

## HDSL Central Office Installation Kit Installation and Maintenance

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### 1. GENERAL

This practice provides installation and operation procedures for the ADTRAN HDSL Installation Kit for the Central Office. The HDSL CO Installation Kit is designed for use with the ADTRAN HDSL Remote Installation Kit, part number 1190851L1. **Figure 1** is an illustration of the HDSL Central Office Installation Shelf. This kit can house any standard 220 mechanics card to include T1, HDSL, and HDSL2. This practice is written around the HDSL application.

#### Revision History

This is the initial release of this document. Future revisions to this document will be explained in this subsection.



Figure 1. HDSL CO Installation Shelf

#### Features

The HDSL Installation Kit for the Central Office, part number 1190852L1, includes the following features:

- Compact Construction Installation Unit.
- Local AC powering.
- Houses a standard 220 CO card, with optional 3192 and DDM Plus adapter cards.
- Bantam to alligator connections.
- Versatile protective carrying case.

The HDSL CO Installation Kit simulates the operation of the central office end of an HDSL circuit (with installed CO line unit).

Make-or-break and signal jacks in each Installation Kit provide access to the HDSL circuit's loop 1 and loop 2 signals. Inserting a test cable into a jack breaks the HDSL circuit at that point and delivers the signal out of the jack. The jacks can be used to insert an HDSL Installation Kit into an HDSL circuit at different points (such as the central-office end or remote end) in order to test circuit or line unit operation.

The jacks can also be used to connect HDSL Installation Kits together to simulate an HDSL circuit's signal path. A fully operational HDSL circuit can be created by connecting a CO Installation Kit to a Remote Installation Kit, and installing HDSL line units. See **Figure 2** for an HDSL Circuit Simulation. To simulate an HDSL circuit with a repeater, push IN the repeater selection switch on the remote unit.

## 2. OPERATION

After unpacking the unit, inspect it for damage. If damage is noted, file a claim with the carrier, then notify ADTRAN Customer Service, see section 6.

The CO Installation Kit should be shipped complete with the CO shelf, softcase, power cord, and dual bantam to alligator clip cable.

### Front Panel Features

The HDSL CO Installation Kit front panel features a CO unit slot, two dual-bantam jacks, and two ground lugs for ESD ground and earth ground. The CO unit slot accepts an HDSL CO line unit. The CO LP1/LP2 Signal Jacks provide access to the CO line unit's (HTU-C) output signals to the remote end. These signals are the loop 1 and loop 2 signals that drive the HDSL circuit. The DS1 TX and RX jacks provide access to the DS1 signals on a CO line unit installed in

the CO Installation Kit. These jacks can be used in addition to DS1 jacks on the front panel of the HTU-C line unit. TX is an input jack and RX is an output jack. See **Figure 3** for a diagram of Front Panel Features.

