

BR1/10 E1 LIU BR1/10 E1 Line Interface Unit Installation and Maintenance

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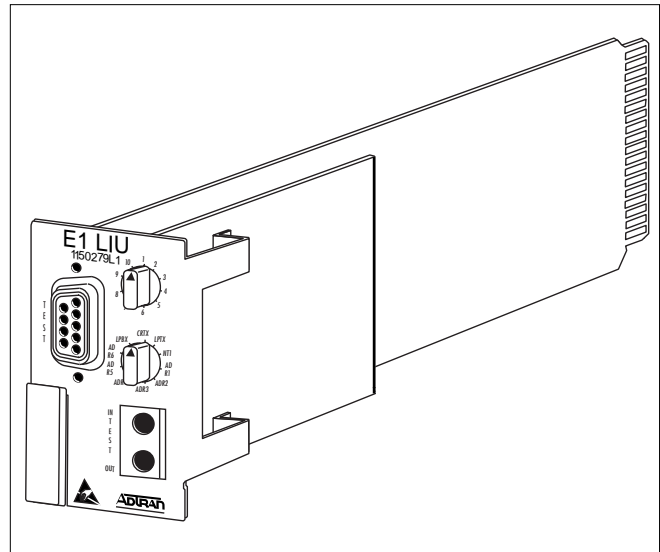


Figure 1. BR1/10 E1 LIU

1. GENERAL

This practice provides installation and maintenance procedures for the ADTRAN BR1/10 E1 LIU.

Figure 1 is an illustration of the BR1/10 E1 LIU.

Revision History

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

Features

The BR1/10 E1 LIU (E1 LIU), part number 1150279L1, includes the following features:

- Common Channel Signal (CCS) framing formats.
- AMI and HBD3 Line Coding.
- Local and remote loopback for E1 interface.
- BRI test access control. (U-BR1TE mode only)
- Front panel bantam jack for DS0 logic tester access. (U-BR1TE mode only)
- Front panel DB-9 for DS0 logic tester clock input. (U-BR1TE mode only)

General Description

The E1 LIU is a common module plug-in unit used in the ADTRAN BR1/10 channel bank as the interface between the channel bank and the E1 line. The BR1/10 can be used in Frame Relay Multiplex configurations to support multiple applications. The BR1/10 functions as an ISDN channel bank and provides 10 standard 2B+D subscriber lines. In the Frame Relay Multiplex configuration, the BR1/10 functions as a statistical multiplexer, concentrating up to 10 high speed SDSL subscriber lines into a single E1 carrier facility.

The E1 LIU provides data formatting, line encoding, and timing recovery and generation for BRI and E1 transmission. Two 10-position rotary switches allow for selection of BRI tests, a dual bantam jack provides test access, and a DB-9 furnishes both an 8 kHz and a 64 kHz clock for the DS0 logic test set. Option selections for E1 LIU functions are selected using the DIP switch on the associated BR1/10 E1 BCU.

The BR1/10 can be used with the ADTRAN FramePort products to deliver ISDSL and SDSL

services from 64 kbps to 1.024 Mbps. In the statistical mode of operation, virtual circuits are established between the BR1/10 and a frame relay switch or router over an un-channelized E1 Facility.

The E1 LIU initiates both local and remote loopbacks as commanded by the associated E1 BCU. Detailed test processes are described in Section 3, Testing.

2. INSTALLATION



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*.

CAUTION

Do not insert the E1 LIU into a powered-up backplane unless the E1 BCU is already inserted.

The E1 LIU plugs directly into the common card area of a BR1/10 chassis in the LIU slot. To install, hold the unit by the front panel while supporting the bottom side. Align the unit to the LIU slot guides. Slide the unit into the shelf ensuring the edge connector inserts firmly into the backplane. Lock the unit in place by pushing in on the lock lever.

