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EXM-PS

Power Supply Module

Reference

RadiSys® Corporation

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FAX: (503) 646-1850

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Hardware Warranty

RadiSys Corporation ("RadiSys") warrants the EPC system and component modules to the original purchaser for two years from the product's shipping date. If an EPC product fails to operate in compliance with its specification during this period, RadiSys will, at its option, repair or replace the product at no charge. The customer is, however, responsible for shipping the product; RadiSys assumes no responsibility for the product until it is received. This warranty does not cover repair of products that have been damaged by abuse, accident, disaster, misuse, or incorrect installation.

RadiSys' limited warranty covers products only as delivered. User modification, such as the addition of memory arrays or other devices, may void the warranty, and if the product is damaged during installation of the modifications, this warranty does not cover repair or replacement.

This warranty in no way warrants suitability of the product for any specific application.

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1. Product Description

This manual contains the information required to install and use the EXM-PS power supply module.

The EXM-PS is a power supply module in the EXM form factor, designed to power a RadiSys Embedded Modular Computer (EMC) system from a DC input voltage. It is designed for use in a small chassis such as the EMC-CC4.

Two versions of the EXM-PS are available: one is a 24-VDC nominal input model (EXM-PS24DC) and the other version is a 48-VDC nominal input voltage model (EXM-PS48DC).

These power supplies are designed to meet the specifications of British Telecom BTR 2511, with respect to immunity to transients and noise on the incoming power, and conducted noise and ripple.

The EXM-PS is based on a packaged, multi-output DC-DC converter. Other circuitry on the EXM-PS includes a power switch, fuse, filter components, and a 5V-detect circuit. The EXM-PS front panel contains a connector for input power, a power switch, a replaceable fuse holder, and three LEDs. The LEDs are labeled Power On, +5V OK, and Overtemp.

Note that the EXM-PS typically is convection cooled. If temperature-related problems occur, a forced-air fan may be required in the system. Contact RadiSys Technical Support for more information.

There are several safety considerations to follow. Safety considerations are listed in Section 2.

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Specifications

Table 1 defines the environmental and electrical specifications of the EXM-PS.

Output rating	+5VDC	500mA min., 6.0A max.
	+12VDC	650mA
	-12VDC	650mA
	-15°C to +60°C	15W output
	-15°C to +40°C	25W output
	Load regulation	3% max
	Line regulation	3% max
	Ripple & Noise	5V: 100mV ±12V: 250mV
Efficiency	Nominal	~75% at full load
Temperature	Operating	-15°C to +60°C
	Storage	-62°C to +85°C
Humidity	Operating	5% to 95% non-cond.
	Storage	5% to 95% non-cond.
Vibration	Operating	.015" P-P 2.5g (max) 5 to 2000 Hz
	Storage	.030" P-P 5.0g (max) 5 to 2000 Hz
Shock	Operating	30G, 11 msec, ½ sine wave
	Storage	50G, 11 msec, ½ sine wave
Dimensions (with tabs & connectors)	Height	106.7 mm (4.2 in)
	Width	20.3 mm (0.8 in)
	Depth	172.7 mm (6.8 in)
Weight		1.02 kg (2.25 lbs)
Input Voltage	EXM-PS-DC24	18-36 VDC
	EXM-PS-DC48	36-72 VDC
Input Current	EXM-PS-DC24	1.8A (25W load)
	EXM-PS-DC48	0.9A (25W load)
Inrush Current		15A max.
Fuse Type	EXM-PS-DC24	IEC Pub. 127/III, 6.30A 250V
	EXM-PS-DC48	IEC Pub. 127/III, 3.15A 250V

Table 1. EXM-PS Environmental and Electrical Specifications.

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2. Installation

2 2

Before installing the EXM-PS, unpack and inspect it for shipping damage.

✉ **DO NOT REMOVE THE MODULE FROM ITS ANTI-STATIC BAG UNLESS YOU ARE IN A STATIC-FREE ENVIRONMENT. THE EXM-PS, LIKE MOST OTHER ELECTRONIC DEVICES, IS SUSCEPTIBLE TO ESD DAMAGE. ESD DAMAGE IS NOT ALWAYS IMMEDIATELY OBVIOUS, IN THAT IT CAN CAUSE A PARTIAL BREAKDOWN IN SEMICONDUCTOR DEVICES THAT MIGHT NOT IMMEDIATELY RESULT IN A FAILURE.**

✉ **ENSURE THAT THE INSTALLATION PROCESS AS DESCRIBED HEREIN IS ALSO PERFORMED IN A STATIC-FREE ENVIRONMENT.**

Safety

Please take a moment to review these safety precautions. They are provided for your protection and to prevent damage to the module. This safety information applies to all operator and service personnel.



