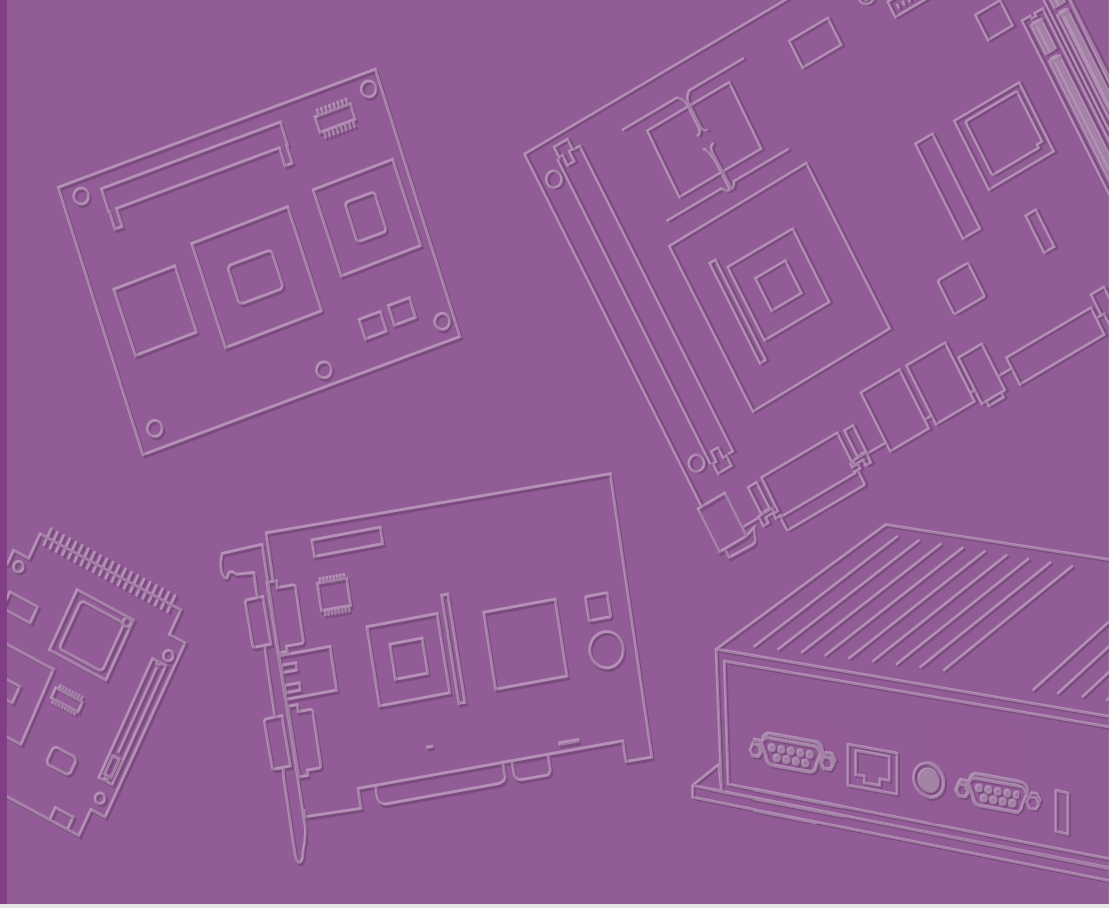

User Manual

AIMB-289

THIN AI Motherboard with 12th/ 13th/14th Gen Intel® Core™ Processor (LGA1700) (codename: Raptor Lake-S Refresh)

ADVANTECH

Enabling an Intelligent Planet

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A Message to the Customer

Advantech Customer Services

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

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

Declaration of Conformity

FCC Class B

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 assistance.

CPU Compatibility

Processor Number	Max_TDP	Code Name	Cores/ Threads	S-Spec	Lithography	ADVANTECH P/N	Result	Remark
i9-14900T	35W	Raptor Lake-Refresh	8P+16E/32T	Q37P	Intel 7	N/A	PASS	
i9-14900	65W	Raptor Lake-Refresh	8P+16E/32T	Q37Q	Intel 7	N/A	PASS	
i7-14700T	35W	Raptor Lake-Refresh	8P+12E/28T	Q3J8	Intel 7	N/A	PASS	
i7-14700	65W	Raptor Lake-Refresh	8P+12E/28T	Q3RX	Intel 7	N/A	PASS	
i5-14500T	35W	Raptor Lake-Refresh	6P+8E/20T	Q37X	Intel 7	N/A	PASS	
i5-14500	65W	Raptor Lake-Refresh	6P+8E/20T	Q37Y	Intel 7	N/A	PASS	
i5-14400T	35W	Raptor Lake-Refresh	6P+4E/16T	Q381	Intel 7	N/A	PASS	
i5-14400	65W	Raptor Lake-Refresh	6P+4E/16T	Q3XZ	Intel 7	N/A	PASS	
i3-14100T	35W	Raptor Lake-Refresh	4P+0E/8T	Q3DE	Intel 7	N/A	PASS	
i3-14100	60W	Raptor Lake-Refresh	4P+0E/8T	Q3E4	Intel 7	N/A	PASS	
Intel Processor 300T	35W	Raptor Lake-Refresh	2P+0E/4T	Q3E7	Intel 7	N/A	PASS	
Intel Processor 300	46W	Raptor Lake-Refresh	2P+0E/4T	Q3E6	Intel 7	N/A	PASS	
i9-13900TE	35W	Raptor Lake	8P+16E/32T	SRMG1	Intel 7	N/A	PASS	
i9-13900E	65W	Raptor Lake	8P+16E/32T	SRMG2	Intel 7	N/A	PASS	
i9-13900	65W	Raptor Lake	8P+16E/32T	SRMB6	Intel 7	N/A	PASS	
i7-13700TE	35W	Raptor Lake	8P+8E/24T	SRMG4	Intel 7	N/A	PASS	
i7-13700E	65W	Raptor Lake	8P+8E/24T	SRMG3	Intel 7	N/A	PASS	
i7-13700	65W	Raptor Lake	8P+8E/24T	SRMBA	Intel 7	N/A	PASS	
i5-13500TE	35W	Raptor Lake	6P+8E/20T	SRMFZ	Intel 7	N/A	PASS	
i5-13500E	65W	Raptor Lake	6P+8E/20T	SRMFW	Intel 7	N/A	PASS	
i5-13500	65W	Raptor Lake	6P+8E/20T	SRMBM	Intel 7	N/A	PASS	
i5-13400	65W	Raptor Lake	6P+4E/16T	SRMBP	Intel 7	N/A	PASS	
i3-13100TE	35W	Raptor Lake	4P+0E/8T	SRMFT	Intel 7	N/A	PASS	
i3-13100E	60W	Raptor Lake	4P+0E/8T	SRMFR	Intel 7	N/A	PASS	
i3-13100	60W	Raptor Lake	4P+0E/8T	SRMBU	Intel 7	N/A	PASS	
i9-12900TE	35W	Alder Lake	8P+8E/24T	SRL6C	Intel 7	N/A	PASS	
i9-12900E	65W	Alder Lake	8P+8E/24T	SRL6B	Intel 7	N/A	PASS	
i9-12900	65W	Alder Lake	8P+8E/24T	SRL4K	Intel 7	N/A	PASS	
i7-12700TE	35W	Alder Lake	8P+4E/20T	SRL6E	Intel 7	N/A	PASS	
i7-12700E	65W	Alder Lake	8P+4E/20T	SRL6D	Intel 7	N/A	PASS	
i7-12700	65W	Alder Lake	8P+4E/20T	SRL4Q	Intel 7	N/A	PASS	
i5-12500TE	35W	Alder Lake	6P/12T	SRL6V	Intel 7	N/A	PASS	

i5-12500E	65W	Alder Lake	6P/12T	SRL6W	Intel 7	N/A	PASS	
i5-12500	65W	Alder Lake	6P/12T	SRL5V	Intel 7	N/A	PASS	
i5-12400	65W	Alder Lake	6P/12T	SRL5Y	Intel 7	N/A	PASS	
i3-12100TE	35W	Alder Lake	4P/8T	SRL6T	Intel 7	N/A	PASS	
i3-12100E	60W	Alder Lake	4P/8T	SRL6U	Intel 7	N/A	PASS	
i3-12100	60W	Alder Lake	4P/8T	SRL62	Intel 7	N/A	PASS	
G7400TE	35W	Alder Lake	2P/4T	SRL6S	Intel 7	N/A	PASS	
G7400E	46W	Alder Lake	2P/4T	SRL6R	Intel 7	N/A	PASS	
G6900TE	35W	Alder Lake	2P/2T	SRL6P	Intel 7	N/A	PASS	
G6900E	46W	Alder Lake	2P/2T	SRL6Q	Intel 7	N/A	PASS	

Memory Compatibility

Category	Speed	Capacity	Vendor	Module P/N	Chip P/N	ADVANTECH P/N	ECC	Result	Remark
DDR5	5600	8GB	Advantech	SQR-SD5N8G5K6SNGPB	SEC337 K4RAH165VPBCWM	SQR-SD5N8G5K6SNGPB	N	PASS	
DDR5	5600	16GB	Advantech	SQR-SD5N16G5K6SNPB	SEC337 K4RAH086VPBCWM	SQR-SD5N16G5K6SNPB	N	PASS	
DDR5	5600	32GB	Advantech	SQR-SD5N32G5K6SNPB	SEC337 K4RAH086VPBCWM	SQR-SD5N32G5K6SNPB	N	PASS	
DDR5	4800	16GB	Advantech	SQR-SD5N16G4K8SNBB	SEC 149 K7RAH08 6VB BCQK	SQR-SD5N16G4K8SNBB	N	PASS	
DDR5	4800	32GB	Advantech	SQR-SD5N32G4K8SNBB	SEC 149 K7RAH08 6VB BCQK	SQR-SD5N32G4K8SNBB	N	PASS	
DDR5	4800	32GB	Advantech	AQD-SD5V32GN48-SB	SEC 210 K4RAH08 6VB BCQK	AQD-SD5V32GN48-SB	N	PASS	
DDR5	4800	16GB	Advantech	AQD-SD5V16GN48-SB	SEC 210 K4RAH08 6VB BCQK	AQD-SD5V16GN48-SB	N	PASS	
DDR5	5600	32GB	Advantech	AQD-SD5V32GN56-SB	SEC346 K4RAH086VPBCWM	AQD-SD5V32GN56-SB	N	PASS	
DDR5	5600	48GB	Crucial	CT48G56C46S5.M16B1	3LB75 D8DCN	N/A	N	PASS	
DDR5	5600	16GB	Advantech	SQR-SD5N16G5K6SNPB	SEC346 K4RAH086VPBCWM	SQR-SD5N16G5K6SNPB	N	PASS	

M.2 Compatibility

Dimension	Interface	Bandwidth Performance	Category	Vendor	Model	ADVANTECH P/N	Result	Remark
2230	M.2 Key E	PCI-E / USB	Wireless LAN + Bluetooth	Advantech	AIW-170BQ	AIW-170BQ	PASS	
2230	M.2 Key A+E	PCI-E / USB	Wireless LAN + Bluetooth	Advantech	EWM-W179M201E	EWM-W179M201E	PASS	
2242	M.2 Key B+M	SATA3	SSD	Advantech	SQF-S4BZ2-128GDSDC	SQF-S4BZ2-128GDSDC	PASS	
3042	M.2 Key B	USB3.2 Gen1	4G LTE	Sierra Wireless	EM7455	N/A	PASS	
2230	M.2 Key A+E	PCIe v3.1	NVMe PCIe SSD	Advantech	SQF-C3AV1-512GDEDC	SQF-C3AV1-512GDEDC	PASS	

Ordering Information

*() Supported by BOM option.

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-289 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 Warranty Card

If any of these items are missing or damaged, contact your distributor or sales representative immediately. We have carefully inspected the AIMB-289 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-289, 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.

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Chapter 1

General Information

1.1 Introduction

The AIMB-289 motherboard is built around the Intel® H610E PC for industrial applications that require both high-performance computing and enhanced power management. It supports Intel® Core™ i9/i7/i5/i3/Pentium™/Celeron™ desktop processors, supporting up to 20MB SmartCache, and up to 96GB of memory through 2 x DDR5 5600MHz SODIMM slots. The motherboard offers a range of connectivity options, including 4 x serial ports, 1 x USB 3.2 Gen2 type C, 1 x USB 3.2 Gen2, 2 x USB 3.2 Gen1, 3 x 2.5 GbE LAN, 2 x SATA III, 1 x NGFF (M.2 E-Key), 1 x NGFF (M.2 B-Key) connector, and 1 x PCIe x4.

1.2 Features

- **I/O connectivity:** 4 x serial ports, 1 x USB 3.2 Gen2 type C, 1 x USB 3.2 Gen2, 2 x USB 3.2 Gen1, 3 x SATA III, 1 M.2 M-Key & 1 M.2 B-Key, 3 x 2.5GbE LAN, 1 x PCIe x4 Gen3
- **Standard Mini-ITX form factor with industrial features:** The AIMB-289 is a full-featured Mini-ITX motherboard with balanced expandability and performance.
- **Wide selection of storage devices:** SATA HDD, M.2 (B-Key). Customers benefit from the flexibility of using the most suitable storage device for their required capacity.
- **Optimized integrated graphics solution:** With Intel® Iris® Xe Graphics flexibility, it supports versatile display options and a 32 EU 3D graphics engine.

1.3 Specifications

1.3.1 System

- **CPU:** LGA1700 Intel® Core™ i9/i7/i5/i3/Pentium®/Celeron® desktop procesor compliant
- **BIOS:** AMI EFI 256 Mbit SPI BIOS
- **System chipset:** Intel® H610E
- **SATA hard disk drive interface:**
  - 2 x SATA connectors with data transmission rates up to 600 MB/s
  - 1 x M.2 B-Key to support PCIe/NVME x2 M.2 2242, 3042

1.3.2 Memory

- **RAM:** 2 x 262-pin SODIMM sockets support dual-channel DDR5 5600MHz SODIMM, up to 96GB Max

1.3.3 Input/Output

- **Serial ports:** Four serial ports; supporting RS-232/422/485
- **USB port:** Supports 4 x USB 3.2 Gen2 and Gen1 with transmission rates of up to 10 Gbps
- **GPIO connector:** 8-bit from Super I/O, general purpose Input/Output

1.3.4 Graphics

- **Controller:** Intel® UHD Graphics 770
- **eDP:** Supports max. resolution 4096 x 2160 @ 60Hz, colay LVDS
- **DP1.4:** Supports max. resolution 4096 x 2160 @ 60 Hz

- **HDMI 2.1a:** Supports max. resolution 4096 x 2160 @ 60 Hz
- **LVDS:** Supports single/dual channel 18-/24-bit with maximum resolution up to 1920 x 1200 @ 60 Hz (LVDS colay with eDP)

1.3.5 Ethernet LAN

- Supports triple 10/100/2500 Mbps Ethernet port(s) via PCI Express x1 bus which provides 500 MB/s data transmission rates.
- **Controller:**
  - GbE LAN1: Intel I226V
  - GbE LAN2: Intel I226V
  - GbE LAN3: Intel I226V

1.3.6 Industrial Features

- **Watchdog timer:** This feature can generate a system reset. The watchdog timer 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:** 12-24V DC-in
- **Power consumption:** Boost 100.2W; Typical 62.5W (configuration: Intel® Core™ i9-14900 5.4 GHz, 2pcs 48 GB DDR5 5600MHz SODIMM)
- **Board size:** 170 x 170 mm (6.69" x 6.69").
- **Board weight:** 0.365 kg

1.4 Jumpers and Connectors

Connectors on the AIMB-289 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

Item	Description	Part Reference
1	Direct Current input connector	DCIN1
2	Display Port / HDMI connector	DP1+HDMI1
3	USB 3.2 Gen1 Connector #2 / #3	USB3_23
4	USB 3.2 Gen2 Connector #1	USB3_1
5	USB 3.2 Gen2 / DP type C Connector	USB-C1
6	RJ-45 Connector #1	LAN1
7	RJ-45 Connector #2	LAN2
8	RJ-45 Connector #3	LAN3
9	HD Audio Interface (Line-Out)	AUDIO1
10	HD Audio Interface (Mic-In)	AUDIO2
11	HD Audio interface (Digital)	SPDIF_OUT1

Table 1.1: Connector and Header List		
12	Front panel audio header	FPAUD1
13	Audio amplifier output pin header	AMP1
14	ATX 12V 4 Pin Power Connector	ATX12V1
15	ATX supported 3-pin header on board	ATX_5VSB1
16	Serial ATA interface Connector #1	SATA1
17	Serial ATA interface Connector #2	SATA2
18	Serial ATA interface power connector	SATA_PWR1
19	EDP Connector / LVDS Connector	EDP1_LVDS1
20	EDP / LVDS Backlight Inverter Power Connector	INV1
21	EDP Panel / LVDS Panel Voltage Selection	JEDP1_LVDS1
22	PCI Express x4 slot	PCIEX4_1
23	SPI BIOS Flash Socket	SPI1
24	M.2 E-KEY Connector	M2_E1
25	M.2 B-KEY Connector	M2_B1
26	USB 2.0 Front panel Header	USB2_45
27	USB 2.0 Front panel Header	USB2_67
28	DDR5 SODIMM Socket A1	DIMMA1
29	DDR5 SODIMM Socket B1	DIMMB1
30	COM1 Connector	COM1
31	COM2 Connector	COM2
32	COM3 Connector	COM3
33	COM4 Connector	COM4
34	COM1 RI# selection pin header	JSETCOM1_V1
35	8-bit General Purpose I/O pin header	GPIO1
36	CPU FAN Connector	CPUFAN1
37	System Fan #1 Connector	SYSFAN1
38	CMOS battery Connector	BAT1
39	PWRBTN#/ RESET#/HDD LED/ SM bus	JFP1
40	Power LED pin header	JFP2
41	LED port 80 connector	LED_P80
42	CMOS Mode selection	JCMOS1
43	AT / ATX Mode selection	PSON1
44	Case Open Connector	JCASE1
45	IMVP9.1 Programming Header	VR_PMB1
46	SIM card Connector	SIM1

1.5 Board Layout: Jumper and Connector Locations

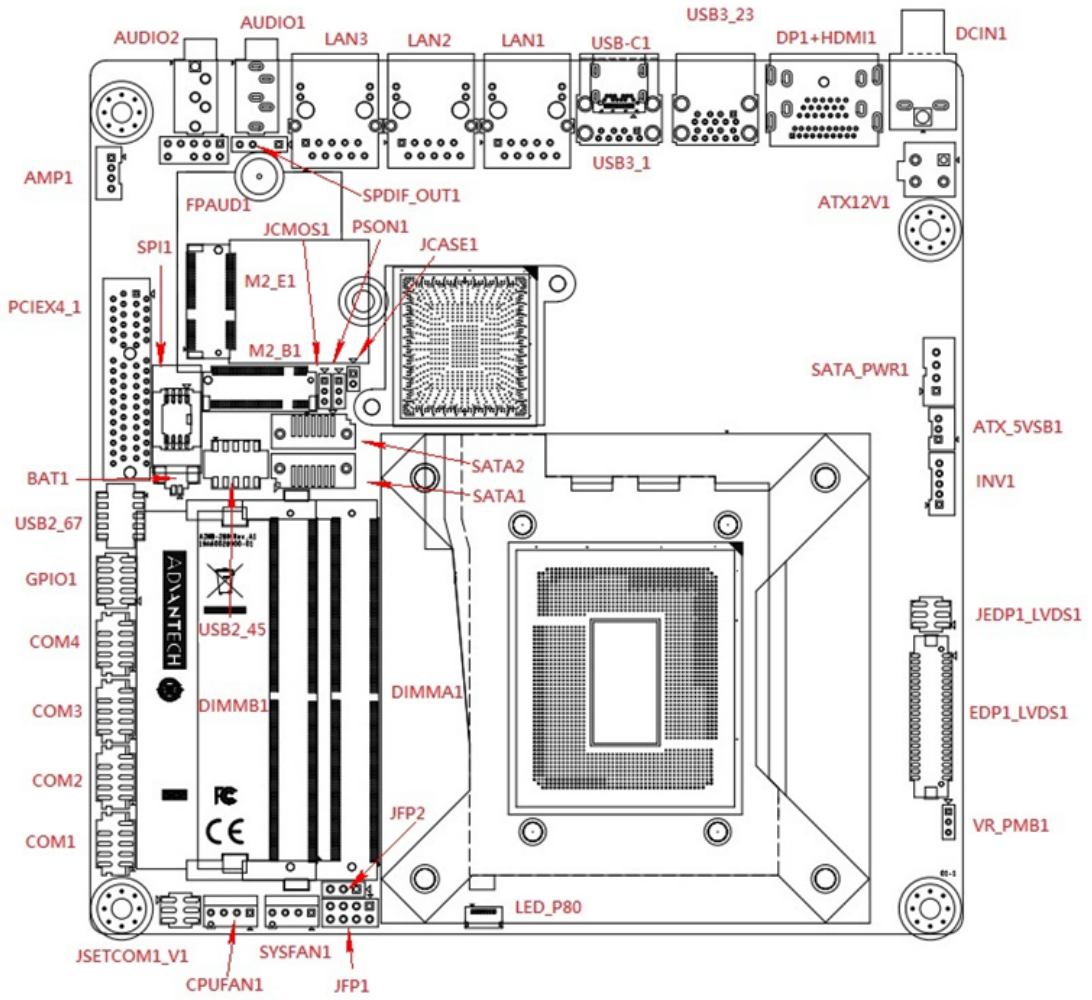


Figure 1.1 Jumper and Connector Locations (Top Side)

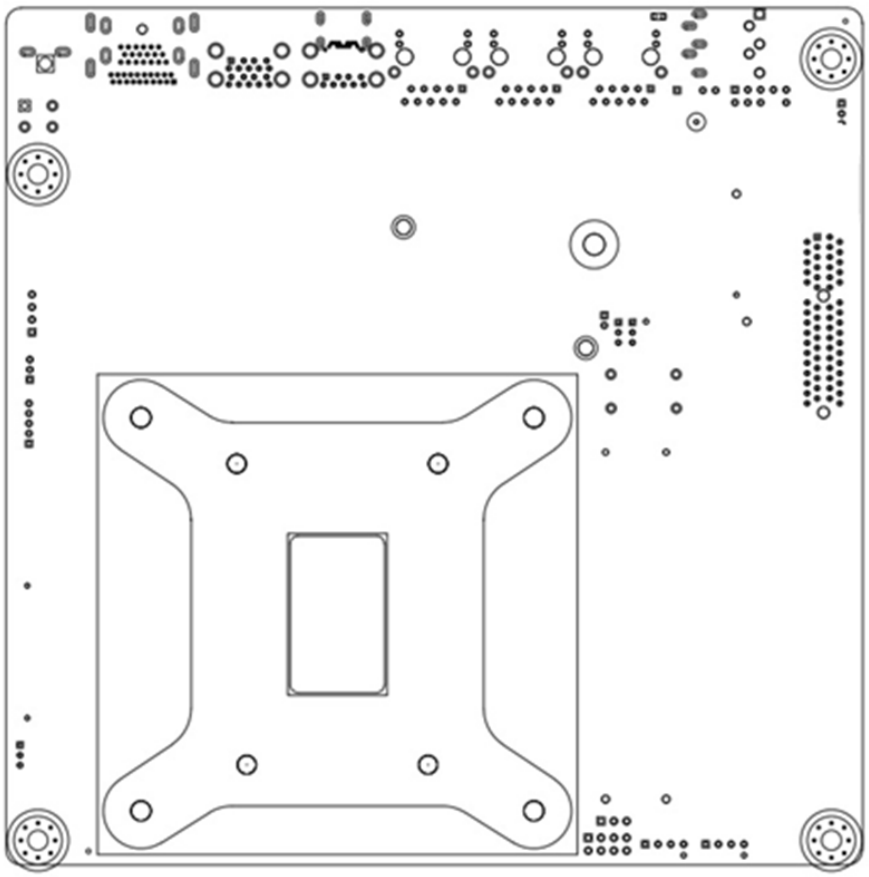


Figure 1.2 Jumper and Connector Locations (Bottom Side)

1.6 AIMB-289 Board Diagram

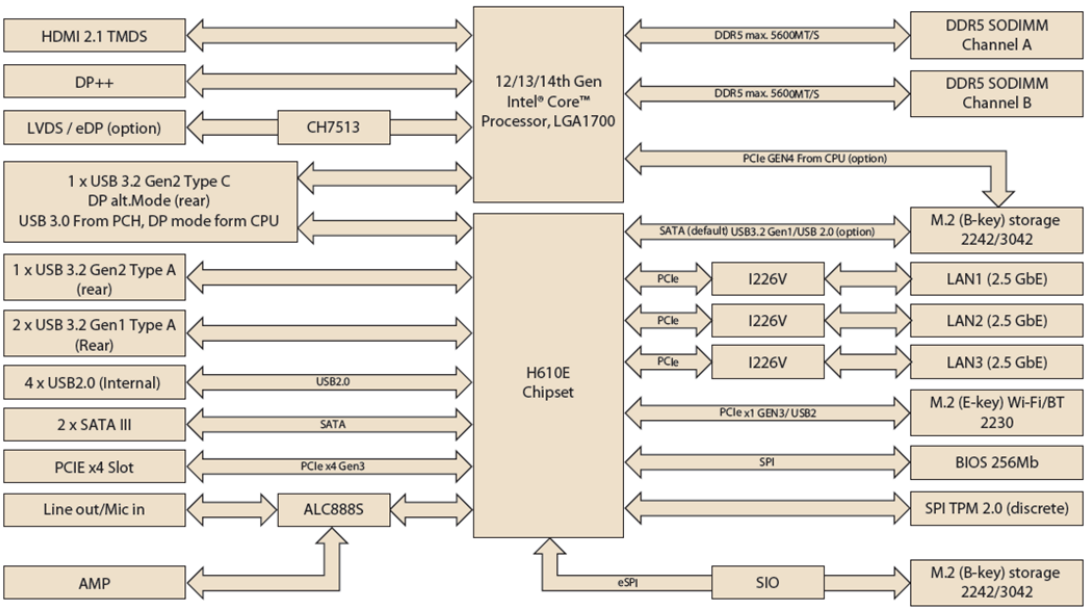


Figure 1.3 AIMB-289 Board Diagram

1.7 Safety Precautions

Warning! *Always completely disconnect the power cord from the 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 electrostatic 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 the battery is incorrectly replaced. Replace only with same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.*

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.*

1.8 Jumper Settings

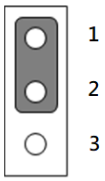
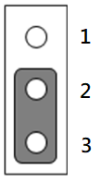
This section provides instructions on how to configure your motherboard by setting the jumpers. It also includes the motherboard's default settings and your options for each jumper.

1.8.1 How to Set Jumpers

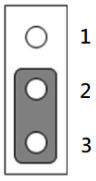
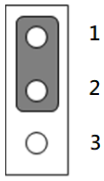
You can configure your motherboard to match the needs of your application by setting the jumpers. A jumper is a metal bridge that closes an electrical circuit. It consists of two metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To "close" (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)

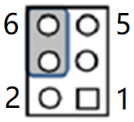
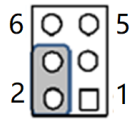
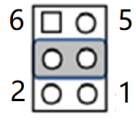
The AIMB-289 motherboard contains a jumper that can erase CMOS data and reset the system BIOS information. Normally this jumper should be set with pins 1-2 closed. If you want to reset the CMOS data, set CMOS1 to 2-3 closed for just a few seconds, and then move the jumper back to 1-2 closed. This procedure will reset the CMOS to its default setting.

Table 1.2: JCMOS1	
Function	**Jumper Setting**
Normal (Default)	 1-2
Clear CMOS	 2-3

1.8.3 ATX/AT Mode Selection (PSON1)

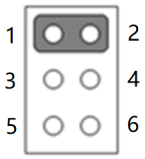
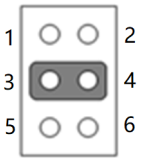
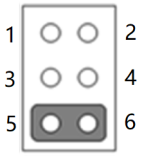
Table 1.3: ATX/AT Mode Selection (PSON1)	
Function	**Jumper Setting**
ATX Mode (Default) PSON1 (2-3)	
AT Mode PSON (1-2)	

1.8.4 EDP Panel / LVDS Panel Voltage Selection (JEDP1_LVDS1)

Table 1.4: EDP Panel / LVDS Panel Voltage Selection (JEDP1_LVDS1)	
Function	**Jumper Setting**
Jumper position for 3.3V (Default)	
Jumper position for 5V	
Jumper position for 12V	

1.8.5 COM1 RI# Selection Pin Header (JSETCOM1_V1)

Table 1.5: COM1 RI# Selection Pin Header (JSETCOM1_V1)

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

1.9 System Memory

The AIMB-289 has two sockets for 262-pin DDR5 SODIMM. These sockets use a 1.2 V unbuffered double data rate synchronous DRAM (DDR SDRAM). DRAM is available in capacities of 8GB, 16GB, 32GB, and 48GB. The sockets can take any combination with SODIMMs of any size, giving a total memory size between 8GB, 16GB, 32GB, 48GB and up to a max of 96GB. AIMB-289 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 mechanism.

