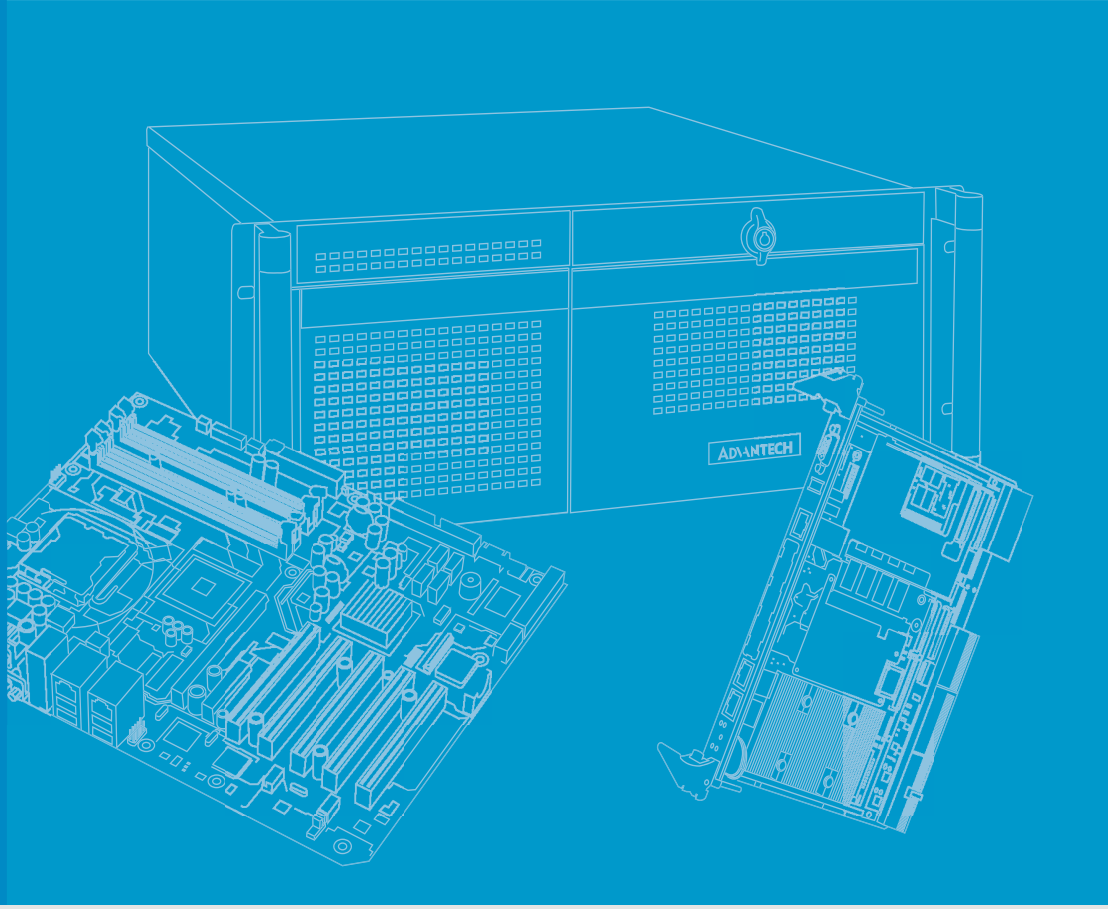

# User Manual

# SKY-642

## 4U Rackmount Intel® Xeon® Scalable Series GPU Server, Supporting 10 x PCIe x16 Double-Deck Cards Plus 1 x PCIe x16 and 1 x PCIe x8 Single-Deck Cards

ADVANTECH

*Enabling an Intelligent Planet*

# Copyright



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# Product Warranty (2 years)

Advantech warrants to you, the original purchaser, that each of its products will be free from defects in materials and workmanship for two years from the date of purchase.

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 onscreen 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 merchandize 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. 2001642000 Edition 1

Printed in Taiwan May 2019

# 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 A

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

# Safety Information

Retain and follow all product safety and operating instructions provided with your equipment. In the event of a conflict between the instructions in this guide and the instructions in equipment documentation, follow the guidelines in the equipment documentation.

Observe all warnings on the product and in the operating instructions. To reduce the risk of bodily injury, electric shock, fire and damage to the equipment, observe all precautions included in this guide.

You must become familiar with the safety information in this guide before you install, operate, or service Advantech products.

## Machine Room Environment

- Make sure that the area in which you install the system is properly ventilated and climate-controlled.
- Ensure that the voltage and frequency of your power source match the voltage and frequency inscribed on the electrical rating label of the equipment.
- Do not install the system in or near a plenum, air duct, radiator, or heat register.
- Never use the product in a wet location.

## Equipment Chassis

- Do not block or cover the openings to the system.
- Never push objects of any kind through openings in the equipment.
- Dangerous voltages might be present.
- Conductive foreign objects can produce a short circuit and cause fire, electric shock, or damage to your equipment.
- Lift equipment using both hands and with your knees bent.

## Rack Mount Instructions

The following or similar rack-mount instructions are included with the installation instructions:

- Elevated Operating Ambient - If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consideration should be given to installing the equipment in an environment compatible with the maximum ambient temperature (Tma) specified by the manufacturer.
- Reduced Air Flow - Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised.
- Mechanical Loading - Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.
- Circuit Overloading - Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on over current protection and supply wiring.
- Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.
- Reliable Earthing - Reliable earthing of rackmounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g. use of power strips).

- Make sure only one component is extended at a time. A rack might become unstable if more than one component is extended.

## Equipment Batteries*

- The system battery contains lithium manganese dioxide. If the battery pack is not handled properly, there is risk of fire and burns.
- Do not disassemble, crush, puncture, short external contacts, or dispose of the battery in fire or water.
- Do not expose the battery to temperatures higher than 60°C (140°F).
- The system battery is not replaceable. If the battery is replaced by an incorrect type, there is danger of explosion. Replace the battery only with a spare designated for your product.
- Do not attempt to recharge the battery.
- Dispose of used batteries according to the instructions of the manufacturer.
- Do not dispose of batteries with the general household waste. To forward them to recycling or proper disposal, use the public collection system or return them to Advantech, your authorized Advantech partner, or their agents.

## Equipment Modifications

- Do not make mechanical modifications to the system. Advantech is not responsible for the regulatory compliance of Advantech equipment that has been modified.

## Equipment Repairs and Servicing

- The installation of internal options and routine maintenance and service of this product should be performed by individuals who are knowledgeable about the procedures, precautions, and hazards associated with equipment containing hazardous energy levels.
- Do not exceed the level of repair specified in the procedures in the product documentation. Improper repairs can create a safety hazard.
- Allow the product to cool before removing covers and touching internal components.
- Remove all watches, rings, or loose jewelry when working before removing covers and touching internal components.
- Do not use conductive tools that could bridge live parts.
- Use gloves when you remove or replace system components; they can become hot to the touch.
  - If the product sustains damage requiring service, disconnect the product from the AC electrical outlet and refer servicing to an authorized service provider. Examples of damage requiring service include:
  - The power cord, extension cord, or plug has been damaged.
  - Liquid has been spilled on the product or an object has fallen into the product.
  - The product has been exposed to rain or water.
  - The product has been dropped or damaged.
  - The product does not operate normally when you follow the operating instructions.

***Note!*** *Danger of explosion if battery is incorrectly replaced.*

*Replace only with the same or equivalent type recommended by the manufacture. Discard used batteries according to the manufacture's instructions.*

*Danger d'explosion si la batterie est remplacée de façon incorrecte.*

*Remplacez-la uniquement avec le même type ou équivalent recommandé par la fabrication. Jetez les piles usagées selon les instructions du fabricant.*

# Peripheral Compatibility

| Category | Advantech PN | Vendor | Part Description | Remarks |
|---|---|---|---|---|
| CPU | TBD | Intel | Xeon Bronze 3104/1.70GHz/ 8.25M/6Cores | 85W |
| | 96MPXE-1.7-11M36 | Intel | Xeon Bronze 3106/1.70GHz/ 11M/8Cores | 85W |
| | TBD | Intel | Xeon Silver 4108/1.80GHz/11M/ 8Cores | 85W |
| | 96MPXE-2.0-11M36 | Intel | Xeon Silver 4109T/2.0GHz/11M/ 8Cores | 70W |
| | 96MPXE-2.1-11M36 | Intel | Xeon Silver 4110/2.1GHz/11M/ 8Cores | 85W |
| | TBD | Intel | Xeon Silver 4112/2.6GHz/8.25M/ 4Cores | 85W |
| | TBD | Intel | Xeon Silver 4114/2.2GHz/ 13.75M/10Cores | 85W |
| | 96MPXE-2.1-16M36 | Intel | Xeon Silver 4116/2.1GHz/16.5M/ 12Cores | 85W |
| | TBD | Intel | Xeon Gold 5115/2.4GHz/ 13.75M/10Cores | 85W |
| | 96MPXE-2.3-16M36 | Intel | Xeon Gold 5118/2.3GHz/16.5M/ 12Cores | 105W |
| | TBD | Intel | Xeon Gold 5120/2.2GHz/ 19.25M/14Cores | 105W |
| | 96MPXE-2.2-19M36 | Intel | Xeon Gold 5120T/2.2GHz/ 19.25M/14Cores | 105W |
| | TBD | Intel | Xeon Gold 6136 CPU @ 3.00 GHz/24.75M/12Cores | 150W |
| | TBD | Intel | Xeon Gold 6140/2.3GHz/ 24.75M/18Cores | 140W |
| | TBD | Intel | Xeon Gold 6142/2.60 GHz/22M/ 16Cores | 150W |
| | TBD | Intel | Xeon Gold 6142M/2.6GHz/22M/ 16Cores | 150W |
| | TBD | Intel | Xeon Platinum 8158/24.75M/ 12cores | 150W |
| | TBD | Intel | Xeon Platinum 8160M/33M/ 24cores | 150W |

| | | | | |
|---|---|---|---|---|
| Memory | AQD-D4U4GR24-HG | ADATA | 4G DDR4-2400 RDIMM | REG |
| | AQD-D4U8GR24-HE | ADATA | 8G DDR4-2400 RDIMM | REG |
| | AQD-D4U16R24-HE | ADATA | 16G DDR4-2400 RDIMM | REG |
| | SQR-RD4M-32G2K4SRB | Advantech | 32G DDR4-2400 RDIMM | REG |
| | SQR-RD4N8G2K4SZBBB | Advantech | 8G DDR4-2400 RDIMM | REG |
| | SQR-RD4N8G2K6SZBCB | Advantech | 8G DDR4-2666 RDIMM | REG-ECC |
| | SQR-RD4N32G2K6SRCB | Advantech | 32G DDR4-2666 RDIMM | REG-ECC |
| | A4B08QD8BNTDSE | ATP | 8G DDR4-2666 RDIMM | REG-ECC |
| | A4B16QE8BNTDSE | ATP | 16G DDR4-2666 RDIMM | REG-ECC |
| | A4B32QB4BNTDSE | ATP | 32G DDR4-2666 RDIMM | REG-ECC |
| SATA HDD | 96HD4TB-ST-SG7KE1 | Seagate | 3.5" SATA HDD 4TB | ST4000NM0035 |
| | 96HD8TB-ST-SG7KE | Seagate | 3.5" SATA HDD 8TB | ST8000NM0055 |
| | 96HD2TB-ST-WD7KE2 | WD | 3.5" SATA HDD 2TB | HUS722T2TALA604 |
| | 96HD6TB-ST-WD7KE2 | WD | 3.5" SATA HDD 6TB | HUS726T6TALE6L4 |
| | 96HD8TB-ST-WD7KE2 | WD | 3.5" SATA HDD 8TB | HUS728T8TALE6L4 |
| | TBD | Toshiba | 3.5" HDD 4TB | NG04ACA400E |
| | TBD | Toshiba | 3.5" HDD 10TB | MG06ACA10TE |
| | TBD | Toshiba | 3.5" HDD 14TB | MG07ACA14TE |
| | TBD | Transcend | 2.5" SSD 720 | MLC TS128G SSD720 MLC |
| | SQF-S25M8-64G-S8C | Advantech | 2.5" SSD 64GB | SQF Flash 64GB |
| CPU Heatsink | 1960081155N101 | CoolJag | Heatsink I-Skylake-EP S-165W 107.75x78.0x25.5-SC | |
| Power supply | 96PSRM-A1K6WCRP | FSP | 1600W CRPS Module | |

| | | | | |
|---|---|---|---|---|
| M.2 SATA PCIe | SQF-CM8V2-128G-E8C | Advantech | SQF M.2 2280 710 128G | 3D NAND BiCS3 (0~70° C )PCIe Interface |
| | SQF-SM8M8-128G-SAC | Advantech | SQF M2 2280 830 128G | MLC (0~70° C )SATA3 Interface |
| | SQF-SM8M1-32G-SBC | Advantech | SQF M.2 2280 640 32G | MLC (0~70° C )SATA3 Interfce |
| GPU Card | SKY-TESL-V100-32P | NVidia | Tesla V100 32GB | PCI-E x 16 HS |
| | SKY-TESL-V100-P | NVidia | Tesla V100 16GB | PCI-E x 16 HS |
| | SKY-TESL-P40-PE | NVidia | Tesla P40 24GB | PCI-E x16 HS |
| | SKY-TESL-P100-PE | NVidia | Tesla P100 12GB | PCI-E x16 HS |
| RAID Card | TBD | LSI | MR SAS 9361-4i | PCIe x8 |
| | TBD | LSI | MR SAS 9380-4i4e | PCIe x8 |
| | TBD | LSI | MR SAS 9340-8i | PCIe x8 |
| | 96RC-SAS-8P-PE-AD4 | Adaptec | ASR-8805 | PCIe x8 |
| | TBD | Adaptec | Adaptec HBA 3102-8i | PCIe x8 |
| | TBD | Adaptec | Adaptec HBA 3154-8i | PCIe x8 |
| Cable | 96CB-MSASH-MSASH-1 | Adaptec | CABLE HD MINI-SAS TO HD MINI-SAS 1M | RAID card cable out at top side |
| | 1700025065-01 | Advantech | M cable SAS 36P/SAS 36P 85cm | RAID card cable out at rear side |
| LAN Card | TBD | Intel | XXV710-DA2 | |
| | TBD | Intel | XXV710-DA1 | |
| | TBD | Intel | XL710-QDA2 | |
| | TBD | Intel | XL710-QA2 | |
| | 96NIC-1G2P-PE-IN3 | Intel | I350-T2 | |

# Initial Inspection

Before powering up the system, please make sure that the following materials have been shipped:

- 1 x SKY-642 system
- 1 x SKY-642 Startup Manual
- 10 x GPU extend bracket
- 2 x CPU heatsink with clip
- 7 x GPU air block for PCIE without add on cards
- 2 x Mounting ears with handles
- 1 x Warranty card

If any of these items are missing or damaged, contact distributor or sales representative immediately. We have carefully inspected the SKY-642 mechanically and electrically before shipment. It should be free of marks and scratches and in perfect working order upon receipt. When unpacking the SKY-642, 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 | Expansion slot | Lan port | IPMI |
|---|---|---|---|
| SKY-6420-R48A1 | 11*PCIe x16 + 1 x PCIe x8 | 2 | Yes |

# Contents

# Chapter 1

## Overview

## 1.1 Introduction

The SKY-642 is a high performance Intel Xeon scalable processor system for GPU applications that require high computing power & multi-expansion slots in a 4U system. This system supports dual Intel Xeon scalable processors and DDR4 ECC-REG 2133/2400/2666 MHz memory/ Intel Optane DC Persistent Memory up to 6TB.

SKY-642 provides 12 x PCIe x16 slots (11 in x16 link, 1 in x8 link).

In addition, SKY-642 provides dual 10GbE Ethernet, eliminating network, also one dedicate LAN port for IPMI function to allow remote control.

High reliability and outstanding performance makes SKY-642 the ideal platform for industrial server applications.

SKY-642 uses the Intel C622 chipset and offers a variety of features such as 12 x SATA/SAS hot swappable bays, SAS optional by RAID card, Intel RSTe (Rapid Storage Technology Enterprise), RAID 0, 1, 5, 10 (Windows only*), 1 x 2280 connector (B + M Key) for OS installation and cache, 7 x USB 3.0 (4 x in rear, 1 x internal Type A Connector, and 2 x at front).

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

## 1.2 Features

**General**

- Intel Xeon Scalable Family processor support: SKY-642 supports two Intel Scalable Family series multi-core (up to twenty cores) processors.
- High performance I/O capability: Dual 10GbE LAN, 12 x PCIe x16 slots (11 in x16 link, 1 in x8 link), 12 x SATA/SAS hot swappable bays, SAS optional by RAID card, 1 x SATA M.2 2280 connector (B + M Key), 7 x USB 3.0 ports.
- Proprietary form factor with industrial features: SKY-642 provides industrial features like long product lifecycle, reliable operation, watchdog timer, etc.
- IPMI 2.0 support: SKY-642 equipped with ASPEED 2500 BMC chip supports IPMI 2.0 (Intelligent Platform Management Interface 2.0) via share and dedicate LAN port.
- KVM over IP: SKY-642 KVM over IP function allows remote control of your system through your own computer.

***Note!***

1. *10 of the PCIe x16 slots support FHFL double deck GPU card, one PCIe x 16 from CPU1 supports FHFL single deck add on cards like RAID cards.*
2. *Please refer to the release notes of each Linux OS for Intel's C622 chipset SATA RAID function support.*

## 1.3 System Specifications

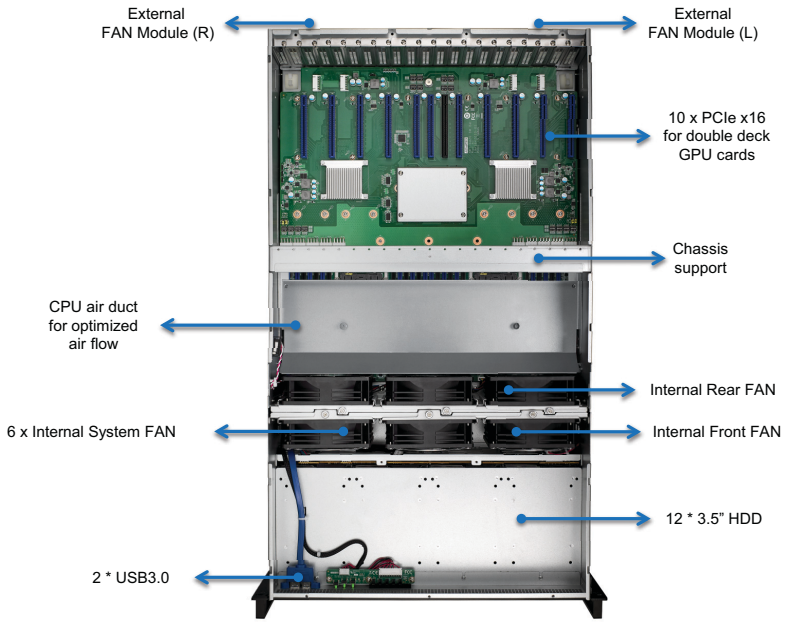
| | |
|---|---|
| **Processor** | |
| CPU | ■ Dual Intel LGA3647 Xeon processor sockets<br>■ Supports Intel Xeon Scalable Family processor<br>■ Supports the processor TDP up to 150 W. |
| **System Memory** | |
| Memory Capacity | ■ Intel Xeon processor supports DDR4 memory bus<br>■ Total 24 x 288-pin memory slots provided<br>■ Supports total capacity up to 6TB<br>■ 6 x channels per processor, 2 x memory slots per channel |
| Memory Type | ■ Supports DDR4 2133/2400/2666 MHz ECC Registered Modules/Intel Optane DC Persistent Memory |
| Memory Sizes | Each memory slot supports 4GB, 8GB, 16GB, 32GB and 64GB memory modules |
| Memory Voltage | 1.2 V |
| Error Detection | ■ Corrects single-bit errors<br>■ Detects double-bit errors (using ECC memory) |
| **On-board Devices** | |
| Chipsets | Intel C622 PCH provide 8 PCIe x1 Gen2 lanes |
| Network Controllers | ■ Intel X557-T for LAN1/2 10 GbE<br>■ Above network Supports1/10 GbE Base-T, with RJ-45 output |
| VGA | ASPEED AST2500 controller with 64 MB VGA memory provides basic 2D VGA function. |
| EC | ITE 8528E chip provides motherboard,<br>RS-232, and hardware monitor functions. |
| BMC | Sharing with LAN 1 + 1 dedicate NIC for IPMI. |
| **Input / Output** | |
| Storage | ■ Total 12 x 2.5"/3.5" HDD bays, all support 6 Gb/s bandwidth<br>■ RAID 0, 1, 5, 10 support (Windows only). |
| LAN | 3 x RJ-45 LAN ports 2 x 10GbE + 1 x dedicate IPMI LAN) |
| USB | ■ 4 x USB 3.0 ports at rear window.<br>■ 2 x USB 3.0 ports at front window.<br>■ 1 x internal Type-A USB 3.0 port. |
| VGA | 1 x D-Sub port |
| Serial Port / Header | 2 x Internal header (2 x 5 pin, 2.0 mm pitch) for UART port. |
| **Power Supply** | |
| **Power** | 80 PLUS Platinum 3+1 4800W redundant power supply, for each power unit<br>1000 W @ 100 ~ 127 V<br>1600 W @ 200 ~ 240 V |
| **Power Connector** | |
| Expansion Card power | 10 x CPU-8P 12V power connector for expansion card.<br>Cable optional, depends on the expansion card type. |
| **Expansion Slots** | |

| | |
|---|---|
| PCI-express | ■ 11 x PCI-E x16 slot (Gen3 x16 link)<br>– Slot 1~ Slot 5 from U1_PLX8796 from CPU0<br>– Slot 6 from CPU1<br>– Slot 8~ Slot 12 from U2_PLX8796 from CPU0<br>■ 1 x PCI-E x16 slot (Gen3 x8 link)<br>– Slot 7 from CPU0 |
| **System BIOS** | |
| BIOS type | 128 Mb SPI Flash EEPROM with AMI BIOS |
| **PC Health Monitoring** | |
| Voltage | Monitors for CPU Cores, +3.3 V, +5 V, +12 V, +5 V Standby, VBAT |
| Fan | ■ Six 120X38 fan for CPU/GPU cooling.<br>■ Four 80X38 fan for expansion card cooling (optional at rear window).<br>■ SYSFAN0-SYSFAN7 with tachometer status monitoring |
| Temperature | Monitoring for CPU0 & CPU1 (PECI)<br>Monitoring for System (HWM) |
| Other Features (Case Open) | ■ Chassis intrusion detection<br>■ Chassis Intrusion header |
| **Operating Environment / Compliance** | |
| RoHS | RoHS Compliant |
| Environmental Spec. | ■ Operating Temperature: 0 to 35° C<br>■ Non-operating Temperature: -40 to 60° C<br>■ Operating Relative Humidity: 95% @ 40° C (non-condensing)<br>■ Non-operating Relative Humidity: 95% @ 60° C (non-condensing) |

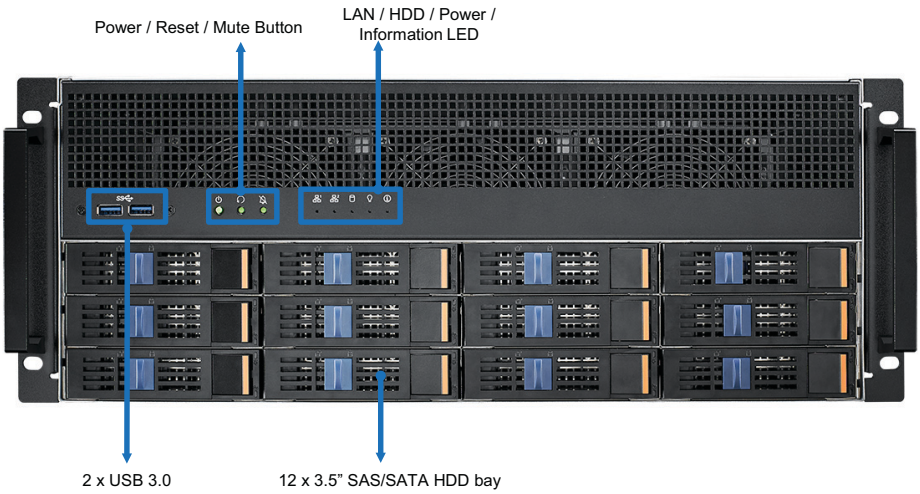
# 1.4 System Layout, LED, Jumpers and Connectors

Connectors on the SKY-642 are linked to external devices such as hard disk drives. In addition, SKY-642 has a jumper that are used to clean CMOS for BIOS. 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 SKY-642.

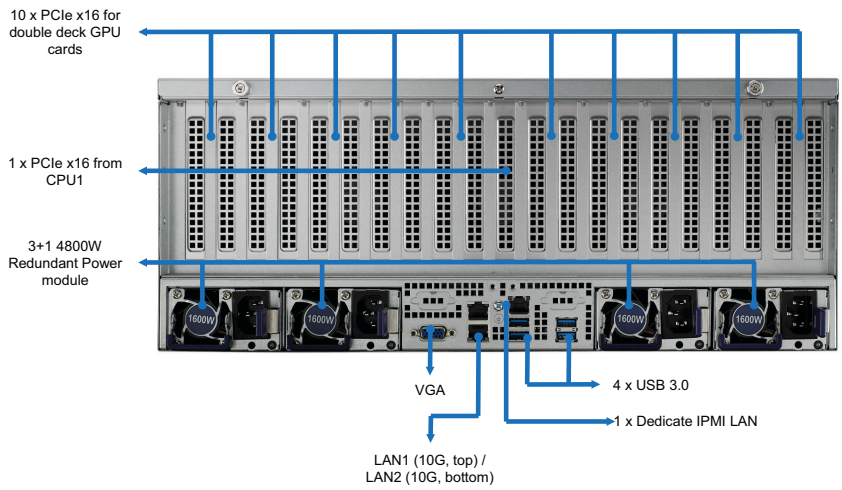
### System top view




### Front IO view



### Rear IO View




## 1.4.1 LED Definitions

### Front I/O LED

| LED | State | Color | Description |
|---|---|---|---|
| Power LED | On | Green | System is turned on |
| | Blinking | Green | System is under S4 state |
| | Off | Off | Power off |
| LAN1 ~ LAN2 LED | Blinking | Green | LAN active |
| | On | Green | LAN linked |
| | Off | Off | LAN unlinked |
| Information LED | On | Red | Hardware monitor fail*; Location function** |
| | Off | Off | No failure |

*The causes of hardware monitoring failure can be over temperature, fan failure, over voltage, case intrusion etc. Please check BMC web UI for more information.

**Location function is used to locate the server on a rack from remote location.

### HDD LED

| HDD status | | Status LED Color: Amber | Activity LED Color: Green |
|---|---|---|---|
| No driver present or power disconnected | | Off | Off |
| Driver present | No activity | Off | On |
| | Access activity | Off | Blinking |
| HDD fail* | | On | - |
| Identify (locate the HDD)* | | 4 Hz Blinking | 4 Hz |
| SATA/SAS RAID rebuild* | | 1 Hz Blinking | - |
| Hot-spare* | | Off | - |

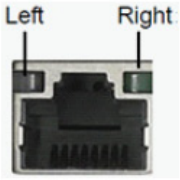
* Fail, Identify, Rebuild, Hot-spare only work under RAID mode.

