

TeleLite™

Data Analog AC Dual Four-wire Interface Card Description and Installation Guide

925W720112-04E



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	8
FCC Part 15	8
FCC Part 68	8
Laser Safety	10
Product Safety	10
NEBS Compliance	10
1.4 Service and Support	11
Technical Customer Support	11
Customer Training	11
Repair Service	12
1.5 TeleLite Warranty	13
Limitation of Liability	13
Cancellation and Rescheduling Charges	14

Chapter 2 – Overview

2.1 TeleLite System Introduction	16
Fiber Connectors	17
2.2 Card Type Model Numbers	18
2.3 Introduction to the Data Analog AC Dual Four-wire Interface Card	18
2.5 Specifications	21

Chapter 3 – Installation

3.1 Installing a Data Analog AC Dual Four-wire Interface Card	24
Line Status LED	28
Alarm Status LED	28
LED Indicator Description	29

Low Power (Station Side) Switch Settings (SW502)	30
Low Power (CO Side) Settings (SW502).	31
3.5 Serving Cable	33
Wiring and Connections	34
Testing (LED Indicators)	34

Appendix A – Acronyms

Acronyms	38
--------------------	----

Chapter 1

General Information

1.1 Publication Information

© 2012 Positron Inc.

TeleLite Data Analog AC Dual Four-wire Interface Card Description and Installation Guide

Part number: 925W720112-04E

Publication date: March 14, 2012

Published By

Positron Inc.

5101 Buchan Street, Suite 220

Montreal, Québec, Canada

H4P 2R9

US and Canada: 1-888-577-5254

International: 1-514-345-2220

Trademarks

TeleLite is a trademark of Positron Inc.

Product names, other than Positron's, mentioned herein may be trademarks and/or registered trademarks of their respective companies

Confidentiality Notice

The information contained in this document is the property of Positron Inc. Except as specifically authorized in writing by Positron Inc., the holder of this document: 1) shall keep all information contained herein confidential and shall protect same in whole or in part from the disclosure and dissemination to all third parties, and 2) shall use same for operating and maintenance purposes only.

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 Data Analog AC Dual Four-wire Interface Card, its features and applications, and describes how to install one 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-position Shelf
- 720013 wall-mounted 3-position Shelf

1.2.2 Positron Products and Services

Positron engineers and manufactures 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 FCC Part 68

This equipment complies with Part 68 of the FCC rules and the requirements adopted by the ACTA (Administrative Council on Terminal Attachments). On the back of this equipment is a label that contains, among other information, a product identifier in the format US:AAAEQ##TXXXX. If requested, this number must be provided to the telephone company.

You are required to request service from the telephone company before you connect the unit to a network. When you request service, provide the telephone company with the following information:

Table 1: Request Service Information

Product Identifier:	2W-0
Facility Interface Code (FIC):	Metallic
Service Order Code (SOC):	7.0Y
Universal Service Order Code (USOC) jack:	RJ-14C
Network Address Code:	N
Equipment Code:	OT
REN:	Not applicable
Identification Numbers: US:	CT50TNANPP-2W-0

A plug and jack used to connect this equipment to the premises wiring and telephone network must comply with the applicable FCC Part 68 rules and requirements adopted by the ACTA. A compliant telephone cord and modular plug is provided with this product. It is designed to be connected to a compatible modular jack that is also compliant. For details, see installation instructions.

The Ringer Equivalent Number (REN) is used to determine the number of devices that may be connected to a telephone line. Excessive RENs on a telephone line may result in the devices not ringing in response to an incoming call. In most but not all areas, the sum of RENs should not exceed five (5.0). To be certain of the number of devices that may be connected to a line, as determined by the total RENs, contact the local telephone company. For products approved after July 23, 2001, the REN for this product is part of the product identifier that has the format US:AAAEQ##TXXXX. The digits represented by ## are the REN without a decimal point (for example, 03 is a REN of 0.3). For earlier products, the REN is separately shown on the label.

If this equipment causes harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of service may be required. But if advance notice isn't practical, the telephone company will notify the customer as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe it is necessary.

The telephone company may make changes in its facilities, equipment, operations or procedures that could affect the operation of the equipment. If this happens the telephone company will provide advance notice in order for you to make necessary modifications to maintain uninterrupted service.

