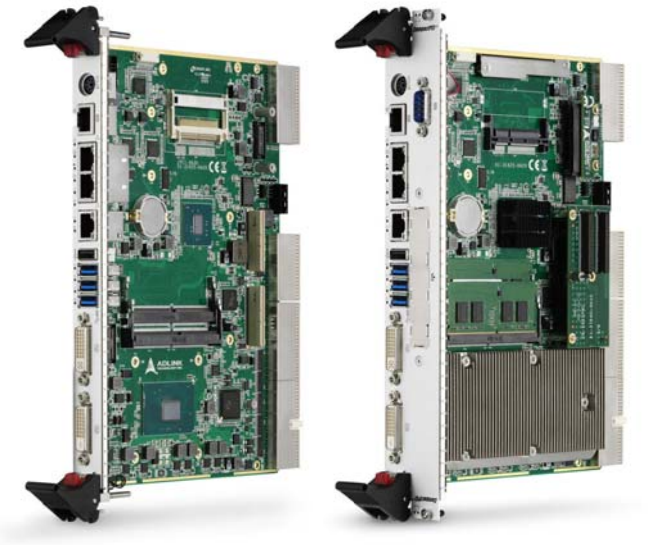
cPCI-6630 Series

Value 6U CompactPCI®
Intel® Core™ i7/i3/Celeron® Processor Blade

User's Manual



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Leading **EDGE COMPUTING**

Revision History

Revision	Release Date	Description of Change(s)
1.0	2018-02-02	Initial release
1.1	2020-06-03	Update block diagram, correct J3 pinout

Preface

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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.

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

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

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-6630 Series is a 6U 4/8 HP CompactPCI® processor blade featuring a 6th generation Intel® Core™ i7/i3/Celeron® processor and Mobile Intel® HM170 PCH with DDR4-2133 non ECC memory up to 32GB via 2 SODIMM sockets. The single-slot 4HP cPCI-6630 features front panel I/O including 1x DVI-I, 1x DVI-D, 3x GbE, 3x USB 3.0, 1x USB 2.0, 1x RJ-45 COM port and 1x PS/2 KB/MS. The dual-slot 8HP cPCI-6630D provides one DB-9 COM port and one 32-bit/33MHz PMC space in additional to single slot version's front panel IO. Available storage options for both the cPCI-6630 and cPCI-6630D include a 1x 2.5" SATA drive space and 1x 7-pin SATA connector. In addition, the cPCI-6630 Series offers an onboard CFast slot with CompactFlash slot as option.

Graphics support for the cPCI-6630 Series is integrated on the CPU. The 6th generation Intel® Core™ processor (formerly "Skylake") supports hardware-accelerated HEVC 8-bit decoding and encoding that brings more efficient and smarter compression for video applications. The cPCI-6630 also supports 3 independent displays when mated with cPCI-R6002 or cPCI-R6100 rear transition modules.

Rear I/O signals to RTM include 2x GbE by Intel® Ethernet Controller I210 switched from the front panel, 1x DVI-I switchable to J3, 1x DVI-D to J5, 1x PCIe x4 (configurable to 4x PCIe x1), 2x SATA 3 Gb/s, 6x USB 2.0, 5x GPIO, High Definition Audio, KB/MS, and 2x serial ports.

The cPCI-6630 Series is powered by 5V only, offers balanced performance provided by the 6th generation Intel® Core™ processor family, and is an ideal solution for industrial applications that require best value-per-watt computing power. The cPCI-6630 Series provides additional flexibility by supporting operation in peripheral slots without CompactPCI bus communication (Satellite mode), as well as supporting remote monitoring and manageability using ADLINK's SEMA Utilities 3.5, making it Industry 4.0 ready.

1.2 Features

- 6U CompactPCI blade in 4/8HP width form factor
- Powered by single 5V power rail
- 14nm Intel® Core™ i7-6820EQ Processor (4 cores, 8 threads, 8MB Smart Cache, 2.8 GHz) and Mobile Intel® HM170 Chipset
- Graphics and memory controllers integrated in processor
- Supports H.265 hardware-accelerated HEVC 8-bit decoding and encoding
- Dual channel DDR4-2133 non-ECC via 2x DDR4-2133 SODIMM socket, up to 32GB
- 64bit/66MHz CompactPCI Interface based on PCI specifications, universal V(I/O)
- Supports Host mode operation as a master in host slots and supports Satellite mode operation as a standalone computer without connection to the PCI bus
- One 32-bit/33MHz PMC site on cPCI-6630D
- One DVI-I port and one DVI-D on front panel
- Three PCIe Gigabit Ethernet egress ports on front panel supported by an Intel Ethernet controller, one supports Intel® AMT 9.0 by Intel® Ethernet Controller I219LM, two Ethernet ports are switchable to J3 for PICMG 2.16
- Additional two Gigabit Ethernet ports with cPCI-R6100 Series RTM
- Three USB 3.0 ports and one USB 2.0 port on front panel
- High definition audio routed to RTM
- Onboard 2.5" SATA SSD space and one 7-pin SATA connector
- Optional CFast or CompactFlash slot (CFast by default)
- Optional SEMA 3.0/3.5 for system management

1.3 Package Contents

The cPCI-6630 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-6630 Series non-standard configurations will vary depending on customer requests.

cPCI-6630 Processor Blade

- Processor Blade
  - CPU and memory specifications will differ depending on options selected
  - Thermal module is assembled on the board
- DVI-I to VGA adapter (PN: 30-52002-1000)
- RJ-45 to DB-9 COM adapter cable (PN: 30-01020-0200)
- PS/2 keyboard/mouse combo cable (PN: 30-01016-2000)
- 2.5" SATA drive accessory pack (PN: 58-99097-0010)
- 2.5” SATA adapter board (PN: 59-37571-0000)
- CFast accessory pack (PN: 58-99721-0000, CFast SKU only)

cPCI-6630D Processor Blade

Same as the cPCI-6630 with the following additional items:

- PMC accessory pack (cPCI-6630D only)
- PMC adapter board (PN: 59-37540-0010)

Compatible Rear Transition Modules

- cPCI-R6002 (PN: 91-37197-3010)
- cPCI-R6002D (PN: 91-37197-3130)
- cPCI-R6100 (PN: 91-37199-0040)
- cPCI-R6110 (PN: 91-37199-1040)
- cPCI-R6120 (PN: 91-37199-401E)

NOTE:

The contents of non-standard cPCI-6630 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.

2 Specifications

2.1 cPCI-6630(D) Processor Blade Specifications

CompactPCI® Standards	• PICMG® 2.0 CompactPCI® Rev. 3.0 • PICMG® 2.1 Hot Swap Specification Rev. 2.0 • PICMG® 2.16 Packet Switching Backplane Rev. 1.0
Mechanical	• Standard 6U CompactPCI® • Board size: 233mm x 160mm • Single/dual-slot (4/8HP, 20.32/40.64mm) • CompactPCI® connectors: J1, J2, J3, J5
Processor	• Intel® Core™ i7-6820EQ Processor, quad core, eight thread, 2.8 GHz (3.5 GHz Turbo), 8MB Smart Cache, TDP 45W • Intel® Core™ i3-6100E Processor, dual core, four thread, 2.7 GHz, 3MB Smart Cache, TDP 35W • Intel® Celeron® Processor G3900E, dual core, dual thread, 2.4 GHz, 2MB Smart Cache, TDP 35W • Passive heatsink
Chipset	• Mobile Intel® HM170 PCH
Memory	• Dual channel DDR4-2133 non-ECC memory via 2x SODIMMs • Supports up to 32GB
Graphics	• Integrated on Intel® Core™ i7-6820EQ and Core™ i3-6100E processors,: Intel® HD Graphics 530 • Integrated on Intel® Celeron® processor G3900E,: Intel® HD Graphics 510 • One DVI-I and one DVI-D port on front panel with shared VGA signal switchable to J3 and DisplayPort signal switchable to J5 • Up to three independent displays with cPCI-R6002 and cPCI-R6100 RTMs
Gigabit Ethernet	• One PCIe x1 Intel® I219LM GbE PHY and two PCIe x1 Intel® I210IT Gigabit Ethernet controllers • Three egress 10/100/1000BASE-T ports on front panel, one supporting Intel® AMT 9.0 by I219LM PHY controller, and two others 10/100/1000BASE-T ports switchable to rear for PICMG 2.16
CompactPCI Bus	• PCI 64-bit/66MHz; 3.3V, 5V universal V I/O • Supports Host mode operation as a master in host slots and supports Satellite mode operation as a standalone computer without connection to the PCI bus

Table 2-1: cPCI-6630 Processor Blade Specifications

Serial Ports	• Up to four serial ports • Up to two RS-232/422/485 serial ports on front panel (one on cPCI-6630, two on cPCI-6630D) • Two RS-232 COM port routed to J3
USB 2.0	• One USB 2.0 port on front panel • Up to six USB 2.0 ports routed to rear transition module
USB 3.0	• Three USB 3.0 ports on front panel
PMC	• One 32-bit/33 MHz PMC site
Audio	• High definition audio routed to rear
Storage Interfaces[1]	• One onboard 2.5” SATA connector supporting SATA 6Gb/s drive on cPCI-6630 • Optional onboard CFast slot or CompactFlash slot • One SATA 3Gb/s 7-pin connector onboard • Three SATA 3Gb/s channels routed to RTM (two to J3 and one to J5)
Faceplate I/O	cPCI-6630 (4HP) • 3x 10/100/1000BASE-T Ethernet ports • 1x DVI-I port & 1x DVI-D port • 3x USB 3.0 ports • 1x USB 2.0 port • 1x RJ-45 serial port supporting RS-232/422/485 • 1x PS/2 keyboard/mouse port cPCI-6630D (8HP) • 3x 10/100/1000BASE-T Ethernet ports • 1x DVI-I port & 1x DVI-D port • 3x USB 3.0 ports • 1x USB 2.0 port • 1x RJ-45 serial port & 1x DB-9 serial port supporting RS-232/422/485 • 1x PS/2 keyboard/mouse port • 1x PMC slot
BIOS	• AMI UEFI BIOS, 64 Mbit SPI serial flash, supports Configurable TDP (can be set as Nominal and Down)
OS Compatibility	• Microsoft Windows 7 64-bit • Microsoft Windows 8.1 64-bit • Microsoft Windows 10 64-bit • Red Hat Enterprise Linux 6.4, 64-bit • Fedora 14, 32-bit • VxWorks 6.8/6.9/7 • QNX 6.5/6.6 • Other OS support upon request

Table 2-1: cPCI-6630 Processor Blade Specifications

Environmental	• Operating Temperature (with forced air flow)[2]: Standard: -20°C to +60°C Extended: -20°C to +70°C with forced air flow • Storage Temperature: -50°C to 100°C • Humidity: 95% @60°C non-condensing • Shock: 20G peak-to-peak, 11ms duration, non-operating • Vibration[1]: 2Grms, 5-500Hz, each axis, operating (w/o hard drive)
EMI	• FCC 47 CER Part 15 Class B • CE EN55032 Class B • IEC 61000 Class A

Table 2-1: cPCI-6630 Processor Blade Specifications

1. 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.
2. ADLINK-certified thermal design. The thermal performance is dependent on the chassis cooling design. Sufficient forced air-flow is required. Temperature limits of optional mass storage devices may also affect the thermal specification.

2.2 Block Diagrams

cPCI-6630(D) Blade

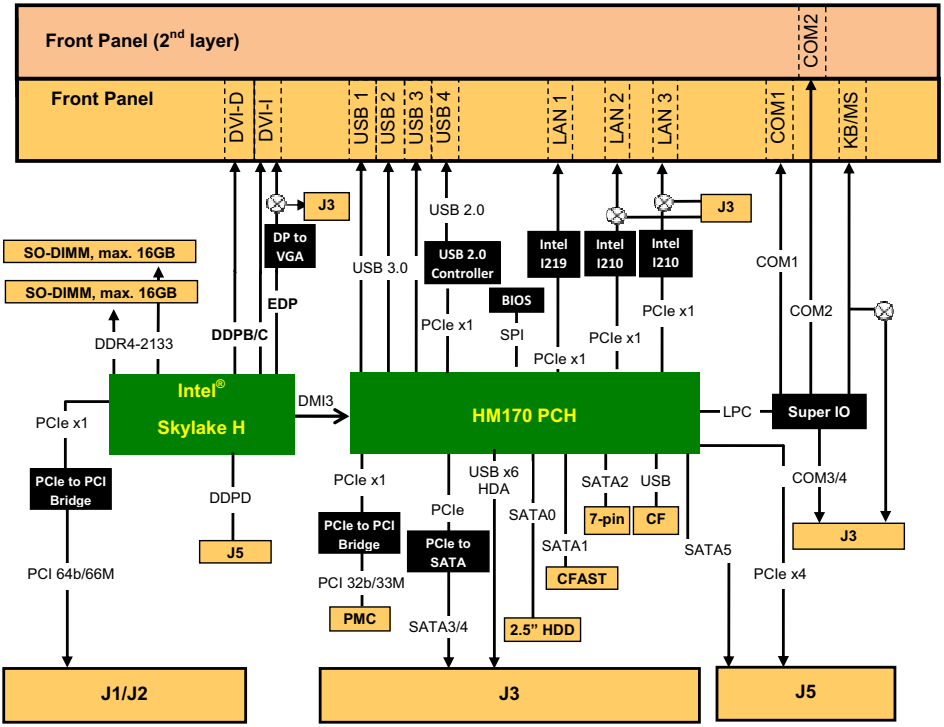

Figure 2-1: cPCI-6630(D) Blade Functional Block Diagram

2.3 I/O Connectivity Table

Function	cPCI-6630 (4HP)		cPCI-6630D (8HP)	
	Faceplate	Onboard	Faceplate	Onboard
Gigabit Ethernet	Y x3	–	Y x3	–
COM	Y x1 (RJ-45)	–	Y x2 (RJ-45 & DB-9)	–
USB 3.0	Y x3	–	Y x3	–
USB 2.0	Y x1	–	Y x1	–
DVI-I	Y x1	–	Y x1	–
DVI-D	Y x1	–	Y x1	–
PS/2 KB/MS	Y x1	–	Y x1	–
Serial ATA	–	Y x2 (one for 2.5" drive, one 7-pin SATA connector)	–	Y x2 (one for 2.5" drive, one 7-pin SATA connector)
CFast/CF	–	Default CFast (CF by option)	–	Default CFast (CF by option)
PMC	–	–	–	Y x1
LEDs	Y x4	–	Y x4	–

Table 2-2: cPCI-6630(D) I/O Connectivity

2.4 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 cPCI-6630 is designed with 5V input only to ensure product stability. The tolerance of the voltage lines described in the CompactPCI specification (PICMG 2.0 R3.0) is +5%/-3% for 5V, 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
V I/O (PCI I/O Buffer Voltage)	+5 VDC	+5% / -3%	50 mV
GND			

Power Consumption

This section provides information on the power consumption of the cPCI-6630(D) when using Intel® Core™ i7/Celeron® processors with 4GB DDR4-2133 SODIMM memory. Storage device is used with ADLINK ASD26-MLC64G-CT 64GB SATA SSD. The cPCI-6630 is powered by 5V only. Power consumption at 100% CPU usage was measured by running Intel Thermal Analysis Tool 5.0.1026 (TAT).

Intel® Core™i7-6820EQ (BIOS EIST enabled, cTDP nominal)		
OS/Mode	**Current 5V**	**Total Power**
Windows 7, Idle mode	2.35 A	11.75 W
Windows 7, CPU 100% stress	12.78 A	63.9 W
Windows 7, BurnIn Test system stress	14.58 A	72.9W

Intel® Core™i3-6100E (BIOS EIST enabled, cTDP nominal)		
OS/Mode	**Current 5V**	**Total Power**
Windows 7, Idle mode	2.33 A	11.65 W
Windows 7, CPU 100% stress	6.26 A	31.30 W
Windows 7, BurnIn Test system stress	7.81 A	39.05W

Intel® Celeron® G3900E (BIOS EIST enabled, cTDP nominal)		
OS/Mode	**Current 5V**	**Total Power**
Windows 7, Idle mode	2.32 A	11.60 W
Windows 7, CPU 100% stress	4.22 A	21.1 W
Windows 7, BurnIn Test system stress	5.83 A	29.15W

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3 Functional Description

The following sections describe the cPCI-6630 Series features and functions.

3.1 Processors

The Mobile 5th Generation Intel® Core™ Processor Family are state of the art, 64-bit, multi-core mobile processor built on 22 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 an Integrated Display Engine, Processor Graphics and Integrated Memory Controller.

The cPCI-6630 Series supports Intel® Core™ i7/i5 processors. The table below lists the general specifications and power ratings of the CPUs supported by the cPCI-6630 Series.

Features	Core™ i7-6820EQ	Core™ i3-6100E	Celeron® G3900E
Clock Speed	2.8GHz	1.6 GHz	2.4 GHz
Max. Single Core Turbo Freq.	3.5GHz	NA	NA
Last Level Cache	8MB Smart Cache	3MB Smart Cache	2MB Smart Cache
No. of Core(s)	4/8	2/4	2/2
Max. Power (TDP[1])	45W	35W	35W
DMI	8 GT/s DMI3	8 GT/s DMI3	8 GT/s DMI3
$T_{junction, MAX}$[2]	100°C	100°C	100°C
Processor Graphics	Intel® HD Graphics 530	Intel® HD Graphics 530	Intel® HD Graphics 510
Graphics Base Frequency (Max)	350 MHz (1 GHz)	350 MHz (950 MHz)	350 MHz (950 MHz)

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.

Supported Technologies

Feature	Core™ i7-6820EQ	Core™ i3-6100E	Celeron® G3900E
Intel® Turbo Boost Technology	2.0	No	No
Intel® vPro Technology	Yes	No	No
Intel® Hyper-Threading Technology	Yes	Yes	No
Intel® Virtualization Technology (Intel® VT-x)	Yes	Yes	Yes
Intel® Virtualization Technology for Directed I/O (Intel® VT-d)	Yes	Yes	Yes
Intel® VT-x with Extended Page Tables (EPT)	Yes	Yes	Yes
Intel® TSX-NI	Yes	Yes	No
Intel® 64 Architecture	Yes	Yes	Yes
Instruction Set Extensions	SSE4.1/4.2, AVX 2.0	SSE4.1/4.2, AVX 2.0	SSE4.1/4.2
Execute Disable Bit	Yes	Yes	No
Enhanced Intel SpeedStep® Technology	Yes	Yes	Yes

Interfaces

- Two channels of DDR4-2133 non ECC memory
- Memory DDR4 data transfer rates of 2133 MT/s
- 64-bit wide channels
- DDR4 I/O Voltage of 1.2V
- 4Gb and 8Gb DDR4 DRAM technologies are supported for x8 and x16 devices (using 8Gb device technologies, the largest memory capacity possible is 16GB, assuming dual-channel mode with x8, dual-ranked SDRAM)
- PCI Express ports are fully-compliant with the PCI Express Base Specification, Revision 2.0.
- 5 GT/s point-to-point DMI interface to PCH is supported

Graphics

The Intel® HD Graphics 530 for Core™ i7 and Core™ i3 and Intel® HD Graphics 510 for Celeron® is integrated in the processor enabling substantial gains in performance and lower power consumption.

