User Manual

ALD76 ATX Motherboard

Maxtang

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HIGH-DEFINITION MULTIMEDIA INTERFACE

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ALD76 Motherboard

User Manual

(Version 1.0)

Version:		
NO.	Description	Issue Date:
V0.5	Initial Version	2023/10/26
V1.0	Updated the NIC to 3x Intel i210+1xIntel i219	2023/12/25

Contents

Chapter 1 Product Introduction

1.1 Brief Introduction

The ALD-76 is a standard ATX motherboard based on the Intel Alder Lake-S/Raptor Lake-S processor (FCLGA1700 socket) with Z690 chipset.

1.2 Parameters

CPU: PCH Z690 + Intel Alder Lake-S/Raptor Lake-S Series Processor

Memory: 4x UDIMM DDR5 slots, single slot maximum capacity: 32GB, maximum memory capacity in total: 128GB. Please note: each channel's frequency for RAM is 4400MHz when connecting a single strip of memory, 4000MHz when connecting two strips (single-sided particles), and 3600MHz when connecting two strips (double-sided particles).

GPU: Integrated Graphics based on CPU. It supports 4x HDMI1.4, 1xVGA onboard pin for display interfaces. All HDMI1.4 interfaces supports dummy load.

Storage: 1 x M.2_2280 key M Slot for NVMe SSD (PCIe 4X Signal), 8 x SATA3.0 standard interfaces (Support RAID0.1.5.10).

USB: 8x USB3.2Gen 1 ports, 4x USB2.0 onboard headers.

Ethernet: 4x Intel Gigabit Ethernet Controllers (1x Intel i219, 3x Intel i210, Date Rate Per Port: 1.0Gbps)

Audio: Realtek High-Definition Audio Codec, support rear audio ports: Line_out, Line_in and Mic_in; front Line out, Mic-in (onboard headers).

Serial I/O: 5x RS232 COM by default. The COM1 can be set as RS232/RS485/RS422 by jumper.

Expansion: Support 2*PCIe 16X slots (PCIe 4.0 8X Signal)/1*PCIe 16x Slot (PCIe 4.0 16X Signal) +2*PCIe 8X slots (PCIe 4.0 8X Signal).
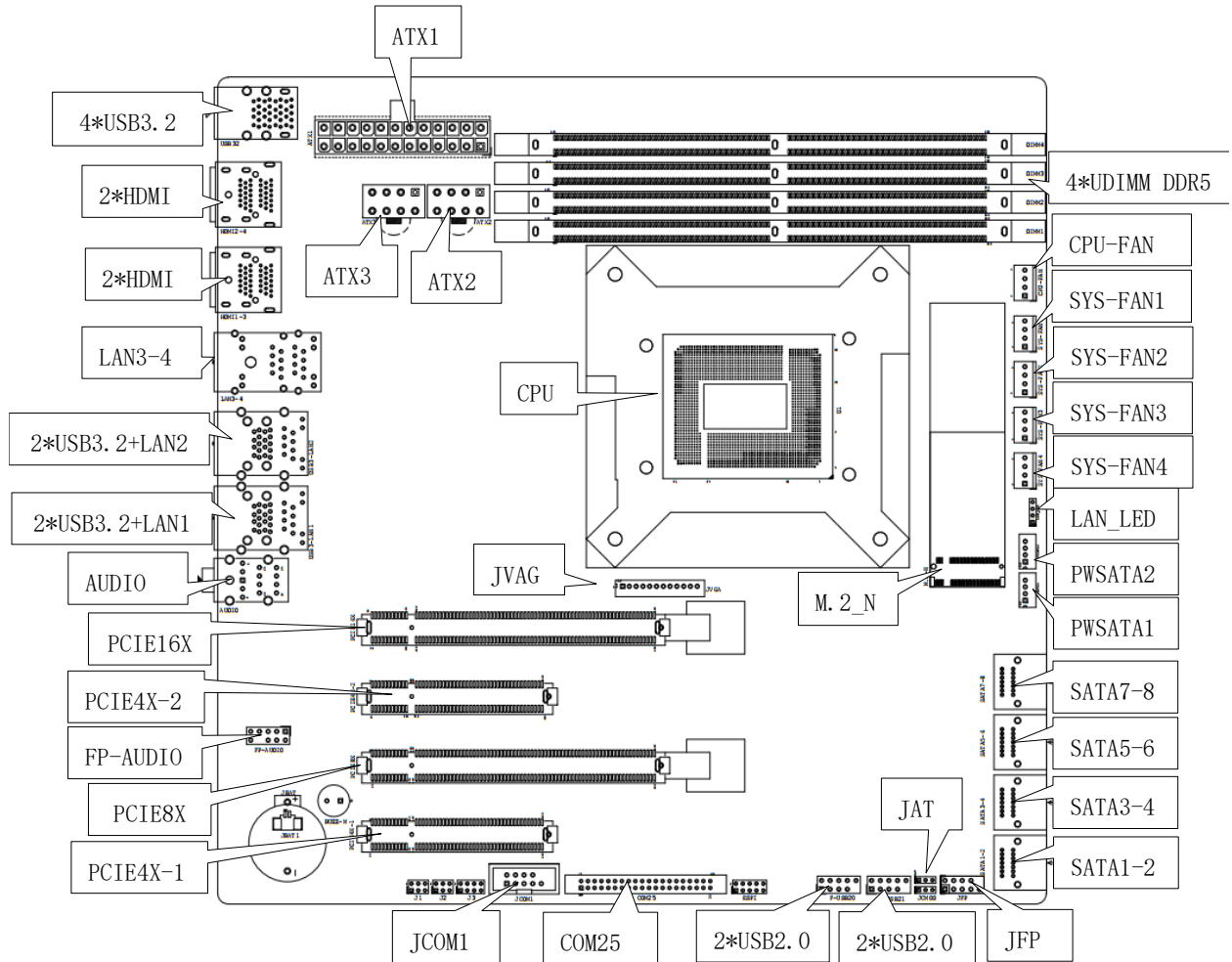
Other: 1xJAT jumper for hardware auto start functions, TPM2.0 onboard optional, 4xSYS-FAN sockets, 1xCPU-FAN sockets.

Dimension: 243.84mm x 243.84mm

Power: ATX_24PIN+2*8 PIN

Operating Temperature: -20℃~60℃

1.3 Connector Diagram

Chapter 2 Hardware

2.1 Installations

Please refer to the following steps for installations:

1. Read the user manual carefully to make sure all the adjustments on the ALD76 are correct.
2. Installing the Memory:
   - Press the ejector tab of the memory slot outwards with your fingertips.
   - Hold the memory module and align the key to the module with that on the memory slot.
   - Gently push the module into the slot until the ejector levers return completely to the closed position, holding the module in place when the module touches the bottom of the slot. To remove the module, press the ejector levers outwards to unseat the module.
3. Installing the expansion cards:
   - Locate the expansion slots and remove the screw, insert the cards into the slot at a 45-degree angle then attach the screw to the expansion cards, gently press down on it then install the screw back.
4. Connect all signal wires, cables, panel control wiring, and power supplies.
5. Start the computer and complete the setup of the BIOS program.

The board's components are integrated circuits and can easily be damaged by Electrostatic Discharge or ESD; therefore, please follow the instructions:

- Hold the board's edge when handing, and do not touch onboard pins, components, or plug sockets.
- When touching integrated circuit components (such as CPU, RAM, etc.), please wear an anti-static wrist strap/glove to avoid electrostatic discharge damage to the board or other sensitive components.
- Before installing the integrated circuits/sensitive components, place the sensitive components in anti-static bags to keep them safe from ESD.
- Please make sure the power switch is OFF before plugging the power plug.

2.2 Jumper Setting

Please configure the jumpers according to your requirements before installing the hardware.

How to identify the first header of jumpers and pins: Observe the mark beside the jumper or pins and find the header marked by "1" or bold line or triangular symbol. Or observe the rear panel and the header with a square solder pad is the first header.

2.3 Memory Slots

The board supports 4x UDIMM DDR5 slots, a maximum capacity of 32GB for a single slot, and a maximum memory capacity of 128GB in total. Please note: each channel's frequency for RAM is 4400MHz when connecting a single strip of memory, 4000MHz when connecting two strips (single-sided particles), and 3600MHz when connecting two strips (double-sided particles).

Please make sure to hold the memory module and align the key to the module with that on the memory slot. While choosing a memory module, please make sure the module matches the specification.

2.4 Display Interfaces

The board provides 4x HDMI1.4, 1xVGA onboard pin for display interfaces. All HDMI1.4 interfaces supports dummy load.

2.5 Storage (Screen Printing: SATA1-2, SATA3-4, SATA5-6, SATA7-8, M.2-N)

The board provides 1 x M.2_Key M type 2280 for NVMe SSD (PCIE4.0 4X Signal), 8 x SATA3.0 standard interfaces, and supports two 1*4PIN SATA hard disk power supply interfaces (2.0mm spacing).

In addition, the board supports RAID mode, allowing for different RAID configurations including RAID 0, 1, 5, and 10. The RAID0 mode supports up to 6 hard disk drives, RAID1 up to 2 hard disk drives, RAID5 up to 6 hard disk drives, and RAID10 up to 4 hard disk drives.

Location to enable RAID mode in BIOS: Chipset -->System Agent (SA) Configuration-->VMD setup menu- ->Enable VMD controller, set to Enabled.

PWSATA, PWSATA Pin Definition (Screen Printing: PWSATA1, PWSATA2)

Pin	Signal
1	5V
2	GND
3	GND
4	12V

2.6 USB Interfaces

The board supports 8x USB3.2 Gen 1 ports, 4x USB2.0 onboard pins (2.54mm spacing).

USB2.0 Pin (Screen Printing: F-USB20, F-USB21)

Signal	Pin		Signal
VCC 5V	1	2	VCC 5V
USB DATA-	3	4	USB DATA-
USB DATA+	5	6	USB DATA+
GND	7	8	GND
(NULL)	9	10	NC

2.7 Audio (Screen Printing: FP-AUDIO)

The board features Realtek High-Definition Audio Codec, the audio interface colored blue is the audio input connector (Line-in), colored green is the audio output connector (Line-out), and colored pink is the microphone input connector (MIC-in). The FP-Audio is the front audio pin (2.54mm spacing).

FP-AUDIO (Screen Printing: FP-AUDIO)

Signal	Pin		Signal
MIC2-L	1	2	AGND
MIC2-R	3	4	AVCC

FRO-R	5	6	MIC2-JD
F-IO-SEN(AGND)	7	8	(NULL)
FRO-L	9	10	LIN2-JD

2.8 COM (Screen Printing: JCOM1, COM25)

The board provides five standard RS232 serial ports (COM1 2.54mm spacing, COM2_5 2.0mm spacing), and the COM1 can set as RS232/RS485/RS422 through jumper.

