



**Model 560-5309
AC/DC Power Supply
Manual**

Serial Number _____
February 2, 2007
Rev. A

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SECTION ONE

1. FUNCTIONAL DESCRIPTION

1.1. PURPOSE OF EQUIPMENT

The Symmetricom Model 560-5309 power supply has a 100-240 VAC input and a 40 to 60 VDC input for powering the 56K chassis. The power supply works in conjunction with the 560-1239-1 rear power entry module that provides the input connector, chassis ground lug, and fuse.

The wide range AC input is converted to 56 VDC and is power OR'ed with the DC input using on-card diodes. The OR'ed power output is connected to the 56K chassis backplane for distribution. The 56 VDC from the AC power supply provides primary power to the 56K chassis when the DC input is less than 56 VDC.

The power OR-ing diodes also allow the 560-5309 power supply to be used in a redundant configuration with another like AC supply or alternate DC power source. In this configuration, if one power supply in the chassis fails, the other takes over. If both supplies are functioning, the highest voltage supply delivers power to the 56K chassis.

1.1.1. PHYSICAL SPECIFICATIONS

Dimensions:	1.6" w x 4.4" h x 8.66" d (4 cm x 10 cm x 22 cm)
Weight:	Approximately 2 pounds (1 kg)

1.1.2. ENVIRONMENTAL SPECIFICATIONS

Operating Temp:	0° to +50°C
Storage Temp:	-40° to +85°C
Humidity:	Up to 95% relative, non-condensing
Cooling Mode:	Convection

1.1.3. POWER SUPPLY SPECIFICATIONS

AC Input Voltage:	100-240 VAC (continuous), 50-60 Hz
AC Input Power:	150 W maximum
AC Input Connector	IEC 320 Connector
Output Voltage:	56 VDC \pm 5%
DC Input Voltage:	40-60 VDC
AC Fuse*	2 Amp 3AG SLO-BLO (100-120 VAC range)
AC Fuse*	1 Amp 3AG SLO-BLO (200-240 VAC range)
DC Fuse*	5 Amp 3AG SLO-BLO

* On 560-1239-1 power entry module

AC Power Supply Maximum Output Power:

INPUT	AMBIENT	AIRFLOW	OUTPUT
100-240 VAC	50°C	CONVECTION	150 W

1.1.4. FUNCTIONAL SPECIFICATIONS

1.1.4.1 INPUT POWER CONNECTOR

See chassis manual.

1.1.4.2 FRONT PANEL “48VDC” TEST POINTS

DC+	DC Input (positive)
DC-	DC Input (negative)
AC+	AC 56 VDC (positive)
AC-	AC 56 VDC (negative)
Isolation:	6.8 kΩ

1.1.4.3 FRONT PANEL STATUS INDICATORS

DC STATUS	RED/GREEN LED (Green or Off)
AC STATUS	RED/GREEN LED (Green or Off)

1.1.4.4 CARD COMPATIBILITY

Location:	Slot 18/19 or 20/21
Compatibility:	560-1239-1 AC/DC Power Entry Module

1.2. CERTIFICATIONS

1.2.1. CE COMPLIANCE / UR AND C-UR RECOGNITION

The 560-5309 Power Supply is CE compliant, and USA/Canada UL Recognized.

SECTION TWO

2. INSTALLATION AND OPERATION

2.1. HOT-SWAPPING

All cards input cables and output cables are hot swappable. It is not necessary to remove chassis power during insertion or removal of load or power assemblies. The system is designed to protect against permanent damage and minimize any temporary effects of hot swapping.

2.2. REMOVAL AND INSTALLATION

CAUTION: Individual components on this card are sensitive to static discharge. Use proper static discharge procedures during removal and installation.

For proper operation, the Power Supply **MUST** be installed in a slot with a matching rear Power Entry Module.

