cPCI-6870 Series

Low Power 6U CompactPCI Processor Blade with Mobile Intel® GS45 Express Chipset

User's Manual



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Revision History

Revision	Release Date	Description of Change(s)
2.00	2010/11/09	Initial Release
2.01	2011/08/30	Remove VGA function from the RJ-45 connector on the front panel for models with ordering numbers ending in “xx30” and higher; SCSI and floppy not supported on current model RTMs; add SW6 description; update addresses

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Preface

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Using this Manual

Audience and Scope

The cPCI-6870 User's Manual is intended for hardware technicians and systems operators with knowledge of installing, configuring and operating industrial grade CompactPCI modules.

Manual Organization

This manual is organized as follows:

Chapter 1, Overview: Introduces the cPCI-6870, its features, block diagrams, and package contents.

Chapter 2, Specifications: Presents detailed specification information, and power consumption.

Chapter 3, Functional Description: Describes the cPCI-6870's main functions.

Chapter 4, Board Interfaces: Describes the cPCI-6870 board interfaces, pin definitions, and jumper settings.

Chapter 5, Getting Started: Describes the installation instructions of the cPCI-6870.

Chapter 6, Driver Installation: Describes the driver installation procedures.

Chapter 7, Utilities: Describes the Watchdog Timer and Preboot Execution Environment functions.

Chapter 8, BIOS Setup Utility: Describes the AMIBIOS®8 BIOS setup utility.

Chapter 9, IPMI User Guide: Provides relevant information for the baseboard management controller (BMC) of the Intelligent Platform Management Interface (IPMI).

Important Safety Instructions: Presents safety instructions all users must follow for the proper setup, installation and usage of equipment and/or software.

Getting Service: Contact information for ADLINK's worldwide offices.

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Conventions

Take note of the following conventions used throughout this manual to make sure that users perform certain tasks and instructions properly.



NOTE:

Additional information, aids, and tips that help users perform tasks.



CAUTION:

Information to prevent ***minor*** physical injury, component damage, data loss, and/or program corruption when trying to complete a task.



WARNING:

Information to prevent ***serious*** physical injury, component damage, data loss, and/or program corruption when trying to complete a specific task.

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1 Overview

1.1 Introduction

The cPCI-6870 Series is a 6U CompactPCI single board computer in single slot (4HP) width form factor featuring a low power, small form factor mobile Intel® chipset and supporting 45nm process Core™2 Duo and Celeron® processors. The cPCI-6870 provides up to 8GB dual channel DDR3-800/1066 memory capacity and implements the Mobile Intel® GS45 Graphics and Memory Controller Hub and ICH9M-SFF I/O Controller Hub to provide a full feature set and optimal performance.

The cPCI-6870 Series supports a 64bit/66MHz CompactPCI bus, two PMC sites with 64-bit/66MHz PCI bus or two PCI-Express x8 XMC sites, four PCI-Express Gigabit Ethernet ports (two on front panel, two for PICMG 2.16), a SATA connector for an onboard 2.5” SATA HDD, and CompactFlash socket support via the Rear Transition Module (RTM). For flexibility of use, the cPCI-6870 Series can be installed in a standard CompactPCI system slot as system master, or peripheral slot as a PCI device. The cPCI-6870 Series is ideally suited for factory automation, transportation and military applications.

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1.2 Features

- 6U CompactPCI SBC in 4HP width form factor
- µFC-BGA package Intel® CoreTM2 Duo or Celeron® processor, up to 2.26GHz
- 1066/800/667 MHz Front Side Bus depending on processor
- Mobile Intel® GS45 Memory Controller Hub and ICH9M-SFF I/O Hub
- Dual Channel DDR3 non-ECC SDRAM at 800 or 1066MHz via two SO-DIMM sockets, up to 8GB
- 64-bit/66MHz CompactPCI Interface based on PCI specifications, 3.3V and 5V signaling
- Supports operation in system slot as system master or in peripheral slot with connectivity to CompactPCI bus (optional isolation from CompactPCI bus)
- Dual PMC sites with 64-bit/133MHz PCI bus
- Dual XMC sites with PCI-Express x8 lane
- Four PCI-Express® Gigabit Ethernet ports, two at front, two for PICMG 2.16
- Onboard CompactFlash socket
- 2.5” SATA HDD direct connector onboard, occupies outer PMC/ XMC site
- Optional -20ºC to 70ºC extended temperature support
- RTM models available with multiple I/O options: SATA, HD audio, COM, USB, Gigabit Ethernet, PS/2 KB/MS, PIM, SAS, CF, SD socket
- Hardware RAID on SATA, SAS interfaces supported (dependent on RTM module)

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1.3 Block Diagram

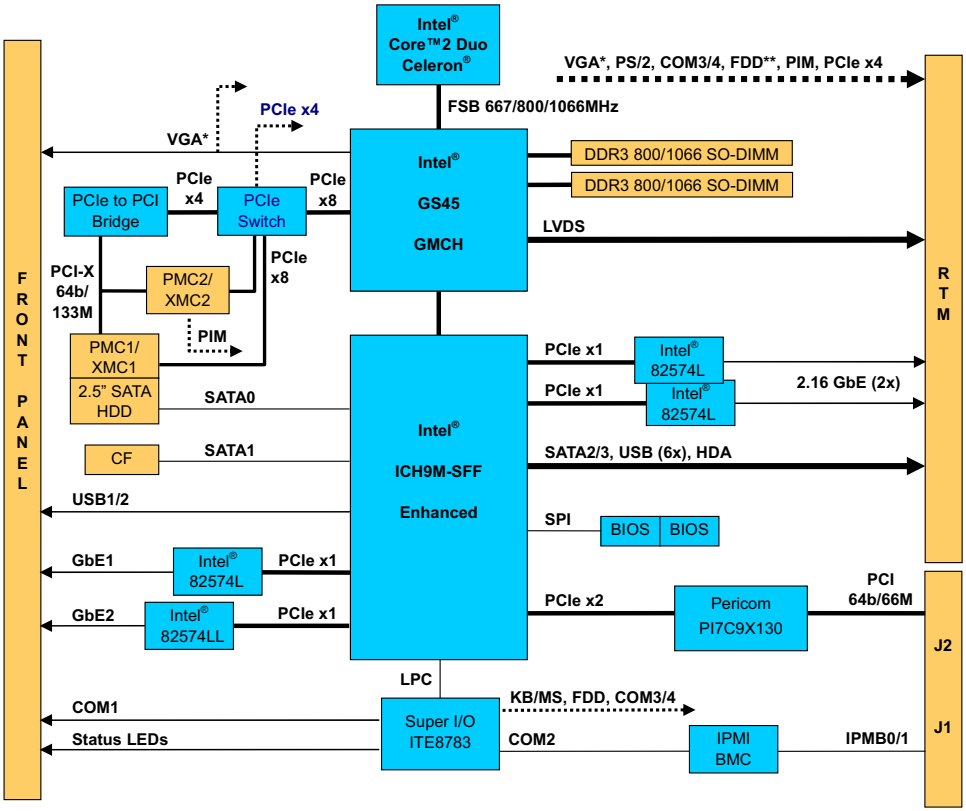


Figure 1-1: cPCI-6870 Series Block Diagram

NOTE:

*VGA is not supported on the front panel of models with ordering numbers ending in "xx30" and higher. On these models, VGA is directly routed to the RTM and the front panel RJ-45 connector is a dedicated serial port.
**Floppy support is not available on current model RTMs.

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1.4 Product List

Products included in the cPCI-6870 Series include:

Processor Blade

- **cPCI-6870:** 4HP width (single-slot) 6U CompactPCI blade featuring single Intel® Core™2 Duo or Celeron® processor, dual channel DDR3-800/1066 SDRAM via two SO-DIMM sockets, two PMC/XMC sites, 2x USB, 2x GbE, RJ-45 COM/VGA*, SATA, and CF socket


NOTE:

*VGA is not supported on the front panel RJ-45 connector of models with ordering numbers ending in “xx30” and higher. On these models, VGA is directly routed to the RTM and the RJ-45 connector is a dedicated serial port.

Rear Transition Modules

- **cPCI-R6001P:** 4HP width RTM with VGA, 2x COM, 3x USB, 2x GbE, PIM, SATA
- **cPCI-R6002:** 4HP width RTM with VGA, 2x COM, 3x USB, 2x GbE, SATA
- **cPCI-R6002D:** 8HP width RTM with VGA, 2x COM, 3x USB, 2x GbE, SATA, DB-R6000L2 riser card provides 2x USB, KB/MS, Mic-in, Line-out and removable SATA direct connector (DB-6920SAT) for 2.5” SATA HDD
- **cPCI-R6101:** 4HP width RTM with 4x GbE, 4x USB, SATA, VGA, PS/2 KB/MS, CF & SD sockets
- **cPCI-R6111:** 4HP width RTM with 2x GbE, 4x USB, SATA, VGA, PS/2 KB/MS, CF, & SD sockets
- **cPCI-R6201:** 8HP width RTM with 2x GbE, 4x USB, 2x COM, VGA, 2x SATA, Mic-in, Line-out, PS/2 KB/MS, 8x SAS

Adapter Kit

- **DB-CF-SA:** CompactFlash socket kit for cPCI-R6001D & cPCI-R6201 RTMs, including DB-6920CF adapter board, card guide and screws to replace SATA adapter with CompactFlash socket

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1.5 Package Contents

The cPCI-6870 is packaged with the components listed below (RTMs and adapter kits are optional). If any of the items in the contents list are missing or damaged, retain the shipping carton and packing material and contact the dealer for inspection. Please obtain authorization before returning any product to ADLINK. The packing contents of non-standard configurations may vary depending on customer requests.

Processor Blade

- The cPCI-6870 Series Processor Blade
  - CPU, RAM will differ depending on options selected
  - Thermal module is assembled on the board
- RJ-45 to DB-9 cable for RJ-45 COM port
- RJ-45 to DB-15 cable for RJ-45 VGA port
  (Not included with ordering numbers ending in “xx30” and higher.)
- DB-6920SAT SATA adapter card
- 2.5” SATA HDD mounting kit, including HDD bracket and screws for HDD
- ADLINK All-in-One CD
- User’s manual

Rear Transition Module

- The cPCI-R6001P, cPCI-R6002(D)*, cPCI-R6101, cPCI-R6111 or cPCI-R6201 RTM
  *Replaces cPCI-R6001(D).
- The DB-SATA kit (cPCI-R6002D, cPCI-R6111, cPCI-R6201 only)
- 2.5” HDD bracket (cPCI-R6002D, cPCI-R6201 only)
- Y-cable for PS/2 combo port (cPCI-R6002D, cPCI-R6101, cPCI-R6111, cPCI-R6201 only)
- DVI to VGA (DB-15) adapter (cPCI-R6002, cPCI-R6001P, cPCI-R6002D, cPCI-R6201 only)

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Adapter Kit

- The DB-CF-SA kit (for cPCI-R6002D, cPCI-R6201 RTM)
  - DB-6920CF adapter board
  - Screw pack
  - CF card guide



The contents of non-standard cPCI-6870 configurations may vary depending on customer requests.



This product must be protected from static discharge and physical shock. Never remove any of the components except at a static-free workstation. Use the anti-static bag shipped with the product when putting the board on a surface. Wear an anti-static wrist strap properly grounded on one of the system's ESD ground jacks when installing or servicing system components.

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2 Specifications

2.1 cPCI-6870 SBC Specifications

CompactPCI Standard	PICMG® 2.0 CompactPCI® Rev. 3.0 PICMG® 2.1 Hot Swap Specification Rev.2.0 PICMG® 2.9 System Management Bus Rev. 1.0 PICMG® 2.16 Packet Switching Backplane Rev.1.0
Mechanical	Standard 6U CompactPCI®
	Board size: 233.23 mm x 160mm
	Single slot (4HP, 20.32mm) width
	CompactPCI® connectors J1, J2, J3, J4 and J5 for cPCI-6870
Processor	µFC-BGA Intel® Core™2 Duo processor SP9300, 6MB L2 cache, 2.26GHz, 1066MHz FSB
	µFC-BGA LV Intel® Core™2 Duo processor SL9400, 6MB L2 cache, 1.86GHz, 1066MHz FSB
	µFC-BGA ULV Intel® Core™2 Duo processor SU9300, 3MB L2 cache, 1.2GHz, 800MHz FSB
	µFC-BGA Intel® Celeron® processor ULV 723, 1MB L2 cache, 1.2GHz, 800MHz FSB
Chipset	Intel® GS45 Graphics Memory Controller Hub (GMCH) Intel® I/O Controller Hub 9M Enhanced (Intel ICH9M-Enhanced) SFF
Memory	Dual channel DDR3-800/1066 SDRAM Two SO-DIMM sockets Maximum 8GB capacity
CompactPCI Bus	PCI 64-bit/ 66MHz; V(I/O) 3.3V and 5V signaling Supports operation in system slot or in peripheral slot with connectivity to CompactPCI bus (Universal Mode)
PMC/XMC	Two PCI 64-bit/133MHz PMC sites, V(I/O) 3.3V or 5V Or two PCI-Express x8 XMC sites
Ethernet	Four PCI-Express® x1 Intel® 82574L GbE controllers Two 10/100/1000BASE-T egress ports Two 10/100/1000BASE-T ports on rear panel, optional PICMG 2.16 support by switch selection

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Graphics	Integrated in Intel® GS45 Express Chipset (GMCH) Intel® Gen 5.0 integrated graphics engine Intel® Dynamic Video Memory Technology (Intel® DVMT 5.0) Microsoft® Direct X 10 support Analog RGB signal to front or rear by switch selection[3] VGA port on front panel via RJ-45 to DB-15 adapter cable[3] (shared with RJ-45 COM port) Analog RGB up to QXGA
Serial Ports	One 16C550 compatible RJ-45 RS-232 port on front panel (shared with RJ-45 VGA port)[3] Two serial ports routed to rear I/O
Storage Interfaces	2.5” SATA HDD direct connector onboard
	CompactFlash Type II socket onboard[1]
BIOS	AMIBIOS®8, dual 16Mbit SPI flash memory, supports failover
IPMI Interface	Supports PICMG® 2.9 secondary system management bus IPMI functions implemented as defined by IPMI Spec. v1.5; ATmega128L-8AU Baseboard Management Controller (BMC) with 128KB programmable in-system flash, 4KB EEPROM, and 4KB internal SDRAM
Faceplate I/O	2x USB 2.0 ports 2x 10/100/1000BASE-T Ethernet ports RJ-45 serial port or VGA port[3] 2x PMC/XMC slots
Onboard Peripherals	Serial ATA connector (signal + power) CompactFlash socket
Supported OS	Red Hat Enterprise 5.1 x86_64 Red Hat Enterprise Linux 5.1 i386 Microsoft® Windows® 7 x86 Edition Microsoft® Windows® Server 2008 x64 Edition (Intel does not provide INF and graphics driver) Microsoft® Windows® Server 2003 32-bit Edition (Intel does not provide graphics driver) Microsoft® Windows® Vista x64 Edition (Intel does not provide graphics driver) Microsoft® Windows® XP Professional SP3 32-bit Edition Microsoft® Windows® 2000 Professional SP4 Other OS support upon request
Operating Temperature[1]	0ºC to 60ºC standard -20ºC to 70ºC extended temperature (optional)
Storage Temperature	-40ºC to 85ºC

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Humidity	20% to 95% non-condensing
Shock	15G peak-to-peak, 11ms duration, non-operating
Vibration[2]	Operating: 2Grms. 5 to 500Hz, each axis (without HDD)
Compliance	CE EN55022, FCC Class A

Notes:

1. ADLINK-certified thermal design. The thermal performance is dependent on the chassis cooling design. Forced airflow with 6 CFM is required to allow safe operation of the CPU at full loading. Temperature limit of optional mass storage devices may affect the thermal specification.
2. The hard drive limits the operational vibration tolerance. When application requires higher specification for anti-vibration, it is recommended to use a solid state drive (SSD) or Compact-Flash card.
3. VGA is not supported on the front panel RJ-45 connector (CN11) of models with ordering numbers ending in “xx30” and higher. On these models, VGA is directly routed to the RTM and the RJ-45 connector is a dedicated serial port.



Specifications are subject to change without prior notice.

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2.2 I/O Connectivity Tables

Processor Blade

Function	cPCI-6870	
	Faceplate	Board
Gigabit Ethernet	2	—
COM1	1[1] (RJ-45)	—
USB 2.0	2	—
PMC/XMC	—	2
VGA	1[1] (RJ-45)	—
Serial ATA	—	1[2]
Compact Flash	—	1
Reset Button	1	—

Table 2-1: SBC I/O Connectivity

Notes:

1. RJ-45 connector shared by COM port and VGA port. COM and VGA cannot be used simultaneously. (VGA is not supported on the front panel RJ-45 connector (CN11) of models with ordering numbers ending in “xx30” and higher.)
2. 2.5” HDD occupies the same space as the outer PMC/XMC site and cannot be installed simultaneously.

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RTMs

Function	cPCI-R6001P (4HP)		cPCI-R6002 (4HP)		cPCI-R6002D (8HP)	
	Faceplate	Board	Faceplate	Board	Faceplate	Board
GbE	2	—	2	—	2	—
USB 2.0	2	1 (5-pin)	2	1 (5-pin)	4	1 (5-pin)
COM	1(DB-9)	1(1) (10-pin)	1 (DB-9)	1(1) (10-pin)	1 (DB-9)	1(1) (10-pin)
VGA	1	—	1	—	1	—
PIM	—	1	—	—	—	—
SATA	—	1 (7-pin)	—	1 (7-pin)	—	2(2)
CF	—	—	—	—	—	1(2) (opt.)
Mic-in	—	—	—	—	1	—
Line-out	—	—	—	—	1	—
PS/2 KB/ MS	—	—	—	—	1	—
SD	—	—	—	—	—	—
SAS	—	—	—	—	—	—

Table 2-2: RTM I/O Connectivity (pt. 1)

Notes:

1. Tx, Rx signals only
2. One 7-pin signal connector for external HDD and one direct connector for onboard 2.5” SATA HDD. Optional Compact-Flash slot is supported by replacing SATA connector adapter with CompactFlash adapter. SATA HDD and CF cannot be used simultaneously.

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RTMs (cont'd)

Function	cPCI-R6101 (4HP)		cPCI-R6111 (4HP)		cPCI-R6201 (8HP)	
	Faceplate	Board	Faceplate	Board	Faceplate	Board
GbE	4	—	2	—	2	—
USB 2.0	4	—	4	—	3	1 (5-pin)
COM	1 (RJ-45)	—	—	—	—	1(1) (10-pin)
VGA	1	—	1	—	1	—
PIM	—	—	—	—	—	—
SATA	—	1 (7-pin)	—	1 (for 2.5" HDD)	—	2(2)
CF	—	1(5)	—	1(3)	—	1(2) (opt.)
Mic-in	—	—	—	—	1	—
Line-out	—	—	—	—	1	—
PS/2 KB/ MS	1	—	1	—	1	—
SD	—	1	—	1	—	—
SAS	—	—	—	—	4 (SFF-8088)	4 (SFF-8087)

Table 2-3: RTM I/O Connectivity (pt. 2)

Notes:

1. Tx, Rx signals only
2. One 7-pin signal connector for external HDD and one direct connector for onboard 2.5" SATA HDD. Optional Compact-Flash slot is supported by replacing SATA connector adapter with CompactFlash adapter. SATA HDD and CF cannot be used simultaneously.
3. Converted from USB

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2.3 Power Requirements

In order to guarantee a stable functionality of the system, it is recommended to provide more power than the system requires. **An industrial power supply unit should be able to provide at least twice as much power as the entire system requires of each voltage**. An ATX power supply unit should be able to provide at least three times as much power as the entire system requires.

