Instruction Manual Revision 13

LV Power LVDC350W3U2IPMI CPCI DC/DC Power Supply.

Thank you for purchasing the LVDC350W3U2IPMI state of the art CPCI power supply.
This supply has been checked and tested prior to shipment. We welcome your comments and input as to how we can still further improve this product, and give you a high feeling of confidence in your system. Please send us your feedback either by Email to Sales@lvpower.com or by Fax to 9729-7494498 or write LV Power 2 Power Rd Salit Ind Area D.N. Sharon Tichon 45885 Israel , Or call 9729-7494495
Address technical matters to TECHNICAL SUPPORT. All other matters to INFO.
WARNING : This power supply is a DC/DC power conversion unit only. The reverse side of the front panel lock incorporates plastic keys allowing the power supply to be inserted into a DC chassis only. Removing the keys and inserting the power supply into an AC system will destroy the supply and invalidate the warranty.

CAUTION: For continued protection against risk of fire replace only with same type and rating of fuse.

Readily accessible overcurrent protection device shall be provided as a part of building installation. overcurrent protection device must meet applicable national and local electrically safety codes and be approved for intended application.

Approvals: The supply is approved to the following international safety and emissions standards.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1)This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.
This Class A/B digital apparatus complies with Canadian ICES-003. Cet appareil num?rique de la classe A/B est conforme ? la norme NMB-003 du Canada.
NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. Changes or modifications not expressly approved by LV Power could void the user's authority to operate the equipment.
CE c UL us E17032

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Installation : Extract the Philips screw that is under the latch as far as possible but WITHOUT OBSTRUCTING THE LATCH WHEN IT IS IN FULL OPEN POSITION. Extract the second Philips screw that is on the other side of the top panel until the screw tip is flush with the panel. In chassis's with more then two power supplies, chouse the side that is closest to the chassis wall (either side) to seat the first supply, and then continue seating supplies sequentially one after the other. Place the supply in the Power supply slot and slide in all the way. Latch the unit firmly in the cage until the front panel leaver lock clicks. Be sure that the unit is seated completely and firmly in the slot. Even a small gap between the connectors may case the unit not to operate, as the short enable pin may not be fully inserted in the connector on the back of the power supply into the chassis connector. Screw in the top and bottom Philips screws on the front panel and tighten to torque of 0.4 Nm.

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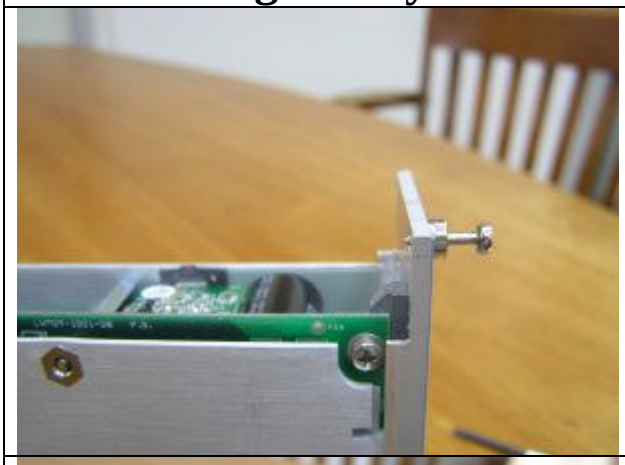
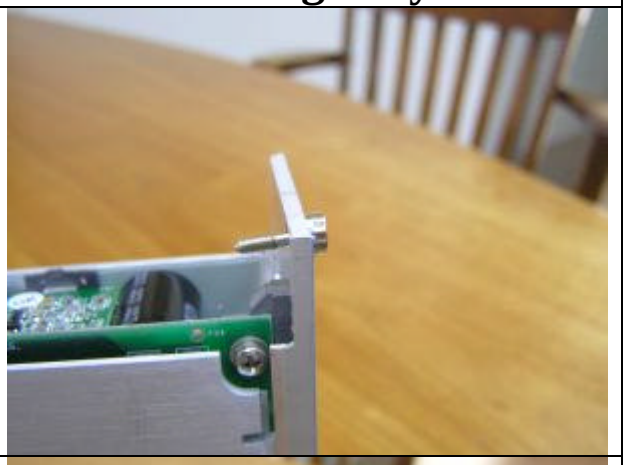
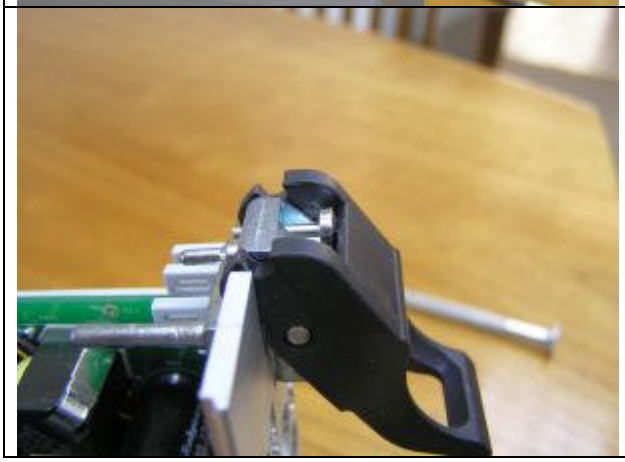
Right Way	Wrong Way
	
