



**3-Slot Card Shelf  
Description & Installation  
P30075**

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## 1.0 Scope

This document describes the technical specifications, technical requirements and installation instructions for the P30075 SNC Lyte Lynx® 3-Slot Card Shelf. It provides an understanding of the basic functions and features available with this product.

## 2.0 Product Overview

### 2.1 Intended Uses

The 3-slot Card Shelf provides an isolated interface for voice (POTS), analog data and digital circuits, depending on the isolation cards that are inserted into the card shelf. The primary function of the Card Shelf is to provide a convenient connection location or housing in which isolation cards can be inserted “transparently” into the circuit. This product presents a very small footprint, making it ideal for installations where space is at a premium and only two or three circuits are required.

Lyte Lynx® systems are intended for use at power substations and similar locations where high voltage isolation is required on the incoming copper telephone pairs to protect the telco network from harm and to provide a personnel safety barrier against voltages. This specifically includes protection from longitudinal voltage surges and Ground Potential Rise (GPR) that may occur during power system faults.

### 2.2 System Requirements

Printed circuit boards designed for installation in the SNC Lyte Lynx® 3-Slot, 6-Slot and 12-Slot Card Shelves or Teleline Isolator\* 8-Slot Card Shelf may be used. A 24, 48 or 130VDC power source from the substation is required whenever fiber optic or other active electronic isolation cards are to be used.

### 2.3 Parts List

<u>QTY</u>	<u>Description</u>
2	#14 X 1.0” sheet metal screws
3	18 pin terminal blocks marked RM1, RM2, RM3
1	¾” inch male adapter for (CO) remote side
3	18 pin terminal blocks marked ST1, ST2, ST3
1	1/2” inch male strain relief for station side
1	Description/Installation Instruction Manual T0355

### 2.4 Physical Characteristics

#### 2.4.1 Mechanical Configuration

The P30075 Card Shelf is constructed of a high dielectric material that meets Underwriters Laboratories Standard 94V-0 flammability test.

#### 2.4.2 Environmental Requirements

The Lyte Lynx® system is designed for an indoor environment and is operable in temperatures ranging from -40°C to 100°C (-40°F to 212°F) under humidity conditions from 0-99 percent. (Requirements for individual cards may vary.)

\* Teleline Isolator is a trademark of Positron Industries, Inc.

### 2.4.3 Physical Dimensions

Table 1

P30075	Height	Width	Depth
CARD SHELF WITH COVER	13.25" (33.7 cm)	7.25" (18.4 cm)	8.75" (22.2 cm)

## 3.0 Product Features

### 3.1 Isolation Card Slots

The P30075 Card Shelf contains three (3) isolation card slots. Slots 1 through 3 are used for any combination of Lyte Lynx® isolation cards and can terminate a total of 6 telephone pairs (2 pairs per slot). Any combination of two-wire or four-wire service can be configured. Card slot no. 1 (J1) has pairs one and two of remote entrance cable and the station entrance cable terminated as “odd” or “even.” Slot 2 (J2) has pairs three and four, etc. The pair color order for the remote cable is that of standard 25 pair exchange cable (i.e., pair one=blue/white, pair two=orange/white, etc.). The pair color order for the station cable is that of standard 25 pair “inside wiring” cable (i.e., pair one = White/Blue and Blue/White; pair two = White/Orange and Orange/White, etc. See Tables 1 and 2.

### 3.2 Powering

The substation side of most SNC Lyte Lynx® and Teleline Isolator\* fiber optic isolation cards requires a supply of -24VDC or -48VDC power to operate. Floated 48VDC or 130VDC battery and 120VAC power is commonly available at most power substations. Various Lyte Lynx® internal power supply cards are available (See Table 3) to convert the chosen power source to -24VDC or -48VDC to power up the electronic circuitries on active isolation cards. The -24VDC or -48VDC is made available to each isolation card slot by means of the upper, station side backplane plug-in connectors.

The Power supply and some isolation cards may be powered by floated 48VDC, 130VDC or 120VAC power. It will accept any two of these power sources at one time (one as primary power and another as secondary active backup power) to provide continuous operation in the event of a power supply card failure or power outage. If only one power source is used, a 24VDC battery backup module may be used.

## 4.0 Installation



**CAUTION:** The incoming telephone pair should be contained in insulated conduit (PVC, etc.), or the pair should be jacketed with sufficient insulation to withstand a voltage rise from ground fault potential and from fault induction voltage.



