

User Manual

ALD-70 Mini ITX Motherboard



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ALD70 Motherboard

User Manual

(Version 0.5)

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Chapter 1 Product Introduction

1.1 Brief Introduction

The ALD-70 is a mini ITX motherboard based on the Intel Raptor Lake/Alder Lake-S (FCLGA1700 socket) processor with H610 chipset; small form factor and high performance up to 65W for TDP.

1.2 Parameters

CPU: PCH H610 + Intel Raptor Lake/Alder Lake-S series processor

Memory: 2x SO-DIMM DDR4-3200MHz, supports dual-channel, maximum capacity: 64GB

GPU: Integrated Graphics based on CPU, display via 1x HDMI2.0b, 1xDP1.4, 1xEDP (1.4b)

Storage: 1 x M.2 Key M slot for 2280 (NVMe/SATA) SSD, 2 x SATA3.0 standard interfaces

USB: 4x USB3.2Gen 1 ports, 3xUSB2.0 (1*on board vertical interfaces), 2xUSB2.0(headers)

Ethernet: Three onboard Gigabyte Network Controllers (one Intel i219 Data Rate Per Port: 1.0GbEs + two Intel i226 Data Rate Per Port: 2.5 GbE)

Audio: High-Definition Audio Codec. Support rear Line_out, Mic_in; on board front Line out, Mic-in; and power amplifier.

Serial I/O: 6x RS232 COM by default or 5xRS232+1xRS485(COM2)

Expansion: 1x M.2_Key E, type 2230 (PCIe/USB2/CNVi).

Other I/O: 1*PCIe16X, GPIO, 1x PS/2(Onboard pin, KB+MOUSE)

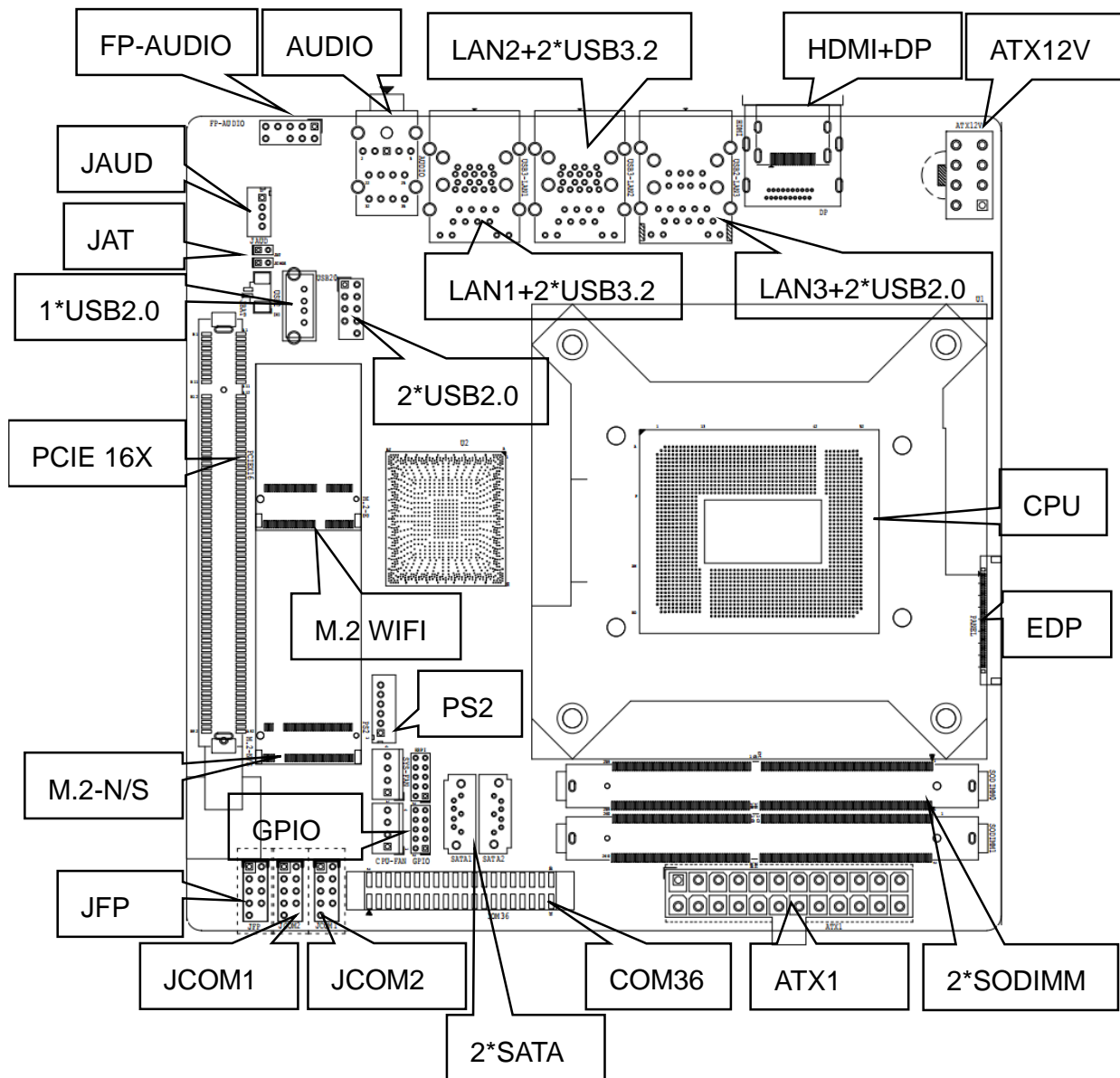
TPM2.0: Optional

Dimension: 170mm x 170mm

Power: ATX_24PIN+ATX_12V auxiliary power supply (2x2)

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 ALD70 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 provides 2 x SO-DIMM DDR4-3200, supports dual-channel, maximum capacity: 64GB.

Attention: 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 features 1xHDMI2.0b, 1x DP (1.4), and 1x eDP (1.4b) interfaces for display.

40Pin eDP (Screen Printing: PANEL)

Pin	Signal	Pin	Signal
1	NC-RESERVED	21	LCD_VCC
2	BL_PWR	22	LCD_VCC
3	BL_PWR	23	LCD_VCC
4	BL_PWR	24	H_GND
5	BL_PWR	25	AUX_CH_N
6	NC-RESERVED	26	AUX_CH_P
7	NC-RESERVED	27	H_GND
8	BL_PWR_DIM	28	Lane0_P
9	BL_ENABLE	29	Lane0_N
10	BL_GND	30	H_GND
11	BL_GND	31	Lane1_P
12	BL_GND	32	Lane1_N
13	BL_GND	33	H_GND
14	HPD	34	Lane2_P
15	LCD_GND	35	Lane2_N
16	LCD_GND	36	H_GND
17	LCD_GND	37	Lane3_P
18	LCD_GND	38	Lane3_N
19	LCD Self-Test or NC	39	H_GND
20	LCD_VCC	40	NC-RESERVED

Attention: While using the 40PIN eDP functions, all the power with GND headers must be connected.

2.5 Storage

The board also features 2x SATA3.0 standard interface, 1 x M.2 Key M slot for 2280 NVME/SATA SSD (SATA protocol and NVME protocol are self-adaptive).

2.6 USB Interface

The board supports four standard USB3.2 Gen1 ports, two standard USB2.0 ports on its rear panel and one vertical USB2.0 interface and two USB2.0 headers onboard pins 2.54mm for spacing.

The USB2.0 rear ports are powered by 5V standby voltage and support a wake-up system through a USB keyboard/mouse when the PC is turned off (not power-off). They also can be used as a charger for external devices: 5V/500mA.

USB (Screen Printing: USB20)

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
NC	9	10	N/A

2.7 LAN

The board adopts a high-performance Intel network card chip, two 2.5Gbps Ethernet control chips (Intel i226) (**Note: the Intel i226 network controller only supports one-time programming of MAC address, which cannot be changed later**); one Gigabit Ethernet controller (Intel i219), all three LANs support Magic packet wake up.

In addition, the LAN3 (Intel i219) supports UEFI PXE network boot. When using UEFI PXE network boot, you need to set (IPv4 PXE Support to Enabled) under BIOS.

LED Interface Status Indicators:

LILED (Green) Status	Function	ACTLED (Orange) Status	Function
Always on	Network Connected	Blinking	Data transfer

2.8 Audio

Features the ALC897 audio codec onboard. The green interface is the audio output interface (LINE-OUT), and the pink interface is the microphone input interface (MIC-IN), and JAUD is the amplifier output.

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(AGNG)	7	8	NC
FRO-L	9	10	LIN2-JD

JAUD (Screen Printing: JAUD)

Pin	Signal
1	L+
2	L-
3	R-
4	R+

2.9 COM (Screen Printing: JCOM1, JCOM2, COM36)

The board provides six RS232 onboard serial port headers COM2 can be changed to RS485 through hardware change.

COM1, COM2 (Screen Printing: JCOM1, JCOM2)

Signal	Pin		Signal
DCD#	1	2	RXD

TXD	3	4	DTR#
GND	5	6	DSR#
RTS#	7	8	CTS#
RI#	9		

COM36 (Screen Printing: COM36)

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

2.10 Expansion Slot (screen printing: SATA, M.2-N, PWSATA)

Screen printing M.2_E: 1xM.2 key E, Type 2230 (PCIe/USB2/CNVi)

Screen printing PCIe16: It can be use for expansion network adapter, graphic card or other PICE devices.

