

TeleLite™

**DDS and Total Reach DDS Interface
Cards, models 720360xxx and
720370xxx**

Description and Installation Guide

925W720110-03E



Contents

Chapter 1 – General Information

1.1 Publication Information	6
1.2 About this Guide	7
Related Documentation	7
Positron Products and Services	7
1.3 Compliance Information	7
FCC Part 15	7
Laser Safety	7
Product Safety	8
NEBS Compliance	8

Chapter 2 – Overview

2.1 TeleLite System Introduction	10
Fiber Connectors	11
2.2 Introduction to the Data 56K DDS Total Reach Interface Card	12
DATA 56K DDS Total Reach Card Model Numbers	12
LED Indicator Description	13
Loop-back Mode (Station side Card)	14
RJ45 Pin-out Description	15
Specifications	16

Chapter 3 – Installation

3.1 Installing the DDS and Total Reach DDS Interface Cards	18
3.2 Wiring and Connections	20
Equipment-side Wiring Connections	20
Fiber Facility-side wiring Connections	20
3.3 Testing	20
3.4 Troubleshooting	20

Appendix A – Support and Warranty

Service and Support	22
TeleLite Warranty	23

Acronyms

AMI	Alternate Mark Inversion coding
ATIS	Association for Telecommunications Industry Solutions
CO	Central Office
CPE	Customer Premises Equipment
CPLD	Complex Programmable Logic Device
DC	Direct Current
DDS	Digital Data Service
DIP	Dual In-line Package
ESD	Electro-Static Discharge
FXO	Foreign Exchange Originating
FXS	Foreign Exchange Subscriber
GPR	Ground Potential Rise
HVI	High Voltage Interface
kbps	Kilobits per second
LED	Light-emitting Diode
LOS	Loss of Signal
NC	No Connection
PBX	Private Branch Exchange
POTS	Plain Old Telephone Service
PWR	Power
RRING	Receive Ring
RTIP	Receive Tip
RMA	Return Material Authorization
RTN	Return
RX	Receive
TRING	Transmit Ring
TTIP	Transmit Tip
TX	Transmit

Chapter 1

General Information

1.1 Publication Information

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Disclaimer Notice

Although Positron Inc. has made every effort to ensure the accuracy of the information contained herein, this document is subject to change without notice.

1.2 About this Guide

This guide introduces you to the TeleLite DDS and Total Reach DDS Interface Cards, models 720360xxx and 720370xxx, their features and applications, and describes how to install each in a TeleLite shelf. This guide was designed to be read from beginning to end.

1.2.1 Related Documentation

The other guides in the TeleLite set are listed below. To order any manuals, please contact your customer service representative.

- 720000 TeleLite 6-position Shelf
- 720002 cHVI 2-slot Rack-Mount Shelf
- 720013 3-slot Swing-out Shelf

1.2.2 Positron Products and Services

Positron engineers and manufactures insulation testing and high voltage isolation products to protect personnel and telecommunications circuits in high voltage areas that are susceptible to the effects of Ground Potential Rise (GPR).

Positron is the leader in isolation technology with its Teleline wireline products and TeleLite optical fiber wireline isolation/protection product families. Positron provides total flexibility in product configuration – from standalone units protecting a single circuit to high-capacity, multi-shelf HVI preconfigured systems.

Positron also provides a wide range of consulting, analysis and training services for communications companies, public safety and security organizations and electrical utilities.

Full details and contact information are available at www.PositronPower.com.

1.3 Compliance Information

1.3.1 FCC Part 15

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

1.3.2 Laser Safety

This laser class 1 product complies with 21 CFR 1040.10 except for deviations pursuant to Laser Notice No. 50, dated July 26, 2001.