The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance instructions in the literature accompanying the product. If you see this symbol on the EXM-PS, be sure to refer to this manual.

	indicates DANGER. These are safety issues that, if not followed, could result in severe personal injury.

!	indicates WARNING. These are informational instructions that pertain to proper use and protection of the EXM-PS power module.

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2 2

The EXM-PS case is grounded via the front-panel ground connection on the power input terminal strip. This terminal MUST be connected to ground to prevent a shock hazard in the event of a malfunction of the EXM-PS unit.

Do not operate this product in an atmosphere of explosive gases. The module provides no explosion protection from static discharge or arcing components.

! Never apply a voltage higher than the rating shown on the front panel of the EXM-PS unit. Higher voltages may cause the fuse on the EXM-PS to blow, and may cause damage to the power supply circuits.

! For continued protection against risk of fire, replace fuses with only the same type and ratings.



To lessen the risk of electric shock, the potential between ground and either the + or - inputs should be less than 72 volts.

Insertion in an EMC Chassis

Insertion of the EXM-PS into an EMC chassis is straightforward. Make sure the power is not connected to the EXM-PS and that the front panel power switch is off. Remove any blank EXM panel from the chassis (by unscrewing the thumbscrews) and insert the EXM-PS into the card guides. Firmly press the EXM-PS front panel to ensure that the module is properly seated in the backplane and secure it with the thumbscrews. Tighten with a screwdriver to lessen shock hazard.

WHEN INSERTING THE EXM, AVOID TOUCHING THE CIRCUIT BOARD, AND MAKE SURE THE ENVIRONMENT IS STATIC-FREE.

INSERT IT WITH ADEQUATE CONTINUOUS FORCE RATHER THAN TAPPING OR HAMMERING ON IT.

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Power Connector

To attach a power cable to the front-panel power connector, strip back the outer insulation 1 1/2" and separate the individual wires. Strip the insulation on each individual wire 1/4" - 3/8". If the power cable has three conductors plus a shield wire, twist the shield wire and the ground wire together before inserting into the connector. One wire at a time, insert each wire until no bare wire is showing and tighten the holding screw.

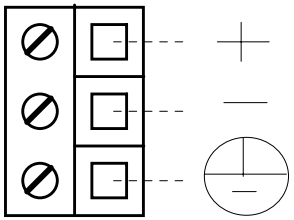


Figure 1. Power Connector.

Note: Only use 14 AWG wire in making connections to the power connector.

Positive and negative inputs are isolated from the chassis ground. Either positive or negative can float to a maximum of 72 VDC as long as the "potential" difference across the two connectors does not exceed the input specification.

The chassis ground connection is also connected to logic ground on the EXM expansion interface.

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2 2

Cooling Requirements

The system should be installed so that a minimum of 5" of air space is provided on each of the exposed sides of the chassis holding the EXM-PS. In no case should the temperature of the heatsink on the EXM-PS be allowed to exceed 100°C.

If you have continued "overtemp" problems, a forced-air fan may be necessary to cool the entire system.

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3. Operation

3 3

Power Switch

The front-panel switch disconnects the input power from the supply when in the "Off" position (labeled with the letter "O"). To avoid any chance of ESD damage, be sure to wait at least ten seconds after turning the power off before removing any EXM modules or the EXM-PS from the chassis.

Fuse

The replaceable fuse is accessible from the front panel. It is housed in a ¼ turn socket immediately above the power switch. The correct replacement fuse type is specified on the front panel immediately above the fuse socket. When replacing the fuse, be sure to use the same type and rating fuse specified.

LEDs

There are three front-panel LEDs: Power On, Overtemp, and 5VDC OK. These LEDs are explained below.

Power On

Power On indicates that the power supply is providing output power to the backplane.

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Overtemp

Overtemp is lit whenever the internal temperature of the power supply exceeds 100°C. DO NOT allow continued operation of the EXM-PS if this LED is illuminated.

5VDC OK



5VDC OK indicates that the 5V output voltage is greater than 4.6V typical ± .1V. This LED circuit only measures under-voltages, not over-voltages.

