cPCI-3970/3971 Series

Performance 3U CompactPCI® PlusIO
Intel® Core™ i7 Processor Blade

User's Manual



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Revision History

Revision	Release Date	Description of Change(s)
2.00	2011/09/15	Initial release
2.01	2012/11/16	Add “Q”, “L” and “M” models; add Gold Cap support
2.02	2013/03/29	Correct “3.3V/5V” column headings in power consumption tables
2.03	2013/07/29	Correct J2 VGA pin definitions, cPCI-R3P00T RTM Board Layout

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Preface

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Using this Manual

Audience and Scope

The cPCI-3970 User's Manual is intended for hardware technicians and systems operators with knowledge of installing, configuring and operating industrial grade single board computers.

Manual Organization

This manual is organized as follows:

Chapter 1, Introduction: Introduces the cPCI-3970, its features, block diagrams, and package contents.

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

Chapter 3, Functional Description: Describes the cPCI-3970 main functions.

Chapter 4, Board Interfaces: Describes the cPCI-3970 board interfaces.

Chapter 5, Getting Started: Describes the installation of components to the cPCI-3970 and rear transition modules.

Chapter 6, Driver Installation: Provides information on how to install the cPCI-3970 device drivers under Windows XP.

Chapter 7, Utilities: Describes the utilities of the cPCI-3970, including watchdog timer and Trusted Platform Module.

Chapter 8, BIOS Setup Utility: Describes basic navigation for the AMI EFI BIOS setup utility.

Chapter 9, IPMI User Guide: Provides information on 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 Introduction

1.1 Overview

The ADLINK cPCI-3970 Series is a 3U CompactPCI® PlusIO compatible processor blade with ECC memory up to 16GB. The ADLINK cPCI-3970 features an Intel® Core™ i7 processor with Mobile Intel® QM67 Express Chipset, supports Satellite mode operation as a standalone blade in peripheral slots and IPMI for system health monitoring.

Front panel I/O includes 2x GbE, 2x USB, VGA, and additional 2x USB, COM, KB/MS, and Line-in/out for the 8HP cPCI-3970D model, or 2x DisplayPort, COM and USB for the cPCI-3970G version. One optional PCI 32-bit/66 MHz PMC site or PCI-Express x1 XMC site is available on the 2nd or 3rd layer. The optional Rear Transition Module (RTM) provides 3x SATA, 2x GbE, 2x USB, 2x COM and VGA.

The cPCI-3970 is a high performance solution for factory automation and other industrial applications that require superior data transfer capabilities and advanced computing power.

1.2 Features

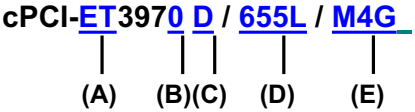
- 3U CompactPCI blade in 4HP, 8HP or 12HP width form factor
- Supports Intel® Core™ i7-2715QE Processor (4 cores, 6M cache, 2.10 GHz)
- Graphics and memory controllers integrated in processor
- Compatible with PICMG 2.30 PlusIO (3x SATA, PCIe x4, 3x USB, 2x GbE to J2)
- Dual channel DDR3-1066/1333 SDRAM with ECC via two SODIMM sockets, up to 16GB
- 32bit/33MHz CompactPCI Interface based on PCI specifications, universal V(I/O)
- Supports Satellite mode operation as a standalone blade in peripheral slots
- Optional 32-bit/66MHz PMC or PCIe x1 XMC site
- Supports IPMI for system health monitoring

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- VGA port on front or switchable to rear I/O by BIOS setting
- Two PCIe Gigabit Ethernet egress ports
- Additional two Gigabit Ethernet ports on 80mm RTM (cPCI-R3P00T)
- One CompactFlash socket
- Optional CFast socket for SATA interface storage (shares CF socket site)
- Line-in and Line-out ports on front panel
- 2.5" SATA drive onboard on 8HP/12HP versions at 6 Gb/s

1.3 Model Number Decoder

Blades



(A) Operating Temperature Code

- **Blank** = 0ºC to +60ºC
- **ET** = -20ºC to +70ºC (for CPUs with TDP below 25W only)

(B) J2 Connector Type Code

- **0** = HM connector
- **1** = UHM connector (PICMG 2.30 PlusIO compliant)

(C) Configuration Code

- **Blank** = Single slot width with CF socket, 2x USB, 2x GbE, VGA
- **D** = Dual slot width with CF socket, 2x USB, 2x GbE, VGA on layer-1; 2x USB, COM, PS/2 KB/MS, Line-in, Line-out and SATA on layer-2 DB-3610L2
- **G** = Dual slot width with CF socket, 2x USB, 2x GbE, VGA on layer-1, 2x DisplayPort, RJ-45 COM, PS/2 KB/MS, USB and SATA on layer-2 DB-3970L2

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- **S** = Dual slot width with CF socket, 2x USB, 2x GbE, VGA on layer-1; PMC/XMC site on layer-2 DB-3UMC.
- **P** =Triple slot width with CF socket, 2x USB, 2x GbE, VGA on layer-1; 2x USB, COM, PS/2 KB/MS, Line-in, Line-out and SATA on layer-2 DB-3610L2; PMC/XMC site on layer-3 DB-3UMC
- **U** = Triple slot width with CF socket, 2x USB, 2x GbE, VGA on layer-1; 2x DisplayPort, RJ-45 COM, PS/2 KB/MS, USB and SATA on layer 2 DB-3970L2; PMC/XMC site on layer-3 DB-3UMC
- **Q** = Dual Slot width with CF socket, 2x USB, 2x GbE, VGA on layer-1; no I/O on layer-2. (for Core i7-2715QE and Core i52515E processor only)
- **L** = Dual Slot width with CF socket, 2x USB, 2x GbE, VGA on layer-1; 2x GbE, DB-9 COM, USB and SATA ports on layer-2 DB-LAN2-S
- **M** = Dual slot width with CF socket, 2x USB, 2x GbE, VGA on layer-1; 100-pin density connector for audio, 2x DVI, 2x USB, KB/MS, 2x COM and SATA ports on layer-2 DB-Max
- **Other** = ODM/OEM project code

(D) CPU Code

- **715Q** = Quad core Intel® i7-2715QE processor
- **655L** = Low voltage dual core Intel® i7-2655LE processor
- **610U** = Ultra low voltage dual core Intel® i7-2610UE processor
- **515E** = Dual core Intel® i5-2515E processor

(E) Memory Size Code

- **M2G** = 2x 1GB DDR3-1333 SO-CDIMM
- **M4G** = 2x 2GB DDR3-1333 SO-CDIMM
- **M8G** = 2x 4GB DDR3-1333 SO-CDIMM
- **M16G** = 2x 8GB DDR3-1333 SO-CDIMM
(dependent on availability of memory modules)

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RTMs



(A) Model Code

- **Blank** = dual slot width, 50mm depth 3U RTM with 2x COM, 2x USB, 3x SATA, VGA, 2x GbE (switched from processor blade)
- **T** = dual slot width, 80mm depth 3U RTM with 2x COM, 2x USB, 3x SATA, VGA, 2x GbE (independent from processor blade)

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1.4 Package Contents

The cPCI-3970 is packaged with the following components. If any of the following items 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 cPCI-3970 Series non-standard configurations will vary depending on customer requests.

CPU module

- The cPCI-3970 Series Processor Blade
  - CPU and memory specifications will differ depending on options selected
  - Thermal module is assembled on the board
- Y-cable for PS/2 combo port (8HP/12HP version only)
- 2.5" HDD accessory pack (8HP/12HP version only)
- RJ-45 to DB-9 COM adapter cable (cPCI-3970G version only)
- RS-422/485 DB-9-to-DB-9 dongle (cPCI-3970G version only)
- DisplayPort to DVI adapter cable (cPCI-3970G version only)
- ADLINK All-in-One DVD
- User's manual



No I/O cables are included with the cPCI-3970M version.

Rear Transition Module

- cPCI-R3P00 or cPCI-R3P00T RTM
- RS-422/485 DB-9-to-DB-9 dongle

Optional Accessories

- DB-3CFAST adapter for CFast socket (P/N 91-37560-0000)
- DisplayPort to DVI adapter cable (P/N 30-01120-0000)
- DisplayPort to VGA adapter cable (P/N 30-01119-0000)
- DisplayPort to HDMI adapter cable (P/N 30-01121-0000)
- I/O cable for cPCI-3970M high density connector (contact your ADLINK sales representative for order code)

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NOTE:

The contents of non-standard cPCI-3970 configurations may vary depending on the customer’s requirements.



CAUTION:

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-3970 Processor Blade Specifications

CompactPCI® Standards	• PICMG® 2.0 CompactPCI® Rev. 3.0 • PICMG® 2.1 Hot Swap Specification Rev. 2.0 • PICMG® 2.9 System Management Rev. 1.0 • PICMG® 2.30 PlusIO compatible (cPCI-3971 supports full PICMG 2.30 compliance - UHM type J2 connector)
Mechanical	• Standard 3U CompactPCI® • Board size: 100mm x 160mm • Single slot (4HP, 20.32mm); Dual slot (8HP, 40.64mm); Triple-slot (12HP, 60.96 mm) • CompactPCI® connectors with J1, J2; HM type J2 connector for cPCI-3970 models, UHM type J2 connector for cPCI-3971
Processor	• Intel® Core™ i7-2715QE Processor, 2.1 GHz, 6MB LLC, FCBGA1023, TDP 45W • Intel® Core™ i7-2655LE Processor, 2.2 GHz, 4MB LLC, FCBGA1023, TDP 25W • Intel® Core™ i7-2610UE Processor, 1.5 GHz, 4MB LLC, FCBGA1023, TDP 17W • Intel® Core™ i5-2515E Processor, 2.5 GHz, 3MB LLC, FCBGA1023, TDP 35W • Passive heatsink
Chipset	• IIntel® QM67 Platform Controller Hub (PCH)
Memory	• Dual channel DDR3-1066/1333 ECC memory • Two SO-CDIMM sockets • Up to 16GB (dependent on availability of memory modules)
CompactPCI Bus	• PCI 32bit/ 33MHz; 3.3V, 5V universal V I/O • Supports operation in system slot as master or in peripheral slot as standalone blade without connectivity to CompactPCI bus (Satellite mode)
Gigabit Ethernet	• Two PCI-Express x1 Intel® 82574L Gigabit Ethernet controllers • Two egress 10/100/1000BASE-T ports switchable to J2 (cPCI-R3P00) by BIOS setting[1]
Serial Ports	• Up to four serial ports • One RS-232/422/485 serial port on front panel • Additional RS-232 10-pin header on layer-2 board (cPCI-3970G only) • Two serial ports on RTM

Table 2-1: cPCI-3970 Processor Blade Specifications

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Graphics	• Integrated in Intel® Core™ processor • DB-15 VGA port on front panel, switchable to J2 (RTM) by BIOS setting • Analog display up to QXGA 2048x1536 @75Hz, 32-bit • Two DisplayPorts on front panel with resolution up to 2560x1600 @60Hz (cPCI-3970G/U only) • Dual independent display
USB	• Up to four USB 2.0 front panel ports, 3 USB 2.0 ports to J2 (RTM)
PMC/XMC	• One 32-bit/66MHz PMC site or PCIe x1 XMC site if DB-3UMC riser card is installed
Audio	• One Line-in and one Line-out port on front panel (cPCI-3970D only)
TPM	Infineon SLB 9635 TT1.2 (not available on Ext. Temp. version) • Over/Under voltage detection • Low/High frequency sensor/filter • Reset filter • Memory Encryption/Decryption
Storage Interface[2]	• CompactFlash Type I or II socket on riser card • Optional CFast Type I or II socket on riser card (shares site with CF) • One SATA 6Gb/s direct connector for 2.5" onboard HDD/SDD (8HP/12HP version only)
BIOS	• AMI® EFI BIOS, 64Mbit SPI flash memory
OS Compatibility	• Microsoft Windows XP Professional • Microsoft Windows 7 64-bit • Red Hat Enterprise Linux 6 64-bit • Fedora 14 32-bit • Other OS support upon request
Environmental	• Operating Temperature (with forced air flow)[3]: Standard: 0°C to 60°C Extended Temperature: -20°C to 70°C (for Intel® Core™ i7-2655LE, i7-2610UE processors only, with forced air flow) • Storage Temperature: -40°C to 85°C • Humidity: 95% @60°C non-condensing • Shock: 15G peak-to-peak, 11ms duration, non-operating • Vibration[2]: 2Grms, 5-500Hz, each axis, operating (w/o hard drive)
EMI	• CE EN55022 • FCC Class A

Table 2-1: cPCI-3970 Processor Blade Specifications

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Faceplate I/O	**4HP (cPCI-3970) & 8HP (cPCI-3970Q)** • 2x USB 2.0 ports • 2x 10/100/1000BASE-T Ethernet ports • Analog DB-15 VGA port **8HP (cPCI-3970D)** • 4x USB 2.0 ports • 2x 10/100/1000BASE-T Ethernet ports • Analog DB-15 VGA port • DB-9 RS-232/422/485/485+ port • PS/2 Keyboard/ Mouse combo port • Line-in and Line-out port **8HP (cPCI-3970G)** • 2x DisplayPort • 3x USB 2.0 ports • 2x 10/100/1000BASE-T Ethernet ports • Analog DB-15 VGA port • RJ-45 RS-232/422/485 port[2] • PS/2 Keyboard/ Mouse combo port **8HP (cPCI-3970L)** • 3xUSB 2.0 ports • 4x 10/100/1000BASE-T Ethernet ports • Analog DB-15 VGA port • DB-9 RS-232/422/485 port • USB port **8HP (cPCI-3970M)** • 2xUSB 2.0 ports • 2x 10/100/1000BASE-T Ethernet ports • Analog DB-15 VGA port • 100-pin I/O port for Line-in, Line-out, 2x DVI, 2xUSB, 2x RS-232/422/485, KB/MS **12HP (cPCI-3970P)** • 4x USB 2.0 ports • 2x 10/100/1000BASE-T Ethernet ports • Analog DB-15 VGA port • DB-9 RS-232/422/485/485+ port • PS/2 Keyboard/ Mouse combo port • Line-in and Line-out port • PMC/XMC site

Table 2-1: cPCI-3970 Processor Blade Specifications

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Faceplate I/O	**12HP (cPCI-3970U)** • 2x DisplayPorts • 3x USB 2.0 ports • 2x 10/100/1000BASE-T Ethernet ports • Analog DB-15 VGA port • RJ-45 RS-232/422/485 port[4] • PS/2 Keyboard/ Mouse combo port • PMC/XMC site

Table 2-1: cPCI-3970 Processor Blade Specifications

1. When using the **cPCI-R3P00** RTM, LAN1/2 from the 82574L controllers can be routed via J2 to the RTM. When using the **cPCI-R3P00T** RTM, the cPCI-3970 front panel GbE ports change to LAN3/4 and the cPCI-R3P00T GbE ports are LAN1/2 due to PCI-Express root port sequence requirements of the PCH.
2. The storage device limits the operational vibration tolerance. When the application requires higher specification for anti-vibration, it is recommended to use a flash storage device.
3. ADLINK-certified thermal design. The thermal performance is dependent on the chassis cooling design. Sufficient forced air-flow is required (see “Thermal Requirements” on page 22). Temperature limits of optional mass storage devices may also affect the thermal specification.
4. A DB-9-to-DB-9 dongle to convert the cPCI-3970G RS-422/485 pin definitions to common pin definitions is included in the package (“cPCI-3970G/U Serial Ports” on page 44).

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2.2 cPCI-R3P00(T) RTM Specifications

Mechanical	Board Size • cPCI-R3P00: 100mm x 50mm • cPCI-R3P00T: 100mm x 80mm Dual-slot (8HP, 40.64mm) (optional single slot upon request)
Gigabit Ethernet	• cPCI-R3P00: Two GbE ports switched from front panel by BIOS setting (LAN1/2) • cPCI-R3P00T: Two GbE ports from independent Intel 82580DB GbE controller[1]
Serial Ports	• Two serial ports on I/O panel from pin header • COM5 converted from USB supporting RS-232/422/485[2] • COM4 provides RS-232 Tx, Rx signals only
Storage Interface	• Three 7-pin Serial ATA ports
Faceplate I/O	• 2x USB 2.0 ports • 2x 10/100/1000BASE-T Ethernet ports • Analog DB-15 VGA port • 2x COM ports

Table 2-2: cPCI-R3P00(T) RTM Specifications

1. cPCI-R3P00T GbE ports are LAN1/2 due to PCI-Express root port sequence requirements of the PCH; cPCI-3970 front panel GbE ports change to LAN3/4 when using the cPCI-R3P00T.
2. A DB-9-to-DB-9 dongle to convert the cPCI-R3P00 RS-422/485 pin definitions to common pin definitions is included in the package (“COM5 Connector (DB-9)” on page 47).


NOTE:

Specifications are subject to change without prior notice.

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2.3 Block Diagrams

cPCI-3970 Blade

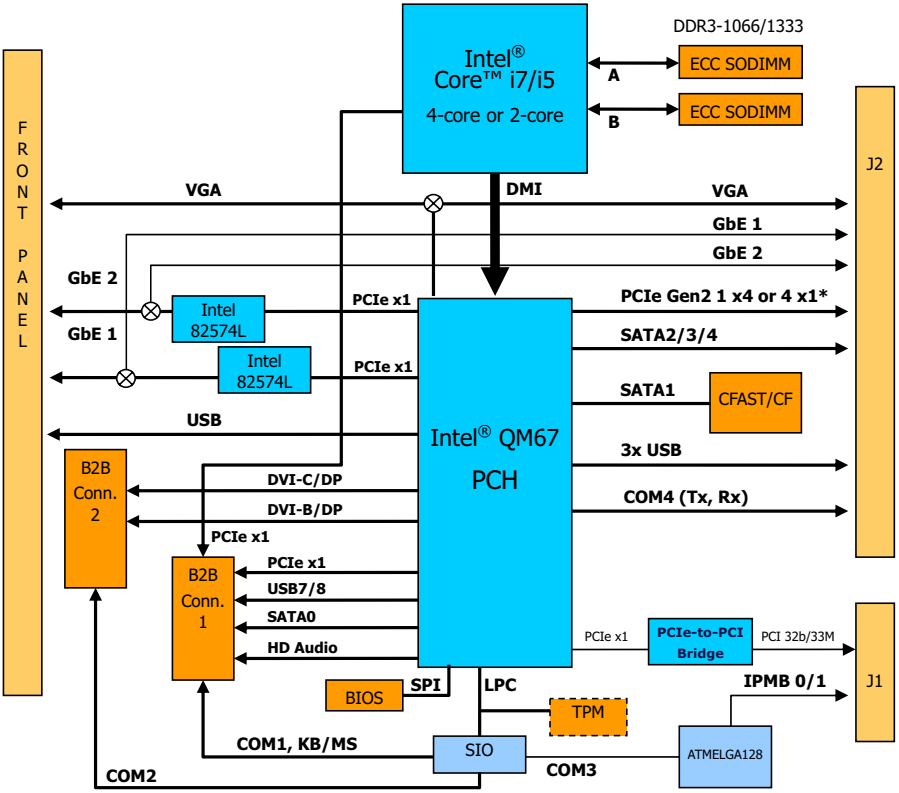


Figure 2-1: cPCI-3970 Blade Functional Block Diagram

NOTE:

*PCI Express to the J2 connector is set to PCIe x4 by default. If you require 4x PCIe x1 at J2, please contact ADLINK for an alternate BIOS version.

