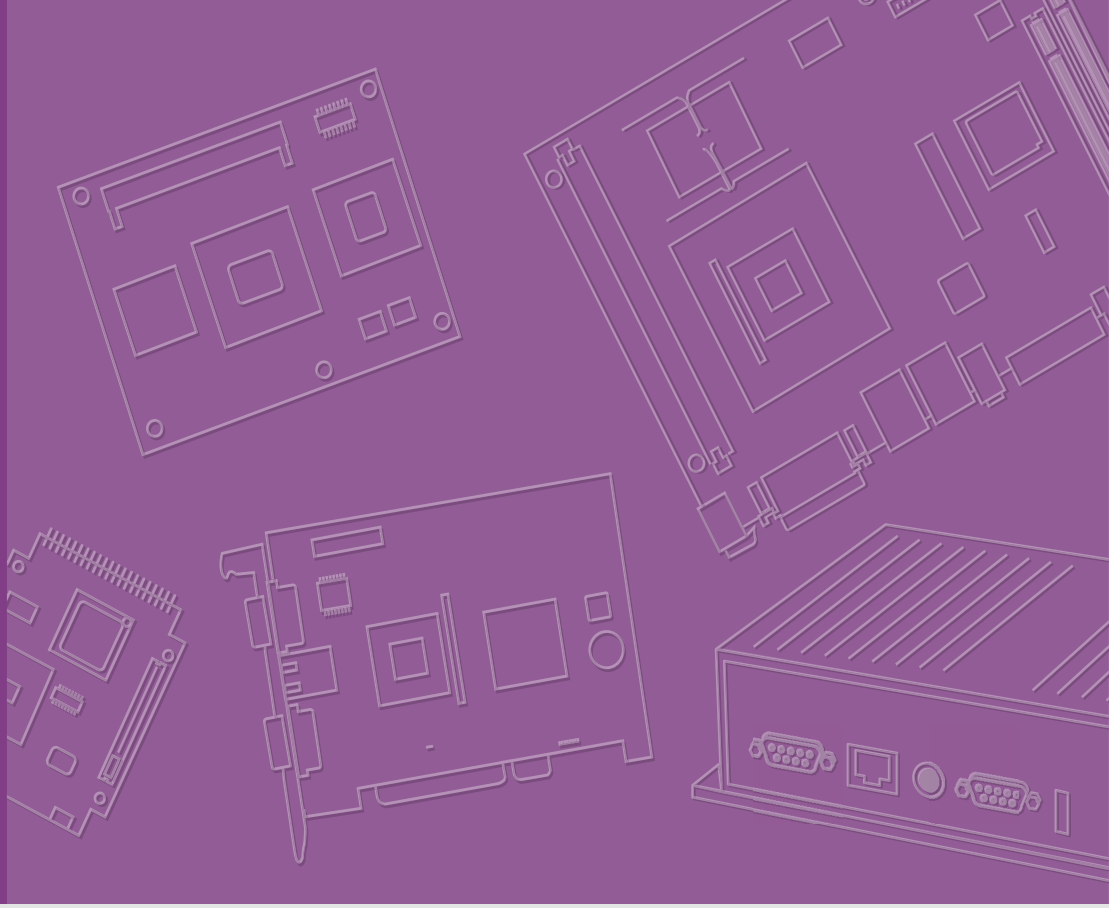


# User Manual

# MIO-5854

## Intel® Core™ Processor N-series N355/N150 on 3.5" SBC (Code Name: Twin Lake)

ADVANTECH

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This manual is for the MIO-5854.

Part No. 2006585400 Edition 1

January 2026

# 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. Test conditions for passing included the equipment being operated within an industrial enclosure. In order to protect the product from being damaged by ESD (Electrostatic Discharge) and EMI leakage, we strongly recommend the use of CE-compliant industrial enclosure products.

### FCC Class B

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

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

***Caution!*** *There is danger of a new battery exploding if it is incorrectly installed. Do not attempt to recharge, force open, or heat the battery. Replace the battery only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.*



# Technical Support and Assistance

1. Visit the Advantech web site at www.advantech.com/support where you can find the latest information about the product.
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 you call:
   - 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

# Packing List

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

- 1 x MIO-5854 SBC
- 1 x SATA Cable 30 cm (P/N: 1700006291)
- 1 x SATA Power Cable 35 cm (P/N: 1700031583-01)
- 1 x Audio Cable 20 cm (P/N: 1700019584-01)
- 2 x COM RS-232/422/485 Cable 20 cm (P/N: 1700030404-01)
- 1 x Heatsink (P/N: 1970005854T001)

# Optional Accessories

- MIO-5854 CPU Heatspreader (P/N: 1970005925T001)
- Internal LAN Cable 15cm (P/N: 1700033611-01)

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# Chapter 1

## General Information

## 1.1 Introduction

The MIO-5854 is a 3.5-inch (146 x 102 mm) single-board computer and is powered by Intel® Core™ Processor N-series, Intel® Core™ 3 N355 and Intel® N150. The MIO-5854 supports single-channel DDR5-4800 SODIMM, up to 16GB. It provides two independent displays via eDP 1.4 and HDMI 2.0, along with abundant I/O options: HDMI 2.0, 4 x GbE, 5 x USB, 4 x COM, 2 x CAN-FD, 2 x 8-bit GPIO, and 1 x I2C. Additionally, it includes 2 standalone M.2 slots: M.2 B-Key 2280 and M.2 E-Key 2230 for easy expansion. The MIO-5854 includes the embedded SUSI API and EdgeBMC for out-of-band remote management with DeviceOn created by Advantech to monitor and control system operation effectively and remotely. Advantech has also validated the MIO-5854 for use with embedded operation systems, including Windows 11 LTSC and Ubuntu v24.04 LTS, making it ready for bundled shipment.

## 1.2 Specifications

**Table 1.1: Specifications**

| | | | |
|---|---|---|---|
| **Platform** | **Processor** | N355 | N150 |
| | **Max. Frequency** | 3.9 GHz | 3.6 GHz |
| | **Base Frequency** | 0.8 GHz | 1.9 GHz |
| | **Core/Tread** | 8/8 | 4/4 |
| | **LLC** | 6MB | 6MB |
| | **CPU TDP** | 15W | 6W |
| | **Chipset** | Intel® Chipset (SoC Integrated) | |
| | **BIOS** | AMI UEFI 256Mbit | |
| **Memory** | **Technology** | DDR5-4800 | |
| | **Max. Capacity** | Up to 16GB | |
| | **Channel/Socket** | Single Channels / One Socket | |
| **Graphics** | **Controller** | Intel® Graphics | |
| | **Max. Frequency** | 1.35 GHz | 1.0 GHz |
| | **Base Frequency** | 1.0 GHz | 400 MHz |
| | **3D/HW Acceleration** | Open GL 4.6, Vulkan 1.2<br>HW Encode: AVC,HEVC/VP9/SCC<br>HW Decode: AVC,HEVC/VP9/SCC,AV1 | |
| **Display I/F** | **eDP** | 1 x eDP 1.4 | |
| | **HDMI** | 1 x HDMI 2.1 | |
| | **Multiple Display** | 2 simultaneous displays: eDP/HDMI | |
| **Ethernet** | **Controller** | LAN1/LAN2: Realtek 8111k; LAN3/LAN4: Intel i210 | |
| | **Speed** | LAN1/LAN2/LAN3/LAN4: 1Gbps | |
| **External I/O** | **Ethernet** | 3 x RJ-45 | |
| | **HDMI/USB-C** | 1/1 | |
| | **USB3.2/2.0** | 2/2 | |

| Table 1.1: Specifications | | |
|---|---|---|
| Internal I/O | **SATA** | 1 x SATA GenIII 6.0Gbps |
| | **Serial Bus** | 1 x I2C (Opt. SMBus) |
| | **COM Port** | 2 x RS-232/422/485(8-wire), 2 x RS-232(4-wire) |
| | **GPIO** | 16-bit general purpose input output I/O |
| | **Audio** | Realtek ALC888S, Line-in/Line-out/MIC |
| | **Invertor** | 5V @2A |
| | **CAN Bus** | 2 x CAN-FD |
| | **Fan** | 4-wire smart fan |
| | **Front Panel Control** | Power-on, Reset, Buzzer, CaseOpen |
| Board Feature | **EdgeBMC OOB** | LAN3: Support EdgeBMC Out-of-Band(OOB) remote control |
| | **Watchdog Timer** | 65536 level, 0~65535 sec |
| | **TPM** | fTPM supported by Intel® Platform Trust Technology Discrete TPM 2.0 |
| Expansion | **M.2 E-Key** | 1 x E-Key 2230 (PCIe x1, USB2.0) |
| | **M.2 B-Key** | 1 x B-Key 2280 (SATA, USB2.0,*optional PCIe x1) w/ Nano-SIM |
| Power | **Supply Voltage** | Vin: DC 12~24V +/- 10%; RTC Battery: Lithium 3V/ 200mAH |
| | **Connector** | ATX 4-pin 90D (*BOM Option to ATX 4-pin 180D or DC-IN Jack by request) |
| | **Power Management** | AT, ATX |
| Environment | **Temperature** | Operating: Standard: 0 ~ 60°C (32 ~ 140°F) with 0.7m/s airflow<br>Storage: -40 ~ 85°C (-40 ~ 185°F) |
| | **Humidity** | Operating: 40°C @95% relative humidity, non-condensing<br>Storage: 60°C @95%relative humidity, non-condensing |
| | **Vibration Resistance** | 3.5 Grms |
| Certification | **EMC** | CE, FCC Class B |
| Mechanical | **Dimensions** | 146 x 102 mm (5.7 x 4”) |

## 1.3 Block Diagram

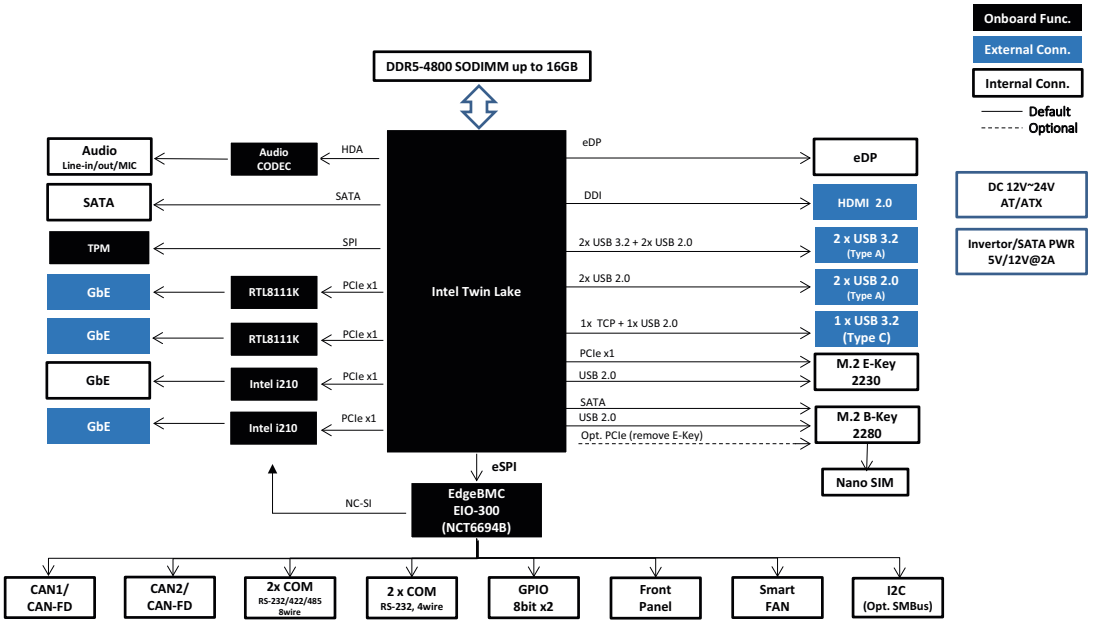



**Figure 1.1 Block Diagram**

# Chapter 2

## Mechanical Specifications

## 2.1 Introduction

The MIO compact form factor SBC is a new-generation SBC designed with a variety of mechanical improvements. This chapter includes board dimension and assembly instructions for the standard thermal solution.

## 2.2 Board Layout: Dimensions

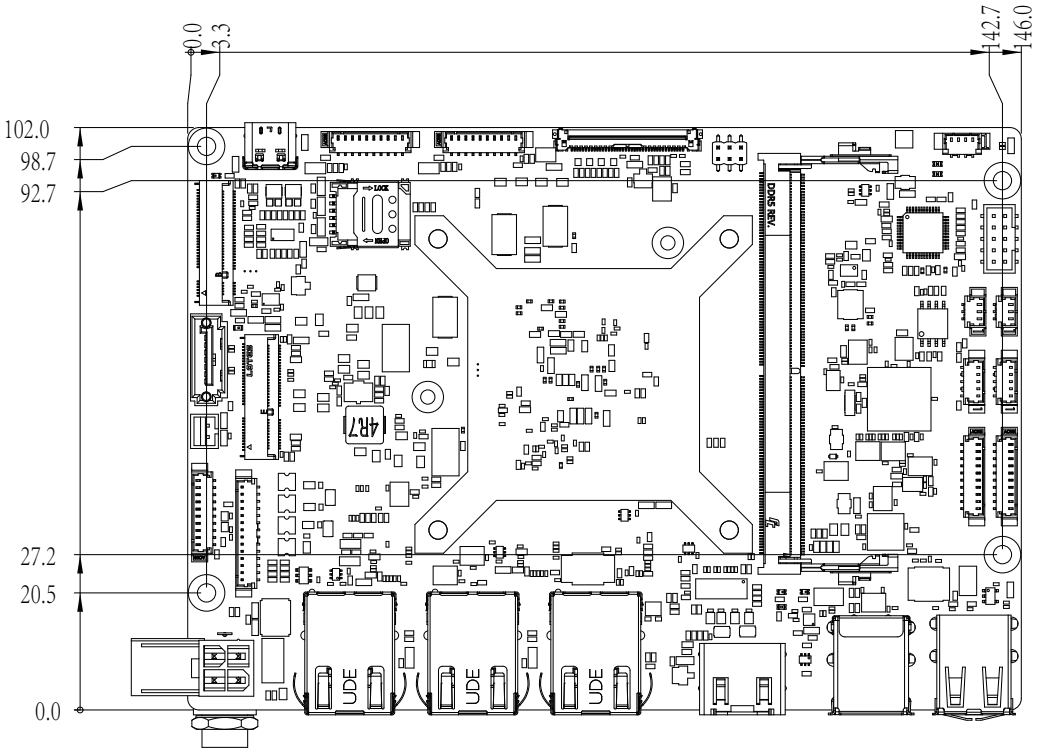



**Figure 2.1 MIO-5854 Mechanical Diagram (Top Side)**

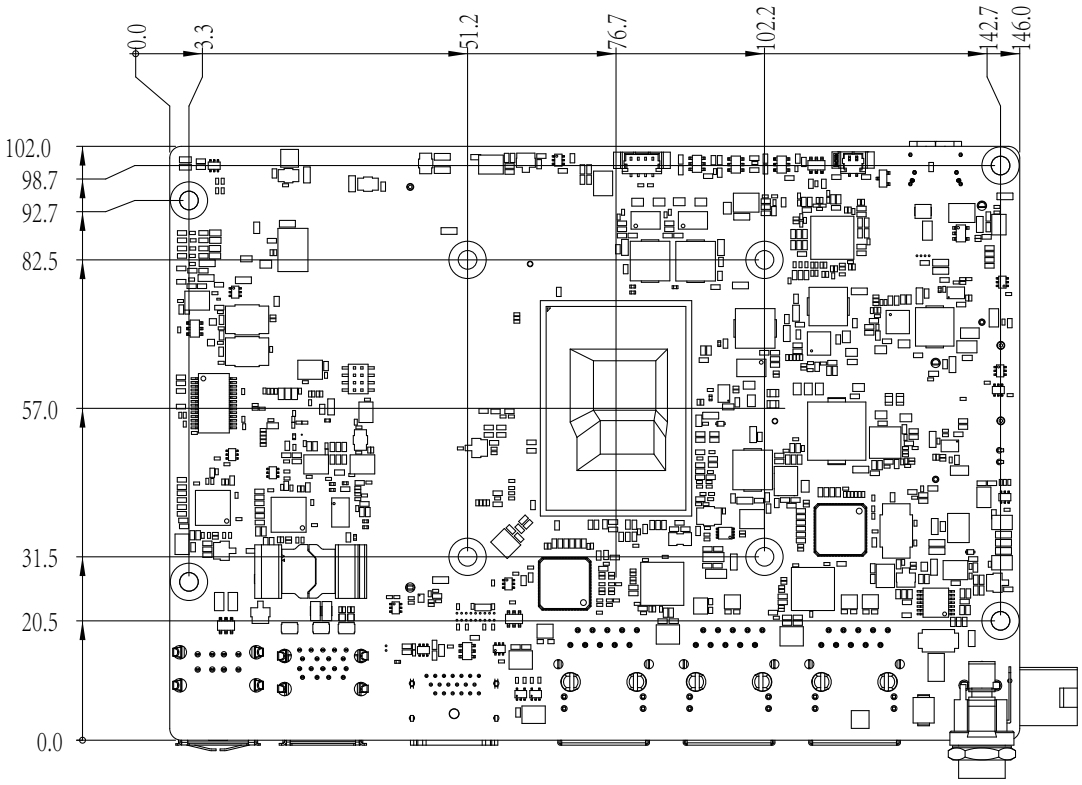



**Figure 2.2 MIO-5854 Mechanical Diagram (Bottom Side)**

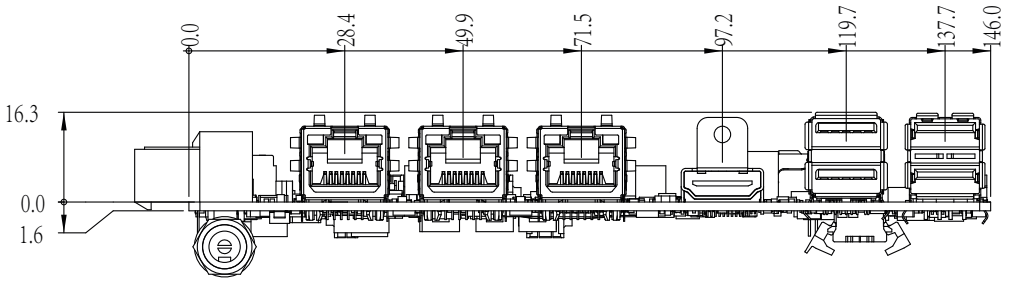



**Figure 2.3 MIO-5854 Mechanical Diagram (Coastline)**

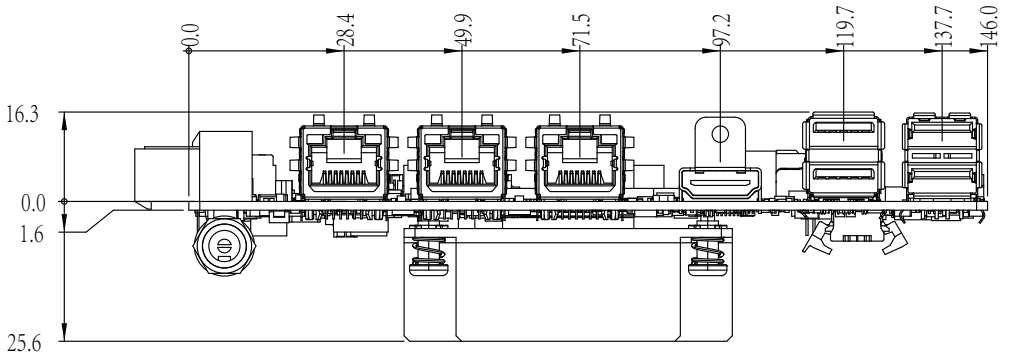



**Figure 2.4 MIO-5854 Mechanical Diagram (with Heatsink)**

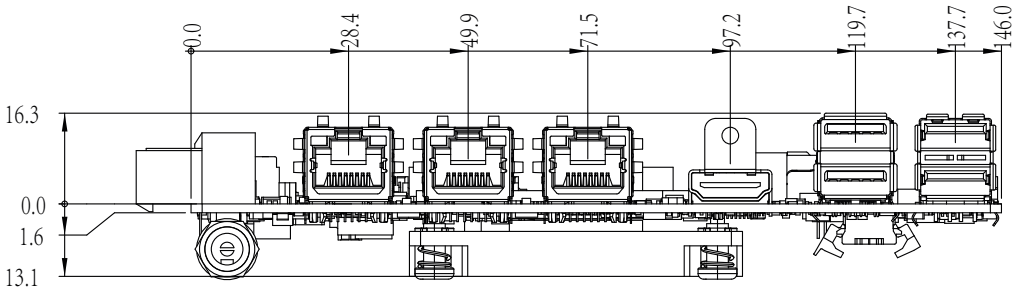



**Figure 2.5 MIO-5854 Mechanical Diagram (with Heatspreader)**

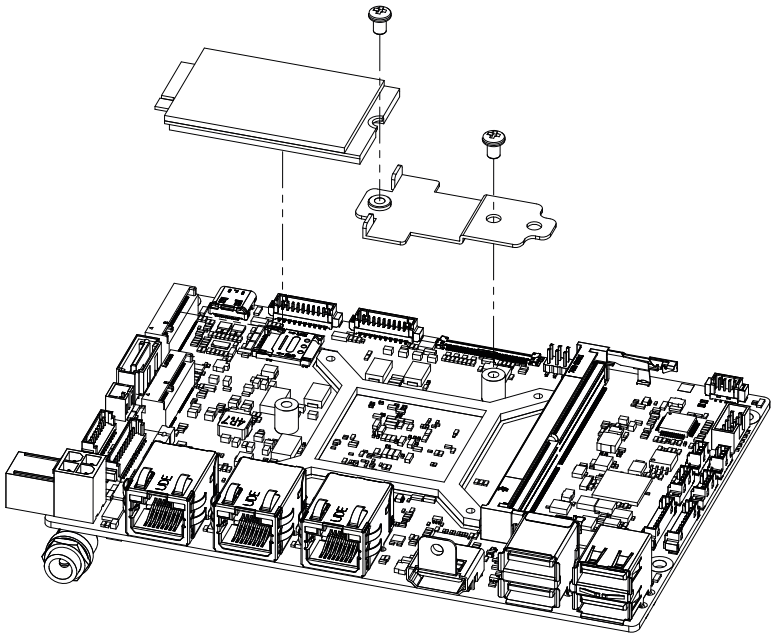


**Figure 2.6 MIO-5854 Mechanical Diagram (with M.2 Extension Bracket)**

## 2.3 Quick Installation Guide

This section introduces installation of the heatsink. If you received them in separate package, please assemble it by following diagram. Remember to remove the plastic from thermal pad before assembling.

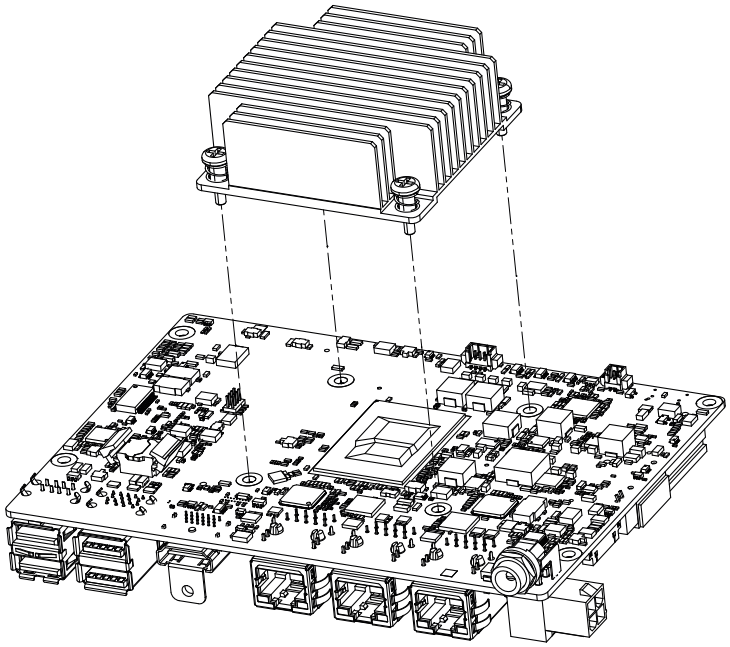


**Figure 2.7 MIO-5854 Heatsink Installation**

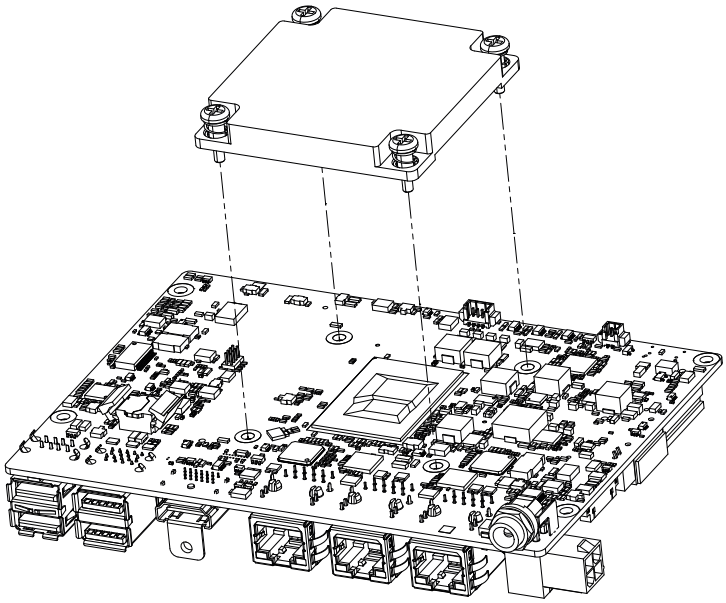


**Figure 2.8 MIO-5854 Heatspreader Installation**

# Chapter 3

## Connectors and Jumpers

## 3.1 Connector and Header List

| Table 3.1: Connector and Header List | | |
|---|---|---|
| | **Description** | **Location Name** |
| 1 | DC input Connector | DCIN2 |
| 2 | DC input Connector (Adapter) | DCIN1 |
| 3 | Type-C USB3.1 Gen1 Connector | TYPEC1 |
| 4 | COM port Connector (RS232+RS422+RS485) | COM1 |
| 5 | COM port Connector (RS232+RS422+RS485) | COM2 |
| 6 | COM port Connector (RS232 only) | COM3 |
| 7 | COM port Connector (RS232 only) | COM4 |
| 8 | CANBus Connector | CANBUS1 |
| 9 | CANBus Connector | CANBUS2 |
| 10 | Audio Connector | AUDIO1 |
| 11 | EDP Connector | EDP1 |
| 12 | SMB Bus Connector | I2C_SMB1 |
| 13 | GPIO Connector | GPIO1 |
| 14 | SATA Power Connector | SATAP1 |
| 15 | Panel Voltage Selection | VDD1 |
| 16 | GPIO Connector | GPIO2 |
| 17 | Power/LED/Case Open/Buzzer Connector | FP1 |
| 18 | M.2 B-Key (SATA / USB 2.0) | M2_B1 |
| 19 | M.2 E-Key (PCIe x1 / USB2.0) | M2_E1 |
| 20 | LAN Connector | LAN4_CN1 |
| 21 | RTC Battery Connector | BAT1 |
| 22 | FAN Connector | FAN1 |
| 23 | SATA Connector | SATA1 |
| 24 | USB Connector | USB2_1 |
| 25 | USB Connector | USB3_1 |
| 26 | HDMI Connector | HDMI1 |
| 27 | LAN Connector | LAN3 |
| 28 | LAN Connector | LAN2 |
| 29 | LAN Connector | LAN1 |
| 30 | DIMM Connector | DIMM1 |
| 31 | SIM Card Connector | SIM1 |

