ADTRAN

T3SU 300 User Manual

1202217L1 DC Version Including AC Mains Power Supply

1200218L1 HSSI DTE Interface Card

1200219L1 V.35 DTE Interface Card

1200284L1 Quad DSX-1 Interface Card

1202217L2 AC Version

1202217L4 DC Version

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 35814-4000
(256) 963-8000

About this Manual

This manual is arranged so you can quickly and easily find the information you need. The following is an overview of the contents of this manual:

- Chapter 1, *Introduction,* familiarizes you with fiber networks and T3SU 300 highlights and gives a brief explanation of the option cards that may be purchased for use with the T3SU 300.
- Chapter 2, *Installation and Operation,* describes the T3SU 300 connectors (pin assignments are given in Appendix A), provides installation instructions, and explains how to operate your T3SU 300 using the terminal interface.
- Chapter 3, *Configuration,* explains how to access the T3SU 300 Configuration menu, describes selections made in the Configuration menus, and provides a menu tree of Configuration options.
- Chapter 4, *Status,* describes each field of the Status menu.
- Chapter 5, *Statistics,* explains how to access statistical information for the T3SU 300 and describes each field.
- Chapter 6, *Diagnostics,* explains how to diagnose problems using loopback and BERT tests.
- Appendix A provides pinouts for the T3SU 300 connectors.
- Appendix B contains product specifications.
- Appendix C lists the acronyms and abbreviations used in this document.
- Appendix D is a glossary.

| NOTE | *Notes provide additional useful information.* |

| CAUTION | *Cautions signify information that could prevent service interruption.* |

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

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 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

Affidavit Requirements for Connection to Digital Services

- An affidavit is required to be given to the telephone company whenever digital terminal equipment without encoded analog content and billing protection is used to transmit digital signals containing encoded analog content which are intended for eventual conversion into voiceband analog signals and transmitted on the network.

- The affidavit shall affirm that either no encoded analog content or billing information is being transmitted or that the output of the device meets Part 68 encoded analog content or billing protection specifications.

- End user/customer will be responsible for filing an affidavit with the local exchange carrier when connecting unprotected customer premise equipment (CPE) to 1.544 Mbps or subrate digital services.

Until such time as subrate digital terminal equipment is registered for voice applications, the affidavit requirement for subrate services is waived.

Affidavit for Connection of Customer Premises Equipment to 1.544 Mbps and/or Subrate Digital Services

For the work to be performed in the certified territory of _____ (telco name)

State of _____

County of _____

I, _____ (name), _____ (business address),

_____ (telephone number) being duly sworn, state:

I have responsibility for the operation and maintenance of the terminal equipment to be connected to 1.544 Mbps and/or _____ subrate digital services. The terminal equipment to be connected complies with Part 68 of the FCC rules except for the encoded analog content and billing protection specifications. With respect to encoded analog content and billing protection:

( ) I attest that all operations associated with the establishment, maintenance, and adjustment of the digital CPE with respect to analog content and encoded billing protection information continuously complies with Part 68 of the FCC Rules and Regulations.

( ) The digital CPE does not transmit digital signals containing encoded analog content or billing information which is intended to be decoded within the telecommunications network.

( ) The encoded analog content and billing protection is factory set and is not under the control of the customer.

I attest that the operator(s)/maintainer(s) of the digital CPE responsible for the establishment, maintenance, and adjustment of the encoded analog content and billing information has (have) been trained to perform these functions by successfully having completed one of the following (check appropriate blocks):

( ) E.   A training course provided by the manufacturer/grantee of the equipment used to encode analog signals; or

( ) F.   A training course provided by the customer or authorized representative, using training materials and instructions provided by the manufacturer/grantee of the equipment used to encode analog signals; or

( ) G.   An independent training course (e.g., trade school or technical institution) recognized by the manufacturer/grantee of the equipment used to encode analog signals; or

( ) H.   In lieu of the preceding training requirements, the operator(s)/maintainer(s) is (are) under the control of a supervisor trained in accordance with _____ (circle one) above.

I agree to provide _____ (telco's name) with proper documentation to demonstrate compliance with the information as provided in the preceding paragraph, if so requested.

_____**Signature**

_____**Title**

_____ **Date**

Transcribed and sworn to before me

This _____ day of _____, _____

_____
Notary Public

My commission expires:

_____

FCC regulations require that the following information be provided in this manual:

1. This equipment complies with Part 68 of FCC rules. On the back of the equipment housing is a label showing the FCC registration number and ringer equivalence number (REN). If requested, provide this information to the telephone company.

2. If this equipment causes harm to the telephone network, the telephone company may temporarily discontinue service. If possible, advance notification is given; otherwise, notification is given as soon as possible. The telephone company will advise the customer of the right to file a complaint with the FCC.

3. The telephone company may make changes in its facilities, equipment, operations, or procedures that could affect the proper operation of this equipment. Advance notification and the opportunity to maintain uninterrupted service are given.

4. If experiencing difficulty with this equipment, please contact ADTRAN for repair and warranty information. The telephone company may require this equipment to be disconnected from the network until the problem is corrected or it is certain the equipment is not malfunctioning.

5. This unit contains no user-serviceable parts.

6. An FCC compliant telephone cord with a modular plug is provided with this equipment. This equipment is designed to be connected to the telephone network or premises wiring using an FCC compatible modular jack, which is Part 68 compliant.

7. The following information may be required when applying to the local telephone company for a dial-up line for the V.34 modem:

Service Type	REN	FIC	USOC
1.544 Mbps - SF	04DU9-BN	6.0N	RJ-48C
1.544 Mbps - SF and B8ZS	04DU9-DN	6.0N	RJ-48C
1.544 Mbps - ESF	04DU9-1KN	6.0N	RJ-48C
1.544 Mbps - ESF and B8ZS	04DU9-1SN	6.0N	RJ-48C

8. The REN is useful in determining the quantity of devices you may connect to your telephone line and still have all of those devices ring when your number is called. In most areas, the sum of the RENs of all devices should not exceed five. To be certain of the number of devices you may connect to your line as determined by the REN, call your telephone company to determine the maximum REN for your calling area.

9. This equipment may not be used on coin service provided by the telephone company. Connection to party lines is subject to state tariffs. Contact your state public utility commission or corporation commission for information.

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.

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

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

Industry Canada Compliance Information

Notice: The Industry Canada label applied to the product (identified by the Industry Canada logo or the "IC:" in front of the certification/registration number) signifies that the Industry Canada technical specifications were met.

Notice: The Ringer Equivalence Number (REN) for this terminal equipment is supplied in the documentation or on the product labeling/markings. The REN assigned to each terminal device indicates the maximum number of terminals that can be connected to a telephone interface. The termination on an interface may consist of any combination of devices subject only to the requirement that the sum of the RENs of all the devices should not exceed five (5).

Canadian Emissions Requirements

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus as set out in the interference-causing equipment standard entitled "Digital Apparatus," ICES-003 of the Department of Communications.

Cet appareil numérique respecte les limites de bruits radioelectriques applicables aux appareils numériques de Class A prescrites dans la norme sur le materiel brouilleur: "Appareils Numériques," NMB-003 edictee par le ministre des Communications.

Warranty and Customer Service

ADTRAN will repair and return this product within 5 years from the date of shipment if it does not meet its published specifications or fails while in service. For detailed warranty, repair, and return information refer to the ADTRAN Equipment Warranty and Repair and Return Policy Procedure.

Return Material Authorization (RMA) is required prior to returning equipment to ADTRAN.

For service, RMA requests, or further information, contact one of the numbers listed at the end of this section.

LIMITED PRODUCT WARRANTY

ADTRAN warrants that for 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 the Customer for any incidental, special, punitive, exemplary or consequential damages experienced by either the 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 the Customer.

Customer Service, Product Support Information, and Training

ADTRAN will repair and return this product if within 5 years from the date of shipment the product does not meet its published specification or the product 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, use the contact information given below.

Repair and Return

If you determine that a repair is needed, please contact our Customer and Product Service (CAPS) department to have an RMA number issued. CAPS should also be contacted to obtain information regarding equipment currently in house or possible fees associated with repair.

> 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. (East Tower)
> Huntsville, Alabama 35806
>
> RMA # _____

Pre-Sales Inquiries and Applications Support

Your reseller should serve as the first point of contact for support. If additional pre-sales support is needed, the ADTRAN Support web site provides a variety of support services such as a searchable knowledge base, latest product documentation, application briefs, case studies, and a link to submit a question to an Applications Engineer. All of this, and more, is available at:

http://support.adtran.com

When needed, further pre-sales assistance is available by calling our Applications Engineering Department.