**On-Board LED**

| LED | State | Color | Description |
|---|---|---|---|
| 5V LED1 | On | Green | System power on |
| | Off | Off | Power off |
| 5VSB LED1 | On | Green | System power on, in sleep mode or in soft-off mode |
| | Off | Off | No AC power input |
| BMC LED1 | Blinking | Green | BMC controller is working normally |

**Rear I/O LED (1)**

**Table 1.1: Onboard LAN LED Color Definition**

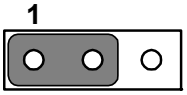
| 1G & 10G bps LAN Link/Activity LED Scheme | | | |
|---|---|---|---|
|  | | LAN1 & LAN2 (10G) | |
| | | Left LED | Right LED |
| 1G Mbps | Link<br>Active | Amber<br>Amber | Green<br>Blinking green |
| 10G Mbps | Link<br>Active | Green<br>Green | Green<br>Blinking green |
| No Link | | Off | Off |

**Rear I/O LED(2)**

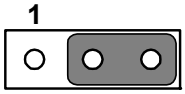
| | | | |
|---|---|---|---|
| Power module LED | Blinking | Amber | No AC power to this module while other PSU with AC input |
| | 1Hz Blinking | Green | AC present standby output on |
| | 1Hz Blinking | Amber | Power supply warning events where the power supply continues to operate; high temp, high power, high current, slow fan |
| | On | Amber | Power supply critical event causing a shutdown; failure, OCP, OVP, fan fail |
| | On | Green | Power supply DC output ON and OK |
| | Off | Off | No AC power to all power modules |

## 1.4.2 Jumpers

| Label | Function | Default |
|---|---|---|
| JCMOS1 | CMOS clear | 1-2 |
| JME1 | ME update | 1-2 |




Keep CMOS data / Disable ME update




Clear CMOS data / Enable ME update

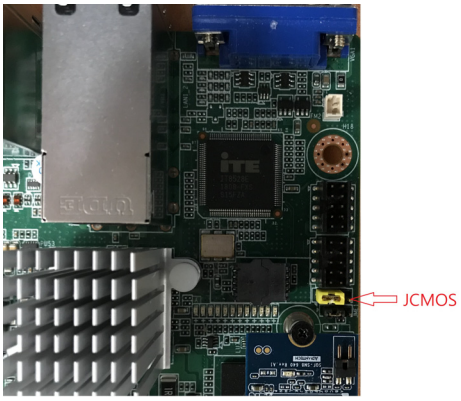
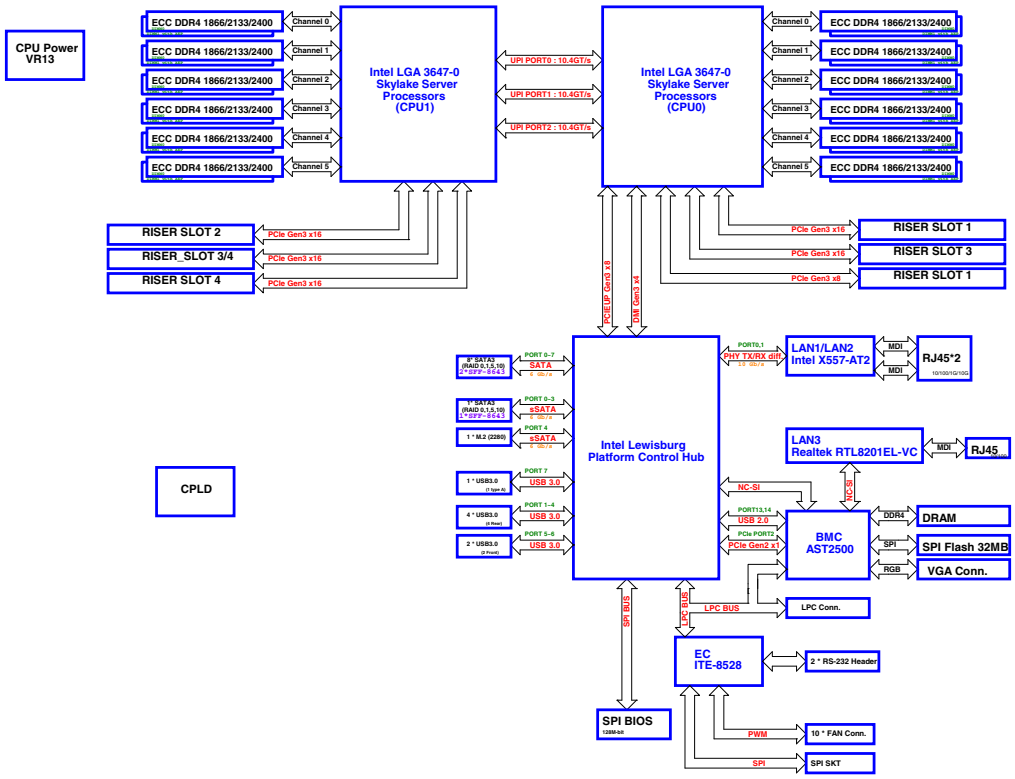



**Figure 1.1 JCMOS location**

### 1.4.3 Connectors

| | |
|---|---|
| CPU0 | Intel LGA3647 CPU0 socket |
| CPU1 | Intel LGA3647 CPU1 socket |
| SYS FAN0 ~ SYS FAN9 | System fan connector (8-pin) |
| DIMMA1, DIMMA2,DIMMB1, DIMMB2,DIMMC1, DIMMC2,DIMMD1, DIMMD2,DIMME1, DIMME2,DIMMF1, DIMMF2, | DIMM channel of CPU0 |
| DIMMG1, DIMMG2,DIMMH1, DIMMH2,DIMMI1, DIMMI2,DIMMJ1, DIMMJ2,DIMMK1, DIMMK2,DIMML1, DIMML2, | DIMM channel of CPU1 |
| GPU_CN1~GPU_CN10 | 12V power output connector for expansion card (CPU-8P) |
| SATA_CON1 | SFF-8643 connector for SATA0~SATA3 |
| SATA_CON2 | SFF-8643 connector for SATA4~SATA7 |
| sSATA_CON1 | SFF-8643 connector for sSATA0~sSATA3 |
| M.2_2280_1 | M.2 2280 connector (B+M key) for SATA and PCIEX2 |
| RISER_SLOT1 ~ RISER_SLOT4 | High density connector for riser card to expansion board |
| PCIEX16_1 ~ PCIEX16_5 | PCIe x16 slot (gen3 x16 link) from CPU0 through U1_PLX8796 |
| PCIEX16_8 ~ PCIEX16_12 | PCIe x16 slot (gen3 x16 link) from CPU0 through U2_PLX8796 |
| PCIEX16 SLOT6 | PCIe x16 slot (gen3 x16 link) from CPU1 |
| PCIEX16 SLOT7 | PCIe x16 slot (gen3 x8 link) from CPU0 |
| LPC1 | LPC port for debug & TPM module |
| COM1 ~ COM2 | Serial port : RS-232 |
| SMBUS1 | For HDD status monitoring |
| BP P1 ~ P3 | 5V power output connector for HDD back plane |
| LAN3_USB1_2, USB3_4 | USB port 1, 2, 3, 4 (rear USB3.0) |
| USB7 | USB port 7 (internal type-A, horizontal) |
| USB5_6 | USB port 5, 6 (front panel USB3.0) |

## 1.5 Block Diagram




## 1.6 System Memory

SKY-642 has 24 x 288-pin memory slots for DDR4 2133/2400/2666 MHz memory modules/ Intel Optane DC Persistent Memory with maximum capacity of 6TB (Maximum 64 GB for each DIMM). SKY-642 supports registered DIMMs only.

## 1.7 Memory Installation Procedures

| Table 1.2: DIMM Population Recommendations with single CPU | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Quantity of memory installed** | | | | | | | | | | | | | |
| CPU0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | CPU1 |
| DIMMA1 | v | v | v | v | | v | | v | | | | v | DIMMG1 |
| DIMMA2 | | | | | | | | v | | | | v | DIMMG2 |
| DIMMB1 | | v | v | v | | v | | v | | | | v | DIMMH1 |
| DIMMB2 | | | | | | | | v | | | | v | DIMMH2 |
| DIMMC1 | | | v | | | v | | | | | | v | DIMM I1 |
| DIMMC2 | | | | | | | | | | | | v | DIMM I2 |
| DIMMD1 | | | | v | | v | | v | | | | v | DIMMJ1 |
| DIMMD2 | | | | | | | | v | | | | v | DIMMJ2 |
| DIMME1 | | | | v | | v | | v | | | | v | DIMMK1 |
| DIMME2 | | | | | | | | v | | | | v | DIMMK2 |
| DIMMF1 | | | | | | v | | | | | | v | DIMML1 |
| DIMMF2 | | | | | | | | | | | | v | DIMML2 |

***Note!*** *5, 7, 9, 10, 11 DIMMs are not recommended DIMM population.*

*When dual CPUs are required, then you need to consider both CPU0 and CPU1 configurations.*

*For example, if CPU0 and CPU1 both need 2 DIMMs, the location will be DIMMA1, DIMMB1, DIMMG1 and DIMMH1.*

# Chapter 2

## Setting up

## 2.1 Before you Begin

This chapter explains how to install the CPUs, CPU heatsinks, memory modules, and hard drives. Instructions on inserting add on cards are also given.

### 2.1.1 Work Area

Make sure you have a stable, clean working environment. Dust and dirt can get into components and cause malfunctions. Use containers to keep small components separated. Putting all small components in separate containers prevents them from becoming lost. Adequate lighting and proper tools can prevent you from accidentally damaging the internal components.

### 2.1.2 Tools

The following procedures require only a few tools, including the following:

- A cross head (Phillips) screwdriver
- A T-30 Torx driver
- A 7-mm Hex Socket Wrench
- A grounding strap or an anti-static pad

Most of the electrical and mechanical connections can be disconnected with your hands. It is recommended that you do not use pliers to remove connectors as it may damage the soft metal or plastic parts of the connectors.

### 2.1.3 Precautions

Components and electronic circuit boards can be damaged by discharges of static electricity. Working on a system that is connected to a power supply can be extremely dangerous. Follow the guidelines below to avoid damage to SKY-642 or injury to yourself.

- Ground yourself properly before removing the top cover of the system. Unplug the power from the power supply and then touch a safely grounded object to release static charge (i.e. power supply case). If available, wear a grounded wrist strap. Alternatively, discharge any static electricity by touching the bare metal chassis of the unit case, or the bare metal body of any other grounded appliance.
- Avoid touching motherboard components, IC chips, connectors, memory modules, and leads.
- The motherboard is pre-installed in the system. When removing the motherboard, always place it on a grounded anti-static surface until you are ready to reinstall it.
- Hold electronic circuit boards by the edges only. Do not touch the components on the board unless it is necessary to do so. Do not flex or stress circuit boards.
- Leave all components inside the static-proof packaging that they ship with until they are ready for installation.
- After replacing optional devices, make sure all screws, springs, or other small parts are in place and are not left loose inside the case. Metallic parts or metal flakes can cause electrical shorts.

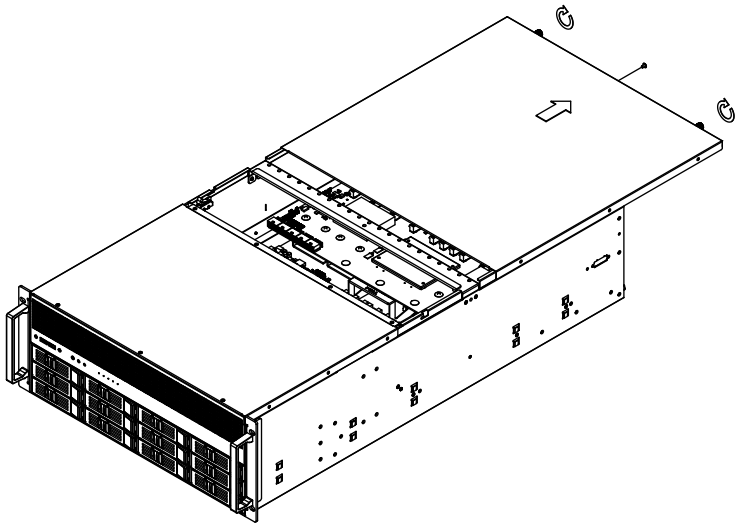
## 2.2 Installing Motherboard Components

This section describes how to install components on to the mainboard, including CPUs, memory modules and add on cards.

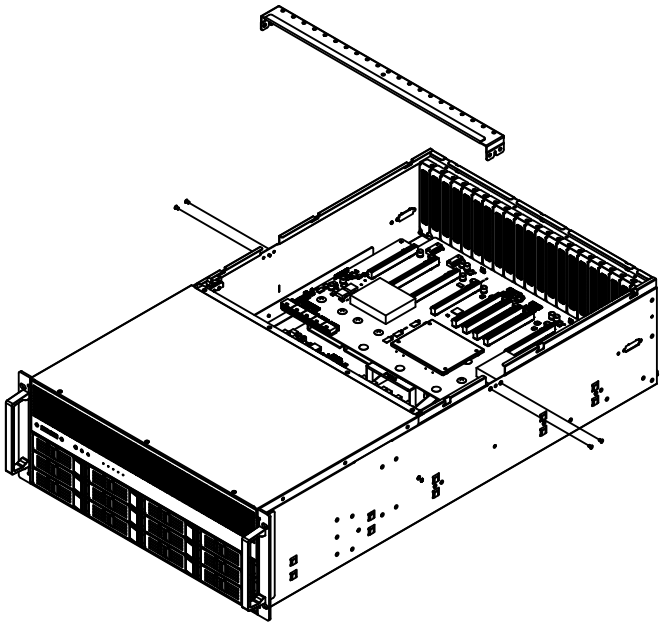
### 2.2.1 Removing the Chassis Cover and CPU Duct

Follow these instructions to remove SKY-642 chassis cover.

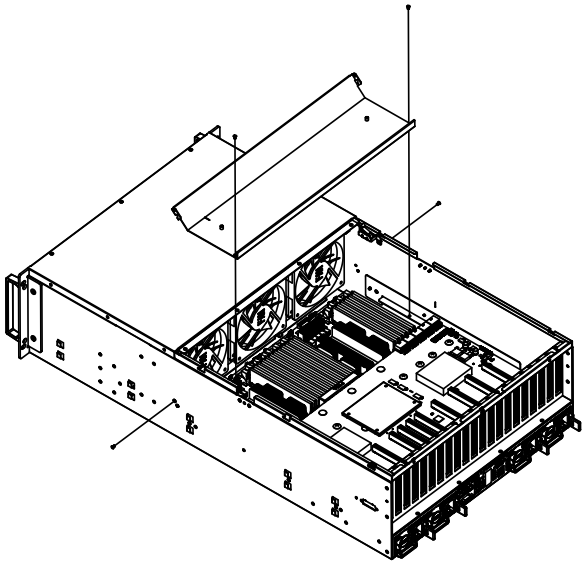
1. Unscrew the rear top cover as shown.



2. Remove chassis support.



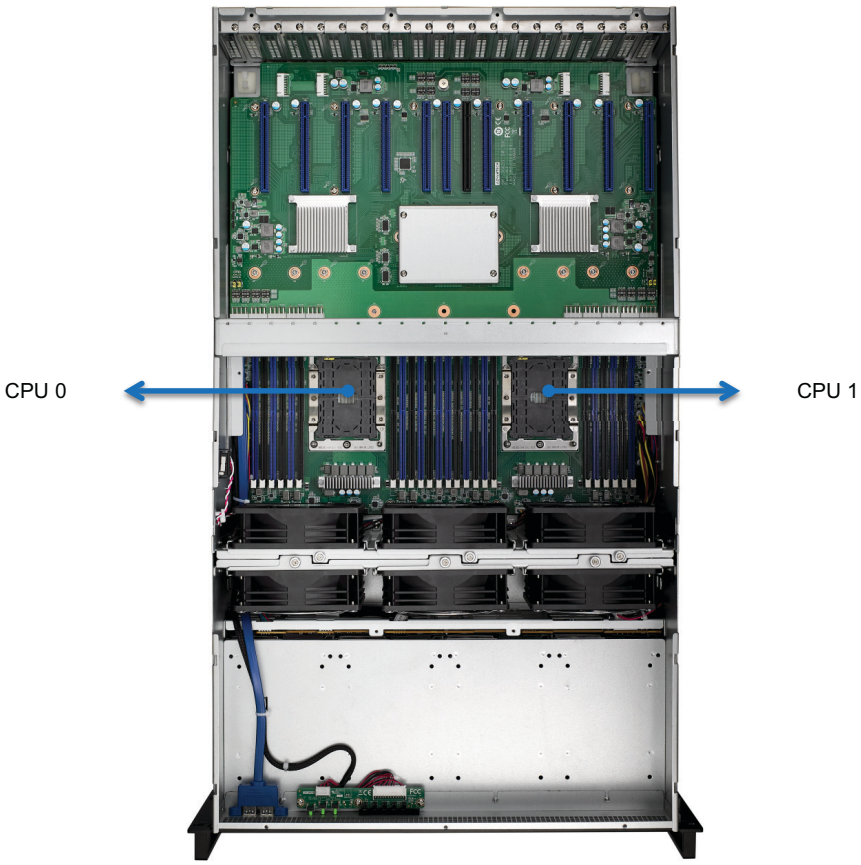
3. Remove CPU air duct.



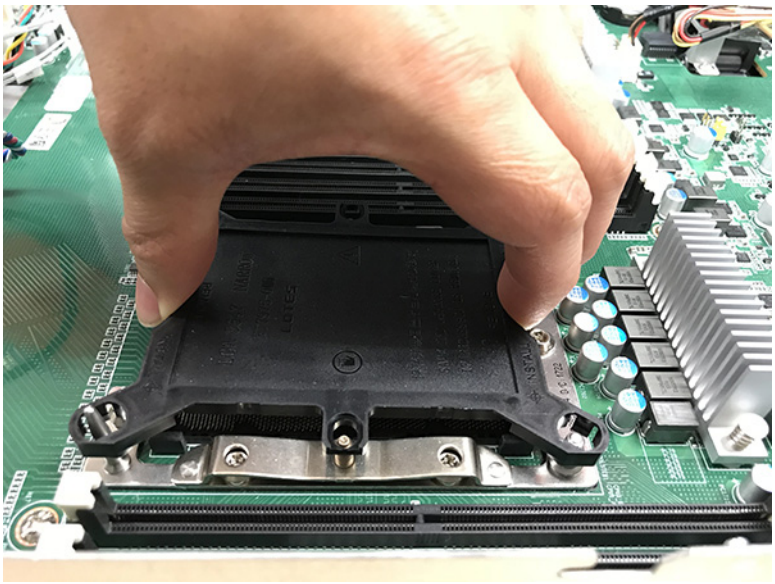
## 2.2.2 Installing the CPU and Heatsink

Follow the steps below to install CPUs and CPU heatsinks.

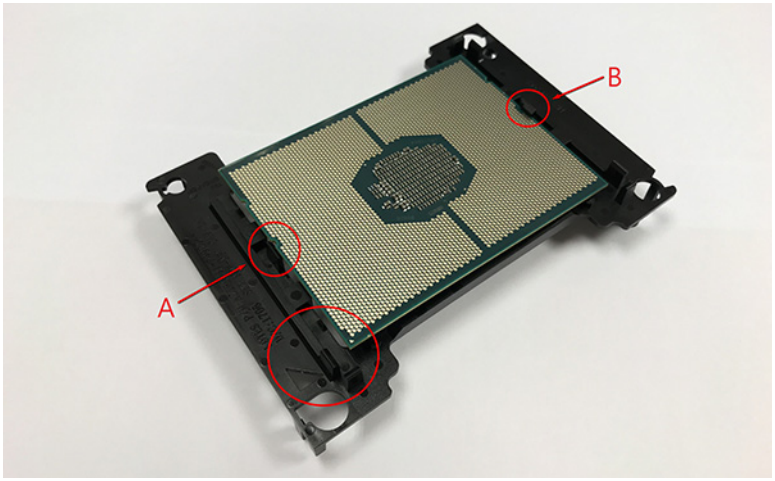
1. Locate the CPU sockets - you must install in the CPU0 socket first.



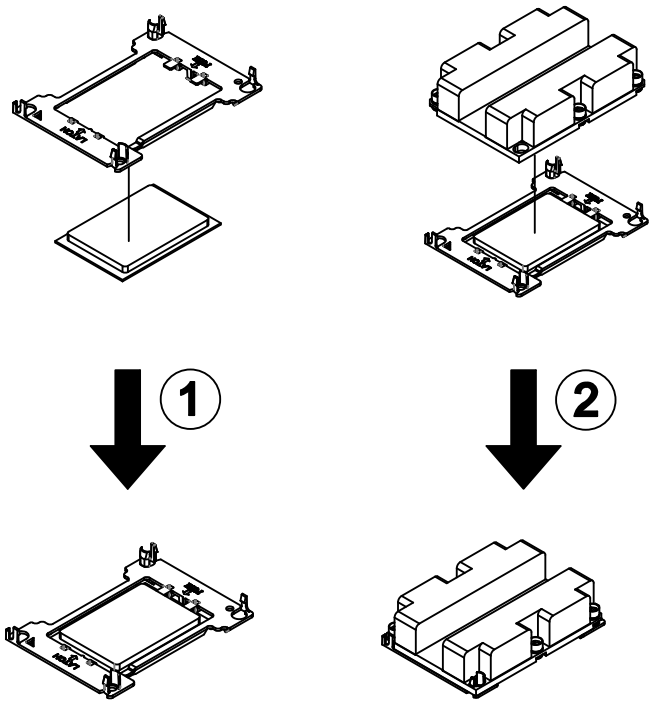
2. Remove CPU dust cover from the CPU socket.



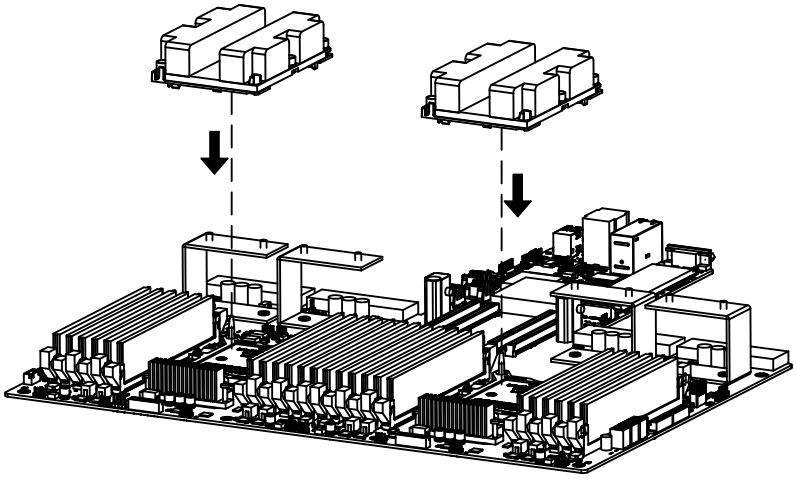
3. Assemble the CPU with CPU clip and align the triangle mark on both CPU and the clip, make sure both notch A and B on the CPU is carefully aligned with CPU clip.



4. Assemble the heatsink and the sub assembly as in the previous step.

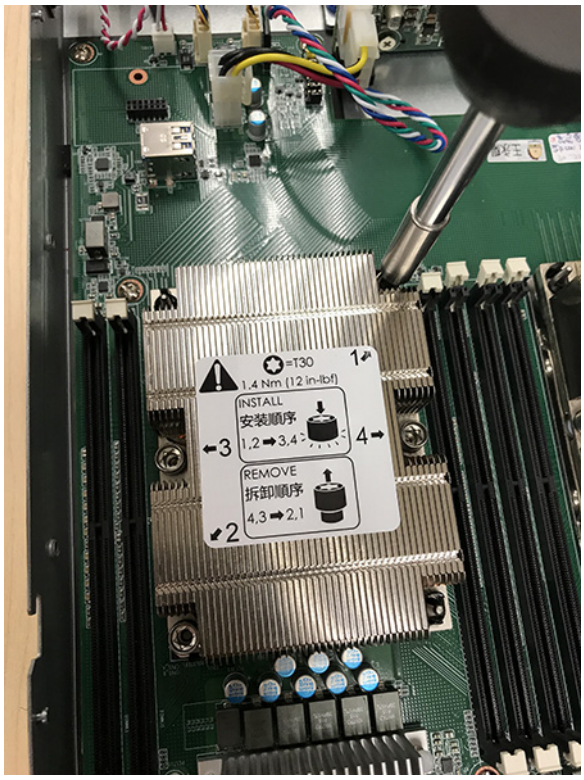



5. Carefully align the triangle mark on the CPU against the triangle mark on the CPU socket then place the CPU with heatsink into the CPU socket.



6. Use a T30 Torx screwdriver for tighten the screws in the order of 1,2 -> 3,4 with a torque of 12lbf.

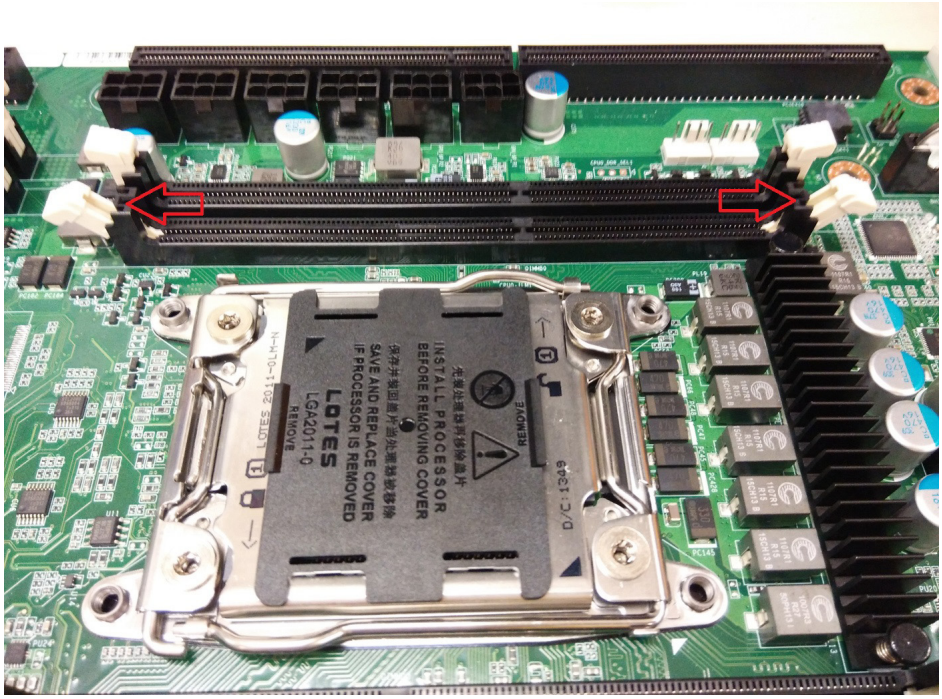
7. When removing CPU and heatsink, use a T30 Trox screwdriver to loosen the screws in the order of 4, 3 -> 2,1, then lift the CPU and heatsink up.



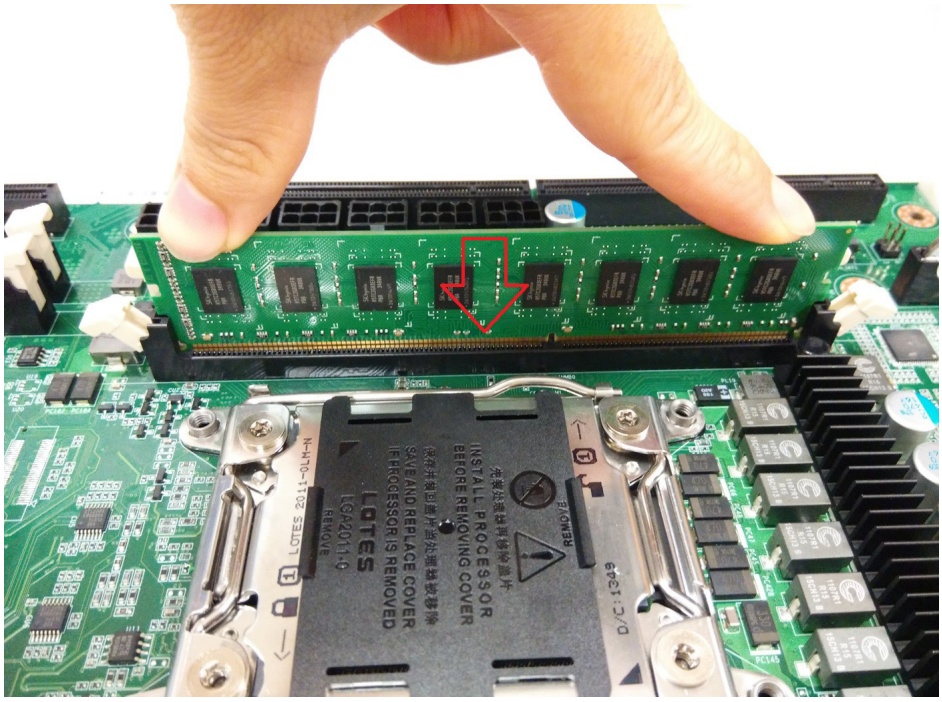

## 2.2.3 Installing the Memory

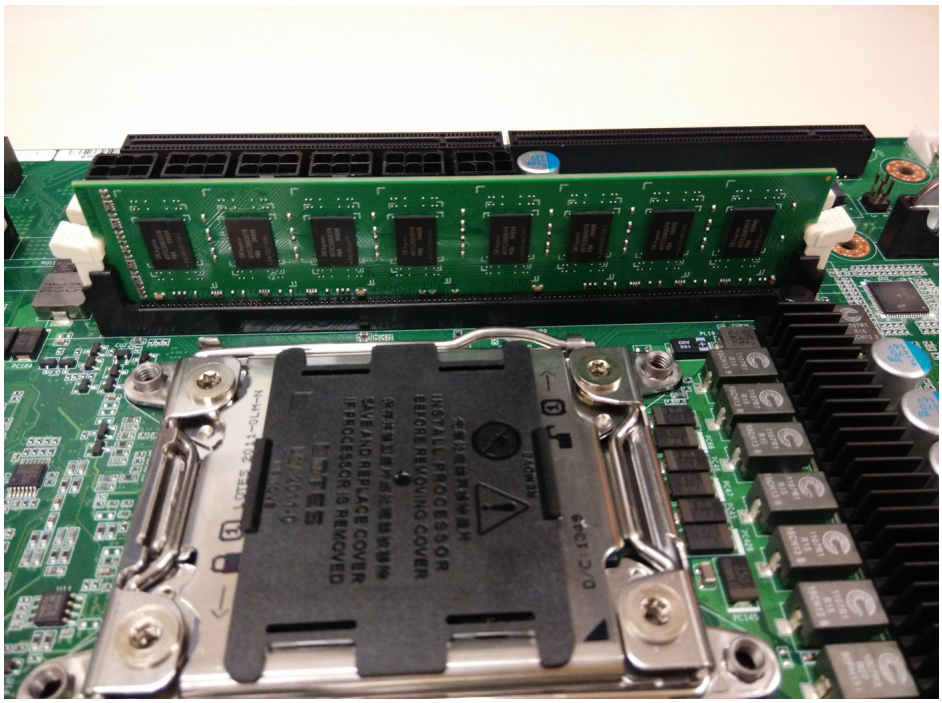
Follow these instructions to install the memory modules onto the motherboard.

1. Locate the memory slots on the motherboard.
2. Press the memory slot locking levers in the direction of the arrows as shown in the following illustration.



3. Align the memory module with the slot. When inserted properly, the memory slot locking levers lock automatically onto the indentations at the ends of the module. Follow the recommended memory population table to install the other memory modules.