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DB-3610L2 Daughter Board

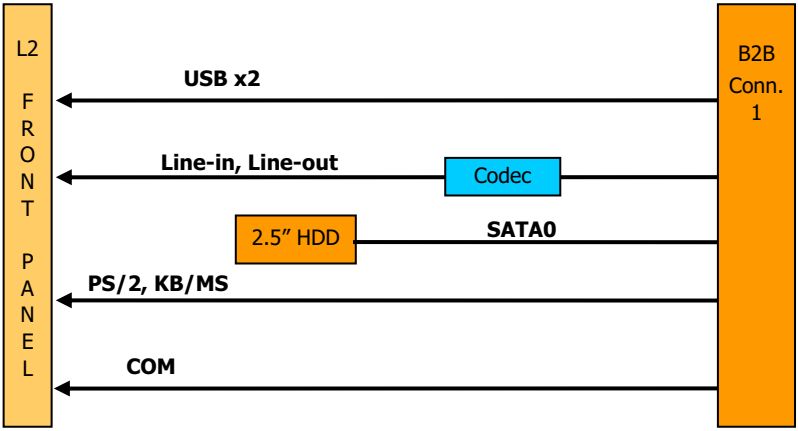


Figure 2-2: DB-3610L2 Daughter Board Functional Block Diagram

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DB-3970L2 Daughter Board

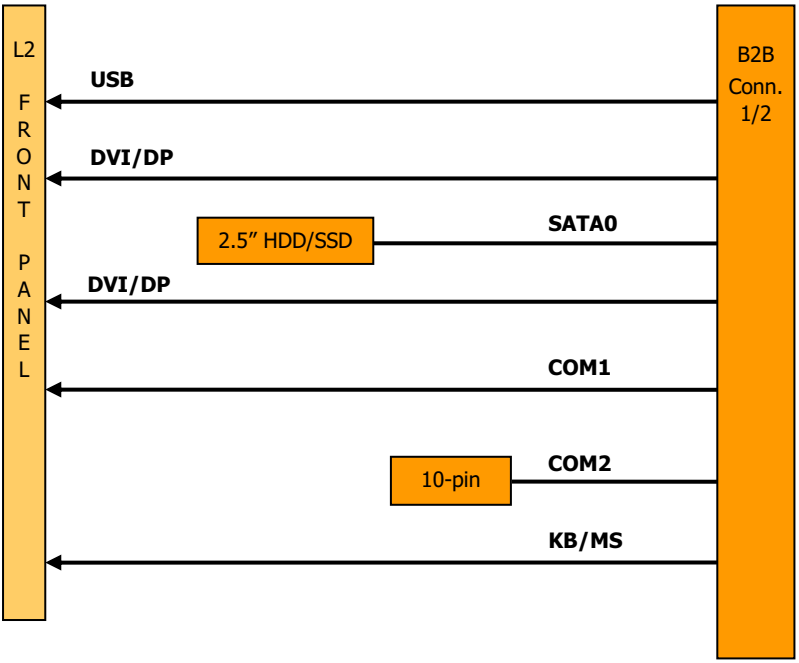


Figure 2-3: DB-3970L2 Daughter Board Functional Block Diagram

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DB-LANL2-S Daughter Board

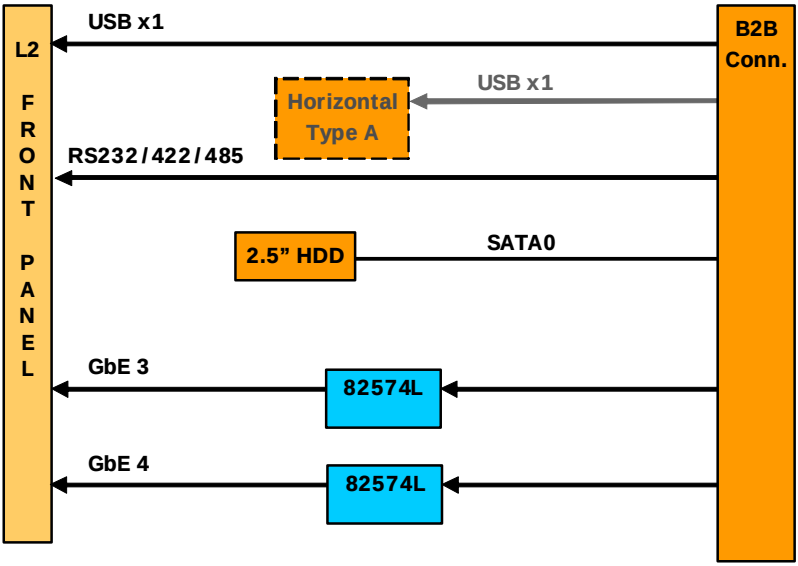


Figure 2-4: DB-LANL2-S Daughter Board Functional Block Diagram

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DB-Max Daughter Board

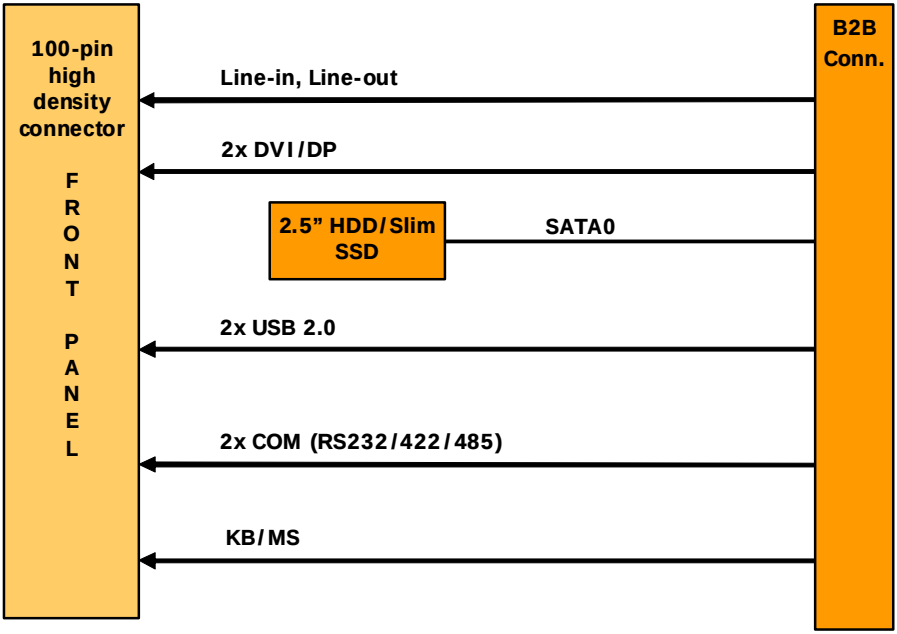


Figure 2-5: DB-Max Daughter Board Functional Block Diagram

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cPCI-R3P00 RTM

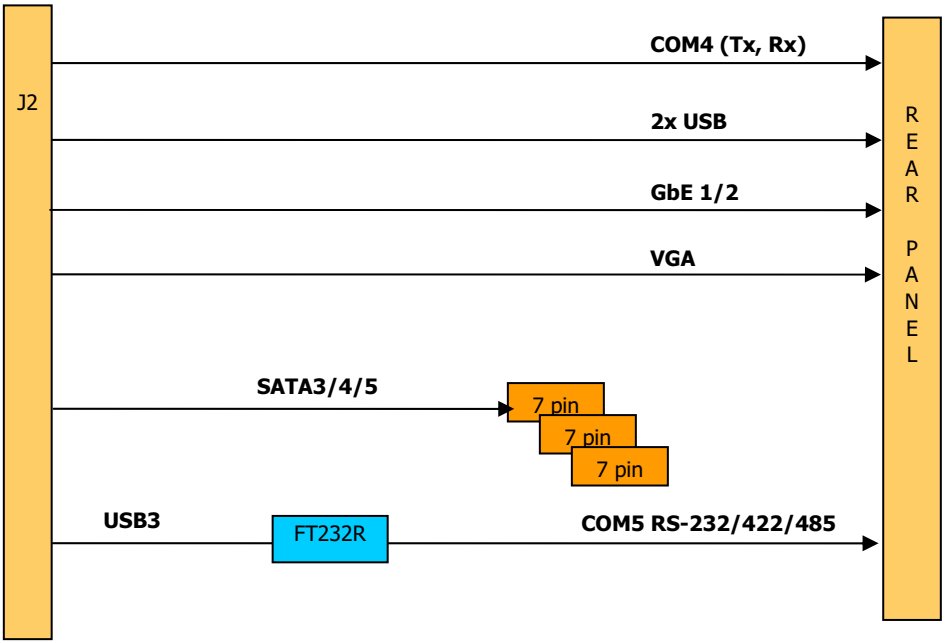


Figure 2-6: cPCI-R3P00 RTM Functional Block Diagram

cPCI-R3P00T RTM

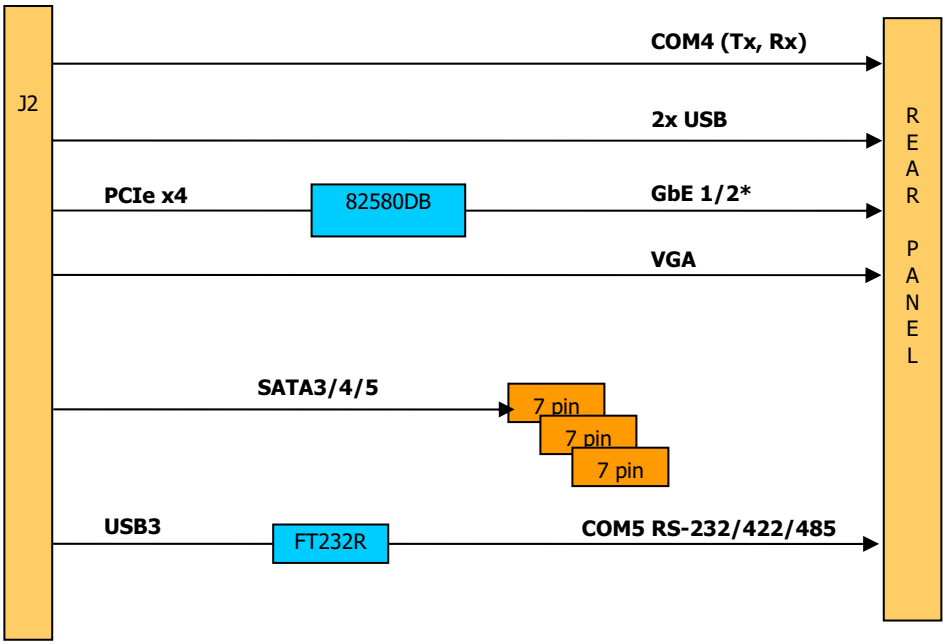


Figure 2-7: cPCI-R3P00T RTM Functional Block Diagram

NOTE:

*cPCI-R3P00T GbE ports are LAN1/2 due to PCI-Express root port sequence requirements of the PCH; cPCI-3970 front panel GbE ports change to LAN3/4 when using the cPCI-R3P00T.

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2.4 I/O Connectivity Table

Function	cPCI-3970 (4HP)		cPCI-3970D (8HP)		cPCI-3970G (8HP)		R3P00(T) (RTM)	
	Faceplate	Onboard	Faceplate	Onboard	Faceplate	Onboard	Faceplate	Onboard
Gigabit Ethernet	Y x2		Y x2		Y x2		Y x2[1]	
COM			Y (DB-9)		Y (RJ-45)	Y (10-pin)	Y x2	
USB 2.0	Y x2		Y x4		Y x3		Y x2	
VGA	Y		Y		Y		Y[2]	
DisplayPort					Y x2			
Serial ATA				Y (2.5" HDD)		Y (2.5" HDD)		Y x3 (7-pin)
CF/CFast		Y		Y		Y		
PS/2 KB/MS			Y		Y			
Line-in/out			Y					
System LEDs	Y x5		Y x5		Y x5			
Reset Button	Y		Y		Y			

1. Switched from front ports for cPCI-R3P00, ports independent from front panel for cPCI-R3P00T.
2. Switched from front port.

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2.5 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 of each voltage.

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			

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Power Consumption

This section provides information on the power consumption of cPCI-3970 Series when using the Intel® Core™ i7 processors with 2x 4GB DDR3-1066 SO-CDIMM memory and onboard 64GB SATA flash disk. The cPCI-3970 is powered by 5V and 3.3V. Power consumption at 100% CPU usage was measured using the Intel Thermal Analysis Tool (TAT).

Intel® Core™i7-2715QE			
OS/Mode	**Current 5V**	**Current 3.3V**	**Total Power**
DOS/Idle mode	5.81 A	0.69 A	31.3W
Windows XP/Idle mode	4.94 A	0.69 A	27.0 W
Windows® XP, CPU 100% Usage	13.1 A	0.68 A	67.5 W

Intel® Core™i7-2655LE			
OS/Mode	**Current 5V**	**Current 3.3V**	**Total Power**
DOS/Idle mode	3.97 A	0.73 A	21.4 W
Windows XP/Idle mode	3.56 A	0.71 A	20.1 W
Windows® XP, CPU 100% Usage	6.97 A	0.71 A	37.2 W

Intel® Core™i7-2610UE			
OS/Mode	**Current 5V**	**Current 3.3V**	**Total Power**
DOS/Idle mode	2.89 A	0.73 A	16.8 W
Windows XP/Idle mode	2.54 A	0.73 A	15.1 W
Windows® XP, CPU 100% Usage	5.01 A	0.73 A	27.4 W

Intel® Core™i5-2515LE			
OS/Mode	**Current 5V**	**Current 3.3V**	**Total Power**
DOS/Idle mode	4.52 A	0.71 A	24.9 W
Windows XP/Idle mode	4.47 A	0.71 A	24.7 W
Windows® XP, CPU 100% Usage	8.72 A	0.71 A	45.9 W

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2.6 Thermal Requirements

Cooling of the CompactPCI blade and its components is provided by the thermal module (passive heatsink) and is dependent on sufficient airflow from the chassis. The amount of thermal energy that can by dissipated from the board is dependent on the ambient air temperature and the airflow rate of the chassis. Please refer to the separate document *cPCI-3970 Power Dissipation Guidelines* which gives information on the upper limits of operating conditions and the maximum ambient air temperature as a function of airflow rate for a given level of power consumption for the cPCI-3970 blade.

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3 Functional Description

The following sections describe the cPCI-3970 Series features and functions.

3.1 Processors

The 2nd Generation Intel® Core™ processor family mobile is the next generation of 64-bit, multi-core mobile processor built on 32-nanometer process technology. Based on a new micro-architecture, the processor is designed for a two-chip platform. The two-chip platform consists of a processor and Platform Controller Hub (PCH). The platform enables higher performance, lower cost, easier validation, and improved x-y footprint. The processor includes Integrated Display Engine, Processor Graphics and Integrated Memory Controller.

The cPCI-3970 Series supports the Intel® Core™ i7/i5 processors. The table below lists the general specifications and power ratings of the CPUs supported by the cPCI-3970 Series.

Features	Core™ i7-2715QE	Core™ i7-2655LE	Core™ i7-2610UE	Core™ i5-2515E
Clock	2.1GHz	2.2GHz	1.5GHz	2.5GHz
Max. Single Core Turbo Freq.	3GHz	2.9GHZ	2.4GHz	3.2GHz
Last Level Cache	6MB	4MB	4MB	3MB
No. of Core(s)	4	2	2	2
Max. Power (TDP[1])	45W	25W	17W	35W
$T_{junction, MAX}$[2]	100ºC	100ºC	100ºC	100ºC

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.

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Supported Technologies

- Intel® Virtualization Technology for Directed I/O (Intel® VT-d)
- Intel® Virtualization Technology (Intel® VT-x)
- Intel® Hyper-Threading Technology
- Intel® 64 Architecture
- Execute Disable Bit
- Intel® Turbo Boost Technology

Interfaces

- Two channels of DDR3 memory with a maximum of one SO-DIMM per channel
- Memory DDR3 data transfer rates of 1066 MT/s, 1333 MT/s, and 1600 MT/s
- 64-bit wide channels
- DDR3 I/O Voltage of 1.5 V
- 1Gb, 2Gb, and 4Gb DDR3 DRAM technologies are supported for x8 and x16 devices
- The PCI Express port(s) are fully-compliant with the PCI Express Base Specification, Revision 2.0.
- 5 GT/s point-to-point DMI interface to PCH is supported
- The Processor Graphics contains a refresh of the sixth generation graphics core enabling substantial gains in performance and lower power consumption.
- DX10.1, DX10, DX9 support
- OGL 3.0 support
- FDI carries display traffic from the Processor Graphics in the processor to the legacy display connectors in the PCH

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3.2 Platform Controller Hub

The QM67 PCH provides extensive I/O support. functions and capabilities include:

- PCI Express Base Specification, Revision 2.0 support for up to eight ports with transfers up to 5 GT/s
- ACPI Power Management Logic Support, Revision 4.0a
- Enhanced DMA controller, interrupt controller, and timer functions
- Integrated Serial ATA host controllers with independent DMA operation on up to six ports
- USB host interface with two EHCI high-speed USB 2.0 Host controllers and two rate
- matching hubs provide support for up to fourteen USB 2.0 ports
- Integrated 10/100/1000 Gigabit Ethernet MAC with System Defense
- System Management Bus (SMBus) Specification, Version 2.0 with additional support for I2C devices
- Supports Intel® High Definition Audio (Intel® HD Audio)
- Supports Intel® Rapid Storage Technology (Intel® RST)
- Supports Intel® Virtualization Technology for Directed I/O (Intel® VT-d)
- Integrated Clock Controller
- Analog and Digital Display ports
- Low Pin Count (LPC) interface
- Firmware Hub (FWH) interface support
- Serial Peripheral Interface (SPI) support

3.3 PMC/XMC

The cPCI-3970P/U/S models support one PMC or XMC site for front panel I/O expansion. The PMC site provides a maximum 32-bit/66MHz PCI bus link using a Pericom PI7C9X110 PCI-Express-to-PCI bridge and PCI-Express x1 link. The PMC site supports +3.3V signaling only. The XMC site provides a PCI Express x1 lane.

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3.4 Intel® Turbo Boost Technology

Intel Turbo Boost Technology is a feature that allows the processor to opportunistically and automatically run faster than its rated operating core and/or render clock frequency when there is sufficient power headroom, and the product is within specified temperature and current limits. The Intel Turbo Boost Technology feature is designed to increase performance of both multi-threaded and single-threaded workloads. The processor supports a Turbo mode where the processor can use the thermal capacity associated with package and **run at power levels higher than TDP power for short durations**. This improves the system responsiveness for short, bursty usage conditions.

Turbo Mode availability is independent of the number of active cores; however, the Turbo Mode frequency is dynamic and dependent on the instantaneous application power load, the number of active cores, user configurable settings, operating environment, and system design. If the power, current, or thermal limit is reached, the processor will automatically reduce the frequency to stay with its TDP limit.

3.5 Intel® Hyper-Threading Technology

Intel® Hyper-Threading Technology allows an execution core to function as two logical processors. While some execution resources (such as caches, execution units, and buses) are shared, each logical processor has its own architectural state with its own set of general-purpose registers and control registers. This feature must be enabled using the BIOS and requires operating system support. Intel recommends enabling Hyper-Threading Technology with Microsoft Windows 7, Vista, and XP, and disabling Hyper-Threading Technology using the BIOS for all previous versions of Windows operating systems.

3.6 Trusted Platform Module

The cPCI-3970 integrates the Infineon SLB 9635 TT 1.2 Trusted Platform Module (TPM), a security controller with cryptographic functionality that provides users a secure environment in e-commerce transactions and Internet communications.

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The key features the TPM provides are:

- Hardware hash accelerator for SHA-1 algorithm.
- Advanced Crypto Engine (ACE) for asymmetric key operations (up to 2048-bit key length) to make hardware protection.
- Tick counter to extend the time required to decipher the key.

In addition to an encryption key created by the user, the TPM also provides security features to protect the TPM itself:

- Over/Under-voltage detection to monitor the system stability. If the voltage fluctuates dramatically, this function can block the data transfer and lock the chip.
- Low/High frequency sensor to detect the IC clock frequency. If the frequency fluctuates dramatically, this function can block the data transfer and lock the chip.
- Reset filter to filter reset signal in order to break the time set by tick counter is received.
- Memory encryption to protect memory.
- Physical shield in the IC to protect the die from intruding or hacking by matching the data transferred on the 2 layer metal shield on the IC. If the data is not matched, the IC may be blocked.


NOTE:

The TPM does not support operation below 0ºC. Below this temperature, the system may not boot. As a result, the Extended Temperature version cPCI-ET3970 is not available with TPM.

3.7 Battery

The cPCI-3970 is equipped with a 3.0V "coin cell" lithium battery for the Real Time Clock (RTC). The battery socket is equipped on the DB-3CAST/DB-3CF daughter board. The lithium battery must be replaced with an identical battery or a battery type recommended by the manufacturer. A Rayovac BR2032 with -40°C to +85°C operating temperature support is equipped on board by default. The coin cell battery can be replaced with a Gold Cap type by request.

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3.8 BIOS Recovery

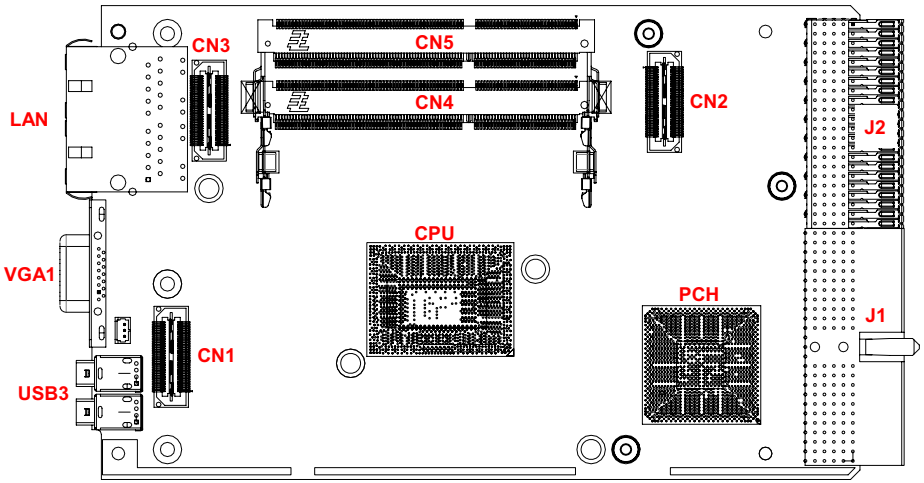
The cPCI-3970 Series features AMI® EFI BIOS with BIOS recovery. If the BIOS becomes corrupted and you are unable to boot your system, follow the instructions in Section 7.3“BIOS Recovery” on page 101.

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4 Board Interfaces

This chapter illustrates the board layout, connector pin assignments, and jumper settings to familiarize users with the cPCI-3970 Series.

4.1 cPCI-3970 Series Board Layout



CPU	Intel® Core™ Processor	**J1**	CompactPCI Connector J1
PCH	Intel® QM67 PCH	**J2**	cPCI J2 (UHM/HM)
CN4/5	Stacked SO-CDIMM socket	**LAN**	Dual Ethernet connectors
CN1	DB-3610L2/DB-3970L2 connector	**VGA1**	DB-15 VGA connector
CN2	DB-3CFAST connector	**USB3**	USB ports
CN3	DB-3970L2 connector		

Figure 4-1: cPCI-3970 Series Board Layout

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4.2 cPCI-3970 Blade Assembly Layout

This section describes the final assembly layout of the single slot cPCI-3970 Blade.

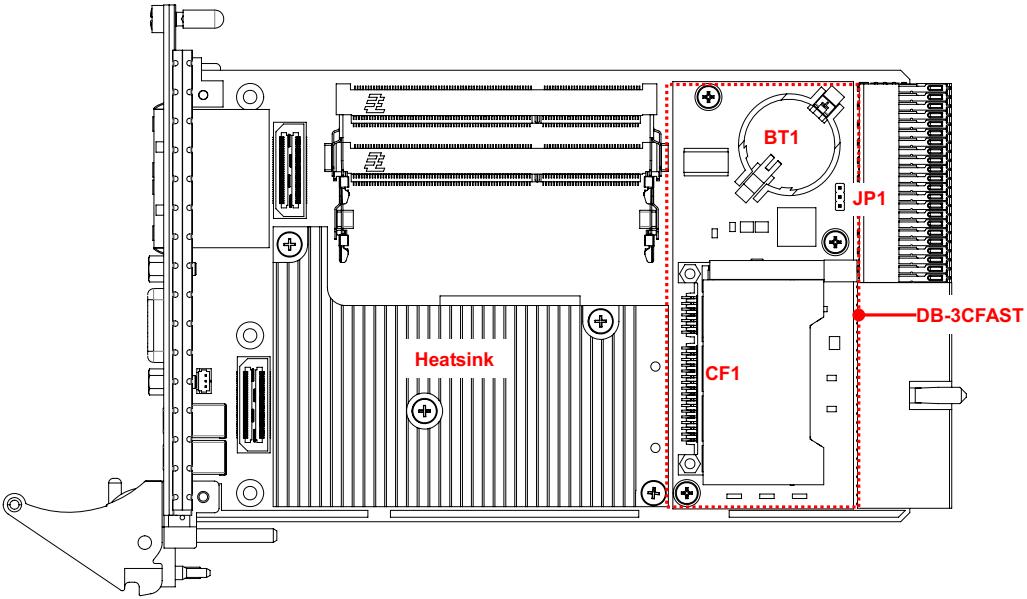


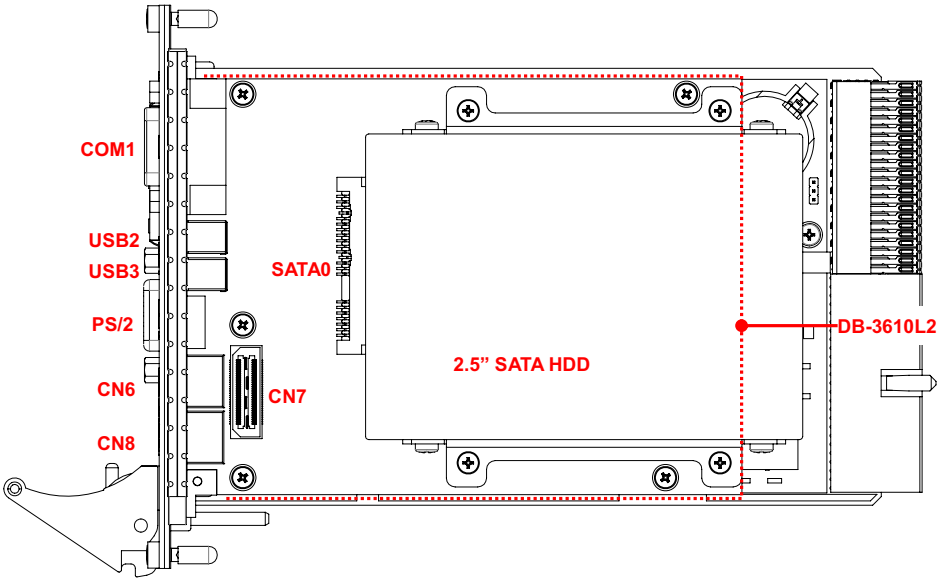
Figure 4-2: cPCI-3970 Blade Assembly Layout

BT1	Battery	**CF1**	CF or CFast socket
JP1	Clear CMOS Jumper	**J2**	cPCI J2 (UHM/HM)

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4.3 cPCI-3970D Blade Assembly Layout

The dual-slot width cPCI-3970D Blade is comprised of the cPCI-3970 single-slot main board and the DB-3610L2 riser card to expand I/O connectivity with PS/2, COM, 2x USB ports, Line-in, and Line-out ports .