RS232 Pin Definition (Screen Printing: JCOM1)

Signal	Pin		Signal
DCD	1	2	RXD
TXD	3	4	DTR
GND	5	6	DSR
RTS	7	8	CTS
RI	9		

COM25 Pin Definition (Screen Printing: COM25)

Signal	Pin		Signal
DCD#	1	2	RXD
TXD	3	4	DTR#
GND	5	6	DSR#
RTS#	7	8	CTS#
RI#	9	10	NC
DCD#	11	12	RXD
TXD	13	14	DTR#
GND	15	16	DSR#
RTS#	17	18	CTS#
RI#	19	20	NC
DCD#	21	22	RXD
TXD	23	24	DTR#
GND	25	26	DSR#
RTS#	27	28	CTS#
RI#	29	30	NC
DCD#	31	32	RXD
TXD	33	34	DTR#
GND	35	36	DSR#
RTS#	37	38	CTS#
RI#	39	40	NC

COM1 Pin Definition (RS232/RS485/RS422 optional)

Pin	RS232	RS485	RS422
1	DCD	DATA-	TX-
2	RXD	DATA+	TX+
3	TXD	(NC)	RX+
4	DTR	(NC)	RX-
5	GND	GND	GND
6	DSR	(NC)	(NC)
7	RTS	(NC)	(NC)
8	CTS	(NC)	(NC)
9	RI	(NC)	(NC)

Set the JCOM1 through jumper J1, J2, J3:

Interface	RS232	RS485	RS422
JCOM1	J1(1-3,2-4)	J1(3-5,4-6)	J1(3-5,4-6)
	J2(1-3,2-4)	J2(1-3,2-4)	J2(3-5,4-6)
	J3(1-2,3-5)	J3(3-4,7-8)	J3(1-3,5-6)

2.9 Switch Panel Socket (screen printing: JFP)

The board provides a front control panel pin for connecting to the function buttons and indicators on the front panel of the chassis.

Switch Panel Pin (screen printing: JFP)

Signal	Pin		Signal
HDD_LED+	1	2	PWR_LED+
HDD_LED-	3	4	PWR_LED-
RSTBTN-	5	6	PWR_ON+
RSTBTN+	7	8	PWR_ON-
(NC)	9	10	(NULL)

2.10 SYSTEM FAN/CPU FAN Socket

The board provides a 4Pin CPU fan socket and four 4Pin system fan sockets for cooling. Please note: The *system FAN1 setting* under the BIOS controls the "SYSFAN1/3" and the *System FAN2 Setting* controls the "SYSFAN2/4."

CPU Fan Definition (screen printing: CPU-FAN)

Pin	Signal
1	GND

Pin	Signal
2	12V
3	TAC
4	CTL

System Fan Definition (screen printing: SYS-FAN1, SYS-FAN2, SYS-FAN3, SYS-FAN4)

Pin	Signal
1	GND
2	12V
3	TAC
4	CTL

2.11 ATX Power Supply (Screen printing: ATX1, ATX2, ATX3)

The board power supply: ATX power supply (ATX_24PIN+2*8PIN).

ATX_24PIN DEFINTION (screen printing: ATX1)

Signal	Pin		Signal
+3.3V	1	13	+3.3V
+3.3V	2	14	-12V
GND	3	15	GND
+5V	4	16	PS_ON
GND	5	17	GND
+5V	6	18	GND
GND	7	19	GND
PWR_OK	8	20	NC
5VSB	9	21	+5V
+12V	10	22	+5V
+12V	11	23	+5V
+3.3V	12	24	GND

8PIN DEFINTION (screen printing: ATX2, ATX3)

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

GND	4	8	+12V

2.12 LAN (Screen printing: LAN1, LAN2, LAN_LED)

The board features four high-speed ethernet controllers, which include 1x Intel i219 (Date Rate Per Port: 1.0 Gbps) plus 3x Intel i210 (Data Rate Per Port: 1.0 Gbps).

All four LANs support network wake-up (Magic packet wake-up), while LAN1 (Intel i219) supports UEFI PXE network boot. In order to utilize UEFI PXE network boot, it is necessary to set (IPv4 PXE Support) to "Enabled" under the BIOS settings.

The board also provides a group of LAN_LED pins, enabling the extension of the LAN1/LAN2 (orange) status indicator light to the chassis panel.

LED Interface Status Indicators:

LI_LED (Green) Status	Function	ACT_LED (Orange) Status	Function
Always on	Network Connect	Blinking	Data Transmission

LAN_LED (Screen Printing: LAN_LED)

Pin	Signal
1	LAN1_D+
2	LAN1_D-
3	LAN2_D-
4	LAN2_D+

2.13 Expansion Slot (Screen Printing: PCIE16X, PCIE4X-1, PCIE4X-2, PCIE8X)

The board support two PCIe16X slots (PCIE 4.0 8X Signal) or one PCIe16X slot (PCIE 4.0 16X Signal), plus 2 PCIe 8X slots (PCIe4.0 4X Signal).

2.14 Hardware Auto Start (Screen Printing: JAT)

The board features JAT (2.0mm spacing) for hardware auto start functions, which support automatic booting upon power connection.

JAT (Screen Printing: JAT)

Pin	Setting	Function
1-2	Close	Hardware Auto Start
2-3	Close	NC

2.15 CMOS Clearance/Retention (screen printing: JCMOS)

CMOS is powered by onboard button batteries. Clearing CMOS will permanently remove the previous system settings and restore the board system to original settings (factory settings).

1. Turn off the computer and disconnect the power.
2. Use a jumper cap to short the 1st and 2nd pins of JCMOS for approximately 30 seconds, then remove the jumper cap.
3. Reinsert the jumper cap onto the 2nd and 3rd pins of JCMOS (Note: Closing pins 1 and 2 clears the CMOS).

4. Start the computer and press the <Del> key to enter the BIOS. Load optimized default values, save the settings, and exit.

CMOS (Screen Printing: JCMOS)

Pin	Setting	Function
1-2	Close	Clear CMOS
2-3	Close	NC

⚠ Do not clear the CMOS while the computer is powered on to prevent potential damage to the board.

Chapter 3 BIOS Setup

3.1 Entering the BIOS

1.   Turn on the computer and press <Delete> entering the BIOS
2.   After the computer is turned on, keep pressing F11, select enter Setup
3.   BIOS Hotkeys:
         F9: Restore to Factory setting.
         F10: Save and Exit.
         ESC: Exit

3.2 Main Setup (BIOS info, Date, Time)

When you enter the BIOS Setup utility the first things you will encounter is the Main Setup screen. Shown below is the Main BIOS Setup screen. You can always return to the Main setup by selecting the Main tab.
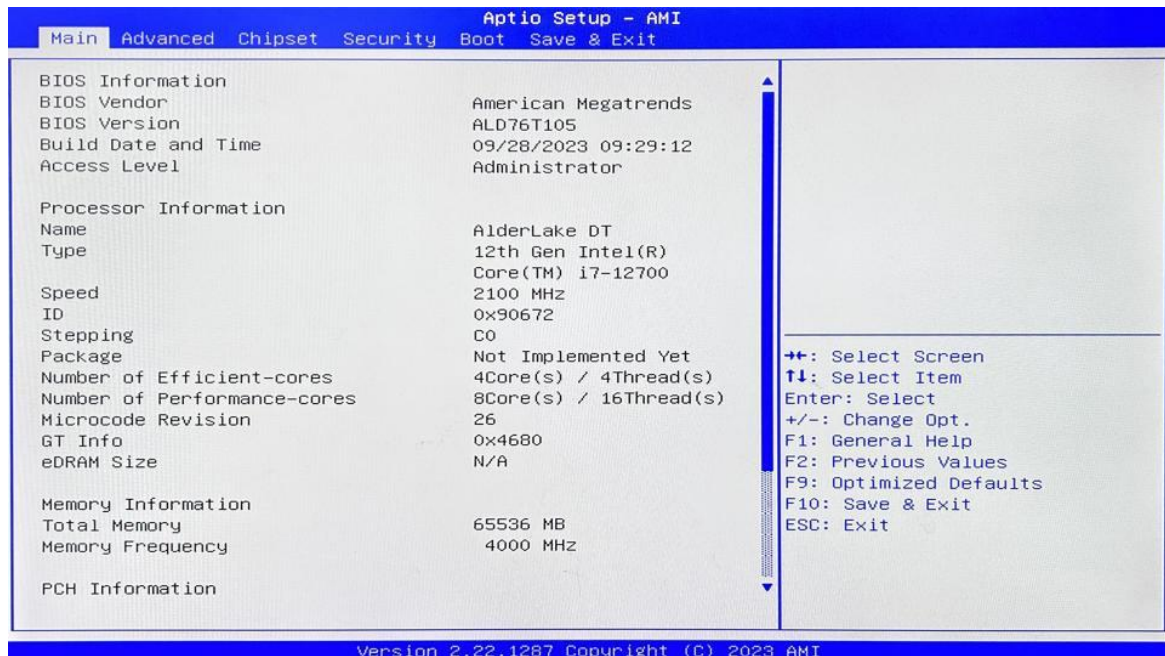
System Date: Set the date. MM/DD/YY format.
System Time: Set the time. HH:MM: SS format.