2.11 GPIO (Screen Printing: JGPIO)

The board provides a set of 2x5Pin JGPIO headers (2.0mm spacing) 8 programmable I/O lanes in total.

GPIO (Screen Printing: GPIO)

Signal	Pin		Signal
SIO_GP70	1	2	3.3V
SIO_GP71	3	4	SIO_GP74
SIO_GP72	5	6	SIO_GP75
SIO_GP73	7	8	SIO_GP76
GND	9	10	SIO_GP77

2.12 PS/2 (Screen Printing: PS2)

The board supports 1xPS2 header for PS2 keyboard and mouse (2.54mm spacing).

PS2 Pin (Screen Printing: PS2)

Pin	Signal
1	5V
2	KB_DATA
3	KB_CLK
4	MS_DATA
5	MS_CLK
6	GND

2.13 Switch Panel Socket (screen printing: JFP)

The Jumper Front Panel interface is used to connect 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-
NUL	9	10	N/A

2.14 System Fan/CPU Fan Socket (Screen Printing: CPU-FAN, SYS-FAN)

The board provides one 4Pin smart cooling CPU fan sockets, one 4Pin system fan sockets.

CPUFAN (screen printing: CPU-FAN):

Pin	Signal
1	GND
2	12V
3	TAC
4	CTL

SYSFAN (screen printing: SYS-FAN):

Pin	Signal
1	GND
2	12V
3	TAC
4	CTL

2.15 ATX Power Supply (Screen printing: ATX1, ATX12V)

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

ATX_24PIN (screen printing: ATX)

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 (screen printing: ATX12V)

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

2.16 Hardware Auto Start (screen printing: JAT)

JAT:

Settings	JAT
Close	Hardware Auto Start

2.17 CMOS Clearance/Retention

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).


Step 1: Turn off the PC and disconnect the power.

Step 2: Use the jumper cap to connect the 1st and 2nd header of JCMOS for 10 seconds, then disconnect.

Step 3: Restart the device, press the button to enter the BIOS, load the optimal default value, save, and exit the settings.

CMOS (Screen Printing: JCMOS)

Setting	Setting	JCMOS
Close	Close	Clear CMOS

 **Please do not clear COMS when the PC is connected to power in case board damages.**

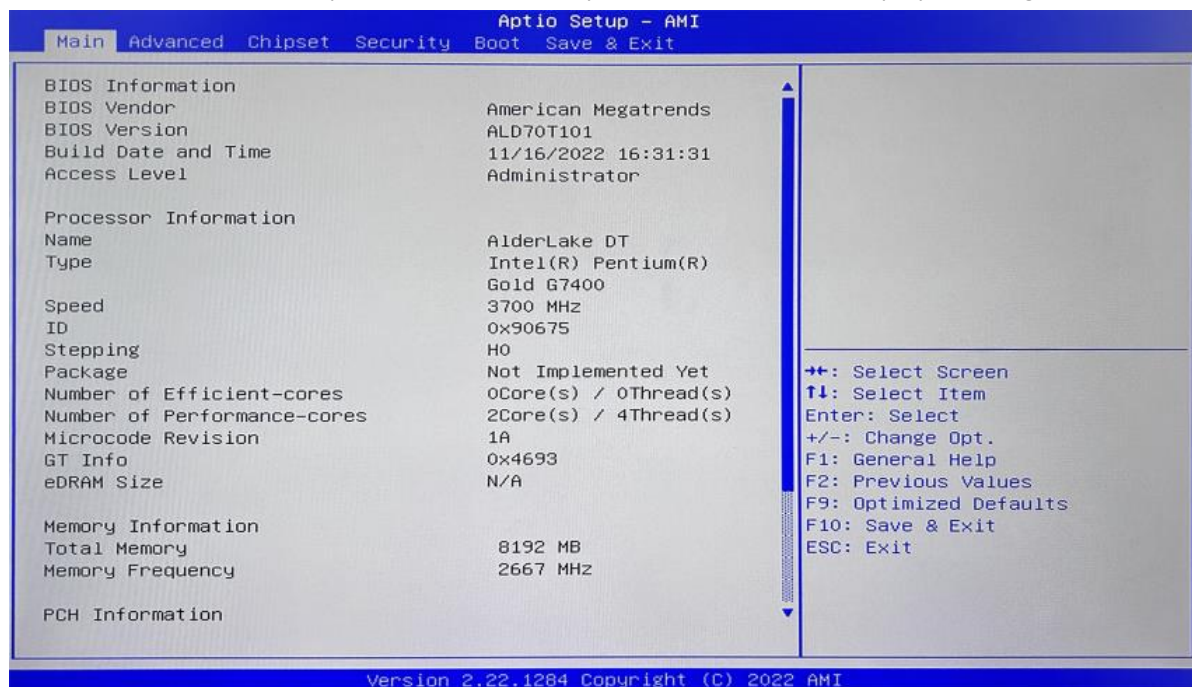
Chapter 3 BIOS Setup

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)

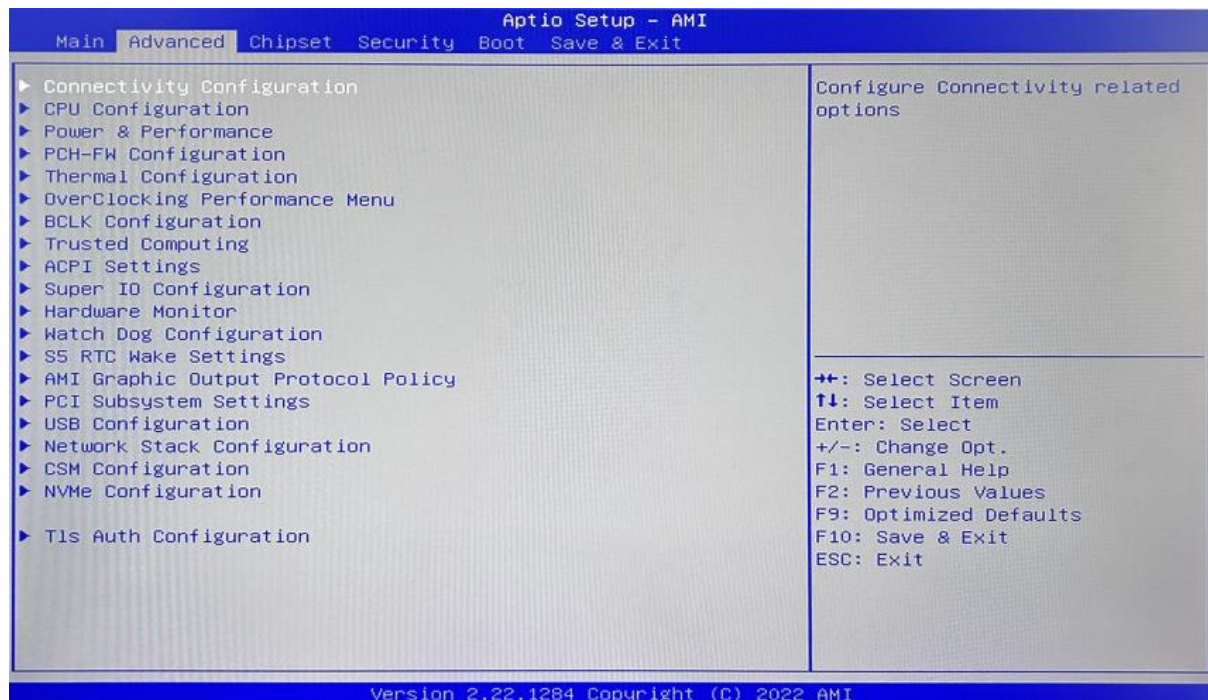
When you enter the BIOS Setup utility the first things you will encounter is the Main Setup screen. Shown below is the Main BIOS Setup screen. You can always return to the Main setup by selecting the Main tab.



System Date: Set the date. MM/DD/YY format.