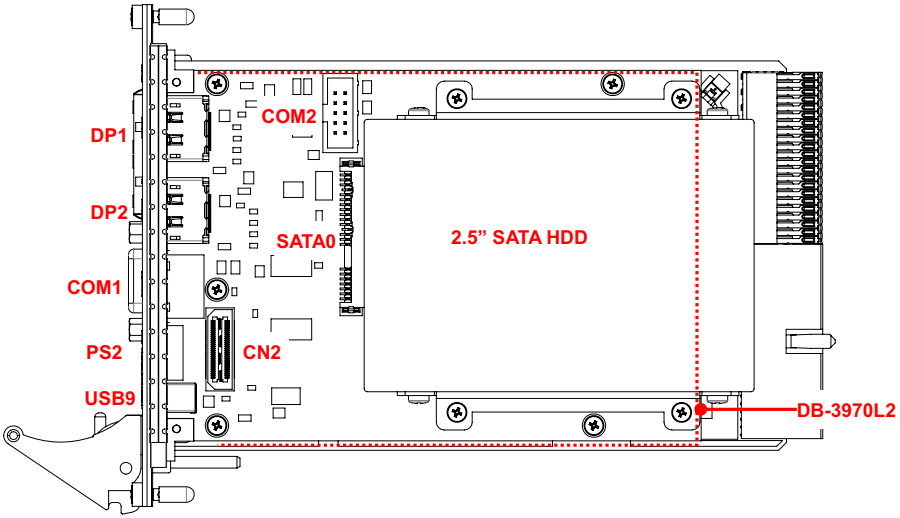
COM1	DB-9 COM port	**CN7**	DB-3UMC connector
USB2/3	USB connectors	**CN6**	Line-in port
PS2	PS/2 KB/Ms Combo port	**CN8**	Line-out port
SATA0	22-pin SATA connector		

Figure 4-3: cPCI-3970D Blade Assembly Layout

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4.4 cPCI-3970G Blade Assembly Layout

The dual-slot width cPCI-3970D Blade is comprised of the cPCI-3970 single-slot main board and the DB-3970L2 riser card to expand I/O connectivity with PS/2, COM, USB ports, and 2x DisplayPorts.



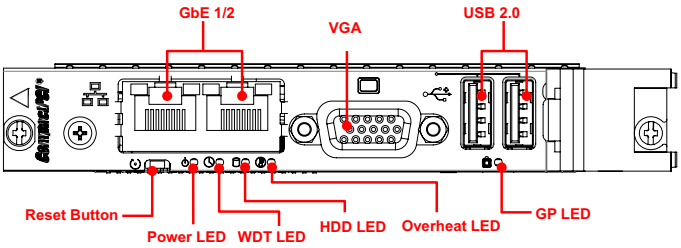
COM1	RJ-45 COM port	**CN2**	DB-3UMC connector
COM2	10-pin COM port	**DP1/2**	DisplayPort connectors
USB9	USB connector	**PS2**	PS/2 KB/MS Combo port
SATA0	22-pin SATA connector		

Figure 4-4: cPCI-3970G Blade Assembly Layout

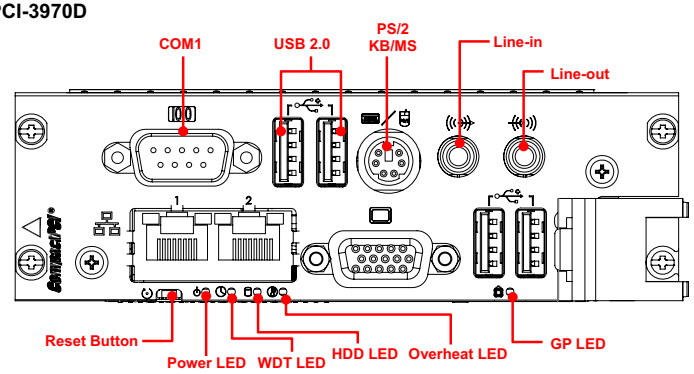
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4.5 cPCI-3970, cPCI-3970D, cPCI-3970G Faceplate

cPCI-3970



cPCI-3970D



cPCI-3970G

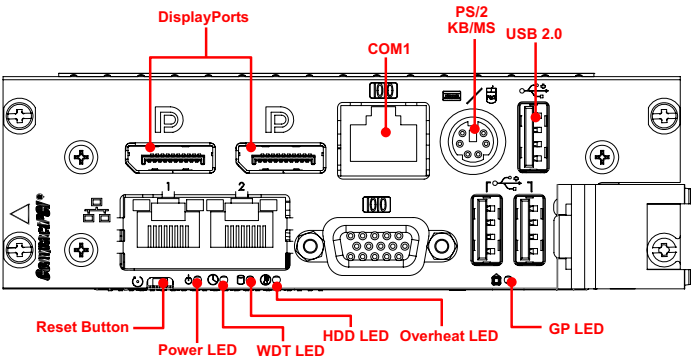


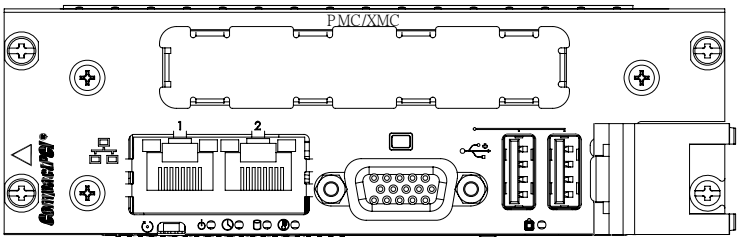
Figure 4-5: cPCI-3970, cPCI-3970D, cPCI-3970G Front Panel Layout

(See *cPCI-3970 Processor Blade Specifications*, *Note 1* on page 10 for LAN1/2 info.)

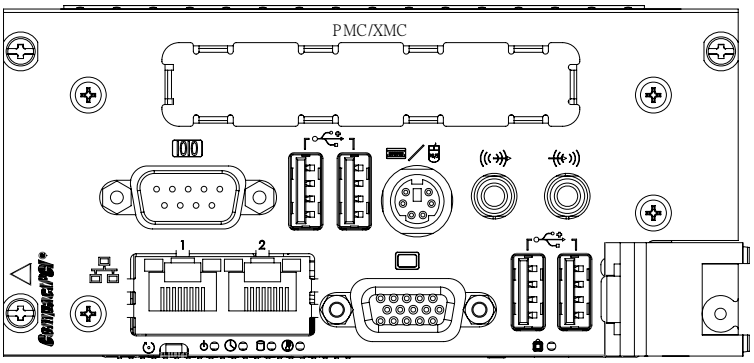
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4.6 cPCI-3970S, cPCI-3970P, cPCI-3970U Front Panel

cPCI-3970S



cPCI-3970P



cPCI-3970U

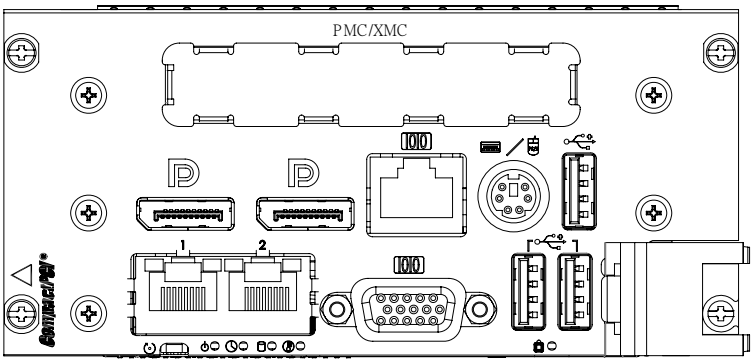
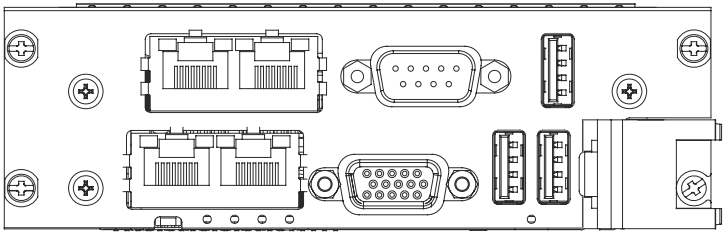


Figure 4-6: cPCI-3970S, cPCI-3970P, cPCI-3970U Front Panel Layout

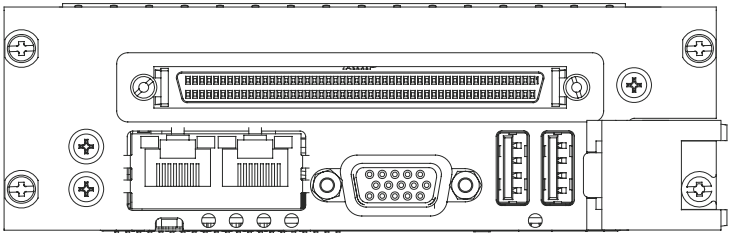
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4.7 cPCI-3970L, cPCI-3970M, cPCI-3970Q Front Panel

cPCI-3970L



cPCI-3970M



cPCI-3970Q

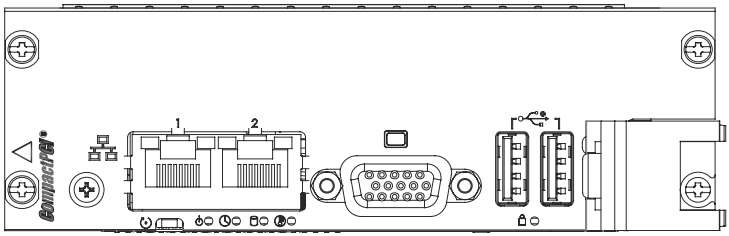


Figure 4-7: cPCI-3970L, cPCI-3970M, cPCI-3970Q Front Panel Layout

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System LEDs

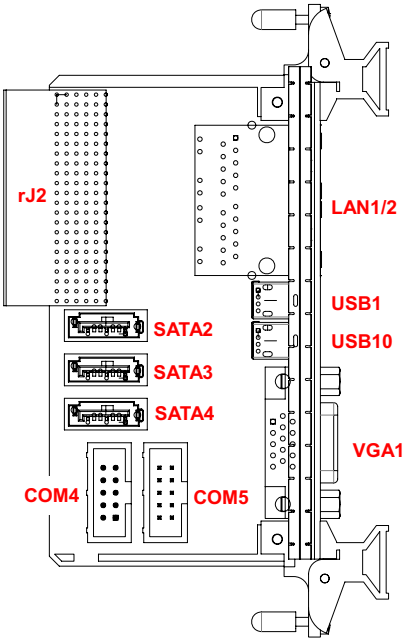
LED	Color	Condition	Indication
Power[1] 	Green/ Red	OFF	System is off
		Red	System Power ready (PWGD)
		Green	Post OK
WDT[1] 	Orange	OFF	No Watchdog event
		Blinking	Watchdog event alert
HDD 	Blue	OFF	No CF/CFast/SATA HDD activity
		Blinking	Data read/write in process for CF/CFast/ SATA HDD
Overheat[1] 	Red	OFF	CPU $T_{junction}$ temperature is under 100ºC
		ON	CPU $T_{junction}$ temperature exceeds 100ºC
GP (General Purpose)[1] 	Yellow	OFF	No activity
		ON/Blinking	Defined by user

Table 4-1: cPCI-3970 Front Panel System LED Descriptions

1. Power, WDT, Overheat, GP LEDs are connected to GPIO pins of IPMC.

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4.8 cPCI-R3P00 RTM Board Layout



COM5*	RS-232/422/485 port (converted from USB)	**LAN1/2**	Dual Ethernet ports
COM4	RS-232 port (Tx, Rx only)	**VGA1**	VGA port
SATA2/3/4	SATA ports	**USB1/10**	USB ports
rJ2	CompactPCI connector		

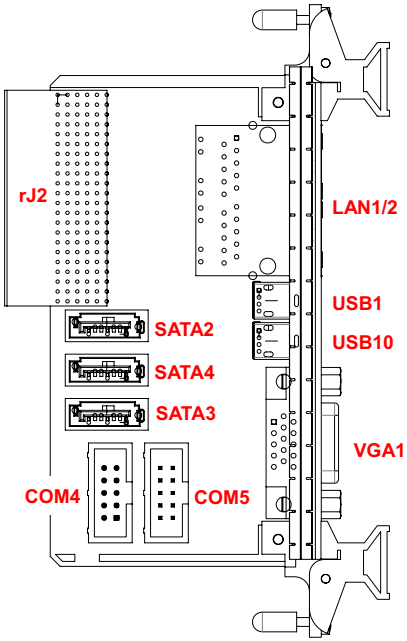
Figure 4-8: cPCI-R3P00 RTM Board Layout

NOTE:

*COM5 is incorrectly labeled COM3 on the A1 vers. PCB silk-screen.

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4.9 cPCI-R3P00T RTM Board Layout



COM5*	RS-232/422/485 port (converted from USB)	**LAN1/2**	Dual Ethernet ports
COM4	RS-232 port (Tx, Rx only)	**VGA1**	VGA port
SATA2/3/4	SATA ports	**USB1/10**	USB ports
rJ2	CompactPCI connector		

Figure 4-9: cPCI-R3P00 RTM Board Layout

NOTE:

*COM5 is incorrectly labeled COM3 on the A1 vers. PCB silk-screen.

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4.10 cPCI-R3P00(T) RTM Faceplate

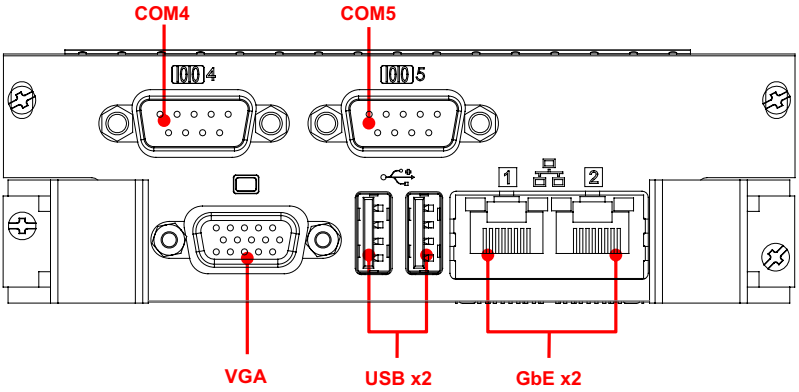


Figure 4-10: cPCI-R3P00(T) RTM Front Panel

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4.11 Connector Pin Assignments

USB Connectors

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

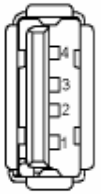


Table 4-2: USB Pin Definition

DB-15 VGA Connector

Signal Name	Pin #	Pin #	Signal Name
Red	1	2	Green
Blue	3	4	N.C.
GND	5	6	GND
GND	7	8	GND
+5V.	9	10	GND
N.C.	11	12	CRTDATA
HSYNC	13	14	VSYNC
CRTCLK	15		

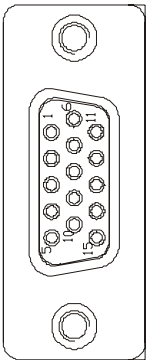


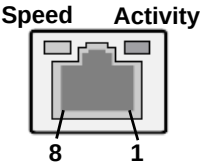
Table 4-3: VGA Pin Definition

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RJ-45 Gigabit Ethernet Connectors

Pin #	10BASE-T/ 100BASE-TX	1000BASE-T
1	TX+	LAN_TX0+
2	TX-	LAN_TX0-
3	RX+	LAN_TX1+
4	—	LAN_TX2+
5	—	LAN_TX2-
6	RX-	LAN_TX1-
7	—	LAN_TX3+
8	—	LAN_TX3-

Table 4-4: RJ-45 GbE Pin Definitions



Status		Speed LED (Green/Orange)	Activity LED (Yellow)
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	Orange	ON
	Active	Orange	Blinking

Table 4-5: LAN LED Status Definitions

NOTE: The cPCI-R3P00 RTM LAN LED signals are not passed through from the main board. LAN status will be displayed on the front faceplate LEDs.

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PS/2 Keyboard/Mouse Connector

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

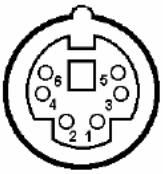


Table 4-6: PS/2 Keyboard/Mouse Pin Definition

cPCI-3970D/P Serial Ports

COM1 Connector (DB-9)

Pin #	RS-232	RS-422	RS-485(+)
1	DCD-L	TXD-	TXD-
2	RXD	TXD+	TXD+
3	TXD	RXD+	—
4	DTR-L	RXD-	—
5	GND	GND	GND
6	DSR-L	—	—
7	RTS-L	—	—
8	CTS-L	—	—
9	RI-L	—	—

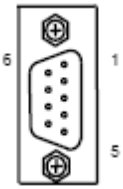
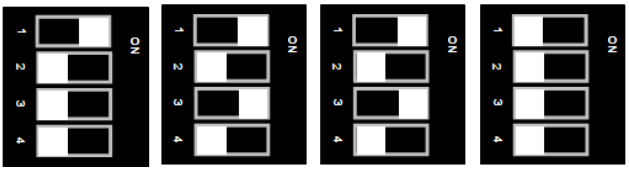


Table 4-7: cPCI-3970D/P COM1 (DB-9) Pin Definition

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COM1 Mode Selection Switches (SW1~SW4)

These switches set the cPCI-3970D/P COM1 to RS-232 full modem, RS-422, RS-485, or RS-485+ half-duplex mode. Switches SW1~SW4 are located on the top edge of the DB-3610L2 board. RS-232 full modem is set by default.



SW1 SW2 SW3 SW4

Mode	Pin	SW1	SW2	SW3	SW4
RS-232	1	ON	ON	ON	OFF
	2	OFF	OFF	OFF	OFF
	3	OFF	ON	ON	OFF
	4	OFF	OFF	OFF	OFF
RS-422	1	OFF	OFF	OFF	ON
	2	ON	ON	ON	OFF
	3	OFF	OFF	OFF	ON
	4	OFF	ON	ON	OFF
RS-485	1	OFF	OFF	OFF	ON
	2	OFF	ON	ON	OFF
	3	ON	OFF	OFF	ON
	4	OFF	ON	ON	OFF
RS-485+	1	OFF	OFF	OFF	OFF
	2	OFF	ON	ON	ON
	3	ON	OFF	OFF	OFF
	4	OFF	ON	ON	ON

Table 4-8: cPCI-3970D/P COM1 Mode Selection Switch Settings

NOTE:

The COM mode setting for cPCI-3970D/P models must be set using the SW1~SW4 DIP switches above. The *cPCI-3970G COM1/2 Output* BIOS setting is only used for cPCI-3970G/U models.

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cPCI-3970G/U Serial Ports

NOTE:

The COM mode setting for cPCI-3970G/U models are set in the BIOS: *"cPCI-3970G COM1/ 2 Output" on page 122*.

COM1 Connector (RJ-45)

Pin #	RS-232	RS-422	RS-485
1	DCD-L	—	—
2	RTS-L	TXD+	TXD+
3	DSR-L	—	—
4	TXD	TXD-	TXD-
5	RXD	RXD-	—
6	Ground	—	—
7	CTS-L	RXD+	—
8	DTR-L	—	—
9	RI-L	—	—

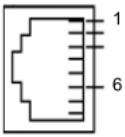


Table 4-9: cPCI-3970G/U COM1 (RJ-45) Pin Definition

COM1 Connector with DB-9 Adapter

An RJ-45 to DB-9 adapter cable is provided to breakout the COM1 signals.

Pin #	RS-232	RS-422	RS-485
1	DCD-L	—	—
2	RXD	RXD-	—
3	TXD	TXD-	TXD-
4	DSR-L	—	—
5	Ground	—	—
6	DSR-L	—	—
7	RTS-L	TXD+	TXD+
8	CTS-L	RXD+	—
9	—	—	—

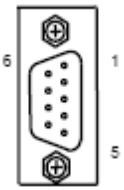


Table 4-10: cPCI-3970G/U COM1 (DB-9 adapter) Pin Definition

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NOTE:

The cPCI-3970G/U COM1 RS-422/485 pin definitions are different from the common DB-9 pin definitions. An RS-422/485 DB-9 male-female adapter dongle is provided to allow compatibility with common RS-422/485 pin definitions.

RS-422/485 Adapter Dongle

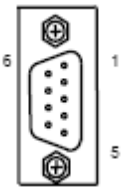
A DB-9 male-female adapter dongle is provided to allow compatibility with common RS-422/485 pin definitions

DB-9 (Female) Signal Name	Pin #	DB-9 (Male) Signal Name
NC	1	TXD-
RXD-	2	TXD+
TXD-	3	RXD+
NC	4	RXD-
NC	5	NC
NC	6	NC
TXD+	7	NC
RXD+	8	NC
NC	9	NC

Table 4-11: RS-422/485 Adapter Dongle Pin Definition

COM1 with RS-422/485 Dongle (DB-9)

Pin #	RS-422	RS-485
1	TXD-	TXD-
2	TXD+	TXD+
3	RXD+	—
4	RXD-	—
5	—	—
6	—	—
7	—	—
8	—	—
9	—	—



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Table 4-12: cPCI-3970D/P COM1 with RS-422/485 Dongle Pin Definition

COM2 Pin Header

Pin #	RS-232	RS-422	RS-485
1	DCD-L	—	—
2	DSR-L	—	—
3	RXD	RXD-	—
4	RTS-L	TXD+	TXD+
5	TXD	TXD-	TXD-
6	CTS-L	RXD+	—
7	DTR-L	—	—
8	RI-L	—	—
9	Ground	—	—
10	NC	—	—

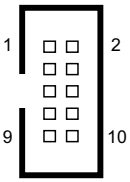


Table 4-13: cPCI-3970G/U COM2 Pin Header Definition

cPCI-R3P00(T) RTM Serial Ports

COM4 Connector (DB-9))

Pin #	RS-232
1	—
2	RXD
3	TXD
4	—
5	GND
6	—
7	—
8	—
9	—

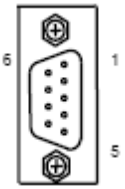


Table 4-14: cPCI-R3P00 RTM COM4 Pin Definition

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COM5 Connector (DB-9)

NOTE:

The cPCI-R3P00(T) RTM COM5 RS-422/485 pin definitions are different from the common DB-9 pin definitions. An RS-422/485 DB-9 male-female adapter dongle is provided to allow compatibility with common RS-422/485 pin definitions. See

Pin #	RS-232	RS-422	RS-485
1	DCD-L	—	—
2	RXD	RXD-	—
3	TXD	TXD-	TXD-
4	DTR-L	—	—
5	GND	—	—
6	DSR-L	—	—
7	RTS-L	TXD+	TXD+
8	CTS-L	RXD+	—
9	RI-L	—	—

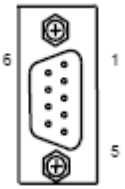


Table 4-15: cPCI-R3P00(T) RTM COM5 Pin Definition

COM5 with RS-422/485 Dongle (DB-9)

Pin #	RS-422	RS-485
1	TXD-	TXD-
2	TXD+	TXD+
3	RXD+	—
4	RXD-	—
5	—	—
6	—	—
7	—	—
8	—	—
9	—	—

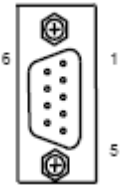


Table 4-16: cPCI-R3P00(T) RTM COM5 with RS-422/485 Dongle Pin Def'n

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DisplayPort Connectors

Pin #	Signal	Pin #	Signal
1	CN_DP0_P	2	Ground
3	CN_DP0_N	4	CN_DP1_P
5	Ground	6	CN_DP1_N
7	CN_DP2_P	8	Ground
9	CN_DP2_N	10	CN_DP3_P
11	Ground	12	CN_DP3_N
13	CN_CAD-L	14	CN_CEC
15	CN_AUX_P	16	Ground
17	CN_AUX_N	18	DDP_HPD
19	Ground	20	P3V3

