

TeleLite™

Enhanced T1 Interface Cards,
720100xxx, 720110xxx, 720120xxx &
720130xxx

Description and Installation Guide

925W720100-06E



Contents

Chapter 1 – General Information

1.1 Publication Information	6
1.2 About this Guide	6
Related Documentation	6
Positron Products and Services	6
1.3 Compliance Information	7
FCC Part 15	7
FCC Part 68	7
Laser Safety	8
Product Safety	8
NEBS Compliance	8

Chapter 2 – Overview

2.1 TeleLite System Introduction	10
Fiber Connectors	10
2.2 Enhanced T1 Interface Card Model Numbers	11
2.3 Introduction to the Enhanced T1 Interface Card	12
Single T1 Features	14
Dual T1 Features	14
2.4 Applications	15
2.5 Front Panel LEDs and Switches	16
2.6 Enhanced Single T1 Switches and Settings	18
Enhanced Single T1 CO Side Jumper Settings	18
Enhanced Single T1 Station Side Switch Settings	20
2.7 Enhanced Dual T1 Switches and Settings	21
Enhanced Dual T1 CO Side Jumper Settings	21
Enhanced Dual T1 Station Side Switch Settings	23
2.8 Enhanced Single T1 Loop Back Mode	24
Setup	24
2.9 Enhanced Dual T1 Loop Back Mode	25
Setup	25
2.10 RJ-45 Pinout Descriptions	27
2.11 Specifications	28

Chapter 3 – Installation

3.1 Installing an Enhanced T1 Interface card	30
3.2 Serving Cable	32
3.3 Earthing (Ground) Connector	32
3.4 Testing	33
Troubleshooting	33

Appendix A – Support and Warranty

Service and Support 36

TeleLite Warranty 37

Acronyms

ALRM	Alarm
AMI	Alternate Mark Inversion
B8ZS	Bipolar 8 Zero Substitution
CO	Central Office
CPE	Customer Premises Equipment
CSA	Canadian Standards Association
CSU	Channel Service Unit
DIP	Dual In-line Package
DSX	Digital Signal Cross-connect
DS0	Digital Signal 0
DS1	Digital Signal 1
ESD	Electro-Static Discharge
FCC	Federal Communications Commission
GND	Ground
GPR	Ground Potential Rise
LB	Loop Back
LBO	Line Build Out
LCL	Local
LED	Light-emitting Diode
LOS	Loss of Signal
NC	No Connection
NTE	Network Terminating Equipment
PWR	Power
PVC	Poly Vinyl Chloride
RMT	Remote
RX	Receive
STAT	Status
TX	Transmit

Chapter 1

General Information

1.1 Publication Information

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**TeleLite Enhanced T1 Interface Cards, 720100xxx, 720110xxx, 720120xxx & 720130xxx,
Description and Installation Guide**

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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 Enhanced T1 Interface Card, its features and applications, and describes how to install a card 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 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:	PP-T1-1
Facility Interface Code (FIC):	04DU9.BN, 04DU9.DN, 04DU9.1KN, 04DU9.1SN
Service Order Code (SOC):	6.0Y
Universal Service Order Code (USOC) jack:	RJ48C
Network Address Code:	N
Equipment Code:	OT
REN:	Not applicable
Identification Numbers: US:	CT50TNANPP-2T1-1

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 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, Suite 220, 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-11/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. For information, see section 2.1.1 on page 10.

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

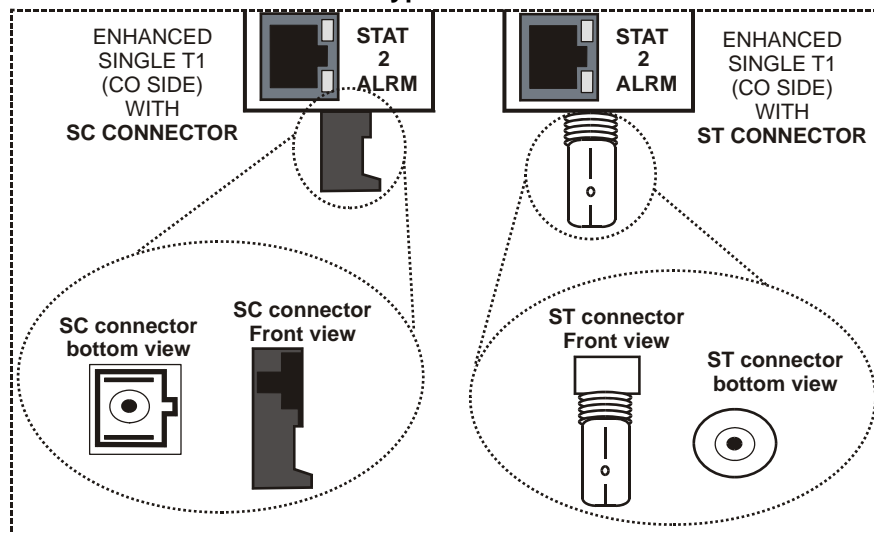
2.1.1 Fiber Connectors

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 fiber 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 4 km (2.5 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 42 km (26 miles) for standard cards and up to 100 km (62 miles) for Long Reach cards, the fiber type will be single-mode using a 1310nm wavelength for standard cards and 1550nm for Long Reach cards

2.2 Enhanced T1 Interface Card Model Numbers

For information contact Positron customer support.

Table 3: Card Type and Model Numbers

Card Type	Model Number
Single Enhanced T1 Station multi-mode ST connector	720100MST
Single Enhanced T1 Station single-mode SC connector	720100SSC
Single Enhanced T1 Station Long Reach SC connector	720100XSC
Single Enhanced T1 Central Office multi-mode ST connector	720110MST
Single Enhanced T1 Central Office single-mode SC connector	720110SSC
"Single Enhanced T1 Central Office Long Reach SC connector	720110XSC
Dual Enhanced T1 Station multi-mode ST connector	720120MST
Dual Enhanced T1 Station single-mode SC connector	720120SSC
"Dual Enhanced T1 Station Long Reach SC connector	720120XSC
Dual Enhanced T1 Central Office multi-mode ST connector	720130MST
Dual Enhanced T1 Central Office single-mode SC connector	720130SSC
Dual Enhanced T1 Central Office Long Reach SC connector	720130XSC

2.3 Introduction to the Enhanced T1 Interface Card

The Enhanced T1 Interface card is provided in two variations:

- On the CO side, the Central Office provides 60 mA DC current between the TX and RX pair to the CO unit, and is used to power the unit. As an alternative, power the card locally using a strapping.