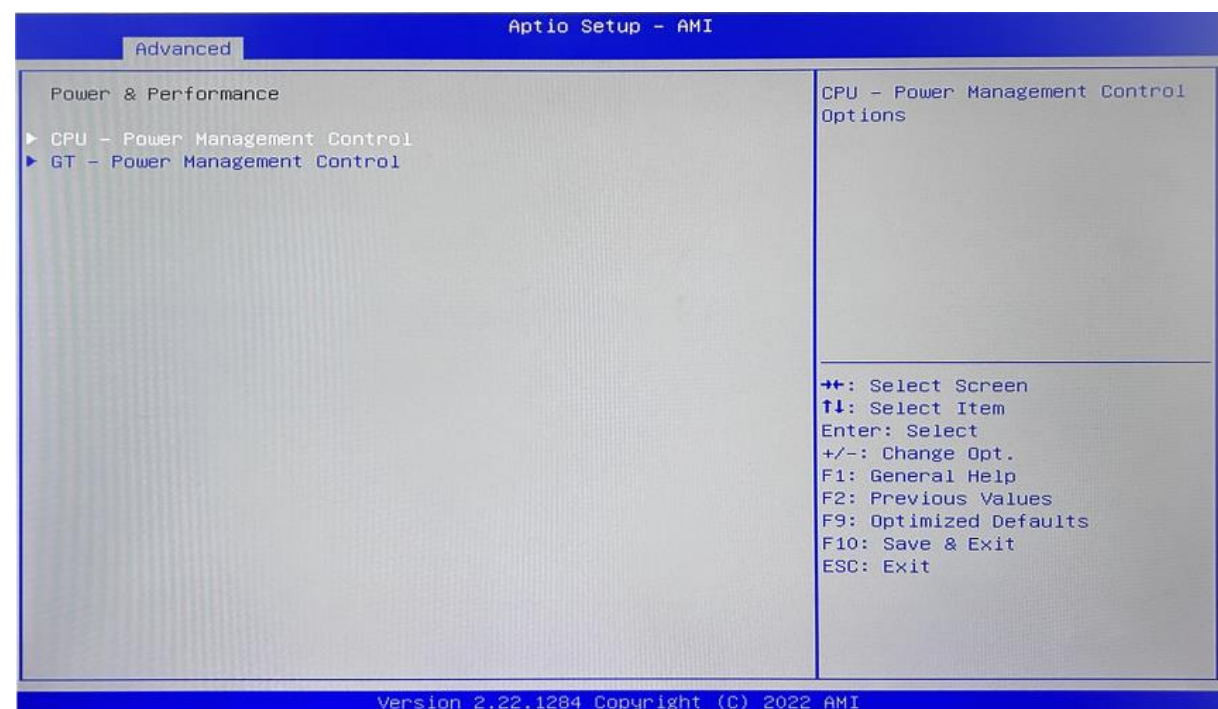
System Time: Set the time. HH:MM: SS format.

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.

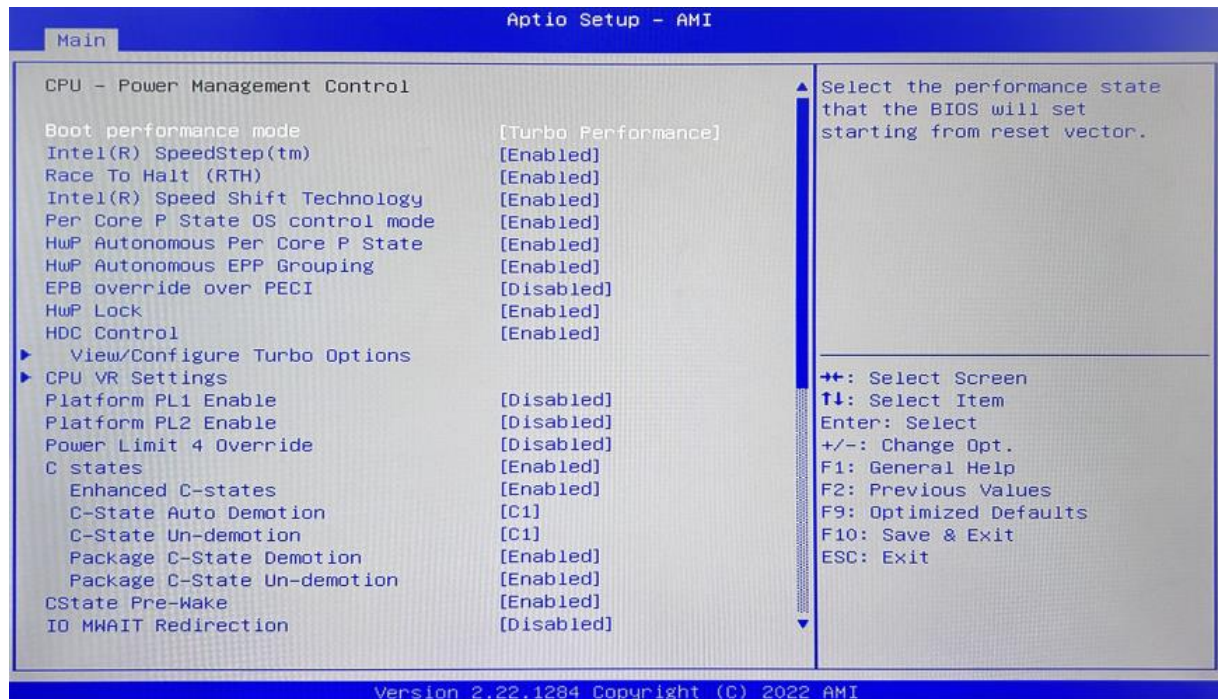
3.3.1 CPU-Power & Performance



CPU-Power Management Control

GT-Power Management Control

3.3.2 CPU-Power Management Control



Intel® Speedstep®(TM):

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

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.

Per core p state OS control mode

HwP Autonomous Per Core P state

HwP Autonomous EPP Grouping

EPB override over PCIE

View/Configure Turbo Options

Platform PL1 Enable

Platform PL2 Enable

Power Limit 4 Override

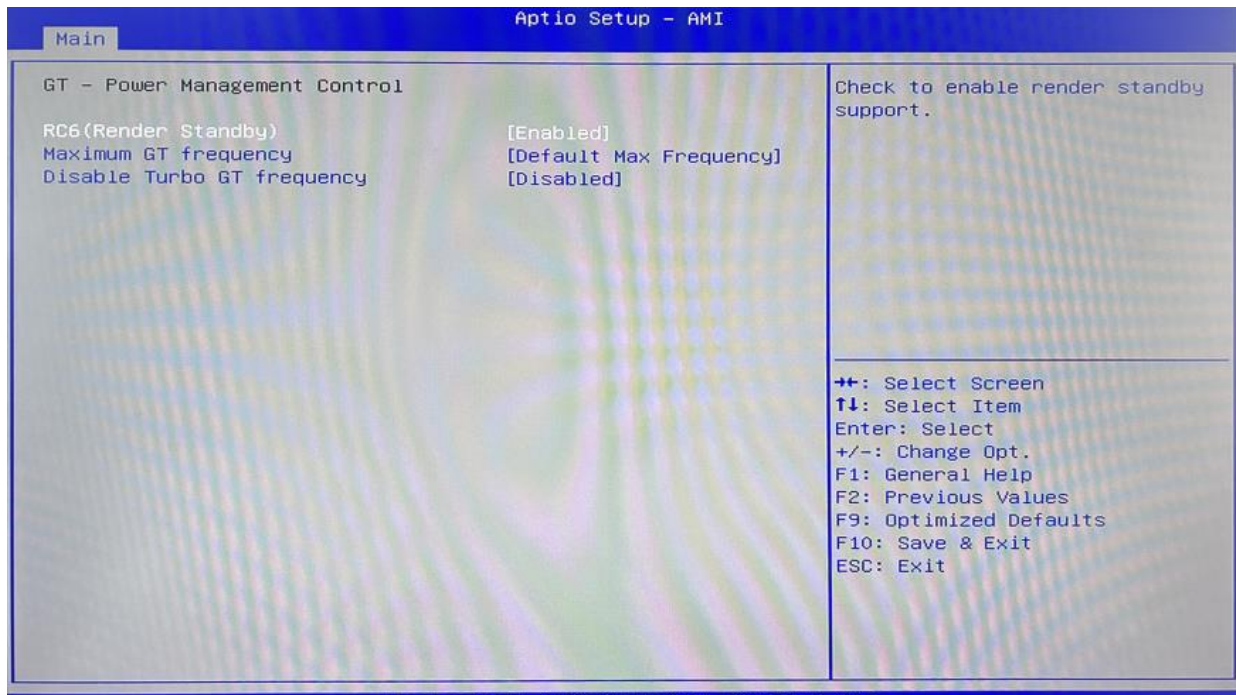
C states

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.

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).

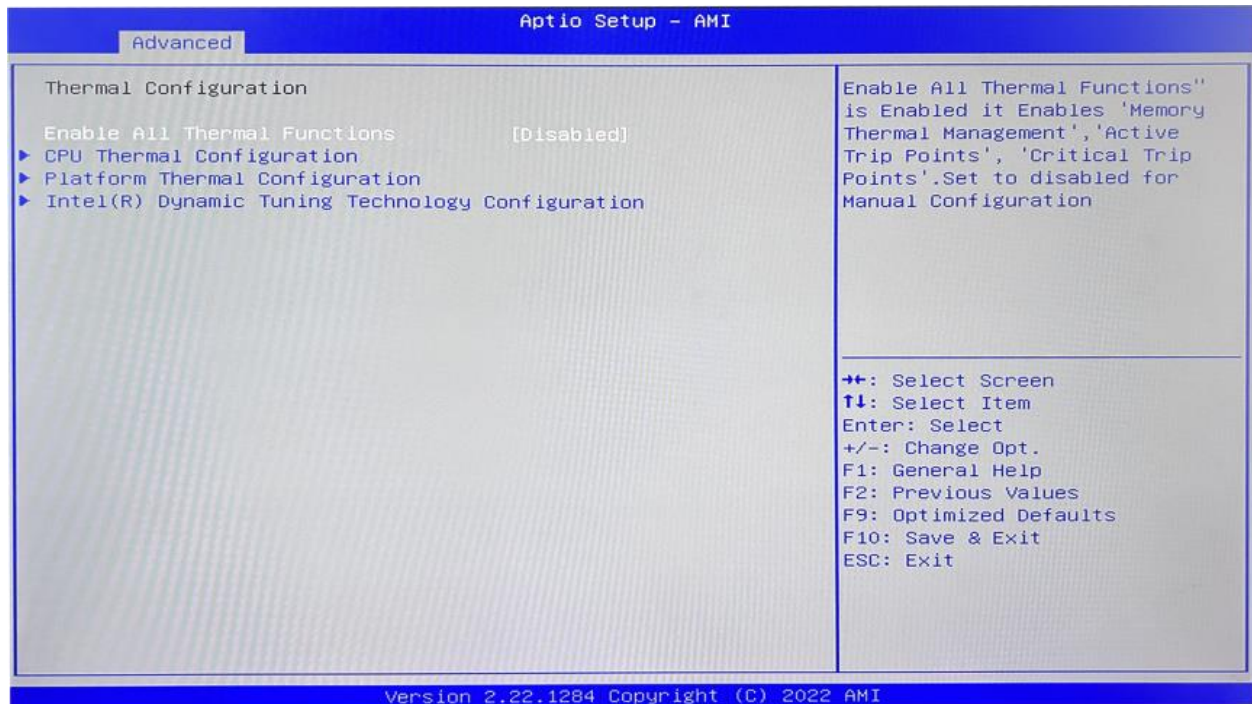
Maximum GT frequency:

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

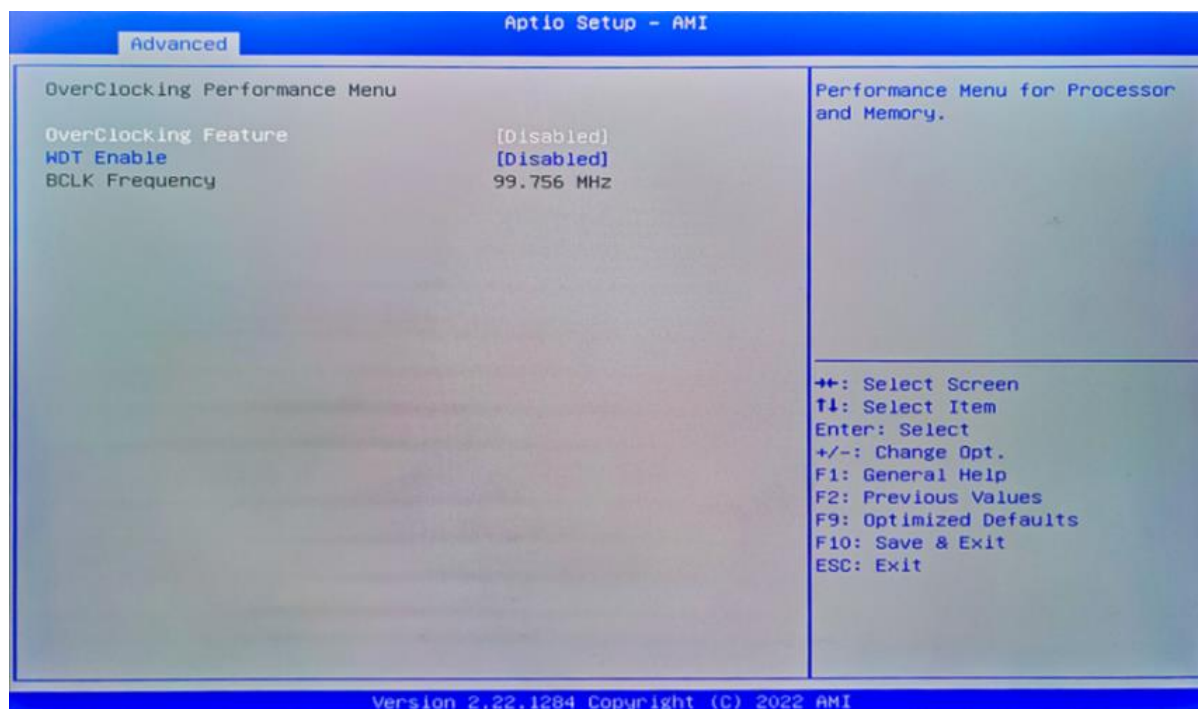
CPU Thermal Configuration:

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

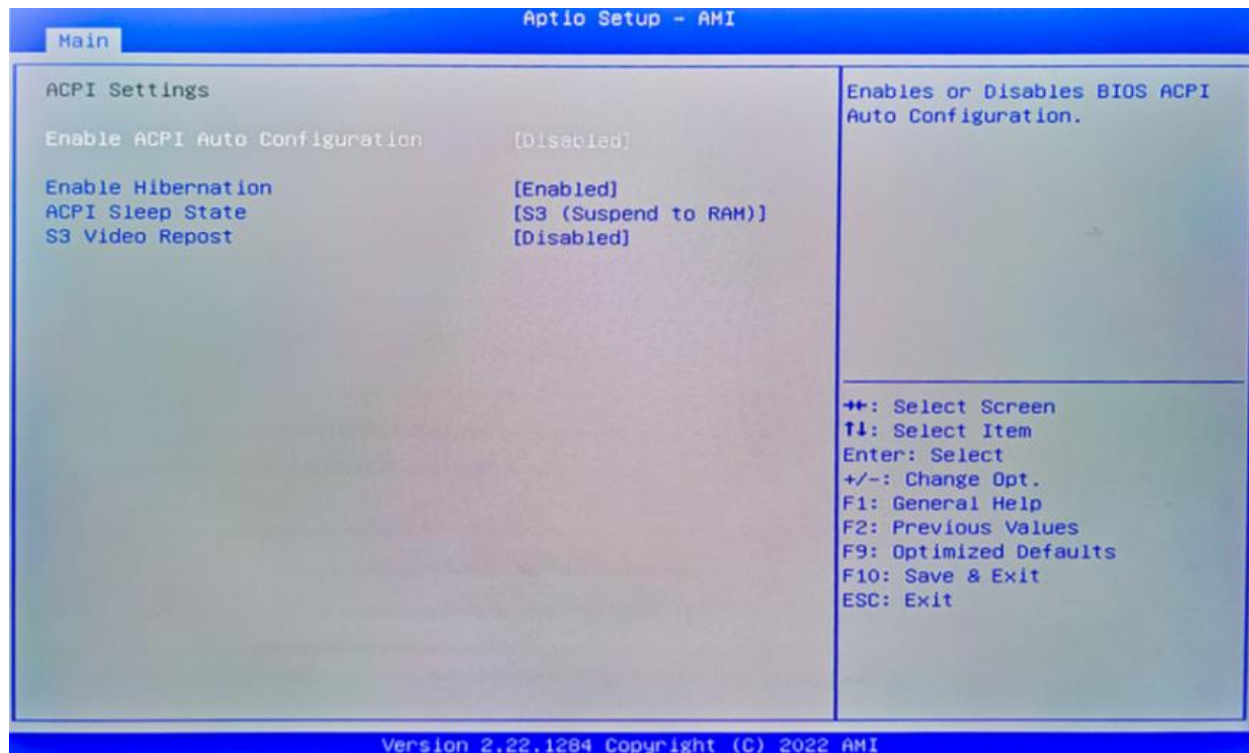


Over Clocking Feature: Disabled

WDT (Watchdog Timer) Enable: Disabled

BCLK Frequency

3.3.6 ACPI Settings



Enabled ACPI Auto Configuration

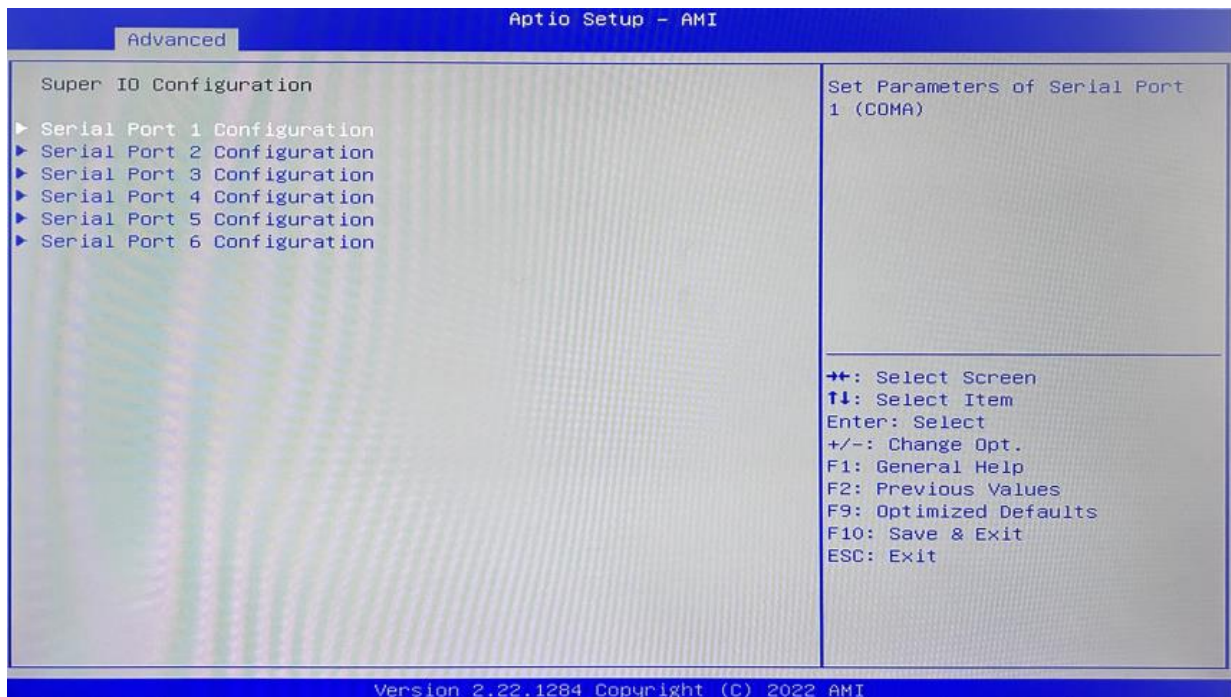
Enabled Hibernation

ACPI Sleep State

S3 Video Repost:

S3 Sleep Mode (Enable VGA BIOS POST function when waking up from S3 Sleep mode)

3.3.7 Super IO Configuration



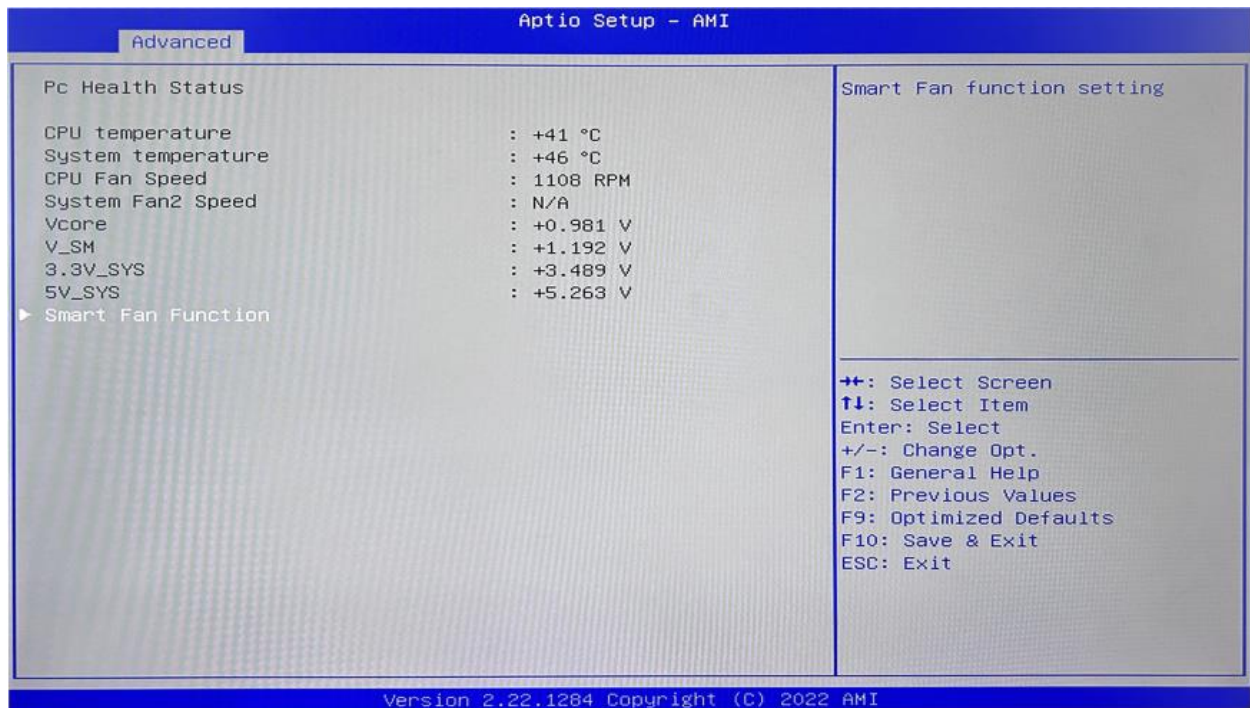
Serial Port 1~6 Configuration

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



PC Health Status

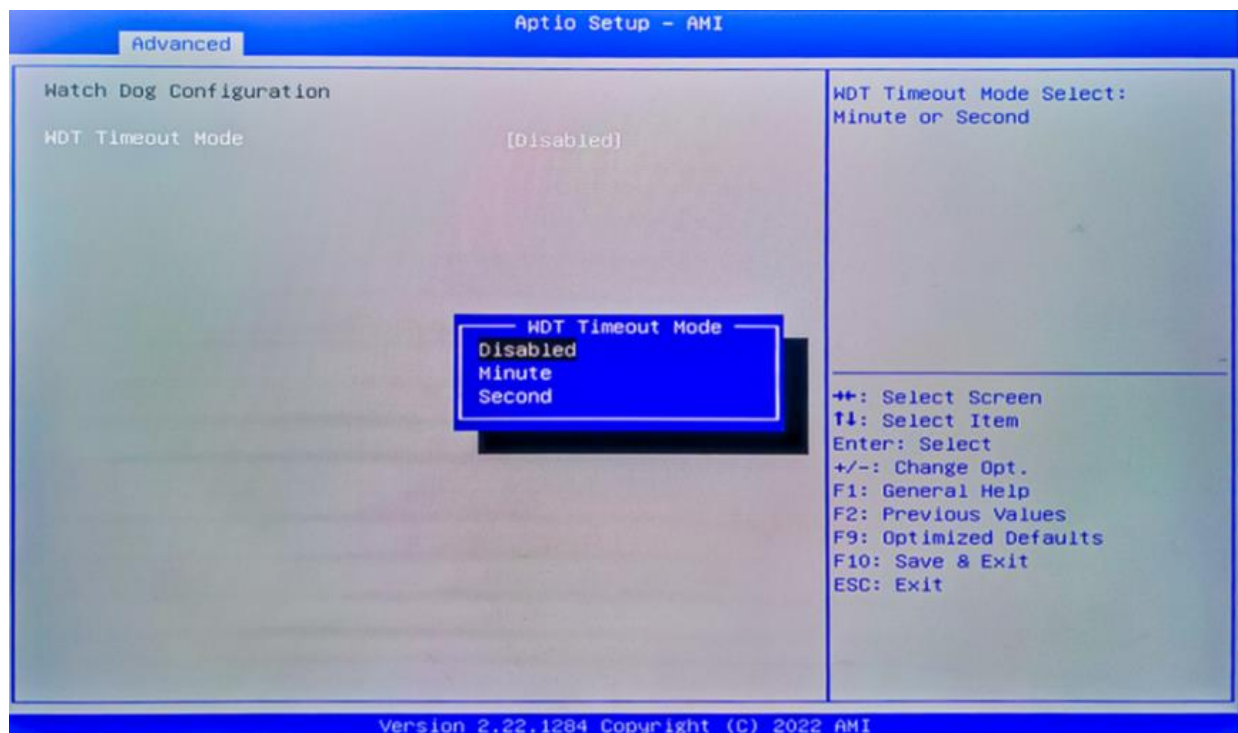
The PC health status displays CPU temperature, system temperature, fan speed, and other relevant voltage values. The above parameters have a certain range, and the system cannot run beyond these ranges.

1. CPU Temperature
2. System Temperature
3. CPU Fan Speed
4. System Fan2 Speed
5. VCore: Core Voltage
6. V_SM
7. +3.3V_SYS: 3.3V
8. +5V_SYS: 5V
9. Smart Fan Function:
 - 1) CPU Fan Setting
 - 2) System Fan 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