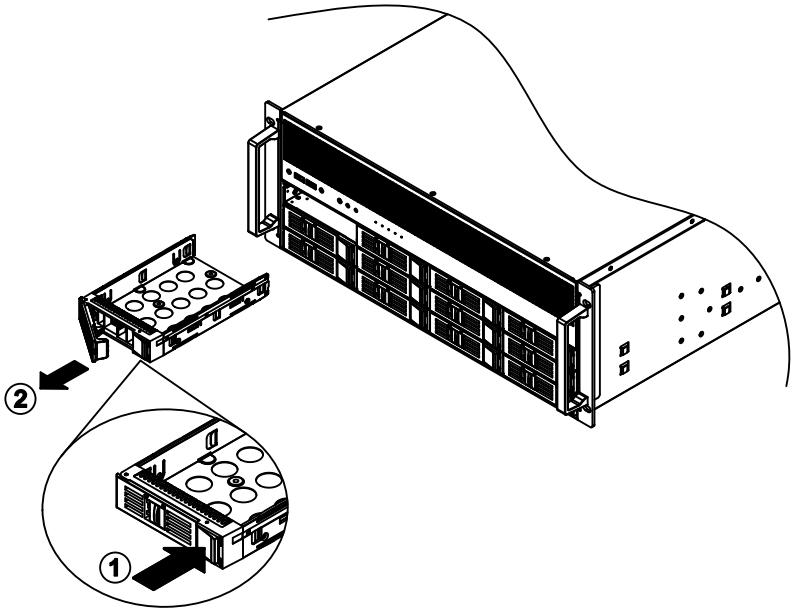


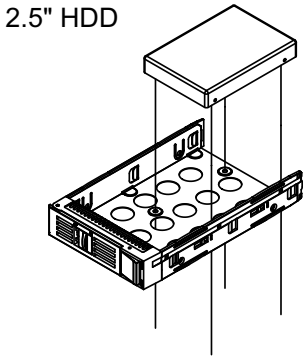
### 2.2.4 Installing Hard Drives

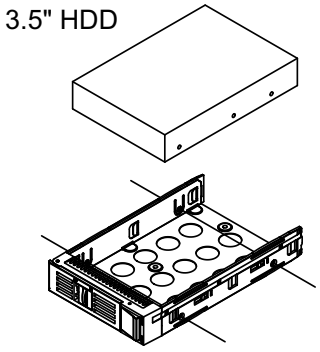
The SKY-642 supports two 2.5” hard drives. Follow these instructions to install a hard drive.

1. Press the locking lever latch and pull the locking lever open and Slide the HDD tray out.




2. Place a hard drive into the drive tray, then use the screws to secure the HDD, then insert the HDD tray into the chassis and press the locking lever to secure the tray.



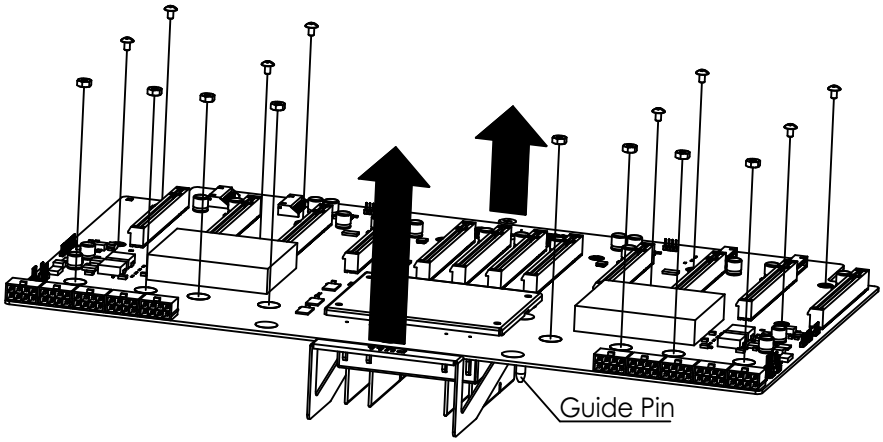



## 2.2.5 Instruction for Expansion Board

***Note!*** *Please remove chassis support before Expansion Board installation.*

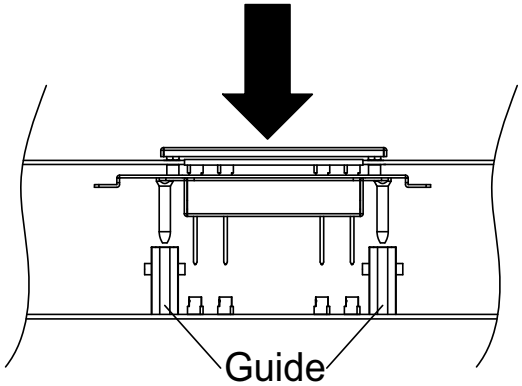
Below pictures give you instructions to unscrew expansion board.

1. Release the Screws and Nuts with icon on the expansion board.
2. Hold the T screw and pull the handle bar to release the expansion board.




Below pictures give you instructions to install Expansion Board

1. Make sure the guide pins are well inserted.
2. Push down the Expansion Board until the riser cards are firmly in place.
3. Fasten the screws with 5 (Kg.cm) and nuts with 10 (Kg.cm) with icon .



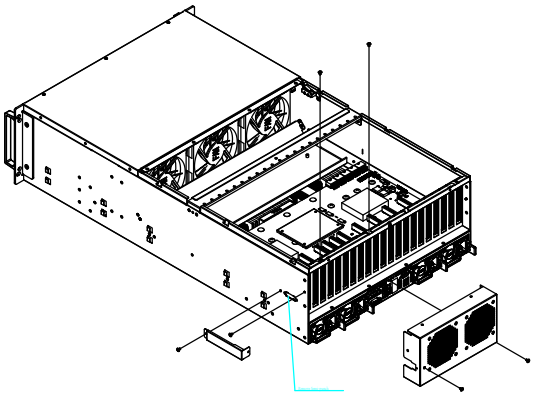
## 2.2.6 Instruction for optional external fan module

To increase the air flow in chassis for passive GPU cards, you may order optional fan module L and R with the following part number:

| | |
|---|---|
| 98R16420300 | External Optional FAN Kit (Left) |
| 98R16420400 | External Optional FAN Kit (Right) |

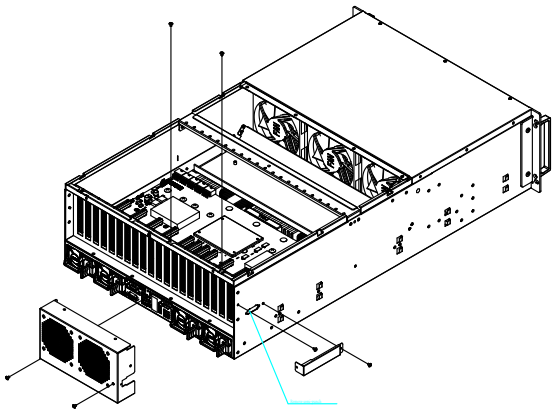
Follow below instructions to install 98R16420300

1. Remove the semi-punch at the left side of chassis.
2. Follow below instructions to screw the fan module.



Follow below instructions to install 98R16420400

1. Remove the semi-punch at the right side of chassis.
2. Follow below instructions to screw the fan module.



## 2.3 Rack Mounting

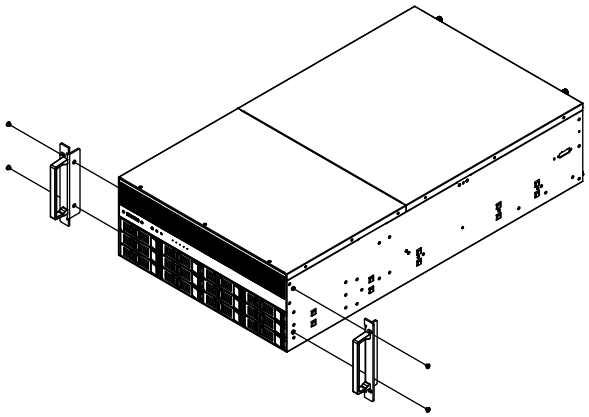
After installing the necessary components, the SKY-642 can be mounted in a rack using the supplied rack mounting kit. We strongly recommend that the minimum depth of cabinets is 1100 mm.

**Rack mounting kit**

- Sliding Rails x 2
- Screws Kit x 1

### 2.3.1 Installing the Server in a Rack

Before mounting the SKY-642 in a rack, ensure that all internal components have been installed and that the unit has been fully tested. Both sides of chassis the ear must be assembled before you assemble the slide rail kit.



Follow these instructions to mount the SKY-642 into an industry standard 43” rack.

**Screws list**

M5 x 4

M4 x 4

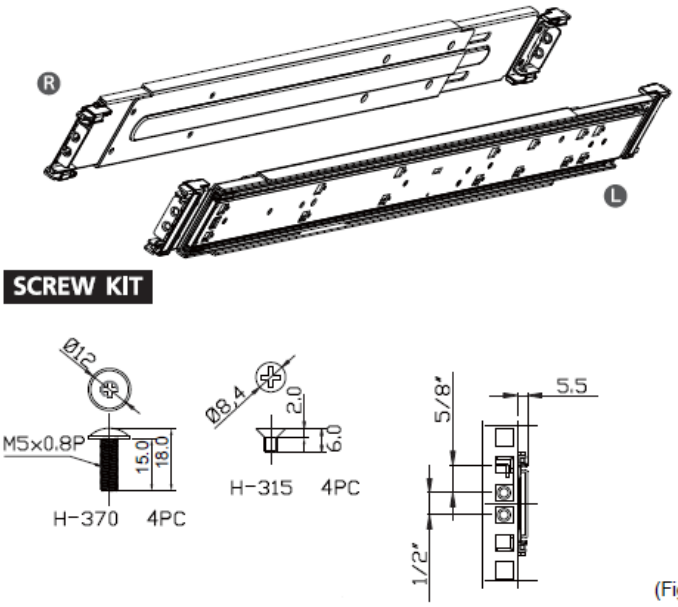
**Installation Instructions**

SB tool-less server slide, 180 pounds (80kg) loading.

***Note!*** Please note that the 180lb-grade SB Tool-less is designed and built for 2U chassis or above. Not recommended for 1U applications.

The SB bracket is for EIA rail with hole pitch as shown on fig-1 and square holes, and can only be mounted behind the rail. You will need to purchase transfer bracket in order to mount SB bracket on the rail with round holes. The standard retail packaging shall include one piece of left hand,one piece of right hand, 4 pieces of H-370 screws for ear plate fastening and 2 pieces of H-315 screws for chassis fastening.

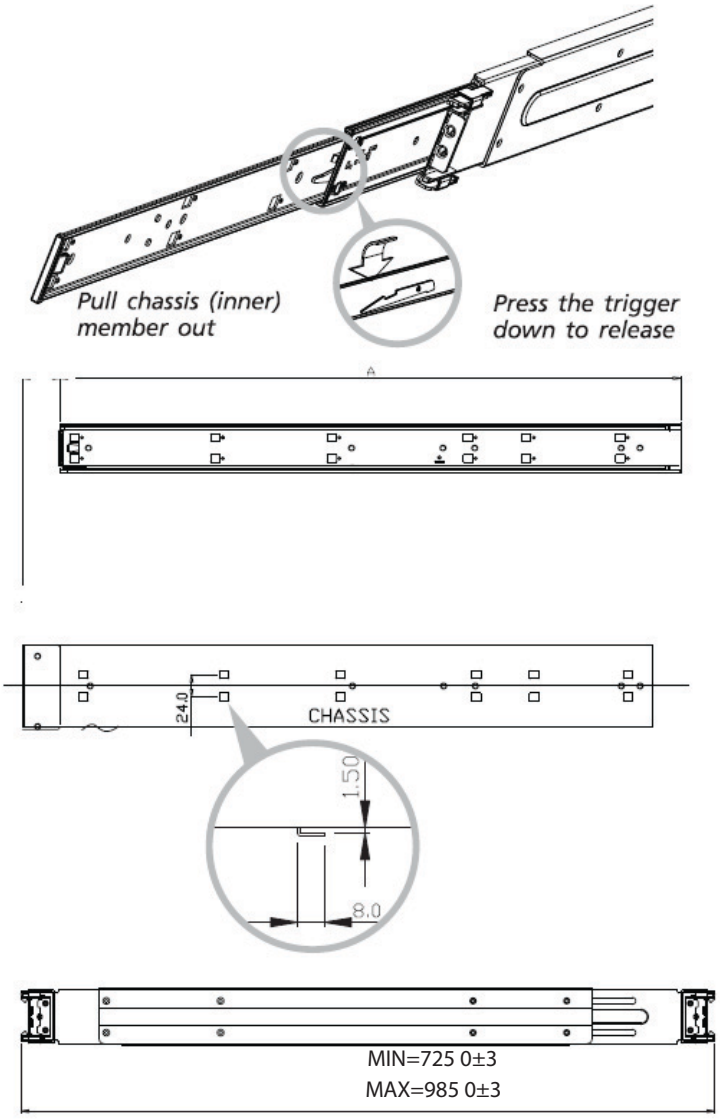
***Note!*** The 180lb-grade SB tool-less is not designed to be screw mounted.You must mount the slides with the bayonet fitting pre-formed on the chassis.




(Fig-1)

After installation or maintenance is finished, you may secure the server by putting a screw through the center hole on bracket.

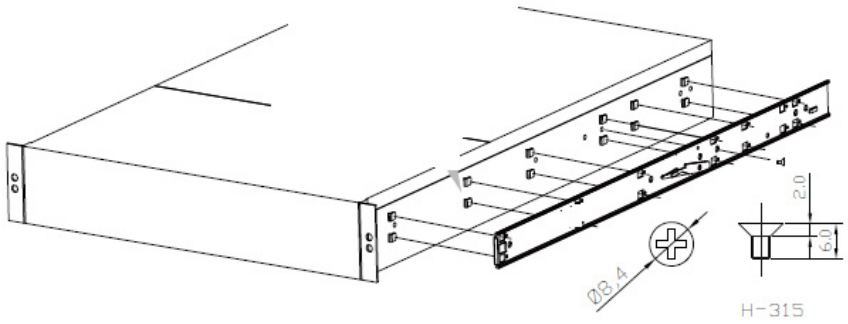
Step 1. Remove the chassis (inner) member. Pull the slide open then press the trigger down as shown on the drawing, and pull the chassis (inner) member out.




EXT=260MM

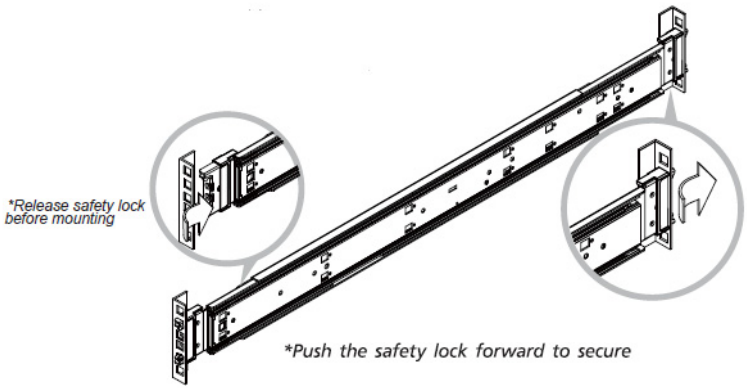
**Extendable front bracket only applies to some tool less models

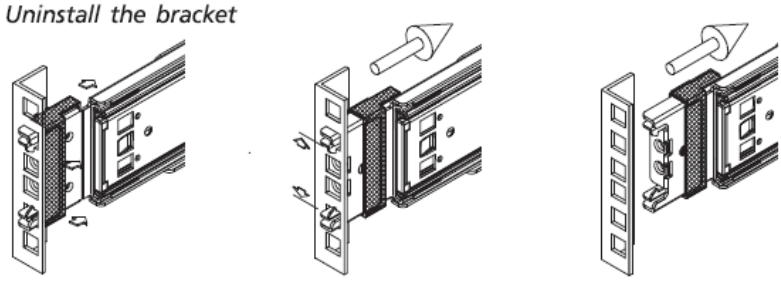
Step 2. Mount the chassis (inner) member to the chassis. Secure the screws on both sides and push back the inner member to allow the rail slide to be fixed to the rack-mount chassis.




*Bayonet on chassis shall be pre-formed as per the recommended dimension and location.

Step 3. Attach the cabinet (outer) member to the rail. Insert the stag into the upper and lower square holes on ELA rail from the back of rail. Push the safety lock forward to secure the bracket. It is important to check if the safety lock is in unlocked position before mounting the brackets.



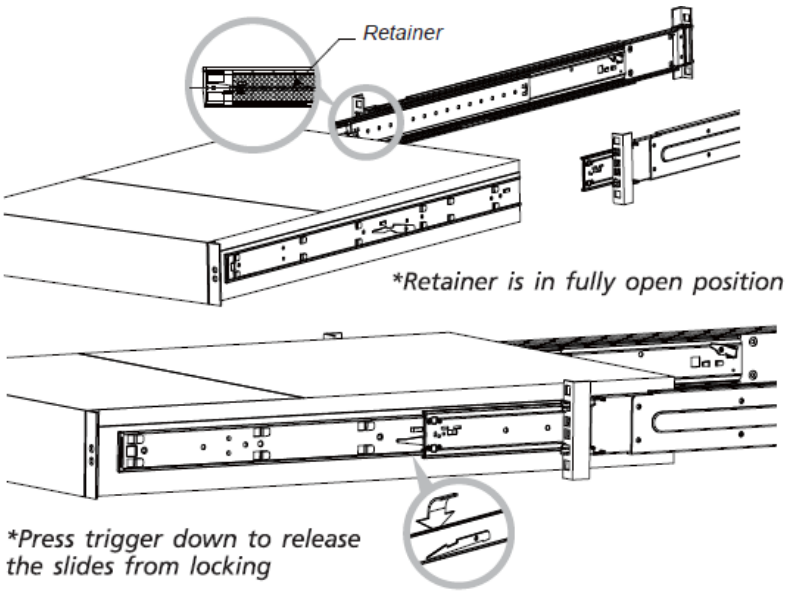



Step 4. Mount the chassis into the cabinet

Insert the chassis (inner) member into the cabinet member as shown on the drawing. It is important to check if the ball retainer is in fully open position before installing the chassis.

***Caution!*** It might cause damage to the chassis if ball retainer is not in fully open position while mounting the chassis. While you are pushing chassis back to the cabinet, you need to release the slide from locking position by pressing the trigger down.

***Warning!*** Requires at least 2 people to install the SKY-642 chassis for safety purposes.



***Note!***

*Rack Mount Instructions - The following or similar rackmount instructions are included with the installation instructions:*

- *Elevated Operating Ambient - If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than the room ambient. Therefore, consideration should be given to installing the equipment in an environment compatible with the maximum ambient temperature (Tma) specified by the manufacturer.*
- *Reduced Air Flow - Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised.*
- *Mechanical Loading - Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.*
- *Circuit Overloading - Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.*
- *Reliable Earthing - Reliable earthing of rackmounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g. use of power strips).*

*Instructions de montage en rack - Le rack en suivant ou similaire - monter instructions sont incluses avec les instructions d'installation:*

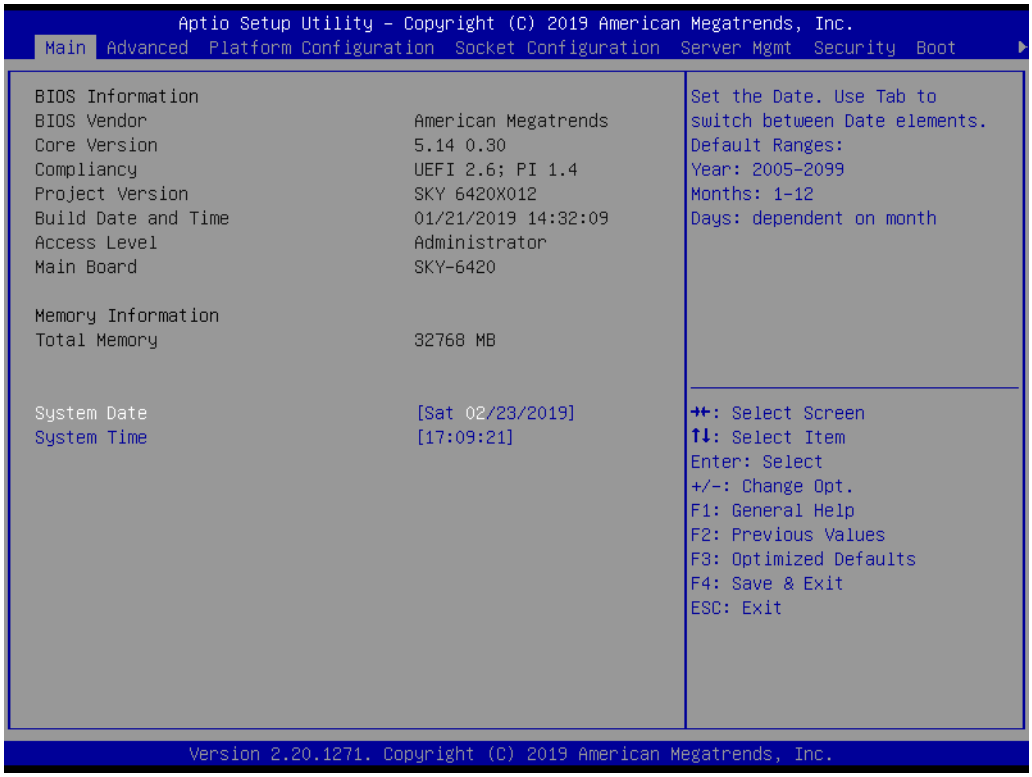
- *Température de fonctionnement élevée - il est installé dans une unité fermée ou plusieurs Ensemble formant bâti, la température ambiante de fonctionnement de l'environnement de l'armoire peut être supérieure à la chambre ambiante. Par conséquent, il devrait être donnée à l'installation de l'équipement dans un environnement compatible avec la température ambiante maximale (Tma) spécifiée par le fabricant.*
- *Débit d'air réduit - Installation de l'équipement dans un rack doit être tel que la quantité de flux d'air nécessaire au bon fonctionnement de l'appareil ne soit pas compromise.*
- *Chargement mécanique - Le montage de l'équipement dans le rack doit être telle qu'une situation dangereuse ne soit générée à inégale chargement mécanique.*
- *Surcharge du circuit - Il faut tenir compte à la connexion de l'équipement au circuit d'alimentation et l'effet que la surcharge des circuits pourrait avoir sur la protection contre les surintensités et le câblage d'alimentation. Considération appropriée de l'équipement plaque signalétique évaluations doivent être utilisés pour répondre à cette préoccupation.*
- *Fiabilité de la mise - Fiable mise à la terre de l'équipement monté en rack doit être maintenue. Une attention particulière devrait être accordée à fournir connexions autres que les connexions directes sur le circuit de branche (par exemple l'utilisation de multiprises).*

# 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 system. 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 SKY-642 setup screens.



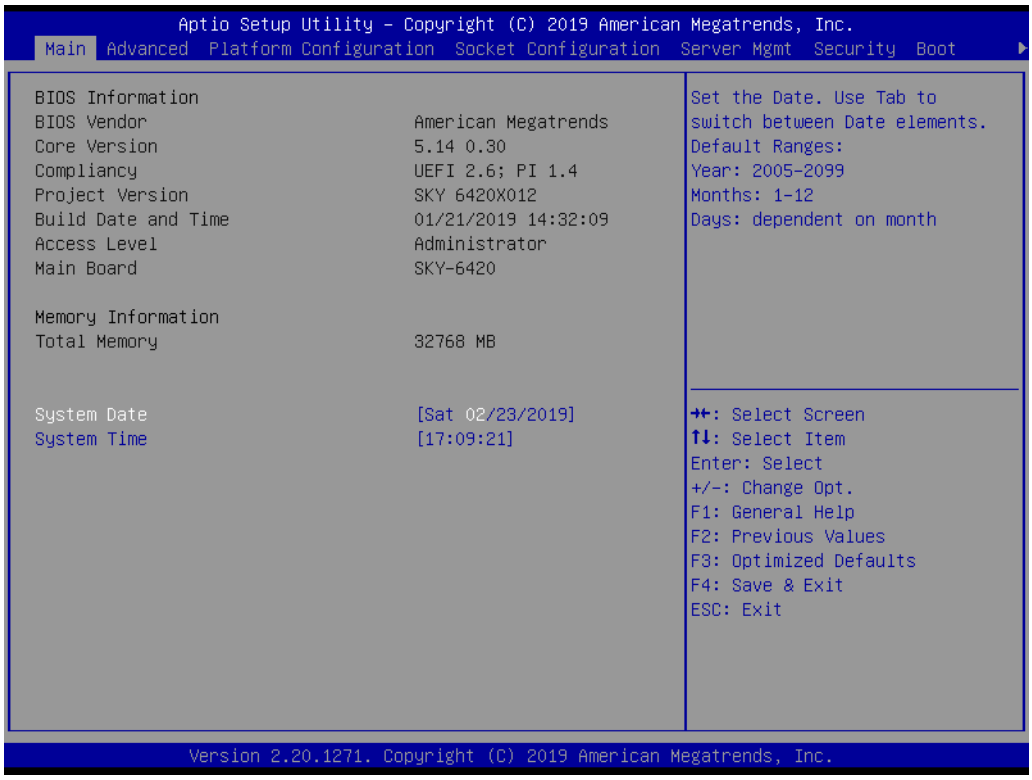

AMI's BIOS ROM has a built-in setup program that allows users to modify the basic system configuration. This type of information is stored in battery-backed up CMOS so it retains the Setup information when the power is turned off.

***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.



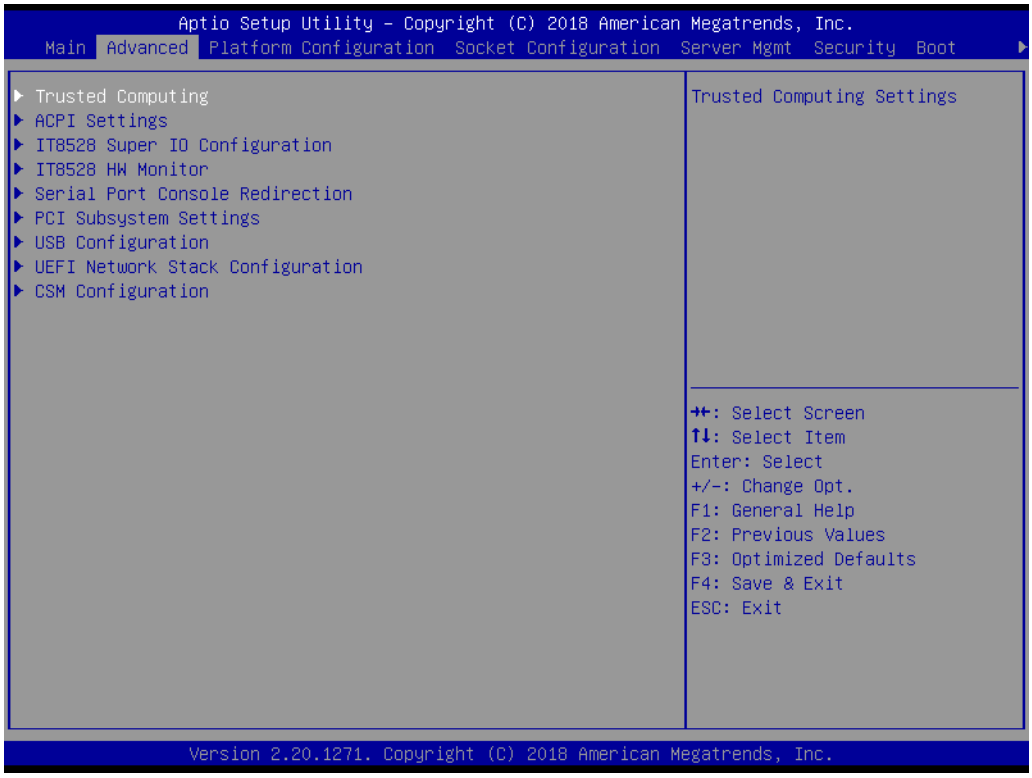

The Main BIOS setup screen has two main frames. The left frame displays all the options that can be configured. Grayed-out options cannot be configured; options in blue can be. The right frame displays the key legend. Above the key legend is an area reserved for a text message. When an option is selected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

- **System Time / System Date**

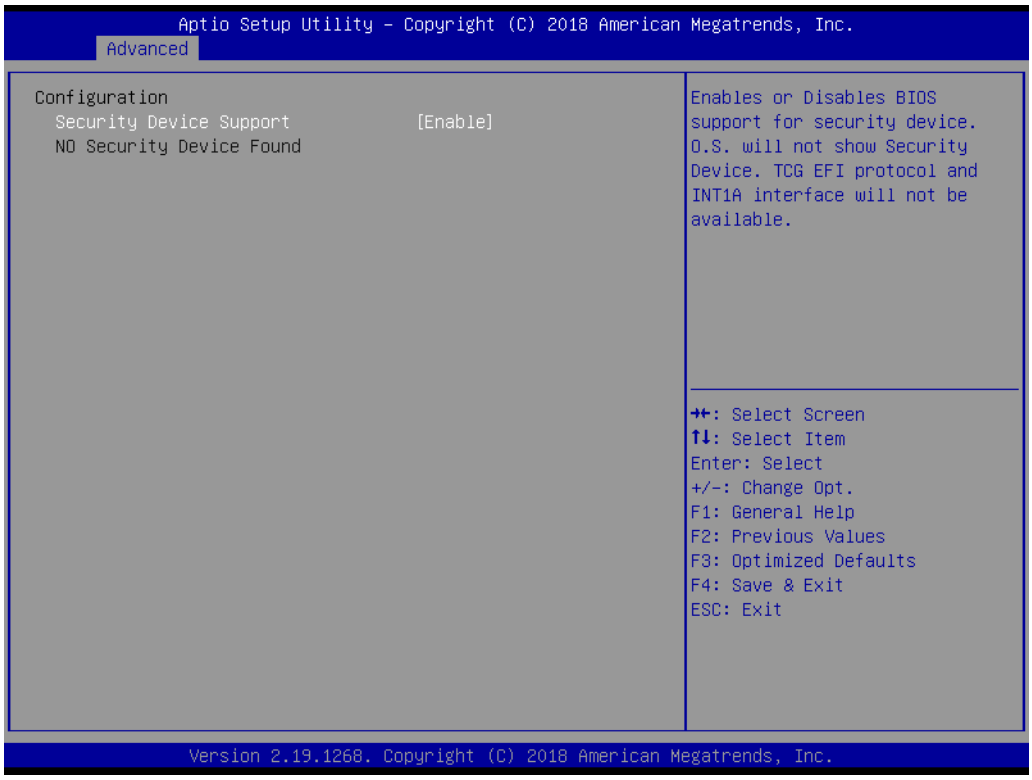
  Use this option to change the system time and date. Highlight System Time or System Date using the <Arrow> keys. Enter new values through the keyboard. Press the <Tab> key or the <Arrow> keys to move between fields. The date must be entered in MM/DD/YY format. The time must be entered in HH:MM:SS format.

