Total Access® 750/850/1500 U-BR1TE Installation and Maintenance

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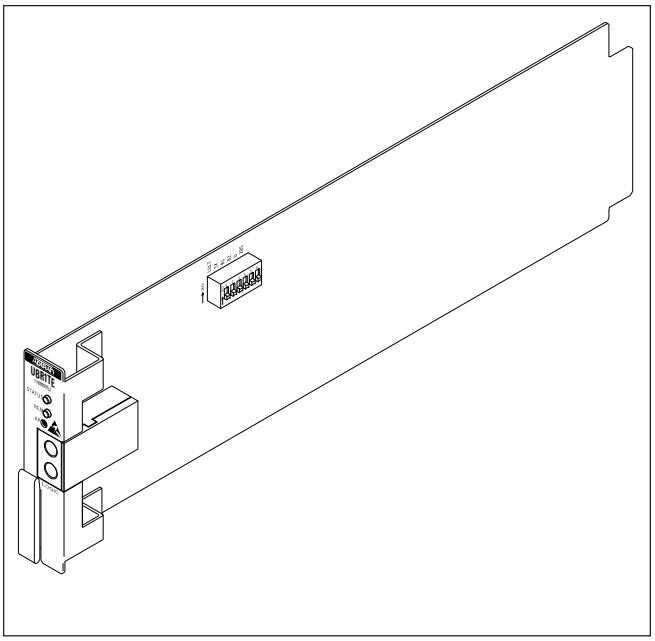


Figure 1. ADTRAN U-BR1TE

1. GENERAL

This practice provides installation and maintenance procedures for the ADTRAN Total Access 750/850 /1500 U-BR1TE (P/N 1180020L1). **Figure 1** is an illustration of the U-BR1TE.

Revision History

This is the second release of this document. The U-BR1TE menu tree, Interconnect Wiring table and general product updates were added to this practice.

General Description

The U-BR1TE is a line card that plugs into a single channel slot of a Total Access 750/850/1500 channel bank. It provides an ISDN U-interface and allows the transport of Basic Rate 2B+D information over T1 carriers and twisted pair wiring. Clear channel capability (B8ZS) is not required of the T1 facility if zero byte substitution is enabled. Block error rate performance over the T1 facility is monitored and is available to the network.

Features

The features of the U-BR1TE (P/N 1180020L1) include the following:

- ISDN 2B1Q interface that meets all Layer 1 requirements as specified in ANSI T1.601-1991
- 18 kft nominal range on mixed gauge wire
- Internal test pattern allows for testing of individual B Channels without requiring external test equipment
- Transportation of ISDN Basic Rate 2B+D information over T1 facilities in the 3-DS0 format specified in TR-NWT-000397
- All Layer 1 maintenance functions
- Performance monitoring of the Layer 1 facility as specified in TR-NWT-000397 and TR-TSY-000829

- Distinctive metallic DC test signature to identify either line unit LT or line unit NT mode of operation as specified in TR-NWT-000397
- Provides loopback capability for full 2B+D as well as individual B channels in both loop and carrier directions. Individual B channel loopbacks, for the NT1 and up to six devices in the Network-to-Customer direction, may be initiated via the DB-9 VT100 craft interface on the Total Access 750 BCU, Total Access 850 RCU, or the Total Access 1500 SCU, or from a remote location through the maintenance channel.
- DS0 logic level transmit and receive data access through front panel bantam jacks
- Addressing and error status with front panel LED indicators.
- Responds to OCU and CSU latching loopback in 2B, B1, and B2 modes of operation
- A front panel pushbutton allows toggling between local provisioning via DIP switches and remote provisioning via the local craft interface

2. INSTALLATION

Remove the U-BRITE from the carton and visually ensure that damage has not occurred during shipping or handling. If damage has occurred, file a claim with the carrier, then contact ADTRAN. Refer to *Warranty and Customer Service* section.

Compliance Codes

Table 1 shows the compliance codes for the Total Access 750/850/1500 U-BR1TE. This product is intended to be installed in product providing a Type "B" or "E" enclosure, and in a Restricted Access Location.

