

Plug-in OPX Card 7501-16A, B and C

Description and Installation



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TECHNICAL CUSTOMER SUPPORT

Should a problem arise, contact your customer support department. If the problem cannot be resolved by your support department or if you have any questions, contact Positron's Technical Customer Support department at 1-888-577-5254.

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1. The Plug-in OPX Card

The Plug-in Off Premise Extension (OPX) Card is used to provide high voltage isolation for a wide variety of telephone voice grade applications involving the bi-directional transmission of AC and DC voltage. The unit is a plug-in card designed for use with the Teleline Isolator multi-card shelf. It is available in three options, as listed below:

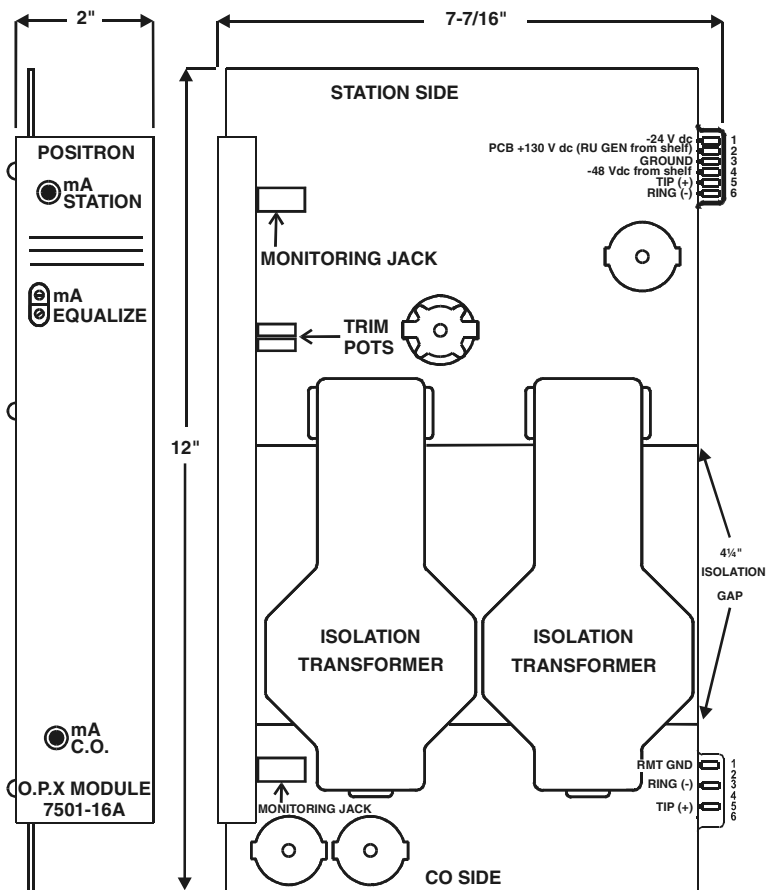
- Model 7501-16A is designed for a floating 130 V dc source.
- Model 7501-16B is designed for a -24 V dc source referenced to station ground.
- Model 7501-16C is designed for a -48 V dc source, also referenced to station ground.

Its features include the following:

- The card may be used with both the old and the new generation Three, Five and Eight-card Teleline Shelf.
- The OPX Card is completely bi-directional to all loop signalling, i.e. line voltages can originate from either Station or Central Office (CO) side loops. Bi-directional modulator/demodulators are used to realize a circuit which behaves as an ideal 1:1 isolation device.
- Varistors provide transient voltage protection to the isolation device.
- The OPX Card provides low loss, full duplex DC to voice band communication.
- The OPX Card transmits on/off-hook, dial pulses or touch tone signalling, ringing, polarity reversals, AC and DC voltage and current levels.
- Impedances applied to either side of the card are reflected to the opposite side.

Model variations A, B, and C are all visually similar. For a view of the Plug-in OPX Card, refer to Figure 1.

Figure 1 Model 7501-16A Component Layout (Only Major Components Shown)



NOTE: The faceplates of models 7501-16B and C will bear their respective model numbers, instead of 7501-16A. The rest of the units are visually similar.

2. Applications

The applications of the OPX Card include the following:

- OPX. For an illustration of this application, refer to Figure 3.
- Direct Inward Dial (DID) loop start. For an illustration of this application, refer to Figure 4.
- Automatic ring down. For an illustration of this application, refer to Figure 5.
- Radio keying. For an illustration of this application, refer to Figure 6.
- Loop start telephone
- Call waiting pulse
- Forward disconnect
- Caller ID
- Coin telephone (two cards required)
- Simplex continuity when used with four-wire DX signalling
- Fax and dial-up “smart” modems (up to 56.6 Kb modem, speed of 45.3 Kb/s if line permits)

Refer to Figure 2 for applications.

