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

Section 61150.077L1-5B
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BR1/10 U-BR1TE
ISDN 2B1Q INTERFACE
INSTALLATION AND MAINTENANCE

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1. GENERAL

This practice provides installation and maintenance procedures for the ADTRAN® BR1/10 U-BR1TE. **Figure 1** is an illustration of the BR1/10 U-BR1TE.

Revision History

Revision to this practice adds a Specification Table, incorporates a new CLEI Code, changes **Figure 2**, and corrects typographical errors.

Features

BR1/10 U-BR1TE, part number 1150077L1, features include:

- Features an 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.
- 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.

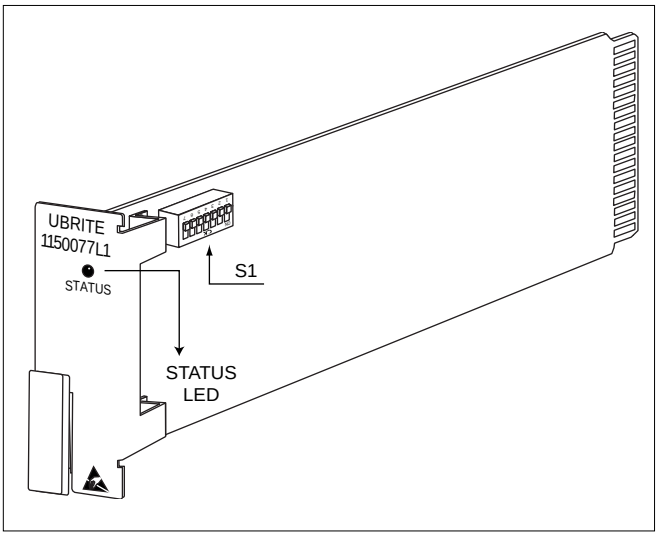

Figure 1. BR1/10 U-BR1TE

- Responds to B1, B2 and 2B+D loopbacks through the embedded operations channel (*eoc*).
- Operates with BR1/10 LIU and BCU to provide local access to test each channel unit.

General Description

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

The BR1/10 and BR 1/10 U-BR1TE have been designed to provide a maximum concentration for 2B+D Basic Rate ISDN (BRI). The BR1/10 and BR 1/10 U-BR1TE are used in both central office terminal (COT) and a remote terminal (RT) applications. The BR1/10 Channel Bank will interoperate with other channel bank systems that are WECO®D4 compatible, such as SLC-96 and SLC-5 systems.

The BR1/10 and BR 1/10 U-BR1TE operate 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 unit, such as the ADTRAN D4 U-BR1TE II, and the ADTRAN SLC-5 U-BR1TE.

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

Options for the functions specific to the BR1/10 U-BR1TE are selected with the seven-position Dual In-line Package (DIP) switch on the U-BR1TE. The STATUS LED provides status synchronization information for the 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 Service (see section 6, *Warranty and Customer Service*).

The BR1/10 U-BR1TE plugs directly into any of the BR1/10 chassis channel positions labeled 1 through 10. To install the U-BR1TE, grasp the unit by the faceplate and insert it 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. Once synchronization is achieved on both interfaces, 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 A.** For more information, see the BCU Installation and Maintenance Practice number 61150.080L1-5A.

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 1-10 on the LIU.

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

Table A. 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 not achieved on the 2-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 ZBS option on associated BR1TE unit *or* Timing error on T1 carrier facility
LP CRC	**RED** or *FLASHING*	A Near End Block Error (NEBE) has been received from the 2-wire U-interface.	Noise problems on DSL or other ISDN network element.

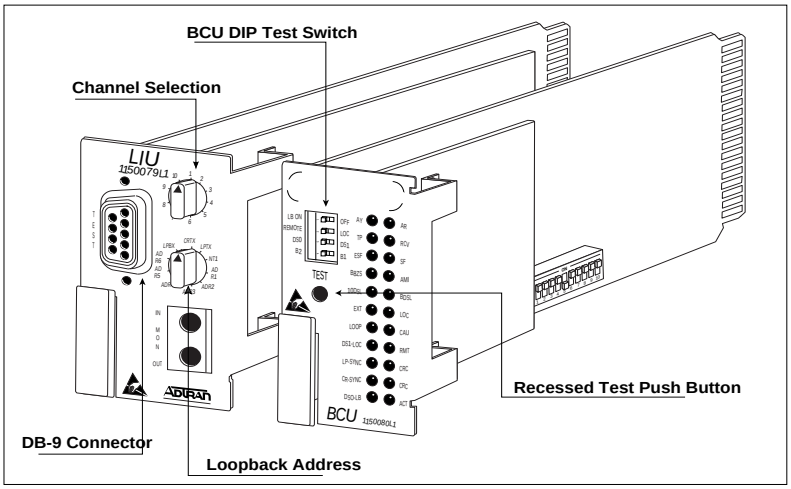

Figure 2. BR1/10 LIU and BCU

Table B. 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 CONFIGURATION. ONE *FLASH* PER SECOND FOR A B1 LOOPBACK; TWICE PER SECOND FOR A 32 LOOPBACK.
ACT:	EXCHANGE OF THE ACTIVATION BIT BETWEEN THE CUSTOMER'S TERMINAL EQUIPMENT, AND THE ISDN SWITCH.

Connections

Table C shows the wiring interconnects for the 2-wire U-Interface. All other input and output to the BR1/10 U-BR1TE are made through the backplane.