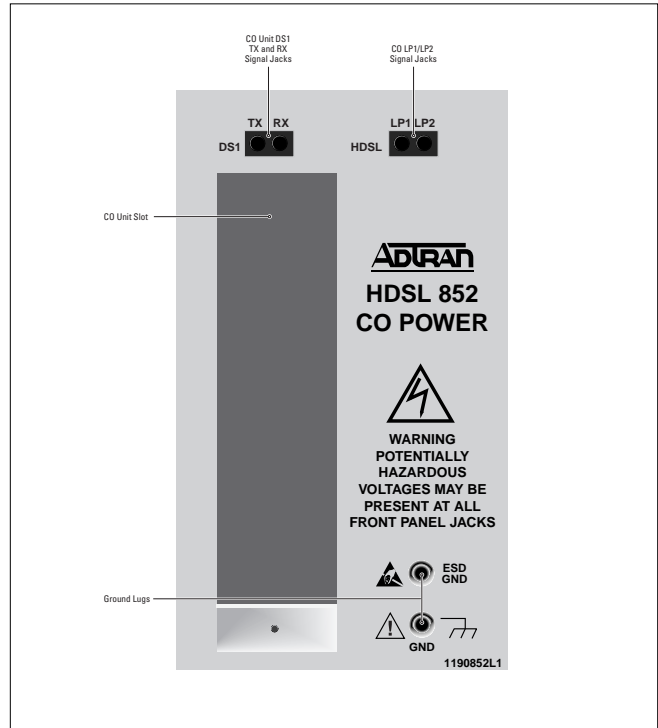


Figure 3. Front Panel Features

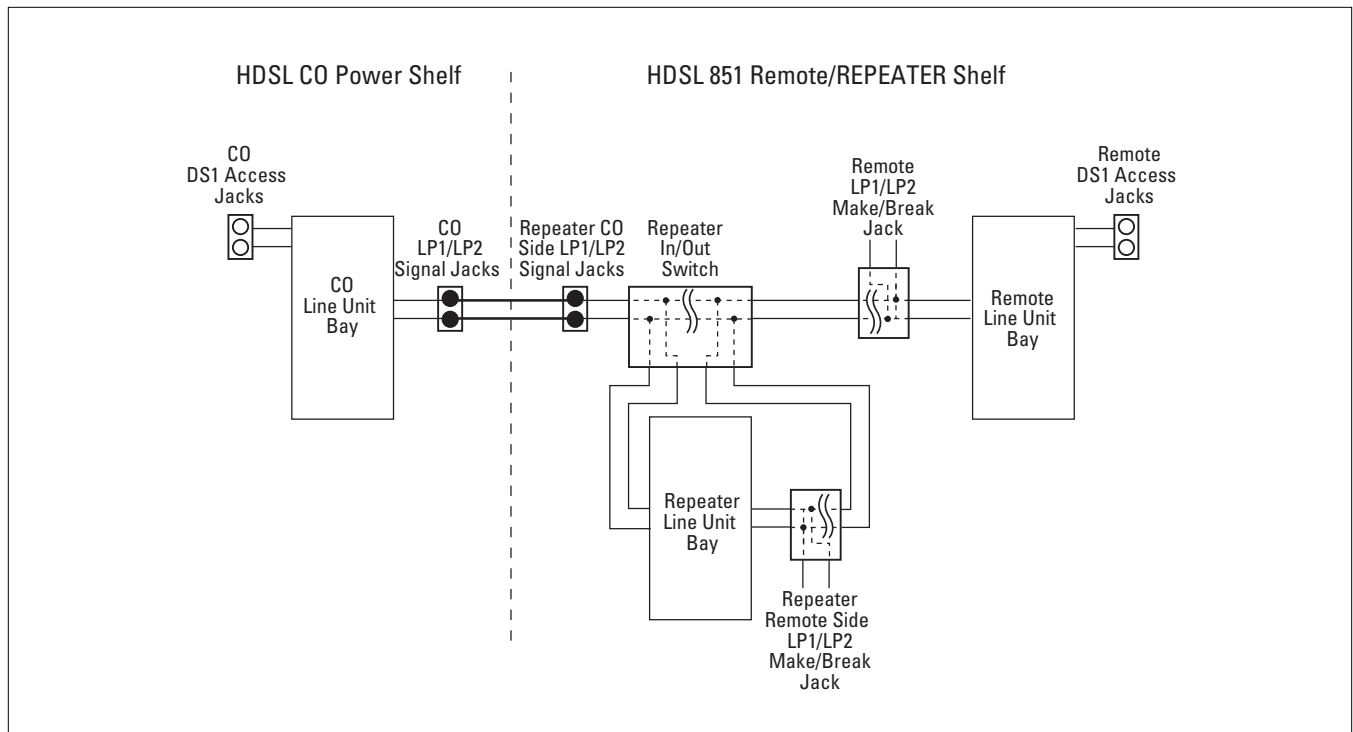


Figure 2. HDSL Circuit Simulation

## Rear Panel Features

The HDSL CO Installation Kit rear panel features an AC power switch and connectors. The AC power switch controls power to the CO Installation Kit. If the switch is set in the ON position, the AC power switches on when the Installation Kit is connected to a 115 VAC power outlet. If the switch is set in the OFF position, the AC power is switched off. The 1 amp, 250 VAC, slow-blow fuse protects the electrical circuitry from power surges and voltage spikes. Use a small screwdriver or similar tool to pull out the fuse cover to access the fuse. A spare fuse is provided in the fuse housing. See **Figure 4** for a diagram of Rear Panel Features.

