

HDSL Remote Installation Kit Installation and Maintenance

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1. GENERAL

This practice provides installation and operation procedures for the ADTRAN HDSL Remote Installation Kit. The HDSL Remote Installation Kit is designed for use with the ADTRAN HDSL Central Office Installation Kit, part number 1190852L1.

Figure 1 is an illustration of the HDSL Remote Installation Shelf. This kit can house any standard T200 or T400 card and thereby support any number of technologies to include T1, HDSL, HDSL2, DDS, ISDN, TR-DDS, TR-ISDN, FT1, and others. 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 Remote Installation Shelf

The HDSL Remote Installation Kit simulates the operation of the remote end of an HDSL circuit (with installed remote 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 a diagram of an HDSL Circuit Simulation. To simulate an HDSL circuit with a repeater, push IN the repeater selection switch on the remote unit.

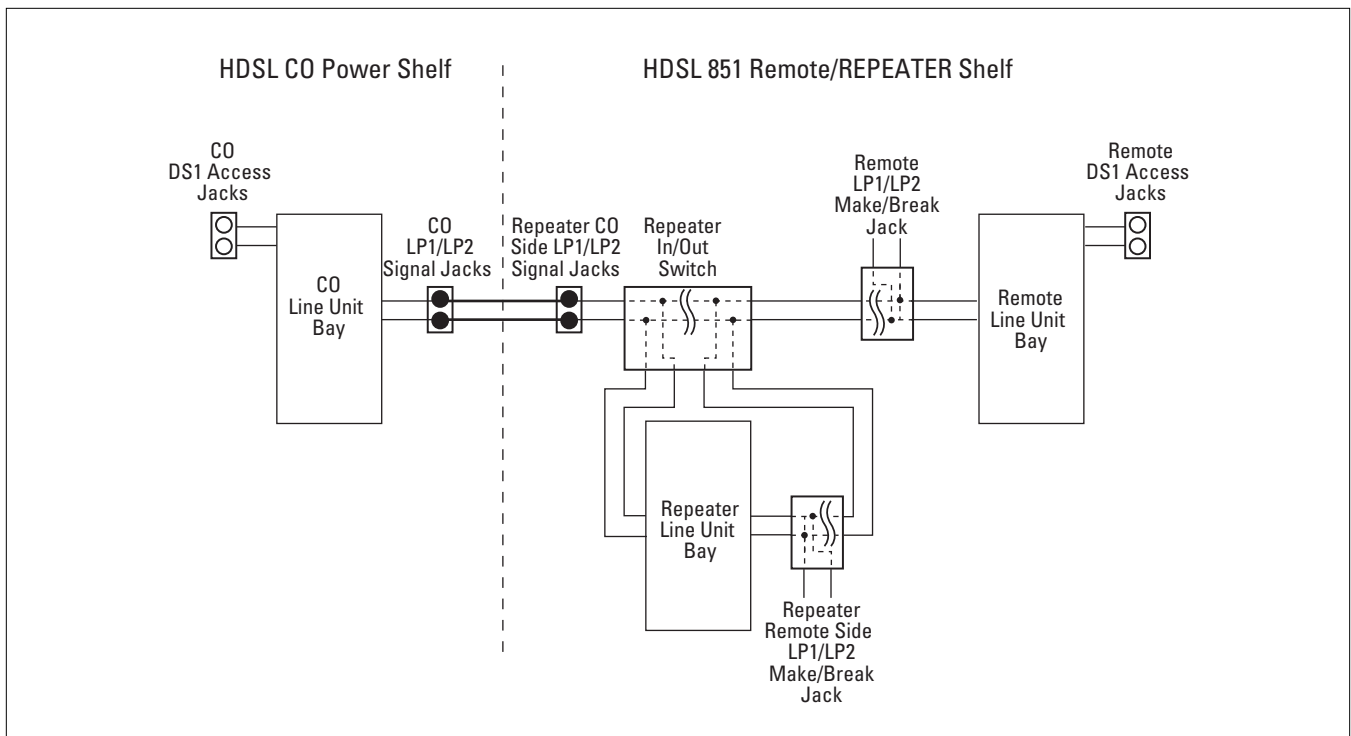


Figure 2. HDSL Circuit Simulation

Features

The HDSL Remote Installation Kit, part number 1190851L1, includes the following features:

- Compact construction Installation Unit.
- Optional adapter for 239 size repeaters.
- Span powered.
- Bantam to alligator connections.
- Versatile protective carrying case.

