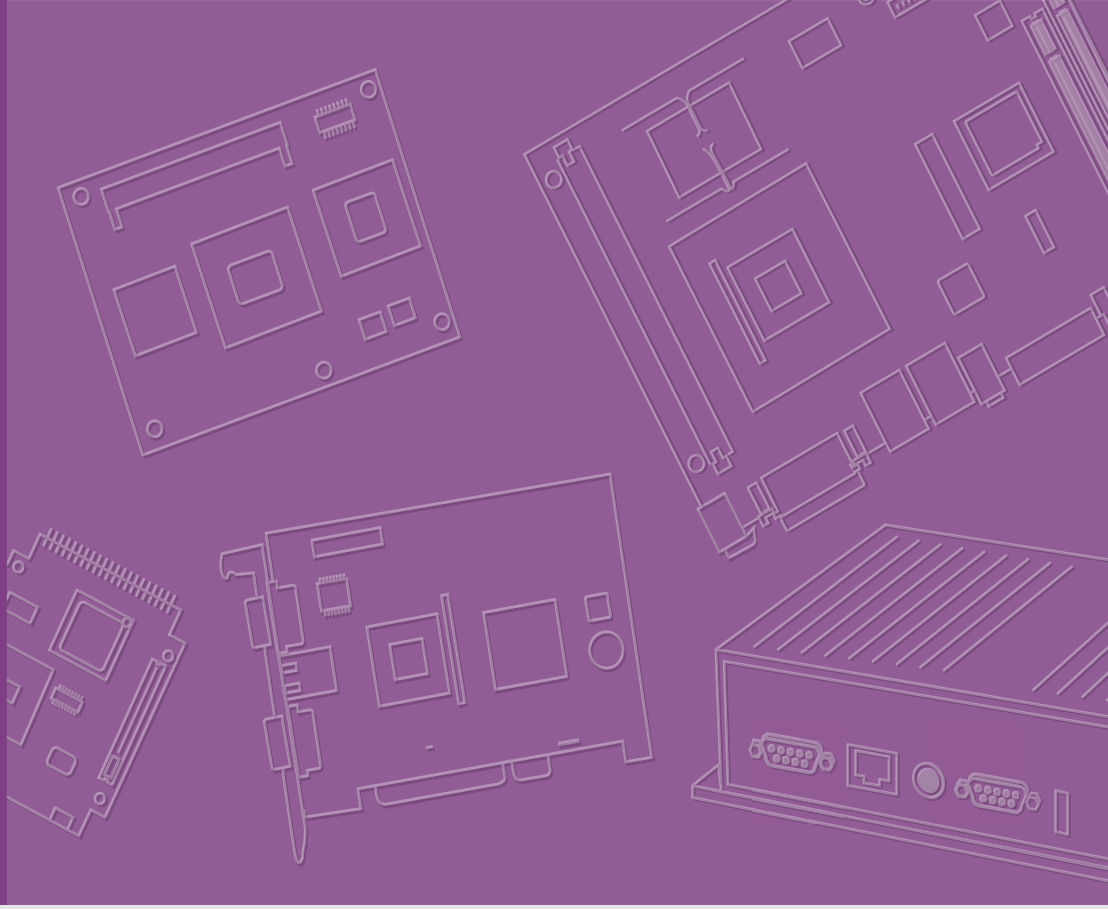

User Manual

ASMB-815 Series

LGA 3647-P0 Intel Xeon® Server Board with 6 DDR4, 5 PCIe x8 or 2 PCIe x16 and 1 PCIe x8, 8 SATA3, 6 USB3.0, Dual 10GbE, IPMI

ADVANTECH

Enabling an Intelligent Planet

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Product Warranty (2 years)

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This warranty does not apply to any products which have been repaired or altered by persons other than repair personnel authorized by Advantech, or which have been subject to misuse, abuse, accident or improper installation. Advantech assumes no liability under the terms of this warranty as a consequence of such events.

Because of Advantech's high quality-control standards and rigorous testing, most of our customers never need to use our repair service. If an Advantech product is defective, it will be repaired or replaced at no charge during the warranty period. For out-of-warranty repairs, you will be billed according to the cost of replacement materials, service time and freight. Please consult your dealer for more details.

If you think you have a defective product, follow these steps:

1. Collect all the information about the problem encountered. (For example, CPU speed, Advantech products used, other hardware and software used, etc.) Note anything abnormal and list any on screen messages you get when the problem occurs.
2. Call your dealer and describe the problem. Please have your manual, product, and any helpful information readily available.
3. If your product is diagnosed as defective, obtain an RMA (return merchandise authorization) number from your dealer. This allows us to process your return more quickly.
4. Carefully pack the defective product, a fully-completed Repair and Replacement Order Card and a photocopy proof of purchase date (such as your sales receipt) in a shippable container. A product returned without proof of the purchase date is not eligible for warranty service.
5. Write the RMA number visibly on the outside of the package and ship it prepaid to your dealer.

Part No. 2001815I00 Edition 1

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A Message to the Customer

Advantech Customer Services

Each and every Advantech product is built to the most exacting specifications to ensure reliable performance in the harsh and demanding conditions typical of industrial environments. Whether your new Advantech equipment is destined for the laboratory or the factory floor, you can be assured that your product will provide the reliability and ease of operation for which the name Advantech has come to be known. Your satisfaction is our primary concern. Here is a guide to Advantech's customer services. To ensure you get the full benefit of our services, please follow the instructions below carefully.

Technical Support

We want you to get the maximum performance from your products. So if you run into technical difficulties, we are here to help. For the most frequently asked questions, you can easily find answers in your product documentation. These answers are normally a lot more detailed than the ones we can give over the phone.

So please consult this manual first. If you still cannot find the answer, gather all the information or questions that apply to your problem, and with the product close at hand, call your dealer. Our dealers are well trained and ready to give you the support you need to get the most from your Advantech products. In fact, most problems reported are minor and are easily solved over the phone.

In addition, free technical support is available from Advantech engineers every business day. We are always ready to give advice on application requirements or specific information on the installation and operation of any of our products.

Declaration of Conformity

FCC Class B

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Initial Inspection

Before installing motherboard, please make sure that the following materials have been shipped:

- 1 x ASMB-815 ATX motherboard
- 1 x ASMB-815 Startup Manual
- 1 x Driver CD
- 2 x Serial ATA HDD data cables
- 1 x I/O port bracket
- 1 x CPU power cable (8P)
- 2 x SATA power cable
- 1 x Warranty card

If any of these items are missing or damaged, contact distributor or sales representative immediately. We have carefully inspected the ASMB-815 mechanically and electrically before shipment. It should be free of marks and scratches and in perfect working order upon receipt. When unpacking the ASMB-815, check it for signs of shipping damage. (For example, damaged box, scratches, dents, etc.) If it is damaged or it fails to meet the specifications, notify our service department or local sales representative immediately. Also notify the carrier. Retain the shipping carton and packing material for inspection by the carrier. After inspection, we will make arrangements to repair or replace the unit.

Order Information

Part Number	Chipset	HDD	Expansion Slot	IPMI	10GbE LAN
ASMB-815-00A1E	C621	8*SATA3+ 1*M.2	5 PCIe x8 or 2 PCIe x16 and 1 PCIe x8+ 1 PCIe x4 + 1 PCIe x1 (Gen 3.0)	No	No
ASMB-815I-00A1E	C621	8*SATA3+ 1*M.2	5 PCIe x8 or 2 PCIe x16 and 1 PCIe x8+ 1 PCIe x4 + 1 PCIe x1 (Gen 3.0)	Yes	No
ASMB-815T2-00A1E	C622	8*SATA3+ 1*M.2	5 PCIe x8 or 2 PCIe x16 and 1 PCIe x8+ 1 PCIe x4 + 1 PCIe x1 (Gen 3.0)	Yes	Yes

Contents

Chapter 1

Overview

1.1 Introduction

The ASMB-815 serverboard is the most advanced Intel Xeon Processor scalable family series board for server-grade IPC applications that require high-performance computing power & multi-expansion slots. This serverboard supports Intel Xeon Scalable series processor and DDR4 ECC-REG 2133/2400/2666 MHz memory up to 192 GB.

ASMB-815 provides five PCIe x8 or two PCIe x16 and 1 PCIe x8, one PCIe x4 and one PCIe x1 in Gen3.0 high speed. In addition, the full ASMB-815 SKU has dual Gigabit and dual 10GbE Ethernet LAN ports that eliminate network bottlenecks. (ASMB-815 I & T2 SKUs only)

A fifth RJ-45 LAN connector (LAN5) is dedicated for IPMI function that allows remote control management. One RJ-45 LAN jack (LAN 4) from 10GbE port can also be used as IPMI LAN. High reliability and outstanding performance makes ASMB-815 the ideal platform for industrial server/networking applications.

By using the Intel C621/C622 chipset, the ASMB-815 offers a variety of features such as 6 x USB3.0 and 7 x USB 2.0 connectivity, 8 x onboard SATA III, and 1 x M.2 (SATA and PCIe) interface. It supports software RAID 0, 1, 10 and 5 (Windows only*), and with the latest Intel RSTe (Rapid Storage Technology Enterprise) it provides a compelling RAID solution for NVMe SSDs via Intel VROC (Virtual RAID on CPU) HW key.

These powerful I/O capabilities ensure even more reliable data storage capabilities and high-speed I/O peripheral connectivity.

Note!

1. *IPMI module will be included in ASMB-815I and ASMB-815T2 SKUs. Only ASMB-815T2 SKU can support 10GbE LAN ports.*
2. *Please refer to Order Information at the front for chipset, IPMI, and LAN support on individual product SKU.*
3. *Please refer to the release note of each Linux OS for Intel's C621/C622 chipset SATA RAID function support.*

1.2 Features

General

- **Intel Xeon Processor Scalable Family support:** ASMB-815 is equipped with single CPU socket to support Intel Xeon Platinum/Gold/Silver/Bronze series up to 28-core processors.
- **High performance I/O capability:** 2 x 10GbE + 2 x GbE LAN, 2 PCIe x16 slot (x8 or x16 link) +3 PCIe x8 slot (x8 link) +1 PCIe x4 (x4 link) + 1 PCIe x1 (x1 link), 8 x SATA and 1 x M.2 connector, 6 x USB 3.0 and 7 x USB 2.0 (incl. 1 x Type-A) ports.
- **Standard ATX form factor with industrial features:** ASMB-815 provides industrial features like long product life cycle, reliable operation under wide temperature range, watchdog timer, etc.
- **IPMI 2.0 support:** ASMB-815 (T2 and I SKUs) equipped with ASPEED 2500 BMC chip supports IPMI 2.0 (Intelligent Platform Management Interface 2.0) via dedicated LAN port.
- **KVM over IP:** KVM over IP function allows BIOS level remote control of ASMB-815 (T2 and I SKUs) through your own computer.

1.3 Specifications

Table 1.1: Specifications

Processor	
CPU	■ Dual Intel LGA3647 Xeon processor sockets ■ Supports Intel Xeon processor scalable family, up to 28 cores ■ Supports the TDP of processor up to 205 W
System Memory	
Memory Capacity	■ Supports DDR4 memory bus ■ Total 6 memory slots provided ■ Supports up to 192 GB memory ■ One DIMM per channel
Memory Type	Supports DDR4 2133/2400/2666 MHz ECC-REG DIMM modules
DIMM Sizes	Each memory slot supports 4GB, 8GB, 16GB and 32GB memory modules
Memory Voltage	1.2 V
Error Detection	■ Corrects single-bit errors ■ Detects double-bit errors (using ECC memory)
On-Board Devices	
Chipsets	Intel C621/C622 PCH
Network Controllers	■ 2 x Intel X557 10GbE and 2 x Intel I210 Gigabit Ethernet Controller connected to PCH (ASMB-815 I & T2 SKUs) ■ Above network supports 10 GbE Base-T and 10/100/1000 Base-T, with RJ-45 output
VGA	ASPEED AST2500/2510 controller with 64 MB VGA memory provides basic 2D VGA function.
EC	ITE IT8528E chip provide motherboard keyboard mouse, RS-232, and hardware monitor functions
BMC 815I/815T2 SKUs	One Realtek 8201EL Gigabit PHY connected to AST2500 for BMC remote management
Input / Output	
Storage	■ Total 8 x SATA ports and 1 x M.2 (SATA/PCIe x4 compatible) provide 6 Gb/s and 8 Gb/s bandwidth ■ RAID 0, 1, 5, 10 support (Windows only)
LAN	■ 4 x RJ-45 LAN ports (2 x 10GbE + 2 x 10/100/1000 Base-T LAN) ■ 1 x RJ-45 Dedicated IPMI LAN port(10/100/1000 Base-T) for IPMI only, there is no regular LAN function (ASMB-815 I & T2 SKUs).
USB	■ 4 x USB 3.0 ports + 2 x USB 2.0 ports at rear window ■ 1 x USB 3.0 internal header (2 ports) ■ 2 x USB 2.0 internal headers (4ports) ■ 1 x internal Type-A USB 2.0 port.
Graphics	■ 1 x VGA port.
Keyboard / Mouse	■ PS/2 keyboard and mouse internal header (onboard).
Serial Port / Header	■ 1 x RS232 port at rear window, 1 x internal header (2 x 5P pitch: 2.50 mm)
Power Connector	
System Power	1 x 24-pin SSI EPS 12V power connector (Input 12V, 5V, 3.3V, 5Vsb)

Table 1.1: Specifications	
CPU Power	1 x 8-pin SSI EPS 12V power connector for CPU & Memory power (12V)
PCIe slot power	1 x 4-pin 12V power connector for PCIe slot 12V input
Expansion Slots	
PCI-express	■ 2 x PCIe x16 slot (Gen3 x8 or x16 link) – PCIEX16_SLOT4 (from CPU) – PCIEX16_SLOT6 (from CPU) ■ 3 x PCIe x8 slot (Gen3 x8 link or NF*) – PCIEX8_SLOT3 (from CPU) – PCIEX8_SLOT5 (from CPU) – PCIEX8_SLOT7 (from CPU) ■ 1 x PCIe x4 slot (Gen3 x4 link) – PCIEX4_SLOT2 (from PCH) ■ 1 x PCIe x1 slot (Gen3 x1 link) – PCIEX1_SLOT1 (from PCH)
System BIOS	
BIOS Type	128 Mb SPI Flash EEPROM with AMI BIOS
PC Health Monitoring	
Voltage	Monitors for CPU Cores, +3.3V, +5V, +12V, +5V Standby, VBAT
FAN	■ One 4-pin header for CPU cooler and five 4-pin headers for system fans (front*4 + rear*1) ■ All fans with tachometer status monitoring ■ Thermal control for all fan connectors
Temperature	■ Monitoring for CPU (PECI) ■ Monitoring for System (EC)
Other Features (Case Open)	■ Chassis intrusion detection ■ Chassis intrusion header
Operating Environment / Compliance	
RoHS	RoHS 6/6 Pb Free Compliant
Environmental Spec.	■ Operating Temperature: 0 to 60° C ■ Non-operating Temperature: -40 to 85° C ■ Operating Relative Humidity: 10% to 90% (non-condensing) ■ Non-operating Relative Humidity: 10% to 95% (non-condensing)

Note! *The PCIe slot 3/5 has no function when slot 4/6 is card occupied with x16 link.*

1.4 Board Layout, Jumpers and Connectors

Connectors on the ASMB-815 are linked to external devices such as hard disk drives. In addition, ASMB-815 has a number of jumpers that are used to configure the system for specific applications.

The tables below list the functions of each jumper and connector. Later sections in this chapter give instructions for setting jumpers. Chapter 2 gives instructions for connecting external devices to ASMB-815.

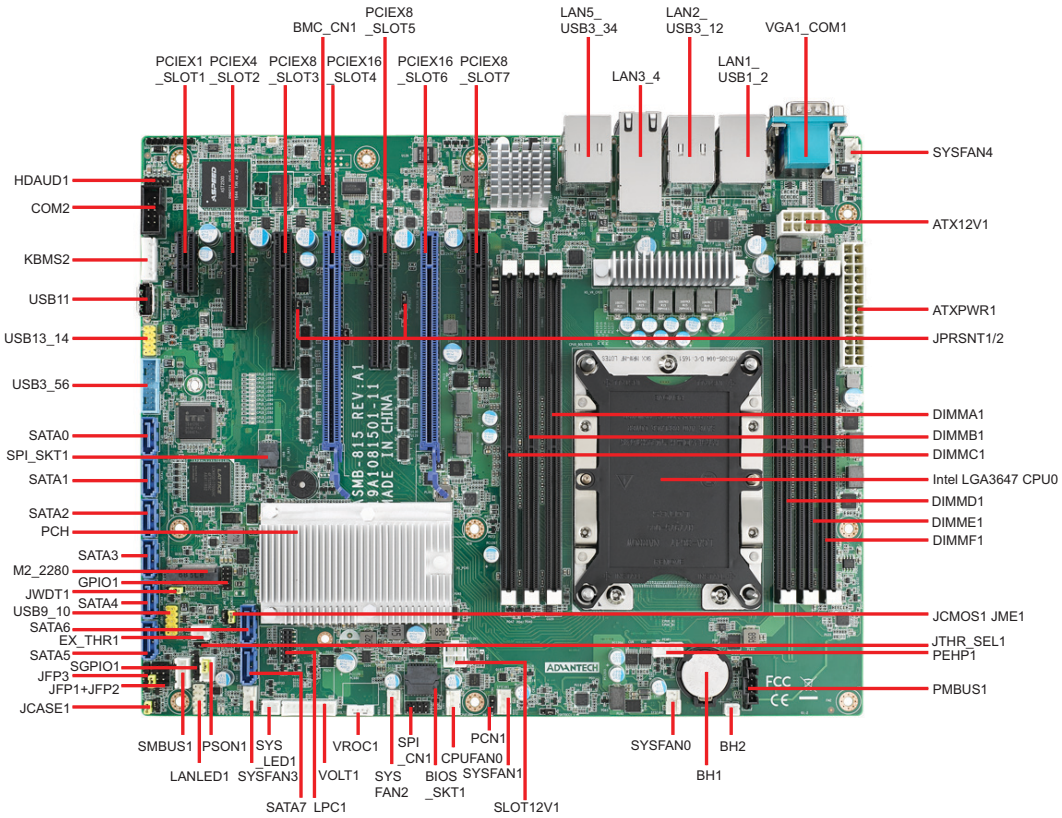


Figure 1.1 Board Layout

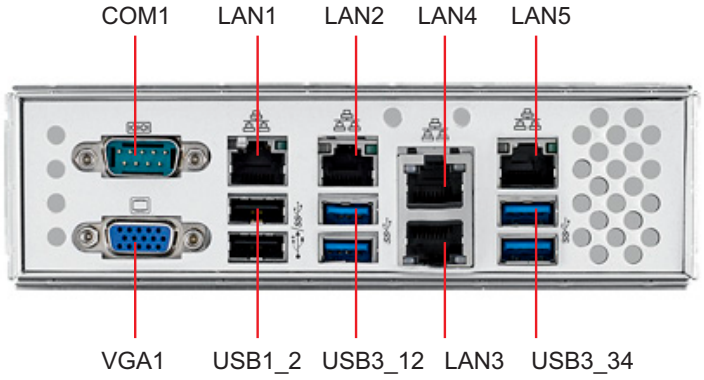


Figure 1.2 Rear I/O of full SKU (ASMB-815T2-00A1E)

Note!

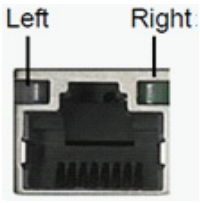
ASMB-815-00A1E with no IPMI/10GbE LAN support provides two LAN ports (LAN1~2).

ASMB-815I-00A1E with IPMI LAN support provides three LAN ports (LAN1~2 & LAN5).

ASMB-815T2-00A1E with IPMI/10GbE LAN support provides five LAN ports (LAN1~5).

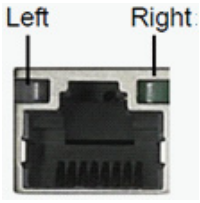
Table 1.2: Onboard LAN LED Color Definition

10/100/1000 & 10G Mbps LAN Link/Activity LED Scheme



LAN3 & LAN4 (10G)

		Left LED	Right LED
100 Mbps	Link Active	Off Off	Green Blinking green
1G Mbps	Link Active	Amber Amber	Green Blinking green
10G Mbps	Link Active	Green Green	Green Blinking green

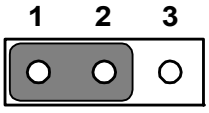


LAN1 & LAN2 (1G)

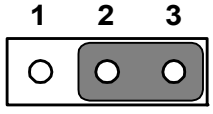
		Left LED	Right LED
10 Mbps	Link Active	Off Off	Green Blinking green
100 Mbps	Link Active	Amber Amber	Green Blinking green
1000 Mbps	Link Active	Green Green	Green Blinking green
No Link		Off	Off

Table 1.3: Jumpers

Label	Function	Default
JCMOS1	CMOS Clear	1-2
JME1	ME update	1-2
JWDT1	Watch Dog Reset	1-2
PSON1	AT(1-2) / ATX(2-3)	2-3
JCASE1	Chassis case open alarm	1-2
JTHR_SEL	On board(1-2)/external thermistor(2-3)	1-2
JPRSNT1/2	PCIE slot switch: Auto (1-2) / Manual (2-3)	1-2



Keep CMOS data/Disable ME update



Clear CMOS data/Enable ME update

Table 1.4: Connectors

Label	Function
ATX12V1	SSI EPS 12V auxiliary power connector (for CPU) and memory
ATXPWR1	SSI EPS 24-pin main power connector (for system)
BH2	For optional battery kit
BIOS_SKT1	BIOS SPI ROM
BMC_CN1	IPMI connector (ASMB-815 I & T2 SKUs only)
COM2	Serial port: RS-232
CPU0	Intel LGA3647 CPU0 socket
CPUFAN0	CPU0 fan connector (4-pin)
DIMMA1	Channel A DIMM1
DIMMB1	Channel B DIMM1
DIMMC1	Channel C DIMM1
DIMMD1	Channel D DIMM1
DIMME1	Channel E DIMM1
DIMMF1	Channel F DIMM1
EX_THR1	Connector for external thermistor
GPIO1	GPIO function for customize usage
HDAUD1	Audio header
JFP1/JFP2/JFP3	Front panel pin header
KBMS2	For additional keyboard/mouse
LAN1~LAN5	RJ-45 LAN connector
LANLED1	LAN LED extension connector
LPC1	LPC port for debug & TPM module
M2_2280	M.2 connector (SATA & PCIe x4)
PEHP1	NVMe RAID LED control
PMBUS1	PMBUS connector to communicate with power supply
SATA0~SATA7	Serial ATA0~7
SGPIO1	Supports Serial_Link interface for onboard SATA connections
SLOT1	PCIE x1 slot (x1 link) (PCH)
SLOT2	PCIE x4 slot (x4 link) (PCH)
SLOT3	PCIE x8 slot (0 or x8 link) (CPU)
SLOT4	PCIE x16 slot (x16 or x8 link) (CPU)
SLOT5	PCIE x8 slot (0 or x8 link) (CPU)
SLOT6	PCIE x16 slot (x16 or x8 link) (CPU)
SLOT7	PCIE x8 slot (x8 link) (CPU)
SLOT12V1	For PCIe slot 12V input only
SMBUS1	SMBus header (SMBus from either BMC or PCH)
SPI_CN1	Connector for BIOS update tool
SPI_SKT1	EC EEPROM
SYSFAN0~SYSFAN4	System FAN connector (4-pin)
SYS_LED1	System LED connector (T2/I SKUs)
USB3_12, USB3_34, USB3_56	USB 3.0 port 1, 2, 3, 4; USB 3.0 port 5, 6 (20-pin header)
USB1_2, USB9_10, USB13_14	USB 2.0 port 1, 2; USB 2.0 port 9, 10, 13, 14 (9-pin header)
USB11	USB 2.0 port 11 (Type-A)

Table 1.4: Connectors	
VGA1_COM1	VGA+COM connector
VOLT1	Voltage display
VROC1	Intel Virtual RAID (VROC) key

Table 1.5: Onboard LED			
LED	**Description**	**LED Definition**	
5V_LED1	Power on LED	Off: Power off	On (Green): System is On
5VSB_LED1	Standby LED	Off: No input AC Power	On (Green): System is ON, in sleep mode, or in soft-off mode
LED3	BMC heartbeat LED (ASMB-815 T2 and I SKUs)	Blinking (Green): Controller is working normally	

1.5 Block Diagram

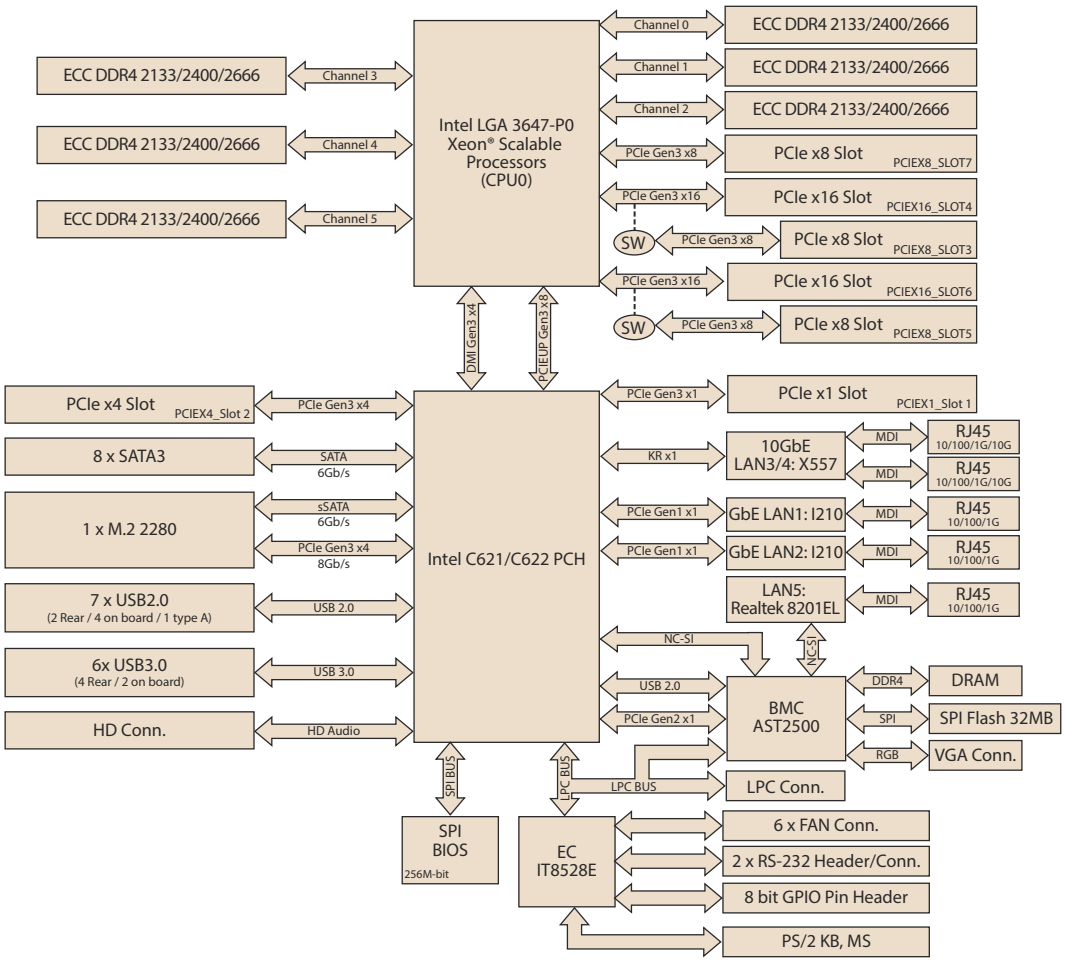


Figure 1.3 Block Diagram

1.6 System Memory

ASMB-815 has six 288-pin memory slots for DDR4 2133/2400/2666 MHz memory modules with maximum capacity of 192 GB (Maximum 32 GB for each DIMM). ASMB-815 supports registered DIMMs memory module.

1.7 Memory Installation

	Quantity of memory installed					
	1	**2**	**3**	**4**	**5**	**6**
DIMM A1	V	V	V	V	V	V
DIMM B1			V	V	V	V
DIMM C1					V	V
DIMM D1		V	V	V	V	V
DIMM E1				V	V	V
DIMM F1						V

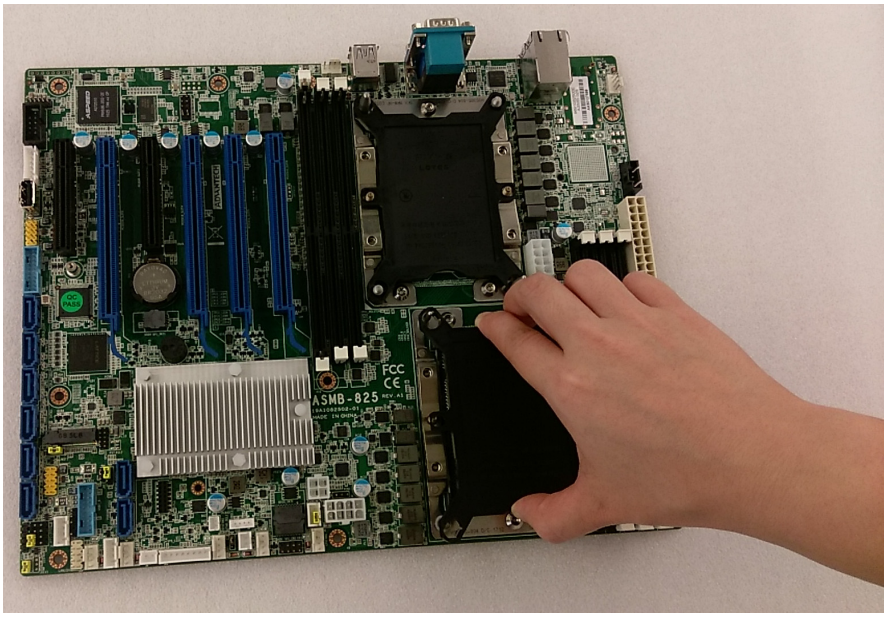
1.8 Processor Installation

The ASMB-815 is designed for Intel Xeon processor scalable family.

Step 1

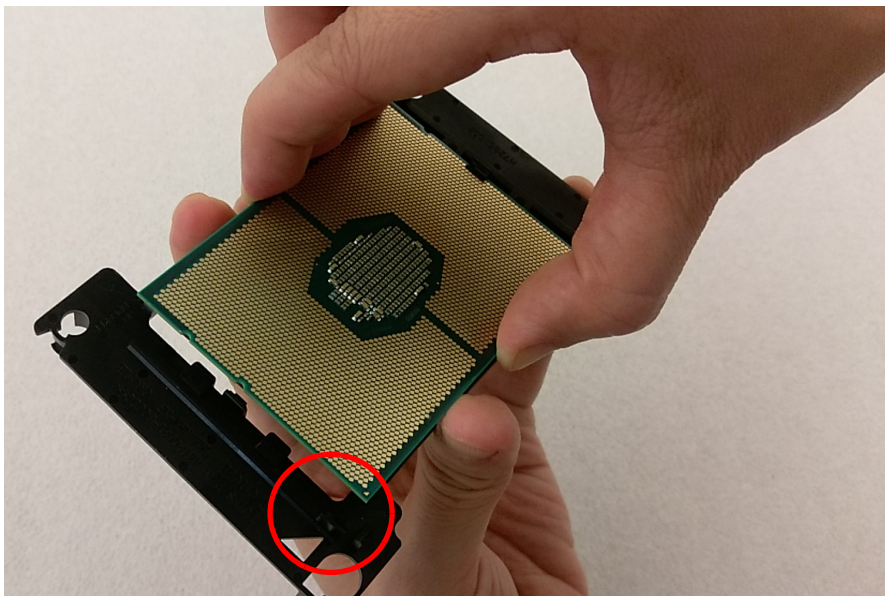
Remove dust cover.

(The following pictures are referred from same platform ASMB-825 with dual processors but ASMB-815 is with single processor)



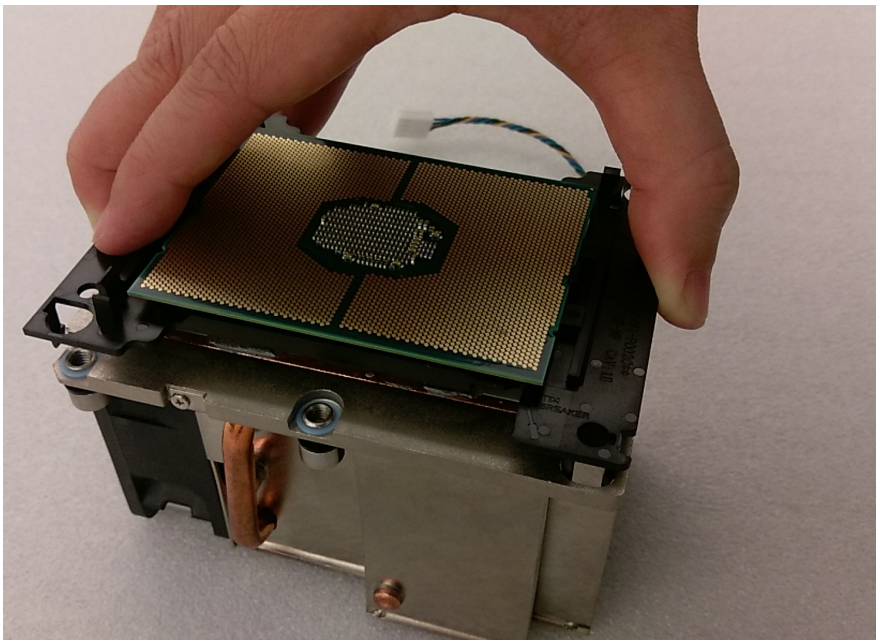
Step 2

Install CPU on CPU clip and align the pin 1 mark.



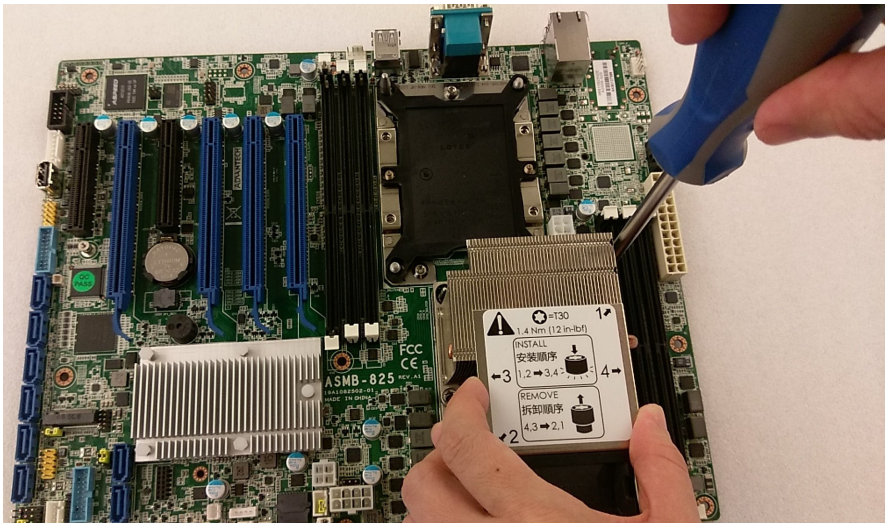
Step 3

Install the CPU clip assembly on the heatsink as a processor + heatsink module.



Step 4

Place the processor heatsink module into the motherboard bolster plate by using a T-30 screw driver (follow heatsink label direction 1-2-3-4).



Chapter 2

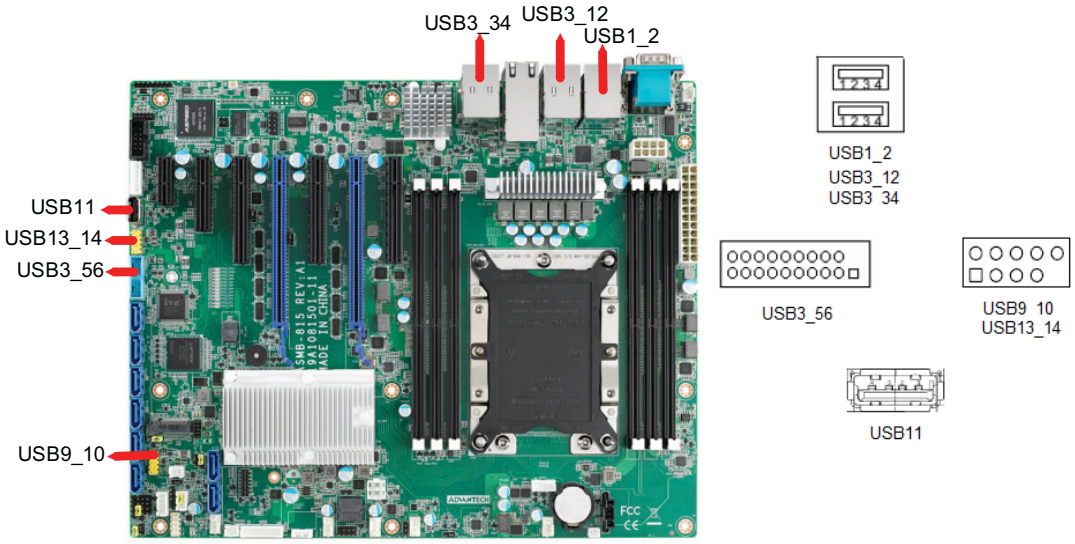
Connections

2.1 Introduction

You can access most of the connectors from the top of the board as it is being installed in the chassis. If you have a number of cards installed, you may need to partially remove a card to make all the connections.

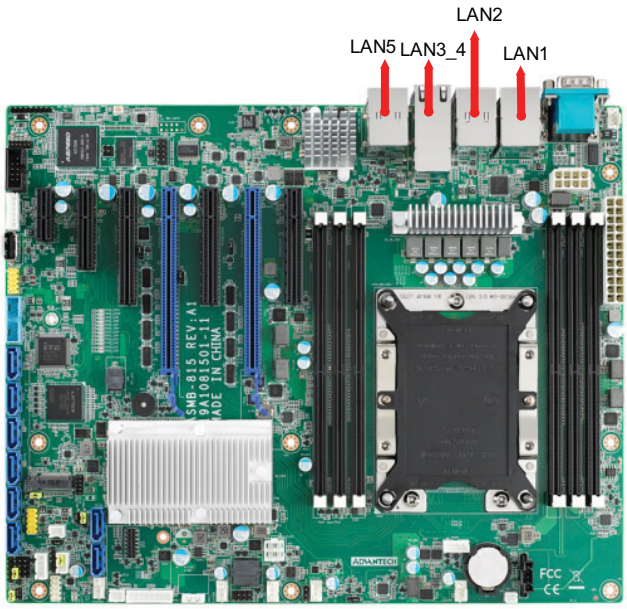
2.2 USB Ports (USB1_2, USB3_12, USB3_34, USB3_56, USB9_10, USB11, USB13_14)

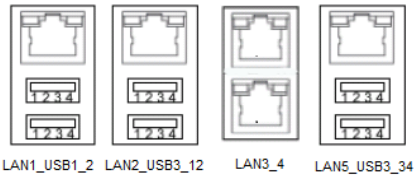
The four USB 3.0 ports on the rear plate and two USB3.0 on-board ports could reach transmission rates up to 5Gbps, besides the two USB2.0 ports on the rear and four on-board ports and one Type-A ports are with 480 Mbps speed. Fuse protection is supported and the USB interface can be disabled in the system BIOS setup.



2.3 LAN Ports (LAN1~LAN5)

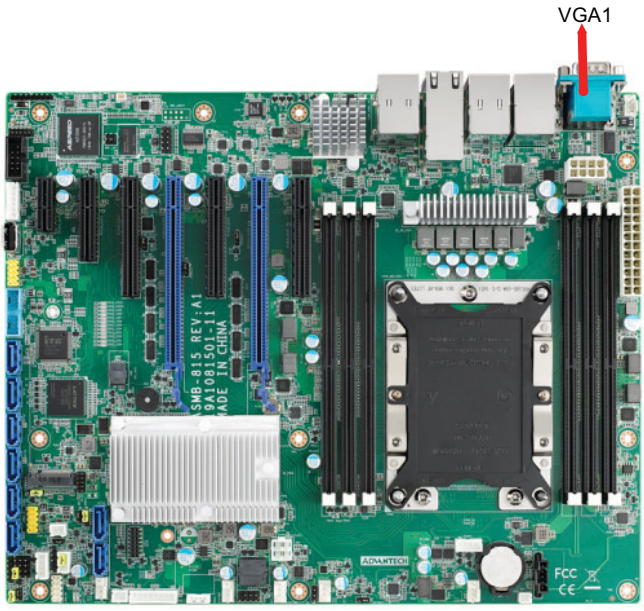
The ASMB-815 is equipped with two 10GbE (LAN3,4), two GbE LAN (LAN1,2) ports and one dedicated IPMI LAN (LAN5) port. One of 10 GbE LAN (LAN4) can be used as IPMI LAN as well for system management. They are all with RJ-45 jacks and supported by all major network operating systems.