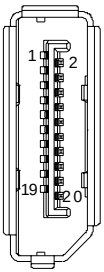


Table 4-17: DisplayPort Pin Definition

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cPCI-3970M 100-pin I/O Connector (CN4)

Pin #	Signal	Pin #	Signal
1	GND	2	USB9_CN-N
3	USB9_CN-P	4	GND
5	USB1_CN-N	6	USB1_CN-P
7	GND	8	GND
9	TMDS_I2C_DATA	10	TMDS_I2C_CLK
11	GND	12	TMDSB_DATA2B
13	TMDSB_DATA2	14	GND
15	TMDSB_DATA1B	16	TMDSB_DATA1
17	GND	18	TMDSB_DATA0B
19	TMDSB_DATA0	20	GND
21	TMDSB_CLKB	22	TMDSB_CLK
23	GND	24	P5V_DVI1
25	TMDSB_HPD	26	GND
27	NC	28	NC
29	GND	30	TMDS_I2C_DATA
31	TMDS_I2C_CLK	32	GND
33	TMDSB_DATA2B	34	TMDSB_DATA2
35	GND	36	TMDSB_DATA1B
37	TMDSB_DATA1	38	GND
39	TMDSB_DATA0B	40	TMDSB_DATA0
41	GND	42	TMDSB_CLKB
43	TMDSB_CLK	44	GND
45	P5V_DVI2	46	TMDSB_HPD
47	GND	48	NC
49	NC	50	GND
51	P5V_USB_1_9	52	P5V_USB_1_9
53	P5V_USB_1_9	54	P5V_USB_1_9
55	GND	56	GND
57	GND	58	P5V_KBMS
59	MSCLK_CN	60	MSDATA_CN

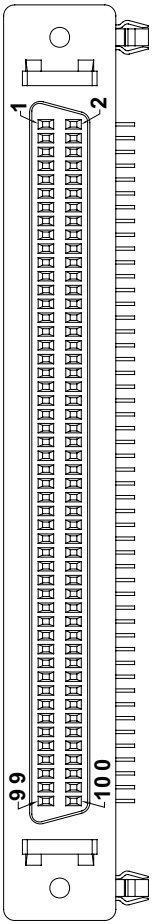


Table 4-18: cPCI-3970M 100-pin I/O Connector Pin Definition

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Pin #	Signal	Pin #	Signal
61	KBCLK_CN	62	KBDATA_CN
63	GND	64	GND
65	COM1_RXD_CN	66	COM1_CTS-L_CN
67	GND	68	COM1_TXD_CN
69	COM1_RTS-L_CN	70	GND
71	COM1_DTR-L_CN	72	COM1_DSR-L_CN
73	COM1_DCD-L_CN	74	GND
75	COM2_RXD_CN	76	COM2_CTS-L_CN
77	GND	78	COM2_TXD_CN
79	COM2_RTS-L_CN	80	GND
81	COM2_DTR-L_CN	82	COM2_DSR-L_CN
83	COM2_DCD-L_CN	84	AGND_AU
85	NC	86	NC
87	NC	88	NC
89	NC	90	NC
91	NC	92	AGND_AU
93	L_IN_R	94	L_IN_L
95	L_IN_JD	96	AGND_AU
97	HP_R	98	HP_L
99	HP_JD	100	AGND_AU

Table 4-18: cPCI-3970M 100-pin I/O Connector Pin Definition

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Serial ATA Connectors on RTM (CN4-R, CN5-R)

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



Table 4-19: Serial ATA Connector on RTM Pin Definition

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Serial ATA Connector on DB-3610L2/3970L2

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	NC
P12	GND
P13~P15	NC

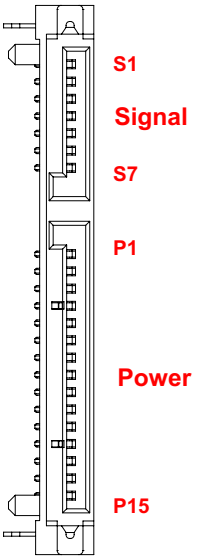


Table 4-20: Serial ATA Connector on DB-3610L2/3970L2 Pin Definition

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CompactFlash Socket (on DB-3CF)

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

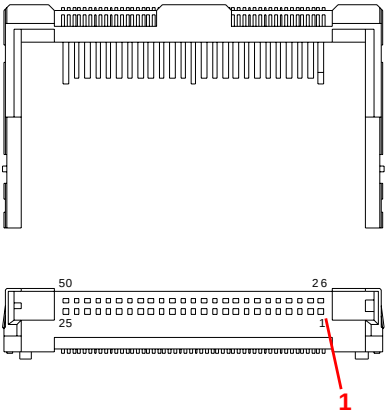


Table 4-21: CompactFlash Socket Pin Definition

CFast Socket (on DB-3CFAST)

Pin #	Signal Name
Ground	S1
SATA_TX-P	S2
SATA_TX-N	S3
Ground	S4
SATA_RX-N	S5
SATA_RX-P	S6
Ground	S7
CFast_CDI	P1
Ground	P2
NC	P3
NC	P4
NC	P5
NC	P6
Ground	P7
CFast_LED1	P8
CFast_LED2	P9
NC	P10
NC	P11
NC	P12
P3V3	P13
P3V3	P14
Ground	P15
Ground	P16
CFast_CDO	P17

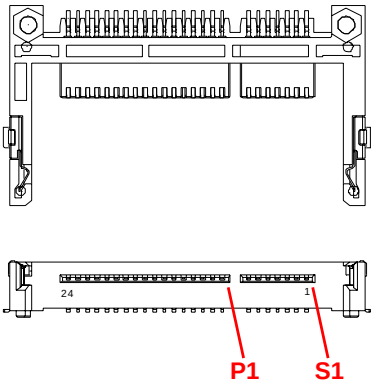


Table 4-22: CFast Socket Pin Definition

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

DB-3610L2 Connector (CN1)

Signal Name	Pin #	Pin #	Signal Name
USB2-N	1	2	-12V
USB2-P	3	4	+12
GND	5	6	GND
USB3-N	7	8	HDA_SDIN0
USB3-P	9	10	HDA_R_SDOUT
GND	11	12	GND
SATA_ICH_RX-N0	13	14	HDA_R_SYNC
SATA_ICH_RX-P0	15	16	HDA_R_BIT_CLK
GND	17	18	GND
SATA_TX-P0	19	20	CK_L2_PCIE1-P
SATA_TX-N0	21	22	CK_L2_PCIE1-N
GND	23	24	GND
PCIE_TXN5	25	26	CK_L2_PCIE2-P
PCIE_TXP5	27	28	CK_L2_PCIE2-N
GND	29	30	GND
PCIE_RXN5	31	32	HDA_R_RST-L
PCIE_RXP5	33	34	SPKR
GND	35	36	L2_PCIE_RST-L
PCIE_RXN4	37	38	NC
PCIE_RXP4	39	40	USB_2_3_OC-L
GND	41	42	COM1_DCD-L
PCIE_TXN4	43	44	COM1_RI-L
PCIE_TXP4	45	46	COM1_CTS-L
GND	47	48	COM1_DTR-L
MSCLK	49	50	COM1_RTS-L
MSDATA	51	52	COM1_DSR-L
KBCLK	53	54	COM1_SOUT
KBCDATA	55	56	COM1_SIN
P5V	57	58	+3.3V
P5V	59	60	+3.3V

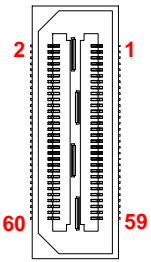


Table 4-23: DB-3610L2 Connector Pin Definition

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

DB-3CFAST Connector (CN2)

Signal Name	Pin #	Pin #	Signal Name
PCH_SPKR	1	2	CLK33_TPM
SIO_SPKR	3	4	LPC_FRAME-L
GND	5	6	TPM_RST-L
CN_VCC_RTC	7	8	LPC_AD3
GND	9	10	LPC_AD2
NC	11	12	LPC_AD1
NC	13	14	LPC_AD0
NC	15	16	TPM_LPCPD
NC	17	18	PCH_SERIRQ
NC	19	20	TPM_CLKRUN
NC	21	22	TPM_GPIO
NC	23	24	NC
NC	25	26	NC
NC	27	28	NC
NC	29	30	NC
NC	31	32	NC
NC	33	34	NC
NC	35	36	NC
GND	37	38	NC
SATA_PCH_RX-N0	39	40	NC
SATA_PCH_RX-P0	41	42	NC
GND	43	44	NC
SATA_PCH_TX-N0	45	46	NC
SATA_PCH_TX-P0	47	48	NC
GND	49	50	NC
CFast_CDI	51	52	NC
CFast_CDO	53	54	NC
GND	55	56	NC
P5V	57	58	P3V3
P5V	59	60	P3V3

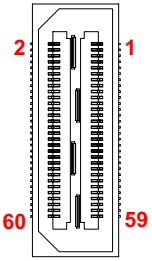


Table 4-24: DB-3CFAST Connector Pin Definition

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

DB-3970L2 Connector (CN3)

Signal Name	Pin #	Pin #	Signal Name
NC	1	2	RS232_COM2_SEL-L
NC	3	4	COM2_DCD-L
NC	5	6	COM2_RI-L
NC	7	8	COM2_CTS-L
NC	9	10	COM2_DTR-L
NC	11	12	COM2_RTS-L
NC	13	14	COM2_DSR-L
NC	15	16	COM2_SOUT
NC	17	18	COM2_SIN
NC	19	20	NC
NC	21	22	NC
GND	23	24	GND
PCH_DDPD_AUXN	25	26	PCH_DDPC_AUXN
PCH_DDPD_AUXP	27	28	PCH_DDPC_AUXP
GND	29	30	GND
PCH_DDPD_0N	31	32	PCH_DDPC_0N
PCH_DDPD_0P	33	34	PCH_DDPC_0P
GND	35	36	GND
PCH_DDPD_1N	37	38	PCH_DDPC_1N
PCH_DDPD_1P	39	40	PCH_DDPC_1P
GND	41	42	GND
PCH_DDPD_2N	43	44	PCH_DDPC_2N
PCH_DDPD_2P	45	46	PCH_DDPC_2P
GND	47	48	GND
PCH_DDPD_3N	49	50	PCH_DDPC_3N
PCH_DDPD_3P	51	52	PCH_DDPC_3P
GND	53	54	GND
DDPD_CTRLCLK	55	56	DDPC_CTRLCLK
DDPD_CTRLDATA	57	58	DDPC_CTRLDATA
DDPD_HPD	59	60	DDPC_HPD

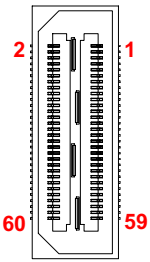


Table 4-25: DB-3970L2 Connector Pin Definition

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

DB-3UMC Connector on DB-3610L2/3970L2

Signal Name	Pin #	Pin #	Signal Name
NC	1	2	-12V
NC	3	4	+12V
GND	5	6	GND
NC	7	8	NC
NC	9	10	NC
GND	11	12	GND
NC	13	14	NC
NC	15	16	NC
GND	17	18	GND
NC	19	20	CK_PCIE1_P
NC	21	22	CK_PCIE1_N
GND	23	24	GND
PCIE_TXN2	25	26	CK_PCIE2_P
PCIE_TXP2	27	28	CK_PCIE2_N
GND	29	30	GND
PCIE_R_RXN2	31	32	NC
PCIE_R_RXP2	33	34	NC
GND	35	36	PCIE_RST#
PCIE_R_RXN1	37	38	NC
PCIE_R_RXP1	39	40	NC
GND	41	42	NC
PCIE_TXN4	43	44	NC
PCIE_TXP4	45	46	NC
GND	47	48	NC
NC	49	50	NC
NC	51	52	NC
NC	53	54	NC
NC	55	56	NC
+5V	57	58	+3.3V
+5V	59	60	+3.3V

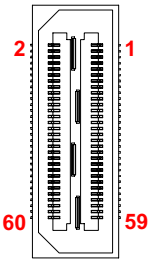


Table 4-26: DB-3UMC Connector Pin Definition

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

PMC Connector on DB-3UMC (JN1/2)

Pin#	JN1 Signal	JN2 Signal
1	PMC_TCK	P12V
2	N12V	PMC_TRST-L
3	GND	PMC_TMS
4	PCIX_INTA-L	NC (PMC_TDO)
5	PCIX_INTB-L	PMC_TDI
6	PCIX_INTC-L	GND
7	PMC_MOD-L1	GND
8	P5V	NC
9	PCIX_INTD-L	NC
10	NC	NC
11	GND	PMC_MOD-L2
12	P3V3_PMCAUX	P3V3
13	CLK66_PCIX_PMC	PMC_RST-L
14	GND	PMC_MOD-L3
15	GND	P3V3
16	PCIX_GNT-L0	PMC_MOD-L4
17	PCIX_REQ-L0	PMC_PME-L
18	P5V	GND
19	PMC_VIO	PCIX_AD30
20	PCIX_AD31	PCIX_AD29
21	PCIX_AD28	GND
22	PCIX_AD27	PCIX_AD26
23	PCIX_AD25	PCIX_AD24
24	GND	PCIX_AD23
25	GND	PMC_IDSEL
26	PCIX_CBE-L3	PCIX_AD23
27	PCIX_AD22	P3V3
28	PCIX_AD21	PCIX_AD20
29	PCIX_AD19	PCIX_AD18
30	P5V	GND
31	PCIX_FRAME-L	PCIX_AD16
32	PCIX_AD17	PCIX_CBE-L2

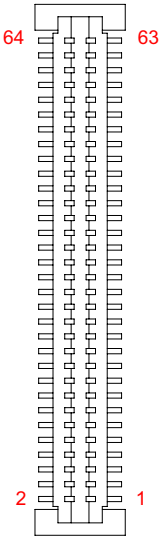


Table 4-27: PMC Connector Pin Definitions

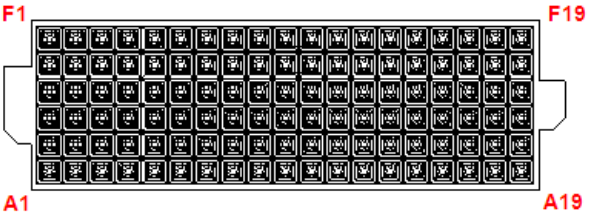
LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Pin#	JN1 Signal	JN2 Signal
33	PCIX_FRAME-L	GND
34	GND	NC
35	GND	PCIX_TRDY-L
36	PCIX_IRDY-L	P3V3
37	PCIX_DEVSEL-L	GND
38	P5V	PCIX_STOP-L
39	PCIX_PCIXCAP	PCIX_PERR-L
40	PCIX_LOCK-L	GND
41	NC	P3V3
42	NC	PCIX_SERR-L
43	PCIX_PAR	PCIX_CBE-L1
44	GND	GND
45	PMC_VIO	PCIX_AD14
46	PCIX_AD15	PCIX_AD13
47	PCIX_AD12	PCIX_M66EN
48	PCIX_AD11	PCIX_AD10
49	PCIX_AD9	PCIX_AD8
50	P5V	P3V3
51	GND	PCIX_AD7
52	PCIX_CBE-L0	NC
53	PCIX_AD6	P3V3
54	PCIX_AD5	NC
55	PCIX_AD4	NC
56	GND	GND
57	PMC_VIO	NC
58	PCIX_AD3	NC
59	PCIX_AD2	GND
60	PCIX_AD1	NC
61	PCIX_AD0	PCIX_ACK64-L
62	P5V	P3V3
63	GND	GND
64	PCIX_REQ64-L	NC

Table 4-27: PMC Connector Pin Definitions (cont'd)

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XMC Connector on DB-3UMC (JN3)



Pin#	A	B	C	D	E	F
1	RXP	RXN	3.3V	NC	NC	VPWR
2	GND	GND	Not used	GND	GND	PCIE_RST-L
3	NC	NC	3.3V	NC	NC	VPWR
4	GND	GND	Not used	GND	GND	Not used
5	NC	NC	3.3V	NC	NC	VPWR
6	GND	GND	Not used	GND	GND	+12V
7	NC	NC	3.3V	NC	NC	VPWR
8	GND	GND	Not used	GND	GND	-12V
9	NC	NC	Not used	NC	NC	VPWR
10	GND	GND	Not used	GND	GND	GA0
11	TXP	TXN	Not used	NC	NC	VPWR
12	GND	GND	GA1	GND	GND	Not used
13	NC	NC	3.3V	NC	NC	VPWR
14	GND	GND	GA2	GND	GND	Not used
15	NC	NC	Not used	NC	NC	VPWR
16	GND	GND	Not used	GND	GND	Not used
17	NC	NC	Not used	NC	NC	NC
18	GND	GND	Not used	GND	GND	Not used
19	CK-P	CK-N	Not used	Not used	Not used	Not used

Table 4-28: XMC Connector Pin Definition

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CompactPCI J1 Connector

Pin	Z	A	B	C	D	E	F
25	GND	+5V	REQ64#	ENUM#	+3.3V	+5V	GND
24	GND	CPCI_AD1	+5V	CPCI_VIO	CPCI_AD0	ACK64#	GND
23	GND	P3V3	CPCI_AD4	CPCI_AD3	P5V	CPCI_AD2	GND
22	GND	CPCI_AD7	GND	P3V3	CPCI_AD6	CPCI_AD5	GND
21	GND	P3V3	CPCI_AD9	CPCI_AD8	CPCI_M66EN	CPCI_CBE-L0	GND
20	GND	CPCI_AD12	GND	VIO	CPCI_AD11	CPCI_AD10	GND
19	GND	P3V3	CPCI_AD15	CPCI_AD14	GND	CPCI_AD13	GND
18	GND	CPCI_SERR-L	GND	P3V3	CPCI_PAR	CPCI_CBE-L1	GND
17	GND	P3V3	NC	NC	GND	CPCI_PERR-L	GND
16	GND	CPCI_DEVSEL-L	CPCI_PCIXCAP	VIO	CPCI_STOP-L	CPCI_LOCK-L	GND
15	GND	P3V3	CPCI_FRAME-L	CPCI_IRDY-L	NC	CPCI_TRDY-L	GND
12-14	Key						
11	GND	CPCI_AD18	CPCI_AD17	CPCI_AD16	GND	CPCI_CBE-L2	GND
10	GND	CPCI_AD21	GND	P3V3	CPCI_AD20	CPCI_AD19	GND
9	GND	CPCI_CBE-L3	NC	CPCI_AD23	GND	CPCI_AD22	GND
8	GND	CPCI_AD26	GND	VIO	CPCI_AD25	CPCI_AD24	GND
7	GND	CPCI_AD30	CPCI_AD29	CPCI_AD28	GND	CPCI_AD27	GND
6	GND	CPCI_REQ-L0	GND	P3V3	CPCI_CLK0	CPCI_AD31	GND
5	GND	NC	NC	CPCI_RESET-L	GND	CPCI_GNT-L0	GND
4	GND	NC	CPCI_HEALTHY-L	VIO	NC	NC	GND
3	GND	CPCI_IRQA-L	CPCI_IRQB-L	CPCI_IRQC-L	P5V	CPCI_IRQD-L	GND
2	GND	cPCI_TCK-L	P5V	cPCI_TMS-L	NC	cPCI_TDI-L	GND
1	GND	P5V	NC	cPCI_TRST-L	P12V	P5V	GND

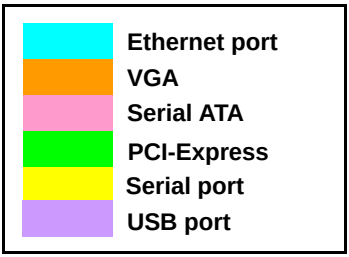
Table 4-29: CompactPCI J1 Connector Pin Definition

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CompactPCI J2 Connector

Pin	Z	A	B	C	D	E	F
22	GND	GA4	GA3	GA2	GA1	GA0	GND
21	GND	CLK6	GND	2_ETH_B+	1_ETH_D+	1_ETH_B+	GND
20	GND	CLK5	GND	2_ETH_B-	1_ETH_D-	1_ETH_B-	GND
19	GND	GND	GND	2_ETH_A+	1_ETH_C+	1_ETH_A+	GND
18	GND	2_ETH_D+	2_ETH_C+	2_ETH_A-	1_ETH_C-	1_ETH_A-	GND
17	GND	2_ETH_D-	2_ETH_C-	PRST#	REQ6#	GNT6#	GND
16	GND	4PE_CLK-	2_PE_CLK+	DEG#	GND	+5V	GND
15	GND	4PE_CLK+	2_PE_CLK-	FAL#	REQ5#	GNT5#	GND
14	GND	3PE_CLK+	1_PE_CLK+	4_PE_CLKE#	DDC_DAT	+5V	GND
13	GND	3PE_CLK-	1_PE_CLK-	3_PE_CLKE#	VGA_HSY	DDC_CLK	GND
12	GND	4PE_RX00+	1_PE_CLKE#	2_PE_CLKE#	VGA_VSY	2_SATA_RX+	GND
11	GND	4PE_RX00-	4PE_TX00+	COM4_TX	2_SATA_TX+	2_SATA_RX-	GND
10	GND	3PE_RX00+	4PE_TX00-	COM4_RX	2_SATA_TX-	3_SATA_RX+	GND
9	GND	3PE_RX00-	3PE_TX00+	0_USB+	3_SATA_TX+	3_SATA_RX-	GND
8	GND	2PE_RX00+	3PE_TX00-	0_USB-	3_SATA_TX-	4_SATA_RX+	GND
7	GND	2PE_RX00-	2PE_TX00+	1_USB+	4_SATA_TX+	4_SATA_RX-	GND
6	GND	1PE_RX00+	2PE_TX00-	1_USB-	4_SATA_TX-	RGB_RED	GND
5	GND	1PE_RX00-	1PE_TX00+	10_USB+	RS232_COM5_SEL-L	RGB_GREEN	GND
4	GND	VIO	1PE_TX00-	10_USB-	USB1_10_OC	RGB_BLUE	GND
3	GND	CLK4	GND	GNT3#	REQ4#	GNT4#	GND
2	GND	CLK2	CLK3	SYSEN#	GNT2#	REQ3#	GND
1	GND	CLK1	GND	REQ1#	GNT1#	REQ2#	GND

Table 4-30: CompactPCI J2 Connector Pin Definition

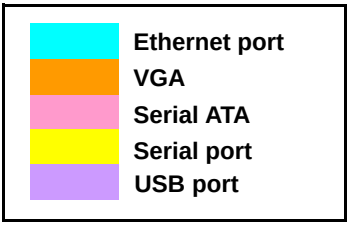


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cPCI-R3P00 rJ2 Connector

Pin	Z	A	B	C	D	E	F
22	GND	NC	NC	NC	NC	NC	GND
21	GND	NC	GND	2_ETH_B+	1_ETH_D+	1_ETH_B+	GND
20	GND	NC	GND	2_ETH_B-	1_ETH_D-	1_ETH_B-	GND
19	GND	GND	GND	2_ETH_A+	1_ETH_C+	1_ETH_A+	GND
18	GND	2_ETH_D+	2_ETH_C+	2_ETH_A-	1_ETH_C-	1_ETH_A-	GND
17	GND	2_ETH_D-	2_ETH_C-	NC	NC	NC	GND
16	GND	NC	NC	NC	GND	+5V	GND
15	GND	NC	NC	NC	NC	NC	GND
14	GND	NC	NC	NC	DDC_DAT	+5V	GND
13	GND	NC	NC	NC	VGA_HSY	DDC_CLK	GND
12	GND	NC	NC	NC	VGA_VSY	2_SATA_RX+	GND
11	GND	NC	NC	COM4_TX	2_SATA_TX+	2_SATA_RX-	GND
10	GND	NC	NC	COM4_RX	2_SATA_TX-	3_SATA_RX+	GND
9	GND	NC	NC	0_USB+	3_SATA_TX+	3_SATA_RX-	GND
8	GND	NC	NC	0_USB-	3_SATA_TX-	4_SATA_RX+	GND
7	GND	NC	NC	1_USB+	4_SATA_TX+	4_SATA_RX-	GND
6	GND	NC	NC	1_USB-	4_SATA_TX-	RGB_RED	GND
5	GND	NC	NC	10_USB+	RS232_COM5_SEL-L	RGB_GREEN	GND
4	GND	NC	NC	10_USB-	USB1_10_OC	RGB_BLUE	GND
3	GND	NC	GND	NC	NC	NC	GND
2	GND	NC	NC	NC	NC	NC	GND
1	GND	NC	GND	NC	NC	NC	GND