If trouble is experienced with the TeleLite product, please contact Positron for repair or warranty information. If the equipment is causing harm to the telephone network, the telephone company may request that you disconnect the equipment until the problem is resolved.

Positron Inc. located at 5101 Buchan street, Montreal in Canada hereby certifies that the TeleLite bearing labeling identification numbers mentioned above complies with the Federal Communications Commission's (FCC) Rules and Regulations 47 CFR Part 68, and the Administrative Council on Terminal Attachments (ACTA)-adopted technical criteria TIA-968-A-2, Telecommunications - Telephone Terminal Equipment -Technical Requirements for Connection of Terminal Equipment To the Telephone Network, January 2004.

1.3.3 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.

1.3.4 Product Safety

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

1.3.5 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

1.4 Service and Support

Table 2: 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

1.4.1 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.

1.4.2 Customer Training

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

1.4.3 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. Due to the varied nature of repairs, no specific turnaround can be guaranteed, but average turnaround time is 20 working days 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 plug-in cards should never be shipped while installed in a shelf; this will cause damage that can extend the repair period.

1.5 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.

1.5.1 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.

EXCEPT AS EXPRESSLY SET FORTH IN THIS AGREEMENT, POSITRON DISCLAIMS ANY FURTHER CONDITIONS, REPRESENTATIONS OR WARRANTIES, WHETHER WRITTEN OR ORAL, EXPRESSED OR IMPLIED, INCLUDING THE CONDITIONS AND WARRANTIES OF MERCHANTABILITY, MERCHANTABILITY QUALITY, FITNESS FOR A PARTICULAR PURPOSE, TITLE, PERFORMANCE AND THOSE ARISING FROM STATUTE, TO THE EXTENT PERMITTED BY LAW. POSITRON DOES NOT WARRANT THAT THE SYSTEM WILL OPERATE WITHOUT INTERRUPTION OR THAT IT WILL BE ERROR FREE.

1.5.2 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.

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 RJ-14C/RJ-45 connectors, located on the front panel of each card.

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

NOTE

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

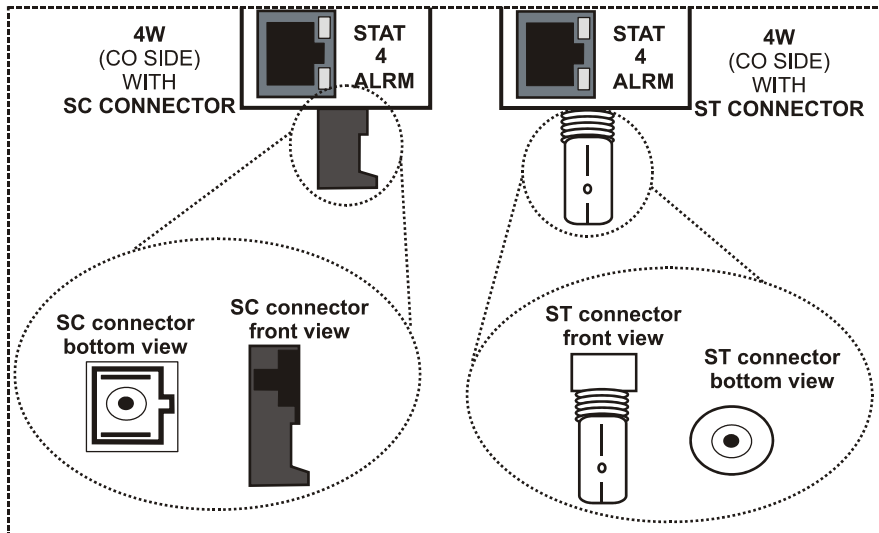
2.1.1 Fiber Connectors

The fiber interface is located on the bottom front panel of each line card. Each of these fiber interfaces will support one of two types of fiber connectors: ST or SC.

Table 3: 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 2 km (1.2 miles), the fiber type will be multi-mode using an 850 nm wavelength LED.

2.1.1.2 Single-mode fiber type

For longer distances, up to 16 km (9.9 miles), the fiber type will be single-mode using a 1310 nm wavelength laser.

2.2 Card Type Model Numbers

For information, contact Positron Customer Support.