## 3.2 Jumper & Switches

| Table 3.2: Jumper & Switches | | |
|---|---|---|
| | **Description** | **Location Name** |
| 1 | Multifunction Switch | SW1 |

## 3.3 Connector Locations

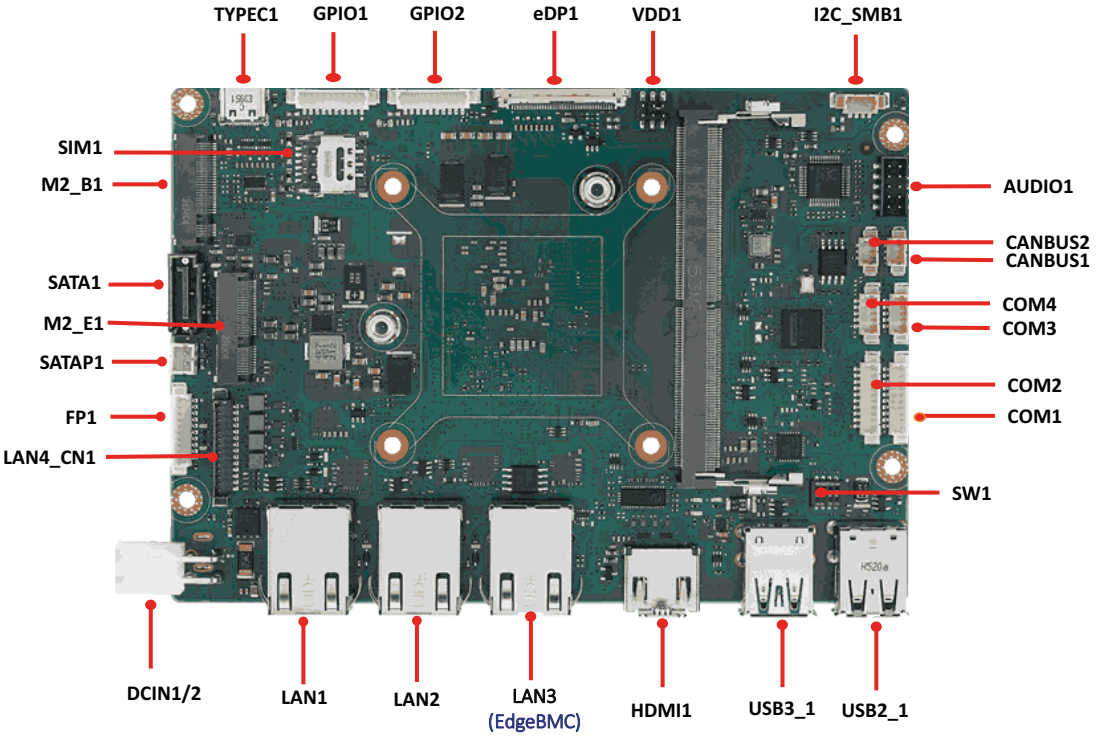



**Figure 3.1 MIO-5854 Locating Connectors (Front View)**

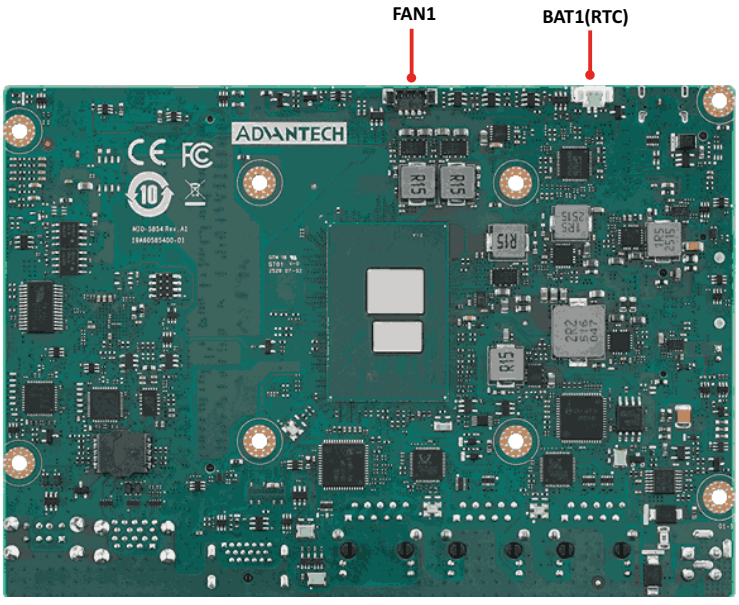



**Figure 3.2 MIO-5854 Locating Connectors (Bottom View)**

### 3.3.1 COM Port Connector (RS232+RS422+RS485)

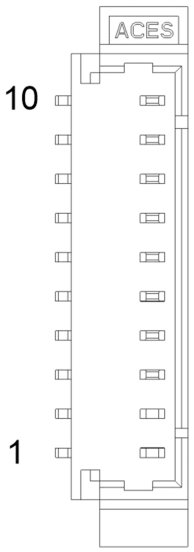



**Table 3.3: COM Port Connector (RS232+RS422+RS485)**

| Pin | Signal Pin Definition |
|---|---|
| 1 | NC |
| 2 | COM1_z_RI# |
| 3 | COM1_DTR# |
| 4 | COM1_CTS# |
| 5 | COM1_TXD |
| 6 | COM1_RTS# |
| 7 | COM1_RXD |
| 8 | COM1_DSR# |
| 9 | COM1_DCD# |
| 10 | GND |

### 3.3.2 COM Port Connector (RS232)

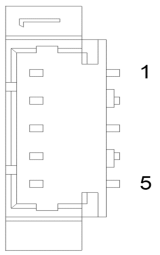
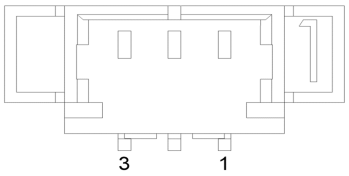



**Table 3.4: COM port Connector (RS232)**

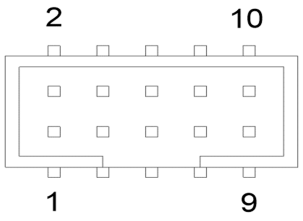
| Pin | Signal Pin Definition |
|---|---|
| 1 | COM3_RS232-TXD |
| 2 | COM3_RS232-RTS# |
| 3 | COM3_RS232-RXD |
| 4 | COM3_RS232-CTS# |
| 5 | GND |

### 3.3.3 CANBUS Connector



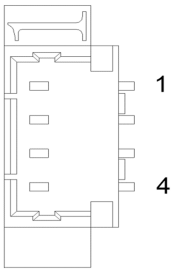

| Table 3.5: CANBUS Connector | |
|---|---|
| **Pin** | **Signal Pin Definition** |
| 1 | CAN1_D+ |
| 2 | CAN1_D- |
| 3 | GND |

### 3.3.4 Audio Connector



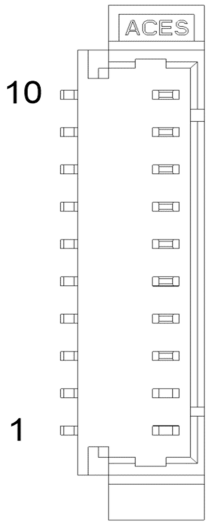

| Table 3.6: Audio Connector | |
|---|---|
| **Pin** | **Signal Pin Definition** |
| 1 | LOUTR |
| 2 | LINR |
| 3 | GND |
| 4 | GND |
| 5 | LOUTL |
| 6 | LINL |
| 7 | GND |
| 8 | NC |
| 9 | MIC1R |
| 10 | MIC1L |

### 3.3.5 SMB Connector



| Table 3.7: SMB Connector | |
|---|---|
| **Pin** | **Signal Pin Definition** |
| 1 | GND |
| 2 | EC_SMB0_z_DAT |
| 3 | EC_SMB0_z_CLK |
| 4 | +V3.3_DUAL |

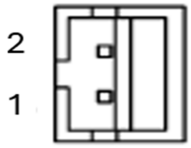
### 3.3.6 GPIO Connector




| Table 3.8: GPIO Connector | |
|---|---|
| **Pin** | **Signal Pin Definition** |
| 1 | GND |
| 2 | GPIO7 |
| 3 | GPIO2 |
| 4 | GPIO6 |
| 5 | GPIO1 |
| 6 | GPIO5 |
| 7 | GPIO0 |
| 8 | GPIO4 |
| 9 | +V5A_GPIO1 |
| 10 | GPIO3 |

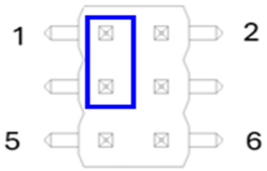
| **Pin** | **Signal Pin Definition** |
|---|---|
| 1 | GND |
| 2 | GPIO15 |
| 3 | GPIO10 |
| 4 | GPIO14 |
| 5 | GPIO9 |
| 6 | GPIO13 |
| 7 | GPIO8 |
| 8 | GPIO12 |
| 9 | +V5A_GPIO2 |
| 10 | GPIO11 |

### 3.3.7 SATA Power Connector




| Table 3.9: SATA Power Connector | |
|---|---|
| **Pin** | **Signal Pin Definition** |
| 1 | 5V |
| 2 | GND |

### 3.3.8 Panel Voltage Selection




| Table 3.10: Panel Voltage Selection | |
|---|---|
| **Pin** | **Signal Pin Definition** |
| 1 | +V3.3 |
| 2 | NC |
| 3 | Panel Voltage |
| 4 | +V12 |
| 5 | +V5 |
| 6 | NC |

| **Jumper location** | **Voltage selection** |
|---|---|
| 1-3 | 3.3V(default) |
| 3-5 | 5V |
| 3-4 | 12V |

### 3.3.9 Power/LED/Case Open/Buzzer Connector

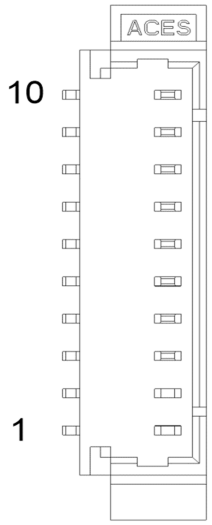



**Table 3.11: Power/LED/Case Open/Buzzer Connector**

| Pin | Signal Pin Definition |
|---|---|
| 1 | GND |
| 2 | BUZZER- |
| 3 | BUZZER+ |
| 4 | RDC_CASEOPEN |
| 5 | SATA_EXT_LED# |
| 6 | FP_A_PSIN# |
| 7 | FP_A_RST# |
| 8 | +3.3V |
| 9 | NC |
| 10 | +5V |

### 3.3.10 M.2 Key B (SATA / USB 2.0)

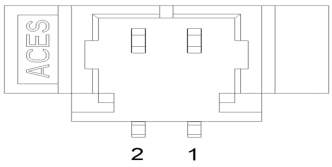
| Table 3.12: M.2 B-Key (SATA / USB 2.0) | | | |
|---|---|---|---|
| **Pin** | **Signal Pin Definition** | **Pin** | **Signal Pin Definition** |
| 74 | 3.3V (Suspend) | 75 | CONFIG_2 |
| 72 | 3.3V (Suspend) | 73 | GND |
| 70 | 3.3V (Suspend) | 71 | GND |
| 68 | SUSCLK (3.3V) | 69 | CONFIG_1 |
| 66 | NC | 67 | NC |
| 64 | NC | 65 | NC |
| 62 | NC | 63 | NC |
| 60 | NC | 61 | NC |
| 58 | NC | 59 | NC |
| 56 | NC | 57 | GND |
| 54 | PEWAKE# (3.3V) | 55 | REFCLKp |
| 52 | CLKREQ# (3.3V) | 53 | REFCLKn |
| 50 | PERST# (3.3V) | 51 | GND |
| 48 | NC | 49 | PERp0 / SATA-A+ |
| 46 | NC | 47 | PERn0 / SATA-A- |
| 44 | NC | 45 | GND |
| 42 | NC | 43 | PETp0 / SATA-B- |
| 40 | NC | 41 | PETn0 / SATA-B+ |
| 38 | NC | 39 | GND |
| 36 | M2B1_UIM_PWR | 37 | NC |
| 34 | M2B1_UIM_DATA | 35 | NC |
| 32 | M2B1_UIM_CLK | 33 | GND |
| 30 | M2B1_UIM_RESET | 31 | NC |
| 28 | NC | 29 | NC |
| 26 | NC | 27 | GND |
| 24 | NC | 25 | NC |
| 22 | NC | 23 | NC |
| 20 | NC | 21 | CONFIG_0 |
| 29 | | 29 | |
| 30 | | 30 | |
| 31 | | 31 | |
| 32 | | 32 | |
| 10 | LED_1# (3.3V) | 11 | GND |
| 8 | 660BR_GPIO8# | 9 | USB_M2B1- |
| 6 | 660BR_OPTION#1 | 7 | USB_M2B1+ |
| 4 | 3.3V (Suspend) | 5 | GND |
| 2 | 3.3V (Suspend) | 3 | GND |
| | | 1 | CONFIG_3 |

### 3.3.11 M.2 E-Key (PCIe x1 / USB2.0)

**Table 3.13: M.2 E-Key (PCIe x1 / USB2.0)**

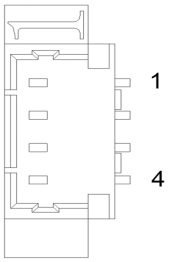
| Pin | Signal Pin Definition | Pin | Signal Pin Definition |
|---|---|---|---|
| 74 | 3.3V (Suspend) | 75 | GND |
| 72 | 3.3V (Suspend) | 73 | NC |
| 70 | NC | 71 | NC |
| 68 | NC | 69 | GND |
| 66 | NC | 67 | NC |
| 64 | NC | 65 | NC |
| 62 | NC | 63 | GND |
| 60 | NC | 61 | NC |
| 58 | NC | 59 | NC |
| 56 | W_DISABLE1# (3.3V) | 57 | GND |
| 54 | W_DISABLE2# (3.3V) | 55 | PEWAKE0# (3.3V) |
| 52 | PERST0# (3.3V) | 53 | CLKREQ0# (3.3V) |
| 50 | SUSCLK (3.3V) | 51 | GND |
| 48 | NC | 49 | REFCLKn0 |
| 46 | NC | 47 | REFCLKp0 |
| 44 | NC | 45 | GND |
| 42 | NC | 43 | PETn0 |
| 40 | NC | 41 | PETp0 |
| 38 | NC | 39 | GND |
| 36 | NC | 37 | PERn0 |
| 34 | NC | 35 | PERp0 |
| 32 | NC | 33 | GND |
| 29 | | | |
| 30 | | | |
| 31 | | | |
| 32 | | | |
| 22 | NC | 23 | NC |
| 20 | NC | 21 | NC |
| 18 | GND | 19 | NC |
| 16 | NC | 17 | NC |
| 14 | NC | 15 | NC |
| 12 | NC | 13 | NC |
| 10 | NC | 11 | NC |
| 8 | NC | 9 | NC |
| 6 | NC | 7 | GND |
| 4 | 3.3V (Suspend) | 5 | USB_D- |
| 2 | 3.3V (Suspend) | 3 | USB_D+ |
| | | 1 | GND |

### 3.3.12 RTC Battery Connector



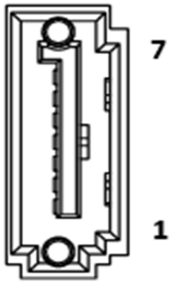

| Table 3.14: RTC Battery Connector | |
|---|---|
| **Pin** | **Signal Pin Definition** |
| 1 | +VBAT_b1 |
| 2 | GND |

### 3.3.13 FAN Connector



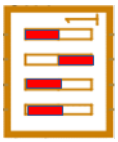
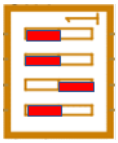
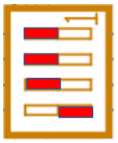

| Table 3.15: FAN Connector | |
|---|---|
| **Pin** | **Signal Pin Definition** |
| 1 | GND |
| 2 | +V12 |
| 3 | FAN_SPEED |
| 4 | FAN_V5_PWM |

### 3.3.14 SATA Connector



| Table 3.16: SATA Connector | |
|---|---|
| **Pin** | **Signal Pin Definition** |
| 1 | GND |
| 2 | SATA0_TX+ |
| 3 | SATA0_TX- |
| 4 | GND |
| 5 | SATA0_RX- |
| 6 | SATA0_RX+ |
| 7 | GND |

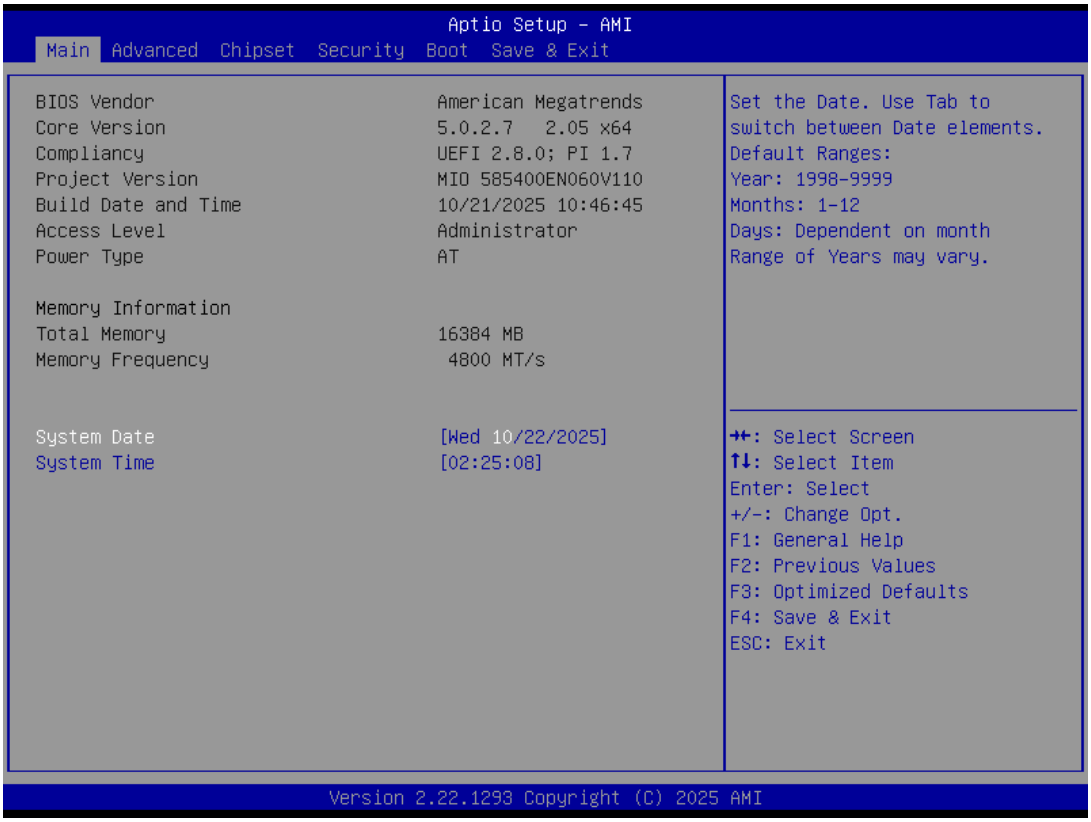
### 3.3.15 Multifunction Switch

| Table 3.17: Multifunction Switch | | |
|---|---|---|
| **Function** | **Switch Settings** | |
| AT/ATX Selection |  |  |
| | AT Mode | ATX Mode |
| Load BIOS Default |  |  |
| | Normal | Load BIOS Default |
| COM1 120 Ω Termination RX Enable |  |  |
| | Disable | Enable |
| COM2 120 Ω Termination RX Enable |  |  |
| | Disable | Enable |

# Chapter 4

## AMI BIOS Setup

The AMIBIOS has been integrated into a plethora of motherboards for decades. With the AMIBIOS Setup program, you can modify BIOS settings and control the various system features. This chapter describes the basic navigation of the MIO-5854 BIOS setup screens.




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

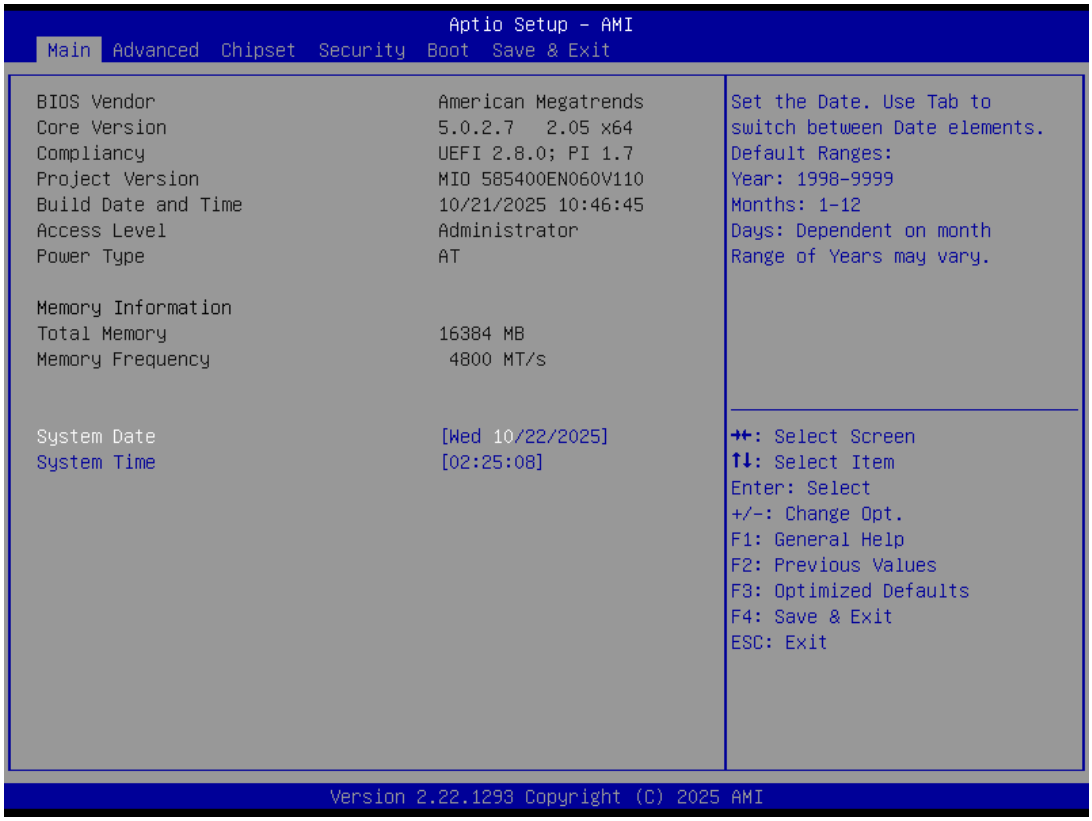
# 4.1 Entering Setup

Turn on the computer and check for the patch code. If there is a number assigned to the patch code, it means that the BIOS supports your CPU. If there is no number assigned to the patch code, please contact an Advantech application engineer to obtain an up-to-date patch code file. This will ensure that your CPU's system status is valid. After ensuring that you have a number assigned to the patch code, press <DEL> and you will immediately be allowed to enter Setup.

## 4.1.1 Main Setup

When you first enter the BIOS Setup Utility, you will encounter the Main setup screen.