Table 4-31: cPCI-R3P00 rJ2 Connector Pin Definition

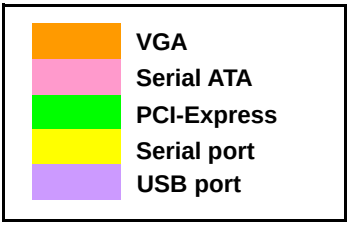


LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

cPCI-R3P00T rJ2 Connector

Pin	Z	A	B	C	D	E	F
22	GND	NC	NC	NC	NC	NC	GND
21	GND	NC	GND	NC	NC	NC	GND
20	GND	NC	GND	NC	NC	NC	GND
19	GND	GND	GND	NC	NC	NC	GND
18	GND	NC	NC	NC	NC	NC	GND
17	GND	NC	NC	NC	NC	NC	GND
16	GND	4PE_CLK-	2_PE_CLK+	NC	GND	+5V	GND
15	GND	4PE_CLK+	2_PE_CLK-	NC	NC	NC	GND
14	GND	3PE_CLK+	1_PE_CLK+	4_PE_CLKE#	DDC_DAT	+5V	GND
13	GND	3PE_CLK-	1_PE_CLK-	3_PE_CLKE#	VGA_HSY	DDC_CLK	GND
12	GND	4PE_RX00+	1_PE_CLKE#	2_PE_CLKE#	VGA_VSY	2_SATA_RX+	GND
11	GND	4PE_RX00-	4PE_TX00+	COM4_TX	2_SATA_TX+	2_SATA_RX-	GND
10	GND	3PE_RX00+	4PE_TX00-	COM4_RX	2_SATA_TX-	3_SATA_RX+	GND
9	GND	3PE_RX00-	3PE_TX00+	0_USB+	3_SATA_TX+	3_SATA_RX-	GND
8	GND	2PE_RX00+	3PE_TX00-	0_USB-	3_SATA_TX-	4_SATA_RX+	GND
7	GND	2PE_RX00-	2PE_TX00+	1_USB+	4_SATA_TX+	4_SATA_RX-	GND
6	GND	1PE_RX00+	2PE_TX00-	1_USB-	4_SATA_TX-	RGB_RED	GND
5	GND	1PE_RX00-	1PE_TX00+	10_USB+	RS232_COM5_SEL-L	RGB_GREEN	GND
4	GND	NC	1PE_TX00-	10_USB-	USB1_10_OC	RGB_BLUE	GND
3	GND	NC	GND	NC	NC	NC	GND
2	GND	NC	NC	NC	NC	NC	GND
1	GND	NC	GND	NC	NC	NC	GND

Table 4-32: cPCI-R3P00T rJ2 Connector Pin Definition



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4.12 Jumper Settings

Load BIOS Default Jumper (JP1)

The cPCI-3970 Load BIOS Default Jumper is located on the DB-3CF/CFast daughter board. To load the default BIOS settings, short pins 2-3 on JP1, then reinstall the jumper cap to pins 1-2.

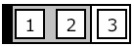
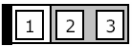
BIOS Setting	Connection	JP1
Normal	1 – 2	
Load default BIOS	2 – 3	

Table 4-33: Load BIOS Default Jumper Settings

XMC VPWR Select Jumper on DB-3UMC (JPX1)

This jumper is located on the DB-3UMC board near JN1/2 and selects the XMC VPWR setting. 5V is set by default.

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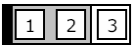
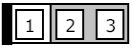
Mode	Connection	JPX1
+5V (Default)	1 – 2	
+12V	2 – 3	

Table 4-34: XMC VPWR Select Jumper Settings

PMC V(I/O) Select Jumper on DB-3UMC (JPX2)

This jumper is located on the DB-3UMC board near JN1/2 and selects the PMC V(I/O) setting. 3.3V is set by default.

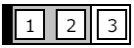
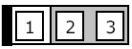
Mode	Connection	JPX2
+5V	1 – 2	
+3.3V (Default)	2 – 3	

Table 4-35: PMC V(I/O) Select Jumper Settings

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5 Getting Started

This chapter describes the following installation procedures for the cPCI-3970 and rear transition module:

- CPU and Heatsink
- Memory modules
- 2.5" SATA storage drive
- CompactFlash card
- CFast card
- PCI Mezzanine Card
- Processor blade installation to chassis
- RTM installation to chassis

5.1 CPU and Heatsink

The cPCI-3970 Series come with CPU and heatsink pre-installed. Removal of heatsink/CPU by users is not recommended. Please contact your ADLINK service representative for assistance.

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5.2 Memory Module Installation

The cPCI-3970 Series supports DDR3-1066/1333 ECC memory modules via two stacked-type SO-CDIMM sockets. The SO-CDIMM modules have a 204-pin footprint and are notched to facilitate correct installation in the SO-DIMM sockets. At least one memory module will be pre-installed in the lower socket as shown below.



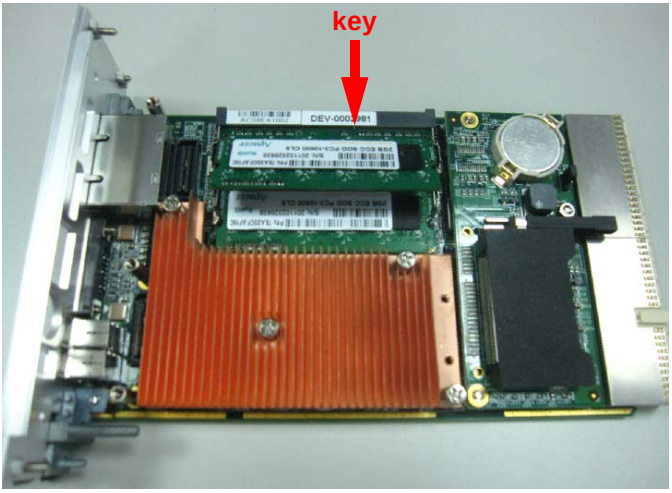
NOTE:

The front panel and the layer-2 daughter board (DB-3610L2, DB-3970L2) must be removed before installing memory modules to the cPCI-3970D/G 2-slot version (see “Removing the Layer-2 Daughter Board” on page 73), and both layer-2 and layer 3 daughter boards should be removed before installing to the cPCI-3970P/U 3-slot version (see “Removing the Layer-3 Daughter Board” on page 72).

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Installing the Memory Modules

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





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5.3 SATA Drive Installation

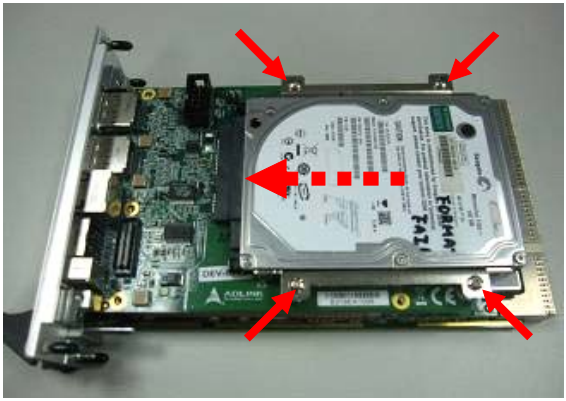
The cPCI-3970D/G 2-slot version and cPCI-3970P/U 3-slot version provide space to install a slim type 2.5" Serial-ATA storage drive.

Installing a SATA Drive - cPCI-3970D/G(P/U)

1. Drive mounting brackets and screws are provided in the accessory kit. Secure the brackets to the SATA drive with the four M3 screws provided.



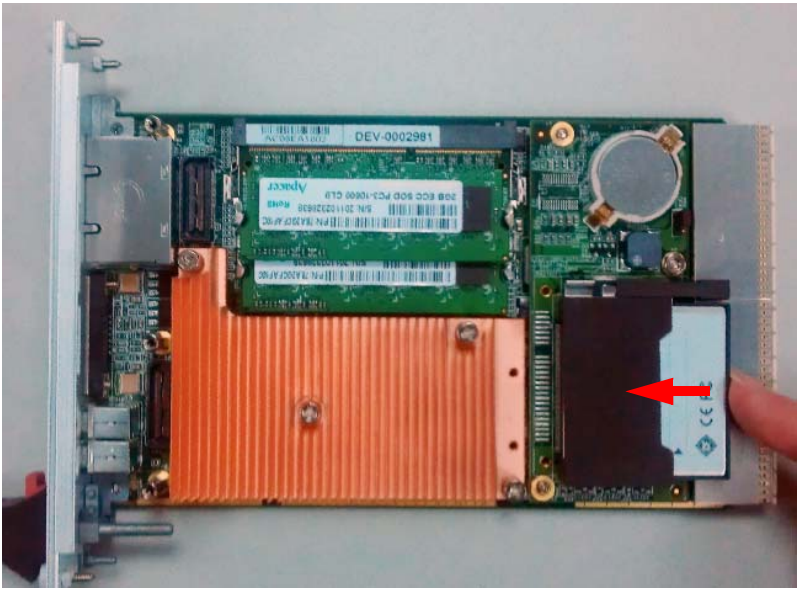
2. Align the SATA drive assembly with the onboard SATA connector on the cPCI-3970 as shown and push it in until it is properly seated. Secure the drive assembly to the layer-2 daughter board (DB-3610L2 or DB-3970L2) as shown using the four M2.5 screws provided.



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5.4 CompactFlash Installation

The CompactFlash socket is located on the DB-3CF daughter board mounted on layer-1. To install a CF card, orient the card so that the **bottom side is facing up** and align with the CF socket as shown. Insert the CF card into the socket until it is fully seated and flush with the ejector button.



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5.5 Converting from CF to CFast Slot

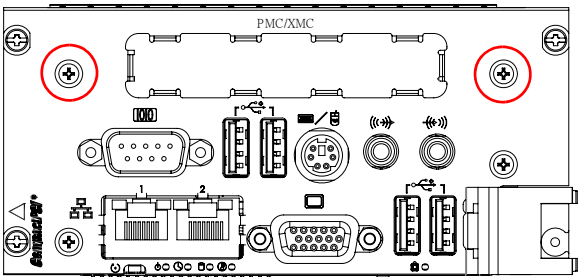
DB-3CFAST is an optional accessory for the cPCI-3970 series. To change the CF1 slot from CompactFlash to CFast, follow the instructions below. For cPCI-3970 models with 2 or 3 slots, the layer-2 and layer-3 daughter boards and front panel must first be removed. For single slot models skip ahead to *Installing the DB-3CFAST Daughter Board* below.

Removing the Layer-3 Daughter Board

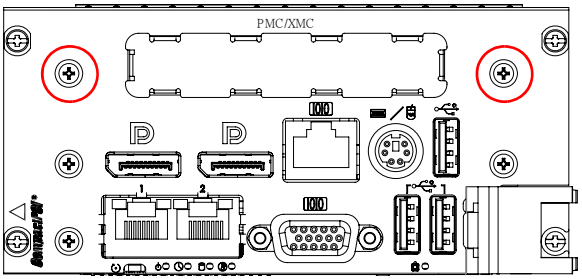
For "P/U" models, follow the instructions below to remove the layer-3 daughter board. For "D/G" 2-slot models, skip ahead to *Removing the Layer-2 Daughter Board* below.

1. Remove the two screws on either side of the PMX/XMC slot on the "P/U" front panel.

cPCI-3970P



cPCI-3970U



2. Remove the 4 screws securing the DB-3UMC daughter board to the layer-2 daughter board.
3. Lift the DB-3UMC daughter board from the cPCI-3970 assembly.

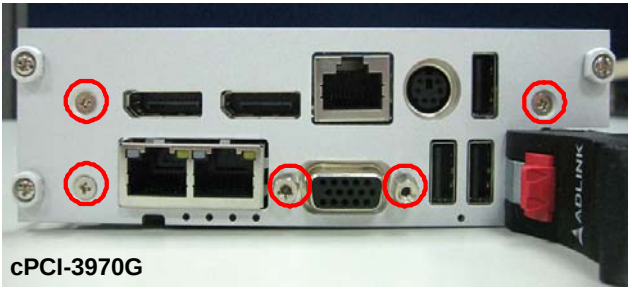
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Removing the Layer-2 Daughter Board

1. Remove the screws on the front panel as shown below (6 screws on "D/P" model, 5 screws on the "G/U" model).



cPCI-3970D



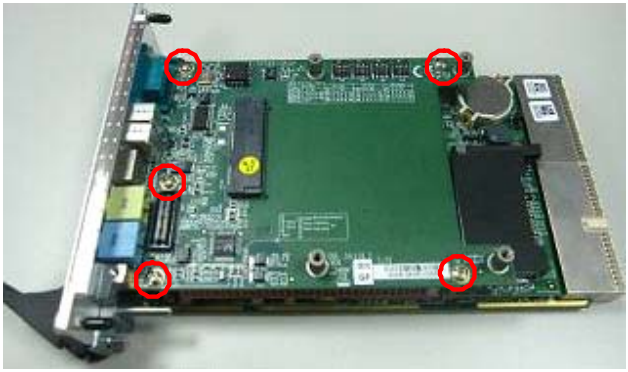
cPCI-3970G

2. Remove the screw next to the handle on the solder side of the cPCI-3970.



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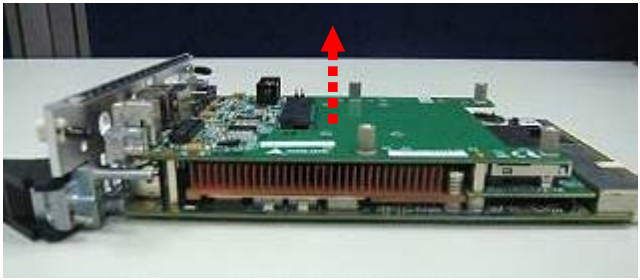
3. Remove the 5 screws securing the DB-3970L2 or DB-3610L2 layer-2 daughter board to the blade assembly.



4. Remove the front panel from the blade assembly.



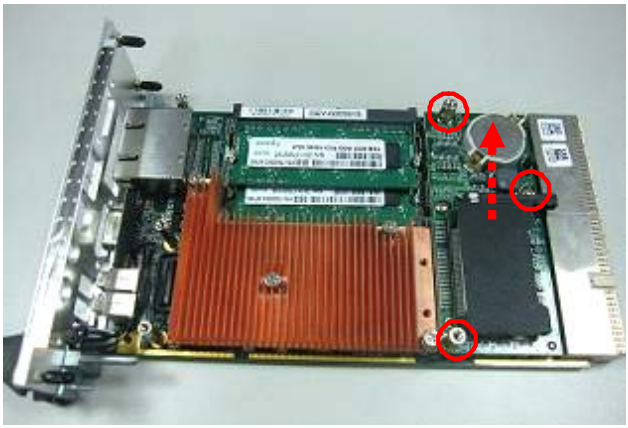
5. Lift the DB-3970L2 or DB-3610L2 daughter board to remove it from the blade assembly.



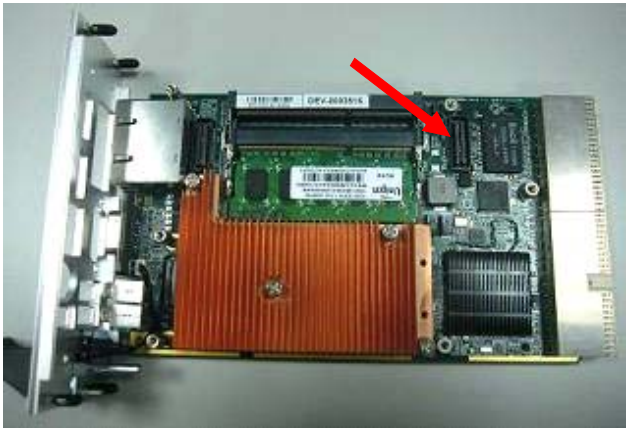
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Installing the DB-3CFAST Daughter Board

1. Remove the three screws securing the DB-3CF daughter board as shown and lift it from the blade assembly.

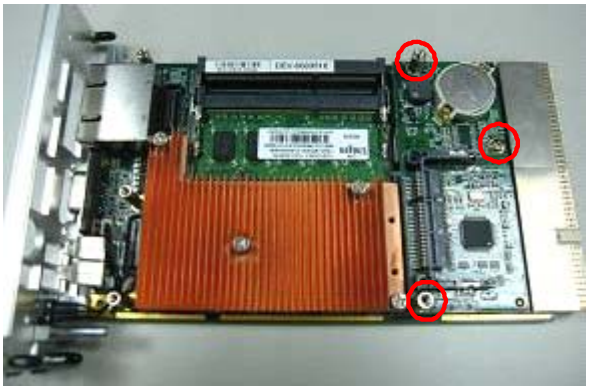


2. Install the DB-3CFAST daughter board by aligning it with the board-to-board connector (CN2) on the cPCI-3970 main board and pressing down firmly.



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3. Secure the DB-3CFAST by tightening the three screws shown below.



4. Reinstall the layer-2 daughter board, front panel and layer-3 daughter board as required by reversing the steps described above.

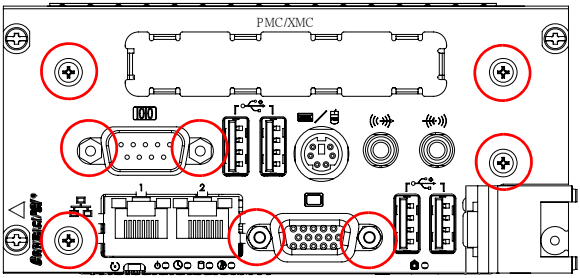
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5.6 PMC/XMC Card Installation

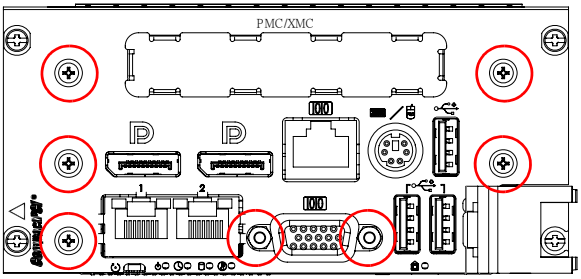
The cPCI-3970P/U provides one PMC/XMC slot designed to support 3.3V or 5V V(I/O) (default 3.3V) and 5V or 12V VPWR (default 5V). Before you install the PMC/XMC card on the cPCI-3970P/U, please make sure that the PMC V(I/O) jumper JPX2 and XMC VPWR jumper JPX1 have been correctly set (see page 66).

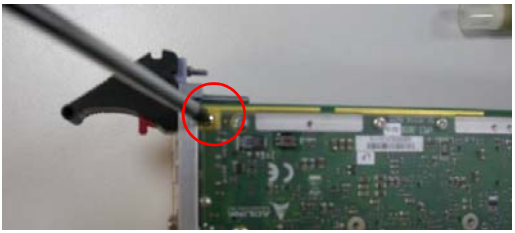
1. To install a PMC/XMC card on the cPCI-3970P/U, the front panel and layer-3 DB-3UMC daughter board must first be disassembled. To remove the front panel, loosen the screws securing it to the blade assembly as shown, including one additional screw under the ejector handle.

cPCI-3970P



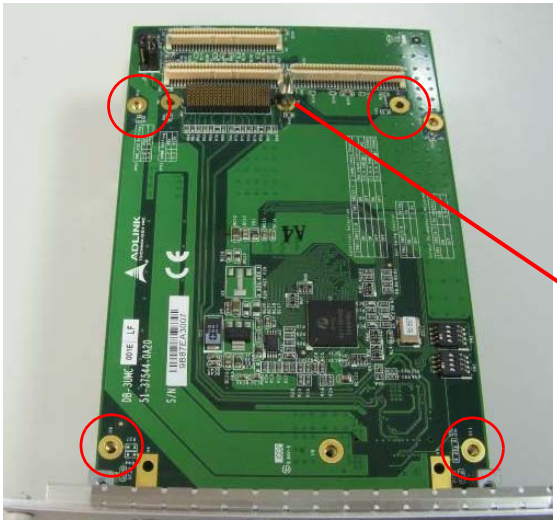
cPCI-3970U





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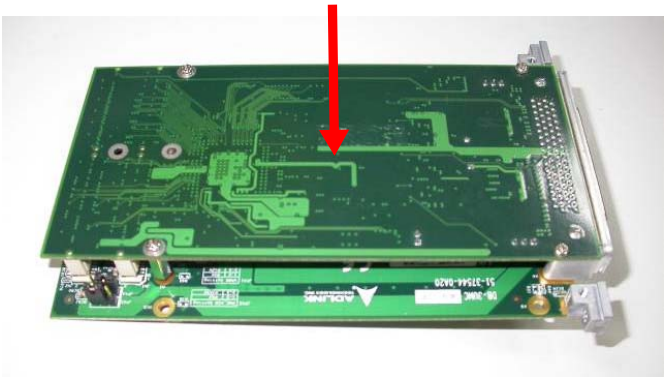
2. Remove the DB-3UMC daughter board from the blade assembly by unscrewing the four screws securing it to the layer-2 daughter board as shown below.



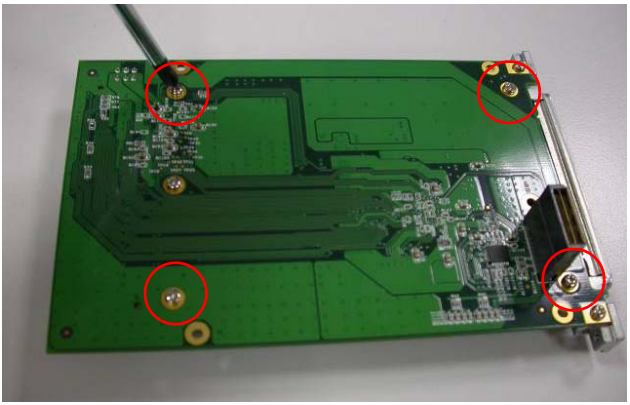
3. There is a 3.3V key on board by default, if the PMC/XMC card you wish to install is 5V signaling, please remove the key and set the PMC V(I/O) jumper JPX2 to the 5V setting (see “PMC V(I/O) Select Jumper on DB-3UMC (JPX2)” on page 66).

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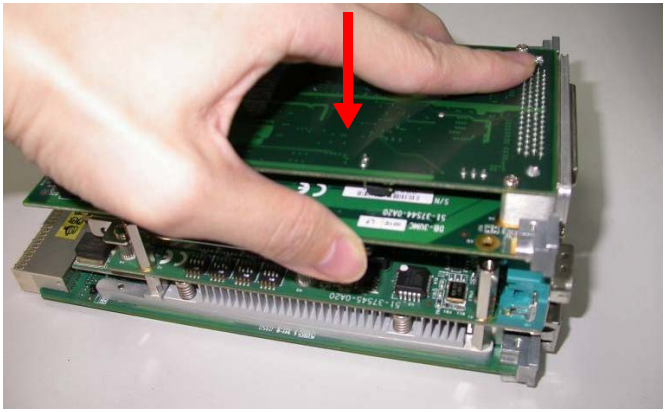
4. Align the male connectors of the PMC/XMC card (component-side down) to the female connectors of the DB-3UMC and press down.