Applications Engineering   (800) 615-1176

Post-Sale Support

Your reseller should serve as the first point of contact for support. If additional support is needed, the ADTRAN Support web site provides a variety of support services such as a searchable knowledge base, updated firmware releases, latest product documentation, service request ticket generation and trouble-shooting tools. All of this, and more, is available at:

http://support.adtran.com

When needed, further post-sales assistance is available by calling our Technical Support Center. Please have your unit serial number available when you call.

Technical Support   (888) 4ADTRAN

Installation and Maintenance Support

The ADTRAN Custom Extended Services (ACES) program offers multiple types and levels of installation and maintenance services which allow you to choose the kind of assistance you need. This support is available at:

http://www.adtran.com/aces

For questions, call the ACES Help Desk.

ACES Help Desk   (888) 874-ACES (2237)

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) 963-6700
Training Email	training@adtran.com

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Chapter 1   Introduction

PRODUCT OVERVIEW

The T3SU 300 is a multiport DSU/CSU (data service unit/channel service unit) that provides access to T3 services. The unit provides a cost-effective, versatile approach for migrating T1 services to T3. The TDM (time division multiplexer) multiport design allows you to share the cost of a T3 line between multiple applications. This unit maximizes the use of T3 services, providing up to four data ports capable of transmitting and receiving high-capacity, real time data.

A HSSI (high speed serial interface) port is built in along with three 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 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), RFC 1407 standards, and an ADTRAN enterprise MIB, the T3SU 300 can be configured, monitored, and diagnosed using standard SNMP network management programs such as Hewlett Packard's HP OpenView™, IBM's Netview™, and Cabletron's Spectrum™.

Complete configuration, diagnostics, and performance monitoring are available through SNMP, TELNET, or a VT100 terminal interface. This connection can be made via Ethernet, a local EIA-232 link, or through the built-in V.34 modem. Advanced dial-out on trap capabilities through the built-in modem allow the T3SU 300 to contact remote hosts and alert them to DSX-3 network conditions (without dedicated management connections). The T3SU 300 is designed for either desktop use or installation in a 19-inch rack.

The major features or the T3SU 300 are as follows:

- Full feature multiport T3 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 VT100 terminal menu structure
- Integrated V.34 modem for dial-up and dial-out access
- Standard 5-year warranty

T3 OVERVIEW

T3 provides the same bandwidth as 28 T1s and is used to interconnect high-speed bridges, routers, front-end processors, and data terminal equipment (DTE). T3 service plays a major role in Internet backbones and public organizations needing broad bandwidth for WAN (wide area network) connectivity.

SNMP

The T3SU 300's embedded SNMP feature allows the unit to be accessed and controlled by a network manager through either the auxiliary (AUX) control port or the 10BaseT local area network

(LAN) port. The T3SU 300 supports the MIB-II standard, RFC 1213, and the ADTRAN Enterprise Specific MIB.

✎ NOTE   *MIB files are available from ADTRAN in the support section of the ADT-RAN web page at www.adtran.com.*

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
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 T3SU 300 that allows a remote user to control the T3SU 300 through the terminal menus. Only one TELNET session may be active at a time.

INTERFACE OPTION CARDS

Optional interface cards may be purchased to equip the T3SU 300 with up to three additional ports. HSSI, V.35, and Quad DSX-1 interface cards are available.

HSSI Card

The optional HSSI card plugs into one of the three card slots on the rear of the T3SU 300. With optional HSSI cards installed, the total 44.2 Mbps bandwidth of the T3 can be divided among the total number of ports to provide multiple data channels over the T3. The total bandwidth of the T3 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. When it is inserted in a slot on the rear panel and its faceplate is secured to the rear panel of the T3SU 300 with the integral thumb screws, a PCMCIA type connector on the card mates with a compatible connector on the main board of the T3SU 300. A standard 50-pin HSSI connector is then available for DTE connections. See the section *DTE Port Interface Card Slots* on page 35 for more information on installing option cards.

V.35 Card

The optional V.35 card plugs into the card slots on the rear of the T3SU 300 to provide a V.35-type DTE interface. Operation of the V.35 card is similar to that of 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. Instead of the standard HSSI connector, this card contains a standard 34-pin V.35 connector for DTE connections. See the section *DTE Port Interface Card Slots* on page 35 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 T3SU 300. This card allows you to transport up to four DSX-1 lines per card over the DS3 interface of the T3SU 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 any of the T3SU 300 DTE port card slots.

> **NOTE**
>
> *Even though the Quad DSX-1 interface card allows you to transport T1 information, the T3SU 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 T3SU 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 front section of this manual for contact information). Keep the original shipping container to use for future shipment or verification of damage during shipment.

ADTRAN Shipments Include

The following items are included in ADTRAN shipments of the T3SU 300:

- T3SU 300 unit
- User manual
- An 8-position modular to 8-position modular cable (part number: 3127004)
- An 8-position modular to DB-25 female connector (part number: 3196ADPT005)
- A 4-position modular to 4-position modular cable (part number: 3127014)
- Two BNC to BNC coaxial cables (part number: 3125I054)
- Mounting ears for 19-inch rack installation

- Rubber feet for stand-alone use

> **NOTE** *The ADTRAN T3SU 300 MIB is available in the support section of the ADTRAN web page at www.adtran.com.*

Customer Provides

The customer provides an interface cable for each port used. Each cable should be either HSSI, V.35, or an 8-pin modular cable, depending on the interface type.

Power Up

The AC version of the T3SU 300 is provided with a captive eight-foot power cord, terminated by a three-prong plug which connects to a grounded 115 VAC power receptacle.
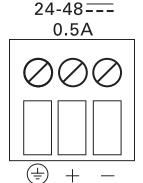
> **NOTE** *Power to the AC version of the T3SU 300 must be provided from a grounded 115 VAC, 60 Hz receptacle.*

A three-position terminal block which accommodates 12 to 26 AWG wire is located on the rear panel of the T3SU 300 DC version. The positive (+) and negative (-) terminals connect to a 24 to 48 VDC, 0.4A power source. Figure 2-1 on page 33 provides an illustration of the terminal block power connector, along with definitions for the three connector symbols.

> **NOTE** *The chassis should be connected to an earth ground.*

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

Figure 2-1. DC Power Connector

The following UL requirements must be met during installation of the DC version of the T3SU 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 V, 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.

INSTALLING THE UNIT

The T3SU 300 can be used as a desktop stand-alone device or mounted into a standard 19-inch equipment rack. See *Establishing Terminal Connection* on page 37 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 T3SU 300 enclosure at one of the three available positions.

> **NOTE** *Be sure to install the flanges with the screw provided.*

2. After the flanges have been installed, position the T3SU 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 *Power Up* on page 32 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 VT100 terminal device to the **CONTROL** interface jack on the front panel of the unit.

Desktop Installation

Follow these steps when using your T3SU 300 as a desktop unit:

1. Affix the four adhesive-backed rubber feet to the bottom of the unit, one in 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 *Power Up* on page 32 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 VT100 terminal device to the **CONTROL** interface jack on the front panel of the unit.

REAR PANEL

The T3SU 300 is equipped with three option card slots, a built-in HSSI interface, an alarm output terminal block, an auxiliary (AUX) port, a LAN port, and a DS3 interface. Pin assignments for

connectors are given in Appendix A, *Pinouts* on page 107. The T3SU 300 rear panel is shown in Figure 2-2.

Item	Function
On/Off Switch	On/Off control
115 VAC Connection	Power connection (AC version)
DTE Ports 2-4	Interface option card slots
Alarm	NC/NO relay contacts
DTE Port 1	Integral HSSI interface
Aux	Telephone line connection for internal V.34 modem
LAN	10BaseT LAN connection
DS3 Interface	T3 service connection
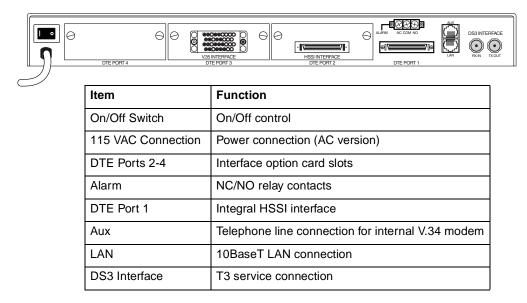
Figure 2-2. T3SU 300 Rear View (AC Version)

DTE Port Interface Card Slots

The T3SU 300 rear panel has three card slots for the installation of optional interface cards. To insert cards, perform the following procedure:

1. Remove blank slot cover from the rear of the T3SU 300.

2. Slide the card into the corresponding rear slot until the card panel is flush with the T3SU 300 chassis.

3. Push in thumbscrews and turn clockwise to secure the card and ensure proper connection to the main board of the T3SU 300.

