

# CT9

## High Performance PICMG® 2.16 6U CompactPCI® Server Blade

### Features

- Intel® Pentium® M processor, 1.4 GHz to 1.8 GHz and Intel Celeron® M processor 1.0 GHz and 1.3 GHz
- Optimized for telecom applications
- Ultra-compact, one slot
- Hot swap (full) PICMG 2.1 compliant
- System and non-system (peripheral) mode
- Extensive software support
- Up to 2 GB DDR SDRAM (200 MHz) with ECC
- Flash drive or local 2.5" hard disk
- VGA/LCD up to 1600x1200
- Two Gigabit Ethernet ports, 10/100/1000BaseT, front or rear option
- PICMG 2.16 compliant
- Two PMC expansion slots, one 64-bit/133 MHz and one 32-bit/33 MHz
- IPMI PICMG 2.9
- Ultra ATA/100 on-board, second channel rear I/O
- 2x serial I/O with FIFOs RS-232/422/485 interface
- USB 2.0 ports, one front, four rear
- Watchdog, temperature sensors
- IEEE 1284 parallel port
- Optional extended temperature range (-40°C to +85°C)
- Customer-specific, low-cost assembly versions
- RoHS compliant (version 3.x)

The CT9 is a 6U CompactPCI all-in-one CPU board with an integrated low power Intel Pentium M processor and dual Gigabit Ethernet channels. The CT9 supports full hot swap and is capable of being used in a system or non-system (peripheral) slot. Adhering to the PICMG 2.16 dual Ethernet specification, the CT9 supports the 64-bit/66 MHz CompactPCI bus and is designed for use in a broad range of applications such as wireless base stations, voice over packet, enterprise devices, test and measurement systems, and server blade applications.

The CT9 platform is designed to support processors from 1 GHz up to 1.8 GHz. It offers low power consumption and eliminates the need for onboard fans. The design is ready to accept future higher performance Intel® Pentium® M processor versions.

The CT9 provides a unique feature set, including up to 2 GB of 200 MHz DDR SDRAM with ECC, three independent onboard PCI buses, high speed support for the CompactPCI backplane, two PMC interfaces (64-bit/133 MHz and 32-bit/33 MHz).

A high level of functional integration (VGA/TFT, USB, serial interfaces, etc.) within a single slot gives users the freedom to use the PMC interfaces as extensions for their applications. This, combined with a custom specific assembly service, provides optimized price/performance for all kinds of OEM applications. The board is also available in an extended temperature version with a range of -40 °C to +85 °C.

The CT9 also includes a Baseboard Management Controller (BMC) that supports the Intelligent Platform Management Interface (IPMI) architecture. It allows independent platform management between IPMI enabled boards, power supplies, fans and other accessories in a system. This feature can be used for autonomous monitoring, logging and recovery control functions.

The supported operating systems are Microsoft® Windows® XP, VxWorks® and Linux®. QNX and LynxOS® are available on request.

The CT9 version 3.x is RoHS compliant.

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## Specifications

### CompactPCI - PLX 6254 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: 1.4 GHz to 1.8 GHz
- Intel® Celeron® M processor: 1.0 GHz and 1.3 GHz
- High efficiency on-board switching regulator (DC/DC)
- Fanless cooling with heat sink
- Contact GE Fanuc Intelligent Platforms for latest CPU versions

### Chipset - Intel E7501/P64H2/ICH4

- 400 MHz system bus to processor
- PCI burst mode transfers up to 512 MB/s (64-bit/66 MHz)
- Two 64-bit wide PCI buses with 66 MHz
- One 32-bit wide PCI bus with 33 MHz

Cache	Level 1	Level 2
Pentium M (90nm)	32 KB	2048 KB, full speed
Pentium M (130nm)	32 KB	1024 KB, full speed
Celeron M (90nm)	32 KB	512 KB, full speed
Celeron M (130nm)	32 KB	512 KB, full speed

### Memory - DDR 200

- High-speed registered DDR SDRAM
- 72-bit wide with error correction (ECC)
- 512 Mbytes to 2 Gbyte with soldered chips

