Plug-in Power Supply Card
+24 V dc to -24 V dc, 751324

Description and Installation

POSITRON
Positron Inc.

DOCUMENT CONTROL INFORMATION

Document Part Number:	925-751324-001, Rev. 5
Project Level:	5
Publication Date:	February 11, 2003
Document ID:	o01jc000fm

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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 Power Supply Card

The Plug-in Power Supply Card, model 751324, is powered from a +24 V dc source and provides -24 V dc power to the Five-card Shelf, model 751112/1, or the Eight-card Shelf, model 751109. Since Teleline equipment cannot operate from +24 V, it requires -24 V referenced to ground. The card has a floating input, and does not ground the station batteries. It also offers the possibility of recharging the Plug-in Battery Backup Card, model 751312.

If the Plug-in Battery Backup Card is not used, then two Plug-in Power Supply Cards may be installed in the Five or Eight-card Teleline shelf for redundancy. Each card is capable of providing the power required by a fully loaded shelf. When two cards are available, the load is shared by the two cards. If one of them fails, the other one takes over the full load without interruption of power.

Note

With the two-card configuration, 2 to 5% more power is dissipated due to the reduced efficiency of the Power Supply Cards at lower loads. However, two cards will deliver more power to the load (27 V instead of 25 or 26 V).

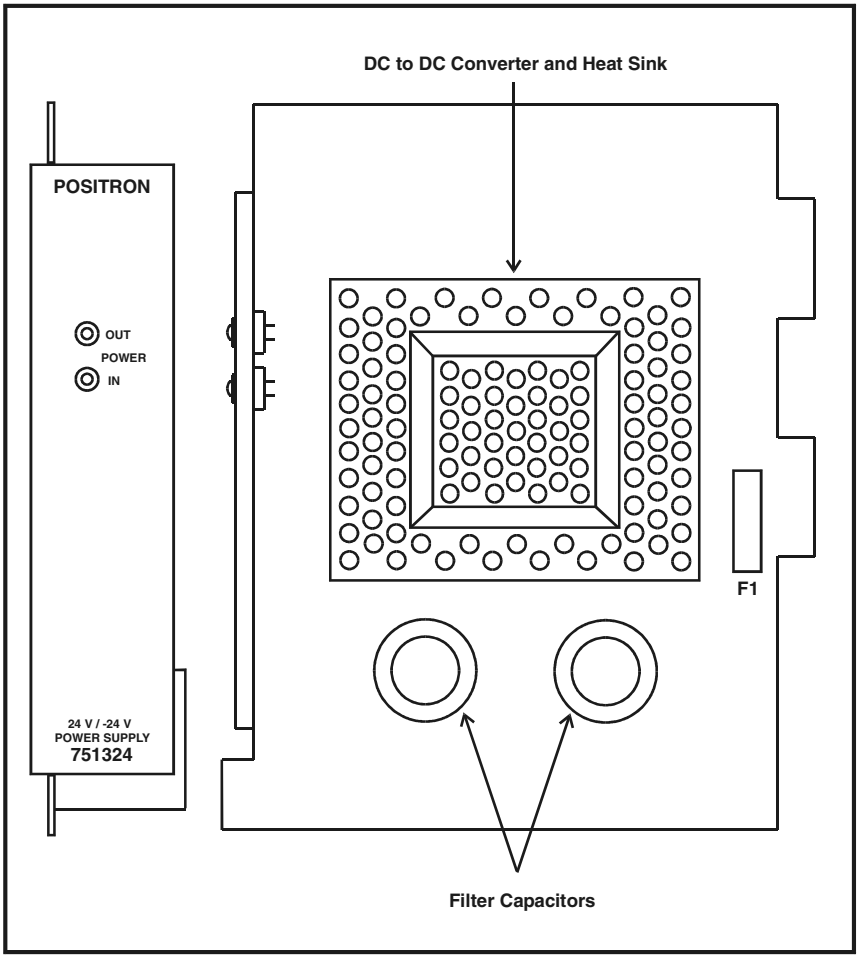
Its features include the following:

- The card is thermally protected. In case of overloading, the Power Supply Card will stop when too high a temperature is reached and will restart once it cools off.
- The card allows for redundancy if two are connected in the shelf. If one card fails, the other takes over the full load.
- The card can be used in conjunction with the Plug-in Battery Backup Card, model 751312, to provide an uninterruptible power supply when operating from a 24 V dc source that can be interrupted.
- A “Power In” LED and a “Power Out” LED allow easy assessment of power supply functionality.

