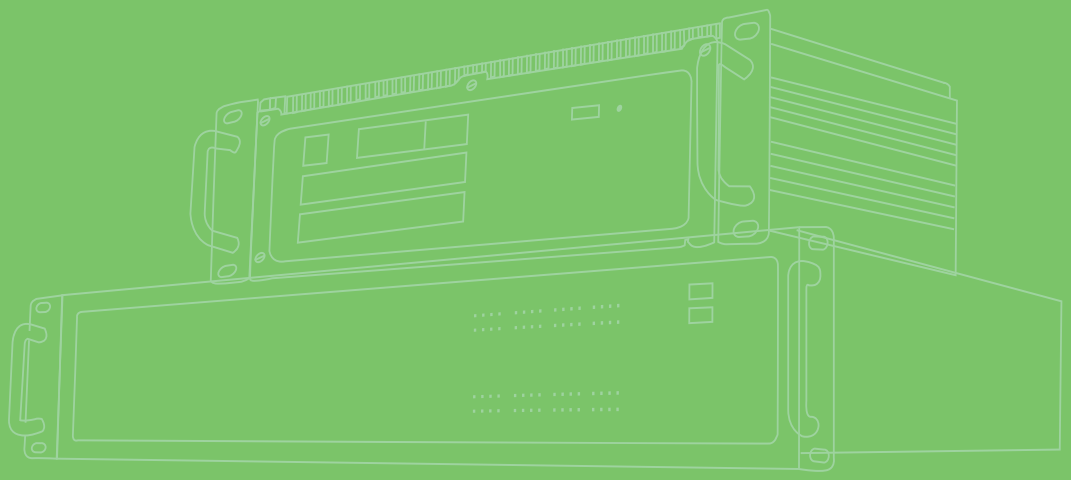


User Manual

# ECU-579 Series

## IEC 61850-3 Power Substation 2U Rackmount Server with Intel® Xeon® Scalable Processor

ADVANTECH

*Enabling an Intelligent Planet*

# Copyright



# Acknowledgments



## Support

For more information on this and other Advantech products, please visit our website at

http://www.advantech.com

For technical support services, please visit our support website at

http://www.advantech.com/en/support/

This manual is for the ECU-579 Series.

Part No. 2001057902 Edition 3

April 2025

# Product Warranty (2 years)

Advantech warrants 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 that have been repaired or altered by persons other than repair personnel authorized by Advantech, or products that 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 customers never need to use our repair service. If an Advantech product is defective, it will be repaired or replaced free of charge during the warranty period. For out-of-warranty repairs, customers will be billed according to the cost of replacement materials, service time, and freight. Please consult your dealer for more details.

If you believe your product to be defective, follow the steps outlined below.

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 displayed 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 a return merchandise authorization (RMA) number from your dealer. This allows us to process your return more quickly.
4. Carefully pack the defective product, a completed Repair and Replacement Order Card, and a proof of purchase date (such as a photocopy of your sales receipt) into a shippable container. Products returned without a proof of purchase date are not eligible for warranty service.
5. Write the RMA number clearly on the outside of the package and ship the package prepaid to your dealer.

# Declaration of Conformity

## CE

This product has passed the CE test for environmental specifications when shielded cables are used for external wiring. We recommend the use of shielded cables. This type of cable is available from Advantech. Please contact your local supplier for ordering information.

Test conditions for passing also include the equipment being operated within an industrial enclosure. In order to protect the product from damage caused by electrostatic discharge (ESD) and EMI leakage, we strongly recommend the use of CE-compliant industrial enclosure products.

## FCC Class A

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 this event, users are required to correct the interference at their own expense.

# Technical Support and Assistance

1. Visit the Advantech website at www.advantech.com/support to obtain the latest product information.
2. Contact your distributor, sales representative, or Advantech's customer service center for technical support if you need additional assistance. Please have the following information ready before calling:
   - Product name and serial number
   - Description of your peripheral attachments
   - Description of your software (operating system, version, application software, etc.)
   - A complete description of the problem
   - The exact wording of any error messages

# Safety Precautions - Static Electricity

Follow these simple precautions to protect yourself from harm and the products from damage.

- To avoid electrical shock, always disconnect the power from the PC chassis before manual handling. Do not touch any components on the CPU card or other cards while the PC is powered on.
- Disconnect the power before making any configuration changes. A sudden rush of electricity after connecting a jumper or installing a card may damage sensitive electronic components.

# Packing List

Before system installation, check that the items listed below are included and in good condition. If any item does not accord with the list, contact your dealer immediately.

- The main ECU-579 unit
- Accessory box (screws, jumpers, 1 x Startup Manual)
- 1 x warranty card
- 1 x ROHS LIST

# Safety Instructions

1. Read these safety instructions carefully.
2. Retain this user manual for future reference.
3. Disconnect this equipment from any A/C outlets before cleaning. Use a damp cloth for cleaning. Do not use liquid or spray detergents.
4. For pluggable equipment, the power outlet socket should be located near the equipment and easily accessible.
5. Protect the equipment from humidity.
6. Place the equipment on a reliable surface during installation. Dropping or letting the equipment fall may cause damage.
7. The openings on the enclosure are for air convection. Protect the equipment from overheating. DO NOT COVER THE OPENINGS.
8. Ensure that the voltage of the power source is correct before connecting the equipment to a power outlet.
9. Position the power cord away from high-traffic areas. Do not place anything over the power cord.
10. All cautions and warnings on the equipment should be noted.
11. If the equipment is not used for a long time, disconnect it from the power source to avoid damage from transient overvoltage.
12. Never pour liquid into an opening. This may cause fire or electrical shock.
13. Never open the equipment. For safety reasons, the equipment should only be opened by qualified service personnel.
14. If one of the following occurs, have the equipment checked by service personnel:
    - The power cord or plug is damaged.
    - Liquid has penetrated the equipment.
    - The equipment has been exposed to moisture.
    - The equipment is malfunctioning or does not operate according to the user manual.
    - The equipment has been dropped and damaged.
    - The equipment shows obvious signs of breakage.
15. DO NOT LEAVE THIS EQUIPMENT IN AN ENVIRONMENT WHERE THE STORAGE TEMPERATURE MAY GO BELOW -40 °C (-40 °F) OR ABOVE 85 °C (185 °F). THIS COULD DAMAGE THE EQUIPMENT. THE EQUIPMENT SHOULD BE IN A CONTROLLED ENVIRONMENT.
16. CAUTION: THERE IS DANGER OF EXPLOSION IF THE BATTERY IS INCORRECTLY REPLACED. REPLACE ONLY WITH THE SAME OR EQUIVALENT TYPE RECOMMENDED BY THE MANUFACTURER. DISCARD USED BATTERIES ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS.
17. Equipment is intended for installation in Restricted Access Area.
18. When installing this equipment, ensure that the earth cable is securely attached using a 3.5 mm screw.
19. The equipment does not include a power cord and plug.

DISCLAIMER: This set of instructions is given according to IEC 704-1. Advantech disclaims all responsibility for the accuracy of any statements contained herein.

# Consignes de sécurité

1. Lisez attentivement ces consignes de sécurité.
2. Conservez ce manuel d'utilisation pour référence future.
3. Débranchez cet équipement de toutes les prises de courant alternatif avant de le nettoyer. Utilisez un chiffon humide pour le nettoyage. N'utilisez pas de détergents liquides ou en spray.
4. Pour les équipements enfichables, la prise de courant doit être située à proximité de l'équipement et facilement accessible.
5. Protéger le matériel de l'humidité.
6. Placez l'équipement sur une surface fiable lors de l'installation. Faire tomber ou laisser tomber l'équipement peut provoquer des dommages.
7. Les ouvertures sur le boîtier sont destinées à la convection de l'air. Protégez l'équipement de la surchauffe. NE COUVREZ PAS LES OUVERTURES.
8. Assurez-vous que la tension de la source d'alimentation est correcte avant de connecter l'équipement à une prise de courant.
9. Éloignez le cordon d'alimentation des zones à fort trafic. Ne placez rien sur le cordon d'alimentation.
10. Toutes les mises en garde et avertissements figurant sur l'équipement doivent être notés.
11. Si l'équipement n'est pas utilisé pendant une longue période, débranchez-le de la source d'alimentation pour éviter tout dommage dû à une surtension transitoire.
12. Ne versez jamais de liquide dans une ouverture. Cela pourrait provoquer un incendie ou un choc électrique.
13. N'ouvrez jamais l'équipement. Pour des raisons de sécurité, l'équipement ne doit être ouvert que par un personnel de service qualifié.
14. Si l'un des événements suivants se produit, faites vérifier l'équipement par le personnel de service :
    - Le cordon d'alimentation ou la fiche est endommagé.
    - Du liquide a pénétré dans l'équipement.
    - L'équipement a été exposé à l'humidité.
    - L'équipement fonctionne mal ou ne fonctionne pas conformément au manuel d'utilisation.
    - L'équipement est tombé et a été endommagé.
    - L'équipement présente des signes évidents de casse.
15. NE LAISSEZ PAS CET ÉQUIPEMENT DANS UN ENVIRONNEMENT OÙ LA TEMPÉRATURE DE STOCKAGE PEUT DESCENDRE EN DESSOUS DE -25 °C (-13 °F) OU AU-DESSUS DE 55 °C (131 °F). CELA POURRAIT ENDOMMAGER L'ÉQUIPEMENT. L'ÉQUIPEMENT DOIT ÊTRE DANS UN ENVIRONNEMENT CONTRÔLÉ.
16. ATTENTION: IL Y A UN RISQUE D'EXPLOSION SI LA BATTERIE EST MAL REMPLACEE. REMPLACER UNIQUEMENT PAR LE MÊME TYPE OU ÉQUIVALENT RECOMMANDÉ PAR LE FABRICANT. JETEZ LES BATTERIES USÉES SELON LES INSTRUCTIONS DU FABRICANT.
17. L'équipement est destiné à être installé dans une zone d'accès restreint.
18. Lors de l'installation de cet équipement, assurez-vous que le câble de terre est solidement fixé à l'aide d'une vis de 3,5 mm.
19. L'équipement ne comprend pas de cordon d'alimentation ni de prise. Le niveau de pression acoustique au poste de conduite selon la norme CEI 704-1:1982 ne doit pas dépasser 70 dB (A).

AVIS DE NON-RESPONSABILITÉ: Cet ensemble d'instructions est donné conformément à la norme CEI 704-1. Advantech décline toute responsabilité quant à l'exactitude des déclarations contenues dans le présent document.

# Contents

# Chapter 1

## Overview

This chapter provides an overview of the ECU-579 Series specifications.
Sections include:

- Introduction
- Hardware Specifications
- Safety Precautions
- Function Block Diagram
- Chassis Dimensions
- Packing List

# 1.1 Introduction

Upgrades to smart grid technologies are in high demand in this new era, driven by the need for rugged computing platforms with faster processors and increased, reliable storage capacity in modern substation automation systems. To meet the performance requirements of modern distributed software applications—which demand rapid processing—Advantech offers the ECU-579. This solution is designed for advanced, server-level data concentrators and protocol converters in scenarios such as substation automation, energy management, secondary communication, and control.

In previous years, substations were managed using the well-established SCADA OT system. Now, in this next phase of virtualization, centralized computing is better suited to meet the demand for higher energy efficiency. There is also a growing need for immediate and flexible optimization based on the cloud-as-a-service business model.

The ECU-579 is certified to IEC 61850-3, the international standard for electrical substation automation design, which ensures high reliability and stability. This standard is applicable across the global power and energy automation market and defines communication among all intelligent electronic devices (IEDs) and other related equipment from the process level (e.g., data acquisition, sensors, and actuators). It provides high performance and reliable functionality to support even the most critical computing applications. Additionally, the ECU-579 supports remote monitoring, diagnostics, and device connectivity to improve maintenance efficiency.

**Isolation & High-Speed Communication Interface**

- A comprehensive communication interface is used for smart substation communication servers and IED analyzers to easily implement data gateway & protocol conversion. There is support for a variety of protocols (IEC-60870-104, DNP3.0, etc.) with 3rd party applications.
- Network interfaces are required to respond to real-time data and collect high-density network packets and accurately facilitate data analysis.
- Versatile communication interface: the IED analyzer easily fulfills the data gateway & protocol conversion requirement.

**Easy to Diagnose and Maintain**

- Remote diagnosis can be done and the system can be managed to provide high system maintenance efficiency.
- The rear I/O connections and LEDs on the front panel are for various ports and modes, simplifying the monitoring of operational status.

**Fast and Easy Customization**

- The structured and functional internal design of the module allows for easy customization and fast assembly to suit different kinds of applications for the CTOS manufacturing process.
- Customer-focused service provides fast response for customization requests based on this product's main hardware structure.

## 1.2 Hardware Specifications

### 1.2.1 General

- **Certifications:** CE, FCC Class A, IEC 61850-3, IEEE 1613, CB/UL
- **Dimensions (W x D x H):** 440 x 460 x 88 mm
- **Enclosure:** SECC & Aluminum
- **Mounting:** 2U 19” Rackmount
- **Power Requirements:**
  - Redundant Power Supply, 800W
  - ECU-579-SSDA: 100 ~ 240 $V_{AC}$, 50-60Hz, 10-5A
  - ECU-579-SSDB:
    100 ~ 240 $V_{AC}$, 50-60Hz, 10-5A
    100 ~ 240 $V_{DC}$, 11.5-4A
  - ECU-579-SSDC: 48 $V_{DC}$, 30-15A
- **Weight:** 11 kg
- **OS Support:** Windows 10, Windows Server 2012, 2016, 2019, 2022 and Linux
- **Hypervisior Support:** VMware ESXi 8.0 U3, RHEL 8.2

**Table 1.1: Power Consumption (Watts)**

| System Configuration | Idle Mode | Max. Condition |
|---|---|---|
| ECU-579 Base System | 200 | 300 |
| 24 Cores CPU, TDP 150W (Xeon® 8160T) | | |
| 8 x 16 GB DDR4 RDIMM | | |
| 4 x 64 GB SATA III 2.5" SSD | | |

### 1.2.2 System Hardware

- **CPU:** 1st & 2nd Generation Intel® Xeon® Scalable Processors to be selected and assembled
- **Memory:** DDR4 RDIMM/LRDIMM-ECC 2400/2666/2933 MHz (4 GB, 8 GB, 16 GB, 32 GB, 64 GB) x 12 slots up to 768 GB
- **Indicators:** LEDs for Power. HDD, programmable LED, LAN (LINK, ACT), expansion cards
- **Storage:** hot-swappable 4 x 2.5" SATA SSD (RAID0, RAID1, RAID5, RAID10), 1 x M.2 SATA/NVMe
- Expansion Interface:
  - 1 X Proprietary PCI/PCIe (ECU-P)
  - 1 X PCIe x4 slot Gen. 3
  - 1 X PCIe x8 slot Gen. 3
  - 2 X PCIe x16 slots Gen. 3
  - 1 X Mini PCIe (PCIe x1 Gen. 1 + USB 2.0)

### 1.2.3 I/O Interface

- **Ethernet:** 4 x Gigabit RJ-45 ports
- **USB Ports:** 3 x USB, Rev. 3.0 compliant
- **Display:**
  - 1 X VGA
  - 2 x DVI-D, Display Resolution FHD (1920 x 1080) @ 60 Hz
- **SATA Disk Tray:** 4 x 2.5 inch SSD

### 1.2.4 Environment

- **Humidity:** 95% @ 40°C (non-condensing)
- **Operating Temperature:** -20 ~ 60°C(-4 ~ 140°F), IEC 60068-2-2 with 100% CPU/ I/O loading, 24 hrs
- **Operating Humidity:** 5 ~ 95% RH (non-condensing)
- **Storage Humidity:** 5 ~ 95% RH (non-condensing)
- **Shock Protection:** IEC 60068-2-27 SSD: 10 G, 11 ms
- **Vibration Protection:** IEC 60068-2-64 SSD: 2 G @ 15 ~ 500 Hz

## 1.3 Function Block Diagram

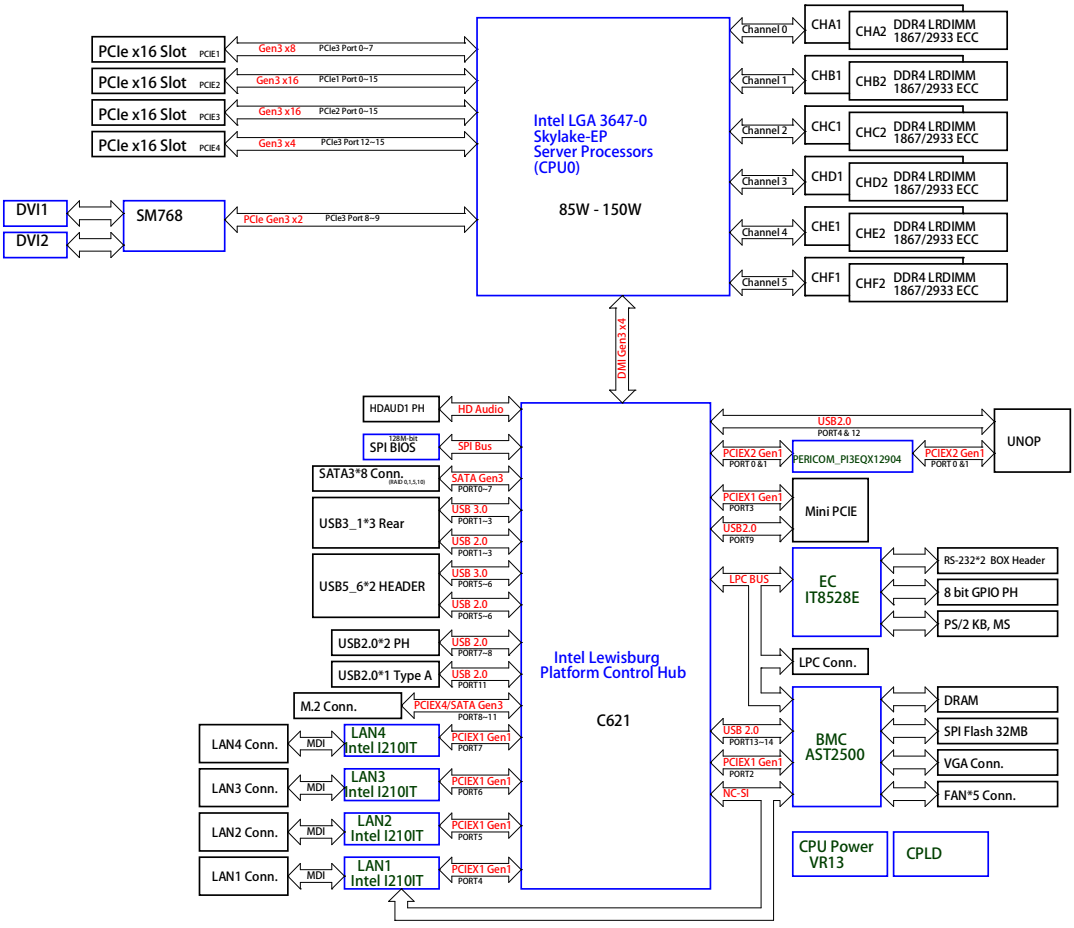



**Figure 1.1 ECU-579 Series Product Function Block**

## 1.4 Safety Precautions

The following messages inform how to make each connection. In most cases, you will simply need to connect a standard cable.

***Warning!*** *Always disconnect the power cord from your chassis whenever you are working on it. Do not connect it while the power is on. A sudden rush of power can damage sensitive electronic components. Only experienced electronics personnel should open the chassis.*

***Caution!*** *Always ground yourself to remove any static electric charge before touching the ECU-579 series. Modern electronic devices are very sensitive to static electric charges. Use a grounding wrist strap at all times. Place all electronic components on a static-dissipative surface or in a static-shielded bag.*

***Note!*** *If DC voltage is supplied by an external circuit, please put a protection device in the power supply input port.*

***Warning!*** *The equipment has a separate protective earthing terminal on the chassis that must be permanently connected to earth ground to adequately ground the chassis and protect the operator from electrical hazards.*

*See Enclosure / Safety Instruction for equivalent details.*

***Avertissement!*** *L'équipement est équipé d'une borne de mise à la terre de protection distincte sur le châssis. Cette borne doit être reliée en permanence à la terre pour assurer une mise à la terre adéquate du châssis et protéger l'opérateur des risques électriques.*

*Voir le boîtier/les consignes de sécurité pour plus de détails.*

## 1.5 Chassis Dimensions

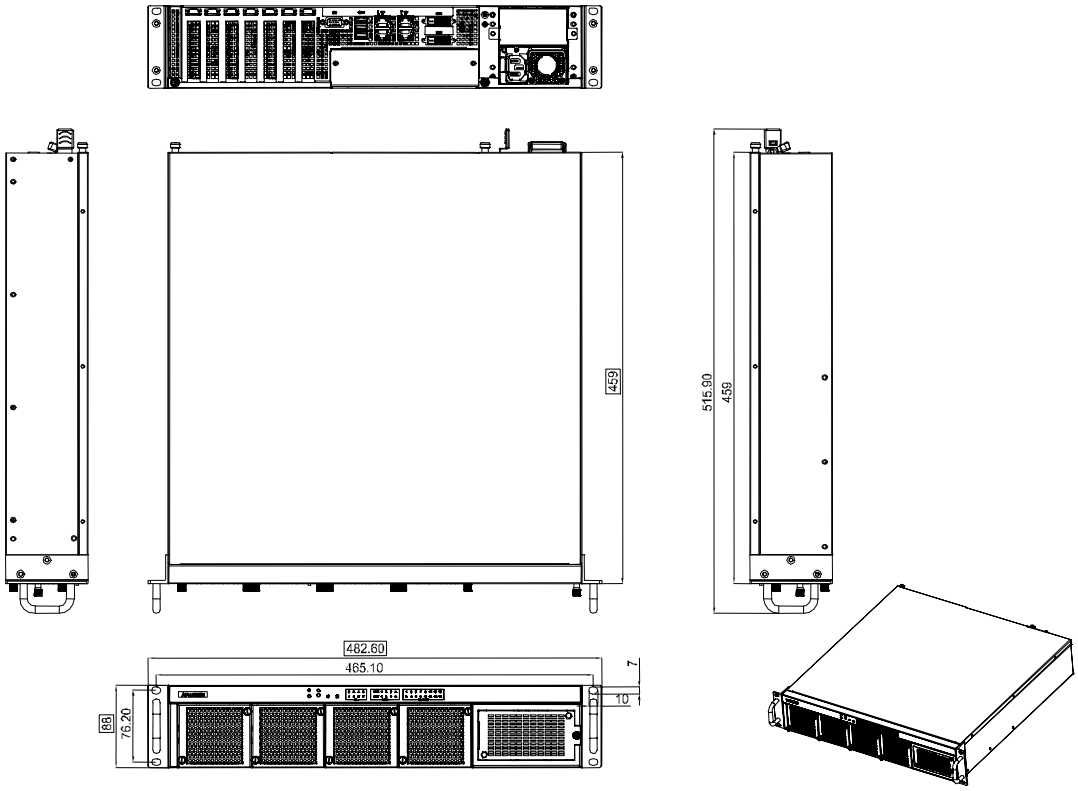



**Figure 1.2 ECU-579 Chassis Dimensions**

# Chapter 2

## Hardware Specifications

Sections include:

- Overview
- Front Elements (LED, FAN, SATA Slots)
- Power Input
- Ethernet Interface (On-Board)
- Display Interface
- USB
- Expansion Functions
- Storage (SATA, M.2)
- Processors
- Memory
- TPM
- Platform Features Description
- Available Accessories

# 2.1 Overview

## 2.1.1 ECU-579 LED and Interface

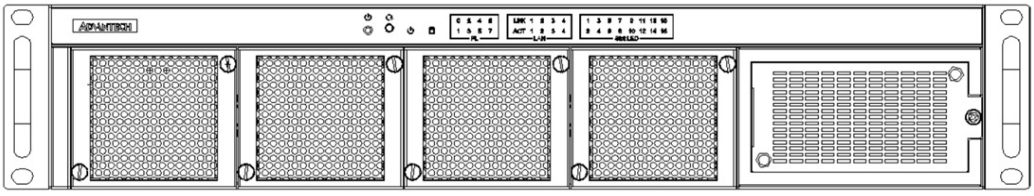


**Figure 2.1 ECU-579 Front Panel**

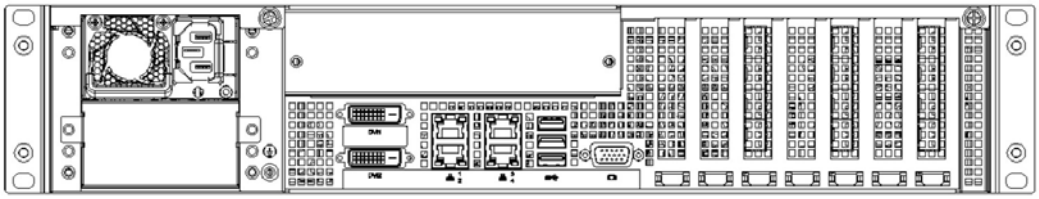
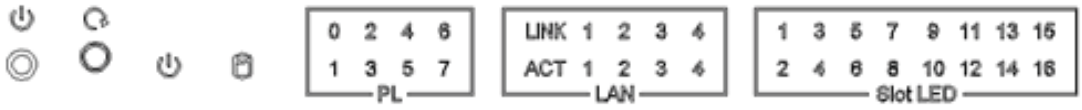


**Figure 2.2 ECU-579 Rear Panel**

# 2.2 Front Elements

## 2.2.1 LED Indicators

The LEDs on the front panel can be divided into 4 groups.




### 2.2.1.1 System Status Indicators

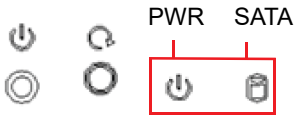



**Table 2.1: Definition of System Status Indicators**

| LED | Status | Description |
|---|---|---|
| PWR | Green | System power 1 or 2 is on |
| | Off | System power 1 and 2 is off |
| SATA | Green | Data is transmitting |
| | Off | No data is transmitting |

#### 2.2.1.2 LAN Status Indicators

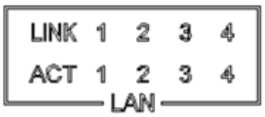
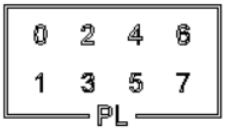



**Table 2.2: Definition of System Status Indicators**

| Item | LED | Status | Description |
|---|---|---|---|
| 1 | LAN/LINK (Port 1 ~ 4) | Green | 1 Gbps network link |
| | | Orange | 100 Mbps network link |
| | | Off | 10 Mbps network link or invalid network link |
| 2 | LAN/ACT (Port 1 ~ 4) | Green | Ethernet date being received/transmitted |
| | | Off | Invalid network link |

#### 2.2.1.3 Programmable LED




The ECU-579 Series products provide 8 programmable LED indicators which are convenient for users to control the programmable LED state (green, off) using API programming. They can be used to indicate and edit the machine's operating status. Below is a detailed explanation of how to use API programming with this product.

**Table 2.3: Programmable LED Status Indicators**

| LED | Status | Description |
|---|---|---|
| PL (0 ~ 7) | Green | Customers can, according to their needs, define the programmable LED state |
| | Off | |

There are up to 8 LEDs (LED0 ~ LED7) which can control and monitor the status (On/Off). The Advantech programmable LED driver provides examples of how to use the ECU-579's programmable LEDs and offers references for users to develop their own applications. You can modify these sample applications to meet your requirements.

#### 2.2.1.4 Slot LED

The Slot LED is different according to the corresponding expansion card. Here, we take the LED definition of UNOP-1514RE/PE as an example to show how it is defined. Other LEDs are defined according to the description of the relevant expansion card and manual.

The below table shows the LED number definitions for UNOP-1514RE/PE:


**Table 2.4: Ex. UNOP-1524PE/RE LED Status Indicators**

| LED No. | LAN Status | LED Status | Description |
|---|---|---|---|
| 1 | LAN 1 Active | White (blinking) | Data being received/transmitted |
| | | Off | No data being received/transmitted |
| 2 | LAN 1 Link | White | 10 Mbps/100 Mbps/1 Gbps network link |
| | | Off | Invalid network link |
| 3 | LAN 2 Active | White (blinking) | Data being received/transmitted |
| | | Off | No data being received/transmitted |
| 4 | LAN 2 Link | White | 10 Mbps/100 Mbps/1 Gbps network link |
| | | Off | Invalid network link |
| 5 | LAN 3 Active | White (blinking) | Data being received/transmitted |
| | | Off | No data being received |
| 6 | LAN 3 Link | White | 10 Mbps/100 Mbps/1 Gbps network link |
| | | Off | Invalid network link |
| 7 | LAN 4 Active | White (blinking) | Data being received/transmitted |
| | | Off | No data being received/transmitted |
| 8 | LAN 4 Link | White | 10 Mbps/100 Mbps/1 Gbps network link |
| | | Off | Invalid network link |
| 9 - 16 | N/A | - | - |

### 2.2.2 Fan Modules

The ECU-579 has four hot-swappable fan modules at the front. Each of the fan modules carries a high performance fan for optimized air flow. Each fan module is secured by two thumbscrews.

We have a unique patent design to ensure no loss of fan air volume, even if one of the fan modules is broken.

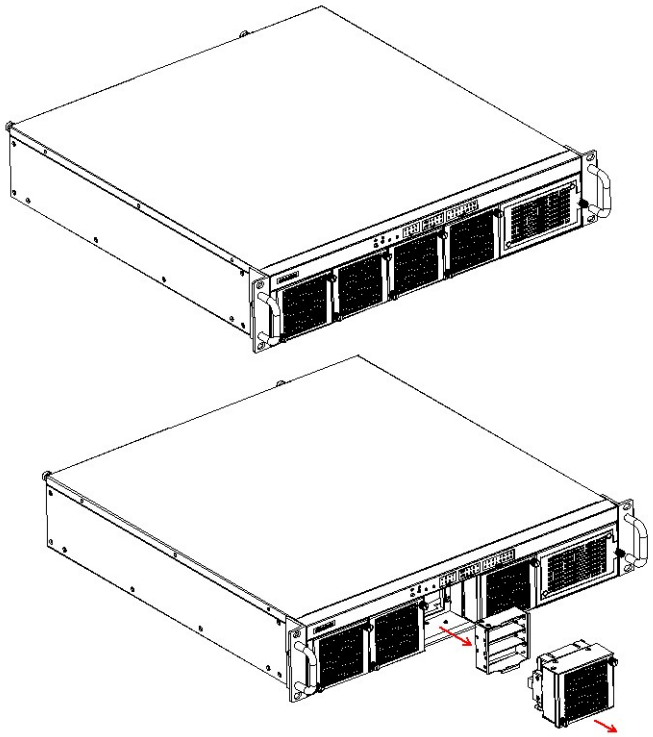


**Figure 2.3 Removing the Fan Module**

### 2.2.3 Disk Bay

ECU-579 supports four hot-swappable 2.5” HDDs/SSDs at the front.

Follow these steps below to install an HDD:

1. Remove the baffle on the right of the front panel, and pull out the disk tray.

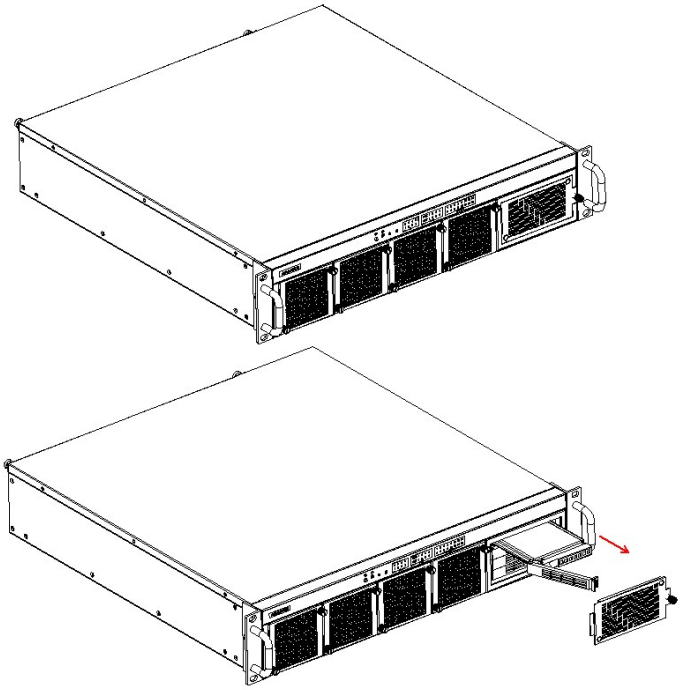


**Figure 2.4 Removing the SATA Baffle**

2. Fix the SATA disk onto the tray and push it back into the disk bay. Then attach the baffle in front of the SATA bay.

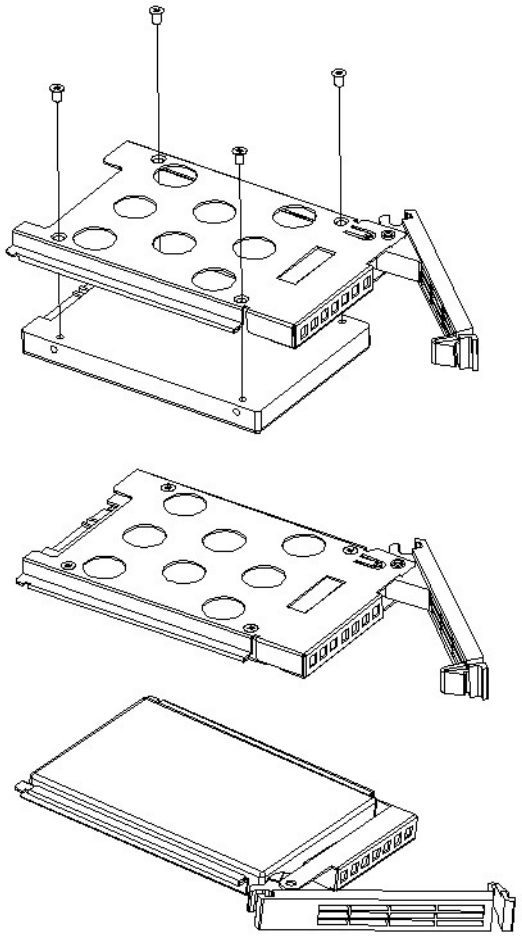
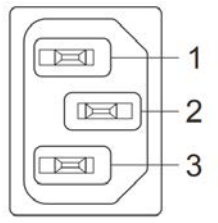
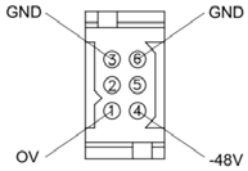


**Figure 2.5 Fixing the SATA Disk onto the Disk Tray**

## 2.3 Power Input

The ECU-579 Series products support redundant power input for both A/C and D/C.

