

## Total Access 750/850/1500 DS0 DP Access Module Installation and Maintenance Practice

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## 1. GENERAL

This document provides installation and maintenance procedures for the ADTRAN Total Access® 750/850/1500 DS0 DP access module (P/N 1180003L1).

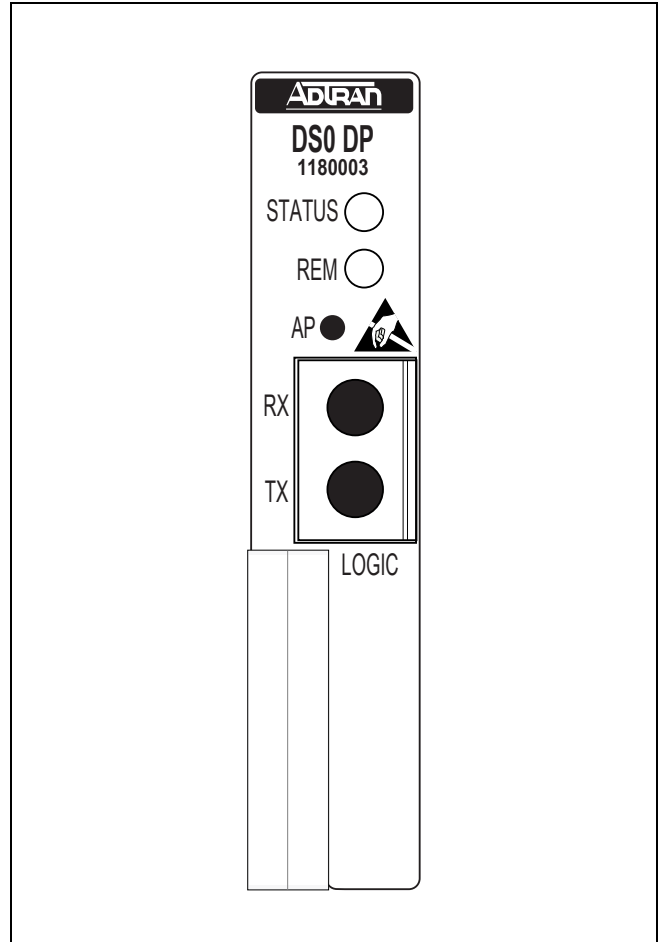
**Figure 1** is an illustration of the DS0 DP access module.

### Revision History

This is the third release of this document. This release includes a new CLEI Code, *Compliance* subsection, menu tree illustration, and specifications table.

### Functional Description

The DS0 dataport is a channel unit which is used in the Dataphone Digital Service (DDS®) to interface the basic DDS DS0 (64 kbps) signal to a T-carrier line. The DS0 DP is generally located in either a hub or intermediate office and is used in conjunction with an ADTRAN All-Rate Office Channel Unit (OCU) dataport or Total Reach DDS dataport located at the end office to extend the DDS network to an end office.



**Figure 1. Total Access 750/850/1500 DS0 DP**

### Physical Description

The front panel of the DS0 DP displays the module name, part number, and status LEDs. The module name, part number, and CLEI code may also be found through the terminal menus. The dimensions of the card itself are approximately 3.125 inches in height, 0.62 inches in width, and 10.1 inches in depth.

### Features

The DS0 DP includes the following features:

- For use in Total Access 750, Total Access 850 or Total Access 1500 integrated access devices
- Sub-rate, 19.2, 56, and 64 kbps Clear Channel operation; Subrate Error Correction, Zero Code Suppression, and Latching Loopback.

- The dataport can be optioned to operate as a DS0 DP or as a Clear Channel Unit (CCU).
- Switched 56 Tandem functionality
- Logic level test access; nonintrusive receive monitoring capability.