Alarm Connector

The alarm connector is a three-position, screw-type terminal block that is connected to the three contacts of a Form C-type relay on the main board of the T3SU 300. This relay is activated any time the T3SU 300 detects an alarm condition on the T3 network interface. The alarm function can be disabled through the **ALARM RELAY** selection of the **CONFIGURATION** menu.

DTE Port 1 (HSSI Interface)

DTE port 1 is a built-in HSSI port that resides on the main board of the T3SU 300. The bandwidth of this port is configurable from 75 kbps to 44.2 Mbps in either 75 kbps or 3.16 Mbps increments. When a single application requires the full 44.2 Mbps of bandwidth, the T3SU 300 does not have to be equipped with additional port cards.

Auxiliary Port

The auxiliary (**AUX**) port is an 8-pin modular jack located on the rear panel of the T3SU 300. The **AUX** port provides a telephone line (POTS) connection for the internal V.34 modem.

The T3SU 300 can be configured as a dial-in host and also as a dial-out-on-TRAP device (meaning that the unit dials out to a specified host to report error conditions). Configure the modem parameters in the **DIALUP OPTIONS** menu under the **SYSTEM MANAGEMENT** portion of the **CONFIGURATION** menu (**CONFIGURATION** -> **SYSTEM MANAGEMENT** -> **DIALUP OPTIONS**).

LAN Port

The **LAN** port is an 8-pin modular connector that provides a 10BaseT Ethernet LAN interface. This **LAN** interface is used for SNMP and TELNET control.

DS3 Interface

The DS3 network interface is a full-duplex circuit provided by two BNC coaxial cable connections. The receive data from the network is connected to the **RX IN** connector, while the transmit data from the T3SU 300 is connected to the **TX OUT** connector.

FRONT PANEL

The T3SU 300 faceplate is shown in Figure 2-3. Descriptions of each part of the front panel follow.
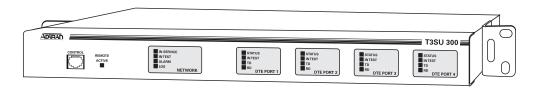
Figure 2-3. T3SU 300 Front Panel

Control Port

The T3SU 300 has an 8-pin modular jack labeled **CONTROL**. The control port provides connection to a VT100 EIA-232 compatible interface.

Establishing Terminal Connection

To control the T3SU 300 using a VT100 terminal, follow this procedure:

1. Configure the VT100 terminal for 57600 baud, 8-bit characters, no parity, and one stop bit.
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 T3SU 300.
3. Initialize the terminal session.
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 2-4 on page 38.

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 **Ctl**-**C** at any time.

```
                    Adtran T3SU 300 Main Menu

    1 - Status
    2 - Statistics
    3 - Configuration
    4 - Diagnostics

    5 - Remote login

    6 - Logout




  Enter selection >
```
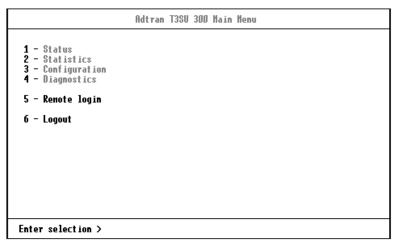
Figure 2-4. Terminal Main Menu

Navigating Within the Menus

Navigate within the T3SU 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 within the same selection	the up and down arrow keys. Additional screens are available when **UP** or **DOWN** is displayed in the right-hand side of the menu.
scroll left and right within the same screen	the left and right arrow keys. Additional screens are available when **<** or **>** is displayed in the top portion of the menu.

If you want to...	Press...
return to the previous menu	the **ESC** key.
end the terminal session	**Ctl-C**.
refresh the display	**Ctl-R**.

Menus Available

Status
This selection provides status information on the network and DTE ports. See Chapter 4, *Status* on page 67 for more information.

Statistics
This selection provides statistical information for the network and DTE ports. See Chapter 5, *Statistics* on page 75 for more information.

Configuration
The **CONFIGURATION** menu is used to set network, DTE, and system management parameters. See Chapter 3, *Configuration* on page 43 for more detailed information.

Diagnostics
The **DIAGNOSTICS** menu is used to perform loopback and BERT tests. See Chapter 6, *Diagnostics* on page 83 for more detailed information.

Remote Login
The **REMOTE LOGIN** selection allows you to configure the remote T3SU 300. The remote unit's password is required at login. The **DATA LINK** option (in the **DS3 NETWORK CONFIGURATION** menu) must be enabled in order to perform remote configuration.

Logout
The **LOGOUT** selection ends the terminal session and logs out of the system. Password entry is required before a new session can begin.

LED Descriptions

The T3SU 300 has LED status indicators for remote access, the network port, and for each individual DTE port. These LEDs are identified as follows:

Remote Active

This LED is solid when a remote configuration session is taking place through a TELNET session or from the remote end T3SU 300. It flashes when the unit is being accessed locally through the front panel **CONTROL** port.

Network LEDs

In Service
This LED is active when a valid signal is being received on the DS3 interface.

In Test
This LED is active when the network interface has been put in loopback by the service provider.

Alarm
This LED is active when the DS3 receive signal contains framing errors, the yellow alarm is received from the far end unit, or other alarm messages are received from the network.

LOS
This LED is active when no receive signal from the network is detected on the Rx (in) circuit.

DTE Port LEDs

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 is active when the DTE interface is in a loopback condition or is performing a BERT test.

TD

This LED is active when the T3SU 300 DTE port is transmitting data.

RD

This LED is active when the T3SU 300 DTE port is receiving data.

Chapter 3   Configuration

The T3SU 300 can be configured locally and remotely. Local configuration is accomplished through a 10BaseT Ethernet connection, a SLIP/PPP port, or a VT100 terminal. Remote configuration can take place through the T3 datalink using a local T3SU 300.

The **CONFIGURATION** menu (see Figure 3-1 on page 44) consists of the following submenus relating to specific interfaces or functions:

DS3 NETWORK

DTE PORTS

SYSTEM MANAGEMENT

UTILITIES

SAVE CONFIGURATION

Detailed descriptions of each individual menu parameter are given in the following sections. These sections are divided by the five submenus: **DS3 NETWORK** (page 44), **DTE PORTS** (page 46), **SYSTEM MANAGEMENT** (page 55), **UTILITIES** (page 65), and **SAVE CONFIGURATION** (page 66).

```
                            Configuration

    1 - DS3 Network
    2 - DTE Ports
    3 - System Management
    4 - Utilities

    5 - Save Configuration




Enter selection > _
```

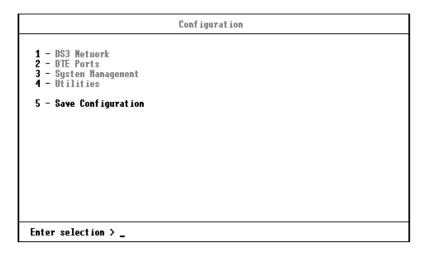**Figure 3-1. Configuration Main Menu**

DS3 NETWORK

Select **1 DS3 NETWORK** to access the network configuration
parameters. Configure the T3SU 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 on page 45.
Descriptions of the **DS3 NETWORK** fields follow the figure.

```
                      DS3 Network Configuration

   1 - DS3 framing = C-Bit parity
   2 - Line length = Short (0 - 225 ft.)
   3 - DS3 timing = Local
   4 - DS3 scrambler = Disabled
   5 - Multiplexing Mode

   6 - Data Link = Enabled
   7 - Remote auto-configuration = Slave

   8 - IDLE alarm suppression = Disabled
   9 - XCV Threshold = Disabled




  Enter selection > _
```

Figure 3-2. DS3 Network Configuration Menu

DS3 Framing

Set the framing format to match the format of the receive signal at the network interface. **C-BIT PARITY** and **M13** framing formats are supported. Select **AUTO** to allow the interface to detect the framing type automatically.