The tolerance of the voltage lines described in the CompactPCI specification (PICMG 2.0 R3.0) is +5%/ -3% for 5, 3.3 V and ±5% for ±12V. This specification is for power delivered to each slot and it includes both the power supply and the backplane tolerance.

Voltage	Nominal Value	Tolerance	Max. Ripple (P - P)
5V	+5.0 VDC	+5% / -3%	50 mV
3.3V	+3.3 VDC	+5% / -3%	50 mV
+12V	+12 VDC	+5% / -5%	240 mV
-12V	-12 VDC	+5% / -5%	240 mV
V I/O (PCI I/O Buffer Voltage)	+3.3 VDC or +5 VDC	+5% / -3%	50 mV
GND			

Table 2-4: CompactPCI Input Voltage Characteristics

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Power Consumption

This section provides information on the power consumption of cPCI-6870 Series with different CPUs, 2GB soldered onboard memory, 2x 2GB SO-DIMM memory, 100GB onboard SATA HDD and cPCI-R6002 installed. The systems were tested in Idle Mode and Full Load Mode under Windows XP running Burn-in Test 6.0. The cPCI-6870 is powered by 5V, 3.3V and optional +12V.

Idle Mode under Windows XP

CPU	SV Core™2 Duo SP9300		LV Core™2 Duo SL9400		ULV Core™2 Duo SU9300		ULV Celeron® M 723	
Voltage (V)	Current (A)	Power (W)	Current (A)	Power (W)	Current (A)	Power (W)	Current (A)	Power (W)
+3.3	3.49	11.52	3.47	11.45	3.49	11.53	3.55	11.73
+5	5.32	26.61	3.12	15.60	3.14	15.71	3.41	17.08
Total		38.13		27.05		27.24		28.81

Table 2-5: Idle Mode Power Consumption

100% CPU Usage under Windows XP

CPU	SV Core™2 Duo SP9300		LV Core™2 Duo SL9400		ULV Core™2 Duo SU9300		ULV Celeron® M 723	
Voltage (V)	Current (A)	Power (W)	Current (A)	Power (W)	Voltage (A)	Current (W)	Power (A)	Current (W)
+3.3	3.46	11.44	3.47	11.45	3.49	11.53	3.55	11.73
+5	6.54	32.70	5.24	26.20	4.07	20.39	4.11	20.57
Total		44.14		37.65		31.93		32.30

Table 2-6: 100% CPU Usage Power Consumption

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3 Functional Description

The following sections describe the cPCI-6870 Series features and functions.

3.1 CPU

The following table lists the processors supported by the cPCI-6870 Series and their power ratings.

Features	Intel® Core™2 Duo SP9300	Intel® Core™2 Duo SL9400	Intel® Core™2 Duo SU9300	Intel® Celeron® 722	Intel® Celeron® 723
Clock	2.26 GHz	1.86 GHz	1.2 GHz	1.2 GHz	1.2 GHz
L2 cache	6MB	6MB	3MB	1MB	1MB
FSB	1066MHz	1066MHz	800MHz	800MHz	800MHz
Max. Power (TDP[1])	25 W	17 W	10 W	5.5 W	10 W
$T_{junction, MAX}$[2]	105ºC	105ºC	105ºC	100ºC	100ºC
Process	45nm	45nm	45nm	45nm	45nm
# of cores	2	2	2	1	1

Notes:

1. The highest expected sustainable power while running known power intensive applications. TDP is not the maximum power that the processor can dissipate.
2. The maximum supported operating temperature.

Intel® Core™2 Duo Processor

The Intel® Core™2 Duo mobile processors are high-performance, low-power processors based on the Intel® Core™ microarchitecture for Intel® Centrino® 2 technology. The following list outlines the key features of this processor:

- Dual-core processor for mobile with enhanced performance
- Supports Intel architecture with Intel® Wide Dynamic Execution
- Supports L1 cache-to-cache (C2C) transfer
- On-die, primary 32-KB instruction cache and 32-KB, write-back data cache in each core

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- The processor in DC-XE, standard voltage (SV) and LV have an on-die, up to 6-MB second-level, shared cache with Advanced Transfer Cache architecture
- The processor in ULV single-core and dual-core have an on-die, up to 3-MB second-level, shared cache with Advanced Transfer Cache architecture
- Streaming SIMD extensions 2 (SSE2), streaming SIMD extensions 3 (SSE3), supplemental streaming SIMD extensions 3 (SSSE3) and SSE4.1 instruction sets
- The processor in DC-XE, SV and LV are offered at 1066-MHz, source-synchronous front side bus (FSB)
- Advanced power management features including Enhanced Intel SpeedStep® Technology and dynamic FSB frequency switching
- Digital thermal sensor (DTS)
- Intel® 64 architecture
- Supports enhanced Intel® Virtualization Technology
- Enhanced Intel® Dynamic Acceleration Technology and Enhanced Multi-Threaded Thermal Management (EMTTM)
- Supports PSI2 functionality
- SV processor offered in Micro-FCPGA and Micro-FCBGA packaging technologies
- Execute Disable Bit support for enhanced security
- Intel® Deep Power Down low-power state with P_LVL6 I/O support
- Support for Intel® Trusted Execution Technology
- Half ratio support (N/2) for core to bus ratio

Intel® Celeron® Processor 722, 723

The Intel® Celeron® 722, 723 processor are based on 45 nm process technology in small form factor (SFF). The following list provides some of the key features of this processor:

- Single core with enhanced performance
- Ultra Low Voltage
- Supports L1 cache-to-cache transfer

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- On-die, primary 32-KB instruction cache and 32-KB write-back data cache
- On-die, 1-MB second level shared cache with advanced transfer cache architecture
- 800-MHz source-synchronous front side bus (FSB)
- Supports Intel® architecture with Intel® Wide Dynamic Execution
- Digital Thermal Sensor (DTS)
- 956-ball Micro-FCBGA packaging technology
- Execute Disable Bit support for enhanced security
- Intel® 64 architecture (formerly Intel® EM64T)
- Architectural and performance enhancements of the Core microarchitecture.

3.2 Chipset

The cPCI-6870 Series incorporates the Mobile Intel® 82GS45 Graphics and Memory Controller Hub (GMCH) and 82801IUX I/O Controller Hub (ICH9M-SFF).

Intel® GS45 Graphics Memory Controller Hub

The following outlines the key features of GS45 GMCH.

Processor Support

- Intel® Core™2 Duo, Intel® Core™2 Solo, and Intel® Celeron® mobile processors based on the 45-nm process
- 800-MHz and 1066-MHz FSBSupport for Dynamic FSB Frequency Switching
- Support for Intel® Virtualization Technology (Intel® VT) for Directed I/O (Intel® VT-d) (DMA)
- 36-bit interface to addressing, allowing the CPU to access the entire 64 GB of the GMCH's memory address space

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System Memory Support

- Supports DDR2 and DDR3 SDRAM (DDR3 only on cPCI-6870)
- Support for DDR3 at 667, 800 and 1066 MHz
- Two Memory Channel Configurations supported in Dual-channel Asymmetric
- 8-GB maximum memory support
- Support for x8 and x16 DDR2 and DDR3 devices
- 64-bit wide per channel
- No support for ECC

Direct Management Interface

- Chip-to-chip interface between GMCH and 82801 GMB/GHM
- Configurable as x2 or x4 DMI lanes
- 2-GB/s (1-GB/s each direction) point-to-point interface to ICH
- 32-bit downstream address

Integrated Graphics

- Intel Gen 5.0 integrated graphics engine with ten, fully-programmable cores
- 533-MHz core render clock @ 1.05-V core voltage
- Low-power configuration: 320-MHz core render clock at 1.05-V core voltage
- Supports HDMI/DVI, DP, TV-Out, LVDS, CRT and SDVO (the cPCI-6870 implements analog CRT only)
- Intel® Dynamic Video Memory Technology (Intel® DVMT 5.0)
- Microsoft DirectX10 support
- Single channel LVDS interface support: 1x18 bpp (LVDS signals are routed to J5 connector)
- Integrated 300-MHz DAC analog CRT
- Analog monitor support up to QXGA
- Support for CRT Hot-Plug

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Intel® ICH9M-SFF Mobile I/O Controller Hub

The ICH9M-SFF provides extensive I/O support. Functions and capabilities include:

- ACPI Power Management Logic Support
- Integrated Serial ATA host controllers with independent DMA operation on up to four ports and AHCI support.
  - Supports data transfer rates of up to 3.0 Gb/s (300 MB/s).
  - The SATA controller contains two modes of operation – a legacy mode using I/O space, and an AHCI* mode using memory space. Software that uses legacy mode will not have AHCI* capabilities.
- Provides 6 PCI Express x1 ports, supporting the PCI Express Base Specification, Revision 1.1. Each Root Port supports 2.5GB/s bandwidth in each direction (5 GB/s concurrent). The cPCI-6870 utilizes four PCI Express ports 3-6 for four Gigabit Ethernet controllers and configures the PCI Express ports 1-2 to PCI-Express x2 for connecting PCI Express to PCI bridge to support 64bit/66MHz CompactPCI bus..
- Enhanced DMA controller, interrupt controller, and timer functions
- System Management Bus (SMBus) Specification, Version 2.0 with additional support for I2C devices
- Supports Intel® High Definition Audio
- Supports Intel® Virtualization Technology for Directed I/O
- PCI Local Bus Specification, Revision 2.3 support for 33MHz PCI operations

*AHCI is a new programming interface for SATA host controllers. Platforms supporting AHCI may take advantage of performance features such as no master/slave designation for SATA devices—each device is treated as a master—and hardware-assisted native command queuing. AHCI also provides usability enhancements such as Hot-Plug. AHCI requires appropriate software support (e.g., an AHCI driver) and for some features, hardware support in the SATA device or additional platform hardware.

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3.3 Super I/O

The ITE IT8783F Super I/O is on a Low Pin Count interface supporting PS/2 keyboard/mouse, three 16C550-compatible serial ports, floppy drive interface, hardware monitor function to monitor CPU voltage, CPU temperature, power supply voltages and system temperature, and Watch Dog Timer with time resolution from minimum 1 second or minute to maximum 65,535 seconds or minutes.

3.4 Battery

The cPCI-6870 is provided with a 3.0V coin cell lithium battery for the Real Time Clock (RTC). The lithium battery must be replaced with an identical battery or a battery type recommended by the manufacturer. A Rayovac BR2032 is equipped on board by default.

3.5 PMC/XMC Sites

The cPCI-6870 series supports two PMC sites for front panel I/O expansion. The PMC sites provides a maximum 64bit/133MHz PCI bus link using a Pericom PI7C9X130 PCI-Express-to-PCI bridge and PCI-Express x4 link. The PMC site supports +3.3V or +5V signaling.

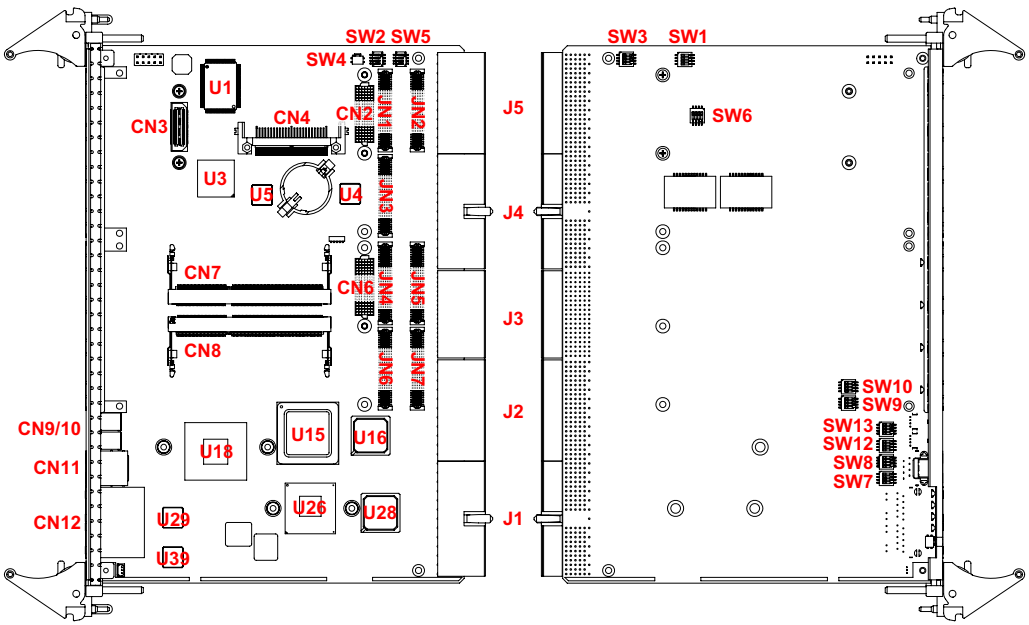
The JN1/4 and JN2/5 connectors provide the signals for the 32-bit PCI bus. The JN3/6 connector provides the 64 bit extension for the PMC interface. The JN7 connector in PMC/XMC 2 supports user defined I/O signals and is routed to the CompactPCI J4 connector to rear I/O.

The cPCI-6870 provides two PCIe x8 XMC interfaces sharing the same space as the PMC sites for high speed I/O expansion such as 10GbE or high-end graphics.

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4 Board Interfaces

4.1 cPCI-6870 SBC Board Layout



U26	CPU	**CN3**	SATA adapter card conn.
U18	North Bridge GS45	**CN7/8**	SO-DIMM socket
U3	South Bridge ICH9M-SFF	**CN9/10**	USB ports
U16/28	PCIe to PCI Bridge	**CN11**	COM/VGA port*
U4/5/29/39	Intel 82574L GbE controllers	**CN12**	LAN ports
U15	PCIe Switch	**J1-J5**	CompactPCI connectors
U1	Super I/O	**JN1-JN7**	PMC connectors
CN2/6	XMC connectors	**SW1~13**	Switches
CN4	CompactFlash socket	**SW4**	Clear CMOS button

Figure 4-1: cPCI-6870 SBC Board Layout

NOTE:

*VGA is not supported on CN11 of models with ordering numbers ending in “xx30” and higher. On these models, VGA is directly routed to the RTM and the RJ-45 connector is a dedicated serial port.

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4.2 cPCI-6870 SBC Front Panel

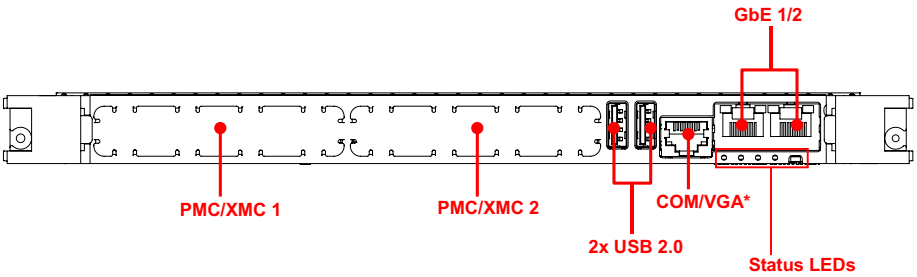


Figure 4-2: cPCI-6870 Series Front Panel Layout

Status LEDs



LED	Color	Condition	Indication
Power (PW)	Green	OFF	System is off
		ON	System is on
Hot Swap (HW)	Blue	OFF	Handles closed, System is on
		Fast Blink	Preparing to shut down system (LED: 0.1s on, 0.9s off)
		ON	Handles open and SBC ready to be removed
		Slow Blink	Voltages out of tolerance: 3.3V, 5V, 12V, 1.5V over ±5% (LED: 2s on, 1s off)
WDT (WDT)	Red	OFF	No Watchdog event
		ON	Watchdog event alert
HDD (HD)	Amber	OFF	No HDD activity
		Blink	Data read/write in process

Table 4-1: cPCI-6870 Front Panel Status LED Descriptions

*VGA is not supported on front panel RJ-45 of models with ordering numbers ending in “xx30” and higher.

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4.3 Connector Pin Assignments

USB Connectors

Pin #	Signal Name
1	Vcc
2	UV0-
3	UV0+
4	GND

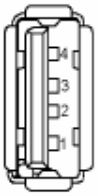


Table 4-2: USB Connector Pin Definition

RJ-45 COM/VGA* Port (CN-11)

Pin #	COM Signal	VGA Signal
1	DCD#	DDCDAT_5V
2	RTS#	HSYNC
3	DSR#	VSYNC
4	TXD	DDCCLK_5V
5	RXD	BLUE
6	GND	GND
7	CTS#	GREEN
8	DTR#	RED

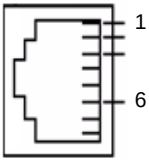


Table 4-3: RJ-45 Serial/VGA Port Pin Definition

NOTE:

*VGA is not supported on CN11 of models with ordering numbers ending in “xx30” and higher. On these models, VGA is directly routed to the RTM and the RJ-45 connector is a dedicated serial port.