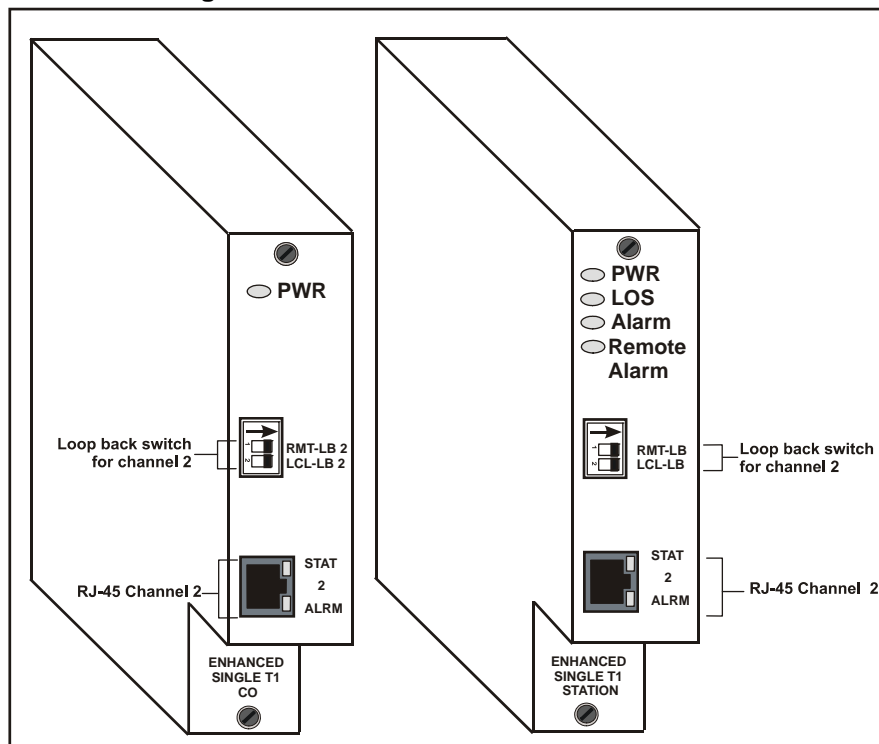
The Station side can only be powered locally, and provides 60 mA DC between the TX and RX pair to the Station side equipment on each channel. This current source provides no more than -48 Vdc.

NOTE

A Single Enhanced T1 card type provides isolation for one T1 line.

A Dual Enhanced T1 card type provides isolation for up to two T1 lines.

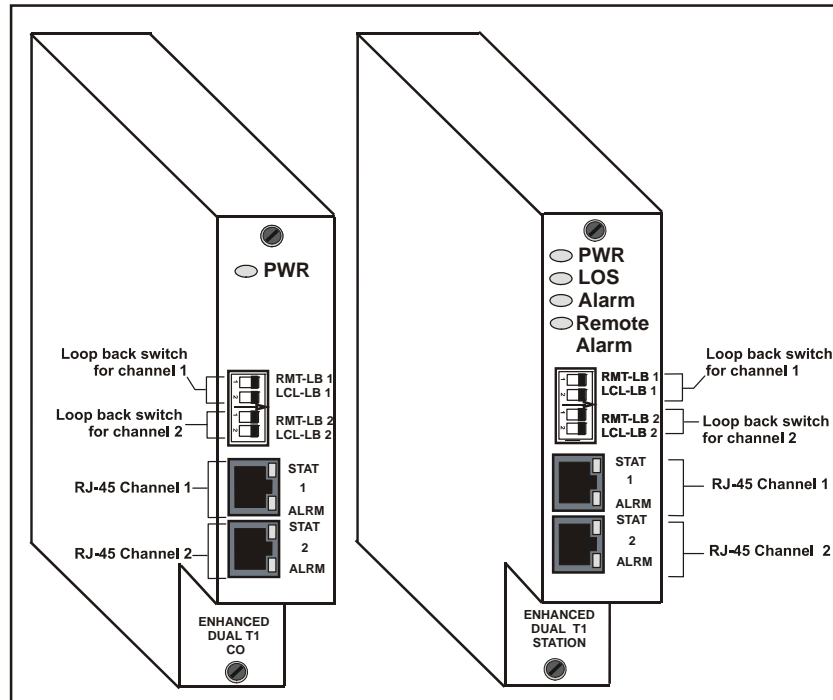
Figure 2: Enhanced Single T1 CO and Station Side Interface Cards



NOTE

This illustration is a general guideline only.

Figure 3: Enhanced Dual T1 CO and Station Side Interface Cards



NOTE | This illustration is a general guideline only.

2.3.1 Single T1 Features

The following is a list of features that both CO side and Station side Single T1 cards provide (unless otherwise specified):

- Isolation of one T1 line
- Line power from the T1 line (CO side only), or locally powered
- Support of single- and multi-mode fiber with ST/SC connector type
- 60 mA dc to the Customer Premises Equipment (CPE) (Station side only)
- Line coding “AMI” and “B8ZS”
- Loop back for maintenance and diagnostic of the Interface card

2.3.2 Dual T1 Features

The following is a list of features that both CO side and Station side Dual T1 cards provide (unless otherwise specified):

- Isolation up to two T1 lines
- Line power from the T1 line (CO side only), or locally powered
- Support of single- and multi-mode fiber with ST/SC connector type
- 60 mA DC to the CPE (Station side only)
- Line coding “AMI” and “B8ZS”
- Loop back for maintenance and diagnostic of the Interface card

NOTE

- **Dual T1 Only:** When only one of the two ports is connected to an active T1 line, set unused port in loopback mode, to disable minor alarm due to this port.

NOTE

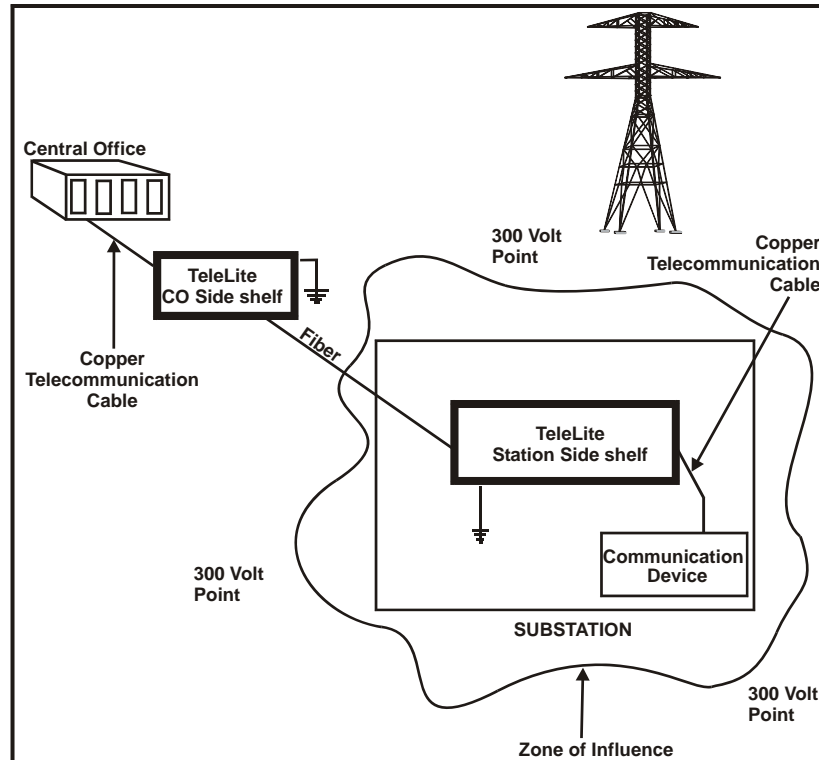
All TeleLite cards (CO and Station side) share the same functionality; see section 2.5 on page 16.

