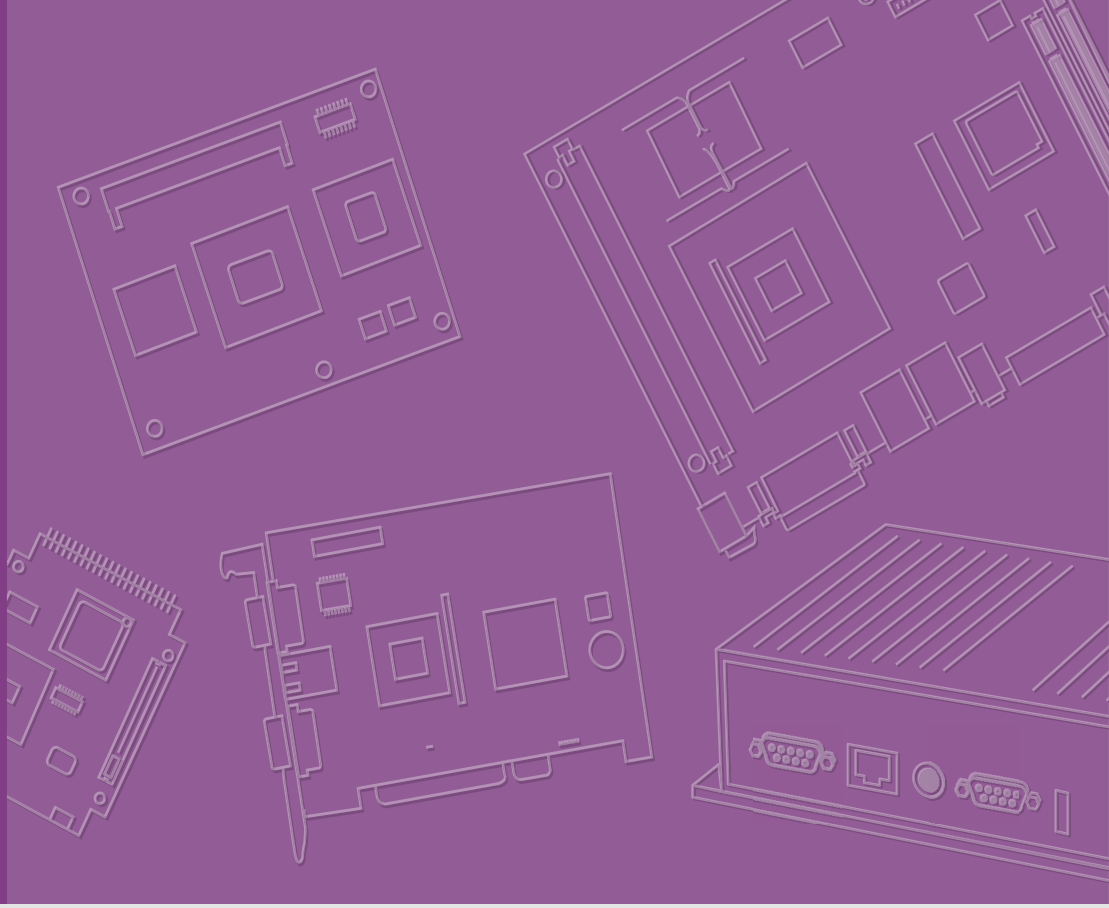

User Manual

AIMB-278

12th Gen Intel® Core™ Processor (Alder Lake), Mini-ITX with Q670E, PCIex16 Gen5, and 2.5GbE

ADVANTECH

Enabling an Intelligent Planet

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2. Call your dealer and describe the problem. Please have your manual, product, and any helpful information readily available.
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Advantech Customer Services

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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.

CPU Compatibility

Processor Number	Max_TDP	Code Name	Cores/Threads	S-Spec	Lithography
i9-12900TE	35W	Alder Lake	8P+8E/24T	SRL6C	Intel 7
i9-12900E	65W	Alder Lake	8P+8E/24T	SRL6B	Intel 7
i9-12900	65W	Alder Lake	8P+8E/24T	SRL4K	Intel 7
i7-12700TE	35W	Alder Lake	8P+4E/20T	SRL6E	Intel 7
i7-12700E	65W	Alder Lake	8P+4E/20T	SRL6D	Intel 7
i7-12700	65W	Alder Lake	8P+4E/20T	SRL4Q	Intel 7
i5-12500TE	35W	Alder Lake	6P/12T	SRL6V	Intel 7
i5-12500E	65W	Alder Lake	6P/12T	SRL6W	Intel 7
i5-12500	65W	Alder Lake	6P/12T	SRL5V	Intel 7
i5-12400	65W	Alder Lake	6P/12T	SRL5Y	Intel 7
i3-12100TE	35W	Alder Lake	4P/8T	SRL6T	Intel 7
i3-12100E	60W	Alder Lake	4P/8T	SRL6U	Intel 7
i3-12100	60W	Alder Lake	4P/8T	SRL62	Intel 7
G7400TE	35W	Alder Lake	2P/4T	SRL6S	Intel 7
G7400E	46W	Alder Lake	2P/4T	SRL6R	Intel 7
G6900TE	35W	Alder Lake	2P/2T	SRL6P	Intel 7
G6900E	46W	Alder Lake	2P/2T	SRL6Q	Intel 7

Memory Compatibility

Category	Speed	Capacity	Vendor	Module_PN	Chip_PN	ADVANTECH P/N	ECC	Result
DDR5	4800	32GB	Advantech	SQR-SD5N32G4K8MNAB	IVA45D8BNJ	SQR-SD5N32G4K8MNAB	N	PASS
DDR5	4800	16GB	Advantech	SQR-SD5N16G4K8MNAB	2AA45D8BNJ	SQR-SD5N16G4K8MNAB	N	PASS

M.2 SSD Compatibility

Dimension	Interface	Bandwidth Performance	Category	Vendor	Model	ADVANTECH P/N	Result
2280	M.2 Key B+M	SATA3	SSD	Advantech	SQF-SM8V4-1TCSBC	SQF-SM8V4-1TCSBC	PASS
2280	M.2 Key B+M	SATA3	SSD	Advantech	SQF-SM8Z4-256GCSBE	SQF-SM8Z4-256GCSBE	PASS
2280	M.2 Key M	PCIe v3.1	NVMe PCIe SSD	Advantech	SQF-C8MV4-2TCEDC	SQF-C8MV4-2TCEDC	PASS
2280	M.2 Key B+M	PCIe v3.1	NVMe PCIe SSD	Advantech	SQF-C8BV4-2TD-EDC	SQF-C8BV4-2TDEDC	PASS
2280	M.2 Key B+M	SATA3	SSD	Advantech	SQF-S8BV4-2TDSDC	SQF-S8BV4-2TDSDC	PASS
2280	M.2 Key M	PCIe v3.0	NVMe PCIe SSD	WD	WDSN850500GB	N/A	PASS

M.2 Wi-Fi Compatibility

Dimension	Interface	Bandwidth Performance	Category	Vendor	Model	ADVANTECH P/N	Result
2230	M.2 Key E	PCI-E / USB	Wireless LAN + Bluetooth	Advantech	EWM-W162M201E	EWM-W162M201E	PASS
2230	M.2 Key A+E	PCI-E / USB	Wireless LAN + Bluetooth	Advantech	EWM-W192M201E	EWM-W192M201E	PASS
2230	M.2 Key A+E	PCI-E / USB	Wireless LAN + Bluetooth	Intel	AX200NGW	N/A	PASS
2230	M.2 Key A+E	PCI-E / USB	Wireless LAN + Bluetooth	Advantech	AIW-163BR	AIW-163BR	PASS

Ordering Information

P/N	Chipset	HDMI	LVDS/ eDP	DP	GbE	2.5GbE	COM	SATAIII	USB3.2	USB 2.0	M.2 M key	M.2 E key	PCIe x16	TPM	AMP
AIMB-278Q-00A1	Q670E	1	(1)/ 1	2	2	1	2	3	6	2	1	1	1	1	1
AIMB-278H-00A1	H610E	(1)	(1)/ 1	2	2	(1)	2	2	2/(2)	4	1	1	1	(1)	(1)

*() Supports by BOM options

Note! ***USB power current delivery under S5 Max. 1.8A.***

Initial Inspection

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

- 1 x AIMB-278 Intel® Core™ i9/i7/i5/i3 LGA1700 Mini-ITX motherboard
- 1 x SATA HDD cable
- 1-to-2 serial port cables, 20 cm
- 1 x I/O port bracket
- 1 x startup manual
- 1 x warranty card

If any of these items are missing or damaged, contact your distributor or sales representative immediately. We have carefully inspected the AIMB-278 mechanically and electrically before shipment. It should be free of marks and scratches and in perfect working order upon receipt. As you unpack the AIMB-278, check it for signs of shipping damage. (For example, damaged box, scratches, dents, etc.) If it is damaged or it fails to meet the specifications, notify our service department or your local sales representative immediately. Also notify the carrier. Retain the shipping carton and packing material for inspection by the carrier. After inspection, we will make arrangements to repair or replace the unit.

Contents

Chapter 1 General Information 1

1.1 Introduction 2
1.2 Features 2
1.3 Specifications 2
1.3.1 System 2
1.3.2 Memory 2
1.3.3 Input/Output 2
1.3.4 Graphics 3
1.3.5 Ethernet LAN 3
1.3.6 Industrial Features 3
1.3.7 Mechanical and Environmental Specifications 3
1.4 Jumpers and Connectors 4
Table 1.1: Connector and Header List 4
1.5 Board Layout: Jumper and Connector Locations 5
Figure 1.1 Jumper and Connector Locations (Top Side) 5
Figure 1.2 Jumper and Connector Locations (Bottom Side) 6
1.6 AIMB-278 Board Diagram 6
Figure 1.3 AIMB-278 Board Diagram 6
1.7 Safety Precautions 7
1.8 Jumper Settings 7
1.8.1 How to Set Jumpers 7
1.8.2 CMOS Clear (JCMOS1) 8
Table 1.2: JCMOS1 8
1.8.3 Watchdog Timer Output and OBS Beep (JWDT1+JOBS1) 8
Table 1.3: Watchdog Timer Output and OBS Beep (JWDT1+JOBS1) 8
1.8.4 ATX/AT Mode Selection (PSON1) 8
Table 1.4: ATX/AT Mode Selection (PSON1) 8
1.8.5 1.8.5 .....eDP/LVDS Panel Voltage Selection (JEDP1_LVDS1)9
Table 1.5: 1.8.5... eDP/LVDS Panel Voltage Selection (JEDP1_LVDS1) 9
1.8.6 JFP1: PWRBTN# / RESET# / HDD LED / Internal Buzzer / External Speaker Header 9
Table 1.6: JFP1: PWRBTN# / RESET# / HDD LED / Internal Buzzer / External Speaker Header 9
1.8.7 PCI Express x16 Bifurcation (SW1) 9
Table 1.7: PCI Express x16 Bifurcation (SW1) 9
1.8.8 COM1_RI# Pin RI# / 5V / 12V selection (JSETCOM1_V1) 10
Table 1.8: COM1_RI# Pin RI# / 5V / 12V selection (JSETCOM1_V1) 10
1.9 System Memory 10
1.10 Memory Installation Procedures 10
1.11 Cache Memory 11
1.12 Processor Installation 11

Chapter 2 Connecting Peripherals 13

2.1 Introduction 14
2.2 DisplayPort Dual Port Stack up Connector (DP1_DP2) 14
2.3 EDP Connector / LVDS Connector (EDP1_LVD1) 15
2.4 HDMI Connector (HDMI1) 16
2.5 Power LED Pin Header (JFP2) 17
2.6 RJ45 + USB 3.2 Stack Connector (LAN1_USB12) 17
2.7 RJ45 + USB 3.2 Stack Connector (LAN2_USB34) 18

2.8 Flash Descriptor Security Override Pin Header (ME1) 18
2.9 COMS Mode Selection (JCOMS1) 19
2.10 Universal Serial Bus 3.2 (USB78) 19
2.11 HD Audio Interface (Analog) (AUDIO1) 20
2.12 Audio Amplifier Output Pin Header (AMP1) 20
2.13 SPI BIOS Flash Socket1 (SPI1) 20
2.14 PCI-Express x16 Slot (PCIEX16_1) 21
2.15 M.2 M-KEY Connector (M2M1) 23
2.16 Serial ATA Interface Connector (SATA1) 24
2.17 Serial ATA iInterface Connector (SATA2) 24
2.18 Serial ATA Interface Connector (SATA3) 25
2.19 COM1 / COM2 Connector (COM12) 25
2.20 LED Port 80 Connector (LED_P80) 26
2.21 Case Open Connector (JCASE1) 26
2.22 COM1 RI# Selection Pin Header(JSETCOM1_V1) 26
2.23 ATX 20pin Power Connector (EATXPWR1) 27
2.24 8-bits General Purpose I/O Pin Header (GPIO1) 27
2.25 CMOS Battery Connector (BAT1) 28
2.26 DDR5 SO-DIMM Socket B1 (DIMMB1) 28
2.27 DDR5 SO-DIMM Socket A1 (DIMMA1) 28
2.28 EDP Panel / LVDS Panel Voltage Selection (JEDP1_LVDS1) 28
2.29 PWRBTN# / RESET# /HDD LED / Internal Buzzer / External Speaker header (JFP1) 29
2.30 CPU FAN Connector (CPUFAN1) 29
2.31 System Fan #1 Connector (SYSFAN1) 29
2.32 System Fan #2 Connector (SYSFAN2) 30
2.33 LVDS VESA, JEIDA Format Selection pin Header (JLVDS_VCON1) 30
2.34 Watchdog timer output and OBS beep (JWDT1+JOBS1) 30
2.35 EDP / LVDS Backlight Inverter Power Connector (INV1) 31
2.36 IMVP9.1 Programming Header (JSMB1) 31
2.37 ATX 8 Pin Main Power Connector (ATX12V1) 31
2.38 USB2.0 Front Panel Header (USB56) 32
2.39 AT / ATX Mode Selection (PSON1) 32
2.40 M.2 E-KEY Connector (M2E1) 33
2.41 PCI Express x16 Bifurcation (SW1) 34

Chapter 3 BIOS Operation 35

3.1 Introduction 36
3.2 BIOS Setup 36
3.2.1 Main Menu 37
3.2.2 Advanced BIOS Features 38
3.2.3 Chipset Configuration Settings 65
3.2.4 Security 79
3.2.5 Boot Setting 81
3.2.6 Save & Exit Configuration 82

Chapter 4 Software Introduction & Services ... 85

4.1 Introduction 86
4.2 Value-Added Software Services 86
4.2.1 Software API 86

Chapter 5 Chipset Software Installation Utility 89

5.1 Before you Begin 90
5.2 Introduction 90

Chapter 6 VGA Setup 91

6.1 Introduction 92
6.2 Windows 10 VGA Driver Installation 92

Chapter 7 LAN Configuration 93

7.1 Introduction 94
7.2 Features 94
7.3 Installation 94
7.4 Windows® 10 Driver Setup (Intel i219LM&Intel i226) 94

Chapter 1

General Information

1.1 Introduction

The Advantech AIMB-278 is designed with the Intel® Q670E/H610E PCH for industrial applications that require both performance computing and enhanced power management capabilities. The motherboard leverages Intel® Core™ i9/i7/i5/i3/Pentium/Celeron desktop processors, up to 20 MB SmartCache, and 2 x DDR5 4800MHz SO-DIMM (up to 64) GB. It provides I/O connectivity via 2 x serial ports, 6 x USB 3.2 Gen 2, 2 x 2.5 GbE LAN, 3 x SATA III, 1 x NGFF (M.2_E key), and 1 x NGFF (M.2_M Key) connector. It also supports 1 x PCIex16 slot.

1.2 Features

- **I/O connectivity:** 2 x serial ports, 6 x USB 3.2 Gen 2, 3 x SATAIII, 1 x M.2 M key & 1 x M.2 E key, 1 x GbE LAN, 1 x 2.5GbE LAN, 1 x PCIex16 Gen5
- **Standard Mini-ITX form factor with industrial features:** AIMB-278 is a full-featured Mini-ITX motherboard with balanced expandability and performance.
- **Wide selection of storage devices:** SATA HDD, M.2 (M key), customers benefit from the flexibility of using a suitable storage device for larger capacity.
- **Optimized integrated graphics solution:** The flexibility of Intel® Graphics supports versatile display options and a 32/64 bit 3D graphics engine.

1.3 Specifications

1.3.1 System

- **CPU:** LGA1700 Intel desktop Core i9/i7/i5/i3/Pentium/Celeron processors compliant.
- **BIOS:** AMI EFI 256 Mbit SPI BIOS.
- **System chipset:** Intel® Q670E/H610E.
- **SATA hard disk drive interface:**
  - Three on-board SATA connectors with data transmission rates up to 600 MB
  - One M.2 M key to support PCIe/NVMe x4 M.2 2280.

1.3.2 Memory

- **RAM:** 2 x 260-pin SODIMM socket support dual channel DDR5 4800MHz SDRAM, up to 64GB Max.

1.3.3 Input/Output

- **Serial ports:** Two serial ports; support RS-232/422/485.
- **USB port:** Supports 6 x USB 3.2 Gen 2 with a transmission rates of up to 10 Gbps.
- **GPIO connector:** 64-bit general purpose input/output.

1.3.4 Graphics

- **Controller:** Intel® HD graphics
- **eDP:** Supports max. resolution 4096x2160 @60Hz, colay LVDs
- **DP1.4:** Supports max. resolution 4096x2304 @60Hz
- **HDMI2.0a:** Supports max. resolution 4096x2160 @60Hz
- **VGA:** Supports max. resolution 1920x1200 @60Hz
- **LVDs:** Supports single/dual channel 18/24-bit with maximum resolution up to 1920x1200 @60Hz (LVDs colay with eDP)

1.3.5 Ethernet LAN

- Supports dual 10/100/2500 Mbps Ethernet port (s) via PCI Express x1 bus which provides 500 MB/s data transmission rates.
- **Controller:**
  - GbE LAN1: Intel i219LM
  - GbE LAN2: Intel i226V

1.3.6 Industrial Features

- **Watchdog timer:** A WTD can generate a system reset, and is programmable, with each unit equal to one second or one minute (255 levels).

1.3.7 Mechanical and Environmental Specifications

- **Operating temperature:** 0 ~ 60 °C (32 ~ 140 °F, depending on CPU).
- **Storage temperature:** -40 ~ 85 °C (-40 ~ 185 °F).
- **Humidity:** 5 ~ 95% non-condensing.
- **Power supply voltage:** +3.3V, +5V, +12V, -12V, +5VSB
- **Power consumption:**

  Intel® Core™ i9-12900E 5GHz, 2pcs 32GB DDR5 4800MHz SDRAM

  Boost: 117.882W; Typical: 102W
- **Board size:** 170 x 170 mm (6.69 x 6.69 in).
- **Board weight:** 0.365 kg.

1.4 Jumpers and Connectors

Connectors on the AIMB-278 motherboard link it to devices such as hard disk drives and a keyboard. In addition, the board has a number of jumpers used to configure the system for your application.

The tables below list the function of each of the board jumpers and connectors. Later sections in this chapter give instructions on setting jumpers. Chapter 2 gives instructions for connecting external devices to your motherboard.

Table 1.1: Connector and Header List

	Description	Location Name
1	DisplayPort Dual port stack up Connector	DP1_DP2
2	EDP Connector / LVDS Connector	EDP1_LVDS1
3	HDMI Connector	HDMI1
4	Power LED pin header	JFP2
5	RJ45 + USB 3.2 stack connector	LAN1_USB12
6	RJ45 + USB 3.2 stack connector	LAN2_USB34
7	Flash Descriptor Security Override Pin Header	ME1
8	COMS Mode selection	JCMOS1
9	Universal Serial Bus 3.2	USB78
10	HD Audio Interface (Analog)	AUDIO1
11	Audio amplifier output pin header	AMP1
12	SPI BIOS flash socket	SPI1
13	PCI Express x16 slot	PCIEX16_1
14	M.2 M-KEY Connector	M2M1
15	Serial ATA interface Connector	SATA1
16	Serial ATA interface Connector	SATA2
17	Serial ATA interface Connector	SATA3
18	COM1 / COM2 Connector	COM12
19	LED port 80 connector	LED_P80
20	Case Open Connector	JCASE1
21	COM1 RI# selection pin header	JSETCOM1_V1
22	ATX 20pin power connector	EATXPWR1
23	6-bits General Purpose I/O pin header	GPIO1
24	CMOS battery Connector	BAT1
25	DDR5 SO-DIMM Socket B1	DIMMB1
26	DDR5 SO-DIMM Socket A1	DIMMA1
27	EDP Panel / LVDS Panel Voltage Selection	JEDP1_LVDS1
28	PWRBTN#/ RESET#/HDD LED/ Serial bus from HW monitor IC/Internal Buzzer / External Speaker header	JFP1
29	CPU FAN Connector	CPUFAN1
30	System Fan #1 Connector	SYSFAN1
31	System Fan #2 Connector	SYSFAN2
32	LVDS VESA, JEIDA format selection pin header	JLVDS_VCON1
33	Watchdog timer output and OBS beep	JWDT1+JOBS1
34	EDP / LVDS Backlight Inverter Power Connector	INV1
35	IMVP9.1 Programming Header	JSMB1
36	ATX 8 Pin Power Connector	ATX12V1
37	USB 2.0 Front panel Header	USB56

Table 1.1: Connector and Header List		
38	AT / ATX Mode selection	PSON1
39	M.2 E-KEY Connector	M2E1
40	PCI Express x16 Bifurcation	SW1

1.5 Board Layout: Jumper and Connector Locations

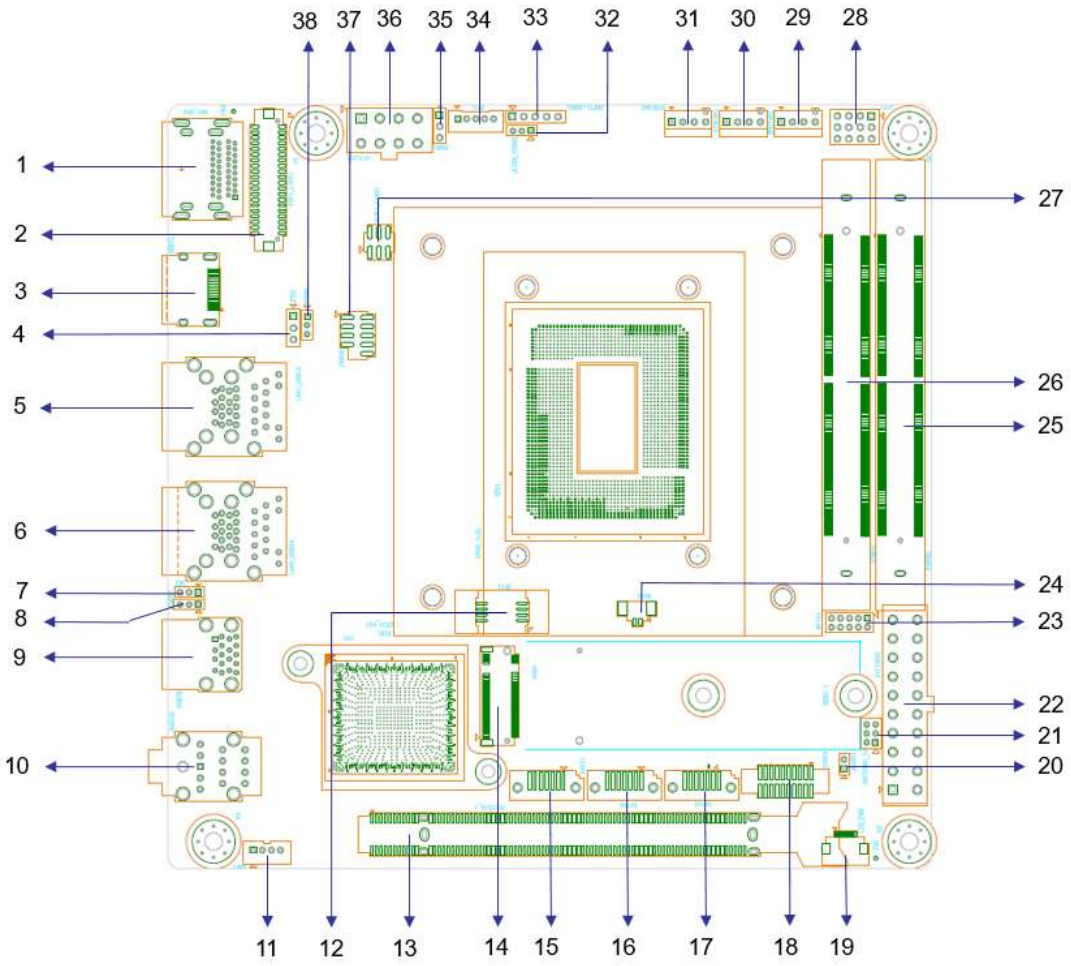


Figure 1.1 Jumper and Connector Locations (Top Side)

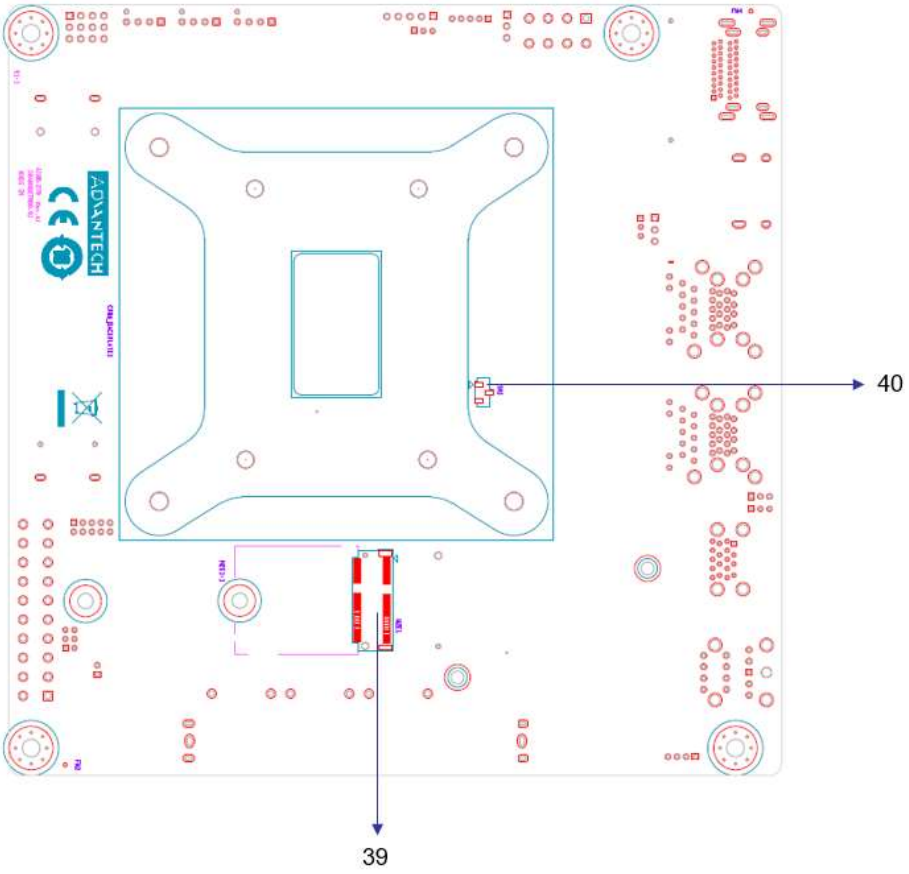


Figure 1.2 Jumper and Connector Locations (Bottom Side)

1.6 AIMB-278 Board Diagram

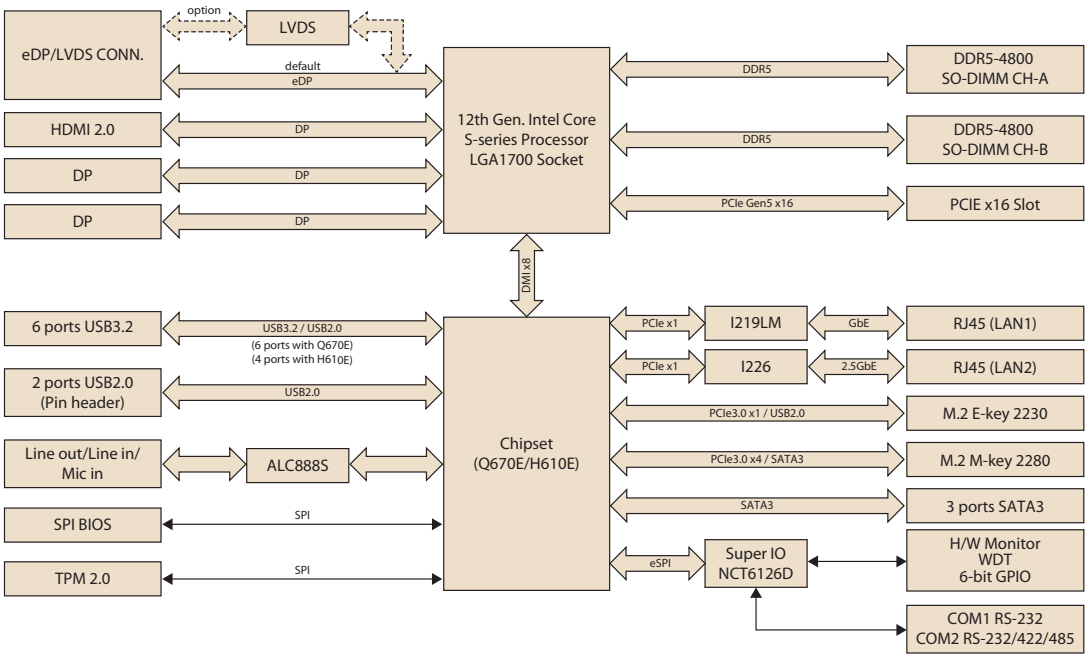


Figure 1.3 AIMB-278 Board Diagram

1.7 Safety Precautions

Warning! *Always completely disconnect the power cord from chassis whenever you work with the hardware. Do not make connections while the power is on. Sensitive electronic components can be damaged by sudden power surges. Only experienced electronics personnel should open the PC chassis.*

Caution! *Always ground yourself to remove any static charge before touching the motherboard. Modern electronic devices are very sensitive to electro-static discharges. As a safety precaution, use a grounding wrist strap at all times. Place all electronic components on a static-dissipative surface or in a static-shielded bag when they are not in the chassis.*

Caution! *The computer is provided with a battery-powered real-time clock circuit. There is a danger of explosion if battery is incorrectly replaced. Replace only with same or equivalent type recommended by the manufacturer. Discard used batteries according to manufacturer's instructions.*

Caution! *There is a 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.*

1.8 Jumper Settings

This section provides instructions on how to configure your motherboard by setting the jumpers. It also includes the motherboard's default settings and your options for each jumper.

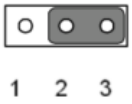
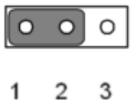
1.8.1 How to Set Jumpers

You can configure your motherboard to match the needs of your application by setting the jumpers. A jumper is a metal bridge that closes an electrical circuit. It consists of two metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To "close" (or turn ON) a jumper, you connect the pins with the clip. To "open" (or turn OFF) a jumper, you remove the clip. Sometimes a jumper consists of a set of three pins, labeled 1, 2, and 3. In this case you connect either pins 1 and 2, or 2 and 3. A pair of needle-nose pliers may be useful when setting jumpers.

1.8.2 CMOS Clear (JCMOS1)

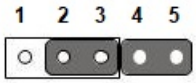
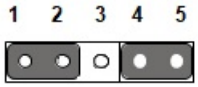
The AIMB-278 motherboard contains jumpers that can erase CMOS data and reset the system BIOS information. Normally these jumpers should be set with pins 1-2 closed. If you want to reset the CMOS data, set CMOS1 to 2-3 closed for just a few seconds, and then move the jumper back to 1-2 closed. This procedure will reset the CMOS to its default setting.

