OSU 300

User Manual

1200663L1	Single Mode SC
1200663L2	Multi-mode SC
1200663L4	Multi-mode ST
1200218L1	HSSI DTE Interface Card
1200219L1	V.35 DTE Interface Card
1200284L1	Quad DSX-1 Interface Card

61200663L1-1B
May 2001

Trademark Information
OpenView is a trademark of Hewlett-Packard Company.
Spectrum is a registered trademark of Cabletron.
Netview is a registered trademark of IBM.

901 Explorer Boulevard
P.O. Box 140000
Huntsville, AL 35806
(256) 963-8000

The following conventions are used in this manual.

Notes provide additional useful information.

Cautions signify information that could prevent service interruption.

Warnings provide information that could prevent damage to the equipment or endangerment to human life.

Important Safety Instructions

When using your telephone equipment, please follow these basic safety precautions to reduce the risk of fire, electrical shock, or personal injury:

1. Do not use this product near water, such as near a bathtub, wash bowl, kitchen sink, laundry tub, in a wet basement, or near a swimming pool.
2. Avoid using a telephone (other than a cordless-type) during an electrical storm. There is a remote risk of shock from lightning.
3. Do not use the telephone to report a gas leak in the vicinity of the leak.
4. Use only the power cord, power supply, and / or batteries indicated in the manual. Do not dispose of batteries in a fire. They may explode. Check with local codes for special disposal instructions.

Save These Important Safety Instructions

Federal Communications Commission Radio Frequency Interference Statement

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 frequencies. 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.

Shielded cables must be used with this unit to ensure compliance with Class A FCC limits.

Change or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Limited Product Warranty

ADTRAN warrants that for five (5) years from the date of shipment to Customer, all products manufactured by ADTRAN will be free from defects in materials and workmanship. ADTRAN also warrants that products will conform to the applicable specifications and drawings for such products, as contained in the Product Manual or in ADTRAN's internal specifications and drawings for such products (which may or may not be reflected in the Product Manual). This warranty only applies if Customer gives ADTRAN written notice of defects during the warranty period. Upon such notice, ADTRAN will, at its option, either repair or replace the defective item. If ADTRAN is unable, in a reasonable time, to repair or replace any equipment to a condition as warranted, Customer is entitled to a full refund of the purchase price upon return of the equipment to ADTRAN. This warranty applies only to the original purchaser and is not transferable without ADTRAN's express written permission. This warranty becomes null and void if Customer modifies or alters the equipment in any way, other than as specifically authorized by ADTRAN.

EXCEPT FOR THE LIMITED WARRANTY DESCRIBED ABOVE, THE FOREGOING CONSTITUTES THE SOLE AND EXCLUSIVE REMEDY OF THE CUSTOMER AND THE EXCLUSIVE LIABILITY OF ADTRAN AND IS IN LIEU OF ANY AND ALL OTHER WARRANTIES (EXPRESSED OR IMPLIED). ADTRAN SPECIFICALLY DISCLAIMS ALL OTHER WARRANTIES, INCLUDING (WITHOUT LIMITATION), ALL WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. SOME STATES DO NOT ALLOW THE EXCLUSION OF IMPLIED WARRANTIES, SO THIS EXCLUSION MAY NOT APPLY TO CUSTOMER.

In no event will ADTRAN or its suppliers be liable to Customer for any incidental, special, punitive, exemplary or consequential damages experienced by either Customer or a third party (including, but not limited to, loss of data or information, loss of profits, or loss of use). ADTRAN is not liable for damages for any cause whatsoever (whether based in contract, tort, or otherwise) in excess of the amount paid for the item. Some states do not allow the limitation or exclusion of liability for incidental or consequential damages, so the above limitation or exclusion may not apply to Customer.

Customer Service, Product Support Information, and Training

ADTRAN will replace or repair this product within five years from the date of shipment if the product does not meet its published specification, or if it fails while in service.

A return material authorization (RMA) is required prior to returning equipment to ADTRAN. For service, RMA requests, training, or more information, see the toll-free contact numbers given below.

Presales Inquiries and Applications Support

Please contact your local distributor, ADTRAN Applications Engineering, or ADTRAN Sales:

Applications Engineering	(800) 615-1176
Sales	(800) 827-0807

Post-Sale Support

Please contact your local distributor first. If your local distributor cannot help, please contact ADTRAN Technical Support and have the unit serial number available.

Technical Support	(888) 4ADTRAN

The Custom Extended Services (ACES) program offers multiple types and levels of service plans which allow you to choose the kind of assistance you need. For questions, call the ACES Help Desk.

ACES Help Desk	(888) 874-2237

Repair and Return

If ADTRAN Technical Support determines that a repair is needed, Technical Support will coordinate with the Custom and Product Service (CAPS) department to issue an RMA number. For information regarding equipment currently in house or possible fees associated with repair, contact CAPS directly at the following number:

CAPS Department	(256) 963-8722

Identify the RMA number clearly on the package (below address), and return to the following address:

ADTRAN Customer and Product Service
901 Explorer Blvd.
Huntsville, Alabama 35806

RMA # _____

Training

The Enterprise Network (EN) Technical Training Department offers training on our most popular products. These courses include overviews on product features and functions while covering applications of ADTRAN's product lines. ADTRAN provides a variety of training options, including customized training and courses taught at our facilities or at your site. For more information about training, please contact your Territory Manager or the Enterprise Training Coordinator.

Training - phone	(800) 615-1176, ext. 7500
Training - fax	(256) 963 7941
Training - email	training@adtran.com

Table of Contents

Chapter 3. Configuration

Chapter 4. Status

Chapter 5. Statistics

Chapter 6. Diagnostics

List of Figures

List of Tables

Chapter 1 Introduction

PRODUCT OVERVIEW

The OSU 300 is a multiport DSU/CSU (data service unit/channel service unit) that provides access to high-speed services over single-mode or multi-mode fiber. The unit provides a cost-effective, versatile approach for delivering high-speed frame relay and dedicated digital services at data rates from 75.18 kbps to 44.2 Mbps. The TDM (time division multiplexer) multiport design allows you to share the cost of the fiber link between multiple applications. This unit maximizes the use of high-speed services, providing up to four data ports capable of transmitting and receiving high-capacity, realtime data.

The OSU 300 contains a built-in HSSI (high speed serial interface) port and three expansion slots which accept additional HSSI, V.35, or Quad DSX-1 interface cards. The HSSI interfaces support rates between 75 kbps and 44.2 Mbps in 75-kbps increments. The high-speed V.35 interface option card supports rates up to 10 Mbps in increments of 75 kbps. The Quad DSX-1 interface card provides four DSX-1 lines. Each DSX-1 port supports rates up to 1.544 Mbps.

Embedded SNMP (simple network management protocol) and Telnet are available through either a SLIP/PPP or a 10BaseT Ethernet port. Through the Management Information Base II (MIB II), and RFC 1213 and 1407 standards, and an ADTRAN Enterprise MIB, the OSU 300 can be configured, monitored, and diagnosed using standard SNMP network management programs such as Hewlett Packard's HP OpenView™, IBM's Netview™, Cabletron's Spectrum™, and MACS.

Complete configuration, diagnostics, and performance monitoring are available through SNMP, Telnet, or a VT-100 terminal interface. This connection can be made via Ethernet or a local EIA-232 link. The OSU 300 is designed for either desktop use or for installation in a 19-inch rack.

The major features of the OSU 300 are as follows:

- Full feature multiport optical DS3 DSU / CSU
- Maximum of four user data ports: one integrated HSSI port and three additional slots for optional HSSI, high-speed V.35, or Quad DSX-1 cards
- Automatic or manual remote configuration
- Embedded SNMP and Telnet management through 10BaseT Ethernet or SLIP / PPP
- Detailed performance monitoring for local and remote units
- Simplified configuration through detailed VT-100 terminal menu structure

OPTICAL INTERFACE PORT

- The optical interface of the OSU 300 consists of either a single-mode or a multi-mode transceiver module comprised of a transmitter, a receiver, and an SC or ST receptacle.
- The optical interface port supports angled SC type optical connectors (1200663L1 and L2 only).
- The optical interface port operates in the 1280 nm to 1335 nm wavelength range (1310 nm nominal).
- The total output power is 8 mW, as defined by IEC with a 50 mm aperture at 10 cm distance.
- The optical interface uses two fibers, one for each direction of transmission.
- The transceiver optical budgets for the optical transceivers are 28dB (single-mode) and 9 dB (multi-mode). See the *Optical Interface Port* section on page 2-7 for calculations.
- The optical interface complies with the physical interface parameters listed in ITU-T recommendation G 957.

- The IEC Class 1 laser is safety compliant under normal operating conditions. The Class 1 rating is due to an integrated automatic shutdown circuit that disables the laser when it detects transmitter failures. The FITS rating of the internal shutdown circuit is less than 500 FITS.
- The FDA Class 1 laser is safety FDA compliant.
- The product is shipped with a removable process plug covering the optical interface.
- A mechanical cover engages when the fiber cable is removed from the optical interface. The cover provides dust protection in the event of the optical interface being disconnected, and additional protection to the human eye.

SNMP

The OSU 300's embedded SNMP feature allows unit access and control by a network manager through either the auxiliary (AUX) control port or the 10BaseT local area network (LAN) port. The OSU 300 supports the MIB-II standard, RFC 1213 and 1407, and the ADTRAN Enterprise Specific MIB.

The term SNMP broadly refers to the message protocols used to exchange information between the network management system (NMS) and the managed devices, as well as to the structure of device management databases. SNMP has three basic components: Network Manager, Agent, and MIB.

Network Manager

Control programs that collect, control, and present data pertinent to the operation of the network devices. These programs reside on a network management station.

Agent

Control program that resides in every network device. This program responds to queries and commands from the network manager, returns requested information or invokes configuration changes initiated by the manager, and sends unsolicited traps to the manager.

MIB
Industry standard presentation of all status and configuration parameters supported by a network device.

TELNET

Telnet provides a password-protected, remote login facility to the OSU 300 that allows a remote user to control the OSU 300 through the terminal menus. Only one Telnet session may be active at a time.

INTERFACE OPTION CARDS

Optional HSSI, V.35, or Quad DSX-1 interface cards may be purchased to equip the OSU 300 with up to three additional ports.

HSSI Card

The optional HSSI card plugs into one of the three expansion slots on the rear of the OSU 300. With optional HSSI cards installed, the total 44.2 Mbps bandwidth of the DS3 can be divided among the total number of ports to provide multiple data channels over the DS3. The total bandwidth of the DS3 can be divided among the available ports in any fashion, as long as the divisions are on 75 kbps boundaries.

The HSSI card can be hot inserted or swapped. Once the card is inserted into an expansion slot and its faceplate is secured to the rear panel of the OSU 300 with the integral thumb screws, a PCMCIA type connector on the card mates with a compatible connector on the main board of the OSU 300. A standard 50-pin HSSI connector is then available for DTE connections. See the section *DTE Ports 2-4 (Expansion Slots)* on page 2-5 for more information on installing option cards.

V.35 Card

The optional V.35 card plugs into an expansion slot on the rear of the OSU 300 to provide a V.35-type DTE interface. The V.35 card operates similarly to the HSSI card, except that the maximum bandwidth of the V.35 card is limited to 10 Mbps.

Like the HSSI card, the V.35 card can be hot inserted or swapped, and it installs just as the HSSI card does. However, instead of the standard HSSI connector, this card contains a standard 34-pin V.35 connector for DTE connections. See the section *DTE Ports 2-4 (Expansion Slots)* on page 2-5 for more information on installing option cards.

Quad DSX-1 Card

The optional Quad DSX-1 interface card plugs into the card slots on the rear of the OSU 300. This card allows you to transport up to four DSX-1 lines per card over the DS3 interface of the OSU 300 along with high-speed data from the other HSSI / V.35 ports. This configuration allows connectivity of both voice channels and high-speed data channels for two point-to-point sites using only one network interface. Up to three cards may be installed into the OSU 300 port card slots.

Like the other interface cards, the Quad DSX-1 card can be hot inserted or swapped. See the section *DTE Ports 2-4 (Expansion Slots)* on page 2-5 for more information on installing option cards.

Even though the Quad DSX-1 interface card allows you to transport T1 information, the OSU 300 still operates the DS3 interface in an unchannelized fashion. Therefore, your DS3 network provider must supply you with an unchannelized, point-to-point DS3.

Chapter 2 Installation and Operation

RECEIVING INSPECTION

Carefully inspect the OSU 300 for any damage that may have occurred in shipment. If damage is suspected, file a claim immediately with the carrier and contact ADTRAN Technical Support (see the last page of this manual). Keep the original shipping container to use for future shipment or verification of damage during shipment.

SHIPPING CONTENTS

The OSU 300 shipment includes the following items:

- The OSU 300 unit
- The OSU 300 User Manual
- 8-position modular to 8-position modular cable (P / N 3127004)
- 8-position modular to DB-25 female connector (P / N 3196ADPT005)
- Mounting ears for 19-inch rack installation
- Rubber feet for stand-alone use

CUSTOMER PROVIDES

The customer provides an interface cable for each port used.

INSTALLING THE UNIT

The OSU 300 can be used as a desktop stand-alone device or mounted into a standard 19-inch equipment rack. See the section *VT-100 Terminal Connection* on page 2-9 for information on terminal configuration.

Rackmount Installation

Follow these steps to mount your unit into a rack:

1. Install the 19-inch rackmount flanges on each side of the OSU 300 enclosure at one of the three available positions.

Be sure to install the flanges with the screws provided.

2. After the flanges have been installed, position the OSU 300 at the correct location within the rack and secure the mounting flanges to the mounting rails of the rack.
3. Make all network, DTE, and power connections to the rear of the unit. See the section *Powering the Unit* on page 2-8 for more information on making the DC power connection.
4. Using the 8-position modular to DB-25 female connector and the 8-position modular to 8-position modular cable, connect a VT-100 terminal device to the **CONTROL** interface jack on the front panel of the unit.

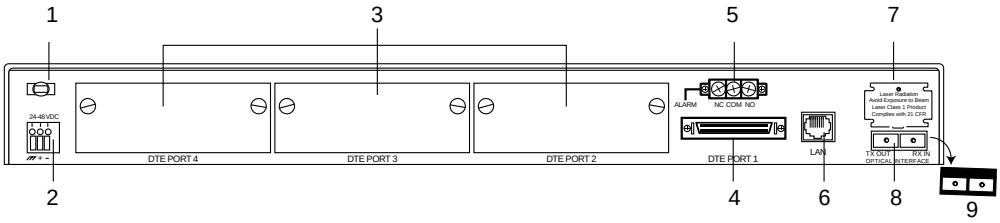
Desktop Installation

Follow these steps when using your OSU 300 as a desktop unit:

1. Affix the four adhesive-backed rubber feet to the bottom of the unit, one on each of the four corners. The feet should be placed approximately one inch from the front or back and one inch from the sides of the unit
2. Make all network, DTE, and power connections to the rear of the unit. See the section *Powering the Unit* on page 2-8 for more information on making the DC power connection.
3. Using the 8-position modular to DB-25 female connector and the 8-position modular to 8-position modular cable, connect a VT-100 terminal device to the **CONTROL** interface jack on the front panel of the unit.

REVIEWING THE REAR PANEL

The OSU 300 rear panel contains a DC terminal block and provides a strain relief nylon plug that allows you to tie off the input power cable, thus relieving strain on the cable. The rear panel also provides three expansion slots, a built-in HSSI interface, an alarm output terminal block, a LAN port, an optical interface with sliding door, and a removable dust cover for the optical interface. Pin assignments for the connectors are given in Appendix A. Figure 2-1 on page 2-4 shows the OSU 300 rear panel, and Figure 2-2 on page 2-4 shows the movement of the optical interface door.



ID #	Item	Function
1	Nylon Plug	Provides strain relief on the input power cable.
2	DC Terminal Block	Attaches to input power cable for supplying power to the unit.
3	DTE Ports 2-4	Interface expansion slots (with covers in place).
4	DTE Port 1	Integral HSSI interface.
5	Alarm Connector	NC/COM/NO relay contacts.
6	LAN	10BaseT LAN connection.
7	Optical Interface Door	Provides protection from laser beam.
8	Optical Interface	DS3 service connection.
9	Removable Dust Cover	Protects unit from dust. Remove to use the Optical Interface.

Figure 2-1. OSU 300 Rear Panel Description

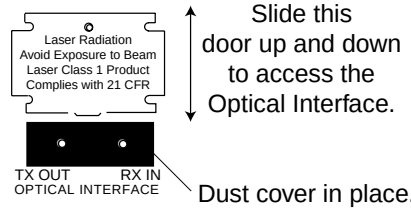


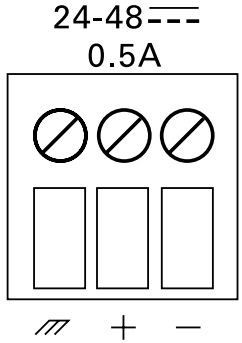
Figure 2-2. Moving the Optical Interface Door

Strain Relief

To relieve strain on the input power cable, the nylon plug ties off the power cable.