Line Length

Set the line length to reflect the physical length of the DS3 network line. Set to **LONG** if the cabling distance exceeds 225 feet; set to **SHORT** if the distance is less than 225 feet.

DS3 Timing

Set the timing to **LOOP** if the T3SU 300 is to derive timing from the network; set to **LOCAL** if the unit is to be the master timing source for the circuit. In most cases, the unit should be configured for **LOOP** timing.

DS3 Scrambler

Enable this option to scramble the DS3 payload data. This prevents certain transport equipment from falsely reporting alarms.

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.

Data Link

Set to **ENABLE** to allow for remote configuration. When enabled, the T3SU 300 provides a channel between the local and the remote DSU for point-to-point remote configuration.

Remote Auto-Configuration

This feature allows one T3SU 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.

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 on page 47. 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 54.

```
                    Configure DTE Ports

     1 - DTE Port 1
     2 - DTE Port 2
     3 - DTE Port 3
     4 - DTE Port 4

     5 - 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. **PORT CONFIGURATION** menu examples are shown in Figure 3-4 on page 48 and Figure 3-5 on page 52. 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 49 lists the menu fields available for HSSI and V.35 interfaces.
- Table 3-2 on page 50 lists the menu fields available for V.35 interfaces (in addition to those listed in Table 3-1).
- Table 3-3 on page 52 lists the menu fields available for DSX-1 interfaces.

```
                        Port 2 Configuration

        Interface type = V.35
        Port status = Inactive

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

        Port bandwidth = 75.18 Kbps
        Unallocated 75k blocks = 588

   3 - Apply settings

   4 - CS = Forced ON              8 - Transmit clock = Normal
   5 - TR = Ignored
   6 - SR = Forced ON
   7 - CD = Forced ON


 Enter selection >
```

Figure 3-4. Port Configuration Menu (V.35 Interface Card)

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 50 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:** 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 an 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
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 T3SU 300. You may cancel changes made to the current **PORT CONFIGURATION** menu by pressing the **ESC** key.
Note: 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 T3SU 300's response to the data terminal ready (TR) lead.
	IGNORED: The T3SU 300 ignores the state of the TR lead.
	IDLE WHEN OFF: The T3SU 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 T3SU 300 receives an out of service/out of frame (OOS/OOF) condition from the network.
	OFF WHEN TEST: The SR lead remains on except when the T3SU 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.

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

Selection	Description
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 T3SU 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 T3SU 300. Use the following chart to determine your selection:

Select...	If...
Normal	you want the transmit clock to be derived from the T3SU 300.
Invert	your DTE device cannot provide a transmit clock signal and data errors are present between your DTE and the T3SU 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.

> **NOTE**
>
> *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 85 for information on performing these tests.*

Configuration Selections for DSX-1 Interfaces

The configuration selections listed in Table 3-3 on page 52 are available for Quad DSX-1 interfaces. Separate selections can be made for each of the four DSX-1 ports of the card. This menu is shown in Figure 3-5 on page 52.

```
                        Port 3 Configuration

        Interface type = QUAD DSX-1
        Port status = Inactive           9 - DSX-1 Timing Source = DS3
        Unallocated 75k blocks = 588    10 - Apply settings

        DSX-1 #1                             DSX-1 #3
    1 - Port state = Disabled           11 - Port state = Disabled
    2 - Framing = ESF                   12 - Framing = ESF
    3 - Line coding = B8ZS              13 - Line coding = B8ZS
    4 - Line length = 533-655 ft.       14 - Line length = 533-655 ft.

        DSX-1 #2                             DSX-1 #4
    5 - Port state = Disabled           15 - Port state = Disabled
    6 - Framing = ESF                   16 - Framing = ESF
    7 - Line coding = B8ZS              17 - Line coding = B8ZS
    8 - Line length = 533-655 ft.       18 - Line length = 533-655 ft.


 Enter selection >
```

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

> **NOTE**   *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 T3SU 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 T3SU 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- 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- 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 the near- and far-end 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** (x is 1,2,3, or 4): 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 T3SU 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 on page 55.

> **NOTE**
>
> **TIMED PROFILE** *selections are only available if the* **REMOTE AUTO-CONFIGURATION** *selection is set to* **MASTER** *on the near-end T3SU 300 and* **SLAVE** *on the far-end T3SU 300 (*CONFIGURATION *->* **DS3 NETWORK** *->* **REMOTE AUTO-CONFIGURATION***).*

```
                        Timed Profiles

      Current Time = 13:14:04

   1 - Bandwidth Profile 1
   2 - Bandwidth Profile 2

   3 - Profile 1 switch time = 00:00:00
   4 - Profile 2 switch time = 00:00:00

   5 - Active Profile = Disabled




 Enter selection >
```

Figure 3-6. Timed Profiles Screen

Bandwidth Profiles 1 and 2

The **PROFILE CONFIGURATION** screens allow you to change the **PORT STATE** and **Nx75K BLOCKS** options for HSSI and V.35 ports. See page 49 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 day 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 55.

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 disable the profiles completely.

```
                    Profile 1 Configuration

        DTE Port 1                      DTE Port 3
          Interface type = HSSI           Interface type = QUAD DSX-1
    1 - Port state = Disabled       5 - DSX-1 Port 1 state = Disabled
    2 - N x 75k blocks = 0          6 - DSX-1 Port 2 state = Disabled
          Port bandwidth = 0 bps    7 - DSX-1 Port 3 state = Disabled
                                    8 - DSX-1 Port 4 state = Disabled

        DTE Port 2                      DTE Port 4
          Interface type = V.35           Interface type = HSSI
    3 - Port state = Disabled       9 - Port state = Disabled
    4 - N x 75k blocks = 0         10 - N x 75k blocks = 0
          Port bandwidth = 0 bps          Port bandwidth = 0 bps


        Unallocated 75k blocks = 588

    Enter selection > _
```

Figure 3-7. Example of a Profile Configuration Menu

SYSTEM MANAGEMENT

The **SYSTEM MANAGEMENT** menu allows you to configure the T3SU 300 for management through SNMP, TELNET, or a VT100 interface. Embedded SNMP and TELNET are available through either a SLIP/PPP or a 10BaseT Ethernet port. The **SYSTEM MANAGEMENT CONFIGURATION** menus is shown in Figure 3-8 on page 56.

```
                    System Management Configuration

Management Options                    System Security
  1 - Local IP Address = 10.210.10.12  13 - Password = *
  2 - Subnet Mask = 255.255.255.0      14 - Terminal timeout = Disabled
  3 - Gateway IP Address = 10.210.10.1 15 - IP Security = Disabled
  4 - Remote IP Address = 0.0.0.0      16 - IP Hosts
  5 - Management Port = LAN
  6 - Auxiliary Port Mode = Local VT-100  Miscellaneous
  7 - Auxiliary Port Baud Rate = 38400 17 - Unit ID =
                                        18 - Date = 09/10/02
SNMP Management Options                19 - Time = 14:56:13
  8 - READ Community Name = public     20 - Alarm Relay = Disabled
  9 - WRITE Community Name = private
 10 - TRAP Community Name = trap
 11 - TRAP IP Addresses
 12 - TRAP Generation


Enter selection >
```

Figure 3-8. System Management Configuration Menu

Local IP Address

Enter the T3SU 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.

Subnet Mask

Enter the subnet mask of the T3SU 300. This address is available from the network administrator.

Gateway IP Address

Enter the gateway IP address of the T3SU 300. This address is necessary only if the T3SU 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.

Remote IP Address

Enter the remote T3SU 300's IP address to provide network management access through the local T3SU 300. See the section *Remote SNMP Management Application on page 104* for more information.

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 16 IP addresses of management stations from which the unit should accept management commands. These addresses are only applicable if **IP SECURITY** is enabled.

Management Port

Assign the management port to be either **LAN**, **FDL** (facility datalink), or the **AUX PORT**.

Modem Mode

Select the **AUX** port function for your application. The **AUX** port, located on the rear panel of the T3SU 300, provides a telephone line (POTS) for connecting to the internal V.34 modem. The modem interface can be configured for dial-in service in VT100, SLIP, and PPP modes. In addition, the T3SU 300 is capable of dial-out operation to report error conditions. All modem options can be configured in the **DIALUP OPTIONS** menu located on the **SYSTEM MANAGEMENT CONFIGURATION** screen. See Figure 3-8 on page 56. The **DIALUP OPTIONS** are described on page 62.

Selections for the **MODEM MODE** include dialup options for VT100, PPP, and SLIP. If the **MANAGEMENT PORT** option is set to **AUX PORT**, the **PPP** and **SLIP** options are available.

Modem Baud Rate

Set the operating speed of the **AUX** port to match the connected device. The selections are 1200, 2400, 4800, 9600, 19200, and 38400 bps.

Read Community Name

Enter the authentication strings used for SNMP management. Match the T3SU 300 to the SNMP manager for read privileges.

Write Community Name

Enter the authentication strings used for SNMP management. Match the T3SU 300 to the SNMP manager for write privileges.

Trap IP Addresses

Enter up to five IP addresses of SNMP managers to which the T3SU 300 sends traps.

Trap Generation

This selection determines which trap types (if any) are generated by the unit. Use this menu (see Figure 3-9 on page 59) 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 on page 59 through Table 3-8 on page 61 for trap descriptions.

