TeleLite™

**Dual/Quad POTS with Caller ID Interface Card
Description and Installation Guide**

925W720101-05E

Contents

Acronyms

cHVI	Compact High Voltage Interface
CO	Central Office
CPE	Customer Premises Equipment
CSA	Canadian Standards Association
DC	Direct Current
ESD	Electro-Static Discharge
FCC	Federal Communications Commission
FXO	Foreign Exchange Originating
FXS	Foreign Exchange Subscriber
GND	Ground
GPR	Ground Potential Rise
HVI	High Voltage Interface
PBX	Private Branch Exchange
LED	Light-emitting Diode
LOS	Loss of Signal
NC	No Connection
OPX	Off Premise Extension
POTS	Plain Old Telephone Service
PWR	Power
PVC	Poly Vinyl Chloride
RJ	Registered Jack
RTN	Return
RX	Receive
TX	Transmit

Chapter 1

General Information

1.1 Publication Information

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

1.2   About this Guide

This guide introduces you to the Dual/Quad POTS with Caller ID 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-slot Rack-Mount Shelf

■   720013 3-slot Swing-out 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/en.

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:	Loop start: PP-PLS-0 Ground start: PP-PGS-0
Facility Interface Code (FIC):	Loop start: 02LS2 Ground start: 02GS2
Service Order Code (SOC):	9.0Y
Universal Service Order Code (USOC) jack:	RJ-11C
Network Address Code:	E
Equipment Code:	OT
REN:	0.1B
Identification Numbers: US:	Loop start: CT05TO1BPP-PLS-0 Ground start: CT05TO1BPP-PGS-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 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 Enhanced T1, 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

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 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. For information, see section 2.1.1 on page 13.

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 2: 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
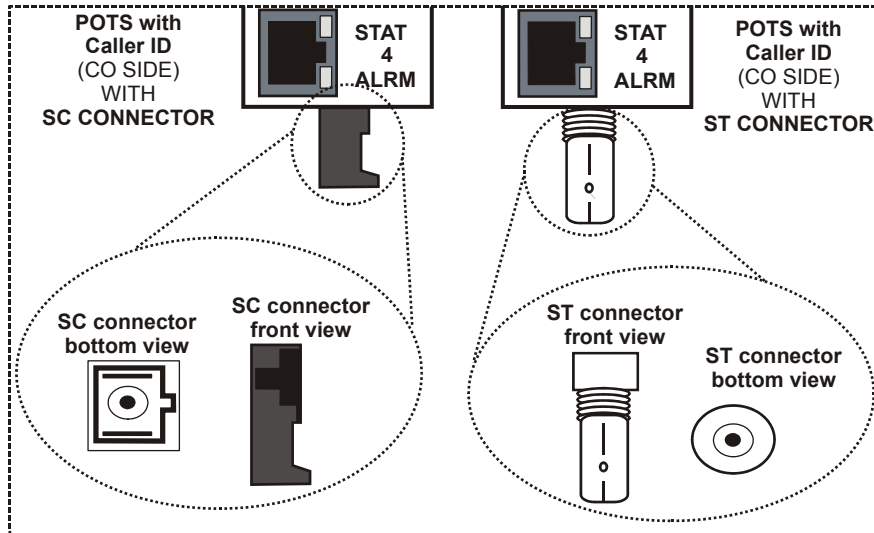
2.1.1.1   Multi-mode fiber type

For short distances, less than 3.5 km (2 miles), the fiber type will be **multi-mode** using an 850 ηm wavelength LED.

2.1.1.2   Single-mode fiber type

For longer distances, up to 42 km (26 miles), the fiber type will be **single-mode** using a 1310 ηm wavelength laser.

2.2 Card Type Model Numbers

For information contact Positron customer support.

Table 3: Quad POTS with Caller ID Interface Card Model Numbers

Card Type	Model Number
Quad POTS with Caller ID FXS Station side multi-mode ST Connector	720600MST
Quad POTS with Caller ID FXS Station side single-mode SC Connector	720600SSC
Quad POTS with Caller ID FXO CO side multi-mode ST Connector (Loop start)	720610MST
Quad POTS with Caller ID FXO CO side single-mode SC Connector (Loop start)	720610SSC
Quad POTS with Caller ID FXO CO side multi-mode ST Connector (Ground start)	720611MST
Quad POTS with Caller ID FXO CO side single-mode SC Connector (Ground start)	720611SSC

Table 4: Dual POTS with Caller ID Interface Card Model Numbers

Card Type	Model Number
Dual POTS with Caller ID FXS Station side multi-mode ST Connector	720640MST
Dual POTS with Caller ID FXS Station side single-mode SC Connector	720640SSC
Dual POTS with Caller ID FXO CO side multi-mode ST Connector (Loop start)	720650MST
Dual POTS with Caller ID FXO CO side single-mode SC Connector (Loop start)	720650SSC
Dual POTS with Caller ID FXO CO side multi-mode ST Connector (Ground start)	720651MST
Dual POTS with Caller ID FXO Co side single-mode SC Connector (Ground start)	720651SSC

2.3 Introduction to the POTS with Caller ID Interface Card

The POTS with Caller ID interface card comes in two variations:

■ The **Quad**: isolates up to 4 lines using a single fiber link; see Figure 2 on page 15.

