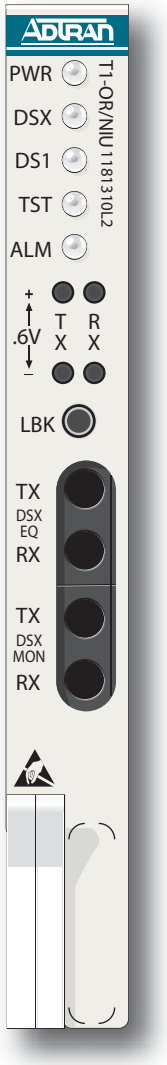


ADTRAN®

Total Access 3000/3010 T1-OR/NIU Installation and Maintenance Practice

Document Number: 61181310L2-5D
CLEI: M3CUTYLB_ _
November 2008

Trademarks

Any brand names and product names included in this document are trademarks, registered trademarks, or trade names of their respective holders.

To the Holder of the Document

The contents of this document are current as of the date of publication. ADTRAN® reserves the right to change the contents without prior notice.

In no event will ADTRAN be liable for any special, incidental, or consequential damages or for commercial losses even if ADTRAN has been advised thereof as a result of issue of this document.

901 Explorer Boulevard
P.O. Box 140000
Huntsville, AL 35814-4000
(256) 963-8000

Revision History

Revision	Date	Description
A	April 2002	Initial release
B	August 2004	Revised to expand information on the Network Service options.
C	August 2008	Revised to add a Connections section, expand descriptions of Provisioning options, and change the CLEI code.
D	November 2008	Revised to add the input voltage to the Specifications section and to correct illustrations.

Conventions

The following typographical conventions are used in this document:

This font indicates a cross-reference link.

This font indicates screen menus, fields, and parameters.

THIS FONT indicates keyboard keys (ENTER, ESC, ALT). Keys that are to be pressed simultaneously are shown with a plus sign (ALT+X indicates that the ALT key and X key should be pressed at the same time).

This font indicates references to other documentation and is also used for emphasis.

`This font` indicates on-screen messages and prompts.

`This font` indicates text to be typed exactly as shown.

This font indicates silk-screen labels or other system label items.

This font is used for strong emphasis.

NOTE

Notes inform the user of additional, but essential, information or features.

CAUTION

Cautions inform the user of potential damage, malfunction, or disruption to equipment, software, or environment.

WARNING

Warnings inform the user of potential bodily pain, injury, or death.

Training

ADTRAN offers training courses on our products. These courses include overviews on product features and functions while covering applications of the ADTRAN product lines.

ADTRAN provides a variety of training options, including customized training and courses taught at our facilities or at customer sites.

For inquiries concerning training, contact ADTRAN:

Training Phone: 800-615-1176, ext. 6303

Training Fax: 256-963-6217

Training Email: training@adtran.com

Contents

Figures

Tables

Total Access 3000/3010 T1-OR/NIU

INTRODUCTION

This is an installation and maintenance practice for the ADTRAN Total Access® 3000/3010 T1 Office Repeater/Network Interface Unit (T1-OR/NIU). Figure 1 illustrates the T1-OR/NIU (P/N 1181310L2) front panel. This device provides office repeater functionality in a single-slot interface module.

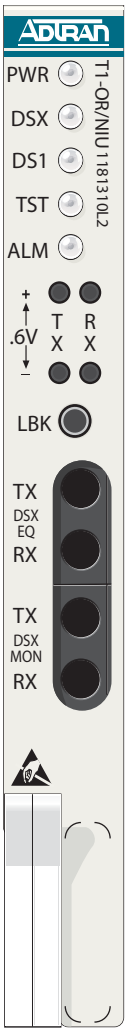


Figure 1. Total Access 3000/3010 T1-OR/NIU

Description

The T1-OR/NIU enhances existing T1 repeater spans. The T1-OR/NIU provides trouble-shooting capabilities through either locally or remotely-programmed options and loopbacks.

The T1-OR/NIU receive-transmission-path provides a long-haul regenerator, followed by a provisionable DSX pre-equalizer, and its transmit path provides a short-haul regenerator followed by a provisionable transmit line build-out. The T1-OR/NIU is equipped with a DSX-level interface to the equipment side and provides independent monitoring jacks at DSX and T1 sides. In addition, the T1-OR/NIU provides both DSX and multiplexer (MUX) position connections with appropriate switching logic.

Features

The basic features of the Total Access 3000/3010 T1-OR/NIU include the following:

- Screen provisioning and troubleshooting via menus through the System Controller Unit (SCU)
- ESF and SF compatibility
- Provisionable DS1 Line Build Out (0 to –22.5 dB)
- Provisionable DSX–1 Line Build Out (0 to 655 feet in 133 foot increments)
- AMI and B8ZS compatible
- Provisionable span power
- Addressable loopbacks
- DSX monitor jacks
- Front panel Bantam jacks and span power test points
- Seven day storage and real-time performance monitoring information

Compliance

Table 1 shows the compliance codes for the T1-OR/NIU. The T1-OR/NIU is NRTL listed to the applicable UL standards. Install the T1-OR/NIU in a restricted access location and in a type “B” or “E” enclosure only.

Table 1. Compliance Codes

Configuration Code	Input	Output
Power Code (PC)	F	X
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.

INSTALLATION

After unpacking the T1-OR/NIU, inspect it for damage. If damage exists, file a claim with the carrier, then contact ADTRAN Customer Service. Refer to "Appendix B, Warranty" for further information. If possible, keep the original shipping container for returning the T1-OR/NIU for repair or for verification of shipping damage.

Refer to "Connections" on page 8 prior to card insertion. The T1-OR/NIU plugs directly into the Total Access 3000 chassis. No installation wiring is required. This unit can be either DSX or MUX fed. If the unit is MUX fed, a BNC connector (P/N 1181004L1) is required for the MUX module to interface with the network.

Shipping Contents

The contents include the following items:

- Total Access 3000/3010 T1-OR/NIU
- Total Access 3000/3010 T1-OR/NIU *Job Aid* (document number 61181310L2-22C)

CAUTION

CAUTION!

SUBJECT TO ELECTROSTATIC DAMAGE OR DECREASE IN RELIABILITY.

HANDLING PRECAUTIONS REQUIRED.

Electrical Static Discharge (ESD) can damage Electronic modules. When handling modules, wear an antistatic discharge wrist strap to prevent damage to electronic components. Place modules in antistatic packing material when transporting or storing. When working on modules, always place them on an approved antistatic mat that is electrically grounded.

Instructions for Installing the Module

To install the Total Access 3000/3010 T1-OR/NIU, perform the following steps:

1. Set the Span Power option to either T1-OR or NIU. Two board-mounted jumper straps (P4) select this span power option.
   a. Set Span Power option to T1-OR. Move P4 straps to posts 1-3 and 2-4 (default setting).

      With the straps positioned in the 1-3 and 2-4 configuration (factory default setting), span power is software controlled.

   b. Set Span Power option to NIU. Move the straps to the 3-5 and 4-6 position.

      In positions 3-5 and 4-6, span power is always disabled and software selection is ignored regardless of screen indication.

> **CAUTION**
>
> If the card is provisioned as a T1-NIU, change jumper P4 to 4-6 and 3-5. Failure to change the strap prevents the span power from looping back properly through the unit, and the line powered devices do not receive power.

2. If present, remove the Access Module Blank (P/N 1191953L1) from the appropriate access module slot of the Total Access 3000/3010 chassis.
3. Pull the ejector latch, located on the lower left-hand side of the T1-OR/NIU front panel, from its closed position.
4. Hold the T1-OR/NIU by the front panel while supporting the bottom edge of the module with the ejector latch opened to engage the chassis edge.
5. Align the module edges to fit in the lower and upper guide grooves for the access module slot.
6. Slide the module into the access module slot. Apply simultaneous thumb pressure at the top (above the **PWR** LED) and at the bottom (below the electrostatic caution symbol) of the module. This ensures that the module is firmly seated against the backplane of the chassis.
7. Secure the T1-OR/NIU in place by pushing in on the ejector latch.

Once properly installed, the T1-OR/NIU performs a series of self-tests. Once the self-tests are complete, the front panel LEDs indicate the true status of the hardware.

Front Panel LEDs

The T1-OR/NIU provides front panel LEDs to display status information. Table 2 shows the LEDs and status descriptions.

