TeleLite™

HVI Pre-configured Units, Description and Installation Guide

925W720109-01E ****PRELIMINARY***

POSITRON
Positron Inc.

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Chapter 1

General Information

1.1 Publication Information

TeleLite HVI Pre-configured Units, Description and Installation Guide
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Positron Inc.
5101 Buchan Street, Suite 220
Montreal, Québec, Canada
H4P 2R9

US and Canada: 1-888-577-5254
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1.2 About this Guide

This guide introduces you to the TeleLite HVI Pre-configured Units, their features and applications, and describes how to install them. 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

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 High Voltage Interface (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 Overall Compliances

All configurations meets FCC Part 15 Class A, FCC Part 68, Laser Safety Class 1, NRTL safety.

These configurations also meet NEBS requirements GR-487, GR- 63 & GR-1089.

1.3.2 3rd Party Options Compliances:

- The HYPEREDGE Digital Termination Wall-mount Assembly (DTWA) is listed UL 60950 and complies with NEBS.
- The 50 pairs 3M™ Indoor Protected Entrance Terminal (PET) 4588 Series is listed under UL1459.
- The 5-pin Protection module meets the Telcordia 974, GTE GTS-8700, and N.E.C. requirements. It is also listed under UL 497.

1.3.3 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.

1.3.4 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 example

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
Ringer Equivalency Number (REN):	Not applicable
Identification Numbers: US:	CT5OTNANPP-T1-1

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 Ringer Equivalency 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 Enhanced T1, please contact the Positron Repair department at 1-800-661-4311 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.

1.3.5 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.

1.3.6 Product Safety

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

1.3.7 NEBS (Network Equipment Building Systems) 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
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 (TCS) at 1-888-577-5254 (US and Canada) or at 1-514-345-2220 (International).

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 at 1-800-661-4911 (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.

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, 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.

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 products provide electrical isolation between two points on a telecommunication landline. The system is divided into two parts: the Central Office (CO) side and the Station side. The electrical isolation between these two parts is achieved by using a fiber optic link. Moreover, the CO side must be located far enough from the Station side so the ground potential at that point does not increase above 300 Volts with respect to the CO side. The CO side unit represents a Copper to Fiber Junction (CFJ), which will perform an electrical to optical signal conversion. At the Station side, the TeleLite unit recreates the electrical signal and therefore represents an Optical to Electrical Interface (OEI).

The TeleLite High Voltage Interface (HVI) Pre-configured Units (PCU) are installed to protect communication lines and all associated equipment against lightning induced GPR.

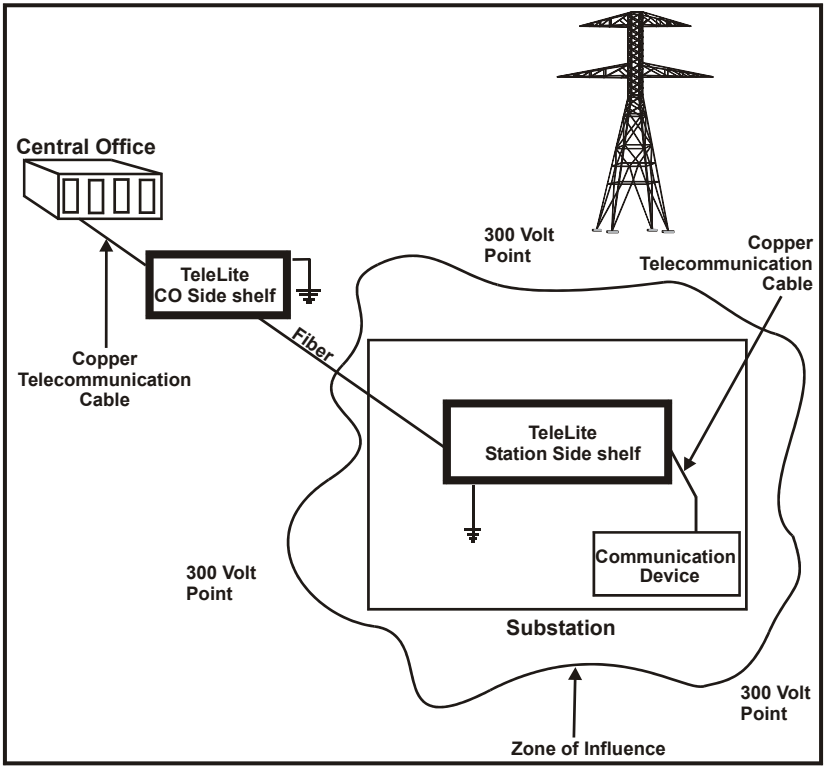
Positron offers different configurations of the TeleLite HVI. When supplied as a pre-wired backboard unit, for indoor installations, the TeleLite HVI can be wall-mounted. When used outdoors, or for compliance, the backboard must be mounted in an enclosure. Two enclosure options are available: a NEBS (Network Equipment Building Systems) metal cabinet, and a lighter-weight polymer cabinet. These cabinets can be pole-mounted, wall-mounted, pod-mounted, or in the case of the NEBS cabinet, pedestal-mounted.

TeleLite HVI units provide resources to accommodate up to 6 TeleLite Plug-in Interface Cards (single-shelf models) or 12 TeleLite Plug-in Interface Cards (double-shelf models) for different types of transmission lines (POTS, DDS, T1, 2W/4W, etc), along with other 3rd party equipment.

Each shelf includes a seventh slot to accommodate a TeleLite Access Interface card, which provides -48 Vdc power to the shelf when locally-powered Plug-in Interface Cards are used. When a -48 Vdc supply is not locally available, the customer must use the appropriate ac-dc or dc-dc converter to obtain -48 Vdc necessary to power the TeleLite shelf via the Access Interface card.

The figure below represents a typical TeleLite PCU installation:

Figure 1: TeleLite PCU System Overview



2.2 TeleLite High Voltage Interface Pre-configured Units

Depending on configuration, the cabinet and backboard can include the following elements:

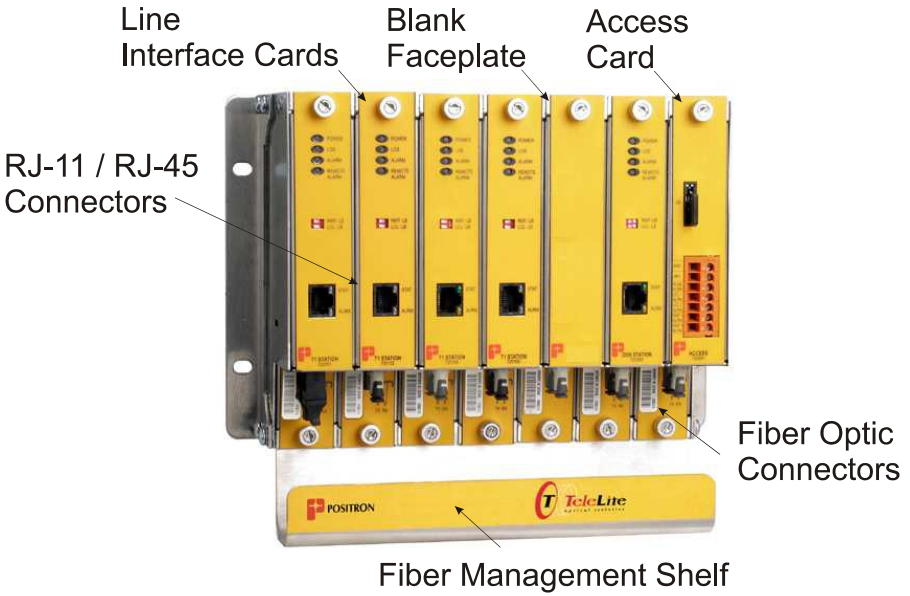
- One or two TeleLite shelves
- Up to two 4-position HyperEdge Digital Termination Wall-mount Assemblies (DTWA)
- 25- or 50-pair protection blocks
- 50-pair punch block
- Fiber optic management center
- Ground bar
- Fused, DIN rail-mounted power and alarm terminals
- Cabinet
- Mounting hardware

2.3 TeleLite Shelf

The CO and station side shelves are the same, in both cases one or two TeleLite shelves can be pre-installed on the backboard to accommodate six TeleLite line interface cards and one Access card per shelf. Any available slot can accommodate any available line card. A blank faceplate must be used for any slot without a card to block electromagnetic interference.

Each shelf contains a motherboard, which provides power and alarm connections. The motherboard does not provide for any telecom connections since all telecom connections will be made directly to the RJ-11/RJ-45 connectors on the front panel of each card. A fiber management shelf running across the bottom of the shelf facilitates orderly cable arrangement.

Figure 2: TeleLite Shelf



2.4 Line Interface Cards

All connections to the line interface cards are done via modular jacks on their front plates and routed to a break-out box using a patch cord provided. Each line interface card provides visual indication to quickly identify its status.

The TeleLite line interface card product family supports the following types of telecommunication line.

- POTS
- T1 with 1 or 2 Channels
- Data 56K DDS
- Dual 4-wire AC
- Single Data Analog 2 and 4 Wire AC
- HDSL
- High-density POTS with CLID
- High-density Ground Start lines
- High-density DID
- High density OPX
- Quad Ethernet Card

Different versions of the TeleLite Plug-in Interface Cards support Single-Mode (SM) and Multi-Mode fiber (MM) with SC and ST fiber connectors. For short distances, less than 1.2 miles (approx. 2 km) between CO and Station side, the fiber type must be Multi-Mode, using a 850 nm wavelength LED. For longer distances, up to 9.9 miles (approx. 16km) the fiber type must be Single-Mode, using a 1310 nm wavelength Laser.

NOTE

- Please refer to TeleLite Description and Installation Guide for each line interface card and shelf for a detailed description.
- A full list of currently-available line interface cards including specifications and installation guides is provided on the Positron Power website www.PositronPower.com.
- Any slot in the shelf not used by a card requires a blank face plate (model 719999) to reduce electromagnetic interference (EMI).

2.5 Access Interface Card

Each TeleLite Shelf has one slot reserved for an Access Interface card to power the shelf. This card is rated -48 Vdc, 1A, fused at 2A. When only line-powered cards are installed, the Access card is not required and can be replace by a blank face plate.

The Access Interface card can be housed in any slot, but to provide best cable routing, it is recommended that the card be located in the rightmost slot. A Terminal block on the front of the unit provides connection for power and alarm indications.

Figure 3: Access Interface Card

2.6 Powering Option

Table 3: Available powering options

Ordering Numbers	Description
7243PT-15	Power Terminal 115 Vac
7243PT-29	Power Terminal -129 Vdc
7243PT-48	Power Terminal -48 Vdc

NOTE

- The powering option includes the terminal and cabling to the shelves. The Access Interface card must be ordered separately.
- These power options are not NEBS compliant

2.7 Product Ordering Configurations

Each configuration will consist of cabinet with a mounting option, a pre-wired backboard assembly, and a powering option.

When an HVI assembly is installed outdoors, it is essential that the unit be enclosed in a cabinet. Two kinds of cabinets are available, NEBS and non-NEBS.

2.7.1 Cabinet configurations

Table 4: Available Cabinet Configurations

Ordering Numbers	Description
7243NC-PD	Cabinet 40 X 30 NEBS, pad mount
7243NC-PL	Cabinet 40 X 30 NEBS, pole mount
7243NC-WL	Cabinet 40 X 30 NEBS, wall mount
7243PC-PL	Cabinet 40 X 30 Polymer, pole mount
7243PC-WL	Cabinet 40 X 30 Polymer, wall mount
7232PC-PL	Cabinet 20 X 30 Polymer, pole mount
7232PC-PL	Cabinet 20 X 30 Polymer, wall mount

2.7.2 Backboard Configuration

Table 5: Available Backboard Configurations

Ordering Numbers	Description
7232BS-00	Single-shelf - Bix punch block
7232BS-10	Single-shelf - 25-pair protection block, 50-pair punch block
7243BS-10	Single shelf - SurgeTech protection 25 pairs - No DTWA
7243BS-20	Single shelf - 3M protection 50 Pairs - No DTWA
7243BD-10	Dual shelves - SurgeTech protection 25 pairs - No DTWA
7243BD-20	Dual shelves - 3M protection 50 Pairs - No DTWA
7243BD-22	Dual shelves - 3M protection 50 Pairs - Two DTWA

NOTE

- All backboard configurations include cabling provisions to route the -48 Vdc from the input power terminals to the shelf or shelves. For other options refer to powering option section below.

2.8 Individual Kits

A NEBS HVI preconfigured unit can be upgraded in the field by adding individual kits:

Table 6: NEBS HVI Preconfigured Unit Individual Upgrade Kits

Part Number	Description
719999	TeleLite blank face plate (must be used for all empty slots in the shelf)
72505P-06	5-pin protector, (qty 6)
72505P-12	5-pin protector, (qty 12)
7250BB-50	Break-out box with 50” cable
7250PR-25	Surgetech 25 pair protection block
7250PR-50	3M 50 pair protection module
7250PU-66	66 type 25 pair punch block
7200DT-04	Hyperedge 4 Position DTWA kit
7200FC-MM	Fiber Conversion kit Multi-Mode, to convert SC fiber to ST
7200FC-SM	Fiber Conversion kit Single-Mode, to convert ST fiber to SC
7200FO-MM	Fiber Optic kit Multi-Mode ST
7200FO-SM	Fiber Optic kit Single-Mode SC
7202FC-MM	Fiber Conversion Multi-Mode, to convert SC fiber to ST
7202FC-SM	Fiber Conversiont Single-Mode, to convert ST fiber to SC
7202FO-MM	Fiber patch cord Multi-Mode ST
7202FO-SM	Fiber patch cord Single-Mode SC

2.9 NEBS Cabinet

The cabinet overall dimensions are 44" high x 18" deep x 32" wide.

The photo below shows an external view of the NEBS cabinet. It is made of aluminum with a powder coat painted finish for reduced weight and superior corrosion resistance. The front door is equipped with quarter-turn pad lockable latches. The top of the cabinet has a double wall construction to reduce the effects of solar radiation and for structural integrity.

Figure 4: NEBS HVI Preconfigured Cabinet

2.9.1 NEBS Cabinet Replacement Parts

Table 7: NEBS Cabinet Replacement Parts

Part Number	Description	Kit Quantity
22-10000-1271-0420-000	Latch, door	2
22-R427009	Gasket, door	180"
22-7000-131	Vent valve	2
22-10000-005	Hinge, door leaf	2
22-10000-004	Hinge, frame leaf	2
22-10500-176	Panel mounting bracket kit	4
22-10000-075	Pad mounting skirt	1
22-10000-055	Pole mounting kit	1
22-10000-312P	Kit, 5/16 Pinned Allen Hex Key	1
22-01T-0624/PH4	Paint, SPC Cream Touch Up Spray	1
G10500-114	Depth Gasket, 18" for sides of Cabinet Base	2
G10500-115	Width Gasket, 28" for front & back of Cabinet Base	2

2.10 Polymer Cabinet

The TeleLite 40 X 30” Cabinet overall dimensions are 40" high x 14" deep x 29.5" wide, and the 20 X 30” Cabinet is 31” high x 13” deep x 21” wide.

The figure below shows an external view of a polymer cabinet offering reduced weight and superior corrosion resistance. The front door is equipped with a cylinder lock and latch. The top of the cabinet has a rain hood to reduce the effects of weather and solar radiation.

Figure 5: Polymer HVI Preconfigured Cabinet

Chapter 3

Description

3.1 Enclosures

3.1.1 Types of enclosures

Two types of TeleLite HVI cabinets are available: an aluminum (NEBS) enclosure or two sizes of polymer (non-NEBS) enclosures**.**

3.2 NEBS Cabinet

Network Equipment Building Systems (NEBS) compliance is often required by telecommunications service providers including Bell operating companies for equipment installed in their switching offices. NEBS defines everything from fire spread and self -extinguishment, to earthquake, thermal shock, mechanical shock, and electrostatic discharge.

3.2.1 NEBS Compliance

For NEBS compliant systems, the TeleLite pre-configured backboard must be factory installed in the NEBS approved aluminum enclosure with the -48Vdc power option.

NOTE Other power options such as -129 Vdc or 115 Vac are not NEBS compliant.

3.2.2 Applicable Products:

7243NC-XX

- Cabinet Specifications

The SPC TelEquip cabinet front door is equipped with quarter turn pad lockable latches. The top of the cabinet has a double wall construction to reduce the effects of solar radiation and for structural integrity.

The equipment bay is provided with four mounting brackets for an already installed 26.5" wide x 35" TeleLite equipment mounting backboard. Cable entry and exit from the cabinet passes through four openings in the bottom of the equipment bay located below the equipment's mounting panel.

The ground bar is located at the bottom of the backboard and the cabinet frame is connected to the backboard ground bar by a stranded wire.

The cabinet is equipped with two hoisting mounts, as a fully-populated cabinet will weigh over 200 lbs.

- Condensation Prevention

To prevent and minimize the inside formation of moisture the cabinet is equipped with two membrane vents at the top that allow the cabinet to breath without introducing new moisture. These vents do not allow the passage of solidified or vaporous moisture during thermal cycling conditions.

- Corrosion Prevention

The cabinet is constructed of aluminum with a powder coat finish for reduced weight and superior corrosion resistance.

The mounting screws and hardware are made with the zinc-plated galvanized material to avoid corrosion. This is a galvanized process that protects steel from corrosion in two ways: It provides cathodic protection and barrier protection.

The pad mounting support is supplied with a non-metallic gasket. This gasket is installed between the cabinet and the pad to eliminate the potential natural or chemical corrosive action.

3.2.3 Cabinet Transportation

Because of the weight of a fully-populated metallic cabinet, it can be shipped using any kind of transportation except by train. The metallic cabinet can be damaged due of the high degree of vibration and especially the impact loads resulting from railroad car coupling during train transportation.

NOTE Train Transportation is not recommended for the NEBS cabinet.

