

### **DSX-1 Plug-On Board**

Part Number 1200114L1

**USER MANUAL** 



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### FEDERALCOMMUNICATIONSCOMMISSION RADIOFREOUENCYINTERFERENCESTATEMENT:

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio frequencies. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

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

WARNING

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

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## Chapter 1 Introduction

#### DSX-1 PLUG-ON BOARD OVERVIEW

The DSX-1 plug-on board is one of the plug-on options available for use with the ADTRAN TSU 100/600. The DSX-1 plug-on board provides a single DSX-1 interface that can be used to provide access to a PBX, router, or other equipment that uses a DSX-1 interface. When used with a PBX, this interface permits the combination of voice and data in a single T1 stream. The allocation of the amount of bandwidth for the DSX-1 plug-on board is selectable.

When plugged onto any option card other than the drop and insert (D&I) or DSX-1 option modules, the DSX-1 plug-on board operates exactly like the DSX-1 passthru option module. The DSX-1 plug-on board can also be installed on option modules in slots 1 through 5 of the TSU 600 and used as a data port for applications not requiring robbed-bit signaling. When plugged onto a drop & insert option module, the DSX-1 plug-on board can be used as a PBX port for the drop & insert T1. In this configuration, robbed bit-signaling can be enabled or disabled from a front-panel menu option.

#### **FUNCTIONAL DESCRIPTION**

The DSX-1 plug-on board operates as a plug-on with any TSU option module. The DSX-1 plug-on board is configured from the front panel of the TSU 100/600 or by an external personal computer (PC) program. The

internal menus for its configuration are a part of the passthru and are automatically installed when the DSX-1 plug-on board is present in the unit.

#### **FEATURES**

The DSX-1 plug-on board has the following features:

- Operates using 1 to 24 DS0s
- Executes an extensive self test
- Can be used as a PBX port for the drop and insert option module
- Displays menu options for easy configuration
- Functions as a data port in slots 1 through 5 of the TSU 600

When used as a DSX-1 passthru:

- Operates as a drop and pass-on or as a standard passon module
- Provides timing for the TSU 100/600 as an option

#### **INTERFACES**

The DSX-1 plug-on board interface has the following features:

- DSX-1 per ANSI T1.102
- RJ-48C interface connector
- Alternate mark inversion (AMI) or binary 8 zero substitution (B8ZS) coding
- Extended superframe (ESF) or superframe (SF) (D4) formatting (independent of T1 facility interface)
- Line length up to 655 feet
- Line loopback (front panel/remote/inband)

#### **DSX-1 PLUG-ON BOARD SPECIFICATIONS**

The DSX-1 plug-on board conforms to the following specifications:

**DSX-1 Interface** Per ANSI T1.102

Line rate 1.544 Mbps

Capacity 1 to 24 DS0s (can be user

configured, contiguous or non-

contiguous)

Line Codes AMI

Bipolar return to zero (B8ZS)

**Framing Options** ESF per ANSI T1.403 and AT&T

Publication TR 54016;

D4 per AT&T Publication 62411

Line Length -3 dB dsx up to 655 feet in 110 feet

steps

**Clock Source** Supports network, secondary,

and CSU timing modes

**Tests** Power-on circuit self test

Line loopback

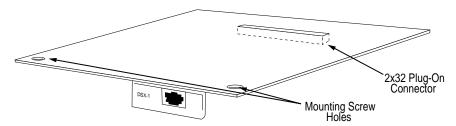
Port loopback (internal toward

Mux)

Connectors RJ-45C

#### PHYSICAL DESCRIPTION

The DSX-1 plug-on board (see Figure 1-1) is a plug-on board that plugs onto the TSU 100/600 option modules.



**Figure 1-1** *DSX-1 Plug-On Board* 

# Chapter 2 Installation

#### UNPACK AND INSPECT

Carefully inspect the DSX-1 plug-on board for any shipping damage. If damage is suspected, file a claim immediately with the carrier and then contact ADTRAN Customer Service. If possible, keep the original shipping container for use in shipping the DSX-1 plug-on board back for repair or for verification of damage during shipment.

#### **Shipped by ADTRAN**

The following items are included in the ADTRAN shipment:

- DSX-1 plug-on board
- DSX-1 Plug-On Board User Manual (to be inserted into the main TSU 100/600 User Manual)

#### **Provided by Customer**

The customer must provide the following:

• Cable for connection to PBX or other equipment

#### INSTALLING THE OPTION MODULE



Unless the plug-in module is hot replaceable, power to the TSU 100/600 should be Off when installing the option module with the plug-on board in the TSU 100/600.