For a view of the Plug-in Power Supply Card, refer to Figure 1.

2 +24 V dc to -24 V dc Plug-in Power Supply Card

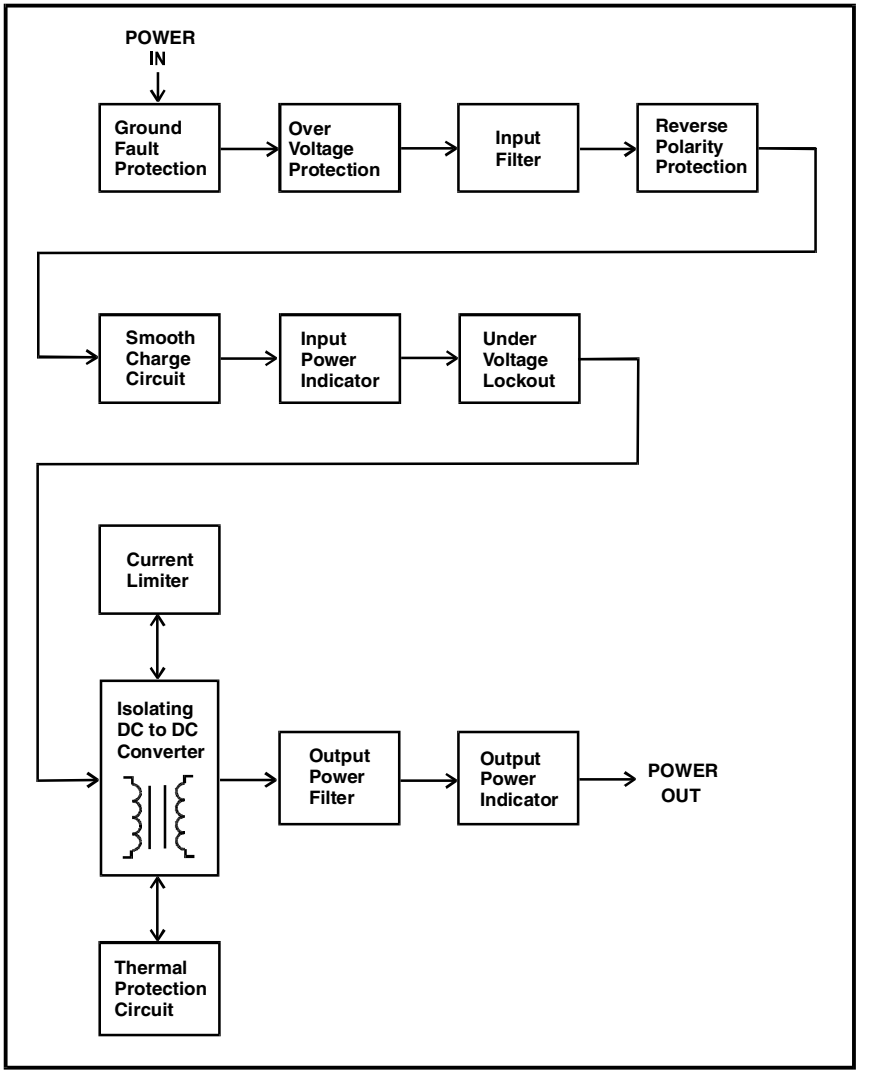
Figure 1 Model 751324 Component Layout



2. Hardware Description

For the card's block diagram, refer to Figure 2.

Figure 2 Block Diagram



The following is a description of the elements of the Plug-in Power Supply Card block diagram.

