

## FramePort Total Reach® SDSL, D4 Installation and Maintenance

### CONTENTS

1. GENERAL .....	1
2. INSTALLATION .....	2
3. OPERATION .....	3
4. TESTING .....	5
5. MAINTENANCE .....	6
6. SPECIFICATIONS .....	6
7. WARRANTY AND CUSTOMER SERVICE .....	6

### Figures

Figure 1. FP TR SDSL .....	1
Figure 2. Frame Access DSL Applications .....	2
Figure 3. Establishment of Management Addressess ..	3
Figure 4. Loopback and Pattern Points for Fault Isolation .....	6

### Tables

Table 1. LED Indicators .....	3
Table 2. DLCI Map .....	5
Table 3. FramePort TR SDSL, D4 Specifications ....	7

### 1. GENERAL

This Practice provides installation and maintenance information for the ADTRAN D4 FramePort Total Reach SDSL (P/N 1100049L1). The FP TR SDSL is illustrated in **Figure 1**.

#### Revision History

This is the initial release of this document. Future revisions will be explained in this subsection.

#### Features

- D4 form factor
- 24 SDSL subscriber ports per DS1 digroup
- Embedded SNMP and Telnet agents
- Frame relay features for business class traffic priority
- Software upgradable
- Interfaces with end user equipment to provide V.35, 10baseT, or DSX-1 interfaces

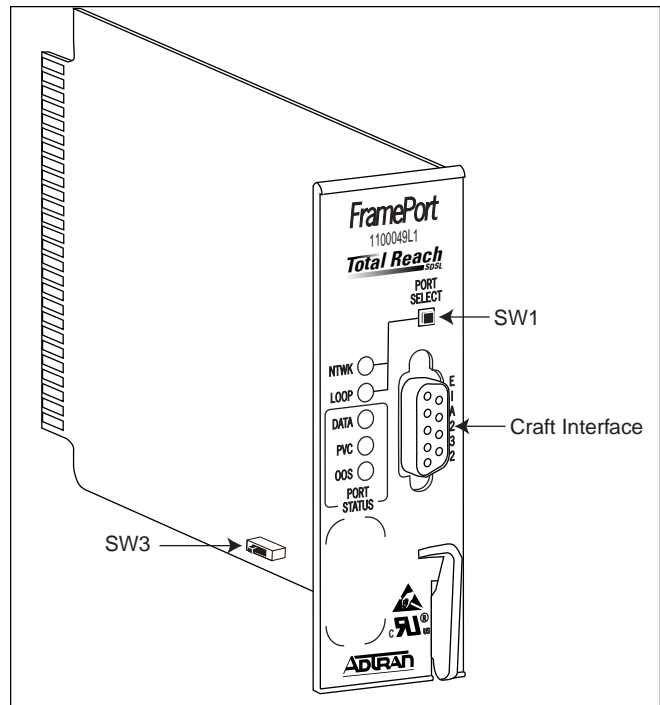


Figure 1. TR SDSL

#### Description

The FP TR SDSL is a single SDSL interface D4 unit that converts an existing D4 channel bank into a frame relay multiplexing platform. The FP TR SDSL can be provisioned for rates of 160, 256, 384, 512, and 768 kbps and uses Simple Network Management Protocol (SNMP), Telnet, or craft interface to provision, test, and monitor performance and alarms. The FP TR SDSL requires no local provisioning, and there are no channel bank common equipment or wiring changes necessary.<sup>1</sup>

Total Reach SDSL is a variable rate/variable range line coding technology that allows a service provider to lower bit rates to achieve increased deployment distances. TR SDSL is spectrally compatible with common existing services including HDSL/HDSL2, and ADSL. TR SDSL uses Trellis coding and Pulse Amplitude Modulation to increase transport speeds

<sup>1</sup> Clear channel capable common equipment required. DS1 should be provisioned for ESF and B8ZS.

beyond traditional AMI and 2B1Q implementations. Copper facilities qualified for Basic Rate ISDN can be used to deploy 384 kbps services using TR SDSL.

