ADTRAN 23-Inch T400 Shelf
Installation and Maintenance

CONTENTS

FIGURES

TABLES

1. GENERAL

This practice provides installation and maintenance procedures for the ADTRAN 23-inch T400 Shelf, illustrated in **Figure 1**.

Revision History

Issue 5 clarifies shelf backplane fuse requirements and updates text format.

Features

The T400 shelf, P/N 1150092L1, supports the following features and functions:

- Accommodates up to 14 industry standard T400/T200 circuit packs.
- Meets applicable sections of GR-1089-CORE and GR-63-CORE for NEBS Level 3 Compliance.
- Provides four 25-pair amphenol connectors.
- Locking front cover.
- Various mounting positions for standard rack configurations.
- Loss of power alarm relay.
- Front panel electrostatic discharge (ESD) grounding jack.

General Description

The T400 Shelf is designed to deploy T200/T400 circuit packs. The shelf supports 2-wire, 4-wire, or two to 4-wire circuit pack form factors for both central offices and customer premises.

Equipped with mounting flanges, the T400 shelf installs in a standard 23-inch central office communications bay. The shelf measures 21 inches wide, 11 inches deep, and 7 inches high, occupying four vertical rack units. Two sets of holes on the mounting flanges allow for positioning the shelf in either of two standard bay mounting configurations.

The shelf backplane printed circuit board (PCB) accommodates card edge connectors plus the interconnects for signals, power, ground, and loss of power alarm (**Figure 2**). The backplane of the T400 Shelf contains the following:

- Fourteen 56-pin card edge connectors, one for each individual circuit pack.

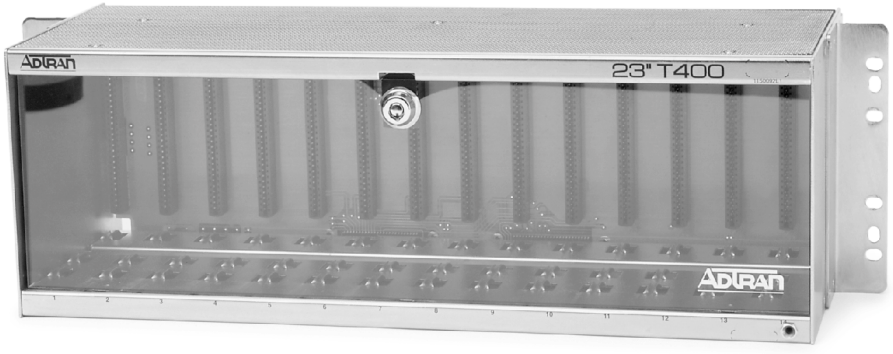

Figure 1. 23-inch T400 Shelf

- Four 50-pin male amphenol connectors for input/output signals.
- One loss-of-power relay.
- One five-terminal barrier strip for power, ground, frame ground, and two Loss-of-Power Alarm contacts.

2. INSTALLATION

CAUTION!
SUBJECT TO ELECTROSTATIC DAMAGE OR DECREASE IN RELIABILITY.
HANDLING PRECAUTIONS REQUIRED.

After unpacking the unit inspect it for damage. If damage is noted, file a claim with the carrier, then contact ADTRAN. See *Warranty and Customer Service*.

After unpacking the shelf, verify the zip-lock bag contains the following items:

- Four cable tie-wrap mounts.
- Five cable tie-wraps.
- Five #12-24 mounting screws.
- One card and card pouch.
- One key for lockable front cover.

Before installing the T400 Shelf into a bay, remove any plug-in cards that were shipped with the shelf. To remove the cards, grasp the faceplate handle and pull. Temporarily store these units in an area protected from static electricity.

Mounting

The T400 Shelf is designed to mount directly into a standard 23-inch wide flange type communications bay. The T400 Shelf is factory configured to mount 4 inches from the front of the bay. Holes are also provided for mounting the shelf 5 inches from the front of the bay. The flanges are easily repositioned for the applicable mounting arrangement.

Instructions for mounting and electrically connecting the T400 Shelf in the bay are as follows:

1. Determine the chassis location in the bay.
2. Align the flange mounting holes on each side of the shelf with the bay mounting holes and secure with supplied fasteners.
3. Remove the rear cover by disengaging the two Phillips-head screws.

NOTE

Customer supplied ring-lug wire terminals are recoáGended for TS1 connections.

