

SLC-5 U-BR1TE III With DDS Loopbacks ISDN 2B1Q Interface Installation and Maintenance

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1. GENERAL

This practice provides installation and maintenance information for the ADTRAN SLC-5 U-BR1TE III With DDS Loopback (U-BR1TE III). **Figure 1** is an illustration of the unit. The U-BR1TE III (P/N 1102040L3) is a direct replacement and fully compatible with the previous ADTRAN SLC-5 U-BR1TEs, including the 1100040L1, 1100040L3, 1102040L2, and the 1102040L1.

ISDN/DDS

The U-BR1TE III employs features for both ISDN and DDS transport. ISDN comprises the major functionality and is described in this section. A description of DDS functionality is located in Section 3.

Revision History

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

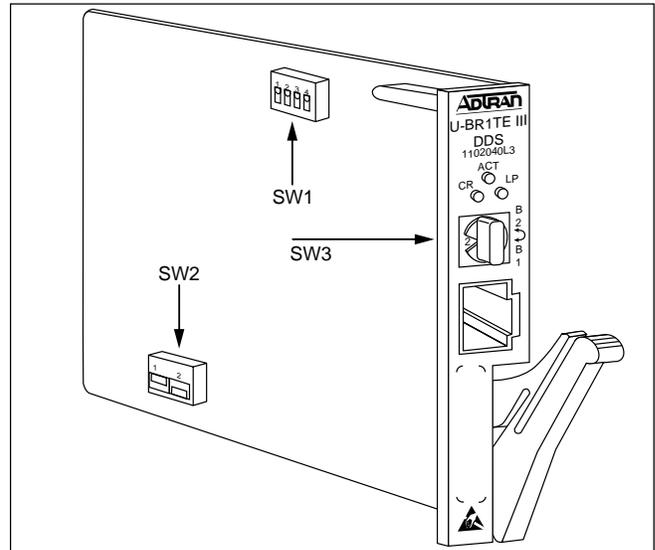


Figure 1. ADTRAN SLC-5 U-BR1TE III

Functional Description

The U-BR1TE III is a channel unit for use in the AT&T® SLC Series 5 and Series 2000 Digital Loop Carrier Systems. The U-BR1TE III allows the deployment of Basic Rate ISDN to locations whose telephone services are provided from these DLC systems. It can be used in a SLC-5 Central Office Terminal deployed as Feature Package C, and SLC-5 Remote Terminals deployed as Feature Package C without Autocut and Feature Package B. The U-BR1TE III will also operate in SLC-2000 COTs and RTs when deployed as SLC Mode 1. Clear Channel capability (B8ZS) is not required of the T1 facility if zero byte substitution is enabled on the U-BR1TE III. The U-BR1TE III plugs into a single physical slot of the channel 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.

The SLC-5 U-BR1TE III incorporates a feature that allows for detection of ISDN capable and non-ISDN capable SLC-5 Bank Controller Units. In addition, the unit will facilitate communications to the non-ISDN capable BCU for the time slots associated with the adjacent physical slot, eliminating the need for the NULL Channel Unit, P/N 1200102L1, in the non-ISDN SLC-5 terminals.

Earlier versions of the SLC-5 BCU will not recognize an ISDN channel unit ID, and will not assign the required time slots of the next physical position for 2B+D operation. For previous versions of the SLC-5 U-BR1TE, a NULL channel unit, which communicated to the non-ISDN capable BCU, is required to reserve the associated time slots for 2B+D service.

By automatically determining the version and requesting the necessary time slots for the non-ISDN capable BCUs, the U-BR1TE III eliminates the confusion regarding 2B+D deployment, and the requirement of deploying the NULL cards. The U-BR1TE III will operate properly when a NULL card is installed in the adjacent physical, as in a replacement situation.

Features

U-BR1TE III features support both ISDN and DDS, plus features common to both as listed here:

ISDN Features:

- Provides for the transport of ISDN Basic Rate 2B+D information over T1 facilities in the 3-DS0 format specified in TR-NWT-000397.
- NULL card not required with non-ISDN BCUs.
- B1 or B2 loopback addressability at the front panel for the NT1 and up to six devices in the Network-to-Customer direction.
- Compatible with MLT 3.0/ISDN per TR-NWT-000397, Issue 3, December 1993.

DDS Features:

- Perform bidirectional loopback (loop and network) when commanded into DS0 DP loopback from the network direction only.
- Loopback release in response to TIPs per TR62310.
- Remap all subsequent DS0 DP loopback codes into respective *eoc* loopbacks to loop back respective downstream U-Repeaters, TRISDN elements, and U-BR1TEs when optioned for 1B+D, or 2B+D.
- Pass OCU loopback code through to loop the IDSL OCU-R.
- Pass CSU loopback code through to loop the CSU/DSU and simultaneously send a remap to the NT1 *eoc* address.
- Transmit Mux-Out-of-Sync (MOS) trouble code upstream for IDSL loss of signal, loss of sync, or open loop.
- Returns Abnormal Station Code (ASC) to the network in B1 during loopback conditions initiated by the IDSL OCU-R.

Common Features:

- ISDN 2B+D interface which meets all Layer 1 requirements as specified in ANSI T1.601-1992.
- 18 kft nominal range on mixed gauge wire (42 dB @ 40 kHz loop loss, 1300 Ω DC resistance design).
- All Layer 1 maintenance functions.
- Performance monitoring of the Layer 1 facility as specified in TR-NWT-000397.
- A distinctive metallic DC test signature to identify either Line Unit Loop Termination (LULT) or Line Unit Network Termination (LUNT) mode of operation as specified in TR-NWT-000397.
- DS0 logic level transmit and receive data access through a front panel RJ-45 jack.
- Loop, carrier, and synchronization status available at the front panel.
- Compatible with AT&T SLC-2000, SLC Mode 1.
- Compliant with TR-TSY-829, TR-TSY-1089, FCC Part 15, Class A, and UL 1459.