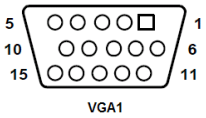




2.4 VGA Connector (VGA1)

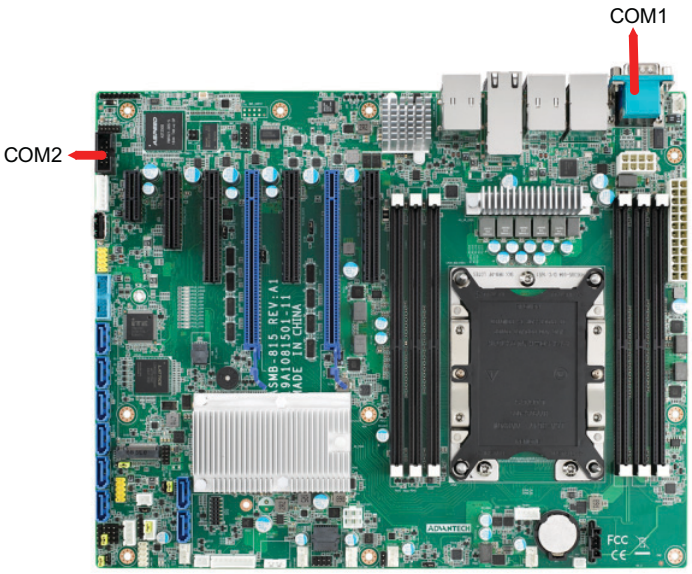
The ASMB-815 includes a VGA interface that can drive conventional CRT and LCD displays.

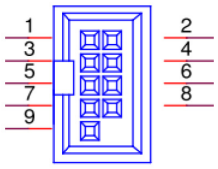




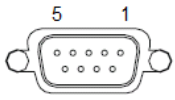
2.5 Serial Ports (COM1~2)

The ASMB-815 offers one serial port on the rear plate and one 2.50mm onboard with 2 x 5-pin pitch.





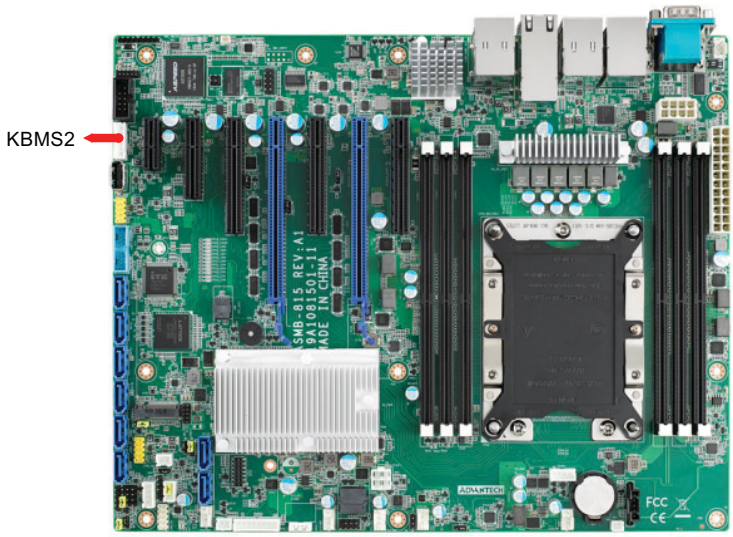
COM2

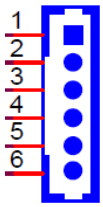


COM1

2.6 PS2 Keyboard and Mouse Connectors (KBMS2)

The 6-pin KBMS2 connector is for additional keyboard & mouse device usage.

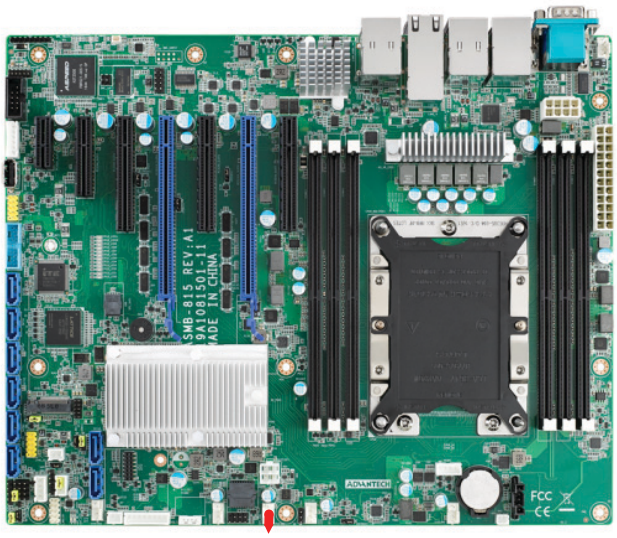


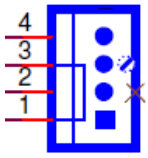


KBMS2

2.7 CPU Fan Connector (CPUFAN0)

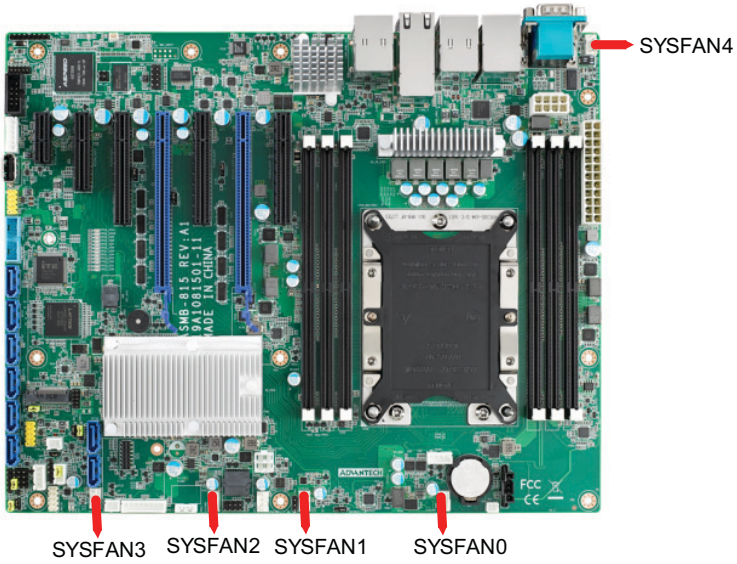
If a fan is used, this connector supports cooling fans that draw up to 1.5A (18W).

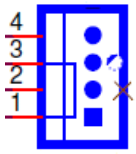




CPUFAN0

2.8 System Fan Connector (SYSFAN0~4)

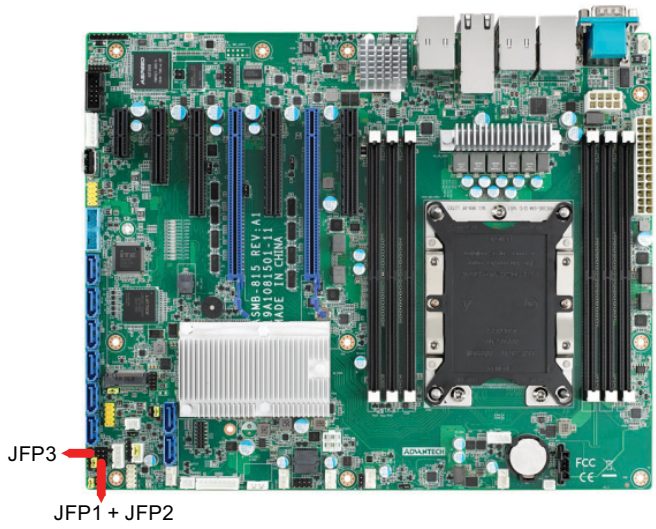




SYSFAN0~4

2.9 Front Panel Connector (JFP1~3)

There are several external switches and LEDs to monitor and control the ASMB-815.



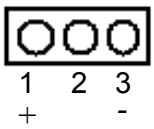
JFP1	3	6	9	12	PWRSW	RESET
&	2(+)	5(-)	8	11	HDDLED	
JFP2	1(+)	4	7	10(-)	SPEAKER	
JFP3	1(+)	2	3(-)	4	5	PWRLED	KEYLOCK

2.9.1 Power LED (JFP3)

JFP3 pin 1 and pin 3 are for the power LED. Refer to Appendix B for detailed information on the pin assignments. If an ATX power supply is used, the system's power LED status will be as indicated as follows.

Table 2.1: ATX Power Supply LED Status

ACPI Power Mode	LED (ATX power)
System On (S0)	On
System Standby (S1)	Fast flashes
System Hibernation(S4)	Slow flashes
System Off (S5)	Off

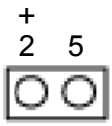


2.9.2 External Speaker (JFP2 pins 1, 4, 7, 10)

JFP2 pins 1, 4, 7, 10 connect to an external speaker. The ASMB-815 provides an onboard buzzer as an alternative. To enable the buzzer, set pins 7-10 closed.

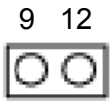
2.9.3 HDD LED Connector (JFP2 Pins 2 & 5)

You can connect an LED to connector JFP2 to indicate when the HDD is active.



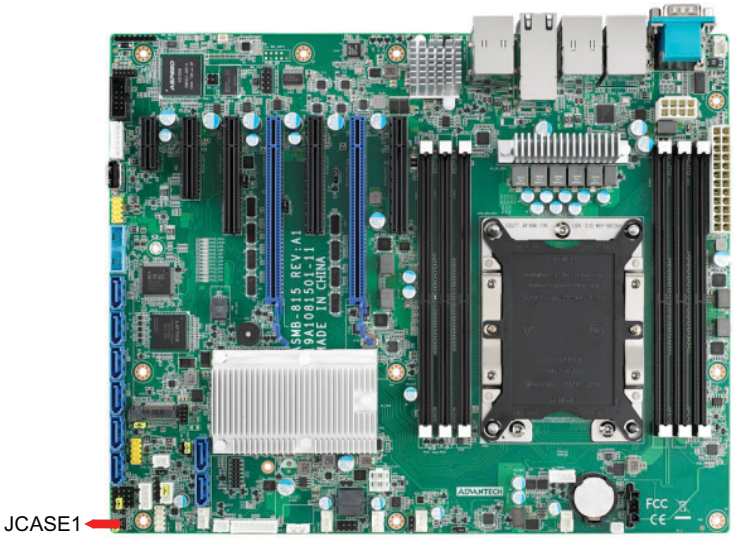
2.9.4 Reset Connector (JFP1 Pins 9 & 12)

Many computer cases offer the convenience of a reset button.

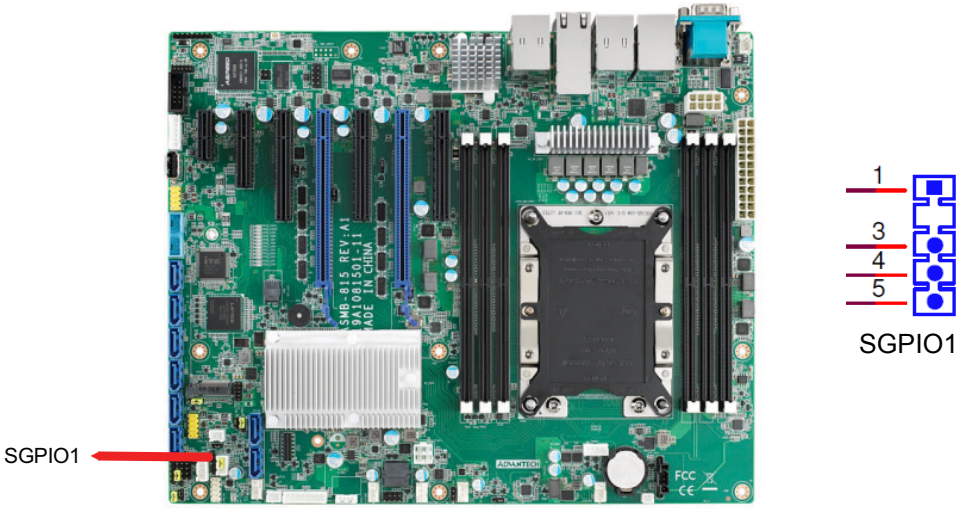


2.9.5 Case Open (JCASE1)

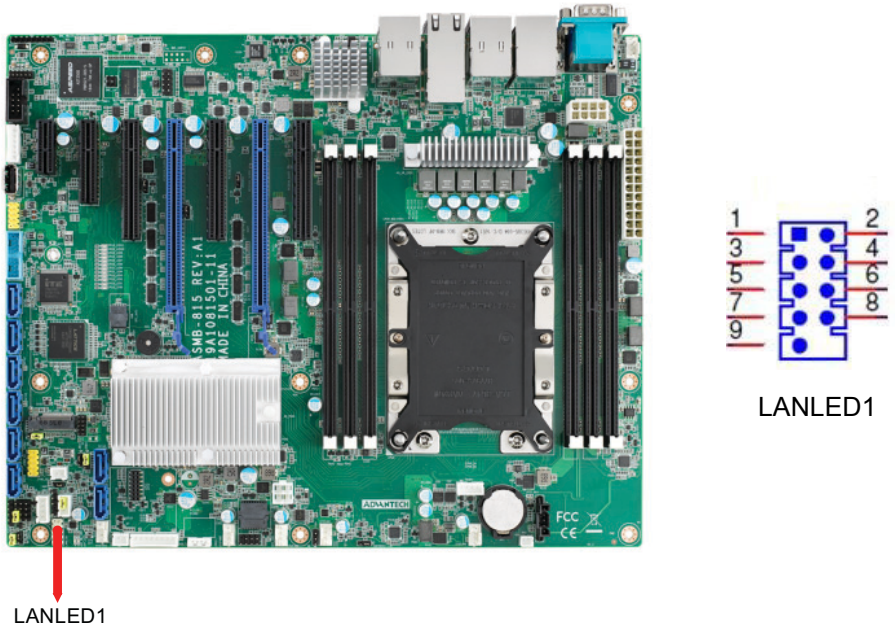
A chassis intrusion header is located at JCASE1 on the motherboard. Attach the appropriate cable from the chassis to be informed of a chassis intrusion when the chassis is opened. The default function is disabled and Pin 1-2 is bridged by a jumper cap.



2.10 SATA SGPIO (SGPIO1)

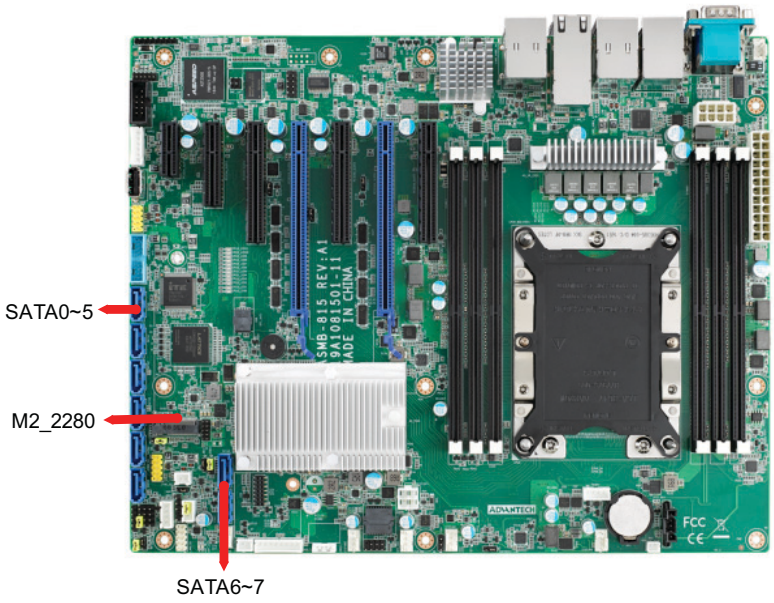


2.11 Front Panel LAN Indicator Connector (LANLED1)



2.12 SATA and M.2 Connector (SATA0~7, M2_2280)

ASMB-815 features eight serial ATA III interfaces (up to 600 MB/s) which eases cabling to hard drives with thin and long cables. The M.2 2280 connector can support both SATA and PCIe SSD devices for higher read/write speed.

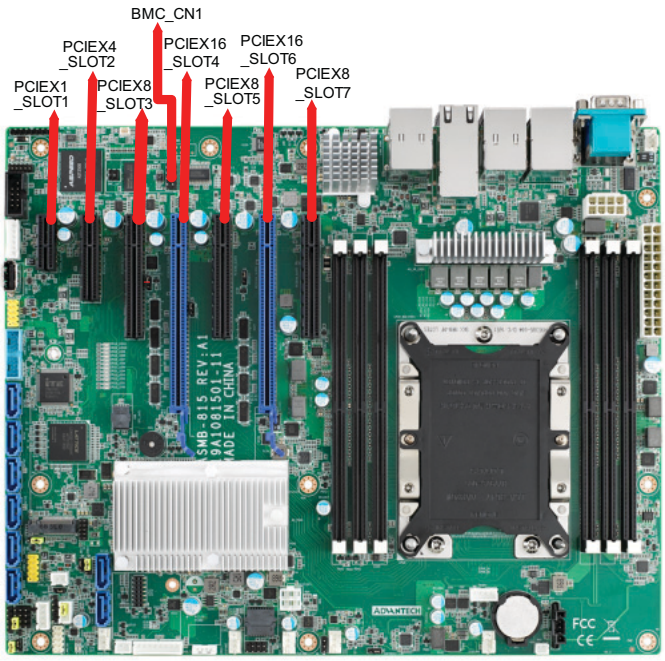


SATA0~7

Note! *Please pay attention to one MB screw hole H4 allocated in the M.2 area should be unfixed when you prepare to disassemble the system.*

2.13 PCIe Expansion Slots & PCIe switch (JPRSNT1/2)

The ASMB-815 provides seven expansion slots. Riser card for 1U or 2U chassis can be used in slot-6 only.



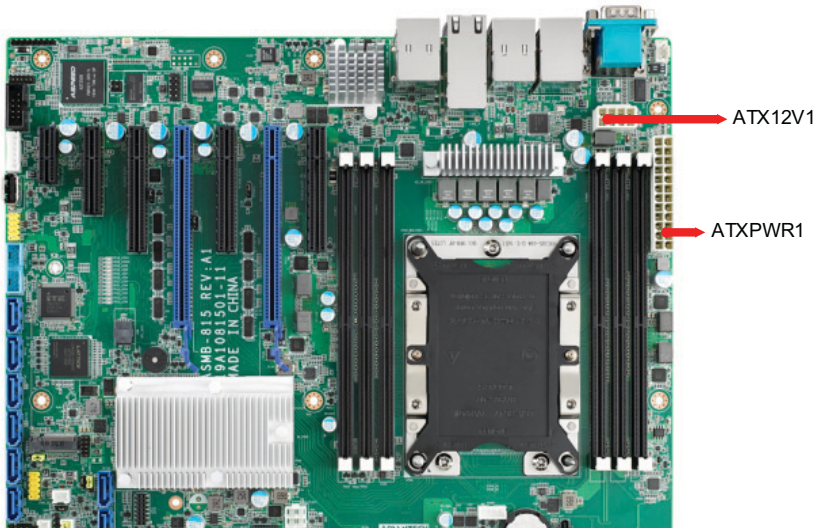
	Slot Length	Link	PCI-E Generation	PCIe link from
SLOT1	PCI-E x1	PCI-E x1	3	PCH
SLOT2	PCI-E x4	PCI-E x4	3	PCH
SLOT3	PCI-E x8	PCI-E x8	3	CPU
SLOT4	PCI-E x16	PCI-E x16	3	CPU
SLOT5	PCI-E x8	PCI-E x8	3	CPU
SLOT6	PCI-E x16	PCI-E x16	3	CPU
SLOT7	PCI-E x8	PCI-E x8	3	CPU

	Part Number	Description	Remarks
Riser Card	ASMB-RF388-21A1E	ASMB-RF388 (2U riser card)	2*PCI-E x8 or 1*PCI-E x8 + 2*PCI-E x4
	ASMB-RF348-21A1E	ASMB-RF348 (2U riser card)	2*PCI-E x4 + 1*PCI-E x8
	ASMB-RF3X8-21A1E	ASMB-RF3X8 (2U riser card)	1*PCI-Ex4 + 2*PCI-X
	AIMB-RF10F-01A1E	AIMB-RF10F (1U riser card)	1*PCI-E x16

Slot 7 has dedicated PCIe x8 link. Slot 3/4 is sharing one x16 link from CPU0, and slot 5/6 is sharing another x16 link from CPU0.

There are JPRSNT1 or JPRSNT2 jumper to switch PCIe slot 3/4 or slot 5/6 to two x8 links manually. Normally this jumper is 1-2 closed as default for auto detect. Some cards on slot 3 or slot 5 can't be recognized until JPRSNT jumper is forced to 2-3 closed.

2.14 Auxiliary Power Connector (ATXPWR1/ ATX12V1)

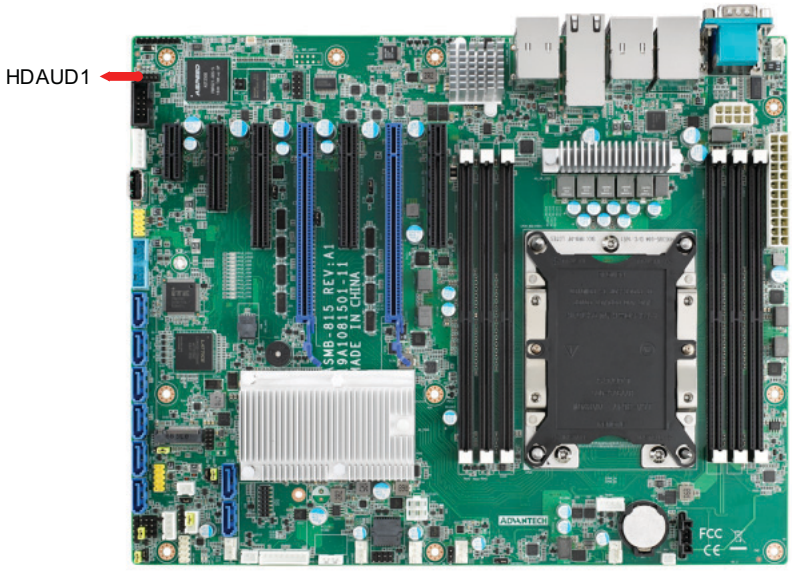


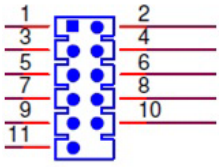
Note!

1. *Please use a power supply which is of SSI type; minimum output should be at least 500 W.*
2. *ATXPWR1 & ATX12V1 sockets should be all connected with power supply, otherwise ASMB-815 will not boot up normally.*

2.15 HD Audio Interface Connector (HDAUD1)

ASMB-815 has one audio connector for Advantech's audio board (P/N: PCA-AUDIO-HDB1E) installation.

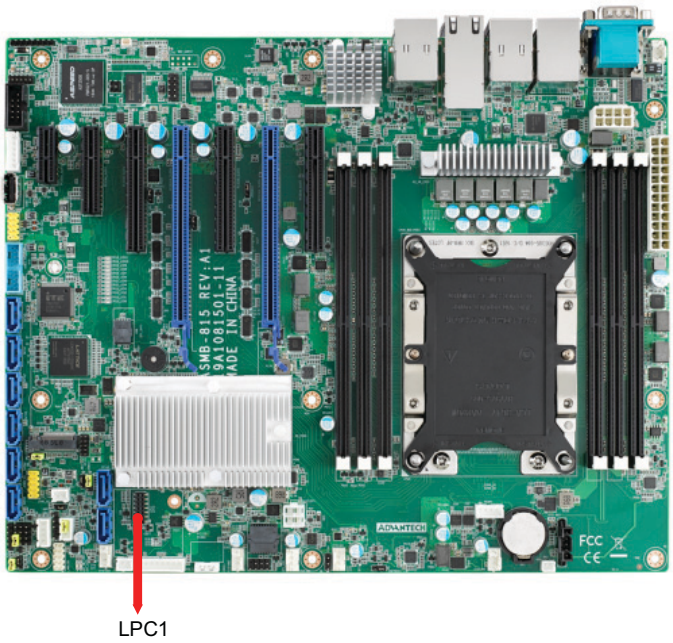


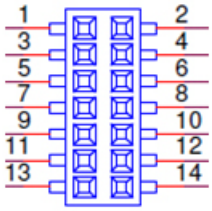


HDAUD1

2.16 LPC Connector (LPC1)

ASMB-815 has one LPC connector that can be used for Advantech's TPM Module (P/N: PCA-TPM-00A1E, PCA-TPM-00B1E) for security management.

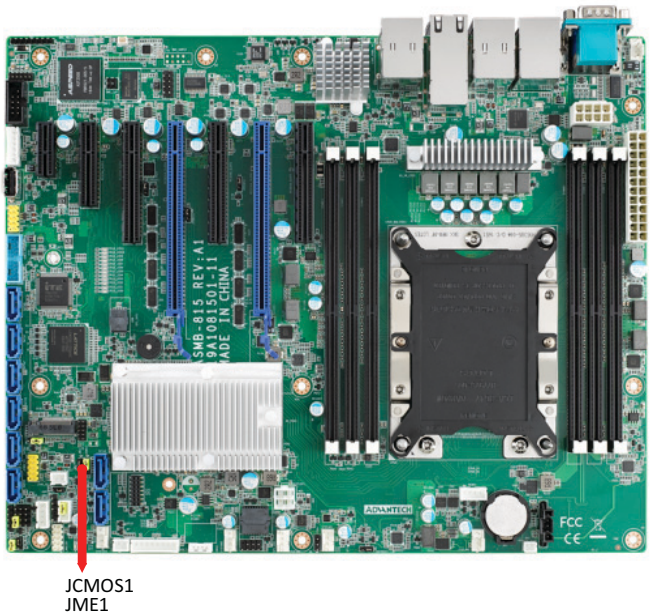


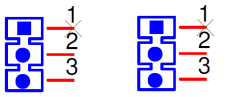


LPC1

2.17 Clear CMOS Connector (JCMOS1, JME1)

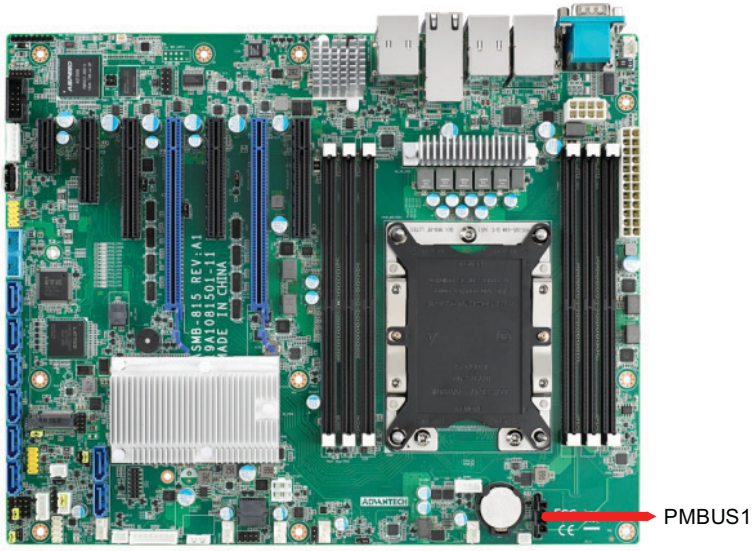
Setting jumper from pin 1-2 to pin 2-3, then back to pin 1-2 to reset CMOS data.

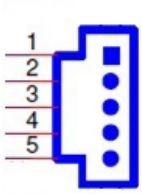




JME1 JCMOS1

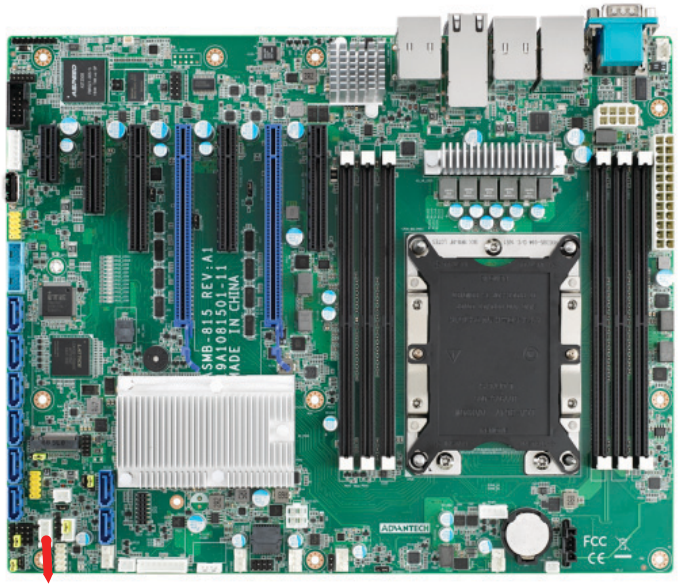
2.18 PMBUS Connector (PMBUS1)

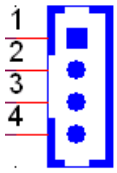




PMBUS1

2.19 Front Panel SMBUS Connector (SMBUS1)

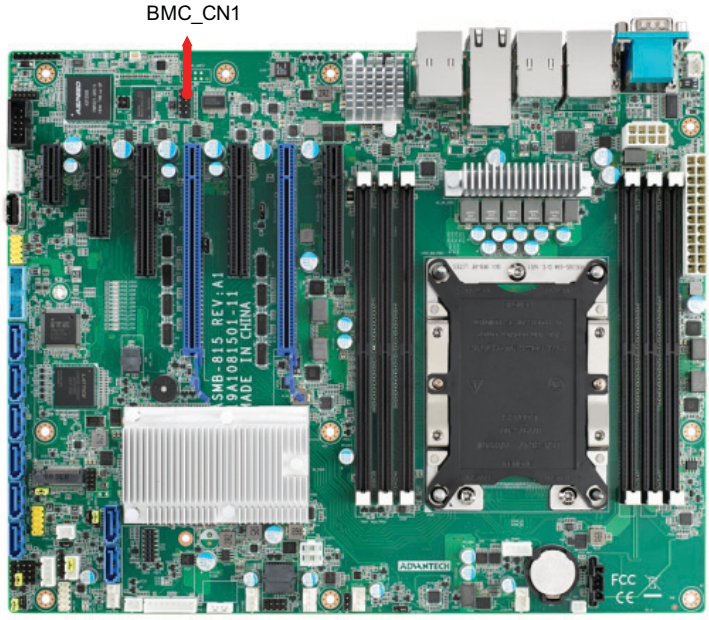


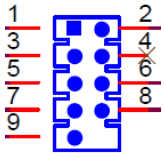


SMBUS1

2.20 IPMI Module Connector (BMC_CN1)

This connector only fits to Advantech's BMC Module that will exist in ASMB-815 I & T2 SKUs for enabling IPMI function.

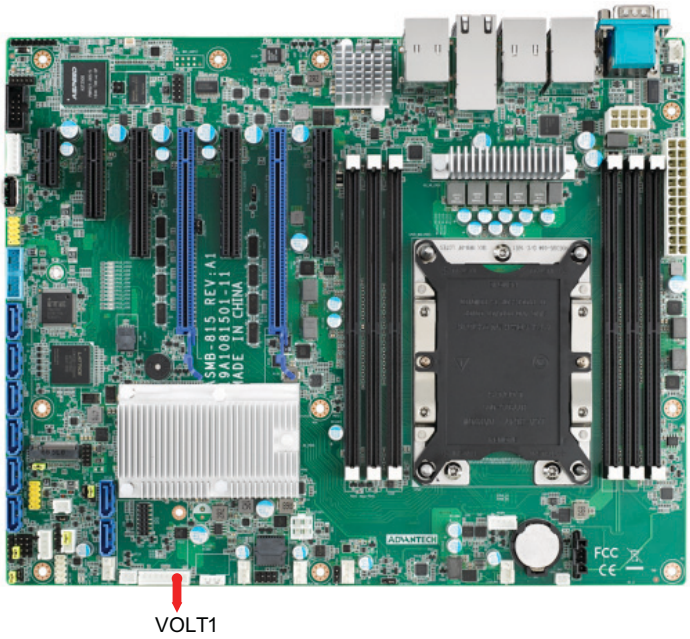


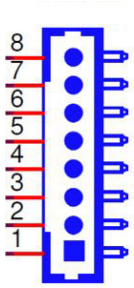


BMC_CN1

2.21 VOLT1 Connector (VOLT1)

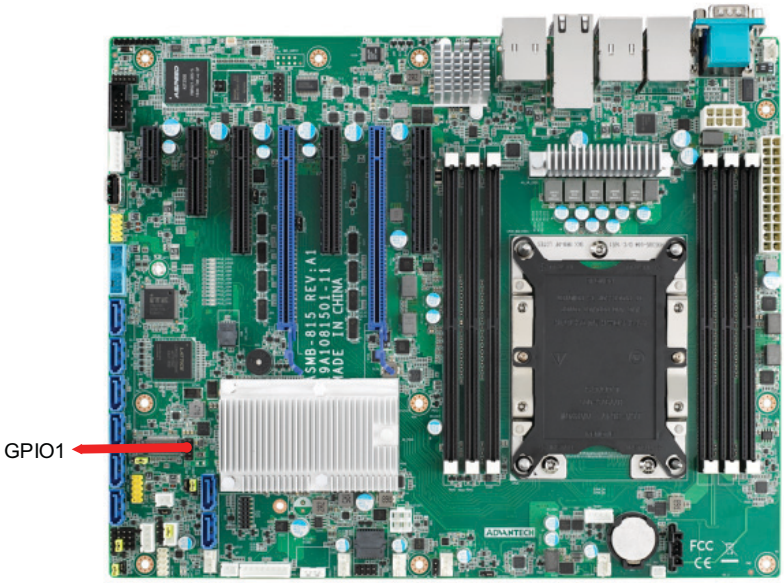
VOLT1 connects to the alarm board on the Advantech chassis. These alarm boards give warnings if a power supply or fan fails, if the chassis overheats, or if the back-plane malfunctions.

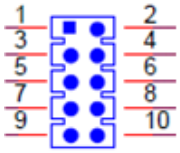




VOLT1

2.22 GPIO Connector (GPIO1)

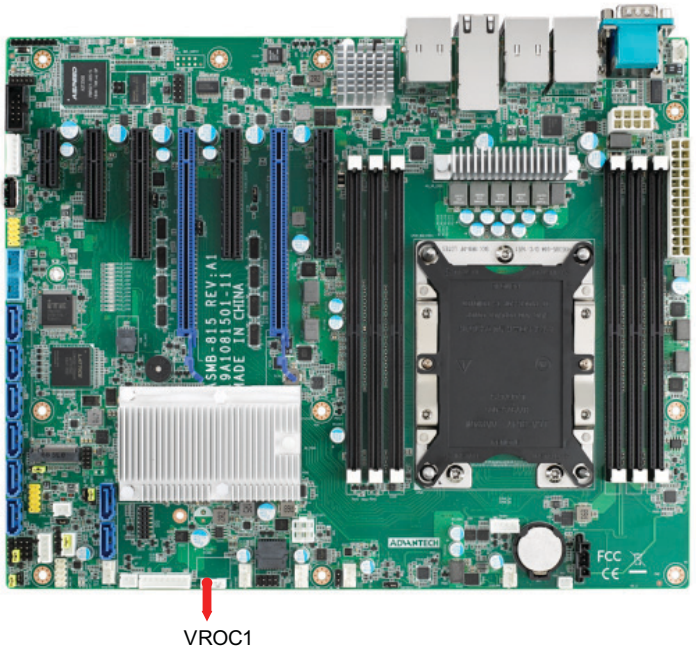




GPIO1

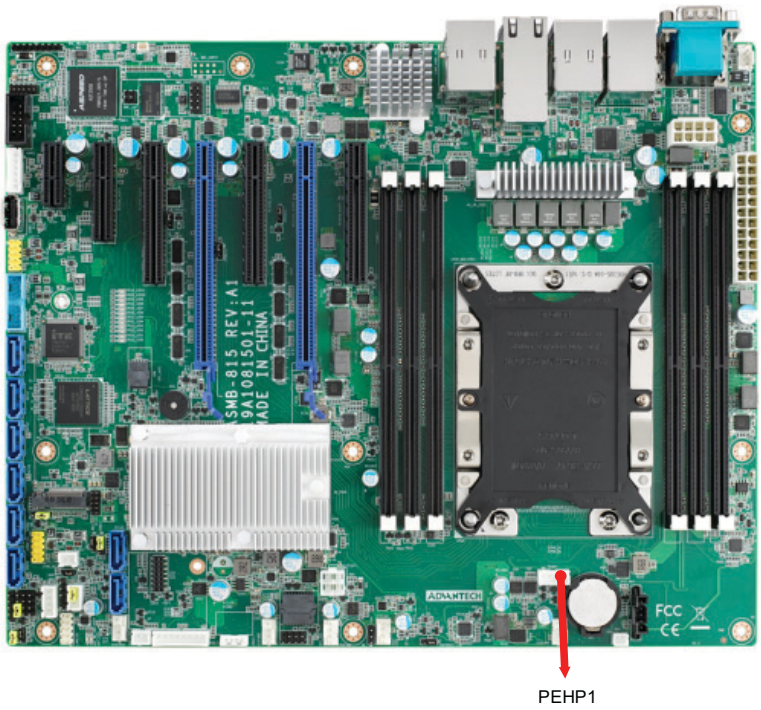
2.23 Intel Virtual RAID (VROC1)

Intel VROC license key of VMD allows NVMe SSDs to connect via PCIe and directly manage on the CPU for better RAID performance. ASMB-815 has a VROC connector to enable NVMe SSD RAID, hot-plug and LED management features on Advantech's storage system.



2.24 NVMe RAID LED Control (PEHP1)

ASMB-815 has a PEHP1 connector for storage chassis to enable NVMe RAID LED control feature.

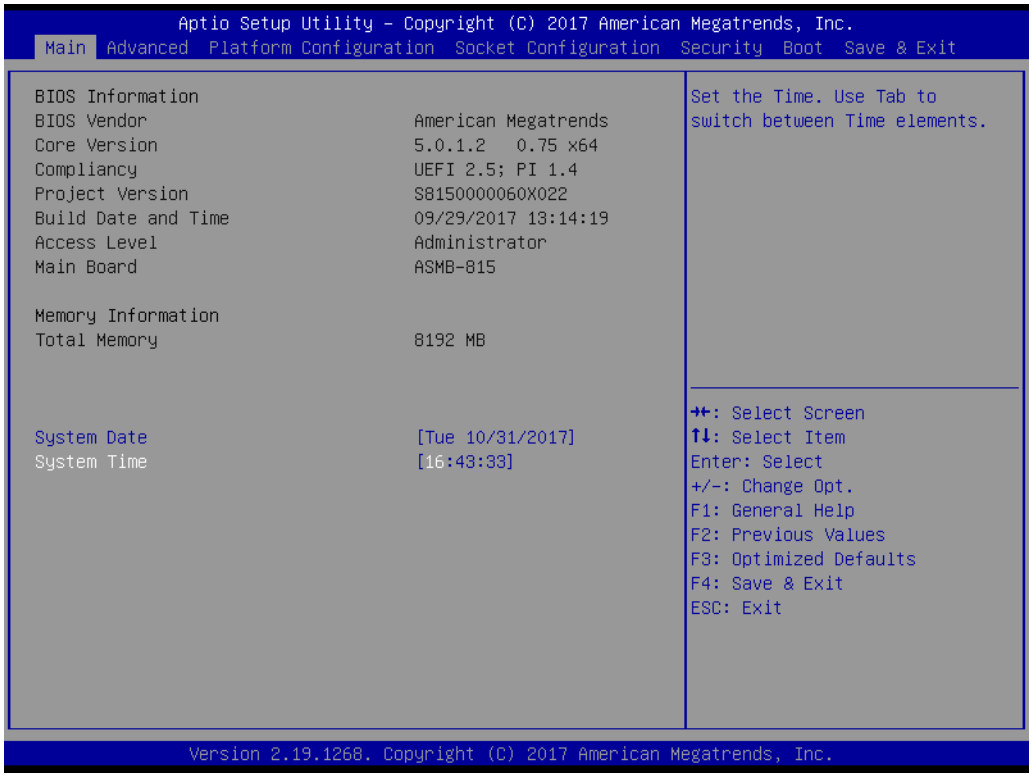


Chapter 3

AMI BIOS

3.1 Introduction

With the AMI BIOS Setup program, you can modify BIOS settings and control the special features of your computer. The Setup program uses a number of menus for making changes and turning the special features on or off. This chapter describes the basic navigation of the ASMB-815 setup screens.



AMI's BIOS ROM has a built-in Setup program that allows users to modify the basic system configuration. This type of information is stored in battery-backed up CMOS so it retains the Setup information when the power is turned off.

Note! *The BIOS setup screens shown in this chapter are for reference only, they may not exactly match what you see on your display devices.*

3.2 BIOS Setup

3.2.1 Main Menu

Press <Del> during bootup to enter AMI BIOS CMOS Setup Utility; the Main Menu will appear on the screen. Use arrow keys to select among the items and press <Enter> to accept or enter the sub-menu.