4. Insert wires through the cable side entry grommet before attaching ring-lug terminals.
5. Connect a fused -48 Vdc supply and return, that is electrically isolated from an AC source, to -48 V and GND on TS1 (see **Figure 3**). Fuse rating depends on the type of circuit cards deployed. Maximum current for the shelf PCB is 15 A.

NOTE

Although rated at 15 A, the shelf PCB can be fused at 5 A if all shelf units are ADTRAN.

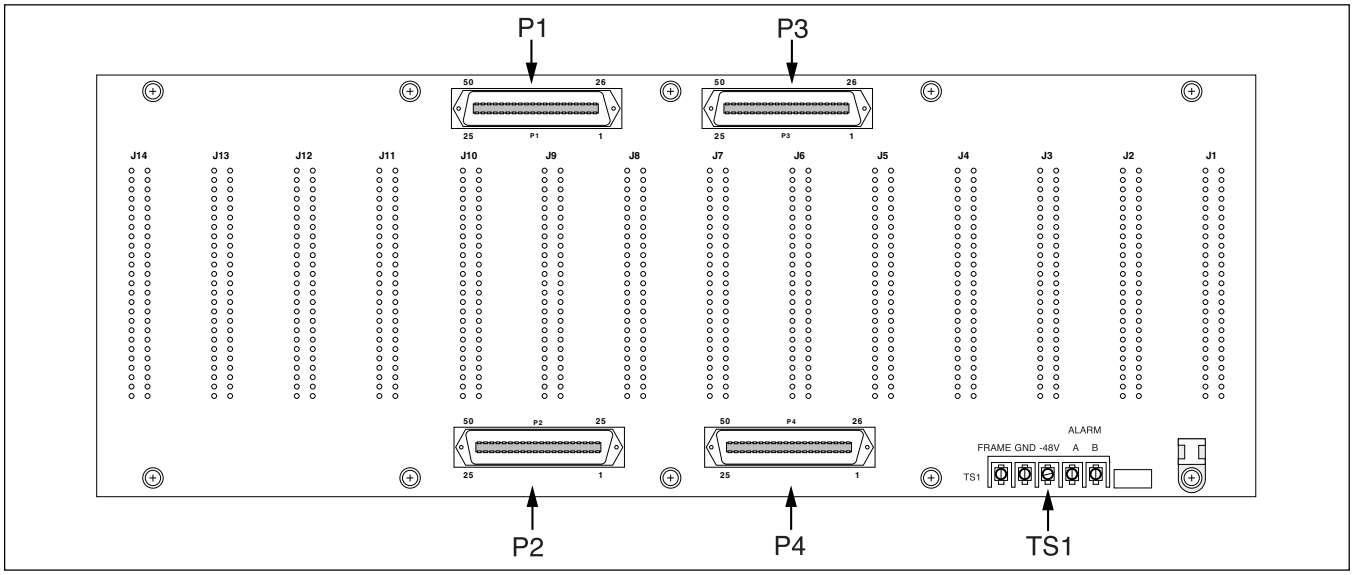

Figure 2. 23-inch T400 Backplane

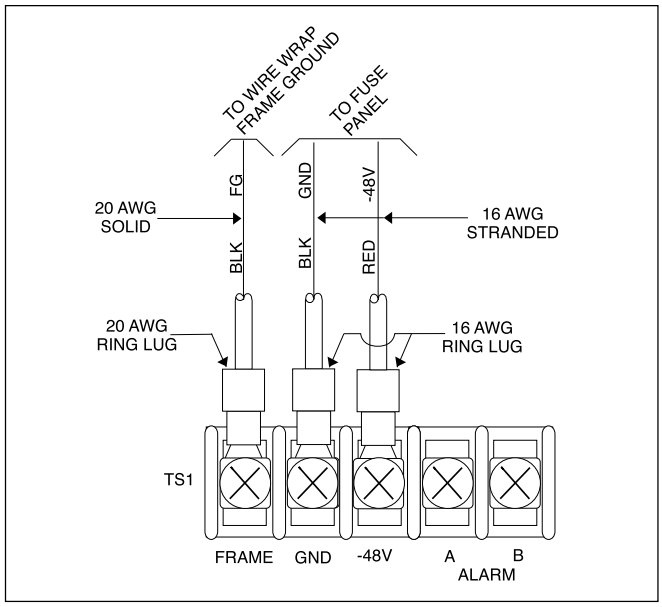

Figure 3. TS1 Power & Ground Connections

6. Connect frame ground to TS1 FRAME (see Figure 3). Because the 48 V return (TS1 GND) is isolated in the shelf, connect it externally to a central ground.
7. Connect power alarm contacts to TS1-A and B (see **Figure 4**).
8. Provide some slack to ensure that wiring and terminals are not under strain then tie down the TS1 wire bundle using the cable tie mount and wrap provided.