- DX12 support
- OpenGL 4.4, OpenCL 1.2 support
- Graphics Base Frequency: 3500 MHz
- Graphics Max Dynamic Frequency: 1 GHz for Core™ i7 and 950MHz for Core™ i3 and Celeron®
- Graphics Video Max Memory: 64GB
- Supports Intel® InTru™ 3D Technology

3.2 Chipset

The cPCI-6630(D) is equipped with Mobile Intel® HM170 Chipset. Functions and capabilities include:

- PCI Express Base Specification, Revision 3.0 support for up to 16 Gen3 lanes
- CPU interfaces with DMI3, transfers rate up to 8 GT/s
- Supports xHCI only
- ACPI Power Management Logic Support, Revision 4.0a
- Supports Intel® High Definition Audio Technology (Intel® HD Audio)
- Supports Intel® Rapid Storage Technology (Intel® RST)
- Supports Intel® Virtualization Technology for Directed I/O (Intel® VT-d)
- Supports Intel® vPro Technology
- Supports Intel® Smart Response Technology
- Supports Intel® Stable Image Platform Program (SIPP)
- Supports Intel® Small Business Advantage
- Integrated Clock Controller
- Low Pin Count (LPC) interface
- Firmware Hub (FWH) interface support
- Serial Peripheral Interface (SPI) support

3.3 PMC

The cPCI-6630D supports one 32-bit/33MHz PMC site for front panel I/O expansion. The PMC site provides a maximum 32-bit/33 MHz PCI bus link using a TI XIO2001 PCI-Express-to-PCI bridge via PCI-Express x4 link. The PMC site supports +3.3V signaling only.

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, and disabling Hyper-Threading Technology using the BIOS for all previous versions of Windows operating systems.

3.6 Battery

The cPCI-6630(D) is equipped with a 3.0V "coin cell" lithium battery for the real time clock (RTC). The lithium battery must be replaced with an identical battery or a battery type recommended by the manufacturer. A Rayovac BR2032 is equipped on board by default.

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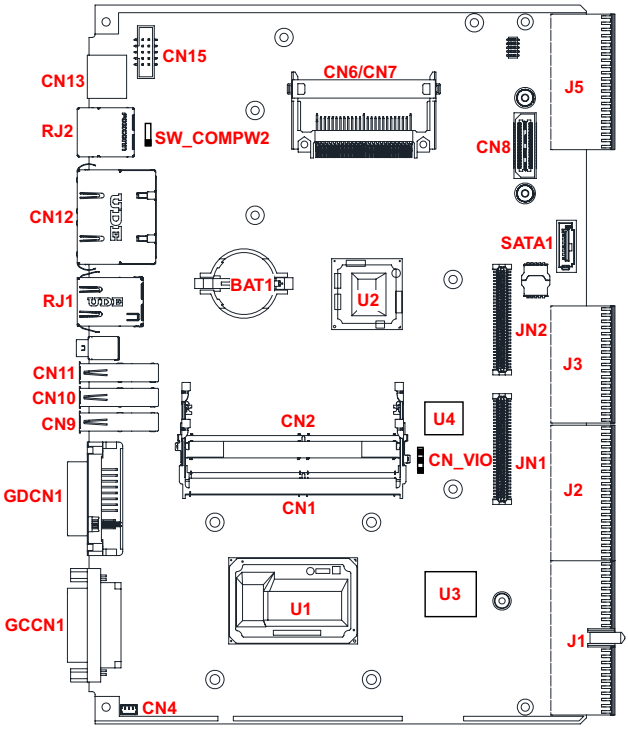
4 Board Interfaces

This chapter illustrates the board layout, connector pin assignments, and jumper settings to familiarize users with the cPCI-6630 Series.

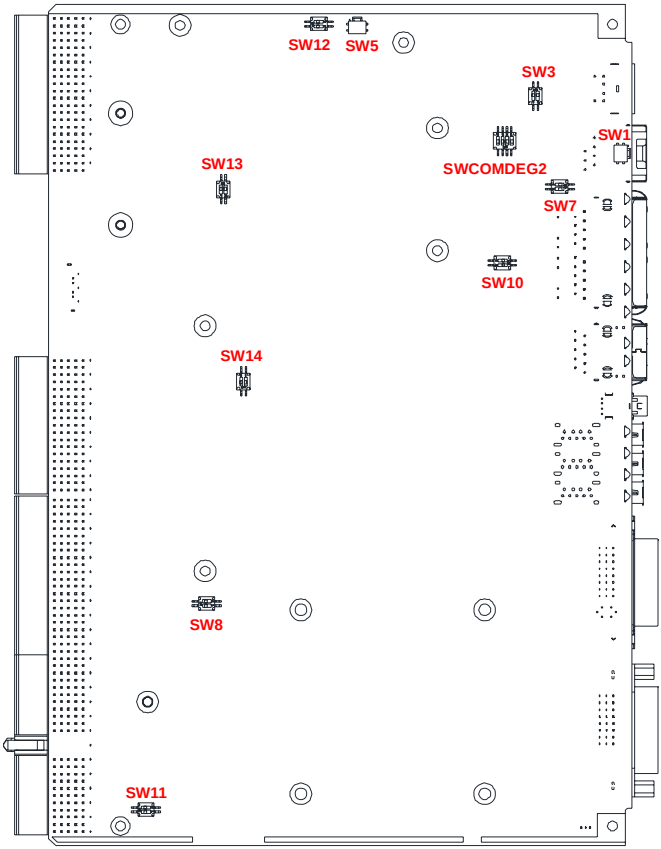
4.1 cPCI-6630(D) Component Side Layout



U1	Intel® processor	**U2**	Intel® PCH
U3	Pericom PI7C9X130	**U4**	TI XIO2001I
CN1/CN2	Memory socket	**JN1/JN2**	PMC board-to-board conn.
BAT1	Battery	**CN4**	Micro-switch socket
CN6/CN7	CFast/CF socket co-lay	**CN8**	SATA board-to-board conn.
CN9/10/11	USB 3.0 connector	**USB1**	USB 2.0 connector
CN12/RJ1	LAN connectors	**RJ2**	COM1 connector
CN13	PS/2 connector	**GCCN1**	DVI-D connector
J1/J2/J3/ J5	CompactPCI connectors	**GDCN1**	DVI-I connector
		SW_COMPW2	Reserved

Figure 4-1: cPCI-6630(D) Component Side Layout

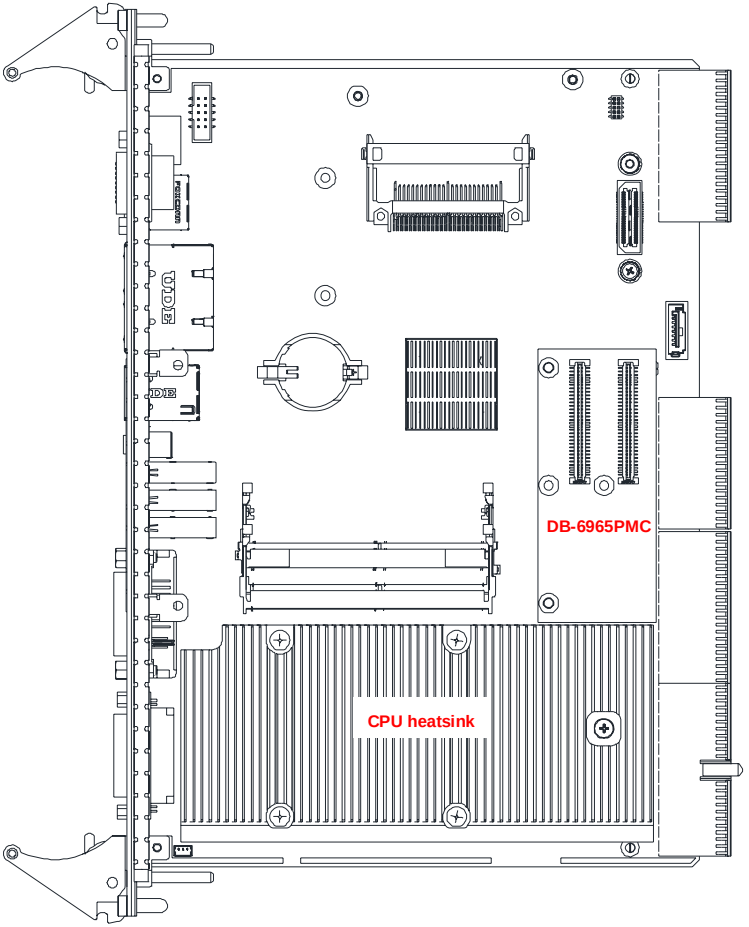
4.2 cPCI-6630 Solder Side Layout



SW_COMDEG2	Reserved	**SW10**	LAN (CN12) front/rear switch
SW1	Reset button	**SW11**	“Force ejector handle closed” switch
SW3	COM2 mode switch	**SW12**	PS/2 front/rear switch
SW5	Clear CMOS	**SW13**	DVI-D digital signal front/rear switch
SW7	COM1 mode switch	**SW14**	Reserved
SW8	DVI-I VGA signal front/rear switch		

Figure 4-2: cPCI-6630(D) Solder Side Layout

4.3 cPCI-6630D Assembly Layoutt

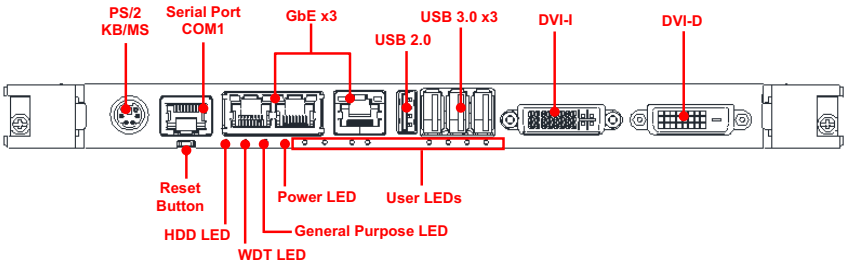


DB-6965PMC	32Bit/33MHz PMC adapter

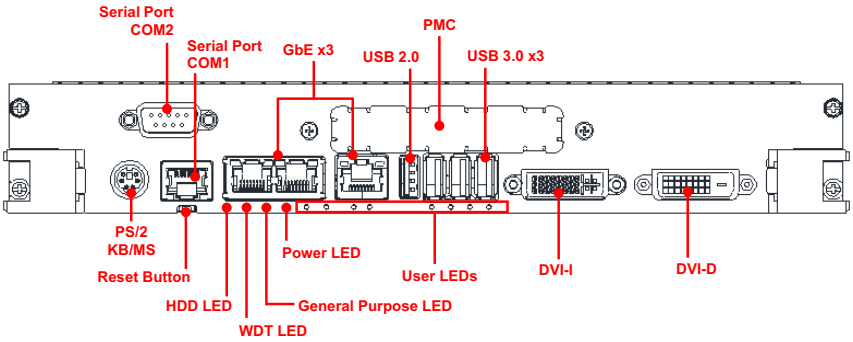
Figure 4-3: cPCI-6630D Assembly Layout

4.4 cPCI-6630(D) Front Panel

cPCI-6630



cPCI-6630D



System LEDs

LED	Color	Condition	Indication
Power	Green/ Red	Off	System is off
		Red	System Power ready (PWGD)
		Green	Post OK
WDT	Orange	Off	No Watchdog event
		Blinking	Watchdog event alert
HDD	Yellow	Off	No CF/CFast/SATA HDD activity
		Blinking	Data read/write in process for CF/CFast/ SATA HDD
General Purpose	Blue	Off Fast Blink On Slow Blink	Off by default (user programmable, connected to PCH and BMC; contact ADLINK for more information)

Table 4-1: cPCI-6630(D) Front Panel System LED Descriptions

4.5 User LEDs

During bootup, the eight User LEDs on the faceplate display port 80h POST codes in hexadecimal during boot up. Users can use the POST codes to identify issues during the BIOS POST process. In default mode, these eight LEDs display the POST code output to Port 80h during system bootup. The LED number corresponds to the bit number (from "0" to "7"). For example, if the bit7 > bit0 output is "01110101", then the port 80h output is "75h" (see Chapter 9 Checkpoints & Beep Codes on page 115).

Each LED indicates a corresponding bit of the port 80h POST code. Refer to the figure and table below.

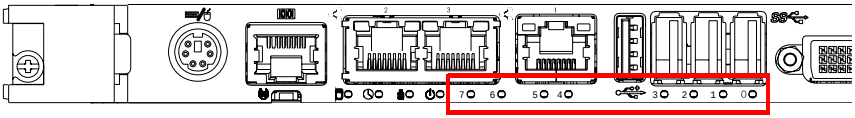


Figure 4-4: cPCI-6630(D) LED Labels

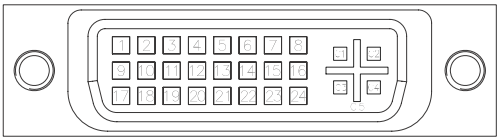
	LED No.	Port 80h bit
Low Nibble	LED 0	Port 80h bit0
	LED 1	Port 80h bit1
	LED 2	Port 80h bit2
	LED 3	Port 80h bit3
High Nibble	LED 4	Port 80h bit4
	LED 5	Port 80h bit5
	LED 6	Port 80h bit6
	LED 7	Port 80h bit7

After the system is under OS control, the eight User LEDs can be controlled as user defined LEDs. The LEDs are connected to eight GPIO pins of the Super I/O IT8786. See Section 7.2 for information on programming the User LEDs.

For assistance using the User LEDs, please log in to: **http://askanexpert.adlinktech.com**.

4.6 Connector Pin Assignments

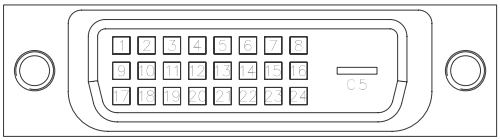
DVI-I Connector (GDCN1)



Pin #	Signal	Pin #	Signal
1	TMDS Data2-	16	Hot Plug Detect
2	TMDS Data2+	17	TMDS Data0-
3	GND	18	TMDSData0+
4	NC	19	GND
5	NC	20	NC
6	DDC Clock [SCL]	21	NC
7	DDC Data [SDA]	22	GND
8	Analog vertical sync	23	TMDS Clock +
9	TMDS Data1-	24	TMDS Clock -
10	TMDS Data1+	C1	Analog Red
11	GND	C2	Analog Green
12	NC	C3	Analog Blue
13	NC	C4	Analog Horizontal Sync
14	+5 V Power	C5	Analog GND Return
15	GND		

Table 4-2: DVI-I Connector Pin Definition

DVI-D Connector (GCCN1)



Pin #	Signal	Pin #	Signal
1	TMDS Data2-	16	Hot Plug Detect
2	TMDS Data2+	17	TMDS Data0-
3	GND	18	TMDSData0+
4	NC	19	GND
5	NC	20	NC
6	DDC Clock [SCL]	21	NC
7	DDC Data [SDA]	22	GND
8	Analog vertical sync	23	TMDS Clock +
9	TMDS Data1-	24	TMDS Clock -
10	TMDS Data1+	C1	NC
11	GND	C2	NC
12	NC	C3	NC
13	NC	C4	NC
14	+5 V Power	C5	GND
15	GND		

Table 4-3: DVI-D Connector Pin Definition

USB 2.0 Connectors

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

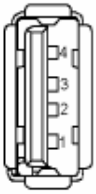
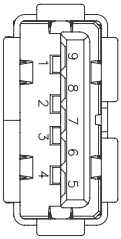


Table 4-4: USB 2.0 Pin Definition

USB 3.0 Connectors

Pin #	Signal Name
1	VCC
2	Data-
3	Data+
4	GND
5	RX_N
6	RX_P
7	GND
8	TX_N
9	TX_P



COM1 (RJ-45)

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

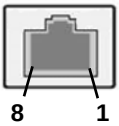


Table 4-5: Front Panel COM1 Pin Definitions

COM2, COM RJ-45 to DB-9 Cable

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

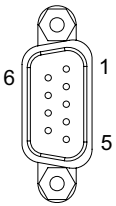
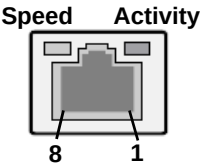


Table 4-6: COM RJ-45 to DB-9 Cable Pin Definitions

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 4-7: RJ-45 GbE Pin Definitions



Status		Speed LED (Green/Amber)	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	Amber	ON
	Active	Amber	Blinking

Table 4-8: LAN LED Status Definitions

Serial ATA 7-pin Connector (SATA1)

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

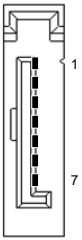


Table 4-9: Serial ATA 7-pin Connector Pin Definition

Serial ATA Connector with Power

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

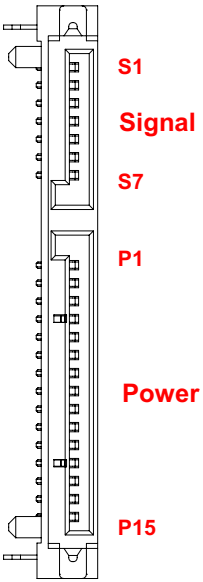


Table 4-10: Serial ATA Connector with power Pin Definition

CFast Socket

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
+3.3V	P13
+3.3V	P14
Ground	P15
Ground	P16
CFast_CDO	P17

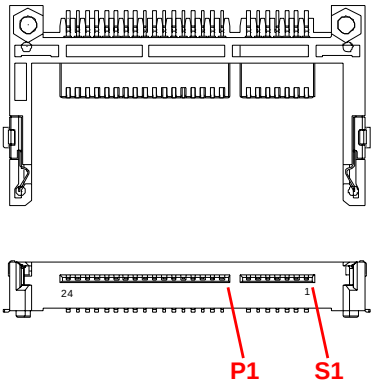


Table 4-11: CFast Socket Pin Definition

PMC Connectors (JN1, JN2)

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	PCI_PCLK0	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	P3V3
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	PCI_VIO	PCIX_AD16
32	PCIX_AD17	PCIX_CBE-L2