**Table 2.5: Power Input**

| AC/DC | Voltage Range | Power Rating | Pin Assignment |
|---|---|---|---|
| AC (For ECU-579-SSDA/SSDB) | 100-240 $V_{AC}$ | 10-5A |  |
| DC (For ECU-579-SSDB only) | 100-240 $V_{DC}$ | 11.5-4A | Pin / AC / DC<br>1 / L / V+<br>2 / E / GND<br>3 / N / V- |
| DC (For ECU-579-SSDC only) | 48 VDC | 30-15A |  |

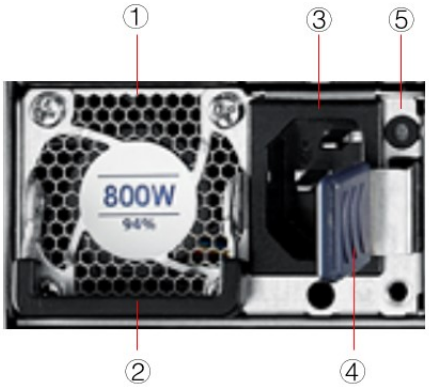



**Figure 2.6 Power Installation Position**

**Table 2.6: PSU Details**

| Item | Element | Description |
|---|---|---|
| 1 | Fan | PSU fan and air outlet area |
| 2 | Handle | Handle for extraction/insertion |
| 3 | Power Connector | Power connector |
| 4 | Lock | Lock for locking/unlocking the module. Pull left to unlock |
| 5 | LED | Red LED indicating failure or degradation when lit |

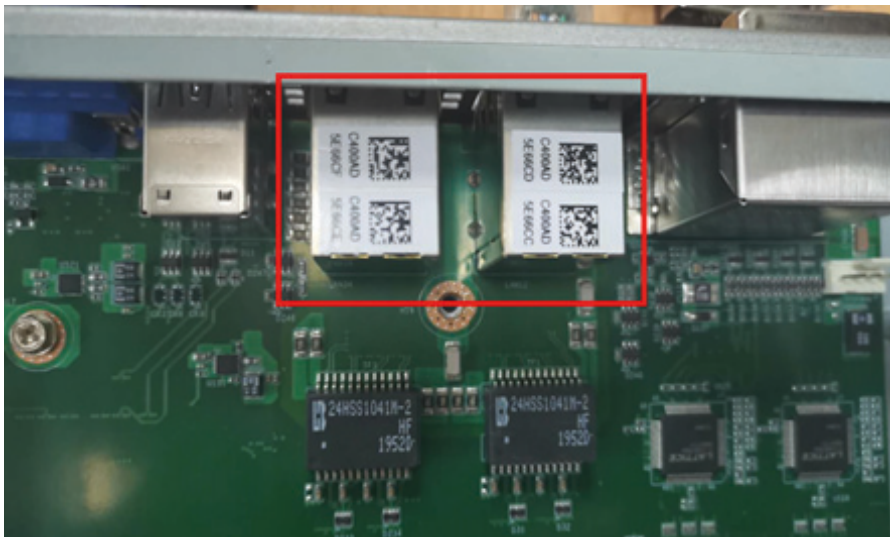
| Table 2.7: PSU LED Status Information | |
|---|---|
| Power supply condition | Power supply LED |
| Output ON and OK | Green |
| No A/C power to PSU | OFF |
| A/C present / only standby output on | 1 Hz Blinking green (0.5s: OFF, 0.5s: green) |
| A/C cord unplugged or A/C power lost; with a second power supply in parallel with A/C input power | Amber |
| Power supply warning events where the power supply continues to operate: high temp, high power, high current, slow fan | 1 Hz Blinking amber (0.5s: OFF, 0.5s: amber) |
| Power supply critical event causing a shutdown: failure, OCP, OVP, fan failure | Amber |
| Smart redundant state | 0.33 Hz Blinking green (1s: OFF, 2s: green) |
| Power supply FW update mode | 2 Hz Blinking green (0.25s: OFF, 0.25s: green) |

## 2.4 Ethernet Interface

The ECU-579 Series products are equipped with Intel® 4 x Gigabit LAN. LAN1 port is shared with the IPMI function.

### 2.4.1 MAC Address

You can identify MAC addresses according to the labels placed on Ethernet connectors as shown below.



## 2.5 Display Interface

ECU-579 is configured with dual DVI connectors and one VGA connector. You can set up the display through BIOS.

***Note!*** *Due to hardware design limitations, the single DVI and VGA ports on ECU-579 cannot be set to "mirror display" in the OS. However, the two DVI ports can be configured for "mirror display."*

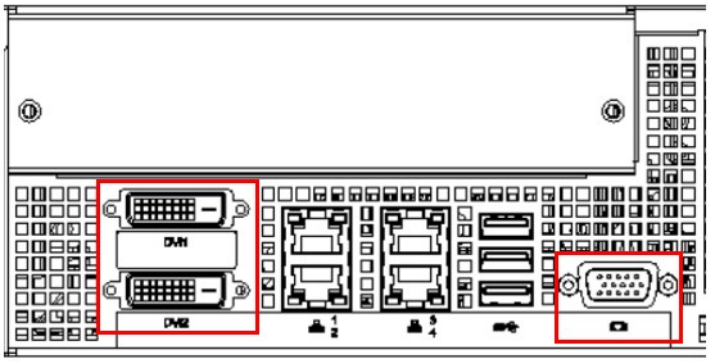


**Figure 2.7 Display Position**

The first time getting started with a bare sever, the operating system needs to be installed. "Legacy" is the default mode on the bare machine, and VGA is the default display in BIOS.

The following cautions need your attention:

***Caution!*** *If you choose UEFI mode, both VGA and DVI can be used to display BIOS output.*

*After the Windows operating system is installed, you can use both VGA and DVI for display output (you need to install the "DVI SM768 driver").*

***Caution!*** *If you choose Legacy mode, then only VGA or DVI can be used to display BIOS output.*

*If you install Windows OS, then both VGA and DVI can be used to display output (for DVI, you need to install the "DVI SM768 driver").*

***Caution!*** *If you install Linux OS, please use VGA to install Linux. Refer to link below to install DVI driver.*

*Due to hardware limitation, VGA and DVI cannot output simultaneously under Linux OS.*

*https://www.advantech.com/zh-tw/support/details/faq?id=1-2EHZGTG*

If you want to use the DVI port as the primary display during the BIOS stage (POST), please follow these steps:

1. Go to "Platform Configuration → PCH Configuration → PCH Device" in BIOS. Set "VGA priority" to "Onboard Device".
2. Set "Onboard Display Output select" to "DVI".

## 2.6 USB Ports

ECU-579 is equipped with 3 x USB 3.0 connectors on the rear panel with transmission rates of up to 5Gbps via USB 3.0 and fuse protection is supported. The USB interface can be disabled in the system BIOS.

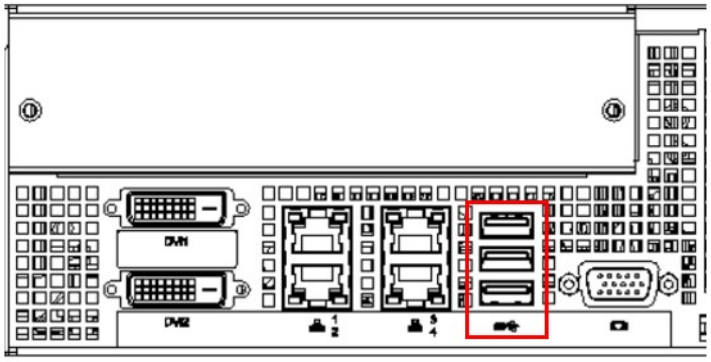


**Figure 2.8 USB Port Positions**

## 2.7 Expansion Slots

### 2.7.1 Expansion PCI/PCIe Slot

#### 2.7.1.1 Expansion PCI/PCIe Slot Illustration

ECU-579 supports 1 standard domain I/O expansion. Customers can choose different proprietary PCI/PCIe cards from the following Table 2.7.1.2 according to their needs.

Through the interface card, the ECU-579 Series can also use standard PCI cards, PCIe cards, mini-PCI cards, as well as PCI-104 cards. Due to the ECU-579 Series being an embedded system, the power provided for the expansion slot is limited.

The maximum power for each slot is:

5 V @ 2 A

3.3 V @ 1.5 A

12 V @ 0.25 A

There is maximum support for 25 W (at 50°C) for all slots. Before you configure the module and plug-in card, please note not to exceed this power limit.

#### 2.7.1.2 Proprietary PCI/PCIe Card List

Below is the list of proprietary cards compatible with ECU-579:

**Table 2.8: Proprietary PCI/PCIe Card List**

| ECU Standard P/N | Description |
|---|---|
| ECU-P1618D-AE | 8-port RS-232/422/485 serial port card |
| ECU-P1628D-AE | 8-port isolated RS-232/422/485 serial port card |
| ECU-P1524PE-GAE | 2-port SFP Gigabit Ethernet Card with HSR/PRP |
| ECU-P1761A-AE | 4-ch Digital input 4-ch relay output card with IRIG-B |
| ECU-P1524PE-AE | 2-port SFP 100Mbps Ethernet Card with HSR/PRP |
| UNOP-1624D-AE | 4-port Iso.RS-232/422/485 & IRIG-B card |
| ECU-P1528RE-B | 8-port RJ-45 LAN Gigabit card |
| ECU-P1528PE-B | 8-port SFP LAN Gigabit card |

### 2.7.2 PCIe Expansion Cards

#### 2.7.2.1 PCIe Expansion Card Illustration

ECU-579 supports 4 low-profile PCIe cards. The size limitation is shown below:

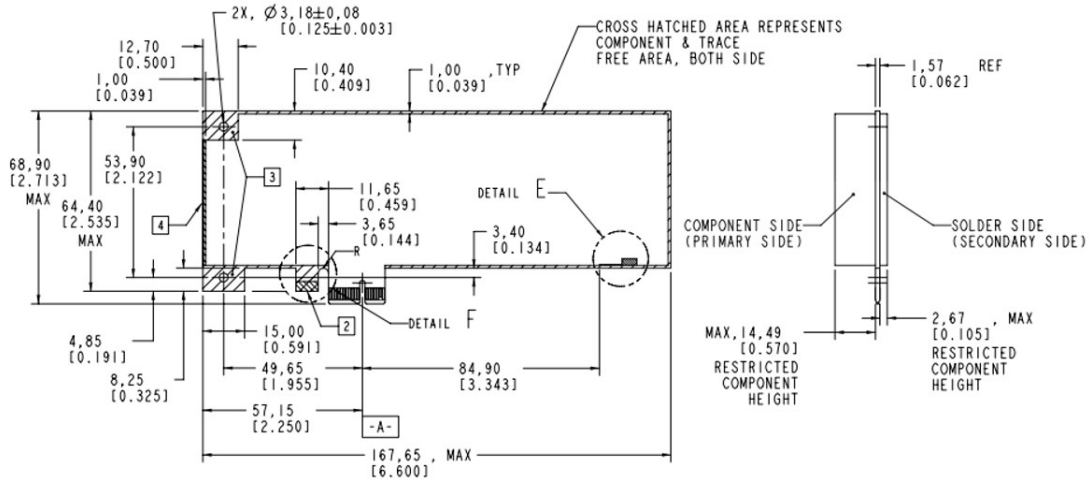



**Figure 2.9 PCIe Card Dimension Limitation**

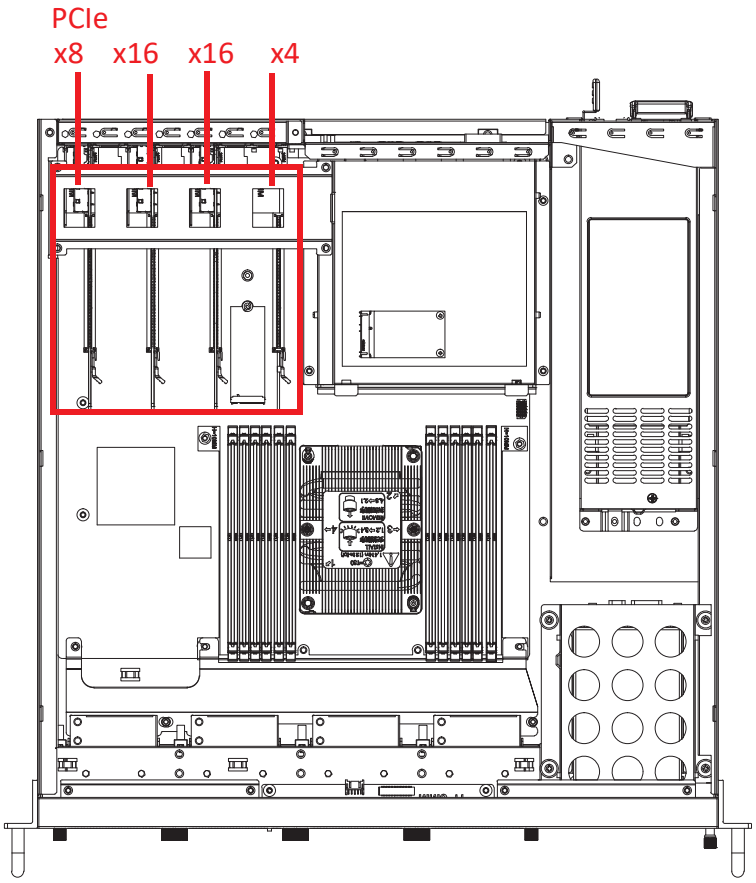



**Figure 2.10 PCIe Card Position on the Main Board**

#### 2.7.2.2 PCIe Expansion Card List

The tested PCIe expansion list is as follows:

**Table 2.9: PCIe Expansion Card List**

| Part Number | Description |
|---|---|
| ECU-P1522LPE-A | 2-port SFP Gigabit Ethernet Card with HSR/PRP |
| PCIE-1130PS-00A1E | 4-ports 1G fiber NIC (RJ45) with Intel I350 |
| PCIE-1131PS-00A1E | 4-ports 1G fiber NIC (SFP) with Intel I350 |
| 96NIC-1G2P-PE-IN3 | INTEL NIC 10/100/1000M PCIEx4 2pt. RJ45 Server |
| PCIE-1220PS-00A1E | 2-ports 10G fiber NIC (SFP+) with Intel X710 |
| PCIE-2230NP-00A1E | 4-ports 10G fiber NIC (SFP+) with Intel XL710 |
| PCIE-2231NP-00A1E | 4-ports 10G fiber NIC (RJ45) with Intel XL710 |
| 96RC-SAS-4P-PE-AD6* | ADAPTEC 3101E-4i SAS 4Port 12GB/S |
| 96RC-SAS-8P-PE-AD6* | ADAPTEC 2100-8i SAS 8Port 12GB/S |
| GFX-NG730L16-5C1 | GT730 2G DVI+HDMI |

*Order with 1700034612-01 x1.

## 2.8 Storage (SATA, M.2)

### 2.8.1 SATA Disks

ECU-579 provides 4 slots for 2.5” SATA disks which support RAID 0, 1, 5, 10.

### 2.8.2 M.2 Storage

The M.2 2280 connector supports both SATA and PCIe SSD devices for higher read/ write speeds.

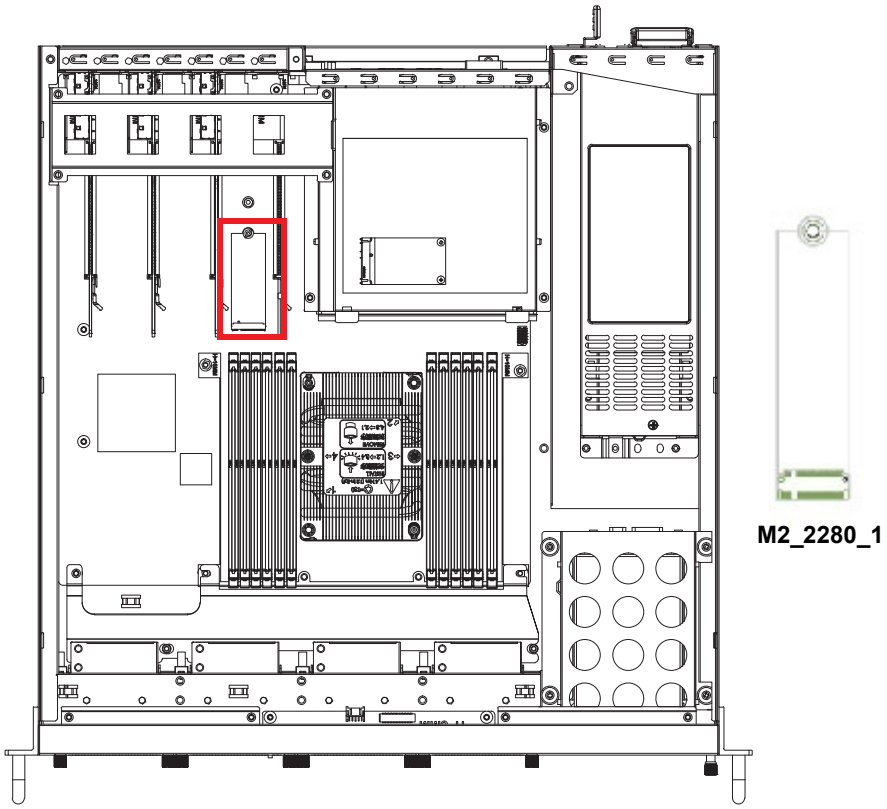



**Figure 2.11 M.2 Connector Position on the Main Board**

# 2.9 Processors

## 2.9.1 Compatible with Intel® Xeon® Scalable Processors

ECU-579 is equipped with one CPU socket to support Intel® Xeon® Platinum/Gold/Silver/Bronze Scalable series processors.

**Table 2.10: Tested 2nd Generation Intel® Xeon® Scalable Processors List**

| Test Item | Description | | | | | | | | Result |
|---|---|---|---|---|---|---|---|---|---|
| **CPU Family** | **S-Spec** | **Core Stepping** | **Power** | **Number of Processor Cores** | **Intel® UPI** | **HT** | **Shared Last Level Cache** | **Package Type** | |
| Intel® Xeon® Gold 6238T CPU @1.90GHz | SRF9C | B1 | 125W | 22 | 10.4GT/s | Y | 30.25 MB | FCL-GA3647 | PASS |
| Intel® Xeon® Gold 5218T CPU @2.10GHz | SRFPM | B1 | 105W | 16 | 10.4GT/s | Y | 22 MB | FCL-GA3647 | PASS |
| Intel® Xeon® Silver 4209T CPU @2.20GHz | SRFBQ | R1 | 70W | 8 | 9.6GT/s | Y | 11 MB | FCL-GA3647 | PASS |

## 2.10 Memory

ECU-579 has 12 x 288-pin memory slots for DDR4 2133/2400/2666 MHz memory modules with a maximum total capacity of 768 GB (maximum 64 GB for each DIMM). ECU-579 supports registered DIMM memory modules.

### 2.10.1 Memory Configurations

A total of 12 DDR4 DIMMs are supported on the ECU-579 equally spread over one processor socket with a total capacity of up to 768 GB.

The following table indicates recommended DIMM configurations. Based on the guidelines, you may adjust your memory configuration according to your PCIe expansion card configuration.

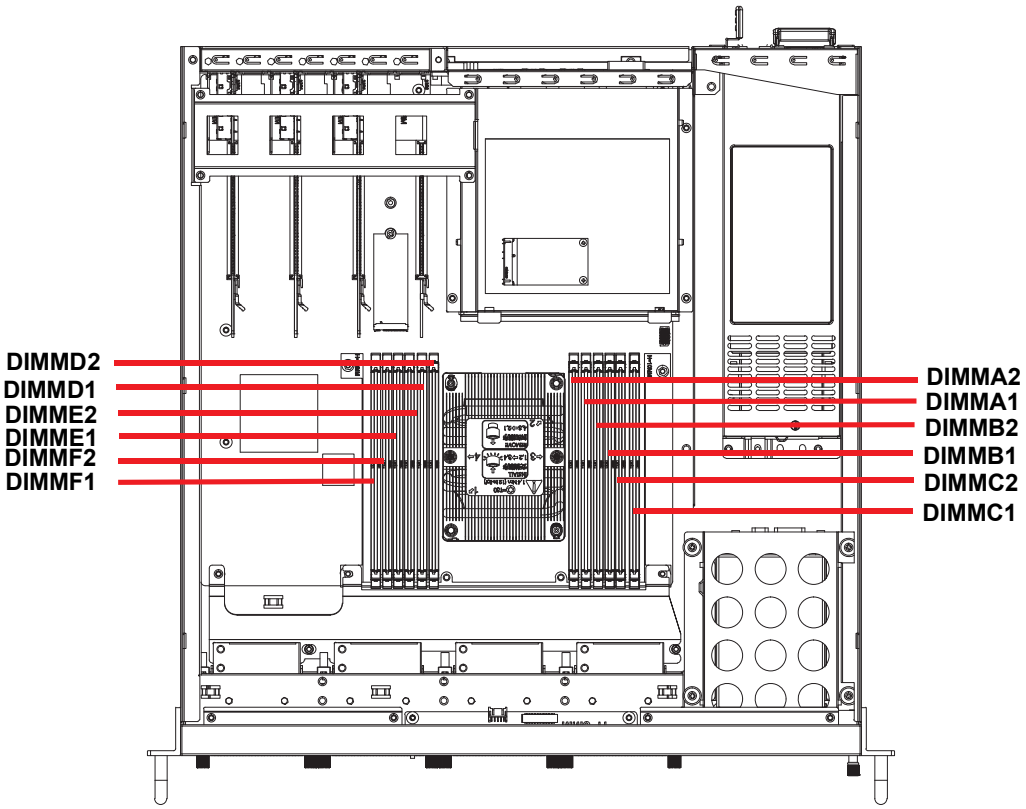
The table below summarizes the supported DIMM configurations.

**Table 2.11: DIMM Configurations**

| **Quantity of memory installed** | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CPU | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| DIMMA1 | v | v | v | v | | v | | v | | | | v |
| DIMMA2 | | | | | | | | v | | | | v |
| DIMMB1 | | v | v | v | | v | | v | | | | v |
| DIMMB2 | | | | | | | | v | | | | v |
| DIMMC1 | | | v | | | v | | | | | | v |
| DIMMC2 | | | | | | | | | | | | v |
| DIMMD1 | | | | v | | v | | v | | | | v |
| DIMMD2 | | | | | | | | v | | | | v |
| DIMME1 | | | | v | | v | | v | | | | v |
| DIMME2 | | | | | | | | v | | | | v |
| DIMMF1 | | | | | | v | | | | | | v |
| DIMMF2 | | | | | | | | | | | | v |

***Note!*** *DIMMX1: Blue sockets.*

*DIMMX2: Black sockets.*




## 2.10.2 Validated Memory

Advantech has tested a list of RAM for your reference, and these are verified as compatible with ECU-579 under our test.

**Table 2.12: DIMM Configurations**

| Test Item | Description | | | | | | Result | Remark |
|---|---|---|---|---|---|---|---|---|
| Brand | Size | Speed (MHz)* | Type | ECC | Temperature** | Vendor PN | PASS | |
| Advantech | 64 GB | 3200 | DDR4 | Y | 0-85 °C | SQR-RD4N64G3K2SRMB | PASS | |
| Advantech | 32 GB | 3200 | DDR4 | Y | 0-85 °C | 96D4-32G3200ER-MI | PASS | |
| Advantech | 32 GB | 3200 | DDR4 | Y | 0-85 °C | SQR-RD4N32G3K2SRB | PASS | |
| Advantech | 13 GB | 3200 | DDR4 | Y | 0-85 °C | SQR-RD4N16G3K2SZCB | PASS | Need to set as 2400 MHz via BIOS for better compatibility. |

*Actual speed depends on the spec. of CPU.

**ECU-579 has passed 500 times on/off test under -25°C environment.

## 2.11 TPM

ECU-579 supports Trusted Platform Module (TPM 2.0) technology. TPM is designed to provide hardware-based security-related functions. TPM is a microchip designed to provide basic security-related functions primarily involving encryption keys. TPM is usually installed on the motherboard of a computer, and communicates with the rest of the system using a hardware bus.

The Trusted Platform Module (TPM) is the root-of-trust in a given platform (such as on desktop computers). If built into a computer that runs an operating system that is aware of this chip, it can check the system integrity and authenticate third-party users who would like to access the security features while remaining under complete control of its primary user. With TPM, privacy and confidentiality are assured.

## 2.12 Platform Feature Description

### 2.12.1 BIOS

With the AMI BIOS Setup program, you can modify BIOS settings and control the special features of your computer. The Setup program uses a number of menus for making changes and turning special features on or off. This chapter describes the basic navigation of the ECU-579 Setup screens.


**Figure 2.12 BIOS Interface**

ECU-579'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 CMOS so that 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.*

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 legend. Above the 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.

## 2.12.2 Watchdog

### 2.12.2.1 Watchdog Timer Overview

The watchdog timer is built into the EC controller, IT8528E. It provides the following functions for user programming and can be enabled and disabled by the user's program timer, which can be set from 1 to 255 seconds. It generates an interrupt or reset signal if the software fails to reset the timer before time-out.

To get the driver and test case for Windows and Linux operating systems, you can visit the official Advantech website on the ECU-579 product page to download the driver with the test sample.

## 2.12.3 IPMI

ECU-579 is equipped with the ASPEED 2500 BMC chip (Part Number: 9691B250000) and supports IPMI 2.0 (Intelligent Platform Management Interface 2.0) via a LAN port.

LAN1 can operate with the IPMI function that allows remote control management. High reliability and outstanding performance make ECU-579 the ideal platform for industrial server/networking applications.

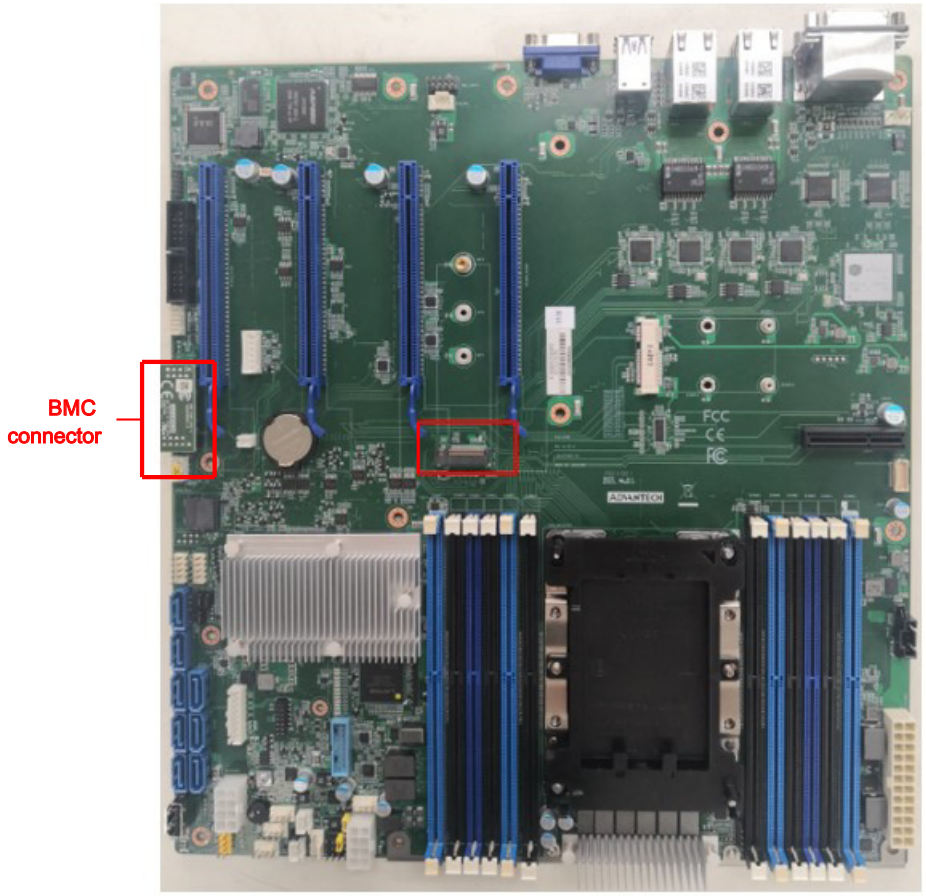



**Figure 2.13 BMC Position**

To enable the IPMI function, you need to set it up in BIOS. First, enter the IP of the ECU-579 LAN1 you are using or use DHCP mode to get the IP address automatically. Then enter the IP address to initialize the IPMI network interface to start remote control. For more instructions, please refer to the introduction of the Intel® IPMI document.

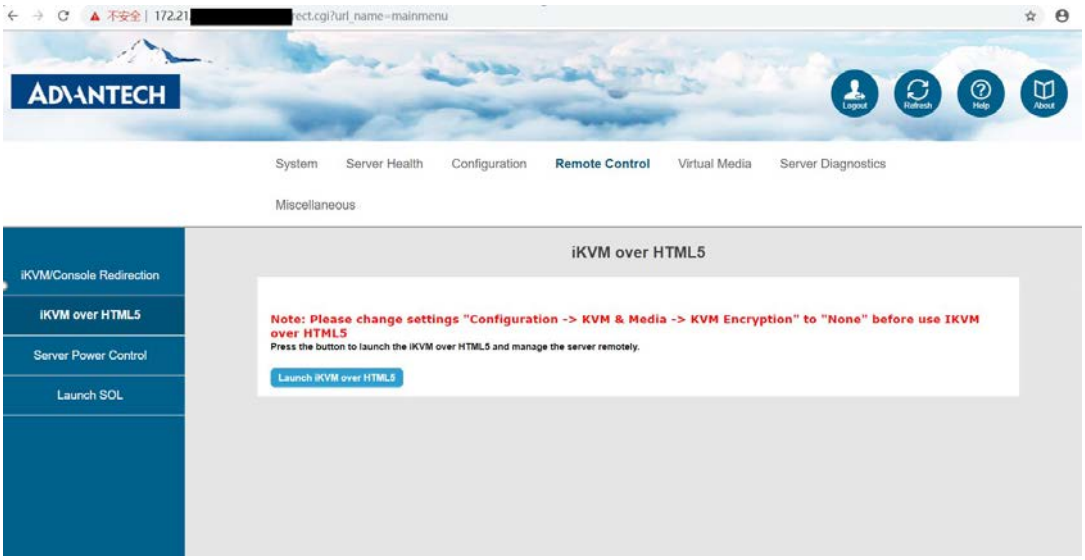



**Figure 2.14 IPMI Interface**

***Note!*** *If you need to remotely operate the BIOS, only VGA display mode supports this function.*

# 2.13 Available Accessories

## 2.13.1 Spare Parts

The following spare parts are available for ordering:

**Table 2.13: Spare Parts**

| Order Part Number | Description |
|---|---|
| XECU-FSP800-20FN | Power module |

# Chapter 3

## Initial Setup and Configuration

**Sections include:**

- Jumper Indication
- Installing Components (CPU, RAM, SATA, PCIe Cards)
- Replacing Components

## 3.1 Jumper Positions

ECU-579 has 7 jumpers in case you need to implement certain functions.

**Table 3.1: Jumper List**

| Jumper Position Name | Function |
|---|---|
| JME1 | Intel® ME update |
| PSON1 | AT mode: 1-2 short / ATX mode: 2-3 short (default) |
| JTHR_SEL1 | Thermal sensor on board (default): 1-2 short / external: 2-3 short |
| JWDT1 | Watchdog enable: 1-2 short (default) / disable: 2-3 short |
| JCMOS1 | CMOS clear normal: 1-2 short (default) / clear CMOS: 2-3 short |

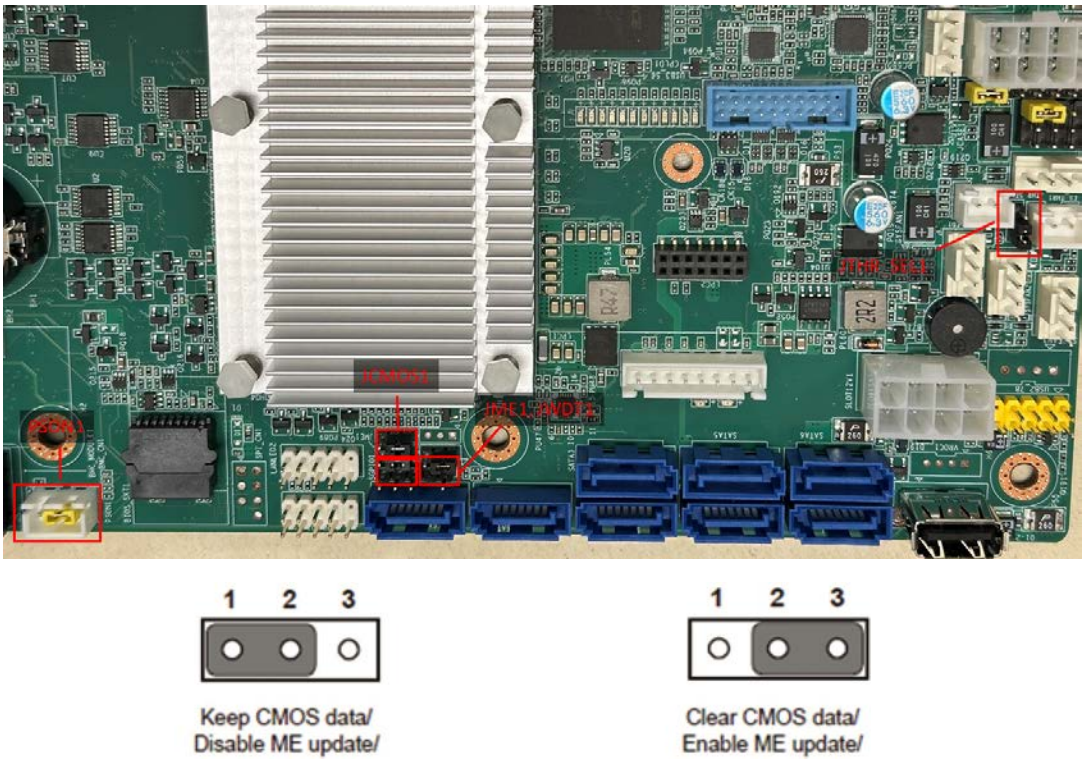



**Figure 3.1 ECU-579 Jumper Position Indication**

Steps for BIOS and ME update:
# JME1 jumper
- Set to (2-3) ME force update
# Flash BIOS and ME command
- AfuEfix64.efi filename /p /b /n /x /ME
- Power off ECU-579
- Set JME1 jumper to (1-2)

## 3.2 Installing Components

When setting up the ECU-579, it is essential to begin by installing basic components such as the CPU and RAM.

This chapter includes pictures with detailed instructions to guide you through the installation process.

Start by opening the chassis. Unscrew the points indicated in the image below.

