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C2K

High Performance PICMG 2.16 6U CompactPCI® Embedded Computer

Single Board Computers

Features

- PICMG 2.16 compliant
- MPC7447A / MPC7448 PowerPC G4 host processor with 512kB/1MB on-chip L2 cache
- MV64460 System Controller (Discovery III) Bridge chip
- DDR333 SDRAM 512MB, or 1GB with ECC
- Soldered boot flash up to 512MB with multi-level write-protection
- Real-Time Clock with battery backup from system
- Watchdog from MV64460
- Three 10/100/1000 Ethernets ports
- Two 64-bit IEEE 1386.1 PMC extension slots
- Four async RS-232 or sync/async RS-422 serial I/O ports (COM1, COM2, COM3, COM4)
- Four sync/async RS-422/485 ports (COM5–COM8)
- Three USB 2.0 ports at backplane; additional port at front panel (convection-cooled configuration only)
- Two 1.5 Gb/s SATA 1.0 ports
- 16 programmable GPIO ports with independent interrupts
- Dual temperature sensor
- System and non-system (peripheral) mode
- C-style or N-style configurations
- Extended temperature range (-40°C to 85°C)



C2K is a rugged PICMG 2.16 compliant 6U CompactPCI Single Board Computer featuring increased processor speeds, bus speeds and memory capacities making it an excellent choice for advanced defense, aerospace, and homeland security applications.

The C2K hosts the MPC7447A or MPC7448 PowerPC G4 processor from Freescale Semiconductor, with core processor speeds up to 1GHz (MPC7447A), 1.4GHz (MPC7448), and 512kB of on-board L2 cache (1MB on MPC7448). The processor is supported with a 167MHz MPX System Bus.

The C2K integrates the Marvell® MV64460 System Controller (Discovery III) Bridge chip, which includes a high speed DDR333 SDRAM controller with 167MHz interface that service memory densities of 256MB, 512MB or 1GB. It also provides two PCI interfaces: one 64-bit 33/66MHz PCI bus interface shared with on-board devices and PMC1, and one 64-bit 33/66MHz PCI / 33/66/133MHz PCI-X Bus interface dedicated to PMC0.

The C2K features multiple I/O, including three Gigabit Ethernet ports, four RS-232/RS-422 ports, four RS-422/485 ports, two 1.5Gbps SATA ports, and three high-speed USB 2.0 ports. The convection model also provides one high-speed USB2.0 port at the front panel.

The C2K includes 16 programmable GPIO ports with independent interrupts. Each port can be programmed for direction, input polarity, output type, interrupt type (level or edge) and interrupt mask.

The C2K hosts two 64-bit IEEE1386.1 PMC sites for expanding I/O capability.

For increased flexibility, the PLX PCI 6254 cPCI Backplane Bridge, allows the C2K to operate as a system controller or peripheral processor card.

The C2K is available in conduction-cooled (N-style) or convection-cooled (C-style) configurations.

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Specifications

Processor
- Motorola MPC7447A or MPC7448 PowerPC G4 processor
- Core processor speeds: up to 1GHz (MPC7447A), 1.4GHz (MPC7448)
- High performance, low power, 32-bit PowerPC RISC architecture
- Superscalar processor
- 32kB L1 instruction and data caches
- 512kB L2 on-chip cache (1MB on MPC7448)
- 64-bit 167MHz MPX system bus interface to MV64460 System Controller

DDR SDRAM
- Soldered DDR333 SDRAM
- SDRAM Controller from MV64460 System Controller
- 64-bit (72-bit with ECC) 167MHz Memory Bus
- Capacities: 512MB, or 1GB

Flash ROM
- 128 flash memory
- Multi-level write-protection

PCI Interfaces
- Two PCI Bus interfaces from MV64460 System Controller
- PCI Bus 0: 32/64-bit 33/66MHz PCI / 133MHz PCI-X (dedicated to PMC0 site)
- PCI Bus 1: 32/64-bit 33/66MHz (shared by PMC1 site, USB Controller, and PCI 6254 PCI Bridge)
- Both PCI busses configurable VIO—+3.3V or +5V through on-board jumpers

10/100/1000 Ethernet
- Three 10/100/1000Base-T Ethernet port to rear I/O
- MACs provided by the MV64460 System Controller
- Independent Quad Port PHY

General-Purpose I/O
- 16 programmable GPIO ports
- Programmable for line direction (input, output), input polarity (inverted, non-inverted), output type (TTL, open-drain), interrupt type (edge, level sensitive) and interrupt masking
- +5V tolerant
- Independent interrupts for each port

