CAUTION!
SUBJECT TO ELECTROSTATIC DAMAGE OR DECREASE IN RELIABILITY.
HANDLING PRECAUTIONS REQUIRED.

Section 61150077L2-5A
Issue 1, May 1998
CLEI Code # D4C5BBBB_ _

BR1/10 PREFERRED OPTION U-BR1TE ISDN 2B1Q INTERFACE INSTALLATION AND MAINTENANCE

CONTENTS

FIGURES

TABLES

1. GENERAL

This practice provides installation and maintenance procedures for the ADTRAN® BR1/10 Preferred Option U-BR1TE illustrated in Figure 1.

Features

BR1/10 Preferred Option U-BR1TE, part number 1150077L2, features include the following:

- Supports a preferred set of options that minimizes provisioning errors and expedites installation.
- Features an Integrated Services Digital Network (ISDN) 2B1Q interface that meets all Layer 1 requirements as specified in ANSI T1.601-1992.
- Provides 18 kft nominal range on mixed gauge wire.
- Operates in 3 DS0 format according to TR-NWT-000397.
- Supports ADTRAN 4:1 Time Division Multiplexer (TDM) format.
- Features performance monitoring of the Layer 1 facilities as specified in TR-NWT-000397 and TR-TSY-000829.

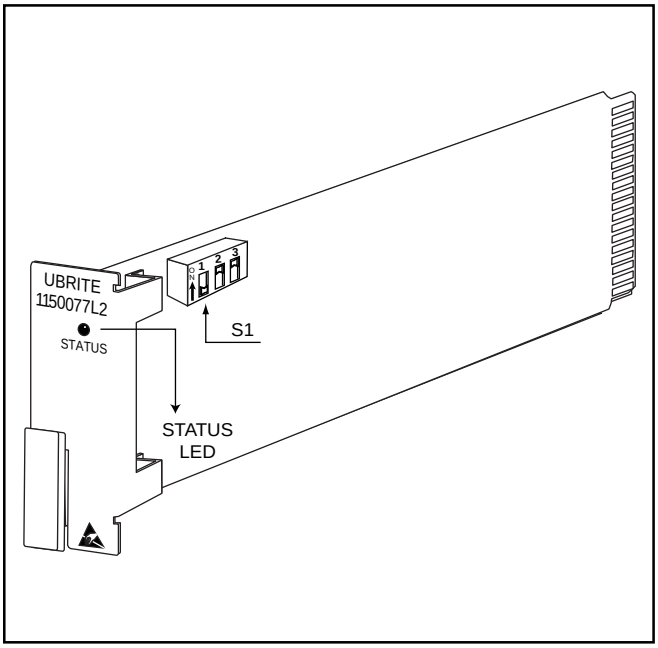

Figure 1. BR1/10 Preferred Option U-BR1TE

- Provides a distinctive metallic DC test signature, as specified in TR-NWT-000397, to identify the unit as either a line unit LT or line unit NT.
- Responds to B1, B2, and 2B+D loopbacks through the embedded operations channel (*eoc*).
- Operates with BR1/10 Line Interface Unit (LIU) and Bank Channel Unit (BCU) to provide local access to test each channel unit.

General Description

The BR 1/10 Preferred Option U-BR1TE is a line card that plugs into a single channel slot of an ADTRAN BR1/10 channnel bank, and provides the interface between the Digital Subscriber Line (DSL) and T1 carrier facility.

The BR1/10 and BR 1/10 Preferred Option U-BR1TE have been designed to provide a maximum concentration for 2B+D Basic Rate ISDN (BRI). The BR1/10 and BR 1/10 Preferred Option U-BR1TE are used in both central office terminal (COT) and remote terminal (RT) applications. The BR1/10 Channel Bank will interoperate with other channel bank

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systems that are WECO®D4 compatible, such as SLC-96 and SLC-5 systems.

The BR 1/10 Preferred Option U-BR1TE operates in the TR-NWT-000397 3-DS0 mode allowing up to eight individual BR1TE cards for each T1 carrier facility. In the 8 DSL mode the BR1/10 is compatible with channel bank systems equipped with TR-NWT-000397-compliant ISDN channel units, such as the ADTRAN D4 U-BR1TE and ADTRAN SLC-5 U-BR1TE.