■ The **Dual**: isolates up to 2 lines using a single fiber link; see Figure 3 on page 16.

The **CO side** uses a Foreign Exchange Originating (FXO) interface card. The FXO interface card is powered from the backplane supply of -48 Vdc. Two types of functionalities are available on an FXO; Loop start and Ground start.

   ■ The CO side card with Loop start provides an off-hook circuit, line polarity detection, ring detection and battery disconnect detection.

   ■ The CO side card with Ground start provides an off-hook circuit, line polarity detection, ring detection, battery disconnect detection, ring-ground generation and tip-ground detection.

The **Station side** uses a Foreign Exchange Subscriber (FXS) interface card. The FXS interface card is powered from the backplane supply of -48 Vdc. This card is available in a design that can handle both Loop start and Ground start functionalities. It provides battery feed with polarity reversal, ringing, battery disconnect, ring-ground detection and tip-open to the Station side equipment.

**Figure 2: Quad POTS with Caller ID Interface Cards
           (CO side Loop start, CO side Ground start and Station side)**
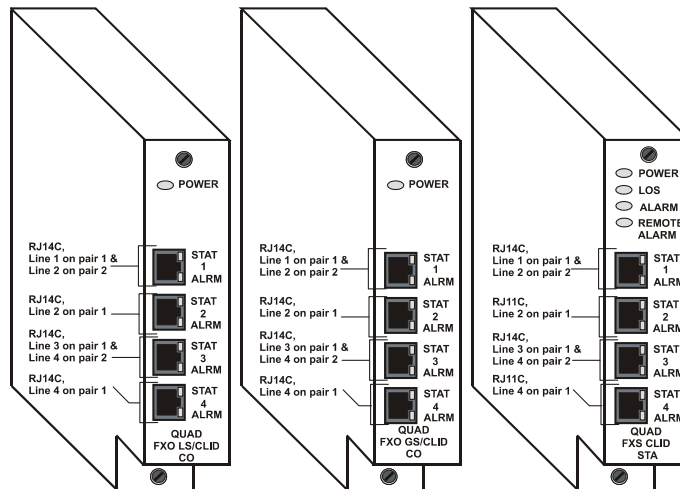
Figure 3: Dual POTS with Caller ID Interface Cards
(CO side Loop start, CO side Ground start and Station side)
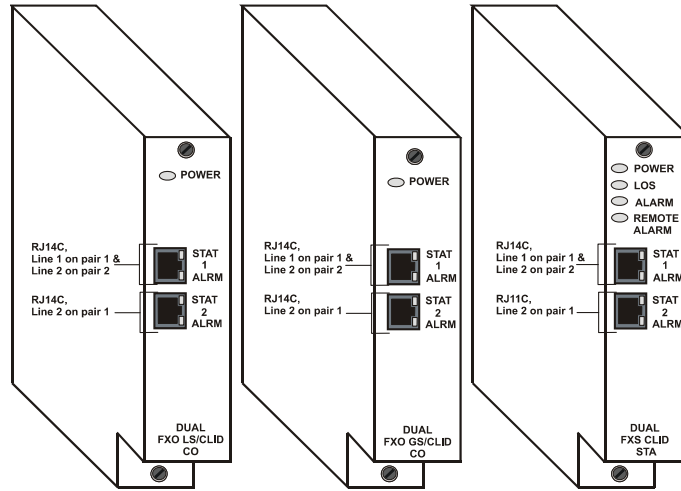
2.4   Applications

■   Loop start telephone (POTS)