Table 4: Card Type and Model Numbers

Card Type	Model Number
Dual 4W Station side Multi-mode ST Connector	720480MST
Dual 4W Station side Single-mode SC Connector	720480SSC
Dual 4W CO side Multi-mode ST Connector	720490MST
Dual 4W CO side Single-mode SC Connector	720490SSC

2.3 Introduction to the Data Analog AC Dual Four-wire Interface Card

The Data Analog AC Dual Four-wire Interface Card isolates two AC 4-wire lines using fiber links. Two different cards are used to achieve this functionality.

The CO side uses a CO interface card. The CO interface card is powered from a shelf backplane power supply of -48 Vdc or from an express pair feeding - 48 Vdc or -72 Vdc. It interfaces to the CO and transmits in full duplex. It allows simplex sealing current of less than 4 mA.

The Station side uses a Station interface card. The Station interface card is powered from the shelf's backplane supply of -48 Vdc. The card interfaces with the Station side and transmits in full duplex. The Station provides LED statuses on the front plate and generates alarms in the event of a problem with the circuit.

For an illustration of the Data Analog AC Dual Four-wire Interface Card, see Figure 3 on page 20.

2.4 Applications

The applications of the Data Analog AC Dual Four-wire Interface Card include the following:

- Dedicated line modems
- Supervisory control and data acquisition (SCADA) systems
- Tone relay control systems
- Any other equipment using tone related signaling

This fiber optic interface supports single- and multi-mode ST/SC connector types.

Figure 2: TeleLite Application

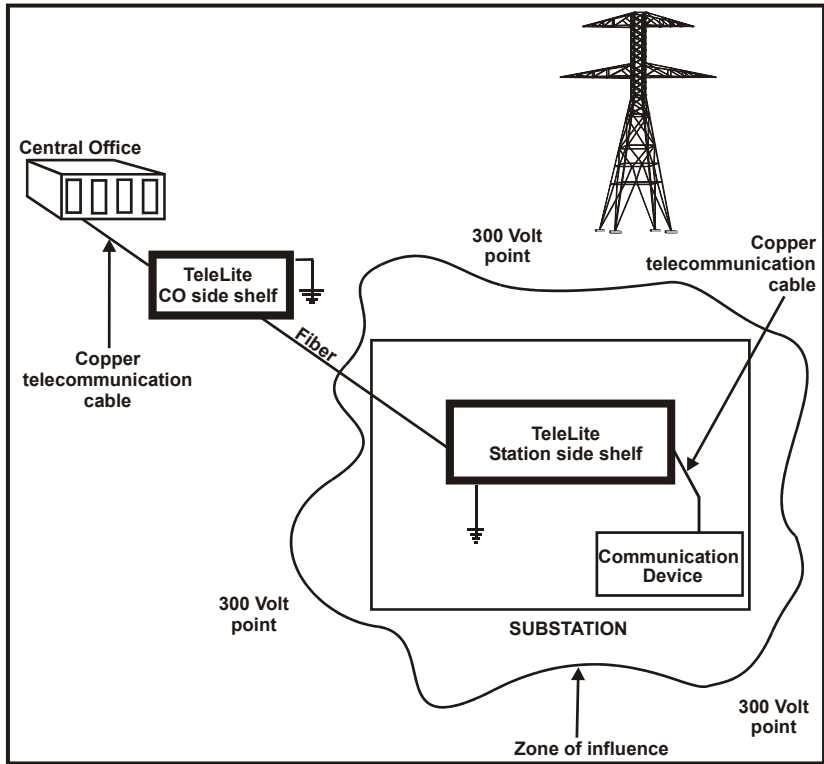
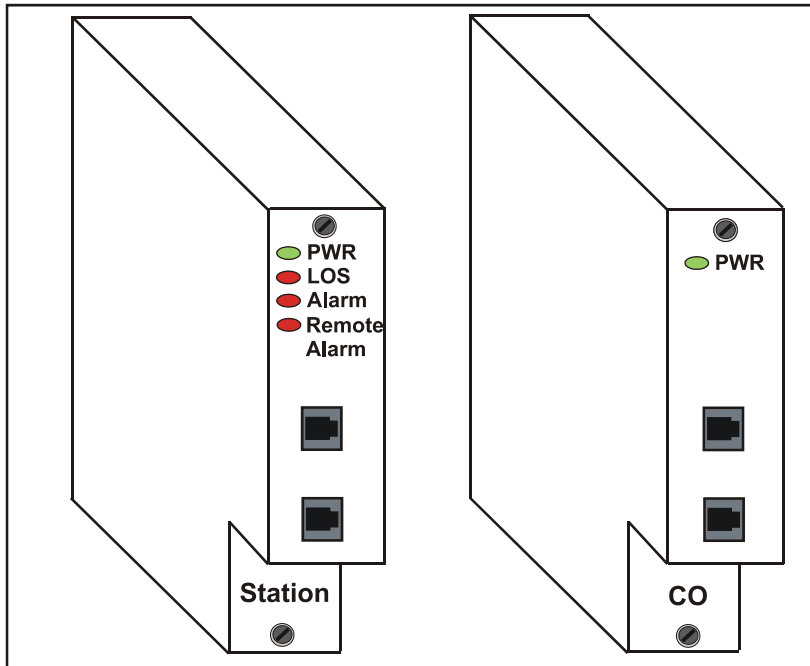


