User Manual

SXC-ALN30

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Warning

1. Before using the product, carefully read the manual to ensure proper installation and operation.
2. If you are not ready to install any extension card, store it in an anti-static protective bag to prevent damage.
3. To discharge any static electricity, briefly touch a grounded metal object before removing the extension card from the protective bag.
4. Always wear anti-static gloves and handle the card by its edges to avoid damaging sensitive components.
5. Verify that the power supply voltage is correct before connecting the motherboard to the power supply.
6. To prevent electric shock or damage, always turn off the AC power or unplug the power cord before removing or reconfiguring the motherboard or any components.
7. Unplug the AC power cord from the outlet before relocating the motherboard or any components.
8. Ensure all power cords are unplugged before connecting or disconnecting any equipment to avoid electrical hazards.
9. Wait at least 30 seconds after powering off the system before powering it on again to prevent unnecessary wear.
10. If any issues arise during operation, consult a qualified professional for assistance.
11. This product may cause radio interference in certain environments; if necessary, users should take appropriate measures to mitigate such interference.

SXC-ALN30

User Manual

(Version 0.5)

Version:		
NO.	Description	Issue Date:
V0.5	Initial Version (CN)	2025/03/25
V0.5	Initial Version (EN)	2025/04/03

Contents

Chapter 1 Product Introduction

1.1 Brief Introduction

The SXC-ALN30 is a compact embedded system powered by the Intel Alder Lake-N platform. It offers high computing performance with energy efficiency, and its space-saving design makes it ideal for industrial and commercial applications.

1.2 Parameters

Intel Alder Lake-N Series:

CPU	Cores/Threads	Base Frequency	Max Turbo Frequency	Cache	TDP	RAM	GPU
Intel Core i3-N305	8C/8T	1.8 GHz	3.8 GHz	6MB	15W (PL1/PL2:15W)	1xSO-DIMM DDR4-3200 MHz Max. 16GB	Intel® UHD Graphics 32EU (Max Dynamic Frequency: 1.25 GHz
Intel N97	4C/4T	2.0 GHz	3.6 GHz	6MB	15W (PL1/PL2:12W)	1xSO-DIMM DDR4-3200 MHz Max. 16GB	Intel® UHD Graphics 24EU (Max Dynamic Frequency: 1.2 GHz

Memory: 1x SO-DIMM DDR4-3200 slot, supports single channel, up to 32GB for maximum capacity.

GPU: Integrated Graphics based on CPU, display via 3x HDMI2.0b (HDCP2.3 support) interfaces.

Storage:

- 1xM.2 Key_M slot (Labeled as **M.2_S** on the motherboard), supports 2242/2280 SSDs with SATA 3.0 and NVMe protocols at PCIe x1 speed.
- 1xM.2 Key_B slot (Labeled as **M.2_ SW5G** on the motherboard), supports 2280 SSDs with SATA 3.0 and NVMe protocols at PCIe x1 speed and is also compatible with M.2 4G modules.

Expansion: 1xM.2 Key_E slot (Labeled as **M.2_E** on the motherboard), supports M.2_2230 Wi-Fi and Bluetooth Modules (PCIE/USB2.0).

Nano SIM: 1x Nano SIM Slot. The slot supports Nano SIM and enables 4G communication when used with a compatible M.2_4G module.

Serial I/O (COM Ports): 2xCOM interfaces, with RS232 configuration by default and RS485 optional.

USB: 4x USB3.2 Gen 2(10Gbps) type A interfaces, 2x USB2.0(480Mbps) type A interfaces.

MCU Timer: Equipped with a MCU Timer, allowing users to schedule independent power on/off times for each day of the week.

Ethernet: Two Realtek RTL8111H Gigabit Network Controllers, Data Rate Per Port: 1.0Gbps

Audio: ALC897 High-Definition Realtek Audio Codec, 1xCTIA Audio Jack, supports Line-out plus Mic-in.

Board Dimension: 179mm x 132mm

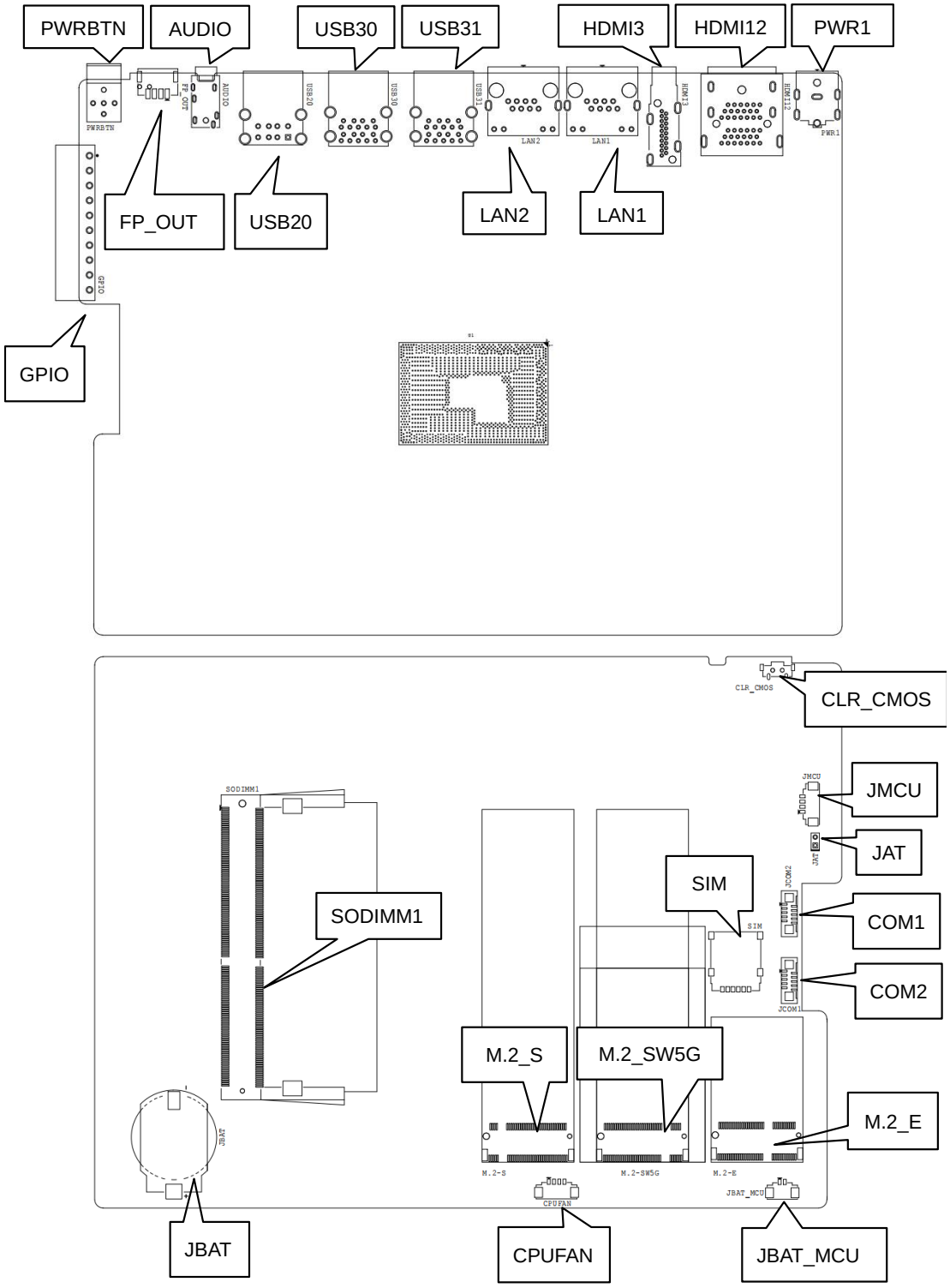
Enclosure Dimension: 190mm x 150mm x35mm (LxWxH)

Power: 12V/19V DC-IN, 9V-35V optional

Working Temperature: -20℃~60℃

1.3 Connector Diagram

ALN-30 Motherboard



1.4 I/O Interfaces

SXC-ALN30 Embedded PC

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 SXC-ALN30 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.

Attention!!!

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 a 1xSO-DIMM DDR4-3200MHz slot and supports single channels up to 16GB for memory.

Notes: 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 board’s specifications.

2.4 Display Interfaces (Screen Printing: HDMI12, HDMI3)

The board features 3xHDMI2.0b (supports HDCP2.3) interfaces for 4K resolution at 60Hz.

2.5 Storage Interfaces

The board features 1xM.2_2280 key M slot (Screen printing: M.2_S) for SATA/NVMe (limited to PCIe X1 speed) SSD. 1xM.2_2242/2280 key B slot (Screen printing: M.2_SW5G) for SATA/NVMe SSD (limited to PCIe X1 speed) or 4G modules.

2.6 Expansion Slots

The board features 1x M.2_2230 Key E slot (Screen Printing M.2_E) for Wi-Fi and Bluetooth Modules (supports PCIe/USB2.0).

1xNano SIM Slot. The slot supports Nano SIM and enables 4G communication when used with a compatible M.2_4G module.

2.7 USB Interfaces

The board is equipped with 4x USB 3.2 Type-A ports, each supporting speeds up to 10Gbps, and 2x USB 2.0 Type-A ports, each supporting speeds up to 480Mbps.

2.8 LAN

The board features two RJ45 LAN interfaces, each powered by a high-speed Realtek RTL8111H network controller, supporting data rates of up to 1Gbps(10/100/1000Mbps) per port.

Both LAN1 and LAN2 support Magic Packet wake-up and UEFI PXE network boot. To enable UEFI PXE network boot, set "IPv4 PXE Support" to "Enabled" in the BIOS.

LED Status Indicators:

LI_LED Status (Green)	Function	ACT_LED Status (Orange)	Function
Always on	Network Connected	Flashing	Data transmission

2.9 COM

The board comes with two RS232 serial ports by default, which can be optionally configured as RS485.

COM1, COM2(RS232/RS485) Pin Definition:

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

2.10 GPIO (Screen Printing: GPIO)

The board includes a 1×10-pin Phoenix terminal (pin spacing: 3.5mm), providing eight programmable input/output (GPIO) ports. The signal source is SI0 GP70–GP77.