Table 2. Front Panel LEDs

Label	Status	Description
PWR	○ Off	No power to module
	● Green	Module in service
	✹ Green Flashing	Module in service and being accessed from SCU front panel craft interface port
	● Yellow	Module is out of service
	✹ Yellow Flashing	Module is out of service and being accessed from SCU front panel craft interface port
DSX	○ Off	DSX interface loss of synchronization
	● Green	Normal
DS1	○ Off	DS1 interface loss of synchronization
	● Green	Normal
TST	○ Off	Loopback not active
	● Yellow	Loopback active
	✹ Yellow Flashing	Loopback arming
ALM	○ Off	No alarm condition detected
	● Red	Local alarm condition detected

FRONT PANEL OPERATION

The T1-OR/NIU provides the following front panel operational controls:

- **LBK** pushbutton

  XMT and **RCV** span power test points
- **DSX TX** and **RX** monitor (**MON**) jacks
- **DSX TX** and **RX** equalizer (**EQ**) jacks

LBK Pushbutton

The **LBK** push button initiates a loopback to the network and sends an AIS signal (all ones) toward the customer end.

LBK Operation

- To *activate* a loopback, depress the **LBK** pushbutton for two seconds. If successful, the **TST** LED illuminates. Release the pushbutton.
- To *release* a loopback, depress the **LBK** pushbutton a second time.

XMT and RCV Span Power Test Points

The test points provide front-panel access for measuring the 60 mA-current provided to the DS1 facility when the T1-OR module is in the T1-OR mode.

Test Point Operation

Table 3 provides the VOM connections for both span current and voltage measurements.

Table 3. Span Current/Voltage Test Points

When Measured Between Points	Measurement Taken
+TX to **–TX**	Measures the *transmit* span current A reading of 0.6 volts indicates a 60 mA span current in the transmit path
+RX to **–RX**	Measures the *receive* span current A reading of 0.6 volts indicates a 60 mA span current in the receive path
–TX to **+RX**	Measures the actual span *voltage* being supplied to the facility. This is the span voltage across the facility T/R pairs

Front Panel Bantam Jacks

Monitoring of DSX signal characteristics can be performed through two sets of front panel bantam jacks. Table 4 describes the functions of the jacks and test points.

Bantam EQ and MON test jacks provide two monitoring functions depending on the mode of the module:

- Office Repeater (OR)
- Network Interface Unit (NIU)

NOTE

EQ Jacks do not function in NIU mode if the customer equipment is connected to the DSX interface.

CAUTION

EQ testing is *intrusive*. Do not use EQ bantam jacks if there is equipment attached to the DSX connection on the Total Access 3000 backplane.

Table 4. Bantam Jack Test Directions

Function	Description
MON (non-intrusive)	DSX MON Office Repeater Mode: • TX to customer • RX from customer
EQ (intrusive)	DSX EQ T1-OR mode: • TX to customer or network* • RX from customer or network*

* Direction of the EQ Jacks depends upon the EQ Jack direction option on the Loopback and Test screen as well as the network source provisioning option. Refer to "Loopback and Test" on page 21 for further information.

CONNECTIONS

The cabling for the T1-OR/NIU is significantly different for each mode of operation:

- "Office Repeater Mode" on page 8
- "Network Interface Unit Mode" on page 9

Office Repeater Mode

Figure 2 illustrates the Office Repeater mode.

Figure 3 illustrates the backplane cabling for the Office Repeater mode.

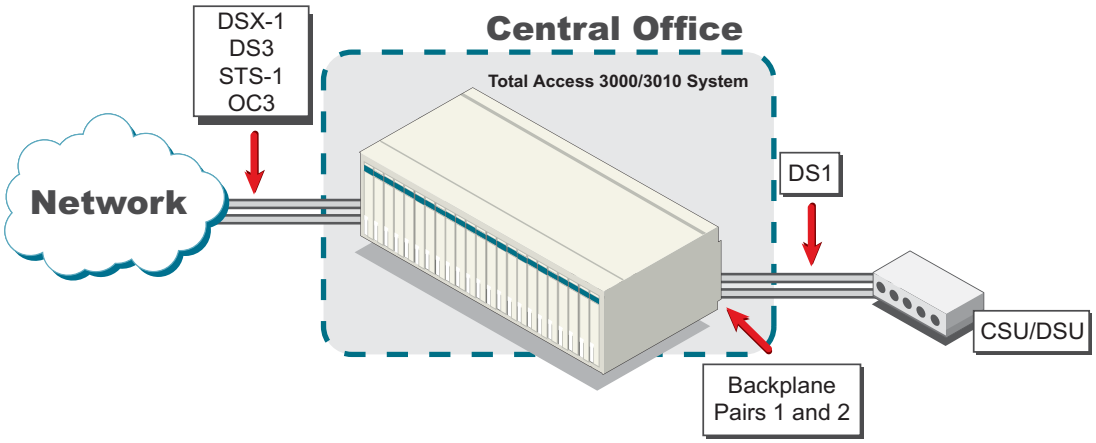
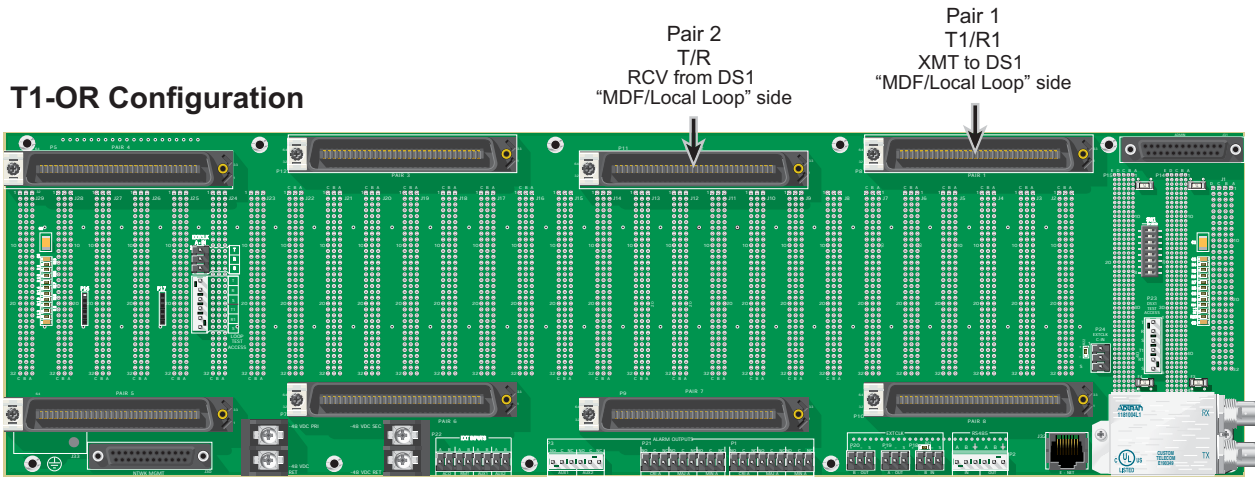


Figure 2. Office Repeater Mode Orientation



NOTE:
When the T1-OR/NIU is provisioned for T1-OR mode, the DSX-1 signal is active via these connections.

Figure 3. Office Repeater Mode Backplane Cabling

Network Interface Unit Mode

Figure 4 illustrates the Network Interface Unit mode.

Figure 5 illustrates the backplane cabling for the Network Interface Unit mode.

