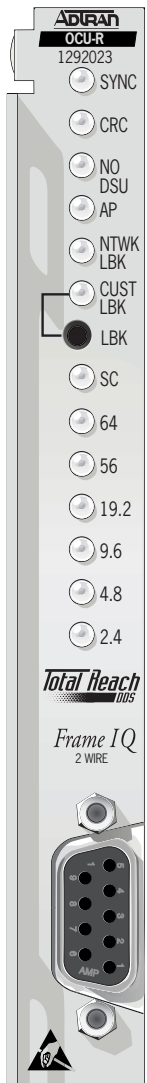


TR OCU-R

CLEI: D40IKXU8_



LED STATUS

SYNC	● GREEN	Loop synchronized
	● RED	Loop not synchronized
CRC	● ON	Errors on 2-wire loop
NO DSU	● ON	No customer DSU/CSU
AP	● ON	TR OCU-R remotely provisioned
	* FLASHING	Remote link is active
NTWK LBK	● ON	TR OCU-R in loopback toward the network
	* FLASHING	Indicates the TR OCU-R has requested a DSU/CSU loopback toward network. This condition only occurs during Alternating Channel or Latching CSU loopbacks
CUST LBK	● ON	TR OCU-R in loopback toward the customer
	* FLASHING	TR DDS-DP in loopback toward the customer

Refer to *LBK & Pushbutton Tests* for more detail.

SIGNAL LOSS INDICATION

The Signal Loss LEDs provide signal meter indication during synchronization, which may take up to 90 seconds. When synchronized the LEDs show the data rate. During synchronization the LEDs indicate the following:

2.4 LED On - Loop loss greater than 56 dB, Total Reach system will not synchronize.

2.4 & 4.8 LEDs On - Loop loss between 50 and 56 dB, indicates marginal deployment.

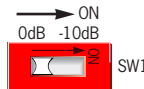
Three or more LEDs On - Circuit meets deployment criteria, dB loss corresponds to highest illuminated LED.

After synchronization one of the following rate LEDs will be on plus SC if selected:

SC	● Green	Indicates Secondary Channel Selected
64	● Green	64 kbps selected on TR DDS-DP office card
56	● Green	56 kbps selected on TR DDS-DP office card
19.2	● Green	19.2 kbps selected on TR DDS-DP office card
9.6	● Green	9.6 kbps selected on TR DDS-DP office card
4.8	● Green	4.8 kbps selected on TR DDS-DP office card
2.4	● Green	2.4 kbps selected on TR DDS-DP office card

CIRCUIT BOARD DIP SWITCH SW1

Toggles between 0 dB and -10 dB AMI signal across the 4-wire customer interface towards the CSU/DSU.



FRONT PANEL LBK PUSHBUTTON SW2

Loopback pushbutton SW2 initiates loopback tests without CO or Test Center coordination. Refer to LBK Pushbutton in *Testing* section. Depressing the LBK pushbutton for 5 seconds will toggle between hardware and software option settings.

FRONT PANEL DB-9 CONNECTOR

Provides an RS-232 interface for connection to a VT100 or compatible terminal.

DEPLOYMENT GUIDELINES

- All loops must be nonloaded.
- AML should not exceed 50 dB at 13.3 kHz, 135 Ω termination.
- Loop length should not exceed 50 kft.
- Bridge tap tolerant to 12 kft (tests show no degradation to 18 kft).
- Background noise should not exceed 34 dBm.
- Impulse noise should not exceed -40 dBm (+50 dBm).

■ For a complete Installation and Maintenance Practice (P/N 61292023L5-5): 877-457-5007, Faxback Document 717. Please have your fax number ready. ■

INSTALLATION & TURNUP

CAUTION: Ensure ground continuity exists between the unit, the housing, and a known approved ground source.

Installation assumes the TR DDS-DP is installed into an operating channel bank.

1. See reverse for wiring.
2. Position SW1 for the required AMI signal to the customer.
 - -10 dB for typical installation.
 - 0 dB for extended demarcation installation.
3. Insert the TR OCU-R into its designated slot ensuring the edge connector seats firmly into the backplane.
4. Data rate is automatically selected by the TR DDS-DP.
5. After insertion the TR OCU-R will run a self-test during which all LEDs undergo an On/Off sequence.
6. After synchronization, which may take up to 90 seconds, the following LED indication will show:
 - **SYNC** LED - Green
 - One **RATE** LED - on
 - **SC** LED - on, if selected
 - All other LEDs will be off until network occurrences cause them to turn on.

