

Series 5 Total Reach DDS-DP Total Reach® All-Rate DDS Dataport Installation and Maintenance

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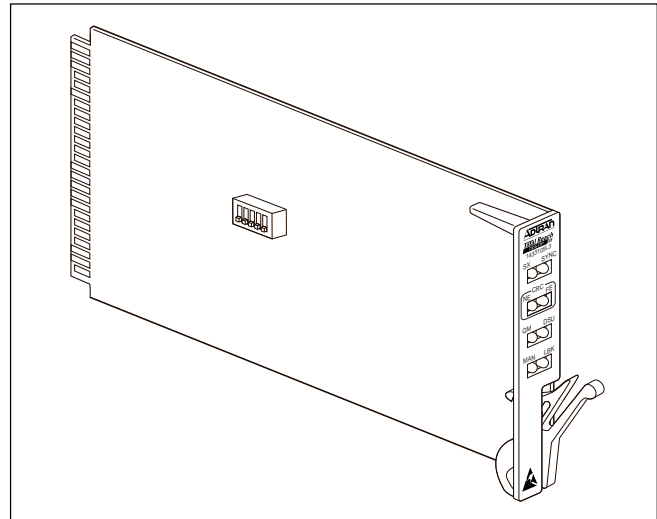


Figure 1. Series 5 Total Reach DDS-DP

The ADTRAN Series 5 Total Reach DDS-DP occupies a single channel position in the AT&T® SLC Series 5 or Series 5 compatible channel bank. It provides the interface between a DS0 timeslot of the T-carrier data stream and the two-wire metallic loop extending to the customer premises. The Series 5 Total Reach DDS-DP may interoperate over the carrier system with another Total Reach DDS-DP, OCU DP, DS0 DP, 1/0 DCS, or switch and may be located in an end office, hub office, intermediate office, or Digital Loop Carrier (Figure 2). The two-wire loop is connected using the odd pair Tip (pin 31) and Ring (pin 32) on the Series 5 backplane.

1. GENERAL

This practice provides installation and maintenance procedures for the ADTRAN Series 5 Total Reach® DDS-DP All-Rate DDS Dataport. Figure 1 is an illustration of the ADTRAN Series 5 Total Reach DDS-DP.

The ADTRAN Series 5 Total Reach DDS-DP is a functional replacement for the SLC® Series 5 OCU DP, CLEI 5SCU48, delivering data at rates up to 64 kbps using a single copper pair. Used in combination with the TRDDS-R termination unit, the Series 5 Total Reach DDS-DP can accommodate extended loop lengths, eliminating the need for DDS repeaters. The Series 5 Total Reach DDS-DP span powers the TRDDS-R located at the customer premises. The TRDDS-R converts the two-wire signal to the traditional four-wire Alternate Mark Inversion (AMI) signal for presentation to the customer.

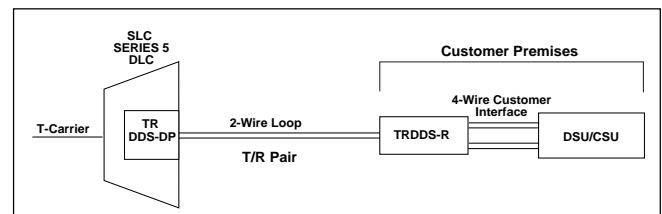


Figure 2. Total Reach DDS Circuit Diagram

NOTE

The Series 5 Total Reach DDS-DP must be used with an appropriate TRDDS-R unit.

Features

- Two-wire deployment
- Repeaterless operation
- Bridged tap tolerant
- Span power for remote TRDDS-R termination unit
- Utilization in SLC Series 5 channel bank
- Loop Quality Monitor and A/B signaling options
- Bidirectional OCU loopback capability

2. OPTIONS

The Series 5 Total Reach DDS-DP is provisioned through the SLC Series 5 system and an on-board dual in-line package (DIP) switch. SW1 provides feature options not available through the SLC Series 5 channel bank intelligent system. Use the SLC Series 5 Craft Interface Unit (CIU) to provision intelligent channel bank features supported by the Series 5 Total Reach DDS-DP. See Figure 3 and Table 1 for option description and provisioning.