When deployed with another BR1/10 using the ADTRAN proprietary D-channel 4:1 TDM, up to 10 BR1 2B+D circuits can be delivered. This makes optimum use of the T1 carrier facilities.

Options for the functions specific to the BR1/10 Preferred Option U-BR1TE are selected with the three-position Dual In-line Package (DIP) switch on the U-BR1TE. The STATUS LED provides status synchronization information for local craftpersons.

2. INSTALLATION

After unpacking the unit, immediately inspect it for possible shipping damage. If damage is discovered, file a claim immediately with the carrier; then contact ADTRAN Customer and Product Services (CAPS) (see section 6, *Warranty and Customer Service*).

The BR1/10 Preferred Option U-BR1TE plugs directly into any of the BR1/10 chassis channel positions labeled 1 through 10. To install the U-BR1TE, insert the unit into the backplane connector until firmly seated. At this point, the **STATUS** LED on the U-BR1TE should illuminate **RED**. A **RED STATUS** LED indicates that synchronization has not been achieved for either the ISDN U-Interface or the T1 interface. When both interfaces are synchronized, the **STATUS** LED will change to **GREEN**. If the **STATUS** LED remains **RED**, check the BCU indicators to determine the error type. A quick summary of error information is provided in Table 1**.** For more information, see *BCU Installation and Maintenance Practice*, number 61150080L1-5.

The BR1/10 BCU provides additional STATUS information regarding the individual U-BR1TEs. To access this information, select an individual U-BR1TE unit using the selection dial labeled 1 through 10 on the LIU.

Once an individual U-BR1TE is selected, check the status using the indicators on the BCU; the LIU and BCU are illustrated in Figure 2 and explained in Table 2. Following power-up, the BR1/10 U-BR1TE LEDs, LP and CR SYNC, will be **ON** (Red) until the T1 facility and ISDN interface are synchronized. When synchronization occurs with the carrier and loop interface, the LEDs turn **OFF** and remain off.

Table 1. BR1/10 BCU LED Error Information for U-BR1TE

LED	INDICATOR	PROBLEM	FAULT
CR SYNC	**RED**	Framing across T1 carrier is not achieved to another ISDN network element.	Associate channel unit not installed at remote channel banks *or* T1 carrier facility problem
LP SYNC	**RED**	Synchronization is not achieved on the two-wire U-interface.	Appropriate upstream or downstream ISDN Network Element not installed (NT1, U-Repeater, Tandem U-BR1TE, or ISDN switch) *or* DSL problem
CR CRC	**RED** or *Flashing*	A Near End Block Error (NEBE) has been received from the T1 carrier facility.	Mismatch of zero byte substitution (ZBS) option on associated BR1TE unit *or* Timing error on T1 carrier facility
LP CRC	**RED** or *Flashing*	A NEBE has been received from the two-wire U-interface.	Noise problems on DSL or other ISDN network element