Table 1.2: JCMOS1

Function	Jumper Settings	
Keep CMOS data (Default)		1-2
Clear CMOS data		2-3

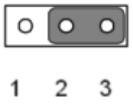
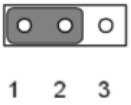
1.8.3 Watchdog Timer Output and OBS Beep (JWDT1+JOBS1)

Table 1.3: Watchdog Timer Output and OBS Beep (JWDT1+JOBS1)

Function	Jumper Setting
Watchdog Timer Output (2-3) (Default) OBS BEEP(4-5) (Default)	
Watchdog Timer Disable (1-2) OBS BEEP(4-5) (Default)	

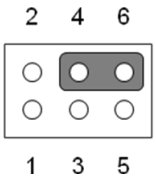
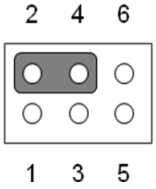
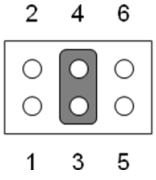
1.8.4 ATX/AT Mode Selection (PSON1)

Table 1.4: ATX/AT Mode Selection (PSON1)

Function	Jumper Setting
ATX Mode (Default)	
AT Mode	

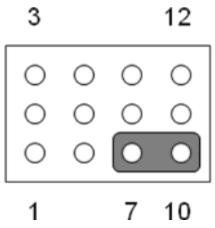
1.8.5 1.8.5eDP/LVDS Panel Voltage Selection (JEDP1_LVDS1)

Table 1.5: 1.8.5eDP/LVDS Panel Voltage Selection (JEDP1_LVDS1)

Function	Jumper Setting
Jumper position for +3.3V (Default)	
Jumper position for +5V	
Jumper position for +12V	

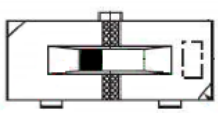
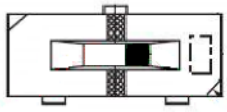
1.8.6 JFP1: PWRBTN# / RESET# / HDD LED / Internal Buzzer / External Speaker Header

Table 1.6: JFP1: PWRBTN# / RESET# / HDD LED / Internal Buzzer / External Speaker Header

Function	Jumper Setting
Internal Buzzer (Default)	

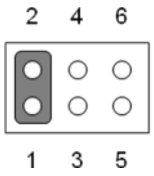
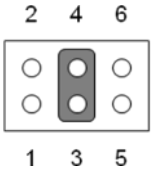
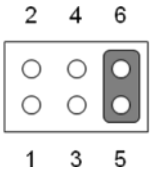
1.8.7 PCI Express x16 Bifurcation (SW1)

Table 1.7: PCI Express x16 Bifurcation (SW1)

Function	Jumper Setting
1 X16 (Default)	
2 X8	

1.8.8 COM1_RI# Pin RI# / 5V / 12V selection (JSETCOM1_V1)

Table 1.8: COM1_RI# Pin RI# / 5V / 12V selection (JSETCOM1_V1)

Function	Jumper Setting
Jumper position for RI# (Default)	
Jumper position for 5V	
Jumper position for 12V	

1.9 System Memory

AIMB-278 has two sockets for a 260-pin DDR4 SO-DIMM. These sockets use a 1.2 V unbuffered double data rate synchronous DRAM (DDR SDRAM). DRAM is available in 4GB, 8GB, 16GB, and 32GB capacities. The sockets can take any combination with SODIMMs of any size, providing a total memory sizes of 4GB, 8GB, 16GB, and up to max 64GB. AIMB-278 does NOT support error checking and correction (ECC).

1.10 Memory Installation Procedures

To install SODIMMs, first make sure the two handles of the SODIMM socket are in the “open” position, i.e., the handles lean outward. Slowly slide the SODIMM module along the plastic guides on both ends of the socket. Then firmly, but gently (avoid pushing down too hard) press the SODIMM module well down into the socket, until you hear a click when the two handles have automatically locked the memory module into the correct position of the SODIMM socket. To remove the memory module, just push both handles outward, and the memory module will be ejected by the mecha-nism.

1.11 Cache Memory

The AIMB-278 supports a CPU with one of the following built-in full-speed last level caches:

30MB for Intel® Core™ i9-12900E/i9-12900TE

25MB for Intel® Core™ i7-12700E/i7-12700TE

18MB for Intel® Core™ i5-12500E/i7-12500TE

12MB for Intel® Core™ i3-12100E/i7-12100TE

2.5MB Pentium G7400E/G7400TE

The built-in second-level cache in the processor yields much higher performance than conventional external cache memories.

1.12 Processor Installation

The AIMB-278 is designed to support 12th Gen Intel LGA1700, Core i9/Core i7/ Core i5/Core i3, Pentium, Celeron processors.

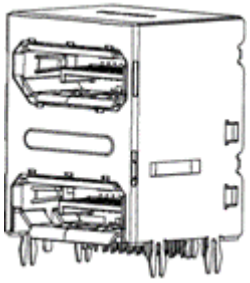
Chapter 2

Connecting Peripherals

2.1 Introduction

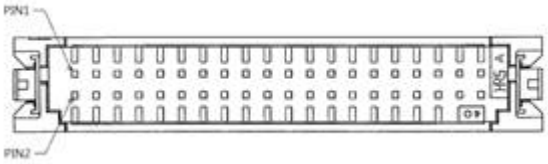
You can access most of the connectors from the top of the board as it is being installed in the chassis. If you have a number of cards installed, or have a packed chassis, you may need to partially remove the card to make all the connections.

2.2 DisplayPort Dual Port Stack up Connector (DP1_DP2)



Pin	Signal	Pin	Signal
P1	DP1_0+	P21	DP2_0+
P2	GND	P22	GND
P3	DP1_0-	P23	DP2_0-
P4	DP1_1+	P24	DP2_1+
P5	GND	P25	GND
P6	DP1_1-	P26	DP2_1-
P7	DP1_2+	P27	DP2_2+
P8	GND	P28	GND
P9	DP1_2-	P29	DP2_2-
P10	DP1_3+	P30	DP2_3+
P11	GND	P31	GND
P12	DP1_3-	P32	DP2_3-
P13	DP1_AUX_EN#	P33	DP2_AUX_EN#
P14	GND	P34	GND
P15	DP1_AUX+	P35	DP2_AUX+
P16	GND	P36	GND
P17	DP1_AUX-	P37	DP2_AUX-
P18	DP1_HPD	P38	DP2_HPD
P19	GND	P39	GND
P20	+V3.3_DP1	P40	+V3.3_DP1

2.3 EDP Connector / LVDS Connector (EDP1_LVD1)



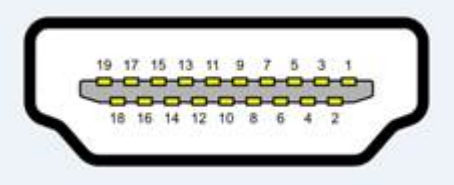
LVDS1:

Pin	Signal	Pin	Signal
1	VDD	2	VDD
3	LVDS DETECT#	4	GND
5	VDD	6	VDD
7	LVDS_OD0-	8	LVDS_ED0-
9	LVDS_OD0+	10	LVDS_ED0+
11	GND	12	GND
13	LVDS_OD1-	14	LVDS_ED1-
15	LVDS_OD1+	16	LVDS_ED1+
17	GND	18	GND
19	LVDS_OD2-	20	LVDS_ED2-
21	LVDS_OD2+	22	LVDS_ED2+
23	GND	24	GND
25	LVDS_OCK-	26	LVDS_ECK-
27	LVDS_OCK+	28	LVDS_ECK+
29	GND	30	GND
31	N.C	32	N.C
33	GND	34	GND
35	LVDS_OD3-	36	LVDS_ED3-
37	LVDS_OD3+	38	LVDS_ED3+
39	LVDS ENBKL	40	LVDS VCON

EDP1:

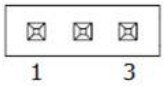
Pin	Signal	Pin	Signal
1	VDD	2	VDD
3	LVDS DETECT#	4	GND
5	VDD	6	VDD
7	EDP_TX2-	8	N.C
9	EDP_TX2+	10	N.C
11	GND	12	GND
13	EDP_TX1-	14	N.C
15	EDP_TX1+	16	N.C
17	GND	18	GND
19	EDP_TX0-	20	N.C
21	EDP_TX0+	22	N.C
23	GND	24	GND
25	EDP_TX3-	26	N.C
27	EDP_TX3+	28	N.C
29	GND	30	GND
31	EDP_AUX+	32	EDP_AUX-
33	GND	34	EDP_HPD
35	N.C	36	N.C
37	N.C	38	N.C
39	N.C	40	GND

2.4 HDMI Connector (HDMI1)



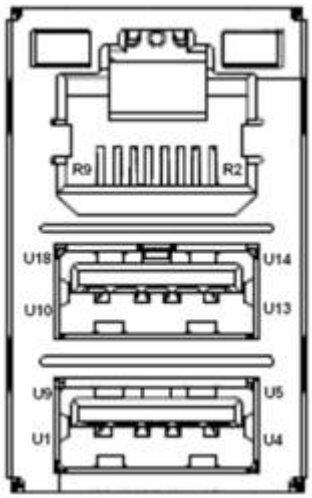
Pin	Signal	Pin	Signal
1	TMDS Data2+	2	GND
3	TMDS Data2-	4	TMDS Data1+
5	GND	6	TMDS Data1-
7	TMDS Data0+	8	GND
9	TMDS Data0-	10	TMDS Clock+
11	GND	12	TMDS Clock-
13	NC	14	NC
15	SCL	16	SDA
17	GND	18	+5V Power
19	Hot Plug Detect		

2.5 Power LED Pin Header (JFP2)



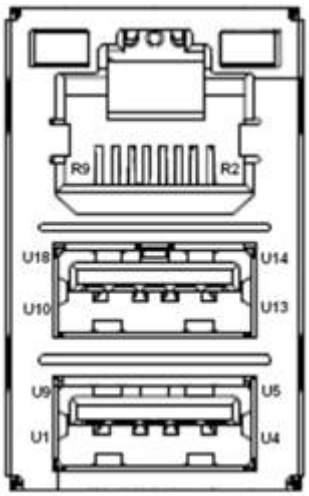
Pin	Signal
1	Power LED+
2	NC
3	Power LED-

2.6 RJ45 + USB 3.2 Stack Connector (LAN1_USB12)



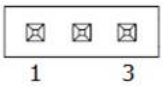
Pin	Signal	Pin	Signal
U1	VBUS	U10	VBUS
U2	D_1-	U11	D_2-
U3	D_1+	U12	D_2+
U4	GND	U13	GND
U5	RX_1-	U14	RX_2-
U6	RX_1+	U15	RX_2+
U7	GND	U16	GND
U8	TX_1-	U17	TX_2-
U9	TX_1+	U18	TX_2+
R2	MDI_0+	R6	MDI_2+
R3	MDI_0-	R7	MDI_2-
R4	MDI_1+	R8	MDI_3+
R5	MDI_1-	R9	MDI_3-

2.7 RJ45 + USB 3.2 Stack Connector (LAN2_USB34)



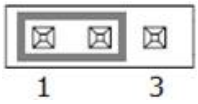
Pin	Signal	Pin	Signal
U1	VBUS (*)	U10	VBUS (*)
U2	D_3-	U11	D_4-
U3	D_3+	U12	D_4+
U4	GND	U13	GND
U5	RX_3-	U14	RX_4-
U6	RX_3+	U15	RX_4+
U7	GND	U16	GND
U8	TX_3-	U17	TX_4-
U9	TX_3+	U18	TX_4+
R2	MDI_0+	R6	MDI_2+
R3	MDI_0-	R7	MDI_2-
R4	MDI_1+	R8	MDI_3+
R5	MDI_1-	R9	MDI_3-

2.8 Flash Descriptor Security Override Pin Header (ME1)



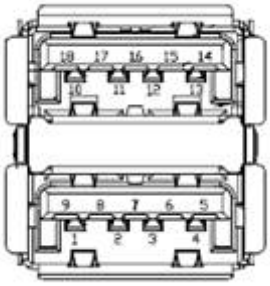
Pin	Signal
1	Advantech Define
2	Advantech Define
3	NC

2.9 COMS Mode Selection (JCOMS1)



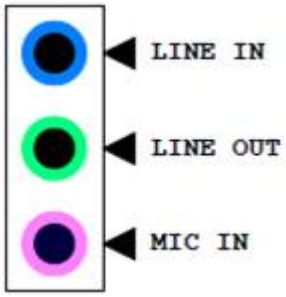
Pin	Signal
1	NC
2	RTC_RESET#
3	GND

2.10 Universal Serial Bus 3.2 (USB78)



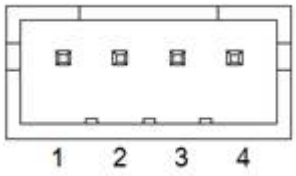
Pin	Signal	Pin	Signal
1	VBUS	2	D- [7]
3	D+ [7]	4	GND
5	RX- [7]	6	RX+ [7]
7	GND	8	TX- [7]
9	TX+ [7]	10	VBUS
11	D- [8]	12	D+ [8]
13	GND	14	RX- [8]
15	RX+ [8]	16	GND
17	TX- [8]	18	TX+ [8]

2.11 HD Audio Interface (Analog) (AUDIO1)



Pin	Signal
1	MIC IN
2	LINE OUT
3	LINE IN

2.12 Audio Amplifier Output Pin Header (AMP1)

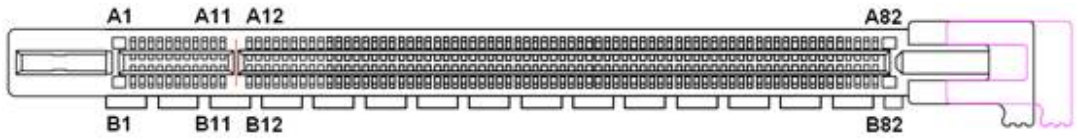


Pin	Signal
1	AMP OUT – R+
2	AMP OUT – R-
3	AMP OUT – L-
4	AMP OUT – L+

2.13 SPI BIOS Flash Socket1 (SPI1)

Pin	Signal	Pin	Signal
1	CS#	5	MOSI
2	MISO	6	SCLK
3	WP# / IO2	7	HOLD# / IO3
4	GND	8	+V3.3_SPI

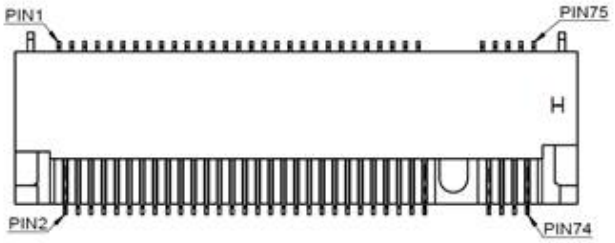
2.14 PCI-Express x16 Slot (PCIEX16_1)



Pin	Signal	Pin	Signal
B1	+12V	A1	PRSNT1#
B2	+12V	A2	+12V
B3	+12V	A3	+12V
B4	GND	A4	GND
B5	SMB_CLK	A5	Reserved
B6	SMB_DATA	A6	Reserved
B7	GND	A7	Reserved
B8	+3.3V	A8	Reserved
B9	Reserved	A9	+3.3V
B10	+3.3VAUX	A10	+3.3V
B11	WAKE#	A11	PWRGD
B12	Reserved	A12	GND
B13	GND	A13	REFCLK+
B14	TX0+	A14	REFCLK-
B15	TX0-	A15	GND
B16	GND	A16	RX0+
B17	Reserved	A17	RX0-
B18	DETECT#	A18	GND
B19	TX1+	A19	Advantech define
B20	TX1-	A20	GND
B21	GND	A21	RX1+
B22	GND	A22	RX1-
B23	TX2+	A23	GND
B24	TX2-	A24	GND
B25	GND	A25	RX2+
B26	GND	A26	RX2-
B27	TX3+	A27	GND
B28	TX3-	A28	GND
B29	GND	A29	RX3+
B30	Reserved	A30	RX3-
B31	Reserved	A31	GND
B32	GND	A32	Advantech define
B33	TX4+	A33	Reserved
B34	TX4-	A34	GND
B35	GND	A35	RX4+
B36	GND	A36	RX4-
B37	TX5+	A37	GND
B38	TX5-	A38	GND
B39	GND	A39	RX5+

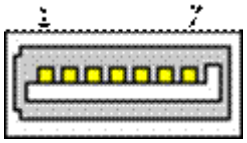
B40	GND	A40	RX5-
B41	TX6+	A41	GND
B42	TX6-	A42	GND
B43	GND	A43	RX6+
B44	GND	A44	RX6-
B45	TX7+	A45	GND
B46	TX7-	A46	GND
B47	GND	A47	RX7+
B48	Reserved	A48	RX7-
B49	GND	A49	GND
B50	TX8+	A50	Reserved
B51	TX8-	A51	GND
B52	GND	A52	RX8+
B53	GND	A53	RX8-
B54	TX9+	A54	GND
B55	TX9-	A55	GND
B56	GND	A56	RX9+
B57	GND	A57	RX9-
B58	TX10+	A58	GND
B59	TX10-	A59	GND
B60	GND	A60	RX10+
B61	GND	A61	RX10-
B62	TX11+	A62	GND
B63	TX11-	A63	GND
B64	GND	A64	RX11+
B65	GND	A65	RX11-
B66	TX12+	A66	GND
B67	TX12-	A67	GND
B68	GND	A68	RX12+
B69	GND	A69	RX12-
B70	TX13+	A70	GND
B71	TX13-	A71	GND
B72	GND	A72	RX13+
B73	GND	A73	RX13-
B74	TX14+	A74	GND
B75	TX14-	A75	GND
B76	GND	A76	RX14+
B77	GND	A77	RX14-
B78	TX15+	A78	GND
B79	TX15-	A79	GND
B80	GND	A80	RX15+
B81	Reserved	A81	RX15-
B82	Reserved	A82	GND

2.15 M.2 M-KEY Connector (M2M1)



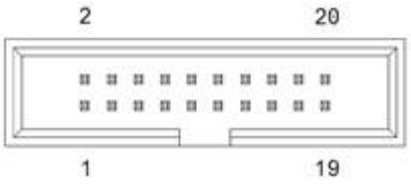
Pin	Signal	Pin	Signal
1	GND	2	3.3V
3	GND	4	3.3V
5	PERn3	6	N/C
7	PERp3	8	N/C
9	GND	10	DAS/DSS# (I/O)/LED1# (I)(0/3.3V)
11	PETn3	12	3.3V
13	PETp3	14	3.3V
15	GND	16	3.3V
17	PERn2	18	3.3V
19	PERp2	20	N/C
21	GND	22	N/C
23	PETn2	24	N/C
25	PETp2	26	N/C
27	GND	28	N/C
29	PERn1	30	N/C
31	PERp1	32	N/C
33	GND	34	N/C
35	PETn1	36	N/C
37	PETp1	38	DEVSLP (O)
39	GND	40	N/C
41	PERn0/SATA-B+	42	N/C
43	PERp0/SATA-B-	44	N/C
45	GND	46	N/C
47	PETn0/SATA-A-	48	N/C
49	PETp0/SATA-A+	50	PERST# (O)(0/3.3V) or N/C
51	GND	52	CLKREQ# (I/O)(0/3.3V) or N/C
53	REFCLKn	54	PEWAKE# (I/O)(0/3.3V) or N/C
55	REFCLKp	56	N/C
57	GND	58	N/C
59	Connector Key	60	Connector Key
61	Connector Key	62	Connector Key
63	Connector Key	64	Connector Key
65	Connector Key	66	Connector Key
67	N/C	68	SUSCLK(32kHz) (O)(0/3.3V)
69	PEDET (NC-PCIe/GND-SATA)	70	3.3V
71	GND	72	3.3V
73	GND	74	3.3V
75	GND		

2.16 Serial ATA Interface Connector (SATA1)



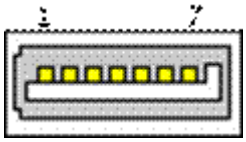
Pin	Signal
1	GND
2	TX+
3	TX-
4	GND
5	RX-
6	RX+
7	GND

2.17 Serial ATA iInterface Connector (SATA2)



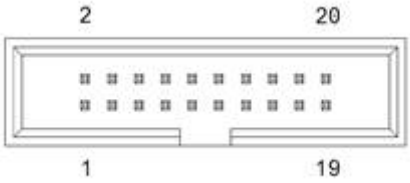
Pin	Signal
1	GND
2	TX+
3	TX-
4	GND
5	RX-
6	RX+
7	GND

2.18 Serial ATA Interface Connector (SATA3)



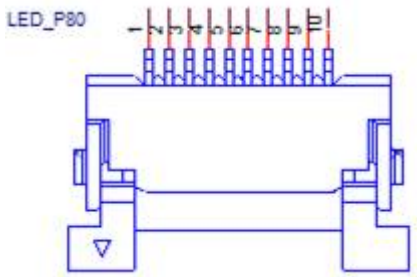
Pin	Signal
1	GND
2	TX+
3	TX-
4	GND
5	RX-
6	RX+
7	GND

2.19 COM1 / COM2 Connector (COM12)



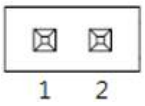
Pin	Signal	Pin	Signal
1	DCD# [1]	2	DSR# [1]
3	RXD [1]	4	RST# [1]
5	TXD [1]	6	CTS# [1]
7	DTR# [1]	8	RI# [1]
9	GND	10	GND
11	DCD# [2]	12	DSR# [2]
13	RXD [2]	14	RST# [2]
15	TXD [2]	16	CTS# [2]
17	DTR# [2]	18	RI# [2]
19	GND	20	GND

2.20 LED Port 80 Connector (LED_P80)



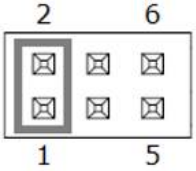
Pin	Signal
1	GND
2	LED_A
3	LED_B
4	LED_C
5	LED_D
6	LED_E
7	LED_F
8	LED_G
9	DGH0#
10	DGL0#

2.21 Case Open Connector (JCASE1)



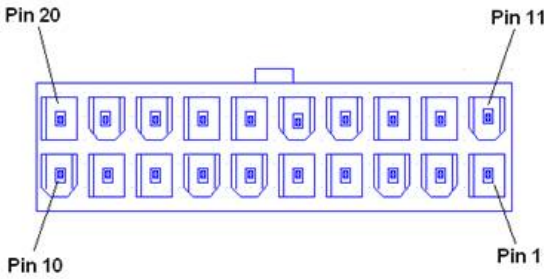
Pin	Signal
1	Case Open
2	GND

2.22 COM1 RI# Selection Pin Header(JSETCOM1_V1)



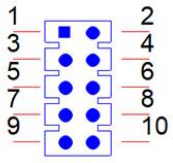
Pin	Signal	Pin	Signal
1	RI# [1]	2	Advantech define
3	Advantech define	4	+5V
5	+12V	6	Advantech define

2.23 ATX 20pin Power Connector (EATXPWR1)



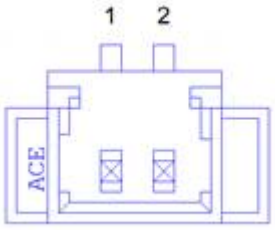
Pin	Signal	Pin	Signal
1	+3.3V	11	+3.3V
2	+3.3V	12	-12V
3	GND	13	GND
4	+5V	14	PSON#
5	GND	15	GND
6	+5V	16	GND
7	GND	17	GND
8	PWROK	18	-5V
9	+5VSB	19	+5V
10	+12V	20	+5V

2.24 8-bits General Purpose I/O Pin Header (GPIO1)



Pin	Signal	Pin	Signal
1	NC	2	GPIO4
3	NC	4	GPIO5
5	GPIO2	6	GPIO6
7	GPIO3	8	GPIO7
9	VCC_GPIO	10	GND

2.25 CMOS Battery Connector (BAT1)



Pin	Signal
1	+VBAT
2	GND

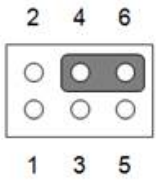
2.26 DDR5 SO-DIMM Socket B1 (DIMMB1)

Please refer to JEDEC STANDARD.

2.27 DDR5 SO-DIMM Socket A1 (DIMMA1)

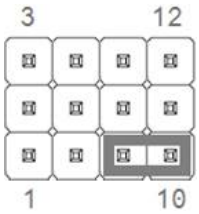
Please refer to JEDEC STANDARD.

2.28 EDP Panel / LVDS Panel Voltage Selection (JEDP1_LVDS1)



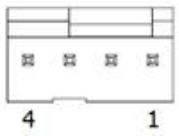
Pin	Signal	Pin	Signal
1	NC	2	+5V
3	+12V	4	VDD
5	NC	6	+3.3V

2.29 PWRBTN# / RESET# /HDD LED / Internal Buzzer / External Speaker header (JFP1)



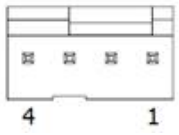
Pin	Signal	Pin	Signal
1	+5V	2	HDD LED+
3	Power Button+	4	SPK_P2
5	HDD LED-	6	Power Button-
7	SPK_P3	8	SMB_DATA
9	System Reset+	10	SPK_P4
11	SMB_CLK	12	System Reset-

2.30 CPU FAN Connector (CPUFAN1)



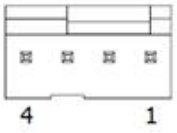
Pin	Signal
1	GND
2	CPU FAN VCC
3	CPU FAN SPEED
4	CPU FAN PWM

2.31 System Fan #1 Connector (SYSFAN1)



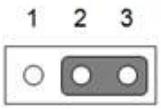
Pin	Signal
1	GND
2	SYSTEM FAN VCC
3	SYSTEM FAN SPEED
4	SYSTEM FAN PWM

2.32 System Fan #2 Connector (SYSFAN2)



Pin	Signal
1	GND
2	SYSTEM FAN VCC
3	SYSTEM FAN SPEED
4	SYSTEM FAN PWM

2.33 LVDS VESA, JEIDA Format Selection pin Header (JLVDS_VCON1)

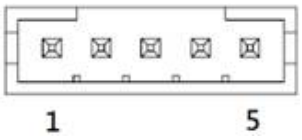


Pin	Signal
1	+3.3V
2	Advantech define
3	GND

2.34 Watchdog timer output and OBS beep (JWDT1+JOBS1)

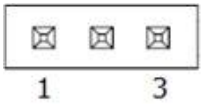
Pin	Signal	Pin	Signal
1	NC	4	SIO Warning Beep output
2	Watch Dog Reset# output	5	SP1 Buzzer Beep input
3	System Reset input#		

2.35 EDP / LVDS Backlight Inverter Power Connector (INV1)



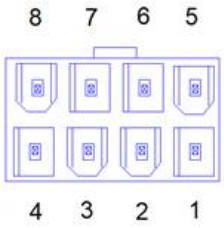
Pin	Signal
1	+12V
2	GND
3	BKL EN
4	BKL CTRL
5	+5V

2.36 IMVP9.1 Programming Header (JSMB1)



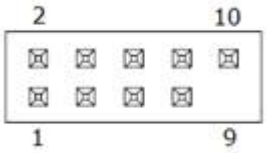
Pin	Signal
1	CLK
2	GND
3	DATA

2.37 ATX 8 Pin Main Power Connector (ATX12V1)



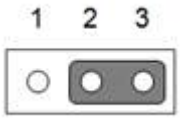
Pin	Signal	Pin	Signal
1	GND	5	+12V
2	GND	6	+12V
3	GND	7	+12V
4	GND	8	+12V

2.38 USB2.0 Front Panel Header (USB56)



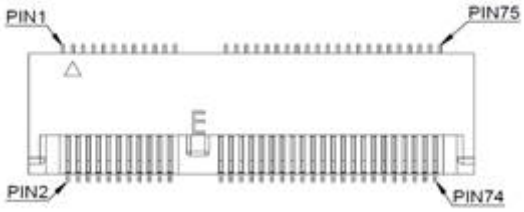
Pin	Signal	Pin	Signal
1	VBUS #3	2	VBUS #4
3	D- [3]	4	D- [4]
5	D+ [3]	6	D+ [4]
7	GND	8	GND
		10	GND

2.39 AT / ATX Mode Selection (PSON1)



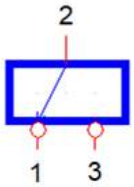
Pin	Signal
1	AT
2	+3.3V
3	ATX

2.40 M.2 E-KEY Connector (M2E1)



Pin	Signal	Pin	Signal
1	GND	2	+3.3V
3	USB_D+	4	+3.3V
5	USB_D-	6	WLAN_LED1#
7	GND	8	BT_PCMCLK
9	CNV_WR_D1-	10	BT_PCMFRM
11	CNV_WR_D1+	12	BT_PCMIN
13	GND	14	BT_PCMOUT
15	CNV_WR_D0-	16	BT_LED#
17	CNV_WR_D0+	18	GND
19	GND	20	UART WAKE#
21	CNV_WR_CLK-	22	CNV_BRI_RSP
23	CNV_WR_CLK+	24	Connector Key
25	Connector Key	26	Connector Key
27	Connector Key	28	Connector Key
29	Connector Key	30	Connector Key
31	Connector Key	32	CNV_RGI_DT_R
33	GND	34	CNV_RGI_RSP
35	PETp0	36	CNV_BRI_DT_R
37	PETn0	38	CL_RST#
39	GND	40	CL_DAT
41	PERp0	42	CL_CLK
43	PERn0	44	CNV_GNSS_PA_BLANKING
45	GND	46	CNV_MFUART2_TXD
47	REFCLKp0	48	CNV_MFUART2_RXD
49	REFCLKn0	50	SUSCLK
51	GND	52	WLAN_RST#
53	CLKREQ0#	54	BT_RF_KILL#
55	PEWAKE0#	56	WIFI_RF_KILL#
57	GND	58	NC
59	CNV_WT_D1-	60	NC
61	CNV_WT_D1+	62	NC
63	GND	64	NC
65	CNV_WT_D0-	66	NC
67	CNV_WT_D0+	68	NC
69	GND	70	NC
71	CNV_WT_CLK-	72	+3.3V
73	CNV_WT_CLK+	74	+3.3V
75	GND		

2.41 PCI Express x16 Bifurcation (SW1)



Pin	Signal
1	VCC_CFG
2	CFG
3	GND

Chapter 3

BIOS Operation

3.1 Introduction

With the AMI BIOS Setup program, you can modify BIOS settings and control the special features of your computer. The Setup program uses a number of menus for making changes and turning special features on or off. This chapter describes the basic navigation of the AIMB-278 setup screens.

3.2 BIOS Setup

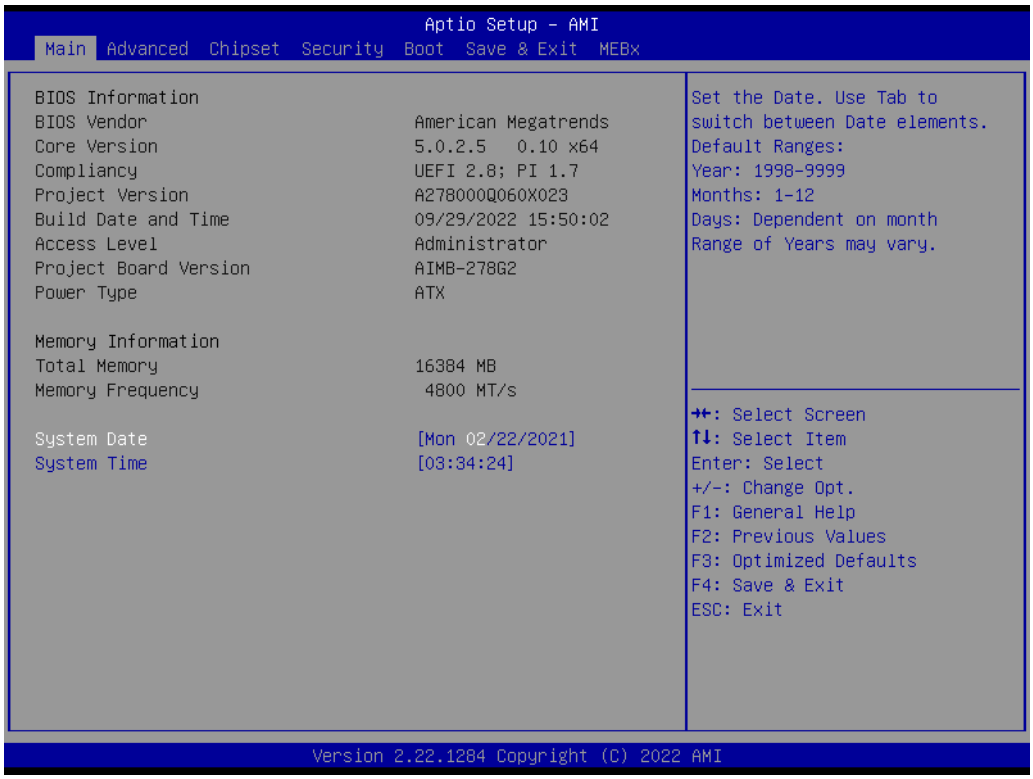
The AIMB-278 Series system has AMI BIOS built in, with a CMOS SETUP utility that allows users to configure required settings or to activate certain system features. The CMOS SETUP saves the configuration in the CMOS RAM of the motherboard. When the power is turned off, the battery on the board supplies the necessary power to preserve the CMOS RAM.

When the power is turned on, press the <Del> button during the BIOS POST (Power-On Self Test) to access the CMOS SETUP screen.

Control Keys	
< ↑ >< ↓ >< ← >< → >	Move to select item
<Enter>	Select item
<Esc>	Main Menu - Quit without saving changes to the CMOS Sub Menu - Exit current page and return to the Main Menu
<Page Up/+>	Increase the numeric value or make changes
<Page Down/->	Decrease the numeric value or make changes
<F1>	General help, for Setup Sub Menu
<F2>	Item help
<F5>	Loads previous values
<F7>	Loads setup defaults
<F10>	Saves all CMOS changes

3.2.1 Main Menu

Press <Del> 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.



