

## 19-Inch Universal T400 Shelf Installation and Maintenance

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Figure 1. T400 Shelf

### 1. GENERAL

This practice provides installation and maintenance procedures for the ADTRAN 19-inch Universal T400 Shelf, illustrated in **Figure 1**.

#### Revision History

This is the first issue of this document. Future revisions will be described in this paragraph.

#### Features

The T400 shelf, part number 1242007L2, supports the following features and functions:

- Accommodates up to 12 industry standard T400/T200 circuit packs.
- Provides four 25-pair amphenol connectors.
- Locking front cover.
- Various mounting positions for standard rack and wall configurations.

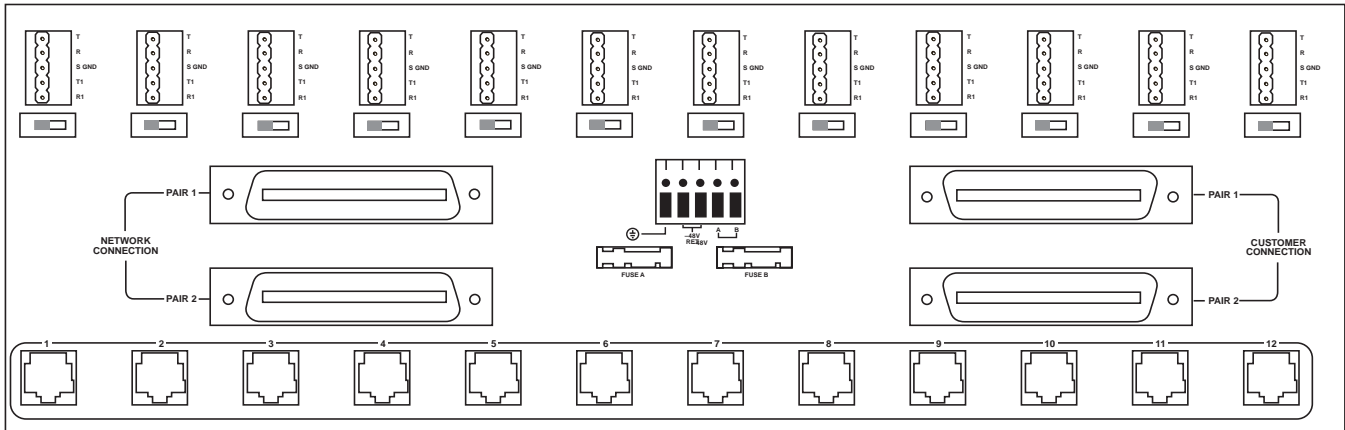
- Local powering options.
- Front panel electrostatic discharge (ESD) grounding jack.
- Customer modular jacks with switch for selecting RJ-48C or RJ-48S.

#### General Description

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

Equipped with mounting flanges, the T400 shelf can be wall mounted. By flipping the mounting brackets over, the shelf installs in a standard 19-inch communications bay. The shelf measures 19 inches wide, 8 inches deep, and 12 inches high, occupying eight 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 printed circuit board (PCB) accommodates 12 card edge connectors plus the interconnects for signals, power, ground, and loss of power alarm (**Figure 2**). The T400 Shelf contains the following:



**Figure 2. T400 Front Panel**

- Twelve 56-pin card edge connectors, one for each individual circuit pack.
- Twelve wire-wrap positions for network connection.
- Twelve modular jacks for customer connection.
- Twelve toggle switches for configuring the modular jacks between RJ-48C and RJ-48S.
- Four 50-pin male amphenol connectors for input/output signals.
- One Euro-connector for power, ground, and frame ground contacts.
- Two fuses for local power.

## 2. INSTALLATION



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

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

- Twelve cable tie-wraps.
- Five #12-24 mounting screws (Rack mount).
- Five #10-3/4" mounting screws (Wall mount).
- 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 factory configured to mount directly onto a wall. The flanges are easily repositioned for mounting in a 19-inch bay.