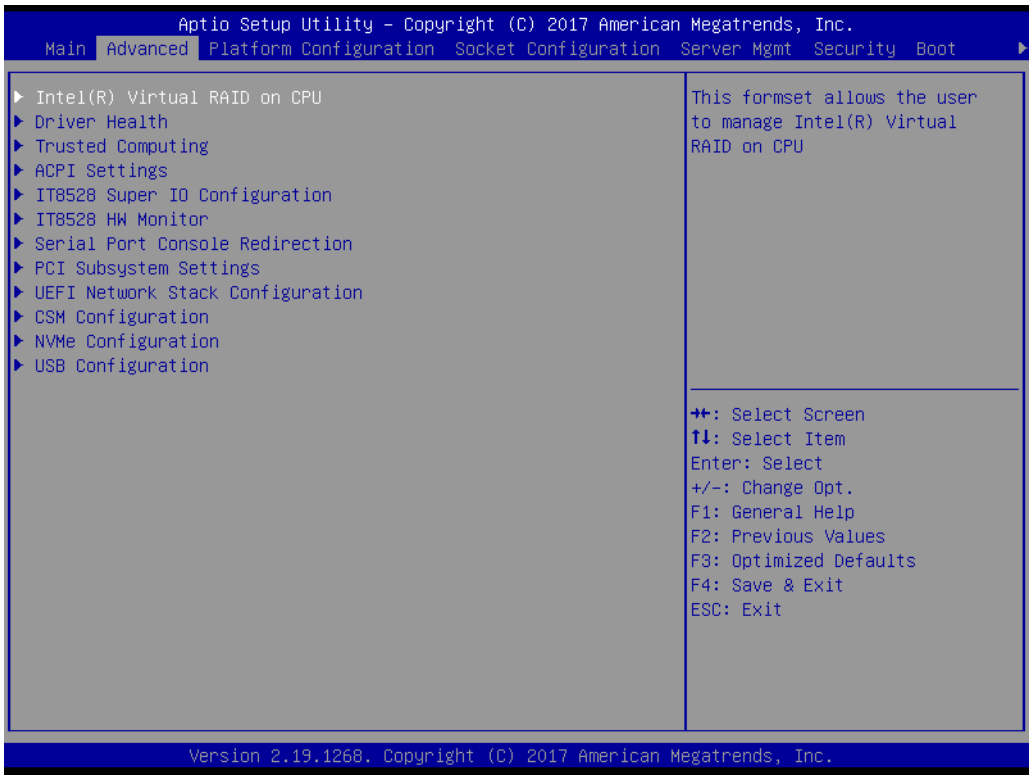
The Main BIOS setup screen has two main frames. The left frame displays all the options that can be configured. Grayed-out options cannot be configured; options in blue can be. The right frame displays the key legend. Above the key legend is an area reserved for a text message. When an option is selected in the left frame, it is highlighted in white. Often a text message will accompany it.

- **System Date / System Time**

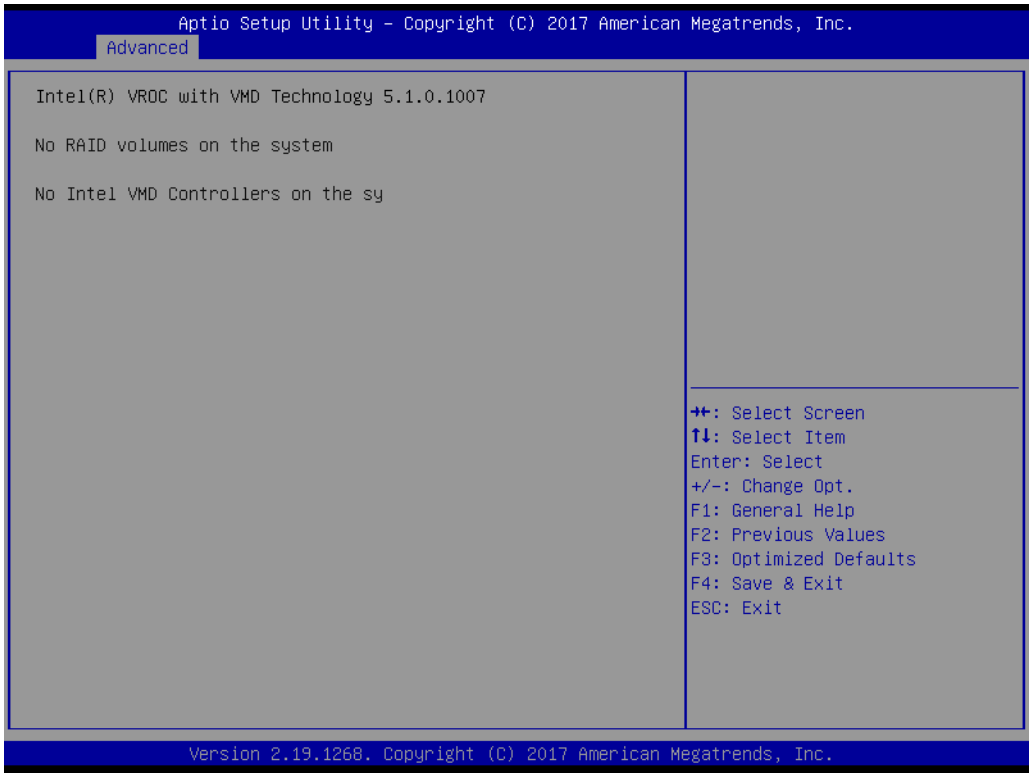
  Use this option to change the system time and date. Highlight System Time or System Date using the <Arrow> keys. Enter new values through the keyboard. Press the <Tab> key or the <Arrow> keys to move between fields. The date must be entered in MM/DD/YY format. The time must be entered in HH:MM:SS format.

3.2.2 Advanced BIOS Features Setup

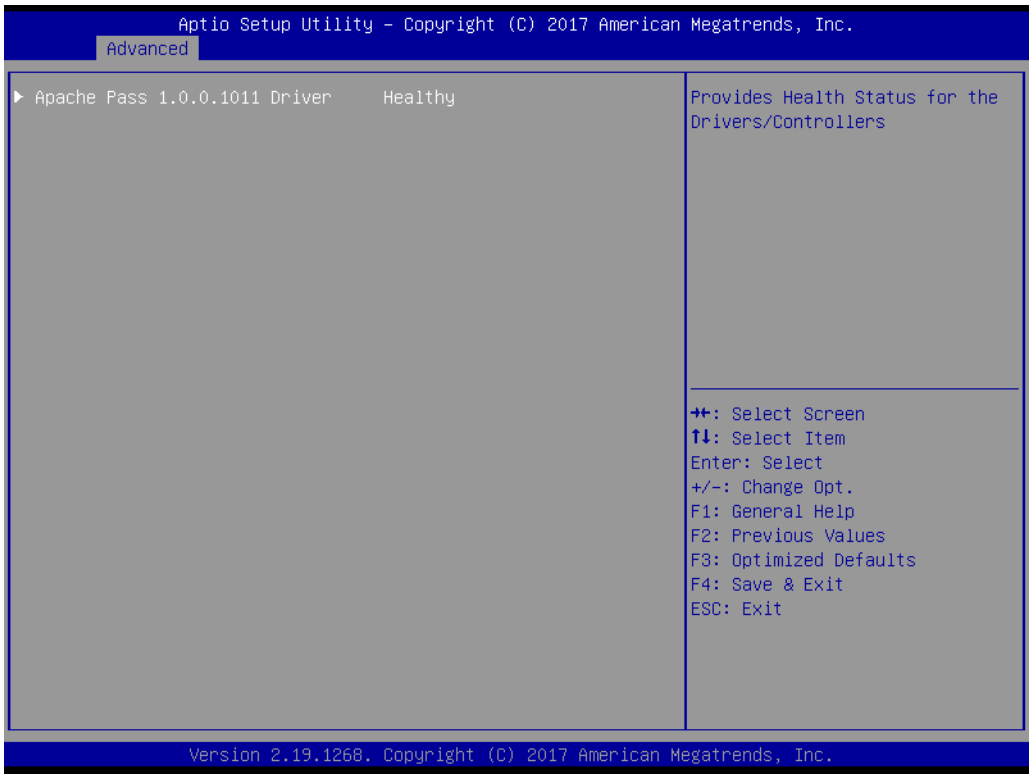
Select the Advanced tab from the ASMB-815 setup screen to enter the Advanced BIOS setup screen. You can select any of the items in the left frame of the screen, such as CPU configuration, to go to the sub menu for that item. You can display an Advanced BIOS Setup option by highlighting it using the <Arrow> keys. All Advanced BIOS Setup options are described in this section. The Advanced BIOS Setup screens are shown below. The sub menus are described on the following pages.



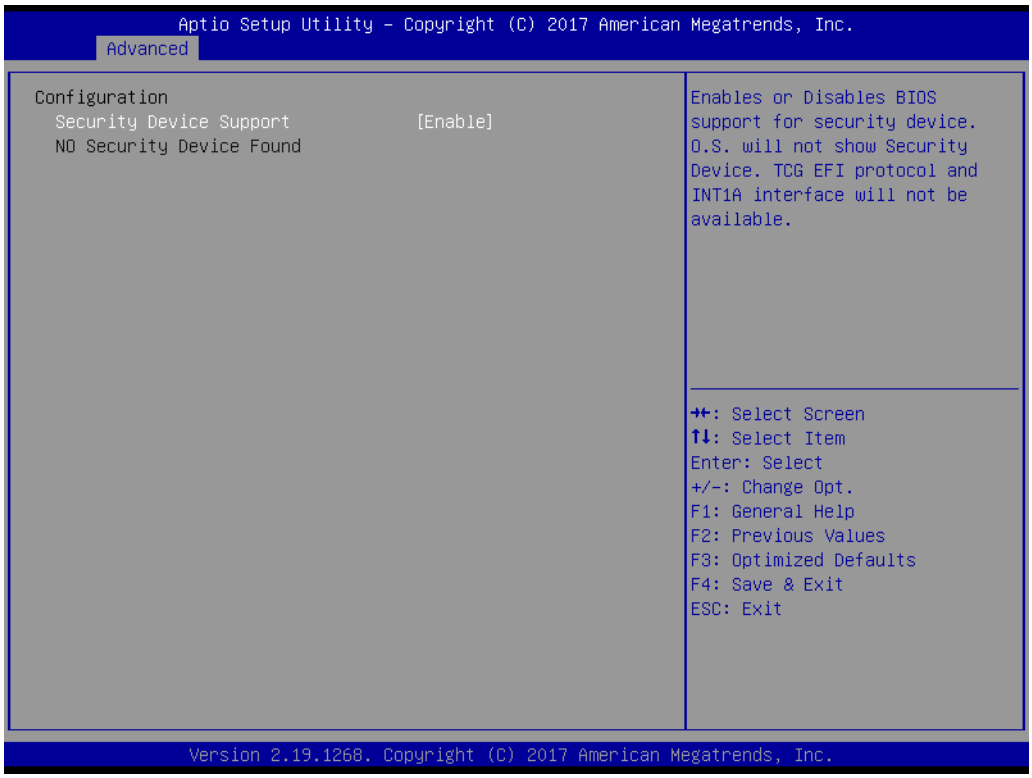
3.2.2.1 Intel Virtual RAID on CPU



3.2.2.2 Driver Health



3.2.2.3 Trusted Computing

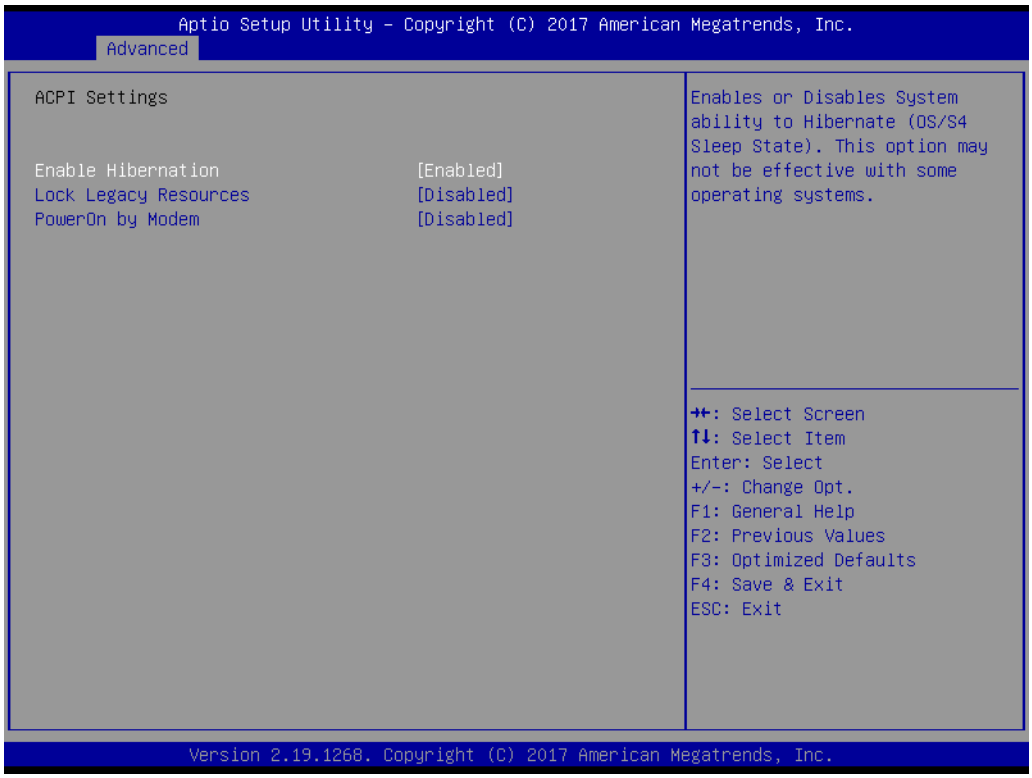


- **Security Device Support**

  Enables or disables BIOS support for security device.

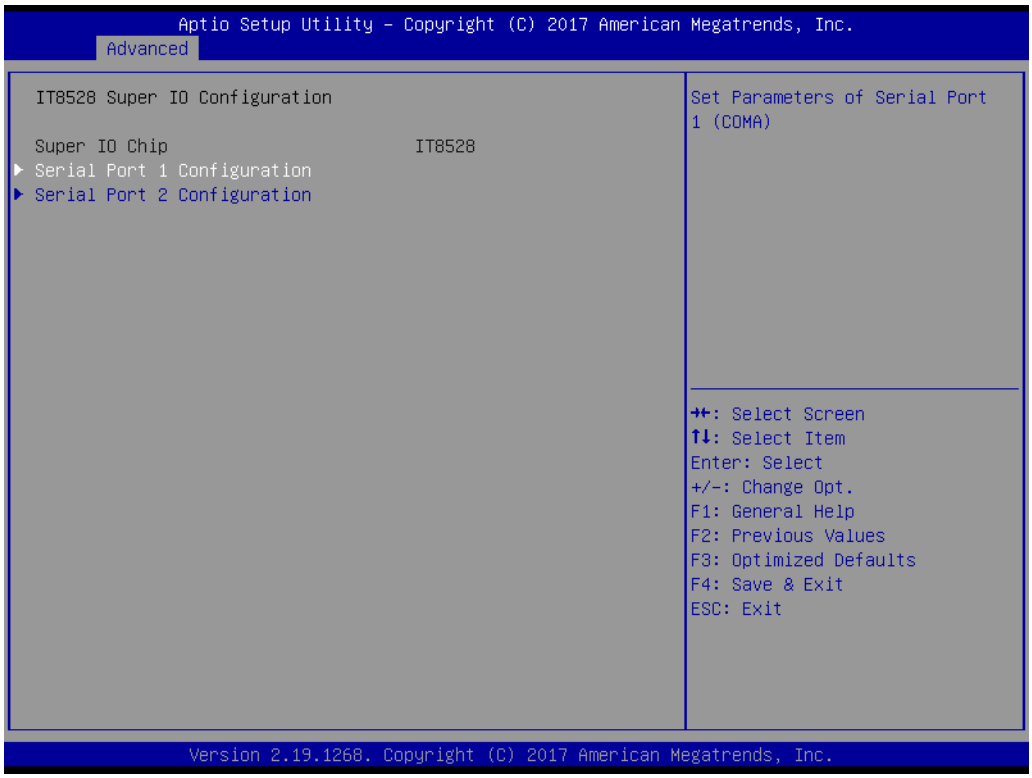
  Purchase Advantech LPC TPM module to use TPM function. P/N: PCA-TPM-00A1E_B1E.

3.2.2.4 ACPI Settings

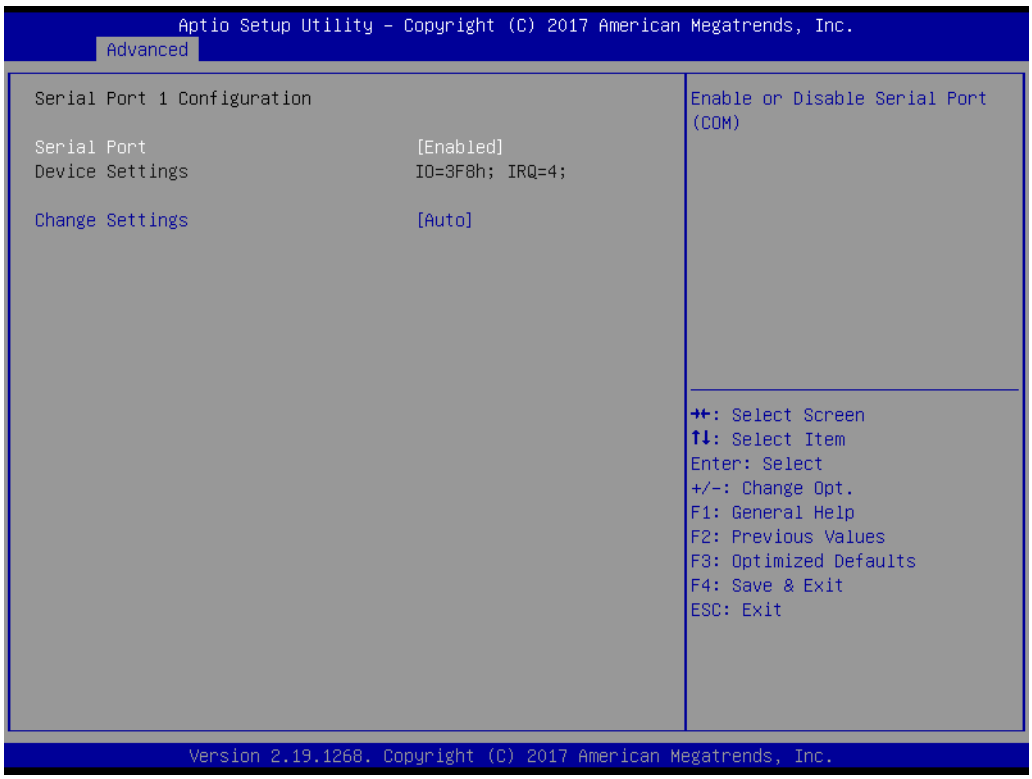


- **Enable Hibernation**
  To "Enable or disable" hibernation feature.
- **Lock Legacy Resources**
  To "Enable or disable" lock legacy resources feature.
- **PowerOn By Modem**
  To "Enable or disable" power on by modem feature.

3.2.2.5 IT8528 EC Super IO Configuration

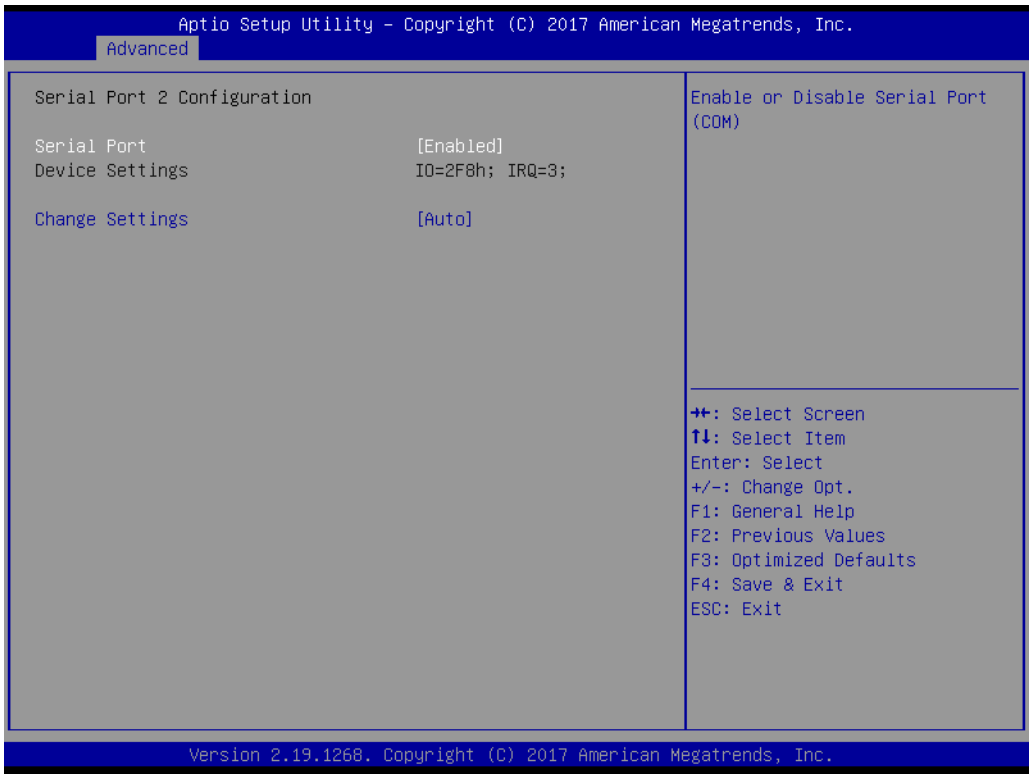


- **Serial Port 1 Configuration**



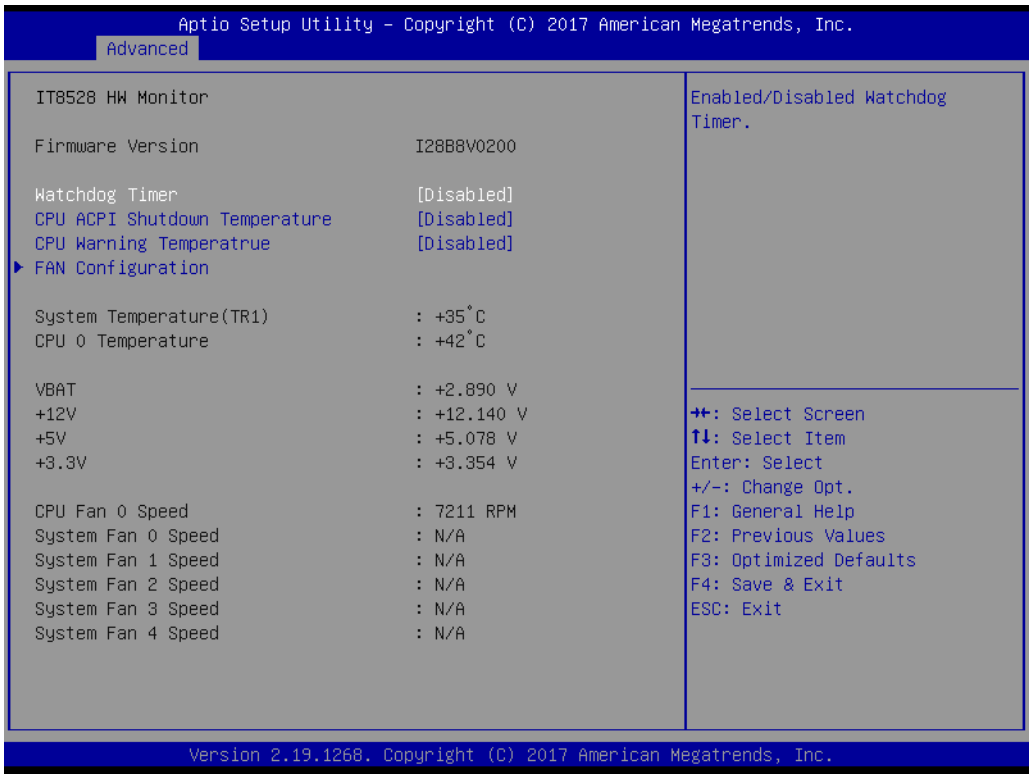
– **Serial Port**
  To "Enable or disable" serial port 1.
– **Change Settings**
  To select an optimal setting for serial port 1.

Serial Port 2 Configuration



- **Serial Port**
  To "Enable or disable" serial Port 2.
- **Change Settings**
  To select an optimal setting for serial port 2.

3.2.2.6 IT8528 HW Monitor



- **Watchdog Timer**

  To "Enable or disable" the watchdog timer function.

- **CPU ACPI Shutdown Temperature**

  "Enable" or "Disable" the ACPI shutdown temperature threshold. When the system reaches the shutdown temperature, it will be automatically shut down by ACPI OS to protect the system from overheat damage.

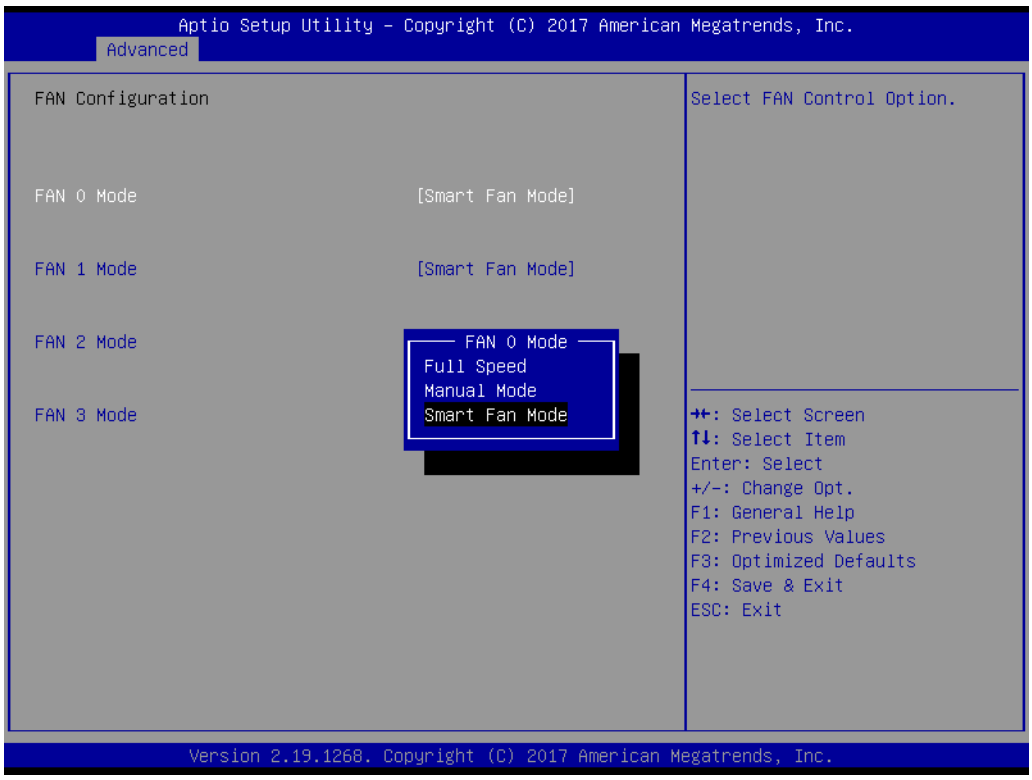
- **CPU Warning Temperature**

  "Enable" or "Disable" the CPU warning temperature threshold. When the system reaches the warning temperature, the speaker will beep.

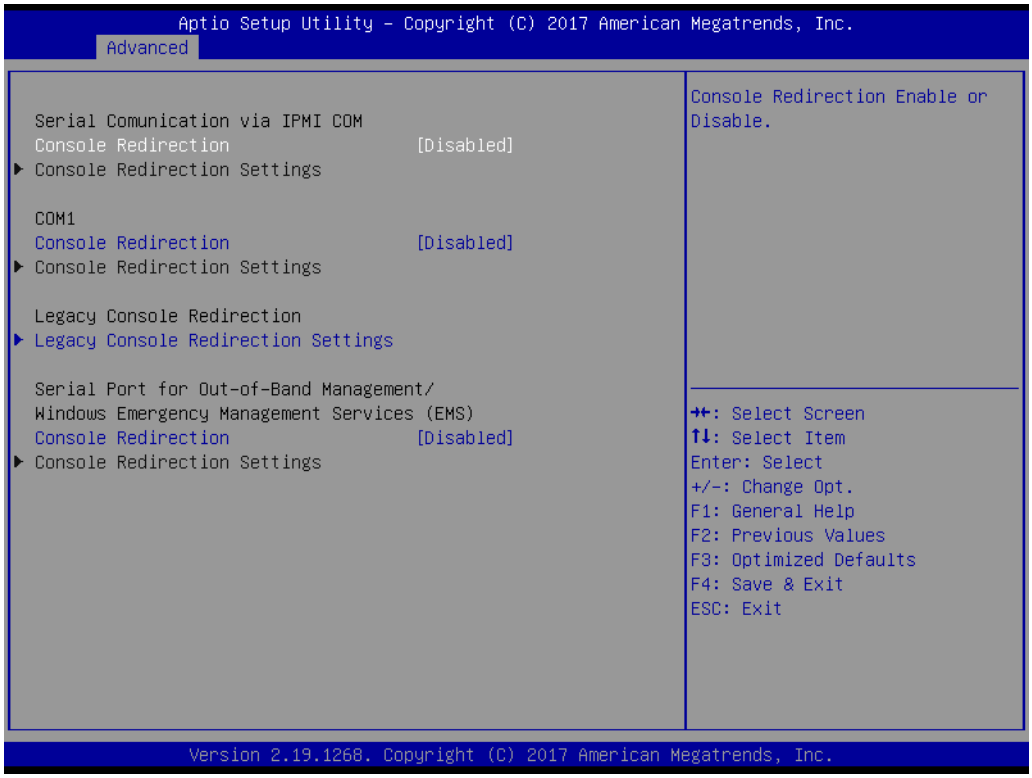
- **Fan Configuration**

  The default of CPU/System FAN is Smart FAN mode and the BIOS will automatically control the FAN speed by CPU temperature.

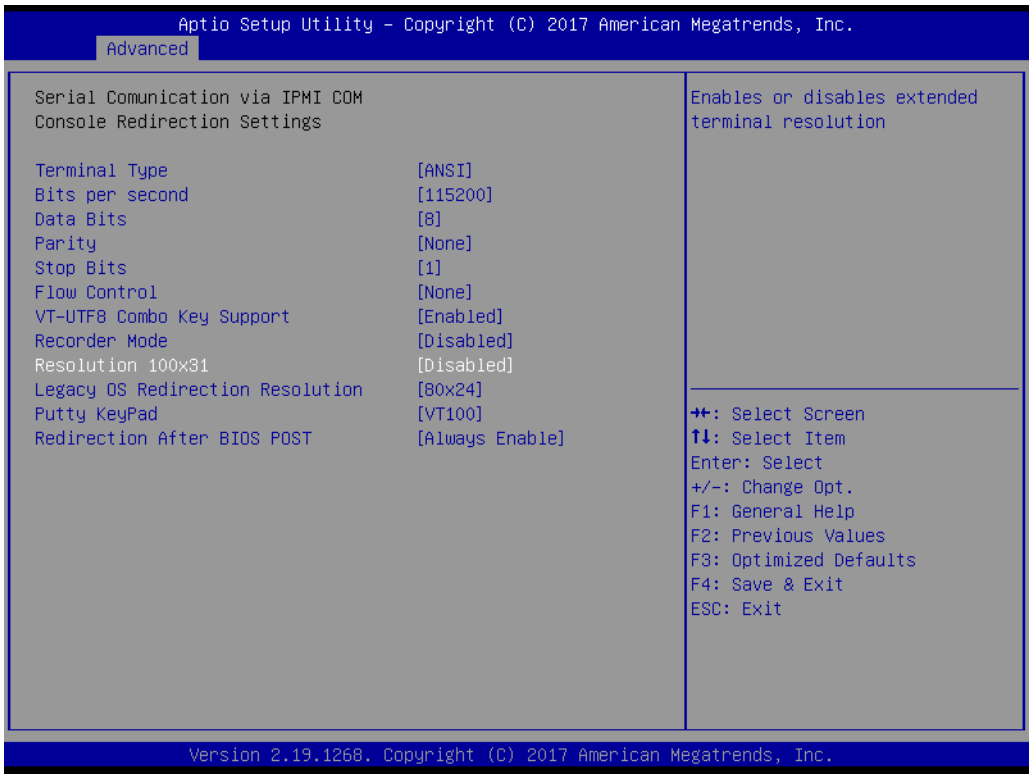
  When set to manual mode, fan duty setting can be changed; the range is from 30%~100%, default setting is 50%.

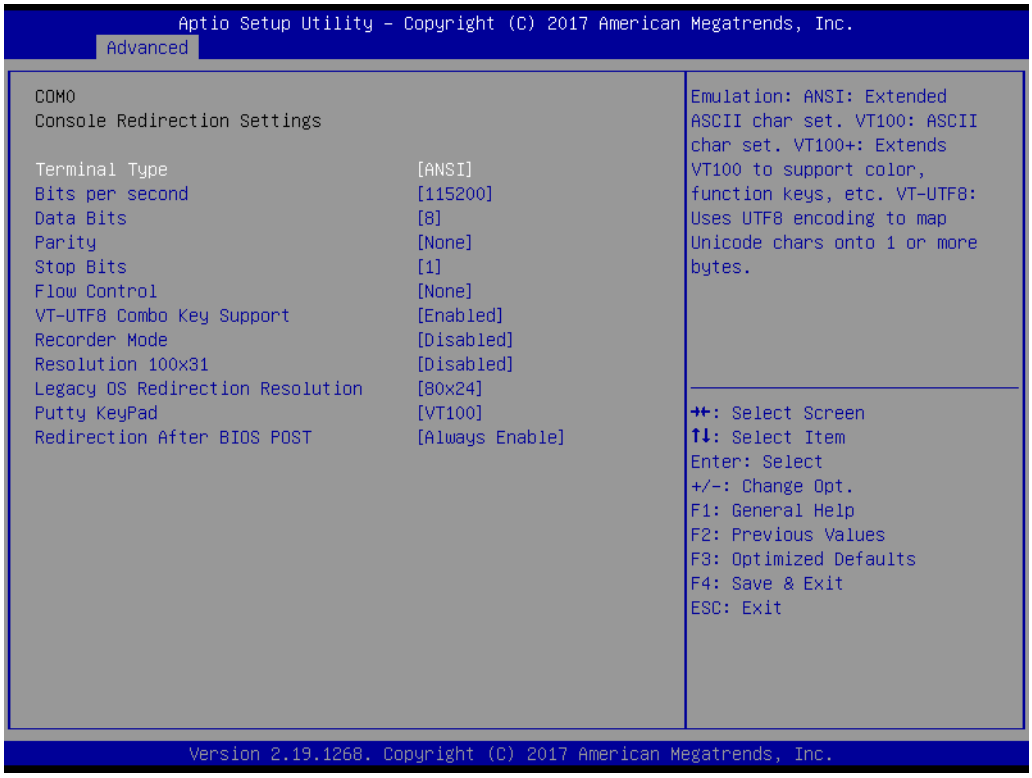


3.2.2.7 Serial Port Console Redirection



COM1 Console Redirection Settings





– **Terminal Type**
  Select a terminal type to be used for console redirection.
  Options available: VT100/VT100+/ANSI /VT-UTF8.
– **Bits Per Second**
  Select the baud rate for console redirection.

Options available: 9600/19200/57600/115200.

- **Data Bits**
- **Parity**

  A parity bit can be sent with the data bits to detect some transmission errors.

  Even: parity bit is 0 if the number of 1's in the data bits is even.

  Odd: parity bit is 0 if number of 1's the data bits is odd.

  Mark: parity bit is always 1. Space: Parity bit is always 0.

  Mark and Space Parity do not allow for error detection.

  Options available: 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.

  Options available: 1/2.

- **Flow Control**

  Flow control can prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a 'stop' signal can be sent to stop the data flow. Once the buffers are empty, a 'start' signal can be sent to re-start the flow. Hardware flow control uses two wires to send start/stop signals.

  Options available: None/Hardware RTS/CTS.

- **VT-UTF8 Combo Key Support**

  Enable VT-UTF8 combination key support for ANSI/VT100 terminals

- **Recorder Mode**

  When this mode enabled, only text will be send. This is to capture Terminal data.

  Options available: Enabled/Disabled.

- **Resolution 100x31**

  Enables or disables extended terminal resolution.

- **Legacy OS Redirection Resolution**

  On Legacy OS, the number of rows and columns support redirection.

  Options available: 80x24/80X25.

- **Putty Keypad**

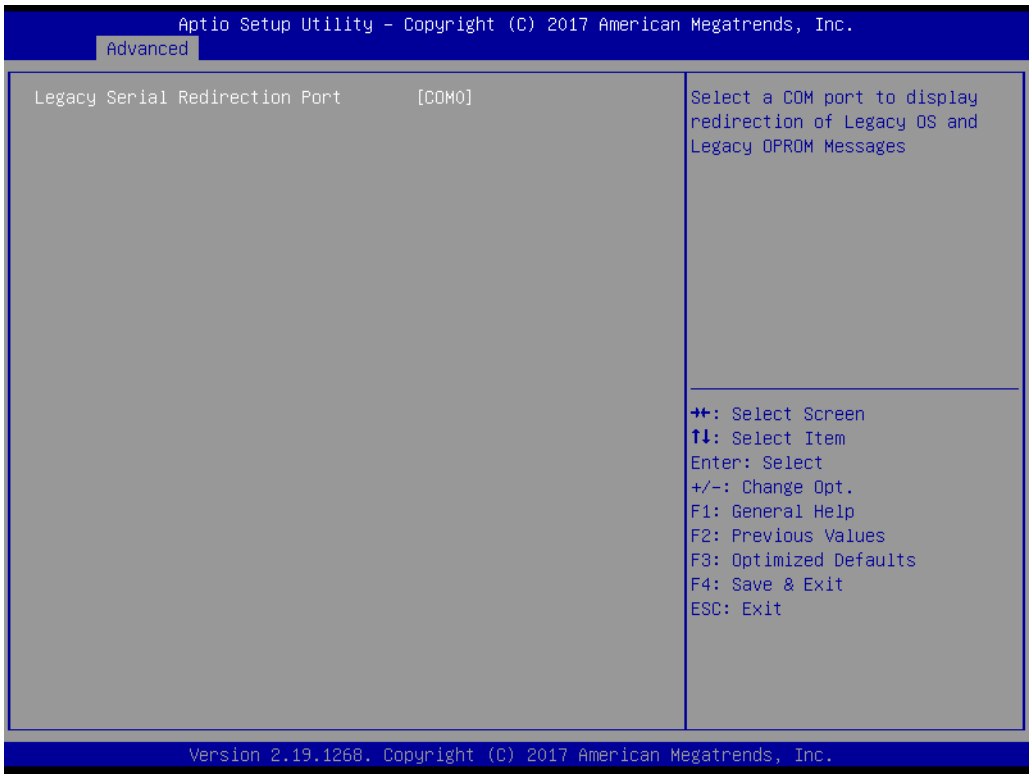
  Select function key and keypad on putty.

- **Redirection After BIOS Post**

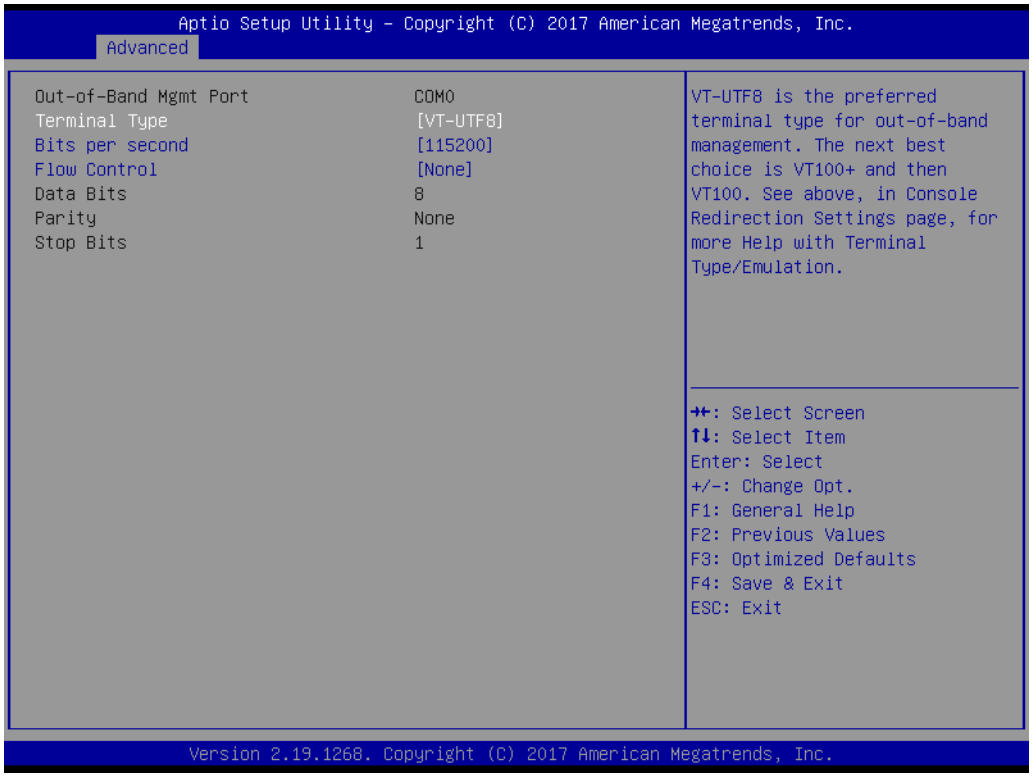
  When Bootloader is selected, then Legacy Console Redirection is disabled before booting to legacy OS. When Always Enable is selected, then Legacy Console Redirection is enabled for legacy OS. Default setting for this option is set to Always Enable.