WARNING

Do not dislodge or damage the fiber sheet insulators on the inside of the cover.

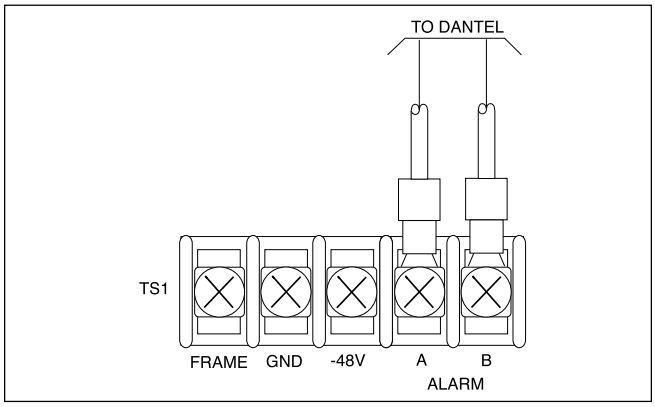

Figure 4. TS1 Alarm Connections

CAUTION

To meet accessibility requirements of GR-1089-CORE Electrical Safety Criteria, the rear cover must be installed when span powering voltages meeting Class A2, A3, AB, B, or C are present. The front access cover must be installed when circuit pack design does not prevent inadvertent contact with non-Class A1 voltage limits.

9. Replace the shelf rear cover and reinstall the screws.
10. Determine the routing direction of the amphenol connector and cable. Insert the cable tie-wrap mounts into the appropriate holes of the rear cover, based on the routing direction. Cable tie-wrap mounts should be located on the cable side of the amphenol connector.
11. Attach the applicable 50-pin female amphenol cables to P1, P2, P3, and P4 of the shelf backplane. See Figure 2. Use the cable tie-wrap mounts and tie-wraps provided to secure the cabling.

Power, Ground, & Data Connections

The 14 slot backplane connectors are all identical. Refer to **Table 1** for pinout connections for power, ground, and tip and ring connections.

Table 1. Power, Ground, and Data Connections

Pin	Function
1	Ground To Frame
5	T1 to Customer
7	T1 to Network
11	Ground To Frame
13	R1 to Network
15	R1 to Customer
17	48 Vdc Return
35	-48 Vdc Supply
41	Tip to Network
47	Ring to Network
49	Ring to Customer
55	Tip to Customer

Telco Connectors

Four 50-pin amphenol connectors (P1 through P4) are provided for the interconnect wiring of the 14 channel positions. The connector is usually terminated with a punch-down block for customer premises wiring or connected directly to a cross-connect or main distribution frame. **Table 2** describes and **Figure 5** details the pinout of each connector.

Loss-of-Power Alarm

The T400 Shelf provides an alarm contact which is open during normal conditions. During a loss of power the alarm contact will close. The dry contact closures are rated for 125 Vac at 10 mA and are designed for connection to a central office alarm system, such as Dantel.

ESD Grounding Jack

The installer should use the ESD grounding jack provided at the front of the shelf as a known ground to prevent ESD during plug-in unit installation.

