

MODEL U-BR1TE II ISDN 2B1Q INTERFACE INSTALLATION/MAINTENANCE

CONTENTS

1. GENERAL	1
2. INSTALLATION	2
3. TESTING	7
4. MLT 3.0/ISDN CHANNEL TEST	9
5. MAINTENANCE	9
6. WARRANTY AND CUSTOMER SERVICE	9

FIGURES

Figure 1. ADTRAN U-BR1TE II	1
Figure 2. Time Slot Assignments for 2B+D Service in SLC Mode I with D1D Counting	2
Figure 3. Connector Pin Assignments	3
Figure 4. U-BR1TE II SW1	3
Figure 5. U-BR1TE II Faceplate	3
Figure 6. Position Switch Settings at Network Locations	6

TABLES

Table A. Basic Features	1
Table B. Channel Slots that <u>CANNOT</u> Contain BR1TE Cards	4
Table C. Switch 1 Option Settings	5
Table D. Test Selector Knob Options	6
Table E. Front Panel LED Indicators	7



Figure 1. ADTRAN U-BR1TE II

1. GENERAL

1.1 This practice provides installation and maintenance information for the ADTRAN U-BR1TE II and U-BR1TE II/ Mechanized Loop Testing (MLT). **Figure 1** is a photograph of the U-BR1TE II. The part number and basic features for the U-BR1TE II are provided in **Table A**.

Table A. Basic Features

Unit	Part No.	Features
U-BR1TE II	1102020L2	Basic rate 2B+D service. Faceplate Bantam jacks. 18 kFt range. LED indicators. NT or LT operational modes. Local and remote loopback.
U-BR1TE II/ MLT	1102020L3	Adds MLT 3.0/ISDN compatibility per TR-NWT-000397, Issue 3, December 1993.

1.2 Issue 2 updates Figure 4 and Table C to reflect new SW1 settings.

1.3 The ADTRAN U-BR1TE II is a line card for use in AT&T D4/SLC®-96 channel banks. The U-BR1TE II provides an ISDN U-interface and allows the transport of Basic Rate 2B+D information over T1 carriers. The U-BR1TE II is used at both the Central Office Terminal (COT) location and the Remote Terminal (RT) location. Clear channel capability (B8ZS) is not required of the T1 facility if zero byte suppression is enabled. The U-BR1TE II plugs into a single channel slot of the D4 bank. Three time slots are required for transport of 2B+D information. Block error rate performance over the T1 facility is monitored and is available to the network.

1.4 The ADTRAN U-BR1TE II provides Basic Rate (2B+D) ISDN service to remote locations over existing single twisted pair wiring. The following is a list of the performance features of the ADTRAN U-BR1TE II:

SLC is a registered trademark of AT&T.

adjacent two time slots of the next physical slot to the right. When using the Slot 2, 5, 8, 11 option, the physical slot to the right must be left vacant. A unit optioned for two time slots (B1+D or B2+D) occupies only the two time slots associated with the physical slot used. In this configuration, option the unit for Slot 1, 4, 7, or 10. See **Table B** for additional channel slot deployment restrictions for each bank type.

2.3 Physical Requirements

The U-BR1TE II occupies one card position in the D4 channel bank. The connector pin assignments are illustrated in **Figure 3**.