Optioning

S1 provides the option settings for the BR1/10 U-BR1TE. **Figure 1** shows the location of S1. Switch functions are explained in **Table D**.

Faceplate Features

The BR1/10 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 of the 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.

Table C. BR1/10 U-BR1TE Connector Interface

Channel Position	Pin	Lead
1	27 2	R T
2	29 4	R T
3	31 6	R T
4	33 8	R T
5	35 10	R T
6	37 12	R T
7	39 14	R T
8	41 16	R T
9	43 18	R T
10	45 20	R T

Table D. Switch Functions

Switch	Function	Description
S1-1 S1-2 S1-3	Service Level Selection	Selects the service level to be provided. The BR1/10 U-BR1TE is typically optioned for 2B+D service, but may provide other levels as needed. **Service Option** 2B+D: S1-1 (B1) *ON*, S1-2 (B2) *ON*, S1-3 (D) *ON* B1+D: S1-1 *ON*, S1-2 *OFF*, S1-3 *ON* B2+D: S1-1 *OFF*, S1-2 *ON*, S1-3 *ON* D: S1-1 *OFF*, S1-2 *OFF*, S1-3 *ON* 2B: S1-1 *ON*, S1-2 *ON*, S1-3 *OFF* B1: S1-1 *ON*, S1-2 *OFF*, S1-3 *OFF* B2: S1-1 *OFF*, S1-2 *ON*, S1-3 *OFF*
S1-4 *ON* *OFF* *ON* *OFF*	Functions dependent upon S1-5 and S1-6 **LULT Mode (S1-5/6 ON)** DC Sealing Current provided DC Sealing Current not provided **LUNT Mode (S1-5/6 OFF)** Periodic wake-up tone provided Periodic wake-up tone not provided Termination Mode	 1. In the LULT mode, S1-4 controls sealing current. When used in an Adjacent-to-Customer configuration, sealing current should be provided, S1-4 *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, S1-4 *OFF*. 2. In the LUNT mode, S1-4 controls periodic wake-up tones. Periodic wake-up tones should be disabled when located in an Adjacent-to-Switch location, S1-4 *OFF*. Periodic wake-up tones are required in a Tandem Office Sink configuration, or when adjacent to a device that required wake-up tones, such as Newbridge switch.
S1-5 S1-6 *ON* *OFF*	Termination Mode LULT LUNT	S1-5 and S1-6 must be set identically for proper operation of the BR1/10 U-BR1TE. Must be set *ON* when unit is installed in an Adjacent-to-Customer or Tandem Office Source configuration. Must be *OFF* when Adjacent-to-Switch and Tandem Office Sink configurations.
S1-7 *ON* *OFF*	Zero Byte Substitution Enables ZBS Disables ZBS	The ZBS option must be set the same for each U-BR1TE terminating the T1 carrier facility. S1-7 should be *ON* for AMI-provisioned circuits. The switch setting is optional for B8ZS-provisioned circuits. Consult local provisioning guidelines.

3. TESTING

The BR1/10 U-BR1TE responds to standard embedded operations channel (*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 LocalTest access allows local craftspersons to assist in circuit turn-up or sectionalization of trouble/ equipment malfunction when remote testing is not available or convenient.

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 bi-lateral 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, the 8 kHz and 64 kHz clock reference, the selection of the desired channel unit (1-10) and of 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:

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 B1/B2 DIP switch on the BCU.
5. Depress the BCU's recessed TEST push-button 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. Tests to the other B channel or additional network ISDN devices may be performed 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 push-button, 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 to 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:

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 push-button 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 push-button, 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:

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 ten-position rotary switch.
3. Select the desired bearer channel using B1/B2 DIP switch on the BCU.
4. Depress the recessed TEST push-button 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 push-button. 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 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 a local performance monitoring, perform the following:

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 Push-button to initiate the test.
5. The total number of *crc* errors are simultaneously displayed by the LP and CR CRC status LEDs. LEDs will *flash* for 6-19 *crc*s, will illuminate solid when >20 errors.
6. To exit Local Performance monitoring, depress the TEST push-button.

4. SPECIFICATIONS

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

5. MAINTENANCE

The BR1/10 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 Service.

6. WARRANTY AND CUSTOMER SERVICE

ADTRAN will replace or repair this product within ten years from the date of shipment if it does not meet its published specifications or fails while in service (see ADTRAN Equipment Warranty, Repair, and Return Policy and Procedure).

Return Material Authorization (RMA) is required prior to returning equipment to ADTRAN.

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

ADTRAN Technical Support..... (800) 726-8663
Standard support hours, Monday-Friday, 7am-7pm CST
Emergency Support, 7 days/week, 24 hours/day

ADTRAN Sales..... (800) 827-0807

ADTRAN Repair/RMA..... (800) 963-8722

Repair and Return Address:
ADTRAN, Inc.
Customer Service Department
901 Explorer Boulevard
Huntsville, Alabama 35806-2807

Table E. BR1/10 U-BR1TE Specifications

Loop Interface		
Line:	2-wire (tip and ring)	
Operating Mode:	Full-duplex	
Data Rate:	160 kbps total; 144 kbps available to customer	
Signal Format:	2B1Q	
Output Amplitude	2.5V 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:		
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 Dissipation
-48v	20 mA	(in LUNT mode), 75 mW (or 3/4 Watt)
5 V	5 mA	Normal Operating Mode
Environmental		
Temperature:	Operating	-40° C to +70° C
	Storage	-40° C to +85° C
Relative Humidity:	up to 95%, non-condensing	