2.4 Applications

The applications of the Enhanced T1 Interface card include, but are not limited to:

- Support of up to two T1 lines (1.544 Mb/s) each
- Frame relay MPLS, VoIP over T1 or fractional T1
- Multiplexed voice or data DS0 channels over T1

Figure 4: Enhanced T1 Interface Card Application



2.5 Front Panel LEDs and Switches

LEDs are located on the front panel of the card:

Figure 5: Enhanced Single T1 Interface Card (CO Side)

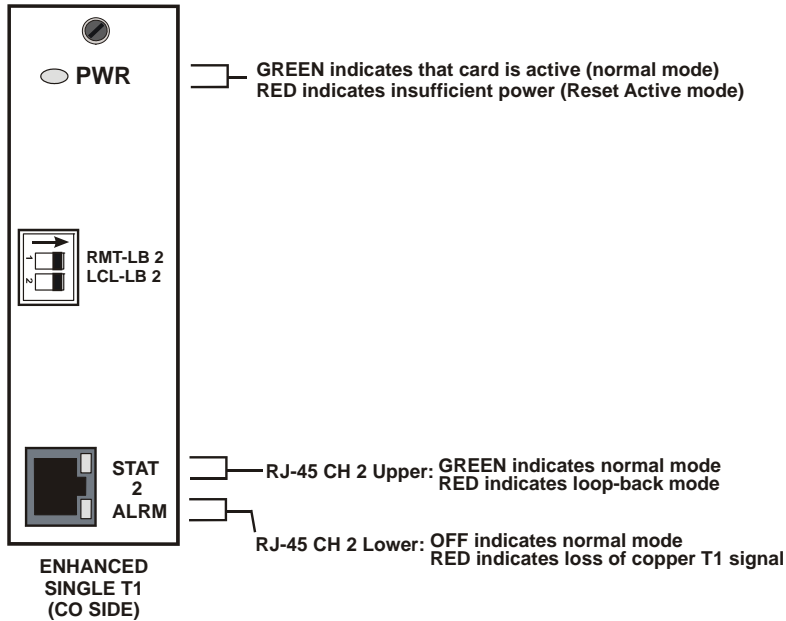


Figure 6: Enhanced Single T1 Interface Card (Station Side)

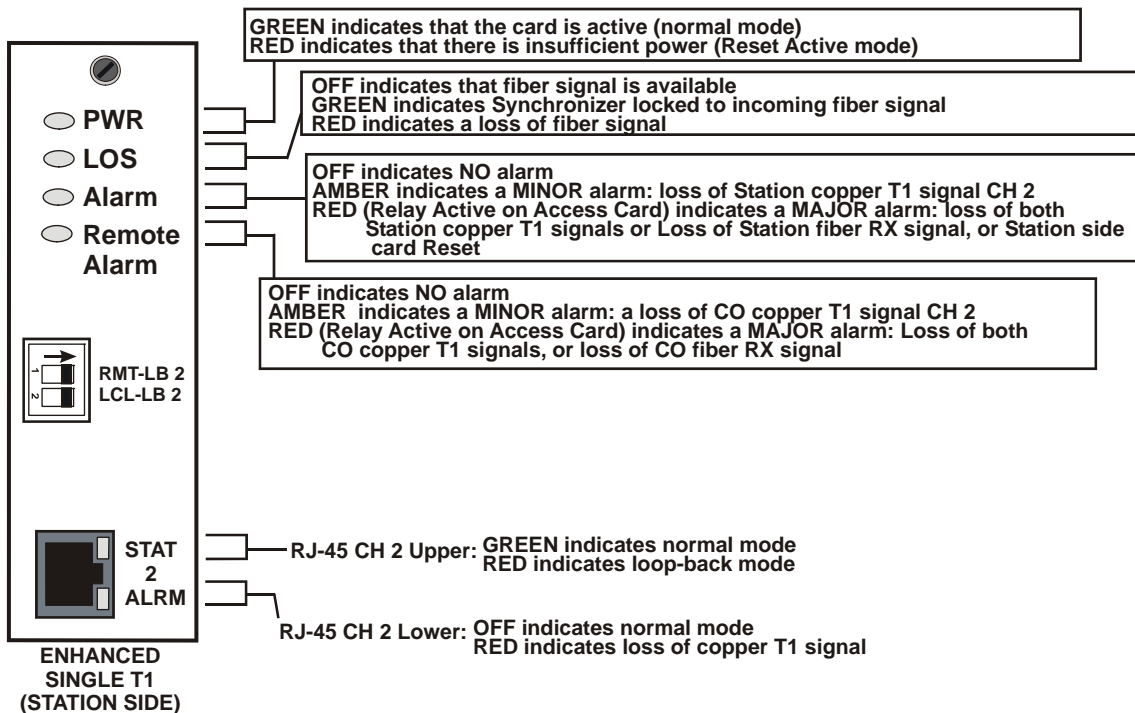


Figure 7: Enhanced Dual T1 Interface Card (CO Side)

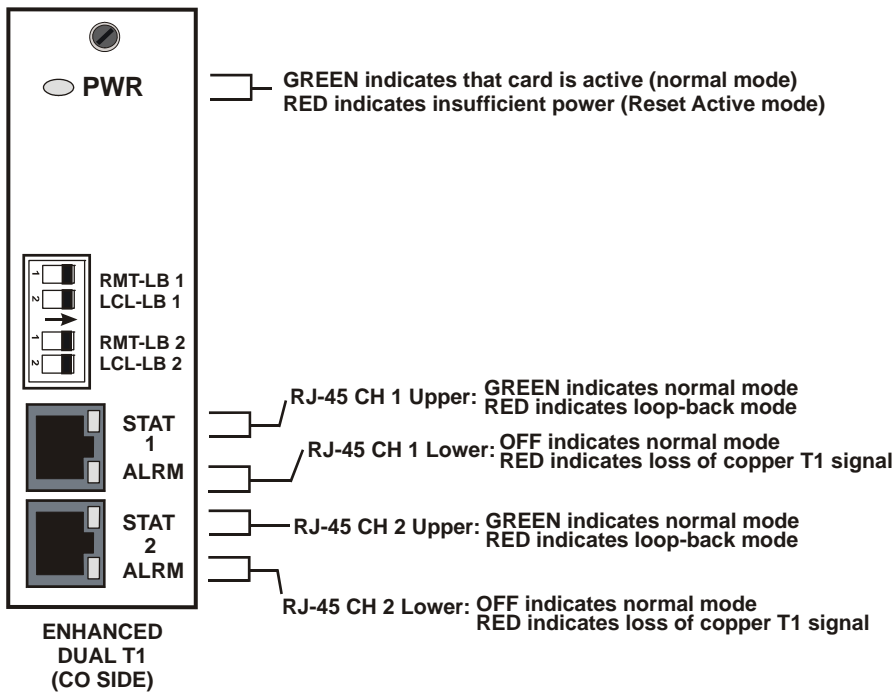
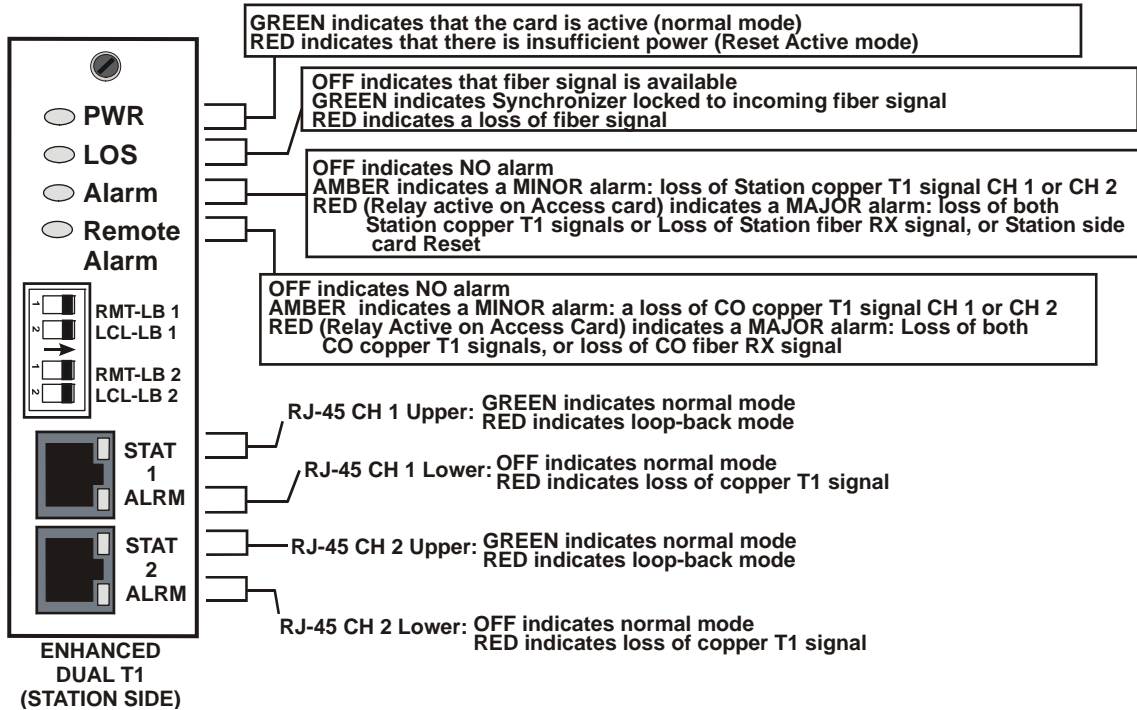