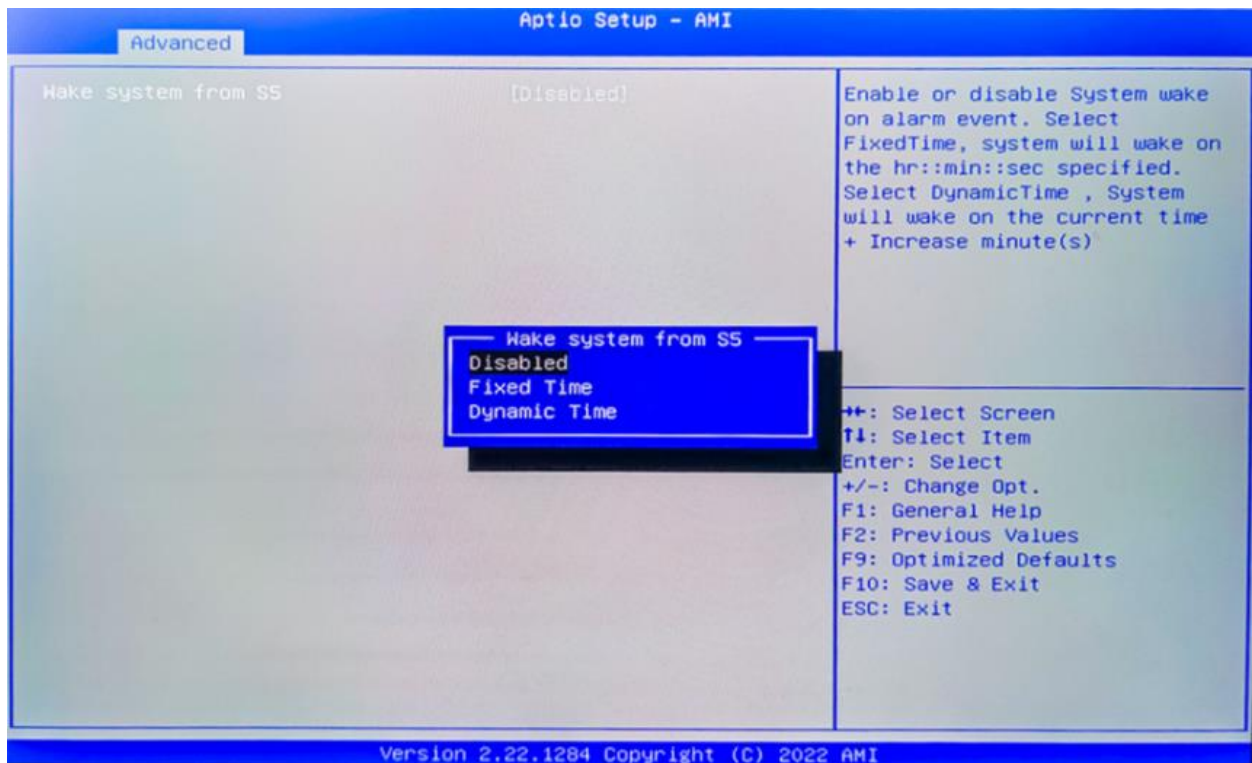
3.3.9 Watch Dog Configuration



Watch Dog Configuration

WDT Timeout Mode select: Minute or Second

3.3.10 S5 RTC Wake Settings

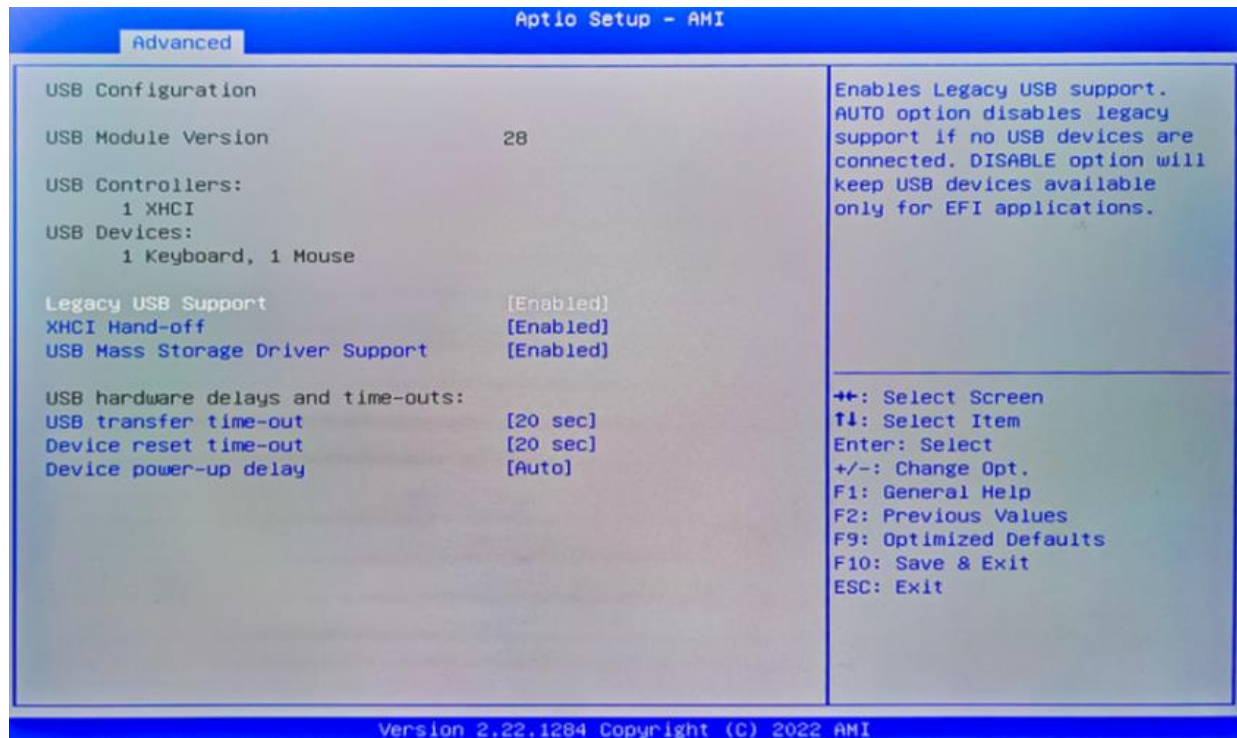


Wake system From S5: timing boot settings, disabled by default.

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.

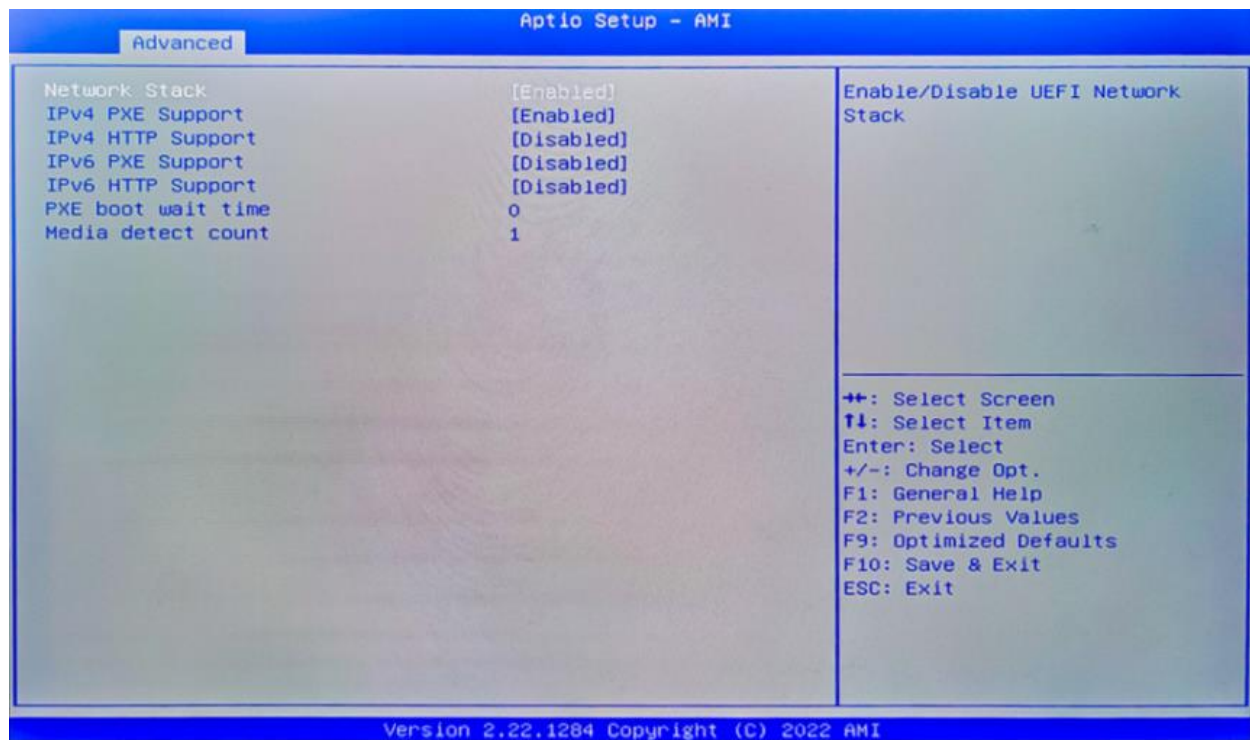
Device reset time-out

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.

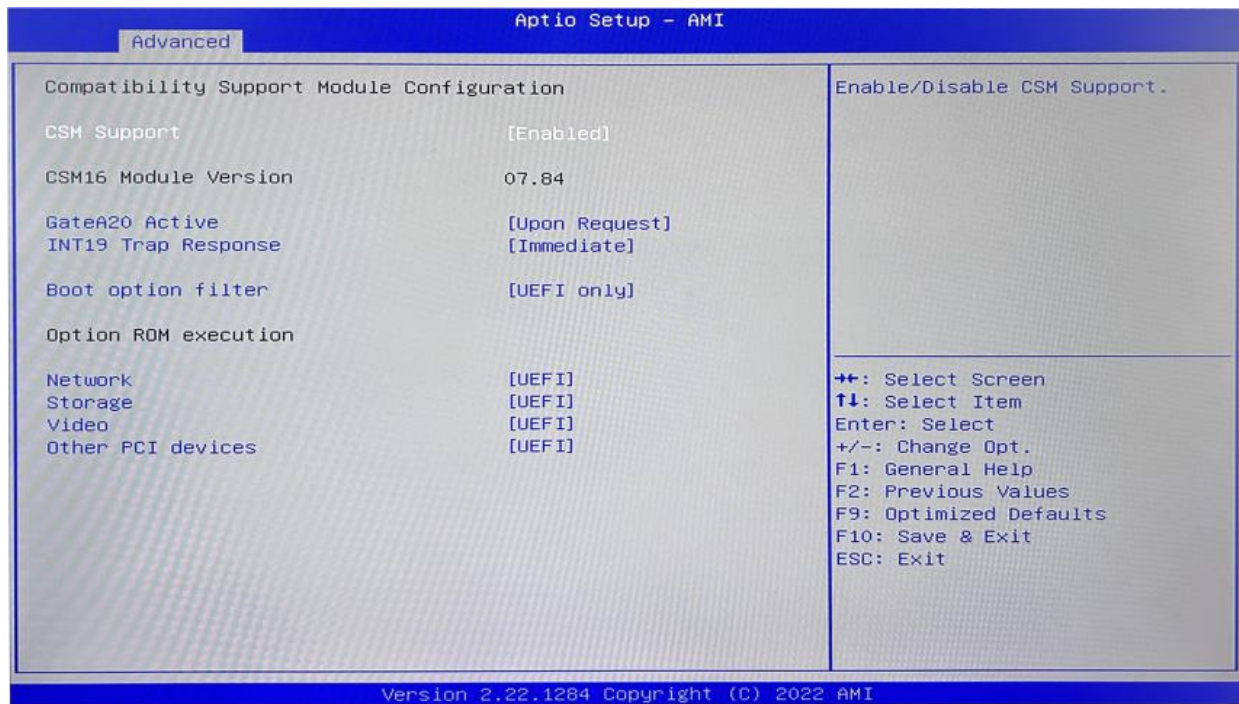
3.3.12 Network Stack Configuration



Network Stack

PXE Network boot setting, disabled by default.