**NOTE**

**All cards in the ADTRAN FramePort family will interoperate within the same channel bank or digroup. The FramePort family of cards will not operate within the same digroup as standard “channelized” D4 units.**

The FP TR SDSL is designed for use in the AT&T/WECO compatible channel bank and the ADTRAN ACT 1900 (P/N 1150051L1) and 2300 (P/N 1150050L1) channel banks. Compatible end user and network equipment includes:

- Total Reach FNID , P/N 1245305L1
- Express 6201, P/N 1200461L1

**Figure 2** shows a typical FP TR SDSL implementation. The FP TR SDSL delivers data to the end user unit at rates of 160, 256, 384, 512, and 768 kbps. The SDSL modem (P/N 1200461L1) provides a 10Base T interface to the customer Network Interface Card (NIC) or LAN hub device.

**2. INSTALLATION**



After unpacking the unit inspect it for damage. If damage is noted, file a claim with the carrier, then notify ADTRAN. See *Warranty and Customer Service*.

**DIP Switch SW3**

Prior to installation, position DIP switch SW3 to either SPAN or SC. SPAN enables -137 Vdc span power. SC provides -48 Vdc sealing current. Refer to *Span Power Option* subsection.

**Central Office Installation**

Insert the FP TR SDSL into the designated channel bank slot in the D4 digroup. The front panel LEDs (**Table 1**) will cycle through a self test.

- When the NTKW LED is On, the OOS LED will be Off unless the digroup is in alarm or test. When the unit has established communications with the frame relay switch the PVC LED will turn On.
- The PVC LED will turn On and the OOS LED will turn Off when the subscriber loop is properly terminated by the termination equipment. The PVC LED will not turn On until frame signaling can be established with the customer FRAD or router.

**NOTE**

**The FP TR SDSL requires common units with clear channel capability provisioned for ESF with B8ZS. OIU modules with alarm cutoff option should have the option set to OFF.**

**Channel Bank Operation Test**

To verify correct operation of channel bank commons, loop the DS1 towards the digroup. This allows the FP TR SDSL to recognize layer 2 frame signaling from itself causing the PVC LED on the NTKW side to turn On (in about one minute), verifying correct operation of the commons.

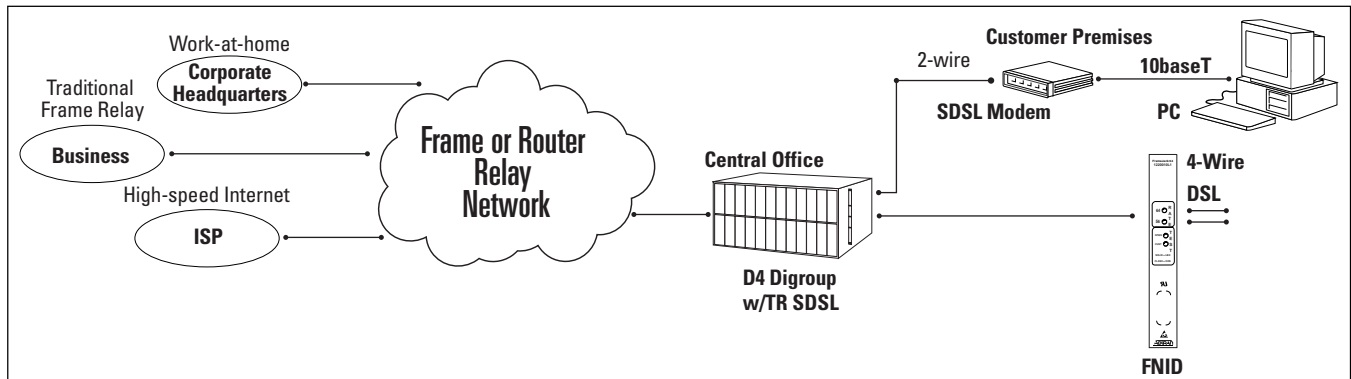


Figure 2. Frame Access DSL Applications

Table 1. LED Indicators

LED	Indicator	Description
NTWK	Green	Network interface-to-switch port status selected
LOOP	Green	Customer SDSL loop interface status selected
DATA	Green	Indicates data on selected physical port
PVC	Green	Indicates active PVC established on selected physical port
OOS (NTWK)	Red	T1 di-group in alarm or LMI signaling not established
OOS (LOOP)	Red	SDSL interface not in sync
OOS	Yellow	Test in progress