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 Remote Installation Kit should be shipped complete with remote shelf, softcase, and dual bantam to alligator cables.

Front Panel Features

The HDSL Remote Installation Kit front panel features Remote and Repeater unit slots, four dual-bantam jacks, a Repeater selection button, and two ground lugs for ESD ground and earth ground.

The Remote unit slot accepts an HDSL remote line unit. The Repeater unit slot accepts a repeater line unit. The Repeater selection button controls whether the repeater installed in the Remote Installation Kit is

inserted into the HDSL circuit. When the button is pressed IN, the repeater is inserted into the HDSL circuit. When the button is popped OUT, the repeater is removed from the HDSL circuit.

There are four dual-bantam jacks on the front panel. The Repeater CO-side LP1/LP2 Signal jacks provide access to the repeater's CO-side loop 1 and loop 2 signals. The Repeater Remote-side LP1/LP2 Signal jacks provide access to the repeater's remote-side loop 1 and loop 2 signals. The Remote LP1/LP2 Signal jacks provide access to the HDSL circuit's loop 1 and loop 2 signals coming from the central office end. The DS1 TX and RX Signal jacks provide access to the DS1 signals on a remote line unit installed in the remote unit slot. These jacks are used when the line unit front panel does not have jacks for accessing the DS1 signals. TX is an input jack and RX is an output jack. See **Figure 3** for front panel features.

Powering the HDSL Remote Installation Kit

The ADTRAN HDSL Remote Installation Kit can be powered by installing cables between its LP1/LP2 signal jacks and the LP1/LP2 signal jacks on the Central Office Installation Kit. See the documentation for the HDSL CO Installation Kit (part number 1190852L1) for directions on powering the CO Installation Kit.