#### Attaching the Plug-On Board to the Option Module

Figure 2-1 represents the action required for proper placement of a plug-on board on the option module.

- 1. Hold the plug-on board above the option module.
- 2. Using a downward and right-to-left motion, slip the RJ-45 connector pins into the opening in the option module back panel.
- Moving the plug-on board downward, secure the connection of the header pins at the front of the board.
- 4. Install the two 4-40 screws at both edges of the option module.

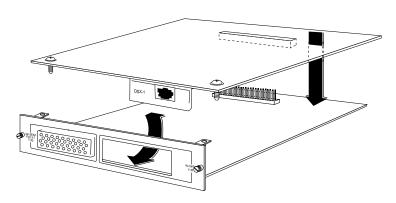


Figure 2-1
Installing Option Module



The connection of the header pins between the option module and the plug-on board must be visually verified. Severe damage of the device can result from an improper connection.

#### Wiring

The DSX-1 plug-on board has an RJ-48C connector as defined in Table 2-A.

 Table 2-A

 Pinout Connectors for Eight-Position Modular Jack Interface

PIN	NAME	DESCRIPTION
1 2 3 4 5 6,7,8	R1 TXDATA-RING T RXDATA-TIP UNUSED R RXDATA-RING T RXDATA-TIP UNUSED	Send data towards the DTE (PBX) Send data towards the DTE (PBX) Receive data from the DTE (PBX) Receive data from the DTE (PBX)
4 5	R RXDATA-RING T RXDATA-TIP	

#### **POWER-UP INITIALIZATION**

No initialization input is required. Any previously configured setting for the DSX-1 plug-on board is restored automatically upon power-up.

#### **Operation Alarms**

The red **Alarm** LED with the Module LEDs on the TSU 100/600 front panel illuminate when an alarm condition is detected. The green **OK LED** illuminates when no alarm conditions are detected.

#### WARRANTY AND CUSTOMER SERVICE

ADTRAN will replace or repair this product within five years from the date of shipment, if the product does not meet its published specifications or if it 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 on the last page of this manual.

# Chapter 3 Operation

#### **OVERVIEW**

The DSX-1 plug-on board is controlled as part of the TSU 100/600 using the same methods as described in the user manual for the TSU 100/600.

Refer to the user manual for the TSU 100/600 for descriptions of front panel indicators and buttons.

#### Menu Structure

When an option card, such as the option module with the DSX-1 plug-on board, is installed in the TSU 100 / 600, the unit adds the board to the list of selectable options under the Port menu items. These menu items are shaded in the limited overview of the TSU 100 menu shown in Figure 3-1. The appendix, *TSU* 100 Menu Tree in the *TSU* 100 User Manual shows a complete menu diagram.

#### Menu Operation

An option module must be selected from the listing in one of the Port menu options before its menus are applicable. With the cursor on one of the Port menu items, press **Enter** to display a list of the currently installed option modules. To activate menus for the DSX-1 plug-on board, scroll through the list to display 1.2 DSX1 DP and press **Enter**.

Once the option module is selected, the DSX-1 plug-on board menus appear as a subset of, and operate the same as, menus for the TSU 100/600. With the cursor on one of the TSU 100/600 four Main menu choices, press **Enter** or a menu number to display the first two submenu items.

Use the up and down **Arrows** to place the cursor on the desired item and press **Enter** to display the first two submenu choices.

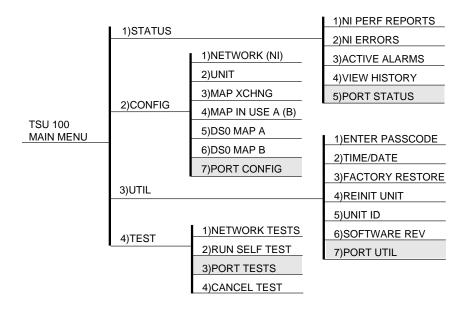


Figure 3-1
TSU 100 Main Menu

#### DSX-1 PLUG-ON BOARD MENU ITEMS

The DSX-1 plug-on board menus are accessed from and operate the same as menus for the TSU 100/600. The DSX-1 plug-on board menu items are submenu choices of the TSU 100/600 four Main menus, as shown in Figure 3-1. For information on Factory Restore and Run Self Test, see *TSU Features Used with DSX-1 Plug-On Board Option* in this chapter.