	

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Operation and LED Indicators: Once the required number of the Power Supplies are inserted into the chassis the power supplies are ready for operation. In standby operation when the chassis is connected to the DC source, their readiness will be indicated by the front panel LED blinking green and the absence of the illumination of the Red Led. The illumination of the Red color LED (in addition to the illumination of the Green led) indicates a fault status which can be either of the following conditions. The load exceeds specified limits, or there is short circuit on the backplane in the chassis, or that the Power Supply has failed. Normal operation of the supplies occurs during solid Illumination of the Green Led and the absence of Red led illumination.

The front panel LED's functionality according to the power supply state is summarized in detail below. Note that the condition of both leds always need to be taken into account to determine the state of the supply.

A) Standby Operation (Inhibit or Non Enable) : Green LED Blinking slowly (+/- 0.5S) Red Led off.
B) Power supply identification via I²C : Green Led Blinking Red Led off.
C) Normal Operation : Green Led On, Red Led off
D) Fail Status : Red Led on, Green Led on

Replacing Failed units: The power supplies are hot-swappable, so a power supply can be replaced during chassis operation. Remove the failed unit by first unscrewing the top and bottom Philips screws on the front panel, then unlocking the lock (pushing the red lock button) and pulling the level in. Insert the new Power Supply as described in the installation section

Input/Output signals:

There are two control input signals and two information output signals from the supply.
The control signals are the Enable# and the Inhibit# pins. Pins 27 and 39 of the output connector respectively. These signal pins may be operated from the backplane by either TTL, Cmos or open collector logic levels. In order for the supply to operate the Inhibit pin must be Active high, and the enable pin must be Active low. Inside the supply Enable#, Inhibit# pins are internally connected to Pull-ups/ Down which by default keeps it in the off state. See signal characteristics table below:

Inhibit (INH) Enable (ENH)	MIN	MAX
Vi Input Low Voltage	0.1V	0.8V
Iin Low Current, Vin =0.4V		<150uA
Vin Input High Voltage, Iin =-200uA	2.0V	
Vin open circuit, Iin =0		<+15V

Note 1: The ENH# signals shall source <150uA into a grounded input, and shall source <+15V into an open circuit input.

Note 2: In application the INH signal may be activated by either electronic means or by a mechanical switch. The supply incorporates an internal de-bouncing mechanism for a mechanical switch. However it is recommended that the user also incorporate de-bouncing circuitry when using a mechanical switch.

Pin Enable pin 27 is pulled up to logic level High voltage. In order for the supply to operate this pin must be connected to GND on the backplane. If this pin is not grounded (floating) then there will be no output from the supply (Power output will not be applied to the power bus).
Pin Inhibit is pin 39. Internally it is pulled up to logic level High voltage . In order for the supply to operate this pin must not be grounded. Grounding this pin will shut off the supply.