Table 1. Compliance Codes

Code	Input	Output
Power Code (PC)	C	C
Telecommunication Code (TC)	-	X
Installation Code (IC)	A	-

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by ADTRAN could void the user's authority to operate this equipment.

Physical Requirements

The U-BR1TE plugs into a single Total Access 750/850/1500 channel slot. When provisioned for basic rate service (2B+D), the U-BR1TE occupies three time slots.

Interface Requirements

The U-BR1TE 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 Total Access 750/850/1500 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. See **Table 2** for wiring interconnect details.

Table 2. Interconnect Wiring

Physical Slot	Associated T1/DSO			Amphenol Connection	Interconnect Wiring
	Dual T1	Quad T1 (D4)	Quad T1 (D1D)		
1	A1 A2 A3	A1 A2 A3	A1 A3 A5	P1 - 26/1	T/R
2	A3 A4 A5	A5 A6 A7	A9 A11 A13	P1 - 27/2	T/R
3	A5 A6 A7	A9 A10 A11	A17 A19 A21	P1 - 28/3	T/R
4	A7 A8 A9	A13 A14 A15	A2 A4 A6	P1 - 29/4	T/R
5	A9 A10 A11	A17 A18 A19	A10 A12 A14	P1 - 30/5	T/R
6	A11 A12 A13	A21 A22 A23	A18 A20 A22	P1 - 31/6	T/R
7	A13 A14 A15	B1 B2 B3	B1 B3 B5	P1 - 32/7	T/R
8	A15 A16 A17	B5 B6 B7	B9 B11 B14	P1 - 33/8	T/R
9	A17 A18 A19	B9 B10 B11	B17 B19 B21	P1 - 34/9	T/R
10	A19 A20 A21	B13 B14 B15	B2 B4 B6	P1 - 35/10	T/R
11	A21 A22 A23	B17 B18 B19	B10 B12 B14	P1 - 36/11	T/R
12	A23 A24	B21 B22 B23	B18 B20 B22	P1 - 37/12	T/R
13	B1 B2 B3	C1 C2 C3	C1 C3 C5	P1 - 38/13	T/R
14	B3 B4 B5	C5 C6 C7	C9 C11 C13	P1 - 39/14	T/R

Table 2. Interconnect Wiring (continued)

Physical Slot	Associated T1/DSO			Amphenol Connection	Interconnect Wiring
	Dual T1	Quad T1 (D4)	Quad T1 (D1D)		
15	B5 B6 B7	C9 C10 C11	C17 C19 C21	P1 - 40/15	T/R
16	B7 B8 B9	C13 C14 C15	C2 C4 C6	P1 - 41/16	T/R
17	B9 B10 B11	C17 C18 C19	C10 C12 C14	P1 - 42/17	T/R
18	B11 B12 B13	C21 C22 C23	C18 C20 C22	P1 - 43/18	T/R
19	B13 B14 B15	D1 D2 D3	D1 D3 D5	P1 - 44/19	T/R
20	B15 B16 B17	D5 D6 D7	D9 D11 D14	P1 - 45/20	T/R
21	B17 B18 B19	D9 D10 D11	D17 D19 D21	P1 - 46/21	T/R
22	B19 B20 B21	D13 D14 D15	D2 D4 D6	P1 - 47/22	T/R
23	B21 B22 B23	D17 D18 D19	D10 D12 D14	P1 - 48/23	T/R
24	B23 B24	D21 D22 D23	D18 D20 D22	P1 - 49/23	T/R

Option Switch Settings

Figure 2 displays the locations for SW-1. **Table 3** contains the option settings for SW-1.