GPIO Pin Definition (Screen Printing: GPIO)

Signal Name	VCC	IO0	IO1	IO2	IO3	IO4	IO5	IO6	IO7	GND
Pin	1	2	3	4	5	6	7	8	9	10
Signal Source	3.3V	GP70	GP71	GP72	GP73	GP74	GP75	GP76	GP77	GND

2.11 Board Power Supply (Screen printing: PWR1, PWR2)

The board supports a 12V/19V DC adapter power supply, with an optional wide voltage range of 9V to 35V.

2.12 CPU Fan Socket (Screen Printing: CPUFAN)

The board provides a 5V CPU fan socket.

CPU Fan Socket Pin Definition (Screen Printing: CPUFAN)

Pin	Signal
1	VCC
2	GND
3	TAC
4	CTL

2.13 Audio Interface

The board features a Realtek ALC897 High-Definition audio codec, and provides a 3.5mm Line-out/MIC-in combo jack that follows the CTIA American Standard.

Two-in-one (CTIA) Audio Jack:

2.14 Hardware Auto Start Optional (Screen Printing: JAT)

By default, the motherboard does not have a hardware auto start function. An optional hardware auto start function can be enabled by shorting the jumper cap, which supports power-on self-start (pin spacing: 2.0mm).

JAT (Screen Printing: JAT)

Setting	JAT
Close	Hardware Auto Start

2.15 MCU Timer

The board features an integrated MCU timer, allowing users to set an independent power on/off schedule for each day of the week.

MCU Program Burning Interface (Screen Printing: JMCU)

Pin	Signal
1	VCC
2	GND
3	DIO
4	CLK

2.16 Wired Control Switch Interface (Screen Printing: FP_OUT)

Pin	Signal
1	SW+
2	SW-
3	D-
4	D+

2.17 CMOS Clearance/Retention (Screen printing: CLR_CMOS)

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: Press CLR_CMOS for 15 seconds then disconnect.

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

⚠ **Attention!!!** Do not clear the CMOS while the computer is powered on, as this may damage the motherboard.

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 Hotkey Functions:

Key	Function	Description
→←	Select Screen	Navigate between menu screens.
↑↓	Select Item	Move between menu items or options.
Enter	Select	Open a submenu or confirm a selection.
+/-	Change Option	Adjust values or change settings.
F1	General Help	Display help information for the selected item.
F2	Previous Values	Load the previously saved settings.
F9	Optimized Defaults	Restore factory default settings.
F10	Save & Exit	Save changes and exit BIOS.
ESC	Exit	Exit BIOS or return to the previous menu.

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.

BIOS Vendor: American Megatrends

BIOS Version: Displays the current BIOS version.

Build Date & Time: Shows the BIOS build date and time.

Processor Information: Displays CPU details.

Total Memory: Indicates the total installed system memory.

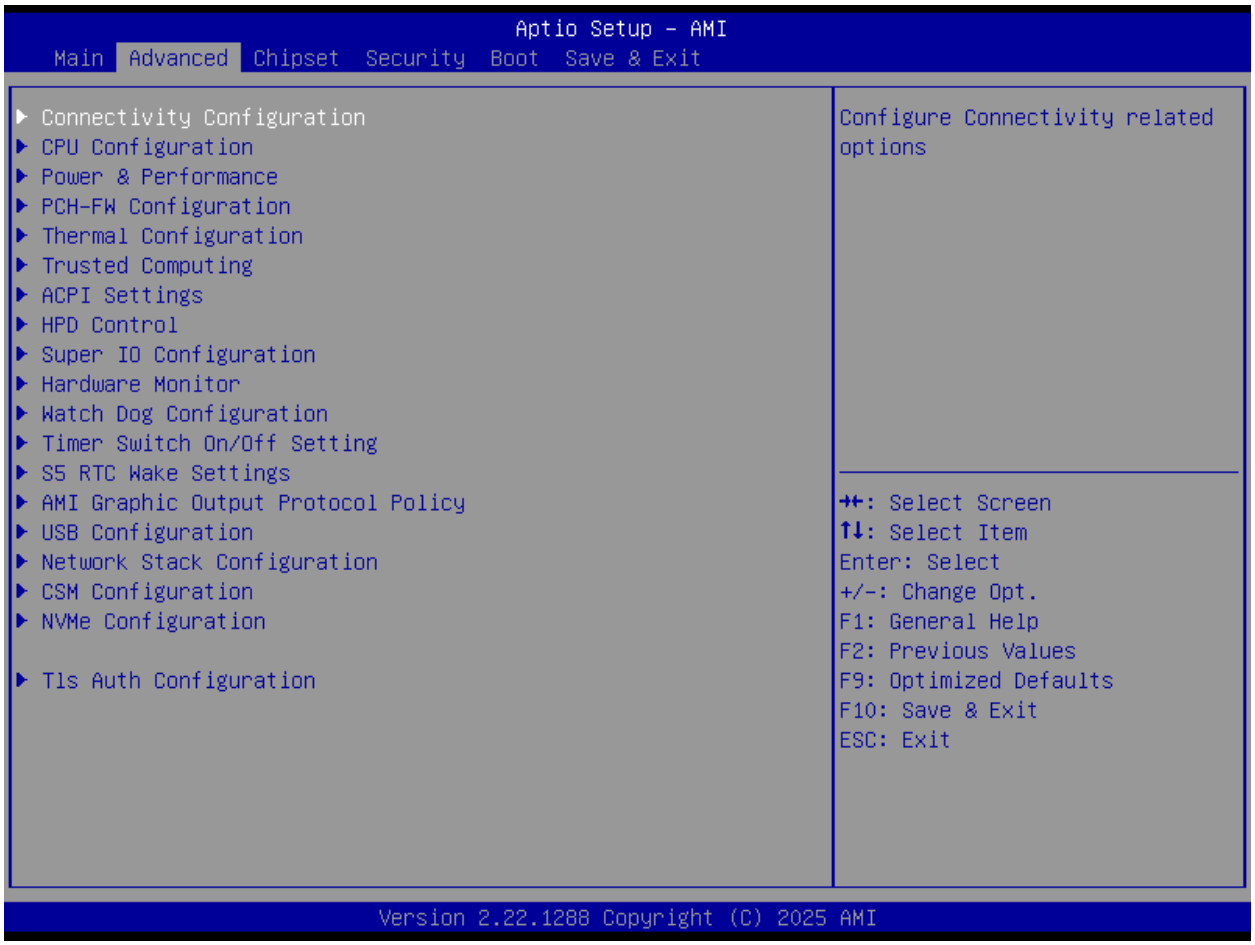
Memory Frequency: Displays the operating memory frequency.

ME FW Version: Shows the Management Engine (ME) firmware version.

System Date: Sets the system date in **MM/DD/YYYY** format.

System Time: Sets the system time in **HH:MM:SS** format.

3.3 Advanced Settings

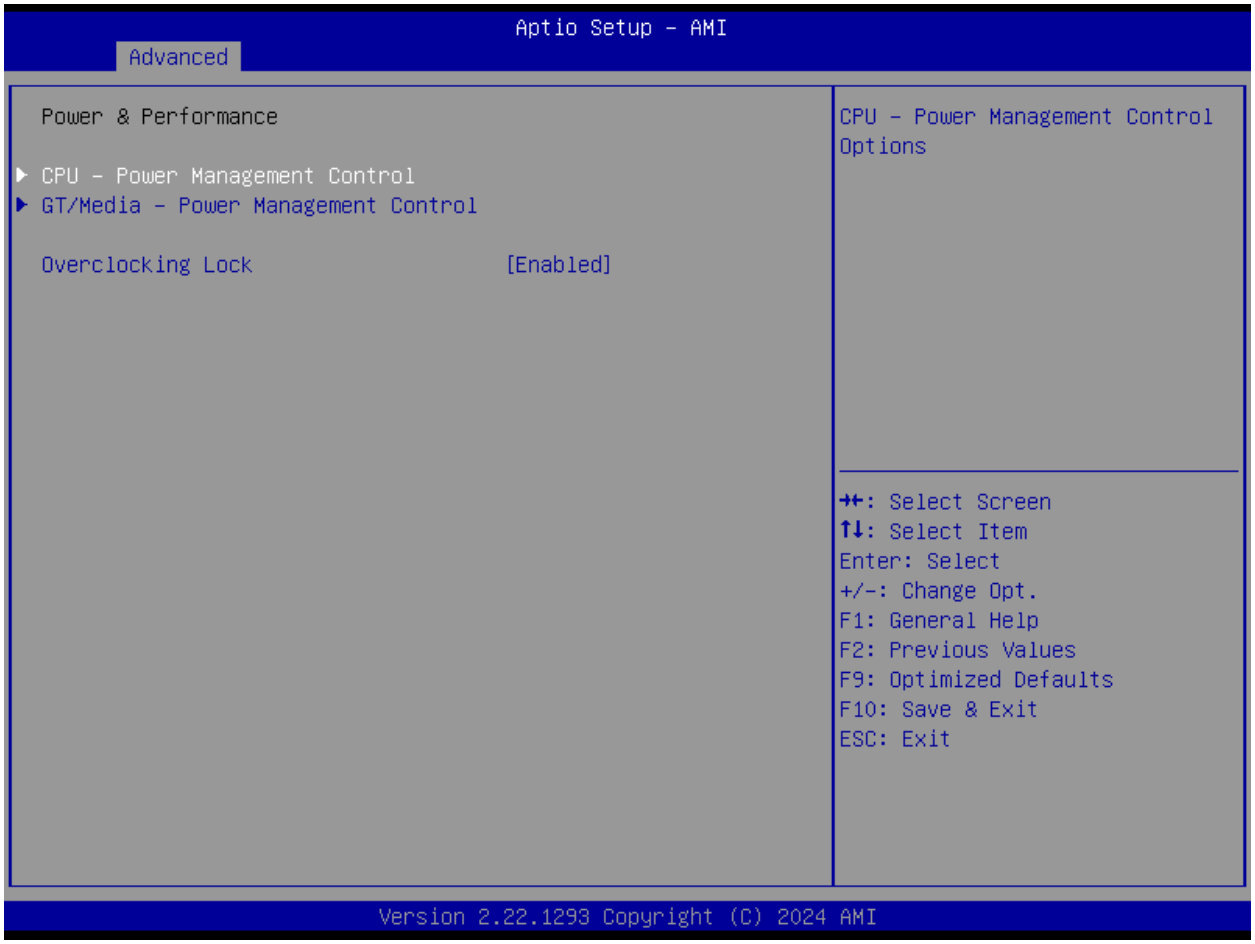


Select any of the items in the left frame of the screen. The advanced sections allow you to configure, improve and set up system features according to the preference of the CPU Configuration. All Advanced BIOS Setup options are described as follows.