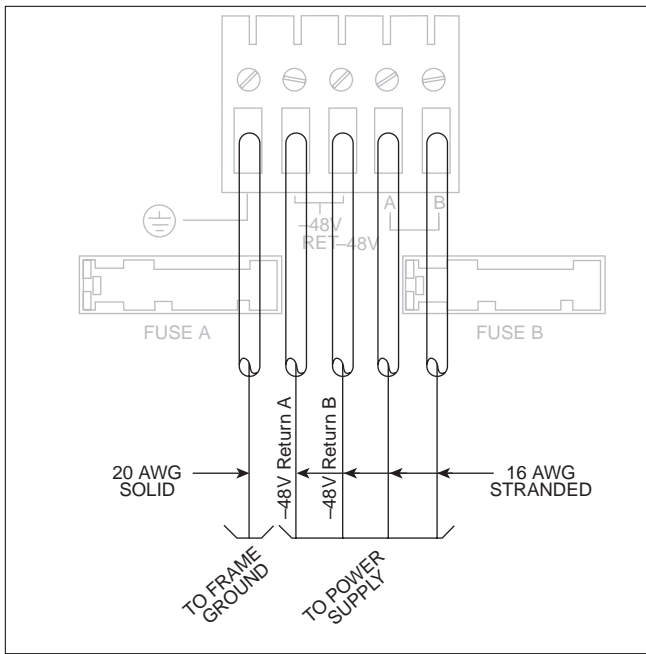
Instructions for mounting and electrically connecting the T400 Shelf on the wall are as follows:

1. Determine the chassis location on the wall.
2. Use the template to place the screws.
3. Align the flange mounting holes on each side of the shelf with the screws and secure shelf.
4. Remove the telco access cover by loosening the thumbscrew.

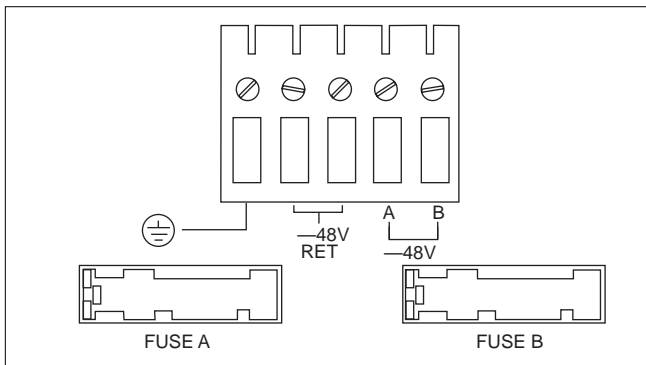
### NOTE

**This product is intended for installation in RESTRICTED ACCESS LOCATIONS only.**

5. If local power is required, complete steps 6-9.
6. Connect frame ground to correct location on the power and ground connector (see Figure 3). Because the -48 V return (GND) is isolated in the shelf, connect it externally to a central ground.
7. If required, connect a fused -48 VDC supply and return, that is electrically isolated from an AC source, to -48V and GND (see **Figure 3**). Fuse rating depends on the type of circuit cards deployed. Maximum current for the shelf PCB is 10 A.



**Figure 3. Power and Ground Connections**



**Figure 4. Fuse Placement**

**NOTE**

**A readily accessible disconnect device should be incorporated in the fixed wiring. This device should be approved and rated to meet local guidelines. The branch circuit overcurrent protection shall be a fuse or circuit breaker rated 48 V, 10 A.**

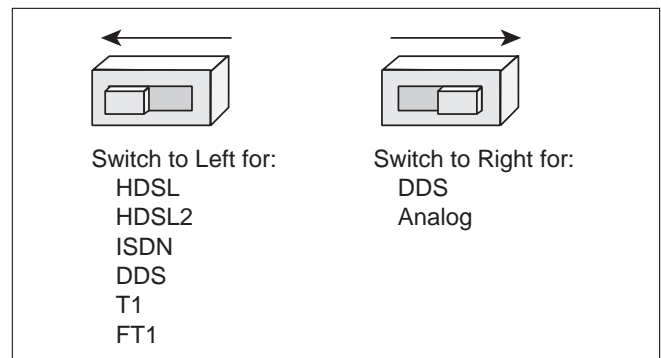
8. Insert both the fuses into their holders (see **Figure 4**).
9. Provide some slack to ensure that wiring and terminals are not under strain then tie down the wire bundle using the cable tie mount and wrap provided.