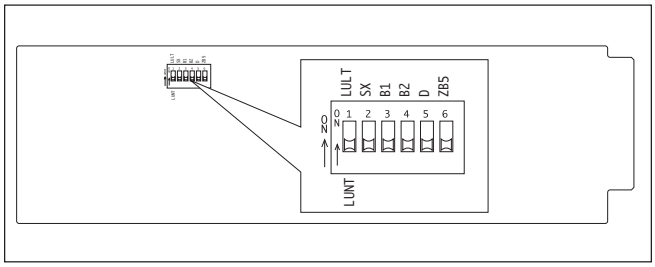


Figure 2. SW-1 Locations and Settings

Table 3. SW-1 Settings

Switch	Label	Menu Description	Function	Description
SW-1 ON OFF	 LULT LUNT	Mode	Termination Mode LULT Mode (RT Typical) LUNT Mode (COT Typical)	This switch should be set toward "LULT" when the unit is installed as Adjacent-to U-Repeater. Adjacent-to-Customer, or Tandem Office Source configuration. This switch should be set toward "LUNT" for Adjacent-to-Switch and Tandem Office Sink configurations.
SW-1-2 ON OFF	SX	Tandem Office Install?	 ON = NO OFF = YES	In LULT mode the following applies: - NO indicates an Adjacent-to-Customer configuration, sealing current should be provided (SW-1-1 ON). - YES indicates a Tandem Office Sink configuration, sealing current in not provided. In LUNT mode the following applies: - NO indicates an Adjacent-to-Switch configuration, no wake-up tomes are provided. - YES indicates a Tandem Office Sink configuration, wake-up tones are provided.
SW-1-3 SW-1-4 SW-1-5	B1 B2 D	Service	Service Level Selection	Selects the service level. The U-BR1TE may be optioned to deliver full ISDN (2B+D) or any of the following levels of service. **Service Option** / **SW-1-3 (B1)** / **SW-1-4 (B2)** / **SW-1-5 (D)** 2B+D / ON / ON / ON 2B / ON / ON / OFF B1+D / ON / OFF / ON B2+D / OFF / ON / ON B1 / ON / OFF / OFF B2 / OFF / ON / OFF D / OFF / OFF / ON
SW-1-6 ON OFF	ZBS	Zero Byte Substitution (ZBS)	 Enables ZBS Disables ZBS	The ZBS option must be set the same for the COT and RT. SW-1-6 should be set toward "ZBS" for AMI-provisioned carriers. The switch setting is optional for B8ZS-provisioned carriers. Consult local provisioning guidelines.

Front Panel Features

The U-BR1TE front panel features a bantam jack, LEDs, and an AP pushbutton, as illustrated in Figure 1. Front panel indicators display the current status of the unit, as listed in **Table 4**.

Electronic Provisioning

The craft interfaces on the Total Access 750 BCU, Total Access 850 RCU, or the Total Access 1500 SCU are used to change default options and obtain access module status through menu screens. To access the menu screens, connect a VT100 terminal of computer running a terminal emulation program to the front panel craft interface ADMIN port using a standard male-to-female RS-232 DB-9 cable. Craft port settings are as follows:

- 9600 Baud
- No parity
- 8 Data bits
- 1 Stop bit

Windows Hyperterminal

Windows Hyperterminal can be used as a VT100 terminal emulation program. Open Hyperterminal by selecting PROGRAMS / ACCESSORIES / HYPERTERMINAL. Refer to the Help section of Hyperterminal for additional information.

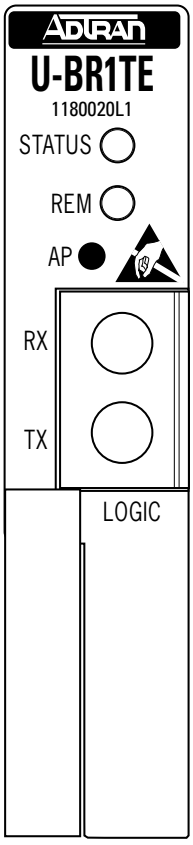
NOTE

To ensure proper display background, select VT100 terminal emulation under SETTINGS.

Password and User ID

Upon initial connection, the password option is factory disabled. To enable the password, select Bank Controller (1)/ Password Control (8)/ Enable Password (2). The factory default username is USER, and the default password is PASSWORD; both are in all capital letters. Both the username and password are required.