Legacy Console Redirection Settings

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



Console Redirection Settings

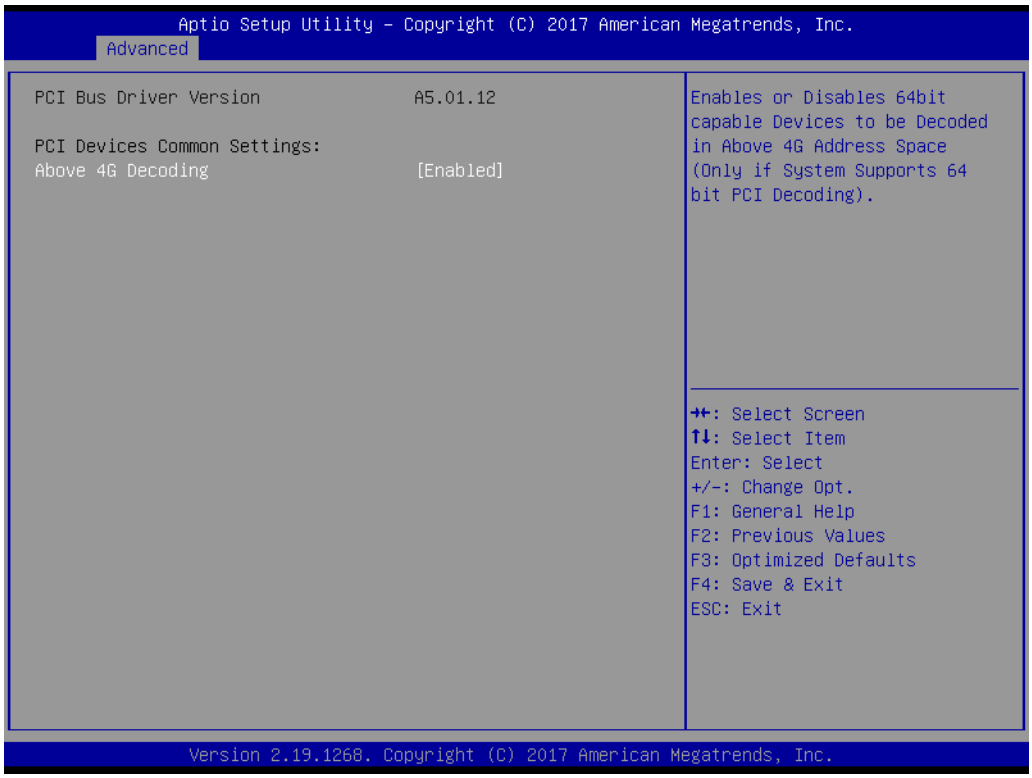


– Out-of-Band Mgmt Port

To select the com port user would like to set for having console redirection feature.

- **Terminal Type**
  Set as "VT100", "VT100+", "VT-UTF8", or "ANSI". "VT-UTF8" is the default setting.
- **Bits Per Second**
  To select serial port transmission. Speed must be matched on the other side. It can be set as "9600", "19200", "57600", or "115200". "115200" is the default setting.
- **Flow Control**
  Flow control can prevent data loss from buffer overflow. It can be set as "None",
  "Hardware RTS/CTS", or "Software Xon/Xoff". "None" is the default setting.
- **Data Bits**
- **Parity**
- **Stop Bits**

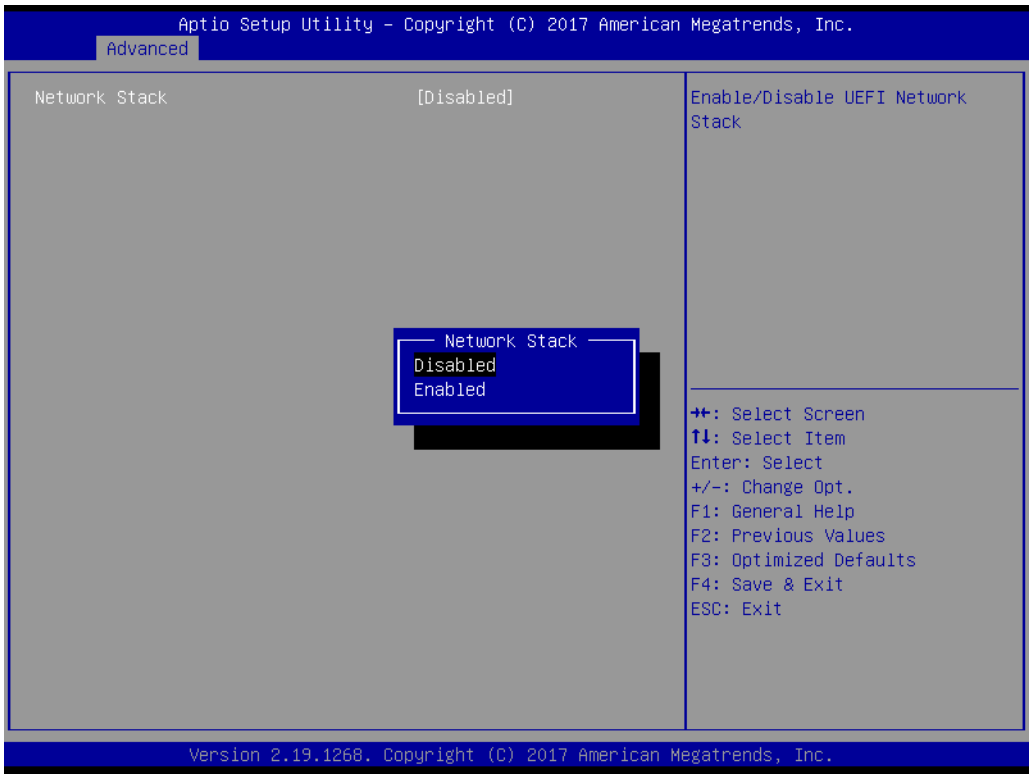
3.2.2.8 PCI Subsystem Settings



- **Above 4G Decoding**
  "Enable or disable" 64-bit capability. Devices to be decoded in above 4G address space (only if the system supports 64-bit PCI decoding).

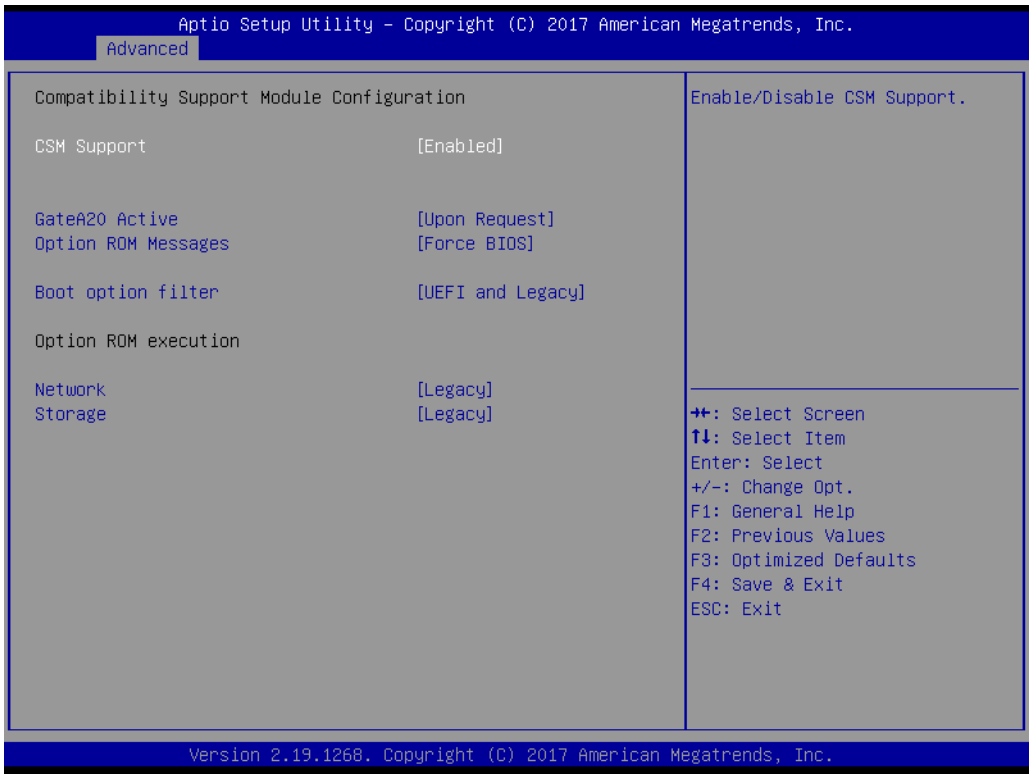
Note! *Some graphic or GPU cards need to enable 4G Decoding.*

3.2.2.9 UEFI Network Stack Configuration

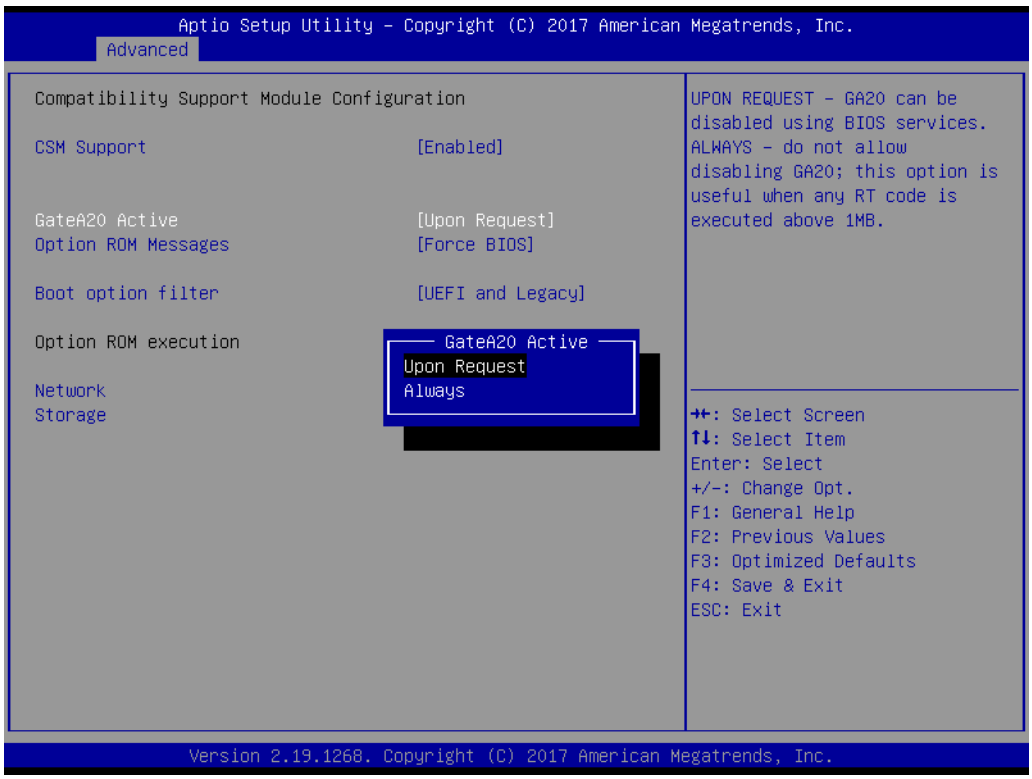


To "Enable or disable" UEFI network stack function.

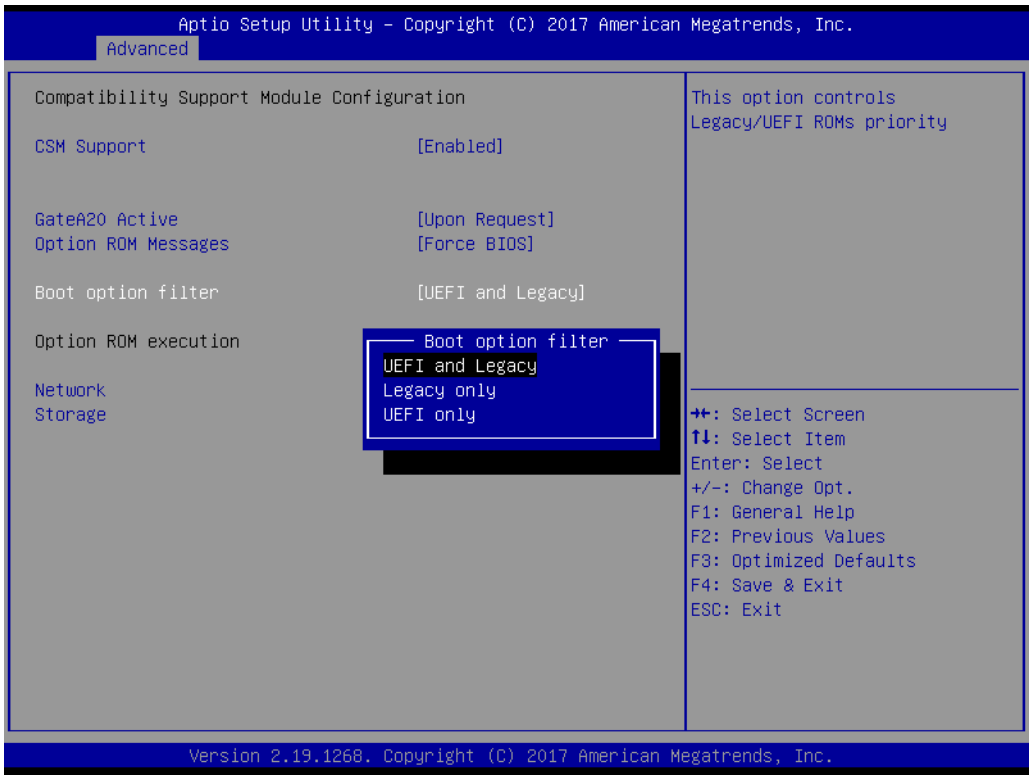
3.2.2.10 CSM Configuration



- **CSM Support**
  To "Enables or disables" UEFI CSM (Compatibility Support Module) to support a legacy PC boot process.
- **GateA20 Active**
  This item is useful when RT code is executed above 1MB. When it's set as "Upon Request", GA20 can be disabled using BIOS services. When it's set as "Always", it does not allow disabling of GA20.

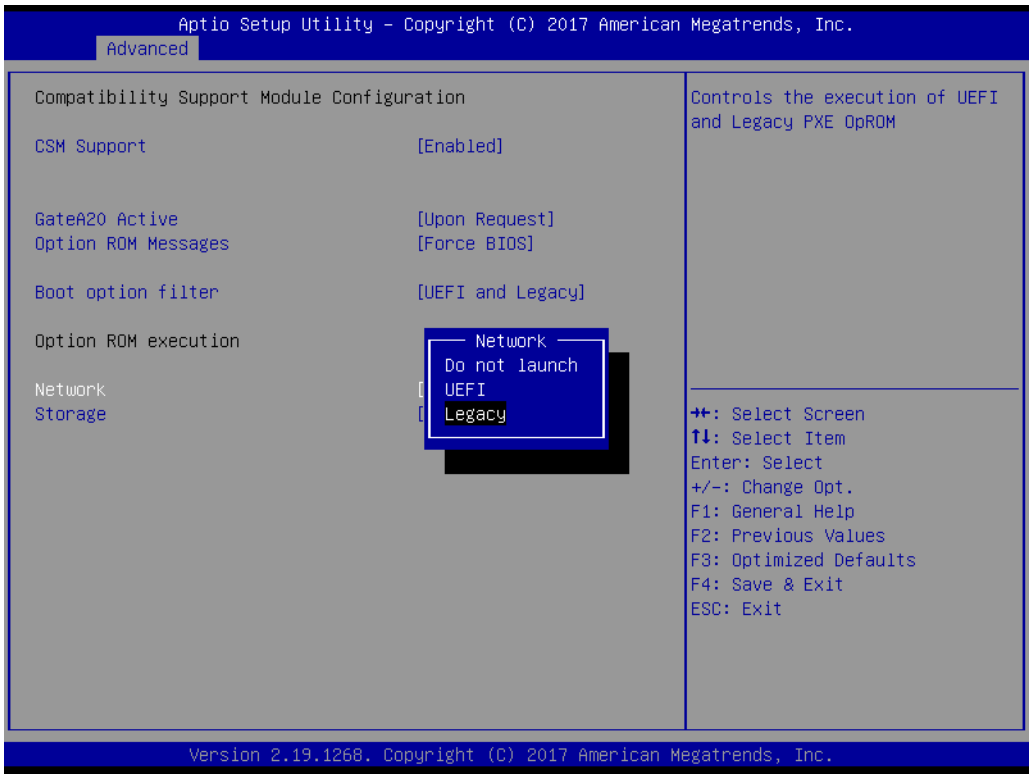


- **Option ROM Messages**
  To "Force BIOS or keep current" to set the display mode for Option ROM.
- **Boot option filter**
  Change UEFI/legacy ROM priority for boot option.



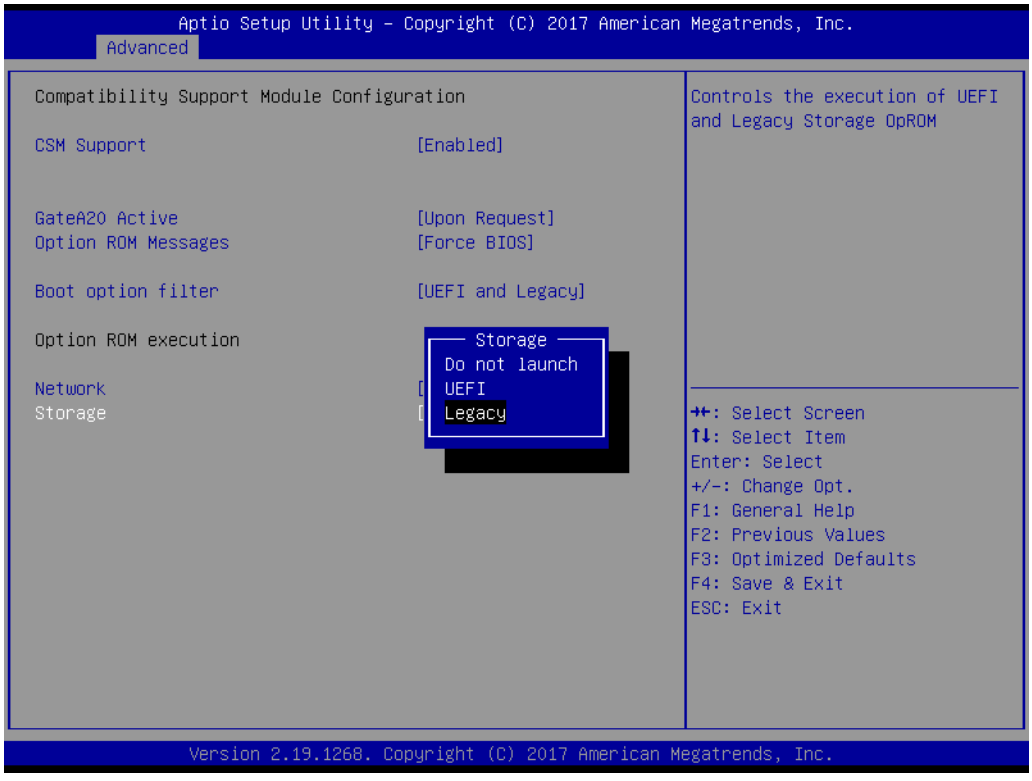
- **Network**

  Control the execution of UEFI and legacy PXE OpROM.



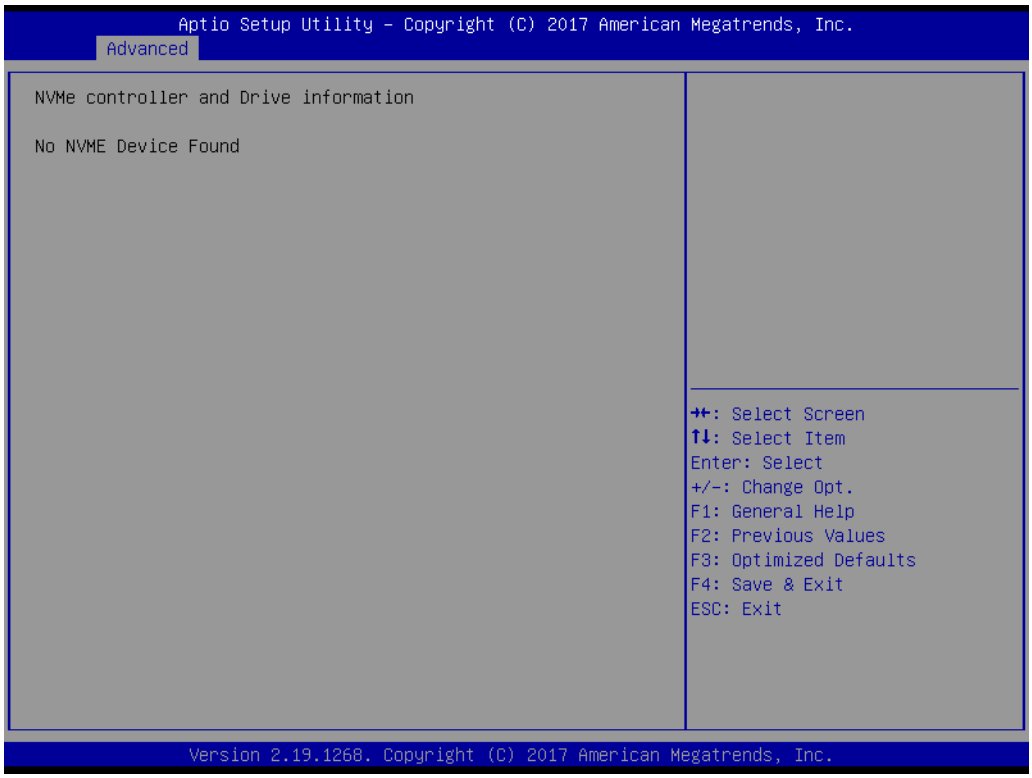
- **Storage**

  Control the execution of UEFI and legacy storage OpROM.



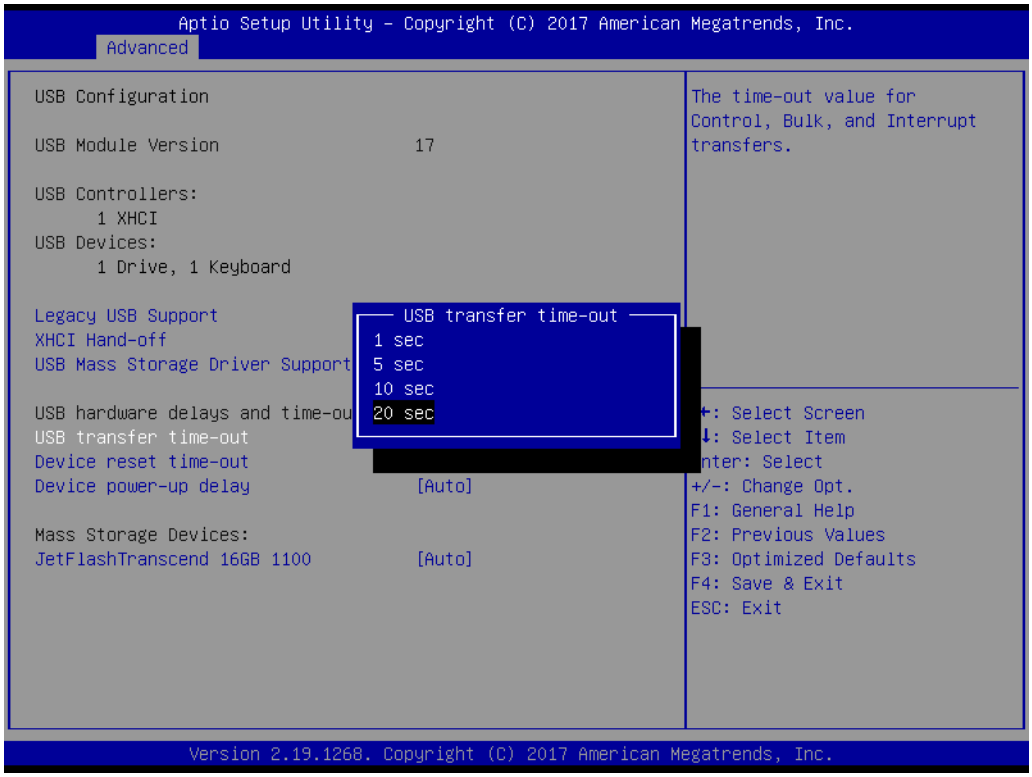
3.2.2.11 NVMe Configuration

Set NVMe device options.



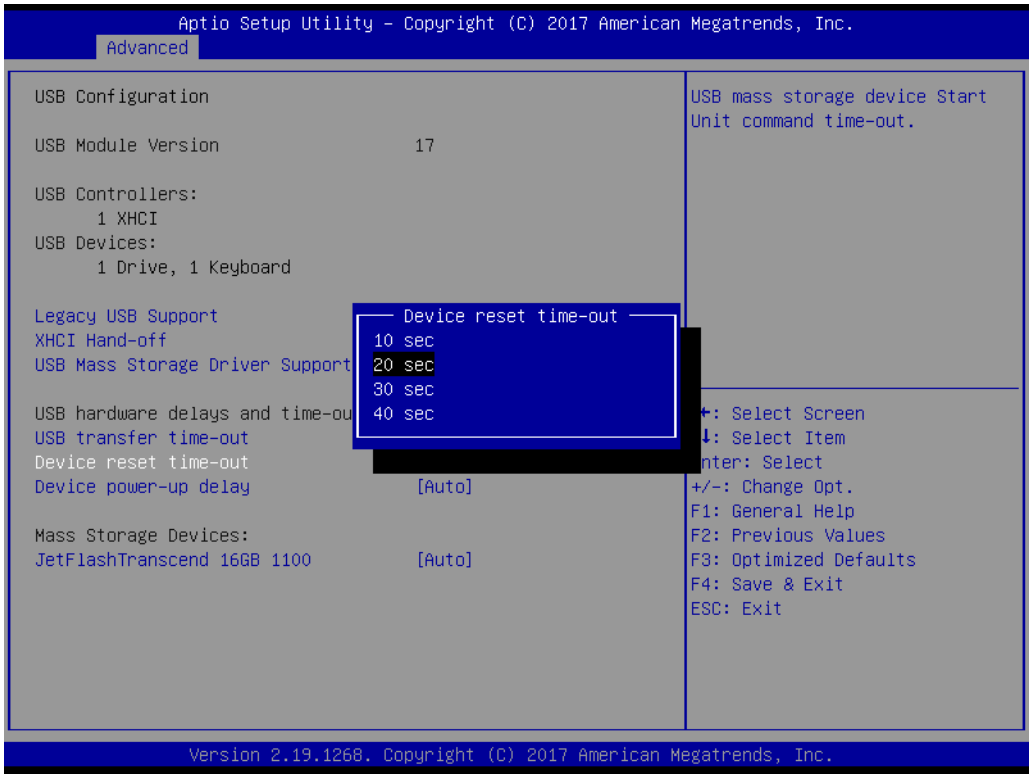
3.2.2.12 USB Configuration

- **Legacy USB Support**
  This is for supporting USB device under a legacy OS such as DOS. When choosing "Auto", the system will automatically detect if any USB device is plugged into the computer and enable USB legacy mode when a USB device is plugged, or disable USB legacy mode when no USB device is attached.
- **XHCI Hand-off**
  This is a workaround for OS without XHCI hand-off support.
  The XHCI ownership change should be claimed by XHCI driver.
- **USB Mass Storage Driver Support**
  To "Disable or enable" USB mass storage driver support.
- **USB Transfer Time-out**
  Selects the USB transfer time-out value. [1,5,10,20sec]



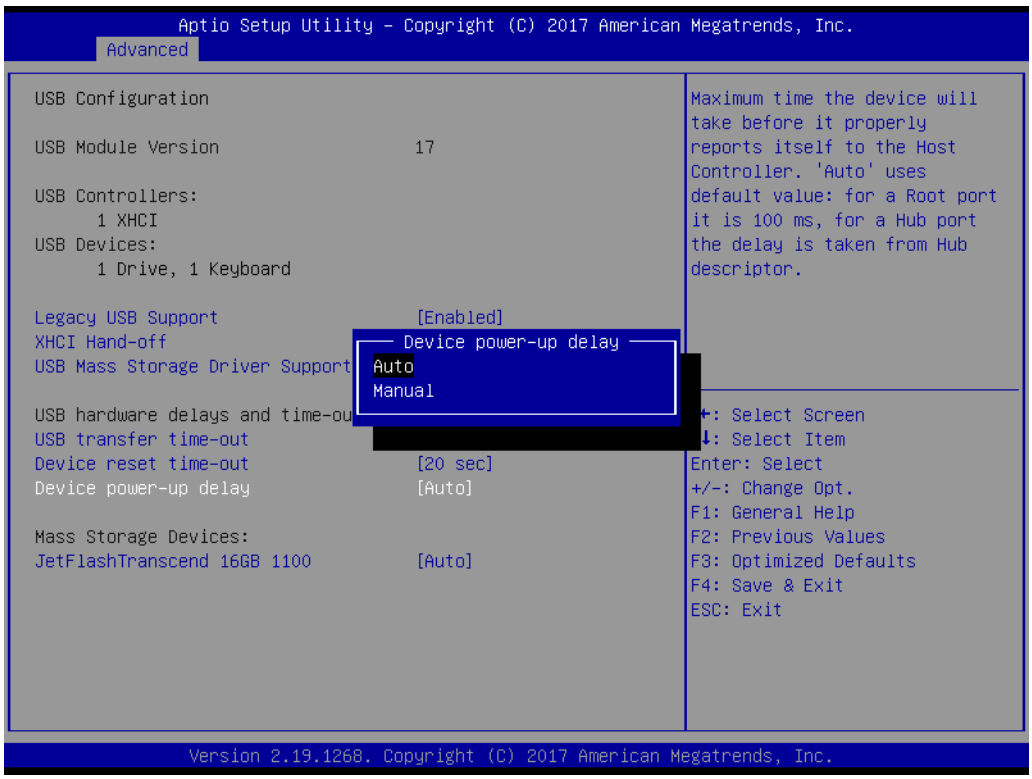
- **Device Reset Time-out**

  Selects the USB device reset time-out value. [10,20,30,40 sec]

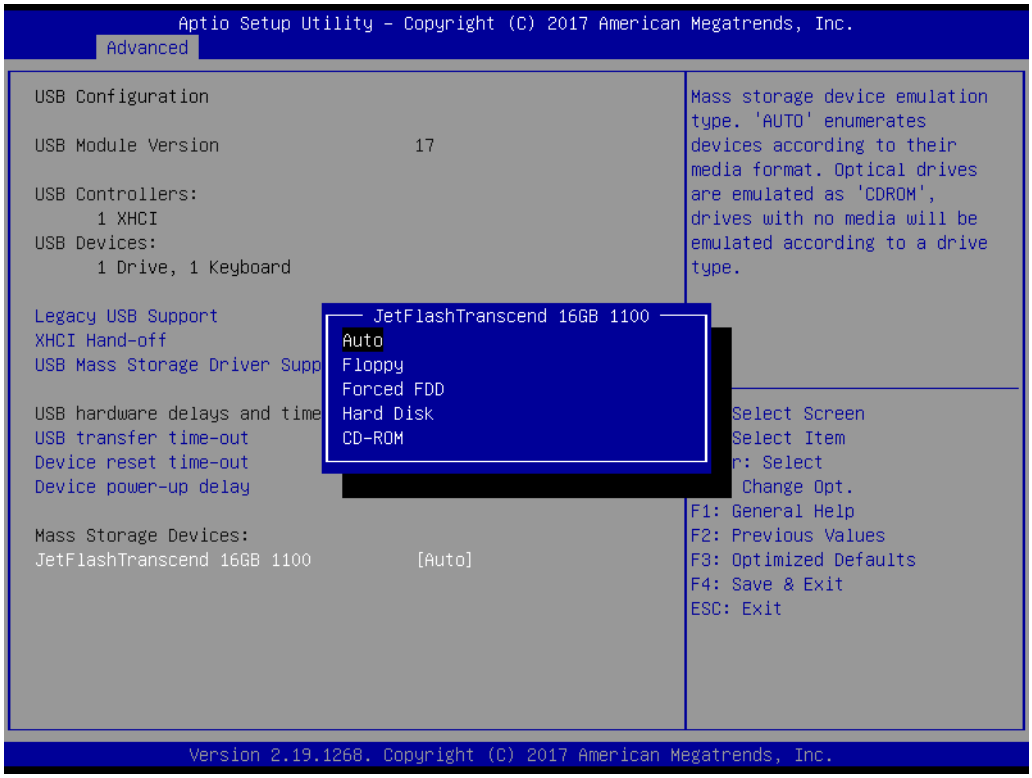


- **Device Power-up Delay**

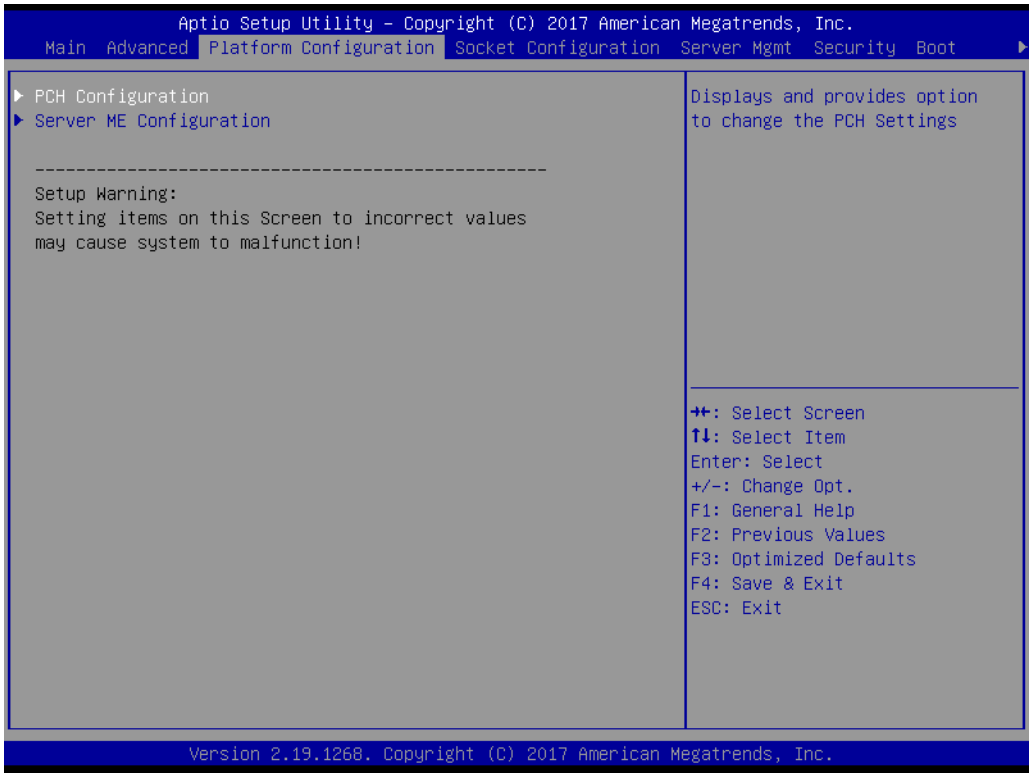
  This item appears only when Device power-up delay item is set to [manual].



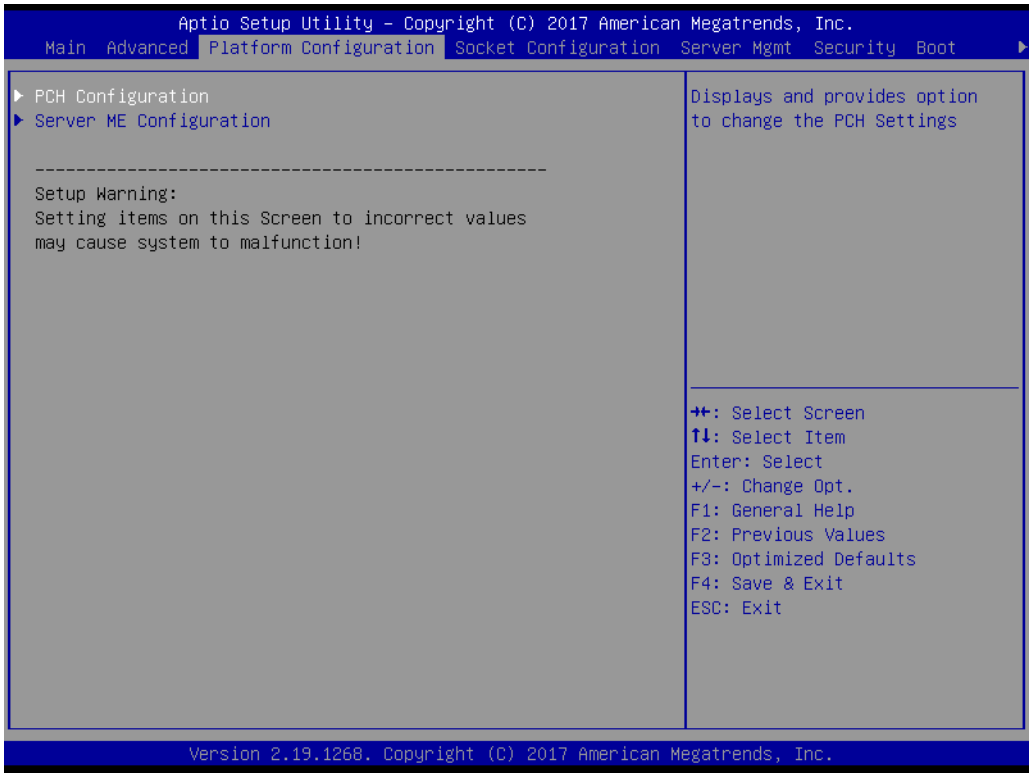
- **Mass Storage Devices**
  Default is "Auto" to enumerate mass storage devices according to media format.