### 3.2.2 Advanced BIOS Features Setup

Select the Advanced tab from the SKY-642 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.



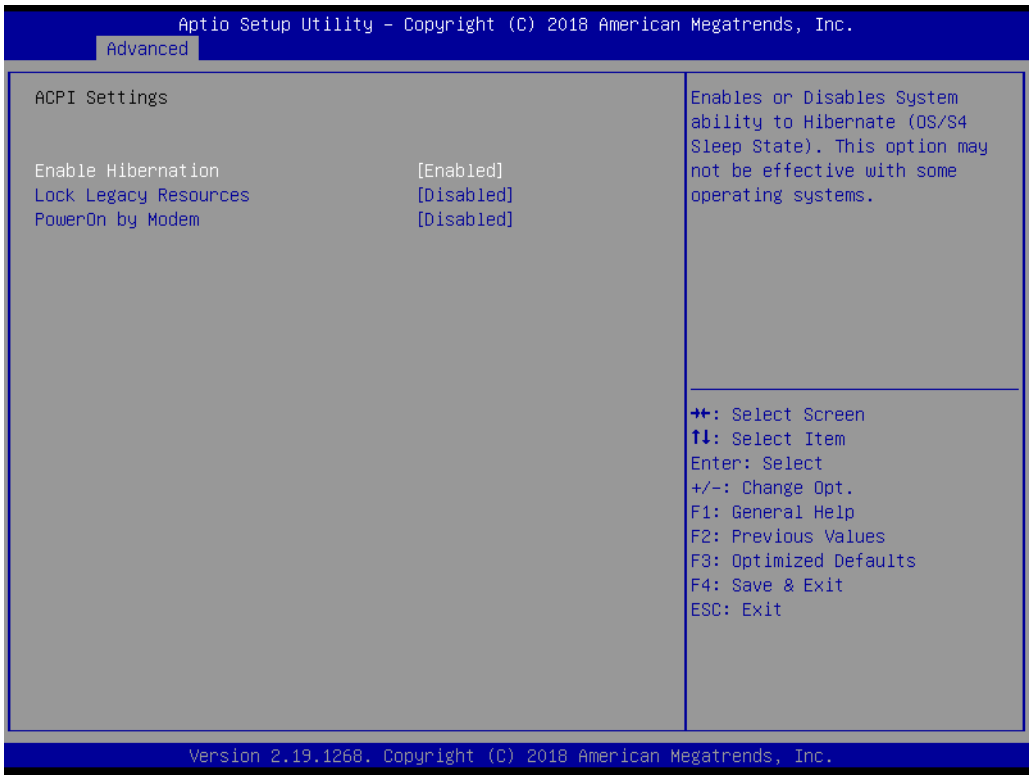
### 3.2.2.1 Trusted Computing




- **Security Device Support**
  Enables or disables BIOS support for security devices.

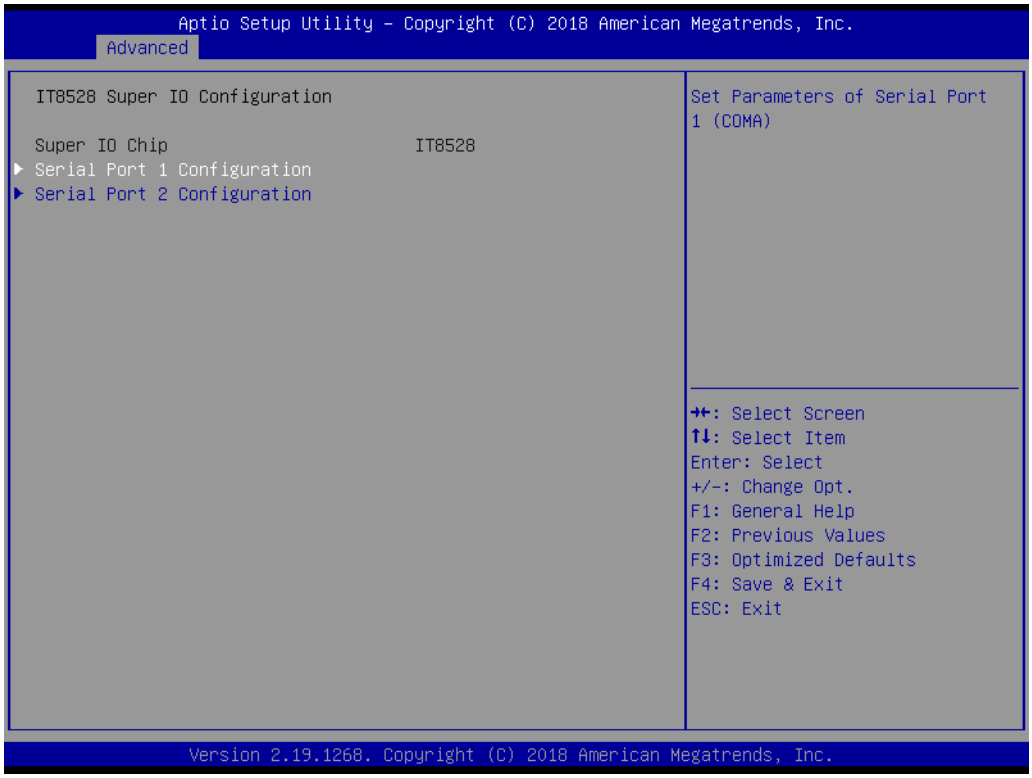
***Note!*** *Purchase Advantech LPC TPM module to enable TPM function. P/N: PCATPM-00A1E.*

### 3.2.2.2 ACPI Settings

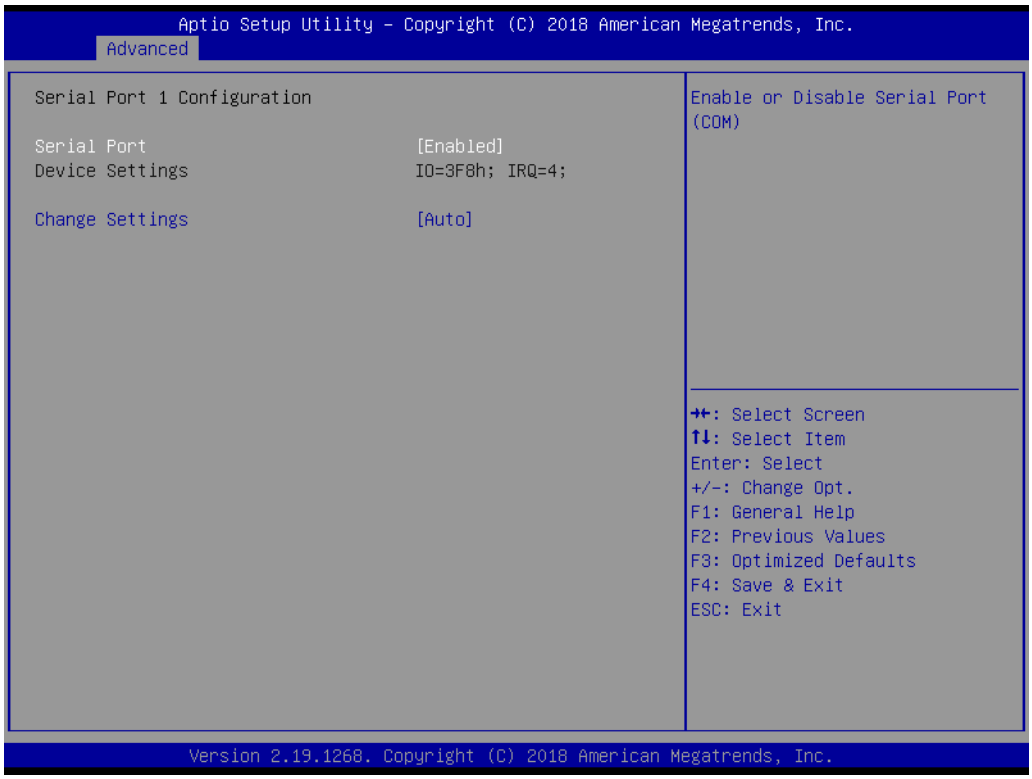



- **Enable Hibernation**
  Enable or Disable Hibernation.
- **Lock Legacy Resources**
  Enable or Disable Lock Legacy Resources.
- **Power on by Modem**
  Enable or Disable Power On by Modem

### 3.2.2.3 ITE8528 Super IO Configuration



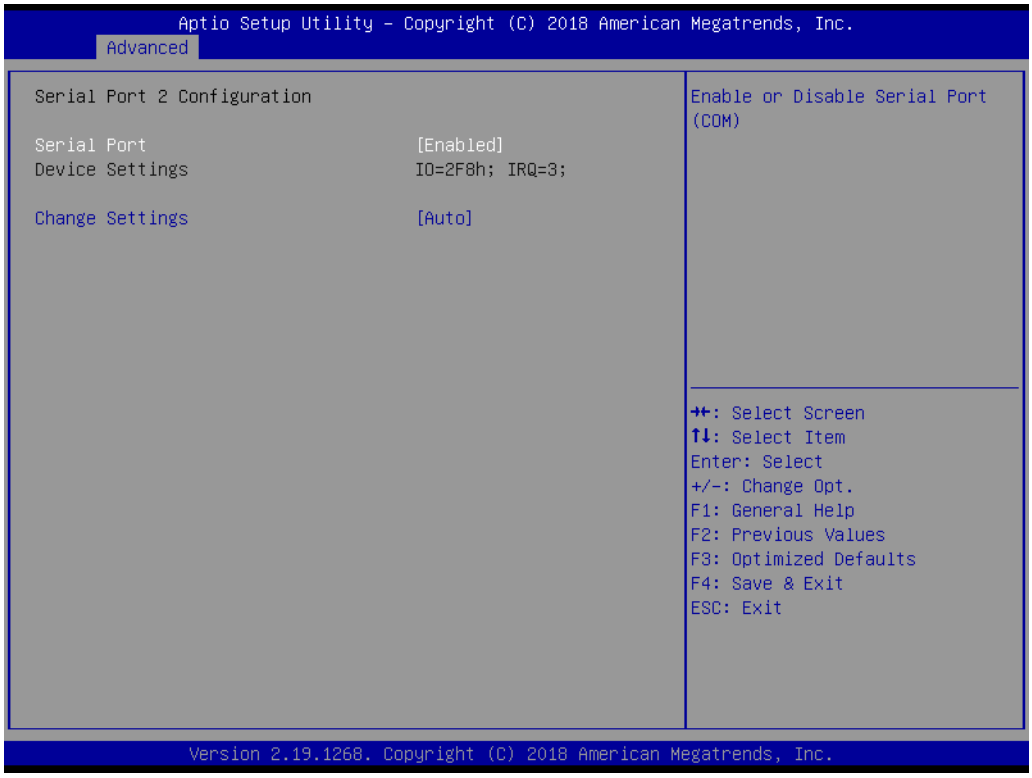

- **Serial Port 1 Configuration**




– **Serial Port**
Enable or Disable Serial Port 1.

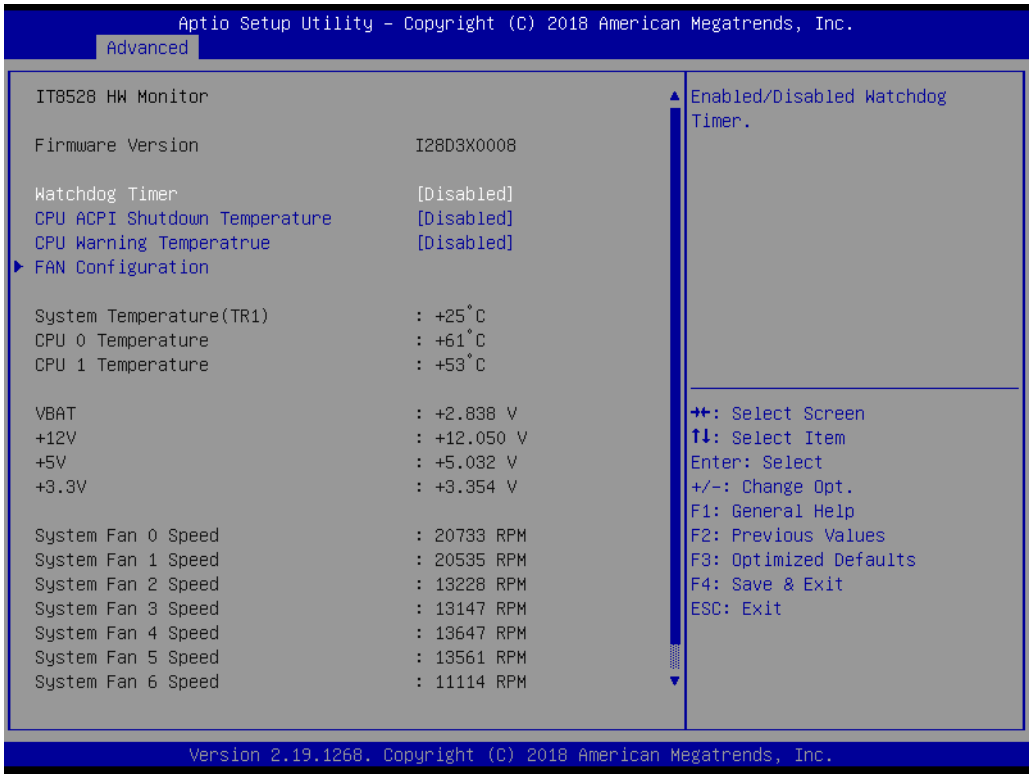
– **Change Settings**
  To select an optimal setting for serial port 1.

## Serial Port 2 Configuration

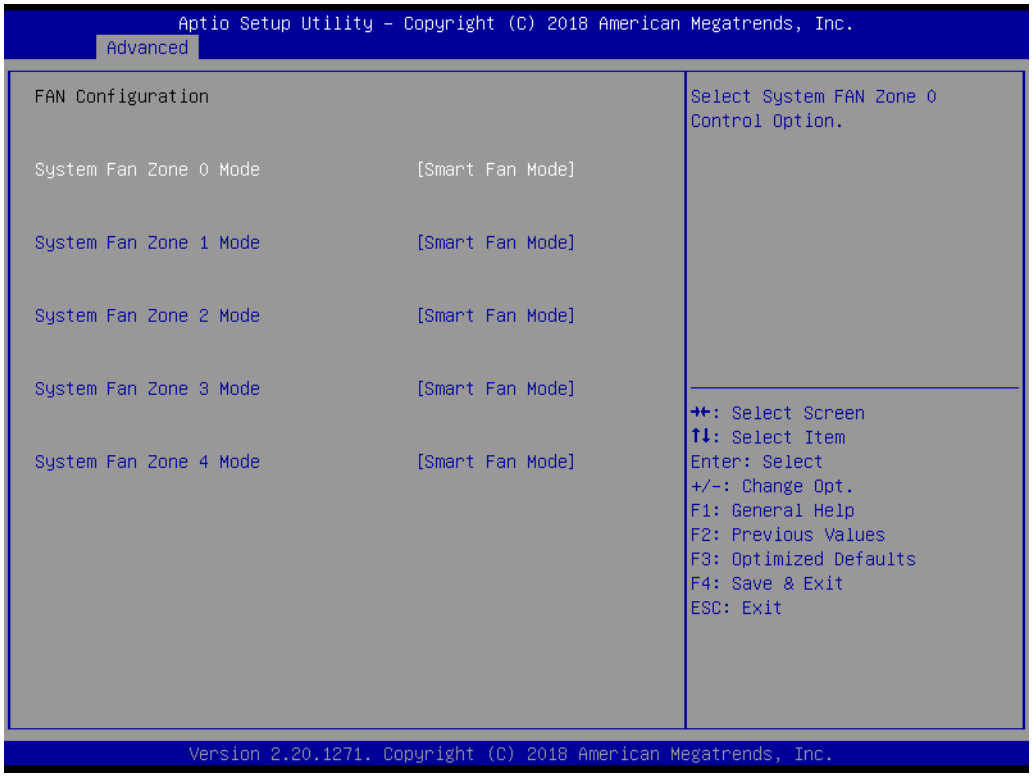



– **Serial Port**
  Enable or Disable Serial Port 2.
– **Change Settings**
  To select an optimal setting for Serial Port 2.

### 3.2.2.4 ITE8528 H/W Monitor

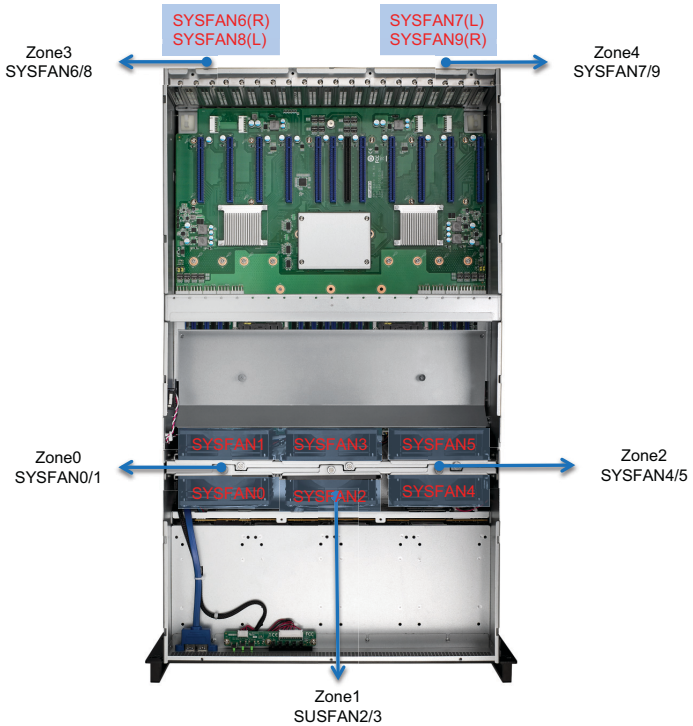



- **Watchdog Timer**
  Enable and Disable the watchdog timer function.
- **CPU ACPI Shutdown Temperature**
  Set the CPU ACPI shutdown temperature threshold. When the system reaches the shutdown temperature, it will be automatically shutdown by ACPI OS to protect the system from overheat damage.
- **CPU Warning Temperature**
  Set the CPU warning temperature threshold. When the system reaches the warning temperature, the speaker will beep.




- **Fan Configuration**

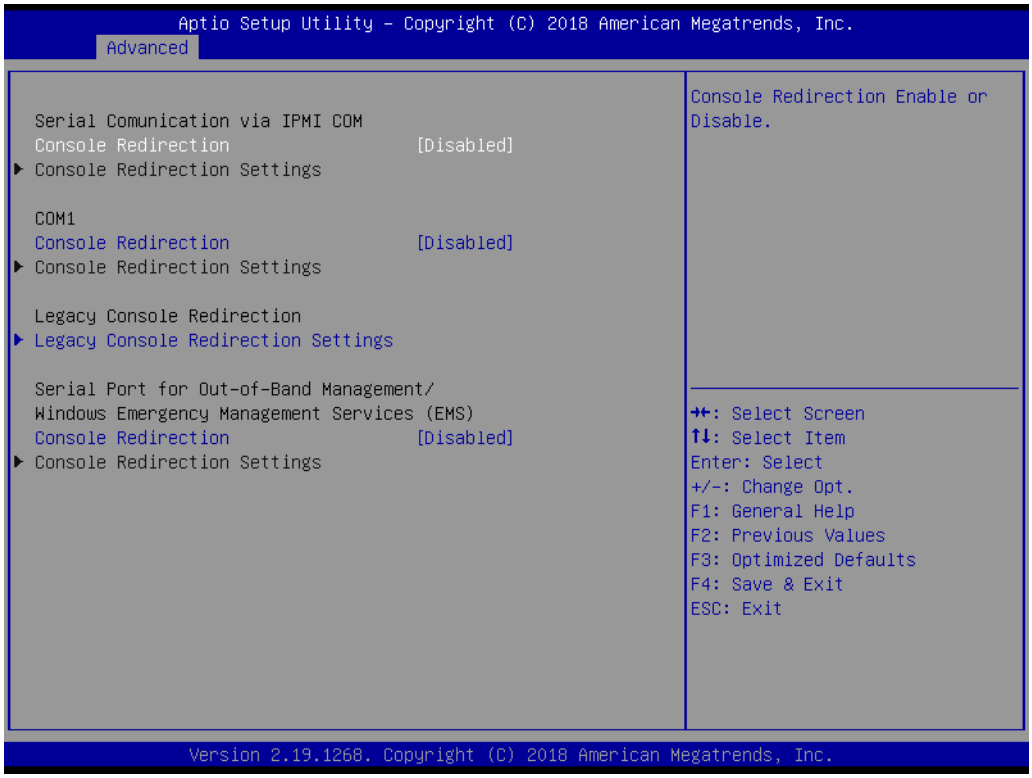
  When set to manual mode, fan duty setting can be changed; the range is from 20%~100%, default setting is smart fan mode.
  System Fan Zone 0 controls SYSFAN 0/1
  System Fan Zone 1 controls SYSFAN 2/3
  System Fan Zone 2 controls SYSFAN 4/5
  System Fan Zone 3 controls SYSFAN 6/8
  System Fan Zone 4 controls SYSFAN 7/9



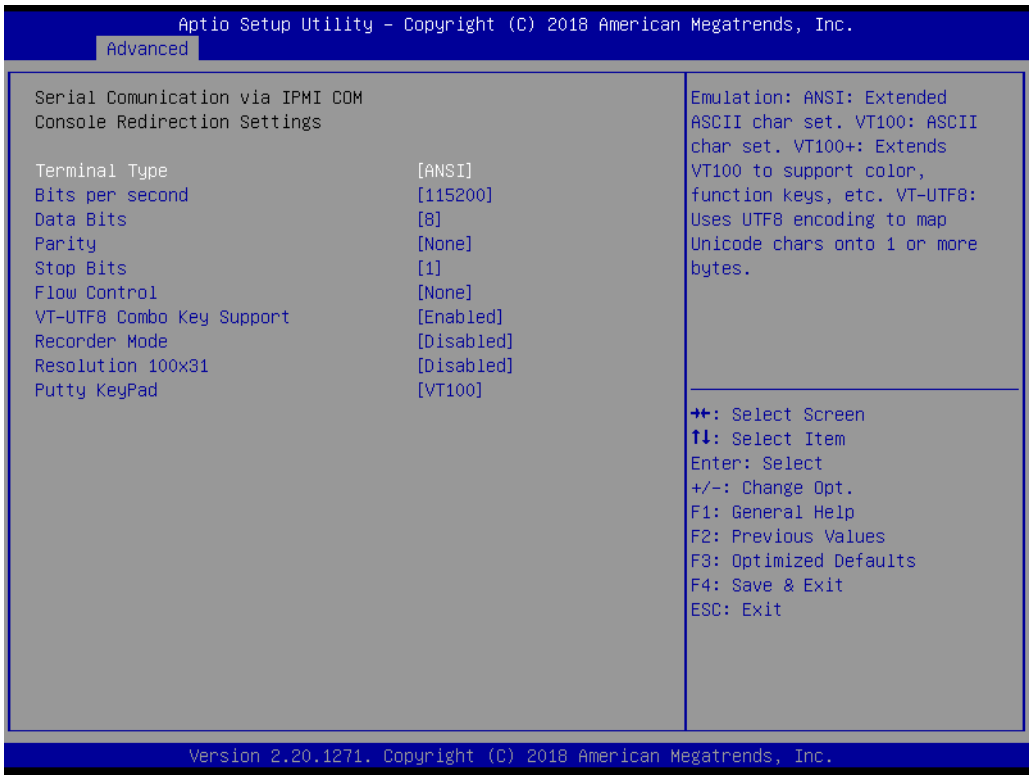
### 3.2.2.5 Serial Port Console Redirection

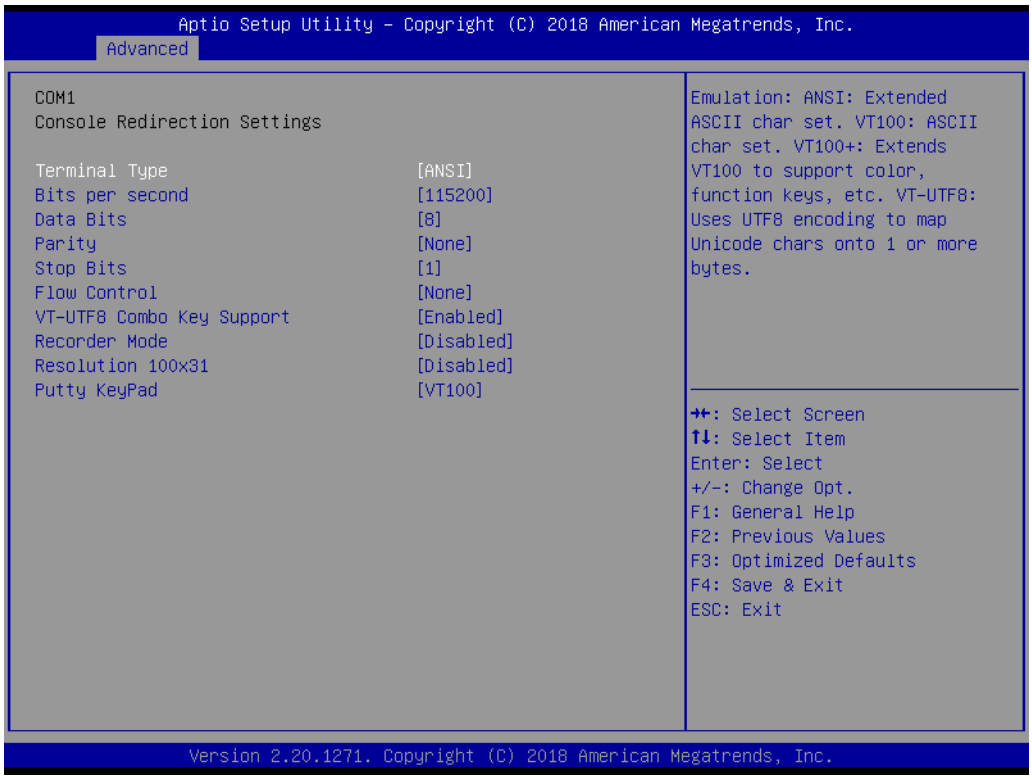
- **Console Redirection**

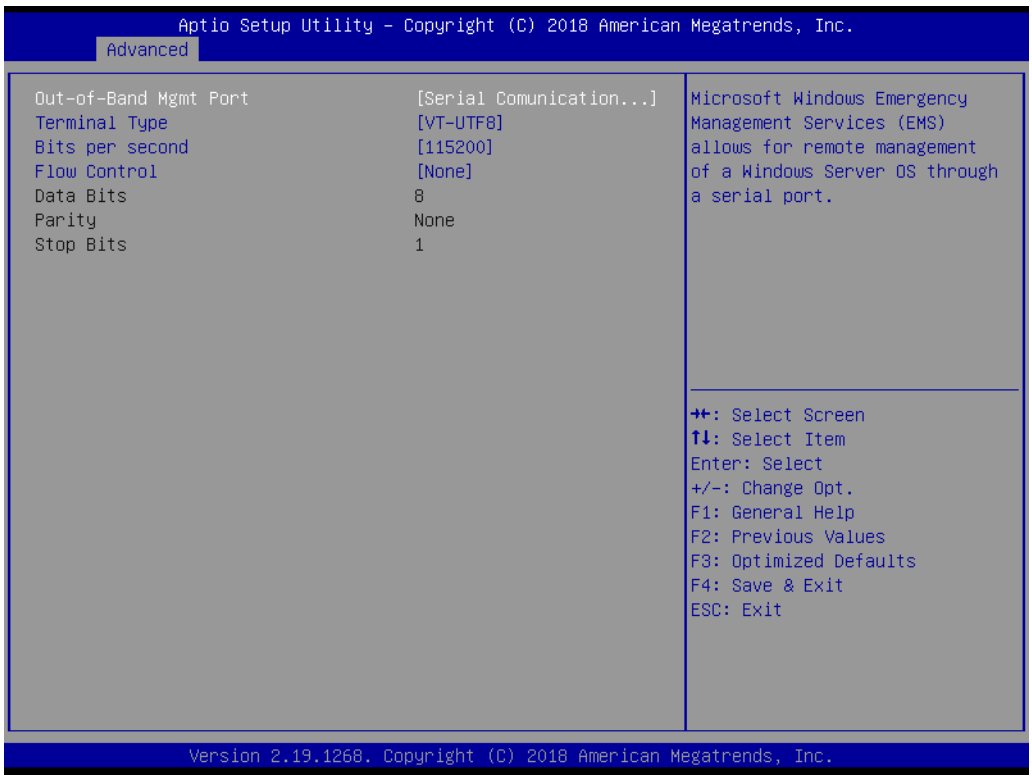
  To “Enable or disable” console redirection feature.