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PS/2 Keyboard/Mouse Connector (CN11-R)

Pin #	Signal	Function
1	KBDATA	Keyboard Data
2	MSDATA	Mouse Data
3	GND	Ground
4	+5V	Power
5	KBCLK	Keyboard Clock
6	MSCLK	Mouse Clock

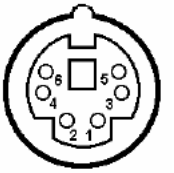


Table 4-4: PS/2 Keyboard/Mouse Connector Pin Definition

RJ-45 Gigabit Ethernet Connectors (CN12, CN20-R, CN21-R)

Pin #	10BASE-T/100BASE-TX	1000BASE-T
1	TX+	BI_DA+
2	TX-	BI_DA-
3	RX+	BI_DB+
4	--	BI_DC+
5	--	BI_DC-
6	RX-	BI_DB-
7	--	BI_DD+
8	--	BI_DD-

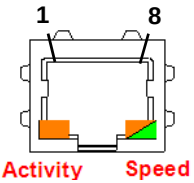


Table 4-5: GbE Connector Pin Definitions

Status (CN4, CN5)		Speed LED (Green/Amber)	Activity LED (Amber)
Network link is not established or system powered off		OFF	OFF
10 Mbps	Link	OFF	ON
	Active	OFF	Blinking
100 Mbps	Link	Green	ON
	Active	Green	Blinking
1000 Mbps	Link	Amber	ON
	Active	Amber	Blinking

Table 4-6: GbE LED CN12 Status Definitions

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DB-9 Serial Port (CN9-R)

Pin #	RS-232
1	DCD, Data carrier detect
2	RXD, Receive data
3	TXD, Transmit data
4	DTR, Data terminal ready
5	IsoGND, Isolated ground
6	DSR, Data set ready
7	RTS, Request to send
8	CTS, Clear to send
9	RI, Ring indicator

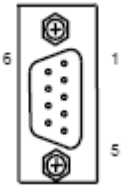


Table 4-7: COM1-2 Serial Port Connector Pin Definition

Onboard Serial Port Connector (CN10-R)

Pin #	RS-232
1	Not used
2	Not used
3	RXD, Receive data
4	Not used
5	TXD, Transmit data
6	Not used
7	Not used
8	Not used
9	IsoGND, Isolated ground
10	Not used

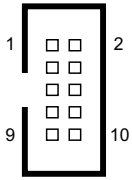


Table 4-8: Onboard Serial Port Connector Pin Definition

Serial ATA Connectors (CN1-R)

Pin #	Signal
1	GND
2	TX+
3	TX-
4	GND
5	RX-
6	RX+
7	GND



Table 4-9: SATA Connector Pin Definition

Serial ATA Connector on DB-6920SAT

Pin #	Signal
S1	GND
S2	TX+
S3	TX-
S4	GND
S5	RX-
S6	RX+
S7	GND
P1	NC
P2	NC
P3	NC
P4	GND
P5	GND
P6	GND
P7	5V
P8	5V
P9	5V
P10	GND
P11	Reserved
P12	GND
P13~P15	12V

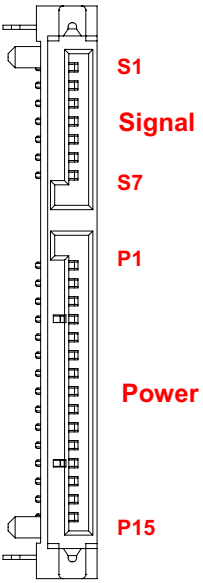


Table 4-10: DB-6920SAT SATA Connector Pin Definition

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PMC Connector (JN1/4, JN2/5, JN3/6, JN7)

Pin#	JN1/4 Signal	JN2/5 Signal	JN3/6 Signal	JN7 Signal
1	PMC_TCK	P12V	NC	PIO1
2	N12V	PMC_TRST-L	GND	PIO2
3	GND	PMC_TMS	GND	PIO3
4	PCIX_INTA-L	NC (PMC_TDO)	PCIX_CBE-L7	PIO4
5	PCIX_INTB-L	PMC_TDI	PCIX_CBE-L6	PIO5
6	PCIX_INTC-L	GND	PCIX_CBE-L5	PIO6
7	PMC_MOD-L1	GND	PCIX_CBE-L4	PIO7
8	P5V	NC	GND	PIO8
9	PCIX_INTD-L	NC	PMC_VIO	PIO9
10	NC	NC	PCIX_PAR64	PIO10
11	GND	PMC_MOD-L2	PCIX_AD63	PIO11
12	P3V3_PMCAUX	P3V3	PCIX_AD62	PIO12
13	CLK66_PCIX_PMC	PMC_RST-L	PCIX_AD61	PIO13
14	GND	PMC_MOD-L3	GND	PIO14
15	GND	P3V3	GND	PIO15
16	PCIX_GNT-L0	PMC_MOD-L4	PCIX_AD60	PIO16
17	PCIX_REQ-L0	PMC_PME-L	PCIX_AD59	PIO17
18	P5V	GND	PCIX_AD58	PIO18
19	PMC_VIO	PCIX_AD30	PCIX_AD57	PIO19
20	PCIX_AD31	PCIX_AD29	GND	PIO20
21	PCIX_AD28	GND	GND	PIO21
22	PCIX_AD27	PCIX_AD26	PCIX_AD56	PIO22
23	PCIX_AD25	PCIX_AD24	PCIX_AD55	PIO23
24	GND	PCIX_AD23	PCIX_AD54	PIO24
25	GND	PMC_IDSEL	PCIX_AD53	PIO25
26	PCIX_CBE-L3	PCIX_AD23	GND	PIO26
27	PCIX_AD22	P3V3	GND	PIO27
28	PCIX_AD21	PCIX_AD20	PCIX_AD52	PIO28
29	PCIX_AD19	PCIX_AD18	PCIX_AD51	PIO29
30	P5V	GND	PCIX_AD50	PIO30
31	PCIX_FRAME-L	PCIX_AD16	PCIX_AD49	PIO31
32	PCIX_AD17	PCIX_CBE-L2	GND	PIO32

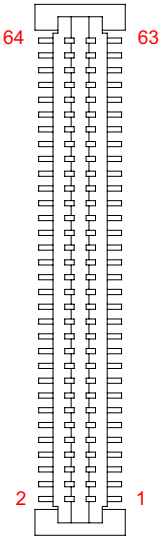


Table 4-11: PMC Connector Pin Definitions

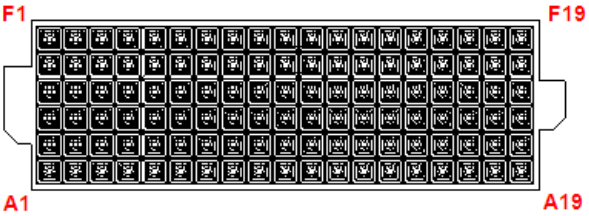
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Pin#	JN1/4 Signal	JN2/5 Signal	JN3/6 Signal	JN7 Signal
33	PCIX_FRAME-L	GND	GND	PIO33
34	GND	NC	PCIX_AD48	PIO34
35	GND	PCIX_TRDY-L	PCIX_AD47	PIO35
36	PCIX_IRDY-L	P3V3	PCIX_AD46	PIO36
37	PCIX_DEVSEL-L	GND	PCIX_AD45	PIO37
38	P5V	PCIX_STOP-L	GND	PIO38
39	PCIX_PCIXCAP	PCIX_PERR-L	GND	PIO39
40	PCIX_LOCK-L	GND	PCIX_AD44	PIO40
41	NC	P3V3	PCIX_AD43	PIO41
42	NC	PCIX_SERR-L	PCIX_AD42	PIO42
43	PCIX_PAR	PCIX_CBE-L1	PCIX_AD41	PIO43
44	GND	GND	GND	PIO44
45	PMC_VIO	PCIX_AD14	GND	PIO45
46	PCIX_AD15	PCIX_AD13	PCIX_AD40	PIO46
47	PCIX_AD12	PCIX_M66EN	PCIX_AD39	PIO47
48	PCIX_AD11	PCIX_AD10	PCIX_AD38	PIO48
49	PCIX_AD9	PCIX_AD8	PCIX_AD37	PIO49
50	P5V	P3V3	GND	PIO50
51	GND	PCIX_AD7	GND	PIO51
52	PCIX_CBE-L0	NC	PCIX_AD36	PIO52
53	PCIX_AD6	P3V3	PCIX_AD35	PIO53
54	PCIX_AD5	NC	PCIX_AD34	PIO54
55	PCIX_AD4	NC	PCIX_AD33	PIO55
56	GND	GND	GND	PIO56
57	PMC_VIO	NC	GND	PIO57
58	PCIX_AD3	NC	PCIX_AD32	PIO58
59	PCIX_AD2	GND	NC	PIO59
60	PCIX_AD1	NC	NC	PIO60
61	PCIX_AD0	PCIX_ACK64-L	NC	PIO61
62	P5V	P3V3	GND	PIO62
63	GND	GND	GND	PIO63
64	PCIX_REQ64-L	NC	NC	PIO64

Table 4-11: PMC Connector Pin Definitions (cont'd)

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XMC Connectors (CN2, CN6)



Pin#	A	B	C	D	E	F
1	PETp0	PETn0	3.3V	PETp1	PETn1	VPWR
2	GND	GND	TRST#	GND	GND	MRSTI#
3	PETp2	PETn2	3.3V	PETp3	PETn3	VPWR
4	GND	GND	TCK	GND	GND	MRSTO#
5	PETp4	PETn4	3.3V	PETp5	PETn5	VPWR
6	GND	GND	TMS	GND	GND	+12V
7	PETp6	PETn6	3.3V	PETp7	PETn7	VPWR
8	GND	GND	TDI	GND	GND	-12V
9	NC	NC	NC	NC	NC	VPWR
10	GND	GND	TDO	GND	GND	GA0
11	PERp0	PERn0	MBIST#	PERp1	PERn1	VPWR
12	GND	GND	GA1	GND	GND	MPRESENT#
13	PERp2	PERn2	3.3V AUX	PERp3	PERn3	VPWR
14	GND	GND	GA2	GND	GND	MSDA
15	PERp4	PERn4	NC	PERp5	PERn5	VPWR
16	GND	GND	MVMRO	GND	GND	MSCL
17	PERp6	PERn6	NC	PERp7	PERn7	NC
18	GND	GND	NC	GND	GND	NC
19	REFCLK+0	REFCLK-0	NC	WAKE#	ROOT0#	NC

Table 4-12: XMC Connector Pin Definition

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68-pin SCSI Connector (CN12-R)*

Signal	Pin #	Pin #	Signal
SCSI-SDP12	1	35	SCSI-SDN12
SCSI-SDP13	2	36	SCSI-SDN13
SCSI-SDP14	3	37	SCSI-SDN14
SCSI-SDP15	4	38	SCSI-SDN15
SCSI-SDP1-P1	5	39	SCSI-SDP1-N1
SCSI-SDP0	6	40	SCSI-SDN0
SCSI-SDP1	7	41	SCSI-SDN1
SCSI-SDP2	8	42	SCSI-SDN2
SCSI-SDP3	9	43	SCSI-SDN3
SCSI-SDP4	10	44	SCSI-SDN4
SCSI-SDP5	11	45	SCSI-SDN5
SCSI-SDP6	12	46	SCSI-SDN6
SCSI-SDP7	13	47	SCSI-SDN7
SCSI-SDP0-P0	14	48	SCSI-SDP0-N0
GND	15	49	GND
DIFFSEN	16	50	NC
P3V3_SCSI	17	51	P3V3_SCSI
P3V3_SCSI	18	52	P3V3_SCSI
NC	19	53	NC
GND	20	54	GND
SCSI-SATN-P	21	55	SCSI-SATN-N
GND	22	56	GND
SCSI-SBSY-P	23	57	SCSI-SBSY-N
SCSI-SACK-P	24	58	SCSI-SACK-N
SCSI-SRST-P	25	59	SCSI-SRST-N
SCSI-SMSG-P	26	60	SCSI-SMSG-N
SCSI-SSEL-P	27	61	SCSI-SSEL-N
SCSI-SCD-P	28	62	SCSI-SCD-N
SCSI-SREQ-P	29	63	SCSI-SREQ-N
SCSI-SIO-P	30	64	SCSI-SIO-N
SCSI-SDP8	31	65	SCSI-SDN8
SCSI-SDP9	32	66	SCSI-SDN9
SCSI-SDP10	33	67	SCSI-SDN10
SCSI-SDP11	34	68	SCSI-SDN11

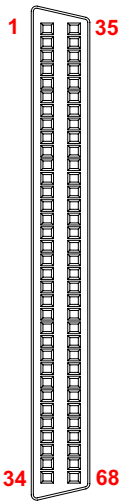


Table 4-13: 68-pin SCSI Connector Pin Definition

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Floppy Connector 34-pin (CN4-R)*

Pin #	Signal	Pin #	Signal
1	GND	2	Extended Density
3	GND	4	No Connect
5	NC	6	Data Rate
7	GND	8	Index
9	GND	10	Motor A Select
11	GND	12	Drive B Select
13	GND	14	Drive A Select
15	GND	16	Motor B Select
17	GND	18	Step Direction
19	GND	20	Step Pulse
21	GND	22	Write Data
23	GND	24	Write Gate
25	GND	26	Track 0
27	GND	28	Write Protect
29	GND	30	Read Data
31	GND	32	Side 1
33	GND	34	Disk Change

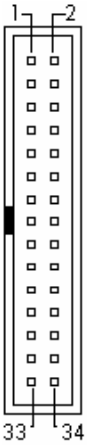


Table 4-14: Floppy Connector Pin Definition

NOTE:

*SCSI and floppy are not supported on current model RTMs. These pin definitions are provided for customers with older model RTMs.

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PIM Connector (JN1-R)

Pin#	Signal Name	Signal Name	Pin#
1	PIM1	PIM2	2
3	PIM3	PIM4	4
5	PIM5	PIM6	6
7	PIM7	PIM8	8
9	PIM9	PIM10	10
11	PIM11	PIM12	12
13	PIM13	PIM14	14
15	PIM15	PIM16	16
17	PIM17	PIM18	18
19	PIM19	PIM20	20
21	PIM21	PIM22	22
23	PIM23	PIM24	24
25	PIM25	PIM26	26
27	PIM27	PIM28	28
29	PIM29	PIM30	30
31	PIM31	PIM32	32
33	PIM33	PIM34	34
35	PIM35	PIM36	36
37	PIM37	PIM38	38
39	PIM39	PIM40	40
41	PIM41	PIM42	42
43	PIM43	PIM44	44
45	PIM45	PIM46	46
47	PIM47	PIM48	48
49	PIM49	PIM50	50
51	PIM51	PIM52	52
53	PIM53	PIM54	54
55	PIM55	PIM56	56
57	PIM57	PIM58	58
59	PIM59	PIM60	60
61	PIM61	PIM62	62
63	PIM63	PIM64	64

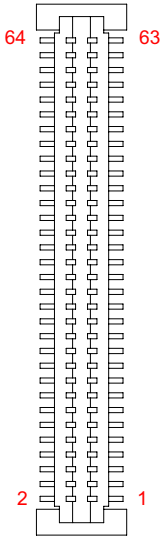


Table 4-15: PIM Connector (JN1-R) Pin Definition

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PIM Connector (JN2-R)

Pin#	Signal Name	Signal Name	Pin#
1	NC	NC	2
3	NC	NC	4
5	P5V	NC	6
7	NC	NC	8
9	NC	P3V3	10
11	NC	NC	12
13	GND	NC	14
15	NC	NC	16
17	NC	GND	18
19	NC	NC	20
21	P5V	NC	22
23	NC	NC	24
25	NC	P3V3	26
27	NC	NC	28
29	GND	NC	30
31	NC	NC	32
33	NC	GND	34
35	NC	NC	36
37	P5V	NC	38
39	NC	NC	40
41	NC	P3V3	42
43	NC	NC	44
45	GND	NC	46
47	NC	NC	48
49	NC	GND	50
51	NC	NC	52
53	P5V	NC	54
55	NC	NC	56
57	NC	P3V3	58
59	NC	NC	60
61	NC	NC	62
63	NC	NC	64

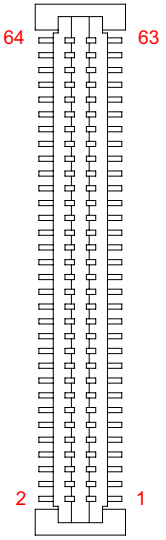


Table 4-16: PIM Connector (JN2-R) Pin Definition

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CompactFlash Connector

Signal Name	Pin#	Pin#	Signal Name
GND	1	26	GND
DD3	2	27	DD11
DD4	3	28	DD12
DD5	4	29	DD13
DD6	5	30	DD14
DD7	6	31	DD15
CS1J	7	32	CS3J
GND	8	33	GND
GND	9	34	SDIORJ
GND	10	35	SDIOWJ
GND	11	36	5V
GND	12	37	IRQ15
5V	13	38	5V
GND	14	39	PCSEL
GND	15	40	NC
GND	16	41	BRSTDRVJ
GND	17	42	SDIORDY
DA2	18	43	NC
DA1	19	44	SDACKJ
DA0	20	45	IDEACTJ
DD0	21	46	DIAG
DD1	22	47	DD8
DD2	23	48	DD9
IOIS16J	24	49	DD10
GND	25	50	GND

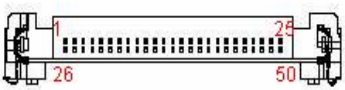
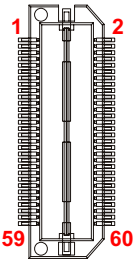


Table 4-17: CompactFlash Connector Pin Definition

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DB-6920SAT/CF Connector (CN3, CN6-R)



Signal Name	Pin #	Pin #	Signal Name
GND	1	2	GND
GND	3	4	GND
GND	5	6	GND
GND	7	8	GND
GND	9	10	GND
GND	11	12	GND
GND	13	14	GND
GND	15	16	GND
GND	17	18	GND
GND	19	20	GND
GND	21	22	GND
GND	23	24	GND
GND	25	26	GND
GND	27	28	GND
GND	29	30	GND
P3V3	31	32	P5V
P3V3	33	34	P5V
P3V3	35	36	P5V
P3V3	37	38	P5V
P1V8	39	40	NC
P1V8	41	42	NC
P1V8	43	44	NC
GND	45	46	GND
GND	47	48	SATA-TXN0
GND	49	50	SATA-TXP0
SATA-RXN0	51	52	GND
SATA-RXP0	53	54	GND
GND	55	56	RESET#
GND	57	58	GND
GND	59	60	GND

Table 4-18: DB-6920SAT/CF Connector Pin Definition

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DB-R6000L2 Connector (CN14-R)

Signal Name	Pin #	Pin #	Signal Name
SATA-T1P	1	2	USB-P3
SATA-T1N	3	4	USB-N3
GND	5	6	GND
SATA-R1P	7	8	USB-OC3#
SATA-R1N	9	10	GND
GND	11	12	GND
GND	13	14	USB-P2
HAD_RST-L	15	16	USB-N2
HAD_SYNC	17	18	GND
HAD_SDOUT	19	20	USB-OC2#
HAD_BIT_CLK	21	22	GND
HAD_SDIN0	23	24	PS2-KBC
GND	25	26	PS2-KBD
HAD_SDIN1	27	28	PS2-MSD
HAD_SDIN2	29	30	PS2-MSC
HAD_SDIN3	31	32	GND
GND	33	34	RESET#
GND	35	36	GND
GND	37	38	GND
GND	39	40	GND
GND	41	42	GND
GND	43	44	GND
GND	45	46	GND
GND	47	48	GND
GND	49	50	GND
P5V	51	52	P1V8
P5V	53	54	P1V8
P5V	55	56	P1V8
P5V	57	58	NC
P5V	59	60	NC
GND	61	62	GND

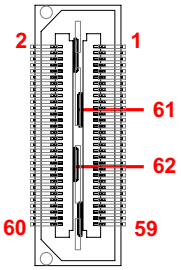


Table 4-19: DB-R6000L2 Connector Pin Definition

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CompactPCI J1 Connector Pin Assignment

Pin	Z	A	B	C	D	E	F
1	GND	+5V	-12V	TRST#	+12V	+5V	GND
2	GND	TCK#	+5V	TMS#	NC	TDI#	GND
3	GND	IRQA#	IRQB#	IRQC#	+5V	IRQD#	GND
4	GND	+5V_IPMB	HEALTHY#	V(I/O)	NC	NC	GND
5	GND	NC	NC	RESET#	GND	GNT0#	GND
6	GND	REQ0#	GND	+3.3V	CLK0	AD31	GND
7	GND	AD30	AD29	AD28	GND	AD27	GND
8	GND	AD26	GND	V(I/O)	AD25	AD24	GND
9	GND	CBE3#	IDSEL	AD23	GND	AD22	GND
10	GND	AD21	GND	+3.3V	AD20	AD19	GND
11	GND	AD18	AD17	AD16	GND	CBE2#	GND
12-14	Key						
15	GND	+3.3V	FRAME#	IRDY#	BDSEL#	TRDY#	GND
16	GND	DEVSEL#	PCIXCAP	V(I/O)	STOP#	LOCK#	GND
17	GND	+3.3V	IPMB_CLK	IPMB_DAT	GND	PERR#	GND
18	GND	SERR#	GND	+3.3V	PAR	CBE1#	GND
19	GND	+3.3V	AD15	AD14	GND	AD13	GND
20	GND	AD12	GND	VIO	AD11	AD10	GND
21	GND	+3.3V	AD9	AD8	M66EN	CBE0#	GND
22	GND	AD7	GND	+3.3V	AD6	AD5	GND
23	GND	+3.3V	AD4	AD3	+5V	AD2	GND
24	GND	AD1	+5V	V(I/O)	AD0	ACK64#	GND
25	GND	+5V	REQ64#	ENUM#	+3.3V	+5V	GND