3.3.13 CSM Configuration

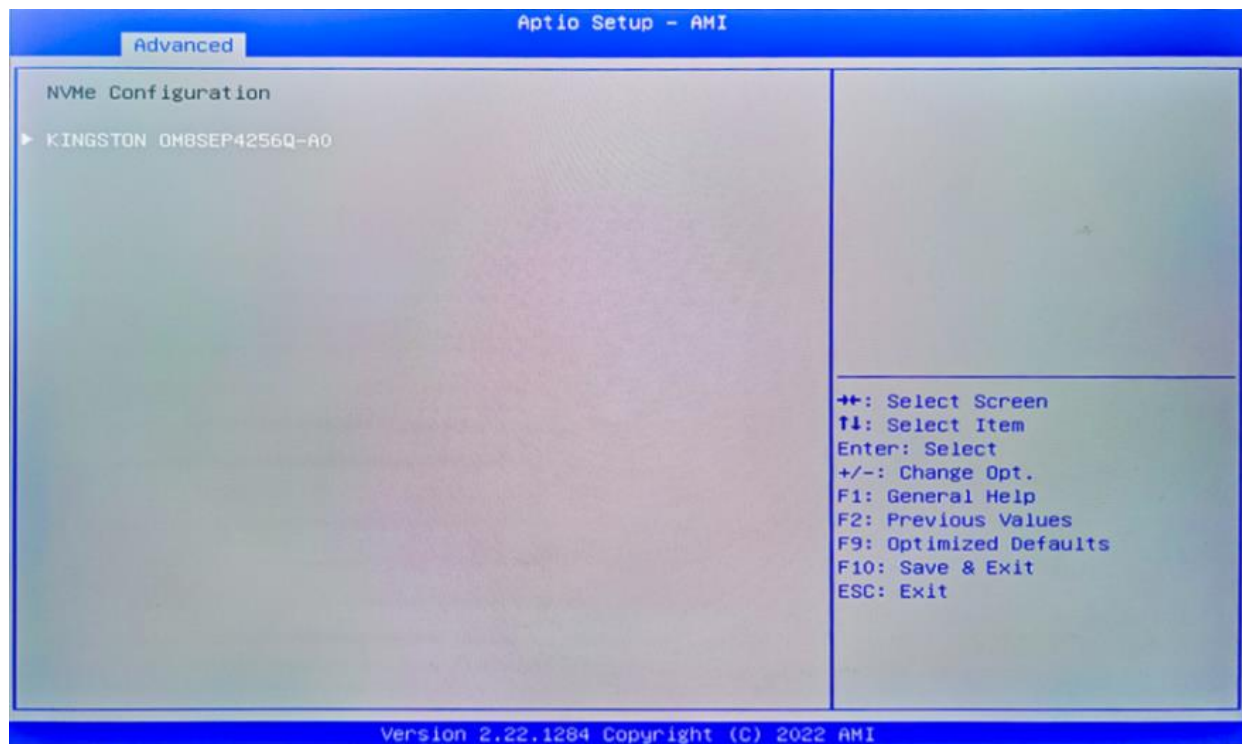


Boot Option Filter

Option ROM Execution

Network
Storage
Video
Other PCI Devices

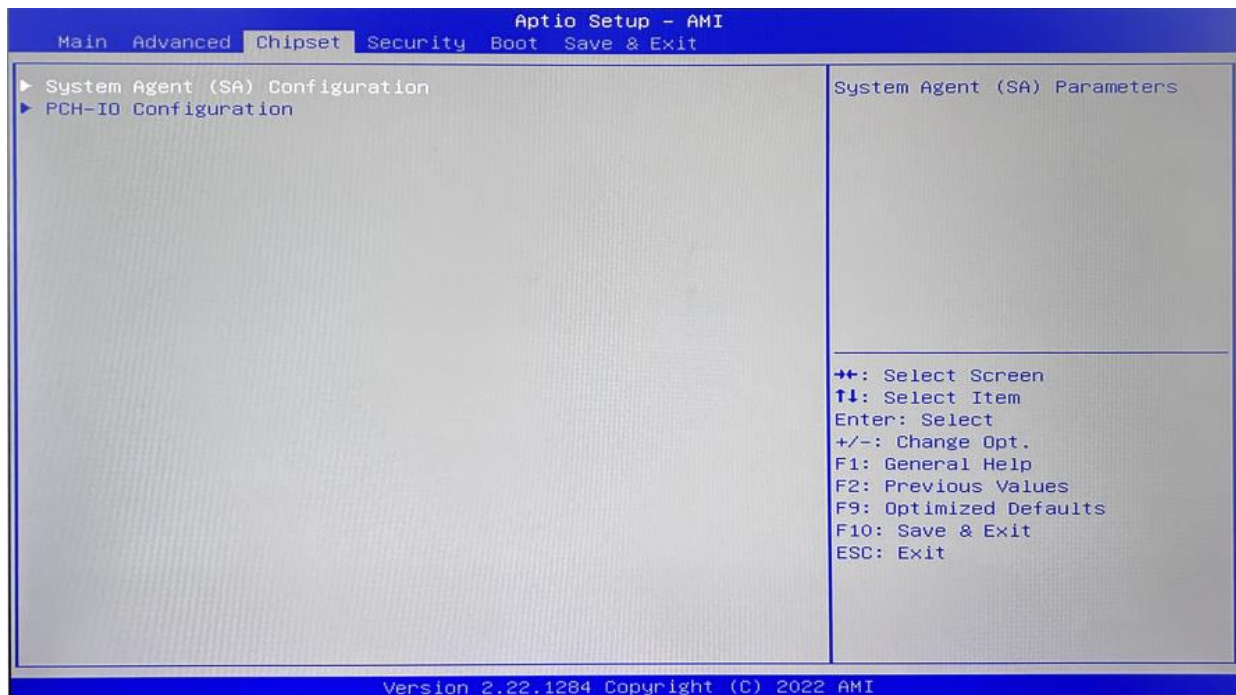
3.3.14 NVMe Configuration



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

3.4 Chipset

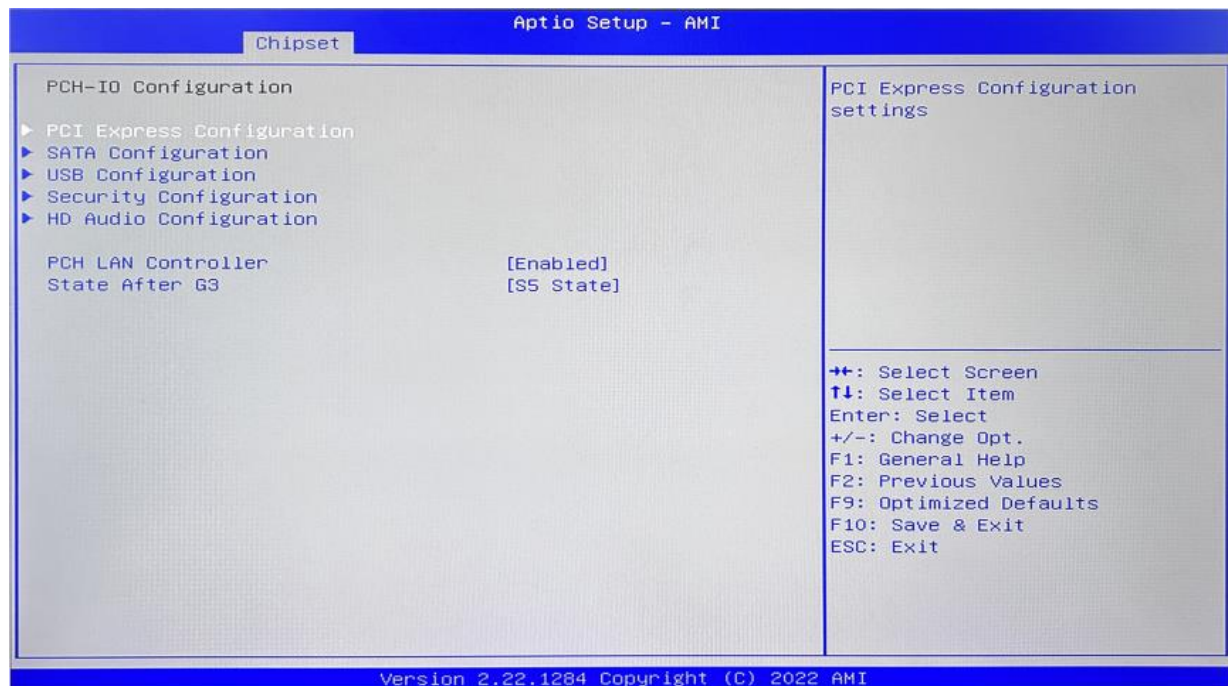
Select the chipset tab from the setup screen to enter the chipset BIOS Setup screen.