Figure 8: Enhanced Dual T1 Interface Card (Station Side)



2.6 Enhanced Single T1 Switches and Settings

NOTE | DIP switch mode, Line Build Out (LBO) settings, receiver sensitivity settings, and Jumper settings are the same for both the Single and Dual Enhanced T1 Interface cards.

DIP switch mode is set according to the distance from the CO side equipment to the terminating equipment, or from the Station side equipment to the Station side shelf.

- For CO side DIP switch locations, see Figure 9 on page 19
- For CO side LBO settings, see Table 4 on page 19
- For CO side Receiver sensitivity settings, see Table 5 on page 19
- For Station side DIP switch locations, see Figure 10 on page 20
- For Station side LBO settings, see Table 6 on page 20
- For Station side Receiver sensitivity settings, see Table 7 on page 20

2.6.1 Enhanced Single T1 CO Side Jumper Settings

NOTE | By default, the jumper mode for a CO side card is set for line power, and all DIP switches are set in the ON position.

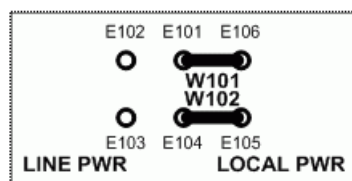
The CO side Enhanced Single T1 Interface card can be:

- Line powered: Power will come from the RJ45 incoming circuit.
- Locally powered: Power will be provided by a local supply through an Access Card (720001) or Power Access Card (721123, 721124, 721125).

NOTE | For information on the different access cards, refer to their respective Description and Installation guides available at www.PositronPower.com/en.

► To configure the Enhanced Single T1 Interface card to be locally powered

1. Insert W101 & W102 as illustrated (for jumper locations, see Figure 9 on page 19):



► To configure the Enhanced Single T1 Interface card to be line powered

1. Insert W101 & W102 as illustrated (for jumper locations, see Figure 9 on page 19):

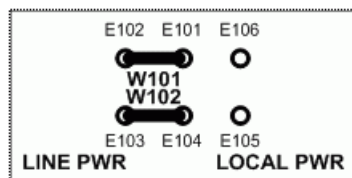
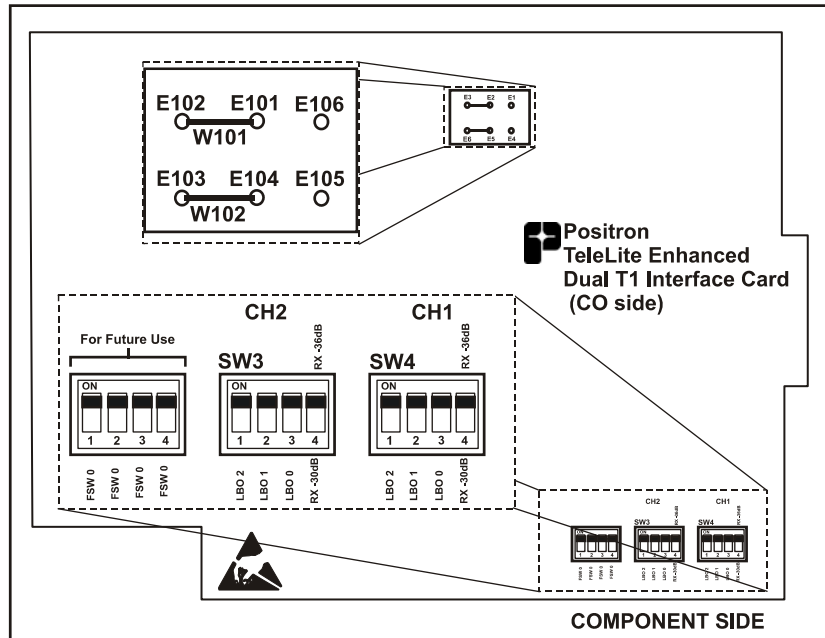


Figure 9: TeleLite Enhanced Single T1 Interface Card (CO Side)



NOTE | By default, the jumper mode for a CO side card is set for line power, and all DIP switches are set in the ON position.

NOTE | SW3 is used for CH2 settings.