**CAUTION:** Any metallic shielding on the incoming CO/Remote pair must be isolated from substation grounds all the way from the network low voltage interface (300 volt peak GPR point per IEEE Standard 487) to the entry into the Card Shelf. The conductors must also be isolated.

\* Teleline Isolator is a trademark of Positron Industries, Inc.



**CAUTION:** The Lyte Lynx® Remote/CO terminals and electronics are isolated from substation ground. To provide personnel isolation from local ground, stand on a thick rubber mat and use other adequate insulation devices (rubber gloves) when working on the Card Shelf.

Tools required for P30075 Card Shelf installation include:

- Tape Measure
- Screwdriver, 1/8" Blade
- 3/8" Wrench or Socket
- Center Punch
- 1/8" Drill Bit · Drill
- Hammer
- Channel lock
- Wire stripper

#### 4.1 Card Shelf Mounting

- (a) Determine the location for the Card Shelf, leaving room to the left or below the shelf for a lightning arrester, if required. The shelf should be mounted to a 3/4" thick plywood wall (or equivalent).
- (b) Mark the location for the sheet metal crews. Two keyhole cutouts distanced on 8" centers are provided in the back wall of the Card Shelf.
- (c) Center punch location and drill 1/8" pilot holes in wall at center punch marks.
- (d) Mount the Card Shelf to the wall using the #14 sheet metal screws (included).