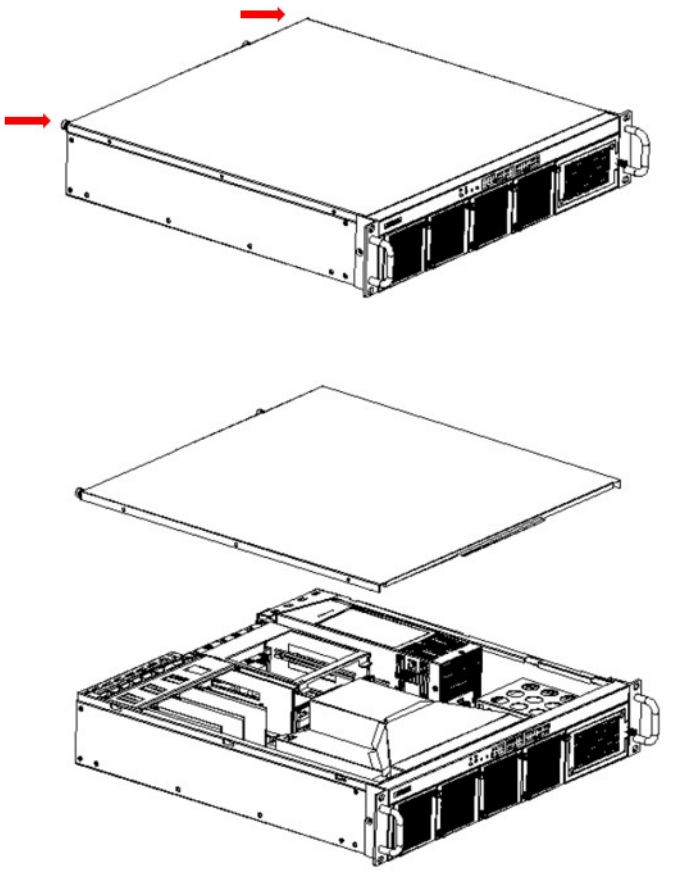


**Figure 3.2 Open the Chassis**

### 3.2.1 Installing the CPU

To install the CPU, you need to take off the wind scooper and unscrew the cooling fin.

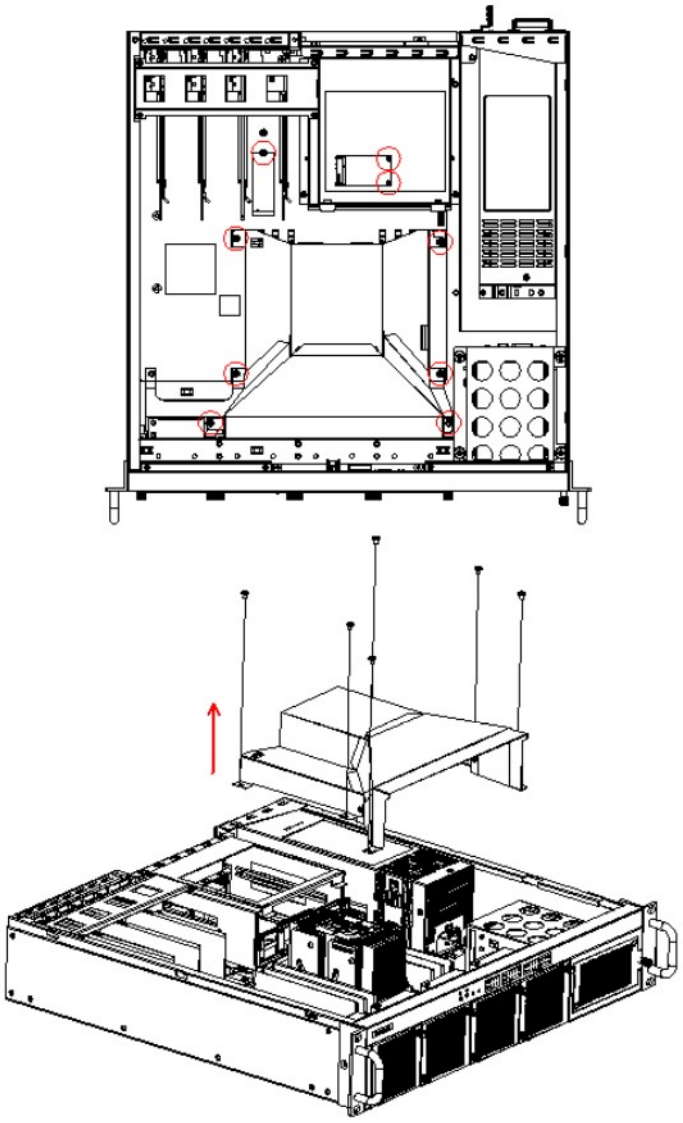


**Figure 3.3 Taking Off the Wind Scooper**

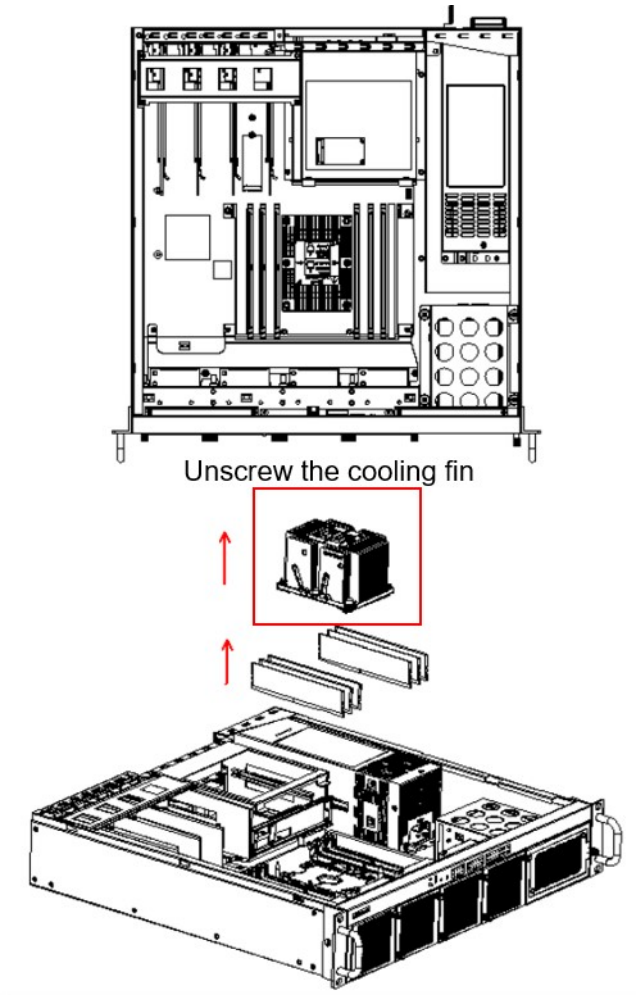
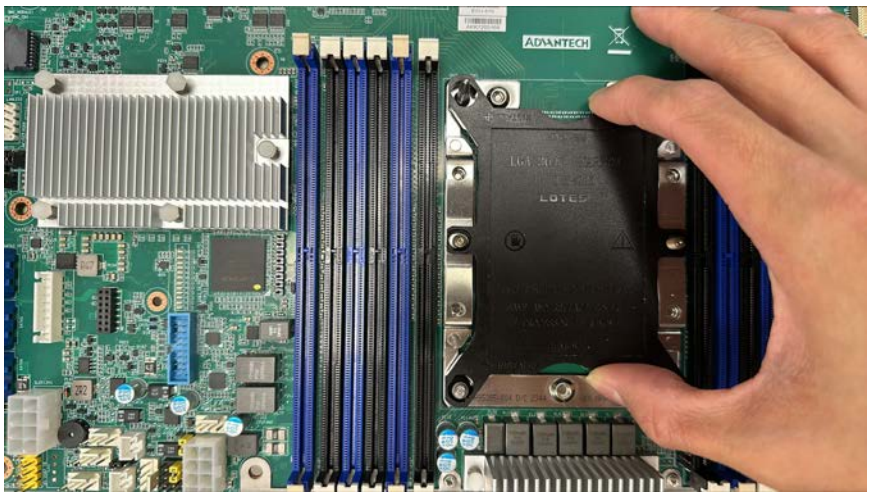


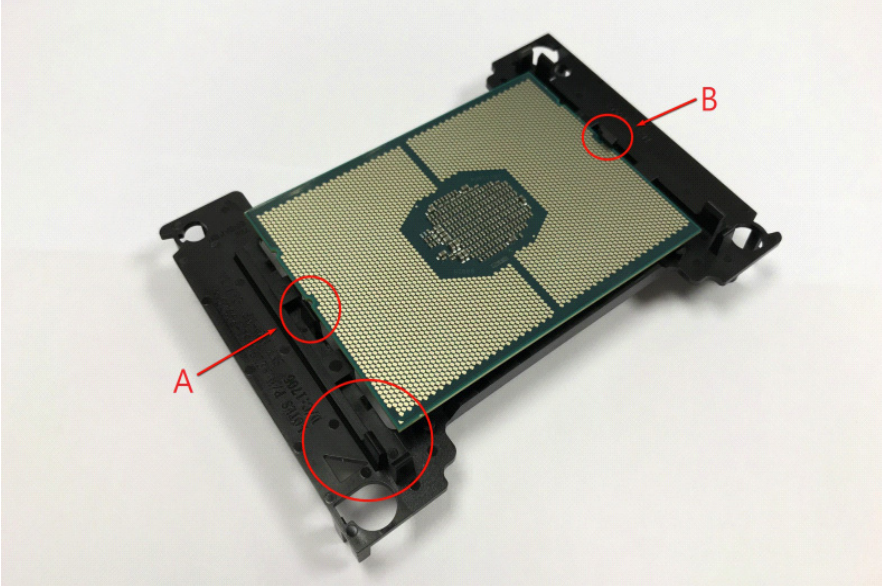

**Figure 3.4 Taking Off the Cooling Fin**

Pay attention to ensure the orientation of the CPU is consistent with that of the CPU bracket and the cooling fin. Install the CPU into the CPU bracket and then re-attach the cooling fin. Then install the CPU bracket back onto the main board.

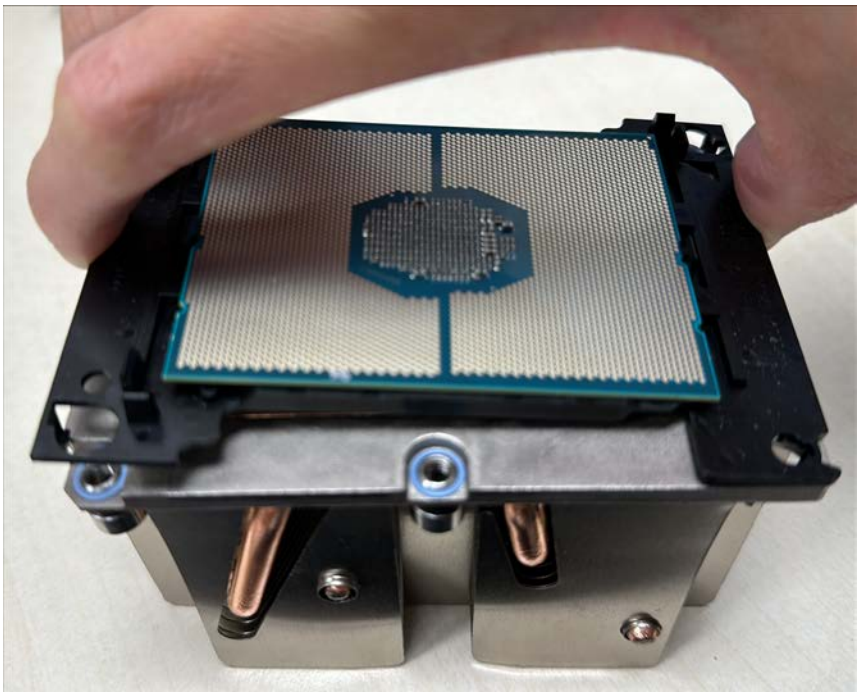
Remove the dust cover on the CPU socket.



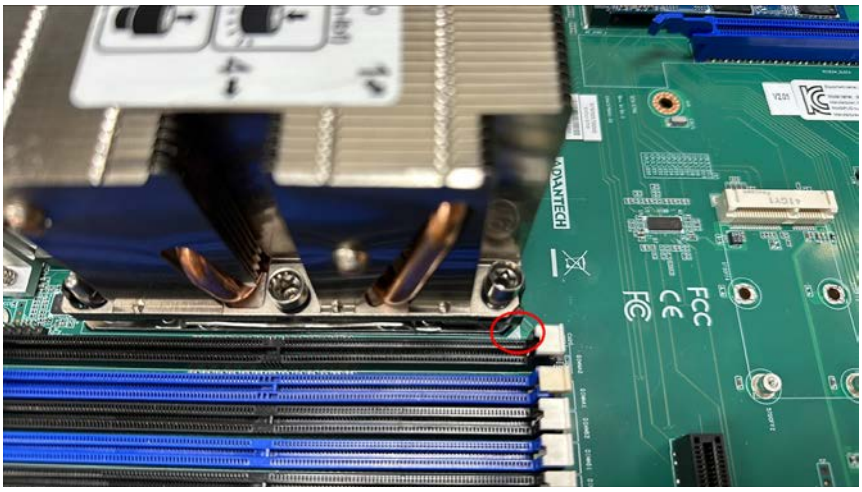
Insert CPU on CPU clip and align pin 1 mark, then latch both notch A and B on the CPU, and notch A and B on the CPU clip.



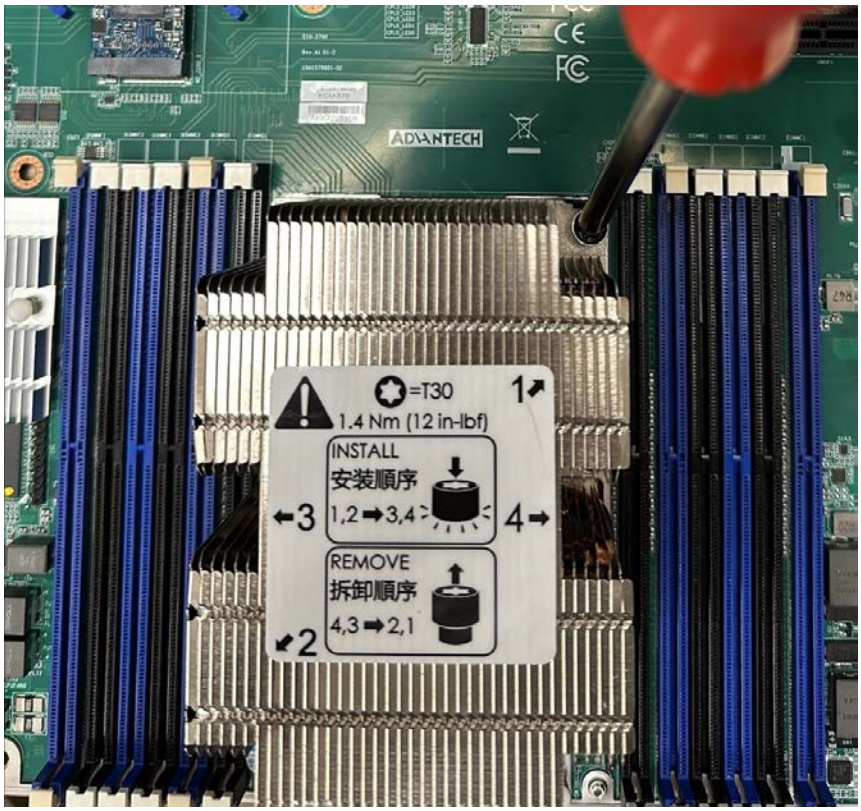

Install the CPU clip assembly on the heatsink as a processor heatsink module.



Place the processor heatsink module on the CPU socket on the motherboard and align the triangle mark printed on the motherboard.



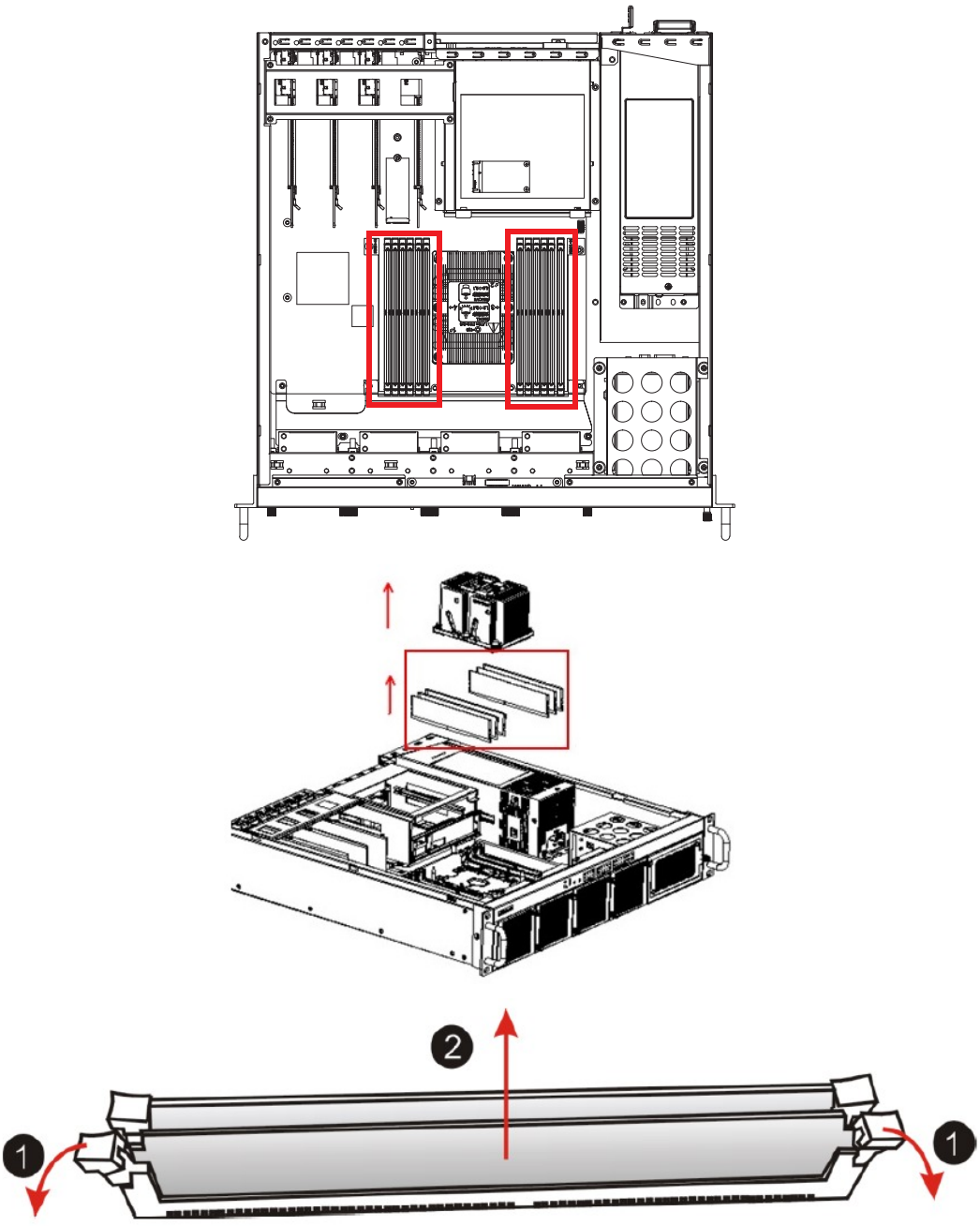
Tighten the screws in sequence 1-2-3-4 by using a T30 Torx screwdriver.



### 3.2.2 Installing RAM

Memory performance is affected by different DIMM configurations. For optimal memory interleaving, be sure to install identical DIMM types with the same size, speed, and number of ranks on the memory slots corresponding to the correct processor.

### 3.2.3 RAM Installation Position




***Note!*** *If only one RAM card is installed into a slot, it should be installed in the BLUE slot, and it is best if it is installed in a symmetric manner.*

To replace a DIMM module, extract the DIMM module by pushing the DIMM socket latches outward. As the latches flip completely open, the DIMM module will be automatically extracted from the socket. Pull the DIMM module out vertically.

There can be a maximum of 12 RAM cards installed in the ECU-579 with 6 cards on each side of the cooling fins.

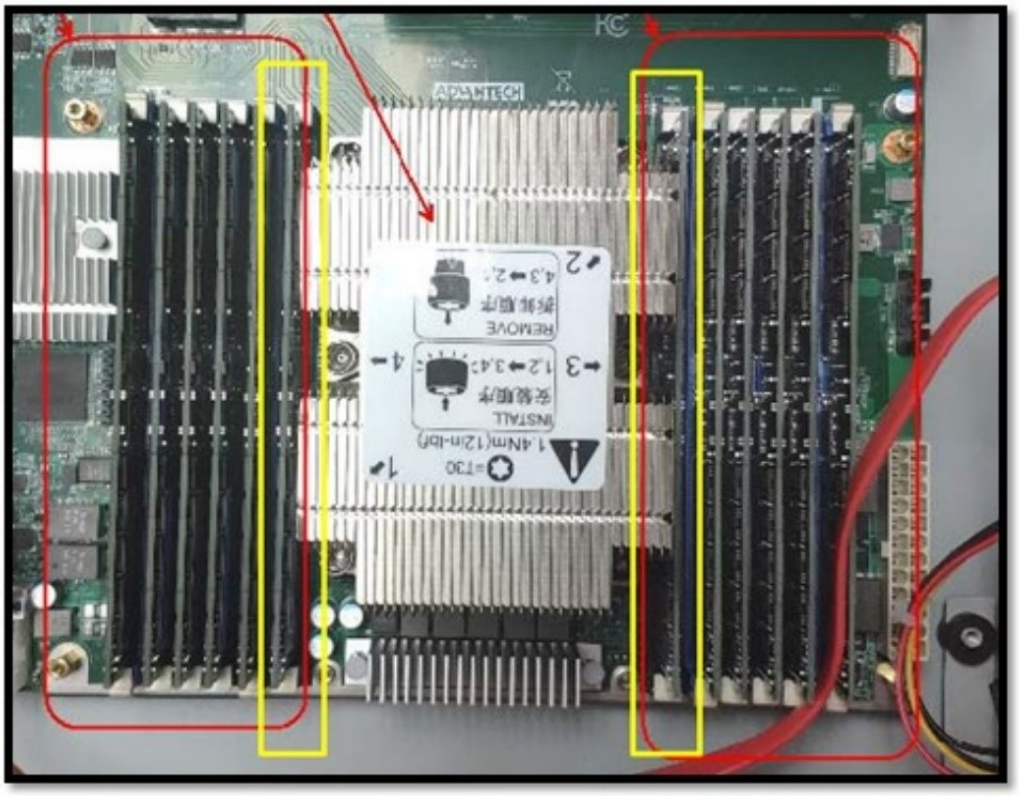



**Figure 3.5 Full Quantity of Memory Installed**

### 3.2.4 Installing Storage Disks Using SATA and M.2

First remove the baffle as shown in the picture below. Pull out the disk tray.

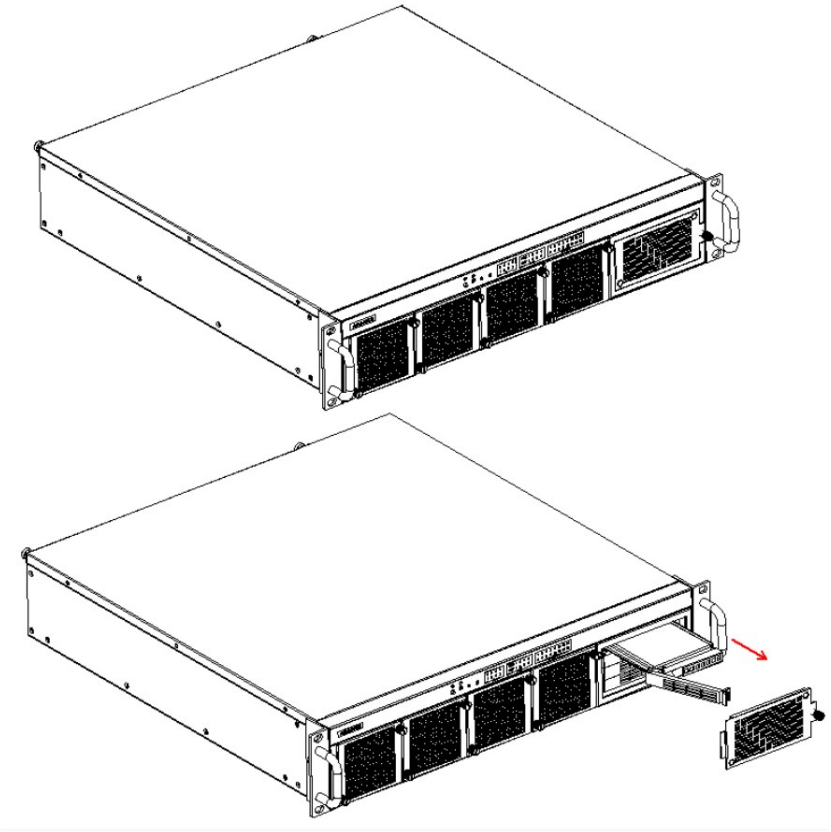


**Figure 3.6 Removing the HDD Baffle**

Use the screws in the accessory box to fix the hard disk onto the tray, and push it into the disk drawer. We have 4 disk drawers in total for a maximum of 4 hard disks.

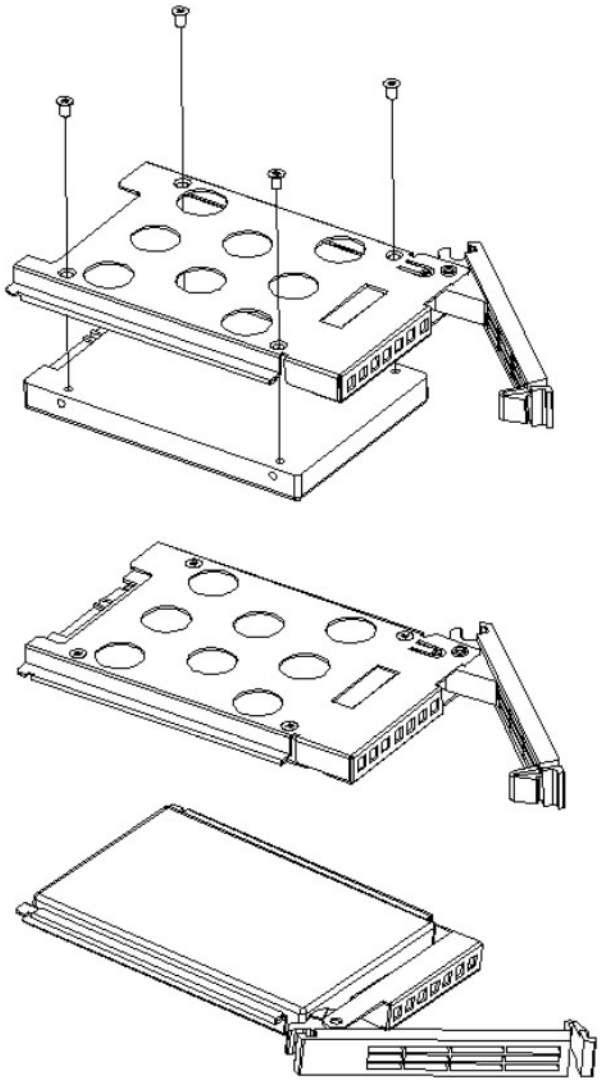


**Figure 3.7 Attaching the Hard Disk**

You may add one M.2 hard disk in the position shown below.

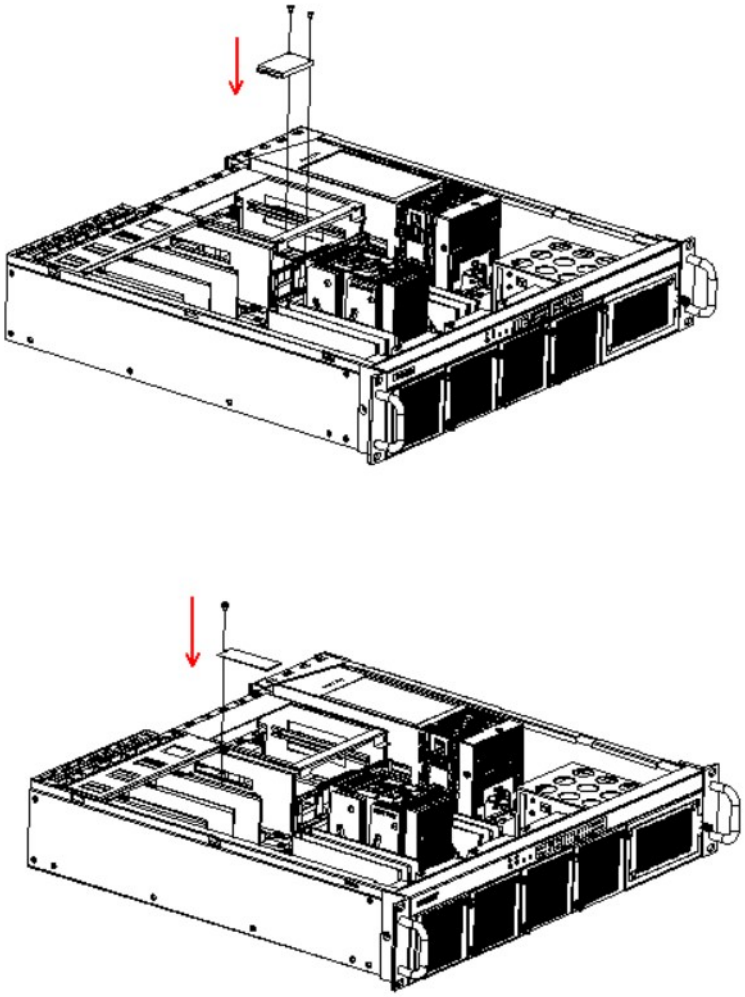


**Figure 3.8 Installing an M.2 Disk into Position**

### 3.2.5 Installing a Proprietary PCI/PCIe Card

You can install one proprietary PCI/PCIe card without opening the chassis on the back panel in the position shown below after removing the baffle. You can find the proprietary card list in Section 2.7.1.

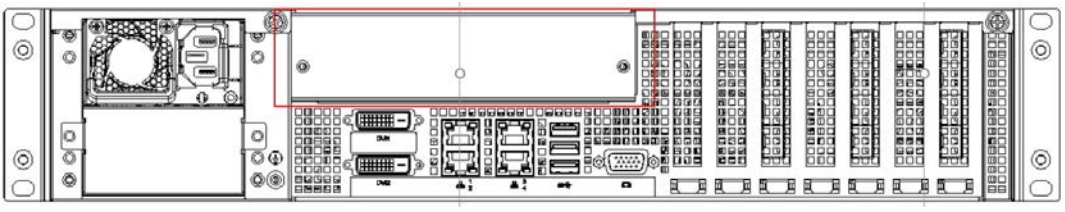


**Figure 3.9 Proprietary PCI/PCIe Card Installation Position**

### 3.2.6 Installing a Low-Profile PCIe Card

You can install 4 low-profile PCIe cards in most in the positions shown below.