**CAUTION**

**To meet accessibility requirements of GR-1089-CORE Electrical Safety Criteria, the top 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.**

10. If the network connections are to be wire wrapped, do it at this time.

11. Set the toggle switch for the type of service to be deployed out of each slot. Services can be mixed in the shelf. See **Figure 5** for details. If the switch is to the left, the modular jack is configured as an RJ-48C with active pins 1, 2, 4, and 5. If the switch is to the right, the modular jack is configured as an RJ-48S with active pins 1, 2, 7, and 8.



**Figure 5. Switch Setting**

12. Replace the shelf top cover and reinstall the screws.

13. Determine the routing direction of the amphenol connector and cable. Insert the cable tie-wrap mounts into the appropriate holes on the front, based on the routing direction. Cable tie-wrap mounts should be located on the cable side of the amphenol connector.

14. Attach the applicable 50-pin female amphenol cables customer and network interfaces or wire wrap to applicable slot shown in Figure 2. Use the cable tie-wrap mounts and tie-wraps provided to secure the cabling.

**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
27	Ground To Frame
35	-48 Vdc Supply
41	Tip to Network
47	Ring to Network
49	Ring to Customer
55	Tip to Customer

**Power, Ground, & Data Connections**

The 12 slot backplane connectors are all identical. Refer to **Table 1** for pinout connections for power, ground, and tip and ring connections.

**Chassis Interconnect  
NETWORK CONNECTIONS**

Two 50-pin amphenol connectors are provided on the left-hand side of the chassis to access the network loops. The connector is typically run to a punch-down block where network wiring is terminated. **Table 2** describes and **Figure 6** details the pinout of each connector. Alternatively, the network loops can be accessed via the wire-wrap connectors at the top of the shelf.

**CUSTOMER CONNECTIONS**

Two 50-pin amphenol connectors are provided on the right-hand side of the chassis to access the customer loops. The connector is typically run to a punch-down block where customer wiring is terminated. Table 2