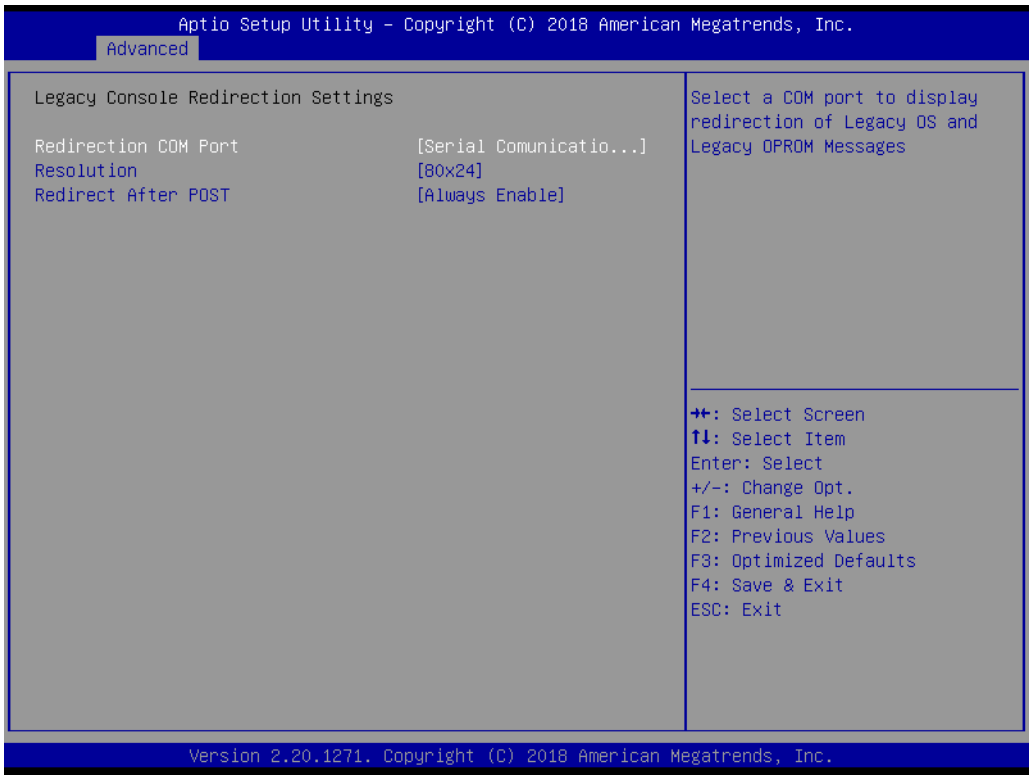



- **Console Redirection Settings**




Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
Advanced
COM1
Console Redirection Settings
Terminal Type [ANSI]
Bits per second [115200]
Data Bits [8]
Parity [None]
Stop Bits [1]
Flow Control [None]
VT-UTF8 Combo Key Support [Enabled]
Recorder Mode [Disabled]
Resolution 100x31 [Disabled]
Putty KeyPad [VT100]
Emulation: ANSI: Extended ASCII char set. VT100: ASCII char set. VT100+: Extends VT100 to support color, function keys, etc. VT-UTF8: Uses UTF8 encoding to map Unicode chars onto 1 or more bytes.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.20.1271. Copyright (C) 2018 American Megatrends, Inc.


Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
Advanced
Out-of-Band Mgmt Port [Serial Comunication...]
Terminal Type [VT-UTF8]
Bits per second [115200]
Flow Control [None]
Data Bits 8
Parity None
Stop Bits 1
Microsoft Windows Emergency Management Services (EMS) allows for remote management of a Windows Server OS through a serial 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) 2018 American Megatrends, Inc.

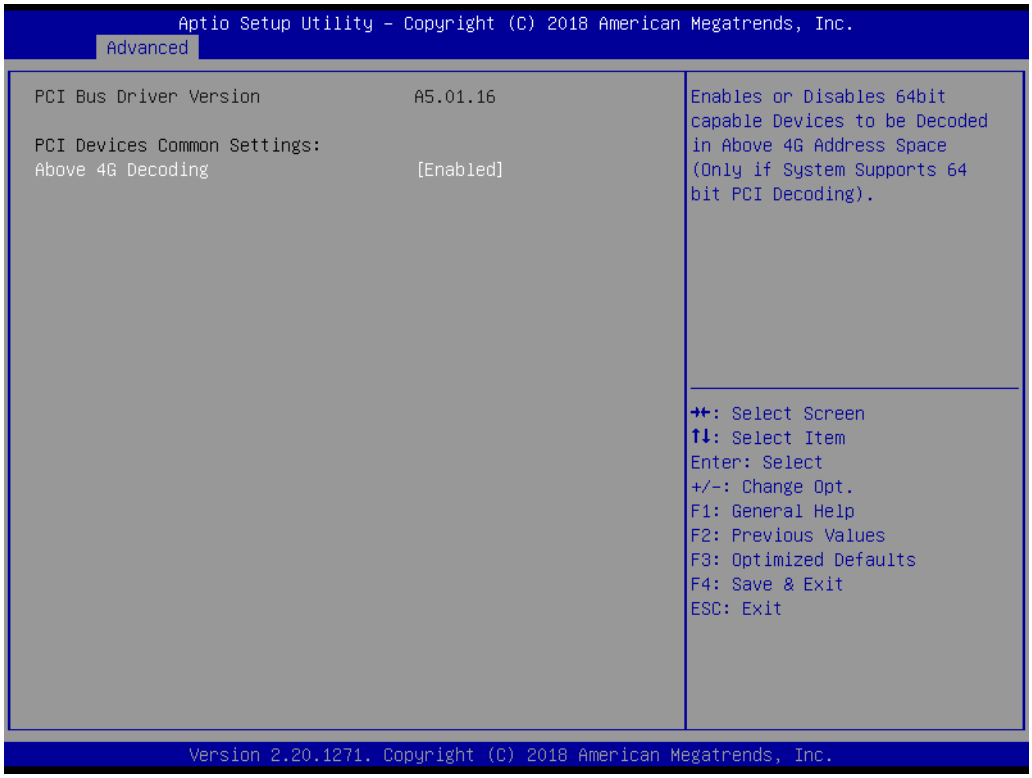



- **Terminal Type**
  Select a terminal type to be used for console redirection.
  Options available: VT100/VT100+/ANSI /VT-UTF8.
- **Bits Per Second**
  Select the baud rate for console redirection.
  Options available: 9600/19200/57600/115200.
- **Parity**
  A parity bit can be sent with the data bits 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.
- **Recorder Mode**

When this mode enabled, only text will be send. This is to capture Terminal data.
Options available: Enabled/Disabled.

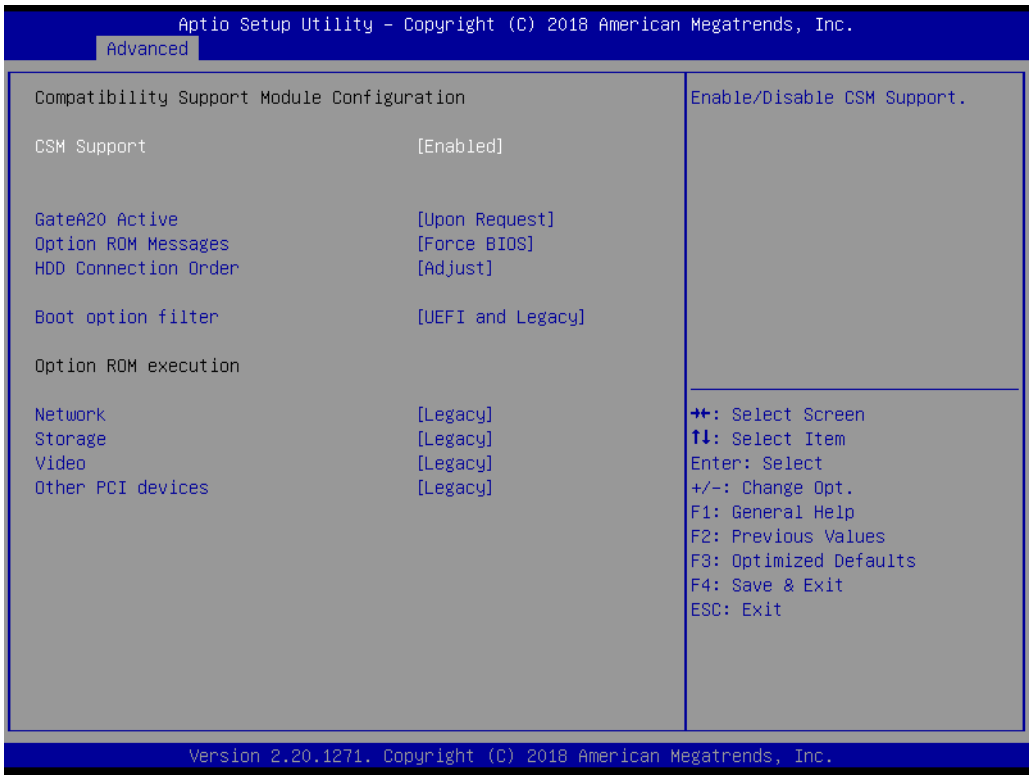
- **Legacy OS Redirection Resolution**
  On Legacy OS, the number of Rows and Columns supported redirection.
  Options available: 80x24/80X25.
- **Putty Keypad**
  Select function key and keypad on putty.

#### 3.2.2.6 PCI Subsystem Settings




- **Above 4G Decoding**
  Enable or disable 64-bit capable devices to be decoded in above 4G address space. This setting is available only if system supports 64-bit decoding.

### 3.2.2.7 CSM Configuration

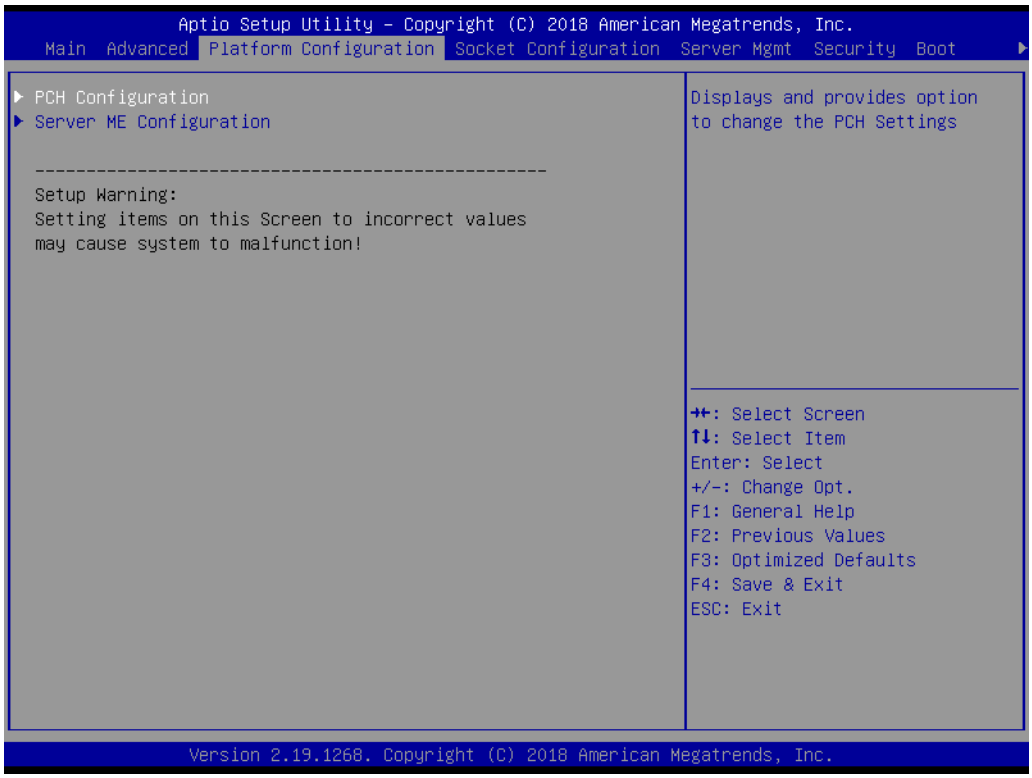



- **CSM Support**
  Enable/Disable CSM support.
- **GateA20 Active**
  UPON REQUEST - GA20 can be disabled using BIOS services.
  Do not allow disabling of GA20; this option is useful when any RT code is executed above 1MB.
- **Option ROM Message**
  Set display mode for Option ROM.
  HDD Connection Order.
- **Boot option filter**
  Controls and filter the option ROM in UEFI or legacy mode or both.
- **Option ROM Execution**
  Controls the execution of UEFI and Legacy OpROM for each device.

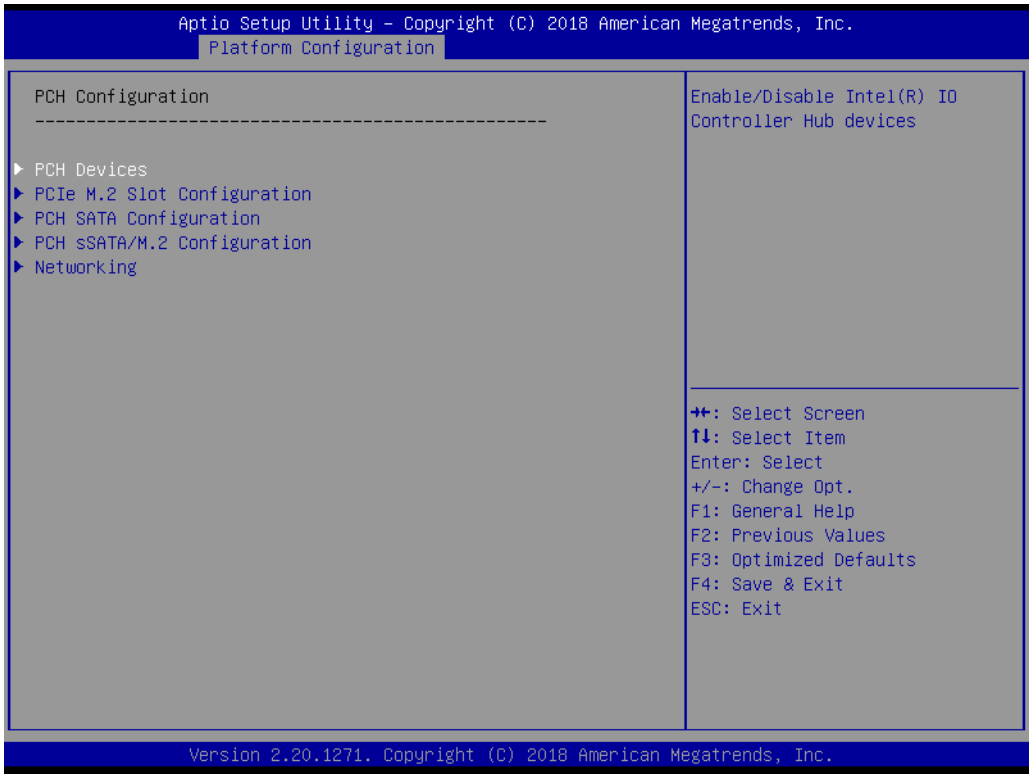
### 3.2.2.8 USB Configuration


- **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 and 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**
  Enable/Disable 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].

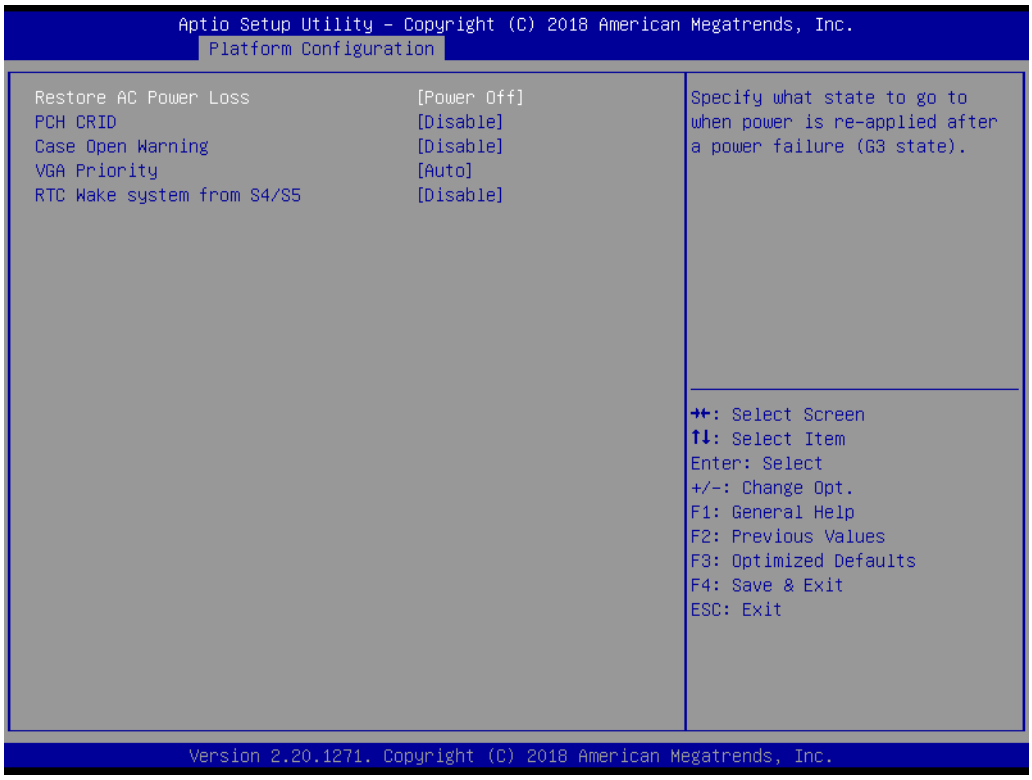
### 3.2.3 Platform Configuration




#### 3.2.3.1 PCH Configuration

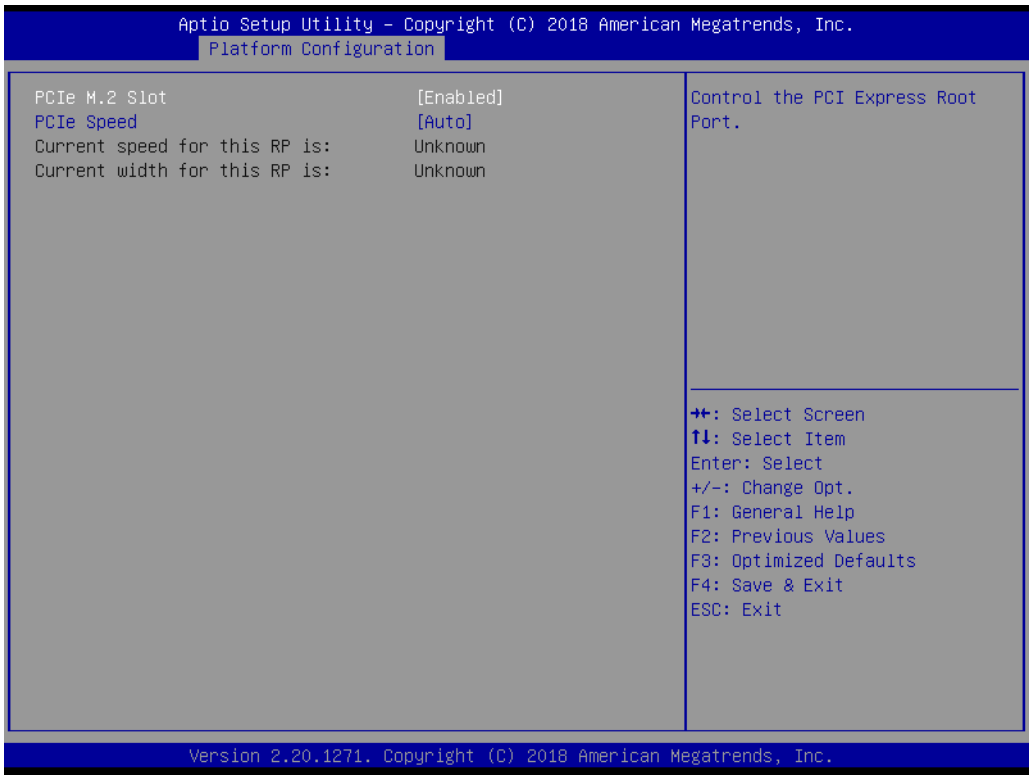


## PCH Device



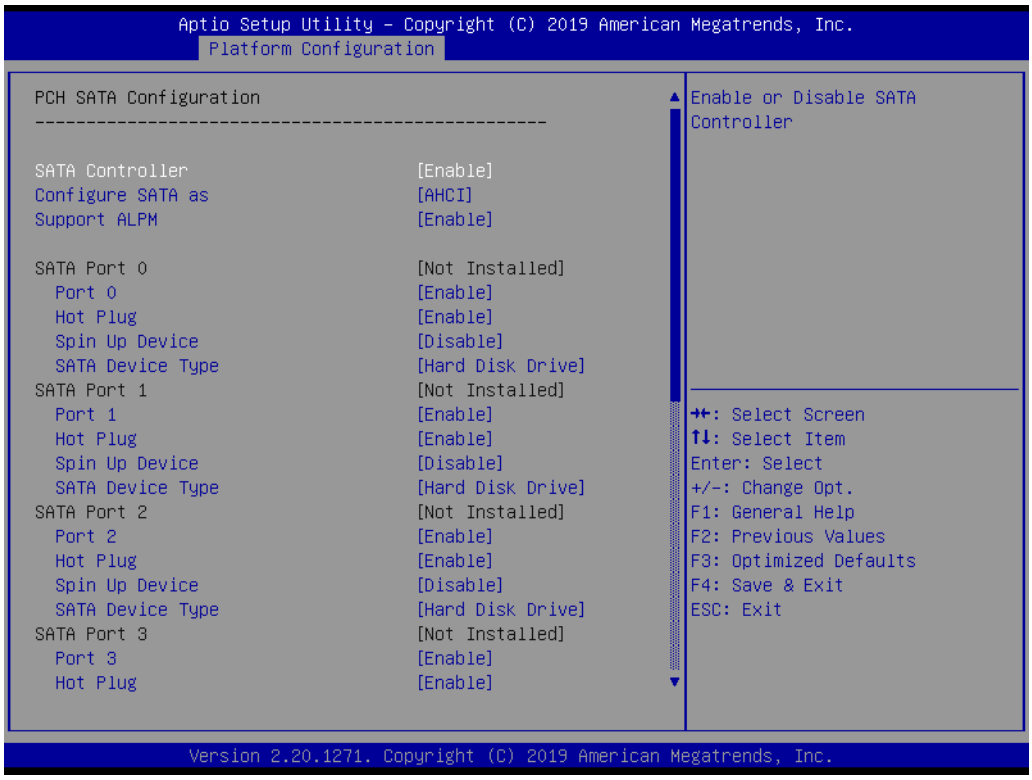

- **Restore AC Power Loss**
  Specify what state to go to when power is re-applied after a power failure (G3 state).
- **PCH Compatibility RID**
  Enable/Disable PCH Compatibility Revision ID (CRID) functionality.
- **Case Open Warning**
  Enable/Disable the chassis Intrusion monitoring function. When enabled and he case is opened, the warning message will show in POST screen.
- **VGA Priority**
  Select active video type as on board device or PCIE device. Default auto is PCIE device priority higher than on board device.
- **RTC wake system from S4/S5**
  Enable or Disable system wake on alarm event. When enabled, system will wake on the day and time specified.

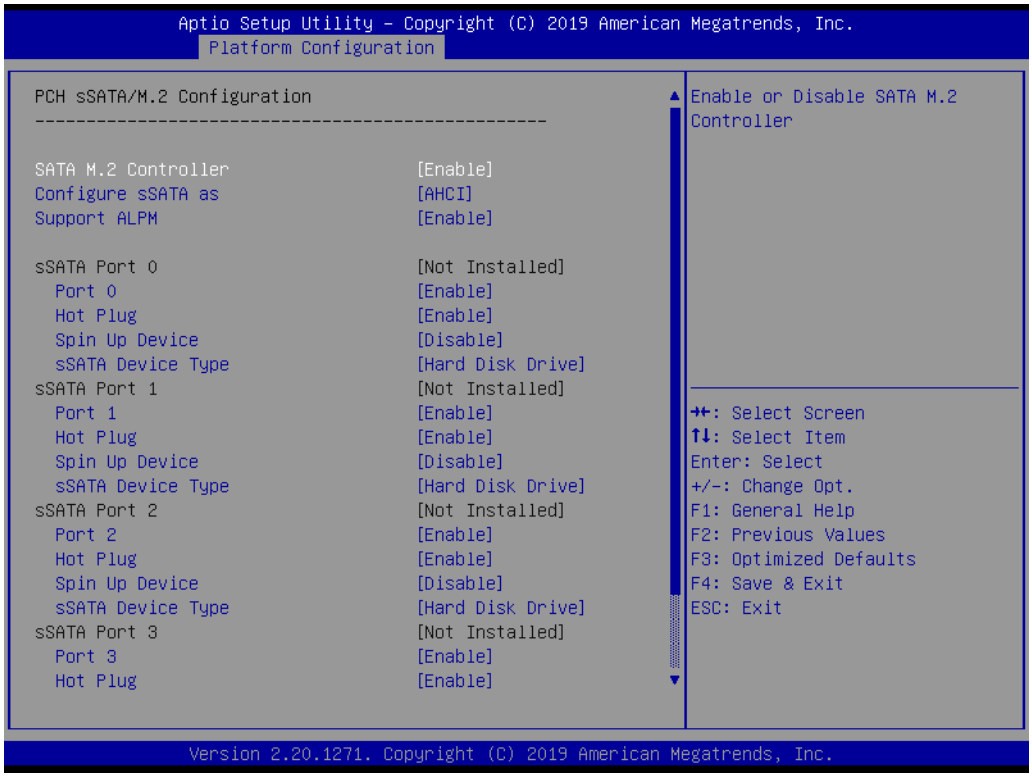
## PCIe M.2 Slot Configuration




- **PCIe M.2 Slot**
  Enable/Disable PCIe M.2 Slot.
- **PCIe Speed**
  Configure PCIe M.2 speed, default is auto.

## PCH SATA/sSATA M.2 Configuration

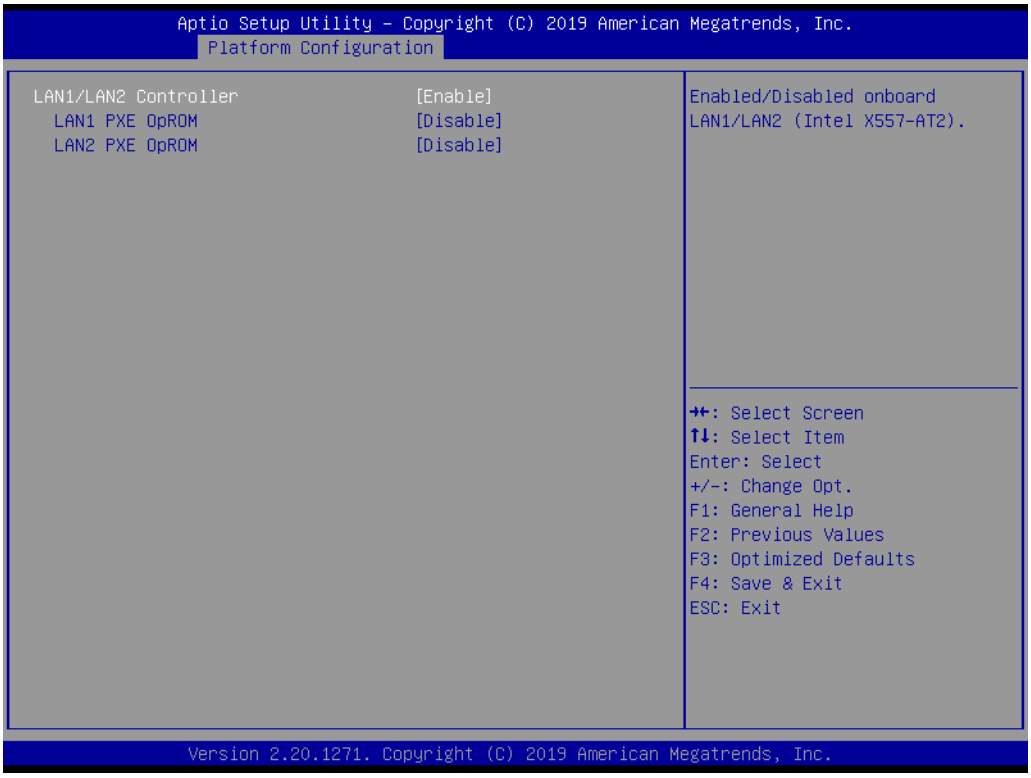



- **SATA/sSATA M.2 Controller**
  Enables/Disables sSATA controller.
- **Configure SATA/sSATA as**
  Configured as AHCI/RAID mode.
- **Supports ALPM**

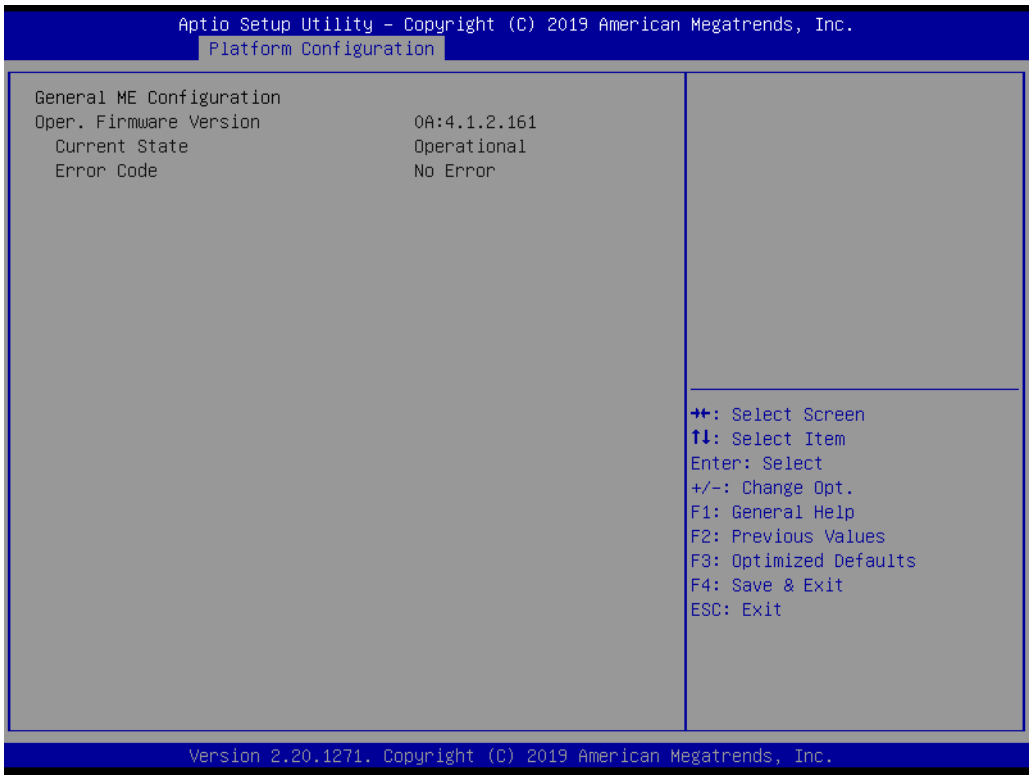
Enables/Disables SATA Aggressive Link Power Management. This item will appear when "AHCI" or "RAID" is selected.

