cPCI-A3515 Series

Performance 3U CompactPCI® Serial
4th/5th Gen Intel® Core™ Processor Blade

User's Manual



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Revision History

Revision	Release Date	Description of Change(s)
1.0	27/02/2018	Initial release

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Preface

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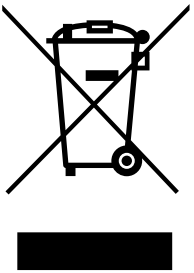
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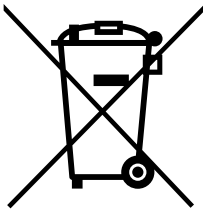
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Conventions

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


NOTE:

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


CAUTION:

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


WARNING:

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

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1 Introduction

1.1 Overview

CompactPCI® Serial (PICMG CPCI-S.0) is a new modular computer standard officially adopted by PICMG in 2011. The CompactPCI Serial standard defines a completely new connector to support high-speed serial interfaces including PCI Express, SATA, USB and Ethernet. The mechanical specification is fully compliant with PICMG 2.0 CompactPCI and interoperable with existing CompactPCI systems via hybrid backplanes. A CompactPCI Serial backplane has six high-speed connectors P1 to P6 on the system slot but only P1 is mandatory on peripheral slots, P2 to P6 being optional. A CompactPCI Serial system can comprise a total of nine blades (one system blade and eight peripheral I/O blades) through an Ethernet full mesh or single star architecture. The CompactPCI® Serial standard is the next-generation of the CompactPCI® specification and provides more flexibility and higher speed and bandwidth in modular system solutions.

The ADLINK cPCI-A3515 Series is a 3U CompactPCI Serial compatible processor blade with soldered DDR3L-1333/1600 ECC memory up to 16GB. The ADLINK cPCI-A3515 features a 4th/5th generation Intel® Core™ processor with Mobile Intel® QM87 Chipset.

The cPCI-A3515 Series is a 3U CompactPCI Serial blade available in single-slot (4HP) or dual-slot (8HP) width form factors with various daughter boards to provide a broad range of I/O requirements. Faceplate I/O on the single-slot (4HP) version includes 2x DP, 2x GbE and 2x USB 3.0 ports (these I/O are common to all versions). Faceplate I/O on the dual-slot (8HP) version includes additional 2x USB 2.0, 1x COM, 1x VGA on the cPCI-A3515B or additional 2x USB 2.0, 1x COM and Line-in/Line-out on the cPCI-A3515D.

Graphics support is integrated on the CPU and allows 3 independent displays on the faceplate of the cPCI-A3515B with its additional VGA output. Storage includes an mSATA slot or a 32GB SSD (optional) and 2.5” SATA drive on the layer 2 riser card (cPCI-A3515B/D).

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Serial interfaces on the backplane connectors P1 to P5 include one PCI Express x8, two PCI Express x4, three PCI Express x1, four SATA 6Gb/s, two USB 3.0, and eight USB 2.0 ports. Additionally, the P6 connector supports up to eight Gigabit Ethernet interfaces.

The cPCI-A3515 is a high performance solution for transportation, factory automation, defense and other industrial applications that require superior data transfer capability and advanced computing power. The ADLINK cPCI-A3515 provides high manageability, supports Satellite mode operation as a standalone blade in peripheral slots, and Smart Embedded Management Agent (SEMA) for system health monitoring. In addition, with multiple operating system and board support package (BSP) support, users can build a reliable and high-performance industrial system with cPCI-A3515 Series

1.2 Features

- 3U CompactPCI Serial (PICMG CPCI-S.0) processor blade in 4HP or 8HP width form factor
- $4^{th}/5^{th}$ generation Intel® Core™ Processor
- Graphics engine integrated in processor supporting up to three independent displays with DirectX 11.2, OpenGL 4.3
- Dual channel DDR3L-1333/1600 soldered memory with ECC, up to 16GB
- Backplane communication by PCI Express, USB 2.0/3.0, SATA, and Gigabit Ethernet
- Optional 32-bit, 33/66MHz CompactPCI (PICMG 2.0) support
- Supports Satellite mode operation as a standalone blade in peripheral slots
- Supports SEMA for system health monitoring
- Line-in and Line-out ports on faceplate (cPCI-A3515D)
- Storage options: mSATA socket, onboard SATA SSD, onboard 2.5" SATA 3 Gb/s direct connector on 8HP versions (cPCI-A3515B/D)
- Multiple OS and BSP support including Windows, Linux, VxWorks (by request) and QNX (by request)

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1.3 Model Number Decoder

cPCI-	EX	A3515	B	/5700E	/M16	/S32
	(A)		(B)	(C)	(D)	(E)

(A) Operating Temperature Code

- ▷ **Blank** = -20°C to +70°C
- ▷ **EX**= -40°C to +85°C (for CPUs with TDP below 37W only)

(B) Configuration Code

- ▷ **Blank** = Single slot width, 2x DP, 2x GbE, 2x USB 3.0
- ▷ **B** = Dual slot width, 2x DP, 2x GbE, 2x USB 3.0, COM, 2x USB 2.0, VGA, mSATA socket, SATA connector, Compact-PCI J1 and J2 connectors
- ▷ **D** = Dual slot width, 2x DP, 2x GbE, 2x USB 3.0, COM, 2x USB 2.0, Line-in, Line-out, mSATA socket and SATA connector
- ▷ **Other** = ODM/OEM project code

(C) CPU Code

- ▷ **4700E** = Quad-core Intel® Core™ i7-4700EQ processor
- ▷ **5700E** = Quad-core Intel® Core™ i7-5700EQ processor

(D) Memory Size Code

- ▷ **M8** = 2x 4GB DDR3L-1600 soldered SDRAM
- ▷ **M16** = 2x 8GB DDR3L-1333 soldered SDRAM

(E) Storage Configuration Code

- ▷ **Blank** = Default with mSATA socket
- ▷ **S32** = Onboard soldered 32GB SSD on daughter board

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1.4 Package Contents

The cPCI-A3515 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-A3515 Series non-standard configurations will vary depending on customer requests.

Processor Blade

- The cPCI-A3515 Series Processor Blade
  - CPU and memory specifications will differ depending on options selected
  - Thermal module is assembled on the board
- 2.5” SATA drive installation kit (P/N 58-99348-1000)


NOTE:

The contents of non-standard cPCI-A3515 configurations may vary depending on the customer’s requirements.

Optional Accessories

- DisplayPort to DVI adapter cable (P/N 30-01120-0000)
- DisplayPort to VGA adapter cable (P/N 30-01121-0000)
- DisplayPort to HDMI adapter cable (P/N 30-01119-0000)


CAUTION:

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

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2 Specifications

2.1 cPCI-A3515 Processor Blade Specifications

CompactPCI Standards	• PICMG 2.0 CPCI-S.0 CompactPCI® Serial R1.0 • PICMG CompactPCI® Rev. 3.0
Mechanical	• Standard 3U CompactPCI • Board size: 100mm x 160mm • Single slot (4HP, 20.32mm); dual slot (8HP, 40.64mm) • CompactPCI Serial P1 to P6 connector
Processor	• Quad-core Intel® Core™ i7-5700EQ Processor 2.6GHz, 6M Cache, 47/37W by cTDP • Quad-core Intel® Core™ i7-4700EQ Processor 2.4GHz, 6M Cache, 47/37W by cTDP • Passive heatsink
Chipset	• Mobile Intel® QM87 Chipset
Memory	• Dual channel DDR3L-1333/1600 ECC soldered memory • Up to 16GB
BIOS	• AMI EFI BIOS, 128Mbit SPI flash memory
CompactPCI Bus	• Support through CompactPCI bridge (cPCI-A3515B only[1]) • PCI 32-bit, 33/66MHz; 3.3V, 5V universal V(IO)
Gigabit Ethernet	• One PCIe x1 Intel® I218 GbE PHY and one PCIe x1 Intel® I210 Gigabit Ethernet controllers • Two egress 10/100/1000BASE-T ports on faceplate, one supporting Intel® AMT 9.0 by I218 controller • Up to eight Gigabit Ethernet interfaces via P6 connector to backplane
Graphics	• Integrated in Intel® Core™ processor • Two DisplayPort outputs on faceplate with resolution up to 2560x1440 @60Hz • One VGA port on faceplate (cPCI-A3515B only) • Up to three independent display outputs
USB	• Two USB 3.0 ports on faceplate • Additional two USB 2.0 ports on 8HP faceplate (cPCI-A3515B/D)
Serial Ports	• One RS-232/422/485 serial port on 8HP faceplate (cPCI-A3515B/D)
Audio	• Line-in/Line-out on faceplate by Realtek ALC262 High Definition Audio codec (cPCI-A3515D only)

Table 2-1: cPCI-A3515 Processor Blade Specifications

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TPM	Atmel AT97SC3204 TPM (upon request) supporting: • Over/Under voltage detection • Low/High frequency sensor/filter • Reset filter • Memory encryption/decryption
Storage Interfaces[3]	• mSATA socket on daughter board • Optional onboard 32GB SSD on daughter board • One SATA 3Gb/s direct connector for 2.5" SATA drive on 8HP versions (cPCI-A3515B/D)
Faceplate I/O	**4HP (cPCI-A3515)** • 2x USB 3.0 ports • 2x 10/100/1000BASE-T Ethernet ports • 2x DisplayPort **8HP (cPCI-A3515B)** • 2x USB 3.0 ports • 2x 10/100/1000BASE-T Ethernet ports • 2x DisplayPort • 2x USB 2.0 ports • 1x RS-232/422/485 port • 1x VGA port **8HP (cPCI-A3515D)** • 2x USB 3.0 ports • 2x 10/100/1000BASE-T Ethernet ports • 2x DisplayPort • 2x USB 2.0 ports • 1x RS-232/422/485 port • Line-in and Line-out port
OS Compatibility	• Microsoft Windows 7 32/64-bit • Microsoft Windows 8 32/64-bit • Red Hat Enterprise Linux 6.6 and 7.0, 64-bit • Windows Embedded Standard 7, VxWorks, QNX and other OS support by request
Environmental	• Operating Temperature (with forced air flow)[2]: Standard: -20°C to 70°C Extreme temperature: -40°C to +85°C (screened, Intel® Core™ i7-4700EQ and i7-5700EQ 47W adjusted to 37W by Intel cTDP and forced air flow) • Storage Temperature: -50°C to 100°C • Humidity: 95% @60°C non-condensing • Shock: 20G peak-to-peak, 11ms duration, operating • Vibration[3]: 2Grms random vibration, 5-500Hz, each axis, operating (w/o hard drive)

Table 2-1: cPCI-A3515 Processor Blade Specifications

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EMI	• CE EN55022 • FCC Class A

Table 2-1: cPCI-A3515 Processor Blade Specifications

1. The cPCI-A3515B supporting CompactPCI bus requires a PICMG CPCI-S.0 backplane with system slot on the left and a PICMG 2.0 backplane with system slot on the right. Please contact your ADLINK representative for detailed information on compatible backplanes.
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.
3. 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.

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2.2 Block Diagrams

cPCI-A3515 Processor Blade

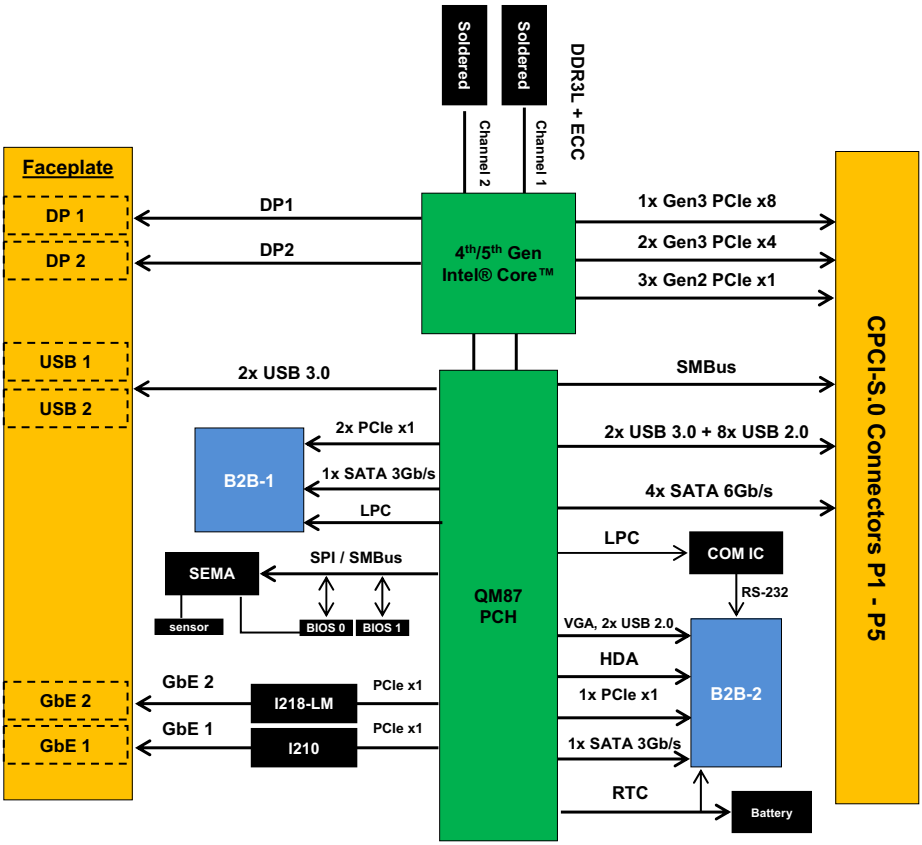


Figure 2-1: cPCI-A3515 Processor Blade Functional Block Diagram

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cPCI-A3515B Daughter Board

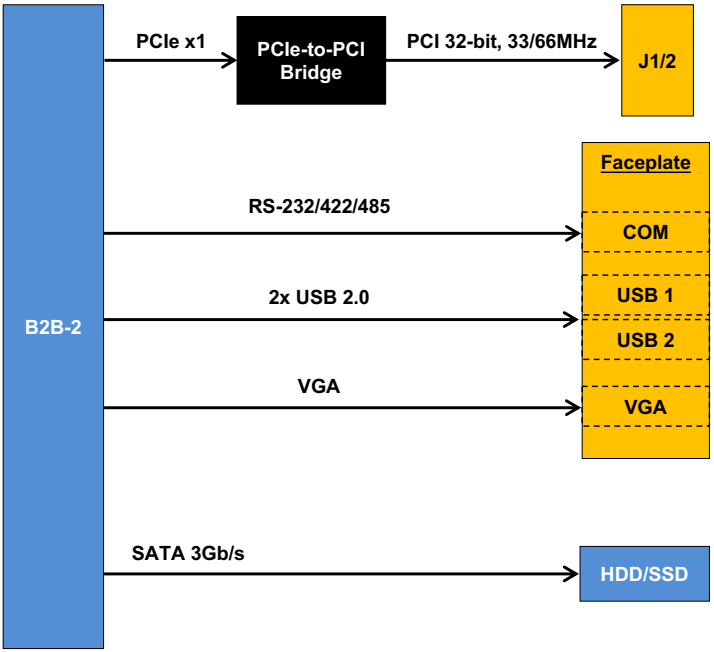


Figure 2-2: cPCI-A3515B Daughter Board Functional Block Diagram

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cPCI-A3515D Daughter Board

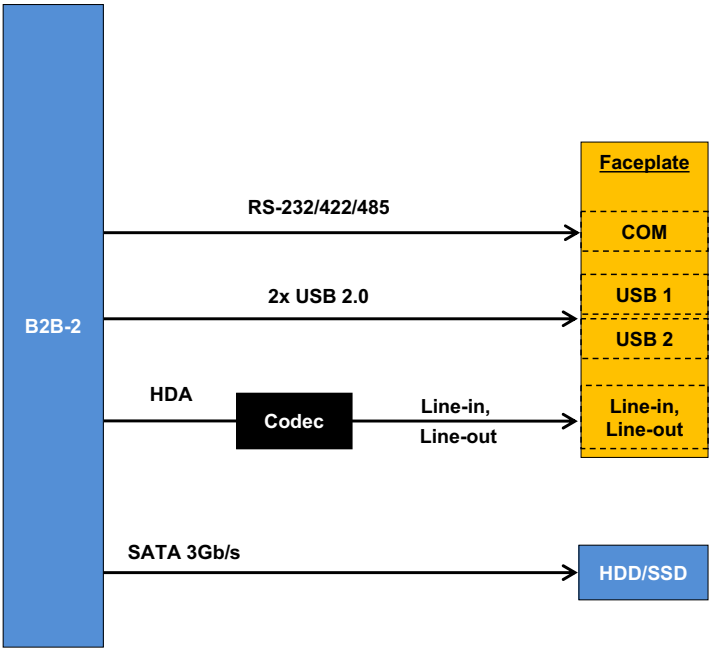


Figure 2-3: cPCI-A3515D Daughter Board Functional Block Diagram

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2.3 I/O Connectivity Table

Function	cPCI-A3515 (4HP)		cPCI-A3515B (8HP)		cPCI-A3515D (8HP)	
	Faceplate	Onboard	Faceplate	Onboard	Faceplate	Onboard
GbE	2 (RJ-45)	—	2 (RJ-45)	—	2 (RJ-45)	—
USB	2 (3.0)	—	2 (3.0) 2 (2.0)	—	2 (3.0) 2 (2.0)	—
COM		—	1 (DB9)	—	1 (DB9)	—
Display	2 (DP)	—	2 (DP) 1 (VGA)	—	2 (DP)	—
SATA 2.5”	—	—	—	1	—	1
mSATA	—	optional[1]	—	1	—	1
Onboard SSD	—	1	—	optional[2]	—	optional[2]
Audio	—	—	—		Line-in Line-out	—

Table 2-2: cPCI-A3515 I/O Connectivity

1. Available by replacing onboard SSD with mSATA socket.
2. Available by replacing mSATA socket with onboard SSD.

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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.

Power Consumption

This section provides information on the power consumption of cPCI-A3515 Series when using Intel® Core™ i7 processors with 16GB DDR3L-1333 ECC soldered memory and 2.5" SATA 64GB SATA SSD. The cPCI-A3515 is powered by +12V only.

Intel® Core™i7-5700EQ		
OS/Mode	**Current 12V**	**Total Power**
Windows 7 Ultimate x64 Idle Mode[1]	1.46A	17.52W
Windows 7 Ultimate x64 Typical Mode[2]	2.9A	34.8W
Windows 7 Ultimate x64 Maximum Mode[3]	5.185A	62.22W

1. The system set to idle mode and stays idle for 10 minutes.
2. Run BurnInTest™ that includes CPU, memory, video and 2D/3D graphics. Set all test items to 100% loading and run for 10 minutes.
3. Run Intel® Thermal Analysis Tool that includes CPU, graphics and memory. Set all test items to 100% loading and run for 10 minutes.