To remove the power supply card, loosen the captive retaining hardware at the top and bottom of the assembly then, firmly pull on the handle at the bottom of the card. Slide the card free of the chassis. Refer to the SETUP section for any required switch settings or set them identically to the card being replaced. Reinstall the power supply in the chassis and slide it in slowly, avoiding contact with the front panel of the adjacent card, until it mates with the connector. Seat card firmly to avoid contact bounce. Secure the retaining screws at the top and bottom of the assembly.

2.3. SETUP

Setup of this power supply involves an on-board 4-position switch that provides control of the front panel Status LEDs and the card's alarm conditions. SW1 has the following functions:

SW1-1	"AC_GRN"
ON	Enables the front panel AC STATUS LED to illuminate green when the AC supply has power.
OFF	Disables the AC STATUS LED green indication when the AC supply has power (LED off). Provides the same indication (none) as older 56K power supplies (560-5149).
SW1-2	"AC_EN"
ON	Enables AC power supply fault reporting to the 560-5179 Fault Monitor/CPU card. No power = alarm.
OFF	Disables AC power supply fault reporting to the 560-5179 Fault Monitor/CPU card. No power = no alarm.

SW1-3	"DC_EN"
ON	Enables DC power supply fault reporting to the 560-5179 Fault Monitor card. No power = alarm.
OFF	Disables DC power supply fault reporting to the 560-5179 Fault Monitor card. No power = no alarm.
SW1-4	"DC_GRN"
ON	Enables the front panel DC STATUS LED to illuminate green when the DC supply is available.
OFF	Disables the DC STATUS LED green indication when the DC supply has power (LED off). Provides the same indication (none) as older 56K power supplies (560-5149).

The front panel AC and DC STATUS LEDs will illuminate red when the associated power source is off (and backplane power is available from another source).

The factory defaults for SW1 is all ON – both AC and DC Status LEDs indicate green when the associated power is on and either AC or DC loss of power will cause a fault condition.

SECTION THREE

3. THEORY OF OPERATION

3.1. GENERAL INFORMATION

This section contains a brief description of the circuits on the 560-5309 power supply card.

3.2. HARDWARE DESCRIPTION

The power supply utilizes an AC Input Filter located on the 560-1239-1 Power Entry Module, AC-to-DC power supply, power OR-ing diodes, solid state relays for LED Status and power supply fault reporting, and the 4-position SW1 control switch.

3.3. DETAILED DESCRIPTION

3.3.1. AC INPUT FILTER

The input filter consists of an electromagnetic interference (EMI) filter. The filter reduces common and differential mode EMI conducted into and/or out of the chassis. This filter is located on the Power Entry Module located at the rear of the chassis mid-plane, directly behind the associated power supply.

3.3.2. AC-to-DC POWER SUPPLY

The wide range AC power supply provides a 56 VDC output. This output may be the primary power source for the 56K chassis.

3.3.3. OR-ING DIODES

Power is delivered to the backplane via 10 Amp diodes -- one diode in the AC power supply leg and one in the DC input leg. This connects the two power sources in a primary/secondary configuration, where the source with the highest voltage provides power to the 56K chassis.

The front panel test points (marked as 48VDC DC and AC) connect to these power sources and provide a means to measure the sources rather than the voltage on the 56K backplane.

3.3.4. STATUS INDICATION

The front panel fault indicators are powered by the backplane power source. This power can be from either the 560-5309 AC or DC source or the AC or DC source from another 560-5309 power supply that has been installed in the 56K chassis to provide redundancy. When backplane power is available, the LED STATUS indicators will illuminate red when the corresponding power source is off. This could be caused by a loss of power at the source, a disconnected power entry power-input cable, a blown power entry fuse, or a failed power supply.

If SW1 switches 1 and 4 are on, the LED STATUS indicators will illuminate green when the corresponding power source is on. If SW1 switches 1 and 4 are off, the STATUS indicators will be off to indicate that power from both sources is on.

The front panel STATUS LEDs are controlled by solid-state relays. Note that the STATUS indicators may activate briefly during a hot-swap or power-up.