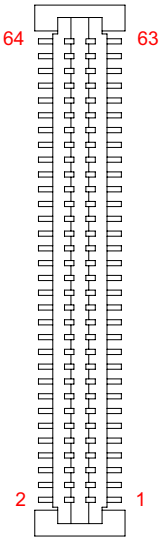


Table 4-12: PMC Connector Pin Definitions

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	PMC_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	P1_REQ64-L	NC

Table 4-12: PMC Connector Pin Definitions (cont'd)

CompactPCI J1 Connector

Pin	Z	A	B	C	D	E	F
25	GND	+5V	CPCI_REQ64-L	CPCI_ENUM-L	+3.3V	+5V	GND
24	GND	CPCI_AD1	+5V	CPCI_VIO	CPCI_AD0	CPCI_ACK64-L	GND
23	GND	+3.3V	CPCI_AD4	CPCI_AD3	+5V	CPCI_AD2	GND
22	GND	CPCI_AD7	GND	+3.3V	CPCI_AD6	CPCI_AD5	GND
21	GND	+3.3V	CPCI_AD9	CPCI_AD8	CPCI_M66EN	CPCI_CBE-L0	GND
20	GND	CPCI_AD12	GND	CPCI_VIO_STB	CPCI_AD11	CPCI_AD10	GND
19	GND	+3.3V	CPCI_AD15	CPCI_AD14	GND	CPCI_AD13	GND
18	GND	CPCI_SERR-L	GND	+3.3V	CPCI_PAR	CPCI_CBE-L1	GND
17	GND	+3.3V	IPMCB_CLK	IPMB_DAT	GND	CPCI_PERR-L	GND
16	GND	CPCI_DEVSEL-L	GND	CPCI_VIO	CPCI_STOP-L	CPCI_LOCK-L	GND
15	GND	+3.3V	CPCI_FRAME-L	CPCI_IRDY-L	CPCI_BDSEL-L	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	+3.3V	CPCI_AD20	CPCI_AD19	GND
9	GND	CPCI_CBE-L3	CPCI_IDSEL	CPCI_AD23	GND	CPCI_AD22	GND
8	GND	CPCI_AD26	GND	CPCI_VIO	CPCI_AD25	CPCI_AD24	GND
7	GND	CPCI_AD30	CPCI_AD29	CPCI_AD28	GND	CPCI_AD27	GND
6	GND	CPCI_VIO	CPCI_PRESENT-L	+3.3V	CPCI_CLK0	CPCI_AD31	GND
5	GND	NC	NC	CPCI_RST-L	GND	CPCI_VIO	GND
4	GND	+5V_IPMB	IPMC_HEALTHY-L	CPCI_VIO_STB	NC	NC	GND
3	GND	CPCI_INTA-L	CPCI_INTB-L	CPCI_INTC-L	+5V	CPCI_INTD-L	GND
2	GND	NC	+5V	NC	NC	NC	GND
1	GND	+5V	-12V	NC	+12V	+5V	GND

Table 4-13: CompactPCI J1 Connector Pin Definition


NOTE:

The 3.3V and +/-12V pins are reserved in design but not connected by default. These pins are floating when the backplane does not provide power input. The B1 -12V pin is floating when the backplane does not support N12V input. But if the backplane supports B1 -12V power input, this pin will have -12V. This design does not impact the usage of the cPCI-6630.

The 3.3V and +/-12V pins can utilized by BOM option. Contact ADLINK if 3.3V and +/-12V input are required.

CompactPCI J2 Connector

Pin	Z	A	B	C	D	E	F
22	GND	GA4	GA3	GA2	GA1	GA0	GND
21	GND	CPCI_CLK6	GND	NC	NC	NC	GND
20	GND	CPCI_CLK5	GND	NC	GND	NC	GND
19	GND	GND	GND	IPMB_DAT	IPMB_CLK	IPMB_PWR	GND
18	GND	NC	NC	NC	GND	NC	GND
17	GND	NC	GND	J2_RST-L	CPCI_REQ-L6	CPCI_GNT-L6	GND
16	GND	NC	NC	CPCI_DEG-L	GND	NC	GND
15	GND	NC	GND	CPCI_FAL-L	CPCI_REQ-L5	CPCI_GNT-L5	GND
14	GND	CPCI_AD35	CPCI_AD34	CPCI_AD33	GND	CPCI_AD32	GND
13	GND	CPCI_AD38	GND	CPCI_VIO	CPCI_AD37	CPCI_AD36	GND
12	GND	CPCI_AD42	CPCI_AD41	CPCI_AD40	GND	CPCI_AD39	GND
11	GND	CPCI_AD45	GND	CPCI_VIO	CPCI_AD44	CPCI_AD43	GND
10	GND	CPCI_AD49	CPCI_AD48	CPCI_AD47	GND	CPCI_AD46	GND
9	GND	CPCI_AD52	GND	CPCI_VIO	CPCI_AD51	CPCI_AD50	GND
8	GND	CPCI_AD56	CPCI_AD55	CPCI_AD54	GND	CPCI_AD53	GND
7	GND	CPCI_AD59	GND	CPCI_VIO	CPCI_AD58	CPCI_AD57	GND
6	GND	CPCI_AD63	CPCI_AD62	CPCI_AD61	GND	CPCI_AD60	GND
5	GND	CPCI_CBE-L5	CPCI_DEV64-L	CPCI_VIO	CPCI_CBE-L4	CPCI_PAR64	GND
4	GND	CPCI_VIO	NC	CPCI_CBE-L7	GND	CPCI_CBE-L6	GND
3	GND	CPCI_CLK4	GND	CPCI_GNT-L3	CPCI_REQ-L4	CPCI_GNT-L4	GND
2	GND	CPCI_CLK2	CPCI_CLK3	SYSEN-L	CPCI_GNT-L2	CPCI_REQ-L3	GND
1	GND	CPCI_CLK1	GND	CPCI_REQ-L1	CPCI_GNT-L1	CPCI_REQ-L2	GND

Table 4-14: CompactPCI J2 Connector Pin Definition

CompactPCI J3 Connector

Pin	Z	A	B	C	D	E	F
19	GND	P5V	P5V	P12V	P5V	P5V	GND
18	GND	LAN3_MDI0_P	LAN3_MDI0_N	GND	LAN3_MDI2_P	LAN3_MDI2_N	GND
17	GND	LAN3_MDI1_P	LAN3_MDI1_N	GND	LAN3_MDI3_P	LAN3_MDI3_N	GND
16	GND	LAN2_MDI0_P	LAN2_MDI0_N	GND	LAN2_MDI2_P	LAN2_MDI2_N	GND
15	GND	LAN2_MDI1_P	LAN2_MDI1_N	GND	LAN2_MDI3_P	LAN2_MDI3_N	GND
14	GND	USB_OC3-L	USB_OC4-L	USB_OC5-L	USB_OC6-L	USB_OC7-L	GND
13	GND	USB8-P	USB8-N	GND	USB9-P	USB9-N	GND
12	GND	USB6-P	USB6-N	GND	USB7-P	USB7-N	GND
11	GND	USB4-P	USB4-N	GND	USB5-P	USB5-N	GND
10	GND	USB_OC2-L	DVID_SCL_ RTM_J3	DVID_SDA_ RTM_J3	CRT_HSYNC	CRT_VSYNC	GND
9	GND	COM3_CTS-L	COM3_RI-L	CRT_BLUE	CRT_RED	CRT_GREEN	GND
8	GND	COM3_RXD	COM3_TXD	COM3_DTR-L	COM3_DSR-L	COM3_RTS-L	GND
7	GND	COM4_TX	COM4_RX	COM3_DCD-L	IPMB_CLK	IPMB_DAT	GND
6	GND	SATA0_RXPC	SATA0_RXNC	GND	SATA1_RXPC	SATA1_RXNC	GND
5	GND	GND	GND	NC	GND	GND	GND
4	GND	SATA0_TXPC	SATA0_TXNC	GND	SATA1_TXPC	SATA1_TXNC	GND
3	GND	KBDATA	KBCLK	NC	MSDATA	MSCLK	GND
2	GND	A_HDA_SDIN1	AUD_SDIN2	NC	AUD_DOCK_ EN-L	AUD_DOCK_ RST-L	GND
1	GND	A_HDA_RST-L	A_HDA_SYNC	A_HDA_BIT_CLK	A_HDA_SDOUT	A_HDA_SDIN0	GND

Table 4-15: CompactPCI J3 Connector Pin Definition

USB	
Audio	
DVI	
LAN	
SATA	
COM	

CompactPCI J5 Connector

Pin	Z	A	B	C	D	E	F
22	GND	PWELED-L	LAN2_LED_ ACT-L	NC	LAN3_LED_ ACT-L	NC	GND
21	GND	NC	NC	NC	NC	NC	GND
20	GND	NC	NC	NC	NC	NC	GND
19	GND	NC	NC	NC	NC	NC	GND
18	GND	NC	NC	DETECT-L	NC	NC	GND
17	GND	NC	NC	REAR_GPIO8	NC	NC	GND
16	GND	NC	NC	REAR_GPIO7	NC	NC	GND
15	GND	NC	NC	REAR_GPIO6	SATA_RX3_P_C	SATA_RX3_N_C	GND
14	GND	NC	NC	GND	SATA-TX3_P_C	SATA-TX3_N_C	GND
13	GND	LAN2_LED_ 100-L	LAN3_LED_ 100-L	NC	LAN3_LED_ 1000-L	LAN2_LED_ 1000-L	GND
12	GND	DVI_SDA_RTM	DVI_SCL_RTM	DVI_HPD_RTM	NC	NC	GND
11	GND	DVID_TX2_P_C	DVID_TX2_N_C	GND	DVID_CLK_P_C	DVID_CLK_N_C	GND
10	GND	DVID_TX0_P_C	DVID_TX0_N_C	GND	DVID_TX1_P_C	DVID_TX1_N_C	GND
9	GND	REAR_GPIO1	REAR_GPIO2	REAR_GPIO3	REAR_GPIO4	REAR_GPIO5	GND
8	GND	GPIOLED-L	WDTLED-L	NC	HDDLED_R	NC	GND
7	GND	GND	GND	BAT_RTM	GND	GND	GND
6	GND	CLK_REAR-P	CLK_REAR-N	GND	PLTRST_REAR-L	NC	GND
5	GND	GND	GND	GND	GND	GND	GND
4	GND	PCIE_TX8-P	PCIE_TX8-N	GND	PCIE_RX8-P	PCIE_RX8-N	GND
3	GND	PCIE_TX7-P	PCIE_TX7-N	GND	PCIE_RX7-P	PCIE_RX7-N	GND
2	GND	PCIE_TX6-P	PCIE_TX6-N	GND	PCIE_RX6-P	PCIE_RX6-N	GND
1	GND	PCIE_TX5-P	PCIE_TX5-N	GND	PCIE_RX5-P	PCIE_RX5-N	GND

Table 4-16: CompactPCI J5 Connector Pin Definition

PCIe		**LAN**	
GPIO		**SATA**	
DVI			

NOTE:

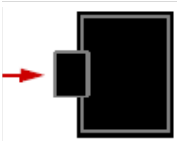
GPIO signals to J5 are from the PCH. Contact ADLINK for information on how to control these GPIO.

4.7 Switches and Buttons

Refer to Section 4.1 cPCI-6630(D) Component Side Layout on page 19 and Section 4.2 cPCI-6630 Solder Side Layout on page 20 for switch and button locations.

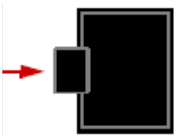
System Reset Button (SW1)

The cPCI-6630(D) has a system reset button on the front panel. Press the switch SW1 to reset the system.



Clear CMOS, RTC Reset Button (SW5)

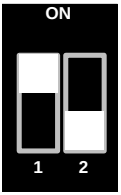
Press switch SW5 to clear CMOS and reset the RTC.



COM1/2 Mode Switches (SW7/3)

Switch SW7 sets the mode of the COM1 port on the front panel. Switch SW3 sets the mode of the COM2 port on layer 2 of the front panel (cPCI-6630D only).

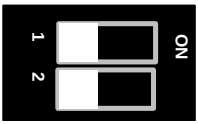
Mode	1	2
RS-232 (default)	ON	OFF
RS-422	ON	ON
RS-485	OFF	ON



DVI-I VGA Signal Front/Rear Switch (SW8)

Switch SW8 routes the VGA signals of the DVI-I port to either the front panel or rear I/O.

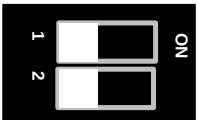
Pin	ON	OFF
1	Rear I/O	Front Panel (default)
2	Reserved	Reserved (default)

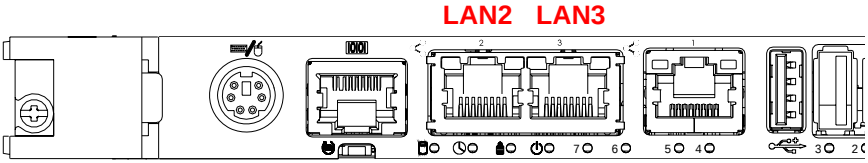


GbE (CN12) Front/Rear Switch (SW10)

Switch SW10 routes the GbE (CN12) signals to either the front panel or rear I/O.

Pin	ON	OFF
1	LAN2 to Rear I/O	LAN2 to Front Panel (default)
2	LAN3 to Rear I/O	LAN3 to Front Panel (default)

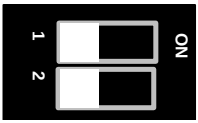




Force Ejector Handle Closed Switch (SW11)

Switch SW11 allows the ejector handle state to be forced "closed" so that blades without ejector handles (e.g. conduction cooled) will power on when inserted into the chassis.

Pin	ON	OFF
1	Force the ejector handle state to "closed" (default)	On/Off state is controlled by the ejector handle
2	NC	NC (default)



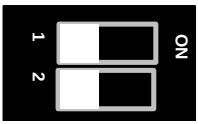
NOTE:

When the On/Off state is controlled by the ejector handle (Pin 1 OFF), make sure to properly shut down the OS before opening the handle. If the ejector handle is opened while the OS is operating, power will be cut immediately, resulting in possible system corruption and data loss.

PS/2 Front/Rear Switch (SW12)

Switch SW12 routes the PS/2 keyboard/mouse to either the front panel or rear I/O.

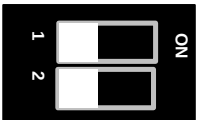
Pin	ON	OFF
1	PS/2 to rear	PS/2 to front (default)
2	Reserved	Reserved



DVI-D Digital Signal Front/Rear Switch (SW13)

Switch SW13 routes the DVI-D signal to either the front panel or rear I/O.

Pin	ON	OFF
1	DVI-D to rear	DVI-D to front (default)
2	Reserved	Reserved



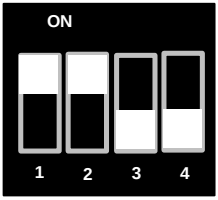
Debug Switch (SW14, Reserved)

The default setting for SW14 is 1 OFF, 2 OFF. Do not change the settings unless instructed by ADLINK.

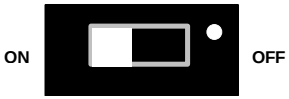
COM Debug Switches (SW_COMDEG2, SW_COMPW2)

Switch **SW_COMDEG2** is set 1, 2 ON and 3, 4 OFF by default to set the front panel RJ-45 COM1 (RJ2) serial port as a standard RS-232 serial port. The setting can be changed to use RJ2 as an BMC debug port. Leave the switch on default settings unless instructed by ADLINK.

SW_COMDEG1	Function
1, 2 ON, 3, 4 OFF	Normal COM (Default)
1, 2 OFF, 3, 4 ON	BMC Debug



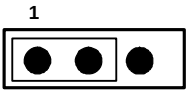
Switch **SW_COMPW2** is located on the component side of the board. Switch SW_COMPW2 is set ON by default. Leave the switch on default settings unless instructed by ADLINK.



PMC VIO Function Jumper (CN_VIO)

Jumper CN_VIO is located on the component side of the board. CN_VIO sets the PMC VIO to either 3.3V or 5V.

Pin	Function
Short 1-2	3V3 (default)
Short 2-3	5V



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5 Getting Started

This chapter describes the following installation procedures for the cPCI-6630(D):

- CFast card
- CompactFlash card
- 2.5” SATA drive
- PMC module installation

5.1 CPU and Heatsink

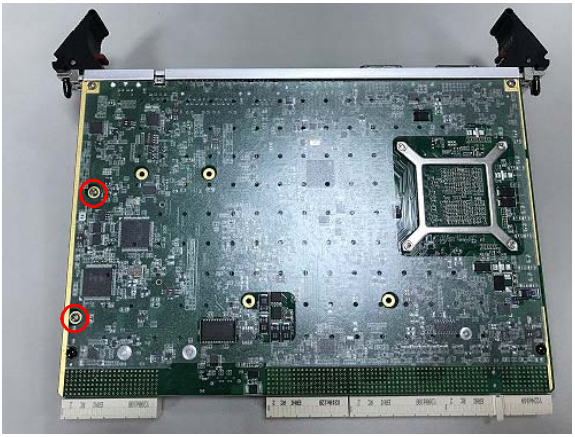
The cPCI-6630 Series come with CPU and heatsink pre-installed. Removal of heatsink/CPU by users is not recommended. Please contact your ADLINK service representative for assistance.

5.2 CFast Card Installation

The cPCI-6630(D) provides space to install a CFast card or a CompactFlash card (optional). Follow the instructions below to install a CFast to the cPCI-6630(D).

1. A CFast card can be installed in the location marked below. A retention bracket is pre-installed to secure the CFast card in place.

2. Turn the cPCI-6630(D) over and remove the two screws indicated below. Remove the retention bracket.



3. Insert the CFast card into the socket. Locate the strip of black foam in the CFast accessory pack and remove the backing from the adhesive side.

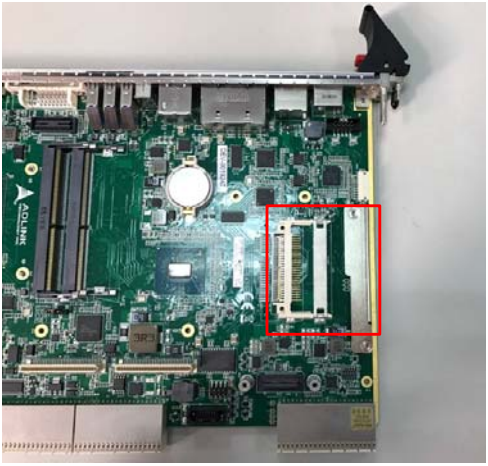
4. Attach the foam to the bracket as shown below.

5. Place the bracket on the board as shown below. Secure the bracket to the board by fastening the 2 screws removed in Step 2 on the solder side of the cPCI-6630(D).