### Dual Gigabit Ethernet - Intel 82546GB

- Highly integrated Dual Channel Ethernet Controller with 64-bit/66 MHz PCI local bus mastering
- 64 Kbyte Transmit and Receive FIFO
- 10/100/1000BaseT auto-negotiation
- Versions with front I/O available
- Compliant to PICMG 2.16

### Hard Disk or Flash Drive

- Internal 2.5" IDE hard disk or 2.5" flash drive (for extended temperature range and higher shock/vibration immunity)

### PMC Extension Slots - IEEE P1386/1386.1

- One high bandwidth 64-bit/66 MHz PMC interface and one 32-bit/33 MHz PMC interface
- Enhancement to processor PMC standard VITA 32-2003 (non-monarch)
- Cardbus adapter available on PMC2
- Note: The 32-bit/33 MHz PMC slot is not available with VGA or Ethernet on the front and IDE secondary installed.

### IPMI 1.5

- Baseboard Management Controller supporting the Intelligent Platform Management Interface (IPMI) architecture in compliance with PICMG 2.9
- Peripheral mode and BMC mode are supported

### Serial I/O - RS-232/422/485

- 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 RS-232/422/485 interface
- COM1 optional available at front

### VGA and LCD - NVIDIA® GeForce™ 4 420 Go

#### CT9 board version 2.x only

- 256-bit 3D and 2D graphics accelerator
- On-chip 32 MB frame buffer (66-190 MHz)
- 32-bit/33 MHz PCI interface
- Dual CRT/Simultaneous Dual Display
- 350 MHz Palette-DAC for analog VGA (up to 1600x1200)
- DVI-I interface (PanelLink®) for TFT displays up to 1024x768 single channel DVI (165 MHz), EDID display PnP supported
- Fully compliant support for OpenGL™ 1.2 for all supported Windows operating systems and Linux

### VGA and LCD - ATI MOBILITY™ RADEON™

#### CT9 board version 3.x only, RoHS version

- 128/256-bit 3D and 2D and multimedia graphics accelerator
- Local DDR memory (16 MB or 64 MB) @ 125 MHz to 200 MHz
- 32-bit/33 MHz PCI interface
- Dual independent CRT controllers to support two asynchronous simultaneous display paths
- RAMDAC (300 MHz to 400 MHz) for analog VGA (1600x1200)
- TDMS transmitter up to 165 MHz (1024x768 at 60 Hz); DVI
- Fully support of OpenGL 1.3 (Windows) and xFreeX86 (Linux)
- Support for DirectX® 6.0 to DirectX 8.1 under Windows

### 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 with rear I/O

### Parallel Port

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

### General Purpose I/O (Software configurable)

- Eight GPIO (input or output) pins
- Interrupt capability (level, edge)

### USB 2.0 - ICH4

- One USB 2.0 connector at front
- Four universal serial bus channels at rear

### Keyboard and Mouse

- PS/2 compatible

### Real-time Clock

- RTC 146818 compatible, on-board Li-battery

### CMOS RAM

- 242 bytes non-volatile CMOS RAM

### EEPROM

- 512 kbit serial EEPROMs for non-volatile user data

### Floppy

- One channel 3.5" floppy drive controller

### Watchdog (user programmable)

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

### Timer

- Integrated in E7501/ICH4 chipset

### Temperature Sensors

- CPU die and heat sink temperature software readable from -65 °C to +127 °C

### LED

- Front panel LED System control
- Hot swap (blue), Status (red/yellow/green)

### Hot-Swap - compliant to PICMG 2.1

- 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

### H.110 Friendly

- Versions with non-populated J4 (see front and rear I/O table below) do not interfere with H.110 bus on P4

### 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
- Extensive setup with remappable serial/parallel ports
- Operation without disk, keyboard and video
- Remote BIOS through serial port