3.3.5. BACKPLANE FAULT OUTPUT

Each power supply slot contains a fault output, which can be read by the Fault Monitor CPU. If SW1 switches 2 and 3 (AC_EN, DC_EN) are on, the CPU will respond to a fault from either source by setting all fault status and status register bits HIGH for the chassis slots of the faulting power supply module. The fault alarm signal from either the AC or the DC source can be made inactive by setting the appropriate SW1 switch off.

Solid-state relays (and SW1-2 & 1-3) control the fault output. Note that a power supply fault may activate briefly during a hot-swap or power-up.

SECTION FOUR

4. ADDITIONAL STEPS

4.1. RACK MOUNTING THE 56K CHASSIS

The 56000 Unit is designed for mounting in a standard 19-inch (48.26 cm) rack. Follow the rack manufacturer's instructions for mounting the 56000 Unit while observing the following guidelines:

- **Elevated Operating Temperature:** If the 56000 Unit is installed in a closed or multi-unit rack assembly, the ambient temperature of the rack environment may be greater than the 56000 Unit 's Maximum Operating Temperature of 50°C/122°F. Install the 56000 Unit in an environment that is compatible with the 56000 Unit 's operating temperature range, which is 0 °C to 50 °C, or 32 °F to 122 °F
- **Reduced Air Flow:** Position the 56000 Unit with enough space above, below, and adjacent to the chassis to allow an adequate flow of air so that it may operate safely. Symmetricom recommends leaving 1.4 Inches (3.6 cm) above and below the 56000 Unit or enough space to allow 5 CFM.
- **Mechanical Loading:** Mount the 56000 Unit so as to avoid uneven mechanical loading that could cause hazardous conditions.
- **Circuit Overloading:** Observe the power ratings on the 56000 Unit 's nameplate and the additional load the 56000 Unit may place on the supply circuit. Overloading the supply circuit may adversely affect the supply wiring and over-current protection.
- **Reliable Earthing:** Maintain reliable earthing (grounding) of rack mounted equipment. Pay particular attention to supply connections other than direct connections to the branch circuit (e.g., use of power strips).

Warning: Install the 56000 Unit to allow adequate air flow through and around the unit. Symmetricom recommends leaving 1.4 Inches (3.6 cm) above and below the chassis or enough space to allow 5 CFM.

Avertissement : Installez le the 56000 pour permettre un flux d'air autour et a travers l'unité. Symmetricom recommande de laisser 1.4 inches (3.6 cm) au-dessus et au-dessous du chassis ou assez d'espace pour permettre 5 CFM.

Warning: Prior to servicing the interior of a unit, remove any power connections.

Avertissement : Avant entretenir l'intérieur d'une unité, enlever n'importe quelles connexions de pouvoir.

4.2. AC POWER SUPPLY OPERATION

Warning: The 56000 Unit should only be plugged into a grounded receptacle. Symmetricom recommends that the chassis external ground be connected to a reliable earth ground.

Avertissement : Relier cet appareil à une prise de courant avec contact suffisant de mise à la terre. Symmetricom recommande que le châssis soit relié à une terre fiable.

4.3. DC POWER SUPPLY (48 VDC OPERATION MODEL) INSTALLATION

Please note the following:

- Use a 15-amp DC circuit breaker in series with the DC power source.
- Do not connect the unit directly to a DC power source without the breaker.
- **14 AWG (1.5mm²) gage** wire is the minimum gage recommended for DC power source hookup.
- The Unit chassis must be grounded for proper safety.

Warning: Ensure that a disconnect device, such as a switch, with the appropriate voltage/current rating is provided when connecting a DC power source to the 48 VDC Operation Model.

Avertissement : S'Assurer qu'un débrancher l'appareil, tel qu'un commutateur, avec le classement de tension/courant approprié est fourni en connectant une source de pouvoir au Modèle de 48 VDC.