## Networking



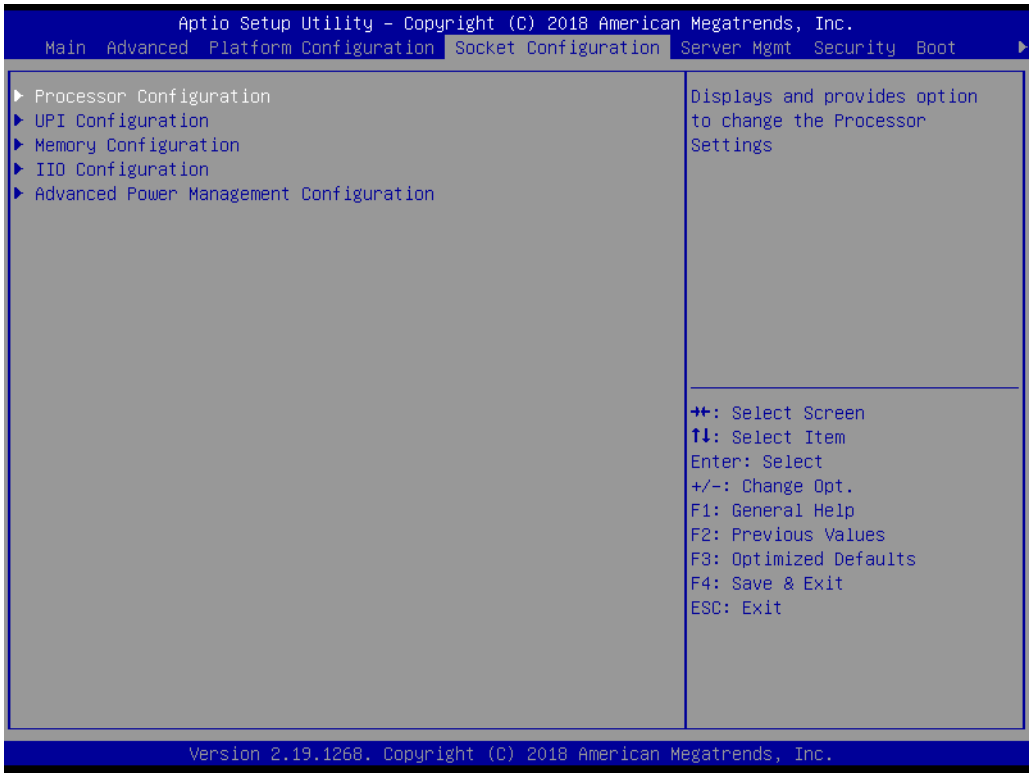

- **LAN1/LAN2 Controller**
  Enable/Disable on board LAN1/LAN2 from Intel X557AT2 Controller support.
- **LAN1 PXE OpROM**
  Enable/Disable Legacy Boot option for LAN1 from Intel X557AT2 controller.
- **LAN2 PXE OpROM**
  Enable/Disable Legacy Boot option for LAN2 from Intel X557AT2 controller.

### 3.2.3.2 Server ME Configuration

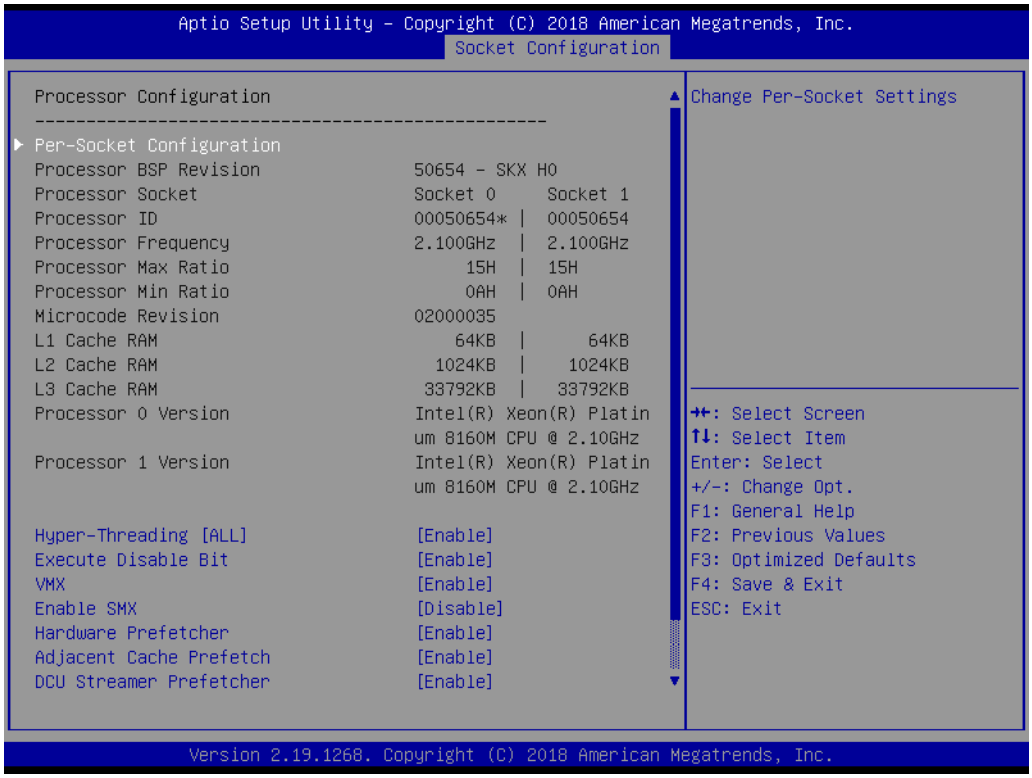



This page show the operating ME firmware version and state.

## 3.2.4 Socket Configuration

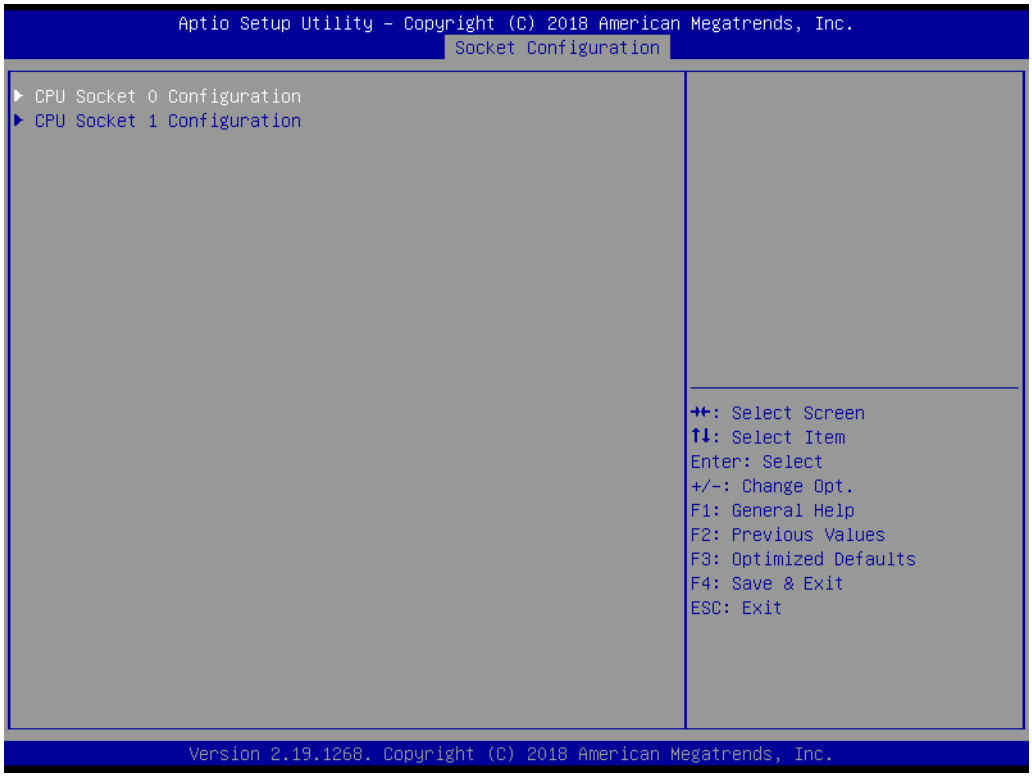


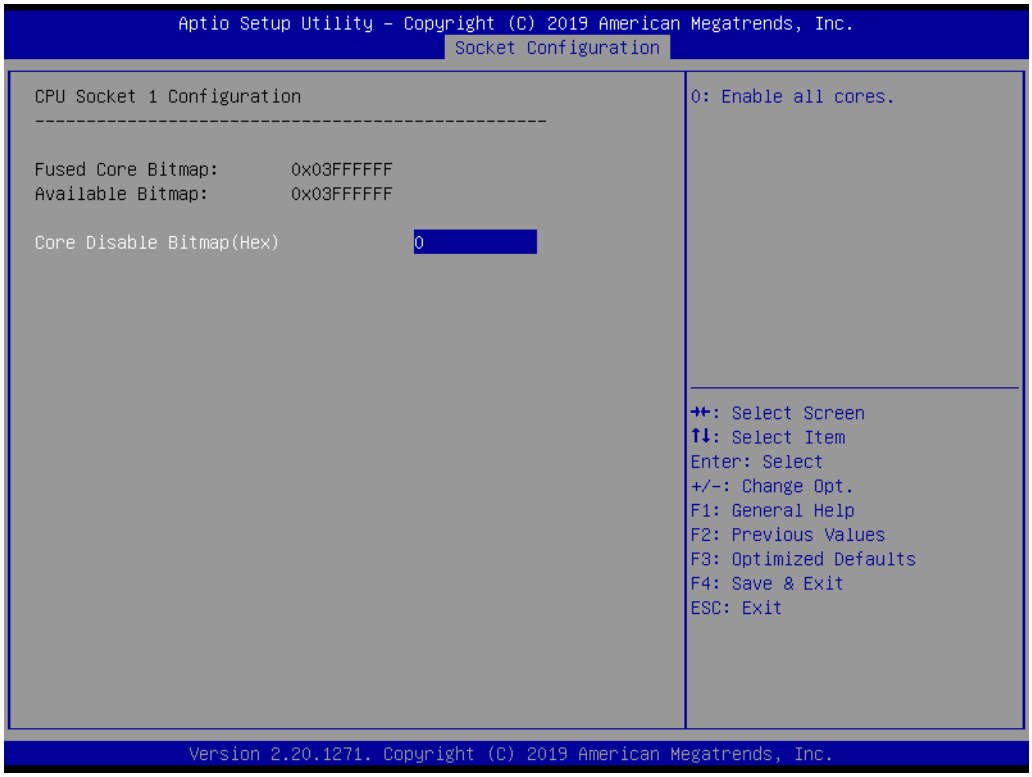
### 3.2.4.1 Processor Configuration

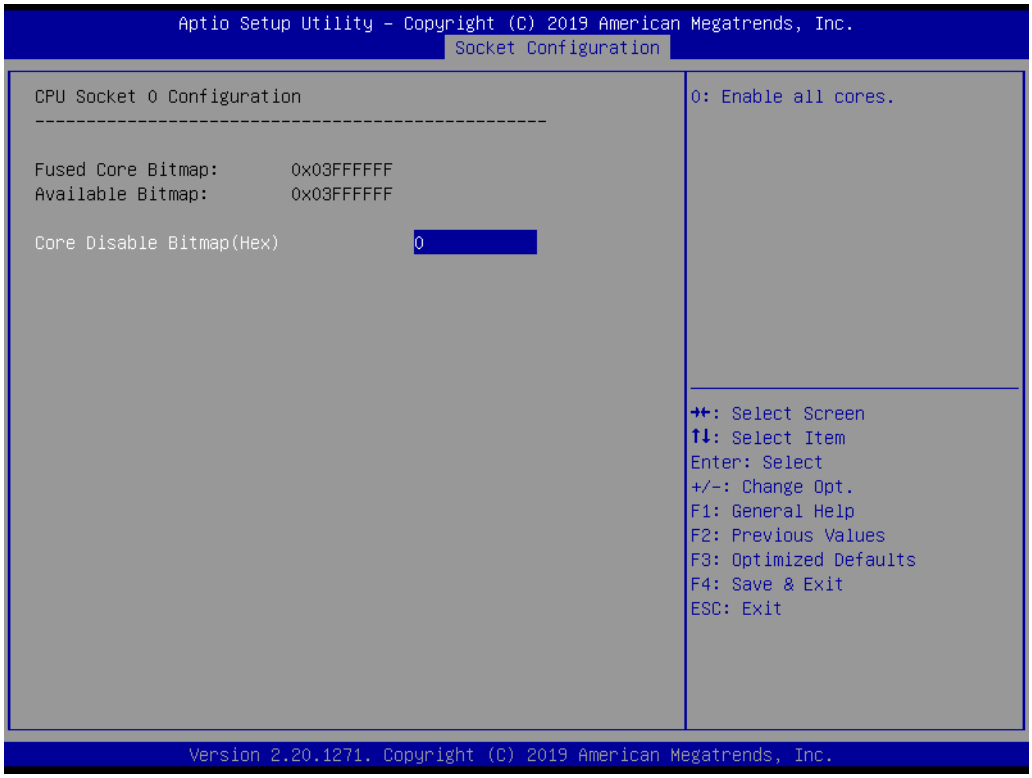



- **Hyper-Threading**
  Enables Hyper Threading (software method to Enable/Disable logical processor threads).
- **Execute Disable Bit**
  This item specifies the execute disable bit feature. The settings are Enabled and Disabled. The optimal and fail-safe default setting is enabled. If disabled is selected, the BIOS forces the XD feature flag to always return to 0.
- **VMX**
  Enables the Vanderpool Technology, takes effect after reboot.
- **Enable SMX**
  Enables Safer Mode Extensions (SMX).
- **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. Set to enable or disable.
- **Adjacent Cache Line 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. Set to enable or disable.
- **DCU Streamer Prefetch**
  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**
  MSR 31h Bit[0] - A write of 1 selects the DCU mode as 16KB 4-way with ECC.
- **AES-NI**
  Enable/disable AES-NI support.

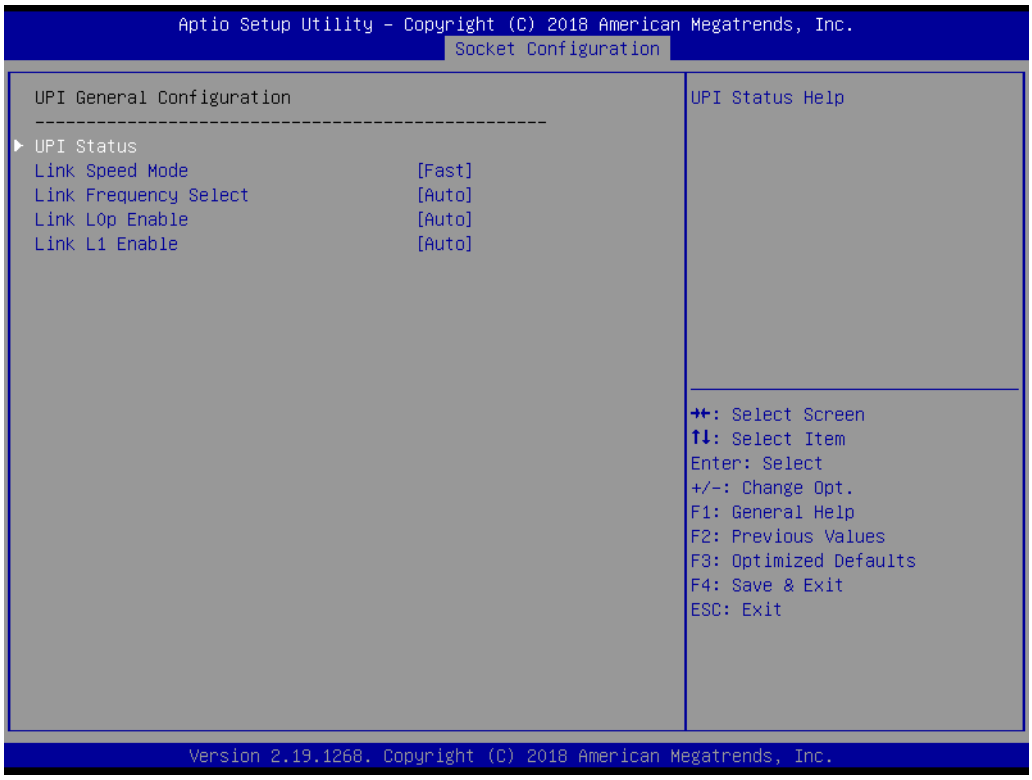


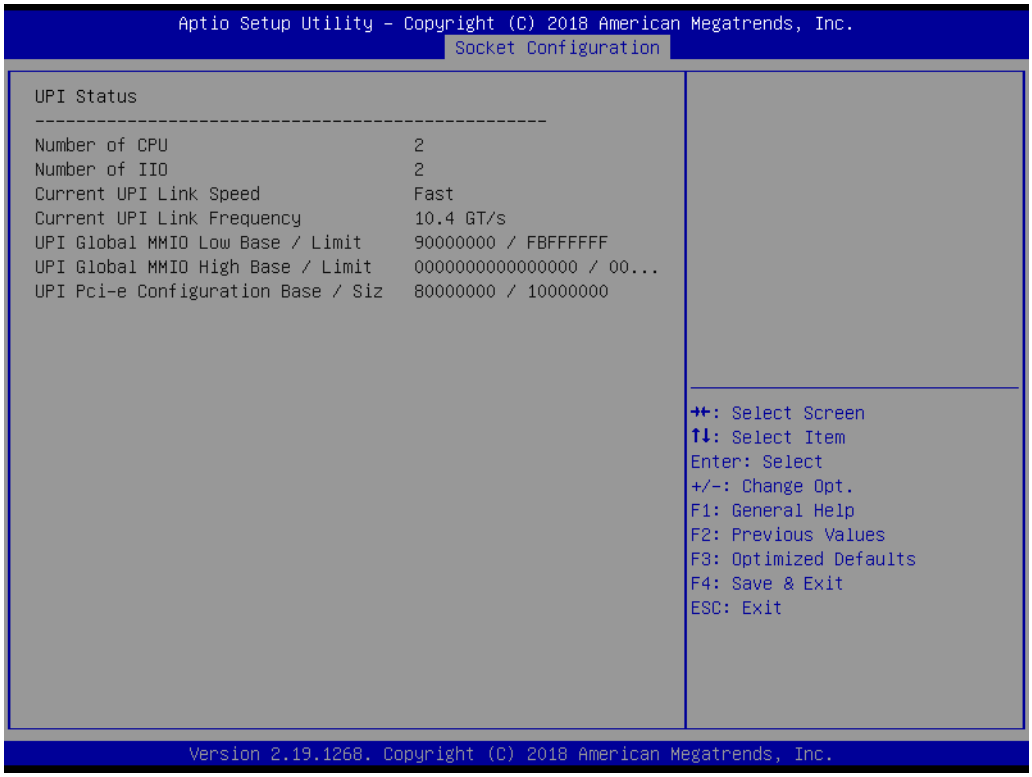



- **Core Disable Bitmap (Hex)**
  Hex value for CPU Core disable, default value 0 is enable all cores.

### 3.2.4.2 UPI Configuration

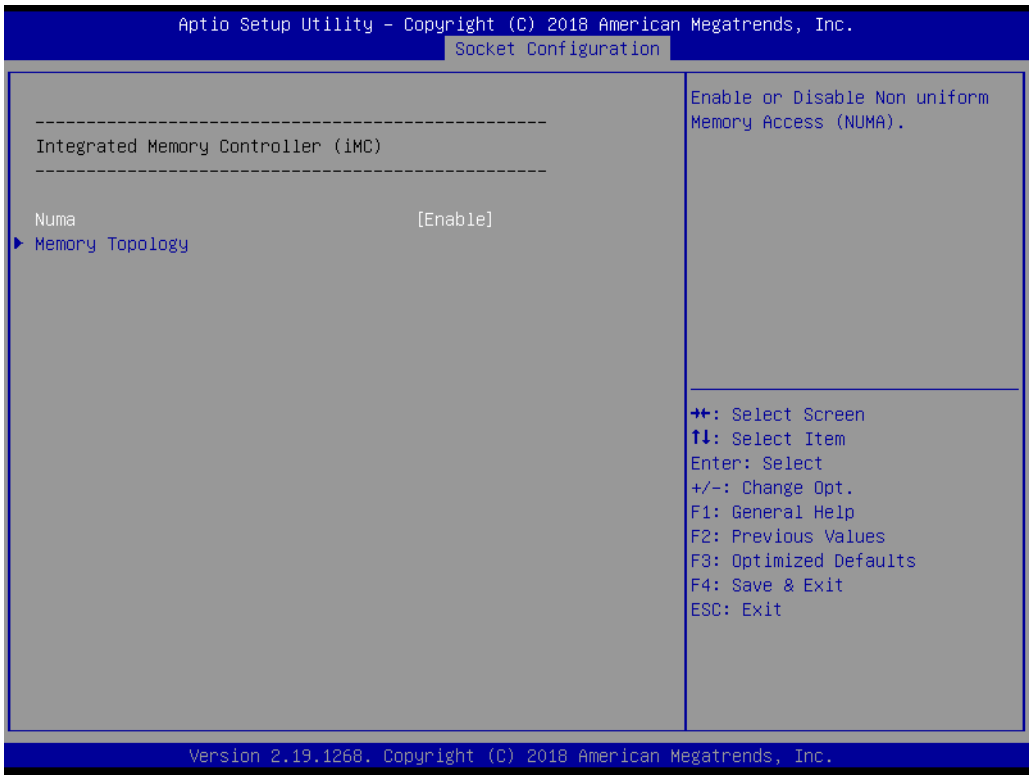


– **UPI status**

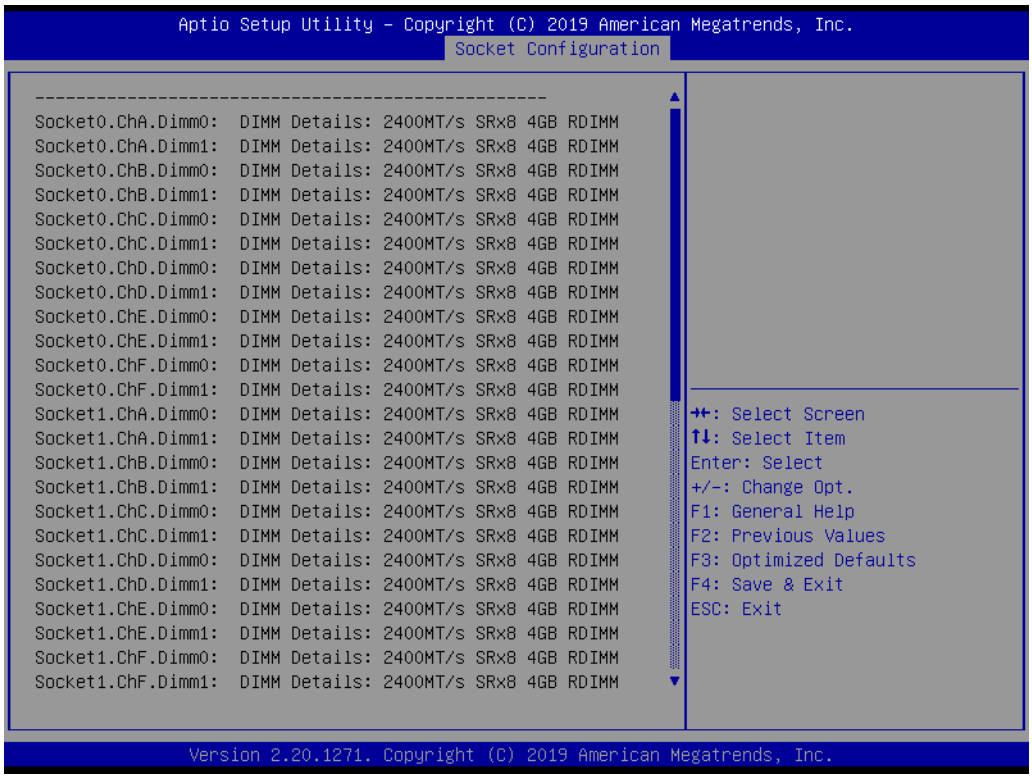



– **Link Speed Mode**
  Select the QPI link speed as either the POR speed (Fast) or default speed (Slow).
– **Link Frequency Select**
  Allows for selecting the QPI Link frequency.
– **Link L0p Enable**
  Enable/Disable QPI Link0p.
– **Link L1 Enable**
  Enable/Disable QPI L1.

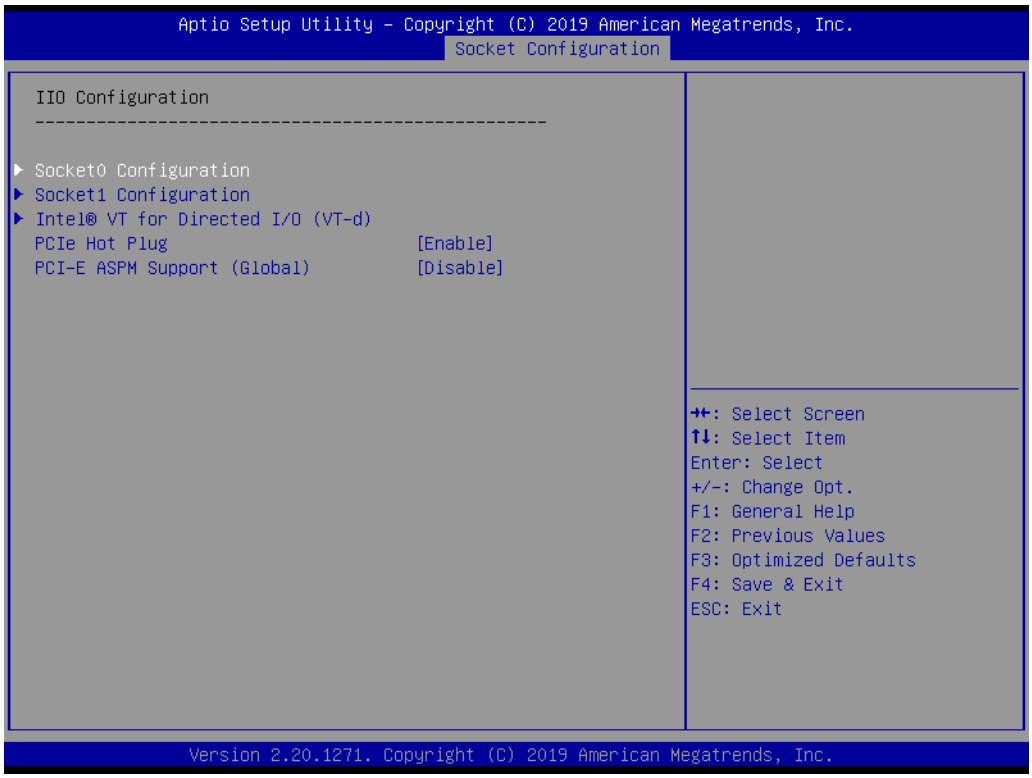
### 3.2.4.3 Memory Configuration




- **NUMA**
  Enable/Disable Non-uniform Memory Access (NUMA).
- **Memory Topology**

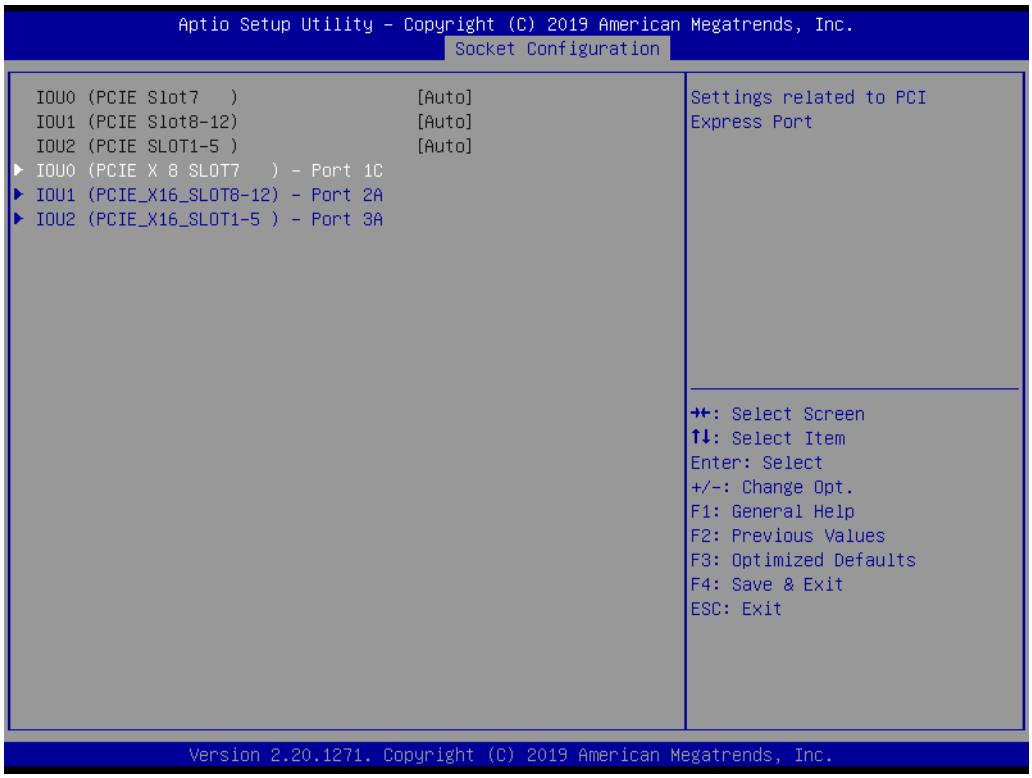


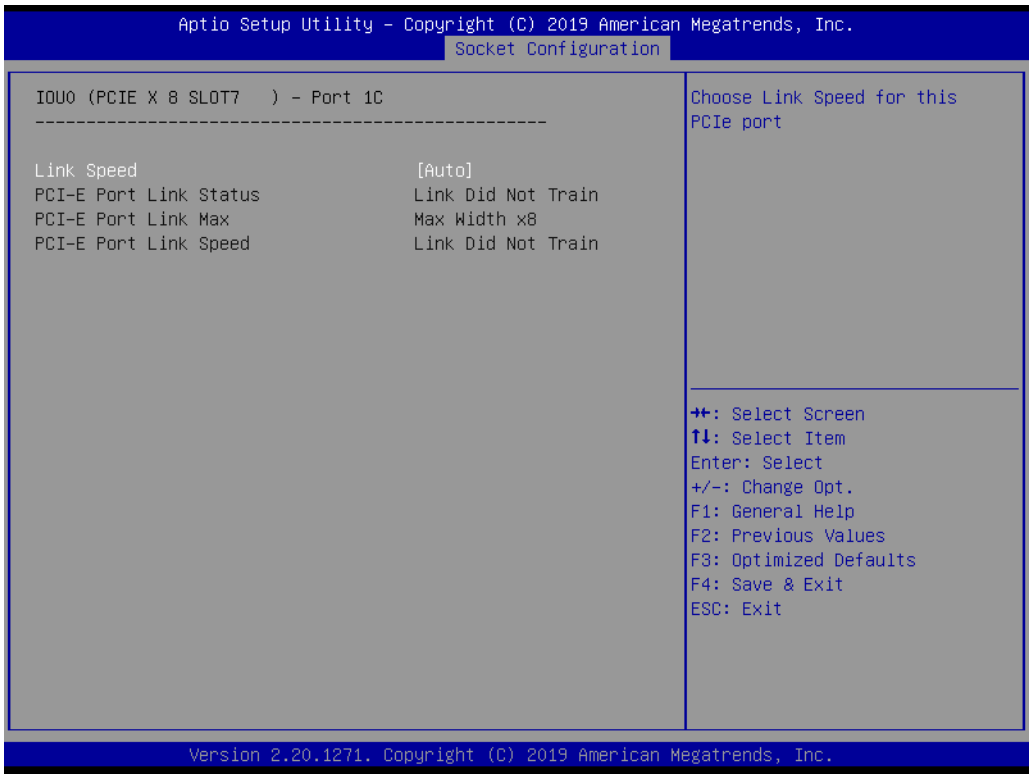
### 3.2.4.4 IIO Configuration




- **PCI-E ASPM Support (Global)**
  Enable or disable the Active State Power Management for all PCI-Express slots.

