



DC/DC Power Supply PC/104 Module

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1. DESCRIPTION

JUPITER-MM is a PC/104-format power supply module designed for mobile as well as stationary embedded applications. The JUPITER-MM is designed using a high efficiency DC/DC converter circuit to provide the maximum power with minimum losses. Power supply performance and reliability have been optimized through the use of precision surface mount components. The Jupiter-MM series contains significant advances in mobile embedded power supply technology:

- ◆ **Surface Mount Components**

To the maximum extent possible, surface mount components have been used in the design, to lower the profile and improve ruggedness. An additional benefit to SMT technology is the improved ability to use the PCB planes as a heat sink.

- ◆ **High Efficiency, High-Frequency Design**

Efficiency is as high as 92 percent, lowering input power requirements as well as heat generation. The 200KHz switching circuit allows the use of smaller inductors, reducing size and weight and allowing the board to fully fit within the PC/104 height requirements.

- ◆ **Advanced Heat Sink Technology**

A new compressible thermally-conductive material mounted under the aluminum heat sink makes it possible to wick heat away effectively from varying height components. Also, the use of surface mount components and careful PCB design enhance the dissipation of heat through the PCB planes.

- ◆ **Remote On/Off Control**

The supply can be turned on and off with an external contact closure through an auxiliary connector.

- ◆ **Extended Temperature Operation**

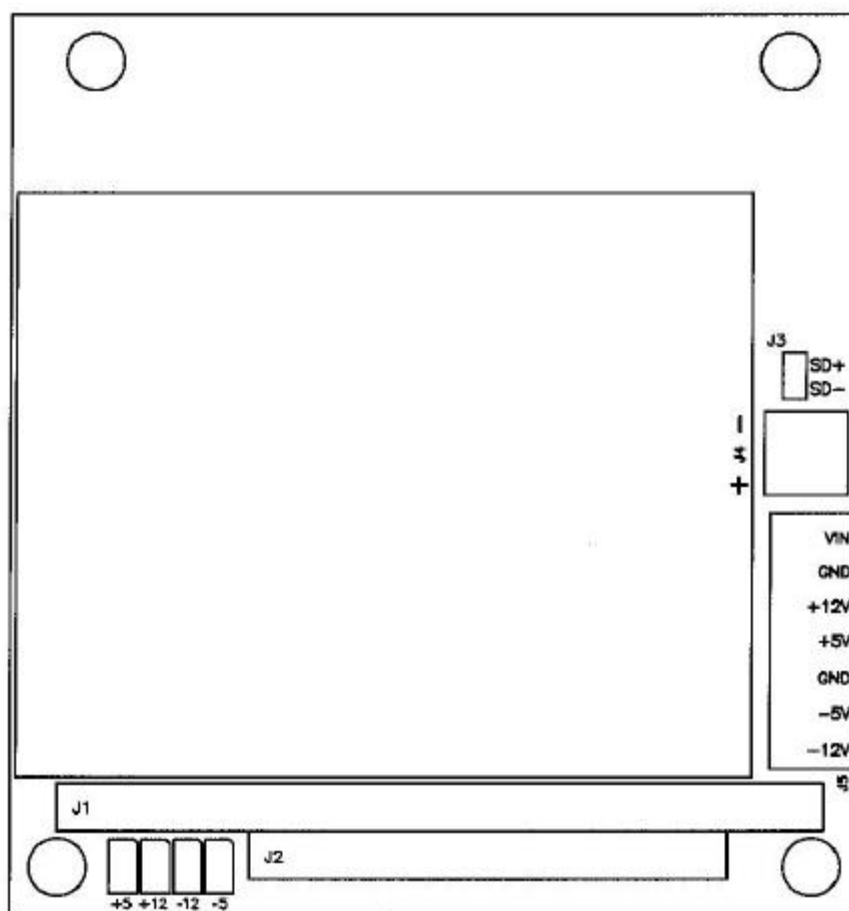
Extended temperature (-40 to +85°C) operation is standard, enabling the supplies to be used in vehicle applications and other harsh environments.