1.3.3 Product Safety

This equipment is compliant with CSA CAN/CSA-C22.2 No. 60950-1-03

1.3.4 NEBS Compliance

This equipment has been tested and found to comply with the following Telcordia specifications:

- GR-63-CORE
- GR-1089-CORE
- GR-487-CORE

Chapter 2

Overview

2.1 TeleLite System Introduction

TeleLite provides electrical isolation between two points on a telecom landline. Its purpose is to increase electrical isolation between the CO (Central Office) side and Station side. The increase in electrical isolation is achieved by using a fiber optic link. The Station side unit is located either inside or outside the building. The CO side must be located far enough from the Station side so that the GPR does not increase above 300 V with respect to the CO.

The TeleLite system is divided into two parts: the **CO side unit** and the **Station side unit**. Each unit is composed of one shelf. Each shelf has six slots for line cards and one slot for a power connection. The shelf backplane does not provide for any telecom connection since all connections (except local power) will be made directly to the connectors, located on the front panel of each card.

The communications link between the CO side unit and the Station side unit supports single-mode or multi-mode fibers, depending on the customer installation.

NOTE | The appropriate fiber type must be used for each line card (multi-mode or single-mode).

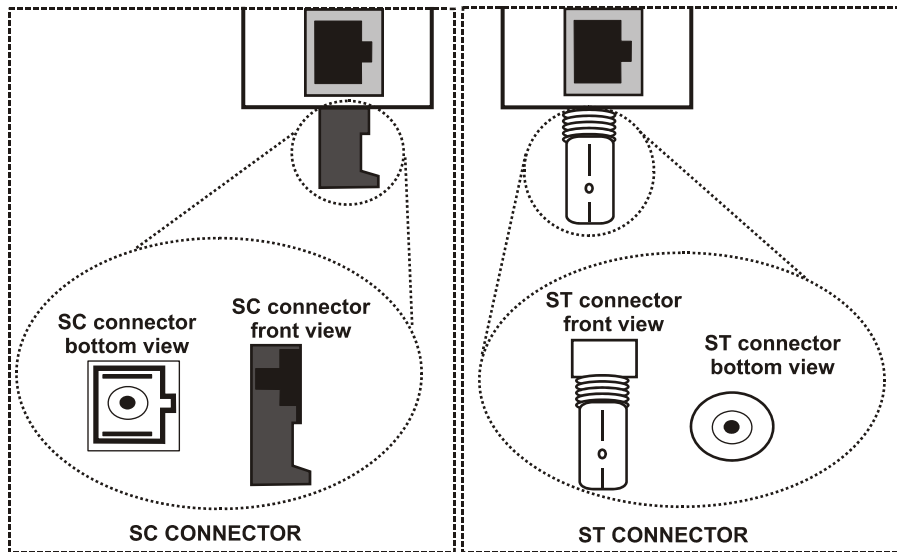
2.1.1 Fiber Connectors

The fiber interface is located on the bottom front panel of each plug-in card (except for the TeleLite Access and Power/Access interface cards). Each of these fiber interfaces will support one of two types of fiber connectors: ST or SC.

Table 1: Fiber Connectors

Fiber Connector	Description
SC	A plastic snap-on optic connector.
ST	An optical fiber connector used to join single fibers together at interconnects, or to connect them to optical cross connects.

Figure 1: SC and ST Fiber Connector Types



2.1.1.1 Multi-mode fiber type

For short distances, less than 3.3km (2 miles), the fiber type will be multi-mode using an 850nm wavelength LED.

2.1.1.2 Single-mode fiber type

For longer distances, up to 38km (23.5 miles), the fiber type will be single-mode using a 1310 nm wavelength laser.

2.2 Introduction to the Data 56K DDS Total Reach Interface Card

The DDS and Total Reach DDS (Digital Data Services) Card interfaces to the customer end of a DDS circuit or to the customer side of an Adtran Total Reach™ remote card which transmits DDS data over a switched network. It can send data at different rates from 2.4kb/s to 64kb/s.

NOTE | Use with Adtran Total Reach Card Part Number 1292023L5 (provides 12 mA at 30 V) or contact Positron for more information.

2.2.1 DATA 56K DDS Total Reach Card Model Numbers

For information consult our website: www.PositronPower.com or contact Positron customer support.