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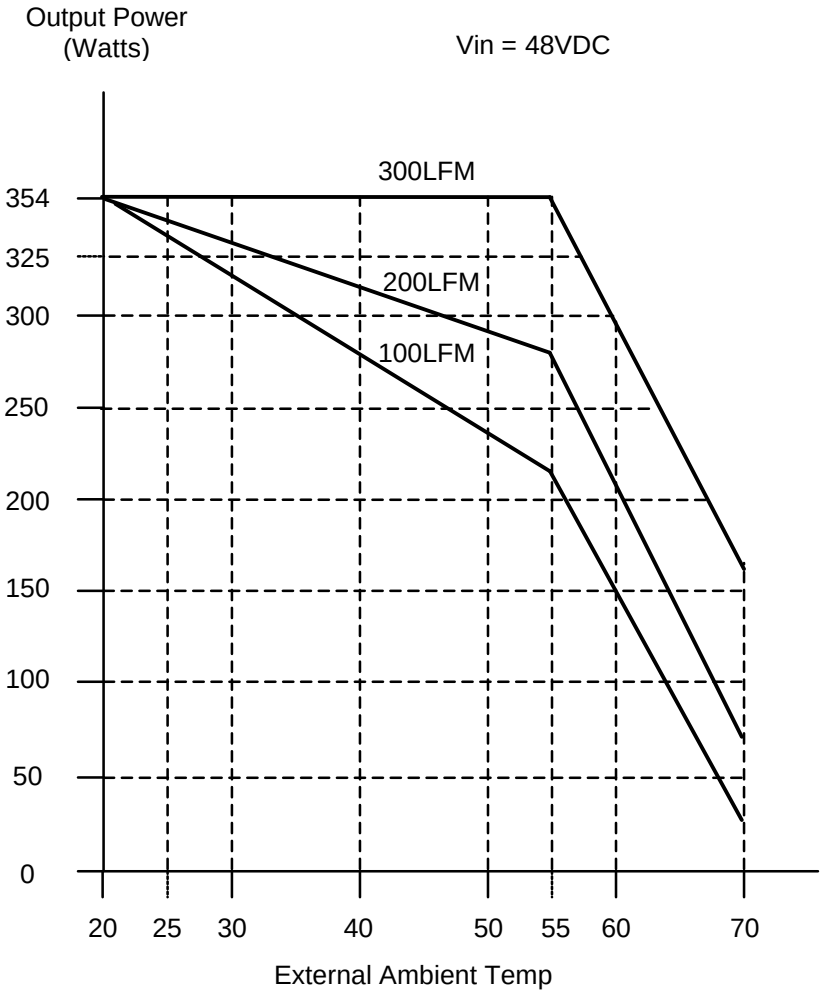
Inhibit has priority over the enable. It is the on /off switch of the supply.

Power Supply Status true table

INH# =	LOW	LOW	HIGH	HIGH
EN# =	LOW	HIGH	LOW	HIGH
Power Status	OFF	OFF	ON	OFF

Output Power vs Temperature and Airflow



Note: LFM is the airflow in feet per minute through the Power Supply.
Ambient temperature is measured in front of the face plate.

The information output signals determining the power supply health status are the **DEG** (degrade) signal and the **Fail** signal. The Degrade Signal is Pin 38. The degrade signal is active low. This signal indicates that the output power needs to be derated as a result of over temperature. This occurs at a temperature of between 70ºC to 80ºC in the power supply. A fail signal occurs at a temperature of over 80ºC. Internally this signal is connected to an open collector transistor. On the backplane side pin 38 needs to be connected to a pull up resistor that may source up to 1 mA to the supply. A voltage of up to 15V can be provided to the pull up resistor.