### Software

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

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

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

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

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Function	Front	Rear J3/J4/J5
DVI-I	-	√ <sup>1,4</sup>
VGA	√ <sup>3</sup>	√ <sup>1,4</sup>
Ethernet 1	√ <sup>2,3</sup>	√ <sup>2</sup>
Ethernet 2	√ <sup>2,3</sup>	√ <sup>2</sup>
Keyboard + Mouse	√	√
Reset	√	√
LEDs	√	√
USB 2.0 1-5	1	2-5 <sup>4</sup>
IDE primary	-	√
IDE secondary	Onboard <sup>3</sup>	-
Floppy	-	√ <sup>4</sup>
COM 1-2	1	1, 2
LPT	-	√ <sup>4</sup>
GPIO (8 pins)	-	√ <sup>4</sup>
PMC 1 (64-bit/66 MHz)	√	√
PMC 2 (32-bit/33 MHz)	√ <sup>3</sup>	√

<sup>1</sup> Rear DVI-I connector for DVI and VGA

<sup>2</sup> Either front or rear as an order option

<sup>3</sup> 32-bit/33 MHz PMC slot not available with front VGA and/or front Ethernet and/or IDE secondary installed

<sup>4</sup> Not without J4

## Styles

	C	I
<b>Non-RoHS</b>	<b>1</b>	<b>3</b>
<b>RoHS</b>	<b>1</b>	<b>3</b>
Front panel	yes	yes
Front stiffener	no	no
Middle stiffener	no	no
Wedge locks	no	no
Parts soldered	yes	yes
Li-battery	yes	yes
Extended temperature	no	yes
Conformal coating	no	no
Conduction cooled	no	no

## Power Requirements

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

## Power Consumption - typical operating current

- Without keyboard, hard disk, modules, Ethernet (no link), measured at DOS prompt, no power savings.

Processor, Memory	5V	3.3V	Total Power
1 GHz, 1 GB	1.0 A	5.9 A	24.5 W
1.3 GHz, 1 GB	2.2 A	5.9 A	30.5 W
1.4 GHz, 2 GB	1.4 A	5.9 A	26.5 W
1.6 GHz, 2 GB	2.7 A	5.9 A	33.0 W
1.8 GHz, 2 GB	2.5 A	5.9 A	32.0 W

- Without keyboard, hard disk, modules, Windows XP, 3D graphics active. Both Gigabit Ethernet channels linked, CPU running at instruction mix for maximum power consumption.

Processor, Memory	5 V	3.3 V	Total Power
1 GHz, 1 GB	1.3 A	7.5 A	31.3 W
1.3 GHz, 1 GB	4.6 A	7.5 A	47.8 W
1.4 GHz, 2 GB	2.7 A	7.5 A	38.3 W
1.6 GHz, 2 GB	5.4 A	7.5 A	51.8 W
1.8 GHz, 2 GB	4.8 A	7.5 A	48.8 W

## Power Allowances - PMC slot

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

## Mechanical - PICMG 2.0

- 6U, 1 slot wide
- 233 x 160 x 20 mm (including flash drive) or hard disk

## Temperature

- Note: For detailed information about the operating temperature behavior of any style board it is absolutely necessary to consult the manual. The processor type and speed, altitude, the use or not of Ethernet and video, ambient conditions and the type of cooling influences the board temperature range.

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

	Operating	Storage
Humidity	5 - 95% @ 40°C	5 - 95% @ 40°C
Altitude	15,000 ft. (4.5 km)	40,000 ft. (12 km)

