T200 IDSL OCU-R
Remote Termination Unit
Installation and Maintenance

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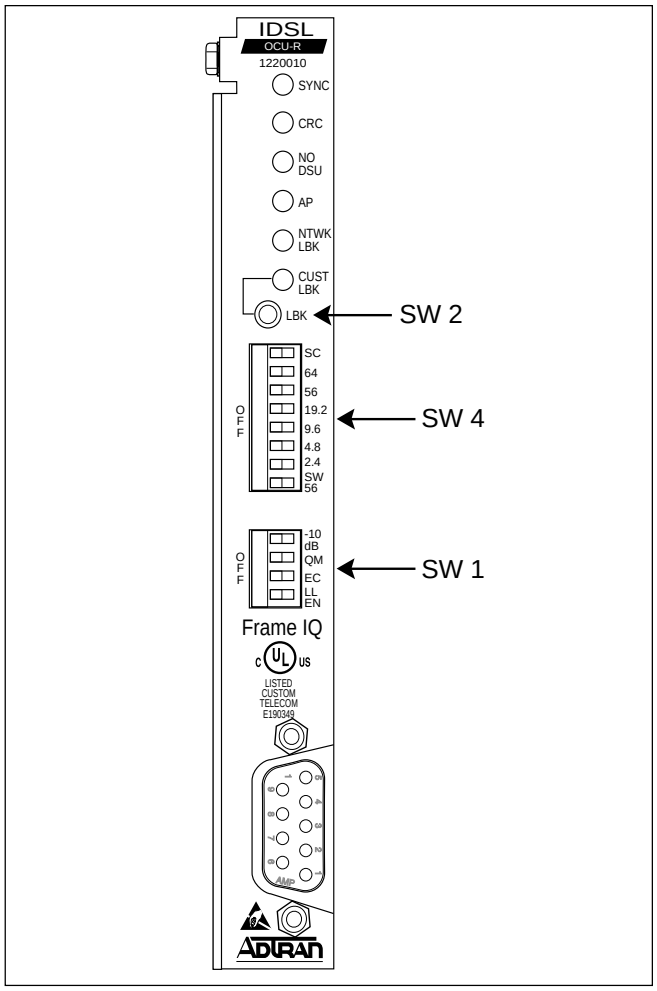

Figure 1. IDSL OCU-R

1. GENERAL

This practice provides installation and maintenance procedures for the IDSL OCU-R Remote Termination Unit. **Figure 1** is an illustration of the ADTRAN IDSL OCU-R (P/N 1220010L2).

Revision History

Issue three of this document replaces the term IDSL-R with OCU-R, where it is appropriate.

Description

The ADTRAN IDSL OCU-R is a termination unit designed to deliver data rates up to 64 kbps and provide testing functionality at the customer premises. The IDSL OCU-R converts an industry standard

2-wire Integrated Services Digital Network (ISDN) U-interface to the traditional 4-wire DDS signal for presentation to the customer.

The IDSL OCU-R is a digital network interface device located at the customer premises point-of-demarcation. In addition to terminating the ISDN U-interface, the IDSL OCU-R functions as a regenerative loopback device supporting Telco-generated testing. The IDSL OCU-R unit is available in T200 mechanics and can be optioned for 0 or -10 dB output toward the customer. **Figure 2** illustrates the IDSL OCU-R Circuit Diagram. The IDSL OCU-R is powered from -120 Vdc constant voltage supplied by a U-BR1TE with PWR, or -48 Vdc provided by a locally powered T200 compatible mounting.

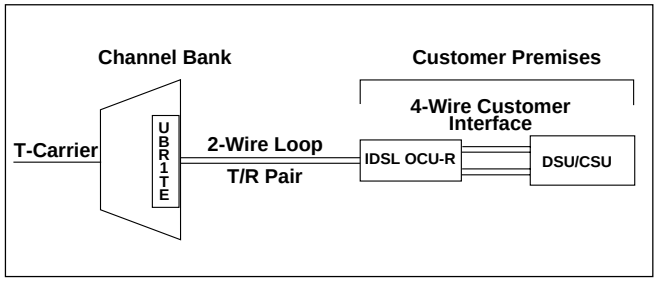

Figure 2. IDSL/DDS Circuit Diagram

Features

- 2-wire DDS deployment provided over a U-interface.
- Dual powering capability; Locally powered by -48 Vdc provided by mounting assembly or by -120 Vdc from a U-BR1TE with PWR.
- DB-9 craft interface access for provisioning, testing, and performance monitoring.
- Frame IQ/ADS-6 provide physical layer and Frame Relay PM and inband PM access respectively.
- Protected loopback prevents false latching loobpack at 64 kbps.
- Switch selectable data rate including subrates, 19.2 and 56 kbps rates, including secondary channel, and 64 kbps clear channel capability.
- LED indicators for operational status.
- T200 mechanics.
- Transmits Abnormal Station Code upstream during out-of-service 4-wire customer loop condition.

2. OPTIONS

Options and rate are selected with the front panel DIP switches as shown in Figure 1 and listed in **Table 1.**

Table 1. Options

Switch	Description
SC	ON selects the Secondary Channel if 56, 19.2, 9.6, 4.8, or 2.4 are selected
64	ON selects 64k clear channel data
56	ON selects 56k data and, if SC = ON, selects 56k secondary channel data
19.2	ON selects 19.2k data and, if SC = ON, selects 19.2k secondary channel data
9.6	ON selects 9.6k data rate and, if SC = ON, selects 9.6k secondary channel data
4.8	ON selects 4.8k data rate and, if SC = ON, selects 4.8k secondary channel data
2.4	ON selects 2.4k data rate and, if SC = ON, selects 2.4k secondary channel data
SW56	ON selects Switched 56 operation
-10 dB	ON reduces DDS transmit signal by approximately 10 dB
QM	ON enables quality monitoring
EC	ON selects error correction mode. Only valid for rates of 19.2k or lower
LLEN	ON allows unit to respond to latching loopbacks; unit always responds to non-latching loopbacks OFF while in 64k data mode will enable PLB feature; latching loopbacks are always enabled in this mode

Customer Interface Transmit Line Build Out

When -10 dB (SW1-1) is ON, the IDSL OCU-R transmits a -10 dB AMI signal across the 4-wire customer interface toward the CSU/DSU. When OFF is selected the unit transmits a 0 dB AMI signal toward the CSU/DSU.

Quality Monitor (QM)

When QM (SW1-2) is ON, the IDSL OCU-R monitors the customer interface for errors. If excessive errors are detected the unit blocks customer data transmission and sends Abnormal Station Code to the network. Customer data transmission is automatically restored when the trouble condition is cleared.

Error Correction (EC)

When EC (SW1-3) is ON, the unit enables the appropriate technique to ensure data integrity across the digital network.

