

## MODEL ADTRAN 9004 U-BR1TE II ISDN 2B1Q INTERFACE FOR SIEMENS 9004 A/B CHANNEL BANKS INSTALLATION/MAINTENANCE

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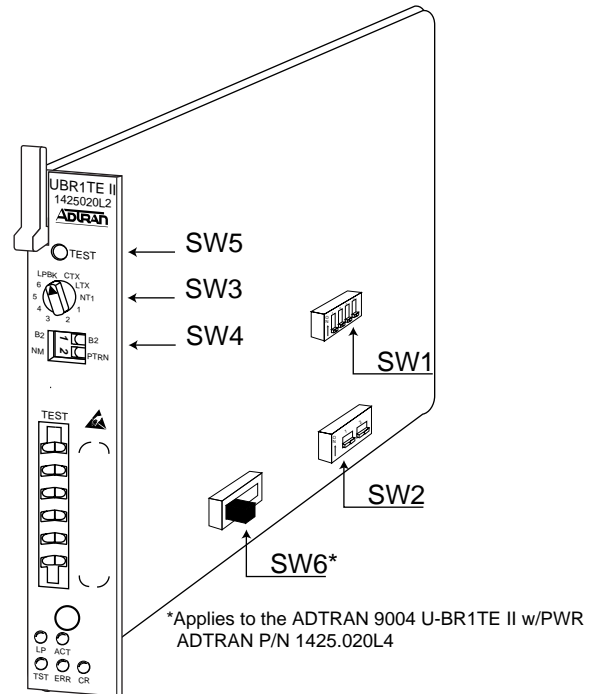


Figure 1. Siemens 9004 U-BR1TE II

## 1. GENERAL

This practice provides installation and maintenance information for the 9004 U-BR1TE II L2, part number 1425.020L2, and the 9004 U-BR1TE II w/PWR L4, part number 1425.020L4. Figure 1 is an illustration of the 9004 U-BR1TE II.

The 9004 U-BR1TE II (L2 and L4) are line cards designed to operate with the Siemens 9004 A/B channel banks. Both lists of the 9004 U-BR1TE II provide an ISDN U-interface allowing transportation of Basic Rate ISDN (2B+D) over T1 carriers. This allows ISDN service to be extended beyond the normal servicing range (18 kft) of an ISDN ready switch. Either list of the 9004 U-BR1TE II may be used in the Central Office Terminal (COT) location and in the Remote Terminal (RT) location. Each list of the 9004 U-BR1TE II plugs into a single physical slot but requires up to three consecutive time slots when configured for 2B+D. Block Error Rate (BER) performance over the T1 facility is monitored and available to the network.

The 9004 U-BR1TE II w/PWR provides an ISDN 2B1Q U-interface that will supply 43 mA to span power an ADTRAN ISDN U-Repeater II or U-Repeater III.

Each list of the 9004 U-BR1TE II is interchangeable with the Siemens ISDN Basic Rate Interface Unit (BRIU), part number 91469-01 and the ADTRAN 9004 U-BR1TE L1. Features of the 9004 U-BR1TE II (L2 and L4) include:

- ISDN 2B1Q interface meets all Layer 1 requirements as specified in ANSI T1.601-1992.
- Transports ISDN Basic Rate 2B+D information over T1 facilities in the 3-DS0 format per TR-NWT-000397.
- 18 kft nominal range on mixed gauge wire (42 dB @ 40 kHz loop loss, 1300 Ω DC resistance).
- Respond to all Layer 1 maintenance functions.
- Performance monitoring of the Layer 1 facility as specified in TR-NWT-000397.

- Distinctive metallic DC test signature to identify either line unit LT or line unit NT mode of operation.
- B1 and B2 addressability at the faceplate for a local loopback, the NT1, and up to six devices in the network-to-customer direction.
- DS0 logic level transmit and receive data access through 91441 test adapter access jacks.
- Faceplate LEDs indicate operational and test status.
- Responds to OCU and CSU loopbacks in Leased modes.

Additional features to the L4 include:

- Provides repeater power of 43 mA at -28 to -120 VDC.

