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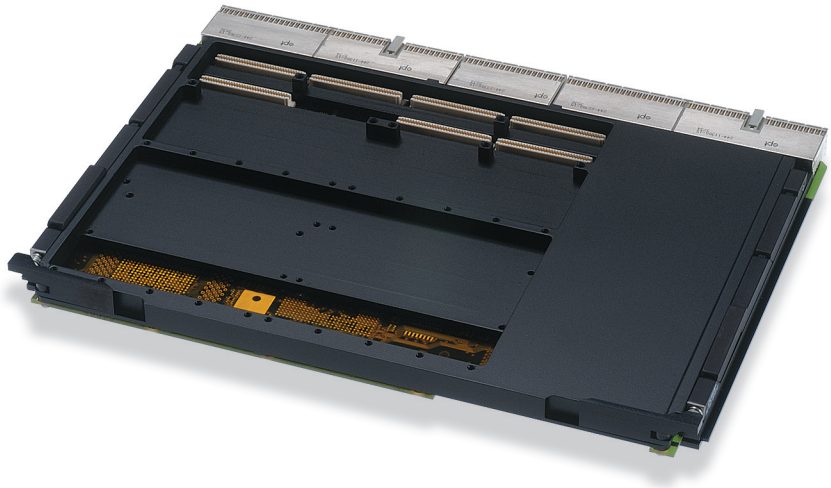
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GE Fanuc
Intelligent Platforms



CR9

High Performance, Rugged 6U CompactPCI® Embedded Computer

Features

- Intel® Pentium® M processor, 600 MHz to 1.8 GHz
- Optimized for harsh environments
- Ultra compact, 1 slot
- Hot Swap (Full) PICMG 2.1 compliant, C-I-R-style
- System & non-system
- Compliant to VITA 30.1-2002 & ANSI/VITA 20-2001
- Extensive software support
- Up to 2 GB DDR SDRAM (200) with ECC
- Flash drive up to 1 GB or local 2.5" hard disk
- VGA/LCD up to 2048x1536, 16/32 MB DDR SDRAM
- Two Gigabit Ethernet ports10/100/1000 BaseT front or rear optional
- PICMG 2.16 compliant
- Two PMC extension slots, one 64-bit/133 MHz and one 32-bit/33 MHz
- Ultra ATA/100 onboard, second channel rear I/O
- 2x serial I/O with FIFOs RS-232/422/485 interface
- USB 2.0 ports, one front,4 rear
- IEEE 1284 parallel port
- Watchdog, temperature sensor
- Optional –40° to +85°C
- Optional Conduction cooling
- High shock and vibration immunity with stiffener bars and wedge locks
- Conformal coating
- Customer specific, low cost assembly versions

CR9 is a 6U CompactPCI all-in-one CPU board with an integrated low power Intel Pentium M processor and dual Gigabit Ethernet PICMG 2.16 channels. The CR9 is designed to meet the harsh environmental requirements of markets like the heavy industry, simulation/training, test and measurement, military and aerospace.

Based on the Intel Pentium M processor, the CR9 platform is designed to support processor speed starting with 600 MHz up to 1.6 GHz. It offers low power consumption and eliminates the need for on-board ventilation. Rugged needs are addressed with optional conduction cooling (VITA 30.1-2002 and ANSI/VITA 20-2001) and extended temperature range of up to -40° to +85° C. Increased shock and vibration immunity is designed in by using stiffener bars and wedge locks. Conformal coating is optional.

The CR9 provides a unique feature set, including up to 2 GB of DDR SDRAM (200) with ECC, three independent on-board PCI buses, support for the CPCI backplane, two PMC interfaces (64-bit/133 MHz and 32-bit/33 MHz). A high level of functional integration (Gigabit Ethernet, two serial interfaces with flexible RS-232 or RS-422/485, USB 2.0, integrated HDD or flash drive, etc.) within a single slot gives users the freedom to use the PMC interfaces as extension for their applications. The VGA/TFT interface is supported through a high performance 2D/3D NVIDIA® video controller able to drive dual displays in parallel.

Versions with front panel I/O are available in various configurations with one or two PMC interfaces.

Supported operating systems are Windows® 2000, Windows XP, QNX, VxWorks®, LynxOS®, Linux® and others.