1. Connectivity Configuration: Connection Configuration
2. CPU Configuration: CPU Parameter Information and Common Settings Selection
3. Power & Configuration: Power & Configuration
4. PCH-FW Configuration: PCH Firmware Configuration
5. Thermal Configuration: Thermal Configuration
6. Trusted Computing: Trusted Computing
7. ACPI Settings: ACPI Settings
8. HPD Control: HDMI HPD Lock Configuration
9. Super IO Configuration: Super IO Configuration
10. Hardware Monitor: Hardware Monitor
11. Watchdog Configuration: Watchdog Configuration
12. Timer Switch On/Off Setting: Timer Switch Setting
13. S5 RTC Wake Settings: S5 RTC Wake Settings
14. AMI Graphic Output Protocol Policy: AMI Graphic Output Protocol Policy
15. USB Configuration: USB Configuration
16. Network Stack Configuration: Network Stack Configuration

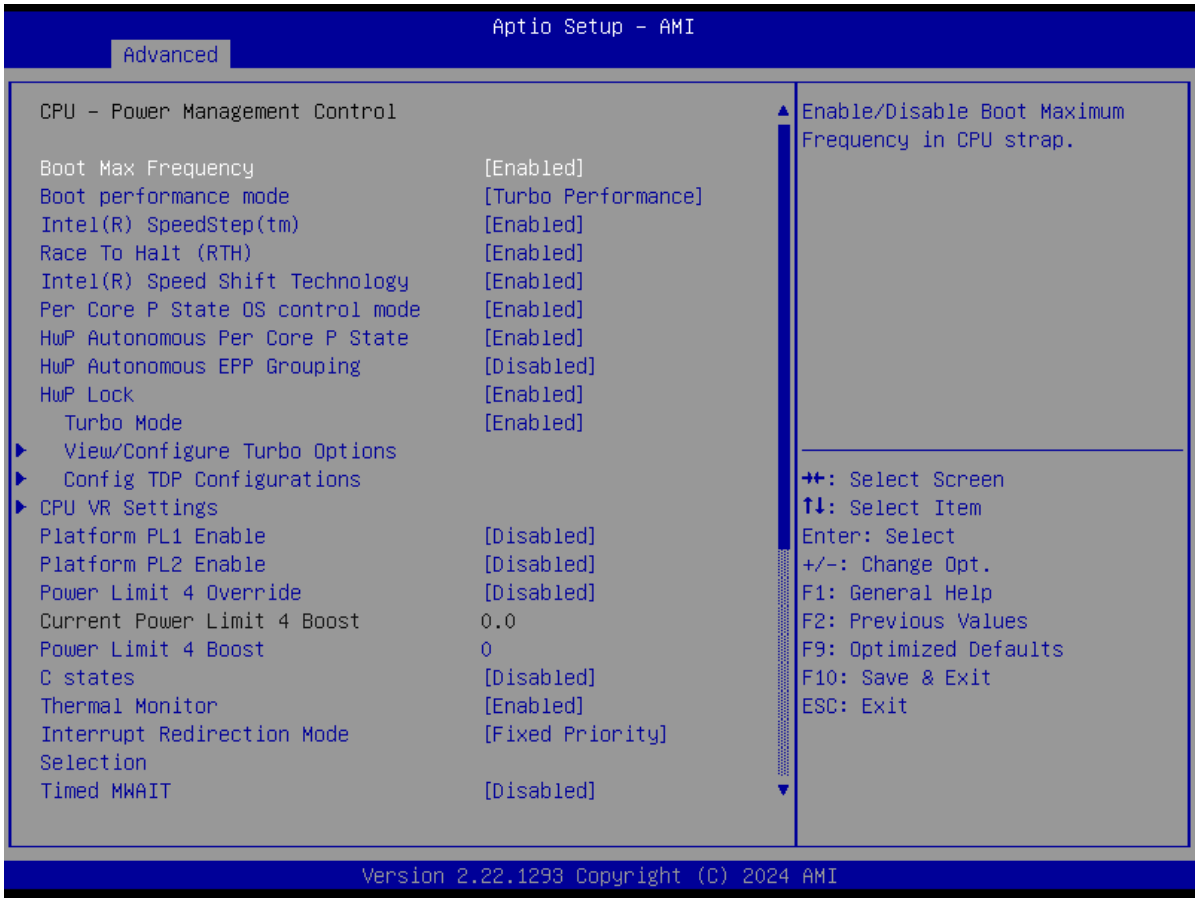
17. CSM Configuration: CSM Configuration
18. NVMe Configuration: NVMe Configuration
19. TLS Auth Configuration: TLS Auth Configuration

3.3.1 Power & Performance



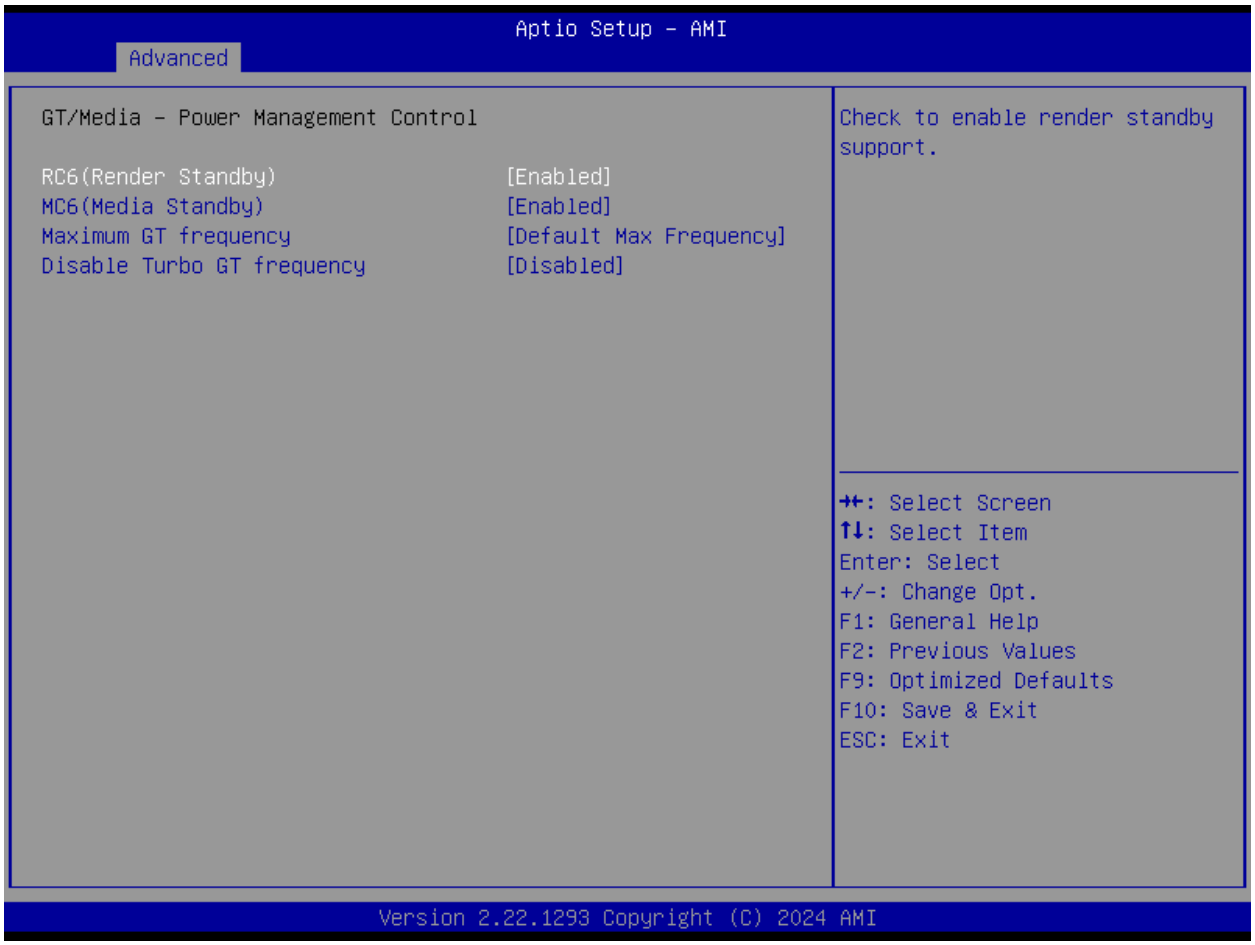
1. CPU-Power Management Control
2. GT-Power Management Control

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. **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.
4. **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.
5. **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)：

(Standby)Enable/disable integrated graphics standby, default Enabled.

MC6(Media Standby)：

(Standby)Enable/disable Media standby, default Enabled.