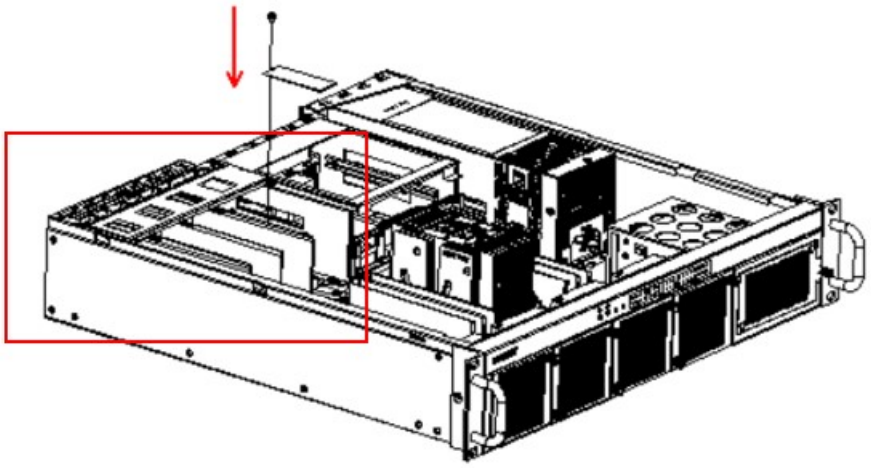


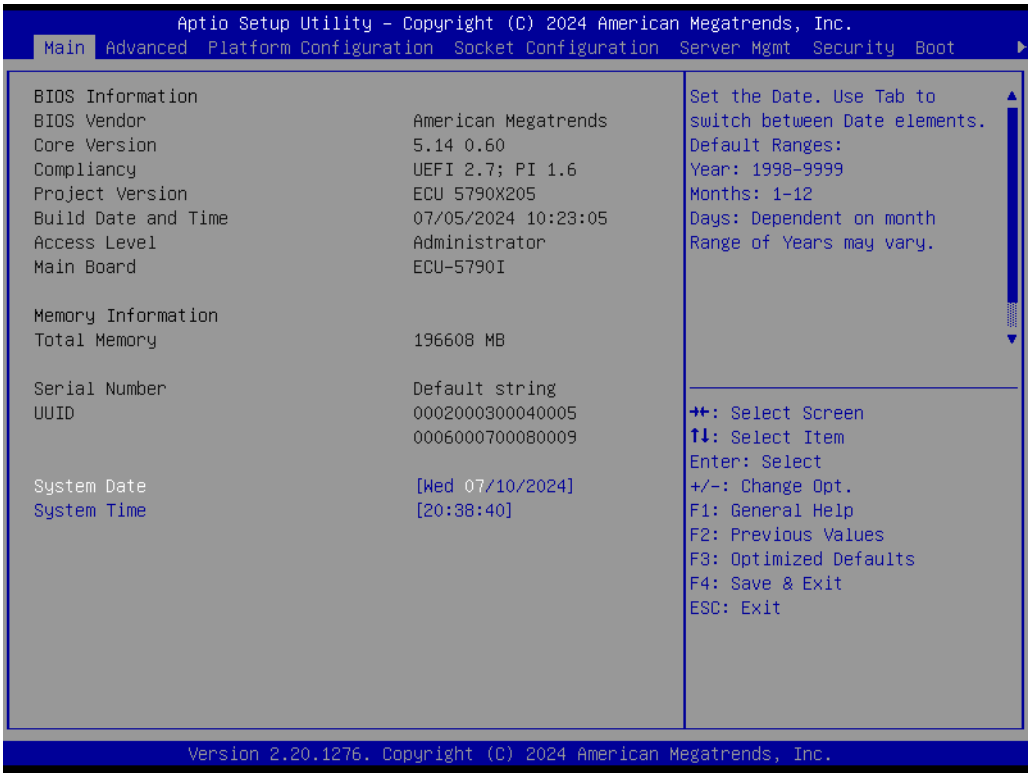
**Figure 3.10 Low-Profile PCIe Card Installation Position**

# Chapter 4

## AMI BIOS

# 4.1 Introduction

With the AMI BIOS Setup program, you can modify BIOS settings and control the special features of your computer. The Setup program uses a number of menus for making changes and turning the special features on or off. This chapter describes the basic navigation of the ECU-579 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.*

# 4.2 BIOS Setup

## 4.2.1 Main Menu

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

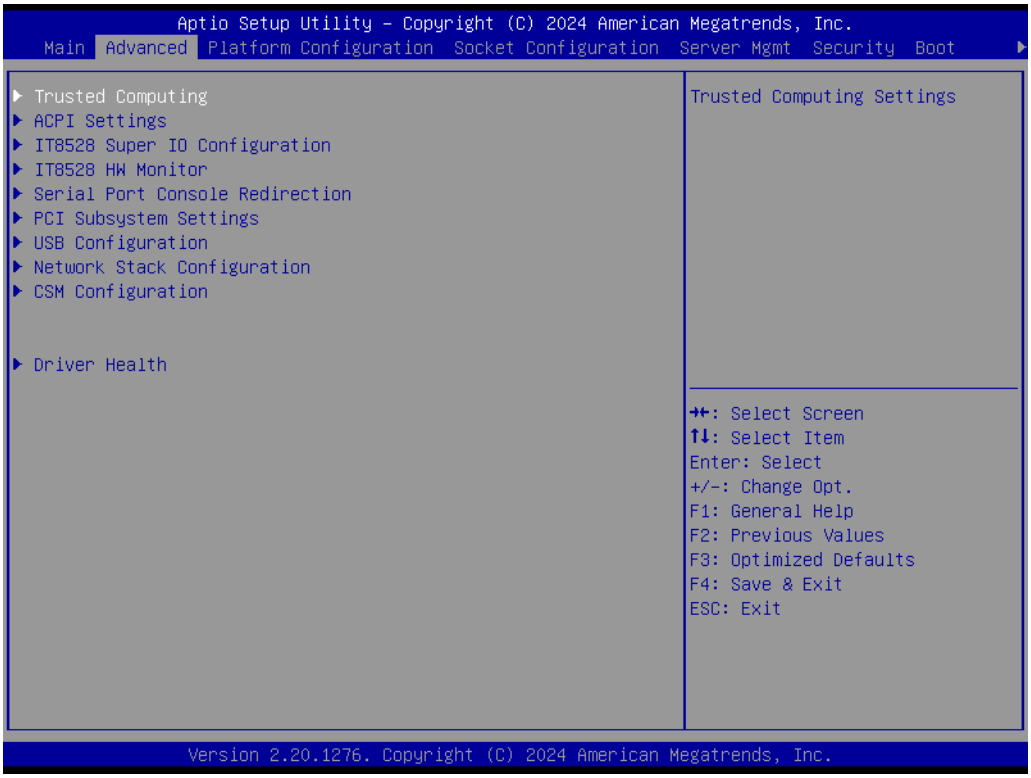

The Main BIOS setup screen has two main frames. The left frame displays all the options that can be configured. Grayed-out options cannot be configured; options in blue can be. The right frame displays the key legend. Above the key legend is an area reserved for a text message. When an option is selected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

- **System Date/System Time**

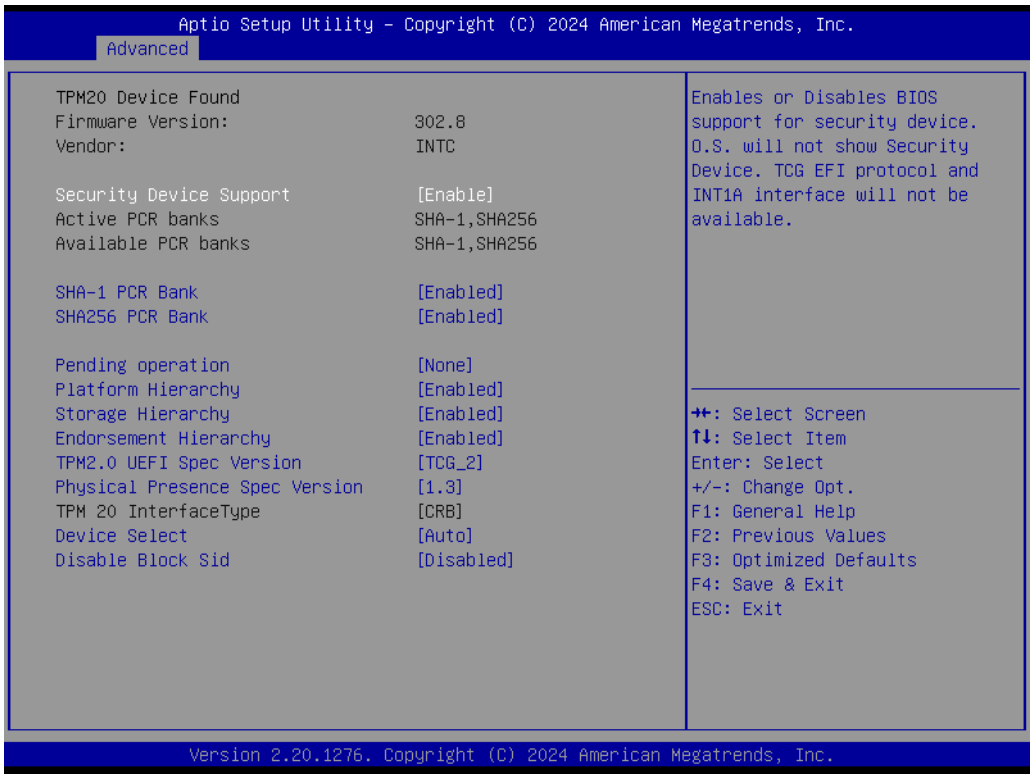
  Use this option to change the system time and date. Highlight System Time or System Date using the <Arrow> keys. Enter new values through the keyboard. Press the <Tab> key or the <Arrow> keys to move between fields. The date must be entered in MM/DD/YY format. The time must be entered in HH:MM:SS format.

### 4.2.2 Advanced BIOS Features Setup

Select the Advanced tab from the ECU-579 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.



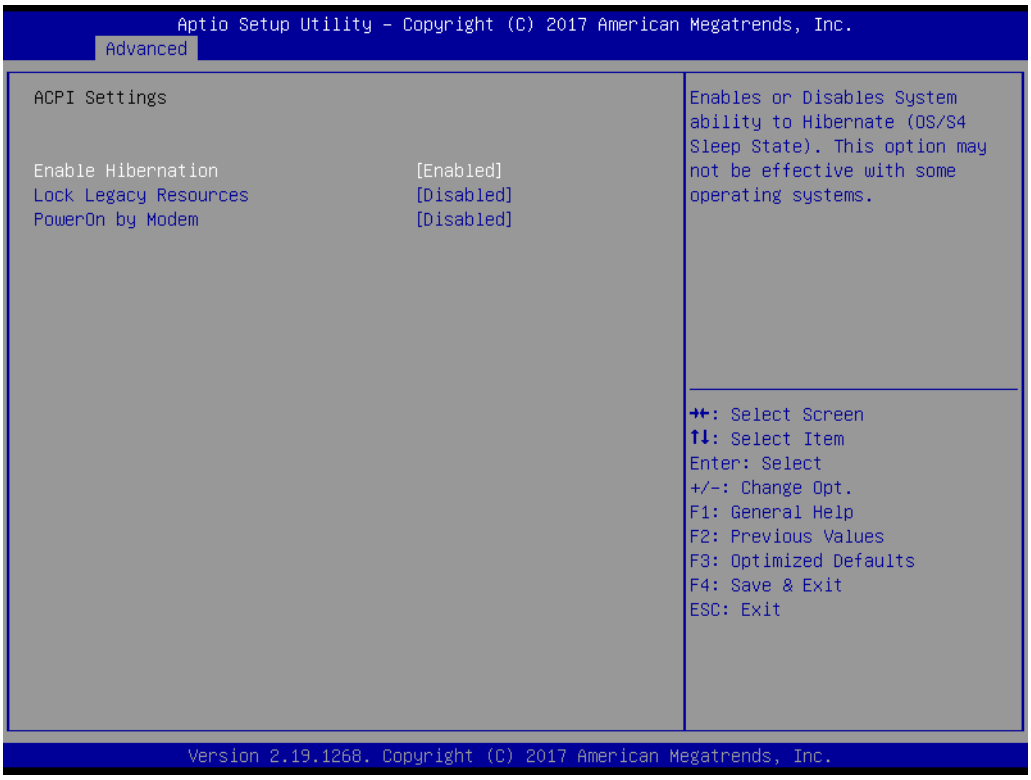
#### 4.2.2.1 Trusted Computing




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

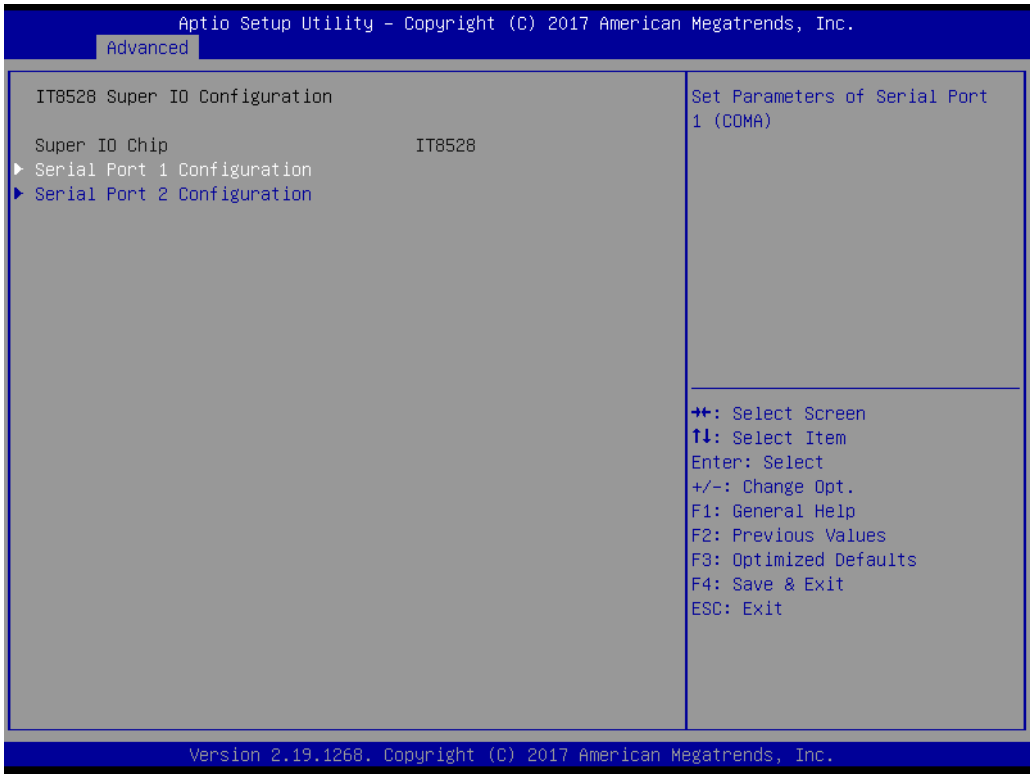
***Note!*** *Purchase Advantech's LPC TPM module to enable TPM function. P/N: PCA-TPM-00B1E.*

### 4.2.2.2 ACPI Settings

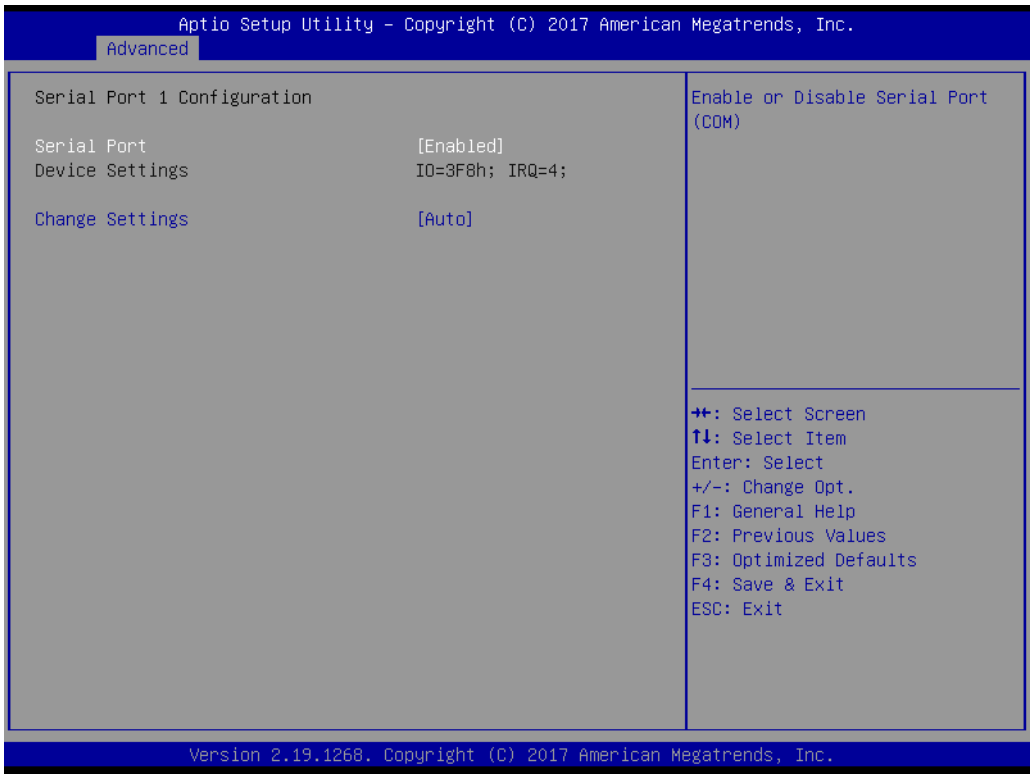



- **Enable Hibernation**
  Enable or disable the hibernation feature.
- **Lock Legacy Resources**
  Enable or disable the lock legacy resources feature.
- **PowerOn By Modem**
  Enable or disable the power on by modem feature.

#### 4.2.2.3 IT8528 EC Super IO Configuration

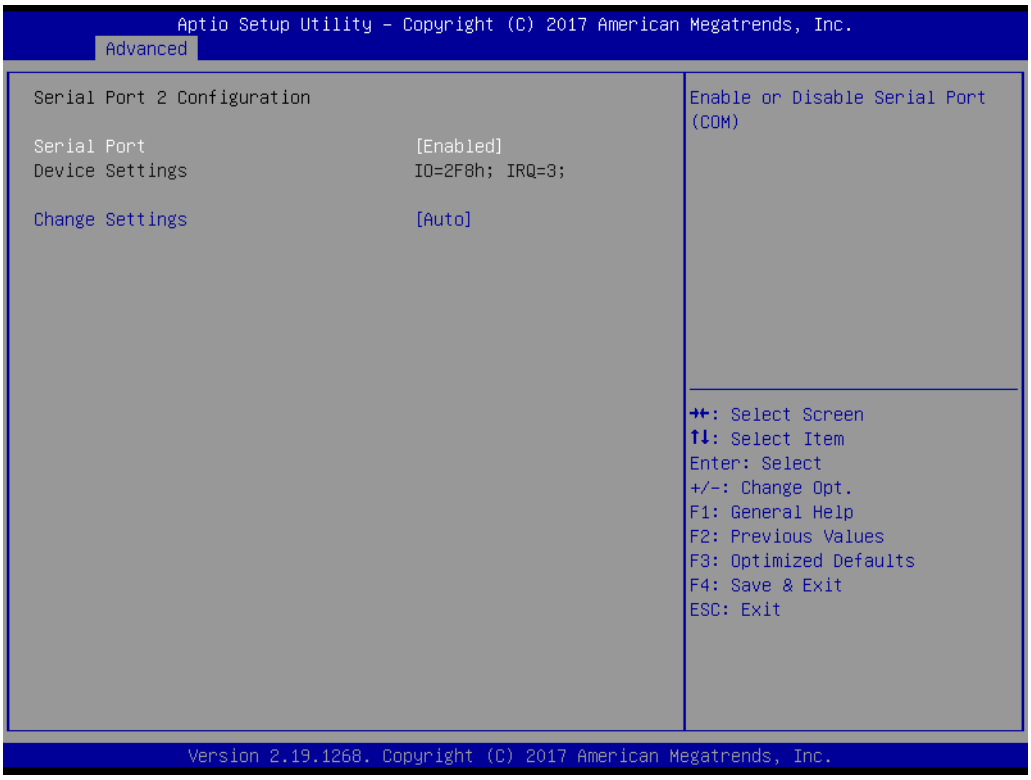



■ **Serial Port 1 Configuration**



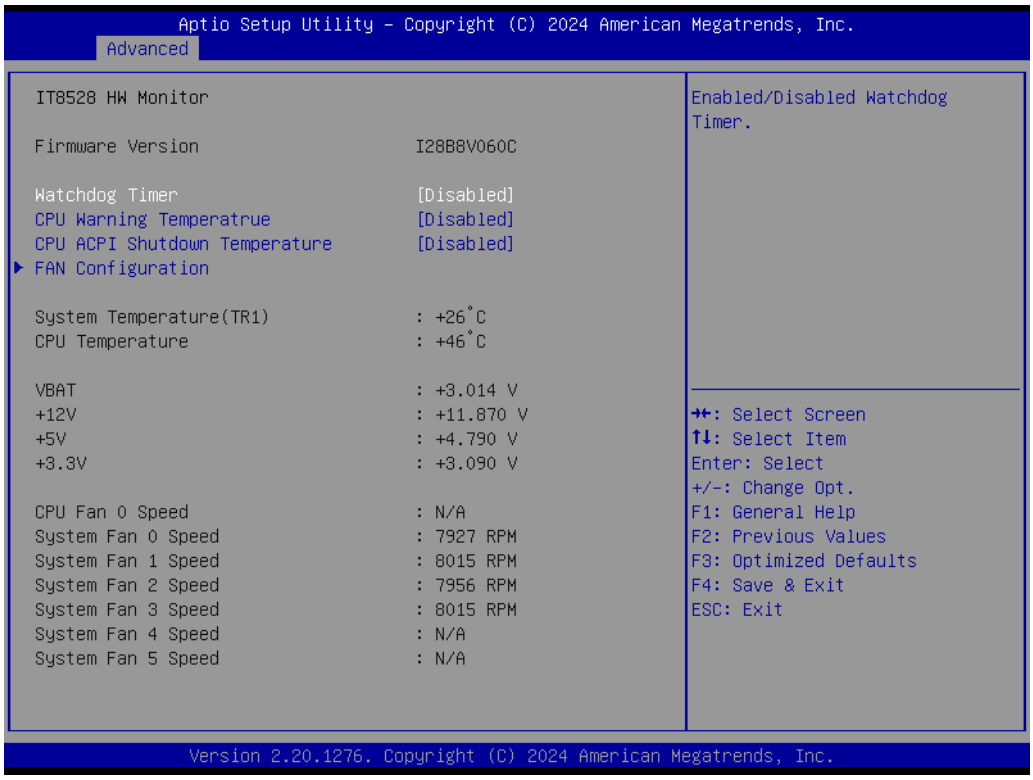

– **Serial Port**
  Enable or disable serial port 1.
– **Change Settings**
  To select an optimal setting for serial port 1.

## Serial Port 2 Configuration




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

#### 4.2.2.4 IT8528 HW Monitor




- **Watchdog Timer**

  Enable or disable the watchdog timer function.

- **CPU Warning Temperature**

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

- **CPU ACPI Shutdown Temperature**

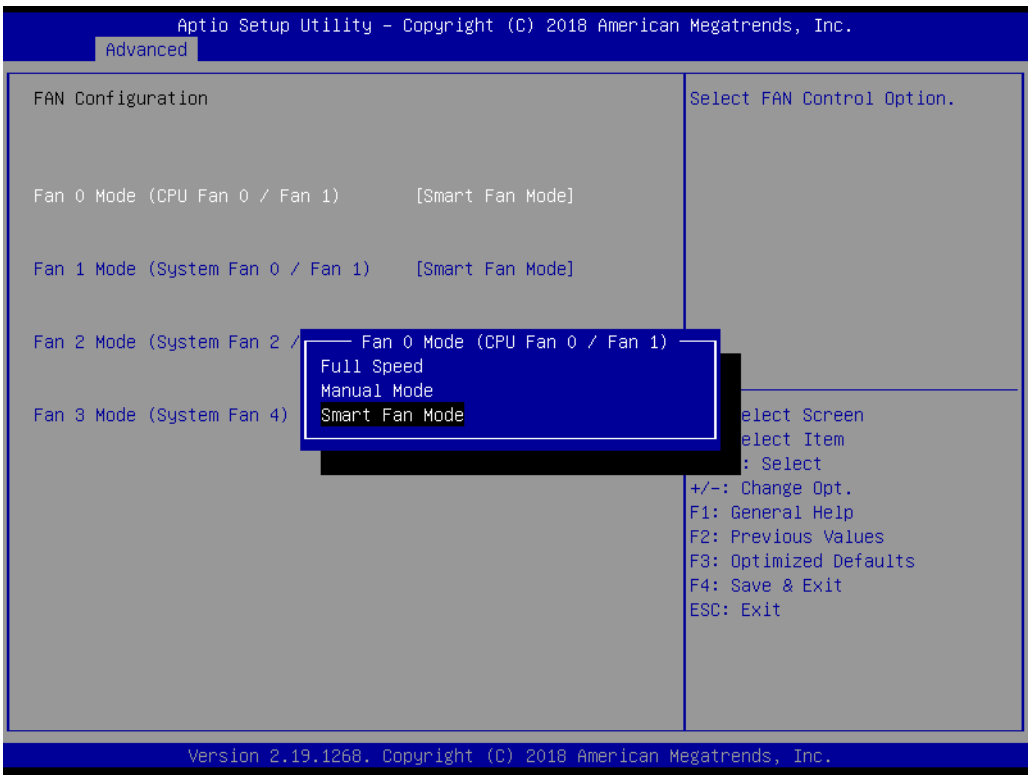
  Enable or disable the ACPI shutdown temperature threshold. When the system reaches the shutdown temperature, it will be automatically shut down by ACPI OS to protect the system from overheat damage.

- **Fan Configuration**

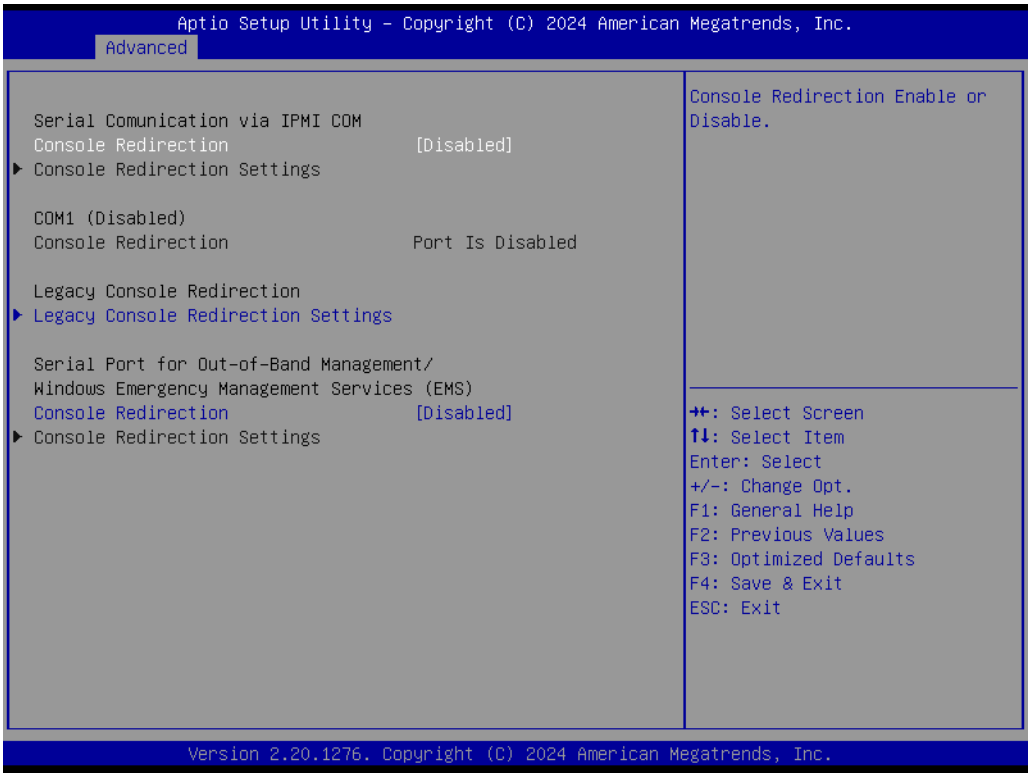
  Fan 0 mode controls CPUFAN0, Fan 1 mode controls SYSFAN0 and SYSFAN1, FAN 2 mode controls SYSFAN2 and SYSFAN3; and FAN 3 mode controls SYSFAN4 and SYSFAN5.

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

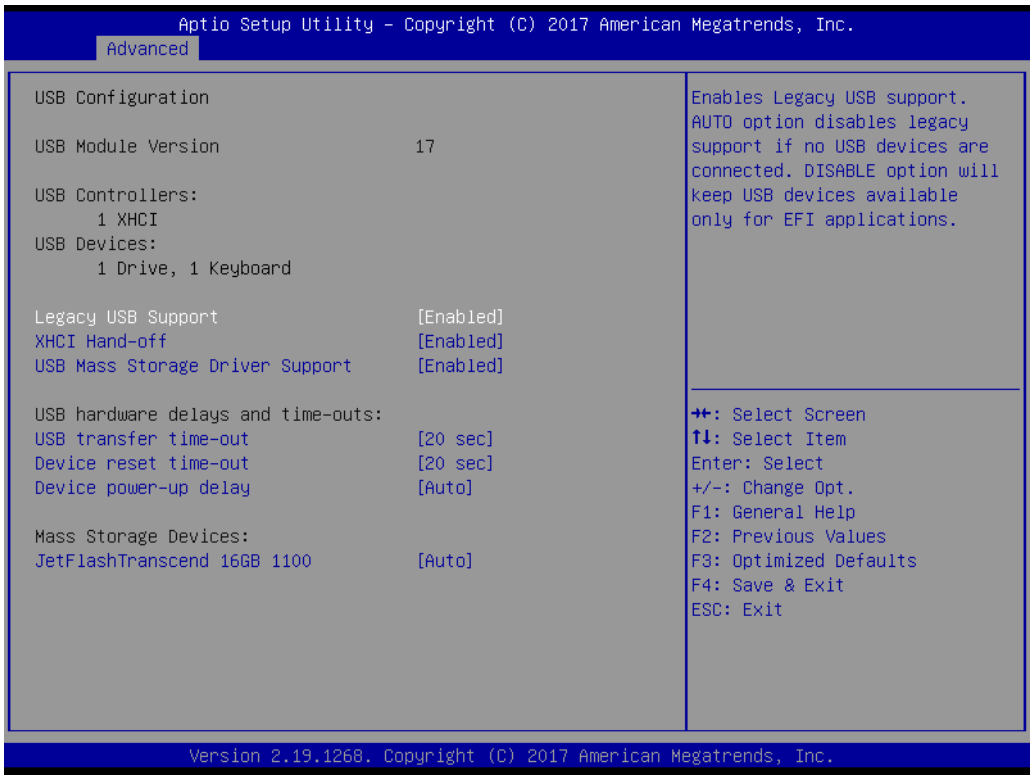
  When set to manual mode, fan duty setting can be changed; the range is from 30%~100%, default setting is 50%.



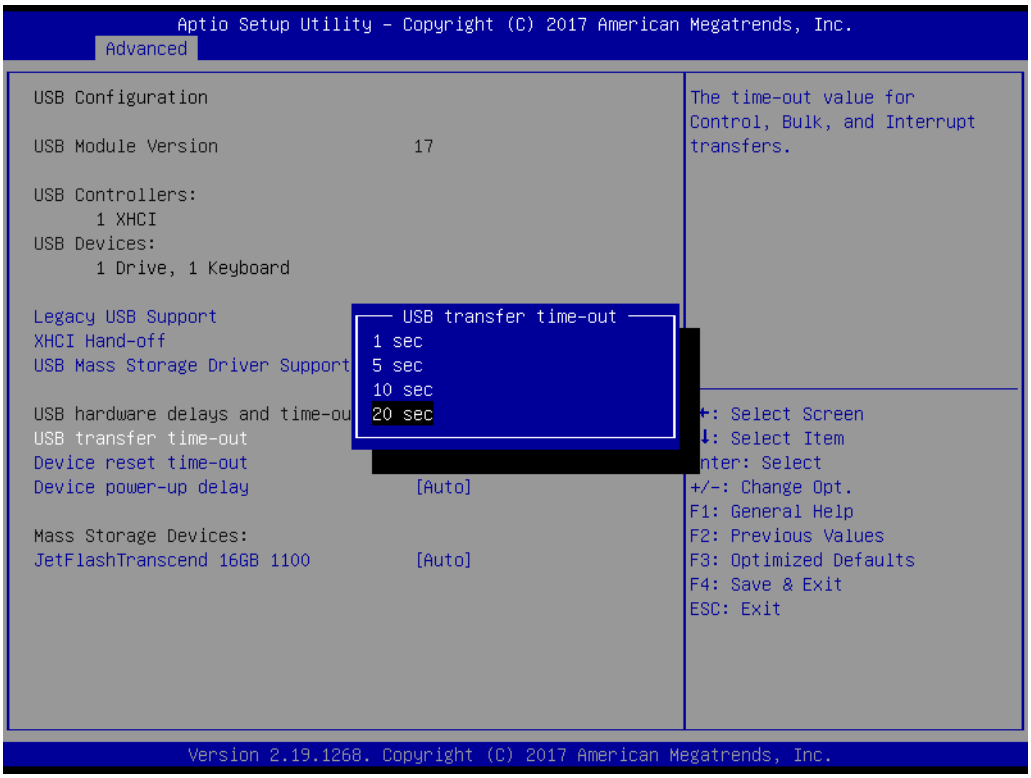

### 4.2.2.5 Serial Port Console Redirection



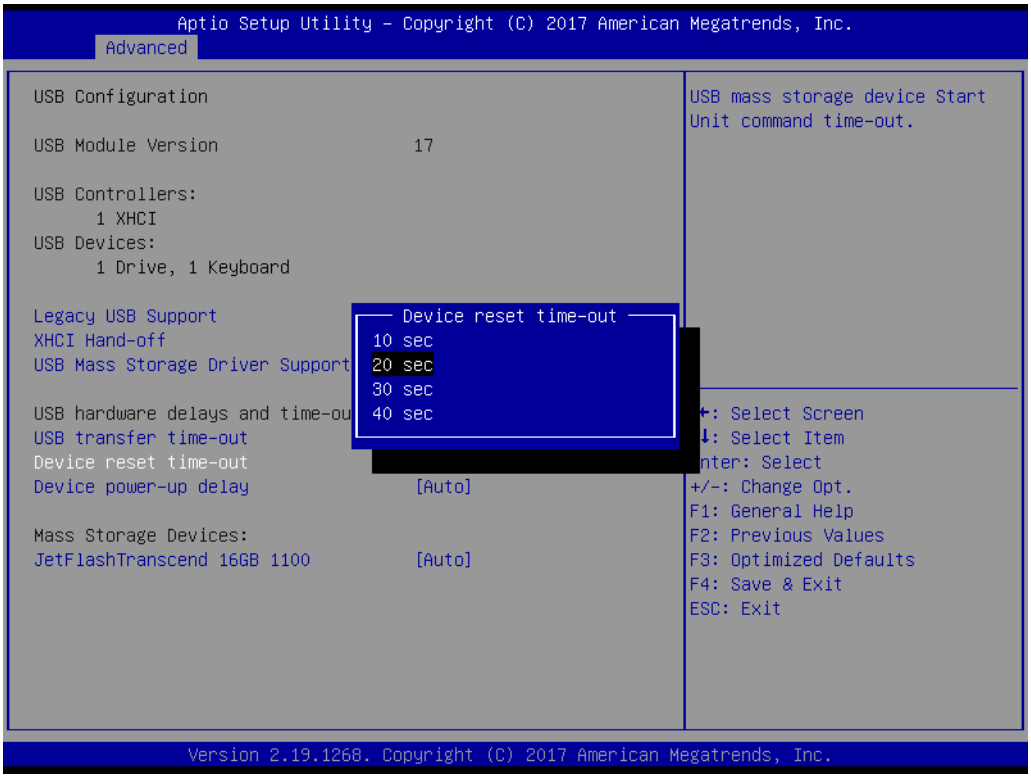
#### 4.2.2.6 USB Configuration




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

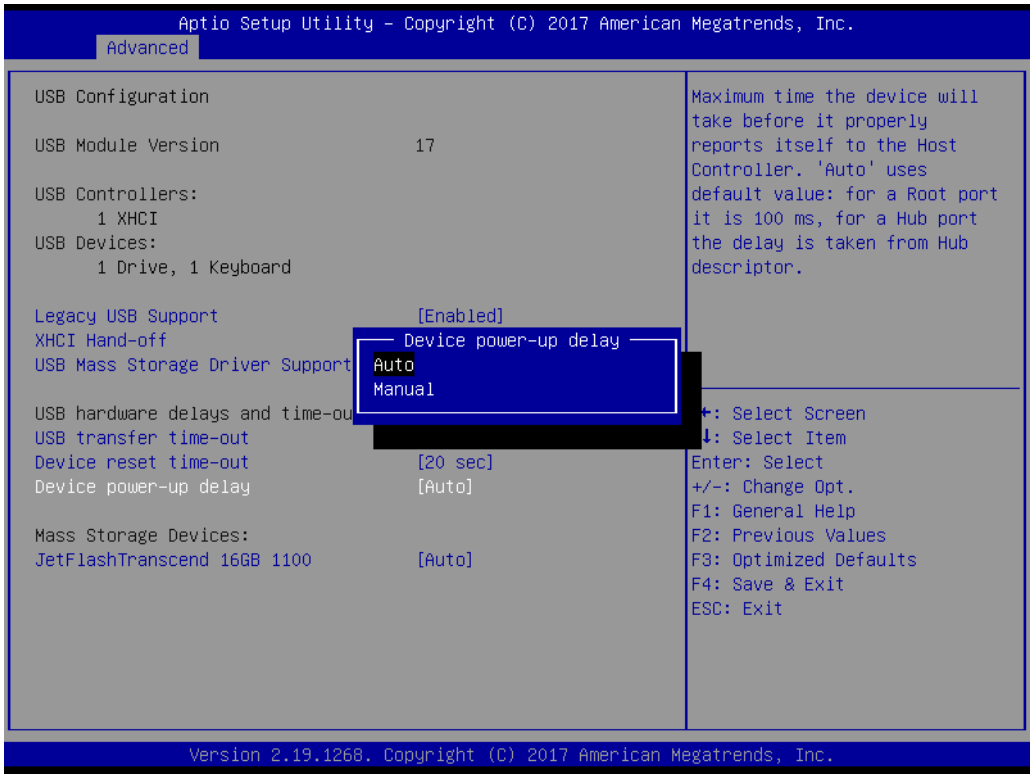



- **Device Reset Time-out**
  Selects the USB device reset time-out value. [10,20,30,40 sec]



