



DSX-1 PASSTHRU OPTION MODULE

USER MANUAL

**61200.055L1-1C**  
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# Chapter 1

## Introduction

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### PASSTHRU OVER VIEW

The DSX-1 Passthru is one of the secondary interface option modules available for use with the ADTRAN TSU 100/600. The Passthru option card should be selected to provide DSX-1 access for PBXs, or other equipment, that use 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 Passthru is selectable.

### FUNCTIONAL DESCRIPTION

The Passthru is designed to fit in the option slot of the TSU 100/600 and is subject to its operation and control. The Passthru 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 card and are automatically installed when the Passthru is plugged into the unit.

#### Features

The DSX-1 Passthru Option Module has the following features:

- Operates using 1 to 24 DS0s
- Operates as a drop and pass-on or as a standard pass-on module

- Accommodates an additional plug-on (piggyback) interface such as the Nx56/64
- Includes an elastic store and controlled frame slip permitting loop timing on the network interface, as well as on the DSX-1 interface
- Provides timing for the TSU 100/600 as an option
- Displays menu options for easy configuration
- Executes an extensive self test

### Interfaces

The DSX-1 Passthru Option Module has the following interfaces:

- DSX-1 per ANSI T1.102
- Interface connectors RJ48C and DB15
- Alternate mark inversion (AMI) or B8ZS coding
- ESF or SF (D4) formatting (independent of T1 facility interface)
- Line length up to 655 feet
- Line loopback (front panel/remote/inband)

### DSX-1 Passthru Option Module Specifications

The DSX-1 Passthru Option Module 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	up to 655 ft. in 110 ft. steps
Clock source	allows PBX to be master timing source
Tests	power-on circuit self test line loopback port loopback (internal toward Mux)
Connectors	DB15 (female) RJ45C

## PHYSICAL DESCRIPTION

The Passthru is an option module which plugs into the option slot in the rear of the TSU 100/600. See Figure 1-1.

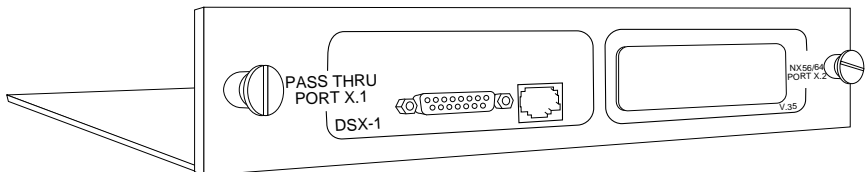


Figure 1-1  
*DSX-1 Passthru Option Module*

The Passthru rear panel includes a plastic plug over a cutout for a V.35 connector. This allows a V.35 Nx56/64 interface plug-on card to be added to the Passthru card, part number 1200053L1. The PORT X.1 identification on the rear panel is linked to the port numbering philosophy of the TSU 100/600 product family. The X

represents the slot number, and the .1 indicates the port number. For the TSU 100/600 application, there is only one option slot. Therefore the port designation for the Passthru port is 1.1. If added, the Nx56/64 port designation would be 1.2. These port numbers appear in the front panel LCD menu displays.



# Chapter 2

## Installation

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### UNPACK AND INSPECT

Carefully inspect the DSX-1 module for any shipping damages. 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 Module back for repair or for verification of damage during shipment.

### Shipped by ADTRAN

The following items are included in the ADTRAN shipment:

- DSX-1 Module
- User Manual  
(to be inserted into main *TSU 100/600 User Manual*)

### Provided by Customer

The customer must provide the following:

- Cable for connection to PBX  
(either DB-15 or RJ type)

## INSTALLING THE OPTION MODULE



*Power to the TSU 100/600 should be off when installing the DSX-1 Module.*

### Placement of the Option Module

Figure 2-1 represents the action required for proper placement of the option module.

1. Remove cover plate from the TSU 100/600 rear panel.
2. Slide option module into the rear panel until it is positioned firmly against the front of the TSU 100/600.
3. Fasten thumb-screws at both edges of option module.

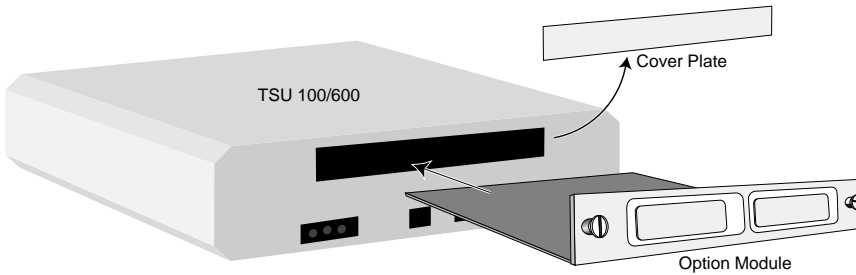


Figure 2-1  
*Installing Option Module*

### Power Connection

Each DSX-1 module derives power from the base TSU 100/600 unit. Power to the TSU 100/600 is supplied by a captive eight foot power cord.