Latching Loopback Enabled (LLEN)

When LLEN (SW1-4) is ON, the IDSL OCU-R will respond to latching loopback sequences.

False Loopback Immunity

ADTRAN's Protected Loopback family of channel units include an algorithm compatible with SARTS, Hekimian, TPI, and other test systems that virtually eliminates false latching loopback occurrences. This algorithm is always enabled at 64 kbps. In addition, ADTRAN's Protected Loopback family features a Protected Loopback mode for further false latching loopback protection.

Latching Loopback

During operation up to 56 kbps, with LLEN enabled (SW1-4 ON), the IDSL OCU-R will respond to the legacy OCU latching loopback sequences and translates CSU latching loopback sequences to the DSU/CSU per TR62310 and ANSI T1.417. With LLEN OFF, the IDSL OCU-R will not respond to latching loopback.

At 64 kbps the function of the LLEN switch is altered. At 64 kbps, placing LLEN ON will permit the IDSL OCU-R to respond to the legacy latching loopback sequence per TR62310 and ANSI T1.417. At 64 kbps, with LLEN OFF, the IDSL OCU-R enables ADTRAN's Protected Loopback.

Protected Loopback

ADTRAN's Protected Loopback supports the new proposed DDS latching loopback standard in T1E1.2/ 99-007R1. When enabled, the IDSL OCU-R will respond to latching loopback when the idle code preamble is sent prior to the latching loopback sequence specified in TR62310 and ANSI T1.417. See **Table 2** for the latching loopback sequence requirement when Protected Loopback is enabled.

Table 2. Protected Loopback Mode Requirement T1E1.2/99-007R1 (Latching Loopback)

Sequence Function	Byte Code	# of Received Bytes
Exit data protocol	Idle - 11111110	Minimum of 35 Idle bytes
Clear existing loopbacks	Transition in progress (TIP) X0111010	Minimum of 35 TIP bytes
Identify device to be looped	Loopback select code (LSC) X0000101 - DS0 X1010101 - OCU X0110001 - CSU	Minimum of 35 LSC bytes
Prepare to loop; send MAP code after 30 bytes	Loopback enabled (LBE) X1010110	Minimum of 100 LBE bytes
Activate loopback	Far-End voice (FEV) X1011010	Minimum of 32 FEV bytes
Minimum of 35 TIP bytes required to disable established latching loopback. X = Don't care bit		

3. 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*.

WARNING

- Never install telephone wiring during a lightning storm.
- Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.
- Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.

Wiring

The ADTRAN IDSL OCU-R may be mounted in any standard T400/T200 housing, or the following ADTRAN T400/T200 housings:

CAUTION

On span-powered units, ensure ground continuity exists between the unit, the housing, and a known approved ground source.

Span Power Applications

- Single Mount Housing P/N 1212007L1
- Dual Mount Housing P/N 1212008L1

For 2-wire DDS deployment from D4/SLC-96 and SLC-5 channel banks, a repeater powering U-BR1TE is used to provide the metallic 2-wire DDS interface. In these cases, the IDSL OCU-R is span-powered with -120 Vdc and the customer premises installation should include a span-powered mounting.

Local Power Applications

- Single Mount Housing P/N 1212007L2

For 2-wire DDS deployment from non-ADTRAN digital loop carrier U-BR1TEs, the IDSL OCU-R must be locally powered with customer provided AC. For these applications a local powered T400/T200 mounting is required.

Table 3 shows the Compliance Codes for the IDSL OCU-R. The IDSL OCU-R complies with the requirements covered under UL 1459 third edition and is intended to be installed in an enclosure with an Installation Code (IC) of "B" or "E". The IDSL OCU-R is intended for installation in restricted access locations only. Maximum input current at max load is 32 mA @ -48 Vdc with an output of 6 mA @ 10 Vdc.

NOTE

The DDS customer port is classified as suitable for connection to intra-building or non-exposed wiring only.

Table 3. Compliance Codes

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

Connections are made using screwdown terminals on the barrier strip located in the rear of a single mount housing. **Figure 3** describes the circuit card pinout. **Table 4** shows the wiring connections for the IDSL OCU-R.

The housing should be wired as follows:

- Network pair to terminal strip TR and TT positions.
- To Customer and From Customer pairs through customer 8-pin RJ-48 modular connector.

or

- To Customer (DRT, DRR) and From Customer (DTR, DTT) to designated terminal strip positions.
- Local -48 Vdc power supplied to pins 17 (GND) and 35 (-48 Vdc) of mounting is provided only when the OCU-R is <u>not</u> span-powered from the 2-wire IDSL loop.

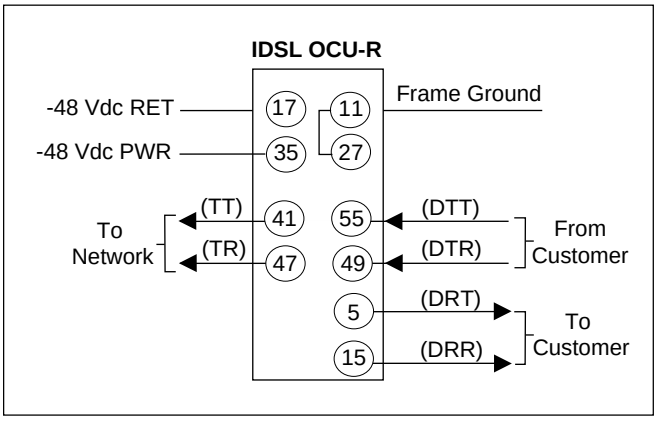

Figure 3. Circuit Card Pin Assignments

Table 4. Wiring Connections

Pair	Terminal Strip Designations	T400 Pin Number	Customer RJ-48
To/From Network	TT, TR	41, 47	
To Customer (Rx)	DRT, DRR	5, 15	7, 8
From Customer (Tx)	DTR, DTT	49, 55	1, 2

LED Indication

The IDSL OCU-R front panel LEDs display the operating status. The LEDs are described in **Table 5**.

Table 5. LED Indication

LED	Color	Description
SYNC	RED GREEN	Indicates that there is no network sync. Indicates network synchronization.
CRC	RED	ON indicates that there are CRC errors. OFF indicates no CRC errors.
NO DSU	YELLOW	ON indicates no signal, no sealing current, no SC framing. OFF indicates signal, sealing current, and SC framing achieved.
AP	GREEN	ON indicates that the unit has been remotely provisioned. FLASHING indicates remote control link active. OFF indicates locally provisioned operation.
NTWK LBK	YELLOW	ON indicates a loopback towards the network is invoked at RT's DDS Customer interface in response to Test Center issuing OCU loopback. FLASHING indicates loopback toward network is invoked at CSU/DSU via network commanded CSU loopback, and RT's response of reversing sealing current to CSU/DSU.
CUST LBK	YELLOW	ON indicates a loopback towards the customer is invoked at IDSL OCU-R interface via front panel LBK button. FLASHING indicates a loopback towards the customer is invoked at the ADTRAN U-BR1TE via IDSL OCU-R front panel LBK button.