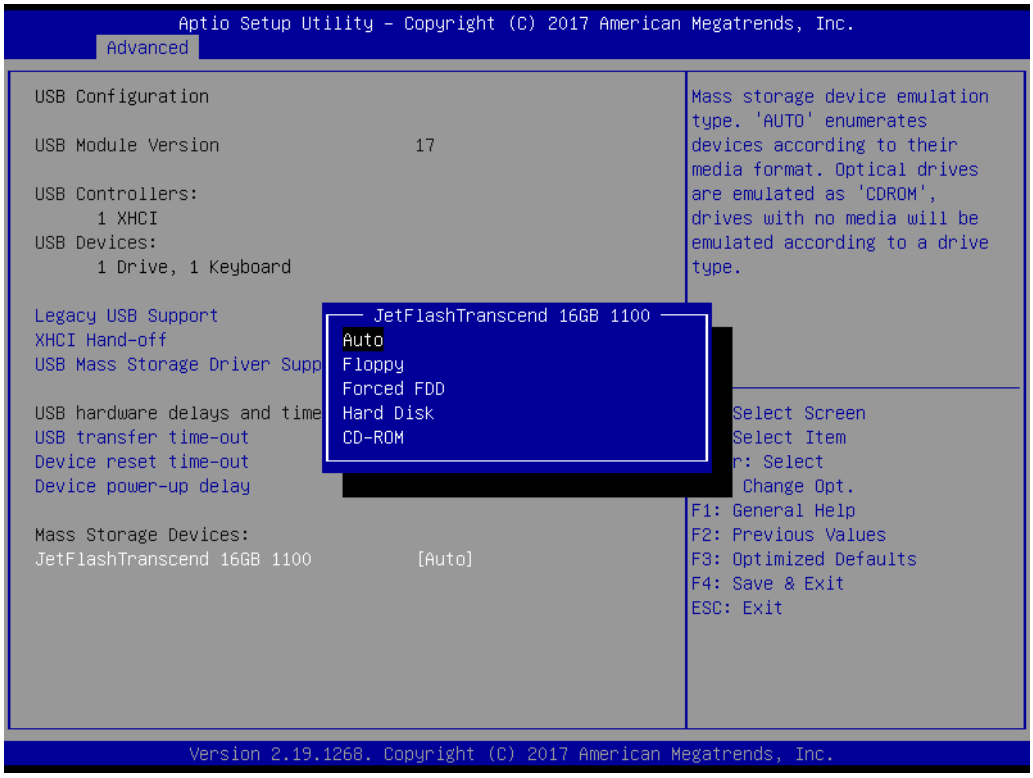
### Device Power-up Delay

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

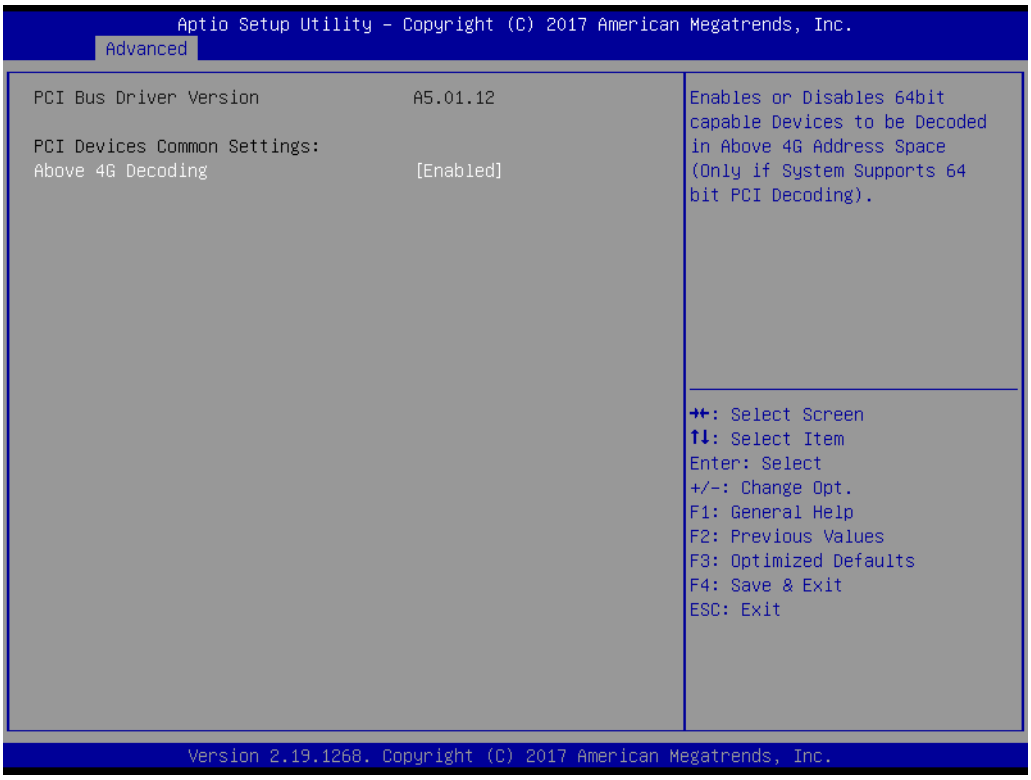



### Mass Storage Devices

Default is "Auto" to enumerate mass storage devices according to media format.



### 4.2.2.7 PCI Subsystem Settings

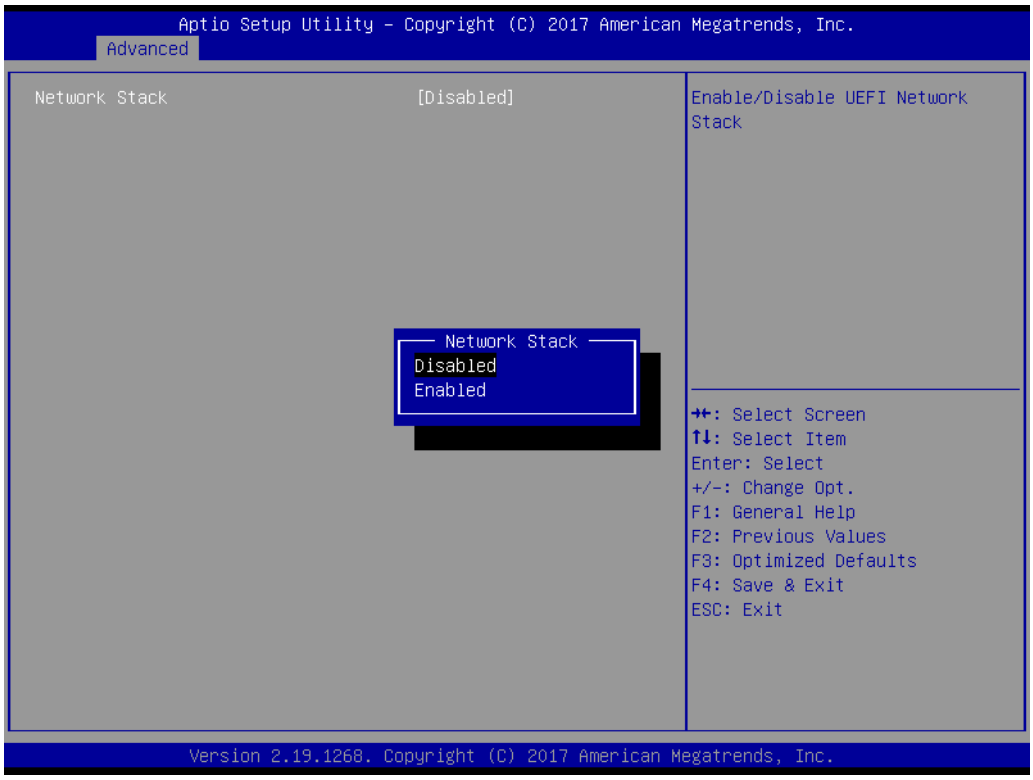



- **Above 4G Decoding**
  Enable or Disable 64-bit capable devices to be decoded in above 4G address space (Only if system supports 64-bit PCI decoding)

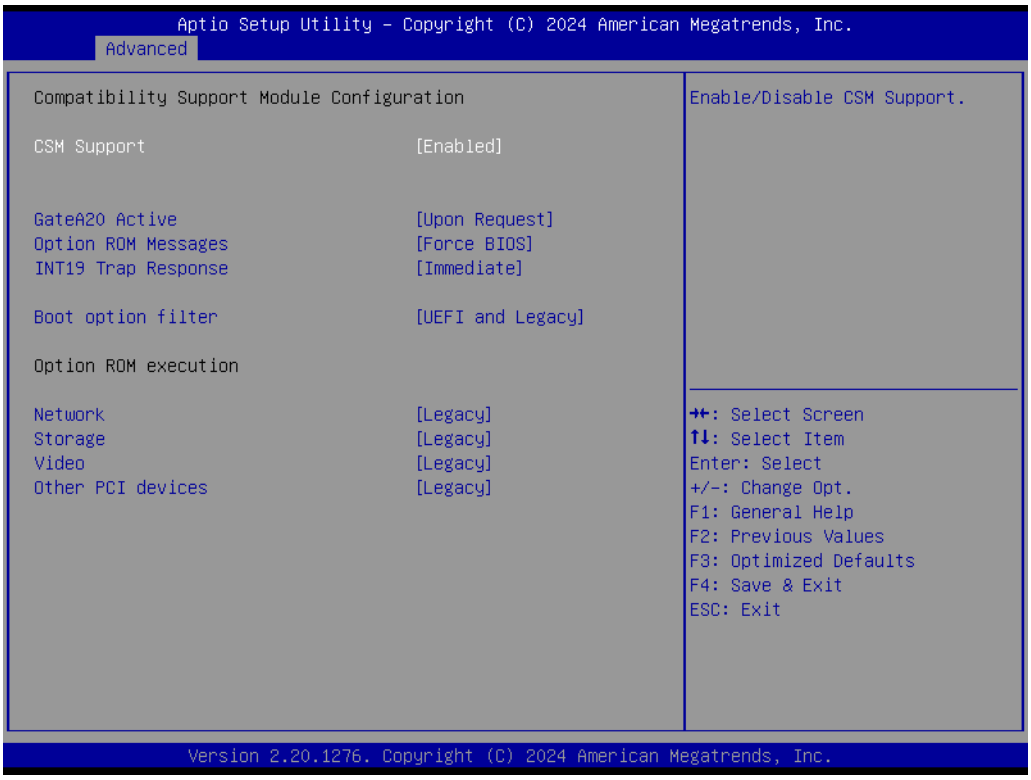
***Note!*** *Some graphics or GPU cards need to enable 4G decoding.*

#### 4.2.2.8 UEFI Network Stack Configuration

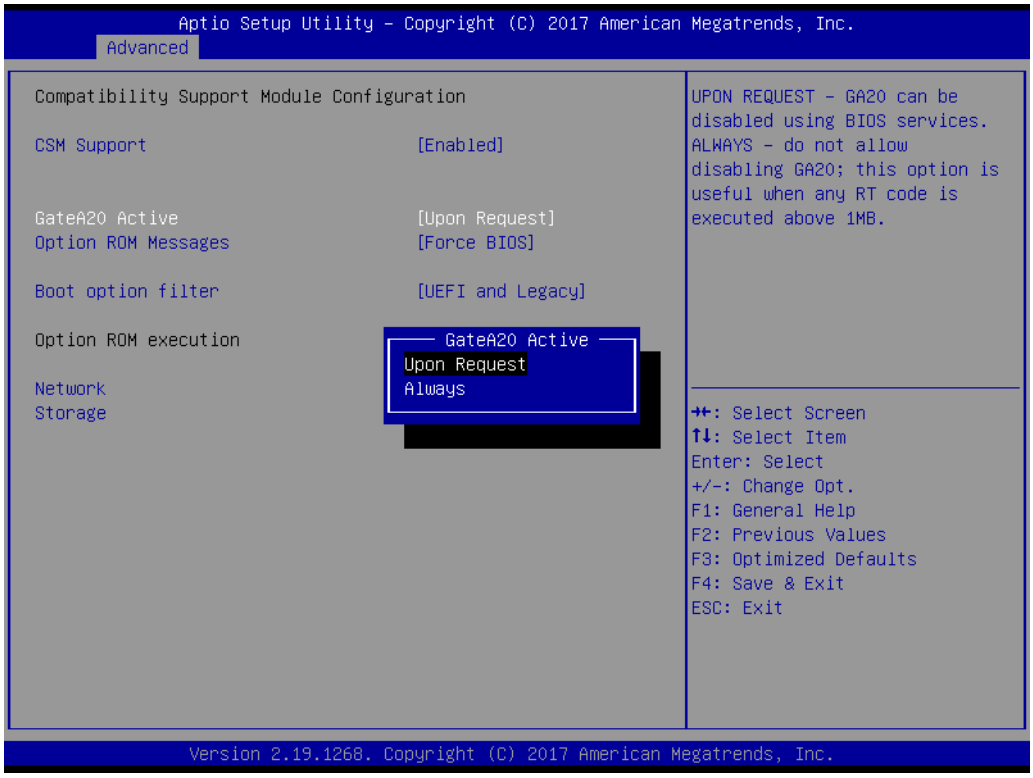
Enable or disable UEFI network stack function.



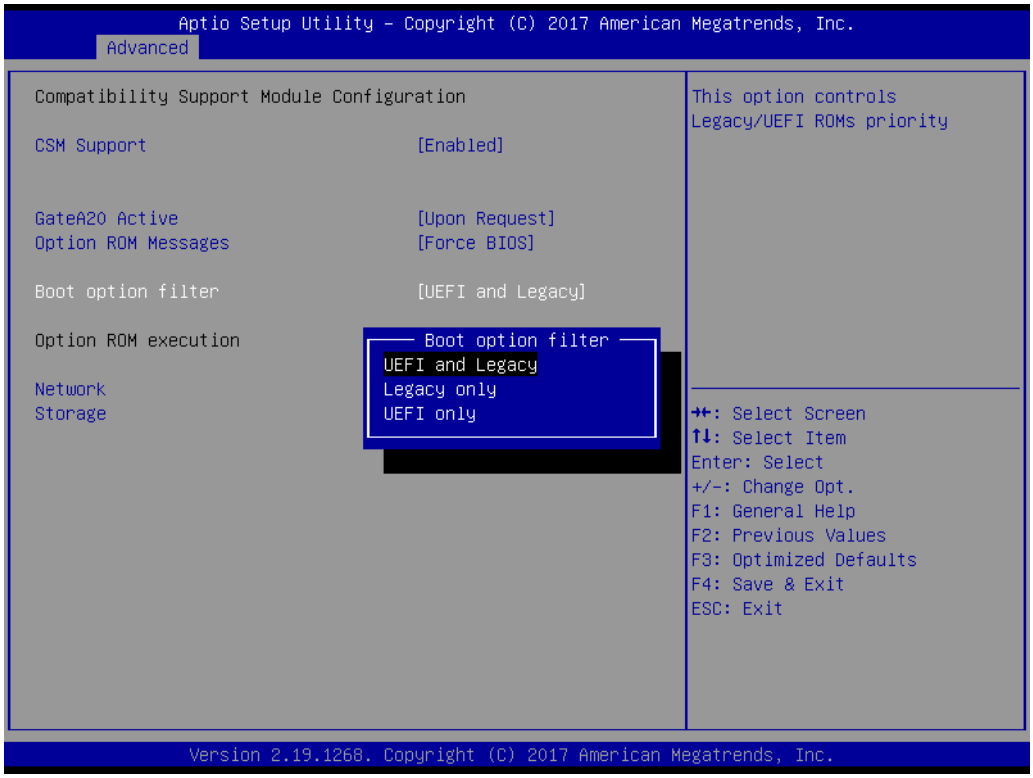
### 4.2.2.9 CSM Configuration



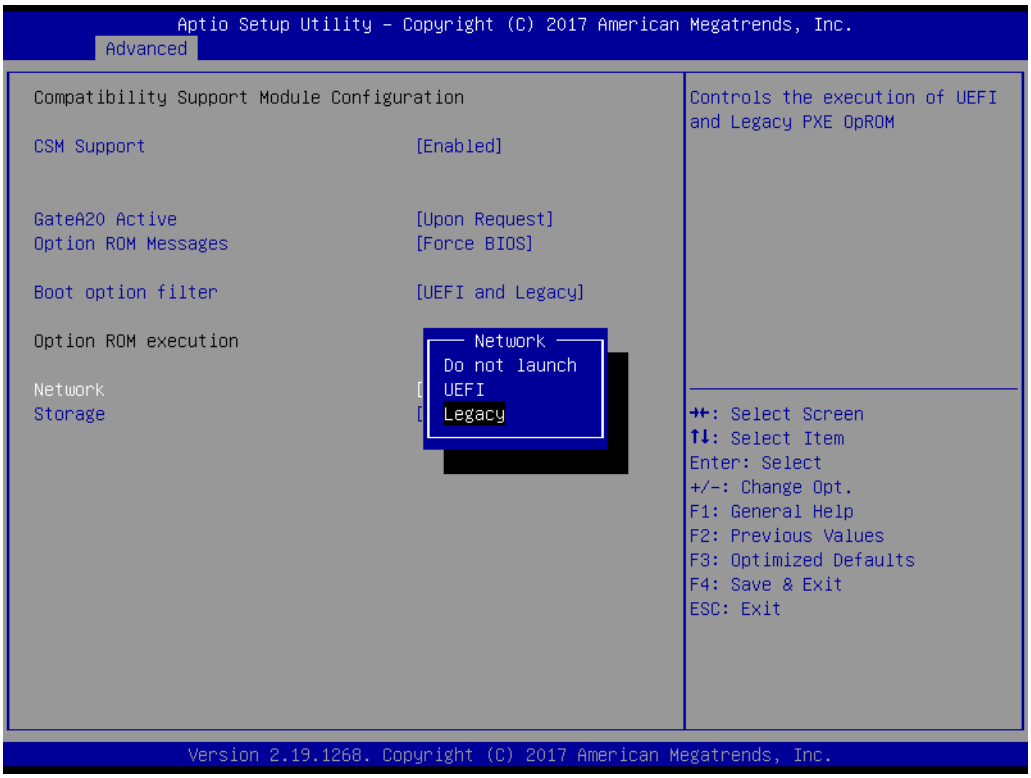

- **CSM Support**
  Enable or disable UEFI CSM (Compatibility Support Module) to support a legacy PC boot process.
- **GateA20 Active**
  This items is useful when RT code is executed above 1MB. When it's set as "Upon Request", GA20 can be disabled using BIOS services. When it's set as "Always", it does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



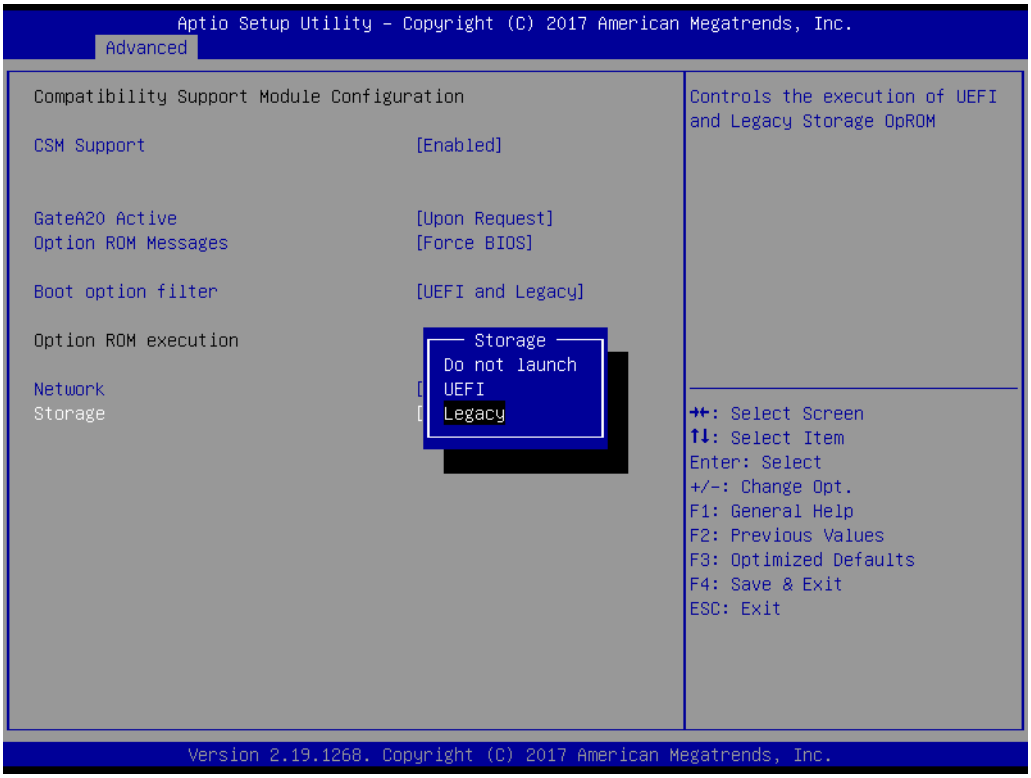

- **Option ROM Messages**
  To "Force BIOS or keep current" to set the display mode for Option ROM.
- **Boot option filter**
  Change UEFI/legacy ROM priority for boot option.



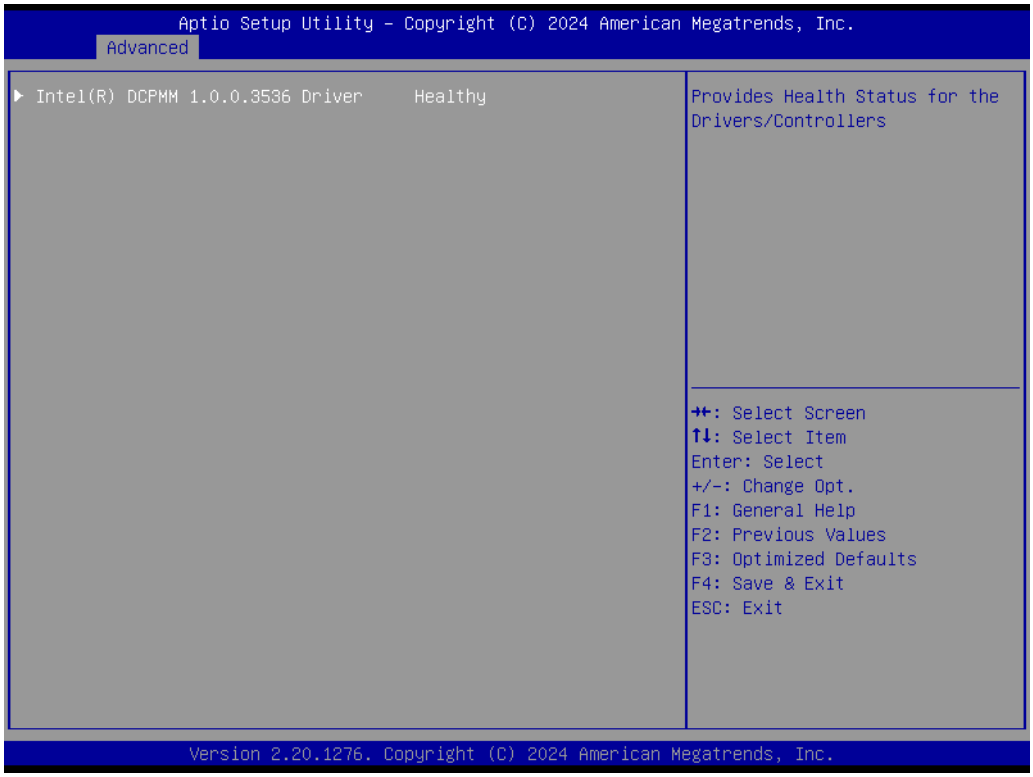
- **Network**
  Control the execution of UEFI and legacy PXE OpROM.



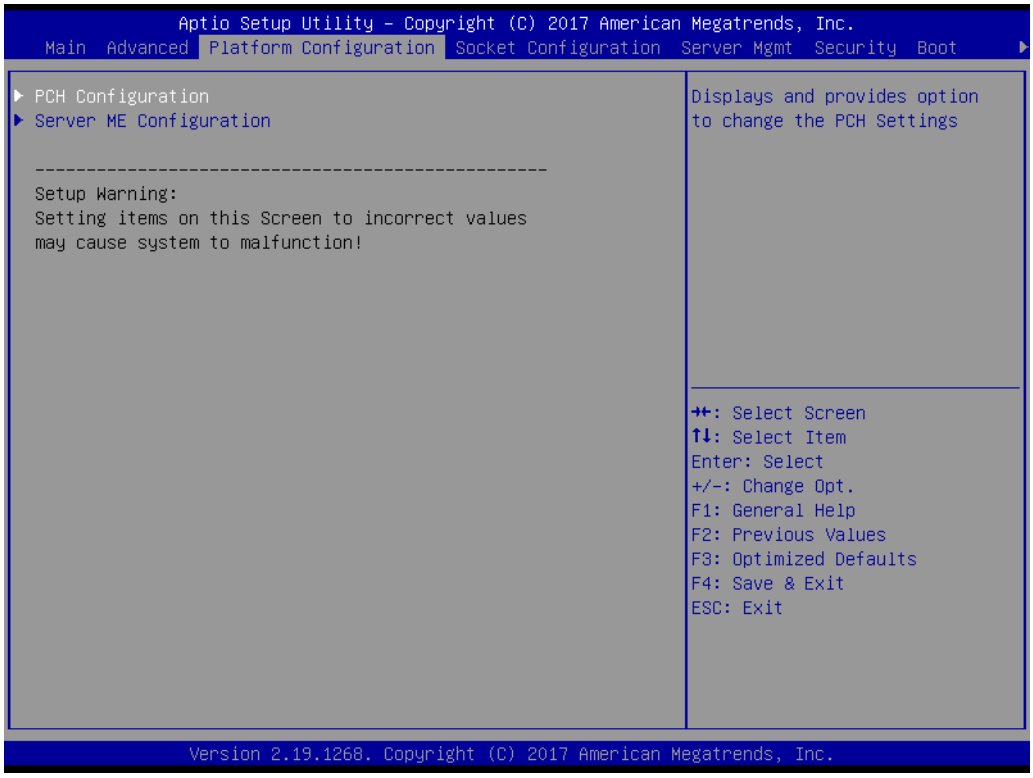

- **Storage**
  Control the execution of UEFI and legacy storage OpROM.



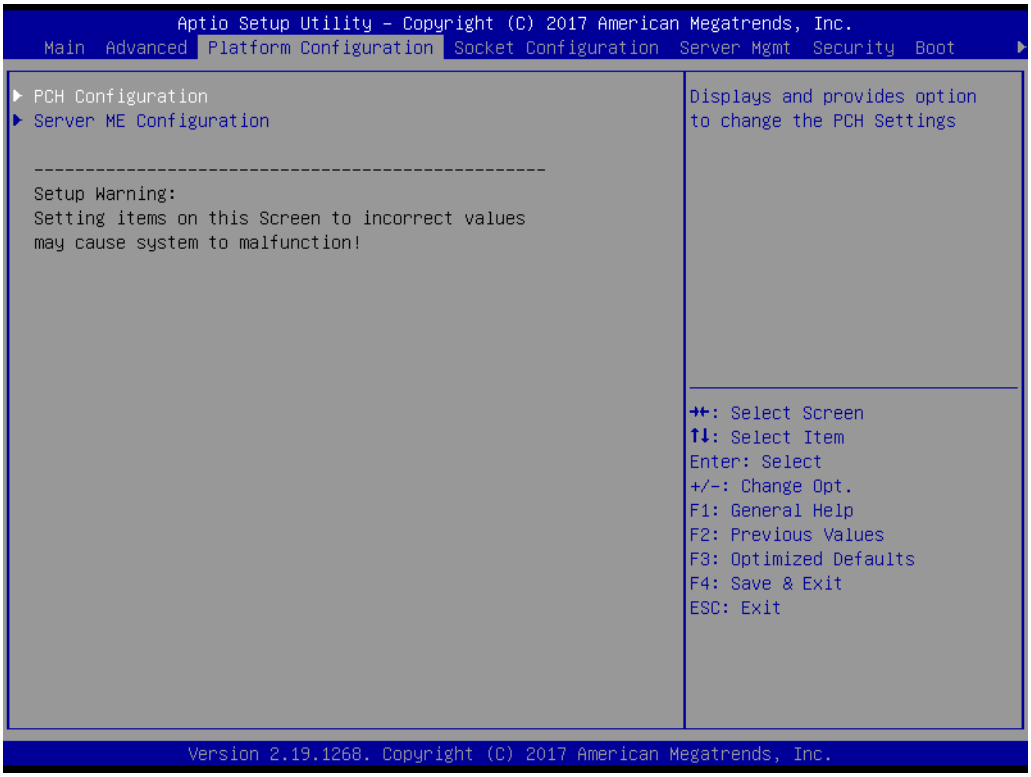
#### 4.2.2.10 Driver Health

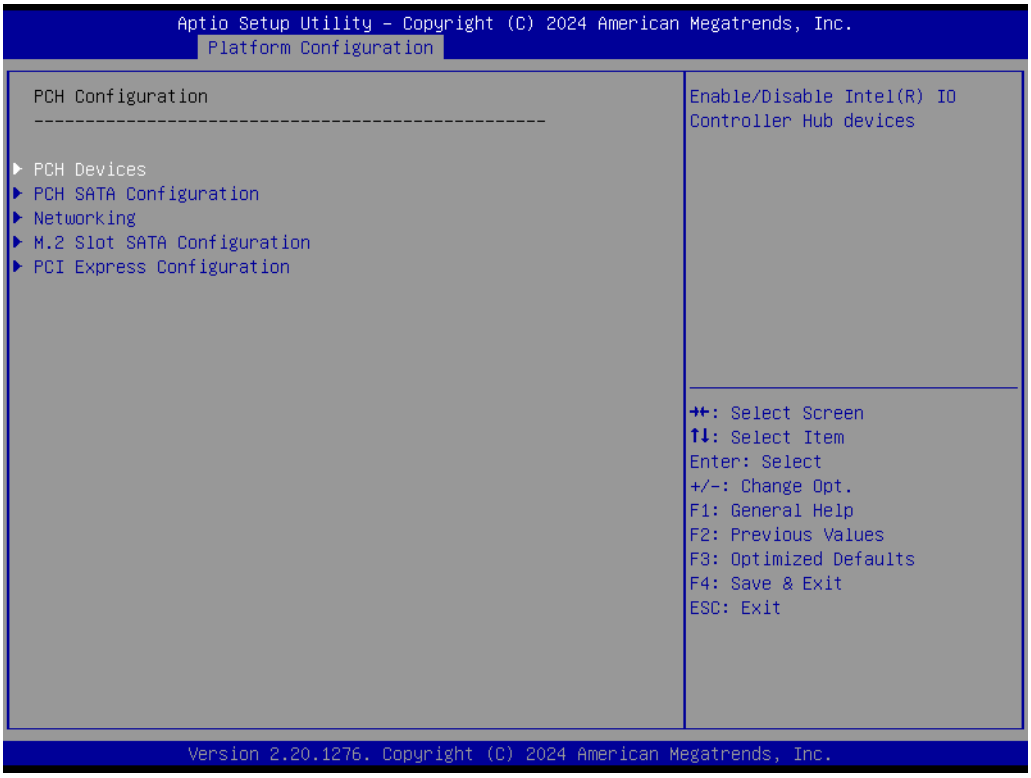



### 4.2.3 Platform Configuration

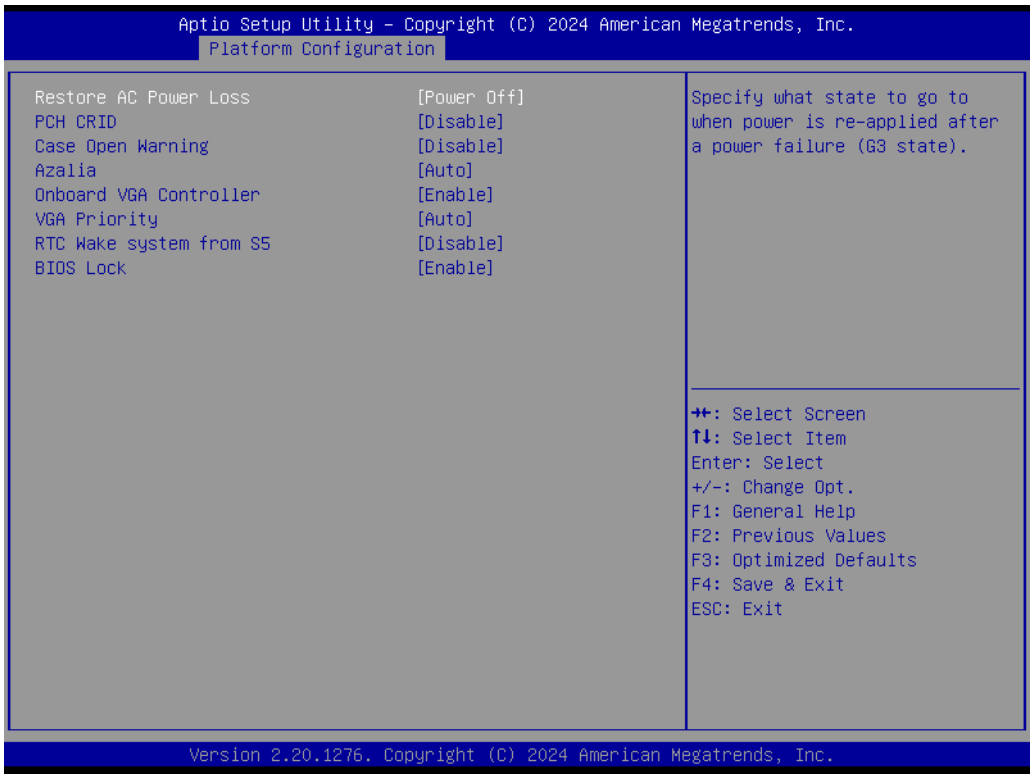


### 4.2.3.1 PCH Configuration



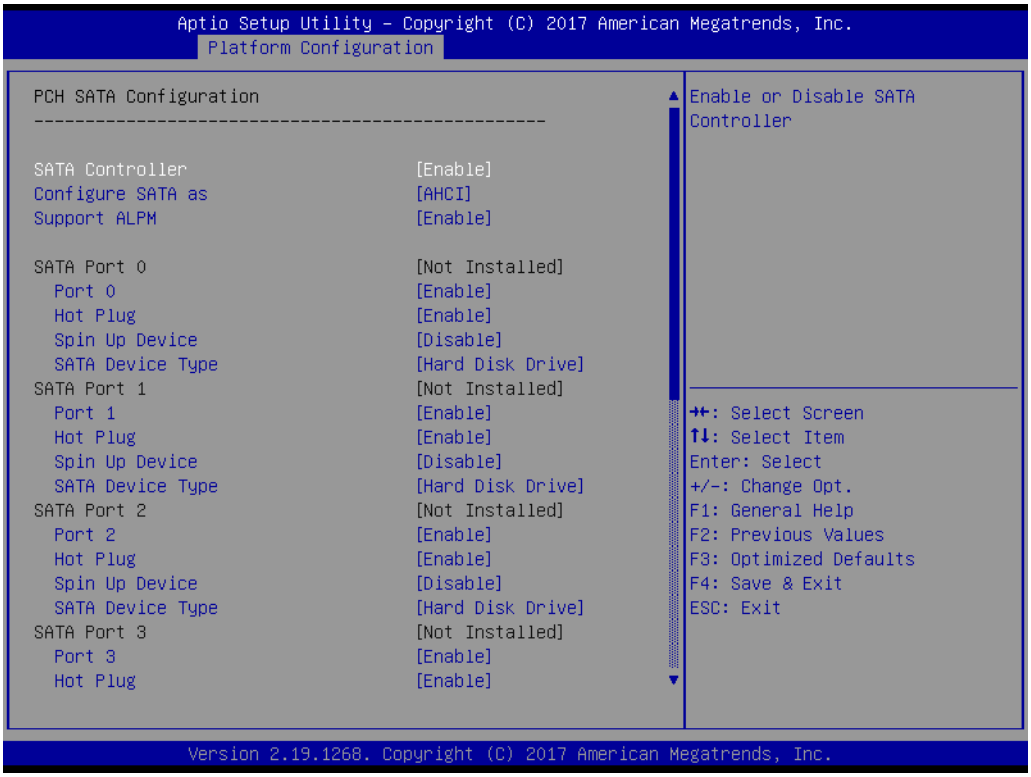



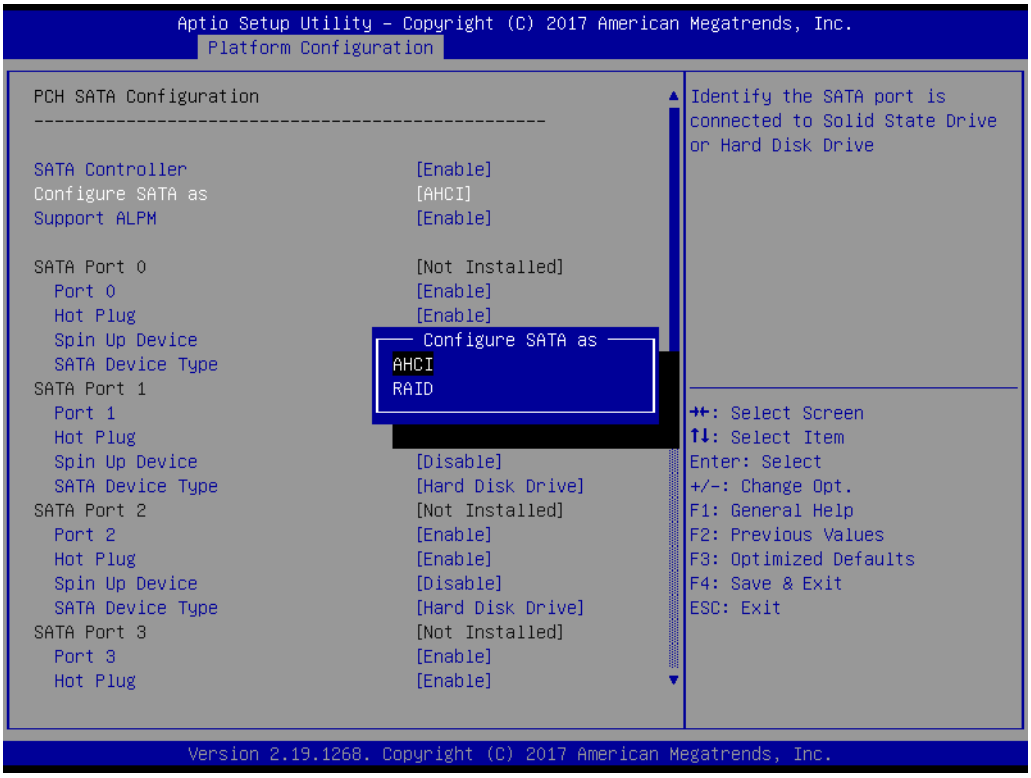

- **PCH Devices**
  This item is to set up IO controller hub devices.