### CAUTION

**Disconnect power before accessing the fuse. If the fuse is bad, replace it only with a similar 1 amp, 250 VAC, slow-blow fuse.**

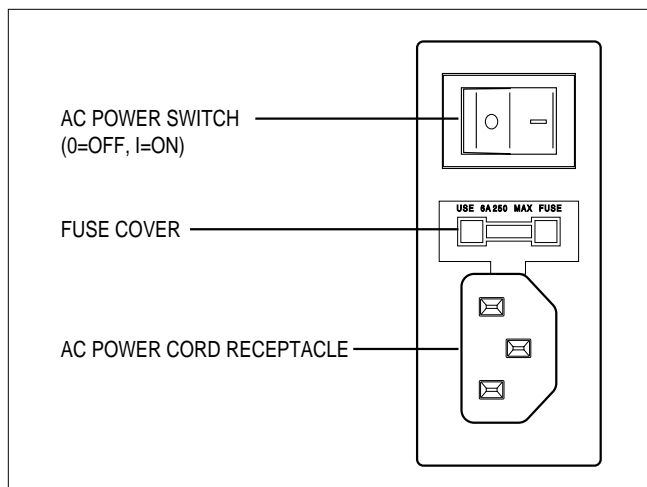


Figure 4. Rear Panel Feature

### Powering the HDSL CO Installation Kit (See **Figure 5**)

1. With the AC power switch in the OFF position, connect the AC power cord between the AC power cord receptacle (at the rear of the Central Office Installation Kit) and a grounded 115 VAC power outlet.
2. Press the AC power switch ON to power the Central Office Installation Kit.
3. The ADTRAN HDSL Remote Installation Kit (part number 1190851L1) can be span powered by installing cables between its LP1/LP2 signal jacks and the LP1/LP2 signal jacks on the Central Office Installation Kit.

### CAUTION

**In a live HDSL circuit, potentially dangerous voltage may be present on the loop 1 and loop 2 signals. Use extreme caution when accessing these signals at the LP1/LP2 jacks.**

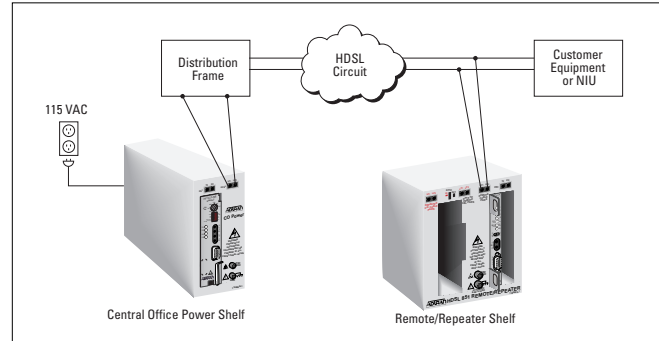


Figure 5. Pairing CO Installation Kit

### Preventing ESD Damage

To prevent damage caused by electrostatic discharge (ESD), follow these precautions when using the HDSL Installation Kit.

1. Install the earth ground cable between earth ground and the bottom ground lug on the front of the HDSL Installation Kit.
2. When working with HDSL line units, make sure the ESD wrist strap is attached to the top ground lug on the front of the HDSL Installation Kit.

### Installing Line Units

The following steps describe how to install an HTU-C line unit into the HDSL CO Installation Kit, connect the line unit to the HDSL circuit, and remove the line unit.

1. Locate the slot to install the HTU-C on the HDSL Central Office Installation Kit.

### NOTE

**Before handling line units, connect the HDSL Installation Kit to earth ground and connect the ESD wrist strap to the Installation Kit.**

2. Grasp HTU-C by its front panel and align it with the guides in the slot. Slide it into the slot until it seats firmly with the connector at the rear.

3. Connect the HTU-C to the HDSL circuit by installing a cable between the LP1 and LP2 signal jacks on the HDSL Installation Kit and the HDSL circuit's loop 1 and loop 2 twisted pairs. Maintain signal polarity by observing the color coding of the cable ends. Connect the CO LP1/LP2 signal jacks to the loop 1 and loop 2 twisted pairs, respectively, going to the remote end of the HDSL circuit.
4. To remove an HTU-C, remove the patch cord connecting the HTU-C to the HDSL circuit. Pull the ejector lever on the bottom of the HTU-C, or grasp it by its front panel and gently pull it from the slot, observing ESD precautions.