DC Terminal Block

The three-position DC terminal block accommodates 12 to 26 AWG wire. The positive (+) and negative (-) terminals connect to a 24 to 48 VDC, 0.4A power source. Figure 2-3 illustrates the terminal block power connector, along with definitions for the three connector symbols.



Symbol	Definition
⏚	Frame ground.
+	Positive side of DC power source (usually ground).
-	Negative side of DC power source (usually -48V).

Figure 2-3. DC Power Connector

DTE Ports 2-4 (Expansion Slots)

The OSU 300 rear panel contains three expansion slots (DTE ports 2-4) for installing optional interface cards. Currently available cards include the HSSI card (P / N 1200218L1), the V.35 card (P / N 1200219L1), and the Quad DSX-1 card (P / N 1200284L1). To insert the cards, follow these steps:

1. Remove the appropriate slot cover from the empty slot.
2. Slide the card into the empty slot until the card panel is flush with the OSU 300 chassis.
3. Push in the thumbscrews and turn clockwise to secure the card and ensure proper connection to the main board of the OSU 300.

DTE Port 1 (HSSI Interface)

DTE port 1 is a built-in HSSI port that resides on the main board of the OSU 300. Configure the bandwidth of this port in 75 kbps increments from 75 kbps to 44.2 Mbps. If a single application requires the full 44.2 Mbps of bandwidth, the OSU 300 does not have to be equipped with additional port cards. Appendix A contains the pinout for this port.

Alarm Connector

The alarm connector is a three-position, screw-type terminal block that connects to the three contacts of a Form C-type relay on the main board of the OSU 300. This relay activates any time the OSU 300 detects an alarm condition on the high-speed network interface. Table 2-1 describes the alarm connector terminal block. Use the **ALARM RELAY** selection of the **CONFIGURATION** menu to disable the alarm function.

Table 2-1. Alarm Connector Terminal Block Description

Position	Name	Description
Left	NC (Normally Closed)	Opens when a selected alarm condition is present.
Center	COM (Common)	Common connection between external circuitry and NC or NO terminal.
Right	NO (Normally Open)	Closes when a selected alarm condition is present.

LAN Port

The LAN port is an 8-pin modular connector that provides a 10BaseT Ethernet LAN interface. This interface uses SNMP and Telnet to control the unit. Appendix A contains the pinout for this port.

Optical Interface Port

The OSU 300 optical interface port consists of a single-mode or multi-mode transceiver module composed of a transmitter, a receiver, and an SC or ST receptacle. The optical interface port supports angled SC type optical connectors (61200663L1 and L2 only) and operates in the 1280 nm to 1335 nm wavelength range (1310 nm nominal). The total output power is 8 mW with a 50 mm aperture at 10 cm distance, as defined by IEC. The optical interface uses two fibers, one for each direction of transmission.

The transceiver optical power budgets for the optical transceivers are 28dB (single-mode) and 9dB (multi-mode). These budgets are calculated as follows:

Single-Mode

Worst case optical transmit power = -5dBm
Worst case optical receiver sensitivity = -34dBm

Calculations:
(34 - 5) dB = 29 dB - 1dB (optical path penalty) = 28dB

Multi-Mode

Worst case optical transmit power = -20dBm
Worst case optical receiver sensitivity = -30dBm

Calculations:
(30 - 20) dB = 10dB - 1dB (optical path penalty) = 9dB

The optical interface complies with the physical interface parameters listed in ITU-T recommendation G 957, with IEC Class 1 laser safety requirements (under normal operating conditions) and with FDA Class 1 laser safety requirements. The OSU 300 contains an integrated automatic shutdown circuit that disables the laser when it detects transmitter failures, thus the Class 1 rating. The FITS rating of the internal shutdown circuit is less than 500 FITS.

The OSU 300 comes with a removable process plug that covers the optical interface. A mechanical door engages when the fiber cable is removed from the optical interface (see also, Figure 2-2 on page 2-4). This door protects the unit from dust in the event of the optical interface being disconnected, and it provides additional protection for the human eye from the laser beam.

POWERING THE UNIT

The OSU 300 can be powered from either a standard AC mains supply or a 48 VDC Supply. When mains powered, the unit receives power via an external power supply that converts the mains power to a usable 48 VDC source. When powered by the AC mains supply, the unit operates normally within specification when supplied with AC voltages from 190–264 VAC at 47–53 Hz. The 48 VDC source interfaces to the rear panel of the unit through a screw-down terminal block. A nylon plug allows strain relief on the power cabling to the system.

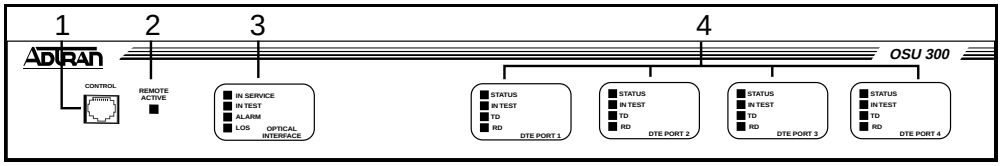
The chassis should be connected to an earth ground.

The following requirements must be met during installation of the DC version of the OSU 300:

1. The unit must be connected to a reliably grounded -24 or -48 VDC source which is electrically isolated from the AC source.
2. The branch circuit overcurrent protection should be a fuse or circuit breaker rated 48 VDC, 15 A.
3. The unit should be installed in accordance with the requirements of NEC NFPA 70.
4. A readily-accessible disconnect device that is suitably approved and rated should be incorporated in the fixed wiring.

REVIEWING THE FRONT PANEL

Figure 2-4 illustrates the OSU 300 front panel. Descriptions of each front panel item follow Figure 2-4.



ID #	Item
1	Control Port
2	Remote Active
3	Optical Interface LEDs
	In Service
	In Test
	Alarm
	LOS

ID #	Item
4	DTE Port LEDs
	Status
	In Test
	TD
	RD

Figure 2-4. OSU 300 Front Panel

Control Port

The OSU 300 front panel contains an 8-pin modular jack labeled **CONTROL**. The control port provides connection to a VT-100 EIA-232 compatible interface. Appendix A gives the pinout.

VT-100 Terminal Connection

To control the OSU 300 using a VT-100 terminal, follow this procedure:

1. Configure the VT-100 terminal for 9600, 19200, 38400, or 57600 baud, 8-bit characters, no parity, and one stop bit (*xxxx*, 8N1).

2. Using the ADTRAN-provided terminal interface cable adapter, connect the DTE port of a terminal to the 8-pin modular jack labeled **CONTROL** on the front panel of the OSU 300.
3. Initialize the terminal session and allow approximately 20 seconds for initialization.
4. Press **Enter** repeatedly until the password prompt appears.
5. Enter the password. The factory default password is *adtran* (all lower-case). The **MAIN** menu appears (see Figure 2-5).
6. Make selections by entering the number corresponding to the chosen parameter. Press **Esc** to return to the previous screen. End a terminal session by selecting **LOGOUT** from the **MAIN** menu or by pressing **Ctrl-C** at any time.

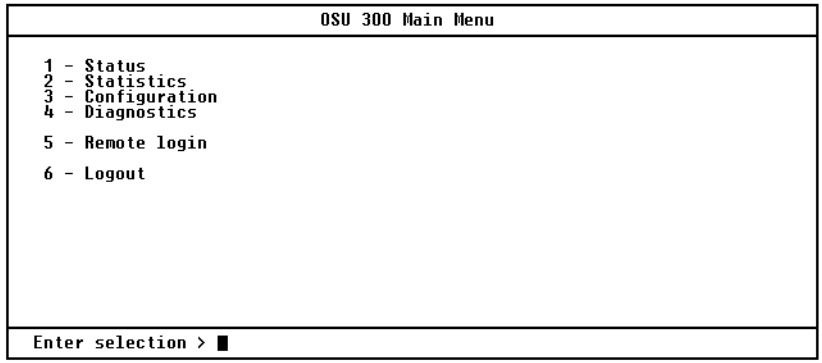


Figure 2-5. OSU 300 Main Menu

Navigating Within the Menus

Navigate within the OSU 300 terminal menus using the following procedures:

If you want to...	Press...
select an item	the number corresponding to your choice, and then press the **Enter** key.
scroll between screens of the same selection	the up and down arrow keys. Additional screens are available when the words **Up** or **Down** display in the right-hand side of the menu.
scroll left and right of the same screen	the left and right arrow keys. Additional screens are available when **<** or **>** display in the top portion of the menu.
return to the previous menu	the **ESC** key.
end the terminal session	**Ctl-C**.
refresh the display	**Ctl-R**.

OSU 300 Main Menus

Status

Provides status information on the network and DTE ports. See the chapter *Status* on page 4-1 for more information.

Statistics

Provides statistical information for the network and DTE ports. See the chapter *Statistics* on page 5-1 for more information.

Configuration

Sets network, DTE, and system management parameters. See the chapter *Configuration* on page 3-1 for more detailed information.

Diagnostics

Performs loopback and BERT tests. See the chapter *Diagnostics* on page 6-1 for more detailed information.

Remote Login

Allows configuration of certain items on the remote OSU 300. The remote unit's password is required at login.

Logout

Ends the terminal session and logs out of the system. Password entry is required before a new session can begin.

Remote Active LED

A solid LED indicates a remote configuration session is taking place through a Telnet session or from the remote end OSU 300. The LED flashes when the unit is being accessed locally through the front panel **CONTROL** port.

Optical Interface LEDs

The following LEDs provide information on the optical interface.

In Service

Active when a valid signal is being received on the optical interface.

In Test

Active when the network interface has been put in loopback by the service provider.

Alarm

Active when the high-speed receive signal contains framing errors, when the yellow alarm is received from the far end unit, or when other alarm messages are received from the network.

LOS

Active when no receive signal from the network is detected on the Rx (in) circuit.

DTE Port LEDs

The following LEDs provide information on DTE ports 1 through 4.

Status

This LED indicates the following conditions:

LED	Condition
Off	No option card is installed.
Flashing green	Interface is available but not configured.
On green	Interface is available and configured.
On red	DTE fault condition (for HSSI interface, no clock from DTE).
On yellow	For HSSI interface, terminal available (TA) signal inactive.

In Test

This LED indicates the DTE interface is performing a BERT test.

TD

This LED indicates the OSU 300 DTE port is transmitting data.

RD

This LED indicates the OSU 300 DTE port is receiving data.

Chapter 3 Configuration

The OSU 300 can be configured locally and remotely. Local configuration is accomplished through a 10BaseT Ethernet connection, a SLIP / PPP port, or a VT-100 terminal. Remote configuration can take place through the T3 data link using a local OSU 300.

The **CONFIGURATION** menu consists of the following submenus relating to specific interfaces or functions: **DS3 NETWORK**, **DTE PORTS**, **SYSTEM MANAGEMENT**, **UTILITIES**, and **SAVE CONFIGURATION**.

Figure 3-1 shows the main **CONFIGURATION** terminal menu. Detailed descriptions of each individual menu parameter are given in the following sections: **DS3 NETWORK** (page 3-2), **DTE PORTS** (page 3-3), **SYSTEM MANAGEMENT** (page 3-11), **UTILITIES** (page 3-17), and **SAVE CONFIGURATION** (page 3-18).

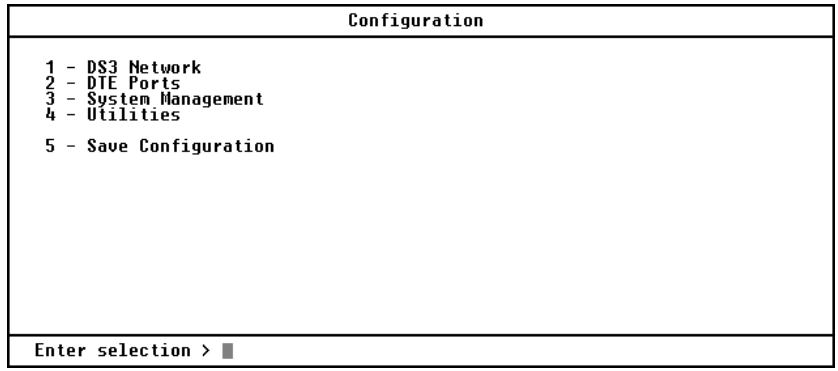


Figure 3-1. Configuration Main Menu

DS3 NETWORK

To access the network configuration parameters, select **1- DS3 NETWORK**. Configure the OSU 300 network settings to match the T3 signal received from the service provider. During remote configuration, this menu is read-only. The **DS3 NETWORK CONFIGURATION** menu is shown in Figure 3-2. Descriptions of the **DS3 NETWORK** fields follow the figure.

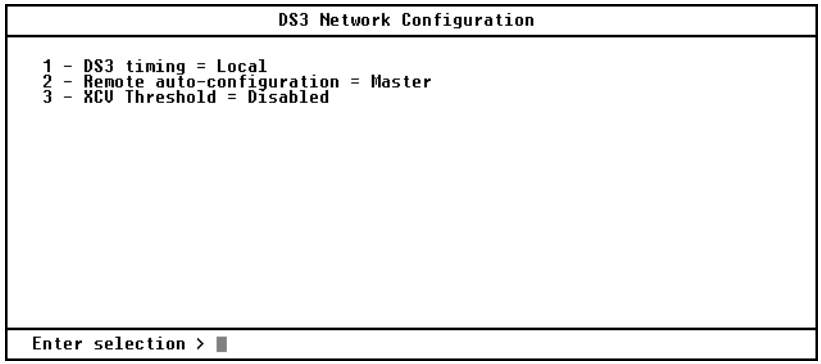


Figure 3-2. DS3 Network Configuration Menu

DS3 Timing

Set the timing to **LOOP** if the OSU 300 is to derive timing from the network; set to **LOCAL** if the unit is to be the master timing source for the circuit.

Remote Auto-Configuration

This feature allows one OSU 300 (set to **MASTER**) to automatically relay its DTE port bandwidth configuration to a second unit (set to **SLAVE**). If desired, the feature can be disabled by either unit.

XCV Threshold

Sets the threshold for code violations. Options include **1)DISABLED**, **2)1E-3**, **3)1E-4**, **4)1E-5**, and **5)1E-6**.

Multiplexing Mode

The **MULTIPLEXING MODE** menu allows you to select the DTE port bandwidth increment size. The increment size of Nx75 kbps allows the user to divide 588 blocks among the four ports. The increment size of Nx3.16 Mbps has 14 blocks available, and ports 2, 3, and 4 are disabled. Only port 1, the built-in HSSI port, is available in this mode. The Nx3.16 Mbps mode provides compatibility with Juniper and Cisco routers at below full-bandwidth rates. When the user switches the multiplexing mode, the system will reboot causing service interruption. Loading default settings does not reset this option.

DTE PORTS

The **DTE PORTS** menu allows you to select a port to configure. If **REMOTE AUTO CONFIGURATION** is set to **MASTER** (**CONFIGURATION** -> **DS3 NETWORK** -> **REMOTE AUTO CONFIGURATION** -> **MASTER**), then a fifth option, **TIMED PROFILES**, is available (see Figure 3-3). This option allows you to set up timed profiles specifying bandwidth allocation for all four ports.

Configuration selections for the individual ports are described in the following section. A more in-depth description of **TIMED PROFILES** is on page 3-10.

```
                    Configure DTE Ports

Master-End
 1 - DTE Port 1
 2 - DTE Port 2
 3 - DTE Port 3
 4 - DTE Port 4

Slave-End
 5 - DTE Port 1
 6 - DTE Port 2
 7 - DTE Port 3
 8 - DTE Port 4

 9 - Timed Profiles




Enter selection >
```

Figure 3-3. DTE Ports Menu

Port Selections 1-4

Select **DTE PORT 1**, **2**, **3**, or **4** to access the port configuration parameters. Configure each DTE port to be compatible with the DTE equipment attached to it. Figure 3-4 shows **PORT CONFIGURATION** menu examples. Descriptions of the individual fields follow the illustration. The descriptions are listed in tables based on the DTE port interface type (HSSI, V.35, or Quad DSX-1).