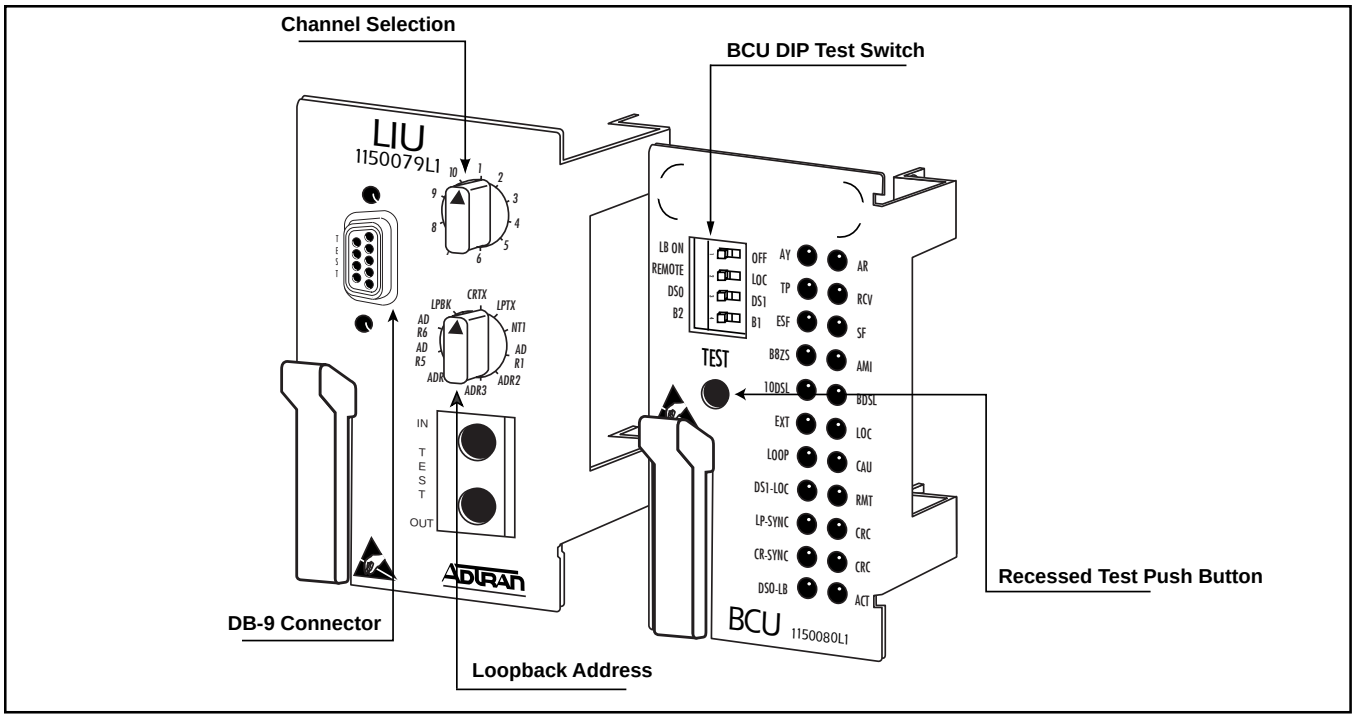

Figure 2. BR1/10 LIU and BCU

Table 2. BR1/10 BCU Indicators

LED	DESCRIPTION
LP SYNC	U-interface synchronization status
LP CRC	U-interface cyclic redundancy check *(crc*) errors
CR SYNC	Appropriate T1 interface framing status
CR CRC	T1 interface *crc* errors
DS0-LB	**ON** indicates U-BR1TE is in a 2B+D loopback configuration, one **FLASH** per second for a B1 loopback; twice per second for a B2 loopback
ACT	Exchange of the activation bit between the customer's terminal equipment and the ISDN switch has occurred; layer 1 is complete.

Connections

Table 3 shows the wiring interconnects to the backplane amphenol connector for the two-wire U-Interface. All other input and output to the BR1/10 Preferred Option U-BR1TE are made through the backplane.

Table 3. Connector Interface

CHANNEL POSITION	PIN	LEAD
1	27	R
	2	T
2	29	R
	4	T
3	31	R
	6	T
4	33	R
	8	T
5	35	R
	10	T
6	37	R
	12	T
7	39	R
	14	T
8	41	R
	16	T
9	43	R
	18	T
10	45	R
	20	T

Optioning

The BR1/10 Preferred Option U-BR1TE is always optioned for 2B+D service and ZBS. S1 provides the remaining option settings. Figure 1 shows the location of S1. Switch functions are explained in Table 4.

Faceplate Features

The BR1/10 Preferred Option U-BR1TE provides a faceplate **STATUS** LED, as illustrated in Figure 1. **GREEN** indicates synchronization on both U and T1 interfaces. **RED** indicates the lack of synchronization of one or both interfaces. The LED will *flash* **RED** and **GREEN** for 3 seconds following selection of the channel unit on the BR1/10 LIU, and then return to the current synchronization status.

3. TESTING

The BR1/10 Preferred Option U-BR1TE responds to standard *eoc* testing, including B1, B2, and 2B+D loopbacks. These *eoc* commands are sent from an upstream device, such as the ISDN switch, another U-BR1TE, or an ISDN test set. This loopback capability allows for remote testing.

DS0 TESTING

DS0 local test access allows local craftpersons to assist in circuit turn-up or sectionalization of trouble/equipment malfunction when remote testing is not available or convenient.

