

Installation and Operations Manual

PR96e



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DESCRIPTION

The PR96e is a compact power unit designed to service ISDN CPE. The unit comes equipped with a 250 Watt power supply and has space available for 48 NT1-230s. Distribution for the unit is provided by ten, 25 pair Amphenol connectors located on the left side of the unit.

The right side of the unit has the power cord, fuse for an internal battery pack, two external battery connectors, and access to the remote alarm connections. (See Appendix A.1)

The ten Amphenol connectors on the left side of the unit provide both input and output connections. Two of the connectors provide the U interface connections for the 48 NT1's located in the cage area. The other eight connectors provide 4 pair S/T connections for the terminals of the NT1's. (See Appendix A.2)

Power for the terminals is provided on the eight output connectors. Each terminal power pair is protected by a solid state re-settable over current device (PTC). Power for the NT1's is provided in groups of 6. Each group of six is protected using the same PTC device.

TECHNICAL SPECIFICATIONS

Electrical Specifications

Input

Voltage	120 +10/-15% VAC
Frequency	50-60 Hz

Output

Voltage	42 -56 VDC
Current	4.5 Amps DC

Mechanical Dimensions

Width	19.00 in
Depth	8.25 in
Height	19.25 in
Weight	49lb

Environmental

Temperature

Operating	0 C to 40 C
Storage	-20 C to +50 C
Thermal	350 BTU/Hr

<u>Humidity</u>	0-95% non-condensing
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SAFETY INFORMATION

Always insure that the person assigned to the job can perform the job safely.

Always lift all equipment properly.

Always disconnect commercial power and remove the battery fuse before working on the unit.

Always replace the batteries with batteries of the same type and style.

DO NOT work on this equipment during an electrical storm

DO NOT work on locations where there is condensing moisture or standing water.

INSTALLATION INSTRUCTIONS

GENERAL

The installation section of this manual will provide all the necessary information for room requirements, proper inspection, and installation; as well as instructions on checking and bringing the PR96e on line for use.

Inspection

The equipment has been fully tested and inspected prior to shipment. Although the unit has been packed in accordance with good commercial practices, it does not preclude damage in transit.

The following actions should be taken on receipt of the equipment:

- Visually inspect the shipping container for damage. If damaged, request that the carrier inspect the shipment.
- Unpack the inner container from the shipping container and remove the unit from the packaging. Inspect the unit for visible damage.

If a claim for damages is to be made, it should be filed promptly with the transportation company. In addition, notify SEI Corporation within two days of delivery. SEI Corporation will advise the customer of any further procedures that may be required, including an RMA number in the event that the unit has to be returned to the factory for repair.

Make sure the following items are included inside the package:

- One PR96e Power Supply Unit.
- One AC Power Cord.
- One warranty card.
- One Installation and Operations Manual.
- Mounting Instructions.

Electrical Power Requirements

All units are shipped from the factory for use with 115 VAC. In the event that operations at 230 VAC is required please notify the factory.

Each unit requires a separate NEMA 5-15R receptacle with a maximum of two units per 15 amp service.

A standard 7 foot 6 inch power cord with a molded NEMA 5-15 plug is supplied with each unit.

AC Input

AC power is applied via the IEC receptacle located on the right hand side of the chassis using the power cord supplied. (See Appendix A.1)

DC Output

The DC distribution to the terminals is achieved through the 25 pair Amphenol S/T connectors located on the left of the unit. (See Appendix A.2 and B.2)

Load Specifications

The PR96 series will handle phones in both point to point configurations and in multipoint configurations. In point to point configurations, telephones greater than three watts off-hook load may be used.

In multipoint configurations it is not recommended to use 970, 65XX, 75XX or equivalent telephones.

Remote Alarm Contacts

The PR96e includes external alarm contacts to provide the ability to remotely monitor the status of the unit. These alarms will indicate either an AC Fail or a Battery Test Fail condition. Both normally open and normally closed contacts are provided to suite the user's external monitoring circuitry. The alarm contacts have a 2 Amp rating. The NO and NC contacts will change state when an alarm condition occurs. The connector state pin-outs are printed on the System Controller Card.

