

# 5 OmniSwitch Power Supplies

AC and DC power supplies are available for all OmniSwitch chassis. Except for the Omni-3wx, you can install and remove these supplies. Descriptions of the power supplies begin on page 5-2. See Chapter 4, “The OmniSwitch Chassis,” for more information on OmniSwitch chassis.

## ***Redundant Power Supplies***

OmniSwitch power supplies can support a fully configured unit. When operating with two power supplies, load sharing is automatic. In the event of failure on one of the supplies, the redundant power supply is capable of powering the OmniSwitch without any loss of data. If power to one supply fails, the switch will automatically notify the network manager and keep running with no loss of data.

## ***Hot-Swappable Power Supplies***

Power supplies can be removed and inserted while the unit is operational. You can add or replace a power supply at any time.

## ***Dual AC Inputs***

Each AC power supply has its own power cord. If dual power supplies are installed a loss of power due to a circuit breaker on one power supply will not affect the other power supply.

# Omni-3wx Power Supplies

The Omni-3wx uses a built-in AC or DC power supply that has a capacity of 25 Amps at 5 volts and 2 amps at 12 volts for 150 Watts of output power. The Omni-3wx may also be connected to a Backup Power Supply (BPS) to provide power redundancy. A power connector is provided on the back of the Omni-3wx that connects to a BPS.

The Omni-3wx chassis is available in the following AC and DC version.

- Omni-3wx

The standard Omni-3wx with an AC power supply. It has a capacity of 25 Amps and can provide 150 Watts of power at 5 Volts.
- Omni-3wx-48V

A -48 volt (input voltage) DC version of the Omni-3wx. This power supply has a capacity of 25 Amps and can provide 150 Watts of power at 5 Volts. It requires the use of 18 to 20 gauge wire for connections to the DC power source.

◆ **Caution** ◆

Do not connect the power connector on the back of the Omni-3wx to data communication equipment.

◆ **VORSICHT** ◆

NICHT MIT DATEN-KOMMUNIKATIONSGERATEN  
VERBINDEN.

See *Backup Power System (BPS)* on page 5-27 for more information on the BPS.

Omni-3wx Power Supply Specifications	
Voltage Range	90-265 VAC, 47 to 63 Hz auto-ranging and auto-sensing.
Current Draw	3.5 Amps at 100/115 VAC 1.5Amps at 230 VAC
Watts (Output)	150
Current Provided	25 Amps at +5 Volts; 2 amps at +12 Volts
Heat Generation	approximately 512 BTUs per hour
Agency Listings	See Chapter 4, “The OmniSwitch Chassis,” for agency listings.

## Omni-5 Power Supplies

The Omni-5 provides bays for two power supplies. The power supplies are self-enclosed to allow safe hot-insertion and hot-removal. When two power supplies are installed, they share the electrical load. If one should fail, the remaining power supply automatically takes up the load without any disruption to the operation.

### ◆ Caution ◆

This unit may be equipped with two power connections. To reduce the risk of electrical shock, disconnect both power connections before servicing the unit.

### ◆ VORSICHT ◆

Das Gerät kann mit zwei Netzanschlüssen ausgestattet sein. Um einen elektrischen Schlag zu vermeiden, immer beide Anschlüsse vor der Wartung vom Netz trennen.

The Omni-5 may use one of two types of power supplies.

- PS5                      The standard power supply. It has a capacity of 25 Amps and provides 150 Watts of power at 5 Volts.
- PS5-DC48            A -48 volt (input voltage) DC version of the PS5 power supply. This power supply has a capacity of 25 Amps and can provide 150 Watts of power. It requires the use of 18 to 20 gauge wire for connections to the DC power source.

Neither one of these power supplies can be used in an Omni-5e chassis.

Some combinations of switching modules (those that include CDDI and Fast Ethernet modules) may exceed the power provided by one Omni-5 power supply. Use the amp figure for your modules (in the tables beginning on page 5-15) to determine the type and number of modules your 5-slot chassis will power. See *Power Requirements* on page 5-12 for further information.

Omni-5 PS5 and PS5-DC-48 Specifications	
Current Draw	3.5 Amps at 100/115 VAC 1.5 Amps at 230 VAC
Watts (Output)	150
Current Provided	25 Amps at 5 Volts
Heat Generation	approximately 512 BTUs per hour (one power supply)
Agency Listings	See Chapter 4, "The OmniSwitch Chassis," for agency listings.

## Omni-5e Power Supplies

The Omni-5e provides bays for two power supplies. The power supplies are self-enclosed to allow safe hot-insertion and hot-removal. When two power supplies are installed, they share the electrical load. If one should fail, the remaining power supply automatically takes up the load without any disruption to the operation.

### ◆ Caution ◆

This unit may be equipped with two power connections. To reduce the risk of electrical shock, disconnect both power connections before servicing the unit.

### ◆ VORSICHT ◆

Das Gerät kann mit zwei Netzanschlüssen ausgestattet sein. Um einen elektrischen Schlag zu vermeiden, immer beide Anschlüsse vor der Wartung vom Netz trennen.

The Omni-5e can use one of two types of power supplies.

**PS5-250**      The standard power supply. It has a capacity of 45 Amps and provides 250 Watts of power at 5 Volts. It can support any possible combination of frame switching modules.

**PS5-DC250**      A -48 volt (input voltage) DC version of the PS5-250 power supply. This power supply has a capacity of 45 Amps and can provide 250 Watts of power. It requires the use of 12 to 14 gauge wire for connections to the DC power source. See *Connecting a DC Power Source* on page 5-20 for more information.

Omni-5e PS5-250 and PS5-DC250 Technical Specifications	
Voltage Range	90-265 VAC, 47 to 63 Hz auto-ranging and auto-sensing.
Current Draw	4 Amps at 100/115 VAC 2 Amps at 230 VAC
Watts (Output)	250
Current Provided	45 Amps at 5 Volts 2 Amps at 12 Volts 5.1 Amps at 1.2 Volts 3 Amps at 3.3 Volts
Heat Generation	approximately 853 BTUs per hour (one power supply)
Agency Listings	See Chapter 4, "The OmniSwitch Chassis," for agency listings.

## Omni-5x Power Supplies

The Omni-5x provides bays for two power supplies. The power supplies are self-enclosed to allow safe hot-insertion and hot-removal. When two power supplies are installed, they share the electrical load. If one should fail, the remaining power supply automatically takes up the load without any disruption to operation.

### ◆ Caution ◆

This unit may be equipped with two power connections. To reduce the risk of electrical shock, disconnect both power connections before servicing the unit.

### ◆ VORSICHT ◆

Das Gerät kann mit zwei Netzanschlüssen ausgestattet sein. Um einen elektrischen Schlag zu vermeiden, immer beide Anschlüsse vor der Wartung vom Netz trennen.

The Omni-5x can use one of two types of power supplies.

**PS5-250** The standard power supply. It has a capacity of 45 Amps and provides 250 Watts of power at 5 Volts. It can support any possible combination of switching modules.

**PS5-DC250** A -48 volt (input voltage) DC version of the PS5-250 power supply. This power supply has a capacity of 45 Amps and can provide 250 Watts of power. It requires the use of 12 to 14 gauge wire for connections to the DC power source. See *Connecting a DC Power Source* on page 5-20 for more information.

Omni-5x PS5-250 and PS5-DC250 Specifications	
Voltage Range	90-265 VAC, 47 to 63 Hz auto-ranging and auto-sensing.
Current Draw	4 Amps at 100/115 VAC 2 Amps at 230 VAC
Watts (Output)	250
Current Provided	45 Amps at 5 Volts 2 Amps at 12 Volts 5.1 Amps at 1.2 Volts 3 Amps at 3.3 Volts
Heat Generation	approximately 853 BTUs per hour (one power supply)
Agency Listings	See Chapter 4, "The OmniSwitch Chassis," for agency listings.

# Omni-5wx Power Supplies

The Omni-5wx provides bays for two power supplies. The power supplies are self-enclosed to allow safe hot-insertion and hot-removal. When two power supplies are installed, they share the electrical load. If one should fail, the remaining power supply automatically takes up the load without any disruption to the operation.