### Functions

- In the receive direction, converts 2.4, 4.8, 9.6, 19.2, and 56 kbps PCM data from the Line Interface Unit (LIU) at the 64 kbps rate to DDS formatted 64 kbps signals for transmission.
- In the transmit direction, converts the DDS formatted 64 kbps line signals to 2.4, 4.8, 9.6, 19.2, and 56 kbps PCM data at the 64 kbps rate for handoff to the Line Interface Unit (LIU).

### Compliance

**Table 1** shows the Compliance Codes for the Total Access 750/850/1500 DS0 DP. The DS0 DP is NRTL listed to the applicable UL standards. The DS0 DP is to be installed in a restricted access location and in a Type “B” or “E” enclosure only.

**Table 1. Compliance Codes**

Code	Input	Output
Power Code (PC)	C	C
Telecommunication Code (TC)	–	X
Installation Code (IC)	A	–

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by ADTRAN could void the user’s authority to operate this equipment.

## 2. INSTALLATION



After unpacking the DS0 DP, inspect it for damage. If damage has occurred, file a claim with the carrier, then contact ADTRAN Customer Service (refer to *Warranty and Customer Service* on page 8). If possible, keep the original shipping container for returning the DS0 DP for repair or for verification of shipping damage.

### Shipping Contents

The contents include the following items:

- DS0 DP
- DS0 DP Access Module Job Aid

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### CAUTION

Electronic modules can be damaged by static electrical discharge. Before handling modules, wear an antistatic wrist strap to prevent damage to electrical components. Place modules in antistatic packing material when transporting or storing.

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### Instructions for Installing the Module

The Total Access 750/850/1500 DS0 DP Access Module inserts into any access module slot on the Total Access 750/850/1500 chassis. To install the DS0 DP, perform the following steps:

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### NOTE

Hot insertion of the module is permissible.

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1. If present, remove the Access Module Blank (P/N 1175099L1) from the appropriate Access Module slot of the Total Access 750/850/1500 chassis.
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### WARNING

Dangerous voltage is exposed when the Access Module Blank is removed.

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2. Hold the unit by the front panel while supporting the bottom side.

3. Align the module to fit in the lower and upper grooves.
4. Slide the module into the access slot pressing equally on the top and bottom of the front panel until the module is firmly positioned against the back of the chassis.
5. Lock the module in place by pushing in on locking lever located on the lower left-hand side of the module.

The DS0 DP initializes and goes operational upon insertion into an active Total Access 750/850/1500 chassis. Initialization is indicated by the front panel LEDs.

### Front Panel LEDs

Status of the analog service for each customer loop is shown by four (green) LEDs. See **Table 2** for a description of the front panel LEDs.

**Table 2. Front Panel LEDs**

LED	Condition	Description
STATUS	Green	Normal operating condition
	Yellow	DS0 Loopback is active
REM	Flashing	DS-6 control link established
	On	Unit has been remotely provisioned
AP	Push Button	Toggles between manual and remote provisioning

### 3. PROVISIONING

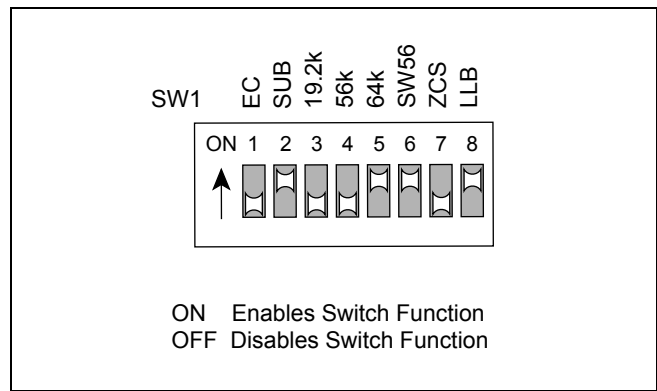
Select the appropriate RATE and OPTIONS using SW1. Provisioning may also be accomplished by utilizing the craft interface on the BCU or SCU without removing the card from the channel bank. At insertion time, the Status LED should illuminate briefly, see Table 2. If the LED does not illuminate, check the office clock or LIU channel unit. **Figure 2** is an illustration of the option switches located on the DS0 DP.