Alarm Access and Connection

The alarm connectors are located on the front edge of the System Controller Card. To access these connectors, remove the front panel, remove the square plastic plug, located on the right side panel (Figure 1). A 1/2in rubber grommet (not supplied) may be inserted into the opening to prevent chafing of the wire insulation. The user-supplied wire is fed through this opening to the alarm connectors (Figure 2). The ends of the wires should be stripped back 1/8in, and inserted into the metal contacts. A small screwdriver is needed to tighten the contacts against the inserted wires.

Local Alarms And LED Indicators

There are two LED indicators on the front of the unit; Battery Charge Status and Battery Test Status. The functions of these indicators are as follows:

Battery Charge Status: Constant Green – Fully Charged Flashing Green – Charging Constant Red – On Battery Fast Flash Red- Adjust supply	Manual Battery Test Switch –Push to Test
Battery Test Status: Constant Green – Battery Good Fast Flash Red – Wait, Then Test Slow Flash Red – Replace Battery	<i>NOTE:</i> The Manual Battery Test switch is disabled when the battery is charging. Also, to prevent unnecessary battery discharge, the Manual Battery Test is disabled for 5 minutes following a Battery Test. In both cases, the <i>Wait, Then Test</i> indication is displayed.

Mounting Instructions

- When mounting the PR96e, keep in mind the weight of the unit is 49lb.
- The PR96e is designed to mount to a rack or wall without further requirements for additional mounting kits. For wall mounting a user supplied 3/4in plywood backboard or equivalent is required. PR96e should be fastened to the backboard using number ten wood screws for each unit. A number 27 drill bit should be used to provide a pilot hole for the screws. All of the screws should be tightened with a torque of 30in/lb minimum and 34 in/lb maximum.
- Whether the unit is to be rack or wall mounted it should be mounted vertically in a clean dry area where the ambient temperature does not exceed 40°C (104° F)
- It is important that ventilation for the unit be provided. Leave adequate space above and below the unit so that unrestricted airflow is allowed to the unit. It is suggested that 5 inches of space be allocated around the top of the unit.

- The PR96e is supplied with mounting angles suitable for 19" standard, racks or wall mounting. Optional 23" angles for wider racks are available.
- The mounting slots on each rack adapter are spaced in conformance with EIA standard RS-310-B

START UP AND CHECKOUT

Initial Start Up and Checkout

When the unit is shipped from the factory, the PR96e is configured for 115 VAC operation. If operation at 230 VAC is required, please notify the factory.

AC Power Checkout

Check out the following before plugging in the unit:

- Make sure that the unit(s) are being plugged into their own circuit breakers. Make sure that there are no other loads on these breakers.
- With the breaker in the on position measure the utility voltage at the service outlet; the voltage should be between 92 to 132 volts.

Power Up Procedure

- Once the unit is mounted, attach the first "S/T" connector to the 25 pair connectors on the left side of the unit. It is suggested that telco connectors are 25 pair male cables be used with the termination end readied for either punch down or terminal connection.
- Connect the "U" input connectors, which provide the signal to the NT1's. Each input distributes the signal to 24 NT1's, (Racks labeled 1 - 24 and 25- 48)
- The "S/T" output connectors provide six 4-pair outputs to the terminal punchdown block. Each 4 pair includes power and signal. (See wiring diagram Appendix B.1 and B.2) where multi-point is required, the 4 pair must be bridged.
- Connect to the output cable to the terminals.

- Once the cabling is completed, install the first group of NT1's in their appropriate slots, making sure that the pin connection is made at the rear of the unit.

Connect the power cord and supply power to the unit. You should have a solid green Battery Test Status led, and a flashing green Battery Charge Status led indication on the front of the unit. If any problems arise, consult the troubleshooting guide in the installation manual.

- Connect the remaining "U" input cable.
- Connect the "S/T" output cable for terminal group 2.
- Connect the "S/T" output cable for terminal group 3.
- Connect the "S/T" output cable for terminal group 4.
- Connect the "S/T" output cable for terminal group 5.
- Connect the "S/T" output cable for terminal group 6.
- Connect the "S/T" output cable for terminal group 7.
- Connect the "S/T" output cable for terminal group 8.
- Install the remaining NT1's

DC Power Checkout

Select a pair of power wires on the output connector and verify that the output voltage is present. (see Figure xxx for pin-outs)

If all of the above checks are completed and if the results obtained are satisfactory, then the system is ready to be connected to operational loads.