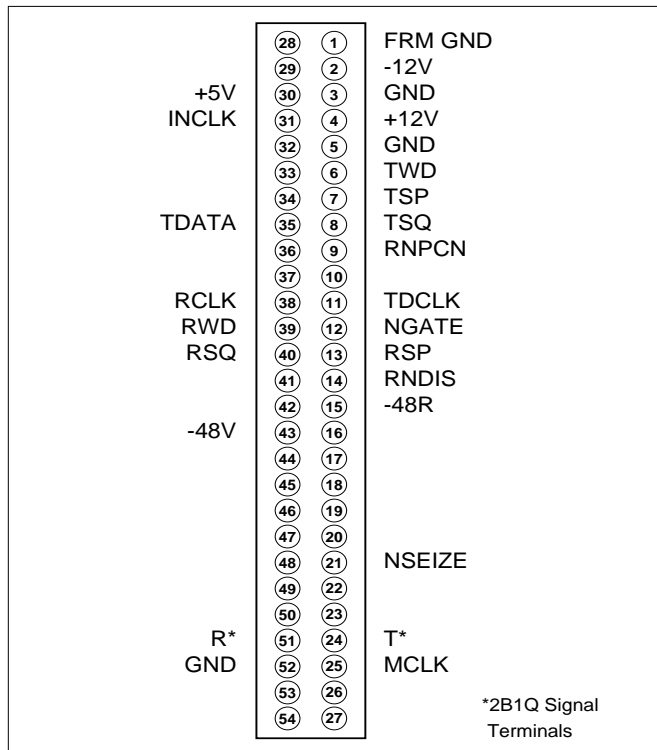


Figure 3. Connector Pin Assignments

2.4 Interface Requirements

The U-BR1TE II unit includes two interfaces. The loop-side interface is an ISDN U-interface which is used to deliver Basic Rate service. The carrier-side interface is a D4/SLC-96 channel bank interface which is used to insert data into the 1.544 Mbps T1 stream. Only the polarity-insensitive T and R leads are used in the cross-connection.

2.5 Internal Options Switch Settings

See **Figure 4** for SW1 location. **Table C** contains the option settings for for SW1.

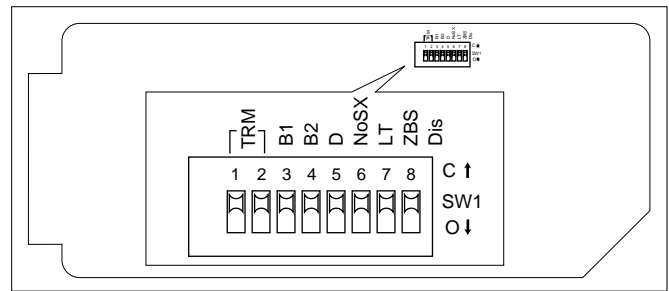


Figure 4. U-BR1TE II SW1

2.6 Faceplate Features

Figure 5 is an illustration of the ADTRAN U-BR1TE II faceplate. The B1/B2 dual in-line package (DIP) switch determines which bearer channel (B1 or B2) is to be looped back. If only one bearer channel has been selected, the switch must select the configured channel. Loopback addresses may only be selected in a downstream direction from the ISDN switch (see **Figure 6**). The NORM/TEST DIP switch, which activates U-BR1TE II test features, is recessed to prevent inadvertent operation. The rotary switch is used to determine the loopback location or specific tests. See **Table D** for a list of the possible options using the rotary switch.