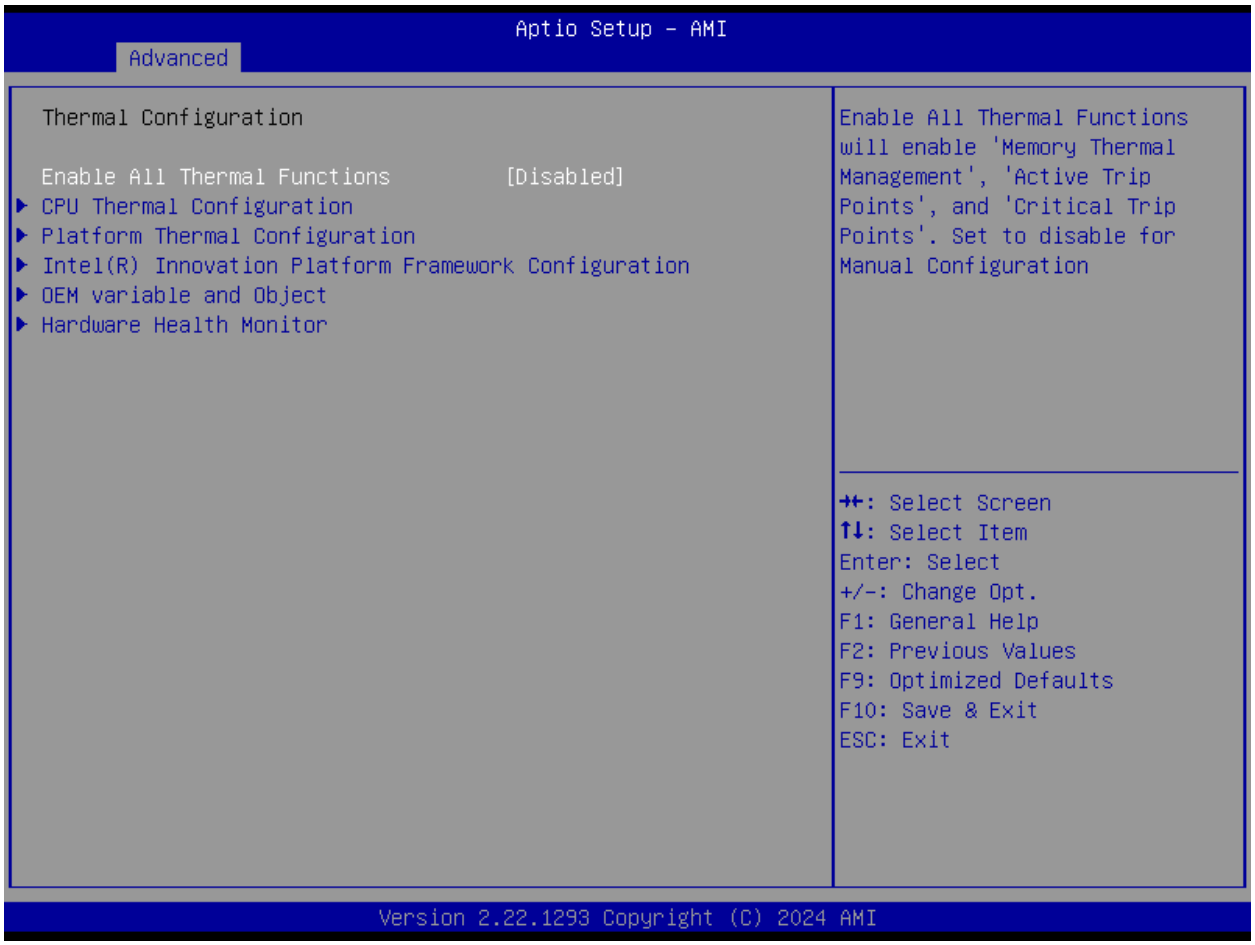
Maximum GT frequency：

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

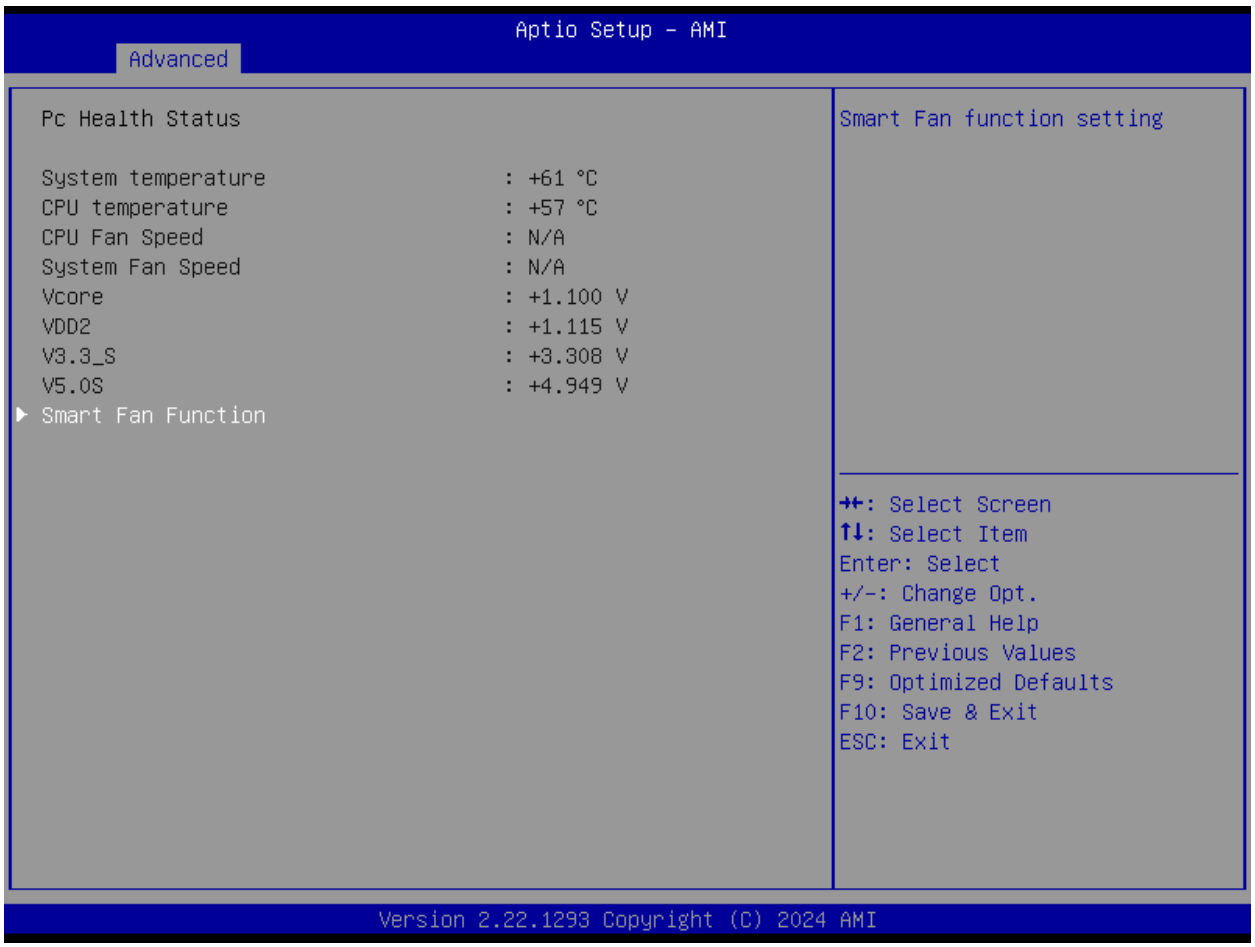
CPU Thermal Configuration:

Unlocks the temperature setting, the “Tcc Activation Offset” is the temperature adjustment option, the highest temperature is 100°C. Change the temperature by minus the number of degrees you wish to change. For example, minus 0(100-0) to set the temperature at 100°C, minus 20(100-20) to set the temperature at 80°C. (Please note the maximum supported temperature for the processor can be found on ark.intel.com.)

Platform Thermal Configuration

Intel(R) Dynamic Tuning Technology Configuration

3.3.5 Hardware Monitor

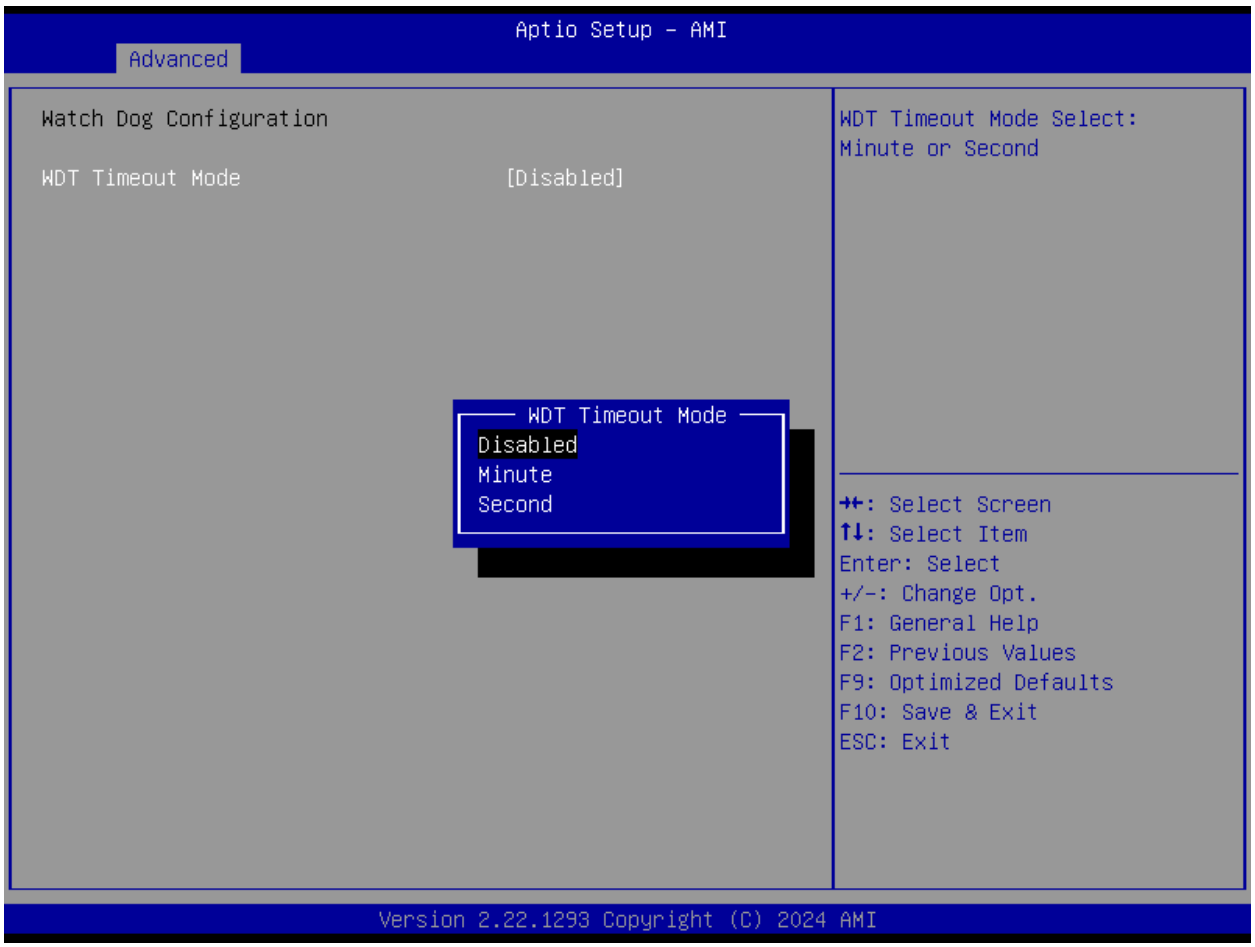


PC Health Status

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. System Temperature
2. CPU Temperature
3. CPU Fan Speed
4. VCore: Core Voltage
5. VDD2: RAM Voltage
6. V3.3_S: 3.3V
7. V5.0S: 5V
8. Smart Fan Function:
    i. Automatic Mode
    ii. Full on Mode
    iii. Manual Mode