◆ **Caution** ◆

This unit may be equipped with two power connections. To reduce the risk of electrical shock, disconnect both power connections before servicing the unit.

◆ **VORSICHT** ◆

Das Gerät kann mit zwei Netzanschlüssen ausgestattet sein. Um einen elektrischen Schlag zu vermeiden, immer beide Anschlüsse vor der Wartung vom Netz trennen.

The Omni-5wx can use one of two types of power supplies.

- PS5-250

The standard power supply. It has a capacity of 45 Amps and provides 250 Watts of power at 5 Volts.
- PS5-DC250

A -48 volt (input voltage) DC version of the PS5-250 power supply. This power supply has a capacity of 45 Amps and can provide 250 Watts of power. It requires the use of 12 to 14 gauge wire for connections to the DC power source. See *Connecting a DC Power Source* on page 5-20 for more information.

Omni-5wx PS5-250 and PS5-DC-250 Technical Specifications	
Voltage Range	90-265 VAC, 47 to 63 Hz auto-ranging and auto-sensing.
Current Draw	4 Amps at 100/115 VAC 2 Amps at 230 VAC
Watts (Output)	250
Current Provided	45 Amps at 5 Volts 2 Amps at 12 Volts 5.1 Amps at 1.2 Volts 3 Amps at 3.3 Volts
Heat Generation	approximately 853 BTUs per hour (one power supply)
Agency Listings	See Chapter 4, "The OmniSwitch Chassis," for agency listings.

## Omni-9 Power Supply

The Omni-9 provides bays for two power supplies. The power supplies are self-enclosed to allow safe hot-insertion and hot-removal. When two power supplies are installed, they share the electrical load. If one should fail, the remaining power supply automatically takes up the load without any disruption to the operation.

### ◆ Caution ◆

This unit may be equipped with two power connections. To reduce the risk of electrical shock, disconnect both power connections before servicing the unit.

### ◆ VORSICHT ◆

Das Gerät kann mit zwei Netzanschlüssen ausgestattet sein. Um einen elektrischen Schlag zu vermeiden, immer beide Anschlüsse vor der Wartung vom Netz trennen.

The Omni-9 uses a power supply called the PS9-350T. The PS9-350T has a capacity of 50 Amps, and can provide 350 Watts of power at 5 Volts. Some combinations of switching modules (those that include CDDI and Fast Ethernet modules) may exceed the power provided by one power supply. Use the amp figure for your modules (in the tables beginning on page 5-15) to determine the type and number of modules your Omni-9 chassis will power. See *Power Requirements* on page 5-12 for further information.

The Omni-9 and Omni-9e power supply may not be used interchangeably.

Omni-9 PS9-350T Specifications	
Voltage Range	85-270 VAC, 47 to 63 Hz auto-ranging and auto-sensing.
Current Draw	6 Amps at 100/115 VAC 3 Amps at 230 VAC
Watts (Output)	350
Current Provided	50 Amps at 5 Volts 8 Amps at 12 Volts 5 Amps at 3.3 Volts
Heat Generation	approximately 1195 BTUs per hour (one power supply)
Agency Listings	See Chapter 4, "The OmniSwitch Chassis," for agency listings.

## Omni-9e Power Supplies

The Omni-9e provides bays for two power supplies. The power supplies are self-enclosed to allow safe hot-insertion and hot-removal. When two power supplies are installed, they share the electrical load. If one should fail, the remaining power supply automatically takes up the load without any disruption to the operation.

### ◆ Caution ◆

This unit may be equipped with two power connections. To reduce the risk of electrical shock, disconnect both power connections before servicing the unit.

### ◆ VORSICHT ◆

Das Gerät kann mit zwei Netzanschlüssen ausgestattet sein. Um einen elektrischen Schlag zu vermeiden, immer beide Anschlüsse vor der Wartung vom Netz trennen.

The Omni-9e can use one the following power supply types. Power supply types cannot be mixed in the same chassis.

- PS9-500      The standard power supply. It has a capacity of 75 Amps and can provide 500 Watts of power at 5 Volts. This power supply supports any possible combination of frame switching modules.
- PS9-DC500      A -48 volt (input voltage) DC version of the PS9-500 power supply. This power supply has a capacity of 75 Amps and can provide 500 Watts of power. It requires 10 to 12 gauge wire for connections to the DC power source.

Omni-9e PS9-500 and PS9-DC500 Specifications	
Voltage Range	85-270 VAC, 47 to 63 Hz auto-ranging and auto-sensing.
Current Draw	8 Amps at 100/115 VAC 4 Amps at 230 VAC
Watts (Output)	500
Current Provided	75 Amps at 5 Volts 8 Amps at 12 Volts 5 Amps at 3.3 Volts 6 Amps at 1.2 Volts
Heat Generation	approximately 1707 BTUs per hour (one power supply)
Agency Listings	See Chapter 4, "The OmniSwitch Chassis," for agency listings.

## Omni-9x Power Supplies

The Omni-9x provides bays for two power supplies. The power supplies are self-enclosed to allow safe hot-insertion and hot-removal. When two power supplies are installed, they share the electrical load. If one should fail, the remaining power supply automatically takes up the load without any disruption to operation.

### ◆ Caution ◆

This unit may be equipped with two power connections. To reduce the risk of electrical shock, disconnect both power connections before servicing the unit.

### ◆ VORSICHT ◆

Das Gerät kann mit zwei Netzanschlüssen ausgestattet sein. Um einen elektrischen Schlag zu vermeiden, immer beide Anschlüsse vor der Wartung vom Netz trennen.

The Omni-9x can use one the PS9-500P, PS9-500T, and PS9-DC500 power supplies, which are described in *Omni-9wx and Omni-9wx-PLUS Power Supplies* on page 5-10. Power supply types cannot be mixed in the same chassis.

## Omni-9wx and Omni-9wx-PLUS Power Supplies

The Omni-9wx can use one the power supply types listed below. Power supply types cannot be mixed in the same chassis.

- PS9-500T      An earlier version of the standard power supply. It has a capacity of 75 Amps and provides 375 Watts of power at 5 Volts.
- PS9-500P      The standard power supply. It has a capacity of 90 Amps and provides 450 Watts of power at 5 Volts.
- PS9-DC500    A -48 volt (input voltage) DC version of the PS9-500 power supply. This power supply has a capacity of 75 Amps and provides 375 Watts of power. It requires 10 to 12 gauge wire for connections to the DC power source.

The Omni-9wx-PLUS uses the power supply types listed below.

- PS9-650P      The power supply designed for use with CSM-622 modules. It has a capacity of 120 Amps and can provide 650 Watts of power at 5 Volts.

### ◆ Caution ◆

This unit may be equipped with two power connections. To reduce the risk of electrical shock, disconnect both power connections before servicing the unit.

### ◆ VORSICHT ◆

Das Gerät kann mit zwei Netzanschlüssen ausgestattet sein. Um einen elektrischen Schlag zu vermeiden, immer beide Anschlüsse vor der Wartung vom Netz trennen.

Omni-9wx PS9-500T Specifications	
Voltage Range	90-264 VAC, 47 to 63 Hz auto-ranging and auto-sensing.
Current Draw	8 Amps at 100/115 VAC; 4 Amps at 230 VAC
Watts (Output)	375
Current Provided	75 Amps at 5 volts 8 Amps at 12 Volts 5 Amps at 3.3 Volts 6 Amps at 1.2 Volts
Heat Generation	approximately 1707 BTUs per hour (one power supply)
Agency Listings	See Chapter 4, "The OmniSwitch Chassis," for agency listings.

<b>Omni-9wx PS9-500P and PS9-DC500 Specifications</b>	
Voltage Range	90-264 VAC, 47 to 63 Hz auto-ranging and auto-sensing.
Current Draw	8 Amps at 100/115 VAC; 4 Amps at 230 VAC
Watts (Output)	450
Current Provided	90 Amps at 5 volts 4 Amps at +12 Volts 6 Amps at + 3.3 Volts 8 Amps at +1.2 Volts
Heat Generation	approximately 1707 BTUs per hour (one power supply)
Agency Listings	See Chapter 4, "The OmniSwitch Chassis," for agency listings.