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3 Functional Description

The following sections describe the cPCI-A3515 Series features and functions.

3.1 Processors

The Mobile 4th/5th Generation Intel® Core™ Processor Family are state-of-the-art, 64-bit, multi-core mobile processor. 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-A3515 Series supports Intel® Core™ i7 processors. The table below lists the general specifications and power ratings of the CPUs supported by the cPCI-A3515 Series.

Features	Core™ i7-5700EQ	Core™ i7-4700EQ
Clock	2.6GHz	2.4GHz
Max. Single Core Turbo Freq.	3.4GHz	3.4GHz
Last Level Cache	6MB	6MB
No. of Core(s)	4/8	4/8
Max. Power (TDP[1])	47W	47W
DMI	5 GT/s	5 GT/s
$T_{junction, MAX}$[2]	105°C	100°C

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

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Supported Technologies

Features	Core™ i7-5700EQ	Core™ i7-4700EQ
Intel® Virtualization Technology for Directed I/O (Intel® VT-d)	Yes	Yes
Intel® Virtualization Technology (Intel® VT-x)	Yes	Yes
Intel® VT-x with Extended Page Tables (EPT)	Yes	Yes
Intel® Transactional Synchronization Extensions - New Instructions (Intel® TSX-NI)	Yes	No
Intel® Hyper-Threading Technology	Yes	Yes
Intel® 64 Architecture	Yes	Yes
Execute Disable Bit	Yes	Yes
Intel® Turbo Boost Technology	2.0	2.0
Intel® vPro Technology	Yes	Yes
Enhanced Intel SpeedStep® Technology	Yes	Yes
Thermal Monitoring Technologies	Yes	Yes
Intel® Identity Protection Technology	Yes	Yes
Intel® Stable Image Platform Program (Intel® SIPP)	No	No

Interfaces

- Two channels of DDR3L-1333/1600 memory
- DDR3 memory data transfer rates of 1333 MT/s and 1600 MT/s
- 64-bit wide channels
- DDR3L I/O voltage of 1.35V
- 2Gb, 4Gb and 8Gb DDR3 DRAM technologies are supported for x8 and x16 devices (using 4Gb device technologies, the largest memory capacity possible is 8 GB,

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assuming dual-channel mode with x8, dual-ranked ECC 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

3.2 Platform Controller Hub

The Mobile Intel® QM87 Chipset provides extensive I/O support. Functions and capabilities include:

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

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3.3 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.

3.4 Intel® Hyper-Threading Technology

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

3.5 Trusted Platform Module

The cPCI-A3515 is optionally equipped with an Atmel AT97SC3204 Trusted Platform Module (TPM). The TPM is a secure controller with added cryptographic functionality to provide users a secure environment in e-commerce transactions and Internet communications.

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The key features Trusted Platform Module (TPM) offers are:

- Fully compliant to the Trusted Computing Group (TCG) Trusted Platform Module (TPM) version 1.2 specification
- Hardware hash accelerator for SHA-1 algorithm
- Advanced Crypto Engine (ACE) for asymmetric key operations (up to 2048-bit key length) to make hardware protection.
- Tick counter to extend the time required to decipher the key
- In addition to encryption key created by user. it also provide some security features to protect the integrated circuit itself:
- Over/Under-voltage detection to monitor the system stability. If the voltage fluctuates dramatically, this function can block the data transfer and lock the chip.
- Low/High frequency sensor to detect the IC clock frequency. If the frequency fluctuates dramatically, this function can block the data transfer and lock the chip.
- Reset filter to filter reset signal in order to break the time set by tick counter is received
- Memory encryption to protect memory
- Physical shield in the IC to protect the die from intruding or hacking by matching the data transferred on the 2 layer metal shield on the IC. If the data is not matched, the IC may be blocked.

3.6 Battery

The cPCI-A3515 is equipped with a 3.0V "coin cell" lithium battery for the Real Time Clock (RTC). The battery socket is equipped on the the processor blade. The lithium battery must be replaced with an identical battery or a battery type recommended by the manufacturer. A Panasonic CR2032 is equipped on board by default.

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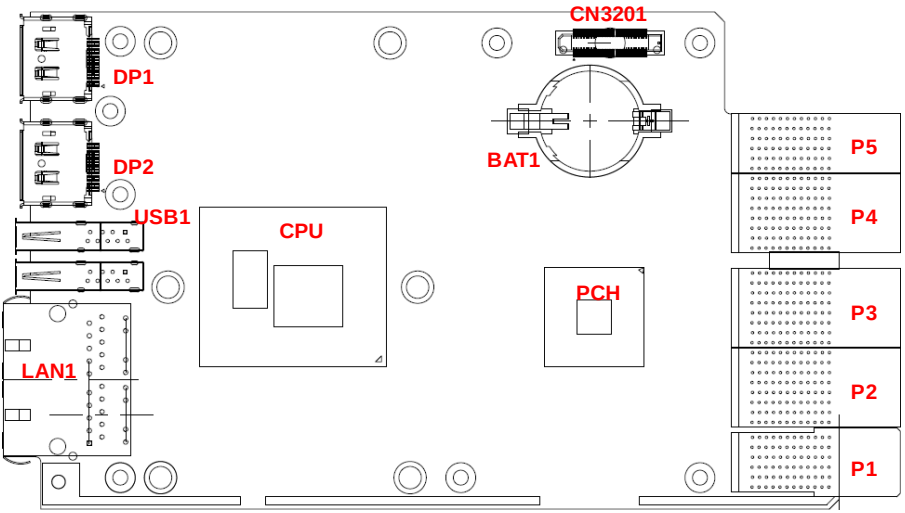
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4 Board Interfaces

This chapter illustrates the board layout, connector pin assignments, and jumper settings to familiarize users with the cPCI-A3515 Series.

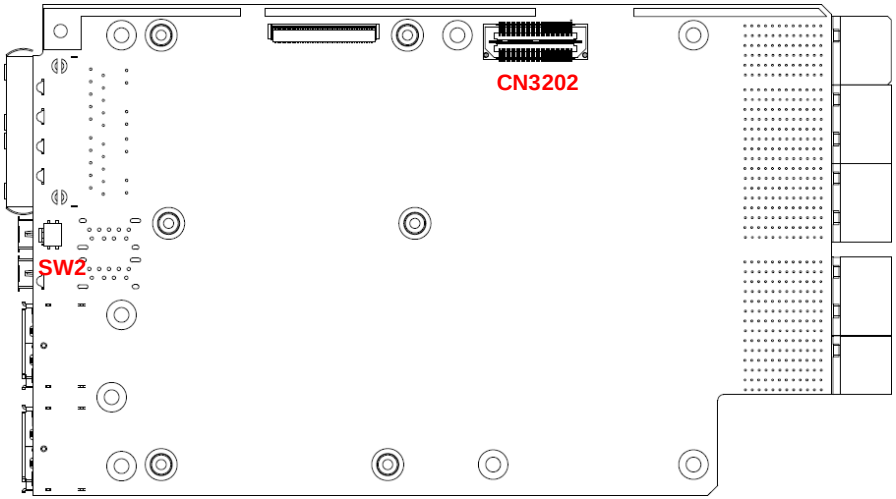
4.1 cPCI-A3515 Series Board Layout



CPU	Intel® Core™ Processor	**P1-P5**	CompactPCI Serial P1 to P5 connectors
PCH	Intel® QM87 PCH	**CN3201**	Storage/Ethernet daughter board connector
BAT1	CMOS battery	**DP1/ DP2**	DisplayPort connector
USB1	Dual USB connectors	**LAN1**	Dual Ethernet connectors

Figure 4-1: cPCI-A3515 Series Board Layout (component side)

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SW2	Reset Button	**CN3202**	Layer-2 daughter board connector

Figure 4-2: cPCI-A3515 Series Board Layout (solder side)

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4.2 cPCI-A3515 Blade Assembly Layout

This section describes the final assembly layout of the single slot cPCI-A3515 Blade.

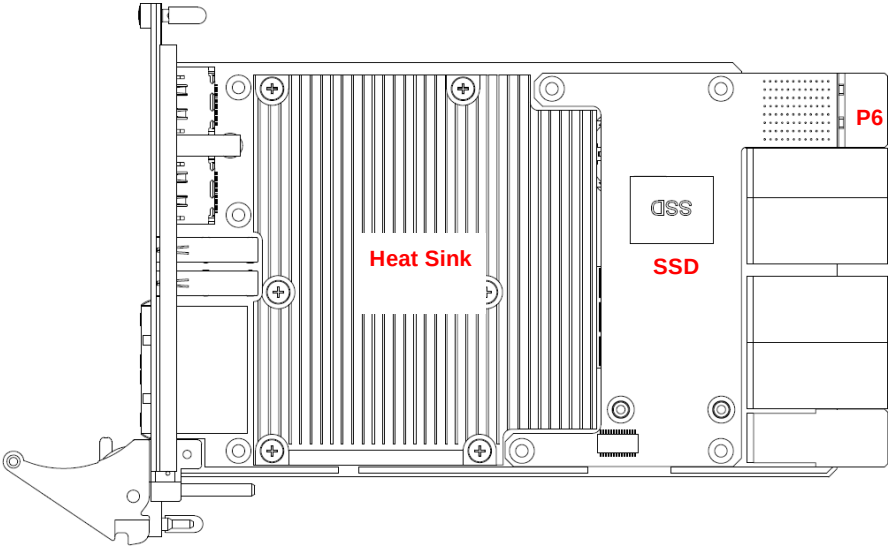


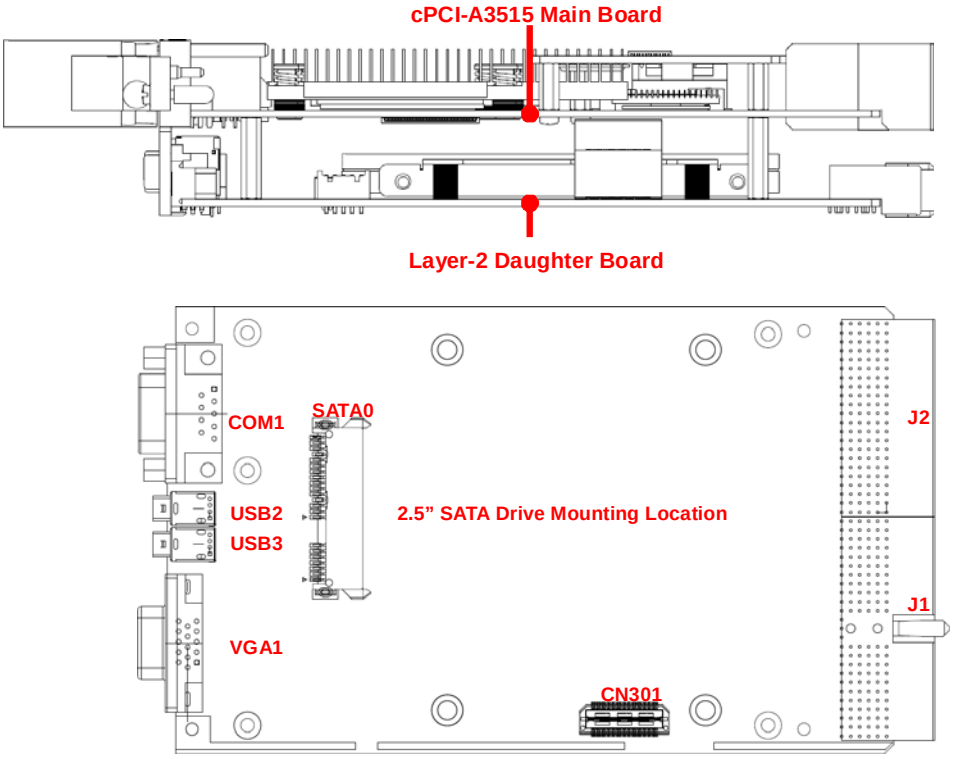
Figure 4-3: cPCI-A3515 Blade Assembly Layout

SSD	Onboard SSD	**P6**	CompactPCI Serial P6 connector

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4.3 cPCI-A3515B Blade Assembly Layout

The dual-slot width cPCI-A3515B Blade is comprised of the cPCI-A3515 single-slot main board and the cPCI-A3515B layer-2 daughter board to expand I/O connectivity with COM, 2x USB 2.0, and VGA.

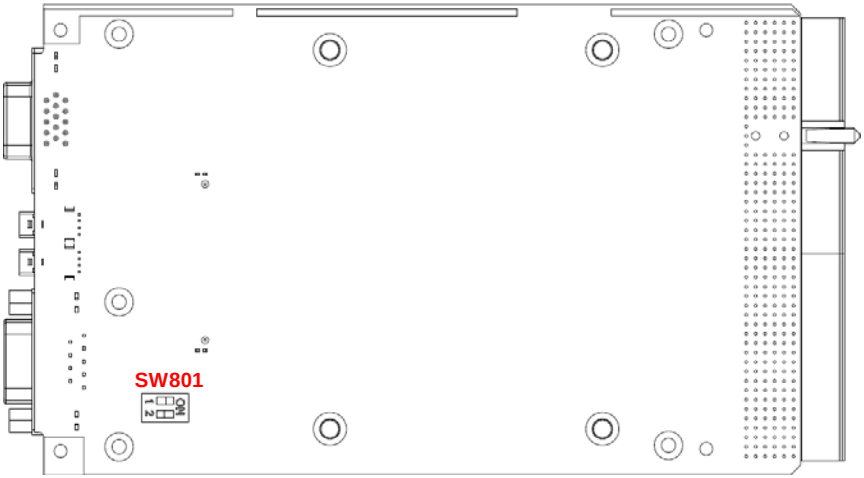


cPCI-A3515B Daughter Board Component Side

COM1	DB-9 COM port	**CN301**	Board-to-board connector to main board
USB2/3	USB connectors	**J1/J2**	CompactPCI connectors
VGA1	VGA connector	**SATA0**	22-pin SATA connector

Figure 4-4: cPCI-A3515B Blade Assembly Layout

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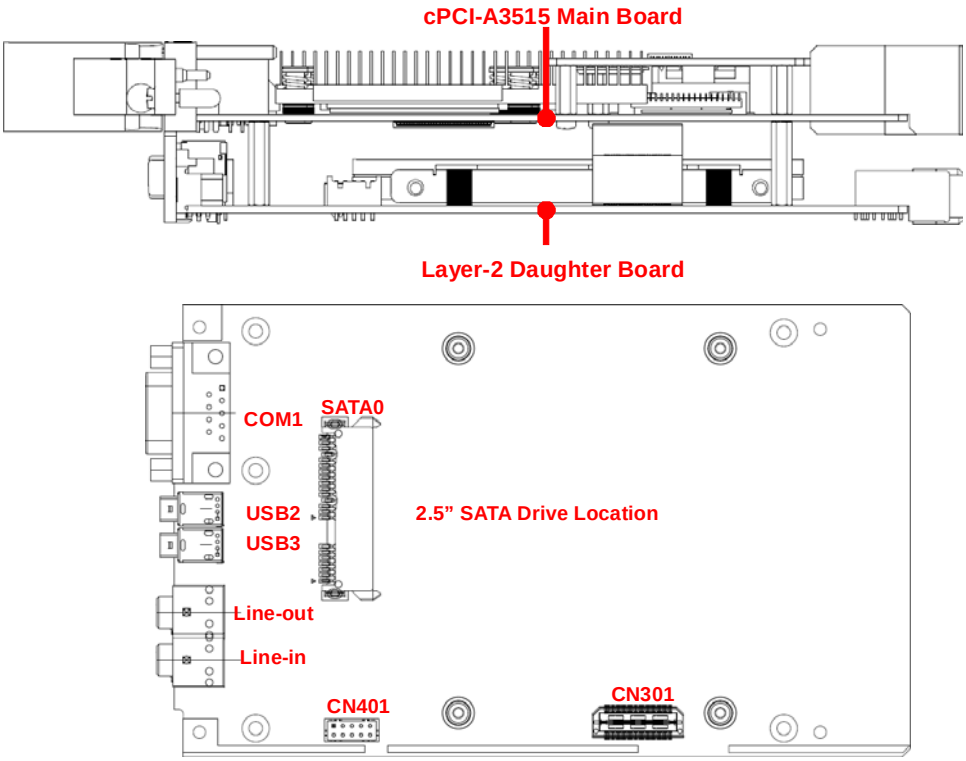
SW801	COM1 mode selection switch

Figure 4-5: cPCI-A3515B Daughter Board Solder Side Layout

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4.4 cPCI-A3515D Blade Assembly Layout

The dual-slot width cPCI-A3515D is comprised of the cPCI-A3515 single-slot main board and cPCI-A3515D layer-2 daughter board to expand I/O connectivity with COM, 2x USB 2.0, Line-in and Line-out.