**SDSL Interface Connections**

The FP TR SDSL provides one multi-rate SDSL customer loop interface. This interface uses tip (pin 24) and ring (pin 51) of the channel bank backplane.

**Port Select Switch**

To obtain interface status, depress the front panel Port Select pushbutton (SW1) to select between the

customer loop interface and the network interface. The associated LED turns On to indicate which interface is selected. The Port Status LEDs in Table 1 provide status of the selected interface.

**3. OPERATION**

**Digroup Configuration**

The FP TR SDSL is managed inband with TELNET or SNMP. To configure a digroup for service, connect the T1 of the digroup to a T1 port on the Frame Relay switch and provision both for ESF with B8ZS. Provision the T1 port of the Frame Relay switch or router as follows:

- Non-channelized operation (if a channelized interface port).
- Select desired frame relay interface type (UNI-DCE, NNI). The FramePort cards in the digroup will automatically detect the selected type.
- Select desired Local Management Interface (LMI) signaling protocol (Annex A, Annex D, or LMI). The FramePort cards in the digroup will automatically detect the selected protocol.
- Configure a PVC between the Network Operation Center and the digroup equipped with TR SDSL. DLCI 900 is recognized by the digroup as the management PVC. A single IP address is required to manage the digroup and all channel units. See **Figure 3**.