## Wiring

The Passthru offers two connectors for interfaces. Only one is used in an installation and each is connected to the same interface.

The required wiring connections are

Connector Type (USOC) = RJ48C

Part number = AMP # 555164-1

Table 2-A

*Pinout Connectors for Eight-Position Modular Jack Interface*

PIN	NAME	DESCRIPTION
1	R1 TXDATA-RING	Send Data Towards the DTE (PBX)
2	TRXDATA-TIP	Send Data Towards the DTE (PBX)
3	UNUSED	
4	RRXDATA-RING	Receive Data from the DTE (PBX)
5	TRXDATA-TIP	Receive Data from the DTE (PBX)
6,7,8	UNUSED	

Table 2-B

*Pinout Connectors for 15 Pin "D" Shell Interface*

PIN	NAME	DESCRIPTION
1	TRXDATA-TIP	Receive Data from the DTE (PBX)
2	FRAME GROUND	
3	T1 TXDATA-TIP	Send Data Towards the DTE (PBX)
4	FRAME GROUND	
5,6,7,8	UNUSED	
9	RRXDATA-RING	Receive Data from the DTE (PBX)
10	UNUSED	
11	R1 TXDATA-RING	Send Data Towards the DTE (PBX)
12,13,14,15	UNUSED	

## POWER-UP TESTING AND INITIALIZATION

The Passthru option module executes a self test during the power-up sequence, as described in the *TSU 100/600 User Manual*. No initialization input is required. Any previously configured setting for the Passthru is restored automatically upon power-up.

### Successful Selftest

The green OK LED, located with the Module LEDs on the front panel, illuminates when a successful self test is completed and the configuration is successfully restored. See *Front Panel Operation, TSU 100/600 User Manual*.

### Failed Selftest

If the Passthru module fails one or more of the self tests a message is displayed in the LCD during power-up. See *TSU 100/600 User Manual*. Specific failures of the Passthru module are identified in the alarm listings in the appendix.

### Operation Alarms

The red ALARM LED with the Module LEDs on the front panel illuminates when an alarm condition is 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 ADTRAN's 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 more information, contact one of the numbers on the last page of this manual.



# Chapter 3

## Operation

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### OVER VIEW

The Passthru (DSX-1) module is controlled as part of the TSU 100/600 using the same methods as described in the user manual.

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

### Menu Structure

When an option card is installed in the TSU 100/600, the unit adds it 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 Complete Menu*, of 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 Passthru Option Module scroll through the list to display 1.1 DSX PT and press **Enter**.

Once the option module is selected, the Passthru 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.

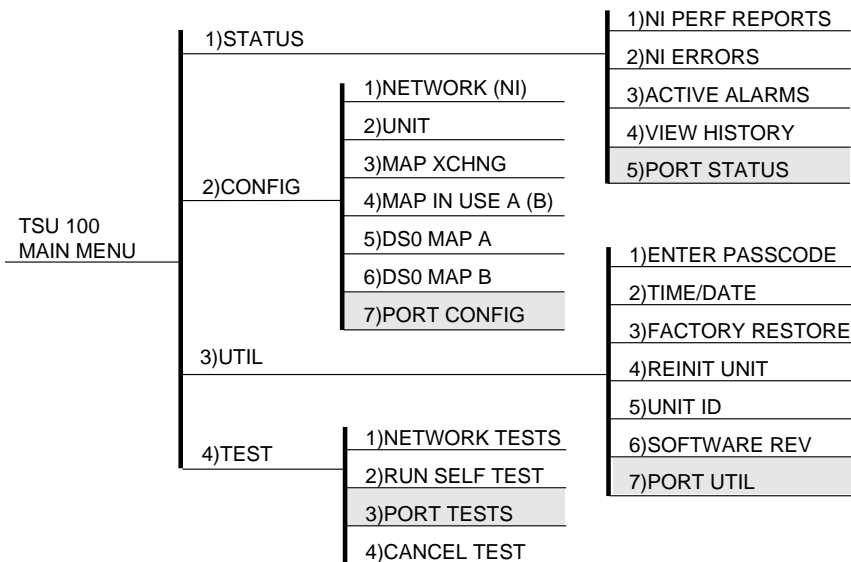


Figure 3-1  
TSU 100 Main Menu



## PASSTHRU MENU ITEMS

The Passthru menus are accessed from and operated the same as menus for the TSU 100/600. The Passthru 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 Passthru Options* in this chapter.