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



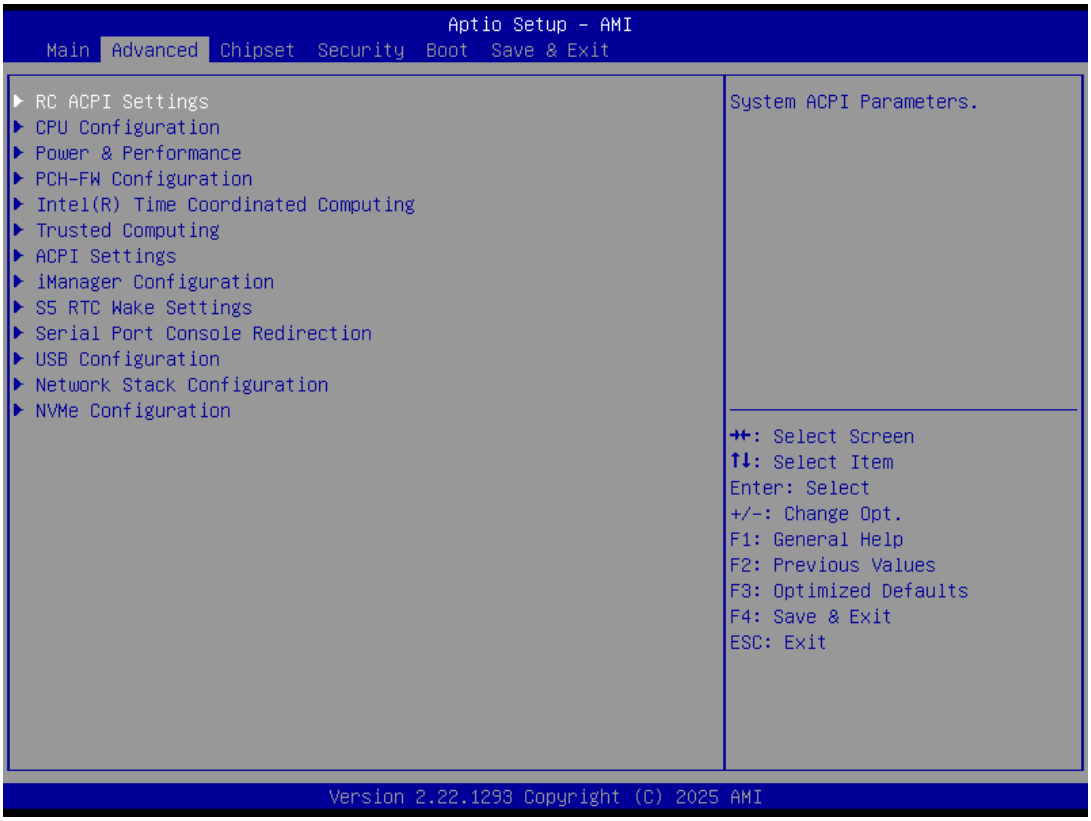

The Main BIOS setup screen has two main frames. The left frame displays all the options that can be configured. Grayed-out options cannot be configured; options in blue can. The right frame displays the key legend. Above the key legend is an area reserved for a text message. When an option is selected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

- **System Time / System Date**

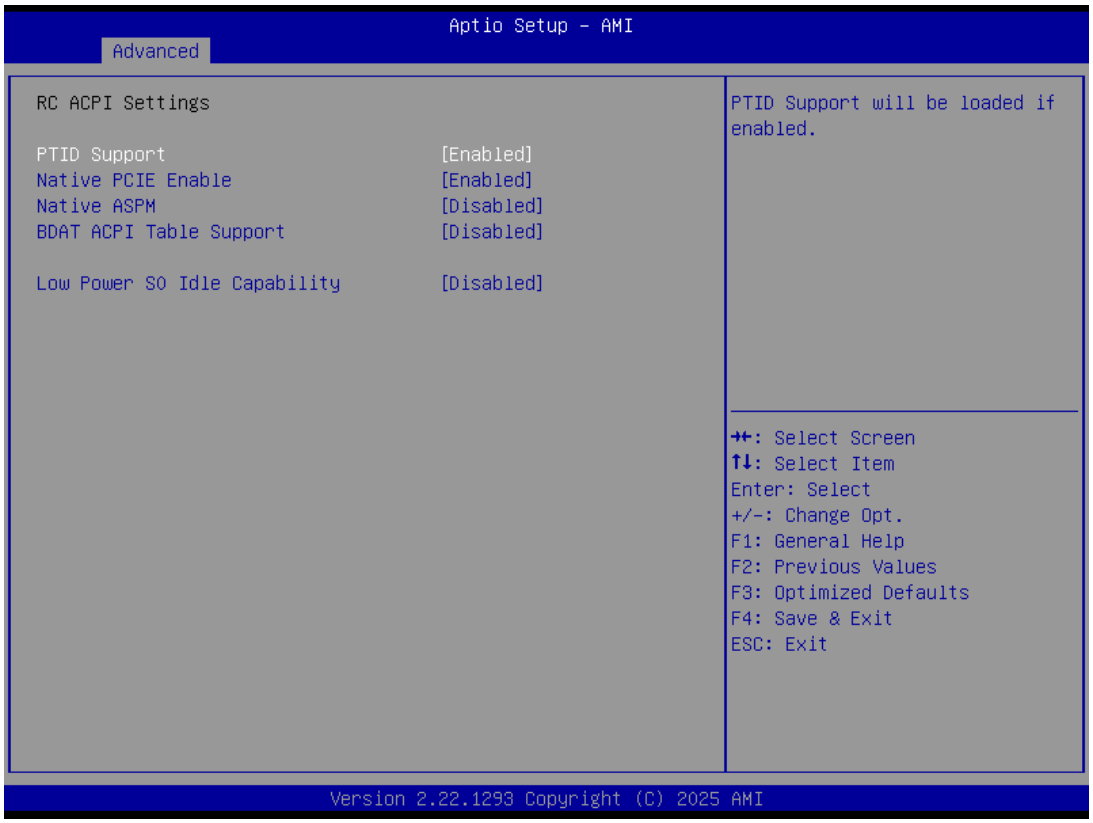
  Use this option to change the system time and date. Highlight System Time or System Date using the <Arrow> keys. Enter new values through the keyboard. Press the <Tab> key or the <Arrow> keys to move between fields. The date must be entered in MM/DD/YY format. The time must be entered in HH:MM:SS format.

### 4.1.2 Advanced BIOS Features Setup

Select the Advanced tab from the MIO-5854 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.

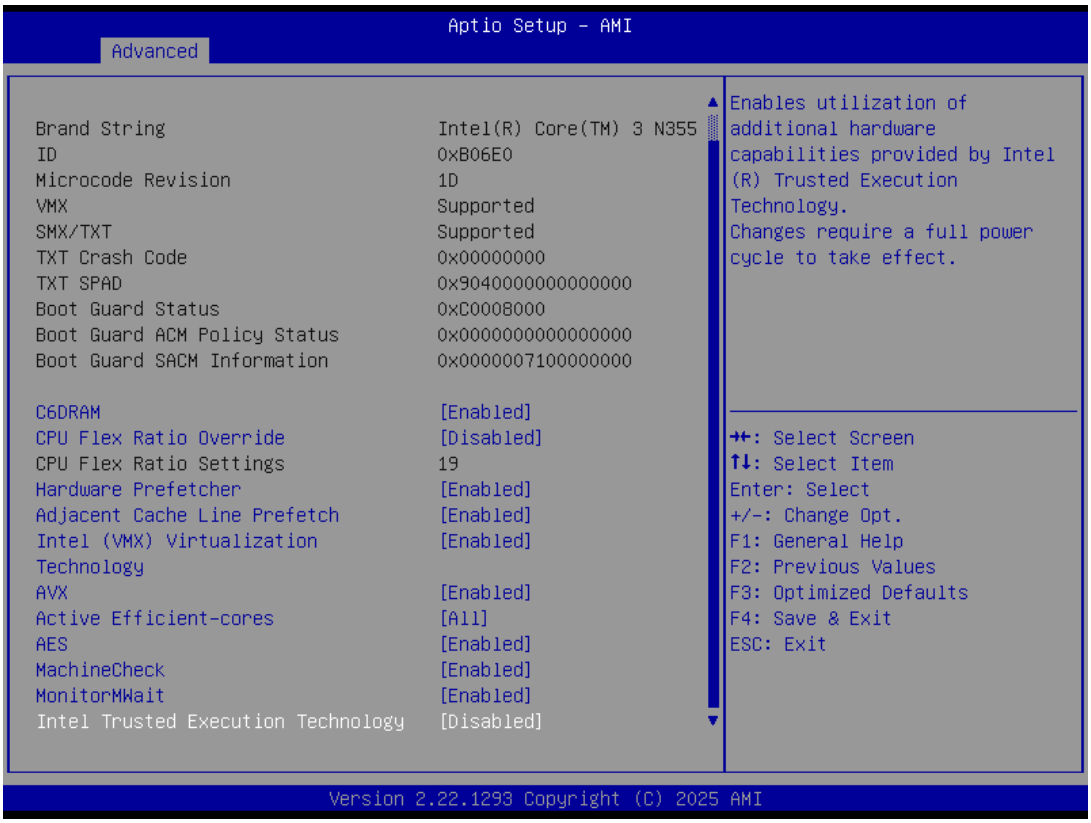


#### 4.1.2.1 RC ACPI Settings




- **PTID Support**
  Enable/Disable to load the PTID Table.
- **Native PCIE Enable**
  Enable/Disable PCIE Native Control reported in ACPI Table.
- **Native ASPM**
  Choose ASPM feature is controlled by OS or BIOS.
- **BDAT ACPI Table Support**
  Enable/Disable to support BDAT ACPI Table.
- **Low Power S0 Idle Capability**
  Enable/Disable ACPI Low Power S0 Idle Capability under OS.

### 4.1.2.2 CPU Configuration

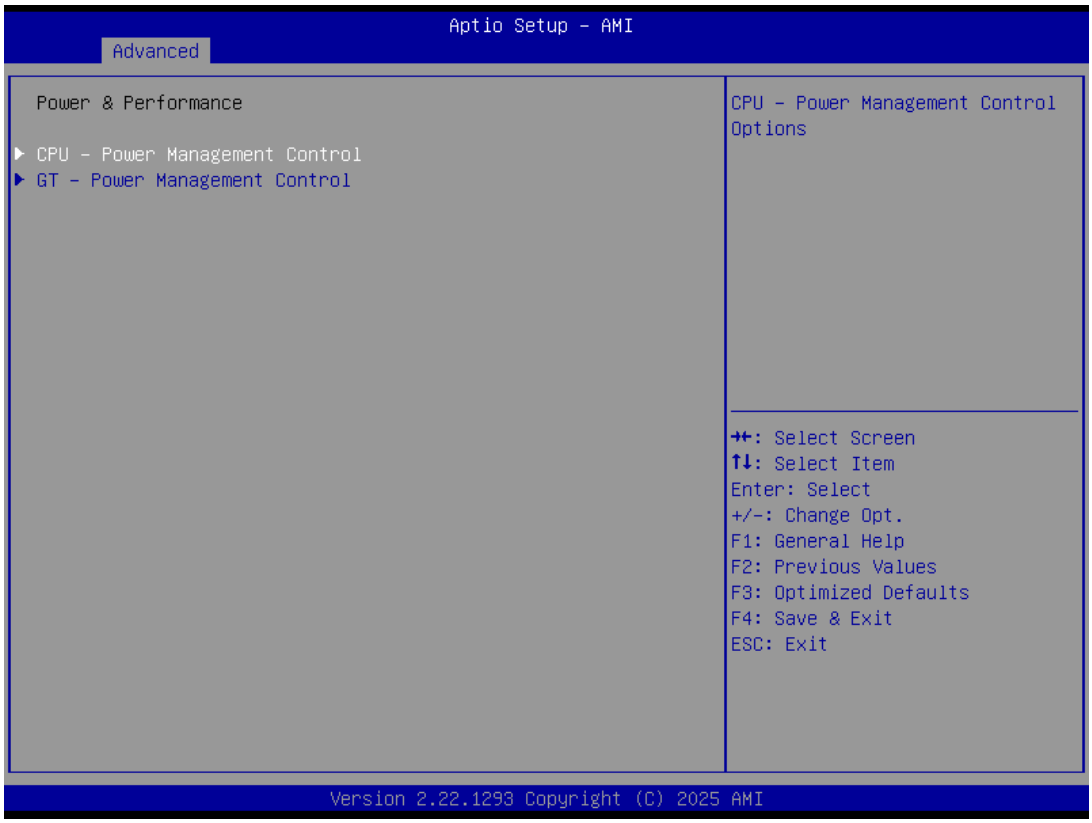



- **C6DRAM**
  Enable/Disable moving of dram contents to PRM memory when CPU is in C6 state.
- **CPU Flex Ratio Override**
  Enable/Disable CPU Flex Ratio Programming.
- **Hardware Prefetcher**
  This item allows users to enable or disable the hardware prefetcher feature.
- **Adjacent Cache Line Prefetch**
  This item allows users to enable or disable the adjacent cache line prefetch feature.
- **Intel (VMX) Virtualization Technology**
  When Enabled, a VMM can utilize the additional hardware capability provided by Vanderpool Technology.
- **AVX**
  Enable/Disable the AVX 2/3 Instructions.
- **Active Efficient-cores**
  Number of E-cores to enable in each processor package.
- **AES**
  Enable/Disable AES (Advanced Encryption Standard).
- **MachineCheck**
  Enable/Disable Machine Check.
- **MonitorMWait**
  Enable/Disable MonitorMWait.
- **Intel Trusted Execution Technology**

Enables utilization of additional hardware capability provided by Intel® Trusted Execution Technology.

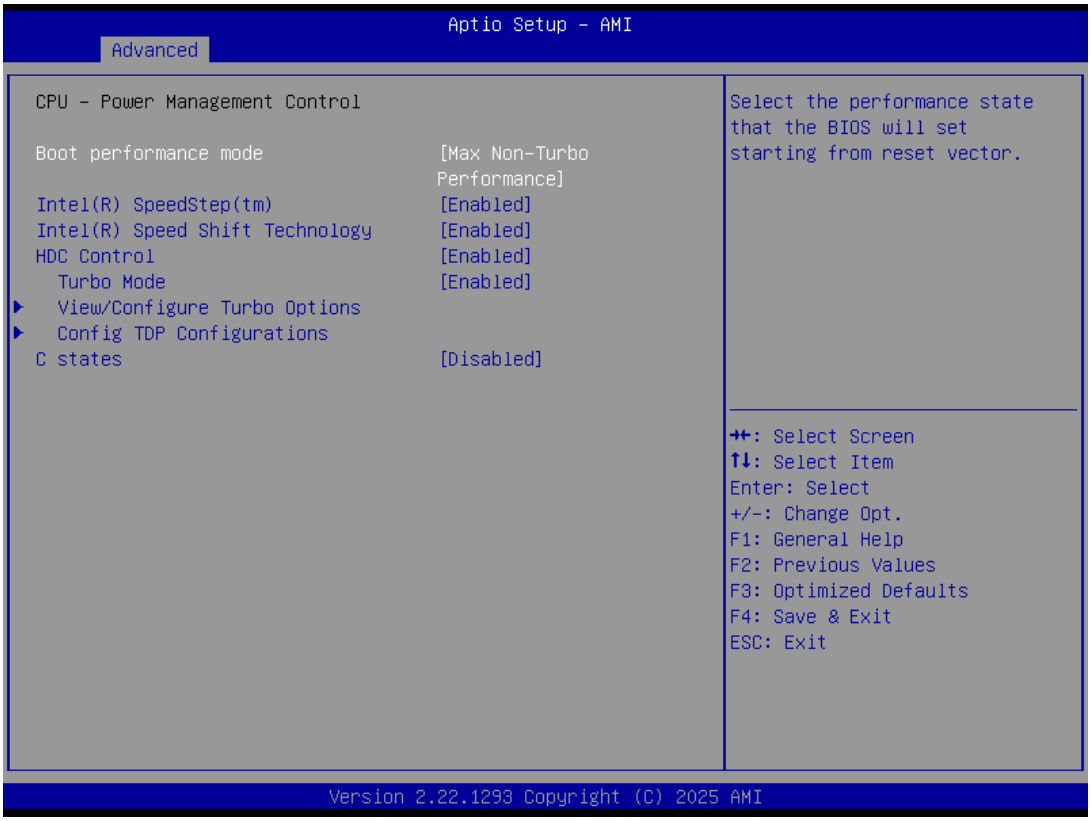
- **Total Memory Encryption**
  Configure Total Memory Encryption (TME) to protect DRAM data from physical attacks.

#### 4.1.2.3 Power & Performance



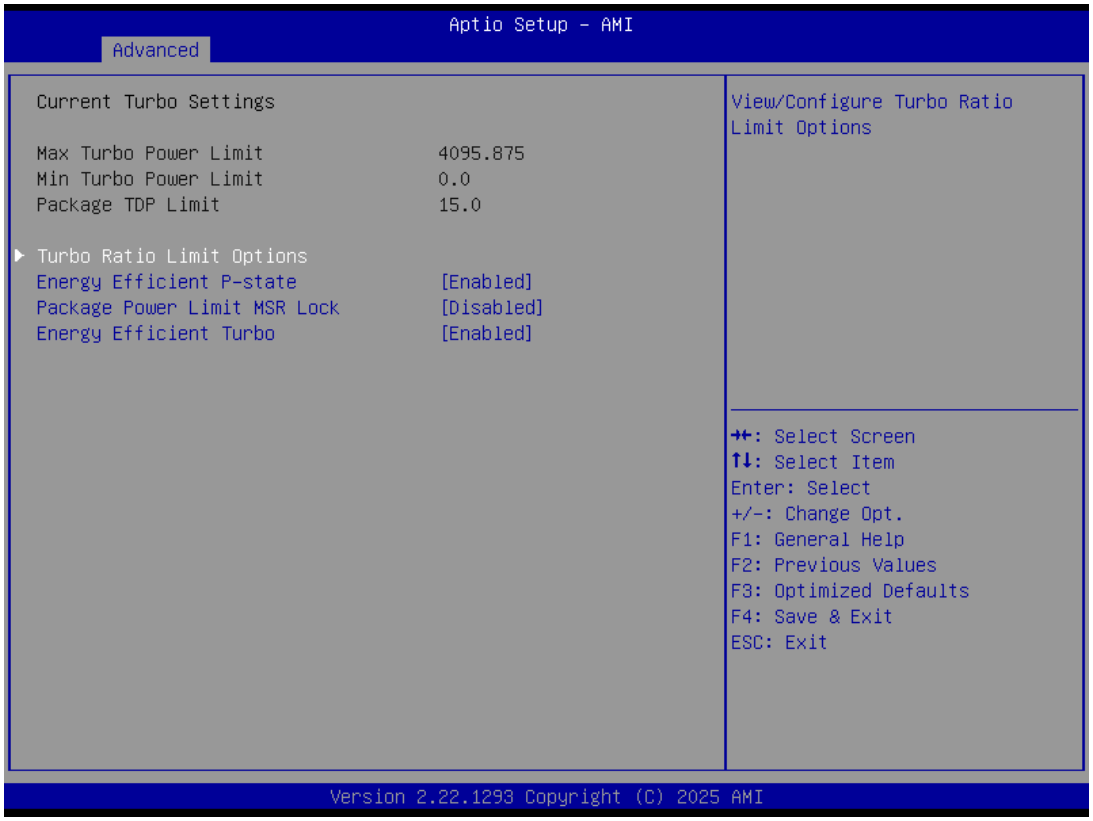

- **CPU – Power Management Control**
  CPU – Power Management Control Options.
- **GT – Power Management Control**
  GT – Power Management Control Options.

### CPU - Power Management Control



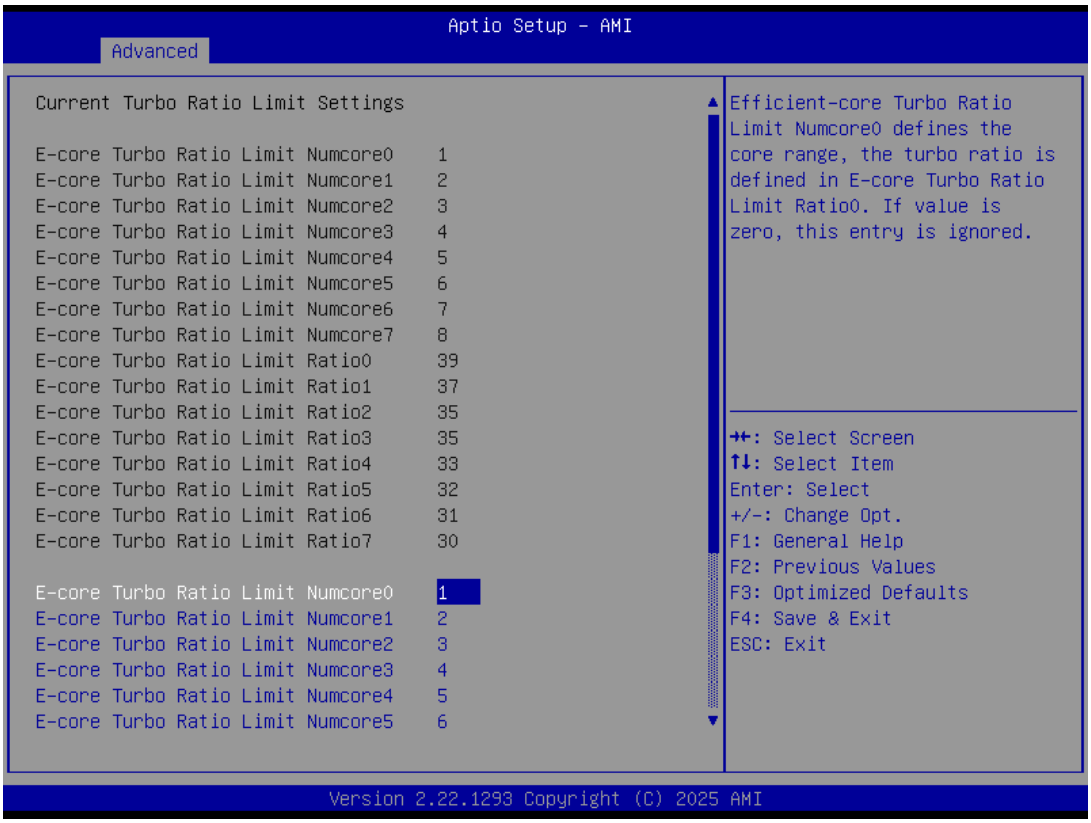

- **Boot Performance Mode**
  Select the performance state that the BIOS will set before OS handoff.
- **Intel® SpeedStep™**
  Allows more than two frequency ranges to be supported.
- **Intel® Speed Shift Technology**
  Enable/Disable Intel® Speed Shift Technology support.
- **HDC Control**
  Enable/Disable Intel HDC.
- **Turbo Mode**
  Enable/Disable processor turbo mode.
- **View/Configure Turbo Options**
  View and Configure Turbo Options.
- **Config TDP Configuration**
  Config TDP Configurations.
- **Platform PL1 Enable**
  Enable/Disable Platform Power Limit 1 programming.
- **Platform PL2 Enable**
  Enable/Disable Platform Power Limit 1 programming.
- **Power Limit 4 Override**
  Enable/Disable Power Limit 4 override.
- **C states**
  Enable/Disable CPU Power Management.
- **PowerLimit 3 Settings**
  Power Limit 3 Settings.

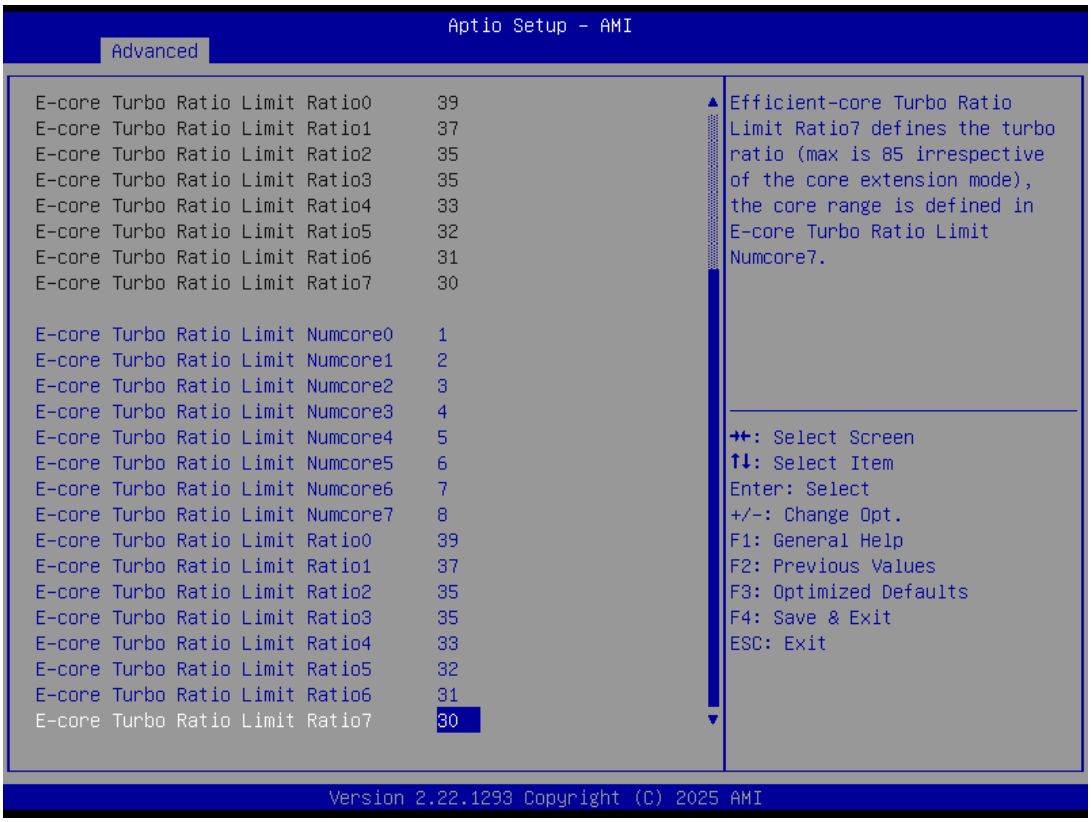
### View/Configure Turbo Options




- **Turbo Ratio Limit Option**
  View/Configure Turbo Ratio Limit Options.
- **Energy Efficient P-state**
  Enable/Disable Energy Efficient P-state feature.
- **Package Power Limit MSR Lock**
  Enable/Disable locking of Package Power Limit settings.
- **Energy Efficient Turbo**
  Enable/Disable Energy Efficient Turbo feature.