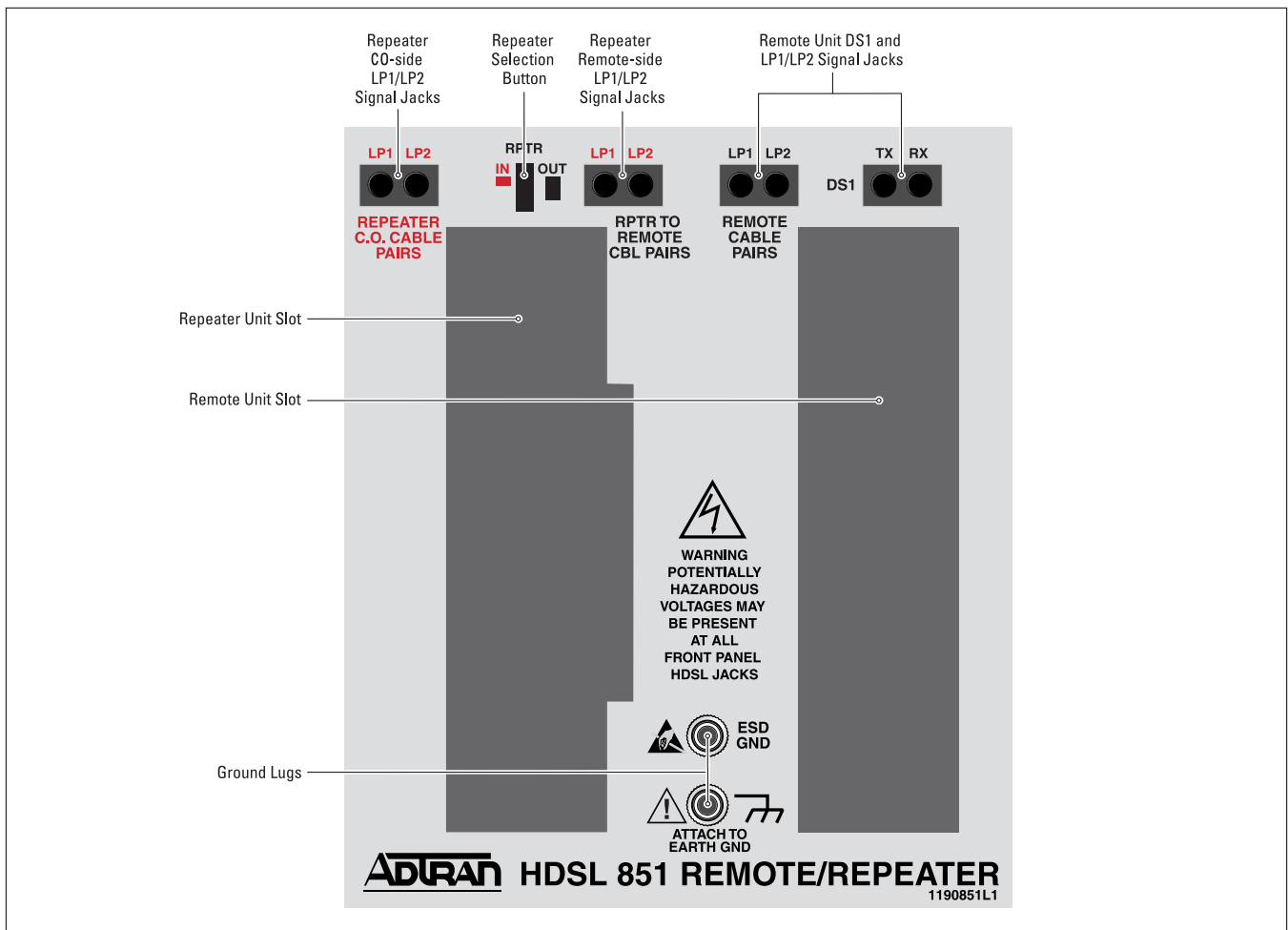


Figure 3. Front Panel Features

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.

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 your ESD wrist strap is attached to the top ground lug on the front of the HDSL Installation Kit.

Installing HDSL Line Units



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

1. Locate the slot to install the line unit on the HDSL Remote 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 the HTU-R by its front panel and align it with the guides in the slot. Slide the line unit into the slot until it seats firmly with the connector at the rear.
3. Connect it 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. ADTRAN HDSL units are insensitive to either loop or pair reversals.
 - Repeater line unit - Connect the repeater input LP1/LP2 signal jacks to the loop 1 and loop 2 twisted pairs, respectively, from the central office end of the HDSL circuit. Connect the repeater output LP1/LP2 signal jacks to the loop 1 and loop 2 twisted pairs, respectively, going to the remote end of the HDSL circuit.

NOTE

If the remote line unit is installed in the HDSL Remote Installation Kit, the Installation Kit's internal circuitry completes the connection between the repeater output LP1/LP2 signal jacks and the remote line unit.

- Remote line unit – connect the remote LP1/LP2 signal jacks to the loop 1 and loop 2 twisted pairs, respectively, coming from the central office end of the HDSL circuit.
4. To remove an HTU-R, remove the patch cord connecting the line unit to the HDSL circuit. Pull the ejector lever on the bottom of the HTU-R, or grasp the line unit 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 tipping 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 4**.

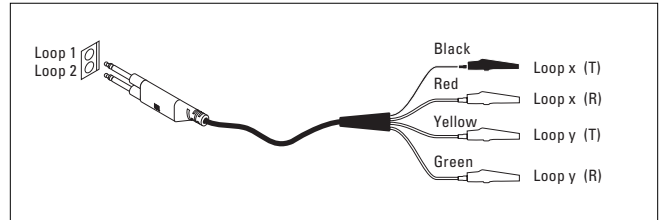


Figure 4. Test Cable

3. TESTING

Testing Line Units (See Figure 5)

This section describes the method for testing HDSL line units. The steps are as follows:

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.