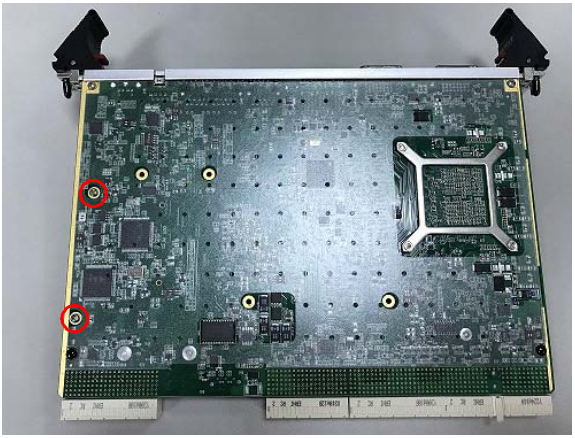
5.3 CompactFlash Card Installation (optional)

Follow the instructions below to install a CompactFlash card to the cPCI-6630(D) with optional CF card slot.

1. A CompactFlash card can be installed in the location marked below. A retention bracket is pre-installed to secure the CompactFlash card in place.



2. Turn the cPCI-6630(D) over and remove the two screws indicated below. Remove the retention bracket.

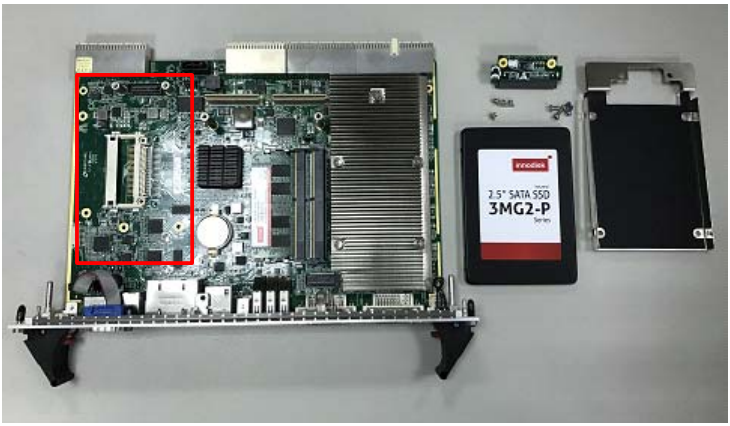


3. Insert the CompactFlash card into the CompactFlash slot. Secure the bracket on to the board by fastening the 2 screws removed in Step 2 on the solder side of cPCI-6630(D).

5.4 2.5" SATA Drive Installation

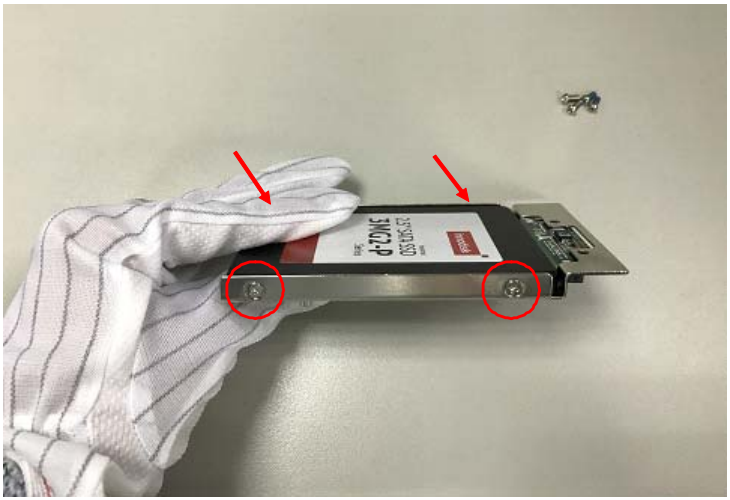
The cPCI-6630(D) provides space to install a 2.5” SATA drive.

1. A 2.5” SATA drive can be installed on the cPCI-6630(D) in the location shown below. The items in the 2.5” SATA drive accessory pack are shown on the right.



2. Attach the SATA adapter board to the SSD. Place the 2.5” SATA drive and SATA adapter assembly onto the SATA drive bracket as shown below.

3. Secure the 2.5” SATA drive to the drive bracket by fastening 4 screws (M3 L4, flat head) on both sides of the bracket as indicated below.



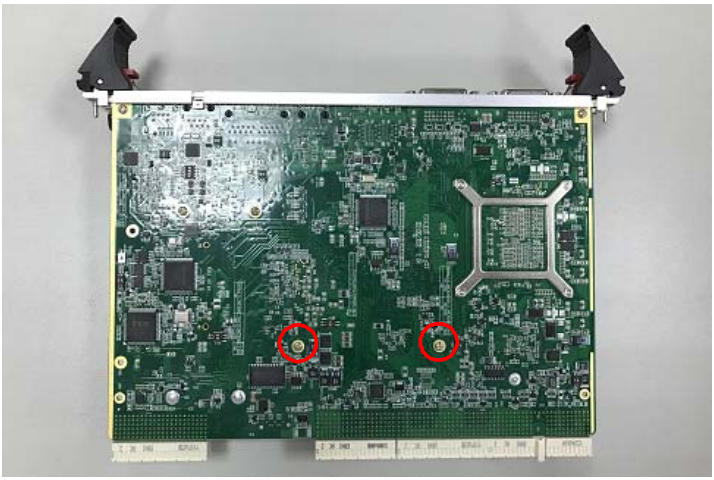
4. Place the SATA drive and drive bracket assembly onto cPCI-6630(D) by fastening two screws(M2.5 L6, round head) circled as below.

5. Turn the board over and finish securing the SATA drive and drive bracket assembly by fastening two screws (M2.5 L6, round head))as shown below.

5.5 PMC Installation (cPCI-6630D only)

The cPCI-6630D provides space to install one PMC module. Follow following steps to install a PMC module.

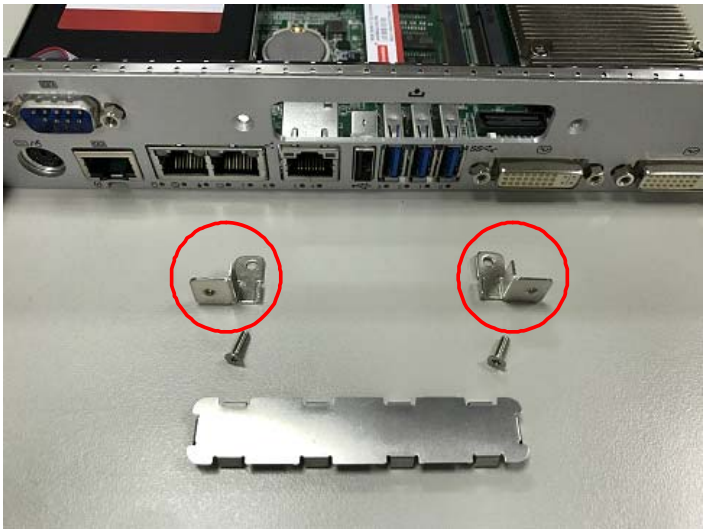
1. A PMC module can be installed on the cPCI-6630D in the location indicated below. Locate the two male/female standoffs (M2.5, H15) and two screws (M2.5 L6, round head) in the PMC accessory pack. Secure the standoffs onto the PCB (indicated by arrows) by fastening the two screws on the back side of the cPCI-6630D.

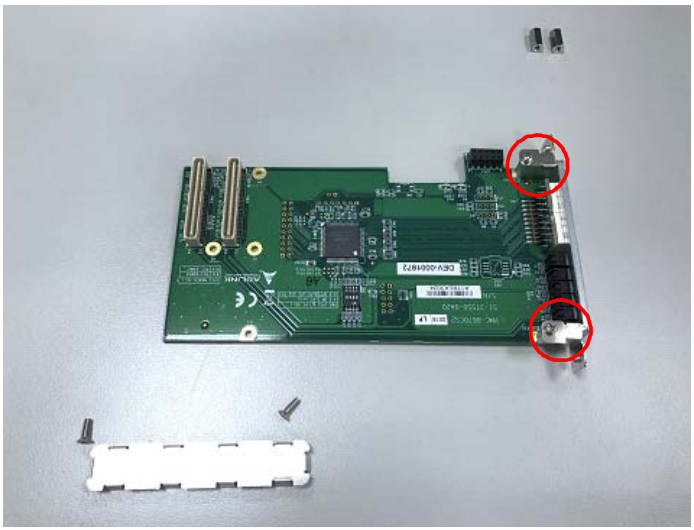


2. Remove the PMC filler plate and the screws securing two brackets to the front panel as shown below.

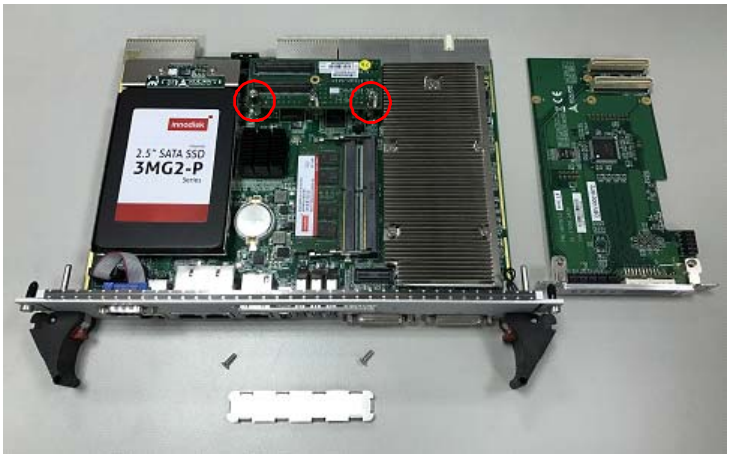
3. Locate the DB-6965PMC daughter board in the PMC accessory pack and attach it to the JN1/JN2 PMC board-to-board connectors on the cPCI-6630D in the location shown below.

4. Secure the two brackets removed in Step 2 above to the PMC card as shown below.



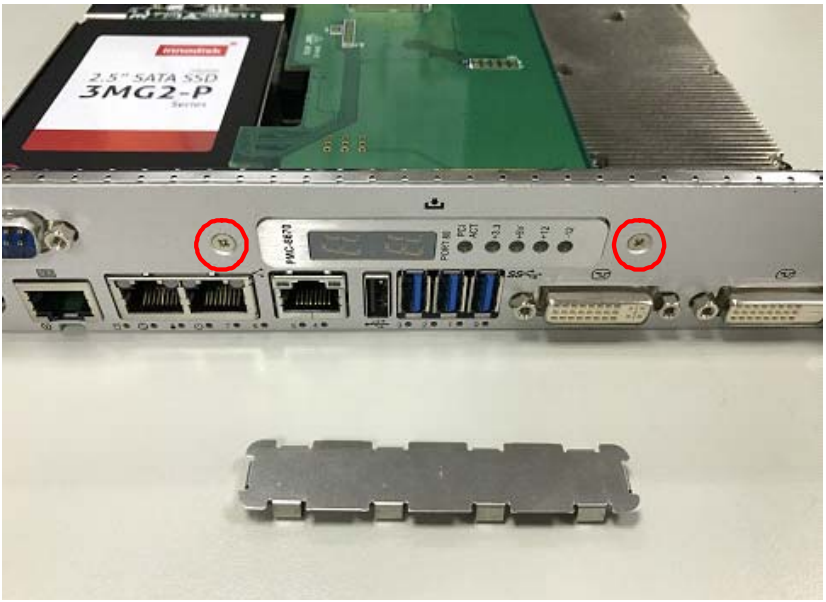


5. Locate the two female/female standoffs provided in the PMC accessory pack and fasten them to secure the DB-6965PMC daughter board as shown.



6. Align the connectors of the PMC card with those on the DB-6965PMC daughter board and fasten with two screws as indicated below.

7. Fasten the two screws removed in Step 2 above to the front panel to complete securing the PMC card to the cPCI-6630D. Set aside the PMC filler plate so it can be replaced if the PMC card is uninstalled.



5.6 Installing the cPCI-6630(D) to the Chassis

The cPCI-6630(D) may be installed in a system or peripheral slot of a 6U CompactPCI chassis. These instructions are for reference only. Refer to the user guide that comes with the chassis for more information.

1. Be sure to select the correct slot depending on the operational purpose of the module. The system power may now be powered on or off.
2. Remove the blank face cover from the selected slot, if necessary.
3. Press down on the release catches of the cPCI-6630 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.

6 Driver Installation

The cPCI-6630 drivers can be downloaded from the ADLINK website (**http://www.adlinktech.com**). ADLINK provides validated drivers for Windows 7 and Windows 10. We recommend using these drivers to ensure compatibility. VxWorks BSP and QNX BSP can also be downloaded from the cPCI-6630 product page on the ADLINK website.

6.1 cPCI-6630 Drivers

The driver installation procedure for Windows 10 is described below. Note that since Intel does not support EHCI on the 6th generation Intel® Core™ platform (formerly "Skylake"), it is recommended to use a PS/2 KB/MS to install the Windows OS.

1. Install the Windows operating system before installing any driver. Most standard I/O device drivers are installed during Windows installation.
2. Install the **chipset driver** by extracting and running the program in **...\Intel_Chipset_Win10x64_v10.1.1.38_public.zip**.
3. Install the **graphics driver** and utilities by extracting and running the program in **...\Intel_Graphics_Win10x64_ v15.40.31.64.4549.zip**.
4. Install the **LAN drivers** by extracting and running the program in **…\Intel_Chipset_Win10x64_v10.1.1.38_public.zip**.
5. Install the **Intel Rapid Storage Technology Utility** by extracting and running the program in **…\Intel_RST_Win10x64_ v15.2.0.1020.zip**.
6. Install the **Intel® Management Engine Interface driver** for Intel® AMT support by extracting and running the program in **…\Intel_ME_Win10x64_v11.0.4.1186.zip**.
7. Install the **audio driver** and utilities by extracting and running the program in **…\Realtek_Audio_Win10x64_v.R279.zip**.

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7 Utilities

7.1 Watchdog Timer

This section describes the operation of the cPCI-6630's watch dog timer (WDT). The primary function of the WDT is to monitor the cPCI-6630 operation and to reset the system if a software application fails to function as programmed. The following WDT functions may be controlled using a software application:

- enabling and disabling
- reloading timeout value

The cPCI-6630 custom WDT circuit is implemented using the internal IO of the ITE Super I/O IT8786 which is at 2Eh of LPC. The basic functions of the WDT include:

- Starting the timer countdown.
- Enabling or disabling WDT.
- Enable or disable WDT countdown LED ON.
- Reloading the timeout value to keep the watch dog from timing out.
- Setting the range of the timeout period from 1 to 15300 seconds.
- Sending a RESET signal to system when the watch dog times out

Using the Watchdog in an Application

The following section describes the WDT functions in an application. These can be controlled through the registers in the cPCI-6630 Super I/O.

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

Sample Code

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

typedefunsigned charBYTE;

void EnterConfig()
{
   outportb(SIO_CONFIG_INDEX, 0x87);
   outportb(SIO_CONFIG_INDEX, 0x01);
   outportb(SIO_CONFIG_INDEX, 0x55);
   outportb(SIO_CONFIG_INDEX, 0x55);
}

void ExitConfig()
{
   outportb(SIO_CONFIG_INDEX, 0x02);
   outportb(SIO_CONFIG_DATA, 0x02);
}

void LDNSelection(BYTE LDN)
{
   outportb(SIO_CONFIG_INDEX, 0x07);
   outportb(SIO_CONFIG_DATA, LDN);
}

void SIOBasicIORead(
   BYTE LDN,
   BYTE Register,
   BYTE *Data)
{
   LDNSelection(LDN);
   outportb(SIO_CONFIG_INDEX, Register);
   *Data = inportb(SIO_CONFIG_DATA);
}

void SIOBasicIOWrite(
   BYTE LDN,
   BYTE Register,
   BYTE Data)
{
```

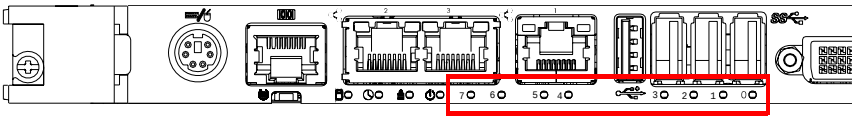
```
   LDNSelection(LDN);
   outportb(SIO_CONFIG_INDEX, Register);
   outportb(SIO_CONFIG_DATA, Data);
}

BOOL StringToByte(char *string, BYTE *value)
{
   BYTE i, temp;
   *value = 0;
   for(i=0; string[i]!=NULL; ++i) {
        if(i>1) { printf("Digital count error!\n");
   return 0; }
        *value <<= 4;
        temp = toupper(string[i]);
        if(temp >='0' && temp <='9')
             *value += temp - '0';
        else if(temp >='A' && temp <='F')
             *value += temp - 'A' + 0x0a;
        else {
             printf("Input char[%c] is illegal!\n",
   string[i]);
             return 0;
        }
   }
   return1;
}

BOOL StringToWORD_Dec(char *string, WORD *value)
{
   BYTE i;
   WORD temp;

   *value = 0;
   for(i=0; string[i]!=NULL; ++i) {
        if(i>4) { printf("Digital count error!\n");
   return 0; }
        *value *= 10;
        temp = toupper(string[i]);
        if(temp >='0' && temp <='9')
             *value += temp - '0';
        else {
```

```
                printf("Input char[%c] is illegal!\n",
   string[i]);
                return 0;
           }
   }
   if(temp > 65535) {
           printf("Input number is large than
   65535!\n");
   }
   return1;
}

int IT8786_WatchDog(int argc, char *argv[])
{
   BYTE    bTemp, bUnit;
   WORD wWdtimer;

   printf("ADLINK WatchDog DOS Utility [Version
   1.00]\n\n");
   if((argc != 3) && strcmp(argv[1], "/?")) {
           printf("Invalid command, please type /? to
   get the details.\n");
           return 0;
   }
   if(!strcmp(argv[1], "/?")) {
           printf("WatchDog [argument1]
   [argument2]\n\n");
           printf("argument1 :\n");
           printf("   1 - Second\n");
           printf("   0 - Minute\n");
           printf("argument2 :\n");
           printf("   Time-out value\n\n");
           printf("Example below for 10 seconds.\n");
           printf("   WatchDog 1 10\n");
           printf("Example below for 3 minutes.\n");
           printf("   WatchDog 0 3\n");
           return 0;
   }

   StringToByte(argv[1], &bUnit);
   if((bUnit != 0) && (bUnit != 1)) {
```

```
        printf("Argument1 is a invalid
    number[%d].\n", bUnit);
        return 1;
    }

    StringToWORD_Dec(argv[2], &wWdtimer);

    EnterConfig();