Table 4-20: CompactPCI J1 Connector Pin Definition

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CompactPCI J2 Connector Pin Assignment

Pin	Z	A	B	C	D	E	F
1	GND	CLK1	GND	REQ1#	GNT1#	REQ2#	GND
2	GND	CLK2	CLK3	SYSEN#	GNT2#	REQ3#	GND
3	GND	CLK4	GND	GNT3#	REQ4#	GNT4#	GND
4	GND	V(I/O)	NC	CBE7#	GND	CBE6#	GND
5	GND	CBE5#	GND	V(I/O)	CBE4#	PAR64	GND
6	GND	AD63	AD62	AD61	GND	AD60	GND
7	GND	AD59	GND	V(I/O)	AD58	AD57	GND
8	GND	AD56	AD55	AD54	GND	AD53	GND
9	GND	AD52	GND	V(I/O)	AD51	AD50	GND
10	GND	AD49	AD48	AD47	GND	AD46	GND
11	GND	AD45	GND	V(I/O)	AD44	AD43	GND
12	GND	AD42	AD41	AD40	GND	AD39	GND
13	GND	AD38	GND	V(I/O)	AD37	AD36	GND
14	GND	AD35	AD34	AD33	GND	AD32	GND
15	GND	NC	GND	FAL#	REQ5#	GNT5#	GND
16	GND	NC	NC	DEG#	GND	NC	GND
17	GND	NC	GND	RSTBTN#	REQ6#	GNT6#	GND
18	GND	NC	NC	NC	GND	NC	GND
19	GND	GND	GND	NC	NC	NC	GND
20	GND	CLK5	GND	NC	GND	NC	GND
21	GND	CLK6	GND	NC	NC	NC	GND
22	GND	GA4	GA3	GA2	GA1	GA0	GND

Table 4-21: CompactPCI J2 Connector Pin Definition

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CompactPCI J3 Pin Assignment

Pin	Z	A	B	C	D	E	F
1	GND	HDA_RST#	HDA_SYNC	HDA_BIT_CLK	HDA_SDOUT	HDA_SDIN0	GND
2	GND	HDA_SDIN1	HDA_SDIN2	NC	HDA_DOCK_EN#	HAD_DOCK_RST#	GND
3	GND	KBDATA	KBCLK	NC	MSDATA	MSCLK	GND
4	GND	SATA-TX3+	SATA-TX3-	GND	SATA-TX2+	SATA-TX2-	GND
5	GND	GND	GND	NC	GND	GND	GND
6	GND	SATA-RX3+	SATA-RX3-	GND	SATA-RX2+	SATA-RX2-	GND
7	GND	COM4-TX	COM4-RX	COM3-DCD#	IPMB_CLK	IPMB_DAT	GND
8	GND	COM3-RX	COM3-TX	COM3-DTR#	COM3-DSR#	COM3-RTS#	GND
9	GND	COM3-CTS#	COM3-RI#	RGB-BLUE	RGB-RED	RGB-GREEN	GND
10	GND	USB-OC3#	RGB-DDCCLK	RGB-DDCDAT	RGB-HSYNC	RGB-VSYNC	GND
11	GND	USB-P3+	USB-P3-	GND	USB-P4+	USB-P4-	GND
12	GND	USB-P5+	USB-P5-	GND	USB-P6+	USB-P6-	GND
13	GND	USB-P7+	USB-P7-	GND	USB-P8+	USB-P8-	GND
14	GND	USB-OC4#	USB-OC5#	USB-OC6#	USB-OC7#	USB-OC8#	GND
15	GND	LAND_TXD1+	LAND_TXD1-	GND	LAND_TXD3+	LAND_TXD3-	GND
16	GND	LAND_TXD0+	LAND_TXD0-	GND	LAND_TXD2+	LAND_TXD2-	GND
17	GND	LANC_TXD1+	LANC_TXD1-	GND	LANC_TXD3+	LANC_TXD3-	GND
18	GND	LANC_TXD1+	LANC_TXD0-	GND	LANC_TXD2+	LANC_TXD2-	GND
19	GND	P5V	P5V	P12V	P5V	P5V	GND

Table 4-22: CompactPCI J3 Connector Pin Definition



High Definition audio
Keyboard/Mouse
Serial ATA
Serial ports
USB ports
Ethernet ports
RGB

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CompactPCI J4 Connector Pin Assignment

Pin	Z	A	B	C	D	E	F
1	GND	PMC IO:61	PMC IO:63	NC	PMC IO:62	PMC IO:64	GND
2	GND	PMC IO:57	PMC IO:59	NC	PMC IO:58	PMC IO:60	GND
3	GND	NC	NC	NC	NC	NC	GND
4	GND	PMC IO:53	PMC IO:55	NC	PMC IO:54	PMC IO:56	GND
5	GND	PMC IO:49	PMC IO:51	NC	PMC IO:50	PMC IO:52	GND
6	GND	NC	NC	NC	NC	NC	GND
7	GND	PMC IO:45	PMC IO:47	NC	PMC IO:46	PMC IO:48	GND
8	GND	PMC IO:41	PMC IO:43	NC	PMC IO:42	PMC IO:44	GND
9	GND	NC	NC	NC	NC	NC	GND
10	GND	PMC IO:37	PMC IO:39	NC	PMC IO:38	PMC IO:40	GND
11	GND	PMC IO:33	PMC IO:35	NC	PMC IO:34	PMC IO:36	GND
12-14	Key						
15	GND	PMC IO:29	PMC IO:31	NC	PMC IO:30	PMC IO:32	GND
16	GND	PMC IO:25	PMC IO:27	NC	PMC IO:26	PMC IO:28	GND
17	GND	NC	NC	NC	NC	NC	GND
18	GND	PMC IO:21	PMC IO:23	NC	PMC IO:22	PMC IO:24	GND
19	GND	PMC IO:17	PMC IO:19	NC	PMC IO:18	PMC IO:20	GND
20	GND	NC	NC	NC	NC	NC	GND
21	GND	PMC IO:13	PMC IO:15	NC	PMC IO:14	PMC IO:16	GND
22	GND	PMC IO:9	PMC IO:11	NC	PMC IO:10	PMC IO:12	GND
23	GND	NC	NC	NC	NC	NC	GND
24	GND	PMC IO:5	PMC IO:7	NC	PMC IO:6	PMC IO:8	GND
25	GND	PMC IO:1	PMC IO:3	NC	PMC IO:2	PMC IO:4	GND

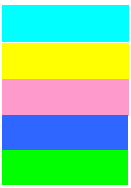
Table 4-23: CompactPCI J4 Connector Pin Definition

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CompactPCI J5 Pin Assignment

Pin	Z	A	B	C	D	E	F
1	GND	PCIE-TX0+	PCIE-TX0+	GND	PCIE-RX0+	PCIE-RX0-	GND
2	GND	PCIE-TX1+	PCIE-TX1-	GND	PCIE-RX1+	PCIE-RX1-	GND
3	GND	PCIE-TX2+	PCIE-TX2-	GND	PCIE-RX2+	PCIE-RX2-	GND
4	GND	PCIE-TX3+	PCIE-TX3-	GND	PCIE-RX3+	PCIE-RX3-	GND
5	GND	GND	GND	GND	GND	GND	GND
6	GND	PCIE-CLK+	PCIE-CLK-	GND	RESET#	RTM_IN#	GND
7	GND	GND	GND	RTC	GND	GND	GND
8	GND	LVDS_DATA3-	LVDS_DATA3+	NC	LVDS_CLK	LVDS_DATA	GND
9	GND	GPIO1	GPIO2	GPIO3	GPIO4	GPIO5	GND
10	GND	NC	NC	GND	NC	NC	GND
11	GND	NC	NC	GND	NC	NC	GND
12	GND	NC	NC	NC	NC	NC	GND
13	GND	LAND_100#	LANC_100#	NC	LANC_1G#	LAND_1G#	GND
14	GND	NC	NC	GND	NC	NC	GND
15	GND	NC	NC	GPIO6	NC	NC	GND
16	GND	MTR0#	INDEX#	GPIO7	NC	DENSEL#	GND
17	GND	DIR#	NC	GPIO8	DRVA#	NC	GND
18	GND	TRK0#	WGATE#	DETECT#	WDATA#	STEP#	GND
19	GND	DSKCHG#	HDSEL#	NC	RDATA#	WRPORT#	GND
20	GND	LVDS_DATA0-	LVDS_DATA0+	GND	LVDS_DATA1-	LVDS_DATA1+	GND
21	GND	LVDS_DATA2-	LVDS_DATA2+	GND	LVDS_CLK-	LVDS_CLD+	GND
22	GND	NC	LAND_LINK_ACT#	+3.3V	LANC_LINK_ACT#	+3.3V	GND

Table 4-24: CompactPCI J5 Connector Pin Definition



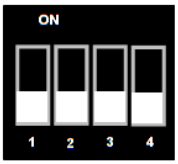
PCI-Express x4
GPIO
Floppy
Ethernet port
LVDS

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4.4 Switch and Jumper Settings

Mode Switch (SW2)

Switch SW2 is a multi purpose switch that allows users to define the board operating mode. Four pins independently control the mode setting. All are set to OFF by default.



Pin#	Status	Description
1	OFF	Universal Mode: The cPCI-6870 in a peripheral slot has CompactPCI bus communication with the host board in the system slot. The cPCI-6870 can boot-up in a peripheral slot and be recognized by the host board in the system slot as a PCI device.
	ON	Satellite Mode: The cPCI-6870 in a peripheral slot has no CompactPCI bus communication with the host board in the system slot. The cPCI-6870 behaves a as standalone blade in the peripheral slot.
2	OFF	When the system does not include a CMM (Chassis Management Module), set this pin to OFF to allow IPMI to run in "without CMM mode".
	ON	When the system includes a CMM, set this pin to ON to allow IPMI to run in "with CMM mode".
3	OFF	The cPCI-6870 cannot boot-up when installed in a peripheral slot if there is no host board in the system slot.
	ON	The cPCI-6870 is able to boot-up when installed in a peripheral slot if there is no host board in the system slot. The cPCI-6870 behaves as a system board in all slots. (Set this pin to "ON" if the cPCI-6870 is installed in a blade server backplane).
4	OFF	The cPCI-6870 power on/off state is controlled by the ejector handle state.
	ON	Force the ejector handle state to "closed".

Table 4-25: Mode Switch Settings

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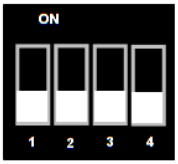
Clear CMOS Switch (SW4)

Press switch SW4 to clear the CMOS and reset the CMOS values to default.



PMC Clock Switch (SW1)

Switch SW1 sets the PCI bus clock of the two PMC sites. All are set OFF by default.

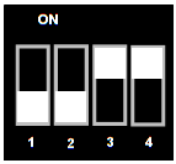


Mode	1	2	3	4
PCI-X 133MHz	OFF	OFF	OFF	OFF
PCI-X 100MHz	OFF	OFF	OFF	ON
PCI-X 66MHz	OFF	OFF	ON	OFF
PCI 66MHz	ON	ON	ON	OFF
PCI 33MHz	ON	OFF	ON	OFF

Table 4-26: PMC Clock Switch Settings

PMC V(I/O) Switch (SW5)

Switch SW5 sets the signaling voltage of the two PMC sites.



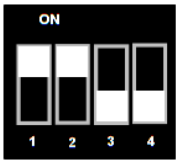
Mode	1	2	3	4
PMC V(I/O) = 5V	ON	ON	OFF	OFF
PMC V(I/O) = 3.3V	OFF	OFF	ON	ON

Table 4-27: PMC V(I/O) Switch Settings

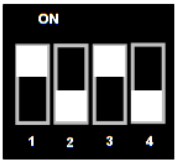
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COM1/Debug Switch (SW9, SW10 pins 1-2)

Switches SW9 and SW10 (pins 1, 2) set the RJ-45 serial port (CN11) as a standard RS-232 serial port or as an IPMI debugging port.



SW9



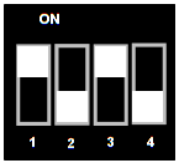
SW10

Mode	SW9				SW10	
	1	2	3	4	1	2
RS-232 COM port (default)	ON	ON	OFF	OFF	ON	OFF
IPMI debugging port	OFF	OFF	ON	ON	OFF	ON

Table 4-28: COM1/Debug Switch Settings

Front/Rear VGA Selection Switch (SW10 pins 3-4)*

Switch SW10 (pins 3, 4) sets the VGA output to the front panel RJ-45 port (CN11) or the VGA port on the RTM. The default VGA output is set to rear I/O. To enable Front VGA output, the **COM/VGA Mode Selection Switches (SW7-8, SW12-13)*** must be set to VGA mode.



Mode	3	4
Rear VGA output (default)	ON	OFF
Front VGA output	OFF	ON

Table 4-29: Front/Rear VGA Selection Switch Settings

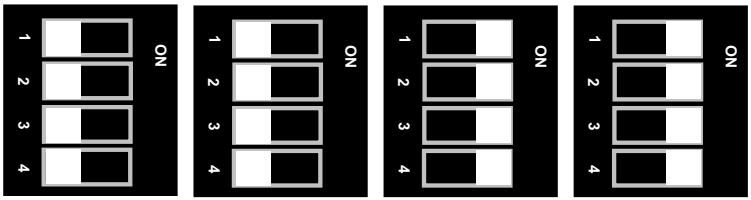
NOTE:

*VGA is not supported the front panel RJ-45 connector (CN11) of models with ordering numbers ending in “xx30” and higher. On these models, SW10 is set to “Rear VGA output” and the RJ-45 connector is a dedicated serial port.

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COM/VGA Mode Selection Switches (SW7-8, SW12-13)*

The front panel RJ-45 port (CN11) is designed to support RS-232 or VGA output by connecting separate adapter cables. CN11 is set to RS-232 COM port by default. Please note that if VGA mode is selected, switch SW10 should be set to Front VGA mode.



SW7 SW8 SW12 SW13

Mode	SW7, SW8	SW12, SW13
COM Mode	All OFF	All ON
VGA Mode	All ON	All OFF

Table 4-30: COM/VGA Mode Selection Switch Settings

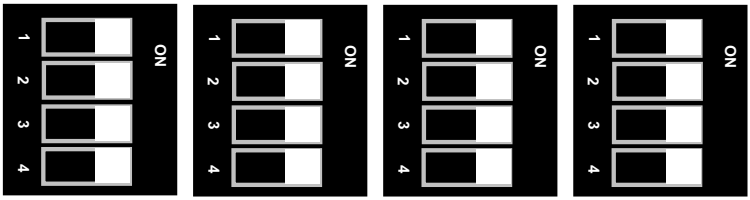
NOTE:

*VGA is not supported the front panel RJ-45 connector (CN11) of models with ordering numbers ending in “xx30” and higher. On these models, VGA is directly routed to the RTM, the RJ-45 connector is a dedicated serial port, switches SW7-8 and SW12-13 are not installed.

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PICMG 2.16 Switches (SW1-R,SW2-R, SW3-R, SW4-R)

The RTM supports GbE3 and GbE4 on either the 2.16 backplane or via rear I/O. The PICMG® 2.16 backplane and rear I/O cannot be accessed simultaneously. Switches SW1-R to SW4-R must be set to connect GbE3 and GbE4 to either the 2.16 backplane or to the RTM. The following table shows how to set the switches to enable GbE3 and GbE4 for either the 2.16 backplane or the RTM. All switches are set to ON by default (rear I/O).



SW1-R SW2-R SW3-R SW4-R

Connect GbE3/4 to	GbE3 (SW1-R, SW2-R)	GbE4 (SW3-R, SW4-R)
PICMG® 2.16 Backplane	All OFF	All OFF
Rear faceplate RJ-45 connectors (default)	All ON	All ON

Table 4-31: PICMG 2.16 Switch Settings

IPMC Mode Switch (SW6)

Switch SW6 is for debugging-purpose only and set to *All OFF* by default. Please do NOT change settings.

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5 Getting Started

This chapter describes the installation of the following components to the cPCI-6870 and rear transition modules:

- Memory module
- 2.5” SATA hard drive
- CompactFlash card
- cPCI-6870 CPU module installation to chassis
- RTM installation to chassis

5.1 Memory Module Installation

The cPCI-6870 Series supports dual channel DDR3-800/1066 memory in two 200-pin SO-DIMM sockets.

Installing the Memory Module

1. Align the notch in the memory module with the key on the SO-DIMM slot.
2. Press down on the module until it is properly seated in the socket.

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5.2 Hard Drive Installation

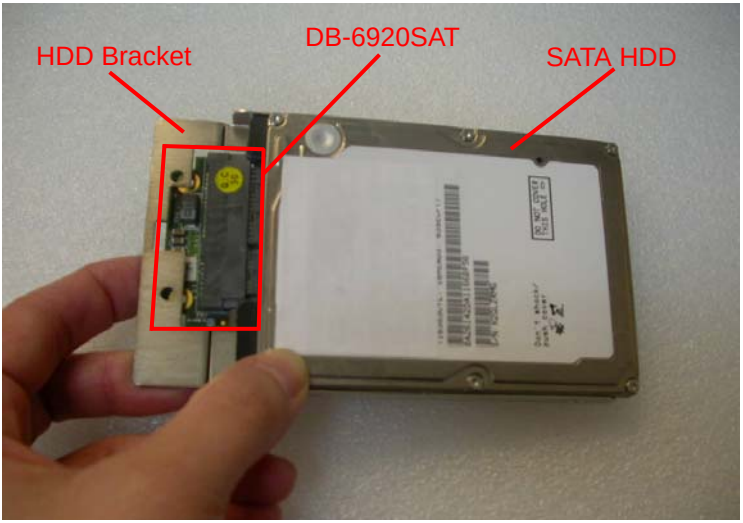
The cPCI-6870 and cPCI-R6001D provide space to install a slim type 2.5” Serial-ATA hard drive.

Installing a SATA Hard Drive - cPCI-6870

NOTE:

Install a CF card to the cPCI-6870 before installing the hard drive (see “Installing a CF card – cPCI-6870” on page 52).

1. Attach the DB-6920SAT adapter board to the SATA hard drive connectors. Position the hard drive on the HDD bracket provided as shown below. Be sure the adapter board is under HDD bracket to avoid damaging the hard drive connectors.