```
                        TRAP Generation

        Near End Alarm TRAPs            MIB II Standard TRAPs
   1 - Red Alarm (LOS)    = Disabled  14 - Cold Start       = Disabled
   2 - Out of Frame (OOF) = Disabled  15 - Link Up/Down      = Disabled
   3 - Yellow Alarm (RAI) = Disabled  16 - Auth. Failure     = Disabled
   4 - Blue Alarm (AIS)   = Disabled
   5 - Idle Signal        = Disabled      Network Test TRAPs
                                       17 - Network Test In/Out = Disabled
        Far End Alarm TRAPs
   6 - Red Alarm (LOS)    = Disabled      DTE Port TRAPs
   7 - Out of Frame (OOF) = Disabled  18 - Port Status Change  = Disabled
   8 - Yellow Alarm (RAI) = Disabled
   9 - Blue Alarm (AIS)   = Disabled      QDSX ALARM TRAPs
  10 - Idle Signal        = Disabled  19 - QDSX Alarms       = Disabled
  11 - Eqpt. Fail NSA     = Disabled
  12 - Eqpt. Fail SA      = Disabled  20 - Toggle ALL TRAPs
  13 - Con. Eqpt. Fail NSA = Disabled

 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.
Blue Alarm (AIS)	when the unit detects an incoming AIS signal.
Idle Signal	when the unit detects an incoming idle signal (1100) over the entire DS3 bandwidth.

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 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.
Blue Alarm (AIS)	when the unit receives indication from the far end unit through the FEAC channel that the far end unit is receiving an AIS 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 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 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).

Unit ID

Enter a name to identify the unit for management purposes.

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.

Date/Time

Enter date and time information. Enter the time in military time (separated by colons). Enter the month, date, and year (separated by forward slashes). 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.

Dialup Options

Configure the dialup capabilities of the T3SU 300. See Figure 3-10 on page 63. Descriptions of the individual fields of this menu follow the figure.

```
                        Dialup Options

   1 - Primary Phone Number =
   2 - Secondary Phone Number =
   3 - Init String = ATZ
   4 - Dial String = ATDT

   5 - Maximun redial attempts = 10
   6 - Idle timeout = 10
   7 - Connection timeout (> 20 sec) = 60
   8 - Pause between calls = 3

   9 - Dialout on trap = Disabled
  10 - Answer on ring = Enabled

  11 - Hangup

       Last Modem Response = OK


 Enter selection >
```

Figure 3-10. Dialup Options Menu

Primary and Secondary Phone Numbers

> When the T3SU 300 dials out to send a trap, it first dials the
> PRIMARY PHONE NUMBER. If the call is unsuccessful, it tries the
> SECONDARY PHONE NUMBER. Attempts between the two numbers
> continue until a call is established and the trap is reported (or until
> each number's maximum for redial attempts is reached).

Initializing String

> The AT command entered in this field is used to initialize the
> modem. Normally, this field should be left at the default setting
> (ATZ).

Dial String

> The AT command entered in this field causes the modem to dial
> out. Normally, this field should be left at the default setting
> (ATDT).

Maximum Redial Attempts

> The T3SU 300 attempts to establish a call the number of times
> entered in this field. If a successful call is not established after the
> final attempt, the T3SU 300 discards the trap messages.

Idle Timeout

> Once a call is established and the trap messages are sent, the T3SU 300 remains online for the amount of seconds entered in this field. If the field is set to 0, the unit hangs up as soon as the trap is sent.

Connection Timeout

> The T3SU 300 waits for a connection the amount of seconds entered in this field. Timing begins as soon as the dial command is issued.

Pause Between Calls

> The T3SU 300 waits the number of seconds entered in this field between redial attempts.

Dialout On Trap

> Enable or disable the T3SU 300's ability to dial out to report traps. When configured for **DIALUP VT100**, the unit reports error conditions in plain ASCII with the following information:
>
> • The Unit ID value programmed in the Unit ID field of the **SYSTEM MANAGEMENT** screen (see Figure 3-8 on page 56).
>
> • A trap code indicating the error condition (selected from the **TRAP GENERATION** screen under **SYSTEM MANAGEMENT**)
>
> • The date and time when the error was logged
>
> When the **MODEM MODE** is configured for **DIALUP PPP** or **DIALUP SLIP**, the unit logs in to the PPP/SLIP host and reports the error conditions to the hosts designated under the **TRAP IP ADDRESSES** (also found under **SYSTEM MANAGEMENT**).

Answer on Ring

> Enable or disable the T3SU 300's ability to accept an incoming call. If enabled, incoming calls are automatically answered by the T3SU 300, allowing you to remotely perform management functions.

Hangup

> Selecting this option forces the T3SU 300 to end an established call.

Last Modem Response

> This status field displays the last modem response to the T3SU 300. Possible responses include:
>
> **OK**
> **CONNECT**
> **BUSY**
> **ERROR**
> **NO DIALTONE**
> **NO CARRIER**

UTILITIES

> The **UTILITIES** menu allows you to view T3SU 300 system information (including self-test results), revert to default configuration settings, update the flash software of the local unit, update the flash software of the far-end T3SU 300, or reset the unit. The **SYSTEM UTILITIES** menu is shown in Figure 3-11 on page 66. Possible results for the self-test are listed in the following chart.

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 the inside front section of this manual for more information.
CONFIGURATION CORRUPT	select **SAVE CONFIGURATION** from the main **CONFIGURATION** menu. If condition persists, contact ADTRAN Technical Support.

```
                        System Utilities

        MAC Address = 00:C0:A8:D2:43:21
        Serial number = B10234567
        Hardware = 2nd GENERATION T3SU, 120V AC, V.34 MODEM

        Software version = 2.00B          Boot version = 1.00A
        Software checksum = EAA8          Boot ckecksum = 8C9A

        Self test results = PASS

     1 - Load default settings
     2 - Update FLASH software via XMODEM
     3 - Update FLASH software using TFTP
     4 - Update REMOTE FLASH
     5 - Restart


   Enter selection >
```

Figure 3-11. 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. The **STATUS** menu is shown in Figure 4-1.

```
                            Status

    Network
    DS3 framing = C-Bit parity       Data Link State = Down
    Network State = Alarm            Remote State = Unknown
    Alarm State = LOS (Red Alarm)

    DTE Port 1                       DTE Port 3
    Interface type = HSSI            Interface type = QUAD DSX-1
    Port status = Inactive           Port status = Inactive
    Bandwidth = 0 bps                T1 Status = OFF  OFF  OFF  OFF
    DTE Leads =

    DTE Port 2                       DTE Port 4
    Interface type = V.35            Interface type = HSSI
    Port status = Inactive           Port status = Inactive
    Bandwidth = 0 bps                Bandwidth = 0 bps
    DTE Leads =                      DTE Leads =

    Enter selection > _
```

Figure 4-1. Status Menu

NETWORK PORT

DS3 Framing

The DS3 framing type is shown in this field.

Network State

This field displays the current chart:

Condition	Description
Normal	The T3SU 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.

Alarm State

This field displays the current alarm condition of the T3SU 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.
Blue (AIS)	The unit is receiving a blue alarm condition from the network. A blue alarm occurs when consecutive 1010s are received in the information bits. This indicates that there is a transmission fault located either at or upstream from the transmitting terminal.
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.

Data Link State

This field displays the current state of the data link between the local and the remote T3SU 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.