Power Cycling

If the E1 LIU is inserted into a powered-up channel bank, power to the channel bank must be cycled to cause reinitialization of channel bank elements. To cycle power, remove and reinsert either the front panel fuse on the associated PAU, or the -48 V input fuse on the channel bank backplane.

Optioning

The E1 LIU does not require DIP switch settings. Instead, the multi-position DIP switch on the E1 BCU circuit board (SW3) provides the necessary option settings for the channel bank common cards. These options must be selected prior to card insertion into the channel bank. Refer to E1 BCU I&M Practice, ADTRAN part number 61150280L1-5, for additional information.

Connections

All input and output to the E1 LIU is made through the backplane. No additional backplane wiring is necessary for design operation.

Front panel Features

The E1 LIU front panel components work in conjunction with the E1 BCU to monitor status and to initiate BRI testing and E1 loopback testing. On the E1 LIU, two 10-position rotary switches work together to perform tests or monitor channel bank status. Access to individual units is provided through front panel bantam jacks, while the DB-9 provides the necessary clock output required by standard DS0 logic test equipment. **Figure 2** is an illustration of the E1 LIU and E1 BCU.

NOTE

Front panel rotary switches and bantam test access apply to U-BR1TE application of BR1/10. In FramePort application, rotary switches have no effect, and use of bantam test access will cause disruption of service.

DSL Channel Selection Switch (U-BR1TE Mode Only)

The DSL switch selects individual channel positions for monitoring and BRI testing. Labeled 1 through 10, the switch selects the corresponding channel unit. When selected, the individual channel unit's STATUS LED will Flash red/green for about 3 seconds to acknowledge selection. The LEDs on the E1 BCU then display current status of the selected channel unit.

Loopback Address Switch (U-BR1TE mode only)

The Address switch selects the local test to be performed for the designated channel unit. Tests include loopback for the NT-1 and up to six ISDN devices in the customer direction. Test transmission include the following:

- Test pattern to carrier.
- Test pattern to loop interface.
- Local bilateral loopback.
- Local performance monitoring.

Table 1 shows the E1 LIU 10-position Address switch options.