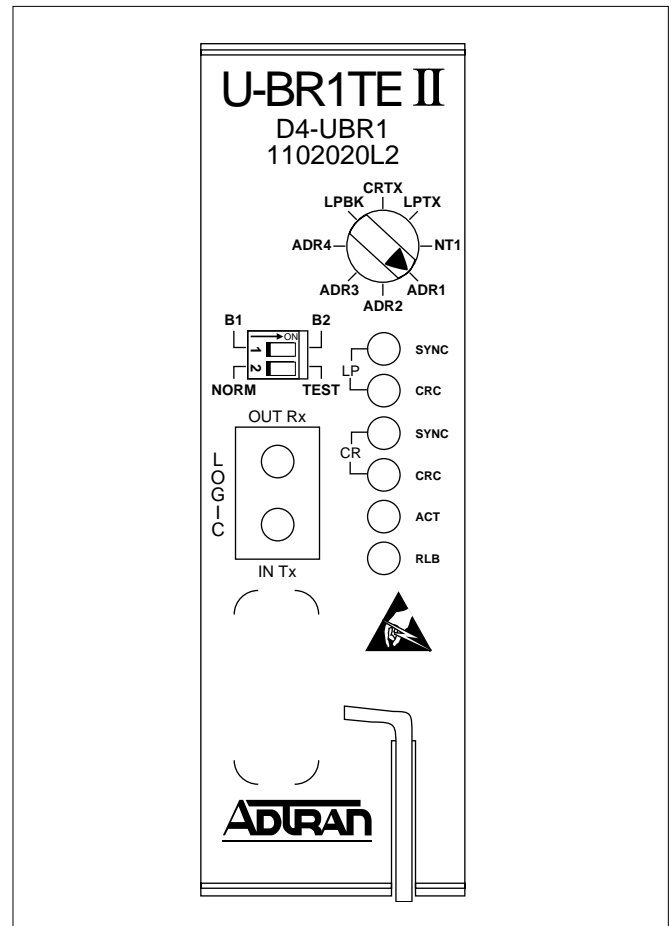


Figure 5. U-BR1TE II Faceplate

Table B. Channel Slots that CANNOT Contain BR1TE Cards

Type of Service	D4 Bank with D4 Counting	SLC-96 Mode I with D1D Counting	SLC-96 Mode III with D1D Counting	D4 Bank with D1D Counting or SLC-96 Mode III with D4 Counting
D B1+D or B2+D (*) 2B+D (**)	--- 24 23, 24	--- --- 6, 12	--- 6, 12, 18, 24, 5, 6, 11, 12, 17, 18, 23, 24	--- 12, 24, 11, 12, 23, 24

D4 Bank - D4 Channel Counting

Physical Slots:	1	2	3	4	5	6	7	8	9	10	11	12
Time Slots:	1	2	3	4	5	6	7	8	9	10	11	12
	13	14	15	16	17	18	19	20	21	22	23 **	24 **
Physical Slots:	13	14	15	16	17	18	19	20	21	22	23	24

SLC-96 Carrier Mode I Terminal - D1D Channel Counting

Physical Slots:	1	2	3	4	5	6	7	8	9	10	11	12
Time Slots:	1	5	9	13	17	21 **	2	6	10	14	18	22 **
	3	7	11	15	19	23	4	8	12	16	20	24

SLC-96 Carrier Mode III Terminal - D1D Channel Counting

Physical Slots:	1	2	3	4	5	6	7	8	9	10	11	12
Time Slots:	3	7	11	15	19 **	23 **	4	8	12	16	20 **	24 **
	1	5	9	13	17 **	21 **	2	6	10	14	18 **	22 **
Physical Slots:	13	14	15	16	17	18	19	20	21	22	23	24

D4 Bank - D1D Channel Counting or SLC-96 Carrier Mode III Terminal - D4 Channel Counting

Physical Slots:	1	2	3	4	5	6	7	8	9	10	11	12
Time Slots:	1	3	5	7	9	11	13	15	17	19	21 **	23 **
	2	4	6	8	10	12	14	16	18	20	22 **	24 **
Physical Slots:	13	14	15	16	17	18	19	20	21	22	23	24

* A channel unit with B+D service cannot occupy this slot.
 ** A channel unit with 2B+D service cannot occupy this slot.