4. TESTING

Loopback Testing

Loopback tests can be performed from the Central Office (CO) to verify proper loop and IDSL OCU-R operation. The IDSL OCU-R provides a network loopback in response to an OCU latching or non-latching loopback command. The IDSL OCU-R also provides a sealing current reversal when the CSU loopback command is detected. Alternating loopbacks may be performed at all rates, except 64 kbps Clear Channel. See **Table 6** for alternating loopback sequences. See **Table 7** for latching loopback sequences.

Table 6. Alternating Loopback Sequences

Sequence Function	Received Bytes
Activate loopback	Four consecutive bytes of specified loopback code X0101010 - OCU X0101000 - CSU X0101100 - DSU
Maintain loopback and test for bit errors	Data byte alternating with loopback code example: XDDDDDD1/X0101010
Clear loopback	Four consecutive data bytes without CSU loopback code
X = Don't care bit	

Table 7. Latching Loopback Sequences

Sequence Function	Byte Code	Number of Received Bytes
Clear existing loopbacks	Transition in progress (TIP) X0111010	Minimum of 35 TIP bytes
Identify device to be looped	Loopback select code (LSC) X0000101 - DS0 X1010101 - OCU X0110001 - CSU	Minimum of 35 LSC bytes
Prepare to loop; send MAP code after 30 bytes	Loopback enabled (LBE) X1010110	Minimum of 100 LBE bytes
Activate loopback	Far-End voice (FEV) X1011010	Minimum of 32 FEV bytes
Minimum of 35 TIP bytes required to disable established latching loopback. X = Don't Care bit		

IDSL/DDS Trouble Code

The IDSL/DDS system provides a quick diagnosis in the case of a circuit condition where continuity is broken when the IDSL/DDS circuit uses ADTRAN U-BR1TEs with DDS Loopback capability in the central office or remote terminal. 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 a 2-wire DSL loss of signal, loss of sync, or open condition caused by an open conductor or disconnected 2-wire loop, the U-BR1TE transmits a Mux-Out-of-Sync (MOS 9Ah) trouble code into the network as shown in **Figure 4**. 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 4.

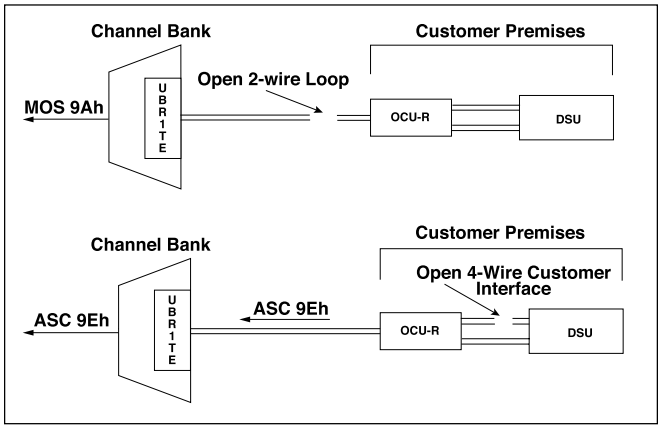

Figure 4. IDSL/DDS Trouble Codes

Loopback LED Operation

IDSL OCU-R loopback status is indicated via the faceplate NTWK LBK and CUST LBK LEDs. An active loopback occurring at the unit being viewed is always indicated via a solid loopback LED. A flashing loopback LED indicates a loopback condition at the far end unit. When a loopback towards the network is initiated, the NTWK LBK LED on the faceplate of the IDSL OCU-R is illuminated. A loopback generated towards the customer illuminates the CUST LBK LED.

ADTRAN U-BR1TE Bidirectional Loopback

The ADTRAN U-BR1TE will execute a bidirectional loopback when performing DS0 DP loopbacks. Refer to **Figure 5** for an illustration of the bidirectional loopback.

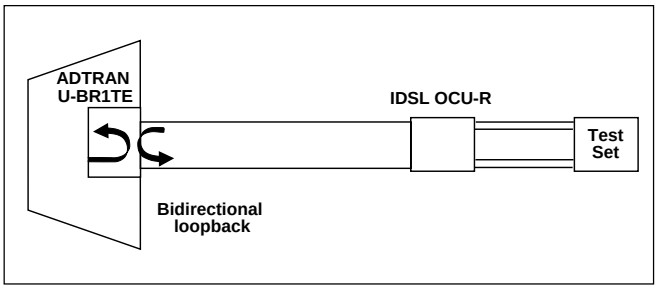

Figure 5. ADTRAN U-BR1TE Bidirectional Loopback

Remote End Initiated LBK Tests

The U-BR1TE supports loopbacks generated from the IDSL OCU-R which allow testing to be performed without coordination with the CO or test center. Loopbacks initiated by the IDSL OCU-R front panel LBK pushbutton (SW2) aid in system turn-up testing or troubleshooting from the remote end.

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

Pressing the LBK pushbutton on the OCU-R once will initiate a loopback at the U-BR1TE towards the customer. See **Figure 6**. This allows data to be sent from the remote end to test the local loop and the IDSL OCU-R. This loopback is indicated by a flashing CUST LBK LED on the IDSL OCU-R and a flashing TEST LED (D4) on the U-BR1TE.

Pressing the OCU-R LBK pushbutton a second time initiates a loopback at the IDSL OCU-R towards the 4-wire DDS (CPE) interface. A solid CUST LBK on the IDSL OCU-R indicates a loopback at the IDSL OCU-R towards the customer equipment.
See **Figure 7**.

Pressing the OCU-R LBK pushbutton a third time disables all current loopbacks initiated by the OCU-R LBK pushbutton.

If errors exist the loopbacks can help determine the source; either the local loop or the IDSL OCU-R. During a remote end initiated loopback the IDSL/DDS system transmits ASC 9Eh towards the network, indicating an out-of-service condition generated by the remote end, as shown in Figures 6 and 7.

All latching loopbacks, whether initiated by the craft interface, LBK pushbutton, CO, or from a remote test center, can be released by sending 35 DDS loop down TIP bytes <X0111010> (where X is a “don’t care” bit).