3.2.4 NEBS Cabinet Dimensions

Figure 6: Front View of the NEBS Cabinet With Door Open

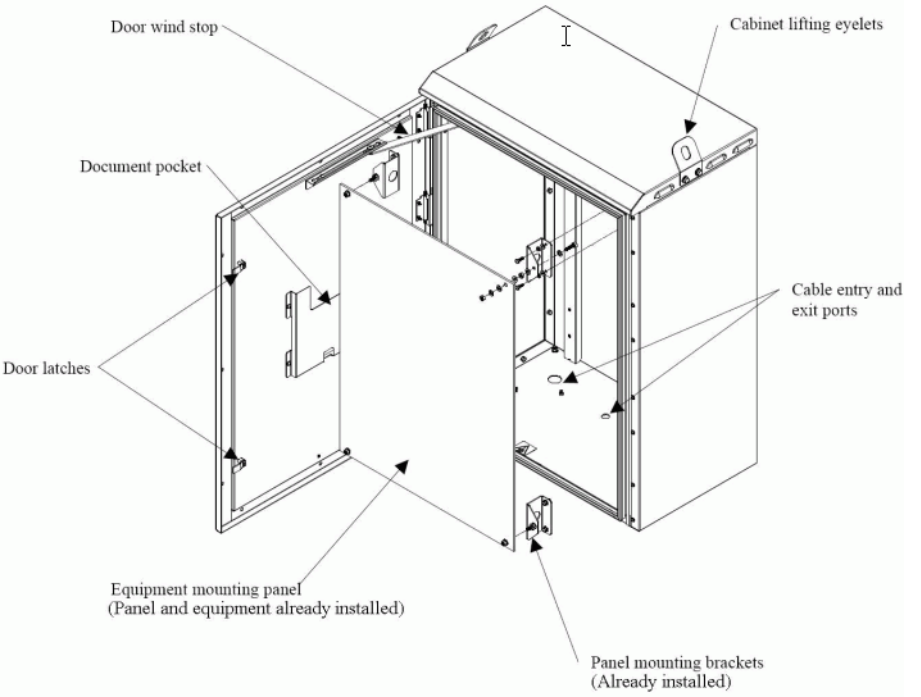


Figure 7: NEBS Cabinet overall dimensions

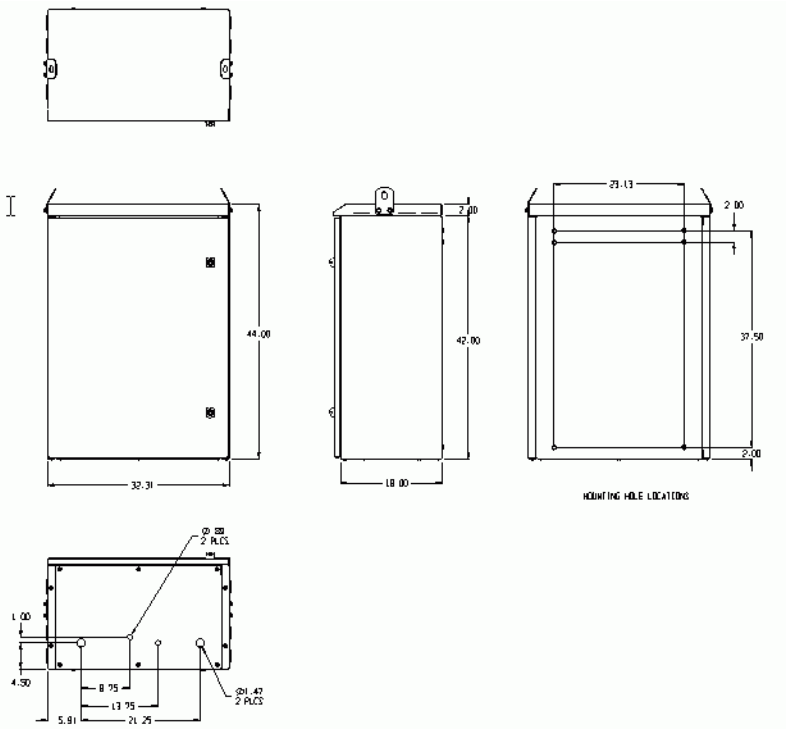


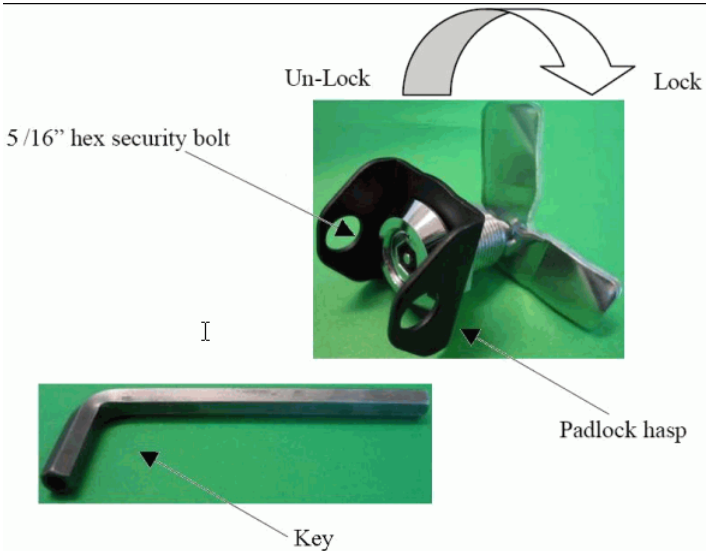
Table 8: NEBS Cabinet Dimensions

	Specification
Height	44 inches
Width	32 inches
Depth	18 inches
Approx. Weight	150 pounds (Empty cabinet)
Approx. Weight	225 pounds (Cabinet + TeleLite equipment)

3.2.5 Quarter-Turn Locking Door Latches

The NEBS cabinet door is equipped with a quarter-turn pad lockable latches. The latches are secured by turning the 5/16” hex security bolt a quarter-turn clockwise until the stop is reached. Convenient security locking hasps are factory-installed to allow for a #1 Master lock (or equivalent) to be installed. With a padlock on the latch the electronics access door cannot be opened, deterring vandalism.

Figure 8: Quarter-Turn Locking Door Latches



3.3 Polymer Cabinet

For non-NEBS systems, the TeleLite polymer cabinets offer a low cost and lightweight alternative.

3.3.1 Backboard Options:

Two pre-configured backboards are available:

- 20 X 30” format 1 shelf unit
- 40” X 30” format 1 and 2 shelf units

3.3.2 Power Options:

- -129 Vdc
- 115 Vac
- -48 Vdc

3.3.3 Further Information

For further information on the polymer cabinet 7243PC-xx, refer to the Polymer Cabinet documentation.

3.3.4 Applicable Products:

7232PC-WL

and

7232PC-WL

- **Cabinet Specifications**

The polymer cabinet front door is equipped with a key cylinder lockable latch. The top of the cabinet has a rain hood to reduce the effects of solar radiation and for structural integrity.

The equipment bay is provided with four mounting bolts for the pre-installed 27" wide x 35" (in the 40 X 30” cabinet) or 25.75” wide X 15.375” (in the 20 X 30” cabinet) TeleLite equipment mounting backboard. Cable entry and exit from the

cabinet passes through openings in the bottom of the equipment bay located below the equipment's mounting panel.

The ground bar is located at the bottom of the backboard and the cabinet frame is connected to the backboard ground bar by a stranded wire.

- **Condensation Prevention**

To prevent and minimize the inside formation of moisture the cabinet is equipped with two membrane vents at the top that allow the cabinet to breath without introducing new moisture. These vents do not allow the passage of solidified or vaporous moisture during thermal cycling conditions.

- **Corrosion Prevention**

The cabinet is constructed of a polymerized plastic with a powder coat finish for reduced weight and superior corrosion resistance.

The mounting screws and hardware are made with a zinc-plated galvanized material to avoid corrosion. This is a galvanized process that protects steel from corrosion in two ways: It provides cathodic protection and barrier protection.

3.3.5 Polymer Cabinet Dimensions

Figure 9: 20 X 30” Polymer Cabinet overall dimensions

Figure 10: 40” x 30’’Polymer Cabinet overall dimensions

Table 9: Polymer Cabinet Dimensions

	20 X 30” Cabinet	40 X 30” Cabinet
Height	31 inches	40 inches
Width	21 inches	29.5 inches
Depth	13 inches	14 inches
Approx. Weight (Empty)	43 lbs.	92 lbs.

3.4 Labeling

On the cabinet door and inside the cabinet and its contents, there are various safety, certification and technical identification labels. Please read them and follow their instructions and cautions carefully.

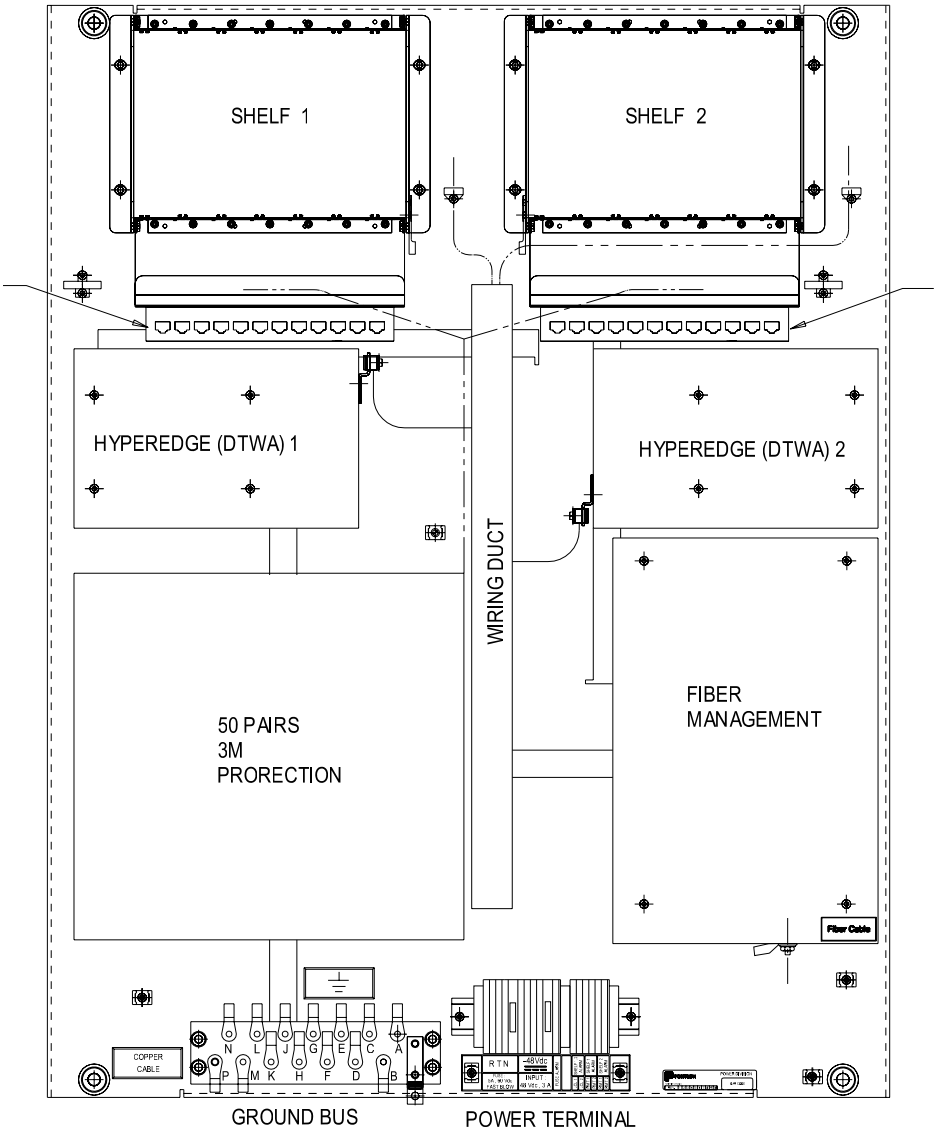
The following symbol can be fond on the faceplates of some line interface cards indicating a warning related to the grounding of the system. When this symbol is found adjacent to a connector, refer to that equipment documentation for details about the warning.

3.5 Backboard Equipment Options

Depending on configuration, the backboard can include the following elements:

- One or two TeleLite shelves
- Up to two 4-position HyperEdge Digital Termination Wall-mount Assemblies (DTWA)
- 25- or 50-pair protection blocks that accept 5-pin protection modules
- 50-pair punch block
- Fiber optic management center
- Ground bar
- Fused, DIN rail mounted power and alarm terminals

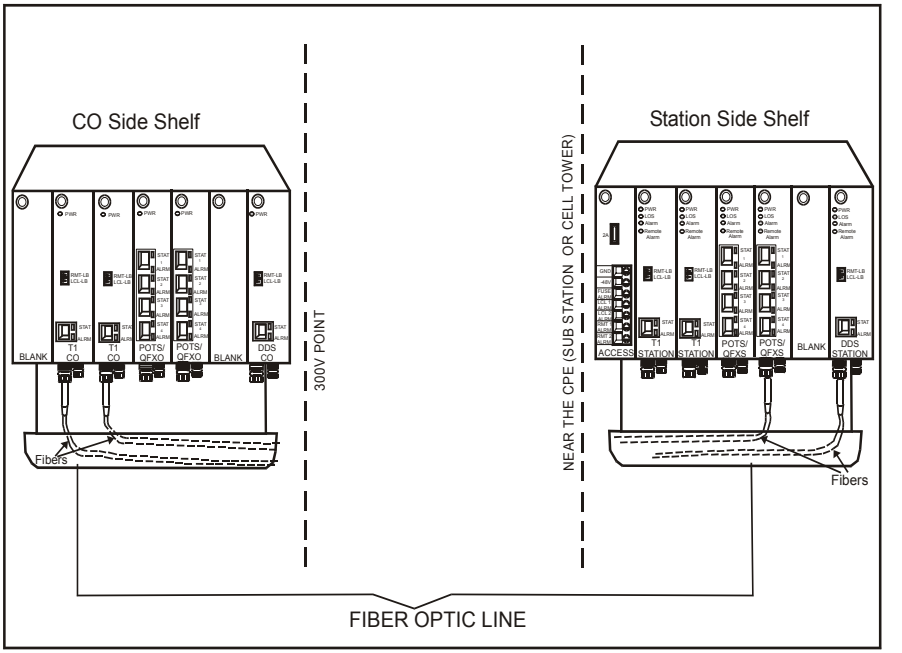
Figure 11: Backboard assembly 7243BD-22



3.6 TeleLite Shelf

The TeleLite system is divided into two parts: the **CO side unit** and the **Station side unit**.

Figure 12: Example of a CO Side and Station Side Shelf Layout



NOTE Any slot in the shelf not used by a circuit card requires a blank face plate (model 719999) to reduce EMI.

3.6.1 Motherboard

The motherboard is located inside the shelf. It has seven identical edge connectors, one for each slot, providing power and alarm connections. The motherboard does not provide for any telecom connections since all telecom connections will be made directly to the RJ-11/RJ-45 connectors on the front panel of each card.

For a list of CO and Station side pinout functions, see Table 10 on page 42.

Figure 13: Motherboard Positioned Inside a Shelf

NOTE The motherboard in the CO side shelf and the motherboard in the Station side shelf are the same.

Table 10: Motherboard Edge Connector Pin-outs

Pin Number	Function (CO Side)	Function (Station side)
1	Chassis	Chassis
2	Chassis	Chassis
3	NC	NC
4	NC	NC
5	RTN	RTN
6	RTN	RTN
7	-48 Vdc	-48 Vdc
8	-48 Vdc	-48 Vdc
9	Not used	Local Alarm (normally open)
10	Not used	Local Alarm (normally open)
11	Not used	Remote Alarm (normally open)
12	Not used	Remote Alarm (normally open)
13	Spare	Spare
14	Spare	Spare
15	Spare	Spare
16	Spare	Spare
17	NC	NC
18	NC	NC
19	Chassis	Chassis
20	Chassis	Chassis

3.7 Protection Blocks

Based on the configuration, the TeleLite PCU products use two types of protection blocks:

- 25-pair Surgetech protection blocks (used on 7243Bx-1y)
- 50-pair 3M protection module (used on 7243Bx-2y)

The protection blocks provide a termination point for outside plant cable as well as a electrical protection. These blocks accommodate industry standard 5-pin protection modules. When installed with our recommended 5-pin protector, these modules provide multi stage protection at 300V.

3.7.1 3M 50-Pair Protection

The 3M Indoor Protected Entrance Terminal (PET) 4588 Series provides electrical protection and a termination point for outside plant cable (feeder) and indoor house wiring (distribution)

3.7.2 3M PET Parts and Components:

(Please see Figure 14 on page 45 and Figure 15 on page 46)

A. Connectorized tails with 3M flame-retardant 4000 D/CO module.

B. Splice chamber, for the feeder cable, with cable strain relief.

C. Insulated #6 ground strap for the feeder cable.

D. External bottom-mounted three point ground bar and top-mounted single point ground bar.

E. Numbered standard 5-pin protector receptacle field.

F. 3M Self-Strip distribution wire termination field.

G. Binder post log and instruction label.

H. 3M Self-Strip Single Pair Test Probe 4327A and Dish.

I. Fully lockable protective cover.

J. Three (3) screws (2 small and1 large) to mount the PET.

NOTE | 4000 D/CO modules for input cable require a special tool for wiring.

Figure 14: 3M 50 Pair Protection Block

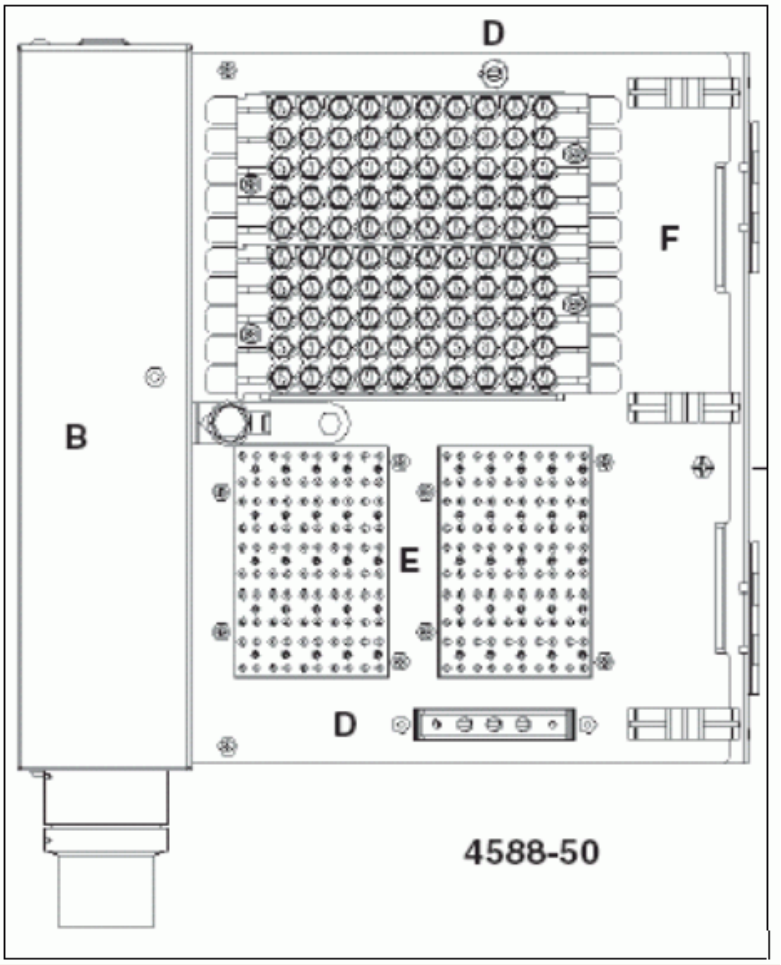
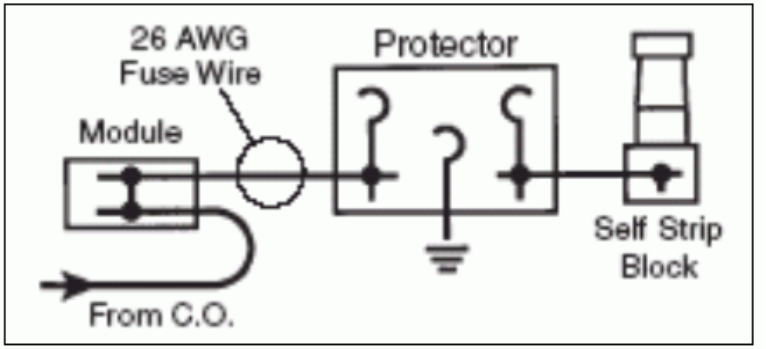


Figure 15: 3M Protection Circuit



3.7.3 Surge Technologies™ 25-pair Protection:

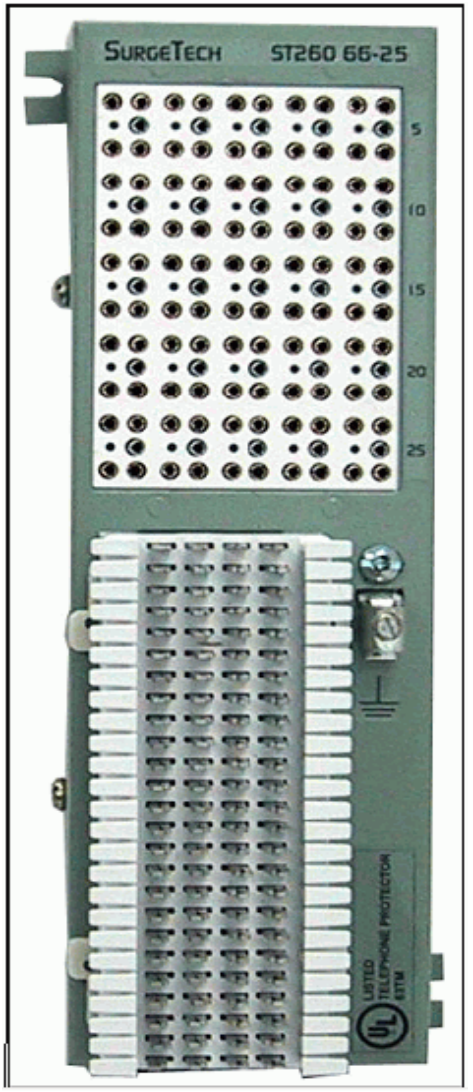
The Surge Tech™ Building Entrance Terminal (BET) Series ST260 66 provides electrical protection and a termination point for outside plant cable (feeder) and indoor house wiring (distribution). The ST260 BET is Underwriters Laboratories (UL) Listed

3.7.4 Surge Technologies BET Parts and Components:

(Please see Figure 16 on page 47)

- IDC style 66 block input and output
- Protects up to 25 lines
- Utilizes the industry standard 89 type bracket to facilitate cable routing
- Termination options; Bix™ or RJ connectors (ST260 B), 110TM or RJ connectors (ST260 110)
- External ground connectors accept 6-14 AWG ground wire
- Accommodates industry standard 5-pin protection modules
- Plastic components meet or exceed specifications set forth in UL 497

Figure 16: Surge Tech 25-Pair Protection Block



3.7.5 5-Pin Protection Modules

The 5-pin protector option provides Bourns® 5-Pin Multi-Stage Protector (MSP®), the latest generation telecommunications protector for high performance and long life in overvoltage protection of copper pair voice-band and high-speed data circuits. MSP combines the advantages of gas tube and solid state protection while integrating three advanced technologies: a proprietary high-efficiency gas discharge tube, precision matched metal oxide varistors and a patented Switch-Grade Fail-Short mechanism. The Switch-Grade Fail-Short mechanism ensures superior thermal protection with fast acting, highly reliable response to thermal overload conditions.