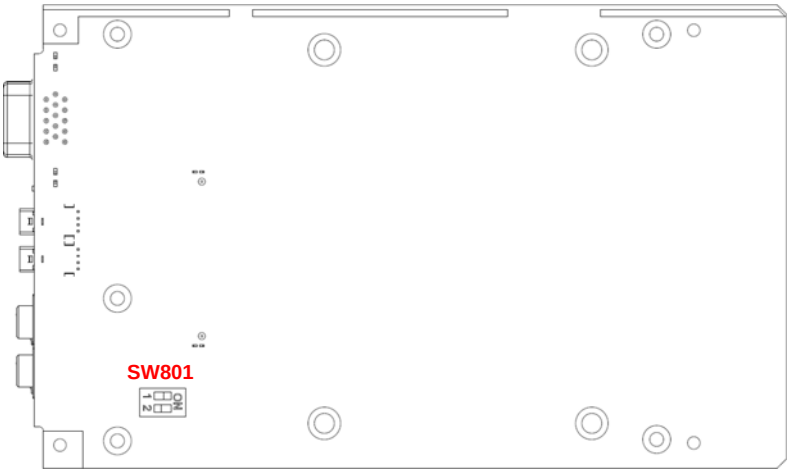


cPCI-A3515D Daughter Board Component Side

COM1	RJ-45 COM port	**CN301**	Board-to-board connector to main board
USB2/3	USB connectors	**CN401**	Audio cable connector (to Line-in/Line-out)
SATA0	22-pin SATA connector	**Line-in/out**	Line-in/Line-out jacks

Figure 4-6: cPCI-A3515D Blade Assembly Layout

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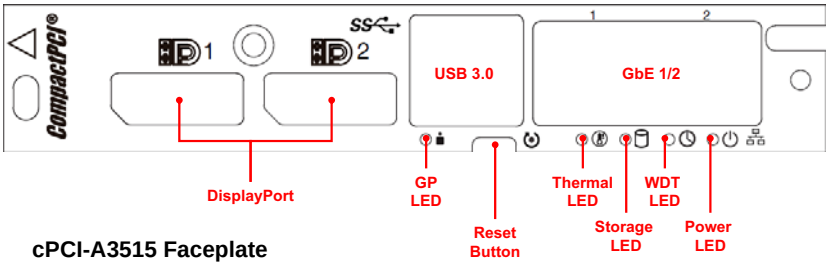


SW801	COM1 mode selection switch

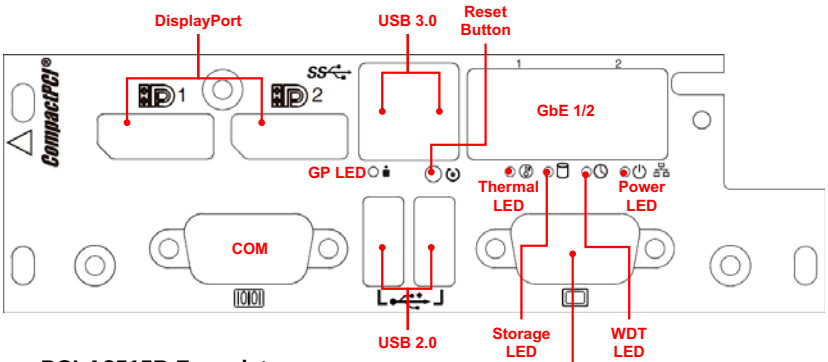
Figure 4-7: cPCI-A3515D Daughter Board Solder Side Layout

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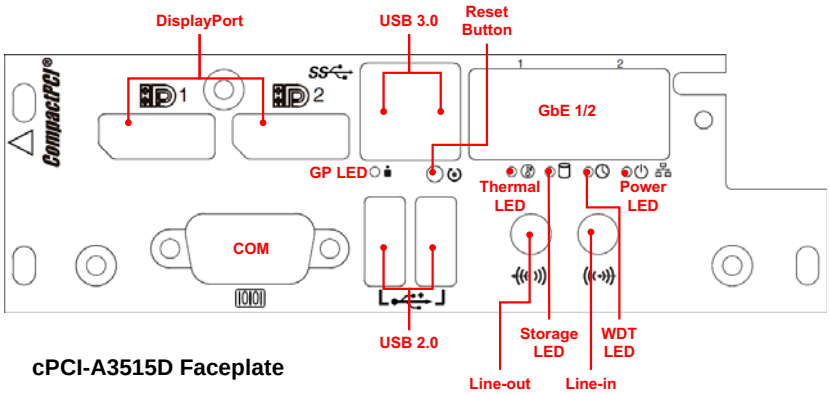
4.5 cPCI-A3515/B/D Faceplate



cPCI-A3515 Faceplate



cPCI-A3515B Faceplate



cPCI-A3515D Faceplate

Figure 4-8: cPCI-A3515/B/D Faceplate Layout

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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
Drive 	Blue	OFF	No SSD/mSATA/SATA drive activity
		Blinking	Data read/write in process for SSD/ mSATA/SATA drive
Overheat 	Red	OFF	CPU temperature is under 100ºC
		ON	CPU temperature exceeds 100ºC
GP (General Purpose) 	Yellow	OFF	No activity
		ON/Blinking	Defined by user

Table 4-1: cPCI-A3515 Faceplate System LED Descriptions



The GP LED is connected to the GPIO pins of the BMC. The GP LED can be programmed by the user as a general purpose LED.

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4.6 Connector Pin Assignments

USB 2.0 Connectors

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



Table 4-2: USB 2.0 Pin Definition

USB 3.0 Connectors

Pin #	Signal Name
1	USB3.0_P5VA
2	USB2_CMAN
3	USB2_CMAP
4	GND
5	USB3A_CMRXN
6	USB3A_CMRXP
7	GND
8	USB3A_CMTXN
9	USB3A_CMTXP

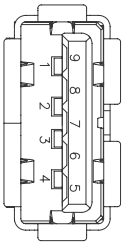


Table 4-3: USB 3.0 Pin Definition

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DB-15 VGA Connector

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

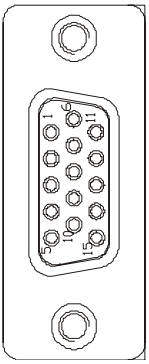


Table 4-4: VGA Pin Definition

DisplayPort Connectors

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

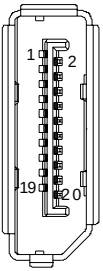


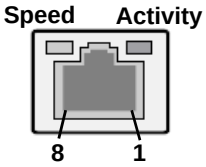
Table 4-5: DisplayPort Pin Definition

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RJ-45 Gigabit Ethernet Connectors

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

Table 4-6: RJ-45 GbE Pin Definitions



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

Table 4-7: LAN LED Status Definitions

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cPCI-A3515B/D Serial Port

COM1 Connector (DB-9)

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

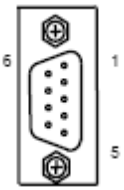


Table 4-8: cPCI-A3515D/P COM1 (DB-9) Pin Definition

COM1 Mode Selection Switch (SW801)

This switch sets the cPCI-A3515B/D COM1 port to RS-232 full modem, RS-422, RS-485. See cPCI-A3515B/D Blade Assembly Layout above for switch SW801 location. RS-232 full modem is set by default.



Mode	Pin 1	Pin 2
RS-232	ON	OFF
RS-422	ON	ON
RS-485	OFF	ON

Table 4-9: cPCI-A3515B/D COM1 Mode Selection Switch Settings

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SATA Conn. on cPCI-A3515B/D Daughter Board

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

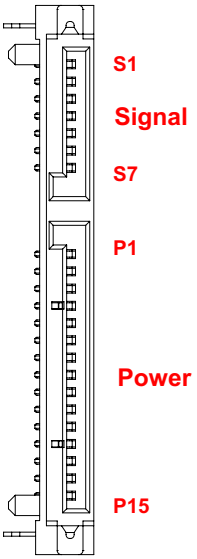
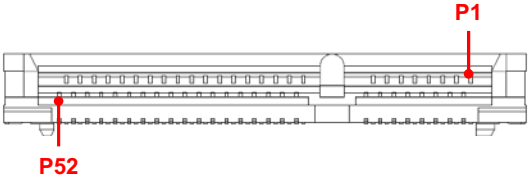


Table 4-10: SATA on cPCI-A3515B/D Daughter Board Pin Def'n

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mSATA Socket on Storage/Ethernet Daughter Board



Pin #	Signal Name	Pin #	Signal Name
P1	NC	P2	+3V3
P3	NC	P4	GND
P5	NC	P6	Reserved
P7	NC	P8	NC
P9	GND	P10	NC
P11	NC	P12	NC
P13	NC	P14	NC
P15	GND	P16	NC
P17	NC	P18	GND
P19	NC	P20	NC
P21	GND	P22	NC
P23	SATA_RX0_P	P24	+3V3
P25	SATA_RX0_N	P26	GND
P27	GND	P28	Reserved
P29	GND	P30	NC
P31	SATA_TX0_N	P32	NC
P33	SATA_TX0_P	P34	GND
P35	GND	P36	NC
P37	GND	P38	NC
P39	+3V3	P40	GND
P41	+3V3	P42	NC
P43	NC	P44	NC
P45	NC	P46	NC
P47	NC	P48	Reserved
P49	NC	P50	GND
P51	NC	P52	+3V3

Table 4-11: mSATA Socket Pin Definition

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CompactPCI J1 Connector (cPCI-A3515B only)

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

Table 4-12: CompactPCI J1 Connector Pin Definition

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CompactPCI J2 Connector (cPCI-A3515B only)

Pin	Z	A	B	C	D	E	F
22	GND	NC	NC	NC	NC	NC	GND
21	GND	CPCI_CLK6	GND	NC	NC	NC	GND
20	GND	CPCI_CLK5	GND	NC	GND	NC	GND
19	GND	GND	GND	NC	NC	NC	GND
18	GND	NC	NC	NC	GND	NC	GND
17	GND	NC	GND	J2_RSTJ	PCI_REQ6-L	PCI_GNT6-L	GND
16	GND	NC	NC	NC	GND	NC	GND
15	GND	NC	NC	NC	PCI_REQ5-L	PCI_GNT5-L	GND
14	GND	NC	NC	NC	NC	NC	GND
13	GND	NC	GND	CPCI_VIO	NC	NC	GND
12	GND	NC	NC	NC	NC	NC	GND
11	GND	NC	GND	CPCI_VIO	NC	NC	GND
10	GND	NC	NC	NC	GND	NC	GND
9	GND	NC	GND	CPCI_VIO	NC	NC	GND
8	GND	NC	NC	NC	GND	NC	GND
7	GND	NC	GND	CPCI_VIO	NC	NC	GND
6	GND	NC	NC	NC	NC	NC	GND
5	GND	NC	GND	CPCI_VIO	NC	NC	GND
4	GND	CPCI_VIO	NC	NC	NC	NC	GND
3	GND	CPCI_CLK4	GND	PCI_GNT3-L	PCI_REQ4-L	PCI_GNT4-L	GND
2	GND	CPCI_CLK2	CPCI_CLK3	CPCI_SYSEN-L	PCI_GNT2-L	JCPCI_REQ3-L	GND
1	GND	CPCI_CLK1	GND	PCI_REQ1-L	PCI_GNT1-L	PCI_REQ2-L	GND

Table 4-13: CompactPCI J2 Connector Pin Definition

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CompactPCI Serial Connector P1

L	K	J	I	H	G	F	E	D	C	B	A	
PEG_RXN3	PEG_RXP3	GND	PEG_TXN3	PEG_TXP3	GND	PEG_RXN2	PEG_RXP2	GND	PEG_TXN2	PEG_TXP2	GND	**6**
GND	PEG_RXN1	PEG_RXP1	GND	PEG_TXN1	PEG_TXP1	GND	PEG_RXN0	PEG_RXP0	GND	PEG_TXN0	PEG_TXP0	**5**
TP3409	TP3408	GND	TP3407	TP3406	GND	TP3405	TP3404	GND	USB0-N	USB0-P	GND	**4**
GA3	NC	NC	GA2	NC	NC	GA1	USB3_RX_4N	USB3_RX_4P	GA0	USB3_TX_4N	USB3_TX_4P	**3**
SYSEN#	TP3401	GND	WAKE_IN_OUT#	PRST#	GND	RST#	PS_ON#	GND	BP_I2C_DAT	BP_I2C_CLK	GND	**2**
GND	P12V_CONN	P12V_CONN	GND	P12V_CONN	P12V_CONN	GND	P12V_CONN	P12V_CONN	GND	P5VSB	P12V_CONN	**1**

CompactPCI Serial Connector P2

L	K	J	I	H	G	F	E	D	C	B	A	
USB3-N	USB3-P	NC	USB2-N	USB2-P	GND	USB1-N	USB1-P	GND	NC	NC	GND	**8**
GND	NC	NC	GND	NC	NC	GND	NC	NC	GND	NC	NC	**7**
NC	NC	GND	NC	NC	GND	NC	NC	GND	NC	NC	GND	**6**
GND	NC	NC	GND	NC	NC	GND	NC	NC	GND	NC	NC	**5**
PEG_RXN11	PEG_RXP11	GND	PEG_TXN11	PEG_TXP11	GND	PEG_RXN10	PEG_RXP10	GND	PEG_TXN10	PEG_TXP10	GND	**4**
GND	PEG_RXN9	PEG_RXP9	GND	PEG_TXN9	PEG_TXP9	GND	PEG_RXN8	PEG_RXP8	GND	PEG_TXN8	PEG_TXP8	**3**
PEG_RXN7	PEG_RXP7	GND	PEG_TXN7	PEG_TXP7	GND	PEG_RXN6	PEG_RXP6	GND	PEG_TXN6	PEG_TXP6	GND	**2**
GND	PEG_RXN5	PEG_RXP5	GND	PEG_TXN5	PEG_TXP5	GND	PEG_RXN4	PEG_RXP4	GND	PEG_TXN4	PEG_TXP4	**1**

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CompactPCI Serial Connector P3

L	K	J	I	H	G	F	E	D	C	B	A	
CN_SATA_PCH_RX-N3	CN_SATA_PCH_RX-P3	GND	SATA_TX-N3	SATA_TX-P3	GND	CN_SATA_PCH_RX-N2	CN_SATA_PCH_RX-P2	GND	SATA_TX-N2	SATA_TX-P2	GND	**8**
GND	CN_SATA_PCH_RX-N1	CN_SATA_PCH_RX-P1	GND	SATA_TX-N1	SATA_TX-P1	GND	CN_SATA_PCH_RX-N0	CN_SATA_PCH_RX-P0	GND	SATA_TX-N0	SATA_TX-P0	**7**
NC	NC	GND	NC	NC	GND	NC	NC	GND	NC	NC	GND	**6**
GND	NC	NC	GND	NC	NC	GND	NC	NC	GND	NC	NC	**5**
NC	NC	GND	NC	NC	GND	NC	NC	GND	NC	NC	GND	**4**
GND	NC	NC	GND	NC	NC	GND	NC	NC	GND	NC	NC	**3**
NC	NC	GND	NC	NC	GND	USB3_RX_5N	USB3_RX_5P	GND	USB3_TX_5N	USB3_TX_5P	GND	**2**
GND	USB7-N	USB7-P	GND	USB6-N	USB6-P	GND	USB5-N	USB5-P	GND	USB4-N	USB4-P	**1**

CompactPCI Serial Connector P4

L	K	J	I	H	G	F	E	D	C	B	A	
NC	NC	GND	NC	NC	GND	NC	NC	GND	NC	NC	GND	**8**
GND	NC	NC	GND	NC	NC	GND	PCH_PCIERX_N_3	PCH_PCIERX_P_3	GND	PCH_PCIETX_N_3	PCH_PCIETX_P_3	**7**
NC	NC	GND	NC	NC	GND	NC	NC	GND	NC	NC	GND	**6**
GND	NC	NC	GND	NC	NC	GND	PCH_PCIERX_N_1	PCH_PCIERX_P_1	GND	PCH_PCIETX_N_1	PCH_PCIETX_P_1	**5**
NC	NC	GND	NC	NC	GND	NC	NC	GND	NC	NC	GND	**4**
GND	NC	NC	GND	NC	NC	GND	PCH_PCIERX_N_2	PCH_PCIERX_P_2	GND	PCH_PCIETX_N_2	PCH_PCIETX_P_2	**3**
PEG_RXN15	PEG_RXP15	GND	PEG_TXN15	PEG_TXP15	GND	PEG_RXN14	PEG_RXP14	GND	PEG_TXN14	PEG_TXP14	GND	**2**
GND	PEG_RXN13	PEG_RXP13	GND	PEG_TXN13	PEG_TXP13	GND	PEG_RXN12	PEG_RXP12	GND	PEG_TXN12	PEG_TXP12	**1**

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CompactPCI Serial Connector P5

L	K	J	I	H	G	F	E	D	C	B	A	
NC	NC	NC	NC	NC	NC	PE_CLK_N_4	PE_CLK_P_4	CLK_PCIE_REQ4#	PE_CLK_N_3	PE_CLK_P_3	CLK_PCIE_REQ3#	6
CLK_PCIE_REQ1#	PE_CLK_N_1	PE_CLK_P_1	CLK_PCIE_REQ0#	PE_CLK_N_0	PE_CLK_P_0	PEGB_CLKRQ-L	CLKOUTB_PEG_N	CLKOUTB_PEG_P	PEGA_CLKRQ-L	CLKOUTA_PEG_N	CLKOUTA_PEG_P	5
NC	NC	GND	NC	NC	GND	NC	NC	GND	NC	NC	GND	4
GND	NC	NC	GND	NC	NC	GND	NC	NC	GND	NC	NC	3
NC	NC	GND	NC	NC	GND	NC	NC	GND	NC	NC	GND	2
GND	NC	NC	GND	NC	NC	GND	NC	NC	GND	NC	NC	1

CompactPCI Serial Connector P6

L	K	J	I	H	G	F	E	D	C	B	A	
8_ETH_D-	8_ETH_D+	GND	8_ETH_C-	8_ETH_C+	GND	8_ETH_B-	8_ETH_B+	GND	8_ETH_A-	8_ETH_A+	GND	8
GND	7_ETH_D-	7_ETH_D+	GND	7_ETH_C-	7_ETH_C+	GND	7_ETH_B-	7_ETH_B+	GND	7_ETH_A-	7_ETH_A+	7
6_ETH_D-	6_ETH_D+	GND	6_ETH_C-	6_ETH_C+	GND	6_ETH_B-	6_ETH_B+	GND	6_ETH_A-	6_ETH_A+	GND	6
GND	5_ETH_D-	5_ETH_D+	GND	5_ETH_C-	5_ETH_C+	GND	5_ETH_B-	5_ETH_B+	GND	5_ETH_A-	5_ETH_A+	5
4_ETH_D-	4_ETH_D+	GND	4_ETH_C-	4_ETH_C+	GND	4_ETH_B-	4_ETH_B+	GND	4_ETH_A-	4_ETH_A+	GND	4
GND	3_ETH_D-	3_ETH_D+	GND	3_ETH_C-	3_ETH_C+	GND	3_ETH_B-	3_ETH_B+	GND	3_ETH_A-	3_ETH_A+	3
2_ETH_D-	2_ETH_D+	GND	2_ETH_C-	2_ETH_C+	GND	2_ETH_B-	2_ETH_B+	GND	2_ETH_A-	2_ETH_A+	GND	2
GND	1_ETH_D-	1_ETH_D+	GND	1_ETH_C-	1_ETH_C+	GND	1_ETH_B-	1_ETH_B+	GND	1_ETH_A-	1_ETH_A+	1

NOTE: The signals in red are not supported on cPCI-A3515 Series standard models. Please contact your ADLINK representative if full CompactPCI Serial pinout is required.

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5 Getting Started

This chapter describes the following installation procedures for the cPCI-A3515 and rear transition module:

- CPU and Heatsink
- 2.5" SATA storage drive
- mSATA drive
- Processor blade installation to chassis

5.1 CPU and Heatsink

The cPCI-A3515 Series come with CPU and heatsink pre-installed. Removal of heatsink/CPU by users is not recommended. Please contact your ADLINK service representative for assistance.