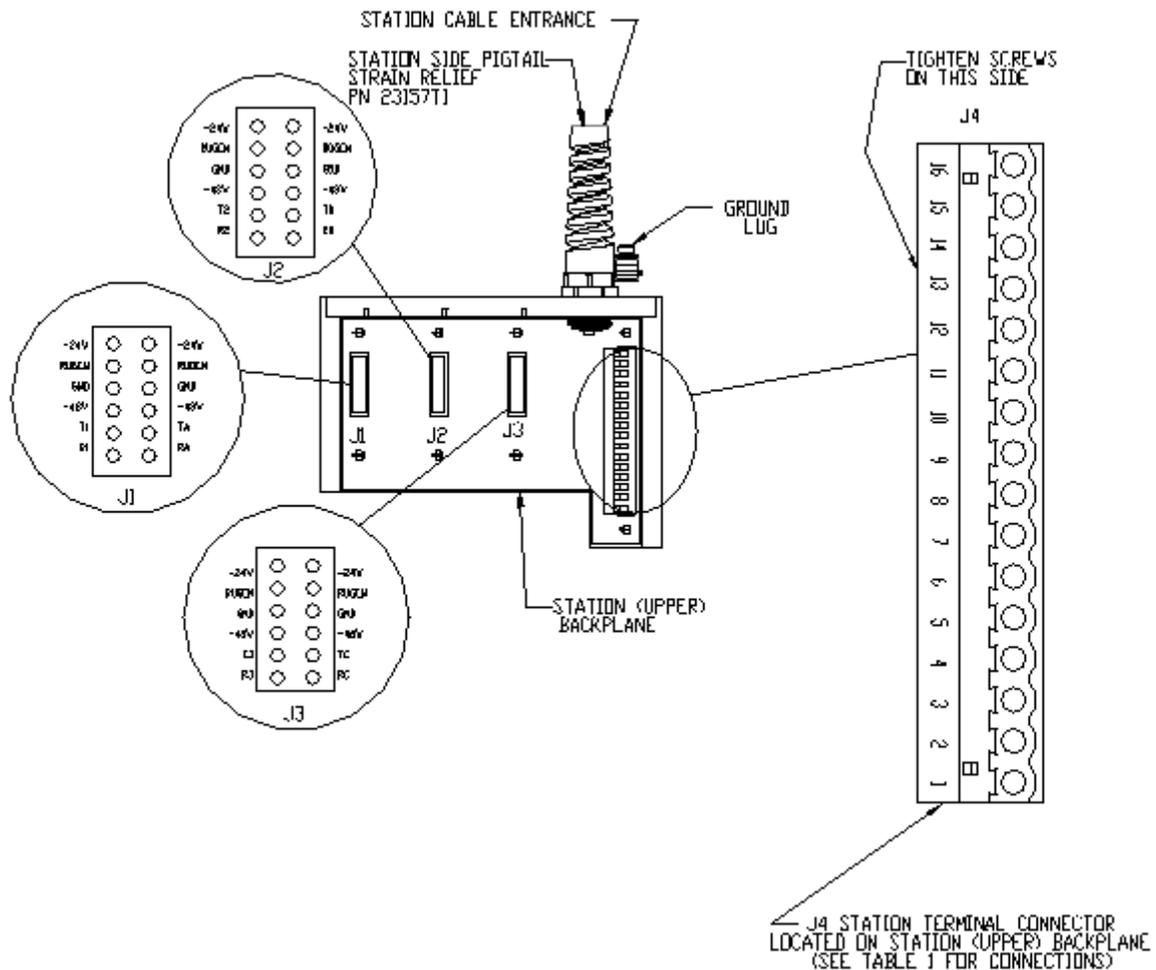


Figure 1: Station Side Installation

## 4.2 Station Side Connections

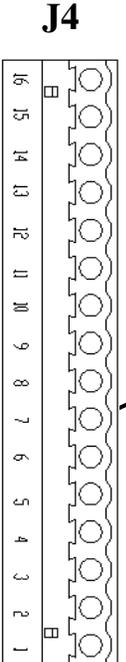
- Cable Pair Entrance

A strain relief (SNC P/N 23157T1) for a 1/2 inch station cable is provided. The top of the right side of the card shelf has a 1/2 inch 14 NPT threaded hole for the strain relief. If standard 1/2 inch PVC pipe will be used instead of the strain relief, install a standard 1/2 inch male PVC fitting (SNC P/N 21311T6) in the threaded hole and run solid or flexible conduit to the shelf.

Insert the station cable through the station side pigtail strain relief and through the station cable entrance in the top of the Card Shelf (See Figure 1). Pull two feet of cable into the Card Shelf for termination.

- Pair Termination

One (1) 16 position, push-on connector block (J4) is located in the upper right hand corner of the card shelf and is used to terminate the station cable pairs. Carefully pull outward on J4 terminal connector and remove. Strip 1/4 inch from the end of each wire and secure in the J4 connector block by tightening terminal connector screw with a small 1/8 inch standard blade screwdriver. See Table 2 and 4 for appropriate cable pair termination.



J4 TERMINAL	FUNTION	COLOR	CARD SLOT	PAIR NO.
16	-24VDC			
15	+48/130VDC			
14	ST GND +			
13	-48/130VDC			
12	TC	RED/BLU	SLOT 3	6
11	RC	BLU/RED	SLOT 3	6
10	T3	WHT/SLT	SLOT 3	5
9	R3	SLT/WHT	SLOT 3	5
8	TB	WHT/BRN	SLOT 2	4
7	RB	BRN/WHT	SLOT 2	4
6	T2	WHT/GRN	SLOT 2	3
5	R2	GRN/WHT	SLOT 2	3
4	TA	WHT/ORN	SLOT 1	2
3	RA	ORN/WHT	SLOT 1	2
2	T1	WHT/BLU	SLOT 1	1
1	R1	BLU/WHT	SLOT 1	1

**TABLE 2: Station Side (J4) Terminal Block Connections**

- **Pair Designations**

Each of the three (3) slots will support two (2) pairs. The first pair is connected to the left side of the backplane jacks and assigned a numeric designation (i.e. T1, R1, etc.). The second pair is connected to the right side of the backplane jacks and is assigned an alpha designation (i.e. TA, RA, etc.). See Table 2 and 4. Once the cable pairs are terminated, plug the terminal block J4 to its mate. Pull the cable back as needed and tighten the strain relief using a channel lock.

- **Station Ground Termination**

A ground lug for connecting a #6 AWG wire to station ground is provided on the upper right side of the card shelf. A separate wire can also be used to bring station ground into the card shelf to J4 terminal 3.



**CAUTION:** All station terminal apparatus should be on the same ground grid as the Card Shelf when the station ground is connected in the Lyte Lynx® Card Shelf.

- **Powering Connections**

### **Powering Card Slots with 24VDC**

To bring 24VDC into the card shelf from an external power source such as a power supply, terminals 14 and 16 are used. Connect negative 24VDC to terminal 16 and positive 24VDC to terminal 14.

### **Powering Card Slots With Other than 24VDC**

Some active isolation cards have special powering requirements, i.e. 48VDC, 130VDC and/or ring-up generator. J4 connections are as follows:

#### **-48VDC**

Connect an external ground-referenced 48VDC power source to terminals 14 and 13. Positive 48V to terminal 14 and negative 48V to terminal 13.