Both protection options use the same 5 pin Network protector. The plug-in modules can also be used with industry-standard five-pin protector.

3.7.6 Punch Block

The punch block is a 50-pair module with two female 25-pair connectors. The punch block is also used in conjunction with one or two SurgeTech 25-pair protection blocks on the TeleLite 7243Bx-1y PCU configurations and allows the customers to make the appropriate cross-connection, depending on the type and position in the shelf of the TeleLite interface cards to be used. The connection between the two female 25-pair connectors of the punch block and the “harmonicas” attached to the TeleLite shelves is made using a straight 25-pair cable. This way, the input copper pairs are routed up to the shelves. When ordering as individual kits, the harmonicas are included with the 25-pair cables.

For details on the pin-out and connection explanation, please see the Instruction sheet and the interconnection example in Chapter 7.

3.7.7 Fiber Management

A fiber optic management solution is available for the TeleLite PCU family of products:

This fiber management center consists of a couple of fiber routing guides, splice tray and a choice of SC or ST connector panel. The fiber connector panel is ordered separately and part of the kit 7200Fx-MM or 7200Fx-SM. See Figure 17 and Figure 18 on page 50 for details on the fiber connectors.

The fiber enters the PCU on the bottom side of the cabinet, through the appropriate strain relief. Then it is routed to the Fiber Management on the Backboard, wound through the plastic routing guides and directed to the Interface cards mounted in the TeleLite Shelf, via the fiber tray on the bottom side of the shelf.

The Fiber Management Center is in a Wall-mountable Interconnect Center (WIC) that accepts two Corning Closet Connector Housing (CCH) panels or modules, in order to accommodate both ST and SC connector types and a maximum of three 0.2 inch or one 0.4 inch reduced-length splice trays. The WIC center (Figure 19 on page 50) is supplied with one CCH blank panel and also includes the routing guides for fiber management.

IMPORTANT The bending radius for the fiber optic cables should be greater than 2 inches.

Figure 17: 12-Fiber ST Compatible Connector Panel

Figure 18: 12-Fiber SC Duplex Connector Panel

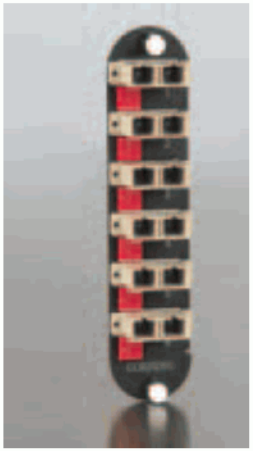
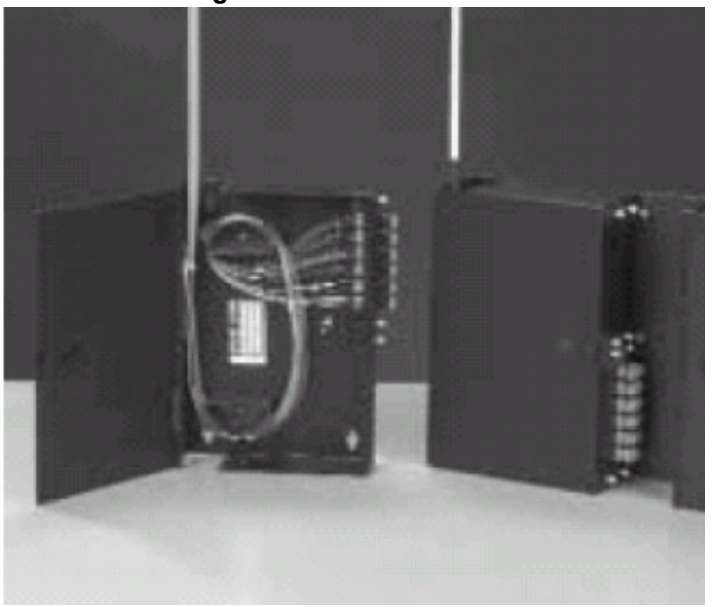


Figure 19: WIC Fiber Management Center



3.8 Digital Termination Digital Termination Wall Mount Assembly (DTWA):

The HyperEdge DTWA-528-04I2 is a 4-position Digital Termination Wall-mount Assembly is mounted on the Backboard. It features a swing-out cover for easy access to the circuit cards plugged into the assembly or for making wiring connections. The DTWA-528-04I2 holds four slim-type units or two 400-type DS1, DDS, HDSL or Analog Data/Voice-type units. Slim-type units are 400-type units with a front panel that is half the width of a standard 400-type front panel. Facility-side connections can be made to screw terminals (standard). CPE connections can be made to RJ48C/S jacks or to screw terminals. This unit operates from a -48 Vdc power source.

3.8.1 Facility-Side Connections (FAC):

Facility-side connections are made using screw terminals. Please see Table 11 below and Figure 20, Table 21 on page 53 and Figure 22 on page 53 for details.

Table 11: Facility-Side Connections Wiring

Lead	Designation	PIN
T	RCV IN from FAC	7
R	RCV IN from FAC	13
T1	XMT IN to FAC	41
R1	XMT IN to FAC	47
Typical for both circuits 1 and 2		

Figure 20: DTWA-528-04I2 Block and Wiring Diagram

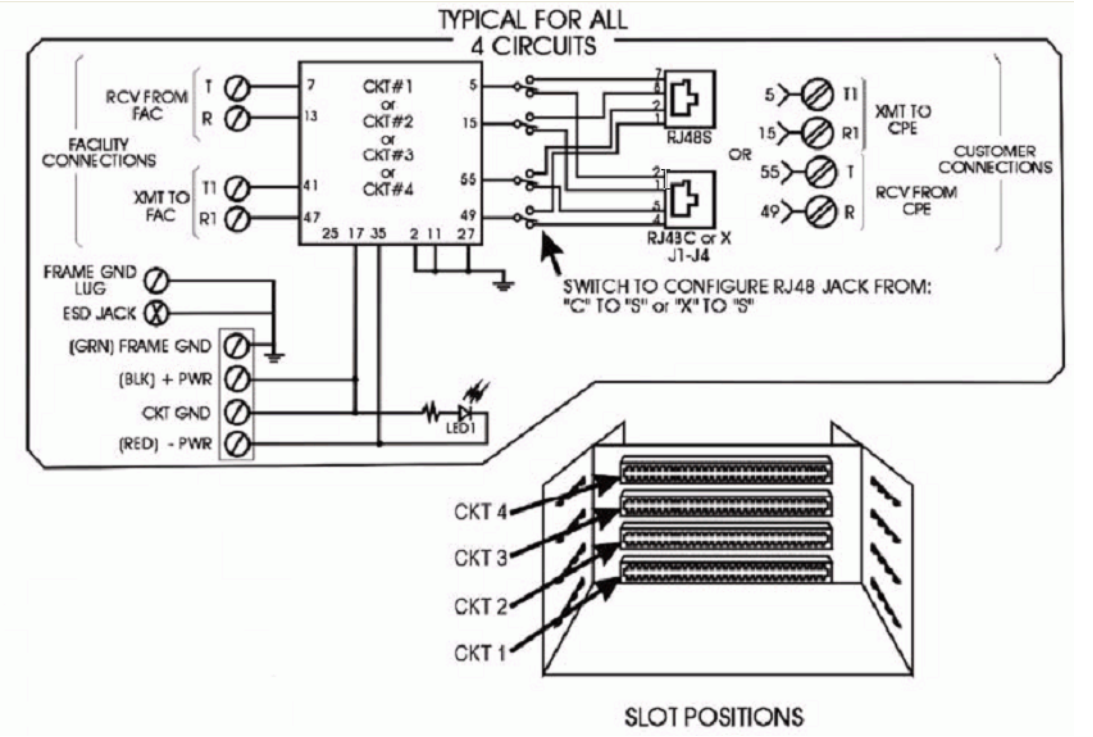


Figure 21: TB9 - Grounding Unit on DTWA

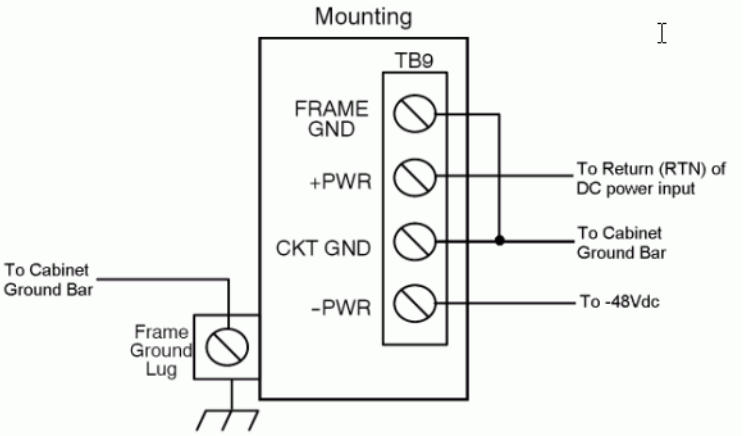
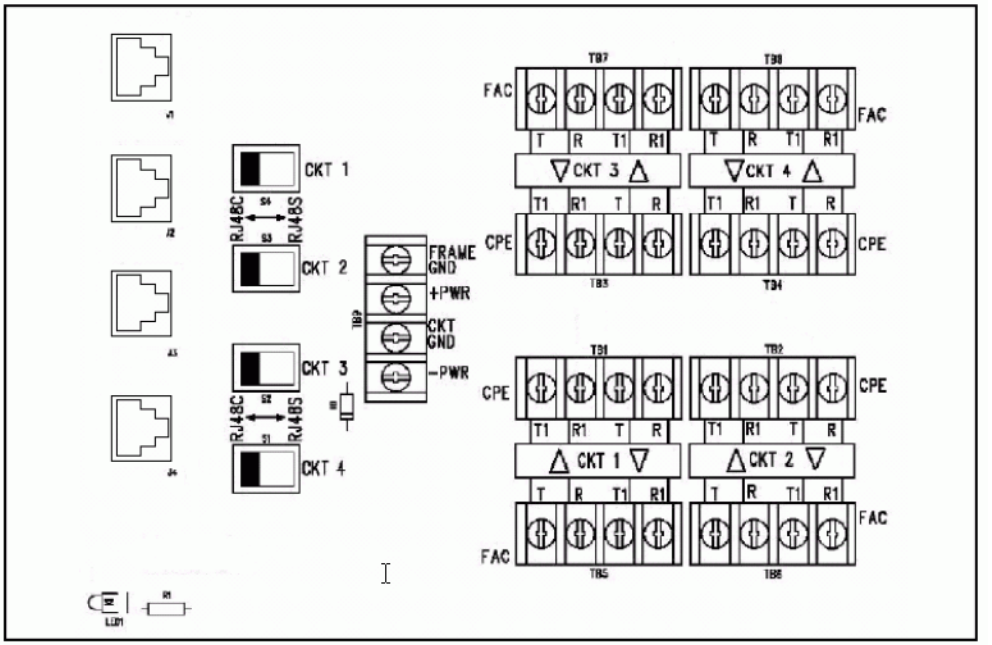


Figure 22: DTWA 528-04I2 Layout Diagram



3.8.2 CPE-Side Wiring Connections:

Customer Premises Equipment connections can be made to RJ48C or RJ48S jacks, or to screw terminals. Please see Table 11 on page 51, Figure 20 on page 52, Figure 21 on page 53, and Figure 22 on page 53.

Table 12: CPE-side Wiring Connections

Lead	Designation	Designation	Designation	Designation
T	RCV OUT to CPE (Tip 1)	5	2	7
R	RCV OUT to CPE (Ring 1)	15	1	8
T1	XMT IN from CPE (Tip)	55	5	2
R1	XMT IN from CPE (Ring)	49	4	1
Typical for both circuits 1 and 2				

3.8.2.1 Power and Ground Connections of the DTWA:

A terminal block (TB9) is provided in the internal PCB of the DTWA for making the external power and ground connections (see Figure 20 on page 52, Figure 21 on page 53, and Figure 22 on page 53). When properly connected to an external source, the POWER LED, on the rear of the mounting, will be lit. Earth ground connections are made to the ground terminal lug (see note below).

CAUTION

- The ground terminal lug, on the rear of the mounting, must be directly and separately connected to a backboard ground bar. This must be done to properly ground the assembly as well as all Network Interface Device front panels. The ground lug will accept a #6 to #14 gauge stranded or solid ground wire.

The ETL Safety Testing Laboratory requires the following warning information:

- Never install telephone wiring during a lightning storm.
- Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.
- Use caution when installing or modifying telephone lines.
- Never touch bare telephone wires or terminals unless disconnected at the network interface.

The module in the DTWA-528-04I2 can be span line powered, or locally powered with an external -48 Vdc power source. Local power and ground connections to the DTWA-528-04I2 are made to TB9. See Table 13 on page 55 for power and ground connections.

Table 13: Power and Ground Connections

Function	Colors	TB9 Terminal Block Label
Earth Ground	Green	Frame Ground
+48 V ext. Power In	Black	+ PWR
Earth Ground Return		CKT gnd
-48 V ext. Power In	Red	-PWR

The exterior frame Ground Lug, labeled FRAME GND, is provided on the rear of the metal housing. This lug should be used to ground the metal housing to earth ground.

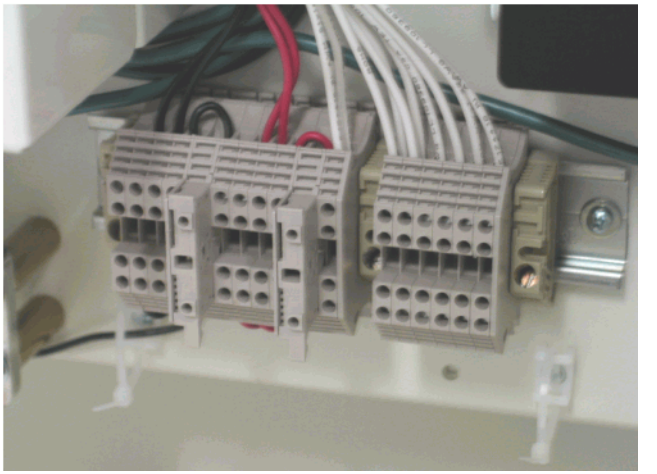
NOTE When the DTWA equipment is pre-mounted at Positron facilities on a PCU, this exterior frame ground lug is already connected to the PCU's ground bar.

3.8.3 PCU Power Terminals

Fused protection terminals are used to power the TeleLite PCU's with the locally supplied -48 Vdc. The protection terminals are DIN rail mounted. The power terminals are rated as 300V, 10A, and accept wires of #20 to #8 AWG.

This configuration can accommodate 5mm x 20mm or 5mm x 25 mm glass fuses. The fuses used are 5mm x 20mm 60 Vdc, 5A, Fast Blow glass fuses.

Figure 23: Power Terminals



3.8.4 PCU Ground Bar

The PCU ground bar accommodates 14 connection holes to receive #10 screws. All the equipment pre-mounted on the backboard is already connected to the ground bar using a # 10 AWG green/yellow ground wire. Any other Network Channel Terminating Equipment (NCTE) that will be later mounted on the backboard will have to be connected to the ground bar in the same manner.

The metal cabinet is pre-wired to the ground bar with a #6 AWG green/yellow ground wire. The polymer cabinet has a ground bar on the backboard.

The local ground shall be connected by the installer to the copper ground lugs. It is recommended to use a # 6 AWG ground wire to connect the ground bar to the local ground. The recommended lug is pressure-fit with two mounting holes. This lug is supplied with all backboards.

Chapter 4

Installation

4.1 General Consideration

The CO side TeleLite PCU unit must be installed no closer than the 300V point from the Station side.

The basic installation steps are:

- Inspect the equipment for any damage,
- Perform the installation,
- Make all required connections,
- Install the Plug-in Interface Cards,
- Test the installation.

NOTE

Follow all pre-mounting concerns:

1. Installations should conform to local practices.
2. Clearance of 35 inches (minimum) is required in front of the equipment. Rear access is not required, since all connections for input and output cables or optical fiber are provided on the bottom of the TeleLite PCU. Therefore in pole mounted applications, clearance is required under the PCU equipment in order to allow a proper routing of the copper and fiber optic cables.
3. If installed inside a building, the equipment should not be in the direct path of air conditioning or heating ducts. If required, a deflector plate should be used to direct airflow away from equipment.
4. Equipment temperature is -40°F to 140°F (-40°C to 60°C).
5. AC power should be available for test equipment, power tools, etc.
6. Local power -48 Vdc is required.
7. A fuse and alarm panel may be required.
8. It is recommended that two or three people install the assembly; one or two to hold the unit in place while the other secures the unit to the mounting area. A lifting device may be required due to the heavy weight of the cabinet assembly.