#### SW1 Option Switch Settings

The following settings are provisioned using SW1.

##### Error Correction (EC SW1-1)

ON indicates the automatic enabling of the appropriate technique to ensure data integrity across the T-carrier system. OFF indicates error correction disabled.



**Figure 2. SW1 Option Switch**

#### NOTE

If more than one rate switch (SW1-2 to SW1-6) is ON the unit defaults to 56 kbps.

##### Subrate Operation (SUB SW1-2)

Set SW1-2 to ON for data rate 2.4, 4.8, or 9.6 kbps.

##### 19.2 kbps Operation (19.2K SW1-3)

Set to SW1-3 ON for 56 kbps operation.

##### 56 kbps Operation (56K SW1-4)

Set to SW1-4 ON for 56 kbps operation.

##### 64 kbps Operation (64K SW1-5)

Set SW1-5 to ON for 64 kbps Clear Channel operation. Select OFF for all other rate options.

##### Switched 56 Operation (SW56 SW1-6)

Set SW1-6 to ON for Switched 56 Tandem operation.

The DS0 DP derives two-state signaling from the incoming data of the DS0 time slot. This signaling bit is sent in the least significant bit of every byte towards the DS0 interface (drop side).

#### NOTE

Error Correction at rates of 56 and 64 kbps require two DS0 time slots for data and error-correcting parity bytes. If SW56 is selected, Error Correction must remain OFF.

### Zero Code Suppression (ZCS SW1-7)

Set SW1-7 to ON to select to suppress all-zeros byte received on the DS0 by a “00011000” byte outbound to the DS1 facility.

When 64 kbps Clear Channel is selected the zero code suppression option is ignored and Zero Code Suppression is automatically disabled.

### Latching Loopback (LLB SW1-8)

When latching loopback is enabled the DS0 DP will respond to the legacy latching loopback sequence as described in TR62310 and ANSI T1.417. At 64 kbps, the function of the LLB switch is altered. When 64 kbps is enabled, placing the LLB switch in the ON position will permit the channel unit to respond to the legacy latching loopback sequence as described in TR62310 and ANSI T1.417. At 64 kbps with the LLB switch in the OFF position the channel unit will initialize ADTRAN’s Protected Loopback mode.

### Protected Loopback

ADTRAN’s Protected Loopback supports the DDS latching loopback standard in T1E1.2/99-007R1. When enabled, the channel unit will respond to latching loopback when the idle code preamble is sent prior to the latching loopback sequence specified in TR62310 and ANSI T1.417. Protected Loopback prevents false latching loopback occurrences when the latching loopback sequence is embedded within the customer data payload.

Automated test equipment should support T1E1.2/99-007R1 to perform testing at 64 kbps when Protected Loopback is enabled. See **Table 3** for the latching loopback sequence requirement when Protected Loopback is enabled.

### Electronic Provisioning

The craft interfaces on the Total Access 750 BCU, Total Access 850 BCU, or the Total Access 1500 SCU are used to change default options and obtain access module status through menu screens. To access the menu screens, connect a VT100 terminal or a computer running a terminal emulation program to the front panel craft interface ADMIN port using a standard male-to-female RS-232 DB-9 cable. Craft port settings are as follows:

- 9600 Baud
- No parity
- 8 Data bits
- 1 Stop bits
- No Flow Control

**Table 3. Protected Loopback Mode**

Function	Byte Code	No. of Received Bytes
Exit data protocol	Idle - 11111110	Minimum of 35 idle bytes
Clear existing loopbacks	Transition in progress (TIP) *0111010	Minimum of 35 TIP bytes
Identify device to be looped	Loopback Select Code (LSC) *1010101 - OCU *0110001 - CSU *1000001 - NI *0000101 - DS0	Minimum of 35 LSC bytes
Prepare to loop: send MAP code after 30 bytes	Loopback Enabled (LBE) *1010110	Minimum of 100 LBE bytes
Activate loopback	Far-End Voice (FEV) *1011010	Minimum of 35 FEV bytes
Minimum of 35 TIP bytes required to disable established latching loopback. *Don’t care bit.		