3.3 Advanced Settings
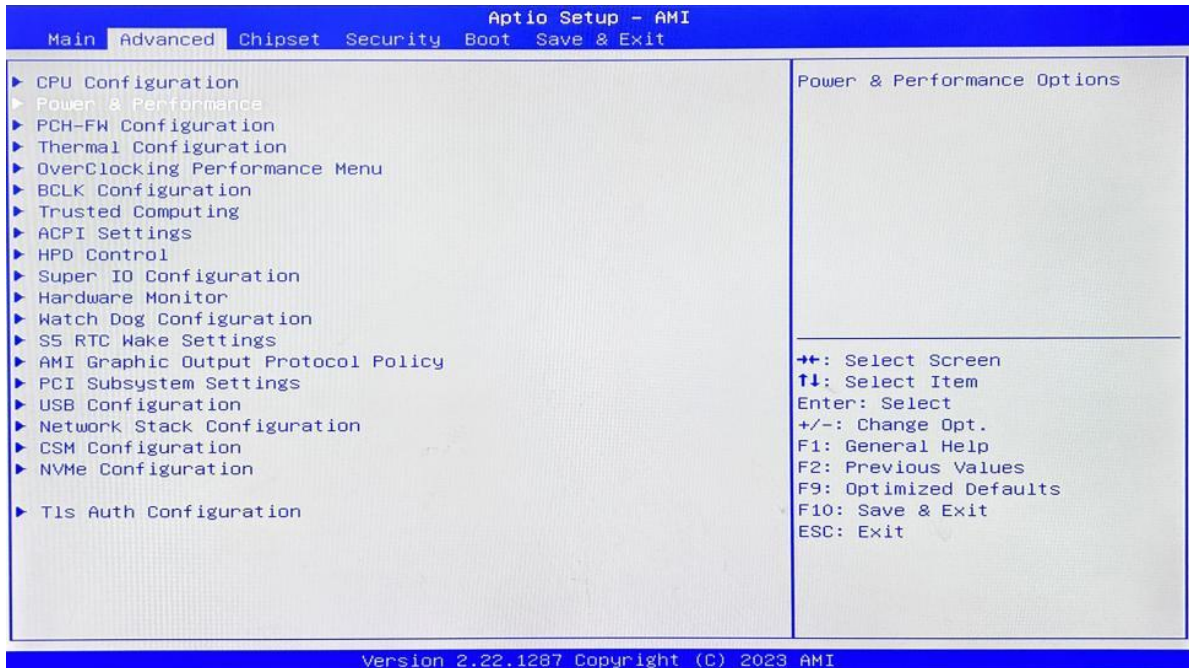
Select any of the items in the left frame of the screen. The advanced sections allow you to configure, improve and set up system features according to the preference of the CPU Configuration. All Advanced BIOS Setup options are described as follows.

3.3.1 Power & Performance

CPU-Power Management Control
GT-Power Management Control

3.3.2 CPU-Power Management Control

1) Intel® Speedstep®(TM):

Enhanced Intel SpeedStep® Technology enables the operating system to control multiple frequencies and voltage points for optimal performance and power efficiency.

2) Intel® Speed Shift Technology:

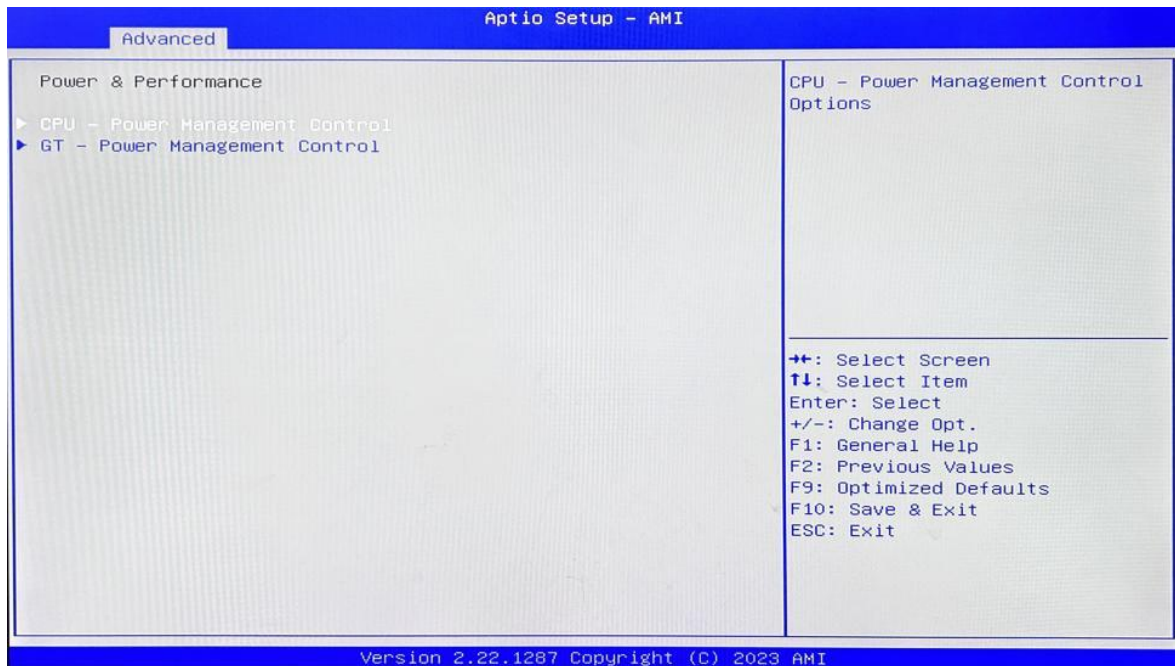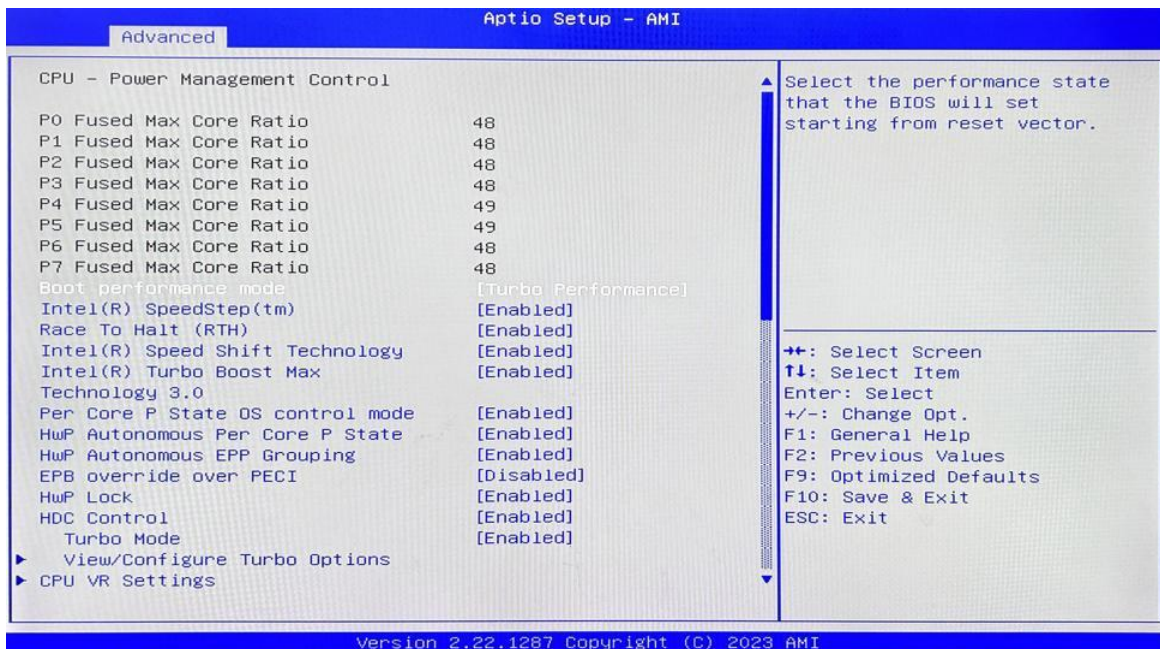An energy-efficient frequency control method by the hardware rather than relying on OS control. Processor decision is based on the different system constraints for example Workload demand, and thermal limits while taking into consideration the minimum and maximum levels and activity window of performance requested by the operating system. Default enabled.

3) Intel ® Turbo Boost Max Technology 3.0

When Intel Turbo Boost Technology is activated, the CPU dynamically modifies its clock frequency (core frequency) according to the present workload. This empowers the CPU to provide peak performance during demanding tasks and optimize energy efficiency during lighter workloads. This feature is activated by default (Enabled).

4) Turbo Mode

The Turbo mode refers to Nehalem's "Integrated Power Gate" power management technology, which allows running off some cores and adding power to the others so that they run at a higher frequency. The capacity of the entire CPU remains unchanged, and the efficiency of the CPU is optimized. Default enabled.

5) C states

Idle States (C-states) are used to save power when the processor is idle. C0 is the operational state, meaning that the CPU is doing useful work 100% load. C1 is the first idle state, C2 the second, and so on, where more power-saving actions are taken for numerically higher C-states. C1 to C3 cuts off the clock inside the CPU, and C4 to C6 reduces the CPU voltage. Default enabled.

6) Enhanced C states

C1 to C3 cuts the clock inside the CPU. C4 and C6 mode reduces CPU voltage. Features two way "Enhanced" mode, enable by default.

3.3.3 GT-Power Management Control
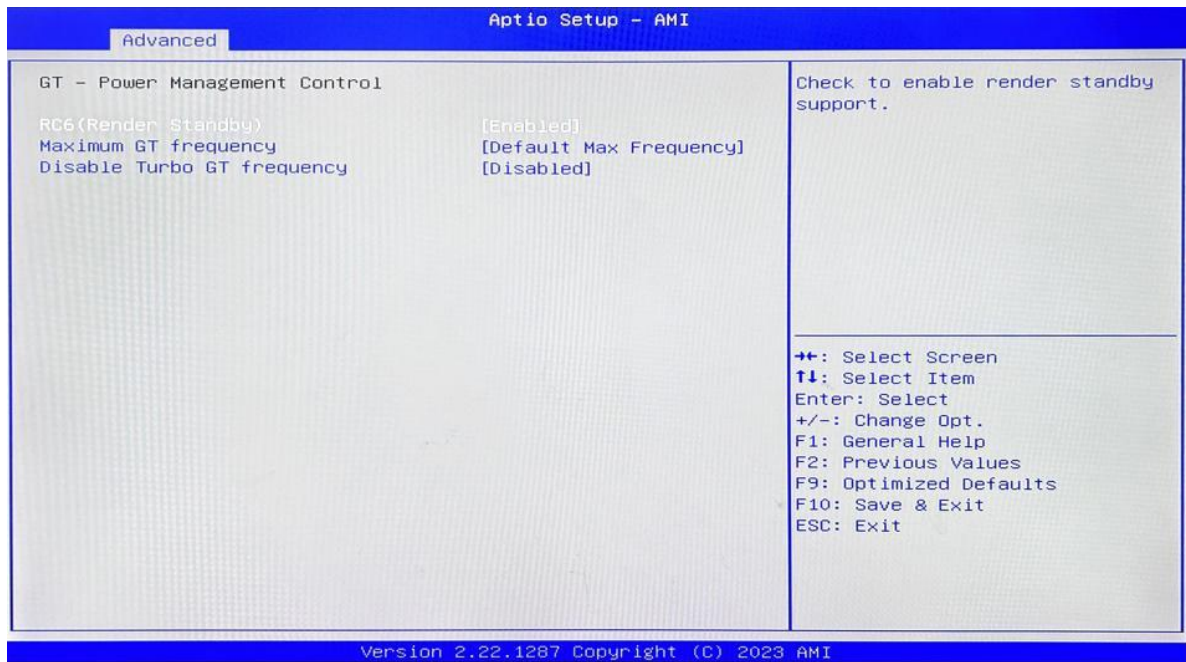
RC6(Render Standby):

Allow/Prohibit integrated graphics card standby, the setting item has been Enabled/Prohibited, and the default setting is (Enabled).