Table 2: Card Type and Model Numbers

Card Type	Model Number
Data 56K DDS Total Reach Card Station Multi-mode ST connector	720360MST
Data 56K DDS Total Reach Card Station Single-mode SC connector	720360SSC
Data 56K DDS Total Reach Card Central Office Multi-mode ST connector	720370MST
Data 56K DDS Total Reach Card Central Office Single-mode SC connector	720370SSC

2.2.2 LED Indicator Description

Table 3: Station Side Card Indicators

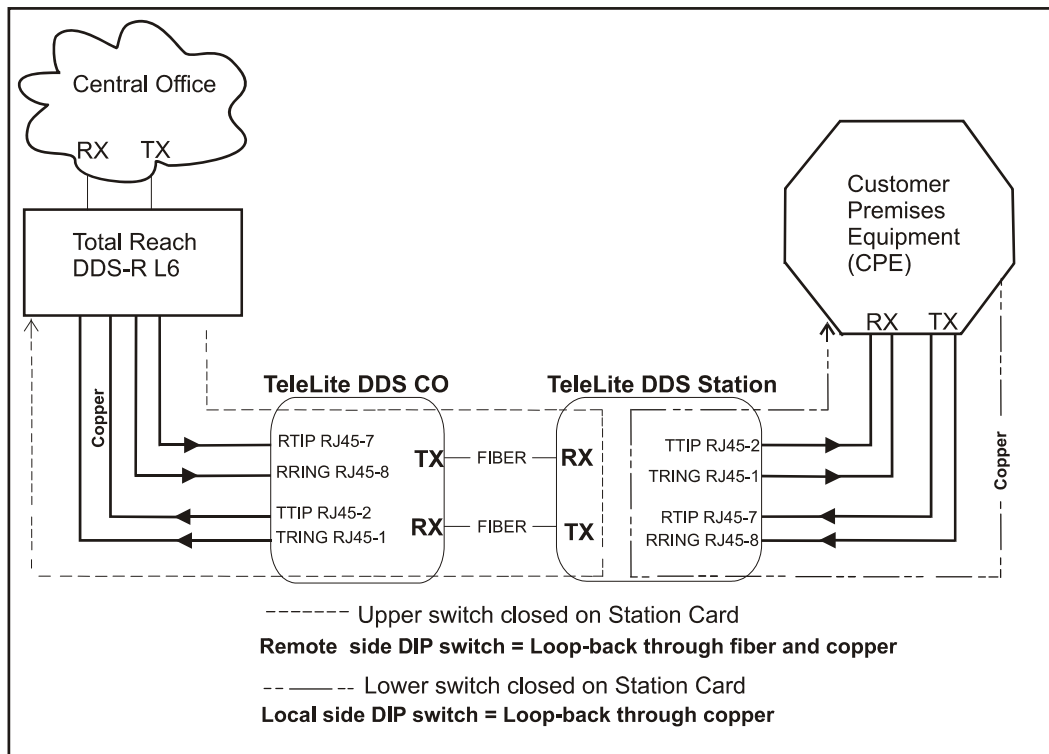
LED	Color	Function
Power	Red	Reset Active (insufficient power)
	Green	Normal (card is powered)
	Off	No power to the card
LOS	Off	No power
	Red	Loss of fiber signal
	Green	Normal operation
Alarm	Off	No alarm
	Amber	Minor alarm
	Red and relay active (on access card)	Loss of station copper RX or reset
RJ45 Upper	Red	Loop-back mode
	Green	Normal mode
	Off	Weak signal CO RX (copper)
RJ45 Lower	Green	Normal mode
	Off	Weak signal Station RX (copper)

2.2.3 Loop-back Mode (Station side Card)

When loop-back is activated from the station side card, the local loop-back DIP switch will activate a loop-back over copper toward the station side CPE.

When a remote loop-back is activated, the signal from the CO is looped back at the station card through the fiber and telco copper connection.