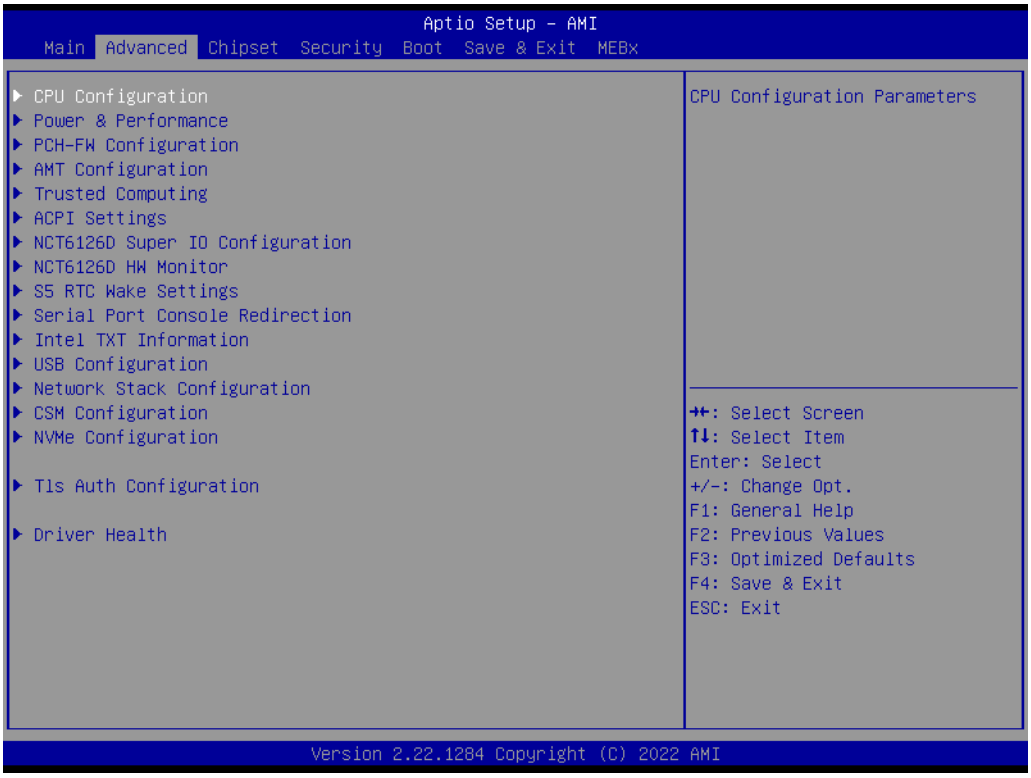
The Main BIOS setup screen has two main frames. The left frame displays all the options that can be configured. Grayed-out options cannot be configured; options in blue can. The right frame displays the key legend.

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 the System Time or System Date using the <Arrow> keys. Enter new values via the keyboard. Press the <Tab> or <Arrow> keys to move between fields. The date must be entered in MM/DD/YY format. The time must be entered in HH:MM:SS format.

3.2.2 Advanced BIOS Features

Select the Advanced tab from the AIMB-278 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 screen is shown below. The sub menus are described on the following pages.

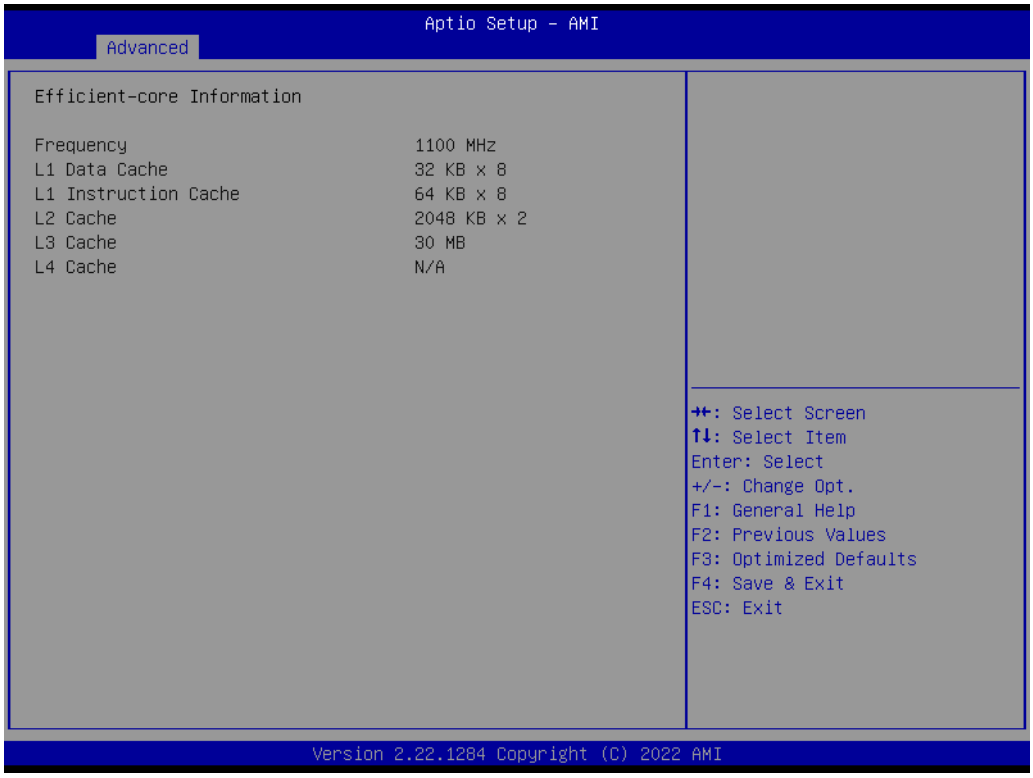


3.2.2.1 CPU Configuration

Advance → CPU Configuration

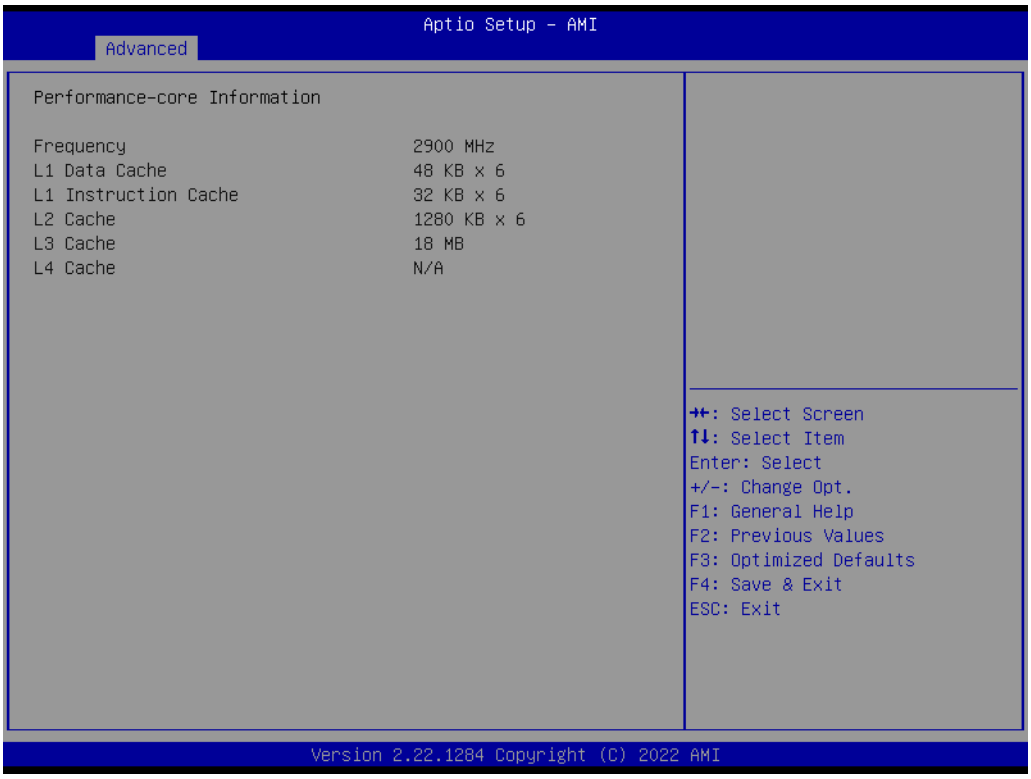
Efficient-core Information

Advance →CPU Configuration → Efficient-core Information



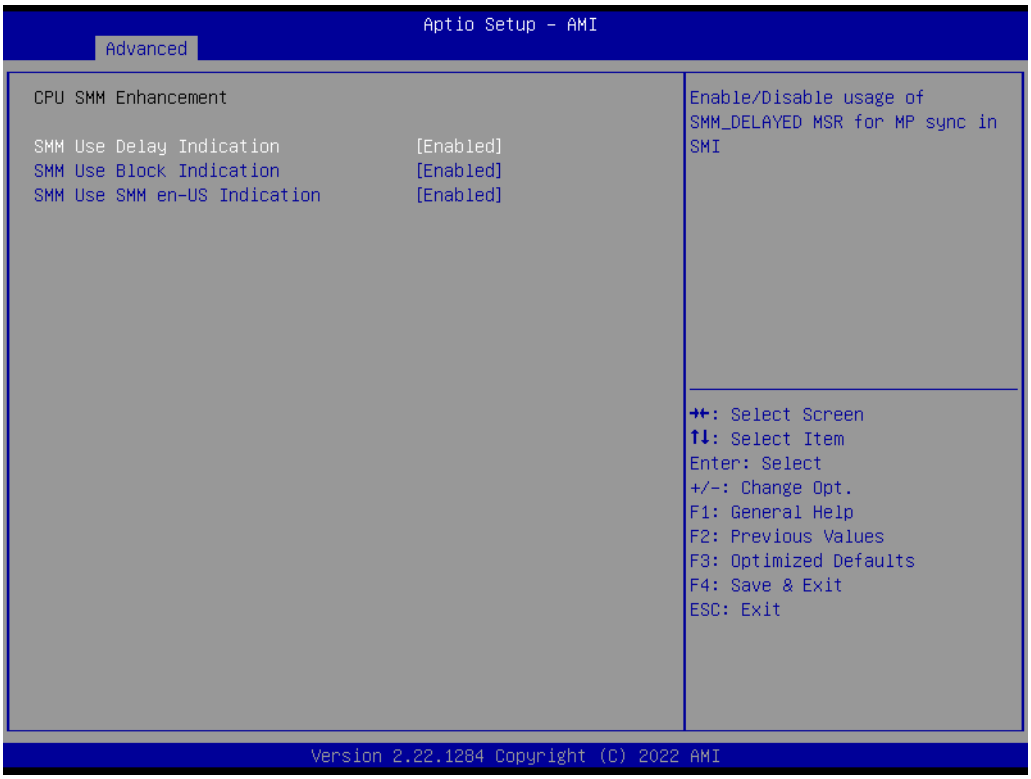
Performance-core Information

Advance →CPU Configuration → Performance-core Information



CPU SMM Enhancement

Advance →CPU SMM Enhancement

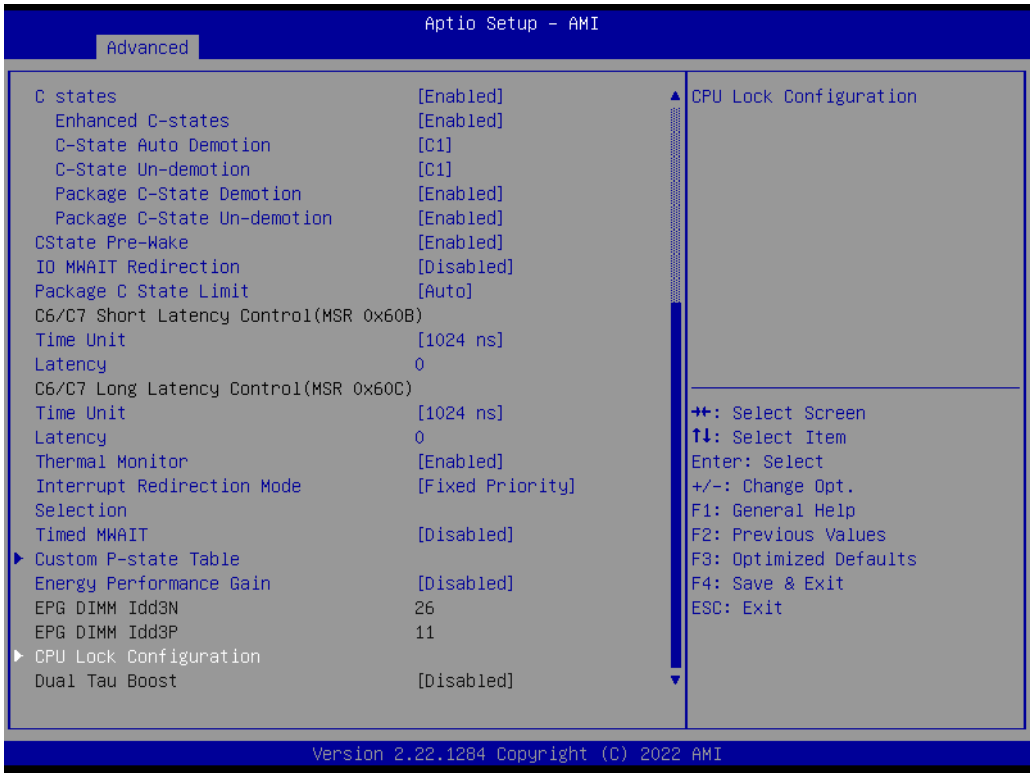


3.2.2.2 Power & Performance

Advance → Power & Performance

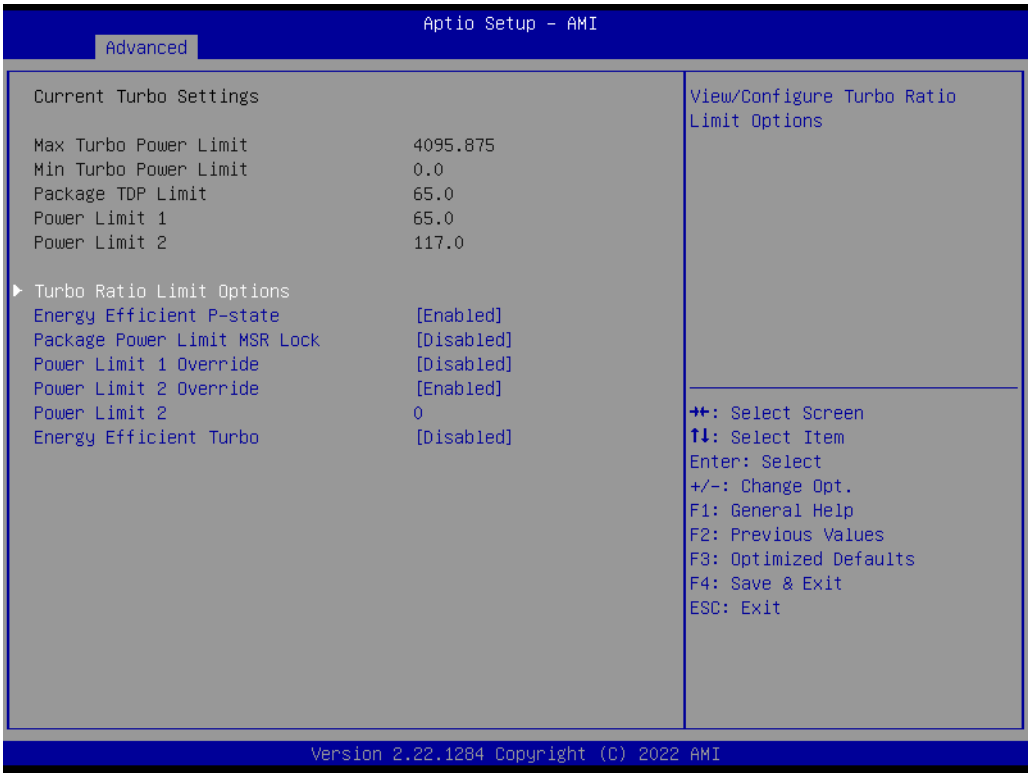
CPU - Power Management Control

Advance → Power & performance → CPU - Power Management Control



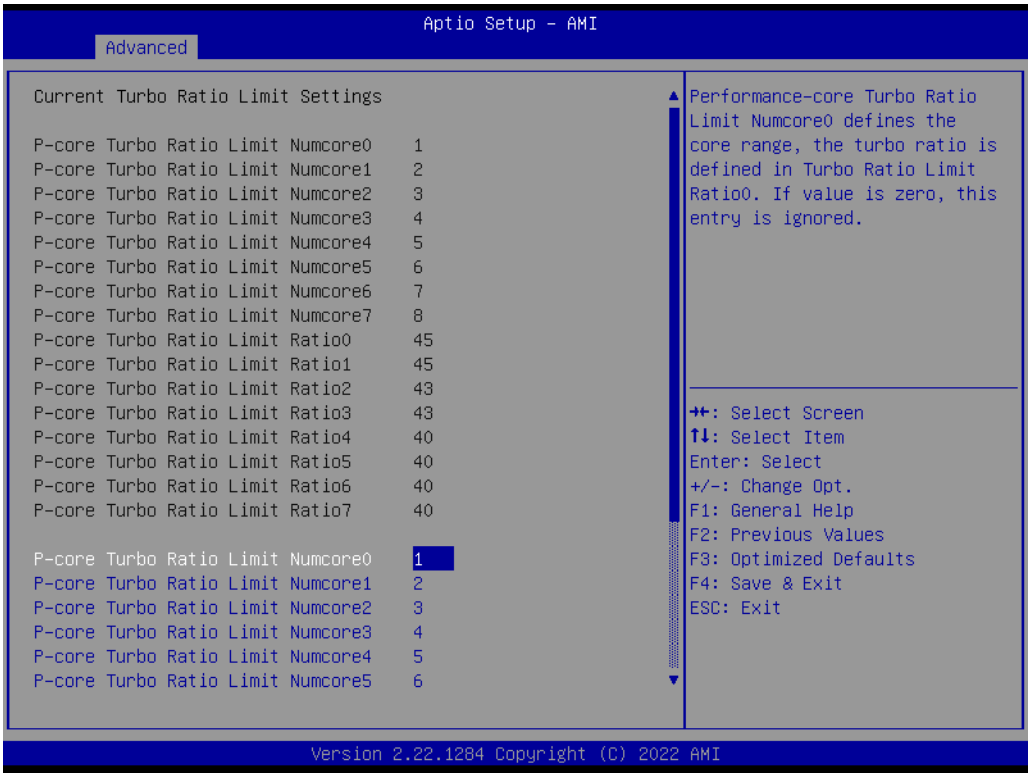
Current Turbo Settings

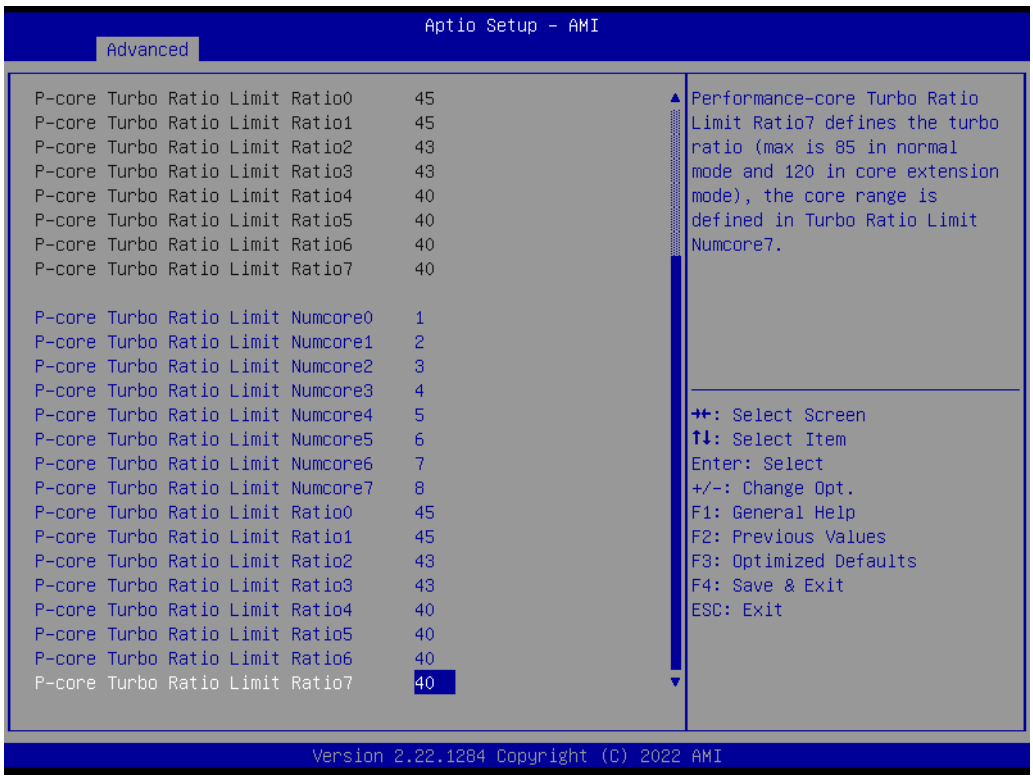
Advance → Power & performance → CPU - Power Management Control → View/ Configure Turbo Option



Turbo Ratio Limit Options

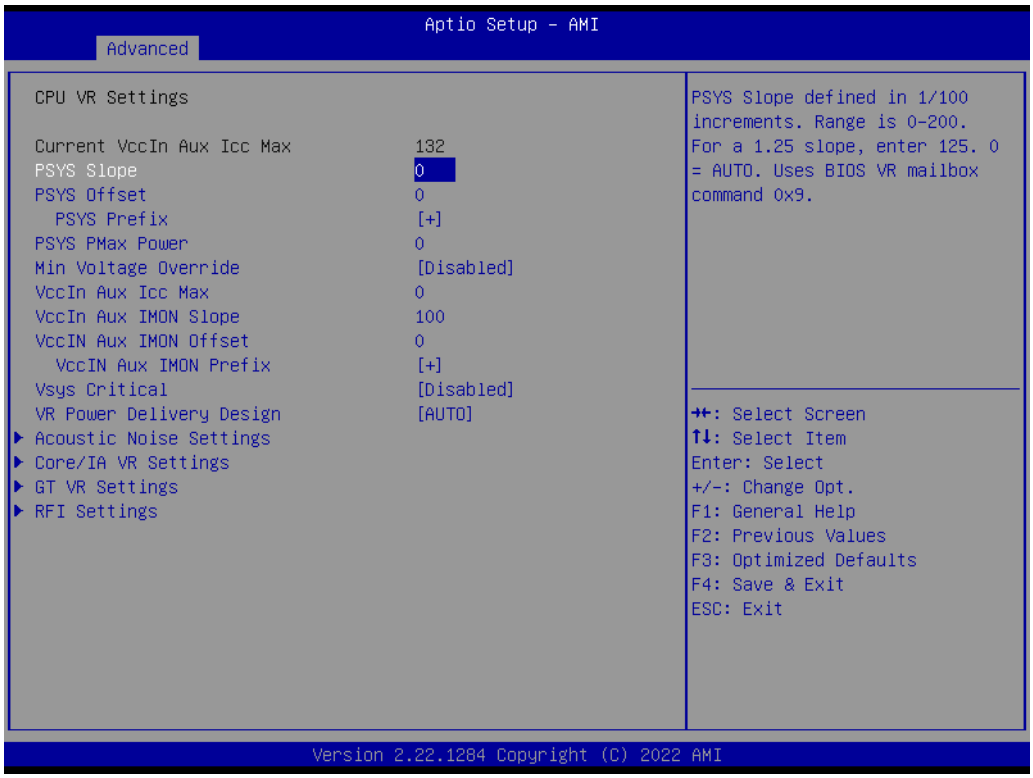
Advance → Power & performance → CPU – Power Management Control → View/ Configure Turbo Option → Turbo Ratio Limit Options





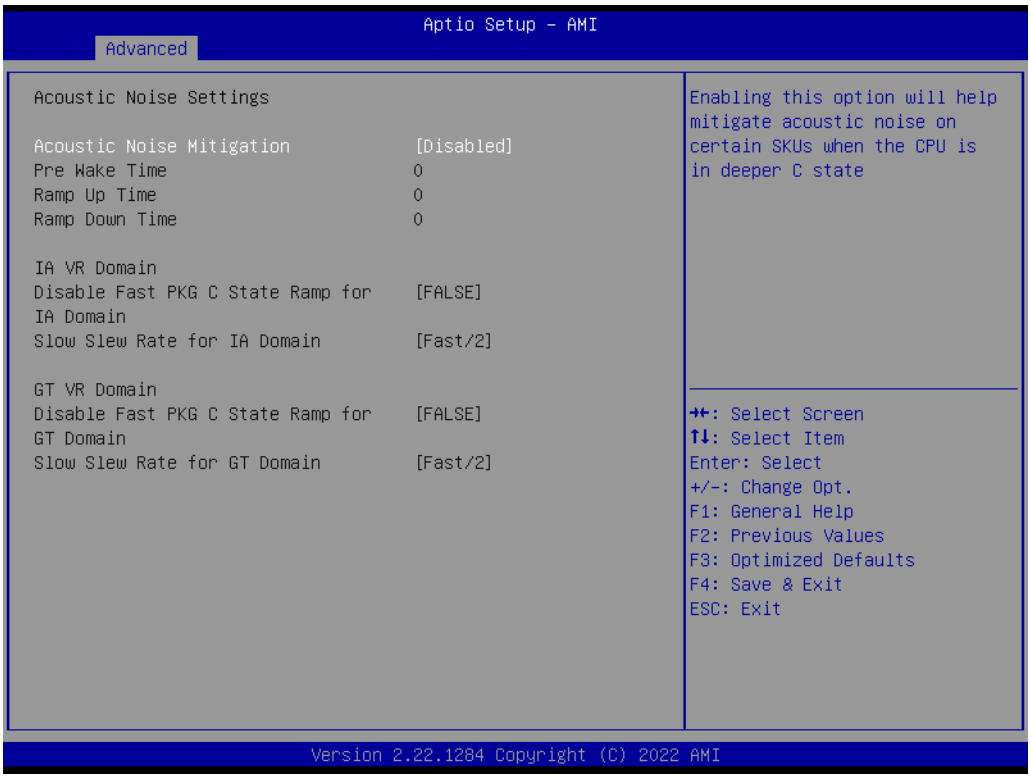
CPU VR Settings

Advance → Power & performance → CPU - Power Management Control → CPU VR Settings



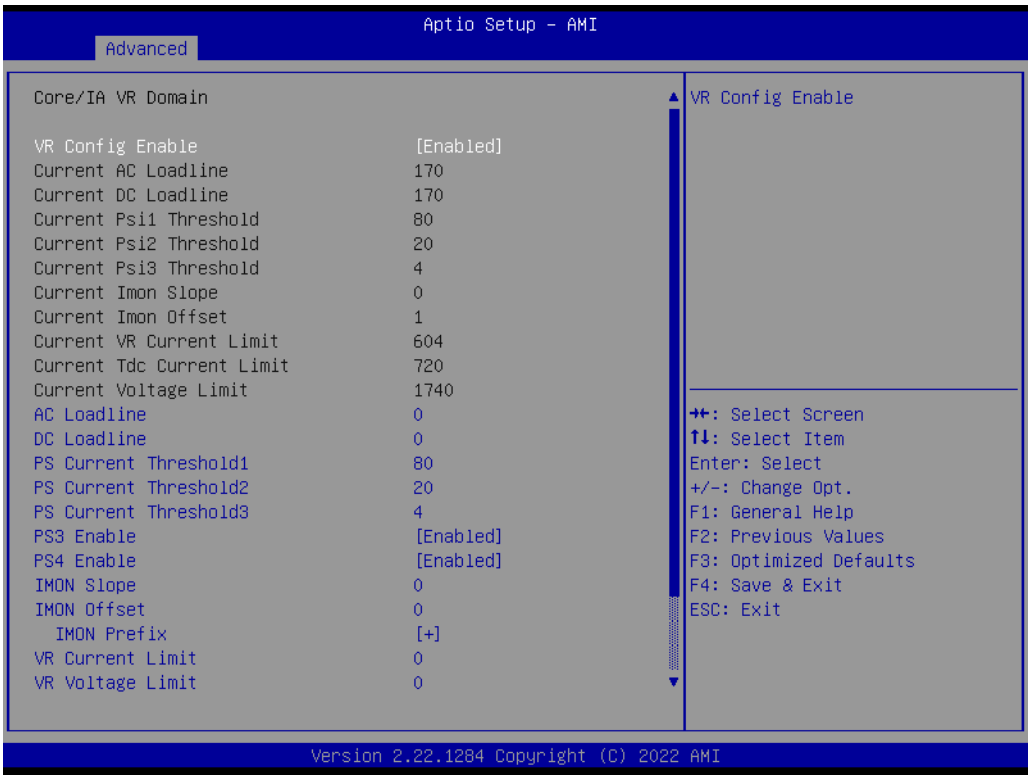
Acoustic Noise Settings

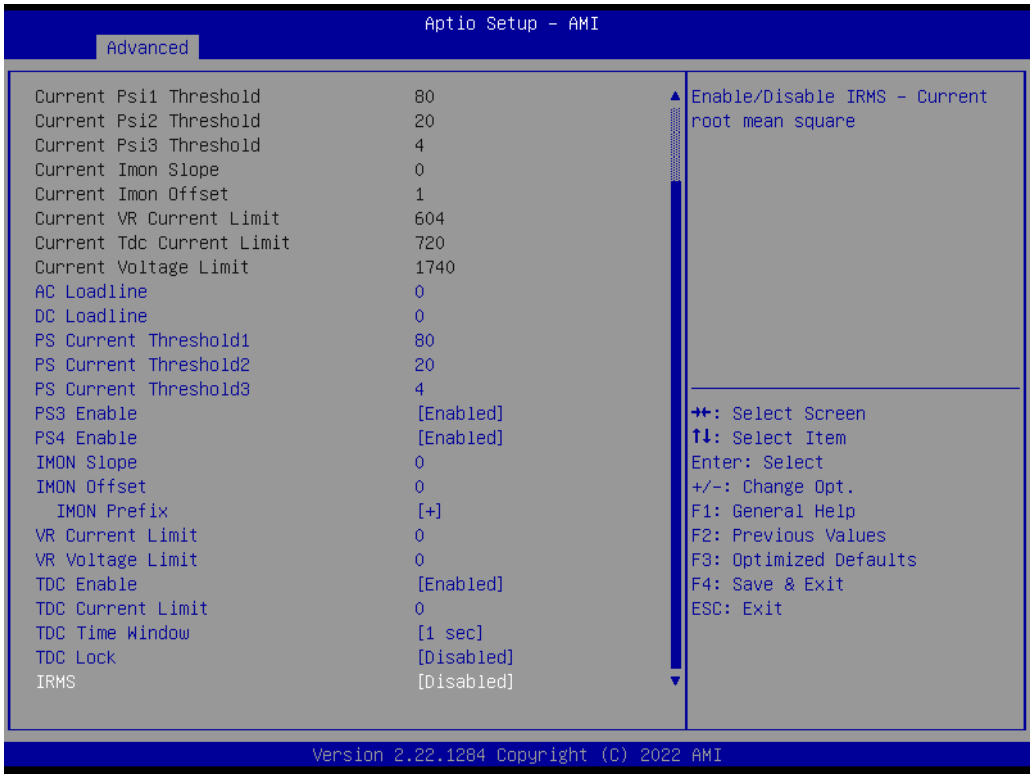
Advance → Power & performance → CPU - Power Management Control → CPU VR Settings → Acoustic Noise Settings



Core/IA VR Settings

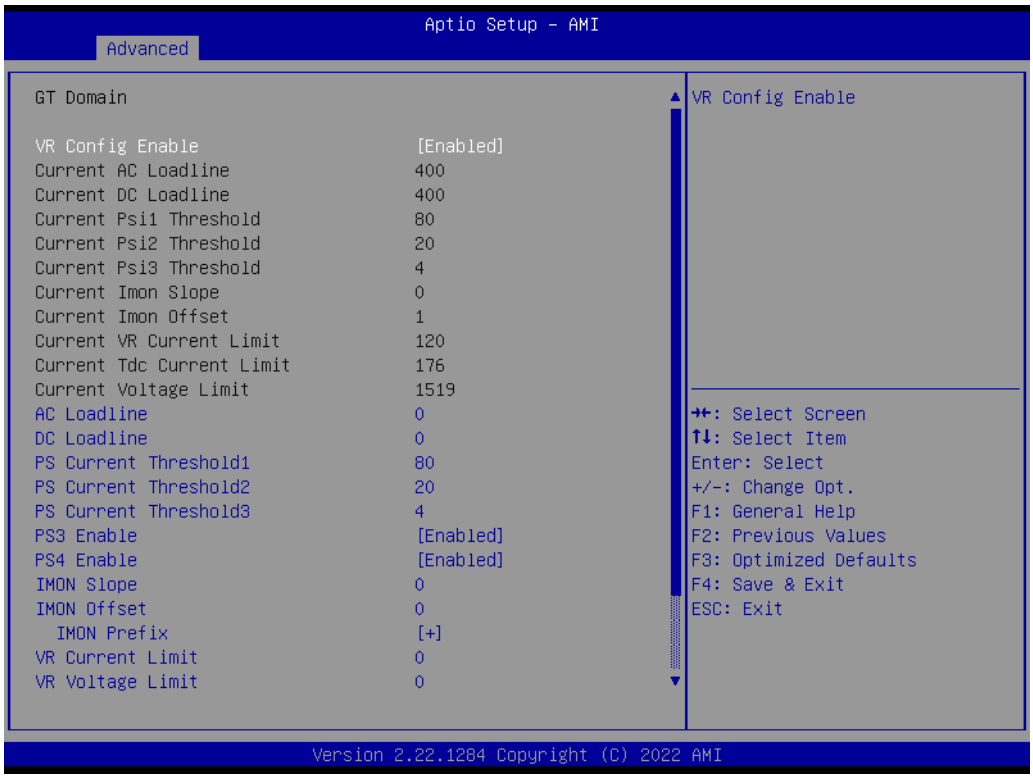
Advance → Power & performance → CPU - Power Management Control → CPU VR Settings → Core/IA Settings