Maximum GT frequency：

Maximum GT Frequency, Default max frequency.

Disable Turbo GT frequency：

Disable Turbo GT Frequency mode, Default disabled.

3.3.4 Thermal Configuration
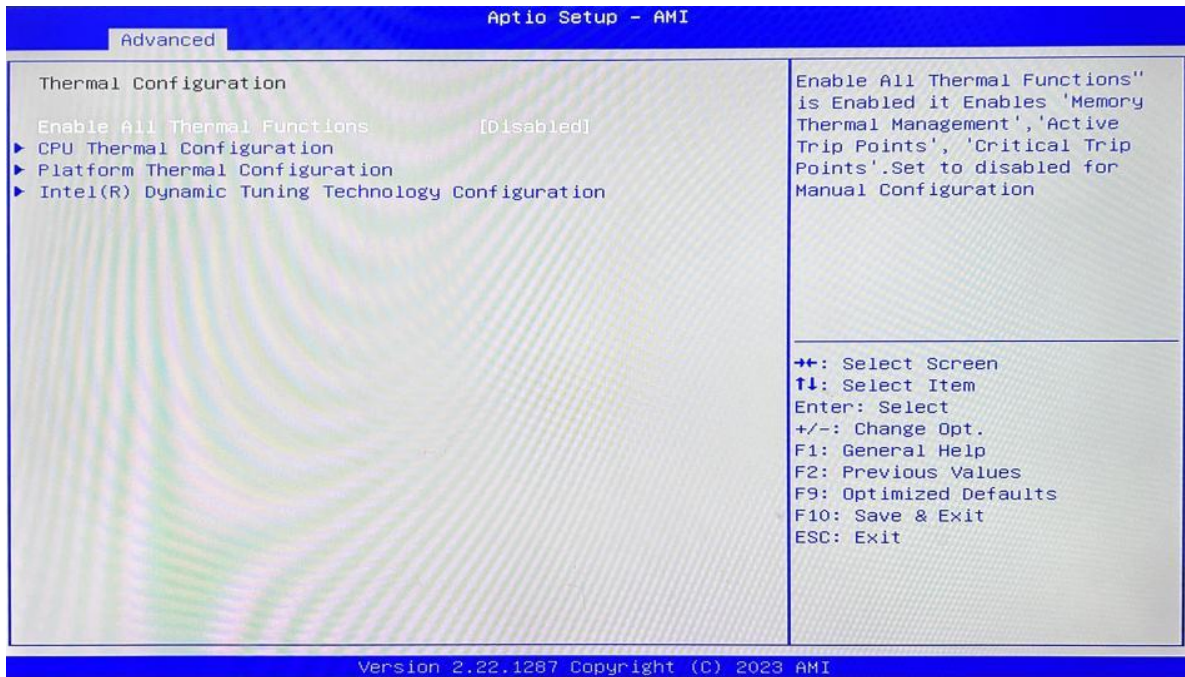
Enable All Thermal Functions

CPU Thermal Configuration:

　　Unlocks the temperature setting, the "Tcc Activation Offset" is the temperature adjustment option, the highest temperature is 105°C. Change the temperature by minus the number of degrees you wish to change. For example, minus 0(105-0) to set the temperature at 105°C, minus 20(105-20) to set the temperature at 85°C.

Platform Thermal Configuration

Intel® Dynamic Tuning Technology Configuration

3.3.5 OverClocking Performance Menu
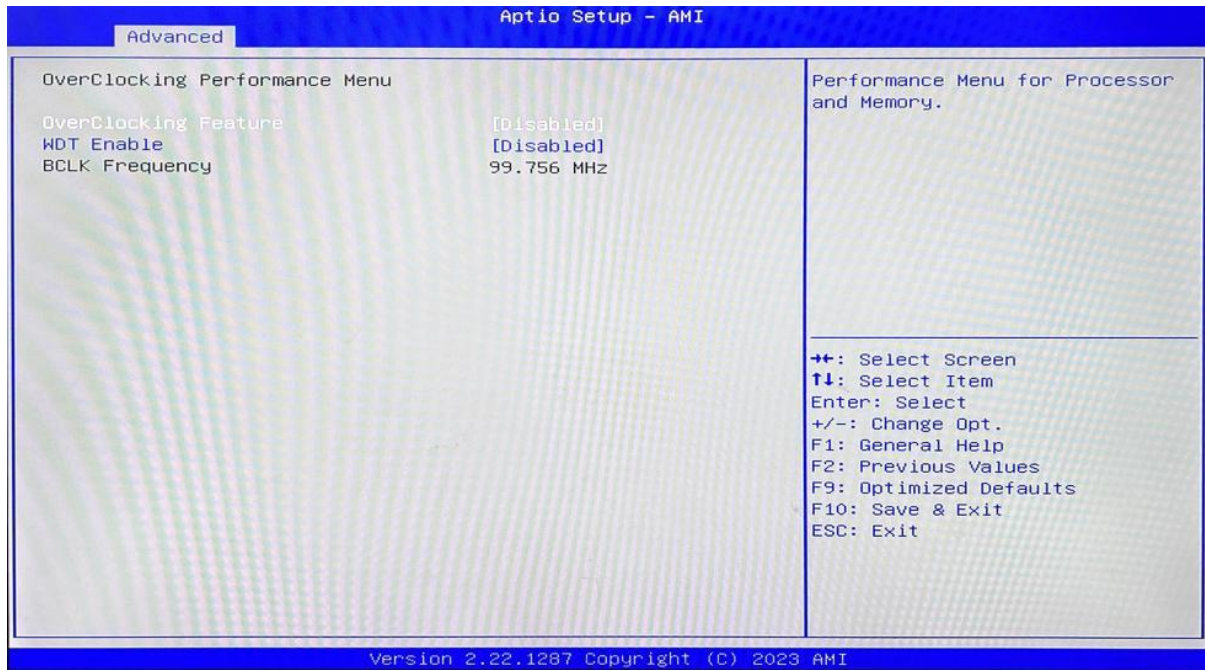
Over Clocking Feature: Disabled

WDT (Watchdog Timer) Enable: Disabled

BCLK Frequency

3.3.6 ACPI Settings
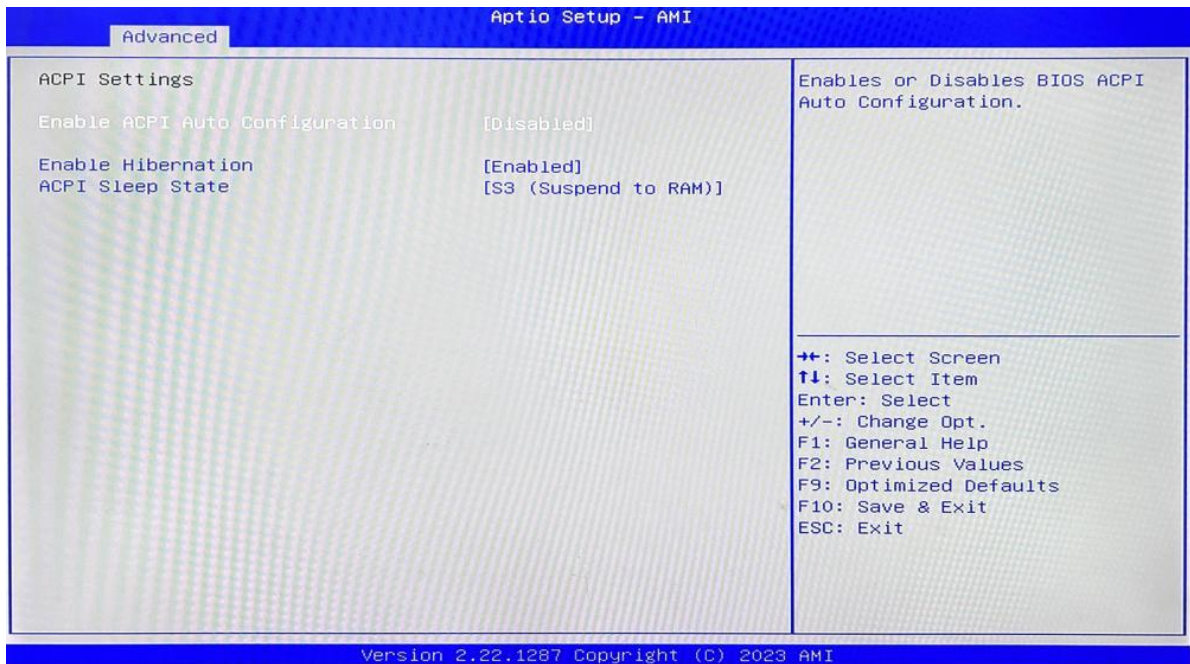
Enabled ACPI Auto Configuration

Enabled Hibernation

ACPI Sleep State

3.3.7 Super IO Configuration

Serial Port 1~5 Configuration

    Serial Port: Enable or disable serial port (COM).

    Device Setting (Read-only): Displays serial ports' interrupt and location.

    Change Setting: Change serial port settings and suggest setting "Auto" as default.