<b>Omni-9wx-PLUS PS9-650P Specifications</b>	
Voltage Range	90-264 VAC, 47 to 63 Hz auto-ranging and auto-sensing.
Current Draw	10 Amps at 100/115 VAC; 5 Amps at 230 VAC
Watts (Output)	650
Current Provided	120 Amps at 5 Volts 4 Amps at 12 Volts 6 Amps at 3.3 Volts 8 Amps at 1.2 to 1.5 Volts
Heat Generation	approximately 2219 BTUs per hour (one power supply)
Agency Listings	See Chapter 4, "The OmniSwitch Chassis," for agency listings.

# Power Requirements

Depending on the combination of modules installed in a chassis, it is possible to exceed the power capacity of a single power supply. Always make sure that the total power requirements of the modules in your chassis do not exceed the limits of your power supply.

To check the power consumption of your configuration, refer to the tables on pages 5-15 through 5-18 and add up the **DC Current Draw** of all modules in your switch. This sum should be below the current provided by your power supply, which is listed with the “Technical Specifications” for each chassis in the corresponding section earlier in this chapter.

For example, if you had the following modules installed in an Omni-9wx:

- 1 x MPM1G (draws 3 amps)
- 1 x FCSM (draws 5.5 amps)
- 2 x CSM-155 (each draws 10 amps for a total of 20 amps)
- 4 x CSM-622 (each draws 14 amps for a total of 56 amps)

you would be within the power constraints of one power supply. An Omni-9wx power supply can provide up to 120 amps of current and the above configuration requires 84.5 amps. However, if you were using the Omni-9wx power supply that provides only 90 amps of current (i.e., PS9-500P) and added another CSM-622 (or any other module requiring more than 5.5 amps), then you would exceed that power supply's limit.

### ◆ Caution ◆

It is possible, but *not recommended*, to have a configuration in which the current draw of the installed modules exceeds the power provided by a single power supply. However, such a configuration would *require two power supplies and would not allow you to have power redundancy*.

## CSM-622 Modules

If you are using CSM-622 modules in the Omni-5x, Omni-5wx, Omni-9x, Omni-9wx, or Omni-9wx-PLUS chassis, you should follow these guidelines:

- In Omni-5x or Omni-5wx chassis, you cannot install more than two (2) CSM-622 modules without exceeding the current provided by one power supply.
- In Omni-9x or Omni-9wx chassis, you can install up to six (6) CSM-622 modules if you are using the PS9-500P or PS9-DC500 power supply, which can provide up to 90 amps of current.
- The PS9-650 power supply for the Omni-9wx-PLUS chassis provides enough power for up to eight (8) CSM-622 modules.

### Omni-5, Omni-9, Omni-9e (350 watt) Chassis

If you are using 8-port CDDI modules, CDDI/FDDI combination modules, or 8-port Ethernet 100Base-Tx modules in an Omni-5, Omni-9, or some older Omni-9e (350 watt) chassis, then you must abide by the following restrictions:

- **Eight-port Fast Ethernet modules.** Install no more than six (6) 8-port Ethernet 100Base-Tx modules in an Omni-9 or older Omni-9e (350 watt) chassis, and no more than three (3) such modules in an Omni-5 chassis.
- **Eight-port CDDI modules.** Install no more than six (6) 8-port CDDI modules in an Omni-9 or older Omni-9e (350 watt) chassis, and no more than three (3) such modules in an Omni-5 chassis.
- **FDDI/CDDI combination modules.** Install no more than seven (7) 1-port FDDI/4-port CDDI combination modules in an Omni-9 or older Omni-9e (350 watt) chassis. If you have a dual-redundant MPM setup, then do not install more than six (6) FDDI/CDDI combination modules in an Omni-9 or older Omni-9e (350 watt) chassis. Install no more than three (3) FDDI/CDDI combination modules in an Omni-5 chassis.

#### ◆ Warning ◆

If you exceed these limitations, then your power supplies will not be able to provide enough power to all the modules in the chassis and network interruptions may result. In addition, exceeding these restrictions may also cause overheating problems in an Omni-5 or Omni-9 chassis.

### Omni-5e and Omni-9e (500 watt) Chassis

Power consumption and overheating are not an issue in the Omni-5e and newer model Omni-9e (500 watt) chassis and power supplies. Any combination of frame switching modules can be used in these chassis without exceeding the current provided by one power supply.

## **FCC Class B Approvals**

The Omni-3wx, Omni-5e, Omni-5x, Omni-5wx, Omni-9e, Omni-9x, and Omni-9wx chassis have met FCC Class B requirements. In addition, the MPM module and several Switching Modules have also met Class B requirements. The table on the following page indicates the FCC Class for which a module has been approved.

Individual modules were tested in a fully loaded chassis that included two or more copper-based modules. The ESM-U-6 module was tested with fiber (10BaseFL) and UTP adapter boards. Also note that some class approvals were met using STP cable, UTP cable, or a ferrite clip as specified in the table.

“HSM” in this table refers to the High-Speed Module to which 100 Mbps Ethernet, Token Ring, FDDI, CDDI, ATM, and Frame Relay boards attach. (The HSM module is described in Chapter 7, “OmniSwitch Switching Modules.”) The values in this table apply to the original HSM (HSM) and the newer HSMs (HSM2 and HSM3).

**Module Power Requirements and FCC Class Approvals**

<b>Module</b>	<b>Description</b>	<b>DC Current Draw (Amps)</b>	<b>FCC Class Approval</b>
MPM/II/1G	Management Processor Module.	3.0	B
ESM-C-8	Ethernet module with eight 10BaseT UTP ports.	3.0	A
ESM-C-12	Ethernet module with twelve 10BaseT UTP ports.	4.0	B (STP cable) A (UTP cable)
ESM-F-8	Ethernet module with eight Fiber (ST) ports.	5.5	B
ESM-T-12	Ethernet module with one Telco 50-pin port.	3.5	B (STP cable) A (UTP cable)
ESM-U-6	Ethernet Universal module with six port slots.	5.0	B (fiber, UTP)
ESM-100C	100BaseTx card, 4 ports, on HSM. 100BaseTx card, 8 ports, on HSM.	5.5 7.0	A A
ESM-100C-FD	100BaseTx full-duplex card, 1 port, on HSM. 100BaseTx full-duplex card, 2 ports, on HSM.	3.5 4.5	A A
ESM-100FM-FD	100BaseFx full-duplex multimode, 1 port, on HSM. 100BaseFx full-duplex multimode, 2 ports, on HSM.	3.5 4.5	B B
ESM-100FS-FD	100BaseFx full-duplex single mode, 1 port, on HSM. 100BaseFx full-duplex single mode, 2 ports, on HSM.	3.5 4.5	B B
ESM-100C-12	10/100 Ethernet module with 12 auto-sensing ports	9.0	B (STP cable)
ESM-C-16	Ethernet module with 16 10BaseT ports	6.5	A (UTP cable)
ESM-C-32	Ethernet module with 32 10BaseT ports.	7.0	A (UTP cable)
ESM-100FM-8	100BaseFx multimode, 8 ports	7.5	A
ESM-FM-16W	Ethernet module with 16 10 Mbps Fiber ST ports	7.75	B
ESM-T-24W	Ethernet module with two Telco 50-pin ports.	3.25	A
ESM-100C-32W	Ethernet module with 32 10/100 RJ-45ports.	5.75	A (UTP cable)
GSM-FM-2W	Gigabit Ethernet multimode, 2 SC ports	6.75	B
GSM-FS-2W	Gigabit Ethernet intermediate-reach single mode, 2 SC ports	6.75	B
GSM-FSH-2W	Gigabit Ethernet long-reach single mode, 2 SC ports	6.75	B

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**Module Power Requirements and FCC Class Approvals**