■   Fax and dial-up "smart" modems

■   Ground start PBX

■   Dial-up remote meter reading

■   Calling line identification

Figure 4: POTS with Caller ID Interface Card Application
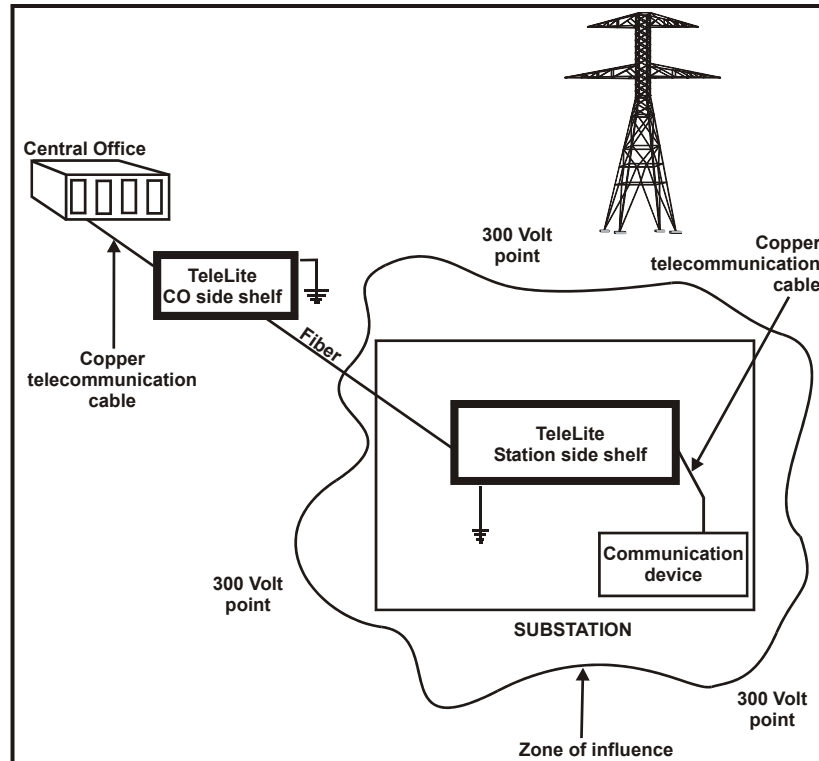
2.5 Front Panel LEDs and RJ Connectors

The interface card front panel features LEDs and RJ connectors.

2.5.1 Front Panel LEDs

Some LEDs are located on the top portion of the front panel, and some LEDs are located on the RJ connectors, on the lower portion of the front panel.

Figure 5: LED Descriptions for the Quad POTS with Caller ID Interface Card (CO side Loop start)
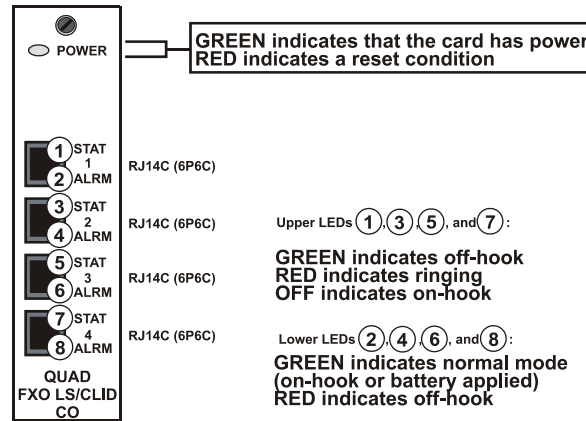
NOTE   RJ14C connectors have 6 pins that carry 2 or 3 pairs. RJ11C connectors have 6 pins that carry 1 or 2 pairs.

Figure 6: LED Descriptions for the Quad POTS with Caller ID Interface Card (CO side Ground start)

NOTE   RJ14C connectors have 6 pins that carry 2 or 3 pairs. RJ11C connectors have 6 pins that carry 1 or 2 pairs.

Figure 7: LED Descriptions for the Quad POTS with Caller ID Interface Card (Station side)

**GREEN indicates that the card has power
RED indicates a reset condition**

**GREEN indicates that fiber signal is available
RED indicates a loss of fiber signal**

**AMBER indicates a MINOR alarm
RED indicates a MAJOR alarm
OFF indicates no alarm**

**RED indicates an alarm condition on the CO unit
OFF indicates no alarm**

POWER
LOS
ALARM
REMOTE ALARM

1 STAT 1
2 ALRM   RJ14C (6P6C)

3 STAT 2
4 ALRM   RJ11C (6P2C)   Upper LEDs 1, 3, 5, and 7 :

5 STAT 3   **GREEN indicates off-hook**
6 ALRM   RJ14C (6P6C)   **RED indicates ringing**
                                      OFF indicates on-hook

7 STAT 4
8 ALRM   RJ11C (6P2C)   Lower LEDs 2, 4, 6, and 8 :
                                      GREEN indicates normal mode
QUAD   **(on-hook or battery applied)**
FXS CLID STA   **RED indicates off-hook**

NOTE   RJ14C connectors have 6 pins that carry 2 or 3 pairs. RJ11C connectors have 6 pins that carry 1 or 2 pairs.