3.3.8 Hardware Monitor

```
                              Aptio Setup - AMI
   Advanced

  Pc Health Status                                  Smart Fan function setting

  CPU temperature              : +42 °C
  System temperature          : +43 °C
  CPU Fan Speed               : 1234 RPM
  System Fan1 Speed           : N/A
  System Fan2 Speed           : N/A
  System Fan3 Speed           : N/A
  System Fan4 Speed           : N/A
  Vcore                       : +0.719 V
  V_SM                        : +1.115 V
  3.3V_SYS                    : +3.344 V
  5V_SYS                      : +4.972 V
▶ Smart Fan Function                               ➔←: Select Screen
                                                   ↑↓: Select Item
                                                   Enter: Select
                                                   +/-: Change Opt.
                                                   F1: General Help
                                                   F2: Previous Values
                                                   F9: Optimized Defaults
                                                   F10: Save & Exit
                                                   ESC: Exit

                      Version 2.22.1287 Copyright (C) 2023 AMI
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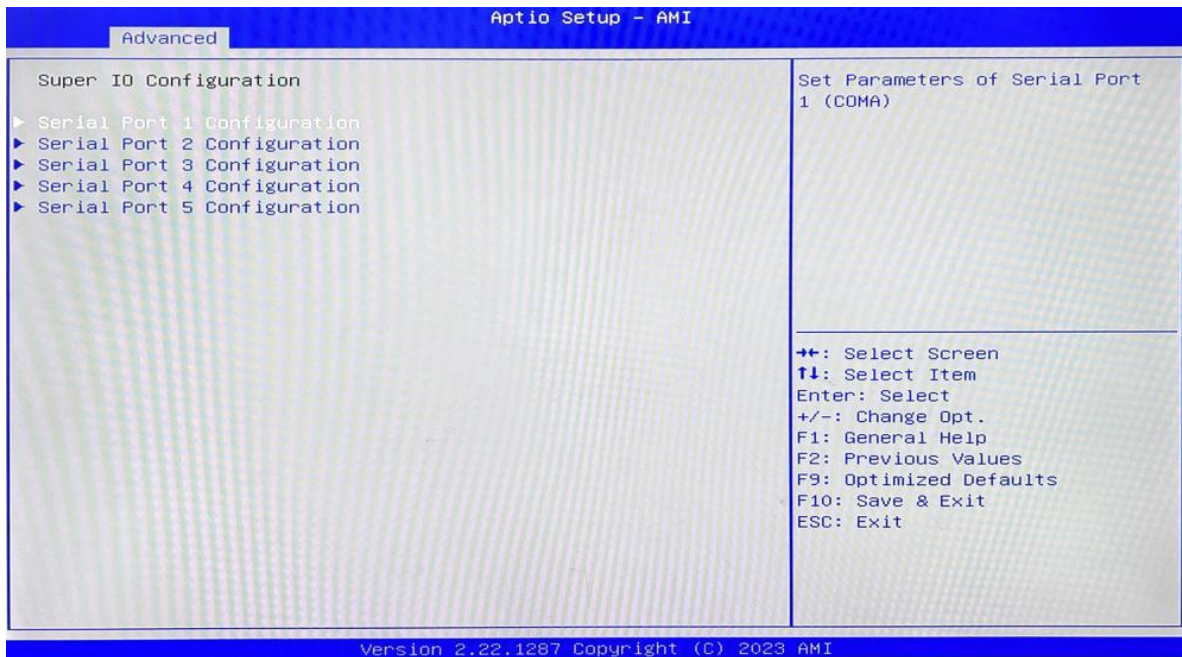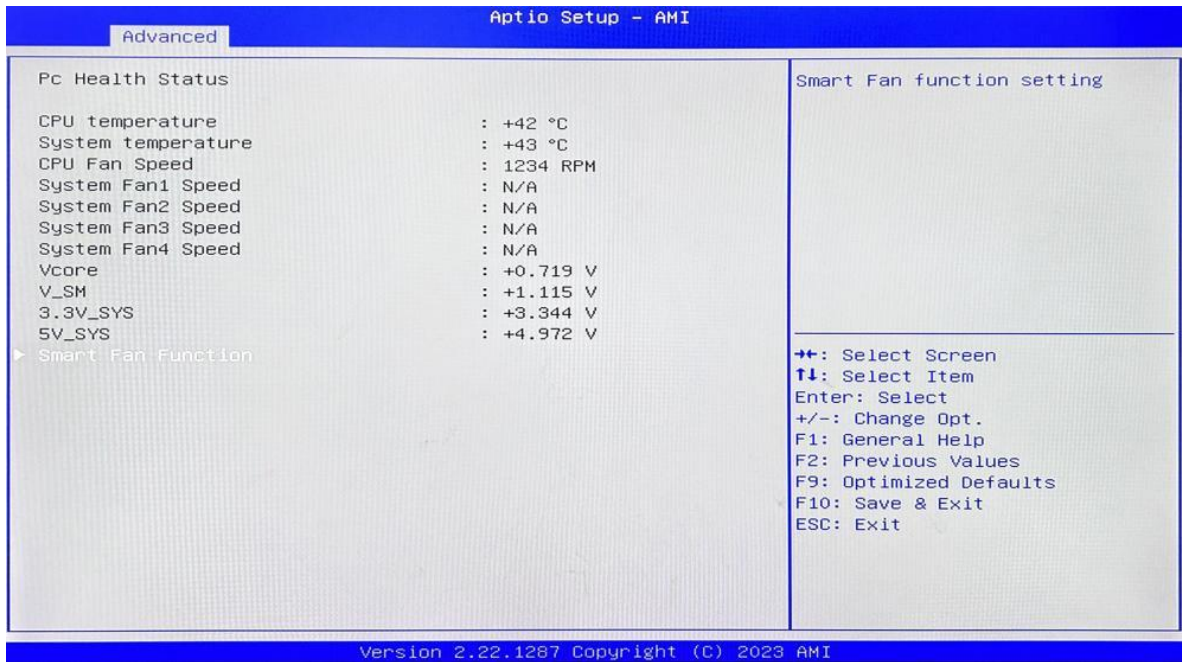
PC Health Status

The PC health status displays CPU temperature, system temperature, fan speed, and other relevant voltage values. The above parameters have a certain range, and the system cannot run beyond these ranges.

1. CPU Temperature

2. System Temperature

3. CPU Fan Speed

4. System Fan1 Speed

5. System Fan2 Speed

6. System Fan3 Speed

7. System Fan4 Speed

8. VCore: Core Voltage

9. V_SM: RAM Voltage

10. 3.3V_SYS: 3.3V

11. 5V_SYS: 5V

12. Smart Fan Function:

> 1) CPU Fan Setting
>
> 2) System Fan1 Setting
>
> 3) System Fan2 Setting