Figure 2 High Voltage Interface Applications

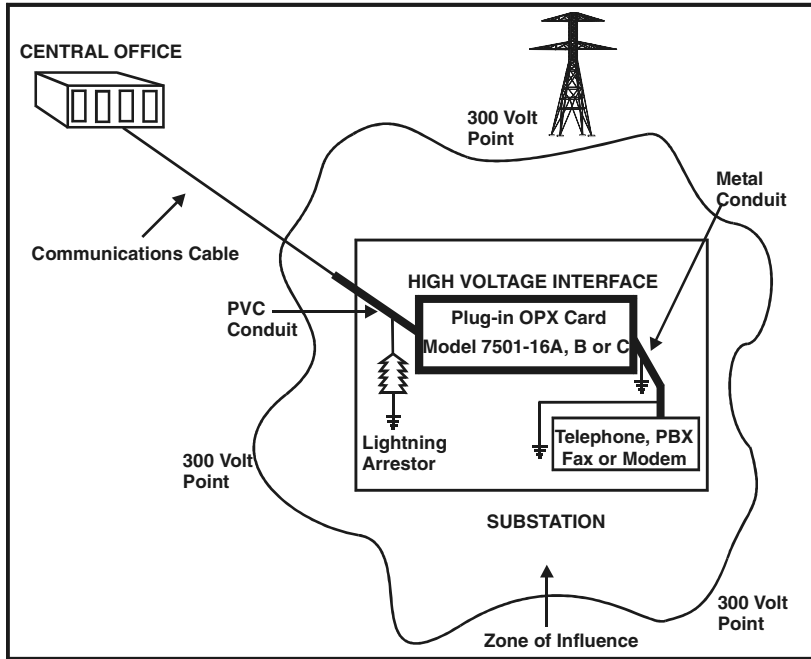
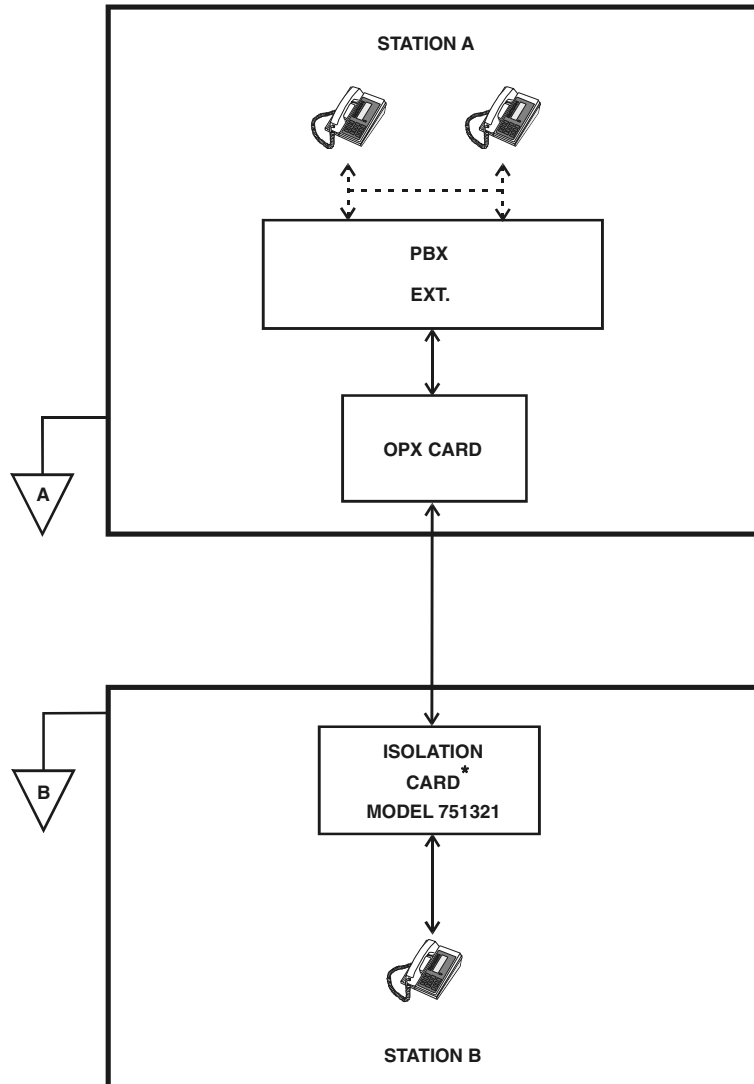


Figure 3 Typical Off Premises Extension (OPX) Application

***Note:** The isolation card is only required if a ground potential rise is possible at the remote site (Station B). If Station B is not a power plant, the telephone card can be omitted.