### Windows HyperTerminal

Windows HyperTerminal can be used as a VT100 terminal emulation program. Open HyperTerminal by selecting PROGRAMS/ACCESSORIES/HYPERTERMINAL. Refer to the Help section of HyperTerminal for additional information.

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#### NOTE

To ensure proper display background, select VT100 terminal emulation under SETTINGS.

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### Password and User ID

Password protection is a function of the SCU/BCU and is factory disabled. If password protection is enabled, the SCU/BCU will display the logon screen, and a valid user name and password are required to access menus. The factory default user name and password are for the Total Access 1500. The default user name is “user,” and the default password is “password.” Both the user name and password are not case sensitive.

### Menu Navigation

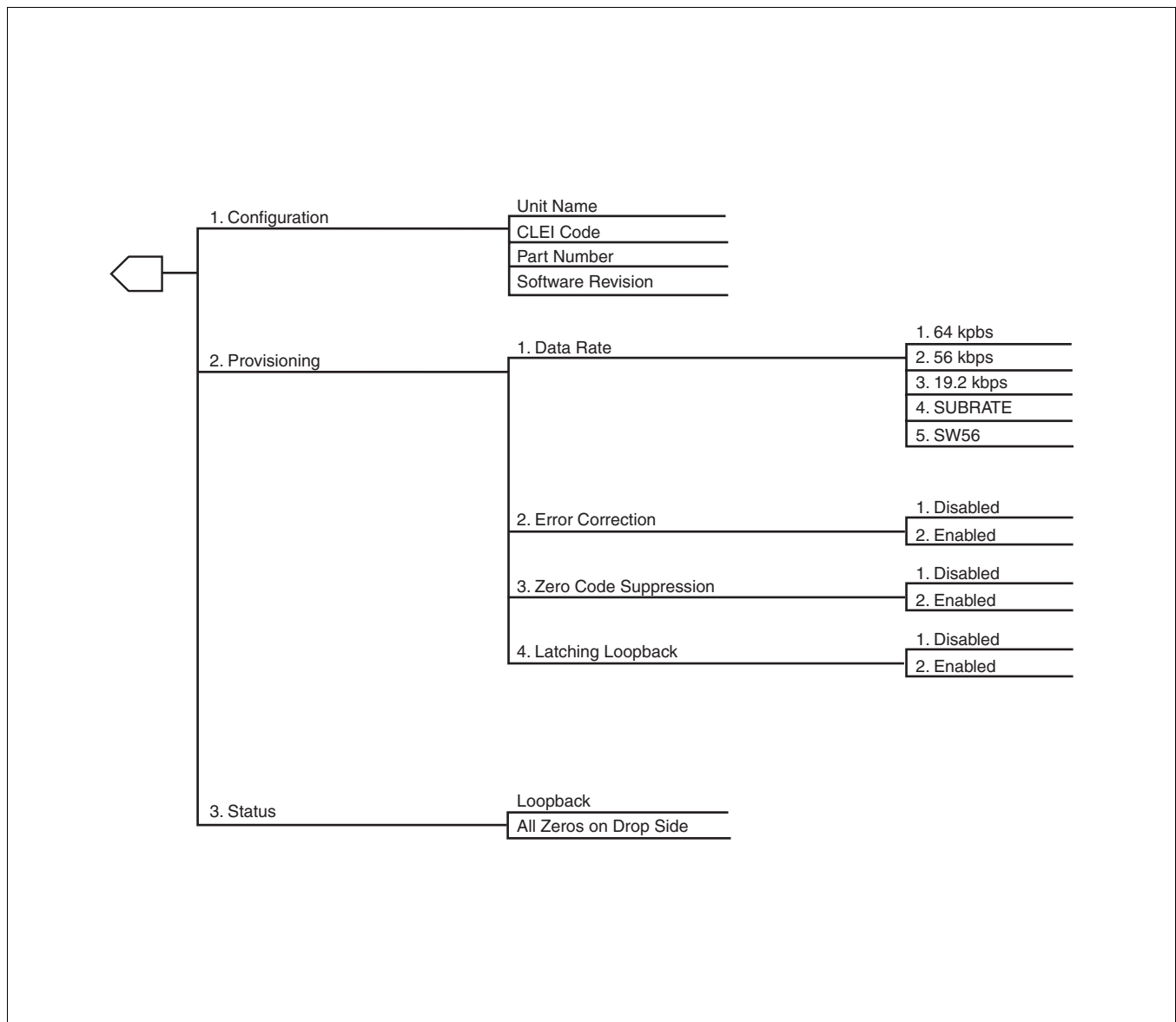
To traverse through the menus, select the desired entry and press Enter. To work backward in the menu press the Esc (escape) key. **Figure 3** illustrates the DS0 DP menu tree.