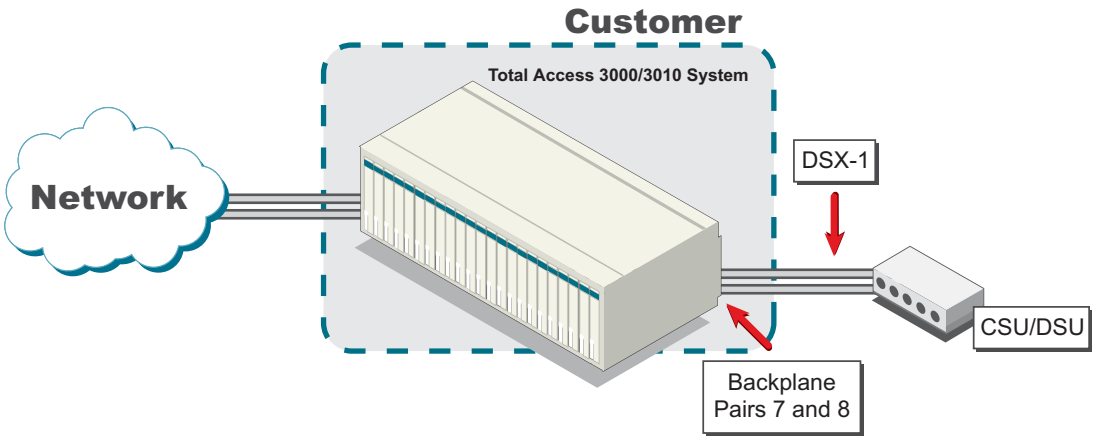


Figure 4. Network Interface Unit Orientation

NIU Configuration

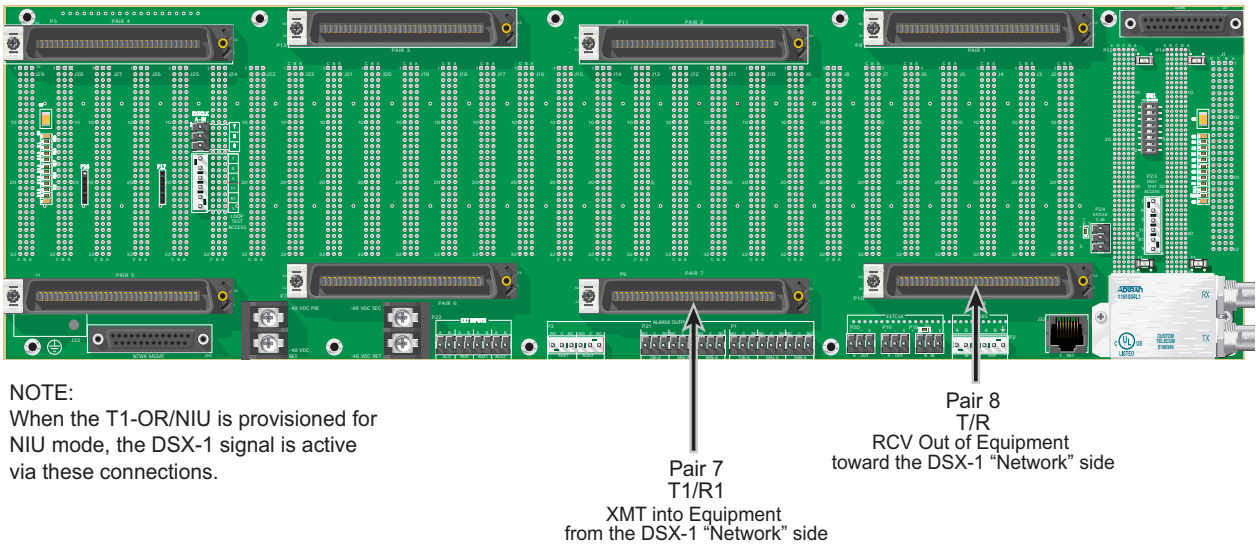


Figure 5. Network Interface Unit Mode Backplane Cabling

Total Access 3000 Chassis Amphenol Connectors

The Total Access 3000 shelf delivers DSX-1 from the network to the T1-OR/NIU through connectors on the backplane labeled **Pair 7** and **Pair 8**. The DS1 signal is provided through the backplane connectors labeled **Pair 1** and **Pair 2**.

Pins 1 and 33 of the connectors Pair 7 and Pair 8 are the DSX connections for the T1-OR/NIU in slot 1. Pins 2 and 34 of these connectors are associated with slot 2. Pins 3 and 35 are associated with slot 3, and so forth, up to pins 28 and 60 for slot 28. Table 5 provides the pin numbers of the Total Access 3000 backplane Amphenol connectors.

Table 5. Total Access 3000/3010 Backplane Connector Pinout

Slot	Total Access 3000/3010 Loop Pair 1 and Pair 2 (DS1 Side)	DSX-1 Pair 7 and Pair 8 (DSX-1 Side)
1	1/33	1/33
2	2/34	2/34
3	3/35	3/35
4	4/36	4/36
5	5/37	5/37
6	6/38	6/38
7	7/39	7/39
8	8/40	8/40
9	9/41	9/41
10	10/42	10/42
11	11/43	11/43
12	12/44	12/44
13	13/45	13/45
14	14/46	14/46
15	15/47	15/47
16	16/48	16/48
17	17/49	17/49
18	18/50	18/50
19	19/51	19/51
20	20/52	20/52
21	21/53	21/53
22	22/54	22/54
23	23/55	23/55

Table 5. Total Access 3000/3010 Backplane Connector Pinout (Continued)

Slot	Total Access 3000/3010 Loop Pair 1 and Pair 2 (DS1 Side)	DSX-1 Pair 7 and Pair 8 (DSX-1 Side)
24	24/56	24/56
25	25/57	25/57
26	26/58	26/58
27	27/59	27/59
28	28/60	28/60

SCU CONTROL PORT OPERATION

The Total Access 3000/3010 System Controller Unit provides a front panel-mounted DB-9 connector that supplies an RS-232 interface for connection to a controlling terminal. The pinout of the DB-9 is illustrated in Figure 6.

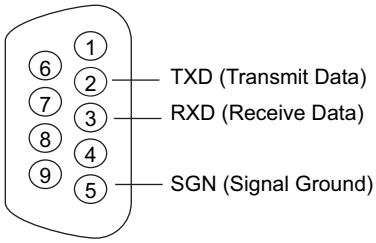


Figure 6. RS-232 (DB-9) Pin Assignments

The terminal interface operates at a default data rate of 9.6 kbps (from 9.6 to 115.2 kbps is possible via Total Access 3000/3010 SCU provisioning options). The asynchronous data format is fixed at 8 data bits, no parity, and 1 stop bit. Disable the line wrap feature of emulation programs.

NOTE

If you are using a personal computer (PC) with terminal emulation capability, disable any power saving programs. Otherwise, communication between the PC and the HDSL4 unit may be disrupted, resulting in misplaced characters or screen time outs.

Menu Structure

The menu structure for the T1-OR/NIU is a layered menu. Each menu level consists of submenus, menu items, or both.

- Submenus are elements that move the display down to the next menu level.
- Menu items are elements that facilitate changes to the current T1-OR/NIU settings.

The T1-OR/NIU supports two different types of menu items: read-only and read-write.

- A read-only menu item displays information that cannot be changed, such as the status of the T1-OR/NIU.
- A read-write menu item displays information that when selected can be changed.

Submenus and menu items are labeled with a number. To view the submenu or menu item, perform the following steps:

1. Select the appropriate number for the desired submenu or menu item.
2. Press ENTER.

The screen displays the appropriate information for the selected option. If additional options are available, a submenu lists the available options.

Login Screen

Accessing the T1-OR/NIU circuit information via the Total Access 3000 SCU control port requires the user to logon by entering a password. See Figure 7.

- Default account name: ADMIN
- Default password: PASSWORD

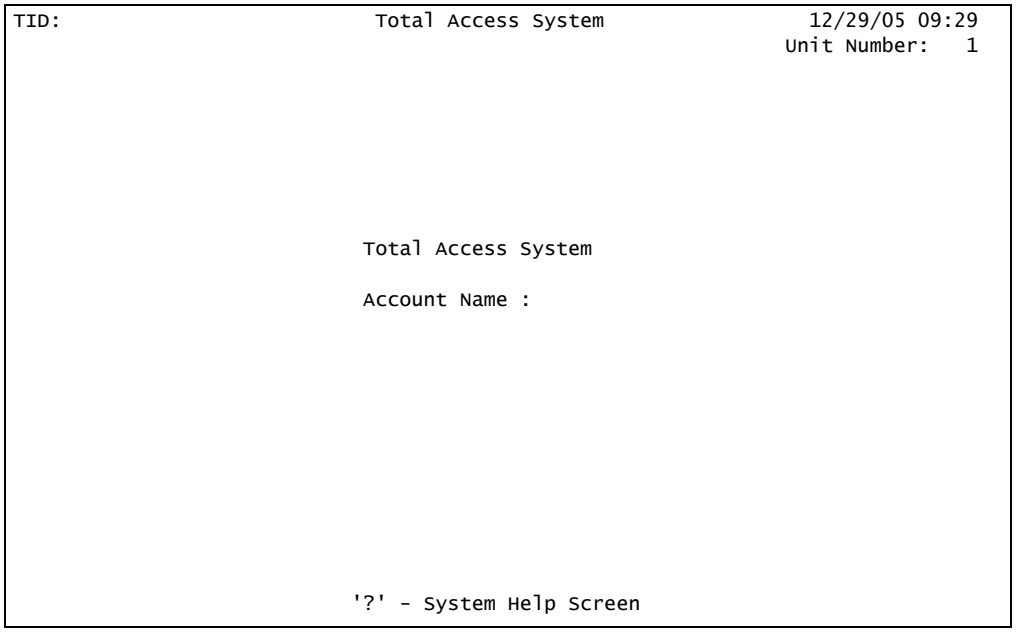


Figure 7. Logon Screen

Total Access Main Menu

After successful logon, the Total Access Main Menu (Figure 8) displays. Select the Access Modules option from this menu.