Figure 4 Typical Direct Inward Dial (DID) Application

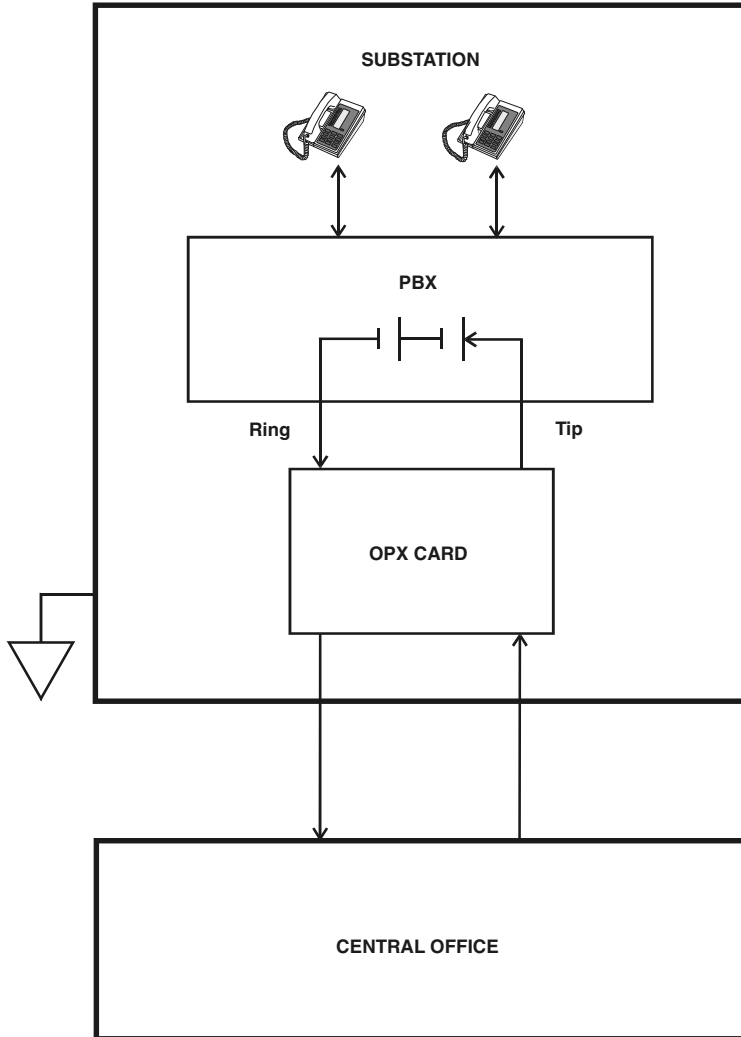