Module	Description	DC Current Draw (Amps)	FCC Class Approval
ASM-155F	ATM OC-3 card, 1 fiber port, on HSM. ATM OC-3 card, 2 fiber ports, on HSM.	3.0 4.0	B B
ASM2-155F (narrow faceplate)	ATM OC-3 card, SAHI chip, 1 fiber port, on HSM. ATM OC-3 card, SAHI chip, 2 fiber ports, on HSM.	4.0 5.0	A A
ASM2-155F (wide faceplate)	ATM OC-3 card, SAHI chip, 1 fiber port, on HSM. ATM OC-3 card, SAHI chip, 2 fiber ports, on HSM.	3.0 4.0	A A
ASM2-155RF	ATM OC-3 card, 1 redundant fiber port, on HSM. ATM OC-3 card, 2 redundant fiber ports, on HSM.	3.5 5.0	A A
ASM-155C	ATM UTP card, 1 copper port, on HSM. ATM UTP card, 2 copper ports, on HSM.	3.0 4.0	B (STP cable) A (UTP cable)
ASM2-622F	ATM OC-12 card, 1 fiber port, on HSM. ATM OC-12 card, 2 fiber ports, on HSM.	4.0 6.0	A A
ASM2-622-RF	ATM OC-12 card, 1 fiber port, on HSM. ATM OC-12 card, 2 fiber ports, on HSM.	5.0 8.0	A A
ASM2-E3	ATM E3 card, 1 BNC port, on HSM. ATM E3 card, 2 BNC ports, on HSM.	4.0 5.5	A A
ASM-DS3	ATM DS-3 card, 1 BNC port, on HSM. ATM DS-3 card, 2 BNC ports, on HSM.	3.0 4.0	A A
ASM-E3	ATM E3 card, 1 BNC port, on HSM. ATM E3 card, 2 BNC ports, on HSM.	3.0 4.0	B B
ASM-CE-155F-2S2T	ATM Circuit Emulation, 1 OC-3, 2 serial, 2 T1 ports	4.5	A
ASM-CE-155F-2S2E	ATM Circuit Emulation, 1 OC-3, 2 serial, 2 E1 ports	4.5	B
ASM-CE-DS3-2S2T	ATM Circuit Emulation, 1 DS-3, 2 serial, 2 T1 ports	4.5	A
ASM-CE-E3-2S2T	ATM Circuit Emulation, 1 E3, 2 serial, 2 E1 ports	4.5	B
ASM2-DS3	ATM DS-3 card, 1 BNC port, on HSM. ATM DS-3 card, 2 BNC ports, on HSM.	4.0 5.5	B B
ASM2-E3	ATM E3 card, 1 BNC port, on HSM. ATM E3 card, 2 BNC ports, on HSM.	4.0 5.5	B B

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## Module Power Requirements and FCC Class Approvals “continued”

Module	Description	DC Current Draw (Amps)	FCC Class Approval
FSM-M or FSM-S	FDDI card, single/multi-mode, 1 port, on HSM. FDDI card, single/multi-mode, 2 ports, on HSM.	4.0 5.0	B B (FSM-S)
FSM-SH	FDDI card, single mode long haul, 1 port, on HSM FDDI card, single mode long haul, 2 ports, on HSM	4.0 5.0	A A
FSM-C	CDDI 4-port UTP card, on HSM. CDDI 8-port UTP card, on HSM.	5.0 7.5	A (STP cable) A (STP cable)
FSM-M-C	One FDDI card, one CDDI 4-port card, on HSM.	6.5	A (STP cable)
TSM-C-6	Token Ring, 6-port UTP/STP card, on HSM.	5.0	A (STP cable)
TSM-F-6	Token Ring, 6-port fiber card, on HSM.	5.0	A
TSM-CD-6	Token Ring, 6-port STP card, on HSM.	5.0	B (UTP cable)
TSM-CD-16W	Token Ring, 16-port UTP/STP ports	8.0	B (STP cable) A (UTP cable)
WSM	WAN module, 2 serial ports on HSM. WAN module, 4 serial ports on HSM. WAN module, 8 serial ports on HSM.	3.5 4.0 6.0	B B B
WSM-BRI	WAN ISDN module, 1 serial, 1 BRI port on HSM. WAN ISDN module, 2 serial, 2 BRI ports on HSM.	4.5 5.0	B B
WSM-FT1	WAN T1 module, 1 serial, 1 T1 port on HSM. WAN T1 module, 2 serial, 2 T1 ports on HSM.	3.5 5.0	A A
WSM-FE1	WAN E1 module, 1 serial, 1 T1 port on HSM. WAN E1 module, 2 serial, 2 T1 ports on HSM.	3.5 5.0	B B
WSM-M013	WAN E1 module, 2 channelized DS3 ports on HSM. WAN E1 module, 4 channelized DS3 ports on HSM.	4.5 6.5	B B

*continued on next page...*

**Module Power Requirements and FCC Class Approvals “continued”**

<b>Module</b>	<b>Description</b>	<b>DC Current Draw (Amps)</b>	<b>FCC Class Approval</b>
FCSM I	Frame-to-Cell Switching Module (155 Mbps)	5.5	B
FCSM II	Frame-to-Cell Switching Module (622 Mbps)	7.75	B
CSM-A25-12	Cell Switching Module with 12 x ATM 25 Mbps ports	4.5	A
CSM-A25-24W	Cell Switching Module with 24 x ATM 25 Mbps ports	6.5	A
CSM-155-8	Cell Switching Module with 8 x OC-3 fiber ports	10.0	B
CSM-155C-8	Cell Switching Module with 8 x OC-3 copper ports	10.0	A
CSM-622	Cell Switching Module with 2 x OC-12 fiber ports	14.0	A
CSM-U	Universal Cell Switching Module, no adapter boards	3.5	B
CSM-AB-155C	CSM-U Adapter Board, 2 OC-3 multimode copper ports	1.0	A
CSM-AB-155FM	CSM-U Adapter Board, 2 OC-3 multimode fiber ports	1.2	B
CSM-AB-155FS	CSM-U Adapter, 2 OC-3 single mode fiber ports	1.3	B
CSM-AB-155FSH	CSM-U Adapter Board, 2 OC-3 single mode (long reach) fiber ports	1.4	B
CSM-AB-DS3	CSM-U Adapter Board, 2 DS-3 ports	0.7	A
CSM-AB-E3	CSM-U Adapter Board, 2 E3 ports	0.7	B
CSM-AB-DS1	CSM-U Adapter Board, 4 DS-1 ports	0.5	A
CSM-AB-E1	CSM-U Adapter Board, 4 E1 ports	0.5	B
CSM-AB-CE-T1	CSM-U Adapter Board, 4 T1 ports	0.9	A
CSM-AB-CE-E1	CSM-U Adapter Board, 4 E1 ports	0.9	B
CSM-AB-IMA-T1	CSM-U Adapter Board, 8 IMA T1 (DS-1) ports	2.5	A
CSM-AB-IMA-E1	CSM-U Adapter Board, 8 IMA E1 ports	2.5	A

## Removing and Installing a Power Supply

You can remove or install a power supply even when power is being supplied to an OmniSwitch. You will need a slotted and a Phillips screwdriver to remove or install a power supply.