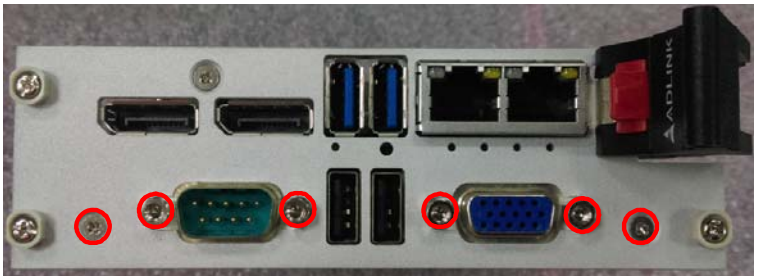
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5.2 SATA Drive Installation

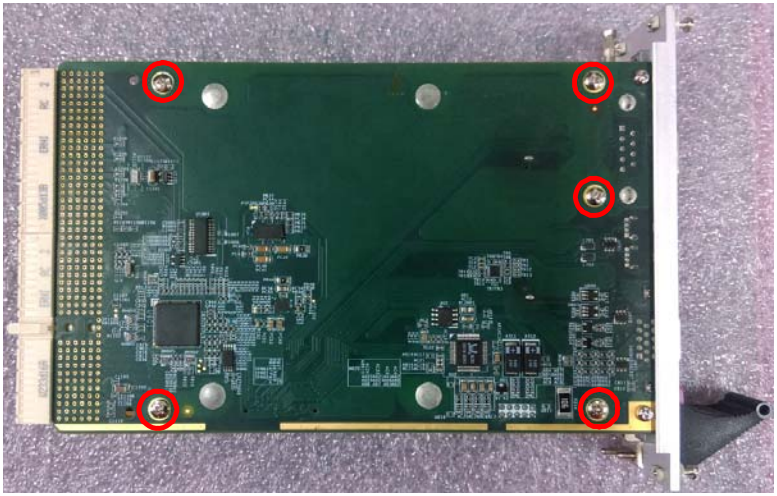
The cPCI-A3515B/D 2-slot versions provide space to install a slim type 2.5" Serial-ATA storage drive.

Installing a SATA Drive - cPCI-A3515B

1. 1.Remove the 6 screws from the faceplate circled in red.

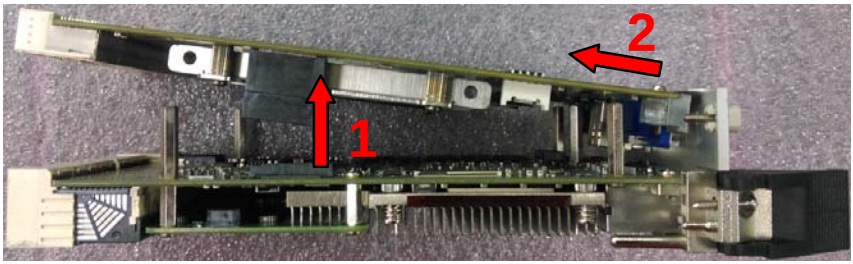


2. Remove the 5 screws from the solder side of the blade circled in red.

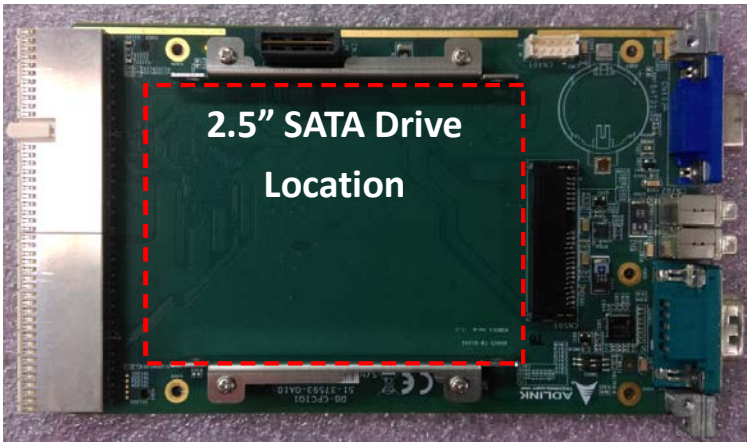


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3. First, detach the daughter board from the board-to-board connector on the cPCI-A3515 blade (1); then remove daughter board in the direction shown (2).



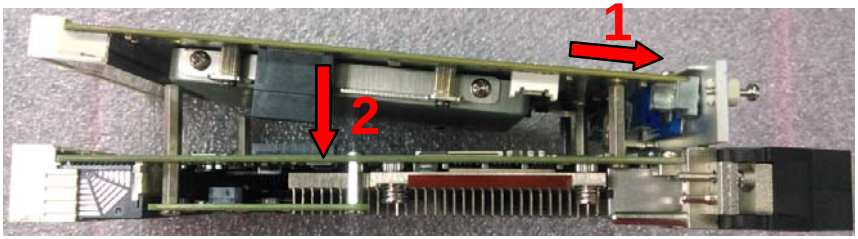
4. Place the daughter board on a flat surface as shown.



5. Insert the SATA drive into the onboard SATA connector until it is fully seated and attach it with four screws as shown



6. Reinstall the daughter board to faceplate (1) and board-to-board connector (2) on the cPCI-A3515 blade by reversing the steps in Step 3 above.



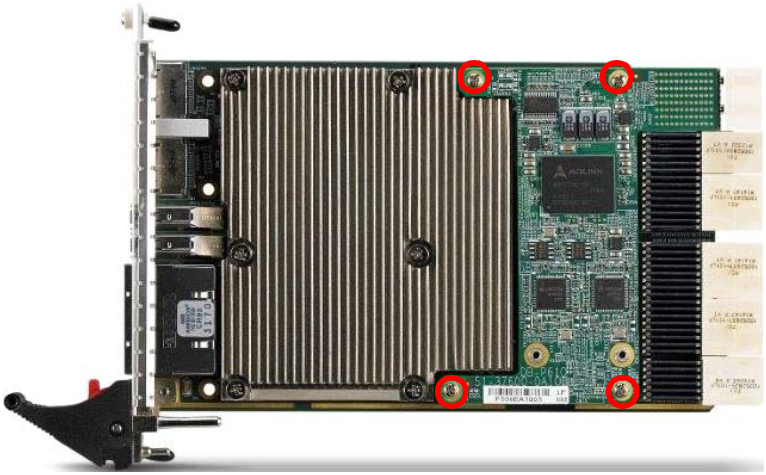
7. Reinstall the 5 screws removed in Step 2 above to the solder side of the blade.
8. Reinstall the 6 screws removed in Step 1 above to the faceplate.

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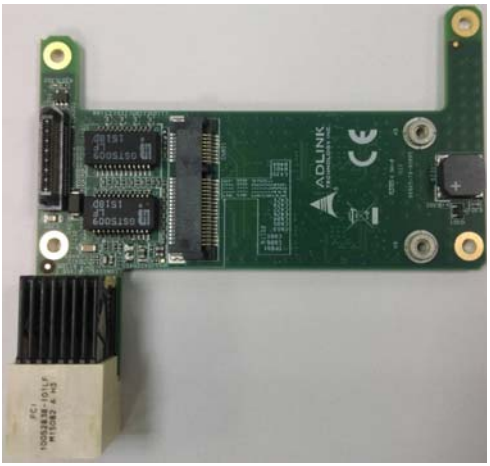
5.3 Installing an mSATA Drive

An mSATA drive can be installed to the underside of the Storage/Ethernet daughter board of the cPCI-A3515.

1. Remove the 4 screws securing the Storage/Ethernet daughter board to the cPCI-A3515 processor blade as indicated.



2. Place the daughter board on a flat surface as shown.



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3. Insert the mSATA drive into the socket at about a 30-degree angle as shown.



4. Secure the mSATA drive with two M2.5 screws.



5. Reinstall the daughter board to the cPCI-A3515 processor blade and secure it with the 4 screws removed in Step 1.

5.4 Installing the cPCI-A3515 to the Chassis

The cPCI-A3515 may be installed in a system or peripheral slot of a 3U CompactPCI chassis. These instructions are for reference only. Refer to the user guide that comes with the chassis for more information.

1. Be sure to select the correct slot depending on the operational purpose of the module. The system power may now be powered on or off.
2. Remove the blank face cover from the selected slot, if necessary.
3. Press down on the release catches of the cPCI-A3515 ejector handles.
4. **Remove the black plastic caps securing the mounting screws to the faceplate.**
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 faceplate.
7. Connect the cables and peripherals to the board, and then turn the chassis on if necessary.


NOTE:

The cPCI-A3515B supporting CompactPCI bus requires a PICMG CPCI-S.0 backplane with system slot on the left and a PICMG 2.0 backplane with system slot on the right. Please contact your ADLINK representative for detailed information on compatible backplanes.

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6 Driver Installation

The cPCI-A3515 drivers are available from the ADLINK website (**http://www.adlinktech.com/PD/web/PD_detail.php?cKind=&pid=1570**). ADLINK provides validated drivers for Windows 7 64-bit. We recommend using these drivers to ensure compatibility. The VxWorks BSP can be downloaded from the cPCI-A3515 product page on the ADLINK website

6.1 cPCI-A3515 Drivers

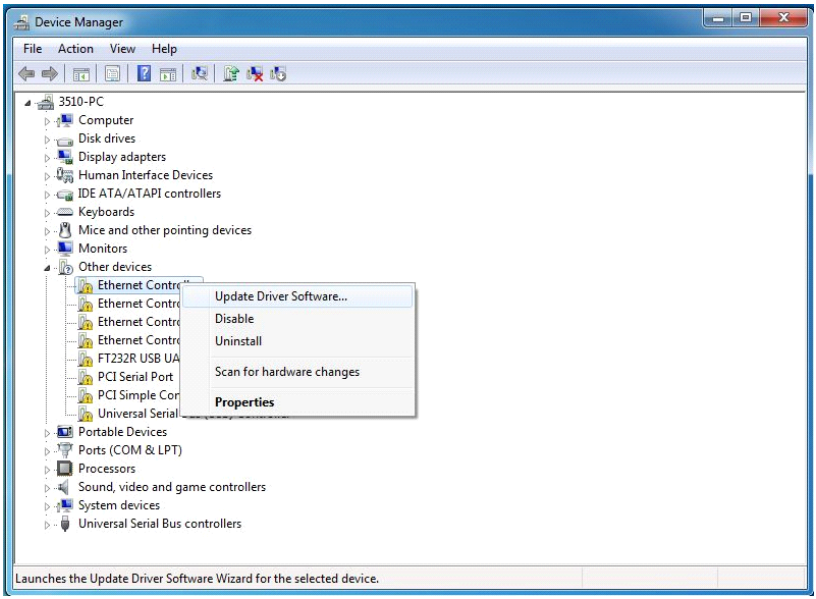
The following describes the cPCI-A3515 driver installation procedures for Windows 7 64-bit. Install the Windows operating system before installing any driver. Most standard I/O device drivers are installed during Windows installation.

1. Before beginning Windows installation, save the AHCI driver to a USB flash drive. During Windows installation, install the AHCI driver from the USB flash drive when prompted.
2. Install the **chipset driver** by extracting and running the program in **...\Chipset\Intel Chipset Device Software_All OS_9.4.0.1017.zip**.
3. Install the **graphics driver** and utilities by extracting and running the program in **...\Graphics\Intel® HD Graphics 4600_Win7_64bit_9.18.10.3220.zip**.
4. Install the **Ethernet Controller driver** by following the steps described in "6.2 Ethernet Controller Driver" on page 48.
5. Install the **Management Engine (ME) driver** and utilities by extracting and running the program in **...\Chipset\Intel Management Engine Interface 9.0.0.1209.zip**.
6. Install the **TPM driver** by extracting and running the program in **…\TPM\Infineon_Trusted_Platform_Module_2.1.1.0.zip**.
7. Install the **audio driver** and utilities by extracting and running the program in **…\Audio\Realtek_High Definition Audio_Win7_8_64_6.0.1.6873.zip**.

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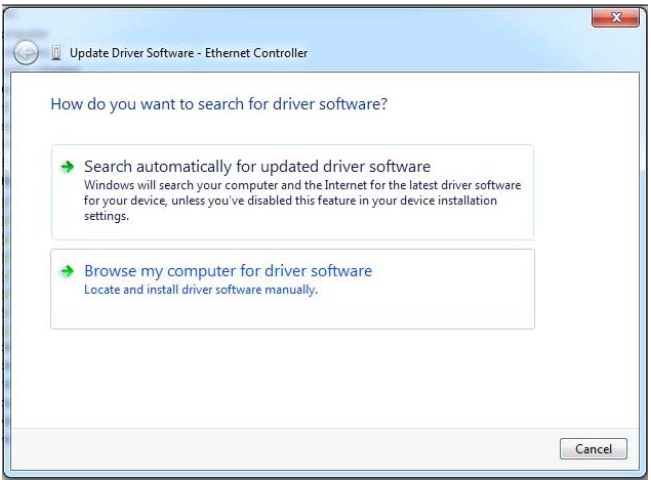
6.2 Ethernet Controller Driver

1. Extract the contents of **…\LAN\Intel® I210 Gigabit Network connection_Win7 64bit_12.7.28.0.zip**.
2. Open the *Device Manager* and go to *Other Devices.* You will see a "question mark" next to *Ethernet Controller* R-click on *Ethernet Controller* and choose "Update Driver Software…".

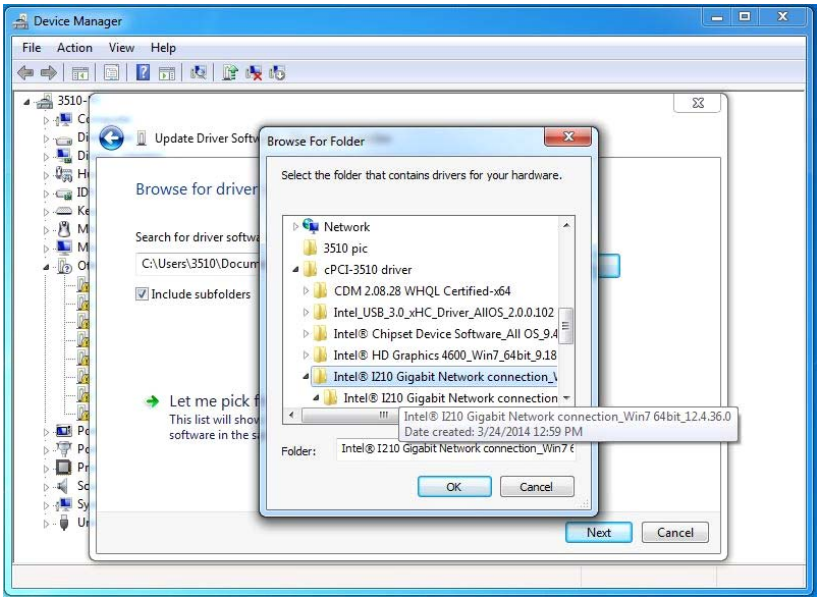


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3. Click “Browse my computer for driver software”.



4. Navigate to the folder where you extracted the contents of the zip file and click “OK”. Click “Next” to install the driver.



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7 Utilities

7.1 SEMA

Hardware monitoring and Watchdog Timer functionality are provided by ADLINK's Smart Embedded Management Agent (SEMA), which operates via a Board Management Controller and communicates with the CPU through the SMBus. A graphical user interface program and command line interface are available to allow you to communicate with SEMA. Please refer to the SEMA user's manuals, available for download from the SEMA product page: **http://www.adlinktech.com/PD/web/PD_detail.php?cKind=&pid=1274**.


NOTE:

The cPCI-A3515 does NOT support the following SEMA functions:

- Save data in write-protectable flash ROM
- LVDS backlight control
- Smart Fan control and fan speed
- Display "Boot Reason" in the SEMA GUI System Health tab after resuming from S4

7.2 Preboot Execution Environment (PXE)

The cPCI-A3515 Series supports the Intel® Preboot Execution Environment (PXE) that is capable of booting up or executing an OS installation through an Ethernet ports. To use PXE, there must be a DHCP server on the network with one or more servers running PXE and MTFTP services. It could be a Windows® 2003 server running DHCP, PXE, and MTFTP services or a dedicated DHCP server with one or more additional servers running PXE and MTFTP services.

To build a network environment with PXE support:

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

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7.3 Watchdog Timer

The watchdog timer on the cPCI-A3515 can be implemented in the following ways:

- Embedded Application Programming Interface (EAPI) library functions
- SEMA library functions

Please refer to the SEMA Software Manual for detailed information: **http://www.adlinktech.com/PD/web/PD_detail.php?cKind=&pid=1274**.

EAPI Library Sample Code

Make sure you have installed the SEMA driver and application. When installing, please check the “Install EAPI” option.

Include the relevant header files

```
#ifndef _WIN32
#include "linux/EApiOs.h"
#else /* _WIN32 */
#include "winnt/EApiOs.h"
#endif /* _WIN32 */
#include "EApi.h"
```

Initialize the EAPI

```
EApiLibInitialize();
```

Call the EAPI function

```
uint32_t status=EApiWDogStart(Delay,EventTimeout,
  ResetTimeout);
```

Example:

```
#ifndef _WIN32
  #include "linux/EApiOs.h"
#else /* _WIN32 */
  #include "winnt/EApiOs.h"
#endif /* _WIN32 */
```

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```
#include "EApi.h"

void main(void)
{
   // Initialize the library
   EApiLibInitialize();

   // Delay in milliseconds
   uint32_tDelay = 100;
   // Event Timeout in milliseconds
   uint32_tEventTimeout = 100;
   // Reset Timeout in milliseconds
   uint32_tResetTimeout = 100;

   // Start Watchdog
   uint32_tstatus = EApiWDogStart( Delay,
   EventTimeout, ResetTimeout );

   // Release resource
   EApiLibUnInitialize();
```

For detailed information on the PICMG EAPI Library, please refer to the **PICMG EAPI - Embedded Application Programming Interface specification**.

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7.4 General Purpose LED Control

The cPCI-A3515 has a General Purpose LED that is user programmable. Make sure you have installed the SEMA driver and the cPCI-A3515 SDK library, downloadable from the cPCI-A3515 product page: **http://www.adlinktech.com/PD/web/PD_detail.php?cKind=&pid=1570**.

Download and extract the contents of the archive **cPCI-A3515_SDK.zip**.

Windows:

1. Copy the file libA3515.dll to the /Windows/System32 folder, e.g.:
   copy lib\Windows32\libA3515.dll Windows\System32
2. Create a temporary folder and copy the tool cPCI-A3515.exe into this folder, e.g.:
   mkdir temp
   copy tool\Windows32\cPCI_A3515.exe temp

Linux:

1. Copy the library to /usr/local/lib
   # cp /lib/Linux32/libA3515.so.2.6 /usr/local/lib/
2. Copy the tool cPCI-A3515 to /usr/local/bin
   # cp /tool/Linux32/cPCI-A3515 /usr/local/bin
3. Add setting
   # echo /usr/local/lib/ > /etc/ld.so.conf.d/liba3515.conf
   # ldconfig

cPCI-A3515 LED Tool

The cPCI-A3515 tool can control the general purpose LED. The commands are as follows:

Windows:

- Turn on LED: > cPCI-A3515.exe 1
- Turn off LED: > cPCI-A3515.exe 0
- Blink LED: > cPCI-A3515.exe 2

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Linux:

- Turn on LED: # cPCI-A3515 1
- Turn off LED: # cPCI-A3515 0
- Blink LED: # cPCI-A3515 2

SemaApi_SetLED Command

Include the relevant header files

```
#include "sema_api.h"
```

Initialize the API library

```
SemaApi_Init();
```

Call the LED function

```
SemaApi_SetLED(Mode);
```

The available "Mode" parameters of SemaApi_SetLED are as follows:

- 0: off
- 1: on
- 2: blinking

Sample Code

```
#include "sema_api.h"

#define LED_OFF 0
#define LED_ON 1
#define LED_BLINKING 2

void main(void)
{
   // Initialize the library
   SemaApi_Init();

   // Turn on LED
   SemaApi_SetLED( LED_ON );

   // Turn off LED
   SemaApi_SetLED( LED_OFF );
```

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```
    // Blink LED
    SemaApi_SetLED( LED_BLINKING );

    // Release resource
    SemaApi_Close();
}
```

8 BIOS Setup Utility

The following chapter describes basic navigation for the AMI EFI BIOS setup utility.