Table 4: CH2 LBO Settings (CO Side)

LBO-2	LBO-1	LBO-0	Application
ON	ON	ON	DSX-1 0 to 40.5 m (0 to 133 ft) / 0 dB CSU
ON	ON	OFF	DSX-1 40.5 to 111.6 m (133 to 366 ft)
ON	OFF	ON	DSX-1 111.6 to 121.6 m (366 to 399 ft)
ON	OFF	OFF	DSX-1 121.6 to 162.5 m (399 to 533 ft)
OFF	ON	ON	DSX-1 162.5 to 200 m (533 to 655 ft)
OFF	ON	OFF	-7.5 dB CSU (SHORT) (DS1)
OFF	OFF	ON	-15 dB CSU (MEDIUM) (DS1)
OFF	OFF	OFF	-22.5 dB CSU (LONG) (DS1)

Table 5: Receiver Sensitivity Settings (CO side)

Parameter	Setting
RX:	-30 dB
	-36 dB (Default)

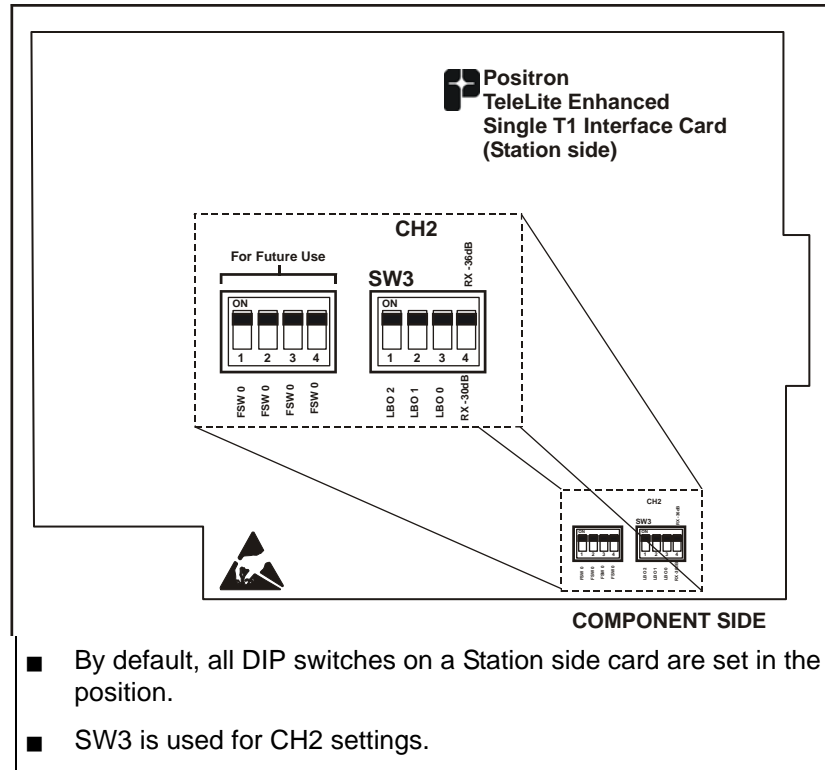
2.6.2 Enhanced Single T1 Station Side Switch Settings

The Station side Enhanced Single T1 is always locally powered. Power will be provided by an Access Card (720001) or Power Access Card (721123, 721124, 721125).

NOTE

For information on the different access cards, refer to their respective Description and Installation guides available at www.PositronPower.com/en.

Figure 10: TeleLite Enhanced Single T1 Interface Card (Station Side)



NOTE

- By default, all DIP switches on a Station side card are set in the ON position.
- SW3 is used for CH2 settings.

Table 6: CH2 LBO Settings (Station side)

LBO-2	LBO-1	LBO-0	Application
ON	ON	ON	DSX-1 0 to 40.5 m (0 to 133 ft) / 0 dB CSU
ON	ON	OFF	DSX-1 40.5 to 111.6 m (133 to 366 ft)
ON	OFF	ON	DSX-1 111.6 to 121.6 m (366 to 399 ft)
ON	OFF	OFF	DSX-1 121.6 to 162.5 m (399 to 533 ft)
OFF	ON	ON	DSX-1 162.5 to 200 m (533 to 655 ft)
OFF	ON	OFF	NOT USED
OFF	OFF	ON	NOT USED
OFF	OFF	OFF	NOT USED

Table 7: Receiver Sensitivity Settings (Station side)

Parameter	Setting
RX:	-30 dB
	-36 dB (Default)

2.7 Enhanced Dual T1 Switches and Settings

NOTE | DIP switch mode, LBO settings, receiver sensitivity settings, and Jumper settings are the same for both the Single, and Dual Enhanced T1 Interface cards.

DIP switch mode is set according to the distance from the CO side equipment to the terminating equipment, or from the Station side equipment to the Station side shelf.

- For CO side DIP switch locations, see Figure 11 on page 22
- For CO side LBO settings, see Table 8 on page 22
- For CO side Receiver sensitivity settings, see Table 9 on page 22
- For Station side DIP switch locations, see Figure 12 on page 23
- For Station side LBO settings, see Table 10 on page 23
- For Station side Receiver sensitivity settings, see Table 11 on page 23

2.7.1 Enhanced Dual T1 CO Side Jumper Settings

NOTE | By default, the jumper mode for a CO side card is set for line power, and all DIP switches are set in the ON position.

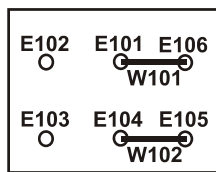
The CO side Enhanced Dual T1 Interface card can be:

- Line powered: Power will come from the RJ45 incoming circuit.
- Locally powered: Power will be provided by a local supply through an Access Card (720001) or Power Access Card (721123, 721124, 721125).

NOTE | For information on the different access cards, refer to their respective Description and Installation guides available at www.PositronPower.com/en.

► To configure the Enhanced Dual T1 Interface card to be locally powered

1. Insert W101 & W102 as illustrated
(for jumper locations, see Figure 11 on page 22)



► To configure the Enhanced Dual T1 Interface card to be line powered

1. Insert W101 & W102 as illustrated
(for jumper locations, see Figure 11 on page 22)

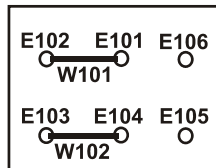
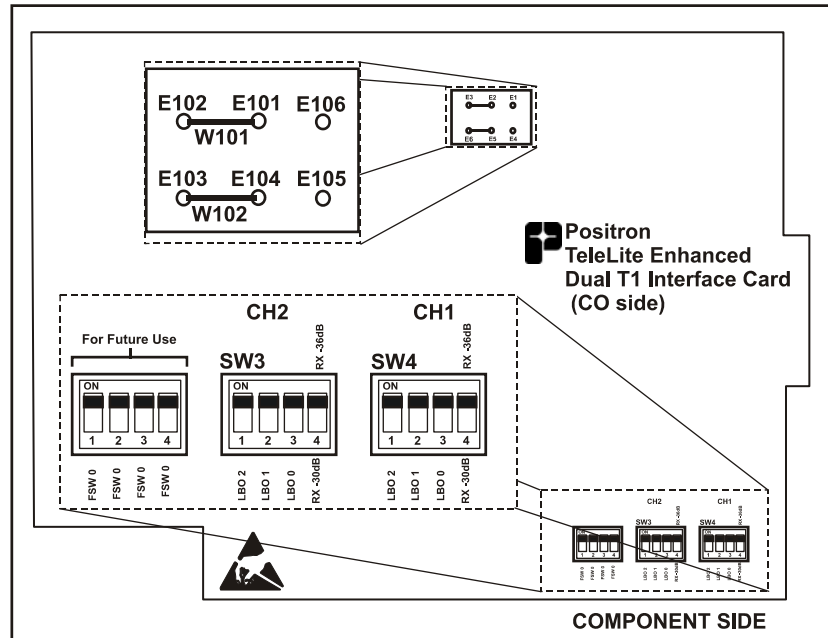


Figure 11: TeleLite Enhanced Dual T1 Interface Card (CO Side)



NOTE

- By default, the jumper mode for a CO side card is set for line power, and all DIP switches are set in the ON position.
- SW3 is used for CH2 settings, and SW4 is used for CH 1 settings.