### Removing a Power Supply

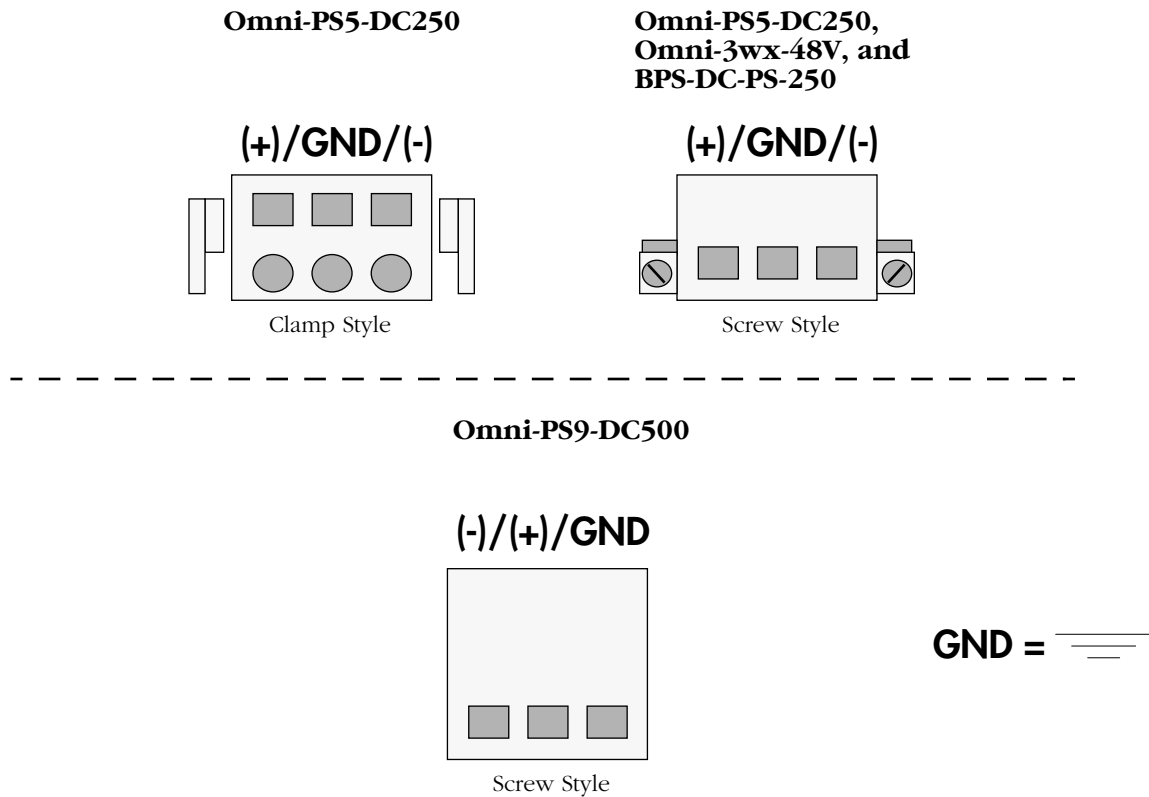
1. Turn the On/Off switch to the O (Off) position on the power supply that you want to remove. Power may still be provided to the power supply you are not removing, but it cannot be applied to the one you are removing.
2. Remove the power cord attached to the AC input socket on the power supply. Even with power Off, the switch backplane could be damaged if the power cord is attached and a power surge occurs.
3. Each power supply is attached to the chassis with four screws. Two of the screws are attached to springs and cannot be removed from the power supply. The other two screws are loose and can be separated from the power supply.  
  
Loosen and remove the two loose screws. These screws will be located at the top of a 5-slot power supply and on the right side (or top, depending on the chassis type) of a 9-slot power supply.
4. Loosen the two screws attached to the power supply by springs.
5. Holding onto the two screws attached to the power supply, pull the power supply out and away from the chassis. Do not hesitate when removing the power supply.
6. Place the power supply in a safe, static-free location until it is re-installed.

### Installing a Power Supply

1. Ensure that the On/Off switch on the power supply is in the O (Off) position.
2. Holding the power supply with both hands, align it with the card guides in the slot where it is to be installed.
3. Gently slide the power supply into the chassis along the card guides. The power supply should slide easily as long as you keep it level and within the card guides. Keep sliding it back until it snaps into place against the switch backplane. The power supply should fit snugly into its slot.
4. Tighten the two screws attached to the power supply.
5. Insert and tighten the two loose screws into the top two holes of a 5-slot power supply and the right (or top, depending on the chassis type) two holes of a 9-slot power supply.
6. Attach the power cord to the AC input socket.
7. Turn the On/Off switch to the I (On) position when you are ready to provide power to the chassis through this power supply.

## Connecting a DC Power Source

The DC power supply on your switch contains a female power connector. Five-slot OmniSwitches use the 48-volt Omni-PS5-DC250 power supply, which can contain one of the two power connectors pictured below. Nine-slot OmniSwitches use the 48-volt Omni-PS9-DC500 power supply, which uses the power connector pictured below.



### OmniSwitch DC Power Supply Connector Styles

All power connector styles require the use of 12 gauge wire. A clamp inside each connector keeps the power wire tightly in place during operation.

The Omni-PS5-DC250 style shown above on the left has side clamps that can be pinched to remove the connector. The Omni-PS5-DC250 style on the right has side screws that can be used to remove the connector.

The procedure for plugging a power source into each connector type will be different. For purposes of this procedure, the Omni-PS5-DC250 connector on the left will be referred to as the “clamp-style” connector and the Omni-PS5-DC250 connector on the right will be referred to as the “screw-style” connector. Although the Omni-PS9-DC500 connectors do not have attachment screws, it will be referred to as the “screw-style” since the procedure is the same.

## Installing DC Power Source Wire Leads

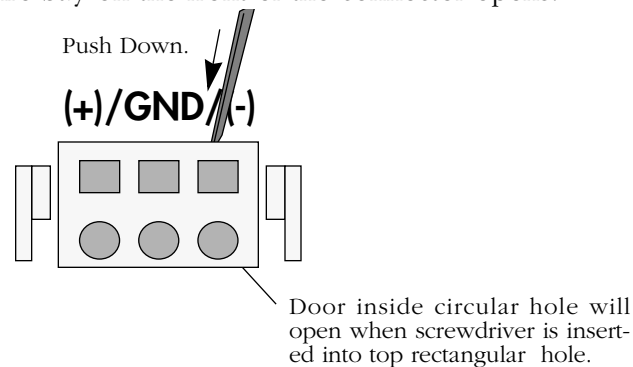
These instructions describe how to connect your 3-wire DC power source to the power connector on your DC power supply. A small flat-tip screwdriver and a wire stripper are required for this procedure.

1. Prepare the three (3) wires—12 gauge—that will plug into the power supply. First make sure they are not plugged into the 48-volt power source. Next, use a wire stripper to carefully strip about a half-inch off the end of each wire, removing the outer insulation to expose the copper core.
2. Twist the loose strands of copper wire together so that they form a tight braid. If possible, solder the entire braid of wire together for better conductivity.
3. Open the wire bay door for one of the three (3) power connector holes. The procedure for opening the bay door is different for each power connector style. Follow the instructions on the next page for your connector style.

### ***“Clamp” Style Connector***

This connector contains a row of square holes and row of circular holes. It also contains three rectangular holes on top; these top rectangular holes are used to open the circular holes on the connector front so that you can insert the wire lead.

- a. Insert a flat-tip screwdriver into one of the top three (3) square holes. Use some force so that the door for the wire bay on the front of the connector opens.

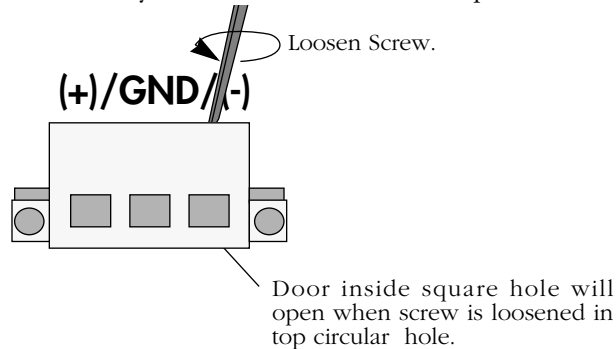


### **Opening Wire Bay on Clamp-Style Connector**

### "Screw" Style Connector

The front of this connector contains a row of square holes. It also contains three circular holes on top containing screws; you loosen the screws in these holes to open the square holes on the connector front so that you can insert the wire lead.

- a. Insert a small flat-tip screwdriver into one of the top three (3) screw holes. Loosen the screw so that the door for the wire bay on the connector front opens.



