GE
Intelligent Platforms

CP9

High Performance 6U CompactPCI® Embedded Computer

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 front I/O
- 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
- 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 CP9 is a 6U CompactPCI all-in-one CPU board with a low power Intel® Pentium® M processor and dual Gigabit Ethernet channels. The CP9 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 CP9 supports the 64-bit/66 MHz CompactPCI bus.

The CP9's dual slot wide front panel allows installation of two PMC modules and a hard disk or a Flash drive in parallel. This compact all-in-one CPU module is very well suited for I/O intensive applications in market segments like automation, industrial control, transportation, and others.

The CP9 platform is designed to support processors starting with 1 GHz up to 1.8 GHz. It offers low power consumption and eliminates the need for on-board fans. The design is ready to accept future higher performance Intel Pentium M processor versions.

The CP9 provides a unique feature set, including up to 2 GB of DDR SDRAM (200MHz) with ECC, three independent on-board PCI buses, high speed support for the CPCI backplane, two PMC interfaces (64-bit/133MHz and 32-bit/33 MHz). A high level of functional integration (VGA/TFT, USB, serial interfaces, etc.) within a single board and wide front panel gives users the freedom to use the PMC interfaces as extension for their applications. This combined with a custom specific assembly service provides optimized price/performance for a range of OEM applications. The CP9 is also available in an extended temperature version ranging from -40°C to +85°C.

Supported operating systems include Windows® XP, VxWorks® and Linux®. QNX6 and LynxOS® are available on request.

The CP9 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 Intelligent Platforms for latest CPU versions

Chipset - Intel E7501/P64H2/ICH4
- 400 MHz system bus to processor
- PCI burst mode transfers up to 1024 MB/s (64-bit/133 MHz)
- One 64-bit wide PCIbus with 133 MHz
- One 64-bit wide PCIbus with 66 MHz
- One 32-bit wide PCIbus 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/up to 133 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

USB 2.0 - ICH4
- One USB 2.0 connector at front
- Four universal serial bus channels at rear

VGA and LCD - NVIDIA® GeForce™4 420 Go
CP9 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 CRTC/Simultaneous Dual Display
- 350 MHz Palette-DAC for analog VGA (up to 1600 x 1200)
- DVI-I interface (PanelLink®) for TFT displays up to 1024 x 768 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™
CP9 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 (1600 x 1200)
- TDMS transmitter up to 165 MHz (1024 x 768 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

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

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)

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 heatsink 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

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).

Function	Front	Rear J3/J4/J5
DVI-I	-	✔[1]
VGA	✔	✔[1]
Eth 1	✔[2]	✔[2]
Eth 2	✔[2]	✔[2]
Keyb+Mouse	✔	✔
Reset	✔	✔
LEDs	✔	✔
USB 2.0 1-5	1	2-5
IDE primary	-	✔
IDE secondary	onboard	-
Floppy	-	✔
COM 1-2	1	1, 2
LPT	-	✔
GPIO (8 pins)	-	✔
PMC 1 (64-bit/up to 133 MHz)	✔	✔
PMC 2 (32-bit/33 MHz)	✔[3]	✔

1. Rear DVI-I connector for DVI and VGA
2. Either front or rear as an order option

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Styles

Non-RoHS RoHS	C 1	I 3
Front panel	yes	yes
Front stiffener	no	no
Middle stiffener	no	no
Wedge locks	no	no
Parts soldered	yes	yes
Li-battery	yes	yes
Entended tempeerature	no	yes
Conformal coating	no	no
Conduction cooled	no	no

Power Requirements

- +5 V, +3.3 V Required
- ±12 V 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	5 V	3.3 V	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; 100 mA each

Mechanical - PICMG 2.0

- 6U, 2 slot wide
- 233 x 160 x 40 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.
- All values under typical conditions without a PMC module.

	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 Intelligent Platforms.

Safety

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

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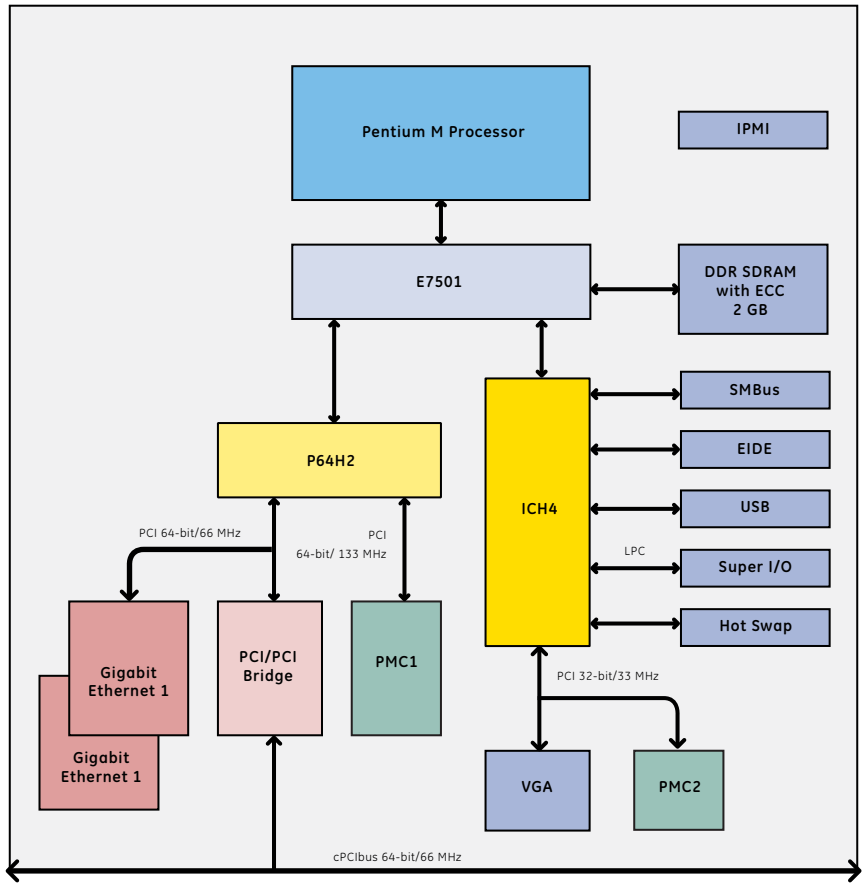
Block Diagram



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
SCC784UE05CP9	CP9 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 Intelligent Platforms.

GE Intelligent Platforms Contact Information

Americas: **1 800 433 2682** or **1 434 978 5100**
Global regional phone numbers are listed by location on our web site at **www.ge-ip.com/contact**

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