## Socket 0 Configuration

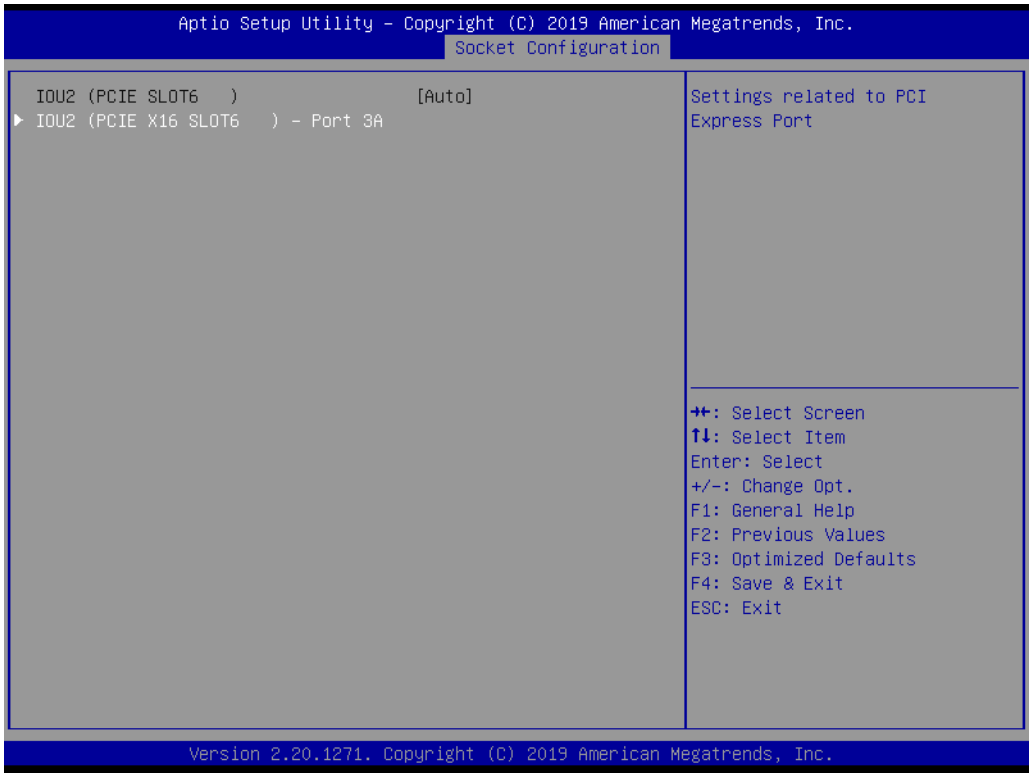


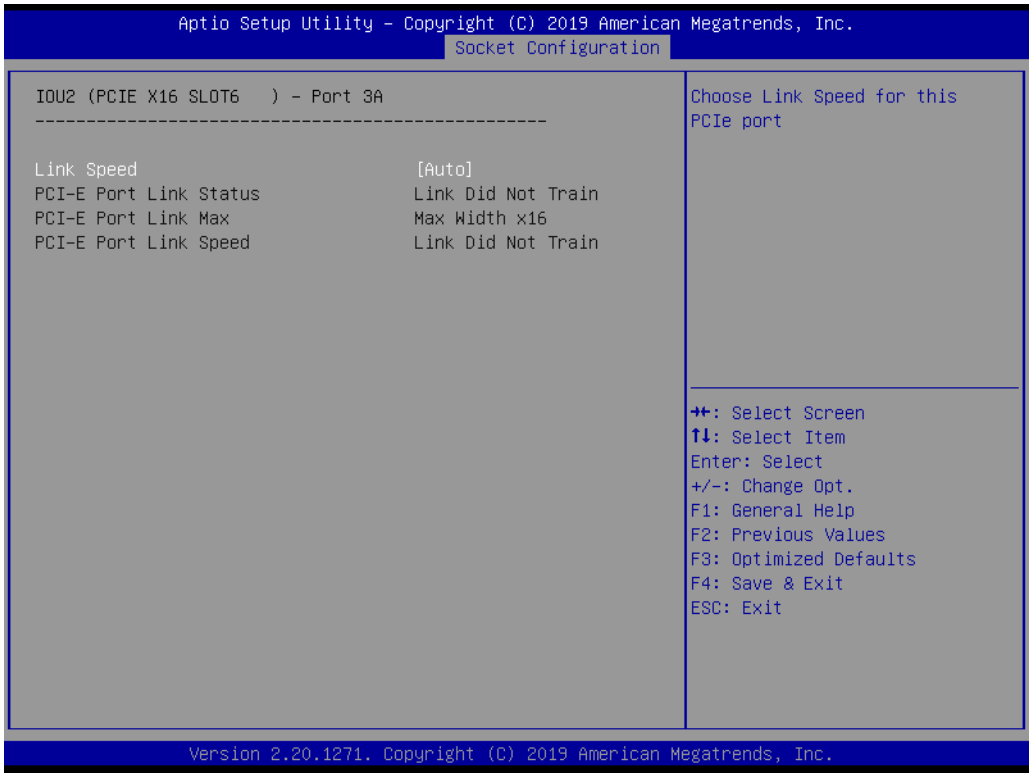



**IOU0 (PCIE X8 Slot7)**
**IOU1 (PCIE X16 Slot8-12)**
**IOU2 (PCIE X16 Slot1-5)**

– **Link Speed**
  Select target link speed as Gen1, Gen2, Gen3.

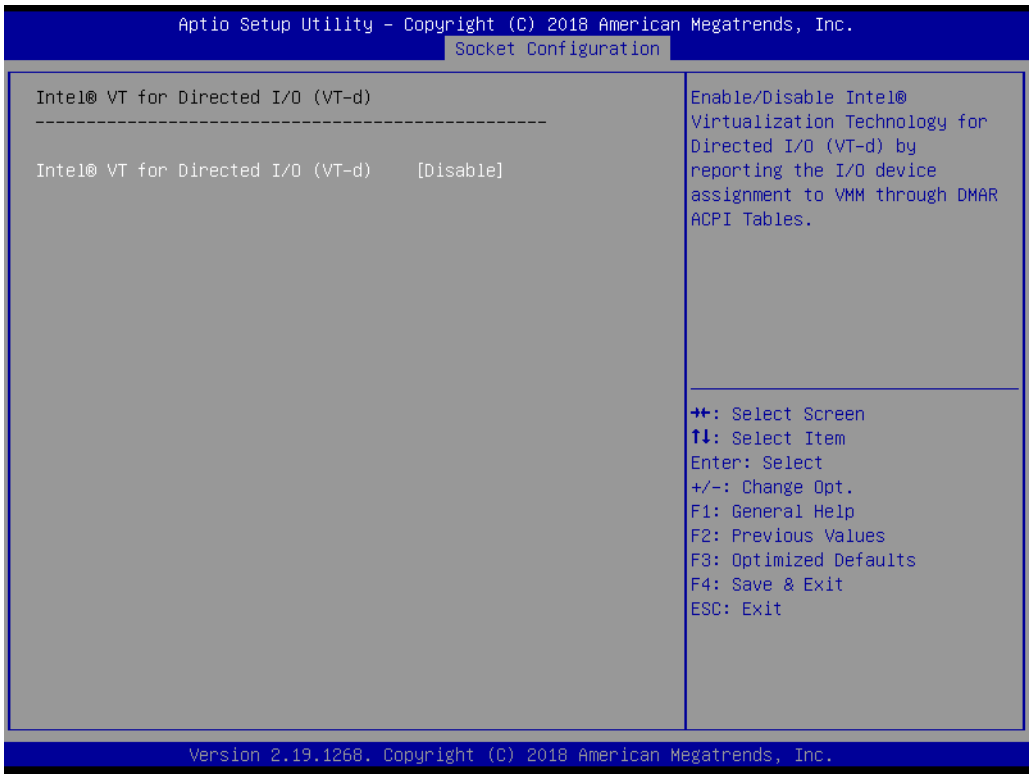
- **Socket 1 Configuration**



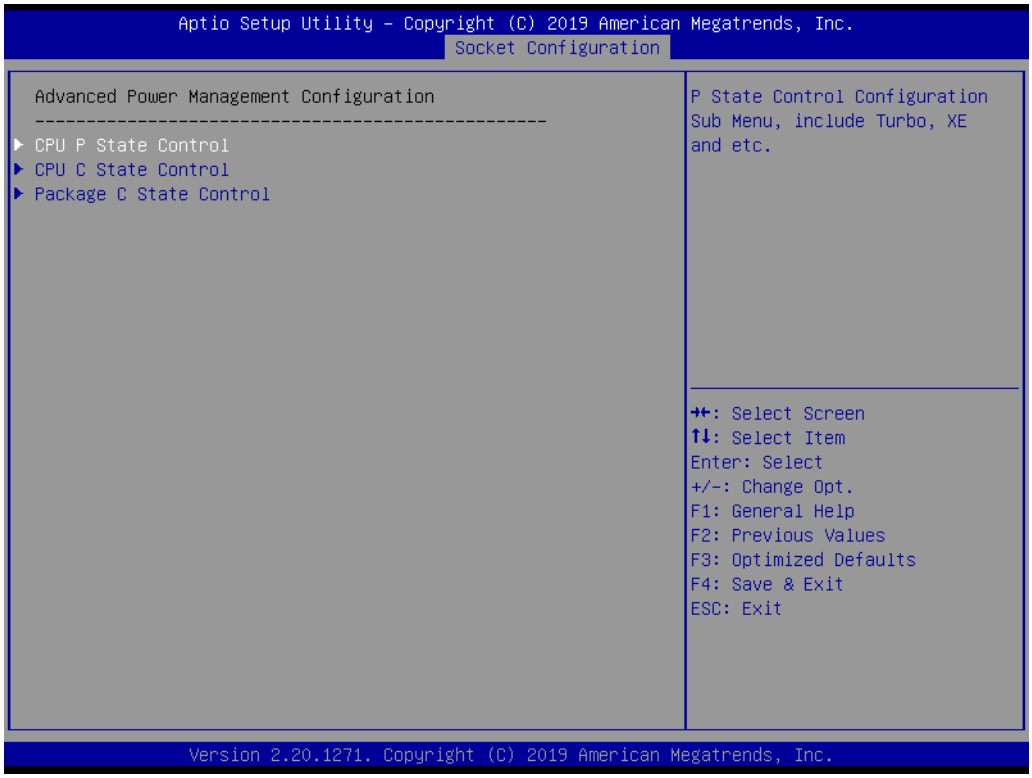
**IOU2**

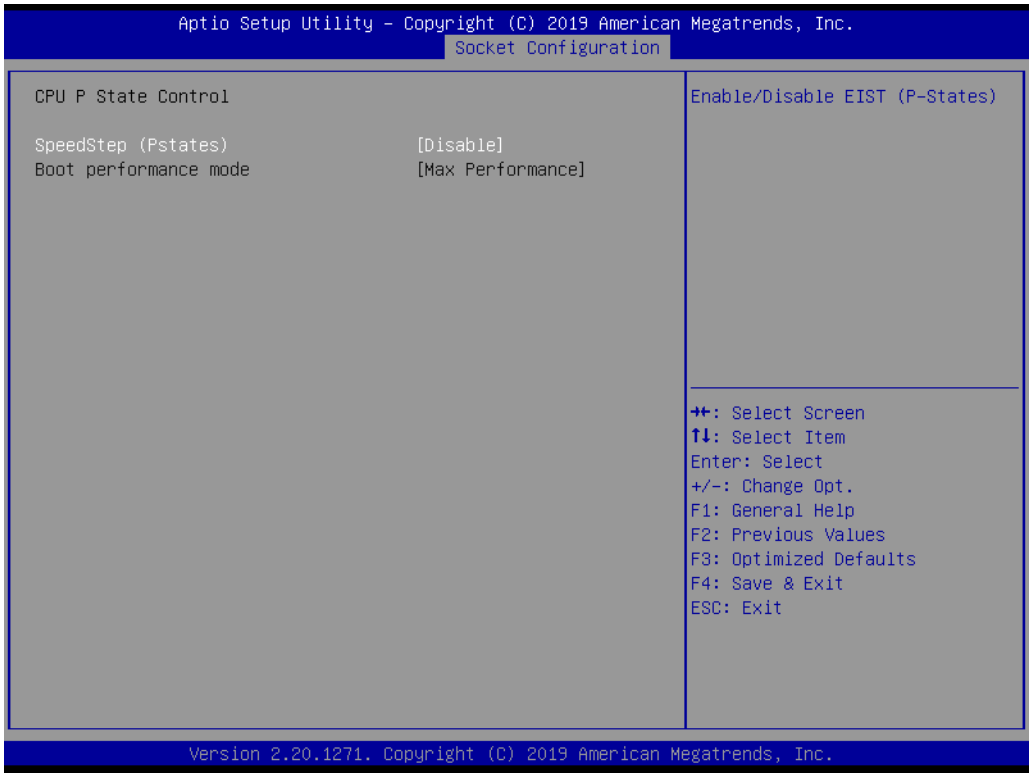
- **PCIE X16 Slot6**
  - **Link Speed**
    Select target link speed as Gen1, Gen2, Gen3.
- **Intel VT for Direct I/O (VT-d)**

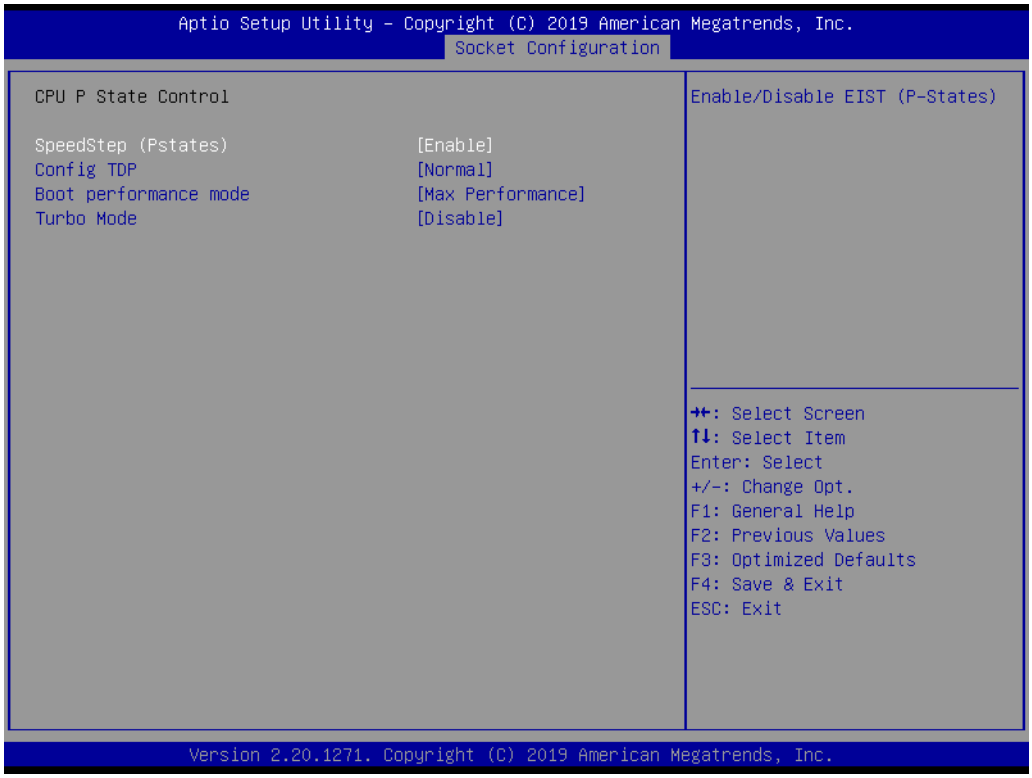



  - **Intel VT for Direct I/O (VT-d)**
    Enable or disable Intel Virtualization Technology for directed I/O (VT-d) by reporting the I/O device assignment to VMM through DMAR ACPI tables.

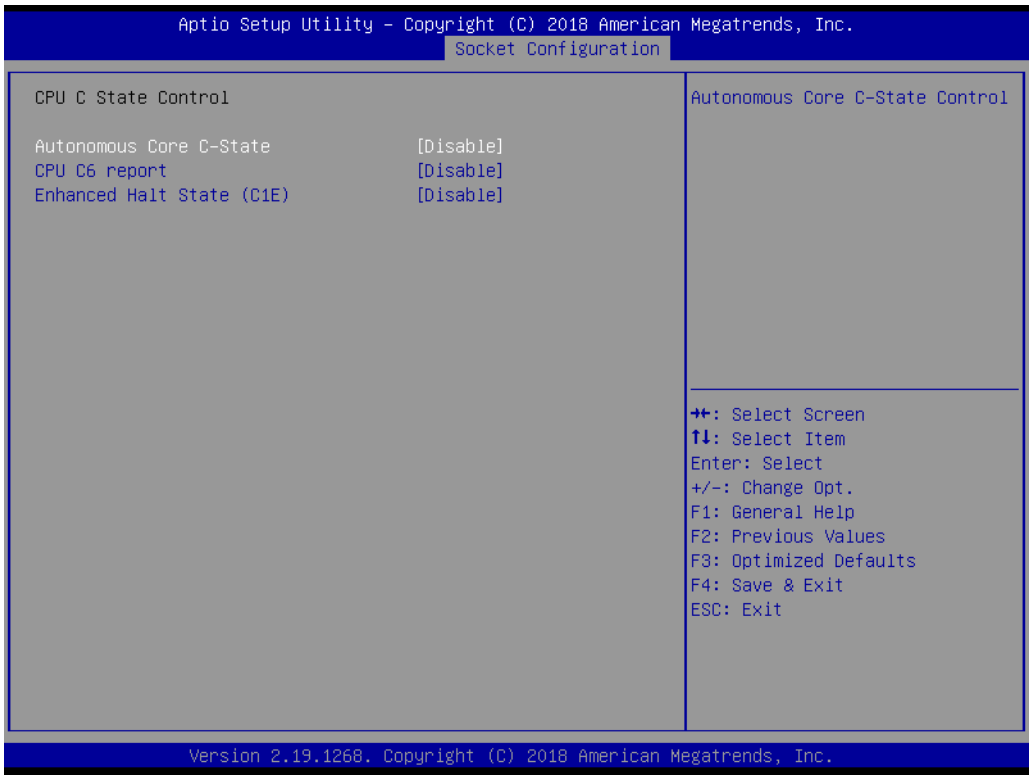
### 3.2.4.5 Advanced Power Management Configuration



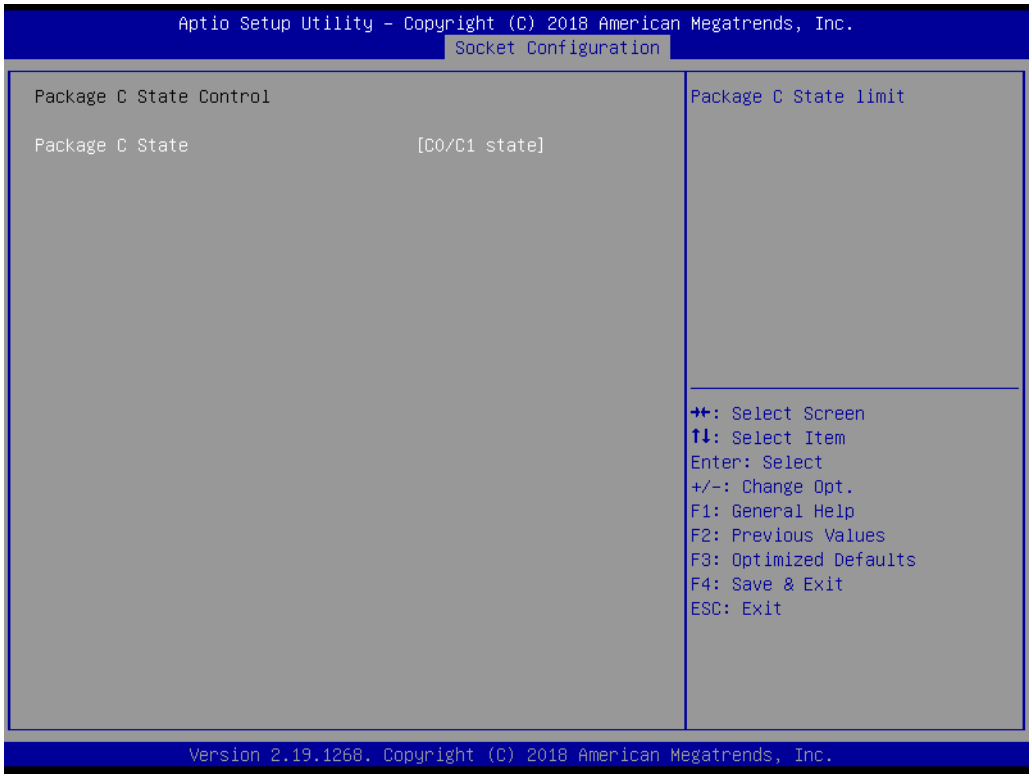






- **SpeedStep (P-state)**
  When enabled, OS sets CPU frequency according to load. When disabled, CPU frequency is set at max non-turbo. Default is disable.
- **Config TDP**
  Config TDP level selection.
- **Boot performance mode**
  Select the performance state that BIOS will set before OS hand off.
- **Turbo Mode**
  Turbo mode allows a CPU logical processor to execute a higher frequency when enough power is available not exceeding CPU defined limits.

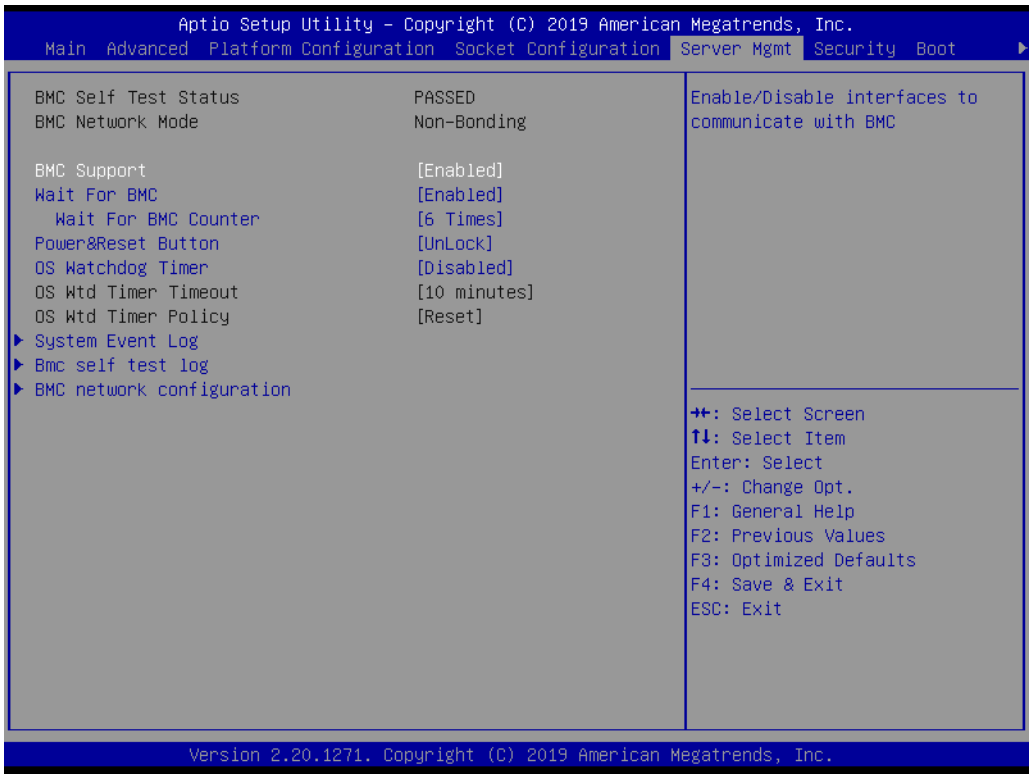



- **Autonomous Core C-State**
  Enable or disable autonomous C-State control for CPU cores. Default is disable.
- **CPU C6 report**
  Enable or disable CPU C6 report. Default is disable.
- **Enhanced Halt State (C1E)**
  Enable or disable C1E for lower power consumption, default is disable.



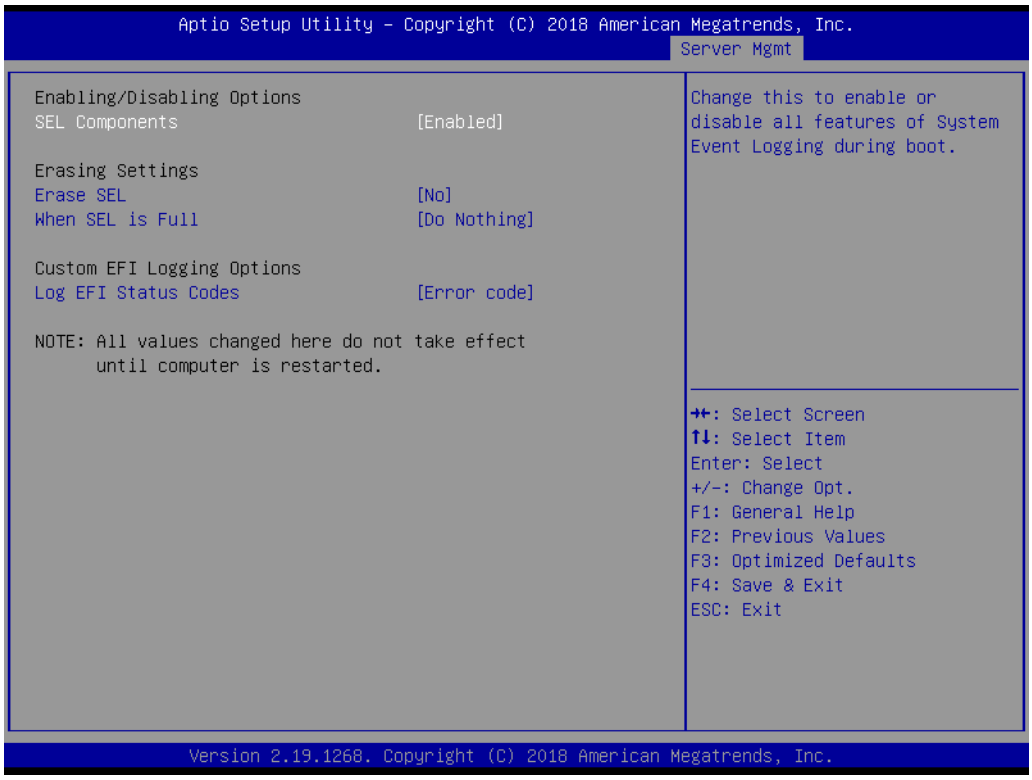
- **Package C State**
  Setting package C state limit, default is C0/C1 state.