- 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.

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.	

NOTE

Verify that the required line units are good before proceeding.

- 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.

- 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.

Adding a Repeater to an HDSL Circuit (See Figure 6)

This section describes the procedure for adding a repeater into a circuit to verify the operation of a currently installed repeater, or to determine whether the cable span might work better with a repeater.

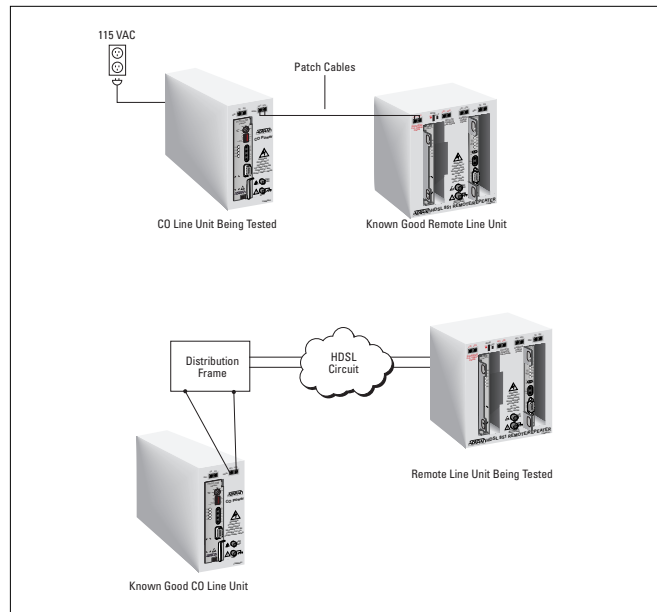


Figure 5. Testing HDSL Live Units

To perform this procedure, access to the cable span at a midpoint, such as a cross-connect, must be obtained. The steps are as follows:

- Install an HDSL repeater line unit in the Remote Installation Kit. Before handling the line unit, make sure the HDSL Assistant is connected to earth ground and the ESD wrist strap is connected to the 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.

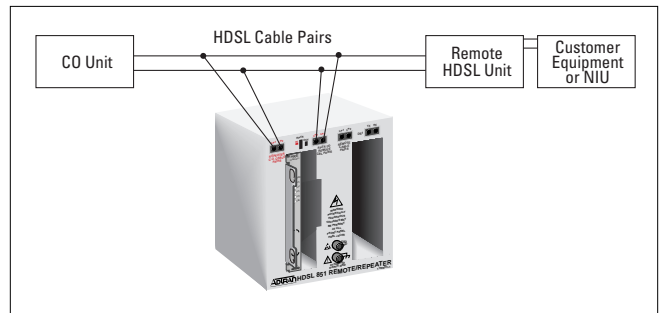


Figure 6. Adding a Repeater to HDSL Circuit

2. Install a test cable to make the following connections. Be sure to maintain signal polarity with the test cables. Connect the repeater central office side LP1 signal jack to the loop 1 twisted-pair from the central office end, and connect the repeater central office side LP2 signal jack to the loop 2 twisted-pair from the central office end.
3. Install another test cable to connect the repeater remote LP1 signal jack to the loop 1 twisted-pair going to the remote end, and connect the repeater remote LP2 signal jack to the loop 2 twisted-pair going to the remote.
4. Make sure that the repeater selection button is IN to insert the HDSL Remote Installation Kit repeater into the circuit. Make sure the repeater selection button is OUT to remove the repeater from the circuit.
5. When power is applied to the HDSL circuit, the HDSL Remote Installation Kit can be used to test repeater line units, or the LP1/LP2 signal jacks can be used to access the circuit's loop 1 and loop 2 signals.