1.11 Cache Memory

The AIMB-289 supports a CPU with one of the following built-in full-speed last level caches:

36MB for Intel® Core™ i9-14900/ i9-14900T/i9-13900E/i9-13900TE

33MB for Intel® Core™ i7-14700/ i7-14700T

30MB for Intel® Core™ i9-12900E/i9-12900TE 25MB for Intel® Core™ i7-12700E/i7-12700TE

24MB for Intel® Core™ i5-14500/ i5-14500T

20MB for Intel® Core™ i5-14400/ i5-14400T

18MB for Intel® Core™ i5-12500E/i7-12500TE 12MB for Intel® Core™ i3-14100/ i3/ 14100T/i3-12100E/i7-12100TE

6MB Intel® Pentium® Processor 300 / Intel® Processor 300T/G7400E/G7400TE

4MB Intel® Pentium® G6900E/G6900TE

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

1.12 Processor Installation

The AIMB-289 is designed to support 12^{th}/13^{th}/14^{th} Gen Intel® Core i9/i7/i5/i3 LGA1700, 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 Direct Current Input Connector (DCIN1)

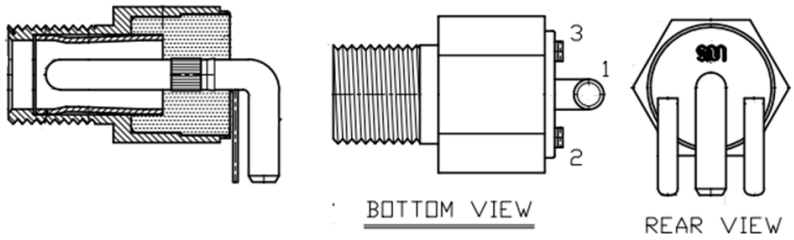


Table 2.1: Direct Current Input Connector (DCIN1)

Pin	Signal
1	12~24V
2	GND
3	GND

2.3 DisplayPort / HDMI Connector (DP1+HDMI1)

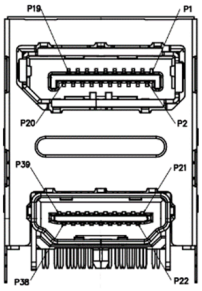


Table 2.2: DisplayPort / HDMI Connector (DP1+HDMI1)

Pin	Signal	Pin	Signal
P1	ML_Lane 0+	P21	TMDS Data2+
P2	GND	P22	GND
P3	ML_Lane 0-	P23	TMDS Data2-
P4	ML_Lane 1+	P24	TMDS Data1+
P5	GND	P25	GND
P6	ML_Lane 1-	P26	TMDS Data1-
P7	ML_Lane 2+	P27	TMDS Data0+
P8	GND	P28	GND
P9	ML_Lane 2-	P29	TMDS Data0-
P10	ML_Lane 3+	P30	TMDS Clock+
P11	GND	P31	GND
P12	ML_Lane 3-	P32	TMDS Clock-
P13	AUX_EN#	P33	NC
P14	GND	P34	NC
P15	AUX+	P35	SCL
P16	GND	P36	SDA
P17	AUX-	P37	GND
P18	HPD	P38	HDMI_PWR
P19	GND	P39	HPD
P20	DP_PWR		

2.4 USB 3.2 Gen1 Connector #2 / #3 (USB3_23)

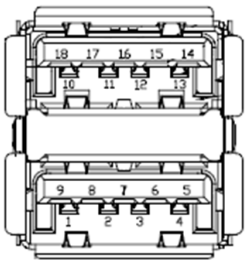


Table 2.3: USB 3.2 Gen1 Connector #2 / #3 (USB3_23)			
Pin	Signal	Pin	Signal
1	VBUS	2	D- [3]
3	D+ [3]	4	GND
5	RX- [3]	6	RX+ [3]
7	GND	8	TX- [3]
9	TX+ [3]	10	VBUS
11	D- [4]	12	D+ [4]
13	GND	14	RX- [4]
15	RX+ [4]	16	GND
17	TX- [4]	18	TX+ [4]

2.5 USB 3.2 Gen2 Connector #1 (USB3_1)

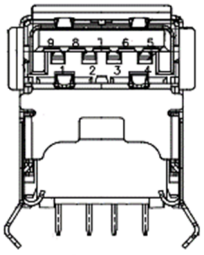


Table 2.4: USB 3.2 Gen2 Connector #1 (USB3_1)			
Pin	**Signal**	**Pin**	**Signal**
1	VBUS	2	D- [1]
3	D+ [1]	4	GND
5	RX- [1]	6	RX+ [1]
7	GND	8	TX- [1]
9	TX+ [1]	10	VBUS

2.6 USB 3.2 Gen2 / DP Type C Connector (USB-C1)

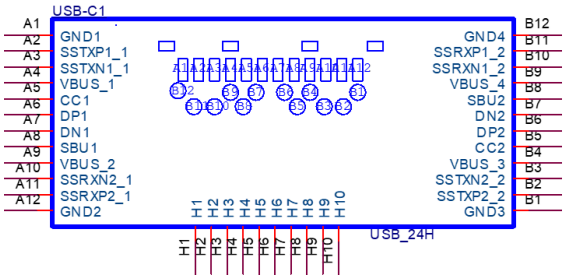


Table 2.5: USB 3.2 Gen2 / DP Type C Connector (USB-C1)			
Pin	**Signal**	**Pin**	**Signal**
A1	GND1	B1	GND3
A2	SSTXP1_1	B2	SSTXP2_2
A3	SSTXN1_1	B3	SSTXN2_2
A4	VUSB_1	B4	VUSB_3
A5	CC1	B5	CC2
A6	DP1	B6	DP2
A7	DN1	B7	DN2
A8	SBU1	B8	SBU2
A9	VUSB_2	B9	VUSB_4
A10	SSRXN2_1	B10	SSRXN1_2
A11	SSRXP2_1	B11	SSRXP1_2
A12	GND2	B12	GND4

2.7 RJ-45 Connector #1 (LAN1)

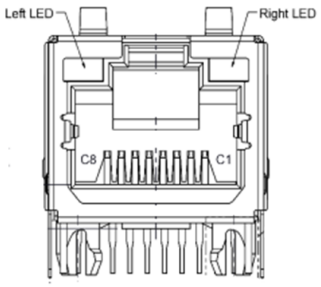


Table 2.6: RJ-45 Connector #1 (LAN1)	
Pin	**Signal**
C1	MDI0+
C2	MDI0-
C3	MDI1+
C4	MDI2+
C5	MDI2-
C6	MDI1-
C7	MDI3+
C8	MDI3-

2.8 RJ-45 Connector #2 (LAN2)

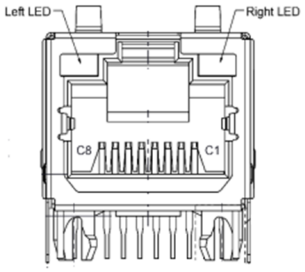


Table 2.7: RJ-45 Connector #2 (LAN2)	
Pin	**Signal**
C1	MDI0+
C2	MDI0-
C3	MDI1+
C4	MDI2+
C5	MDI2-
C6	MDI1-
C7	MDI3+
C8	MDI3-

2.9 RJ-45 Connector #3 (LAN3)

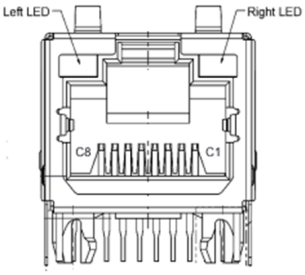


Table 2.8: RJ-45 Connector #3 (LAN3)	
Pin	**Signal**
C1	MDI0+
C2	MDI0-
C3	MDI1+
C4	MDI2+
C5	MDI2-
C6	MDI1-
C7	MDI3+
C8	MDI3-

2.10 HD Analog Audio Interface Line-Out (AUDIO1)

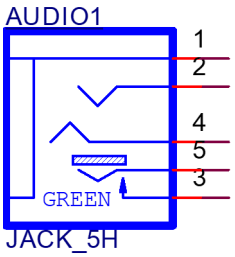


Table 2.9: HD Analog Audio Interface Line-Out (AUDIO1)	
Pin	**Signal Pin Definition**
1	GND_A
2	A_Z_LINEO-L
3	GND_A
4	A_Z_LINEO-R
5	A_FRONT-JD

2.11 HD Analog Audio Interface Mic-In (AUDIO2)

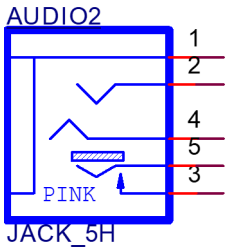


Table 2.10: HD Analog Audio Interface Mic-In (AUDIO2)	
Pin	**Signal Pin Definition**
1	GND_A
2	A_Z_MIC1-L
3	GND_A
4	A_Z_MIC1-R
5	A_MIC1-JD

2.12 HD Digital Audio Interface Digital (SPDIF1)

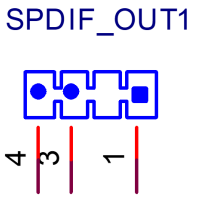


Table 2.11: HD Digital Audio Interface Digital (SPDIF1)	
Pin	**Signal Pin Definition**
1	+5V
2	NA
3	SPDIF OUT
4	GND

2.13 Front Panel Audio Header (FPAUD1)

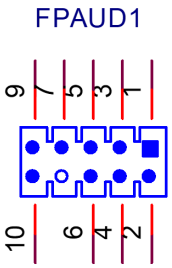


Table 2.12: Front Panel Audio Header (FPAUD1)			
Pin	**Signal**	**Pin**	**Signal**
1	A_z_MIC2-L	2	GND_A
3	A_z_MIC2-R	4	AFP_PRESEN#
5	A_z_LINE2-R	6	A_MIC2-JD
7	A_FIO_SENSE	8	NA
9	A_z_LINE2-L	10	A_LINE2-JD

2.14 Audio Amplifier Output Pin Header (AMP1)

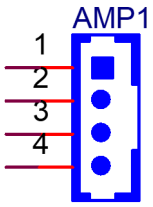


Table 2.13: Audio Amplifier Output Pin Header (AMP1)	
Pin	**Signal**
1	AMP OUT – R+
2	AMP OUT – R-
3	AMP OUT – L-
4	AMP OUT – L+

2.15 ATX 12V 4-Pin Power Connector (ATX12V1)

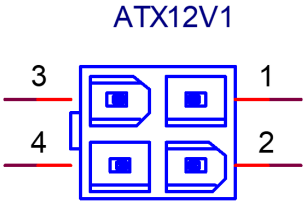


Table 2.14: ATX 12V 4-Pin Power Connector (ATX12V1)			
Pin	**Signal**	**Pin**	**Signal**
1	POWER	3	GND
2	POWER	4	GND

2.16 ATX-Supported 3-Pin Header on Board (ATX_5VSB1)

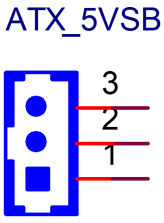


Table 2.15: ATX-Supported 3-Pin Header on Board (ATX_5VSB1)	
Pin	**Signal**
1	+5V_A_ATX
2	GND
3	SPS_PS_ON#

2.17 Serial ATA Interface Connector #1 (SATA1)

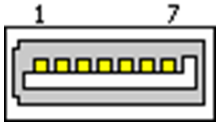


Table 2.16: Serial ATA Interface Connector #1 (SATA1)	
Pin	**Signal**
1	GND
2	TX+
3	TX-
4	GND
5	RX-
6	RX+
7	GND

2.18 Serial ATA Interface Connector #2 (SATA2)

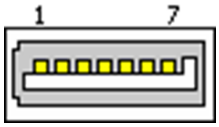


Table 2.17: Serial ATA Interface Connector #2 (SATA2)	
Pin	**Signal**
1	GND
2	TX+
3	TX-
4	GND
5	RX-
6	RX+
7	GND

2.19 Serial ATA Interface Power Connector (SATA_PWR1)

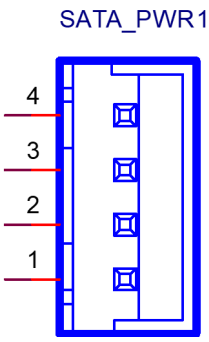


Table 2.18: Serial ATA Interface Power Connector (SATA_PWR1)	
Pin	**Signal**
1	+V5
2	GND
3	GND
4	+V12

2.20 EDP Connector / LVDS Connector (EDP1_LVDS1)

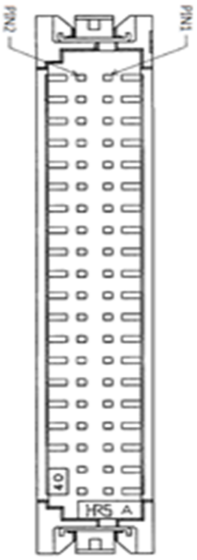


Table 2.19: EDP Connector / LVDS Connector (EDP1_LVDS1)			
LVDS1:			
Pin	**Signal**	**Pin**	**Signal**
1	VDD	2	VDD
3	GND	4	GND
5	VDD	6	VDD
7	LVDS_OD0-	8	LVDS_ED0-
9	LVDS_OD0+	10	LVDS_ED0+
11	GND	12	GND
13	LVDS_OD1-	14	LVDS_ED1-
15	LVDS_OD1+	16	LVDS_ED1+
17	GND	18	GND
19	LVDS_OD2-	20	LVDS_ED2-
21	LVDS_OD2+	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 (EDID_CLK)	32	N.C (EDID_DAT)
33	GND	34	GND

Table 2.19: EDP Connector / LVDS Connector (EDP1_LVDS1)			
35	LVDS_OD3-	36	LVDS_ED3-
37	LVDS_OD3+	38	LVDS_ED3+
39	N.C	40	LVDS VCON
EDP1:			
Pin	Signal	Pin	Signal
1	VDD	2	VDD
3	GND	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

2.21 EDP / LVDS Backlight Inverter Power Connector (INV1)

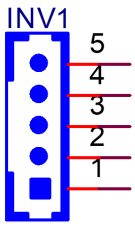


Table 2.20: EDP / LVDS Backlight Inverter Power Connector (INV1)	
Pin	**Signal**
1	+12V
2	GND
3	BKL EN
4	BKL CTRL
5	+5V

2.22 EDP Panel / LVDS Panel Voltage Selection (JEDP1_LVDS1)

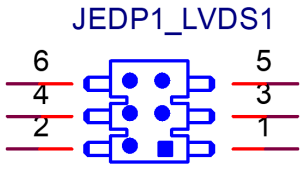


Table 2.21: EDP Panel / LVDS Panel Voltage Selection (JEDP1_LVDS1)			
Pin	**Signal**	**Pin**	**Signal**
1	NC	2	+5V
3	+12V	4	VDD
5	NC	6	+3.3V

2.23 PCI Express x4 Slot (PCIEX4_1)

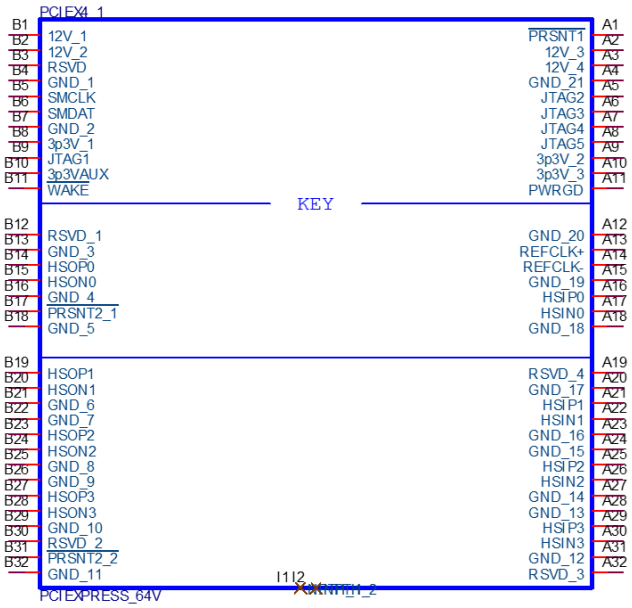


Table 2.22: PCI Express x4 Slot (PCIEX4_1)			
Pin	**Signal**	**Pin**	**Signal**
B1	+12V	A1	PRSNT1#
B2	+12V	A2	+12V
B3	+12V	A3	+12V
B4	GND	A4	GND
B5	SMB_CLK	A5	Reserved
B6	SMB_DATA	A6	Reserved
B7	GND	A7	Reserved
B8	+3.3V	A8	Reserved
B9	Reserved	A9	+3.3V
B10	+3.3VAUX	A10	+3.3V

Table 2.22: PCI Express x4 Slot (PCIEX4_1)			
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	GND
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

2.24 SPI BIOS Flash Socket (SPI1)

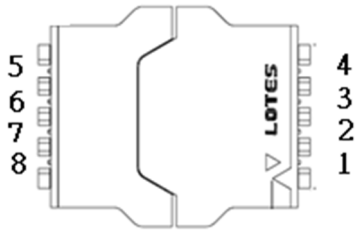


Table 2.23: SPI BIOS Flash Socket (SPI1)			
Pin	**Signal**	**Pin**	**Signal**
1	CS#	5	MOSI
2	MISO	6	SCLK
3	WP# / IO2	7	HOLD# / IO3
4	GND	8	+V3.3_SPI

2.25 M.2 E-Key Connector (M2_E1)

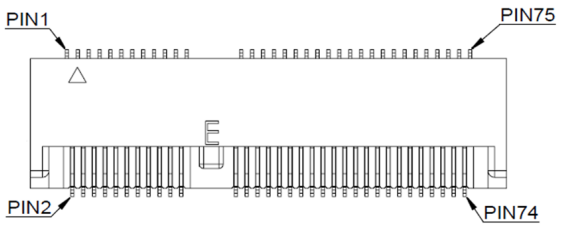


Table 2.24: M.2 E-Key Connector (M2_E1)

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

Table 2.24: M.2 E-Key Connector (M2_E1)			
73	CNV_WT_CLK+	74	+3.3V
75	GND		

2.26 M.2 B-Key Connector (M2_B1)

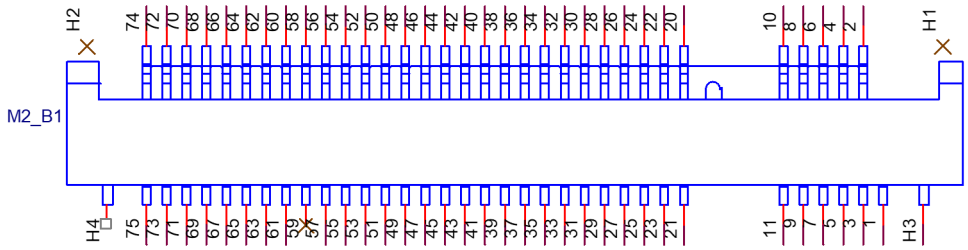


Table 2.25: M.2 B-Key Connector (M2_B1)			
Pin	**Signal Pin Definition**	**Pin**	**Signal Pin Definition**
1	M2B1_CONFIG_3	2	+V3.3_M2B1
3	GND	4	+V3.3_M2B1
5	GND	6	M2B1_POWER_OFF#_R
7	USB_M2B_D9+	8	M2B1_W_DISABLE#_R
9	USB_M2B_D9-	10	M2B1_LED1#
11	GND	20	NC
21	M2B1_CONFIG_0	22	NC
23	M2B1_WAKE_WWAN#	24	NC
25	M2B1_SAR_DPR_WWAN	26	M2B1_GNSS_DISABLE#_R
27	GND	28	NC
29	M2B_PCIe2_USB3_RX_N1	30	UIM_RESET
31	M2B_PCIe2_USB3_RX_P1	32	UIM_CLK
33	GND	34	UIM_DATA
35	M2B_PCIe2_USB3_TX_N1	36	UIM_PWR
37	M2B_PCIe2_USB3_TX_P1	38	M2B1_SATA_DEVSLP_R
39	GND	40	NC
41	M2B_PCIe1_SATA_RX_N0	42	NC
43	M2B_PCIe1_SATA_RX_P0	44	NC
45	GND	46	NC
47	M2B_PCIe1_SATA_TX_N0	48	NC
49	M2B_PCIe1_SATA_TX_P0	50	M2B1_PLTRST#
51	GND	52	M2B1_CLKREQ2#_R
53	M2B1_CLK-	54	M2B1_PCIE_WAKE#
55	M2B1_CLK+	56	NC
57	GND	58	NC
59	NC	60	NC
61	NC	62	NC
63	NC	64	NC
65	NC	66	NC
67	M2B1_RESET#_R	68	M2B1_SUSCLK

Table 2.25: M.2 B-Key Connector (M2_B1)			
69	M2B1_CONFIG_1	70	+V3.3_M2B1
71	GND	72	+V3.3_M2B1
73	GND	74	+V3.3_M2B1
75	M2B1_CONFIG_2		

2.27 USB 2.0 Front Panel Header (USB2_45)

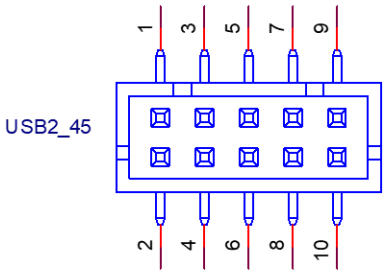


Table 2.26: USB 2.0 Front Panel Header (USB2_45)			
Pin	**Signal**	**Pin**	**Signal**
1	N.C	2	N.C
3	GND	4	GND
5	D+	6	D+
7	D-	8	D-
9	VBUS	10	VBUS

2.28 USB 2.0 Front Panel Header (USB2_67)

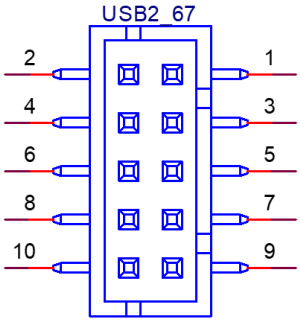


Table 2.27: USB 2.0 Front Panel Header (USB2_67)			
Pin	**Signal**	**Pin**	**Signal**
1	N.C	2	N.C
3	GND	4	GND
5	D+	6	D+
7	D-	8	D-
9	VBUS	10	VBUS

2.29 DDR5 SODIMM Socket A1 (DIMMA1)

Please refer to the JEDEC STANDARD.

2.30 DDR5 SODIMM Socket A1 (DIMMA1)

Please refer to the JEDEC STANDARD.

2.31 COM1 Connector (COM1)

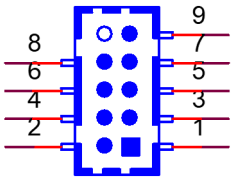


Table 2.28: COM1 Connector (COM1)

Pin	Signal	Pin	Signal
1	DCD#	2	SIN
3	SOUT	4	DTR
5	GND	6	DSR#
7	RTS#	8	CTS#
9	RI		

2.32 COM2 Connector (COM2)

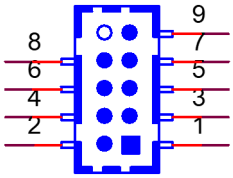


Table 2.29: COM2 Connector (COM2)

Pin	Signal	Pin	Signal
1	DCD#	2	SIN
3	SOUT	4	DTR
5	GND	6	DSR#
7	RTS#	8	CTS#

2.33 COM3 Connector (COM3)

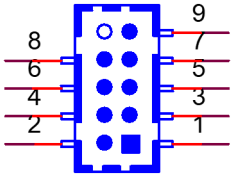


Table 2.30: COM3 Connector (COM3)			
Pin	**Signal**	**Pin**	**Signal**
1	DCD#	2	SIN
3	SOUT	4	DTR
5	GND	6	DSR#
7	RTS#	8	CTS#

2.34 COM4 Connector (COM4)

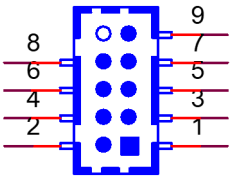


Table 2.31: COM4 Connector (COM4)			
Pin	**Signal**	**Pin**	**Signal**
1	DCD#	2	SIN
3	SOUT	4	DTR
5	GND	6	DSR#
7	RTS#	8	CTS#

2.35 COM1 RI# Selection Pin Header (JSETCOM1_V1)

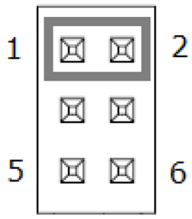


Table 2.32: COM1 RI# Selection Pin Header (JSETCOM1_V1)			
Pin	**Signal**	**Pin**	**Signal**
1	RI# [1]	2	Advantech defined
3	Advantech defined	4	+5V
5	+12V	6	Advantech defined

2.36 8-Bit General Purpose I/O Pin Header (GPIO1)

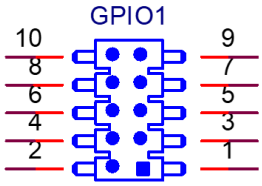


Table 2.33: 8-Bit General Purpose I/O Pin Header (GPIO1)			
Pin	**Signal**	**Pin**	**Signal**
1	GPIO0	2	GPIO4
3	GPIO1	4	GPIO5
5	GPIO2	6	GPIO6
7	GPIO3	8	GPIO7
9	VCC_GPIO	10	GND

2.37 CPU FAN Connector (CPUFAN1)

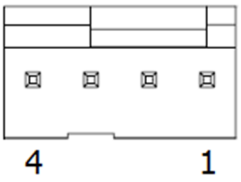


Table 2.34: CPU FAN Connector (CPUFAN1)	
Pin	**Signal**
1	GND
2	CPU FAN VCC
3	CPU FAN SPEED
4	CPU FAN PWM

2.38 SYS FAN Connector#1 (SYSFAN1)

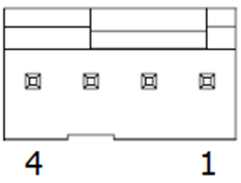


Table 2.35: SYS FAN Connector#1 (SYSFAN1)	
Pin	**Signal**
1	GND
2	SYS FAN VCC
3	SYS FAN SPEED
4	SYS FAN PWM

2.39 CMOS Battery Connector (BAT1)

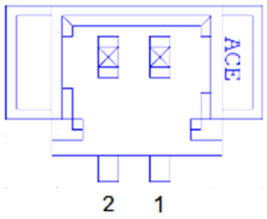


Table 2.36: CMOS Battery Connector (BAT1)	
Pin	Signal
1	+VBAT
2	GND

2.40 PWRBTN# / RESET# /HDD LED / SM Bus (JPF1)

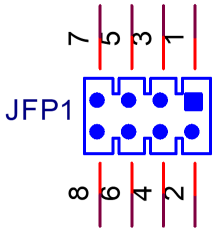


Table 2.37: PWRBTN# / RESET# /HDD LED / SM Bus (JPF1)			
Pin	**Signal**	**Pin**	**Signal**
1	HDD_LED+	2	PWRBTN#
3	HDD_LED-	4	GND
5	SMB_DAT	6	SYS_RESET#
7	SMB_CLK	8	GND

2.41 Power LED Pin Header (JFP2)

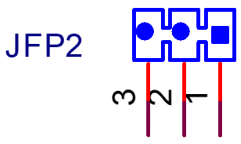


Table 2.38: Power LED Pin Header (JFP2)	
Pin	**Signal**
1	PWR_LED+
2	N.C.
3	PWR_LED-

2.42 LED Port 80 Connector (LED_P80)

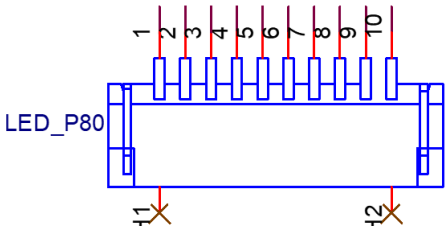


Table 2.39: LED Port 80 Connector (LED_P80)

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	SIO_DGH0#
10	SIO_DGL0#

2.43 CMOS Mode Selection (JCMOS1)

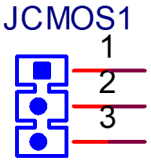


Table 2.40: CMOS Mode Selection (JCMOS1)

Pin	Signal
1	NC
2	RTCRST#
3	GND

2.44 AT / ATX Mode Selection (PSON1)

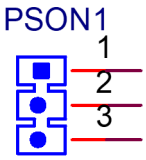


Table 2.41: AT / ATX Mode Selection (PSON1)	
Pin	**Signal**
1	AT
2	+3.3V
3	ATX

2.45 Case Open Connector (JCASE1)

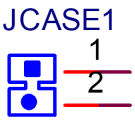


Table 2.42: Case Open Connector (JCASE1)	
Pin	**Signal**
1	Case Open
2	GND

2.46 IMVP9.1 Programming Header (VR_PMB1)

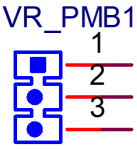


Table 2.43: IMVP9.1 Programming Header (VR_PMB1)	
Pin	**Signal**
1	VR_SDATA
2	GND
3	VR_SCLK

2.47 SIM Card Connector (SIM1)

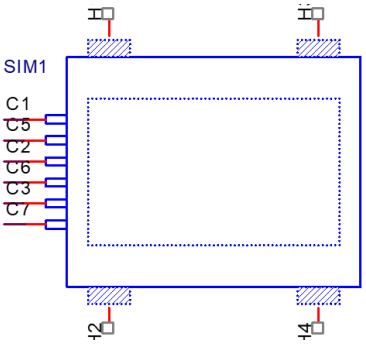


Table 2.44: SIM Card Connector (SIM1)

Pin	Signal	Pin	Signal
C1	VCC	C5	GND
C2	RST	C6	VPP
C3	CLK	C7	IO

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-289 setup screens.

3.2 BIOS Setup

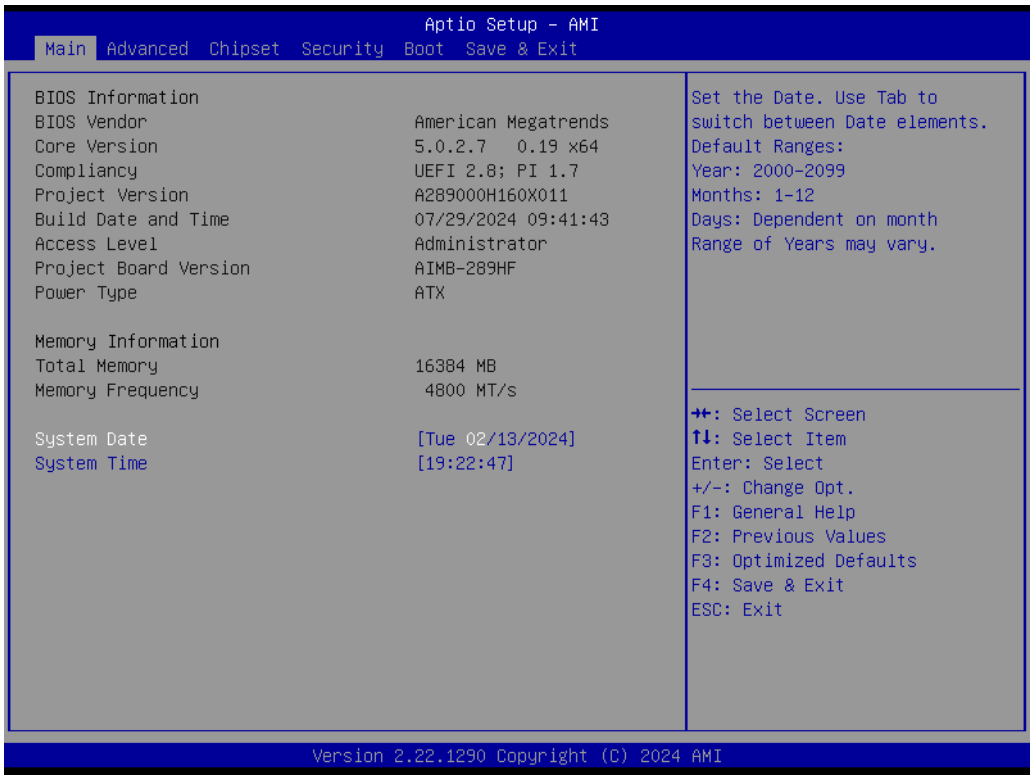
The AIMB-289 Series system has AMI BIOS built in, with a CMOS SETUP utility that allows users to configure required settings or to activate certain system features. The CMOS SETUP saves the configuration in the CMOS RAM of the motherboard. When the power is turned off, the battery on the board supplies 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 the AMI BIOS CMOS Setup Utility, the Main Menu will appear on the screen. Use the arrow keys to select among the items and press <Enter> to accept or enter the sub-menu.



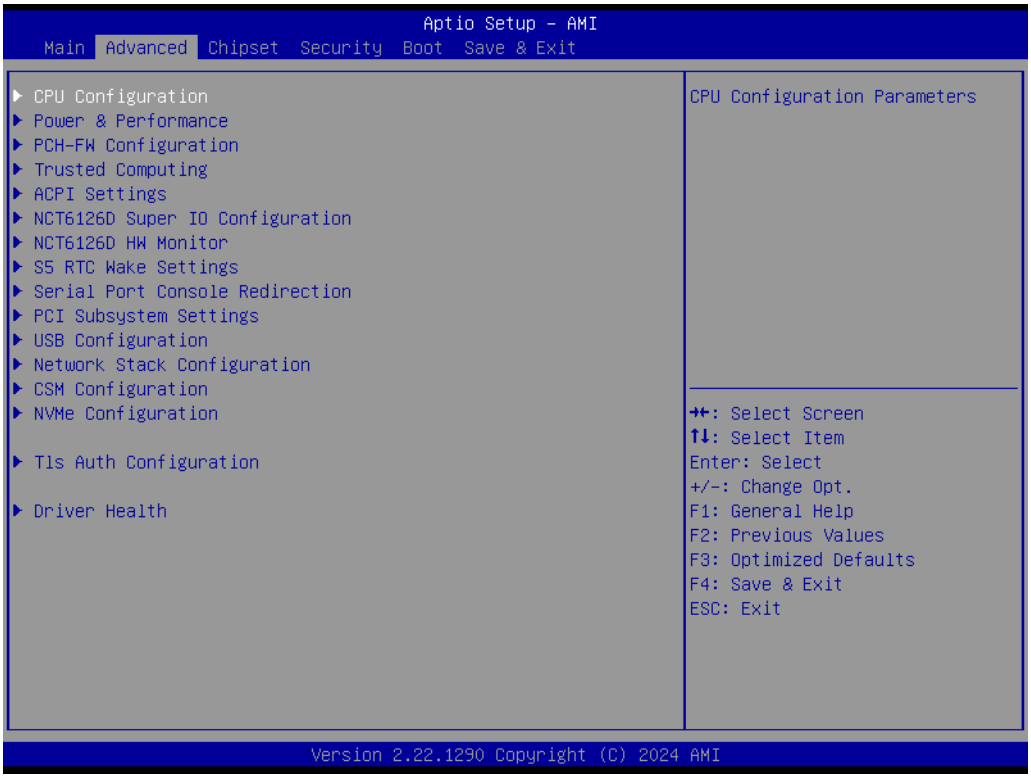
The Main BIOS setup screen has two main frames. The left frame displays all the options that can be configured. Grayed-out options cannot be configured; options in blue can. The right frame displays the key legend.

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.

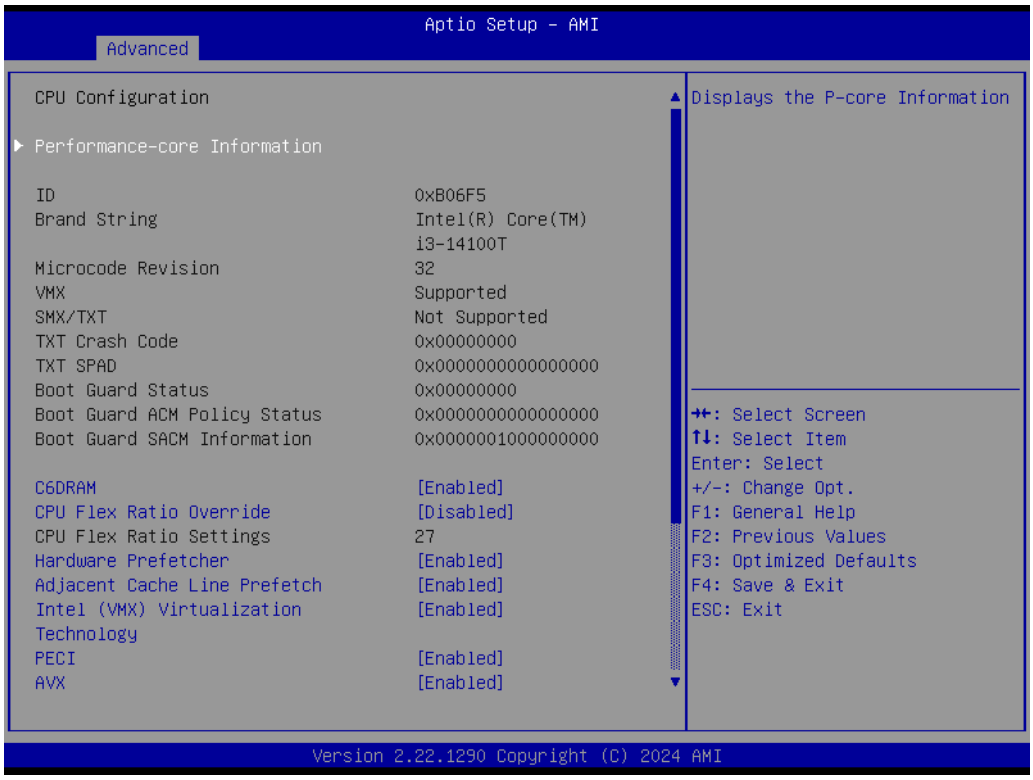
3.2.2 Advanced BIOS Features

Select the Advanced tab from the AIMB-289 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.



