EM-P328-SD-OVR-R2

Rugged 6U Power Supply Board

- 6U conduction cooled
- 500 Watts Outputs Power total
  - 5 V @ 60 A
  - 3.3V @ 30 A
  - +12V @ 6.5 A
  - -12 V @ 2.0 A
  - Optional +12V @ 40 A (HP)
- 85% - 89% Efficiency
- 16 - 36 Vdc Input Range
- MIL-STD-704 B-F and 1275 E
- EMI/RFI Filter for MIL-STD-461
- Input Transient Protection
- Suitable for VME Systems
- Protection against Under- and Over-voltage, Overcurrent, Under- and Overtemperature
- Thermal shutdown override
- ~ACFAIL, ~SYSRST and ~SYSFAIL Control Signals
- Input/Output and Chassis Isolation
- External ON/OFF Control
- BIT Status and Alarms for Voltages, Currents & Temperatures
- Metric screws for chassis wall (captive M3) and wedgelocks
- RoHS II compliant

Overview

The EM-P328-SD-OVR-R2 is a reliable 6U power supply designed for mission critical rugged systems with a wide input voltage range (16 - 36 Vdc) to ensure excellent load and line regulation.

An input line filter is used for EMI reduction to reduce the input reflected ripple.

The power supply outputs four common voltages for VME, VPX and CompactPCI systems, with a maximum total combined output of 500 watts.

All output voltages have sense lines to ensure voltage stability for high current loads. Furthermore, all outputs are individually protected against short-circuit and over-voltage.

The EM-P328-SD-OVR-R2 supports 2300 V isolation from input to output, which eliminates the possibility of ground loops.

Temperatures are monitored by the DC/DC converters and additional external temperature sensors. DC/DC converters are switched off in case of overtemperature.

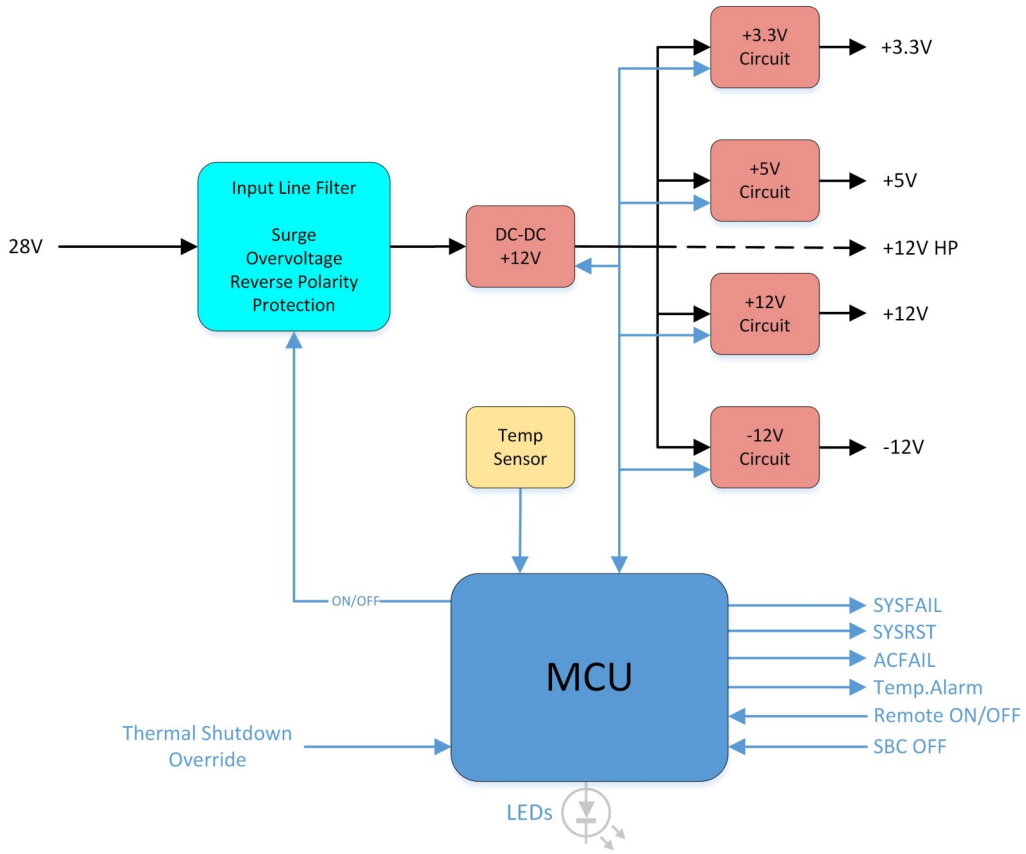
Overtemperature shutdown can be bypassed by the Thermal Shutdown Override input.