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CR9 High Performance, Rugged 6U CompactPCI® Embedded Computer

Specifications

CompactPCI - Hint HB6 PCI-to-PCI Bridge
- PICMG 2.0 R3.0 compliant CPCI local bus standard
- 64-bit PCI-to-PCI bridge for up to 8 slots (33 MHz) or 5 slots (66 MHz)
- Supports System and Peripheral Mode
- J1+2, 2 mm pin and socket connectors (IEC-1076-4-101)

Processor - µFCBGA, Low Power Design
- Scalable processing power with flexible processor design
- Intel Pentium M processor: 600 MHz to 1.8 GHz
- High efficiency on-board switching regulator (DC/DC)
- Fanless cooling with heatsink
- See price list for latest CPU versions

Chipset – Intel E7501/P64H2
- 400 MHz system bus to processor
- PCI burst mode transfers up to 512 MB/s (64-bit/66 MHz)
- Two 64-bit wide PCIbusses with 66 MHz
- One 32-bit wide PCIbus with 33 MHz

Cache	Level 1	Level 2
Pentium M	32 KB	1024 KB, full speed

Memory – DDR 200
- High-speed registered DDR SDRAM
- 72-bit wide with error correction (ECC)
- 128 MB to 2 GB with soldered chips
- Note: Memory speed depends on selected processor type

Dual Gigabit Ethernet – Intel 82546GB
- Highly integrated dual channel Ethernet controller with 64-bit/66 MHz PCI local bus DMA
- 64 KB transmit and receive FIFO
- 10/100/1000BaseT auto-negotiation
- Versions with front I/O available (not N-Style)
- Compliant to PICMG 2.16

Hard Disk or Flash Drive
- Internal 2.5" IDE hard disk or 2.5" flash drive (up to 1 GB, for extended temperature range and higher shock/vibration immunity)

PMC Extension Slots - IEEE P1386/1386.1
- Compliant to ANSI/VITA 20-2001 (N-style only)
- One high bandwidth 64-bit/133 MHz and one 32-bit/33 MHz

PMC interface
- Enhancement to processor PMC standard VITA 32-2003 (non-monarch)
  Note: The 32-bit/33 MHz PMC slot is not available with VGA or Ethernet on the front, IDE secondary installed
  Note: PMC front I/O is not supported with a CR9 in an N-style version (conduction cooled)

VGA and LCD – NVIDIA® GeForce™4 410/420 Go
- 256-bit 3D and 2D graphics accelerator
- On-chip 16/32 Mbytes frame buffer (66-190 MHz)
- 32-bit/33 MHz PCI interface
- NVIDIA Digital Vibrance Control™ technology
- Dual CRTC/Simultaneous Dual Display (same or different surfaces)
- Integrated 350MHz Palette-DAC for analog VGA monitors up to 2048x1536
- DVI-I interface PanelLink® single channel for TFT displays up to 1280x1024 true color (EDID displays PnP supported)
- Fully compliant support for OpenGL 1.2 for all Windows operating systems and Linux
- Versions with front (not N-Style) or rear I/O available

EIDE- ICH4
- Ultra ATA/100 sync. DMA mode up to 100 MB/s
- PIO mode 4 and bus master IDE up to 16 MB/s
- Two devices supported via local EIDE connector and two devices alternative with PMC32/33 rear I/O

Serial I/O - RS232/422/485
- Two async. 16550 compatible full duplex serial channels at rear I/O
- High-speed transfer up to 115.2 kbaud with 16 byte FIFOs
- User selectable RS232/422/485 interface
- COM1 optional available at front (not N-Style)

Parallel Port
- Bi-directional, IEEE 1284 compatible enhanced parallel port (including EPP and ECP) for printer

General Purpose I/O
- 8x GPIO (input or output) pins
- Interrupt capability (edge, level)
- Software configurable

USB 2.0 – ICH4
- One USB 2.0 connector at front (not N-Style)
- 4 universal serial bus channels at rear

Keyboard and Mouse
- PS/2 compatible

Real-time clock
- RTC 146818 compatible, on-board Li-battery

CMOS RAM
- 114 bytes non-volatile CMOS RAM

EEPROM
- 512 KB serial EEPROMs for non-volatile user data

Floppy
- One channel 3.5" floppy drive controller
- 720 KB and 1.44 MB

Watchdog
- Watchdog 1: 4.8 sec to 76 sec, 0.6 sec increments
- Watchdog 2: 1 min to 255 min, 1 min increments
- User programmable

Timer
- Integrated in E7501/ICH4 chipset

Temperature Sensor
- CPU die and heatsink temperature software readable from –65°C to +127°C

LED (not N-Style)
- Front panel LED System control (read)

Hot-Swap - compliant to PICMG 2.1 (not N-Style)
- Peripheral mode: Board can be inserted or removed in a powered system
- System controller mode: Other, non system (peripheral) boards can be removed or added with power on

BIOS Features
- New AMI BIOS Core 8, in-system programmable Flash ROM
- CPU, memory and IDE auto-detection/selection
- Integrated VGA, and Ethernet BIOS ROM
- USB Mass Storage support and booting capability (Floppy, HDD, CDROM)
- Password protection, BIOS post, system and video BIOS shadowing

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- Extensive setup with remappable serial/parallel ports
- Diskless, keyboardless and videoless operation
- Remote BIOS through serial port

Software

- The following software is supported to the extent listed below.