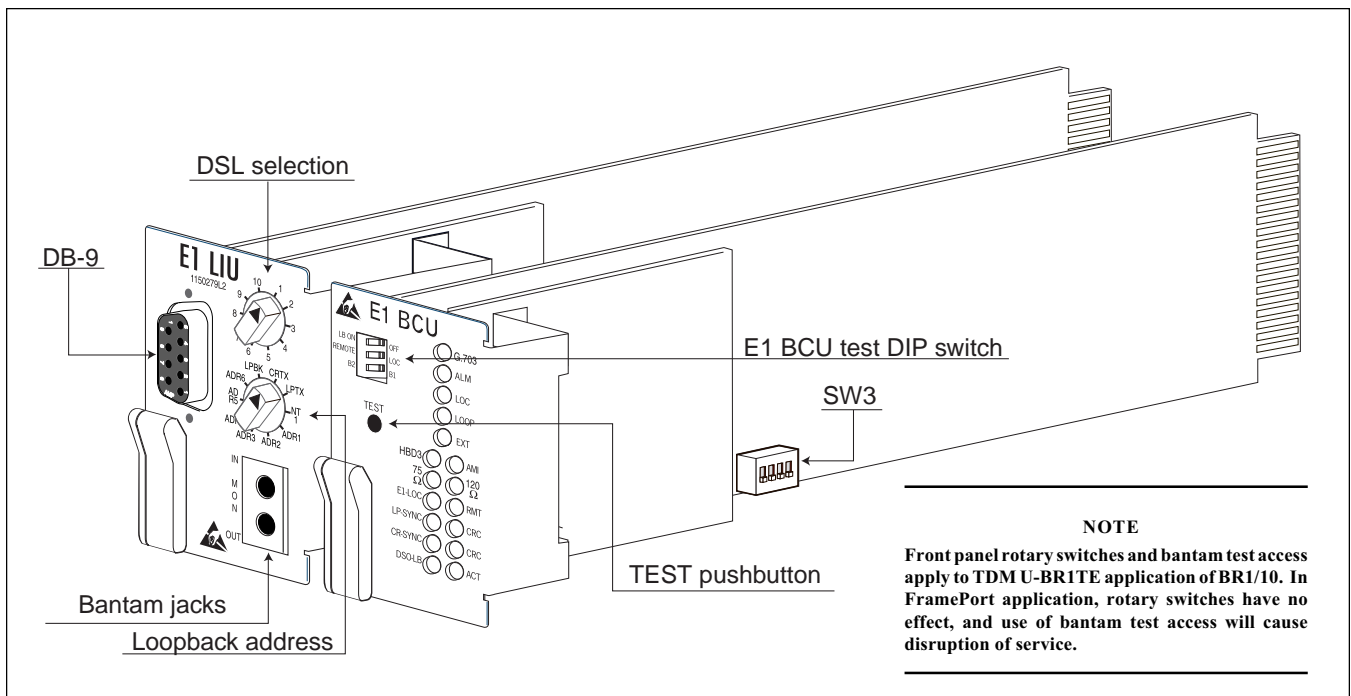


Figure 2. BR1/10 E1 LIU and BCU

Table 1. Rotary Test Switch Options

| Label | Description |
|-------|--|
| ADR 1 | Address of this (the first) device. |
| ADR 2 | Address of the second downstream device. |
| ADR 3 | Address of the third downstream device. |
| ADR 4 | Address of the fourth downstream device. |
| ADR 5 | Address of the fifth downstream device. |
| ADR 6 | Address of the sixth downstream device. |
| LPBK | Forces bidirectional B1 or B2 loopbacks as selected on the BCU faceplate dip switch. |
| CRTX | Carrier transmit in the carrier direction. |
| LPTX | Loop transmit in the carrier direction. |
| NT1 | Address of the NT1. |

DB-9 Connector

The DB-9 female connector provides access to the 8 kHz and 64 kHz clock reference for DS0 logic test equipment. **Figure 3** illustrates the DB-9 connector.

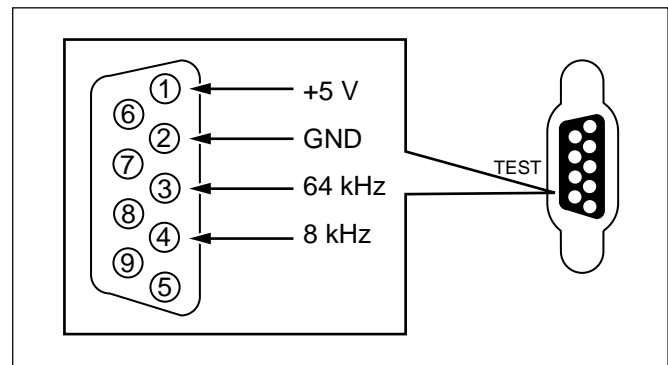


Figure 3. DB-9 Connector

3. TESTING

Although ISDN is designed to be tested from the CO ISDN switch it may be necessary during fault isolation or equipment malfunction to conduct remote testing from the local E1 LIU. The E1 LIU provides access for both E1 loopback and BRI testing.

E1 loopback testing has two loopback modes: local loopback and remote loopback. E1 loopbacks include:

- Providing a loopback for the local E1 data stream.
- Providing a loopback for the remote E1 data stream.

Test Access and Selection (U-BR1TE mode only)

The E1 LIU and E1 BCU allow access for standard DS0 test sets. The E1 LIU provides test selection for each individual U-BR1TE channel unit. The front panel DIP switch on the BCU selects test types for both E1 loopback and BRI tests. **Table 2** describes E1 BCU DIP switch test selections.