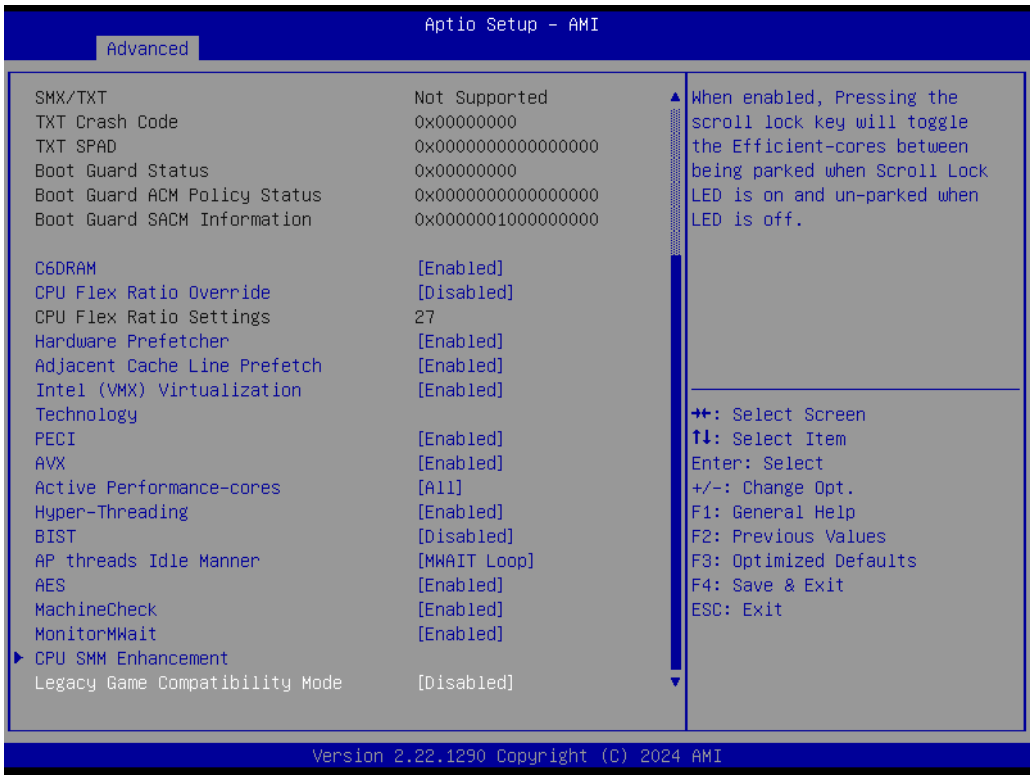
3.2.2.1 CPU Configuration

Advanced → CPU Configuration



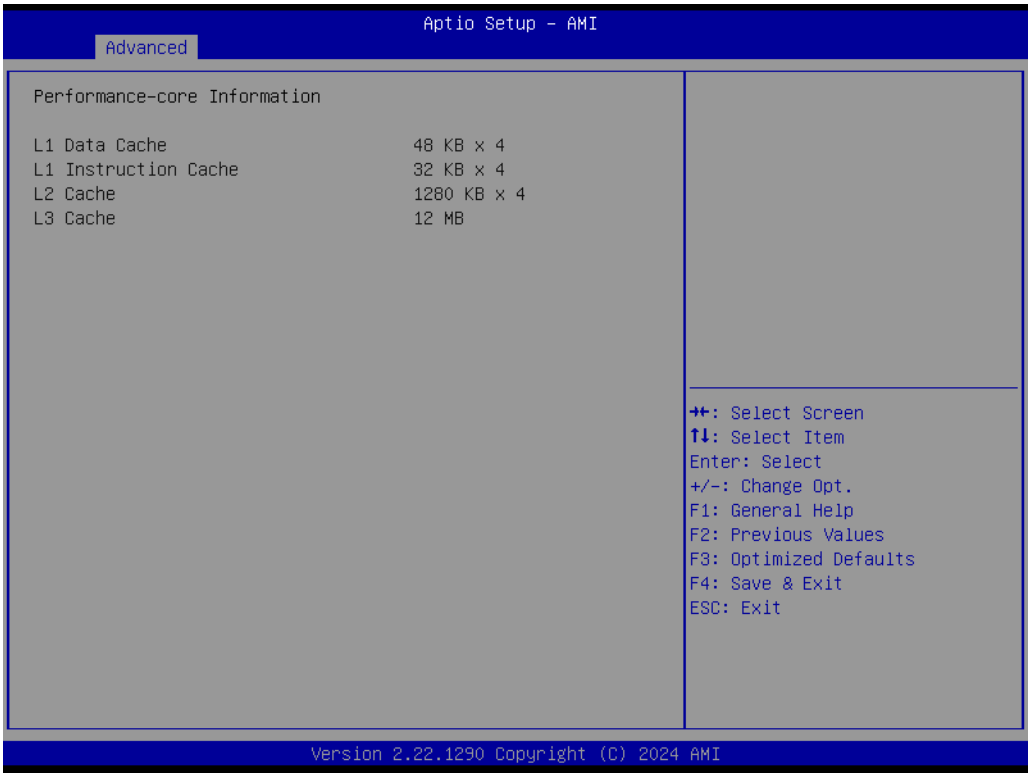
Efficient-Core Information

Advanced → CPU Configuration → Efficient-Core Information



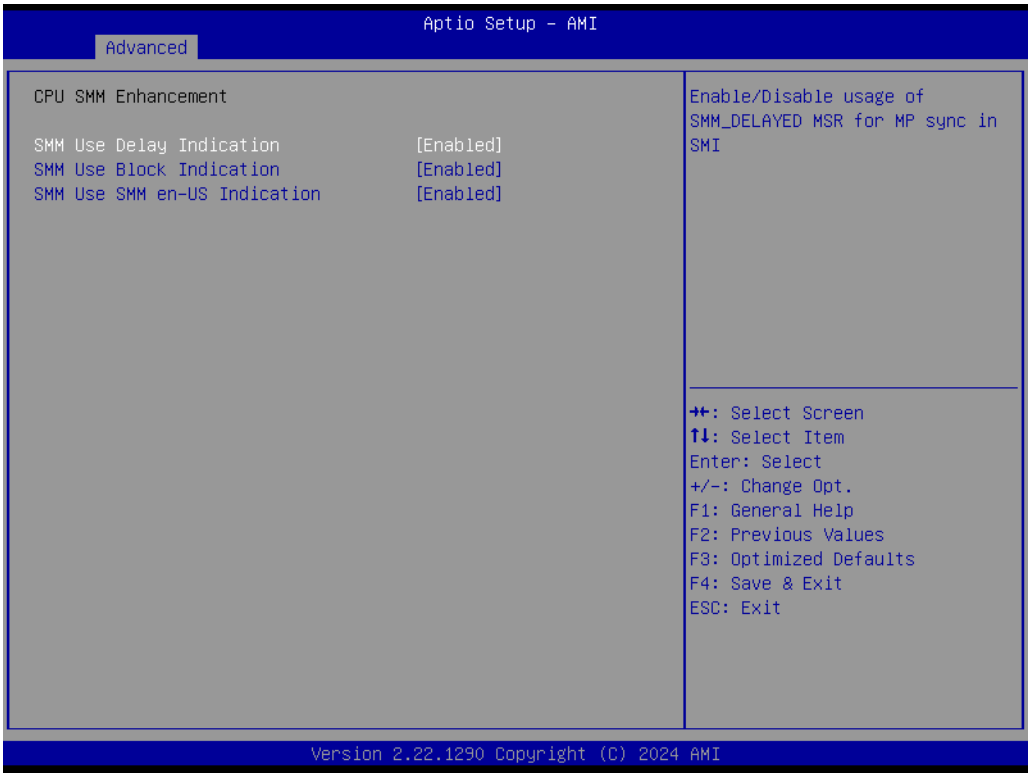
Performance-Core Information

Advanced → CPU Configuration → Performance-Core Information



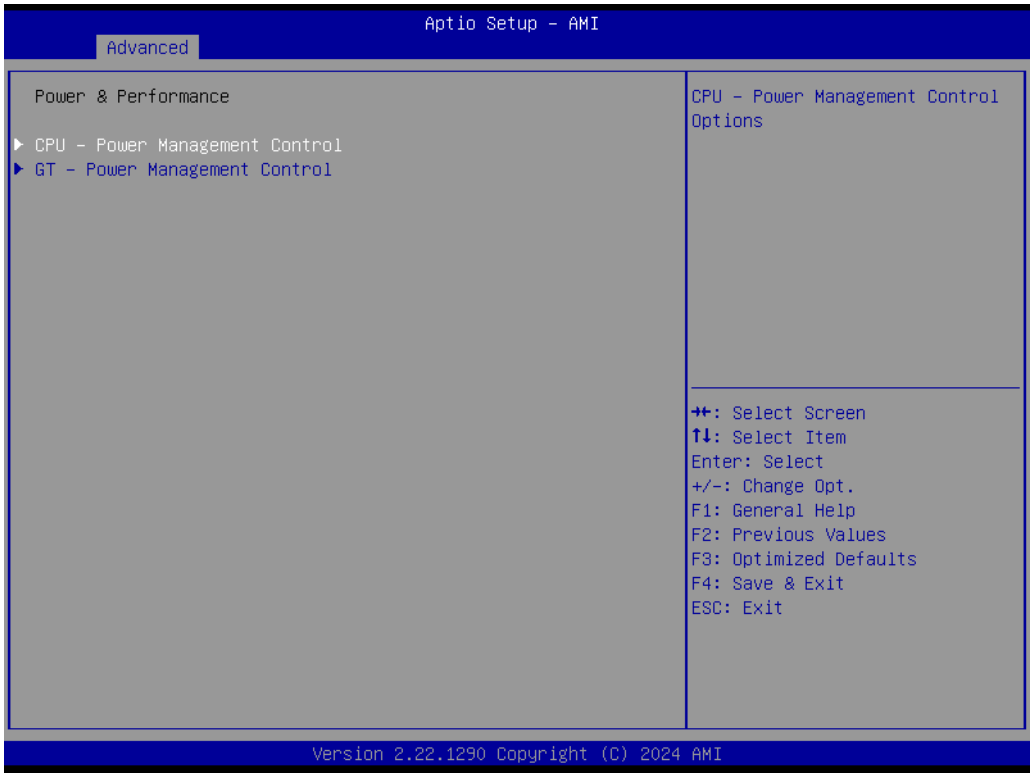
CPU SMM Enhancement

Advanced → CPU SMM Enhancement



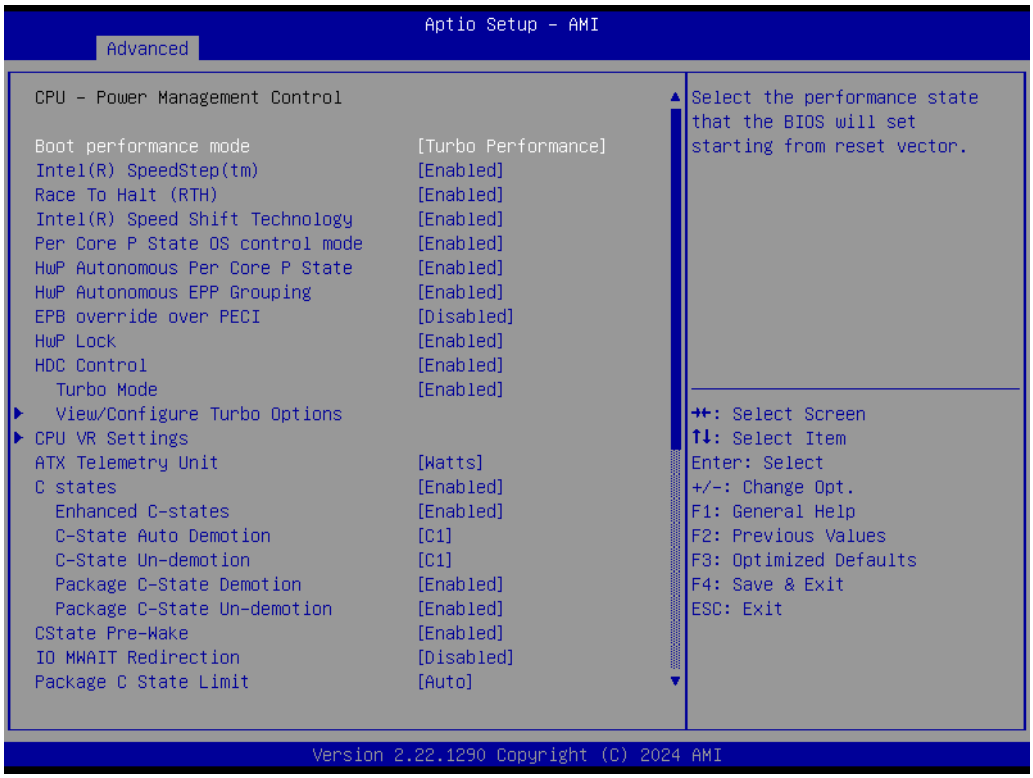
3.2.2.2 Power & Performance

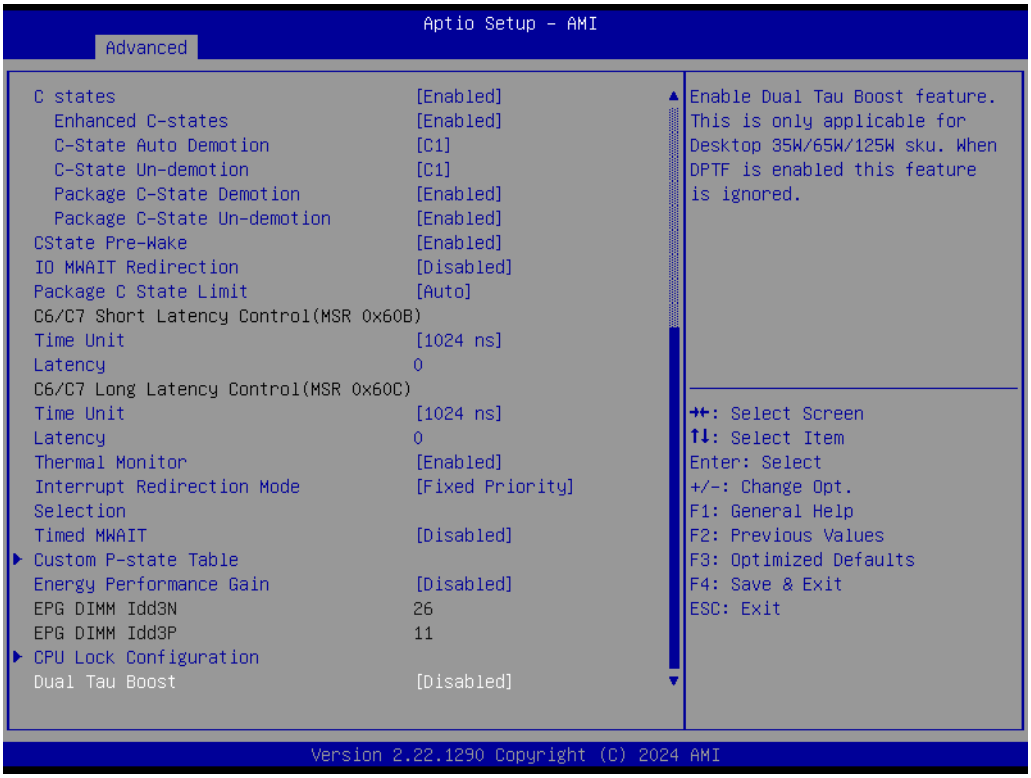
Advanced → Power & Performance



CPU - Power Management Control

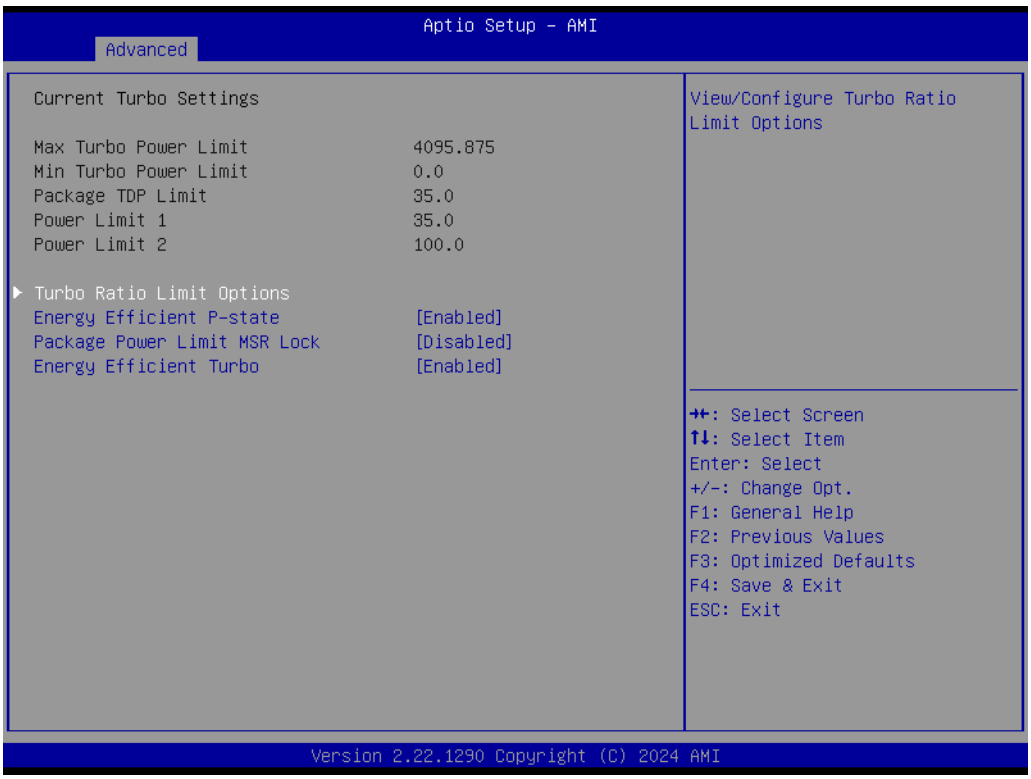
Advanced → Power & Performance → CPU - Power Management Control





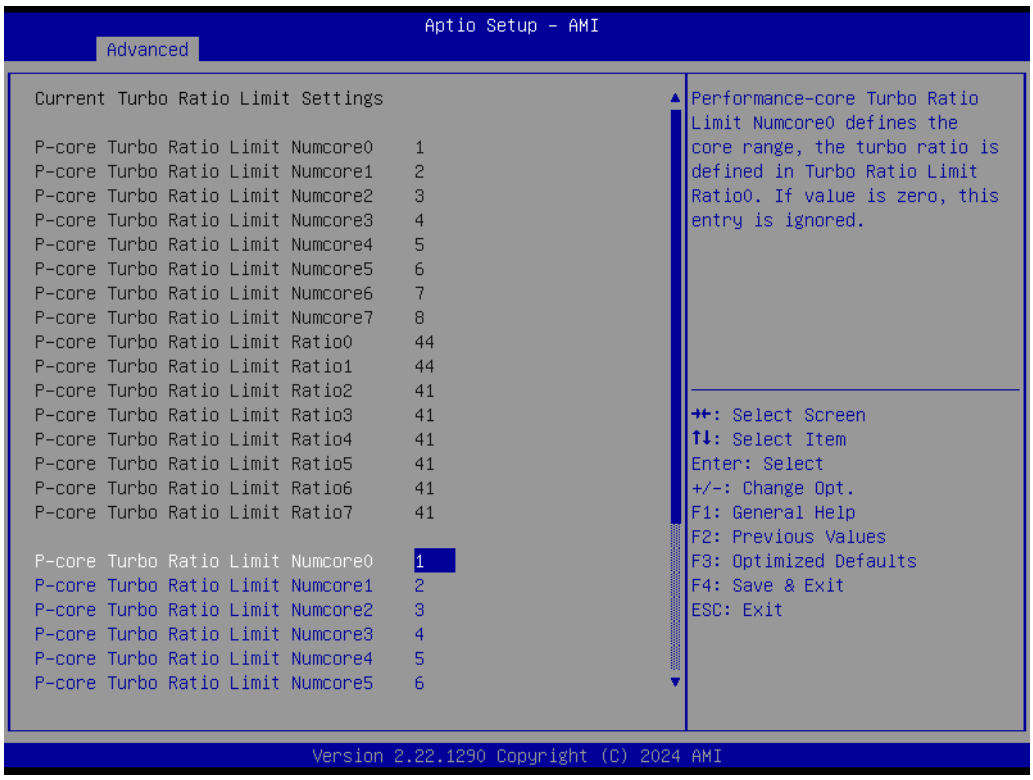
Current Turbo Settings

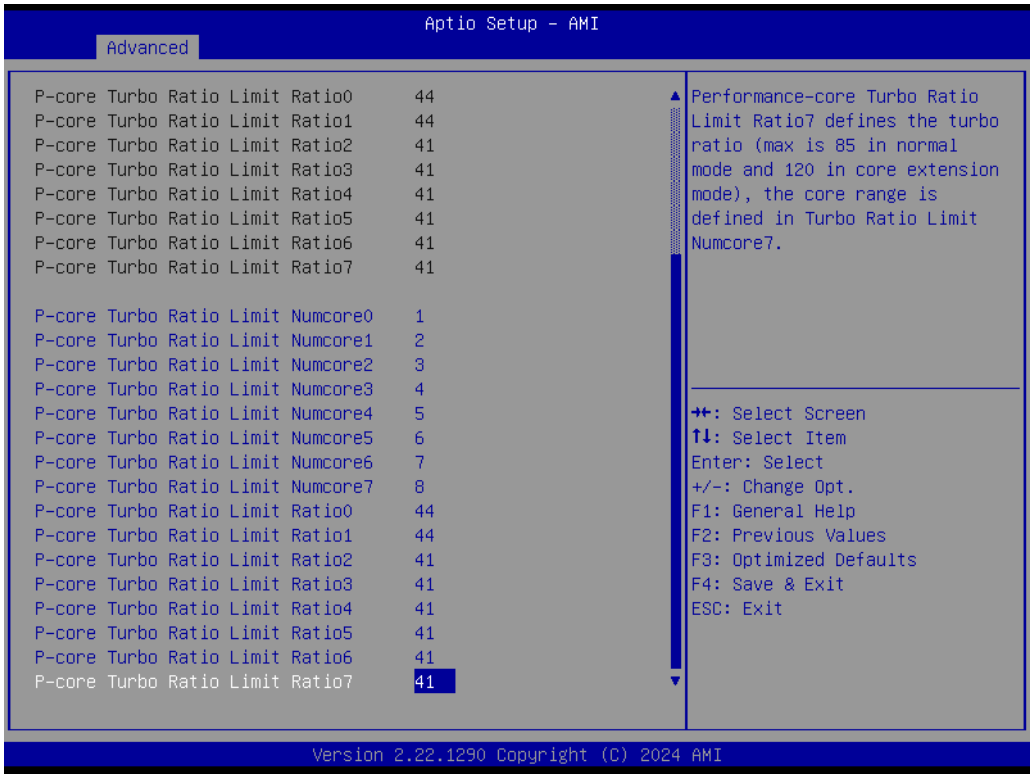
Advanced → Power & Performance → CPU - Power Management Control → View/ Configure Turbo Option



Turbo Ratio Limit Options

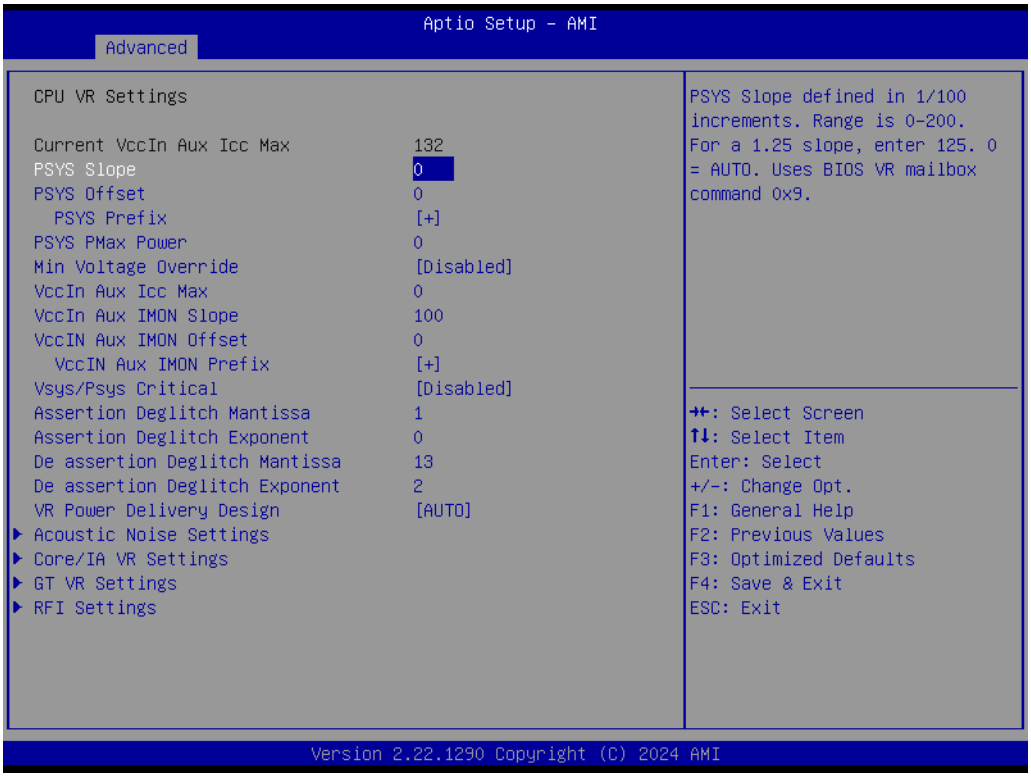
Advanced → Power & Performance → CPU – Power Management Control → View/ Configure Turbo Option → Turbo Ratio Limit Options





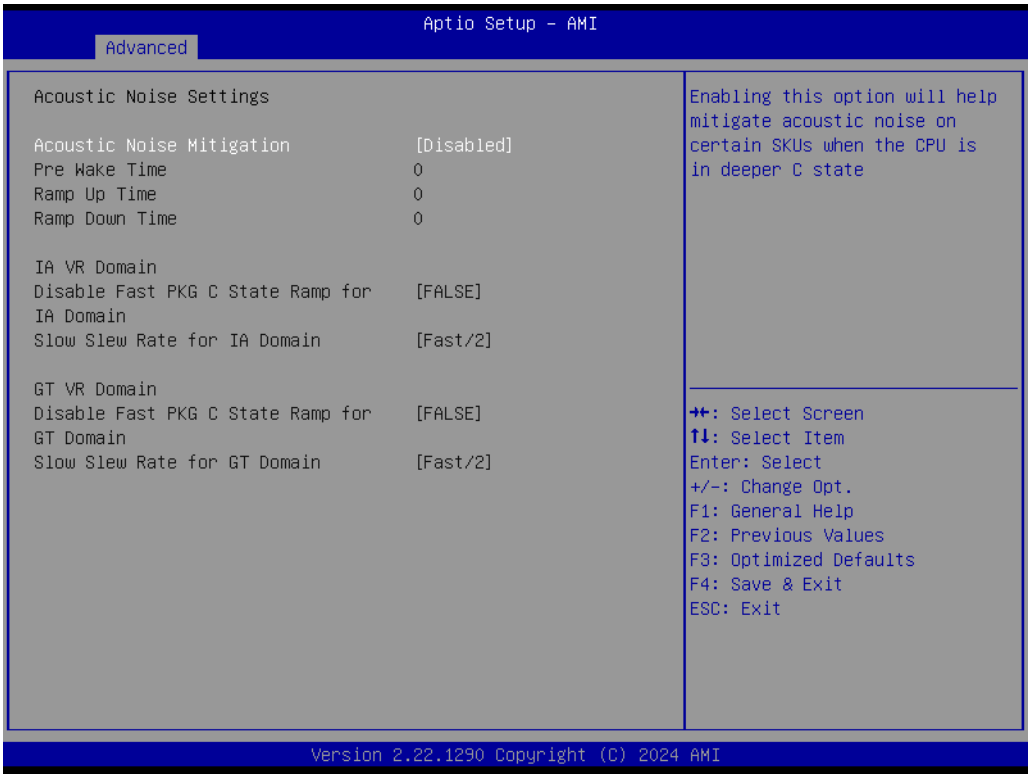
CPU VR Settings

Advanced → Power & Performance → CPU - Power Management Control → CPU VR Settings



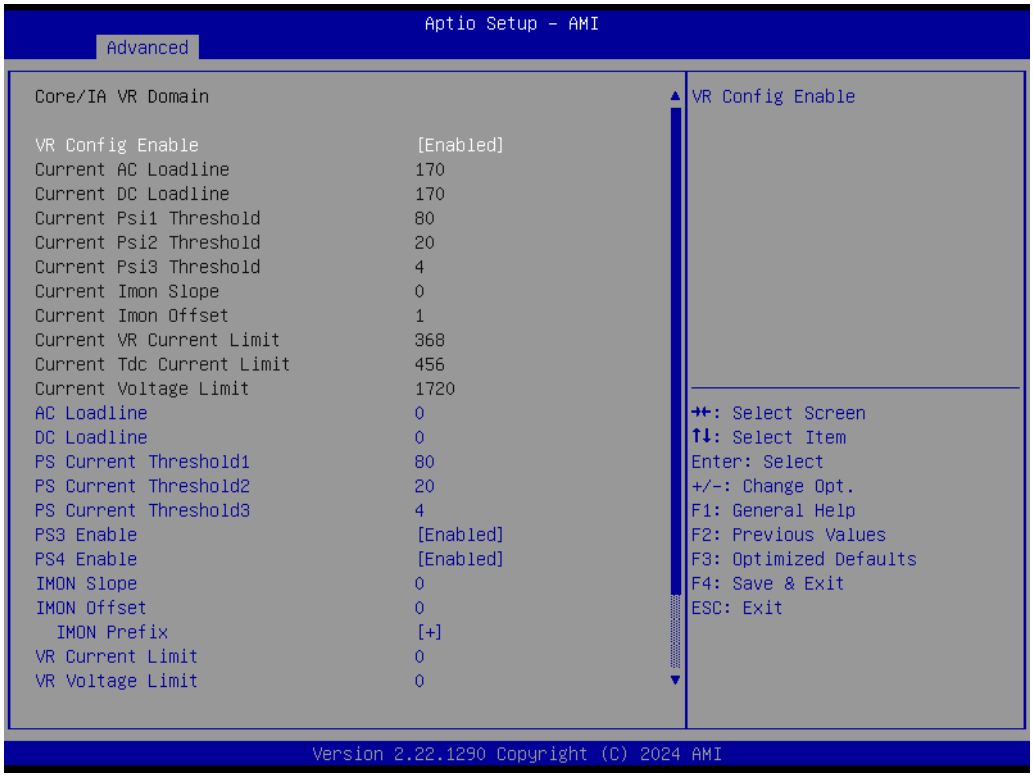
Acoustic Noise Settings

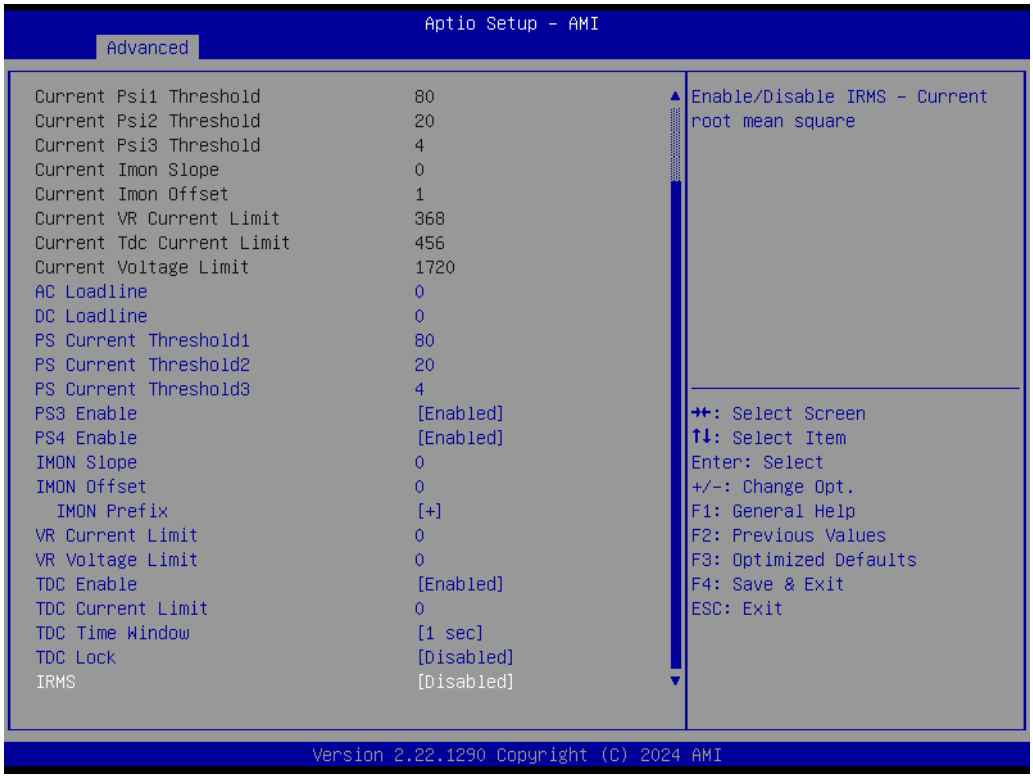
Advanced → Power & Performance → CPU - Power Management Control → CPU VR Settings → Acoustic Noise Settings



Core/IA VR Settings

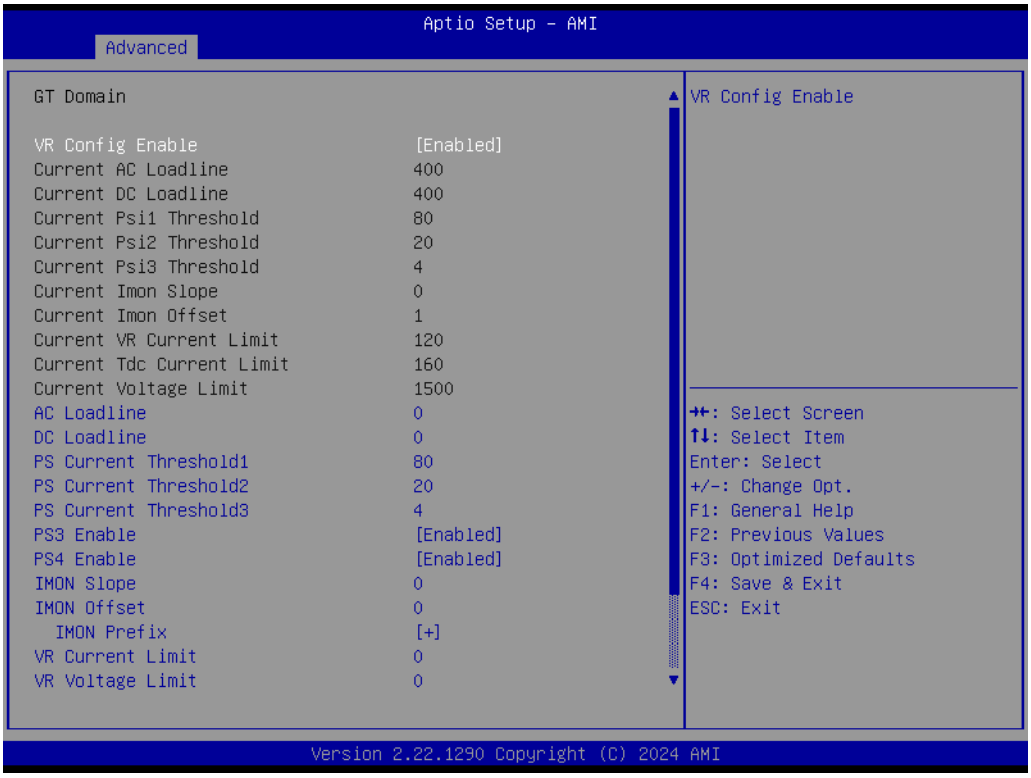
Advanced → Power & Performance → CPU - Power Management Control → CPU VR Settings → Core/IA Settings