Figure 3: Data Analog AC Dual Four-wire Station and CO Interface Cards



2.5 Specifications

Table 5: Electrical Specifications

Parameter	Specification
CO side power consumption	1.6 W maximum with 24 Vdc across Tip and Ring
Line impedance	600 ohm nominal
Sealing current CO side	4 mA maximum
Group delay	250 usec
Frequency response	+1 to -3 dB, 300 to 3,400 Hz
Insertion loss	+1 to -1 dB @ 1 KHz
Line length CO side	5486 meters (18,000 ft) maximum
Line length Station side	609 m (2,000 ft)
Fiber optic interface	ST/SC type connector
Transceiver wavelength	850 nm or 1310 nm
Fiber optic type	Multi-mode fiber: 62.5/125 μm Single-mode fiber: 9/125 μm
Maximum fiber span distance	Multi-mode fiber: 850 nm (2 km or 1.2 miles) Single-mode fiber: 1310 nm (16 km or 9.9 miles)

Table 6: Regulatory Specifications

Network Protections:	FCC part 68
Emissions	FCC part 15, Class A
Electrostatic Discharge	IEC 61000-4-2, Telcordia GR-1089-CORE
Immunity to electrical fast transient	IEC 61000-4-4
Immunity to surge	IEC 61000-4-5
Drop Test	Telcordia GR-63-CORE, Section 4.3

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	-61 to 3048 m (-200 ft to 10,000 ft) above sea level


Chapter 3

Installation

3.1 Installing a Data Analog AC Dual Four-wire Interface Card

After a shelf has been properly installed and all the wiring is complete, the plug-in card can be installed. For information on how to install a shelf, see the TeleLite Description and Installation guide for the appropriate shelf. Documentation is available online at www.PositronPower.com. Follow the ESD precautions shown in Figure 4 below.

Figure 4: ESD Precautions

 <p>ATTENTION ELECTROSTATIC SENSITIVE DEVICES HANDLE ONLY AT STATIC SAFE WORKSTATION</p>	<h4>ESD Precaution</h4> <p>INCORRECT HANDLING MAY VOID WARRANTY</p> <p>These procedures must be followed when handling an electrostatic sensitive device.</p> <ul style="list-style-type: none">• A grounded wrist strap must be worn at all times during installation.• When unpacking, place the antistatic bag containing the device on an electrostatic discharge (ESD) safe surface. An ESD safe surface is a conductive surface connected directly to an earth ground.• When moving, carry the device in an ESD safe container or the antistatic bag, provided with the device.
---	--