Table C. Switch 1 Option Settings

Switch	Label	Function	Description																																
SW1-1 SW1-2	TRM TRM	Bank Type Selection	<p>Switches SW1-1 and SW1-2 are used to select the type of bank for the U-BR1TE II.</p> <table border="1"> <thead> <tr> <th>Bank</th> <th>Count/Slot</th> <th>SW1-1</th> <th>SW1-2</th> </tr> </thead> <tbody> <tr> <td>D4</td> <td>D4 Counting*</td> <td><i>On</i></td> <td><i>Off</i></td> </tr> <tr> <td></td> <td>D1D Counting</td> <td><i>On</i></td> <td><i>On</i></td> </tr> <tr> <td>SLC I</td> <td>CU in slots 1,4,7,10</td> <td><i>On</i></td> <td><i>On</i></td> </tr> <tr> <td></td> <td>CU in slots 2,5,8,11</td> <td><i>Off</i></td> <td><i>Off</i></td> </tr> <tr> <td>SLC III</td> <td>D4 Counting</td> <td><i>On</i></td> <td><i>On</i></td> </tr> <tr> <td></td> <td>D1D Counting</td> <td><i>Off</i></td> <td><i>On</i></td> </tr> </tbody> </table> <p>Note: The ADTRAN U-BR1TE II supports the following bank and counting types: D4 with D4 and D1D counting SLC Mode I D1D counting only SLC Mode III D4 and D1D counting</p>	Bank	Count/Slot	SW1-1	SW1-2	D4	D4 Counting*	<i>On</i>	<i>Off</i>		D1D Counting	<i>On</i>	<i>On</i>	SLC I	CU in slots 1,4,7,10	<i>On</i>	<i>On</i>		CU in slots 2,5,8,11	<i>Off</i>	<i>Off</i>	SLC III	D4 Counting	<i>On</i>	<i>On</i>		D1D Counting	<i>Off</i>	<i>On</i>				
Bank	Count/Slot	SW1-1	SW1-2																																
D4	D4 Counting*	<i>On</i>	<i>Off</i>																																
	D1D Counting	<i>On</i>	<i>On</i>																																
SLC I	CU in slots 1,4,7,10	<i>On</i>	<i>On</i>																																
	CU in slots 2,5,8,11	<i>Off</i>	<i>Off</i>																																
SLC III	D4 Counting	<i>On</i>	<i>On</i>																																
	D1D Counting	<i>Off</i>	<i>On</i>																																
SW1-3 SW1-4 SW1-5	B1 B2 D	Service Level Selection	<p>Switches SW1-3, SW1-4, and SW1-5 are used to select the level of service. The U-BRITE II may be optioned to deliver full ISDN (2B+D) or any other level of service.</p> <table border="1"> <thead> <tr> <th>Service Option</th> <th>SW1-3</th> <th>SW1-4</th> <th>SW1-5</th> </tr> </thead> <tbody> <tr> <td>2B+D*</td> <td><i>On</i></td> <td><i>On</i></td> <td><i>On</i></td> </tr> <tr> <td>2B</td> <td><i>On</i></td> <td><i>On</i></td> <td><i>Off</i></td> </tr> <tr> <td>B1+D</td> <td><i>On</i></td> <td><i>Off</i></td> <td><i>On</i></td> </tr> <tr> <td>B2+D</td> <td><i>Off</i></td> <td><i>On</i></td> <td><i>On</i></td> </tr> <tr> <td>B1</td> <td><i>On</i></td> <td><i>Off</i></td> <td><i>Off</i></td> </tr> <tr> <td>B2</td> <td><i>Off</i></td> <td><i>On</i></td> <td><i>Off</i></td> </tr> <tr> <td>D</td> <td><i>Off</i></td> <td><i>Off</i></td> <td><i>On</i></td> </tr> </tbody> </table>	Service Option	SW1-3	SW1-4	SW1-5	2B+D*	<i>On</i>	<i>On</i>	<i>On</i>	2B	<i>On</i>	<i>On</i>	<i>Off</i>	B1+D	<i>On</i>	<i>Off</i>	<i>On</i>	B2+D	<i>Off</i>	<i>On</i>	<i>On</i>	B1	<i>On</i>	<i>Off</i>	<i>Off</i>	B2	<i>Off</i>	<i>On</i>	<i>Off</i>	D	<i>Off</i>	<i>Off</i>	<i>On</i>