Each list of the 9004 U-BR1TE II has two interfaces. The loop-side interface is an ISDN U-interface that transmits and receives data simultaneous, full-duplex over a standard 2-wire and unloaded loop for a distance up to 18 kft of mixed gauge wire. Either 9004 U-BR1TE II list can be configured to connect to an ISDN switch (Adjacent-to-Switch), the customer NT1 (Adjacent-to-Customer), another U-BR1TE (Tandem Mode), or Adjacent to an ADTRAN U-RPM/U-repeater. See Figure 2 for circuit location description. The carrier side interface provides mapping of up to 2B+D and DSL

overhead to three DS0s of the 1.544 Mbps T1 stream. Indicators for the loop and carrier synchronization status are located on the faceplate. See Table A for a description of each indicator. Connection to the U-interface is made to Tip/Ring of the physical shelf slot position of the U-BR1TE.

## 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 Warranty and Customer Service).

The 9004 U-BR1TE II plugs into a single shelf slot position of an Siemens 9004 A/B channel bank and requires no special wiring. Connection to the U-interface is made to Tip/Ring (T/R) of the physical shelf slot position when the U-BR1TE is installed. The type of the service selected can affect the adjacent shelf slots. When configured for 2B+D mode of operation, which is the most typical application, three timeslots are required. The timeslots used are the first slot position the 9004 U-BR1TE II is installed in, and the next two adjacent shelf slot position, which must be empty. In the 2B+D mode of operation, the 9004 U-BR1TE II cannot be located in slot 23 or 24. In 1B+D or 2B modes of operation, only one adjacent shelf slot position is required.