Power Input

The Power Input requirement for the Power Supply Card is 21 to 27 V dc, at 4 amps dc.

Ground Fault Protection

The Ground Fault Protection consists of fuse F1, and is designed to protect the power supply from severe station and Utility ground faults. Moreover, it protects floating input against common mode above 250 V rms using a varistor.

Over Voltage Protection

The Over Voltage Protection circuit is designed to blow the Five or Eight-card Shelf fuse (5 amp, fast blow) in the event of a sustained overvoltage condition of 32 ± 2. Under such condition, the circuit momentarily shorts the input power lines together, thereby blowing the shelf's fuse.

Input Filter

The Input Filter smooths out the power input and prevents common mode noise from the power supply's switching circuitry from being introduced onto the power lines.

Reverse Polarity Protection

The Reverse Polarity Protection consists of a diode in parallel with the input power. If the polarity is reversed, the diode will cause a short circuit and blow the input fuse to protect the power supply.

Smooth Charge Circuit

The Smooth Charge Circuit protects the DC to DC converter from the large and potentially damaging current surges arising from the charging of the power filter capacitors on power-up.

Input Power Indicator

The Input Power Indicator (green LED) illuminates upon the presence of the minimum required input voltage of 21 V dc.

For a view of the possible LED status indications, refer to Table 1.

Under Voltage Lockout

The Under Voltage Lockout circuit shuts off the DC to DC converter if the input voltage falls below 17 V dc. This is intended to extend the life of the converter.

Current Limiter

The Current Limiter (actually part of the DC to DC Converter) limits the output current to 2½ amps maximum.

Isolating DC to DC Converter

The Isolating DC to DC Converter converts a DC input of 21 to 27 V dc to 27 V dc ± 0.3 V dc, and also provides insulation between input and output up to 1500 Vrms.

Thermal Protection Circuit

The Thermal Protection Circuit shuts down the Power Supply Card when the heat sink temperature exceeds 167°F (75°C), and reactivates it when the temperature falls to 158°F (70°C). This prevents the DC to DC Converter from overheating.

Output Power Filter

The Output Power Filter reduces to an acceptable level any switching noise from the Power Supply Card.

Output Power Indicator

The Output Power Indicator (a yellow LED) illuminates at -20 V dc, indicating that output power is available.

For a view of the possible LED status indications, refer to Table 1.

Power Output

The Power Output of the card is 2½ amps at -27 V dc.

Table 1 LED Status Indications

Input LED (Green)	Output LED (Yellow)	Power Supply Card Status
On	On	Both input and output power are available (normal condition).
On	Off	Input power is present but output power is not available, the output LED circuitry is not functioning, or the output voltage has been short-circuited.
Off	On	Both input and output power are available, but the input LED circuitry requires servicing by Positron.
Off	Off	Input power is not present, or a Battery Backup Card, model 751312, is powering the shelf (in which case the indicator on the right-hand side of the shelf should be lit).

3. Technical Specifications

For a listing of the card's electrical specifications, refer to Table 2. For a listing of the card's physical specifications, refer to Table 3.

Table 2 Electrical Specifications (measured at 77°F or 25°C, 50% R.H.)

Parameter	Specifications
Input DC voltage	21 to 27 V dc
Output DC voltage	-28 V dc ± 3 V dc (factory set to -27 V dc)
Maximum output current	2.5 A at -27 V dc (-20°C to +65°C)
Maximum output power	68 Watt
Power dissipation	25% of power to load, or 20% of input power
Switching noise at 1A	Less than 0.2 V_{pp}
Efficiency	80%
Load regulation	Better than 1%
Line regulation	Better than 0.2%
Overvoltage protection	32 V dc ± 2 V dc.
Thermal shutdown	167°F (75°C)
Input/Output	1.5 KV

Table 3 Physical Specifications

Parameter	Specifications
Operating temperature range	-4°F to +149°F (-20°C to +65°C)
Height	6.375" (16.1925 cm)
Width	1.5" (3.81 cm)
Depth	8.0" (20.32 cm)
Weight	2.17 lbs (0.984 kg)

4. Installation

The Plug-in Power Supply Card plugs into its upper left hand location on the Five-card Shelf, model 751112/1, or the Eight-card Shelf, model 751109/1, 751109/13 & 751109/13F.