#### **Floated 48VDC or 130VDC**

To bring 130 or 48VDC floating station battery into the card shelf to power an internal power supply card or some active isolation cards, terminals 13 and 15 are used. Connect negative 130 or negative 48VDC to terminal 13 and positive 130 or positive 48VDC to terminal 15.

#### **Ring-up Generator**

Cards requiring a ringing generator supply are typically powered by 48VDC. (Refer to previous “Floated 48VDC” paragraph.)

**NOTE:** Isolation cards that require 130VDC cannot be used in same card shelf as isolation cards requiring the RUGEN connection because they utilize the same terminal (RUGEN) position.

Internal power supply cards may not be used in same card shelf as isolation cards that require the RUGEN connection because they utilize the same terminal (RUGEN) position.

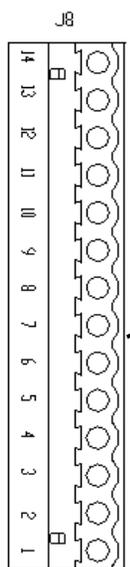
Ground-referenced 24VDC and/or 48VDC may be provided to the card shelf from an external power supply when isolation cards that require the RUGEN connection are used. Pull cable with connector attached back through cable entrance until connector can be carefully pushed onto male backplane pins. Take care to ensure push-on connector is properly aligned within the white outline.

### 4.3 CO/Remote Side Connections

#### Cable Pair Entrance

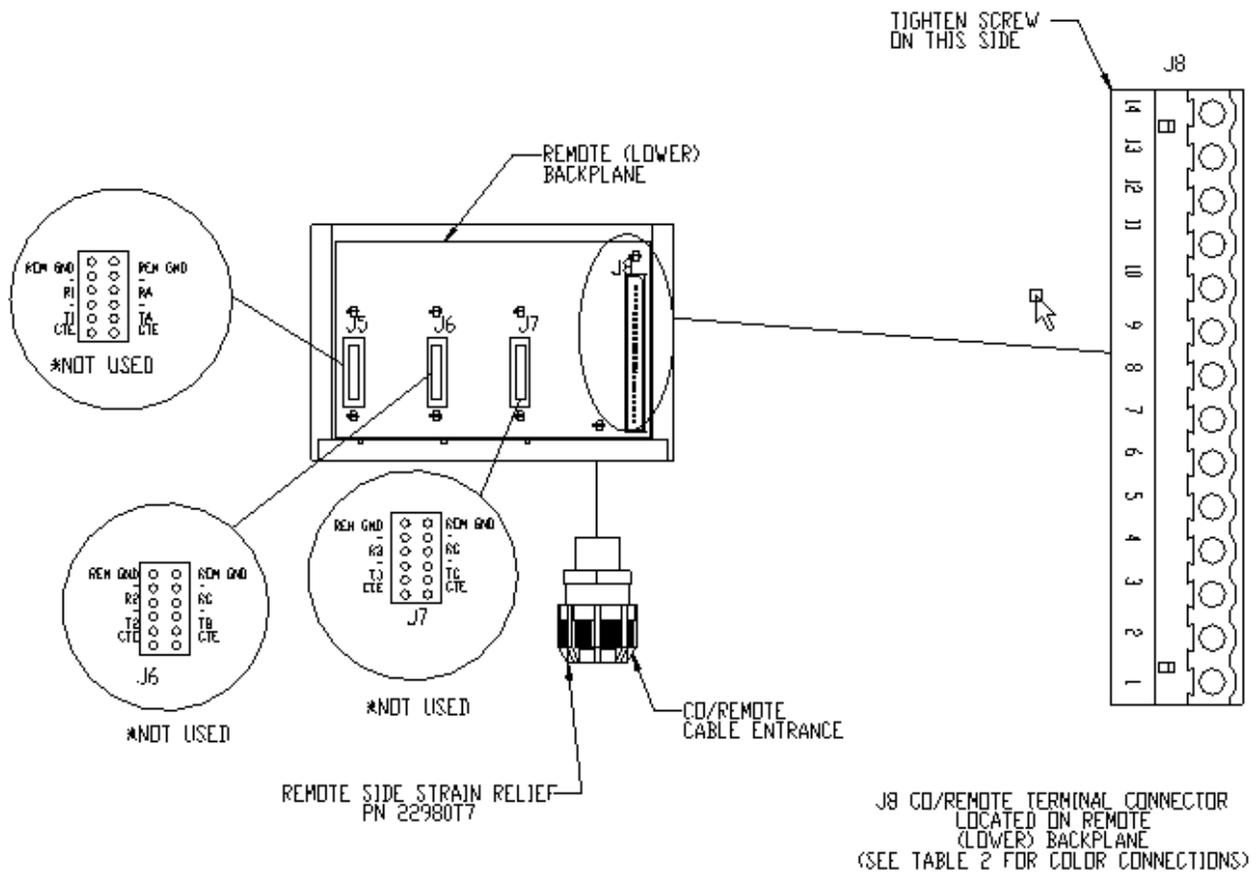
The left side of the card shelf bottom has a 1/2" 14-NPT threaded hole. A strain relief for a 1/2" cable is provided (SNC P/N 22980T7). If standard PVC pipe will be used, simply install a 1/2" standard 14-NPT male PVC fitting (SNC P/N 21311T6) in the threaded hole and run solid or flexible Carflex™ PVC conduit to the shelf.