ADTRAN has obtained the necessary licenses that grant the right to develop a SLC-5 U-BR1TE III. The ADTRAN U-BR1TE III replaces the AT&T AU92 (COT) and AU93 (RT) BR1TE channel units. The U-BR1TE III (TR397 compliant) will not function with the AT&T BR1TE channel units across the T1 carrier facilities. The U-BR1TE III must be terminated across the T1 carrier facilities with another channel unit that meets TR 397. The U-BR1TE III will function with any ISDN 2B1Q U-interface that is ANSI T1.601 compliant.

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*.

To install the U-BR1TE III, hold the unit by the front panel and insert it into the assigned slot until the edge connector is firmly seated in the backplane. The ACT LED on the U-BR1TE III should illuminate GREEN. The CR and LP LEDs will flash GREEN then illuminate AMBER. At this point, push the unit latch upward until it locks into place.

NOTE

During installation rotary switch SW3 can be in any position except 7 (LPBK). LPBK is reserved for special testing functions.

SLC-5

The U-BR1TE III plugs into a single SLC-5 channel slot. Because two time slots are assigned to each physical slot in a SLC-5 channel bank, and a U-BR1TE III provisioned as 2B+D requires three time slots, there are restrictions that apply to the physical placement of the U-BR1TE III in the channel bank. Each SLC-5 digroup consists of 12 physical slots, which can be divided into four groups of three slots each (physical slots 1-3, 4-6, 7-9, and 10-12). These tri-slot groups are used to define the slot restrictions for the U-BR1TE III as follows (see **Figure 2**):

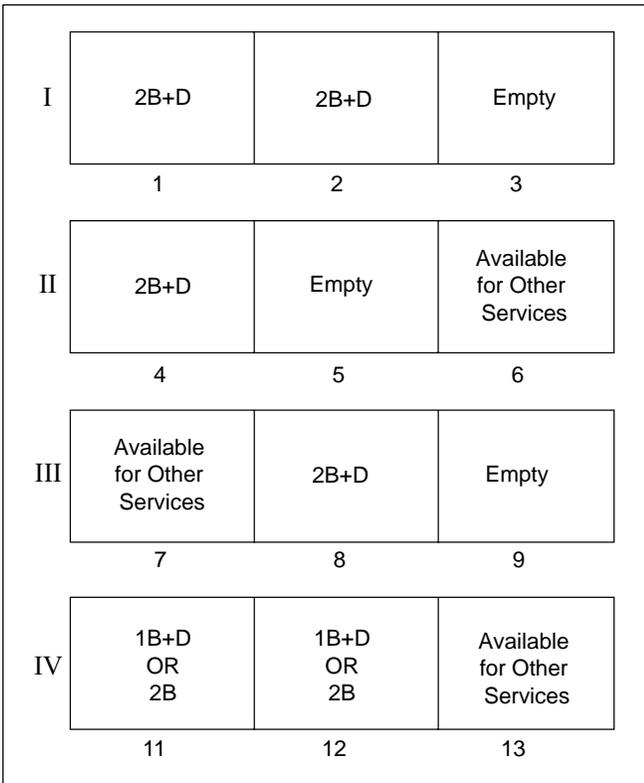


Figure 2. SLC-5 U-BR1TE Slot Placement Examples

- A U-BR1TE III provisioned as 2B+D cannot be installed in the last slot of a tri-slot group (slots 3, 6, 9, or 12).
- A U-BR1TE III provisioned as anything other than 2B+D cannot be installed in the physical slot to the immediate right of a U-BR1TE III provisioned as 2B+D within a tri-slot group.

SLC 2000

The U-BR1TE III operates in all SLC-2000 COT and RT shelves and can be used in combination with any mix of other SLC-2000 channel units. Currently, the unit will not operate in a mode 2 shelf. All option information for SLC-2000 channel units is entered using the SLC-2000 Craft Interface Terminal (CIT) and stored in the controller’s nonvolatile system memory. Once a slot is provisioned, it does not need to be provisioned again unless a different channel unit is installed in that slot.

Table 1 lists the options to set for the U-BR1TE III. The service provisioned should match the switch settings or the unit may not operate properly.

Table 1. SLC-2000 CIT Provisioning Options

Option	SLC-2000 COT	SLC-2000 RT
CLEI	5SC1JE	5SC1HE
Function Code	BRI	BRI
Service	2B+D, B1+D, B2+D, D	2B+D, B1+D, B2+D, D

NOTE

When the U-BR1TE III is optioned for B1 or B2, the SLC-2000 slot must be provisioned for D only. If the U-BR1TE III is optioned for 2B, then the SLC-2000 slot must be provisioned for B1+D.

Physical Requirements

The U-BR1TE III occupies one physical slot in the SLC-5 or SLC-2000 channel bank. The backplane pin assignments are illustrated in **Figure 3**.