Service Option	SW1-3	SW1-4	SW1-5																																
2B+D*	<i>On</i>	<i>On</i>	<i>On</i>																																
2B	<i>On</i>	<i>On</i>	<i>Off</i>																																
B1+D	<i>On</i>	<i>Off</i>	<i>On</i>																																
B2+D	<i>Off</i>	<i>On</i>	<i>On</i>																																
B1	<i>On</i>	<i>Off</i>	<i>Off</i>																																
B2	<i>Off</i>	<i>On</i>	<i>Off</i>																																
D	<i>Off</i>	<i>Off</i>	<i>On</i>																																
SW1-6	NoSX	Function dependent upon SW1-7 setting.	<p>This is a dual-purpose switch.</p> <ol style="list-style-type: none"> In the LULT mode, SW1-6 controls sealing current. Sealing current should be provided when terminated with an NT1, the Adjacent to Customer position. Sealing current is <i>not</i> required as a Tandem Office Source or when used with an ADTRAN ISDN U-Repeater. In the LUNT mode, SW1-6 controls periodic wake-up tone. Normally SW1-6 is <i>Off</i>, the Adjacent to Switch position. SW1-6 should be <i>On</i> when the channel unit is a Tandem Office Sink or adjacent to a device that requires wake-up tones, such as a Newbridge® switch. 																																
<i>On</i> <i>Off</i> *		LULT Mode (SW1-7 = <i>On</i>) Does not provide DC sealing current Provides DC sealing current																																	
<i>On</i> <i>Off</i>		LUNT Mode (SW1-7 = <i>Off</i>) Provides periodic wake-up tone Does not provide periodic wake-up tone																																	
SW1-7	LT	Termination Mode	This switch should be <i>On</i> when the unit is installed in an RT, Adjacent to Customer, or Tandem Office Source configuration. This switch should be <i>Off</i> in the COT, Adjacent to Switch, or Tandem Office Sink configurations.																																
<i>On</i> * <i>Off</i>		LULT mode (RT typical) LUNT mode (COT typical)																																	
SW1-8	ZBS Dis	Zero Byte Substitution	The ZBS option must be set the same for the COT and RT. SW1-8 should be <i>Off</i> for AMI-provisioned circuits. The switch setting is optional for B8ZS-provisioned circuits. Consult local provisioning circuits.																																
<i>On</i> * <i>Off</i>		Disables ZBS Enables ZBS																																	
<p>* Factory default settings Markings on board to the right of SW1 indicate: C (upward arrow) = <i>On</i>, O (downward arrow) = <i>Off</i></p>																																			