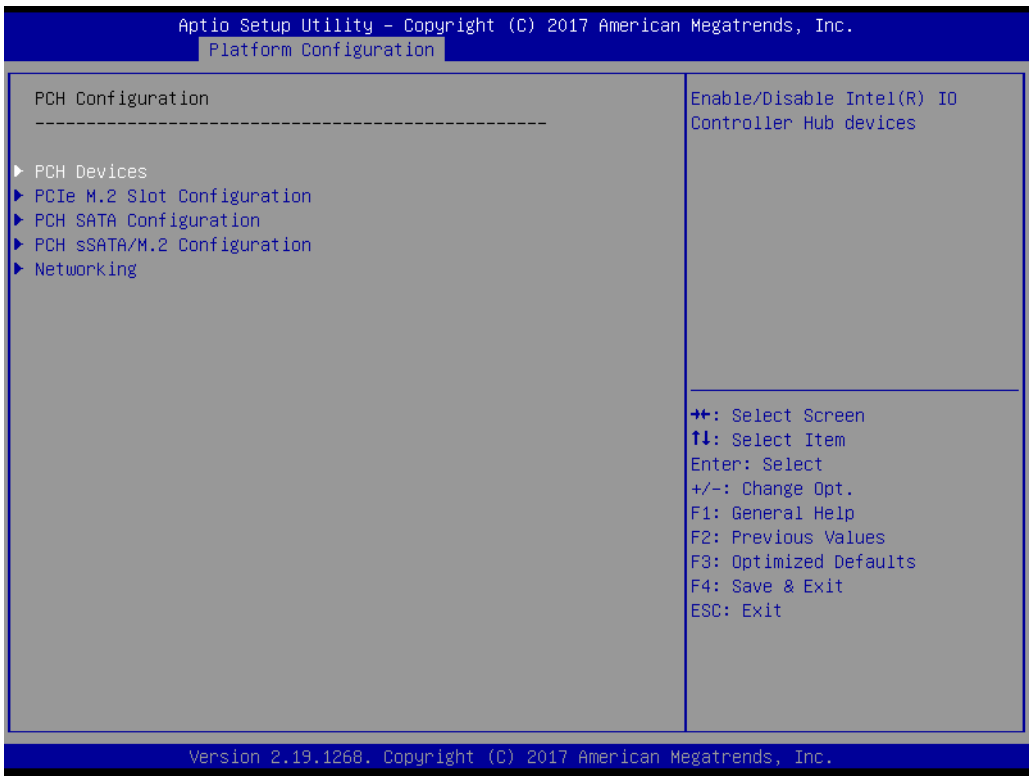


3.2.3 Platform Configuration



3.2.3.1 PCH Configuration



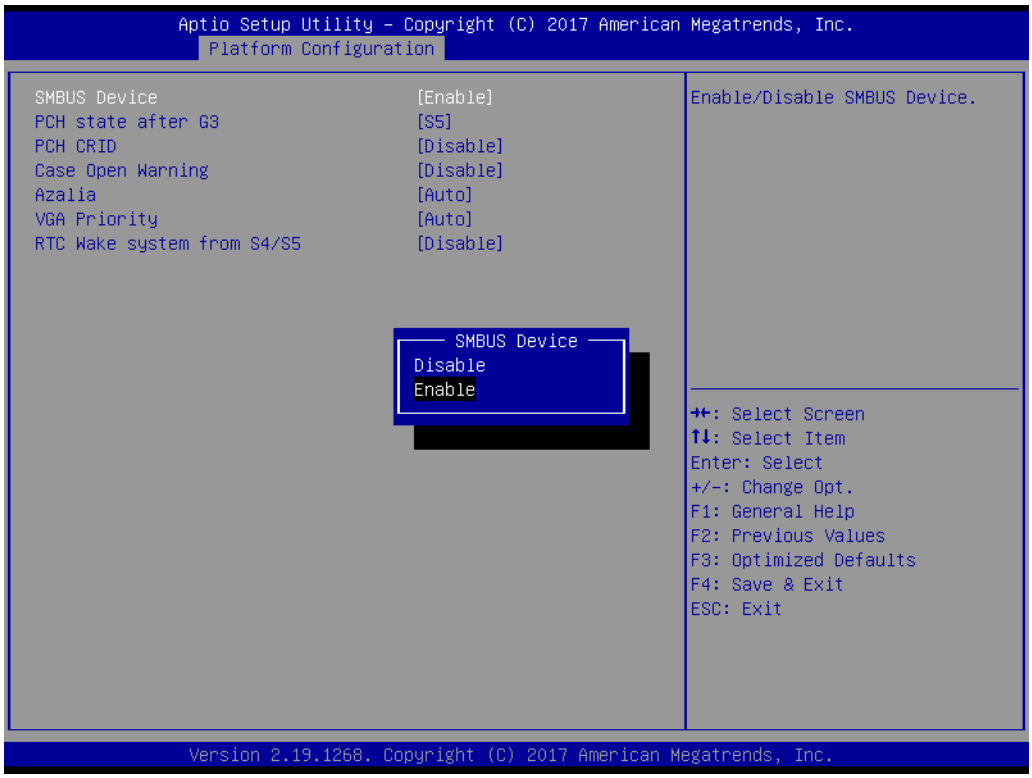


- **PCH Devices**

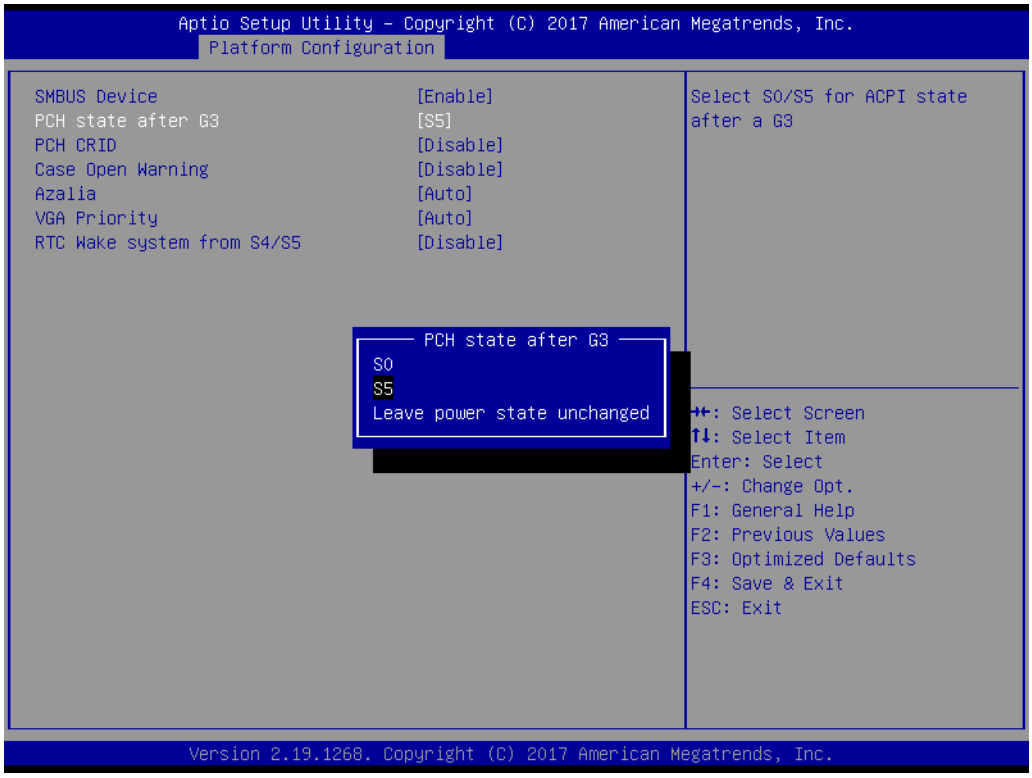
  This item is to set up IO Controller Hub devices.

  – **SMBus Controller**

  To "Enable or disable" SMBus controller.

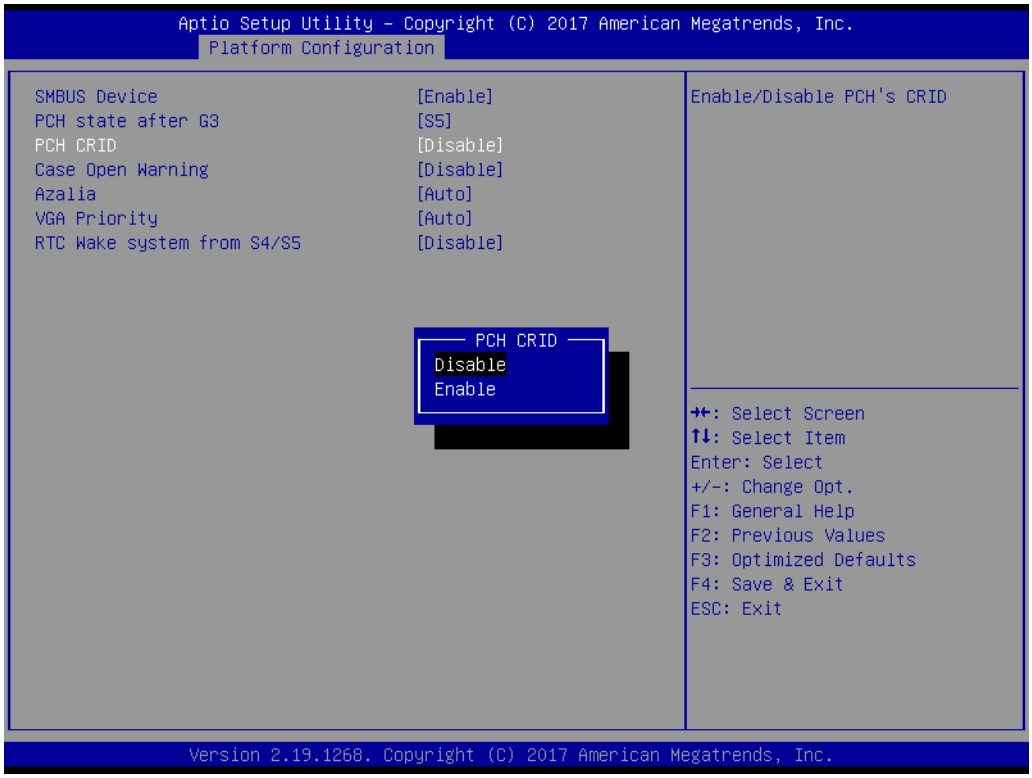


– **PCH state after G3**
Select S0/S5 for ACPI state after G3.



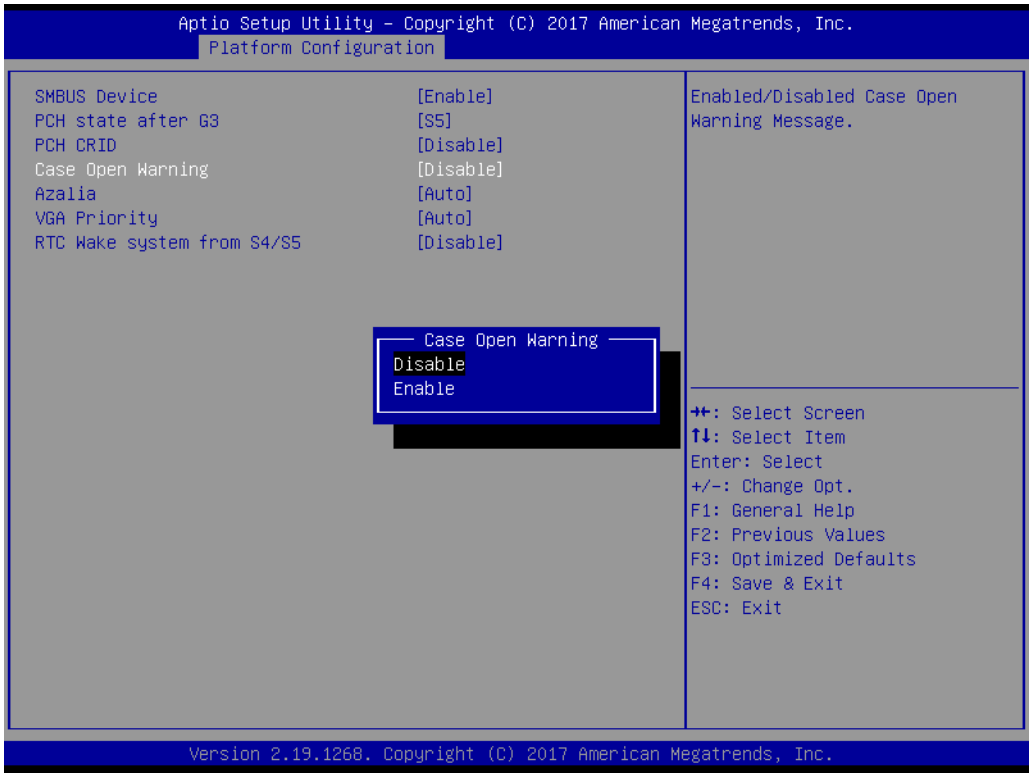
– **PCH CRID**

To "Enable or disable" PCH compatibility revision ID (CRID) functionality.

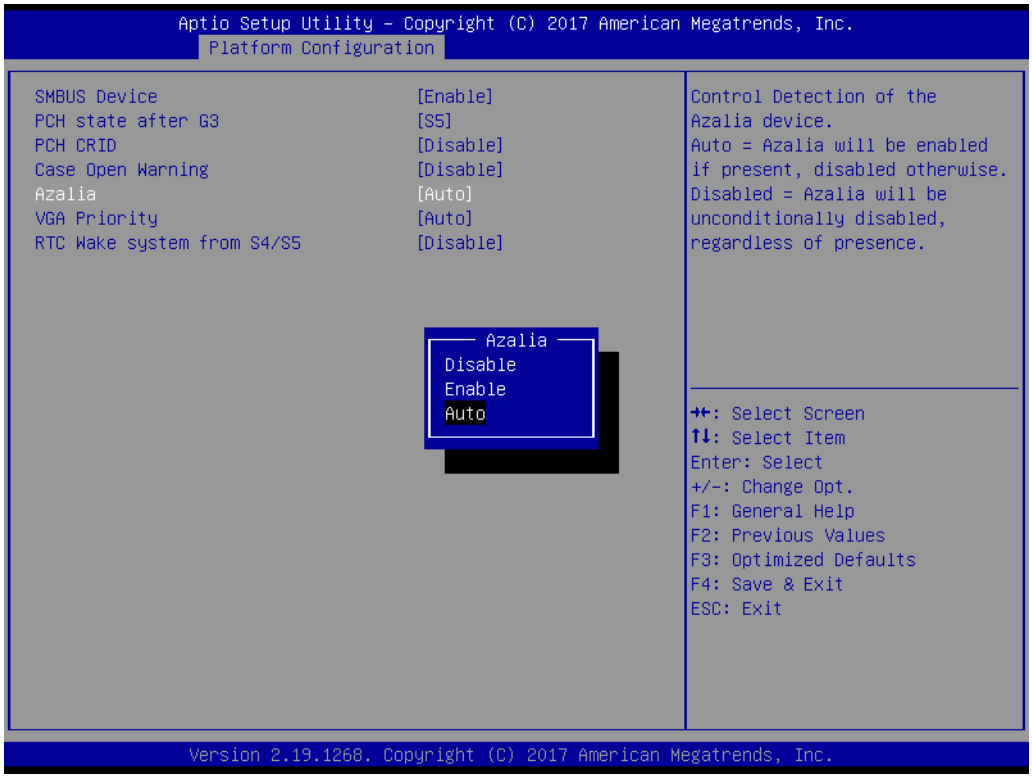


– **Case Open Warning**

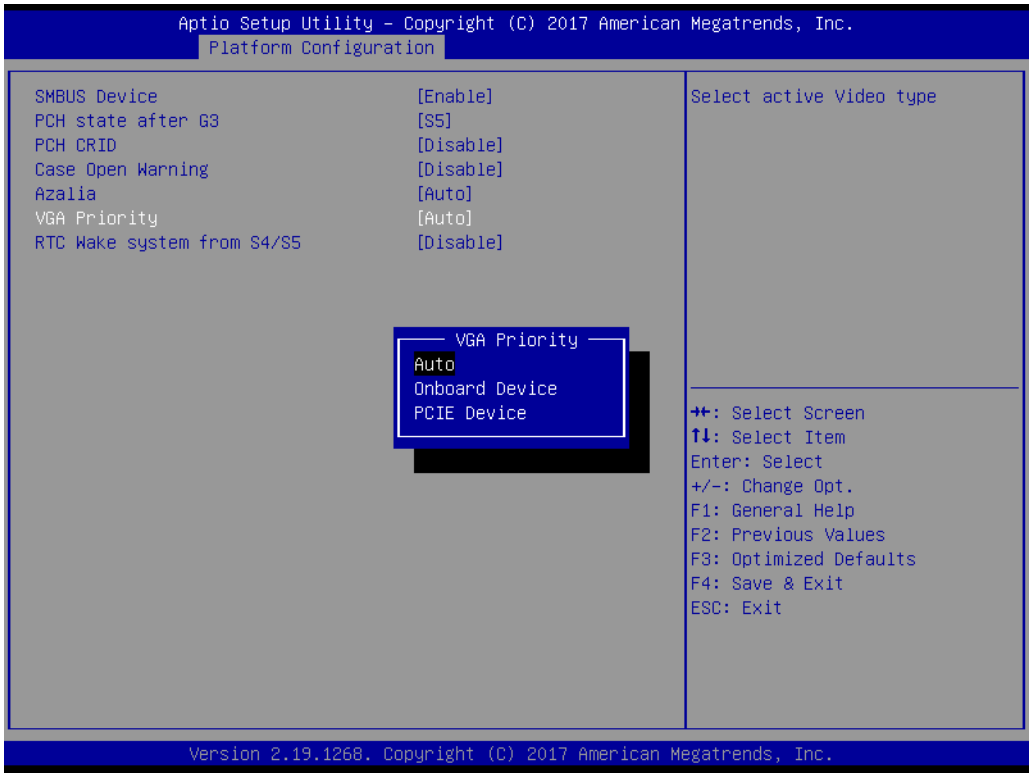
To "Enable or disable" the chassis intrusion monitoring function. When enabled and the case is opened, the warning message will show in the POST screen.



– **Azalia**
To "Enable or disable" Azalia device.

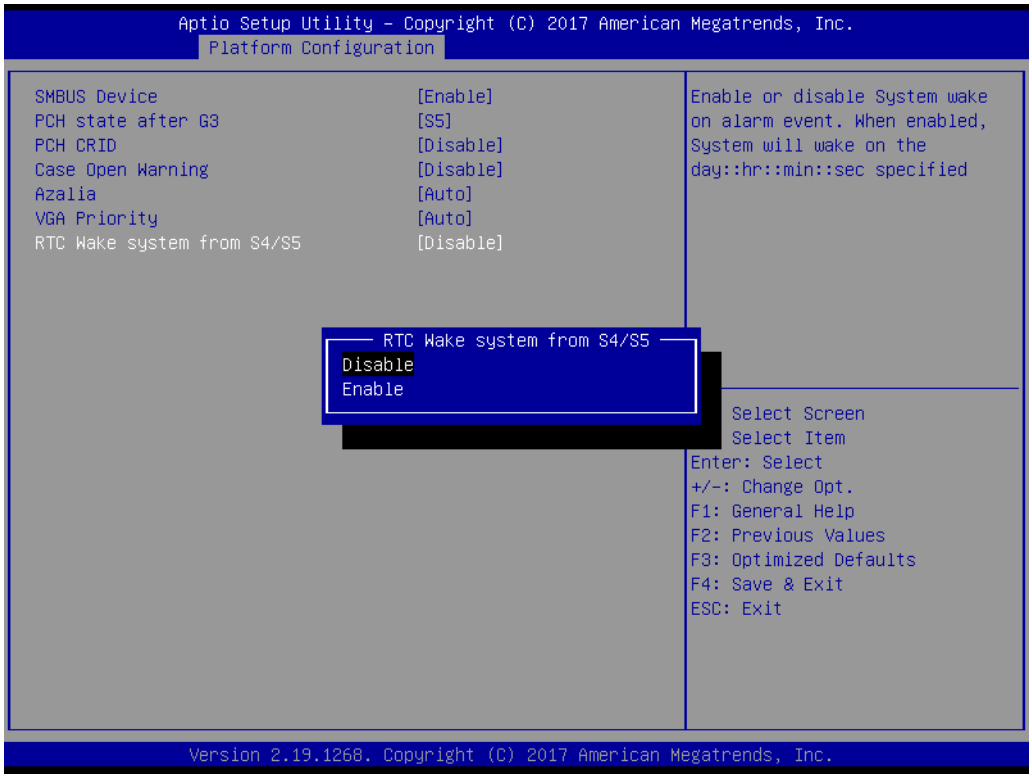


– **VGA Priority**
Determines priority between onboard and 1st off-board video device found.



– **RTC Wake system from S4/S5**

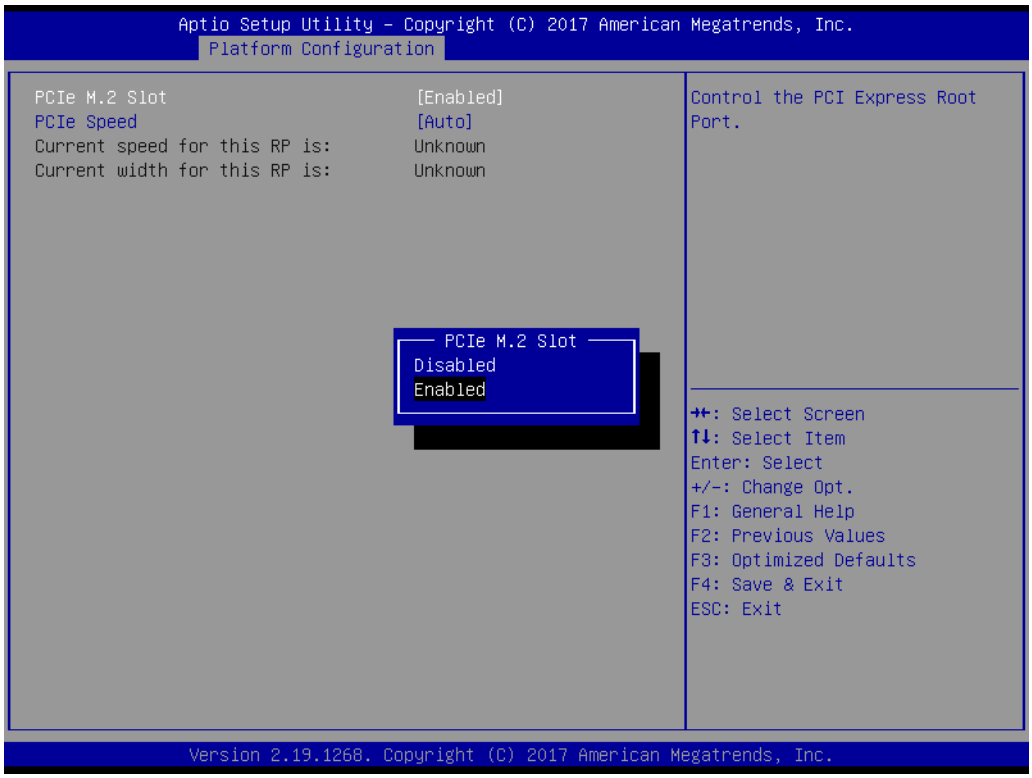
To "Enable or disable" system wake on alarm event.



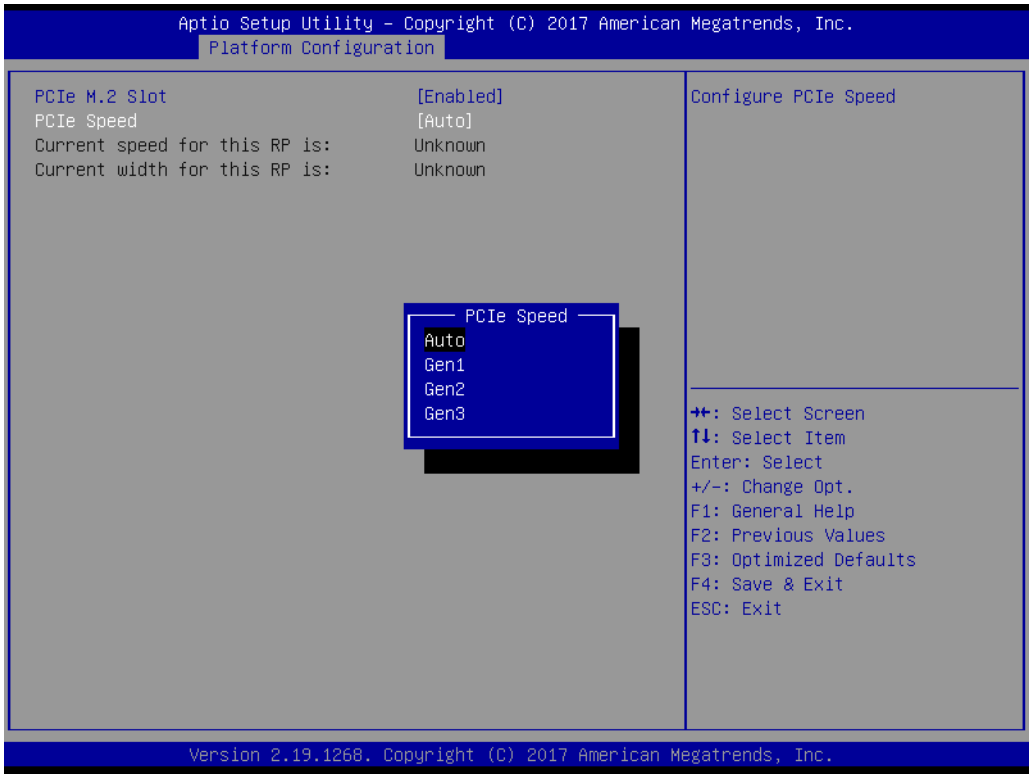
■ PCIe M.2 Slot Configuration

– **PCIe M.2 Slot**

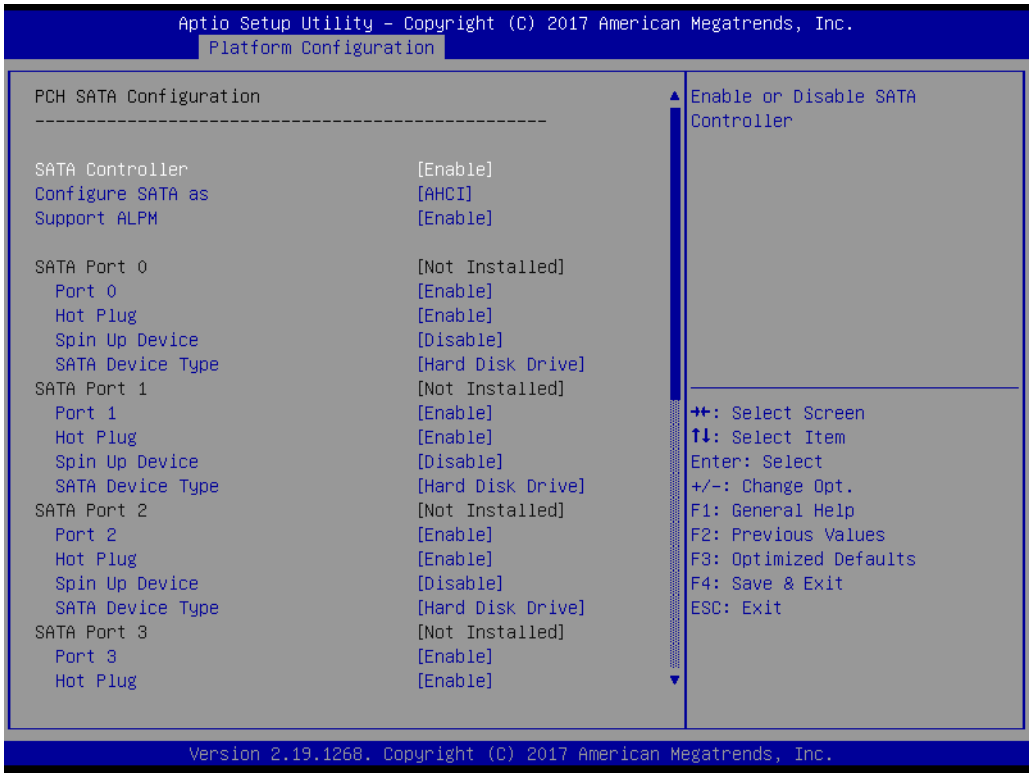
To "Enable or disable" the PCI Express root port.

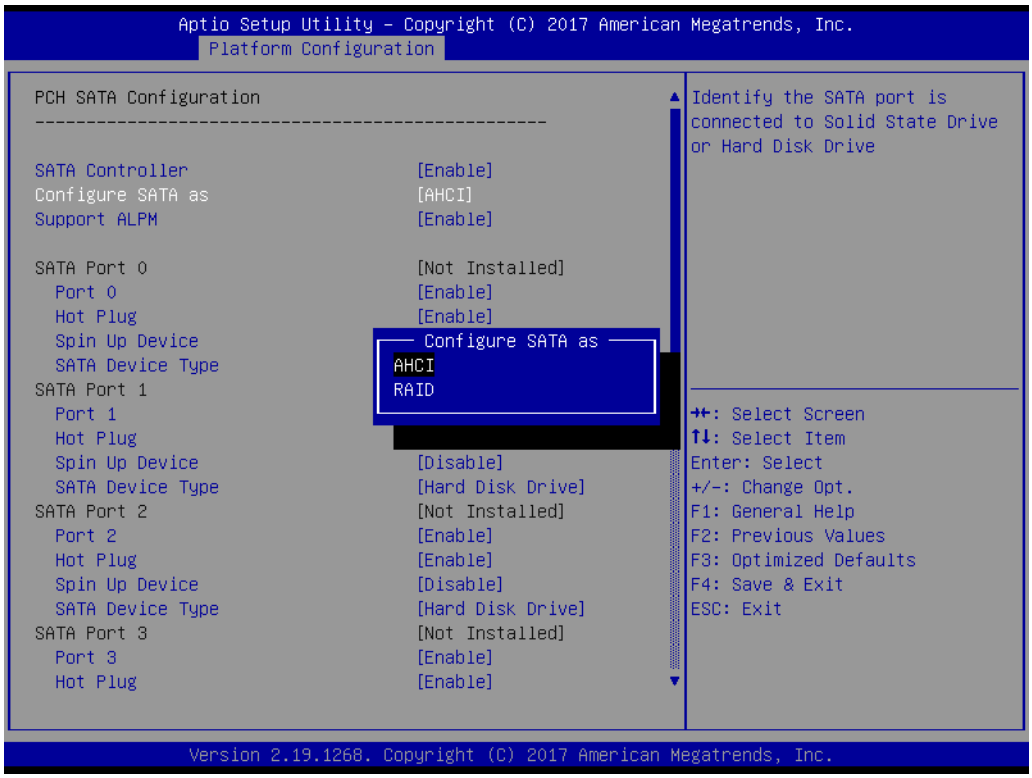


– **PCIe Speed**
  Configure PCI Express speed.



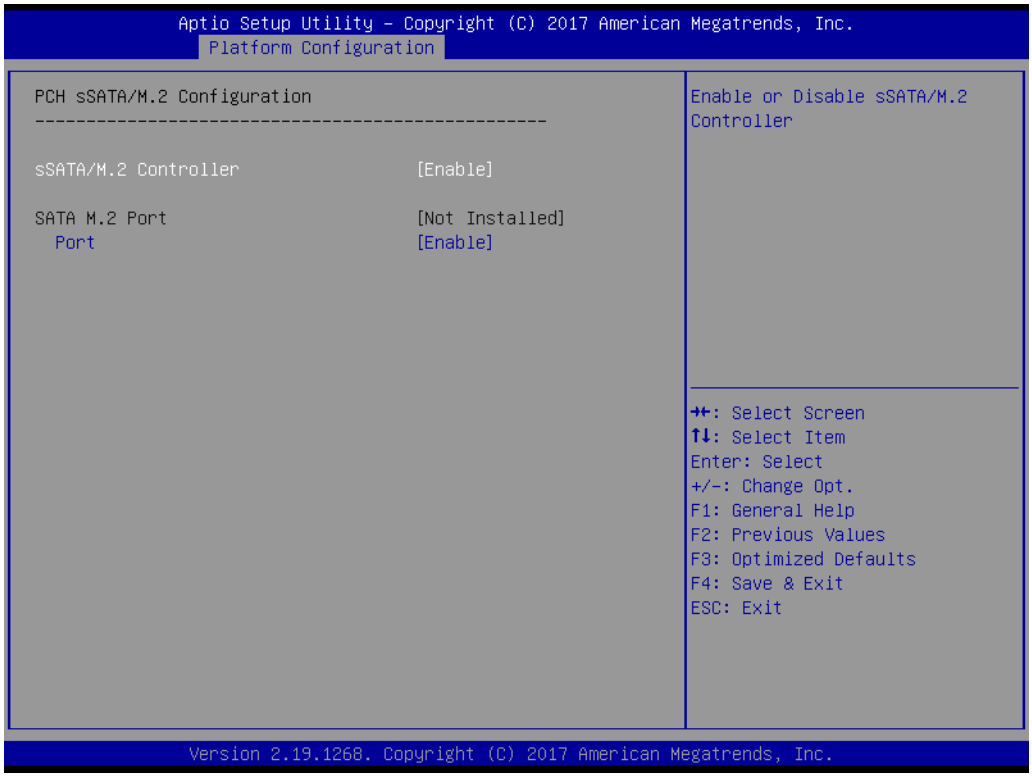
■ PCH SATA Configuration





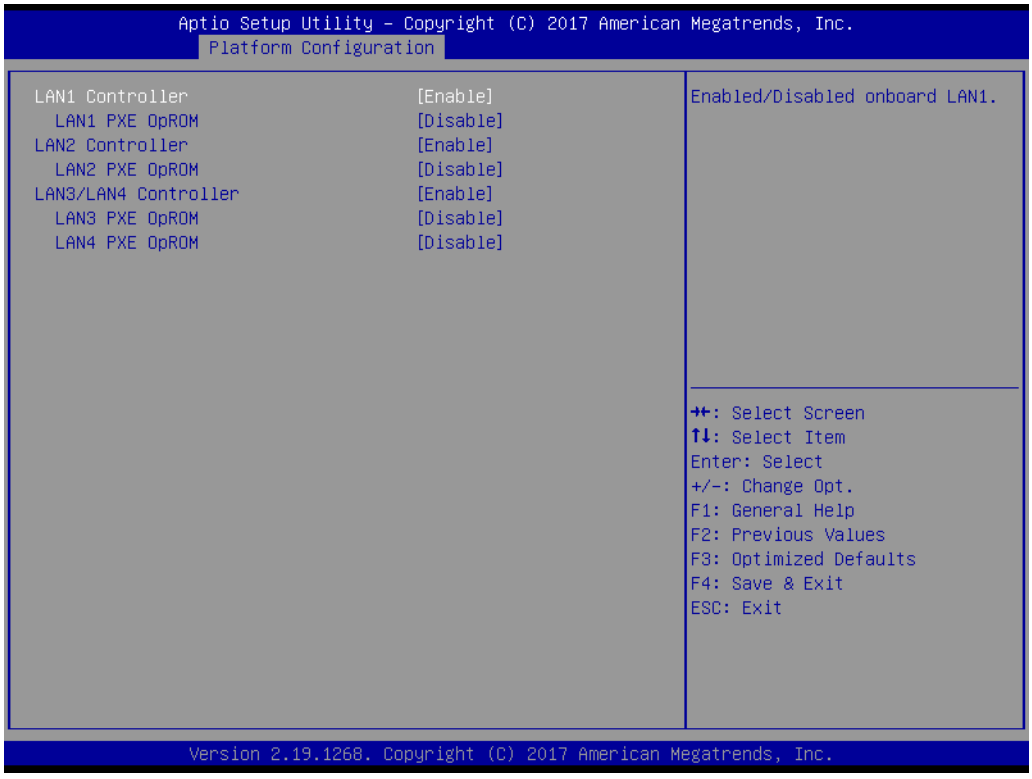
- **SATA Controller**
  To "Enable or disable" SATA devices.
- **Configure SATA as**
  Set as AHCI or RAID when SATA controllers are enabled.
- **Support ALPM**
  To "Enable or disable" Aggressive Link Power Management (ALPM) protocol for Advanced Host Controller Interface-compliant (AHCI) Serial ATA (SATA) devices.
- **SATA Port 0~7**
  To enable or disable SATA port 0~7.
- **Hot Plug Port 0~7**
  Designates SATA port 0~7 as hot pluggable.
- **SATA Port 0~7 Spin Up Device**
  On an edge detect from 0 to 1, the PCH starts a COMRESET initialization sequence to the device.
- **SATA Port 0~7 Device Type**
  To identify the SATA is connected to Solid State Drive or Hard Disk Drive.

PCH sSATA/M.2 Configuration



- **sSATA/M.2 Controller**
  To "Enable or disable" sSATA/M.2 Controller.
- **SATA M.2 Port**
  To "Enable or disable" SATA port.

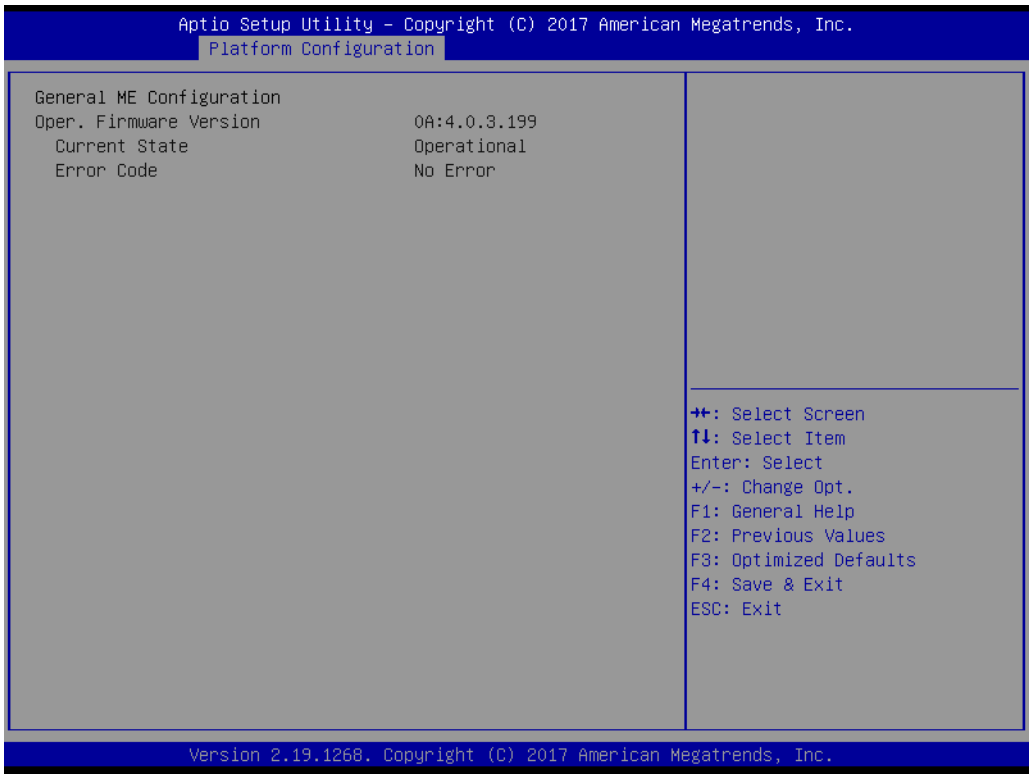
Networking



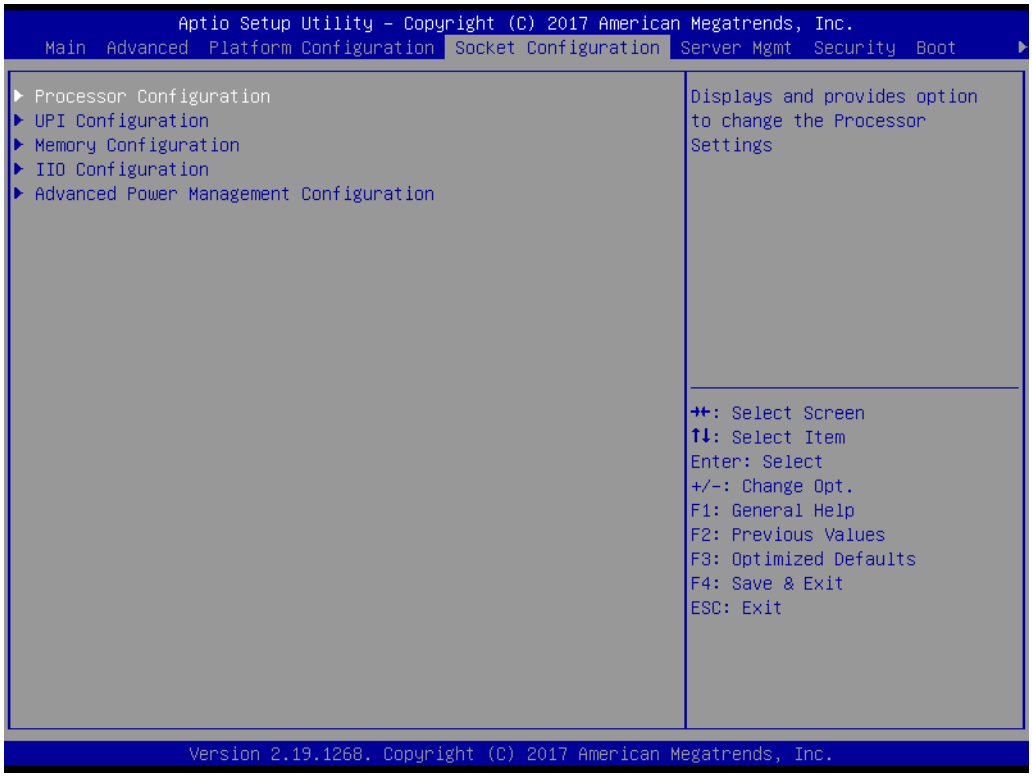
- **LAN1 Controller**
  To "Enable or disable" Intel I210 Controller support.
- **LAN1 PXE OpROM**
  To "Enable or disable" Boot option for Intel I210 controller.
- **LAN2 Controller**
  To "Enable or disable" Intel I210 Controller support.
- **LAN2 PXE OpROM**
  To "Enable or disable" Boot option for Intel I210 controller.
- **LAN3/LAN4 Controller**
  To "Enable or disable" Intel X557 controller support.
- **LAN3 PXE OpROM**
  To "Enable or disable" boot option for Intel X557 controller.
- **LAN4 PXE OpROM**
  To "Enable or disable" boot option for Intel X557 controller.