### Installing Test Cables

The HDSL Installation Kit is connected to the HDSL circuit by installing test cables between the Installation Kit's LP1 and LP2 signal jacks and the twisted-pair or twisted-pairs that form the HDSL circuit. The cables are attached depending on the installation as follows:

- For a single-pair HDSL installation, use a test cable with a single-bantam end and two alligator clips. Insert the cable's bantam end in the LP1 signal jack, and attach each alligator clip to one of the wires in the twisted pair.
- For a two-pair HDSL installation, use a test cable with a dual-bantam end and four alligator clips. Insert the cable's bantam end in the LP1/LP2 signal jacks, and attach each set of alligator clips to the wires in the corresponding twisted-pair.
- For ADTRAN HDSL, the loops are insensitive to tip-ring reversal. For other applications, such as standard T1 testing, the following describes the polarity of the test set. The bantam to alligator-clip test cables in the HDSL Installation Kit indicate tip-and-ring connectivity as follows:
  - The alligator-clip cable ends are color-coded black (tip) and red (ring), yellow (tip) and green (ring).
  - The sleeves on the alligator-clip cable ends are labeled to match their corresponding bantam end.
  - When installing a test cable, maintain signal polarity by matching the LP1/LP2 bantam cable ends to the correct alligator-clip ends (LP1 bantam to loop 1 alligator slips, and LP2 bantam to loop 2 alligator clips). It does not matter

which twisted-pair is considered loop 1 or loop 2 as long as the designations are consistent. (See **Figure 6**).

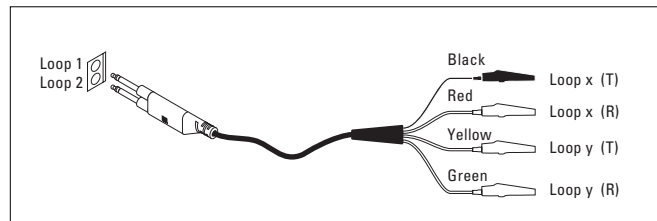


Figure 6. Test Cables

### 3. TESTING

#### Testing Line Units (See Figure 7)

1. Install the line unit to be tested in the appropriate HDSL Installation Kit.

#### CAUTION

**Before handling line units, make sure the HDSL Installation Kit is connected to earth ground and the ESD wrist strap is connected to the Installation Kit.**

2. Verify that the other required line units are available for the test (see **Table 1**). The required line unit (s) can either be installed in another HDSL Installation Kit, or in an HDSL circuit.

#### NOTE

**Verify that the required line units are good before proceeding.**

3. Install patch cables to make the necessary connections between the line unit being tested and the required line units.

If the required line unit (s) is installed in another HDSL Installation Kit, install patch cables between the LP1/LP2 signal jacks on each HDSL Installation Kit. If the required line unit (s) is in the HDSL circuit, install patch cables between the HDSL Installation Kit's LP1/LP2 signal jacks and the HDSL circuit's loop 1 and loop 2 twisted-pairs.

4. If a repeater line unit is being tested, or if the operation of a CO line unit is being tested with a repeater, make sure that the repeater selection button on the Remote Unit is IN. To perform the test without the repeater, make sure the repeater button is OUT on the Remote Installation Kit.

- When power is applied, the HDSL Installation Kit tests the operation of the line unit.

The indicators on the line unit front panel should be observed to determine whether the line unit is operational.