### Opening Wire Bay on Screw-Style Connector

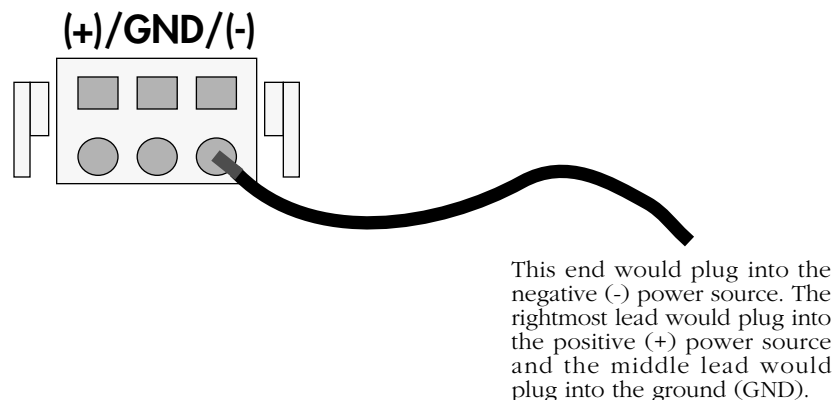
4. Insert the appropriate wire lead into the open circular hole. The silkscreen above each hole indicates which power lead—positive (+), ground (GND), or negative (-)—to plug into which hole. The lead you insert *must* match the lead attached to the 48-volt power source (i.e., positive to positive, negative to negative, ground to ground).

#### ♦ Warning ♦

You must plug DC wire leads into the correct holes in the DC power connector. Use the labels above the DC power connector as a guide to positive, negative, and ground connections.

If you plug wire leads into wrong holes the power supply will not work and could result in damage.

Push the wire in far enough such that it reaches the back wall of the connector, about a half inch inside.



### Inserting the Wire Lead Into the Circular Hole

5. Close the wire bay. The procedure for closing the bay door is different for each power connector style. Follow the instructions below for your connector style.

### ***“Clamp” Style Connector***

Remove the screwdriver from the rectangular hole on top of the power connector. The wire lead should be securely attached inside the connector. You should be able to pull on the wire and not dislodge it.

### ***“Screw” Style Connector***

Using the small screwdriver from Step 3a, tighten the screw above the wire bay into which you inserted a wire lead. The wire lead should be securely attached inside the connector. You should be able to pull on the wire and not dislodge it.

6. Repeat Steps 3 through 5 for the remaining two wire leads. Be sure that the end of each lead attaches to the same power source that you connected to on the power supply (i.e., positive to positive, negative to negative, ground to ground).

## Replacing a Power Supply Fuse (older chassis models)

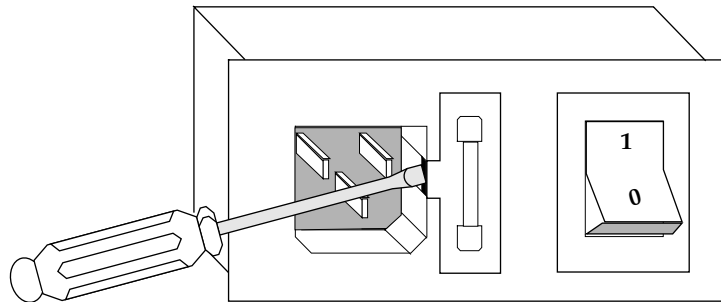
### ♦ Important Note ♦

This procedure applies only to the older chassis versions, Omni-5 and Omni-9. Other chassis do not contain replaceable fuses.

On the Omni-5, the fuse for each power supply is located in a holder immediately to the right of the power cable receptacle. On the Omni-9, the fuse for each power supply is located in a holder immediately below the power cable receptacle. The holder also contains one spare fuse. When you replace the fuse, replace it with a fuse of the same type and rating for continued protection against fire. Each power supply uses a 250 volt, 3.15 amp fuse.

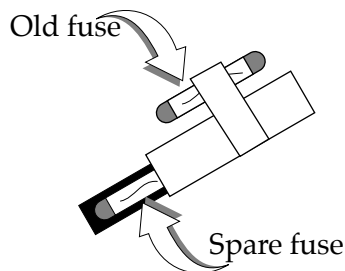
Follow these steps to replace the fuse:

1. Turn the On/Off switch to the O (Off) position on the power supply where you want to replace the fuse. Power may still be provided to the other power supply.
2. Remove the power cord from the power supply.
3. Using a small screwdriver, remove the fuse holder by pulling outward on the small recess (located on the right of the power receptacle).



### Removing the Fuse Holder

4. Remove the old fuse that is held in place by the fuse clip and throw it away.
5. To access the spare fuse, slide the box open by pushing on one end of the fuse holder.



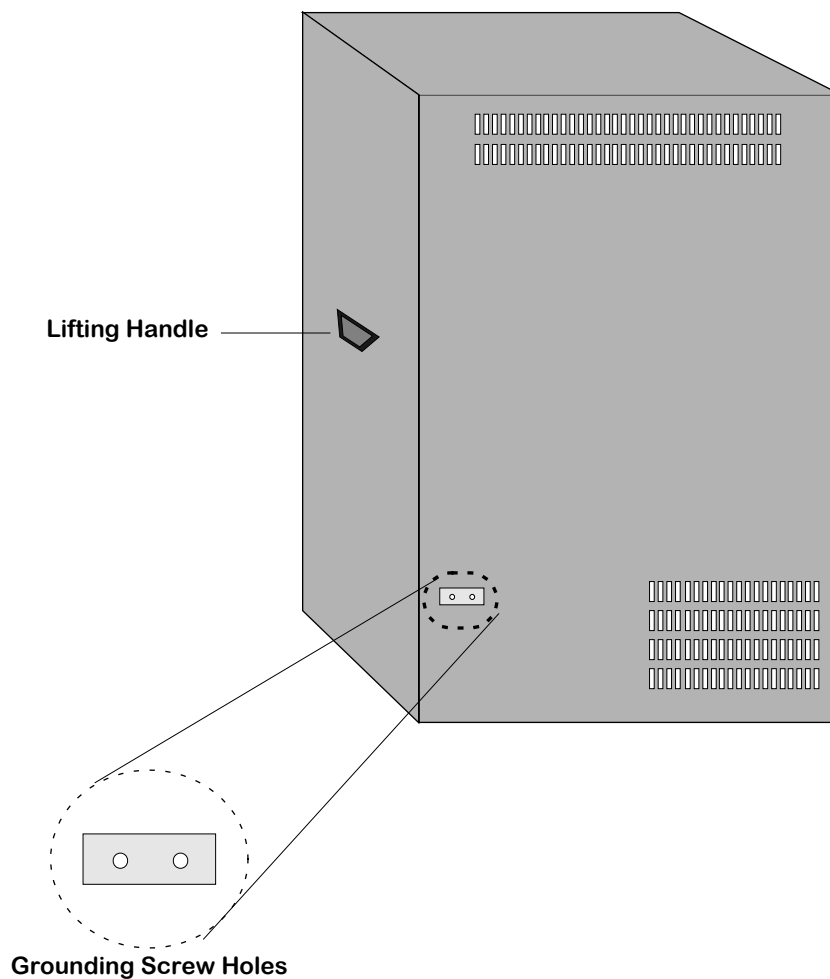
### Removing the Fuse Holder

6. Put the spare fuse in the fuse clip.
7. Replace the fuse holder in the power receptacle.

## Grounding a Chassis

Wide-format chassis (Omni-3wx, Omni-5wx, and Omni-9wx) have two grounding screw holes on the back of the chassis. These holes use 10-32 screws and are approximately 1 inch apart. In addition, these holes do not have paint and are surrounded by a small paint-free rectangular section, which provides for a good connection contact.

The figure below shows the location of the grounding screw holes on the back of a newer Omni-9wx. They are located approximately four (4) inches from the bottom of the chassis and approximately one (1) inch from the left-hand side of the rear of the chassis.



### Grounding Screw Holes on an Omni-9wx

On an Omni-5wx, they are located about one (1) inch from the bottom of the chassis and approximately one (1) inch from the left-hand side of the rear of the chassis. On an Omni-3wx, they are located about four (4) inches from the bottom of the chassis and approximately 1/2-inch from the left-hand side of the rear of the chassis.

## Power Cords

The power cord is the main disconnect device. It should be plugged into an easily accessible outlet. In the event that your power cord is lost or damaged, refer to the specifications below.