USB Ports
- Four USB 2.0 ports: three (USB1–USB3) to cPCI_J5 (all configurations) and one (USB4) to the front panel (C-style version only)
- Three speeds supported: USB1.0 (1.5MHz), USB1.1 (12MHz), and USB2.0 (480MHz)

cPCI Backplane Interface
- PCI 6254 cPCI Bridge
- PICMG 2.0 R3.0 compliant
- 32/64-bit CompactPCI data transfers at 33/66MHz
- Auto-detect firmware detects system slot for system controller or peripheral mode

Serial I/O – RS-232/422
- Two serial ports from Multi-Protocol Serial Controller (MPSC) integrated in the MV64460 System Controller—COM1, COM2 independent configurable as asynchronous RS-232 or synchronous/asynchronous RS-422 available at cPCI_J5
- Two serial ports from USARTs integrated in the FPGA—COM3, COM4 independent serial ports configurable as asynchronous RS-232 or synchronous/asynchronous RS-422 available at cPCI_J4
- Software selectable

Serial I/O – RS-422/485
- Four independently configurable synchronous/asynchronous RS-422/485 serial ports: COM5–COM8 available at cPCI_4
- USART integrated into FPGA

Serial ATA (SATA)
- PCI-to-Serial ATA Host Controller on PCI Bus 1
- Two 1.5 Gb/s SATA 1.0 ports to backplane

PMC Extension Slots - IEEE P1386/1386.1
- Two VITA 30.1-2001 and ANSI/VITA 20-2001-compliant PMC sites
- PMC0: 64-bit 33/66MHz PCI or 133MHz PCI-X PMC site on dedicated PCI Bus 0
- PMC1: 64-bit 33/66MHz PCI PMC site on shared PCI Bus 1
- Both PMC sites provide 64-bit user I/O (rear I/O)
- Both PMC sites (PCI busses) VIO configurable to +3.3V or +5V through on-board jumper

Real-Time Clock
- Real Time Clock feature for timekeeping functions
- Battery backup maintained through off-board +3.3V supply (provided by system through backplane (BATT+) pin at cPCI_J5)

Watchdog Timer
- MV64460 System Controller
- Programmable intervals
- Interrupt and board reset triggers

Temperature Sensor
- CPU die and ambient temperature
- Software readable from –55°C to +125°C

Hot Swap
- PICMG2.1 Hot Swap-compliant

Power Requirements
- +5V, +3.3V—required
- +12V required, -12V optional
- Battery backup for RTC (+3.3 on BATT+)

Power Allowances - PMC slot
- +5V, +3.3V, ±12V: Total power max. 7.5W per site

Power Consumption
- Tests performed with 7.5W PMC load

	+5V	+3.3V
Peak: *	5.7A	4.10A
Max. sustained: *	TBD	TBD
Idle: **	TBD	TBD
Inrush:	2.0A	2.0A
BATT+:		10µA
Total:	42W	

* Calculated values
** Measure at VxWorks® prompt

Temperature

	Operating	Storage
C-style *	0°C to +70°C	–40°C to +85°C
N-style **	–40°C to +85°C	–55°C to +105°C

* Minimum airflow of 200 LFM required
** Measured at card edge.

Mechanical
- PICMG 2.0 R3.0 and VITA 30.1 compliant
- 6U, 1 slot wide
- 233mm x 160mm x 20mm
- Weight C-Style: TBD
  N-Style: TBD

Humidity (non-condensing)
- Operating: 5–95% @ 40°C
- Storage: 5–95% @ 40°C

Altitude
- Operating: 4.5km (15,000 ft.)
- Storage: 12km (40,000 ft.)

Shock
- C-style 20g / 11ms, 3 axes, up & down, 3 hits / direction
- N-style 40g / 11ms, 3 axes, up & down, 3 hits / direction
  100g / 6ms, 3 axes, up & down, 3 hits / direction

Vibration
- C-style $0.04g^2$ / Hz @ 5–100Hz (2g rms), 60 min. / axis
- N-style $0.1g^2$ / Hz @ 5–2000Hz (12g rms), 60 min. / axis

MTBF
- Calculations are available in accordance with MIL-HDBK-217. Please contact SBS for latest values.