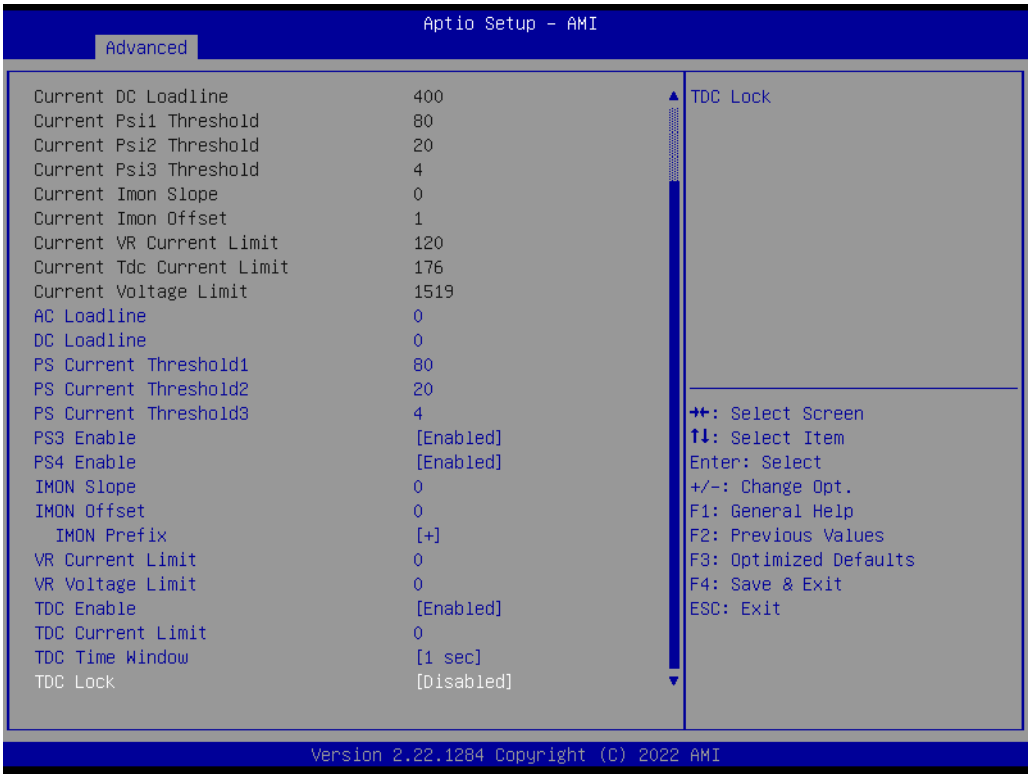




GT VR Settings

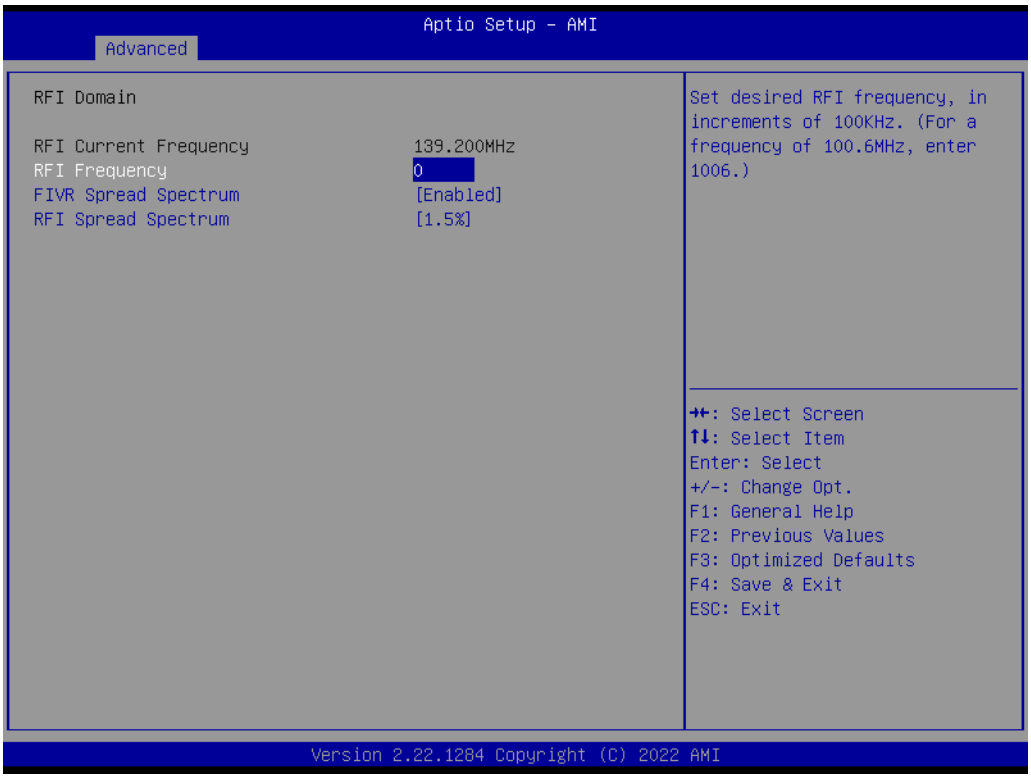
Advance → Power & performance → CPU - Power Management Control → CPU VR Settings → GT VR Settings





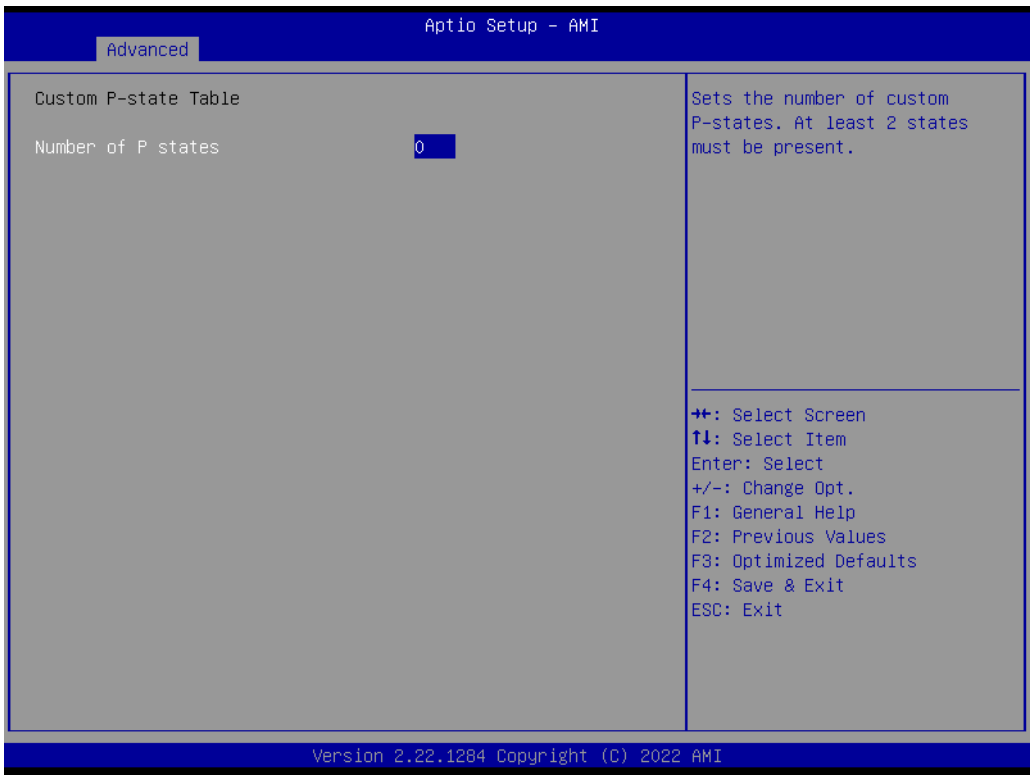
RFI Settings

Advance → Power & performance → CPU - Power Management Control → CPU VR Settings → RFI Settings



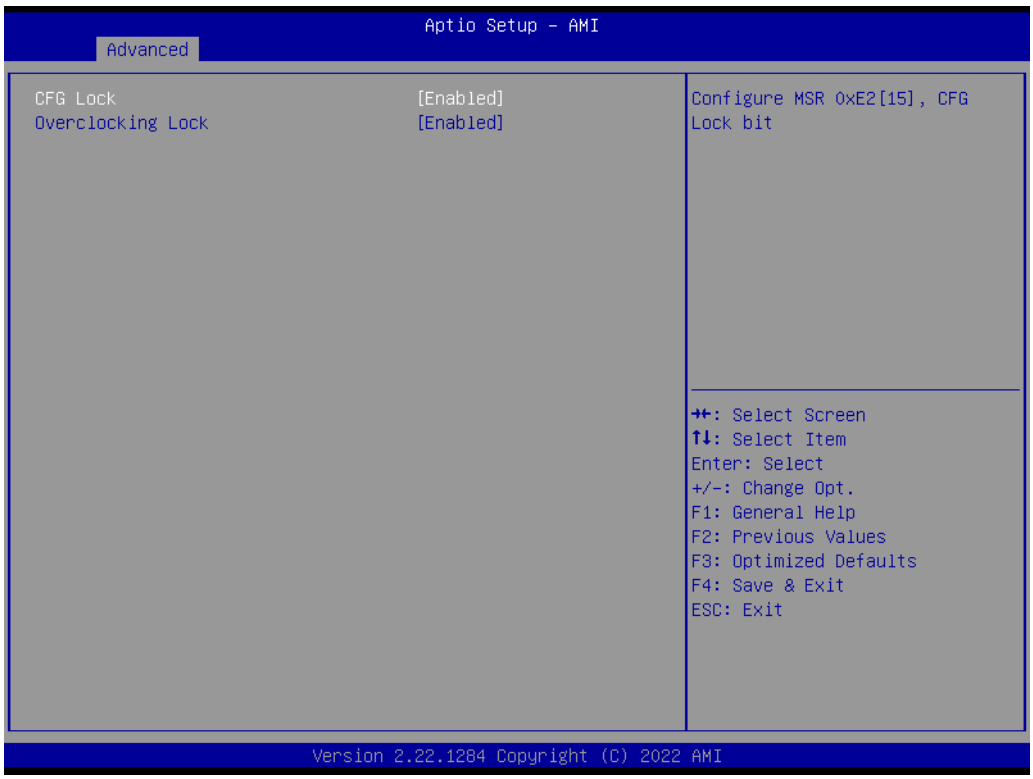
Custom P-State Table

Advance → Power & performance → CPU - Power Management Control → Custom P-State Table



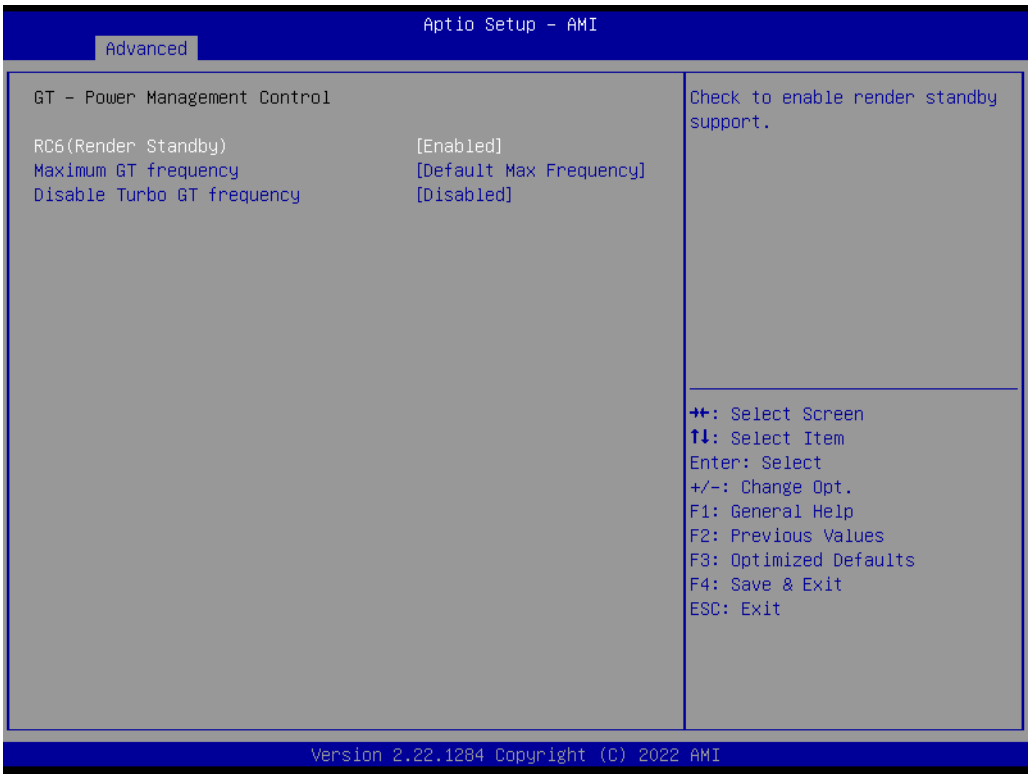
CPU Lock Configuration

Advance → Power & performance → CPU - Power Management Control → CPU Lock Configuration



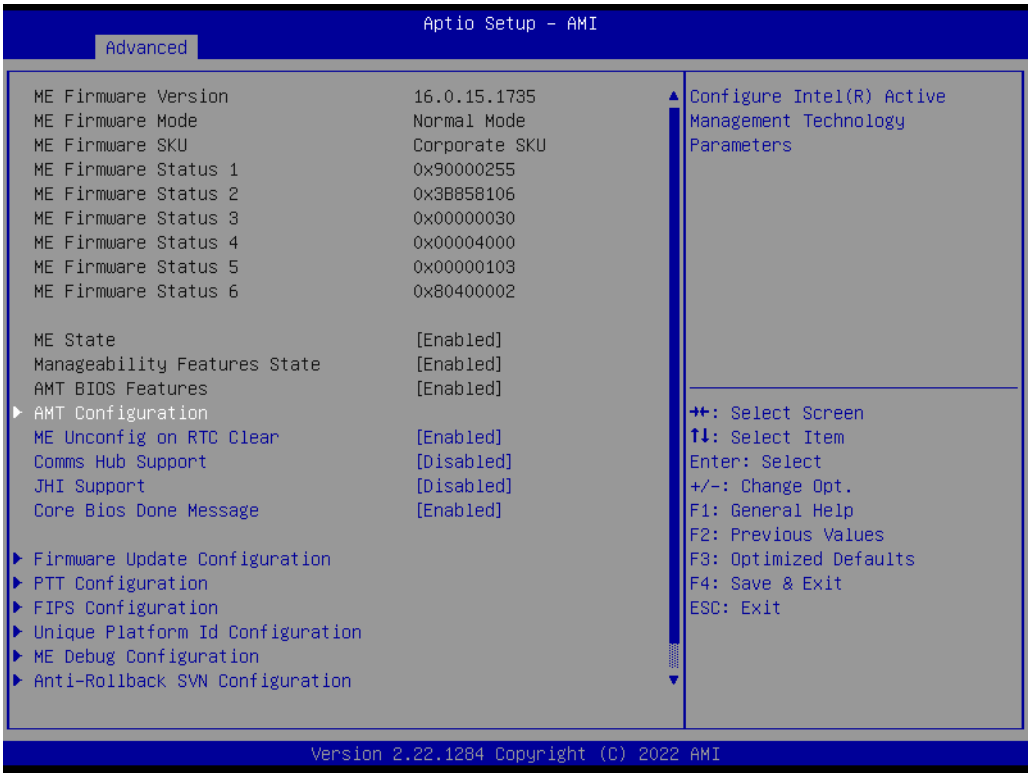
GT - Power Management Control

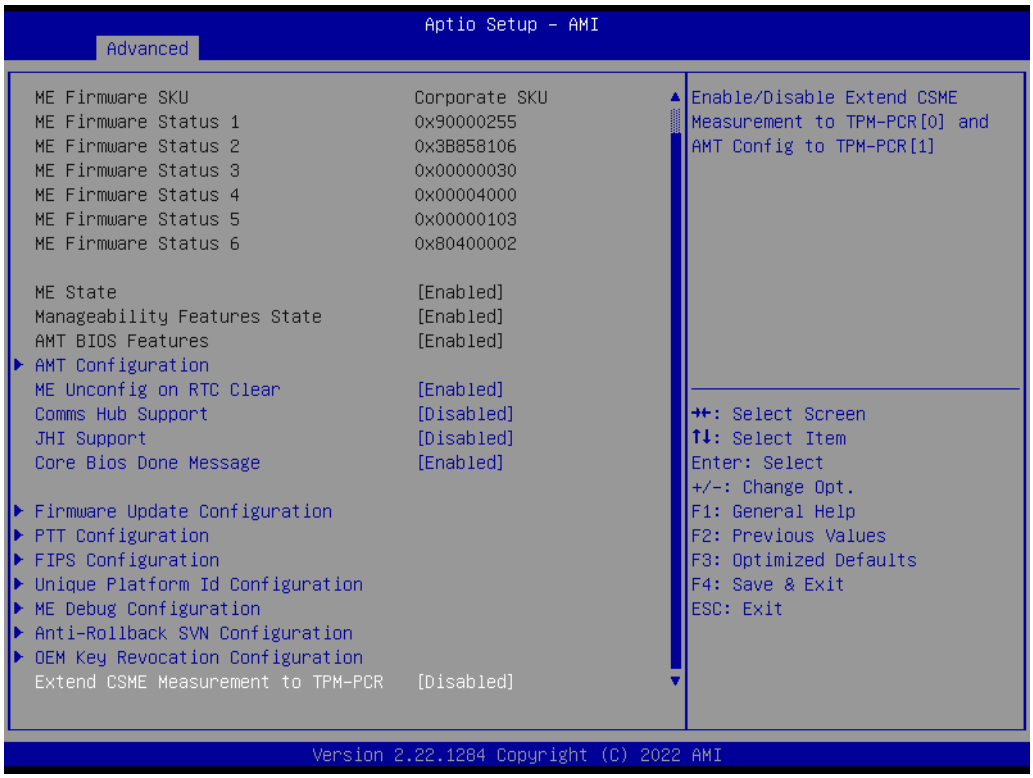
Advance → Power & performance → GT - Power Management Control



3.2.2.3 PCH-FW Configuration

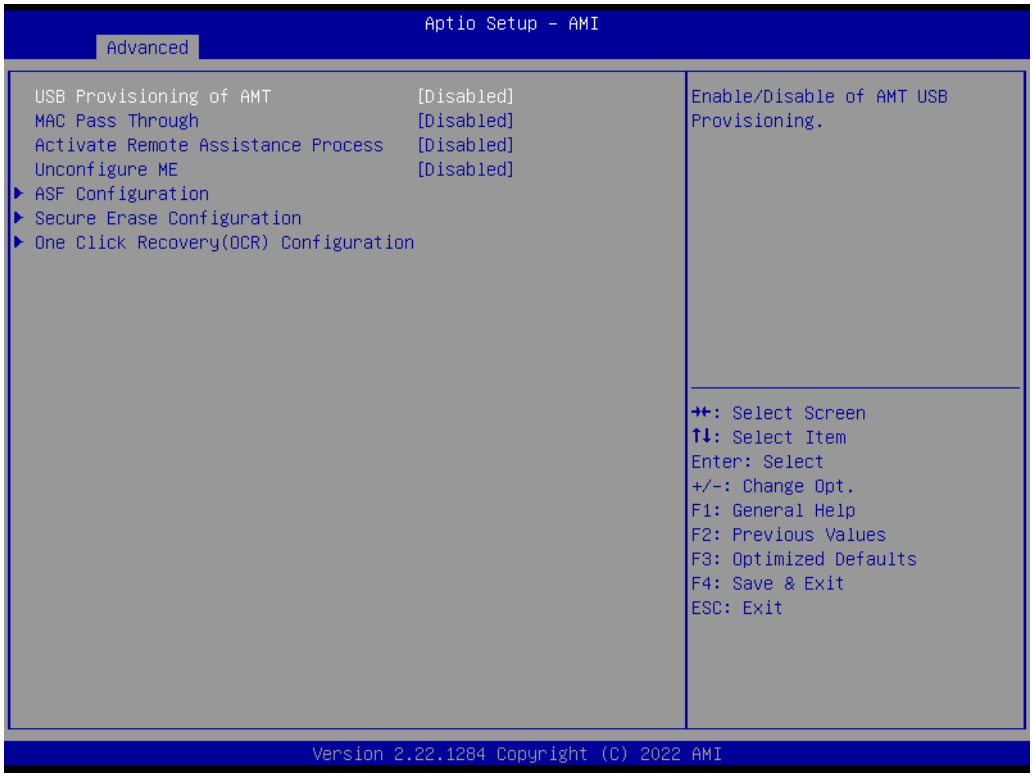
Advance → PCH-FW Configuration





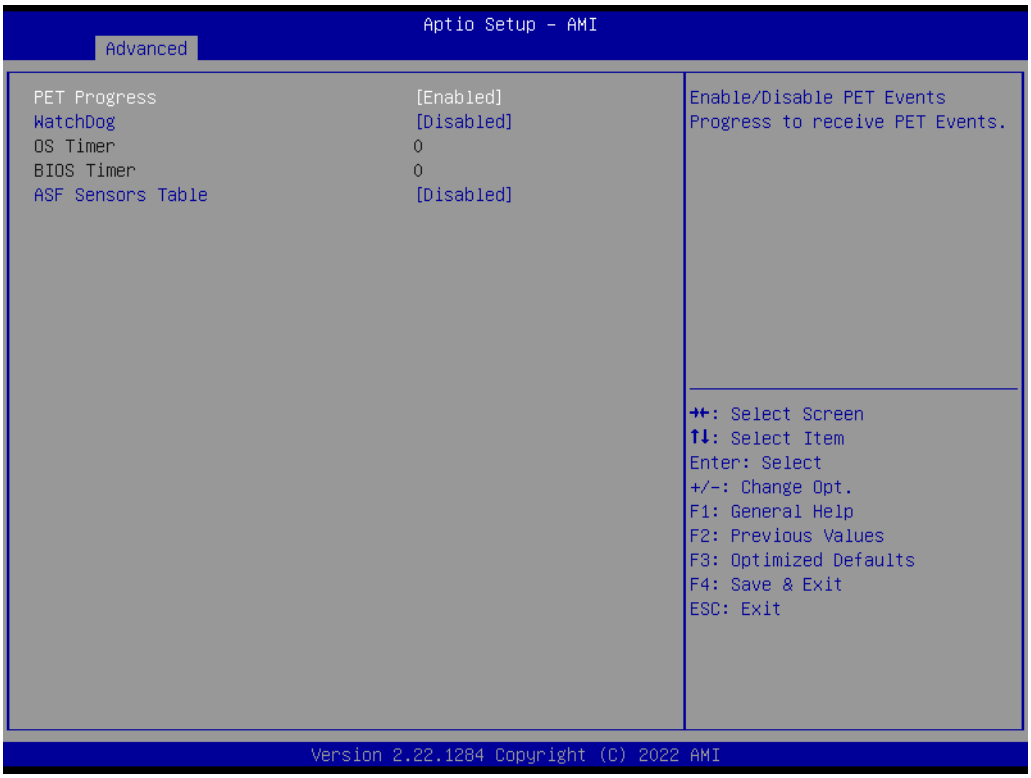
3.2.2.4 AMT Configuration

Advance → PCH-FW Configuration → AMT Configuration



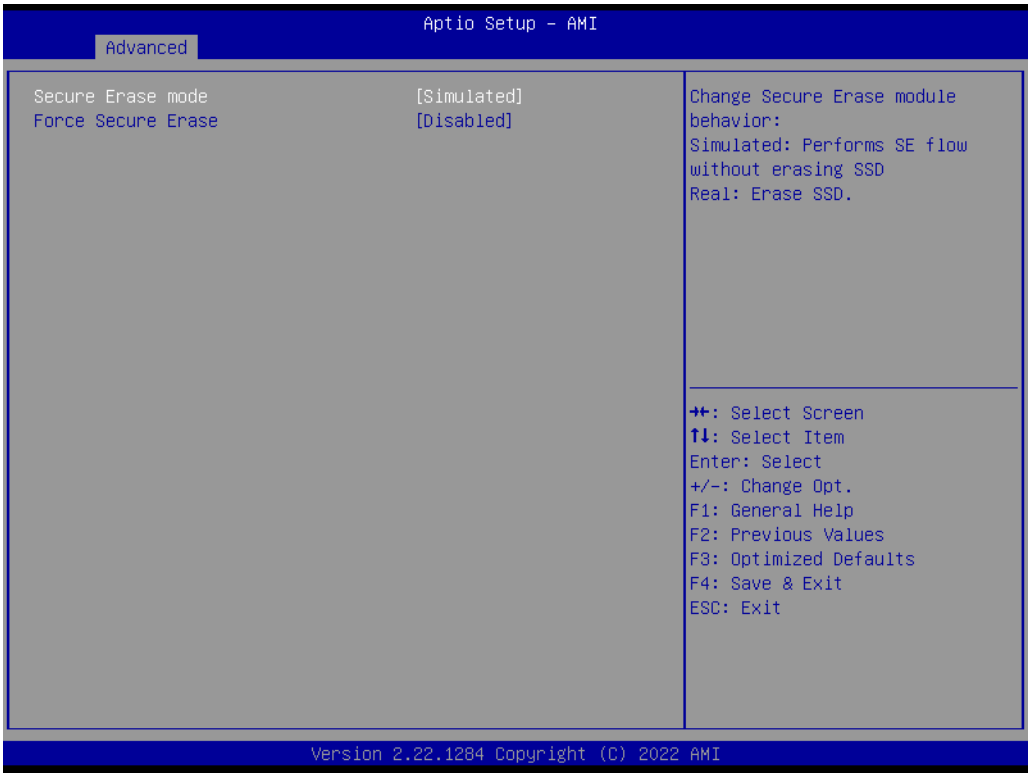
AMT Configuration

Advance → PCH-FW Configuration → AMT Configuration → ASF Configuration



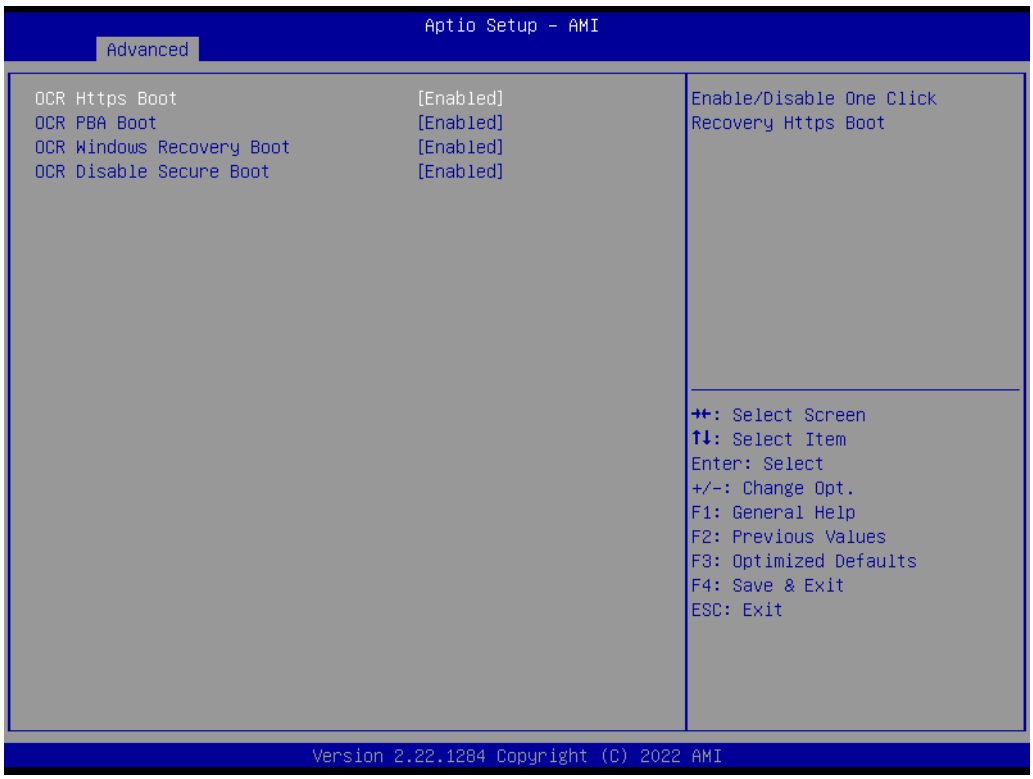
Secure Erase Configuration

Advance → PCH-FW Configuration → AMT Configuration → Secure Erase Configuration



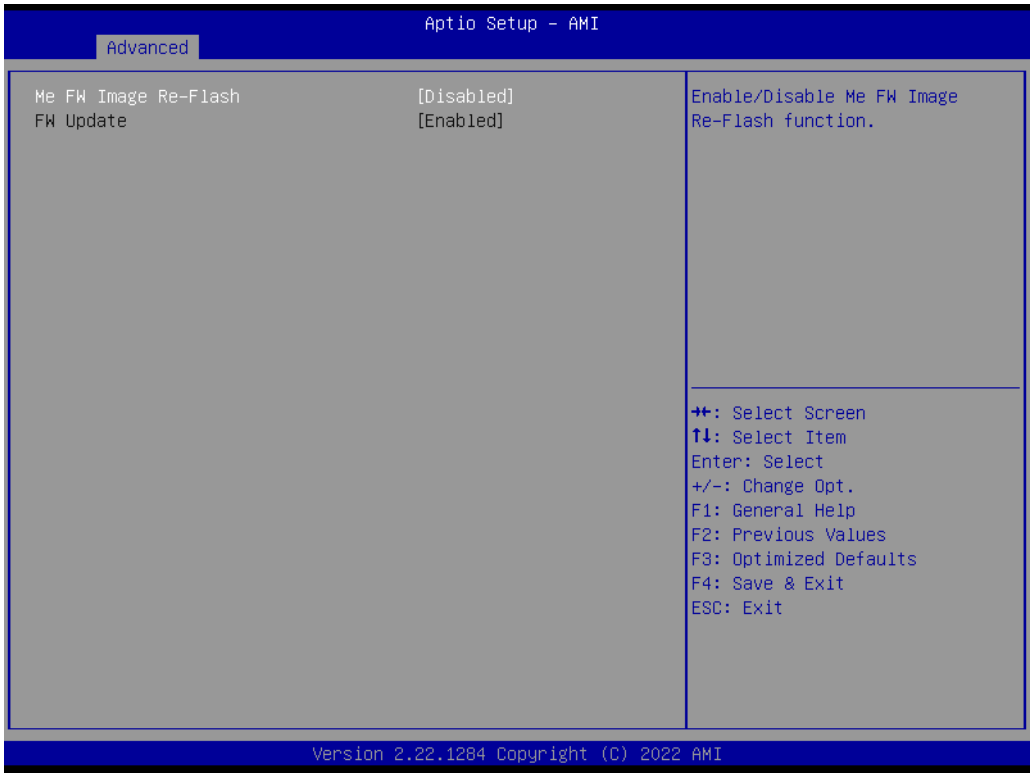
One Click Recovery(ORC) Configuration

Advance → PCH-FW Configuration → AMT Configuration → One Click Recovery(ORC) Configuration