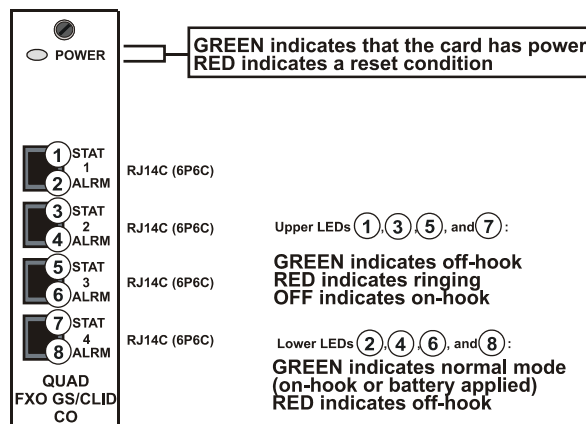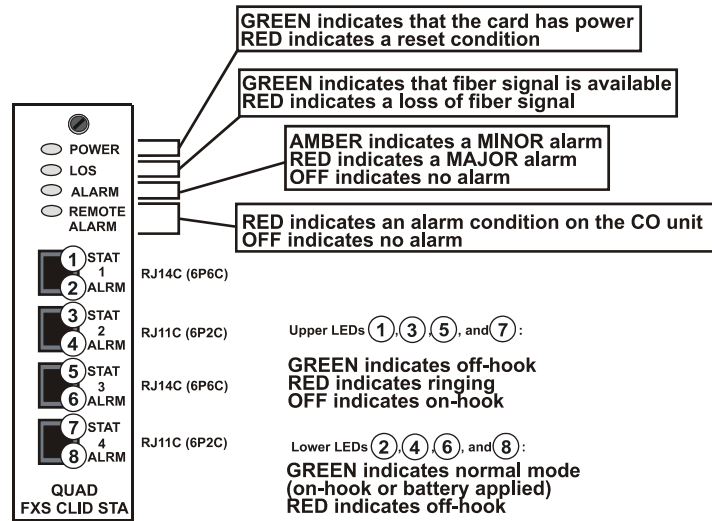**Figure 8: LED Descriptions for the Dual POTS with Caller ID Interface Card (CO side Loop start)**

POWER

**GREEN indicates that the card has power
RED indicates a reset condition**

1 STAT 1
2 ALRM   RJ14C (6P6C)

3 STAT 2   Upper LEDs 1 and 3 :
4 ALRM   RJ14C (6P6C)
                                       GREEN indicates off-hook
                                       RED indicates ringing
                                       OFF indicates on-hook

                                       Lower LEDs 2 and 4 :
                                       GREEN indicates normal mode
DUAL   **(on-hook or battery applied)**
FXO LS/CLID   **RED indicates off-hook**
CO

NOTE   RJ14C connectors have 6 pins that carry 2 or 3 pairs. RJ11C connectors have 6 pins that carry 1 or 2 pairs.

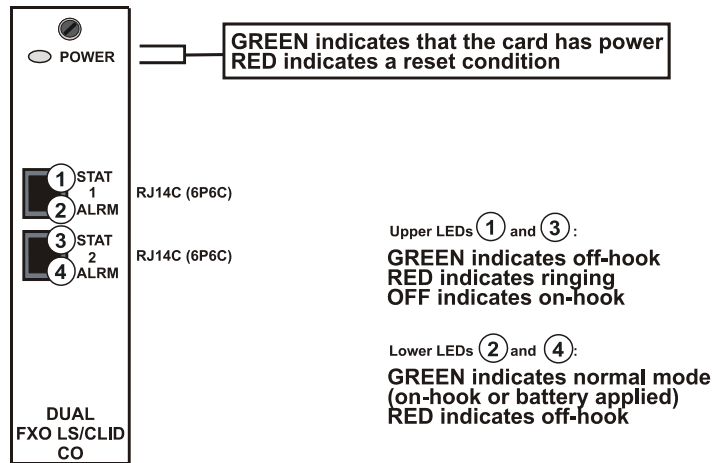**Figure 9: LED Description for the Dual POTS with Caller ID Interface Card (CO side Ground start)**
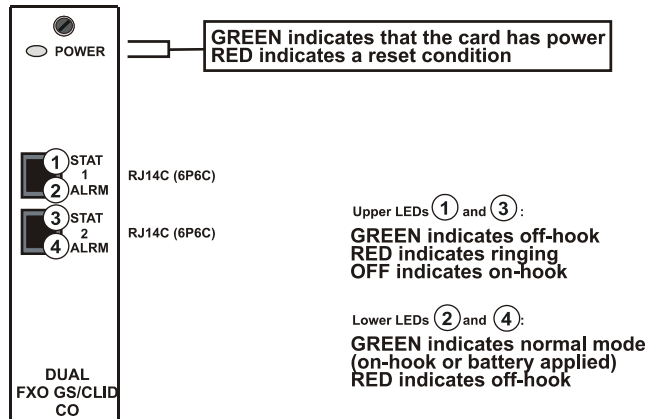
GREEN indicates that the card has power
RED indicates a reset condition

