



### 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.



For full details go to [www.murata-ps.com/rohs](http://www.murata-ps.com/rohs)

| SELECTION GUIDE |       |                  |                  |                 |                 |      |                   |   |
|-----------------|-------|------------------|------------------|-----------------|-----------------|------|-------------------|---|
| Model Number    | Power | Output Current   |                  |                 |                 | IPMI | Production Status |  |
|                 |       | 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.



| 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  |     |       | lfm   |
| 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   |
|--|
| <ul style="list-style-type: none"> <li>■ Complies with IPMI V1.5 Rev 1.1 and IPMB V1.0</li> <li>■ Complies with PICMG 2.9 (CompactPCI Systems Management Specification)</li> <li>■ 8 analog inputs configured for monitoring voltages and currents on power supply outputs V1 - V4</li> <li>■ Monitors the thermal sensor (DEG#) and fault signal (FAL#)</li> <li>■ Output inhibit can be controlled by IPMI commands</li> <li>■ Self Test with LED indicator (can be read and overridden by IPMI commands)</li> <li>■ 6 programmable thresholds on each analog sensor; each threshold on each sensor can be enabled to generate event messages if that threshold is crossed</li> <li>■ Thermal sensor can be enabled to generate event messages</li> <li>■ Responds to all mandatory IPMI commands and numerous optional commands as indicated in the functional specification</li> <li>■ Firmware can be upgraded via the IPMB bus</li> <li>■ 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.</li> <li>■ Includes FRU data such as model number, serial number and firmware creation date</li> </ul> |

### PACKAGE SPECIFICATIONS (PIN ASSIGNMENTS)

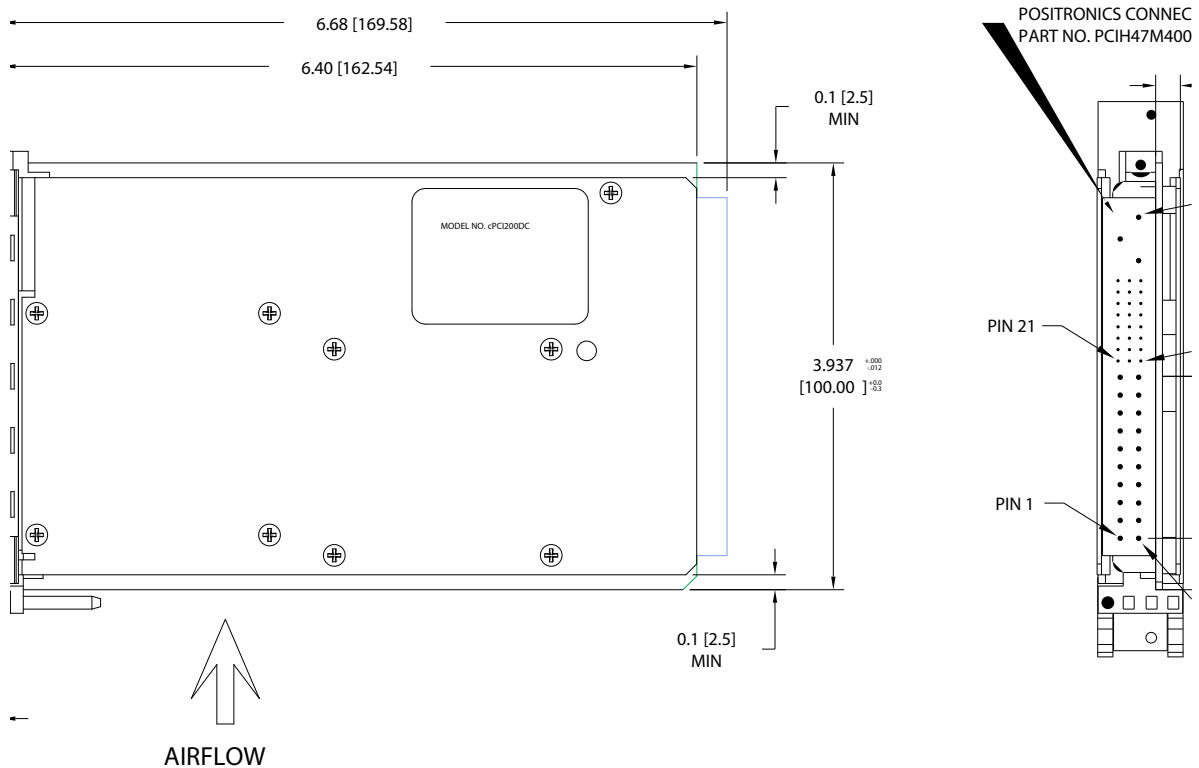
PIN ASSIGNMENT: Pin assignment consistent with PICMG™ 2.11R1.0 specification. The table below details the PICMG™ assignment.

| 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).