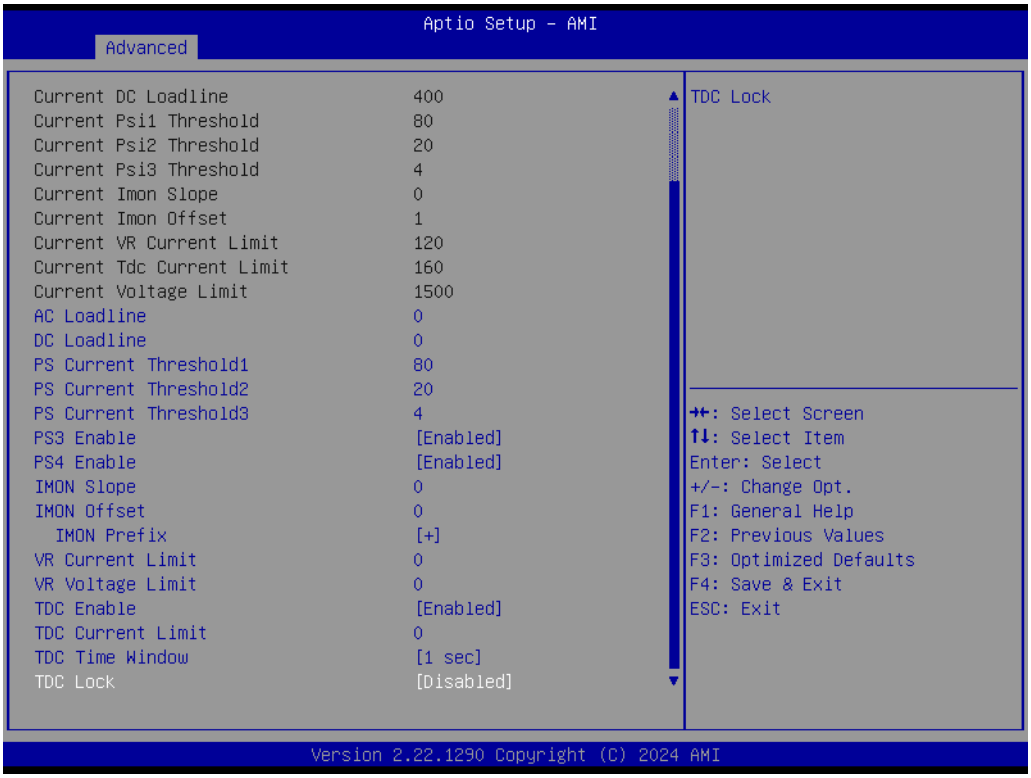




GT VR Settings

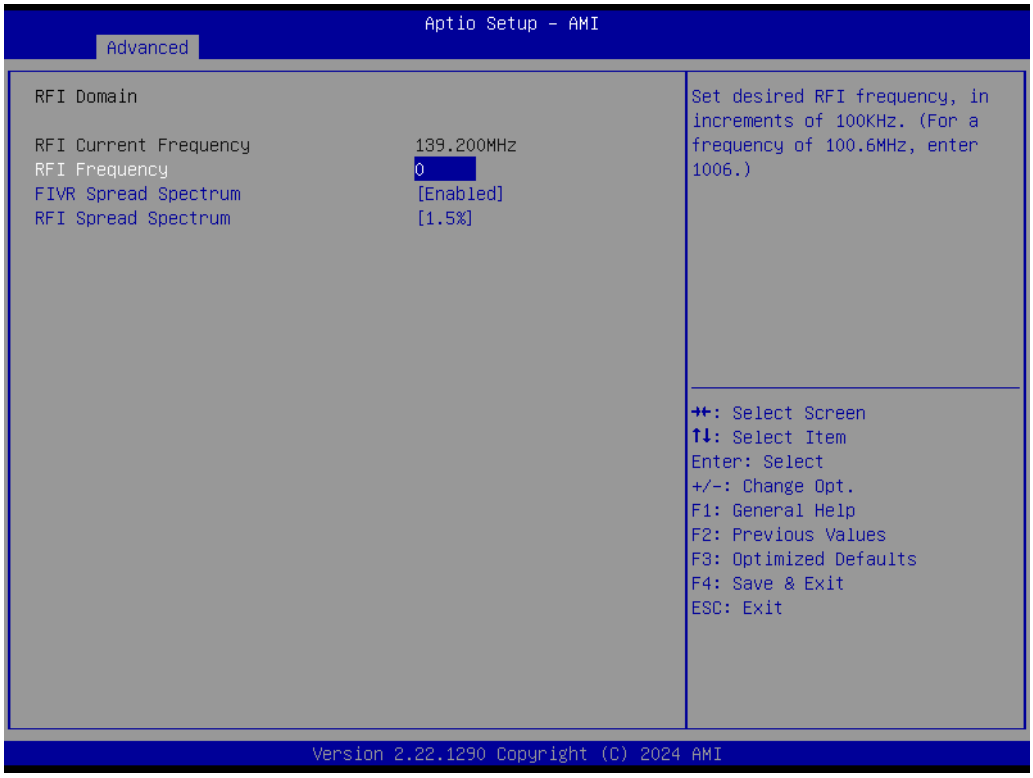
Advanced → Power & Performance → CPU - Power Management Control → CPU VR Settings → GT VR Settings





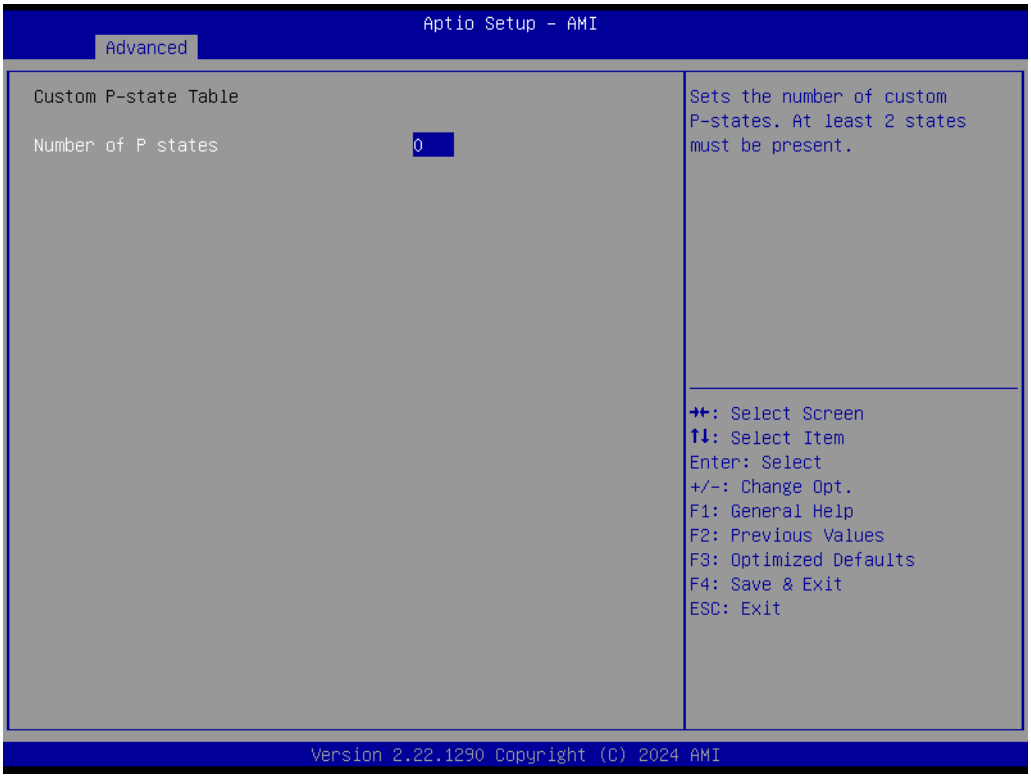
RFI Settings

Advanced → Power & Performance → CPU - Power Management Control → CPU VR Settings → RFI Settings



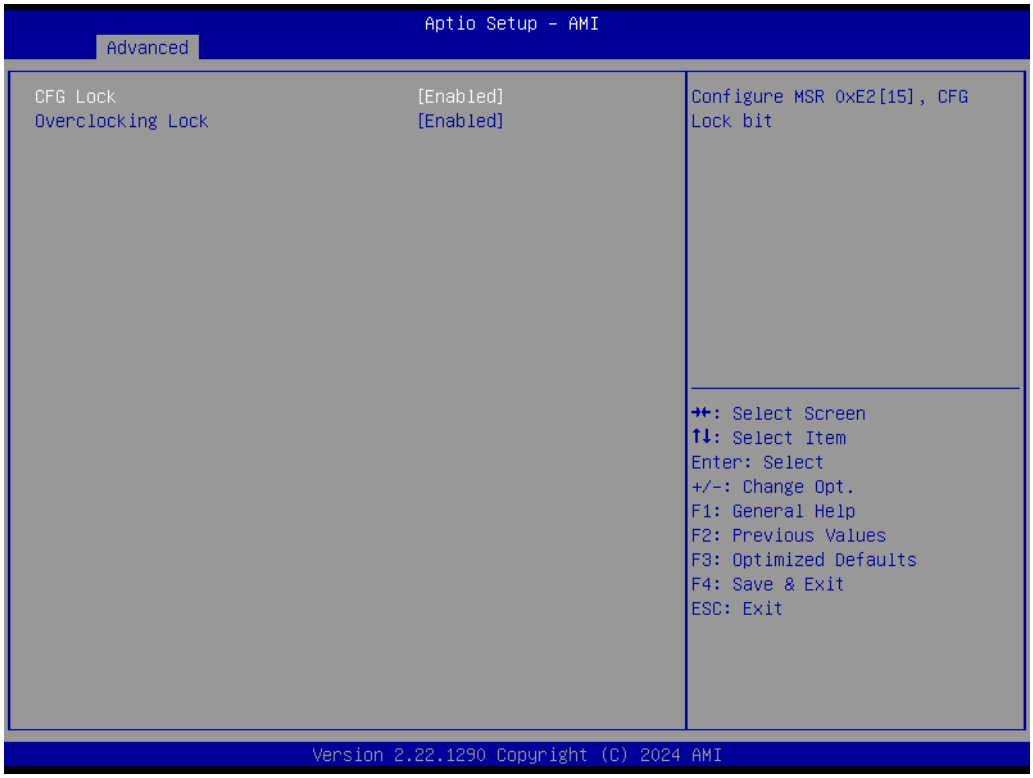
Custom P-State Table

Advanced → Power & Performance → CPU - Power Management Control → Custom P-State Table



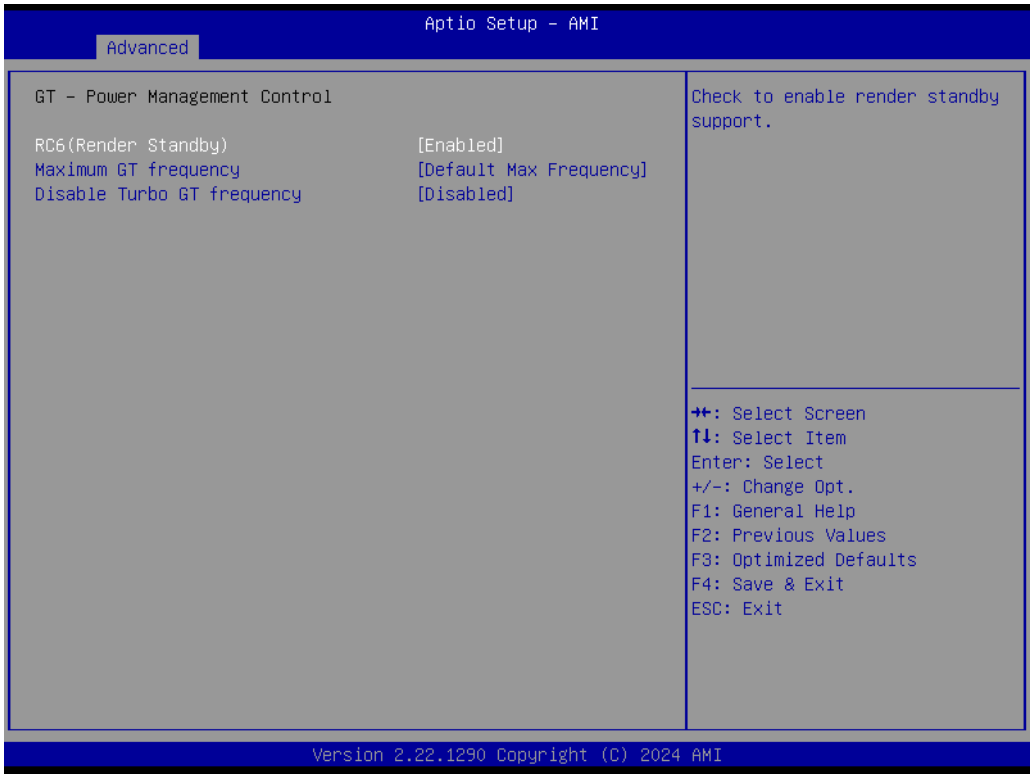
CPU Lock Configuration

Advanced → Power & Performance → CPU - Power Management Control → CPU Lock Configuration



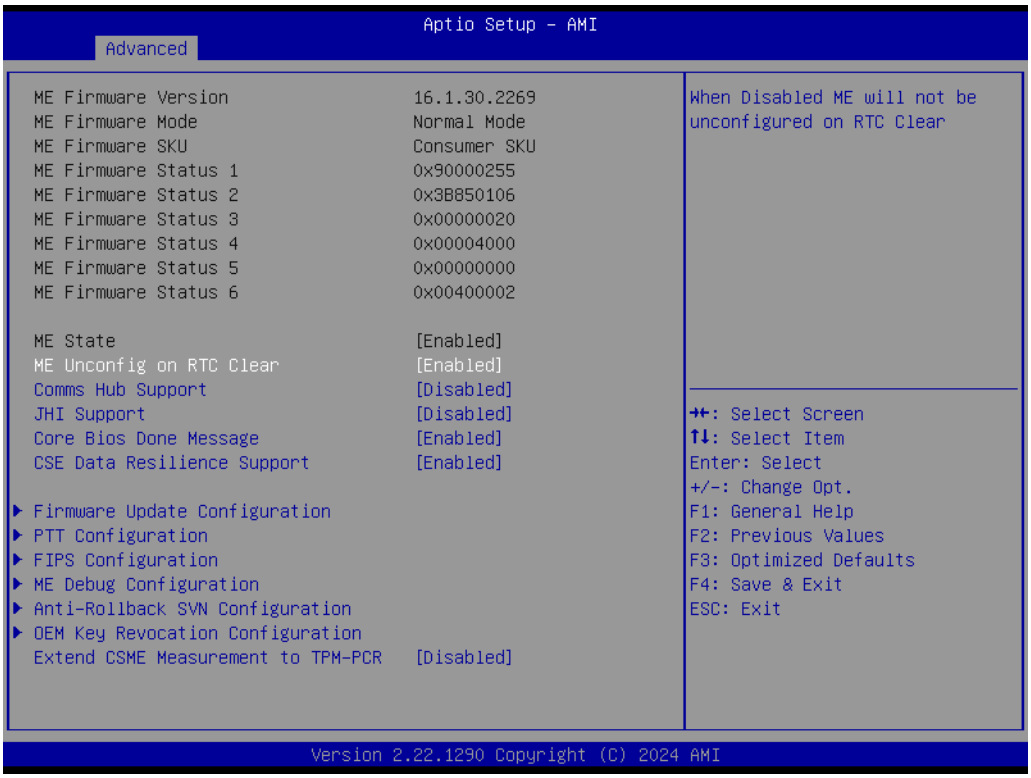
GT - Power Management Control

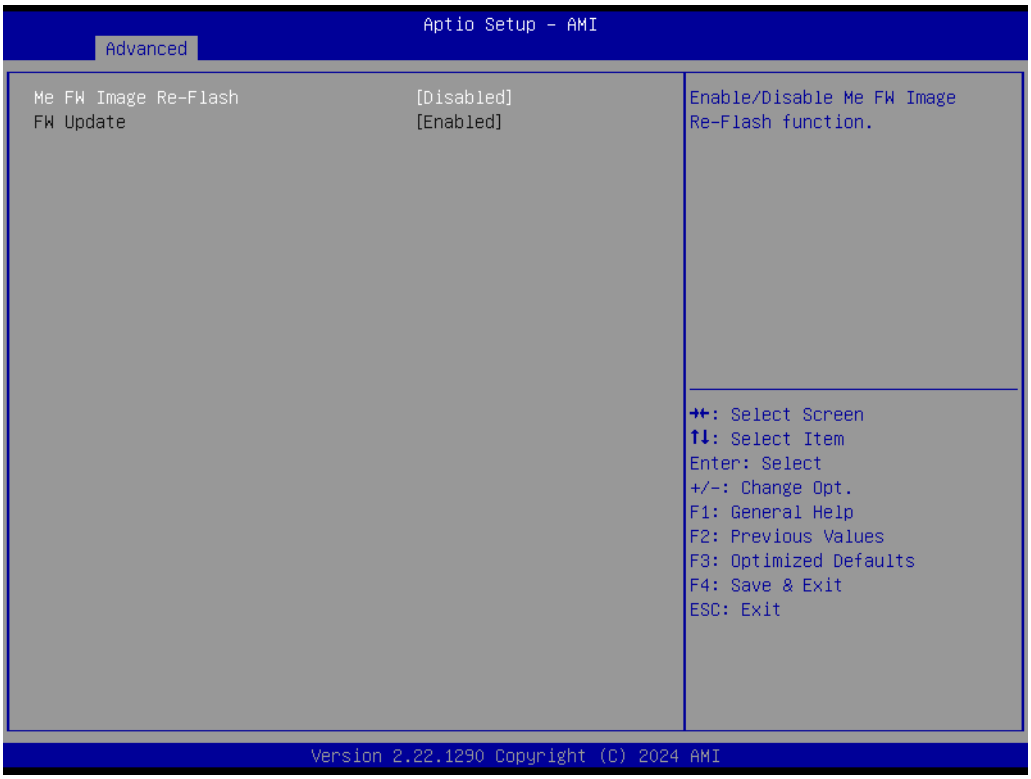
Advanced → Power & Performance → GT - Power Management Control