- Table 3-1 on page 3-5 lists the menu fields available for HSSI and V.35 interfaces.
- Table 3-2 on page 3-6 lists menu fields available only for V.35 interfaces.
- Table 3-3 on page 3-8 lists the menu fields available for Quad DSX-1 interfaces.

```
                    Port 3 Configuration - Master

     Master-Interface type = V.35
     Master-Port status = Inactive

     Port bandwidth = 75.18 Kbps
     Unallocated 75k blocks = 503

 1 - Port state = Disabled
 2 - N x 75k blocks (1-140) = 1

 3 - CS = Forced ON
 4 - TR = Ignored
 5 - SR = Forced ON
 6 - CD = OFF when OOS/OOF
 7 - Transmit clock = External

 8 - Apply settings

Enter selection > _
```

```
                    Port 1 Configuration - Master

     Master-Interface type = HSSI
     Master-Port status = Inactive

     Port bandwidth = 75.18 Kbps
     Unallocated 75k blocks = 503

 1 - Port state = Disabled
 2 - N x 75k blocks (1-588) = 1

 3 - TA = Ignored

 4 - Apply settings

Enter selection >
```

Figure 3-4. Port Configuration Menus for V.35 and HSSI Interface Cards

Configuration Selections for HSSI and V.35 Interfaces

The configuration selections listed in Table 3-1 are available for HSSI and V.35 interfaces. Additional selections listed in Table 3-2 on page 3-6 apply only to V.35 interfaces.

Table 3-1. HSSI and V.35 Configuration Selections

SELECTION	DESCRIPTION
INTERFACE TYPE	This read-only status field shows the interface type of the selected port (HSSI or V.35).
PORT STATUS	This read-only status field displays one of the following messages to show the port status of the selected port: **INACTIVE**, **ACTIVE**, **WAITING**, **ERROR**, or **NOT INSTALLED**.
INACTIVE	The port is installed, but idle. Activate a port through the **PORT STATE** field of this menu.
ACTIVE	The port has been configured and is passing data.
WAITING	The port has been configured and is waiting for the DTE to issue the appropriate handshaking signals. • For the HSSI interface, the terminal equipment available (TA) signal must be asserted by the DTE. • For V.35, DTR is required if the TR field in this menu is set to **IDLE WHEN OFF**; otherwise, DTR is ignored.
ERROR	An error condition such as loss of transmit clock has occurred.
NOT INSTALLED	An interface card is not installed in the selected port. If a port is not installed, the remainder of the **PORT CONFIGURATION** menu does not appear.
PORT STATE	If a port is installed but not currently in use, set to **DISABLED**. Set to **ENABLED** to activate an installed port.
NX75K BLOCKS	This field determines the amount of bandwidth allocated to the selected port. For a HSSI interface, the selections are from 1-588 (yielding a bandwidth of 75.2 kbps to 44.2 Mbps). For a V.35 interface, the selections are from 1-140 (yielding a bandwidth of 75.2 kbps to 10.5 Mbps). Changes to this field do not take effect until **APPLY SETTINGS** is selected.
PORT BANDWIDTH	This read-only status field shows the amount of bandwidth that will be available if the selection made in the **NX75K BLOCKS** field is applied.

Table 3-1. HSSI and V.35 Configuration Selections (Continued)

SELECTION	DESCRIPTION
UNALLOCATED 75K BLOCKS	This read-only status field shows the number of 75k blocks of bandwidth not already allocated to the four DTE ports.
APPLY SETTINGS	Select this field after making all configuration changes for the selected port. The changes are then applied to the unit immediately. Applying the settings briefly affects all ports of the OSU 300. You may cancel changes made to the current **PORT CONFIGURATION** menu by pressing the **ESC** key.

Additional configuration selections are available for V.35 interfaces. These selections are listed in Table 3-2.

Table 3-2. Additional V.35 Interface Port Configuration Selections

SELECTION	DESCRIPTION
CS	Selects the control mode for the clear to send (CS) lead.
FORCED ON	The CS lead remains on and request to send (RS) is ignored as long as the unit is synchronized and able to pass data.
FOLLOW RS	The CS state matches the RS state.
TR	Selects the OSU 300's response to the data terminal ready (TR) lead.
IGNORED	The OSU 300 ignores the state of the TR lead.
IDLE WHEN OFF	The OSU 300 suspends traffic on the selected port if the TR lead is off.
SR	Selects the control mode for the data set ready (SR) lead.
FORCED ON	The SR control lead remains on regardless of the state of the network.
OFF WHEN OOS/OOF	The SR control lead remains on unless the OSU 300 receives an out of service/out of frame (OOS/OOF) condition from the network.

Table 3-2. Additional V.35 Interface Port Configuration Selections (Continued)

SELECTION	DESCRIPTION
OFF WHEN TEST	The SR lead remains on except when the OSU 300 is executing a test.
OFF WHEN OOS/OOF OR TEST	The SR lead remains on except when the unit receives an OOS/OOF condition from the network or when the unit is executing a test.
CD	Selects the control mode for the carrier detect (CD) lead.
FORCED ON	The CD lead remains active at all times.
OFF WHEN OOS/OOF	The CD control lead remains on unless the OSU 300 receives an OOS/OOF condition from the network.
TRANSMIT CLOCK	See the following section for a description of this item.

Transmit Clock

Selects the source of the clock used to transfer data from the DTE to the OSU 300. Use the following chart to determine your selection:

SELECT...	IF...
NORMAL	you want the transmit clock to be derived from the OSU 300.
INVERT	your DTE device cannot provide a transmit clock signal and data errors are present between your DTE and the OSU 300.
EXTERNAL	you are transmitting at high rates. This selection eliminates data errors caused by excessive delays in the DTE transmit clock receiver, transmit data driver, and cable length.

Selecting **NORMAL** *or* **INVERT** *clocking options depends on your DTE, cable length, and cable characteristics. To verify error free operation, perform a DTE loopback test and a BERT test from the DTE. See the chapter Diagnostics on page 6-1 for information on performing these tests.*

Configuration Selections for DSX-1 Interfaces

The configuration selections listed in Table 3-3 are available for Quad DSX-1 interfaces. Separate selections can be made for each of the four DSX-1 ports of the card. The menu is shown in Figure 3-5.

```
                    Port 4 Configuration - Master

     Master-Interface type = QUAD DSX-1  1 - DSX-1 Timing = DS3
     Master-Port status = Active         2 - Apply settings
     Unallocated 75k blocks = 503

       DSX-1 #1                            DSX-1 #3
   3 - Port state = Enabled            11 - Port state = Enabled
   4 - Framing = ESF                   12 - Framing = ESF
   5 - Line coding = B8ZS              13 - Line coding = B8ZS
   6 - Line length = 0-133 ft.         14 - Line length = 0-133 ft.

       DSX-1 #2                            DSX-1 #4
   7 - Port state = Enabled            15 - Port state = Enabled
   8 - Framing = ESF                   16 - Framing = ESF
   9 - Line coding = B8ZS              17 - Line coding = B8ZS
  10 - Line length = 0-133 ft.         18 - Line length = 0-133 ft.


 Enter selection > _
```

Figure 3-5. Port Configuration Menu for Quad DSX-1 Interface Card

The Quad DSX-1 does not perform ESF to SF (D4) conversion through the network. Therefore, both ends of the circuit must be configured for the same framing type.

Table 3-3. DSX-1 Interface Port Configuration Selections

SELECTION	DESCRIPTION
INTERFACE TYPE	This read-only status field displays **QUAD DSX-1**, indicating that a Quad DSX-1 interface card is installed in the DTE Port card slot.
PORT STATUS	This read-only status field displays **INACTIVE**, **ACTIVE**, **WAITING**, **ERROR**, or **NOT INSTALLED**, indicating the current status of the DSX-1 interface.
UNALLOCATED 75K BLOCKS	Displays the amount of bandwidth (in 75k increments) not already allocated to any of the OSU 300 DTE ports.
PORT STATE	If an individual DSX-1 interface is installed but not currently in use, set to **DISABLED**. Set to **ENABLED** to activate a port.

Table 3-3. DSX-1 Interface Port Configuration Selections (Continued)

SELECTION	DESCRIPTION
FRAMING	Select the framing format for each individual DSX-1 interface. The default setting is **ESF**. Select **ESF** if your DTE device is configured for Extended Superframe framing. Select **D4** if your DTE device is configured for D4 framing. Select **AUTO** to allow the interface to detect the framing type (**ESF** or **D4**) automatically. When in **AUTO** mode, the selected interface toggles between **ESF** and **D4** approximately every ten seconds until it detects valid framing. *Note: D4 is equivalent to superframe format (SF).*
LINE CODING	Set the line code for each individual DSX-1 interface to match the connected DTE device. Three choices are available: **B8ZS**, **AMI**, and **AMI W/STUFFING** (AMI coding with bit stuffing).
LINE LENGTH	Set the line length for each DSX-1 interface according to the distance from the OSU 300 to your DTE device. Set to 7.5 dB if the attached DTE device only supports DS-1 levels.
DSX-1 TIMING SOURCE	For each Quad DSX-1 card pair (the near-end and far-end Quad DSX-1 cards), there must be only one source of timing. The available timing sources are described below. **DS3** The timing for both the near-end and far-end Quad DSX-1 cards is derived from the DS3 interface. All DTE devices connected to the DSX-1 interfaces must be slave timed since both cards source the timing reference derived from the DS3. Both units must be set to DS3. **REMOTE** The timing source for the Quad DSX-1 card is derived from the far-end Quad DSX-1 card. Use this mode if the far-end card has a **DSX-1 TIMING SOURCE** configuration of **DSX-1 #1**, **DSX-1 #2**, **DSX-1 #3**, or **DSX-1 #4**. **DSX-1 #X** The timing source for the Quad DSX-1 pair is derived from one of the four DSX-1 interfaces. When configured in this manner, one of the DSX-1 interfaces is slaved to the DSX-1 interface from your DTE. The remaining three DSX-1 interfaces, if enabled, source the timing as derived from the slaved port. The far-end DSX-1 interface must be configured for **REMOTE**. *Note: If more than one Quad DSX-1 card is installed, each card can have a different timing source configuration.*
APPLY SETTINGS	Select this field after making all configuration changes for the selected port. The changes are then applied to the unit immediately.

Timed Profiles

Using this option, you can allocate bandwidth based on the time of day. For example, you can assign more bandwidth to the corporate LAN during business hours and more bandwidth to a backup machine in the evenings. The OSU 300 can store two separate user profiles which have bandwidth selections for each of the four ports. See Figure 3-6 and Figure 3-7.

TIMED PROFILE *selections are only available if the* **REMOTE AUTO-CONFIGURATION** *selection is set to* **MASTER** *on the near-end OSU 300 and* **SLAVE** *on the far-end OSU 300 (*(**CONFIGURATION** -> **DS3 NETWORK** -> **REMOTE AUTO-CONFIGURATION***).*

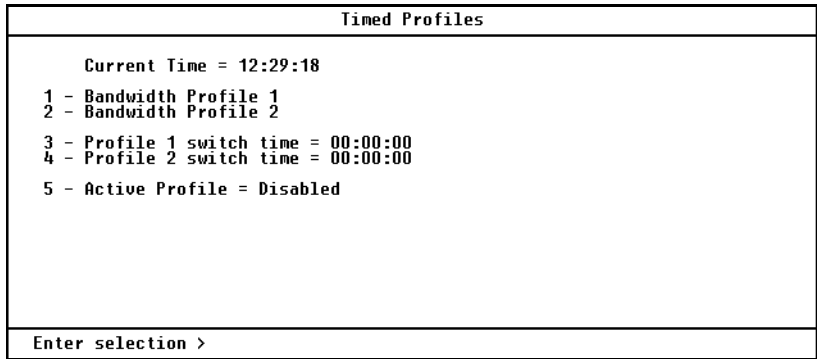


Figure 3-6. Timed Profiles Screen

Bandwidth Profiles 1 and 2

The **PROFILE CONFIGURATION** menus allow you to change the **PORT STATUS** and **NX75K BLOCKS** options for HSSI and V.35 ports. See page 3-5 for descriptions of these options. This screen also allows you to enable or disable each individual DSX-1 interface of a Quad DSX-1 card at the time of date specified in the given profile. Settings for all port types are assigned to the selected profile (1 or 2) and will apply whenever that profile is active (see Figure 3-7 on page 3-11).

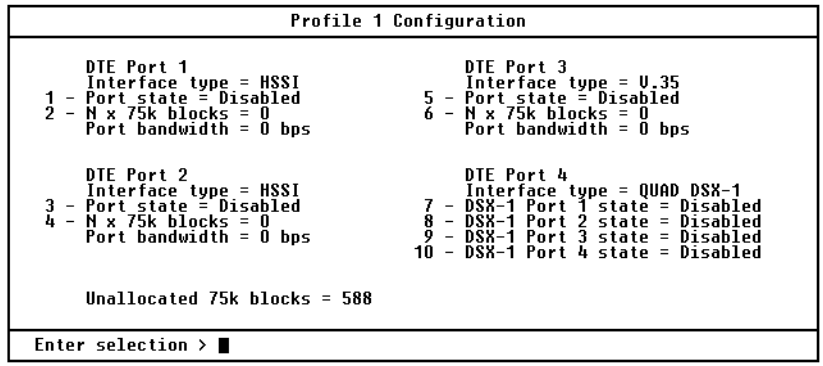


Figure 3-7. Example of a Profile Configuration Menu

Profile Switch Time (1 and 2)

Enter the time that you want the profile to become active. Enter the time in military time (i.e., 00:00:00 = 12 AM). The profile remains active until one of the following occurs: (1) the other profile's activation time comes about, or (2) the profile is disabled manually through the **ACTIVE PROFILE** selection.

Active Profile

Use this field to either manually force a profile to become active (regardless of the time of day) or to disable the profiles completely.

SYSTEM MANAGEMENT

The **SYSTEM MANAGEMENT** menus (see Figure 3-8 on page 3-12) allow you to configure the OSU 300 for management through SNMP, Telnet, or a VT-100 interface. Embedded SNMP and Telnet are available through either a SLIP / PPP or a 10BaseT Ethernet port. Scroll between the two menus using the up and down arrows on your keyboard.

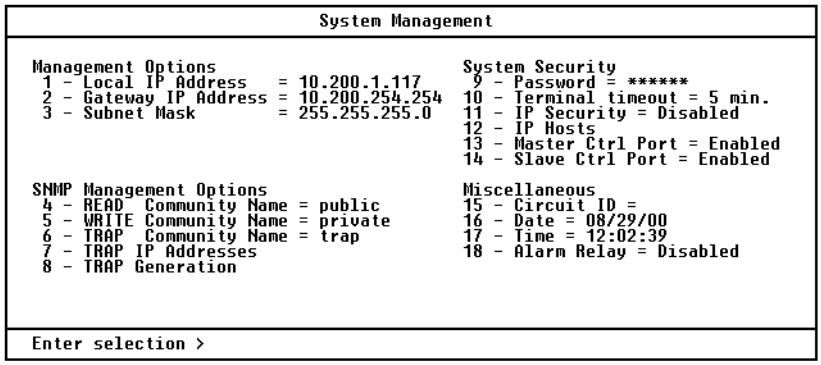


Figure 3-8. System Management Configuration Menu

Local IP Address

Enter the OSU 300 IP address. This IP address applies to the Ethernet or auxiliary port (when configured for PPP or SLIP). This address is available from the network administrator.

Gateway IP Address

Enter the gateway IP address of the OSU 300. This address is necessary only if the OSU 300 and the network manager are connected through a gateway node. If an IP packet is to be sent to a different network, the unit sends it to the gateway.

Subnet Mask

Enter the subnet mask of the OSU 300. This address is available from the network administrator.

Read Community Name

Enter the authentication strings used for SNMP management. Match the OSU 300 to the SNMP manager for read privileges.

Write Community Name

Enter the authentication strings used for SNMP management. Match the OSU 300 to the SNMP manager for write privileges.

Trap Community Name

Enter the authentication strings used for SNMP management. Match the OSU 300 to the SNMP manager for trap privileges.

Trap IP Addresses

Enter up to five SNMP manager IP addresses to which the OSU 300 sends traps.