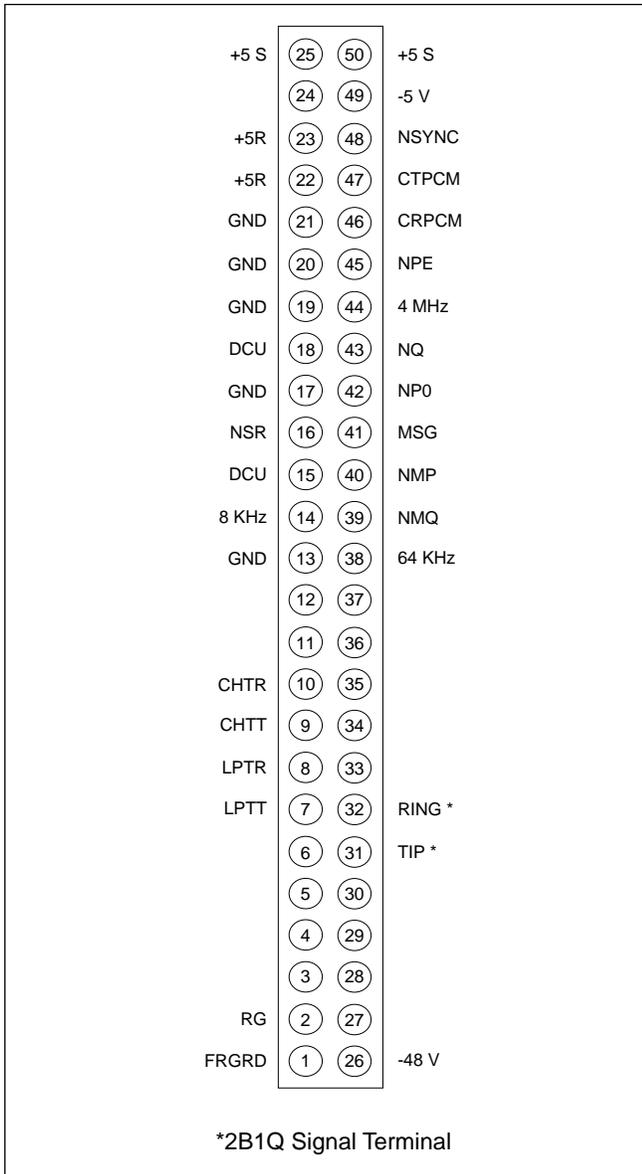


Figure 3. Backplane Pin Assignments

Interface Requirements

The U-BR1TE III 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 SLC-5 or SLC-2000 channel bank interface which is used to insert data into the 1.544 Mbps T1 stream. Only the polarity insensitive Tip and Ring leads are used in the cross-connection.

Option Switch Settings

See Figure 1 and **Figure 4** for SW1 and SW2 location. The options for SW1 and SW2 are described in **Table 2**. **Figure 5** displays the position switch settings at ISDN network locations. **Figure 6** displays the position switch settings at IDSL/DDS network locations.

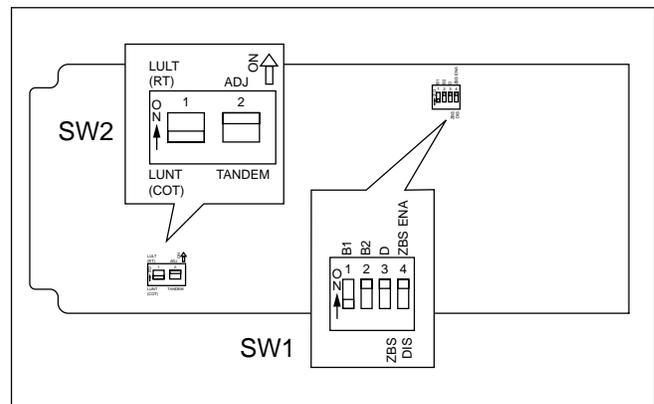


Figure 4. SW1 and SW2 Labeling

Table 2. Internal Switch Option Settings

Switch	Label	Function	Description																																								
SW1-1 SW1-2 SW1-3	B1 B2 D	Service Level Selection	<p>Selects the service level. The U-BRITE II may be optioned to deliver full ISDN (2B+D) or any of the following levels of service.</p> <table border="1"> <thead> <tr> <th>Service Type</th> <th>Service Option</th> <th>SW1-1 (B1)</th> <th>SW1-2 (B2)</th> <th>SW1-3 (D)</th> </tr> </thead> <tbody> <tr> <td>ISDN</td> <td>*2B+D</td> <td>On</td> <td>On</td> <td>On</td> </tr> <tr> <td>Leased (128 kbps)</td> <td>2B</td> <td>On</td> <td>On</td> <td>Off</td> </tr> <tr> <td>ISDN/DDS</td> <td>B1+D</td> <td>On</td> <td>Off</td> <td>On</td> </tr> <tr> <td>ISDN</td> <td>B2+D</td> <td>Off</td> <td>On</td> <td>On</td> </tr> <tr> <td>DDS/Leased</td> <td>B1</td> <td>On</td> <td>Off</td> <td>Off</td> </tr> <tr> <td>Leased</td> <td>B2</td> <td>Off</td> <td>On</td> <td>Off</td> </tr> <tr> <td>ISDN</td> <td>D</td> <td>Off</td> <td>Off</td> <td>On</td> </tr> </tbody> </table>	Service Type	Service Option	SW1-1 (B1)	SW1-2 (B2)	SW1-3 (D)	ISDN	*2B+D	On	On	On	Leased (128 kbps)	2B	On	On	Off	ISDN/DDS	B1+D	On	Off	On	ISDN	B2+D	Off	On	On	DDS/Leased	B1	On	Off	Off	Leased	B2	Off	On	Off	ISDN	D	Off	Off	On
Service Type	Service Option	SW1-1 (B1)	SW1-2 (B2)	SW1-3 (D)																																							
ISDN	*2B+D	On	On	On																																							
Leased (128 kbps)	2B	On	On	Off																																							
ISDN/DDS	B1+D	On	Off	On																																							
ISDN	B2+D	Off	On	On																																							
DDS/Leased	B1	On	Off	Off																																							
Leased	B2	Off	On	Off																																							
ISDN	D	Off	Off	On																																							
SW1-4 On Off	ZBS EN ZBS DIS*	Zero Byte Substitution Enables ZBS Disables ZBS	In 2B+D, B1+D, or B2+D the ZBS option must be set the same for the COT and RT. SW1-4 should be set toward "ZBS ENA" for AMI-provisioned carriers. The switch setting is optional for B8ZS-provisioned carriers. In non-D channel modes, ZBS must be disabled when DDS service rate is 64 kbps, or 56 kbps with secondary channel. Consult local provisioning guidelines.																																								
SW2-1 On Off	LULT (RT)* LUNT (COT)	Termination Mode LULT Mode (RT typical) LUNT Mode (COT)	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 (See Figure 5).																																								
SW2-2 On Off On Off	ADJ* TANDEM ADJ TANDEM	<p>LULT Mode (SW2-1 On) DC sealing current provided</p> <p>DC sealing current not provided</p> <p>LUNT Mode (SW2-1 Off) Periodic wake-up tone not provided</p> <p>Periodic wake-up tone provided</p>	<p>In the LULT(RT) mode, SW2-2 controls sealing current. When used in an Adjacent-to-Customer configuration, sealing current should be provided (SW2-2 On). In a Tandem Office Source, sealing current is not required, and should be disabled (SW2-2 Off) (See Figure 5).</p> <p>In the LUNT(COT) mode, SW2-2 controls periodic wake-up tone. Periodic wake-up tones should be disabled when located in an Adjacent-to-Switch location (SW2-2 On). Periodic wake-up tones are required (SW2-2 Off) when located in a Tandem Office Sink configuration, or when adjacent to a device requiring wake-up tones, such as a Newbridge switch (See Figure 5).</p>																																								
*Factory Setting																																											