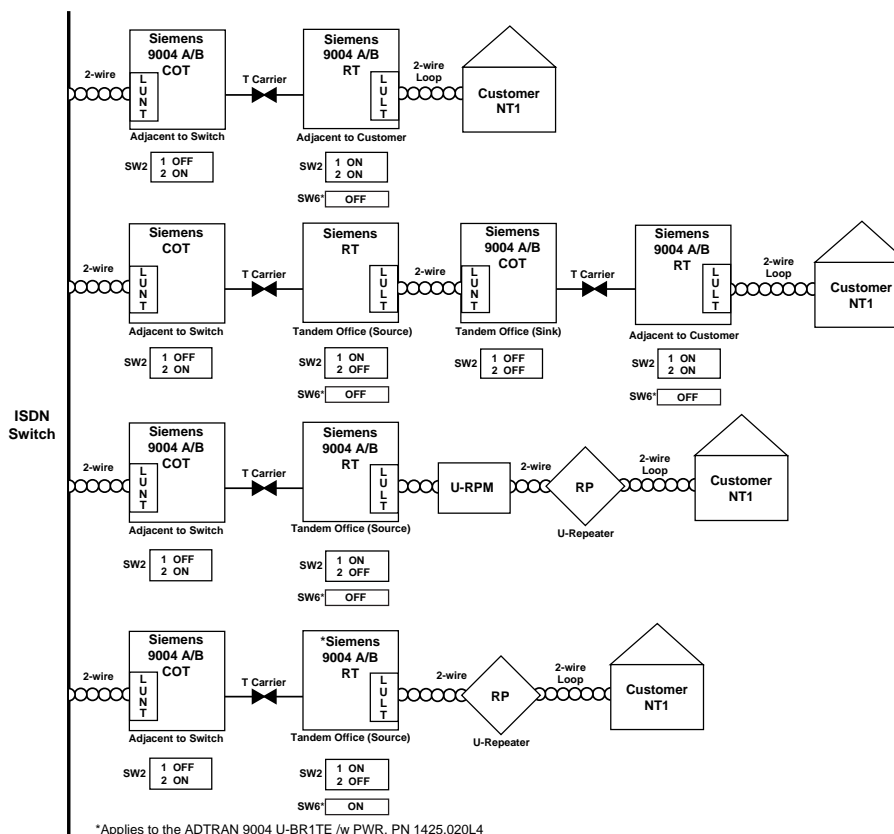


Figure 2. Position Switch Settings at Network Locations

**Table A. Faceplate LED Indicators**

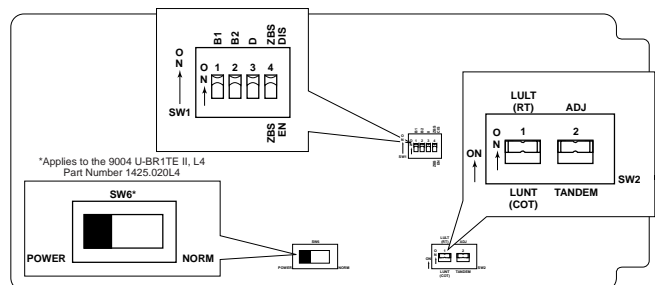
Indicator	Color	Description
Loop Sync (LP)	Red	Illuminated when U-interface is out of sync or has a loss of signal. OFF indicates loop synchronization has been established.
Loop (LP)	Yellow	Off during normal operation or test modes, indicates no Near-End Block Errors (NEBE) or Far-End Block Errors (FEBE) are detected from the U-Interface loop. Flashes yellow upon receipt of a NEBE or FEBE. During Local Performance Monitoring (see TESTING) will flash yellow when 5 or more CRCs are detected and illuminate yellow when 20 or more CRCs are detected.
Carrier Sync (CR)	Red	Illuminated when no framing pattern (TR-TSY-000397 compliant) is received. OFF indicates carrier synchronization has been established.
Carrier (CR)	Yellow	Off during normal operation or test modes, indicates no NEBEs or FEBEs are detected from the carrier. Flashes yellow upon receipt of a NEBE or FEBE. During Local Performance Monitoring (see TESTING) will flash when 5 or more CRCs are detected and illuminate yellow when 20 or more CRCs are detected.
Activation (ACT)	Green	Illuminated when Layer 1 is established from the ISDN switch to the customer ISDN terminal equipment.
Test (TST)	Yellow	Solid yellow when a front panel test has been successfully initiated or when responding to a 2B+D loopback request. Flashes yellow once every two seconds when responding to a B1 loopback request. Flashes yellow twice every two seconds when responding to a B2 loopback request.
	Green	Solid Green when in Local Performance Monitoring or when the local test pattern gen/det is invoked.
Error (ERR)	Red	Flashes red when errors are seen by local test pattern detector.

Therefore, slot 24 cannot be used. In 1B and D modes of operation, only the physical time slot of the shelf slot position is required, and there are no restrictions.

When the 9004 U-BR1TE II is deployed in a channel bank located at the same facility as the ISDN servicing switch (Adjacent-to-Switch) or in a tandem Office configuration, the channel bank should be provisioned for external timing. External timing from a suitable composite clock must have Stratum One traceability. When deployed in a remote terminal (Adjacent-to-Customer), the timing for that channel bank may either be loop-timed (LP) or timed from an external source. Consult local provisioning documents for timing options.

### 3. CONFIGURATION

There are several switch settings on the PCB that must be configured before installing the 9004 U-BR1TE II. Figures 1 and 3 identify the location of these switches and their settings. Table B describes the settings for determining the appropriate switch positions. Figure 2 displays a typical circuit position and associated switch settings.