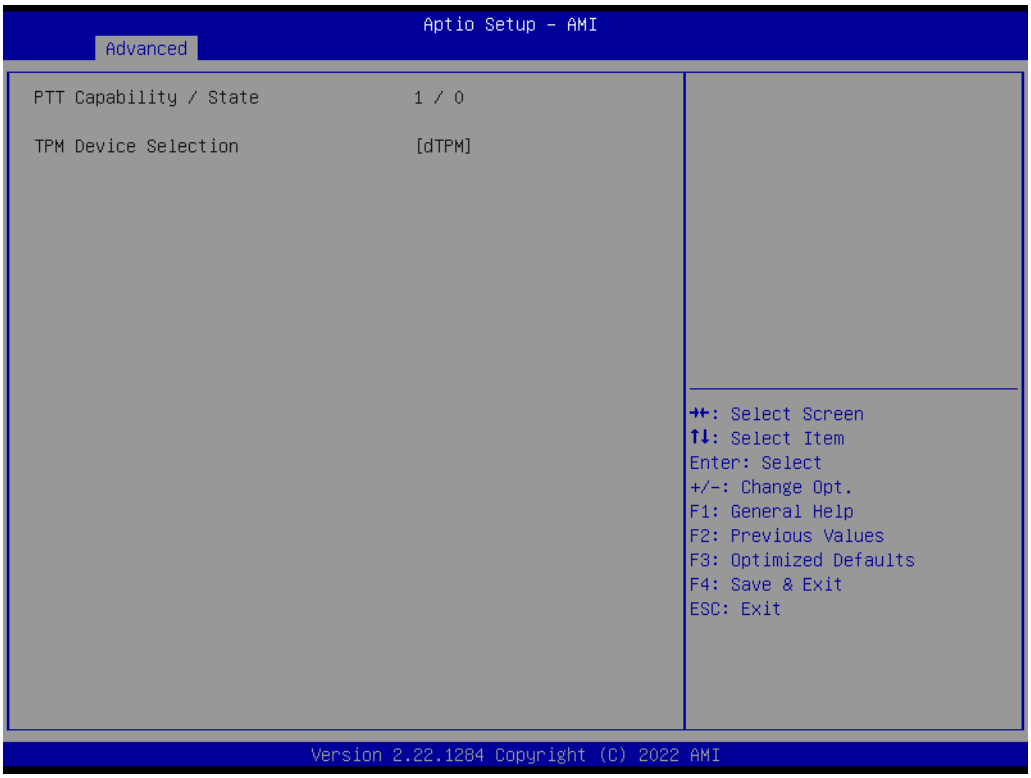
Firmware Update Configuration

Advance → PCH-FW Configuration → Firmware Update Configuration



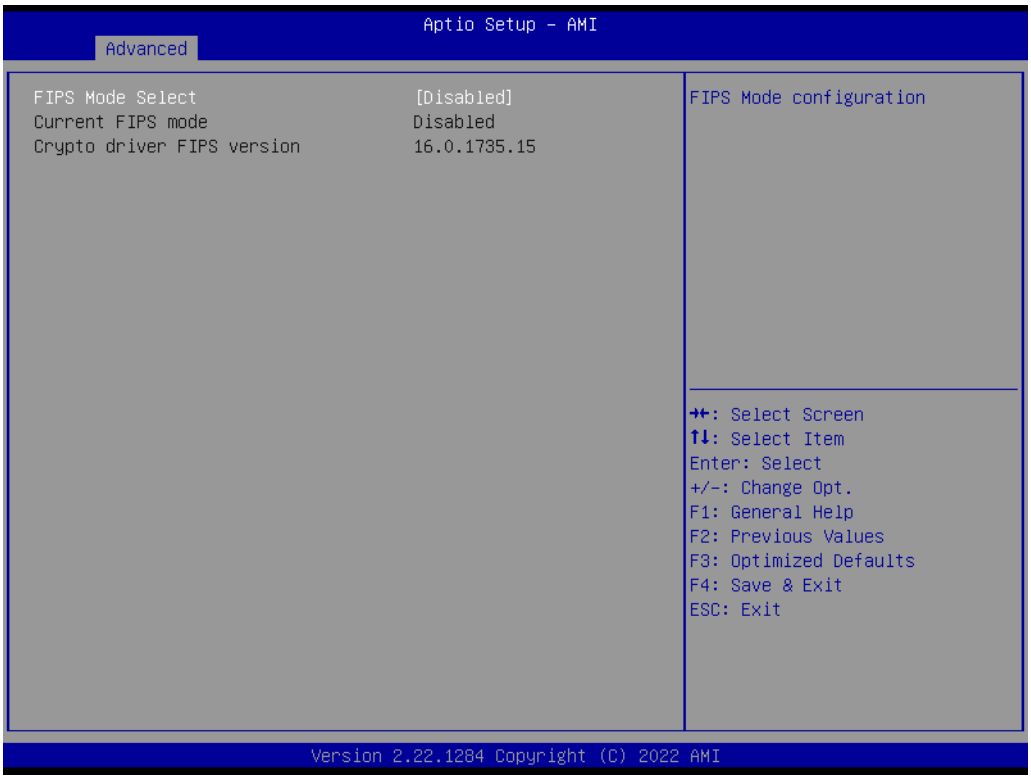
PTT Configuration

Advance → PCH-FW Configuration → PTT Configuration



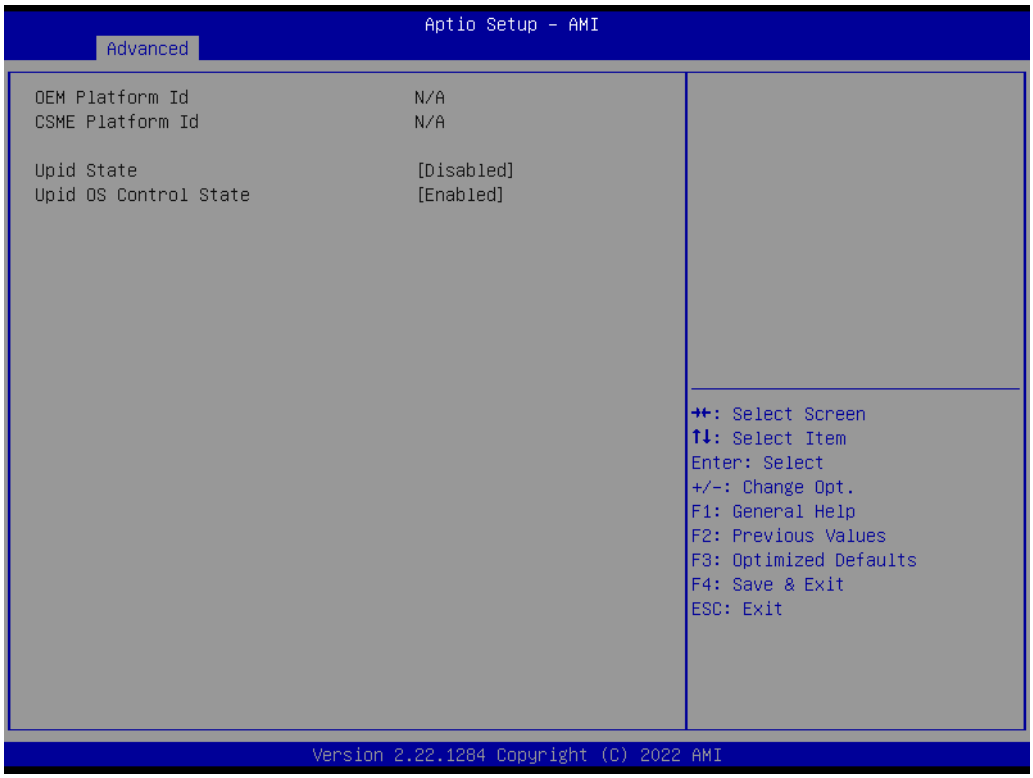
FIPS Configuration

Advance → PCH-FW Configuration → FIPS Configuration



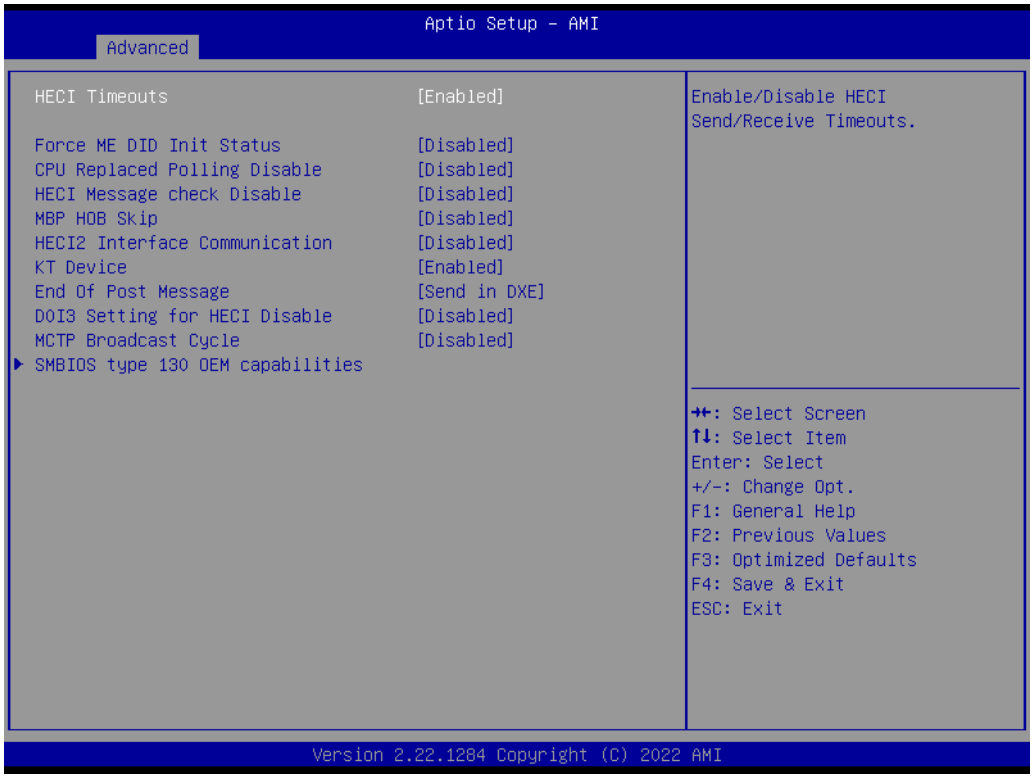
Unique Platform Id Configuration

Advance → PCH-FW Configuration → Unique Platform Id Configuration



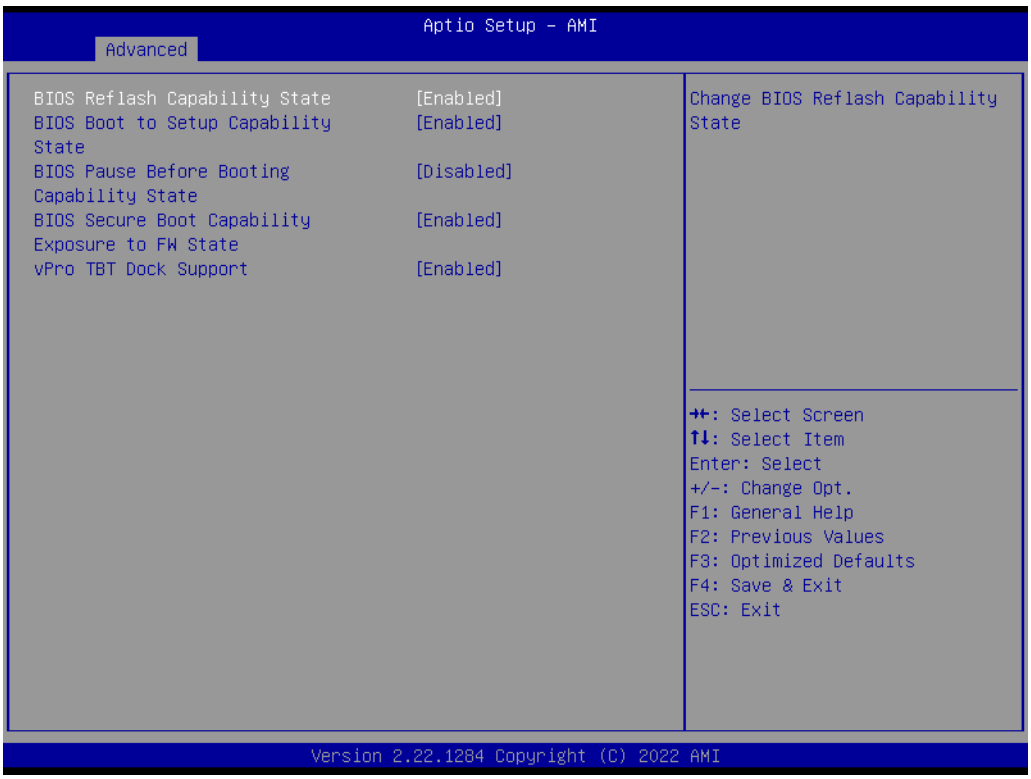
ME debug Configuration

Advance → PCH-FW Configuration → ME debug Configuration



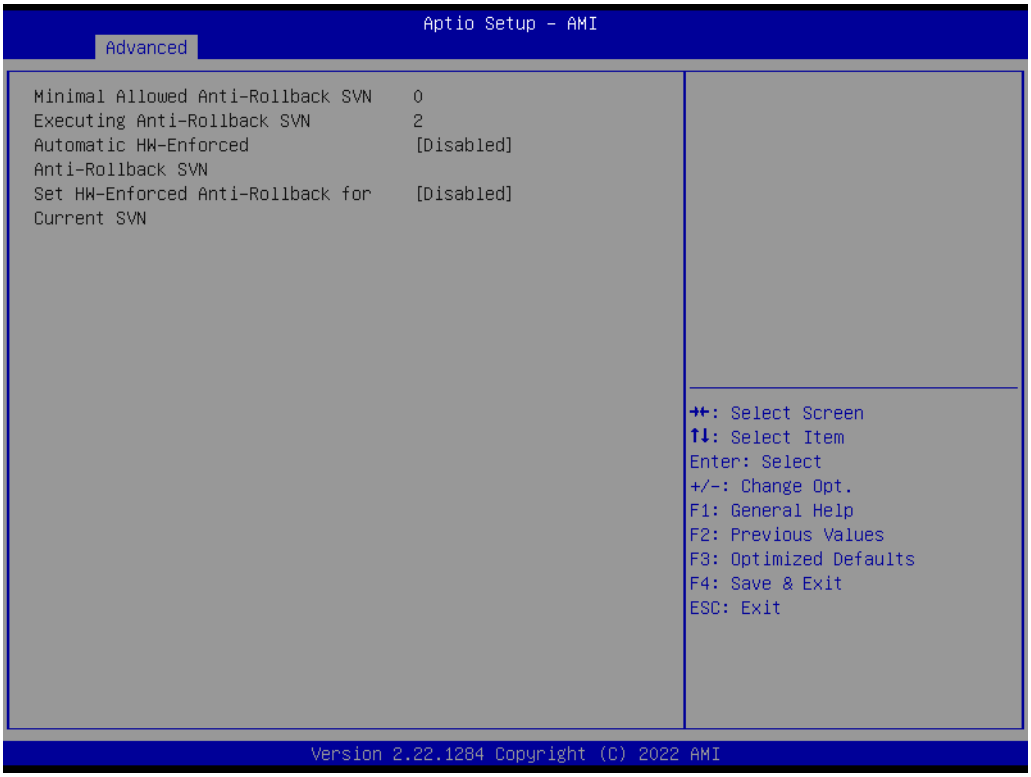
SMBIOS type 130 OEM capabilities

Advance → PCH-FW Configuration → ME debug Configuration → SMBIOS type 130 OEM capabilities



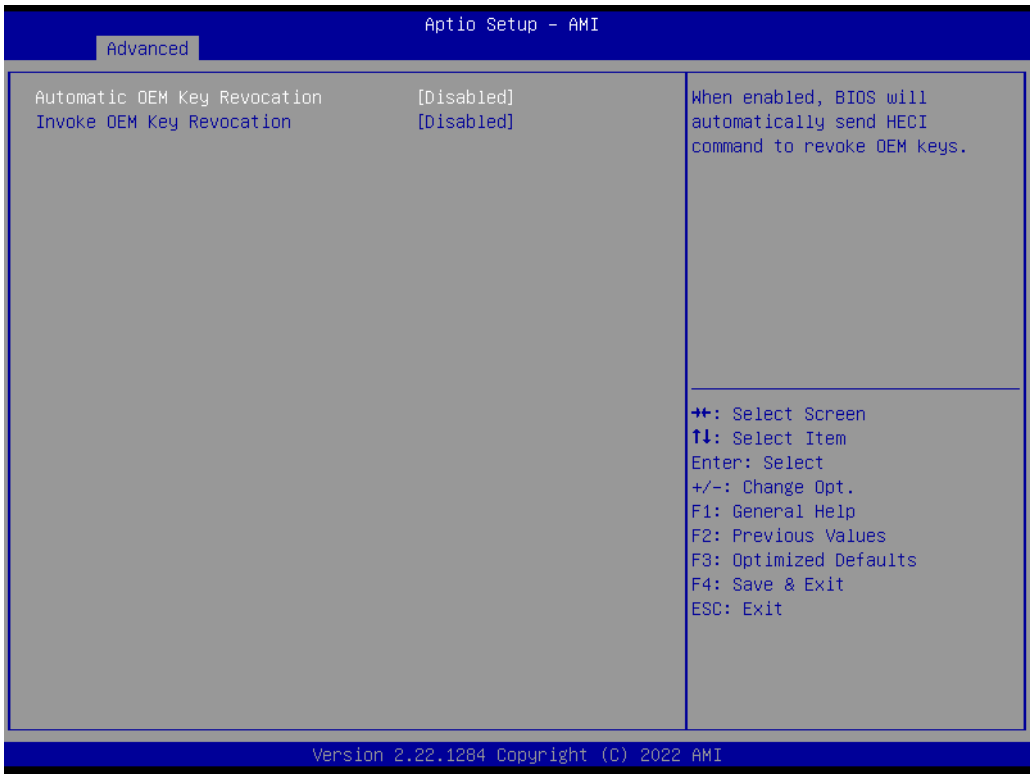
Anti-Rollback SVN Configuration

Advance → PCH-FW Configuration → Anti-Rollback SVN Configuration



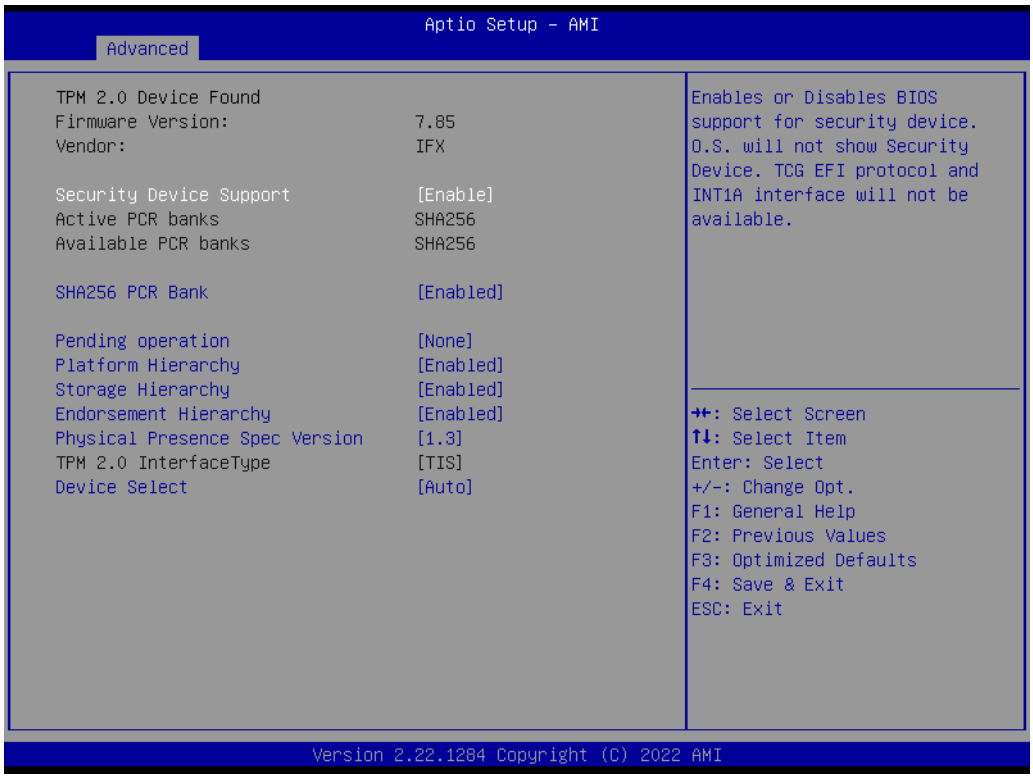
OEM Key Revocation Configuration

Advance → PCH-FW Configuration → OEM Key Revocation Configuration



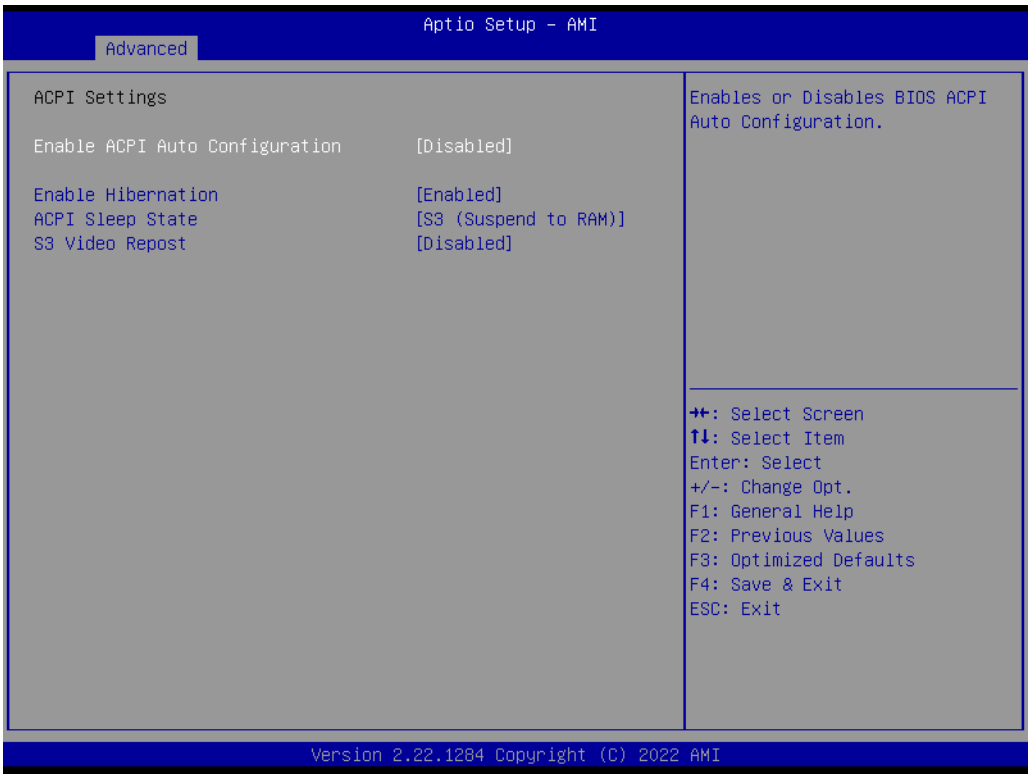
3.2.2.5 Trusted Computing Settings

Advance → Trusted Computing



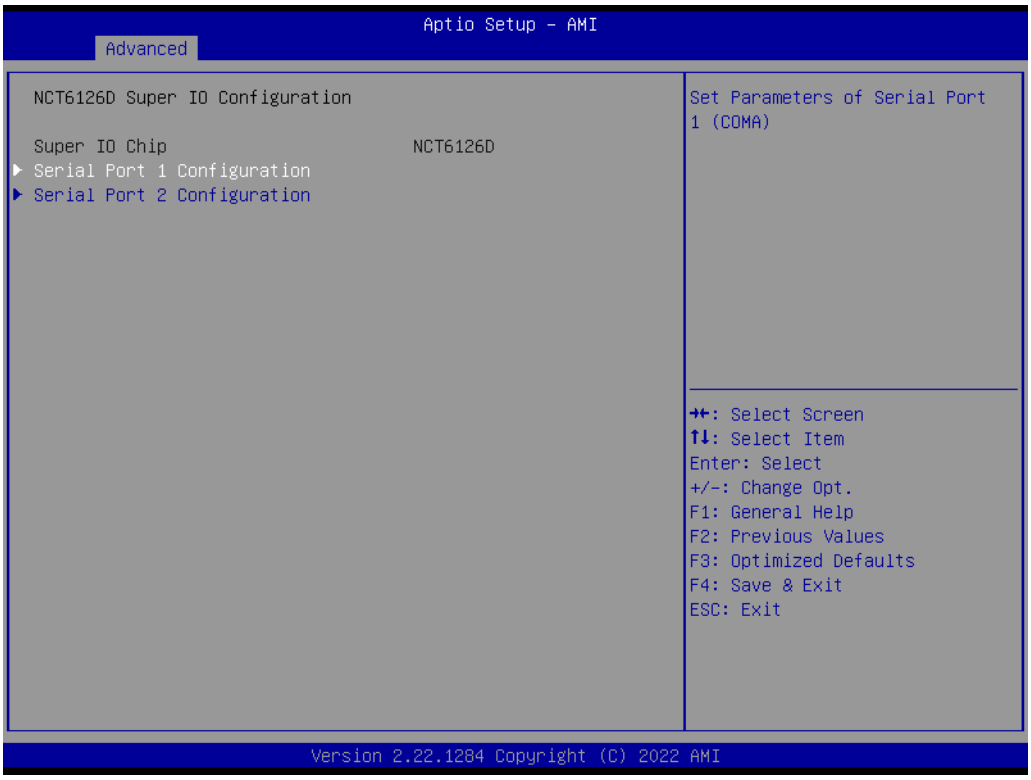
3.2.2.6 ACPI Settings

Advance → ACPI Settings



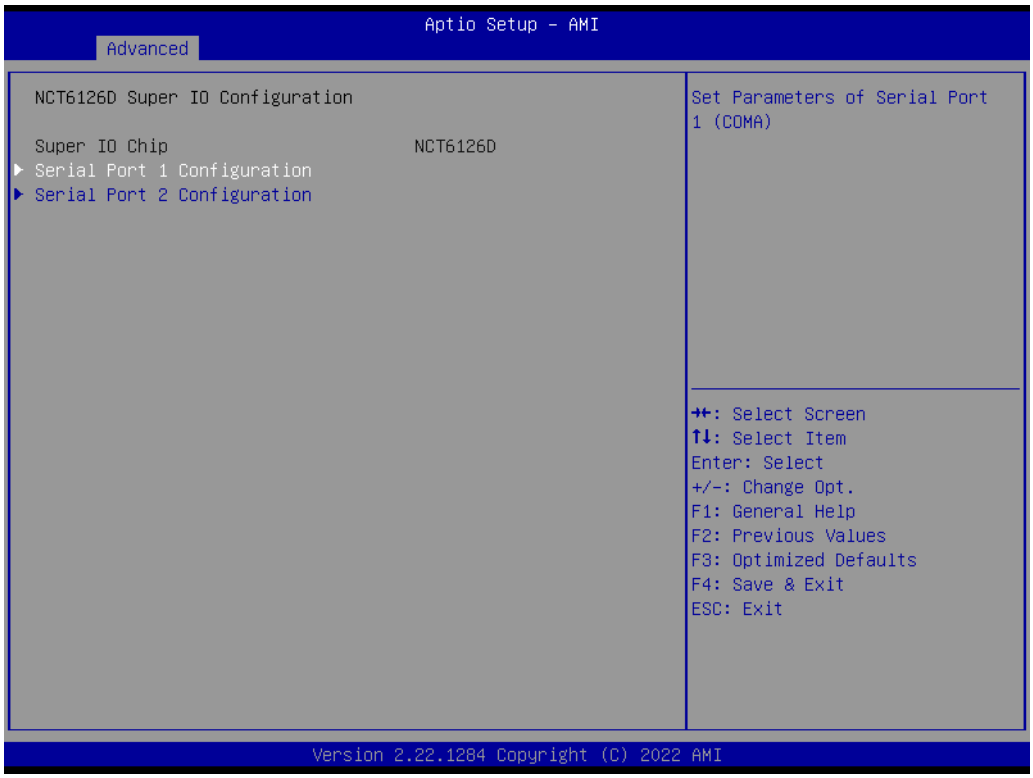
3.2.2.7 NCT6126D Super IO configuration

Advance → NCT6126D Super IO configuration



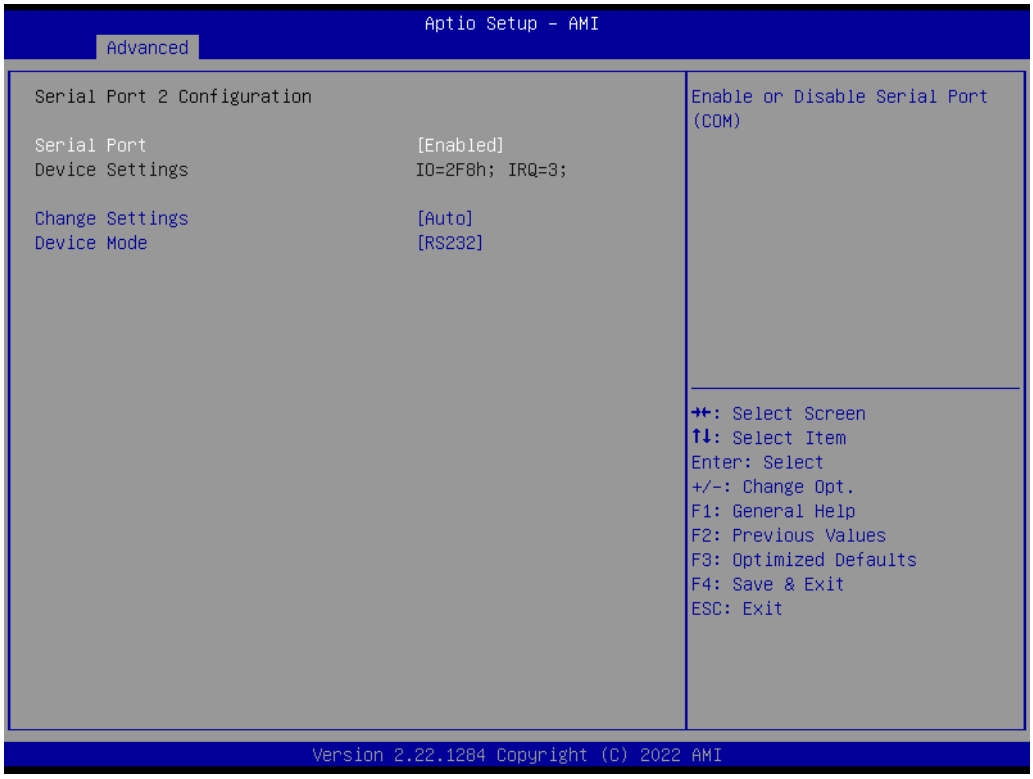
Serial Port 1 Configuration

Advance → NCT6126D Super IO configuration → Serial Port 1 Configuration



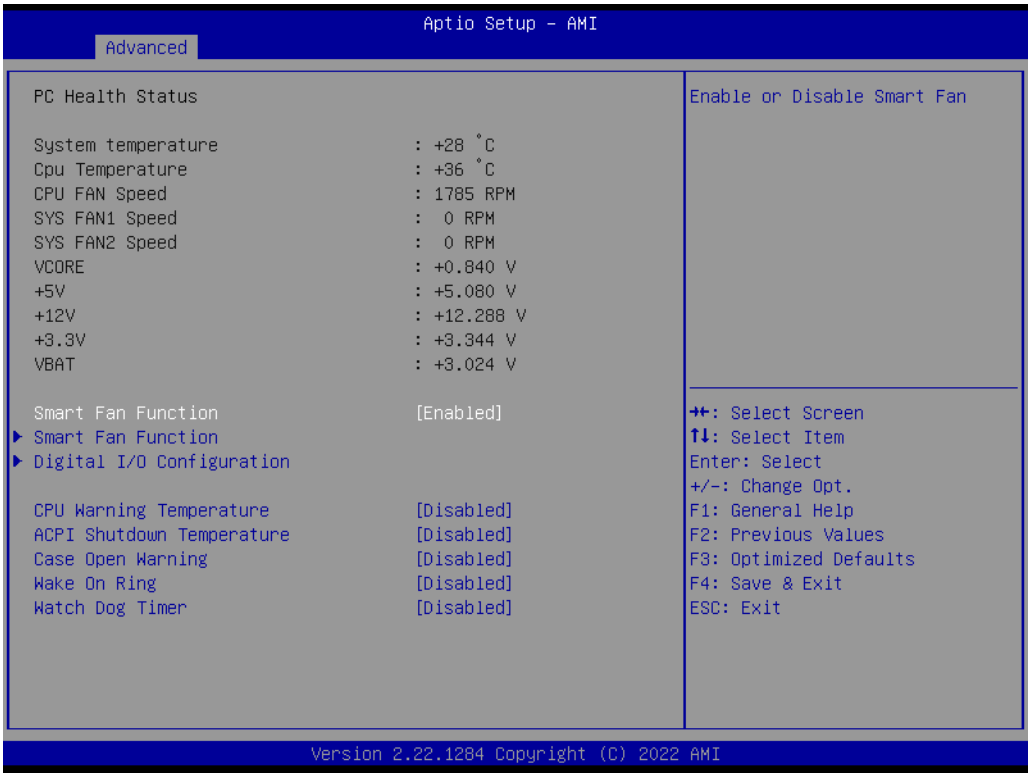
Serial Port 2 Configuration

Advance → NCT6126D Super IO configuration → Serial Port 2 Configuration



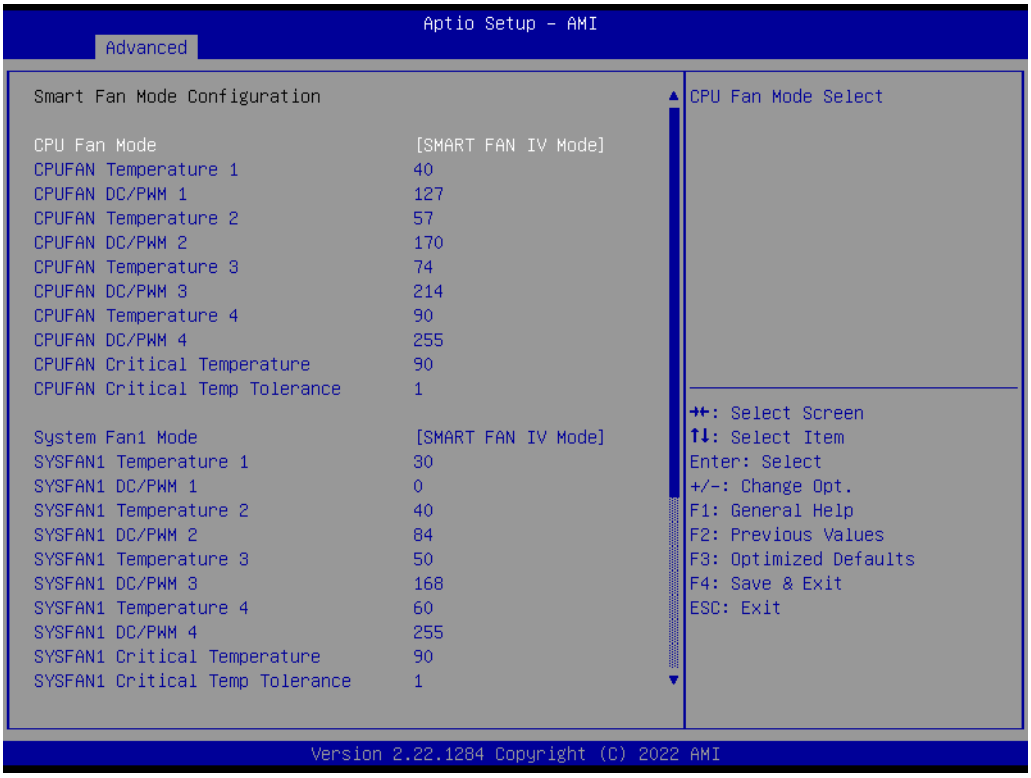
3.2.2.8 NCT6126D HW Monitor

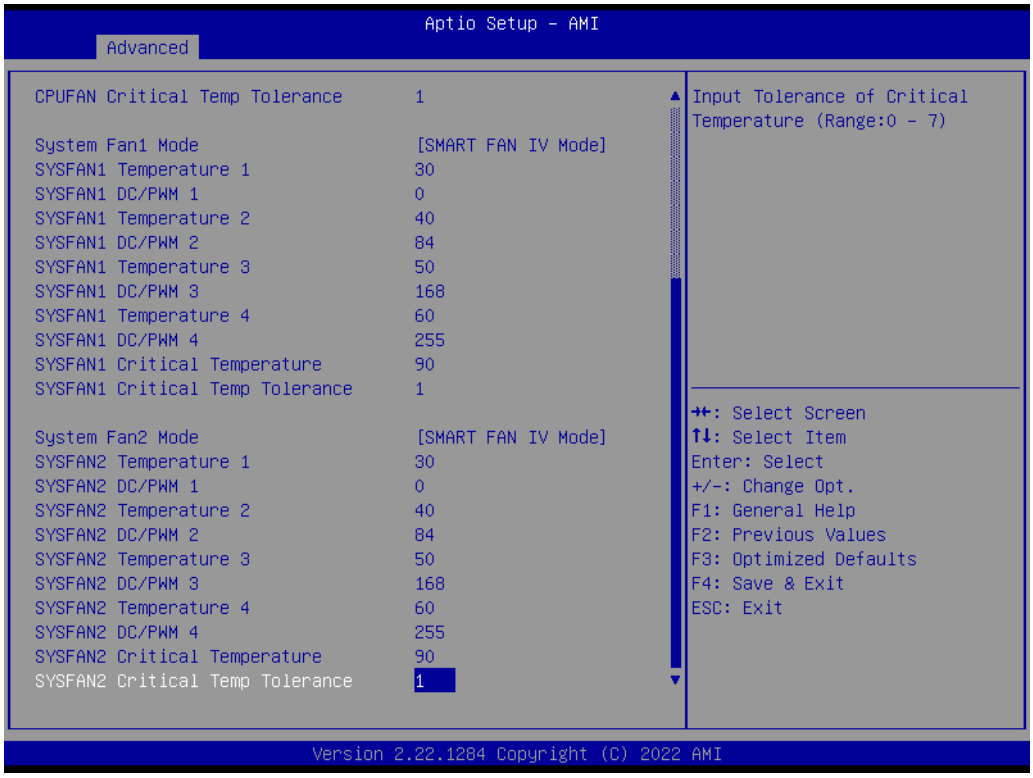
Advance → NCT6126D HW Monitor



Smart Fan Function

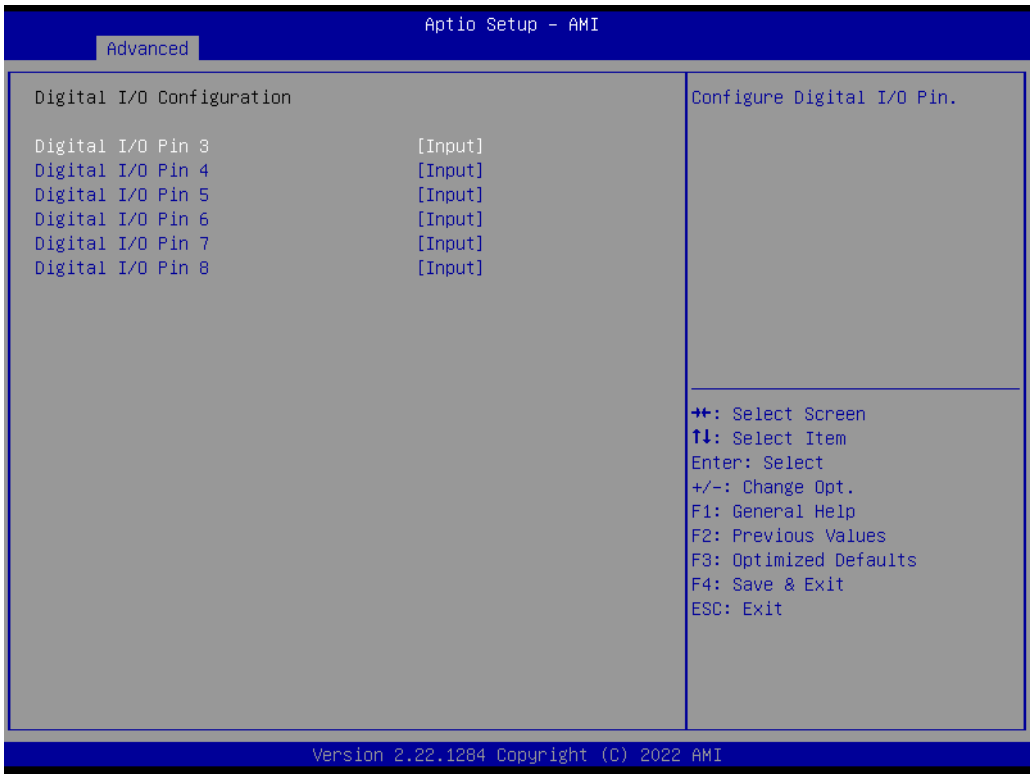
Advance → NCT6126D HW Monitor → Smart Fan Function