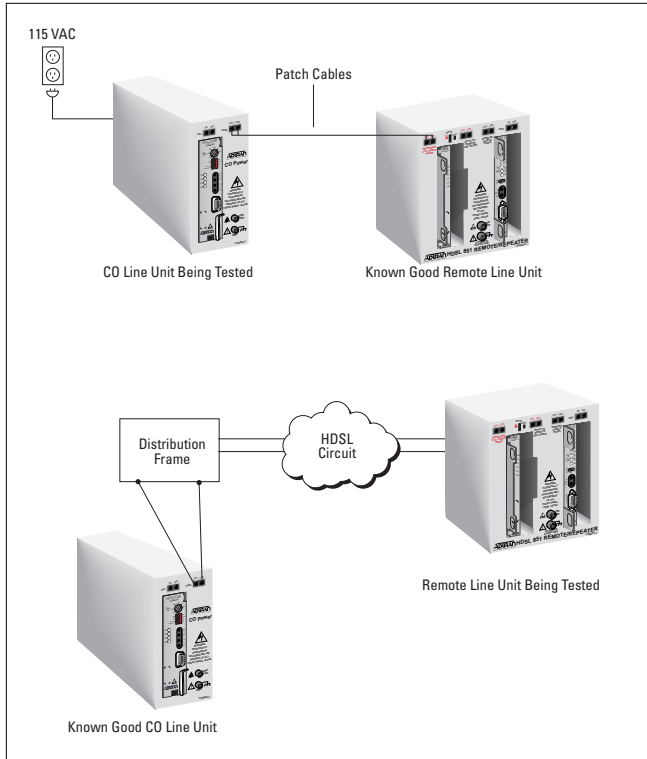


Figure 7. Testing Line Units

Table 1. Line Units

Line Unit Being Tested	Additional Required Line Units
CO line unit	Remote line unit*
Remote line unit	CO line unit*
Repeater line unit	CO line unit Remote line unit
* To test operation with a repeater, a repeater line unit is also required. * All line units are purchased separately.	

### Powering a Circuit (See Figure 8)

The HDSL CO Installation Kit can be used to send a powered HDSL signal from the distribution frame of a serving office. Access to the central office side of the cable span must be obtained to perform this procedure.

1. Install an HTU-C or other line unit in the HDSL CO Installation Kit.

### NOTE

Before handling the line unit, make sure the HDSL Installation Kit is connected to earth ground and the ESD wrist-strap is connected to the HDSL Installation Kit.

### WARNING

In a live HDSL circuit, potentially dangerous voltage may be present on the loop 1 and loop 2 signals. Use extreme caution when accessing these signals.

2. Install a test cable to make the following connections. Be sure to maintain signal polarity with the test cable. Connect the CO LP1 signal jack to the loop 1 twisted-pair, and connect the CO LP2 signal jack to the loop 2 twisted-pair.
3. When the HDSL CO Installation Kit is switched ON, the HTU-C or other line unit will power the two loops.

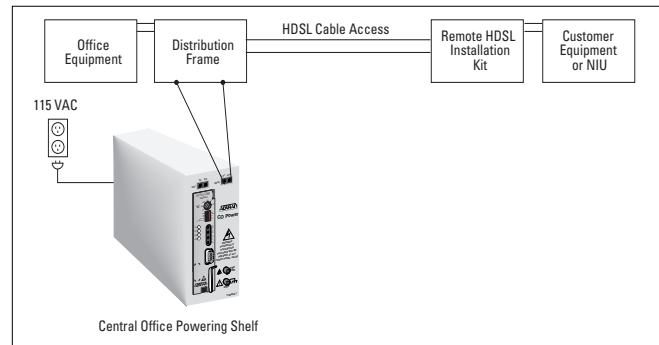


Figure 8. Powering a Circuit

### T1 BERT Testing of an HDSL Circuit (See Figure 9)

This section describes how to perform a T1 Bit-Error Rate Test (BERT) using an HDSL Installation Kit and a T1 BERT tester.

With a single HDSL Installation Kit and T1 BERT tester, a loopback test of the cable span can be performed from the central office end or from the remote end. With CO and Remote HDSL Installation Kits and two BERT testers, an end-to-end test of the entire cable span can be performed. The directions for performing the BERT test are as follows.

1. Install test cables to make the following connections between the T1 BERT tester and the HTU-C installed in the HDSL Installation Kit. For an end-to-end test, make the connections at both ends of the cable span.
  - Connect the BERT tester's DSX-1 RX jack to the DS1 line receive jack on the front of the HTU-C or HTU-R.
  - Connect the BERT testers DSX-1 TX jack to the DS1 line transmit jack on front panel of the HTU-C or HTU-R.

**NOTE**

As an alternative to the front panel DS1 signal jacks, use the DS1 RX and TX jacks located just above the line unit slot on the HDSL Installation Kit. These jacks correspond to line unit operation, which means that the BERT tester's DS1 transmit jack must be connected to the Installation Kit's DS1 TX jack, and the tester's DS1 receive jack to the Installation Kit's DS1 RX jack.