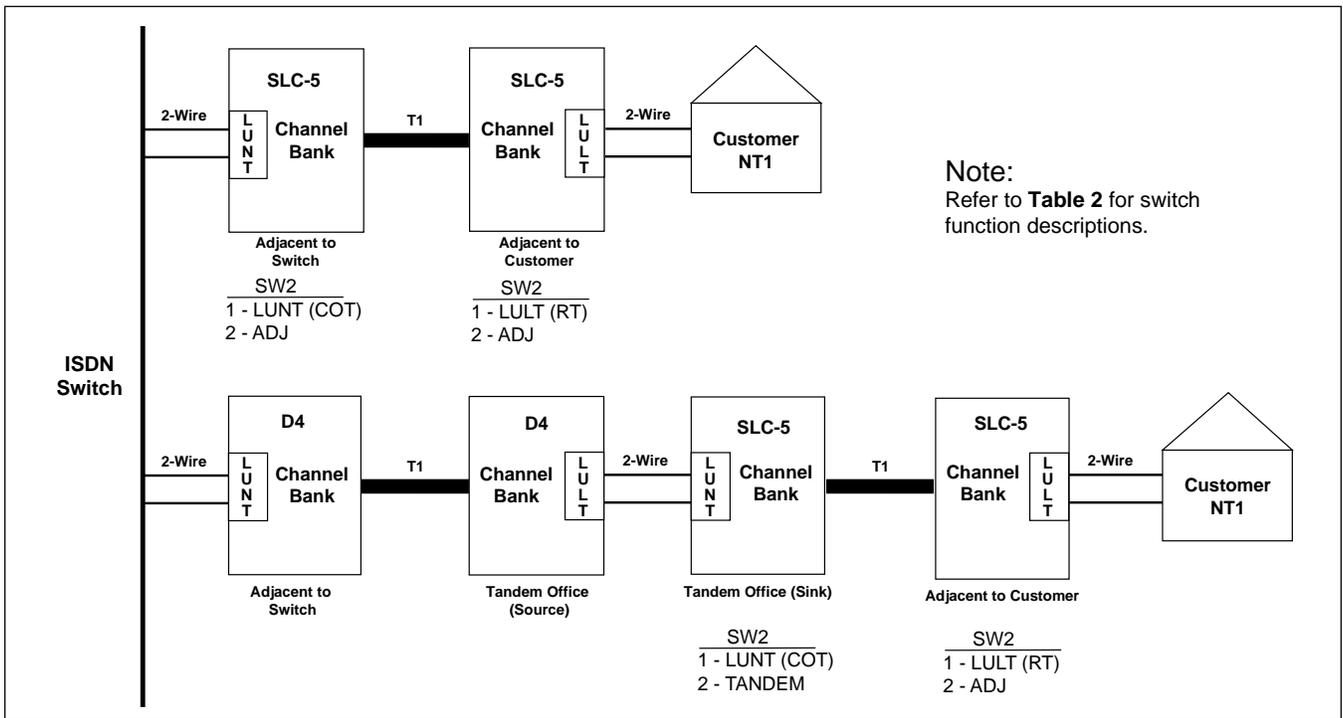


Figure 5. Position Switch Settings at Network Locations for ISDN Applications

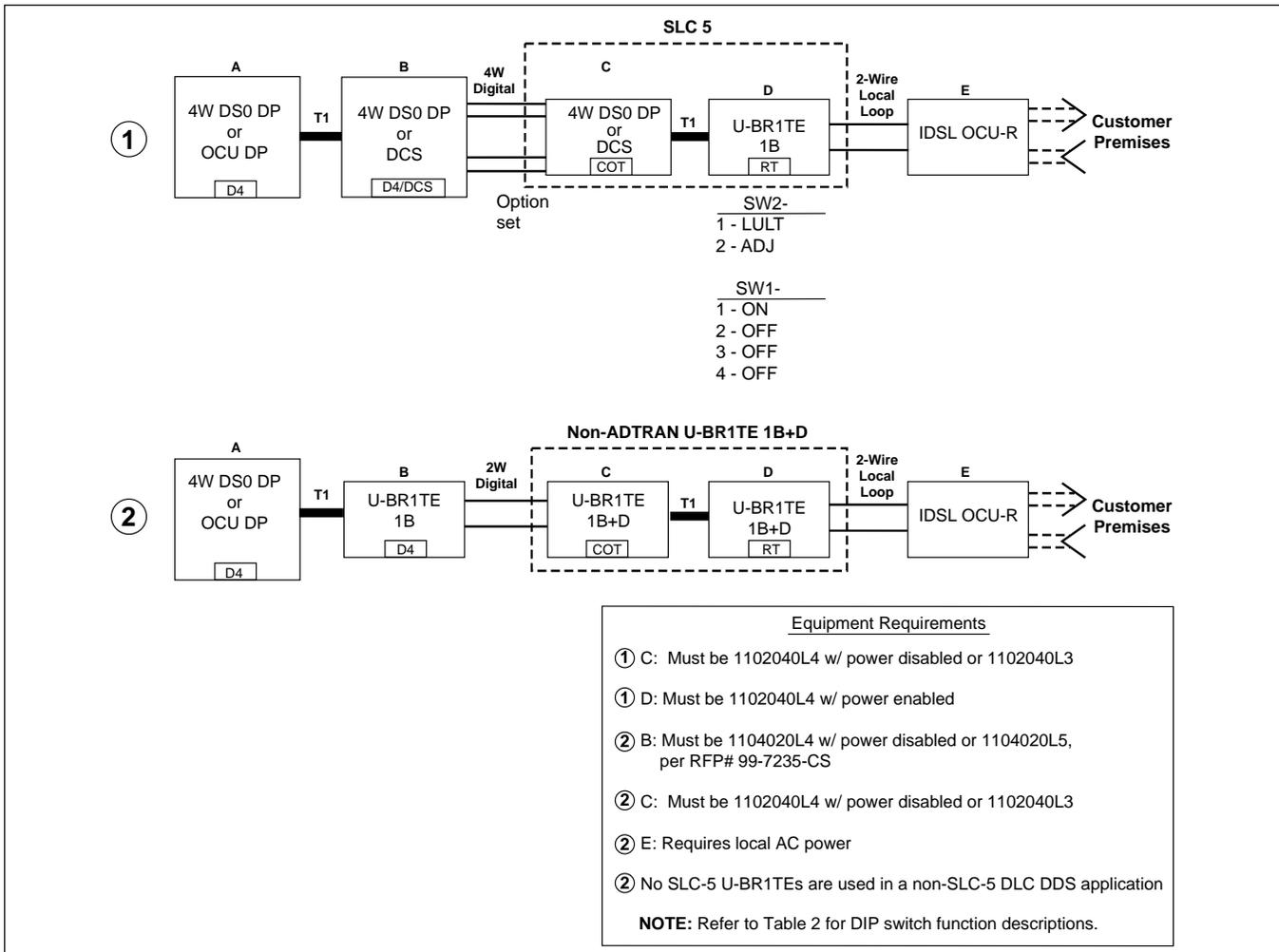


Figure 6. U-BR1TE III IDSL/DDS Circuit Diagram

Front Panel Features

The RJ-45 jack allows front panel test access for local or downstream loopbacks. The Address Select Knob (SW3) determines which element is being looped back. **Table 3** lists the loopback options.

Three LEDs on the front panel of the U-BR1TE III show the synchronization and loopback status. Descriptions of these LEDs are given in **Table 4**. The SLC Series 5 COT must be externally timed from a suitable composite clock with stratum one traceability.

Table 3. Rotary Switch Legend

Display	Name	Interpretation
0	NT1	NT1, address of the NT1 Latching OCU in DDS mode
1	ADR1	Address #1, address of this unit
2*	ADR2	Address #2, the next downstream unit away
3	ADR3	Address #3, the second unit downstream
4	ADR4	Address #4, the third unit downstream
5	ADR5	Address #5, the fourth unit downstream
6	ADR6	Address #6, the fifth unit downstream
7	LPBK	Loopback, forces this unit to loopback the selected B1 or B2 channel. Loopbacks occur in both the customer and network directions.
8	CRTX	Carrier transmit, in the carrier direction
9	LPTX	Loop transmit, in the loop direction

Clockwise rotation selects the B1 channel. Counterclockwise rotation selects the B2 channel
 *Factory Setting

Table 4. Front Panel LED Indication

LED	Color	Indication
LP (Loop)	Amber	Synchronization over the loop has not been achieved.
	Green	<i>Solid</i> in response to a 2B+D loopback. <i>Flashes</i> once per second for B1, twice per second for B2 in response to an <i>eoc</i> loopback from the loop side and during DS0 logic test when the remote unit has successfully looped over the loop side, or in LPTX or CRTX testing.
	Off	Synchronization over the loop has been achieved. No loopbacks or tests are in progress