Table 4. Switch Functions

SWITCH	FUNCTION	DESCRIPTION
S1-1	**Sealing Current/Wake-up Tones** (Functions dependent on S1-2 and S1-3)	
	LULT Mode (S1-2/3 ON)	In the LULT mode, S1-1 controls sealing current. When used in an Adjacent-to-Customer configuration, sealing current should be provided, S1-1 **ON**. In a Tandem Office Source configuration, or adjacent to an ADTRAN U-Repeater Powering Module, sealing current is not required, and should be disabled, S1-1 **OFF**.
ON	DC Sealing Current provided	
OFF	DC Sealing Current not provided	
	LUNT Mode (S1-2/3 OFF)	In the LUNT mode, S1-1 controls periodic wake-up tones. Periodic wake-up tones should be disabled when the unit is located in an Adjacent-to-Switch location, S1-1 **OFF**. Periodic wake-up tones are required in a Tandem Office Sink configuration, or when the unit is adjacent to a device that requires wake-up tones, such as a Newbridge switch.
ON	Periodic wake-up tone provided	
OFF	Periodic wake-up tone not provided	
S1-2 S1-3	**Termination Mode**	
ON	LULT	S1-2 and S1-3 must be be set identically for proper operation of the BR1/10 Preferred Option U-BR1TE. They must be set to **ON** when the unit is installed in Adjacent-to-Customer or Tandem Office Source configuration. They must be set to **OFF** when the unit is installed in Adjacent-to-Switch or Tandem Office Sink configuration.
OFF	LUNT	

The BR1/10 BCU and LIU provide the required network access for testing downstream ISDN devices, inserting a test pattern to either the carrier or loop interface, performing a local bilateral loopback, and performing local performance monitoring of the ISDN circuit.

When DS0 is selected on the BR1/10 BCU, local test access is afforded to each of the installed BR1/10 BR1TE channel units in both the downstream and upstream directions. Bantam jacks for DS0 logic access, 8 and 64 kHz clock reference, selection of the desired channel unit (1-10) and the desired test are provided by the BR1/10 LIU. When the 10 position rotary switch is used to select a BR1TE channel unit, the **STATUS** LED on the BR1TE channel unit will alternate *flashing* **RED** and **GREEN** for approximately 3 seconds before returning to the current status display.

Loopback Test (ADR1-ADR6, NT1)

Loopbacks in the network-to-customer direction can be initiated from either the ISDN switch or the BR1/10 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 bantam plugs of the DS0 digital test set into the bantam jack of 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 BR1TE channel unit using the DSL rotary switch on the LIU. The selected BR1TE channel card **STATUS** LED will *flash* **GREEN** and **RED** for approximately 3 seconds when selected.
3. Select the desired loopback address on the LIU (ADR1-ADR6, or NT1).
4. Select the desired bearer channel using the B1/B2 DIP switch on the BCU.
5. Depress the BCU's recessed **TEST** pushbutton to initiate the loopback test. The **DS0-LB** status LED will light **YELLOW** when the loopback is established to the selected address. If the selected address does not respond, the **DS0-LB** LED will remain out. Observe the DS0 digital set for bit errors.
6. Test the other B channel or additional network ISDN devices by changing to another test (steps 3 and 4). It is not necessary to exit the test mode to select a new test. If a new BR1TE channel unit is selected, all DS0 tests will be terminated.
7. To terminate the loopback, depress the **TEST** pushbutton, or remove the transmit bantam plug. Upon deactivation of the test, the **DS0-LB** LED will go out.

Point-to-Point Test (CRTX, LPTX)

A point-to-point (straightaway) test can be performed on either the U-interface (LPTX) or the T1 carrier interface (CRTX).

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 bantam jack 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 BR1TE channel unit using the DSL rotary switch on the LIU. The selected BR1TE channel card **STATUS** LED will *flash* **GREEN** and **RED** for approximately 3 seconds when selected.
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. Depress the recessed **TEST** pushbutton on the BCU to initiate the test.
6. If the far end unit is a BR1/10 BR1TE channel unit, perform steps 1 through 4 choosing the same faceplate 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, depress the **TEST** pushbutton, or remove the transmit bantam plug. Upon deactivation of the test, the **DS0-LB** LED will go out.