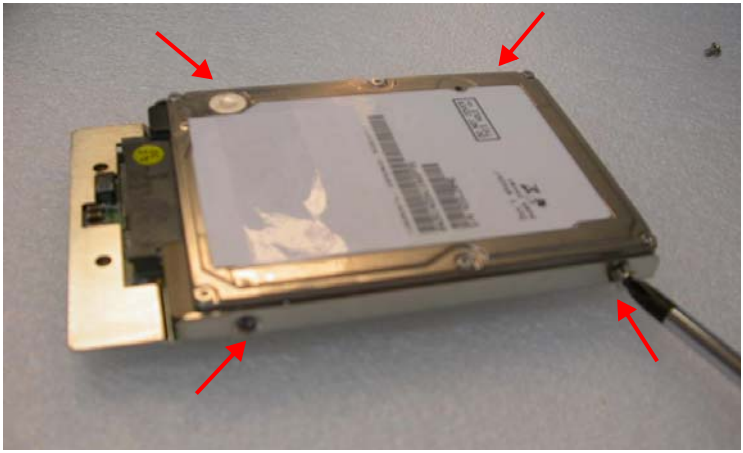


CAUTION:

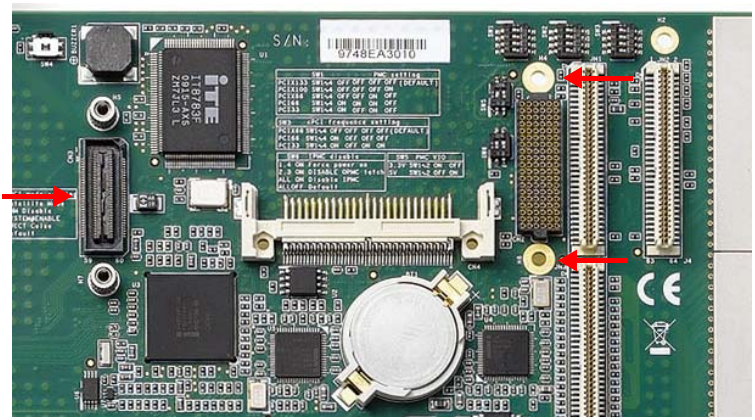
Make sure the adapter board is under the HDD bracket to avoid damaging the hard drive connectors.

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2. Secure the HDD to the bracket with four screws provided.



3. Position the hard drive assembly on the cPCI-6870 so that the standoffs are aligned with the screw holes on the board, and the connector on the DB-6920SAT adapter board is aligned with the board-to-board connector (CN3).



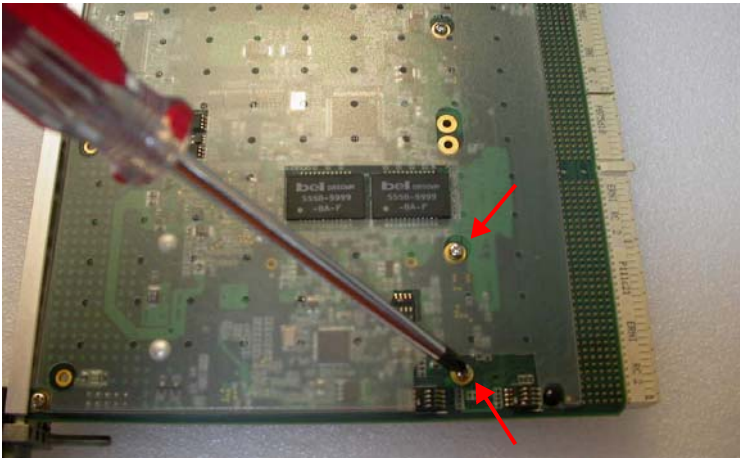
4. Press the DB-6920SAT adapter onto the board-to-board connector until it is properly seated. Secure the adapter to the board with the two screws provided.



CAUTION:

Support the hard drive assembly when turning the board over to proceed with step 5.

5. Secure the hard drive with two screws from the solder side of the board.



Removing the SATA Hard Drive - cPCI-6870

Reverse steps 5 through 1 above to remove the SATA hard drive.



When removing the hard drive, be careful to hold the adapter board and lift upwards in a vertical motion to disconnect it from the board-to-board connector. This will avoid damaging the adapter board and connectors.

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5.3 CompactFlash Card Installation

The cPCI-6870 has an onboard CompactFlash socket and the cPCI-R6001D RTM supports a removable CompactFlash socket in the same space as the 2.5” SATA HDD. Contact your sales representative to purchase a DB-CF-SA CompactFlash adapter kit for the cPCI-R6001D.

Installing a CF card – cPCI-6870

Insert the CF card into the CF slot on the cPCI-6870 (CN4 - see Figure 4-1: cPCI-6870 SBC Board Layout). If necessary, first remove the hard drive assembly by reversing the steps described in “Installing a SATA Hard Drive - cPCI-6870” on page 48 above.

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5.4 Installing the cPCI-6870 SBC to the Chassis

The cPCI-6870 may be installed in a system or peripheral slot of a 6U CompactPCI chassis. These instructions are for reference only. Refer to the user guide that comes with the chassis for more information.

1. Be sure to select the correct slot depending on the operational purpose of the module. The system power may now be powered on or off.
2. Remove the blank face cover from the selected slot, if necessary.
3. Press down on the release catches of the cPCI-6870 ejector handles.
4. **Remove the black plastic caps securing the mounting screws to the front panel.**
5. Align the module's top and bottom edges to the chassis card guides, and then carefully slide the module into the chassis. A slight resistance may be felt when inserting the module. If the resistance it too strong, check if there are bent pins on the backplane or if the board's connector pins are not properly aligned with connectors on the backplane. Then push the board until it is completely flush with the chassis.
6. Push the ejector handles outwards to secure the module in place, and then fasten the screws on the module front panel.
7. Connect the cables and peripherals to the board, and then turn the chassis on if necessary.

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5.5 Installing the RTM to the Chassis

The installation and removal procedures for a RTM are the same as those for CompactPCI boards. Because they are shorter than front boards, pay careful attention when inserting or removing RTMs.

Refer to previous sections for peripheral connectivity of all I/O ports on the RTM. When installing the cPCI-6870 Series and related RTMs, make sure the RTM is the correct matching model.



You must install the correct RTM to enable functions (I/O interfaces) on the rear panel. Installation of non-compatible RTMs may damage the system board and/or other RTMs.

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6 Driver Installation

The cPCI-6870 drivers can be found on the ADLINK All-In-One CD at **X:\cPCI\cPCI-6870**, the cPCI-R6001(D) drivers can be found at **X:cPCI\cPCI-R6001(D)**, or from the ADLINK website (**http://www.adlinktech.com**). ADLINK provides validated drivers for chipset, graphics, LAN, and SATA/AHCI on Windows XP Professional, Windows XP x64 Edition and Windows Vista x64 Edition.

6.1 Driver Installation Procedure

Install the Windows operating system before installing any driver. Most standard I/O device drivers are installed during Windows installation. The driver installation procedures for Windows XP are described below.

1. Install the **chipset driver** by extracting and running the program in **...\Chipset \Intel_INF_Update_Utility_WinAllOS_v9.0.0.1008.zip.**
2. Install the **graphics driver** and utilities by extracting and running the program in **...\Graphics \Intel_Integrated_Graphics_WinXP32_v14383.zip**.
3. Install the **LAN drivers** by extracting and running the program in **…\LAN \Intel_Network_Adapter_WinXP32_Win2000_Win2003_v14.0.zip**.
4. Install the **audio driver** for RTM cPCI-R6001D by extracting and running the program in **…\Audio\Professional\ Realtek_WDM_Audio_WinXP32_Win2003_v2.21.zip**.

We recommend using the drivers provided on the ADLINK All-in-One CD or downloading them from the ADLINK website to ensure compatibility. Contact ADLINK to get support for VxWorks BSP.


NOTE:

SCSI is not supported on current model RTMs. If your RTM supports SCSI, refer to "SCSI Driver" on page 56.

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6.2 SCSI Driver


NOTE:

SCSI is not supported on current model RTMs. If your RTM supports SCSI, follow the instructions below.

The SCSI driver is available from the ADLINK All-In-One CD at **X:cPCI\cPCI-R6001(D)\SCSI** or from the ADLINK website (**http://www.adlinktech.com**). The installation procedure for Windows XP is described below. It is not necessary to install the SCSI driver on Windows 2003 Server and Vista as it has a built-in driver.

1. Click **Start**, right-click on **My Computer**, then select **Properties** from the drop-down menu.
2. Click on the **Hardware** tab, then click **Device Manager.**
3. Right-click on the **SCSI Controller** item, then click **Properties** from the drop-down menu.
4. From the **General** tab, click **Reinstall Driver**.
5. Select **Yes, this time only** and click **Next** when the **Upgrade Device Driver Wizard** window appears.
6. Select **Install** from a list on specific location [Advanced], then click **Next**.
7. Uncheck **Search removable media** [floppy, CD-ROM...], and check **Include this location** in the search:, then click **Browse**.
8. Select the **xp_x86** folder from this directory on the ADLINK All-In-One CD: **…X:\cPCI\cPCI-R6001(D)\SCSI**.
9. Click **OK**, then click **Next**.
10. Click **Continue Anyway** to go on, and click **Finish** to complete the installation.

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7 Utilities

7.1 Watchdog Timer

This section describes the operation of the cPCI-6870's watchdog timer (WDT). The primary function of the WDT is to monitor the cPCI-6870's operation and to reset the system if a software application fails to function as programmed. The following WDT functions may be controlled using a software application:

- enabling and disabling
- reloading timeout value

The cPCI-6870 custom WDT circuit is implemented using the internal IO of the ITE Super I/O IT8783 which is at address 2Eh of LPC. The basic functions of the WDT include:

- Starting the timer countdown
- Enabling or disabling WDT
- Enabling or disabling WDT countdown LED ON
- Reloading the timeout value to keep the watchdog from timing out
- Setting the range of the timeout period from 1 to 65535 seconds or minutes
- Sending a RESET signal to the system when the watchdog times out

Using the Watchdog in an Application

The following section describes using the WDT functions in an application. The WDT reset function is explained in the previous section. This can be controlled through the registers in the cPCI-6870's Super I/O.

An application using the reset feature enables the watchdog function, sets the count-down period, and reloads the timeout value periodically to keep it from resetting the system. If the timer count-down value is not reloaded, the watchdog resets the system hardware after its counter reaches zero.

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For a detailed programming sample, refer to the sample code provided on the ADLINK All-In-One CD. You can find it in the following directory: **X:\cPCI\cPCI-6870\WDT**.

Sample Code

The sample program written in C shown below offers an interactive way to test the Watchdog Timer under DOS.

```
#include<stdio.h>
#include<dos.h>

#define IT8783_ID1 0x87
#define IT8783_ID2 0x83

static unsigned int IT8783_ioPort = 0x2e;

//Check index port
void Enter_IT8783_Config(unsigned int flag)
{
     if(flag) IT8783_ioPort = 0x4e;

     switch(IT8783_ioPort)
     {
          case 0x2E:  //Address port = 0x2E, enter keys =
     0x87, 0x01, 0x55, 0x55
               outportb(0x2E, 0x87);
               outportb(0x2E, 0x01);
               outportb(0x2E, 0x55);
               outportb(0x2E, 0x55);
               break;
          case 0x4E:  //Address port = 0x4E, enter keys =
     0x87, 0x01, 0x55, 0xAA
               outportb(0x4E, 0x87);
               outportb(0x4E, 0x01);
               outportb(0x4E, 0x55);
               outportb(0x4E, 0xAA);
               break;
          default:
               break;
        }
}
```

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```
//Exit index port
void Exit_IT8783_Config(unsigned int flag)
{
     if(flag) IT8783_ioPort = 0x4e;

     outportb(IT8783_ioPort, 0x02);
     outportb(IT8783_ioPort+1, 0x02);
}

//Check chip
void Get_IT8783_ID(unsigned int &ID1, unsigned int &ID2)
{
     outportb(IT8783_ioPort, 0x20);
     ID1 = inportb(IT8783_ioPort+1);
     outportb(IT8783_ioPort, 0x21);
     ID2 = inportb(IT8783_ioPort+1);
}

//WDT and LED program
void IT8783_3_WDTRun(unsigned int count_value, unsigned
     int PLEDflag)   //for cPCI-6870
{
     unsigned long tempCount;
     unsigned int registerValue;


     outportb(IT8783_ioPort, 0x07);
     outportb(IT8783_ioPort+1, 0x07);// Device 7

     outportb(IT8783_ioPort, 0xf8);
     outportb(IT8783_ioPort+1, 0x00);// PLED mapping to
     nothing, disable PLED function

     if(PLEDflag == 1)
     {
          outportb(IT8783_ioPort, 0x2D);
          registerValue = inportb(IT8783_ioPort + 1);
          registerValue |= 0x01;       // set Pin109 is
     GPIO function GP60
          outportb(IT8783_ioPort+1, registerValue);

          outportb(IT8783_ioPort, 0xC5);
          registerValue = inportb(IT8783_ioPort + 1);
```

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```
        registerValue &= 0xfe;      // set GP60 is
alternate function
        outportb(IT8783_ioPort+1, registerValue);

        outportb(IT8783_ioPort, 0xCD);
        registerValue = inportb(IT8783_ioPort + 1);
        registerValue |= 0x01;  // set GP60 is output
        outportb(IT8783_ioPort+1, registerValue);

        outportb(IT8783_ioPort, 0xf8);
        outportb(IT8783_ioPort+1, 0x30);// PLED
mapping to GP60

        outportb(IT8783_ioPort, 0xf9);
        registerValue = inportb(IT8783_ioPort + 1);
        registerValue |= 0x02;
        registerValue &= 0xfb;
        outportb(IT8783_ioPort+1, registerValue);
}
outportb(IT8783_ioPort, 0x71);
registerValue = inportb(IT8783_ioPort + 1);
registerValue |= 0xD0;  // set Mouse & Keyboard
interrupt Enable
outportb(IT8783_ioPort+1, registerValue);

outportb(IT8783_ioPort, 0x73);
outportb(IT8783_ioPort+1, count_value);
// set WDT count LSB
tempCount = tempCount >> 8;
outportb(IT8783_ioPort, 0x74);
outportb(IT8783_ioPort+1, count_value);
// set WDT count MSB

if(count_value >= 60)
{
        outportb(IT8783_ioPort, 0x72);
        registerValue = inportb(IT8783_ioPort+1);
        registerValue &= 0x8f;
        registerValue |= 0x10; //enable WDT output
through PowerOK!
        outportb(IT8783_ioPort+1, registerValue);
        // set WDT count is minute
```

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```
            tempCount = count_value / 60;
            if((count_value%60) > 30)
                  tempCount++;
            if(tempCount > 65535)
                  tempCount = 65535;
            printf("WDT timeout in %d minutes.\n",
      tempCount);
      }
      else
      {
            outportb(IT8783_ioPort, 0x72);
            registerValue = inportb(IT8783_ioPort+1);
            registerValue |= 0x80;

            tempCount = count_value;
            if(tempCount != 0)
            {
                  printf("WDT timeout in %d seconds.\n",
      tempCount);
                  registerValue |= 0x40; //Enable WDT
      output through KBRST
            }
            else
            {
                  printf("WDT is Disabled.\n");
                  registerValue &= 0xbf; //Disable WDT
      output through KBRST
            }

            outportb(IT8783_ioPort+1, registerValue);
            // set WDT count is second
      }