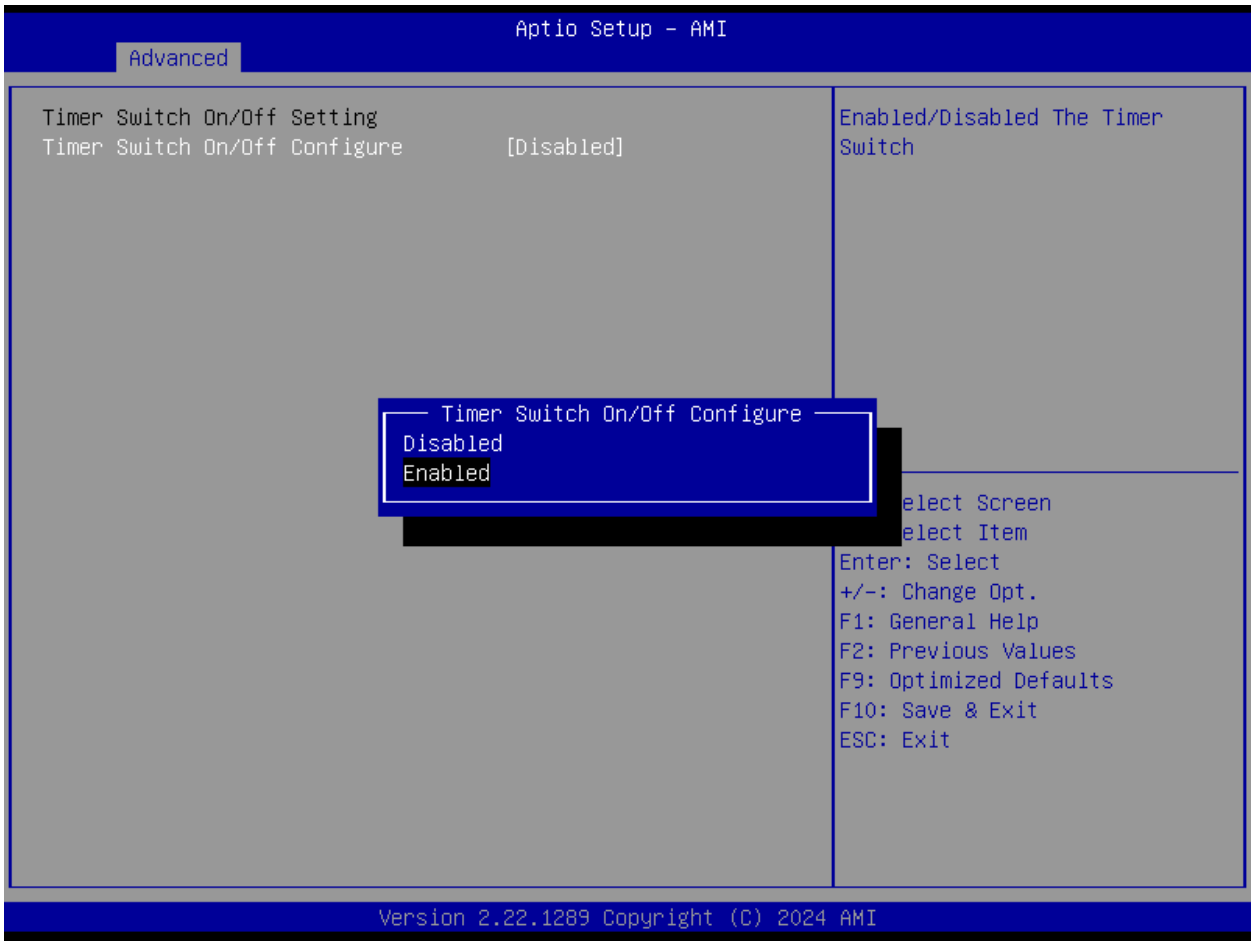
3.3.6 Watch Dog Configuration



Watch Dog Configuration

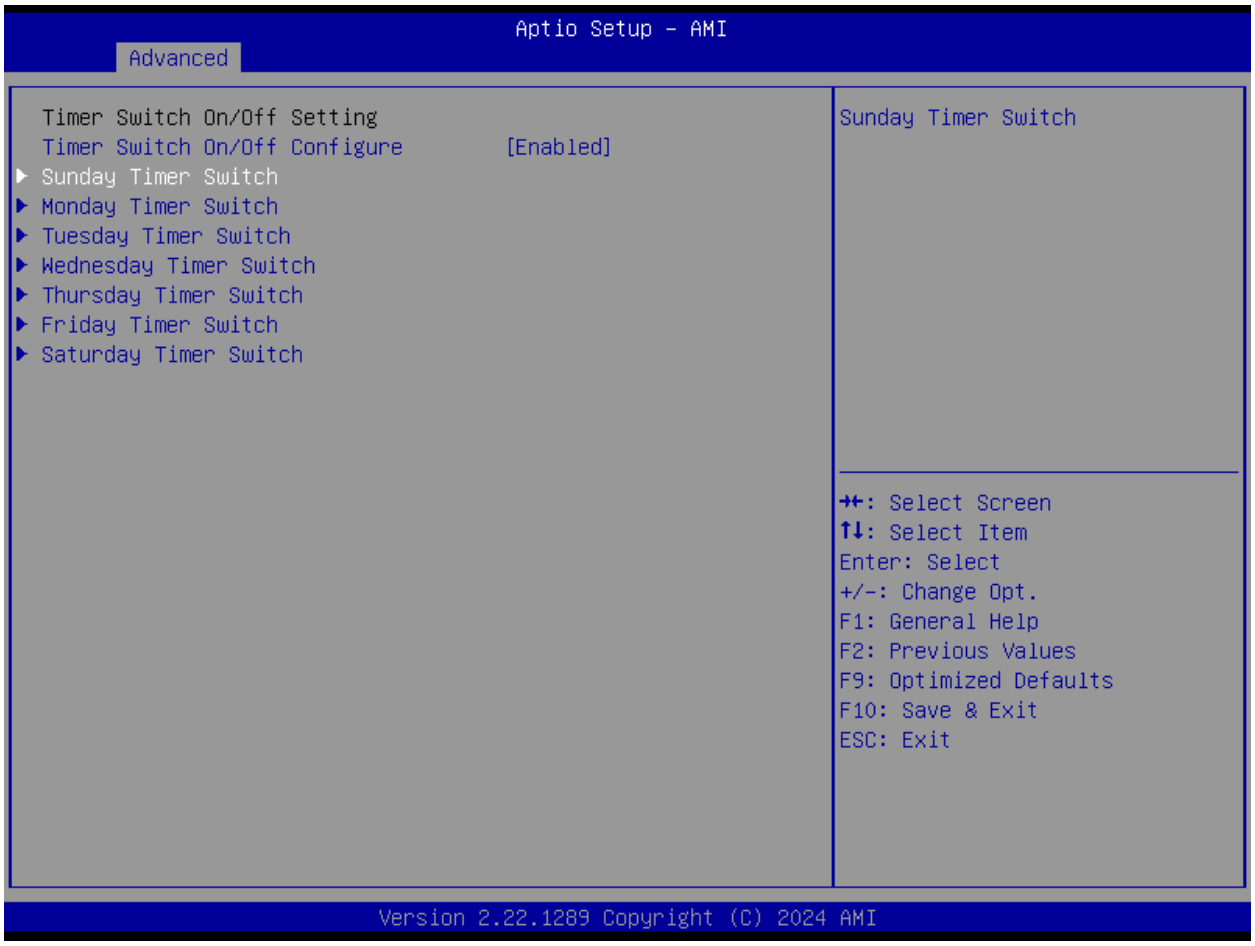
WDT Timeout Mode select: Minute or Second

3.3.7 Timer Switch On/Off Setting



This option integrates the MCU timer with the RTC timer power-on function. Users can set independent power-on or power-off schedules for each day of the week. The default setting is Disabled (off).

3.3.7.1 Timer Switch On/Off Setting



Timer Switch On/Off Configure (Enabled)

Sunday Timer Switch: Set the timer schedule for Sunday.

Monday Timer Switch: Set the timer schedule for Monday.

Tuesday Timer Switch: Set the timer schedule for Tuesday.