Trap Generation

This field determines which trap types (if any) are generated by the unit (see Figure 3-9). Use this menu to enable or disable **NEAR END ALARM**, **FAR END ALARM**, **MIB II STANDARD**, **NETWORK TEST**, **DTE PORT**, and **QDSX ALARM** trap types. See Table 3-4 through Table 3-9 for trap descriptions.

```
                              TRAP Generation

     Near End Alarm TRAPs                        MIB II Standard TRAPs
 1 - Red Alarm (LOS)      = Disabled    13 - Cold Start          = Disabled
 2 - Out of Frame (OOF)   = Disabled    14 - Link Up/Down        = Disabled
 3 - Yellow Alarm (RAI)   = Disabled    15 - Auth. Failure       = Enabled
 4 - Idle Signal          = Disabled
 5 - Excessive CV (XCV)   = Disabled         Network Test TRAPs
     Far End Alarm TRAPs                16 - Network Test In/Out = Disabled
 6 - Red Alarm (LOS)      = Disabled
 7 - Out of Frame (OOF)   = Disabled         DTE Port TRAPs
 8 - Yellow Alarm (RAI)   = Disabled    17 - Port Status Change  = Disabled
 9 - Idle Signal          = Disabled
10 - Eqpt. Fail NSA       = Disabled         QDSX ALARM TRAPs
11 - Eqpt. Fail SA        = Disabled    18 - QDSX Alarms         = Disabled
12 - Com. Eqpt. Fail NSA  = Disabled
                                       19 - Toggle ALL TRAPs


 Enter selection >
```

Figure 3-9. Trap Generation Menu

Table 3-4. Near End Alarm Trap Descriptions

Trap Type	If ENABLED, this trap is sent...
Red Alarm (LOS)	when the unit detects a loss of signal.
Out of Frame (OOF)	when the unit detects an out of frame condition.
Yellow Alarm (RAI)	when the unit detects an incoming RAI signal.
Idle Signal	when the unit detects an incoming idle signal (1100) over the entire DS3 bandwidth.
Excessive CV (XCV)	when the unit detects excessive code violations.

Table 3-5. Far End Alarm Trap Descriptions

TRAP TYPE	IF ENABLED, THIS TRAP IS SENT...
Red Alarm (LOS)	when the unit receives indication from the far end unit through the far end alarm and control (FEAC) channel that the far end unit has lost its receive signal.
Out of Frame (OOF)	when the unit receives indication from the far end unit through the FEAC channel that the far end unit has lost frame synchronization with the network.
Yellow Alarm (RAI)	when the unit receives indication from the far end unit through the FEAC channel that the far end unit is receiving an RAI indication from the network.
Idle Signal	when the unit receives indication from the far end unit through the FEAC channel that the far end unit is receiving an idle signal (1100) over the entire DS3 payload.
Eqpt. Fail NSA	when the unit receives indication from the network through the FEAC channel of a non-service-affecting failure in the network equipment.
Eqpt. Fail SA	when the unit receives indication from the network through the FEAC channel of a service-affecting failure in the network equipment.
Com. Eqpt. Fail NSA	when the unit receives indication from the network through the FEAC channel of a non-service-affecting failure in the network common equipment.

Table 3-6. MIB II Standard Trap Descriptions

TRAP TYPE	IF ENABLED, THIS TRAP IS SENT...
Cold Start	when the unit is first powered on.
Link Up	when the network recovers from a Link Down condition and data transmission is restored.
Link Down	when a network condition prevents data transmission. This could be either an alarm or a network test.
Auth. Failure	when an SNMP request is made with the wrong read or write community names.

Table 3-7. Network Test Trap Descriptions

TRAP TYPE	IF ENABLED, THIS TRAP IS SENT...
Network Test In	when the unit goes into a DS3 network test, either commanded locally or remotely.
Network Test Out	when the unit is in a DS3 network test and the test is terminated.

Table 3-8. DTE Port Trap Description

TRAP TYPE	IF ENABLED, THIS TRAP IS SENT...
Port Status Change	when the unit detects a change in any of the four DTE ports. These traps may be generated when a DTE interface card is plugged in, a cord is removed, a port is reconfigured, a port goes into an error condition due to cabling problems, or a port goes into a test mode.

Table 3-9. Quad DSX-1 Port Trap Description

TRAP TYPE	IF ENABLED, THIS TRAP IS SENT...
QDSX Alarms	when any of the DSX-1 ports detects an error condition.

Toggle All Traps

When activated, this entry allows you to toggle ALL alarms (previously described) between their disabled and enabled states.

Password

Set the password required at login (up to 32 characters). The default password is **adtran** (all lower case).

Terminal Timeout

Set the amount of time the terminal or Telnet session can remain inactive before requiring re-entry of the password for access. This option can be disabled or set for **1 MINUTE**, **5 MINUTES**, **15 MINUTES**, **60 MINUTES**, or **ONE DAY**.

IP Security

Enable or disable the IP Security option. If enabled, the unit accepts management commands and Telnet sessions from the IP addresses entered into the **IP HOSTS** fields.

IP Hosts

Enter up to sixteen management station IP addresses from which the unit should accept management commands. These addresses are only applicable if **IP SECURITY** is enabled.

Master Control Port

Enable or disable the **MASTER CONTROL PORT** option. If enabled, the unit may be accessed through the craft port.

Slave Control Port

Enable or disable the **CONTROL PORT** option. If enabled, the unit may be accessed through the craft port.

Circuit ID

Enter a name to identify the unit for management purposes.

Date/Time

Enter date and time information. Enter the time in military time (20:16:00 for 8:16 pm). Enter the month, date, and year (08/02/01). View this information in the **STATISTICS** menus.

Alarm Relay

Enable if the alarm terminal block (located on the rear of the unit) is connected to an audible alarm. If enabled, the alarm circuit is activated when a network alarm occurs.

UTILITIES

The **UTILITIES** menu allows you to view OSU 300 system information (including self-test results), revert to default configuration settings, or flash load a new version of software. The **UPDATE FLASH SOFTWARE** selection is only applicable when configuring the unit locally. The **SYSTEM UTILITIES** menu is shown in Figure 3-10 on page 3-18. Possible results for the self-test are listed in the chart on the following page.

IF THE SELF-TEST RESULTS ARE...	THEN...
PASS	the self-test was successful and the unit is ready to use.
BAD RAM DATA BAD RAM ADDRESS BAD CHECKSUM BAD BOOT SECTOR DS3F LOOPBACK FAILURE ARTE TERMINAL LOOPBACK FAILURE or ARTE INTERNAL LOOPBACK FAILURE	contact ADTRAN Technical Support. See *Customer Service, Product Support Information, and Training* in the front section of this manual.
CONFIGURATION CORRUPT	select **SAVE CONFIGURATION** from the main **CONFIGURATION** menu. If condition persists, contact ADTRAN Technical Support.

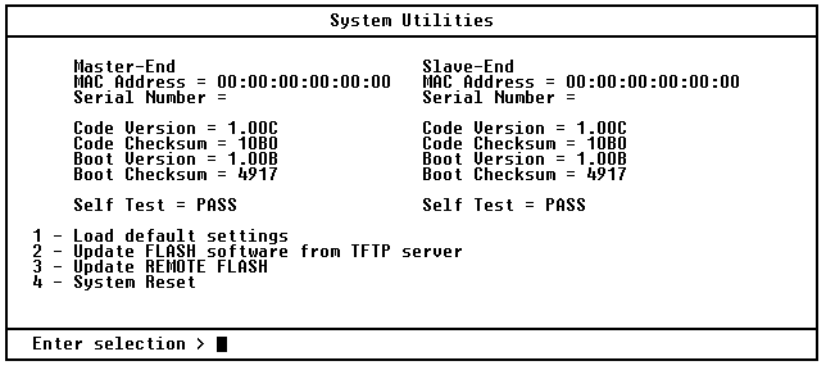


Figure 3-10. System Utilities Menu

SAVE CONFIGURATION

The **SAVE CONFIGURATION** selection commits the current configuration changes to nonvolatile memory. If this option is not selected after making changes to the configuration, the unit reverts to its previous configuration when powered down.

Chapter 4 Status

View port status information by selecting **1-STATUS** from the **MAIN** menu. Information for the network port and the DTE ports is provided. Figure 4-1 shows the **STATUS** menu.

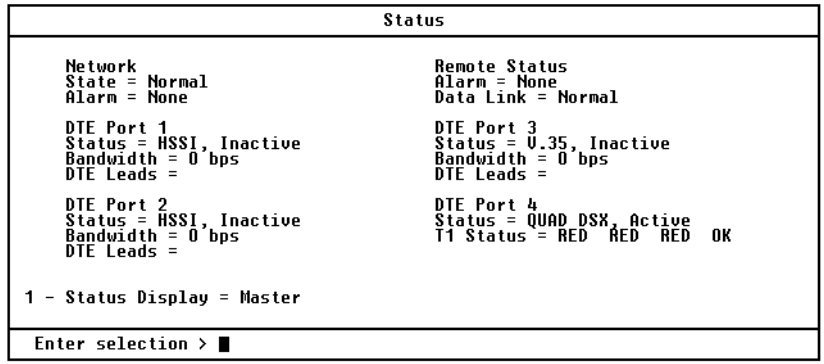


Figure 4-1. Status Menu

NETWORK: STATE

This field displays the current condition of the network. Possible conditions are listed in the following chart.

Condition	Description
Normal	The OSU 300 is ready to pass data.
Alarm	The unit is currently receiving an alarm indication. See the **ALARM STATE** field in this menu to determine the alarm type.
In Test	The unit is currently in test mode. The **DIAGNOSTICS** menu provides information on test type.

NETWORK: ALARM

This field displays the current alarm condition of the OSU 300. Possible conditions are given in the following chart.

Condition	Description
Normal	No alarms are currently being received.
Yellow	The unit is transmitting a yellow alarm from the network. This alarm is a signal sent back toward the source of a failed transmit circuit. The X-bits (X1 and X2) are set to zero.
LOS (Red Alarm)	The unit has lost the Rx signal.
OOF	The unit detects an out of frame condition from the network.
Idle	The unit detects an idle sequence from the network. Service is immediately available for use.

REMOTE STATUS: ALARM

This field displays the current state of the remote link. Possible states are listed in the following chart.

Condition	Description
Normal	No alarms are currently being received.
RAI (Yellow Alarm)	The unit is transmitting a yellow alarm from the network. This alarm is a signal sent back toward the source of a failed transmit circuit. The X-bits (X1 and X2) are set to zero.
LOS (Red Alarm)	The unit has lost the Rx signal.
OOF	The unit detects an out of frame condition from the network.
Idle	The unit detects an idle sequence from the network. Service is immediately available for use.
Eqpt Fail (SA)	The network has signaled a service affecting equipment failure condition.
Eqpt Fail (NSA)	The network has signaled a non-service affecting equipment failure condition.
Com Eqpt Fail (NSA)	The network has signaled a non-service affecting common equipment failure condition.
Unknown	The OSU 300 is unable to determine the state of the network or the remote unit.

REMOTE STATUS: DATA LINK

This field displays the current state of the data link between the remote and the local OSU 300s. Possible states are listed in the following chart.

Condition	Description
Normal	The local unit's data link is in sync with the remote unit.
Disabled	The **DATA LINK** option in the **DS3 NETWORK CONFIGURATION** menu is set to **DISABLED**.
Down	The local and remote units are not in sync.

DTE PORTS

The following status information is available for DTE Ports 1-4.

Interface Type

The interface type of the port is shown in this field (HSSI, V.35, or Quad DSX-1).

Port Status

This field displays the current port status. Possible states are listed in the following chart.

Condition	Description
Inactive	The port is installed, but idle. Activate a port through the **PORT STATE** field of the **DTE PORT CONFIGURATION** menu.
Active	The port has been configured and is passing data.
Error	An error condition such as loss of transmit clock has occurred.
In Test	The unit is currently in test mode.
Waiting for DTE	The port has been configured and is waiting for the DTE to issue the appropriate handshaking signals. For the HSSI interface, the terminal equipment available (TA) signal must be asserted by the DTE. For V.35, DTR is required if the TR field is set to **IDLE WHEN OFF**; otherwise, DTR is ignored. The TR field is found in the **DTE PORT CONFIGURATION** menu.

Bandwidth

Displays the amount of bandwidth allocated to this port. This field does not apply to the Quad DSX-1 interface card.

DTE Leads

If a lead is active on the port, it displays in this field. The leads differ according to the interface type. This field does not apply to

the Quad DSX-1 interface card. Lead descriptions for both the HSSI and the V.35 interfaces follow.

T1 Status

This field displays the current status of the Quad DSX-1 interface card. Some conditions are given for each of the four individual ports, while others apply to the entire card. Possible states are listed in the following charts.

Condition	Description
Status conditions for an individual DSX-1 port	
Off	The DSX-1 port has been turned off by the user.
OK	The DSX-1 port is on and is capable of passing data.
Red	The DSX-1 port detects a loss of signal and is in red alarm.
OOF	The DSX-1 port detects an out of frame condition from the network.
Yel	The DSX-1 port detects a yellow alarm condition.
Blue	The DSX-1 port detects a blue alarm condition (unframed all ones).
Tst	The DSX-1 port is in test.

Condition	Description
Status conditions for the entire Quad DSX-1 card	
Initializing	The Quad DSX-1 interface card has just been inserted and is initializing.
Comm Error	The OSU 300 unit is unable to communicate with the Quad DSX-1 interface card. If displayed, call ADTRAN Technical Support (refer to the last page of this manual).
Frame Slip	The Quad DSX-1 interface card has detected a frame slip.
PLL Error	The Quad DSX-1 interface card is unable to lock on to the timing source.

When a DSX-1 port is enabled but is not attached to a DTE device, the OSU 300 will transmit an unframed all ones condition (blue alarm) to the remote site.

HSSI Interface Leads

TA (terminal available)
Asserted by the DTE to indicate readiness to transmit data.

CA (communications equipment available)
Asserted by the OSU 300 to indicate readiness to transmit data.

LA (loopback circuit A)
The condition reflected by this lead is dependent upon the LB lead. See Table 4-1.

LB (loopback circuit B)
The condition reflected by this lead is dependent upon the LA lead. See Table 4-1.

LC (loopback circuit C)
Asserted by the unit to request a loopback from the DTE.

TM (test mode)
Asserted by the OSU 300 when either the network or the port is being tested.

Both TA and CA must be on before data will flow.

Table 4-1. LA and LB Leads

LA	LB	Condition
Off	Off	No test (normal)
On	Off	Local line loopback
Off	On	Remote line loopback
On	On	Local DTE loopback

V.35 Interface Leads

RS
Request to send.

CS
Clear to send.

CD
Carrier detect.

TR
Data terminal ready.

SR
Data set ready.

LL
Local DTE port loopback.

RL
Remote port payload loopback.

TM
Test mode. Asserted by the OSU 300 when either the network or the port is being tested.

Chapter 5 Statistics

VIEWING STATISTICAL INFORMATION

To access **LOCAL STATISTICS** menus, select **2-STATISTICS** from the **MAIN** menu. Alarm information and performance parameters are available for both the near and far ends of the network (see Figure 5-1). If a Quad DSX-1 card is installed, the menu item **OTHER STATISTICS** appears on the main **STATISTICS** screen. This selection provides access to alarm counts for the DSX-1 ports.

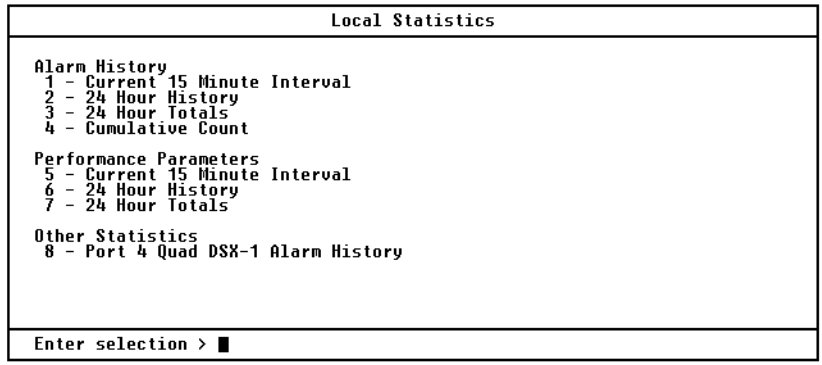


Figure 5-1. Main Local Statistics Menu Screen

All statistical information is given in screens based on the following time periods: the current 15-minute interval, a 24-hour history (divided into 96 15-minute intervals), and the totals for the previous 24 hours. Also, a cumulative alarm count is given. This count continues indefinitely until reset by the user.

If the **DATA LINK** *option is disabled, remote statistics are not available (***CONFIGURATION** -> **F/O NETWORK** -> **DATA LINK***).*

Alarm History

The OSU 300 keeps track of yellow and red alarms for the near end. View alarm history information in one of the three time period selections, or view a cumulative alarm count. Information in these fields is for the given time period (if any) since the last reset. The cumulative alarm count continues indefinitely until **CLEAR ALL DS3 ALARM COUNTS** is selected. See Figures 5-2 through 5-4 for examples of alarm history screens.

An alarm history is also available for the individual ports of a Quad DSX-1 interface card (if installed). Select **PORT X QUAD DSX-1 ALARM HISTORY** (where **X** is the number of the card slot in which the Quad DSX-1 card is installed). See Figure 5-5 on page 5-4 for an example of the 24-hour alarm history for the card.

The count given reflects the number of times the alarm has occurred (rather than the number of seconds the alarm was active).