Figure 2: Data 56K DDS Total Reach Interface Card Set-up



2.2.4 RJ45 Pin-out Description

Figure 3: RJ45 Pin-out for Data 56K DDS Total Reach Interface Card

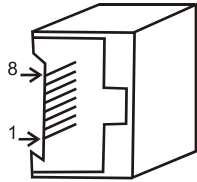


Table 4: RJ45 Pin-out Assignments

Pin	Signal (CO side)	Signal (Station side)
1	TRING	TRING
2	TTIP	TTIP
3	NC	NC
4	NC	NC
5	NC	NC
6	NC	NC
7	RTIP	RTIP
8	RRING	RRING

2.2.5 Specifications

Table 5: Electrical Specifications

Parameter	Specification
CO side power consumption	250 mW typical
CO side minimum current requirement	12 mA simplex
Line coding	AMI
Bit rate	2.4 kbps , 3.2 kbps, 3.5 kbps, 4.8 kbps , 5.4 kbps, 7.0 kbps, 14.0 kbps, 19.2 kbps , 25.6 kbps, 28.8 kbps, 38.4 kbps , 51.2 kbps, 56.0 kbps , 64.0 kbps
Rates in BOLD represent the ATIS T1.410 requirement	
Maximum copper length on CO side	4500 m (15,000 ft)
Maximum copper length on station side	615 m (2,000 ft) *the total copper length of CO + station should not exceed 15,000 ft

Table 6: Optical Specifications

Parameter	Specification
Fiber optic interface	ST/SC type connector
Transmitter wavelength	Multi-mode: 850 nm Single-mode: 1310 nm
Transmitter power output	Multi-mode: -19dBm Single-mode: -10dBm
Receiver sensitivity	Multi-mode: -35 dBm Single-mode: -35 dBm
Fiber optic type	Multi-mode fiber: 62.5/125 μm Single-mode fiber: 9/125 μm
Fiber span distance	Multi-mode: 3.3 km (2 miles) Single-mode: 38 km (23.5 miles)

Table 7: Environmental Specifications

Parameter	Specification
Operating temperature	-40°C to 65°C (-40°F to 149°F)
Storage temperature	-40°C to 85°C (-40°F to 185°F)
Humidity (non-condensing)	20% to 80%
Altitude	-60m to 3050 m (-200 ft to 10,000 ft) above sea level

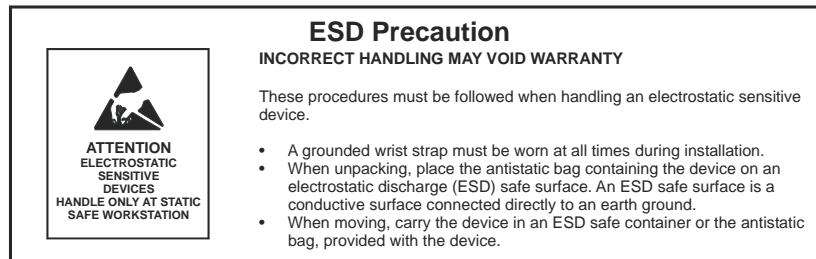
Chapter 3

Installation

3.1 Installing the DDS and Total Reach DDS Interface Cards

Follow the ESD precautions shown below.