// Implement  Watch Dog
    SIOBasicIORead(0x07, 0x29, &bTemp);
    bTemp &= ~BIT6; // default function = KRST
    SIOBasicIOWrite(0x07, 0x29, bTemp);

// Config settings
    if(bUnit) {
        bTemp = 0xd0; // second
    } else {
        bTemp = 0x50; // minute
    }
    SIOBasicIOWrite(0x07, 0x72, bTemp);

// Set timer value
    SIOBasicIOWrite(0x07, 0x74,
    (BYTE)(wWdtimer>>8));
    SIOBasicIOWrite(0x07, 0x73, (BYTE)wWdtimer);

// Program led blinking
    SIOBasicIORead(0x07, 0x25, &bTemp);
    bTemp |= BIT2;
    SIOBasicIOWrite(0x07, 0x25, bTemp);

    SIOBasicIOWrite(0x07, 0xF8, 0x0A);

    ExitConfig();

    return 0;
}
```

7.2 User LED Programming

The eight User LEDs on the front panel display port 80h POST codes in hexadecimal during boot up. Users can use the POST codes to identify issues during the BIOS POST process. In default mode, these eight LEDs display the POST code output to Port 80h during system bootup (see “User LEDs” on page 24). After the system is under OS control, the eight User LEDs can be controlled as user defined LEDs. The LEDs are connected to eight GPIO pins of the Super I/O IT8786. Users can follow the sample code below to control the LEDs.



Sample Code

```
#define IT8786_GPIO_BASE_ADDRESS 0xa00
typedef unsigned char BYTE;
//================================================
//
// Procedure: LedCheckpoint
//
//================================================
VOID LedCheckpoint(IN BYTE Checkpoint)
{
    BYTE bData = 0xFF, i;
    for(i=0; i<8; i++)
    {
        if(Checkpoint&(1<<i))
        bData &= ~(UINT8)(1<<i);
    }