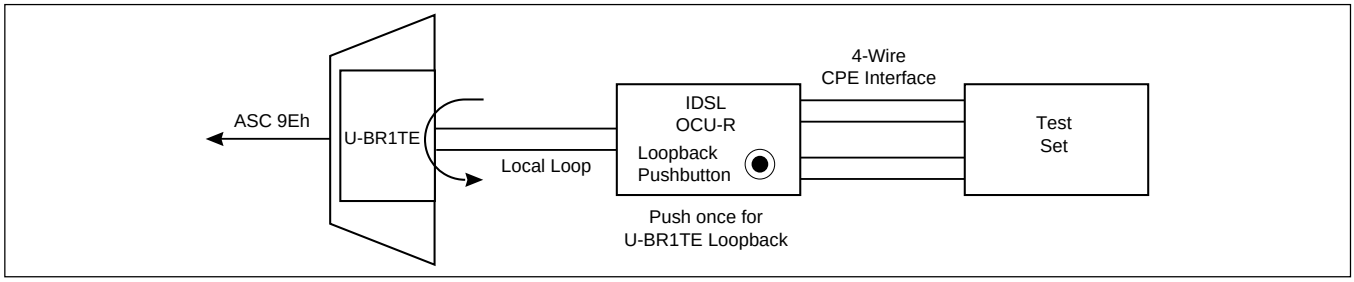

Figure 6. IDSL/DDS Remote End Initiated Loopback, Local Loop

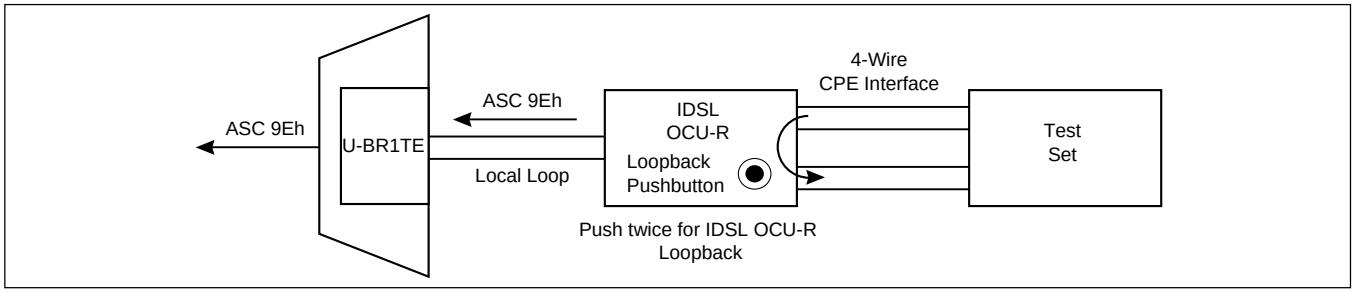

Figure 7. IDSL/DDS Remote End Initiated Loopback, Customer Loop

All existing latching loopbacks can also be disabled by pressing the TEST or LBK pushbutton on the U-BR1TE or remote unit, respectively.

NOTE

The remote end test feature is only supported when the upstream U-BR1TE is an ADTRAN D4 or Series 5 U-BR1TE with DDS Loopback capability. Other U-BR1TEs will ignore the loopback command sent by pressing the IDSL OCU-R LBK button.

5. CONTROL PORT OPERATION

The IDSL OCU-R front panel DB-9 provides an RS-232 interface for connection to a controlling terminal. The pinout of the DB-9 is illustrated in **Figure 8**.

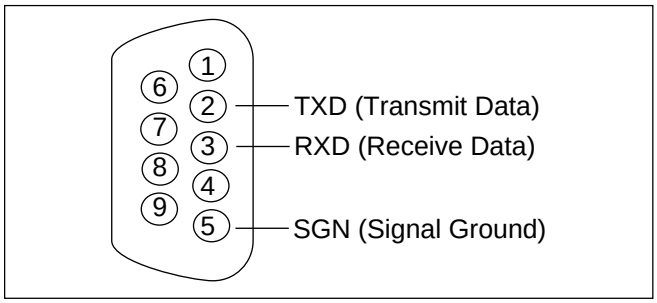

Figure 8. RS-232 (DB-9) Cable Side Pin Assignments

NOTE

When conducting a Terminal Session, always select VT100 mode prior to making the craft connection.

The terminal interface operates at data rates from 1.2 kbps to 19.2 kbps. The asynchronous data format is fixed at 8 data bits, no parity, and 1 stop bit. The supported terminal type is VT100 or compatible.

NOTE

If using a personal computer (PC) with terminal emulation capability, disable all power saving programs. Otherwise, communication between the PC and the IDSL OCU-R unit can be disrupted, resulting in misplaced characters or screen timeouts.

Operation

The T200 IDSL OCU-R is ready for synchronization and operation upon insertion in an active shelf or housing. Terminal sessions provide access to screen menus for provisioning, monitoring, testing, or obtaining performance history. Terminal session screen access is available at any time during operation. The screens shown in this practice identify the main menu screens; subordinate screens are not depicted. Abbreviations used in the screen diagrams are detailed in **Table 8**.

Table 8. Definition of Screen Abbreviations

Abbreviation and Definition

ES – Errored Seconds: A count of the number of seconds in which at least one code violation was detected on a digital circuit.

- IDSL Interface ....Second in which a CRC error occurs.
- Customer DDS Interface....Second in which a bipolar violation occurs.

UAS – Unavailable Seconds: A count of the number of seconds that a circuit or path is not available.

- IDSL Interface (U-Interface) ....Will accumulate upon the loss of loop synchronization or the occurrence of 7 errored seconds in a period of 20 seconds. UAS will stop accumulating upon the occurrence of 30 consecutive non-errored seconds.
- Customer DDS Interface.... Will accumulate upon the loss of sealing current (LOOP OPEN), loss of receive signal (LOS), loss of secondary channel framing (LOF), or when the illegal bipolar violation error rate is >1E-3 for at least 10 seconds. UAS will stop accumulating upon the occurrence of 10 consecutive non-severely errored seconds.

BPV – Illegal Bipolar Violation

- Customer DDS Interface.... Two consecutive pulses of the same polarity or violation received that does not alternate in polarity with respect to the prior violation.

INV – Invalid Frame Relay Frame

- Any frame with a CRC error.
- Any frame containing fewer than five octets.
- Any frame containing more than 8191 octets.
- Any frame that does not contain an integral number of octets.
- Any frame containing a frame abort.

FECN – Forward Explicit Congestion Notification

- Count of frames in which the Forward Explicit Congestion Notification bit was set.
- Indicates congestion in the frame relay network but does not isolate cause or location of congestion.

BECN – Backward Explicit Congestion Notification

- Count of valid frames in which the Backward Explicit Congestion Notification bit was set.
- Indicates congestion in the frame relay network but does not isolate cause or location of congestion.

LMI – Local Management Interface

- Local Management Interface (LMI) status is a monitor of the heart beat between the frame switch and the CPE.
- Recognizes FRF (Annex A), ANSI T1.617 Annex D, and ITU T.933A frame relay interfaces.
- Network and Customer LMI counts should be equal if everything is ok between the frame switch and the CPE.
- Maintains counts of LMI status messages monitored by the U-Interface, which are sent by the frame relay switch.
- Maintains counts of LMI status inquiry messages monitored at the DDS Interface which are sent by the frame relay CPE.