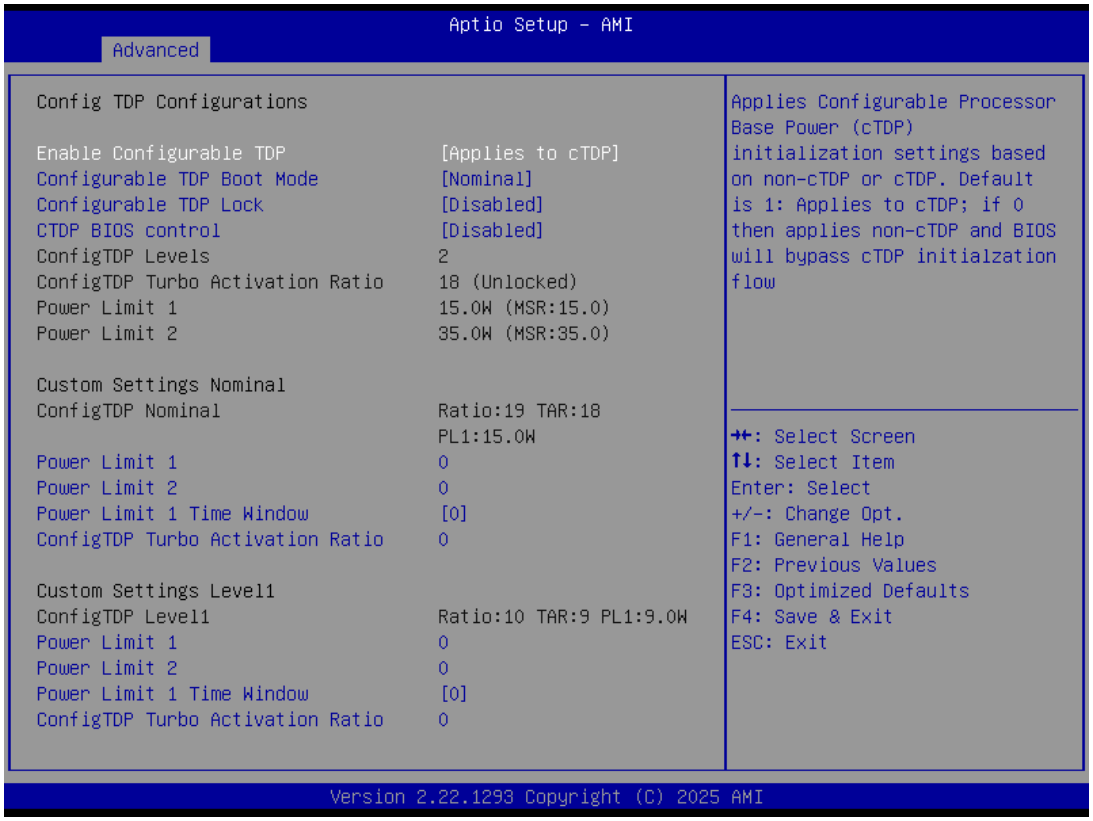
## Current Turbo Ratio Limit Settings



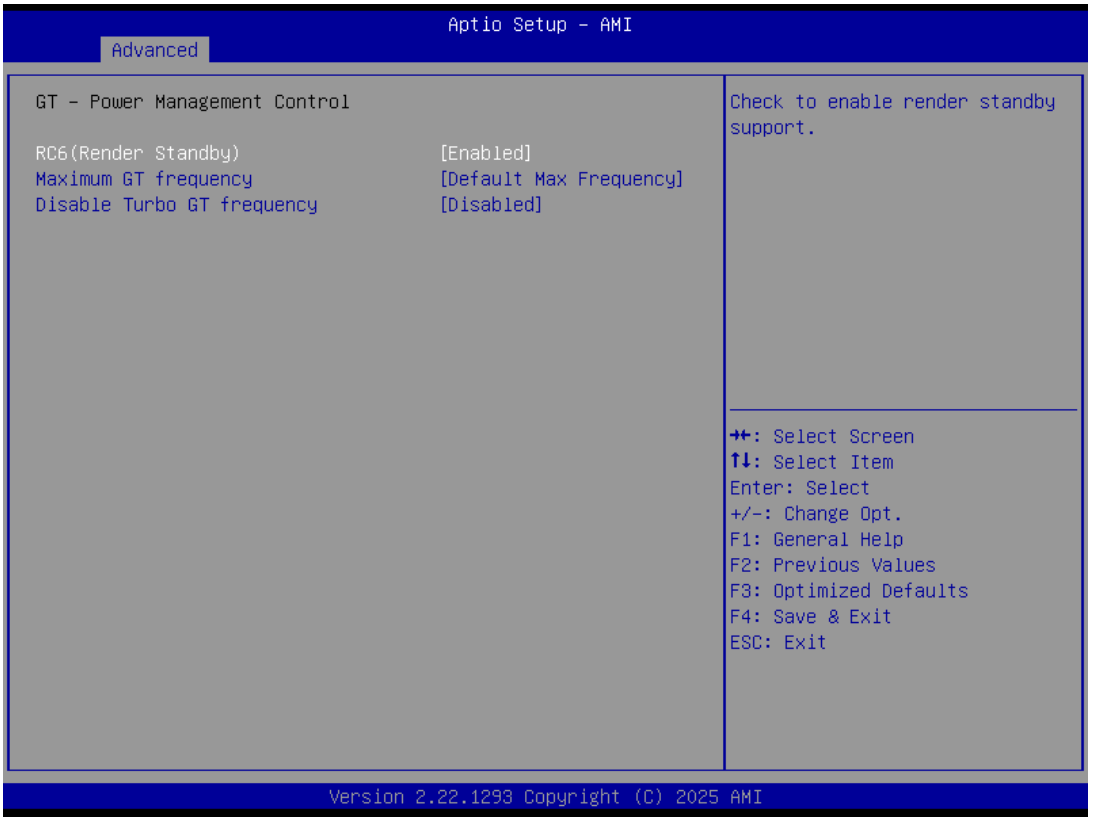

– E-core Turbo Ratio Limit Numcore x
  Efficient-core Turbo Ratio Limit Numcore x defines the core range.

### Config TDP Configurations



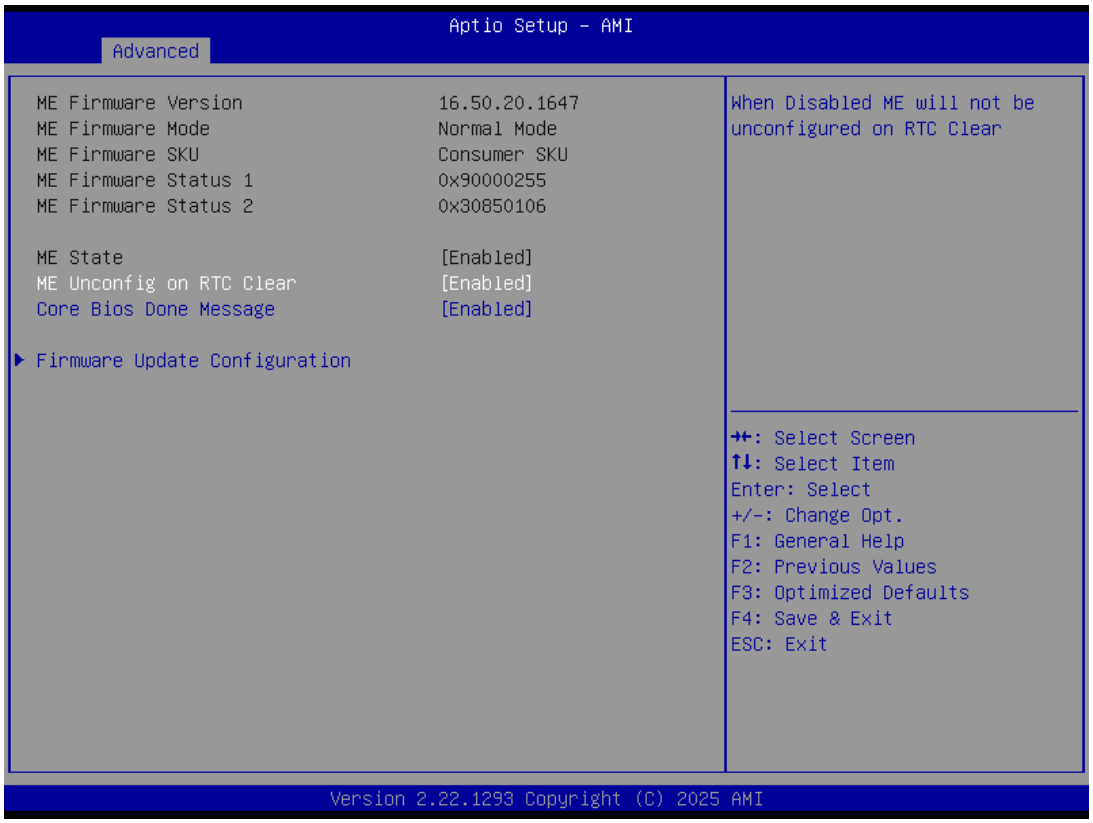

- **Enable Configurable TDP**
  Applies TDP initialization settings based on non-cTDP or cTDP.
- **Configurable TDP Boot Mode**
  Configurable TDP Mode as Nominal/Up/Down/Deactivate TDP selection.
- **Configurable TDP Lock**
  Configurable TDP Mode Lock sets the Lock bit.
- **CTDP BIOS Control**
  Enables CTDP control via runtime ACPI BIOS method.

### GT - Power Management Control




- **RC6(Render Standby)**
  Check to enable render standby support.
- **Maximum GT Frequency**
  Maximum GT frequency limited by user.
- **Disable Turbo GT Frequency**
  Enabled/Disabled Turbo GT frequency.

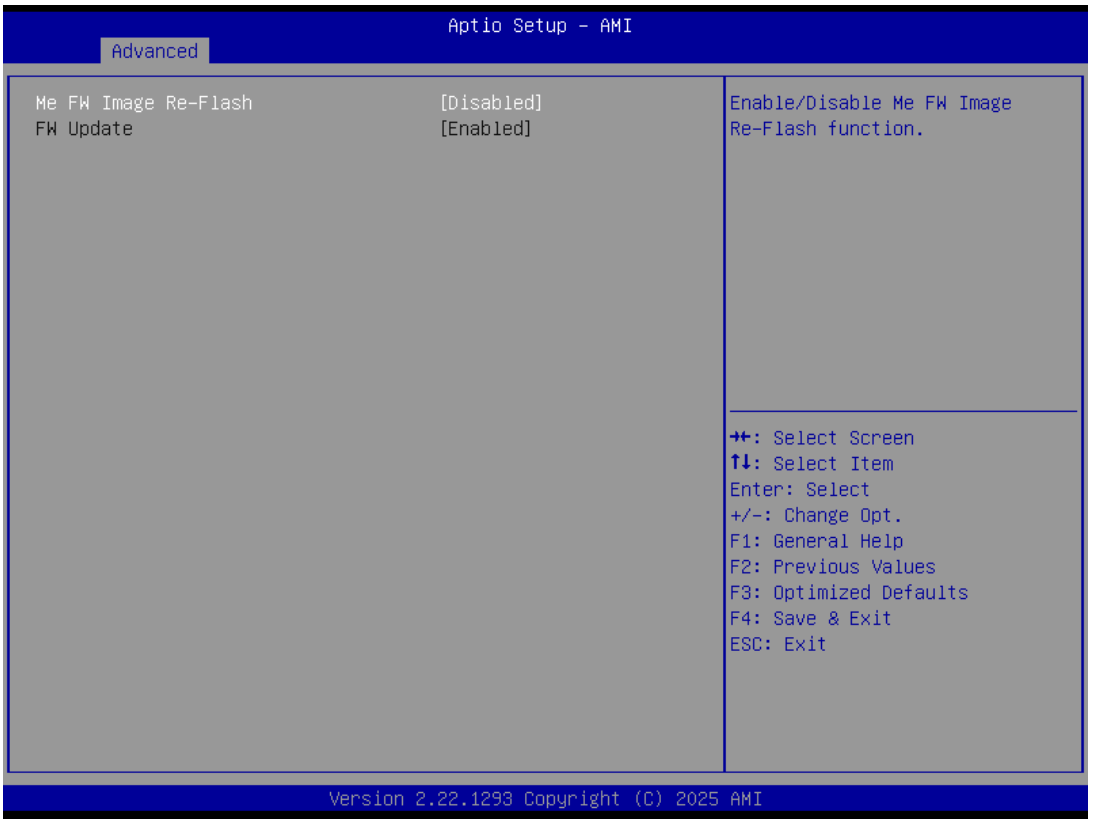
#### 4.1.2.4 PCH-FW Configuration




- **ME State**
  When Disabled ME will be put ME into Temporarily Disabled Mode.
- **ME Unconfig on RTC Clear**
  When Disabled, ME will not be unconfigured on RTC Clear.
- **Core BIOS Done Message**
  Enable/Disable Core BIOS Done message sent to ME.

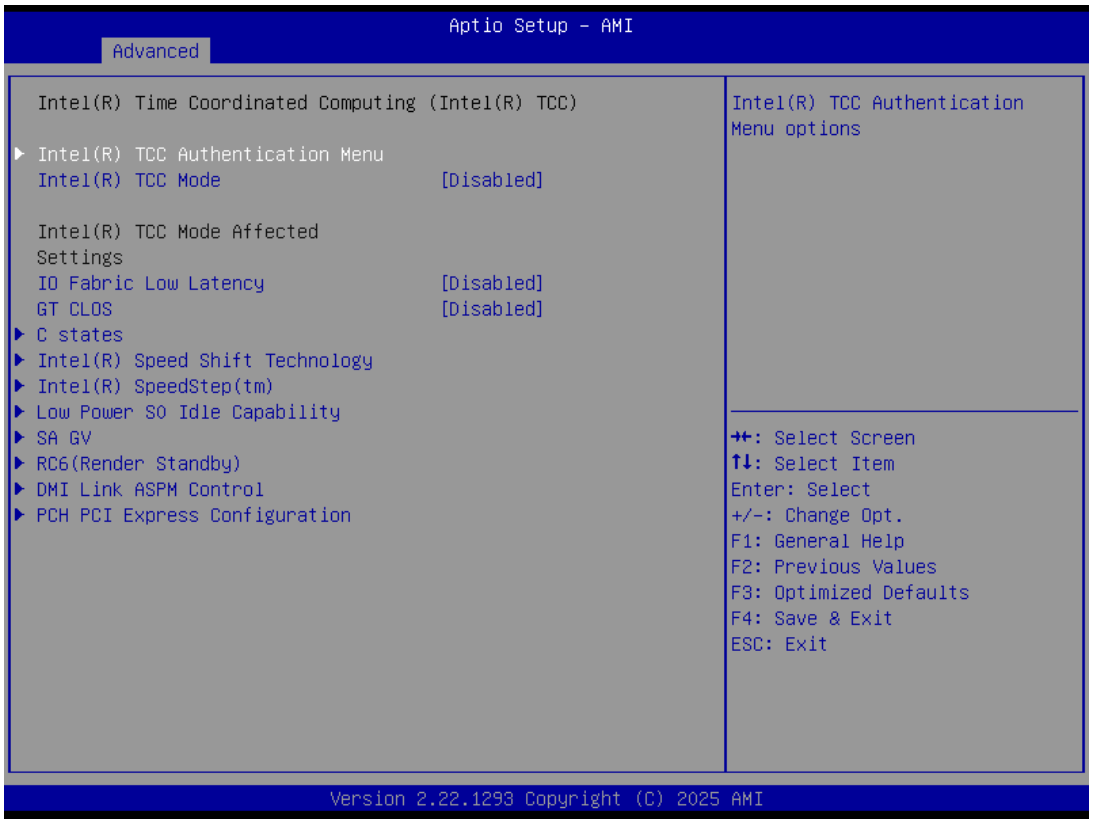
## Firmware Update Configuration

Configure Management Engine Technology Parameters.




- ME FW Image Re-Flash
  Enable/Disable ME FW Image Re-Flash function.
- FW Update
  Enable/Disable ME FW Update function.

#### 4.1.2.5 Intel® Time Coordinated Computing (Intel ® TCC)




- **Intel® TCC Authentication Menu**
  Intel® TCC Authentication Menu Options
- **Intel® TCC Mode**
  Enable or Disable Intel® TCC Mode. When enabled, this will modify system settings to improve real-time performance. The full list of settings and their current state are displayed below when Intel® TCC mode is enabled.
- **Intel® TCC Mode Affected Settings**
- **IO Fabric Low Latency**
  Enable or Disable IO Fabric Low Latency. This will turn off some power management in the PCH IO fabrics. This option provides the most aggressive IO Fabric performance setting. S3 state is NOT supported.
- **GT CLOS**
  Enable or Disable Graphics Technology (GT) Class of Service. Enable will reduce Gfx LLC allocation to minimize impact of Gfx workload on LLC.
- **C States**
  Enable/Disable CPU Power Management. Allow CPU to go to C states when it's not 100% utilized.
- **Intel® Speed Shift Technology**
  Enable/Disable Intel® Speed Shift Technology support. Enabling will expose the CPPC v2 interface to allow for hardware controlled P-states.
- **Intel® SpeedStep™**
  Allow more than two frequency ranges to be supported.
- **Low Power S0 Idle Capability**

This variable determines if we enable ACPI Lower Power S0 Idle Capability (Mutually exclusive with Smart connect). While this is enabled, it also disables the 8254 timer for SLP_S0 support.

- **SA GV**

  System Agent Geyserville. This can disable, fix to a specific point, or enable frequency

  switching.

- **RC6 (Render Standby)**

  Check to enable render standby support.

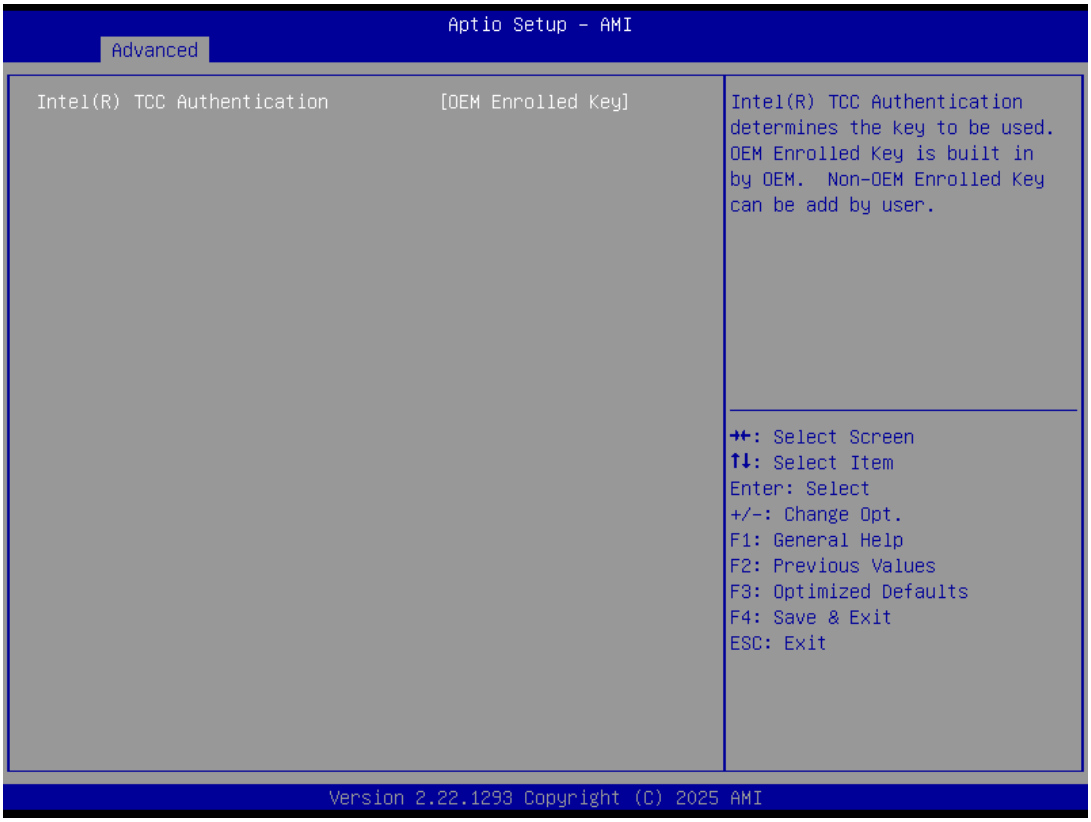
- **DMI Link ASPM Control**

  The control of Active State Power Management of the DMI Link.

- **PCH PCI Express Configuration**

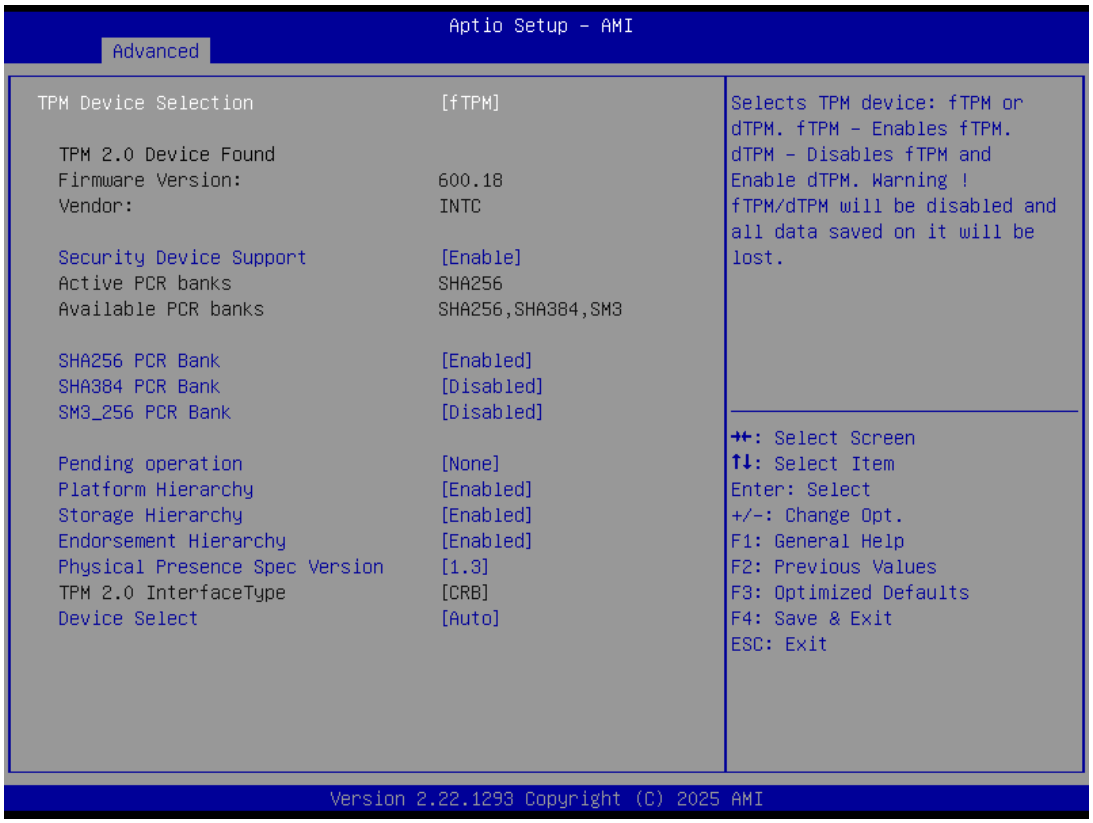
  PCI Express Configuration Setting.

- **Intel® TCC Authentication**




  – Intel® TCC Authentication determines the key to be used. OEM Enrolled Key is built in by the OEM. Non-OEM Enrolled Key can be added by the user.

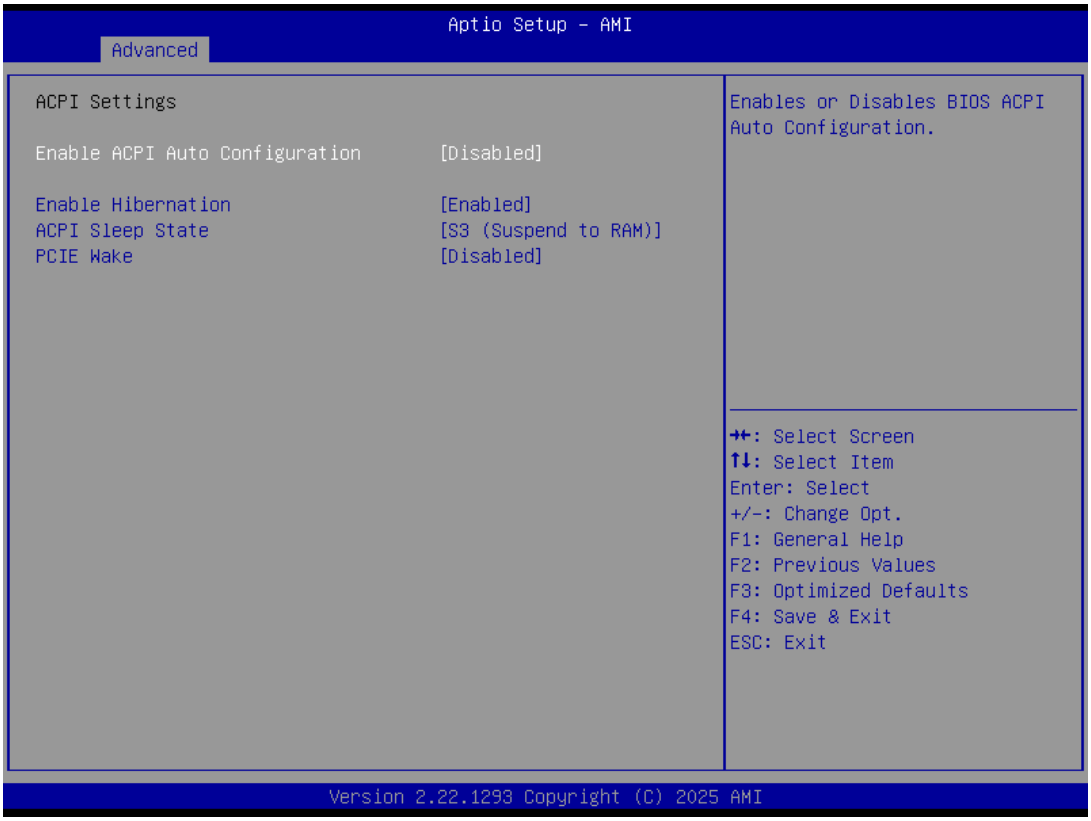
#### 4.1.2.6 Trusted Computing




- **TPM Device Selection**
  Select TPM device: fTPM or dTPM.
- **Security Device Support**
  Enable or disable BIOS support for a security device.
- **SHA256 PCR Bank**
  Enable or Disable SHA256 PCR Bank.
- **SHA384 PCR Bank**
  Enable or Disable SHA384 PCR Bank.
- **SM3_256 PCR Bank**
  Enable or Disable SM3_256 PCR Bank.
- **Pending Operation**
  Schedule an Operation for the Security Device.
- **Platform Hierarchy**
  Enable or Disable Platform Hierarchy.
- **Storage Hierarchy**
  Enable or Disable Storage Hierarchy.
- **Endorsement Hierarchy**
  Enable or Disable Endorsement Hierarchy.
- **Physical Presence Spec Version**
  Select to tell the OS to support PPI Spec Version 1.2 or 1.3.
- **TPM 2.0 Interface Type**
- **Device Select**

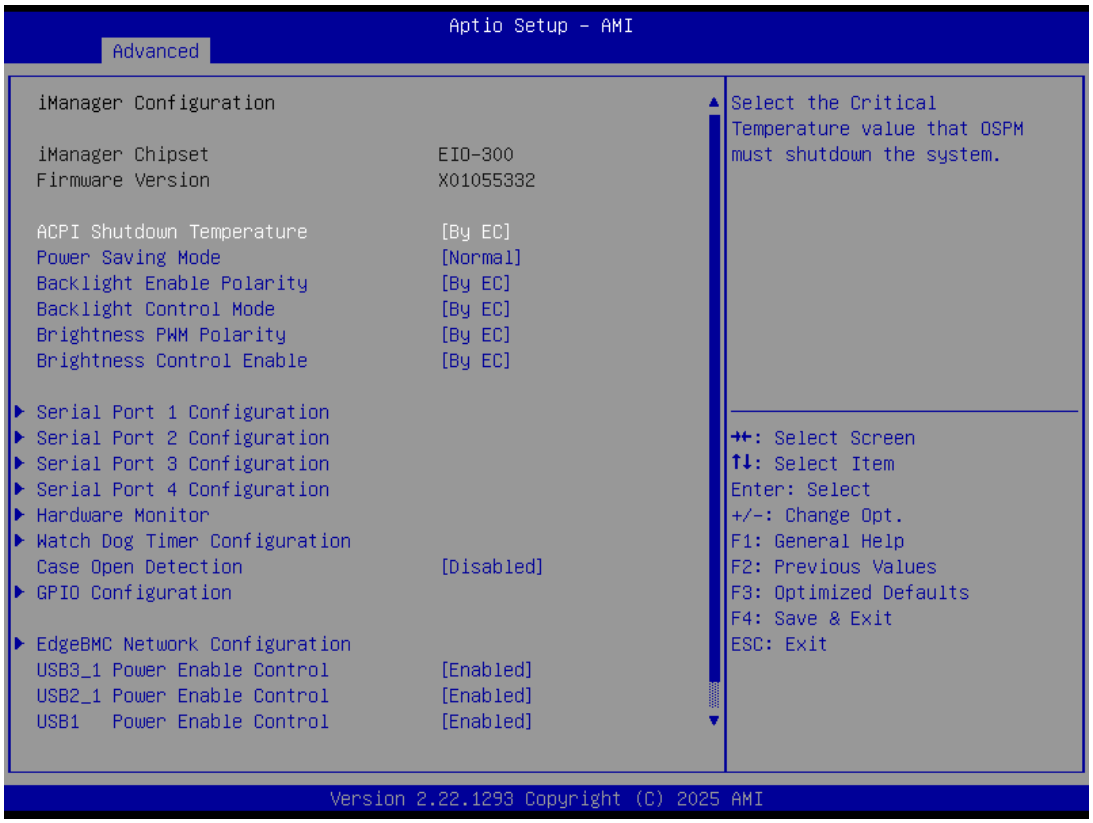
TPM 1.2 will restrict support to TPM 1.2 devices. TPM 2.0 will restrict support to TPM 2.0 devices. Auto will support both with the default set to TPM 2.0 devices. If not found, TPM 1.2 devices will be enumerated.