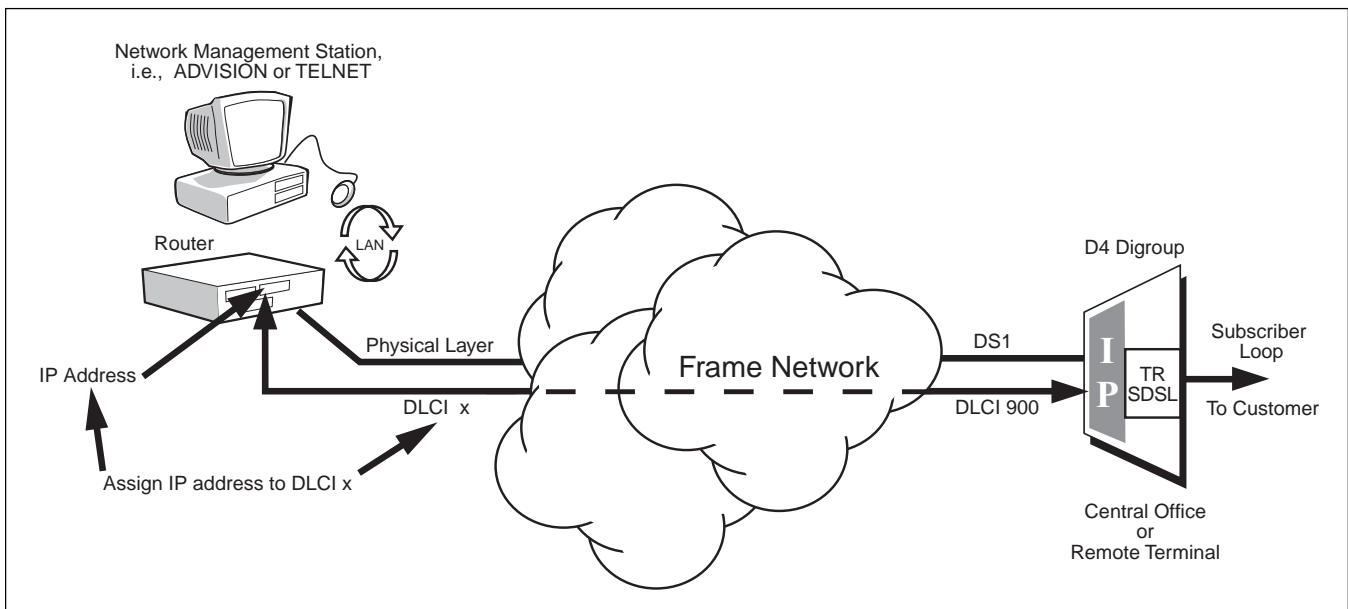


Figure 3. Establishment of Management Addresses

- From the Network Operations Center, assign an IP address with the PVC connecting to DLCI 900 of the D4 digroup through a router. Specify RFC 1490 (or IETF) encapsulation for this router port. The D4 digroup will automatically assume the IP address.

Upon establishment of the management PVC to the D4 digroup, the digroup should be configured for trap destination address (up to four are allowed) and tftp software upgrade address (if desired). This may be accomplished through ADVISION, TELNET access, or local faceplate craft interface. The lowest number slot assumes control of the digroup and can be configured for trap and tftp addresses; chassis level parameters are read only for non-master channel units. It is necessary to establish trap and tftp addresses only upon digroup installation; it is not necessary to configure those addresses each time an FP TR SDSL is added to the digroup.

### SNMP Access

The FramePort family of cards is equipped with an integrated SNMP agent. As such, no additional proxy device is needed to access any FramePort unit. The FramePort family of cards supports management information base (MIB-II) as well as an enterprise MIB for provisioning, test, and additional performance data. FramePort unit MIBs are integrated into ADVISION management software and are also available from ADTRAN upon request.

### TELNET Access

The FramePort family of products supports inband TELNET for configuration, testing, and performance monitoring. Each unit in the digroup can be selected individually with up to four Telnet sessions per unit. Multiple TELNET sessions are allowed concurrently to different units in the digroup. FramePort units are designated by the digroup IP address (refer to *Digroup Configuration*) and the physical slot number. The syntax for invoking a Telnet session is as follows:

```
telnet <ip address> 2000 + Slot Number
```

The following command example invokes a TELNET session with a FramePort unit in physical slot 5 of the digroup associated with the IP address of 206.26.160.61:

```
telnet 206.26.160.61 2005
```

Digroup level parameters are accessed using the port value of 2000. To TELNET to the master channel unit controlling digroup parameters, type:

```
telnet <ip address> 2000
```

The master unit will always be the unit installed in the lowest numbered slot in the digroup.

Once the Telnet session has been established, enter the LOGIN PASSWORD “frameport” at the prompt to access the main menu (pressing <ENTER> at the login prompt will give the user Read-Only access). This password can be changed if desired by accessing the main menu through the craft interface.

### Craft Interface

The FP TR SDSL products can be configured, tested, and monitored locally through the Craft Interface. To access the Craft Interface, first connect a VT-100 terminal to the front panel DB9 connector as shown in Figure 1. Configure the VT-100 for 9600 bps, 8 bits, no parity, and 1 stop bit. Enter the login password “frameport” to access the main menu (pressing <ENTER> at the login prompt will give the user Read-Only access).

### PVC Optioning

The FP TR SDSL uses fixed DLCI assignments toward the network based on the slot number of the digroup. This technique ensures a predictable, pre-assigned addressing scheme to ease provisioning concerns. Customer-side DLCI assignments always default to 100-131 regardless of slot or port. This technique ensures “plug and play” operations with the SDSL modem and can be configured to any value within standard DLCI range. However, no port should have more than one PVC with the same DLCI. The Total Reach SDSL maps customer DLCI assignments to network DLCI assignments. **Table 2** provides DLCI assignments for each slot and port.

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#### NOTE

**It is not necessary to configure all DLCIs upon installation. DLCIs (PVCs) can be assigned on an as-needed basis.**

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In accordance with ITU CCITT Recommendations I.370, the FP TR SDSL uses the following parameters to prioritize traffic flow from the customer toward the network.