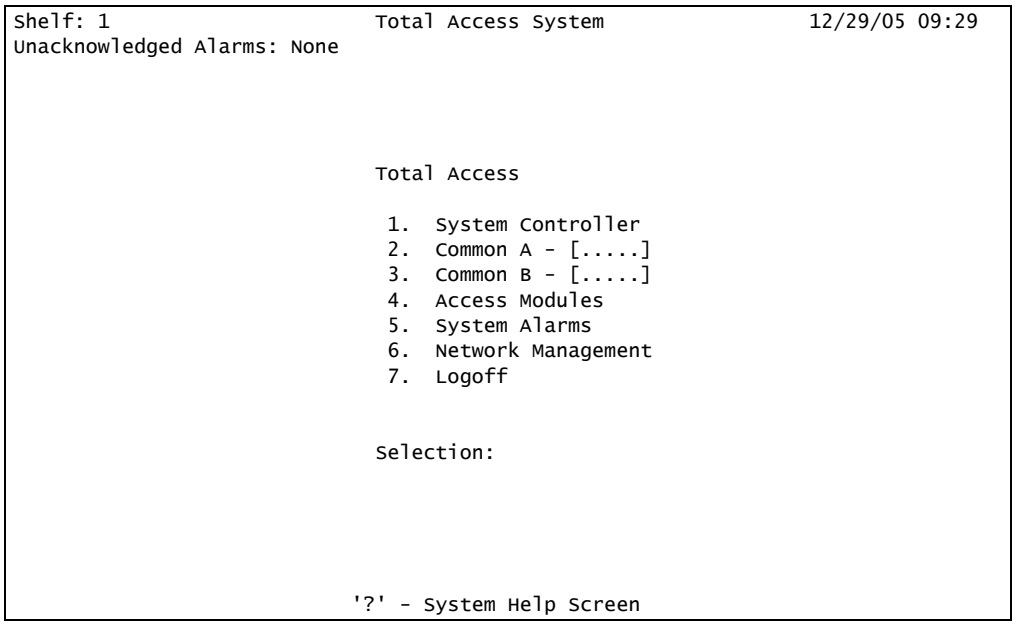


Figure 8. Total Access Main Menu

Access Module Menus

The Access Module Menus screen (Figure 9) displays the access modules that occupy the Total Access 3000 shelf. Select the corresponding channel slot number for the desired T1-OR/NIU to display its menu options. To the right of each access module listed, the current alarm state is indicated.

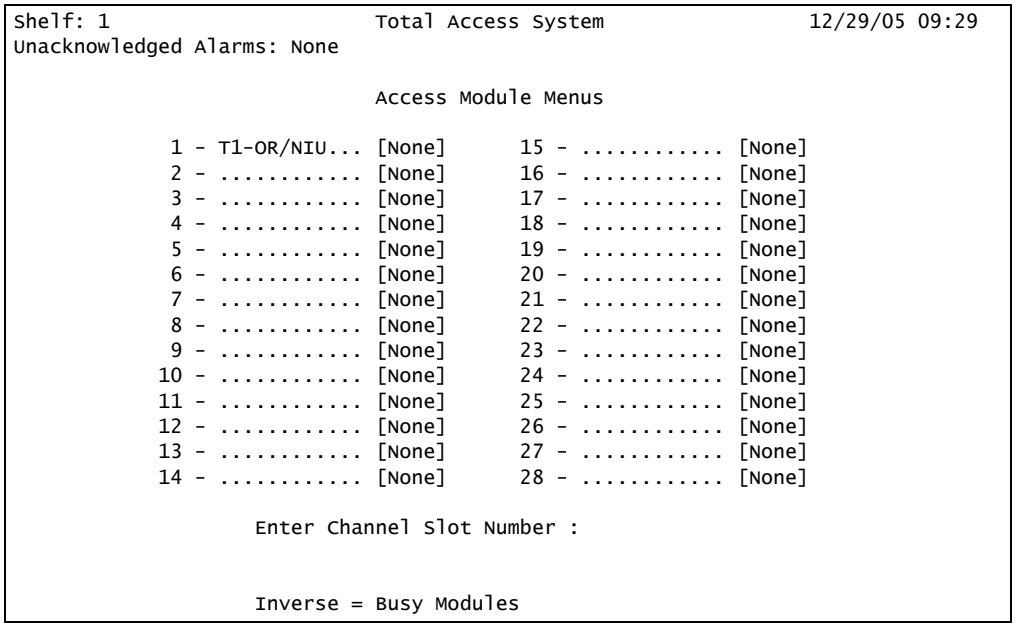


Figure 9. Access Module Menus Screen

T1 Main Menu

Following selection of the desired module, the T1 Main Menu is displayed (Figure 10).

```
Shelf: 1 Slot: 12                Total Access System              12/29/05 09:29
Unacknowledged Alarms: None
                         CIRCUIT ID:

                                    T1 Main Menu

                                   1. Configuration
                                   2. Provisioning
                                   3. Status
                                   4. Loopbacks and Test
                                   5. Performance Monitoring
                                   6. Circuit ID
                                   7. Alarm History
                                   8. Event History




                                   '?' - System Help Screen


                                    Selection:
```

Figure 10. T1 Main Menu

The T1 Main Menu consists of numbered category selections. The following list provides an index to the descriptions of each menu item.

- "Configuration" on page 16
- "Provisioning" on page 17
- "Status" on page 20
- "Loopback and Test" on page 21
- "Performance Monitoring" on page 23
- "Circuit ID" on page 25
- "Alarm History" on page 26
- "Event History" on page 26

Configuration

The Configuration screen (Figure 11) is a read only display that lists relevant device information.

```
Shelf: 1 Slot: 12              Total Access System                 12/29/05 09:29
Unacknowledged Alarms: None
                       CIRCUIT ID:


                                   ADTRAN
                             901 Explorer Boulevard
                           Huntsville, Alabama 35806-2807
--------------------- For Information or Technical Support ---------------------
      Support Hours ( Normal 7am - 7pm CST, Emergency 7 days x 24 hours )
  Phone: 800.726.8663 / 888.873.HDSL Fax: 256.963.6217 Internet: www.adtran.com
--------------------------------------------------------------------------------
                                  T1-OR/NIU
                                P/N: 1181310L2
                                S/N: 123456789
                               CLEI: M3CUTYOBAA
                               Manf: 08/29/05
```

Figure 11. Configuration Screen

Provisioning

Provisioning the module provides setup and configuration information that allows the module to conform to local network standards of operation, including framing format, transmit level line coding and network source. Network Administration maintains this information on each circuit.

Office Repeater Mode

The Provisioning menu (Figure 12) for each mode lists option categories and the current option selection for each. Enter the number for a category to advance the screen display to a new screen providing the options for that category. Enter D to restore the factory default options for the entire list.

On this menu, the Card Configuration option selects the appropriate mode for the intended application (T1-OR or NIU).

```
Shelf: 1 Slot: 12              Total Access System              12/29/05 09:29
Unacknowledged Alarms: None
                       CIRCUIT ID:
                                  Provisioning

                          1. DSX-1 Line Buildout    = 0-133 Feet
                          2. DSX-1/DS1 Line Code    = B8ZS
                          3. DSX-1/DS1 Framing      = ESF
                          4. Loopback Timeout       = 120 Min
                          5. DS1 TX Level           = 0 dB
                          6. Network Source         = DSX/DS1
                          7. Service State          = OOS Unassigned
                          8. Span Power             = Disabled
                          9. External Alarms        = Disabled
                         10. Card Configuration     = T1-OR
                         11. AIS                    = Disabled

                          D. Restore Factory Defaults


                          '?' - System Help Screen
                                Selection:
```

Figure 12. Provisioning Menu-OR Mode

Table 6 provides descriptions and defaults for the Provisioning menu options.

CAUTION

Do not make provisioning option changes when the Service State is set to In Service. Make option changes in an Out-of-Service state only.

Network Interface Unit Mode

The Provisioning menu for the NIU mode (Figure 13) is identical to the OR mode with the exception of Span Power. There is no span power in the NIU configuration. See the note on the screen.

```
Shelf: 1 Slot: 12              Total Access System              12/29/05 09:29
Unacknowledged Alarms: None
                       CIRCUIT ID:
                                    Provisioning

                          1. DSX-1 Line Buildout    = 0-133 Feet
                          2. DSX-1/DS1 Line Code    = B8ZS
                          3. DSX-1/DS1 Framing      = ESF
                          4. Loopback Timeout       = 120 Min
                          5. DS1 TX Level           = 0 dB
                          6. Network Source         = DSX/DS1
                          7. Service State          = OOS Unassigned
                          8. Span Power             = Disabled
                          9. External Alarms        = Disabled
                         10. Card Configuration     = T1-NIU
                         11. AIS                    = Disabled
              Span Power option unavailable in T1-NIU configuration.
                       Switch to T1-OR configuration first.

                          D. Restore Factory Defaults

                          '?' - System Help Screen
                                Selection:
```

Figure 13. Provisioning Menu-NIU Mode

NOTE

If P4 option straps are in the "span power disabled" position, span power is disabled regardless of software screen indication.

Table 6 provides descriptions and defaults for the Provisioning menu options.

CAUTION

Do not make provisioning option changes when the Service State is set to In Service. Make option changes in an Out-of-Service state only.