4.2 Clearance Requirements

NOTE

- Due to the cabinet's weight and size, mounting of the cabinet may require hoisting equipment. Lifting eyebolts are provided on the NEBS cabinet to facilitate hoisting.
- During cabinet mounting the cabinet should be held securely in place to avoid personal injury or cabinet damage.

When selecting a cabinet mounting location, ensure that proper clearance is available to allow adequate ventilation and to allow the cabinet door to open fully. See Figure 24 on page 59 for top view of cabinet footprint.

Figure 24: NEBS Cabinet Footprint - Top View

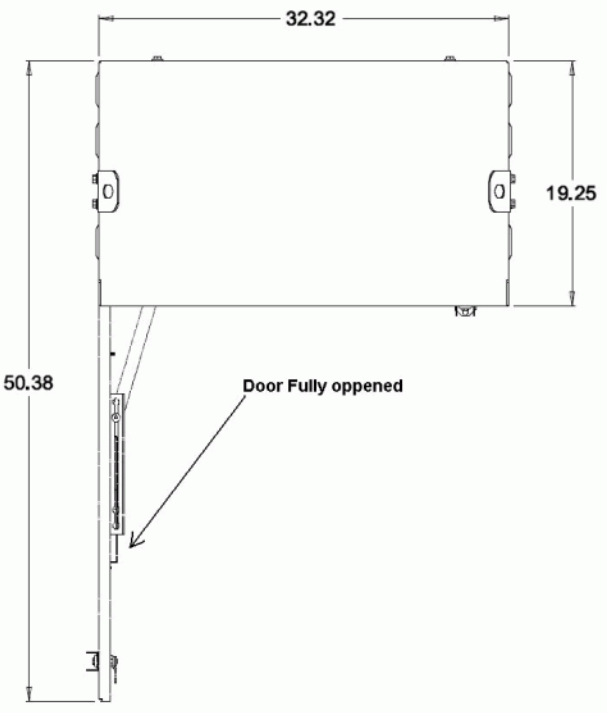


Figure 25: 20 x 30” Polymer Cabinet Footprint - Top View

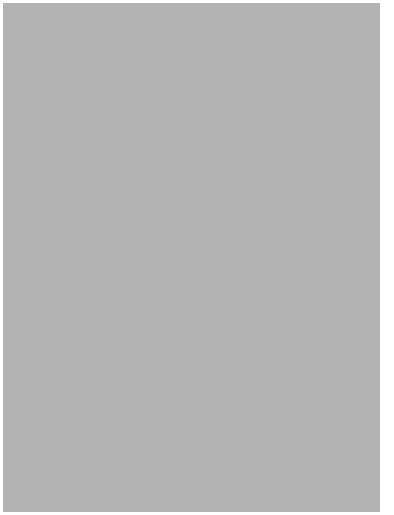


Figure 26: 40 X 30” Polymer Cabinet Footprint - Top View

4.3 Mounting Instructions

The cabinets can be mounted to a wall or to a pole. The NEBS cabinet can be mounted to a pre-cast concrete pad or a poured-in-place concrete pad using the standard pad mounting skirt.

The HVI PCU comes with all the necessary hardware required to facilitate the installation of the preconfigured enclosure, attach the ground wire, and terminate the network cables, fiber cables and power conductors.

The following are required for all mounting types:

- TeleLite Mounting Assembly
- Appropriate ESD strap
- Screwdrivers (flat head and Phillips head)
- Wire/line cutter (or appropriate pliers)
- Wire strippers
- Closed (ring) or open-end connectors for terminal block connections (optional)
- Set of wrenches of different sizes

4.3.1 Pole-Mounting the NEBS Cabinet

Figure 27: Pole Mounting Diagram (NEBS Cabinet shown)

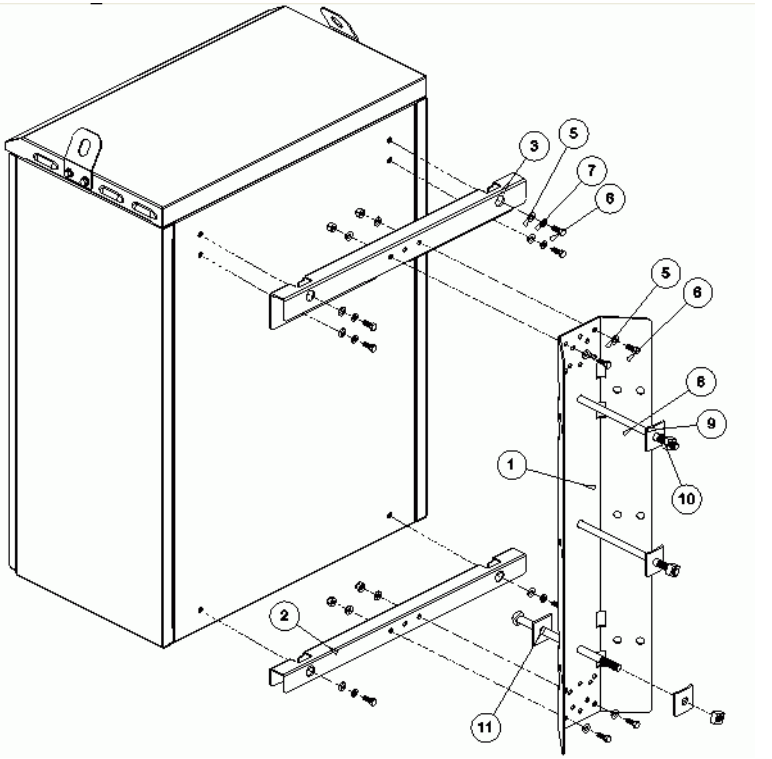


Table 14: NEBS Cabinet Pole Mounting Kit

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	S10500-019	Bracket, Vertical Pole Mount, 17U / 20U Cabinet	1
2	S10500-018	Bracket, Lower Pole Mount, Access	1
3	S10500-017	Bracket, Upper Pole Mount	1
4	H38CPSLNNIZ	Nut, Nylon Top Lock 3/8"	4
5	H38NSSFW	Washer, 3/8" Stainless Steel, SAE, Flat	14
6	H38C100SSMSHH	Screw, 3/8-16 x 1", Stainless Steel, Cap	10
7	H38NPSLWZ	Washer, Split Lock, 3/8 ZP	6
8	H63C1600PSSHGV	Bolt, Square head, 5/8-11 x 16 & Nut, Galvanized	3
9	H63NPSCWGV	Washer, Curved, 2 ¼ x 2 ¼ x 3/16, 5/8, Galvanized	3
10	H63NUT	Nut, 5/8, Galvanized (Included with Bolt)	3
11	H63NPSSWGV	Washer, Square, 2 ¼ x 2 ¼ x 3/16, 5/8, Galvanized	3

See Figure 27 on page 62 and Table 14 for details on the parts supplied with the Pole mounting kit.

➤ **To mount the NEBS cabinet on a pole:**

Use this procedure to mount the cabinet on a 8 to 14 inch diameter pole.

NOTE

Have the following equipment ready before beginning this procedure:

- One drill
- One 3/4” (19.05 mm) x 12" (30.5 cm) drill bit
- One 9/16” wrench
- Two 3/4” wrenches
- Two 15/16” wrenches
- A pencil
- Optional small pole mounting kit

1. Pre-assemble the upper and lower horizontal brackets to the vertical bracket as shown in Figure 27 on page 62.
2. Select a convenient mounting location on the pole.
3. Position the mounting bracket assembly against the pole and mark on the pole the location of the three (3) 5/8” bolts (item 8).
4. Place the mounting bracket assembly out of the way.
5. Drill three (3) 3/4” (19.05 mm) diameter holes completely through the pole at the locations marked in step 3.
6. Insert machine bolt (item 8) through mounting bracket and into the top mounting hole and press bolt and bracket flush against the pole.
7. Place round-cupped washer (item 9), with the concave side in, on bolt and finger tighten nut.
8. Repeat step 6 for remaining two (2) bolts.
9. Secure the mounting bracket assembly to the pole by securely tightening the machine bolts to 40 ft-lbs for wooden posts and 100 ft-lbs for metal posts.
10. Engage the four 3/8” cap screws (item 6) into the cabinet as shown in Figure 27 on page 62.

11. Using proper lifting and safety equipment, place cabinet on mounting bracket assembly using supplied 3/8” hardware and tighten to 45 ft lbs. Lifting eyebolts are provided on the NEBS cabinet for hoisting it in place.
12. Secure the bottom of the cabinet to the bracket assembly using the supplied 1/2” hardware (item 2) as shown in Figure 27 on page 62.
13. Once cabinet is securely mounted to bracket assembly tighten all hardware to 45 ft lbs.
14. If the cable stubs connect to an underground cable, dress the cable down the pole. If the cable stubs connect to an aerial cable, form a drip loop in the cable and dress it up the pole to the splice case.

4.3.2 NEBS Cabinet Pad Mount Installation

This option requires two procedures as per following sections. The first procedure created a concrete to provide a solid base for the cabinet while the second procedure details the step to instal the cabinet on the concrete pad.

4.3.2.1 Concrete Pad Installation:

NOTE Have the following equipment ready before beginning this procedure:

- 2" x 6" lumber for concrete form
- #16 Nails
- Concrete
- Sand & Gravel Mixture
- Rebar
- Concrete tools (Float, Trowel, Etc.)
- Cable ducting as required
- Ground rods
- Ground wire (#6 Gauge)
- Shovel
- Megger-Type Ohm meter
- One masonry drill
- One 5/8” (15.9 mm) masonry drill bit
- 3/8” Masonry expansion anchors
- One 9/16” wrench
- A pencil
- One hammer

➤ **To create a Poured Concrete Pad:**

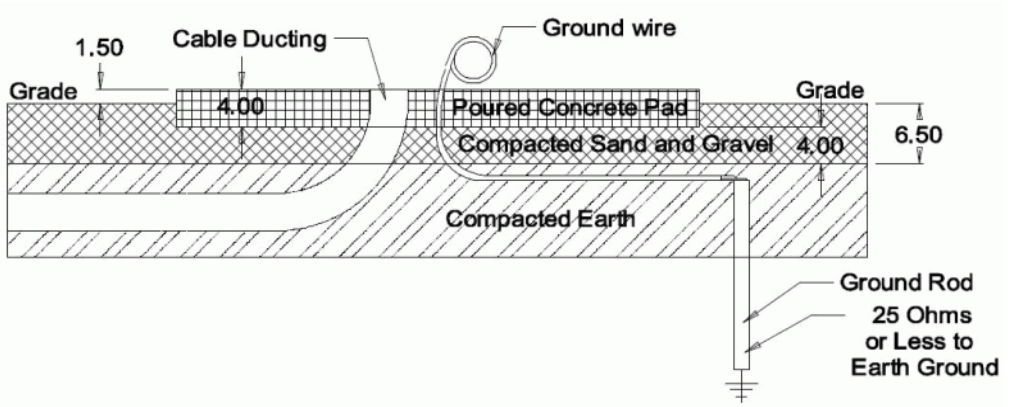
1. Select a location for the pad that allows for clearance on all four side and for the doors to fully open per the previous section section 4.2 on page 59.
2. For a precast pad follow the instruction for installing the pad and proceed to section section ä on page 69.
3. Allow for the concrete pad to be at least 4” inches larger than the base footprint of the cabinet.
4. Remove the earth six to eight inches deep and 36" larger than the cabinet base. Example: if the cabinet is 32" x 18", dig the hole 68" x 54" x 8" deep.
5. Compact the soil in the conformed area to a solid density.
6. Using the pad mount template provided with the cabinet locate and Install ninety degree cabling ducts as required with the cable entry hole located in the cable entrance position of the cabinet and the other end facing your intended cable junction or splice case.
7. Plug the holes to prevent concrete from entering the cabling ducts.
8. Install ground rods in the earth below the cabinet's base level.

NOTE Local practices must be followed and take precedence over this document. Ground rod system should provide a maximum of 25 ohms to earth ground as tested with a Megger-type Ohm meter. See section 5.3 on page 76

9. Prepare and attach a #6 Gauge ground wire to the ground rod system of sufficient length to extend into the cabinet to be attached to the cabinet's ground bar.
10. Secure ground wire to prevent damage during the pouring of the concrete pad.
11. Pour a sand and gravel mixture four to six inches deep across the bottom of the hole.
12. Compact the sand and gravel mixture to a flat and level surface 2-1/2” below grade.
13. Create a form for the perimeter of the concrete pad, that extends 18" in each direction larger than the cabinet base.

14. Place the concrete form on the compacted area locating the cable ducting appropriately per the pad-mounting template provided.
15. Stake the outside walls of the concrete form in place to prevent movement during the concrete pouring process.
16. Level the top surface of the concrete form to approximately 1-1/2” above earth grade to within ¼” of level to earth's plane.
17. Install reinforcement rods in the area to be filled by concrete elevated approximately 2" above the compacted sand surface.
18. Mix or purchase a concrete mixture per common concrete mixing practices suitable for flat work per local construction practices.
19. Pour the mixture into the formed area using caution not to damage the ground system or cable ducts.
20. Smooth the top surface level and flat with the top of the forms, preventing sags or dips from forming in the surface of the concrete pad.
21. Allow concrete to cure at least 24 hours.
22. Remove concrete forms.
23. Backfill void around concrete with sand and gravel mixture to one inch below grade.
24. Finish covering area with soil and seed appropriately for local conditions.

Figure 28: Concrete Installation



➤ **To Mount the NEBS Cabinet on a Pad:**

Figure 29: NEBS Cabinet with Pad Mounting Skirt

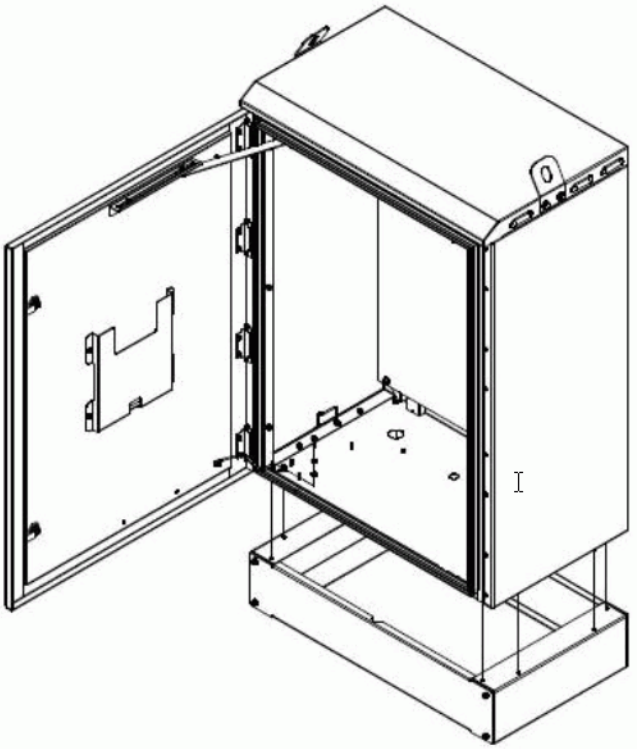
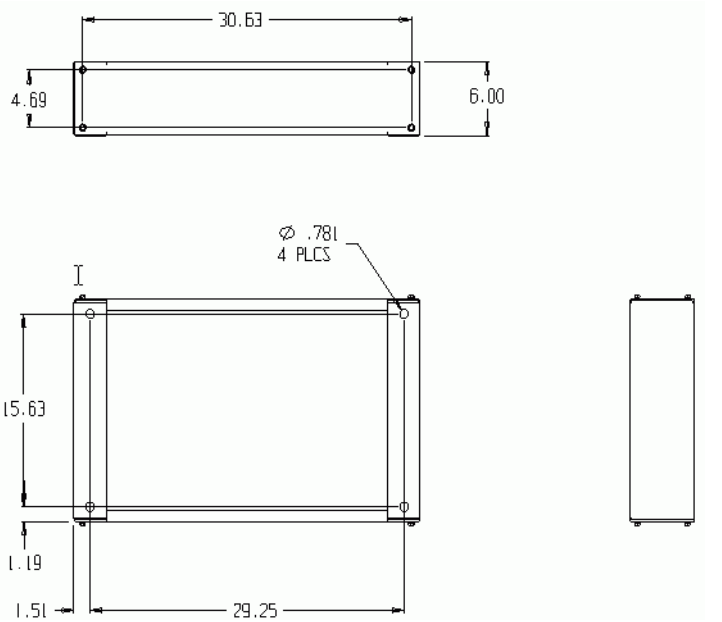


Figure 30: NEBS Cabinet Pad Mount Skirt Dimensions



The NEBS Cabinet Pad Mounting kit comes with two pairs of gaskets. These gaskets should be installed between the Pad and the Cabinet.

See Figure 31, Figure 32, Figure 33, and Figure 34 for details on the gaskets supplied with the Pad mounting kit.

Figure 31: NEBS Cabinet Pad Mount Depth Gasket

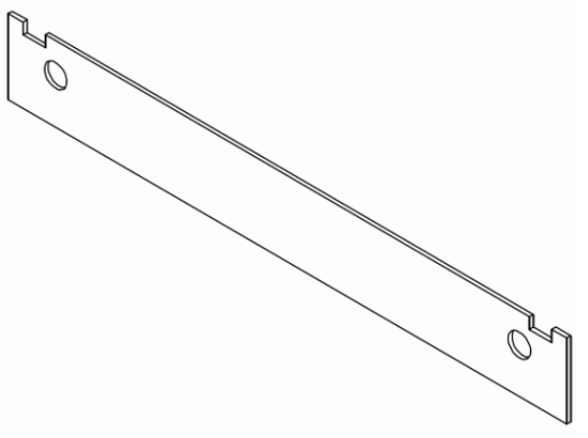


Figure 32: NEBS Cabinet Pad Mount Depth Gasket Dimension

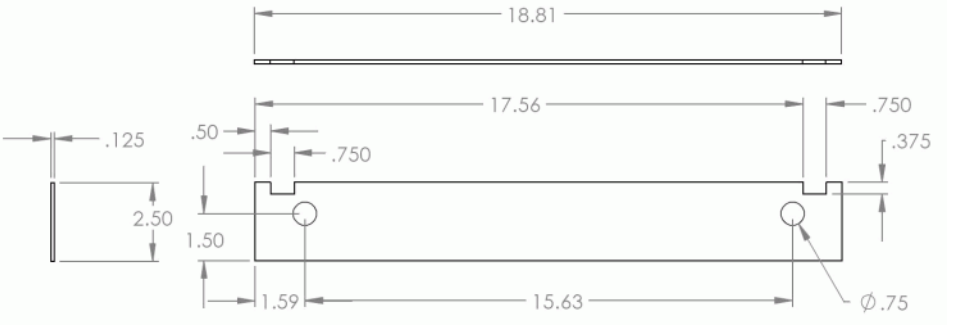


Figure 33: Figure 28: NEBS Cabinet Pad Mount Width Gasket

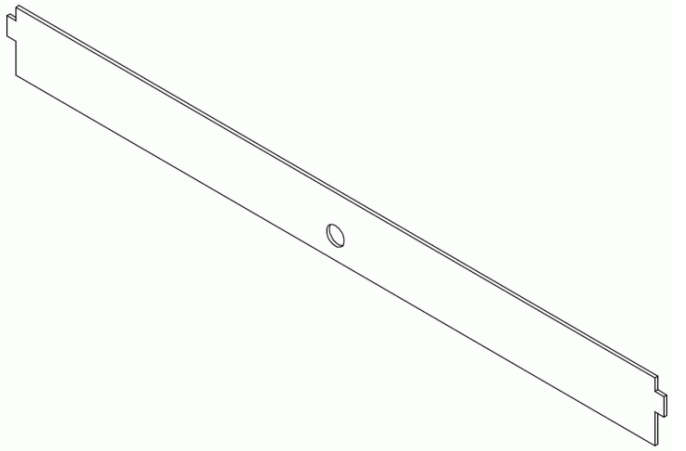
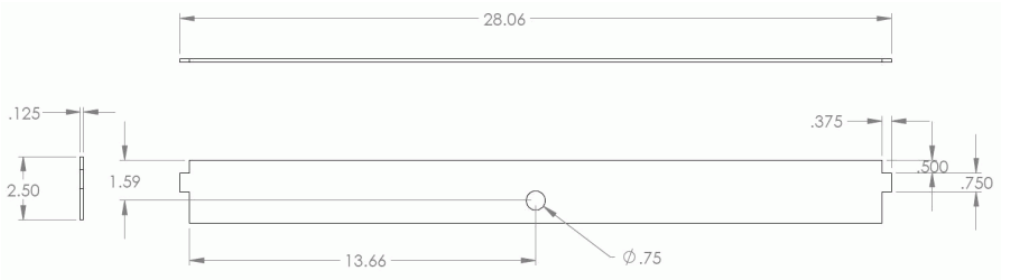


Figure 34: NEBS Cabinet Pad Mount Gasket Width Dimension



➤ **To mount the NEBS cabinet on a concrete slab.**

NOTE Have the following equipment ready before beginning this procedure:

- One masonry drill
- One 5/8” (15.9 mm) masonry drill bit
- Masonry expansion anchors
- One 9/16” wrench
- A pencil
- One hammer

1. Select a convenient mounting location on slab.
2. Position the provided mounting template on the slab in the desired location for the cabinet and mark the location of the mounting holes.
3. Place the template out of the way.
4. Drill 5/8” (15.9 mm) diameter by 3" (7.62 cm) deep holes at the locations marked in step 2.
5. Insert the anchor bolts into the holes in the slab and tap them firmly into the holes with a hammer.
6. Remove the nuts and washers from the expansion anchors.
7. Remove the front access panel of the cabinet skirt

NOTE The gasket is used to prevent corrosion to the base of the cabinet.