#### 4.1.2.7 ACPI Settings




- **Enable ACPI Auto Configuration**
  Enable or Disable BIOS ACPI auto configuration.
- **Enable Hibernation**
  Enable or Disable the system ability to hibernate (OS/S4 Sleep State). This option may not be effective with some OS.
- **ACPI Sleep State**
  Select the highest ACPI sleep state the system will enter when the SUSPEND button is pressed.
- **PCIE Wake**
  Enable or disable PCIE to wake the system from S5.

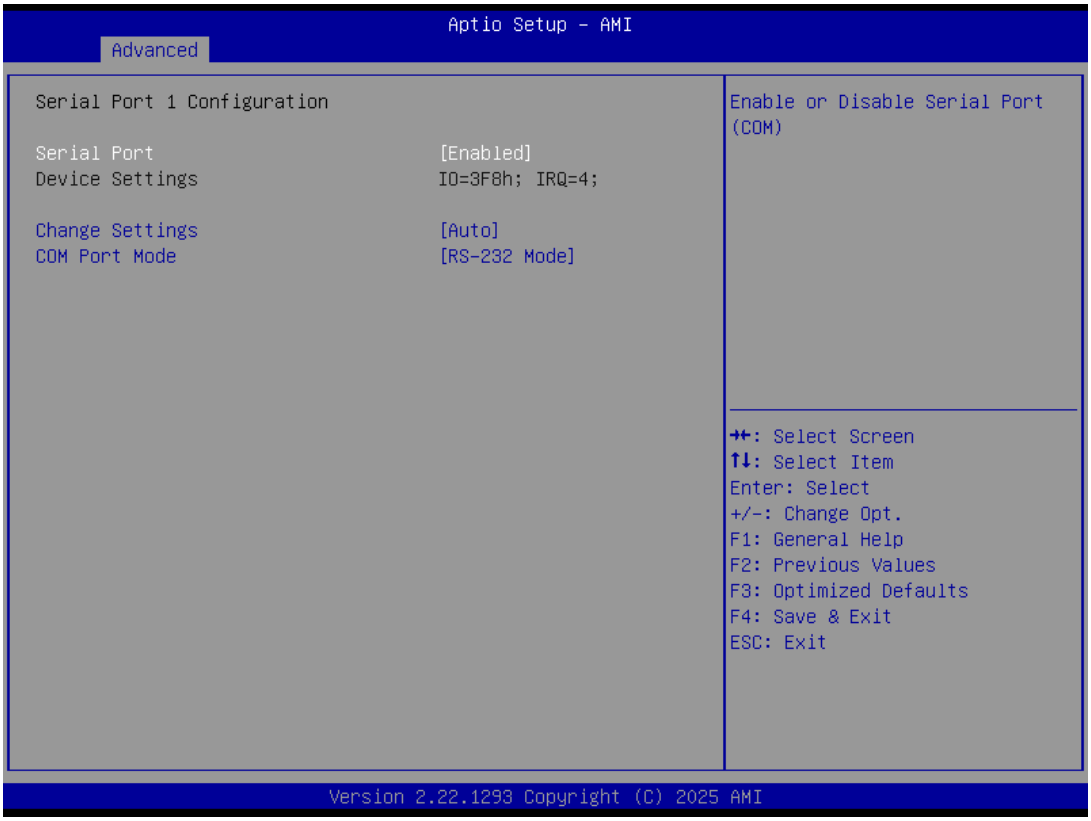
### 4.1.2.8 iManager Configuration




- **ACPI Shutdown Temperature**
  Select the Critical Temperature value at which the OSPM must shut down the system.
- **Power Saving Mode**
  Enable/Disable power saving mode.
- **Backlight Enable Polarity**
  Switch Backlight Enable Polarity for Native or Invert.
- **Backlight Control Mode**
  Switch Backlight Control to PWM or DC mode.
- **Brightness PWM Polarity**
  Backlight Control Brightness PWM Polarity for Native or Invert.
- **Brightness Control Enable**
  Choose to control LVDS brightness value by EC or User override during POST stage.
- **Serial Port 1 Configuration**
  Set Parameters of Serial Port 1.
- **Serial Port 2 Configuration**
  Set Parameters of Serial Port 2.
- **Serial Port 3 Configuration**
  Set Parameters of Serial Port 3.
- **Serial Port 4 Configuration**
  Set Parameters of Serial Port 4.
- **Hardware Monitor**
  Monitor hardware Status.

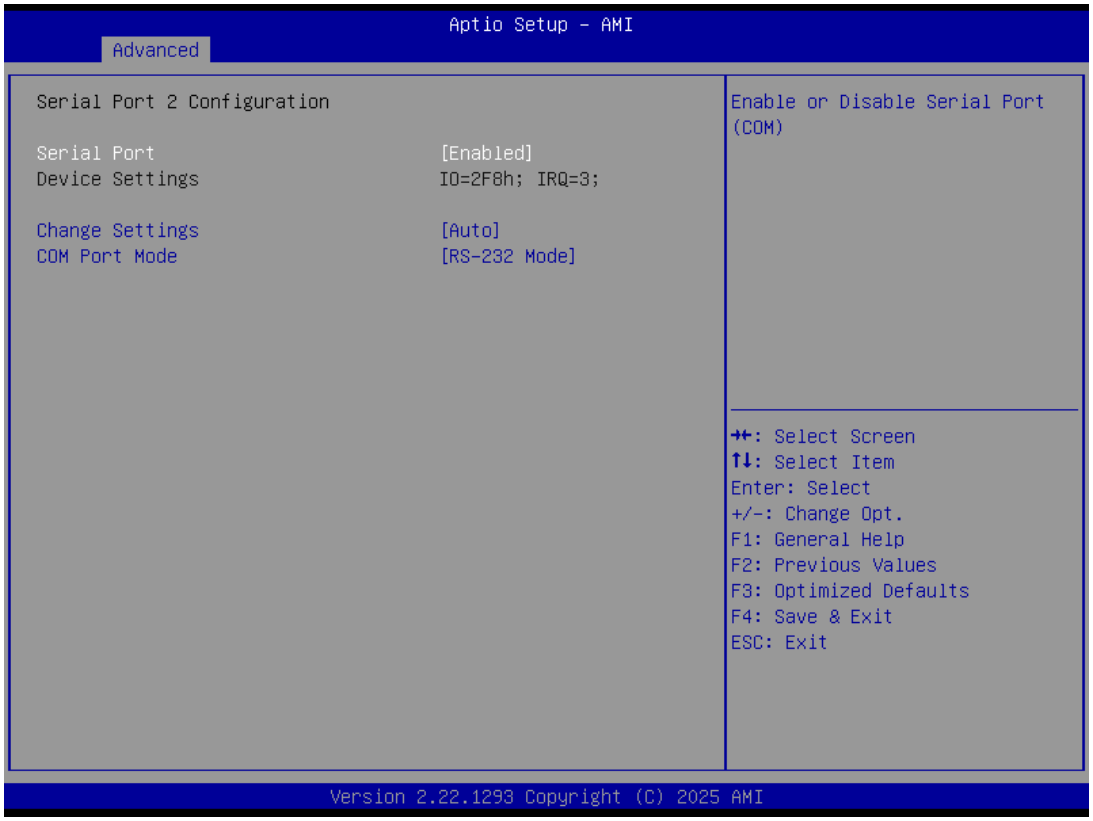
- **Watch Dog Timer Configuration**
  Watch Dog Timer Configuration Page.
- **Case Open Detection**
  Enable or Disable Case Open Detect Function.
- **GPIO Configuration**
  GPIO Configuration Settings.
- **EdgeBMC Network Configuration**
  Configure EdgeBMC Network Parameters.
- **USB3_1 Power Enable Control 1/2/3**
  Enable or Disable USB3_1 Rear Port Power in S4/S5.
- **USB1 Power Enable Control 1/2/3**
  Enable or Disable USB1 Internal Port Power in S4/S5.
- **USB2_1 Power Enable Control 1/2/3**
  Enable or Disable USB2_1 Rear Port Power in S4/S5.

### Serial Port 1 Configuration



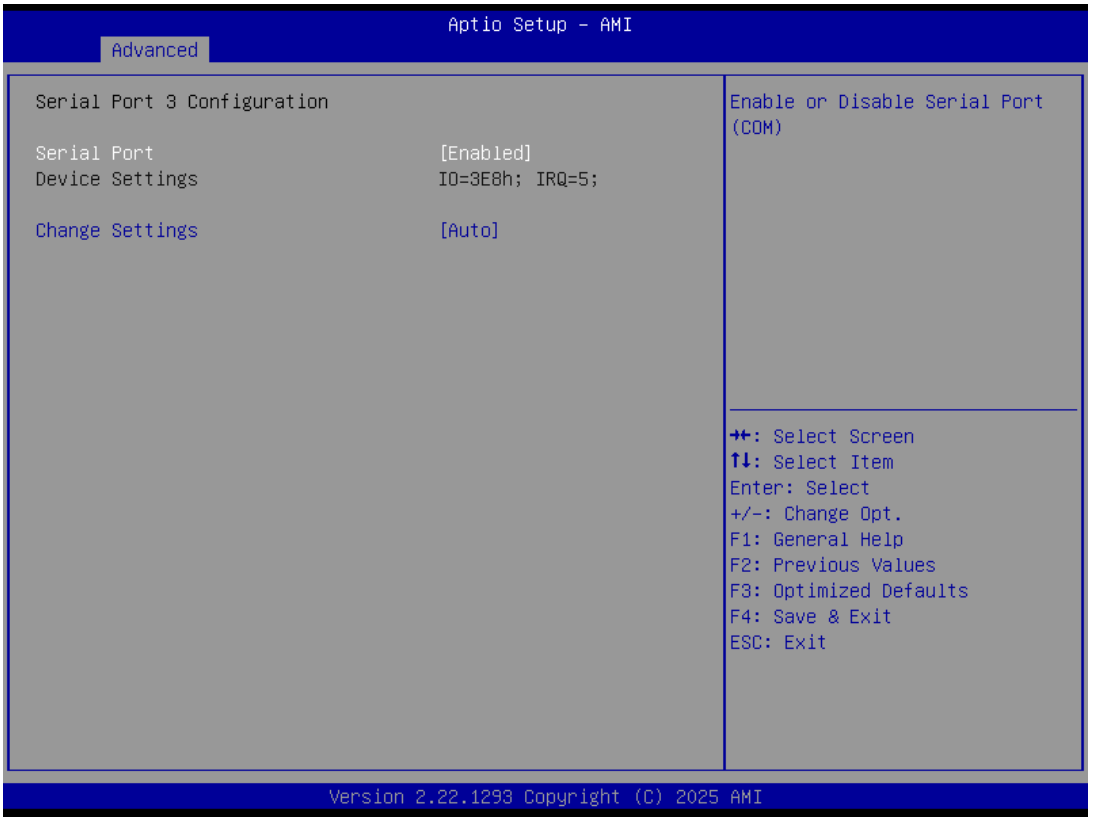

- **Serial Port**
  Enable or Disable Serial Port (COM).
- **Change Settings**
  Select an optimal settings for Super IO device.
- **COM Port Mode**
  COM Port Mode Select.

### Serial Port 2 Configuration



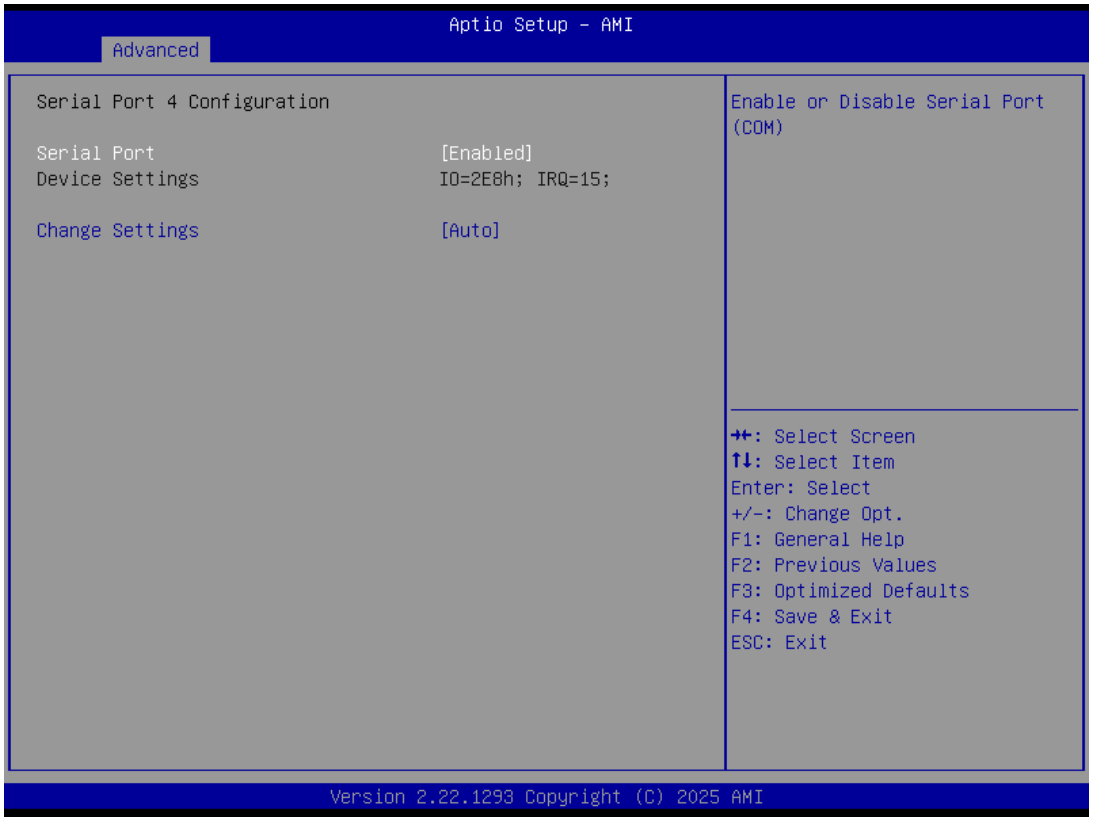

- **Serial Port**
  Enable or Disable Serial Port (COM).
- **Change Settings**
  Select an optimal settings for Super IO device.
- **COM Port Mode**
  COM Port Mode Select.

### Serial Port 3 Configuration



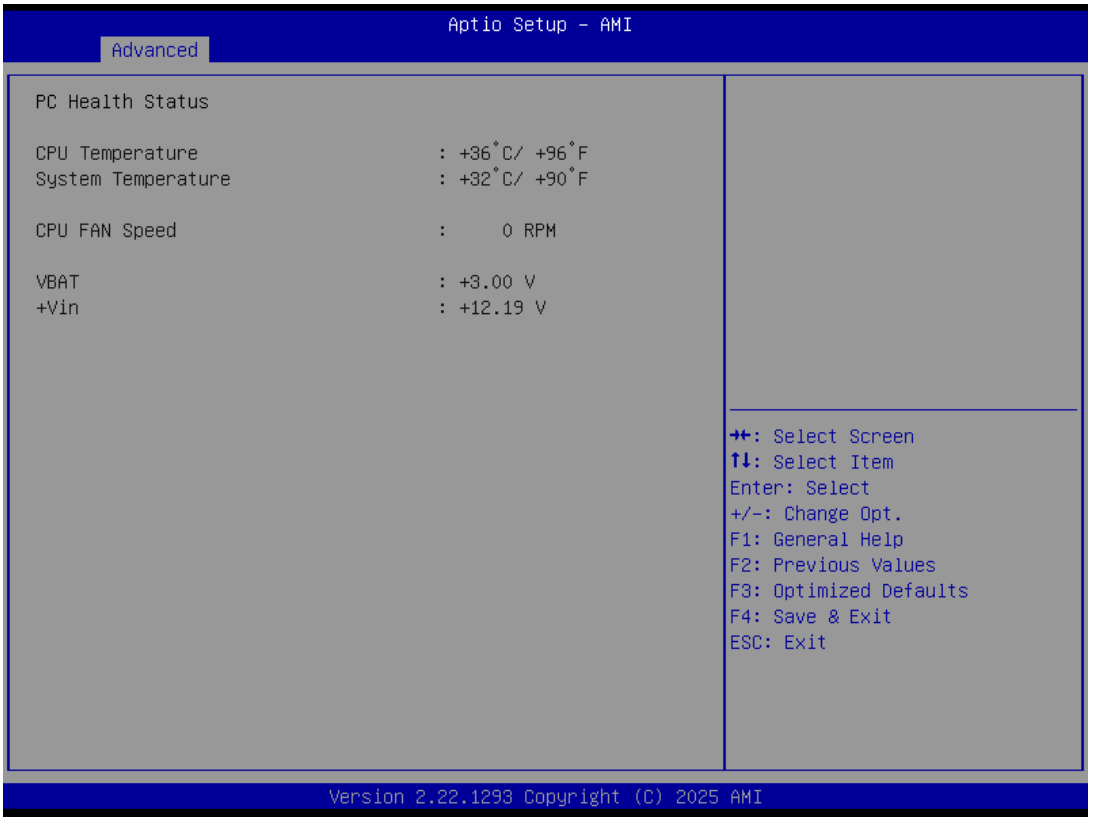

- **Serial Port**
  Enable or Disable Serial Port (COM).
- **Change Settings**
  Select an optimal settings for Super IO device.

### Serial Port 4 Configuration




- **Serial Port**
  Enable or Disable Serial Port (COM).
- **Change Settings**
  Select an optimal settings for Super IO device.

### Hardware Monitor



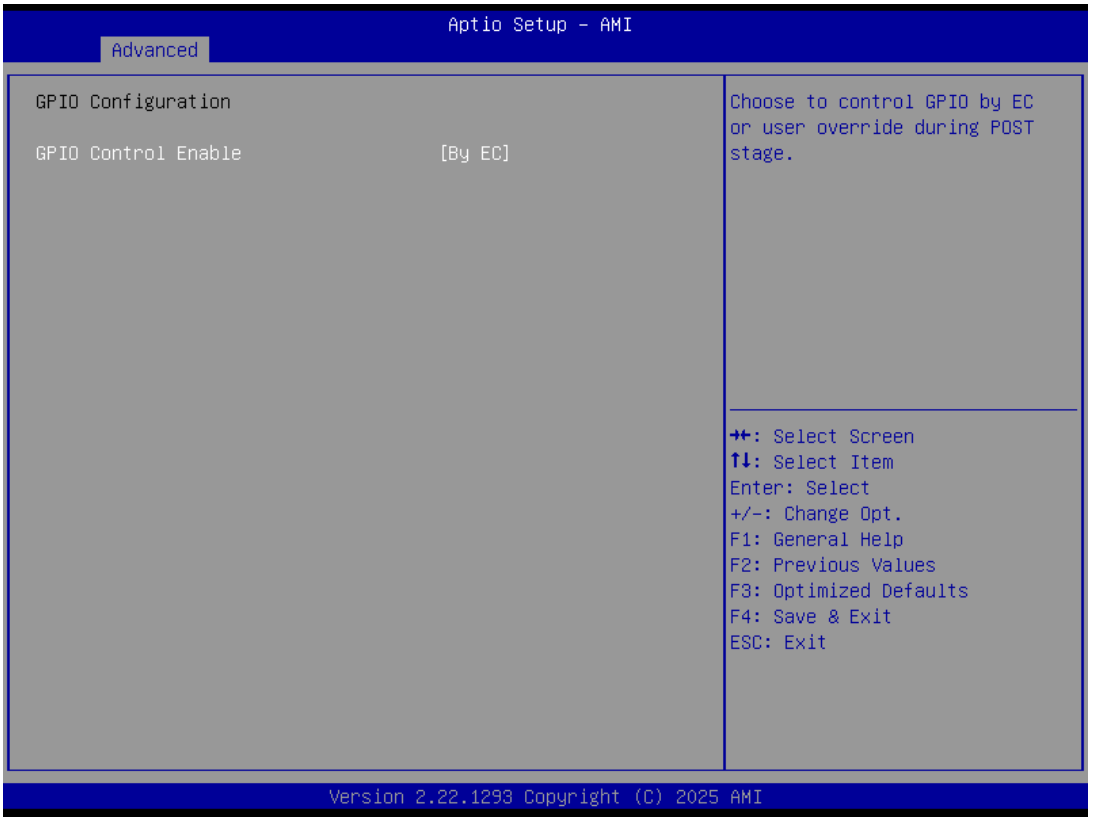

- **CPU Temperature**
- **System Temperature**
- **CPU FAN Speed**
- **VBAT**
  The Voltage of RTC Battery.
- **+Vin**
  The Voltage of System DC-IN.

### Watch Dog Timer Configuration



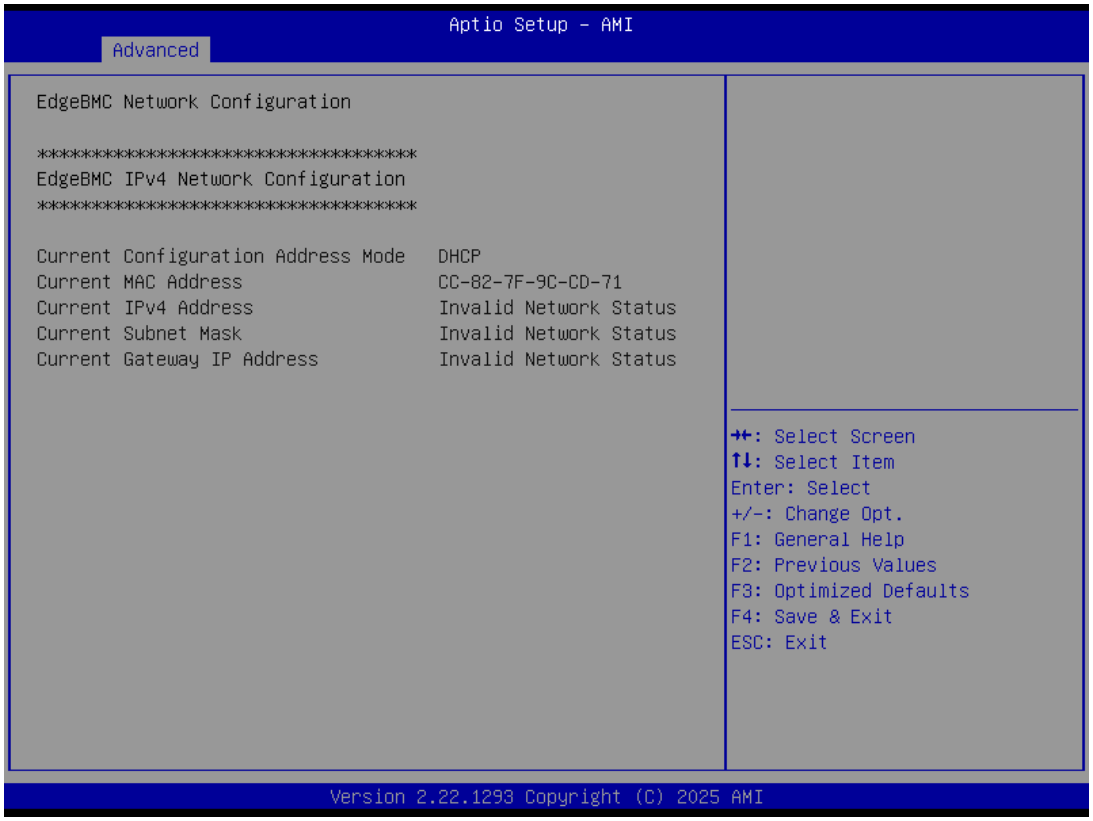

- **Watch Dog Timer**
  Enable or Disable Watch Dog Timer Function. (Start before boot to OS and must stop by self).

## GPIO Configuration




- **GPIO Control Enable**
  Choose to control GPIO by EC or user override during POST stage.