**Table 2. Interface Wiring for P1 through P4**

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

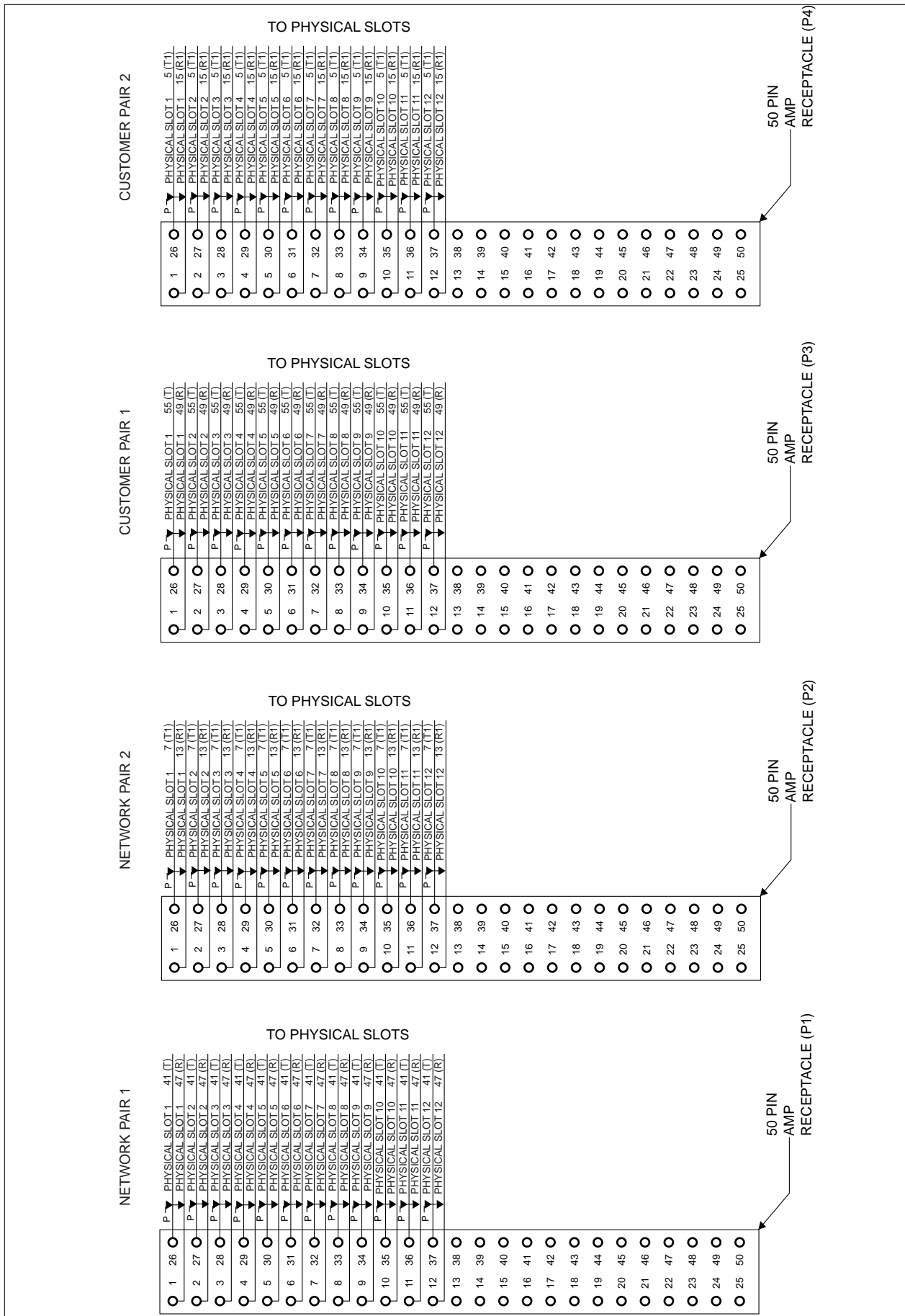


Figure 6. Details of Amphenol Connectors

describes and Figure 6 details the pinout of each connector. Alternatively, the customer loops can be accessed via the modular jacks in the middle of the shelf. These jacks can be configured for DDS, analog, HDSL, HDSL 2, ISDN, FT1, or T1 services as described in Figure 5.

#### 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.

### 3. APPLICATIONS

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

### 4. SPECIFICATIONS

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

### 5. MAINTENANCE

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

**Table 3. Universal T400 Shelf Application**

Product	Function Of (41,47)	Function Of (7,13)	Function Of (55,49)	Function Of (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
HDSL-2 Remote Unit	Network HDSL Loop	Not Used	DS1 From Customer	DS1 To Customer	2-wire HDSL to 4-wire DS1
HDSL-2 Repeater	Network HDSL Loop	Not Used	Customer HDSL Loop	Not Used	2-wire HDSL repeater
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

**Table 4. Universal T400 Shelf Specifications**

<b>System Power Requirements</b>	
Input: DC Voltage	-42 to -55 VDC -48 VDC nominal
Max Current	10 A
<b>Environmental</b>	
Operating temperature:	-40 to +70° C (-40 to +158° F)
Storage temperature:	-40 to +85° C (-40 to +185° F)
Relative humidity:	95% max, non-condensing
<b>Physical</b>	
Dimension:	8.0" deep, 12" high, 19.0" wide
Weight:	13.0 lb
<b>Mounting</b>	
wall mount or 19" communications bay	

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).

**6. WARRANTY AND CUSTOMER SERVICE**

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

service (see: ADTRAN Carrier Network Equipment Warranty, Repair, and Return Policy and Procedure, document: 60000087-10A).

Contact CAPS prior to returning equipment to ADTRAN.

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

**ADTRAN Sales**

Pricing and availability  
(800) 827-0807

**ADTRAN Technical Support**

Presales Applications / Post-sale Technical Assistance  
(800) 726-8663

Standard support hours:  
Monday-Friday, 7 a.m.-7 p.m. CST

Emergency support: 7 days/week, 24 hours/day

**ADTRAN Repair/CAPS**

Return for repair/updrade  
(256) 963-8722

**Repair and Return Address**

ADTRAN, Inc.  
Customer and Product Support (CAPS)  
901 Explorer Boulevard  
Huntsville, Alabama 35806-2807