To Install an Interface Card in a Shelf

NOTE

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

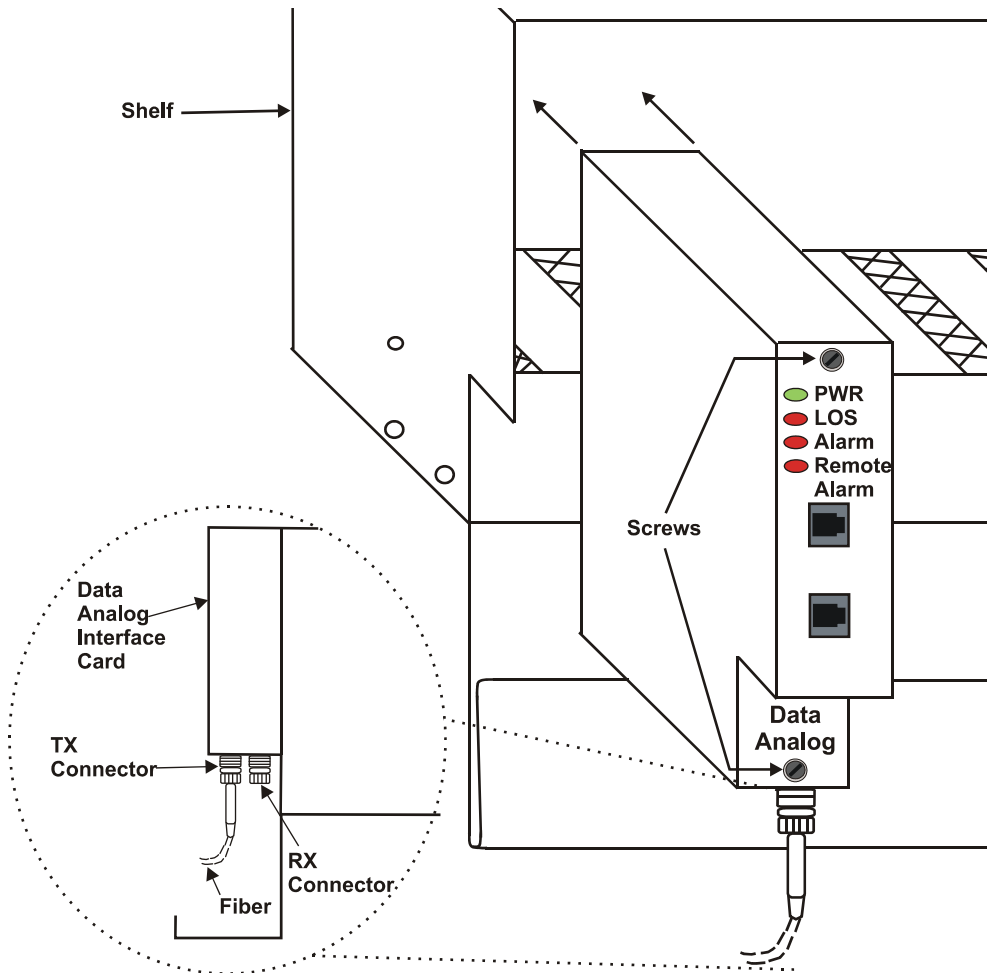
1. Take the card out from its protective packaging.
2. Make sure the card is right-side up, align the card with the appropriate slot of the shelf, and slide it in as shown in Figure 5 on page 26.
3. Hand-tighten the top and bottom screws, to secure the card in place.
4. Connect cables to and from the 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.
5. Dress the fiber cables using the fiber tray at the front of the shelf, then secure them using a cable guide.
6. Connect the phone line to the RJ-14C connector found on the front panel.

NOTE

- For information on Access Cards (720001) or Power Access Cards (721123 & 721124), refer to their respective Description and Installation guide.
- For information on connecting TX and RX fibers, see the Teelite Description and Installation Guide (part number 925-751500-001).

7. Tighten the top and bottom screws, to secure the card in place.

Figure 5: Installing a Data Analog AC Dual Four-wire Interface Card in a Shelf



NOTE | This illustration is a general guideline only.

3.1.1 RJ-14C Pin-out Description

For RJ-14C pin-outs, see Figure 6:. For 4-wire RJ-14C pin-out assignments for Data analog AC 4-wire interface card, see Table 8 below.

Figure 6: Two-wire RJ-14C Pin-outs

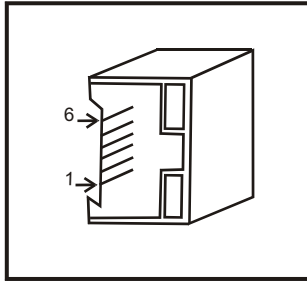


Table 8: Four-wire RJ-14C Pin-out Assignments

CO side		Station side	
1	Express Pair POWER (-48 V/GND)	1	N.C.
2	RING TX	2	RING TX
3	TIP RX	3	TIP RX
4	RING RX	4	RING RX
5	TIP TX	5	TIP TX
6	Express Pair POWER (-48 V/GND)	6	N.C.