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.

Table 4 Model 751324 Kit Contents

Items Included	Part Number
5A Fuse	248-990000-010
Instruction Sheet	924-010421-001
Label	612-010132-001R1
Bag	221-990000-003

1. Unpack the Plug-in Power Supply Card from its protective box and the shielded anti-static bag.
2. Confirm that the unit is a Power Supply Card by identifying the name and model number on the faceplate of the card.

3. Install the five or eight-card Teleline shelf power cable as per its installation instructions. Refer to the Description and Installation documentation for the Five-card Shelf, model 751112/1, part number 924-010199-001 or Eight-card Shelf, model 751109/13, part number 924-010040-001, respectively.

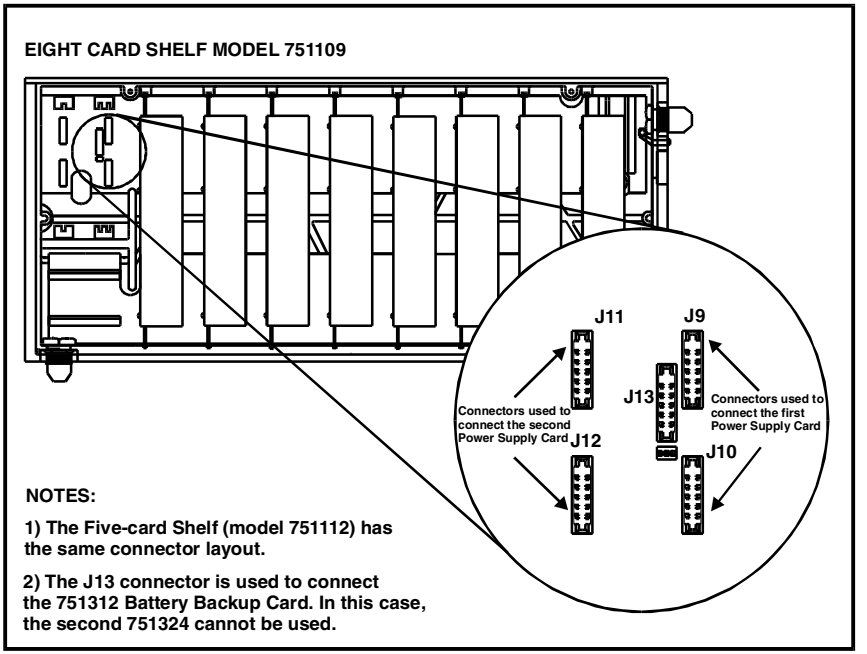
4. Replace the 2A fuse located on the side of the shelf which is provided with the 751324 power supply card (new fuse is 5A).

5. Apply the label provided with the 751324 power supply card above the fuse holder.

6. 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 shelf slot until the two card-edge connectors lock into the Teleline shelf. For an illustration of its installation location, refer to Figure 3.

Figure 3 Model 751324 Installation Location



7. Choose an installation option for the Power Supply Card. For a list of options, refer to Table 5.

Table 5 Installation Options

Option	Station Side Slot Connectors
Single: one Power Supply Card	J9/J10
Redundant: two Power Supply Cards *	J9/J10 (primary card) and J11/J12 (second card)
* Only possible if the Plug-in Battery Backup Card, model 751312, is not used.	

- If the redundant option is required, repeat step 6 and install the second Power Supply Card.

8. Verify the installation by verifying that the “Power In” and the “Power Out” LEDs of the card, and the “Power Out” LED of the shelf are all lit.

- If not, verify the polarity of the +24 V input with the Eight-card Shelf Description and Installation document, model 751109/13, part number 924-010199-001 or the Five-card Shelf Description and Installation document, model 751112/1, part number 924-010040-001, respectively.

5. 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 five (5) 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 6.

Table 6 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