NOTE

Select **OCU DP, CLEI 5SCU48, when provisioning via the CIU.**

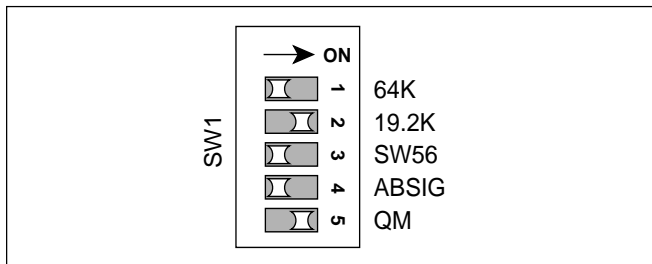


Figure 3. Option Switch

Error Correction

When error correction is enabled, the Series 5 Total Reach DDS-DP provides an error detection and correction capability that maintains data integrity across the carrier facility. For subrate and 19.2 kbps rates, error correction and data transmission is accomplished over a single DS0 time slot using a Majority Vote Error Correction (MVEC) algorithm. For error correction at these rates, MVEC must be selected in the BCU via the SLC Series 5 CIU.

Software Provisioning via Series 5 Bank Controller Unit (BCU)	
Function	Description
Rate	Select 2.4, 4.8, 9.6, or 56 kbps
Error Correction (EC)	Select MVEC for 2.4, 4.8, 9.6, 19.2 Select SCEC for 56 & 64
Zero Code (ZC)	Yes or No
Secondary Channel (SC)	Yes or No
Hardware Provisioning via Series 5 Total Reach DDS-DP SW 1	
64K	SW1-1 (64K) ON selects 64 kbps Clear Channel
19.2K ¹	SW1-2 (19.2K) ON selects 19.2 loop rate
Switched 56	SW1-3 (SW56) ON enables Switched 56 OFF disables Switched 56
A/B Signaling	SW1-4 (ABSIG) ON maintains A/B signaling OFF transparent to signaling
Quality Monitor	SW1-5 (QM) ON enables Quality Monitor OFF disables Quality Monitor
¹ For 19.2 kbps Error Correction select 19.2 on SW1 and enable 9.6 MVEC with the SLC Series 5 CIU.	

For rates of 56 and 64 kbps, error correction requires one additional DS0 time slot for the error correcting parity byte. The Series 5 Total Reach DDS-DP only allows SCEC, the parity byte error correction scheme, at 56 and 64 kbps. When error correction is desired for 19.2 kbps service, provision 9.6 kbps and MVEC via the CIU and select 19.2 on SW1.

Zero Code

When Zero Code is enabled, the Series 5 Total Reach DDS-DP allows DS0 bytes of all zeros to enter the T-carrier data stream. On Alternate Mark Inversion (AMI) facilities, this function should be disabled. B8ZS carrier facilities that accommodate 64 kbps clear channel operation do not require the zero code to be suppressed, therefore zero code is automatically enabled when the 64 kbps rate has been selected.

NOTE

Only one rate should be selected. Service rates of 64 kbps, 19.2 kbps, and Switched-56 are not supported by the SLC Series 5 BCU. These operating modes must be provisioned by enabling switches on SW1. A manual rate setting overrides BCU rate settings. The Series 5 Total Reach DDS-DP does not support 38.4 kbps.

When 64K (SW1-1) is ON, the Series 5 Total Reach DDS-DP operates at 64K Clear Channel.

When 19.2K (SW1-2) is ON, the Series 5 Total Reach DDS-DP operates at 19.2 kbps.

When SW56 (SW1-3) is ON, the Series 5 Total Reach DDS-DP enables Switched-56 operation.

When A/B SIGNALING (SW1-4) is OFF, the unit derives signaling from the incoming data stream. When A/B SIGNALING is ON, the unit determines the state of the A and B signaling bits using signals present on the backplane of the channel bank. This method assumes that proper signaling has been maintained throughout network tandems and cross-connect systems.

NOTE

A/B option is only applicable when SW56 is selected; otherwise it is a “don’t care.”

When QUALITY MONITOR (SW1-5) is ON, the Series 5 Total Reach DDS-DP monitors the incoming two-wire loop and four-wire customer interface data for errors. If excessive errors are detected, the unit blocks the customer’s data transmission and sends Abnormal Station Code to the network. Customer data transmission is automatically restored when the trouble condition is cleared.