CR (Carrier)	Amber	Synchronization over the carrier has not been achieved
	Green	<i>Solid</i> in response to a 2B+D loopback. <i>Flashes</i> once per second for B1, twice per second for B2 in response to an <i>eoc</i> loopback from the carrier side and during DS0 logic test when the remote unit has successfully looped over the carrier side, or in LPTX or CRTX testing.
	Off	Synchronization over the carrier has been achieved. No loopbacks or tests are in progress.
LP and CR	Amber (flashing)	U-BR1TE II channel unit has violated the physical slot restrictions or is not provisioned correctly.
	Green (flashing)	BCU has been removed from service or the U-BR1TE II is in special test mode (refer to Local Loopback subsection).
CR (only)	Amber (flashing)	The channel bank has informed the U-BR1TE II that a network or trunk alarm is present.
ACT (Active)	Green	<i>ISDN Application</i> - Indicates that the terminal equipment has exchanged ACT bits with the ISDN switch.
	Green	<i>DDS Application</i> - Indicates loop is terminated with an OCU-R.
	Green (flashing)	<i>ISDN Application</i> - Once per second indicates that the ACT bit is being sent in one direction only.

3. TESTING

The U-BR1TE III responds to embedded operation channel loopbacks, including B1, B2, and 2B+D, when configured for D channel operations. When used in B1 configuration (non-D channel modes of operation); the U-BR1TE III will respond to an inbound DS0 DP latching loopback sequence. When remote testing is not available, or during troubleshooting of trouble or equipment malfunctions, the U-BR1TE III front panel provides local test capabilities for use with industry standard Digital Logic Test Sets such as the TPI 108/109 or equivalent testers. Available tests include a local loopback, loopback of up to five addressable downstream ISDN devices, loopback of the customer's NT1, and point-to-point testing in both the upstream and downstream directions.