If LEDs in step 6 are as noted, proceed with loop testing per specifications.

If LEDs in step 6 are in any other configuration, refer to *Troubleshooting Guide* section.

CONTROL PORT OPERATION

The front panel DB-9 provides an RS-232 interface for a VT100 or compatible terminal. The terminal interface operates at baud rates from 1.2 to 19.2 kbps, asynchronous, 8 data bits, no parity, and one stop bit. Terminal sessions provide access to screen menus for the following:

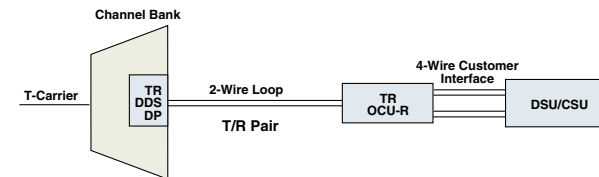
- Provisioning
- Testing
- Performance Monitoring

Upon terminal connection, press space bar three times to access screens. Directions on the screens guide craft personnel through the various menus.

NOTE: When conducting a Terminal Session, always select VT100 mode in the settings menu prior to making the craft connection.

TYPICAL APPLICATION

- Both Customer and Network Interfaces are equipped with outside plant lightning protection.
- Extended Range on Customer Interface up to 18 kft.



TROUBLESHOOTING GUIDE – CONTINUED ON BACK

No Power at the TR OCU-R

- Ensure TR DDS-DP is supplying necessary voltage to power the TR OCU-R. Measure T/R voltage at the frame (tip to ground = -130 VDC or less depending on input voltmeter impedance, tip to ring = -125 to -130 VDC, ring to ground = 0). The TR DDS system is not polarity sensitive.
- Measure T/R voltage at the TR OCU-R.
- If voltage is not present at the TR OCU-R, check continuity of cable pair.
- If voltage is measured at the TR OCU-R, replace the unit.
- The TR OCU-R does not invoke a measurable short between tip and ring, thus cable resistance measurements must be made with a manually applied short, and the TR elements removed.

Power, but No Synchronization

- Check cable for load coils.
- Note signal meter reading on TR OCU-R during power up and synchronization process. Refer to *Signal Loss Indication* for definitions. Loop loss may be too great for synchronization to occur.
- Ensure loop length is within allowable deployment guidelines.
- Relocate the TR OCU-R to splice points sequentially closer to the TR DDS-DP to isolate suspect cable sections.

Excessive Errors On Loop

- Ensure background noise does not exceed 34 dBrn.
- Ensure impulse noise is not greater than -40 dBm (+50 dBrn). Note: measure noise with 50 kbit filter.
- Compare resistances of individual conductors. If these are different, high-resistance or intermittent opens may be indicated. A TDR is commonly required to find such faults.

Trouble Codes

The TR OCU-R transmits an ASC (9Eh) trouble code towards the network from the customer premises for the following fault conditions:

- 4-wire customer interface loss of signal
- Invalid 4-wire interface framing (may be due to mismatched Total Reach and DSU/CSU data rates)
- Open loop on the 4-wire customer interface
- During Customer loopback conditions initiated by the TR OCU-R

The TR DDS-DP transmits an MOS (9Ah) trouble code towards the network under similar 2-wire loop fault conditions.

Remote Access

The TR OCU-R responds to or supports the following:

- ADTRAN Digital System 6 Message Protocol
- TPI 108/109 and 105 portable test sets
- Hekimian React 2001 Release 1.900
- ANSI Standard T1.107-1995 "Digital Hierarchy Format Specifications Annex G"

INSERTION LOSS MEASUREMENTS

Total Reach Design Limits at Traditional 4-wire Frequencies

The table shown is for comparison only. The TR DDS system operates at 13.3 kHz for all customer data rates. Loss should not exceed 50 dB at 13.3 kHz.