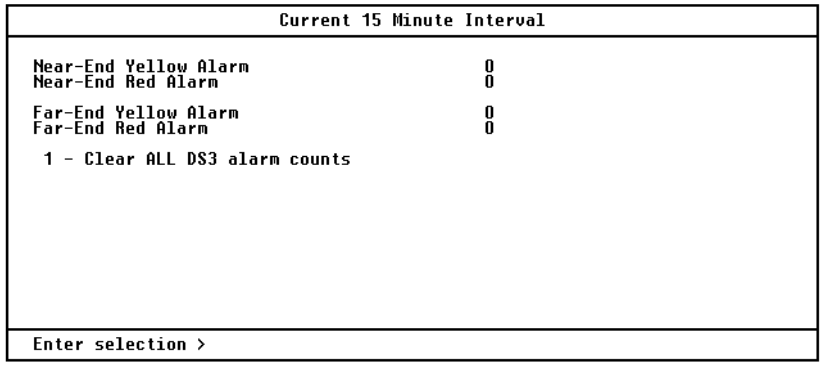


Figure 5-2. Current Alarm Count

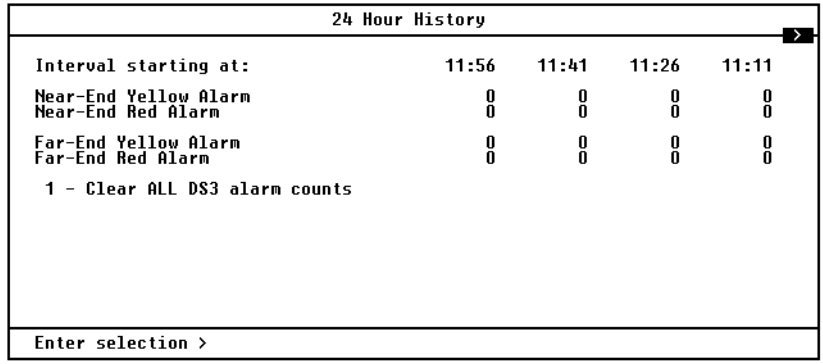


Figure 5-3. 24-Hour Alarm History

When a > or < symbol appears in the upper corner of the screen, you can use the arrow keys on your keyboard to scroll right or left to view additional information (see Figure 5-3 above).

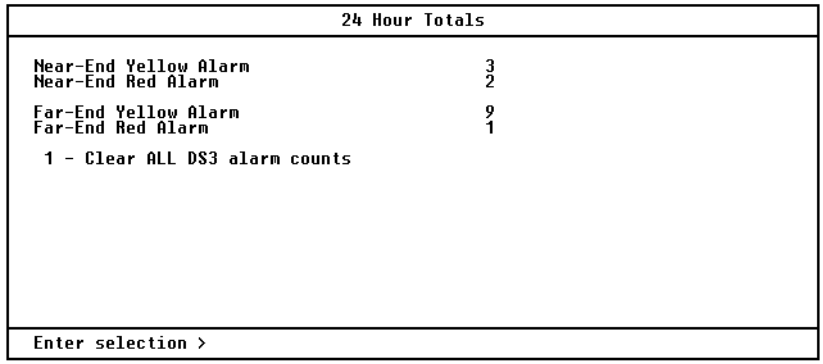


Figure 5-4. 24-Hour Alarm Totals

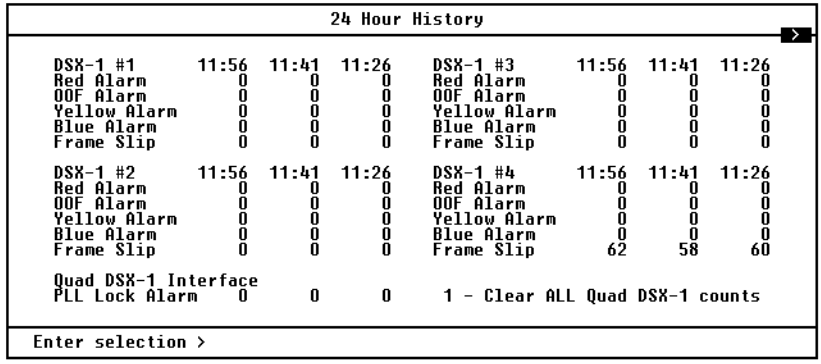


Figure 5-5. Quad DSX-1 24 Hour Alarm History

Performance Parameters

View performance parameter information in one of the three time period selections. Information in these fields is for the given time period since the last reset. When viewing the 24-hour history statistics screen, use the left and right arrow keys to scroll through all 96 15-minute intervals. See Figures 5-6 through 5-8 for examples

of the performance parameter screens. Descriptions of each field on these screens follow the illustrations.

```
                    Current 15 Minute Interval

Unavailable Seconds (UAS)                    0
Severely Errored Framing Sec (SEFS)          0
Line Coding Violations (LCV)                 0
Line Errored Seconds (LES)                   0
P-Bit Errored Seconds (PES)                  0
P-Bit Severely Errored Sec (PSES)            0
P-Bit Coding Violations (PCV)                0
C-Bit Coding Violations (CCV)                0
C-Bit Errored Seconds (CES)                  0
C-Bit Severely Errored Sec (CSES)            0
F-Bit Errors (FBE)                           0
M-Bit Errors (MBE)                           0
Far-End Block Errors (FEBE)                  0
Percent Availability                       100

 1 - Clear ALL local DS3 statistics

Enter selection > _
```

Figure 5-6. Network Statistics Menu for Current 15-Minute Interval

```
                        24 Hour History                              >

Interval starting at:                  11:56    11:41    11:26    11:11

Unavailable Seconds (UAS)                  0        0        0        0
Severely Errored Framing Sec (SEFS)        0        0        0        0
Line Coding Violations (LCV)               0        0        0        0
Line Errored Seconds (LES)                 0        0        0        0
P-Bit Errored Seconds (PES)                0        0        0        0
P-Bit Severely Errored Sec (PSES)          0        0        0        0
P-Bit Coding Violations (PCV)              0        0        0        0
C-Bit Coding Violations (CCV)              0        0        0        0
C-Bit Errored Seconds (CES)                0        0        0        0
C-Bit Severely Errored Sec (CSES)          0        0        0        0
F-Bit Errors (FBE)                         0        0        0        0
M-Bit Errors (MBE)                         0        0        0        0
Far-End Block Errors (FEBE)                0        0        0        0
Percent Availability                     100      100      100      100
                                                                   DOWN

Enter selection > _
```

Figure 5-7. Network Port Statistics 24-Hour History

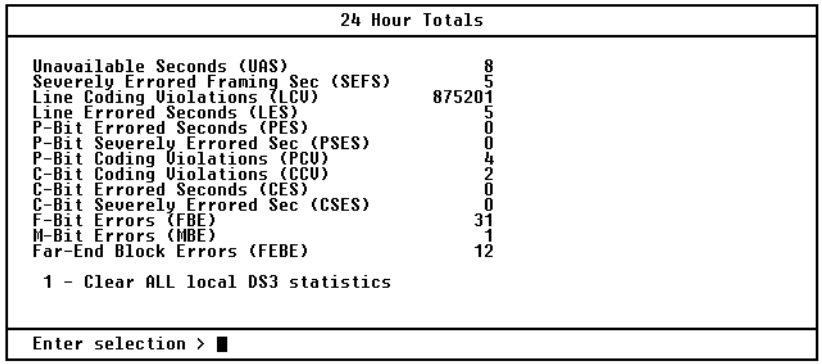


Figure 5-8. Network Port Statistics Menu (24-Hour Totals)

Interval starting at:

Time that the 15-minute interval began. This field is only displayed in the 24-hour history screen, which gives information for the previous 24 hours divided into 15-minute intervals (shown in Figure 5-7 on page 5-5).

Unavailable Seconds (UAS)

Time in seconds that the network port is unavailable for data delivery. This means that the T3 link is down or in test, or that the signaling state is down.

Severely Errored Framing Seconds (SEFS)

Number of seconds with one or more out of frame defects or a detected incoming AIS.

Line Coding Violations (LCV)

Number of BPVs (bipolar violations) and EXZs (excessive zeros) that have occurred.

Line Errored Seconds (LES)

Number of seconds in which one or more CVs or one or more LOS (loss of signal) defects occurred.

P-Bit Errored Seconds (PES)

Number of seconds with one or more PCVs (P-bit coding violations), one or more out of frame defects, or a detected

incoming AIS (alarm indication signal). This count is not incremented when UASs (unavailable seconds) are counted.

P-Bit Severely Errored Seconds (PSES)
Number of seconds with 44 or more PCVs, one or more out of frame defects, or a detected incoming AIS. This count is not incremented when UASs are counted.

P-Bit Coding Violations (PCV)
Number of coding violation (CV) error events that have occurred.

C-Bit Coding Violations (CCV)
In C-bit parity mode, this is a count of coding violations reported via the C-bits or the number of C-bit parity errors that have occurred.

C-Bit Errored Seconds (CES)
Number of seconds with one or more CCVs, one or more out of frame defects, or a detected incoming AIS. This count is not incremented when UASs are counted.

C-Bit Severely Errored Seconds (CSES)
Number of seconds with 44 or more CCVs, one or more out of frame defects, or a detected incoming AIS. This count is not incremented when UASs are counted.

F-Bit Errors (FBE)
Number of times an F-bit framing error has occurred.

M-Bit Errors (MBE)
Number of times an M-bit framing error has occurred.

Far-End Block Errors (FEBE)
Number of times a block error has occurred on the far end.

Percent Availability
Time that the network port is available for data delivery.

Clear All Local DS3 Statistics/Refresh All Remote Statistics
Clears or refreshes all current information. These selections affect all statistical information (not just the displayed screen).

Chapter 6 Diagnostics

The **DIAGNOSTICS** menu allows you to initiate loopback and BERT tests from the OSU 300. Figure 6-1 on page 6-2 shows the main **DIAGNOSTICS** menu. Perform tests for the entire DS3 or for an individual DTE port. If a Quad DSX-1 card is installed, activate loopback tests for an entire card (all four DSX-1s) or for an individual DSX-1 port.

To choose a DTE port from the left column of the menu, select the port's corresponding number and press **Enter**. The individual port menus provide loopback and BERT selections. BERT configuration options and results are given in the right column of the main **DIAGNOSTICS** menu.

Diagnostic selections are described in the following portions of this chapter:

- *DS3* on page 6-2
- *DTE Ports 1-4* on page 6-3 (HSSI and V.35 Port Options)
- *Quad DSX-1 Diagnostic Options* on page 6-7
- *BERT Configuration* on page 6-12

You can only perform a BERT test on one DTE port at a time. If a BERT test is already in progress and a second BERT test is selected for another port, the first test is discontinued.

Loopback tests may be performed simultaneously on all four DTE ports.

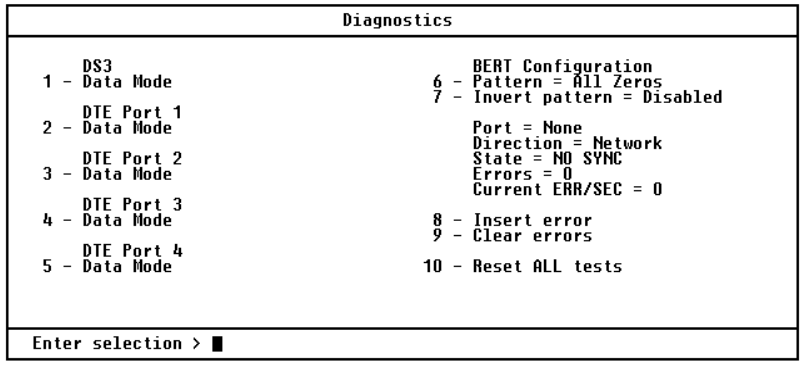


Figure 6-1. Diagnostics Main Menu

DS3

When you access the DS3's diagnostic options by selecting **1** from the main **DIAGNOSTICS** menu, the screen shown in Figure 6-2 displays.

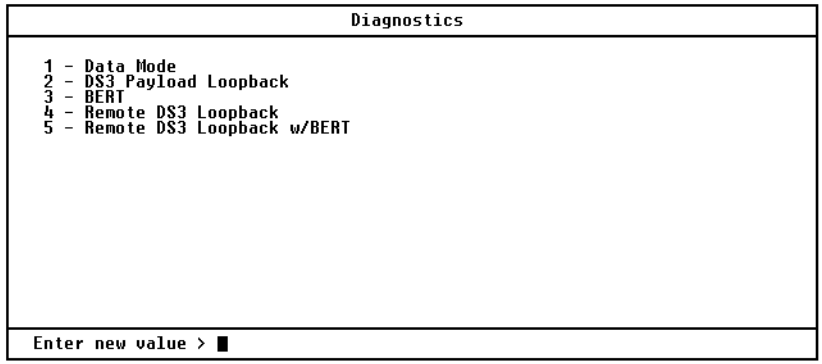


Figure 6-2. DS3 Diagnostics Menu

Data Mode

Ends a test already in progress for this port.

DS3 Payload Loopback

During this test, all payload information is re-framed and looped back towards the network. See Figure 6-3 for a block diagram illustrating the loopback point and the signal paths for this test.

> NOTE *This test does not interrupt data flow from the network to the DTE, but it does block all DTE-to-network data.*

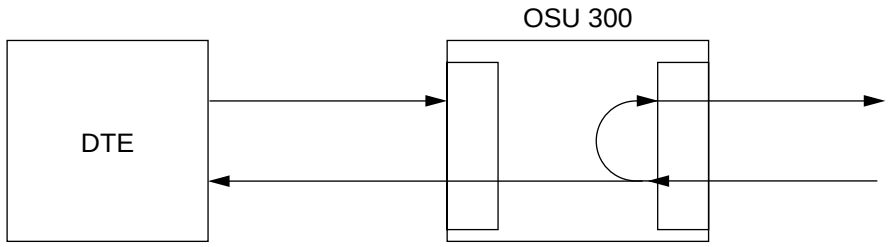


Figure 6-3. DS3 Payload Loopback Test

BERT

Select **BERT** to perform a bit error rate test over the entire payload bandwidth. Only one BERT test may be performed at a time.

Remote DS3 Loopback

This selection initiates a DS3 loopback test for the remote unit.

Remote DS3 Loopback with BERT

This selection initiates a DS3 loopback test for the remote unit and sends/checks the BERT pattern over the entire DS3 payload bandwidth.

DTE Ports 1-4

Access the DTE port diagnostic options by selecting the number corresponding with the desired port (options **2** through **5**) from the

main **DIAGNOSTICS** menu. These options differ depending on the interface type of the selected port. See the following section for the testing options available for the HSSI and V.35 ports. See *Quad DSX-1 Diagnostic Options* on page 6-7 for testing options available for the DSX-1 ports.

HSSI and V.35 Diagnostic Options

Figure 6-4 shows the available menus when the selected DTE port is HSSI or V.35. Descriptions of the menus follow the figure.

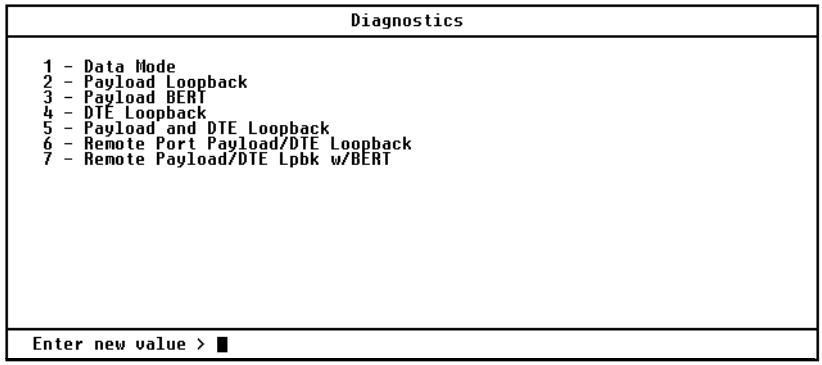


Figure 6-4. HSSI or V.35 Port Diagnostics Menu

Data Mode

Ends a test already in progress.

Payload Loopback

This selection initiates a **PAYLOAD LOOPBACK** test for all data on the selected port rather than for the entire DS3. During this test, the data is looped back in the network direction. Perform this test to verify the integrity of the portion of the DS3 link connecting the selected port of the OSU 300 and the remote DTE. This test is non-intrusive to the three other ports (see Figure 6-5 on page 6-5).

This test does not interrupt data flow from the network to the DTE, but it does block all DTE-to-network data for the selected port.