8.1 Starting the BIOS

To enter the setup screen, follow these steps:

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



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

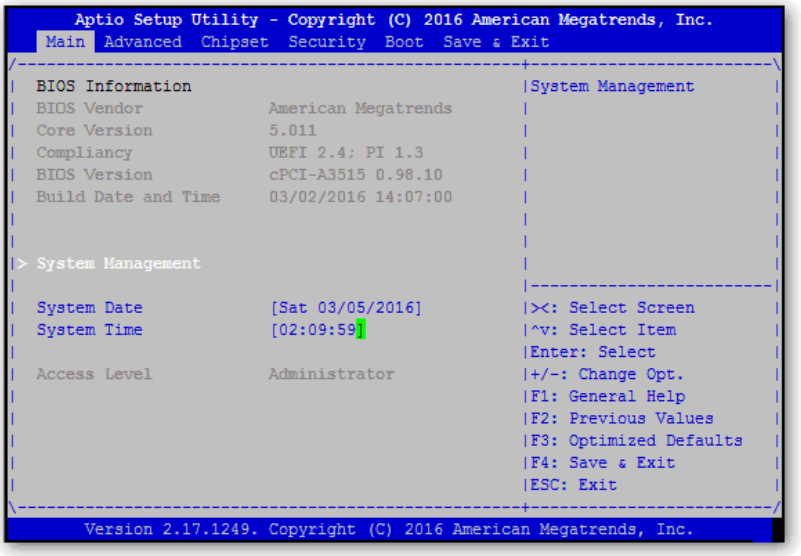
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Setup Menu

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

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

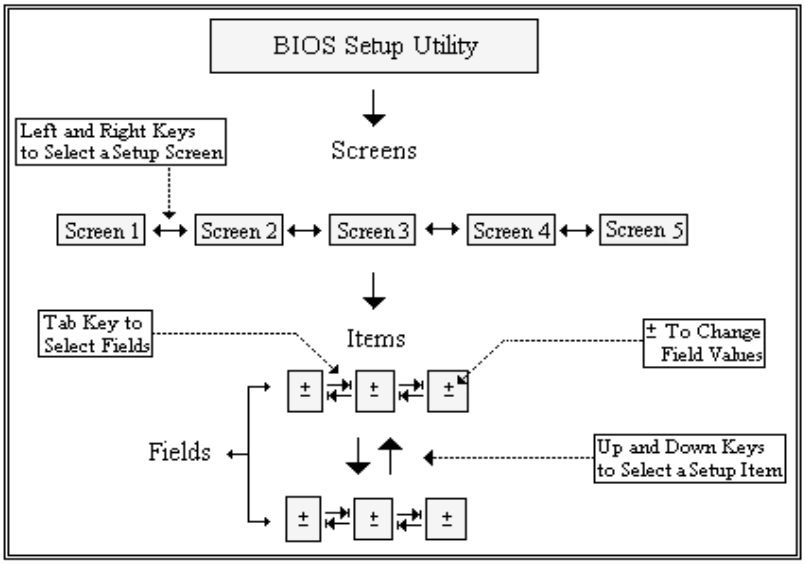
The right frame displays the key legend. Above the key legend is an area reserved for a text message. When an option is selected in the left frame, it is highlighted in white. Often a text message will accompany it.



Navigation

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

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

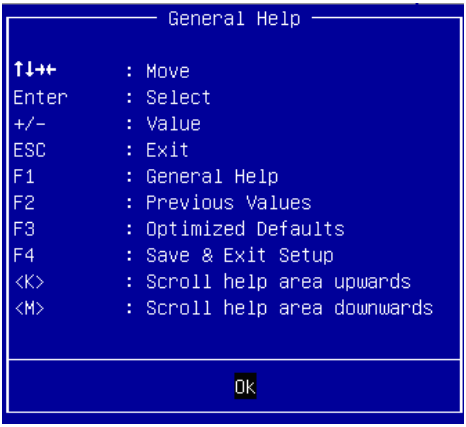
The < F8 > key on your keyboard is the Fail-Safe key. It is not displayed on the key legend by default. To set the Fail-Safe settings of the BIOS, press the < F8 > key on your keyboard. It is located on the upper row of a standard 101 keyboard. The Fail-Safe settings allow the motherboard to boot up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

Hotkey Descriptions

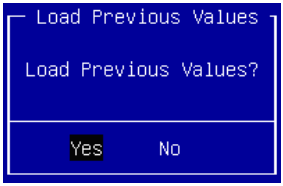
Enter The < Enter > key allows you to display or change the setup option listed for a particular setup item. The < Enter > key can also allow you to display the setup sub-screens.

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

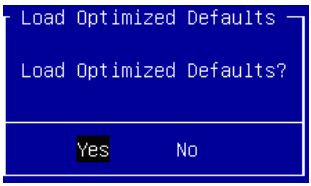
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F2 The < F2 > key on your keyboard is the previous values key. It is not displayed on the key legend by default. To set the previous values settings of the BIOS, press the < F2 > key on your keyboard. It is located on the upper row of a standard 101 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.

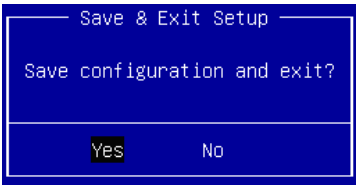


F3 The < F3 > key on your keyboard is the optimized defaults key. To set the optimized defaults settings of the BIOS, press the < F3 > key on your keyboard. It is located on the upper row of a standard 101 keyboard. The optimized defaults settings allow the motherboard to boot up with the optimized defaults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



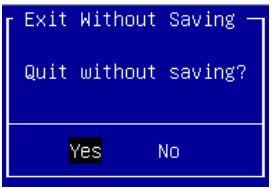
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F4 The < F4 > key allows you to save any changes you have made and exit Setup. Press the < F10 > key to save your changes. The following screen will appear:



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:

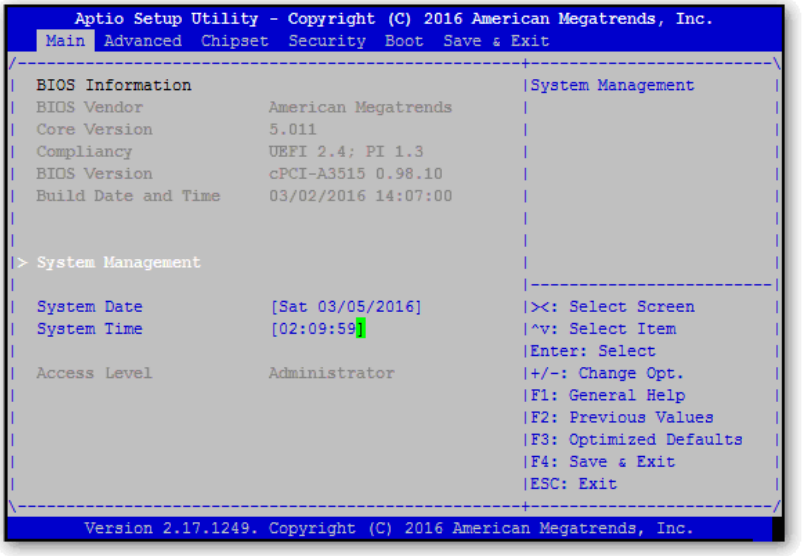


Press the < Enter > key to discard changes and exit. You can also use the < Arrow > key to select Cancel and then press the < Enter > key to abort this function and return to the previous screen.

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8.2 Main Setup

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

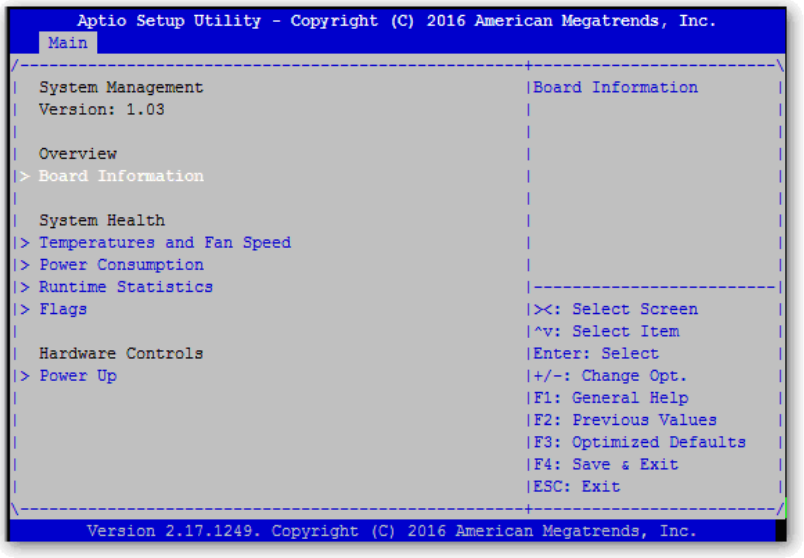


BIOS Information

The Main BIOS setup screen displays BIOS information such as BIOS Vendor, Core Version, Compliancy, BIOS Version, and Build Date and Time.

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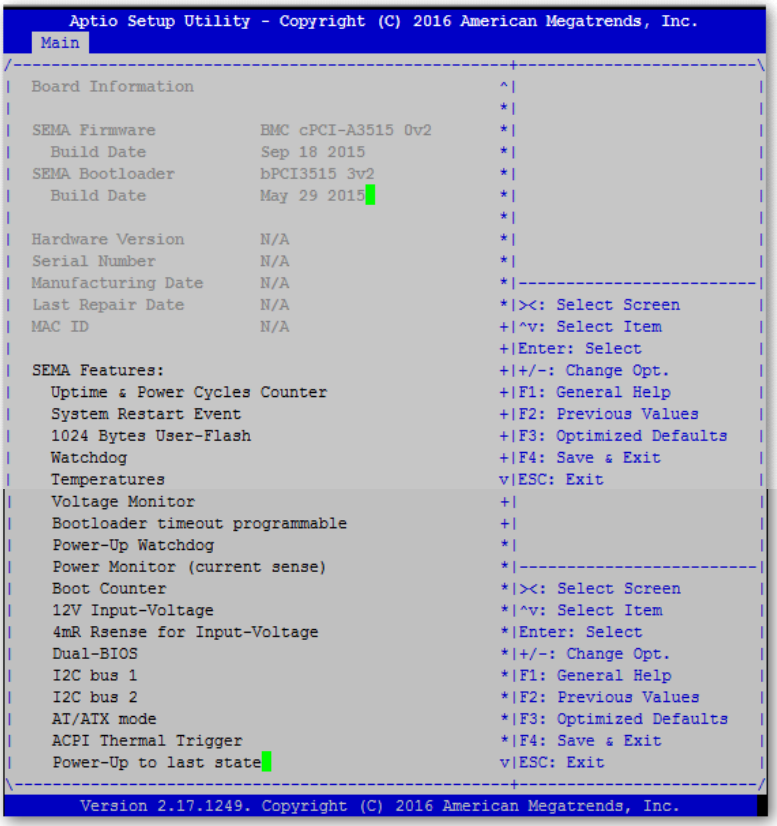
System Management



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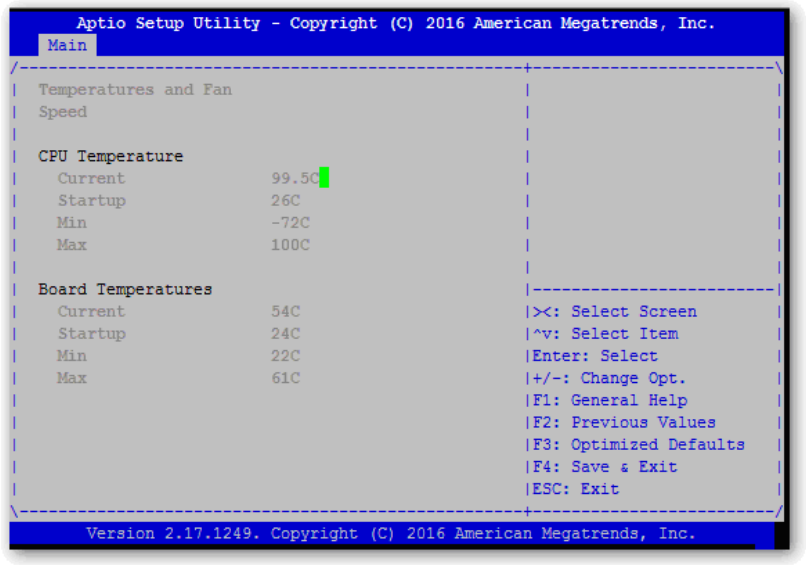
Board Information

Displays information from SEMA via the SMBus: SEMA Firmware, SEMA Bootloader, Build Date, Hardware Version, Serial Number, Manufacturing Date, Last Repair Date, MAC ID.

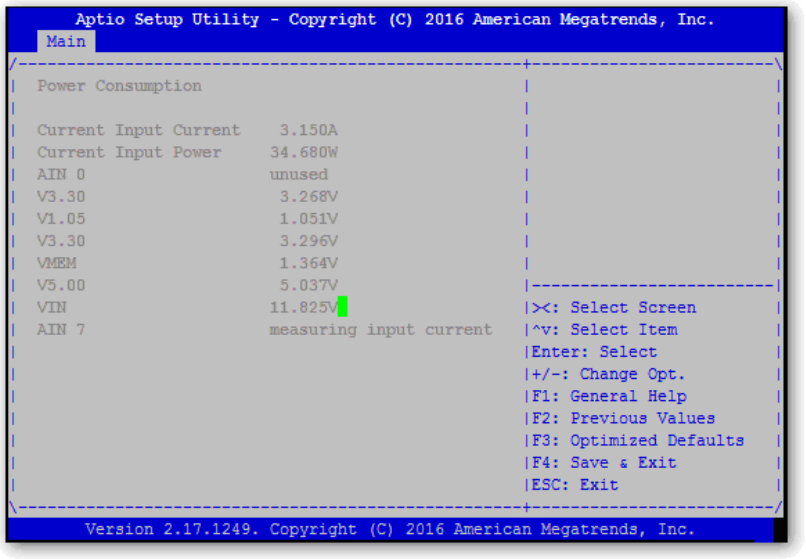


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Temperatures and Fan Speed

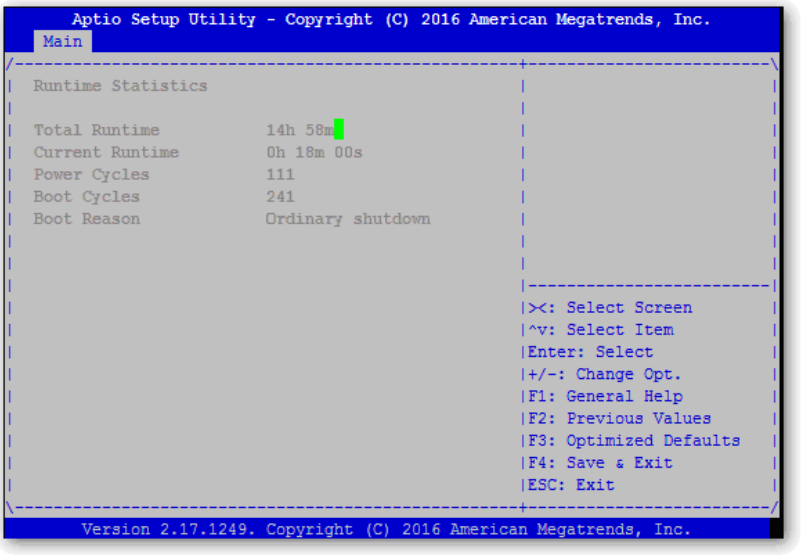


Power Consumption

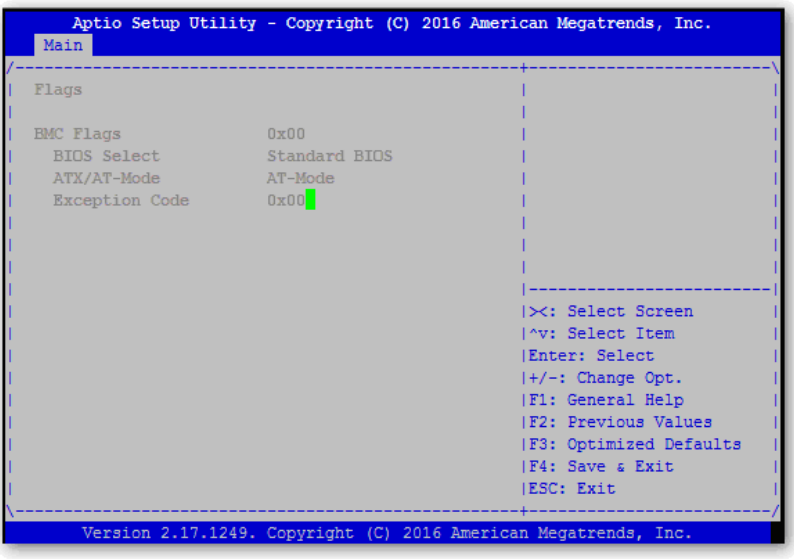


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Runtime Statistics

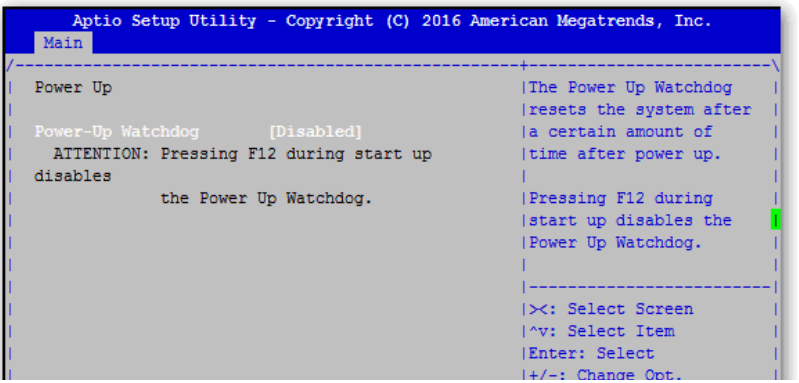


Flags



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Power Up



Power-Up Watchdog

Enable/Disable the Power-Up Watchdog. Pressing F12 during startup disables the Power Up Watchdog.