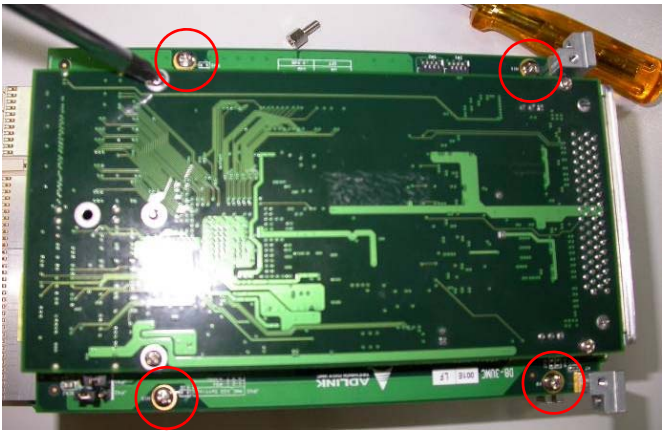
5. Secure the PMC/XMC card to the DB-3UMC by attaching four screws (provided with the card) from the underside of the daughter board.



6. Align the male board-to-board connector (CN1) of the PMC/XMC assembly to the female board-to-board connector (CN7) of the layer-2 daughter board and press down.



7. Secure the PMC/XMC assembly to the layer-2 daughter board using the four screws removed in Step 2 above.



8. Remove the PMC filler faceplate from the front panel.
9. Install the front panel to the cPCI-3970P/U by reversing Step 1.

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5.7 Installing the cPCI-3970 to the Chassis

The cPCI-3970 may be installed in a system or peripheral slot of a 3U 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-3970 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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5.8 RTM Installation - cPCI-R3P00(T)

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-3970 Series and related RTMs, make sure the RTM is the correct matching model.


NOTE:

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-3970 drivers are available from the ADLINK All-In-One DVD at **X:\cPCI\cPCI-3970**, or from the ADLINK website (**http://www.adlinktech.com**). ADLINK provides validated drivers for Windows XP Professional and Windows 7. We recommend using these drivers to ensure compatibility. The VxWorks BSP can be downloaded from the cPCI-3970 product page on the ADLINK website

6.1 cPCI-3970 Drivers

The following describes the cPCI-3970 driver installation procedures for Windows XP.

1. Install the Windows operating system before installing any driver. Most standard I/O device drivers are installed during Windows installation.


NOTE:

In order to enable AHCI mode, you must pre-install the Intel® Rapid Storage Technology driver using the F6 installation method described in **…\AHCI\F6Readme.txt**.

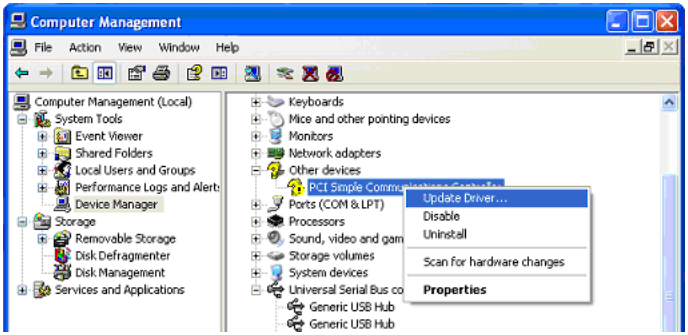
2. Install the **chipset driver** by extracting and running the program in **...\Chipset\Intel_Chipset_Device_Software _AllOS_9.2.0.1015.zip**.
3. Install the Microsoft .NET Framework utilities (required for the graphics utility) by extracting and running the program in **...\Chipset\Microsoft_Net_Framework_v3.5_SP1.zip.**
4. Install the **graphics driver** and utilities by extracting and running the program in **...\Graphics\Intel_HD_Graphics _Family_WinXP_6.14.10.5313.zip**.
5. Install the **LAN drivers** by extracting and running the program in **…\LAN\Intel_82574L_Gigabit_Network_WINXP _11.4.7.0.zip**.
6. Install the **Intel Rapid Storage Technology Utility** by extracting and running the program in **…\AHCI\ Intel_Rapid_Storage_Technology_10.1.0.1008.zip**.
7. Install the **TPM driver** by extracting and running the program in **…\TPM\Infineon_Trusted_Platform_Module_2.1.1.0.zip**.

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8. Install the **audio driver** and utilities by extracting and running the program in **…\Audio\RealTek_High_Definition_Audio_WINXP_5.10.0.6029.zip**.
9. Install the **Intel® Management Engine Interface driver** to remove the "question mark" from *Other Devices* in Windows Device Manager.

NOTE: The cPCI-3970 does not support Intel® Active Management Technology. The purpose of installing this driver is to remove the ""question mark" from Windows Device Manager.

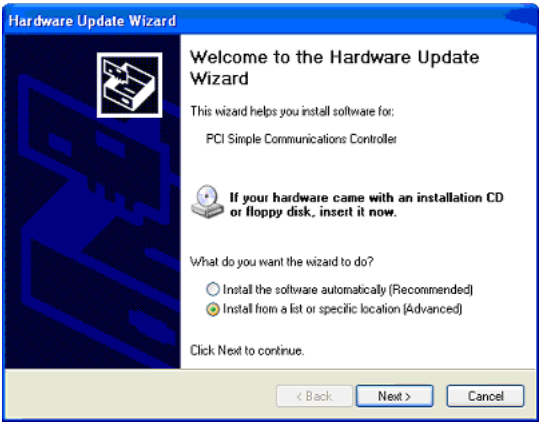
- ▷ R-click on *My Computer*, select *Manage*, and open the *Device Manager*.
- ▷ Under *Other Devices* you will see a "question mark" next to *PCI Simple Communication Controller.* R-click on *PCI Simple Communication Controller* and click on *Update Driver* to start the *Hardware Update Wizard*.



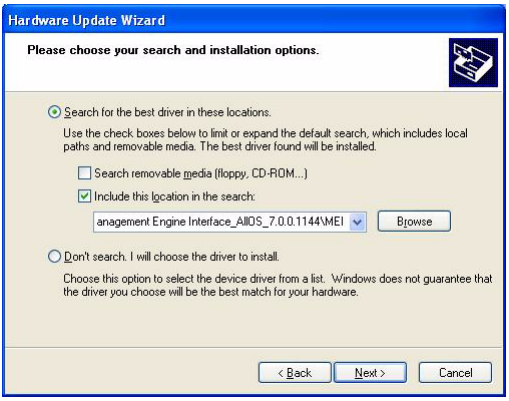
- ▷ When asked to let Windows Update search for software, select "*No, not at this time*" and click *Next*.

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▷ Select "*Install from a list or specific location (Advanced)*" and click *Next*.



▷ Extract the contents of **…\cPCI-3970\Chipset\Intel_Management_Engine_Interface_AllOS_7.0.0.1144.zip**. Select "*Search for the best driver in these locations*" and "*Include this location in the search*". Click *Browse* and navigate to the folder "MEI" where you extracted the contents of the zip file, and then click *OK*. Click *Next* to continue.

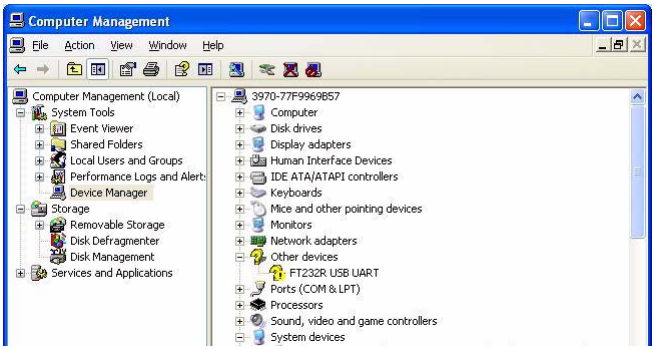


▷ When driver installation has completed, click *Finish* to close the wizard.

6.2 USB-to-Serial Converter Driver (RTM)

The COM5 serial port on the cPCI-R3P00(T) is converted from the USB3 port by a USB-to-serial converter (see “cPCI-R3P00 RTM” on page 17). To install the driver for the converter, follow the procedure below. The installation consists of two parts: *USB Serial Converter* and *USB Serial Port*.

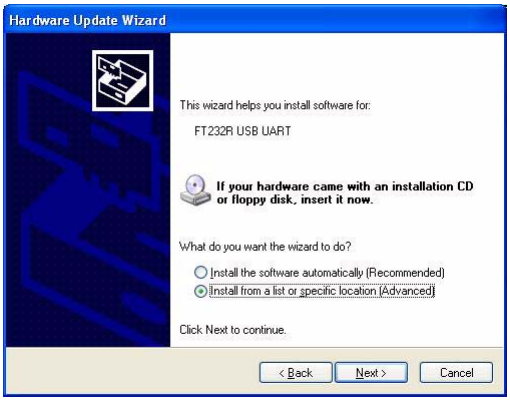
1. R-click on *My Computer*, select *Manage*, and open the *Device Manager*.
2. Under *Other Devices* you will see a "question mark" next to *FT2332R USB UART.* R-click on *FT2332R USB UART* and click on *Update Driver* to start the *Hardware Update Wizard*.



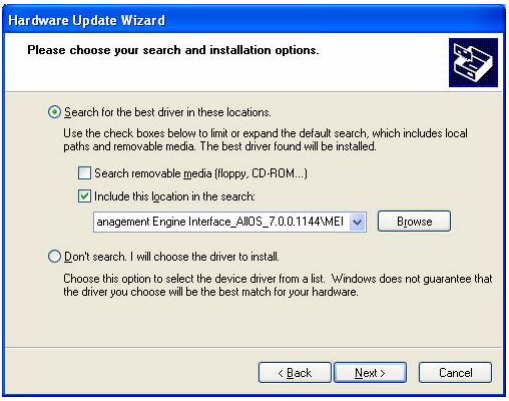
3. When asked to let Windows Update search for software, select "*No, not at this time*" and click *Next*.

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4. Select "*Install from a list or specific location (Advanced)*" and click *Next*.



5. Extract the contents of **…\cPCI-3970\COM\USB_Serial _Port_WINXP_32_WIN7_64_FTDI 2.8.8.0**. Select "*Search for the best driver in these locations*" and "*Include this location in the search*". Click *Browse* and navigate to the folder where you extracted the contents of the zip file, and then click *OK*. Click *Next* to continue.



6. When notified that the software has not passed Windows Logo testing, click *Continue Anyway*.

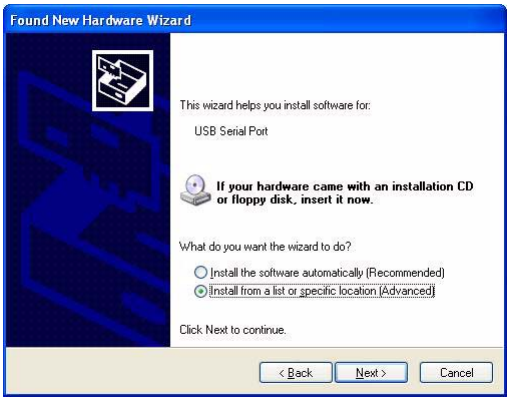


7. When the *USB Serial Converter* driver installation has completed, click *Finish* to close the wizard.



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8. The *Found New Hardware Wizard* will automatically open and ask you to install the software for *USB Serial Port*. Select *Install from a list or specific location (Advanced)* and click *Next*.



9. When notified that the software has not passed Windows Logo testing, click *Continue Anyway*.



10. When the *USB Serial Converter* driver installation has completed, click *Finish* to close the wizard.



6.3 LAN Driver for cPCI-R3P00T

The GbE ports on the cPCI-R3P00T are supported by an Intel® 82580DB Gigabit Ethernet Controller (see “cPCI-R3P00T RTM” on page 18). Install the LAN drivers by extracting and running the program **PROWin32.exe** in **…\cPCI\cPCI-R3P00(T)\INTEL 82580 Network driver**.

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7 Utilities

7.1 Watchdog Timer

This section describes the operation of the cPCI-3970's watchdog timer (WDT). The primary function of the WDT is to monitor the cPCI-3970'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
- set and get current configuration
- reloading timeout value

The cPCI-3970 custom WDT functionality is implemented using an Intelligent Platform Management Controller (IPMC) and controlled using Intelligent Platform Management Interface (IPMI) commands.

Setting the Watchdog by IPMI Command

The following section describes how to set the WDT functions using IPMI commands. For more detailed information about IPMI commands, please refer to IPMI specification: *Intelligent Platform Management Interface Specification Second Generation v2.0*.

WDT Commands

These commands enable the watchdog function, set the countdown period, and reload the timeout value periodically to keep it from resetting the system. If the timer countdown value is not reloaded, the watchdog resets the system hardware after the counter reaches zero.

Command	NetFn Code	Cmd Code
Reset Watchdog Timer	App (18h)	22h
Set Watchdog Timer	App (18h)	24h
Get Watchdog Timer	App (18h)	25h

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Reset Watchdog Timer

This command is used to reload the WDT.

Action	Byte	Value	Description
Request	0	18h	NetFn/LUN
	1	22h	Defined command
Response	0	Complete Code	00h means OK

Set Watchdog Timer

This command is used to start and restart the Watchdog Timer using the specified countdown value.

Action	Byte	Value	Description
Request	0	18h	NetFn/LUN
	1	24h	Defined command
	2	[7] - 1b = don't log [6] - 1b = don't stop timer [5:3] - reserved [2:0] - timer use 000b = reserved 001b = BIOS FRB2 010b = BIOS/POST 011b = OS Load 100b = SMS/OS 101b = OEM 110b -111b = reserved	Timer Use
	3	[7] - reserved [6:4] - pre-timeout interrupt 000b = none 001b = SMI (optional) 010b = NMI / Diagnostic Interrupt (optional) 011b = Messaging Interrupt 100b,111b = reserved [3] - reserved [2:0] - timeout action 000b = no action 001b = Hard Reset 010b = Power Down 011b = Power Cycle 100b,111b = reserved	Timer Actions

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Action	Byte	Value	Description
Request	4	1h~ffh (‘1h’ based.)	Pre-timeout interval in seconds.
	5	[7] - reserved [6] - reserved [5] - OEM [4] - SMS/OS [3] - OS Load [2] - BIOS/POST [1] - BIOS FRB2 [0] - reserved 0b = leave alone 1b = clear timer use expiration bit	Timer Use Expiration flags clear
	6	00h~ffh ,LS byte (100 ms/ count)	Initial countdown value
	7	00h~ffh ,MS byte (100 ms/ count)	Initial countdown value
Response	0	Complete Code	00h means OK

Get Watchdog Timer

This command is used to get the current WDT configuration.

Action	Byte	Value	Description
Request	0	18h	NetFn/LUN
	1	25h	Defined command
Response	0	Complete Code	00h means OK
	1	[7] - 1b = don’t log [6] - 1b = don’t stop timer [5:3] - reserved [2:0] - timer use 000b = reserved 001b = BIOS FRB2 010b = BIOS/POST 011b = OS Load 100b = SMS/OS 101b = OEM 110b -111b = reserved	Timer Use

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Action	Byte	Value	Description
Response	2	[7] - reserved [6:4] - pre-timeout interrupt 000b = none 001b = SMI (optional) 010b = NMI / Diagnostic Interrupt (optional) 011b = Messaging Interrupt 100b,111b = reserved [3] - reserved [2:0] - timeout action 000b = no action 001b = Hard Reset 010b = Power Down 011b = Power Cycle 100b,111b = reserved	Timer Actions
	3	1h~ffh ('1h' based.)	Pre-timeout interval in seconds.
	4	[7] - reserved [6] - reserved [5] - OEM [4] - SMS/OS [3] - OS Load [2] - BIOS/POST [1] - BIOS FRB2 [0] - reserved 0b = leave alone 1b = clear timer use expiration bit	Timer Use Expiration flags clear
	5	00h~ffh ,LS byte (100 ms/ count)	Initial countdown value
	6	00h~ffh ,MS byte (100 ms/ count)	Initial countdown value
	7	00h~ffh ,LS byte (100 ms/ count)	Present countdown value
	8	00h~ffh ,MS byte (100 ms/ count)	Present countdown value

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Example WDT Programming Procedure

Configuration of the watchdog timer is via serial interface. Detailed description of the WDT IPMI commands can be found above. The following example shows the procedure for configuring the WDT works over a serial console. See “Communications with IPMC” on page 137. for more information.

```
[18 00 24 43 01 01 08 50 00]          => Step 1: Set parameters to WDT
[1C 00 24 00]                         => Step 1: Response of setting OK.


[18 00 22]                            => Step 2: Trigger WDT
[1C 00 22 00]                         => Step 2: Response of trigger OK.


[18 00 25]                            => Get current configuration
[1C 00 25 00 43 01 01 00 50 00 28 00] => Response during WDT countdown

<A>: BMC Watchdog expired
<A>: Reset alert


[18 00 25]                            => Get current configuration
[1C 00 25 00 03 01 01 08 50 00 00 00 ] => Response after Reset
```

Figure 7-1: Example procedure for configuring the WDT over serial console

1. **Configure the WDT** by using the raw IPMI command "Set Watchdog Timer" described above.

```
"Set Watchdog Timer" Command:
[18 00 24 43 01 01 08 50 00]
Description:
0x18: Net function. Defined in IPMI specification
0x00: Bus ID. Usually "0x00".
0x24: Command. Defined in IPMI specification.
0x43: Set "Don’t stop timer" and "OS Load".
0x01: Hard Reset.
0x01: Pre-timeout interval in seconds.
0x08: Timer Use Expiration flags cleared by OS Load.
0x50: Initial countdown value. Sets the interval
   before watchdog timer expires.
   80 count: 100ms * 80 = 8000 ms = 8 seconds
Successful response to command:
[1C 00 24 00]
```

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2. **Reload the WDT counter** by using the raw IPMI command "Reset Watchdog Timer".

"Reset Watchdog Timer" Command:
[18 00 22]
Successful response to Command:
[1C 00 22 00]

3. **Get the WDT configuration** by using the "Get Watchdog Timer" command.

"Get Watchdog Timer" Command:
[18 00 25]
Successful response to Command:
[1C 00 25 00 43 01 01 00 50 00 28 00]
0x18: Net function. Defined in IPMI specification
0x00: Bus ID. Usually "0x00".
0x25: Command. Defined in IPMI specification.
0x43: Get timer operation status and "OS Load".
The first nibble is "4". This means the timer is running. If the first nibble is "0", then the watchdog timer has timed out and stopped. The second nibble is "Timer Use". A value of "3" means the option is set to "OS Load".
0x01: Hard Reset.
0x01: Pre-timeout interval in seconds.
0x00: Timer Use Expiration flags clear.
0x50: Initial countdown value. The current interval before the watchdog timer expires.
80 count. 100ms * 80 = 8000ms = 8 seconds.
0x10: Present countdown value. How much time is left before timer expires.
16 count: 100ms * 16 = 1600ms = 1.6 seconds

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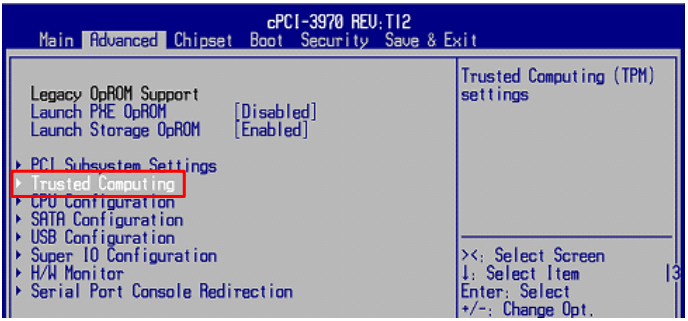
7.2 Using the Trusted Platform Module

This section describes the operation of the cPCI-3970's Trusted Platform Module (TPM).

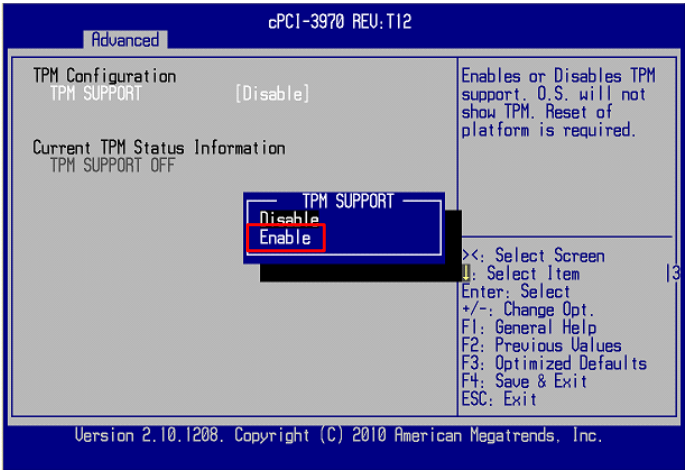
Enabling TPM in BIOS

The TPM is set to "Disabled" by default. Users wishing to use the TPM should enable it in BIOS as follows:

1. Under the "Advanced" section in BIOS, choose "Trusted Computing".

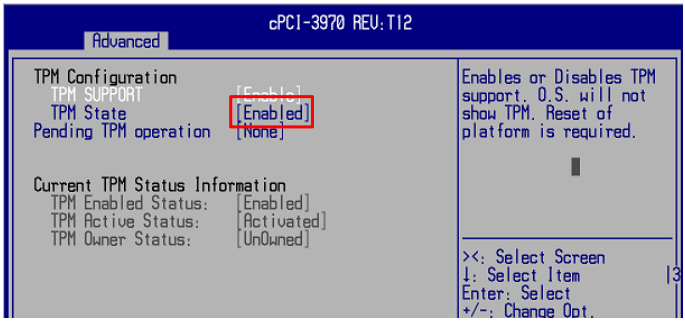


2. Set "TPM Support" to Enabled.



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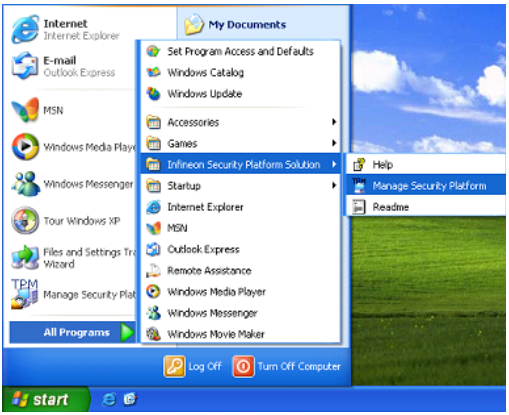
3. Set "TPM State" Enabled. Save settings and exit BIOS.



Using the TPM Utility

A utility for managing the TPM settings, the Infineon Security Platform Settings Tool, is provided with the TPM driver located on the All-In-One DVD in the following directory: X:\cPCI\cPCI-3970\TPM. Make sure you have installed the TPM driver as described in “cPCI-3970 Drivers” on page 83.

1. After driver is installed, click on *Start* > *Programs* > *Infineon Security Platform Solution* > *Manage Security Platform* to run the utility.



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2. The Infineon Security Platform Settings Tool is shown in the screen capture below.