3.2.3.2 Server ME Configuration

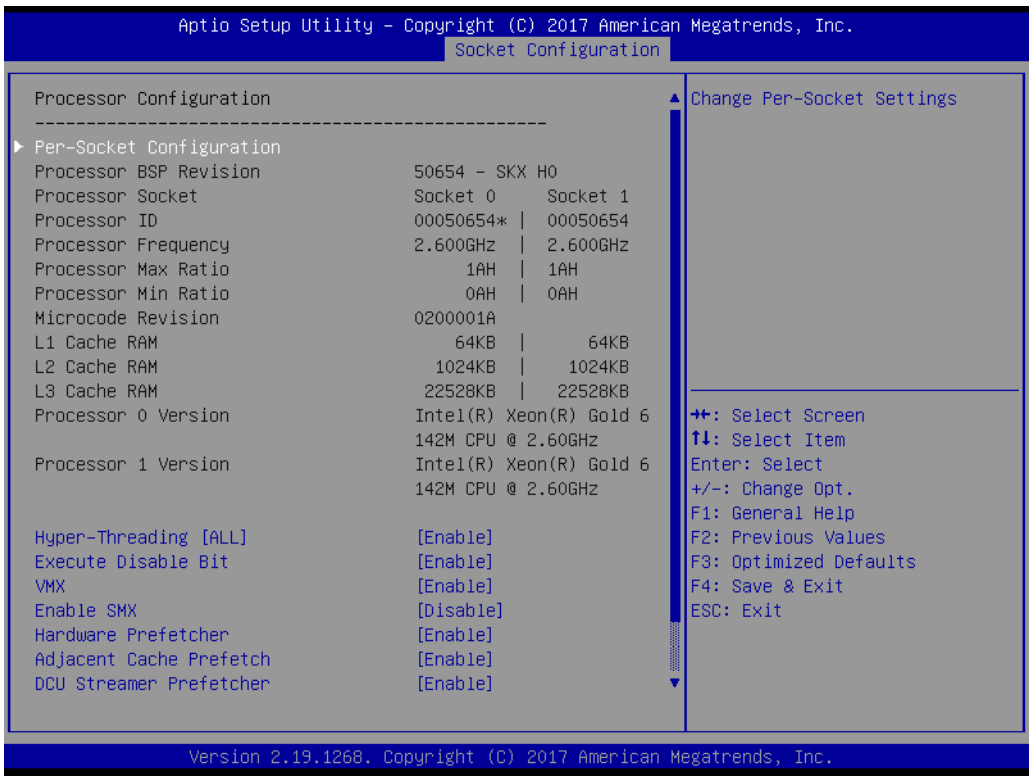
This page shows the Server ME configuration information.

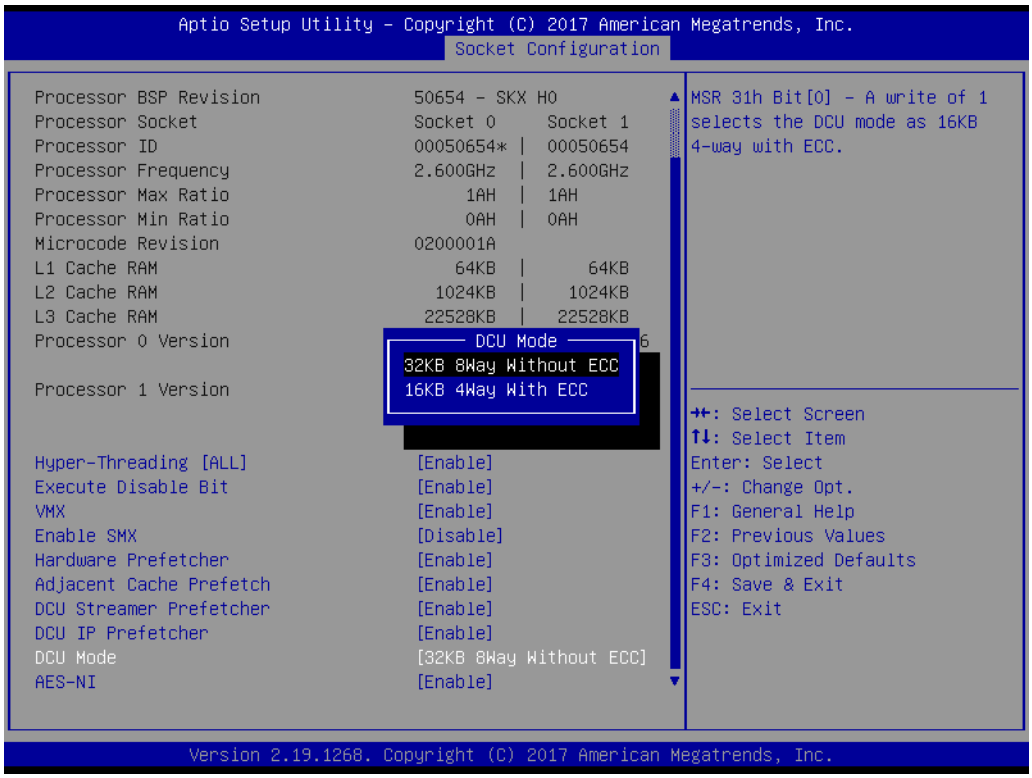


3.2.4 Socket Configuration



3.2.4.1 Processor Configuration



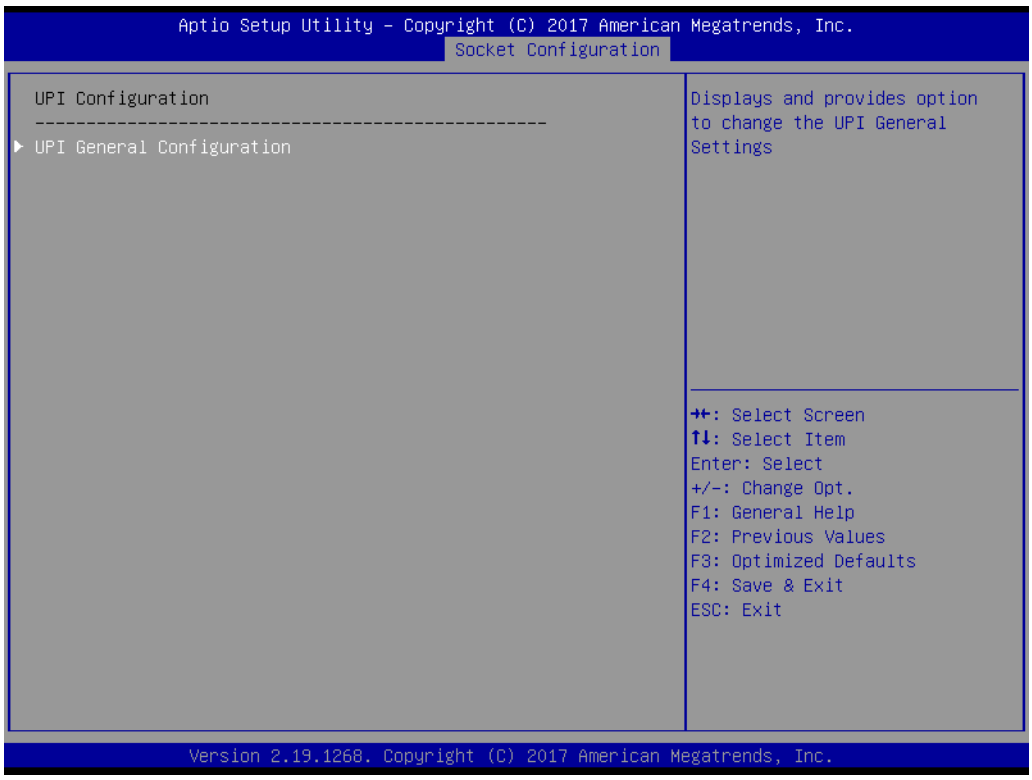


- **Per-Socket Configuration**
  Use this to select how many processor cores you want to activate when you are using a dual or quad core processor.
- **Hyper-threading [All]**
  To "Enable or disable" Intel Hyper Threading technology.
- **Execute Disable Bit**
  To "Enable or disable" the Execute Disable Bit feature. The Optimal and Fail-Safe default setting is Enabled. If Disabled is selected, the BIOS forces the XD feature flag to always return to 0.
- **VMX**
  Enable or disable Intel Virtual Machine Extensions (VMX) for IA-32 processors that support Intel® Vanderpool Technology
- **Enable SMX**
  To "Enable or disable" the Safer Mode Extensions. Safer Mode Extensions (SMX) provide a means for system software to launch an MLE and establish a measured environment within the platform to support trust decisions by end users.
- **Hardware Prefetcher**
  Hardware Prefetcher is a technique that fetches instructions and/or data from memory into the CPU cache memory well before the CPU needs it, so that it can improve the load-to-use latency.
- **Adjacent Cache Prefetch**
  The Adjacent Cache-Line Prefetch mechanism, like automatic hardware prefetch, operates without programmer intervention. When enabled through the BIOS, two 64-byte cache lines are fetched into a 128-byte sector, regardless of whether the additional cache line has been requested or not.
- **DCU Streamer Prefetcher**

Enable prefetch of next L1 data line based upon multiple loads in same cache line.

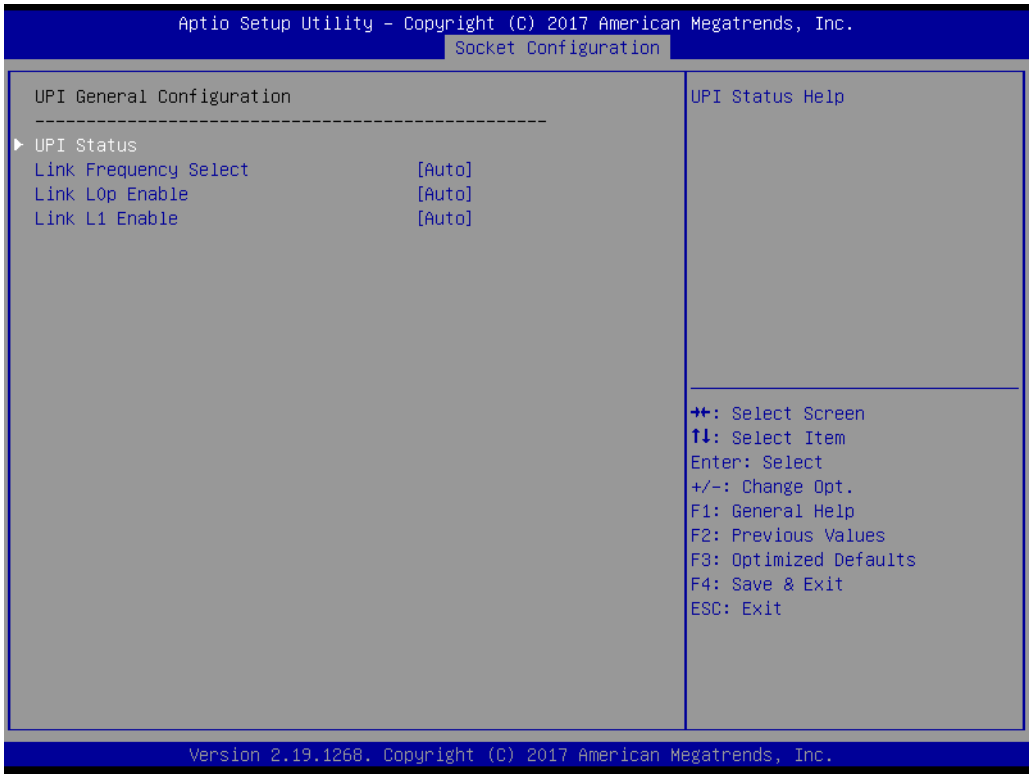
- **DCU IP Prefetcher**
  Enable prefetch of next L1 line based upon sequential load history.
- **DCU Mode**
  Change the data cache unit mode.
- **AES-NI**
  This item is to enable or disable CPU advanced encryption standard instructions.

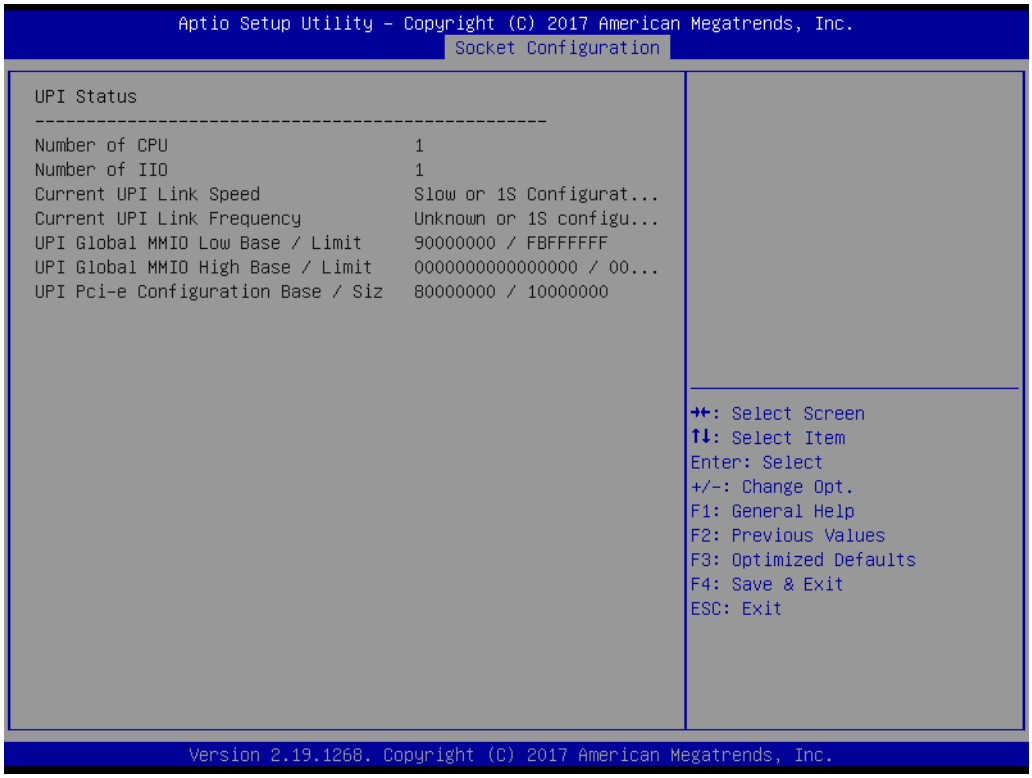
3.2.4.2 UPI Configuration



- **UPI Status**

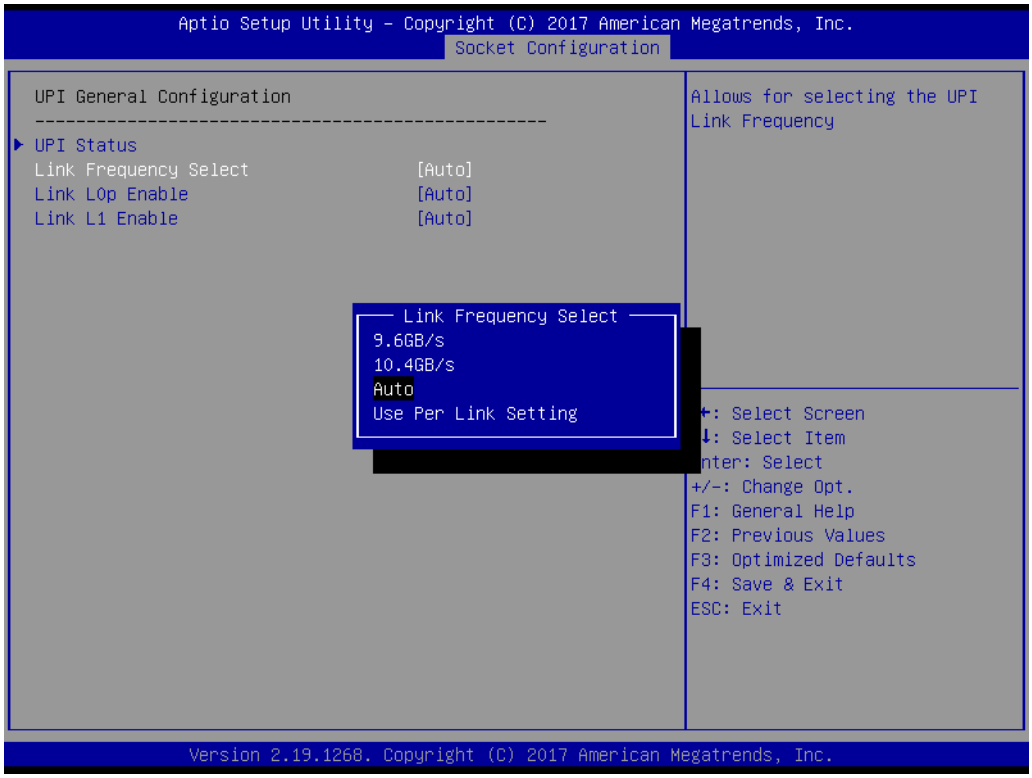
  Display information of Intel UltraPath Interconnect (UPI).





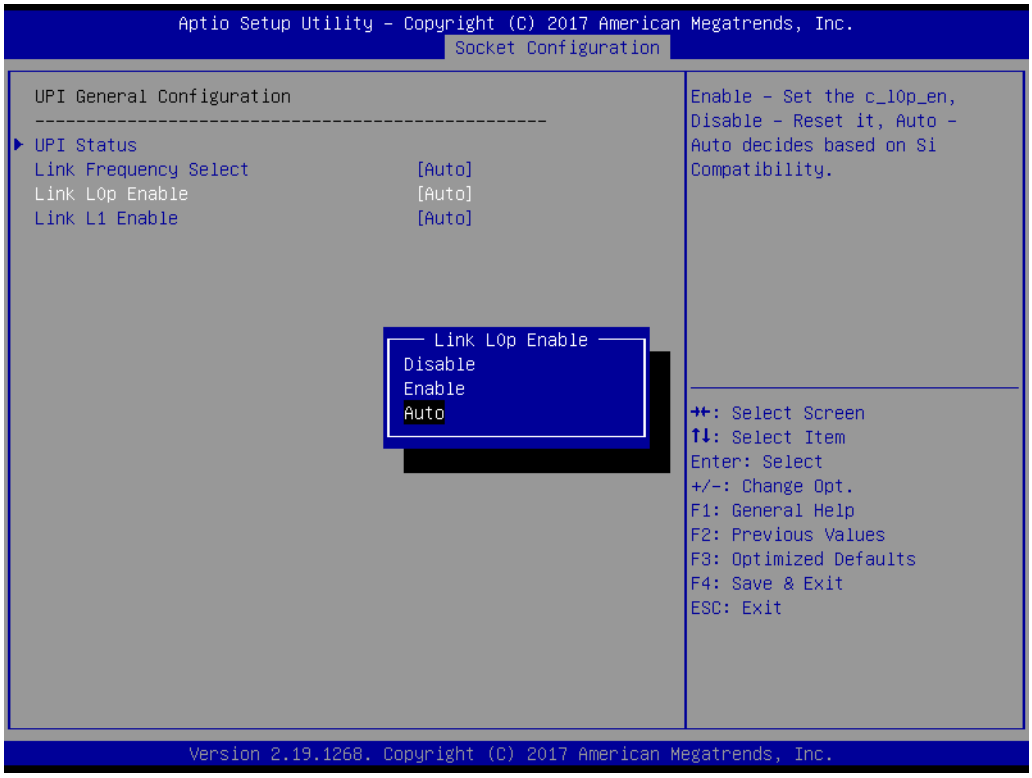
Link Frequency Select

Allows for selecting the QPI Link frequency.

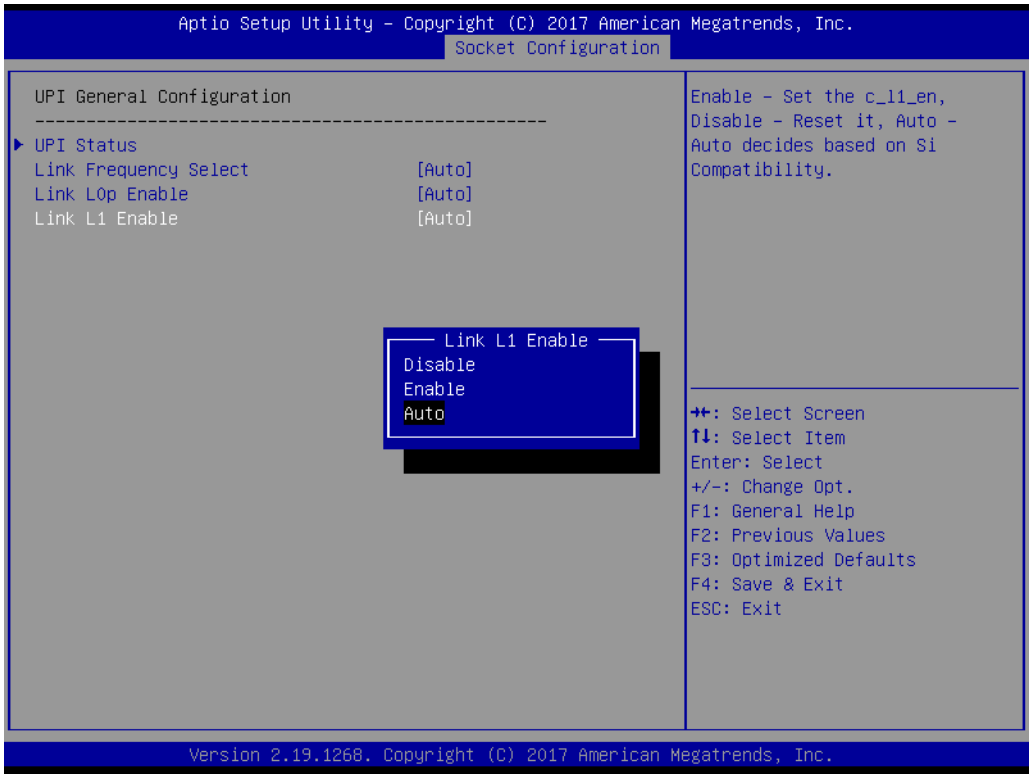


Link L0p Enable

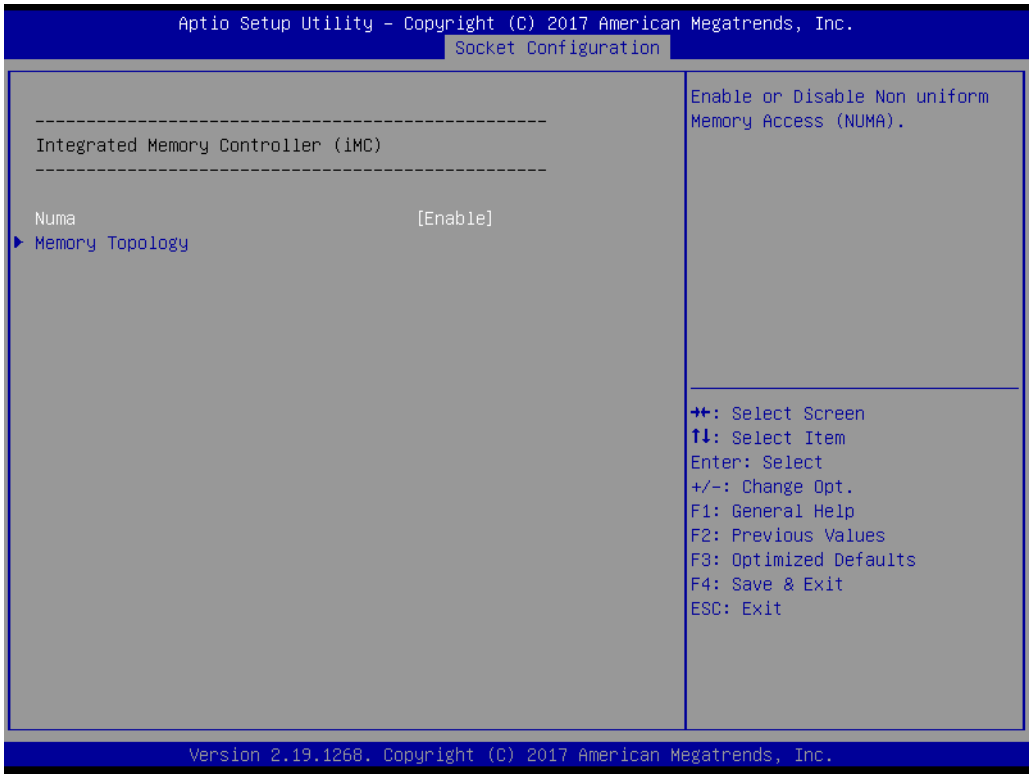
To "Enable or disable" QPI Link0p.



- **Link L1 Enable**
  To "Enable or disable" QPI Link1.



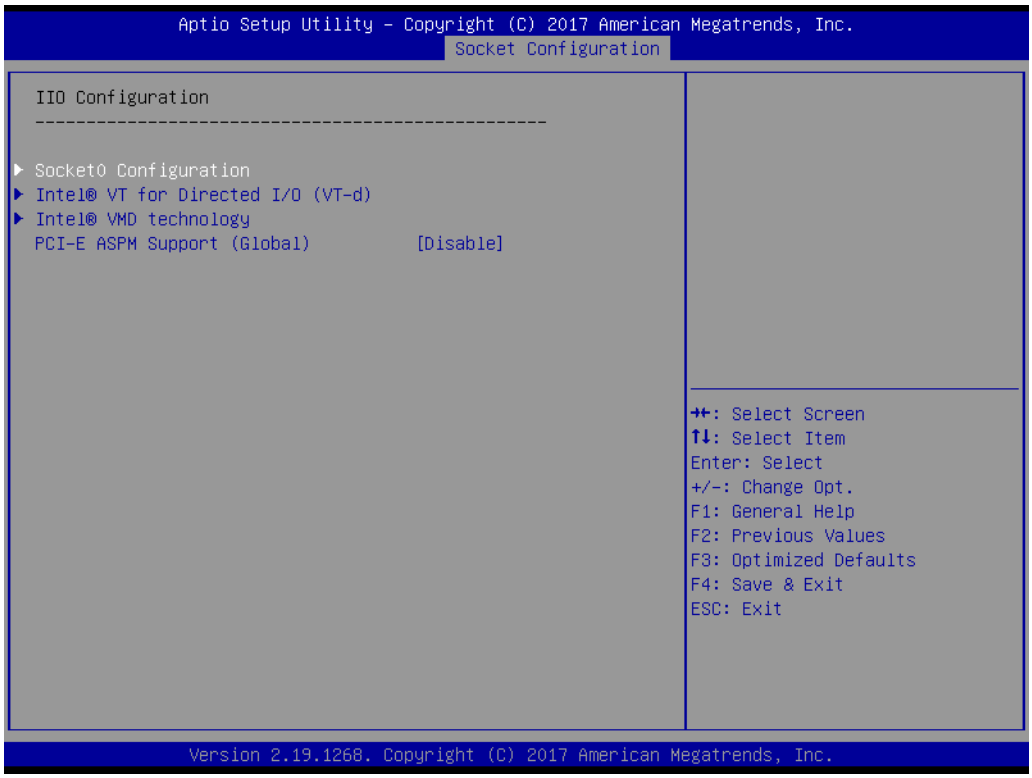
3.2.4.3 Memory Configuration



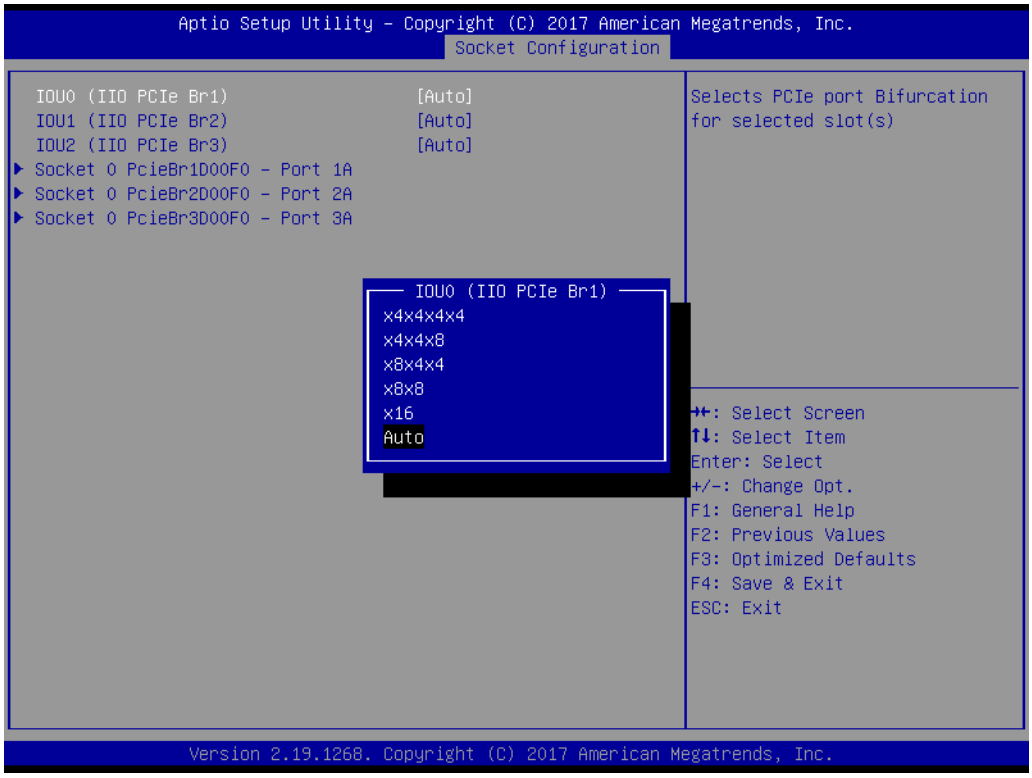
- **Numa**
  To "Enable or disable" non uniform memory access (NUMA).

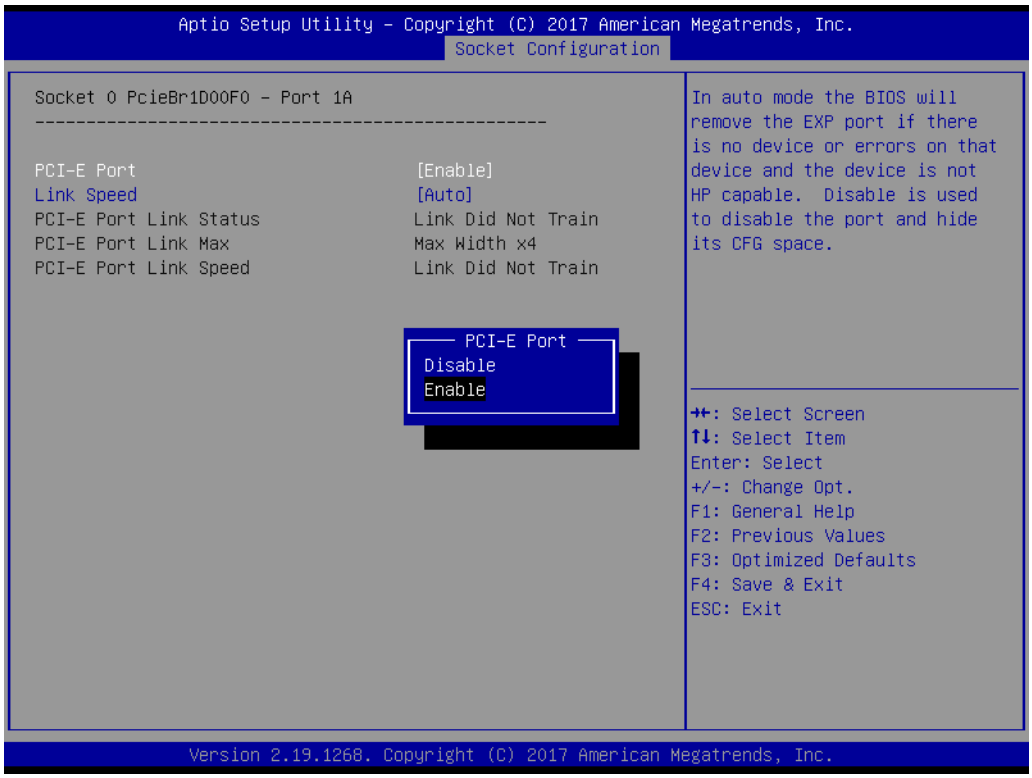
- **Memory Technology**
  Display memory topology with DIMM population information.

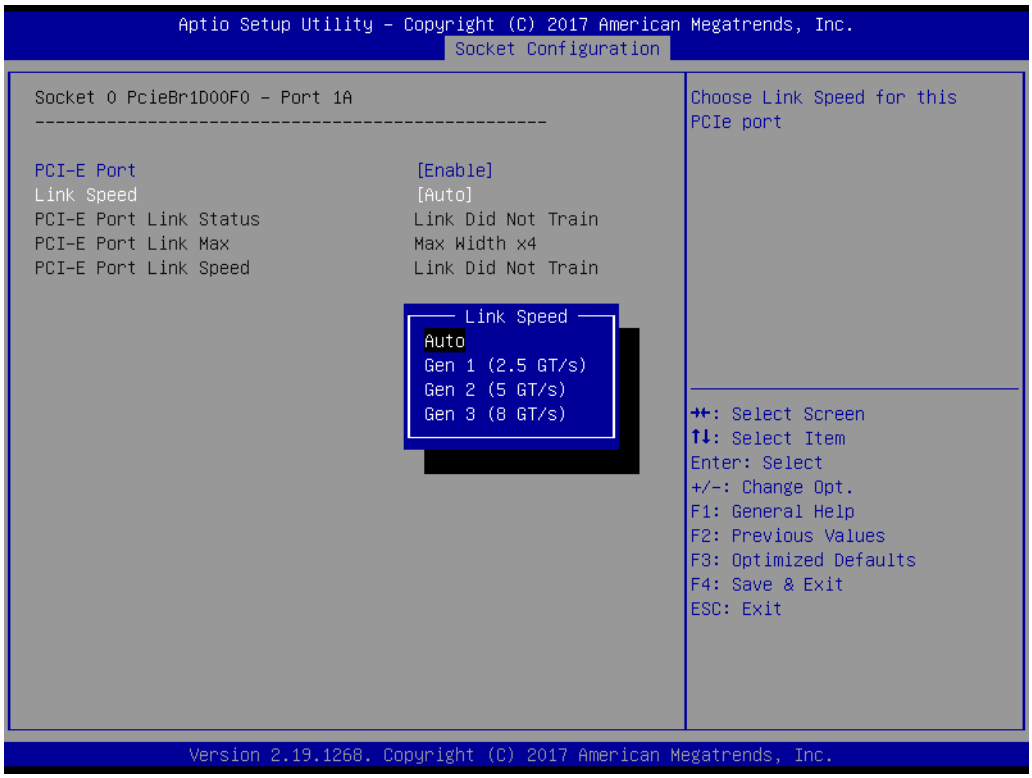
3.2.4.4 IIO Configuration

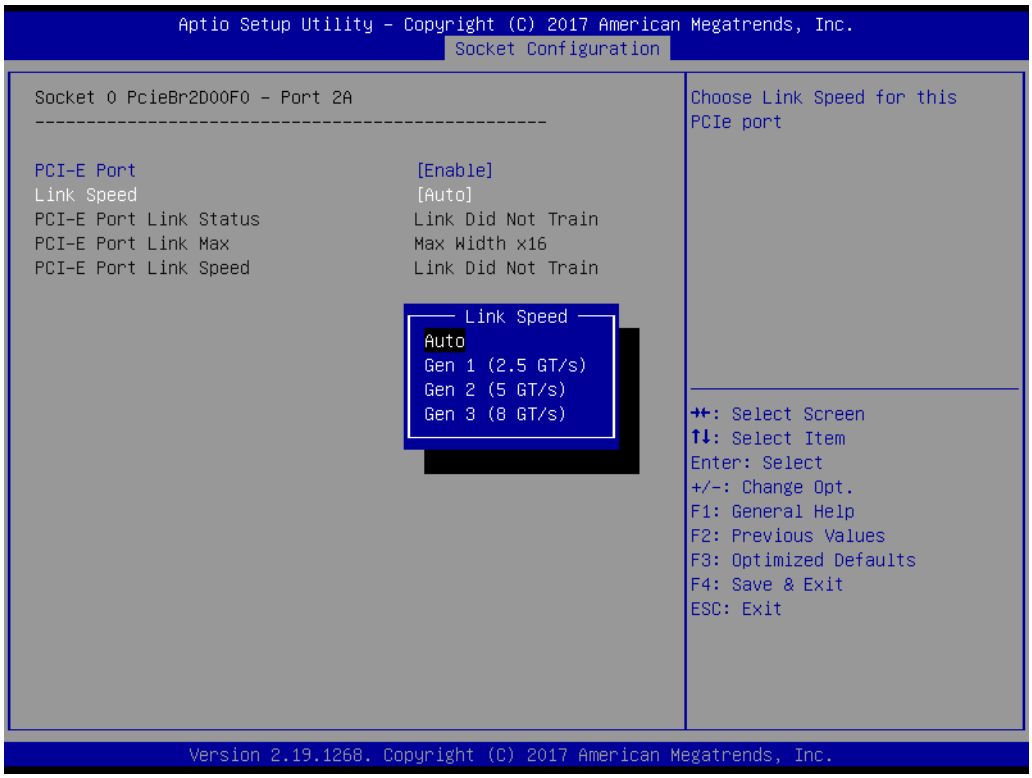


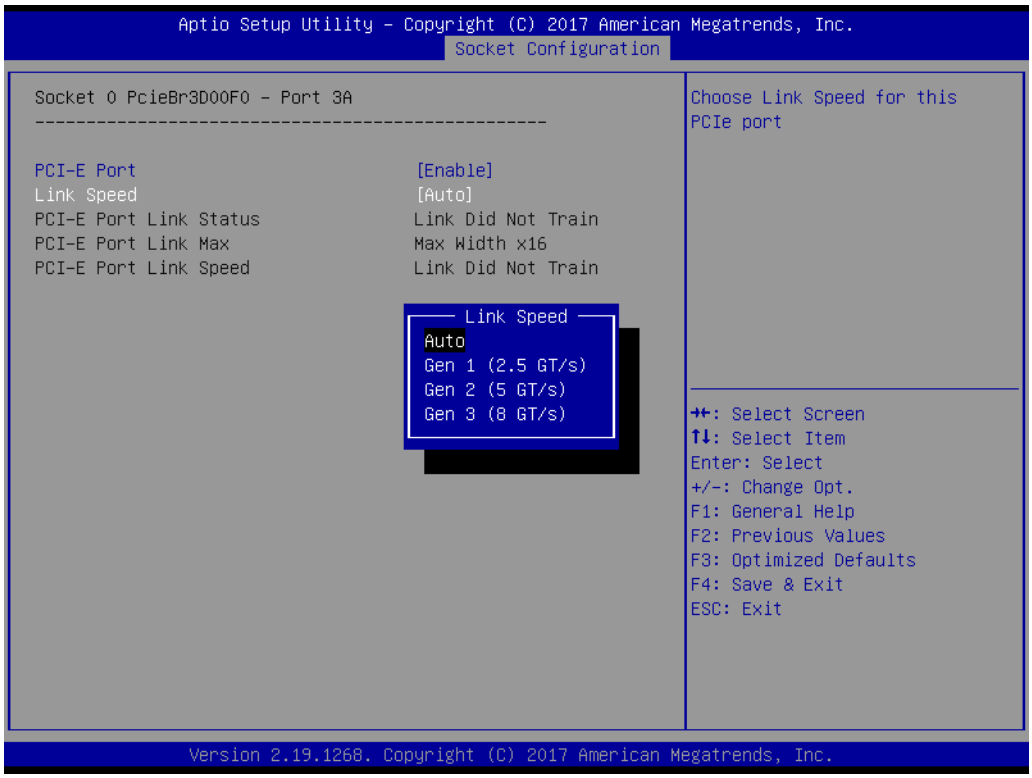
- **Socket0 PCIe Configuration**
  PCIe port bifurcation control and select target link speed as Gen1, Gen2, Gen3.



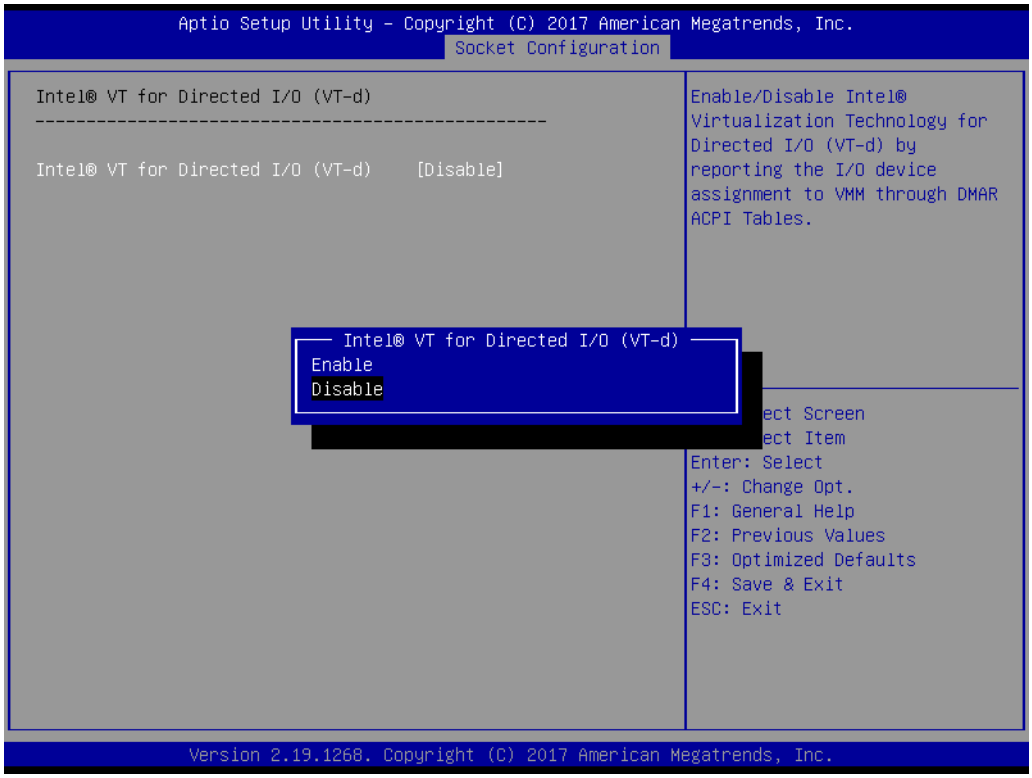

Aptio Setup Utility – Copyright (C) 2017 American Megatrends, Inc.
Socket Configuration
Socket 0 PcieBr1D00F0 – Port 1A
PCI-E Port [Enable]
Link Speed [Auto]
PCI-E Port Link Status Link Did Not Train
PCI-E Port Link Max Max Width x4
PCI-E Port Link Speed Link Did Not Train
PCI-E Port
Disable
Enable
In auto mode the BIOS will remove the EXP port if there is no device or errors on that device and the device is not HP capable. Disable is used to disable the port and hide its CFG space.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.19.1268. Copyright (C) 2017 American Megatrends, Inc.