Table 2. E1 BCU Test DIP Switch

| Position | Description |
|-----------------|--|
| LB ON LB OFF | Initiates E1 loopbacks. Terminates E1 loopbacks. |
| LOCAL REMOTE | Initiates internal local loopback in the E1 data stream. Initiates a remote loopback in the E1 data stream. |
| B1 B2 | Selects B1 channel for BRI testing. Selects B2 channel for BRI testing. |

When a U-BR1TE channel card is configured for D channel operation it will respond to embedded operation channel (*eoc*) loopbacks, including B1, B2, and 2B+D. These loopbacks can be initiated from an upstream device including the ISDN switch, another U-BR1TE channel unit, or ISDN test equipment developed for this purpose.

BRI testing provides test access for individual BR1/10 U-BR1TE channel units. The E1 LIU bantam jacks accommodate standard DS0 logic testers such as the TPI-108/109 RT II or the FIREBERD 4000/6000.

Selection for B1 or B2 is made on the E1 BCU front panel DIP switch. The E1 LIU's rotary switches select the designated channel and the desired test. Pressing the TEST pushbutton on the E1 BCU front panel initiates the test. This will turn the DS0-LB LED On. Pressing the TEST button a second time terminates the test as indicated by the DS0-LB LED going Off.

NOTE

Disengaging the bantam jacks will also terminate tests.

E1 Loopback Testing

Loopback tests incorporate functions of the E1 LIU and E1 BCU common cards in both the local and remote channel banks. For simplicity of description

the term Channel Bank is used as a generic reference to common cards.

CAUTION

E1 loopback tests are intrusive and will disrupt service to the entire BR1/10 channel bank.

Local Loopback

A local loopback bridges the E1 line across the receive pair to the transmit pair isolating the bank from the E1 line. This allows for internal bank testing and individual card testing, and provides a baseline for E1 line testing.

To initiate local loopback, select LB ON and LOC on the E1 BCU front panel DIP switch. This causes outgoing transmitted data to loop back to the receiver at the local BR1/10. During the test unframed All Ones (A1S) are transmitted to the E1 network causing the G.703 LED to turn On green. The E1 LOC LED will also turn On indicating local loopback is in effect.

To terminate the test, position LB to OFF. The G.703 and E1 LOC LEDs turn Off indicating test termination.

NOTE

When local loopback is invoked and the E1 BCU is configured for loop timing, the BR1/10 defaults to local timing.

Remote Loopback

Remote loopback bridges E2 transmit pair to receive pair, causing incoming data to loopback to the transmitter.

To initiate remote loopback, select REMOTE and LB ON on the E1 BCU front panel.

In response, the remote E1 BCU will Flash its RMT LED. RMT LED will turn On indicating successful completion of the remote loopback.

To terminate the test, position LB to OFF. The local channel bank returns to normal operation as indicated by the RMT LED turning Off.

BR1 Testing (U-BR1TE mode only)

Local test access is provided to each of the installed BR1/10 U-BR1TE channel units in the downstream and upstream directions. The E1 LIU provides bantam

jack BRI logic access, 8 kHz and 64 kHz clock reference, selection of the desired channel unit (1-10), and the desired test. When the 10 position rotary switch is used to select a channel unit, the STATUS LED on the selected unit will Flash red/green for about 3 seconds then return to the current status. Refer to U-BR1TE channel unit document, ADTRAN part number 61150077L1-5, for additional STATUS LED operation.

Loopback Test (ADR1-ADR6, NT1)

Loopbacks in the network-to-customer direction can be initiated from either the ISDN switch or the E1 LIU. The downstream direction is automatically selected based on the card position in the network. To initiate a loopback, perform the following steps:

1. Insert the TX and RX plugs of the DS0 digital test set into the bantam jacks on the LIU. Connect the clock input to the DS0 digital test set DB-9 connector on the LIU. Configure the test set for Near Logic and 64 kbps.
2. Select the desired U-BR1TE channel unit using the DSL switch on the LIU.
3. Select the desired loopback address on the LIU (ADR1-ADR6, or NT1).
4. Select the desired bearer channel using B1/B2 DIP switch on the E1 BCU.
5. Press the TEST pushbutton to initiate the loopback test. The DS0 LB status LED will turn ON when the loopback is established to the selected address. If the selected address does not respond, the DS0 LB LED will remain OFF. Observe the DS0 digital set for bit errors.
6. To terminate the loopback, press the TEST pushbutton or remove the transmit bantam plug. Upon deactivation of the test the DS0 LB LED will turn OFF.