NOTE

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

Loopback Tests

Loopbacks in the network-to-customer direction can be initiated from either the ISDN switch or the front panel. Front panel initiated loopbacks are non-obtrusive to unused channels, thereby preventing synchronization loss or dropouts on the carrier or loop while testing.

From the RJ-45 jack at the front panel, a DS0 digital test set is used to inject the required 64 kbps bit pattern into the B1 or B2 channel. The Address Select Knob determines the downstream element to be looped back, and the direction of rotation of the knob selects which channel is to be looped back. Clockwise (CW) rotation selects the B1 channel, and counterclockwise (CCW) rotation selects the B2 channel. To initiate a loopback, perform the following procedure:

1. Connect the DS0 tester to the RJ-45 jack.
2. Rotate the Address Select Knob in the direction associated with the desired loopback channel until the desired downstream element address is reached (see Table 3). The LEDs indicate successful loopback activation according to Table 4.
4. Data is looped back at the selected address until the jack is disconnected or the Address Select Knob is changed.

Point-To-Point Test (CRTX/LPTX)

Point-to-point testing using a DS0 digital tester can be performed to either the T1 carrier interface (SW3, position 8), or the U-interface (SW3, position 9). To initiate a point-to-point test, perform the following:

1. Connect the DS0 digital tester to the RJ-45 jack.
2. Configure the test set for Near Logic and 64kbps.
3. Select the desired test direction and bearer channel using the front panel rotary switch.
4. If the far-end unit is a SLC-5 U-BR1TE III, perform steps 1-3, choosing the same front panel selections. Ensure both test sets are configured for the same test pattern (511, 2047).
5. If the far-end is another device, follow the appropriate directions to provide a point-to-point test.

Local Loopback

The U-BR1TE III incorporates a special test mode to provide a local 2B+D bilateral loopback. Once invoked, this test allows an upstream and downstream test set to send a straight-away test pattern. To put the U-BR1TE III into this test mode, select ADR7 on the front panel rotary switch (SW3) and insert the channel unit into the channel bank. The CR and LP LEDs will flash GREEN once the U-BR1TE III is in this special mode. To discontinue the special test mode, turn SW3 in either direction deselecting the ADR7 position. This will cause the unit to reset and return to normal operation. When the U-BR1TE III operation is normal, the ADR7 position of SW1 does not have a function.

NOTE

This test option is only available on power up of the U-BR1TE III.

ISDN Only - MLT Channel Test -LUNT Mode

When a Pair Gain Test Controller (PGTC) is connected to the U-BR1TE III and the Test Initiate Voltage (116 VDC behind 8 K Ω) is applied to the Tip with the Ring open, the following occurs:

1. The channel unit sends a Channel Test *mp-eoc* message downstream to the LULT.
2. The unit produces a 333 Hz test tone between the Tip and Ring leads. This tone is compliant with TR-TSY-00465.

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.

ISDN Only - MLT 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 informs the bank controller of a test request.
2. Upon completion of handshaking with the channel test equipment, the bank controller commands the channel unit to close its channel test relay. This has the effect of connecting the customer drop to the common equipment through LPTT and LPTR and the channel unit U-interface to CHTT and CHTR. The test setup sequence is complete.
3. Upon completion of the automatic test, the channel unit is commanded by the bank controller to de-energize the channel test relay.
4. Upon reception of the Return to Normal *mp-eoc* message, the channel unit begins re-synchronization of the U-interface between the LULT and the NT1.

Performance Monitoring

The U-BR1TE III supports TR 829 performance monitoring remotely from the ISDN switch.

ISDL/DDS Description

The U-BR1TE III may be deployed in the adjacent to customer position to provide transport for DDS/Frame Relay services with an ADTRAN ISDL OCU-R. This allows pair savings over traditional DDS deployment on local loops up to 18 kft of mixed gauge wire. The ISDL OCU-R is used to terminate the U-interface at the customer's premises provided by the U-BR1TE III and to convert the 2-wire ISDN signal to a 4-wire AMI DDS signal for presentation to the customer. Together, the U-BR1TE III and ISDL OCU-R allow testing over the ISDN transport network to be performed with traditional DDS methods. In this mode U-BR1TE IIIs may be placed in tandem and function as DS0 DPs while the ISDL OCU-R functions as an OCU. See Figure 6 for the U-BR1TE III DDS application.

DDS Testing

For leased mode or DDS applications with the U-BR1TE III the D channel is typically disabled. Without the D channel, standard ISDN *eoc* loopbacks are unavailable to the ISDN transport system and testing may only be accomplished by using the in-band DDS loopback commands. The U-BR1TE III responds to latching loopback sequences for the DS0 DP. The U-BR1TE III allows the OCU loopback command to pass inband downstream to the ISDL OCU-R.

Upon receipt of a DS0 DP latching loopback sequence the U-BR1TE III initiates a bilateral loopback for the B1 channel. This bilateral loopback allows testing of the 2B1Q local loop to the U-BR1TE IV simultaneously with network testing to the U-BR1TE III.

DS0 DP Loopback *eoc* Remapping

Upon receipt of subsequent DS0 DP loopback codes when the D channel is disabled, the U-BR1TE IV remaps the subsequent DS0 DP loopback sequences into the respective ISDN *eoc* loopback messages. This capability will permit all downstream ISDN D channel enabled U-BR1TEs, U-Repeater, and TRISDN elements to respond to standard DDS DS0 DP loopback commands via the ISDN *eoc* as shown in Figure 7.

NOTE

For DDS circuits with the D channel disabled, all tandem U-BR1TE elements should be U-BR1TE IIIs with DDS Loopback for remote end test capability to function properly. In D channel disabled applications, older non-DDS vintage U-BR1TEs may not pass the OCU latching loopback sequence to the ISDL OCU-R.