The onboard MCU generates alarms and provides BIT results and status signals (SYSRST, SYSFAIL and ACFAIL).

A discrete input enables the power supply to be turned on and off remotely.

Indicator LEDs provide a visual indication of power supply status.

EM-P328-SD-OVR-R2 Power Supply Block Diagram



Functional Description

Input Voltage Operation and Protection

The EM-P328-SD-OVR-R2 power supply operates over a continuous DC input voltage range of 16 - 36 V.

The power supply provides full specification operation with input power compliant to MIL-STD-704 (B-F) and 1275.

Output Voltage Operation and Protection

Four independent power supply circuits provide four isolated outputs (+12V/6.5 A, +5 V/60 A, +3.3 V/30 A and -12 V/2.0 A).

High power version with +12V/40 A on separate high power pin is available as ordering option.

Total combined output power capacity is 500 W before derating (see derating graph on next page).

The power supply circuits feature > 2300 V input to output isolation, eliminating any possibility of ground loops. Each DC/DC converter has its own current limitation implemented.

Outputs are protected against short circuit, overcurrent, and overvoltage.

All output voltages are equipped with sense lines that are routed to the power connector.

External Control Signals

3 discrete inputs enable external control of the EM-P328-SD-OVR-R2.

- Remote ON/OFF – Referenced to input GND
- SBC OFF – Referenced output GND. This signal puts the EM-P328-SD-OVR-R2 into a latched OFF state. To turn it back ON, input voltage must be removed and reapplied or the Remote ON/OFF signal (above) must be used to turn power off and on again.
- Thermal Shutdown Override – Referenced output GND. This signal overrides the automatic over temperature shutdown of the internal components.

Temperature Monitoring

Internal temperatures are monitored by the DC/DC converters with additional external temperature sensors.

If the power supply is going to overheat an output alarm signal at the power supply connector is set (temperature above 90°C or 125°C at DC-Input). When the temperature reaches 100°C or 150°C at DC-Input the power supply is shut down.

This mechanism can be disabled by using the Thermal Shutdown Override input.

Status LEDs

The internal MCU continuously collects the BIT data from all DC/DC converters (voltages, currents, temperatures).

Four green LEDs indicate that the four output voltages are within specification limits, and three red LEDs indicate when the SYSRESET, SYSFAIL, and ACFAIL signals are asserted. An additional green LED indicates power supply normal operation by blinking.

Power Monitor Circuit

The EM-P328-SD-OVR-R2 acts as a power monitor for the system with respect to the signals SYSRST#, SYSFAIL#, and ACFAIL#.

ACFAIL# is asserted in the event of an input power loss or failure of the +12 V, +5 V or +3.3 V output.

SYSRST# is asserted for 200 ms at any power-on event.

SYSFAIL# is asserted during any power-on event until the EM-P328-SD-OVR-R2 reaches fully operational mode. During normal operation SYSFAIL# is asserted to indicate a power supply failure.

Mechanical and Thermal Construction

The EM-P328-SD-OVR-R2 is a 6U power supply, equipped with wedgelocks and extractors for easy removal.

Cooling of the EM-P328-SD-OVR-R2 is by heat transfer through the wedgelocks and the surface of its heatsink. Two mounting screws are used to seat the EM-P328-SD-OVR-R2 firmly against the cooling surface of the housing.

Mounting screws (captive M3) and wedgelocks have metric allen heads.