    for (i=0; i<8; i++)
    {
  if(bData &(1<<i))
  {
      bData2 |= 0x01;
```

```
    }
    if(i<7)
    {
        bData2 = bData2 << 1;
    }
     }
     outportb(IT8786_GPIO_BASE_ADDRESS+0x06, bData);
}
```

This page intentionally left blank.

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.

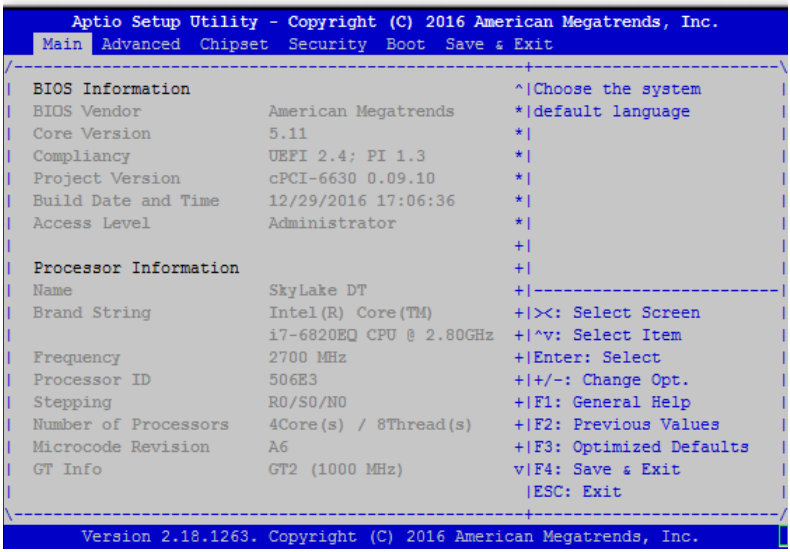
Note: In most cases, the < Delete > key is used to invoke the setup screen. There are several cases that use other keys, such as < F1 >, < F2 >, and so on.

Setup Menu

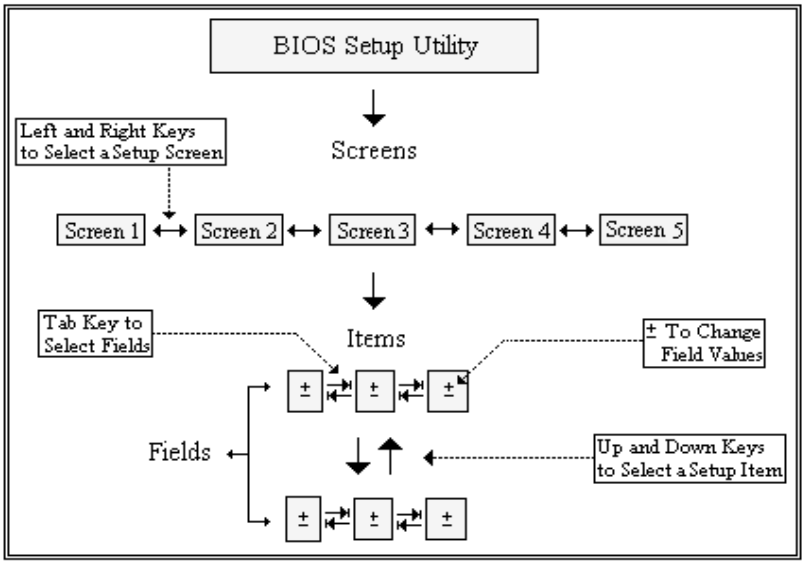
The main BIOS setup menu is the first screen that you can navigate. Each main BIOS setup menu option is described in this user's guide.

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

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



Navigation



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

Keyboard Commands

< > 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.

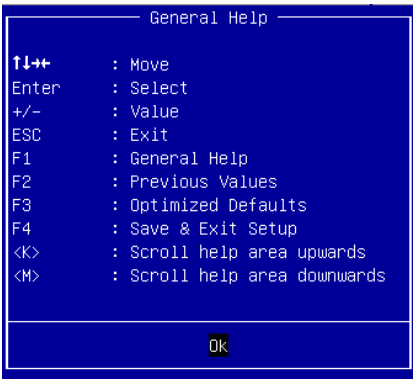
+ - The *Plus* and *Minus* keys allow you to change the field value of a particular setup item.

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

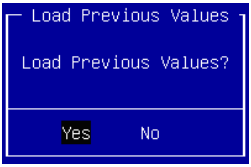
Hotkey Descriptions

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

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

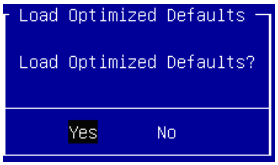


F2 The < F2 > key on your keyboard is the previous values key. It is not displayed on the key legend by default. To set the previous values settings of the BIOS, press the < F2 > key on your keyboard. It is located on the upper row of a standard 101 keyboard. The previous values settings allow the motherboard to boot up with the least amount of options set. This can lessen the probability of conflicting settings.

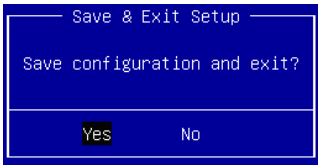


F3 The < F3 > key on your keyboard is the optimized defaults key. To set the optimized defaults settings of the BIOS, press the < F3 > key on your keyboard. It is located on the upper row of a standard 101 keyboard. The optimized defaults settings allow the motherboard to boot up with the optimized defaults of options set. This can lessen the probability of

conflicting settings.

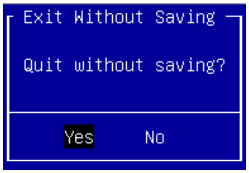


F4 The < F4 > key allows you to save any changes you have made and exit Setup. Press the < F10 > key to save your changes. The following screen will appear:



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

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



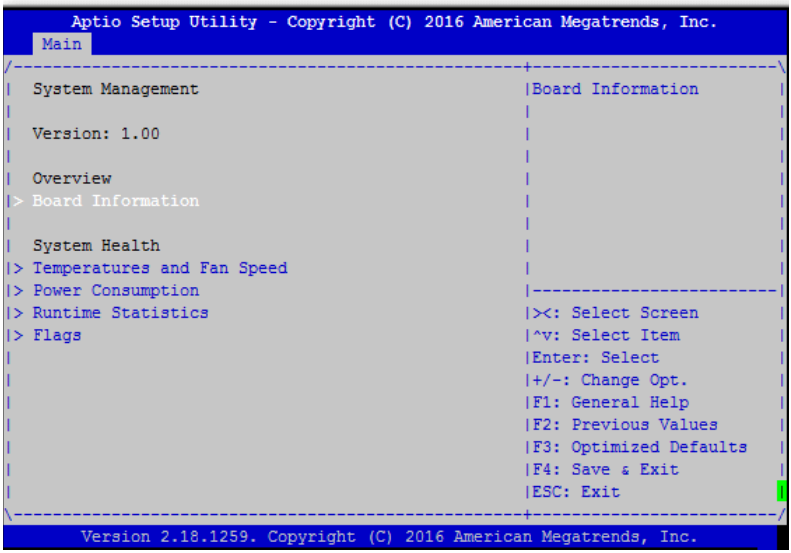
Press the < Enter > key to discard changes and exit. You can also use the < Arrow > key to select Cancel and then press the < Enter > key to abort this function and return to the previous screen.

8.2 Main Setup

When you first enter the Setup Utility, you will enter the Main setup screen which reports BIOS, processor, and PCH information.

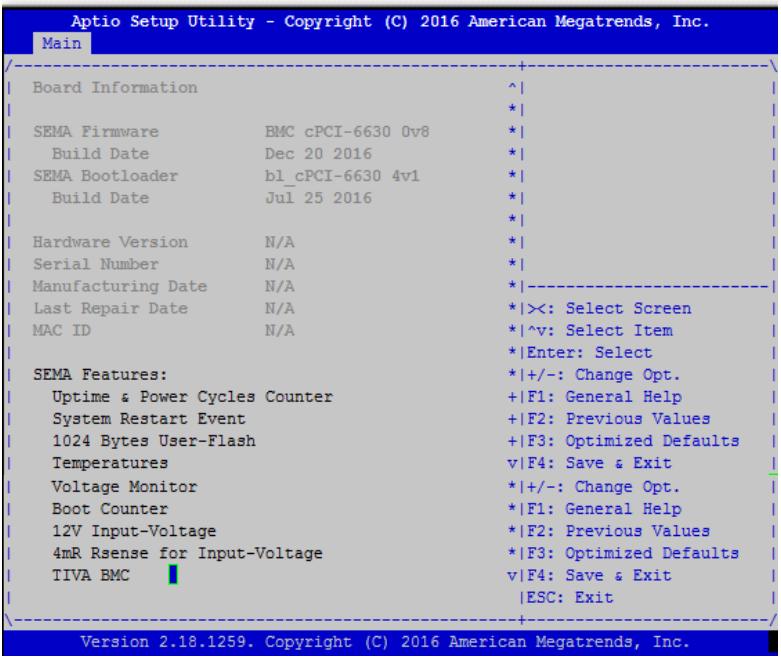
8.2.1 System Management

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

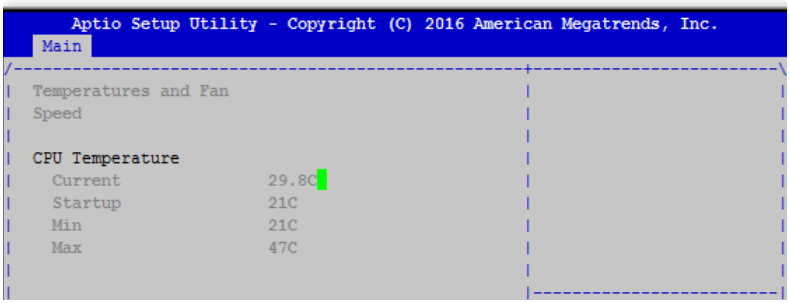


Board Information

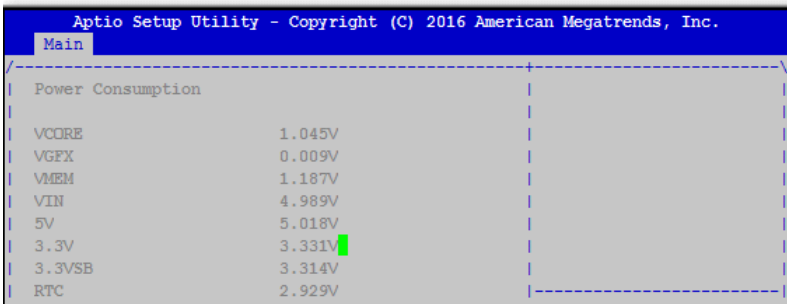
You can use this screen to view Board related information. An example of the Board screen is shown below.



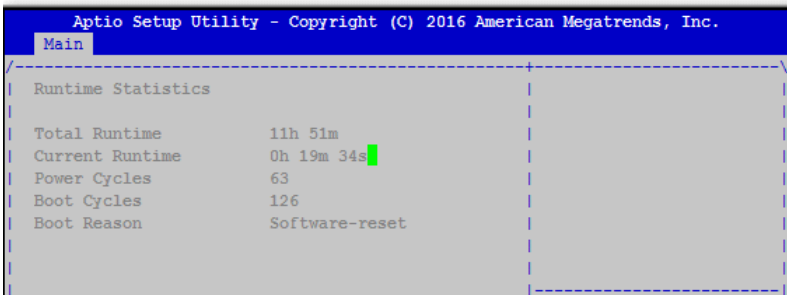
Temperatures and Fan Speed



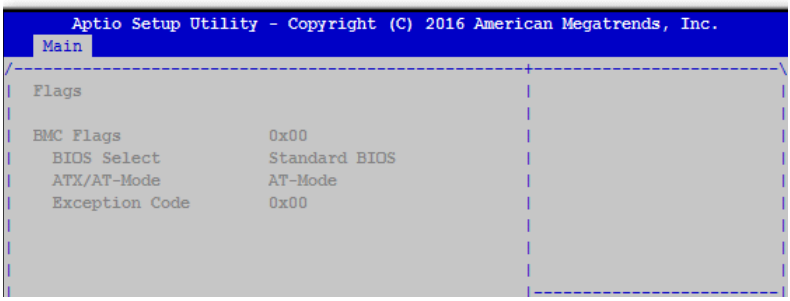
Power Consumption Information



Runtime Statistics Information



Flags



System Date/System Time

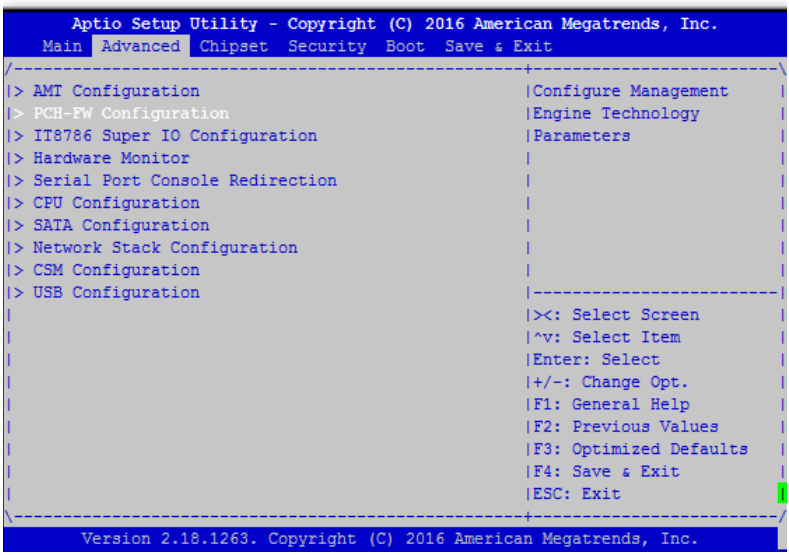
Use this option to change the system date and time. Highlight System Time or System Date using the < Arrow > keys. Enter new values using the keyboard. Press the < Tab > key or the < Arrow > keys to move between fields. The date must be entered in MM/DD/YY format. The time is entered in HH:MM:SS format.

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.

8.3 Advanced BIOS Setup

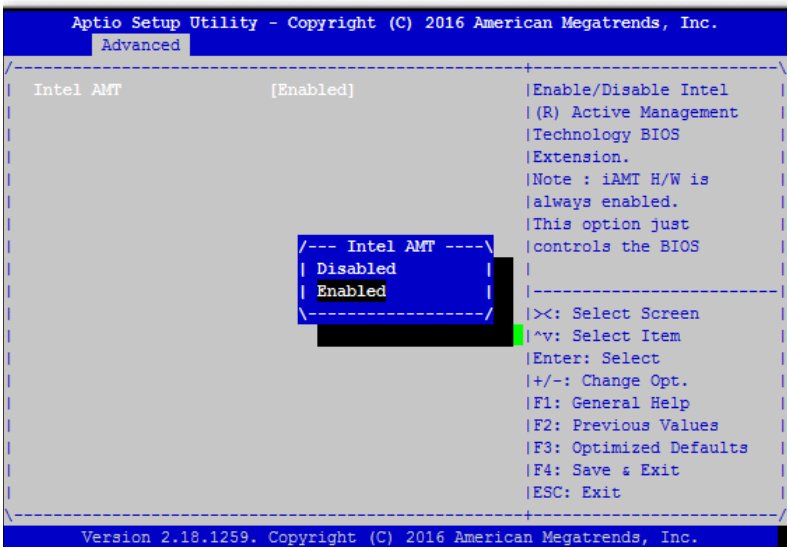
Select the Advanced tab from the setup screen to enter the Advanced BIOS Setup screen. You can select any of the items in the left frame of the screen to go to the sub menu for that item. You can display an Advanced BIOS Setup option by highlighting it using the < Arrow > keys. The Advanced BIOS Setup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

The sub menus are described on the following pages.



8.3.1 AMT Configuration

You can use this screen to select options for the AMT settings. Use the up and down < Arrow > keys to select an item. Use the < + > and < - > keys to change the value of the selected option.

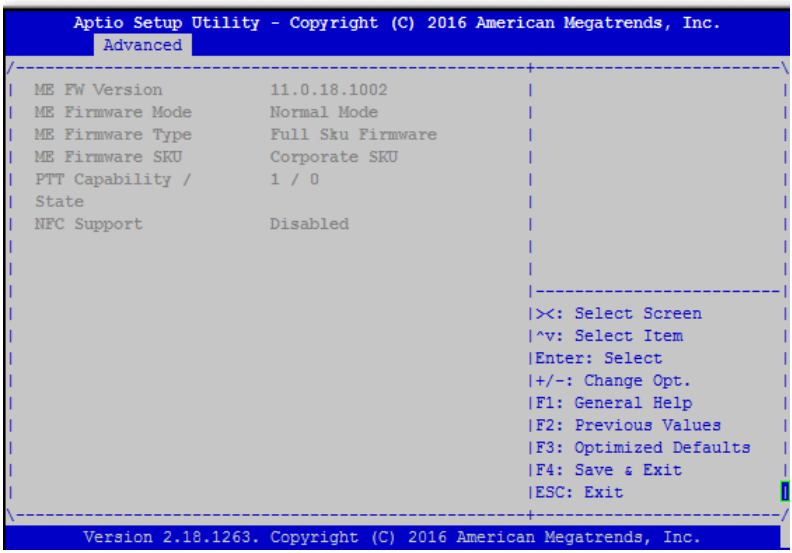


Intel AMT

Intel AMT feature. Set this value to Enabled/Disabled.

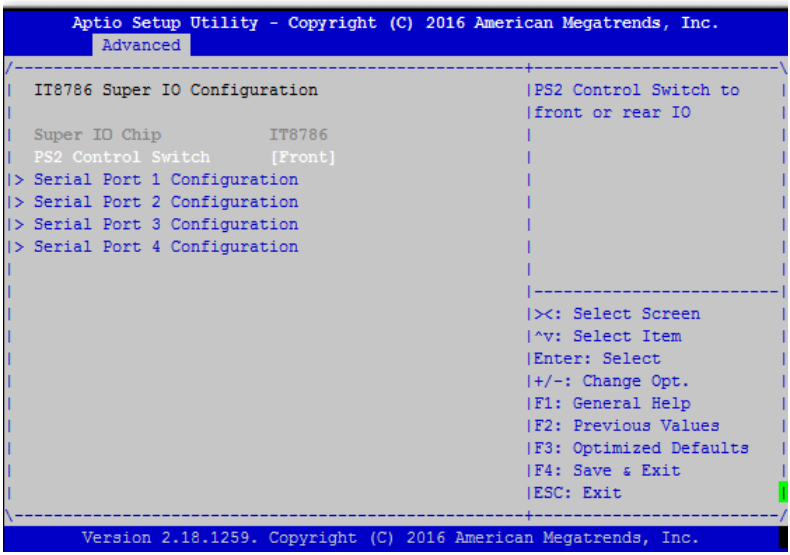
8.3.2 PCH-FW Configuration

You can use this screen to view ME related information. For example, ME FW Version, ME Firmware Mode, ME Firmware Type, ME Firmware SKU..etc. An example of the ME screen is shown below.



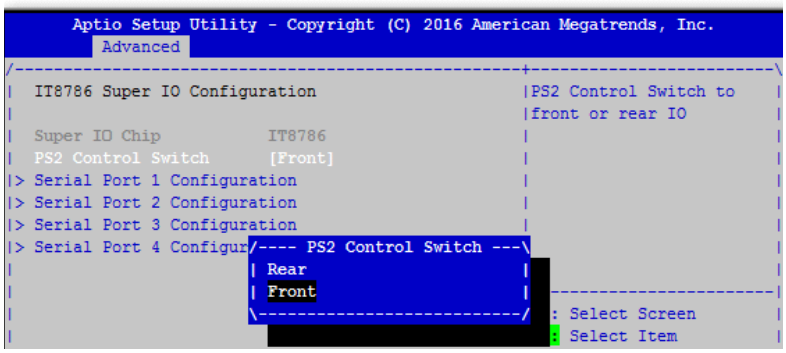
8.3.3 IT8786 Super IO Configuration

You can use this screen to select options for the IT8786 Super IO settings. Use the up and down < Arrow > keys to select an item. Use the < + > and < - > keys to change the value of the selected option.



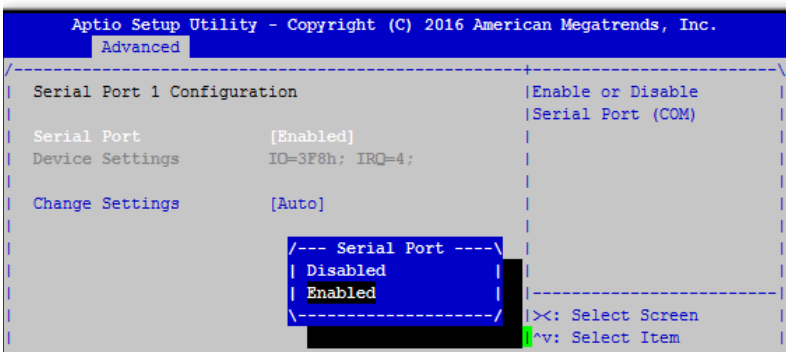
PS2 Control Switch

PS/2 port control switch. Set this value to Front/Rear.



Serial Port 1,2,3,4 Configuration

Set Parameters of Serial Port 1/ 2/ 3/ 4 (COM 1/ 2/ 3/ 4).

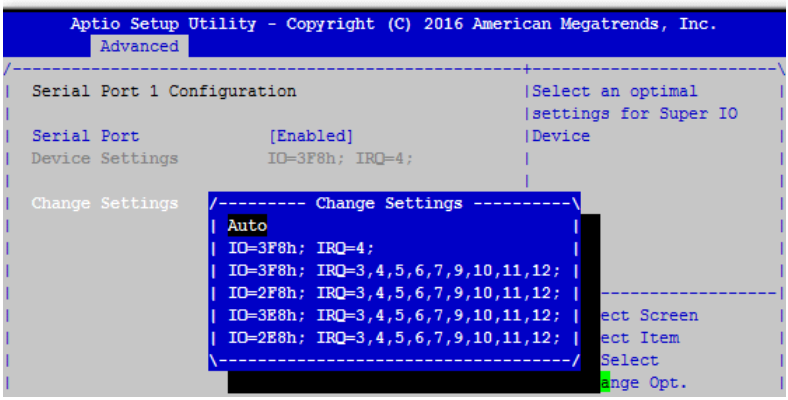


Serial Port

Set this Serial Port to Enabled/Disabled.

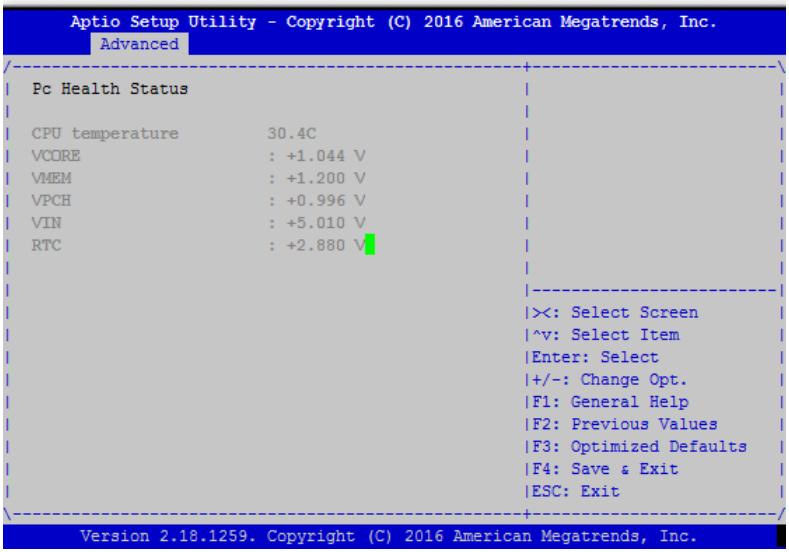
Change Settings

Select an optimal setting for Super IO Device. The options are “Auto, 3F8h, 2F8h…”etc.



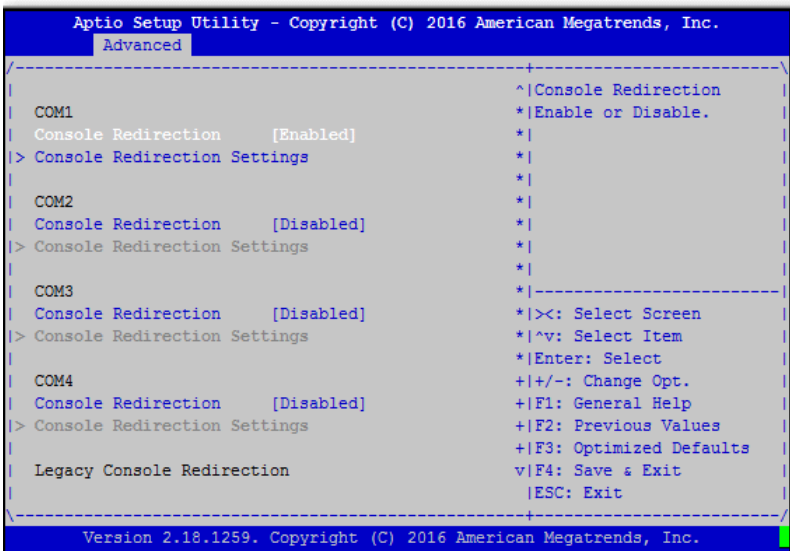
8.3.4 Hardware Monitor

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



8.3.5 Serial Port Console Redirection

You can use this screen to select options for the serial port console redirection settings. An example of the Serial Port Console Redirection screen is shown below.

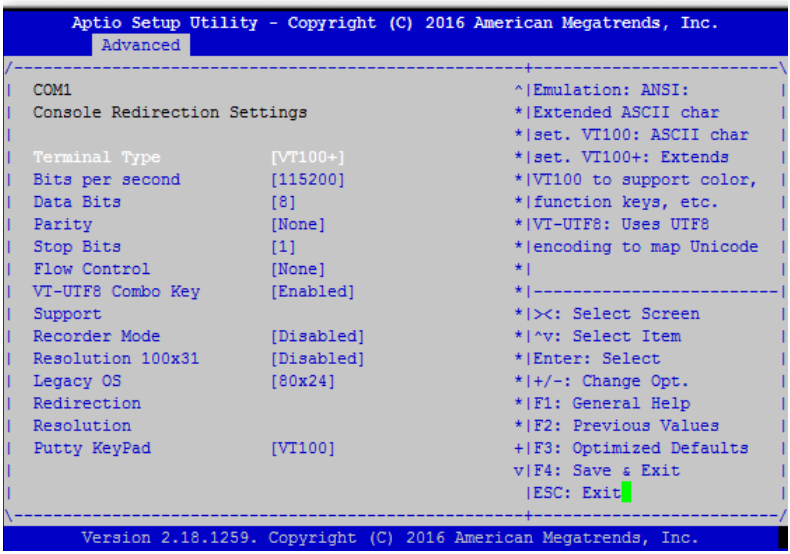


Console Redirection

Set this value to Enabled/Disabled.

Console Redirection Settings

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



Terminal Type

VT100+ is the preferred terminal type for out-of-band management. Configuration options: VT100, VT100+, VT-UTF8, ANSI.

Bits per second

Select the bits per second you want the serial port to use for console redirection. The options are 115200, 57600, 38400, 19200, 9600.

Data Bits

Select the data bits you want the serial port to use for console redirection. Set this value to 7, 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. Communication with slow devices may require more than 1 stop bit. Set this value to 1 and 2.

Flow Control

Set this option to select Flow Control for console redirection. The settings for this value are None, Hardware RTS/CTS, Software Xon/Xoff.

VT-UTF8 Combo Key Support

Enables VT-UTF8 combination key support for ANSI/VT100 terminals.Set this value to Enabled/Disabled.

Recorder Mode

When this mode is enabled, only text will be sent. This is to capture terminal data. Set this value to Enabled/Disabled.

Resolution 100x31

Set this option to extended terminal resolution. Set this value to Enabled/Disabled.

Legacy OS Redirection

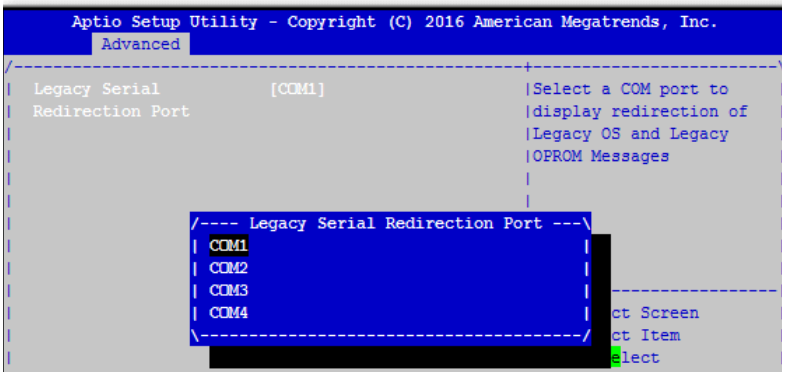
On legacy OS, the number of rows and columns supported for redirection. Set this value to 80x24, 80x25.

Putty Key Pad

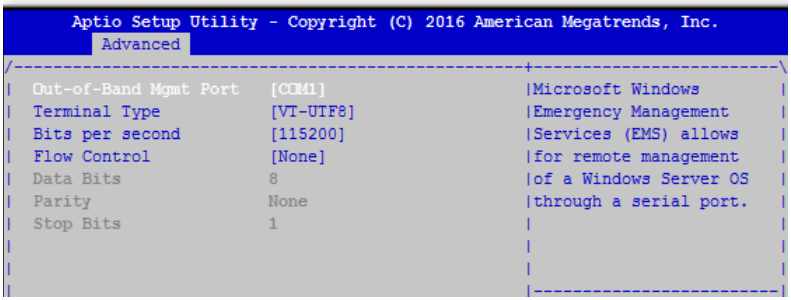
Select FunctionKey and KeyPad on Putty. Set this value to VT100, LINUX, XTERMR6, SCO, ESCN, VT400.

Legacy Console Redirection

Legacy Console Redirection Settings. Select a COM port to display redirection of Legacy OS and Legacy OPROM Messages.



Serial Port for Out-of-Band Management / Windows Emergency Management Services (EMS)



Out-of-Band Mgmt Port

Microsoft Windows Emergency Management Services (EMS) allows for remote management of a Windows Server OS through a serial port.

Terminal Type

VT-UTF8 is the preferred terminal type for out-of-band management. The next best choice is VT100+ and then VT100. See above, in Console Redirection Settings page, for more Help with Terminal Type/Emulation.

Bits per Second

Selects serial port transmission speed. The speed must be matched on the other side. Long or noisy lines may require lower speeds.

Flow Control

Set this option to select Flow Control for console redirection. The settings for this value are None, Hardware RTS/CTS, Software Xon/Xoff.

8.3.6 CPU Configuration

You can use this screen to select options for the CPU Configuration Settings. The settings are described on the following pages. An example of the CPU Configuration screen is shown below.

Hyper-Threading

- **Enabled:** for Windows and Linux (OS optimized for Hyper-Threading Technology).
- **Disabled:** for other OS (OS not optimized for Hyper-Threading Technology).

Active Processor Cores

Number of cores to enable in each processor package.

Intel Virtualization Technology

When Enabled, a VMM can utilize the additional hardware capability provided by Vanderpool Technology. Set this value to Enabled/Disabled.

Intel(R) SpeedStep(tm)

Allows more than two frequency ranges to be supported.

Turbo Mode

Set this value to Enabled/Disabled.

Configurable TDP Boot Mode

Configurable TDP Mode as Nominal/Up/Down/Deactivate TDP selection. Deactivate option will set MSR to Nominal and MMIO to Zero.

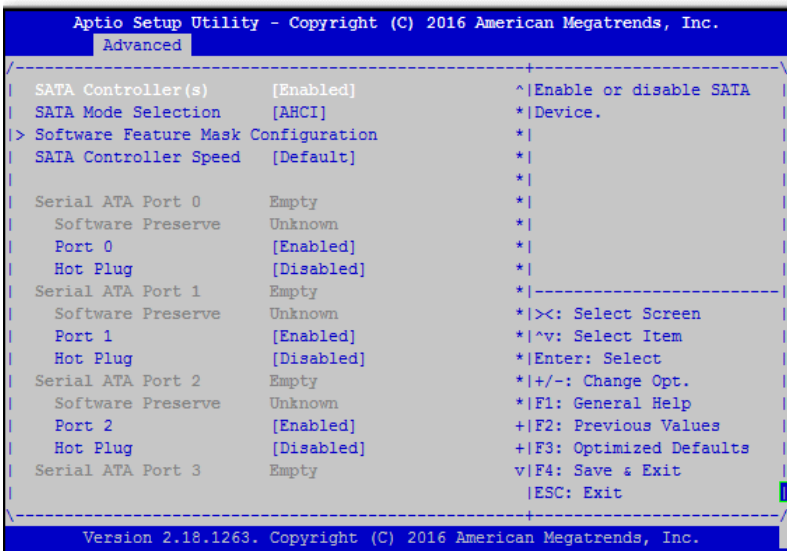
Configurable TDP Lock

Configurable TDP Mode Lock sets the Lock bits on TURBO_ACTIVATION_RATIO and CONFIG_TDP_CONTROL