Aptio Setup Utility – Copyright (C) 2017 American Megatrends, Inc.
Socket Configuration
Socket 0 PcieBr1D00F0 – Port 1A
PCI-E Port [Enable]
Link Speed [Auto]
PCI-E Port Link Status Link Did Not Train
PCI-E Port Link Max Max Width x4
PCI-E Port Link Speed Link Did Not Train
Link Speed
Auto
Gen 1 (2.5 GT/s)
Gen 2 (5 GT/s)
Gen 3 (8 GT/s)
Choose Link Speed for this PCIe port
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.19.1268. Copyright (C) 2017 American Megatrends, Inc.

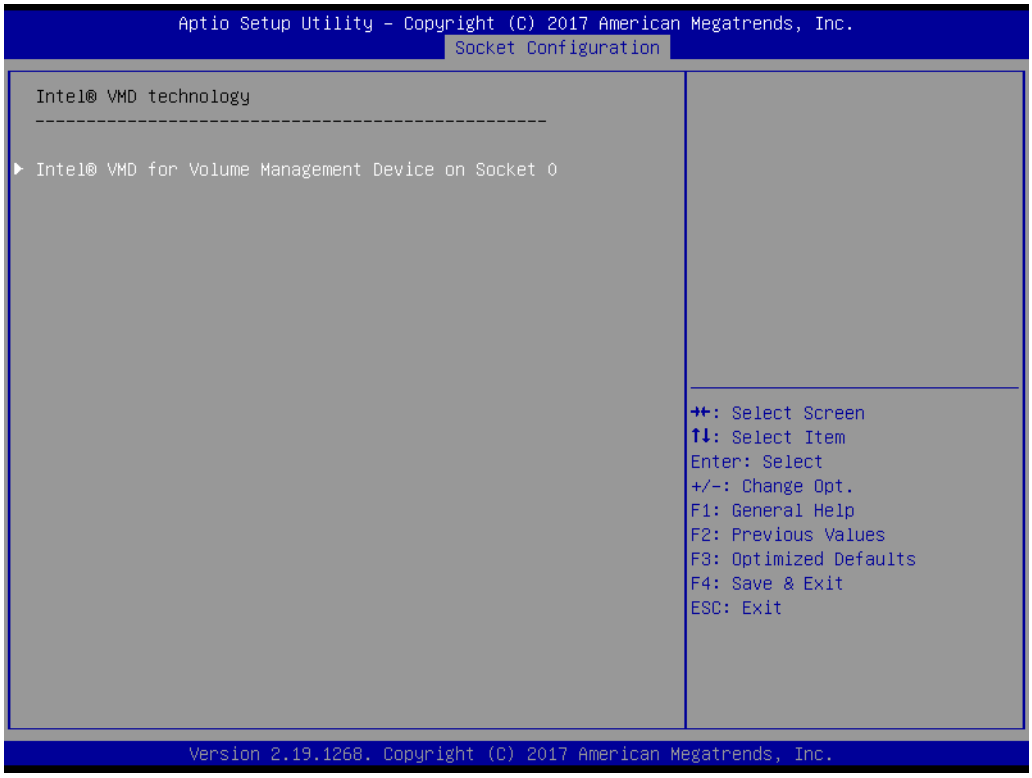

Aptio Setup Utility – Copyright (C) 2017 American Megatrends, Inc.
Socket Configuration
Socket 0 PcieBr2D00F0 – Port 2A
PCI-E Port [Enable]
Link Speed [Auto]
PCI-E Port Link Status Link Did Not Train
PCI-E Port Link Max Max Width x16
PCI-E Port Link Speed Link Did Not Train
Link Speed
Auto
Gen 1 (2.5 GT/s)
Gen 2 (5 GT/s)
Gen 3 (8 GT/s)
Choose Link Speed for this PCIe port
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.19.1268. Copyright (C) 2017 American Megatrends, Inc.

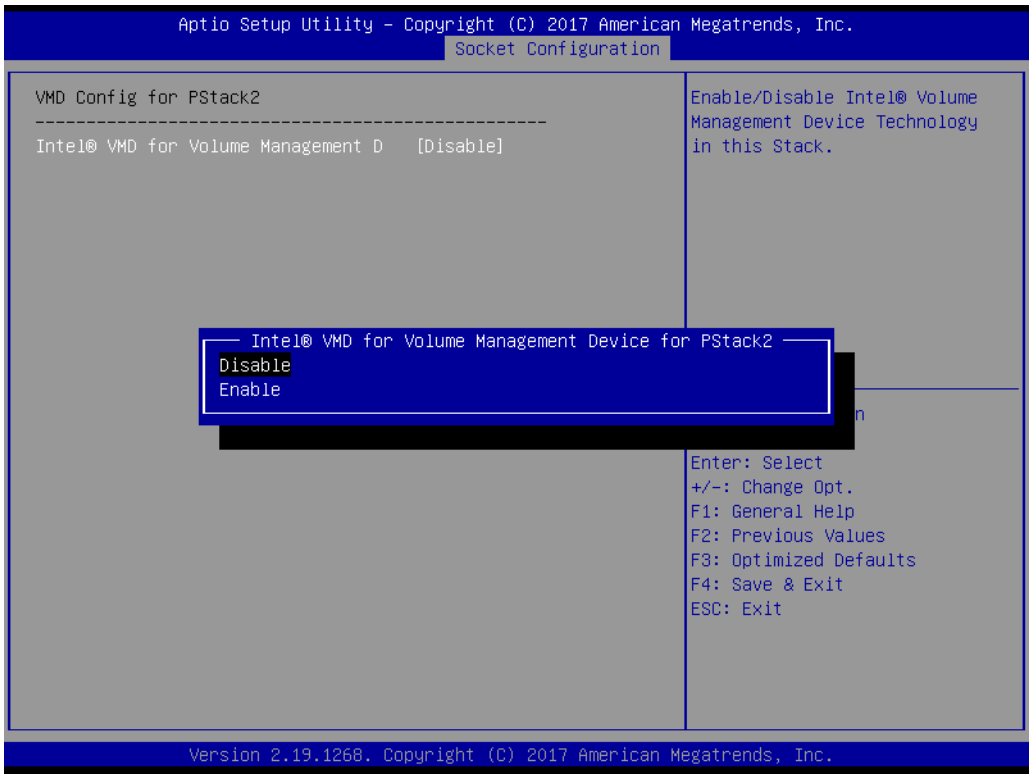

Aptio Setup Utility – Copyright (C) 2017 American Megatrends, Inc.
Socket Configuration
Socket 0 PcieBr3D00F0 – Port 3A
PCI-E Port [Enable]
Link Speed [Auto]
PCI-E Port Link Status Link Did Not Train
PCI-E Port Link Max Max Width x16
PCI-E Port Link Speed Link Did Not Train
Link Speed
Auto
Gen 1 (2.5 GT/s)
Gen 2 (5 GT/s)
Gen 3 (8 GT/s)
Choose Link Speed for this PCIe port
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.19.1268. Copyright (C) 2017 American Megatrends, Inc.

- **Intel VT for Directed I/O (VT-d)**
  To "Enable or disable" Intel Virtualization Technology for Directed I/O.

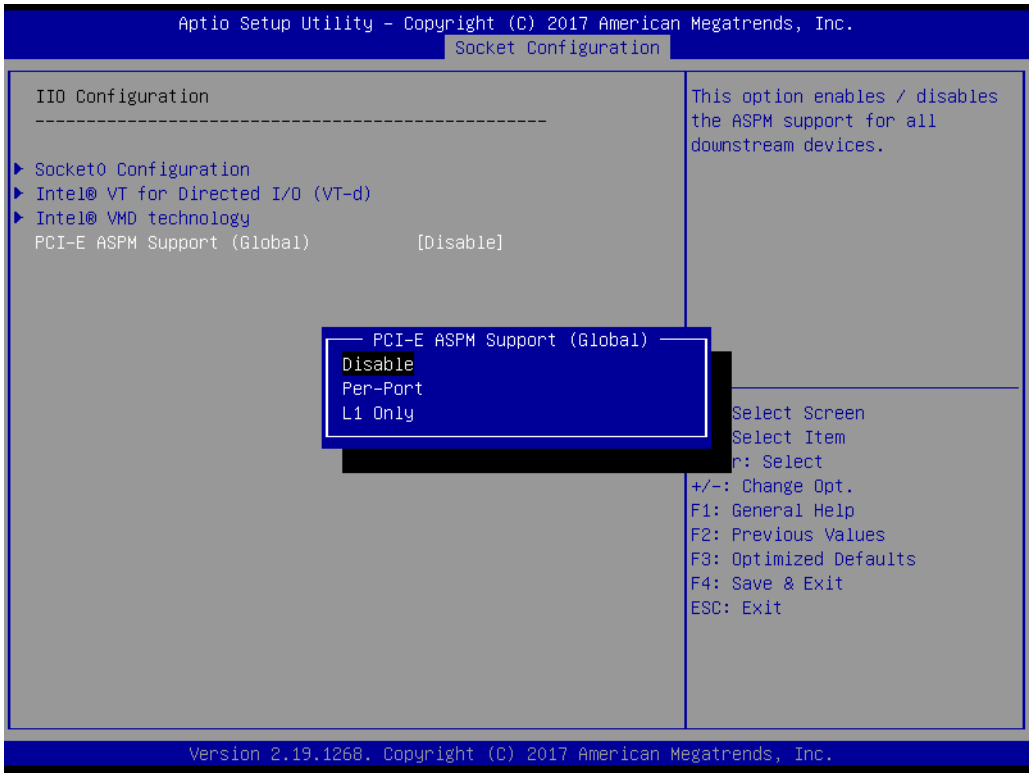


- **Intel VMD technology**
  To "Enable or disable" Intel Volume Management Device Technology.

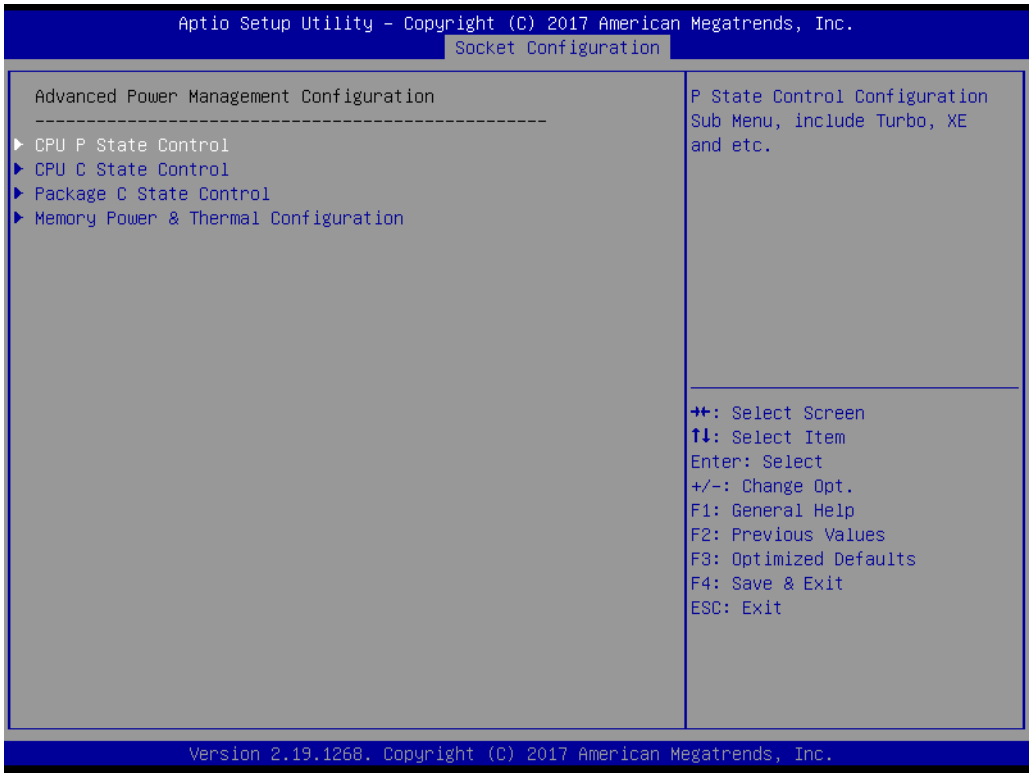




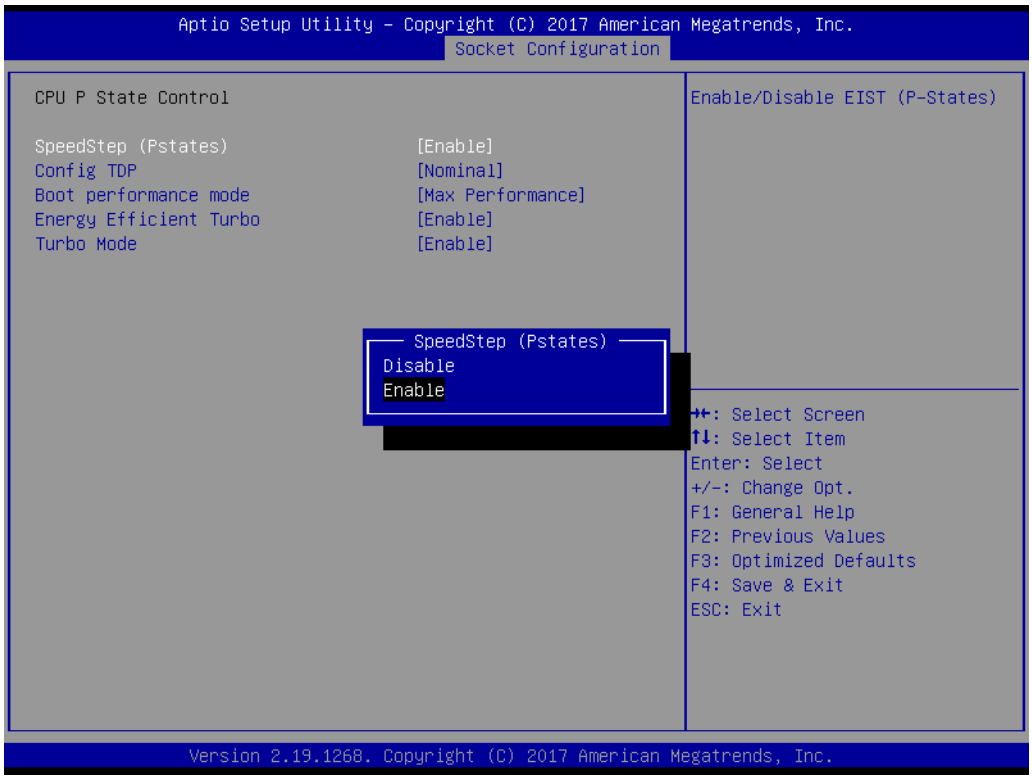
- **PCIe Hot Plug**
  To "Enable or disable" PCIe hot plug globally. This item is hidden.
- **PCI-E ASPM Support (Global)**
  Set the ASPM level to Disable, Per-Port or L1 state only.

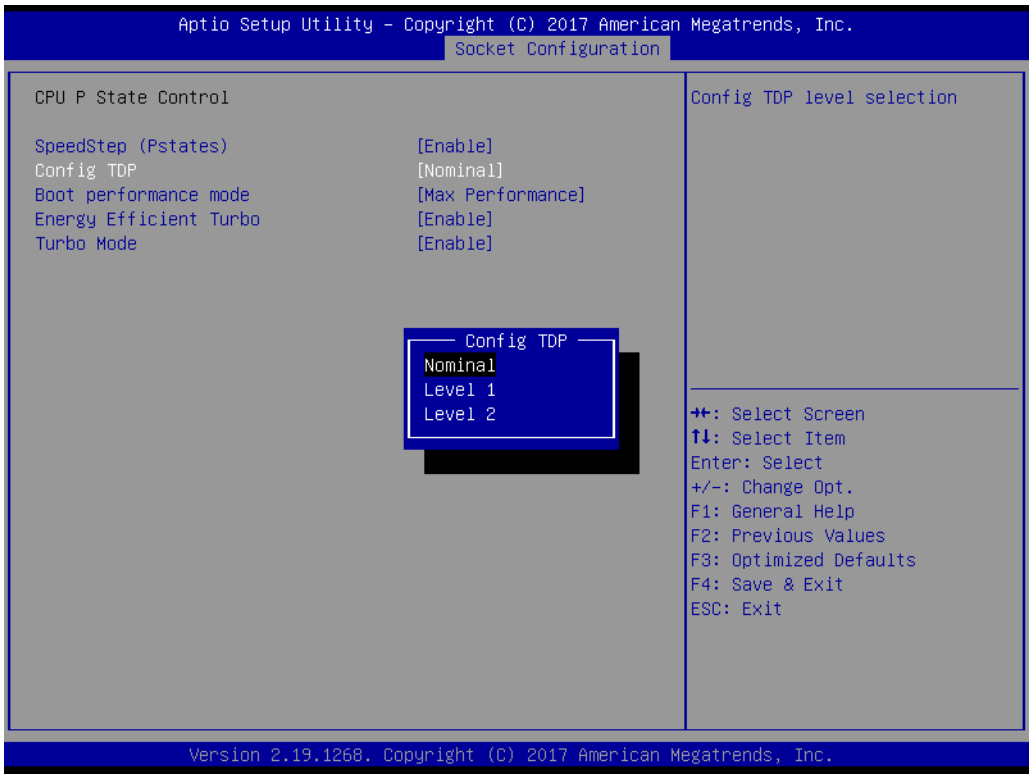


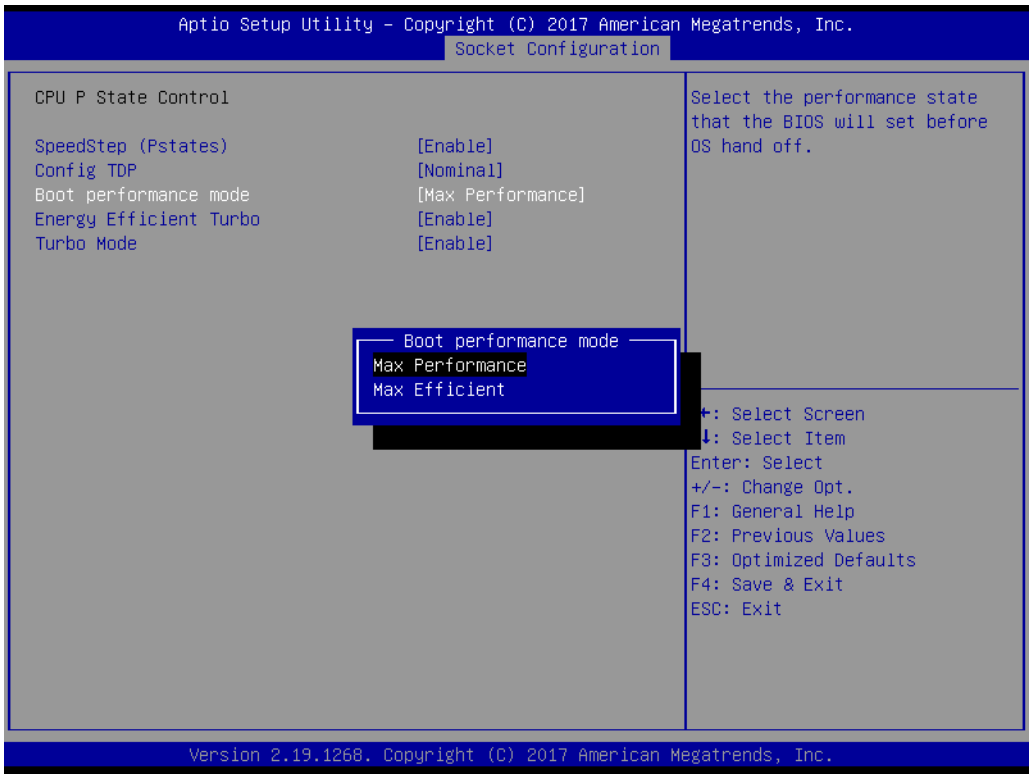
3.2.4.5 Advanced Power Management Configuration

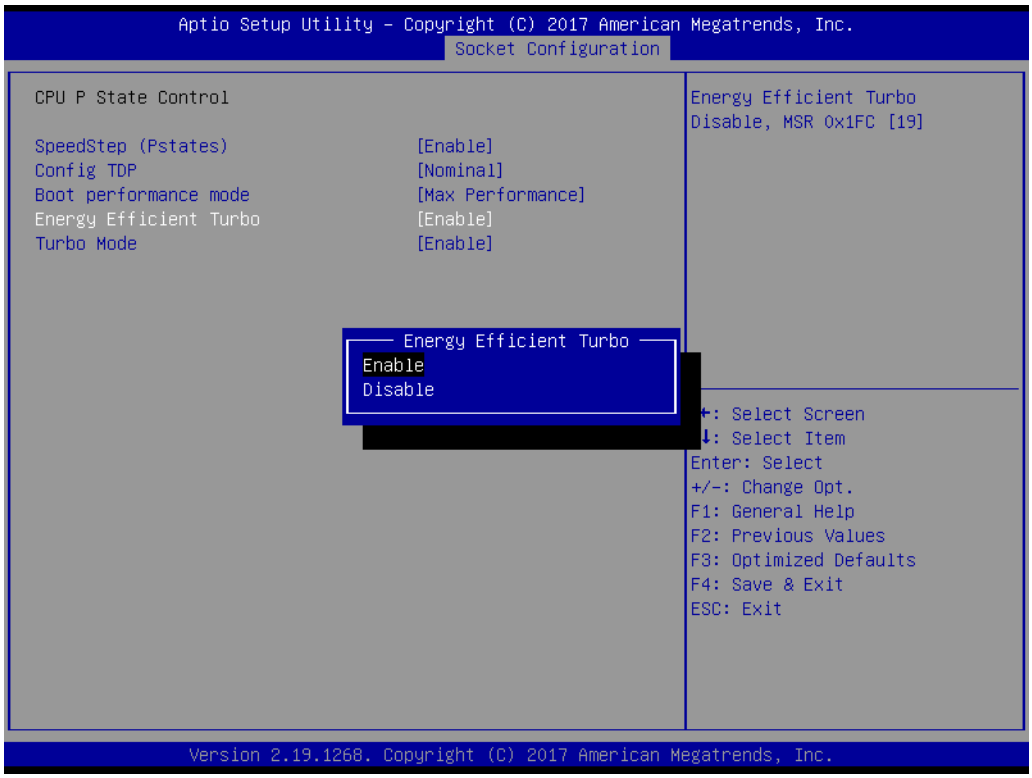


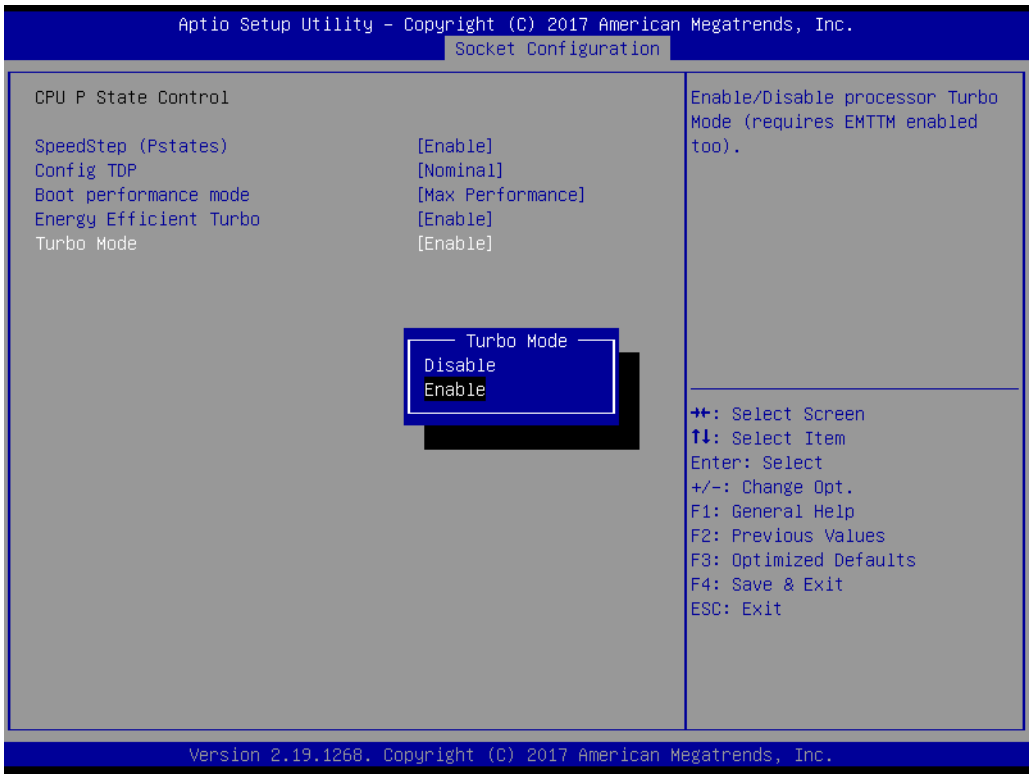
- **CPU P State Control**



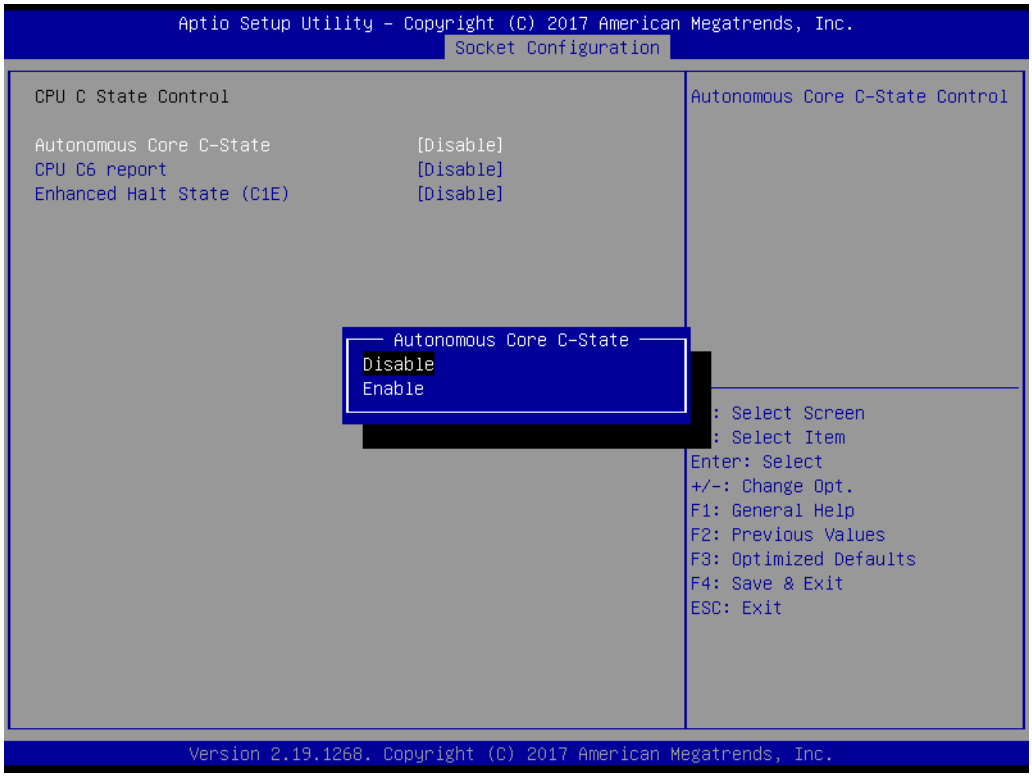

Aptio Setup Utility – Copyright (C) 2017 American Megatrends, Inc.
Socket Configuration
CPU P State Control
SpeedStep (Pstates) [Enable]
Config TDP [Nominal]
Boot performance mode [Max Performance]
Energy Efficient Turbo [Enable]
Turbo Mode [Enable]
Config TDP
Nominal
Level 1
Level 2
Config TDP level selection
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.19.1268. Copyright (C) 2017 American Megatrends, Inc.

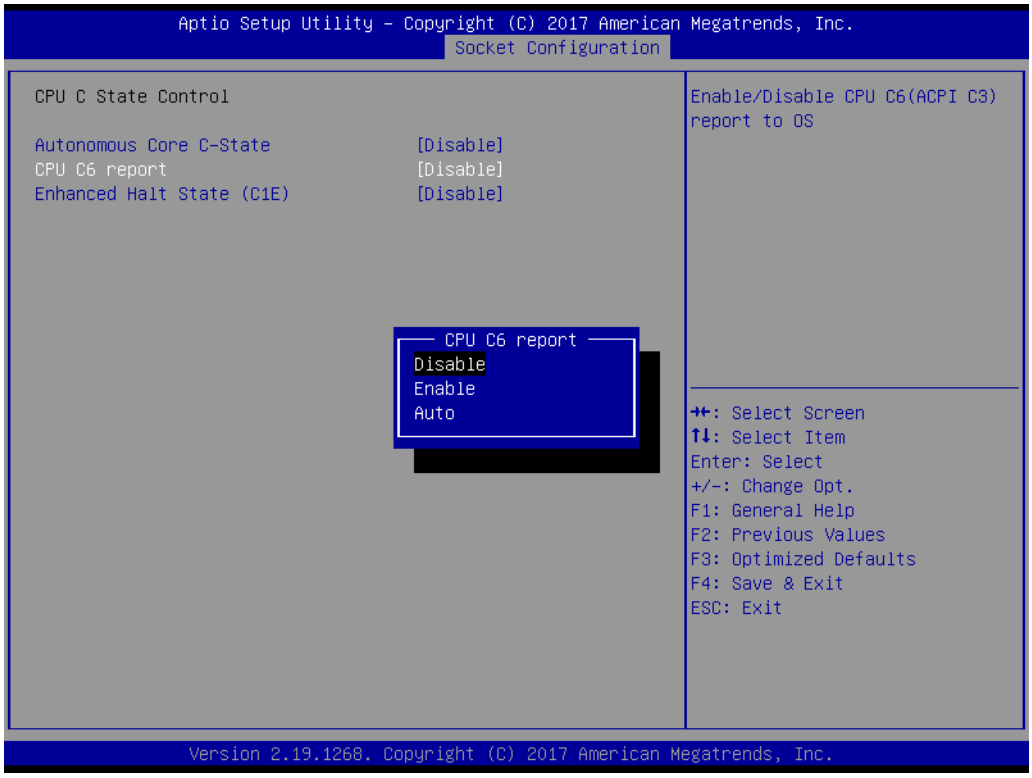

Aptio Setup Utility – Copyright (C) 2017 American Megatrends, Inc.
Socket Configuration
CPU P State Control
SpeedStep (Pstates) [Enable]
Config TDP [Nominal]
Boot performance mode [Max Performance]
Energy Efficient Turbo [Enable]
Turbo Mode [Enable]
Boot performance mode
Max Performance
Max Efficient
Select the performance state that the BIOS will set before OS hand off.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.19.1268. Copyright (C) 2017 American Megatrends, Inc.

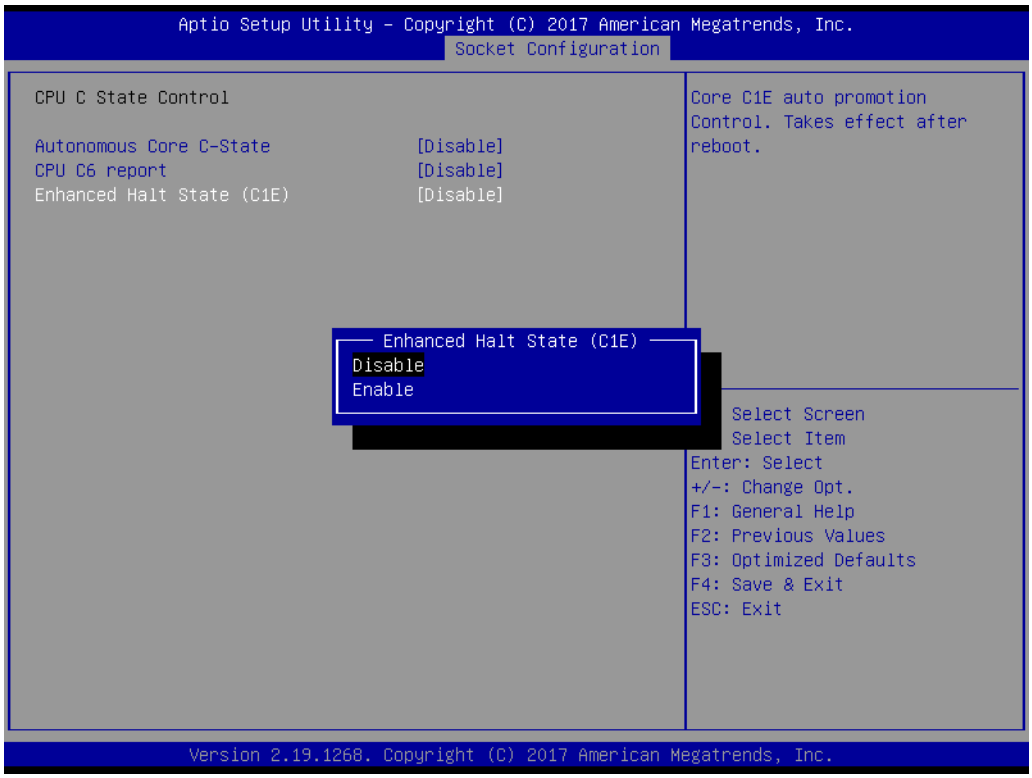

Aptio Setup Utility – Copyright (C) 2017 American Megatrends, Inc.
Socket Configuration
CPU P State Control
SpeedStep (Pstates) [Enable]
Config TDP [Nominal]
Boot performance mode [Max Performance]
Energy Efficient Turbo [Enable]
Turbo Mode [Enable]
Energy Efficient Turbo
Enable
Disable
Energy Efficient Turbo
Disable, MSR 0x1FC [19]
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.19.1268. Copyright (C) 2017 American Megatrends, Inc.


Aptio Setup Utility – Copyright (C) 2017 American Megatrends, Inc.
Socket Configuration
CPU P State Control
SpeedStep (Pstates) [Enable]
Config TDP [Nominal]
Boot performance mode [Max Performance]
Energy Efficient Turbo [Enable]
Turbo Mode [Enable]
Turbo Mode
Disable
Enable
Enable/Disable processor Turbo Mode (requires EMTTM enabled too).
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.19.1268. Copyright (C) 2017 American Megatrends, Inc.

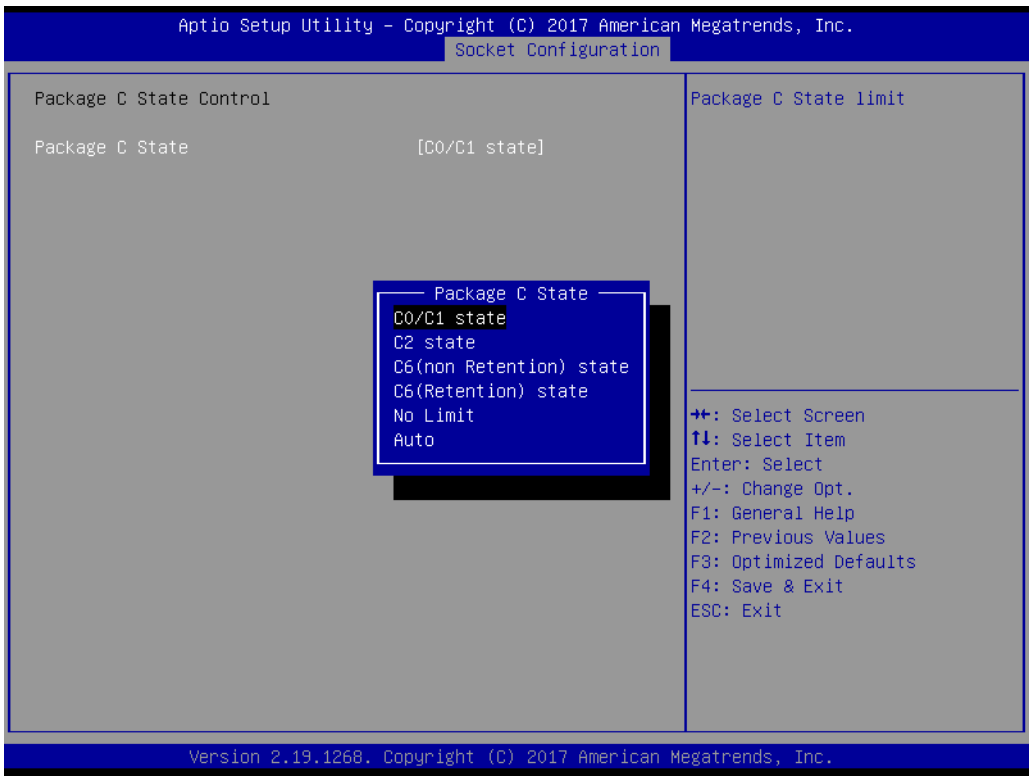
CPU C State Control



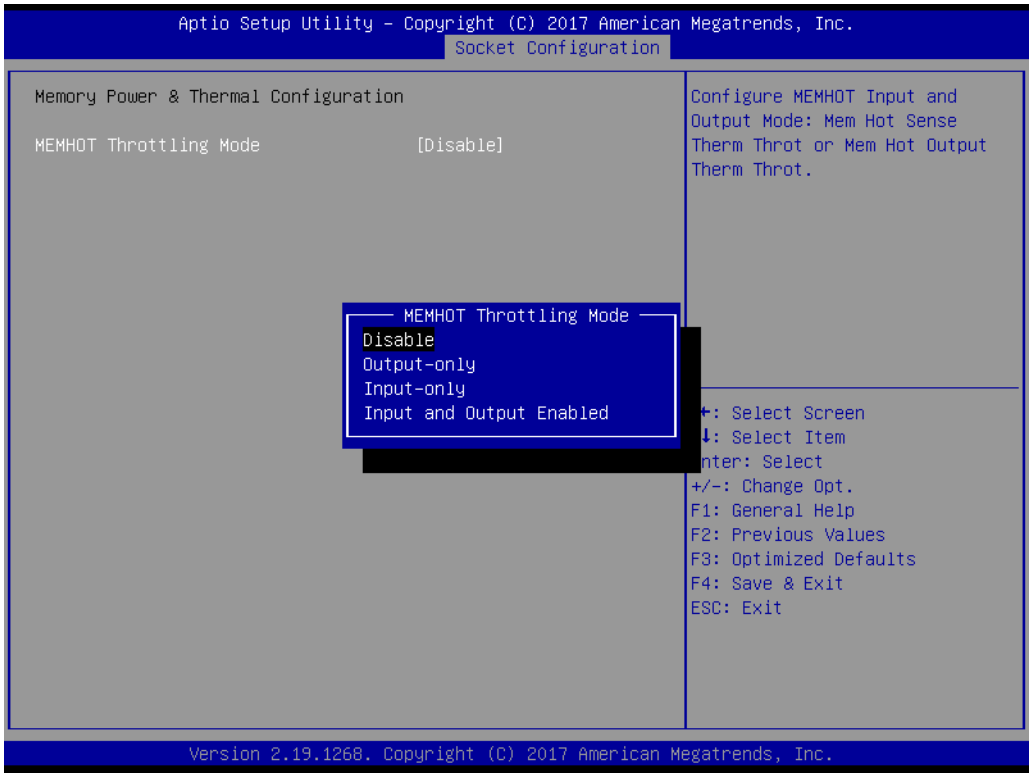




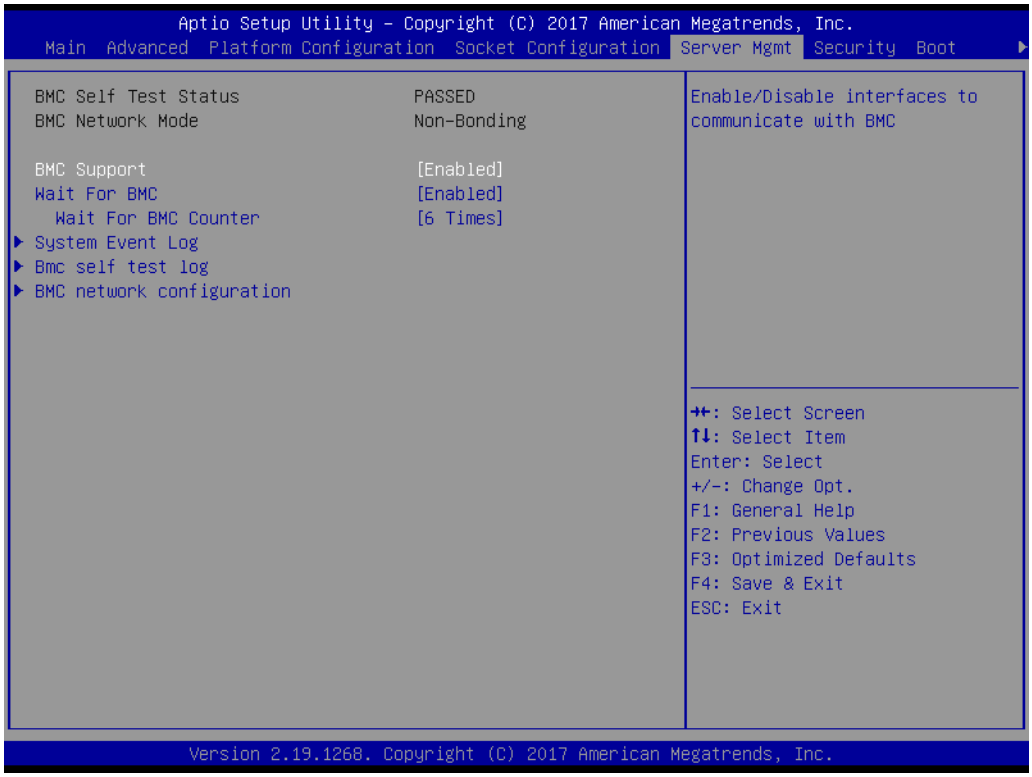
Package C State Control



- **Memory Power & Thermal Configuration**



3.2.5 Server Management

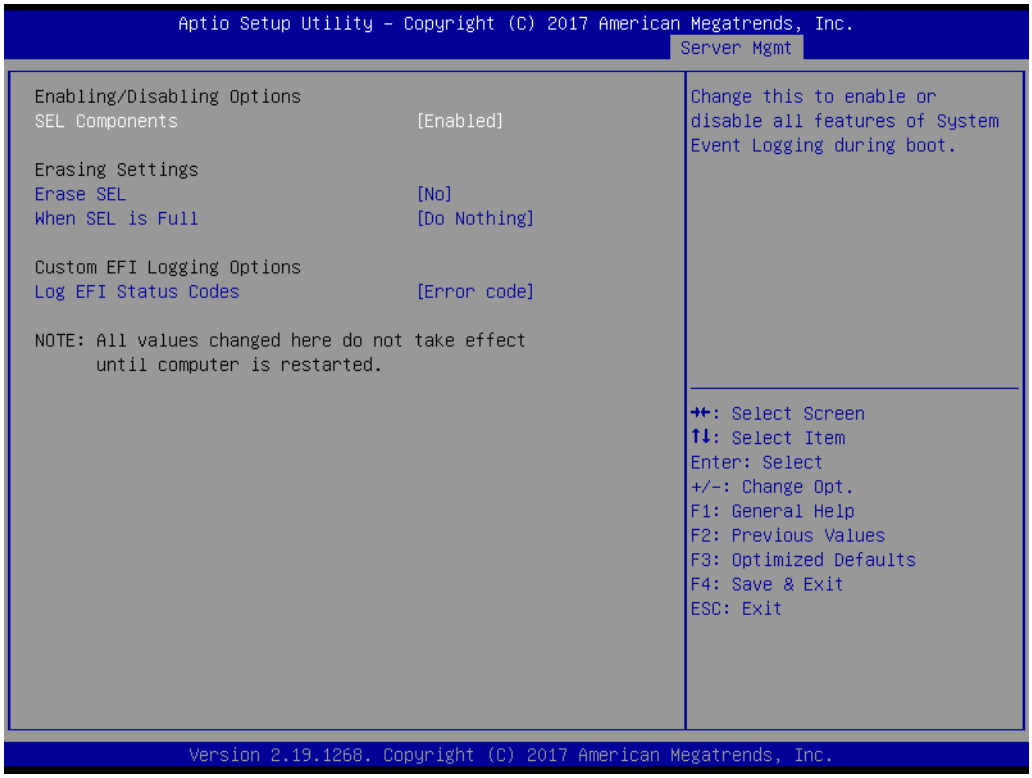


- **BMC Support**
  To "Enable or disable" interfaces to communicate with BMC.
- **Wait for BMC**

If enabled, motherboard will wait 30 ~ 60 seconds until BMC module boots up completely. After that, the normal BIOS post screen will be displayed.
If disabled, motherboard will not wait for BMC module's response.