POWER

1 STAT 1
2 ALRM
RJ14C (6P6C)

3 STAT 2
4 ALRM
RJ14C (6P6C)

Upper LEDs ① and ③ :
GREEN indicates off-hook
RED indicates ringing
OFF indicates on-hook

Lower LEDs ② and ④ :
GREEN indicates normal mode
(on-hook or battery applied)
RED indicates off-hook

DUAL
FXO GS/CLID
CO

Figure 10: LED Descriptions for the Dual POTS with Caller ID Interface Card (Station side)

GREEN indicates that the card has power
RED indicates a reset condition

GREEN indicates that fiber signal is available
RED indicates a loss of fiber signal

POWER
LOS
ALARM
REMOTE
ALARM

AMBER indicates a MINOR alarm
RED indicates a MAJOR alarm
OFF indicates no alarm

RED indicates an alarm
condition on the CO unit
OFF indicates no alarm

1 STAT 1
2 ALRM
RJ14C (6P6C)

3 STAT 2
4 ALRM
RJ11C (6P2C)

Upper LEDs ① and ③ :
GREEN indicates off-hook
RED indicates ringing
OFF indicates on-hook

Lower LEDs ② and ④ :
GREEN indicates normal mode
(on-hook or battery applied)
RED indicates off-hook

DUAL
FXS CLID
STA

20

2.5.2 RJ Connectors

<u>NOTE</u> | ■ The pinouts for the CO side (FXS) Quad cards are the same for the Station side (FXO) Quad cards.

■ The pinouts for the CO side (FXS) Dual cards are the same for the Station side (FXO) Dual cards.

Figure 11: Pinout Assignments for the Quad POTS with Caller ID Interface Card (CO side and Station side)
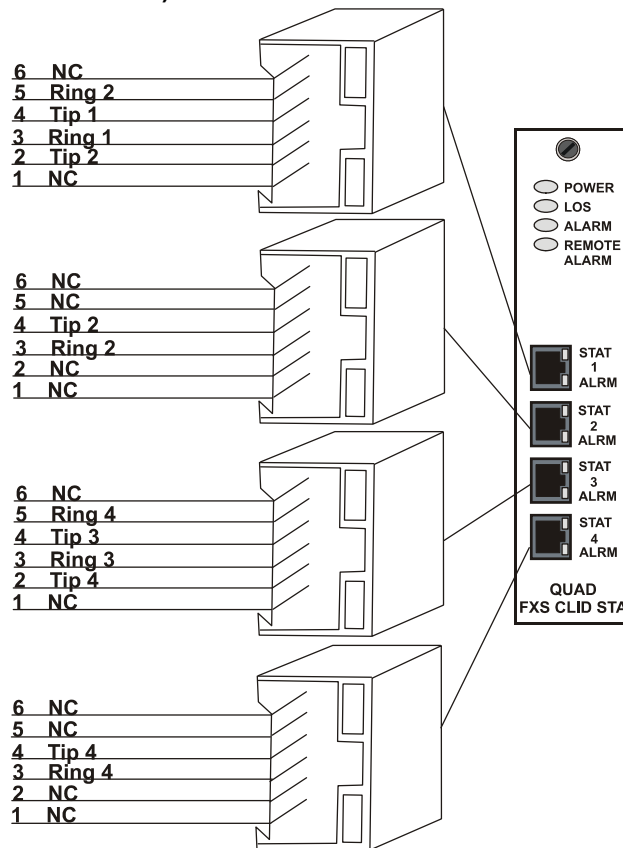
<u>NOTE</u> | The pinouts for the Quad CO side card with Loop start are the same for the Quad CO side card with Ground start

**Figure 12: Pinout Assignments for Dual POTS with Caller ID Interface Card
(CO side and Station side)**
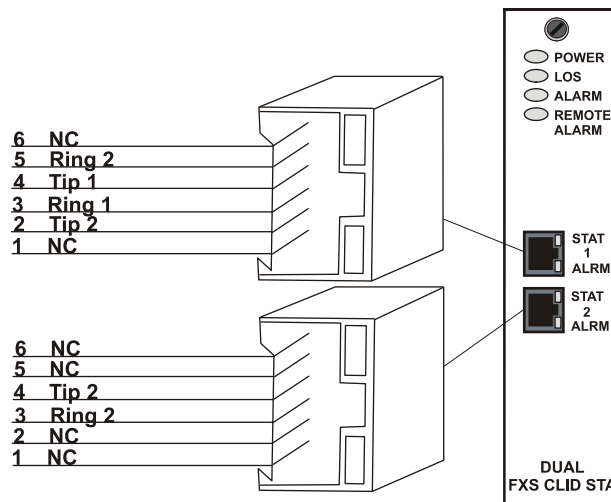
2.5.2.1   Boot Sequence

NOTE | The pinouts for the Dual CO side card with Loop start are the same for the Dual CO side card with Ground start.