Table 2. DLCI Map

Slot	Network DLCIs
1	32-63
2	64-95
3	96-127
4	128-159
5	160-191
6	192-223
7	224-255
8	256-287
9	288-319
10	320-351
11	352-383
12	384-415
13	416-447
14	448-479
15	480-511
16	512-543
17	544-575
18	576-607
19	608-639
20	640-671
21	672-703
22	704-735
23	736-767
24	768-799

- CIR - Committed Information Rate
- Bc - Committed Burst Size
- Be - Excess Burst Size
- TC - Time Constant

FP TR SDSL provides the QOS (Quality Of Service) option as another prioritization parameter. QOS can be selected from four levels of priority:

- Internet (lowest priority)
- SNA
- TCP/IP
- Voice/Video (highest priority)

The following equations provide a guideline for provisioning the FP TR SDSL PVC:

1.  $Bc + Be \leq$  Access rate or port speed
2.  $CIR = Bc/Tc$ , so in most cases  $CIR = Bc$
3. If  $CIR = Bc = 0$ , then policing function is turned OFF, and traffic is transmitted in “best effort fairness” mode
4. Cumulative digroup  $CIR \leq 1.536$  Mbps, although CIR can be oversubscribed if desired

The provisioning of the FP TR SDSL affects traffic priority only at the digroup level. Parameters are not passed to the frame relay switch or router. It is recommended that the PVC options for the FP TR SDSL reflect the same settings for the frame relay switch or router.

#### Span Power/Sealing Current Option

The FP TR SDSL has span power capability. When SPAN is selected on SW3, -137 Vdc is provided towards the customer side thus powering any single downstream device. The FP TR SDSL master unit monitors the number of span powering units in a digroup and will not source span-powering current if the digroup power budget is exceeded.

When SC is selected, -48 Vdc sealing current is provided. Select sealing current when connecting directly to the SDSL modem or a locally powered device.

#### 4. TESTING

Circuit testing is conducted via any of the following:

- ADVISION (or other SNMP-based system with appropriate enterprise MIB support)
- TELNET
- Front panel DB9 craft interface.

The FP TR SDSL supports loopback testing for NID, modem, and extenders if installed. **Figure 4** shows test loopback points for fault isolation. From the main menu choose “test” to access testing options.

The LOOPBACK and PATTERN TEST automatically generates a test pattern and sends a loopback command pattern to the device (at the selected address) to verify