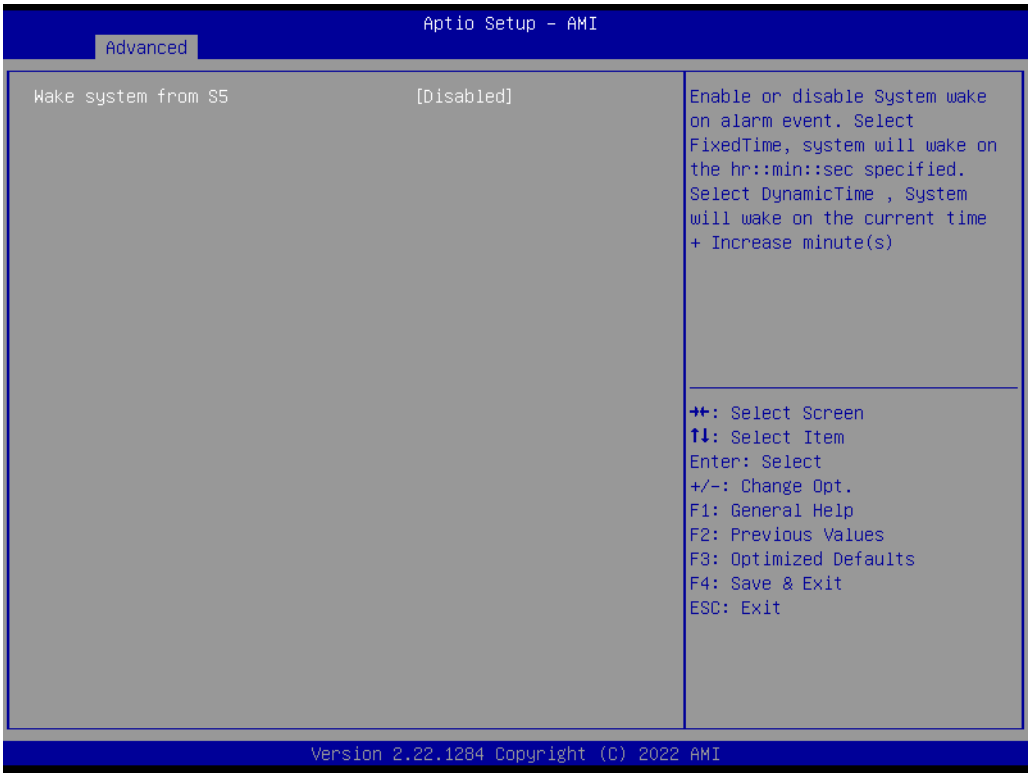
Digital I/O Configuration

Advance → NCT6126D HW Monitor → Digital I/O Configuration



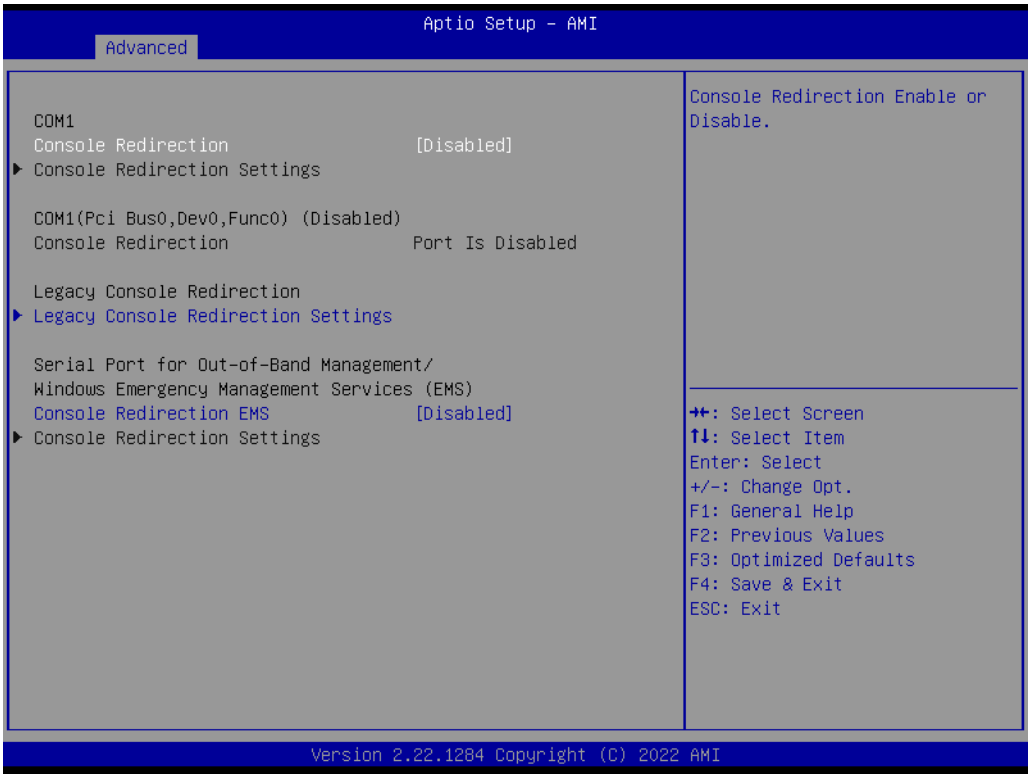
3.2.2.9 S5 RTC Wake Settings

Advance → S5 RTC Wake Settings



3.2.2.10 Serial Port Console Redirection

Advance → Serial Port Console Redirection

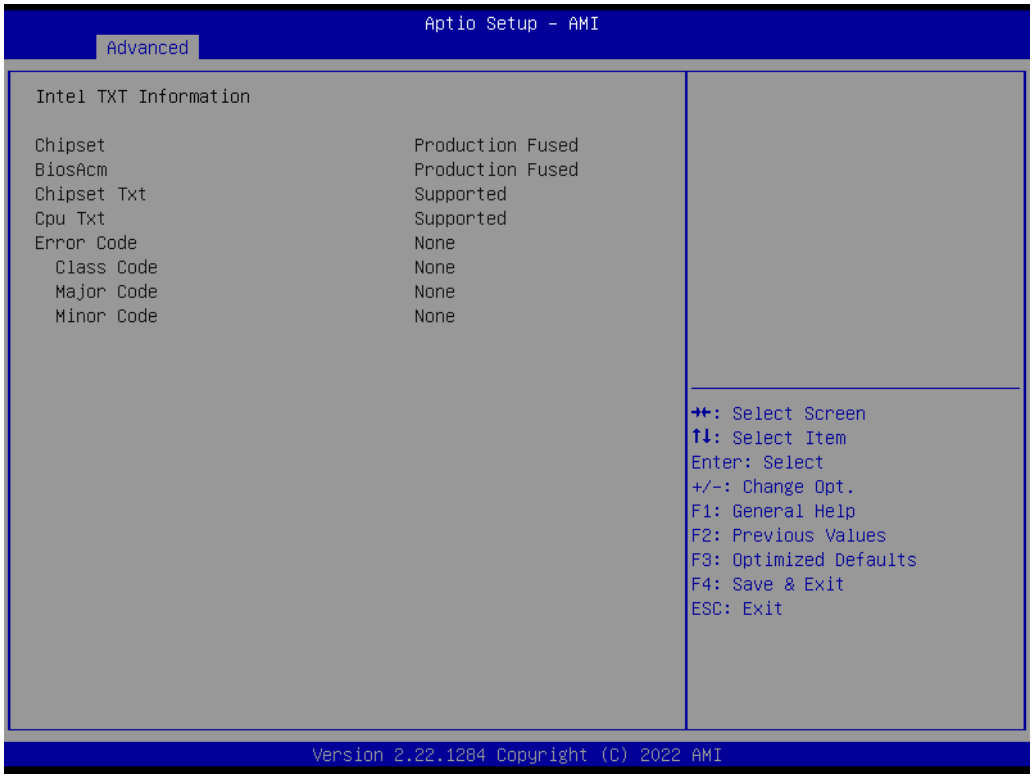


Legacy Console Redirection Settings

Advance → Serial Port Console Redirection → Legacy Console Redirection Settings

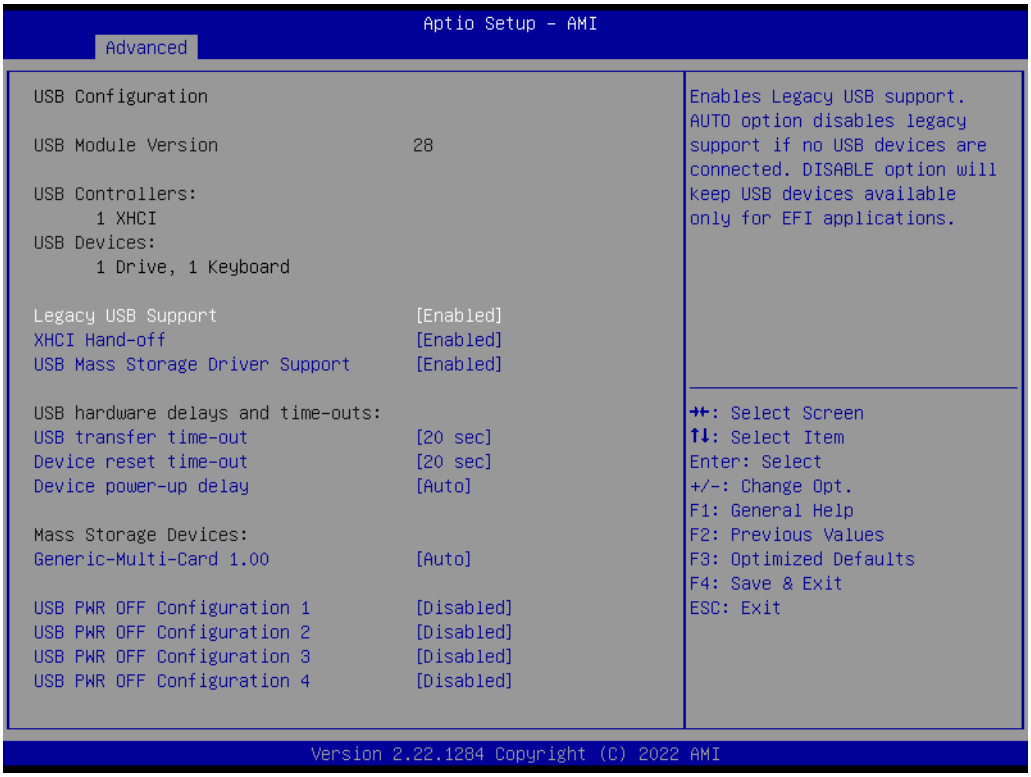
3.2.2.11 Intel TXT Information

Advance → Intel TXT Information



3.2.2.12 USB Configuration

Advance → USB Configuration

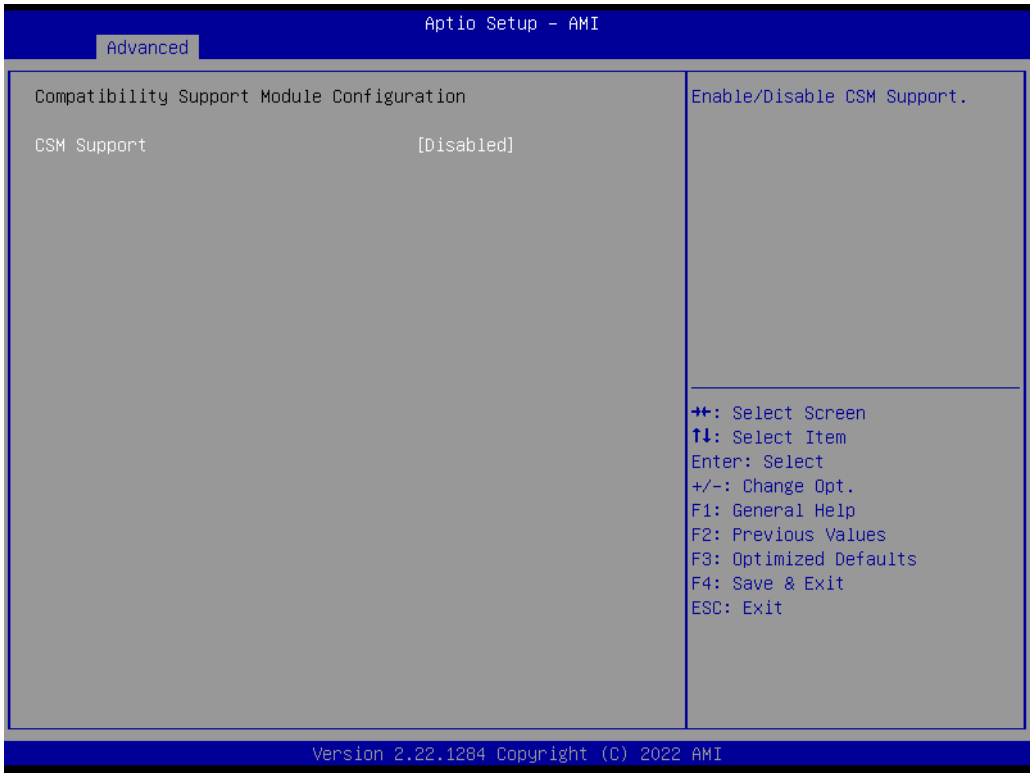


3.2.2.13 Network Stack Configuration

Advance → Network Stack Configuration

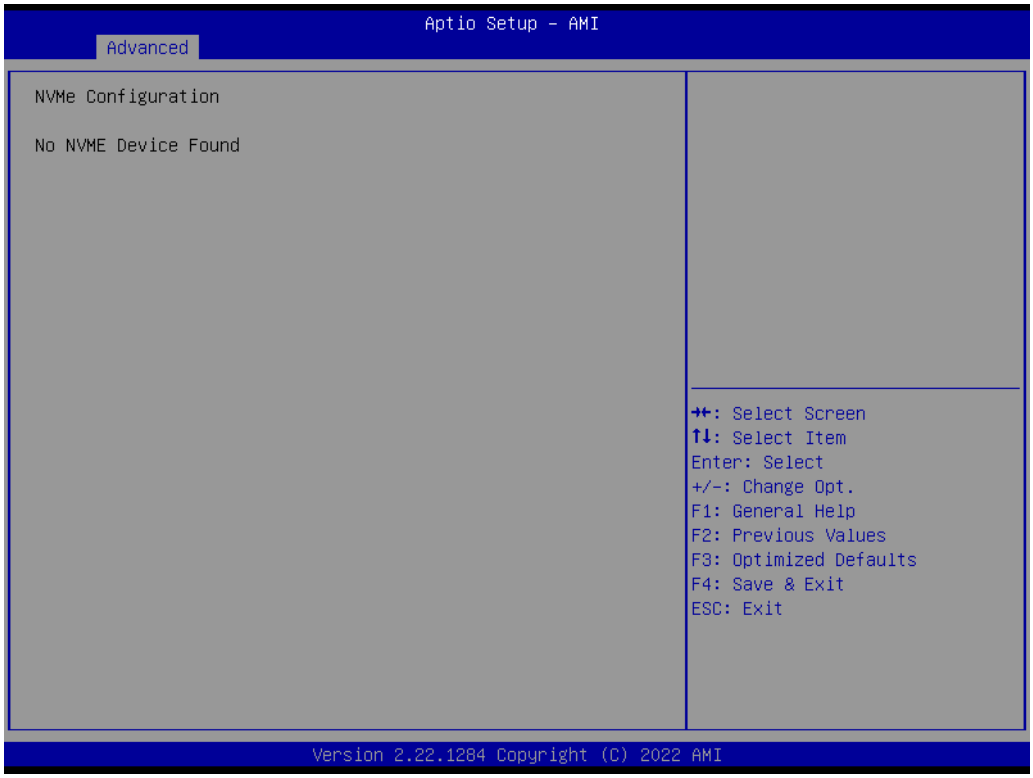
3.2.2.14 CSM Configuration

Advance → CSM Configuration



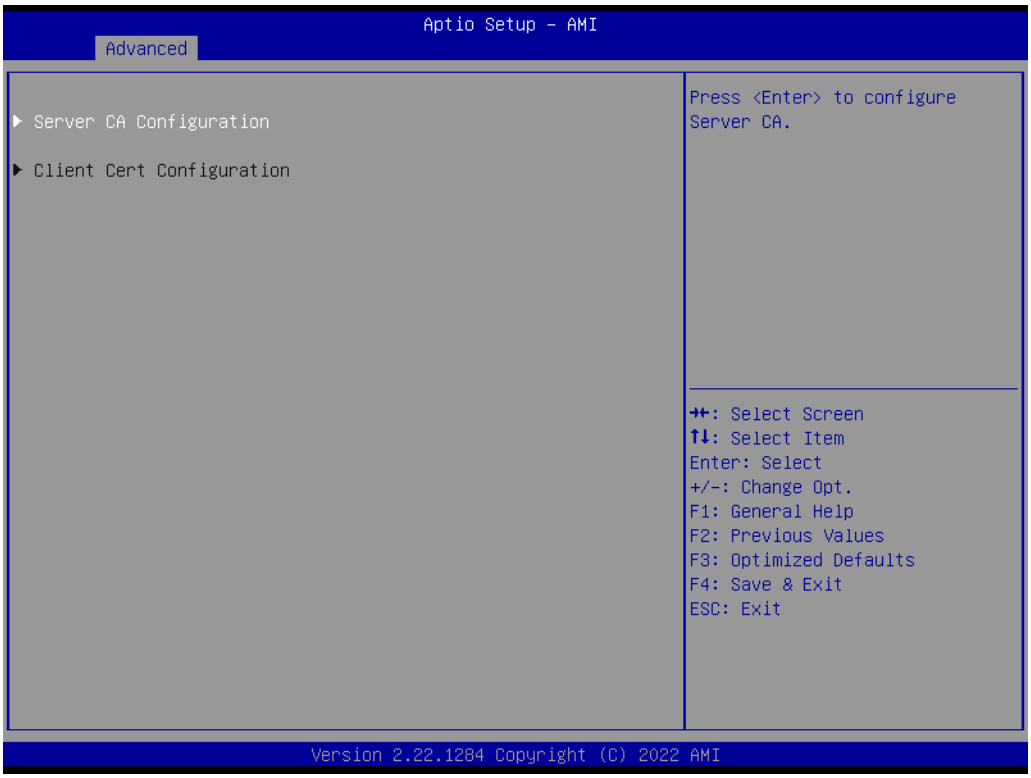
3.2.2.15 NVMe Configuration

Advance → NVMe Configuration



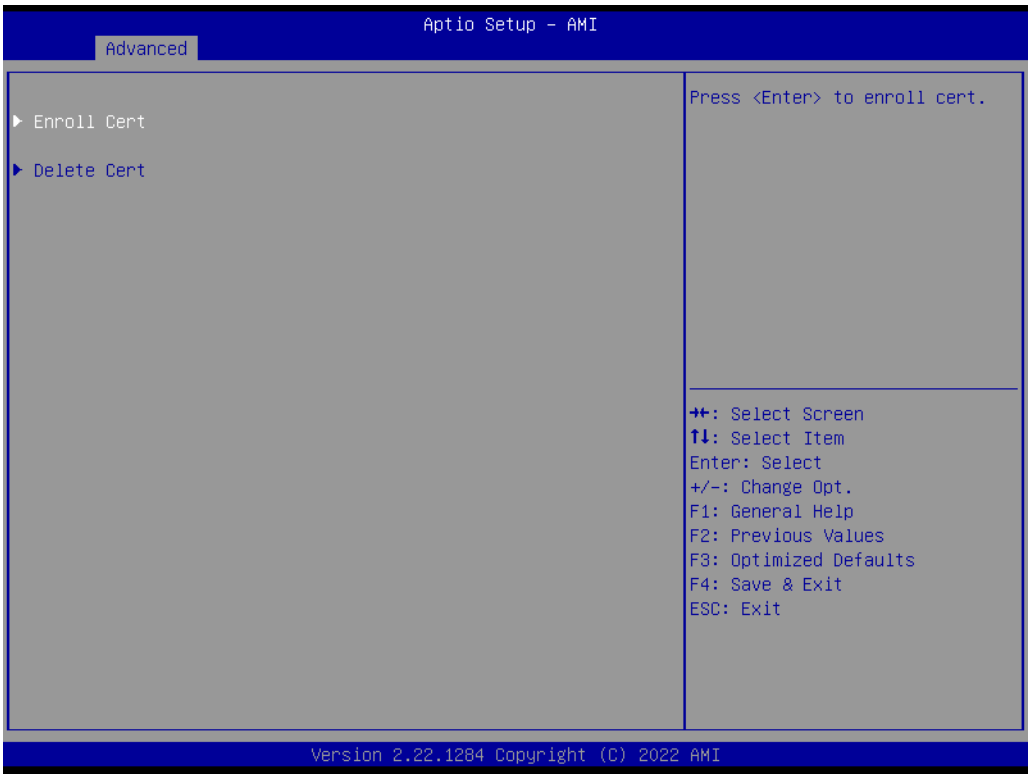
3.2.2.16 Tls Auth Configuration

Advance → Tls Auth Configuration



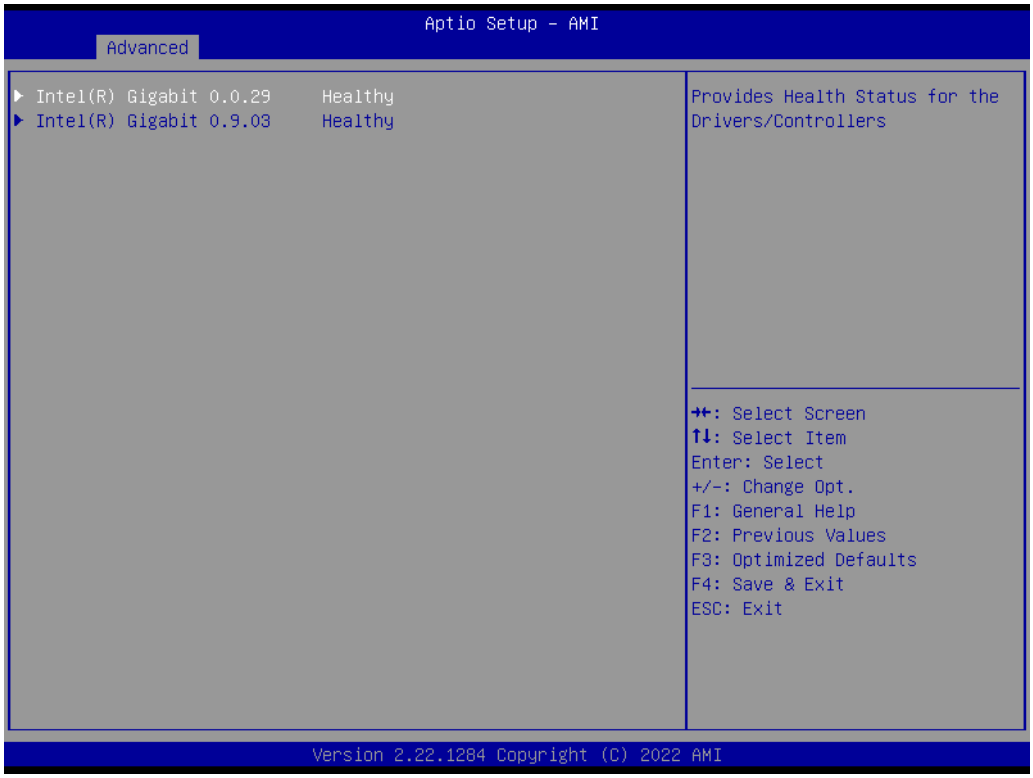
3.2.2.17 Driver Health

Advance → Driver Health



3.2.3 Chipset Configuration Settings

Select the chipset tab from the BIOS setup screen to enter the Chipset Setup screen. Users can select any item in the left frame of the screen, such as PCI express Configuration, to go to the sub menu for that item. Users can display a Chipset Setup option by highlighting it using the <Arrow> keys. All Chipset Setup options are described in this section. The Chipset Setup screens are shown below. The sub menus are described on the following pages.