EMI/RFI Design

The power supply is equipped with an on board EMI/RFI input line filter on the input power lines, to meet the requirements of MIL-STD-461.

All high power and noisy components are cooled and shielded by the monolithic heatsink.

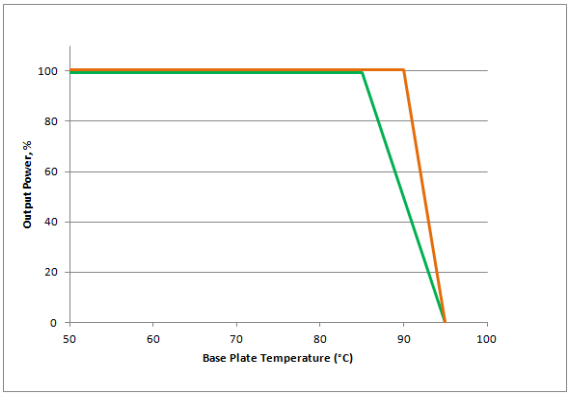
Power Supply Connector

The power supply is equipped with two power connectors at the edge of the board.

Efficiency

Typical efficiency of the power supply is 85% to 89% (DC/DC converters 93%) depending on operating load, input voltage, and operating temperature.

Derating



Thermal derating Output Power vs. temperature at module cover. (ΔT to wedgelock 7°C)

Specifications

Input

Normal Steady State Operation	16 - 36 Vdc
Overvoltage Protection	up to 60 Vdc
General Characteristics and transient suppression	Per MIL-STD 704 (B-F) and 1275 E

Outputs

Output Specification	OUT1	OUT2	OUT3	OUT4
Voltage (Vdc)	+5V	+3.3V	+12V	-12V
Current (A), Max	60	30	6.5	2.0
Current Limit Point (A)	63	32	7.0	2.2
Ripple/Noise (mVP-P)	40-50	40-50	40-50	40-50
Short Circuit Protection	√	√	√	√

Thermal Shutdown

- 100°C ± 5°C

Isolation Resistance

- >10 MΩ at 100 V input to chassis
- >10 MΩ at 100 V output to chassis
- >10 MΩ at 500 V input to output

Environmental

Designed to meet the following standards:

Temperature (MIL-STD-810G)

- Maximum Operating Temperatures (wedgelock): -40 to +85 °C
- Storage Temperature: -55 to + 105 °C

Altitude (MIL-STD-810G)

- Operating: Up to 50,000 ft.

Humidity (MIL-STD-810G)

- MIL-STD-810, 500.5 - Procedure I, II, III
- 0 - 95% relative humidity

Random Vibration (MIL-STD-810G)

- MIL-STD-810, 514.6 - Procedure I, Class V3

  withstand vibration for 1 hour per axis:
  5 Hz to 100 Hz PSD increasing at 3 dB/octave
  100 Hz to 1000 Hz PSD = 0.1 g^2/Hz
  1000 Hz to 2000 Hz PSD decreasing at 6 dB/octave

Shock (MIL-STD-810G)

- MIL-STD-810, 516.6 - Procedure I, VI, Class OS2

  withstand exposure to 40g, 11 ms shock
  half-sine or terminal sawtooth shock pulses
  in all three axes

EMC Protection (MIL-STD-461E/462)

- additional filter circuitry in the chassis may be required

Mechanical Specifications

Height	233.35 mm
Depth	160 mm (excluding connectors)
Width	23.2 mm
Weight	1244 g

Ordering Information

Configuration	Description	Order Code
EM-P328-SD-OVR-R2	Rugged 6U VMEbus Power Supply Board, 500 Watt Output, 16 - 36 Vdc Input Range, conduction cooled, -40 to +85°C operating temperature, thermal shutdown override Input, +3.3V, +5V and +12V sense inputs, metric screws for chassis wall (captive M3) and wedgelocks, RoHS II compliant	**A09231**
EM-P328-SD-OVR-R2-HP	EM-P328-SD-OVR-R2 with additonal high power output +12V/40A On request (MOQ)	**A09245**

Contact

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