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The **Fail** signal is pin 42. Internally this signal is connected to an open collector transistor .The fail signal is active low. On the backplane side pin 42 needs to be connected to a pull up resistor that may source up to 1 mA to the supply. A voltage of up to 15V can be provided to the pull up resistor.
The **Fail** signal indicates on any of the following failure conditions:
If any one of the 4 outputs has failed.
If the output voltage drops below **60%** of the programmed DC output voltage.
If the output over Voltage exceeds **125%** of the programmed DC for **10mS**
If the output current is in overload condition (anywhere between the limits of **120% -150% I_{out} max).**
If on the output there is short circuit of 15 **m**W **or less**
If the internal temperature sensor activates (anywhere between 80 +/- 5°C)

Intelligent platform management interface (IPMI)
The supply incorporates IPMI functionality that is transferred via I²C bus to the system architecture by way of pins 37,40 and 43. The IPMI functionality allows monitoring, eventing, and control of the power supply via the central chassis processor.
For general information on IPMI see:
http://developer.intel.com/design/servers/ipmi/ http://www.linktionary.com/i/ipmi.html
http://www.compactpci-systems.com/articles/lee.2.shtml

The supply implements IPMI monitoring, eventing and control for the following sensors.

Feed Status, Feed is considered failed when it is below -36V DC and above -72VDC.
Temperature of critical components/areas
All Output voltages
All Output currents

The Power Supplies supports the following devices

1) Device SDRs (See Default Voltages Below)

Voltages	**3.3V**	**5V**	**12V**	**-12V**
Upper Non Recoverable (over Voltage)	4.000	6.000	14.514	-14.490
Upper Critical	3.824	5.856	14.160	-14.175
Upper Non Critical	3.792	5.760	13.806	-13.797
Lower Non Critical	3.136	4.752	11.387	-11.403
Lower Critical	2.896	4.440	10.443	-10.458
Lower Non Recoverable (Under Voltage)	2.672	4.104	9.440	- 9.450
SDR hysteresis data : +/- 24mV				
Current	**3.3V**	**5V**	**12V**	**-12V**
Upper Non Recoverable	54.760A	35.882	7.000	1.203
Upper Critical	49.728A	33.971	6.080	1.093
Upper Non Critical	39.960A	29.561	5.000	0.995
SDR hysteresis data : 3.3V and 5V : +0.9A -0A SDR hysteresis data -12v : +0.038A - 0A SDR hysteresis data +12v : +0.12A - 0A				
Temperature				
Upper Non Recoverable	83.000c			
Upper Critical	77.900c			
Upper Non Critical	67.500c			
SDR hysteresis data : +7.74ºC				

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IANA Private Enterprise Numbers Dept	17498			

2) IPMB Event Generator
3) FRU Inventory device
4) Sensor device

IPMI Global Device commands:
Get Device ID
Get Self Test Results
Broadcast Get Device ID

Chassis Device Commands:
Get Chassis status
Chassis control command can control individual Power Supplies. The system IPMB can command the Power Supply to shut down, turn on, or identify the specific supply via a rapid blinking of the green led.

Event Commands:
Set Event Receiver
Get Event Receiver
Platform Event Message (outgoing only)

Troubleshooting:

If the supply fails to operate check the following.

1) If no leds are operating check the existence of 48V input power to the power supply at the backplane on pins 46 and 47.

2) If both the red and green led are operating, check that the supply is firmly seated in the connector. Next check the backplane to insure that pin 39 (Inhibit) active high is at a high logic level, and pin 27 (Enable) is at a low logic level.

3) Noise or transient problems may occur if the supply is inserted into a chassis that is not built in accordance with PICMG 2.16. In the official CPCI specification* there are Backplane Decoupling Recommendations (see Table 11. Page 30, Attached) which describe required usage of a tantalum capacitor 44uF and a ceramic 0.1uF capacitor in each slot (up to 16 units). Therefore a capacitance of 700uF minimum is required on each of the power buses +5V,+3.3V, and a capacitance of 240uF on each of the +12V, and -12V power buses. Test measurements need to be taken under the above conditions. Maximum capacitance loading (on a single power supply) in microfarad on each rail is as follows:

3.3V	5V	+12V	-12V
6000uF	10,000uF	2,000uF	500uF

* PICMG specifications can be obtained from http://www.picmg.com

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See Table 11 below from PICMG 2.0 R3.0 10/1/99. If a chassis which incorporates fewer slots is used, then the required backplane capacitance may be reduced as well. The total required backplane capacitance is calculated as 44uf X (number of slots) for the 5Vand 3.3V rail , and 15uF X (number of slots) for the +12 and -12 rails.
If neither of these operations resolves the problem, contact the nearest representative or the factory.