- Connect the remote LP1 signal jack to the loop 1 twisted pair.
 - Connect the remote LP2 signal jack to the loop 2 twisted pair.
3. When power is applied to the HDSL circuit, the HDSL Installation Kit can be used to test remote line units, or the LP1/LP2 signal jacks can be used to access the circuit's loop 1 and loop 2 signals.

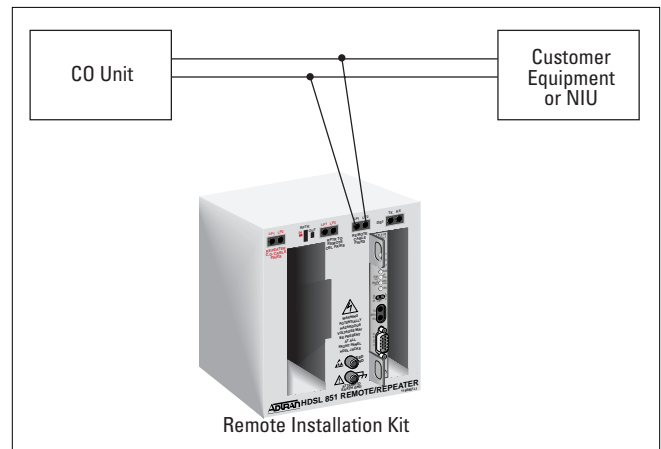


Figure 7. Accessing an HDSL Circuit from the Remote end

NOTE

The repeater selection button (IN/OUT) can be used to observe the operation of the HDSL circuit with and without a repeater.

Accessing an HDSL Circuit from the Remote End (See Figure 7)

The HDSL Remote Installation Kit can be used to access the HDSL circuit from the remote end, or to simulate the remote end for testing purposes. The process is as follows:

1. Install and HDSL remote line unit in the HDSL Installation Kit. Make sure the HDSL Assistant is connected to earth ground, and the ESD wrist strap is connected to the 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.

T1 BERT Testing of an HDSL Circuit (See Figure 8)

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

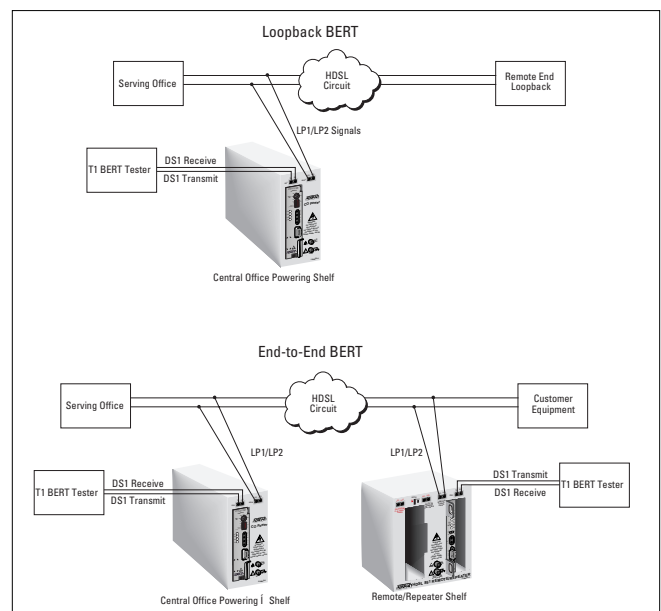


Figure 8. T1 BERT Testing of an HDSL Circuit

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 panel of the HTU-C or HTU-R
 - Connect the BERT testers DSX-1 TX jack to the DS1 line transmit jack on the front panel of the HTU-C or HTU-R.

NOTE

As an alternative to the 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 Remote 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 Installation Kit products. **Table 4** provides a list of products for the CO Installation Kit.

Table 2. Specifications

Enviromental	
Operating temperature:	0 to +50° C (+32 to +122° F)
Storage temperature:	-40 to +70° C (-40 to +158° F)
Physical	
Dimension:	6 1/2" deep, 7 3/8" high, 6" wide
Weight:	4.0 lb

Table 3. 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

Table 4. 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

5. MAINTENANCE

The HDSL Remote 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

1190851L1

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