Figure 4: ESD Precautions



► **To Install a TeleLite DDS and Total Reach DDS Interface Cards in a Shelf**

NOTE

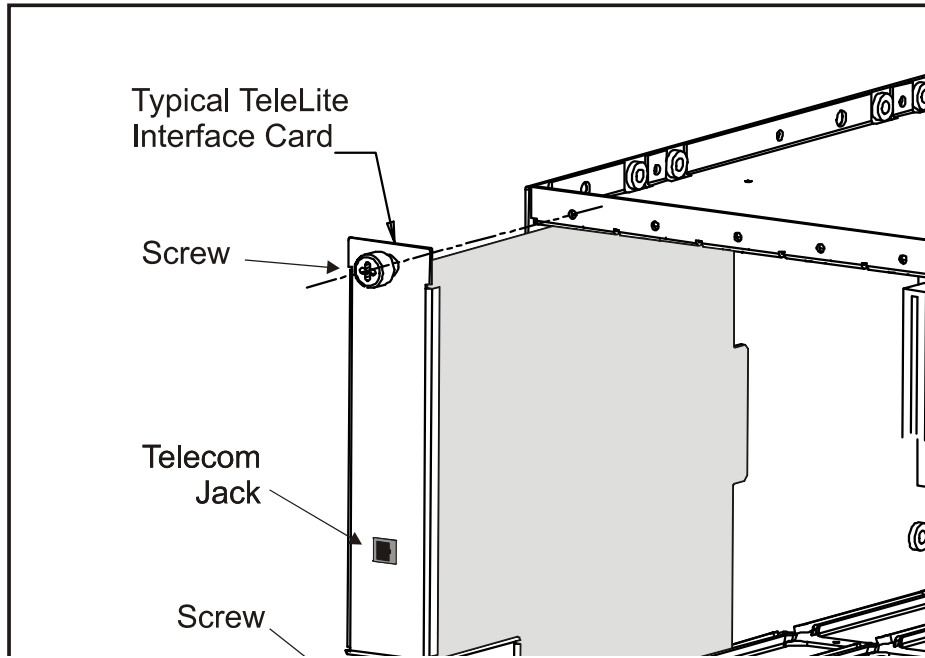
The installation procedure for CO and Station side cards is the same.

1. Take the card out from its protective packaging.
2. Make sure the card is right-side up, align the card with the appropriate slot of the shelf and slide it in.
3. Hand-tighten the top and bottom screws, to secure the card in place.
4. Connect cables to and from the fiber side using the SC or ST type connectors located on the bottom front panel of each card, then connect them to the TX and RX fibers.

Further information on connecting TX and RX fibers, can be obtained on our website: www.PositronPower.com.

5. Connect the phone line to the RJ45 connectors found on the face panel.

Figure 5: Installing an interface card in a TeleLite shelf



3.2 Wiring and Connections

3.2.1 Equipment-side Wiring Connections

Wiring to and from the equipment side (customer/network) is made through the RJ45 modular jacks located on the front panel of the card.

3.2.2 Fiber Facility-side wiring Connections

Wiring to and from the facility side is made through the SC or ST type connection located on the bottom front panel of each card. After making the connections, dress the cables through the cable notch on the right side of the shelf and secure the cable using a cable tie.

3.3 Testing

► To test the installation (Station Side Only)

1. Use a DC Volt meter to measure the voltage of the card, to verify the power (-48 Vdc) at the power supply terminal block on the front of the shelf's associated Access or Power/Access card, and to check the polarity settings.

Make sure that the LEDs have the following status:

- **PWR:** Green (normal mode)
- **LOS:** Green (normal mode)
- **Alarm:** Off (normal mode)

3.4 Troubleshooting

Before calling customer service:

- Ensure that the circuit cards are properly powered. On the Station side, power is obtained through the shelf's associated Access or Power/Access card. On the CO side, power is obtained through span power.
- Verify that the TX and RX connections are correct, on both copper and fiber side. See section 3.1 on page 18.

Appendix A

Support and Warranty

A 1 Service and Support

A 1.1 Positron Contact Information

General information:	Positron Inc. 5101 Buchan Street, Suite 220 Montreal, Quebec, Canada H4P 2R9 US and Canada: 1-888-577-5254 International: 1-514-345-2220 Fax: 514-345-2271 E-mail: info@positronpower.com Website: www.PositronPower.com
Customer Service and Repairs:	US and Canada: 1-888-577-5254 International: 1-514-345-2220 E-mail: customerservice@positronpower.com

A 1.2 Technical Customer Support

Positron is committed to providing excellent ongoing technical support to its customers. A team of specialists is always available for telephone consultations or for on-site visits to assist in the maintenance and troubleshooting of Positron equipment. For pricing information or assistance in the planning, configuration and implementation of the installation of equipment, contact Technical Customer Service.

A 1.3 Customer Training

Full customer training courses on High Voltage Interface (HVI) are also available. For more information, contact Positron.