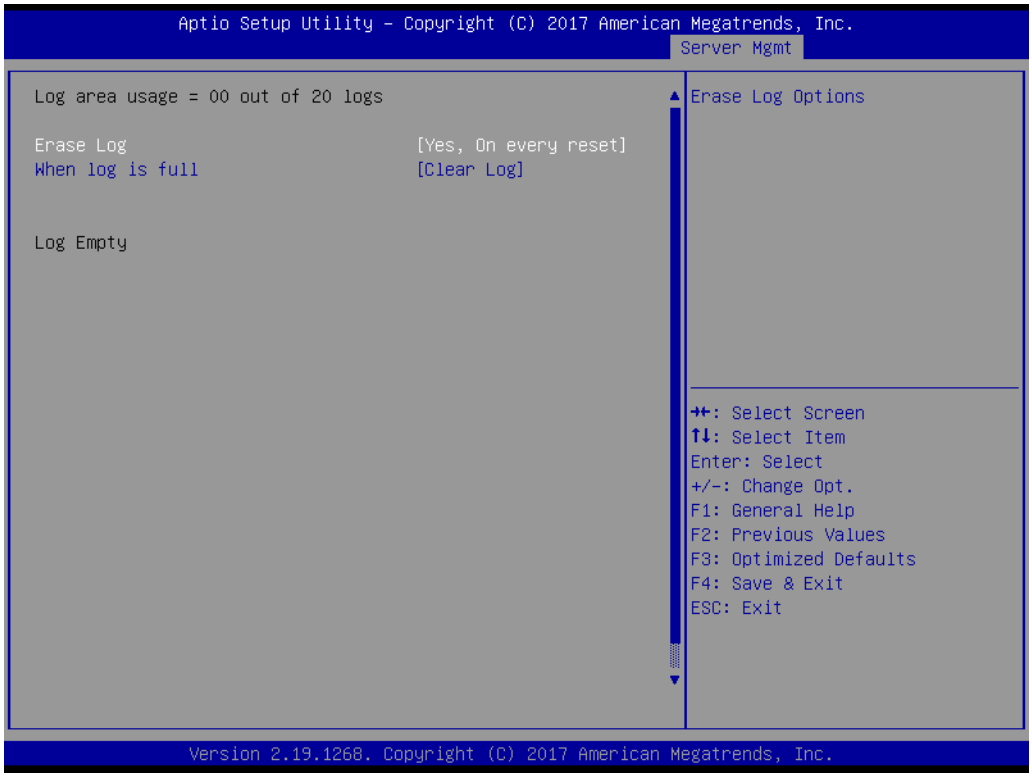
- **Wait for BMC counter**
  Initialize host to BMC interfaces.
  The MB beeps per 5 seconds to check it.

3.2.5.1 System Event Log



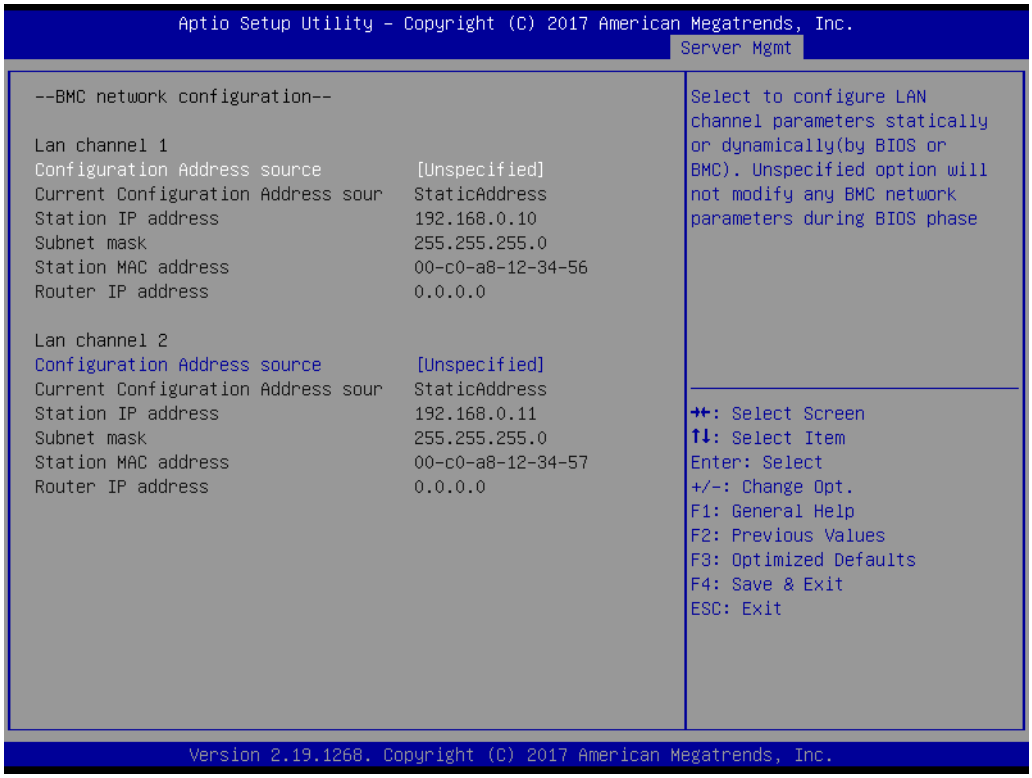
- **SEL Components**
  Enable/Disable all features of system event logging during boot.
- **Erase SEL**
  Choose options for erasing SEL.
- **When SEL is Full**
  Choose options for reactions to a full SEL.
- **Log EFI Status Codes**
  Disable the logging of EFI status codes or log only error code or only progress code or both.

3.2.5.2 BMC Self Test Log



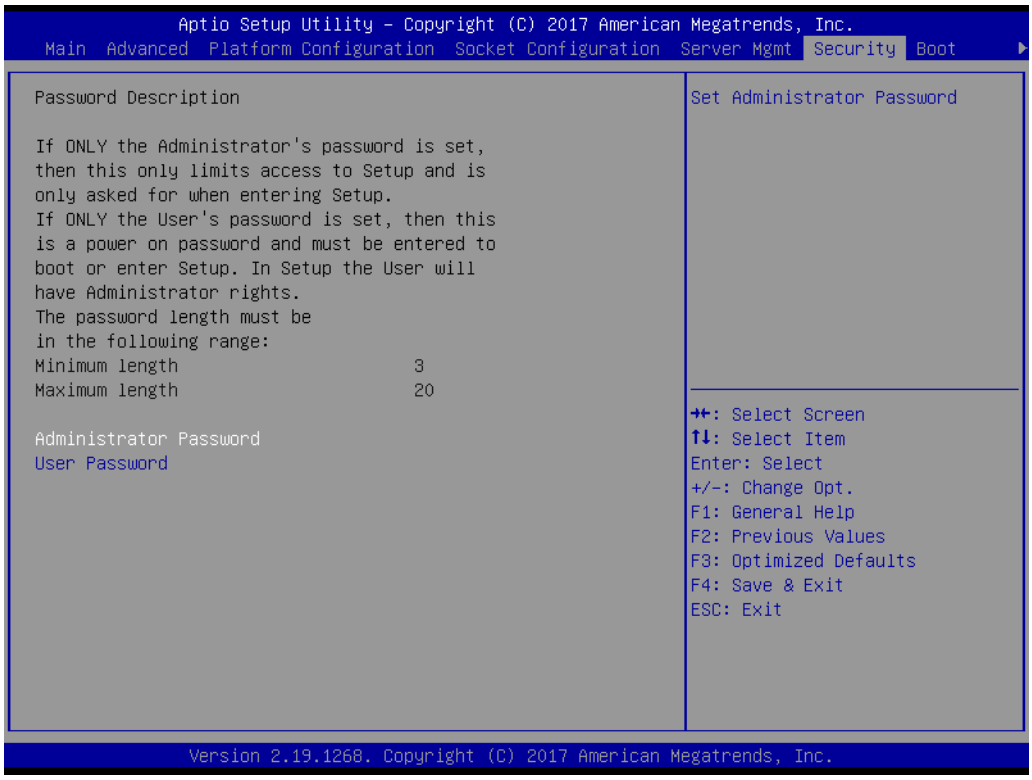
- **Erase Log**
  Erase log options.
- **When Log is Full**
  Select the action to be taken when log is full.

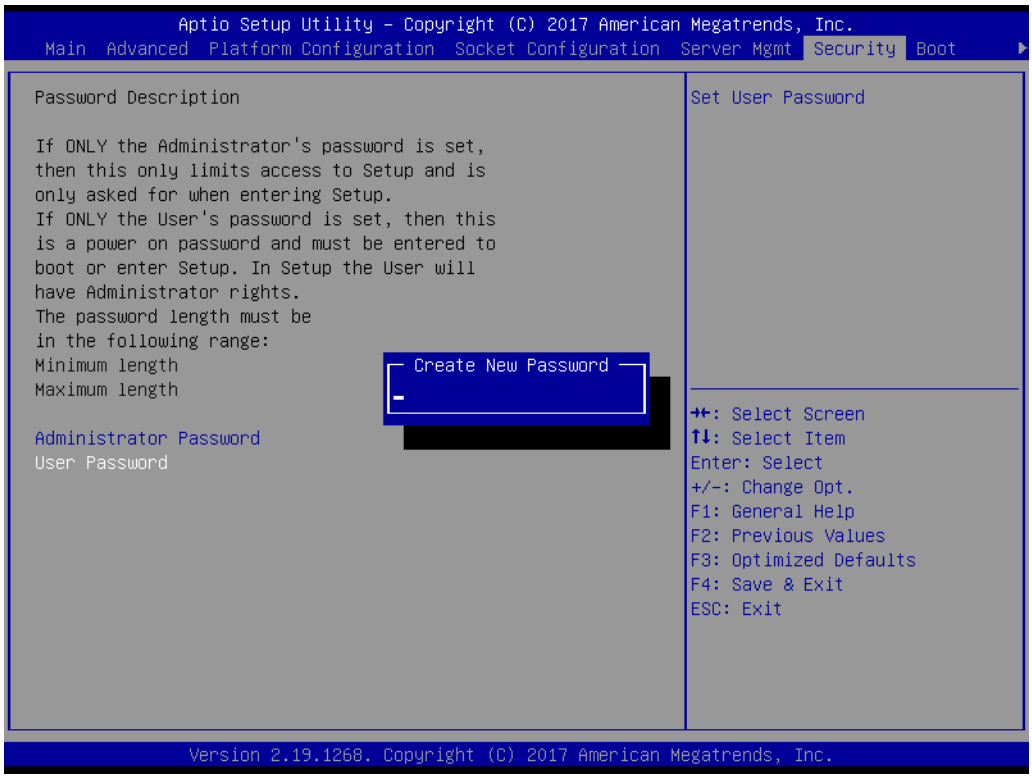
3.2.5.3 BMC Network Configuration



- **Configuration Address Source**
  Select to configure LAN channel parameters statically or dynamically (by BMC). Unspecified option will not modify any BMC network parameters during BIOS phase.

3.2.6 Security





Note! ***With AC power & Battery. Short CMOS1 Jumper:***

Date/Time & Password: Keep

Setting: reset to default

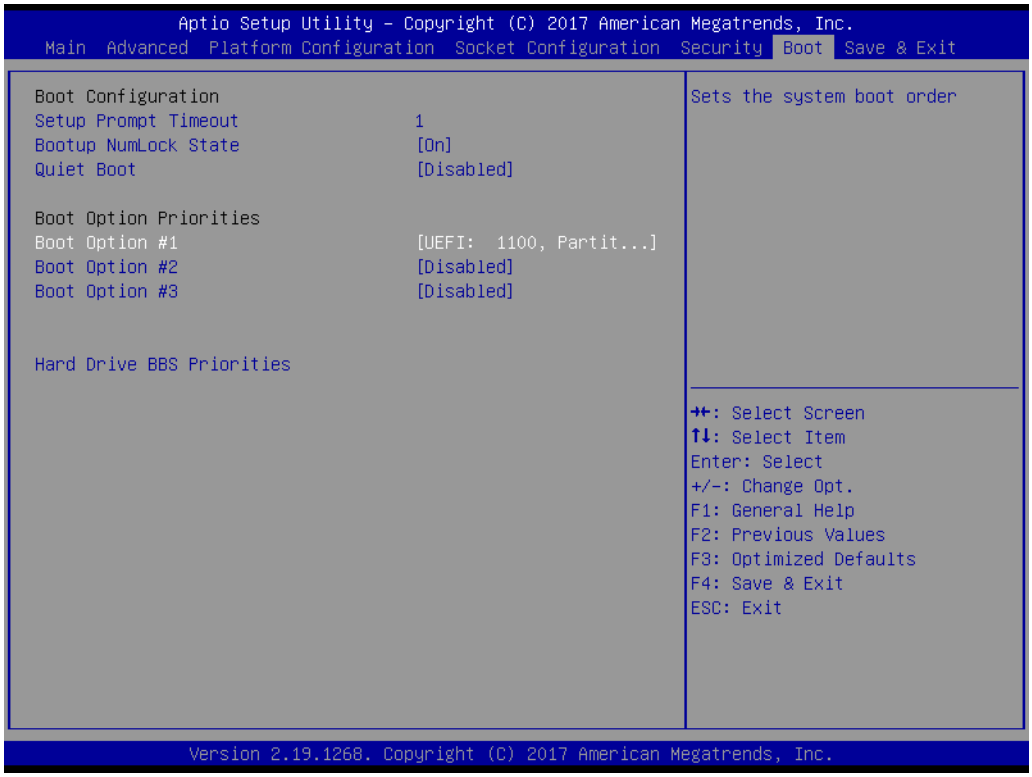
AC power and CMOS battery are removed. Short CMOS1 Jumper:

Date/Time: reset to default

Password: Keep

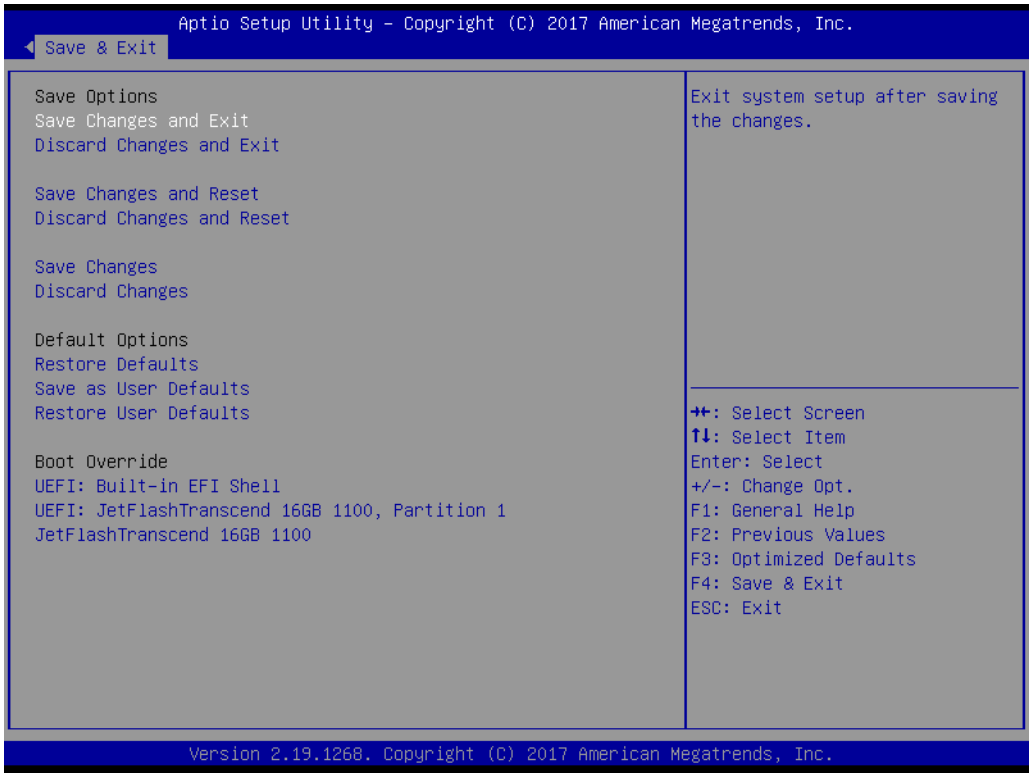
Setting: reset to default

3.2.7 Boot



- **Setup Prompt Timeout**
  Number of seconds to wait for setup activation key.
- **Bootup NumLock State**
  Select the keyboard NumLock state as "On" or "Off".
- **Quiet Boot**
  To "Enable or disable" quiet boot option.
- **Boot Option Priorities**
  Sets the system boot priorities.
- **Hard Drive BBS Priorities**
  Display this item when external legacy devices are plugged in to set boot priorities.

3.2.8 Save & Exit



- **Save Changes and Exit**
  Exit system setup after saving the changes.
- **Discard Changes and Exit**
  Exit system setup without saving any changes.
- **Save Changes and Reset**
  Reset the system after saving 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 default values for all the setup options.
- **Save as User Defaults**
  Save the changes done so far as user defaults.
- **Restore User Defaults**
  Restore the user defaults to all the setup options.

Chapter 4

Chipset Software Installation Utility

4.1 Before Beginning

To facilitate the installation of the enhanced display drivers and utility software, read the instructions in this chapter carefully. The drivers for the ASMB-815 are located on the software installation CD.

Before beginning, it is important to note that most display drivers need to have the relevant software application already installed on the system prior to installing the enhanced display drivers. In addition, many of the installation procedures assume that you are familiar with both the relevant software applications and operating system commands. Review the relevant operating system commands and the pertinent sections of your application software's user manual before performing the installation.

4.2 Introduction

The Intel Chipset Software Installation (CSI) utility installs the Windows INF files that outline to the operating system how the chipset components will be configured. This is needed for the proper functioning of the following features:

- Core PCI PnP services
- Serial ATA interface support
- USB 1.1/2.0/3.0 support
- Identification of Intel chipset components in the Device Manager

Note! *The files on the software installation CD are compressed. Do not attempt to install the drivers by copying the files manually. You must use the supplied SETUP program to install the drivers.*

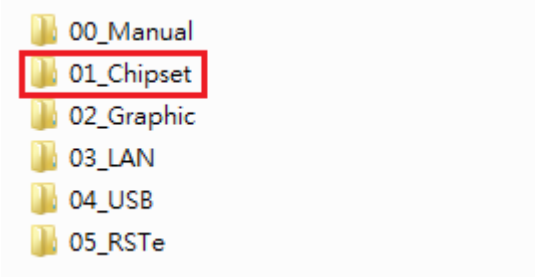
Note! *The chipset driver is used for the following versions of Windows, and it has to be installed before installing all the other drivers:*

Windows Server 2016 Standard	*x64*
Windows Server 2012 R2 Standard	*x64*
Windows 10 Ultimate	*x64*

Note! *It is necessary to update all the latest Microsoft hot fix files when using this OS.*

4.3 Windows Series Driver Setup

Insert the driver CD into your system's CD-ROM drive. When the folder is displayed, move the mouse cursor over the folder "01_Chipset". Find the executable in this folder, click to install the driver.



Chapter 5

Graphic Setup

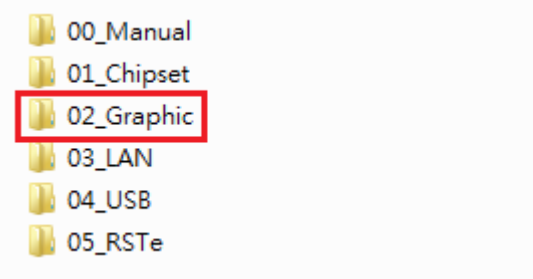
5.1 Introduction

Install the ASPEED VGA driver to enable this function, which includes the following features:

- 32-bit 2D graphics engine on board for normal use.
- 64 MB RAM for this chip, the highest resolution is 1920x1200.

5.2 Windows Series Driver Setup

Insert the driver CD into your system's CD-ROM drive. When the folder is displayed, navigate to the "02_Graphic" folder and click the executable file to complete the installation of the drivers for the OS that you need.



Note!

1. *If ASMB-815 carries an additional graphics card for VGA output, please set this additional graphic card as "major output" under the "Display properties" of OS.*
2. *The WDDM driver can support for the following OS versions:*
   - *Windows 8 x86/x64 version*
   - *Windows 8.1 x86/x64 version*
   - *Windows Server 2012 version (WHQL)*
   - *Windows Server 2012R2 version (WHQL)*
   - *Windows 10 x86/x64 version*
   - *Windows Server 2016 version (WHQL)*
3. *ASPEED Graphics WDDM Driver Limitation on Microsoft Windows OS.*
   - *It is a non-WHQL certified driver because ASPEED VGA is a 2D VGA, it cannot meet the WHQL requirement of WDDM drivers which require 3D VGA functions.*
   - *Because it is a non-WHQL certified driver, it may have some compatibility issues with some specific applications*
   - *Does not support modes with different display frequencies.*

Chapter 6

LAN, USB 3.0 and RSTe RAID

6.1 LAN Configuration

6.1.1 Introduction

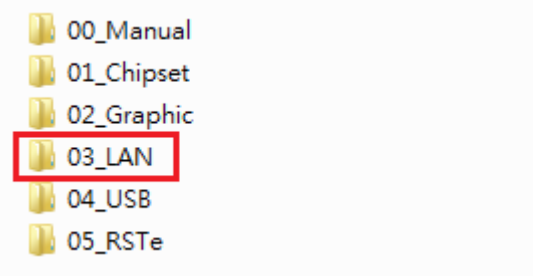
The ASMB-815 has two Gigabit Ethernet LAN connections via dedicated PCI Express x1 lanes: GbE LAN1 - Intel I210 and GbE LAN2 - I210; two 10G Base-T LAN connectors LAN3 and LAN4 - Intel X557 PHY. They eliminate bottlenecks in network data flow when incorporating Gigabit Ethernet at 10Gbps.

- 10/100/1000 & 10G Base-T Ethernet controller
- 10/100/1000 & 10G Base-T triple-speed MAC
- Full duplex at 10/100/1000 Mbps or 10 Gbps and half duplex at 10/100/1000 Mbps
- Wake-on-LAN (WOL) support
- PCIe x1 host and PHY interface

The integrated Intel gigabit Ethernet controller supports all major network operating systems. However, the installation procedure varies with different operating systems.

6.1.2 Windows Series Driver Setup

Insert the driver CD into your system's CD-ROM drive. Select folder "03_LAN" then click the proper LAN driver for the OS.



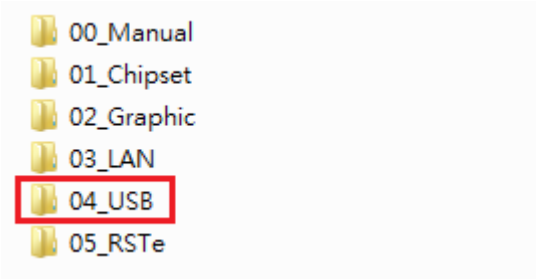
6.2 USB 3.0

6.2.1 Introduction

ASMB-815 offers six USB 3.0 ports, two in rear side and four via onboard header. The USB 3.0 could provide the bandwidth up to 500MB/s to shorter the time for data transmission.

6.2.2 Windows Series Driver Setup

Insert the driver CD into your system's CD-ROM drive. Select folder "04_USB" then click the Setup.exe file for the installation.



6.3 SATA & PCIe SSD RAID

6.3.1 Introduction

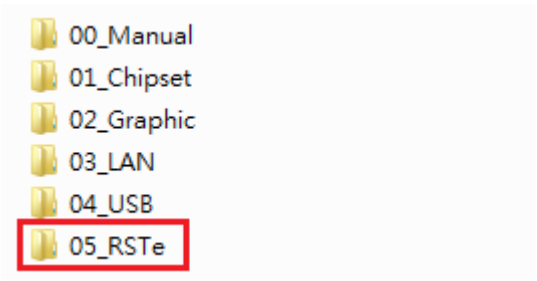
Intel C621/C622 PCH chip offers SATA & PCIe SSD RAID under Windows operating system.

Note! *1.Please visit the Intel download center for "Intel Rapid Storage Technology enterprise for Microsoft Windows Operating System Software User's Guide" file download,*

2.For the hotfix file download, please visit Microsoft website.

6.3.2 Windows Series Driver Setup

Insert the driver CD into your system's CD-ROM drive. Select folder "05_RSTe" then click to install the proper driver for the OS.



Appendix A

Programming the Watchdog Timer

The ASMB-815's watchdog timer can be used to monitor system software operation and take corrective action if the software fails to function within the programmed period. This section describes the operation of the watchdog timer and how to program it.

A.1 Watchdog Timer Overview

The watchdog timer is built in to the EC controller IT8528E. It provides the following functions for user programming:

- Can be enabled and disabled by user's program
- Timer can be set from 1 to 255 seconds
- Generates an interrupt or reset signal if the software fails to reset the timer before time-out

A.2 Programming the Watchdog Timer

The I/O port address of the watchdog timer is as below:

Address	Description	
0x57	Event - Warm Reset: 0x04	
0x5E	Warm Reset Timer (High BYTE)	Based 100ms
0x5F	Warm Reset Timer (Low BYTE)	

Here is an example to step by step program the Watchdog Timer.

Step	Action	Description
00	Read 0x299 port	Clear I/O port
	Wait IBF clear	0x29A, BIT1, = 0
01	Write 0x89 to 0x29A	
	Wait IBF clear	0x29A, BIT1, = 0
02	Write 0x5E to 0x299 port	
	Wait IBF clear	0x29A, BIT1, = 0
03	Write 0x00 to 0x299 port	Set 10 sec (high byte)
	Wait IBF clear	0x29A, BIT1, = 0
04	Write 0x89 to 0x29A	
	Wait IBF clear	0x29A, BIT1, = 0
05	Write 0x5F to 0x299 port	
	Wait IBF clear	0x29A, BIT1, = 0
06	Write 0x64 to 0x299 port	Set 10 sec (low byte)
	Wait IBF clear	0x29A, BIT1, = 0
07	Write 0x89 to 0x29A	
	Wait IBF clear	0x29A, BIT1, = 0

08	Write 0x57 to 0x299 port	Watchdog Event
	Wait IBF clear	0x29A, BIT1, = 0
09	Write 0x04 to 0x299 port	(Warm) Reset event
	Wait IBF clear	0x29A, BIT1, = 0
10	Write 0x28 to 0x29A	Start watchdog
	Wait 1 ~ 9 sec	
	Wait IBF clear	0x29A, BIT1, = 0
11	Write 0x29 to 0x29A	Stop watchdog
	Wait IBF clear	0x29A, BIT1, = 0
12	Go to Step 07	

Appendix B

I/O Pin Assignments

B.1 USB2.0 Header (USB9_10, USB13_14)

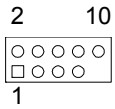


Table B.1: USB Header (USB9_10, USB13_14)

Pin	Signal	Pin	Signal
1	USB_VCC5	2	USB_VCC5
3	USB_D-	4	USB_D-
5	USB_D+	6	USB_D+
7	GND	8	GND
		10	NC

B.2 USB3.0 Header (USB3_56)

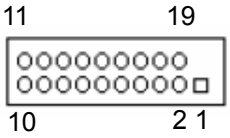


Table B.2: USB Header (USB3_56)

Pin	Signal	Pin	Signal
1	+5 V	2	STDA_SSRX-
3	STDA_SSRX+	4	GND
5	STDA_SSRX-TX-	6	STDA_SSRX+TX+
7	GND	8	D-
9	D+	10	NC (reserved for OC pin)
11	D+	12	D-
13	GND	14	STDA_SSRX+TX+
15	STDA_SSRX-TX-	16	GND
17	STDA_SSRX+	18	STDA_SSRX-
19	+5 V	20	

B.3 VGA Connector (VGA1)

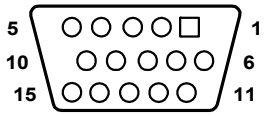


Table B.3: VGA Connector (VGA1)			
Pin	**Signal**	**Pin**	**Signal**
1	RED	9	VCC
2	GREEN	10	GND
3	BLUE	11	NC
4	NC	12	SDT
5	GND	13	H-SYNC
6	GND	14	V-SYNC
7	GND	15	SCK
8	GND		

B.4 RS-232 Interface (COM2)

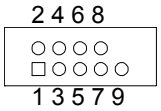


Table B.4: RS-232 Connector (COM2)	
Pin	**Signal**
1	DCD
2	DSR
3	RXD
4	RTS
5	TXD
6	CTS
7	DTR
8	RI
9	GND

B.5 External Keyboard Connector (KBMS2)

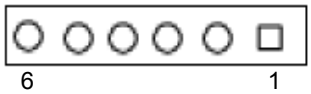


Table B.5: External Keyboard Connector (KBMS2)	
Pin	**Signal**
1	KB CLK
2	KB DATA
3	MS DATA
4	GND
5	VCC
6	MS CLK

B.6 System & CPU Fan Power Connector (SYSFAN0~4, CPUFAN0)

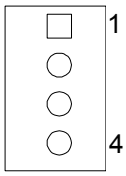


Table B.6: CPU FAN Connector (CPUFAN0)	
	CPUFAN0
1	GND
2	+12V
3	CPU_TACH
4	CPU0_PWM

Table B.7: SYS FAN Connector (SYSFAN0~4)					
	SYS FAN0	**SYS FAN1**	**SYS FAN2**	**SYSFAN3**	**SYSFAN4**
1	GND	GND	GND	GND	GND
2	+12V	+12V	+12V	+12V	+12V
3	FAN0_TACH	FAN1_TACH	FAN2_TACH	FAN3_TACH	FAN4_TACH
4	FAN0_PWM	FAN1_PWM	FAN2_PWM	FAN3_PWM	FAN4_PWM

B.7 Power LED (JFP3)

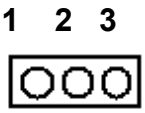


Table B.8: Power LED Connector (JFP3)

Pin	Function
1	LED power (3.3 V)
2	NC
3	LED power
4	Keylock
5	Ground

B.8 External Speaker Connector (JFP2)

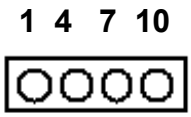


Table B.9: External Speaker Connector (JFP2)

Pin	Function
1	SPK+
4	NC
7	BZ-
10	SPK-

B.9 Reset Connector (JFP1)

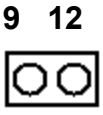


Table B.10: Reset Connector (JFP1)

Pin	Signal
9	RESET
12	GND

B.10 HDD LED Connector (JFP2)

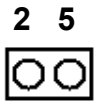


Table B.11: HDD LED Connector (JFP2)	
Pin	**Signal**
2	HDD_LED+
5	HDD_LED-

B.11 ATX Soft Power Switch (JFP1)

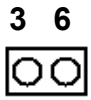


Table B.12: ATX Soft Power Switch (JFP1)	
Pin	**Signal**
3	PWR-BTN
6	GND

B.12 SMBus Connector (SMBUS1)

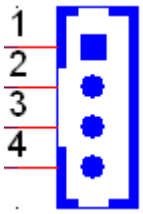


Table B.13: Front panel SMBus Connector (SMBUS1)	
Pin	**Signal**
1	+5V
2	SMB_SCL_FRU
3	SMB_SDA_FRU
4	GND

B.13 LAN Ports (LAN1~5)

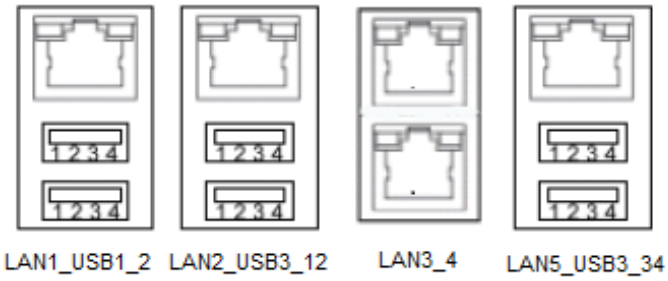


Table B.14: LAN RJ-45 Port (LAN1~2, LAN3_4, LAN5)

Pin	Signal	Pin	Signal
1	MID0+	4	MID2+
2	MID0-	5	MID2-
3	MID1+	7	MID3+
6	MID1-	8	MID3-

B.14 Audio Connector (HDAUD1)

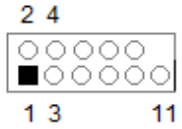


Table B.15: Front Panel Audio Connector (HDAUD1)

Pin	Signal	Pin	Signal
1	ACZ_VCC	2	GND
3	ACZ_SYNC	4	ACZ_BITCLK
5	ACZ_SDOUT	6	ACZ_SDIN0
7	ACZ_SDIN1	8	ACZ_RST
9	ACZ_12V	10	GND
11	GND	12	x

B.15 Alarm Board Connector (VOLT1)

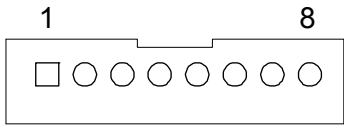


Table B.16: Alarm Board Connector (VOLT1)

Pin	Signal	Pin	Signal
1	5VSB	5	+5V
2	GND	6	+3.3V
3	GND	7	-12V
4	-5V	8	+12V

B.16 Case Open Connector (JCASE1)

Table B.17: Case Open Connector (JFP1)	
Pin	**Signal**
1	CASEOP
2	GND

B.17 Front Panel LAN LED Connector (LANLED1)

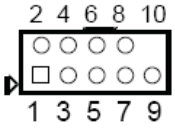


Table B.18: LAN LED Connector (LANLED1)			
Pin	**Signal**	**Pin**	**Signal**
1	LAN1_ACT#	2	LAN2_ACT#
3	+V3.3_AUX	4	+V3.3_AUX
5	LAN3_ACT#	6	LAN4_ACT#
7	+V3.3_AUX	8	+V3.3_AUX
9	NC	10	x

B.18 SATA SGPIO Connector (SGPIO1)

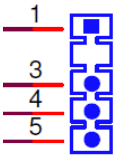


Table B.19: SATA SGPIO Connector (SGPIO1)	
Pin	**Signal**
1	SCLOCK_PCH
2	x
3	SLOAD_PCH
4	SDATAOUT0_PCH
5	SDATAOUT1_PCH

B.19 LPC Connector (LPC1)

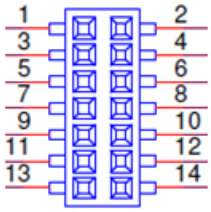


Table B.20: LPC Connector (LPC1)

Pin	Signal	Pin	Signal
1	CLK_24M_LPCCN	2	LPC_AD1
3	PLTRST_LPC	4	LPC_AD0
5	LPC_FRAME	6	+3.3V
7	LPC_AD3	8	GND
9	LPC_AD2	10	SMB_SCL_LPC
11	SERIRQ_PCH	12	SMB_SDA_LPC
13	+5V_AUX	14	+5V

B.20 Clear CMOS Connector (JCMOS1, JME1)

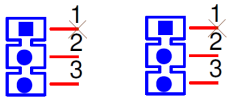


Table B.21: Clear CMOS Connector (JCMOS1, JME1)

	JCMOS1	JME1
Pin	Signal	Signal
1	NC	NC
2	RTC_RST_PCH	HDA_SDOUT_PCH
3	GND	+3.3V_AUX

B.21 PMBUS Connector (PMBUS1)

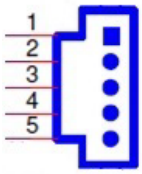


Table B.22: PMBUS Connector (PMBUS1)

Pin	Signal
1	SMB_SCL_PM
2	SMB_SDA_PM
3	SMB_ALT_PM
4	GND
5	+3.3V

B.22 GPIO Connector (GPIO1)

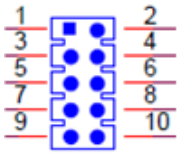


Table B.23: GPIO Connector (GPIO1)

Pin	Signal	Pin	Signal
1	EC_GPIO0	2	EC_GPIO4
3	EC_GPIO1	4	EC_GPIO5
5	EC_GPIO2	6	EC_GPIO6
7	EC_GPIO3	8	EC_GPIO7
9	VCC_GPIO	10	GND

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