Table 8: CH1 and CH2 LBO Settings (CO Side)

LBO-2	LBO-1	LBO-0	Application
ON	ON	ON	DSX-1 0 to 40.5 m (0 to 133 ft) / 0 dB CSU
ON	ON	OFF	DSX-1 40.5 to 111.6 m (133 to 366 ft)
ON	OFF	ON	DSX-1 111.6 to 121.6 m (366 to 399 ft)
ON	OFF	OFF	DSX-1 121.6 to 162.5 m (399 to 533 ft)
OFF	ON	ON	DSX-1 162.5 to 200 m (533 to 655 ft)
OFF	ON	OFF	-7.5 dB CSU (SHORT) (DS1)
OFF	OFF	ON	-15 dB CSU (MEDIUM) (DS1)
OFF	OFF	OFF	-22.5 dB CSU (LONG) (DS1)

Table 9: Receiver Sensitivity Settings (CO side)

Parameter	Setting
RX:	-30 dB
	-36 dB (Default)

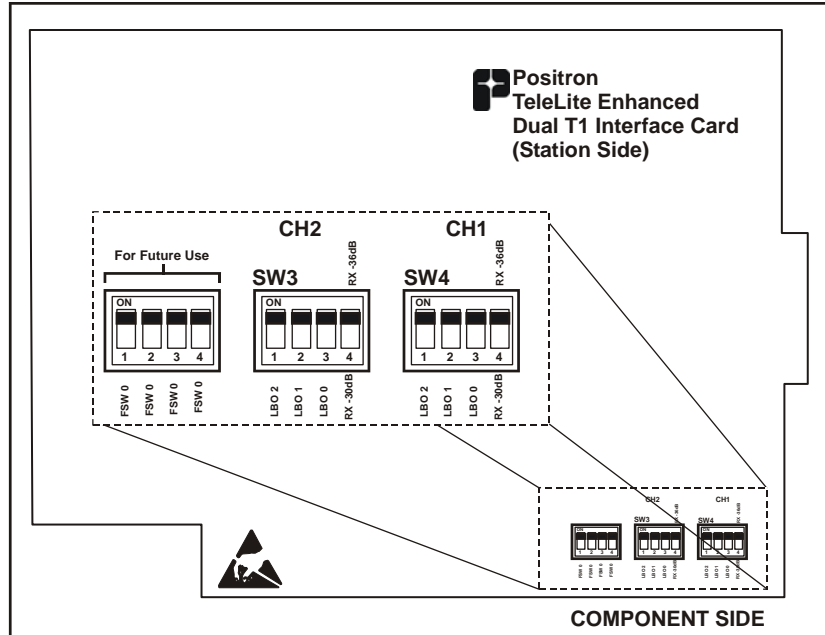
2.7.2 Enhanced Dual T1 Station Side Switch Settings

The Station side Enhanced Single T1 is always locally powered. Power will be provided by an Access Card (720001) or Power Access Card (721123, 721124, 721125).

NOTE

For information on the different access cards, refer to their respective Description and Installation guides available at www.PositronPower.com/en.

Figure 12: TeleLite Enhanced Dual T1 Interface Card (Station Side)



NOTE

- By default, all DIP switches on a Station side card are set in the ON position.
- SW3 is used for CH2 settings, and SW4 is used for CH 1 settings.

Table 10: CH1 and CH2 LBO Settings (Station side)

LBO-2	LBO-1	LBO-0	Application
ON	ON	ON	DSX-1 0 to 40.5 m (0 to 133 ft) / 0 dB CSU
ON	ON	OFF	DSX-1 40.5 to 111.6 m (133 to 366 ft)
ON	OFF	ON	DSX-1 111.6 to 121.6 m (366 to 399 ft)
ON	OFF	OFF	DSX-1 121.6 to 162.5 m (399 to 533 ft)
OFF	ON	ON	DSX-1 162.5 to 200 m (533 to 655 ft)
OFF	ON	OFF	NOT USED
OFF	OFF	ON	NOT USED
OFF	OFF	OFF	NOT USED

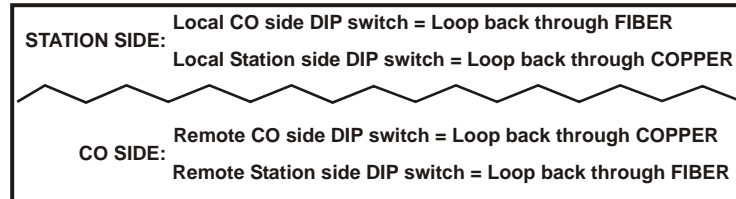
Table 11: Receiver Sensitivity Settings (Station side)

Parameter	Setting
RX:	-30 dB
	-36 dB (Default)

2.8 Enhanced Single T1 Loop Back Mode

Use loop back switch settings to detect remote and local alarms.

Figure 13: Loop Back Switch Settings for Remote and Local Loop Back



2.8.1 Setup

There are two switches on the Enhanced Single T1 Interface card front panel; see Figure 14 on page 24.

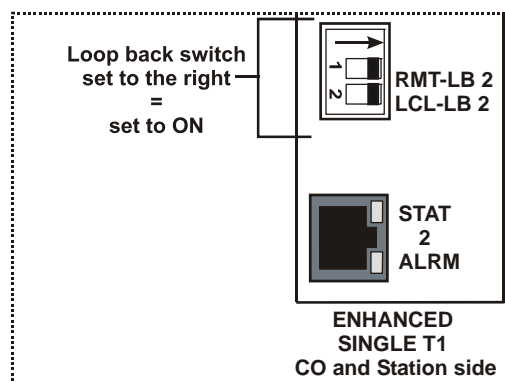
These switches affect CH2 loop back:

- RMT-LB 2: configures the CO side
- LCL-LB 2: configures the Station side (customer equipment)

Table 12: Enhanced Single T1 Interface Loop Back Switch Settings

Switch	Position	Setting	Loop Back Mode
RMT-LB 2	LEFT	OFF	Normal
RMT-LB 2	RIGHT	ON	Loop back to CO
LCL-LB 2	LEFT	OFF	Normal
LCL-LB 2	RIGHT	ON	Loop back to Station side (customer equipment)

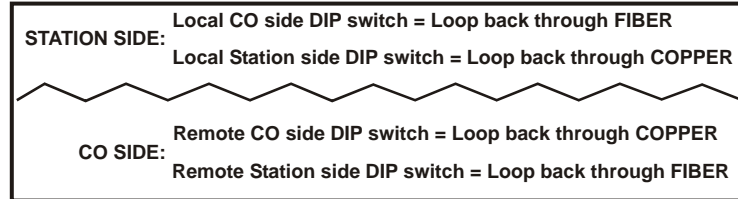
Figure 14: Enhanced Single T1 Interface Loop Back Switches for Channel 2



2.9 Enhanced Dual T1 Loop Back Mode

Use loop back switch settings to detect remote and local alarms.

Figure 15: Loop Back Switch Settings for Remote and Local Loop Back



2.9.1 Setup

There are two switches per channel (for a total of 4 switches) on the Enhanced Dual T1 Interface card front panel; see Figure 16 on page 26.