Table 6. Provisioning Menu Options

Menu Item	Description	Default
DSX-1 Line Buildout	Conditions the output signal to provide a 0 dB output level to the DSX. Options range from 0 to 655 feet in 133-foot increments.	0 to 133 feet
Line Coding	AMI or B8ZS	B8ZS
Line Framing	SF, ESF, or unframed	ESF
Loopback Timeout	20 minutes, 60 minutes, 120 minutes, or disabled	120 minutes
DS1 TX Level	Conditions output signal buildout at: 0 dB, –7.5 dB, –15 dB, or –22.5 dB	0 dB
Network Source [1]	Selects DSX or multiplexer input/output interface: DSX/DS1 MUX A MUX B Auto MUX	DSX/DS1
Service State [2]	Selects one of three service states: In Service Out-of-Service, Unassigned Out-of-Service, Maintenance	Out-of-Service, Unassigned
Span Power	Disabled, –130 volts, ±130 volts	–130 volts
External Alarms	Disabled, Enabled	Disabled
Card Configuration	T1–OR, T1–NIU. Changes to this option can be seen on the Status screen.	T1-OR
AIS	Disabled, Enabled	Disabled

1. For Network Source settings, the following options apply:
   - DSX/DS1: The module will use the DSX-1 interface for the network source when the module is provisioned for the T1-OR mode. If the module is provisioned for the T1-NIU mode, the network source will be the DS1 interface. The MUXes will not be used, even if present.
   - MUX A: The module will use MUX A as its data source. The module will not switch to MUX B in the case of a MUX A failure. The EQ jacks can be used as a temporary test point in conjunction with the EQ jack setting on the loopback/test screen.
   - MUX B: The module will use MUX B as its data source. The module will not switch to MUX A in the case of a MUX B failure. The EQ jacks can be used as a temporary test point in conjunction with the EQ jack setting on the loopback/test screen.
   - Auto MUX: The module will default to MUX A as its data source. In the event of a MUX A failure, the module will perform a protection switch to MUX B if it is present and in service. The EQ jacks can be used as a temporary test point in conjunction with the EQ jack setting on the loopback/test screen.
2. The default service state is Out-of-Service Unassigned
   - Out-of-Service Unassigned allows the loops to train up but does not connect to the DSX or MUX interface.
   - The Out-of-Service Maintenance setting allows active connections to the DSX or MUX interface; however, no alarms will be generated.
   - The In Service setting allows full functioning connections to DSX or MUX interfaces.

Status

The Status screens change (as do the network/customer and DSX orientations) depending on whether in the OR or NIU mode.

The OR Status screen is shown in Figure 14. The NIU Status screen is shown Figure 15.

These screens display a graphic showing the network status within and on either side of the T1-OR/NIU (i.e., loopbacks or loop down indication). Also note the DSX and MUX labels on the NET side of each graphic, which is derived from the Network Source option of the Provisioning menu.

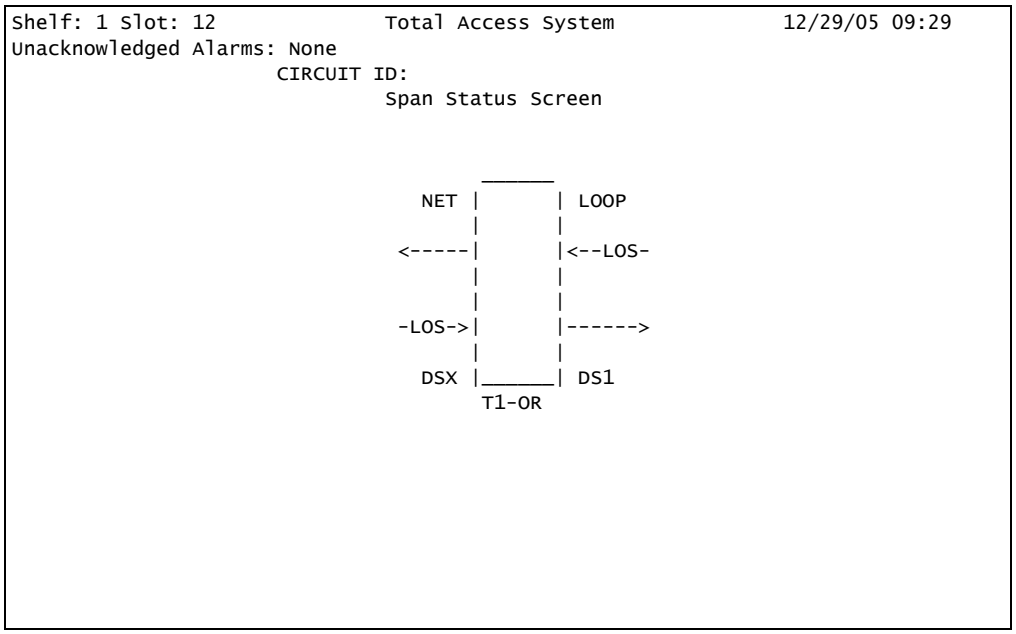


Figure 14. Status Screen-OR

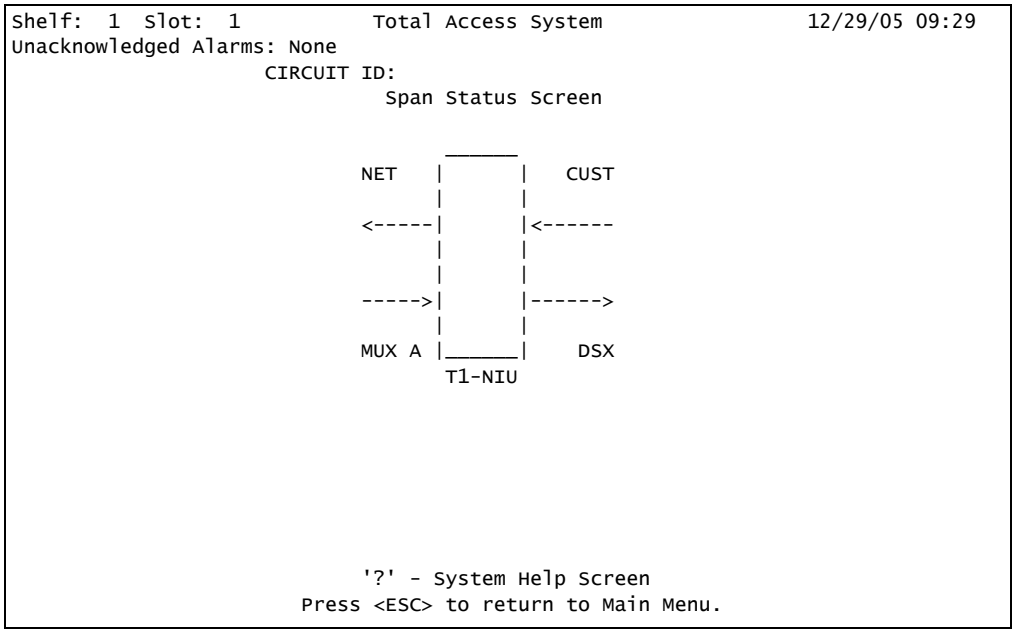


Figure 15. Status Screen-NIU

Loopback and Test

The Loopback and Test menu for each mode is shown in Figure 16 and Figure 17. When selected, the screen displays a graphic of the test or loopback path in effect. A real-time display is also available on the Status screen.

CAUTION

Loopbacks can be initiated in any service state. However, loopbacks initiated in the OOS Maintenance state are preferred to prevent service interruption. Loopbacks can be initiated in any framing mode.

```
Shelf: 1 Slot: 12              Total Access System              12/29/05 09:29
Unacknowledged Alarms: None
                       CIRCUIT ID:
                                Loopback and Test Commands

                                        _______
                                   NET |       | LOOP
                                       |       |
                                  <----|       |<-----
                                       |       |
                                       |       |
                                  ---->|       |----->
                                       |       |
                                   DSX |_______| DS1
                                        T1-OR

                          1. Run Self Tests
                          2. T1-OR Loopup To Network
                          3. T1-OR Loopup To Customer
                          4. Equipment Jack Direction:   To Customer

                                '?' - System Help Screen
                                Selection:
```

