



## FEATURES

- 3Ux4HP Package
- 180/225W Power at 0-50°C
- PICMG 2.11 Compliant
- RoHS Compliant
- Wide range 36-72Vdc Input Range
- IPMI Option
- 47-pin I/O Connector
- 70% Efficiency
- Hot-Swap Capable

## DESCRIPTION

The cPCI200 is a family of high-reliability, 200W, 3Ux4HP CompactPCI™ power supplies operating from a nominal 48Vdc input. The use of our patented V-Series topology yields high efficiency which consequently permits packaging of this product in a compact, single card slot format (4HP).

ORing diodes and current sharing allow the cPCI200 to be operated in N+n parallel-redundant configurations. Available with an IPMI interface option, the cPCI200 was designed for hot-swap, redundant configurations to support high-availability (HA) telecom applications.

With a widerange input of 36-72Vdc, safety agency approvals to UL60950 and EN60950, EMI compliance to ETSI and Telcordia standards, the cPCI200 was designed with globally-deployed systems in mind. Additional features include remote sense compensation, unit enable control (EN#), output inhibit control (INH#), output fault signal (FAL#), and thermal warning signal (DEG#). LEDs are provided for visual indication of input power presence, output inhibit, and output fault condition.

The 4HP package and complement of global safety agency approvals provide for an advanced, high-density, high-efficiency power solution for your CompactPCI requirements.



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# cPCI200D Series

## 200W 3Ux4HP DC/DC CompactPCI™ Power Supply

### SELECTION GUIDE

Model Number	Power	Output Current				IPMI	Production Status	RoHS Compliant 2002/95/EC
		5V	3.3V	12V	-12V			
cPCI200D-1	180W	18A <sup>1</sup>	27A	4A <sup>1</sup>	4A <sup>1</sup>	No	Consult Factory	No
cPCI200D-2	225W	27A	27A <sup>2</sup>	4A <sup>2</sup>	4A <sup>2</sup>	No	Consult Factory	No
cPCI200D-3	180W	18A <sup>1</sup>	27A	4A <sup>1</sup>	4A <sup>1</sup>	Yes	Consult Factory	No
cPCI200D-4	225W	27A	27A <sup>2</sup>	4A <sup>2</sup>	4A <sup>2</sup>	Yes	Consult Factory	No
cPCI200D-1C	180W	18A <sup>1</sup>	27A	4A <sup>1</sup>	4A <sup>1</sup>	No	Active	Yes
cPCI200D-2C	225W	27A	27A <sup>2</sup>	4A <sup>2</sup>	4A <sup>2</sup>	No	Active	Yes
cPCI200D-3C	180W	18A <sup>1</sup>	27A	4A <sup>1</sup>	4A <sup>1</sup>	Yes	Active	Yes
cPCI200D-4C	225W	27A	27A <sup>2</sup>	4A <sup>2</sup>	4A <sup>2</sup>	Yes	Active	Yes

### INPUT CHARACTERISTICS

Parameter	Conditions	Min	Typ	Max	Units
Input Operating Voltage		36		72	Vdc
Input Voltage Withstand		34		75	Vdc
Inrush Current	36Vdc input		20		Apk
	72Vdc input		40		Apk

### OUTPUT CHARACTERISTICS

Parameter	Conditions	Min	Typ	Max	Units
Output Voltage Regulation <sup>3</sup>	Outputs V1 & V2	-2		+4	%Vnom
	Outputs V3 & V4	-10		+10	%Vnom
Temperature Coefficient				0.02	%/°C
PARD (V1 & V2)	20MHz bandwidth			50	mVp-p
PARD (V3 & V4)	20MHz bandwidth		120	180	mVp-p
Output Power, cPCI200D-1 & -3	50°C, 300lfm airflow	0		180	W
	70°C, 300lfm airflow	0		90	W
Output Power, cPCI200D-2 & -4	50°C, 300lfm airflow	0		225	W
	70°C, 300lfm airflow	0		110	W
Transient Response	ΔV, 50% load step			±10	%Vnom
	Settling time			500	μsec
Over-Voltage Protection	V1 & V2		125	135	%Vnom
Minimum Load <sup>4</sup>		500			mA
Remote Sense Compensation	V1 & V2	50			mV
Current Share Tolerance <sup>5</sup>	V1&V2; full load			±10	%I <sub>tot</sub>
Isolation	Pri-Sec	1.5			kVac
	Pri-Chassis	1.5			kVac
	Sec-Chassis	500			Vac