3. INSTALLATION



The ADTRAN Series 5 Total Reach DDS-DP plugs directly into a SLC Series 5 channel bank. No special wiring is required. The two-wire loop uses the T/R (Tip and Ring) of the odd pair, pins 31 and 32 of the SLC Series 5 backplane. The TRDDS-R is not polarity sensitive, therefore the Series 5 Total Reach DDS-DP will operate even when the T/R pair is reversed.

Span powering is accomplished using -130 V, measured from Tip to Ring. Voltage measured from Tip to GND should indicate approximately -130 V; voltage from Ring to GND should indicate approximately 0 V.

NOTE

The Series 5 Total Reach DDS-DP and TRDDS-R typically require 30 to 90 seconds to achieve synchronization. Once synchronized, the SYNCLOSS indicator LED will turn off. If synchronization cannot be achieved, check the T/R pair for open or short circuit conditions or load coils (See Table 2).

Table 2. LED Indicators

INDICATOR	DESCRIPTION
SX	ON indicates no sealing current present on the local loop; check for continuity and proper DDS termination at remote end (TRDDS-R).
SYNC	ON indicates that there is no sync between the TRDDS-DP and the remote TRDDS-R; check for continuity, load coils, and other abnormal line conditions.
NE CRC	ON indicates that there are errors on the incoming data stream; check for the abnormal line conditions closer to the TRDDS-DP (NEAR END).
FE CRC	ON indicates that there are errors occurring towards the remote TRDDS-R; check for the abnormal line conditions closer to the TRDDS-R (FAR END).
QM	ON indicates that the Quality Monitor Disconnect has occurred.
DSU	Yellow indicates the absence of the customer DSU/CSU as determined by the TRDDS-R. Disconnected DSU/CSU, invalid framing pattern, or no RX signal from the DSU/CSU triggers a yellow LED. Green indicates presence of the customer DSU/CSU as determined by the TRDDS-R.
MAN	ON indicates rate has been manually selected using SW1.
LBK	ON indicates the OCU or CSU loopback activation.

4. TESTING

Testing for the Series 5 Total Reach DDS-DP is accomplished using the same test procedures for four-wire OCU and OCU DP units.

NOTE

If 64 kbps is selected, the unit will only respond to latching loopback sequences. Alternating sequences are not valid at this rate.

Total Reach DDS-DP Bidirectional Loopback Support

The Series 5 Total Reach DDS-DP will execute a bidirectional loopback when performing an OCU loopback, as shown in Figure 4. If the TRDDS-R detects a bidirectional loopback during power up synchronization, the TRDDS-R allows data to pass on the four-wire interface by entering into the pass-thru mode (Figure 5). This allows a standard portable DDS test set, connected to the four-wire customer interface of the TRDDS-R, to verify the integrity of the two-wire loop by transmitting a test pattern and examining the returning data for synchronization and errors. The Series 5 Total Reach DDS-DP LBK indicator will illuminate during this test mode.

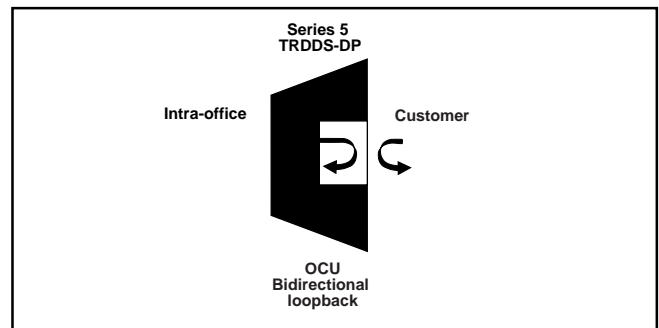


Figure 4. OCU Loopback at the TRDDS-DP

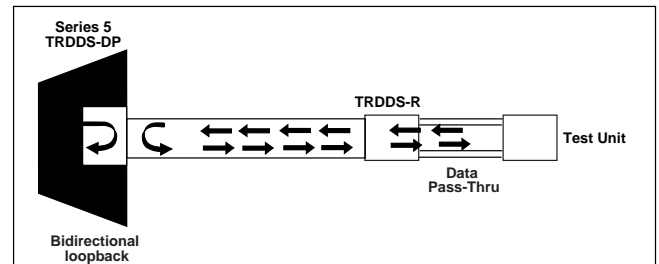


Figure 5. Total Reach DDS-DP Bidirectional Loopback Pass-Thru Mode

If an OCU loopback is invoked after the TRDDS-R achieves synchronization, the TRDDS-R will not pass or receive data from the CPE or DDS test set. This is consistent with current DDS testing methods and is referred to as the bidirectional loopback normal mode (Figure 6). For testing purposes, the installer may choose to initiate the TRDDS-R to pass-thru mode. Once the bidirectional loopback is executed in normal mode, unseat and reseat the TRDDS-R and allow the unit to train up. Once trained, the unit will revert to pass-thru mode for further testing.