> The CPU Fan Speed and the System Fan Speed can be set separately according to specific needs:
>
> 1) Automatic Mode
>
> 2) Full on Mode
>
> 3) Manual Mode

3.3.9 Watch Dog Configuration
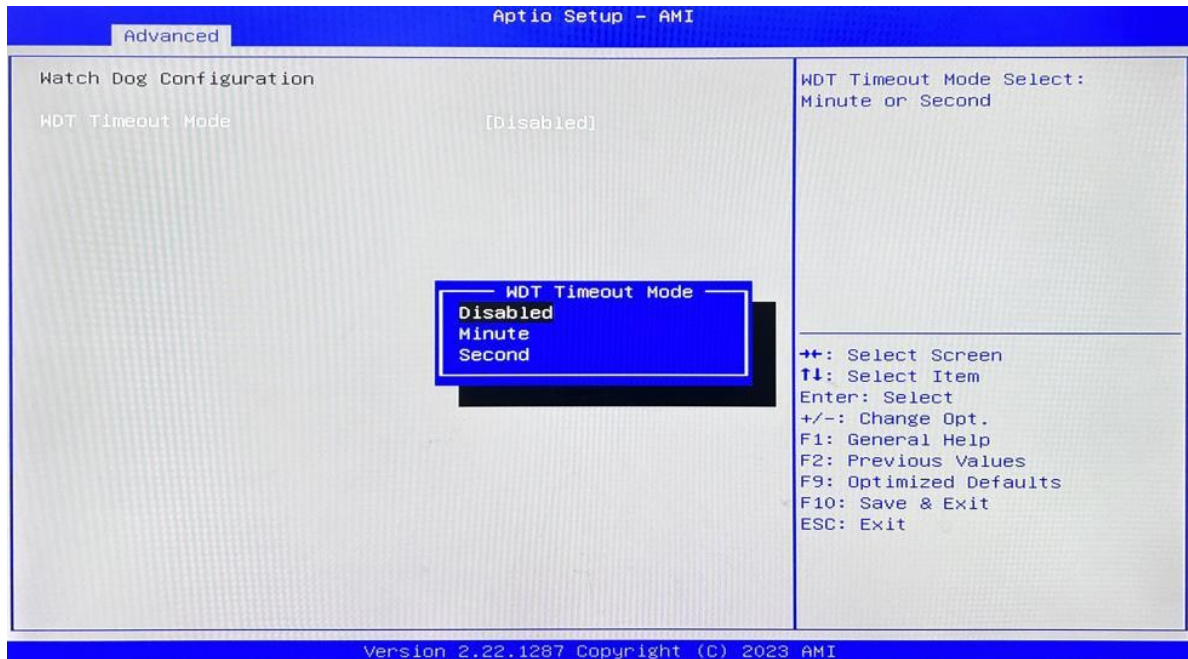
Watch Dog Configuration

    WDT Timeout Mode select: Minute or Second

3.3.10 S5 RTC Wake Settings

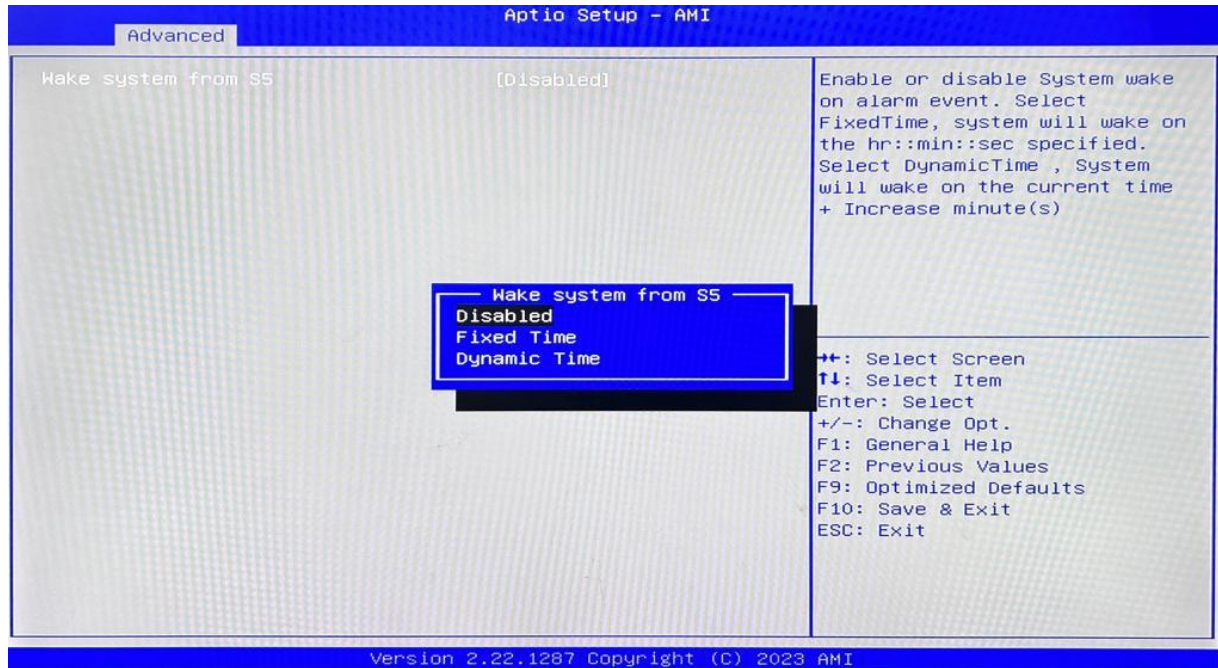**Wake system From S5**: timing boot settings, disabled by default.

    Fixed Time: Select Fixed Time and the system will wake on the Hr: Min: Sec specified.

    Dynamic Time: Select Dynamic Time and the system will wake on a dynamic time.

3.3.11 USB Configuration
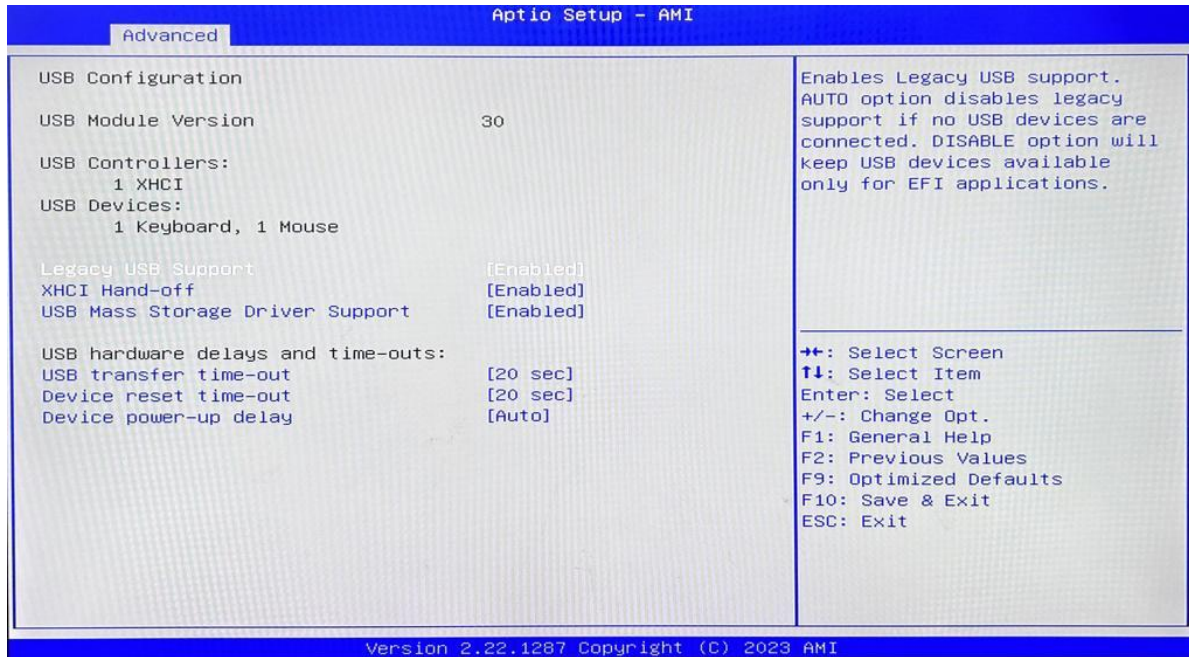
Legacy USB Support

Enable Legacy USB support. Disables legacy support if no USB devices are connected. Select enable will keep USB devices available under UEFI's support.

XHCI Hand-off

Whether to enable the USB XCHI transfer protocol. A workaround for OS without XHCI hand-off support. The XHCI ownership change should be claimed by the USB XCHI driver.

USB Mass Storage Driver Support

Enable(default) or disable USB Mass Storage Driver Support.

USB Transfer Time-out

Time-out value for control, bulk, and interrupt transfers, default time:20 second.

Device Reset Time-out

USB mass storage device start unit command time-out, default time:20 second.

Device Power-up Delay

Maximum time the device will take before it properly reports itself to the host controller.

3.3.12 Network Stack Configuration
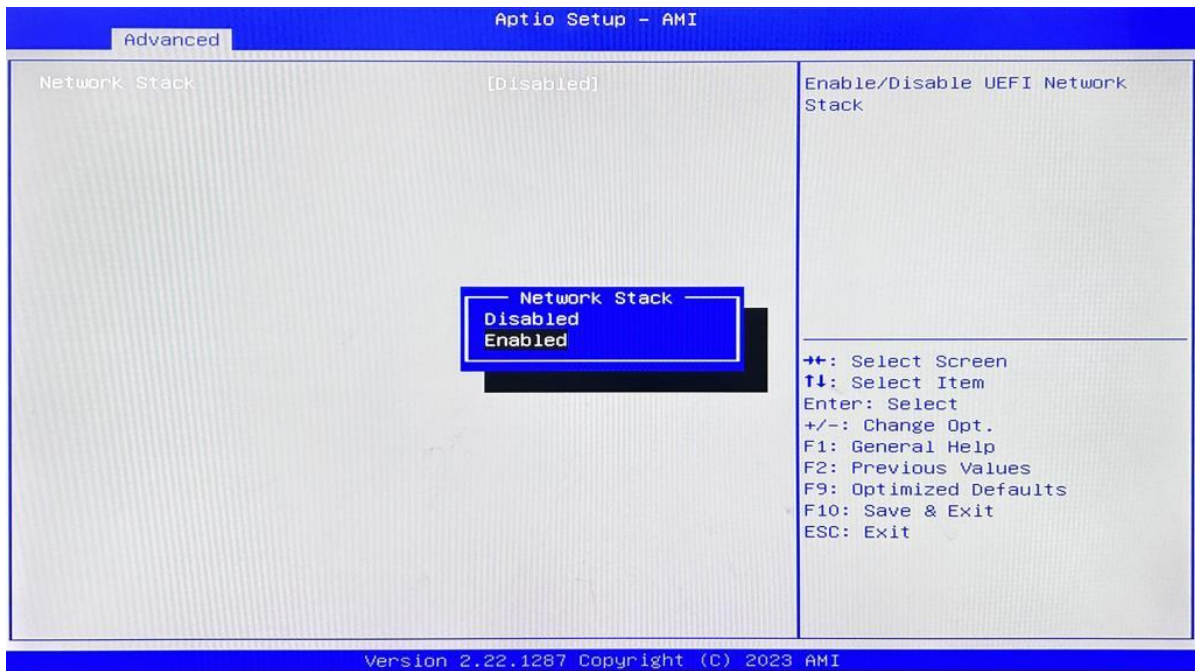
Network Stack

PXE Network boot setting, disabled by default.

3.3.13 CSM Configuration

Boot Option Filter

Option ROM Execution

      Network

      Storage

      Video

      Other PCI Devices

3.3.14 NVMe Configuration
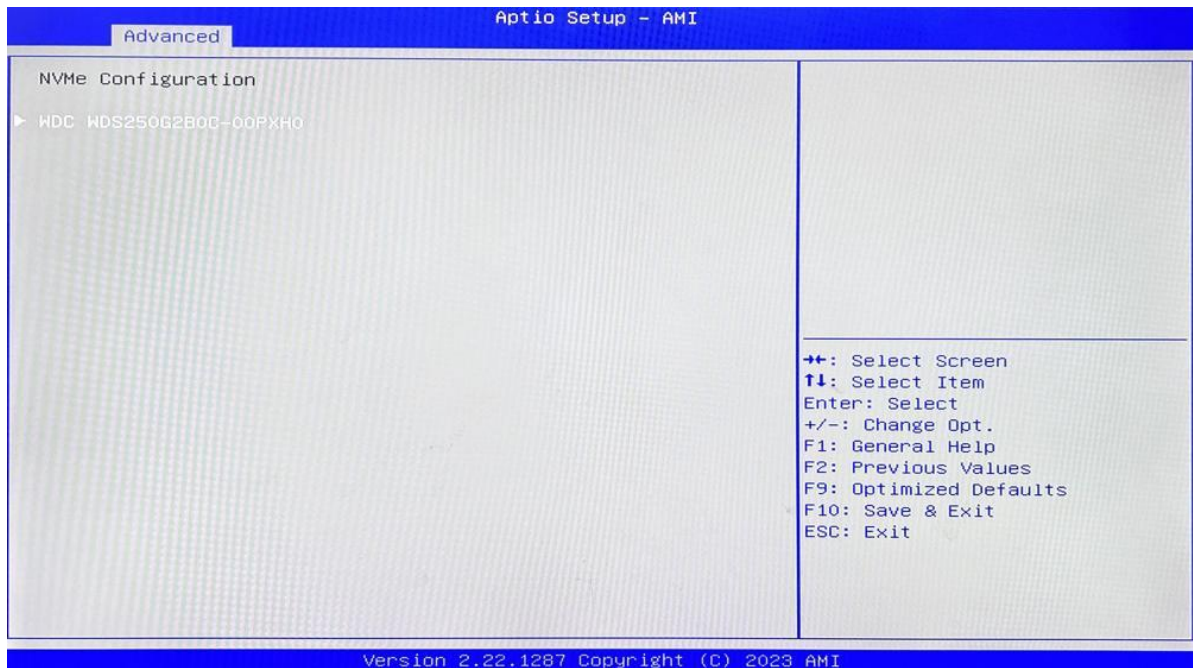
The capacity and model of the SSD will be displayed under the option after the NVMe protocol SSD has been installed.

3.4 Chipset

Select the chipset tab from the setup screen to enter the chipset BIOS Setup screen.