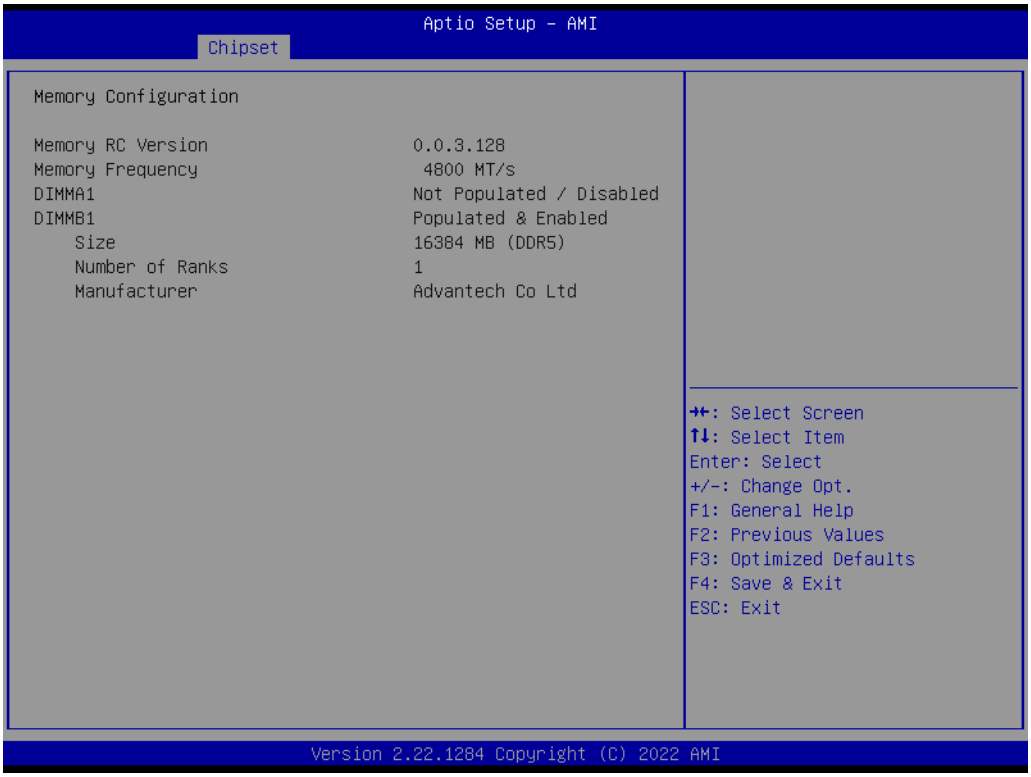


3.2.3.1 System Agent (SA) Configuration

Chipset →System Agent (SA) Configuration

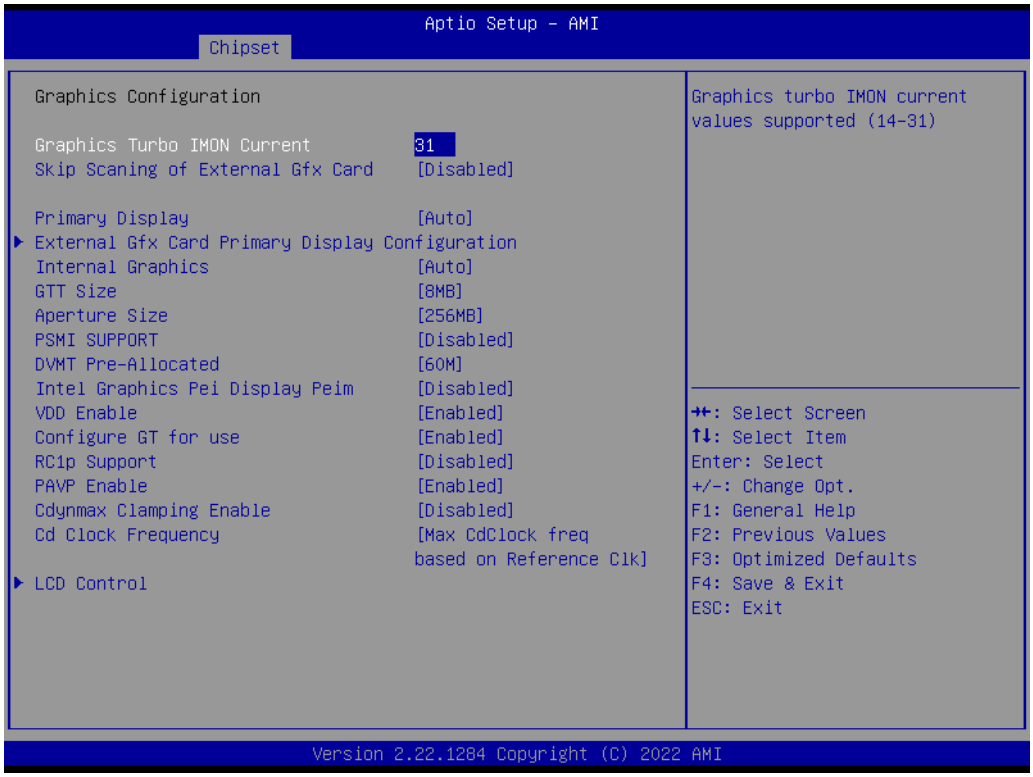
Memory Configuration

Chipset → System Agent (SA) Configuration → Memory Configuration



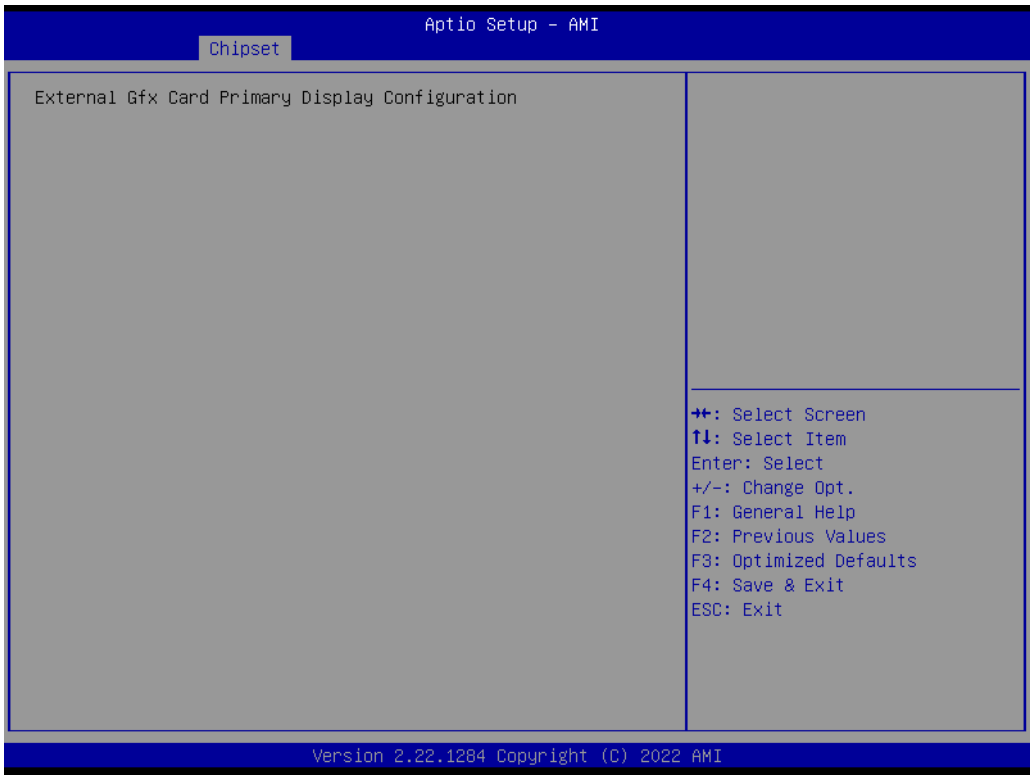
Graphics Configuration

Chipset →System Agent (SA) Configuration → Graphics Configuration



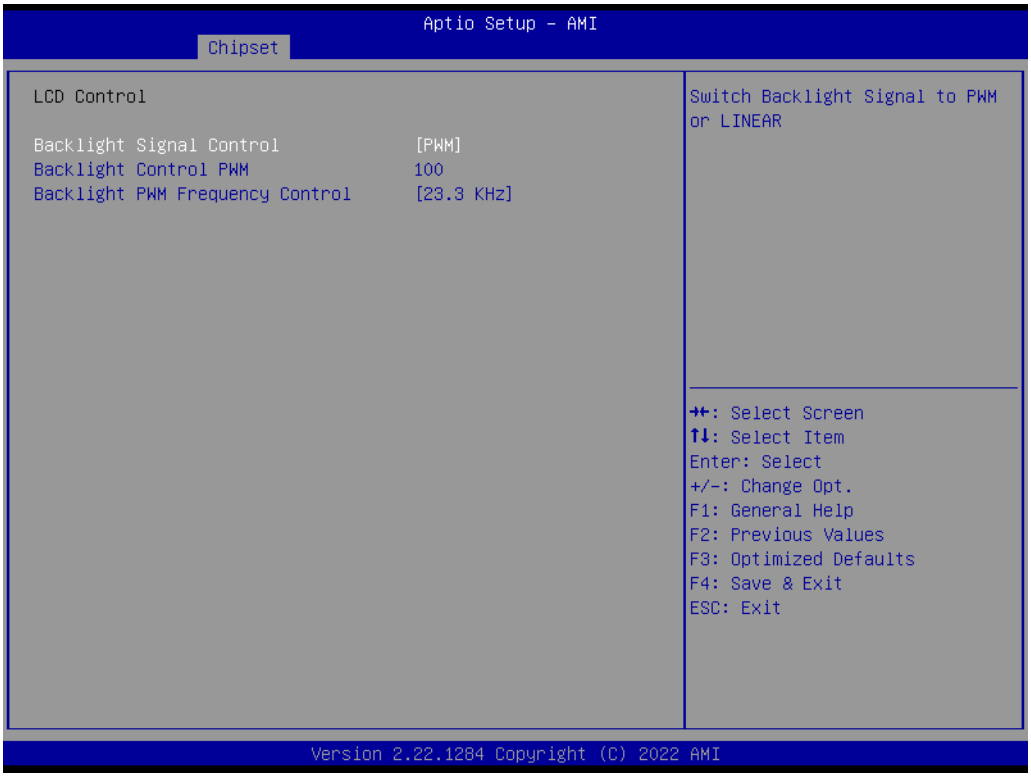
External Gfx Card Primary Display Configuration

Chipset →System Agent (SA) Configuration → Graphics Configuration → External Gfx Card Primary Display Configuration



LCD Control

Chipset →System Agent (SA) Configuration → Graphics Configuration → LCD Control

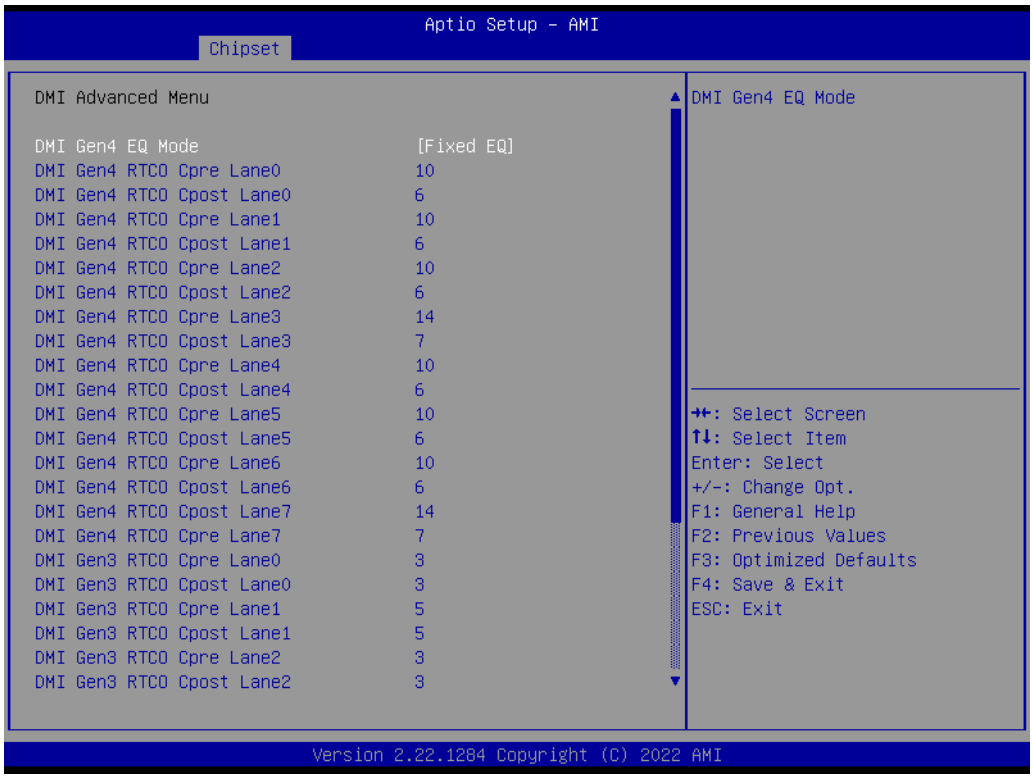


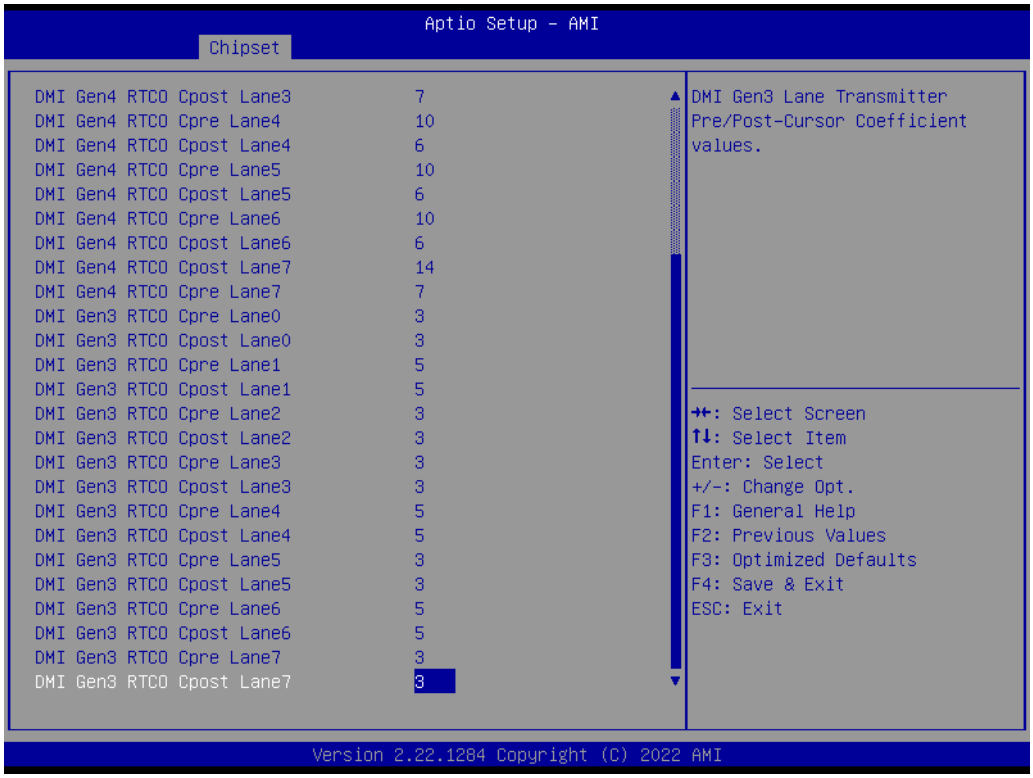
DMI/OPI Configuration

Chipset →System Agent (SA) Configuration → DMI/OPI Configuration

DMI Advanced Menu

Chipset →System Agent (SA) Configuration → DMI/OPI Configuration → DMI Advanced Menu

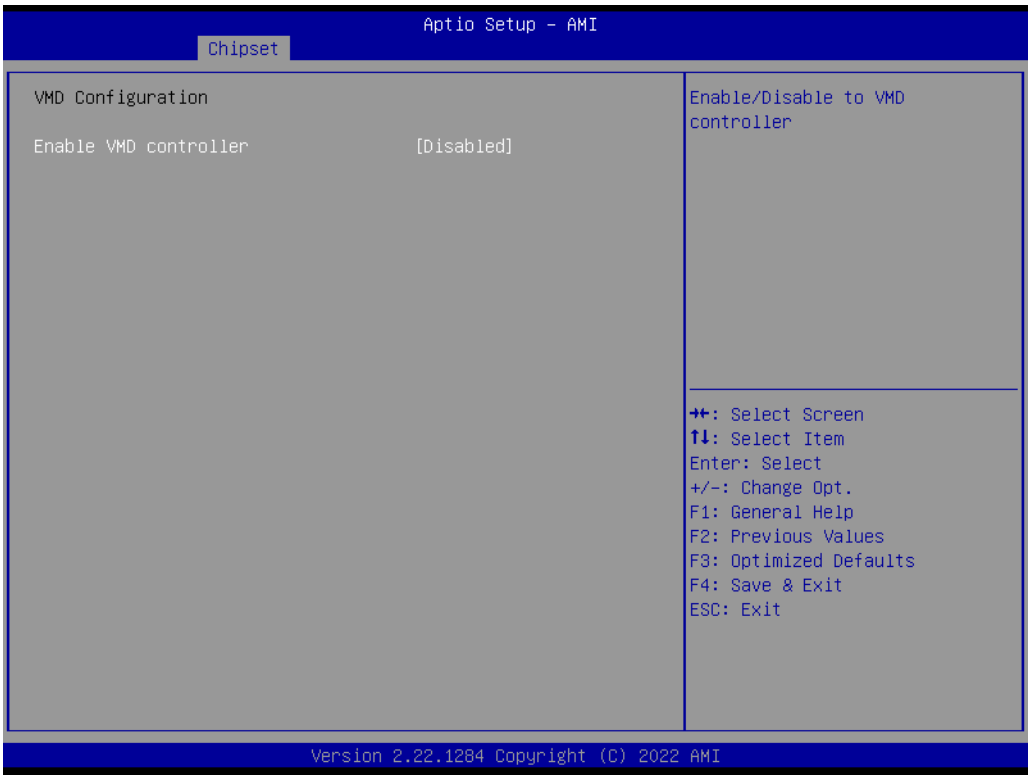




?

VMD setup menu

Chipset →System Agent (SA) Configuration → VMD setup menu

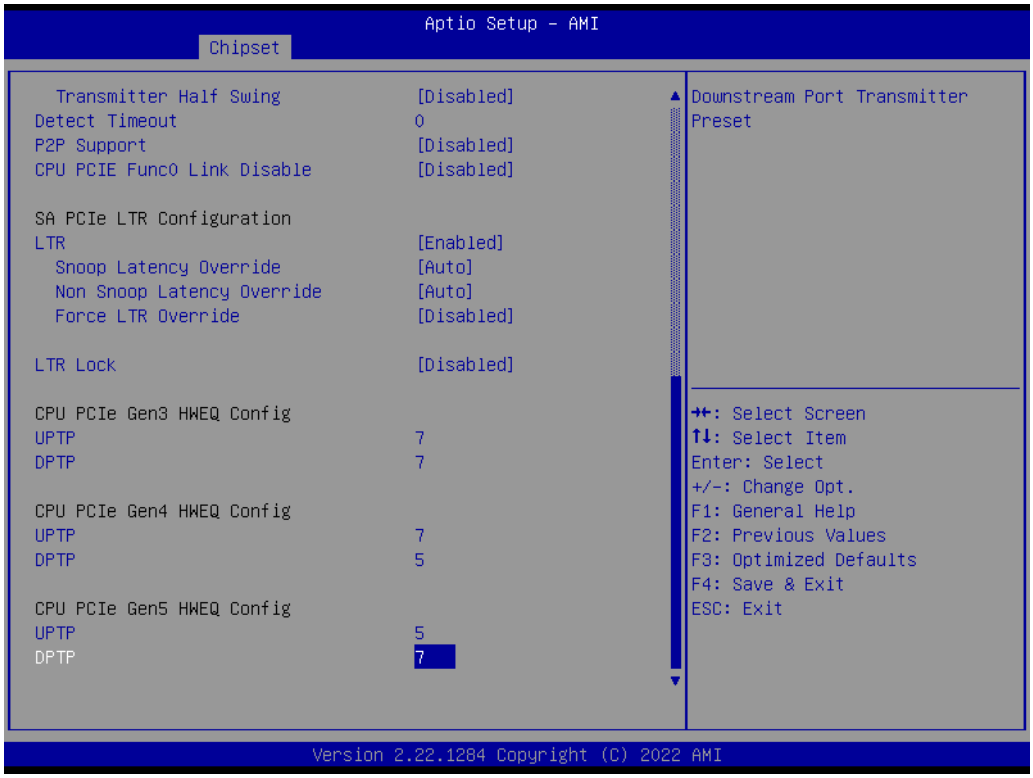


PCI Express Configuration

Chipset →System Agent (SA) Configuration → PCI Express Configuration

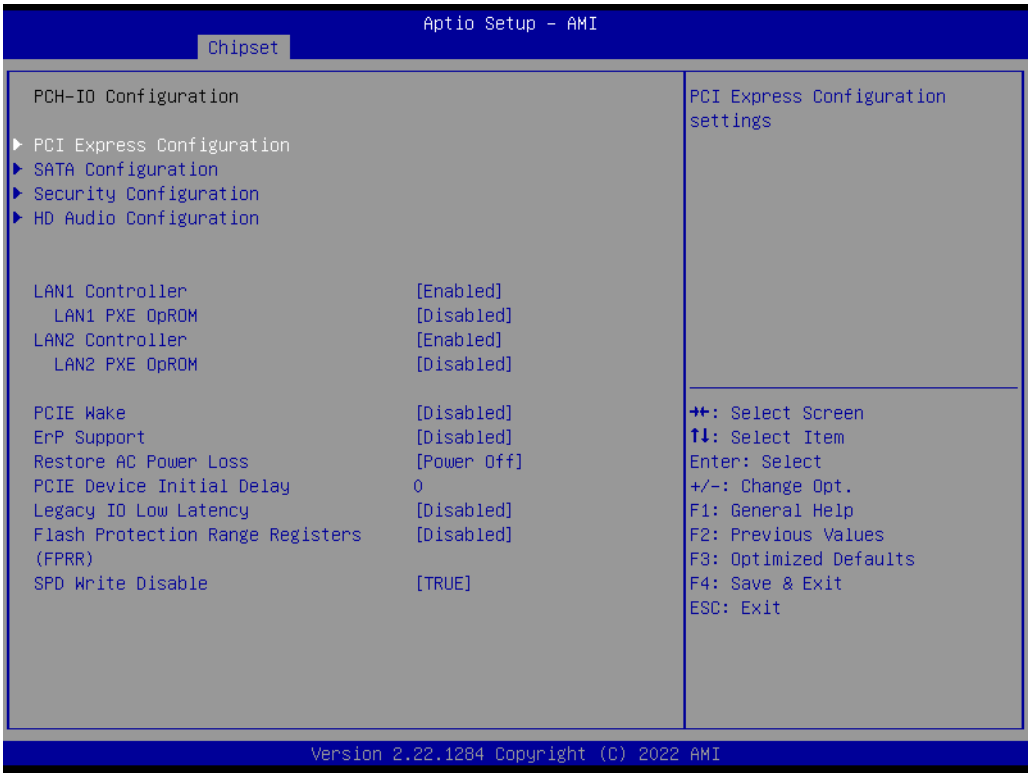
PCI Express Configuration

Chipset →System Agent (SA) Configuration → PCI Express Configuration → PCI EXPRESS SLOT



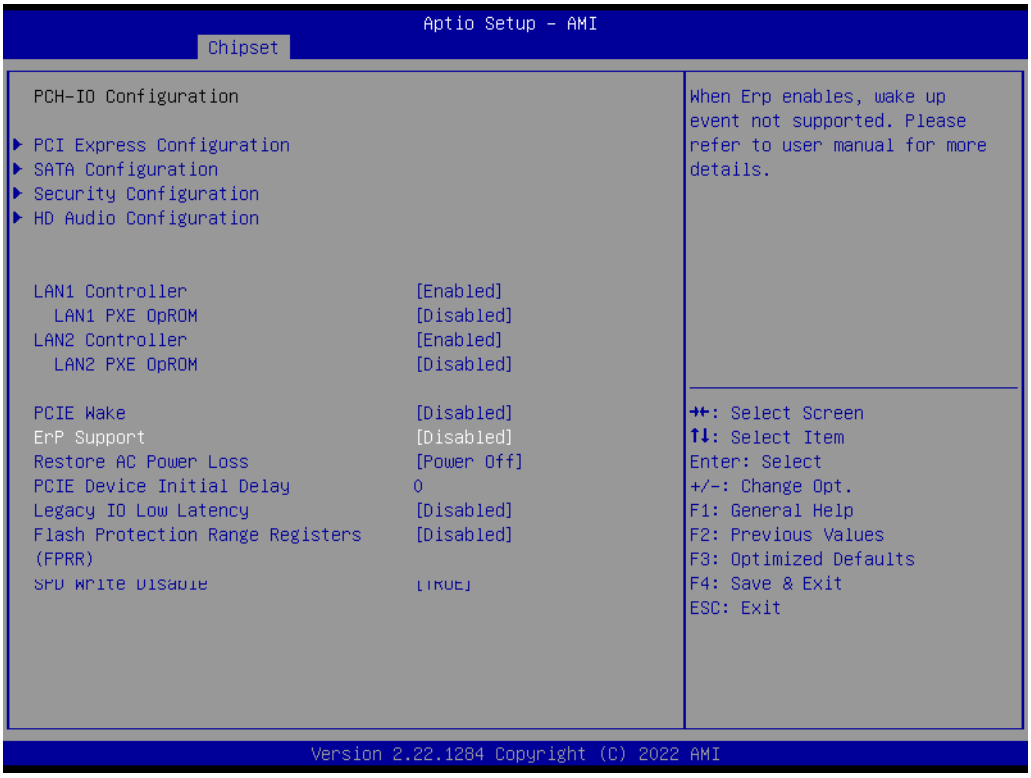
3.2.3.2 PCH-I/O Configuration

Chipset → PCH-I/O Configuration



ErP Support Note

Chipset → PCH-I/O Configuration → ErP Support

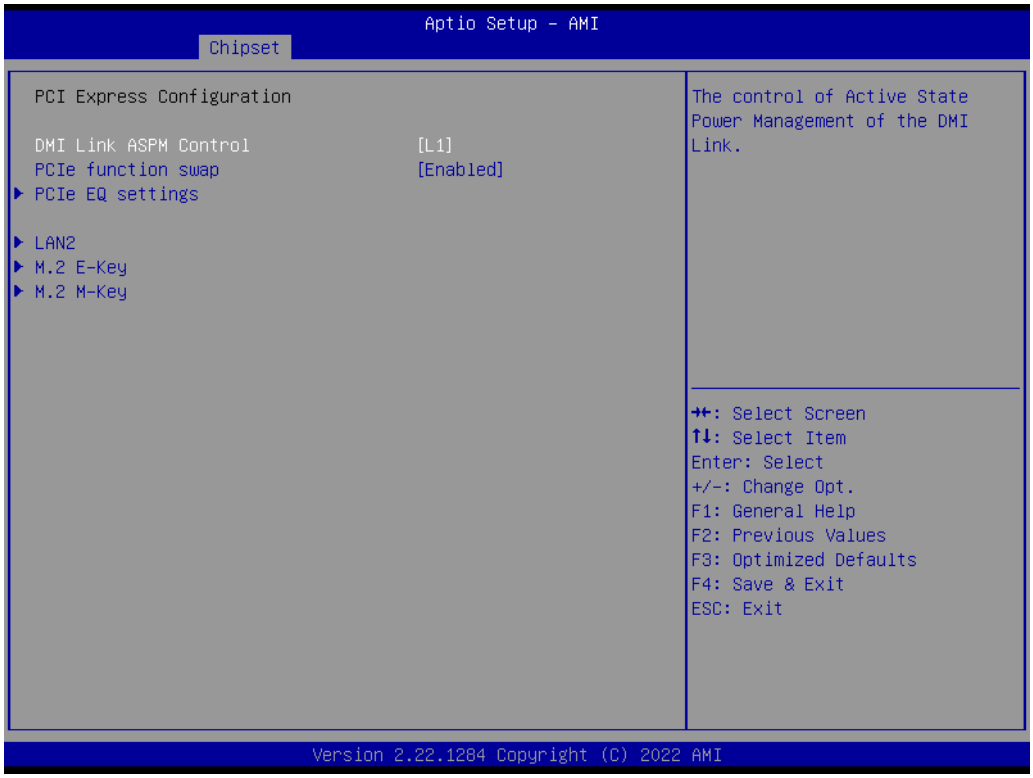


When ErP enables, restore AC power loss & below features are not supported. [USB : S3/S4]

[PCIE Wake] Connect to PCIe slots and depends on add-on card driver behavior.
[RT : S5]
[WOR: S5]
[WOL: depends on LAN chip and driver behavior(GBE)]
Support S3/S4/S5 (with I219 & I226)

PCI Express configuration

Chipset → PCH-I/O Configuration → PCI Express configuration

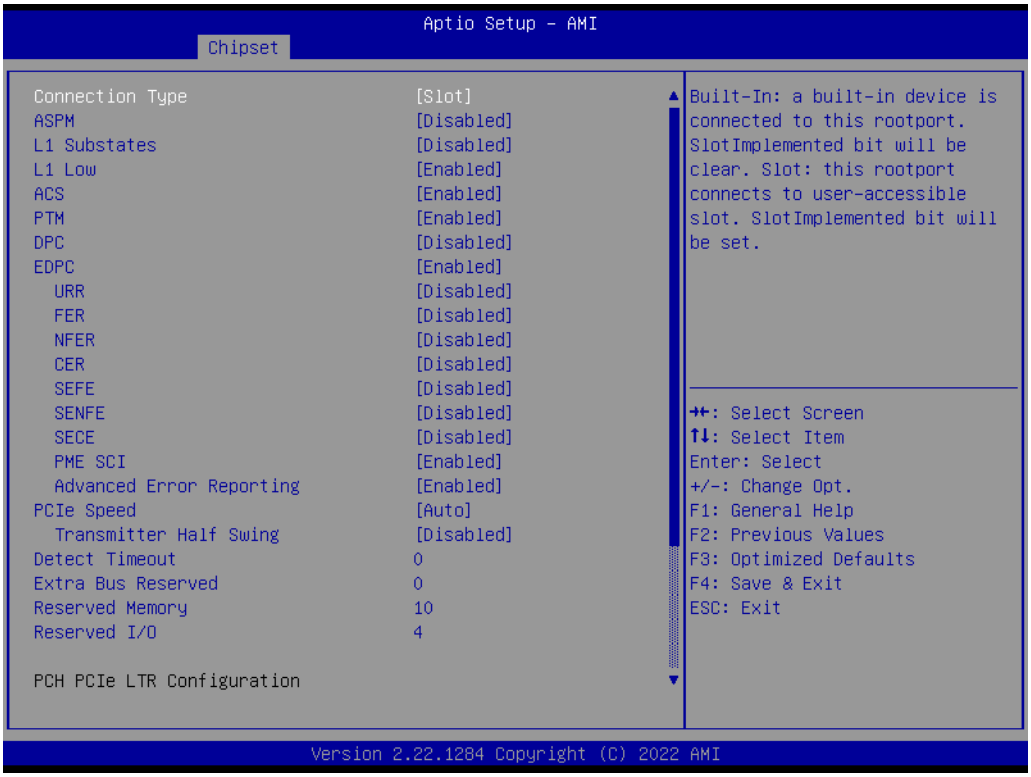


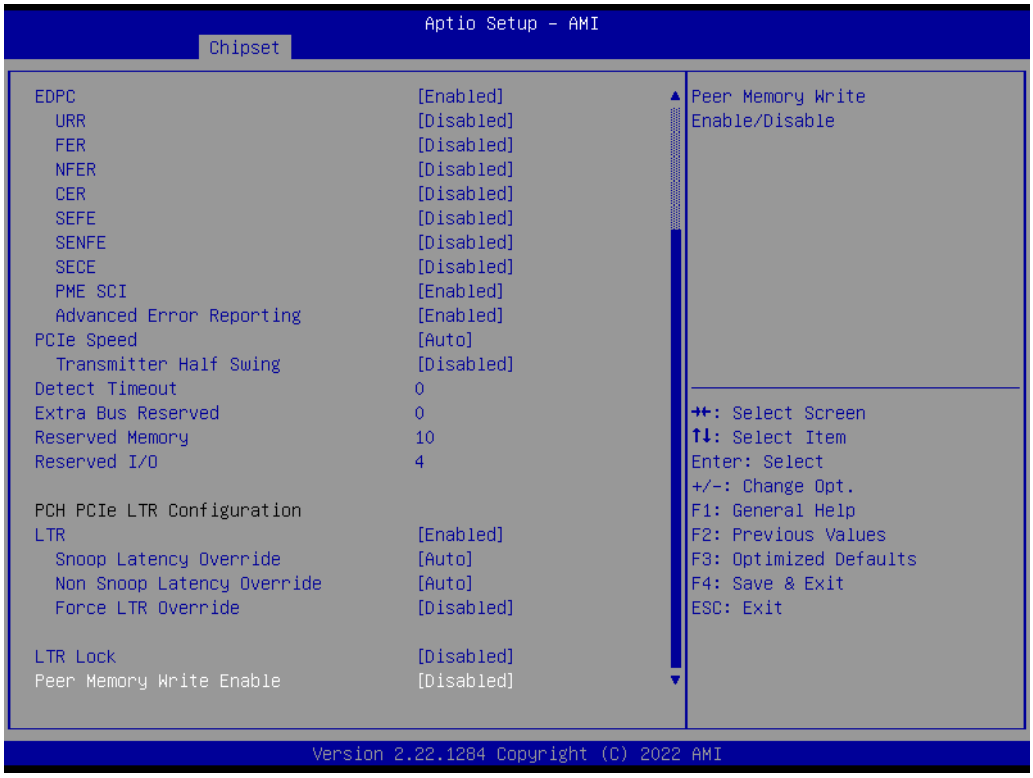
PCIe EQ Settings

Chipset → PCH-I/O Configuration → PCI Express configuration → PCIe EQ Settings

LAN2

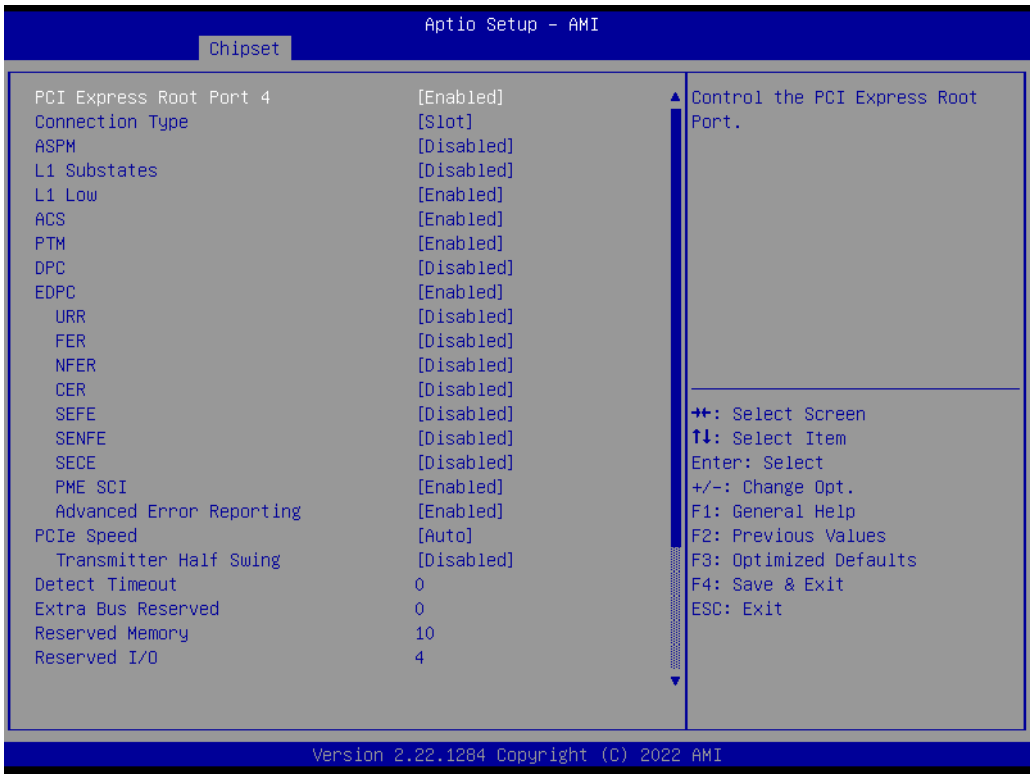
Chipset → PCH-I/O Configuration → PCI Express configuration → LAN2