### EdgeBMC Network Configuration



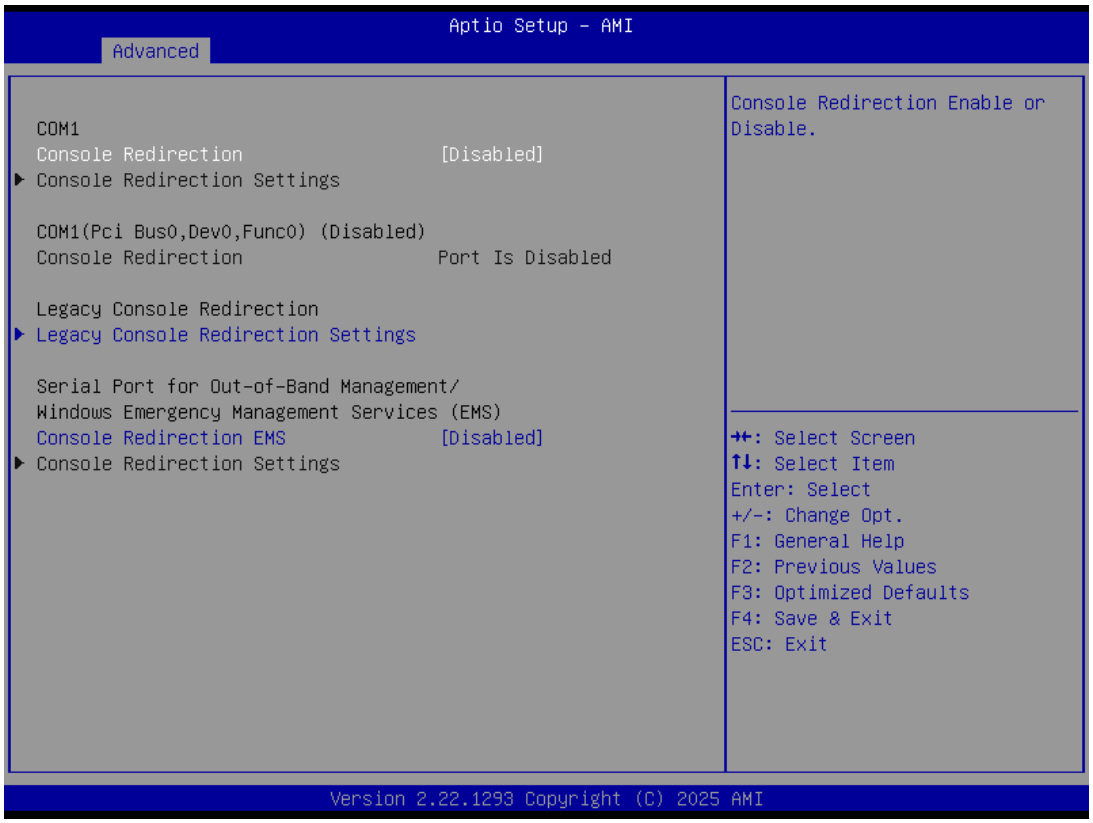

- **EdgeBMC Network Configuration**

### 4.1.2.9 S5 RTC Wake Settings



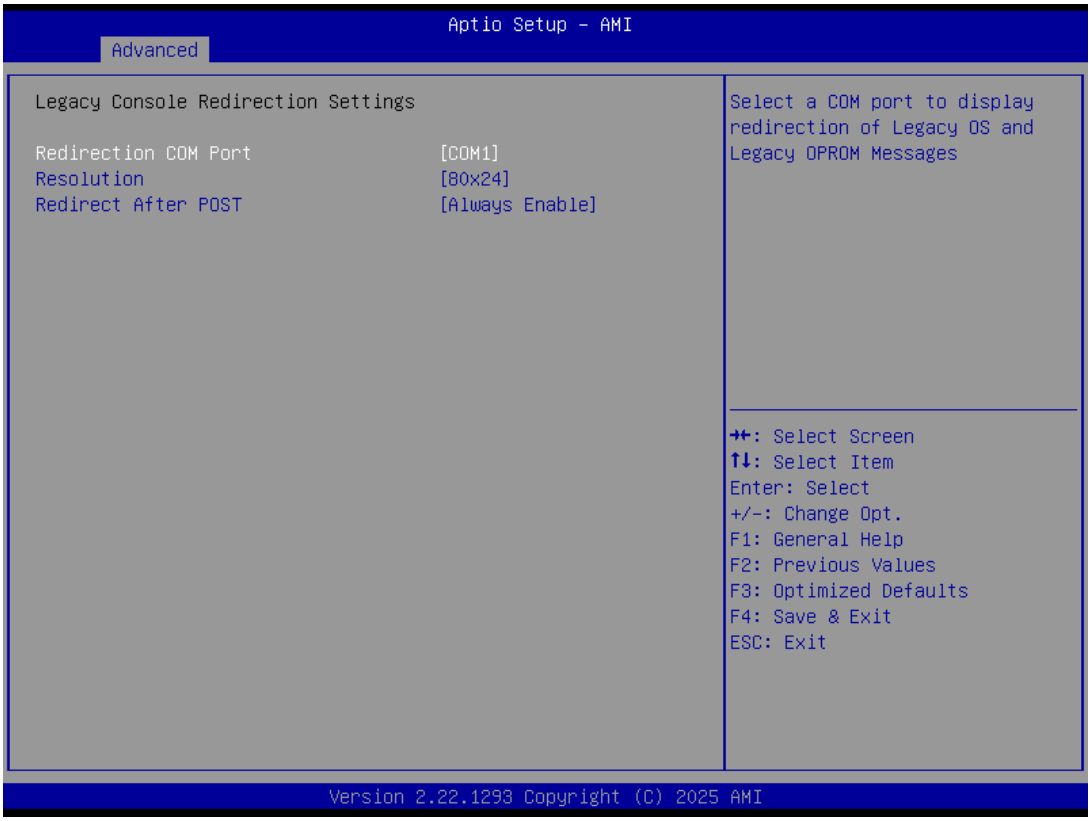

- **Wake System from S5**
  Enable or disable System wake on alarm event. Select FixedTime, system will wake on the hr:min:sec specified.

### 4.1.2.10 Serial Port Console Redirection




- **Console Redirection**
  This item allows users to enable or disable console redirection for Microsoft Windows Emergency Management Services (EMS).
- **Legacy Console Redirection**
  This item allows users to configure legacy console redirection detail settings.
- **Console Redirection EMS**
  This item allows users to enable or disable console redirection for Microsoft Windows Emergency Management Services (EMS).

### Legacy Console Redirection Settings




- **Redirection COM Port**

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

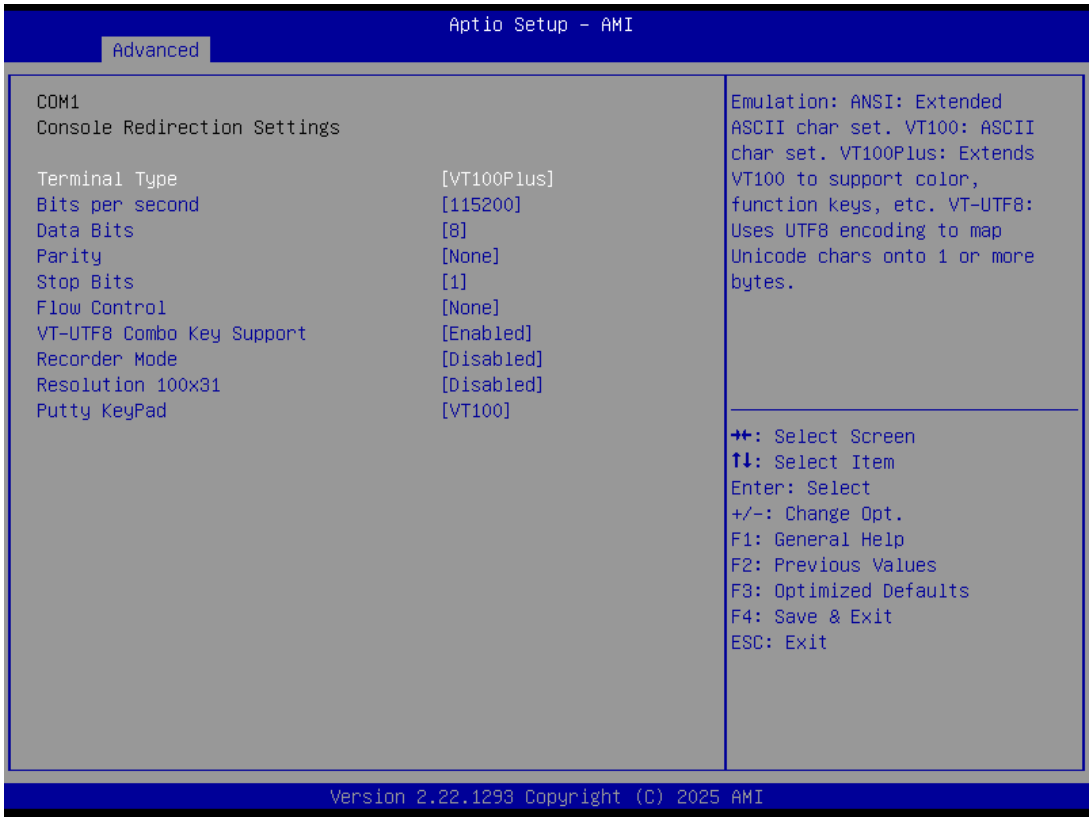
- **Resolution**

  On Legacy OS, the Number of Rows and Columns supported redirection

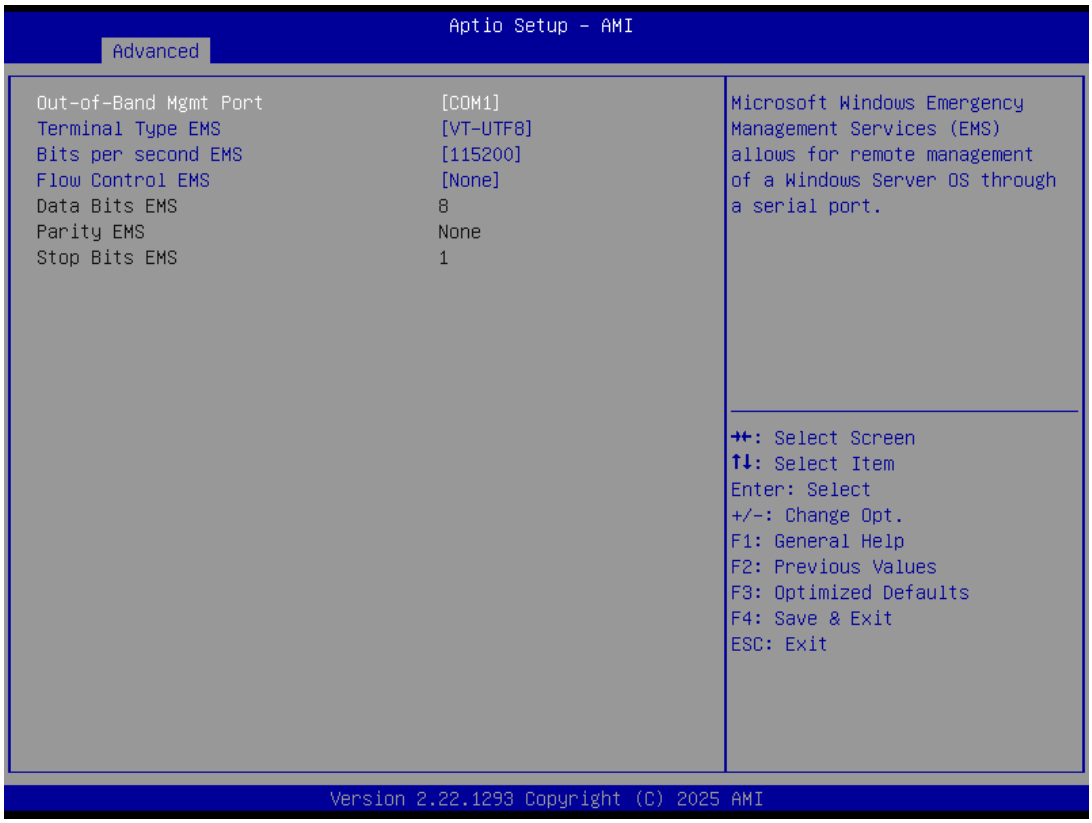
- **Redirect After POST**

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

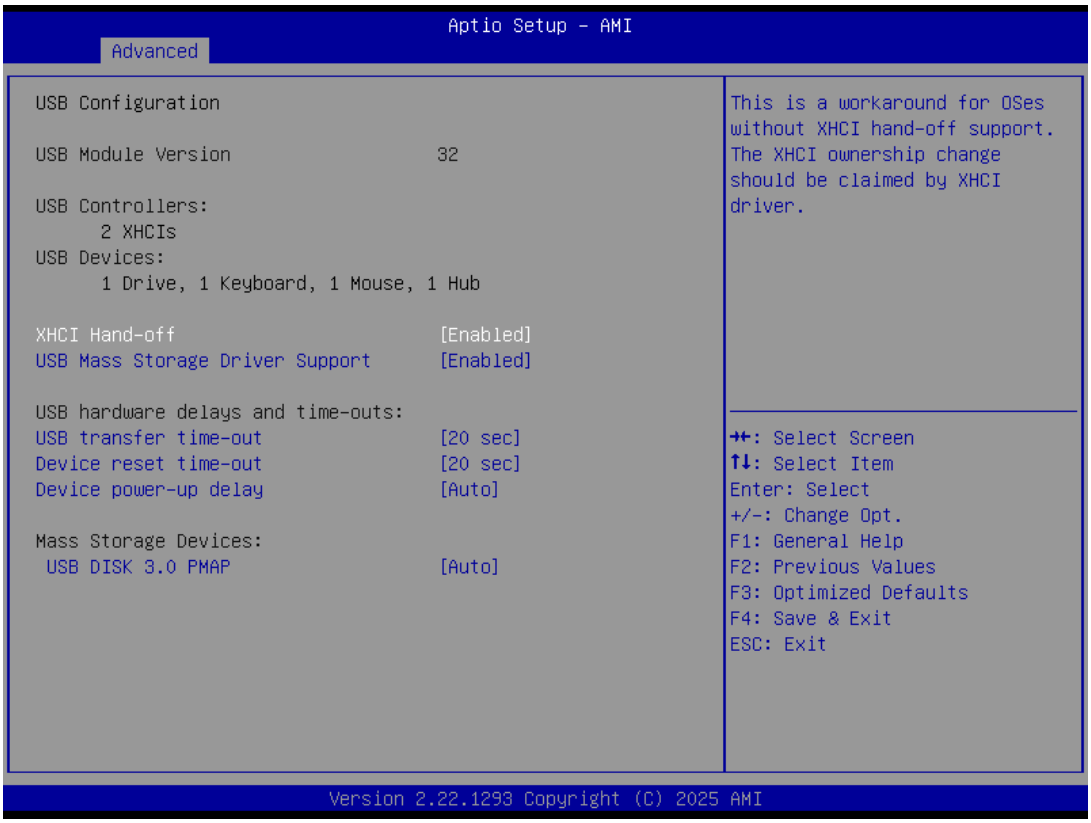
### Console Redirection Settings for COM




### Console Redirection Settings for Serial Port for Out-of-Band Management

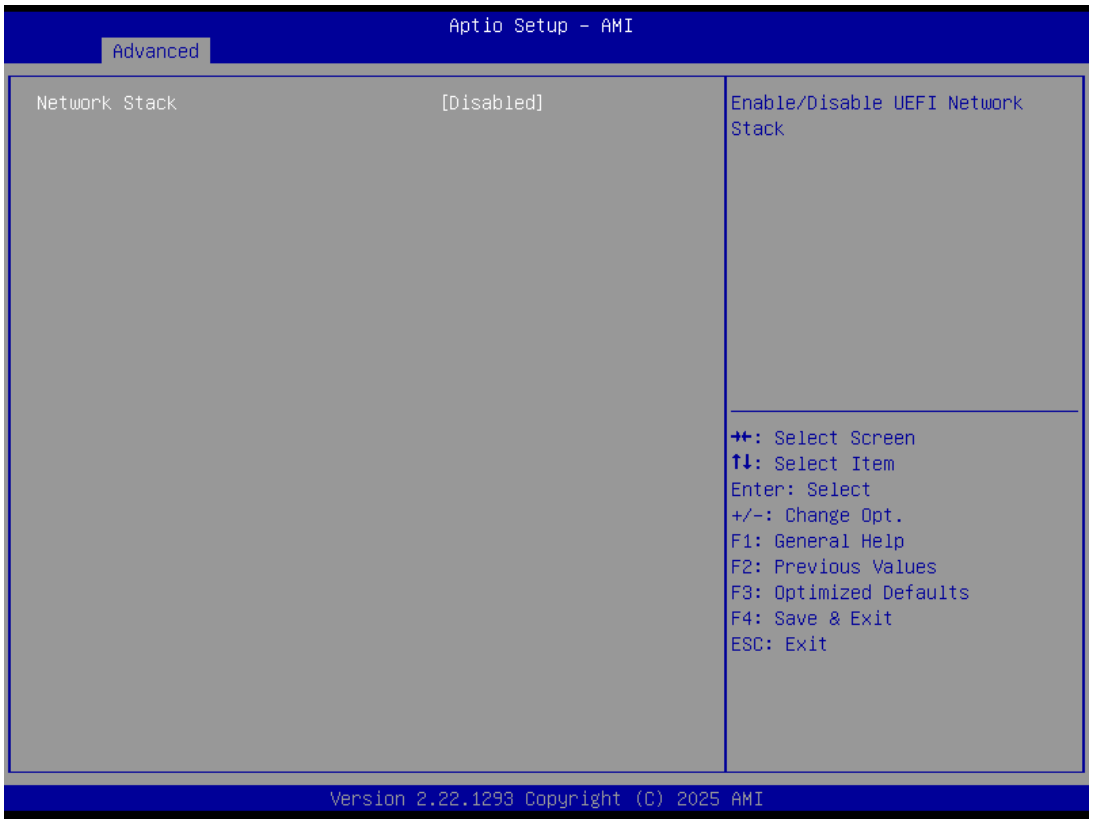


### 4.1.2.11 USB Configuration



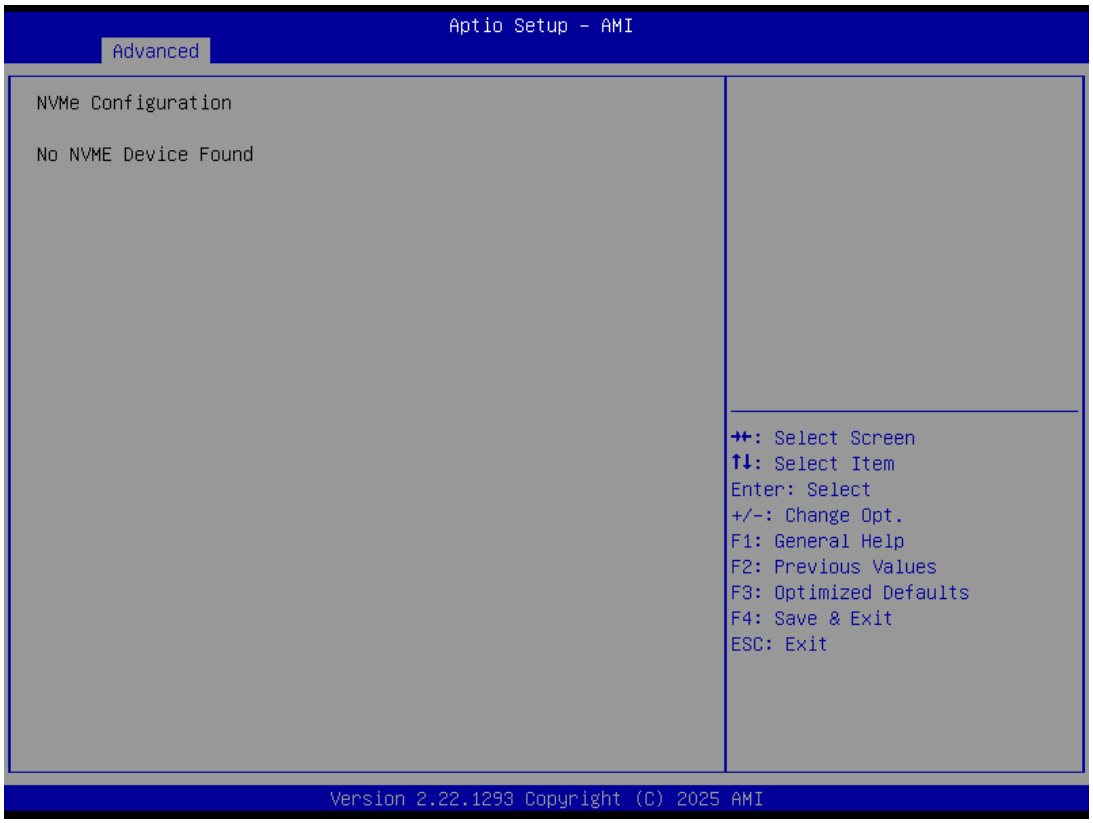

- **XHCI Hand-off**
  This is a workaround for OSes without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.
- **USB Mass Storage Driver Support**
  Enable/Disable USB Mass Storage Driver Support.
- **USB Transfer Time-out**
  Time-out value for control, Bulk, and interrupt transfers.
- **Device Reset Time-out**
  USB mass storage device start unit command time-out.
- **Device Power-up Delay**
  Maximum time the device will take before it properly reports itself to the Host Controller. 'Auto' uses default value: for a Root port it is 100 ms, for a Hub port the delay is taken from Hub descriptor.

### 4.1.2.12 Network Stack Configuration



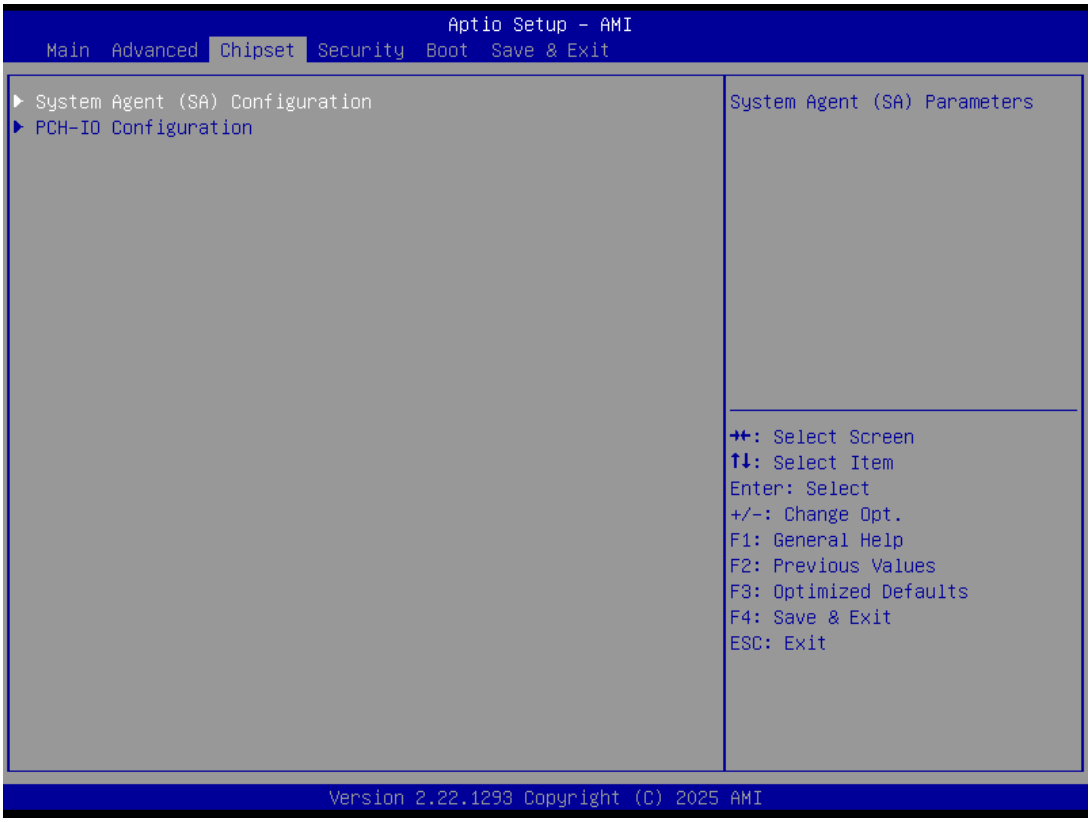

- **Network Stack**
  Enable/Disable UEFI Network Stack.

### 4.1.2.13 NVMe Configuration

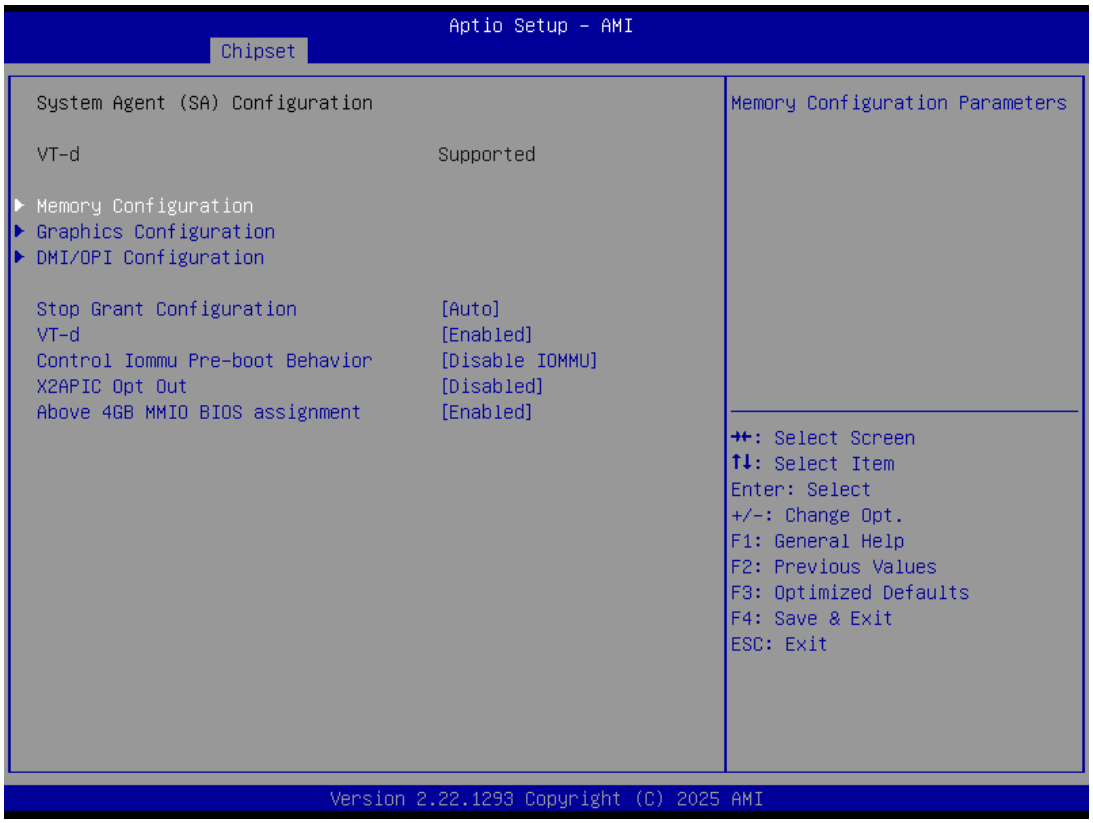


### 4.1.3 Chipset Configuration

Select the Chipset tab from the MIO-5854 setup screen to enter the Chipset BIOS Setup screen. You can display a Chipset BIOS Setup option by highlighting it using the <Arrow> keys. All Plug and Play BIOS Setup options are described in this section. The Plug and Play BIOS Setup screen is shown below.