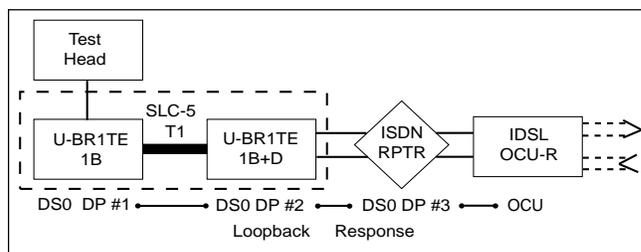


Figure 7. ISDL/DDS Loopback Response

Upon receipt of a OCU latching loopback sequence the U-BR1TE III passes the OCU sequence in-band downstream to the IDSL OCU-R. U-BR1TE IIIs with DDS Loopback do not respond to the CSU latching loopback command but pass it through to the CSU/DSU while mapping the NT1 *eoc* address. The IDSL OCU-R reverses sealing current on its 4-wire AMI DDS interface to place the customer CSU into loopback upon receipt of the CSU latching loopback. The following data sequence enables the DS0 DP, OCU, and CSU latching loopbacks:

1. Minimum of 35 transition in progress (TIP) bytes (X0111010).
2. Minimum of 35 loopback select code (LSC) bytes: DS0 DP (X0000101), OCU (X1010101), CSU (X0110001).
3. Minimum of 100 loopback enable (LBE) bytes (X1010110).
4. Minimum of 32 far-end voice (FEV) bytes (X1011010).

If the U-interface of the U-BR1TE III is not in sync, the unit transmits Mux-Out-of-Sync (X0011010). X Denotes *Don't Care* bit - either a 1 or a 0.

Disable DS0 DP, OCU, or CSU latching loopback sequence:

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, ADR1-ADR6 loopback tests are valid for the LULT mode only. ADR2 would be used to test a U-Repeater or ADR2 and ADR3 would be used to test TRISDN elements respectively.

Initiate Loopback at IDSL OCU-R

When used for DDS, the U-BR1TE III may initiate a loopback at the IDSL OCU-R. The in-band latching OCU loopback code is sent to loop the IDSL OCU-R when the NT1 address is selected on SW3.

ADTRAN U-BR1TE Bidirectional Loopback

In LULT mode, the ADTRAN U-BR1TE will execute a bidirectional loopback when performing DS0 DP loopback. Refer to **Figure 8** for an illustration of the bidirectional loopback.

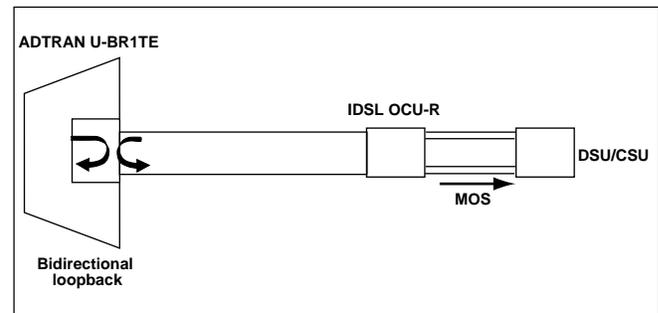


Figure 8. ADTRAN U-BR1TE Bidirectional Loopback

Remote End Initiated LBK Tests

The U-BR1TE supports loopbacks generated from the OCU-R which allow testing to be performed without coordination with the CO or test center. Loopbacks initiated by the OCU-R front panel LBK pushbutton, aid in system turn-up testing or troubleshooting from the remote end.

The U-BR1TE responds to a loopback command initiated at the OCU-R as follows:

Pressing the OCU-R LBK pushbutton on the OCU-R once will initiate a loopback at the U-BR1TE towards the customer. See **Figure 9**. This allows data to be sent from the remote end to test the local loop and the OCU-R. This loopback is indicated by a flashing CUST LBK LED on the IDSL OCU-R and a solid LBK LED on the U-BR1TE.

Pressing the OCU-R LBK pushbutton a second time initiates a loopback at the OCU-R towards the 4-wire DDS (CPE) interface. A solid CUST LBK LED on the IDSL OCU-R indicates a loopback at the IDSL OCU-R towards the customer's equipment. See **Figure 10**. Pressing the OCU-R LBK pushbutton a third time disables all current latching loopbacks initiated by the OCU-R LBK pushbutton.

If errors exist the loopbacks can help determine the source; either the local loop or the OCU-R. During a remote end initiated loopback the system transmits ASC 9Eh towards the network, indicating an out-of-service condition generated by the remote end, as shown in Figures 9 and 10.

All IDSL/DDS system latching loopbacks, whether initiated by the craft interface, LBK pushbutton, CO, or from a remote test center, may be released by sending 35 DDS loop down TIP bytes <X0111010> (Where X is a "don't care" bit.) All existing latching loopbacks may also be disabled by pressing the LBK pushbutton on the CO or remote units.