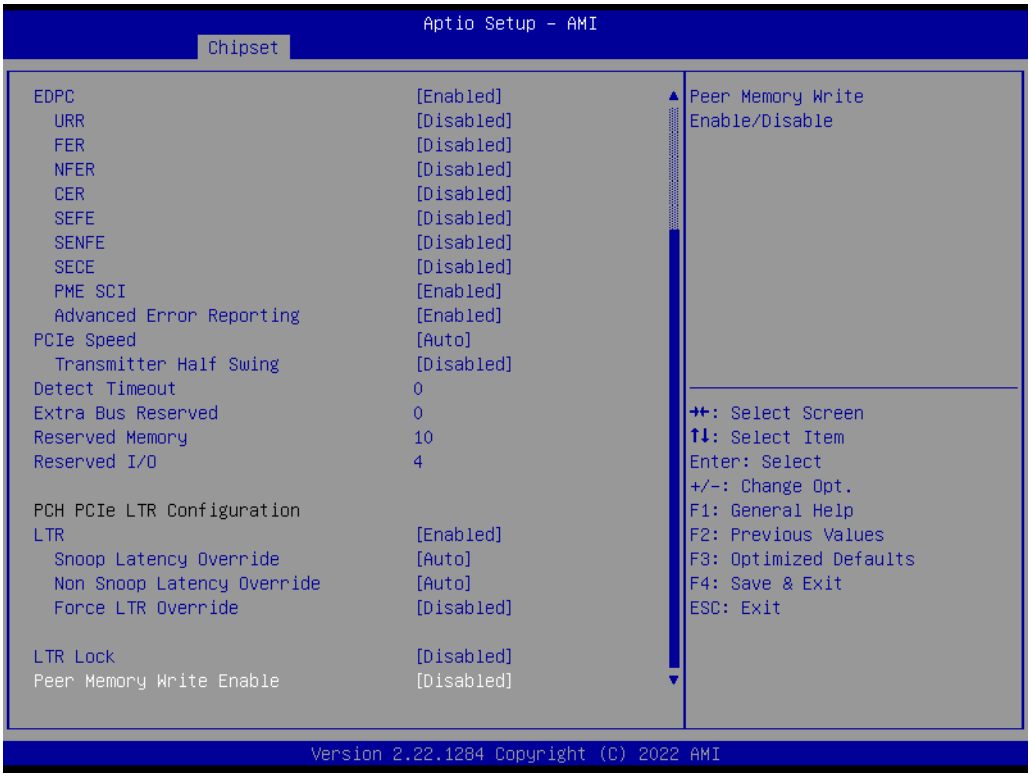




M.2 E-Key

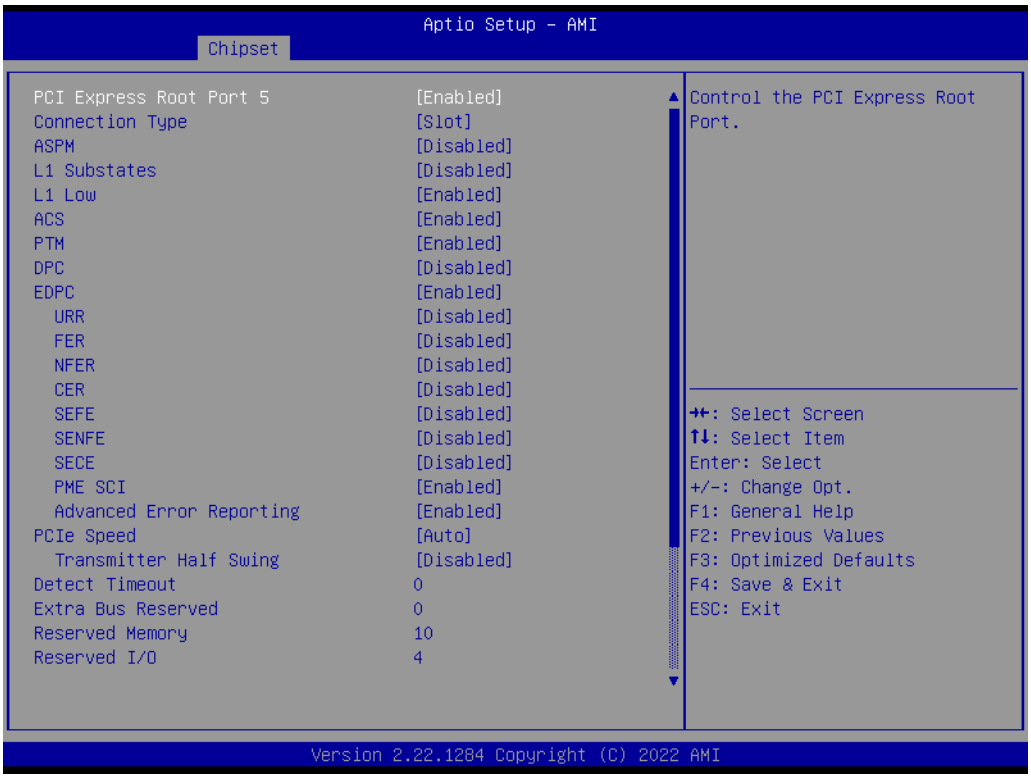
Chipset → PCH-I/O Configuration → PCI Express configuration → M.2 E-Key

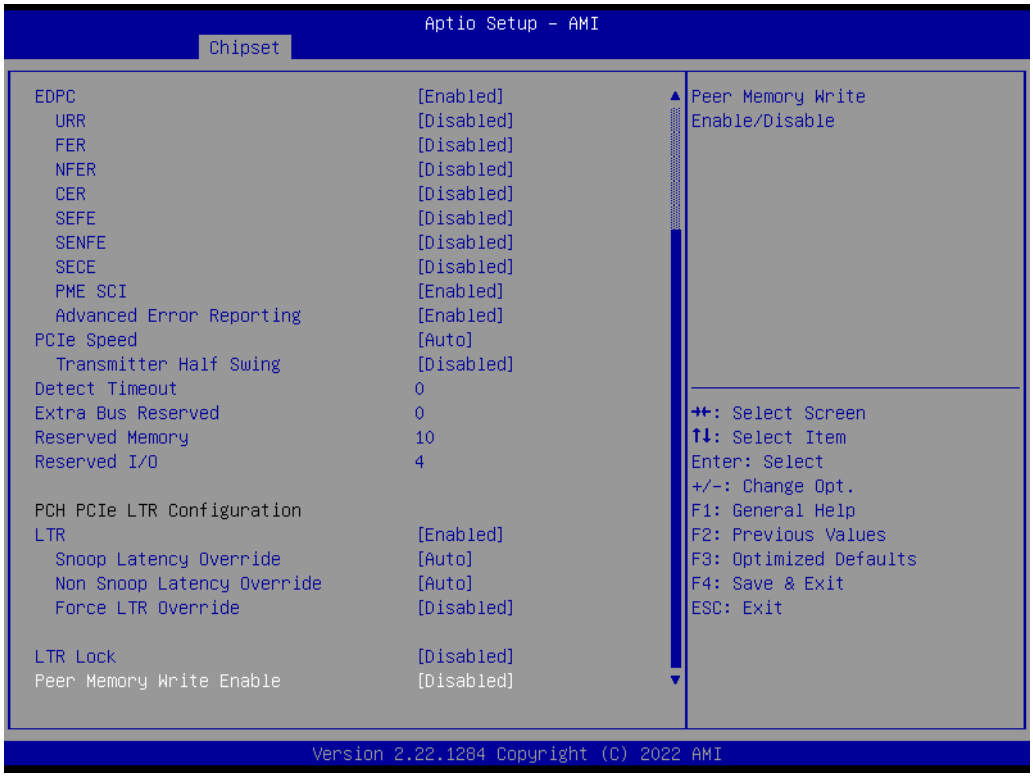




M.2 M-key

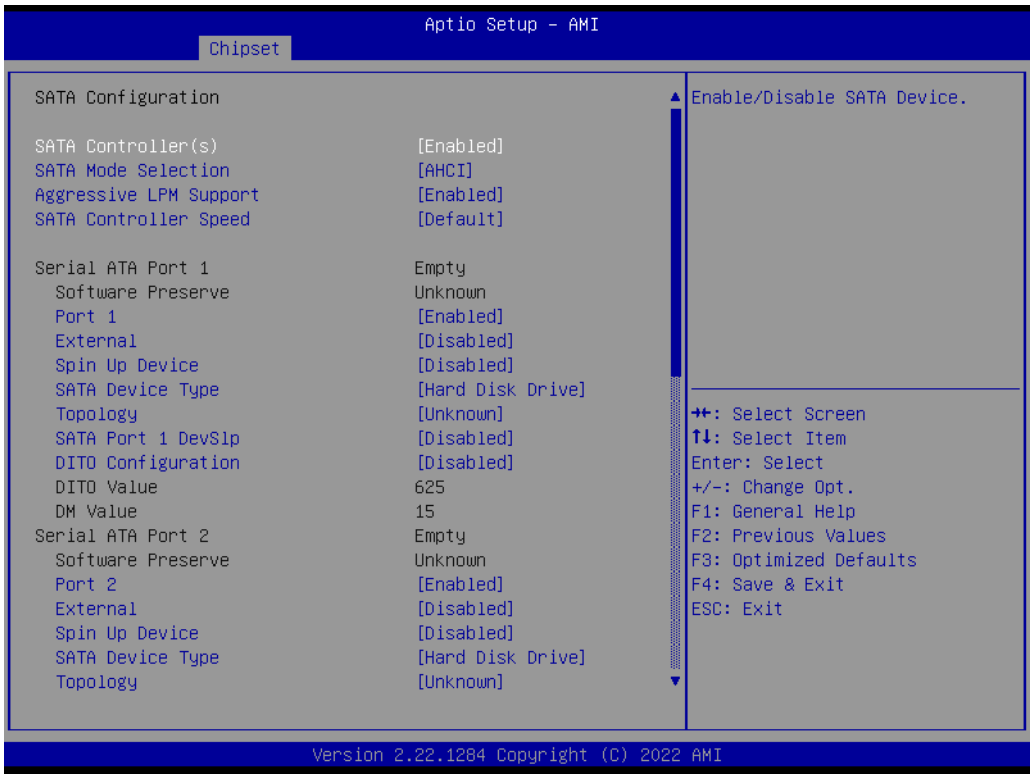
Chipset → PCH-I/O Configuration → PCI Express configuration → M.2 M-Key

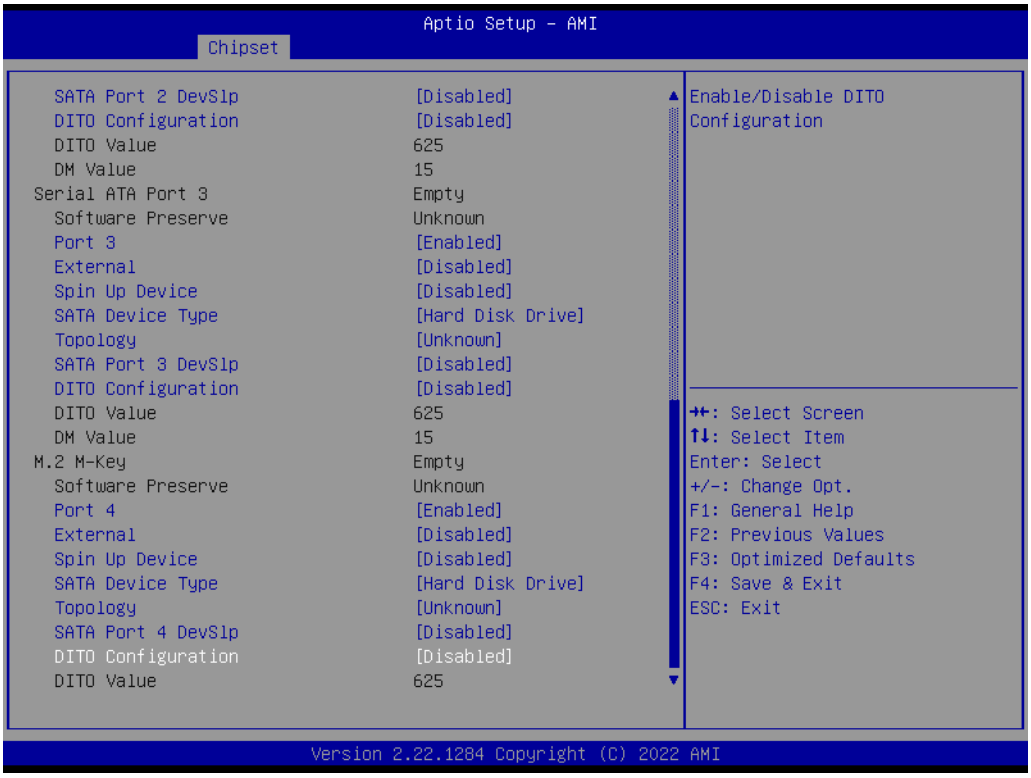




SATA Configuration

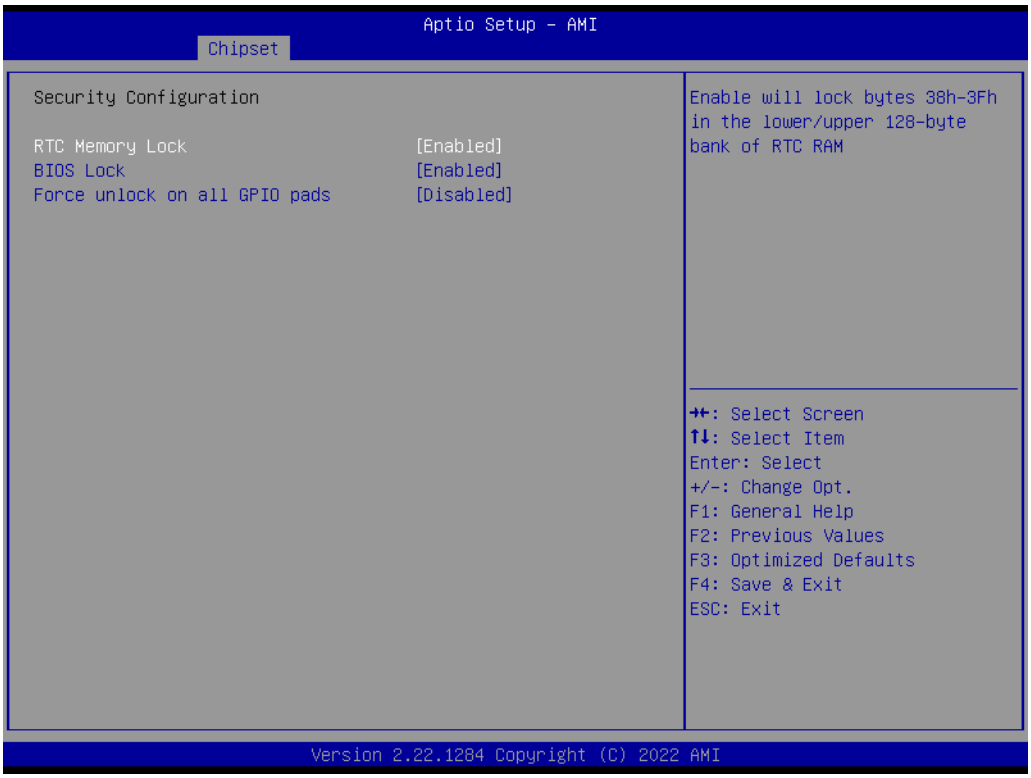
Chipset →PCH-I/O Configuration → SATA Configuration





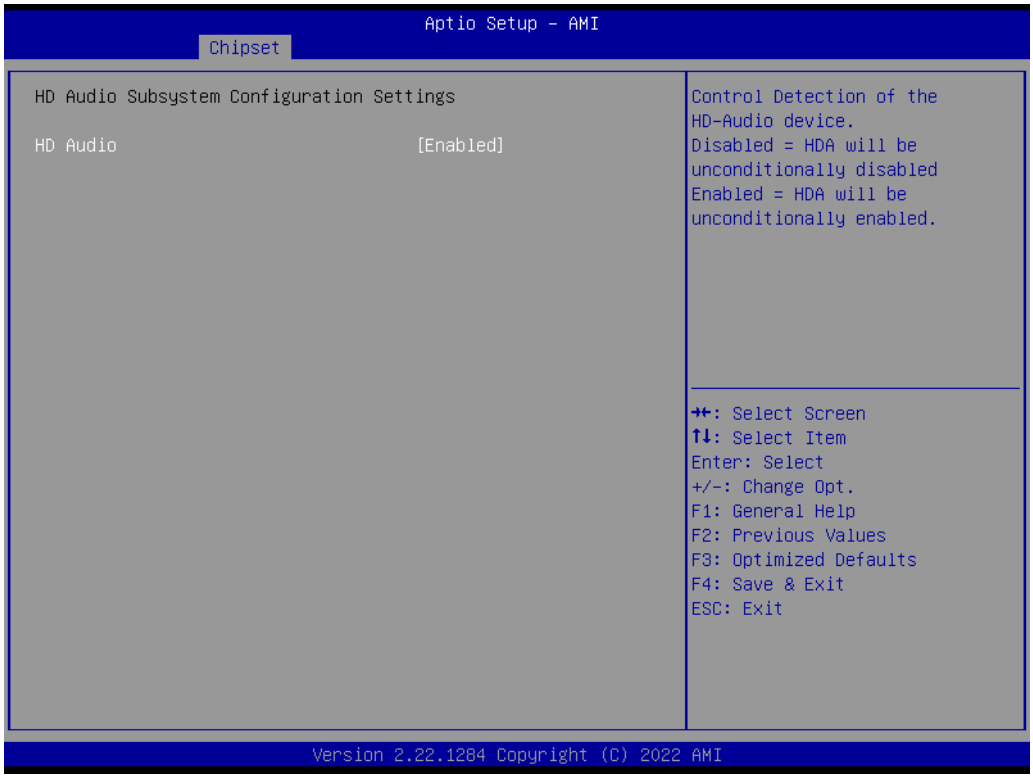
Security Configuration

Chipset →PCH-I/O Configuration →Security Configuration

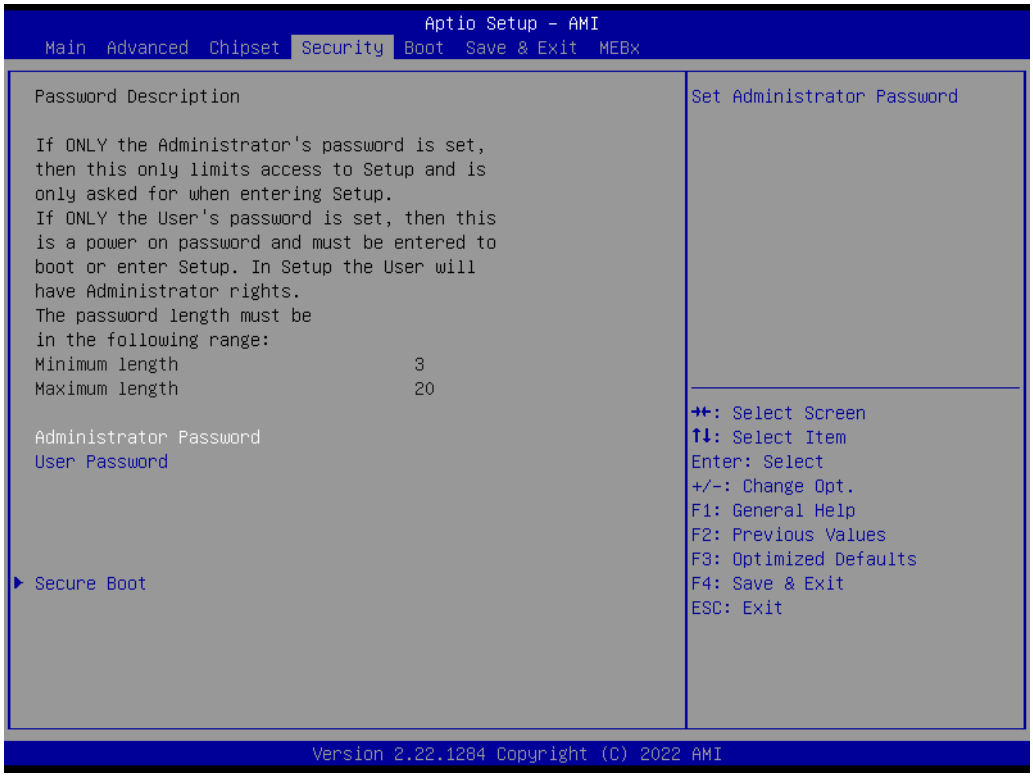


HD Audio Subsystem Configuration Settings

Chipset →PCH-I/O Configuration→ HD Audio Subsystem Configuration Settings



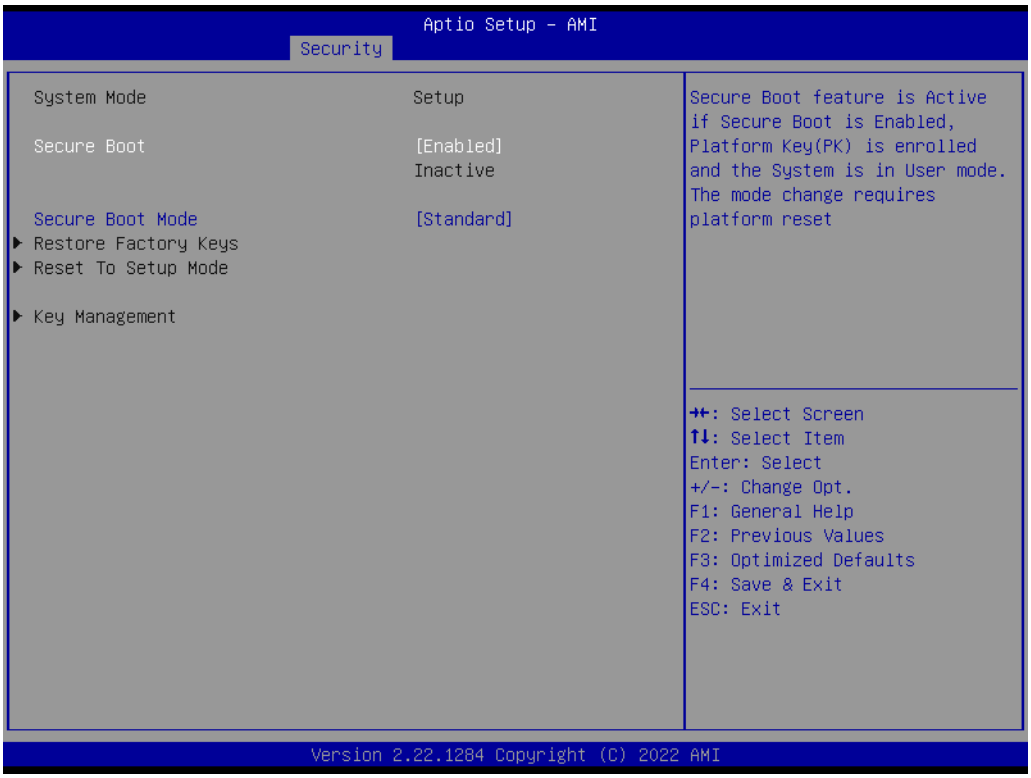
3.2.4 Security



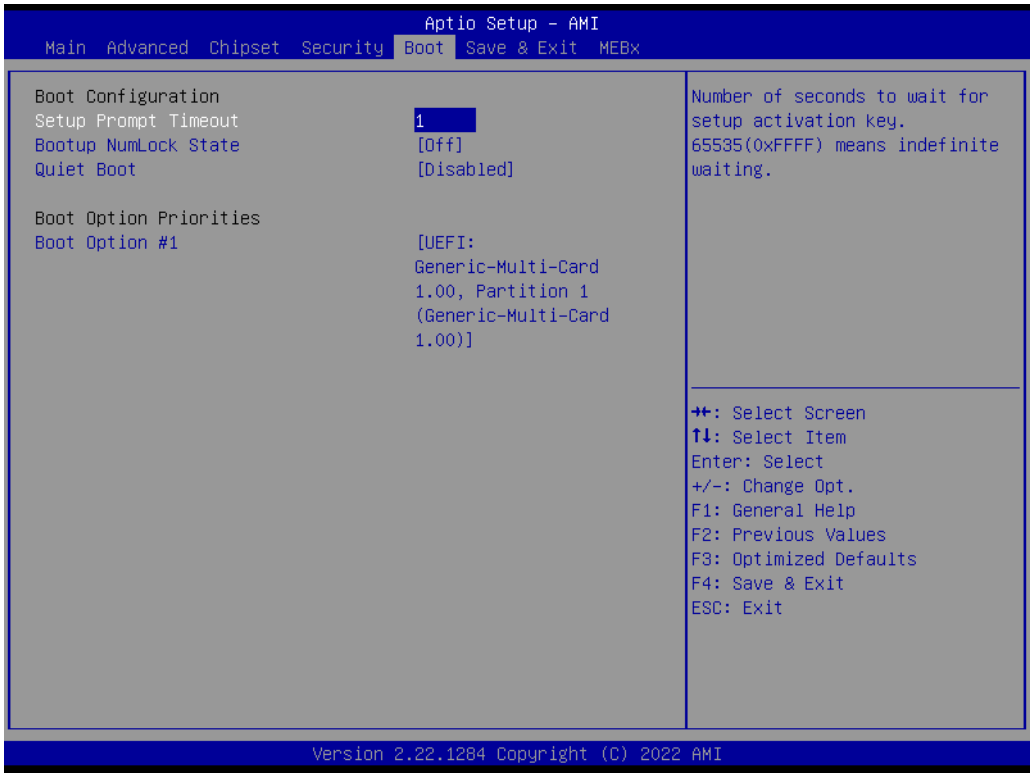
- **Administrator Password**
  Select this option and press <ENTER> to access the sub menu, and then type in the password to set the Administrator password.
- **User Password**
  Select this option and press <ENTER> to access the sub menu, and then type in the password to set the User Password.

Secure Boot

Security → Secure Boot

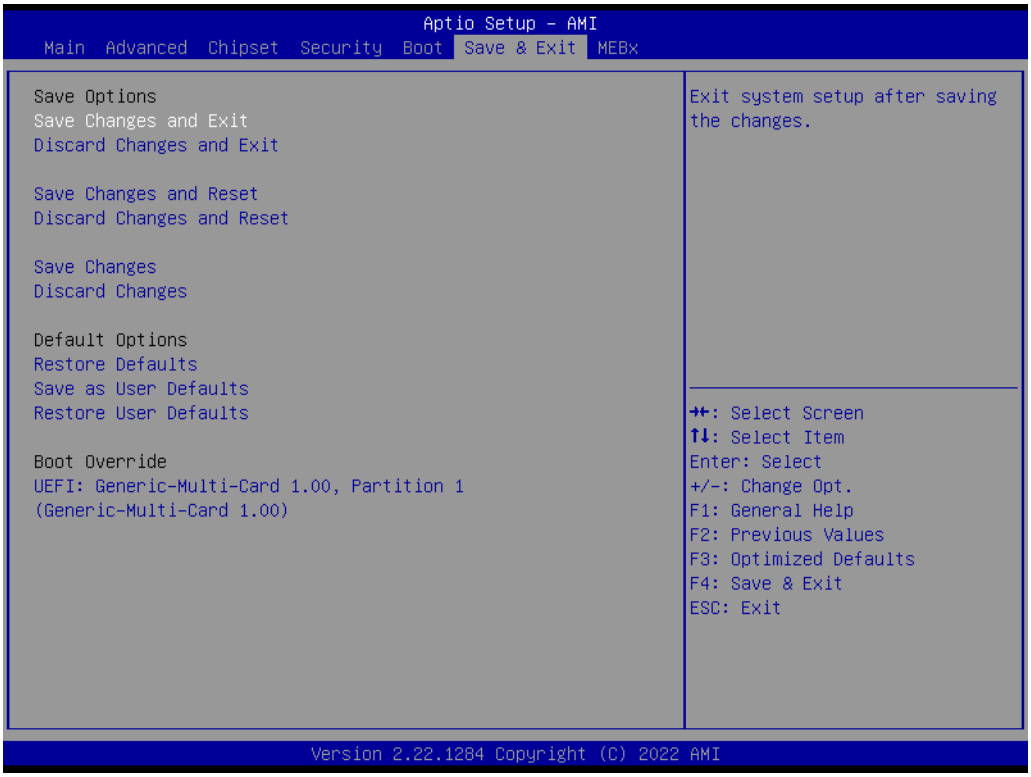


3.2.5 Boot Setting



- **Setup Prompt Timeout**
  User the <+> and <-> keys to adjust the number of seconds to wait for setup activation key.
- **Bootup NumLock State [Off]**
  On or off power on state for the NumLock.

3.2.6 Save & Exit Configuration



- **Save Changes and Exit**
  When users have completed system configuration, select this option to save changes, exit BIOS setup menu and reboot the computer to take effect of all system configuration parameters.
  1. Select **Save Changes and Exit** from the Save & Exit menu and press <Enter>. The following message appears: Save Configuration Changes and Exit Now?
  2. Select [Ok] or [Cancel]
- **Discard Changes and Exit**
  Select this option to quit setup without making any permanent changes to the system configuration.
  1.Select **Discard Changes and Exit** from the Save & Exit menu and press <Enter>. The following message appears: Discard Changes and Exit setup now? [Ok] or [Cancel]
  2. Select Ok to discard changes and exit.
- **Save Changes and Reset**
  When users have completed system configuration, select this option to save changes, exit BIOS setup menu and reboot the computer to take effect.
  1. Select **Save Changes and Reset** from the Save & Exit menu and press <Enter>. The following message appears: Save Configuration Changes and Exit Now? [Ok] or [Cancel]
  2. Select [Ok] or [Cancel]
- **Discard Changes and Reset**
  Select this option to quit Setup without making any permanent changes to the system configuration.
  1. Select **Discard Changes and Reset** from the Save & Exit menu and press <Enter>. The following message appears: Discard Changes and exit setup Now? [Ok] or [Cancel]
  2. Select Ok to discard changes and reset.

- **Restore Default**
  The BIOS automatically configures all setup items to optimal settings when users select this option. Defaults are designed for maximum system performance, but may not work best for all computer applications. In particular, do not use the Defaults if the user's computer is experiencing system configuration problems. Select Restore Defaults from the Exit menu and press <Enter>.
- **Save as User Default**
  Save the all current settings as a user default.
- **Restore User Default**
  Restore all settings to user default values.
- **Boot Override**
  Shows the boot device types on the system.

Chapter 4

Software Introduction & Services

4.1 Introduction

The mission of Advantech Embedded Software Services is to "Enhance quality of life with Advantech platforms and Microsoft® Windows® embedded technology." We enable Windows® Embedded software products on Advantech platforms to more effectively support the embedded computing community. Customers are freed from the hassle of dealing with multiple vendors (hardware suppliers, system integrators, embedded OS distributors) for projects. Our goal is to make Windows® Embedded Software solutions easily and widely available to the embedded computing community.

4.2 Value-Added Software Services

Software API: An interface that defines the ways by which an application program may request services from libraries and/or operating systems. Provides not only the underlying drivers required but also a rich set of user-friendly, intelligent and integrated interfaces, which speeds development, enhances security and offers add-on value for Advantech platforms. It plays the role of catalyst between developer and solution, and makes Advantech embedded platforms easier and simpler to adopt and operate with customer applications.

4.2.1 Software API

4.2.1.1 Control

GP I/O

General Purpose Input/Output is a flexible parallel interface that allows a variety of custom connections. It allows users to monitor the level of signal input or set the output status to switch on/off the device. Our API also provide Programmable GPIO, which allows developers to dynamically set the GPIO input or output status.

SMBus

SMBus is the System Management Bus defined by Intel Corporation in 1995. It is used in personal computers and servers for low-speed system management communications. The SMBus API allows a developer to interface a embedded system environment and transfer serial messages using the SMBus protocols, allowing multiple simultaneous device control.

4.2.1.2 Display

Brightness Control

The Brightness Control API allows developers to access embedded devices and easily control brightness.

4.2.1.3 Monitor

Watchdog

A watchdog timer (WDT) is a device that performs a specific operation after a certain period of time if something goes wrong and the system does not recover on its own. A watchdog timer can be programmed to perform a warm boot (restarting the system) after a certain number of seconds.

Hardware Monitor

The Hardware Monitor (HWM) API is a system health supervision API that inspects certain condition indexes, such as fan speed, temperature, and voltage.

Chapter 5

Chipset Software Installation Utility

5.1 Before you Begin

To facilitate the installation of the enhanced display drivers and utility software, read the instructions in this chapter carefully. The drivers for the AIMB-278 are located on the Advantech support website: http://support.advantech.com/Support/. The drivers on the support website will guide and link you to the utilities and drivers under a Windows system. Updates are provided via Service Packs from Microsoft*.

Note! *The driver files on the website are compressed. Do not attempt to install the drivers by copying the files manually. You must download the files and decompress them first. Also, please use the supplied SETUP program to install the drivers.*

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

5.2 Introduction

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

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

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

- *Windows 10 (64-bit)*

Chapter 6

VGA Setup

6.1 Introduction

The 12th Gen Intel® Core™ i processors are embedded with an integrated graphics controller. You need to install the driver to enable this function.

Optimized integrated graphics solution: Intel Graphics Flexible supports versatile display options and a 3D graphics engine. Dual independent displays include enhanced display modes for widescreen flat panels for, extended, twin, clone and dual display modes, and optimized 3D support delivers an intensive and realistic visual experience.

6.2 Windows 10 VGA Driver Installation

Note! *Before installing this driver, make sure the CSI utility has been installed in your system. See Chapter 5 for information on installing the CSI utility.*

Download the driver from website on your computer. Navigate to the “AIMB-278_Graphic_Win10 (64-bit)” folder and click “setup.exe” to complete the installation of the drivers for Windows 10.

Chapter 7

LAN Configuration

7.1 Introduction

The AIMB-278 has two Gigabit Ethernet LANs via dedicated PCI Express x1 lanes Intel i226 and I219LM (Phy) that offer bandwidth of up to 500 MB/sec, eliminating the bottleneck of network data flow and incorporating Gigabit Ethernet at 2500 Mbps.

7.2 Features

- Integrated 10/100/1000/2500 Mbps transceiver
- 10/100/1000/2500 Mbps triple-speed MAC
- High-speed RISC core with 24-KB cache
- On-chip voltage regulation
- Wake-on-LAN (WOL) support
- PCI Express x1 host interface

7.3 Installation

Note! *Before installing this driver, make sure the CSI utility has been installed in your system. See Chapter 5 for information on installing the CSI utility.*

The AIMB-278's Intel i226 and Intel i219LM Gigabit integrated controllers support all major network operating systems. However, the installation procedure varies from system to system. Please find and use the section that provides the driver setup procedure for the OS you are using.

7.4 Windows® 10 Driver Setup (Intel i219LM&Intel i226)

Download the driver from support website on your computer and decompressed the file. Select the “Autorun” then navigate to the directory for your OS.

Note! *Before installing this driver, make sure the CSI utility has been installed in your system. See Chapter 5 for information on installing the CSI utility.*

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