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4. Support and Service

In North America

Technical Support

RadiSys maintains a technical support phone line at (503) 646-1800 that is staffed weekdays (except holidays) between 8 AM and 5 PM Pacific time. If you have a problem outside these hours, you can leave a message on voice-mail using the same phone number. You can also request help via electronic mail or by FAX addressed to RadiSys Technical Support. The RadiSys FAX number is (503) 646-1850. The RadiSys E-mail address on Internet is support@radisys.com. If you are sending E-mail or a FAX, please include information on both the hardware and software being used and a detailed description of the problem, specifically how the problem can be reproduced. We will respond by E-mail, phone or FAX by the next business day.



Technical Support Services are designed for customers who have purchased their products from RadiSys or a sales representative. If your RadiSys product is part of a piece of OEM equipment, or was integrated by someone else as part of a system, support will be better provided by the OEM or system vendor that did the integration and understands the final product and environment.

Bulletin Board

RadiSys operates an electronic bulletin board (BBS) 24 hours per day to provide access to the latest drivers, software updates and other information. The bulletin

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board is not monitored regularly, so if you need a fast response please use the telephone or FAX numbers listed above.

The BBS operates at up to 14400 baud. Connect using standard settings of eight data bits, no parity, and one stop bit (8, N, 1). The telephone number is (503) 646-8290.

Repair Services

Factory Repair Service is provided for all RadiSys products. Standard service for all RadiSys products covers factory repair with customers paying shipping to the factory and RadiSys paying for return shipment. Overnight return shipment is available at customer expense. Normal turn-around time for repair and re-certification is five working days.

Quick Exchange services (immediate shipment of a loaner unit while the failed product is being repaired) or other extra-cost services can be arranged, but need to be negotiated in advance to allow RadiSys to pool the correct product configurations. RadiSys does not maintain a general "loaner" pool: units are available only for customers that have negotiated this service in advance.

RadiSys does not provide a fixed-price "swap-out" repair service, as customers have indicated that issues of serial number tracking and version control make it more convenient to receive their original products back after repair.

Warranty Repairs

Products under warranty (see warranty information in the front of this manual) will have manufacturing defects repaired at no charge. Products sent in for warranty repair that have no faults will be subject to a recertification charge. Extended Warranties are available and can be purchased at a standard price for any product still under warranty. RadiSys will gladly quote prices for Extended Warranties on products whose warranties have lapsed; contact the factory if this applies.

Customer induced damage (resulting from misuse, abuse, or exceeding the product specifications) is not covered by the standard product warranty.

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Non-Warranty Services

There are several classes of non-warranty service. These include repair of customer induced problems, repairs of failures for products outside the warranty period, recertification (functional testing) of a product either in or out of warranty, and procurement of spare parts.



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All non-warranty repairs are subject to service charges. RadiSys has determined that pricing repairs based on time and materials is more cost-effective for the customer than a flat-rate repair charge. When product is received, it will be analyzed and, if appropriate, a cost estimate will be communicated to the customer for authorization. After the customer authorizes the repair and billing arrangements have been made, the product will be repaired and returned to the customer.

A recertification service is provided for products either in or out of warranty. This service will verify correct operation of a product by inspection and testing of the product with standard manufacturing tests. There is a product-dependent charge for recertification.

There are only a few components that are generally considered field-repairable, but, because RadiSys understands that some customers want or need the option of repairing their own equipment, all components are available in a spares program. There is a minimum billing charge associated with this program.

Arranging Service

To schedule service for a product, please call RadiSys Technical Support directly at (503) 646-1800. Have the product model and serial numbers available, along with a description of the problem. A Technical Support representative will issue a Returned Materials Authorization (RMA) number, a code number by which we track the product while it is being processed. Once you have received the RMA number, follow the instructions of the Technical Support representative and return the product to us, freight prepaid, with the RMA number clearly marked on the exterior of the package. If possible re-use the original shipping containers and packaging. In any case, be sure you follow good ESD-control practices when handling the product, and ensure that anti-static bags and packing materials with adequate padding and shock-absorbing properties are used.

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Ship the product, freight prepaid, to

Product Service Center
RadiSys Corporation
15025 SW Koll Parkway
Beaverton, Oregon 97006-6902



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When shipping the product, include the following information: return address, contact names and phone numbers in purchasing and engineering, and a description of the suspected problem. Any ancillary information that might be helpful with the debugging process will be appreciated.

Other Countries

Contact the sales organization from which you purchased your RadiSys product for service and support.

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