Remote State

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.
AIS (Blue Alarm)	The unit is receiving a blue alarm condition from the network. A blue alarm occurs when consecutive 1010s are received in the information bits. This indicates that there is a transmission fault located either at or upstream from the transmitting terminal.
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.

Condition	Description
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 T3SU 300 is unable to determine the state of the network or the remote unit.

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.

Condition	Description
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.

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 T3SU 300 unit is unable to communicate with the Quad DSX-1 interface card. If displayed, call ADTRAN Technical Support (see front section 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.

> **NOTE**
>
> *When a DSX-1 port is enabled but is not attached to a DTE device, the T3SU 300 will transmit an unframed all ones condition (blue alarm) to the remote site.*

Bandwidth

Displays the amount of bandwidth being used by the port. This field does not apply to the Quad DSX-1 interface card.

DTE Leads

If a lead is active on the port, it is displayed 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 are as follows:

HSSI Interface Leads	Condition
TA (terminal available)	Asserted by the DTE to indicate readiness to transmit data.
CA (communications equipment available)	Asserted by the T3SU 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 T3SU 300 when either the network or the port is being tested.

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

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

Table 4-2. V.35 Interface Leads

Lead	Condition
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 T3SU 300 when either the network or port is being tested.

Chapter 5 Statistics

VIEWING STATISTICAL INFORMATION

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

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.

> **NOTE** *If the* **DATA LINK** *option is disabled, remote statistics are not available (***CONFIGURATION*** -> ***DS3 NETWORK*** -> ***DATA LINK***).*

```
                        Local Statistics

Alarm History
  1 - Current 15 Minute Interval
  2 - 24 Hour History
  3 - 24 Hour Totals
  4 - Cumulative Alarm Count

Performance Parameters
  5 - Current 15 Minute Interval
  6 - 24 Hour History
  7 - 24 Hour Totals

Other Statistics
  8 - Port 3 Quad DSX-1 Alarm History



Enter selection >
```
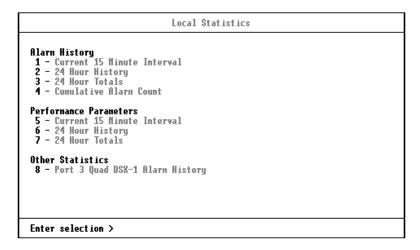
Figure 5-1. Main Local Statistics Menu Screen

Alarm History

The T3SU 300 keeps track of yellow, blue, 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 Figure 5-2 and Figure 5-3 on page 77 for examples of alarm 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 that the Quad DSX-1 card is installed in). See Figure 5-4 on page 78 for an example of the 24-hour alarm history for the card.

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

```
┌─────────────────────────────────────────────────────────────────┐
│                    Local Current Alarm Count                      │
├─────────────────────────────────────────────────────────────────┤
│                                                                   │
│   Near-End Yellow Alarm                      0                    │
│   Near-End Blue Alarm                        0                    │
│   Near-End Red Alarm                         0                    │
│                                                                   │
│   Far-End Yellow Alarm                       0                    │
│   Far-End Blue Alarm                         0                    │
│   Far-End Red Alarm                          0                    │
│                                                                   │
│    1 - Clear ALL DS3 alarm counts                                 │
│                                                                   │
│                                                                   │
│                                                                   │
│                                                                   │
│                                                                   │
├─────────────────────────────────────────────────────────────────┤
│   Enter selection > _                                             │
└─────────────────────────────────────────────────────────────────┘
```
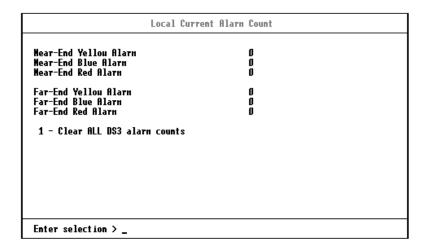
Figure 5-2. Current Alarm Count Screen

```
┌─────────────────────────────────────────────────────────────────┐
│             Local 15 Minute Alarm History                    ▶    │
├─────────────────────────────────────────────────────────────────┤
│   Interval starting at:          13:34    13:19    13:04   12:49  │
│                                                                   │
│   Near-End Yellow Alarm            0        0        0       0    │
│   Near-End Blue Alarm              0        0        0       0    │
│   Near-End Red Alarm               0        0        0       0    │
│                                                                   │
│   Far-End Yellow Alarm             0        0        0       0    │
│   Far-End Blue Alarm               0        0        0       0    │
│   Far-End Red Alarm                0        0        0       0    │
│    1 - Clear ALL DS3 alarm counts                                 │
│                                                                   │
│                                                                   │
│                                                                   │
│                                                                   │
├─────────────────────────────────────────────────────────────────┤
│   Enter selection > _                                             │
└─────────────────────────────────────────────────────────────────┘
```

Figure 5-3. 24-Hour Alarm History Screen

> **NOTE**
>
> *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 5-4 on page 78).*

```
                        24 Hour History
                                                              ▶
    DSX-1 #1      13:49  13:34  13:19   DSX-1 #3      13:49  13:34  13:19
    Red Alarm       0      0      0     Red Alarm       0      0      0
    OOF Alarm       0      0      0     OOF Alarm       0      0      0
    Yellow Alarm    0      0      0     Yellow Alarm    0      0      0
    Blue Alarm      0      0      0     Blue Alarm      0      0      0
    Frame Slip      0      0      0     Frame Slip      0      0      0

    DSX-1 #2      13:49  13:34  13:19   DSX-1 #4      13:49  13:34  13:19
    Red Alarm       0      0      0     Red Alarm       0      0      0
    OOF Alarm       0      0      0     OOF Alarm       0      0      0
    Yellow Alarm    0      0      0     Yellow Alarm    0      0      0
    Blue Alarm      0      0      0     Blue Alarm      0      0      0
    Frame Slip      0      0      0     Frame Slip      0      0      0

    Quad DSX-1 Interface
    PLL Lock Alarm    0      0      0     1 - Clear ALL Quad DSX-1 counts


    Enter selection > _
```

Figure 5-4. 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 Figure 5-5 on page 79 through Figure 5-7 on page 81 for examples of the performance parameter screens.

Descriptions of each field of these screens follow:

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 5-6 on page 80).

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 loss of signal (LOS) defects occurred.

```
                    Local Current Performance

Unavailable Seconds (UAS)              829
Severely Errored Framing Sec (SEFS)    829
Line Coding Violations (LCV)           3621726240
Line Errored Seconds (LES)             829
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

  1 - Clear ALL local DS3 statistics



Enter selection > _
```

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

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.

```
┌────────────────────────────────────────────────────────────┐
│               Local Performance History                     │
│                                                         ▶▶  │
├────────────────────────────────────────────────────────────┤
│                                                             │
│  Interval starting at:         17:49   17:34   17:19   17:04│
│                                                             │
│  Unavailable Seconds (UAS)       900     900     900     900│
│  Severely Errored Framing Sec (SEFS)  900  900   900     900│
│  Line Coding Violations (LCV) 39319033 39319033 39319033 39319033│
│  Line Errored Seconds (LES)      900     900     900     900│
│  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│
│                                                             │
│   1 - Clear ALL local DS3 statistics                        │
│                                                             │
├────────────────────────────────────────────────────────────┤
│  Enter selection >                                          │
└────────────────────────────────────────────────────────────┘
```

Figure 5-6. Network Port Statistics 24-Hour History Screen

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.

```
                    Local 24 Hour Performance Totals

  Unavailable Seconds (UAS)              20700
  Severely Errored Framing Sec (SEFS)    20700
  Line Coding Violations (LCV)        232977159
  Line Errored Seconds (LES)             20700
  P-Bit Errored Seconds (PES)                0
  P-Bit Severely Errored Sec (PSES)          0
  P-Bit Coding Violations (PCV)              3
  C-Bit Coding Violations (CCV)              0
  C-Bit Errored Seconds (CES)                0
  C-Bit Severely Errored Sec (CSES)          0
  F-Bit Errors (FBE)                         7
  M-Bit Errors (MBE)                         1

   1 - Clear ALL local DS3 statistics



  Enter selection >
```

Figure 5-7. Network Port Statistics Menu (24-Hour Totals)

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 T3SU 300. Figure 6-1 on page 84 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 Options: page 85 through page 87
HSSI and V.35 Port Options: page 87 through page 90
Quad DSX-1 Interface Card Options: page 91 through page 96
BERT Configuration Options: page 97 through page 98