Table 4. Front Panel Indicators



Indicator	Color	Description
STATUS	Off	Indicates both loop and carrier synchronization has been established.
	Red	Solid red indicates neither loop nor carrier synchronization has been established. Flashing red once every two seconds indicates loop synchronization has been established, but carrier synchronization has not. Flashing red twice every second indicates carrier synchronization has been established, but loop synchronization has not.
	Green	Indicates that Layer 1 is established from the IDSN switch to the customer ISDN terminal equipment.
	Yellow	Solid yellow when a front panel test has been successfully initiated or when responding to 2B+D loopback request. Flashes yellow once every two seconds when responding to a B1 loopback request or when forced into a B1 loopback from the front panel. Flashes yellow twice every two seconds when responding to a B2 loopback request or when forced into a B2 loopback from the front panel.
REM	Green	Indicates the unit has been provisioned by the BCU.
	Off	Indicates the unit is provisioned by DIP switches.
AP	Pushbutton	Alternative provisioning switch. Changes provisioning source from remote to manual.

Menu Navigation
To traverse through the menus, select the desired entry and press ENTER. To work backward in the menu, press the ESC (escape) key.

The menu tree in **Figure 3** illustrates the path to every provisioning, performance, and test access point in the U-BR1TE menu system.

3. TESTING

The U-BR1TE responds to embedded operation channel loopbacks, including B1, B2, and 2B+D, when configured for D channel operation. When used in non-D channel modes of operation (B1, B2, or 2B), the Adjacent-to-Customer U-BR1TE will respond to an in-band OCU or CSU Latching loopback sequence for each B-Channel. When remote testing is not available, or during isolation of trouble or equipment malfunction, the U-BR1TE front panel provides local capabilities. Using the internal 2047 pseudorandom test pattern generator or the bantam jacks allows skilled personnel to test in both the downstream and upstream directions via the local craft interface, including downstream loopbacks for intermediate ISDN devices and the customer's NT1. In a Total Access 750 channel bank, the U-BR1TE can address up to four downstream intermediate elements. In a Total Access 1500 channel bank, the U-BR1TE can address up to six downstream intermediate elements. The front panel bantam jacks accommodate standard DS0 Logic Testers such as the TP1 108/109 RT II or FIREBERD 4000/6000 which perform both the upstream and downstream testing.

Loopback Tests (ADR1 - ADR6, NT1)

Loopbacks in the Network-to-Customer direction can be initiated from either the ISDN switch or the front panel via the local craft interface. If a DS0 digital test set is jacked into the bantam connector on the front panel, data from the test set provides the 64 kbs test pattern to be tested in B1 or B2. If no test set is