3.2.2.3 PCH-FW Configuration

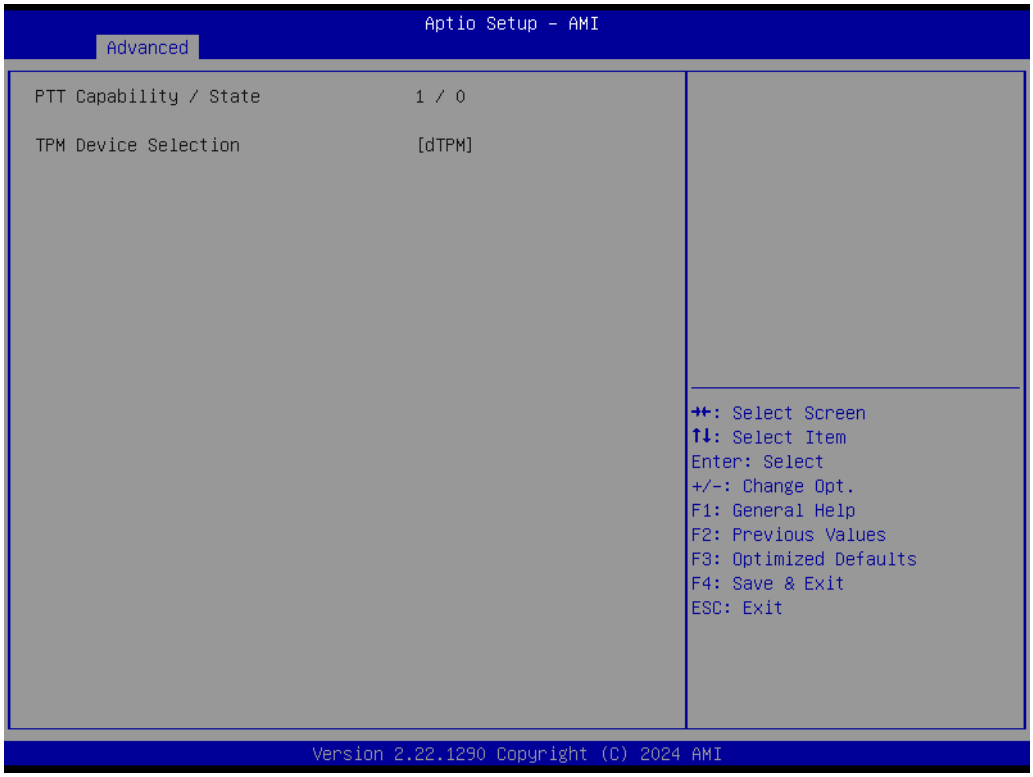
Advanced → PCH-FW Configuration





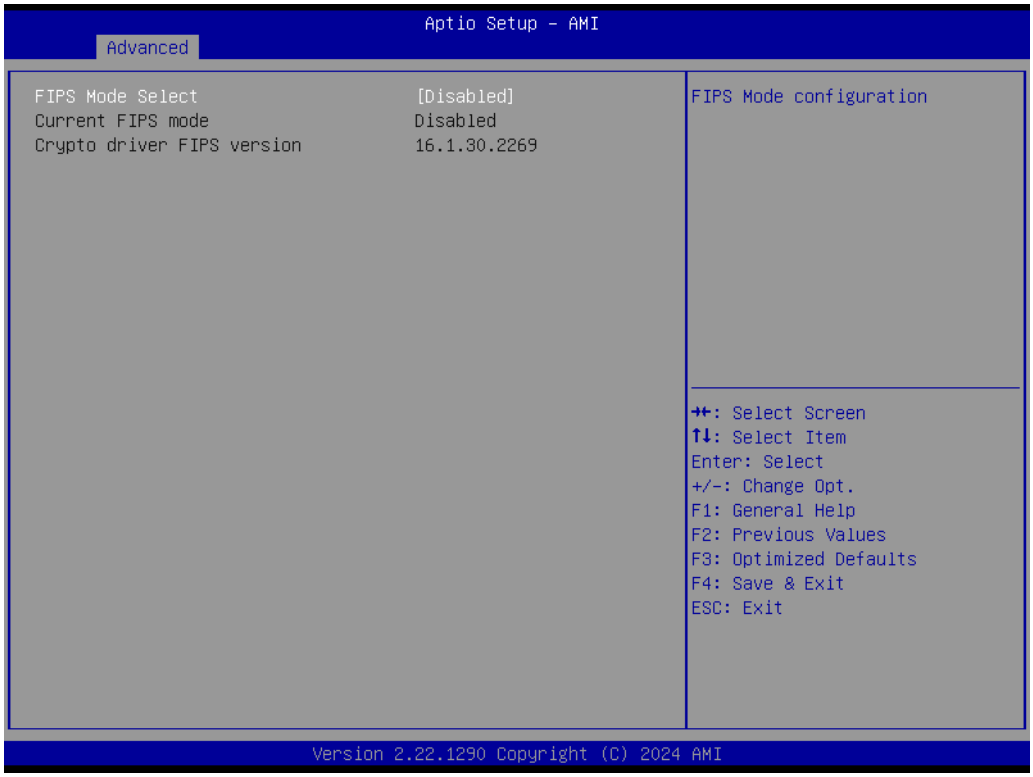
3.2.2.4 AMT Configuration

Advanced → PCH-FW Configuration → AMT Configuration



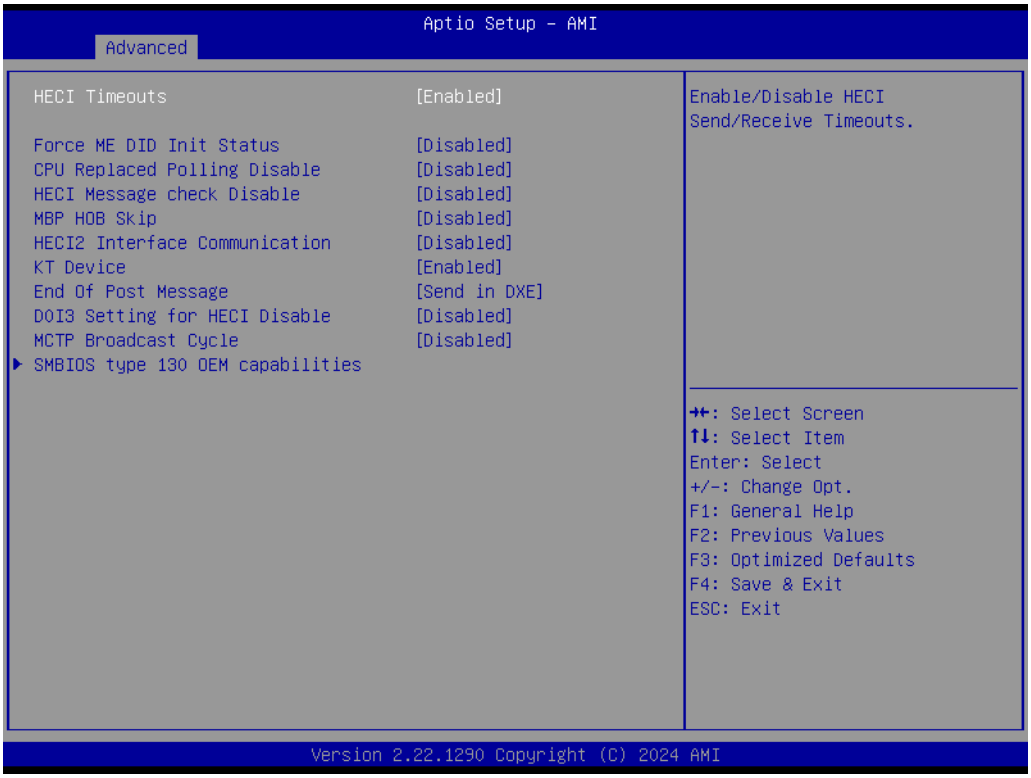
AMT Configuration

Advanced → PCH-FW Configuration → AMT Configuration → ASF Configuration



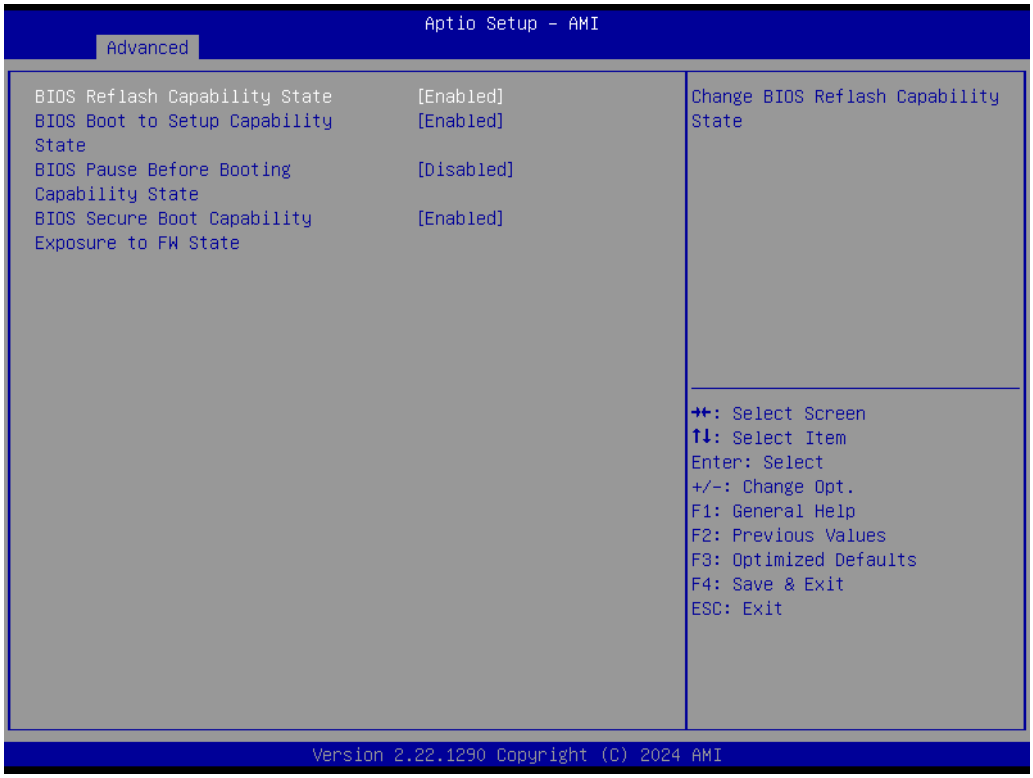
Secure Erase Configuration

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



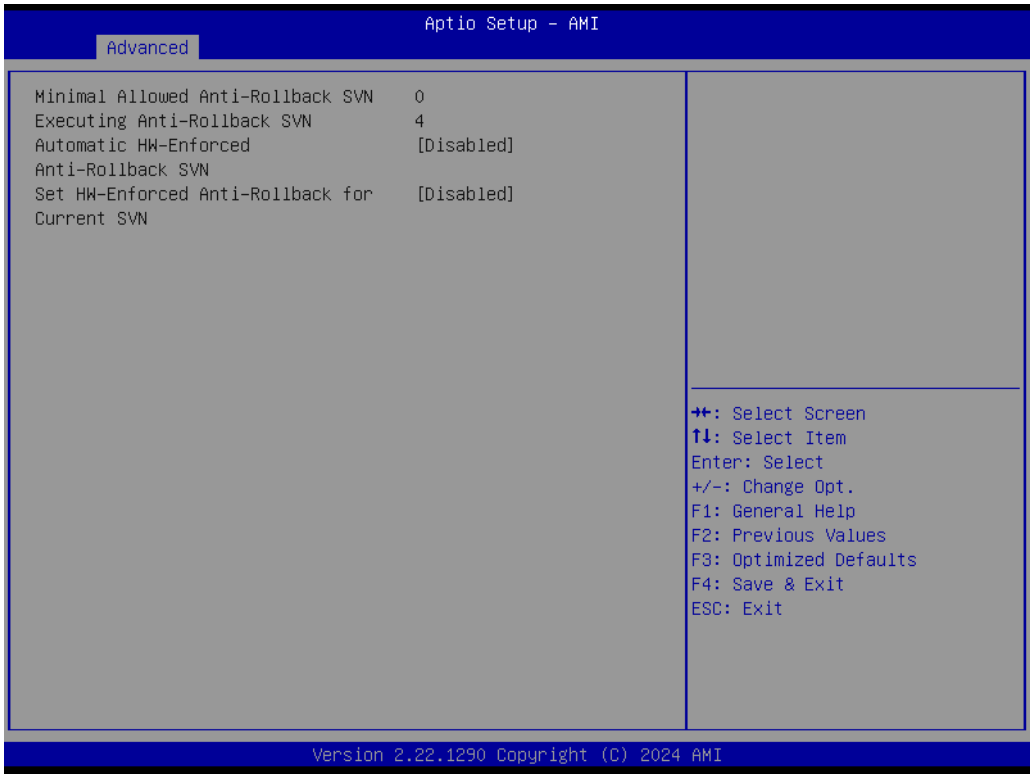
One Click Recovery(ORC) Configuration

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



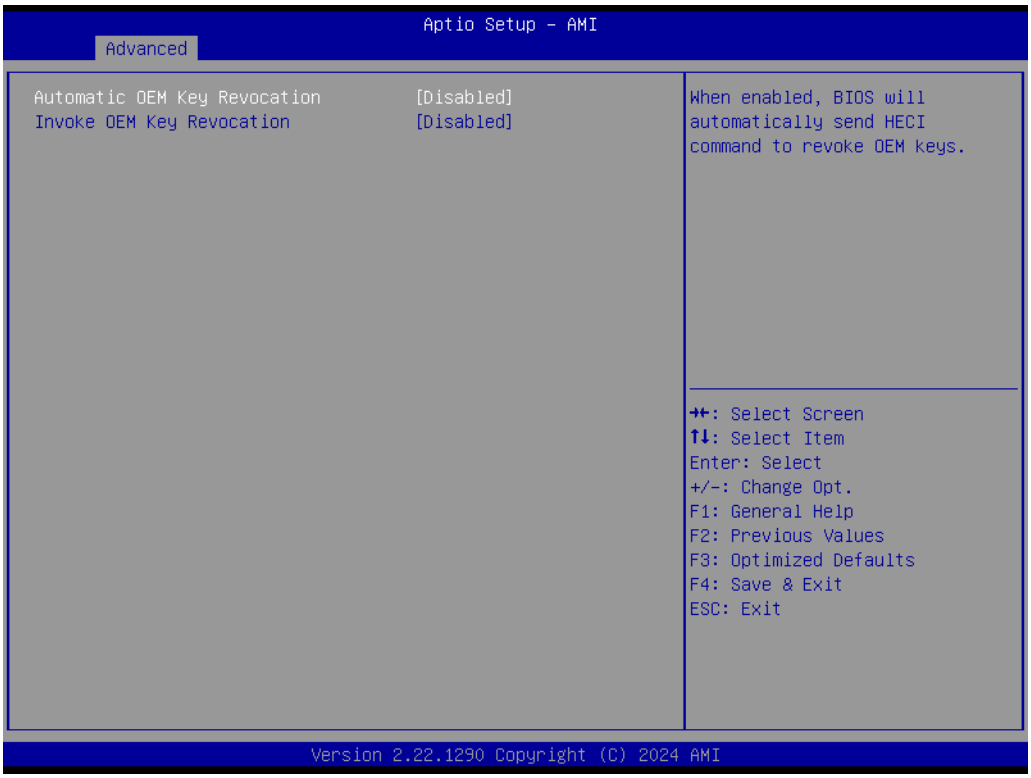
Firmware Update Configuration

Advanced → PCH-FW Configuration → Firmware Update Configuration



PTT Configuration

Advanced → PCH-FW Configuration → PTT Configuration

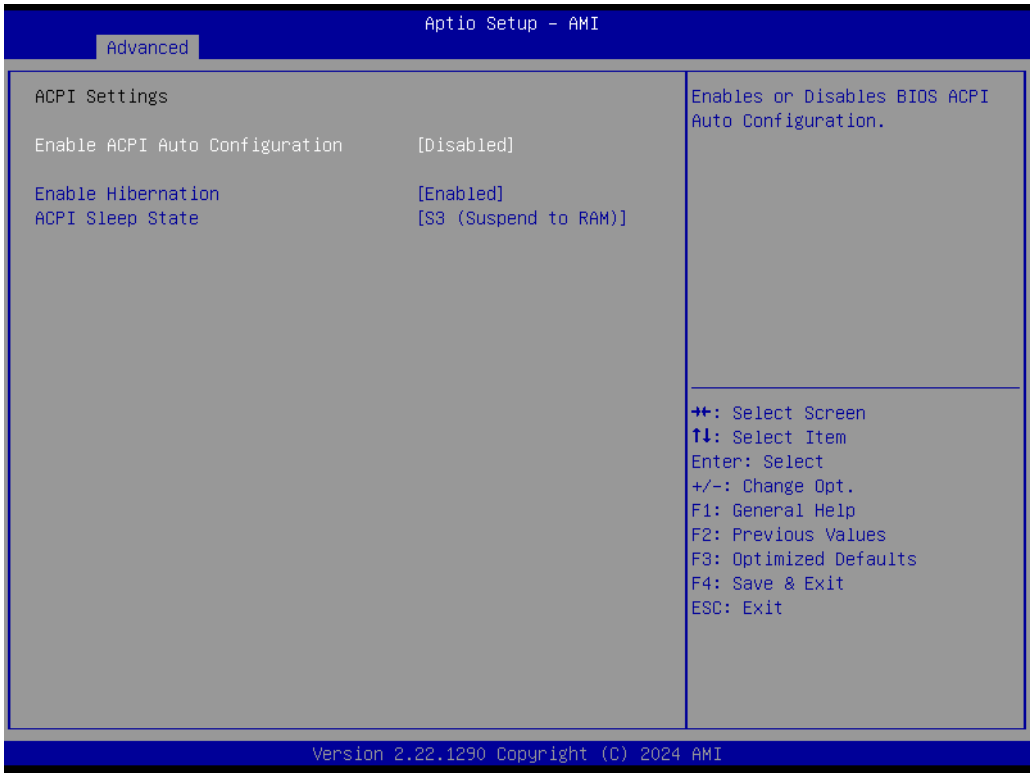


FIPS Configuration

Advanced → PCH-FW Configuration → FIPS Configuration

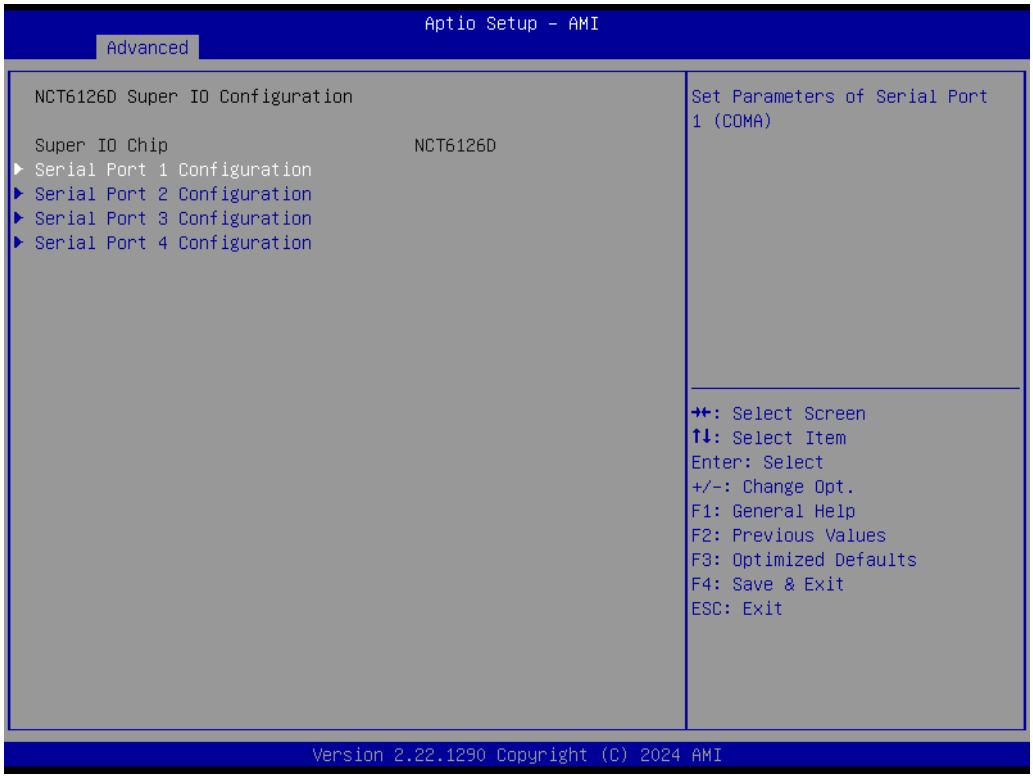
Unique Platform Id Configuration

Advanced → PCH-FW Configuration → Unique Platform Id Configuration



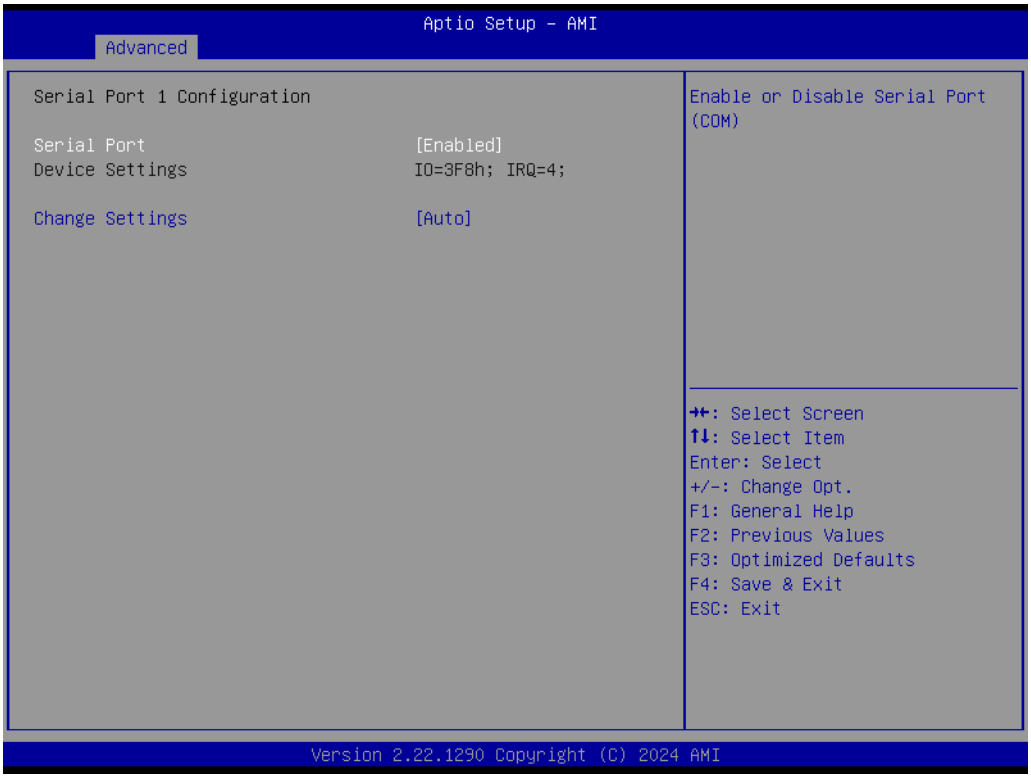
ME Debug Configuration

Advanced → PCH-FW Configuration → ME Debug Configuration



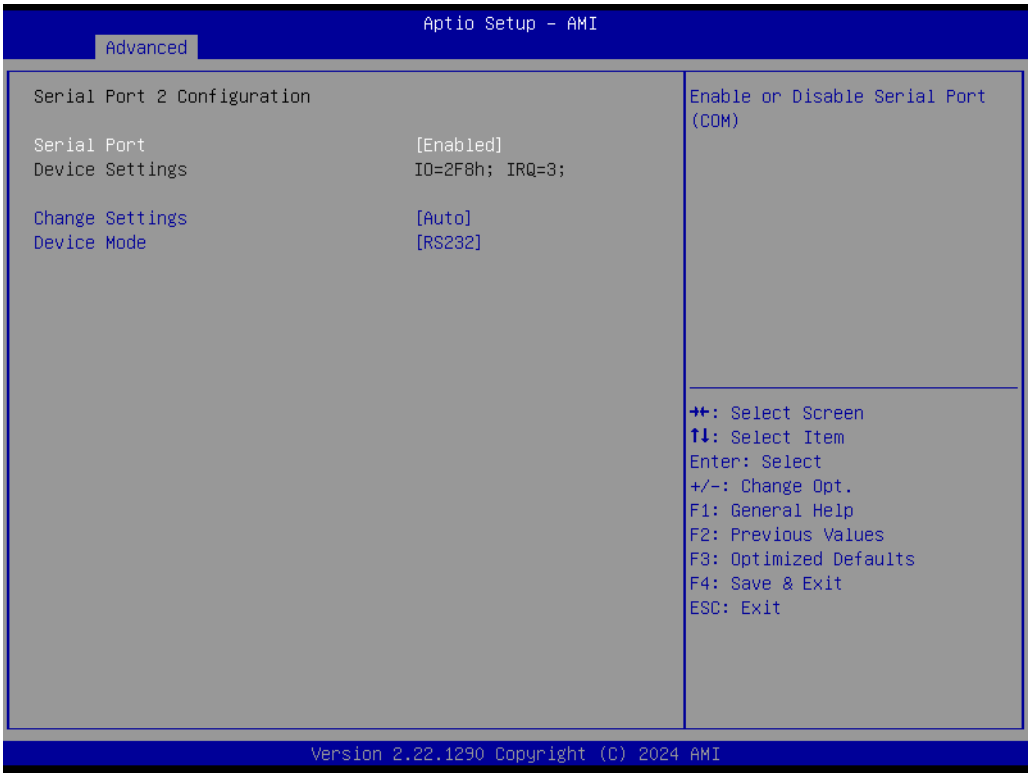
SMBIOS Type 130 OEM Capabilities

Advanced → PCH-FW Configuration → ME debug Configuration → SMBIOS Type 130 OEM Capabilities



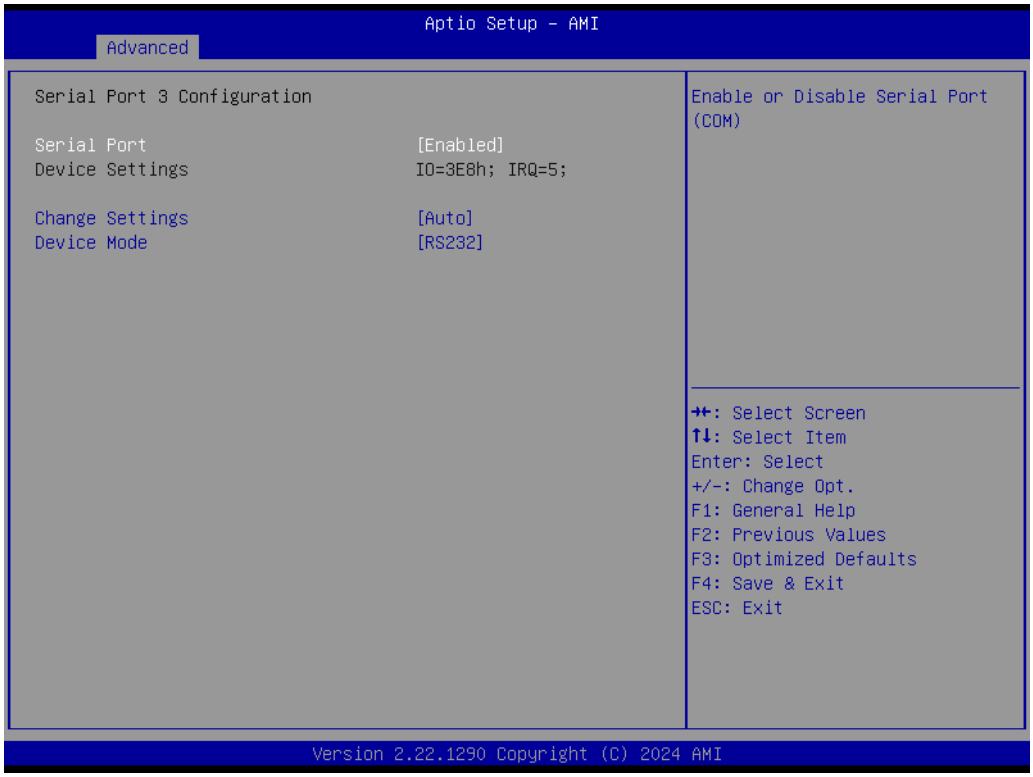
Anti-Rollback SVN Configuration

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



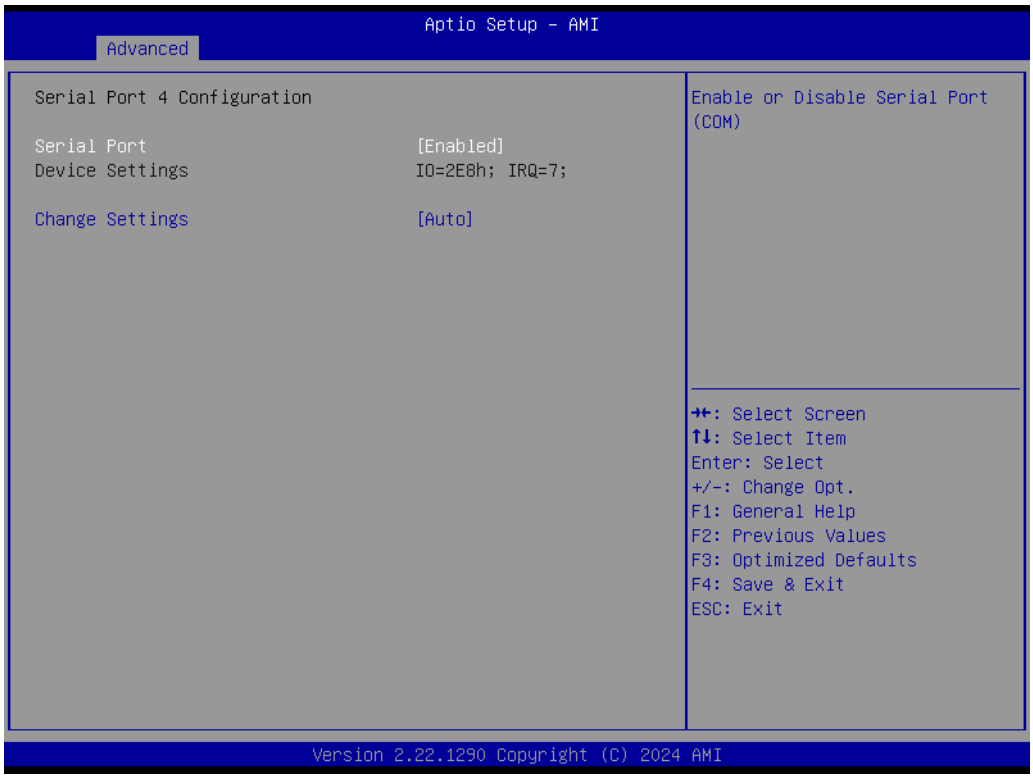
OEM Key Revocation Configuration

Advanced → PCH-FW Configuration → OEM Key Revocation Configuration



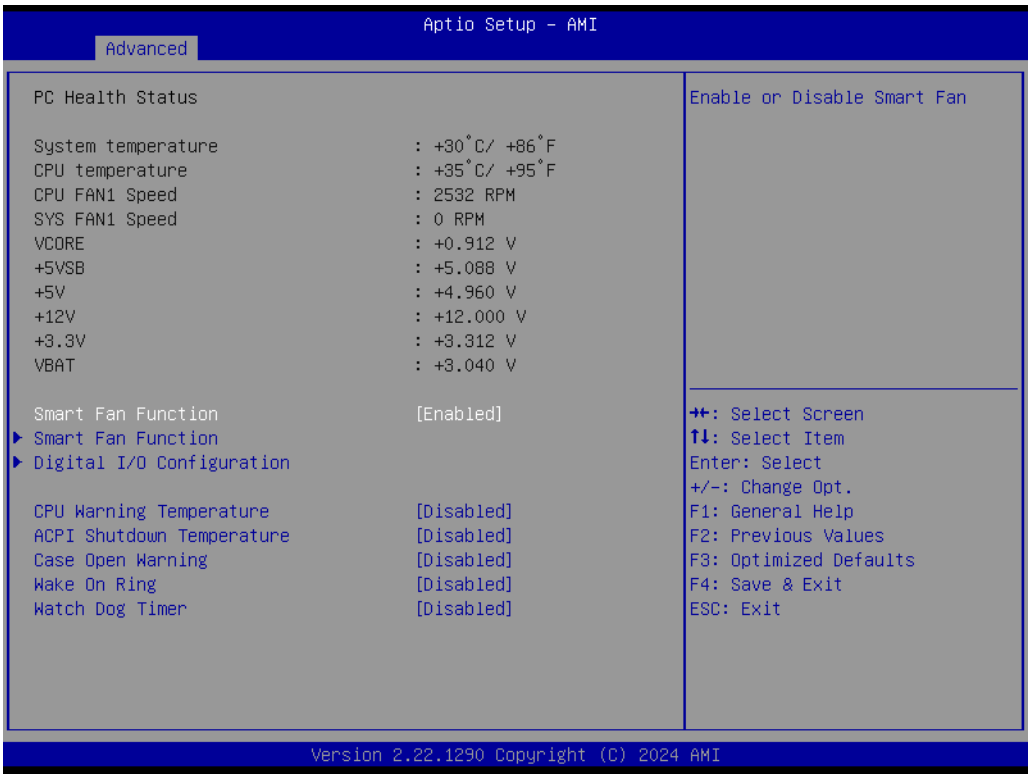
3.2.2.5 Trusted Computing Settings

Advanced → Trusted Computing



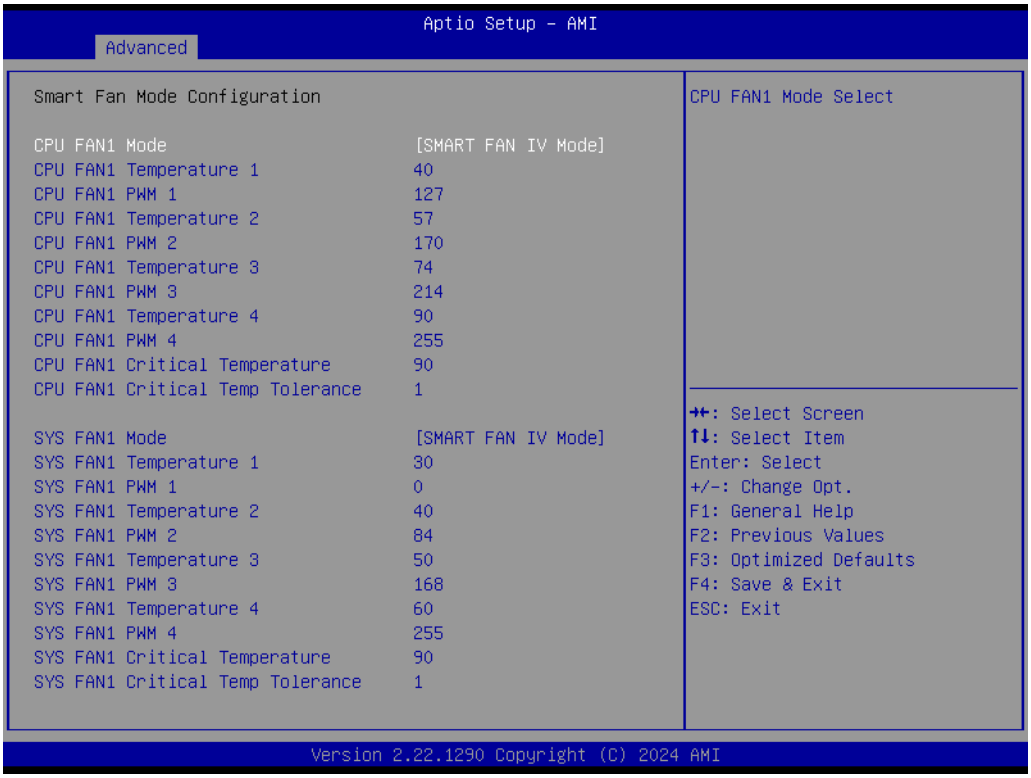
3.2.2.6 ACPI Settings

Advanced → ACPI Settings



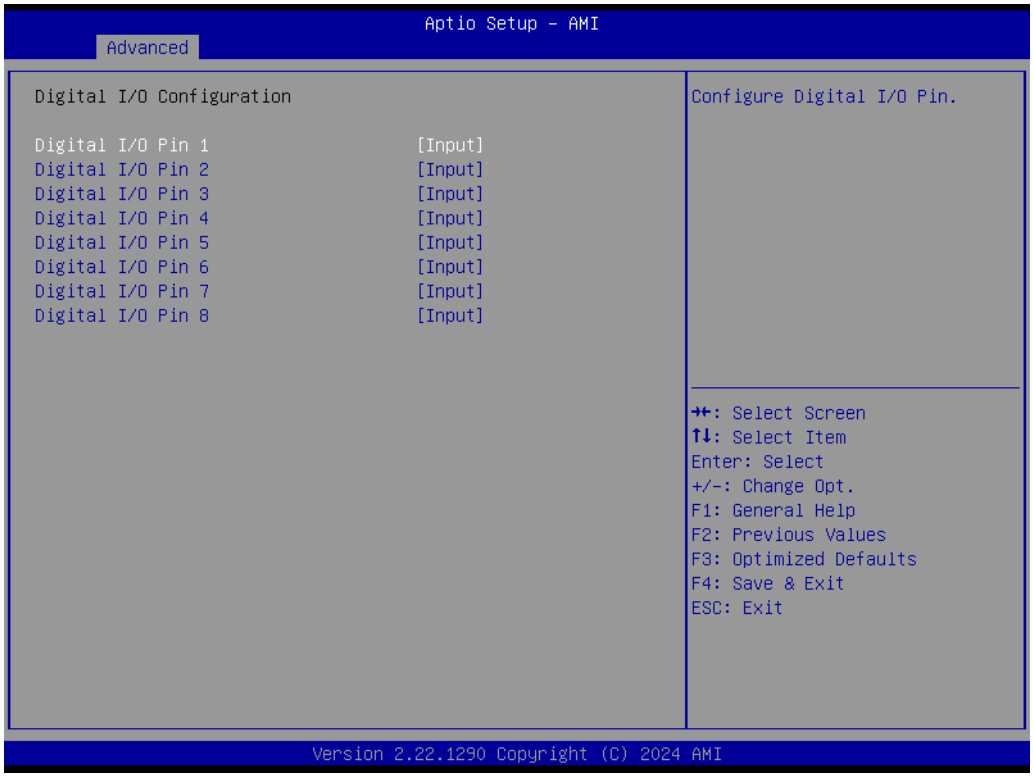
3.2.2.7 NCT6126D Super IO Configuration

Advanced → NCT6126D Super IO Configuration



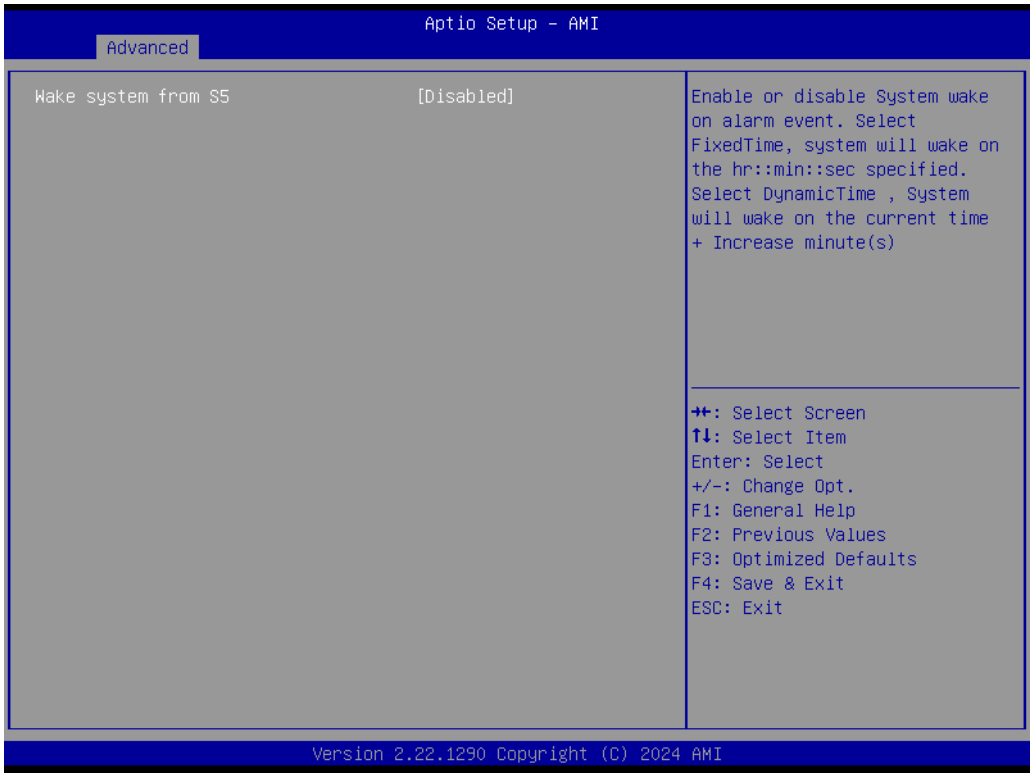
Serial Port 1 Configuration

Advanced → NCT6126D Super IO Configuration → Serial Port 1 Configuration



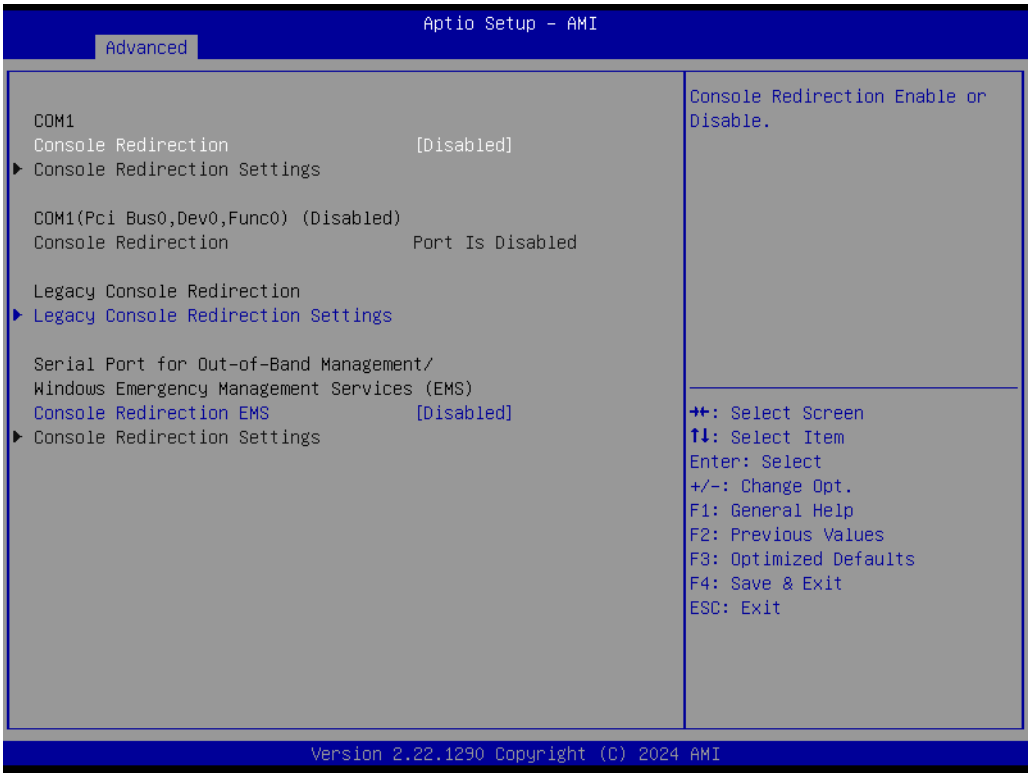
Serial Port 2 Configuration

Advanced → NCT6126D Super IO Configuration → Serial Port 2 Configuration



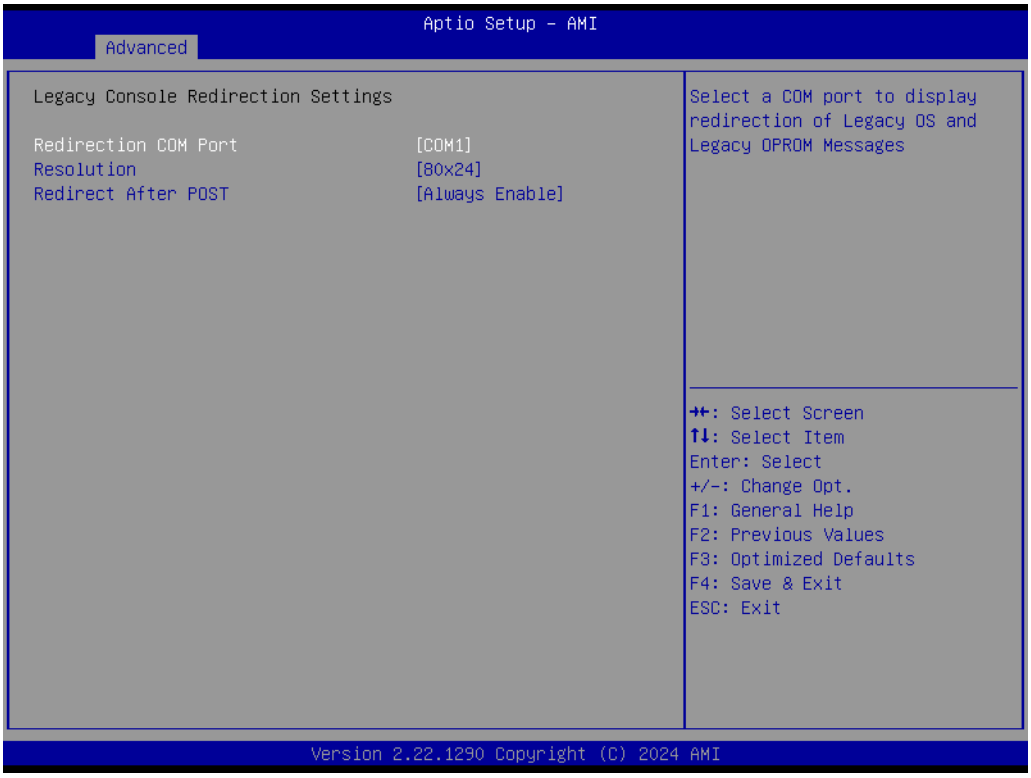
3.2.2.8 NCT6126D HW Monitor

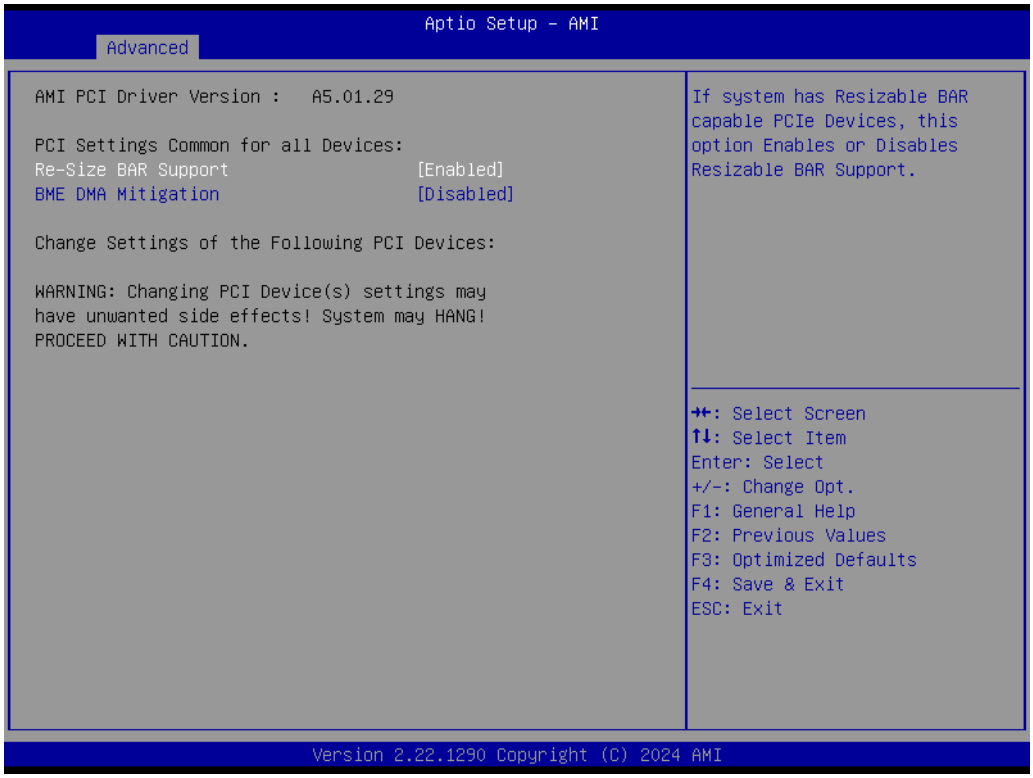
Advanced → NCT6126D HW Monitor



Smart Fan Function

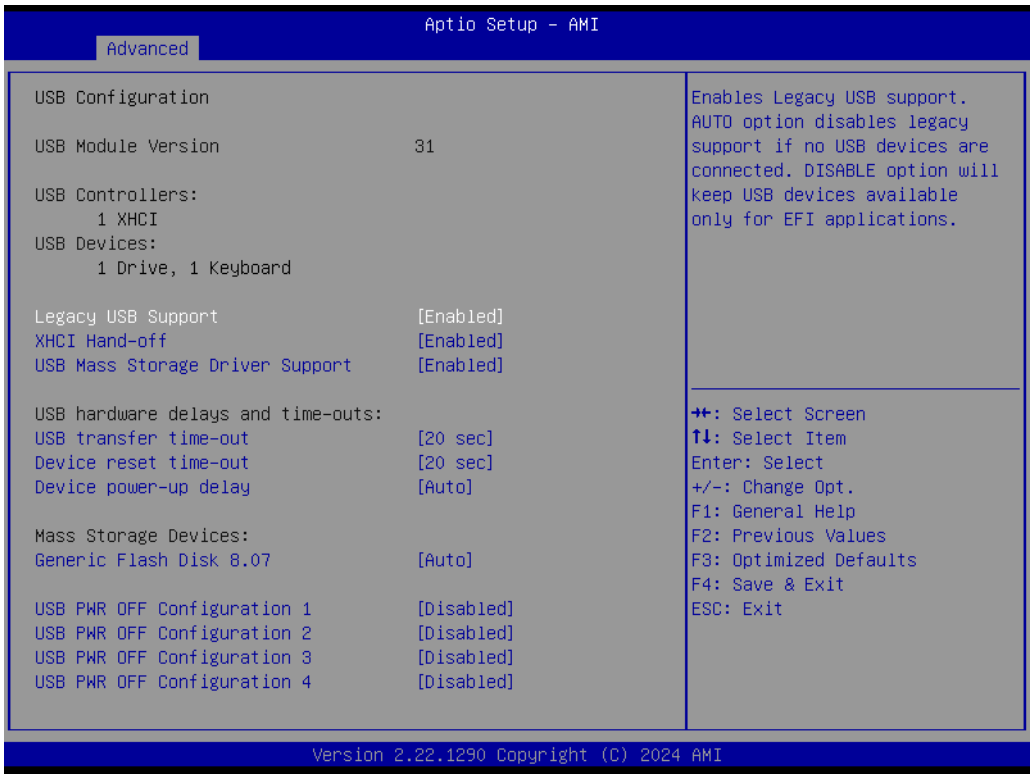
Advanced → NCT6126D HW Monitor → Smart Fan Function