#### Notes:

1. Maximum combined power from outputs V1, V3, & V4 not to exceed 90W.
2. Maximum combined power from outputs V2, V3, & V4 not to exceed 90W.
3. Total regulation includes line, load, and cross regulation.
4. Minimum load requirement of 500mA is required on V1 for 180W models and on V2 for 225W models.
5. Current share circuit is primary-referenced.



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GENERAL CHARACTERISTICS					
Parameter	Conditions	Min	Typ	Max	Units
Efficiency	48Vdc input, full load		70		%
Switching Frequency		400	420	440	kHz
Weight	Unpackaged		636		g

PROTECTION					
Parameter	Conditions/Response	Inception			
		Min	Typ	Max	Units
Thermal Shutdown	Automatic recovery upon restoration to operational temperatures		100		°C
Input Protection	Internal line fuse, all models, Littelfuse R251010 or equivalent			10	A
Over-Voltage Protection	V1 & V2		125	135	%Vnom
Output Overload Protection	Outputs are individually protected against overloads and indefinite short circuit with automatic recovery upon removal of the fault condition. Overload response for all outputs is constant-current mode.				
Hot-Swap Capability	Design Verification Testing (DVT) confirms that voltage excursions on the output buses resulting from insertion/extraction events do not exceed the specified maximum of 10%. However, routing of power and signal lines in the mating backplane is critical to minimization of such excursions. In addition, performance can be critically affected by load characteristics including resistance, negative resistance, and reactive components. While the control loop responses have been designed for optimum hot-swap performance over a wide range of characteristics, there may be instances where the voltage excursions exceed published specifications. In such cases, the control loop responses can be modified to perform optimally.				
Output Fault Isolation	Output isolation devices are present in all outputs to isolate faults within a failed power supply.				
Remote Sense Lead Protection	Outputs V1 & V2 are capable of compensating for >50mV of line drop. Unit automatically reverts to local sensing in the event that the sense lines are opened for any reason. Unit is also protected against reversed or shorted sense leads.				

STATUS & CONTROL SIGNALS & INDICATORS	
Name	Description
Enable (EN#)	Short pin on connector will enable the outputs when the mating pin is grounded. Supply will not power up until this pin is engaged to its mate in the backplane. Unit output will be inhibited as pin is disengaged from the mating connector.
Output Inhibit (INH#)	Secondary referenced; active low, TTL compatible. Logic "0" or short circuit to output return inhibits all outputs.
Output Fault (FAL#)	Secondary referenced. Open collector signal denotes that one of the output voltages has fallen below the lower regulation limit.
Remote Sense (RS+, RS-)	Connection of the sense leads across the load at the desired point of regulation will compensate for voltage distribution drops up to 50mV between the output terminals of the power supply and the point of connection. The unit reverts to local sensing if the sense lines are opened for any reason. The output is protected against shorted or open leads. Applies to outputs V1 & V2.
Thermal Warning (DEG#)	Secondary referenced. Open collector denotes a thermal warning; nominally, 10°C prior to thermal shutdown.
Fault Indicator LED	An LED will illuminate red if the output voltages are not within specification, coincident with assertion of the FAL# signal.
Power Present Indicator LED	A green LED will be illuminated when the input voltage is present and above the minimum requirement.
Output Inhibit Indicator LED	An amber LED will be illuminated when the output is inhibited.
IPMI Interface Option	An I2C interface board is available as a factory-installed option to provide an IPMI interface to the SMBus. Status functions include output voltage and current levels as well as the DEG# warning. Output inhibit control can also be toggled via software command. See application note ACAN-02 for the satellite controller specification, ACAN-03 for the firmware update procedure, and ACAN-04 for the test procedure.