Table 11. Backplane Decoupling Recommendations

Mnemonic	Description	Decoupling Capacitance	Voltage
5V	+5VDC	44 µF ± 20% (1)	15 V min.
.3V	+3.3VDC	44 µF ± 20% (1)	10 V min.
V(I/O)	+5/3.3VDC	44 µF ± 20% (1)	15 V min.
+12V	+12VDC	15 µF ± 20%	35 V min.
-12V	-12VDC	15 µF ± 20%	35 V min.

Note:

(1) Recommended decoupling capacitance per connector best distributed across the length of each connector.

(Page **30** of **74 PICMG 2.0 R3.0 10/1/99)**

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Power Connector Pin Assignment

Connector Pinout

Pin #	Staging #	Signal Name	Description
1 – 4	M	V1	V1 Output
5 – 12	M	RTN	V1 and V2 Return
13 - 18	M	V2	V2 Output
19	M	RTN	V3 Return
20	M	V3	V3 Output
21	M	V4	V4 Output
22	M	RTN	Signal Return
23	M	RESERVED	Reserved
24	M	RTN	V4 Return
25	M	GA0	Geographic Address Bit 0
26	M	RESERVED	Reserved
27	S	EN#	Enable
28	M	GA1	Geographic Address Bit 1
29	M	V1 ADJ	V1 Adjust
30	M	V1 SENSE	V1 Remote Sense
31	M	GA2	Geographic Address Bit 2
32	M	V2 ADJ	V2 Adjust
33	M	V2 SENSE	V2 Remote Sense
34	M	S RTN	Sense Return
35	M	V1 SHARE	V1 Current Share
36	M	V3 SENSE	V3 Remote Sense
37	M	IPMB_SCL	IPMI bus signal clock
38	M	DEG#	Degrade Signal
39	M	INH#	Inhibit
40	M	IPMB_SDA	Reserved for System Management Bus
41	M	V2 SHARE	V2 Current Share
42	M	FAL#	Fail Signal
43	M	IPMB_PWR	Power for IPMI bus
44	M	V3 SHARE	V3 Current Share
45	L	CGND	Chassis Ground (safety ground)
46	L	ACN/+DC IN	AC Input – Neutral; +DC Input
47	L	ACL/-DC IN	AC Input – Line; -DC Input

(1) Pin numbers illustrated are of the Power Supply connector

(2) L = Long length pins (First Mate, Last Break), M = medium length pins, S = Short length pins (Last Make, First Break).

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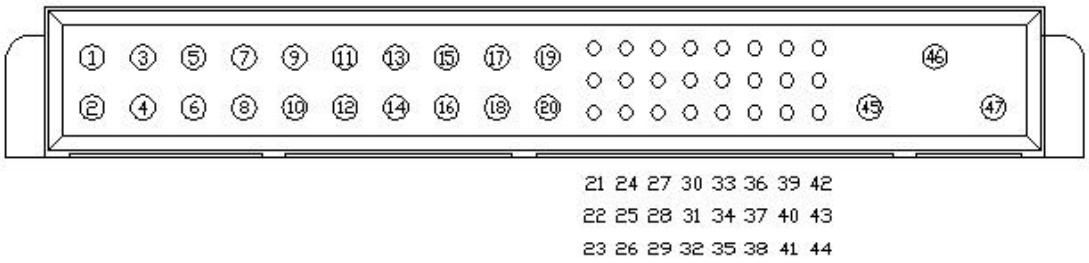

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