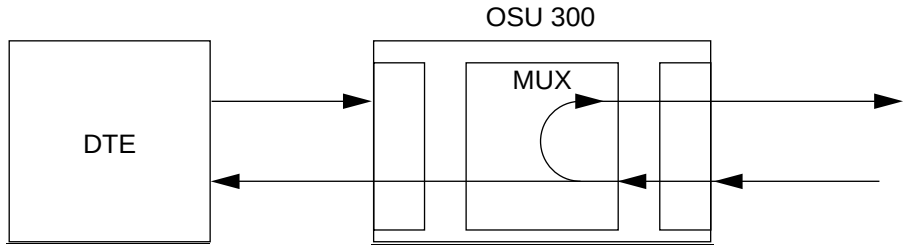


Figure 6-5. Payload Loopback Test

Payload BERT

This selection performs a bit error rate test on the selected port. This test is non-intrusive to the other three ports. Only one BERT test may be performed at a time. This test is normally performed from the remote and local ends simultaneously to determine whether the errors are coming from the transmit or the receive direction (see Figure 6-6).

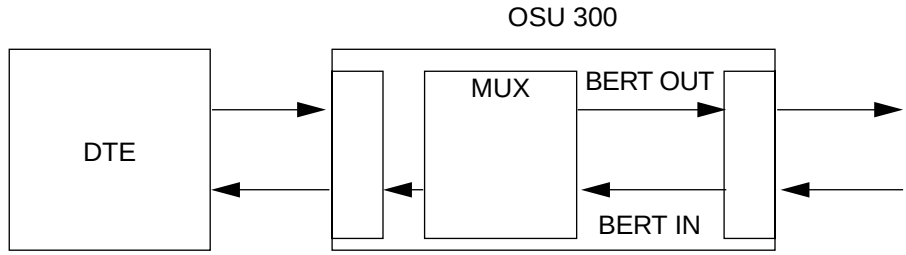


Figure 6-6. Payload BERT Test

DTE Loopback

This test is used to verify proper operation of the link between the OSU 300 and the terminal equipment. During this test, all data sent by the terminal equipment is looped back to the terminal

equipment. Figure 6-7 shows a block diagram illustrating the loopback point and the signal path.

> *While in DTE loopback, data from the host is transmitted into the network.*

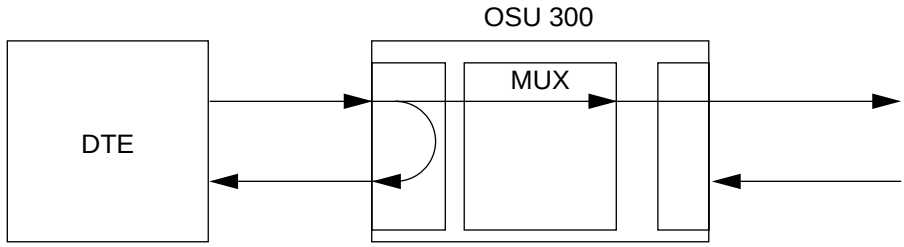


Figure 6-7. DTE Loopback Test

Payload and DTE Loopback

Select this test to perform payload and DTE loopbacks simultaneously. The individual tests are described on page 6-3 and page 6-5, respectively. Figure 6-8 shows a block diagram illustrating this test.

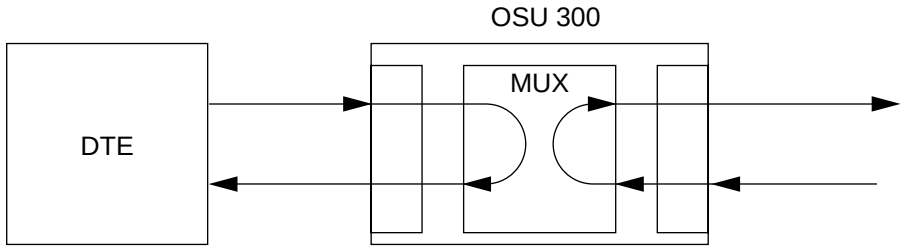


Figure 6-8. Payload and DTE Loopback Test

Remote Port Payload Loopback

This selection initiates a payload loopback on the remote OSU 300 for all data on the selected port. Perform this test to verify the integrity of the portion of the DS3 link connecting the local DTE and the selected port of the remote OSU 300. All other ports on both the local and remote units are unaffected.

Remote Payload Loopback with BERT

Perform this test to verify the integrity of the link between the selected port of the local OSU 300 and the corresponding remote OSU 300 port. During this test, the remote unit loops back all data for the selected port, while the local unit sends and checks the selected BERT pattern. The loopback point and the signal paths for the remote OSU 300 are the same as the payload loopback test for the local OSU 300 (shown in Figure 6-5 on page 6-5).

Quad DSX-1 Diagnostic Options

The menu shown in Figure 6-9 appears if the selected port is a Quad DSX-1. Descriptions of the menu selections follow the figure.

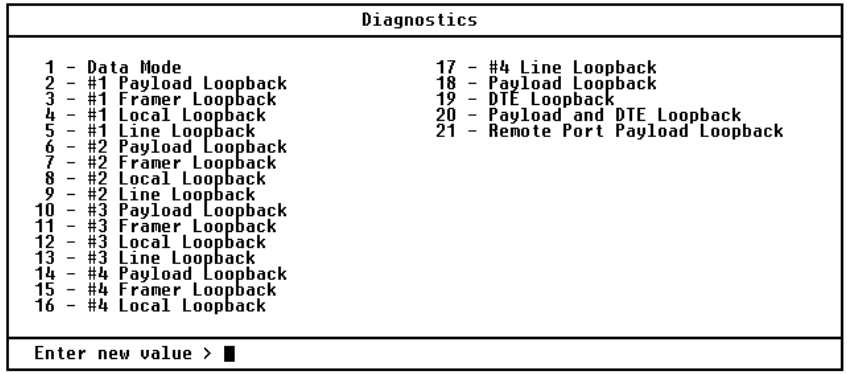


Figure 6-9. Quad DSX-1 Diagnostics Menu

Data Mode

Ends a test already in progress.

#x Payload Loopback

During this test, all payload information on the selected DSX-1 interface is reframed and looped back towards the DTE. See Figure 6-10 for an illustration of this test.

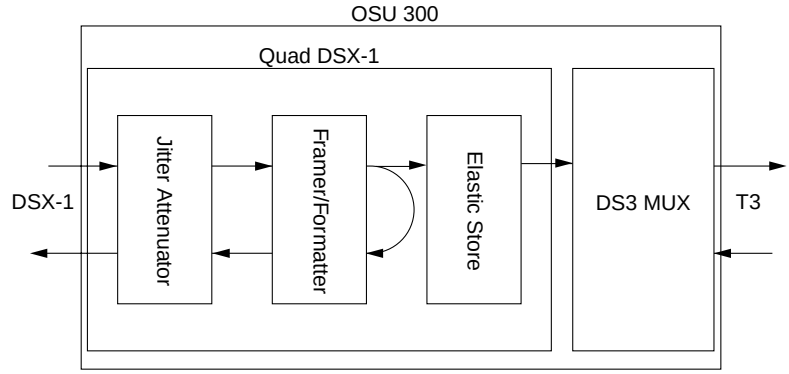


Figure 6-10. T1 Payload Loopback Test

#x Framer Loopback

During this test, all information from the network side (DS3) for the selected DSX-1 interface is looped back towards the network. See Figure 6-11 for an illustration of this test.

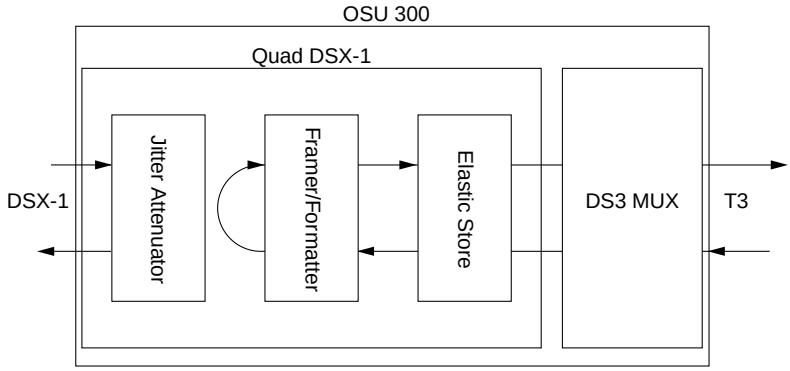


Figure 6-11. Framer Loopback Test

#x Local Loopback

During this test, all information from the network side (DS3) for the selected DSX-1 interface is looped back towards the network. This test is similar to the framer loopback test (described in the previous paragraph), with the exception that this test penetrates the circuitry deeper into the Quad DSX-1 interface card. See Figure 6-12 for an illustration of this test.

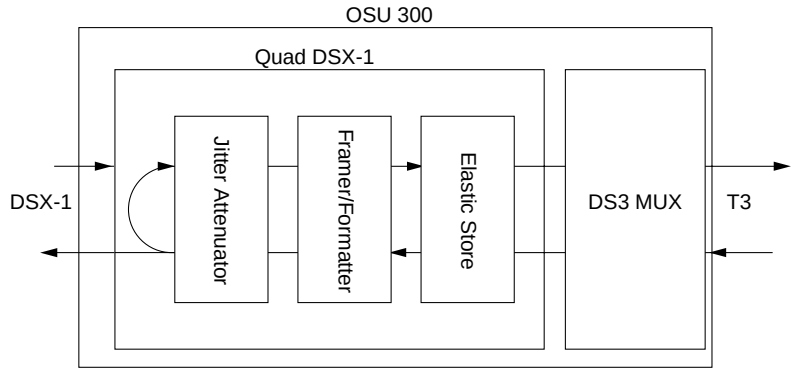


Figure 6-12. T1 Local Loopback Test

#x Line Loopback

During this test, all information on the selected DSX-1 interface, including framing, is looped back towards the DTE. See Figure 6-13 for an illustration of this test.

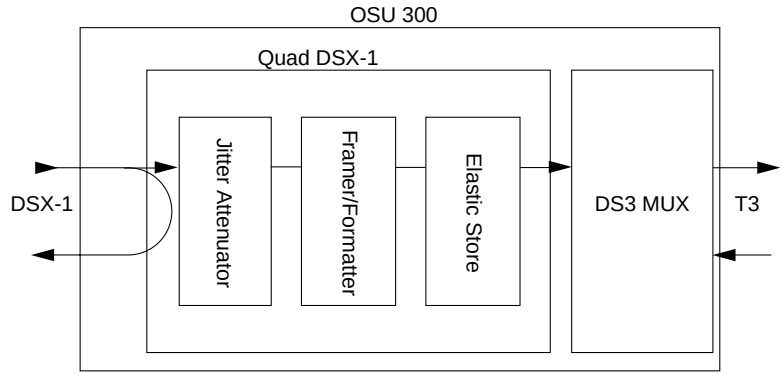


Figure 6-13. Line Loopback Test

Payload Loopback

During this test, all data for the selected DSX-1 interface is looped back to the far-end unit. The end result is all DSX-1 interfaces of the far-end unit are looped back. All other ports are unaffected. See Figure 6-14 for an illustration of this test.

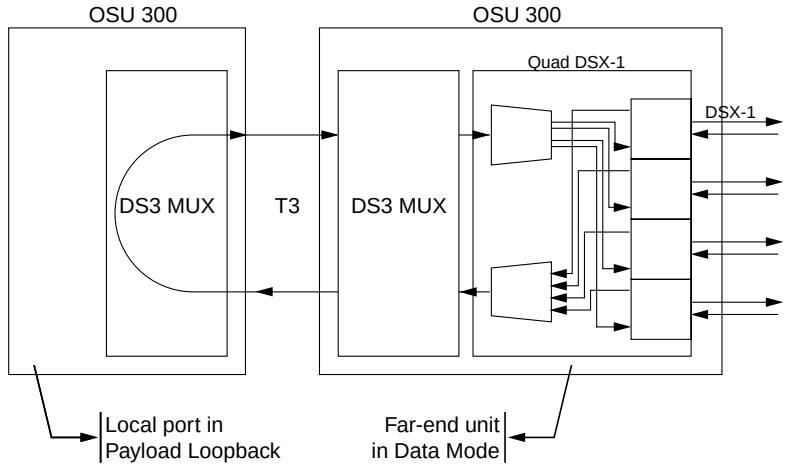


Figure 6-14. Payload Loopback Test

DTE Loopback

During this test, the combined information from the four DSX-1 interfaces is locally looped at the multiplexer of the OSU 300 back towards the Quad DSX-1 interface card. The end result of this test is

a loopback of all DSX-1 interfaces towards the DTE. See Figure 6-15 for an illustration of this test.

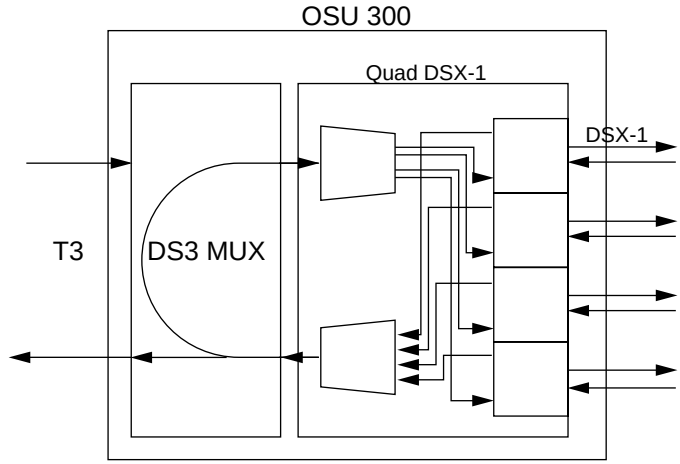


Figure 6-15. DTE Loopback Test

Payload and DTE Loopback

This test is a combination of a payload loopback and a DTE loopback. All of the near-end and far-end DSX-1 interfaces on the selected Quad DSX-1 interface card are looped back. See Figure 6-16 for an illustration of this test.

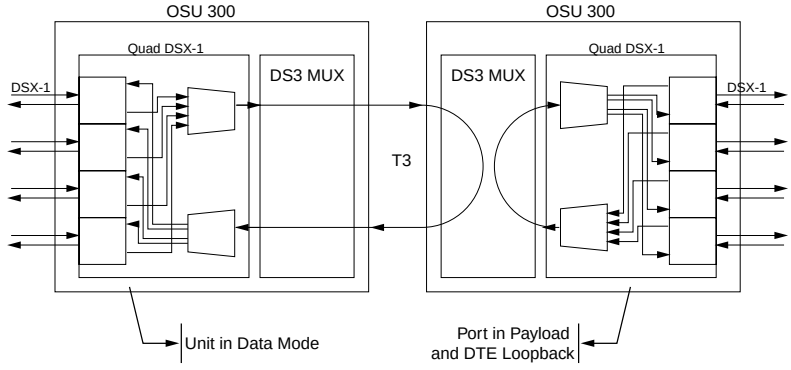


Figure 6-16. Payload and DTE Loopback Test

Remote Port and Payload Loopback

During this test, the local unit commands the far-end unit to perform a payload loopback test for the selected Quad DSX-1 interface card. This results in all of the DSX-1 interfaces in the local unit being looped back. See Figure 6-17 for an illustration of this test.

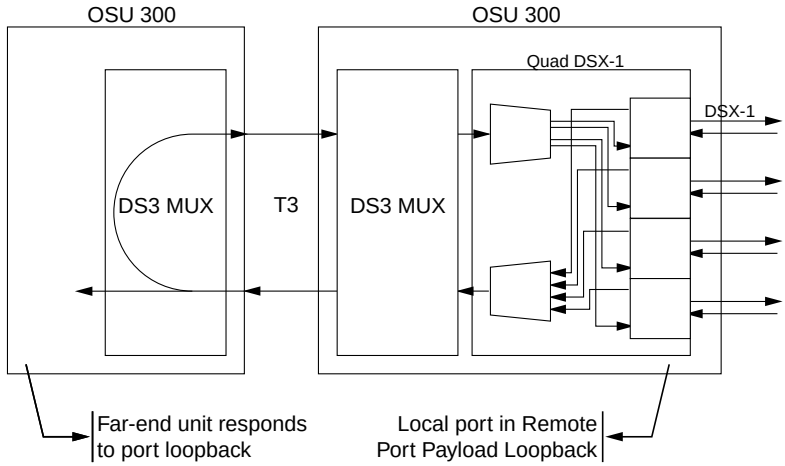


Figure 6-17. Remote Port Payload Loopback Test

BERT Configuration

The following options apply to any of the tests involving BERT testing.

Pattern

Select the desired test pattern for the BERT test (see Figure 6-18 on page 6-13). The internal test pattern generator can be configured for the following types of test patterns:

- All zeros
- All ones
- 2^15-1
- 2^23-1

The test pattern is used to independently test the operation of the framing circuitry and the network interface of the OSU 300. Instead

of using data from the host, this test uses data generated by the OSU 300's internal test pattern generator and detector.