Customer Rate	4-Wire Qualifying Frequency (kHz)	TR OCU Loss Limit (dB)
2.4	1.2	21
2.4/SC	1.6	23
4.8	2.4	26
4.8/SC	3.2	29
9.6	4.8	33.5
9.6/SC	6.4	37
19.2	9.6	44
19.2/SC	12.8	50
56	28.0	59
56/SC & 64	36.0	61

WIRING CONNECTIONS

Pair	Terminal Designation	T400 PIN#	Customer RJ-48
To/From Network	TT, TR	41,47	-
To Customer	DRT, DRR	5, 15	7, 8
From Customer	DTR, DTT	49, 55	1, 2

FRAME GROUND CONNECTIONS

	T400 PIN#
Frame Ground Connections	1, 17
	11, 27

WARRANTY

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. U.S. and Canada customer Faxback: 877-457-5007, Document 414.

TESTING GUIDE

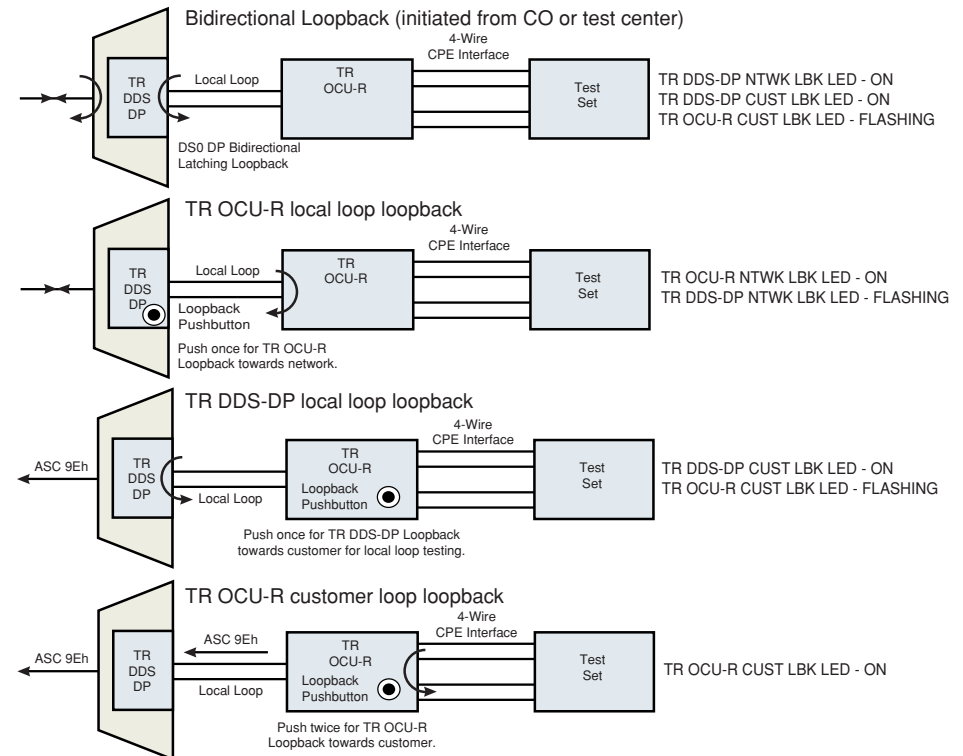
The TR OCU-R supports the following loopbacks and applications:

- Reverses sealing current on 4-wire interface in response to CSU Loopback command.
- OCU latching and non-latching loopbacks.
- NEI latching loopbacks (enabled/disabled via craft interface).
- Bidirectional loopback initiated at the TR DDS-DP.
- Remote end initiated loopbacks from TR DDS-DP.
- All existing Total Reach system loopbacks release in response to 35 DDS loop down TIP bytes, by pressing the LBK button on the TR DDS-DP or TR OCU-R, or via a terminal through the DB-9.
- Loopback tests may also be initiated via the craft interface by selecting "Loopbacks" from the main menu.
- ADTRAN's Protected Loopback supports the DDS Latching Loopback standard in T1E1.2/99-007R1.

Refer to loopback diagrams for all **LBK** pushbutton tests.

LBK & Pushbutton Tests

Successful loopback tests initiated by the **LBK** pushbutton will show the following LED indications:



COMPLIANCE REQUIREMENTS

CAUTION: This product for installation in a restricted access location in a Type B or E enclosure only.

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