}
```

7.2 Preboot Execution Environment (PXE)

The cPCI-6870 series supports the Intel® Preboot Execution Environment (PXE) that is capable of booting up or executing an OS installation through an Ethernet ports. To use PXE, there must be a DHCP server on the network with one or more servers running PXE and MTFTP services. It could be a Windows® 2003 server running DHCP, PXE, and MTFTP services or a dedicated DHCP server with one or more additional servers running PXE and MTFTP services.

To build a network environment with PXE support:

1. Setup a DHCP server with PXE tag configuration
2. Install the PXE and MTFTP services
3. Make a boot image file on the PXE server (i.e. the boot server)
4. Enable the PXE boot function on the client computer

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8 BIOS Setup Utility

The following chapter describes basic navigation for the AMIBIOS®8 BIOS setup utility.

8.1 Starting the BIOS

To enter the setup screen, follow these steps:

1. Power on the motherboard
2. Press the < Delete > key on your keyboard when you see the following text prompt:
   < Press DEL to run Setup >
3. After you press the < Delete > key, the main BIOS setup menu displays. You can access the other setup screens from the main BIOS setup menu, such as Chipset and Power menus.



Note: In most cases, the < Delete > key is used to invoke the setup screen. There are several cases that use other keys, such as < F1 >, < F2 >, and so on.

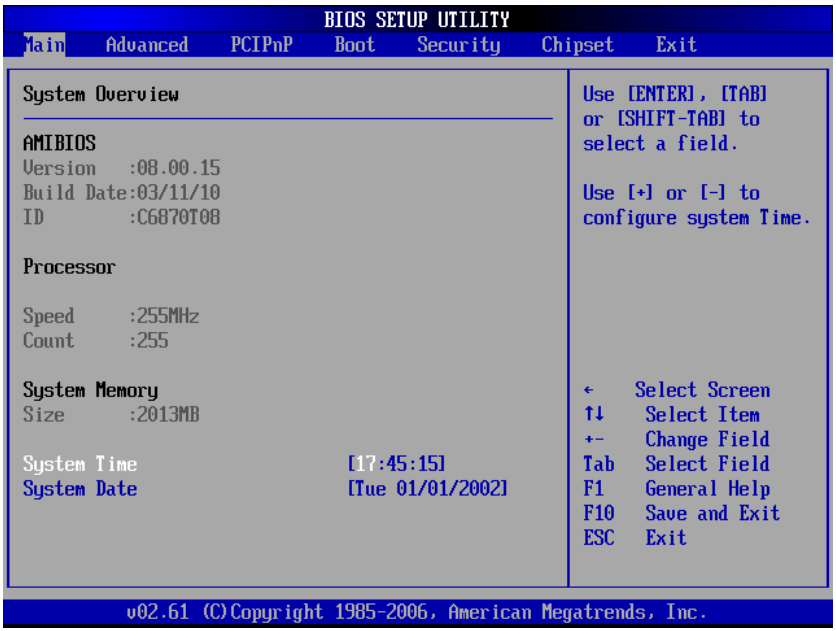
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Setup Menu

The main BIOS setup menu is the first screen that you can navigate. Each main BIOS setup menu option is described in this user's guide.

The Main BIOS setup menu screen has two main frames. The left frame displays all the options that can be configured. "Grayed" options cannot be configured, "Blue" options can be.

The right frame displays the key legend. Above the key legend is an area reserved for a text message. When an option is selected in the left frame, it is highlighted in white. Often a text message will accompany it.

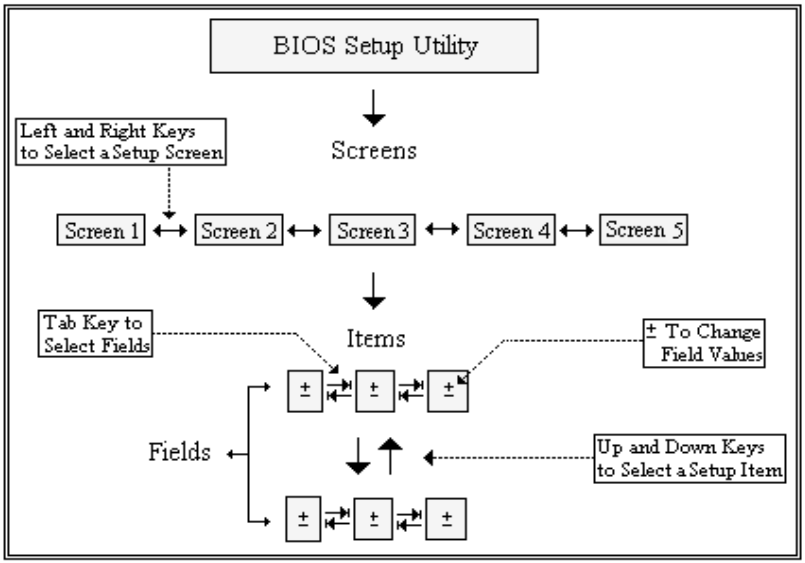


Navigation

The BIOS setup/utility uses a key-based navigation system called hot keys. Most of the BIOS setup utility hot keys can be used at any time during the setup navigation process.

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These keys include < F1 >, < F10 >, < Enter >, < ESC >, < Arrow > keys, and so on. .



Note: There is a hot key legend located in the right frame on most setup screens.

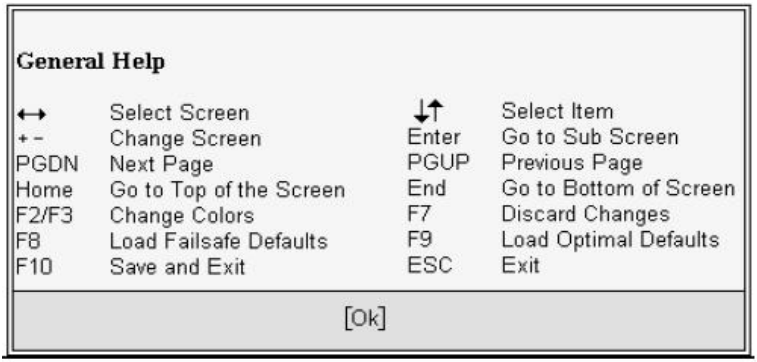
The < F8 > key on your keyboard is the Fail-Safe key. It is not displayed on the key legend by default. To set the Fail-Safe settings of the BIOS, press the < F8 > key on your keyboard. It is located on the upper row of a standard 101 keyboard. The Fail-Safe settings allow the motherboard to boot up with the least amount of options set. This can lessen the probability of conflicting settings.

Hotkey Descriptions

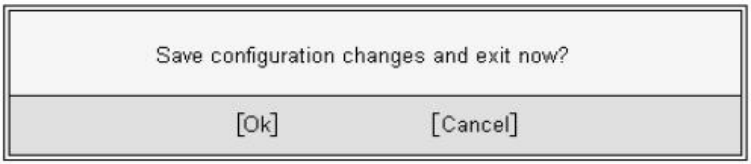
F1 The < F1 > key allows you to display the General Help screen.

Press the < F1 > key to open the General Help screen.

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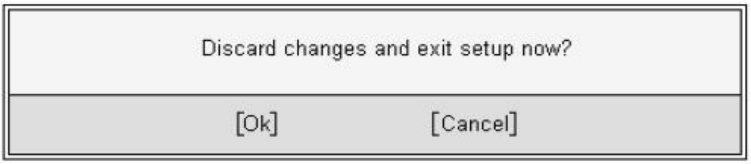


F10 The < F10 > key allows you to save any changes you have made and exit Setup. Press the < F10 > key to save your changes. The following screen will appear:



Press the < Enter > key to save the configuration and exit. You can also use the < Arrow > key to select Cancel and then press the < Enter > key to abort this function and return to the previous screen.

ESC The < Esc > key allows you to discard any changes you have made and exit the Setup. Press the < Esc > key to exit the setup without saving your changes. The following screen will appear:



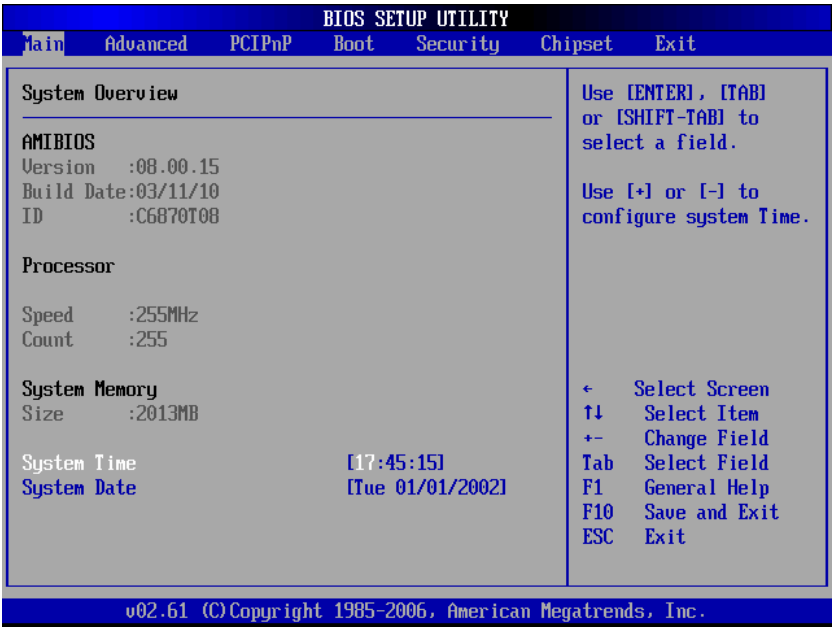
Press the < Enter > key to discard changes and exit. You can also use the < Arrow > key to select Cancel and then press the < Enter > key to abort this function and return to the previous screen.

Enter The < Enter > key allows you to display or change the setup option listed for a particular setup item. The < Enter > key can also allow you to display the setup sub-screens.

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8.2 Main Setup

When you first enter the Setup Utility, you will enter the Main setup screen. You can always return to the Main setup screen by selecting the Main tab. There are two Main Setup options. They are described in this section. The Main BIOS Setup screen is shown below.



System Time/System Date

Use this option to change the system time and date. Highlight System Time or System Date using the < Arrow > keys. Enter new values using the keyboard. Press the < Tab > key or the < Arrow > keys to move between fields. The date must be entered in MM/DD/YY format. The time is entered in HH:MM:SS format.

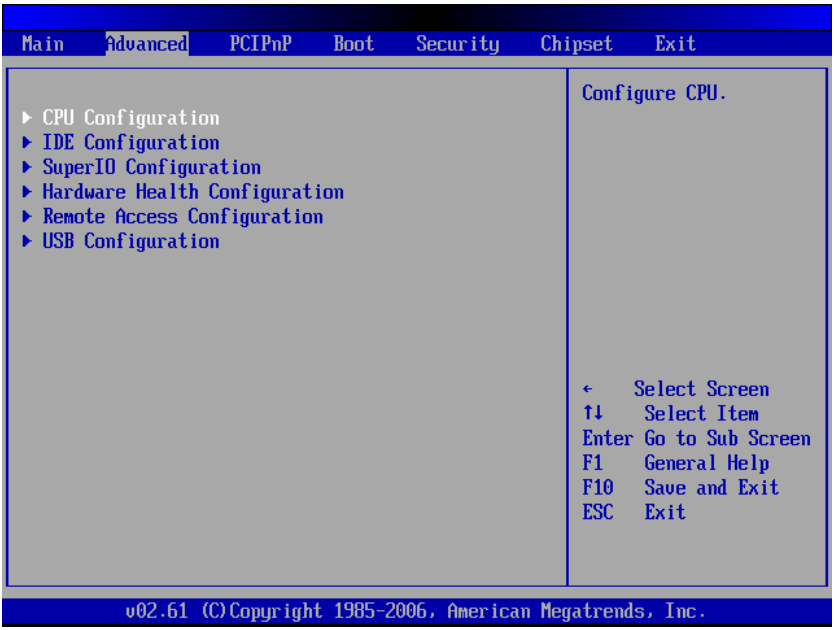
Note: The time is in 24-hour format. For example, 5:30 A.M. appears as 05:30:00, and 5:30 P.M. as 17:30:00.

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8.3 Advanced BIOS Setup

Select the Advanced tab from the setup screen to enter the Advanced BIOS Setup screen. You can select any of the items in the left frame of the screen, such as SuperIO Configuration, to go to the sub menu for that item. You can display an Advanced BIOS Setup option by highlighting it using the < Arrow > keys. The Advanced BIOS Setup screen is shown below.

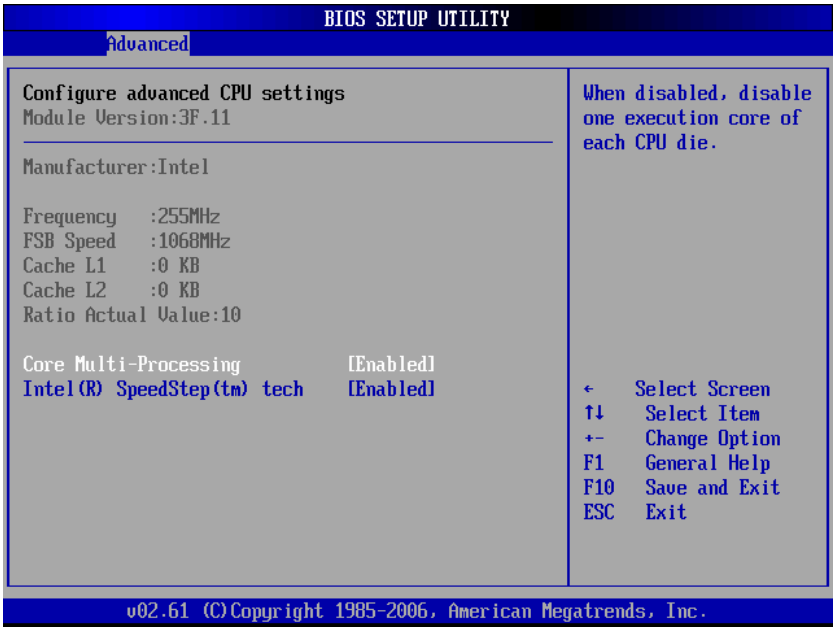
The sub menus are described on the following pages.



CPU Configuration

You can use this screen to select options for the CPU Configuration Settings. Use the up and down < Arrow > keys to select an item. Use the < + > and < - > keys to change the value of the selected option. A description of the selected item appears on the right side of the screen. The settings are described on the following pages. An example of the CPU Configuration screen is shown below.

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Core Multi-Processing

This item enables/disables multi-core processing functionality for multi-core processors (default: Enabled).

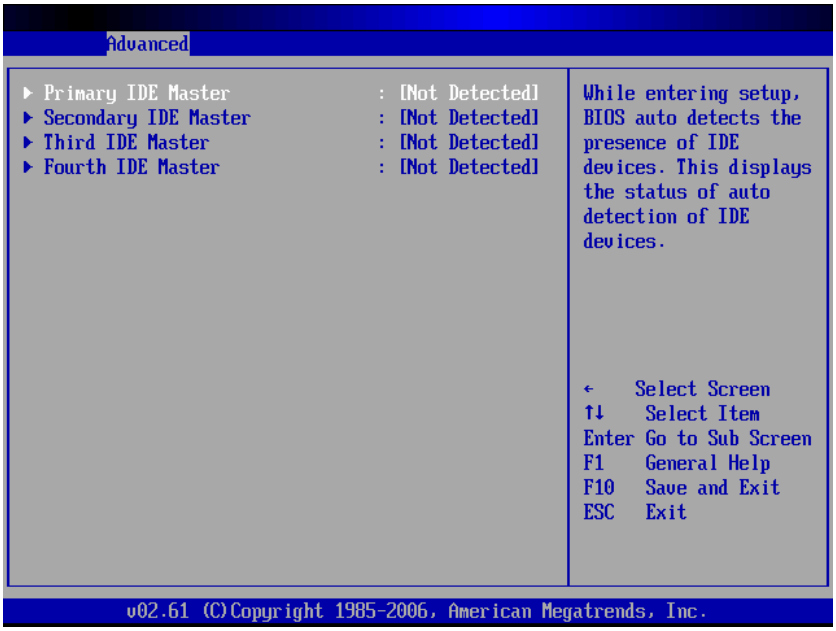
Intel®Speedstep™ Tech

Intel SpeedStep technology allows the system to dynamically adjust processor voltage and core frequency, which can result in decreased average power consumption and decreased average heat production (default: Enabled)..

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IDE Configuration

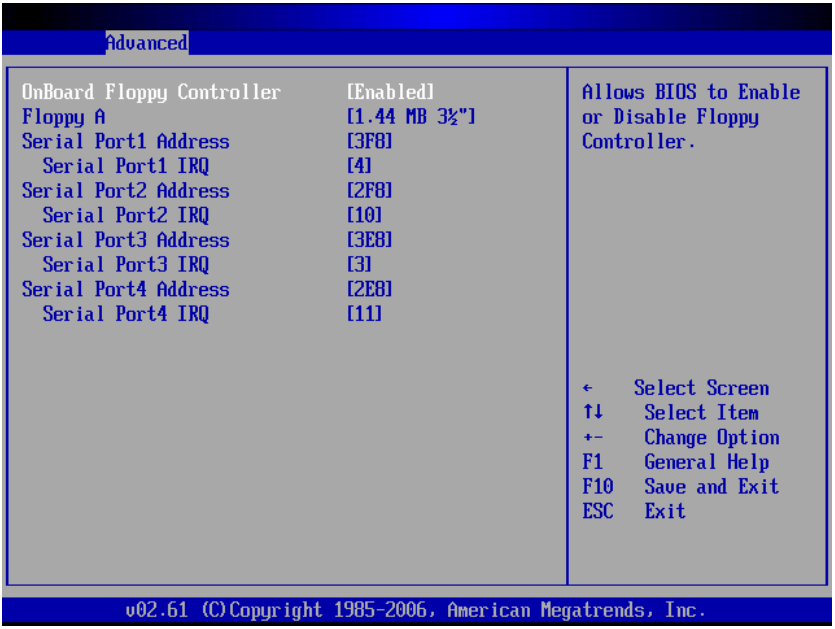
You can use this screen to select options for the IDE Configuration Settings. Use the up and down < Arrow > keys to select an item. Use the < + > and < - > keys to change the value of the selected option. A description of the selected item appears on the right side of the screen. The settings are described on the following pages. An example of the IDE Configuration screen is shown below.



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Super IO Configuration

You can use this screen to select options for the Super IO settings. Use the up and down < Arrow > keys to select an item. Use the < + > and < - > keys to change the value of the selected option. The settings are described on the following pages. The screen is shown below.



Onboard Floppy Controller

Options: Disabled, Enabled

Floppy Drive A

You can use this screen to specify options for the floppy drive settings. Use the up and down < Arrow > keys to select an item. Use the < + > and < - > keys to change the value of the selected option. The settings are described on the following pages. The screen is shown below.

Options: Disabled, 360 KB 5 ¼", 1.2 MB 5 ¼", 720 KB 3 ½", 1.44 MB 3 ½", 2.88 MB 3 ½".

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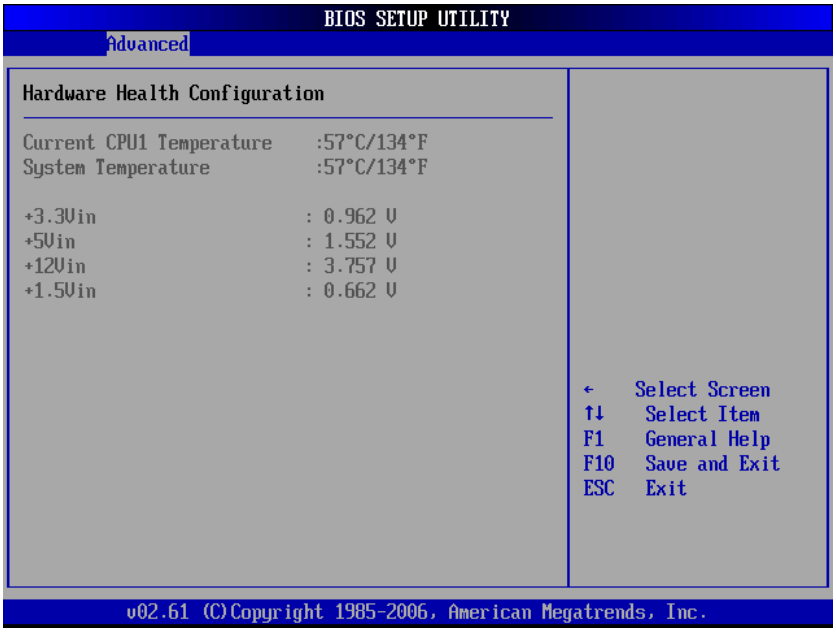
Serial Port1/2/3/4 Address/IRQ

Select an address and a corresponding interrupt for serial ports 1-4.

Address Options: 3F8, 3E8, 2F8, 2E8.
IRQ Options: 3, 4, 10, 11

Hardware Health Configuration

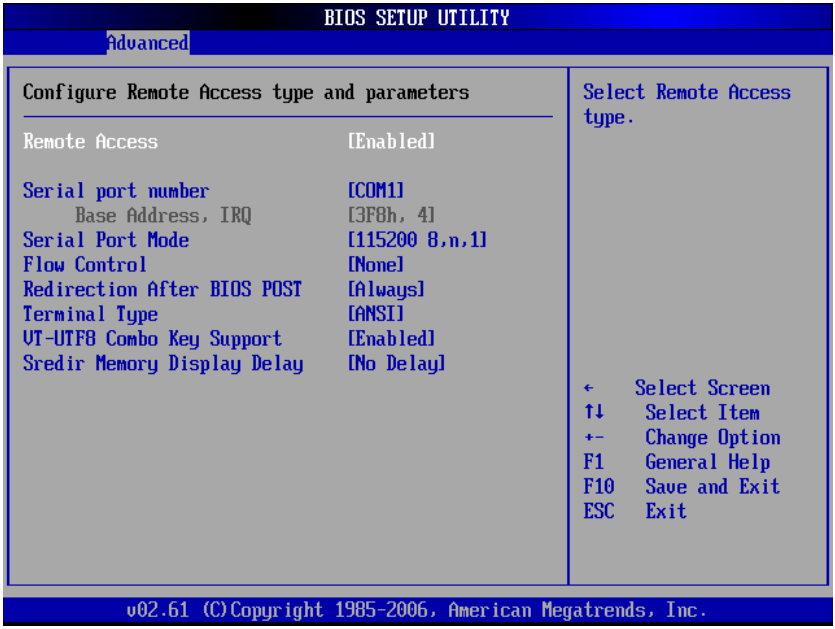
This option displays the current status of all of the monitored hardware devices/components such as voltages and temperatures.



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Remote Access Configuration

Remote access configuration provides the settings to allow remote access by another computer to get POST messages and send commands through serial port access.



Remote Access

Select this option to **Enable** or **Disable** the BIOS remote access feature.

NOTE: Enabling Remote Access requires a dedicated serial port connection. Once both serial ports are configured to disabled, you should set this value to Disabled or it may cause abnormal boot.

Serial Port Number

Select the serial port you want to use for the remote access interface. You can set the value for this option to **COM1** or **COM2**.

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NOTE: If you have changed the resource assignment of the serial ports in Advanced> SuperIO Configuration, you must Save Changes and Exit, reboot the system, and enter the setup menu again in order to see those changes reflected in the Remote Access options.

Serial Port Mode

Select the baud rate you want the serial port to use for console redirection. The options are **115200 8,n,1**; **57600 8,n,1**; **19200 8,n,1**; and **09600 8,n,1**.

Flow Control

Set this option to select Flow Control for console redirection. The settings for this value are **None**, **Hardware**, or **Software**.

Redirection After BIOS POST

This option allows you to set Redirection configuration after BIOS POST. The settings for this value are **Disabled**, **Boot Loader**, or **Always**.

- **Disabled:** Set this value to turn off the redirection after POST
- **Boot Loader:** Set this value to allow the redirection to be active during POST and Boot Loader.
- **Always:** Set this value to allow the redirection to be always active.

Terminal Type

This option is used to select either VT100/VT-UTF8 or ANSI terminal type. The settings for this value are **ANSI**, **VT100**, or **VT-UTF8**.

VT-UTF8 Combo Key Support

This option enables VT-UTF8 Combination Key Support for ANSI/VT100 terminals. The settings for this value are **Enabled** and **Disabled**.

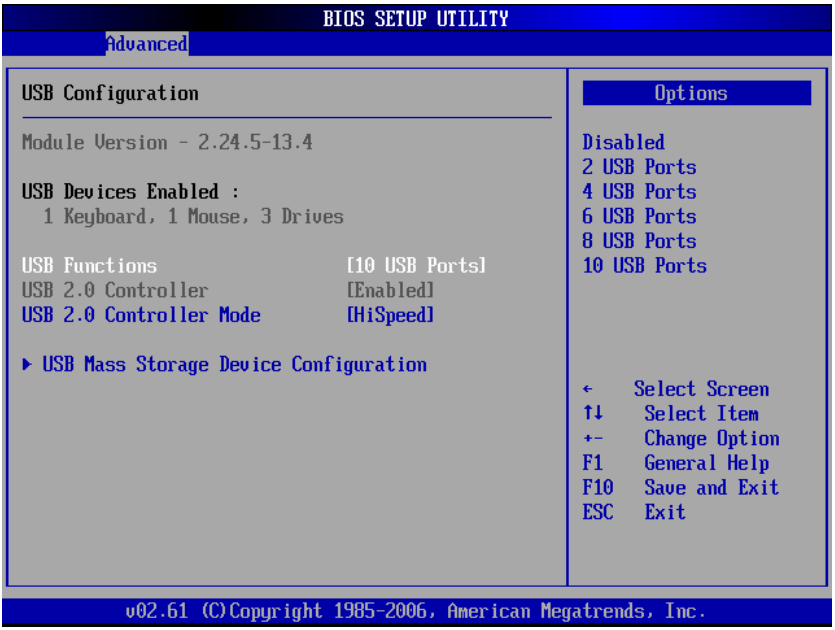
Sredir Memory Display Delay

This option gives the delay in seconds to display memory information. The options for this value are **No Delay**, **Delay 1 Sec**, **Delay 2 Sec**, or **Delay 4 Sec**.

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USB Configuration

You can use this screen to select options for the USB Configuration. Use the up and down < Arrow > keys to select an item. Use the < + > and < - > keys to change the value of the selected option. The settings are described on the following pages. The screen is shown below.



USB Functions

Set this value to allow the system to Disable, Enable, and select a set number of onboard USB ports.

USB 2.0 Controller

If USB Functions is set to Disabled, this option will have no effect. Setting this option to Enabled will allow USB 2.0 functionality to all USB ports.

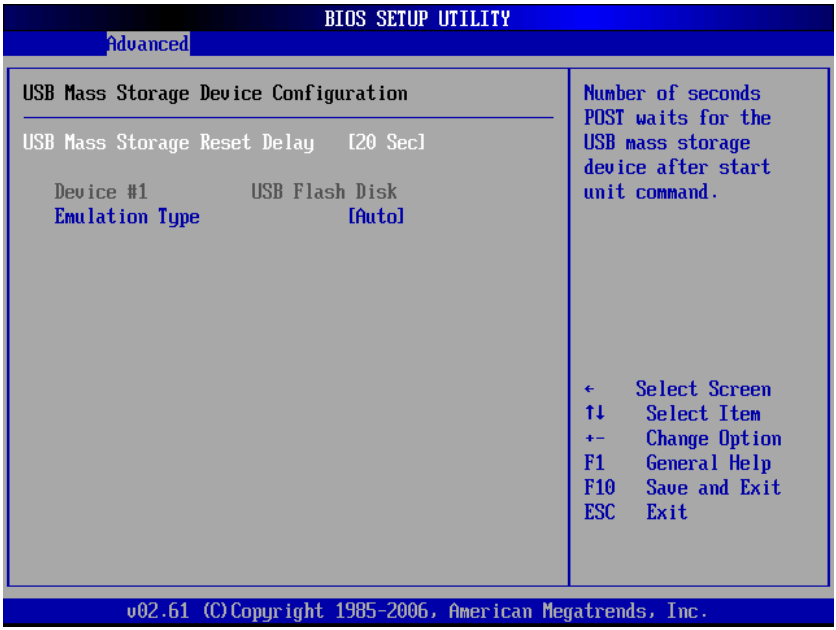
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USB 2.0 Controller Mode

The USB 2.0 Controller Mode configures the data rate of the USB port. The options are FullSpeed (12 Mbps) and HiSpeed (480 Mbps).

USB Mass Storage Device Configuration

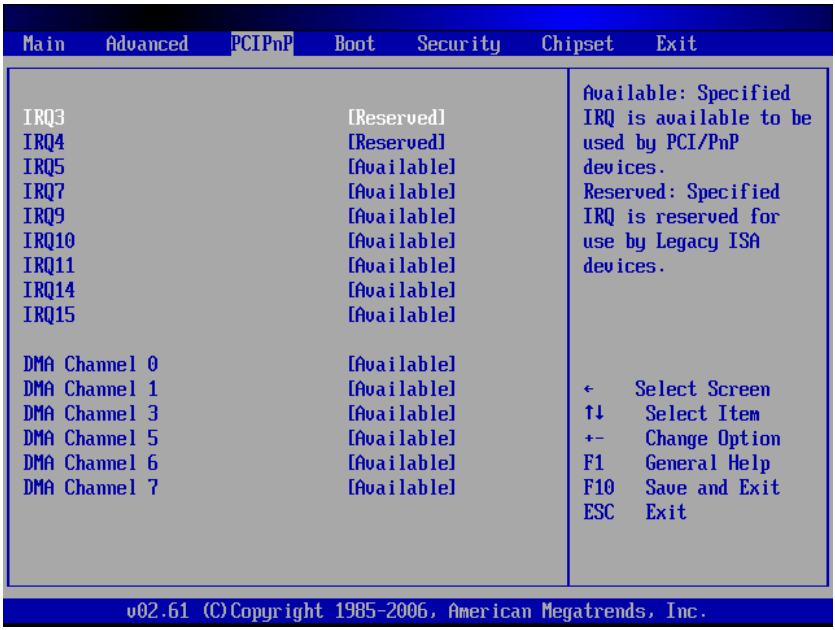
This is a submenu for configuring the USB Mass Storage Class Devices when BIOS finds they are in use on USB ports. Emulation Type can be set according to the type of attached USB mass storage device(s). If set to Auto, USB devices less than 530MB will be emulated as Floppy and those greater than 530MB will remain as hard drive. The Forced FDD option can be used to force a hard disk type drive (such as a Zip drive) to boot as FDD.