Note

- TX means signals transmitted to CO
- RX means signals received from CO
- The power to the Access card is polarity sensitive. (No damage will be incurred, but the system will not work if the polarity is wrong).
- Power through the RJ-14C is not polarity sensitive.

3.2 Front Panel LEDs

Some LEDs are located on the top portion of the front panel, and some LEDs are located on RJ-14C pinouts, on the lower portion of the front panel.

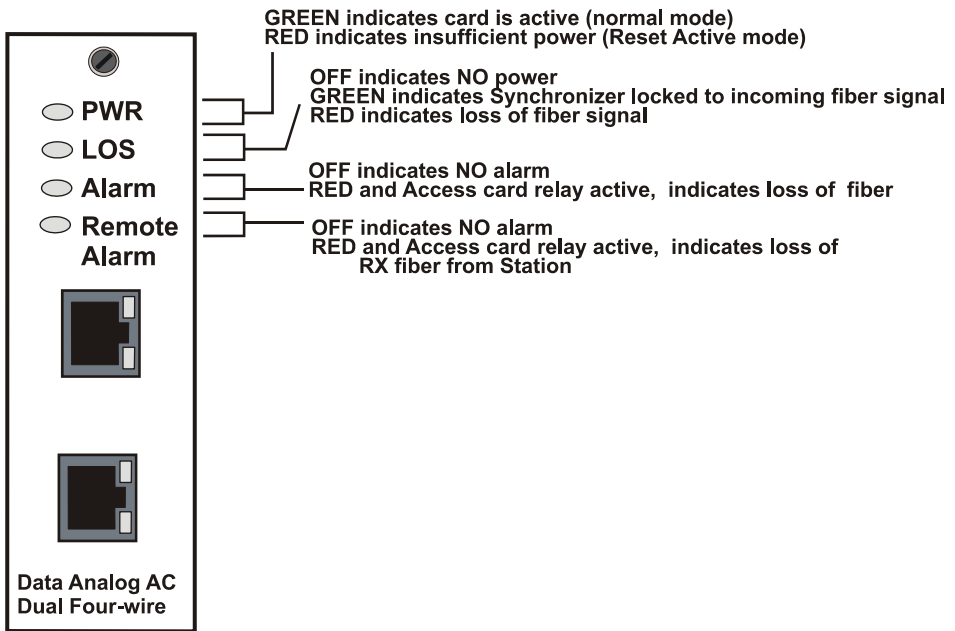
3.2.1 Line Status LED

The line status LED is always green in normal operation.

3.2.2 Alarm Status LED

The alarm status LED is always off in normal operation.

Figure 7: LED Descriptions for the Data Analog AC Dual Four-wire Interface Card



3.2.3 LED Indicator Description

Table 9: Data Analog AC Dual 4-wire Indicators (CO Side)

LED	COLOR	FUNCTION
Power	Red	Reset active (insufficient power)
	Green	Normal (card is powered)

Table 10: Data Analog AC Dual 4-wire Indicators (Station Side)

LED	Color	Function
Power	Red	Reset Active (insufficient power)
	Green	Normal (card is powered)
LOS	Off	No power
	Red	Loss of fiber signal
	Green	Synchronizer locked RX
Alarm	Off	No alarm
	Amber	Minor Alarm: Synchronizer not locked at Station RX
	Red and Access card relay active	Major Alarm: Reset, or loss of RX fiber from CO
Remote Alarm	Off	No alarm
LED and Relay	Red and Access card relay active	Loss of RX fiber from station.