The Passthru 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, displays error information about the DSX-1 interface. There are four information fields. See Figure 3-2. An asterisk (\*) indicates an item is active.

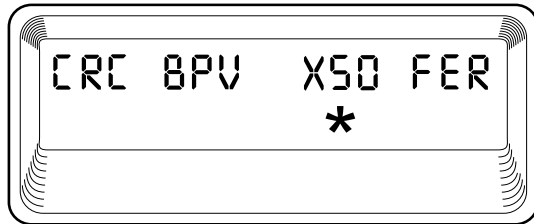


Figure 3-2  
*Port Status Display*

#### CRC

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

BPV

An asterisk is displayed under the BPV if the DSX-1 is detecting bipolar violations.

XSO

An asterisk is displayed under the XSO if the DSX-1 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 is detecting frame bit synchronization errors.

### Port Configuration (POR CONFIG)

Port Configuration, a submenu of TSU 100/600 main menu item Configuration, is used to configure the DSX-1 Passthru Option Card.

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 Passthru.

Code

Code sets the data code for the Passthru.

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 interface based on the length of the interface cable.

**In-band Loopback (INBAND LPBA CK)**

In-band Loopback sets the Passthru 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.

**Clock Source**

Clock Source selects the clock source for transmission toward the PBX or device connected to the Passthru.

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
In-band Loopback	Accept, Reject
Clock Source	Network (NI), Secondary (SI)

**Port Utility (PORTUTIL)**

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 1.1 DSX1 PT, and press **Enter** to activate. The unit displays the option card name and the software version installed. Press **Cancel** to exit or select another port.

## Port Test

Port Test, a submenu of the TSU 100/600 main menu item Test, activates tests of the selected data ports. Selecting the Passthru 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 1.1 DSX1 PT and press **Enter** to activate.

### Loopback

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

### *Line Loopback*

On the Passthru card, the line loopback causes data received at the DSX-1 interface 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 Passthru back toward the network interface on the controller. The loopback (when used in conjunction with an external bit error rate tester (BERT) driving 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 1.1 DSX1 PT submenu.

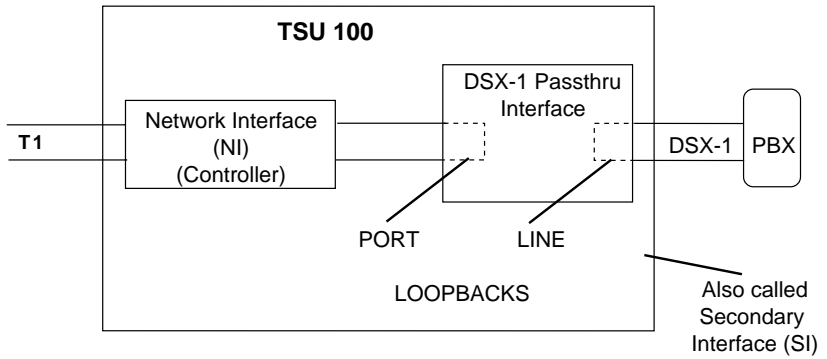


Figure 3-3  
*Diagram of Loopbacks*

## TSU FEATURES USED WITH PASSTHRU OPTIONS

In addition to the Passthru menu items, two additional menu items of the TSU 100/600 may be operated in conjunction with the Passthru Option Module. 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 Passthru option module parameters.

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

### Run Self Test

Run Self Test, a submenu of the TSU 100/600 main menu item Test, executes both the Passthru internal test and the TSU 100/600 internal test. The TSU 100/600 internal test is the same self test executed upon power-up. 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

## Passthru Failure Messages

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### FAILURE MESSAGES AT PO WER-UP

The following messages indicate a probable component failure on the Passthru Module:

- EPROM CS** - EPROM checksum error
- RAM ERR** - Static RAM error

### PASSTHRU ALARM MESSAGES

The following messages indicate an alarm condition on the Passthru Module:

- Red Alarm** - not able to frame data coming from the DSX-1 interface; sometimes referred to as out of frame (OOF)
- Yellow Alarm** - remote alarm indicator (RAI) being received from the DSX-1 Interface
- Blue Alarm** - receiving unframed all 1s from the DSX-1 interface, alarm indicator signal (AIS)
- Loss of Signal** - no signal detected from the DSX-1 interface





**ADTRAN Customer Service:**

<b>RMA</b>	<b>(205) 971-8722</b>
<b>Technical Support</b>	<b>(800) 726-8663</b>
<b>Applications Engineering</b>	<b>(800) 615-1176</b>
<b>Sales</b>	<b>(800) 827-0807</b>

**Repair and Return Address:**

**ADTRAN, Inc.  
Customer Service Department  
901 Explorer Boulevard  
Huntsville, Alabama 35806-2807**