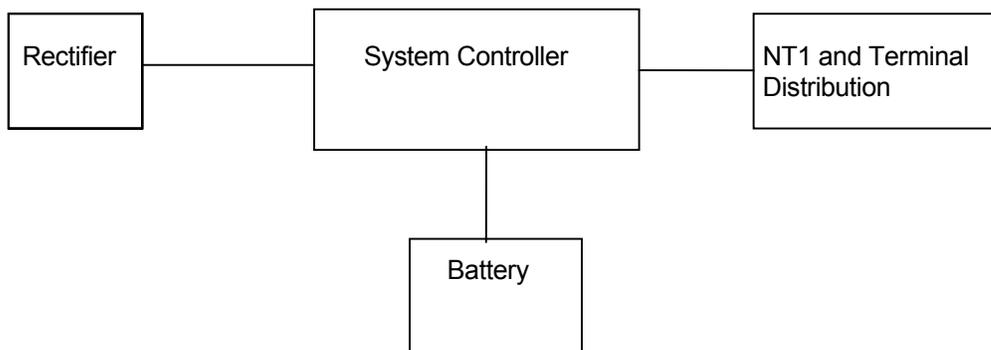
THEORY OF OPERATION

Theory of Operation

The following will provide you with an outline of operations of the system.

The following is a list of the modules found in the PR96e

- Rectifier
- System Controller Card
- Battery Modules
- Backplane and Distribution
- NT1 Card Cage
- Distribution and Connectors



Functional Block Diagram PR96e

Figure 2

Rectifier

The PR96e rectifier provides up to 250 watts of power for the NT1s and terminals. AC Power is applied to the unit on the left side, and is input through the chassis IEC connector. From there it is taken to the input of the rectifiers. A fuse located at the left side of each rectifier protects their input. The output of the rectifier is located on the right side of the unit and is distributed to the racking below through a 3-pin power cable.

System Controller

The System Controller has the following functions:

- Distribution of the DC power
- Local and Remote Alarms
- Low Voltage Disconnect Function
- Automatic and manual battery test
- Battery charge and test status indicators

DC Power Distribution

The System Controller, which is mounted inside of the unit, takes power from the rectifier and distributes it to the battery modules, distribution board, and racking.

Local Alarms And LED Indicators

There are two led indicators front of the unit, Battery Charge Status and Battery Test Status. The functions of these indicators are as follows:

<p>Battery Charge Status: Constant Green – Fully Charged Flashing Green – Charging Constant Red – On Battery Fast Flash Red- Adjust supply</p> <p>Battery Test Status: Constant Green – Battery Good Fast Flash Red – Wait, Then Test Slow Flash Red – Replace Battery</p>	<p>Manual Battery Test Switch –Push to Test</p> <p><i>NOTE:</i> The Manual Battery Test switch is disabled when the battery is charging. Also, to prevent unnecessary battery discharge, the Manual Battery Test is disabled for 5 minutes following a Battery Test. In both cases, the <i>Wait, Then Test</i> indication is displayed.</p>
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Low Voltage Disconnect Function

The low voltage disconnect function will disconnect the battery when the voltage drops below a preset limit (42.0V). This is done to prevent deep discharge of the batteries which can adversely affect battery life. Both internal and external batteries are disconnected.

NT1 Card Cage

The NT1 card cage will hold 48 NT1-230's . Power and signal get to the NT1 via connectors mounted at the rear of the card cage.