**Figure 3. SW1, SW2 and SW6 Labeling**

**Table B. SW1, SW2, and SW6 Option Settings**

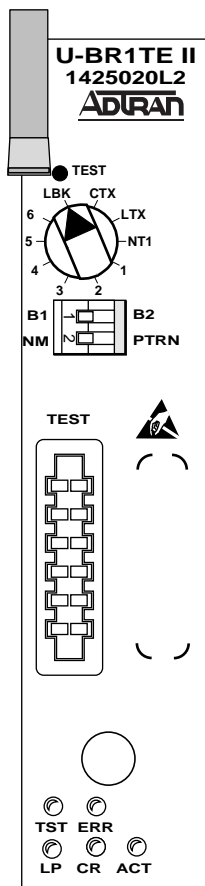
Switch	Label	Function	Description																																
SW1-1 SW1-2 SW1-3	B1 B2 D	Service Level Selection	<p>Selects the service level. The 9004 U-BR1TE II may be optioned to deliver full ISDN (2B+D) or any of the following levels of service.</p> <table border="1"> <thead> <tr> <th>Service Option</th> <th>SW1-1</th> <th>SW1-2</th> <th>SW1-3</th> </tr> </thead> <tbody> <tr> <td>2B+D</td> <td>On</td> <td>On</td> <td>On</td> </tr> <tr> <td>2B</td> <td>On</td> <td>On</td> <td>Off</td> </tr> <tr> <td>B1+D</td> <td>On</td> <td>Off</td> <td>On</td> </tr> <tr> <td>B2+D</td> <td>Off</td> <td>On</td> <td>On</td> </tr> <tr> <td>B1</td> <td>On</td> <td>Off</td> <td>Off</td> </tr> <tr> <td>B2</td> <td>Off</td> <td>On</td> <td>Off</td> </tr> <tr> <td>D</td> <td>Off</td> <td>Off</td> <td>On</td> </tr> </tbody> </table>	Service Option	SW1-1	SW1-2	SW1-3	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
Service Option	SW1-1	SW1-2	SW1-3																																
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																																
SW1-4		Zero Byte Substitution	The ZBS option must be set the same for the COT and RT.																																
On	ZBS DIS	Disables ZBS	SW1-4 should be set toward “ZBS EN” for AMI-provisioned carriers. The switch setting is optional for B8ZS-provisioned carriers. Consult local provisioning guidelines.																																
Off	ZBS EN	Enables ZBS																																	
SW2-1		Termination Mode	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.																																
On	LULT (RT)	LULT Mode (RT typical)																																	
Off	LUNT (COT)	LUNT Mode (COT typical)																																	
SW2-2		<i>Function dependent upon SW2-1 setting in non-powering configuration. Function is not applicable in powering configuration (SW6 to Power).</i>																																	
On	ADJ	<b>LUNT Mode (SW2-1 On)</b> DC sealing current provided	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 Source configuration, sealing current is not required, and should be disabled (SW2-2 Off ).																																
Off	TANDEM	DC sealing current <b>not</b> provided																																	
On	ADJ	<b>LUNT Mode (SW2-1 Off)</b> Periodic wake-up tone <b>not</b> provided	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 Sink configuration, or when adjacent to a device requiring wake-up tones, such as a Newbridge® switch.																																
Off	TANDEM	Periodic wake-up tone provided																																	
SW6*	NORM	Normal	No powering provided toward the customer U-interface.																																
	POWER	Powering provided toward the customer U-Interface.	Automatically determines which of the following modes of operation is appropriate: <ul style="list-style-type: none"> <li>• Constant 43mA to power an ADTRAN ISDN U-Repeater II or U-Repeater III.</li> </ul>																																

Note: Power option should only be used in the LULT(RT) configuration

\*Applies to the 9004 U-BR1TE II w/PWR, P/N 1425.020L4

#### 4. TESTING

The 9004 U-BR1TE II responds to the B1, B2 and 2B+D loopbacks as specified in TR-NWT-000397. This allows an upstream network element, such as the ISDN switch, U-BR1TE, or U-interface testers to initiate industry standard EOC loopbacks. The faceplate can aid in circuit turn-up and, in case of equipment malfunction, sectionalize the network fault. For local test access, a DS0 logic tester (equivalent to a TPI 108/109) can be used along with the ten position Address Select Knob, TEST pushbutton, and B1/B2 switches to perform local and downstream loopbacks. See Figures 1 and 4 for location identification. In addition, non-intrusive local performance monitoring information is available through the faceplate LEDs. The faceplate LEDs provide the U-BR1TE operational and test status indications.



**Figure 4. 9004 U-BR1TE II Faceplate**

Loopbacks in the network-to-customer direction can be initiated from the faceplate of the 9004 U-BR1TE II. Faceplate initiated loopbacks are unobtrusive to unused channels. Loopback on a single B channel will not interrupt the other channels. The 2B+D loopback is service affecting for the customer.

Faceplate indicators display the various conditions occurring with respect to the 9004 U-BR1TE II. Table A lists the faceplate indicators and their error messages.

The ten position rotary Address Select Knob (SW3) determines which downstream network element is to be looped. See Figure 1 for switch location and Table C for setting descriptions.

**Table C. Rotary Switch Options**

Display	Interpretation
AD1	Address #1, address of this unit
AD2	Address #2, the next downstream unit away
AD3	Address #3, the second unit downstream
AD4	Address #4, the third unit downstream
AD5	Address #5, the fourth unit downstream
AD6	Address #6, the fifth unit downstream
LPBK	Loopback, forces this unit to loopback the selected B1 or B2 channel. Loopbacks occur in both the customer and network directions.
CRTX	Carrier transmit, in the carrier direction
LPTX	Loop transmit, in the loop direction
NT1	NT1, address of the NT1

Selecting the B1/B2 DIP switch (SW4-1) sets the bearer channel. The NM/PTRN switch (SW4-2) selects between normal and internal 2047 pattern generator local test. The Test pushbutton (SW5) activates and deactivates the test. See Figures 1 and 4 for switch locations.