> **NOTE**
>
> *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.*

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

```
                          Diagnostics

        DS3                         BERT Configuration
    1 - Data Mode              6 - Pattern = All Zeros
                               7 - Invert pattern = Disabled
        DTE Port 1
    2 - Data Mode                  Port = None
                                   Direction = Network
        DTE Port 2                 State = NO SYNC
    3 - Data Mode                  Errors = 0
                                   Current ERR/SEC = 0
        DTE Port 3
    4 - Data Mode              8 - Insert error
                               9 - Clear errors
        DTE Port 4
    5 - Data Mode             10 - Reset ALL tests



    Enter selection > _
```
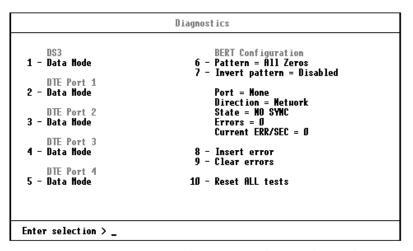
Figure 6-1. Diagnostics Main Menu

DS3

Access the DS3's diagnostic options by selecting **1** from the main **DIAGNOSTICS** menu. The menu in Figure 6-2 appears.

```
                          Diagnostics

     1 - Data Mode
     2 - DS3 Payload Loopback
     3 - Line Loopback
     4 - BERT
     5 - Remote DS3 Loopback
     6 - Remote DS3 Loopback w/BERT










  Enter new value > _
```
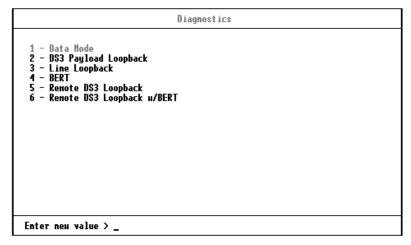
Figure 6-2. DS3 Diagnostics Menu

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 on page 86 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.*
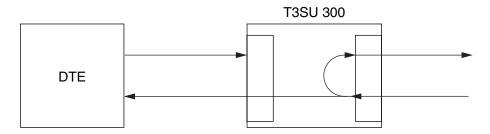
Figure 6-3. DS3 Payload Loopback Test

Line Loopback

This test allows the loop interface (LINE) section of the local T3SU 300 to be tested from the remote T3SU 300 over the actual T3 circuit. Testing from the remote end of the circuit is performed by using a 511 test pattern or DTE data generated by the remote host. With this test, the T3SU 300 transceiver receives data from the network and loops it back toward the network through its transmitter. The transmitted data is identical to the receive data (including framing errors) and can therefore be accurately tested by the carrier for errors. See Figure 6-4.

> **NOTE** *The Line Loopback test is only available in loop timed mode (CONFIGURATION -> DS3 NETWORK -> DS3 TIMING -> LOOP).*
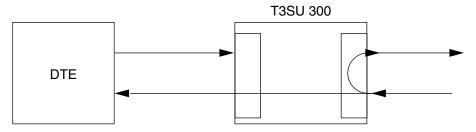
Figure 6-4. Line Loopback Test

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. The DS3 Loopback test is described on page 85.

Remote 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 the section *Quad DSX-1 Diagnostic Options* on page 91 for testing options available for the DSX-1 ports.

HSSI and V.35 Diagnostic Options

The menu in Figure 6-5 appears if the selected DTE port is HSSI or V.35. Descriptions of the menu selections follow the figure.

```
                          Diagnostics

    1 - Data Mode
    2 - Payload Loopback
    3 - Payload BERT
    4 - DTE Loopback
    5 - Payload and DTE Looback
    6 - Remote Port Payload Loopback
    7 - Remote payload loopback w/BERT











 Enter new value >
```
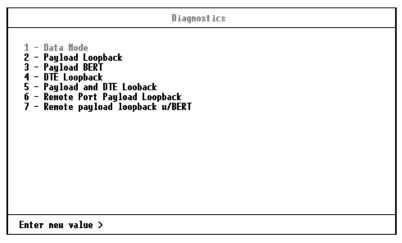
Figure 6-5. HSSI or V.35 Port Diagnostics Menu

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 T3SU 300 and the remote DTE. This test is non-intrusive to the three other ports. See Figure 6-6 on page 89.

> **NOTE**
>
> *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.*
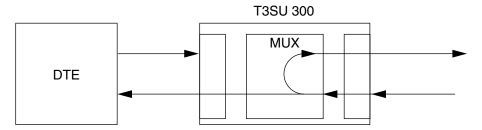
Figure 6-6. Payload Loopback Test

Payload BERT
This selection performs a bit error rate test on the selected port. This test in 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 6-7.
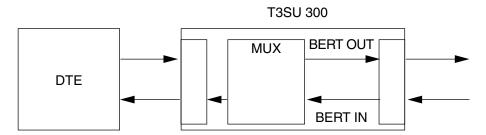
Figure 6-7. Payload BERT Test

DTE Loopback
This test is used to verify proper operation of the link between the T3SU 300 and the terminal equipment. During this test, all data sent by the terminal equipment is looped back to the terminal equipment. A block diagram illustrating the loopback point and the signal path is shown in Figure 6-8 on page 90.

> **NOTE** *While in DTE Loopback, data from the host is transmitted into the network.*
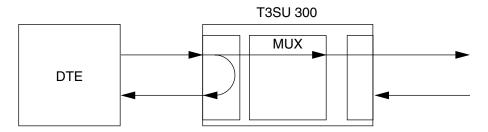
Figure 6-8. DTE Loopback Test

Payload and DTE Loopback

Select this test to perform payload and DTE loopbacks simultaneously. The individual tests are described on page 85 and page 89. See Figure 6-9 for a block diagram illustrating this test.
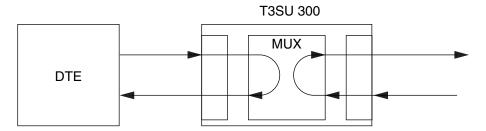
Figure 6-9. Payload and DTE Loopback Test

Remote Port Payload Loopback

This selection initiates a Payload Loopback on the remote T3SU 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 T3SU 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 T3SU 300 and the corresponding remote T3SU 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 T3SU 300 are the same as the Payload Loopback test for the local T3SU 300 (shown in Figure 6-6 on page 89).

Quad DSX-1 Diagnostic Options

The menu in Figure 6-10 appears if the selected port is a Quad DSX-1. Descriptions of the menu selections follow the figure.

```
                        Diagnostics

   1 - Data Mode                    17 - #4 Line Loopback
   2 - #1 Payload Loopback          18 - Payload Loopback
   3 - #1 Framer Loopback           19 - DTE Loopback
   4 - #1 Local Loopback            20 - Payload and DTE Looback
   5 - #1 Line Loopback             21 - Remote Port Payload Loopback
   6 - #2 Payload Loopback
   7 - #2 Framer Loopback
   8 - #2 Local Loopback
   9 - #2 Line Loopback
  10 - #3 Payload Loopback
  11 - #3 Framer Loopback
  12 - #3 Local Loopback
  13 - #3 Line Loopback
  14 - #4 Payload Loopback
  15 - #4 Framer Loopback
  16 - #4 Local Loopback

  Enter new value >
```

Figure 6-10. 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 6-11 for an illustration of this test.
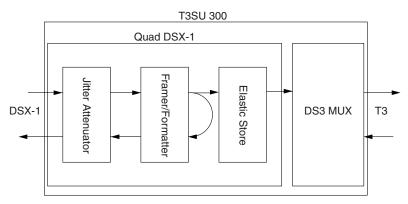
Figure 6-11. T1 Payload Loopback Test

#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 6-12 for an illustration of this test.
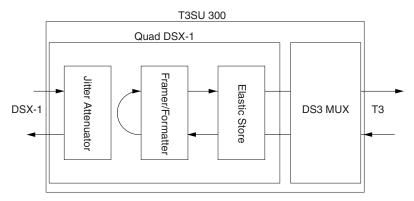
Figure 6-12. Framer Loopback Test

#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 previously), with the exception that this test penetrates the circuitry deeper into the Quad DSX-1 interface card. See Figure 6-13 for an illustration of this test.
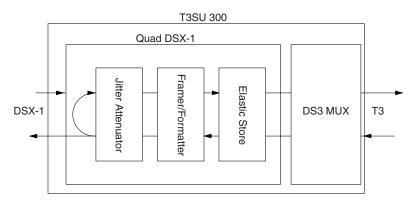
Figure 6-13. T1 Local Loopback Test