ENVIRONMENTAL CHARACTERISTICS					
Parameter	Conditions	Min	Typ	Max	Units
Ambient Operating Temperature	De-rate output power linearly above 50°C to half-power at 70°C.	0		70	°C
Ambient Storage Temperature		-20		85	°C
Cooling Airflow	50°C ambient, full load	300			l/m
Humidity	Operating; non-condensing	10		90	%
	Storage; non-condensing	5		90	%
Altitude	Operating. De-rate operating ambient temperature by 2C° per 1000ft above 5000ft.	-200		10000	ft
	Storage	-200		50000	ft

ELECTROMAGNETIC COMPATIBILITY (EMC)	
Characteristic	Compliance
Conducted Emissions	EN 300 386
	NEBS GR-1089

CERTIFICATIONS	
Agency/Characteristic	Standard
UL	UL1950
CSA	CSA950 (per cUL)
VDE	EN60950
CE	LVD Directive; self-certified
RoHS	EN Directive 2002/95/EC; self-certified; see Selection Guide table for specific model compliance
SELV	Self-certified
Vibration	MIL-STD-810D, Method 514.3, Procedure I; self-certified
Shock	MIL-STD-810D, Method 516.3, Procedure I; self-certified

IPMI/IPMB POWER SUPPLY SATELLITE CONTROLLER FEATURES	
■	Complies with IPMI V1.5 Rev 1.1 and IPMB V1.0
■	Complies with PICMG 2.9 (CompactPCI Systems Management Specification)
■	8 analog inputs configured for monitoring voltages and currents on power supply outputs V1 - V4
■	Monitors the thermal sensor (DEG#) and fault signal (FAL#)
■	Output inhibit can be controlled by IPMI commands
■	Self Test with LED indicator (can be read and overridden by IPMI commands)
■	6 programmable thresholds on each analog sensor; each threshold on each sensor can be enabled to generate event messages if that threshold is crossed
■	Thermal sensor can be enabled to generate event messages
■	Responds to all mandatory IPMI commands and numerous optional commands as indicated in the functional specification
■	Firmware can be upgraded via the IPMB bus
■	Includes Device SDR's (Sensor Data Records) – These specify the type of sensor for each input (voltage, current, temperature, etc.) as well as the conversion formulas for raw ADC data to voltages, currents, etc.
■	Includes FRU data such as model number, serial number and firmware creation date

**PACKAGE SPECIFICATIONS (PIN ASSIGNMENTS)**

PIN ASSIGNMENT: Pin assignment consistent with PICMG™ 2.11R1.0 specification. The table below details the PICMG™ assignment.

Pin # <sup>1</sup>	Staging <sup>2</sup>	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	V1ADJ	V1 Adjust <sup>3</sup>
30	M	V1 SENSE	V1 Remote Sense
31	M	GA2	Geographic Address Bit 2
32	M	V2ADJ	V2 Adjust <sup>3</sup>
33	M	V2 SENSE	V2 Remote Sense
34	M	S RTN	Sense Return
35	M	V1 SHARE	V1 Current Share <sup>3</sup>
36	M	V3 SENSE	V3 Remote Sense
37	M	IPMB SCL	IPMB Serial Clock Line
38	M	DEG#	Degrade Signal
39	M	INH#	Inhibit
40	M	IPMB SDA	IPMB Serial Data Line
41	M	V2 SHARE	V2 Current Share <sup>3</sup>
42	M	FAL#	Fail Signal
43	M	IPMB PWR	IPMB Power Input
44	M	V3 SHARE	V3 Current Share <sup>3</sup>
45	L	CGND	Chassis Grnd (Safety Grnd)
46	M	ACN/+DC IN	AC Input Neutral/+DC Input
47	M	ACL/-DC IN	AC Input Line/-DC Input