Figure 5 Typical Ring Down Application

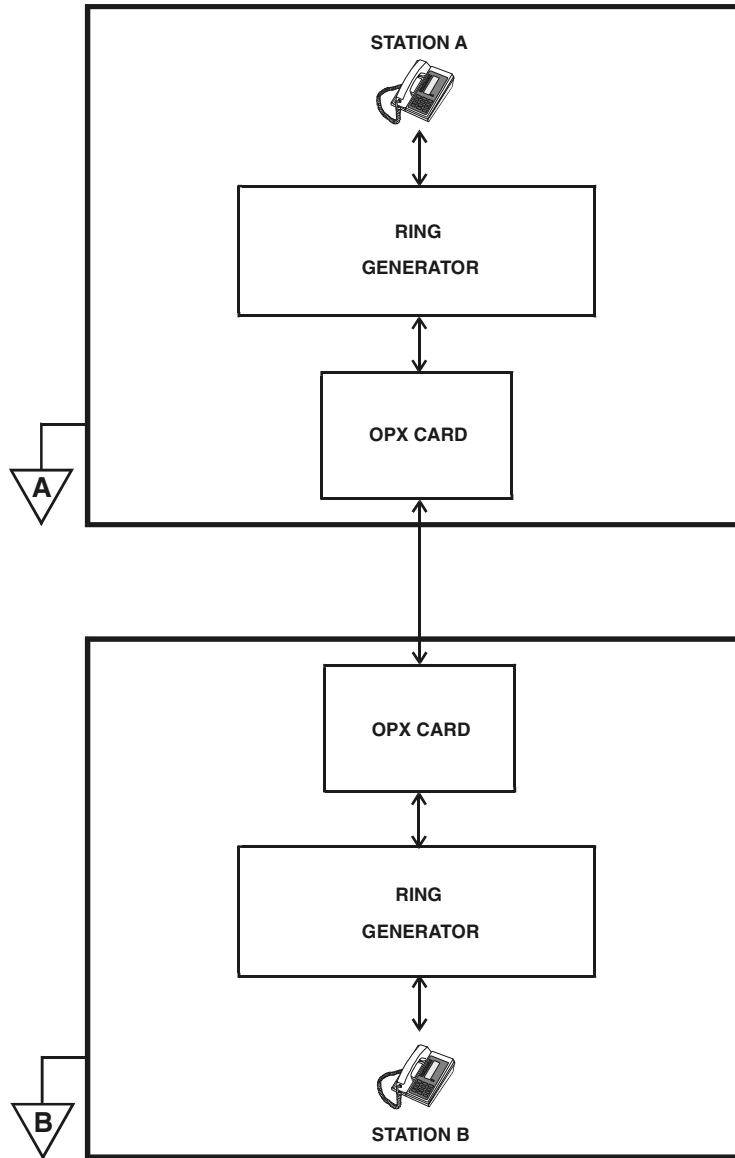
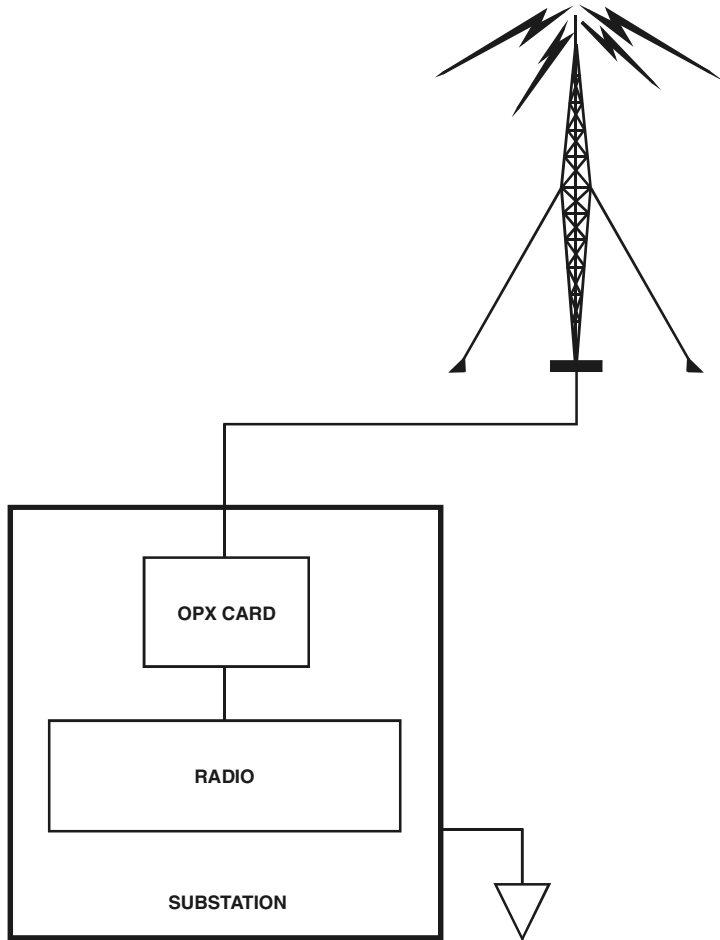