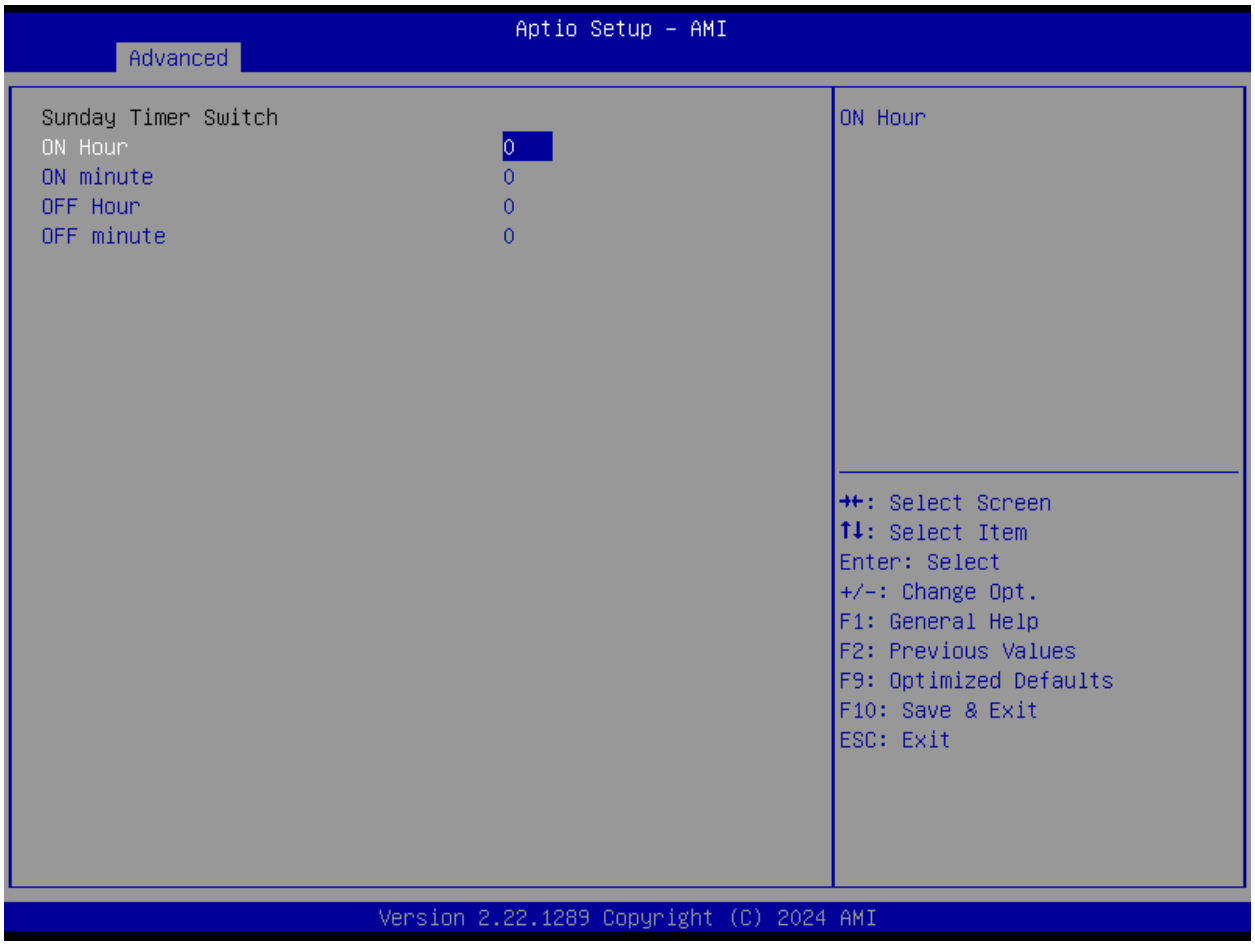
Wednesday Timer Switch: Set the timer schedule for Wednesday.

Thursday Timer Switch: Set the timer schedule for Thursday.

Friday Timer Switch: Set the timer schedule for Friday.

Saturday Timer Switch: Set the timer schedule for Saturday.

3.3.7.1.1 Timer Switch On/Off Setting



Timer Switch On/Off Configure (Enabled)

Sunday Timer Switch: Set the timer schedule for Sunday.

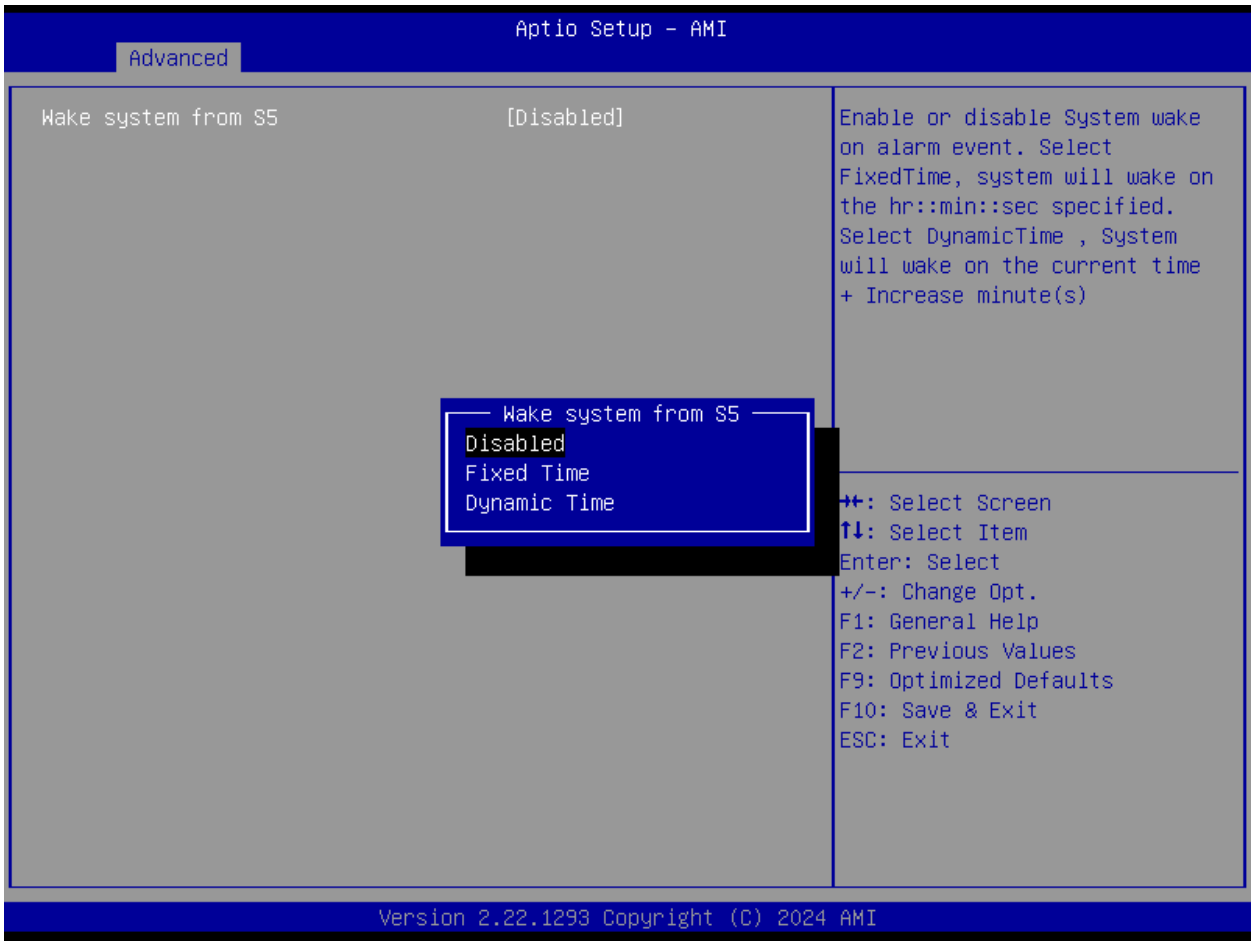
ON Hour: Set the hour for the power-on time.

ON Minute: Set the minute for the power-on time.

OFF Hour: Set the hour for the power-off time.

OFF Minute: Set the minute for the power-off time.

3.3.8 S5 RTC Wake Settings

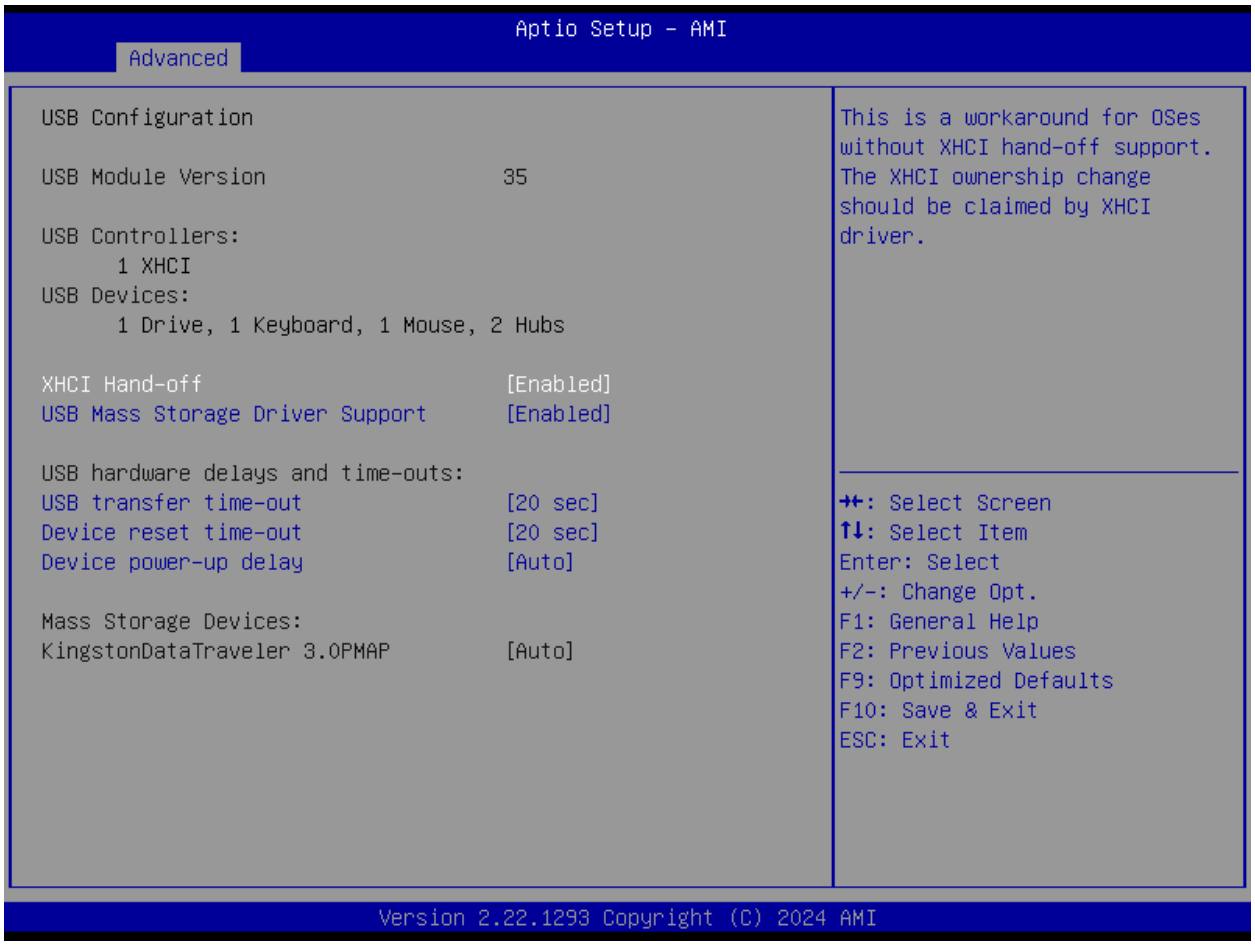


Wake system From S5: timing boot settings, disabled by default.