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 PCH-IO Configuration



PCI Express Configuration

SATA Configuration

USB Configuration

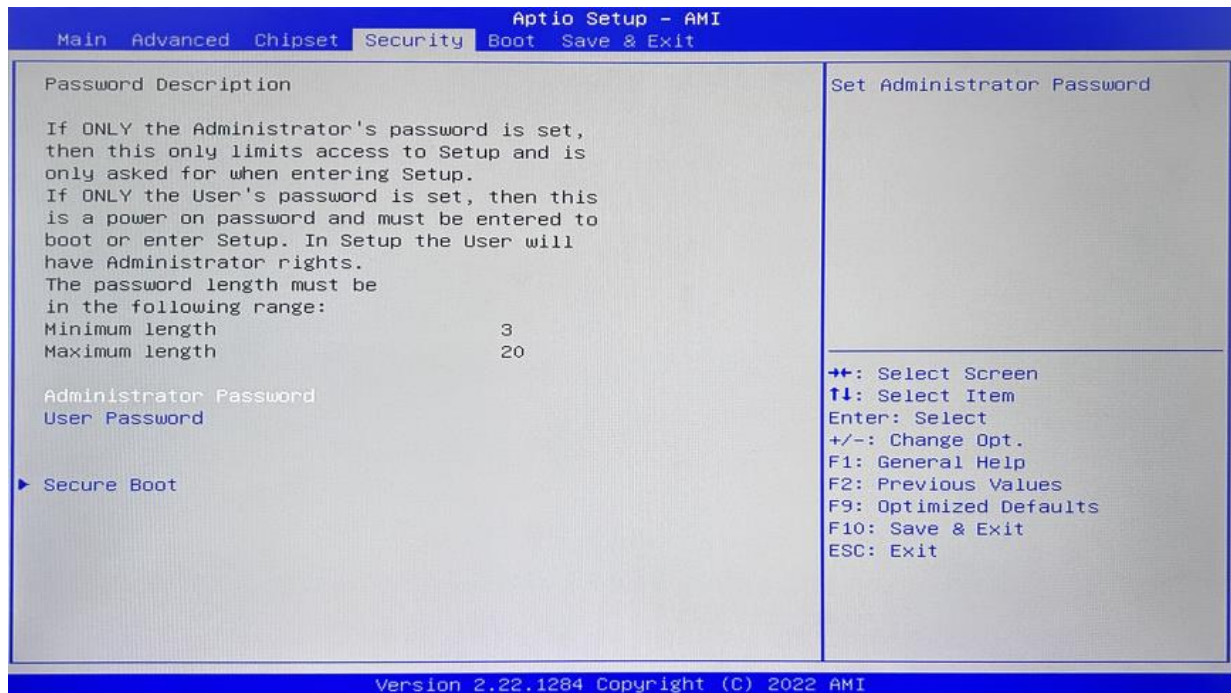
Security Configuration

HD Audio Configuration

PCH LAN Controller

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

3.5 Security

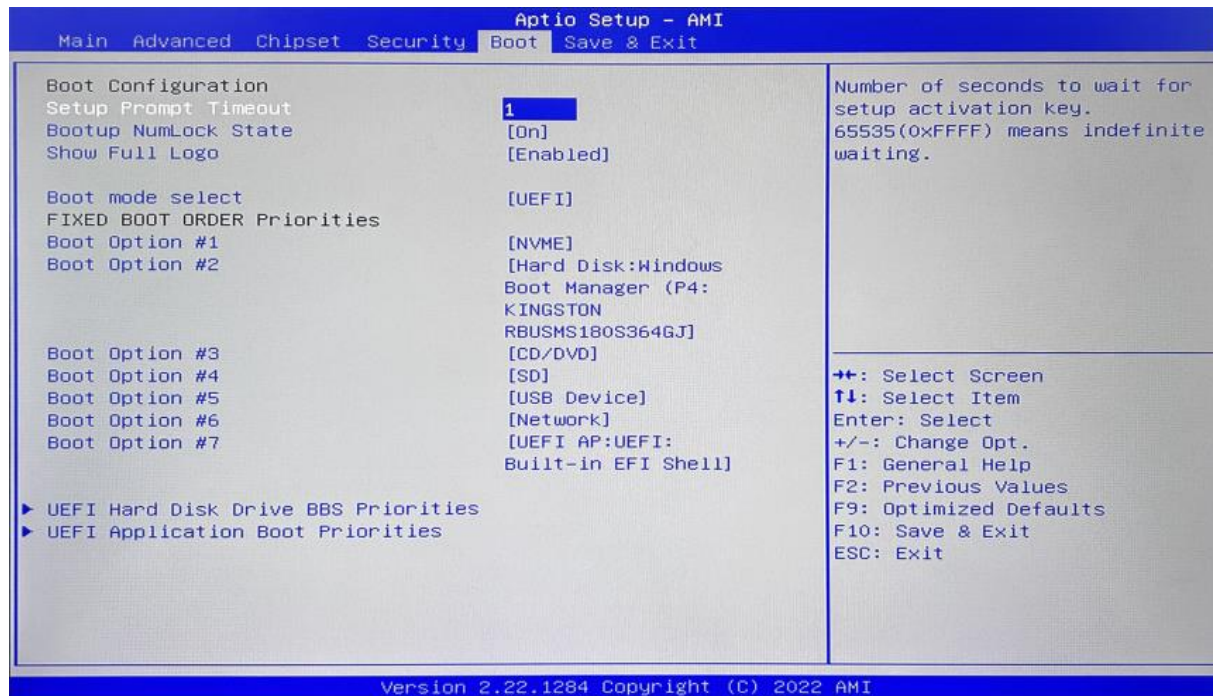


Administrator Password: Set the Administrator Password.

User Password: Set User Password.

Secure Boot: Secure boot

3.6 BOOT



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 Hard Disk Drive BBS Priorities:

UEFI hard drive boot priorities setting.

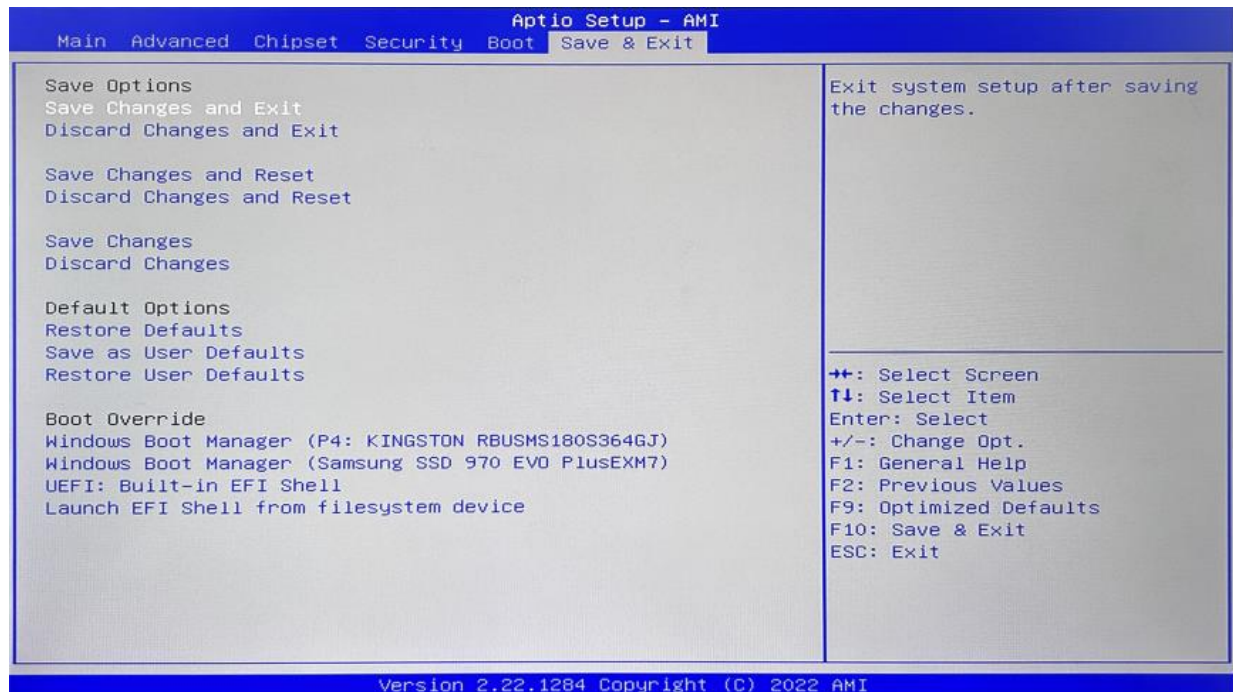
UEFI USB Drive BBS Priorities:

UEFI USB device 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.