8. Place cabinet base rubber gasket over studs.
9. Place cabinet over the studs and reinstall nuts and washers.
10. Secure the cabinet to the slab by securely tightening all anchor bolts to 40 ft-lbs or as recommended by the expansion anchor manufacturer.
11. Replace the front access panel.

4.3.3 Polymer Cabinet Pole Mount Option

The polymer cabinet pole mount kit consists of a pair of adjustable aluminum struts mounted vertically on the horizontal struts which comprise the wall mount option.

Figure 35: Polymer Cabinet Pole Mount Kit

➤ To Install the Polymer Cabinet on a Pole Using Bolts

1. Verify that the unit was shipped with the Polymer Cabinet Pole Mount option, two vertical struts attached to the two horizontal struts by bolts.
2. Determine the diameter of the pole to which the cabinet will be mounted.
3. Loosen the bolts attaching the vertical struts to the horizontal struts and reposition the vertical struts so they are positioned half the pole diameter apart. (5 inches apart for a 10 inch diameter pole)
4. Retighten the bolts.
5. Determine the position on the pole where the cabinet is to be mounted.
6. Drill four holes through the pole, two above and two below where the cabinet is to be located as determined by the holes in the vertical struts.
7. Using 7/16” bolts of appropriate length, fasten the cabinet to the pole.

➤ To Install the Polymer Cabinet on a Pole Using Straps

1. Verify that the unit was shipped with the Polymer Cabinet Pole Mount option, two vertical struts attached to the two horizontal struts by bolts.
2. Determine the diameter of the pole to which the cabinet will be mounted.
3. Loosen the bolts attaching the vertical struts to the horizontal struts and reposition the vertical struts so they are positioned half the pole diameter apart. (5 inches apart for a 10 inch diameter pole)
4. Retighten the bolts.
5. Determine the position on the pole where the cabinet is to be mounted.
6. Using three metal bands or straps of appropriate length, fasten the cabinet to the pole.

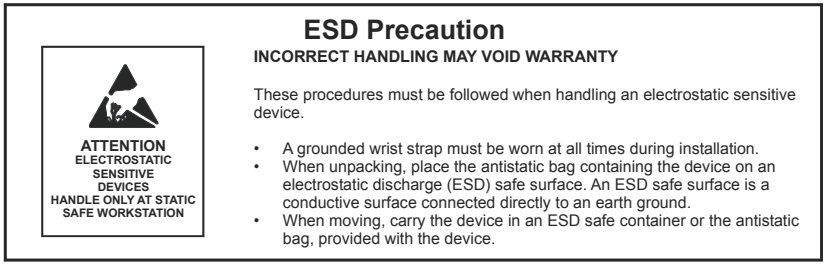
Chapter 5

Cable Entry

5.1 Wiring Instructions

Once the TeleLite PCU is properly mounted according to the specifications mentioned on the previous sections, the next step is to perform the electrical and optical connection of the unit. Ensure that you proceed according to the following ESD warning requirement.

Figure 36: ESD Precautions



- When the PCU is powered from an external source of dc voltage, this voltage should be negative in polarity with respect to ground to minimize stray current corrosion in outside plant cables and equipment where water intrusion may occur.
- The overall dissipated power inside the cabinet configurations should not exceed the following values:
  - 60W inside the metallic enclosure
  - 30W inside the polymeric enclosure

As previously mentioned, the only wiring the user has to do is as follows:

- Grounding TeleLite PCU
- Terminate the telephone cables
- Install the Plug-in Interface Cards and make the appropriate connection between the cards and the input telephone cable
- Connect the fiber patch cord
- Install the 3rd party equipment in the HyperEdge DTWA units
- Install the power supplies and connect the external power cables to the power terminals.

5.2 Grounding TeleLite PCU

For Safety purpose, grounding procedure must be followed.

All the equipment pre-mounted on the backboard is already connected to the ground bar using a #10 AWG green/yellow ground wire. Any other Network Channel Terminating Equipment (NCTE) that will be later mounted on the backboard will have to be connected to the ground bar in the same manner.

For safety and performance reasons it is imperative that the PCU be properly grounded. Unless local practices, rules, or regulations dictate otherwise, Positron recommends connecting the ground bar of the TeleLite PCU to the earth ground using a # 6 AWG ground wire.

The ground wires may need to be removed temporarily to troubleshoot ground faults. The wire may be removed by unscrewing the screws that secure the green wire to the ground bar. Be sure to reattach these wires after troubleshooting and resolving any ground conflicts.

Be sure to ground the cabinet before connecting power to the cabinet. This grounding must be in effect at all times to safeguard personnel.

5.3 Installing Telephone Cables

The input telephone cable will reach the TeleLite PCU on the bottom left side. The cabinet configurations have entry holes on the bottom side with appropriate strain reliefs for the telephone copper cable, fiber optic cable, # 6 AWG ground wire and power input cable.

➤ To install telephone cables

1. Route the input telephone cable through the appropriate entry hole.
2. Tighten properly the strain relief's nut. If necessary, silicone can be used for better sealing the cable entries.
3. Firmly secure the cable on the backboard, using the tie wraps supplied for this purpose.

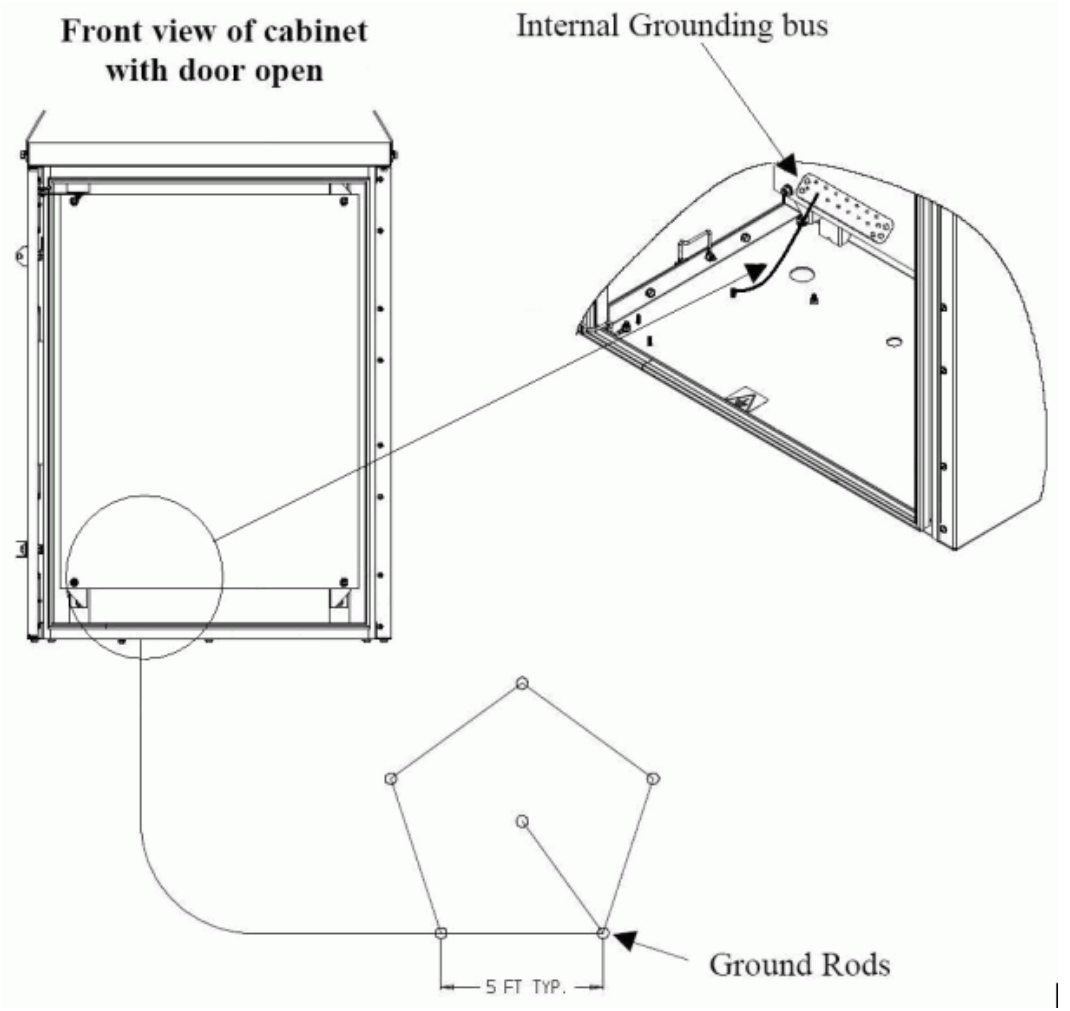
Depending on the TeleLite PCU model, the connection of the copper cable pairs will be performed according to the following the line input configuration.

➤ To Ground the Cabinet

For Safety purpose, grounding procedure must be followed.

1. Drive the ground rods into the ground near the cabinet location.
2. Use a Megger-type ohmmeter to measure the resistance between cabinet ground and the ground rod. The resistance must be 25 ohms or less.
3. If the impedance requirement in step 3 is met proceed to step 4. Otherwise, follow local practices to lower the resistance to ground to comply with step 3 before proceeding to step 4.
4. Connect a #6 ground wire from the ground terminal on the backboard to the ground rod.

Figure 37: Cabinet Grounding Diagram



5.4 Installing the Power Supply

Customer-supplied external power supplies are used to provide -48 Vdc to the Access Interface card(s) when plug-in interface cards on the shelf require local power and when line power is not available.

Connect your power supply as follows:

Table 15: Connecting the Power Supply to the Cabinet

From Power Supply:	To the Cabinet:
Positive lead of Power Supply (or return (RTN))	RTN of the Cabinets Power Terminal.
-48 Vdc of Power Supply	-48 Vdc of the Cabinets Power Terminal

NOTE

- The polarity indicated on the label next to the power terminals must be respected.
- NEBS compliant configurations must be powered from an external-48 Vdc power supply. These configurations already include the necessary powering cable(s) that will allow bringing the power from the power terminals up to the shelf.
- When the PCU is powered from an external source of dc voltage, this voltage should be negative in polarity with respect to ground to minimize stray current corrosion in outside plant cables.

5.5 Installing the Fiber

Refer to the fiber management document.

5.6 Terminating Telephone Cables

NOTE About TX and RX in a 4-wire Interface:

- Regardless of the location of the PCU, the transmit pair (TX) is always a transmission (output) to the CO or to the Station. Therefore, the receive pair (RX) is always a reception (input) from the CO or from the Station.

5.6.1 Terminating the 25/50-Pair Without Protection

For cabinets that are fully NEBS compliant, no protection modules are used between the input of the network and the TeleLite shelves. In this case, the module that receives the lines consist of a plain 50-pair punch block that will spread the lines to the proper TeleLite Interface cards.

NOTE For a single TeleLite shelf mounted in the cabinet, only one half of the 25 pairs punch block will be used while a full (50 pair) punch block will be necessary for a dual shelf.

The cross-connection manner will depend on the type of the TeleLite Interface cards that are mounted in the shelf (or shelves), as well as on the position in the shelf of each card. The transmission lines are then routed to the 12 modular jack harmonica using a straight 25 pair cable. The connection between the Plug-in Interface cards and the harmonica is made using the appropriate patch cord(s) associated with each type of interface card.

NOTE Each type of patch cord has a red label at one end. This end will be connected to the harmonica and the other end(s) will be connected to the interface card.

Figure 49 on page 100 indicates the correspondence between the different types of interface cards and the appropriate patch cord(s), as well as the pin-out correspondence between the 50-pair punch block, and the 12-position modular jack harmonica. The color code of the 25 pair cable wires is also indicated.

The wiring to be performed for a plain punch block is describe in detail in Figure 49 on page 100. Please refer to this section to complete the wiring task.

5.6.2 25-Pair Protection Configuration

This configuration uses 25-pair protection block and 50-pair punch block.

The input telephone cable is connected to the left side of the Protection Block.

NOTE On the TeleLite 7243XD-1X configurations, are used two 25-pair protection blocks, one for each shelf. In this type of protection module, there is no support for the 25-pair female Amphenol connector that goes to the harmonica of the TeleLite shelf. For this reason, 50 pair punch block is used, having two female 25 pair connectors. Each of these two female 25 pair connectors will be connected to one of the TeleLite shelves.

Perform the cross-connection between the protection blocks and the punch block in such a manner that all the pairs connected to one protection block will correspond to the cards that are mounted in the same shelf.

See also the illustration in section 7.4 on page 111.

From the right side of the Protection Block, the pairs will be routed, via distribution spools, to the punch block. The cross-connection manner will depend on the type of the TeleLite Interface cards that are mounted in the shelf or shelves, as well as on the position in the shelf of each card. The transmission lines are then routed to the 12 modular jacks harmonica using a straight 25 pair cable. The connection between the Plug-in Interface cards and the harmonica is made using the appropriate patch cord(s) associated to each type of interface card.

See also, Figure 49 on page 100, and section 7.2 on page 104.

NOTE Every type of patch cord has at one end a red label. This end will be connected to the harmonica and the other end(s) will be connected to the interface card.

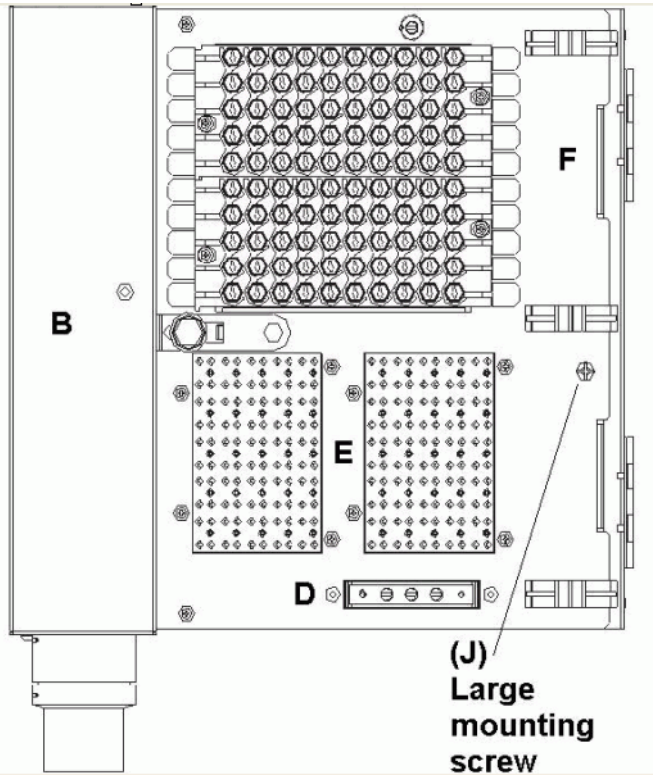
Figure 49 on page 100 indicates the correspondence between the different types of interface cards and the appropriate patch cord(s), as well as the pin-out correspondence between the 50-pair punch block, and the 12-position modular jack harmonica. The color code of the 25 pair cable wires is also indicated.

5.6.3 50-Pair Protection Configurations

Configurations using the 3M 50-pair protection block:

5.6.3.1 3M - PET Parts and Components:

Figure 38: 3M Protected Entrance Terminal (PET)



A. Connectorized tails with 3M flame-retardant modules 4000 D/CO.

B. Splice chamber, for the feeder cable, with cable strain relief (see diagram).

C. Insulated #6 ground strap for the feeder cable.

D. External bottom-mounted three point ground bar and top-mounted single point ground bar (see diagram).

E. Numbered standard 5-pin protector receptacle field. (see diagram).

F. 3M Self-Strip distribution wire termination field.(Note diagram)

G. Binder post log and instruction label.

H. The 3M Self-Strip Single Pair Test Probe 4327A and Dish.

I. Fully lockable protective cover.

J. Three (3) screws (2 small and1 large) to mount the PET (see diagram).

To connect the copper wires to the 3M 50-pair protection block, please consider the following recommendations:

Special Tools Needed to Install:

- 3M MS2™ Module or 3M 710 Connector

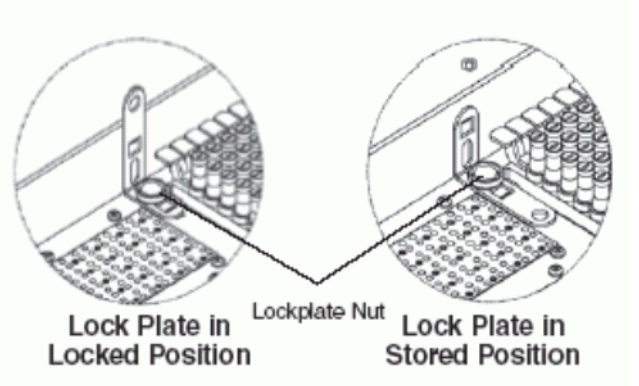
➤ To Locate and Mount the 3M - Terminal

NOTE With the 3M Protection module, the cable that goes to the harmonica is cut on one side to be punched directly into the 3M Self-Strip distribution wire termination field.

CAUTION Use ONLY recommended protectors (see Table 6 on page 25).