Jupiter-MM is available in two standard configurations of output power and output voltages:

JMM-512 50W, +5/+12V outputs

JMM-512-V512 50W, +5/+12/-5/-12V outputs

2. BOARD DRAWING



- J1 PC/104 8-bit bus header
- J2 PC/104 16-bit bus header
- J3 Shutdown control input
- J4 Main power input
- J5 Power input/output connector

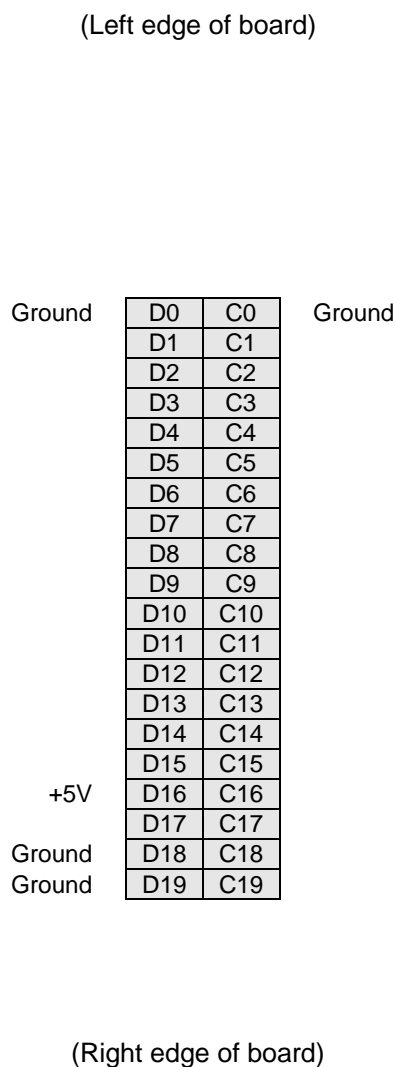
3. I/O HEADER PINOUTS

Jupiter-MM provides connections for input, input/output, remote on/off control, and PC/104 bus. All I/O connectors except the PC/104 bus connectors are located along the right side of the board.

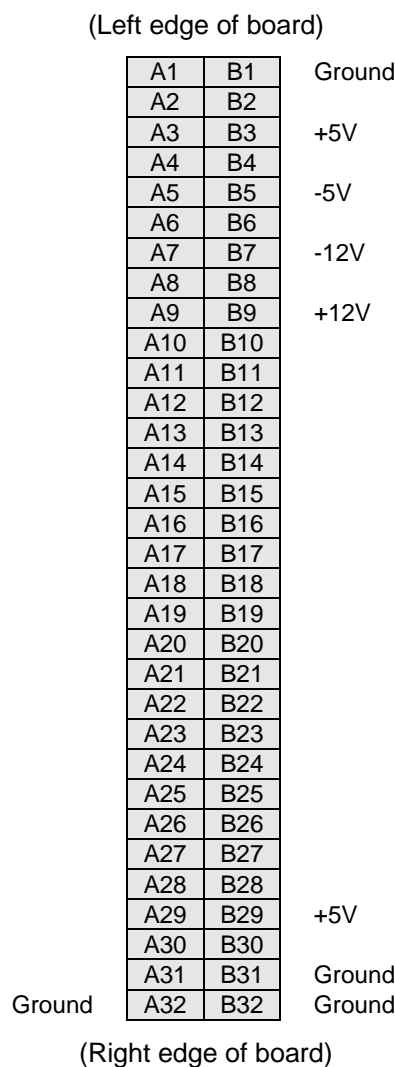
PC/104 Bus Connectors

For simplicity, signal names are only shown for pins with connections on board. All remaining pins are not used on Jupiter-MM.

J1: PC/104 8-bit bus connector



J2: PC/104 16-bit bus connector



Main Input Power – J4

J4 consists of a detachable 2-pin screw terminal block. The screw terminals will accept wire sizes from 18-28 gauge. The input polarity is shown in markings on the board adjacent to the board-mounted connector.

The detachable portion of the screw terminal is Phoenix Contact type no. MC1.5/2-ST-3.81, part no. 1803578.

1	Positive Input
2	Input Return

Auxiliary Input/Output Power – J5

J5 consists of a detachable 7-pin screw terminal block. The screw terminals will accept wire sizes from 18-28 gauge.

The detachable portion of the screw terminal is Phoenix Contact type no. MC1.5/7-ST-3.81, part no. 1803620.