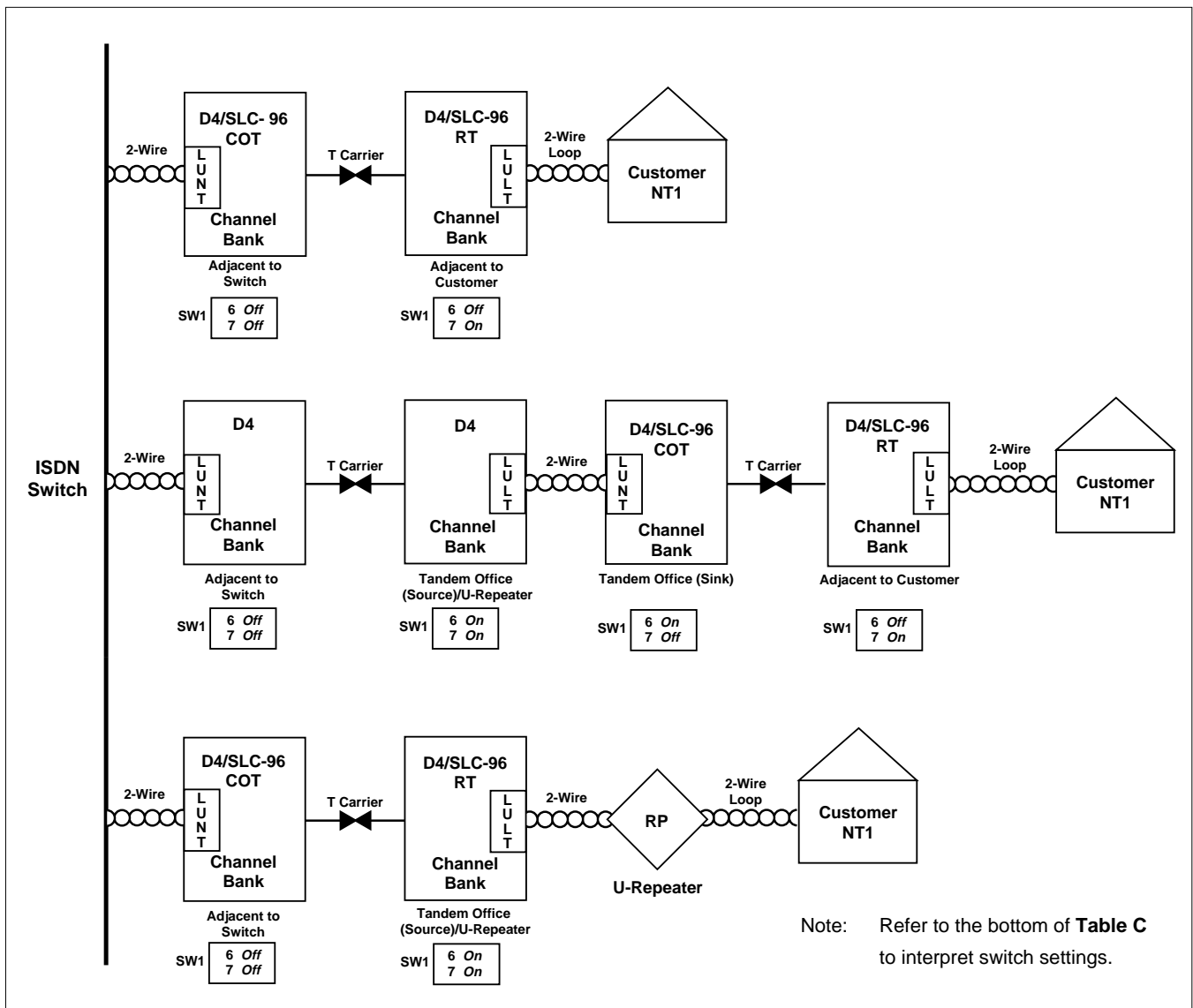


Figure 6. Position Switch Settings at Network Locations

2.7 D4 Bank Requirements

The COT D4 bank must be configured with an OIU-2 optioned for external timing. The COT bank must be provided with an external composite clock synchronized with the network.

2.8 SLC Bank Requirements

The COT SLC bank must be configured with a special service unit (SSU) optioned for external timing. The COT SLC bank must be provided with an external composite clock synchronized with the network.

Table D. Test Selector Knob Options

Display	Interpretation
ADR1	Address #1, address of this unit
ADR2	Address #2, the next downstream unit away
ADR3	Address #3, the third unit away
ADR4	Address #4, the fourth unit away
NT1	NT1, address of the NT1
LPBK	Loopback, forces this unit to loopback either B1/B2 from the front panel. Loopbacks occur in both the customer and network directions.
CRTX	Carrier transmit, in the carrier direction
LPTX	Loop transmit, in the loop direction

3. TESTING

WARNING

Failure to return the NORM/TEST DIP switch to NORM after completion of tests may result in unintentional interruption of data. Placing the eight-position rotary switch to ADR1 is recommended.

3.1 In case of equipment malfunction, use the testing capability of the ISDN switch or the U-BR1TE II faceplate connector with a TPI 108/109 RT II, FIREBERD 6000, or an equivalent digital test sets. The faceplate has Bantam jacks for manual testing.

Note: When a U-BR1TE II is performing a loopback, the loopback occurs internal to the U-interface transceiver.

3.2 Loopback Tests (ADR1 - ADR4, NT1)

Loopbacks in the network-to-customer direction can be initiated from either the ISDN switch or the faceplate. A loopback in the customer-to-network direction can be made from the faceplate only if another ADTRAN ISDN product is closer to the network.

A DS0 digital test set can be used to inject the required 64 kbps bit pattern into a chosen B channel. The test set must be configured as Near Logic. The eight-position rotary switch is used to select the addresses available for loopback in a chosen direction (see **Table D**). To initiate a loopback, perform the following:

1. Insert BERT tester probes into front panel Bantam jacks (configure test set as Near Logic). Place the transmitting Bantam plug into the Tx jack and the receiving Bantam plug into the Rx jack of the faceplate.
2. Use the eight-position rotary switch to select the desired loopback address. The downstream direction for ADR1-ADR4 and NT1 is unnecessary since this is automatically selected based on the card position in the network.
3. Select desired bearer channel using B1/B2 DIP switch.
4. Place the NORM/TEST DIP switch in the TEST position to initiate the test.
5. To deactivate loopback, place the NORM/TEST switch in the NORM position, or remove the transmit test probe, or select another test with the selector knob for further testing.

Note: Tests to additional network addresses may be performed by simply changing the selector knob to the desired address. It is not necessary to exit the test mode to select a new address.

A list of the indications generated by the LED are described in **Table E**.