3. Click on the "User Settings" tab, then follow the on screen instructions to build a security platform.



4. Prepare a removable media to store important passwords and data and follow the on screen instructions.

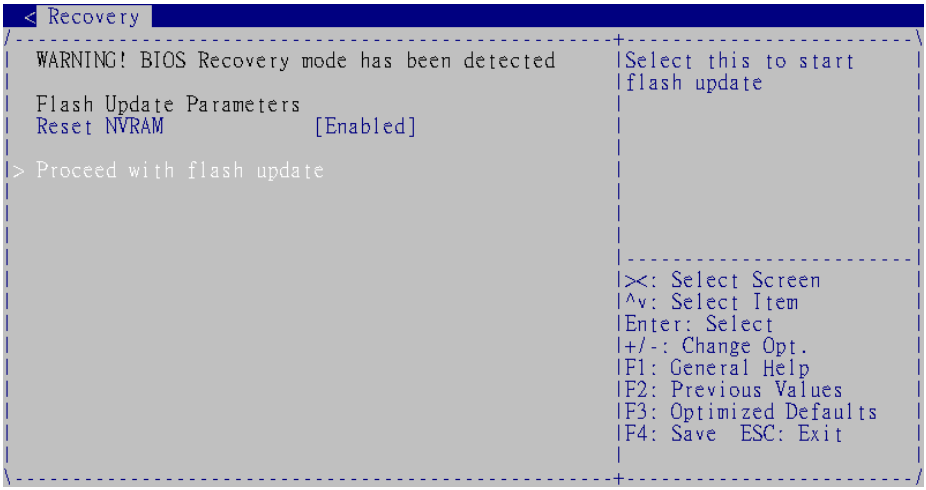


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7.3 BIOS Recovery

The cPCI-3970 Series features AMI® EFI BIOS with BIOS recovery. If the BIOS becomes corrupted and you are unable to boot your system, the system will sound 4 beeps. Follow the instructions below to re-flash the BIOS and recover the system.

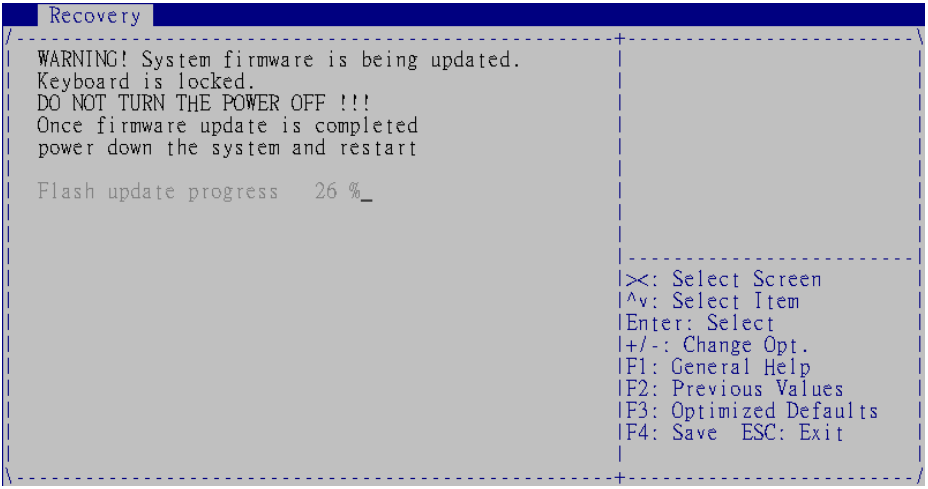
1. Download the BIOS recovery file "**C3970000.ROM**" from the product website at:
   www.adlinktech.com/PD/web/PD_detail.php?cKind=&pid=1013
2. Prepare a bootable USB flash drive and copy the recovery file "C3970000.ROM" to the root directory.
3. Insert the USB flash drive into the cPCI-3970 and power up the system.
4. The system will sound 4 beeps to indicate boot failure, and then it will sound 2 beeps to indicate it is entering Recovery Mode. You will see the screen below:



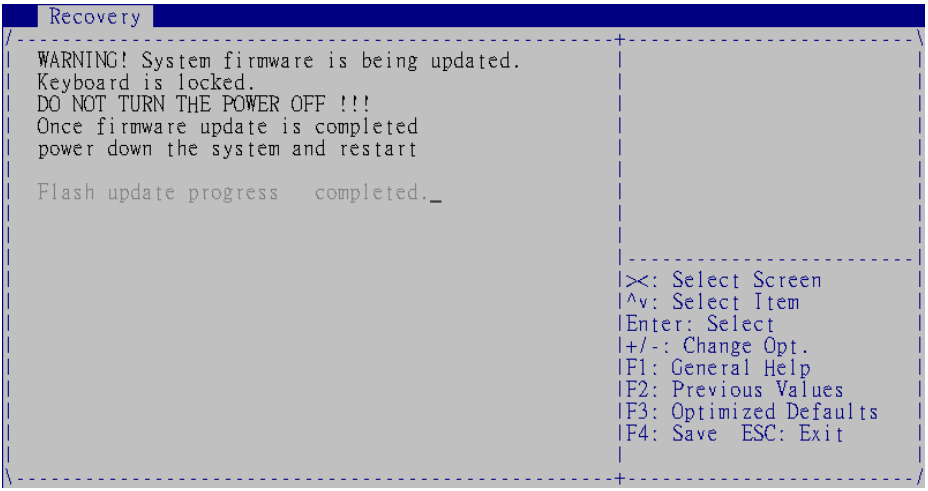
5. Select "Proceed with flash update" and press **Enter**.

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6. During the BIOS recovery process, you will see the following:



7. After the flash update is completed, power down the system and restart. The system should now boot up normally.



NOTE:

After BIOS recovery, follow the instructions in *Section 7.4 BIOS Update* to restore your original BIOS version.

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7.4 BIOS Update

Follow the instructions below to update the BIOS or restore a previous BIOS version.

1. Download the required BIOS file from the product website: **www.adlinktech.com/PD/web/PD_detail.php?cKind=&pid=1013.**
2. Prepare a DOS bootable floppy disk or USB flash drive and unzip the contents of the BIOS file to the disk
3. Boot the system using the floppy disk or USB drive prepared above and run the file **P8.bat**
4. Restart the system (if requested)

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8 BIOS Setup Utility

The following chapter describes basic navigation for the AMI EFI 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.



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.

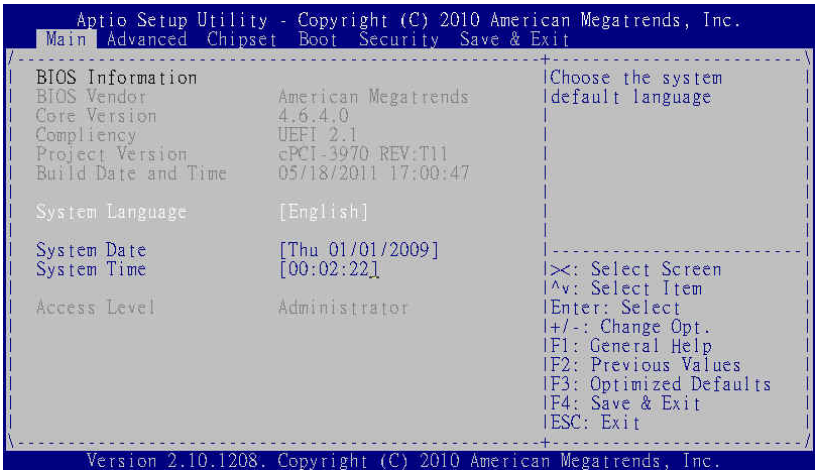
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Setup Menu

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.

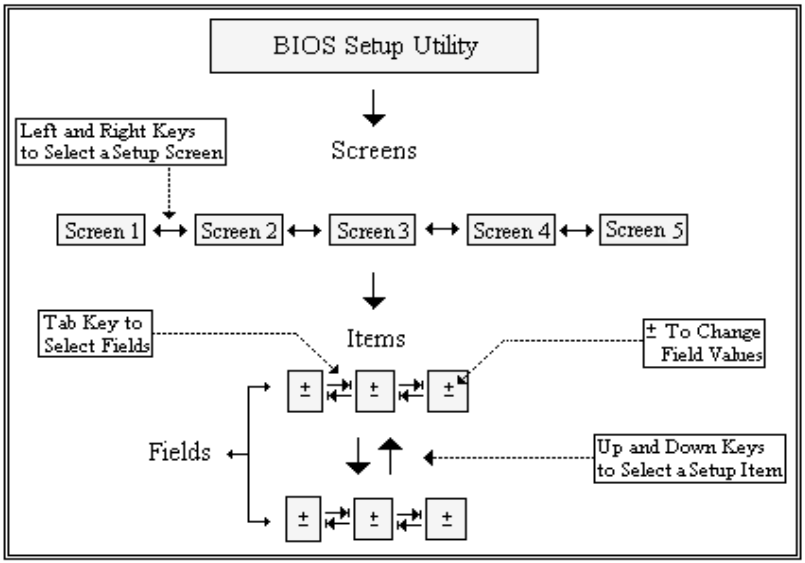
The Main BIOS setup menu screen has two main frames. The left frame displays all the options that can be configured. "Grayed" options cannot be configured, "Blue" options can be.

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.



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Navigation



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

Keyboard Commands

Enter Selects the highlighted option or submenu.

< > The *Left* and *Right* "Arrow" keys allow you to select a setup screen.

^ v The *Up* and *Down* "Arrow" keys allow you to select a setup screen.

+ - The *Plus* and *Minus* keys allow you to change the field value of a particular setup item.

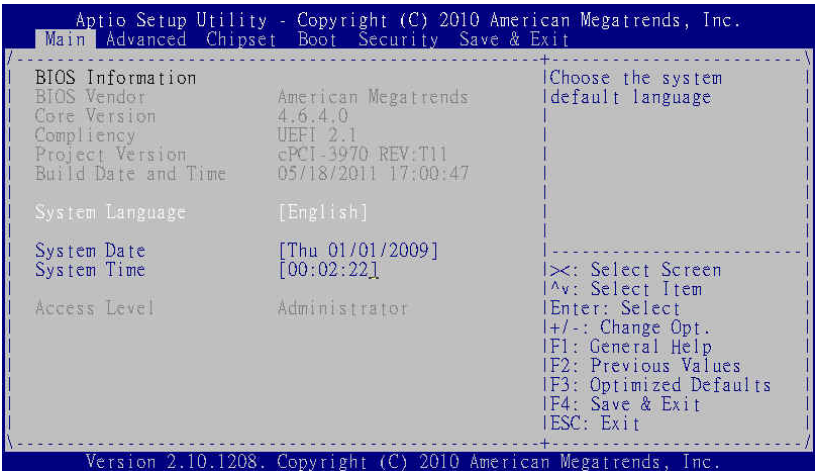
Tab Moves the cursor to the next configurable item or to the next field.

Esc The *Esc* key allows you to discard any changes you have made and exit the Setup menu. Press the *Esc* key to exit the Setup menu without saving your changes. Press the *Enter* key to discard changes and exit. You can also use the "Arrow" keys to select Cancel and then press the *Enter* key to abort this function and return to the previous screen.

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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 & Board Info

BIOS Vendor

Displays the BIOS vendor.

Core Version

Displays the BIOS core version.

Project Version

Displays the current BIOS revision.

Build Data

Displays the BIOS build data.

System Language

Displays the system default language (English only).

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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.

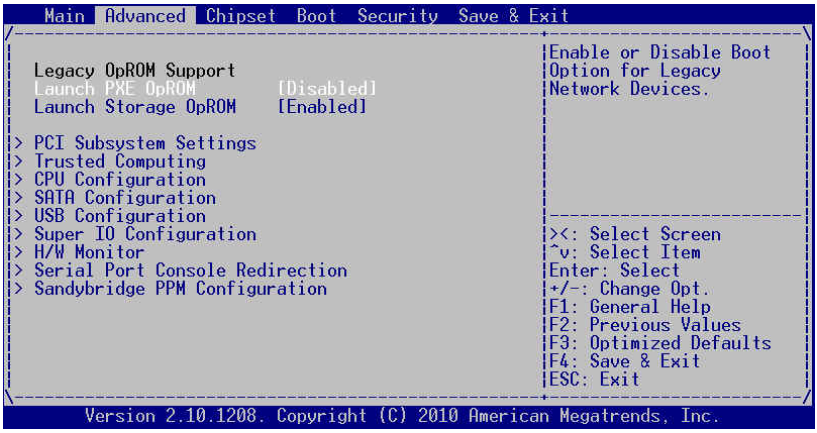
Note: The time is in 24-hour format. For example, 5:30 A.M. appears as 05:30:00, and 5:30 P.M. as 17:30:00.

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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.



Launch PXE OpROM

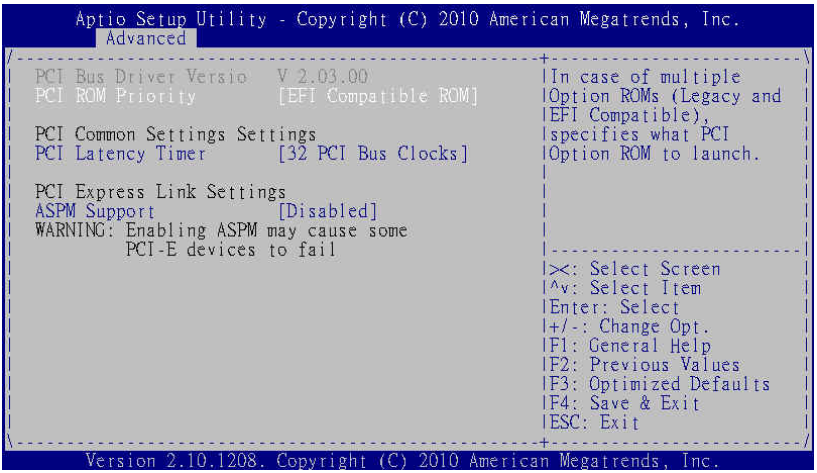
Boot option for legacy network devices. Options: Enabled, Disabled.

Launch Storage OpROM

Boot option for legacy mass storage devices with Option ROM. Options: Enabled/Disabled.

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PCI Subsystem Settings



PCI Latency Timer

Value to be programmed into PCI Latency Timer Register. Options: 32 PCI Bus Clocks, 64 PCI Bus Clocks, 96 PCI Bus Clocks, 128 PCI Bus Clocks, 160 PCI Bus Clocks, 192 PCI Bus Clocks, 224 PCI Bus Clocks, 248 PCI Bus Clocks.

ASPM Support

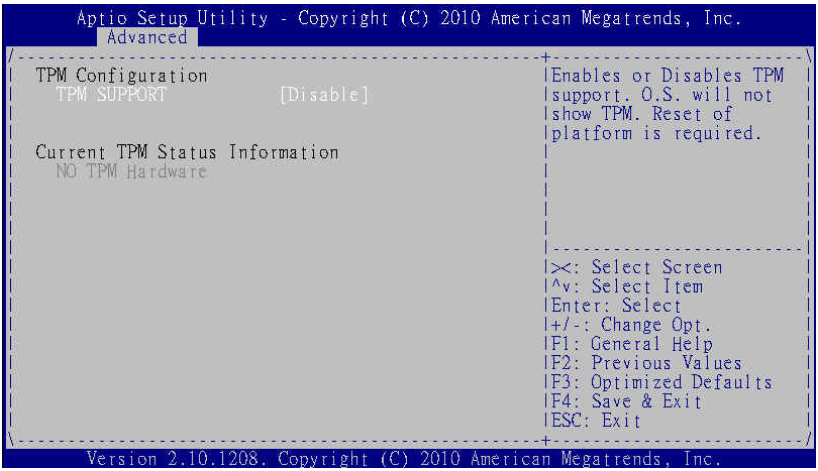
Set the ASPM (Active State Power Management) level. Options:

- **Disabled:** Disable ASPM
- **Auto:** BIOS auto configure
- **Force L0:** Force all links to L0 State

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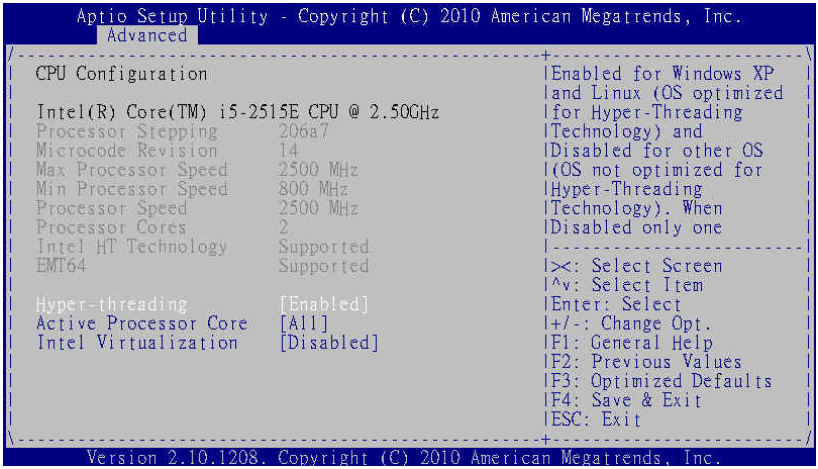
Trusted Computing

Trusted computing is an industry standard to make personal computers more secure through a dedicated hardware chip, called a Trusted Platform Module (TPM). This option allows you to enable or disable the TPM support.



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CPU Configuration



Hyper-Threading

Enables/disables Hyper-Threading Technology.

Active Processor Cores

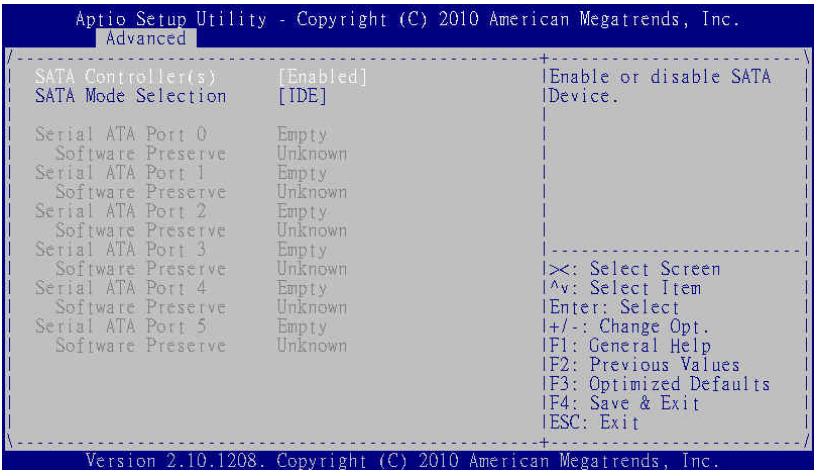
Number of cores to enable in each processor package. Options: All, 1, 2.

Intel Virtualization

Enables/disables Intel Virtualization Technology.

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SATA Configuration



SATA Controllers

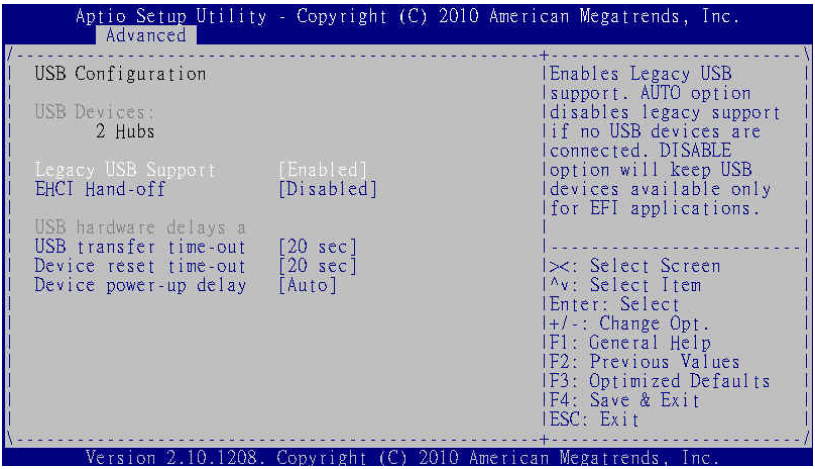
This item specifies enables/disables the SATA Controllers.

SATA Mode

The SATA interface can be configured as a legacy IDE, RAID and AHCI mode.

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USB Configuration



Legacy USB Support

Legacy USB Support refers to USB mouse and keyboard support. Normally if this option is not enabled, any attached USB mouse or keyboard will not become available until a USB compatible operating system is fully booted with all USB drivers loaded. When this option is enabled, any attached USB mouse or keyboard can control the system even when there is no USB driver loaded on the system. Set this value to enable or disable the Legacy USB Support.

EHCI Hand-off

This is a workaround for OSes without EHCI hand-off support. The EHCI ownership change should be claimed by the EHCI driver. Options: Enable, Disable.

USB transfer time-out

This item sets the time-out value for Control, Bulk and Interrupt transfers.

Device Reset Timeout

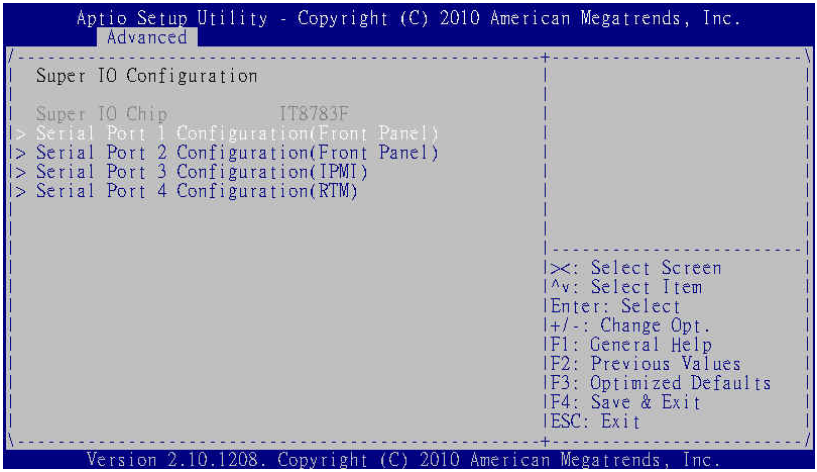
USB mass storage device Start Unit command timeout.

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Device Power-up Delay

Maximum time the device will take before it properly reports itself to the Host Controller. "Auto" uses these default values: for a Root port it is 100ms, for a Hub port the delay is taken from the Hub descriptor.

Super IO Configuration

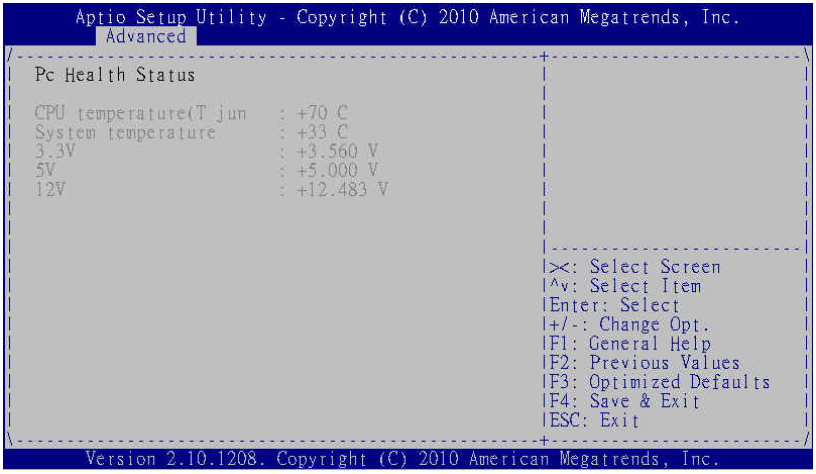


Serial Port 1/2/3/4 Configuration

Each sub-menu allows you to Enable/Disable and set the parameters of Serial Ports 1, 2 (Front Panel), 3 (IPMI), 4 (RTM).