1. Open the splicing chamber by loosening the nut securing the lock plate. Slide the plate to the right to enable the chamber cover to open (see Figure 39).

Figure 39: Lock Plate



2. Prepare the Feeder Cable and the Strain-Relief as follows:

Feeder Cable Diameter

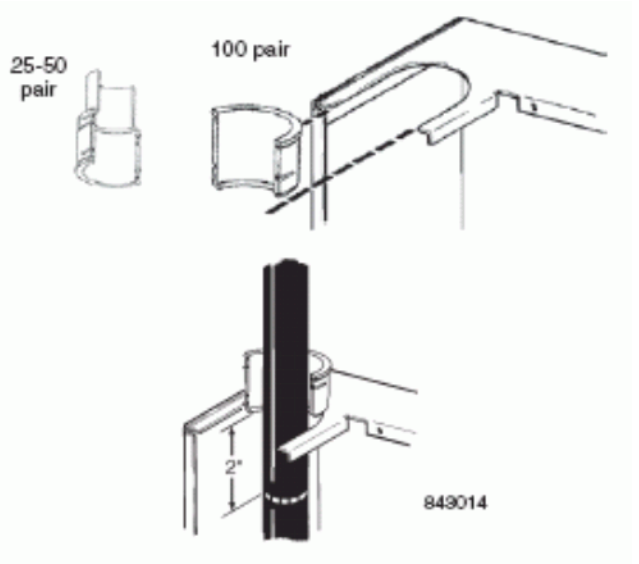
PET Pair Count	Feeder Cable Minimum Diameter	Feeder Cable Maximum Diameter
25	.42”	1.08”
50	.63”	1.45”
100	1.00”	1.80”

NOTE If cable diameter is smaller than the minimum, use tape to build up to the minimum.

3. Run the feeder cable 24" past the PET's cable entry port.

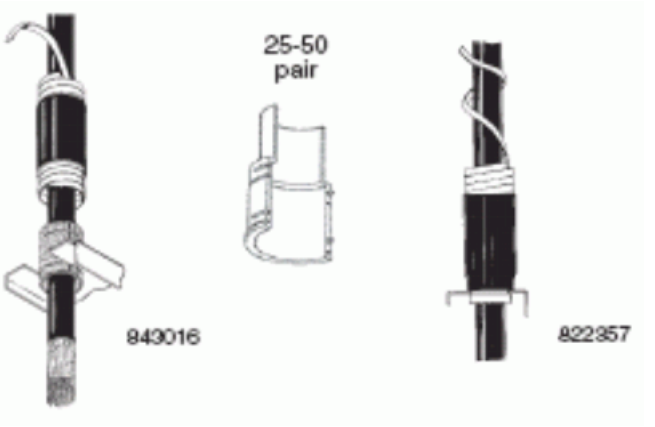
4. Slide the 3M Pull 'N' Shrink Tube (PST) on the end of the cable with the pull-tab away from the PET and temporarily keep it out of the way.
5. With the groove towards the PET and long end towards the cable, snap the cable gland halves around the cable. Slide the gland into the entry port of the PET.
6. Measure 2" of sheath past the gland inside the PET. Pull the gland and cable out of the PET (see Figure 40 on page 85).

Figure 40: Feeder Cable Mounting 1



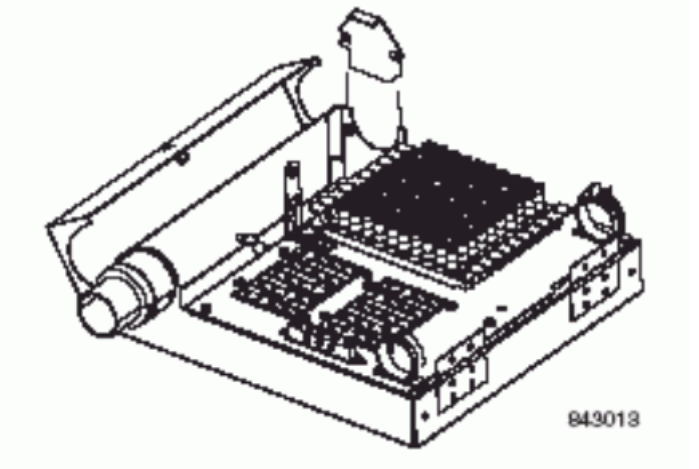
7. Remove the sheath leaving at least 21" of free conductor length, identify and secure the cable groups ends. Bond the cable shield according to your company's practice.
8. Insert the gland's groove into cable port. Slide the PST over the gland and slowly unwind the core. The PST fits over either the small diameter of the 25-50 pair gland or butts up against the PET for the 100 pair gland (see Figure 41 below).

Figure 41: Feeder Cable Mounting 2



9. Complete the PST core removal over the gland.
10. The blank plate MUST be used in the empty cable port for UL Listing (see Figure 42).
11. Attach the cable to the back plate using the tie wrap.

Figure 42: Feeder Cable Mounting 3



➤ To Ground the 3M - Terminal

1. Splice the feeder cable groups to the corresponding connectorized stubs according to your company's practice.
2. When all splicing is completed, bundle the groups and secure them with tie wraps into the splice chamber on the left side.
3. Close the PET's splice chamber cover and secure with the lock plate bolt (see Figure 39 on page 84).

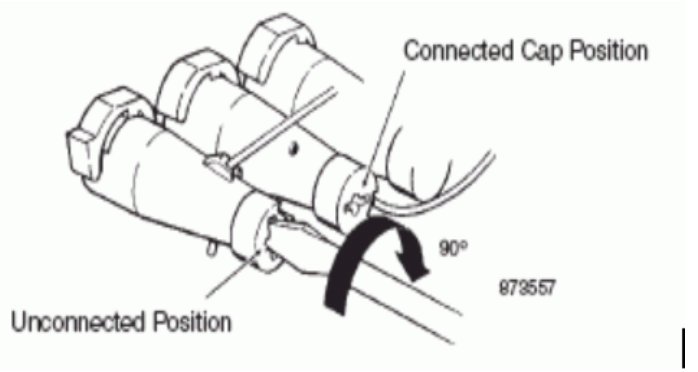
➤ To Terminate the 3M - Distribution (House) Wire Terminal

1. At the assigned binder posts, cut the wire ends clean, separate the pair (Tip-Left, Ring-Right) and bend the wire ends 90 degrees.
2. With the binder post slot vertical, insert the wire into the top entry port, push through the post and out the bottom exit port.
3. Fully insert a flat blade screwdriver into the slot, turn it 90 degrees clockwise until the post comes to a stop and the wire end cuts off (see Figure 43 on page 89).

NOTE

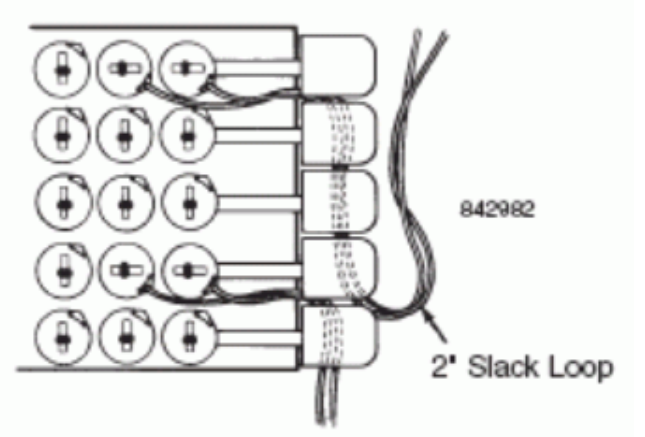
- Use ONLY 22 or 24 AWG House, Station or Jumper Wire to terminate in the 3M Self-Strip terminal blocks.
- The distribution (House) wire termination will depend on the type of the TeleLite Interface cards that are mounted in a shelf, as well as on the position in the shelf of each card. The transmission lines are routed to the 12 modular jack harmonica using 25 pair cable(s) having only one end connectorized. section 7.1 on page 100 indicates the correspondence between the different types of interface cards and the appropriate patch cord(s), as well as the pin-out correspondence between the 50-pair punch block, and the 12-position modular jack harmonica. There is, also, indicated the color code of the 25 pair cable wires. This information will help to properly terminate the distribution wires when using 3M PET. The connection between the Plug-in Interface cards and the harmonica is made using the appropriate patch cord(s) associated with each type of interface card. See, also, section 7.1 on page 100 and section 7.2 on page 104.

Figure 43: Distribution Wire Termination 1



4. Route the wire below the connected cap.(See Figure 44 below).

Figure 44: Distribution Wire Termination 2

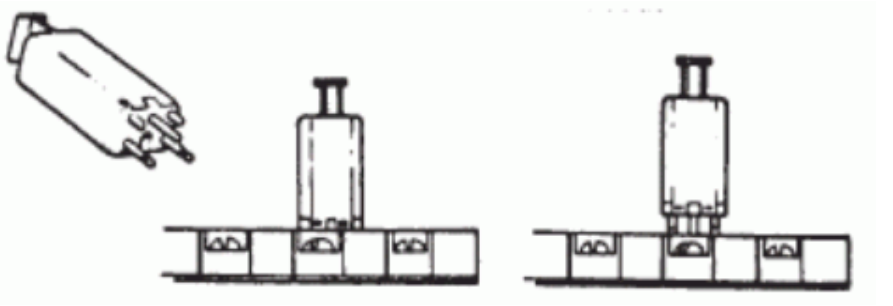


➤ To Install the 3M - Protection Modules

The 4588 PET uses a five-pin protector receptacle field. The long pins of the protector connect Tip and Ring from the feeder cable through the protector to the short pins to the distribution/house wire.

To disconnect the distribution wire, pull the protector out to the detents on the long pins to hold it in place. This continues to protect from the feeder cable side (see Figure 45).

Figure 45: Electrical Protectors



➤ Using the 3M Self-Strip Single Pair Probe 4327A and Dish:

Use for single circuit testing or access.

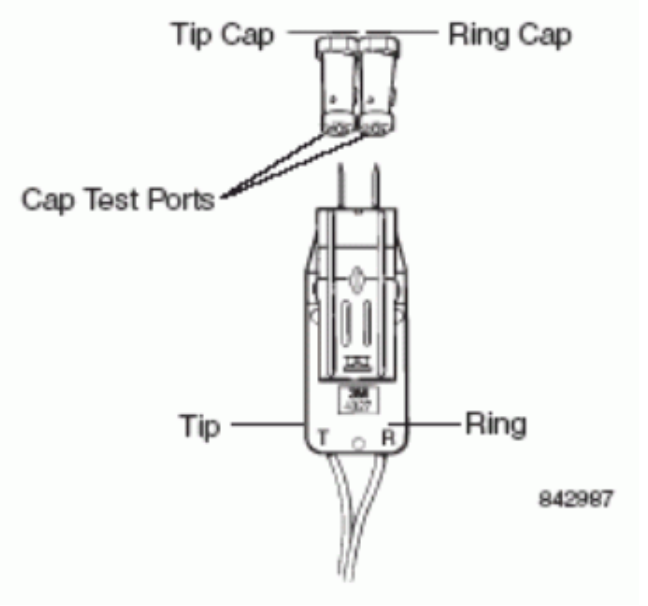
1. Install the Probe 4327A and Dish close to the PET.
2. Align and insert the probe pins into the test ports of the binding post to be accessed.
3. Depress the clamps; push the clamps onto the posts.

To remove:

1. Depress the clamps and pull the probe off the posts.

3M Priority Caps 4324 are used to mark circuits and prevent probe access (see Figure 46 below).

Figure 46: Single Pair Probe



Chapter 6

Installing Plug-in Cards

6.1 Plug-in Interface Card Installation

Install the Plug-in Interface Cards and make the appropriate connection between the cards and the input telephone cable

➤ **To install a Plug-in Interface Card in a shelf:**

1. Take the card out from its protective packaging.
2. Make sure the card is right side up, align the card with the appropriate slot of the shelf and slide it in.
3. Tighten the top and bottom screws, to secure the card in place.
4. Connect the TX and RX fibers.
5. Connect the appropriate patch cord(s) between harmonica's modular jack(s) and the RJ11 (or RJ45) connector(s) found on the front panel.

NOTES

- Every slot of the shelf can accommodate any type of Plug-in Interface Card. Nevertheless, Positron recommends the seventh slot to be used for the Access Interface card (if required).
- Any empty slots on the shelf must be filled with blank panels to reduce EMI.
- Before introducing the cards in the shelf verify if the DIP switches and the jumpers situated on the PCB of each card are properly configured, according to the particular requirements of each application.

For an illustration of the steps that are described above (see Figure 47 on page 96).

In order to establish the appropriate connection between the cards and the input telephone cable please perform the following:

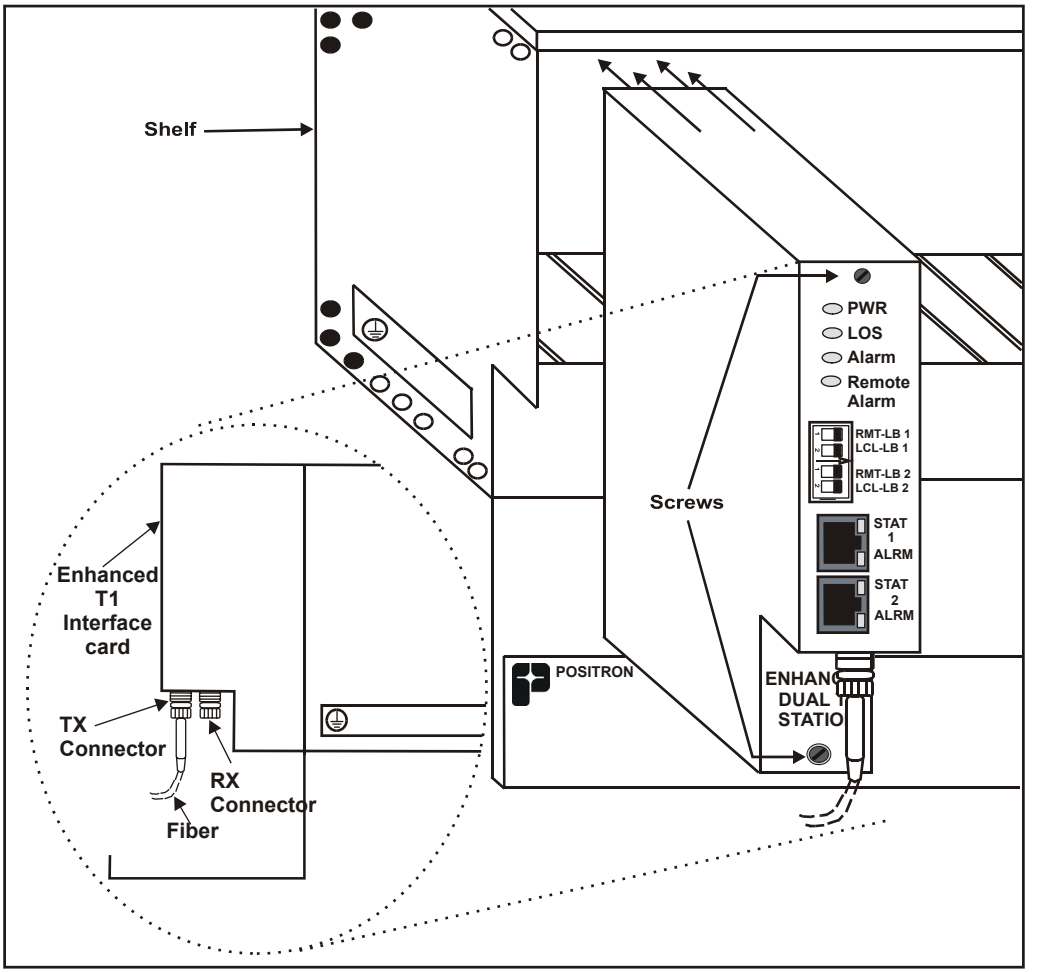
- Establish the type and number of the interface cards that will populate the shelves, as well as the slot number occupied by each card in the shelf.

NOTE Please keep in mind the limitations for the dissipated power on the cabinet configurations.

- Connect each card to the harmonica, using the appropriate patch cord(s). The correspondence between each type of interface card and the necessary patch cords is shown on the section refer to 7.1, “Interconnection Instruction Sheet”.
- Please see the same refer to 7.1, “Interconnection Instruction Sheet”. to get the correspondence between the pin-out of the harmonica's modular jacks, the pin-out of the 25-pair connectors and the pin positions on the punch block. There is also the correspondence between the pin-out mentioned above and the color code of the wires of the 25-pair cable.
    - Please also refer to the refer to 7.4, “Examples of PCU Configurations”..

NOTE All the cables for the Ethernet interface cards will be connected directly to the cards (will not pass through protection blocks, or punch block or harmonica). Splices are not allowed on Ethernet circuits.

Figure 47: Installing the Plug-in Interface Cards in the shelf



6.2 Connecting Fiber Cables

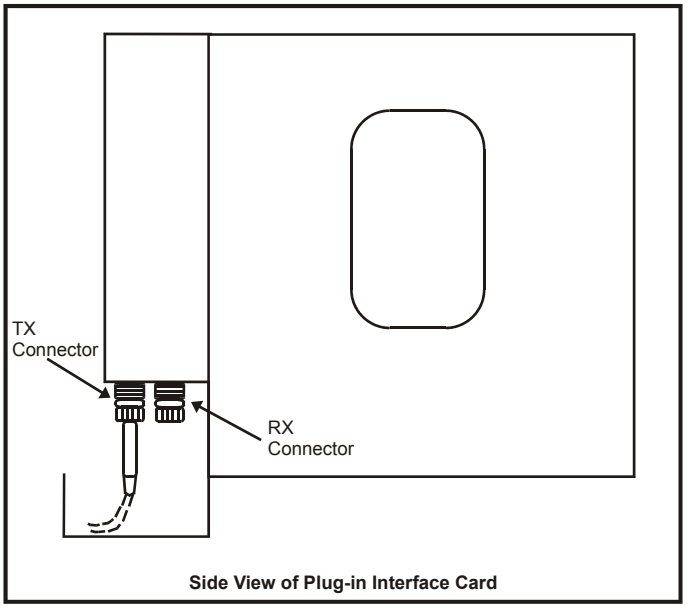
Wiring to and from the facility side is made through the SC or ST type connection located on the bottom front panel of each card (see Figure 48 on page 97). After making the connections, dress the fiber cable using the fiber tray at the bottom side of the shelf and secure the cable via the wiring duct.

The fiber optic cables reach the TeleLite PCU on the bottom side of the boards. In the case of the cabinet configurations, the fiber cables enter the cabinet through the appropriate strain relief. They are then secured using tie wraps, reach the fiber management center and then are routed to the cards via the wiring duct.

Please refer to section 3.7.7 on page 48 to get details on the fiber management possibilities offered by the fiber management centers.

NOTE The bending radius of the fiber has to be greater than 2 inches.