%UT – Frame Relay Percent Utilization

- The average percent utilization over the DS0 channel.

To conduct a terminal session, connect a VT100 or compatible test set to the OCU-R via the front panel DB-9 connector, then press the space bar three times to initiate the session. The Main Menu will appear, as illustrated in **Figure 9**.

The Main Menu provides access to detailed performance and configuration information.

A Terminal Modes Menu is available for configuring the craft interface for a manual terminal update or a real-time terminal update. **Figure 10** shows the Terminal Modes Menu.

NOTE

Real-time terminal update is recommended for normal terminal operation unless screens are to be captured or logged to a print file.

```
CIRCUIT ID:IDSL Test Unit                                   07/25/00 02:14:40


                                  Adtran IDSL Main Menu

                                1.  Status
                                2.  Loopbacks
                                3.  Performance Monitoring
                                4.  Event Log
                                5.  Set Circuit ID
                                6.  Set Date and Time
                                7.  Adtran Information
                                8.  Terminal Modes




                                Selection:
```

Figure 9. Main Menu Screen

```
CIRCUIT ID:IDSL Test Unit                                   07/25/00 02:39:56

                              TERMINAL MODES MENU

    MANUAL UPDATE MODE:

    * You can print or log screens
    * No text is highlighted
    * "Ctrl+R to Update" appears at the top of each screen, reminding
       you to press both the 'Ctrl' and 'R' keys to update the screen
    * There is a delay between screen changes & updates
    * After 30 min. of no interaction, a new baud rate search is begun
    * Ignores input until screen is finished printing

    REAL-TIME UPDATE MODE:

    * Faster of the two modes
    * You cannot print screens to a log file
    * Highlighting is enabled
    * Recommended for daily operation


                    Press <SPACEBAR> to toggle update modes
```

Figure 10. Terminal Modes Menu Screen

Figure 11 shows the System Status screen.

Figure 12 shows Detailed Status for both network and customer loops.