Figure 16. Loopback and Test Commands Menu-OR

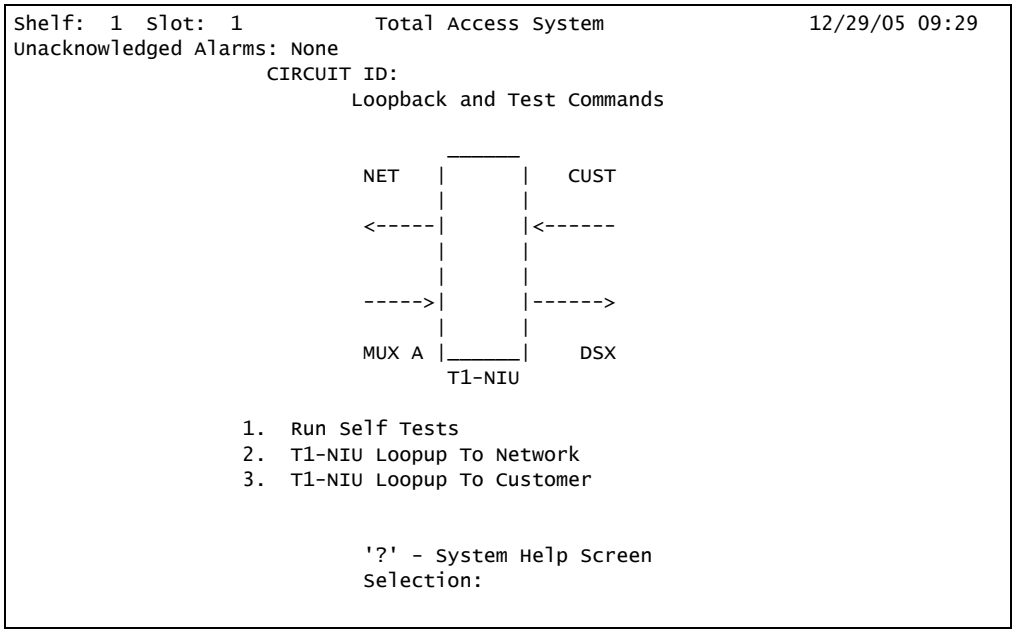


Figure 17. Loopback and Test Commands Menu-NIU Mode

NOTE

The Equipment Jack direction is dependent upon the Network Source option. Equipment Jack direction is only effective when the module network source is provisioned for MUX mode. Equipment Jack will not switch toward network if a DS1/DSX is the source.

Performance Monitoring

The Performance Monitoring screen (Figure 18) displays various error data plus a list of additional screens that are accessed by entering the category number. On-screen instructions explain the selections.

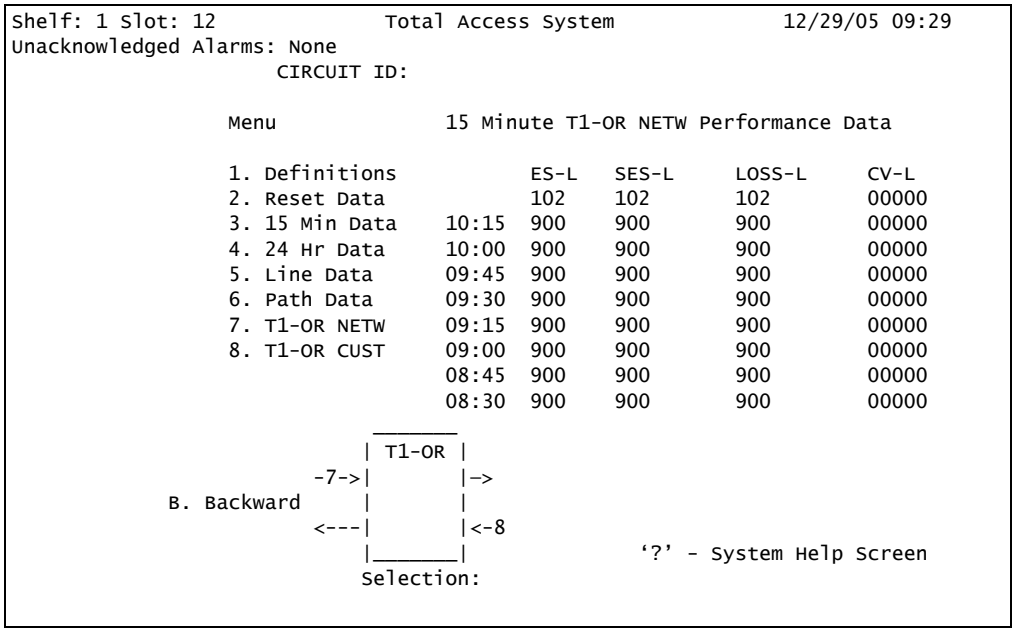


Figure 18. Performance Monitoring Menu

Performance Monitoring Functions

Performance monitoring data is collected and stored in local nonvolatile memory.

Stored Performance Characteristics

The modules collect and store the performance characteristics listed in Table 7. The data is stored in 15-minute increments for the proceeding 24 hours, and in 24-hour increments for the preceding 7 days.

Table 7. Stored Performance Statistics Descriptions

Statistic	Description
Line Statistics (-L)	
Errored Seconds (ES-L)	Count of 1-second intervals containing 1 or more BPV, EXZ, or LOS errors
Severely Errored Seconds (SES-L)	Count of 1-second intervals containing 1544 or more BPV and EXZ errors, or 1 or more LOS errors
LOS Seconds (LOSS-L)	Count of 1-second intervals containing 1 or more LOS errors
Coding Violations (CV-L)	Count the total number of BPV and EXZ errors

Table 7. Stored Performance Statistics Descriptions (Continued)

Statistic	Description	
Path Statistics (-P)		
Errored Seconds (ES-P)	SF Operation:	Count of 1-second intervals containing 1 or more frame bit (FE), SEF, or AIS errors
	ESF Operation:	Count of 1-second intervals containing 1 or more CRC, SEF, or AIDS errors
Severely Errored Seconds (SES-P)	SF Operation:	Count of 1-second intervals containing more than 7 frame bit (FE) errors, or 1 or more SEF or AIS errors
	ESF Operation:	Count of 1-second intervals containing 319 or more CRC errors, or 1 or more SEF or AIS errors
Unavailable Seconds (UAS-P)	Count of ten sequential SES errors will trigger a UAS. UAS clears after 10 sequential seconds without SES errors	
Coding Violations (CV-P)	SF Operation:	Count of frame bit errors
	ESF Operation:	Count of SCRC errors

NOTE

During a UAS condition, ES and SES statistics are inhibited.

Performance Defect Definitions

The defects described in Table 8 are used to calculate the Stored Performance Characteristics.

Table 8. Performance Defect Definitions

Defect	Descriptions
Bipolar Violation (BPV)	A BPV is the occurrence of a pulse of the same polarity as the previous pulse. If B8ZS is provisioned, BPVs associated with the B8ZS are excluded from the count.
Loss of Signal (LOS)	An LOS is defined by the detection of 175 consecutive “0’s.” When a 12.5 percent ones density is detected (4 ones/32 bits and no 15 consecutive “0’s”), the LOS status is eliminated.

Circuit ID

The Circuit ID screen (Figure 19) enables assignment of the Circuit ID, a customer-issued alphanumeric identifier that is assigned specifically to this device. The Circuit ID number targets a device for rack-shelf-slot location, features and functions.

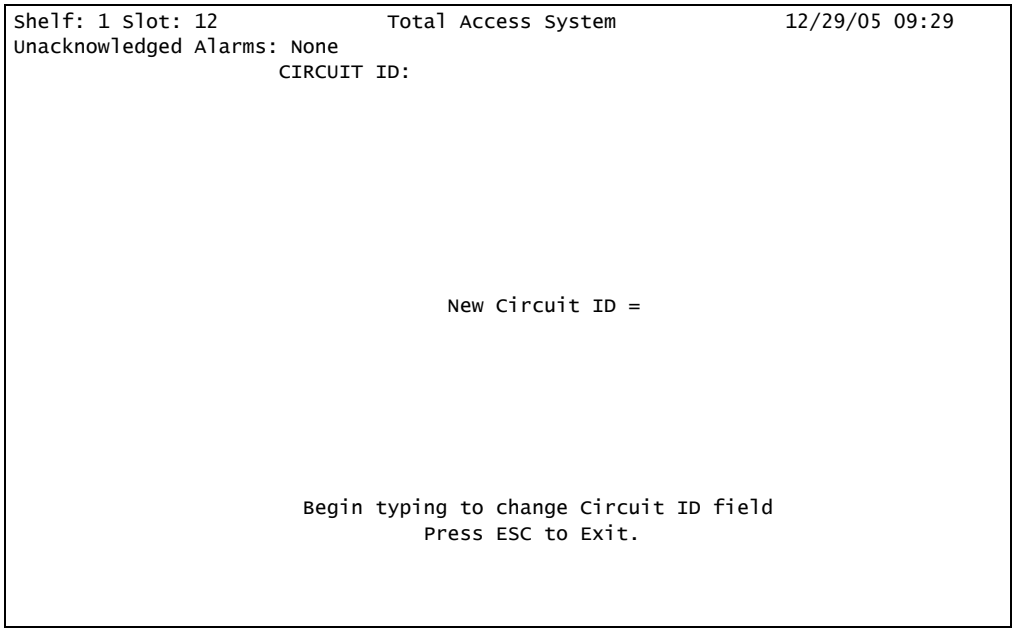


Figure 19. Circuit ID Screen

Alarm History

The Alarm History screen (Figure 20) displays both Customer-side and Network-side T1 red, yellow, and blue alarms. To clear the T1 alarms, type C and press ENTER.

```
Shelf: 1 Slot: 12              Total Access System                12/29/05 09:29
Unacknowledged Alarms: None
                     CIRCUIT ID:
T1 Alarm History
      LOCATION   ALARM        FIRST              LAST               CURRENT   COUNT
-------------------------------------------------------------------------------
      T1-OR      RED(LOS/LOF) 03/04/02 16:49:00   03/04/02 16:49:00   Alarm     001
       NETW      YELLOW(RAI)                                          OK        000
                 BLUE(AIS)                                            OK        000

      T1-OR      RED(LOS/LOF) 03/04/02 16:49:00   03/04/02 16:49:00   Alarm     001
       CUST      YELLOW(RAI)                                          OK        000
                 BLUE(AIS)                                            OK        000









-------------------------------------------------------------------------------
                                C. Clear T1 Alarms
                                '?' - System Help Screen
                                Selection:
```