Figure 48: TX and RX Fiber Connection



Chapter 7

Instruction Sheets

7.1 Interconnection Instruction Sheet

Figure 49: 50 Pair Punch Block

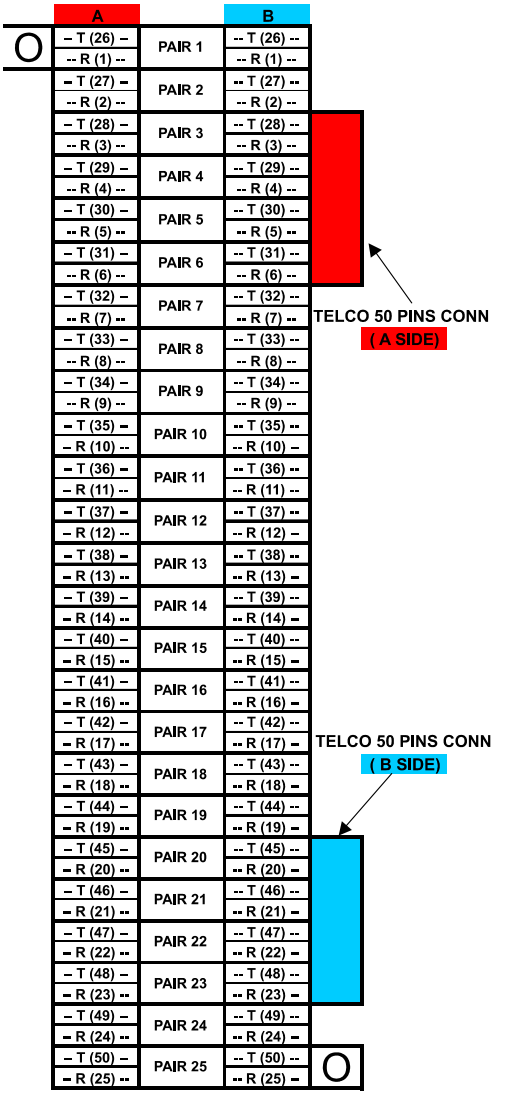


Figure 50: Telco 50 Pin to 12 x RJ45 Harmonica

25 PAIR CABLE COLOR CODE	TELCO 50 PINS	RJ45	HARMONICA LABEL
WHITE/BLUE	Pin 26	Pin 2	1-1
BLUE/WHITE	Pin 1	Pin 1	
WHITE/ORANGE	Pin 27	Pin 5	
ORANGE/WHITE	Pin 2	Pin 4	
WHITE/GREEN	Pin 28	Pin 2	1-2
GREEN/WHITE	Pin 3	Pin 1	
WHITE/BROWN	Pin 29	Pin 5	
BROWN/WHITE	Pin 4	Pin 4	
WHITE/SLATE	Pin 30	Pin 2	2-1
SLATE/WHITE	Pin 5	Pin 1	
RED/BLUE	Pin 31	Pin 5	
BLUE/RED	Pin 6	Pin 4	
RED/ORANGE	Pin 32	Pin 2	2-2
ORANGE/RED	Pin 7	Pin 1	
RED/GREEN	Pin 33	Pin 5	
GREEN/RED	Pin 8	Pin 4	
RED/BROWN	Pin 34	Pin 2	3-1
BROWN/RED	Pin 9	Pin 1	
RED/SLATE	Pin 35	Pin 5	
SLATE/RED	Pin 10	Pin 4	
BLACK/BLUE	Pin 36	Pin 2	3-2
BLUE/BLACK	Pin 11	Pin 1	
BLACK/ORANGE	Pin 37	Pin 5	
ORANGE/BLACK	Pin 12	Pin 4	
BLACK/GREEN	Pin 38	Pin 2	4-1
GREEN/BLACK	Pin 13	Pin 1	
BLACK/BROWN	Pin 39	Pin 5	
BROWN/BLACK	Pin 14	Pin 4	
BLACK/SLATE	Pin 40	Pin 2	4-2
SLATE/BLACK	Pin 15	Pin 1	
YELLOW/BLUE	Pin 41	Pin 5	
BLUE/YELLOW	Pin 16	Pin 4	
YELLOW/ORANGE	Pin 42	Pin 2	5-1
ORANGE/YELLOW	Pin 17	Pin 1	
YELLOW/GREEN	Pin 43	Pin 5	
GREEN/YELLOW	Pin 18	Pin 4	
YELLOW/BROWN	Pin 44	Pin 2	5-2
BROWN/YELLOW	Pin 19	Pin 1	
YELLOW/SLATE	Pin 45	Pin 5	
SLATE/YELLOW	Pin 20	Pin 4	
VIOLET/BLUE	Pin 46	Pin 2	6-1
BLUE/VIOLET	Pin 21	Pin 1	
VIOLET/ORANGE	Pin 47	Pin 5	
ORANGE/VIOLET	Pin 22	Pin 4	
VIOLET/GREEN	Pin 48	Pin 2	6-2
GREEN/VIOLET	Pin 23	Pin 1	
VIOLET/BROWN	Pin 49	Pin 5	
BROWN/VIOLET	Pin 24	Pin 4	

Figure 51: Modular Jacks

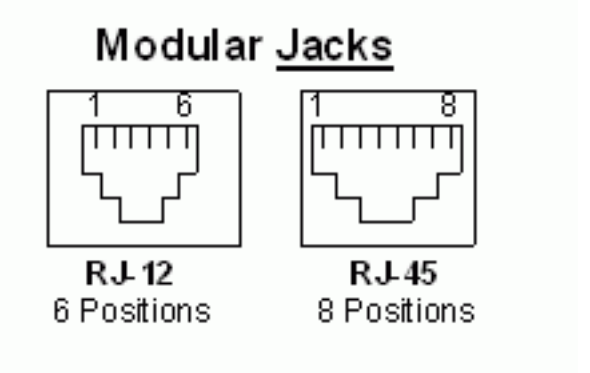


Table 16: T1 Patch Cord

P1 RJ45 (Red Label)	P2 RJ45 (“T1” Label)
1	1 - Ring (Rx)
2	2 - Tip (Rx)
3	NC
4	4 - Ring (Tx)
5	5 - Tip (Tx)
6	NC
7	NC
8	NC

Table 17: DDS Patch Cord

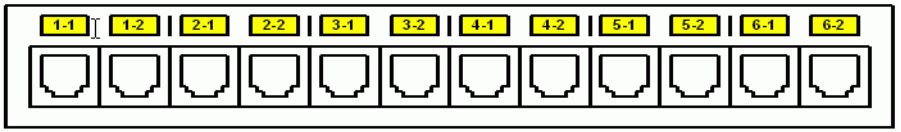
P1 RJ45 (Red Label)	P2 RJ45 (“DDS” Label)
1	8 - Ring (Rx)
2	7 - Tip (Rx)
3	NC
4	1 - Ring (Tx)
5	2 - Tip (Tx)
6	NC
7	NC
8	NC

Table 18: Analog Patch Cord

P1 RJ45 (Red Label)	P2 RJ12 To Card
1	5 - Ring (Rx)
2	2 - Tip (Rx)
3	NC
4	3 - Ring (Tx)
5	3 - Tip (Tx)
6	NC
7	1 - Tip (Express Pair)*
8	6 - Ring (Express Pair)*

NOTE The end of the patch cords having the red label will be connected to the harmonica. The other end(s) will be connected to the interface cards.

Figure 52: Harmonica 12 X RJ45 (FRONT VIEW)



7.2 Using the Interconnection Sheet to Connect the Copper Cable

The example will explain how to use the interconnection sheet to make the proper connections of the input copper cable, depending on the particular type of Plug-in Interface Cards we want to mount in a TeleLite shelf.

We'll consider we have a Quad POTS Featured CLID, FXS Multi-mode ST Connector, model number 720600MST and we want to mount this card in the first slot (from left to right) of a TeleLite shelf. We also consider two scenarios:

- TeleLite shelf belongs to a TeleLite PCU configuration that uses a 25 pair Surge Tech protection block and a 66-punch block.
- TeleLite shelf belongs to a TeleLite PCU configuration that uses a 50 pair 3M-protection block.

See also the interconnection instruction sheet 924-020040-001R2, which is supplied with every PCU configuration. (Shown in Figure 49 on page 100 and Figure 50 on page 101.) Also see the interconnection instruction sheet 924-010447-001, which is supplied with every PCU configuration.

NOTE You will find the card model number at the bottom on the yellow faceplate in front of the card.

We'll determine the types of patch cords that have to be used with the Quad 720600MST-interface card. This correspondence is shown in the table below:

Table 19: Cards and associated Patch Cables (Qty)

Patch Cord Type (Qty)	T1 (1 Pcs)	T1 (2 Pcs)	DDS (1Pcs)	Analog (1Pcs)	Analog (2Pcs)
Product Type	Single T1	Dual T1	All DDS	Single 2-Wire/ 4-Wire	Dual 4-Wire
		Embedded T1		Single POTS	Quad 2-Wire
				Dual POTS	Quad POTS
				Dual DID	Quad DID
				Dual OPX	Quad OPX

So, in order to connect 720600MST-interface card, we need two “Analog” type patch cords. We will connect the first two ports of the interface card using the first patch cord and the third port, using the second patch cord. The pin-out of these two patch cords types is shown in the following tables:

Table 20: Analog Patch Cord

P1 RJ45 (Red Label)	P2 RJ12 to Card
1 (Port 1)	5 - Ring (Rx)
2 (Port 1)	2 - Tip (Rx)
3	NC
4 (Port 2)	3 - Ring (Tx)
5 (Port 2)	3 - Tip (Tx)
6	NC
7	1 - Tip (Express Pair)*
8	6 - Ring (Express Pair)*

NOTE On Quad card, the first RJ-12

Table 21: Analog Patch Cord

P1 RJ45 (Red Label)	P2 RJ12 to Card
1 (Port 3)	5 - Ring (Rx)
2 (Port 3)	2 - Tip (Rx)
3	NC
4	3 - Ring (Tx)
5	3 - Tip (Tx)
6	NC
7	1 - Tip (Express Pair)*
8	6 - Ring (Express Pair)*

Because we need two patch cords to connect this type of card, we will use two of the harmonica's modular jacks: modular jack labeled 1-1 to plug the first Analog patch cord and the modular jack labeled 1-2 to plug the second.

NOTE The end of the patch cords having the red label (red shrink tubing) will be connected to the harmonica. The other end(s) will be connected to the interface cards.

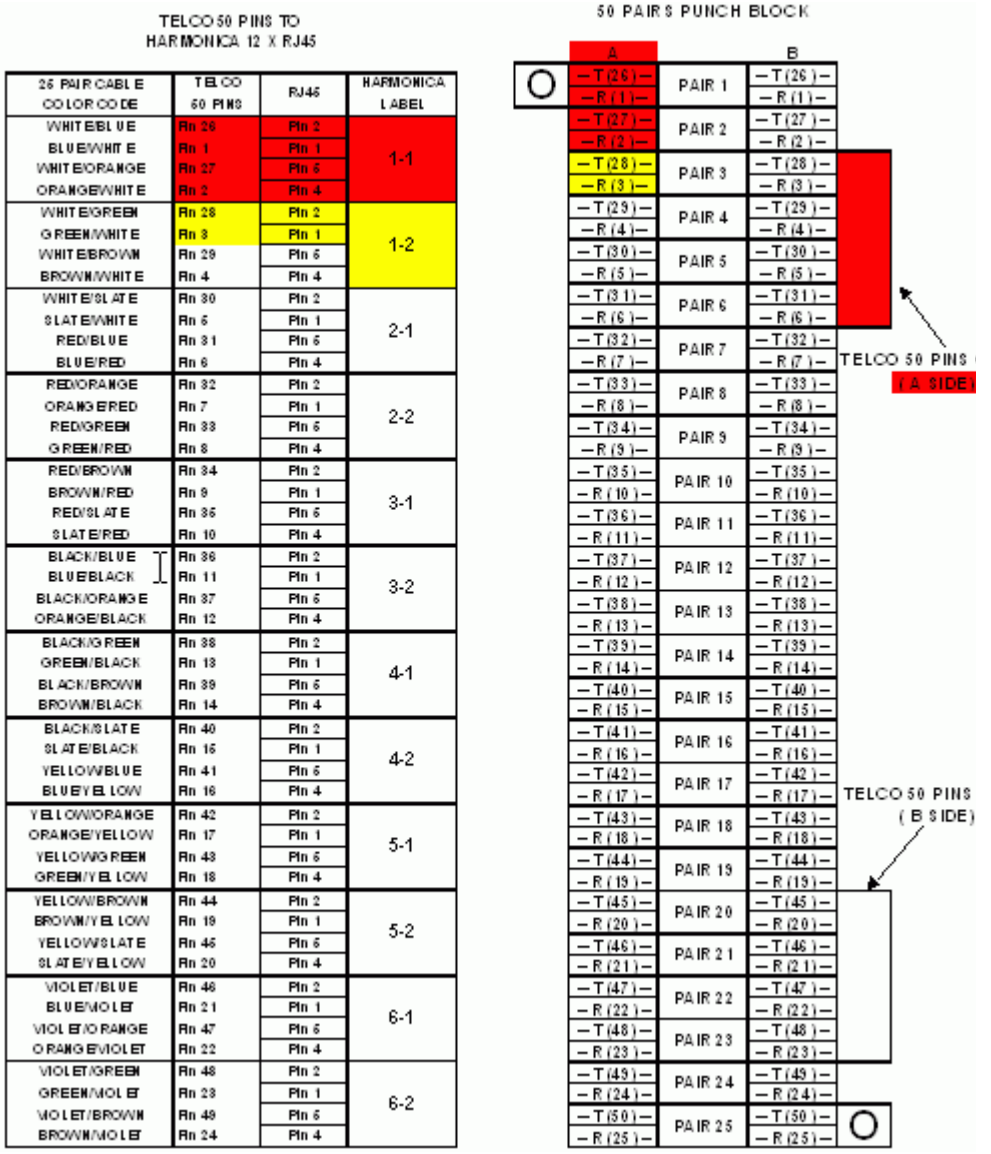
STEP 2:

1. TeleLite shelf belongs to a TeleLite PCU configuration that uses a 25 pair protection block and a 66-punch block (see Figure 49 on page 100):

The harmonica is connected to the 66-punch block using a 25 pair straight cable that has Telco 50 pin connectors at both ends. The end of the 25-pair cable having the red label is connected to the harmonica and the other end is connected to the 66-punch block.

The following figures show the correspondence between harmonica modular jack's pins and Telco 50 pin connector (left table) and the correspondence between the 66-punch block pins and the Telco 50 pin connectors (right table). These two tables will show the right place to punch the pairs on 66-punch block.

Figure 53: Telco Harmonica and 50-pin Punch Block



TELCO 50 PINS TO HARMONICA 12 X RJ45

26 PAIR CABLE COLOR CODE	TELCO 50 PINS	RJ45	HARMONICA LABEL
WHITE/BLUE	Pin 26	Pin 2	1-1
BLUE/WHITE	Pin 1	Pin 1	
WHITE/ORANGE	Pin 27	Pin 5	
ORANGE/WHITE	Pin 2	Pin 4	
WHITE/GREEN	Pin 28	Pin 2	1-2
GREEN/WHITE	Pin 3	Pin 1	
WHITE/BROWN	Pin 29	Pin 5	
BROWN/WHITE	Pin 4	Pin 4	
WHITE/SLATE	Pin 30	Pin 2	2-1
SLATE/WHITE	Pin 5	Pin 1	
RED/BLUE	Pin 31	Pin 5	
BLUE/RED	Pin 6	Pin 4	
RED/ORANGE	Pin 32	Pin 2	2-2
ORANGE/RED	Pin 7	Pin 1	
RED/GREEN	Pin 33	Pin 5	
GREEN/RED	Pin 8	Pin 4	
RED/BROWN	Pin 34	Pin 2	3-1
BROWN/RED	Pin 9	Pin 1	
RED/SLATE	Pin 35	Pin 5	
SLATE/RED	Pin 10	Pin 4	
BLACK/BLUE	Pin 36	Pin 2	3-2
BLUE/BLACK	Pin 11	Pin 1	
BLACK/ORANGE	Pin 37	Pin 5	
ORANGE/BLACK	Pin 12	Pin 4	
BLACK/GREEN	Pin 38	Pin 2	4-1
GREEN/BLACK	Pin 13	Pin 1	
BLACK/BROWN	Pin 39	Pin 5	
BROWN/BLACK	Pin 14	Pin 4	
BLACK/SLATE	Pin 40	Pin 2	4-2
SLATE/BLACK	Pin 15	Pin 1	
YELLOW/BLUE	Pin 41	Pin 5	
BLUE/YELLOW	Pin 16	Pin 4	
YELLOW/ORANGE	Pin 42	Pin 2	5-1
ORANGE/YELLOW	Pin 17	Pin 1	
YELLOW/GREEN	Pin 43	Pin 5	
GREEN/YELLOW	Pin 18	Pin 4	
YELLOW/BROWN	Pin 44	Pin 2	5-2
BROWN/YELLOW	Pin 19	Pin 1	
YELLOW/SLATE	Pin 45	Pin 5	
SLATE/YELLOW	Pin 20	Pin 4	
VIOLET/BLUE	Pin 46	Pin 2	6-1
BLUE/VIOLET	Pin 21	Pin 1	
VIOLET/ORANGE	Pin 47	Pin 5	
ORANGE/VIOLET	Pin 22	Pin 4	
VIOLET/GREEN	Pin 48	Pin 2	6-2
GREEN/VIOLET	Pin 23	Pin 1	
VIOLET/BROWN	Pin 49	Pin 5	
BROWN/VIOLET	Pin 24	Pin 4	

50 PAIRS PUNCH BLOCK

A		B
T(26)	PAIR 1	T(26)
R(1)		R(1)
T(27)	PAIR 2	T(27)
R(2)		R(2)
T(28)	PAIR 3	T(28)
R(3)		R(3)
T(29)	PAIR 4	T(29)
R(4)		R(4)
T(30)	PAIR 5	T(30)
R(5)		R(5)
T(31)	PAIR 6	T(31)
R(6)		R(6)
T(32)	PAIR 7	T(32)
R(7)		R(7)
T(33)	PAIR 8	T(33)
R(8)		R(8)
T(34)	PAIR 9	T(34)
R(9)		R(9)
T(35)	PAIR 10	T(35)
R(10)		R(10)
T(36)	PAIR 11	T(36)
R(11)		R(11)
T(37)	PAIR 12	T(37)
R(12)		R(12)
T(38)	PAIR 13	T(38)
R(13)		R(13)
T(39)	PAIR 14	T(39)
R(14)		R(14)
T(40)	PAIR 15	T(40)
R(15)		R(15)
T(41)	PAIR 16	T(41)
R(16)		R(16)
T(42)	PAIR 17	T(42)
R(17)		R(17)
T(43)	PAIR 18	T(43)
R(18)		R(18)
T(44)	PAIR 19	T(44)
R(19)		R(19)
T(45)	PAIR 20	T(45)
R(20)		R(20)
T(46)	PAIR 21	T(46)
R(21)		R(21)
T(47)	PAIR 22	T(47)
R(22)		R(22)
T(48)	PAIR 23	T(48)
R(23)		R(23)
T(49)	PAIR 24	T(49)
R(24)		R(24)
T(50)	PAIR 25	T(50)
R(25)		R(25)

TELCO 50 PINS (A SIDE)

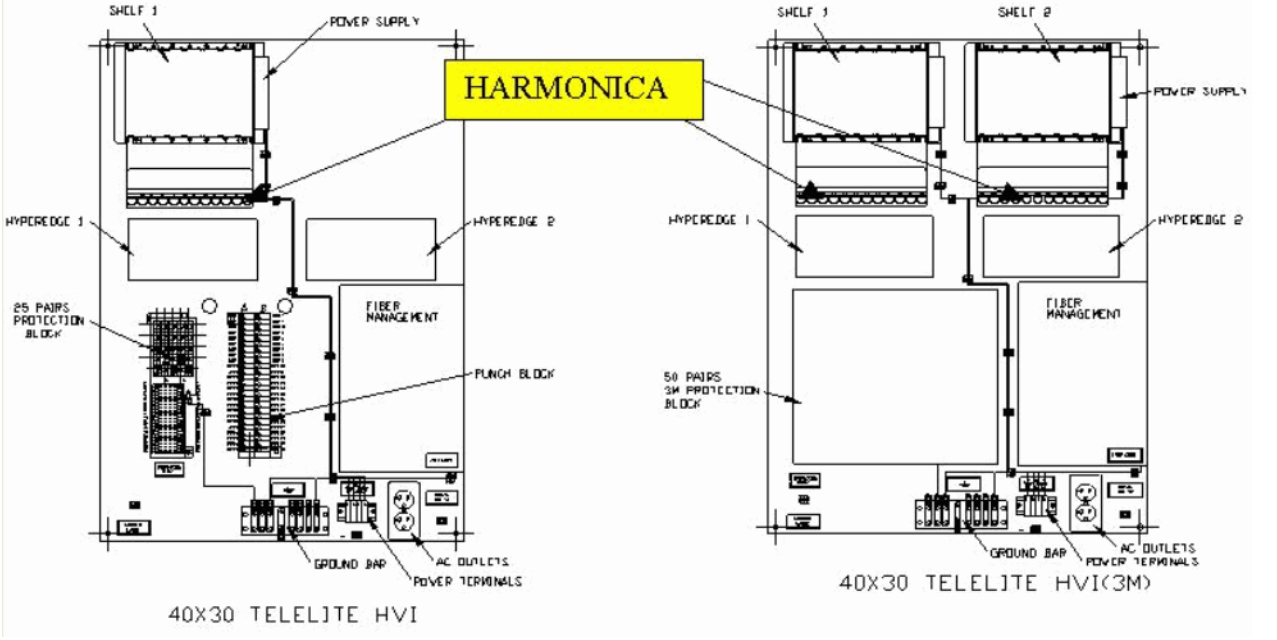
TELCO 50 PINS (B SIDE)

2. TeleLite shelf belongs to a TeleLite PCU configuration that uses a 50 pair 3M protection block (see also document 924-020040-001R2 or (Figure 49 on page 100 and Figure 50 on page 101.).)