Table E. Front Panel LED Indicators

Display	Interpretation
LP SYNC (Loop Sync)	<ul style="list-style-type: none"> – <i>On (Red indicator)</i>, U-interface is out of sync – <i>Off</i>, U-interface is in sync
CR SYNC (Carrier Sync)	<ul style="list-style-type: none"> – <i>On (Red indicator)</i>, No valid TR-397 framing is present – <i>Off</i>, TR-397 framing detected
LP CRC (Loop crc)	<ul style="list-style-type: none"> – <i>Flashes</i> whenever a <i>crc</i> error is detected on the loop <5 <i>crc</i> errors: indicator <i>Off</i> >5, <20 <i>crc</i> errors: indicator <i>Flashes Red</i> >20 <i>crc</i> errors: indicator <i>On (Solid Red)</i>
CR CRC (Carrier CRC)	<ul style="list-style-type: none"> – <i>Flashes</i> whenever a CRC error is detected on the carrier <5 CRC errors: indicator <i>Off</i> >5, <20 CRC errors: indicator <i>Flashes Red</i> >20 CRC errors: indicator <i>On (Solid Red)</i>
ACT (Active)	<ul style="list-style-type: none"> – Indicates Layer 1 activation status – <i>On</i> customer's NT1 successfully exchanged ACT bits with the network – <i>Off</i>, ACT bits exchange failed
RLB	<ul style="list-style-type: none"> – <i>On Solid</i>, when an acknowledgement has been received from a front panel test or when responding to a 2B+D loopback request. – <i>Flashes once</i>, every two seconds when responding to a B1 loopback request or when B1 LPBK is initiated at the front panel. – <i>Flashes twice</i>, every two seconds when responding to a B2 loopback request or when B2 LPBK is initiated at the front panel.

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

To conduct a straight-away (point-to-point) test, follow this procedure:

1. Insert the BERT tester probes into the front panel Bantam jacks (configure the test set as Near Logic). Place the transmitting Bantam plug into Tx jack and the receiving Bantam plug into the Rx jack of the faceplate.
2. Select the desired test direction, either loop (LPTX) or carrier (CRTX), using the eight-position rotary switch.
3. Select the desired bearer channel using the B1/B2 DIP switch.
4. Flip the NORM/TEST DIP switch to TEST to initiate transmitting the BERT pattern into the selected bearer channel through the faceplate Tx plug.
5. On the far-end unit, perform Steps 1 through 4, choosing the exact same faceplate switch settings. Ensure that both BERT testers are using the same identical test pattern (511, 2047, etc.).
6. The U-BR1TEs are now performing a straight-away test with each BERT tester receiving the others transmitted test pattern.
7. To end the straight-away test, switch the NORM/TEST DIP switch back to NORM or remove transmit test probe.

3.4 Local Loopback (LPBK)

To conduct an upstream or downstream loopback to another ADTRAN ISDN unit, use the following procedure:

1. Select the desired bearer channel using the B1/B2 DIP switch.
2. Select LPBK using the eight-position rotary switch. The unit will be placed in a bi-directional loopback, so the other rotary switch settings are not applicable.
3. Place the NORM/TEST DIP switch to the TEST position to force the unit into a loopback.
4. The U-BR1TE is performing a bilateral loopback in the customer and network directions
5. To end the upstream loopback on the downstream unit place the NORM/TEST DIP switch to NORM position.

3.5 Local Performance Monitoring

Performance Monitoring of the local T1 carrier and 2-wire loop can be performed from the front panel without interruption of service to the customer. To initiate local performance monitoring, use the following procedure:

1. Do *not* insert a test probe into the Tx Bantam plug of the faceplate.
2. Select ADR1 using the eight-position rotary switch.
3. Place the NORM/TEST DIP switch to TEST.
4. The total number of *crc* errors is indicated by the LP CRC LED (see **Table E**).
5. Place the NORM/TEST DIP switch to NORM to exit the Local Performance Monitoring mode, or select another test with the selector knob for further testing.