– **Restore AC Power Loss**
  Specify what state to go to when power is re-applied after a power failure (G3 state).
– **PCH CRID**
  Enable or disable PCH compatibility revision ID (CRID) functionality.
– **Case Open Warning**
  Enable or disable the chassis intrusion monitoring function. When enabled and the case is opened, the warning message will show in POST screen.
– **Azalia**
  Enable or disable Azalia device.
– **VGA Priority**
  Determines priority between onboard and 1st off-board video device found.
– **RTC Wake system from S5**
  Enable or disable system wake on alarm event.

## PCH SATA Configuration



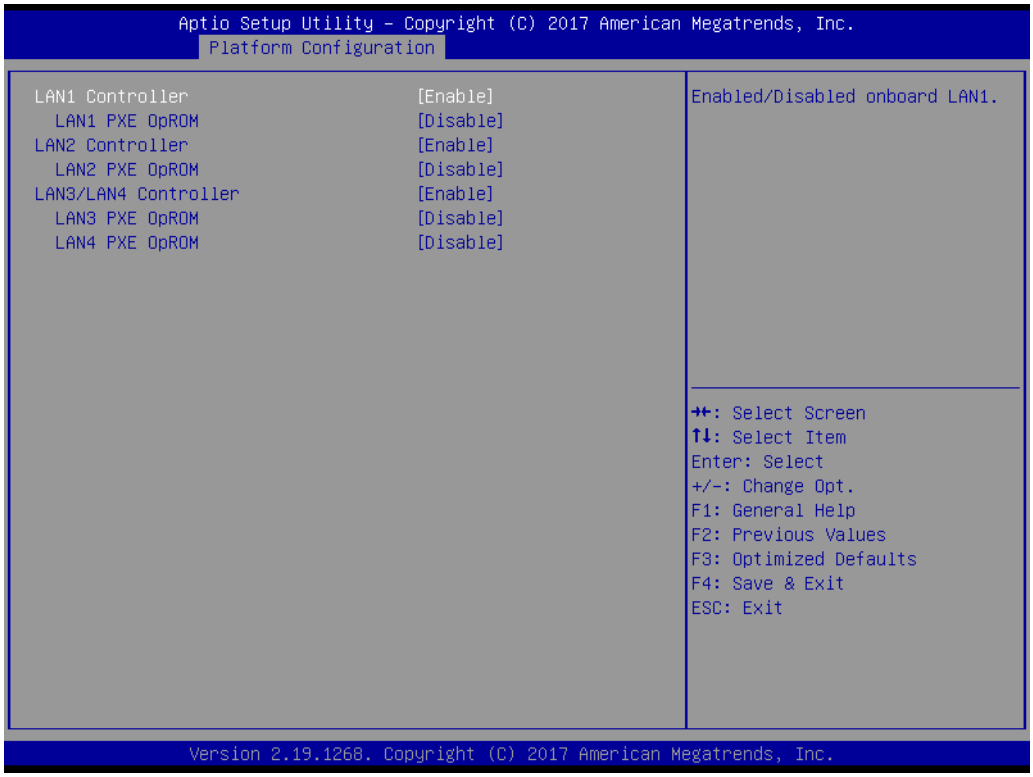




- **SATA Controller**
  Enable or disable SATA devices.
- **Configure SATA as**
  Set as AHCI or RAID when SATA Controllers are enabled.
- **Support ALPM**

Enable or disable Aggressive Link Power Management (ALPM) protocol for Advanced Host Controller Interface-compliant (AHCI) Serial ATA (SATA) devices.

– **SATA Port 0~7**
  Enable or disable SATA port 0~7.
– **Hot Plug Port 0~7**
  Designates SATA port 0~7 as hot pluggable.
– **SATA Port 0~7 Spin Up Device**
  If enabled for any of ports, staggered spin Up will be performed and only the drives which have this option enabled will spin up at boot. Otherwise all drives spin up at boot.
– **SATA Port 0~7 Device Type**
  To identify the SATA is connected to Solid State Drive or Hard Disk Drive.

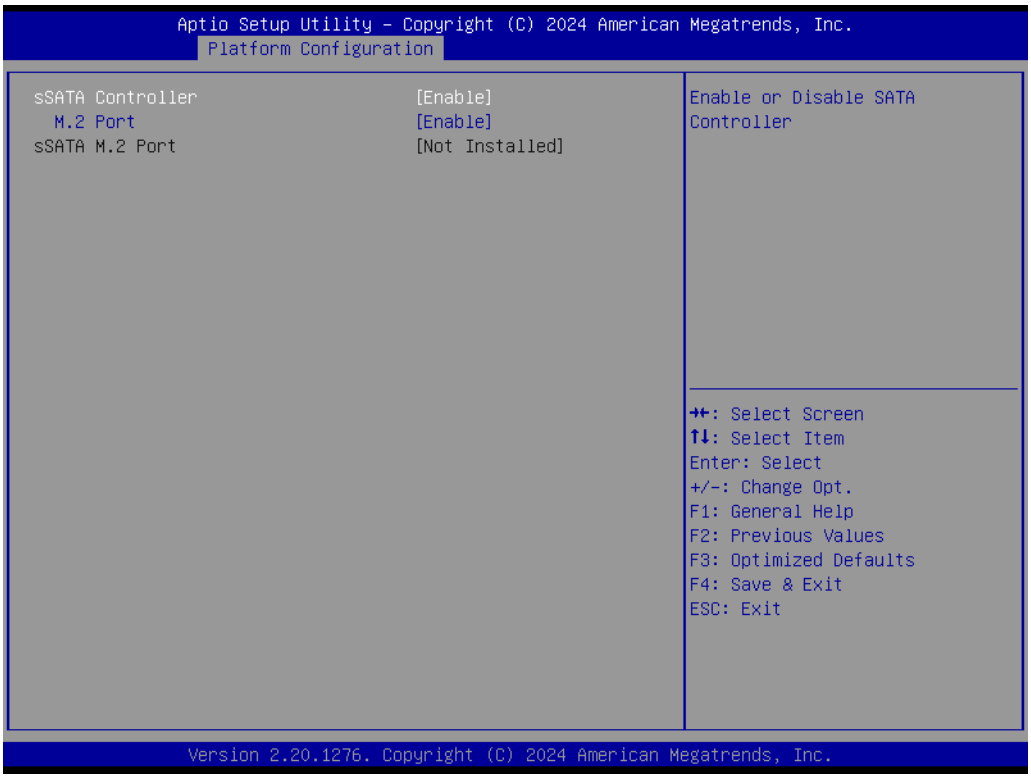
## Networking




– **LAN1 Controller**
  Enable or disable Intel I210 controller support.
– **LAN1 PXE OpROM**
  Enable or disable Boot option for Intel I210 controller.
– **LAN2 Controller**
  Enable or disable Intel I210 controller support.
– **LAN2 PXE OpROM**
  Enable or disable Boot option for Intel I210 controller.
– **LAN3 Controller**
  Enable or disable Intel I210 controller support.
– **LAN3 PXE OpROM**
  Enable or disable Boot option for Intel I210 controller.

- **LAN4 Controller**
  Enable or disable Intel I210 controller support.
- **LAN4 PXE OpROM**
  Enable or disable Boot option for Intel I210 controller.

## M.2 Slot SATA Configuration

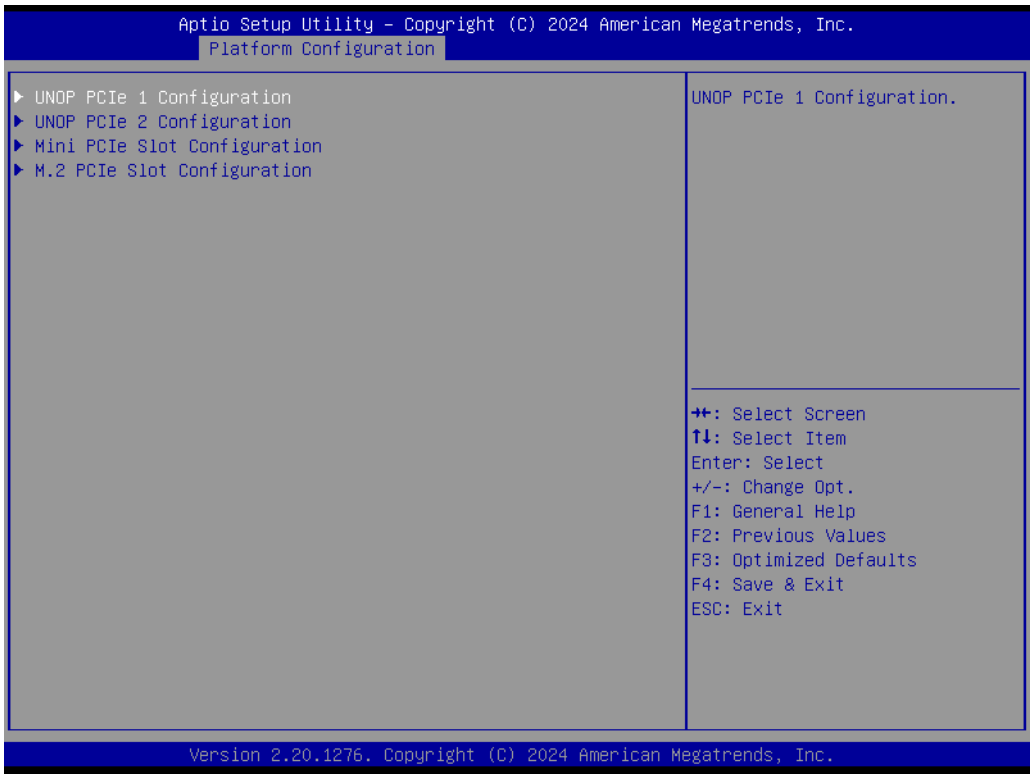



- **sSATA Controller**
  Enable or disable sSATA/M.2 devices.
- **sSATA M.2 Port**
  Enable or disable sSATA/M.2.

## PCI Express Configuration

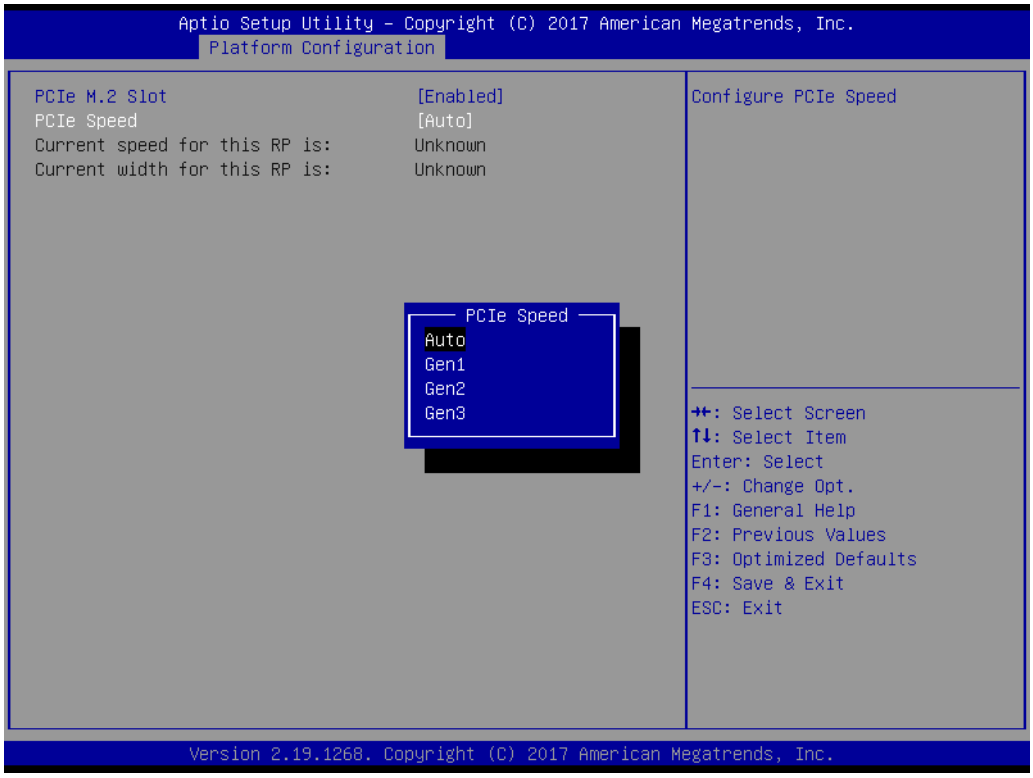
### – PCIe M.2 Slot

Enable or disable the PCI Express root port.



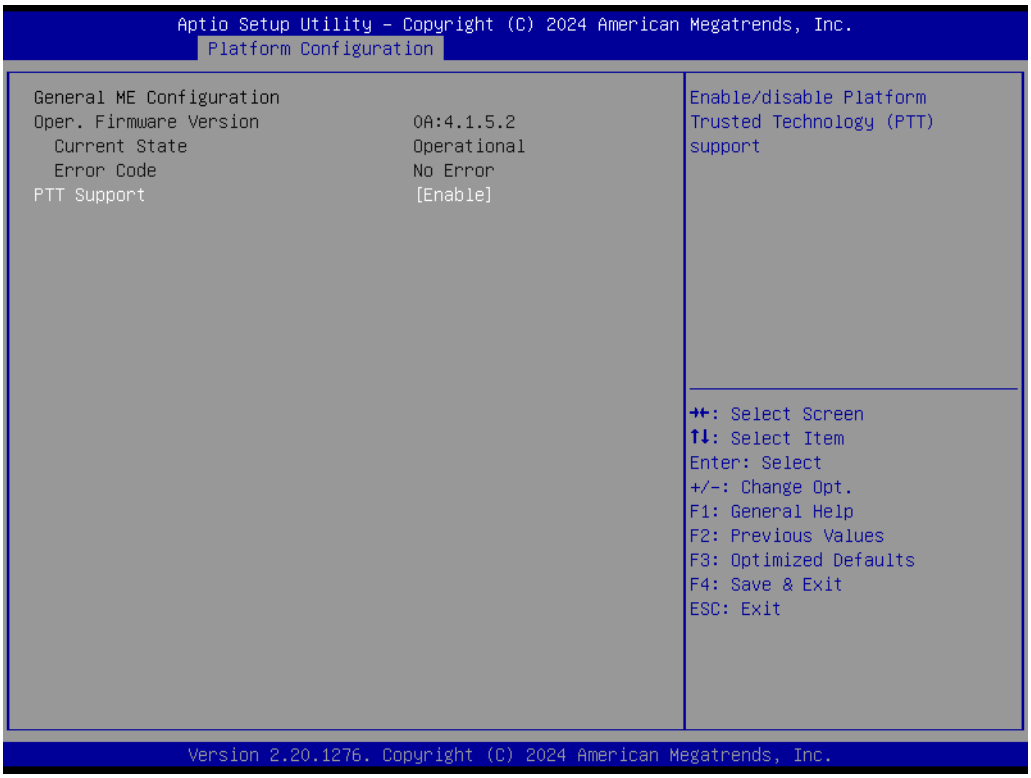

### – PCIe Speed

Configure PCI Express speed.

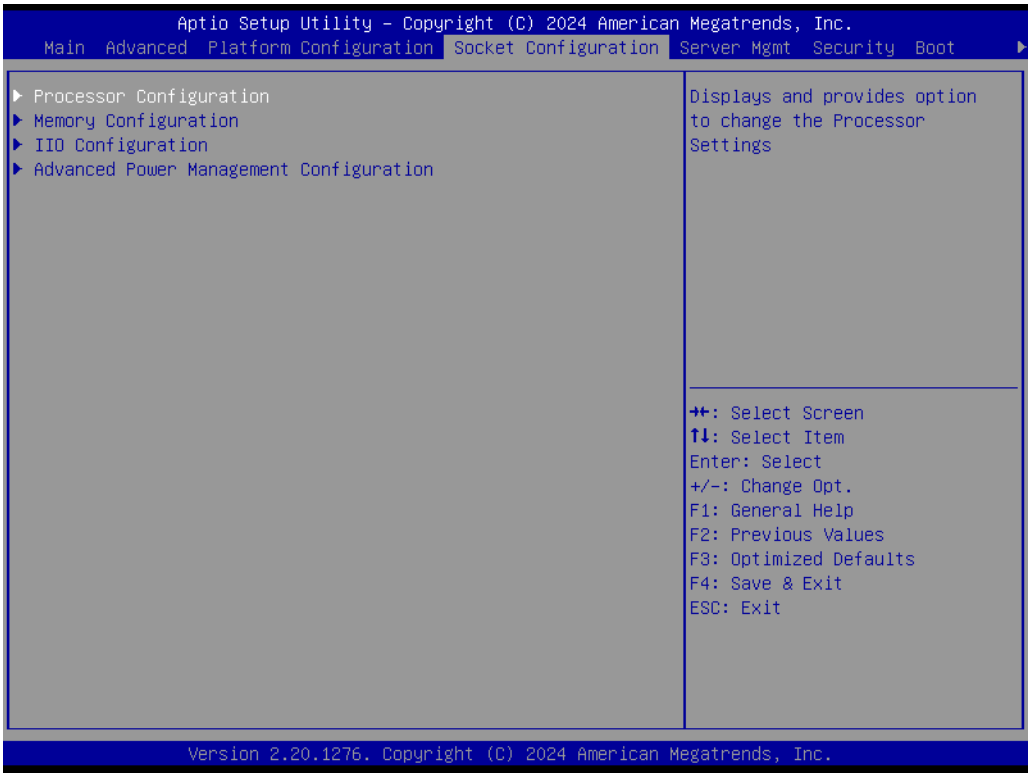


#### 4.2.3.2 Server ME Configuration

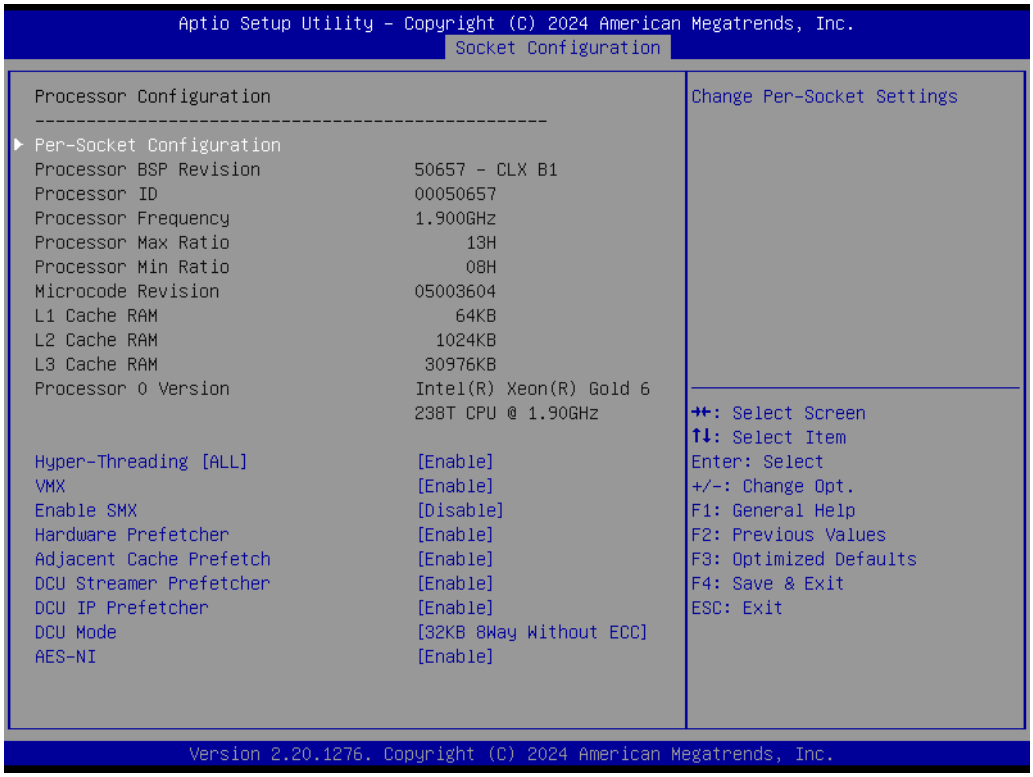
This page shows the Server ME configuration information.




### 4.2.4 Socket Configuration



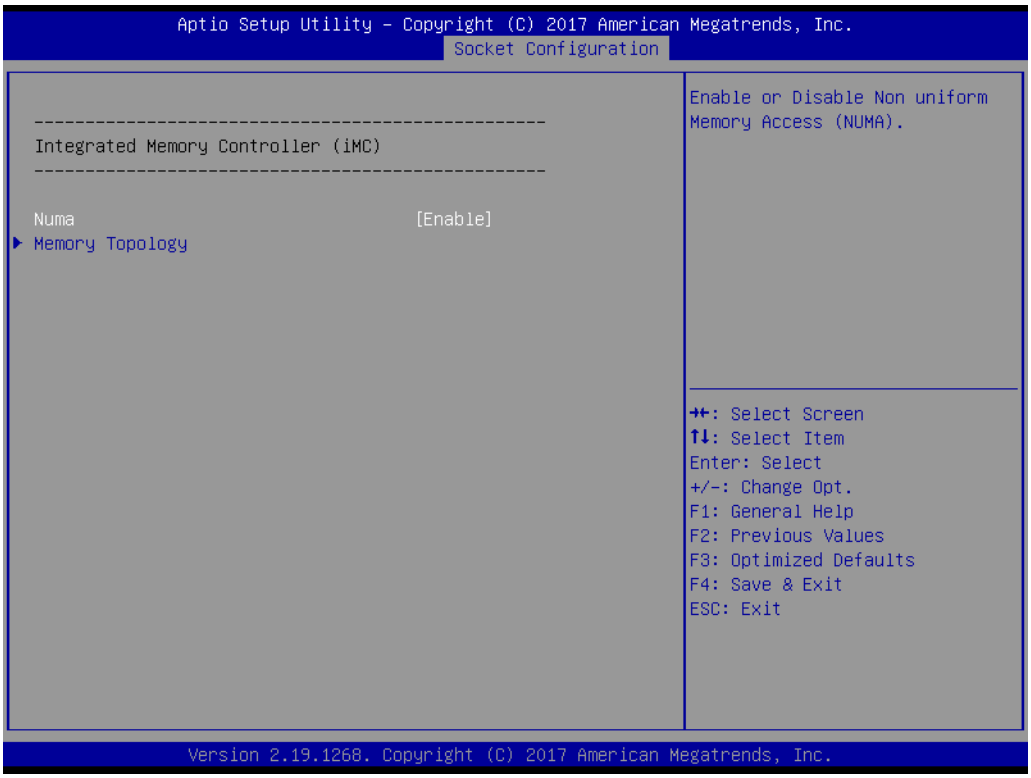
#### 4.2.4.1 Processor Configuration




- **Per-Socket Configuration**
  Use this to select how many processor cores you want to activate when you are using a dual or quad core processor.
- **Hyper-threading [All]**
  Enable or disable Intel Hyper Threading technology.
- **VMX**
  Enable or disable Intel Virtual Machine Extensions (VMX) for IA-32 processors that support Intel® Vanderpool Technology
- **Enable SMX**
  Enable or disable Safer Mode Extensions. Safer Mode Extensions (SMX) provide a means for system software to launch an MLE and establish a measured environment within the platform to support trust decisions by end users.
- **Hardware Prefetcher**
  Hardware Prefetcher is a technique that fetches instructions and/or data from memory into the CPU cache memory well before the CPU needs it, so that it can improve the load-to-use latency.
- **Adjacent Cache Prefetch**
  The Adjacent Cache-Line Prefetch mechanism, like automatic hardware prefetch, operates without programmer intervention. When enabled through the BIOS, two 64-byte cache lines are fetched into a 128-byte sector, regardless of whether the additional cache line has been requested or not.
- **DCU Streamer Prefetcher**
  Enable prefetch of next L1 data line based upon multiple loads in same cache line.
- **DCU IP Prefetcher**
  Enable prefetch of next L1 line based upon sequential load history.

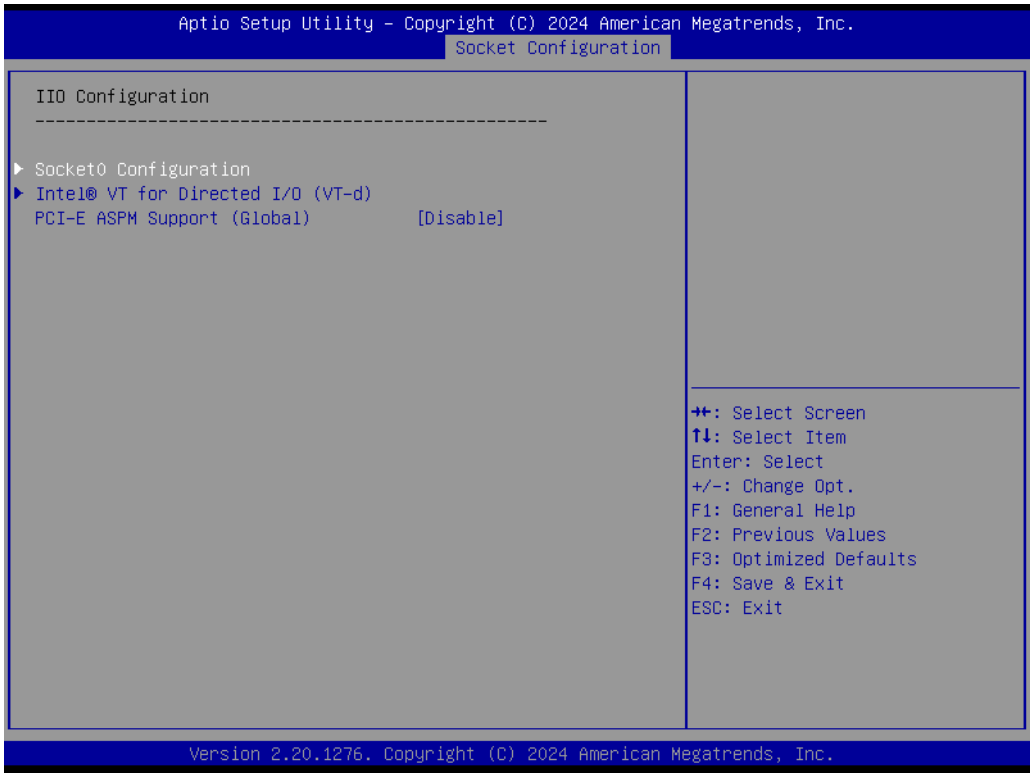
- **DCU Mode**
  Change the data cache unit mode.
- **AES-NI**
  This item is enables or disables CPU advanced encryption standard instructions.

#### 4.2.4.2 Memory Configuration

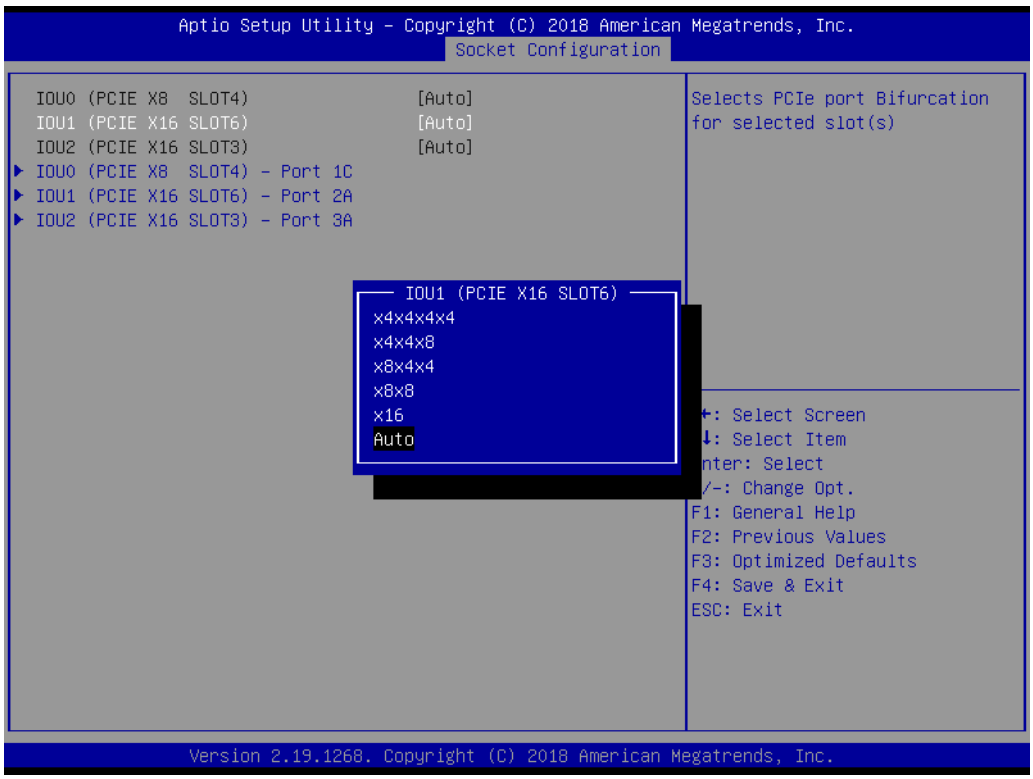


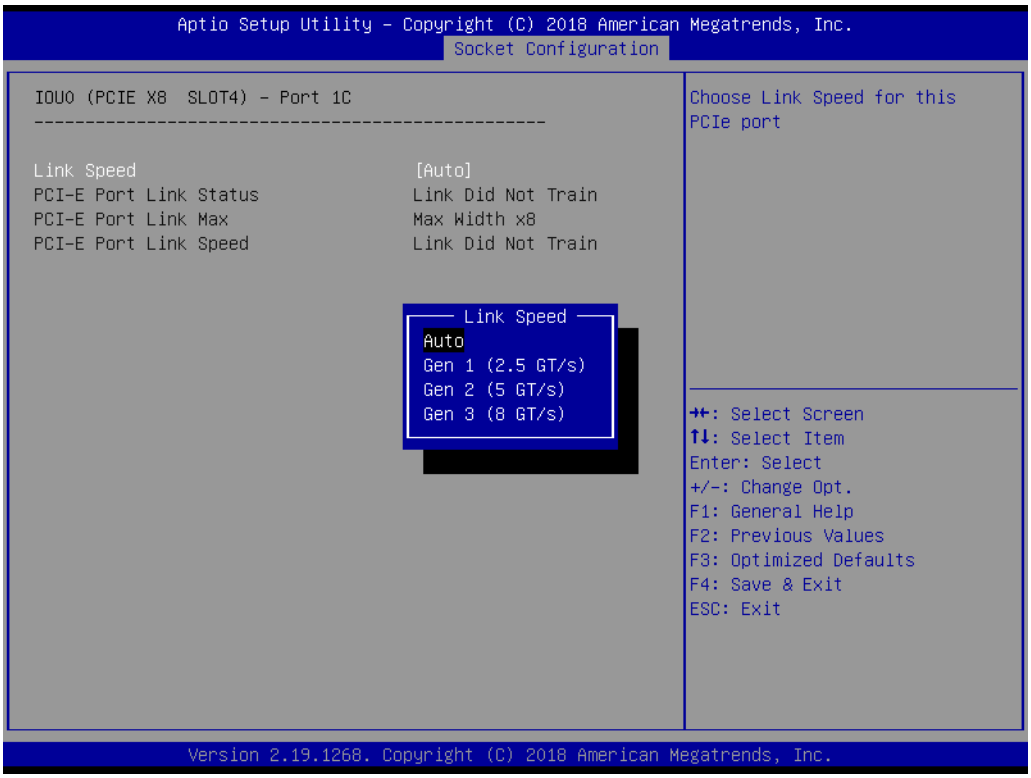

- **Numa**
  Enable or disable non uniform memory access (NUMA).
- **Memory Technology**
  Display memory topology with DIMM population information.