The harmonica is connected to the 50-pair protection block using a 25 pair cable that has a Telco 50 pin connector and a red label shrink tubing only at one end. The other end of the cable has no connector. The end of the 25-pair cable having the connector is connected to the harmonica and the other end is connected to the self-strip output connectors of the 50-pair protection block.

The Figure 54 on page 108 shows a TeleLite PCU configuration that uses a 25 pair protection block and a 66-punch block (Left Side) and of a TeleLite PCU configuration that uses a 50 pair 3M protection block (Right Side)

Figure 54: 25-Pair vs. 50-Pair Cabinet Configuration



7.3 Patch Cords and Harmonica

Figure 55: Type “T1” patch cord

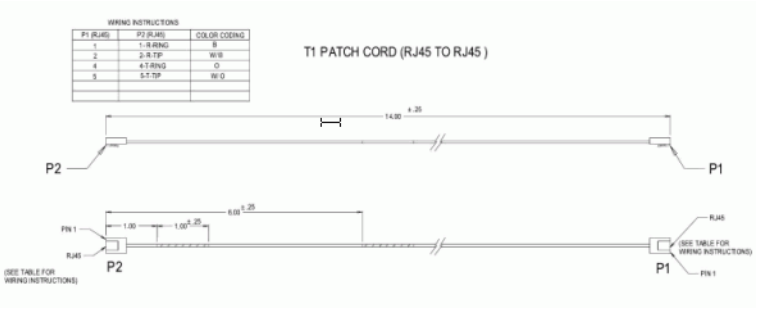


Figure 56: Type “DDS” Patch Cord

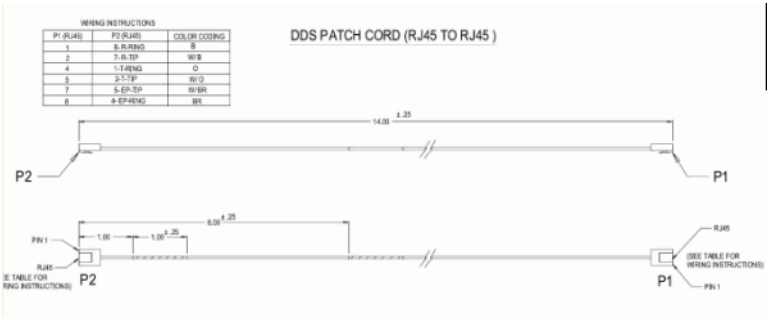


Figure 57: Type “Analog” Patch Cord

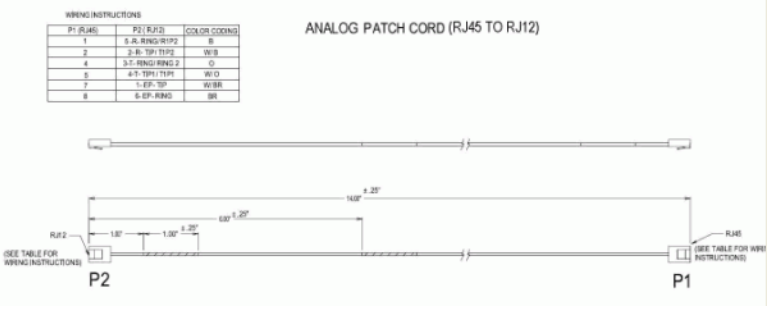


Figure 58: Figure 43: Front of Harmonica

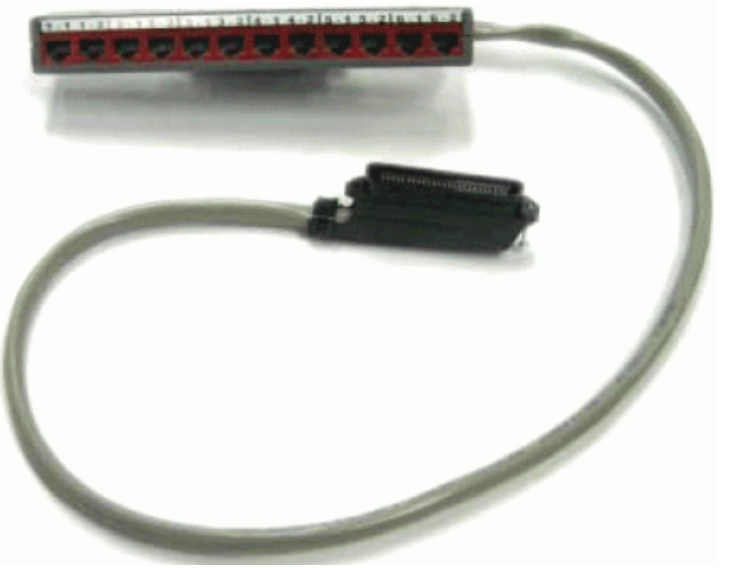
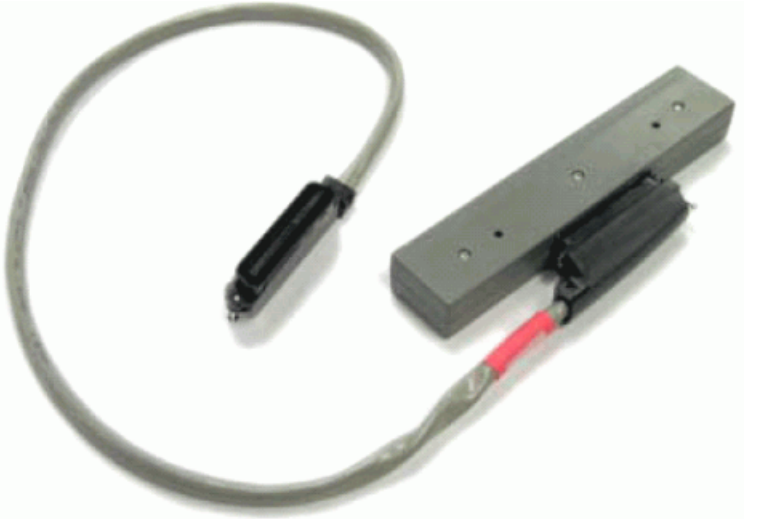


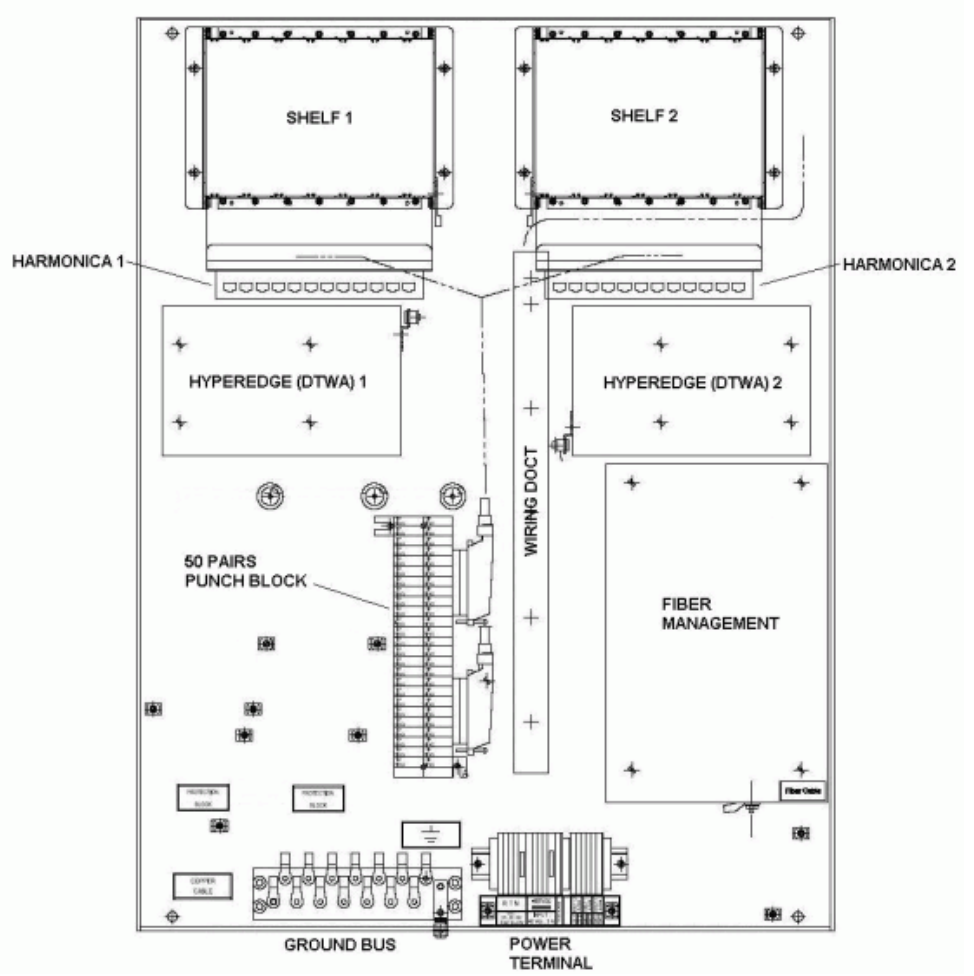
Figure 59: Figure 44: Back of Harmonica



7.4 Examples of PCU Configurations

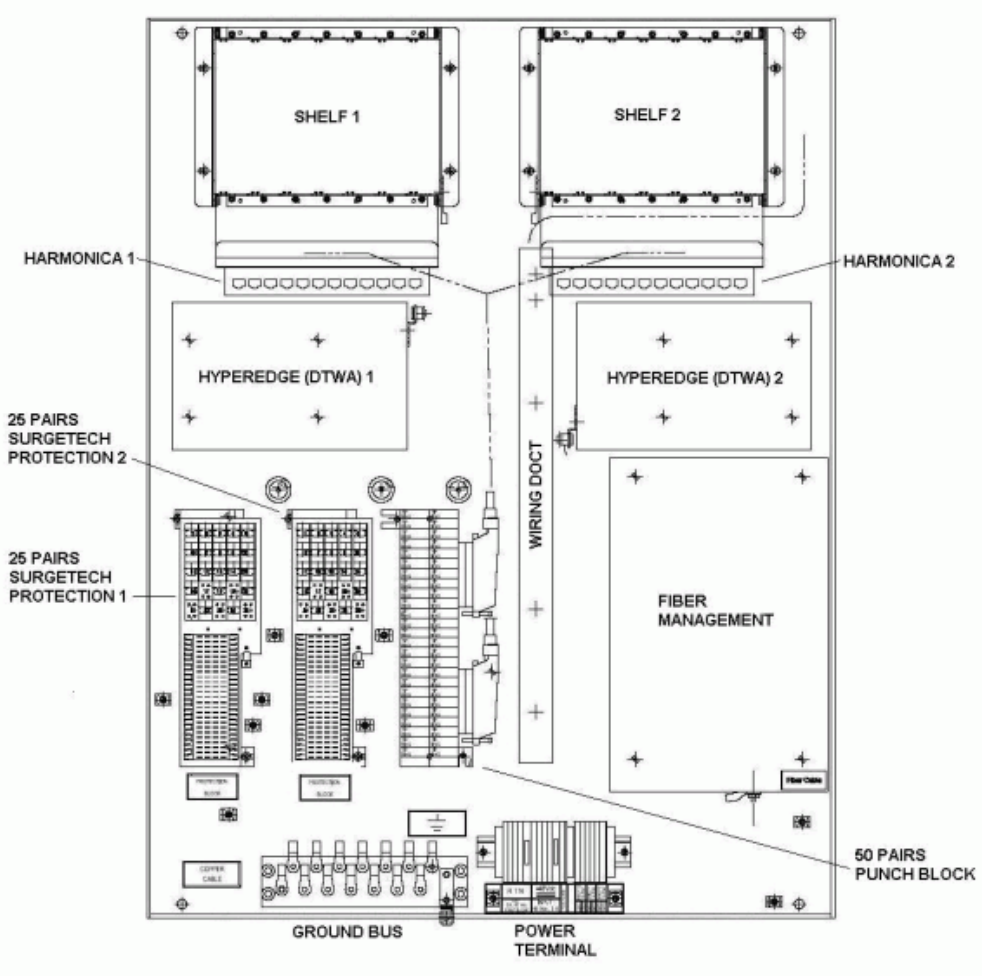
7.4.1 44” X 32” Cabinet without protections:

Figure 60: 7243CD-02/1 (inside of backboard view)



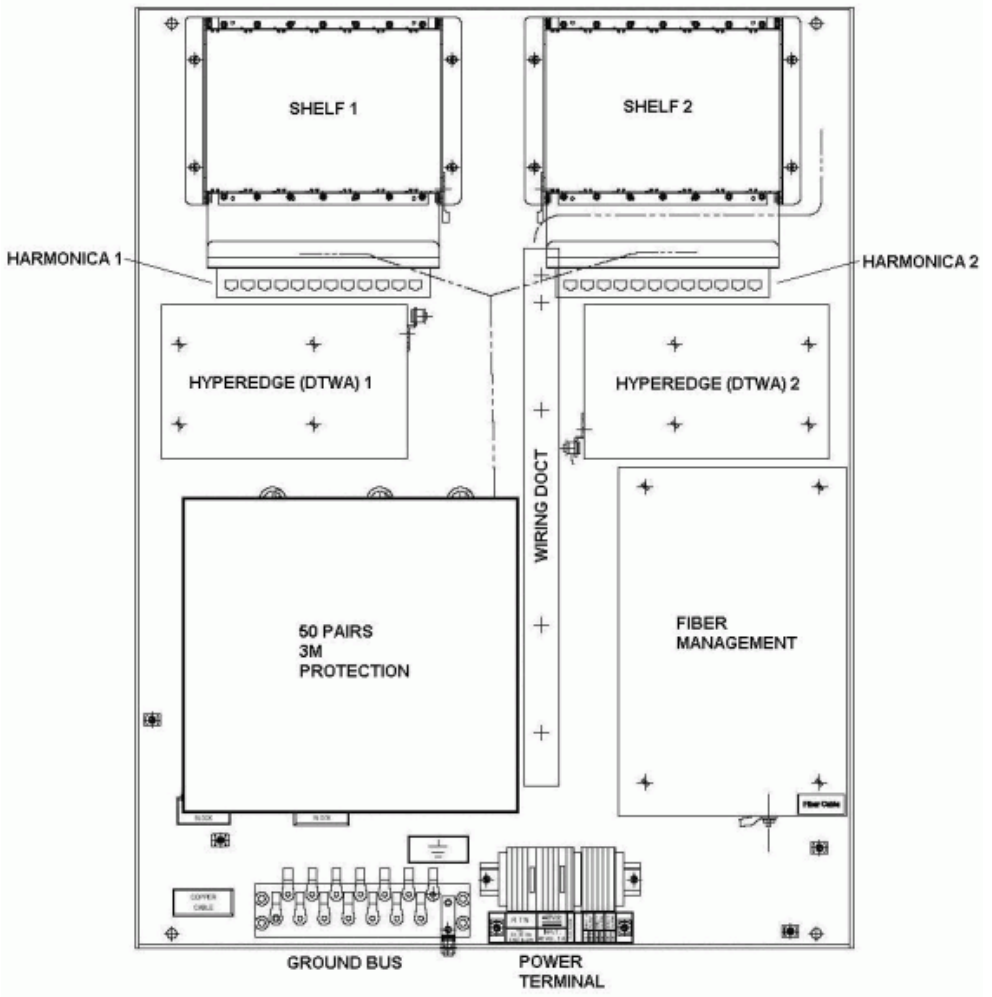
7.4.2 44” X 32” Cabinet with SurgeTech protection (Polymer Cabinet):

Figure 61: Figure 46: 7243CD-12/1 (inside backboard view)



7.4.3 44’ X 32’ Cabinet with 3M protections (NEBS Cabinet):

Figure 62: Figure 47: 7243CD-22/1 (inside backboard view)



Appendix A

Acronyms

A 1 Acronyms

AC
Alternating Current

AWG
American Wire Gauge

BET
Building Entrance Terminal

CCH
Closet Connector Housing

CO
Central Office

CLID
Calling line identification

DC
Direct Current

DDS
Digital Data Service

DID
Direct Inward Dialing

DIP
Dual Inline Package

DIN
Deutsches Institut fur Normung (Standards Agency)

DTWA
Digital Termination Wall-mount Assemblies

EMI
Electromagnetic Interference

ESD
Electro-Static Discharge

FAC
Facility-Side Connections

FXS
Foreign Exchange Station

GPR
Ground Potential Rise

HDSL
High Bit-rate Digital Subscriber Line

HVI
High Voltage Interface

LED
Light-emitting Diode

MM
Multi-Mode

MSP
Multi-Stage Protector

NC
No Connection

NCTE
Network Channel Terminating Equipment

NEBS
Network Equipment Building Systems

OPX
Off-Premises Exchange

PBX
Private Branch Exchange

PCB
Printed Circuit Board

PCU
Pre-configured Unit

PET
Protected Entrance Terminal

POTS
Plain Old Telephone Service

REN
Ringer Equivalency Number

RTN
Return

RX
Receive

SM
Single-Mode

TX
Transmit

UL
Underwriters Laboratories

WIC
Wall-mountable Interconnect Center