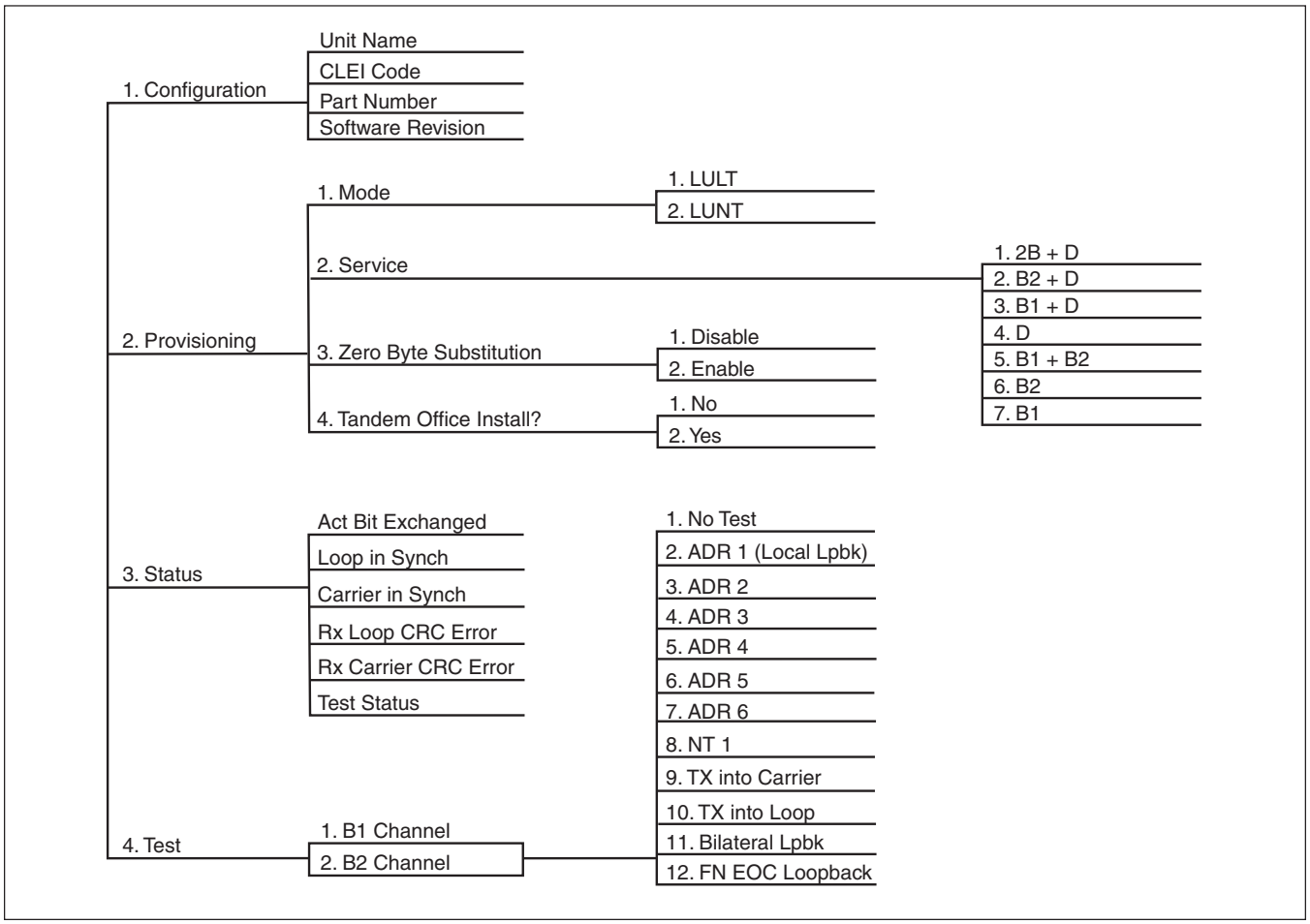


Figure 3. ADTRAN U-BR1TE Menu Tree

connected, an internally generated 2074 test pattern is used. When initiating loopbacks from the U-BR1TE craft interface, the downstream direction is automatically selected based on the card position in the network.

Point-to-Point Test (CRTX, LPTX)

A point-to-point (straight-away) test can be initiated via the local craft interface toward either the U-interface or the T1 carrier interface. In both cases, either the internal 2047 test pattern generator or a DS0 digital test set is used to verify the performance of the selected bearer channel.

Local Loopback (LPBK)

A bilateral loopback can be initiated from the local craft interface for either bearer channel. A local test pattern source is not required for this test.

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

For leased mode applications, the D channel is typically disabled on the U-BR1TE. Without the D channel, standard ISDN loopbacks by way of the EOC are not available across the T1 carrier system. For this situation the ADTRAN U-BR1TE responds to independent network-issued OCU and CSU latching loopback sequences for B1 and B2, when configured as Adjacent-to-Customer. Upon receipt of an OCU Latching loopback sequence, the U-BR1TE initiates a bilateral loopback for the B Channel under test. Upon receipt of a CSU Latching loopback sequence, and provided the U-Interface is terminated by an NT1/TA, the U-BR1TE will issue an EOC NT1 Loopback for the appropriate B channel. In both testsof the OCU and CSU loopbacks, the other B Channel is not affected. The U-BR1TE will support simultaneously testing of both B Channels. The OCU and CSU latching loopbacks are enabled by the following:

1. Minimum of 35 transition in progress (TIP) bytes (*0111010).
2. Minimum of 35 LSC bytes: OCU (*1010101), CSU (*0110001).
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.

Upon receipt of an OCU Latching Loopback, the U-BR1TE will provide a bilateral loopback on the Bearer channel that received the loopback sequence. The other Bearer channel is not affected during this loopback.