NOTE | Power to the Access card is polarity sensitive (if polarity is wrong no damage will be incurred, but the system will not work).

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

2.6   Line Length Settings (CO and Station side)

The CSW1 DIP switch is used to set the cards (CO and Station side) line length:

- Line length settings for the **CO side** (FXO) interface card are measured from the Central Office to the TeleLite CO side.

- Line length settings for the **Station side** (FXS) interface card are measured from the TeleLite Station side to the Customer Premise Equipment (CPE).

NOTE │ To locate switch CSW1, see Figure 13 on page 24.

For line lengths, see Table 5 on page 24.

2.6.1   Short Line Length Setting

➤ **To Set a CO Side or Station Side Interface Card for a Short Line Length Setting**

1. Set switch CSW1 on the CO side or Station side POTS with Caller ID interface card to the right (set to ON).

2.6.2   Long Line Length Setting

➤ **To Set a CO Side or Station Side Interface Card for a Long Line Length Setting**

1. Set switch CSW1 on the CO side or Station side POTS with Caller ID interface card to the left (set to OFF).

Figure 13: CSW1 and CSW2 Switches on the POTS with Caller ID Interface Card (CO and Station side)
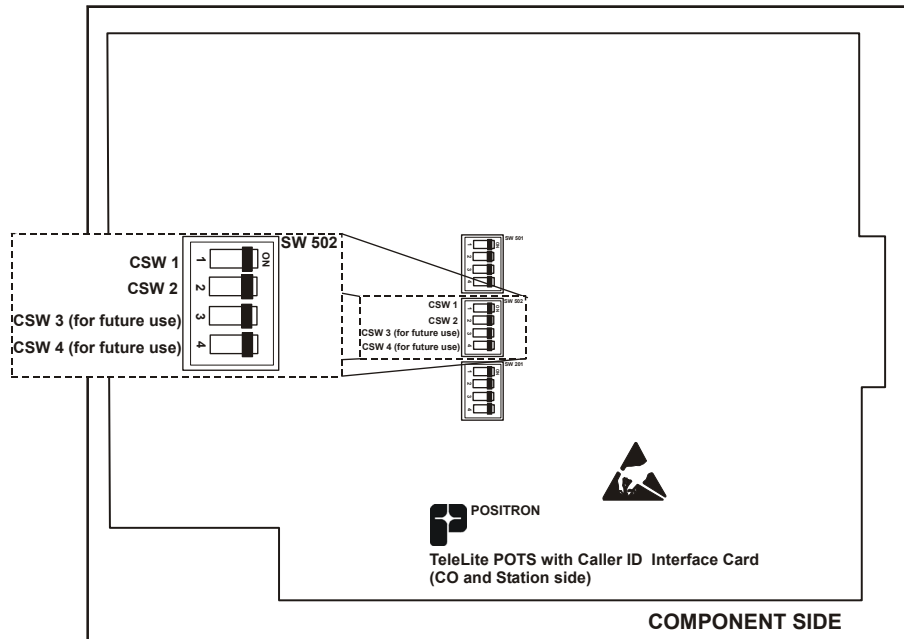
NOTE	■	By default, all DIP switches are set to the ON position.
	■	Switches CSW3 and CSW4 are for future use only.

Table 5: POTS with Caller ID Interface Card Line Lengths

Card Type	Line Setting	Line Length (short and long)
All of these settings apply to the Quad and Dual cards	CSW1 switched to ON	0 to 914.4 m (0 to 3000 ft)
	CSW1 switched to OFF	> 914.4 m (> 3000 ft)

2.7   Low Power Setting (CO side)

The CSW2 DIP switch on the CO side (FXO) interface card is used to set the CO side (FXO) interface card in low power mode. This setting could be used when operating from a lower power source.

There is no low power mode for the Station side (FXS) interface card.

➤ **To Set the CO Side (FXO) Card in Low Power Mode**

1. Set the CSW2 switch on the CO side interface card to the left (OFF). All the front panel RJ LEDs will be disabled.

   ■   To locate switch CSW2 on the CO side interface card, see Figure 13 on page 24.

2.8   Loop Start and Ground Start Settings (Station side)

Loop start mode is used for PBX, regular telephones and fax lines. Ground start mode is used for PBX lines.

Use the SW501 switch on the Station side POTS with Caller ID interface card to set Loop start or Ground start mode.