Distribution and Connectors

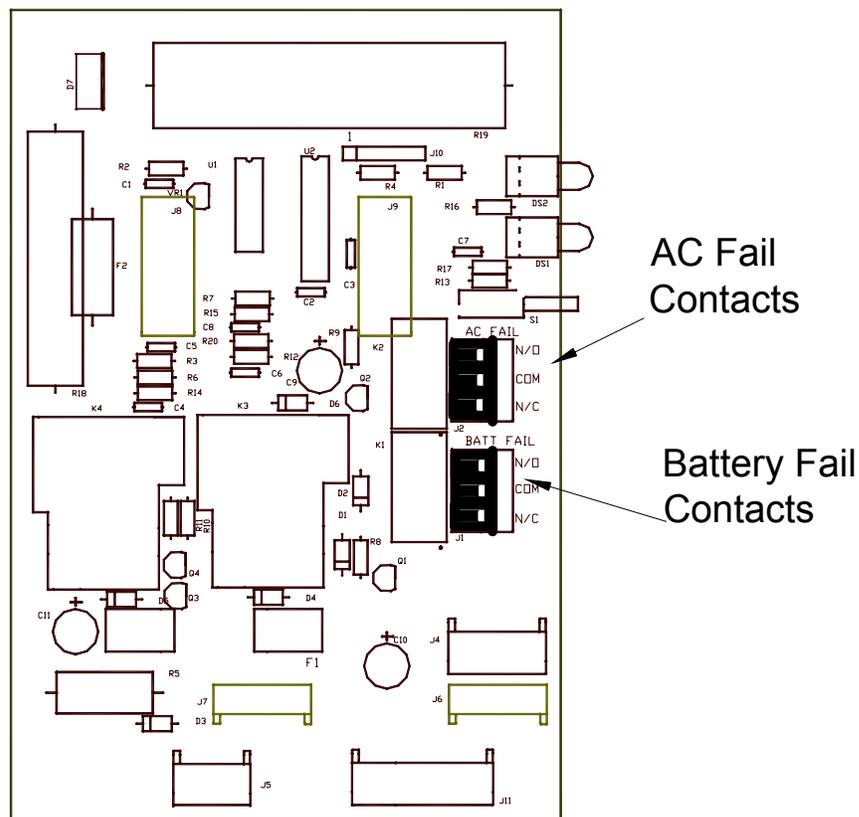
- All telco signals enter through a standard 25 pair Amphenol connectors at the "U" interface. These connectors are located on the left side of the PR96e. Mating to this interface requires a 25 pair male connector on the cable.
- Power from the terminal is provided on 8 output connectors. Each terminal power pair is protected by a solid state over-current PTC
- AC power enters through a standard IEC connector. This connector is located on the left side wall, and plugs into the PoweRack300e from the left. The mating connector should be an IEC female connector three-conductor power cord.
- External Batteries are connected through a two pin locking connector. Two of these connectors are located on the right side wall. The mating cable should have male pins inside of a male housing.
- External Alarm connection access is provided through an opening in the side panel.

Remote Alarm Contacts

The PR96e includes external alarm contacts to provide the ability to remotely monitor the status of the unit. These alarms will indicate either an AC Fail or a Battery Test Fail condition. Both normally open and normally closed contacts are provided to suite the user's external monitoring circuitry. The alarm contacts have a 2 Amp rating. The NO and NC contacts will change state when an alarm condition occurs. The connector state pin-outs are printed on the System Controller Card.

Alarm Access and Connection

The alarm connectors are located on the front edge of the System Controller Card. To access these connectors, remove the front panel, remove the square plastic connector, located on the right side panel (Figure 1). A 1/2in rubber grommet (not supplied) may be inserted into the opening to prevent chafing of the wire insulation. The user supplied wire is fed through this opening to the alarm connectors (Figure 2). The ends of the wires should be stripped back 1/8in, and inserted into the metal contacts. A small screwdriver is needed to tighten the contacts against the inserted wires.



Backplane Distribution

The power distribution is incorporated into the backplane for the NT1 cage. Every 6 NT1's are protected by a solid state over-current device (PTC) rated at 1 Amp. When the PTC has too much current flowing the device heats up and goes to a large resistance. To reset the device you need to remove all current flow from that group.

NT1 Card Cage

The NT1 card cage will hold 48 NT1's. Power and signal get to the NT1 via a connector mounted on the backplane.

Repair and Maintenance

The PR96e is an integrated telecommunications power supply with NT1 card cage. This unit has been designed to operate unattended and with a low maintenance overhead for extended periods of time. Although the electronics within the PR96e require no routine maintenance, system voltage should be maintained within set limits to ensure maximum life of the battery pack. It is recommended therefore that this should be checked at least on a yearly basis and reset as necessary.