Note: When CTDP Lock is enabled Custom ConfigTDP Count will be forced to 1 and Custom ConfigTDP Boot Index will be forced to 0.

8.3.7 SATA Configuration

You can use this screen to select options for the SATA Configuration Settings. An example of the SATA Configuration screen is shown below.



SATA Controller(s)

Enable or disable SATA device.

SATA Mode Selection

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

SATA Port 0-4

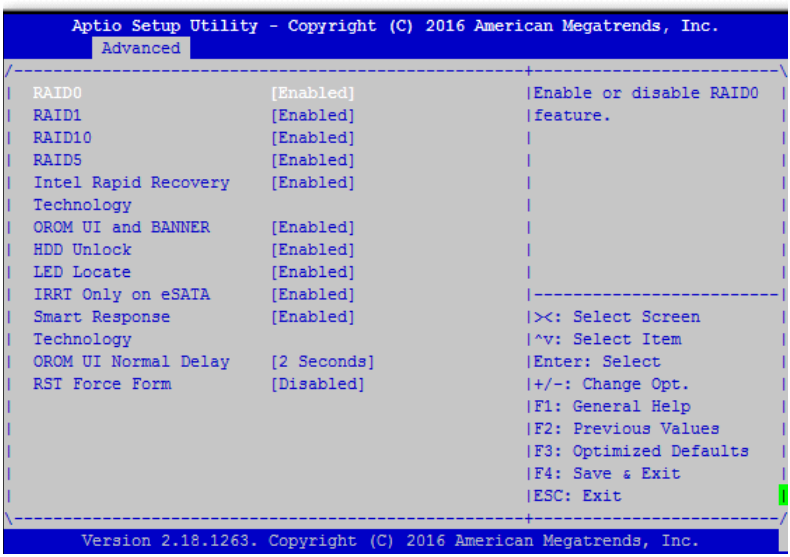
Display SATA device name string. Set this value to Enabled/Disabled.

Hot Plug

Appears when SATA mode is AHCI. SATA port Hot Plug support. Set this value to Enabled/Disabled.

Software Feature Mask Configuration

RAID OROM/RST driver will refer to the SWFM configuration to enable or disable the storage features.



RAID0/1/10/5

Enable or disable RAID0/1/10/5 feature.

Intel Rapid Recovery Technology

Enable or disable Intel Rapid Recovery Technology.

OROM UI and Banner

If enabled, the OROM UI is shown. Otherwise, no OROM banner or information will be displayed if all disks and RAID volumes are Normal.

HDD Unlock

If enabled, the HDD password unlock in the OS is enabled.

LED Locate

If enabled, the LED/SGPIO hardware is attached and ping to locate feature is enabled on the OS.

IRRT Only on eSATA

If enabled, then only IRRT volumes can span internal and eSATA drives. If disabled, then any RAID volume can span internal and eSATA drives.

Smart Response Technology

Enable or disable Smart Response Technology.

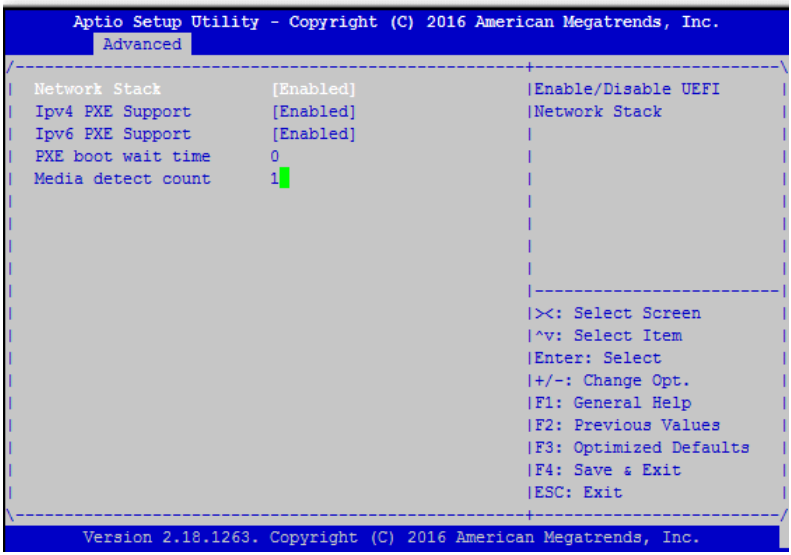
OROM UI Delay

If enabled, indicates the delay of the OROM UI Splash Screen under normal status.

RST Force Form

Enable/Disable Form for Intel Rapid Storage Technology.

8.3.8 Network Stack Configuration



Network Stack

Enable/Disable UEFI Network Stack.

IPv4 PXE Support

Enable IPv4 PXE Boot Support. If disabled, the IPv4 PXE boot option will not be created.

IPv6 PXE Support

Enable IPv6 PXE Boot Support. If disabled, the IPv6 PXE boot option will not be created.

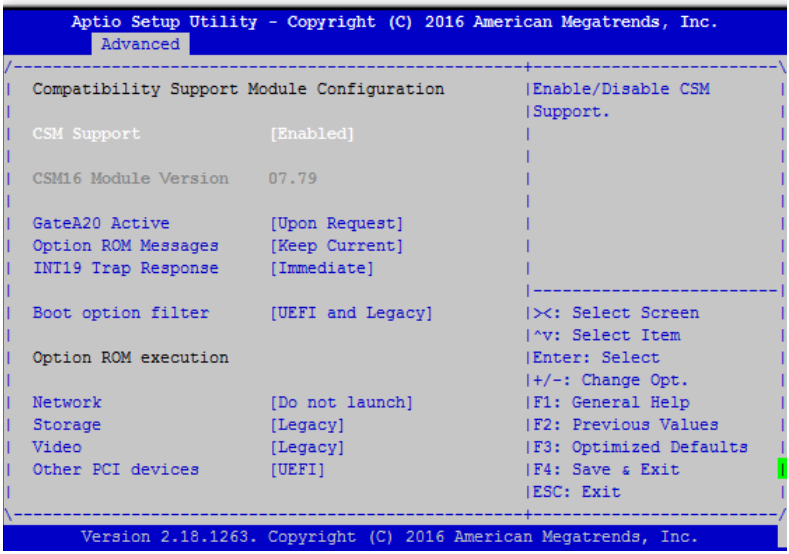
PXE Boot Wait Time

Wait time to press ESC key to abort PXE boot.

Media detect count

Number of times the presence of media will be checked.

8.3.9 CSM Configuration



CSM Support

Enable/Disable CSM Support.

GateA20 Active

Upon Request: GA20 can be disabled using BIOS services. Always: do not allow disabling of GA20; this option is useful when any RT code is executed above 1MB.

Option ROM Messages

Set the display mode for Option ROM.

INT19 Trap Response

BIOS reaction on INT19 trapping by Option ROM: IMMEDIATE - execute the trap right away; POSTPONED - execute the trap during legacy boot.

Boot Option Filter

This option controls Legacy/UEFI ROM priority. Set this value to UEFI and Legacy, Legacy only, UEFI only.

Network

Controls the execution of UEFI and Legacy PXE OpROM. Set this value to Do not launch, Legacy, UEFI.

Storage

Controls the execution of UEFI and Legacy PXE OpROM. Set this value to Do not launch, Legacy, UEFI.

Video

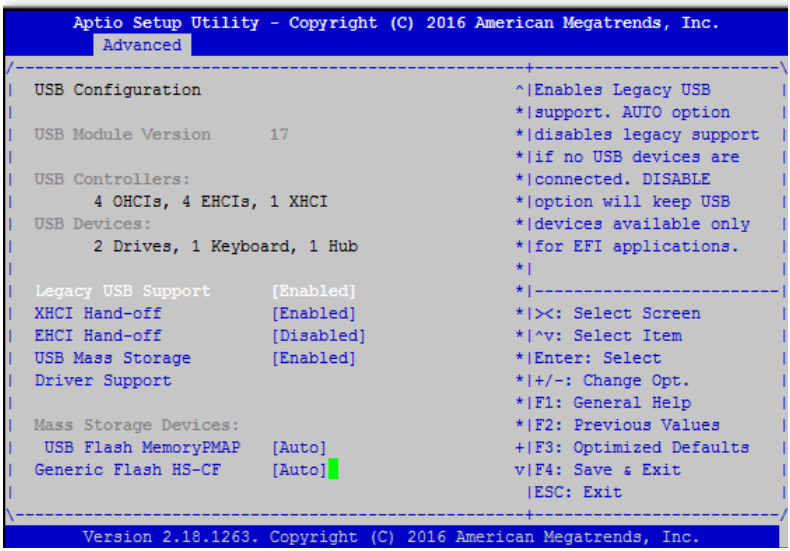
Controls the execution of UEFI and Legacy PXE OpROM. Set this value to Do not launch, Legacy, UEFI.

Other PCI Devices

Determines OpROM execution policy for devices other than Network, Storage, or Video. Set this value to Disable, Legacy, UEFI.

8.3.10 USB Configuration

You can use this screen to select options for the USB Configuration. Use the up and down < Arrow > keys to select an item. The screen is shown below.



Legacy USB Support

Enables legacy USB support. Auto option disables legacy support if no USB devices are connected. Disable option will keep USB devices available only for EFI applications. Set this value to Enabled/Disabled/Auto.

XHCI Hand-off

This is a workaround for OSes without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.

EHCI Hand-off

This is a workaround for OSes without EHCI hand-off support. The EHCI ownership change should be claimed by EHCI driver.

USB Mass Storage Driver Support

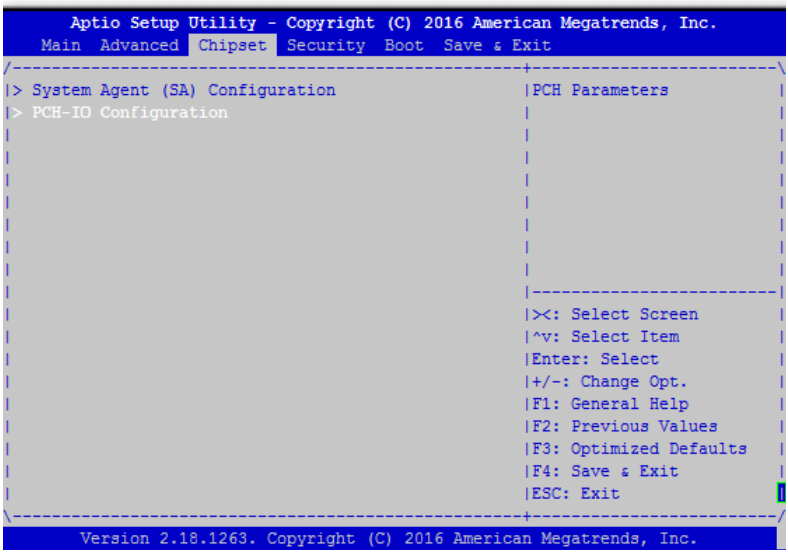
Enable/Disable USB Mass Storage Driver Support.

Mass Storage Devices:

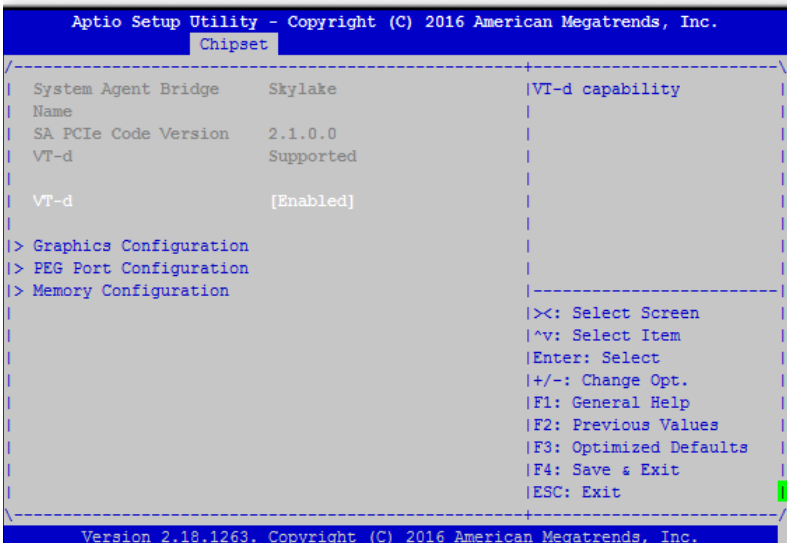
Mass storage device emulation type. 'AUTO' enumerates devices according to their media format. Optical drives are emulated as 'CDROM', drives with no media will be emulated according to a drive type.

8.4 Chipset Setup

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.



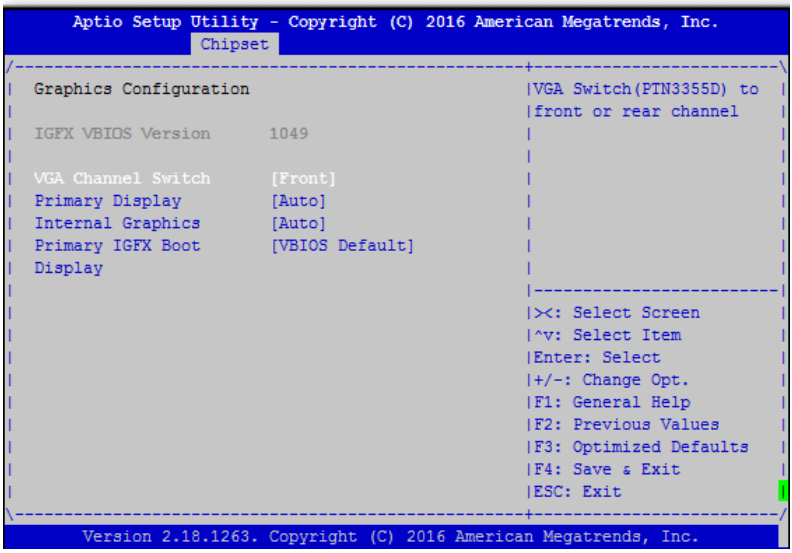
8.4.1 System Agent (SA) Configuration



VT-d

The Intel Virtualization Technology for Directed I/O. Set this value to Enabled/Disabled.

Graphics Configuration



VGA Channel Switch

Sets the VGA signal output to Front or Rear IO.

Primary Display

Select which graphics device should be the primary display. Set this value to Auto, IGFX, PCI.

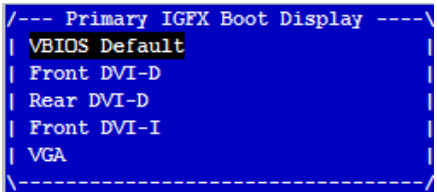
Internal Graphics

Keep IGD enabled based on the setup options. Set this value to Auto, Enabled, Disabled.

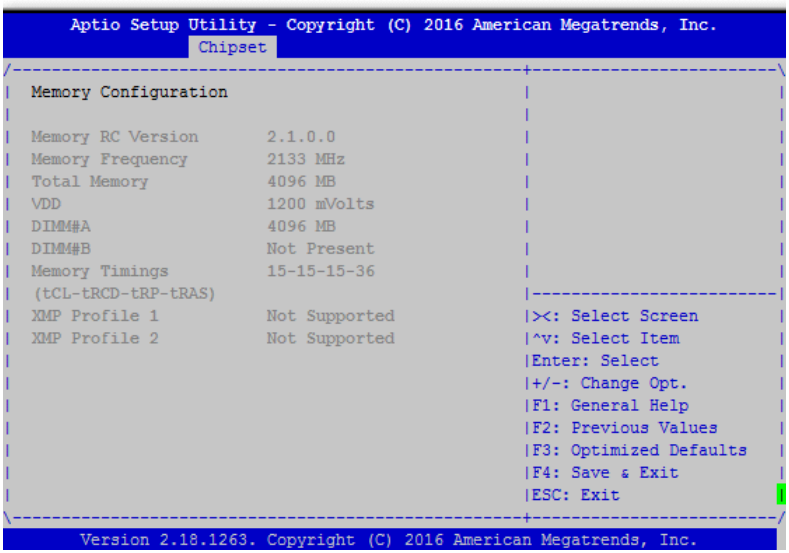
Primary IGFX Boot Display

Select Boot Video Device during POST

- ▷ VBIOS Default: auto-detect video device by vBIOS.
- ▷ Front DVI-D, Rear DVI-D, Front DVI-I, VGA: force to boot with selected video device.

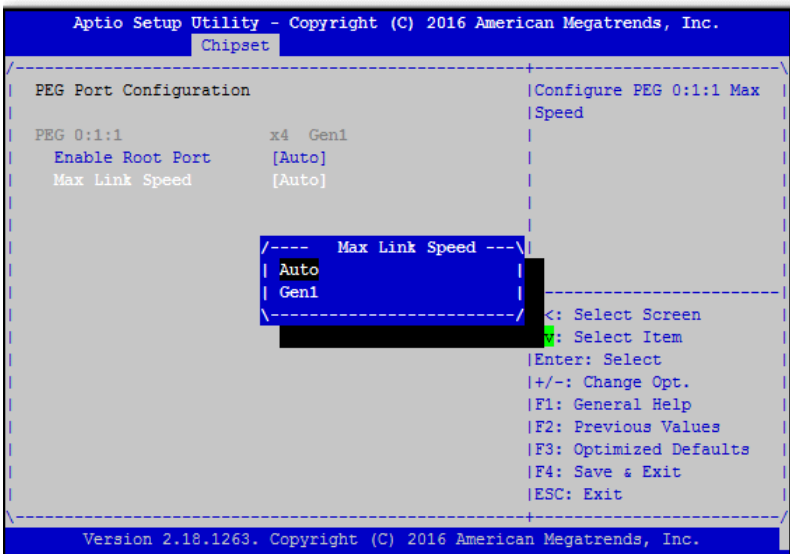


Memory Configuration



PEG Port Configuration

Configure the PCI Express port from the CPU.



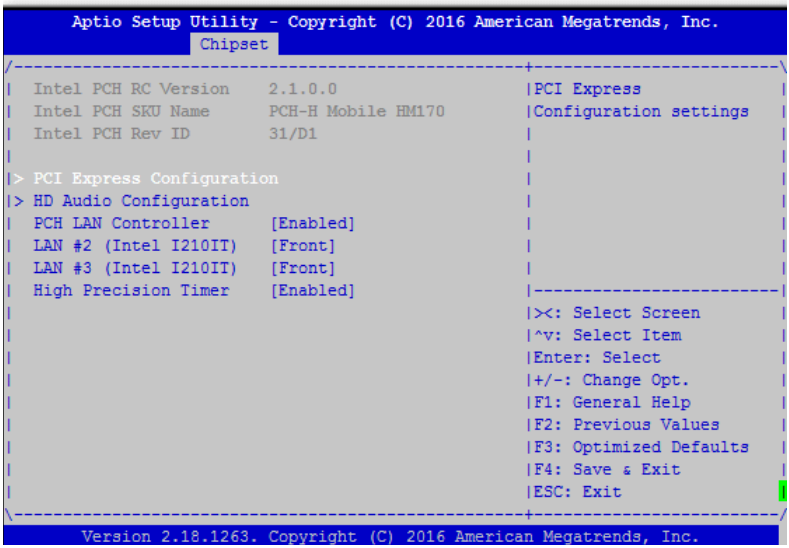
Enable Root Port

Enable or disable the PEG port.

Max Link Speed

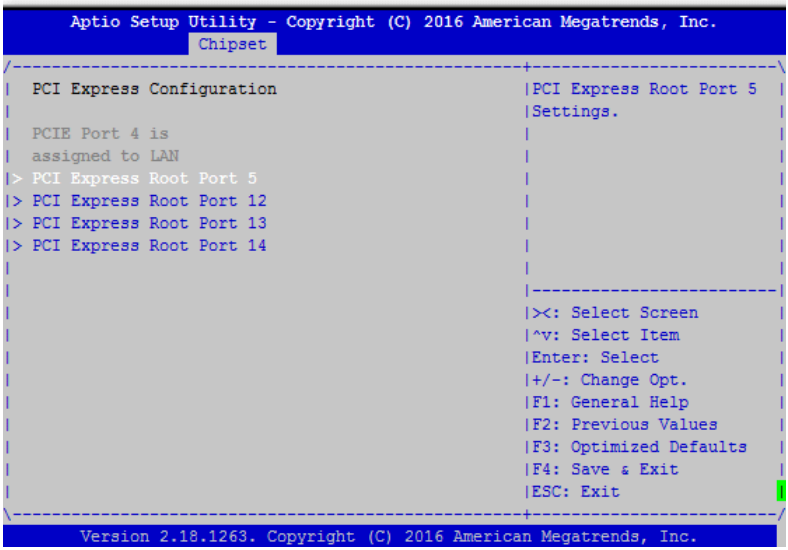
Configure PEG Bus:0 Dev:1 Fun:1. Max. Speed options: Auto or Gen1.

8.4.2 PCH-IO Configuration



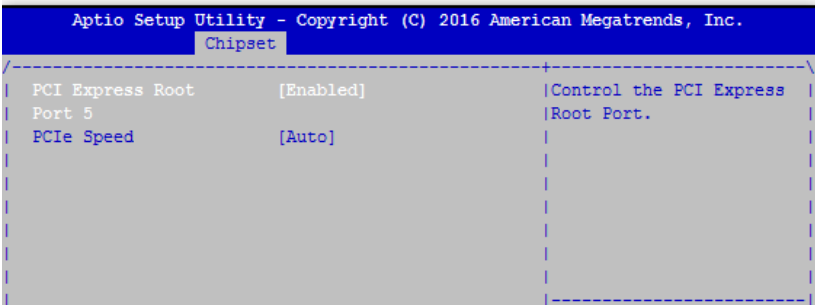
PCI Express Configuration

Configure the PCI Express ports from the PCH.



PCI Express Root Port 5, 12-14

Configure the PCI Express Root Ports 5, 12-14.



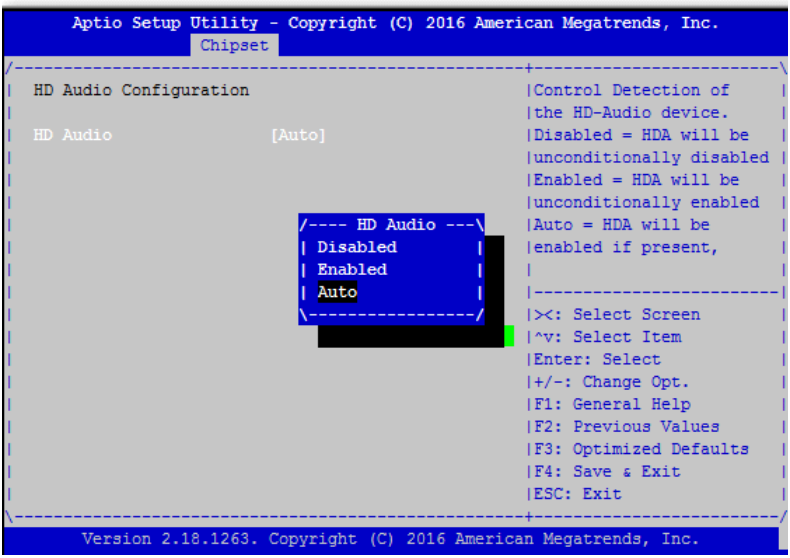
PCI Express Root Port 5, 12-14

Enable/disable the PCI Express port.

PCI Speed

Select PCI Express port speed: Gen1, Gen2, Gen3

HD Audio Configuration



HD Audio

Enable/Disable the HD Audio device.

- ▷ **Disabled:** HDA will be unconditionally disabled
- ▷ **Enabled:** HDA will be unconditionally Enabled
- ▷ **Auto:** HDA will be enabled if present, disabled otherwise.

PCH LAN Controller

Enable/Disable the PCH LAN Controller.

LAN #2 / #3 (Intel I210IT)

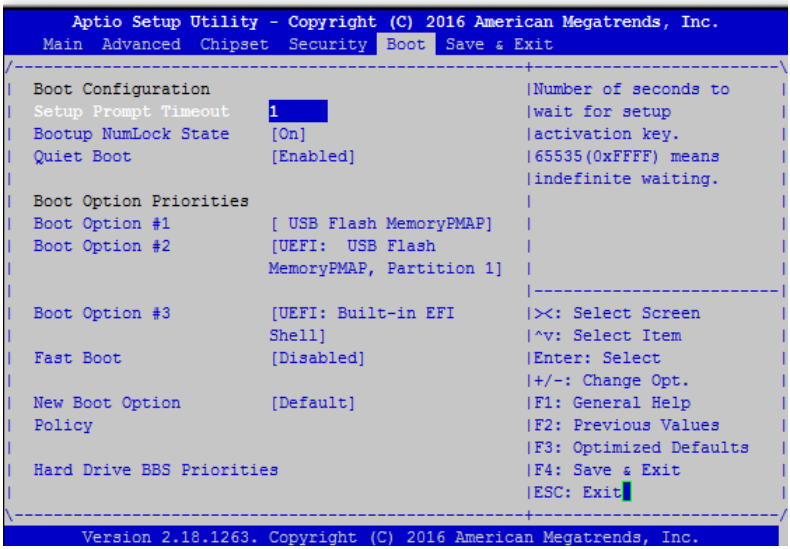
Direct LAN 2/3 to either Front or Rear IO.

High Precision Timer

Enable/Disable the High Precision Event Timer.

8.5 Boot Settings

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



Quiet Boot

- **Disabled** - Set this value to allow the computer system to display the POST messages.
- **Enabled** - Set this value to allow the computer system to display the OEM logo.

Fast Boot

Enables or disables boot with initialization of a minimal set of devices required to launch active boot option. Has no effect for BBS boot options. Set this value to Enabled/Disabled.

Set Boot Priority

Set Boot Option #1 ~2 boot priority.

Hard Disk Drive BBS Priorities

Specifies the Boot Device Priority sequence from available Hard Disk Drives.

8.6 Security Setup

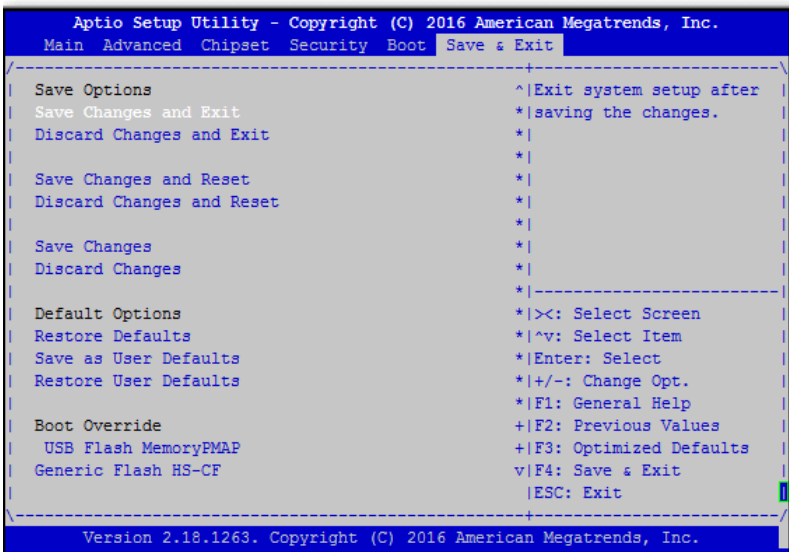
Administrator, User Password

If only the administrator's password is set, then this only limits access to setup and is only asked for when entering setup.

If only the user's password is set, then this is a power on password and must be entered to boot or enter setup. In setup the user will have administrator rights.

8.7 Save & Exit Menu

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



Save Changes and Exit

Exit the system after saving the changes.

Discard Changes and Exit

Exit system setup without saving any changes.

Save Changes and Reset

Reset the system after saving the changes.

Discard Changes and Reset

Reset system setup without saving any changes.

Save Changes

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

Discard Changes

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

Restore Defaults

Restore/Load Defaults values for all the setup options.

Save as User Defaults

Save the changes done so far as user defaults..

Restore User Defaults

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

9 Checkpoints & Beep Codes

The eight User LEDs on the front panel display port 80h POST codes in hexadecimal during boot up. Users can use the POST codes to identify issues during the BIOS POST process (see See “User LEDs” on page 24.).

9.1 Checkpoint Ranges

Status Code Range	Description
0x01 – 0x0B	SEC execution
0x0C – 0x0F	SEC errors
0x10 – 0x2F	PEI execution up to and including memory detection
0x30 – 0x4F	PEI execution after memory detection
0x50 – 0x5F	PEI errors
0x60 – 0x8F	DXE execution up to BDS
0x90 – 0xCF	BDS execution
0xD0 – 0xDF	DXE errors
0xE0 – 0xE8	S3 Resume (PEI)
0xE9 – 0xEF	S3 Resume errors (PEI)
0xF0 – 0xF8	Recovery (PEI)
0xF9 – 0xFF	Recovery errors (PEI)

9.2 Standard Checkpoints

SEC Phase

Status Code	Description
0x00	Not used
Progress Codes	
0x01	Power on. Reset type detection (soft/hard).
0x02	AP initialization before microcode loading
0x03	North Bridge initialization before microcode loading
0x04	South Bridge initialization before microcode loading

Status Code	Description
0x05	OEM initialization before microcode loading
0x06	Microcode loading
0x07	AP initialization after microcode loading
0x08	North Bridge initialization after microcode loading
0x09	South Bridge initialization after microcode loading
0x0A	OEM initialization after microcode loading
0x0B	Cache initialization