➤ **To Set the Station Side (FXS) Interface Card to Ground Start Mode**

1. Set switches LEN1, LEN2, FCT1 and FCT2 on the Station side POTS with Caller ID interface card to the left (OFF).

    ■   To locate these switches, see Figure 14 on page 25.

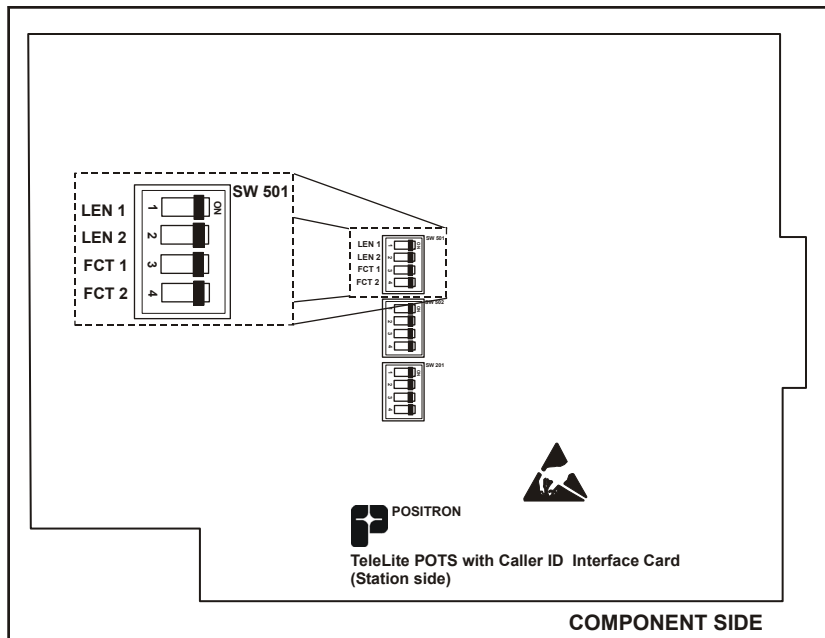➤ **To Set the Station Side (FXS) Interface Card to Loop Start Mode**

1. Set switches LEN1, LEN2, FCT1 and FCT2 on the Station side POTS with Caller ID interface card to the right (ON).

    ■   To locate these switches, see Figure 14 on page 25.

Figure 14: SW501 Switch on the POTS with Caller ID Interface Card (Station side)

NOTE   By default, all DIP switches are set to the ON position.

2.9   Specifications

Table 6: Electrical Specifications

Parameter	Specification
CO side (FXO) card power consumption	2 W maximum
CO side (FXO) card power dissipation	4 W maximum
Station side (FXS) card power consumption	6 W maximum
Station side (FXS) card power dissipation	4.5 W maximum
CO side (FXO) loop specification	As per TIA-968
Station side (FXS) loop current	25 mA min. with at least -48 Vdc on-hook voltage
Station side (FXS) ringing voltage	90 Vrms nominal, unbalanced
Maximum ringing load	5 REN per line, 8 REN per card

Table 7: Optical Specifications

Parameter	Specification
Fiber optic interface	ST/SC type connector
Transmitter wavelength	Multi-mode: 850 ηm
	Single-mode:1310 ηm
Transmitter power output	Multi-mode: -23dBm
	Single-mode: -12dBm
Receiver sensitivity	Multi-mode: -39dBm
	Single-mode: -39dBm
Fiber optic type	Multi-mode fiber: 62.5/125 μm
	Single-mode fiber: 9/125 μm
Fiber span distance	Multi-mode: 3.5 km (2 miles)
	Single-mode: 42 km (26 miles)

Table 8: Environmental Specifications

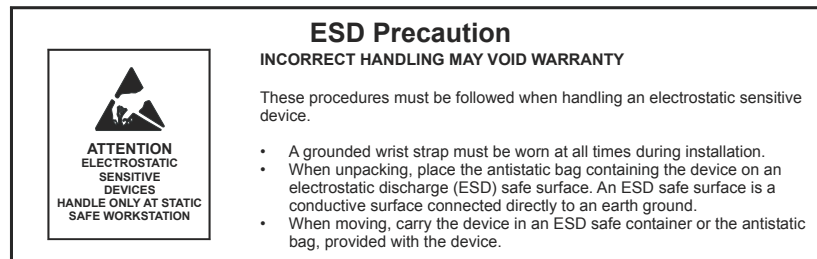| Parameter	Specification
Operating temperature	-40°C to 65°C (-40°F to 149°F)
Storage temperature	-40°C to 85°C (-40°F to 185°F)
Humidity (non-condensing)	20 to 80%
Altitude	-61 to 3048 m (-200 ft to 10,000 ft) above sea level

Chapter 3

Installation

3.1   Installing a POTS with Caller ID 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 6-position Shelf Description and Installation guide*.

