



DS1 Isolation Cards

P30051 – 4-Wire Card

P30077 – 2-Wire Card

Description & Installation

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**Figure 1:** Photo of P30051  
4-Wire DS1 Isolation Card

## 1.0 SCOPE

This document describes the technical specifications, technical requirements and installation instructions for transformer-based P30051 and P30077 SNC Lyte Lynx® T-carrier Data Isolation PC cards. It provides an understanding of the basic functions and features available with these products.

## 2.0 PRODUCT OVERVIEW

### 2.1 System Requirements

The P30051 and P30077 printed circuit Isolation cards are designed for installation in an SNC Lyte Lynx® Card Shelf or Teleline Isolator\* Card Shelf. No powering is required for these passive devices.

### 2.2 Intended Uses

These Data Isolation Interface models provide an isolated interface for 4-wire (P30051) and 2-Wire (P30077) DS1 (such as T1) data circuits, including SuperFrame, Extended SuperFrame, and single or multi-channel DS0 transmission, as well as any other digital channel with a primary signaling frequency in the 10kHz – 2MHz range. Frequency response is 2kHz – 6MHz.

The primary function of these cards is to provide an isolation from hazardous voltages while being “transparent” in the circuit. All data signaling information within the specified frequency bandwidth will be unaffected. However, DC signaling is not supported. A secondary function is to provide for the loopback of DC simplex sealing current/ repeater powering current on the remote (Central Office) side of the units, since there is no DC path for such current through the unit.

**NOTE:** On P30077 isolation cards, the loopback function will only work when using two P30077 2-wire cards for 4-wire service.

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

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

### 3.0 PRODUCT FEATURES

#### 3.1 Transformer Isolation

These Lyte Lynx® data isolation interface models are passive, magnetic-coupled devices. Primary to secondary isolation is rated at 65kV BIL. The center tap of the transmit and receive transformers are connected to one another (via the card cage backplane when using two P30077 cards for 4-Wire service) to provide sealing current or span line powering current loopback at the remote side of the interface.



**WARNING:** DO NOT connect center taps of CO/ Remote and Station sides of transformers together. Doing so would disable the isolation interface and create a hazardous situation.

### 4.0 INSTALLATION



**WARNING:** 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 isolation system.



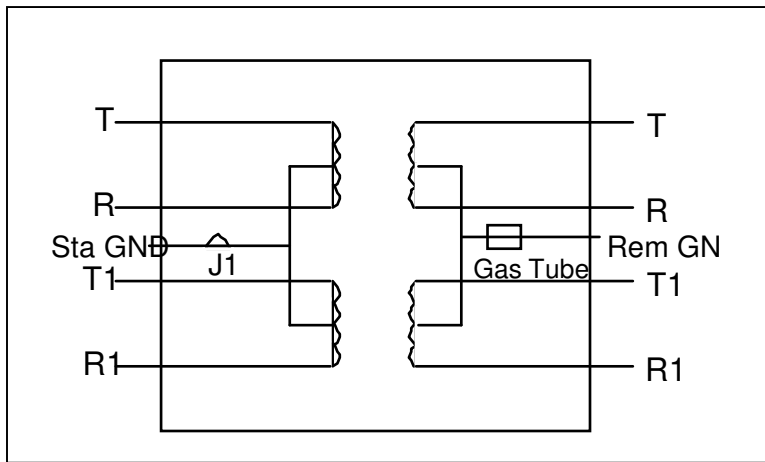
**CAUTION:** The incoming telephone pairs should be contained in insulated conduit (PVC, etc.), or the pair should be jacketed with sufficient insulation to withstand a voltage rise from ground fault potential and from fault induction voltage.



**CAUTION:** Any metallic shielding on the incoming CO/ Remote pairs 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.

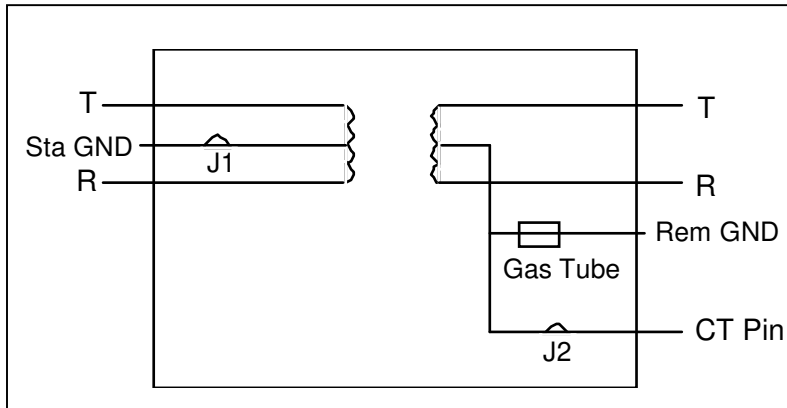
The P30051 and P30077 Isolation Cards require an installed SNC Lyte Lynx® Card Shelf or Teleline Isolator\* Card Shelf. The cards slide into any card shelf slot. With the card shelf installed and properly configured, slide the Isolation card into any available slot and firmly plug it into the card shelf backplane receptacles. This may be done with or without power applied to the card shelf.

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**Figure 1:** P30051 4-Wire Card Schematic

**NOTE: 4-Wire Service with 2-Wire Cards.** If desired, two P30077 cards can be used to provide 4-wire service. For this configuration to work in SNC Lyte Lynx® card shelves, the two P30077 cards must be installed in slots 1 and 3, 5 and 7, or 9 and 11. The SW1 and SW2 backplane switches on the P30069 card shelf must be in the down or "Standard" position to connect the center taps of slots J1 to J3, and J9 to J11. In a Teleline Isolator\* Card Shelf, the two cards must be installed in slots 1 and 2, 3 and 4, 5 and 6, or 7 and 8. The two cards are connected via the remote side backplane inside the card shelf.