1	Positive Input
2	Input Return
3	+12V Output
4	+5V Output
5	Ground
6	-5V Output
7	-12V Output

Shutdown Control – J3

Shutdown may be implemented by shorting the two pins on J3 together. J3 consists of a .1" spacing friction lock header, Amp part no. 640457-2. The mating connector with integrated IDC contacts is included with the board. It is also a stock item at Digi-Key (Tel 800-344-4539 in the US, or www.digikey.com). The part nos. for several compatible mating connectors are shown below. Each contact is rated for 4A using 22AWG wire.

1	Shutdown input
2	Ground

Item	Amp Part No.	Digi-Key Part No.	Description
Mating Connectors	640442-2	A19030	26 AWG, Blue
	640441-2	A1901	24 AWG, White
	640440-2	A1906	22 AWG, Red

4. INSTALLATION

All JUPITER-MM power supplies are load tested prior to shipping. The supplies ship with all the external connectors required to start using your supply immediately.

No user configuration is required for any version of Jupiter-MM. Simply plug in the input power and the supply is operational. To power up your supply:

1. For protection, if you are unfamiliar with the use of this product, do not plug any other boards onto it when powering it up for the first time.
2. Connect a DC source to Main power J4, or to the Auxiliary connector J5. The supply will operate with input voltages from 7 to 30VDC.

CAUTION: Voltages above 31V will be shunted to ground through a transient voltage supressor (TVS) on the board. The TVS is rated for 1,500 watt surges. However it could be damaged by sustained voltages above 31V.

CAUTION: The supply is not protected against reverse polarity inputs. To add this protection would dissipate excessive heat and power, reducing the efficiency. Check your wiring for correct polarity before powering up the supply.

3. Once the input voltage is in the valid range, verify that the power output indicator LEDs in the lower left corner are illuminated. This verifies your input power connections and the supply are fully functional. Note that only indicators corresponding to the voltages available on the supply will be lit. On the dual output version, the -5V and -12V LEDs may be present on the board but will not be lit.
4. Power down the supply. Plug the supply into your PC/104 stack. Your system is ready to use.

5. OUTPUT VOLTAGES AND CURRENTS

Jupiter-MM provides either 2 or 4 output voltages. The outputs appear on the PC/104 bus headers J1 / J2 as well as on the auxiliary I/O connector J5. The table below lists the maximum ratings for each output voltage.

Output	JMM-512	JMM-512-V512	JMM-512-LP	Notes
+5V	10A	10A	5A	Maximum rating achieved when only +5V output is used. Power drawn from additional outputs will reduce the available power on this line.
+12V	2A	2A	2A	
-5V	-	0.2A	-	
-12V	-	0.75A	-	

6. OUTPUT PROTECTION

All outputs on the Jupiter-MM power supply are protected against overload on the outputs. The protection for each output circuit is slightly different:

+5V	Current limited to 10A. Above 10A the output voltage will drop to maintain maximum output of 50W. A short circuit will shut down the entire supply.
+12V	Current limited to 2A. Above 2A the voltage will drop to 5V and output current can increase to 10A (the 5V supply limit). Above 10A the output voltage will continue to drop. A short circuit will shut down the entire supply.
-5V	Current limited to 0.2 – 0.3A. A short circuit will shut down the output due to thermal protection on the output regulator.
-12V	Current limited to 1 – 2A. Above that level the output voltage will drop to zero.

7. SPECIFICATIONS

Input

Input voltage	7-30VDC
Input ripple	<100mV RMS
Transient protection	1500W transient voltage suppressor
Transient cutoff	31V

Output

Output voltage/current	+5V	10A	All models
	+12V	2A	All models
	-5V	0.2A	JMM-512-V512 only
	-12V	0.75A	JMM-512-V512 only
Total output power	50 Watts	JMM-512, JMM-512-V512	
	25 Watts	JMM-512-LP	
Output protection	+5V	Current limited to 10A; short circuit shuts down supply	
	+12V	Current limited to 2A; short circuit shuts down supply	
	-5V	Current limited to 0.2A; thermally protected against short circuit	
	-12V	Current limited to 1A	
Output ripple	<50mV RMS (+5V output, 50% load)		
Load regulation	+/-3%		
Efficiency	80% to 92%, based on load and input voltage		

Mechanical

Size	3.55" x 3.775"
PC/104 bus	J1 (64 pins) and J2 (40 pins) stackthrough connectors installed

Environmental

Operating temperature	-40 to +85°C
Operating humidity	5 to 95% non-condensing