OS	On Request	Planned
WIN 2000	-	√
WIN XP	-	√
QNX 4 + 6	-	√
VxWorks	-	√
Lynx OS	√	-
Linux	-	√

Front and Rear I/O (with transition module CTM12)

- The pinouts of the transition module connectors (rear I/O) corresponds to standard PC connectors (press-fit cables).

Function	Front C-I-R-style	Rear J3/J4/J5
DVID-I	-	√
VGA	√ *3	√ *1
Eth 1	√ *2*3	√ *2
Eth 2	√ *v*3	√ *2
Keyb+Mouse	√	√
Reset	√	√
LEDs	√	√
USB 2.0 1-5	1	2-5
IDE primary	-	√
IDE secondary	onboard *3	-
Floppy	-	√
COM 1-2	1	1, 2
LPT	-	√
GPIO (8 pins)	-	√
PMC 64-bit/66 MHz	√	√
PMC 32-bit/33 MHz	√ *3	√

*1 rear DVI-I connector for DVI and VGA
*2 either front or rear as an order option
*3 The 32-bit/33 MHz PMC slot is not available with VGA or Ethernet on the front, IDE secondary installed

Styles

Function	C	I	R	N
Front panel	yes	yes	yes	no
Front stiffener	no	no	no	yes
Middle stiffener	no	no	yes	yes
Wedge locks	no	no	no	yes
Parts soldered	yes	yes	yes	yes
Li-battery	yes	yes	no	no
Extended temperature	no	yes	yes	
Conformal coating	no	no	yes	
Conduction cooled	no	no	yes	

Power Requirements

- +5 V, +3.3V Required
- ±12V Only if required by mounted PMC module

Power Consumption - typical operating current (*estimated)

- w/o keyboard, hard disk, modules, Ethernet (no link), measured at DOS prompt, no power savings.

Pentium M	5 V	3.3 V	Total Power
600 MHz, 256 MB	0.7A*	5.1A*	20.3W*
1.1 GHz, 512 MB	1.5A*	5.9A*	27.0W*
1.6 GHz, 2 GB	3.4A*	7.5A*	41.8W*

- w/o keyboard, hard disk, modules, Windows XP, 3D graphics active. Both Gigabit Ethernet channels linked, CPU running at instruction mix for maximum power consumption.

Pentium M	5 V	3.3 V	Total Power
600 MHz, 256 MB	0.9A	6.9A	27.3W
1.1 GHz, 512 MB	2.3A	7.7A*	36.9W*
1.6 GHz, 2 GB	5.4A	9.3A*	57.7W*

Power Allowances - PMC Slot

- +5 V, +3.3V Total power max. 7.5 W
- ±12 V 100 mA each

Mechanical – PICMG 2.0

- 6U, 1 slot wide
- 233 x 160 x 20 mm (including flash drive) or hard disk
- Compliant to VITA 30.1-2002 for N-style board

Temperature – (except N-style)

- Highest reachable operating temperature depends on processor type, speed and ambient conditions (airflow)
- TMDS option may reduce temperature range
- All values under typical conditions w/o PMC module, HDD or flash drive

	Operating	Storage
Standard	0°C to +70°C	–40°C to +85°C
Extended	–40°C to +85°C	–40°C to +85°C

Temperature – (N-style)

- Highest reachable operating temperature depends on processor type, speed and card edge temperature
- Value under typical conditions w/o ccPMC module, HDD or flash drive

	Operating	Storage
Extended	–40°C to +85°C	–40°C to +85°C

* Upper temperature limit could be lower depending on configuration (processor, air, speed, etc.) Please contact factory with questions.