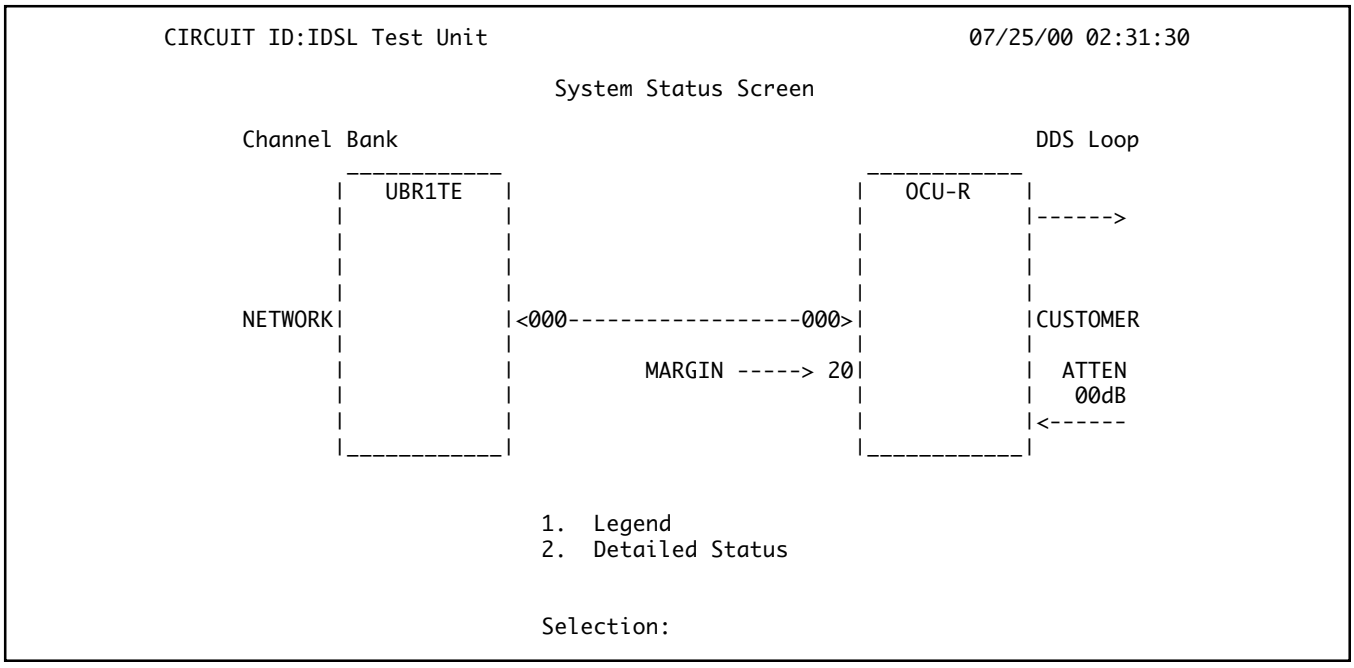

Figure 11. System Status Screen

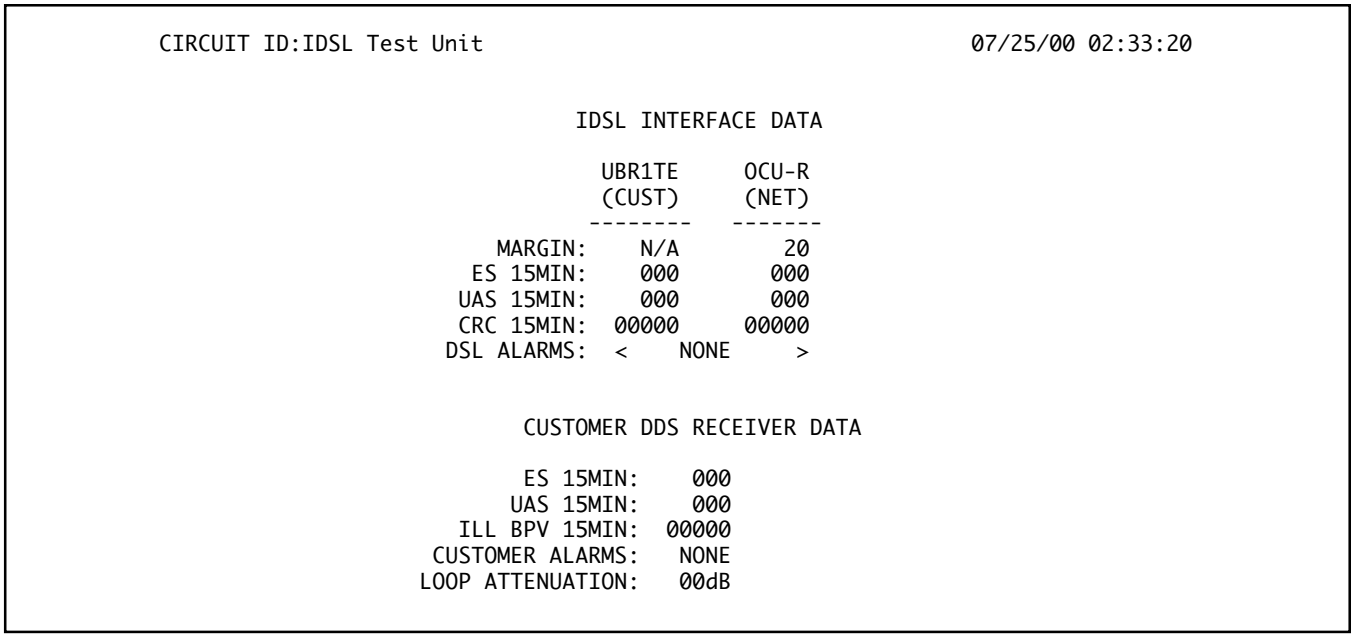

Figure 12. IDSL Detailed Status Screen

Figure 13 shows the Loopbacks display, allowing loopback testing to be initiated or terminated while graphically displaying the testing status of the IDSL system.

Latching Loopback Timeout

When latching loopback timeout is enabled, latching loopbacks will drop out after 120 minutes returning the system to normal operation.

At the top right corner of the screen the time display indicates the current time. At each 15-minute interval, the performance information is transferred to the 15-minute performance data registers accessed from the Performance Monitoring screen. All 15-minute performance data registers are available for the last 25 hours. At each 24-hour interval, the performance data is transferred into the 24-hour performance data register also accessed using this screen. The Performance Monitoring screens are shown in **Figure 14** through **Figure 18**.