System Time/System Date

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

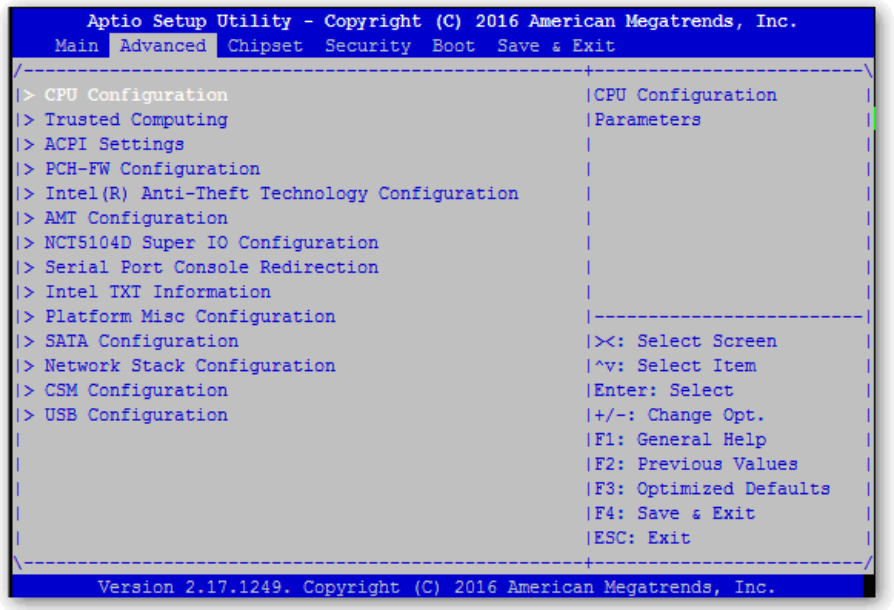
NOTE: The time is in 24-hour format. For example, 5:30 A.M. appears as 05:30:00, and 5:30 P.M. as 17:30:00.

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8.3 Advanced BIOS Setup

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

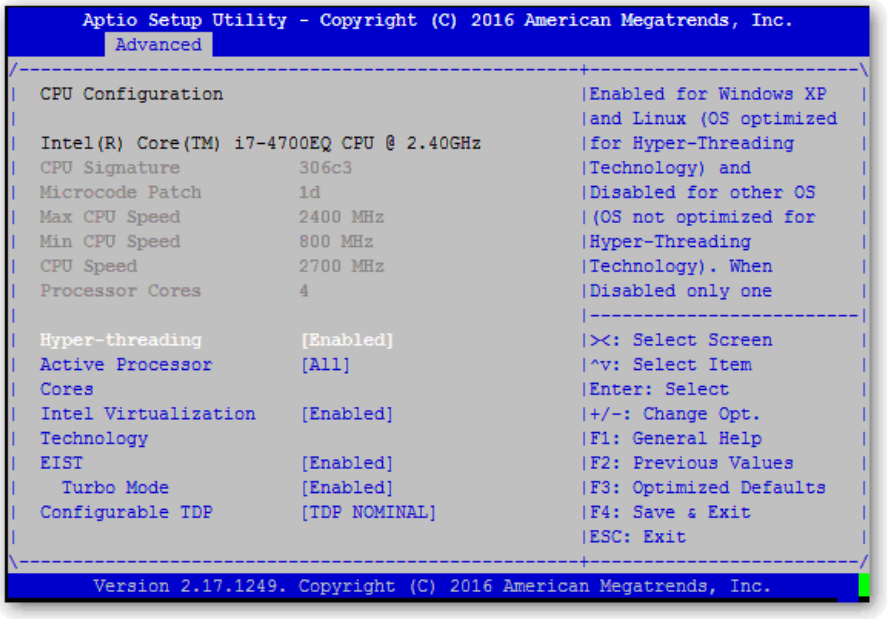
The sub menus are described on the following pages.



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8.3.1 CPU Configuration

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

Number of cores to enable in each processor package. Options: All, 1, 2, 3, 4.

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Intel Virtualization Technology

When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.

EIST

It will allow the user to set the EIST.

Turbo Mode

It will allow the user to set the Turbo Mode.

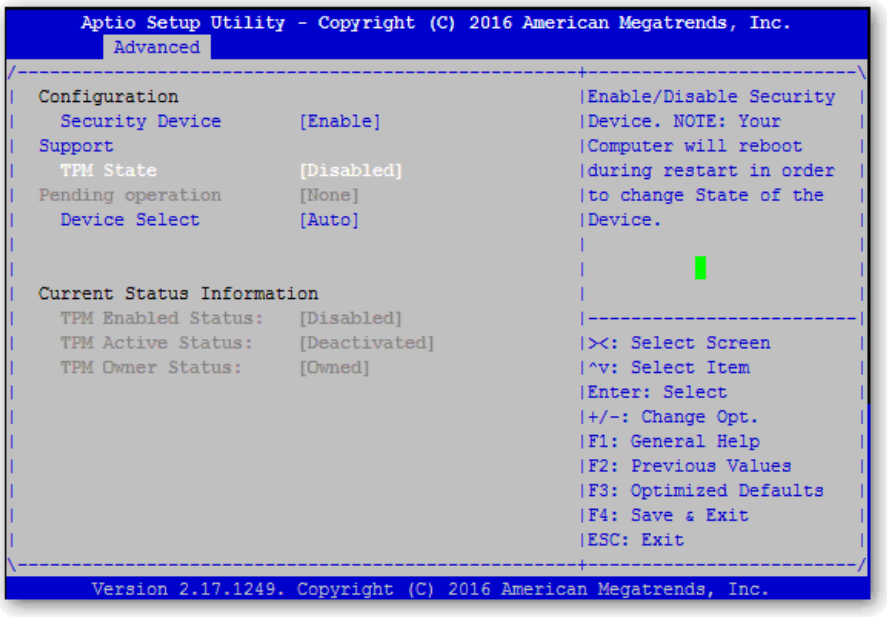
Configurable TDP

Allow reconfiguration of TDP levels base on current power and thermal delivery capabilities of the system..

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8.3.2 Trusted Computing

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



TPM Support

OS will not show TPM. Reset of platform is required. Set this value to Enable/Disable.

TPM State

Determine whether TPM state change requires Password Authentication. Set this value to Enable/Disable.

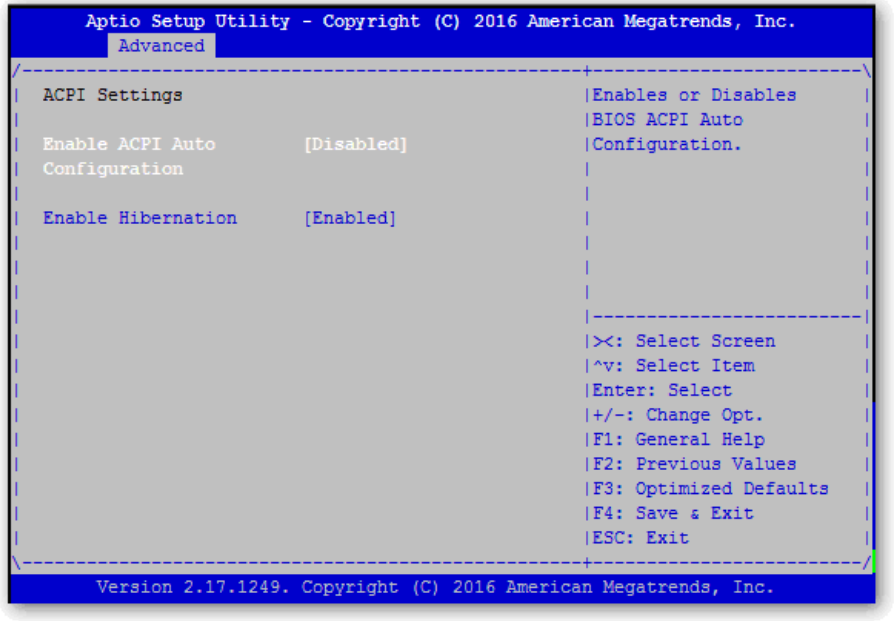
Pending TPM operation

Schedule TPM operation. The settings for this value are Enable, Disable and Clear.

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8.3.3 ACPI Settings

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



Enable ACPI Auto Configuration

Enables or Disables BIOS ACPI Auto Configuration.

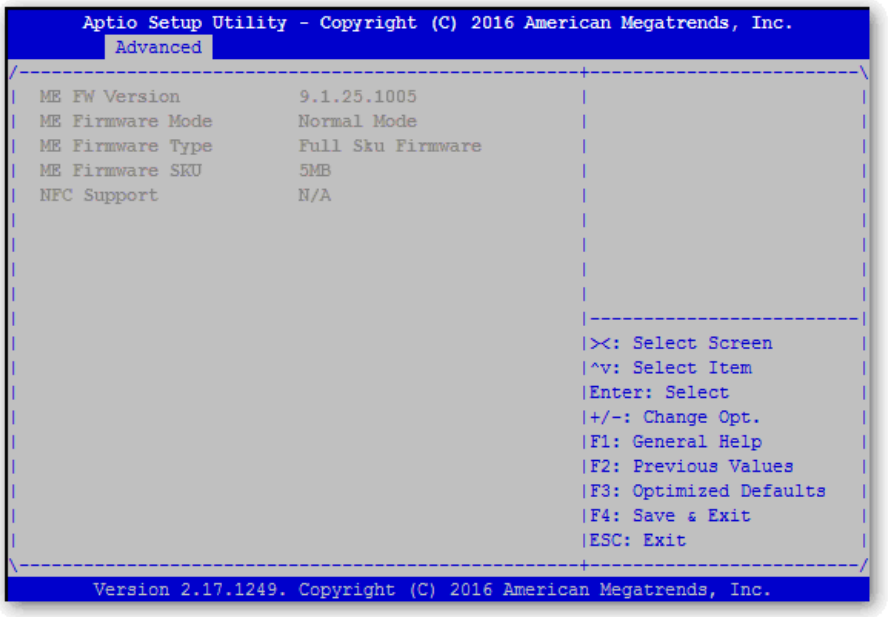
Enable Hibernation

Enables or Disables System ability to Hibernate (OS/S4 Sleep State). This option may not be effective with some OS.

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8.3.4 PCH-FW Configuration

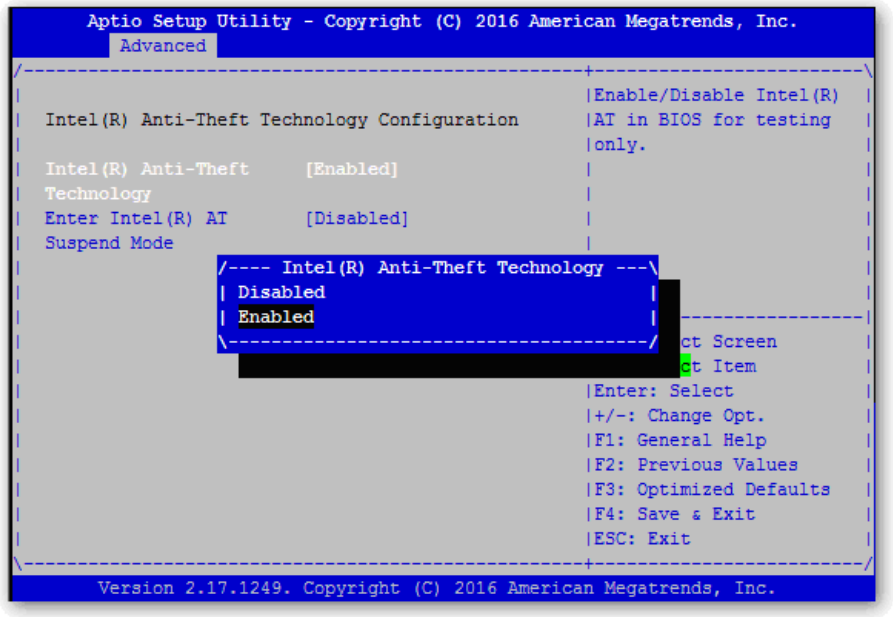
You can use this screen to view ME related information. For example, ME FW Version, ME Firmware Mode, ME Firmware Type, ME Firmware SKU..etc. An example of the ME screen is shown below.



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8.3.5 Intel ® Anti-Theft Technology Configuration

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



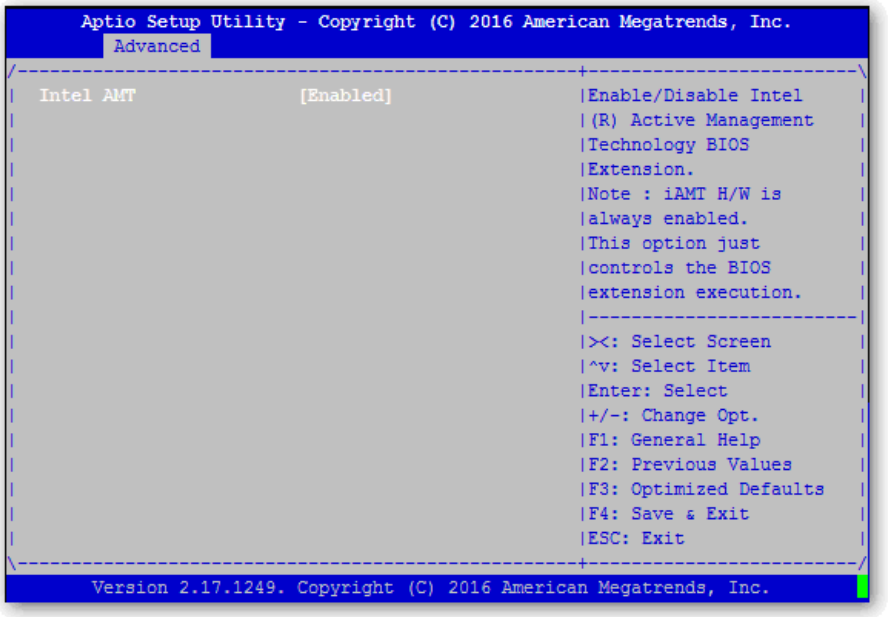
Intel® Anti-Theft Support

Set this value is Enable/Disable.

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8.3.6 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.



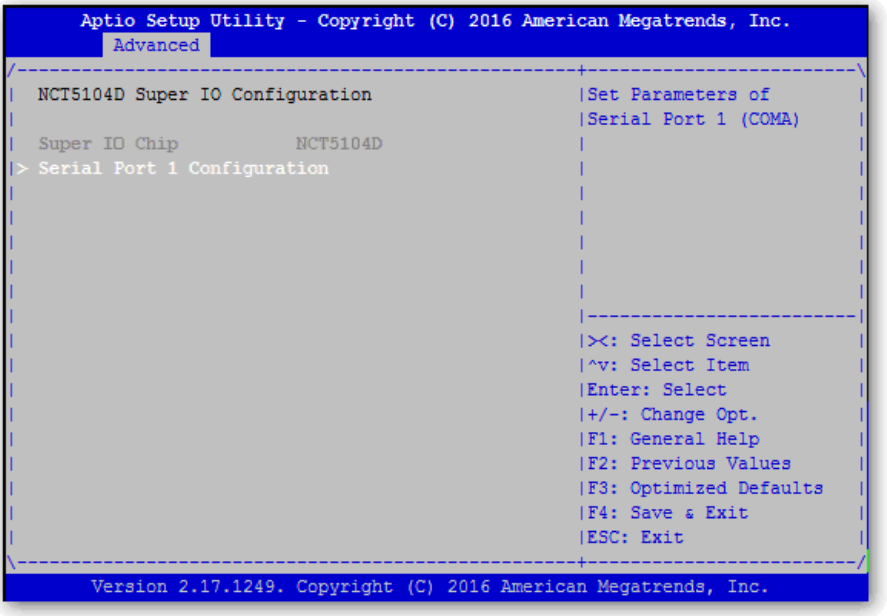
Intel AMT

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

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8.3.7 NCT5104D Super IO Configuration

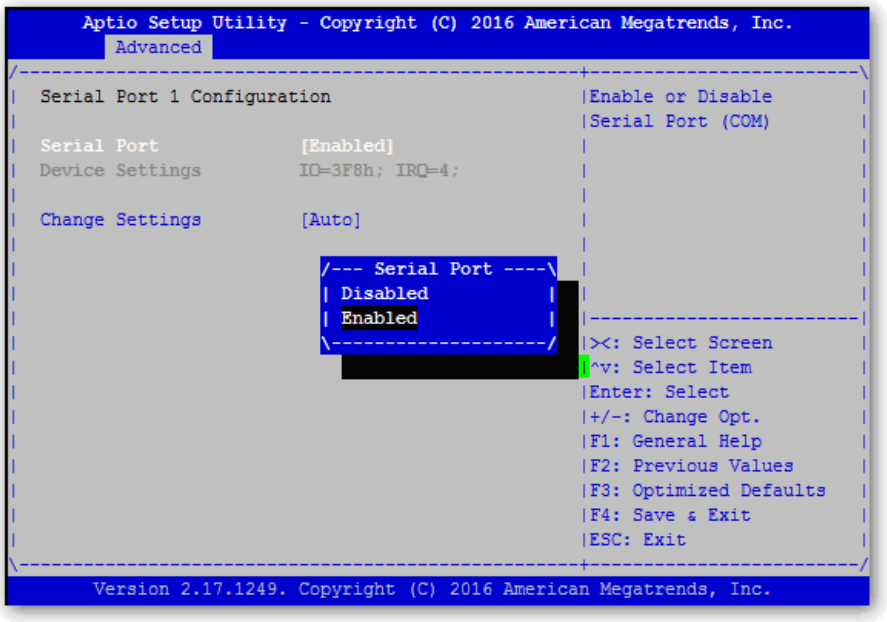
You can use this screen to select options for the Super IO Configuration settings.