```
                            Aptio Setup - AMI
      Main  Advanced  Chipset  Security  Boot  Save & Exit

   ▶ System Agent (SA) Configuration          System Agent (SA) Parameters
   ▶ PCH-IO Configuration







                                              →←: Select Screen
                                              ↑↓: Select Item
                                              Enter: Select
                                              +/-: Change Opt.
                                              F1: General Help
                                              F2: Previous Values
                                              F9: Optimized Defaults
                                              F10: Save & Exit
                                              ESC: Exit



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```
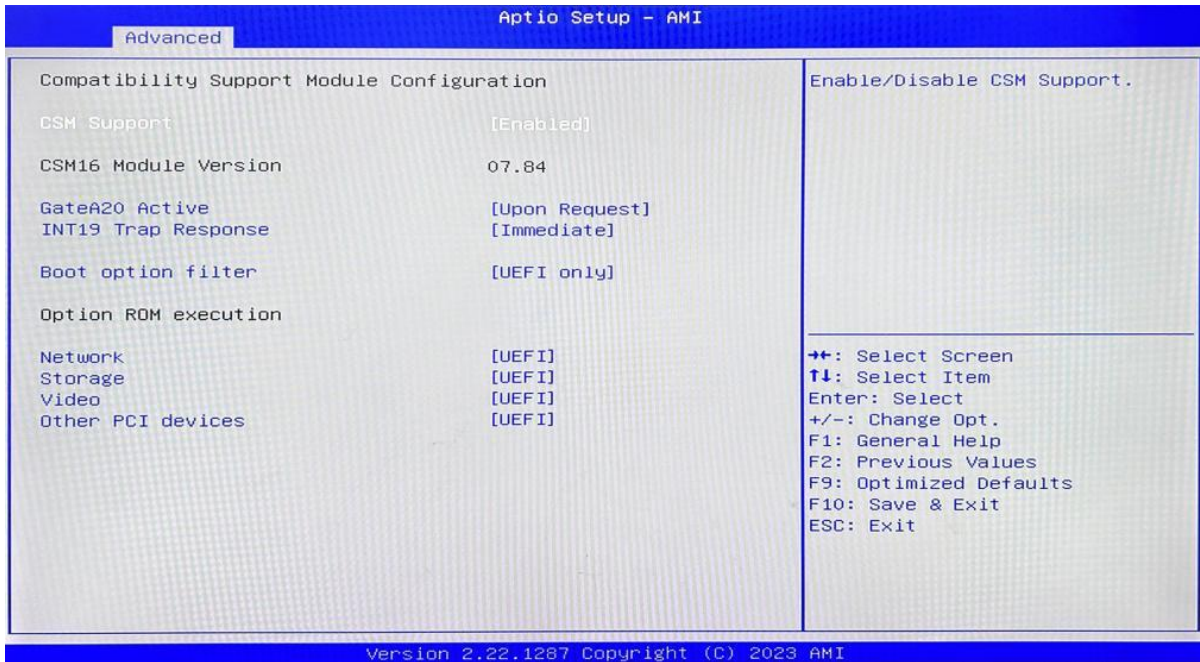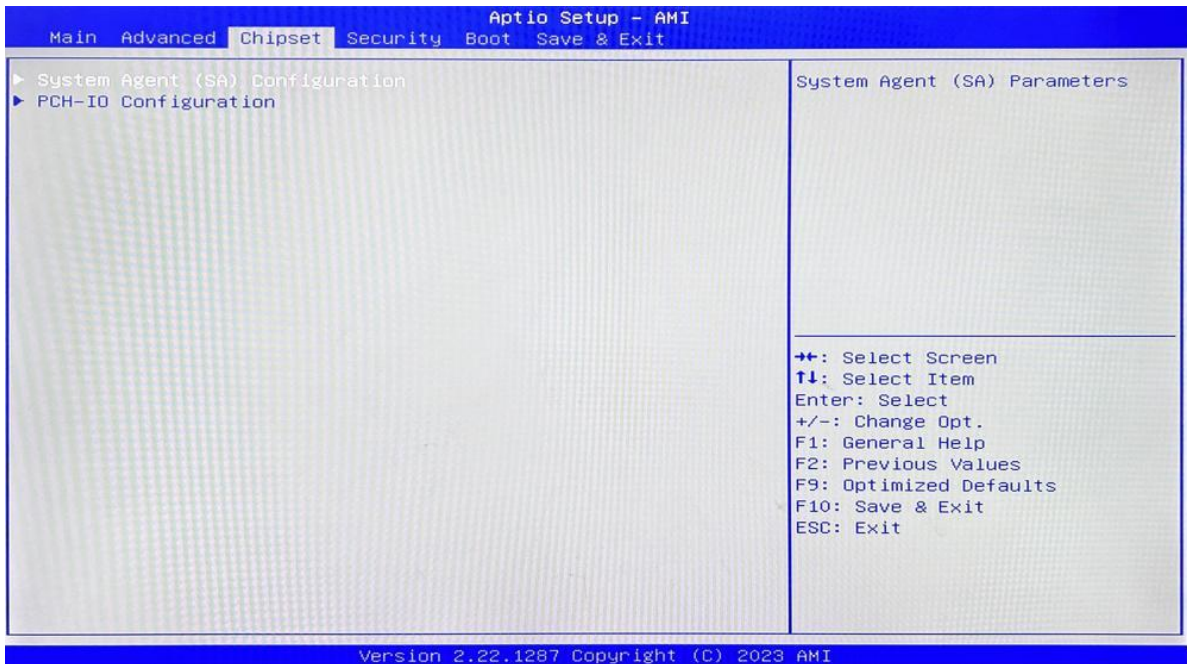
System Agent (SA) Configuration: Northbridge configuration options, including video memory, display devices, and other options.

PCH-IO Configuration: Southbridge configuration options, including hard disk, sound card equipment, and other options

3.4.1 System Agent (SA) Configuration
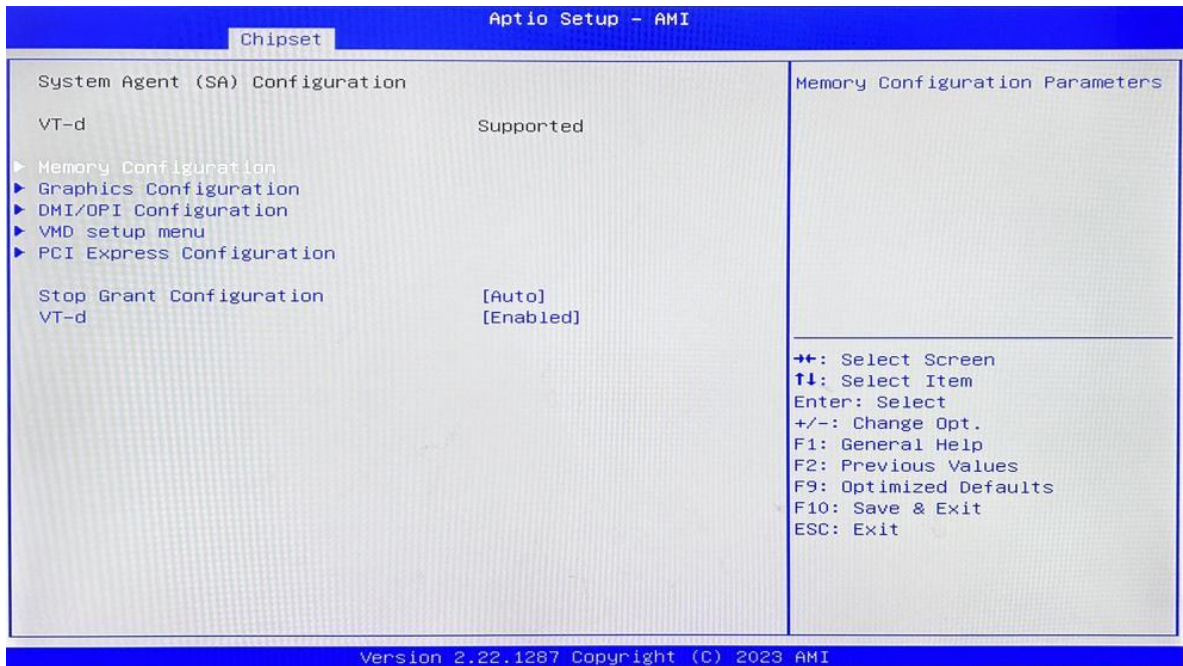
1. Memory Configuration
2. Graphics Configuration
3. DMI/OPI Configuration
4. VMD setup menu: In order to set up the RAID mode, please enter this menu and set the "*Enable VMD controller*" to "*Enabled*".
5. PCI Express Configuration
6. Stop Grant Configuration
7. VT-d: Intel's VT virtualization technology, supporting direct I/O access

3.4.2 PCH-IO Configuration
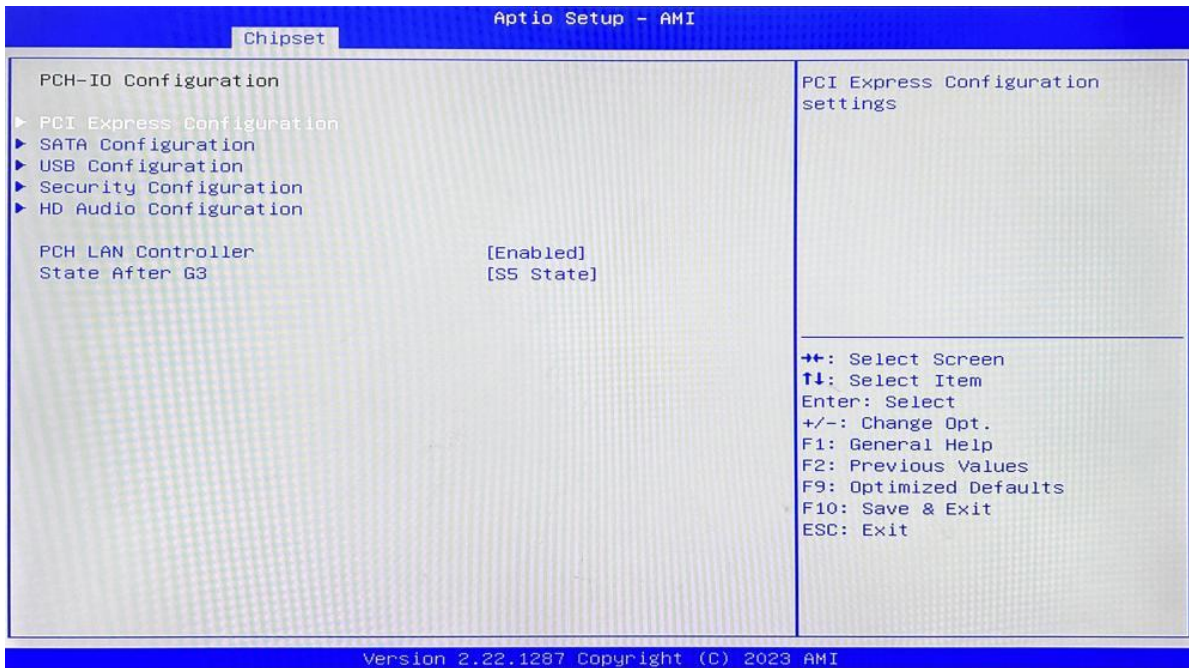
PCI Express Configuration

SATA Configuration

USB Configuration

Security Configuration

HD Audio Configuration

PCH LAN Controller

State After G3 setting: S0 State (auto-start after power-on), S5 State by default.