Tools and Test Equipment

No special tools other than those normally contained in an electronic technicians toolkit are required to service the PR96e. To check the system voltage and reset as necessary, it is recommended that a quality digital voltmeter (DVM) be used.

Rectifier - Output Voltage Adjustment

It is essential that the final output voltage adjustment should only be done with a fully charged battery. Ensure that all battery packs, both internal and external are properly connected. Do not perform power supply adjustment if there has been a recent power failure or if the Battery Charge Status led is flashing. The rectifier should only be adjusted with the nominal system load connected.

Adjustment Procedure

Connect a DVM to one of the external battery connectors. Measure the voltage; it should be between 54.0 and 55.5 volts. If the measured voltage is outside of this range, perform the following steps:

- Loosen the front panel mounting screws and remove the front panel.
- Locate the blue potentiometer in the center of the right edge of the rectifier.
- While monitoring the voltage at the external battery connector, adjust the potentiometer to achieve a reading of 54.8VDC.
- Replace the front panel and re-tighten the mounting screws

TROUBLESHOOTING

Troubleshooting

The attached instructions will help you determine the problem and correctly devise the solution to the most common problems found.

QUESTION - I have just installed the system. All lines are hooked up. However I have **no Indicators on the front panel**.

ANSWER - You will need to check the following:

- a. Check the power cord on the right side of the unit. Make sure that it is plugged in all the way into the mating connector.
- b. Check the power cord at the wall service outlet. Make sure it is plugged in all of the way.
- c. Go to the circuit breaker box and check that the circuit breaker is on.
- d. Using your volt meter, check the voltage at the wall service outlet. This voltage should be between 92 and 132 volts AC.

QUESTION - I have just installed the system. All of the lines are hooked up. I have front panel indicators. However the **NT1's do not light up**.

ANSWER - You will need to check the following:

- a. Make sure that all of the NT1's are installed into the cage securely.

QUESTION - I have just installed the system. All of the lines are hooked up. I have front panel indicators. **All NT1's show power indication except for one group of 6, numbers 25 to 30.**

ANSWER - You will need to check the following:

- a. Disconnect the terminals for lines 25 through 30.
- b. Unplug the NT1's 25 through 30. Inspect the connectors for shorted pins. (These would be pins which are bent over so two adjoining pins touch.)
- c. Reinsert the NT1's. If power indications are not on, unplug plug and swap with working NT1.

d. NT1 power indicator is on. Reconnect one terminal at a time. When power is lost to group of NT1's remove last terminal connected and check for a short on the TX and RX pairs, (PST power).

QUESTION - I have just installed the system. All of the lines are hooked up. I have front panel indicators. All NT1's show power indication. **NT1 32 shows terminal error.**

ANSWER - You will need to check the following:

- a. Swap with a working NT1.
- b. Is there a cable in the output connector for terminal 32.
- c. At the cross connect is there a terminal wired to terminal 32.
- d. At the user location is there a terminal in the terminal 32 position.
- e. Is there a short on terminal 32 power (check both PS1 and PS2).

QUESTION - I have just installed the system. All of the lines are hooked up. I have front panel indicators. All NT1's show power indication. **NT1 27 shows line error.**

ANSWER - You need to check the following:

- a. Swap with a working NT1.
- b. Check to see if there is a cable on the input connector for line 27.
- c. Check at cross-connect for line 27.

QUESTION - The system has been up and running. Everything was working fine. We just had a power outage. And the **system crashed after several hours**. The lights came back on in ten minutes.

ANSWER - You need to check the following:

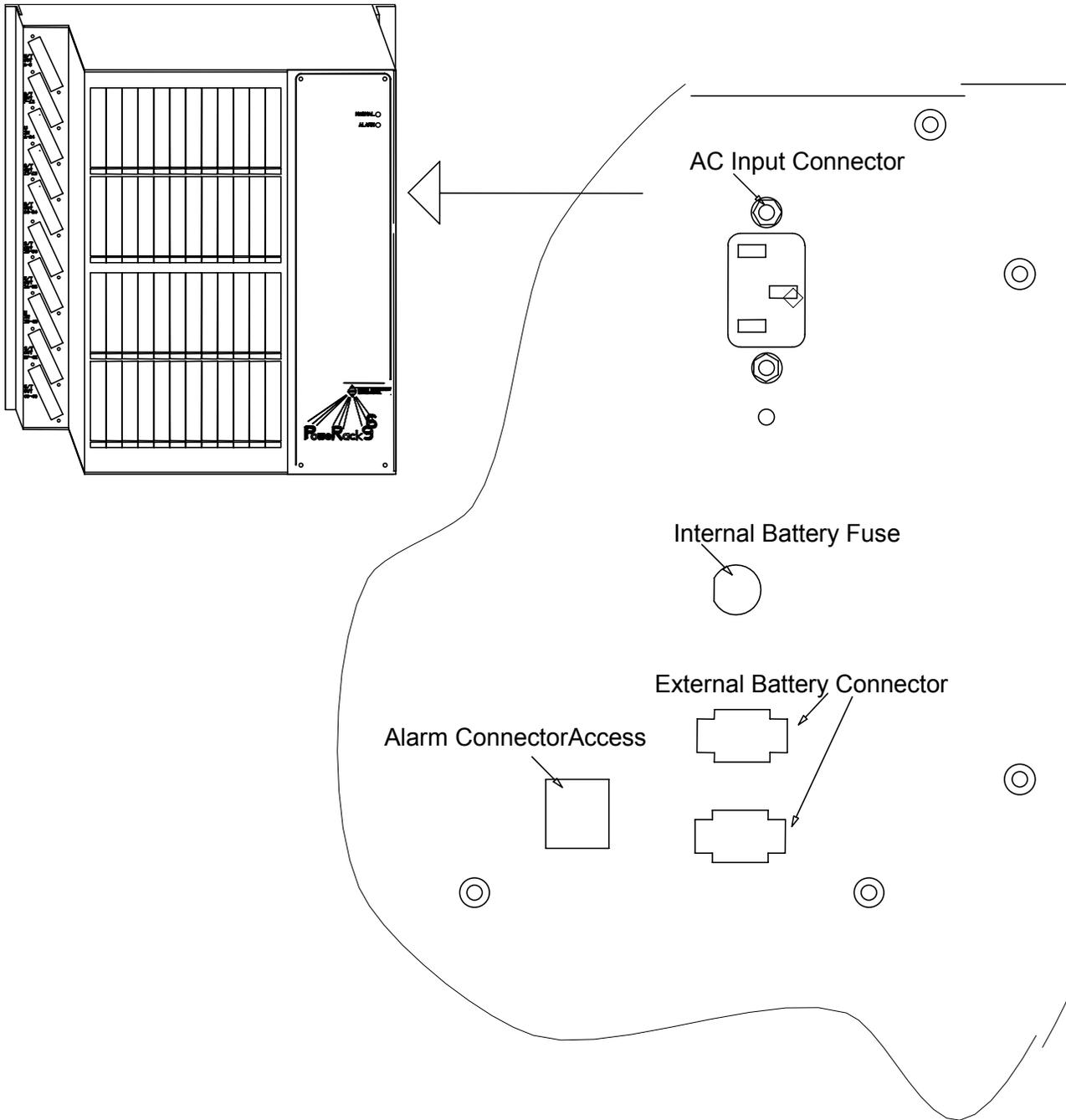
- a. Check the circuit breaker for the unit and see if it has tripped.
- b. Check front panel indicators. The green indicator should be on.
- c. With a volt meter check the voltage at the external battery connector. You should have 55.2 to 55.5 volts DC.

QUESTION - The system has been up and running. Everything was working fine. We just had a power outage, and the **system crashed**. We had a power outage last week, and at that time the system worked fine.