Table 2. Interface Wiring for P1 Through P4

Circuit Number	25 Pair AMP Pin (P1 - P4)	From Card Edge Connector To P1	From Card Edge Connector To P2	From Card Edge Connector To P3	From Card Edge Connector To P4	25-Pair AMP Wire Color (P1 - P4)
1	26 1	41 (T) 47 (R)	7 (T1) 13 (R1)	55 (T) 49 (R)	5 (T1) 15 (R1)	WHT/BLU BLU/WHT
2	27 2	41 (T) 47 (R)	7 (T1) 13 (R1)	55 (T) 49 (R)	5 (T1) 15 (R1)	WHT/ORN ORN/WHT
3	28 3	41 (T) 47 (R)	7 (T1) 13 (R1)	55 (T) 49 (R)	5 (T1) 15 (R1)	WHT/GRN GRN/WHT
4	29 4	41 (T) 47 (R)	7 (T1) 13 (R1)	55 (T) 49 (R)	5 (T1) 15 (R1)	WHT/BRN BRN/WHT
5	30 5	41 (T) 47 (R)	7 (T1) 13 (R1)	55 (T) 49 (R)	5 (T1) 15 (R1)	WHT/SLT SLT/WHT
6	31 6	41 (T) 47 (R)	7 (T1) 13 (R1)	55 (T) 49 (R)	5 (T1) 15 (R1)	RED/BLU BLU/RED
7	32 7	41 (T) 47 (R)	7 (T1) 13 (R1)	55 (T) 49 (R)	5 (T1) 15 (R1)	RED/ORN ORN/RED
8	33 8	41 (T) 47 (R)	7 (T1) 13 (R1)	55 (T) 49 (R)	5 (T1) 15 (R1)	RED/GRN GRN/RED
9	34 9	41 (T) 47 (R)	7 (T1) 13 (R1)	55 (T) 49 (R)	5 (T1) 15 (R1)	RED/BRN BRN/RED
10	35 10	41 (T) 47 (R)	7 (T1) 13 (R1)	55 (T) 49 (R)	5 (T1) 15 (R1)	RED/SLT SLT/RED
11	36 11	41 (T) 47 (R)	7 (T1) 13 (R1)	55 (T) 49 (R)	5 (T1) 15 (R1)	BLK/BLU BLU/BLK
12	37 12	41 (T) 47 (R)	7 (T1) 13 (R1)	55 (T) 49 (R)	5 (T1) 15 (R1)	BLK/ORN ORN/BLK
13	38 13	41 (T) 47 (R)	7 (T1) 13 (R1)	55 (T) 49 (R)	5 (T1) 15 (R1)	BLK/GRN GRN/BLK
14	39 14	41 (T) 47 (R)	7 (T1) 13 (R1)	55 (T) 49 (R)	5 (T1) 15 (R1)	BLK/BRN BRN/BLK