1. Insert CO/Remote cable through the PVC conduit or strain relief. Pull two feet of cable through CO/Remote cable entrance and into the Card Shelf.
2. One 14-position, push-on connector block (J8), located in the lower right corner of the card shelf is used to terminate the CO/Remote cable pairs. See figure 2.



J8 TERMINAL	FUNTION	COLOR	CARD SLOT	PAIR NO.
14	RM GND	-	-	-
13	NOT USED	-	-	-
12	TC	RED	SLOT 3	6
11	RC	BLU	SLOT 3	6
10	T3	WHT	SLOT 3	5
9	R3	SLT	SLOT 3	5
8	TB	WHT	SLOT 2	4
7	RB	BRN	SLOT 2	4
6	T2	WHT	SLOT 2	3
5	R2	GRN	SLOT 2	3
4	TA	WHT	SLOT 1	2
3	RA	ORN	SLOT 1	2
2	T1	WHT	SLOT 1	1
1	R1	BLU	SLOT 1	1

**TABLE 3:** Remote Side (J8) Terminal Block Connections



**Figure 2: Remote Side (J8) Terminal Block Connections**

3. Carefully pull outward on J8 terminal connector and remove.
4. Strip 1/4" of insulation from wires and insert into appropriate J8 Terminal Connector holes. Secure wire in connector by tightening terminal connector screw with 1/8" standard blade screwdriver. See Table 3 and 4 for proper cable pair termination.
5. Pull cable with connector attached back through cable entrance until connector can be carefully pushed onto male backplane pins. Take care to ensure push-on connector is properly aligned within the white outline.

REMOTE SIDE TERMINAL BLOCKS		SNC ISOLATION CARD SHELF - P30075			STATION SIDE TERMINAL BLOCKS	
WIRE Color Code	Terminal J8	Remote Function	Slot Number	Station Function	Terminal J4	WIRE Color Code
-	-	-	-	-24V	J4-16	-
-	-	-	-	+(48/130)	J4-15	-
-	J8-14	RM GND	-	ST +GND	J4-14	-
-	J8-13	NOT USED	-	-(48/130)	J4-13	-
RED	J8-12	TC	3	TC	J4-12	RED/BLU
BLUE	J8-11	RC	3	RC	J4-11	BLU/RED
WHITE	J8-10	T3	3	T3	J4-10	WHT/SLT
SLAT	J8-9	R3	3	R3	J4-9	SLT/WHT
WHITE	J8-8	TB	2	TB	J4-8	WHT/BRN
BROWN	J8-7	RB	2	RB	J4-7	BRN/WHT
WHITE	J8-6	T2	2	T2	J4-6	WHT/GRN
GREEN	J8-5	R2	2	R2	J4-5	GRN/WHT
WHITE	J8-4	TA	1	TA	J4-4	WHT/ORN
ORANGE	J8-3	RA	1	RA	J4-3	ORN/WHT
WHITE	J8-2	T1	1	T1	J4-2	WHT/BLU
BLUE	J8-1	R1	1	R1	J4-1	BLU/WHT