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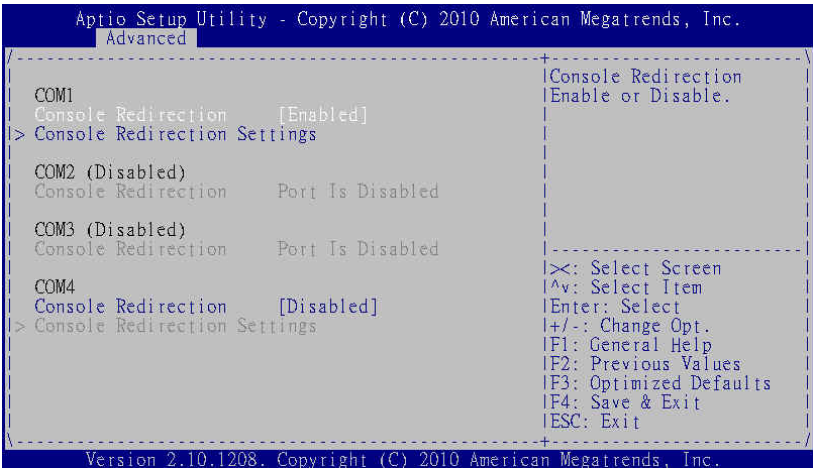
PC Health Configuration



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Console Redirection

The settings specify how the host computer and the remote computer will exchange data. Both computers should have the same or compatible settings.



Terminal Type

VT-UTF8 is the preferred terminal type for out-of-band management. The next best choice is VT100+ and then VT100. Options: VT100, VT100+, VT-UTF8, ASNI.

Bits per Second

Select the bit rate (bits/second) you want the serial port to use for console redirection. Options: 115200, 57600, 19200, 9600.

Data Bits

Select the data bits you want the serial port to use for console redirection. Set this value to 7 or 8.

Parity

Set this option to select Parity for console redirection. The settings for this value are None, Even, Odd, Mark, Space.

Stop Bits

Stop bits indicate the end of a serial data packet. (A start bit indicates the beginning). The standard setting is 1 stop bit.

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Communication with slow devices may require more than 1 stop bit. Set this value to 1 or 2.

Flow Control

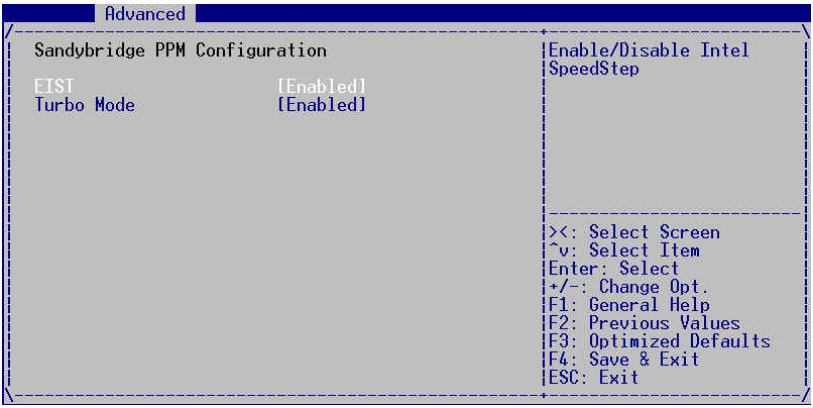
Set this option to select Flow Control for console redirection. The settings for this value are None, Hardware, Software.

Terminal Resolution

Remote Terminal Resolution. Options: 80x25, 100x31.

Sandy Bridge PPM Configuration

Sandy Bridge Processor Power Management (PPM) Configuration.



EIST

Enables/disables Enhanced Intel SpeedStep® Technology (EIST)

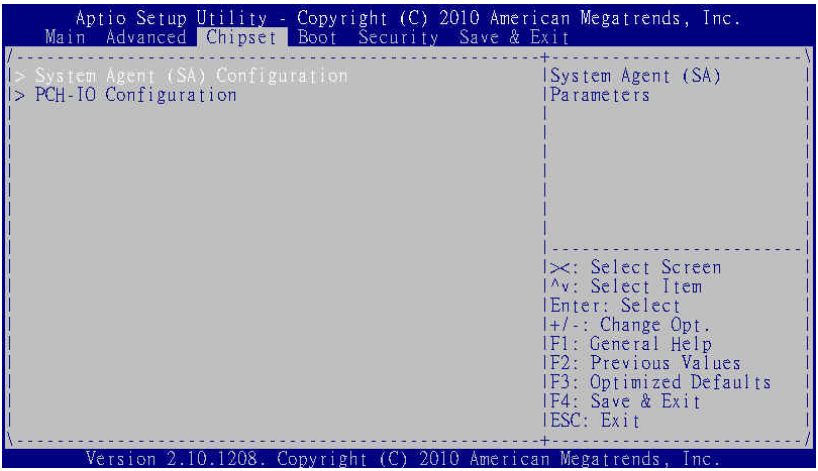
Turbo Mode

Enables/disables Turbo Mode.

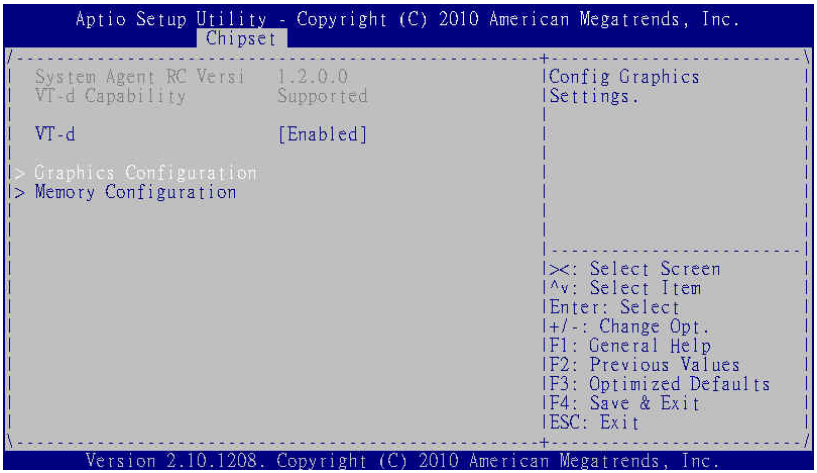
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8.4 Chipset Configuration

Select the Chipset tab from the setup screen to enter the Chipset BIOS Setup screen. You can select any of Chipset BIOS Setup options by highlighting it using the < Arrow > keys. The Chipset BIOS Setup screen is shown below.



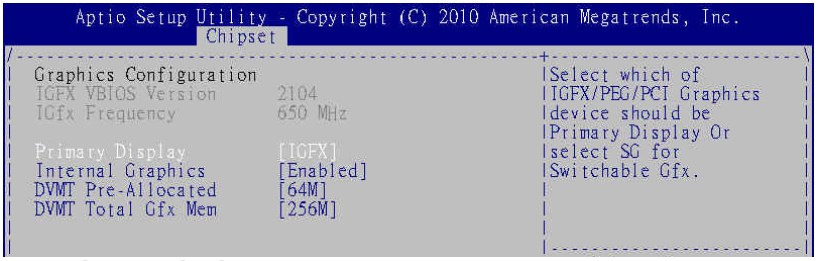
System Agent (SA) Configuratio



Enables/disables Intel® Virtualization Technology for Directed I/O (VT-d).

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Graphics Configuration



Primary Display

Allows you to select which graphics controller to use as the primary boot device. Configuration options: IGD, PCI/IGD, PCI/PEG, PEG/IGD, PEG/PCI.

Internal Graphics

Allows you to select enable/disable.the internal graphics.

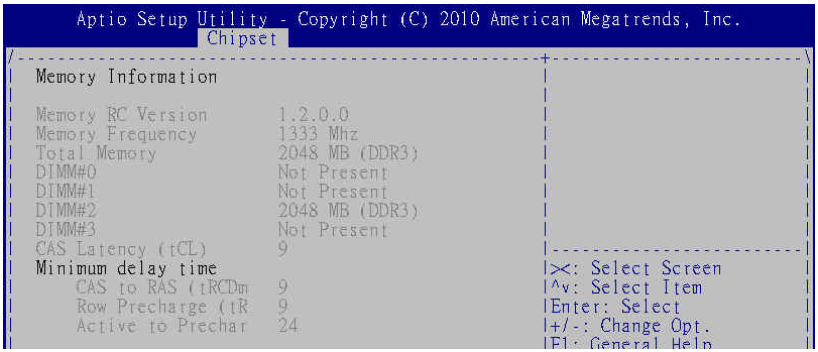
DVMT Pre-Allocated

Select DVMT 5.0 Pre-Allocated (fixed) Graphics Memory size used by the internal graphics device.

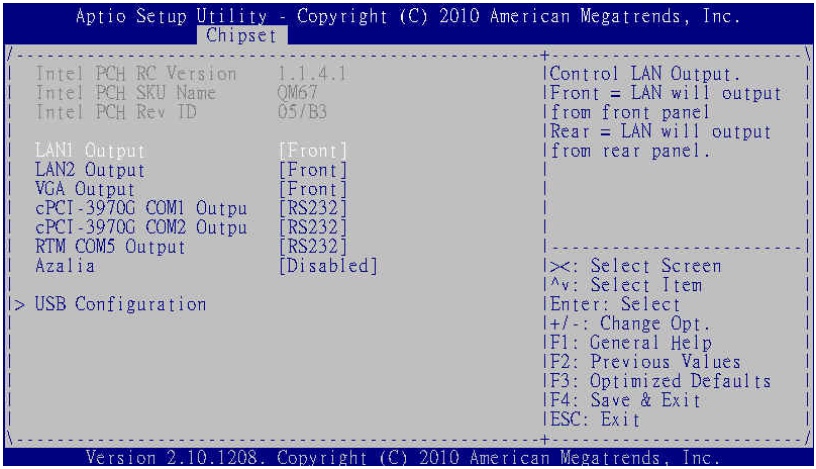
DVMT Total Gfx Mem

Select DVMT5.0 Total Graphic Memory size used by internal graphics device. Options: 128MB, 256MB, Maximum.

Memory Information



PCH-IO Configuration



LAN1, LAN2, VGA Output

Sets the LAN1/LAN2/VGA output to Front/Rear.

cPCI-3970G COM1/ 2 Output

Sets the cPCI-3970G COM1/2 mode. Options: RS232, RS422/RS485.

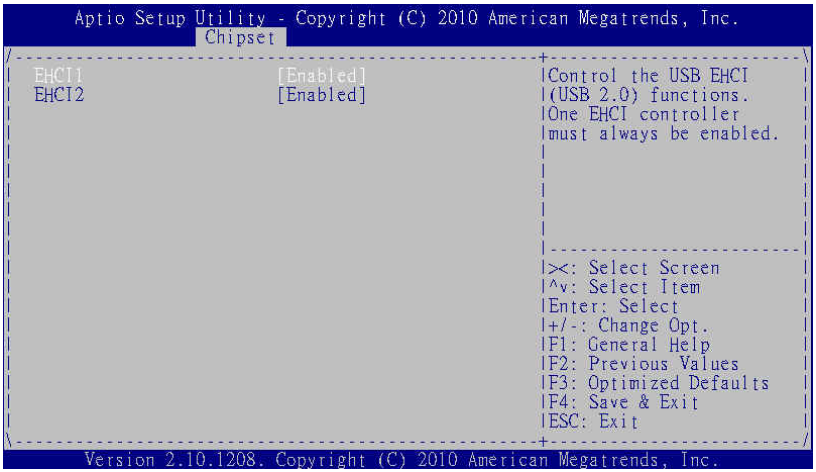
NOTE: The cPCI-3970G COM1/2 Output BIOS setting is only used for cPCI-3970G/U models. The COM mode setting for cPCI-3970D/P models must be set using the *"COM1 Mode Selection Switches (SW1~SW4)" on page 43.*

Azalia HD Audio

The onboard HDA Controller. Set this value to Enable/Disable.

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USB Configuration



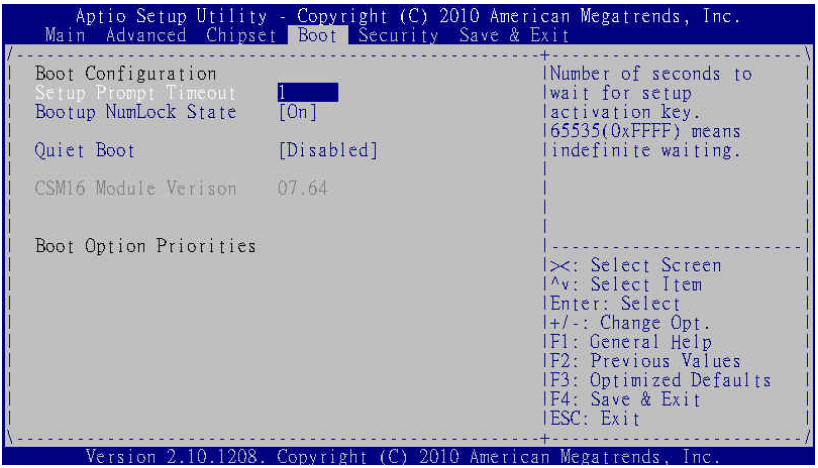
EHCI1/2 Controller 1

USB 2.0 (EHCI) support. Set this value to Enabled/Disabled.

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8.5 Boot Configuration

Select the Boot tab from the setup screen to enter the Boot Configuration screen. You can select any of the items in the left frame of the screen to go to the sub menu for that item. You can display a Boot Configuration option by highlighting it using the < Arrow > keys. The Boot Configuration screen is shown below:



Setup Prompt Timeout

Number of seconds to wait for setup activation key. 65535 (0xFFFF) means indefinite waiting.

Bootup Num-Lock

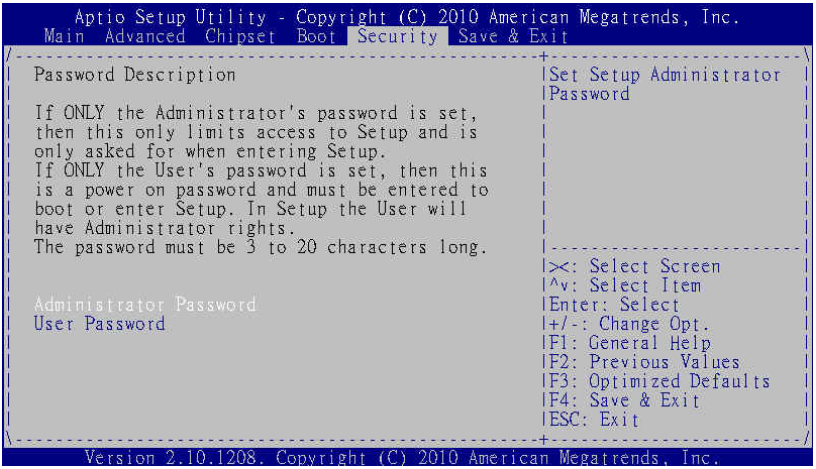
This option sets the Num Lock status when the system is powered on. Setting it to On will turn on the Num Lock key when the system is booted up. Setting it to Off will not enable the Num Lock key on bootup.

Quiet Boot

When this feature is **enabled**, the BIOS will hide normal POST messages during the boot-up sequence. When it is **disabled**, the BIOS will display the normal POST messages.

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8.6 Security Setup



Administrator Password

Use this option to set a password for administrators with full control of the BIOS setup utility.

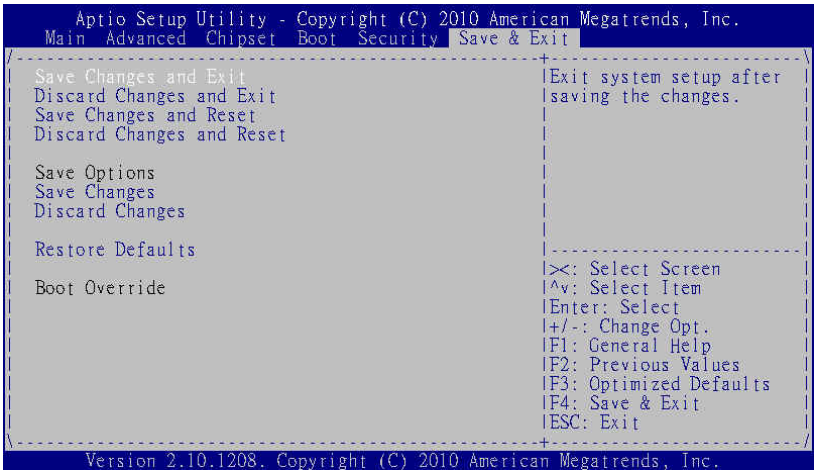
User Password

Use this option to set a password for users with limited access to the BIOS setup utility.

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8.7 Save & Exit

Select the Save & Exit tab from the setup screen to enter the Save & Exit setup screen. You can display a Save & Exit BIOS setup option by highlighting it using the < Arrow > keys. The Save & 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.

Discard Changes and Exit

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

Save Changes and Reset

Reset the system after saving the changes.

Discard Changes and Reset

Reset the system without saving any changes.

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Save Changes

Save changes made so far to any of the setup options.

Discard Changes

Discard changes made so far to any of the setup options.

Restore Defaults

Restore/Load Defaults values for all the setup options.

Boot Override

Use the up/down arrow keys to highlight a boot device to immediately exit the BIOS Setup and boot from the selected device.

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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	17.3	App	03h	This command directs the Responder to perform a 'Warm Reset' of itself.
Get Self Test Results	17.4	App	04h	This command directs the device to return its Self Test results, if any.
Get Device GUID	17.8	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"	17.9	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	18.7	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	21.5	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	21.6	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	21.7	App	25h	This command retrieves the current settings and present countdown of the watchdog timer.
Event Commands				
Set Event Receiver	23.1	S/E	00h	This global command tells a controller where to send Event Messages.
Get Event Receiver	23.2	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")	23.3	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	29.2	S/E	20h	This command returns general information about the collection of sensors in a Dynamic Sensor Device.
Get Device SDR	29.3	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	29.4	S/E	22h	This command is used to obtain a *Reservation ID*.
Set Sensor Hysteresis	29.6	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	29.7	S/E	25h	This command retrieves the present hysteresis values for the specified sensor.
Set Sensor Threshold	29.8	S/E	26h	This command is used to set the specified threshold for the given sensor.
Get Sensor Threshold	29.9	S/E	27h	This command retrieves the threshold for the given sensor.
Set Sensor Event Enable	29.10	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	29.11	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	29.13	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	29.14	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	29.16	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
System Life Time	App (18h)	56h
Statistics of Power Cycle	App (18h)	57h
Voltage Detection from Internal Sensor	App (18h)	58h
Thermal Detection	App (18h)	59h
Voltage Detection from External Sensor	App (18h)	5Ah
System Power Status	App (18h)	5Bh
BIOS Operation Status	App (18h)	5Ch

System Life Time

This command is used to get the period of System Life Time. The units are hours.

Action	Byte	Value	Description
Request	0	18h	NetFn/LUN
	1	56h	Defined command
Response	0	Complete Code	00h means OK
	1:4	System Life Hours	Shows the period of system activation after system is initiated. LS byte last.

Statistics of Power Cycle

This command records the causes of power cycles and times of each occurence.

Action	Byte	Value	Description
Request	0	18h	NetFn/LUN
	1	57h	Defined command

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Action	Byte	Value	Description
Response	0	Complete Code	00h means OK
	1:2	Reset Times on Power Button	The counter is added byt pushing reset button. LS byte last.
	3:4	Reset Times on Payload	The counter is added by system reset request on payload. LS byte last.
	5:6	Reset Times on WDT	The counter is added by Watch Dog Timer function. LS byte last.
	7:8	Reset Times on other cause	The counter is added by other causes. For example : cold reset. LS byte last.
	9	Last Reset Cause	It records the latest cause of triggering reset behavior.

Voltage Detection from Internal Sensor

This command is used to get voltages from internal sensor components.

Action	Byte	Value	Description
Request	0	18h	NetFn/LUN
	1	58h	Defined command
	2	01h~03h	01h : +3.3V MAIN 02h : +5.0V MAIN 03h : +12.0V MAIN
Response	0	Complete Code	00h means OK
	1:2	Assigned Voltage value from Request	It gets digital raw data. The practical value can be translated by formula.

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Thermal Detection

This command is used to get temperatures from external sensor components.

Action	Byte	Value	Description
Request	0	18h	NetFn/LUN
	1	59h	Defined command
	2	01h~02h	01h : CPU Temperature 02h : System Temperature
Response	0	Complete Code	00h means OK
	1:2	Assigned Temperature value from Request	It gets digital raw data. The practical value can be translated by formula.

Voltage Detection from External Sensor

This command is used to get voltages from external sensor components.

Action	Byte	Value	Description
Request	0	18h	NetFn/LUN
	1	5Ah	Defined command
	2	01h~08h	01 : +1.8V 02 : +1.5V 03 : CORE V 04 : VCC GFX 05 : CPU +1.05V 06 : PCH +1.05V 07 : VCCSA 08 : +0.75V
Response	0	Complete Code	00h means OK
	1:2	Assigned Voltage value from Request	It gets digital raw data. The practical value can be translated by formula.

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System Power Status

This command is used to detect system power status via GPIO pin signal on IPMC chip.

Action	Byte	Value	Description
Request	0	18h	NetFn/LUN
	1	5Bh	Defined command
Response	0	Complete Code	00h means OK
	1	00h~01h	00: Power Fail 01 : Power OK

BIOS Operation Status

This command is used to get BIOS operation status. Related status is provided by BIO.

Action	Byte	Value	Description
Request	0	18h	NetFn/LUN
	1	5Ch	Defined command
Response	0	Complete Code	00h means OK
	1	00h~07h	00 : Not Ready. 01 : BIOS Reset. 02 : ROM Check. 03 : Initiate Hardware. 04 : Enter BIOS Menu. 05 : Start BIOS firmware burning process. 06 : Complete BIOS firmware burning process. 07 : POST OK

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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**

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. 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.

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9.6 IPMI Sensors List

Sensor Number	Sensor name	Normal Reading	Sensor Reading Value of IPMI Get Sensor Reading Command
01h	BMC Watchdog		Timeout action: 000b = no action 001b = Hard Reset 000b = Power Down 011b = Power Cycle 100b - 111b = reserved
02h	3.3V	3.3 V	Raw data of 3.3V sensor
03h	5V	5 V	Raw data of 5.0V sensor
04h	12V	12 V	Raw data of 12.0V sensor
05h	CPU Temp	40ºC	Raw data of CPU Temp sensor
06h	SYSTEM Temp	25ºC	Raw data of SYSTEM Temp sensor
07h	+1.8V	1.8V	Raw data of 1.8V sensor
08h	+1.5V	1.5V	Raw data of 1.5V sensor
09h	CORE V	0.3V~1.52V	Raw data of P_VCORE sensor
0Ah	VCC GFX	0V~1.52V	Raw data of VCC_GFX sensor
0Bh	CPU +1.05V	1.05V	Raw data of P1V05_CPU sensor
0Ch	PCH +1.05V	1.05V	Raw data of P1V05_PCH sensor
0Dh	VCCSA	0.75V~0.95V	Raw data of VCCSA sensor
0Eh	+0.75V	0.75V	Raw data of P0V75 sensor
0Fh	System power OK	N/A	Status: 00b : Power Fail 01b : Power OK

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Sensor Number	Sensor name	Normal Reading	Sensor Reading Value of IPMI Get Sensor Reading Command
10h	BIOS POST OK	N/A	BIOS status: 00b : Not Ready. 01b : BIOS Reset. 02b : ROM Check. 03b : Initiate Hardware. 04b : Enter BIOS Menu. 05b : Start BIOS firmware burning process. 06b : Complete BIOS firmware burning process. 07b : POST OK

9.7 Relevant Documents

Document Title	Revision	Source
Intelligent Platform Management Interface Specification v2.0	Document Revision 1.0 February 12, 2004	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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Getting Service

Contact us should you require any service or assistance.

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