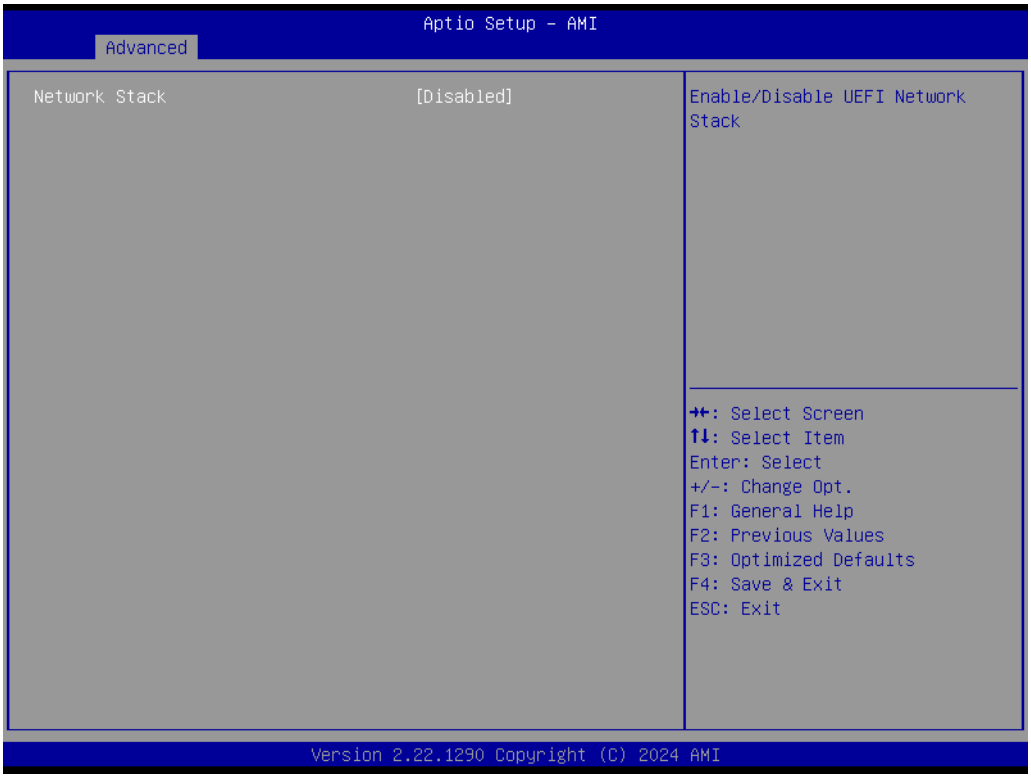
Digital I/O Configuration

Advanced → NCT6126D HW Monitor → Digital I/O Configuration



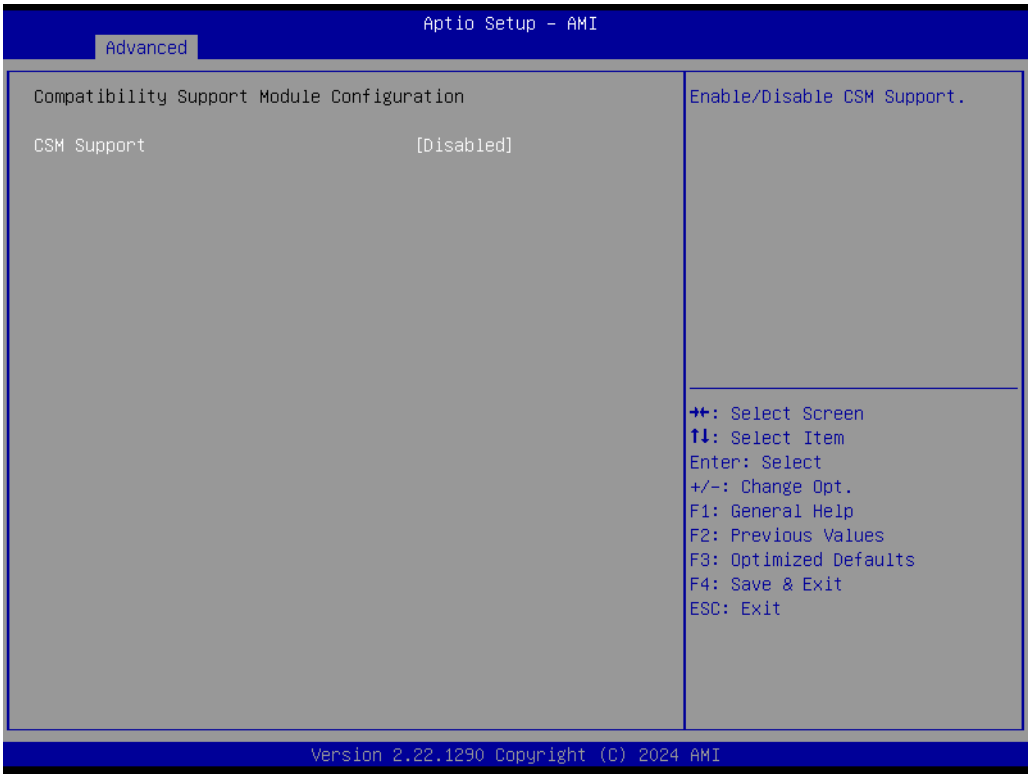
3.2.2.9 S5 RTC Wake Settings

Advanced → S5 RTC Wake Settings



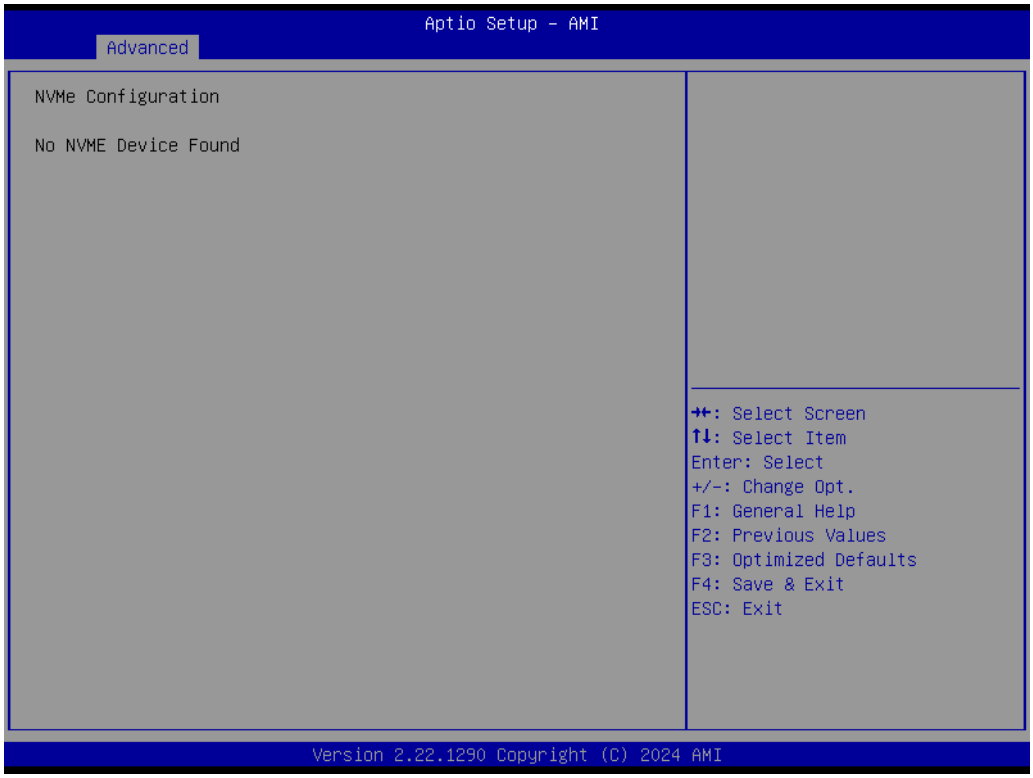
3.2.2.10 Serial Port Console Redirection

Advanced → Serial Port Console Redirection



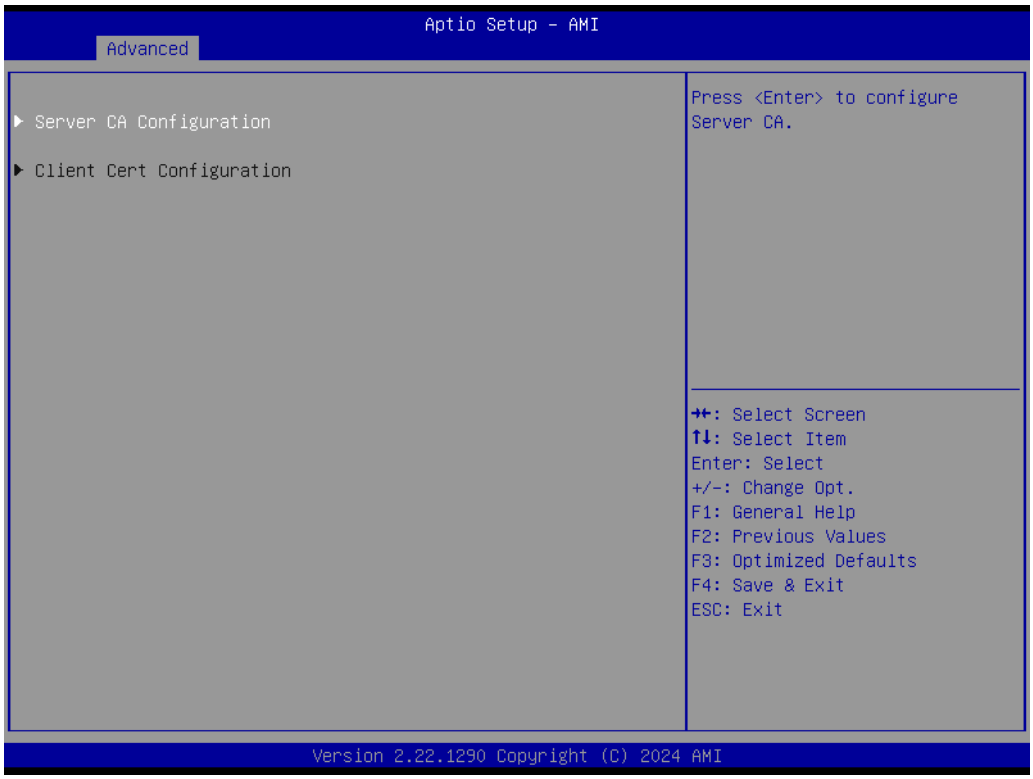
Legacy Console Redirection Settings

Advanced → Serial Port Console Redirection → Legacy Console Redirection Settings



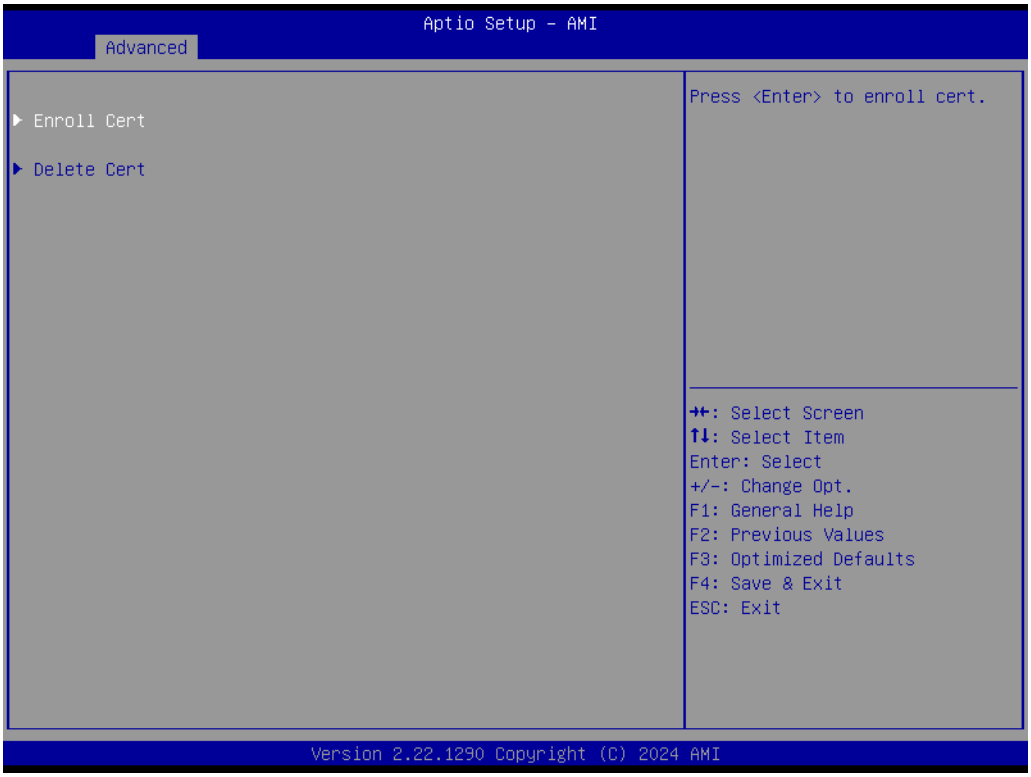
3.2.2.11 Intel TXT Information

Advanced → Intel TXT Information



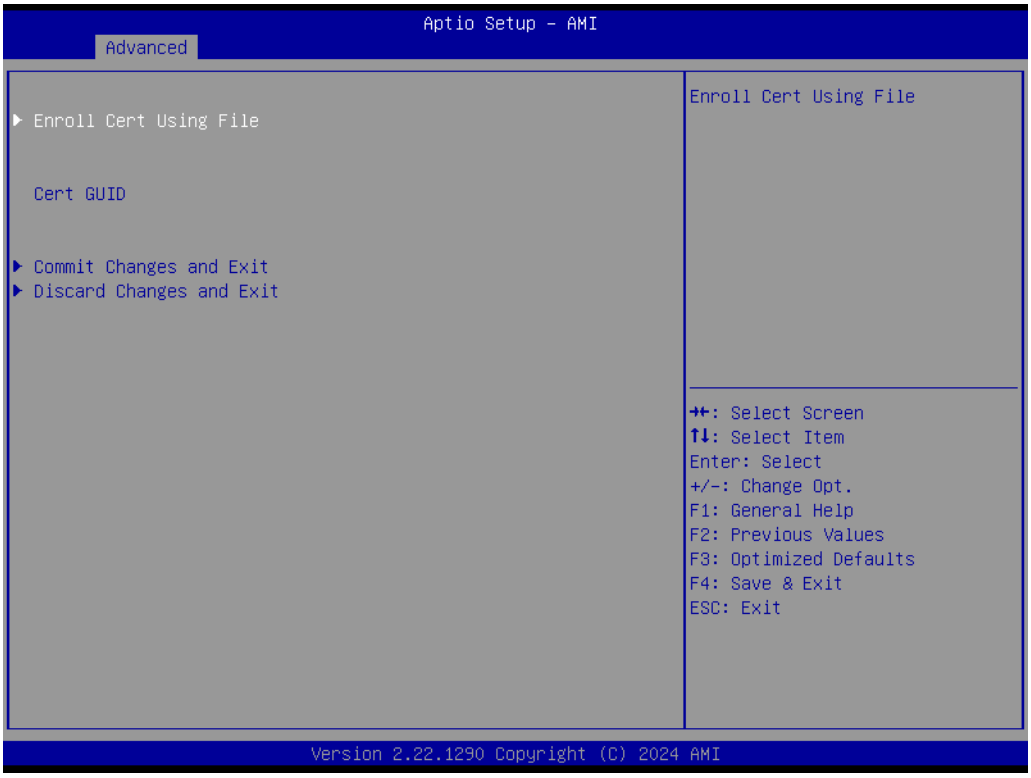
3.2.2.12 USB Configuration

Advanced → USB Configuration



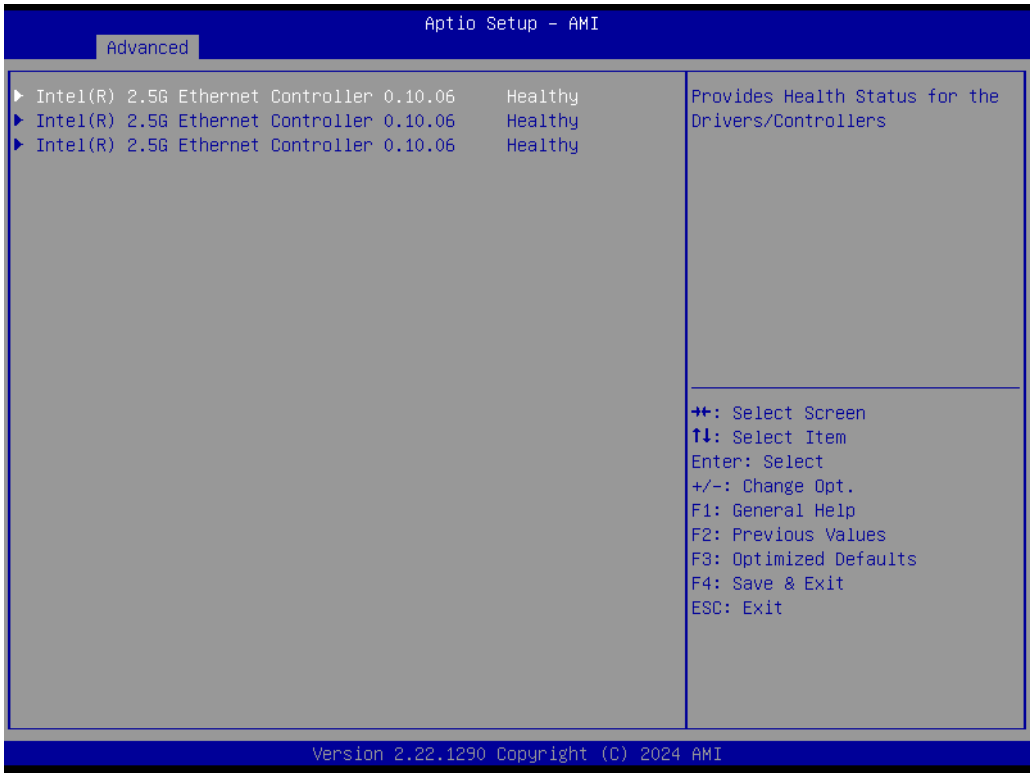
3.2.2.13 Network Stack Configuration

Advanced → Network Stack Configuration



3.2.2.14 CSM Configuration

Advanced → CSM Configuration

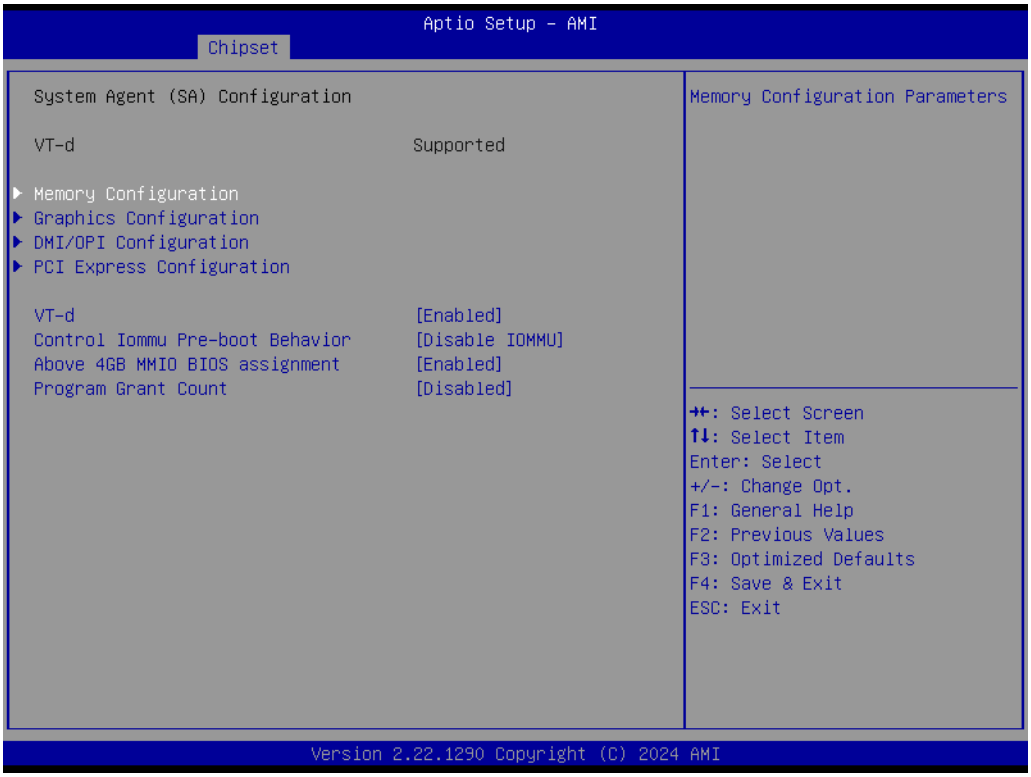


3.2.2.15 NVMe Configuration

Advanced → NVMe Configuration

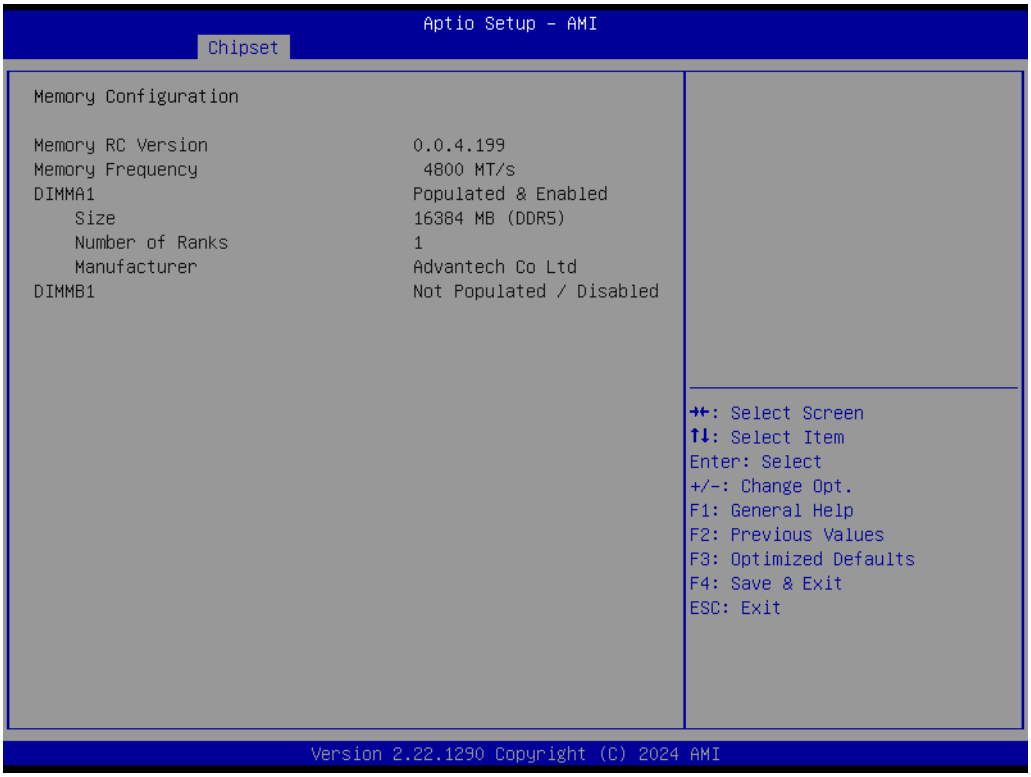
3.2.2.16 Tls Auth Configuration

Advanced → Tls Auth Configuration



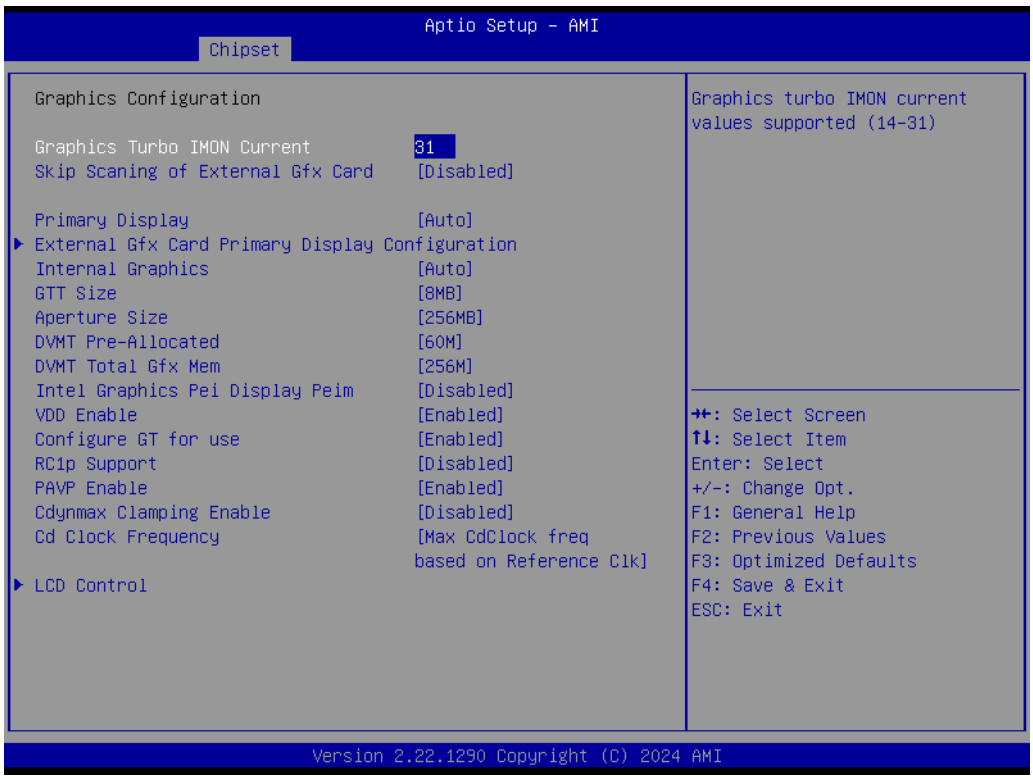
3.2.2.17 Driver Health

Advanced → Driver Health



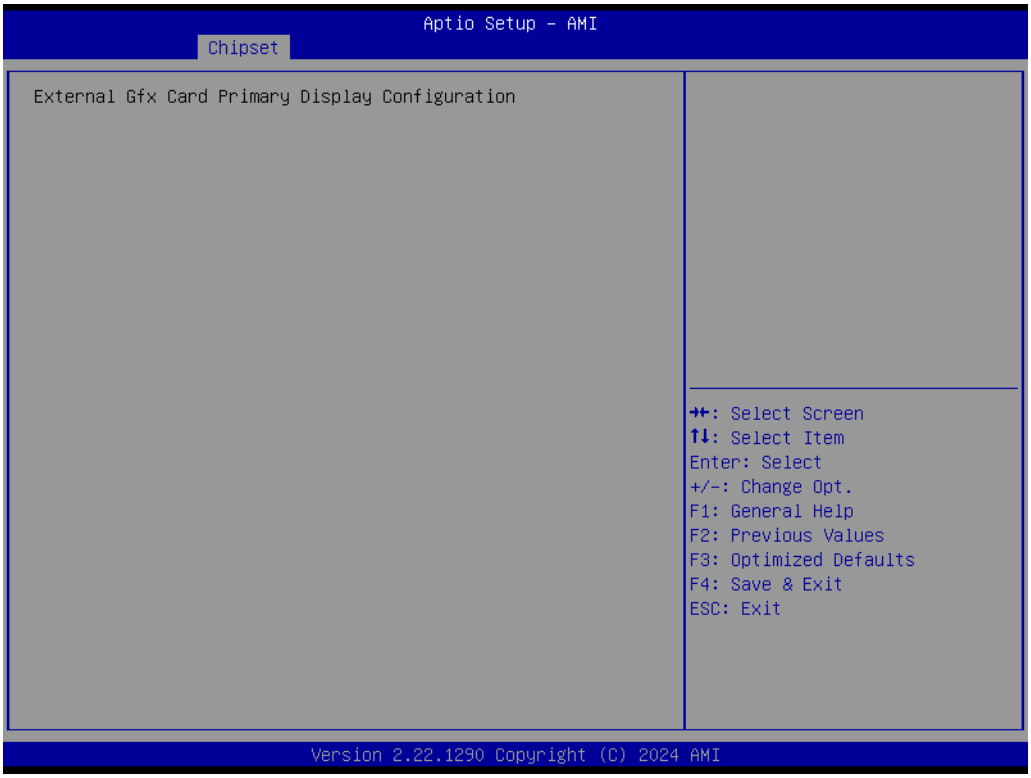
3.2.3 Chipset Configuration Settings

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.