### Time Slot Assignment

The Total Access 750/850/1500 platforms can have multiple time slots in the T1 data stream assigned to each physical slot in the channel bank. **Table 4** outlines the correlation between the T1 and the physical slot for the Total Access 750. The Total Access 1500 allows craft selectable time slots using the electronic provisioning interface.

**Table 4. Total Access 750 Time Slot Assignments**

Physical Slot	T1 Time Slot Assignment
1	1
2	5
3	9
4	13
5	17
6	21



**Figure 3. DS0 DP Menu Tree**

## Connections

All connections are made through the 50-pin male amphenol connector on the backplane of the Total Access 750/850/1500. See **Table 5** for Total Access 1500 information. See **Table 6** for Total Access 750/850 information.

**Table 5. DS0 DP Pair Locator for Total Access 1500**

Slot	T/R (P1) RX	T1/R1 (P2) TX
1	26/1	26/1
2	27/2	27/2
3	28/3	28/3
4	29/4	29/4
5	30/5	30/5
6	31/6	31/6
7	32/7	32/7
8	33/8	33/8
9	34/9	34/9
10	35/10	35/10
11	36/11	36/11
12	37/12	37/12
13	38/13	38/13
14	39/14	39/14
15	40/15	40/15
16	41/16	41/16
17	42/17	42/17
18	43/18	43/18
19	44/19	44/19
20	45/20	45/20
21	46/21	46/21
22	47/22	47/22
23	48/23	48/23
24	49/24	49/24

**Table 6. DS0 DP Pair Locator for Total Access 750/850**

Slot	T/R RX	T1/R1 TX
1	26/1	27/2
2	30/5	31/6
3	34/9	35/10
4	38/13	39/14
5	42/17	43/18
6	46/21	47/22

## Remote Provisioning and Diagnostics

### Control Protocol

Remote access to provisioning and status information is accomplished using ADTRAN Digital System 6 Message protocol, defined in *Control and Diagnostic Procedures Practice, Section 6032991-6*. Digital System 6 is supported by the TPI 108/109 and 105 portable test sets and is supported by Hekimian React remote test system. The TR DDS network elements comply with ANSI T1.107-1995, *Digital Hierarchy Format Specifications Annex G* which allows remote provisioning, querying, and performance monitoring via in-band control of network elements.

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### NOTE

The REACT 2001 GUI software release 1.900 supports ANSI T1.107-1995.

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Remote access is accomplished using a defined set of in-band DS0 byte sequences similar to the latching loopback sequence. Commands issued through the test system are recognized by the individual channel unit, which responds with the appropriate byte sequences. These in-band commands may be used to verify options via dialogs with REACT 2001 and TPI 108/109 test sets. Unit CLEI, serial number, provisioning, and performance information can be retrieved remotely using the Digital System 6 protocol.