**TABLE 4:** Correlation of Remote Side (J8) and Station Side (J4) Terminal Blocks

## 5.0 REMOTE GROUND CONNECTION

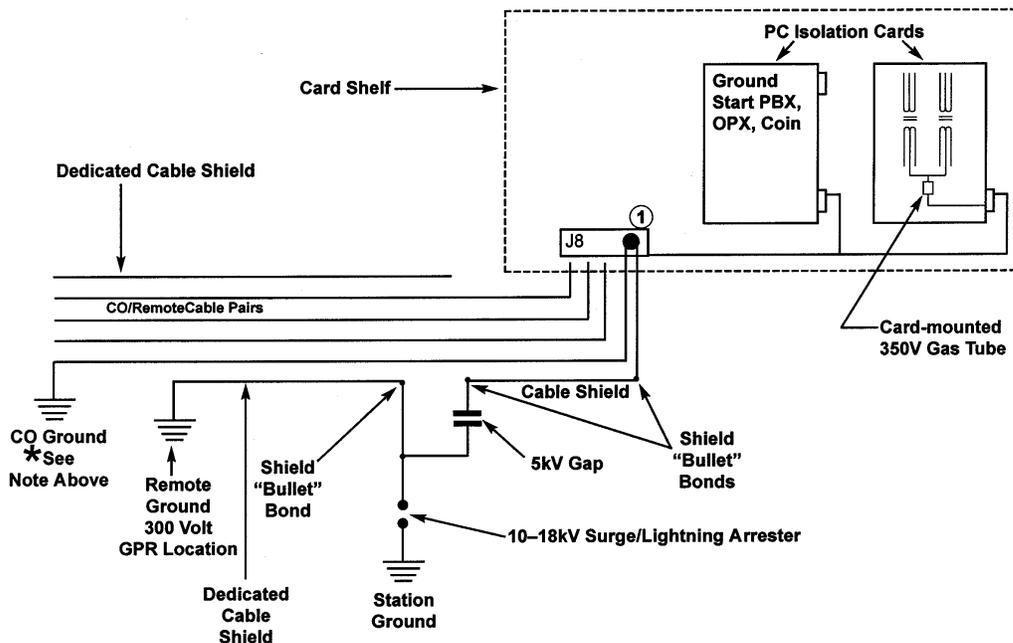
Remote ground for drainage is available on terminal No. 14. SNC recommends external drainage be provided on fiber voice cards.

### 5.1 When Surge/Lightning Arrester is Used

Following the recommended protection practice of IEEE Standard 487-1992, remote ground outside the GPR zone of influence (300 volt GPR location) is accessible via a 5 kV spark gap located in the lightning surge arrester housing external to the card shelf. One of the 5 kV spark gap terminals is physically connected to the remote ground end (line terminal end of the power type surge arrester as opposed to its ground terminal end) of the surge arrester used for the 65 kV rated BIL system. The other spark gap terminal connects to the card shelf “remote ground” J8 terminal 14 via the stub cable shield (equipped with a “bullit bond” or bonding clamps).

This installation scheme (Figure 3) provides for coordinated 65 kV BIL protection of both the isolation equipment (shelf and cards) and the dedicated entrance cable. The 5 kV gap coordinates drainage of surge voltage difference between the dedicated cable pairs and the shield. Should the power type surge arrester operates, the 5 kV gap will equalize ground potential difference between station ground and remote ground via the cable shield.

The isolation system is designed around the protection practice of IEEE Standard 487-1992, and it is recommended that this configuration be used in any application environment where surges are possible. The 65 kV BIL of the isolation system is assured and the dedicated cable receives similar BIL protection and insulation protection coordination between shield and cable conductors. See Figure 3.



**Figure 3:** Remote Ground/Surge Arrester/5kV Gap Connections

**NOTE:** In some applications “remote ground” is directly needed for a circuit function such as for PBX ground start trunks (a less desirable trunk seizure configuration that is more prone to possible transient voltage and circuit noise problems than a loop start trunk). When a direct “remote ground” connection is required, a protection system application utilizing the 5 kV gap must have the gap bypassed by one of the pairs to get central office ground directly accessible to the PBX card. This effectively disables the 5 kV gap.

## 5.2 When Surge/Lightning Arrester is NOT Used

If user has concluded that a surge arrester is not needed for the installation, then the dedicated cable pairs are normally connected in an insulated splice case or terminal box to the card shelf cable stub. One pair should be connected to J8 terminal 14 to provide a means to access central office ground if required for certain circuit applications.

For further information or for technical support - call 800-558-3325  
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