The upper group of switches affect CH1 loop back:

- RMT-LB 1: configures the CO side
- LCL-LB 1: configures the Station side

The lower group of switches affect CH2 loop back:

- RMT-LB 2: configures the CO side
- LCL-LB 2: configures the Station side

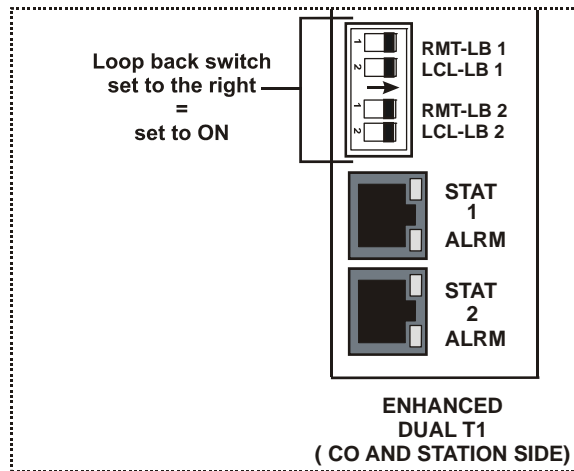
NOTE

- When using only one T1 circuit on Dual Enhanced T1 cards, set the “LCL-LB” switch of the unused circuit to “ON” on both cards to clear the alarm being generated by the unconnected jack.

Table 13: Enhanced Dual T1 Interface Loop Back Switch Settings

Switch	Position	Setting	Loop Back Mode
RMT-LB 1	LEFT	OFF	Normal
RMT-LB 1	RIGHT	ON	Loop back to CO
LCL-LB 1	LEFT	OFF	Normal
LCL-LB 1	RIGHT	ON	Loop back to Station side (customer equipment)
RMT-LB 2	LEFT	OFF	Normal
RMT-LB 2	RIGHT	ON	Loop back to CO
LCL-LB 2	LEFT	OFF	Normal
LCL-LB 2	RIGHT	ON	Loop back to Station side (customer equipment)

Figure 16: Enhanced Dual T1 Interface Loop Back Switches for Channel 1 & 2



2.10 RJ-45 Pinout Descriptions

Figure 17: Enhanced Single T1 Interface Card Pinout Assignments (CO and Station side)

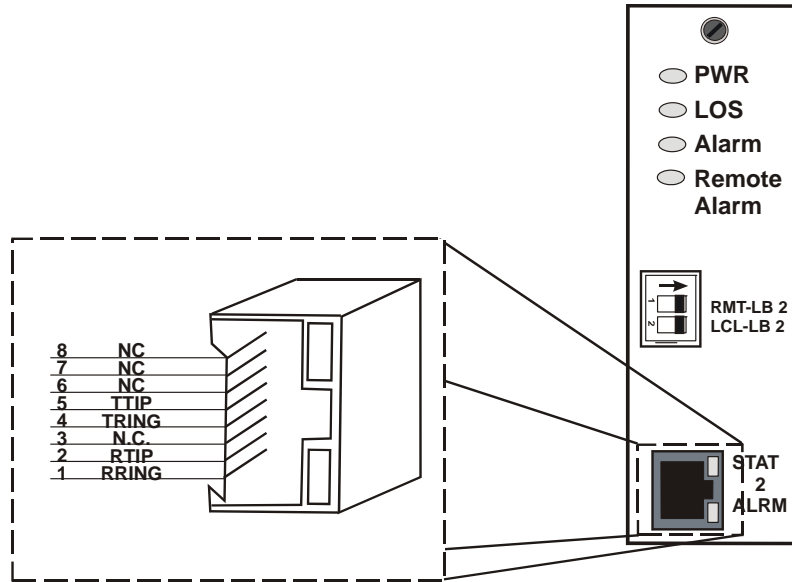
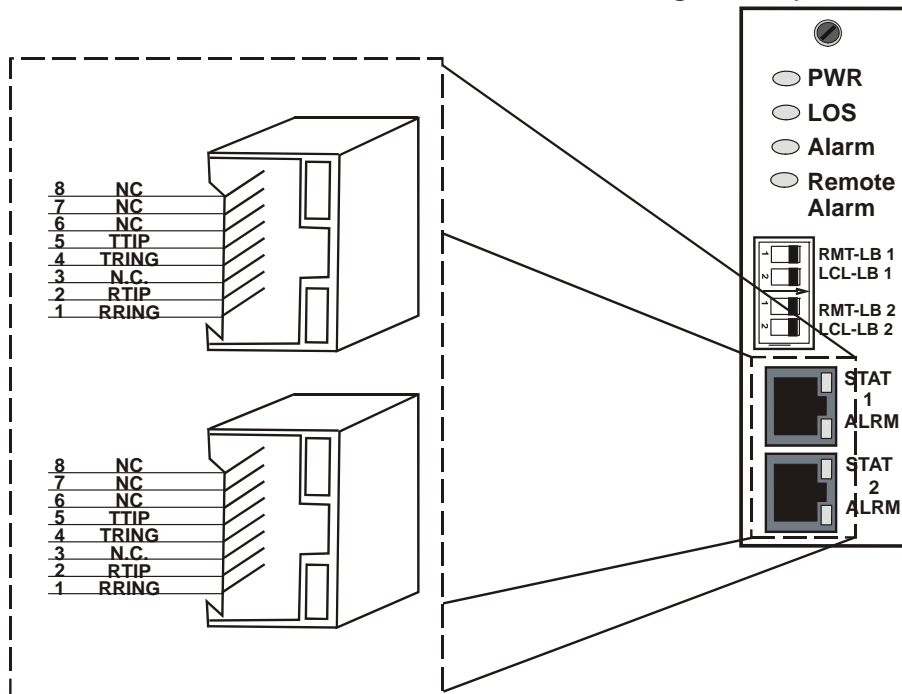


Figure 18: Enhanced Dual T1 Interface Card Pinout Assignments (CO and Station side)



2.11 Specifications

NOTE | The following specifications apply to both the Enhanced Dual and Single T1 Interface cards.

Table 14: Electrical Specifications

Parameter	Specification
CO side power consumption	1.6 Watts at -48 Vdc locally powered
CO side power dissipation	2.2 Watts when line powered 1.6 Watts when locally powered
Station side power consumption	8 Watts
Station side power dissipation	3 Watts
Line coding	AMI or B8ZS (transparent)
Line length CO side	1829 m (6,000 ft)
Line length Station side	1828.8 m (6,000 ft)

Table 15: Optical Specifications

Parameter	Specification
Fiber optic interface	ST/SC type connector
Transmitter wavelength	multi-mode fiber: 850 nm standard single-mode fiber: 1310 nm Long Reach single-mode: 1550 nm
Transmitter power output	multi-mode: -22 dBm standard single-mode: -12 dBm Long Reach single-mode: -3 dBm normal, -43 dBm in safety mode
Receiver sensitivity	multi-mode: -39dBm standard single-mode: -39dBm Long Reach single-mode: -38dBm
Fiber optic type	multi-mode fiber: 62.5/125 μm single-mode fiber: 9/125 μm
Fiber span distance	multi-mode: 4 km (2.5 miles) standard single-mode: 42 km (26 miles) Long Reach single-mode: 100 km (62 miles)

Table 16: Environmental Specifications

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

NOTE | The operating temperature specified in Table 15 is the maximum ambient temperature with any combination of TeleLite cards in the shelf.