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8.4 Advanced PCI/PnP Settings

Select the PCI/PnP tab from the setup screen to enter the Plug and Play BIOS Setup screen. You can display a Plug and Play BIOS Setup option by highlighting it using the < Arrow > keys. The Plug and Play BIOS Setup screen is shown below.



IRQ/DMA Channel

Set this value to allow the IRQ/DMA channel settings to be modified.

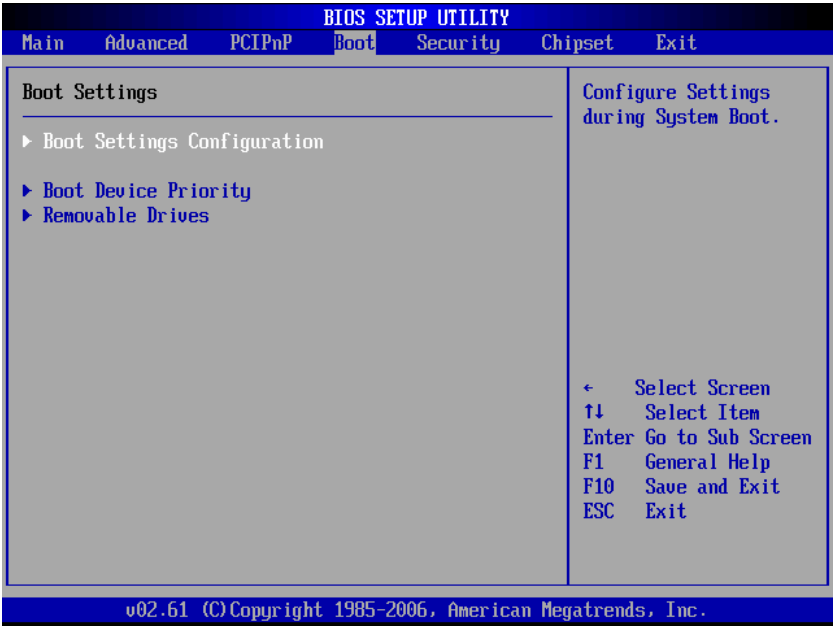
- **Available:** This setting allows the specified IRQ/DMA channel to be used by a PCI/PnP device.
- **Reserved:** This setting allows the specified IRQ/DMA channel to be used by a legacy ISA device.

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8.5 Boot Settings

Select the Boot tab from the setup screen to enter the Boot BIOS Setup screen. You can select any of the items in the left frame of the screen, such as Boot Device Priority, to go to the sub menu for that item. You can display a Boot BIOS Setup option by highlighting it using the < Arrow > keys.

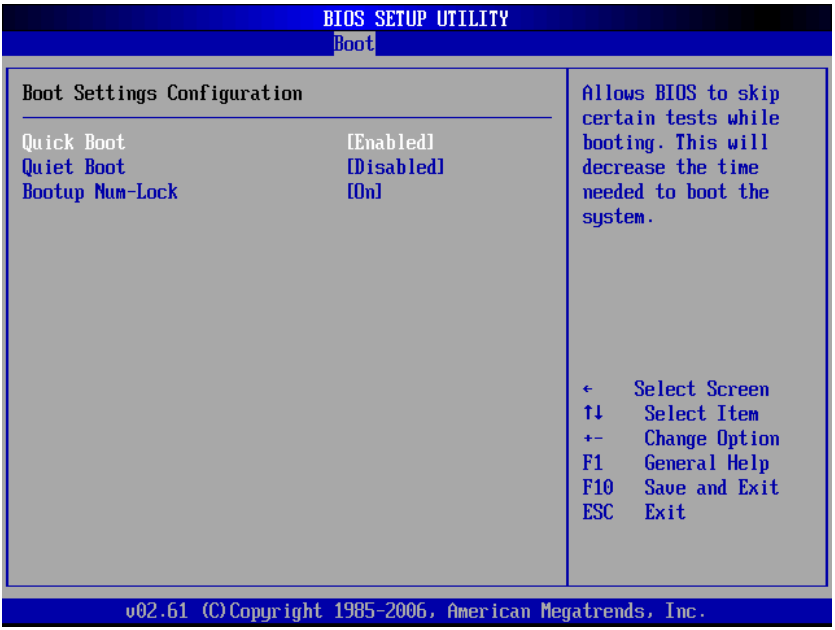
The Boot Settings screen is shown below:



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Boot Settings Configuration

Use this screen to select options for the Boot Settings Configuration. Use the up and down <Arrow> keys to select an item. Use the <Plus> and <Minus> keys to change the value of the selected option. The settings are described on the following pages. The screen is shown below.



Quick Boot

Enabling this setting will cause the BIOS Power-On Self Test routine to skip some of its tests during bootup for faster system boot.

Quiet Boot

When this feature is **enabled**, the BIOS will display the OEM logo during the boot-up sequence, hiding normal POST messages. When it is **disabled**, the BIOS will display the normal POST messages, instead of the OEM logo.

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Bootup Num-Lock

This option sets the Num Lock status when the system is powered on. Setting it to On will turn on the Num Lock key when the system is booted up. Setting it to Off will not enable the Num Lock key on bootup.

Boot Device Priority

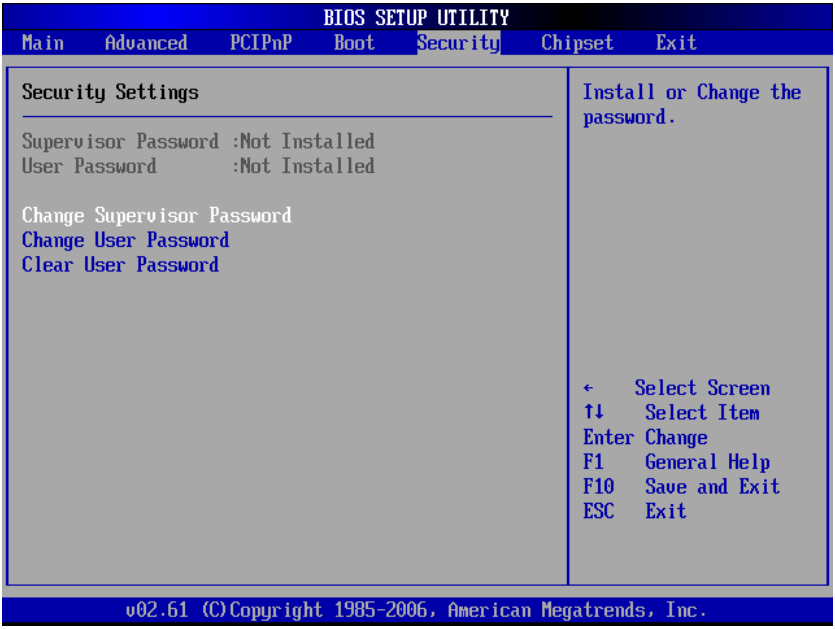
The items allow you to set the sequence of boot devices where BIOS attempts to load the disk operating system. First press <Enter> to enter the sub-menu. Then you may use the arrow keys to select the desired device, then press <+>, <-> or <PageUp>, <PageDown> key to move it up/down in the priority list.

Boot Device Groups

The Boot devices are listed in groups by device type. First press <Enter> to enter the sub-menu. Then you may use the arrow keys to select the desired device, then press <+>, <-> or <PageUp>, <PageDown> key to move it up/down in the priority list. Only the first device in each device group will be available for selection in the Boot Device Priority option.

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8.6 Security Setup



Password Support

Two Levels of Password Protection

Provides both a Supervisor and a User password. If you use both passwords, the Supervisor password must be set first.

The system can be configured so that all users must enter a password every time the system boots or when Setup is executed, using either or either the Supervisor password or User password.

The Supervisor and User passwords activate two different levels of password security. If you select password support, you are prompted for a one to six character password. Type the password on the keyboard. The password does not appear on the screen when typed. Make sure you write it down. If you forget it, you must drain NVRAM and re-configure.

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Remember the Password

Keep a record of the new password when the password is changed. If you forget the password, you must erase the system configuration information in NVRAM.

To access the sub menu for the following items, select the item and press < Enter >:

- Change Supervisor Password
- Change User Password
- Clear User Password

Supervisor Password

Indicates whether a supervisor password has been set.

User Password

Indicates whether a user password has been set.

Change Supervisor Password

Select this option and press < Enter > to access the sub menu. You can use the sub menu to change the supervisor password.

Change User Password

Select this option and press < Enter > to access the sub menu. You can use the sub menu to change the user password.

Clear User Password

Select this option and press < Enter > to access the sub menu. You can use the sub menu to clear the user password.

Change Supervisor Password

Select Change Supervisor Password from the Security Setup menu and press < Enter >.

Enter New Password:

Type the password and press < Enter >. The screen does not display the characters entered. Retype the password as prompted and press < Enter >. If the password confirmation is incorrect, an

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error message appears. The password is stored in NVRAM after completes.

Change User Password

Select Change User Password from the Security Setup menu and press < Enter >.

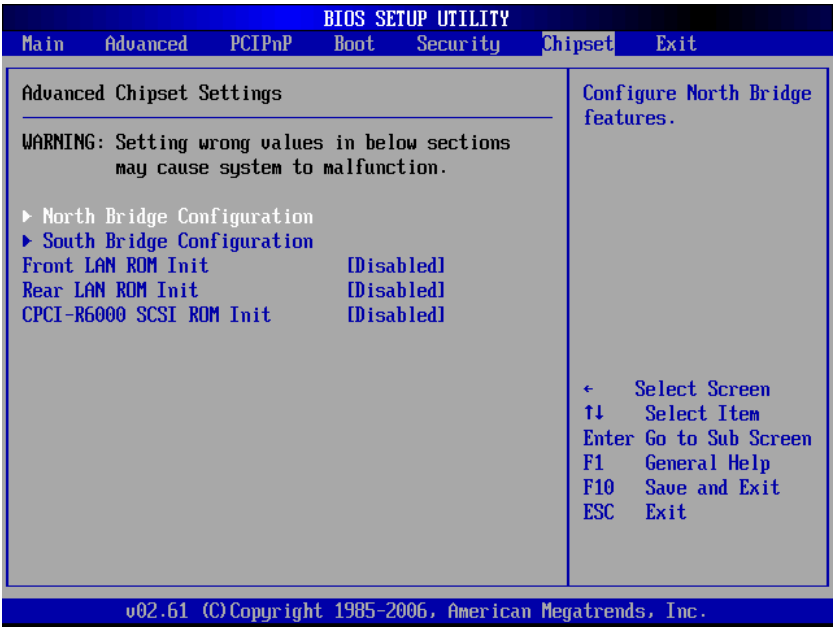
Enter New Password:

Type the password and press < Enter >. The screen does not display the characters entered. Retype the password as prompted and press < Enter >. If the password confirmation is incorrect, an error message appears. The password is stored in NVRAM after completes.

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8.7 Chipset Setup

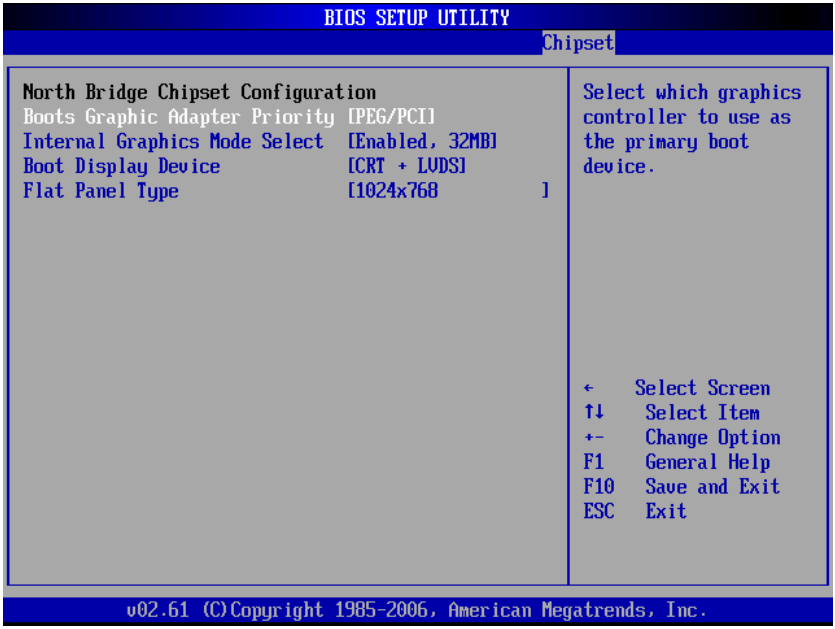
Select the Chipset tab from the setup screen to enter the Chipset BIOS Setup screen. You can select any of the items in the left frame of the screen to go to the sub menu for that item. The Chipset BIOS Setup screen is shown below.



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North Bridge Configuration

You can use this screen to select options for the North Bridge Configuration. Use the up and down < Arrow > keys to select an item. Use the < Plus > and < Minus > keys to change the value of the selected option.



Boot Graphic Adapter Priority

Select which graphics controller to use as the primary boot device.

- IGD: Built-in chipset graphic only
- PCI/IGD: Detect PCI graphics first, then built-in chipset graphics (PCI includes PCI slot and PCI Express x1/x4 slot, PCI will be first)
- PCI/PEG: Detect PCI graphics first, then PCI Express x16 graphics
- PEG/IGD: Detect PCI Express x16 graphics first, then built-in chipset graphics
- PEG/PCI: Detect PCI Express x16 graphics first, then PCI graphics, then built-in chipset graphics

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Internal Graphics Mode Select

Select the amount of system memory (32M/64M/128M) used by the internal graphics device.

Boot Display Device

This item allows the user to configure the type of external display used.

- **CRT:** Only CRT display
- **CRT+DVI:** Both CRT and DVI display (default)
- **CRT+LVDS:** Both CRT and LVDS display

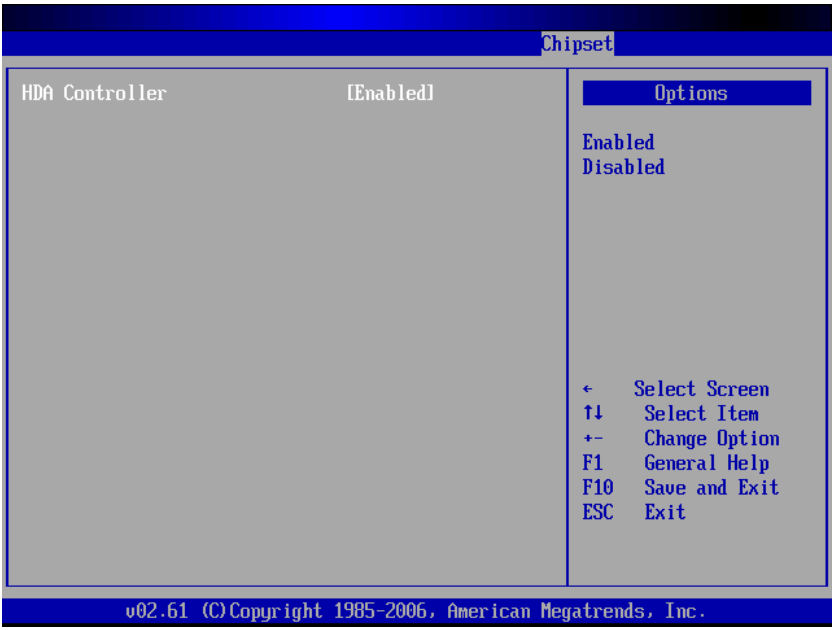
Flat Panel Type

When LVDS is selected from Boot Display Device, this option allows the output resolution to be set for the LVDS device you want to use. Available resolutions: 640x480, 800x600, 1024x768, 1280x1024.

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South Bridge Configuration

You can use this screen to select options for the South Bridge Configuration. Use the up and down < Arrow > keys to select an item. Use the < Plus > and < Minus > keys to change the value of the selected option.



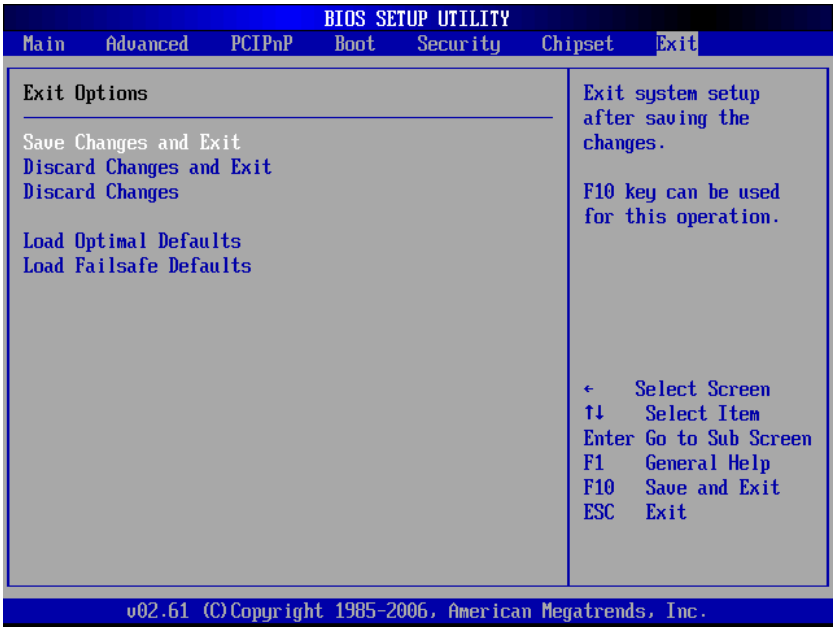
HDA Controller

Set this value to Enable/Disable the HDA Controller.

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8.8 Exit Menu

Select the Exit tab from the setup screen to enter the Exit BIOS Setup screen. You can display an Exit BIOS Setup option by highlighting it using the < Arrow > keys. The Exit BIOS Setup screen is shown below.



Save Changes and Exit

When you have completed the system configuration changes, select this option to leave Setup and reboot the computer so the new system configuration parameters can take effect.

Save Configuration Changes and Exit Now?

[Ok] [Cancel]

appears in the window. Select Ok to save changes and exit.

Discard Changes and Exit

Select this option to quit Setup without making any permanent changes to the system configuration.

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Discard Changes and Exit Setup Now?

[Ok] [Cancel]

appears in the window. Select Ok to discard changes and exit.

Discard Changes

Select Discard Changes from the Exit menu and press < Enter >.

Select Ok to discard changes.

Load Optimal Defaults

Automatically sets all Setup options to a complete set of default settings when you select this option. The Optimal settings are designed for maximum system performance, but may not work best for all computer applications. In particular, do not use the Optimal Setup options if your computer is experiencing system configuration problems.

Select Load Optimal Defaults from the Exit menu and press < Enter >.

Select Ok to load optimal defaults.

Load Failsafe Defaults

Automatically sets all Setup options to a complete set of default settings when you select this option. The Failsafe settings are designed for maximum system stability, but not maximum performance. Select the FailSafe Setup options if your computer is experiencing system configuration problems.

Select Load Fail-Safe Defaults from the Exit menu and press < Enter >.

Load FailSafe Defaults?

[Ok] [Cancel]

appears in the window. Select Ok to load FailSafe defaults.

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9 IPMI User Guide

9.1 Introduction

This chapter is written for those who already have a basic understanding of the newest implementation of the baseboard management controller (BMC) of the Intelligent Platform Management Interface (IPMI) specification rev. 2.0. It also describes the OEM extension IPMI command usages which are not listed in the IPMI specification.

9.2 Summary of Commands Supported by BMR-AVR-cPCI

The table below lists all the commands supported by the BMR-AVR-cPCI. For detailed information on supported commands, please refer to the Intelligent Platform Management Interface Specification downloadable from the Intel website (http://www.intel.com/design/servers/ipmi/spec.htm).

Command	IPMI Spec	NetFn	CMD	Description
IPM Device "Global" Commands				
Get Device ID	20.1	App	01h	This command is used to retrieve the Intelligent Device's Hardware Revision, Firmware/Software Revision, and Sensor and Event Interface Command specification revision information.
Cold Reset	20.2	App	02h	This command directs the Responder to perform a 'Cold Reset' of itself.
Warm Reset	20.3	App	03h	This command directs the Responder to perform a 'Warm Reset' of itself.
Get Self Test Results	20.4	App	04h	This command directs the device to return its Self Test results, if any.
Get Device GUID	20.8	App	08h	This command returns a GUID (Globally Unique ID), also referred to as a UUID (Universally Unique IDentifier), for the management controller.

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Command	IPMI Spec	NetFn	CMD	Description
Broadcast “Get Device ID”	20.9	App	01h	This is a broadcast version of the ‘Get Device ID’ command that is provided for the ‘discovery’ of Intelligent Devices on the IPMB
IPMI Messaging Support Commands				
Send Message	22.7	App	34h	The *Send Message* command is used for bridging IPMI messages between channels, and between the system management software (SMS) and a given channel.