**Figure 2:** P30077 2-Wire Card Schematic

**Sealing Current or Powering Current Termination/Drainage – P30051** – This card provides termination of simplex sealing or span line powering current from 0–160mA of current on the CO/ Remote side. The center taps of the individual transformers are tied together and connected to a 2-electrode, 350 volt gas tube with a high holdover voltage rating (See Figure 1). The other side of the gas tube should be connected to a 5kV spark gap bus and then to CO/ Remote ground via the dedicated cable shield. The card accesses remote ground on the lower backplane when plugged into the lower backplane edge connector. The 25th pair, violet and slate conductors in the incoming CO/ Remote cable, bring remote ground to the card shelf backplane (terminals 35 and 36 on the SNC Lyte Lynx® shelf and TB1-1 and TB2-1 on the Teleline Isolator\* shelf).

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The center taps on the station side of the two transformers are connected for drainage purposes. The center taps access station ground when the PC isolation card plugs into the upper backplane edge connector. The transformers have been tested and proven capable of handling 1600 + amps of drainage current for four milli-seconds. There are NO “sparkover identification” fuses or other extraneous “step potential piggy back” devices to blow that might cause the circuit to shut down and compromise “Class A” or “Class B” service. The isolation card’s purpose is to protect the customer’s station equipment –they are sufficiently robust to do the job without gimmicks to “protect the protector.” See Figure 1.

**Sealing Current or Powering Current Termination/Drainage – P30077** – When using two P30077 2-Wire cards to provide 4-Wire service (see NOTE on page 4) this card provides termination of simplexed sealing or span line powering current from 0–160mA of current on the CO/ Remote side. The center taps of the individual transformers on two P30077 cards may be tied together via the card shelf backplane and connected to a 2-electrode 350 volt gas tube with a high holdover voltage rating (See Figure 2). The other side of the gas tube should be connected to a 5kV spark gap bus, and then to CO/ Remote ground via the dedicated cable shield. The card accesses remote ground on the lower backplane when plugged into the lower backplane edge connector. The 25th pair violet and slate conductors in the incoming CO/ Remote cable bring remote ground to the card shelf backplane (terminals 35 and 36 on the SNC C-Line® shelf and TB1-1 and TB2-1 on the Teleline Isolator\* card shelf).

The center tap on the station side of the transformers are connected for drainage purposes. The center tap accesses station ground when the isolation card plugs into the upper backplane edge connector. The transformer has been tested and proven capable of handling 1600 + amps of drainage current for four milli-seconds. There are NO “sparkover identification” fuses or other extraneous “step potential piggy back” devices to blow that might cause the circuit to shut down and compromise “Class A” or “Class B” service. The isolation card’s purpose is to protect the customer’s station equipment –they are sufficiently robust to do the job without gimmicks to “protect the protector.” See Figure 2.

**NOTE:** On P30051 and P30077 cards, if station drainage is not required, jumper J1 may be clipped off. Jumper J2 can be clipped off if center tap connection is not required on remote side.



**CAUTION:** All station terminal apparatus should be on the same ground grid when the station ground is connected to the Isolation card shelf.

**5.0 PHYSICAL CHARACTERISTICS**

<b>Table 1</b>			
	<b>HEIGHT</b>	<b>DEPTH</b>	<b>WIDTH</b>
<b>P30051</b>	12”	1.5”	7.437”
<b>P30077</b>	30.5cm	3.8cm	18.9cm
<b>Cards</b>			

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### 5.1 Mechanical Configuration

Mechanical stability is provided by two separate backplanes in the card cage, one on the substation side and one on the remote side. The Isolation Cards are two-sided printed circuit boards manufactured in accordance with the appropriate PCB standards.

### 5.2 Environmental Requirements

The P30051 and P30077 Isolation Cards may be installed in an indoor or moderate outdoor environment, and are guaranteed operable in temperatures ranging from -40°C to 100°C (-40°F to 212°F) under humidity conditions from 0-99 percent.

## 6.0 SPECIFICATIONS

**TABLE 2: ISOLATION SPECIFICATIONS**

LONGITUDINAL SURGE	(1.2 × 50 micro-sec)	65kV peak
CONTINUOUS RATING	AC	20kVrms
	DC	58kVdc

**TABLE 3: External System Input Requirements**

INPUT SPECIFICATION	REQUIREMENTS
SIGNAL SOURCE & TERMINATION IMPEDANCES	100 – 135 Ohm
LOOP ATTENUATION (Sum of remote side and station side loops)	34dB Maximum

**TABLE 4: PERFORMANCE SPECIFICATIONS**

PARAMETER	SPECIFICATIONS
LONGITUDINAL BALANCE	10 kHz – 5mHz
RETURN LOSS	772 kHz @ 100 Ohms
RETURN LOSS	135 Ohm Source Impedance
	2.4 kHz
	32 kHz
MESSAGE CIRCUIT NOISE (idle Channel Noise)	1.2k – 4000 Hz @ 600 Ohms
PHASE JITTER	<1p p-p
Signal to Noise Ratio	>50dB
INSERTION LOSS	772 kHz @ 100 Ohms
FREQUENCY RESPONSE	Relative to 772 kHz @ 100 Ohms; +3.0 dB
CROSSTALK (to adjacent channel)	<-45dB
TEMPERATURE RANGE	-40 to +100°C (-40 to 212°F)
HUMIDITY RANGE	0 to 99% Relative Humidity
DRAINAGE CAPACITY – Minimum	0.5 Amps continuous (400 A <sup>2</sup> S Surge Drainage Rating)

For further information or for technical support –call 800-558-3325  
or visit [www.sncmfg.com](http://www.sncmfg.com)



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