Chapter 3

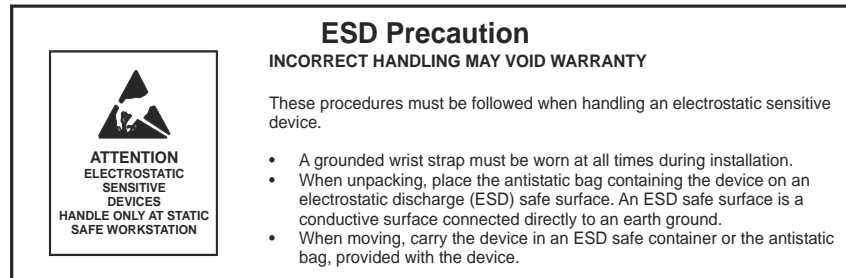
Installation

3.1 Installing an Enhanced T1 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 19.

Figure 19: ESD Precautions



► To install an Enhanced Single or Dual T1 Interface card in a shelf

NOTE

The installation procedure for the CO and Station side Enhanced Single and Dual T1 Interface cards is the same.

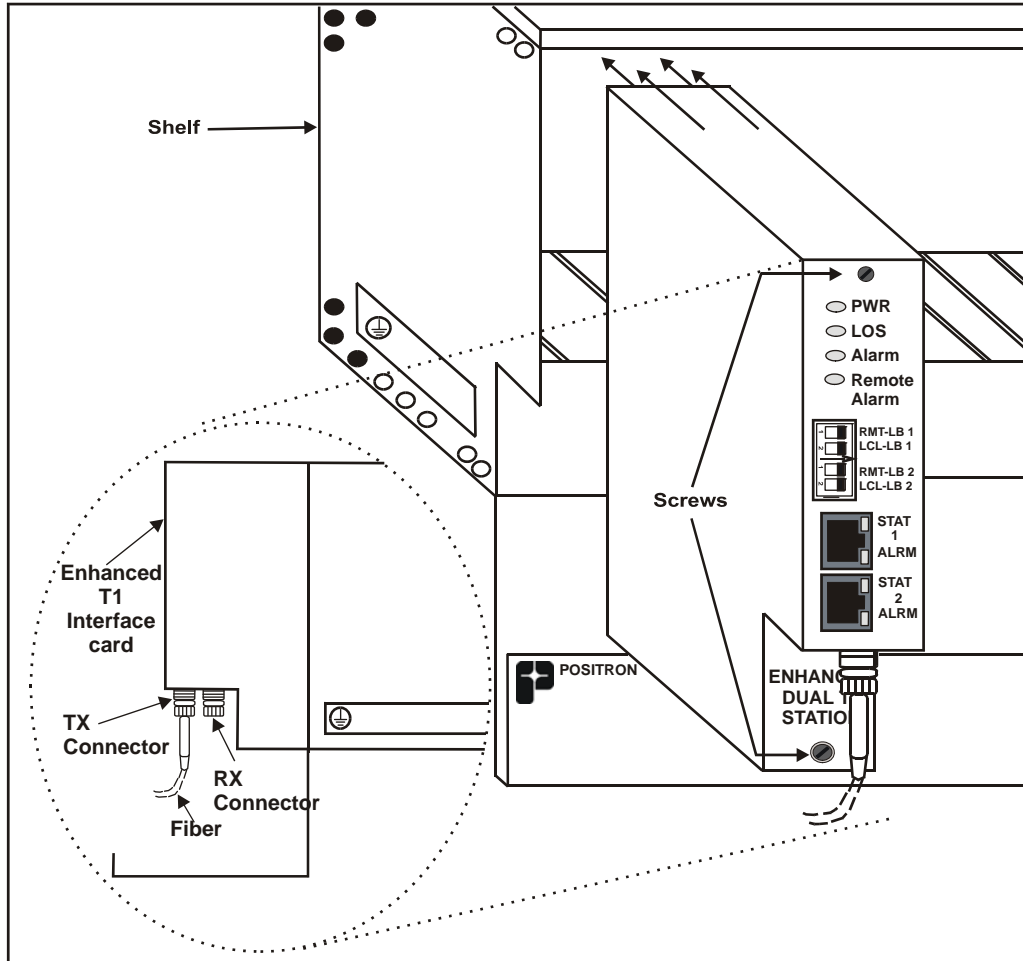
1. Take the card out from its protective packaging.
2. Make sure the card is right-side up, align the card with the appropriate slot of the shelf and slide it in, as show in Figure 20 on page 31.
3. Hand-tighten the top and bottom screws, to secure the card in place.
4. Connect cables to and from the 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 RJ45 jacks on the face plate of the CO card to the incoming T1 line from the CO or from the HTUx-R if serving a DSL line. This connection will use a straight cable.
7. Connect the RJ45 jacks on the face plate of the Station card to the CPE equipment. This connection will use a crossed cable.
8. The powering of the cards will be done from shelf's access card or from the line span power depending on the card and setting.
 - The Enhanced T1 station cards (720100xxx & 720120xxx) are always locally powered. The card will be powered from the access card installed in the shelf. If using an Access Card (720001), apply -48 Vdc to the face plate terminal block. If using a Power Access Card, appropriate power is brought to the face terminal block. Please refer to the appropriate access card Description and Installation guide.
 - The Enhanced T1 CO cards (720110xxx, 720130xxx) can be powered either through the line current or locally. For Enhanced T1 card setting, see section 2.6.1 on page 18

and section 2.7.1 on page 21. If powered locally, it will be powered the same way as the Station card described above.

NOTE For information on the TeleLite Access card (model 720001), refer to the TeleLite Access Interface card, Description and Installation guide.

NOTE ■ For Enhanced Dual T1 Interface card switches and settings, see section 2.7 on page 21.

Figure 20: Installing an Enhanced Single or Dual T1 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 regulations.

The CO unit must be installed outside the state ground where the potential is less than 300 V.

Use a fiber and conduit between the CO and Station side unit that is non-conductive and follows local regulations.

3.3 Earthing (Ground) 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 TeleLite 6-position Shelf Model 720000 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 LEDs and RJ-45 connectors have the following status:

- PWR: Green (card is active)
- LOS: Green (clock is synchronized)
- Alarm: Off (no alarm)
- Remote Alarm: Off (no alarm)
- RJ-45 Channel 1 upper: Green (normal mode)
- RJ-45 Channel 1 lower: Off (normal mode)
- RJ-45 Channel 2 upper: Green (normal mode)
- RJ-45 Channel 2 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 30.
- The TX and RX connections are correct, on both copper and fiber side.
- The DIP switch settings are accurate. For Enhanced Single T1 loop back mode, see section 2.9 on page 25. For Enhanced Dual T1 loop back mode, see section 2.9 on page 25.
- If using Dual Enhanced T1 cards but only one of the pair is being used, make sure the “local loopback” switch of the unused jack is enabled on both cards to clear the alarm generated by the unconnected jack.

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.