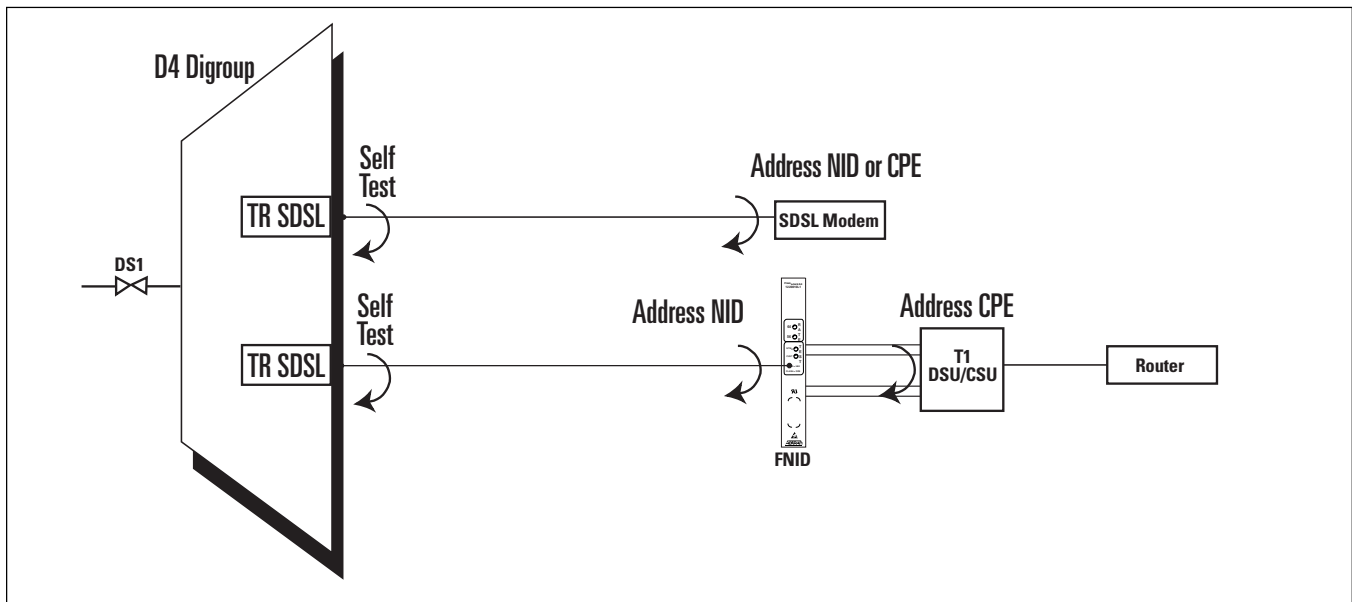


Figure 4. Loopback and Pattern Points for Fault Isolation

data integrity. The PATTERN ONLY command is used to verify a circuit on a device where loopbacks cannot be initiated remotely. This test requires the loopback to be established manually at the desired location. Errors may be injected using the INJECT ERROR command to verify proper test operation. The CLEAR ERROR command may be used to clear accumulated test errors. The LOOP TO CUSTOMER command loops customer data back at the port. This can be used when a test pattern is initiated from the field. The error counter, INJECT ERROR, and CLEAR ERROR fields are not valid for this test.

## 5. MAINTENANCE

The FP TR SDSL does not require routine maintenance for normal operation.

## 6. SPECIFICATIONS

Refer to **Table 3** for TR SDSL, D4 specifications.

## 7. 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 60000087-10A).

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:

### Part Number

1100049L1

### ADTRAN Sales

Pricing and Availability  
(800) 827-0807

### ADTRAN Technical Support

Presales Applications/Post-sale 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

Table 3. FramePort TR SDSL, D4 Specifications

<b>Loop Interface</b>	
1 port per channel unit	
Line .....	Two-wire T/R
Operating Mode .....	Full Duplex
Data Rates .....	160, 256, 384, 512, and 768 kbps
Signal Format .....	TC PAM
<b>DS1 Facility Interface</b>	
Compatible with ADTRAN ACT 2300 channel bank (clear channel required)	
<b>Faceplate Indicators</b>	
NTWK .....	Network interface-to-switch port status selected
LOOP .....	Customer SDSL loop interface status selected
DATA .....	Indicates data on selected physical port
PVC .....	Indicates active PVC established on selected physical port
OOS .....	Out of sync on Test in progress
<b>Network Management</b>	
Integrated SNMP; ADTRAN Enterprise MIB	
Telnet	
<b>Frame Relay Protocols</b>	
Network .....	UNI DTE, NNI
Loop .....	NNI, UNI DCE, UNI DTE
Signaling .....	ANSI T1.617 Annex D CCITT Q.933 Annex A LMI Rev. 1.0
RFC 1490 Encapsulation	
RFC 1973 PPP/Frame Relay	
<b>PVC</b>	
32 PVCs per channel unit, 768 per digroup/DS1	
<b>Power</b>	
< 100mA @ -48 Volts; no bank fill restrictions	
<b>Compliance</b>	
UL 1459	
Bellcore 1089 Lightning and Power Cross	
NEBS level 3	
<b>Certification</b>	
Bellcore SR-2779 Frame Relay compliant	
<b>Environment</b>	
Operating Temperature .....	Operating (Standard): 0°C to 50°C;
Storage Temperature .....	-40°C to +85°C
Relative Humidity .....	Up to 95% non-condensing
<b>Mechanical</b>	
Physical .....	5/8"W x 2 1/2"H x 9 3/8"D