2. Install a test cable to connect the HDSL Installation Kit to the HDSL circuit. For an end-to-end test, make the connections at both ends of the cable span.
  - Connect the HDSL Installation Kit's LP1 signal jack to the loop 1 twisted pair.
  - Connect the HDSL Installation Kit's LP2 signal jack to the loop 2 twisted pair.
3. If a loopback BERT test is being performed, loop back the far end.
4. Turn ON the HDSL Installation Kit and T1 BERT tester. If an end-to-end test is being run, turn on both Installation Kits and testers.
5. Run a T1 BERT test over the HDSL cable span.

**4. SPECIFICATIONS**

Refer to Table 2 for HDSL CO Installation Kit specifications.

**Supporting Products and Replacement Parts**

Table 3 provides a list of supporting products and replacement parts that can be ordered for the CO Installation Kit products. Table 4 provides a list of Remote Installation Kit products.

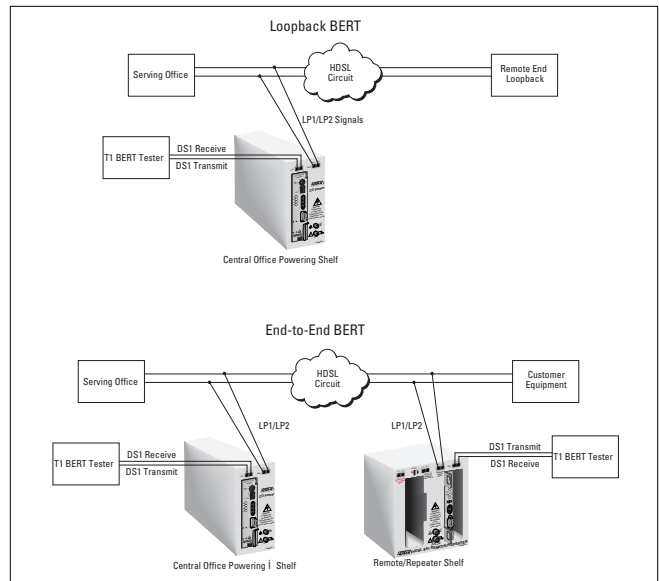


Figure 9. T1 BERT Testing of an HDSL Circuit

Table 2. Specifications

System Power Requirements	
Power:	Grounded 115 Vac, +/- 10%, 50/60 Hz
Fuse Rating:	1 Amp, 250 V, slow-blow
Environmental	
Operating temperature:	0 to +50° C (+32 to +122° F)
Storage temperature:	-40 to +70° C (-40 to +158° F)
Physical	
Dimension:	11 1/2" deep, 7 3/8" high, 4" wide
Weight:	5.0 lb

Table 3. Ordering Guide for the CO Shelf

Description	Part Number
852 CO Test Shelf	1190852L1
Adapter, E220 to 3192	1190852L10
Adapter, E220 to 388	1190852L20
Cable Assy., Dual Bantam to Alligator Clip, 6ft	3125TA002
Cable Assy., Single Bantam to Multi, 15 ft	3125TA003
Soft Case, 852 CO Test Shelf	3150003
AC Power Cord, 852 Test Shelf	3127009

Table 4 Ordering Guide for the Remote Shelf

Description	Part Number
851 Remote/Repeater Test Shelf	1190851L1
Adapter, T400 to 239/439	1190851L10
Cable Assy., Dual Bantam to Alligator Clip, 6ft	3125TA002
Cable Assy., Single Bantam to Multi, 15 ft	3125TA003
Soft Case, 851 Remote Test Shelf	3150002
T200/T400 Test Access Card	1244065L1

**5. MAINTENANCE**

The HDSL CO Installation Kit does not require routine maintenance for design 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).

**6. WARRANTY AND CUSTOMER SERVICE**

ADTRAN will replace or repair this product within 10 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 Customer and Product Service (CAPS) prior to returning equipment to ADTRAN.

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

**Part Number**

1190852L1

**ADTRAN Sales - Pricing and Availability**

(800) 827-0807

**ADTRAN Technical Support - Presales**

**Applications/Post-sale Technical Assistance**

(800) 726-8663

Standard hours: Monday-Friday, 7 am-7 pm 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.

Customer & Product Service (CAPS)

901 Explorer Boulevard

Huntsville, Alabama 35806-2807