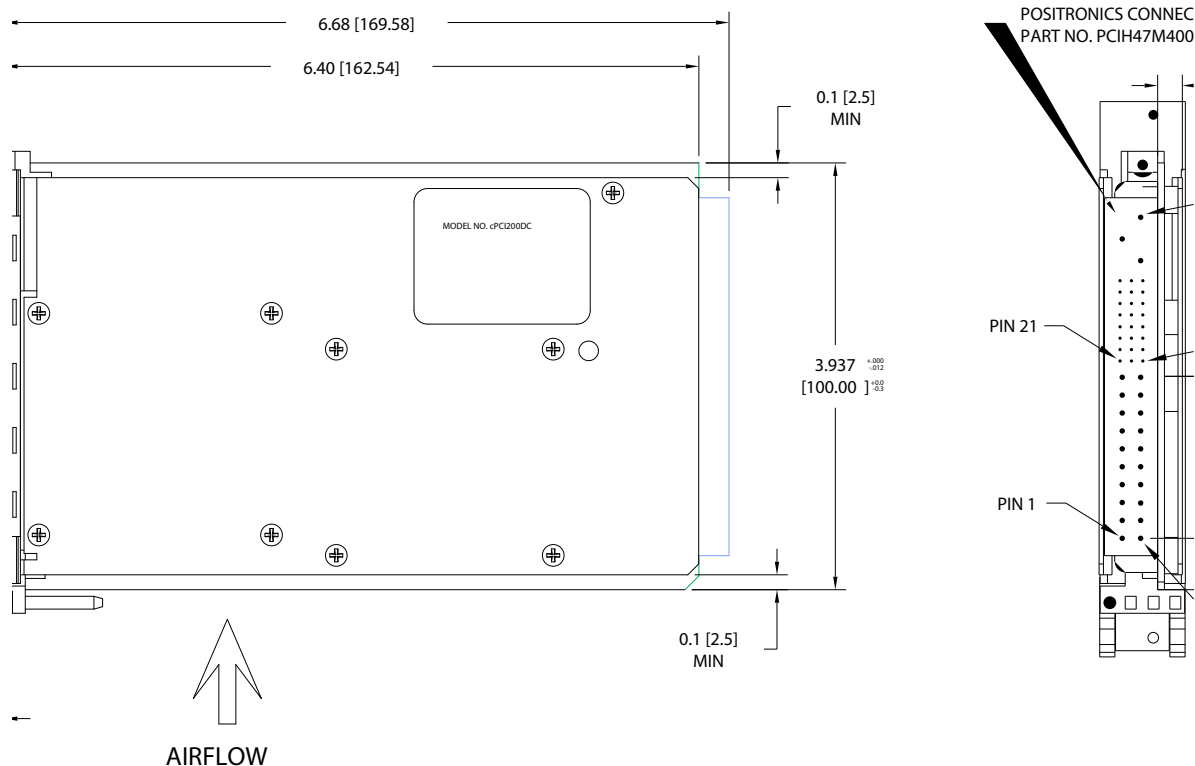
1. Pin numbers correspond to the female backplane connector.

2. Length Pins; S = Short Length Pins (Last Make, First Break) L = Long Length Pin (First Make, Last Break); M = Medium.

3. These functions are not used in the cPCI200D Series.

**PACKAGE SPECIFICATIONS**

**MECHANICAL DIMENSIONS**



**MECHANICAL**

Shock: MIL-STD-810d, Method 516.3, Procedure 1.  
Vibration: MIL-STD-810d, Method 514.3, Procedure 1.  
Dimensions: 3U x 4HP x 160mm (see Mechanical above)

**EMC & SAFETY**

EMI: NEBS Compliant to GR1089 conducted emissions limit  
ETSI Compliant to ETS 300-386 conducted emissions limit

Safety Agency Ratings	180 Watt	225 Watt
Input Voltage:	36-72 VDC	36-72 VDC
Input Current:	7A	9A
Input Power:	260W	320W
Agency Approvals: UL1950/CSA950, EN60950, CE Mark (Low Voltage Directive).		

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