3.3 Boot Sequence

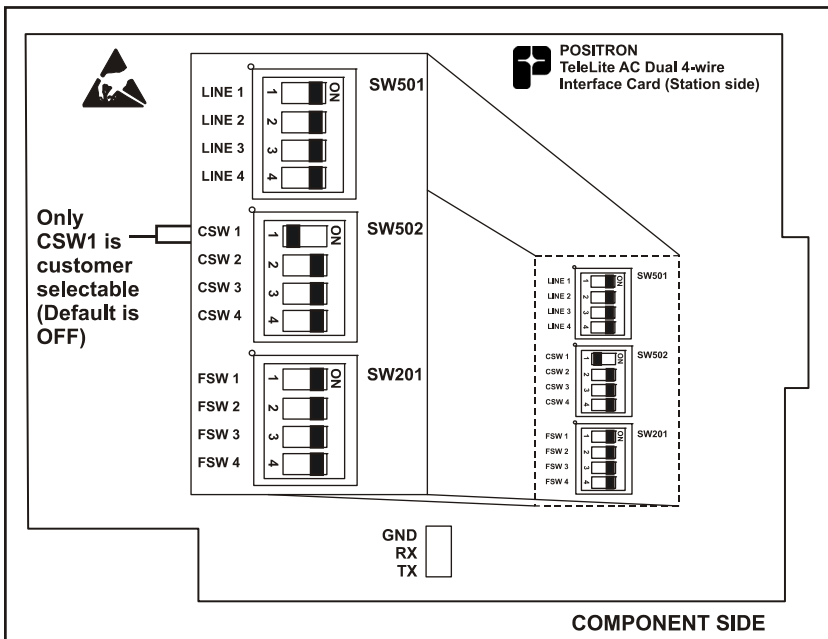
When the unit is powered up, it will perform an automatic LED test according to the following sequence:

- All green LEDs will turn on and off for 250 milliseconds.
- All red LEDs will turn on and off for 250 milliseconds.
- Each green LED will turn on and off for 100 milliseconds.
- Each red LED will turn on and off for 100 milliseconds.

3.3.1 Low Power (Station Side) Switch Settings (SW502)

CSW1 is used to set the card to low power mode. When it is ON, the card is set to low power. Setting the card to low power will disable all the RJ-14C LEDs. this could be used when operating from a low power source.

Figure 8: Data Analog AC Dual Four-wire Interface Card (Station side) Switches



3.4 Express Pair

The express pair from the CO will provide power for one card, and must be connected to the appropriate pin on the RJ-14C connectors on the CO card front panel. This pair provides either -48 Vdc or -72 Vdc. For power pin-outs for CO side, see Figure 6 on page 27 and Table 8 on page 27.

The following table provides information about the distances between the CO and the CO shelf, as a function of the wire gauge voltage, and the power required by the card.

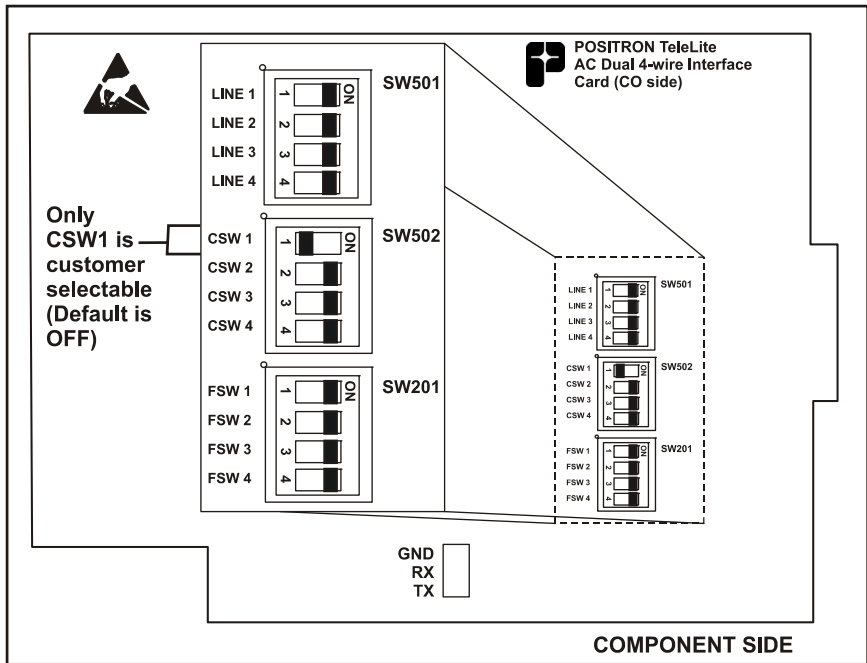
Table 11: Cable Distances Between CO and Shelf

Voltage at the CO and wire size	Maximum distance for 1W consumption	Maximum distance for 1.5W consumption
48 Vdc 24 AWG	2133 meters (7,000 ft.)	1524 meters (5,000 ft.)
48 Vdc 22 AWG	3352 meters (11,000 ft.)	2286 meters (7,500 ft.)
72 Vdc 24 AWG	5486 meters (18,000 ft.)	3657 meters (12,000 ft.)
72 Vdc 22 AWG	5486 meters (18,000 ft.)	5181 meters (17,000 ft.)