### 4.2.4.3 IIO Configuration

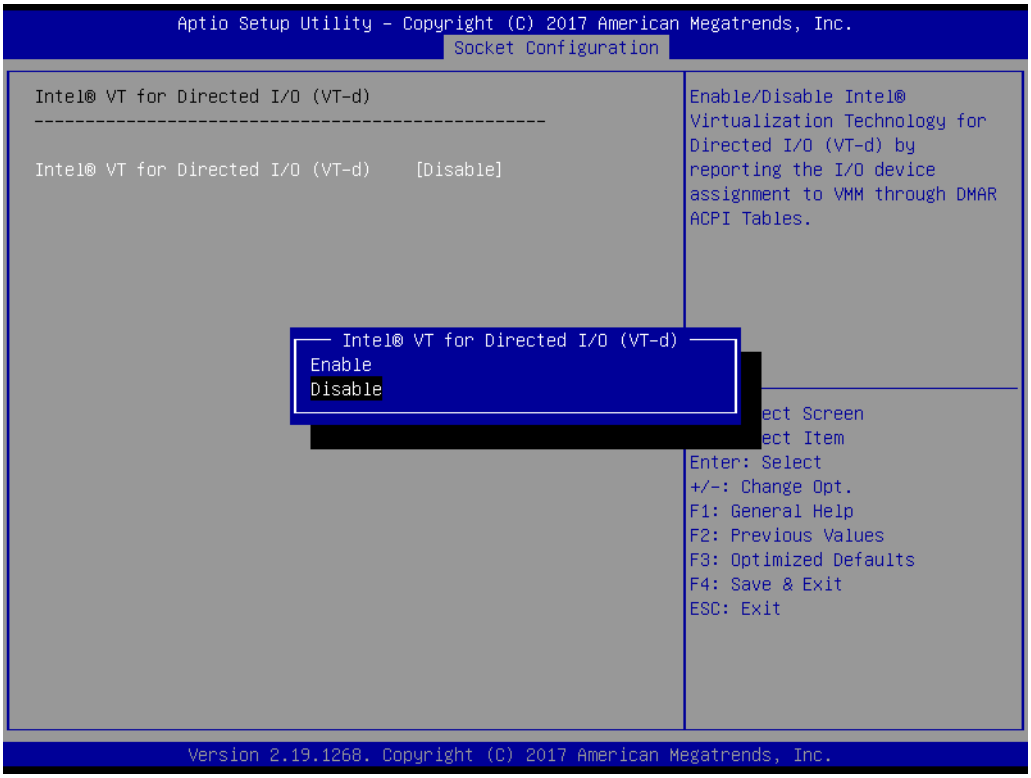



- **Socket0 PCIe Configuration**
  PCIe port bifurcation control and select target link speed as Gen1, Gen2, Gen3.

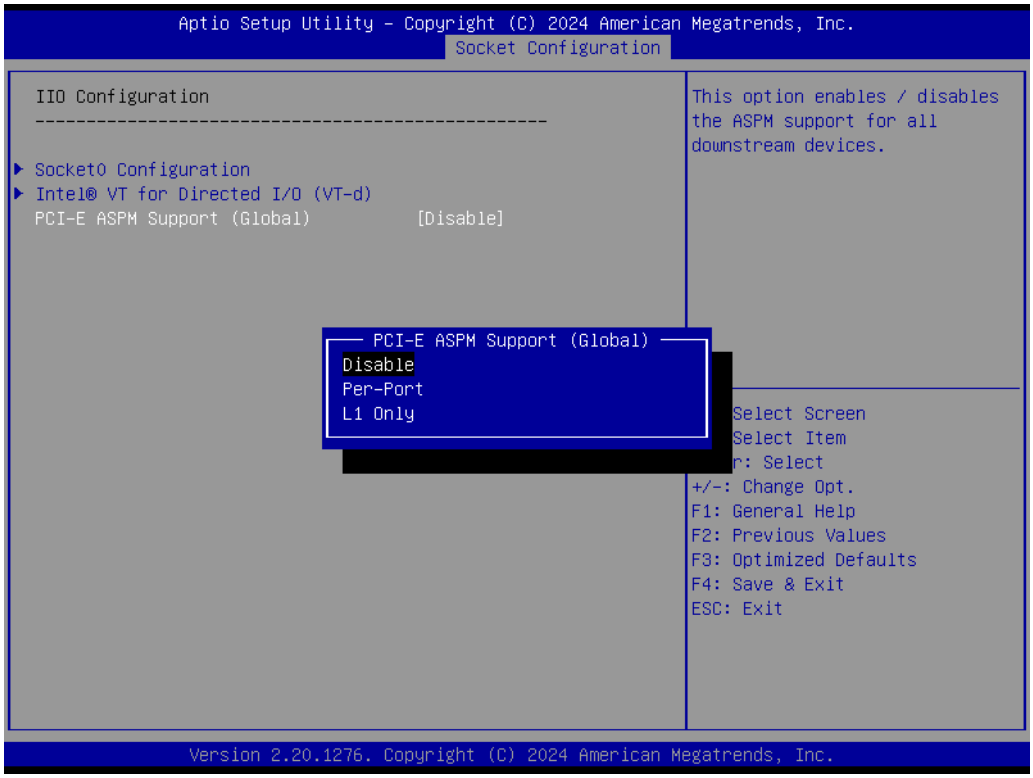




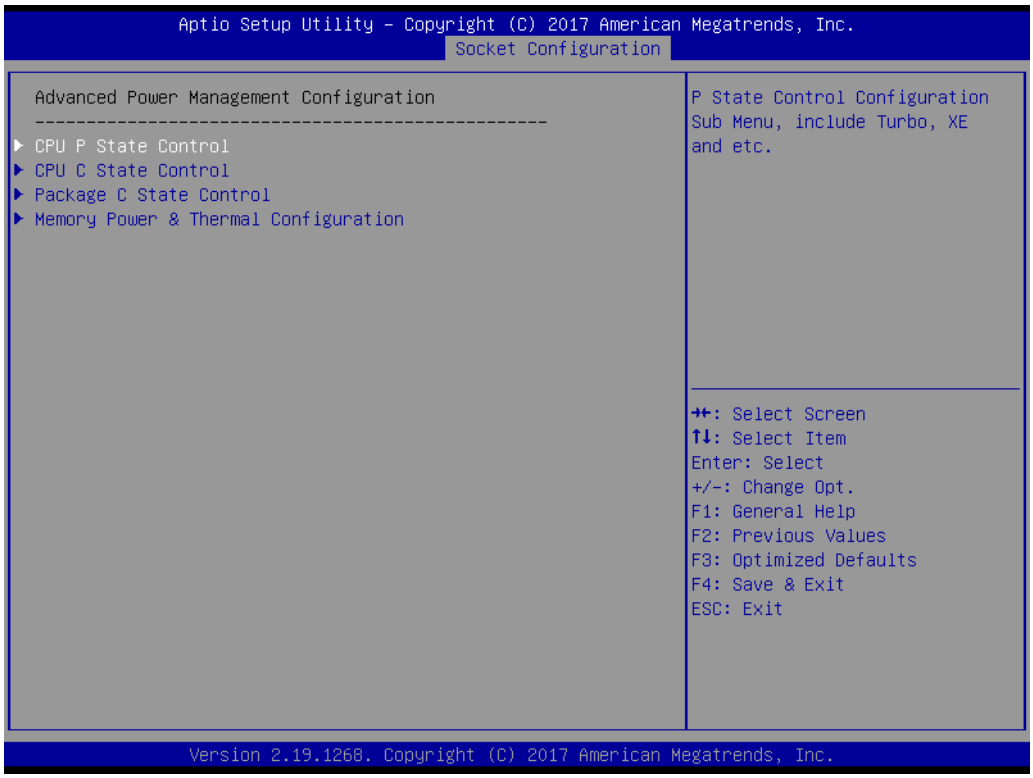

- **Intel VT for Directed I/O (VT-d)**
  Enable or disable Intel Virtualization Technology for Directed I/O.



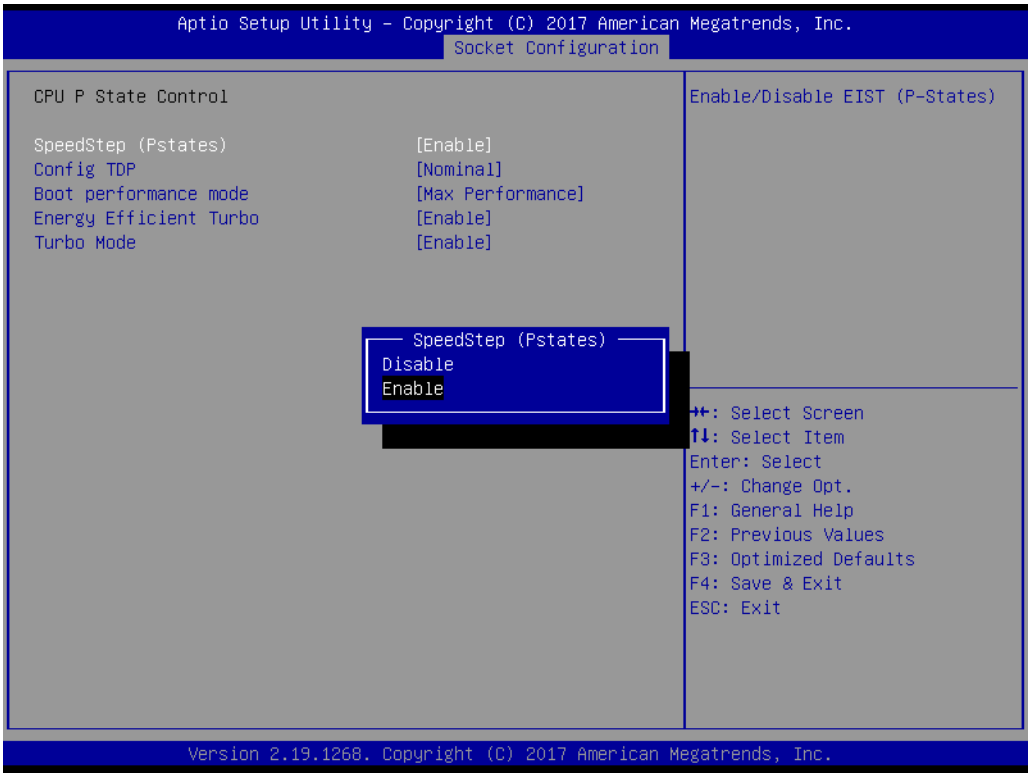
- **PCI-E ASPM Support (Global)**
  Sets the ASPM level to disable, per port or L1 state only.

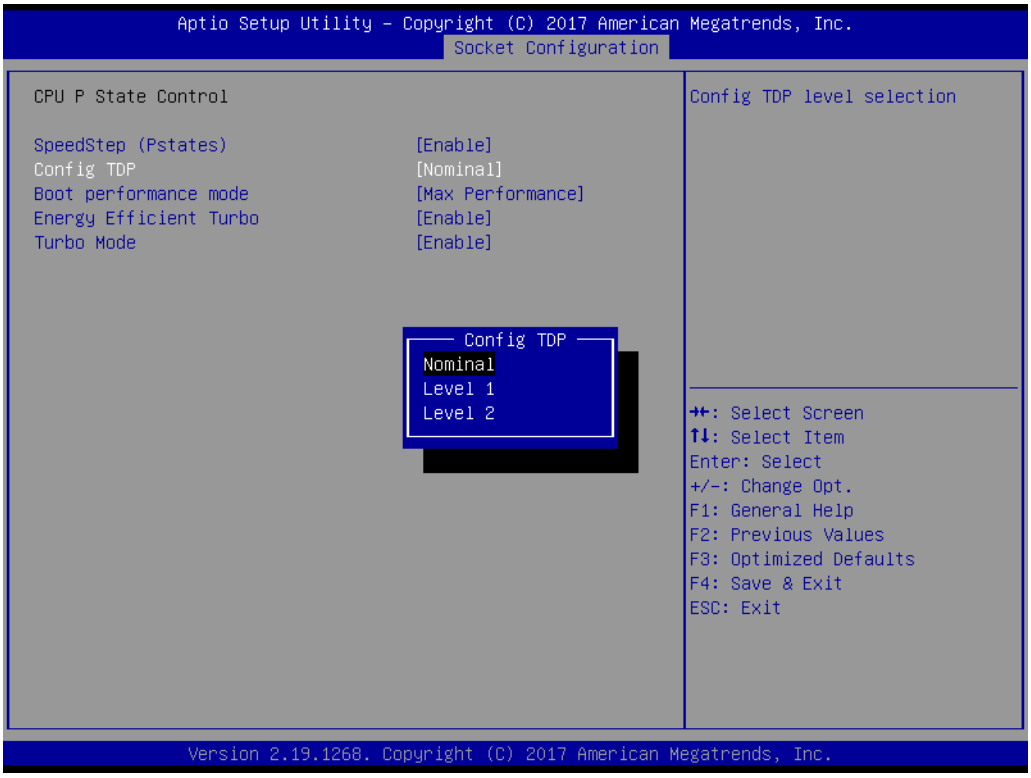


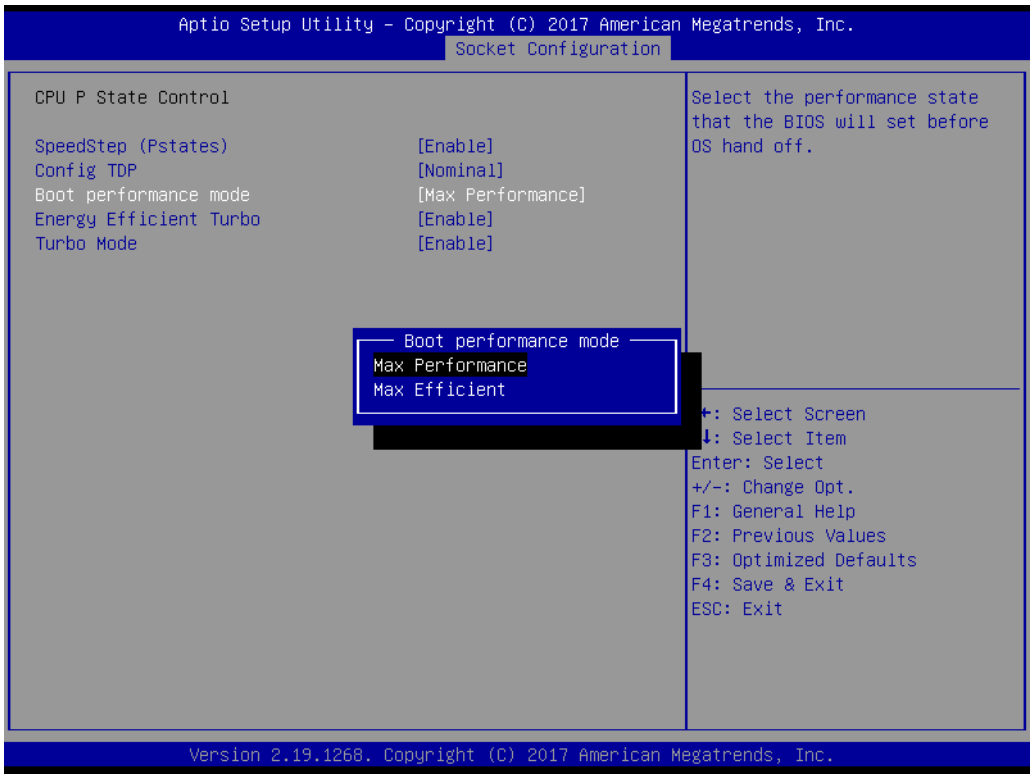

### 4.2.4.4 Advanced Power Management Configuration

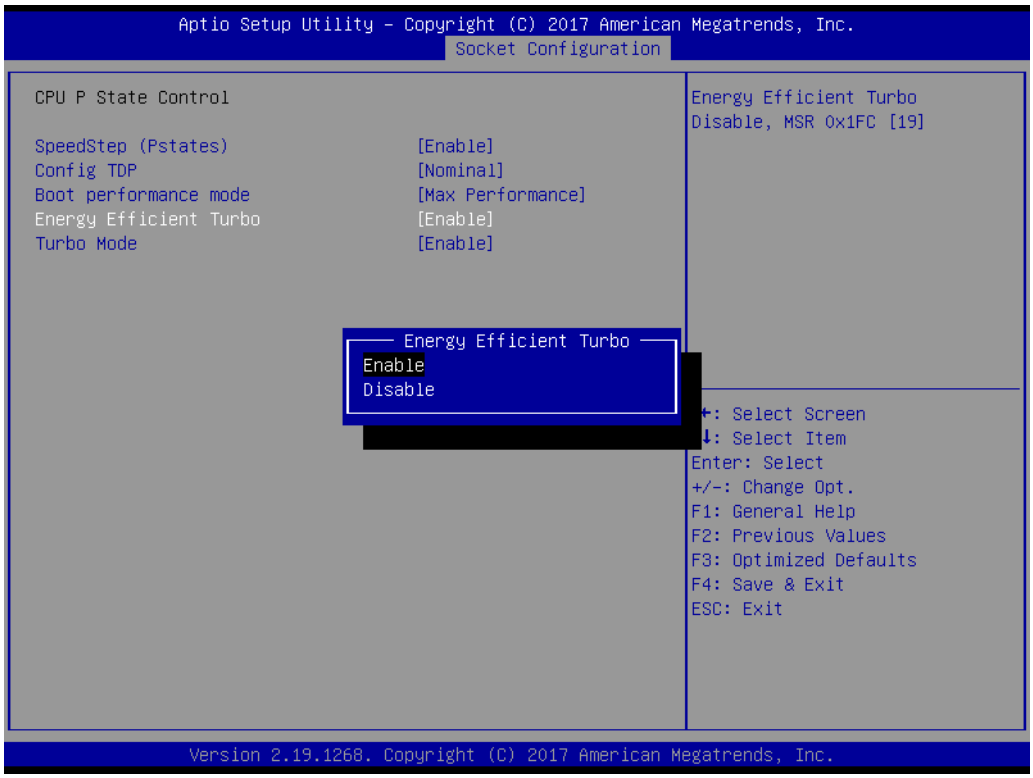


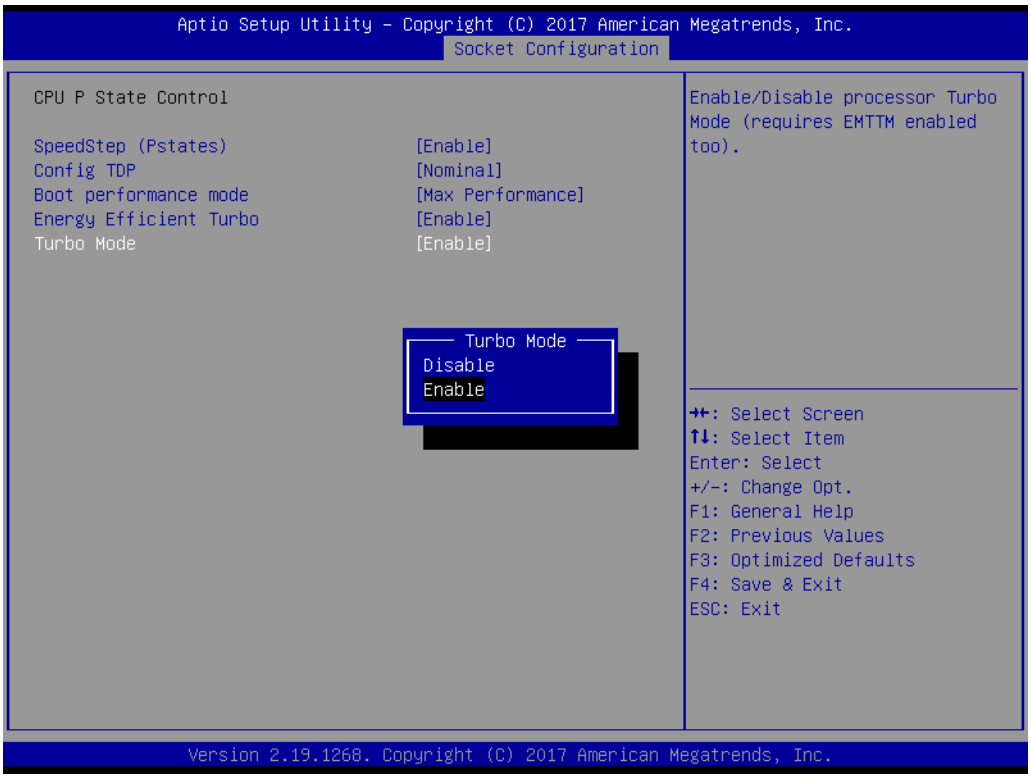
## CPU P State Control



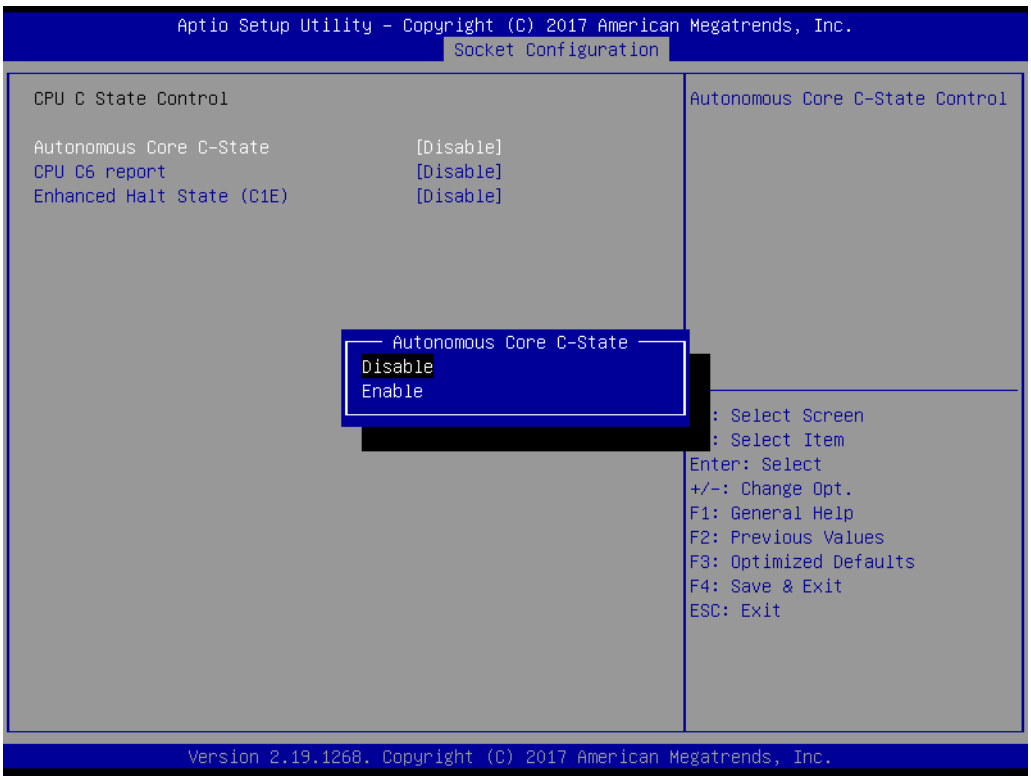



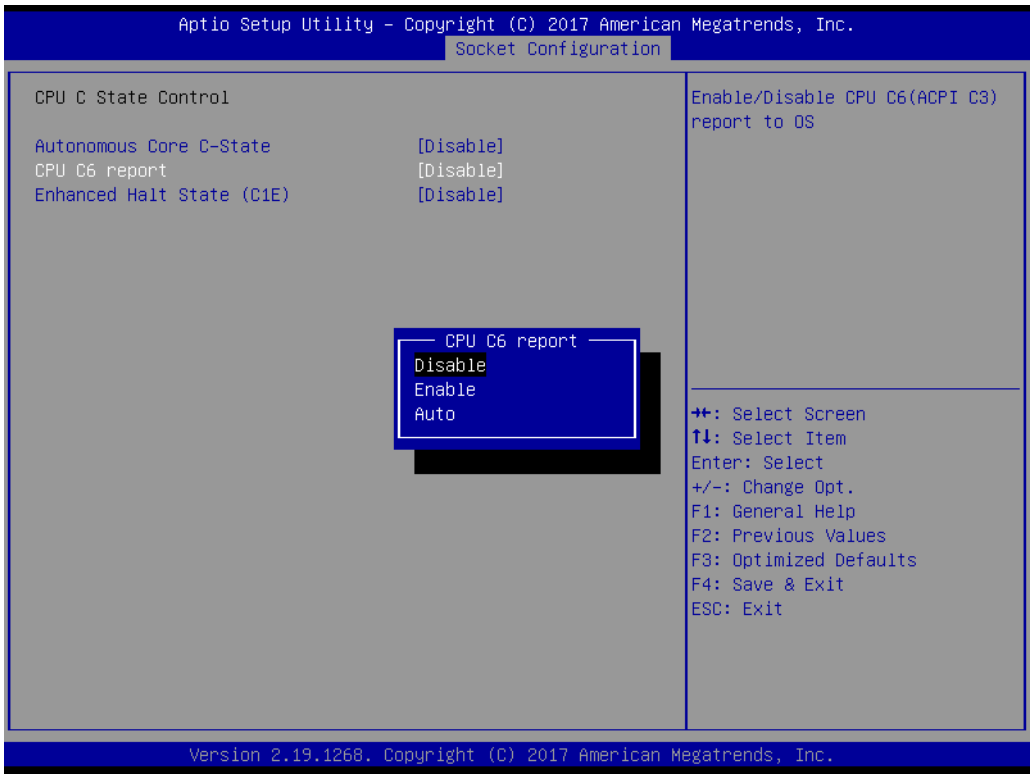

Aptio Setup Utility – Copyright (C) 2017 American Megatrends, Inc.
Socket Configuration
CPU P State Control
SpeedStep (Pstates) [Enable]
Config TDP [Nominal]
Boot performance mode [Max Performance]
Energy Efficient Turbo [Enable]
Turbo Mode [Enable]
Boot performance mode
Max Performance
Max Efficient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

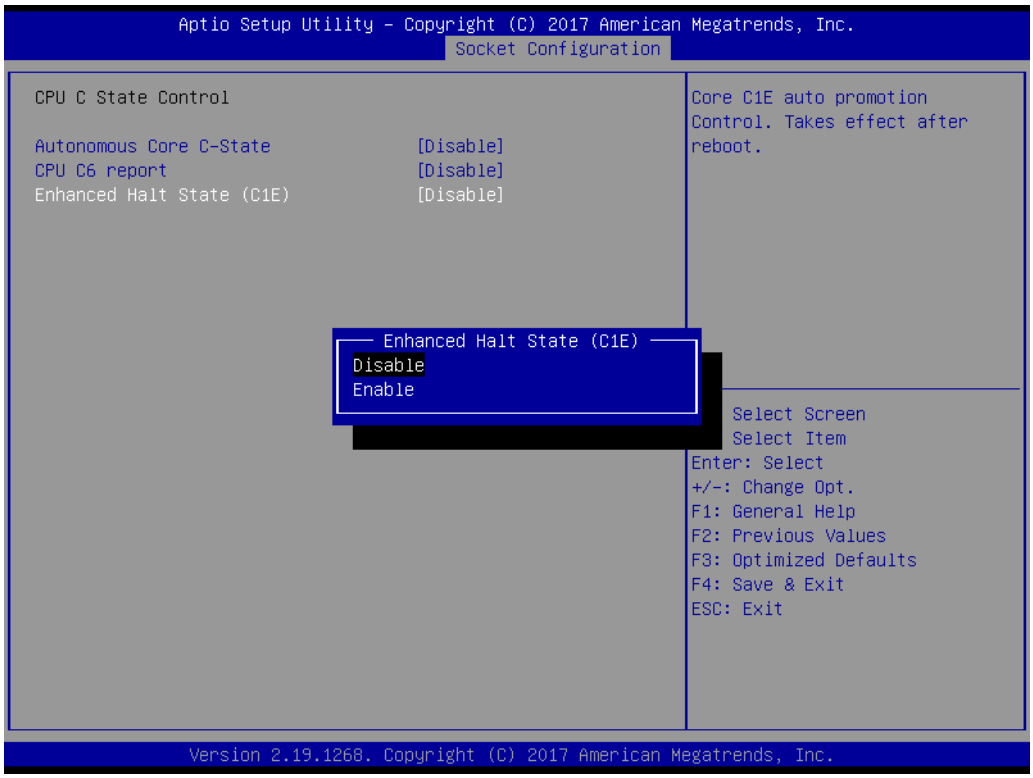

Aptio Setup Utility – Copyright (C) 2017 American Megatrends, Inc.
Socket Configuration
CPU P State Control
SpeedStep (Pstates) [Enable]
Config TDP [Nominal]
Boot performance mode [Max Performance]
Energy Efficient Turbo [Enable]
Turbo Mode [Enable]
Energy Efficient Turbo
Enable
Disable
Energy Efficient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



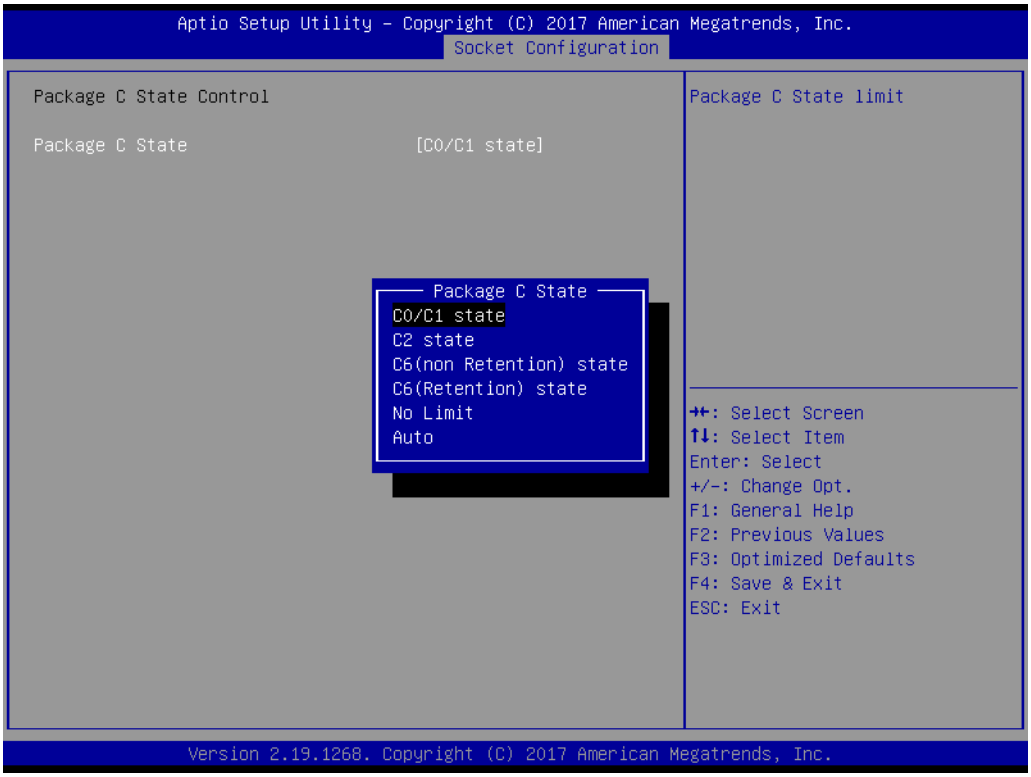

## CPU C State Control




Aptio Setup Utility – Copyright (C) 2017 American Megatrends, Inc.
Socket Configuration
CPU C State Control
Autonomous Core C-State [Disable]
CPU C6 report [Disable]
Enhanced Halt State (C1E) [Disable]
CPU C6 report
Disable
Enable
Auto
Enable/Disable CPU C6(ACPI C3) report to OS
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.19.1268. Copyright (C) 2017 American Megatrends, Inc.

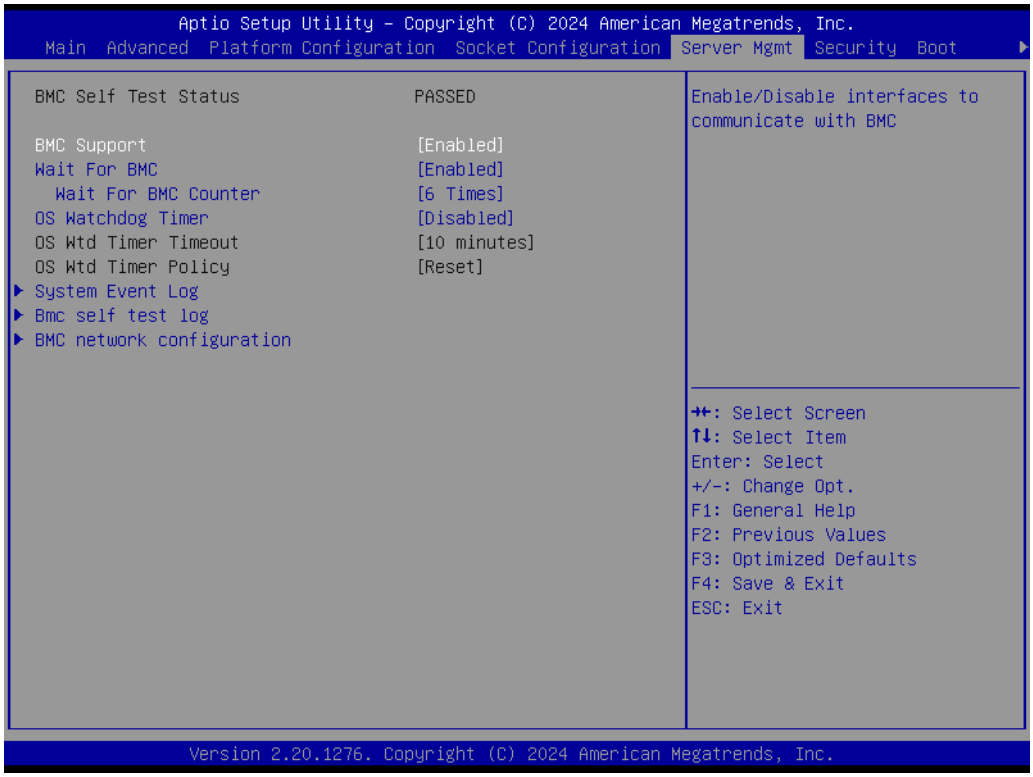

Aptio Setup Utility – Copyright (C) 2017 American Megatrends, Inc.
Socket Configuration
CPU C State Control
Autonomous Core C-State [Disable]
CPU C6 report [Disable]
Enhanced Halt State (C1E) [Disable]
Enhanced Halt State (C1E)
Disable
Enable
Core C1E auto promotion Control. Takes effect after reboot.
Select Screen
Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.19.1268. Copyright (C) 2017 American Megatrends, Inc.