Upon receipt of a CSU latching loopback sequence in either B1 or B2 channels and the U-interface is in sync, the U-BR1TE will issue an EOC loopback request to the NT1 for the appropriate channel. If the U-interface is not in sync, the U-BR1TE sends abnormal station (*0011110) in both B1 and B2 channels.

For a U-BR1TE in a CSU latching loopback, receipt of the 35 TIPs will release the test in progress, following the release code to a U-BR1TE in a CSU test, the U-BR1TE will issue a Return-to-Normal EOC message to the NT1/TA.

The valid front panel tests in leased modes are ADR1, CRTX, LPTX, and LPBK for all circuit positions. NT1, ADR1-ADR6 loopback tests are valid for the Adjacent-to-Customer circuit position only. ADR2 would be used to test an ADTRAN U-Repeater deployed from the U-BR1TE.

4. MLT 3.0/ISDN CHANNEL TEST

The ADTRAN Total Access 750/1500 U-BR1TE, P/N 1180020L1, line card is compatible with Mechanized Loop Testing (MLT 3.0/ISDN) according to TR-NWT-000397, Issue 3, December 1993.

Channel Test (LUNT Mode)

When the Test Initiate Voltage (116 VDC behind 8 kΩ) is applied to the tip with the ring open of a Total Access 750/850/1500 U-BR1TE installed in a Total Access 1500 shelf (the Total Access 750 does not support MLT), and configured as a LUNT, the following events occur:

- The channel unit sends a Channel Test MP-EOC message downstream to the LULT, signaling the request for a MLT channel test.
- The channel unit notifies the SCU that a MLT test is underway.
- The unit sends a 333.3 Hz tone between the tip and ring leads. 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.

Channel Test (LULT Mode)

Upon receipt by the LULT of the MP-EOC message, the following events occur:

- The channel unit notifies the SCU that an MLT test is underway.
- The LULT connects the bypass pair. This connects the customer drop to the common equipment through TEST_R and TEST_T. The set-up sequence is complete.
- Upon completion of the automatic test the bypass relay de-energizes.
- The channel unit then attempts to re-synchronize the U-interface between the LULT and the NT1.

Figure 4 is an illustration of the switch settings at the network location.

5. MAINTENANCE

The ADTRAN U-BR1TE does not require maintenance for normal operation.

ADTRAN does not recommend that repairs be performed in the field. Repair services may be obtained by returning the defective unit to ADTRAN. Refer to *Warranty and Customer Service* section for further information.