Das Netzkabel ist das hauptsächliche Trennungsmittel für den Netzanschluss. Es sollte in eine leicht erreichbare Steckdose gesteckt werden. Im Falle des Verlustes oder Beschädigung beziehen Sie sich auf unten stehende Spezifikationen.

### Specifications

The power cord to be used with 115-Volt configuration is a minimum type SJT (SVT) 18/3, rated at 250 Volts ac, 10 Amps with a maximum length of 15 feet. One end terminates in an IEC 320 attachment plug and the other end terminates in a NEMA 5-15P plug.

The power cord to be used with 230-Volt configuration is minimum type SJT (SVT) 18/3, rated 250 Volts ac, 10 Amps with a maximum length of 15 feet. One end terminates in an IEC 320 attachment plug and the other end terminates as required by the country where it will be installed.

European cords must be Harmonized (HAR) type.

In einer 230 Volt Umgebung ist ein Netzkabel vom Type VDE oder HAR, minimal 3 x 1.00 mm<sup>2</sup>, 250 VAC, 10 Amps, maximal 4.5 m Länge, zu verwenden. Ein Ende entspricht dem Stecker IEC 320. Das andere Ende den Anforderungen des jeweiligen Landes.

## **Backup Power System (BPS)**

The Backup Power System (BPS) is a chassis that accepts one or two power supplies and provides primary or redundant power for up to three Omni-3wx switches. The following power supplies can be installed in the BPS:

**BPS-AC-PS-250** An AC power supply providing 50 Amps and 250 Watts of power at 5 Volts.

**BPS-DC-PS-250** A 48 volt (input voltage) DC version of the BPS-AC-PS-250 power supply, also providing 50 Amps and 250 Watts of power at 5 Volts. It requires the use of 12 to 14 gauge wire for connections to the DC power source. See *Connecting a DC Power Source* on page 5-20 for more information.

Both of these power supplies are self-enclosed to allow safe hot-insertion and hot-removal.

### **Operation with One Power Supply Installed in the BPS**

Connecting up to three Omni-3wx switches to an AC power source and the BPS provides “secondary power redundancy” where the BPS shares the electrical load with the attached switches. If the power supply in any connected Omni-3wx switch fails, the BPS picks up the load without disrupting service.

Note, however, that a switch with a failed power supply should be replaced as expeditiously as possible because the BPS may not be able to support a second failure. This would be particularly true if the aggregate power requirements of the modules installed in all attached Omni-3wx switches exceeded 50 amps.

Alternatively, you could connect up to three Omni-3wx switches to the BPS without plugging those switches into any other power source (i.e., not use the switches’ internal power supplies). The BPS provides enough power to run up to three Omni-3wx switches as long as all installed modules do not require more than 50 amps of current. (See the tables in *Power Requirements* on page 5-12 to find out the power requirements of each module.)

### Operation with Two Power Supplies Installed in the BPS

Connecting up to three Omni-3wx switches to an AC power source and the BPS provides “secondary power redundancy” where the BPS shares the electrical load with the attached switches. If the power supply in any connected Omni-3wx switch fails, the BPS picks up the load without disrupting service.

Connecting up to three Omni-3wx switches to the BPS and then connecting the switches themselves to one independent power source and the BPS to another independent power source provides “primary power redundancy” as well as “secondary power redundancy.” If the power supply in any connected Omni-3wx switch fails, the BPS picks up the load without disrupting service (secondary power redundancy). If one power source fails (for example the electrical circuit connected to the Omni-3wx switches) the second power source (in our example, the electrical circuit connected to the BPS) prevents the switches from failing (primary power redundancy).

With two power supplies, the BPS can provide power redundancy for up to three switches (i.e., the BPS backs up the switches’ built-in power supplies) or the BPS can provide the power for up to three switches (i.e., the switches’ built-in power supplies are not plugged in and the switches depend on the BPS for all power).

If the BPS is providing all power (i.e., the switches’ built-in power supplies are not plugged in), one BPS power supply can fail without disrupting service as long as the aggregate power requirements of all modules in all attached switches do not exceed 50 amps. If three Omni-3wx switches are connected to the BPS and their power requirements exceed 50 amps, losing one power supply would cause all three connected switches to fail since the three switches require more power than one BPS power supply provides.

The BPS does not require that both power supplies be the same type (i.e., if desired, you can install an AC and DC power supply in the same BPS).

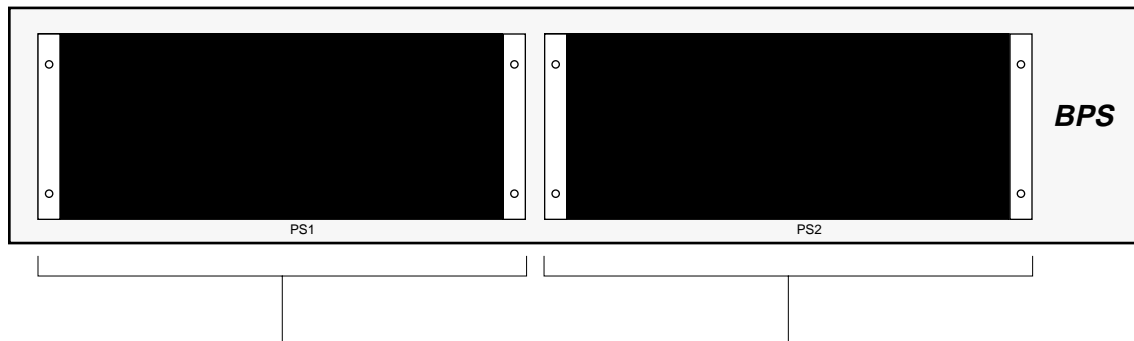
As mentioned before, with the exception of Omni-3wx switches that collectively draw more than 50 amps, the BPS can support up to three failed power supplies in the connected switches without disrupting service. However, regardless of this capability, a switch with a failed power supply should be replaced as expeditiously as possible.

#### ◆ Important ◆

The power supplies in the BPS must be turned on  
BEFORE the BPS is connected to an Omni-3wx switch.

## Front Panel

The front panel provides two power supply bays, as shown in the following illustration.



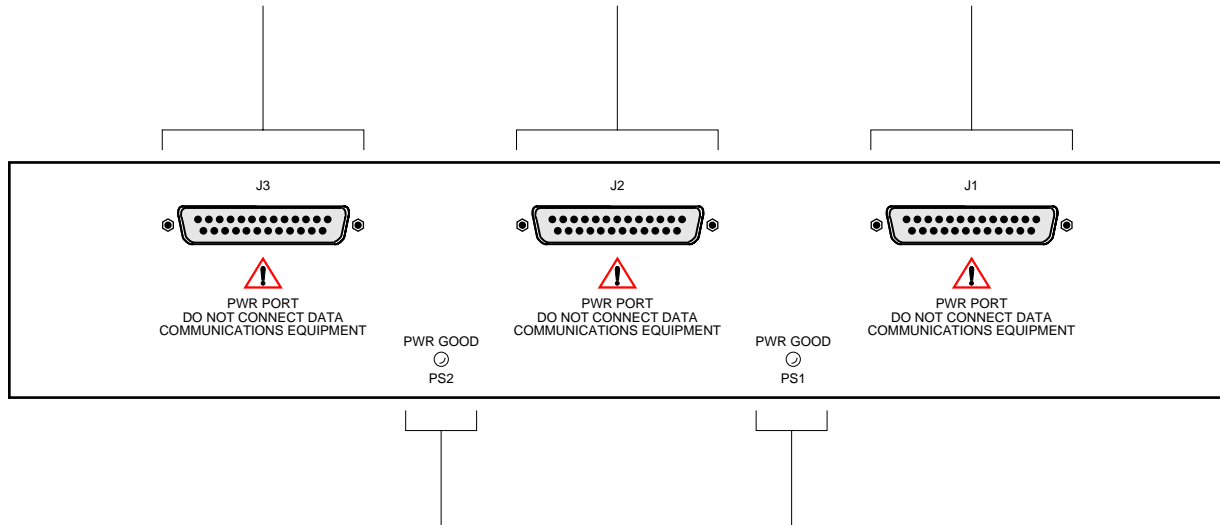
These power supply bays accept BPS-AC-PS-250 or BPS-DC-PS-250 power supplies. You can install the same type of power supply in each bay or install one of each type in each bay (i.e., you can install a BPS-AC-PS-250 in one bay and a BPS-DC-PS-250 in the other bay).