#x Line Loopback
During this test, all information on the selected DSX-1 interface, including framing, is looped back towards the DTE. See Figure 6-14 for an illustration of this test.
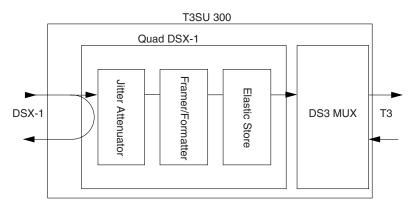
Figure 6-14. Line Loopback Test

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 6-15 for an illustration of this test.
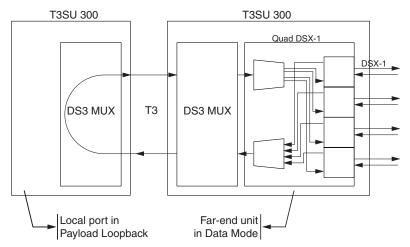
Figure 6-15. Payload Loopback Test

DTE Loopback

During this test, the combined information from the four DSX-1 interfaces is locally looped at the multiplexer of the T3SU 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 6-16 for an illustration of this test.
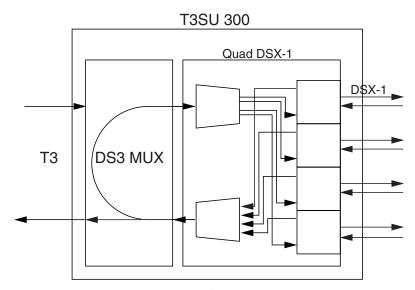
Figure 6-16. DTE Loopback Test

Payload and DTE Loopback

This test is a combination of a Payload Loopback and a DTE Loopback. All of the near- and far-end DSX-1 interfaces on the selected Quad DSX-1 interface card are looped back. See Figure 6-17 on page 96 for an illustration of this test.
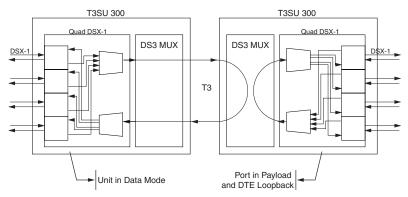
Figure 6-17. Payload and DTE Loopback Test

Remote Port 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 6-18 for an illustration of this test.
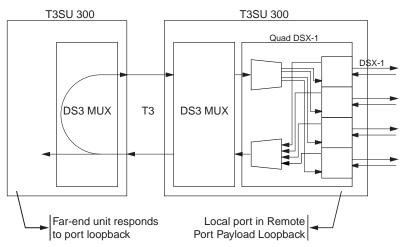
Figure 6-18. T1 Payload Loopback Test

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 6-19). 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 T3SU 300. Instead of using data from the host, this test uses data generated by the T3SU 300's internal test pattern generator and detector.

```
                             Pattern

     1 - All Zeros
     2 - All Ones
     3 - 2^15-1
     4 - 2^23-1








    Enter new value > _
```
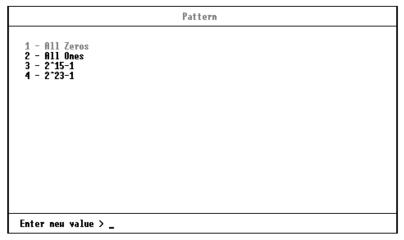
Figure 6-19. BERT Pattern Menu

Invert Pattern

If set to **ENABLE**, the T3SU 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 84).

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 T3SU 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 100), a fractional T3 application (page 102), a remote SNMP management application (page 104), and a voice application (page 105). 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 T3SU 300 operates with other vendor products that support 44.2 Mbps data over unchannelized T3 circuits.

In the application shown in Figure 7-1 on page 99, the T3SU 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 100 for an example configuration.
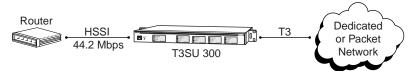
Figure 7-1. Single Port Application

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

	Local T3SU 300
DS3 Network	DS3 Framing - C-bit Parity
	Line Length - Short
	DS3 Timing - Loop
	Data Link - Enabled
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 T3SU 300 for multiport operation. The T3SU 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 Port Interface Card Slots* on page 35 for more information on card installation. A configuration example of this application using a Quad DSX-1 card is on page 105.

This application (shown in Figure 7-2 on page 101) supports two subnet connections via two different routers, a video conferencing connection, and a main frame data connection. The T3SU 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 T3SU 300 to provide 18 Mbps for each router, 1.5 Mbps for the video conference units, and 6 Mbps for the main frames. See Figure 7-2 for an example configuration of this application.
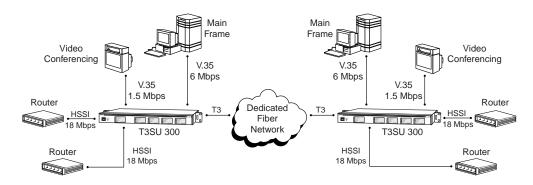
Figure 7-2. Multiport Application

Table 7-2. Multiport Application Configuration Example

	Local T3SU 300	**Remote T3SU 300**
DS3 Network	DS3 Framing - C-bit Parity	DS3 Framing - C-bit Parity
	Line Length - Short	Line Length - Short
	DS3 Timing - Local	DS3 Timing - Loop
	Data Link - Enabled	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

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

	Local T3SU 300	**Remote T3SU 300**
DTE 4 (V.35)	Port State - Enabled	Port State - Enabled
	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 T3SU 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, T3SU 300 units can be used in pairs for deploying sub-T3 rate services.

In this application example (shown in Figure 7-3 on page 103), 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 T3SU 300s via SNMP. Table 7-3 on page 103 gives an example configuration for this application.

NOTE *While in DTE Loopback, data from the host is transmitted into the net-work.*
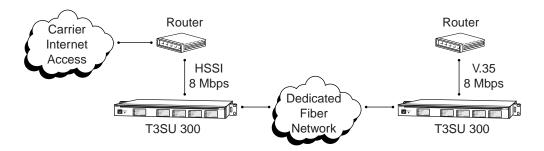
Figure 7-3. Fractional Application

Table 7-3. Configuration Example for Fractional T3 Application

	Local T3SU 300	**Remote T3SU 300**
DS3 Network	DS3 Framing - C-bit Parity	DS3 Framing - C-bit Parity
	Line Length - Short	Line Length - Short
	DS3 Timing - Local	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 T3SU 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 T3SU 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 T3SU 300, connected to the same LAN as the management station, provides management access to a remote T3SU 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. Figure 7-4 gives an example configuration for this application.
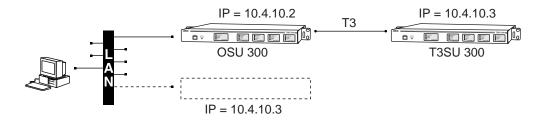
Figure 7-4. Remote Management Application

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

	Local T3SU 300	**Remote T3SU 300**
DS3 Network	Data Link - Enabled	Data Link - Enabled
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 100). 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 Figure 7-5 for an example configuration of this application.
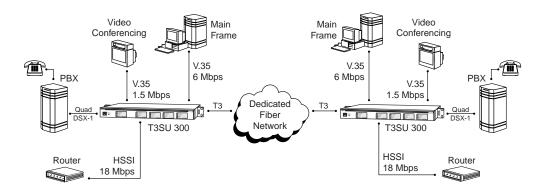
Figure 7-5. Voice Application

Table 7-5. Configuration Example for a Voice Application

	Local T3SU 300	**Remote T3SU 300**
DS3 Network	DS3 Framing - C-bit Parity	DS3 Framing - C-bit Parity
	Line Length - Short	Line Length - Short
	DS3 Timing - Local	DS3 Timing - Loop
	Data Link - Enabled	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 7-5. Configuration Example for a Voice Application (Continued)

	Local T3SU 300	Remote T3SU 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 T3SU 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 T3SU 300. For more information on these connectors, see Chapter 2, *Installation and Operation* on page 31.

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 in the T3SU 300.

Network Interface
Clear channel, non-channelized DS3.
Line length: short (less than 225 feet) and long (greater than 225 feet).
Framing format: M13 and C-bit parity.
Line rate: 44.736 Mbps.
Line interface: 75-ohm BNC coax female connectors.

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 premises 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

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

SR .... data set ready

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 inter-exchange 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 T3SU 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.

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-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.

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.

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.

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 T3SU 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.

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