ANSWER - You need to check the following:

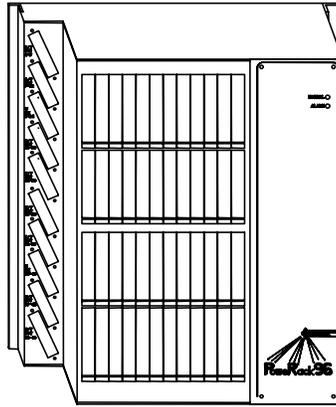
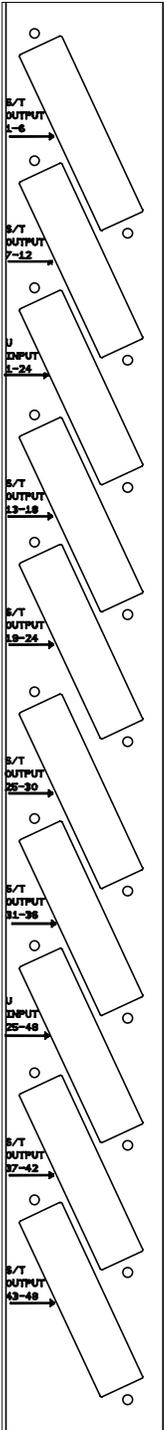
- a. Check the circuit breaker for the unit and see if it has tripped.
- b. Check front panel indicators. The green indicator should be on.
- c. With a volt meter check the voltage at the external battery connector. You should have 55.2 to 55.5 volts DC.
- d. Remove the fuse from the right side of the unit and check to see if it has blown.

If you have a specific question not addressed in this manual please call 1-800-765-4SEI and ask for technical support.