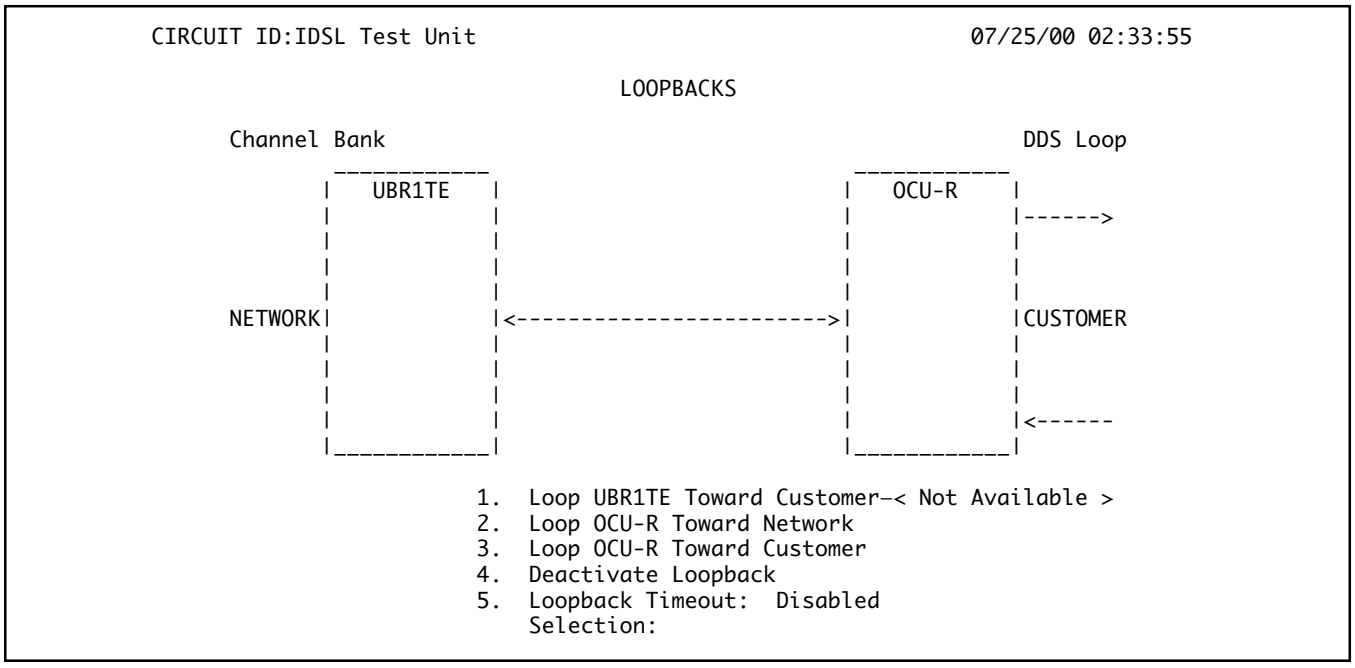

Figure 13. Loopbacks Screen

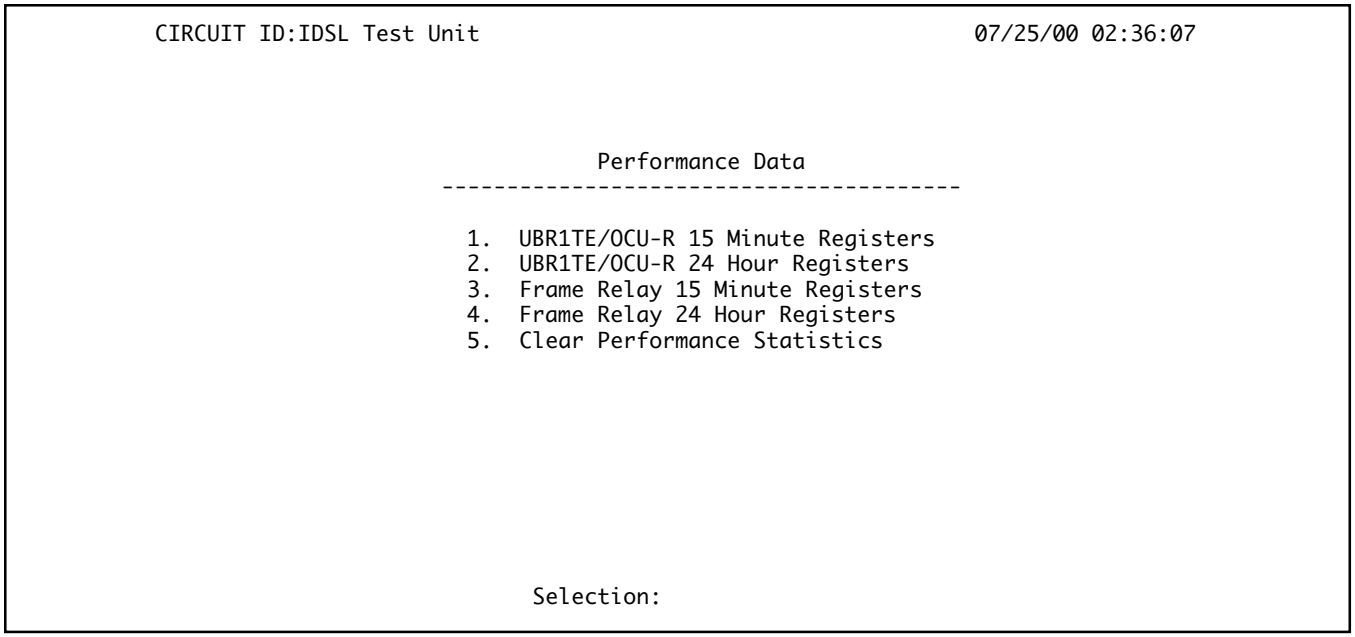

Figure 14. Performance Monitoring Screen

Clearing PM and Event Log Registers

Press “5” at the Performance Monitoring screen (Figure 14) to advance to the Warning screen (not shown). At the Warning screen the user will be prompted to clear registers; “Y” for Yes or “N” for No.

Interface OOS Screen Event

In those instances when the loop or customer interface is out of service, the performance monitoring screens will show dashes (--- --- ---) for elapsed timeframes indicating that data for those intervals is unavailable.

```
CIRCUIT ID:IDSL Test Unit                                   07/25/00 02:36:32
                        UBR1TE/OCU-R 15-Minute Registers
             UBR1TE                          OCU-R              OCU-R
           IDSL INTERFACE                  IDSL INTERFACE      DDS LOOP
            -ES-UAS--CRC-                   -ES-UAS--CRC-    -ES-UAS--BPV-
            000 000 00000                   000 000 00000    000 000 00000
    02:30   000 000 00000           02:30   000 000 00000    000 000 00000
    02:15   000 003 00000           02:15   000 003 00000    000 012 00035
    02:00   000 000 00000           02:00   000 000 00000    000 000 00000
    01:45   000 000 00000           01:45   000 000 00000    000 000 00000
    01:30   000 000 00000           01:30   000 000 00000    000 000 00000
    01:15   000 000 00000           01:15   000 000 00000    000 000 00000
    01:00   000 000 00000           01:00   000 000 00000    000 000 00000
    00:45   000 000 00000           00:45   000 000 00000    000 000 00000
    00:30   000 000 00000           00:30   000 000 00000    000 000 00000
    00:15   000 000 00000           00:15   000 000 00000    000 000 00000
    00:00   000 000 00000           00:00   000 000 00000    000 000 00000
    23:45   000 000 00000           23:45   000 000 00000    000 000 00000
    23:30   000 000 00000           23:30   000 000 00000    000 000 00000
    23:15   000 000 00000           23:15   000 000 00000    000 000 00000
    23:00   000 000 00000           23:00   000 000 00000    000 000 00000
    22:45   000 000 00000           22:45   000 000 00000    000 000 00000

                          Press “B” to go back 4 hours
```

Figure 15. U-BR1TE 15-Minute Performance Monitoring Screen

```
CIRCUIT ID:IDSL Test Unit                                   07/25/00 02:36:53

                        UBR1TE/OCU-R 24-Hour Registers

          UBR1TE                          OCU-R              OCU-R
        IDSL INTERFACE                  IDSL INTERFACE      DDS LOOP
       -ES----UAS---CRC-               -ES----UAS---CRC-  -ES----UAS---BPV-
       00000 00003 00000               00000 00003 00000  00000 00012 00035
 07/24 00015 00253 00321         07/24 00010 00253 00159  00014 01073 08442
 07/23 ----- ----- -----         07/23 ----- ----- -----  ----- ----- -----
 07/22 ----- ----- -----         07/22 ----- ----- -----  ----- ----- -----
 07/21 ----- ----- -----         07/21 ----- ----- -----  ----- ----- -----
 07/20 ----- ----- -----         07/20 ----- ----- -----  ----- ----- -----
 07/19 ----- ----- -----         07/19 ----- ----- -----  ----- ----- -----
 07/18 ----- ----- -----         07/18 ----- ----- -----  ----- ----- -----
 07/17 ----- ----- -----         07/17 ----- ----- -----  ----- ----- -----



                          REVERSED VIDEO  = DATA OVERFLOW

                     * = Contains corrupted 15-minute interval(s)
```

Figure 16. U-BR1TE 24-Hour Performance Monitoring Screen

```
CIRCUIT ID:IDSL Test Unit                                    07/25/00 02:37:18

                        Frame Relay 15-Minute Registers
             IDSL INTERFACE                                      DDS LOOP
       -INV--FECN--BECN---LMI--%UT                         -INV--FECN--BECN---LMI--%UT
       00000 00000 00000 00000 000                         00000 00000 00000 00000 000
 02:30 00000 00000 00000 00000 000                   02:30 00000 00000 00000 00000 000
 02:15 00000 00000 00000 00000 000                   02:15 00000 00000 00000 00000 000
 02:00 00000 00000 00000 00000 000                   02:00 00000 00000 00000 00000 000
 01:45 00000 00000 00000 00000 000                   01:45 00000 00000 00000 00000 000
 01:30 00000 00000 00000 00000 000                   01:30 00000 00000 00000 00000 000
 01:15 00000 00000 00000 00000 000                   01:15 00000 00000 00000 00000 000
 01:00 00000 00000 00000 00000 000                   01:00 00000 00000 00000 00000 000
 00:45 00000 00000 00000 00000 000                   00:45 00000 00000 00000 00000 000
 00:30 00000 00000 00000 00000 000                   00:30 00000 00000 00000 00000 000
 00:15 00000 00000 00000 00000 000                   00:15 00000 00000 00000 00000 000
 00:00 00000 00000 00000 00000 000                   00:00 00000 00000 00000 00000 000
 23:45 00000 00000 00000 00000 000                   23:45 00000 00000 00000 00000 000
 23:30 00000 00000 00000 00000 000                   23:30 00000 00000 00000 00000 000
 23:15 00000 00000 00000 00000 000                   23:15 00000 00000 00000 00000 000
 23:00 00000 00000 00000 00000 000                   23:00 00000 00000 00000 00000 000
 22:45 00000 00000 00000 00000 000                   22:45 00000 00000 00000 00000 000

                          Press “B” to go back 4 hours
```