## 3.2.5 Server Management



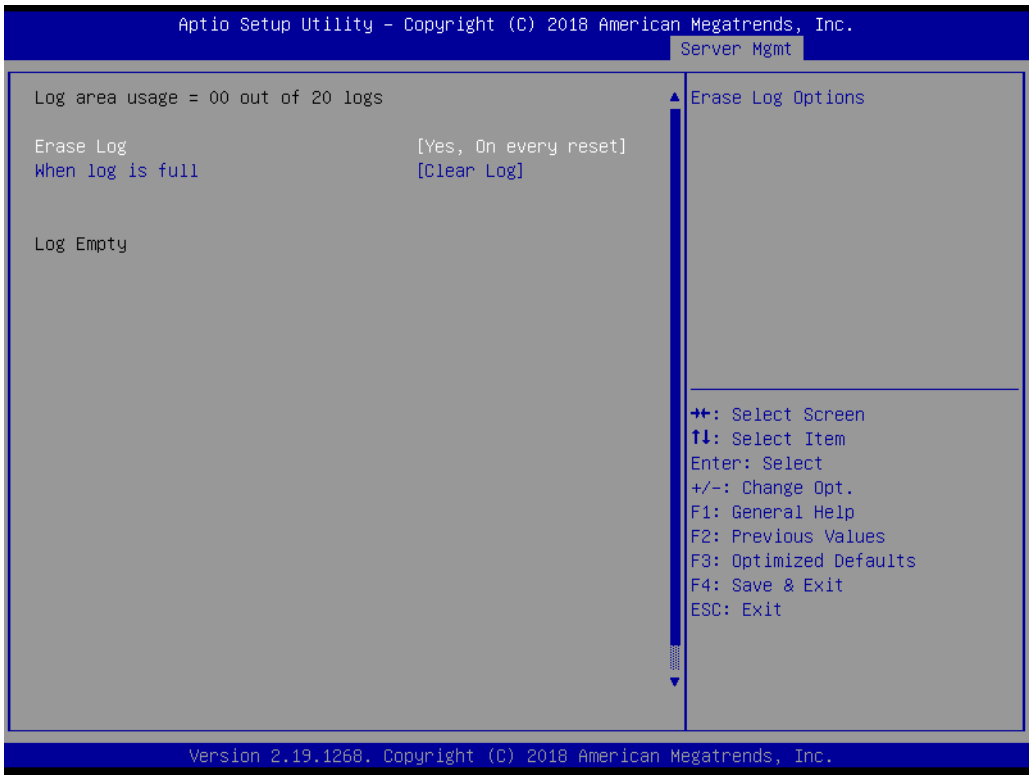

- **BMC Support**
  Enable/Disable interfaces to communicate with BMC.
- **Wait for BMC**
  – If enabled, motherboard will wait 30 ~ 60 seconds until BMC module boots up completely. After that, the normal BIOS post screen will be displayed.
  – If disabled, the motherboard will not wait for BMC module's response.
- **Wait for BMC counter**
  Wait for BMC counter for initialize host to BMC interfaces. The MB beeps per 5 seconds to check it.

## System Event Log



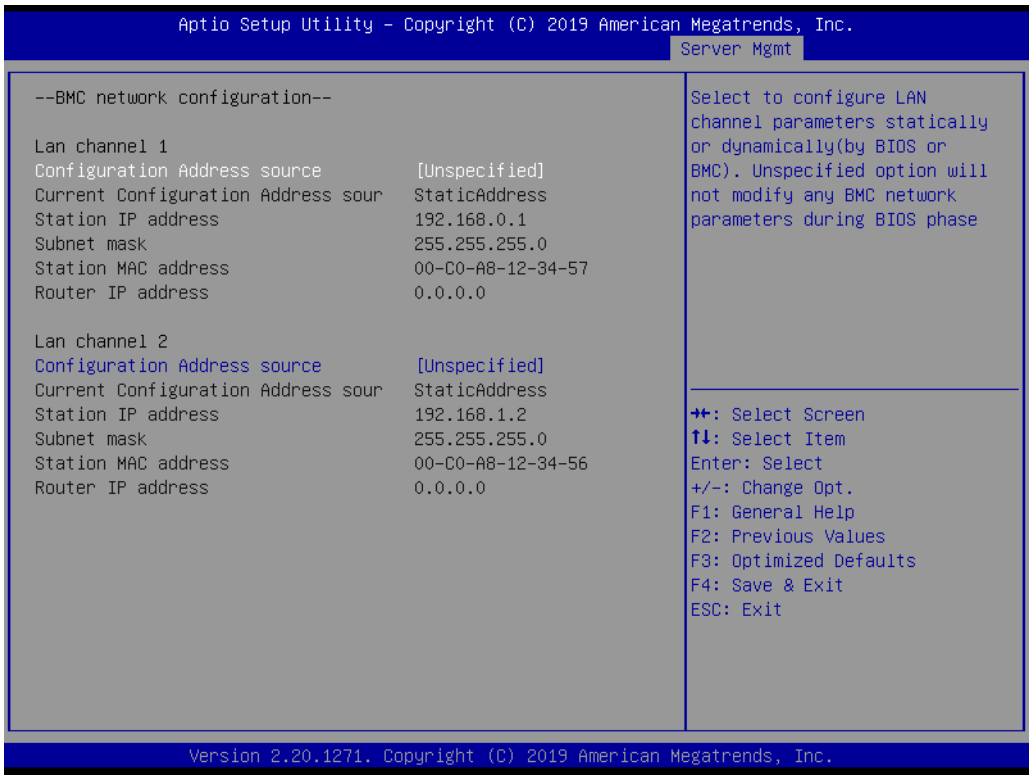

- **SEL Components**
  Enable/Disable all features of system event logging during boot.
- **Erase SEL**
  Choose options for erasing SEL.
- **When SEL is Full**
  Choose options for reactions to a full SEL.
- **Log EFI Status Codes**
  Disable the logging of EFI status codes, or log only error codes,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

## BMC Self Test Log




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

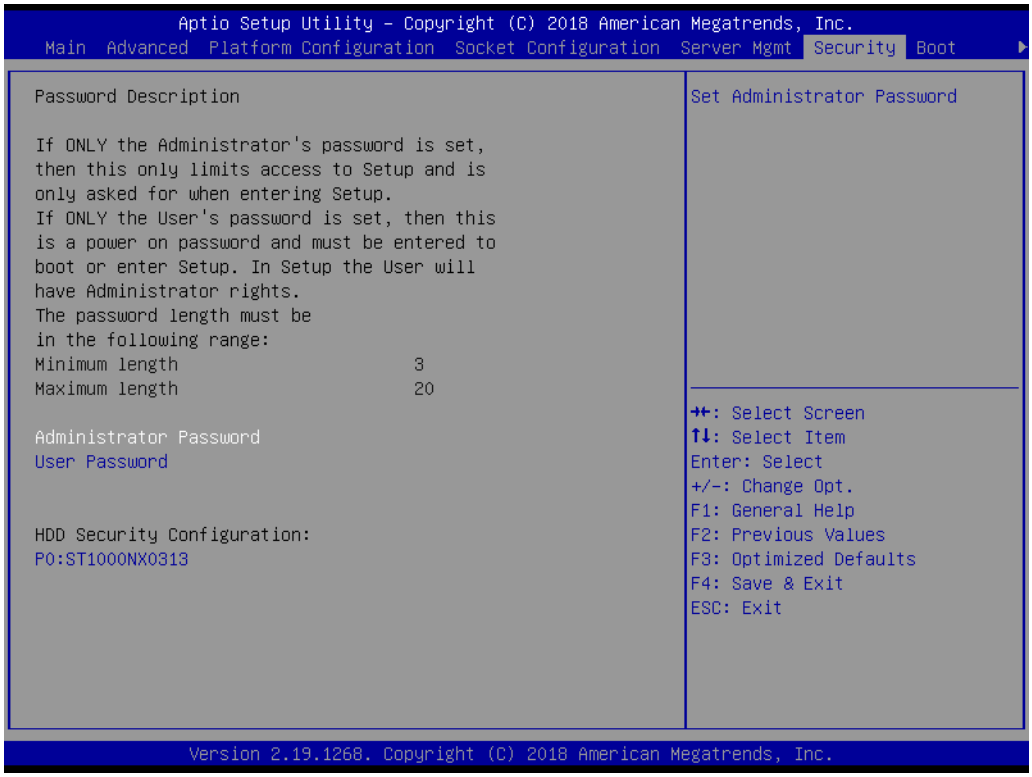
## BMC Network Configuration



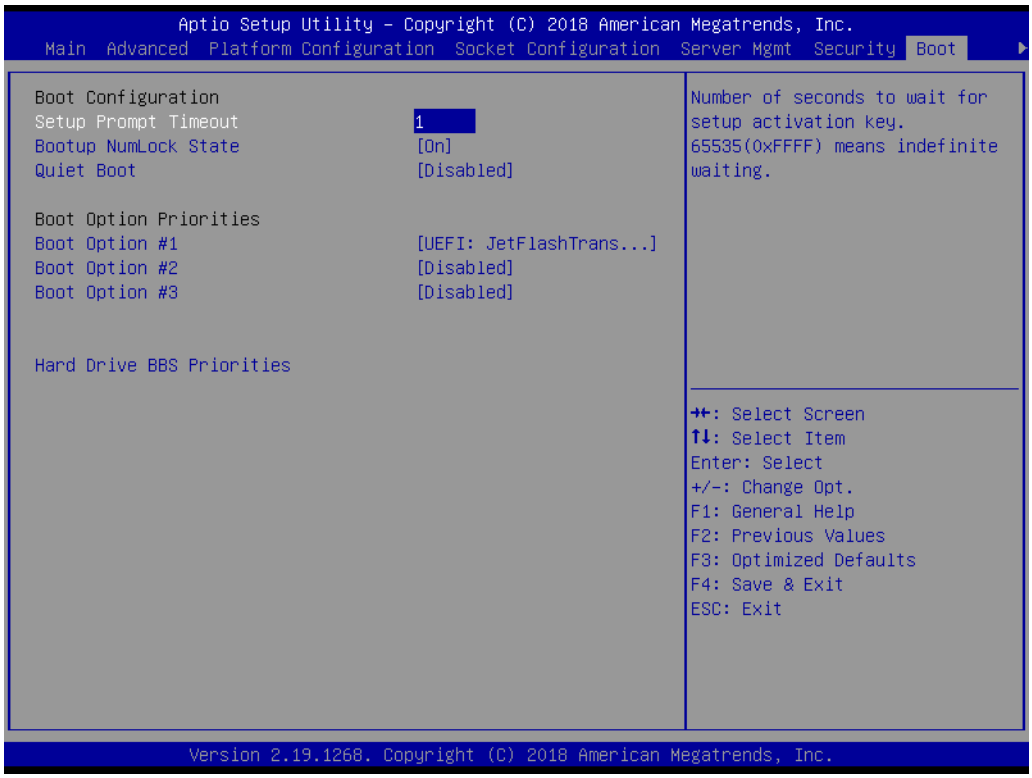

– **Configuration Address Source**

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



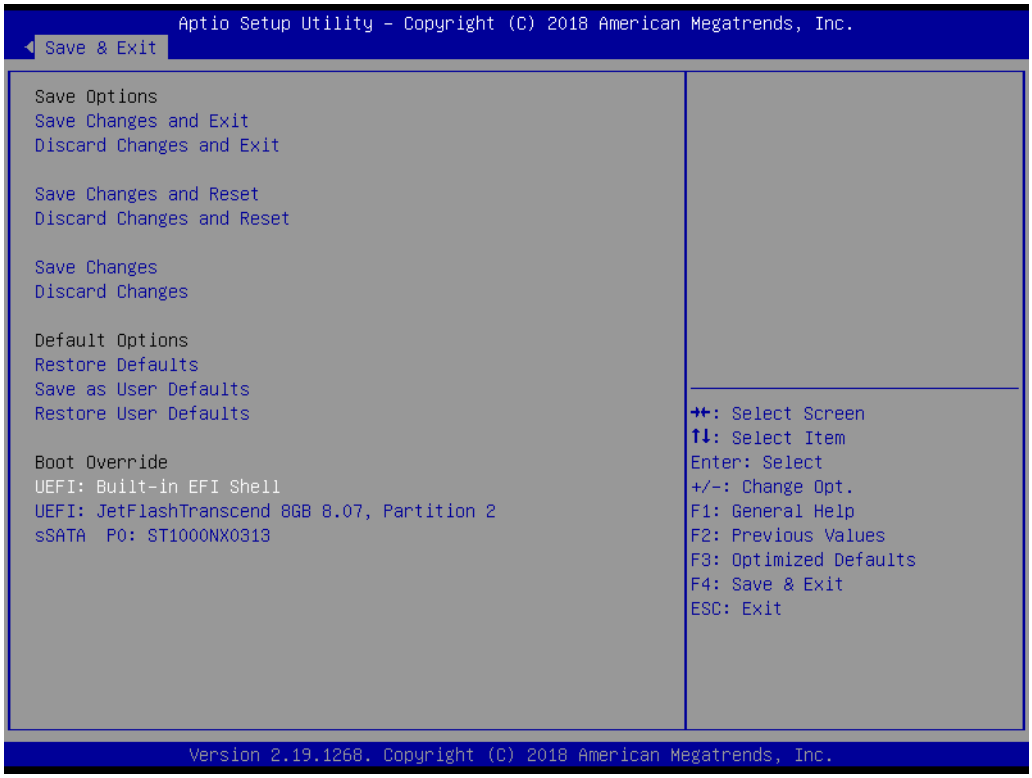

### 3.2.7 Boot




- **Setup Prompt Timeout**
  Number of seconds to wait for setup activation key. 16 (0x10) means indefinite waiting.

- **Bootup NumLock State**
  Select the keyboard NumLock state.
- **Quiet Boot**
  Enable/Disable quiet boot option.
- **Boot Option**
  Sets the system 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

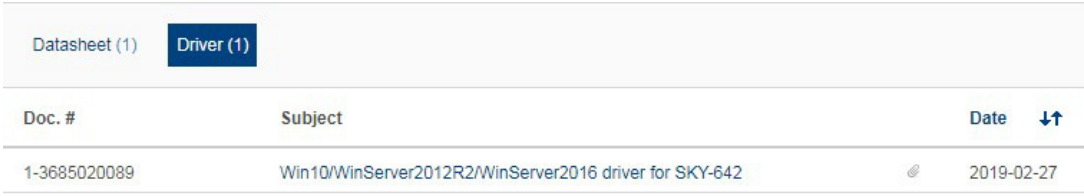
## 4.1 Before You Begin

To facilitate the installation of the enhanced display drivers and utility software, read the instructions in this chapter carefully. Please visit Advantech website or scan the QR code below for quick access to download the driver for SKY-642.

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

Select the corresponding operating system running on SKY-642.




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:

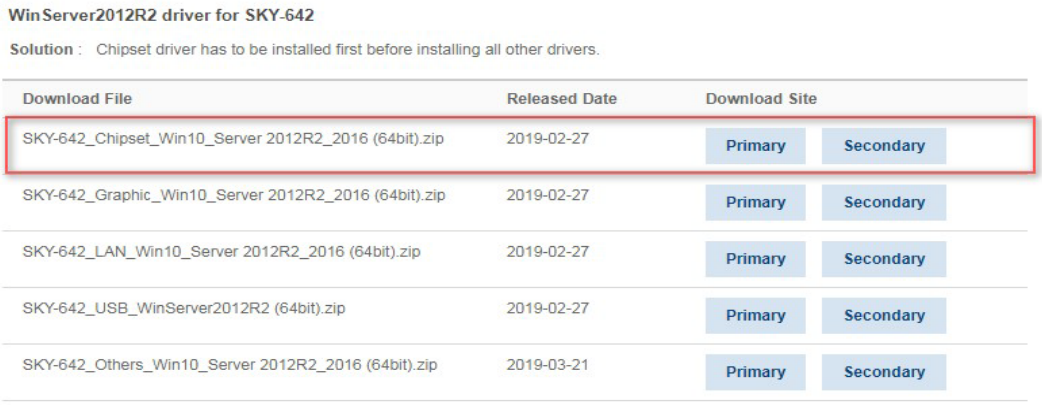
- Core PCI PnP services
- Serial ATA interface support
- USB 1.1/2.0 support
- Identification of Intel chipset components in the Device Manager

***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* |
| *Windows 7 (Ultimate SP1, Legacy mode)* | *x64* |

## 4.3 Windows OS Driver Setup

1. Download the Chipset driver as below picture shown, the file downloaded is compressed, unzip the folder then install the Chipset driver by running the SetupChipset.exe



**WinServer2012R2 driver for SKY-642**

**Solution :** Chipset driver has to be installed first before installing all other drivers.

| Download File | Released Date | Download Site | |
|---|---|---|---|
| SKY-642_Chipset_Win10_Server 2012R2_2016 (64bit).zip | 2019-02-27 | Primary | Secondary |
| SKY-642_Graphic_Win10_Server 2012R2_2016 (64bit).zip | 2019-02-27 | Primary | Secondary |
| SKY-642_LAN_Win10_Server 2012R2_2016 (64bit).zip | 2019-02-27 | Primary | Secondary |
| SKY-642_USB_WinServer2012R2 (64bit).zip | 2019-02-27 | Primary | Secondary |
| SKY-642_Others_Win10_Server 2012R2_2016 (64bit).zip | 2019-03-21 | Primary | Secondary |

# Chapter 5

## VGA Setup

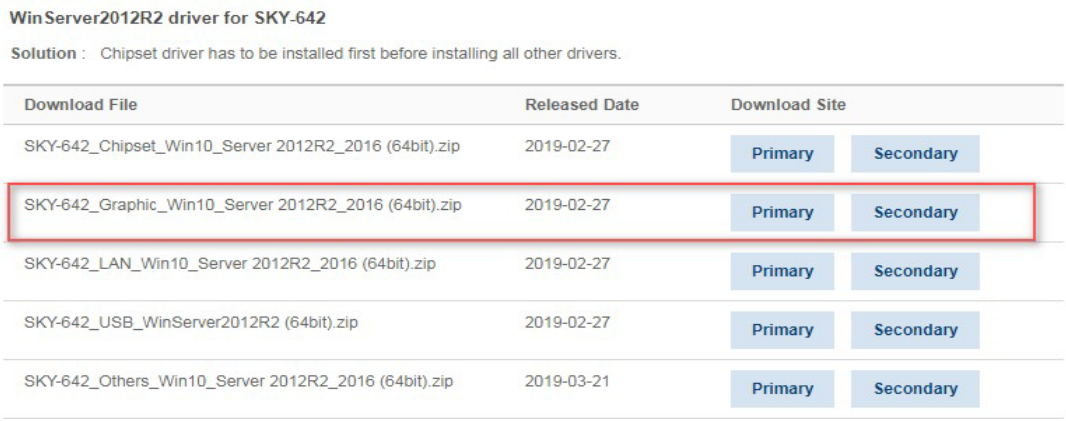
## 5.1 Introduction

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

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

## 5.2 Windows Series Driver Setup

Download the Graphic driver as shown below, the file downloaded is compressed, unzip the folder then install the Graphic driver.



**WinServer2012R2 driver for SKY-642**

**Solution :** Chipset driver has to be installed first before installing all other drivers.

| Download File | Released Date | Download Site |
|---|---|---|
| SKY-642_Chipset_Win10_Server 2012R2_2016 (64bit).zip | 2019-02-27 | Primary Secondary |
| SKY-642_Graphic_Win10_Server 2012R2_2016 (64bit).zip | 2019-02-27 | Primary Secondary |
| SKY-642_LAN_Win10_Server 2012R2_2016 (64bit).zip | 2019-02-27 | Primary Secondary |
| SKY-642_USB_WinServer2012R2 (64bit).zip | 2019-02-27 | Primary Secondary |
| SKY-642_Others_Win10_Server 2012R2_2016 (64bit).zip | 2019-03-21 | Primary Secondary |

***Note!***

1. *If SKY-642 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 Configuration / SATA RAID & AHCI / USB 3.0 Setup

# 6.1 LAN Configuration

## 6.1.1 Introduction

The SKY-642 has two 10G Base-T Ethernet LAN 1/2 connections - Intel X557 PHY. They eliminate bottlenecks in network data flow when incorporating Gigabit Ethernet at 10Gbps.

## 6.1.2 Features

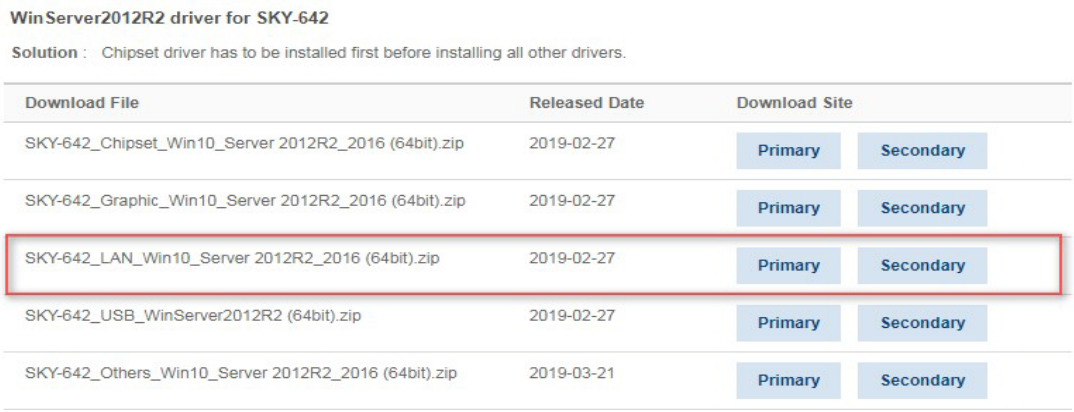
- 1G & 10G Base-T Ethernet controller
- 1G & 10G Base-T triple-speed MAC
- Full duplex and half duplex at 10/1Gbps or 10 Gbps
- Wake-on-LAN (WOL) support

## 6.1.3 Installation

The integrated Intel gigabit Ethernet controller supports all major network operating systems. However, the installation procedure varies with different operating systems. In the following sections, refer to the one that provides the driver setup procedure for the operating system you are using.

## 6.1.4 Windows Series Driver Setup (LAN)

1. Download the Ethernet driver as shown below, the file downloaded is compressed, unzip the folder then install the Ethernet driver.



**WinServer2012R2 driver for SKY-642**

**Solution :** Chipset driver has to be installed first before installing all other drivers.

| Download File | Released Date | Download Site | |
|---|---|---|---|
| SKY-642_Chipset_Win10_Server 2012R2_2016 (64bit).zip | 2019-02-27 | Primary | Secondary |
| SKY-642_Graphic_Win10_Server 2012R2_2016 (64bit).zip | 2019-02-27 | Primary | Secondary |
| SKY-642_LAN_Win10_Server 2012R2_2016 (64bit).zip | 2019-02-27 | Primary | Secondary |
| SKY-642_USB_WinServer2012R2 (64bit).zip | 2019-02-27 | Primary | Secondary |
| SKY-642_Others_Win10_Server 2012R2_2016 (64bit).zip | 2019-03-21 | Primary | Secondary |

# 6.2 AHCI & SATA RAID

## 6.2.1 Introduction

Intel C622 PCH chip offers SATA RAID with RAID 0, 1, 10, 5 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 the Microsoft website.*

## 6.2.2 Windows Series Driver Setup

Download the RSTe driver as shown below, the file downloaded is compressed, unzip the folder then install the RSTe driver.

**WinServer2012R2 driver for SKY-642**

**Solution :** Chipset driver has to be installed first before installing all other drivers.

| Download File | Released Date | Download Site |
|---|---|---|
| SKY-642_Chipset_Win10_Server 2012R2_2016 (64bit).zip | 2019-02-27 | Primary Secondary |
| SKY-642_Graphic_Win10_Server 2012R2_2016 (64bit).zip | 2019-02-27 | Primary Secondary |
| SKY-642_LAN_Win10_Server 2012R2_2016 (64bit).zip | 2019-02-27 | Primary Secondary |
| SKY-642_USB_WinServer2012R2 (64bit).zip | 2019-02-27 | Primary Secondary |
| SKY-642_Others_Win10_Server 2012R2_2016 (64bit).zip | 2019-03-21 | Primary Secondary |

# 6.3 USB3.0

## 6.3.1 Introduction

SKY-642 offers seven USB 3.0 ports, four in rear side, two at front side and one via internal type A connector.

The USB 3.0 provides bandwidth up to 500MB/s to shorter the time for data transmission.

## 6.3.2 Windows Series Driver Setup

Download the USB driver as shown below, the file downloaded is compressed, unzip the folder then install the USB driver.

**WinServer2012R2 driver for SKY-642**

**Solution :** Chipset driver has to be installed first before installing all other drivers.

| Download File | Released Date | Download Site | |
|---|---|---|---|
| SKY-642_Chipset_Win10_Server 2012R2_2016 (64bit).zip | 2019-02-27 | Primary | Secondary |
| SKY-642_Graphic_Win10_Server 2012R2_2016 (64bit).zip | 2019-02-27 | Primary | Secondary |
| SKY-642_LAN_Win10_Server 2012R2_2016 (64bit).zip | 2019-02-27 | Primary | Secondary |
| SKY-642_USB_WinServer2012R2 (64bit).zip | 2019-02-27 | Primary | Secondary |
| SKY-642_Others_Win10_Server 2012R2_2016 (64bit).zip | 2019-03-21 | Primary | Secondary |

# Appendix A

## Programming the Watchdog Timer

The SKY-642'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 | |

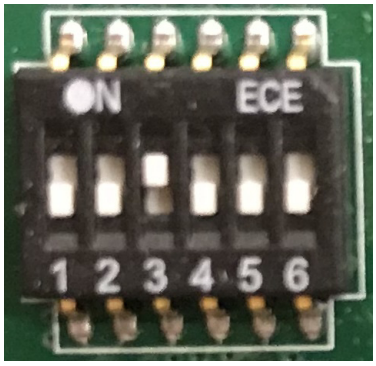
# Appendix B

## On Board DIP Switch Setting for PCI Express Driving

SKY-642 equips twenty DIP switches to regulate PCI-Express driving for CN1 to CN5, below sections illustrates the default setting for each switch which is optimized for qualified GPU cards listed in the peripheral compatibility list.

For each DIP switch, there are six bits to configure the high and low status, if the DIP switch is set to "ON", then the corresponding bit is set to high (1), on the contrary, the bit is set to low (0)

Below Picture is an example of the high (1) and low (0) status of a DIP switch




| | bit1 | bit2 | bit3 | bit4 | bit5 | bit6 |
|---|---|---|---|---|---|---|
| SW | 0 | 0 | 1 | 0 | 0 | 0 |

## B.1 U1 - PEX8796

| | bit1 | bit2 | bit3 | bit4 | bit5 | bit6 |
|---|---|---|---|---|---|---|
| RPT12_SW1 | 0 | 0 | 1 | 0 | 0 | 1 |
| RPT12_SW2 | 0 | 0 | 1 | 0 | 0 | 1 |
| RPT34_SW1 | 0 | 1 | 0 | 0 | 0 | 1 |
| RPT34_SW2 | 0 | 0 | 1 | 0 | 1 | 0 |

## B.2 U2 - PEX8796

| | bit1 | bit2 | bit3 | bit4 | bit5 | bit6 |
|---|---|---|---|---|---|---|
| RPT56_SW1 | 0 | 0 | 1 | 0 | 0 | 1 |
| RPT56_SW2 | 0 | 0 | 1 | 0 | 0 | 1 |
| RPT78_SW1 | 0 | 1 | 0 | 0 | 0 | 1 |
| RPT78_SW2 | 0 | 0 | 1 | 0 | 1 | 0 |

## B.3 PCIE SLOT6

| | bit1 | bit2 | bit3 | bit4 | bit5 | bit6 |
|---|---|---|---|---|---|---|
| RPT910_SW1 | 0 | 1 | 0 | 0 | 0 | 1 |
| RPT910_SW2 | 0 | 1 | 0 | 0 | 0 | 1 |
| RPT1112_SW1 | 0 | 0 | 1 | 0 | 0 | 1 |
| RPT1112_SW2 | 1 | 0 | 0 | 0 | 0 | 1 |

## B.4 PCIE SLOT7

| | bit1 | bit2 | bit3 | bit4 | bit5 | bit6 |
|---|---|---|---|---|---|---|
| RPT13_SW1 | 0 | 1 | 0 | 0 | 0 | 1 |
| RPT13_SW2 | 0 | 0 | 1 | 0 | 1 | 0 |
| RPT14_SW1 | 0 | 0 | 1 | 0 | 1 | 0 |
| RPT14_SW2 | 0 | 0 | 1 | 0 | 1 | 0 |

# Appendix C

## OEM Command for BMC IPMI tool

# C.1 Advantech OEM Commands

| Advantech OEM Commands | OEM NetFn | OEM Sub-Cmd | Advantech NetFn | Advantech Sub-Cmd |
|---|---|---|---|---|
| BMC Lock/Unlock | 0x38 | 0x01 | 0x00 | 0x01 |
| SYS LED Control | 0x38 | 0x01 | 0x06 | 0x03 |
| GPU Power Brake Condition | 0x38 | 0x01 | 0x06 | 0x04 |

## C.1.1 BMC Lock/Unclock Command

This command is to lock/unlock the Power button and Reset button on the front panel.

| | Byte | Data Field |
|---|---|---|
| Request Data | 1 | Customer OEM NetFn = 0x38 |
| | 2 | Customer OEM Sub-Command ID = 0x01 |
| | 3 | Advantech NetFn = 0x00 |
| | 4 | Advantech Sub-Command = 0x01 |
| | 5 | Operation Selection<br>00h: Read BMC lock/unlock state<br>01h: Change BMC lock/unlock state |
| Response Data | 1 | Completion Code |
| | 2 | BMC lock/unlock state<br>00h = unlock<br>01h = lock |

## C.1.2 SYS LED Control Command

This command is to get/set the status of SYS LED.

| | Byte | Data Field |
|---|---|---|
| Request Data | 1 | Customer OEM NetFn = 0x38 |
| | 2 | Customer OEM Sub-Command ID = 0x01 |
| | 3 | Advantech NetFn = 0x06 |
| | 4 | Advantech Sub-Command = 0x03 |
| | 5 | Operation Selection<br>00h: Get LED Status<br>01h: Set LED Status |
| | 6 | LED Status (ignored if getting)<br>00h: off<br>01h: on |
| Response Data | 1 | Completion Code |
| | 2 | The status of SYS LED<br>00h = off<br>01h = on |

### C.1.3 GPU Power Brake Command

This command is to get/set the condition of GPU Power Brake.
The default setting is
the number of overheating GPUs : 10
the overheating temperature : 83°C

| | Byte | Data Field |
|---|---|---|
| Request Data | 1 | Customer OEM NetFn = 0x38 |
| | 2 | Customer OEM Sub-Command ID = 0x01 |
| | 3 | Advantech NetFn = 0x06 |
| | 4 | Advantech Sub-Command = 0x04 |
| | 5 | Operation Selection<br>00h: Get the condition<br>01h: Set the condition |
| | 5 | The number of overheating GPUs (the value would be ignored if getting) |
| | 6 | The overheating temperature in °C (the value would be ignored if getting) |
| Response Data | 1 | Completion Code |
| | 2 | The number of overheating GPUs |
| | 3 | The overheating temperature in °C |

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