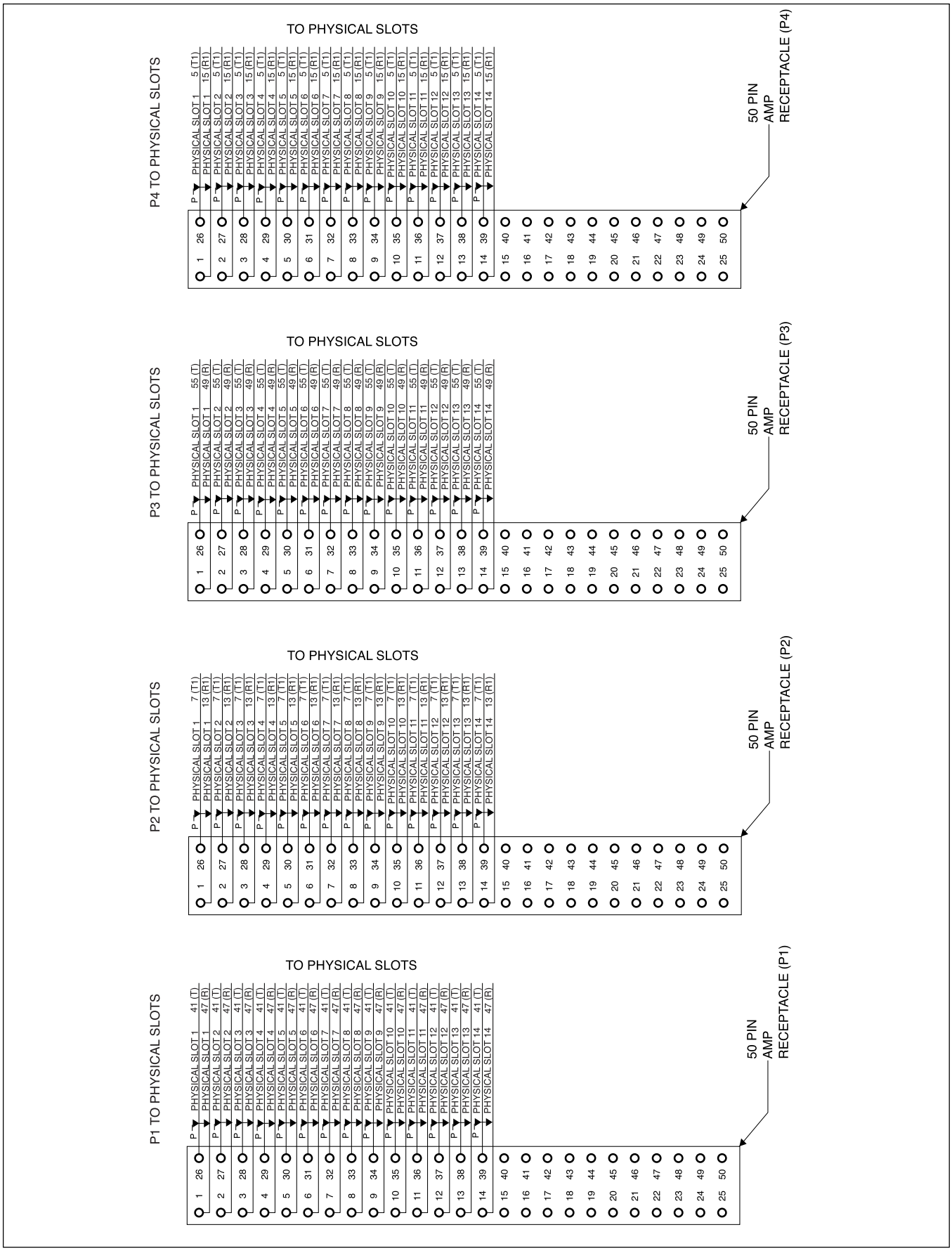

Figure 5. Telco Connectors

3. APPLICATIONS

Table 3 outlines the various applications intended for use with the T400 Shelf.

Table 3. 23-inch T400 Shelf Applications

Product	Function Of P1 (41,47)	Function Of P2 (7,13)	Function Of P3 (55,49)	Function Of P4 (5,15)	Notes
Total Reach ISDN Central Office Unit	To/From Network	Not Used	To/From Customer	Not Used	2-wire ISDN Range Extension
Total Reach ISDN Remote Unit	To/From Network	Not Used	To/From Customer	Not Used	2-wire ISDN Range Extension
U-RPM	To/From Network	To/From Customer	Not Used	Not Used	2-wire Central Office product
Total Reach DDS Remote Unit	To/From Network	Not Used	From Customer	To Customer	2-wire Total Reach termination to 4-wire DDS products
BRIDLE Central Office Unit	Not Used	To/From Network (Full-rate U)	To/From Customer Loop 1	To/From Customer Loop 2	2-wire ISDN to 4-wire ISDN
BRIDLE Remote Unit	To/From Network Loop 2	To/From Network Loop 1	Not Used	To/From Customer (Full-rate U)	4-wire ISDN to 2-wire ISDN termination
DDST	To Network	From Network	From Customer	To Customer	4-wire DDS termination
HDSL Remote Unit	Network HDSL Loop 2	Network HDSL Loop 1	DS1 from Customer	DS1 to Customer	4-wire HDSL to 4-wire DS1 product
HRE	Network HDSL Loop 2	Network HDSL Loop 1	Customer HDSL Loop 2	Customer HDSL Loop 1	4-wire HDSL Range Extender
T1 CSU	To Network	From Network	From Customer	To Customer	4-wire T1 service
ADST	Digital to Network	Digital from Network	Analog from Customer	Analog to Customer	4-wire digital to 4-wire analog service

4. SPECIFICATIONS

The specifications for the T400 Shelf are listed in **Table 4**.

5. MAINTENANCE

The T400 Shelf does not require routine maintenance for normal operation.

ADTRAN does not recommend that repairs be performed in the field. Repair services are obtained by returning the defective unit to ADTRAN Customer and Product Service (CAPS).

Table 4. 23-inch T400 Shelf Specifications

System Power Requirements	
Input: DC Voltage	-42 to -55 Vdc -48 Vdc nominal
Max Current	15 A
Environmental	
Operating temperature	-40° C to +70° C (-40° F to +158° F)
Storage temperature	-40° C to +85° C (-40° F to +185° F)
Relative humidity	95% max, non-condensing
Physical	
Dimension:	11 in. long, 7 in. high, 23 in. wide
Weight:	12 lb
Mounting	
23 in. communications bay	

6. WARRANTY AND CUSTOMER SERVICE

ADTRAN will replace or repair this product within ten (10) years from the date of shipment if it does not meet its published specifications or fails while in service. (See *ADTRAN U.S. and Canada Carrier Networks Equipment Warranty,* document 60000087-10).

Contact CAPS prior to returning equipment to ADTRAN.

For service, CAPS requests, or further information, contact one of the following numbers:

ADTRAN Sales

Pricing/Availability
(800) 827-0807

ADTRAN Technical Support

Pre-sales Applications/Post-sales Technical Assistance
(800) 726-8663

Standard hours: Monday-Friday, 7 a.m. - 7 p.m. CST
Emergency hours: 7 days/week, 24 hours/day

ADTRAN Repair/CAPS

Return for Repair/Upgrade
(256) 963-8722

Repair and Return Address

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