The DSX-1 plug-on board menu items are:

- Port Status
- Port Configuration
- Port Utility
- Port Test

#### **Port Status**

Port Status, a submenu of TSU 100/600 Main menu item Status (STATUS), displays error information about the DSX-1 plug-on board interface. There are four information fields. See Figure 3-2. An asterisk (\*) indicates an item is active.



Figure 3-2
Port Status Display

#### **CRC**

An asterisk is displayed under the CRC if there are CRC errors in extended superframe format (ESF) mode. If the DSX-1 plug-on board is configured for D4 Frame format, the LCD displays n/a.

#### **BPV**

An asterisk (\*) is displayed under the BPV if the DSX-1 plug-on board is detecting bipolar violations.

#### **XSO**

An asterisk (\*) is displayed under the XS0 if the DSX-1 plug-on board is detecting excessive zeroes (eight consecutive zeroes in B8ZS or 16 consecutive zeroes in AMI).

#### **FER**

An asterisk (\*) is displayed under the FER if the DSX-1 plug-on board is detecting frame bit synchronization errors.

#### Port Configuration (PORT CONFIG)

Port Configuration, a submenu of TSU 100/600 Main menu item Configuration (CONFIG), is used to configure the DSX-1 plug-on board.

When Port Configuration is displayed, place the cursor on it and press **Enter** to activate. Scroll to display the desired configuration and activate with **Enter**.

The unit displays the first of six submenu items. Table 3-A identifies the available selections for Port Configuration. Continue with standard operating procedures.

#### **Format**

Format sets the frame format for the DSX-1 plug-on board.

#### Code

Code sets the data code for the DSX-1 plug-on board.

#### Yellow Alarm

YEL Alarm enables and disables the transmitting of yellow alarms.

#### Line Length (ft)

Line Length provides selection of the proper output level for the DSX-1 plug-on board based on the length of the interface cable.

#### In-band Loopback (INBAND LPBACK)

In-band Loopback sets the DSX-1 plug-on board to accept or reject in-band loopup and loopdown codes (per ANSI T1.403 specification) which may be sent to the card over the DSX-1 interface. This loopback is a line loopback.

#### **Robbed Bit Signaling**

This menu option is available only when the DSX-1 plug-on board is plugged onto a drop & insert card and is used to enable / disable robbed-bit signaling.

**Table 3-A** *Port Configuration Parameters* 

MENU ITEM	PARAMETER CHOICES			
Format	D4, ESF			
Code	AMI, B8ZS			
Yellow Alarm	Enable, Disable			
Line Length	1-110, 110-220, 220-330,			
	330-440, 440-550, 550-655, >655, -3 dB dsx			
In-band Loopback	Accept, Reject			
Robbed Bit Signaling	ON, OFF			
	, ,			

#### **Port Utility (PORT UTIL)**

Port Utility, a submenu of the TSU 100/600 Main menu item Utilities (UTIL) displays the current software information for each port installed in the unit. This information is required when requesting assistance from ADTRAN Customer Service or when updates are needed.

When Port Utility is displayed, place the cursor on it and press **Enter** to display the first available port.

Scroll to display 1.2 DSX1 DP, and press **Enter** to activate. The unit displays the option card name and the software version installed. The menu Port Utility contains a second option, 2)CMD MODE, for the DSX-1 plug-on board. This option is reserved for factory use only. Press **Cancel** to exit or select another port.

#### **Port Test**

Port Test, a submenu of the TSU 100/600 Main menu item Test (TEST), activates tests of the selected data ports. Selecting the DSX-1 plug-on board displays two loopback tests available for this option module.

When Port Test is displayed, place the cursor on it and press **Enter** to display the first available port. Scroll to select 1.2 DSX1 DP and press **Enter** to activate.

#### Loopback

Loopback activates the loopback function on the DSX-1 plug-on board. All ports contain a local loopback (toward the DTE) and a port loopback (toward the NI) as explained in the section *Function Description* in the *TSU* 100/600 *User Manual*.

#### Line Loopback

On the DSX-1 plug-on board, the line loopback causes data received at the DSX-1 plug-on board to be looped back toward the DTE (PBX) achieving a local loopback.