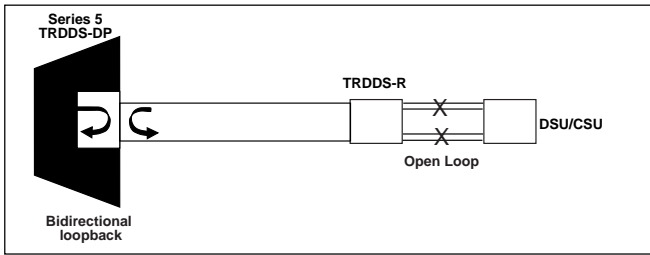


Figure 6. Total Reach DDS-DP Bidirectional Loopback Normal Mode

5. DEPLOYMENT GUIDELINES

The Series 5 Total Reach DDS-DP and TRDDS-R use technology intended to eliminate the need for repeaters and concerns over impairments caused by typical noise and bridged tap. Listed below are the loop design guidelines for TRDDS (see Tables 3 and 4 for more information):

- All loops must be nonloaded.
- Actual Measured Loss (AML) should not exceed 50 dB at 13.3 kHz (135 Ω termination), the Nyquist frequency of TRDDS.

NOTE

The 50 dB AML limit includes 6 dB of signal margin to account for potential near-end cross talk (NEXT) from other digital services that may be provisioned in the same binder group.

- Loop length should not exceed 50 kft.
- Bridged tap length should not exceed 12 kft.
- Background noise level should not exceed 34 dBm.
- Impulse noise should not exceed -40 dBm, (+50 dBm).

NOTE

Measure noise with 50 kbit weighting characteristic approximating a filter with a passband of 40 Hz to 30 kHz. Background noise level or impulse noise level is referenced from 56/64 kbps data rate in TR62310.

Table 3. Cable Type and Temperature Loss Data @ 13.3 kHz

PLASTIC CABLE	dB LOSS/kft	PAPER CABLE	dB LOSS/kft
19 Gauge PIC (0F)	0.5302	19 Gauge PULP (0F)	0.5616
19 Gauge PIC (70F)	0.6083	19 Gauge PULP (70F)	0.6415
19 Gauge PIC (120F)	0.6610	19 Gauge PULP (120F)	0.6955
22 Gauge PIC (0F)	0.912	22 Gauge PULP (0F)	0.9454
22 Gauge PIC (70F)	1.0258	22 Gauge PULP (70F)	1.0606
22 Gauge PIC (120F)	1.1015	22 Gauge PULP (120F)	1.1370
24 Gauge PIC (0F)	1.2571	24 Gauge PULP (0F)	1.2900
24 Gauge PIC (70F)	1.3982	24 Gauge PULP (70F)	1.4324
24 Gauge PIC (120F)	1.4917	24 Gauge PULP (120F)	1.5268
26 Gauge PIC (0F)	1.6823	26 Gauge PULP (0F)	1.6751
26 Gauge PIC (70F)	1.8568	26 Gauge PULP (70F)	1.8469
26 Gauge PIC (120F)	1.9718	26 Gauge PULP (120F)	1.9608

Table 4. Series 5 Total Reach DDS Insertion Loss Measurements

Total Reach DDS 13.3 kHz compared to 28 kHz for traditional DDS service		
Line Configuration	@ 13.3 kHz	@ 28 kHz
27 kft 26 AWG	50.12 dB	65.35 dB
36.25 kft 24 AWG	50.00 dB	62.50 dB
50 kft 22 AWG	50.24 dB	59.33 dB

6. 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 Network Equipment Warranty, Repair, and Return Policy and Procedure*, document 60000087-10A).

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 Technical Support

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Standard hours: Monday-Friday, 7 a.m.-7 p.m. CST

Emergency hours: 7 days/week, 24 hours/day

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