3.5 Security

Administrator Password: Set the Administrator Password.
User Password: Set User Password.
Secure Boot: Secure boot

3.6 BOOT

```
                         Aptio Setup - AMI
   Main  Advanced  Chipset  Security  Boot  Save & Exit

  Boot Configuration                              Number of seconds to wait for
  Setup Prompt Timeout            1               setup activation key.
  Bootup NumLock State            [On]            65535(0xFFFF) means indefinite
  Show Full Logo                  [Enabled]       waiting.

  Boot mode select                [UEFI]
  FIXED BOOT ORDER Priorities
  Boot Option #1                  [NVME:Windows Boot
                                  Manager (WDC
                                  WDS250G2B0C-00PXH0)]
  Boot Option #2                  [Hard Disk]
  Boot Option #3                  [CD/DVD]
  Boot Option #4                  [SD]            ──────────────────────────
  Boot Option #5                  [USB Device]    ←→: Select Screen
  Boot Option #6                  [Network]       ↑↓: Select Item
  Boot Option #7                  [UEFI AP:UEFI:   Enter: Select
                                  Built-in EFI Shell]  +/-: Change Opt.
                                                  F1: General Help
  ▶ UEFI NVME Drive BBS Priorities               F2: Previous Values
  ▶ UEFI Application Boot Priorities             F9: Optimized Defaults
                                                  F10: Save & Exit
                                                  ESC: Exit


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```
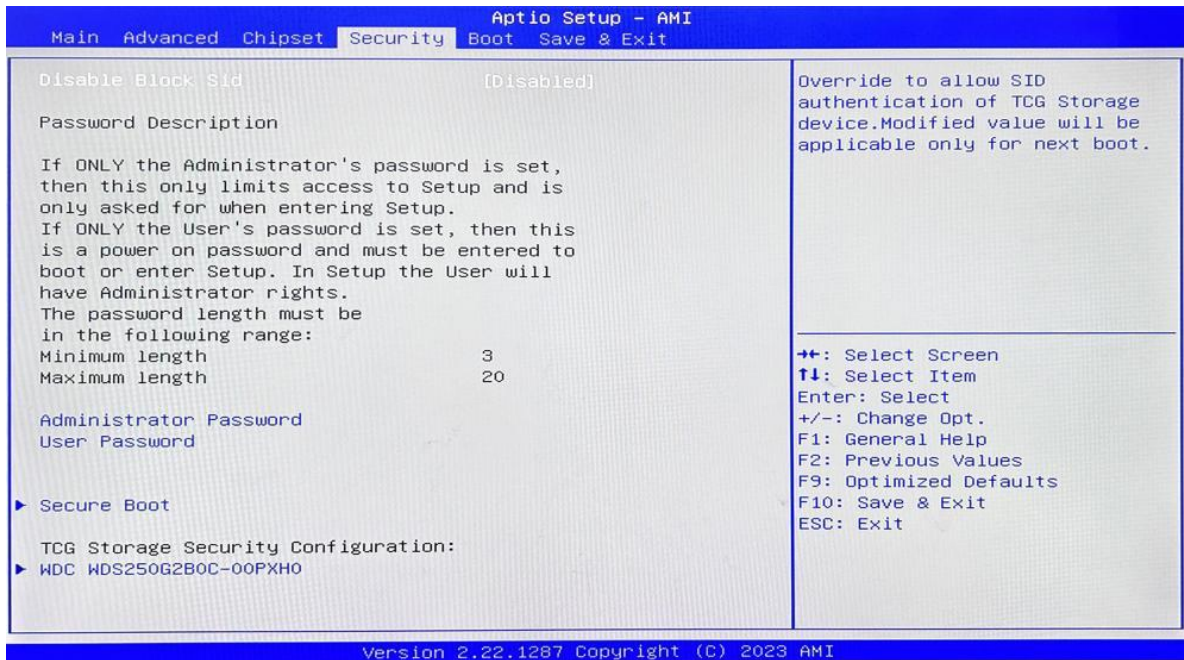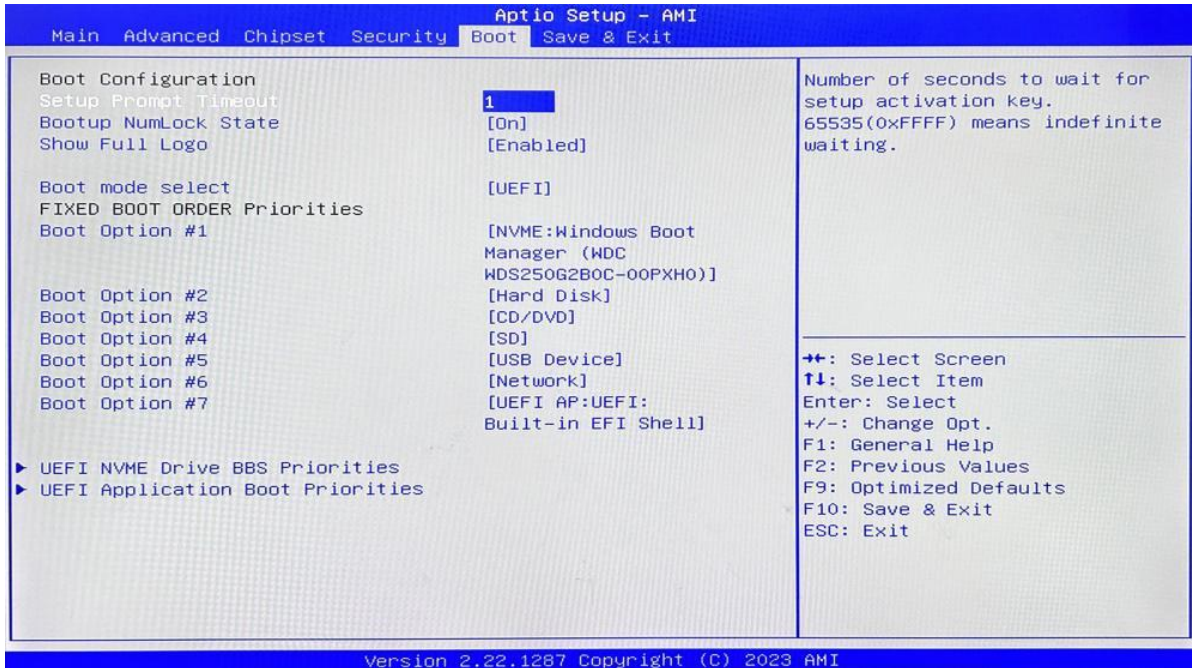
Setup Prompt Timeout:

Number of seconds that the firmware will wait before initiating the original default boot selection. A value of 0 indicates that the default boot selection is to be initiated immediately on boot. A value of 65535(0xFFFF) indicates that firmware will wait for user input before booting. This means the default boot selection is not automatically started by the firmware.

Bootup NumLock State:

Select the keyboard NumLock state. The Bootup NumLock State allows activation of the Keypad number lock function after the system is powered on to the DOS system. When the default is set to ON, the NumLock is on when the system starts. When it is set to OFF, the keypad is in the cursor control state when starting.

Show Full Logo:

Enabled/Disabled Displays customized boot logo.

Boot Option #1~#7:
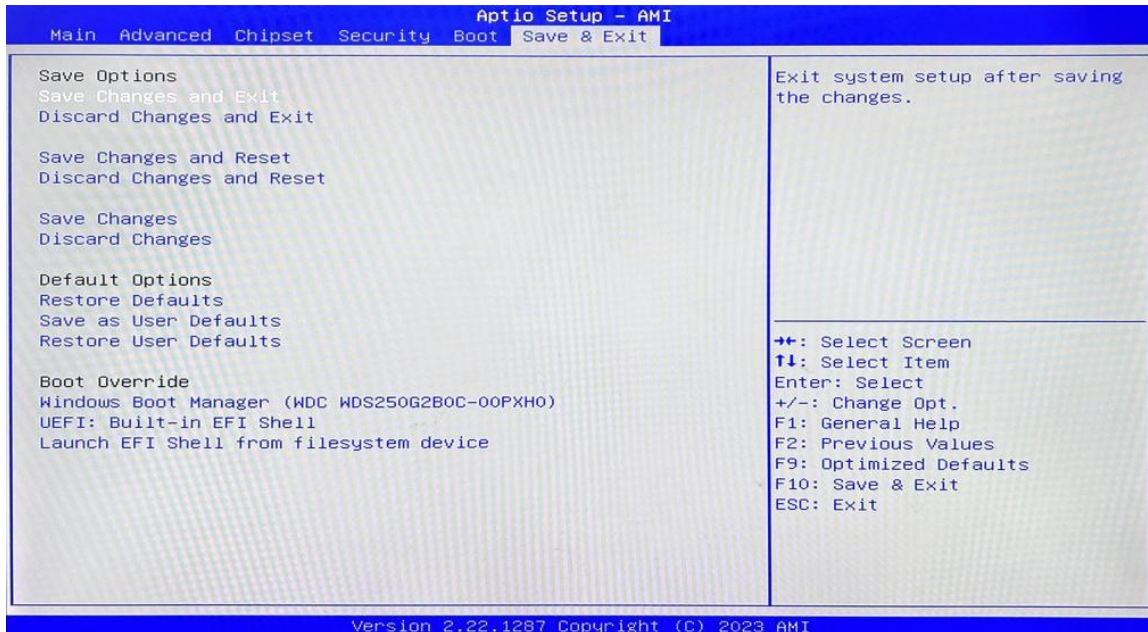
Set the system boot order from Number 1 to Number 7.

UEFI NVME Drive BBS Priorities:

UEFI NVME drive boot priorities setting.

UEFI Application boot Priorities:

UEFI application boot priority.

3.7 Save & Exit

Save Changes and Exit:

Exit the system setup after saving the changes and continue to start the computer.

Discard Changes and Exit:

Exit the system setup without saving any changes and continue to start the computer.

Save Changes and Reset:

Reset the system after saving the changes.

Discard changes and Reset:

Reset the system without saving any changes.

Save Changes:

Save changes done so far to any of the options.

Discard Changes:

Discard changes done so far to any of the options.

Restore Defaults:

Restore/load default values for all the options.

Save as User Defaults:

Save the changes done so far as the user defaults.

Restore User Defaults:

Restore the user defaults to all the options.

Boot Override:

Boot device selection can override your boot priority. Select the specified boot device such as SATA, USB Flash Disk, EFI Shell, PXE, etc., and boot directly. Or press F11 boot by selecting the specified boot device.