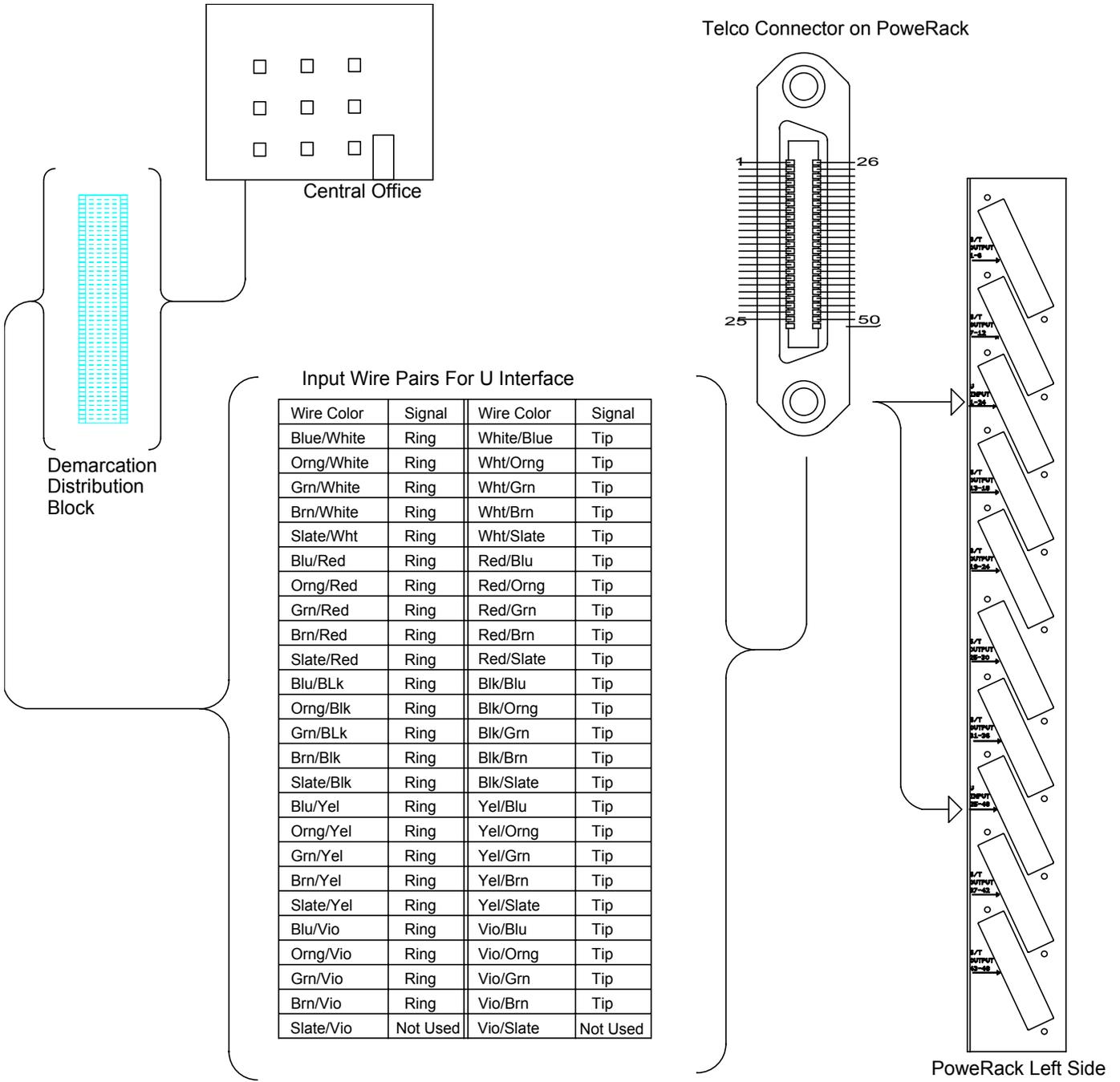
Right Side of PR96e

Appendix A.1



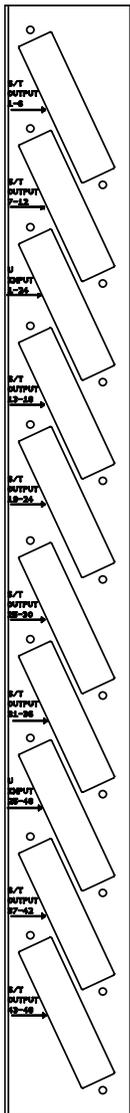
Left Side of PR96

Appendix A.2



U Interface Input Connections

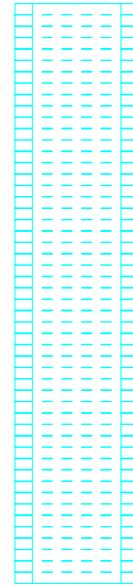
Appendix B.1



PowerRack Left Side

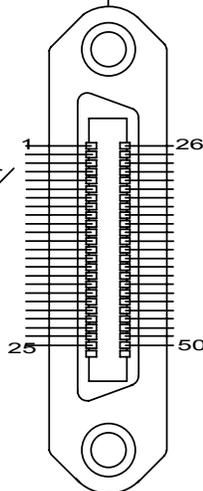
Wire Color	Signal	Wire Color	Signal
Blue/White	TX+	White/Blue	TX-
Orng/White	Spare	Wht/Orng	Spare
Grn/White	RX-	Wht/Grn	RX+
Brn/White	Gnd	Wht/Brn	-48
Slate/Wht	TX+	Wht/Slate	TX-
Blu/Red	Spare	Red/Blu	Spare
Orng/Red	RX-	Red/Orng	RX+
Grn/Red	Gnd	Red/Grn	-48
Brn/Red	TX+	Red/Brn	TX-
Slate/Red	Spare	Red/Slate	Spare
Blu/BLk	RX-	Blk/Blu	RX+
Orng/Blk	Gnd	Blk/Orng	-48
Grn/BLk	TX+	Blk/Grn	TX-
Brn/Blk	Spare	Blk/Brn	Spare
Slate/Blk	RX-	Blk/Slate	RX+
Blu/Yel	Gnd	Yel/Blu	-48
Orng/Yel	TX+	Yel/Orng	TX-
Grn/Yel	Spare	Yel/Grn	Spare
Brn/Yel	RX-	Yel/Brn	RX+
Slate/Yel	Gnd	Yel/Slate	-48
Blu/Vio	TX+	Vio/Blu	TX-
Orng/Vio	Spare	Vio/Orng	Spare
Grn/Vio	RX-	Vio/Grn	RX+
Brn/Vio	Gnd	Vio/Brn	-48
Slate/Vio	Unused	Vio/Slate	Unused

Output Cable
Telcom Connector
4 Pair Arrangement

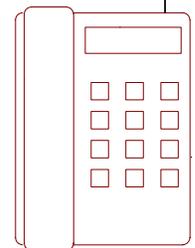


Distribution Block

Wire Color	Signal	Wire Color	Signal
Blue/White	TX+	White/Blue	TX-
Orng/White	Spare	Wht/Orng	Spare
Grn/White	RX-	Wht/Grn	RX+
Brn/White	Gnd	Wht/Brn	-48



Telcom Connector



S/T Interface Output Connections

Appendix B.2