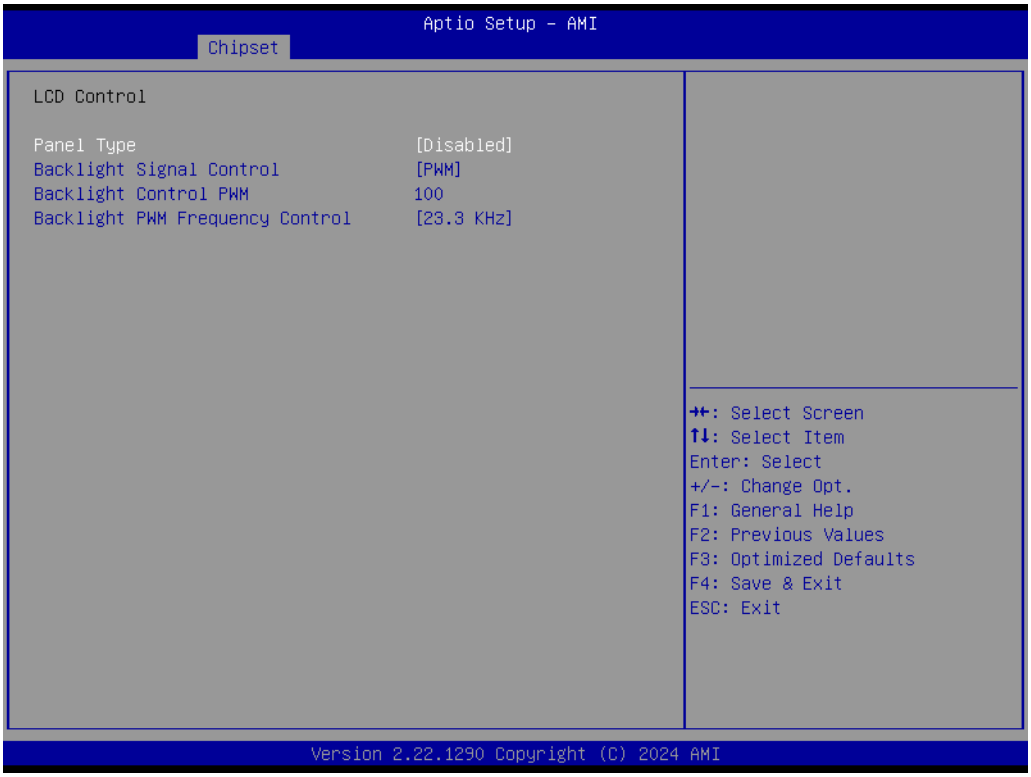
3.2.3.1 System Agent (SA) Configuration

Chipset → System Agent (SA) Configuration



Memory Configuration

Chipset → System Agent (SA) Configuration → Memory Configuration

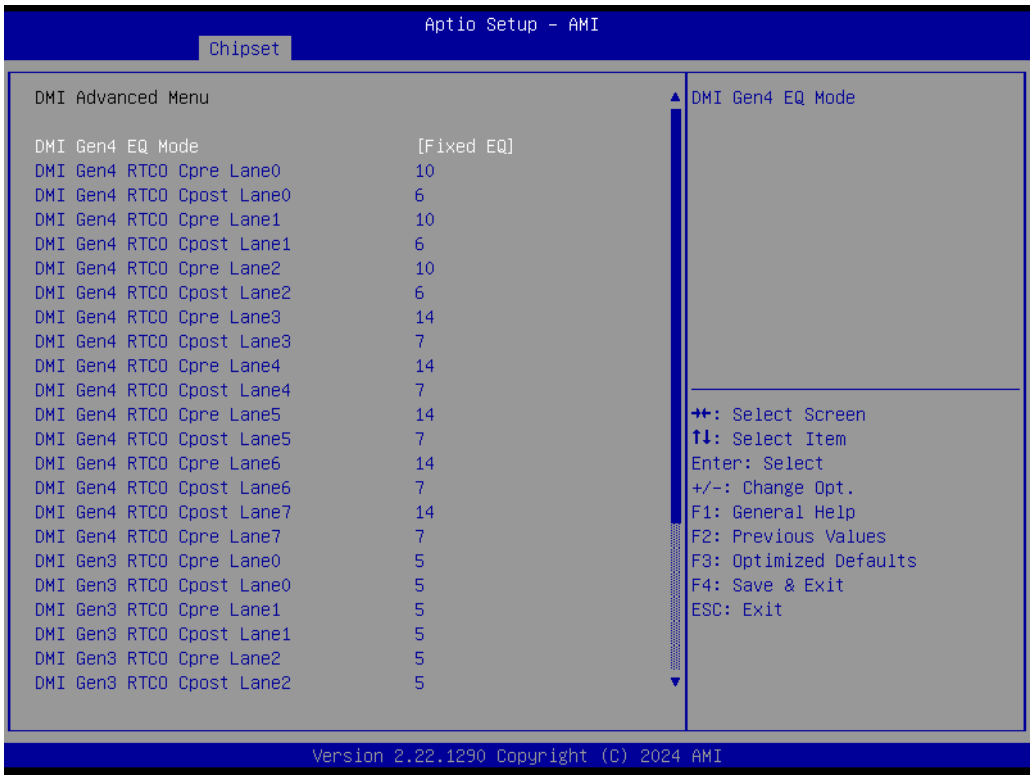


Graphics Configuration

Chipset → System Agent (SA) Configuration → Graphics Configuration

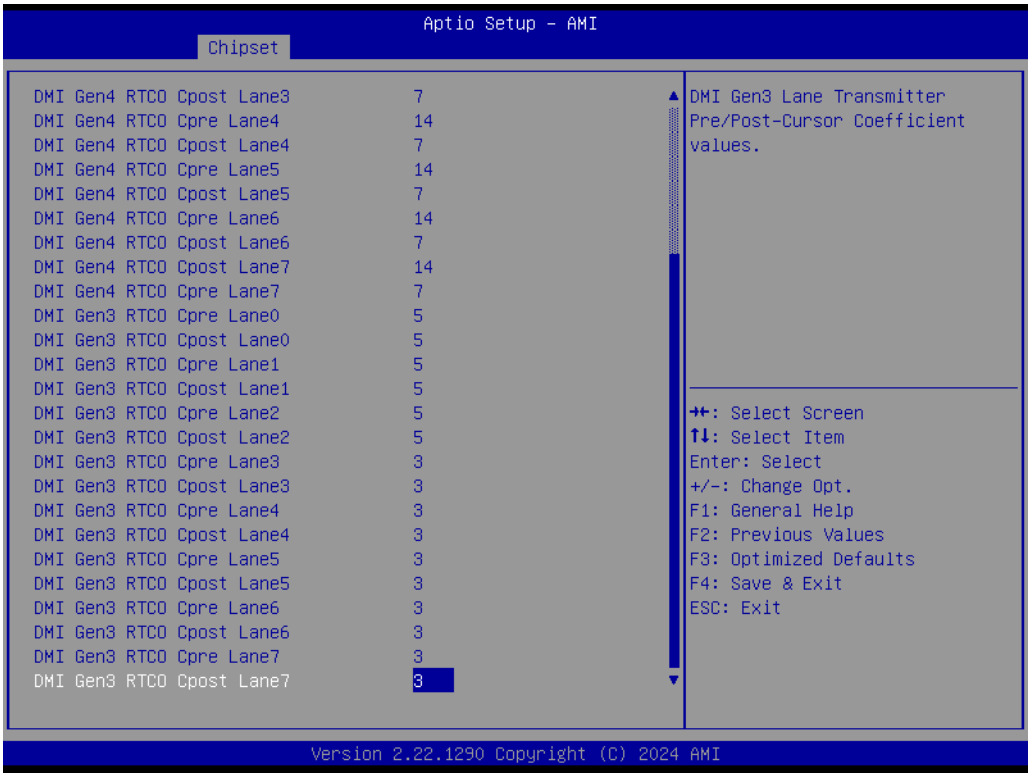
External Gfx Card Primary Display Configuration

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



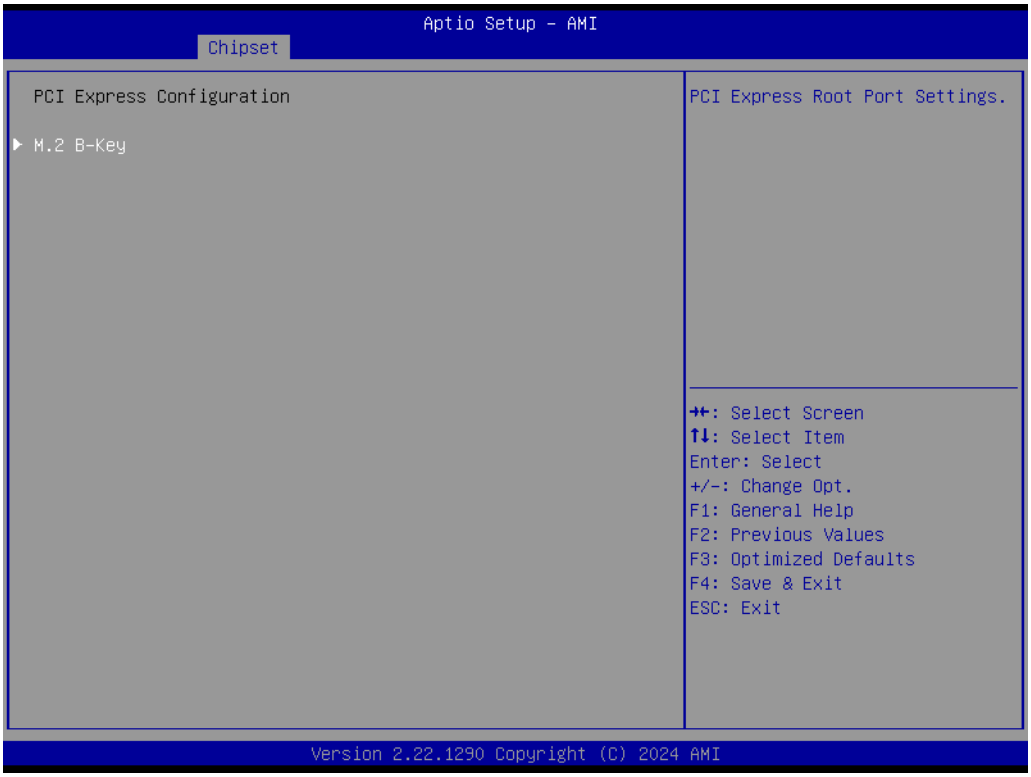
LCD Control

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



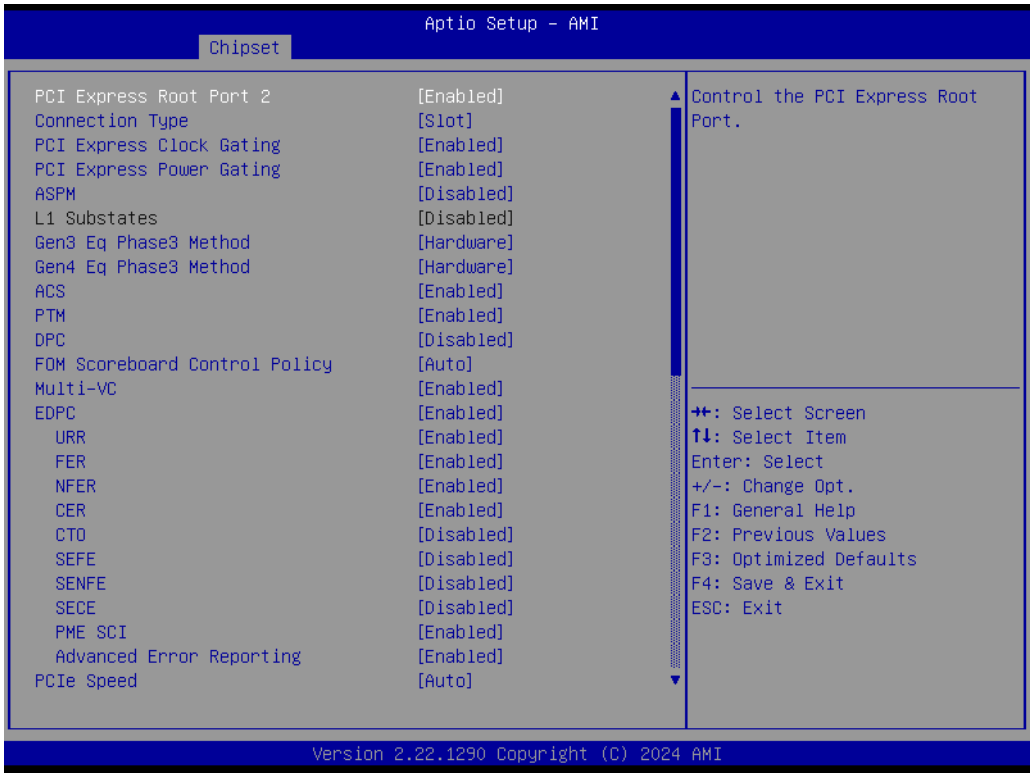
DMI/OPI Configuration

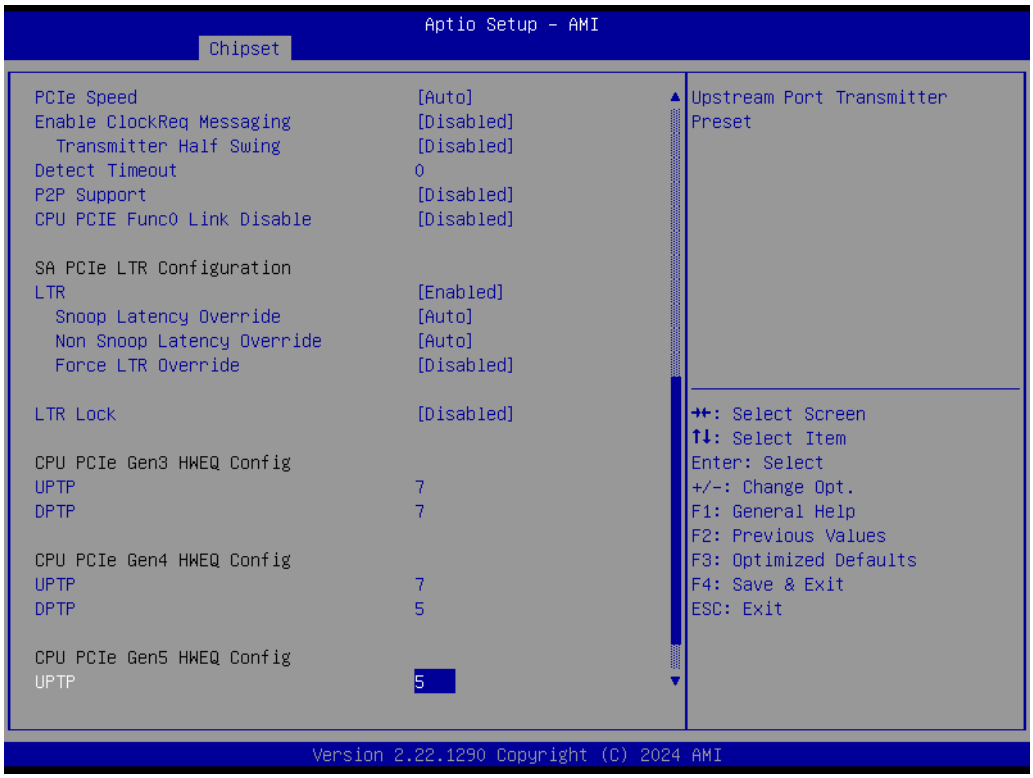
Chipset → System Agent (SA) Configuration → DMI/OPI Configuration



DMI Advanced Menu

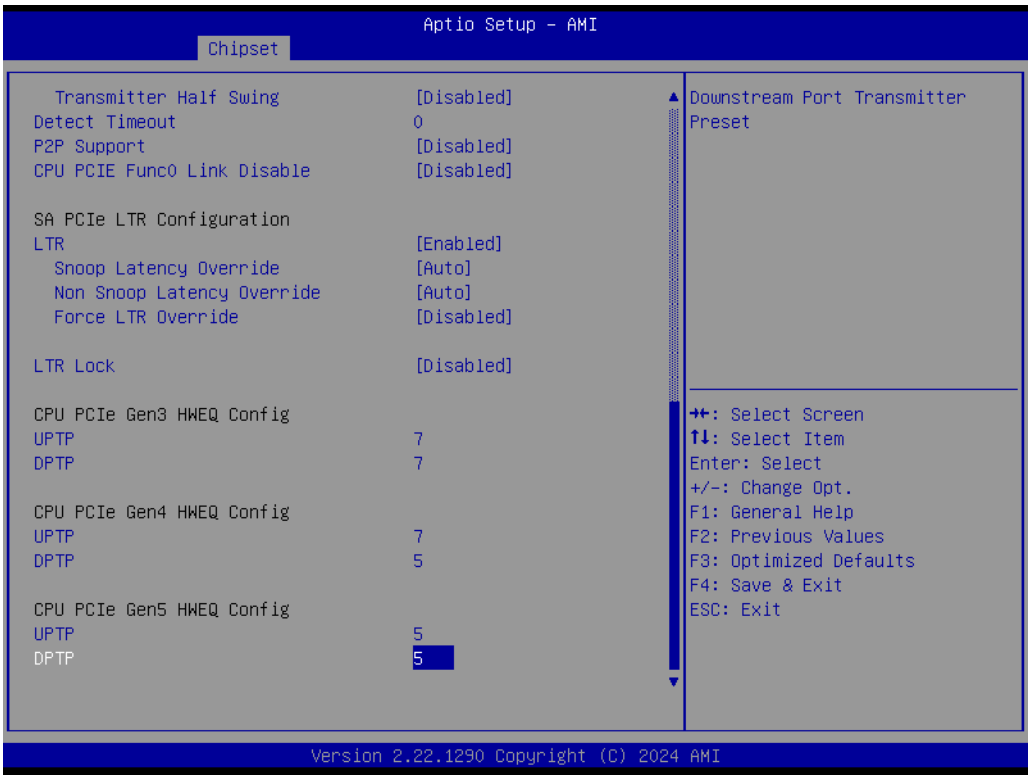
Chipset → System Agent (SA) Configuration → DMI/OPI Configuration → DMI Advanced Menu





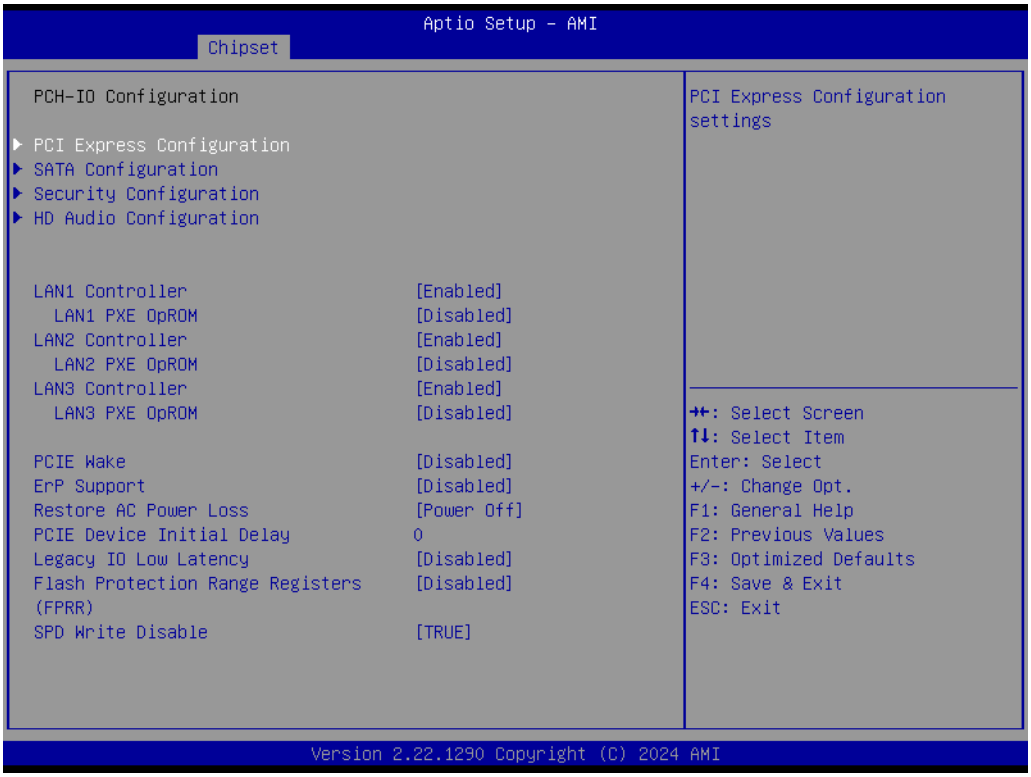
VMD Setup Menu

Chipset → System Agent (SA) Configuration → VMD Setup Menu



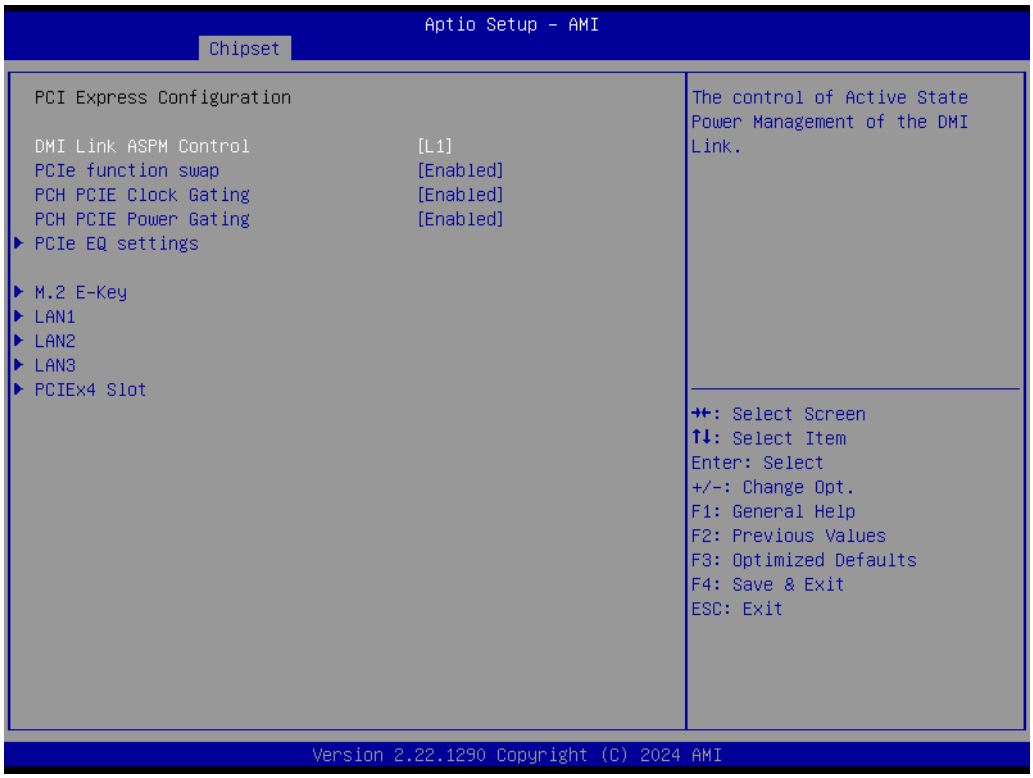
PCI Express Configuration

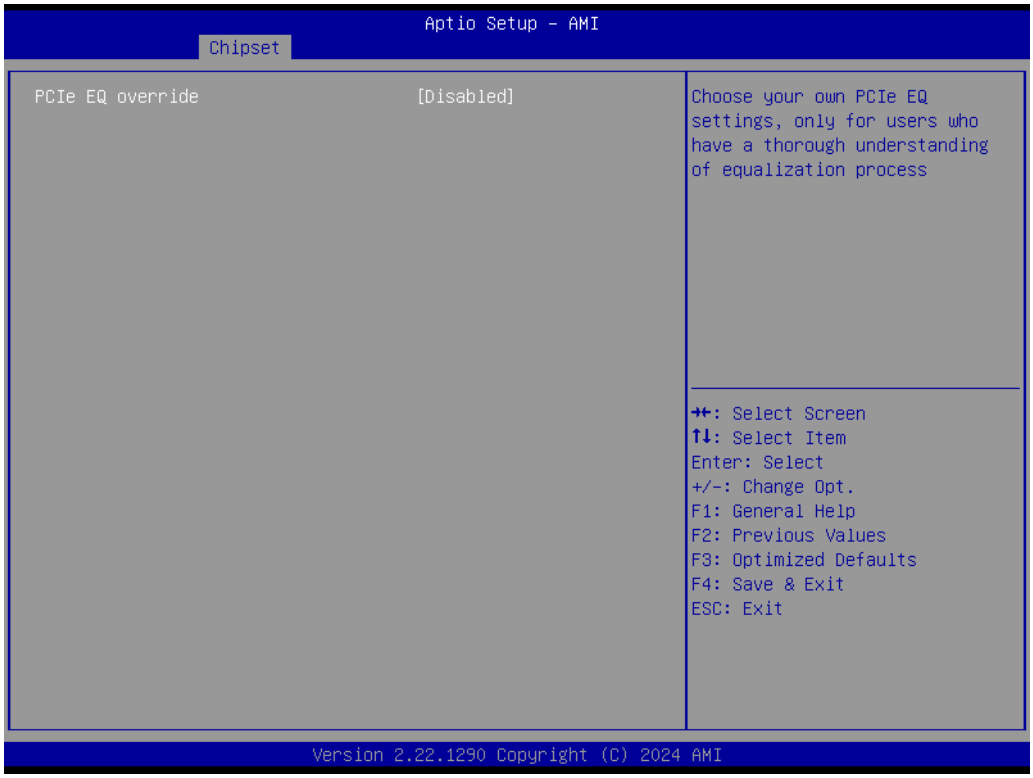
Chipset → System Agent (SA) Configuration → PCI Express Configuration



PCI Express Configuration

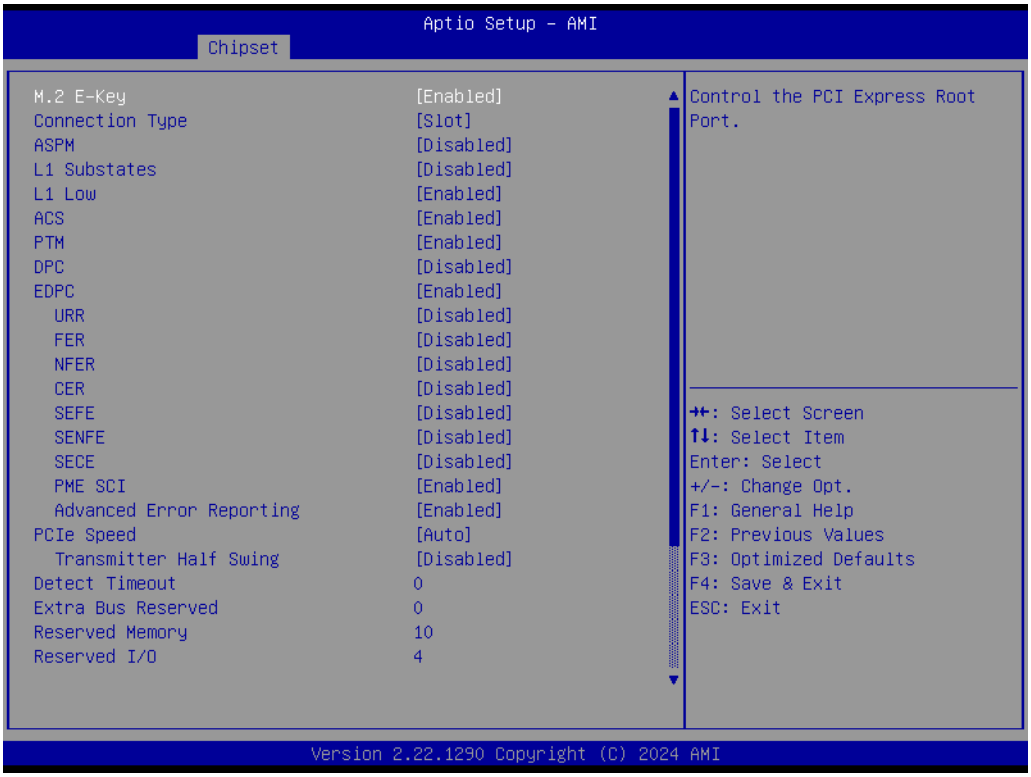
Chipset → System Agent (SA) Configuration → PCI Express Configuration → PCI EXPRESS SLOT





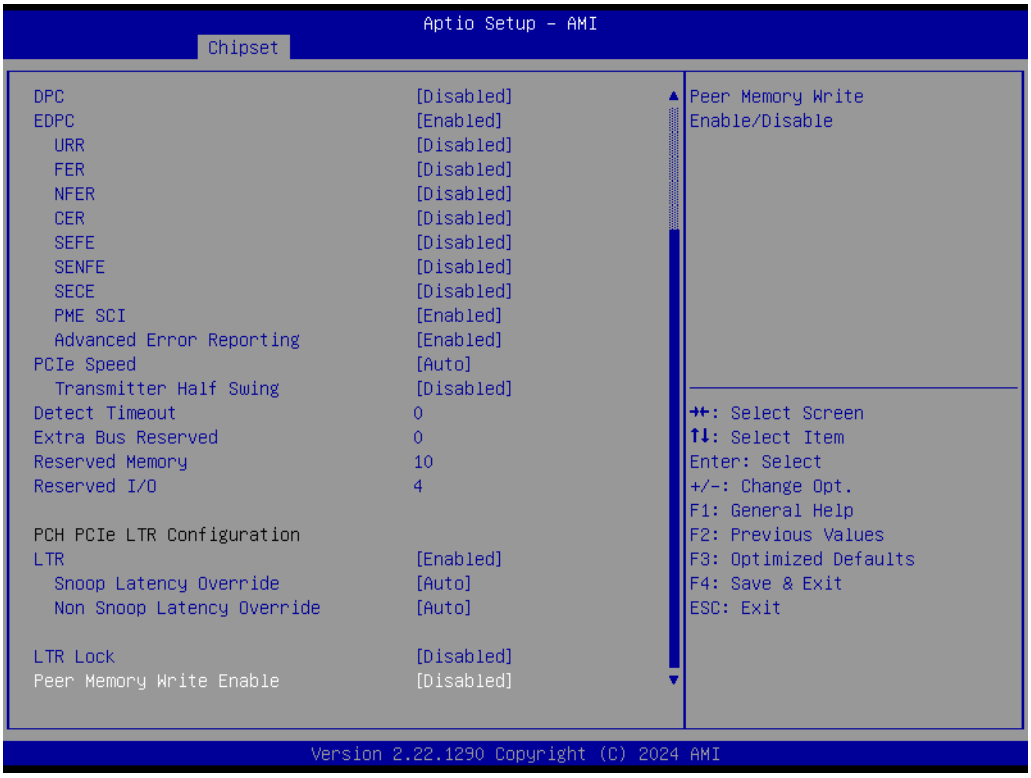
3.2.3.2 PCH-I/O Configuration

Chipset → PCH-I/O Configuration



ErP Support Note

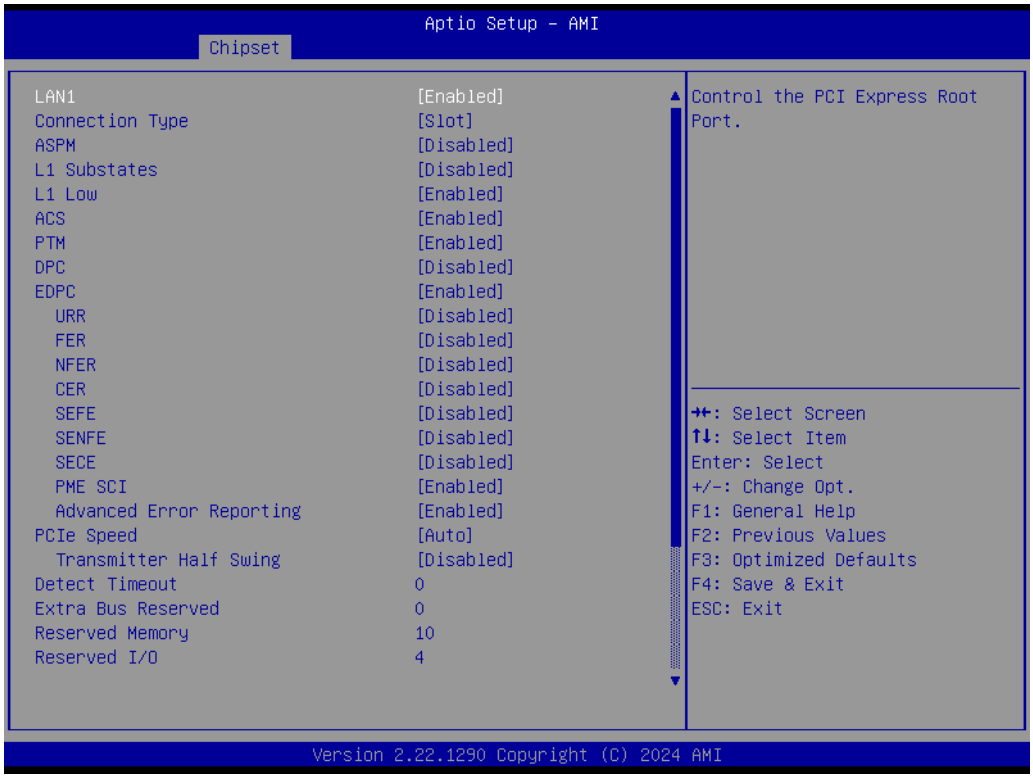
Chipset → PCH-I/O Configuration → ErP Support



When ErP enables, restore AC power loss & below features are not supported.
[USB : S3/S4]
[PCIE Wake] Connect to PCIe slots, depending 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)