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Serial Port 1 Configuration

Set Parameters of Serial Port 1 (COM 1).

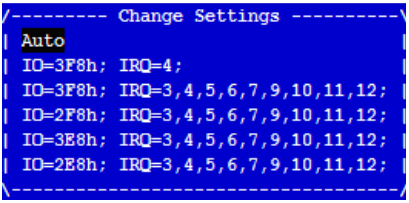


Serial Port

Enable/Disable serial port 1 (COM1). Set this value to Enable or Disable.

Change Settings

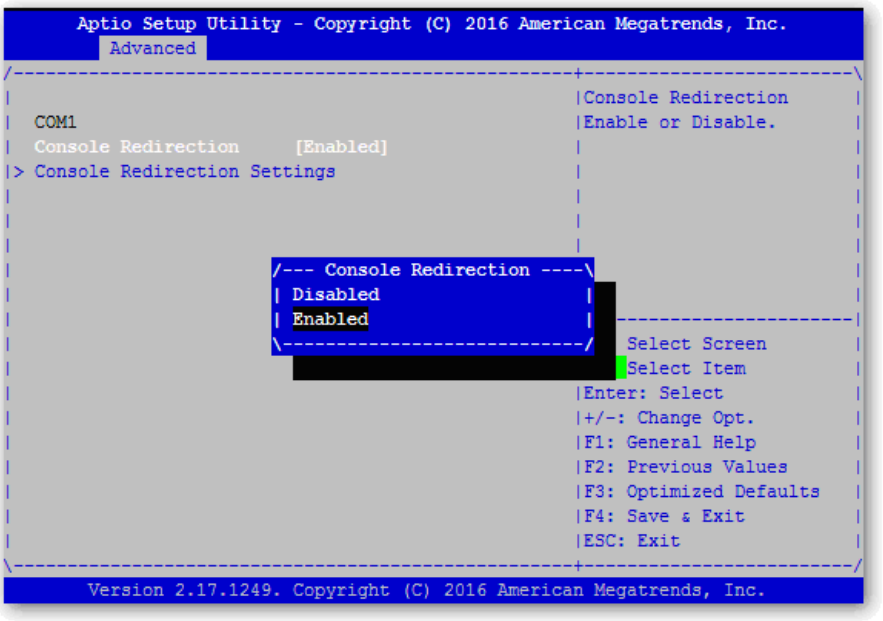
Set the IO/IRQ of serial port 1 (COM1).



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8.3.8 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.



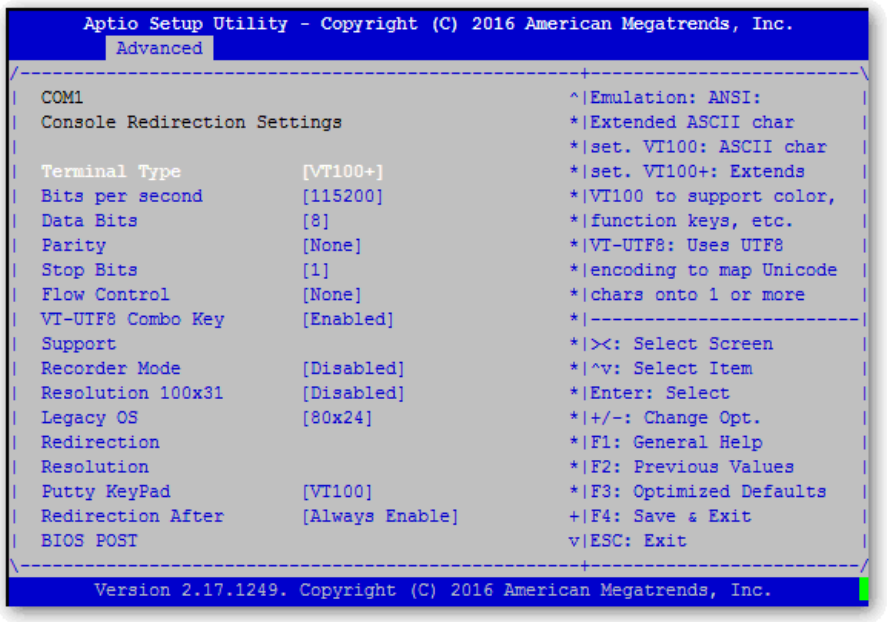
Console Redirection

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.

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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.

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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.

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

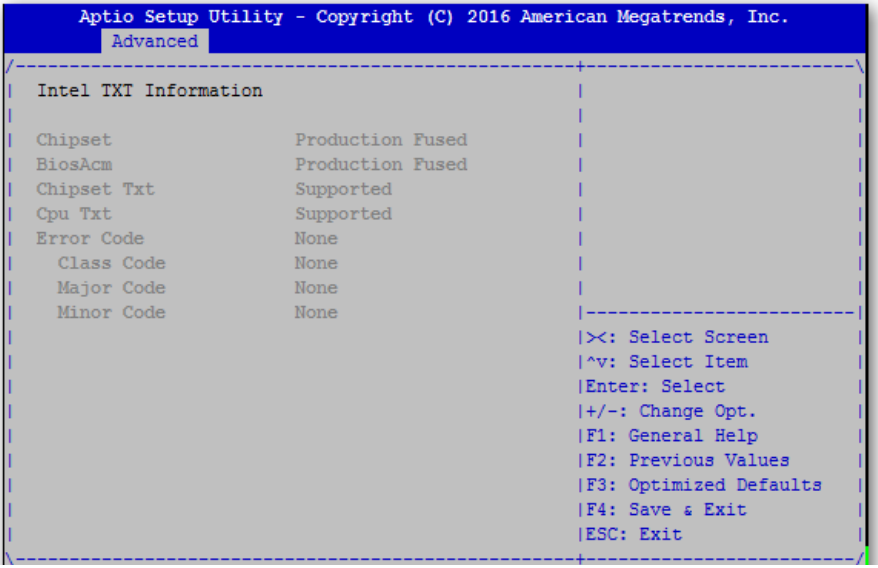
On legacy OS, the number of rows and columns supported for redirection. Set this value to 80x24, 80x25.

Putty Key Pad

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

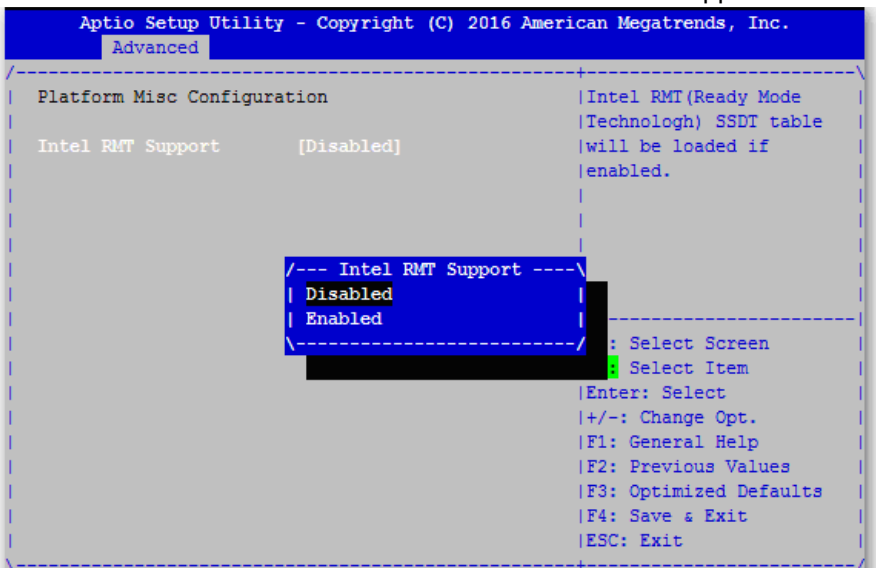
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8.3.9 Intel TXT Information



8.3.10 Platform Misc Configuration

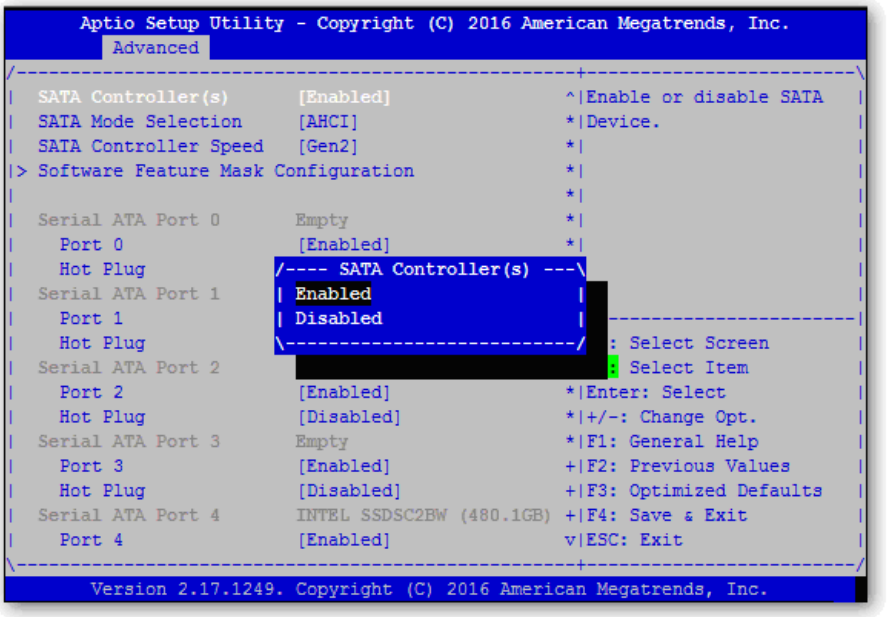
You can use this screen to enable/disable Intel RMT Support



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8.3.11 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.

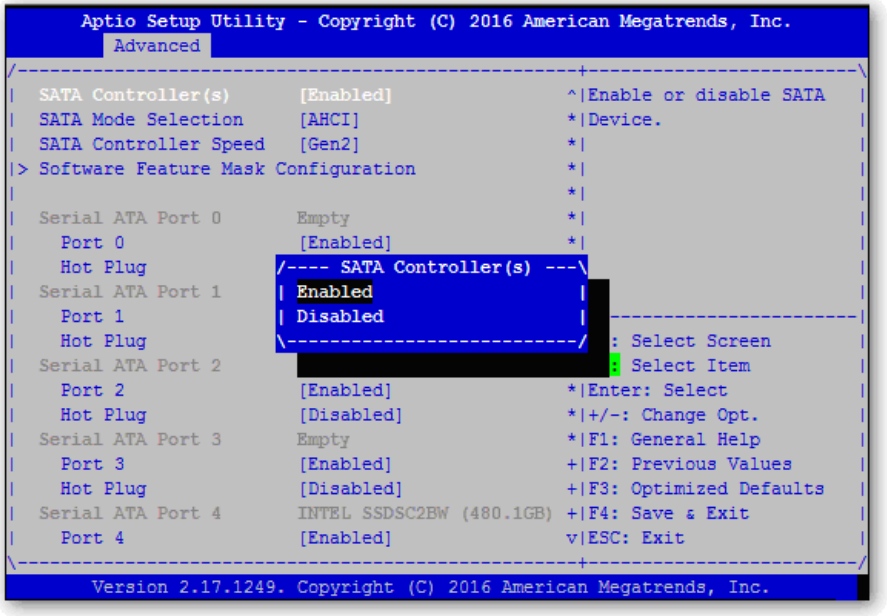
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Hot Plug

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

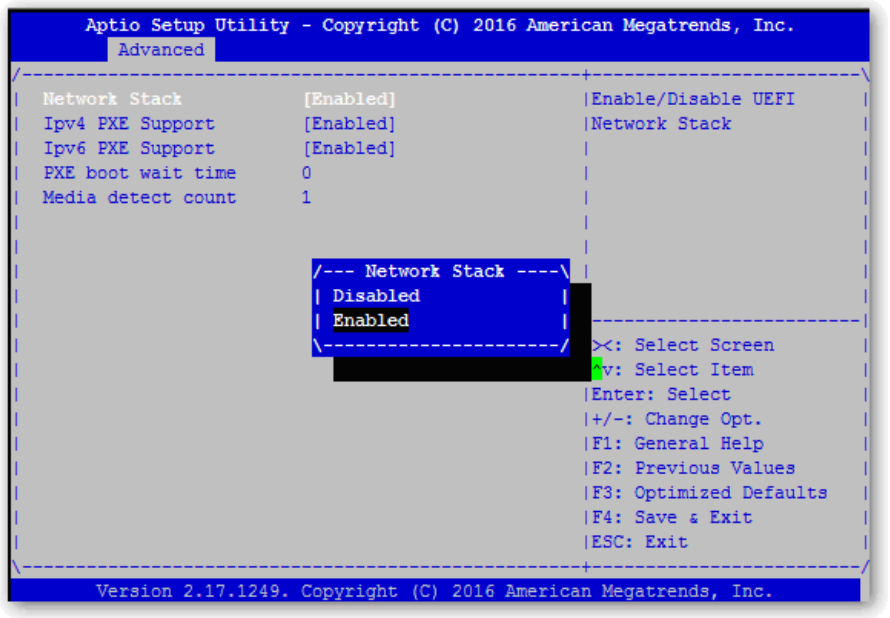
Software Feature Mask Configuration

Use this screen to to enable or disable storage features.



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8.3.12 Network Stack Configuration



Network Stack

Enable/Disable the UEFI network stack.

IPv4 PXE Support

Enable/Disable IPv4 PXE Boot Support.

IPv6 PXE Support

Enable/Disable IPv6 PXE Boot Support.

PXE boot wait time

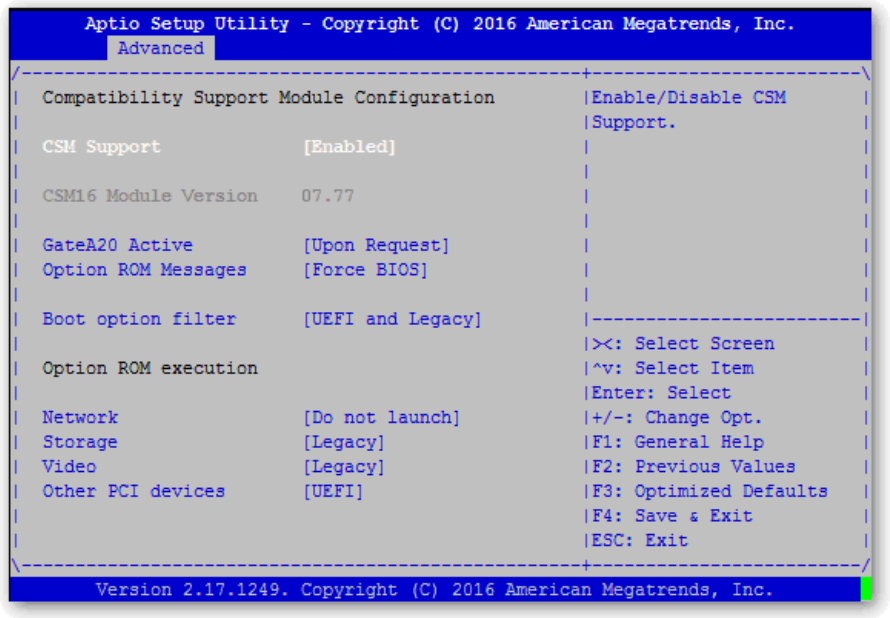
Wait time to press ESC key to abort the PXE boot.

Media detect count

Wait time in sec to detect media.

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8.3.13 CSM Configuration



CSM Support

Enable/Disable CSM Support

GateA20 Active

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

Option ROM Messages

Set display mode for option ROM. Options: Force BIOS, Keep Current.

Network

Setting "OS_Select" to Windows 7 only supports PXE ROM boot. Setting "OS_Select" to Window 8 only supports EFI Network Stack

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Storage

Controls the execution of UEFI and Legacy Storage OpROM.

Video

Controls the execution of UEFI and Legacy Video OpROM.

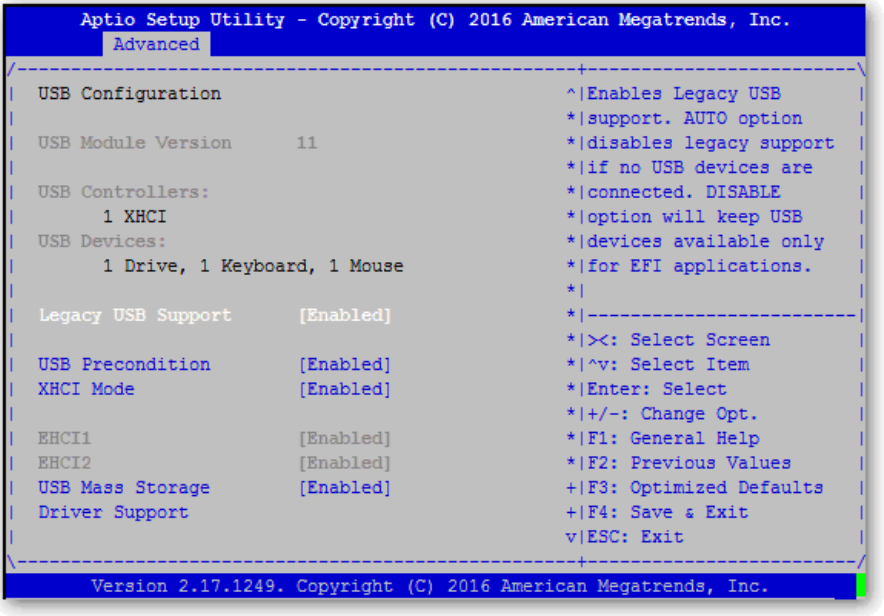
Other PCI Devices

Determines OpROM execution policy for devices other than Network, Storage, or Video

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8.3.14 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 Mode

Mode of operation of xHCI controller. Set this value to Smart Auto/ Auto/ Enabled/ Disabled.

EHCI1

Enable/Disable EHCI 1(USB2.0) controller.

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EHCI2

Enable/Disable EHCI 2(USB2.0) controller.

