TOTAL REACH® DDS-R

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TR DDS-R

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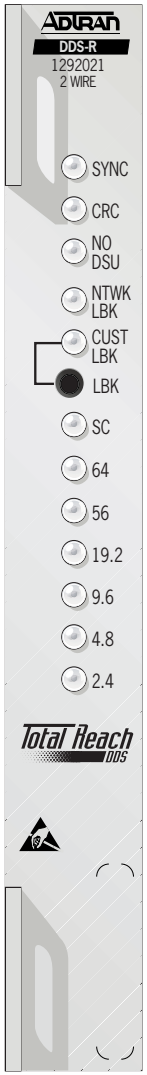


CAUTION!
SUBJECT TO ELECTROSTATIC DAMAGE OR DECREASE IN RELIABILITY.
HANDLING PRECAUTIONS REQUIRED.

STATUS LEDs

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

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

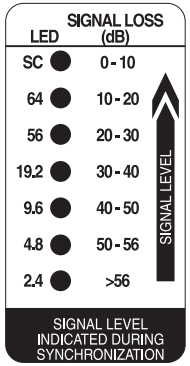
SIGNAL LOSS INDICATION

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.

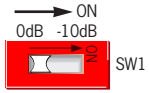


After synchronization one of the following rate LEDs will be On plus SC if selected:

SC	●	Green	Indicates Secondary Channel Selected
64	●	Green	64 kbps selected on TROCU DP office card
56	●	Green	56 kbps selected on TROCU DP office card
19.2	●	Green	19.2 kbps selected on TROCU DP office card
9.6	●	Green	9.6 kbps selected on TROCU DP office card
4.8	●	Green	4.8 kbps selected on TROCU DP office card
2.4	●	Green	2.4 kbps selected on TROCU 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 DSU/CSU.



FRONT PANEL LBK PUSHBUTTON SW2

Loopback pushbutton SW2 initiates loopback tests without CO or Test Center coordination. Refer to LBK Pushbutton in *Testing* section.

DEPLOYMENT GUIDELINES

- All loops must be non-loaded.
- 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 dBrn.
- Impulse noise should not exceed -40 dBm (+50 dBrn).

INSTALLATION & TURNUP

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

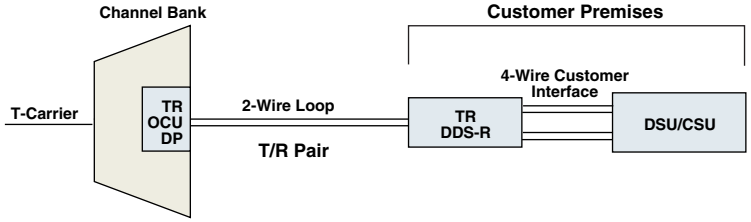
Installation assumes the TROCU DP is installed and the backplane is active.

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 DDS-R into its designated slot ensuring the edge connector seats firmly into the backplane.
4. Data rate is automatically selected by the TROCU DP.
5. After insertion the TR DDS-R will run a self-test during which all LEDs undergo an On/Off sequence. Refer to *Status LEDs* for descriptions.
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 the *Troubleshooting Guide* section.

TYPICAL APPLICATION



TROUBLESHOOTING GUIDE – CONTINUED ON BACK

No Power at the TR DDS-R

- Ensure TROCU DP is supplying necessary voltage to power the TR DDS-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 DDS-R.
- If voltage is not present at the TR DDS-R, check continuity of cable pair.
- If voltage is measured at the TR DDS-R, replace the unit.
- The TR DDS-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.

■ For a complete Installation and Maintenance Practice faxback: (877) 457-5007, Document #705. Please have your fax number available. ■

Power, but No Synchronization

- Check cable for load coils.
- Note signal meter reading on TR DDS-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 DDS-R to splice points sequentially closer to the TROCU 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 DDS-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.
- The TROCU DP transmits an ASC (9Eh) trouble code towards the network under similar 2-wire loop fault conditions.
- ASC (9Eh) is transmitted to the network during loopback conditions initiated by the TR DDS-R.

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 DDS 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 Connection	1, 11, 17, 27

WARRANTY

Warranty for Carrier Networks products manufactured by ADTRAN and supplied under Buyer's order for use in the U.S. is ten (10) years. For a complete faxback copy of ADTRAN's *U.S. and Canada Carrier Networks Equipment Warranty*, call (877) 457-5007, Document #414.

TESTING GUIDE

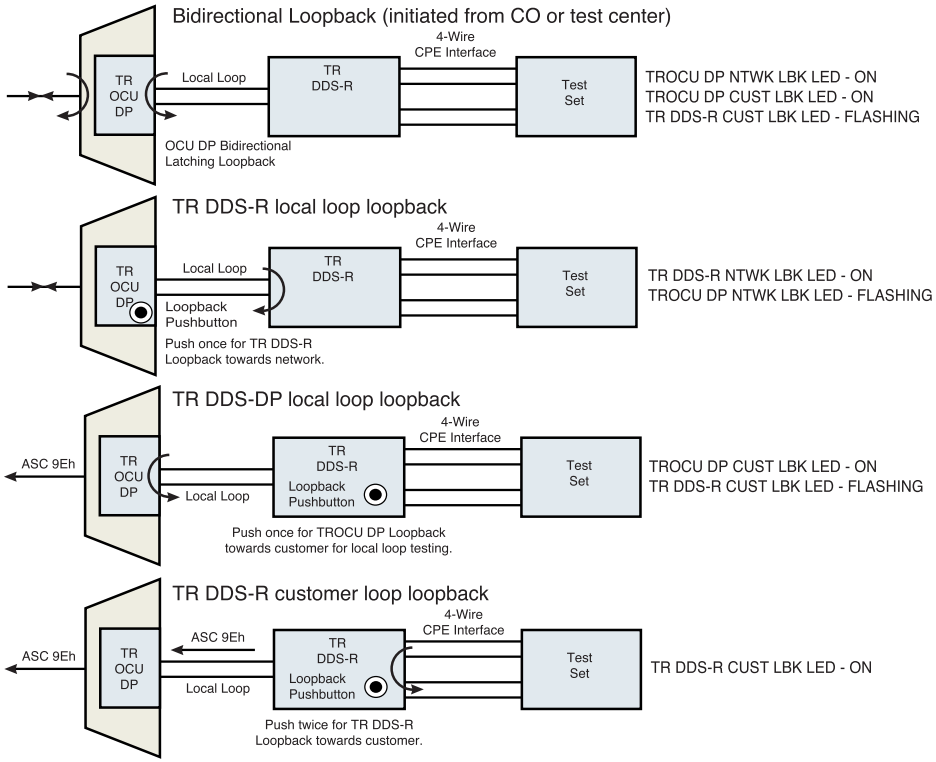
The TR DDS-R supports the following loopbacks and applications:

- Reverses sealing current on 4-wire interface in response to CSU loopback command.
- Responds to NEI latching loopback at all data rates.
- ADTRAN's Protected Loopback supports the proposed DDS Latching Loopback standard in T1E1.2/99-007R1.
- Bidirectional loopback initiated at the TROCU DP.
- Remote end initiated loopbacks from TROCU DP.
- All existing Total Reach system loopbacks release in response to 35 DDS loop down TIP bytes, by pressing the LBK button on the TROCU DP or TR DDS-R.

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	–