If you are only installing one power supply, you can use either bay.

### Rear Panel

These BPS power connectors require a unique cable (model name BPS-EXP-CBL, part number 120086-00). Do NOT attempt to use a standard DB-25 to DB-25 datacom cable to connect the BPS to the Omni-3wx switches.

If you are connecting less than three Omni-3wx switches, you can use any of the BPS power connectors.



**PS1 PS2 PWR GOOD LEDs.** The PWR GOOD **PS1** LED reports the status of the power supply in bay one. The PWR GOOD **PS2** LED reports the status of the power supply in bay two.

If a power supply is not installed in bay one or two, the corresponding LED is off. If a power supply is installed, but not receiving power or has failed, the corresponding LED is off.

If a power supply is installed in bay one or two and operating normally, the corresponding LED is green.

#### ◆ Caution ◆

Do NOT connect any data communications equipment to these DB-25 BPS connectors. Although similar in appearance to a standard datacom DB-25 connector, connecting anything other than an Omni-3wx switch to these connectors may cause damage to the attached equipment.

NICHT MIT DATEN-KOMMUNIKATIONSGERÄTEN VERBINDEN.

The unit may be equipped with two power connections. To reduce the risk of electrical shock, disconnect both power connections before servicing unit.

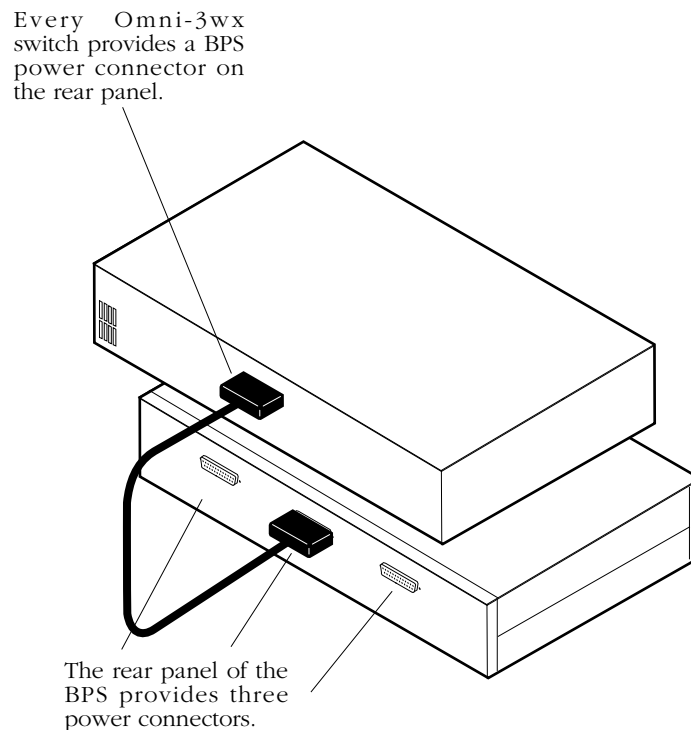
Das Gerät kann mit zwei Netzanschlüssen ausgestattet sein. Um einen elektrischen Schlag zu vermeiden, immer beide Anschlüsse vor der Wartung vom Netz trennen.

## Connecting a BPS to an Omni-3wx

The BPS provides three power connectors on the rear panel. If you are connecting fewer than three Omni-3wx switches, you can use any of the BPS power connectors.

### ◆ Warning ◆

The BPS power connectors on the rear panel require a unique cable (Alcatel part number 120086-00). Do NOT attempt to use a standard DB-25 to DB-25 datacom cable to connect the BPS to the Omni-3wx switches.



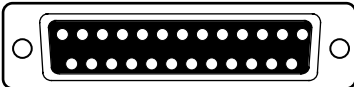
Follow the steps below to connect a BPS to an Omni-3wx.

1. Using the power cable provided with the BPS chassis, connect the female end of the cable to one of the male **PWR PORT** connectors on the rear panel of the BPS.
2. Connect the other end of cable (i.e., the male end) to the female **PWR PORT** connector on the rear panel of the Omni-3wx switch.
3. If you are connecting more than one Omni-3wx switch to the BPS, repeat steps 1 and 2.

### ◆ Warning ◆

The power supplies in the BPS must be turned on BEFORE the BPS is connected to the switch.

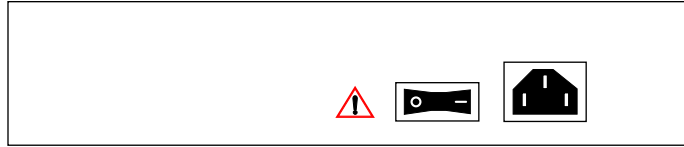
### BPS Technical Specifications

Backup Power System (BPS) Technical Specifications																					
Dimensions	3.475" (8.83 cm) high x 17.125" (43.50 cm) wide x 12.46" (31.65 cm) long																				
Number of power supply bays	2																				
Rear panel power connectors	3 male DB-25 connectors																				
Power Supplies Supported	BPS-AC-PS-250, BPS-DC-PS-250																				
Maximum +5V operating current per power connector	25 Amps																				
Maximum +12V operating current per power connector	1 Amp																				
Maximum +5V operating current for all three power connectors	One Power Supply: 50 Amps Two Power Supplies: 75 Amps																				
Maximum +12V operating current for all 3 power connectors	One Power Supply: 1.5 Amps Two Power Supplies: 3 Amps																				
Heat Generation	approximately 853 BTUs per hour																				
Number of Omni-3wx supported	3																				
Cable Supported	BPS-EXP-CBL, part number 120086-00																				
Pin-outs	<p>Power connector:</p>  <table> <tr> <td>Pin 1</td><td>Connection Detect 1</td></tr> <tr> <td>Pins 2 thru 5</td><td>Power Ground</td></tr> <tr> <td>Pin 6</td><td>+12 VDC</td></tr> <tr> <td>Pin 7</td><td>Key</td></tr> <tr> <td>Pins 8 thru 13</td><td>Power Ground</td></tr> <tr> <td>Pins 14 thru 18</td><td>+5 VDC</td></tr> <tr> <td>Pin 19</td><td>BPS Present</td></tr> <tr> <td>Pin 20</td><td>BPS Power Fail</td></tr> <tr> <td>Pins 21 thru 24</td><td>+5 VDC</td></tr> <tr> <td>Pin 25</td><td>Connection Detect 2</td></tr> </table>	Pin 1	Connection Detect 1	Pins 2 thru 5	Power Ground	Pin 6	+12 VDC	Pin 7	Key	Pins 8 thru 13	Power Ground	Pins 14 thru 18	+5 VDC	Pin 19	BPS Present	Pin 20	BPS Power Fail	Pins 21 thru 24	+5 VDC	Pin 25	Connection Detect 2
Pin 1	Connection Detect 1																				
Pins 2 thru 5	Power Ground																				
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Pin 7	Key																				
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Pins 14 thru 18	+5 VDC																				
Pin 19	BPS Present																				
Pin 20	BPS Power Fail																				
Pins 21 thru 24	+5 VDC																				
Pin 25	Connection Detect 2																				

## BPS Power Supplies

The Backup Power System (BPS) supports two different power supplies:

**BPS-AC-PS-250** The standard power supply. It has a capacity of 50 Amps and can provide 250 Watts of power at 5 Volts. It can support any possible combination of switches.



**BPS-DC-PS-250** A 48 volt (input voltage) DC version of the BPS-AC-PS-250 power supply. This power supply has a capacity of 50 Amps and can provide 250 Watts of power at 5 Volts. It requires the use of 12 to 14 gauge wire for connections to the DC power source. It supports an input voltage range of -40 to -60 VDC (-48 VDC nominal). It can support any possible combination of switches.