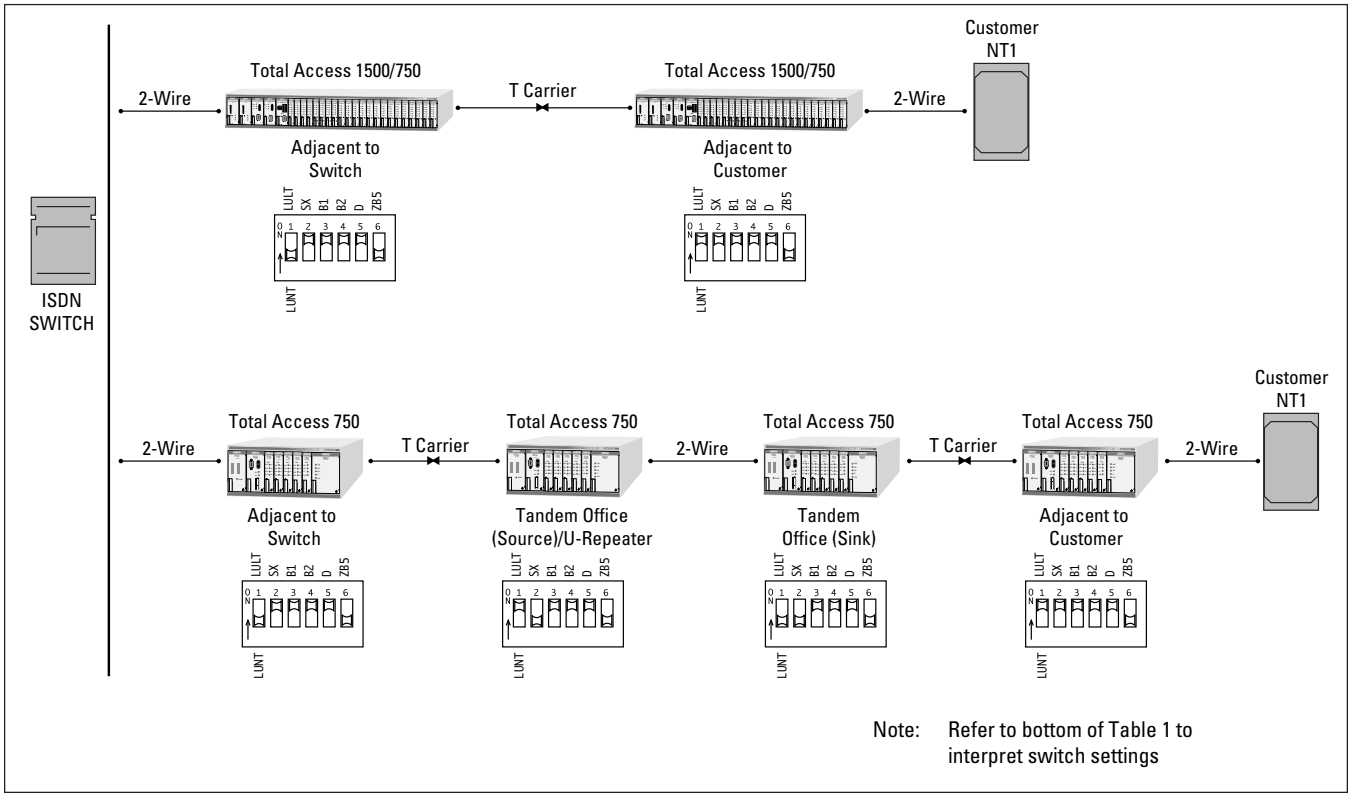


Figure 4. Position Switch Settings at Network Locations

6. SPECIFICATIONS

Specifications for the Total Access 1500 U-BR1TE are detailed in **Table 5.**

Table 5. Specifications

Loop Interface (ANSI T1.601)	
Line:	2-wire (tip and ring)
Operating Mode:	Full-duplex
Data Rate:	160 kbps total; 144 kbps available to customer
Signal Format:	2B1Q
Transmit Power:	13 dBm to 14 dBm nominal
Receiver Sensitivity:	-44.2 dBm
DS1 Facility Interface	
BR1/10 compatible equipment.	
Network Compatibility	
Interface:	ISDN and other digital service, according to TR-NWT-000397
Front Panel Indicators	
STATUS:	Indicates U-interface, carrier interface, and test status
REM:	Indicates manual or remote provisioning
Mechanical	
Dimensions:	3.125 in. H x 0.62 in. W x 10.1 in. D
Weight:	< 1 lb.
Mounting:	Mounts in ADTRAN Total Access 750, Total Access 850, or Total Access 1500 Channel Banks
Power	
Current Draw:	0.023 A maximum @ -48 V
Environmental	
Temperature:	Operating: -40ºC to +70ºC Storage: -40ºC to +85ºC
Relative Humidity:	Up to 95%, noncondensing
Heat Dissipation:	1.10 watts maximum

7. WARRANTY AND CUSTOMER SERVICE

ADTRAN will replace or repair this product within ten (10) years from the date of shipment if it does not meet its published specifications or fails while in service. Refer to ADTRAN *U.S. and Canada Carrier Networks Equipment Warranty,* Document 60000087-10.

Contact Customer and Product Services (CAPS) prior to returning equipment to ADTRAN.

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

ADTRAN Sales

Pricing/Availability
(800) 827-0807

ADTRAN Technical Support

Pre-sales Applications/Post-sales Technical Assistance
(800) 726-8663

Standard hours: Monday-Friday, 7 a.m. - 7 p.m. 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.
CAPS Department
901 Explorer Boulevard
Huntsville, Alabama 35806-2807