Figure 20. Alarm History Screen

Event History

The Event History screen (Figure 21) shows all the events that have occurred since the last time the screen was reset. Events include the date and time for option changes, loop up requests, loop down requests. To reset the screen, press R and then ENTER.

```
Shelf: 1 Slot: 12          Total Access System              12/29/05 09:29
Unacknowledged Alarms: None
                     CIRCUIT ID:
            Num   Description of Event                          Date Time
            ------------------------------------------------------------------
            11.   T1-OR/NIU Network   Loop Down Request       03/12/02 10:00:00
            12.   T1-OR/NIU Customer  Loop Down Request       03/12/02 10:12:00
            13.   T1-OR/NIU Network   Loop Up   Request       03/12/02 10:13:00
            14.   T1-OR/NIU Network   Loop Down Request       03/12/02 10:13:00
            15.   T1-OR/NIU Network   Loop Up   Request       03/12/02 10:14:00
            16.   T1-OR/NIU Customer  Loop Up   Request       03/12/02 10:14:00









            Page Number: 2/ 2 Number of Events: 16
            ------------------------------------------------------------------
            'P' - Previous Page   'H' - Home           'R' - Reset Events
            'N' - Next Page       'E' - End
                                   '?' - System Help Screen
                                   Selection:
```

Figure 21. Event History Screen

IN-BAND LOOPBACKS

Along with the **LBK** pushbutton on the front panel, loopbacks are activated or de-activated with TL1 or in-band commands.

Activating Loopbacks

The repeater circuit can be activated from either the DSX or CPE side of the T1-OR/NIU. When activated from the DSX side, all components, including line-side transformers, are tested. When activated from the CPE side, only the active components of the repeater are tested. Loopbacks can only be active on one interface at a time using in-band codes. Loopback codes are shown in Table 9.

Code Detection

The T1-OR/NIU is capable of detecting loopback codes from either direction, network or customer. Direction determination is accomplished with the application of an arming code. By sensing the arming code for at least five seconds on one side of the T1-OR/NIU, the code direction is determined and the loopback is activated.

NOTE

All in-band codes must be detected for more than five seconds.

Table 9. Loopback Codes

Code	Description
In-band Loopback Arming/Disarming Codes	Arming: 11000 Disarming: 11100
Loopback Activation Code: 1101 0011 1101 011	Acknowledgement is 250 bit errors (bit errors are inserted after initial 6 seconds and in 20 second intervals thereafter)
Loop Down Code: 1001 0011 1001 0011 (Unit returns to the Armed State.)	Arming Timeout: 120 minutes Loopback Timeout: Provisionable for 30 minutes (default), 120 minutes, or No

Note: To be acted on, these codes must be detected for more than five seconds.

MAINTENANCE

The T1-OR/NIU does not require routine maintenance for normal operation. Do not attempt repairs in the field. Obtain repair services by returning the defective unit to ADTRAN. Refer to "Appendix B, Warranty" for further information.

SPECIFICATIONS

Specifications for the Total Access 3000/3010 T1-OR/NIU are detailed in Table 10.

Table 10. T1-OR/NIU Specifications

Specification	Description
Temperature	
Operating Temperature	–40°C to +65°C
Storage Temperature:	–40°C to +65°C
Relative Humidity:	95 percent maximum, noncondensing
Physical	
Dimensions:	Height: 5.20 inches Width: 0.66 inch Length: 9.25 inches
Weight:	< 9.2 ounces
Transmission	
Line Impedance:	100 ohm ±20%
DSX Sensitivity:	0 to –13.6 dB at 772 kHz
Transmit Line Build Out (LBO):	0 to –22.5 dB in –7.5 dB increments
Loopback	
Maximum Detect Error Rate:	10^{-3}
Arming Timeout:	120 minutes, fixed
Loopback Timeout:	No timeout 30, 60, or 120 minutes
Span Powering	
Current Regulation:	Constant 60 mA with 0 to 4.3 k ohm load
Span Voltage Regulation:	0 to 260 VDC (provisionable from the SCU for On/Off, –130 VDC, or ±130 VDC)
Impedance to GND:	Greater than 201 ohms per lead
Longitudinal Immunity:	200 mA VAC, 60 Hz
Power	
Input Voltage:	–48 VDC, nominal
Input Voltage Range:	–40 VDC to –56.7 VDC
Span Powering Mode:	22 watts (maximum)
Power Dissipation:	6 watts (maximum)
Part Number	
Total Access 3000/3010 T1-OR/NIU:	1181310L2

Appendix A
Front Panel DSX and MUX Mode Test Access

GENERAL

Figure A-1 through Figure A-3 are DSX-1 fed modes of operation, and Figure A-4 through Figure A-7 are MUX fed modes of operation.

From the Provisioning menu ("Provisioning" on page 17), the Network Source option is used to choose either MUX fed or DSX fed operation. When performing intrusive MUX mode testing, the equipment jack on the front panel can be configured to access the signal going to the network or the customer. The Equipment Jack option, on the loopback and Test Commands screen ("Loopback and Test" on page 21) is used to configure the equipment jack for the network or customer. Every time the unit is power-cycled, it will default to the customer direction.

DSX MODE TEST ACCESS

DSX Mode connects to the DSX (network) connector on the backplane of the chassis, where a Multiplexer (MUX) is not used in the Total Access 3000 shelf.

DSX MON, Tx to Customer

The Rx of the BERT receives data from the **TX MON** jack (Figure A-1). This data has a monitor jack impedance of 432 ohms and comes from the Backplane Network T1 DSX (the data that would go toward the customer). The **BERT TX** jack is not used. *This test is non-intrusive.*

NOTE

Provision the T1-OR/NIU for the Out-of-Service Maintenance service state when performing intrusive bantam jack testing.

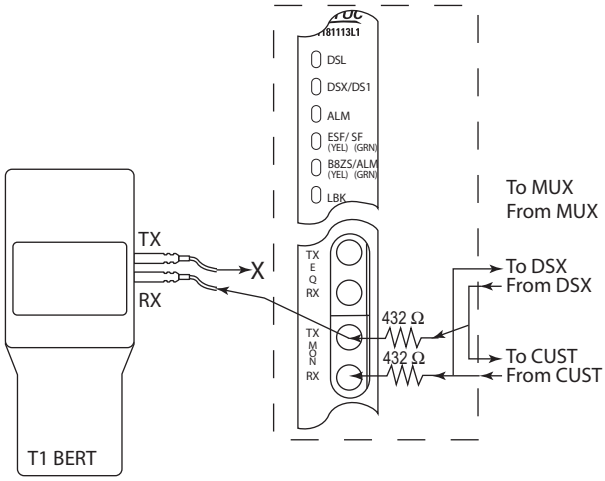


Figure A-1. DSX MON, Tx to Customer

DSX MON, Rx from Customer

The Rx of the BERT receives data from the **RX MON** jack (Figure A-2). This data has a monitor jack impedance of 432 ohms and comes from the customer-originated data. The **BERT TX** jack is not used. *This test is non-intrusive.*

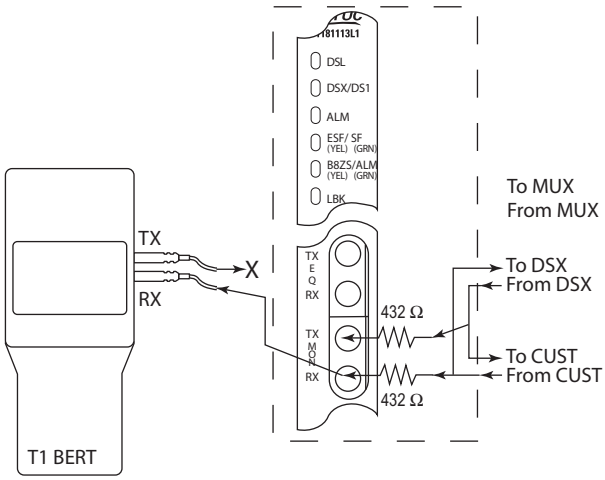


Figure A-2. DSX MON, Rx from Customer

DSX EQ, Tx to Customer, Rx from Customer

The Tx of the BERT goes to the **TX EQ** jack, and the Rx of the BERT goes to the **RX EQ** jack (Figure A-3). The **TX EQ** data from the BERT is sent to the customer. The RX EQ data to the BERT is data from the customer. The **MON** jack **TX** and **RX** are 432 ohm replicas of the **EQ TX** and **RX** direct connections. *This test is intrusive*, as it connects the **EQ** jacks directly to and from the customer data.