Loopback tests to additional network addresses can be performed by changing to another address with the Loopback Address switch (step 3). It is not necessary to exit the test mode to select a new address.

If a new U-BR1TE channel unit is selected testing is terminated. However, pressing the TEST pushbutton will initiate the previous test arrangement on the new address. To start from the beginning (ADR1) return to step 2.

Point-to-Point Test, (CRTX, LPTX)

A point-to-point (straightaway) test can be performed to either the U-interface (LPTX) or the E1 carrier interface (CRTX). This test requires craft personnel at the local and remote channel banks.

To initiate a point-to-point test using a DS0 digital test set perform the following steps:

1. Insert the TX and RX bantam plugs of the DS0 digital test set into the jacks on the LIU. Connect the clock input to the DS0 digital test set DB-9 connector on the LIU. Configure the test set for Near Logic and 64 kbps.
2. Select the desired U-BR1TE channel unit using the DSL switch on the LIU.
3. Select the desired test direction: LPTX or CRTX on the LIU.
4. Select the desired bearer channel using B1/B2 DIP switch on the BCU.
5. Press the TEST pushbutton on the BCU to initiate the test.
6. If the remote unit is a BR1/10 U-BR1TE channel unit, perform Steps 1 through 4, choosing the same front panel switch setting. Ensure both test sets are configured for the same test pattern (511, 2047).
7. Observe the DS0 digital test set for bit errors.
8. To deactivate the loopback, press the TEST pushbutton or remove the transmit bantam plug. Upon deactivation of the test the DS0-LB LED will go Off.

Local Loopback (LPBK)

A bilateral loopback can be initiated for any of the BR1/10 U-BR1TE channel units for either bearer channel. A local test pattern source is not required for this test. To initiate a local loopback, perform the following:

1. Select the desired U-BR1TE channel unit using the DSL switch on the LIU.
2. Select LPBK on the Address switch on the LIU.
3. Select the desired bearer channel using B1/B2 DIP switch on the BCU.
4. Press the TEST pushbutton to initiate the test. The DS0-LB LED will Flash once a second for B1, or twice in succession for B2.

- To deactivate the loopback press the TEST pushbutton. Upon deactivation of the test the DS0 LED will go Off.

Local Performance Monitoring

Performance monitoring of the local E1 carrier system and the 2-wire U-interface of the ISDN data can be performed from the front panel without interruption of service to the customer. For this test, bearer channel selection is not applicable and a test pattern source is not required. To initiate local performance monitoring, conduct the following:

- Ensure a bantam plug is NOT inserted in the TX jack on the E1 LIU.
- Select the desired U-BRITE channel unit using the DSL switch on the LIU.
- Select ADR1 on the LIU Address switch.
- Press the TEST pushbutton to initiate the test. The DS0-LB LED will turn ON.
- The total number of CRC errors is simultaneously displayed by the LP CRC and CR CRC LEDs. The LEDs will Flash for more than 6 but less than 19 errors, and turn ON steady for more than 20 errors.

4. SPECIFICATIONS

The specifications for the BR1/10 E1 LIU are listed in **Table 3**.

5. MAINTENANCE

The BR1/10 E1 LIU 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 Service. See *Warranty and Customer Service*.

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:

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 / upgrade
(256) 963-8722

Repair and Return Address:

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

Table 3. BR1/10 E1 LIU Specifications

| 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% non condensing |
| Physical | |
| Dimensions | 9 3/8" L x 2 1/2" H x 7/8" W |
| Weight | 3.2 Oz |