A 1.4 Repair Service

All warranty repairs are performed at no cost. Positron reserves the right to repair or replace any equipment that has been found to be defective.

For information about out-of-warranty repairs, contact Positron's Repair department at 1-888-577-5254 (US and Canada) or 1-514-345-2220 (International). Due to the varied nature of repairs, no specific turnaround can be guaranteed, but average turnaround time is two weeks from date of receipt. In emergency situations, special arrangements can be made. All repaired items are warranted for a period of 90 days.

Before returning any items to Positron for repair, warranty repair or replacement, call the Repair department to obtain a Return Material Authorization (RMA) number. Parts returned without RMA numbers cannot be accepted. The RMA number must always be clearly marked on all boxes, crates, and shipping documents. Bulk repairs (more than five items) will require additional processing time, so please take this into consideration when requesting an RMA number.

To accelerate the repair process, whenever possible, include a report detailing the reason for return with the unit(s). Also, please include the name and phone number of a person who can be contacted should our Repair department need further information.

When packing items being returned for repair, please ensure they are properly packed to avoid further damage. TeleLite Interface cards should never be shipped while installed in a shelf; this will cause damage that can extend the repair period.

A 2 TeleLite Warranty

Subject to the provisions of this paragraph, Positron warrants that the equipment shall perform in accordance with Positron's specifications. The warranty remains valid for one (1) year from the date of shipment. The warranty fully covers workmanship, materials and labor. Positron shall, at its sole discretion, repair or replace the problem unit.

Freight costs to ship defective equipment to Positron are borne by the Customer, with return of replaced or repaired equipment to be at Positron's expense.

A 2.1 Limitation of Liability

Subject to anything to the contrary contained herein, Positron's sole obligation and liability and the customer's sole remedy for Positron's negligence, breach of warranty, breach of contract or for any other liability in any way connected with or arising out of, the equipment or any services performed by Positron shall be as follows:

- In all situations involving performance or non-performance of the equipment or any component thereof, the customer's sole remedy shall be, at Positron's option, the repair or replacement of the equipment or said component.
- For any other claim in any other way related to the subject matter of any order under, the customer shall be entitled to recover actual and direct damages; provided that Positron's liability for damages for any cause whatsoever, and regardless of the form of the action, whether in contract or in tort (including negligence), shall be limited to the value of the order.

Positron shall not be obligated to repair or replace any item of the equipment which has been repaired by others, abused or improperly handled, improperly stored, altered or used with third party material or equipment, which material, or equipment may be defective, of poor quality or incompatible with the equipment supplied by Positron, and Positron shall not be obligated to repair or replace any component of the equipment which has not been installed according to Positron specifications.

IN NO EVENT SHALL POSITRON BE LIABLE FOR ANY INDIRECT, INCIDENTAL, SPECIAL, CONSEQUENTIAL, PUNITIVE, EXEMPLARY OR SIMILAR OR ADDITIONAL DAMAGES INCURRED OR SUFFERED INCLUDING LOSS OF PROFITS, LOSS OF REVENUES, LOSS OF DATA, LOSS OF BUSINESS INFORMATION, LOSS OF GOODWILL, LOSS OF EXPECTED SAVINGS OR BUSINESS INTERRUPTION ARISING OUT OF OR IN CONNECTION WITH THE EQUIPMENT, A PURCHASE ORDER SUPPLIES, MAINTENANCE SERVICES OR OTHER SERVICES FURNISHED HEREUNDER, EVEN IF POSITRON HAS BEEN ADVISED OR IS AWARE OF THE POSSIBILITY OF SUCH DAMAGES.

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A 2.2 Cancellation and Rescheduling Charges

Should the customer cancel, prior to shipment, any part of an order, the customer agrees to pay to Positron cancellation charges, not as a penalty, which shall total all expenses, including labor expenses, incurred by Positron prior to said cancellation. Equipment that has been specially developed for the customer's specific applications shall not be subject to cancellation. Cancellation or rescheduling is not permissible after shipment of the System.