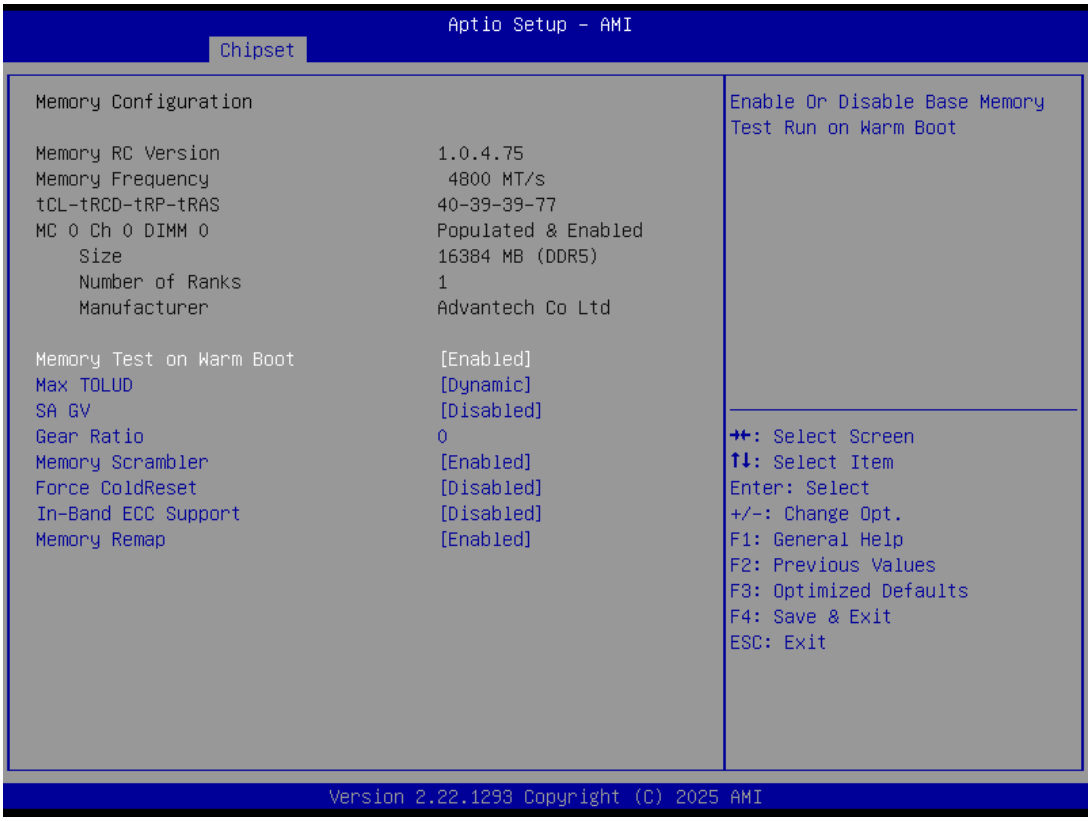


#### 4.1.3.1 System Agent (SA) Configuration



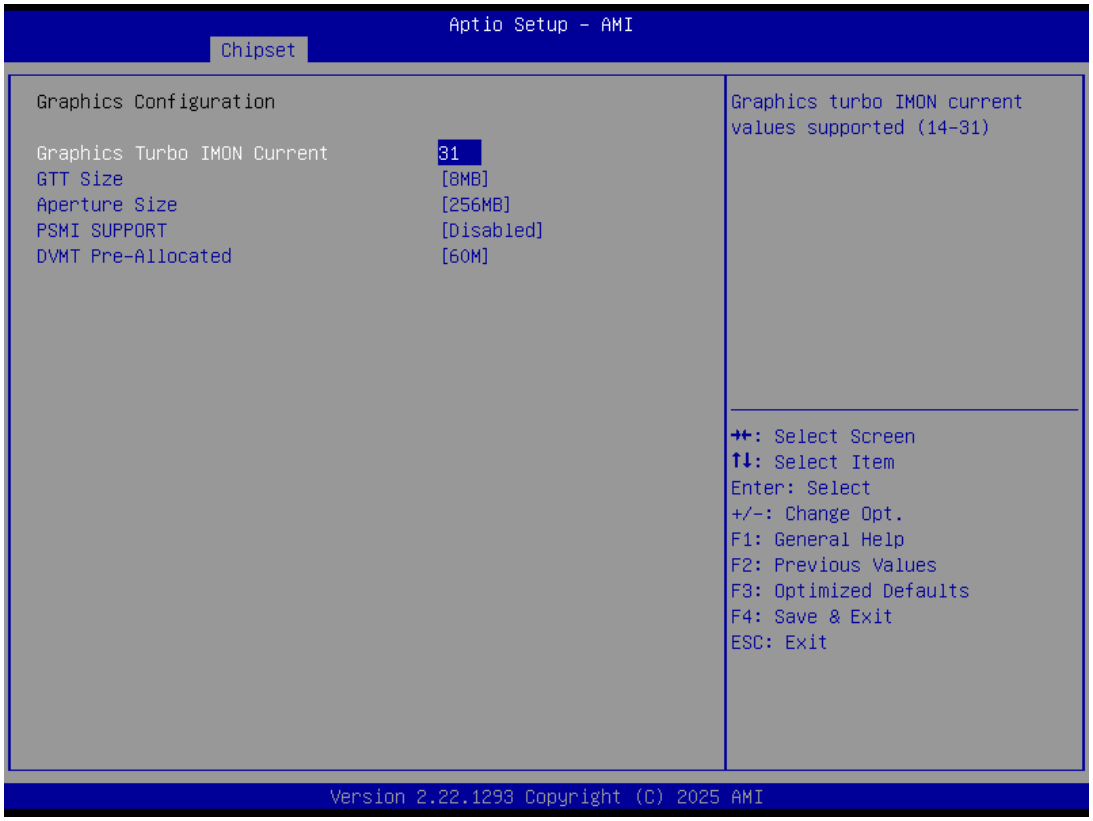

- **Memory Configuration**
  Memory Configuration Parameters.
- **Graphics Configuration**
  Graphics Configuration Parameters.
- **DMI/OPI Configuration**
  Control various DMI functions.
- **Stop Grant Configuration**
  Automatic/Manual stop grant configuration.
- **VT-d**
  VT-D capability.
- **Control Iommu Pre-boot Behavior**
  Enable IOMMU in Pre-boot environment.
- **X2APIC Opt Out**
  Enable/Disable X2APIC Opt Out Bit.
- **Above 4GB MMIO BIOS Assignment**
  Enable/Disable above 4GB Memory Mapped IO BIOS assignment.

### Memory Configuration



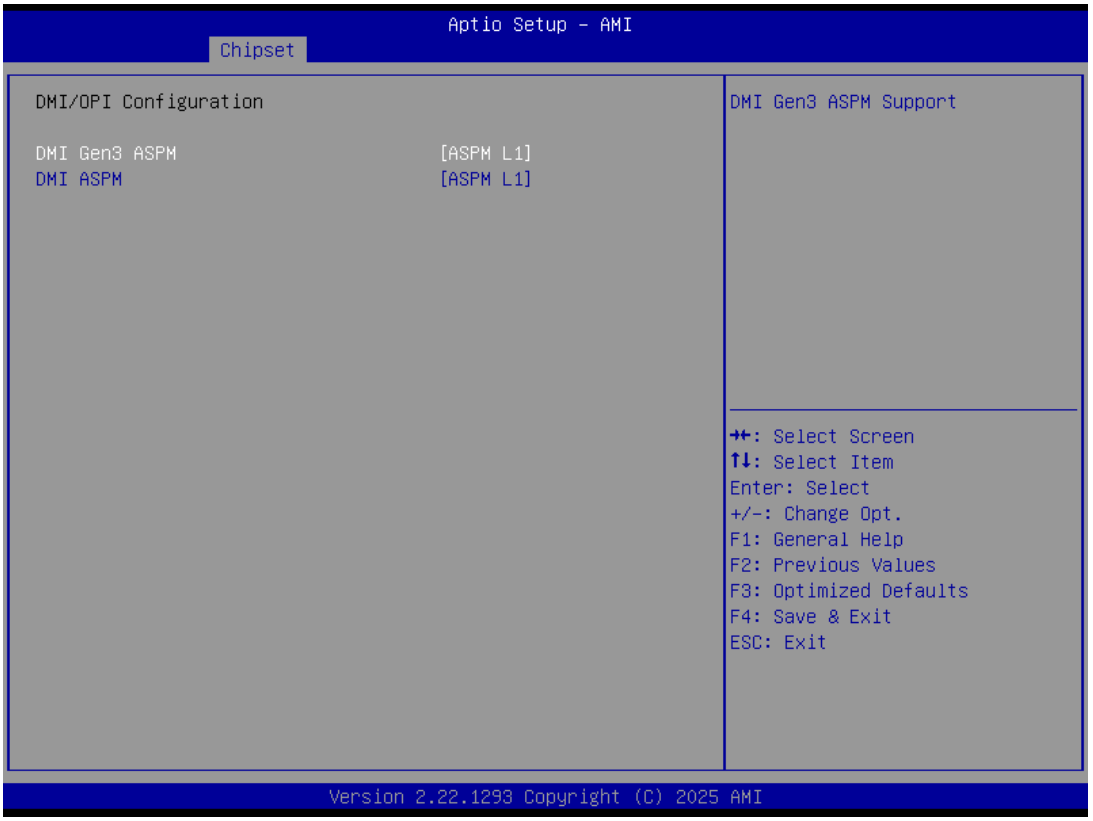

- **Memory Test on Warm Boot**
  Enable/Disable Base Memory Test Run on Warm Boot.
- **Max TOLUD**
  Maximum Value of TOLUD.
- **SA GV**
  System Agent Geysetville.
- **Gear Ratio**
  Gear ratio when SAGV is disabled.
- **Memory Scrambler**
  Enable/Disable Memory Scrambler support.
- **Force ColdReset**
  Force ColdReset OR Choose MrcColdBoot mode.
- **In-Band ECC Support**
  Enable/Disable In-Band ECC.
- **Memory Remap**
  Enable/Disable Memory Remap above 4GB.

### Graphics Configuration



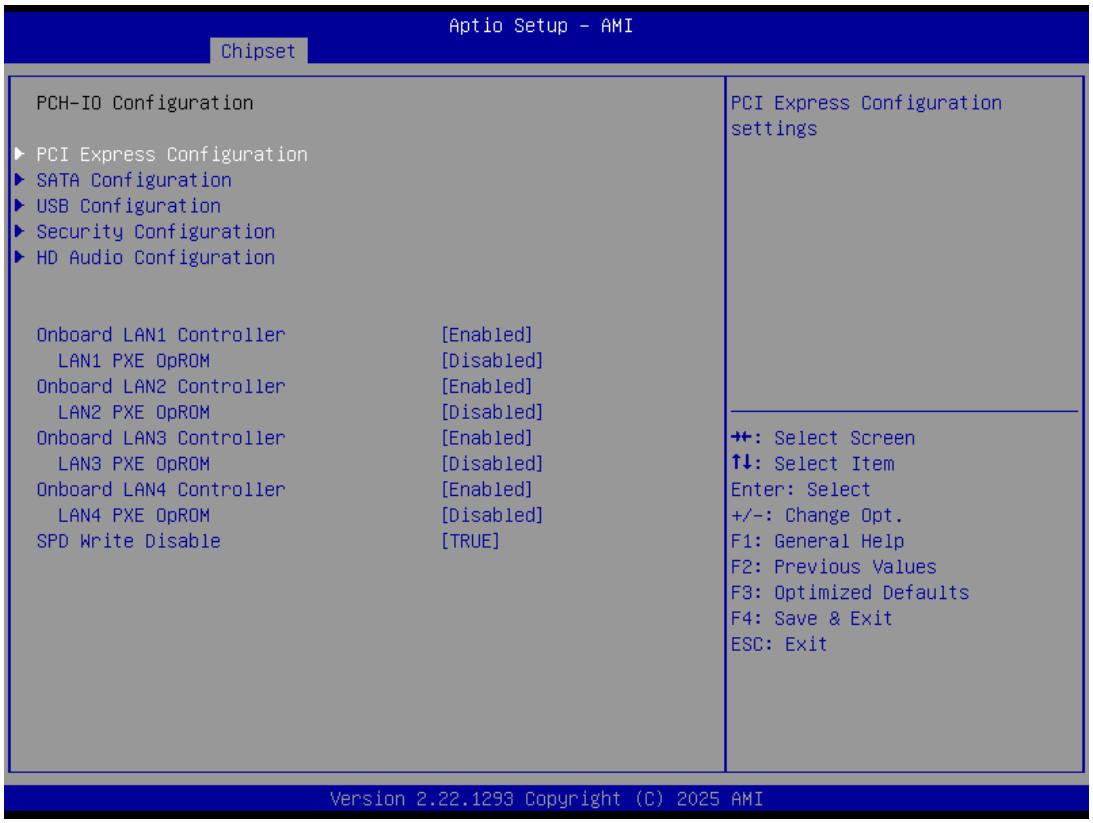

- **Graphics Turbo IMON Current**
  Graphics turbo IMON current values supported.
- **GTT Size**
  Select the GTT Size.
- **Aperture Size**
  Select the Aperture Size.
- **PSMI Support**
  Enable/Disable PSMI.
- **DVMT Pre-Allocated**
  Select DVMT 5.0 Pre-Allocated (Fixed) Graphics Memory size used by the Internal Graphics Device.

### DMI/OPI Configuration




- **DMI Gen3 ASPM**
  DMI Gen3 ASPM Support.
- **DMI ASPM**
  DMI ASPM Support.

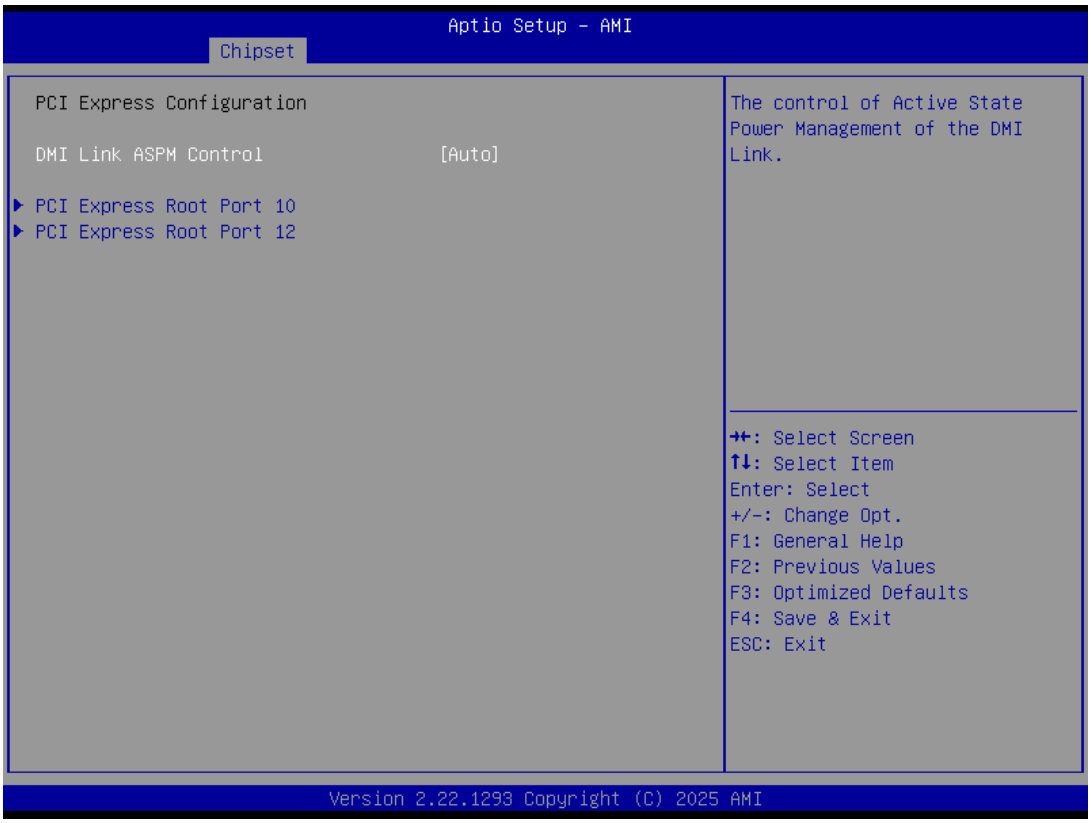
### 4.1.3.2 PCH-IO Configuration




- **PCI Express Configuration**
  PCI Express Configuration Settings.
- **SATA Configuration**
  SATA Device Options Settings.
- **USB Configuration**
  USB Configuration Settings.
- **Security Configuration**
  Security Configuration Settings.
- **HD Audio Configuration**
  HD Audio Subsystem Configuration Settings.
- **Onboard LAN1 Controller**
  Select to Enable or Disable onboard LAN1 Controller.
- **LAN1 PXE ROM**
  Enable or Disable onboard LAN1's PXE option ROM.
- **Onboard LAN2 Controller**
  Select to Enable or Disable onboard LAN2 Controller.
- **LAN2 PXE ROM**
  Enable or Disable onboard LAN2's PXE option ROM.
- **Onboard LAN3 Controller**
  Select to Enable or Disable onboard LAN3 Controller.
- **LAN3 PXE ROM**
  Enable or Disable onboard LAN3's PXE option ROM.
- **Onboard LAN4 Controller**
  Select to Enable or Disable onboard LAN4 Controller.

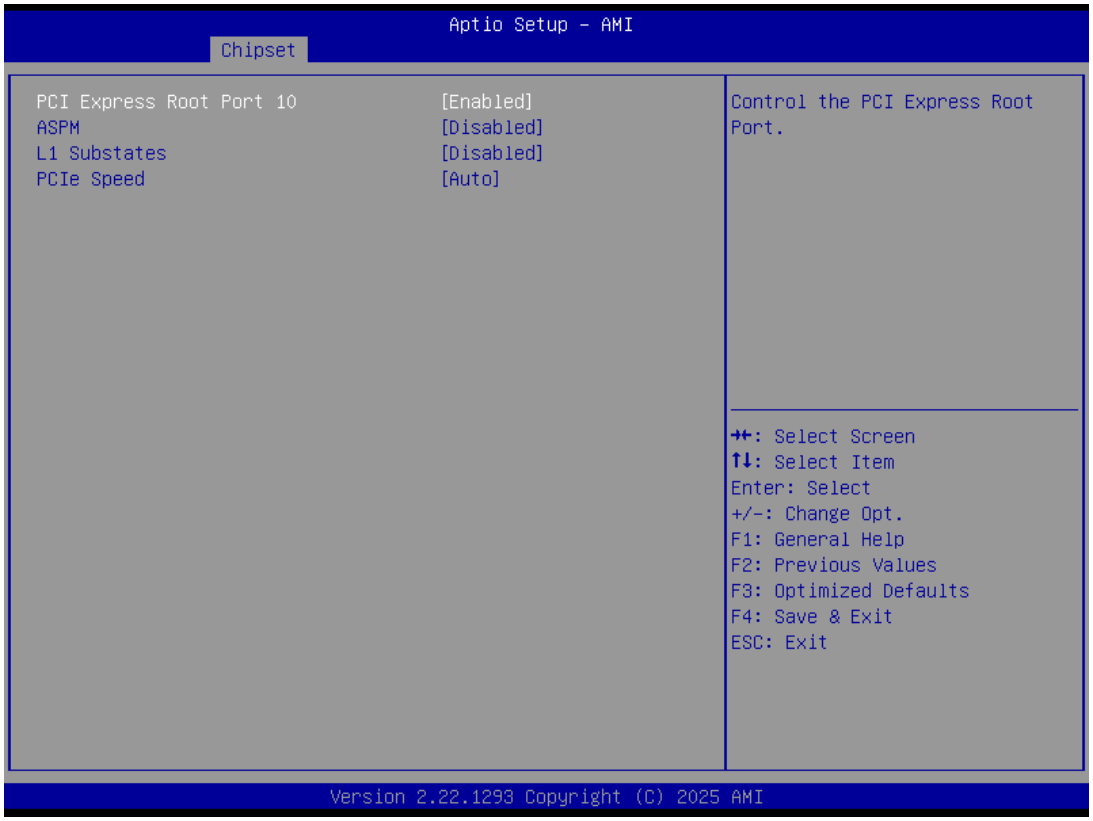
- **LAN4 PXE ROM**
  Enable or Disable onboard LAN4's PXE option ROM.
- **SPD Write Disable**
  Enable/Disable setting SPD Write Disable.

### PCI Express Configuration



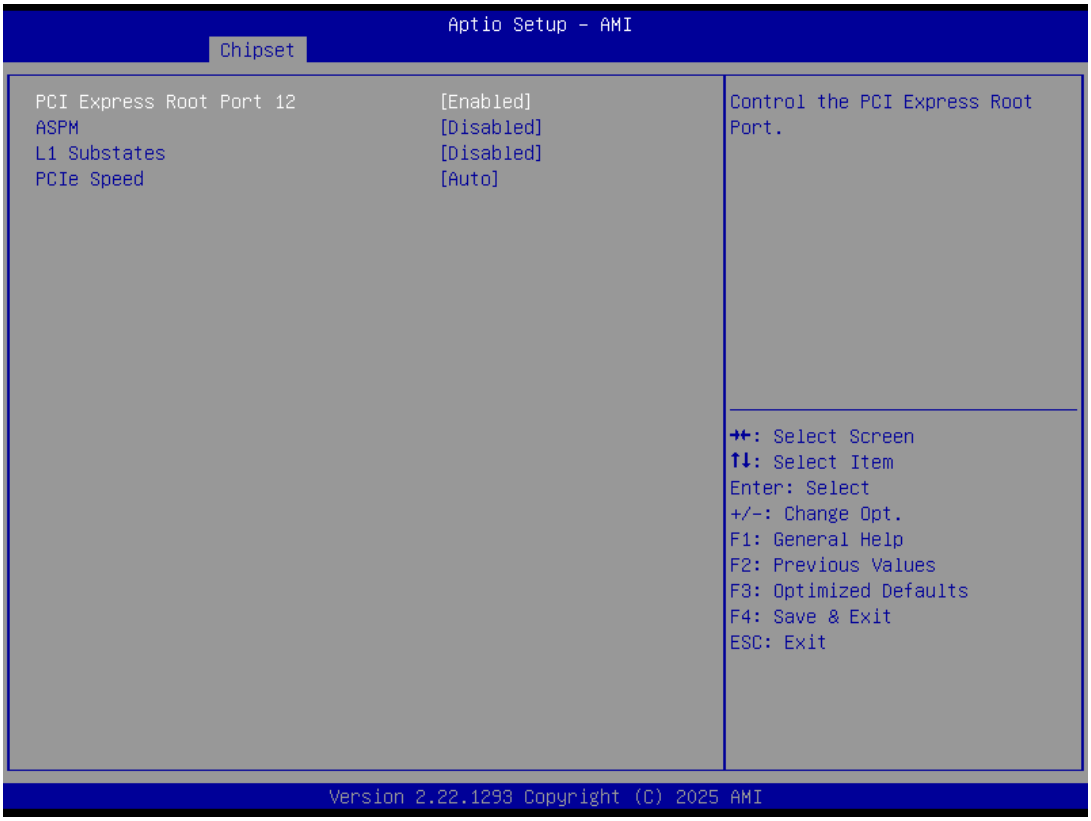

- **DMI Link ASPM Control**
  This item controls Active State Power Management of the DMI Link.
- **PCI Express Root Port 10/12**
  PCI Express Port 10/12 Settings.

### PCI Express Root Port 10



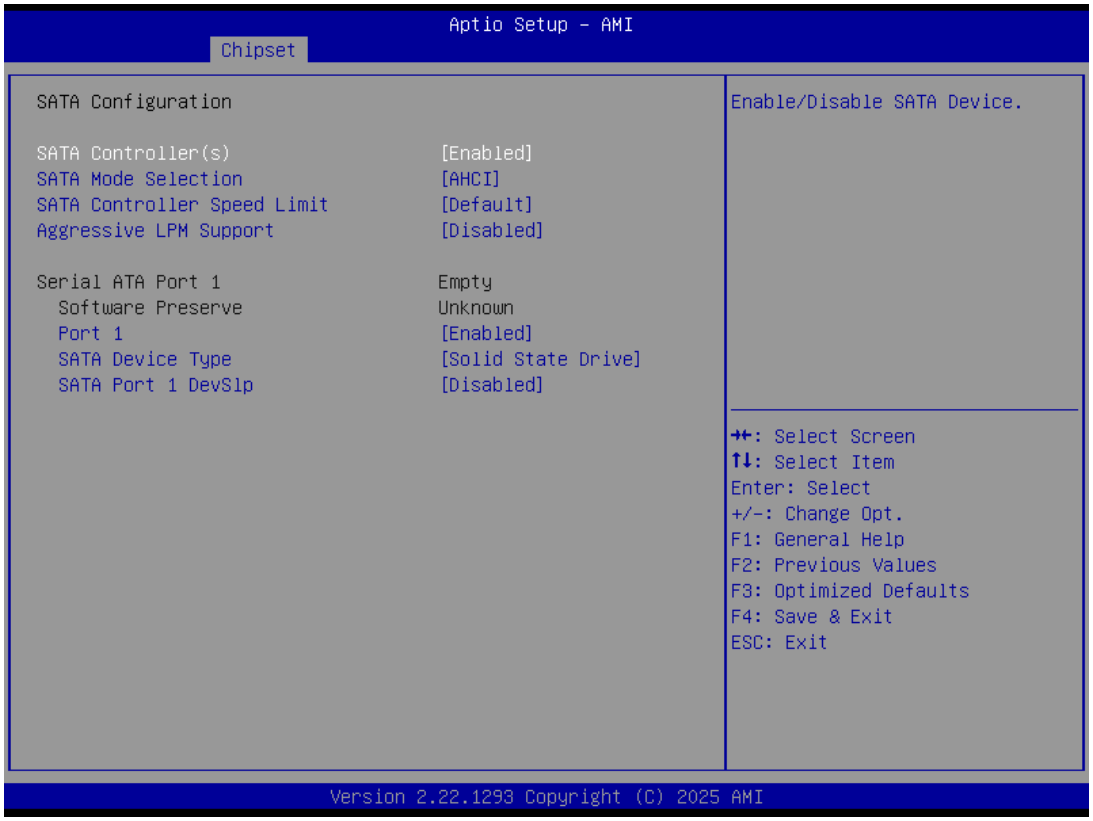

- **PCI Express Root Port 10**
  Control the PCI Express Root Port.
- **ASPM**
  Set the ASPM Level.
- **L1 Substates**
  PCI Express L1 Substates settings.
- **PCIe Speed**
  Configure PCIe Speed.