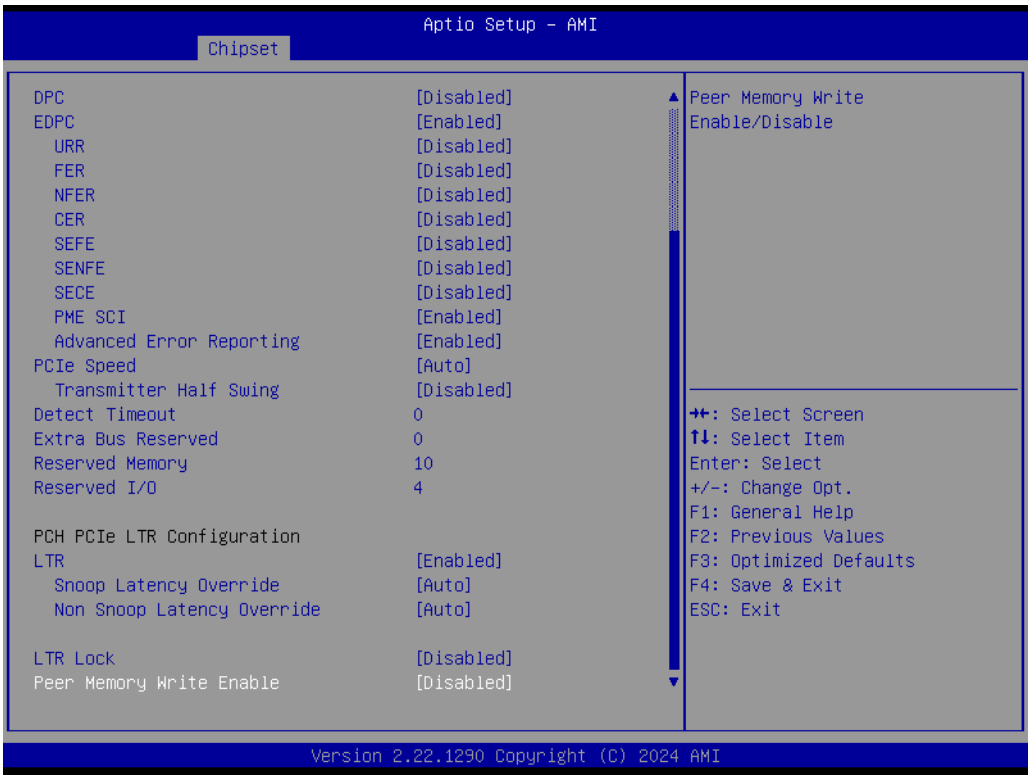
PCI Express Configuration

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



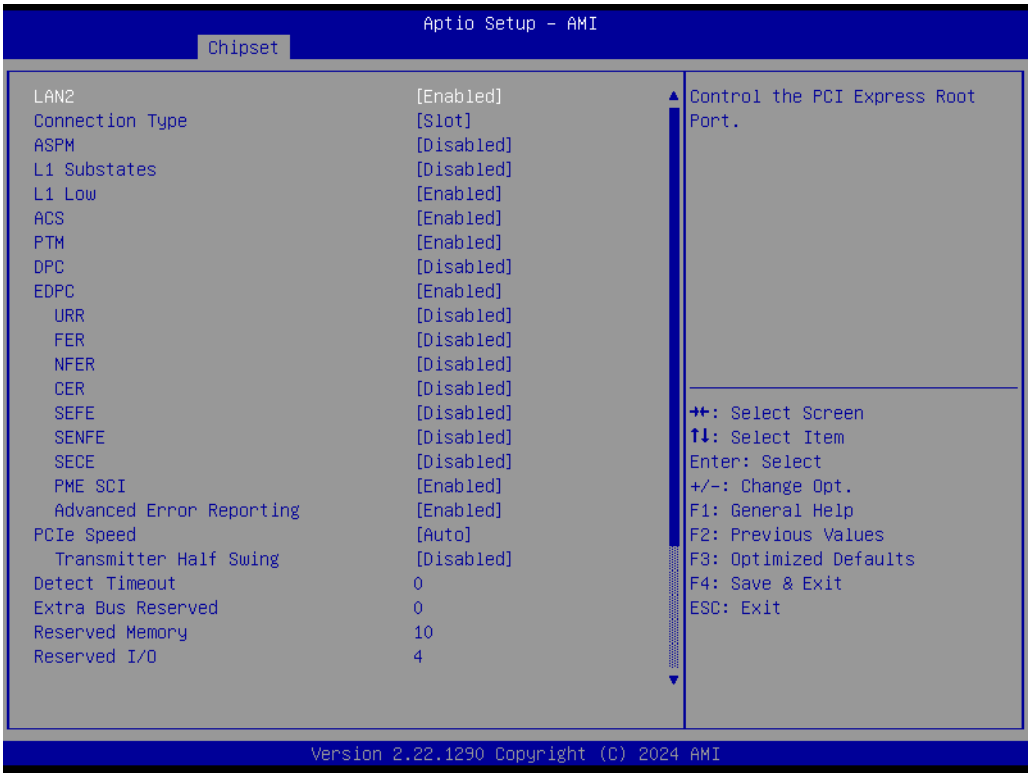
PCIe EQ Settings

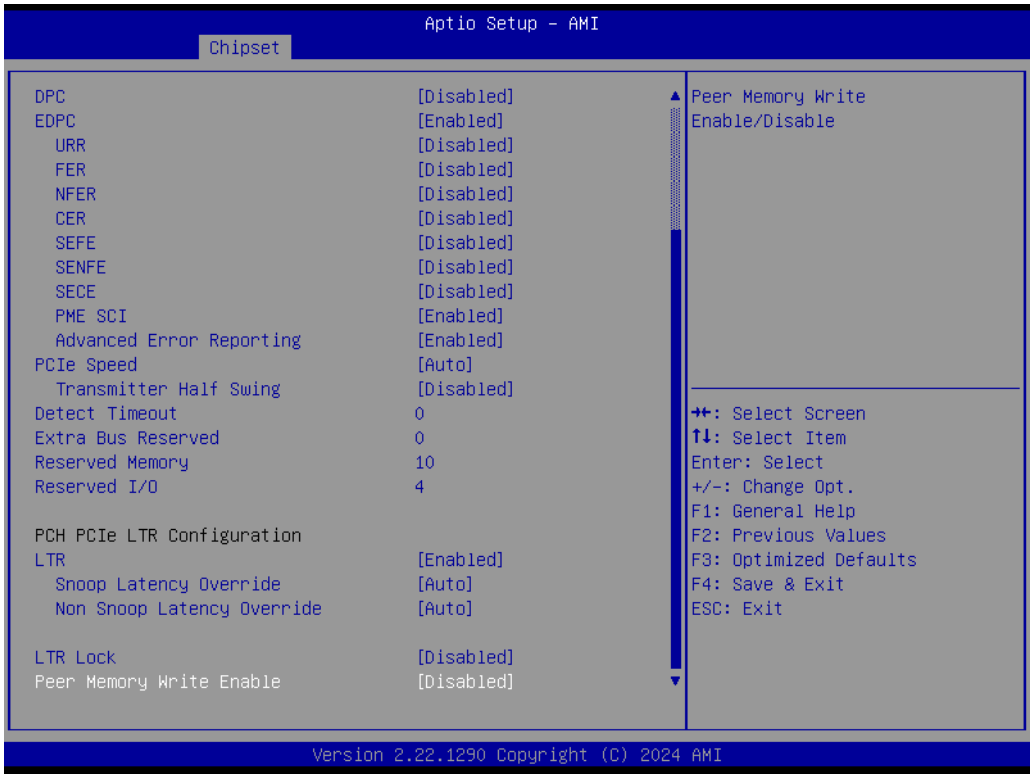
Chipset → PCH-I/O Configuration → PCI Express Configuration → PCIe EQ Settings



LAN2

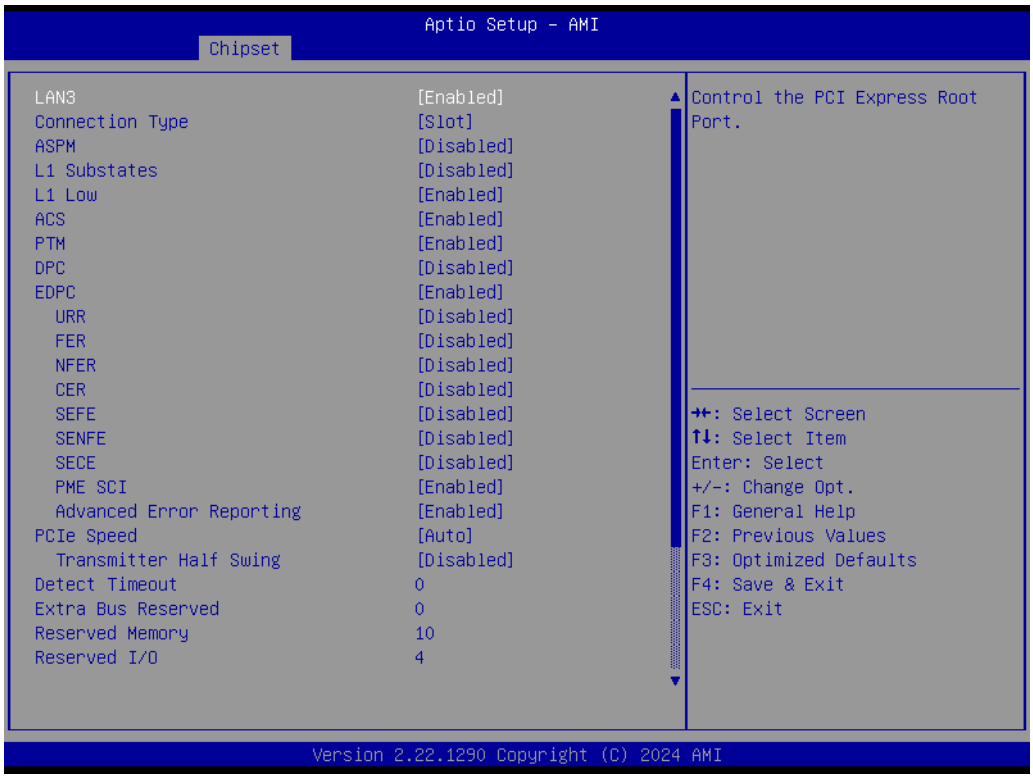
Chipset → PCH-I/O Configuration → PCI Express Configuration → LAN2

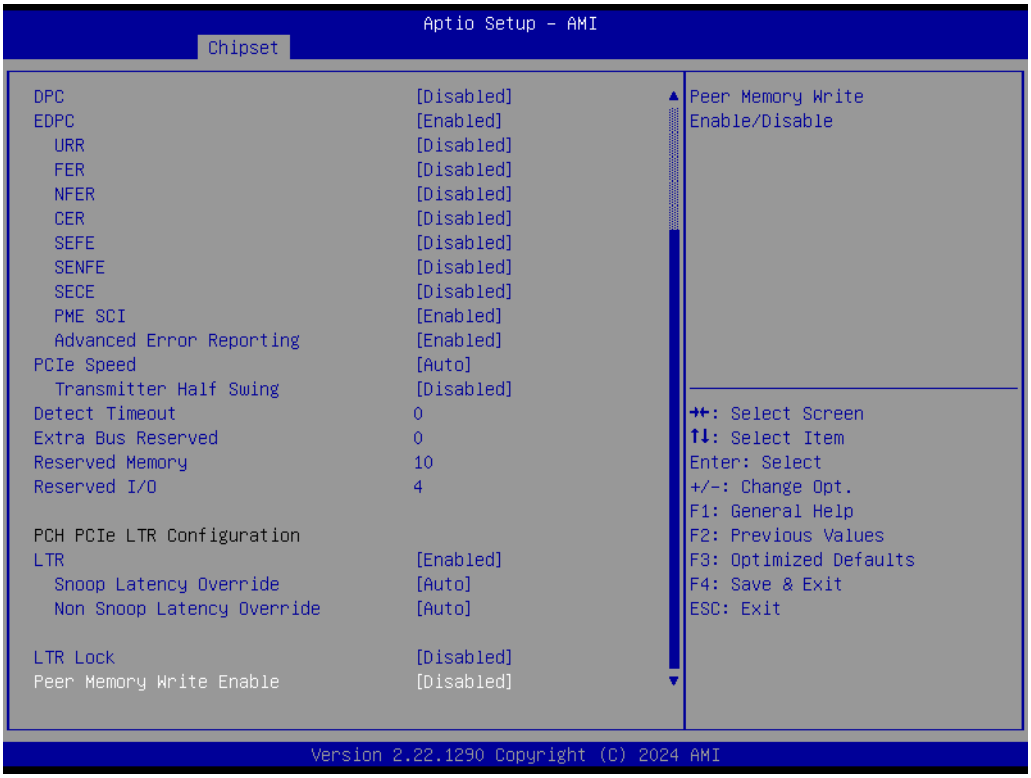




M.2 E-Key

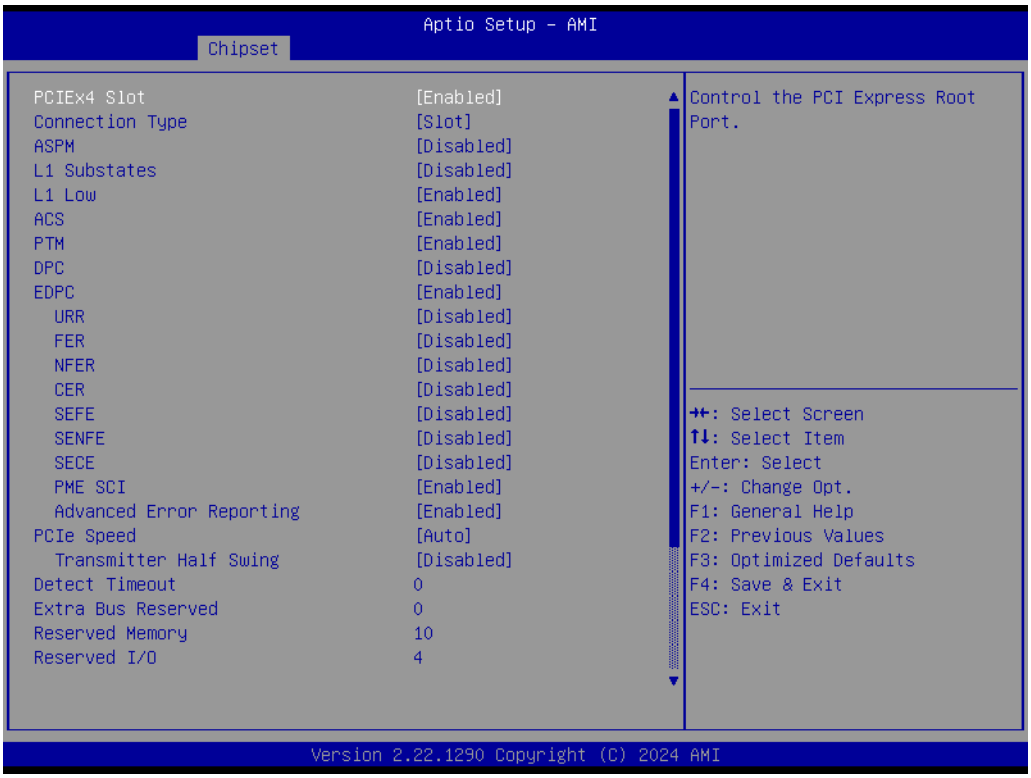
Chipset → PCH-I/O Configuration → PCI Express Configuration → M.2 E-Key

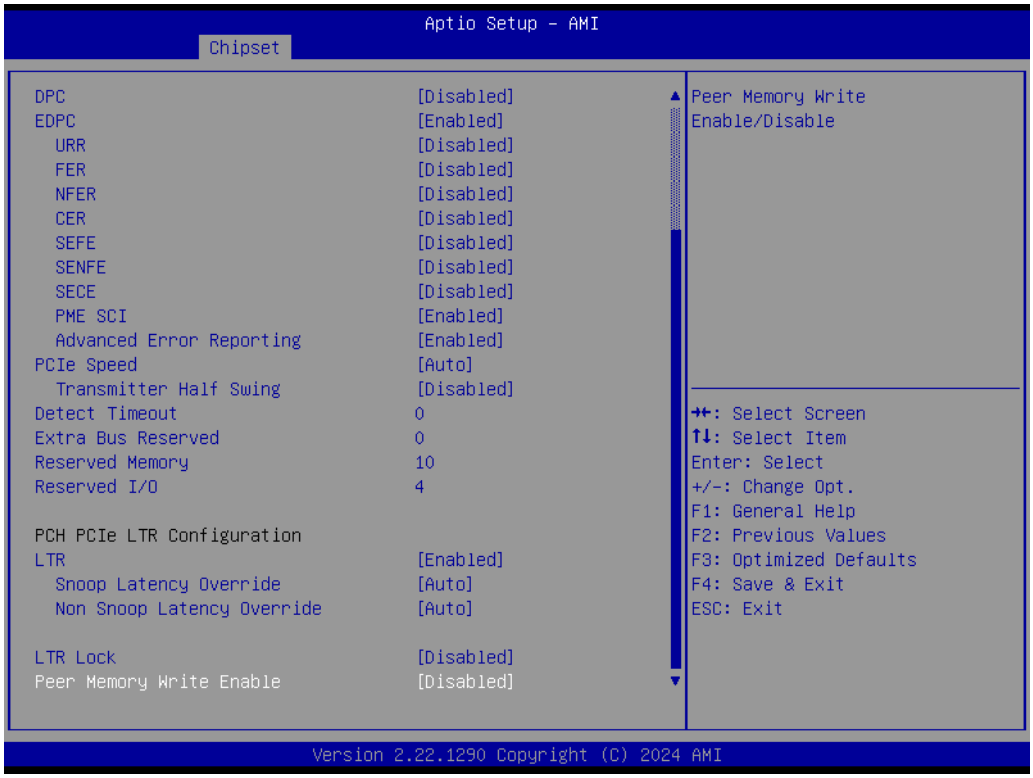




M.2 M-Key

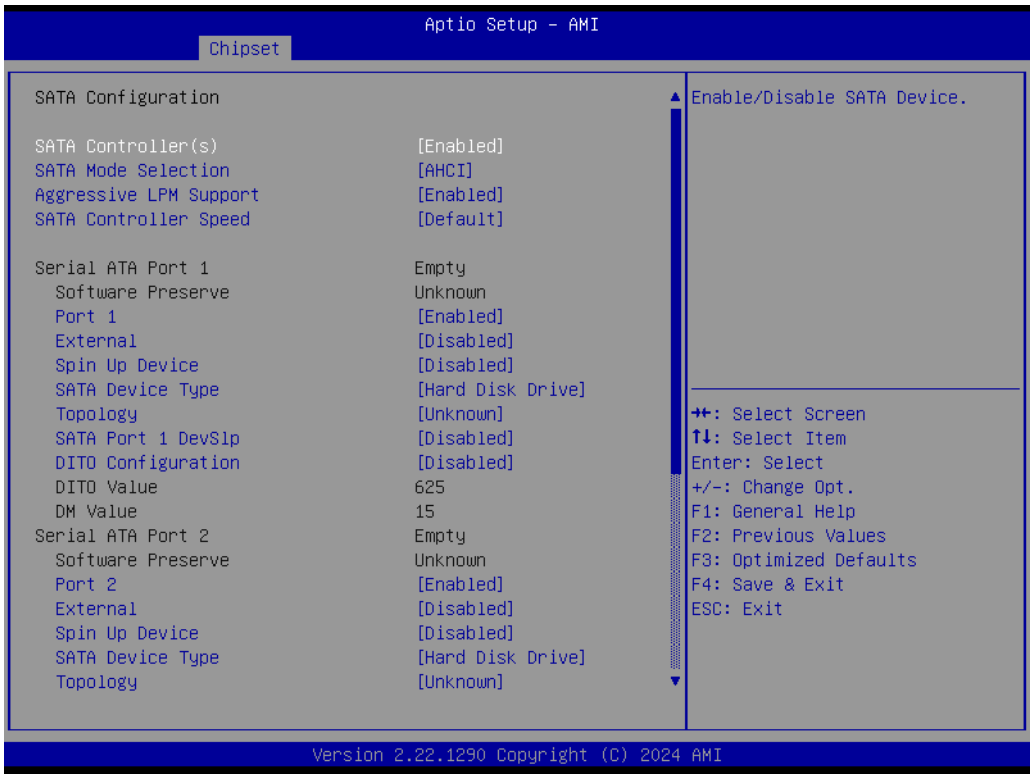
Chipset → PCH-I/O Configuration → PCI Express Configuration → M.2 M-Key

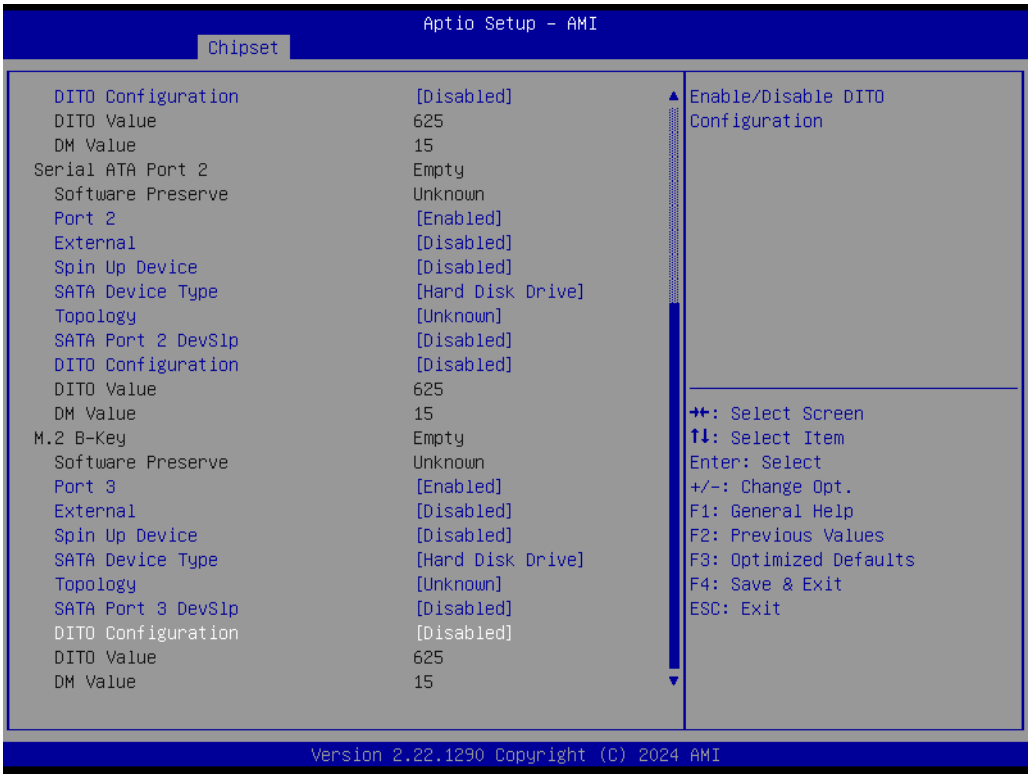




SATA Configuration

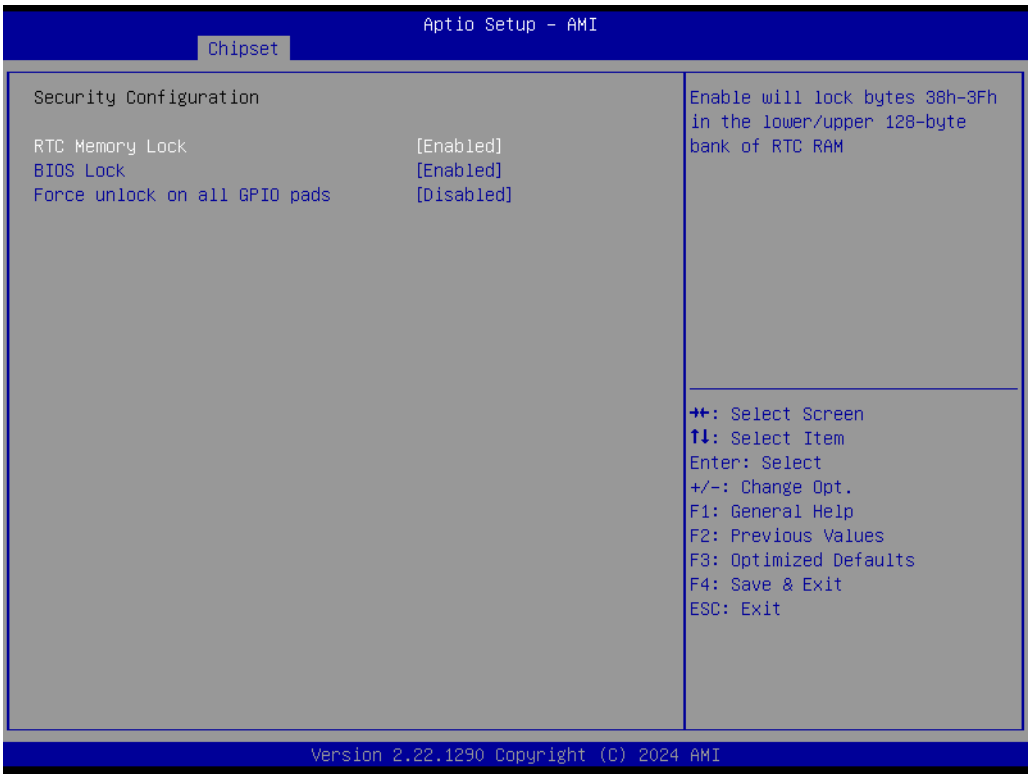
Chipset → PCH-I/O Configuration → SATA Configuration





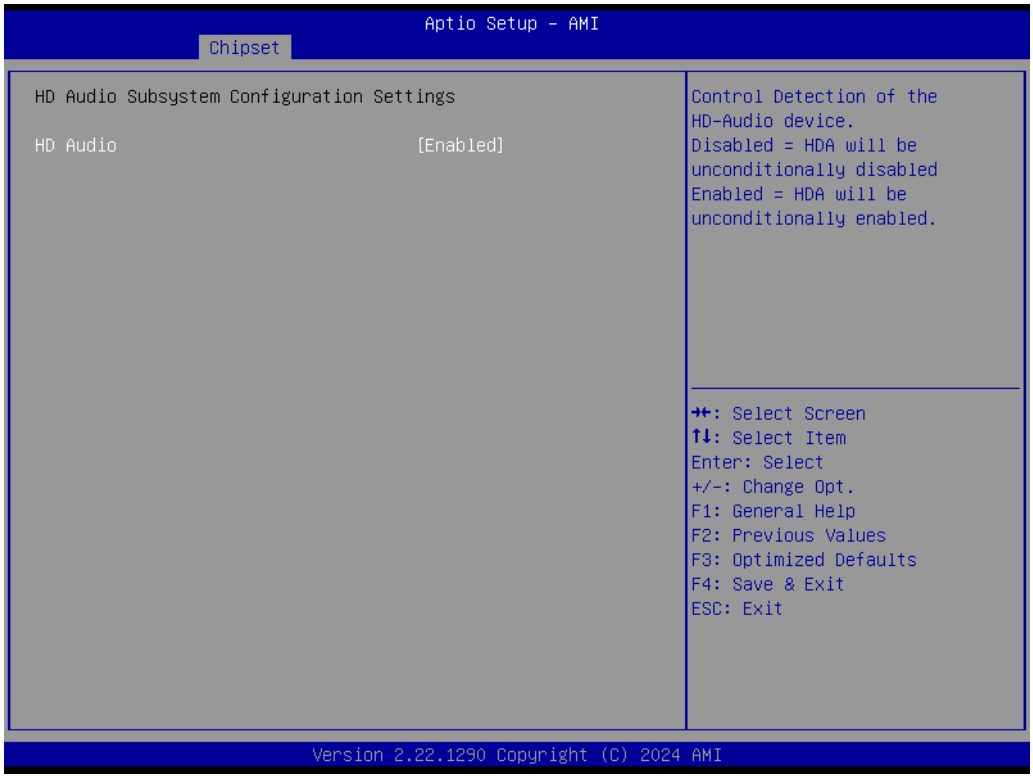
Security Configuration

Chipset → PCH-I/O Configuration → Security Configuration



HD Audio Subsystem Configuration Settings

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



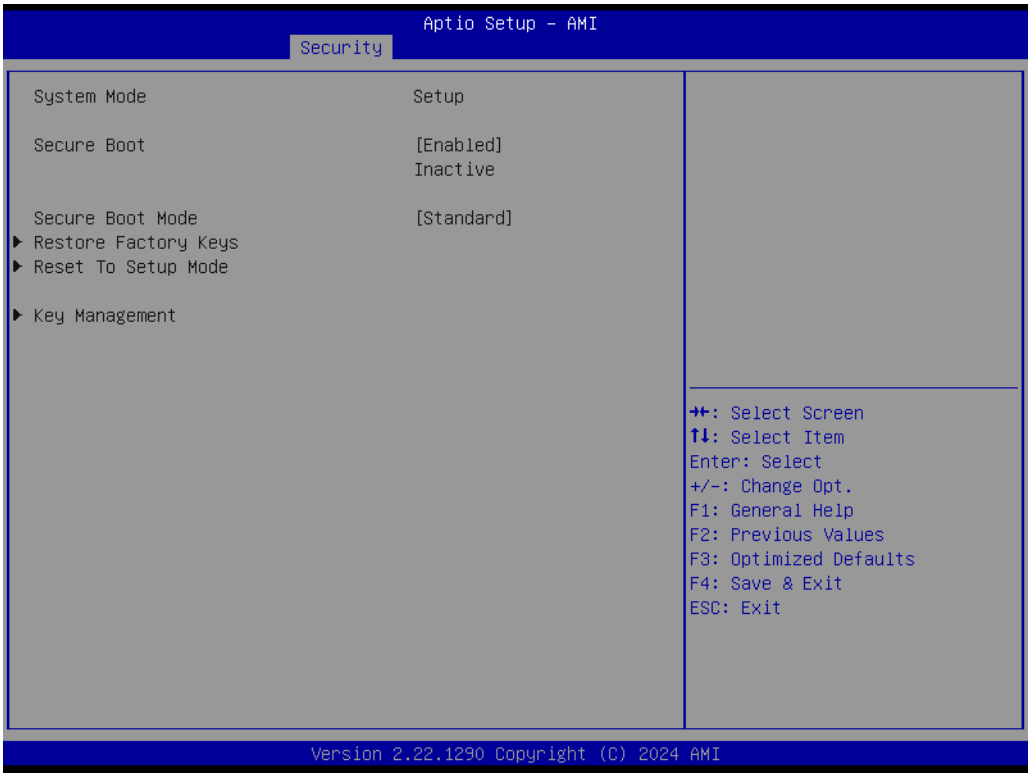
3.2.4 Security

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

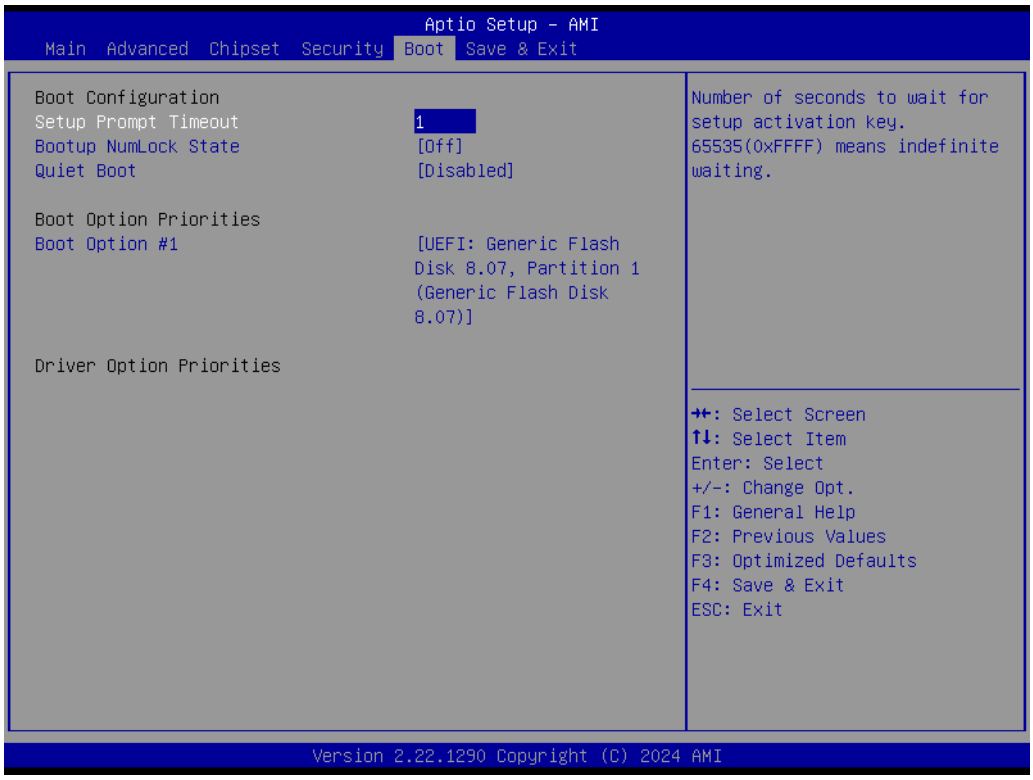
- **User Password**
  Select this option and press <ENTER> to access the sub-menu, and then type in the password to set the User Password.

Secure Boot

Security → Secure Boot

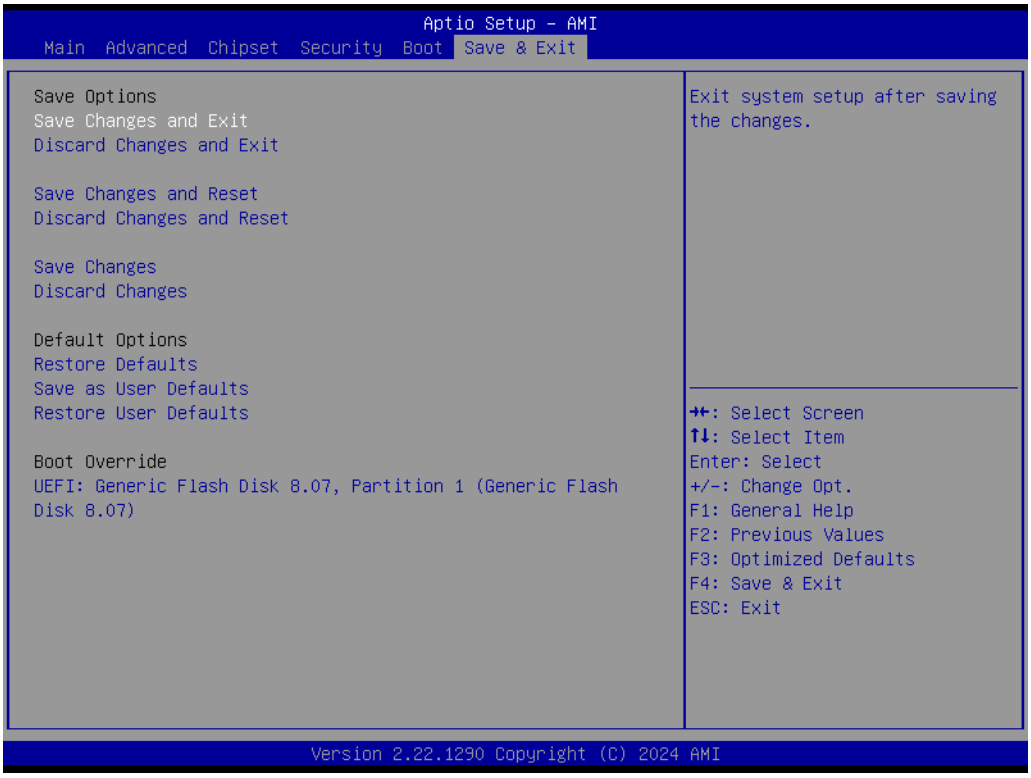


3.2.5 Boot Setting



- **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 the 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 will appear: 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 will appear: 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 the BIOS setup menu and reboot the computer for changes to take effect.
  1. Select **Save Changes and Reset** from the Save & Exit menu and press <Enter>. The following message will appear: 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 all current settings 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

A software API is an interface that defines the ways by which an application program may request services from libraries and/or operating systems. It 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 provides 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 with an 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-289 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 10/11 (64-bit)*

Chapter 6

VGA Setup

6.1 Introduction

The 12th/13th/14th Gen Intel® Core™ i processors are embedded with an integrated graphics controller. You need to install the driver to enable the function.

Intel Graphics Flexible is an optimized integrated graphics solution. It 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. Optimized 3D support delivers an intensive and realistic visual experience.

6.2 Windows 10/11 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 the website to your computer. Navigate to the “AIMB- 289 Technical Downloads” folder and complete the installation of the drivers for Windows 10.

Chapter 7

LAN Configuration

7.1 Introduction

The AIMB-289 has three Gigabit Ethernet LANs (Intel I226V) via dedicated PCI Express x1 lanes 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-289's Intel i226V 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 i226)

Download the driver from the support website on your computer and decompress the file. Select "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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