Figure 17. Frame Relay 15-Minute Performance Monitoring Screen

```
CIRCUIT ID:IDSL Test Unit                                    07/25/00 02:37:38

                          Frame Relay 24-Hour Registers

             IDSL INTERFACE                                      DDS LOOP
       -INV--FECN--BECN---LMI--%UT                         -INV--FECN--BECN---LMI--%UT
       00000 00000 00000 00000 000                         00000 00000 00000 00000 000
 07/24 65535 00000 00000 00000 000                   07/24 65535 00000 00000 00000 000
 07/23 ----- ----- ----- ----- ---                   07/23 ----- ----- ----- ----- ---
 07/22 ----- ----- ----- ----- ---                   07/22 ----- ----- ----- ----- ---
 07/21 ----- ----- ----- ----- ---                   07/21 ----- ----- ----- ----- ---
 07/20 ----- ----- ----- ----- ---                   07/20 ----- ----- ----- ----- ---
 07/19 ----- ----- ----- ----- ---                   07/19 ----- ----- ----- ----- ---
 07/18 ----- ----- ----- ----- ---                   07/18 ----- ----- ----- ----- ---
 07/17 ----- ----- ----- ----- ---                   07/17 ----- ----- ----- ----- ---


                          REVERSED VIDEO  = DATA OVERFLOW

                    * = Contains corrupted 15-minute interval(s)
```

Figure 18. Frame Relay 24-Hour Performance Monitoring Screen

The Event Log, shown in **Figure 19**, loads and time-stamps IDSL circuit performance anomalies and threshold violations. This screen is a very useful aid in troubleshooting a chronic circuit. It monitors DDS sync loss, DDS open loop, IDSL OCU-R margin, IDSL sync loss, and power-up events. IDSL loop signal-to-noise margin is calculated on a numerical scale from 0-20 with 0 approximately equal to a BER of 1×10^{-6} and 20 equal to virtually a 0 BER.

The Set Circuit ID screen, **Figure 20**, sets the circuit identification.

```
CIRCUIT ID:IDSL Test Unit                                  07/25/00 02:38:13


                                  EVENT LOG

EVENT             FIRST                  LAST                 CURRENT    COUNT

DDS SYNC LOSS     07/24/00 11:10:04      07/24/00 20:45:03     CLEAR      255
DDS LOOP OPEN     07/24/00 11:10:04      07/24/00 20:45:03     CLEAR      020

OCU-R MARGIN      -------- --------      -------- --------     CLEAR      ---
DSL SYNC LOSS     07/24/00 11:10:04      07/24/00 20:45:03     CLEAR      021

OCU-R POWER       07/24/00 11:10:01      07/25/00 02:00:00     CLEAR      017


LAST LOG RESET    01/03/98 03:33:20


                          <ENTER>  To CLEAR the Event Log
                          <ESC>    To exit without destroying data
```

Figure 19. Event Log Screen

```
CIRCUIT ID:IDSL Test Unit                                  07/25/00 02:38:36


                                Set Circuit ID









                             New ID =
```

Figure 20. Set Circuit ID Screen

The Set Date and Time screen, **Figure 21**, may be used to set the IDSL OCU-R date and time. Once the date and time are configured the performance registers date and time update accordingly.

The ADTRAN Information screen, **Figure 22**, displays part number, serial number, CLEI code, and unit revision for the IDSL OCU-R.

```
CIRCUIT ID:IDSL Test Unit                                    07/25/00 02:39:01


                              Set System Date and Time


                            New Date =   /  /    (MM/DD/YY)


                       < Press TAB to cycle between time and date >


                            New Time =   :  :    (HH/MM/SS)
```

Figure 21. Set Date and Time Screen

```
CIRCUIT ID:IDSL Test Unit                                    07/25/00 02:39:32

      ## ###################################
     # ##            ##                          Support Hours: 7am - 7pm CST
    #   ##   ######  ##  ######    ##   ######        Emergency: 7days x 24hrs
   #     ##  ##   ## ##  ##   ##  # ##  ##   ##           Phone: 800.726.8663
  ########## ##   ## ##  ######  ###### ##   ##             Fax: 256.963.6217
 #         ########   #####   ###     ####   ##        Internet: www.adtran.com

 ############################################
901 Explorer Boulevard, Huntsville, AL 35806-2807


-----------Manufacturing Information-----------
Unit      PART #    SERIAL NUM     CLEI     REV
-----   ----------  ----------  ----------  ---
OCU-R   1220010L2   123456789   NCT1TX2BAA   1
```

Figure 22. ADTRAN Information Screen

6. REMOTE PROVISIONING AND DIAGNOSTICS

Control Protocol

Remote access to provisioning and status information is accomplished using ADTRAN Digital System 6 Message protocol, defined in Control and Diagnostic Procedures Practice, Section 6032991-6. Digital System 6 is supported by the TPI 108/109 and 105 portable test set and is supported by Hekimian React 2001 Release 1.900 remote test system. The IDSL OCU-R network element complies with ANSI T1.107-1995, "Digital Hierarchy Format Specifications Annex G" which allows remote provisioning, querying, and performance monitoring via inband control of network elements.

NOTE

The REACT 2001 GUI software Release 1.900 supports ANSI T1.107-1995.

Remote access is accomplished using a defined set of inband DS0 byte sequences similar to the latching loopback sequence. Commands issued through the test system are recognized by the individual channel unit, which responds with the appropriate byte sequences. These inband commands may be used to verify options via dialogs with REACT 2001 and TPI 108/109 test sets. Unit CLEI, serial number, provisioning, and performance information can be retrieved remotely using the Digital System 6 protocol.

Provisioning and Status

All configuration options can be remotely viewed or provisioned. The front panel AP LED indicator *Flashes* during control link establishment and remains ON after the IDSL OCU-R has been remotely provisioned.

If the IDSL OCU-R has been remotely provisioned, the operator can alternate between remote configuration and manual switch settings by pressing the momentary LBK button located on the front panel for 5 seconds. If the IDSL OCU-R is removed from the system, the unit retains previous provisioning information in nonvolatile RAM.

The AP LED remains ON when the IDSL OCU-R is operating based on Remote Provisioning, and is OFF when operating on manual switches. See Table 5 for LED indication.

7. MAINTENANCE

The T200 IDSL OCU-R does not require routine maintenance for normal operation.

8. DEPLOYMENT GUIDELINES

The IDSL OCU-R allows a standard U-interface to be used to provide DDS over a single pair. Listed below are the loop design guidelines for deployment of DDS over IDSL.

- All loops must be nonloaded.
- Actual Measured Loss (AML) should not exceed 40 dB at 40 kHz (135 Ω termination), the Nyquist frequency of a U-interface.
- Total bridged tap length should not exceed 2 kft.

NOTE

If any of the above Deployment Guideline criteria are not met, design should be considered using Total Reach DDS, with the exception of the first bullet.

9. 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 60000087-10).

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/Availability
(800) 827-0807

ADTRAN Technical Support

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

Standard hours: Monday-Friday, 7 a.m. - 7 p.m. CST
Emergency hours: 7 days/week, 24 hours/day

ADTRAN Repair/CAPS

Return for Repair/Upgrade
(256) 963-8722

Repair and Return Address

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