## Shock (3 axis, up & down, 5 hits/direction)

- Style (C, I, 1, 3): 12g/6 ms

## Vibration (30 minutes each axis)

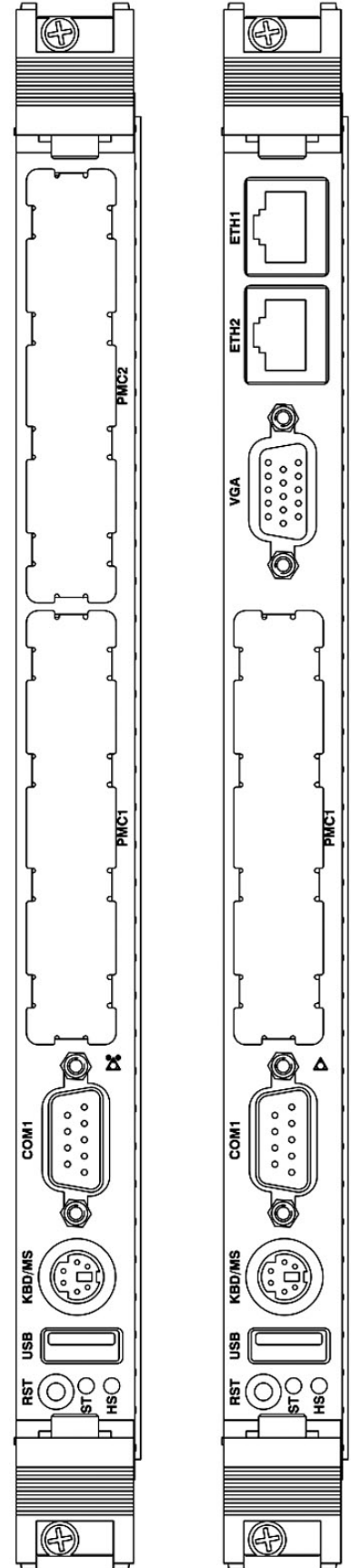
- Style (C, I, 1, 3): 2g rms @ 5 to 100 Hz

## MTBF

- Calculations are available in accordance with MIL-HDBK-217. Please contact GE Fanuc Intelligent Platforms.

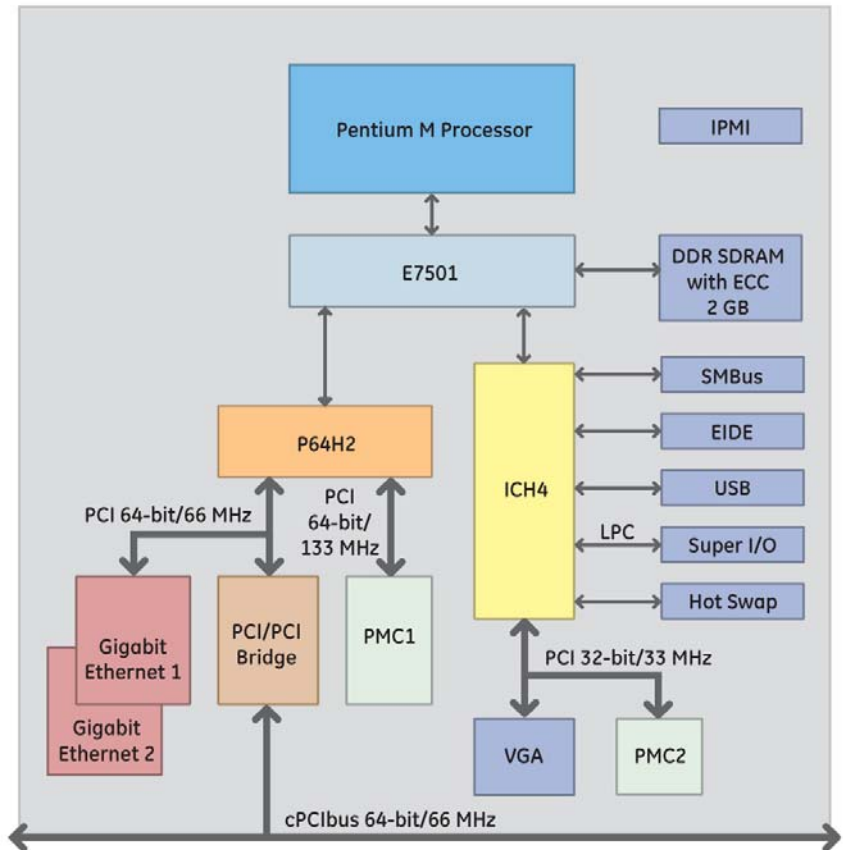
## Safety

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



# CT9 - High Performance PICMG® 2.16 6U CompactPCI® Server Blade

## Block Diagram



## Ordering Information

### Hardware Accessories

CTM12	I/O transition module for 6U backplane (IEEE 1101.11-1998 compliant)
SCM184TL00C	1U 19" chassis with 2 cPCI slots, backplane and power supply
SCC784UE05CT9	CT9 starter cage, 19", 7U, 84HP, 5 cPCI slots, fans, HDD and DVD
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 Platforms.

## 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](http://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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