## Package C State Control



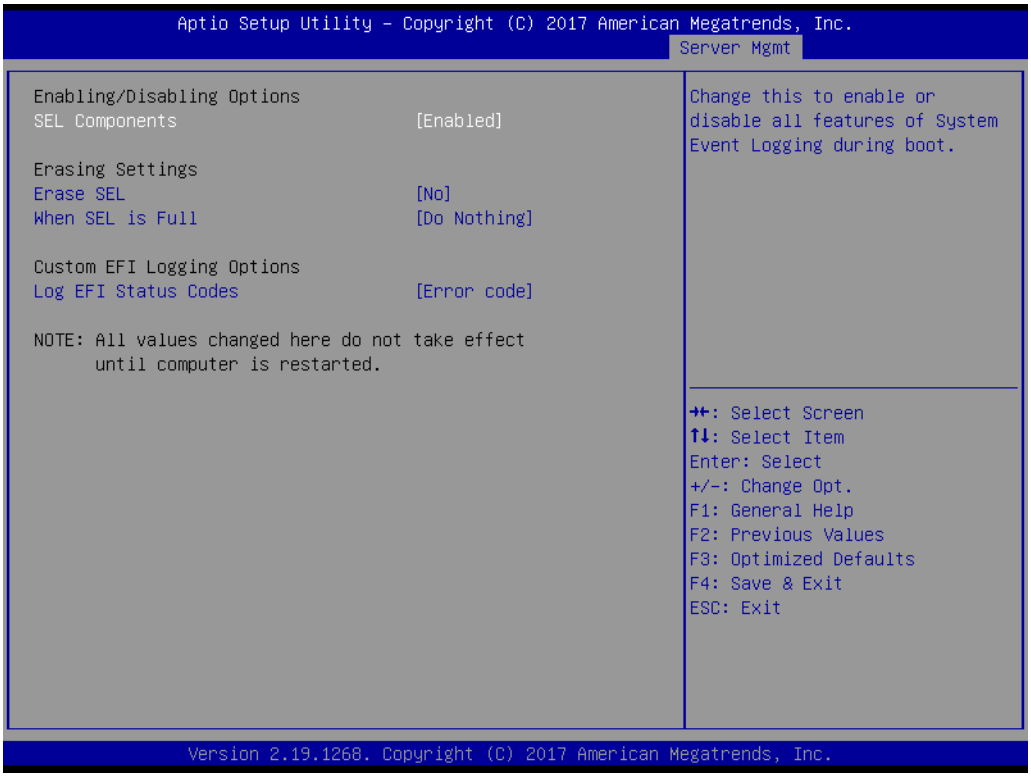

## Memory Power & Thermal Configuration

### 4.2.5 Server Management



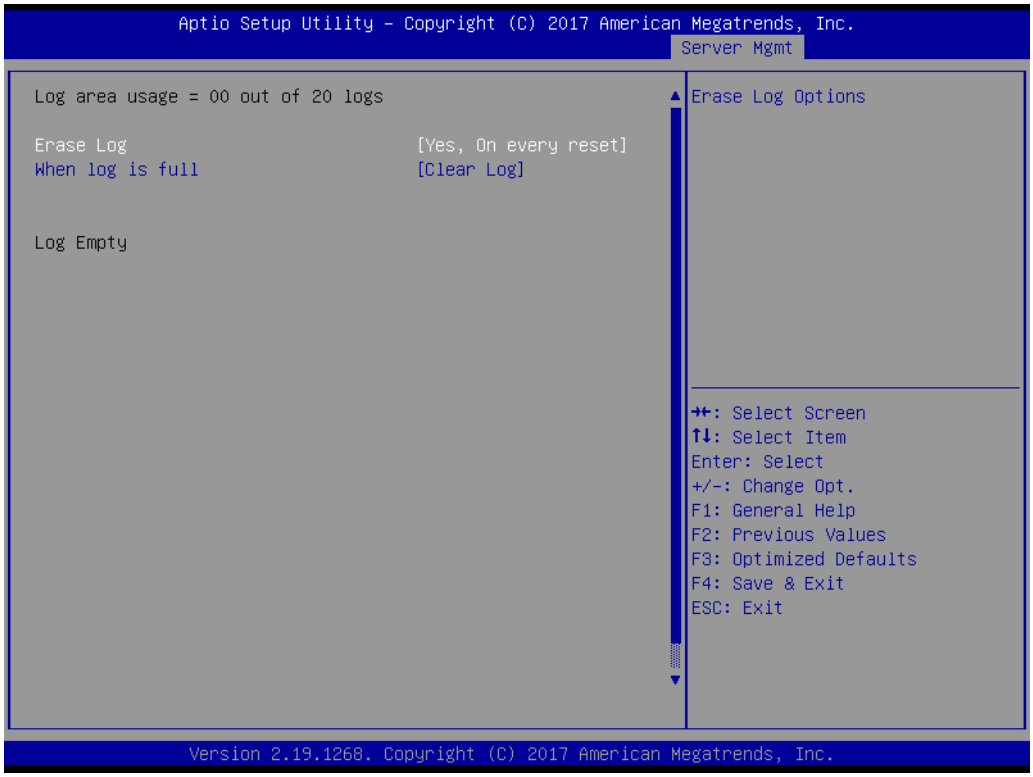

- **BMC Support**
  Enable or disable interfaces to communicate with BMC.
- **Wait for BMC**
  If enabled, motherboard will wait 30 ~ 60 seconds until BMC module boots up completely. After that, the normal BIOS post screen will be displayed.
  If disabled, motherboard will not wait for BMC module's response.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

#### 4.2.5.1 System Event Log



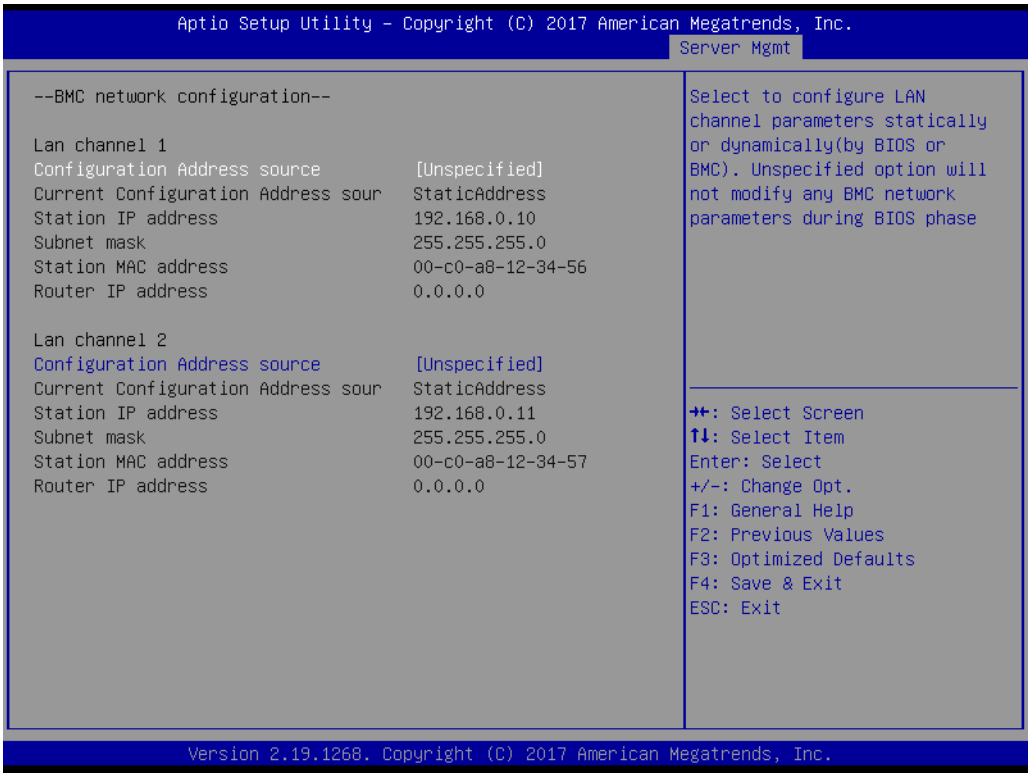

- **SEL Components**
  Enable or disable all features of system event logging during boot.
- **Erase SEL**
  Choose options for erasing SEL.
- **When SEL is Full**
  Choose options for reactions to a full SEL.
- **Log EFI Status Codes**
  Disable the logging of EFI status codes or log only error code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

#### 4.2.5.2 BMC Self Test Log



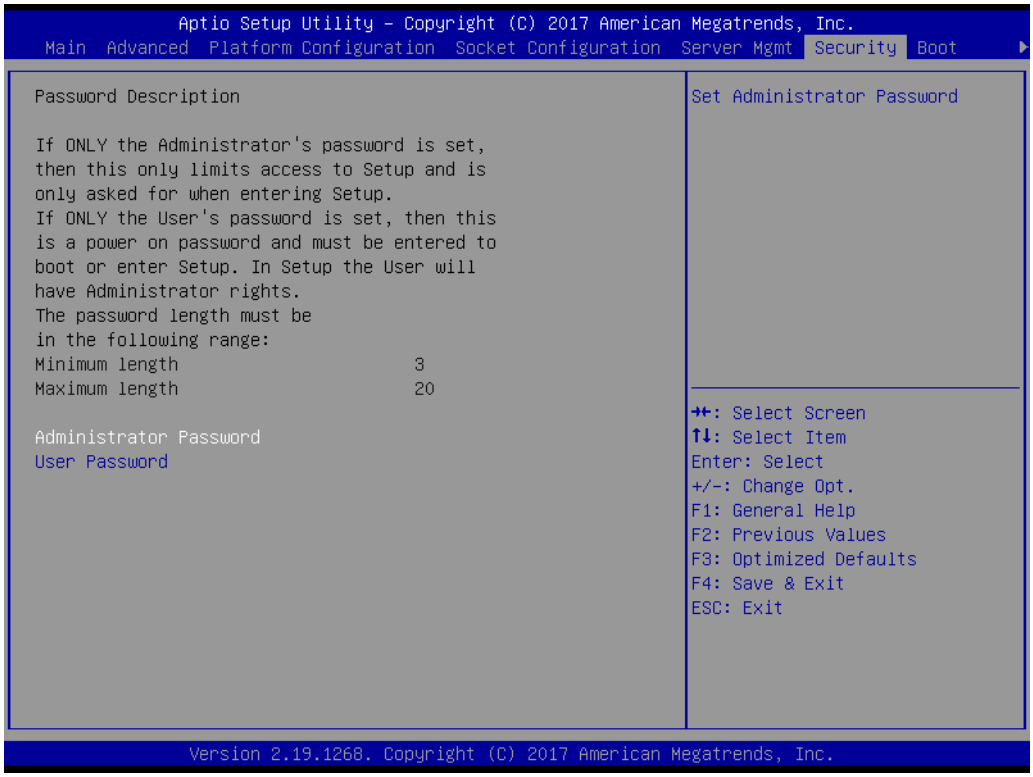

- **Erase Log**
  Erase log options.
- **When Log is Full**
  Select the action to be taken when log is full.

#### 4.2.5.3 BMC Network Configuration




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

### 4.2.6 Security




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

*Date/Time & Password: Keep*

*Setting: reset to default*

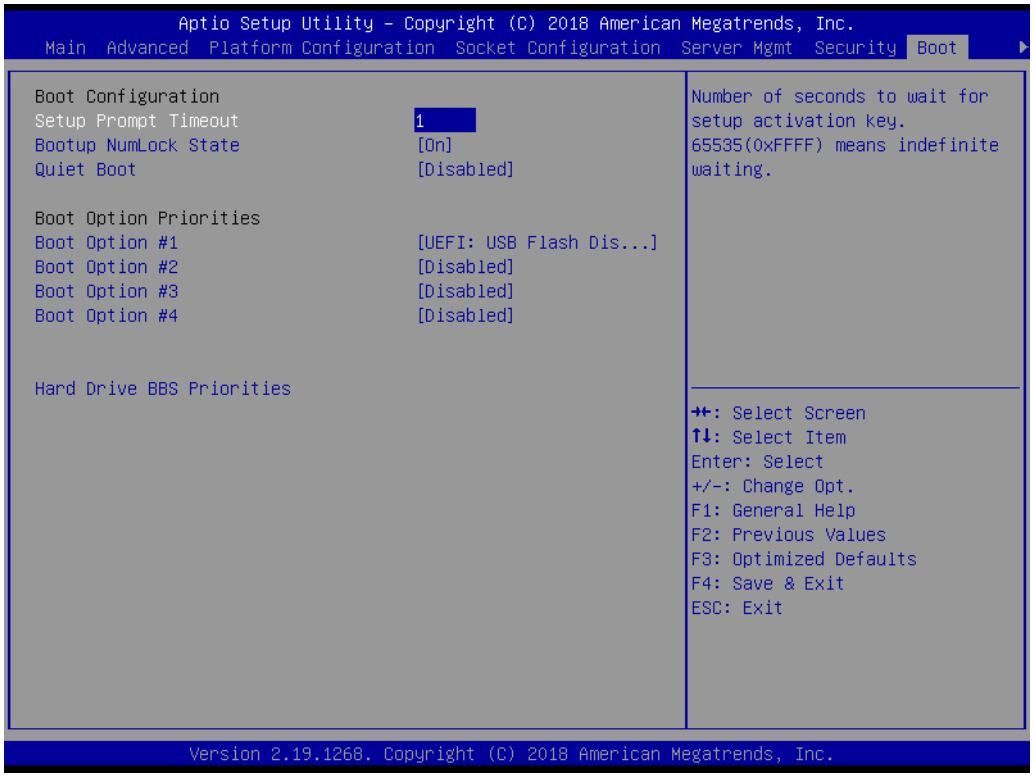
***AC power and CMOS battery are removed. Short CMOS1 Jumper:***

*Date/Time: reset to default*

*Password: Keep*

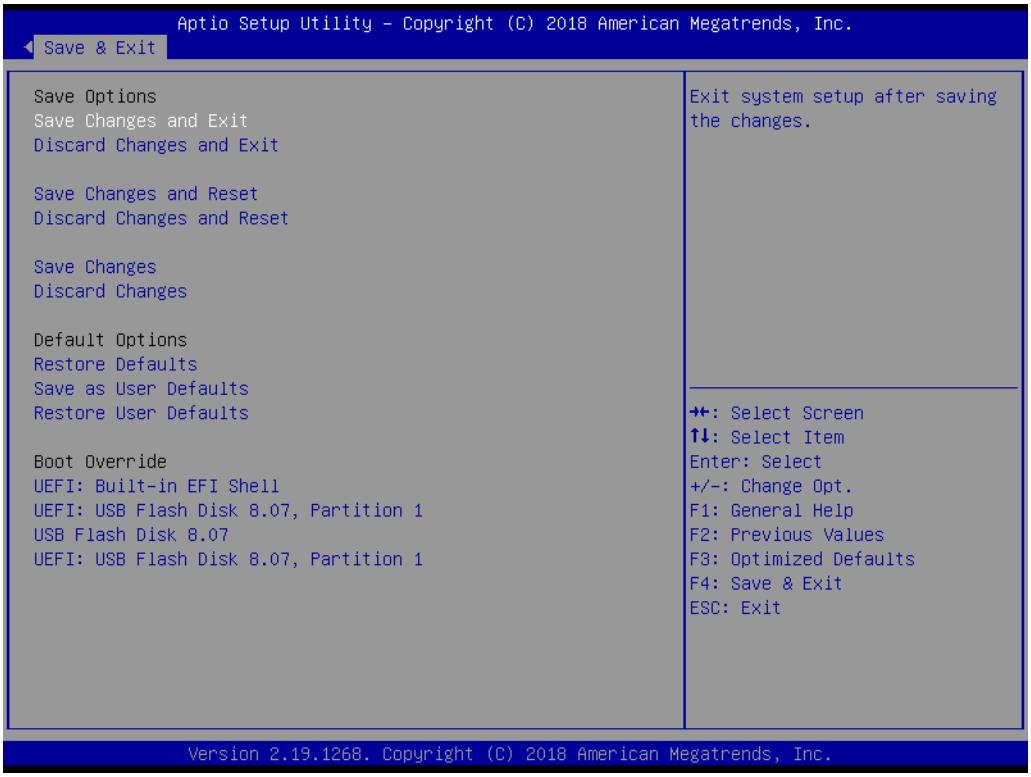
*Setting: reset to default*

### 4.2.7 Boot




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

### 4.2.8 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.

# Appendix A

## Programming the Watchdog Timer

The ECU-579'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:

**Table A.1:**

| 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.

**Table A.2:**

| 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 | |

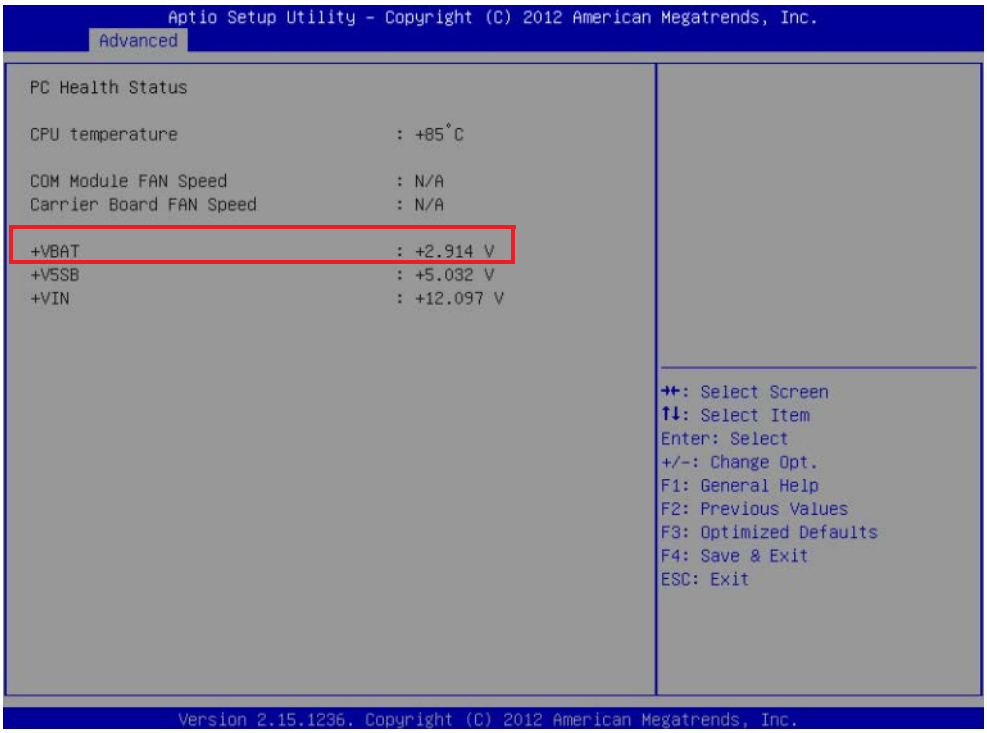
# Appendix B

## Maintenance - RTC Battery

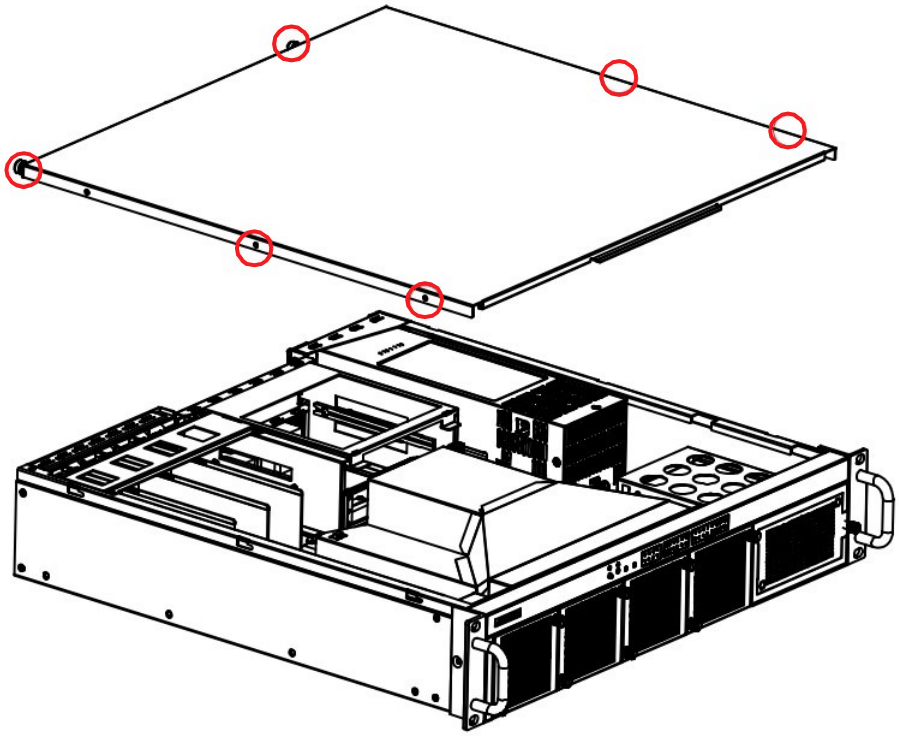
# B.1 Maintenance - RTC Battery

1. A CMOS battery is inside ECU-579 and needs to be maintained and changed when it runs out of power.
2. Battery Model: BR2032 (P/N: 1760000131-11)
3. Battery Lifecycle:
   The CMOS battery will be consumed when the system is powered off.
   The lifecycle of the battery will vary with different conditions.

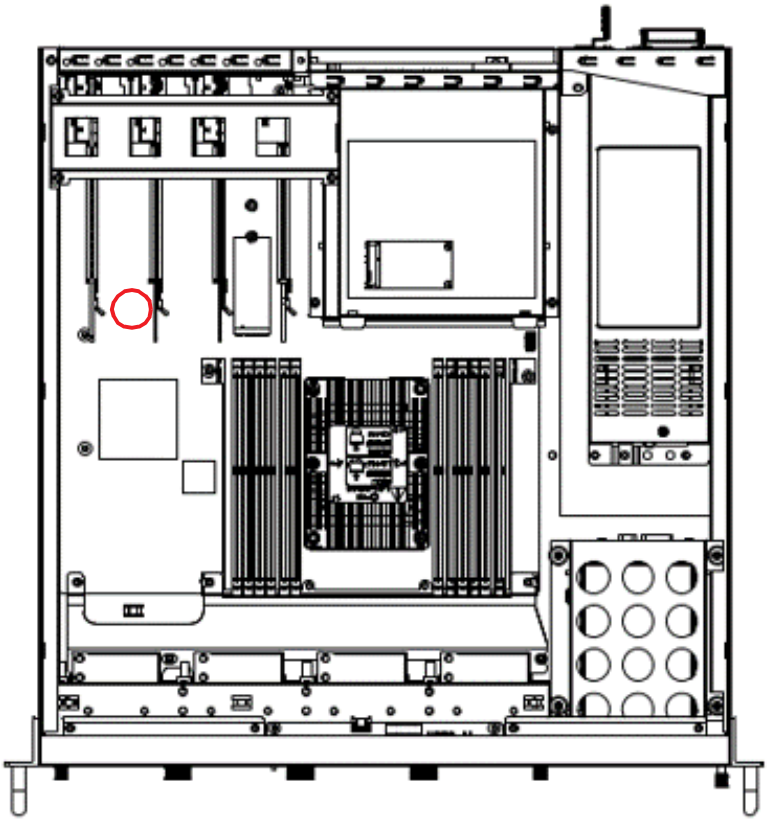
   For systems that remain powered off: 3 years
   For systems that remain powered on:10 years
4. Battery Life Check
   We recommend to change the battery when battery voltage is under 2.5V.
   The voltage of battery can be found in the BIOS hardware monitor page.



5. Changing the battery.
To change the battery, please prepare a new BR2032 and following the instruction below.
Step 1: Open the chassis of the system by losing the screws marked in red.



Step 2: Remove the RTC battery on the board marked in red and change with the new battery.



# Appendix C

## Maintenance - Fan Modules

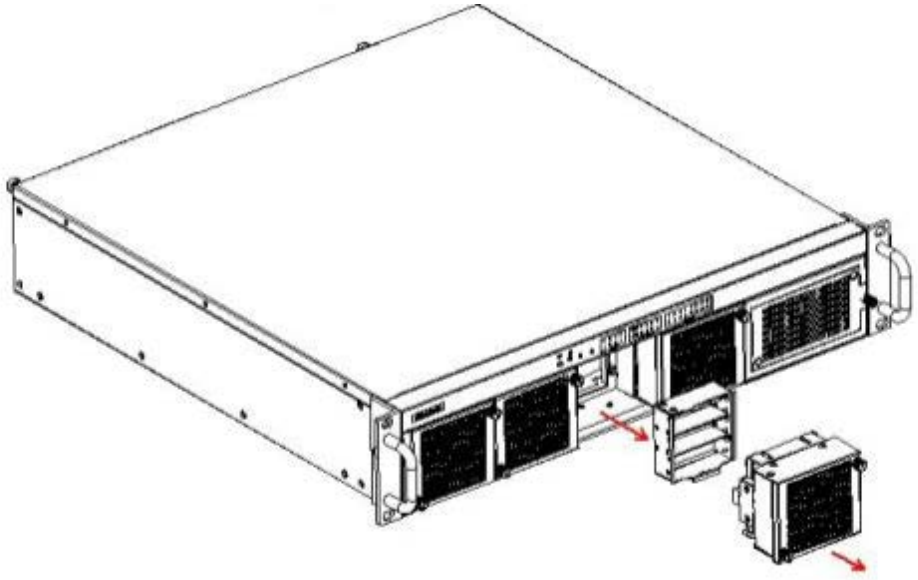
# C.1 Maintenance - Fan Modules

1. The ECU-579 has four hot-swappable fan modules at the front. Each of the fan modules carries a high performance fan for optimized air flow. Each fan module is secured by two thumbscrews.
2. FAN Model: FDA126038BX-051 (P/N: 98R35790001)
3. FAN Lifecycle: Refer to the MTTF table below with different use conditions. Minimum 13 years fan lifecycle under 85 degrees.

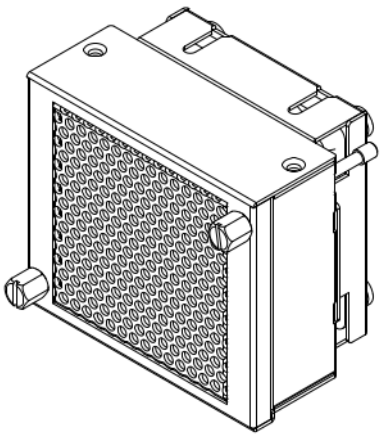
**Table C.1:**

| Temp. Range (°C) | 30 | 40 | 50 | 70 | 85 |
|---|---|---|---|---|---|
| MTTF (hours) | 5,519,369 | 2,759,684 | 1,379,842 | 344,961 | 121,962 |

4. Changing the FAN module and filter.
Step 1: Remove the FAN module by losening the screws.



Step 2: Install the new FAN module to the system.

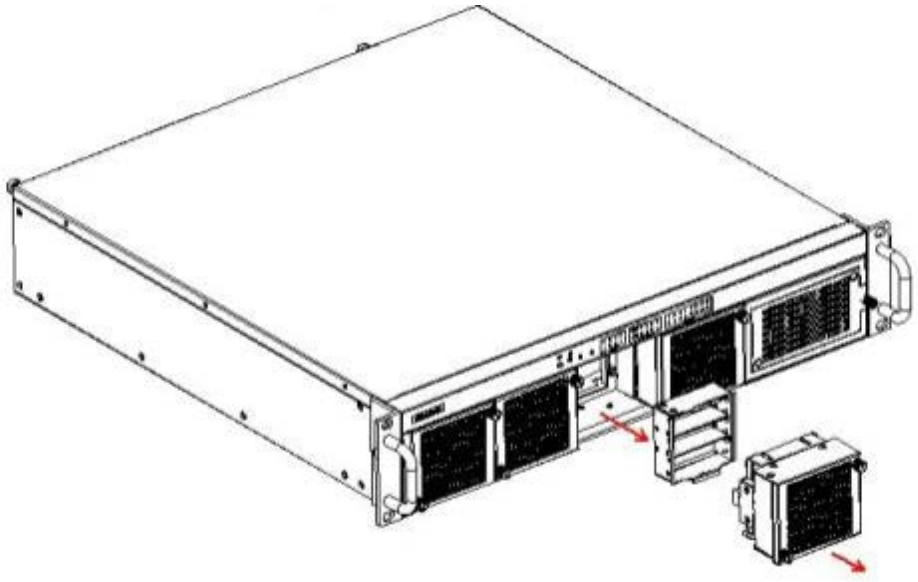


# Appendix D

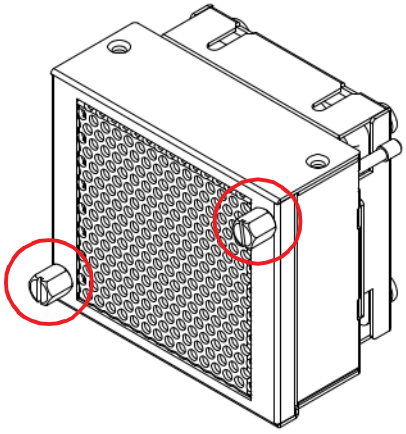
## Maintenance - Fan Filter Sponge

# D.1 Maintenance - Fan Filter Sponge

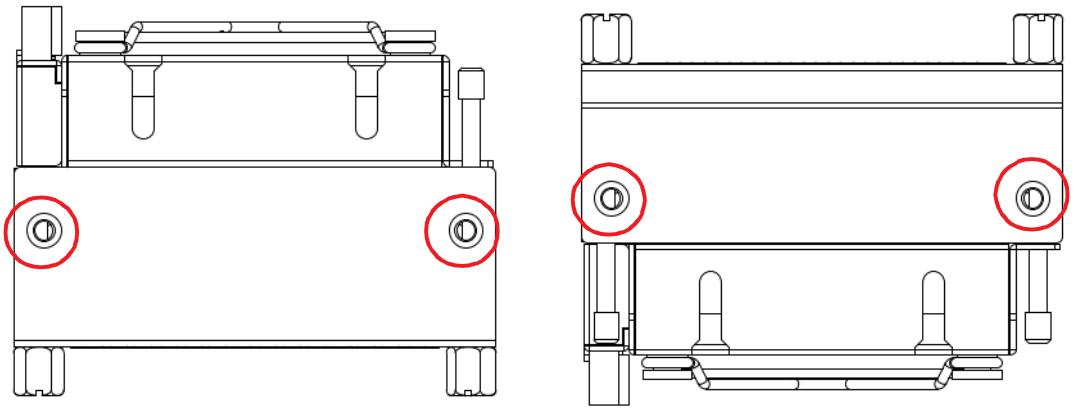
1. The ECU-579 has four hot-swappable fan modules at the front. Each fan has a filter sponge inside to filter the air.
2. FAN Filter Sponge: FILTER Sponge 30PPI (P/N: 2130020965T000)
3. Changing the FAN filter.
   Step 1: Remove the FAN module by losing the screws.



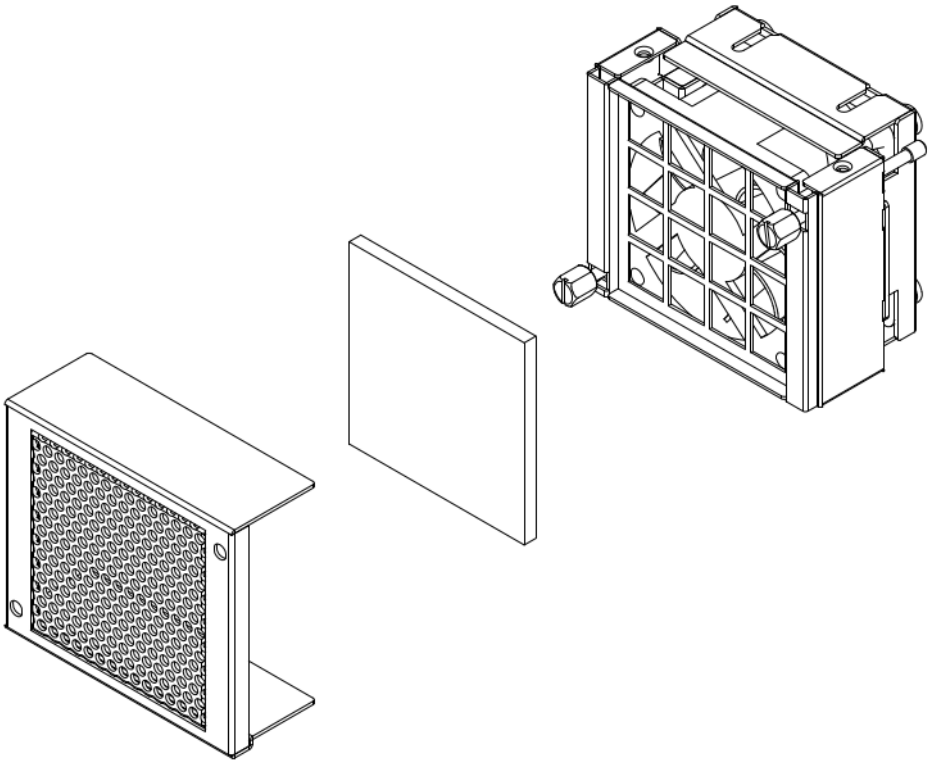
Step 2: Remove the 2 thumb screws marked in red.



Step 3: Remove the 4 screws marked in red on the module.



Step 4: Open the cover and replace the fan filter.



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