3.6 Leased Mode Testing (B1, B2, and 2B)

For leased mode applications, the D channel is typically disabled on the U-BR1TE II. Without the D channel, standard ISDN loopbacks by way of the *eoc* are not available across the T1 carrier system. The ADTRAN U-BR1TE II responds to independent network-issued OCU latching loopback sequences for B1 and B2.

The OCU latching loopback sequence is as follows:

Enable:

1. Minimum of 35 transition in progress (TIP) bytes (*0111010).
2. Minimum of 35 loopback select code (LSC) bytes (*1010101).
3. Minimum of 100 loopback enable (LBE) bytes (*1010110).
4. Minimum of 32 far-end voice (FEV) bytes (*1011010).

* Denotes *Don't Care* bit - either a 1 or a 0.

Disable:

1. Minimum of 35 TIP bytes.

The valid front panel tests in leased modes are ADR1, CRTX, LPTX, and LPBK for all circuit positions. NT1 and ADR2 loopback tests are valid for the Adjacent to Customer circuit position only. ADR2 is used to test to an ADTRAN U-Repeater deployed from the U-BR1TE II.

Local Performance Monitoring is not available. See **subsections 3.2, 3.3, and 3.4** for specific test descriptions.

4. MLT 3.0/ISDN CHANNEL TEST

4.1 The ADTRAN U-BR1TE II/MLT line card is compatible with Mechanized Loop Testing (MLT 3.0/ISDN) according to TR-NWT-000397, Issue 3, December 1993. When configured and installed in a SLC-96 channel bank, the ADTRAN U-BR1TE II/MLT supports the SLC-96 terminal interface to the Channel Test Unit (CTU) controlled by the Pair Gain Tester (PGTC) at the COT.

4.2 Channel Test (LUNT Mode)

When the PGTC is connected to the ADTRAN U-BR1TE II/MLT and the Test Initiate Voltage (116 VDC behind 8 k Ω) is applied to the tip with the ring open, the following events occur:

1. The channel unit sends a Channel Test *mp-eoc* message downstream to the LULT, signaling the request for a MLT channel test.
2. The channel unit pulls the normally high NSEIZE lead low.
3. The unit sends a 333.3 Hz tone between the tip and ring leads toward the PGTC. This tone is compliant with TR-TSY-000465.

When the Test Initiate Voltage is removed, the test tone is subsequently removed, the active test status indication to the bank controller is removed, and the Return to Normal *mp-eoc* message is sent to the LULT. The channel unit then begins re-synchronization of the U-interface between the LUNT and the ISDN switch.

4.3 Channel Test (LULT Mode)

When a PGTC initiates a channel test at the COT, the COT channel unit sends a Channel Test *mp-eoc* toward the LULT. Upon receipt by the LULT of this *mp-eoc* message, the following events occur:

1. The channel unit pulls the normally high NSEIZE lead low, signaling the CTU that a channel test is underway.
2. The channel unit begins to poll the NGATE lead, waiting for it to go low.

3. When the CTU pulls the NGATE lead low, the LULT connects the bypass pair. This connects the customer drop to the common equipment through LPTT and LPTR. The set-up sequence is complete.
4. Upon completion of the automatic test, the NGATE signal returns high, and the bypass relay de-energizes.
5. The channel unit then attempts to re-synchronize the U-interface between the LULT and the NT1.

5. MAINTENANCE

5.1 The U-BR1TE II requires no routine maintenance to operate properly.

5.2 ADTRAN does not recommend that repairs be performed in the field. Repair services may be obtained by returning the defective unit to the ADTRAN Repair Department; see **subsection 6.2**.

6. WARRANTY AND CUSTOMER SERVICE

ADTRAN will replace or repair this product within five years from the date of shipment, if the product does not meet its published specifications or if it fails while in service. For detailed warranty, repair, and return information, refer to the ADTRAN Equipment Warranty and Repair and Return Policy Procedure.

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

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

ADTRAN Customer Service:

RMA	(205) 971-8722
Technical Support	(800) 726-8663
Applications Engineering	(800) 615-1176
Sales	(800) 827-0807

Repair and Return Address:

ADTRAN, Inc.
Customer Service Department
901 Explorer Boulevard
Huntsville, Alabama 35806-2807