SEC Error Codes	
0x0C – 0x0D	Reserved for future AMI SEC error codes
0x0E	Microcode not found
0x0F	Microcode not loaded

SEC Beep Codes

None

PEI Phase

Status Code	Description
Progress Codes	
0x10	PEI Core is started
0x11	Pre-memory CPU initialization is started
0x12	Pre-memory CPU initialization (CPU module specific)
0x13	Pre-memory CPU initialization (CPU module specific)
0x14	Pre-memory CPU initialization (CPU module specific)
0x15	Pre-memory North Bridge initialization is started
0x16	Pre-Memory North Bridge initialization (North Bridge module specific)
0x17	Pre-Memory North Bridge initialization (North Bridge module specific)

Status Code	Description
0x18	Pre-Memory North Bridge initialization (North Bridge module specific)
0x19	Pre-memory South Bridge initialization is started
0x1A	Pre-memory South Bridge initialization (South Bridge module specific)
0x1B	Pre-memory South Bridge initialization (South Bridge module specific)
0x1C	Pre-memory South Bridge initialization (South Bridge module specific)
0x1D – 0x2A	OEM pre-memory initialization codes
0x2B	Memory initialization. Serial Presence Detect (SPD) data reading
0x2C	Memory initialization. Memory presence detection
0x2D	Memory initialization. Programming memory timing information
0x2E	Memory initialization. Configuring memory
0x2F	Memory initialization (other).
0x30	Reserved for ASL (see ASL Status Codes section below)
0x31	Memory Installed
0x32	CPU post-memory initialization is started
0x33	CPU post-memory initialization. Cache initialization
0x34	CPU post-memory initialization. Application Processor(s) (AP) initialization
0x35	CPU post-memory initialization. Boot Strap Processor (BSP) selection
0x36	CPU post-memory initialization. System Management Mode (SMM) initialization
0x37	Post-Memory North Bridge initialization is started
0x38	Post-Memory North Bridge initialization (North Bridge module specific)
0x39	Post-Memory North Bridge initialization (North Bridge module specific)

Status Code	Description
0x3A	Post-Memory North Bridge initialization (North Bridge module specific)
0x3B	Post-Memory South Bridge initialization is started
0x3C	Post-Memory South Bridge initialization (South Bridge module specific)
0x3D	Post-Memory South Bridge initialization (South Bridge module specific)
0x3E	Post-Memory South Bridge initialization (South Bridge module specific)
0x3F-0x4E	OEM post memory initialization codes
0x4F	DXE IPL is started
PEI Error Codes	
0x50	Memory initialization error. Invalid memory type or incompatible memory speed
0x51	Memory initialization error. SPD reading has failed
0x52	Memory initialization error. Invalid memory size or memory modules do not match.
0x53	Memory initialization error. No usable memory detected
0x54	Unspecified memory initialization error.
0x55	Memory not installed
0x56	Invalid CPU type or Speed
0x57	CPU mismatch
0x58	CPU self test failed or possible CPU cache error
0x59	CPU micro-code is not found or micro-code update is failed
0x5A	Internal CPU error
0x5B	reset PPI is not available
0x5C-0x5F	Reserved for future AMI error codes
S3 Resume Progress Codes	
0xE0	S3 Resume is stared (S3 Resume PPI is called by the DXE IPL)
0xE1	S3 Boot Script execution

Status Code	Description
0xE2	Video repost
0xE3	OS S3 wake vector call
0xE4-0xE7	Reserved for future AMI progress codes
S3 Resume Error Codes	
0xE8	S3 Resume Failed
0xE9	S3 Resume PPI not Found
0xEA	S3 Resume Boot Script Error
0xEB	S3 OS Wake Error
0xEC-0xEF	Reserved for future AMI error codes
Recovery Progress Codes	
0xF0	Recovery condition triggered by firmware (Auto recovery)
0xF1	Recovery condition triggered by user (Forced recovery)
0xF2	Recovery process started
0xF3	Recovery firmware image is found
0xF4	Recovery firmware image is loaded
0xF5-0xF7	Reserved for future AMI progress codes
Recovery Error Codes	
0xF8	Recovery PPI is not available
0xF9	Recovery capsule is not found
0xFA	Invalid recovery capsule
0xFB – 0xFF	Reserved for future AMI error codes

PEI Beep Codes

# of Beeps	Description
1	Memory not Installed
1	Memory was installed twice (InstallPeiMemory routine in PEI Core called twice)
2	Recovery started
3	DXEIPL was not found
3	DXE Core Firmware Volume was not found
4	Recovery failed
4	S3 Resume failed
7	Reset PPI is not available

DXE Phase

Status Code	Description
0x60	DXE Core is started
0x61	NVRAM initialization
0x62	Installation of the South Bridge Runtime Services
0x63	CPU DXE initialization is started
0x64	CPU DXE initialization (CPU module specific)
0x65	CPU DXE initialization (CPU module specific)
0x66	CPU DXE initialization (CPU module specific)
0x67	CPU DXE initialization (CPU module specific)
0x68	PCI host bridge initialization
0x69	North Bridge DXE initialization is started
0x6A	North Bridge DXE SMM initialization is started
0x6B	North Bridge DXE initialization (North Bridge module specific)
0x6C	North Bridge DXE initialization (North Bridge module specific)
0x6D	North Bridge DXE initialization (North Bridge module specific)
0x6E	North Bridge DXE initialization (North Bridge module specific)

Status Code	Description
0x6F	North Bridge DXE initialization (North Bridge module specific)
0x70	South Bridge DXE initialization is started
0x71	South Bridge DXE SMM initialization is started
0x72	South Bridge devices initialization
0x73	South Bridge DXE Initialization (South Bridge module specific)
0x74	South Bridge DXE Initialization (South Bridge module specific)
0x75	South Bridge DXE Initialization (South Bridge module specific)
0x76	South Bridge DXE Initialization (South Bridge module specific)
0x77	South Bridge DXE Initialization (South Bridge module specific)
0x78	ACPI module initialization
0x79	CSM initialization
0x7A – 0x7F	Reserved for future AMI DXE codes
0x80 – 0x8F	OEM DXE initialization codes
0x90	Boot Device Selection (BDS) phase is started
0x91	Driver connecting is started
0x92	PCI Bus initialization is started
0x93	PCI Bus Hot Plug Controller Initialization
0x94	PCI Bus Enumeration
0x95	PCI Bus Request Resources
0x96	PCI Bus Assign Resources
0x97	Console Output devices connect
0x98	Console input devices connect
0x99	Super IO Initialization
0x9A	USB initialization is started
0x9B	USB Reset
0x9C	USB Detect
0x9D	USB Enable
0x9E – 0x9F	Reserved for future AMI codes

Status Code	Description
0xA0	IDE initialization is started
0xA1	IDE Reset
0xA2	IDE Detect
0xA3	IDE Enable
0xA4	SCSI initialization is started
0xA5	SCSI Reset
0xA6	SCSI Detect
0xA7	SCSI Enable
0xA8	Setup Verifying Password
0xA9	Start of Setup
0xAA	Reserved for ASL (see ASL Status Codes section below)
0xAB	Setup Input Wait
0xAC	Reserved for ASL (see ASL Status Codes section below)
0xAD	Ready To Boot event
0xAE	Legacy Boot event
0xAF	Exit Boot Services event
0xB0	Runtime Set Virtual Address MAP Begin
0xB1	Runtime Set Virtual Address MAP End
0xB2	Legacy Option ROM Initialization
0xB3	System Reset
0xB4	USB hot plug
0xB5	PCI bus hot plug
0xB6	Clean-up of NVRAM
0xB7	Configuration Reset (reset of NVRAM settings)
0xB8 – 0xBF	Reserved for future AMI codes
0xC0 – 0xCF	OEM BDS initialization codes
DXE Error Codes	
0xD0	CPU initialization error
0xD1	North Bridge initialization error
0xD2	South Bridge initialization error

Status Code	Description
0xD3	Some of the Architectural Protocols are not available
0xD4	PCI resource allocation error. Out of Resources
0xD5	No Space for Legacy Option ROM
0xD6	No Console Output Devices are found
0xD7	No Console Input Devices are found
0xD8	Invalid password
0xD9	Error loading Boot Option (LoadImage returned error)
0xDA	Boot Option is failed (StartImage returned error)
0xDB	Flash update is failed
0xDC	Reset protocol is not available

DXE Beep Codes

# of Beeps	Description
1	Invalid password
4	Some of the Architectural Protocols are not available
5	No Console Output Devices are found
5	No Console Input Devices are found
6	Flash update is failed
7	Reset protocol is not available
8	Platform PCI resource requirements cannot be met

ACPI/ASL Checkpoints

Status Code	Description
0x01	System is entering S1 sleep state
0x02	System is entering S2 sleep state
0x03	System is entering S3 sleep state
0x04	System is entering S4 sleep state
0x05	System is entering S5 sleep state
0x10	System is waking up from the S1 sleep state
0x20	System is waking up from the S2 sleep state
0x30	System is waking up from the S3 sleep state
0x40	System is waking up from the S4 sleep state
0xAC	System has transitioned into ACPI mode. Interrupt controller is in PIC mode.
0x72	System is entering S5 sleep statue.
0x84 (xhci mode enabled)	System has transitioned into ACPI mode. Interrupt controller is in PIC mode.
0x84 (xhci mode enabled)	System has transitioned into ACPI mode. Interrupt controller is in APIC mode.
0x83 (xhci mode disabled)	System has transitioned into ACPI mode. Interrupt controller is in PIC mode.
0x83 (xhci mode disabled)	System has transitioned into ACPI mode. Interrupt controller is in APIC mode.
0xAA	System has transitioned into ACPI mode. Interrupt controller is in APIC mode.

9.3 OEM-Reserved Checkpoint Ranges

Status Code	Description
0x05	OEM SEC initialization before microcode loading
0x0A	OEM SEC initialization after microcode loading
0x1D – 0x2A	OEM pre-memory initialization codes
0x3F – 0x4E	OEM PEI post memory initialization codes
0x80 – 0x8F	OEM DXE initialization codes
0xC0 – 0xCF	OEM BDS initialization codes

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.

- 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.

Getting Service

Ask an Expert: http://askanexpert.adlinktech.com

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