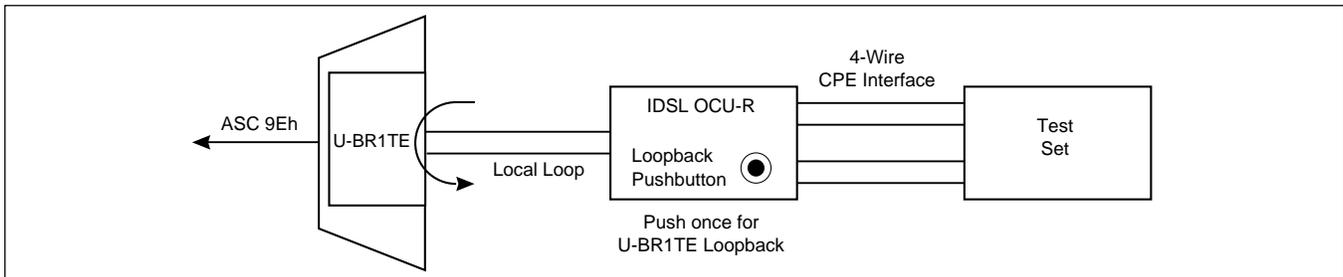


Figure 9. IDSL/DDS Remote End Initiated Loopback, Local Loop

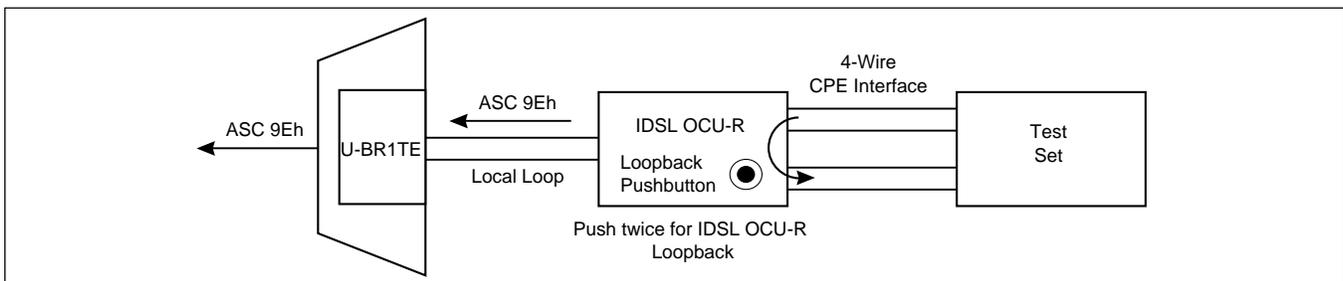


Figure 10. IDSL/DDS Remote End Initiated Loopback, Customer Loop

IDSL/DDS Trouble Code

The IDSL/DDS system provides a quick diagnosis in the case of a circuit condition where continuity is broken. The trouble code type received by a tester determines whether the open condition is occurring on the local loop or at the customer premises. In the event of an open conductor or disconnected 2-wire loop, the U-BR1TE IV transmits a Mux-Out-of-Sync trouble code (MOS 9Ah) into the network as shown in **Figure 11**. During a similar out-of-service condition at the customer premises, the IDSL OCU-R transmits Abnormal Station Code (ASC 9Eh) upstream into the network as shown in Figure 11.

4. MAINTENANCE

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

5. 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 Networks 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

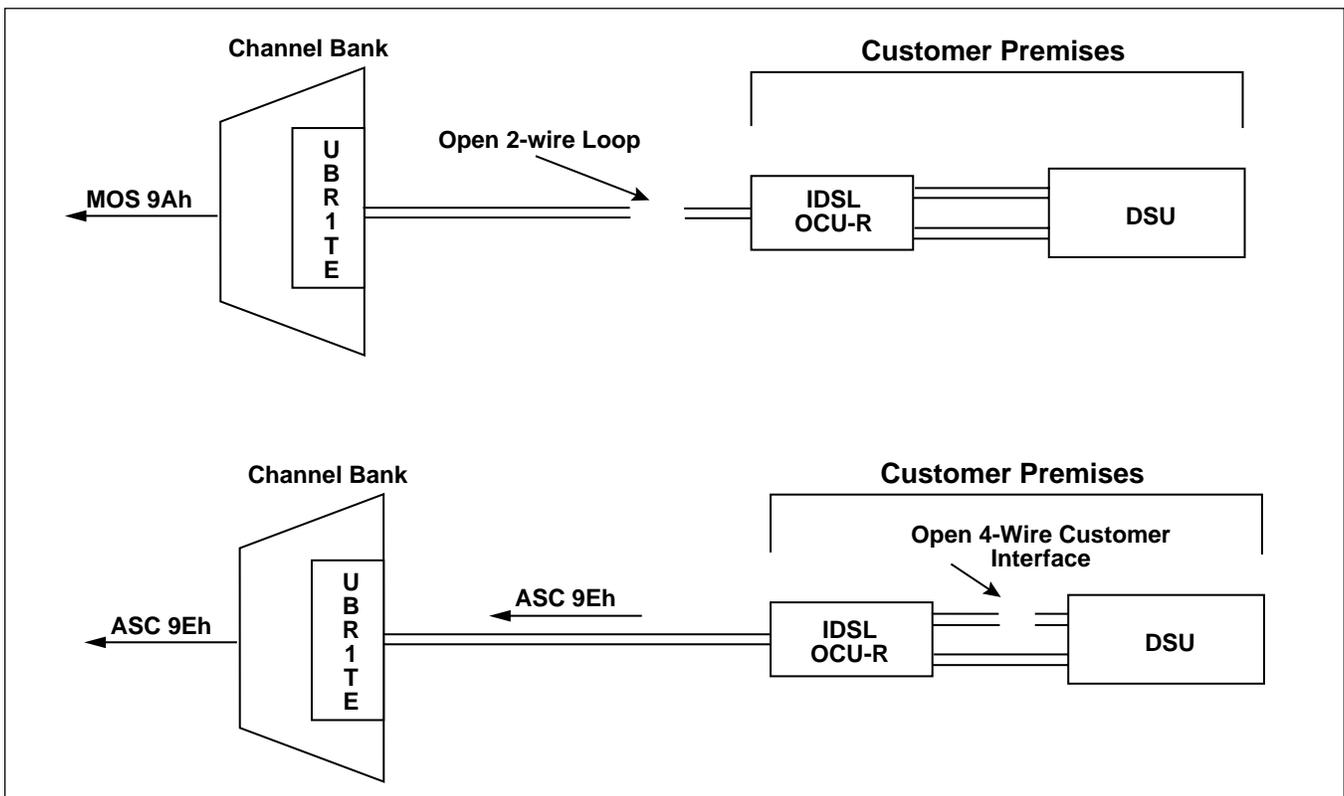


Figure 11. IDSL/DDS Trouble Codes