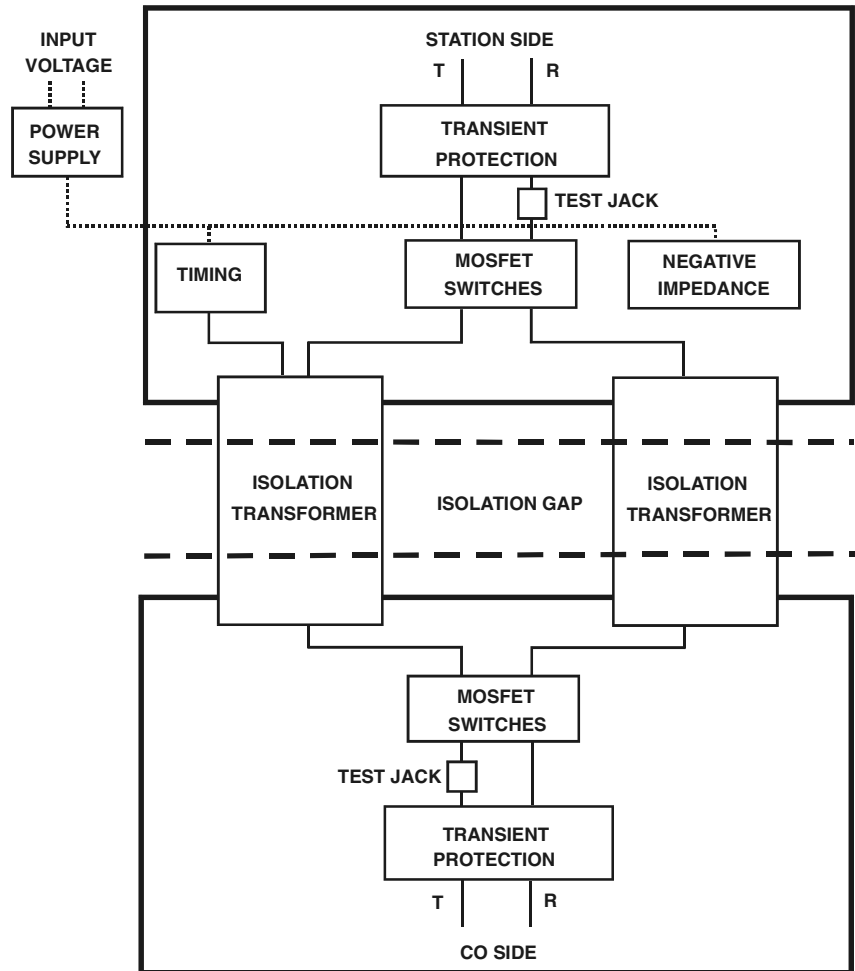
Figure 6 Typical Radio Keying Application



3. Hardware Description

The OPX Card is comprised of two sides. The Station side is located on the upper portion of the card and the CO side is located on the lower portion of the card. The Station side is separated from the CO side by the isolation transformers which create a 4¼ inch isolation gap. For the card's block diagram, refer to Figure 7.

Figure 7 Block Diagram



The following is a description of the elements of the OPX Card block diagram.

Transient Protection Blocks

The Transient Protection Blocks each consist of a varistor, and are designed to protect their respective circuitry (Station or CO side) from transients.

Timing Block

The Timing Block consists of a crystal oscillator which provides the switching frequency for the isolation devices.

MOSFET Switches

The metal oxide semiconductor field effect transistor (MOSFET) Switches are synchronized together to ensure proper transfer of signals.

Negative Impedance Block

The Negative Impedance Block compensates for any signal losses incurred by the isolation devices.

Isolation Transformers

The two Isolation Transformers are specifically designed and manufactured for low-loss signal transmission, while providing the high dielectric strength required for their intended use. They provide the 4/4 inch isolation gap for the card.

Test Jacks

The module faceplate also features two Test Jacks for use in the calibration procedures described later in the Installation section of this document. Insertion of a phono plug into these jacks permits the Station and CO side loop currents to be monitored, and is an essential part of the maintenance and calibration routine for a pilot wire system.

Power Supply Assembly

The Power Supply Assembly converts the station voltage to a level suitable for the Station side of the card. Each DC Trip/DC Pilot Wire module variation is designed for use with a specific station supply. The variations are as follows:

- Model 7501-16A operates from a 130 V dc station battery.
- Model 7501-16B operates from a -24 V dc power supply.
- Model 7501-16C operates from a -48 V dc power supply.

4. Technical Specifications

For a listing of the card's electrical specifications, refer to Table 1. For a listing of the card's physical specifications, refer to Table 2.

Table 1 Electrical Specifications (measured at 77°F or 25°C, 50% R.H.)

| Parameter | Specifications | | |
|---|--|--|--|
| | 7501-16A | 7501-16B | 7501-16C |
| ISOLATION DATA | | | |
| Isolation resistance | 100 000 MΩ | 100 000 MΩ | 100 000 MΩ |
| Metallic surge | 3 kV max | 3 kV max | 3 kV max |
| Insulation voltage | 30 kVrms (42 kV peak) | 30 kVrms (42 kV peak) | 30 kVrms (42 kV peak) |
| SUPPLY VOLTAGE | Floating: 105 to 150 V dc | Grounded: -21 to -27 V dc | Grounded: -42 to -56 V dc |
| SUPPLY CURRENT | 55 mA maximum | 350 mA maximum | 125 mA maximum |
| POWER DISSIPATION INSIDE SHELF | 6.2 W maximum | 8.5 W maximum | 6 W maximum |
| MAXIMUM VOLTAGE TIP TO RING | ±150 V dc | ±150 V dc | ±150 V dc |
| MAXIMUM LOOP CURRENT | ±100 mA continuous | ±100 mA continuous | ±100 mA continuous |
| MAXIMUM LOOP POWER | 5W | 5W | 5W |
| RESPONSE TIME (subscriber to line, or line to subscriber) | <1 ms | <1 ms | <1 ms |
| SERIES RESISTANCE | Series resistance of 25Ω is added to the telephone loop. | Series resistance of 25Ω is added to the telephone loop. | Series resistance of 25Ω is added to the telephone loop. |