#### Port Loopback

The port loopback is internal and loops all data mapped to the DSX-1 plug-on board back toward the network interface on the controller. The loopback, when used in conjunction with an external bit error rate tester (BERT) to drive the network interface, exercises the entire data path from the network interface (NI) controller, through the Passthru option card, and back out the network interface controller. See Figure 3-3.

To deactivate the loopback, select None under the 1.2 DSX1 DP submenu.

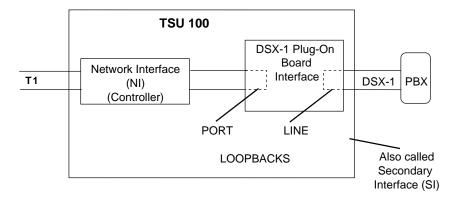


Figure 3-3
Diagram of Loopbacks

#### TSU FEATURES USED WITH DSX-1 PLUG-ON BOARD OPTION

In addition to the DSX-1 plug-on menu items, two additional menu items of the TSU 100/600 may be operated in conjunction with the DSX-1 plug-on board. These are Factory Restore and Run Self Test.

#### **Factory Restore**

Factory Restore, a submenu of the TSU 100/600 Main menu item Utilities (UTIL) restores the factory installed default setting for all DSX-1 plug-on board parameters.

When Factory Restore is displayed, place the cursor on it and press **Enter** to restore preset factory defaults and return to the TSU 100/600 Main menu.

#### **Run Self Test**

Run Self Test, a submenu of the TSU 100/600 Main menu item Test (TEST), executes both the DSX-1 plugon board internal test and the TSU 100/600 internal test. The results of the self test are displayed in the LCD. For additional information on Self Test see the TSU 100/600 User Manual.

When Run Self Test is displayed, place the cursor on it and press **Enter** to execute the test. The unit continuously changes the display in the LCD window until all test results are shown.

### Appendix A

# DSX-1 Plug-On Board Failure Messages

#### **FAILURE MESSAGES AT POWER-UP**

The following messages indicate a probable component failure on the DSX-1 plug-on board:

**EPROM CS** EPROM checksum error

**RAMERR** Static RAM error

#### DSX-1 PLUG-ON BOARD ALARM MESSAGES

The following messages indicate an alarm condition on the DSX-1 plug-on board:

**Red Alarm** Not able to frame data coming

from the DSX-1 plug-on board interface; sometimes referred to as

out-of-frame (OOF)

**Yellow Alarm** Remote alarm indicator (RAI) being

received from the DSX-1 plug-on

board interface

Blue Alarm Receiving unframed all 1s from the

DSX-1 plug-on board interface, alarm indicator signal (AIS)

**Loss of Signal** No signal detected from the DSX-1

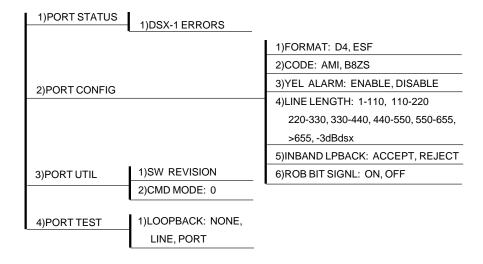
plug-on board interface

Frame Slip

Indicates a Frame Slip has occurred on the DSX-1 plug-on board interface; this is present in Alarm History only

# Appendix B DSX-1 Plug-On Board Menu Tree

The menu tree for the DSX-1 plug-on board is shown in Figure B-1.



**Figure B-1**DSX-1 Plug-On Board Menu Tree

#### **Product Support Information**

#### **Presales Inquiries and Applications Support**

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

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

#### Post-Sale Support

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

Technical Support (800) 726-8663

#### Repair and Return

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

RMA Department (205) 971-8722

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

ADTRAN, Inc. RMA Department 901 Explorer Boulevard Huntsville, Alabama 35806-2807

RMA#					

#### **NOTICE**

 $If the DSX-1 plug-on board is used on a D\&I Module (PN 1200.065L1), the D\&I assembly must be Revision Horlater \\ .$ 

The DSX-1 plug-on board, when used on a DSX-1 Pass thru Option Module (PN 1200.055L1) operates only in a TSU 100 with Software Revision Korlater, or in a TSU 600 with Software Revision Eorlater.

This addendum suppor ts the DSX-1 Plug-On Board User Manual, PN61200114L1-1A.

61200.114L1-1A July 1995