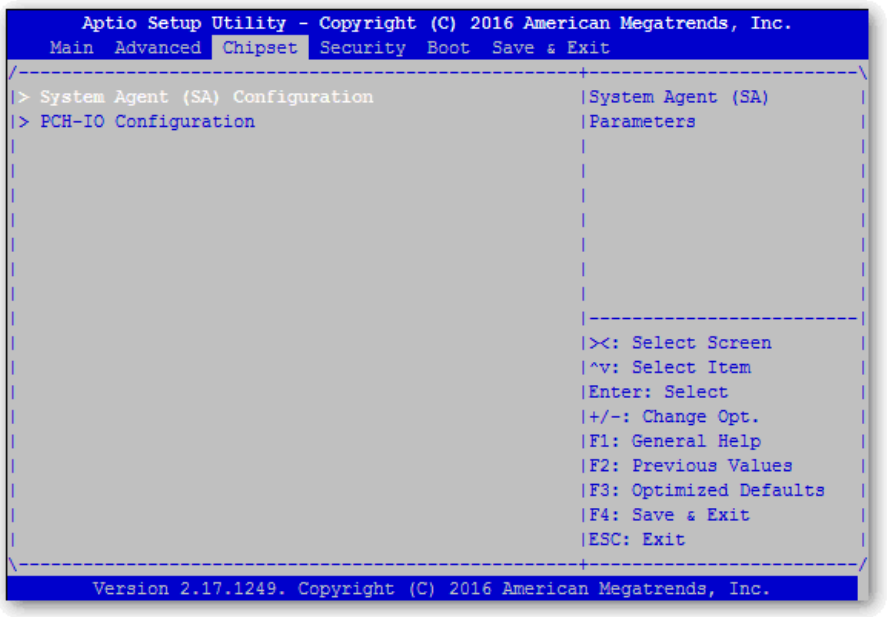
USB Mass Storage Driver Support

Enable/Disable USB Mass Storage Driver Support.

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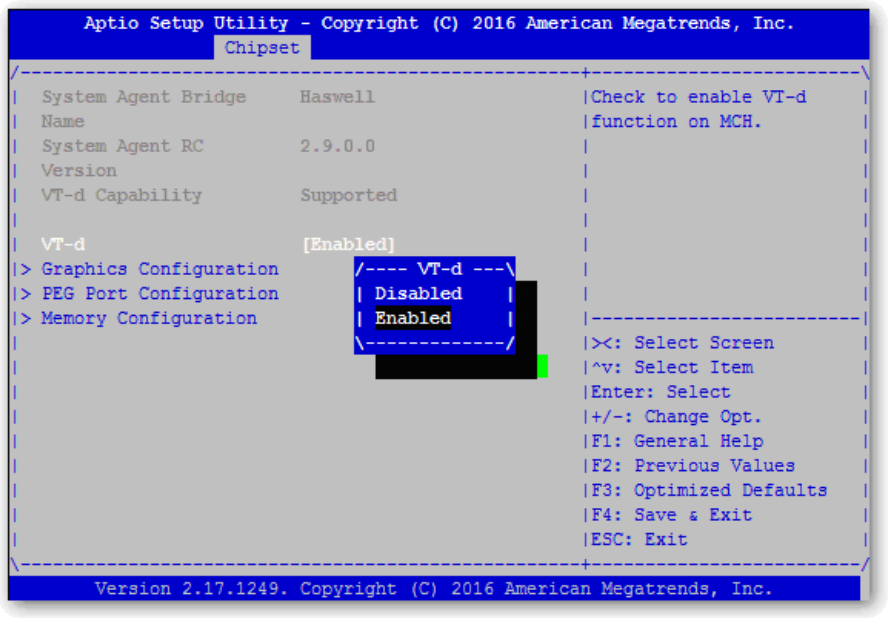
8.4 Chipset Setup

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.



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8.4.1 System Agent (SA) Configuration

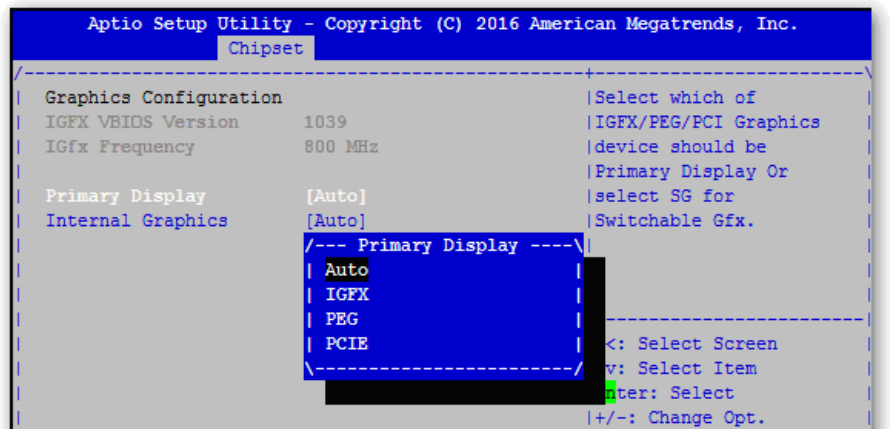


VT-d

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

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Graphics Configuration



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.

PEG Port Configuration

PEG0 - Gen X

Configure PEG0 B0:D1:F0 Gen1-Gen3

PEG1 - Gen X

Configure PEG0 B0:D1:F0 Gen1-Gen3

PEG2 - Gen X

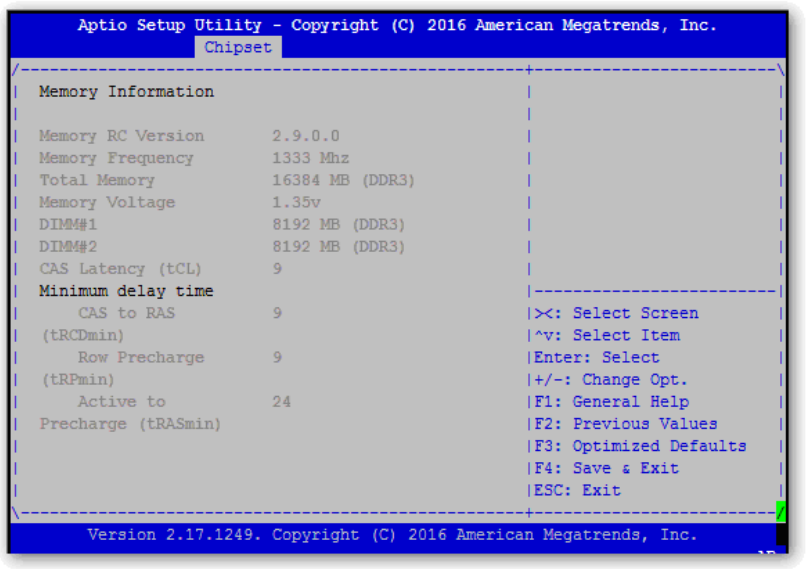
Configure PEG0 B0:D1:F0 Gen1-Gen3

Enable PEG

To enable or disable the PEG.

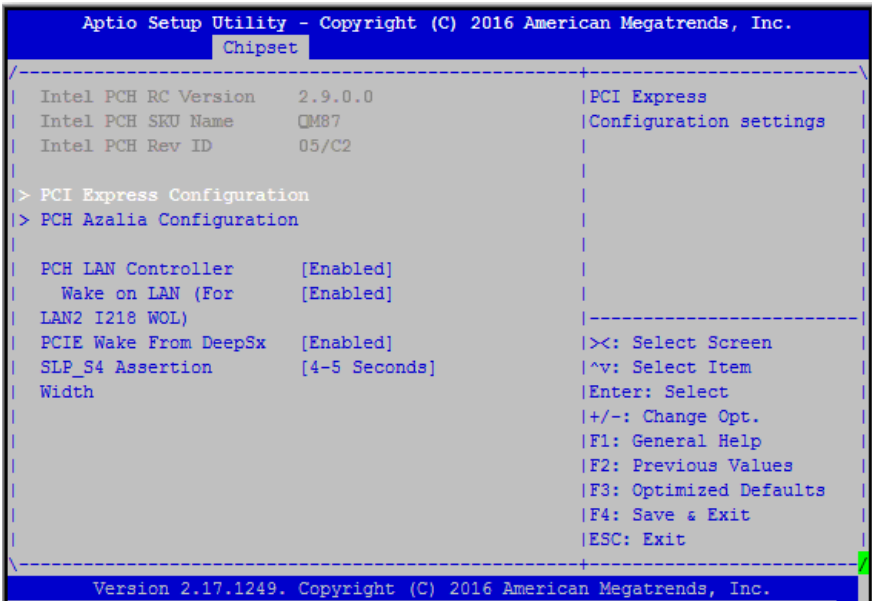
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Memory Configuration



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8.4.2 PCH-IO Configuration



PCH LAN Controller

Enable or disable on-chip NIC.

Wake on LAN (For LAN2 I218 WOL)

Enable or Disable integrated LAN to wake the system. (The Wake On LAN cannot be disabled if ME is on at Sx state.)

PCIE Wake From DeepSx

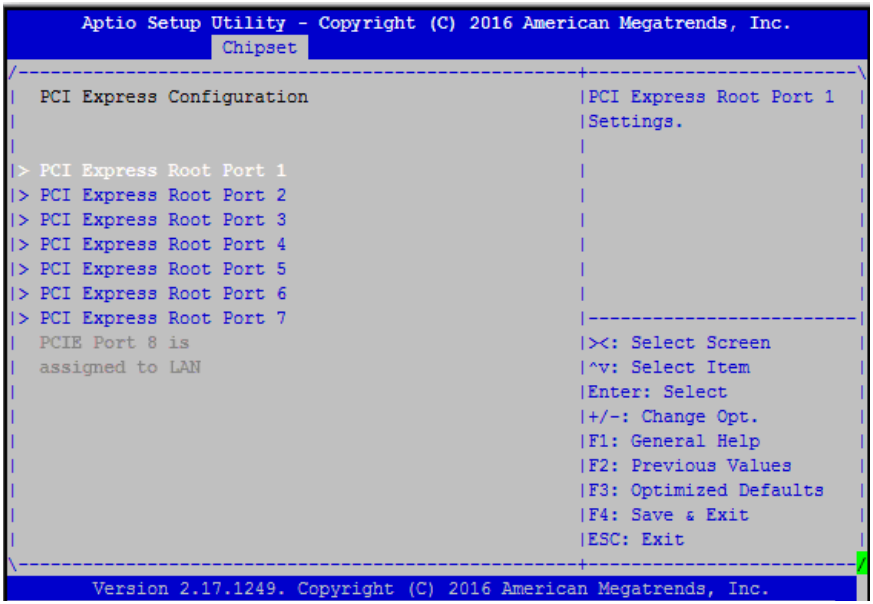
Wake from DeepSx by the assertion of PCIE.

SLP_S4 Assertion Width

Select (1-2 Seconds/ 2-3 Seconds/ 3-4 Seconds / 4-5 Seconds) a minimum assertion width of the SLP_S4# signal.

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PCI Express Configuration

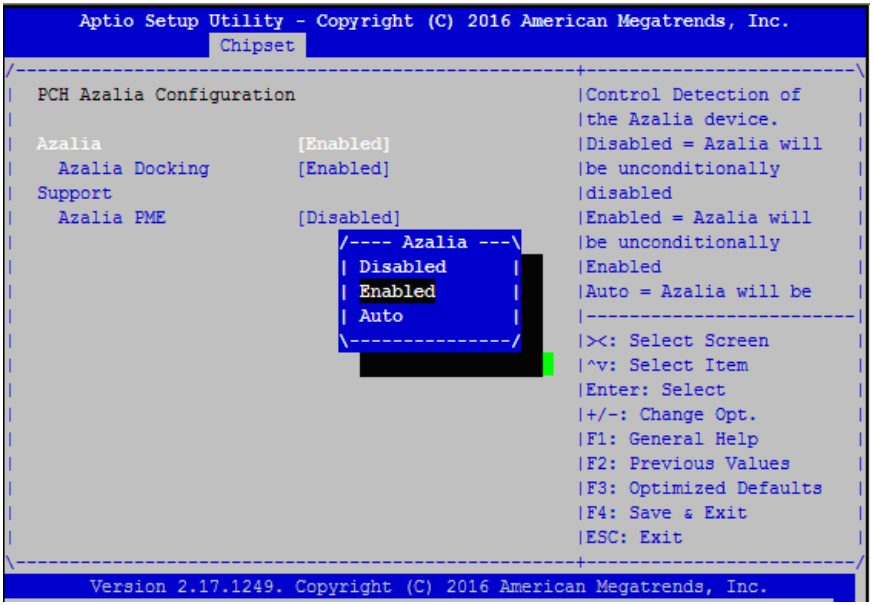


PCI Express Root Port 1~7

Control the PCI Express Root Ports 1~7

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PCH Azalia Configuration



Azalia

Enable or disable Azalia Driver support. Set this value to Enable/Disable.

Azalia Docking Support

Enable or disable Azalia Docking Support of the Audio Controller.

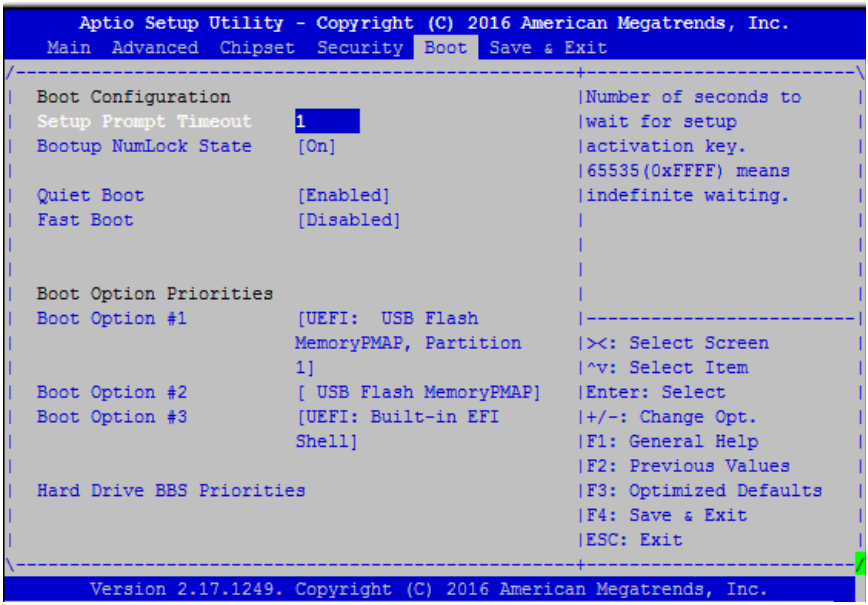
Azalia PME

Enable or disable Power Management capability of the Audio Controller.

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8.5 Boot Settings

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



Setup Prompt Timeout

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

Bootup NumLock State

Select the keyboard NumLock state. Set this value to On / Off.

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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.

Boot Option Priorities

Set Boot Option #1 ~2 boot priority.

Hard Disk Drive BBS Priorities

Specifies the boot device priority sequence from available hard drives.

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8.6 Security Setup



Administrator, User Password

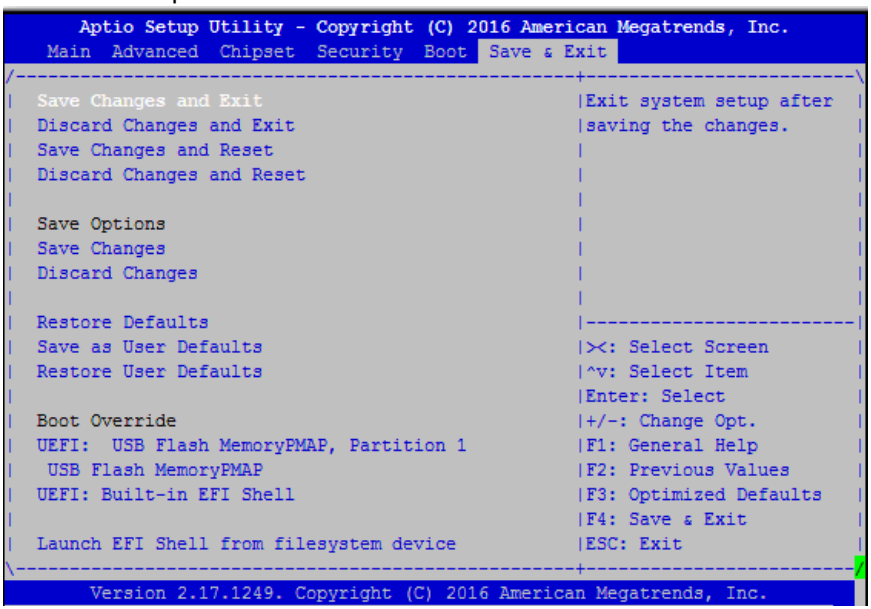
If only the administrator's password is set, then this only limits access to setup and is only asked for when entering setup.

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.

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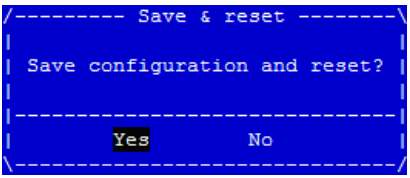
8.7 Save & Exit Menu

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 Reset

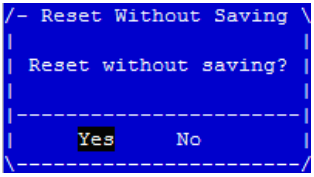
Reset the system after saving the changes.



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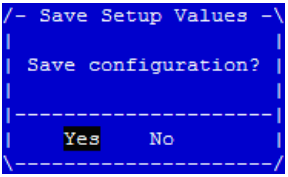
Discard Changes and Reset

Reset system setup without saving any changes.



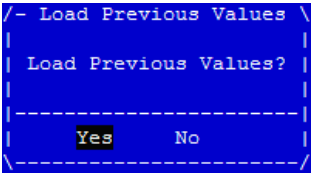
Save Changes

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



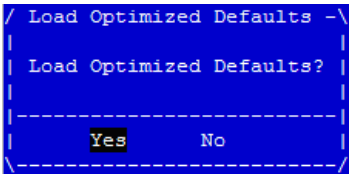
Discard Changes

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



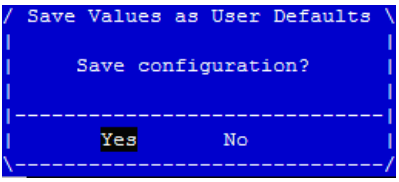
Restore Changes

Restore/Load Defaults values for all the setup options.



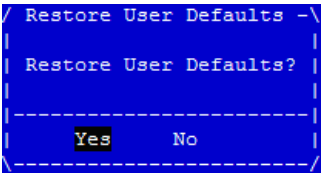
Save as User Defaults

Save the changes done so far as user defaults..



Restore User Defaults

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



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Important Safety Instructions

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

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

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

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



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

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

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Getting Service

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