Humidity

- Operating: 5 - 95% @ 40°C
- Storage: 5 - 95% @ 40°C

Altitude

- Operating: 15.000 ft. (4.5 km)
- Storage: 40.000 ft. (12 km)
- Vacuum for conduction cooled board (N-style)

Shock

- C-, I-Style: 12g/6 ms, 3 axis, up & down, 5 hits/direction
- R-Style: 20g / 6 ms, 3 axis, up & down, 5 hits / direction
- N-Style: 100g / 6 ms, 40g / 11 ms, 3 axis, up & down, 5 hits / direction

Vibration

- C-, I-Style: 2g rms @ 5 to 100 Hz, 30 minutes each axis
- R-Style: 2g rms @ 5 to 2000 Hz, 30 minutes each axis
- N-Style: 14g rms @ 5 to 2000 Hz, 30 minutes each axis

MTBF

- Calculations are available in accordance with MIL-HDBK-217. Please contact factory.

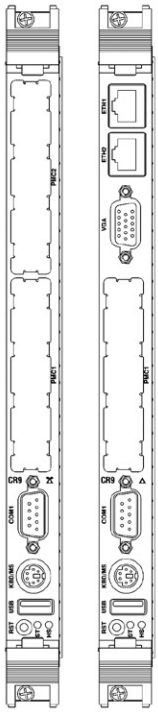
Safety

- Designed to meet standard UL1950, CE class A, FCC-A

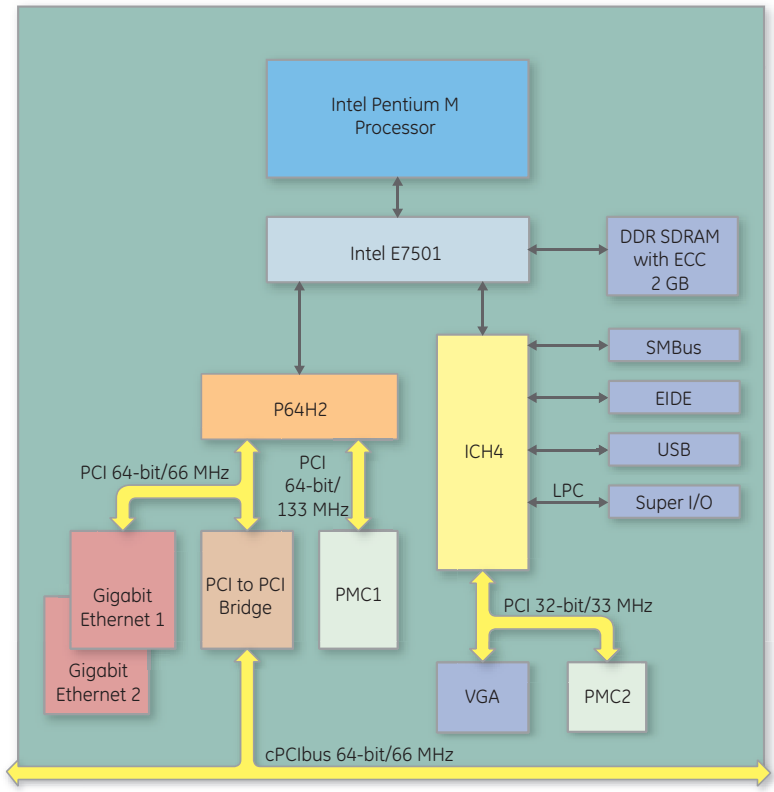
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CR9 High Performance, Rugged 6U CompactPCI® Embedded Computer

C, I, R-Style Front Panel Versions



Block Diagram



Ordering Information

C2K33200C	Hardware Accessories
CTM12	I/O transition module for 6U backplane (IEEE 1101.11-1998 compliant)
SC304F	Floppy disk 3.5 inch, 19" box: 3U/4HP, cable
SC306HI10G0	IDE hard disk 3.5", 10 GB, 19" box: 3U/6HP, cable
ZKAAPS2SPLIT	Cable for keyboard and mouse on front panel
Operating Systems	Extensive operating systems support is available. Chassis with power supplies, backplanes and drives on request.

For detailed information and further options, contact GE Fanuc Intelligent Systems.

About GE Fanuc Intelligent Platforms

GE Fanuc Intelligent Platforms is a leading global provider of embedded computing solutions for a wide range of industries and applications. Our comprehensive product offering includes many types of I/O, single board computers, high performance signal processors, fully integrated, rugged systems including flat panel displays, plus high speed networking and communications products. The company is headquartered in the U.S. and has design, manufacturing and support offices throughout the world. Whether you're looking for one of our standard products or a fully custom solution, GE Fanuc Intelligent Platforms has the breadth, experience and 24/7 support to deliver what you need. For more information, visit www.gefanuc.com.

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Additional Resources

For more information, please visit the GE Fanuc Intelligent Platforms web site at:

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