3.4.1 Low Power (CO Side) Settings (SW502)

CSW1 is used to set the card in low power mode. When it is ON, it is set to low power. Setting the card in low power will disable all the RJ-14C LEDs. This could be used when operating from a low power source.

Figure 9: Data Analog AC Dual Four-wire Interface Card (CO side) Switches



Note

- The power to the Access card is polarity sensitive. (No damage will be incurred, but the system will not work if the polarity is wrong).
- Power to the RJ-14C is not polarity sensitive.

3.5 Serving Cable

CAUTION

- The serving cable to the CO unit must be routed and installed according to local regulation.
- The CO unit must be installed outside the zone of influence, beyond the 300 V point (see Figure 2 on page 19).
- Use a fiber and conduit between the CO and Station side unit that is non-conductive and follows local regulations.

3.6 Earthing Connector

CAUTION

To ensure safety of personnel, Positron recommends following these guidelines:

- The return of the DC supply must be grounded at the source.
- This equipment must be permanently connected to earth. Refer to the shelf documentation for more information.
- The field wiring should include a readily-accessible disconnect device. The disconnect device shall disconnect both poles (-48 Vdc and RTN).
- This equipment is connected directly to the DC supply system earthing electrode conductor or to a bonding jumper from an earthing terminal bar or bus to which the DC supply system earthing electrode is connected.
- This equipment must be located in the same immediate area (such as adjacent cabinets) as any other equipment that has a connection between the earthed conductor of the same DC supply circuit and the earthing conductor, and also the point of earthing of the DC system. The DC system shall not be earthed elsewhere.
- The DC supply source must be located within the same premises as this equipment.
- There shall be no switching or disconnecting devices in the earthed circuit conductor between the DC source and the point of connection of the earthing electrode conductor.

3.6.1 Wiring and Connections

3.6.1.1 Equipment-side Wiring Connections

Wiring to and from the equipment side (customer/network) is made through the RJ-14C modular jacks.

The modular jacks are located on the front panel of the card. After making the connections to the RJ-14C modular jacks, dress the cables through the cable notch on the right side of the shelf and secure the cable using a cable tie.

3.6.1.2 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 fiber cable using the fiber tray at the front of the shelf and secure the cable using a cable tie.

3.7 Testing

To test the installation

1. Use a DC Volt meter to measure the voltage (48 Vdc) at the power supply terminal block at the front of the Access card.

3.7.1 Testing (LED Indicators)

Make sure that the front panel LEDs and RJ-14C LEDs have the following status:

- PWR: Green (card is active)
- LOS: Green (clock is synchronized)
- Alarm: Off (no alarm)
- Remote Alarm: Off (no alarm)
- RJ-14C upper: Green (normal mode)
- RJ-14C lower: Always Off

3.8 Troubleshooting

Before calling customer service, make sure that:

- The circuit cards are properly powered; see section 3.1 on page 24.
- The TX and RX fibers are connected correctly and are not reversed.
- The DIP switch settings are accurate; see section 2.5 on page 21.

Appendix A

Acronyms

Acronyms

AC	Alternating Current
AWG	American Wire Gauge
CO	Central Office
CSA	Canadian Standards Association
DC	Direct Current
DID	Direct Inward Dialling
ESD	Electro-static Discharge
FCC	Federal Communications Commission
GPR	Ground Potential Rise
HVI	High Voltage Interface
PBX	Private Branch Exchange
LED	Light-emitting Diode
LOS	Loss of Signal
MTBF	Mean Time Between Failures
NC	No Connection
POTS	Plain Old Telephone Service
RMA	Return Material Authorization
RTN	Return

RX Receive

TX Transmit