## Provisioning and Status

All configuration options can be remotely viewed or provisioned. The front panel Remote (REM) LED flashes during control link establishment and remains ON after the channel unit has been remotely provisioned.

If the channel unit has been remotely provisioned, the operator can alternate between remote configuration and manual switch settings by pressing the momentary Alternate Provisioning (AP) pushbutton located on the front panel. If the channel unit is removed from the system, the previous provisioning is retained by the Total Access 750/850/1500 shelf common equipment.

The REM indicator remains ON when the channel unit is operating based on Remote Provisioning, and is OFF when operating on manual switches. If the channel unit has never been remotely provisioned, the AP switch has no effect and the REM indicator remains OFF.

## 4. TESTING

Remote latching loopback capability is provided. Remote latching loopback is activated using the automated testing capability of the Service Test Center (STC) or the front panel test connector(s) with the portable TPI 108/109 or equivalent DS0 test set. When using a portable test set select:

- Logic NEAR to test toward the four-wire tandem circuit (drop side).
- Logic FAR to test toward the carrier system (line side).

## Remote Latching Loopback

Latching Loopback for DS0 loopback is conducted by using the specific latching loopback sequence as follows:

1. IDLE (Minimum of 35) - Exit Data Protocol. (11111110)

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### NOTE

Required when Protected Loopback is enabled.

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2. TIP (Minimum of 35) - Transition in Progress. (\*0111010)
3. LSC (Minimum of 35) - Loopback Select Code. (\*0000101)
4. LBE (Minimum of 100) - Loopback Enable. (\*1010110)

5. ALL ONEs (Minimum of 35) followed by LBEs (Min. of 100) for N-1 iterations, where N is the number of channel units of the same type that lie between the test center and the unit on which Loopback is to be operated.

(\*1111111)

6. FEV (Minimum of 32) - Far End Voice.

(\*1011010)

## Disable

1. Minimum of 35 TIP bytes.

False latching loopback conditions are minimized by the implementation of a watchdog timer between successive steps of the latching loopback sequence.

## 5. MAINTENANCE

The Total Access 750/850/1500 DS0 DP access module requires no routine maintenance for normal operation.

ADTRAN does not recommend that repairs be attempted in the field. Repair services may be obtained by returning the defective unit to ADTRAN. Refer to *Warranty and Customer Service* section for further information.

## 6. SPECIFICATIONS

Specifications for the Total Access 750/850/1500 DS0 DP access module are detailed in **Table 7**.

**Table 7. DS0 DP Specifications**

Physical	
Dimensions:	3.125 in. H x 0.62 in. W x 10.1 in. D
Weight:	<1 lb.
Power	
Current Draw:	0.007 A maximum @ -48 VDC
Environment	
Operating Temperature:	-40°C to 65°C
Storage Temperature:	-40°C to 70°C
Relative Humidity:	Up to 95% noncondensing
Heat Dissipation:	0.4 watts maximum
Part Number	
Total Access 750/850/1500 DS0 DP Access Module:	1180003L1

## **7. WARRANTY AND CUSTOMER SERVICE**

ADTRAN will replace or repair this product within the warranty period if it does not meet its published specifications or fails while in service. Warranty information can be found at [www.adtran.com/warranty](http://www.adtran.com/warranty).

U.S. and Canada customers can also receive a copy of the warranty via ADTRAN's toll-free faxback server at 877-457-5007.

- Request document 414 for the *U.S. and Canada Carrier Networks Equipment Warranty*.
- Request document 901 for the *U.S. and Canada Enterprise Networks Equipment Warranty*.

Refer to the following subsections for sales, support, CAPS requests, or further information.

### **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**

Contact Customer and Product Service (CAPS) prior to returning equipment to ADTRAN.

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