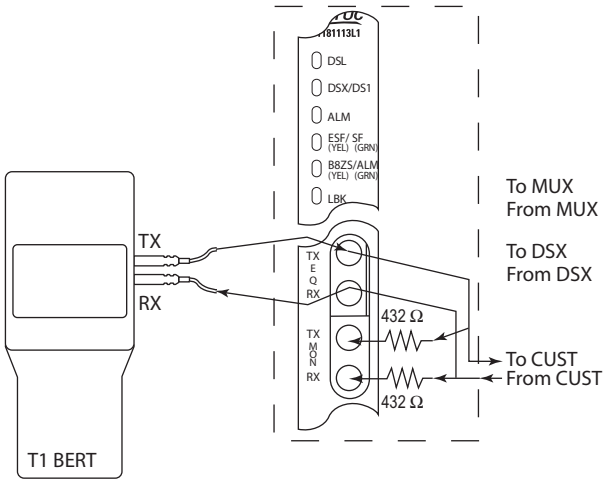


Figure A-3. DSX EQ, Tx to Customer, Rx from Customer

MUX MODE TEST ACCESS

MUX Mode tests through a MUX on the Total Access 3000 shelf.

MUX MON, Tx to Customer

The Rx of the BERT receives data from the **TX MON EQ** jack (Figure A-4). This data is a copy of the data that the T1-OR/NIU will transmit to the customer. The Tx of the BERT is not used. *This test is non-intrusive*.

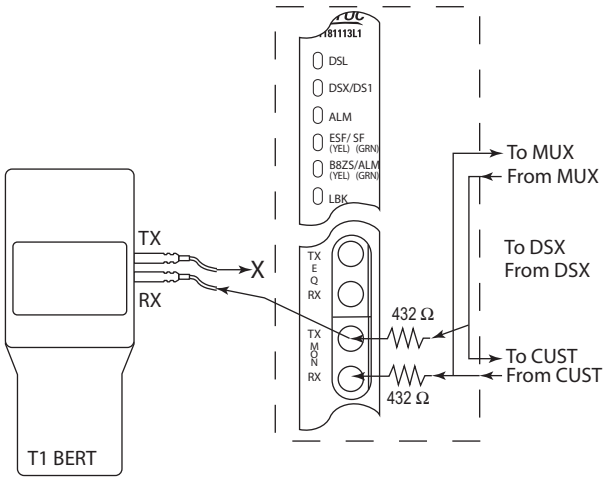


Figure A-4. MUX MON, Tx to Customer

MUX MON, Rx from Customer

The Rx of the BERT receives data from the **RX MON** jack (Figure A-5). This data is 432 ohm copy of the data that the T1-OR/NIU will receive from the customer and route to the Total Access shelf MUX (network). The Tx of the BERT is not used. *This test is non-intrusive*.

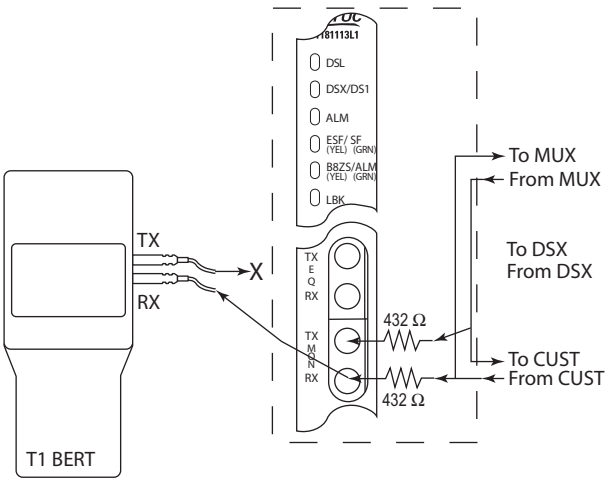


Figure A-5. MUX MON, Rx from Customer

MUX EQ, Tx to Network, Rx from the Network

The Tx of the BERT is connected to the **EQ TX** jack, and the Rx of the BERT is connected to the **RX EQ** jack (Figure A-6). The Tx of the BERT is then substituted for the data that the T1-OR/NIU sends to the Total Access Shelf MUX (network). The Rx of the BERT receives data directly from the MUX (network). The **MON TX** and **RX** jacks are 432 ohm impedance copies of the **EQ** jack **TX** and **RX**. *This test is intrusive*. From the Test screen, ensure that the equipment jack is in the To Network mode. In the To Network mode, AIS (unframed all 1's) is sent in the customer direction.

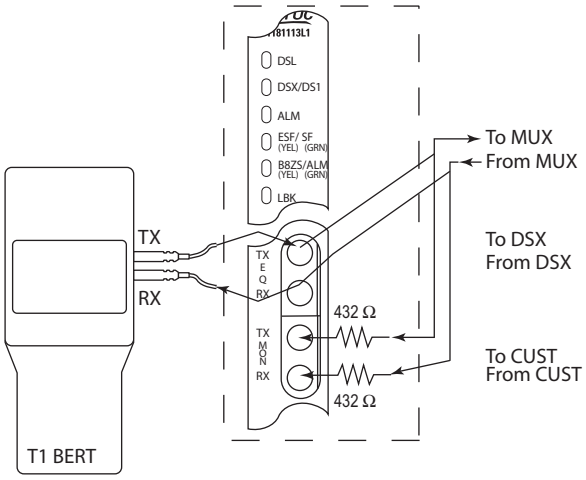


Figure A-6. MUX EQ, Tx to Network, Rx from Network

MUX EQ, Tx to Customer, Rx from Customer

The Tx of the BERT is connected to the **EQ TX** jack, and the Rx of the BERT is connected to the **RX EQ** jack (Figure A-7). The Tx of the BERT is then substituted for the data that the T1-OR/NIU sends to the customer. The Rx of the BERT receives data directly from the customer. The **MON TX** and **RX** jacks are 432 ohm impedance copies of the **EQ** jack **TX** and **RX**. *This test is intrusive*. Via the Test screen, ensure that the equipment jack is in the To Customer mode. In the To Customer mode, AIS (unframed all 1's) is sent in the network direction.

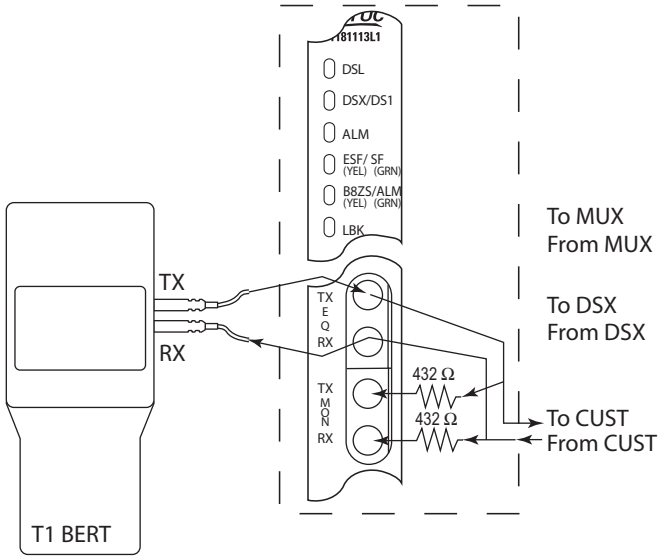


Figure A-7. MUX EQ, Tx to Customer, Rx from Customer

Appendix B
Warranty

WARRANTY AND CUSTOMER SERVICE

ADTRAN will replace or repair this product within the warranty period if it does not meet its published specifications or fails while in service. Warranty information can be found at www.adtran.com/warranty.

Refer to the following subsections for sales, support, Customer and Product Service (CAPS) requests, or further information.

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

Contact CAPS prior to returning equipment to ADTRAN.

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

Carrier Networks Division
901 Explorer Blvd.
Huntsville, AL 35806