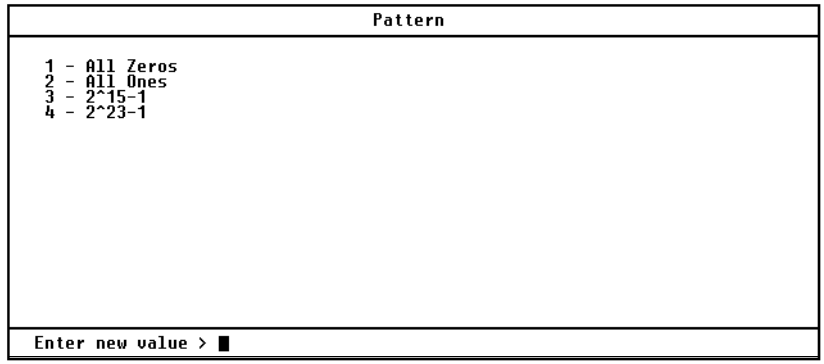


Figure 6-18. BERT Pattern Menu

Invert Pattern

If set to **ENABLE**, the OSU 300 inverts the transmitted and received BERT test pattern. This allows the unit to be compatible with test equipment which generates inverted BERT patterns.

BERT Information Fields

The following five fields provide information about the most recently issued BERT test. These fields appear in the main **DIAGNOSTICS** menu (shown in Figure 6-1 on page 6-2).

Port
Displays which port is transmitting and receiving the BERT pattern.

Direction
Displays the direction in which the BERT pattern is being sent.

State
Displays either **SYNC** or **NO SYNC** to indicate whether the unit is in sync with the BERT pattern.

Errors

Displays the number of BERT errors received by the OSU 300 since the last reset.

Current Err/Sec

Displays the number of BERT errors received by the unit in the last second.

Insert Error

Inserts one error into the data stream.

Clear Errors

Clears the error counts given in the BERT information fields of this menu.

Reset All Tests

Discontinues all active tests and clears the counts displayed in the BERT information fields.

Chapter 7 Applications

This chapter provides examples of some common T3 applications. The examples include a single port DSU / CSU full T3 bandwidth application, a point-to-point multiport application (page 7-2), a fractional T3 application (page 7-4), a remote SNMP management application (page 7-6), and a voice application (page 7-7). The configuration selections given in these examples may need modification based on your network configuration.

SINGLE PORT FULL T3 BANDWIDTH

In applications requiring full T3 bandwidth, the OSU 300 operates with other vendor products that support 44.2 Mbps data over unchannelized T3 circuits.

In the application shown in Figure 7-1, the OSU 300 provides network connectivity for a router running at 44.2 Mbps. The data is frame relay and the unit is SNMP-managed via the local Ethernet. See Table 7-1 on page 7-2 for an example configuration.

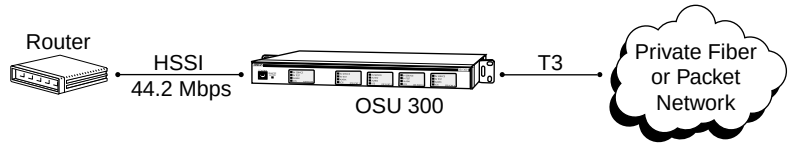


Figure 7-1. Single Port Application

Table 7-1. Single Port Full T3 Bandwidth Application Example

	Local OSU 300
DS3 Network	DS3 Timing - Loop
DTE 1	Port State - Enabled
	Nx75k blocks - 588
DTE 2	Port State - Disabled
DTE 3	Port State - Disabled
DTE 4	Port State - Disabled
System Management	Local IP Address - 10.4.10.2
	Subnet Mask - 255.255.255.0
	Gateway IP Address - 10.4.10.1
	IP Security - Disabled
	Trap IP Address - 10.4.10.10
	Management Port - LAN

POINT-TO-POINT MULTIPORT APPLICATION

When networking requirements call for sharing the bandwidth of a point-to-point T3 circuit, additional data ports can be installed into the OSU 300 for multiport operation. The OSU 300 supports up to three port option cards (Quad DSX-1, V.35 or HSSI). These option cards are hot-swappable and can be field installed. See the section *DTE Ports 2-4 (Expansion Slots)* on page 2-5 for more information on card installation. A configuration example of this application using a Quad DSX-1 card is on page 7-7.

This application (shown in Figure 7-2 on page 7-3) supports two subnet connections via two different routers, a video conferencing connection, and a main frame data connection. The OSU 300 supports the high speed data connection requirements of the routers (using the HSSI ports), as well as the V.35 data connection requirements of the video conferencing unit and the main frame.

The bandwidth is split by the OSU 300 to provide 18 Mbps for each router, 1.5 Mbps for the video conference units, and 6 Mbps for the main frames. See Table 7-2 for an example configuration of this application.

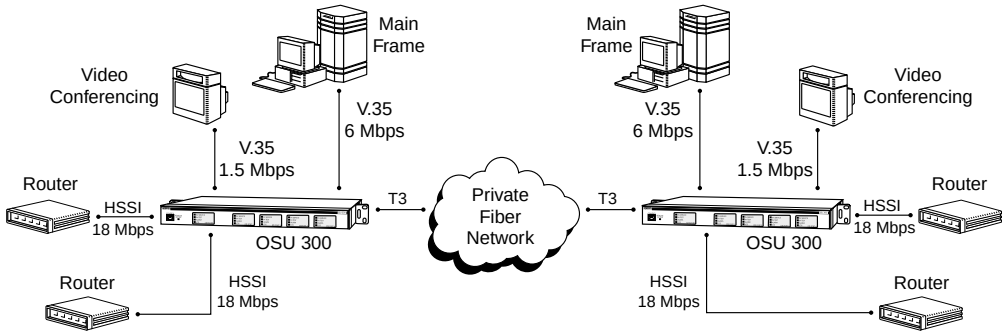


Figure 7-2. Multiport Application

Table 7-2. Multiport Application Configuration Example

	Local OSU 300	Remote OSU 300
DS3 Network	DS3 Framing - C-bit Parity	DS3 Timing - Loop
	Line Length - Short	
	DS3 Timing - Loop	
	Data Link - Enabled	
DTE 1 (HSSI)	Port State - Enabled	Port State - Enabled
	Nx75k blocks - 240	Nx75k blocks - 240
DTE 2 (HSSI)	Port State - Enabled	Port State - Enabled
	Nx75k blocks - 240	Nx75k blocks - 240
DTE 3 (V.35)	Port State - Enabled	Port State - Enabled
	Nx75k blocks - 80	Nx75k blocks - 80
DTE 4 (V.35)	Port State - Enabled	Port State - Enabled

Table 7-2. Multiport Application Configuration Example (Continued)

	Local OSU 300	Remote OSU 300
	Nx75k blocks - 20	Nx75k blocks - 20
System Management	Local IP Address - 10.4.10.2	Nothing required. Remote unit can be managed using the local OSU 300.
	Subnet Mask - 255.255.255.0	
	Gateway IP Address - 10.4.10.1	
	IP Security - Disabled	
	Trap IP Address - 10.4.10.10	
	Management Port - LAN	

FRACTIONAL T3 CARRIER APPLICATION

When network providers want to provide service at rates less than full T3, OSU 300 units can be used in pairs for deploying sub-T3 rate services.

In this application example (shown in Figure 7-3 on page 7-5), a carrier provides fractional T3 access at 8 Mbps for internet connectivity. The data connection can be either V.35 or HSSI at either location. This network uses a HSSI port at the carrier's internet POP (point of presence) and a high-speed V.35 connection at the customer's router. The carrier manages both the local and remote OSU 300s via SNMP. Table 7-3 on page 7-5 gives an example configuration for this application.

While in DTE loopback, data from the host is transmitted into the network.

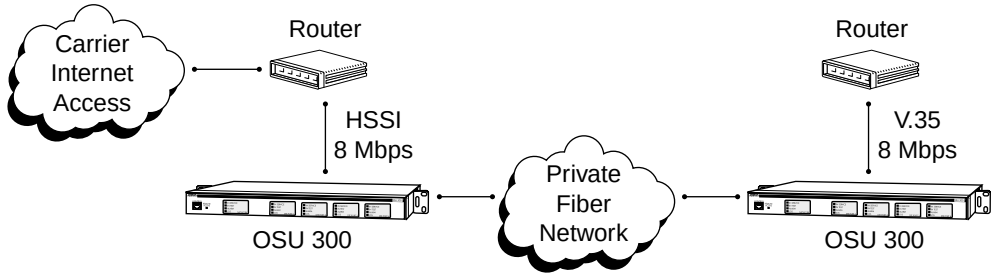


Figure 7-3. Fractional Application

Table 7-3. Fractional T3 Application Configuration Example

	Local OSU 300	Remote OSU 300
DS3 Network	DS3 Framing - C-bit Parity	DS3 Framing - C-bit Parity
	Line Length - Short	Line Length - Short
	DS3 Timing - Loop	DS3 Timing - Loop
	Data Link - Enabled	Data Link - Enabled
DTE 1	Port State - Disabled	Port State - Disabled
DTE 2	Port State - Enabled	Port State - Enabled
HSSI (Local)	Nx75k blocks-107	Nx75k blocks-107
V.35 (Remote)		
DTE 3	Port State - Disabled	Port State - Disabled
DTE 4	Port State - Disabled	Port State - Disabled
System Management	Local IP Address - 12.6.12.2	Nothing required. Remote unit can be managed using the local OSU 300.
	Subnet Mask - 255.255.255.0	
	Gateway IP Address - 12.6.12.1	
	IP Security - Disabled	
	Trap IP Address - 12.6.12.10	
	Management Port - LAN	

REMOTE SNMP MANAGEMENT APPLICATION

A remote OSU 300 can be managed by a local management station if the remote unit is assigned its own IP address. This address must be assigned at both the near and far ends. Also, the **DATA LINK** option must be enabled on both units.

In this application example (shown in Figure 7-4) a local OSU 300, connected to the same LAN as the management station, provides management access to a remote OSU 300. The local unit has the remote unit's IP address in its **REMOTE IP ADDRESS** field. That same IP address is entered into the remote unit's **LOCAL IP ADDRESS** field. Table 7-4 gives an example configuration for this application.

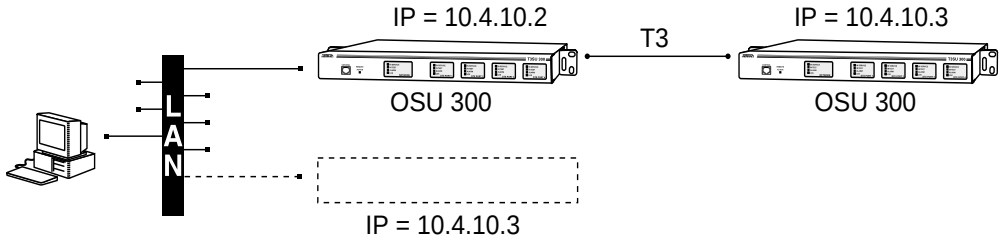


Figure 7-4. Remote Management Application

Table 7-4. Configuration Example for Remote SNMP Management Application

	Table 7-5. Local OSU 300	**Remote OSU 300**
System Management	Local IP Address - 10.4.10.2	Local IP Address - 10.4.10.3
	Subnet Mask - 255.255.255.0	Subnet Mask - 255.255.255.0
	Gateway IP Address - 10.4.10.1	Gateway IP Address - 0.0.0.0
	Remote IP Address - 10.4.10.3	Remote IP Address - 0.0.0.0
	Management Port - LAN	Management Port - FDL

VOICE APPLICATION

This voice application is similar to the point-to-point multiport application (described on page 7-2). This application (shown in Figure 7-5) uses two of the four DSX-1 ports on the Quad DSX-1 card to transport PBX data, including voice channels, through the same T3 as the data. See Table 7-5 for an example configuration of this application.

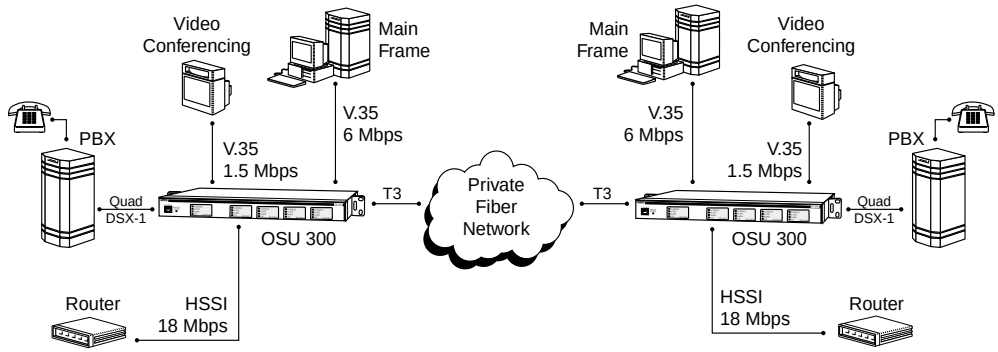


Figure 7-5. Voice Application

Table 7-6. Configuration Example for a Voice Application

	Local OSU 300	Remote OSU 300
DS3 Network	DS3 Framing - C-bit Parity	DS3 Timing - Loop
	Line Length - Short	
	DS3 Timing - Loop	
	Data Link - Enabled	
DTE 1 (HSSI)	Port State - Enabled	Port State - Enabled
	Nx75k blocks - 240	Nx75k blocks - 240
DTE 2 (HSSI)	Port State - Enabled	Port State - Enabled
	Nx75k blocks - 80	Nx75k blocks - 80

Table 7-6. Configuration Example for a Voice Application (Continued)

	Local OSU 300	Remote OSU 300
DTE 3 (V.35)	Port State - Enabled	Port State - Enabled
	Nx75k blocks - 20	Nx75k blocks - 20
DTE 4 (Quad DSX-1)	DSX-1 Port 1: Port State - Enabled Framing - ESF Line Coding - B8ZS Line Length - 0 to 133 feet DSX-1 Port 2: Port State - Enabled Framing - ESF Line Coding - B8ZS Line Length - 0 to 133 feet DSX-1 Timing Source - DS3	DSX-1 Port 1: Port State - Enabled Framing - ESF Line Coding - B8ZS Line Length - 0 to 133 feet DSX-1 Port 2: Port State - Enabled Framing - ESF Line Coding - B8ZS Line Length - 0 to 133 feet DSX-1 Timing Source - DS3
System Management	Local IP Address - 10.4.10.2	Nothing required. Remote unit can be managed using the local OSU 300.
	Subnet Mask - 255.255.255.0	
	Gateway IP Address - 10.4.10.1	
	IP Security - Disabled	
	Trap IP Address - 10.4.10.10	
	Management Port - LAN	

Appendix A Pinouts

The following tables give the pin assignments for the connectors located on the OSU 300. For more information on these connectors, see the chapter *Installation and Operation* on page 2-1.

Table A-1. Control Port Pin Assignments

RJ Pin#	Function	Direction
1	GND	
2	RTS	I
3	TD	I
4	DSR	O
5	RD	O
6	CTS*	O
7	DTR	I
8	DCD	O

* Used for hardware flow control.

Table A-2. HSSI Interface Pin Assignments

Pin # (+ side)	Pin # (- side)	Direction	Description
1	26		Signal Ground (SG)
2	27	O	Receive Timing (RT)
3	28	O	DCE Available (CA)
4	29	O	Receive Data (RD)
5	30	O	Loopback Circuit C (LC)
6	31	O	Send Timing (ST)
7	32		Signal Ground (SG)
8	33	I	DTE Available (TA)
9	34	I	Terminal Timing (TT)
10	35	I	Loopback Circuit A (LA)
11	36	I	Send Data (SD)
12	37	I	Loopback Circuit B (LB)
13	38		Signal Ground (SG)
14-18	39-43	I	Five Ancillary to DCE
19	44		Signal Ground (SG)
20-23	45-48	O	Five Ancillary from DCE
24	49	O	Test Mode (TM)
25	50		Signal Ground (SG)

Table A-3. LAN Port Pin Assignments

Pin	Name	Description
1	TD+	The positive signal for the TD differential pair. This signal contains the serial output data stream transmitted onto the network.
2	TD-	The negative signal for the TD differential pair (pins 1 and 2).
3	RD+	The positive signal for the RD differential pair. This signal contains the serial input data stream received from the network.
4,5	N/A	not used
6	RD-	The negative signal for the RD differential pair (pins 3 and 6).
7,8	N/A	not used

Table A-4. V.35 Interface Card Pin Assignments

Pin	Name	Description
A	101	Protective Ground (PG)
B	102	Signal Ground (SG)
C	105	Request to Send (RTS)
D	106	Clear to Send (CTS)
E	107	Data Set Ready
F	109	Received Line Signal Detector (CD)
H	–	Data Terminal Ready (DTR)
J	–	not used
L	–	Local Loopback (LL)

Table A-4. V.35 Interface Card Pin Assignments (Continued)

Pin	Name	Description
N	–	Remote Loopback (RL)
R	104	Received Data (RD-A)
T	104	Received Data (RD-B)
V	115	Receiver Signal Element Timing (SCR-A)
X	115	Receiver Signal Element Timing (SCR-B)
P	103	Transmitted Data (SD-A)
S	103	Transmitted Data (SD-B)
Y	114	Transmitter Signal Element Timing (SCT-A)
AA	114	Transmitter Signal Element Timing (SCT-B)
U	113	External TX Signal Element (SCX-A)
W	113	External TX Signal Element (SCX-B)
NN	–	Test Indicator (TI)

Table A-5. Quad DSX-1 Interface Card Pin Assignments

Pin	Name	Description
1	R1 TXDATA-RING	Send data toward DTE
2	T1 TXDATA-TIP	Send data toward DTE
3	UNUSED	–
4	R RXDATA-RING	Receive data from DTE
5	T RXDATA-TIP	Receive data from DTE
6,7,8	UNUSED	–

Appendix B Specifications Summary

SPECIFICATIONS AND FEATURES

This section describes the standard specifications and features incorporated into the OSU 300.