BMC Watchdog Timer				
Reset Watchdog Timer	27.5	App	22h	The *Reset Watchdog Timer* command is used for starting and restarting the Watchdog Timer from the initial countdown value that was specified in the *Set Watchdog Timer* command.
Set Watchdog Timer	27.6	App	24h	The *Set Watchdog Timer* command is used for initializing and configuring the watchdog timer. The command is also used for stopping the timer.
Get Watchdog Timer	27.7	App	25h	This command retrieves the current settings and present countdown of the watchdog timer.
Event Commands				
Set Event Receiver	29.1	S/E	00h	This global command tells a controller where to send Event Messages.
Get Event Receiver	29.2	S/E	01h	This global command is used to retrieve the present setting for the Event Receiver Slave Address and LUN. This command is only applicable to management controllers that act as IPMB Event Generators.
Platform Event (a.k.a. “Event Message”)	29.3	S/E	02h	This command may be thought of as a request for the BMC to process the event data that the command contains. Typically, the data will be logged to the System Event Log (SEL).

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Command	IPMI Spec	NetFn	CMD	Description
Sensor Device Commands				
Get Device SDR Info	35.2	S/E	20h	This command returns general information about the collection of sensors in a Dynamic Sensor Device.
Get Device SDR	35.3	S/E	21h	The 'Get Device SDR' command allows SDR information for sensors for a Sensor Device (typically implemented in a satellite management controller) to be returned.
Reserve Device SDR Repository	35.4	S/E	22h	This command is used to obtain a *Reservation ID*.
Set Sensor Hysteresis	35.6	S/E	24h	This command provides a mechanism for setting the hysteresis values associated with the thresholds of a sensor that has threshold based event generation.
Get Sensor Hysteresis	35.7	S/E	25h	This command retrieves the present hysteresis values for the specified sensor.
Set Sensor Threshold	35.8	S/E	26h	This command is used to set the specified threshold for the given sensor.
Get Sensor Threshold	35.9	S/E	27h	This command retrieves the threshold for the given sensor.
Set Sensor Event Enable	35.10	S/E	28h	This command provides the ability to disable or enable Event Message Generation for individual sensor events. The command is also used to enable or disable sensors in their entirety using the *disable scanning* bit.
Get Sensor Event Enable	35.11	S/E	29h	This command returns the enabled/ disabled state for Event Message Generation from the selected sensor. The command also returns the enabled/ disabled state for scanning on the sensor.
Get Sensor Event Status	35.13	S/E	2Bh	The Get Sensor Event Status command is provided to support systems where sensor polling is used in addition to, or instead of, Event Messages for event detection.

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Command	IPMI Spec	NetFn	CMD	Description
Get Sensor Reading	35.14	S/E	2Dh	This command returns the present reading for sensor. The sensor device may return a stored version of a periodically updated reading, or the sensor device may scan to obtain the reading after receiving the request.
Get Sensor Type	35.16	S/E	2Fh	This command is used to assign the Sensor Type and Event/Reading Type to a specified sensor.
FRU Device Commands				
Get FRU Inventory Area Info	34.1	Storage	10h	Returns overall the size of the FRU Inventory Area in this device, in bytes.
Read FRU Data	34.2	Storage	11h	The command returns the specified data from the FRU Inventory Info area.
Write FRU Data	34.3	Storage	12h	The command writes the specified byte or word to the FRU Inventory Info area.

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9.3 OEM Commands Summary Table

Command	NetFn Code	Cmd Code
OemShowRevision	OEM (C0h)	12h
OemRescanGaInput	OEM (C0h)	22h
OemTestFunction	OEM (C0h)	30h
OemSetBlueLEDLongBlinking	OEM (C0h)	31h
OemReportGeoAddress	OEM (C0h)	F0h
OemEnableSmbus	OEM (C0h)	F2h
OemDisableSmbus	OEM (C0h)	F3h
OemDispDebugVariable	OEM (C0h)	F4h
OemResetHost	OEM (C0h)	F5h
OemPowerOff	OEM (C0h)	F6h
OemPowerOn	OEM (C0h)	F7h

OemShowRevision

This command is used to show the current information of the firmware including the firmware revision, the product ID, and additional features.

Action	Byte	Value	Description
Request	0	C0h	NetFn/LUN for OEM
	1	12h	OEM defined command
Response	0	Complete Code	00h means OK
	1	A5h	Internal check byte. Always A5h
	2	*Firmware Rev	‘V’ in ASCII code for verification
	3	*Firmware Rev	Revision info high byte
	4	*Firmware Rev	Revision info low byte
	5	*Product ID	‘P’ in ASCII code for verification
	6	*Product ID	Product info high byte
	7	*Product ID	Product info low byte
	8	*Special info	‘S’ in ASCII code for verification
	9	*Special info	Addition info byte
	10	5Ah	Internal check byte. Always 5Ah

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OemRescanGaInput

This command is used to rescan the geo-address input pins and reset the IPMB address according to the input value.

Action	Byte	Value	Description
Request	0	C0h	NetFn/LUN for OEM
	1	22h	OEM defined command
Response	0	Complete Code	00h means OK
	1	New IPMB address	New IPMB address value

OemTestFunction

Internal test purposes only.

OemSetBlueLEDLongBlinking

This command is used to enable or disable the slow blink of the blue HotSwap LED when a voltage is detected to be over ±5% out of range for five seconds (see Table 4-1 on page 22). This function is set to enabled by default.

Action	Byte	Value	Description
Request	0	C0h	NetFn/LUN for OEM
	1	31h	OEM defined command
	2	00h or 01h	00h: disable slow blink capability 01h: enable slow blink capability
Response	0	Complete Code	00h means OK

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OemReportGeoAddress

This command can report the IPMB address, the GA pin input status, and the event forwarding control value.

Action	Byte	Value	Description
Request	0	C0h	NetFn/LUN for OEM
	1	F0h	OEM defined command
Response	0	Complete Code	00h means OK
	1	IPMB address	IPMB address value
	2	GA value	GA pin input status
	3	Control value	Current control value of event forwarding

OemEnableSmbus

This command is used to turn on the I2C bus when it is off during boot up process. Usually BIOS will perform this command after booting in boards with ServerWorks chipset.

Action	Byte	Value	Description
Request	0	C0h	NetFn/LUN for OEM
	1	F2h	OEM defined command
Response	0	Complete Code	00h means OK

OemDisableSmbus

This command is used to shut down I2C bus access.

Action	Byte	Value	Description
Request	0	C0h	NetFn/LUN for OEM
	1	F3h	OEM defined command
Response	0	Complete Code	00h means OK

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OemDispDebugVariable

This command can report up to 5 interval values for debug purposes. For developers only.

Action	Byte	Value	Description
Request	0	C0h	NetFn/LUN for OEM
	1	F4h	OEM defined command
Response	0	Complete Code	00h means OK
	1	*Debug variable 1	
	2	*Debug variable 2	
	3	*Debug variable 3	
	4	*Debug variable 4	
	5	*Debug variable 5	

OemResetHost

This command is implemented to control the system's status if rebooting is required. Operators can control the system remotely.

Action	Byte	Value	Description
Request	0	C0h	NetFn/LUN for OEM
	1	F5h	OEM defined command
Response	0	Complete Code	00h means OK

OemPowerOff

This command is implemented to control the system's status if power-off is required. Operators can control the system remotely.

Action	Byte	Value	Description
Request	0	C0h	NetFn/LUN for OEM
	1	F6h	OEM defined command
Response	0	Complete Code	00h means OK

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OemPowerOn

This command is implemented to control the system's status if power-on is required. Operators can control the system remotely.

Action	Byte	Value	Description
Request	0	C0h	NetFn/LUN for OEM
	1	F7h	OEM defined command
Response	0	Complete Code	00h means OK

9.4 CompactPCI Address Map

Since more than one system may be installed in a single chassis, we allocate each IPMB address based on GA input as peripheral cards. The CompactPCI Peripheral Address Mapping Table is given below.

CompactPCI Peripheral Address Mapping			
Geo. Addr.	**IPMB Addr.**	**Geo. Addr.**	**IPMB Addr.**
0	**Disabled**	16	D0h
1	B0h	17	D2h
2	B2h	18	D4h
3	B4h	19	D6h
4	B6h	20	D8h
5	B8h	21	DAh
6	Bah	22	DCh
7	BCh	23	DEh
8	BEh	24	E0h
9	Coh	25	E2h
10	C4h	26	E4h
11	C6h	27	E6h
12	C8h	28	E8h
13	CAh	29	EAh
14	CCh	30	ECh
15	CEh	**31**	**Disabled**

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9.5 Communications with IPMC

Operating systems need to use a serial port to communicate with the IPMC. The resource setting of the serial port must be IO: 0x3E8 and IRQ: 3. The communication setting of the serial port must be BaudRate: 9600, DataBit: 8, ParityCheck: None, StopBit: 1, and FlowControl: None. In Windows XP, use “COM3” to communicate with the IPMC.

9.6 IPMI Sensors List

Sensor Number	Sensor name	Normal Reading	Remark
00h	BMC Watchdog		
01h	3.3V	3.3 V	
02h	5V	5 V	
03h	12V	12 V	
04h	SYSTEM Temp	25ºC	
05h	CPU Temp	40ºC	
06h	BIOS CHANGE		
07h	BIOS POST ERROR		

9.7 Relevant Documents

Document Title	Revision	Source
Intelligent Platform Management Interface Specification v2.0	Document Revision 1.1 February 20, 2002	Intel Corp. http://www.intel.com/design/servers/ipmi/spec.htm
PICMG 2.9 D1.0 CompactPCI System Management Specification	January 21, 2000	
Intelligent Platform Management Bus Communications Protocol Specification v0.9	Document Revision 0.15 June 24, 1997	Intel Corp. http://www.intel.com/design/servers/ipmi/license_ipmi.htm

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Important Safety Instructions

For user safety, please read and follow all **instructions**, **WARNINGS**, **CAUTIONS,** and **NOTES** marked in this manual and on the associated equipment before handling/operating the equipment.

- Read these safety instructions carefully.
- Keep this user's manual for future reference.
- Read the specifications section of this manual for detailed information on the operating environment of this equipment.
- When installing/mounting or uninstalling/removing equipment:
  - Turn off power and unplug any power cords/cables.
- To avoid electrical shock and/or damage to equipment:
  - Keep equipment away from water or liquid sources;
  - Keep equipment away from high heat or high humidity;
  - Keep equipment properly ventilated (do not block or cover ventilation openings);
  - Make sure to use recommended voltage and power source settings;
  - Always install and operate equipment near an easily accessible electrical socket-outlet;
  - Secure the power cord (do not place any object on/over the power cord);
  - Only install/attach and operate equipment on stable surfaces and/or recommended mountings; and,
  - If the equipment will not be used for long periods of time, turn off and unplug the equipment from its power source.

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- Never attempt to fix the equipment. Equipment should only be serviced by qualified personnel.

A Lithium-type battery may be provided for uninterrupted, backup or emergency power.



Risk of explosion if battery is replaced with one of an incorrect type. Dispose of used batteries appropriately.

- Equipment must be serviced by authorized technicians when:
  - The power cord or plug is damaged;
  - Liquid has penetrated the equipment;
  - It has been exposed to high humidity/moisture;
  - It is not functioning or does not function according to the user's manual;
  - It has been dropped and/or damaged; and/or,
  - It has an obvious sign of breakage.

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Contact us should you require any service or assistance.

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