Local Loopback (LPBK)

A bilateral loopback can be initiated for any of the BR1/10 BR1TE channel units for either bearer channel. Since a local test pattern source is not required for this test, it can be performed without additional test equipment. To initiate a local loopback, perform the following steps:

1. Select the desired BR1TE channel unit using the DSL rotary switch on the LIU. The selected

BR1TE channel card **STATUS** LED will *flash* **GREEN** and **RED** for approximately 3 seconds when selected.

2. Select the **LPBK** using the 10-position rotary switch.
3. Select the desired bearer channel using the B1/B2 DIP switch on the BCU.
4. Depress the recessed **TEST** pushbutton to initiate the test. The **DS0-LB** LED will *flash* once per second for a B1 loopback, twice per second for a B2 loopback.
5. To deactivate the loopback, depress the **TEST** pushbutton. Upon deactivation of the test, the **DS0-LB** LED will go out.

Local Performance Monitoring

Performance monitoring of the local T1 carrier system and the two-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, perform the following steps:

1. Ensure a bantam plug is NOT installed in the faceplate TX bantam jack on the BR1/10 LIU.
2. Select the desired BR1TE channel unit using the DSL rotary switch on the LIU. The selected BR1TE channel card **STATUS** LED will *flash* **GREEN** and **RED** for approximately 3 seconds when selected.
3. Select **ADR1** on the LIU.
4. Depress the recessed **TEST** pushbutton to initiate the test.
5. The total number of *crc* errors is simultaneously displayed by the **LP** and **CR CRC** status LEDs. LEDs will *flash* for 6-19 *crc*s and will illuminate solid when more than 20 errors have been reached.
6. To exit local performance monitoring, depress the **TEST** pushbutton.

4. SPECIFICATIONS

The specifications for the BR1/10 Preferred Option U-BR1TE are listed in Table 5**.**

5. MAINTENANCE

The BR1/10 Preferred Option U-BR1TE requires no routine maintenance to operate properly.

ADTRAN does not recommend that repairs be performed in the field. Repair services are obtained by returning the defective unit to ADTRAN's Customer and Product Services (CAPS) department.

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 Telco 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 Technical Support

(800) 726-8663
Standard hours: Monday-Friday, 7 am-7 pm CST
Emergency hours: 7 days/week, 24 hours/day

ADTRAN Sales

(800) 827-0807

ADTRAN Repair/CAPS

(256) 963-8722

Repair and Return Address

ADTRAN, Inc.
Customer & Product Service (CAPS) Department
901 Explorer Boulevard
Huntsville, Alabama 35806-2807

Table 5. Specifications

LOOP INTERFACE		
Line:	Two-wire (tip and ring)	
Operating Mode:	Full-duplex	
Data Rate:	160 kbps total; 144 kbps available to customer	
Signal Format:	2B1Q	
Output Amplitude:	2.5 V Zero-to-peak	
Tx Source Impedence:	According to ANSI T1.601.1992	
Rx Source Impedence:	According to ANSI T1.601.1992	
Receiver Sensitivity:	According to ANSI T1.601.1992	
DS1 FACILITY INTERFACE		
BR1/10 compatible equipment:	D4, SLC-96 (modes 1 and 3)	
NETWORK COMPATIBILITY		
Interface:	ISDN and other digital service, according to TR-NWT-000397. 3 DS0 method, ADTRAN 4:1 TDM delivery of 2B+D Basic Rate ISDN	
FACEPLATE INDICATOR		
Status:	Indicated Sync. Status of Loop and Carrier Interface	
MECHANICAL		
Size:	2 1/2" High, 9 3/8" Deep, 5/8" Wide	
Weight:	10 oz	
Mounting:	Mounts in ADTRAN BR1/10 Channel Banks	
POWER		
	Current Drain	On-Card issipation
– 48 V	20 mA	(in LUNT mode), 75 mW (or 3/4 W)
5 V	5 mA	Normal Operating Mode
ENVIRONMENTAL		
Temperature:	Operating:	– 40 to 70° C
	Storage:	– 40 to 85° C
Relative Humidity:	up to 95%, non-condensing	