Safety
- Designed to meet standard UL1950/60950

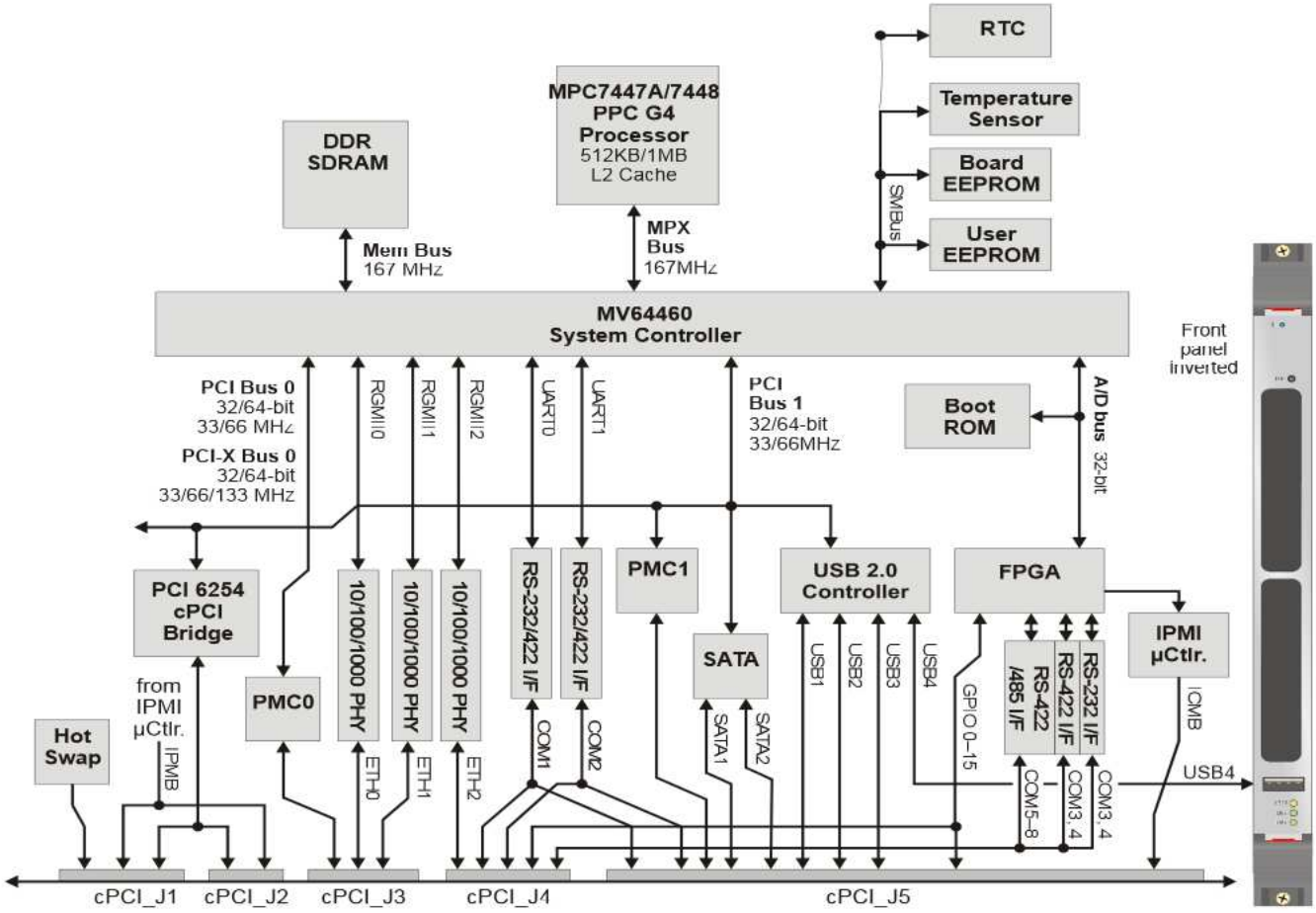
Emissions
- Designed to meet FCC Part15, SubPart A

Input/Output

I/O	Front Panel	J3	J4	J5	C2K-TM Rear Panel	C2K-TM On-board
Serial I/O: COM1, COM2 (RS-232)				√	√	
Serial I/O: COM3, COM4 (RS-232)			√			√
Serial I/O: COM1, COM2, COM3, COM4 (RS-422)			√			√
Serial I/O: COM5–COM8 (RS-422/485)			√			√
10/100/1000Base-T Ethernet (ETH0, ETH1)		√			√	
10/100/1000Base-T Ethernet (ETH2)			√		√	
GPIO (0–3)			√			√
GPIO (4–15)				√		√
PMC0 I/O		√				√
PMC1 I/O				√		√
SATA1–2				√	√	
USB1–3				√	√	
USB4 (C-style only)	√					
EM_BOOTSEL# / ROM_WP#				√		√

C2K

Block Diagram



Ordering Information

C2K33200C
1GB DRAM, MPC7447A 1GHz processor, convection cooled

C2K33200N
1GB DRAM, MPC7447A 1GHz processor, conduction cooled

Hardware Accessories
C2K-TM: I/O transition module for 6U backplane
Operating Systems
SBS supports various operating systems. Please contact us for current offerings
For detailed information and further options, contact SBS.

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