| Parameter | Specifications | | |
|---|---|---|---|
| IMPEDANCE REFLECTION | Impedances on either side appear on the opposite side multiplied by 90% to 110% within the pass band. | Impedances on either side appear on the opposite side multiplied by 90% to 110% within the pass band. | Impedances on either side appear on the opposite side multiplied by 90% to 110% within the pass band. |
| ON-HOOK DATA | | | |
| Terminal resistance | ≥ 200 KΩ at ±100 V dc | ≥ 200 KΩ at ±100 V dc | ≥ 200 KΩ at ±100 V dc |
| OFF-HOOK DATA (40 mA dc) | | | |
| Longitudinal balance (CO Side) | >80 dB @ 60 Hz; >56 dB @ 4 kHz | >80 dB @ 60 Hz; >56 dB @ 4 kHz | >80 dB @ 60 Hz; >56 dB @ 4 kHz |
| Crosstalk with adjacent card | Better than -77dB from 300 to 3400 Hz measured at +10 dBm | Better than -77dB from 300 to 3400 Hz measured at +10 dBm | Better than -77dB from 300 to 3400 Hz measured at +10 dBm |
| Dial pulse distortion | <1% measured at 14 mA threshold (output duty cycle with respect to input duty cycle) | <1% measured at 14 mA threshold (output duty cycle with respect to input duty cycle) | <1% measured at 14 mA threshold (output duty cycle with respect to input duty cycle) |
| NOISE | | | |
| Impulse noise (both sides) | Less than 1 count in 30 minutes above 48 dBrc | Less than 1 count in 30 minutes above 48 dBrc | Less than 1 count in 30 minutes above 48 dBrc |
| Phase jitter (4-300 Hz) | <0.5° | <0.5° | <0.5° |
| Message circuit noise (quiet termination) | <30 dBrc | <30 dBrc | <30 dBrc |
| S/N ratio (C message filter) | 50 dB at 0 dBm | 50 dB at 0 dBm | 50 dB at 0 dBm |
| SIGNAL | | | |
| Bandwidth (-3 dB) | 200 to 4 kHz | 200 to 4 kHz | 200 to 4 kHz |

Table 2 Physical Specifications Model 7501-16A, B and C

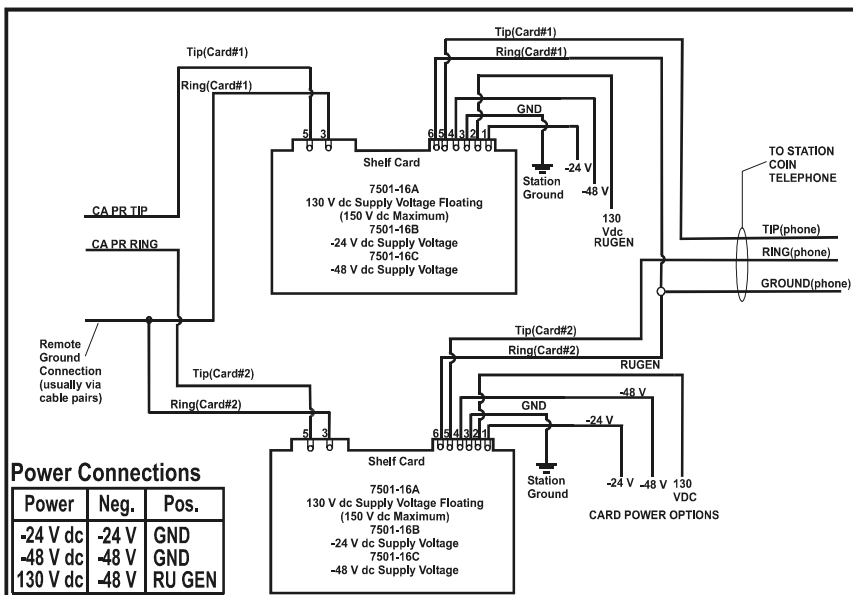
| Parameter | Specifications |
|-----------------------------|-------------------------------|
| Operating temperature range | +32°F to +122°F (0°C to 50°C) |
| Relative humidity | 95% (non-condensing) |
| Height | 12" (30.48 cm) |
| Width | 2" (5.08 cm) |
| Depth | 7-7/16" (18.89 cm) |
| Weight | 3.488 lbs (1.582 kg) |

5. Installation

The OPX Card plugs into any slot of the Teleline Three, Five or Eight-card Shelf. However, the card must be installed into the slot which has been pre-wired according to the installation diagram of the specific shelf.