Optical Interface

Clear channel, non-channelized DS3.
Line length: Single-mode (40 Km); multi-mode (2 Km).
Framing format: M13 and C-bit parity.
Line rate: 44.736 Mbps.
Line interface:
SC or ST style connectors for single-mode and multi-mode fiber.

DTE Interface(s)

Integrated HSSI port.
Three option slots accept any combination of interface cards.
HSSI ports are SCSI-II 50-pin female.
V.35 ports are high-speed, M34 female.
DSX-1 ports are RJ-48C, 4-wire.
All option cards are hot-swappable.

DTE Rates Supported

HSSI port(s) support 75 kbps to 44.2 Mbps.
V.35 port(s) support 75 kbps to 10 Mbps.
DSX-1 ports support up to 1.544 Mbps.
Bandwidth is selectable for V.35 and HSSI in 75 kbps increments.

Clocking

Loop (slaved to network receive clock).
Local (private network master).

VT 100 Terminal Interface

RJ-48, EIA -232 compatible, female DB-25 adapter provided.
Accessible through front or rear panel.
Remote configuration and statistics access available inband.

SNMP/Telnet

Integrated 10BaseT Ethernet and SLIP / PPP (async) port.
MIB II, RFC 1213 and 1407 compliant.
ADTRAN Enterprise MIB for extended monitoring and control / configuration.

Agency Approvals

FCC Part 15, Class A, UL and CUL

Environment

Operating: 0 to 50 °C (32 to 122 °F)
Storage: -20 to 70 °C (-4 to 158 °F)
Relative Humidity: Up to 95%, non-condensing

Power

AC version: 120 VAC, 9 W
DC version: 24 to 48 VDC, 8W

Physical

Dimensions: 11.625“D x 17.0“W x 1.7“H (for 1U high 19” rack space)
Weight: 7 lbs.

Appendix C Acronyms/Abbreviations

AIS..... alarm indication signal

AMI..... alternate mark inversion

async ..... asynchronous

BERT ..... bit error rate test

bps ..... bits per second

BPV ..... bipolar violation

CA..... communications equipment available

CCITT..... Consultive Committee for International Telephony and Telegraphy

CD ..... carrier detect

CO ..... central office

CPE..... customer premise equipment

CRC..... cyclic redundancy check

CS ..... clear to send

CSU ..... channel service unit

CTS..... clear to send

dB..... decibel

DCD ..... data carrier detect

DCE..... data communications equipment

DDS..... digital data service

DLCI ..... data link connection identifier

DSR..... data set ready

DSU ..... data service unit
DSX-1 ..... digital signal cross connect, level 1
DTE ..... data terminal equipment
DTR ..... data terminal ready
ES ..... errored seconds
EXZ ..... excessive zeros
FDL ..... facility datalink
FEAC ..... far end alarm and control
FEBE ..... far end block error
HSSI ..... high-speed serial interface
IP ..... internet protocol
KA ..... keep alive
LAN ..... local area network
LCV ..... line coding violation
LED ..... light emitting diode
LES ..... line errored seconds
LL ..... local loopback
LOS ..... loss of signal
MBE ..... M-bit errors
Mbps ..... megabits per second
MIB ..... management information base
ms ..... millisecond
NC ..... normally closed
NI ..... network interface
NMS ..... network management system
NO ..... normally open
NRZ ..... non-return to zero
OCU ..... office channel unit
OOF ..... out of frame

OOS..... out of service
POP ..... point of presence
PPP ..... point-to-point protocol
PSTN..... public switched telephone network
PVC ..... permanent virtual circuit
RD ..... receive data
RDL..... remote digital loopback
RL ..... remote loopback
RMA..... return material authorization
RS ..... request to send
RTS..... request to send
Rx..... receive
SEFS ..... severely errored framing seconds
SES ..... severely errored seconds
SLIP..... serial line internet protocol
SNMP ..... simple network management protocol
sync ..... synchronous
TA ..... terminal equipment available
TD..... transmit data
TDM..... time division multiplexing
TM ..... test mode
TR ..... data terminal ready
Tx..... transmit
UAS..... unavailable seconds
WAN..... wide area network

Appendix D Glossary

10BaseT

Ethernet connector which implements the IEEE standard on 24-gauge, unshielded twisted pair wiring.

AIS

alarm indication signal. An unframed all ones pattern that replaces the normal traffic signal when a failure has been detected. This signal prevents logical connections from terminating between devices.

AMI

alternate mark inversion. A bipolar line-coding format in T1 transmission systems whereby successive ones are alternately inverted.

ANSI

American National Standards Institute. A non-profit organization that coordinates voluntary standards activities in the United States.

asynchronous

A method of data transmission which allows characters to be sent at irregular intervals by preceding each character with a start bit, followed by a stop bit.

bandwidth

The bandwidth determines the rate at which information can be sent through a channel (the greater the bandwidth, the more information that can be sent in a given amount of time).

baud rate

A measure of transmission speed over an analog phone line. Baud rate measures the shortest signaling elements per second in the analog signal that a modem sends over an analog phone line. Does not necessarily equal the bit rate.

BERT

bit error rate test. A test that uses any of a number of stress patterns to test T3, T1, FT1, and DDS circuits.

bipolar

A signal containing both positive and negative amplitude components.

bipolar violation

See *BPV.*

bit

A binary digit representing a signal, wave, or state as either a one or a zero. A bit is the smallest unit of information a computer can process.

bit error

The receipt of an encoded bit that differs from what was sent by the transmitter.

bit rate

The speed at which bits are transmitted, usually expressed in bits per second (bps).

blue alarm (AIS)

An alarm used in T1/T3 transmission. In a T3 circuit, blue alarms occur when there is a transmission fault located either at or upstream from the transmitting terminal. A blue alarm is when consecutive 1010s are received in the information bits.

bps

bits per second. The number of bits passing a specific point per second. Examples of common rates are kbps (one thousand bits per second) and Mbps (one million bits per second). T3 operates at 44.736 Mbps.

BPV

bipolar violation. A violation in the alternate mark inversion line code for which consecutive 1s are represented by pulses of opposite polarity. BPVs that are not

intentional (B8ZS) are counted as errors. Could also be the presence of two consecutive 1 bits of the same polarity on the T-carrier line.

bridge

A data communications device that connects two or more networks and forwards packets between them.

byte

Generally, an 8-bit quantity of information. This term is used mainly in referring to parallel data transfer, semiconductor capacity, and data storage.

carrier

The provider of the telecommunication services to the customer site. Carriers can be local telephone companies, regional telephone companies, or any interexchange carrier such as AT&T, Sprint, or MCI.

C-bit

An overhead bit in the DS3 string not used for framing, parity, or alarm indication.

CCITT

Consultive Committee for International Telephony and Telegraphy. A standards organization that devises and proposes recommendations for international communications. See also *ANSI*.

CD

carrier detect. A signal generated by a modem or DSU/CSU indicating the presence of a carrier signal on a communications link.

channel

A transmission path between two or more termination points; also called a circuit, facility, line, link, or path.

channel bank

Equipment in a telephone central office or customer premises that performs multiplexing of lower speed digital channels into a higher speed composite channel. The channel bank also detects and transmits signaling information for each channel, thereby transmitting framing information so that time slots allocated to each channel can be identified by the receiver.

channel service unit
See *CSU*.

clocking
An oscillator-generated signal that provides a timing reference for a transmission link. A clock provides signals used in a transmission system to control the timing of certain functions. The clock has two functions: (1) to generate periodic signals for synchronization, and (2) to provide a time base.

control port
The electrical interface between the OSU 300 and the control terminal. The control terminal is used to communicate commands to the unit.

CPE
customer premise equipment. All telecommunications terminal equipment located on the customer premises, including telephone sets, private branch exchanges (PBXs), data terminals, and customer-owned coin-operated telephones.

CSU
channel service unit. A device used to connect a digital phone line coming in from the phone company to either a multiplexer, channel bank, or directly to another device producing a digital signal; for example, a digital PBX, a PC, or data communications device. A CSU performs certain line-conditioning and equalization functions, and responds to loopback commands sent from the central office. A CSU regenerates digital signals. It monitors them for problems and provides a way of testing the digital circuit.

CTS
clear to send. A signal on the DTE interface indicating that the DCE is clear to send data.

data communications equipment
See *DCE*.

data service unit
See *DSU*.

dB
decibel. A unit of measure of signal strength; usually the relation between a transmitted signal and a standard signal source.

dBm

decibels below 1mW. Output power of a single referenced to an input signal of 1mW.

DCE

data communications equipment. Device that provides all the functions required for connection to telephone company lines and for converting signals between telephone lines and DTE. Also see *DTE*.

DDS

digital data service. A private line digital service for transmitting data end-to-end at speeds of 2.4, 4.8, 9.6, and 56 kbps (and in some cases 19.2, 38.4, or 64 kbps). The systems can use central hub offices for obtaining test access, bridging legs of multi-point circuits, and cross connecting equipment. DDS is offered on an inter-LATA basis by AT&T and on an intra-LATA basis by the Bell operating companies.

delay

The amount of time by which a signal is delayed. A round-trip transmission delay measurement helps detect possible causes of protocol timeouts.

DLCI

datalink communications identifier. A unique number assigned to a PVC end point in a frame relay network. Identifies a particular PVC endpoint within a user's access channel in a frame relay network and has local significance only to that channel.

DS1

digital signal level one. Twenty-four DS0 channels make up one DS1 (total bandwidth is 1.544 Mbps).

DS3

digital signal level three. Equivalent of 28 DS1s and 672 DS0s (total bandwidth is 44.736 Mbps).

DSU

data service unit. A device designed to transmit and receive digital data on digital transmission facilities.

DTE

data terminal equipment. The end-user terminal or computer that plugs into the termination point (DCE) of a communications circuit. The main difference between the DCE and the DTE is that pins two and three are reversed.

E1

Transmission rate of 2.048 Mbps on E1 communications lines. See also *T1*.

end device

The ultimate source or destination of data flowing through a network (sometimes referred to as DTE).

end user

Subscriber who uses (rather than provides) telecommunications services.

ES

errored seconds. A second with one or more coding violations (CVs).

Ethernet

Transmission protocol for packet-switching LANs.

facilities

The equipment used by carriers to provide communication services.

far end

The distant end to that being considered. Not the end where testing is being carried out.

FCC

Federal Communications Commission. The U.S. federal agency responsible for regulating interstate and international communications by radio, TV, wire, satellite, and cable.

FDL

facility datalink. FDL bits provide overhead communication between the terminal equipment in ESF framing.

gateway

A device which enables information to be exchanged between two dissimilar systems or networks.

host computer
The primary or controlling computer in a multiple computer operation.

idle code
In a T3 circuit, an idle code consists of a sequence of 1100 over the entire payload bandwidth.

in-band
Signaling (dialing, diagnostics, management, configuration, etc.) over the same channel used for data.

IP
internet protocol. A protocol which provides for transmitting blocks of data between hosts identified by fixed-length addresses.

LAN
local area network. A privately owned network that offers high-speed communications channels to connect information processing equipment in a limited geographic area.

local loopback (LL)
A type of test used to verify the operation of the local terminal equipment, the CSU, and the connection between the two. The signal from the DTE is looped back by the CSU and is sent back to the DTE.

loopback
The technique for testing the processing circuitry of a communications device. May be initiated locally or remotely via a telecommunications circuit. Device being tested will echo back received test data. The results are compared with the original data.

LOS
loss of signal. Defined as a line state in which no pulses are received for 175 bit positions.

M13
DS1/DS3 multiplexer that combines up to 28 DS1 channels into one DS3 channel. Uses two-stage, bit synchronous TDM.

Mbps
Megabits per second (one million bits per second).

MIB

management information base. A database of network management information used by SNMP.

modem

Acronym for modulator / demodulator. Equipment that converts digital signals to and from analog signals. Used to send digital signals over analog phone lines.

monitor

To watch or listen to a signal non-intrusively.

multi-mode

An optical fiber carrying multiple signals that are distinguished by frequency or phase at the same time.

multi-point circuit

A single communications circuit that has more than two terminations.

NC

normally closed. Relay switch contacts that remain closed when inactive.

near end

The unit on-site.

NI

network interface. The demarcation point between the CPE and the PSTN.

NO

normally open. Relay switch contacts that remain open when inactive.

NRZ

non return to zero. A mode in which the digital level is low for a 0 bit and high for a 1 bit, and does not return to zero between successive 1 bits.

out-of-band

Signaling that is separated from the channel carrying information (voice, data, video, etc.). Typically the separation is accomplished by a filter. The signaling includes dialing and other supervisory signals.

point-to-point

Type of communications link that connects a single device to another single device, such as a remote terminal to a host computer.

POP

point of presence. Physical place within a LATA (local access and transport area) where a long distance carrier or a cellular provider interfaces with the network of the local exchange carrier (LEC). A POP is usually a building serving as the point of termination which houses switches and transmission equipment.

protocol

A set of rules controlling the orderly exchange of information between stations in data communications networks or systems.

PSTN

public switched telephone network. Usually refers to the world wide voice telephone network available for public use.

red alarm

Unframed all ones signal (keep alive signal). A red alarm is declared on detection of LOS or OOF not caused by an alarm indication signal (AIS) that persists for more than two seconds.

remote configuration

A feature designed into ADTRAN products that allows remote units to be configured from a local unit or a VT 100 compatible terminal.

router

A device that supports communications between networks. Routers are similar to bridges, with the exception that routers provide more functionality (such as finding the best route between networks and providing network management capabilities).

service

The provision of telecommunications to customers by a common carrier, administration, or private operating agency, using voice, data, and/or video technologies.

service provider

A company that delivers or sells a telecom service.

SC

A snap-on fiber optic connector.

SES

severely errored seconds. A second in which more than 320 code violations (CVs) occurred or an OOF condition occurred.

signaling

Communication between switches to set up and terminate calls.

single-mode

An optical fiber allowing a single mode of light to propagate.

SNMP

simple network management protocol. A control and reporting scheme widely used to manage devices from different vendors. SNMP operates on top of the Internet protocol.

SR

data set ready. A signal on the DTE interface that indicates if a connection exists and if the devices are ready to start handshaking control signals so communications can begin.

ST

A fiber optic connector plug and socket.

synchronous

Communications in which the timing is achieved by sharing a single clock. Each end of the transmission synchronizes itself with the use of clocks and information sent along with the transmitted data.

T1

Transmission rates of 1.544 Mbps are available on T1 communication lines. Also referred to as digital signal level 1 (DS-1). See also *E1*.

T3

Transmission rates of 44.736 Mbps are available on T3 communication lines. Also referred to as digital signal level 3 (DS-3).

TDM

time division multiplexing. A technique for transmitting two or more signals at the same time over a single communication medium. This is accomplished by allocating channels to the bandwidth for specific increments of time.

Telnet

The standard TCP/IP remote login protocol specified in RFC-854.

transceiver

A combination of transmitter and receiver providing both output and input interfaces within a single device.

transmission

The signaling of data over telecommunications channels.

V.35

A standard for trunk interface between a network access device and a packet network that defines signaling for data rates greater than 19.2 kbps.

VT 100

A non-intelligent terminal or terminal emulation mode used for asynchronous communications. Used to configure the OSU 300.

WAN

wide area network. A communications network serving geographically separate areas. A WAN typically extends a LAN outside the building to link to other LANs over telephone lines.

yellow alarm

A T3 yellow alarm is an indication sent back toward the source of a failed transmit circuit in a DS3 two-way transmission path. The X-bits (X1 and X2) are set to zero.

Index

D

E

F