### PCI Express Root Port 12



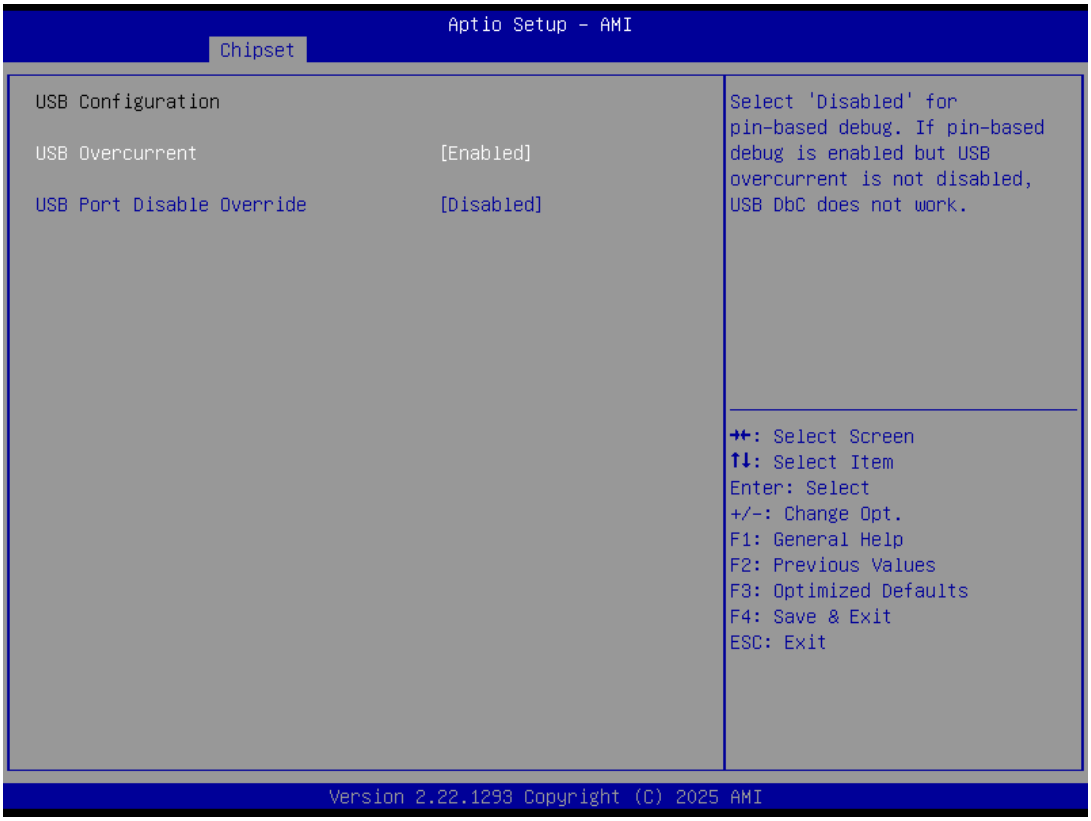

- **PCI Express Root Port 12**
  Control the PCI Express Root Port.
- **ASPM**
  Set the ASPM Level.
- **L1 Substates**
  PCI Express L1 Substates settings.
- **PCIe Speed**
  Configure PCIe Speed.

### SATA Configuration



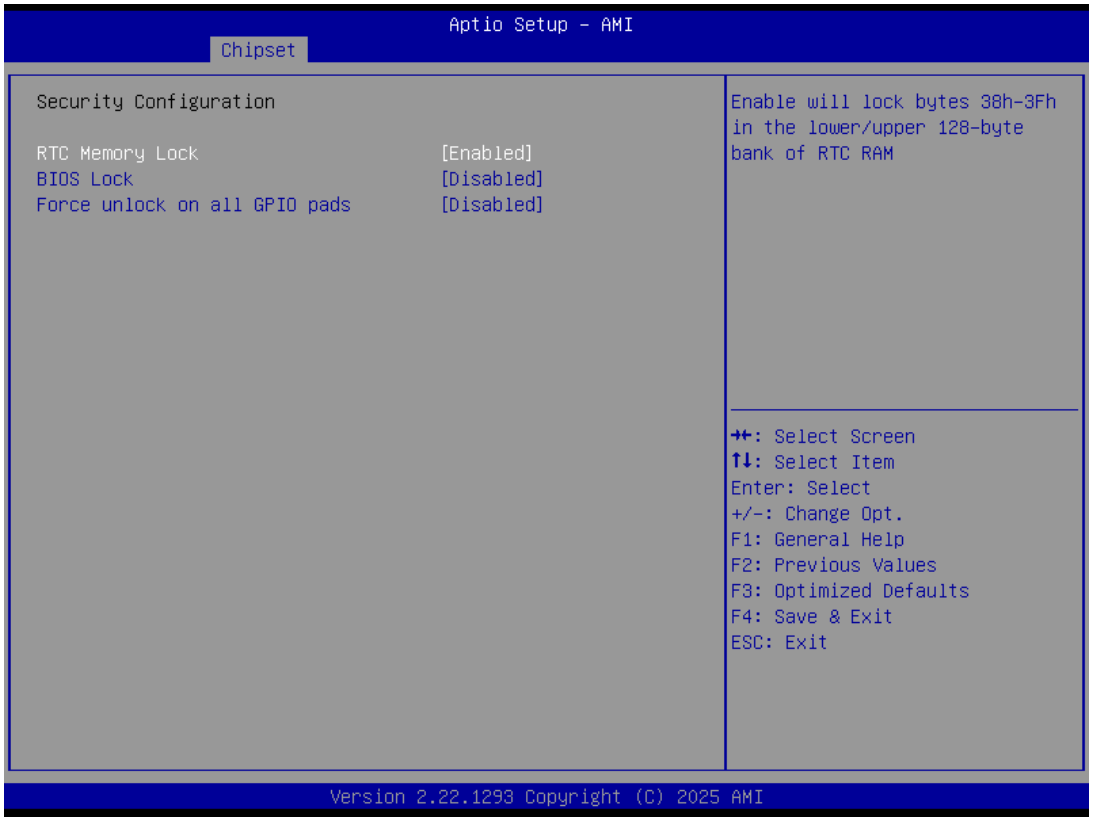

- **SATA Controller(s)**
  Enable/Disable SATA Device.
- **SATA Mode Selection**
  Determine how SATA controller operate.
- **SATA Controller Speed Limit**
  Indicates the maximum speed the SATA controller can support.
- **Aggressive LPM Support**
  Enabled PCH to aggressively enter link power state.

### USB Configuration



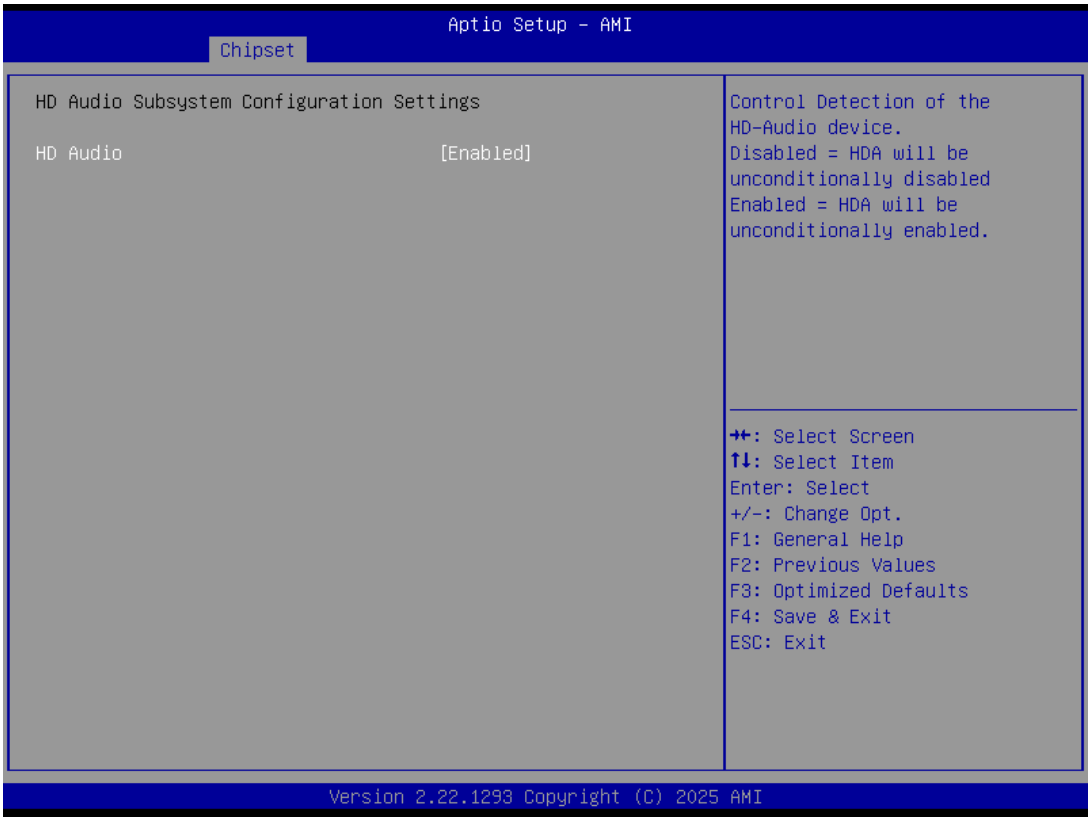

- **USB Overcurrent**
  Select "Enabled" if Overcurrent functionality is used.
- **USB Port Disable Override**
  Selectively Enable/Disable the corresponding USB Port from reporting a Device Connection to the Controller.

### Security Configuration




- **RTC Memory Lock**
  Enable will lock bytes 38h-3Fh in the lower/upper 128-byte bank of RTC RAM.
- **BIOS Lock**
  Enable or Disable the PCH BIOS Lock Enable feature.
- **Force Unlock on All GPIO Pads**
  If Enabled BIOS will force all GPIO pads to be in unlock state.

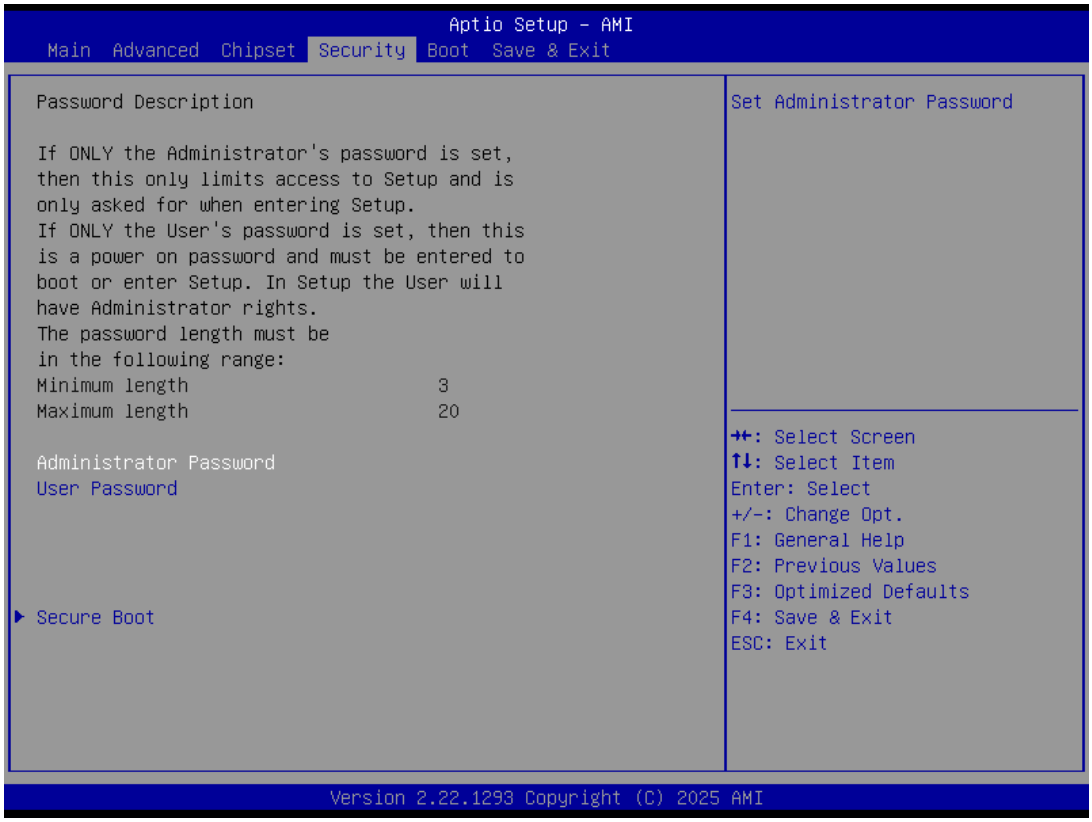
### HD Audio Configuration




- **HD Audio**
  Control Detection of the HD-Audio device. Disabled = HDA will be unconditionally disabled. Enabled = HDA will be unconditionally Enabled.

### 4.1.4 Security

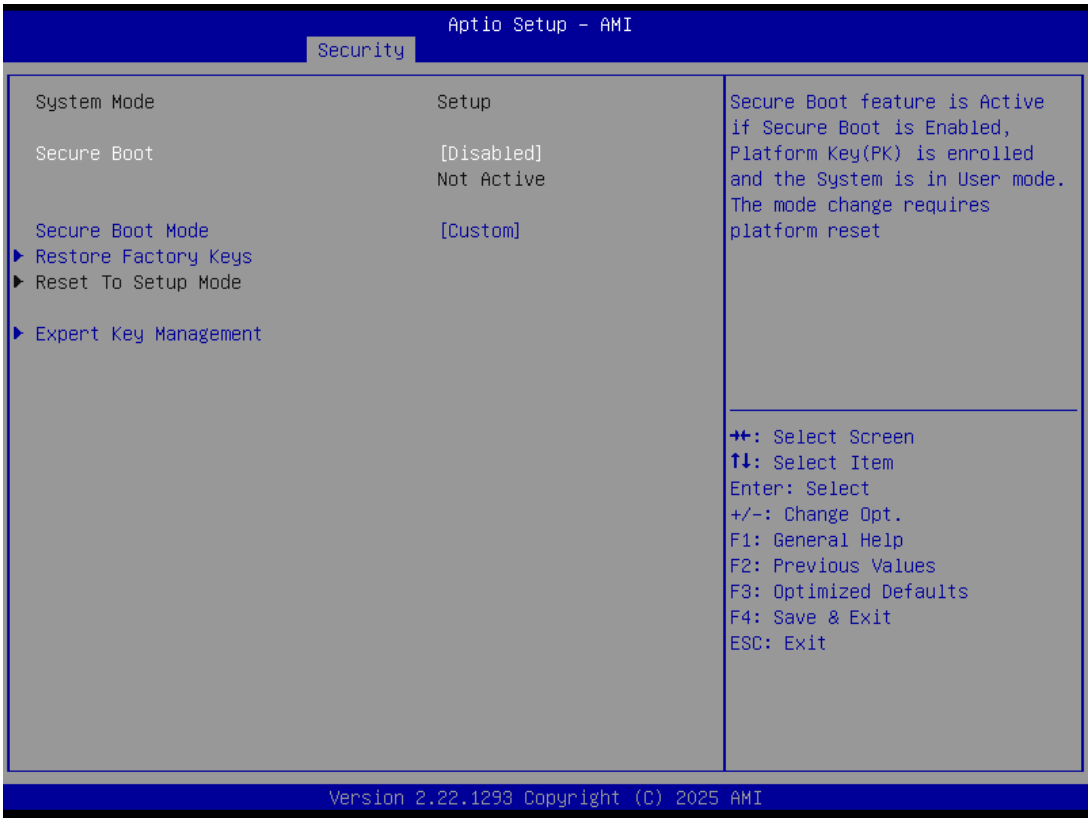
Select Security Setup from the MIO-5854 Setup main BIOS setup menu. All Security Setup options, such as password protection and virus protection are described in this section.




To access the sub menu for the following items, select the item and press <Enter>:

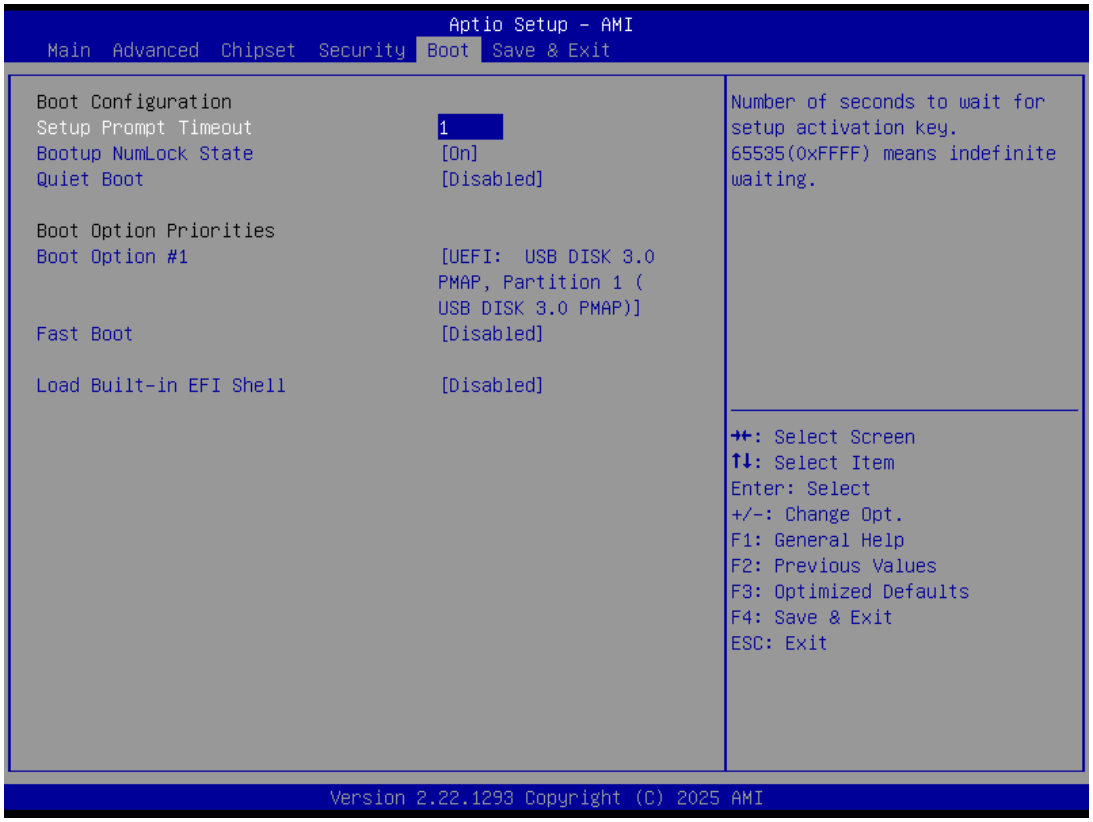
- **Change Administrator / User Password**
  Select this option and press <ENTER> to access the sub menu, and then typein the password.
- **Secure Boot**
  Secure Boot Configurations.

### 4.1.5 Secure Boot



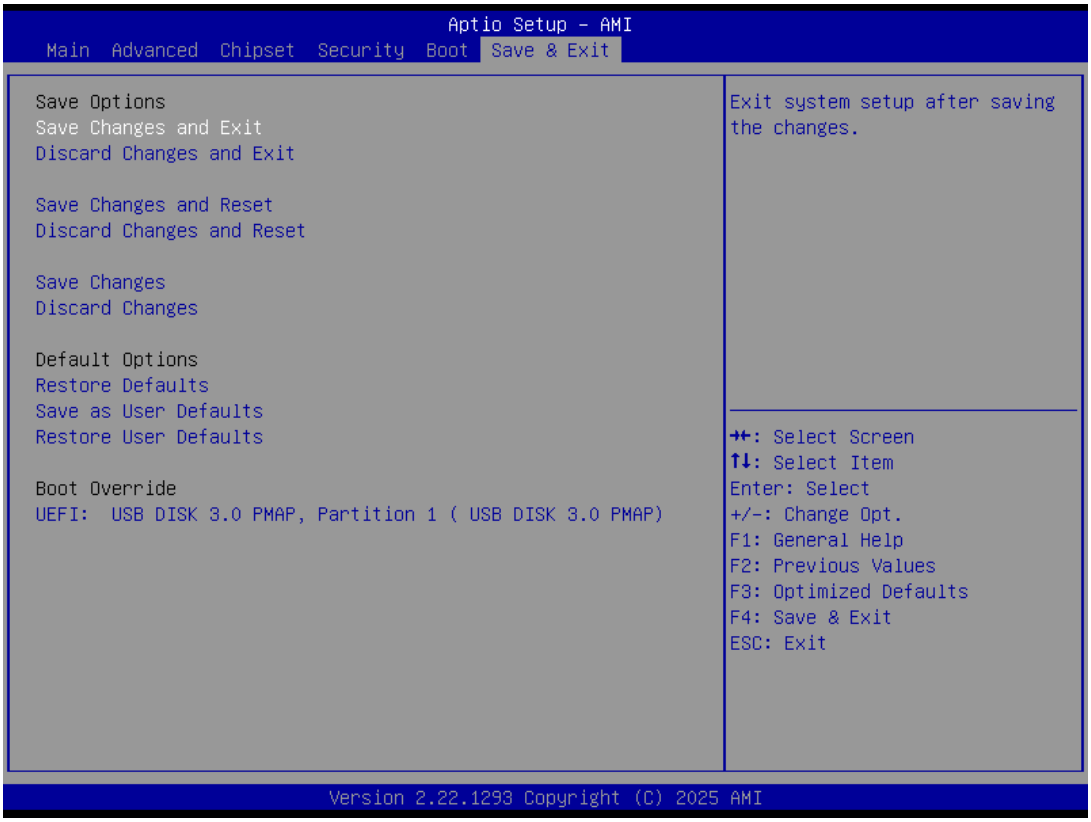

- **Secure Boot**
  The Secure Boot feature is Active if Secure Boot is Enabled, Platform Key (PK) is enrolled, and the System is in User mode. The mode change requires a platform reset.
- **Secure Boot Mode**
  Secure Boot mode options: Standard or Custom. In Custom mode, Secure Boot Policy variables can be configured by a physically present user without full authentication.
- **Restore Factory Keys**
  Force System to User Mode. Install factory default Secure Boot Key databases.
- **Expert Key Management**
  Enables expert users to modify Secure Boot Policy variables without variable authentication.

### 4.1.6 Boot




- **Setup Prompt Timeout**
  Number of seconds that the firmware will wait before initiating the original default boot selection. A value of 0 indicates that the default boot selection is to be initiated immediately on boot. A value of 65535(0xFFFF) indicates that firmware will wait for user input before booting. This means the default boot selection is not automatically started by the firmware.
- **Bootup NumLock State**
  Select the keyboard NumLock state.
- **Quiet Boot**
  Enables or disables Quiet Boot option.
- **Boot Option #1**
  Sets the system boot order.
- **Fast Boot**
  Enables or disables boot with initialization of a minimal set of devices required to launch active boot option. Has no effect for BBS boot options.
- **Load Built-in EFI Shell**
  Load/Unload Internal Built-in EFI Shell image inside the BIOS. (Built-in EFI Shell will still be loaded if no bootable device is found).

### 4.1.7 Save & Exit




- **Save Changes and Exit**
  This item allows you to exit system setup after saving the changes.
- **Discard Changes and Exit**
  This item allows you to exit system setup without saving any changes.
- **Save Changes and Reset**
  This item allows you to reset the system after saving the changes.
- **Discard Changes and Reset**
  This item allows you to rest system setup without saving any changes.
- **Save Changes**
  This item allows you to save changes done so far to any of the options.
- **Discard Changes**
  This item allows you to discard changes done so far to any of the options.
- **Restore Defaults**
  This item allows you to restore/load default values for all the options.
- **Save as User Defaults**
  This item allows you to save the changes done so far as user defaults.
- **Restore User Defaults**
  This item allows you to restore the user defaults to all the options.
- **Boot Override**
  Boot device select can override your boot priority.

# Appendix A

## System Assignments

# A.1 System I/O Ports

**Table A.1: System I/O Ports**

| Addr. Range (Hex) | Device |
|---|---|
| 00h-1Fh | DMA Controller |
| 20h-2Dh | Interrupt Controller |
| 2Eh–2Fh | Motherboard resources |
| 30h-3Dh | Interrupt Controller |
| 40h-43h | Timer/Counter |
| 4Eh–4Fh | Motherboard resources |
| 50h-53h | Timer/Counter |
| 60h-6Fh | 8042 (keyboard controller)/NMI Controller/Microcontroller |
| 70h-7Fh | Real-time Controller |
| 80h-8Fh | Debug Port/Reserved |
| 90h-9Fh | Debug Port/Reset Generator |
| A0h-ADh | Interrupt Controller |
| B0h-B1h | Interrupt Controller |
| B4h-BDh | Power Management |
| 200h-27Fh | CANBus Controller |
| 280h-28Fh | I2C Controller |
| 290h-29Fh | EC Index port and Data port |
| 2A0h-2BFh | GPIO Controller |
| 2C0h-2DFh | SMBus Controller |
| 2E8h-2EFh | Communications Port (COM4) |
| 2F0h-2F7h | EC/PMC Controller |
| 2F8h-2FFh | Communications Port (COM2) |
| 300h-37Fh | CANBus Controller |
| 3E8h-3EFh | Communications Port (COM3) |
| 3F8h-3FFh | Communications Port (COM1) |
| 480h-4CFh | Motherboard resources |
| 4D0h-4D1h | Interrupt Controller |
| 680h-69Fh | Motherboard resources |
| A00h-AFFh | Motherboard resources |
| 164Eh-164Fh | Motherboard resources |
| 1800h-18FFh | Motherboard resources |
| CF9h-CF9h | Reset Generator |

## A.2 DMA Channel Assignments

| Table A.2: DMA Channel Assignments | |
|---|---|
| **Channel** | **Function** |
| 0 | Available |
| 1 | Available |
| 2 | Available |
| 3 | Available |
| 4 | Direct memory access controller |
| 5 | Available |
| 6 | Available |
| 7 | Available |

## A.3 1st MB Memory Map

| Table A.3: 1st MB Memory Map | |
|---|---|
| **Addr. Range (Hex)** | **Device** |
| E0000h - FFFFFh | System board |
| D0000h - DFFFFh | PCI Bus |
| C0000h - CFFFFh | System board |
| A0000h - BFFFFh | PCI Bus |
| A0000h - BFFFFh | Intel® HD Graphic |
| 00000h - 9FFFFh | System board |

## A.4 Interrupt Assignments

| Table A.4: Interrupt Assignments | |
|---|---|
| **Interrupt#** | **Interrupt Source** |
| NMI | Parity error detected |
| IRQ0 | System timer |
| IRQ1 | Using SERIRQ, Keyboard Emulation |
| IRQ2 | Interrupt from controller 2 (cascade) |
| IRQ3 | Communications Port (COM2) |
| IRQ4 | Communications Port (COM1) |
| IRQ5 | EC Watch Dog |
| IRQ6 | CANBus Controller |
| IRQ7 | Communications Port (COM3) |
| IRQ8 | System CMOS/real time clock |
| IRQ9 | Microsoft ACPI-Compliant System |
| IRQ10 | Communications Port (COM4) |
| IRQ11 | Display Controller |
| IRQ12 | Available |
| IRQ13 | Numeric data processor |
| IRQ14 | GPIO Controller |
| IRQ15 | Reserved |

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