To view the Ground Start Coin Circuit using two 7501-16 cards, refer to Figure 8.

Figure 8 Ground Start Coin Circuit Using Two 7501-16 Cards

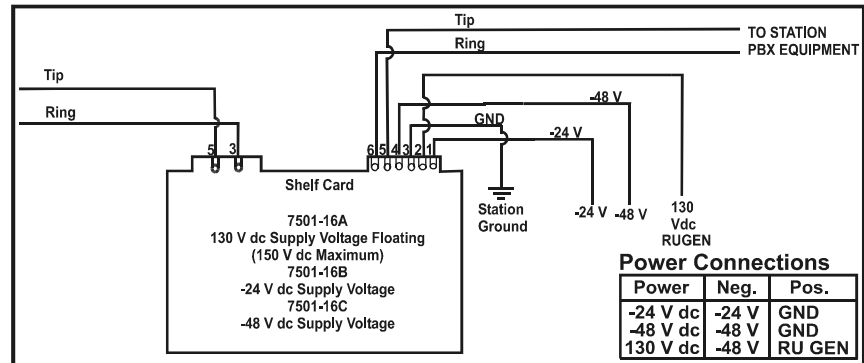


Note

1. Type 7501-16 cards can be powered with either -24 V, -48 V or 130 V dc; the suffix A, B or C specifies the operating voltage the card is designed for.
2. Two cards are required per coin circuit.
3. Use in adjacent slots where possible.
4. You cannot use cards powered by 130 V dc in the same shelf as 7501-04 cards that require a ringing generator (RUGEN) as the 130V and the RUGEN share the same pin connection.

To view the OPX trunk using single 7501-16 card, refer to Figure 9.

Figure 9 OPX Trunk Using Single 7501-16 Card



Note

1. Type 7501-16 cards can be powered with either -24V, -48V or 130 V dc; the suffix A, B or C specifies the operating voltage the card is designed for.
2. You cannot use cards powered by 130 V dc in the same shelf as 7501-04 cards that require a ringing generator (RUGEN) as the 130V and the RUGEN share the same pin connection.
3. This card may be used for DID trunks where the PBX supplies the loop battery.
4. This card can substitute for a 751311 type card when: 48 V dc station side loop power, Caller ID, and/or Forward Disconnect operations are required.

Caution

- Stand on a thick rubber mat and wear rubber gloves during the installation. It is preferable to perform these procedures on a clear dry day when a Ground Potential Rise (GPR) or transients are less likely to occur.
 - This card utilizes CMOS circuitry that can be damaged by static electricity. Observe normal CMOS handling procedures to avoid static discharge. Manipulate the card exclusively by the faceplate to prevent any damage to the card and to limit the possibility of electric shock. When moving the card, carry it in an ESD safe container or the antistatic bag, provided with the card. Failure to follow ESD precautions may void the warranty. For further information concerning ESD precautions, contact Positron's Customer Support department.
 - The remote ground must be brought in on a separate pair. Do not use the cable sheath. Do not connect remote ground to station ground.
 - The 130 V dc supply required by a model 7501-16A is connected between the RU GEN (+) and the -48 V dc (-) pairs of the station cable of the Teleline shelf. These conductors are floating with respect to ground. The station ground terminal of the shelf must be connected to station ground to create a path for leakage currents. This connection in no way compromises the floating nature of the station batteries.
-

Danger

The "mA CO" jack on the module faceplate is connected to the CO side. If a ground potential rise should occur, the potential difference between station ground and cables and equipment connected to the CO jack can be very high.

Note

The OPX Card was factory calibrated prior to shipping, and the “mA EQUALIZE” trimpots should not be adjusted. The “mA STATION” and “mA CO” jacks are provided for monitoring purposes only.

1. Unpack the OPX Card from its protective box and shielded anti-static bag.
2. Confirm that the isolation unit is an OPX Card by identifying the name and model number on the faceplate of the card.
3. The card must be inserted rightside up and may be plugged into the shelf with the power ON or OFF.
 - ▶ Slide the card into its designated pre-wired shelf slot until the 2 card-edge connectors lock into the Teleline shelf and the retaining clip snaps into place.
4. Verify the installation by checking that you can make and receive calls.