Follow the ESD precautions shown in Figure 15.

Figure 15: ESD Precautions

ESD Precaution
INCORRECT HANDLING MAY VOID WARRANTY

These procedures must be followed when handling an electrostatic sensitive device.

- 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.

ATTENTION
ELECTROSTATIC
SENSITIVE
DEVICES
HANDLE ONLY AT STATIC
SAFE WORKSTATION

➤ **To Install a POTS with Caller ID Interface Card in a Shelf**

1. Take the card out from its protective packaging.

   - If the card is a CO side (FXO), set jumpers W1 and W2 according to your installation requirements; see section on page 22. If low power option is required on the CO side, see section 2.7 on page 24.

   - If the card is a Station side (FXS), make sure switch SW501 is set to the appropriate line functionality (Loop or Ground start); see section 2.8 on page 25.

2. Set the appropriate line length settings. For a:

   - Short line length setting, see section 2.6.1 on page 23.

   - Long line length setting, see section 2.6.2 on page 23.

3. Make sure the card is right-side up, align the card with the appropriate slot of the shelf and slide it in, as show in Figure 16 on page 29.

4. Hand-tighten the top and bottom screws, to secure the card in place.

5. 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.

6. Dress the fiber cables using the fiber tray at the front of the shelf, then secure them using a cable guide.

7. Connect the phone line to the RJ connector found on the front panel.

   NOTE | For information on the Access card (720001) or the different Power Access cards (721123, 721124, 721125), please refer to their respective Description and Installation guides. Those can be found on the Positron website at www.PositronPower.com/en.

Figure 16: Installing a POTS With Caller ID Interface Card in a Shelf
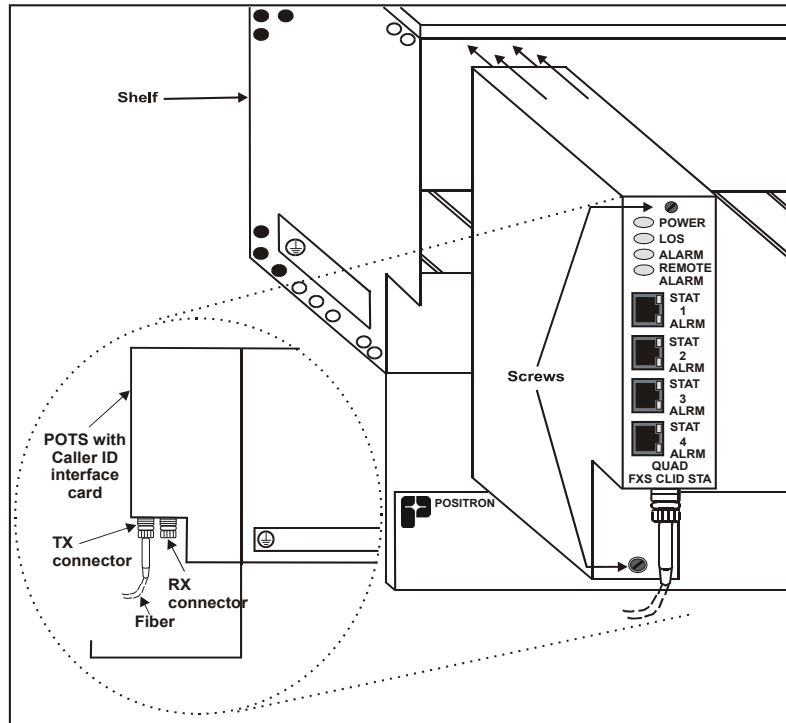
| NOTE | This illustration is a general guideline only. |

3.2   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 4 on page 17).
	Use a fiber and conduit between the CO and Station side unit that is non-conductive and follows local regulations.

3.3   Earthing (Grounding) Connector

<u>CAUTION</u> | 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 6 position shelf documentation.

■ 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.

3.4   Testing

Make sure that the front panel LEDs and RJ 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 upper**: Green (normal mode)

■ **RJ lower**: Off (normal mode)

3.4.1   Troubleshooting

Before calling customer service, make sure that:

■ The circuit cards are properly powered; see section 3.1 on page 28.

■ The TX and RX fibers are installed correctly and are not reversed.

■ The jumpers and switch settings are accurate; see section on page 22 and section 2.6 on page 23.

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.

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, MERCHANTABLE QUALITY, FITNESS FOR A PARTICULAR PURPOSE, TITLE, PERFORMANCE AND THOSE ARISING FROM STATUE, TO THE EXTENT PERMITTED BY LAW. POSITRON DOES NOT WARRANT THAT THE SYSTEM WILL OPERATE WITHOUT INTERRUPTION OR THAT IT WILL BE ERROR FREE.

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.