The following describes local test access testing for local or remote loopbacks.

1. Configure the DS0 tester for near logic and connect the Rx/Tx cables to the 91441 test adapter Bantam jack. Connect the clock cord between the DS0 tester and the 91441 test adapter. Finally, insert the 91441 paddle jack test interface into the U-BR1TE faceplate jack.
2. Using the ten position rotary Address Select Knob (SW3), select the desired address of the downstream unit to be tested. See Table C for address information.
3. Select the appropriate bearer channel using the B1/B2 DIP switch (SW4-1).
4. To activate the loopback test, press the TEST pushbutton (SW5).

5. Upon completion of the test, select another address using the ten position rotary switch, or another bearer channel (SW4-1).
6. Upon completion of all testing, press the TEST pushbutton (SW5) and remove the 91441 test adapter access jack.

Performance Monitoring of the local T1 carrier system and 2-wire U-interface of 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:

1. Ensure the NORM/PTRN DIP switch is in the NORM position, and the paddle jack is NOT installed in the faceplate TX bantam jack.
2. Select ADR1 using the ten-position rotary switch.
3. Depress the recessed TEST push-button to initiate the test. The TEST LED will illuminate GREEN.
4. The total number of Near End Block Errors (NEBE) received are simultaneously displayed as crc errors with the LP and CR CRC status LEDs. (See Table D).
5. To exit Local Performance monitoring, depress the TEST button for two seconds or longer. Upon deactivation of the test, the TEST LED will go out.

For leased mode applications, the D channel is typically disabled on the 9004 U-BR1TE II. 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 9004 U-BR1TE II responds to independent network-issued OCU and CSU latching loopback sequences for B1 and B2, when configured as Adjacent-to-Customer.

Enabling OCU latching loopback sequence:

1. Minimum of 35 transition in progress (TIP) bytes (\*0111010).
2. Minimum of 35 OCU 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.

If the 9004 U-BR1TE II detects a CSU latching loopback sequence in either B1 or B2 service and the U-interface is in sync, the 9004 U-BR1TE II will issue the corresponding *eoc* loopback request to the NT1. If the U-interface is not in sync, the 9004 U-BR1TE II sends *abnormal station* (\*0011110) in both services of B1 and B2.

Enabling CSU latching loopback sequence:

1. Minimum of 35 TIP bytes.
2. Minimum of 35 CSU LSC bytes (\*0110001).
3. Minimum of 100 LBE bytes.
4. Minimum of 32 FEV bytes.

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

Disabling 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 Adjacent to Customer circuit position only. ADR2 would be used to test an ADTRAN U-Repeater deployed from the 9004 U-BR1TE II.

## 5. SPECIFICATIONS

Refer to Table D for product specifications.

## 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..... (205) 963-8722**

### Repair and Return Address

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

**Table D. Specifications**

**Input/Output Signal**

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Line	2 wire
Operating Mode	Full Duplex
Data Rate	160 kbps; 144 kbps available to customer
Signal Format	2B1Q
Line Loss	42db @ 20kHz 1300 DC

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**Power**

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	<b>L2</b>			<b>L4*</b>		
Voltage	-48V(Talk Bat.)	+5V	+12V	-48V(Sig. Bat.)	+5V	+12V
Current	7.5mA	75mA	2mA	105mA	75mA	2mA
Power	0.8W max			1.75W max		

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**Sealing Current**

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Constant	6-8mA constant
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**Repeater Powering Current\***

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Constant	43mA constant
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**Dimensions**

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Height	4.75 in (14.8 cm).
Width	1.10 in (24.0 cm)
Depth	11.4 in (o.15 cm)
Weight	8.0 oz (226.8 g)
Mounting	Mounts in a Siemens 9004 A/B channel bank

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**Operating Environment**

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	<b>Operating</b>	<b>Storage</b>
Temperature	0° to 50° C (32° to 131° F)	-40° to 85° C (-40° to 185° F)
Humidity	To 95%, non-condensing	

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\*Applies to the ADTRAN 9004 U-BR1TE II w/PWR, P/N 1425.020L4