6. Service and Support

Technical Customer Support

Positron is committed to providing excellent ongoing technical support to its customers. A team of specialists is always available at our Technical Support Center in Montreal for either telephone consultations or on-site visits, to assist Field Technical personnel in the maintenance and troubleshooting of Positron equipment. During normal business hours, (8:30 a.m to 5:00 p.m. EST), any one of our Technical Customer Support (TCS) staff may be reached by dialing 1-888-577-5254 from anywhere in the continental United States or from Canada. Customers outside North America should dial 1-514-345-2200. Staff may also be contacted via fax at 514-345-2271 or e-mail at powerdivision@positron.qc.ca.

Positron TCS staff are available to provide technical assistance and/or to supervise the installation of Positron equipment. Assistance in the planning, configuration, and implementation of the installation will be provided as requested. Arrangements and pricing information regarding field assistance may be obtained by contacting the Technical Customer Support department. Please contact Positron for scheduling at least four weeks prior to the actual requested visit date.

Customer Training

Positron offers full customer training courses, as requested. Seminars are also available on High Voltage Interface (HVI). For more information, contact a customer representative by dialing 1-888-577-5254 or use our e-mail address, powerdivision@positron.qc.ca.

Warranty

Positron warrants that all equipment shall perform in accordance with Positron's specifications. The warranty remains valid for 5 (five) years from the date of shipment. The warranty will be honored provided that the equipment has not been abused and provided that the equipment has been installed and used in accordance with Positron's installation instructions and specifications. The warranty fully covers workmanship, materials and labor.

This warranty is in lieu of all other warranties, whether expressed or implied, including warranties of merchantability and fitness for a particular purpose. Positron guarantees that all equipment shall perform in accordance with Positron's specifications. Positron disclaims any warranty that Positron

equipment will meet customer requirements beyond the product specification. Positron disclaims any warranty that operations will be uninterrupted or error free.

Repair Service

Positron Inc. offers repair services by which customers can count on timely and quality repairs, regardless of customer location.

All warranty repairs are performed at no cost. Positron reserves the right to repair or replace any equipment which has been found to be defective.

For information about out-of-warranty repairs, contact Positron's Repair department at 1-800-661-4911 (from anywhere in the continental United States or from Canada) or dial 514-345-2228. Due to the varied nature of repairs, no one time frame for turnaround can be guaranteed. However, average turnaround time is two weeks from date of receipt. In emergency situations, special arrangements can be made by contacting our Repair department. All repaired items are warranted for a period of 90 days. Bulk repairs (more than five items) will require additional processing time, therefore, please take this into consideration when requesting a Return Material Authorization (RMA) number.

Before returning any items to Positron for repair, warranty repair or replacement, call the Repair department to obtain an RMA number. Parts returned without RMA numbers cannot be accepted. The RMA number must always be clearly marked on all boxes and crates and on all shipping documents.

Items under warranty are to be shipped prepaid to Positron and will be returned prepaid to the customer. Items that are not under warranty are to be shipped prepaid to Positron and will be returned prepaid with freight charges included on the invoice. Positron cannot accept items shipped collect. A purchase order number is required for all repairs.

To accelerate the repair process, whenever possible, customers should include a report detailing the reason for return with the unit(s) being returned. 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 that the item(s) is properly packed to avoid further damage. Teleline Isolator cards should never be shipped while installed in a shelf; this will cause damage and will almost invariably extend the repair period.

Ordering Information

Positron's Teleline equipment can be ordered by telephone, facsimile, or by mail. All orders should be directed to the Positron Inside Sales department. Ordering by telephone, or facsimile will eliminate any delays arising from postal services. However, a hard copy purchase order is required as a confirmation. In addition to the model numbers of the items being ordered, the following information is required:

- Company name, contact name and telephone number
- Purchase order number
- "Ship To" address
- "Bill To" address
- Date required on site

All orders must be followed by a confirming order. Equipment will not be shipped until such confirmation is received.

For a list of our contact information, refer to Table 3.

Table 3 Positron Contact Information

| | |
|--|-------------------------------------|
| Address | Positron Inc. |
| | 5101 Buchan St. |
| | Montreal, Quebec, Canada |
| | H4P 2R9 |
| Main telephone number | 514-345-2200 |
| Customer Service department telephone number | 514-345-2200, 1-888-577-5254 |
| General e-mail address | powerdivision@positron.qc.ca |
| Customer Service department fax number | 514-345-2271 |
| TCS department toll-free number | 1-888-577-5254 |
| TCS department fax number | 514-345-2271 |
| TCS department e-mail address | scarbonaro@positron.qc.ca |
| Repair department telephone numbers | 514-345-2228 or 1-800-661-4911 |
| Customer representative e-mail address | customerservicepower@positron.qc.ca |