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

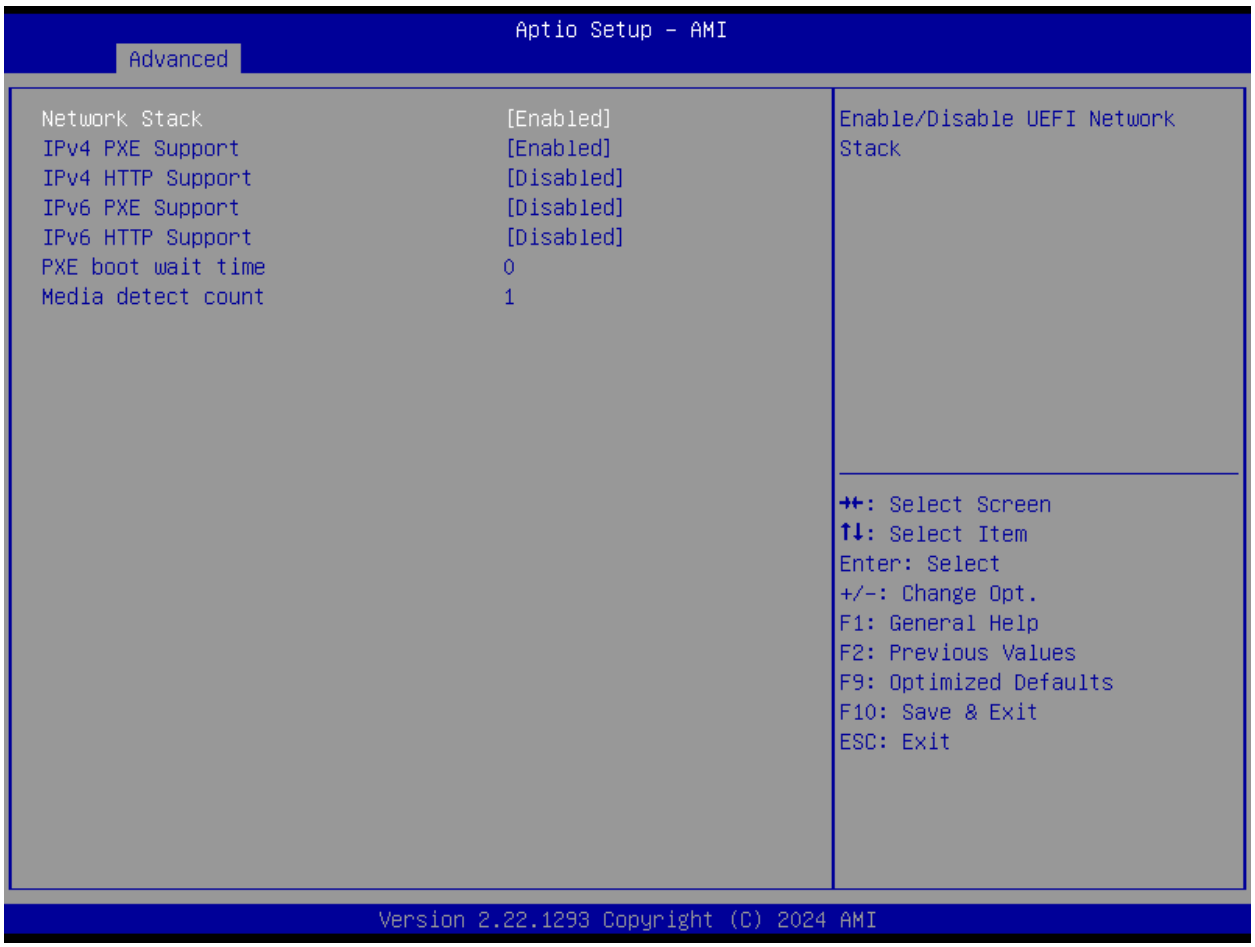
Dynamic Time: Select Dynamic Time and the system will wake on a dynamic time.

3.3.9 USB Configuration



1. **Legacy USB Support**
   a) Enable Legacy USB support. Disables legacy support if no USB devices are connected. Select enable will keep USB devices available under UEFI's support.
2. **XHCI Hand-off**
   a) A workaround for OS without XHCI hand-off support. The XHCI ownership change should be claimed by the USB XCHI driver.
3. **USB Mass Storage Driver Support**
   a) Enable(default) or disable USB Mass Storage Driver Support.
4. **USB transfer time-out**
   a) Time-out value for control, bulk, and interrupt transfers, default time:20 second.
5. **Device reset time-out**
   a) USB mass storage device start unit command time-out, default time:20 second.
6. **Device Power-up Delay**
   a) Maximum time the device will take before it properly reports itself to the host controller.

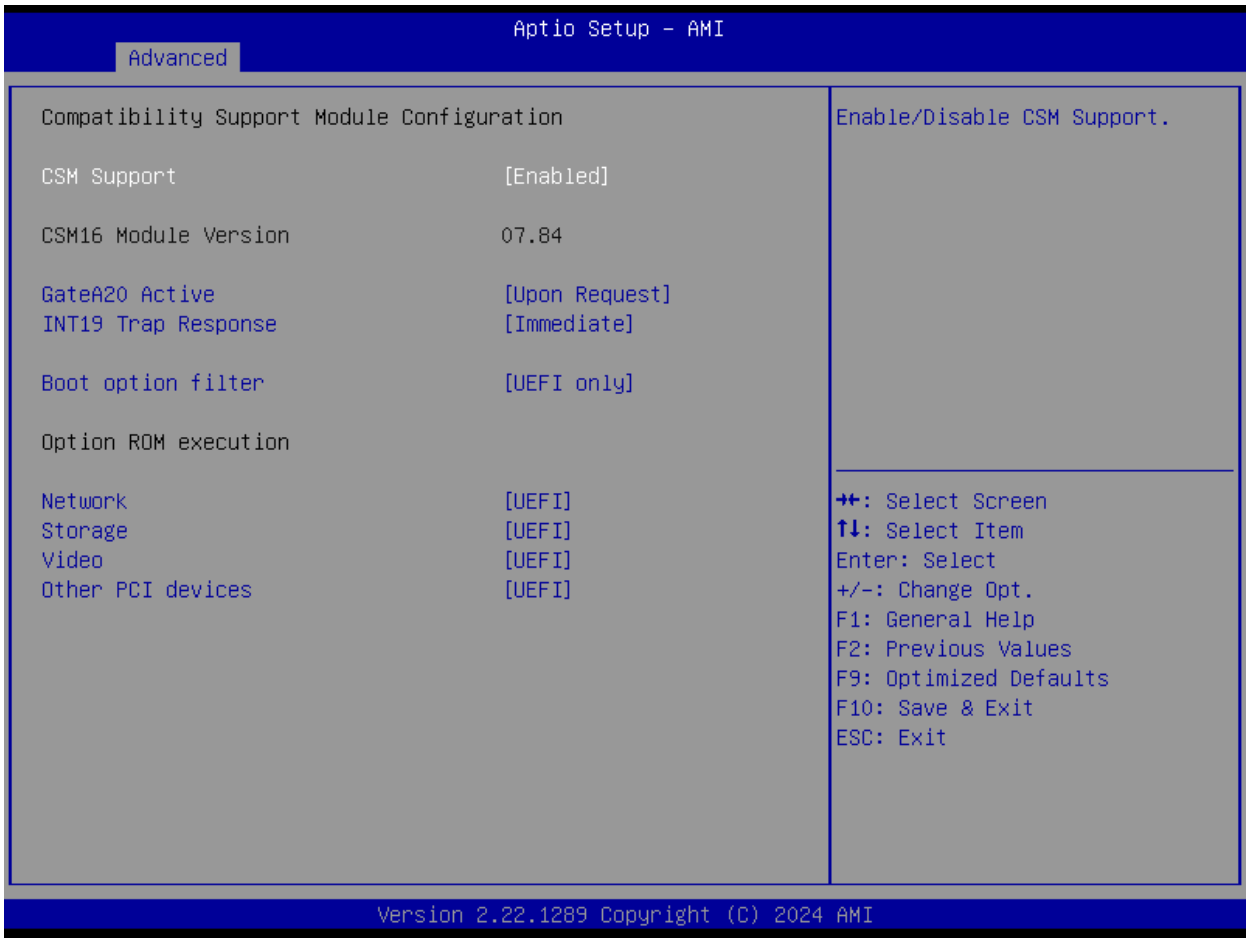
3.3.10 Network Stack Configuration



Network Stack

PXE Network boot setting, disabled by default.

3.3.11 CSM Configuration



Boot Option Filter: Configure boot options for the system.

Option ROM Execution:

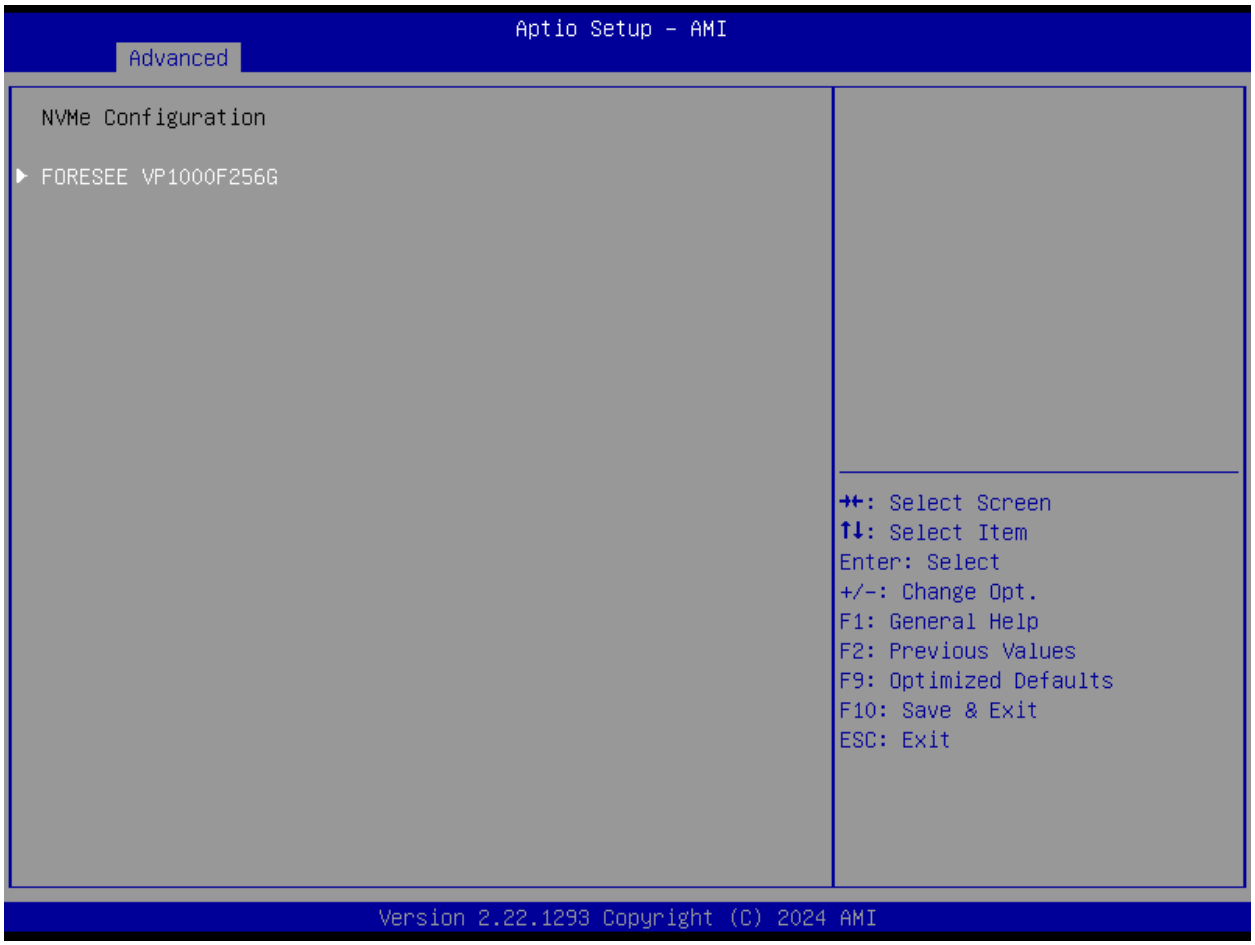
Network: Network Option ROM execution.

Storage: Storage Option ROM execution.

Video: Video Option ROM execution.

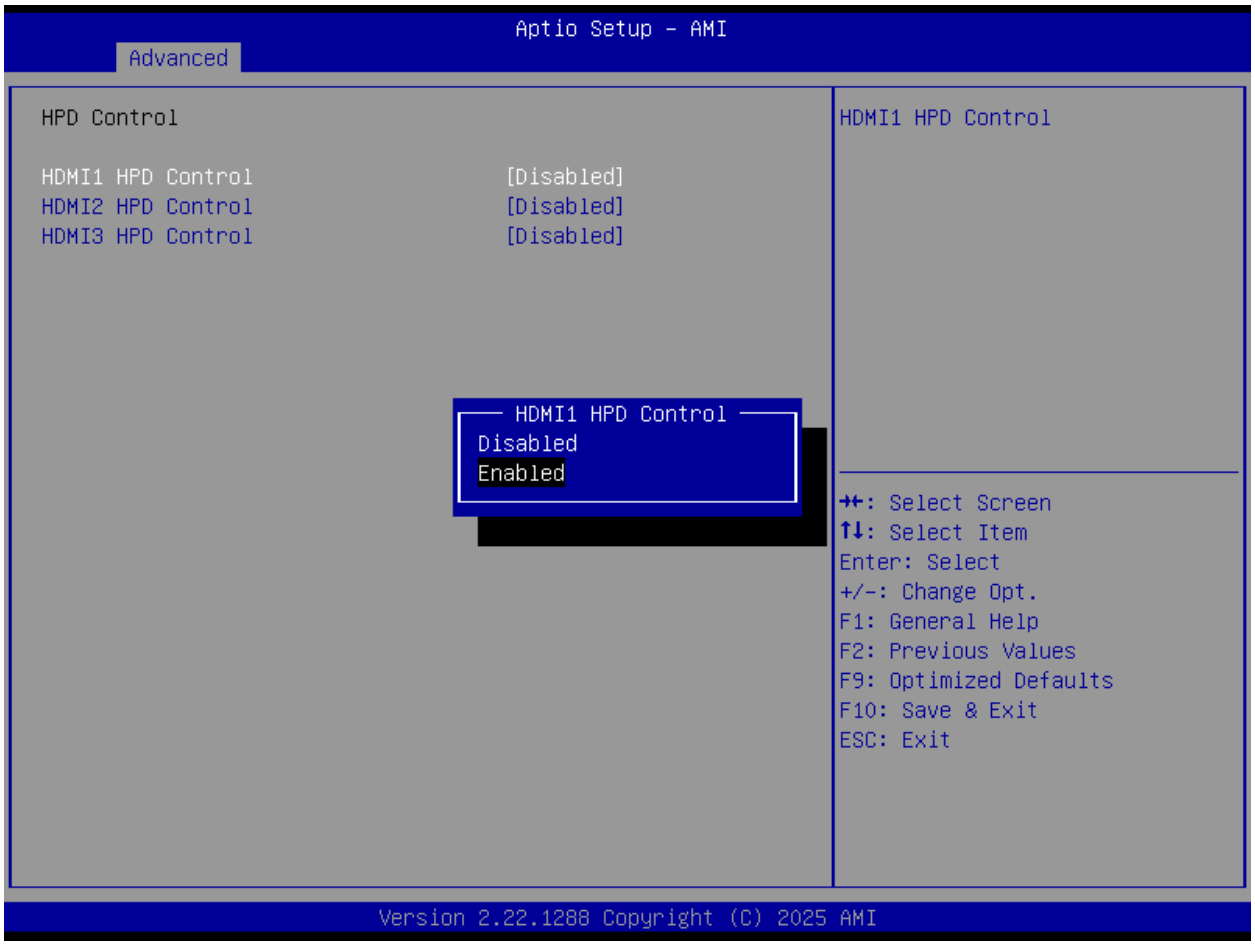
Other PCI Devices: Option ROM execution for other PCI devices.

3.3.12 NVME Configuration



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

3.3.13 HPD Control (HDMI HPD LOCKING)



HDMI HPD Locking Option: This option controls the HDMI HPD (Hot Plug Detection) locking functionality.

HDMI HPD 1~3 Control: Configure the HDMI OUT self-lock function for HDMI ports 1 to 3.

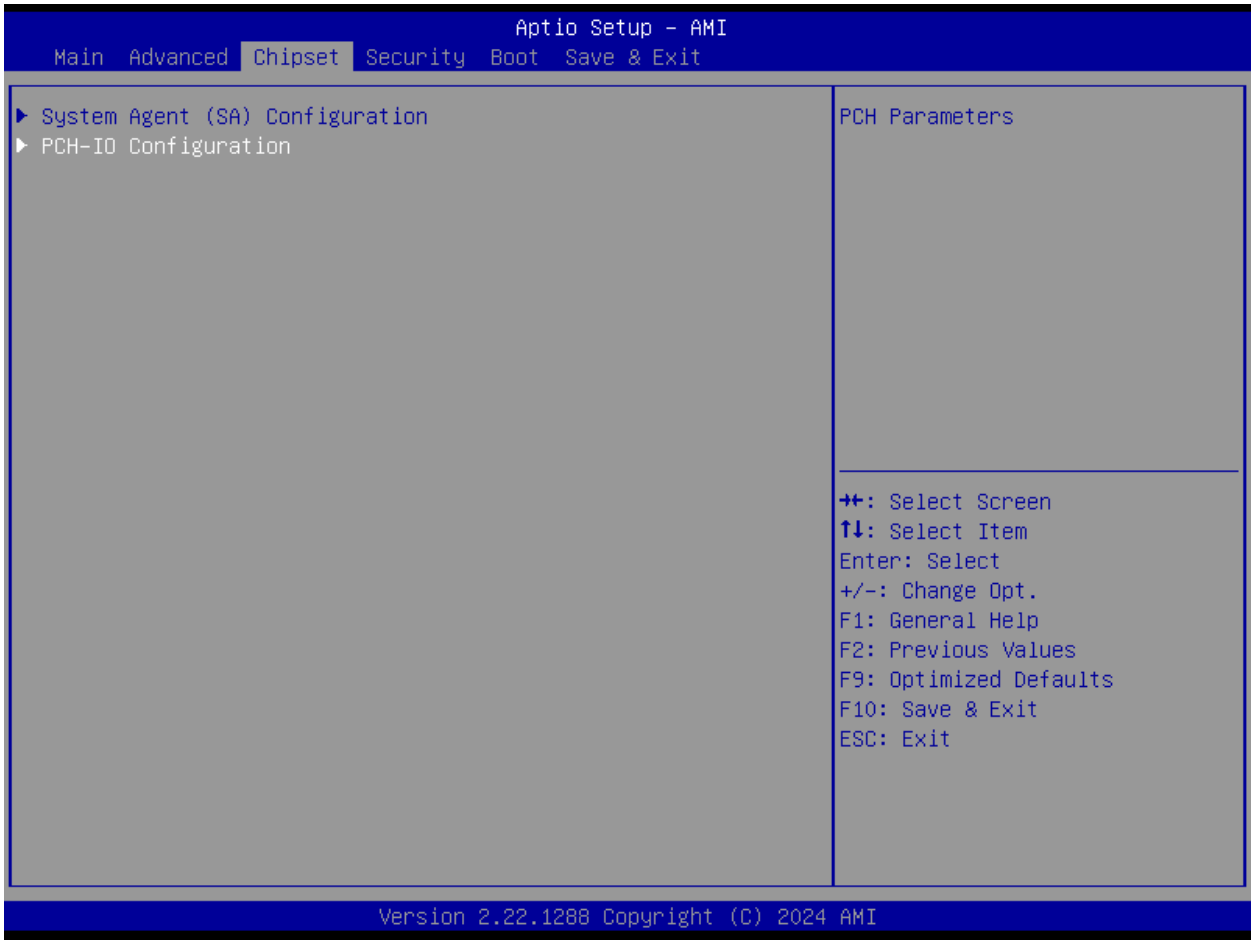
HDMI 1 HPD Control: Enable or disable HDMI 1 HPD.

HDMI 2 HPD Control: Enable or disable HDMI 2 HPD.

HDMI 3 HPD Control: Enable or disable HDMI 3 HPD.

3.4 Chipset

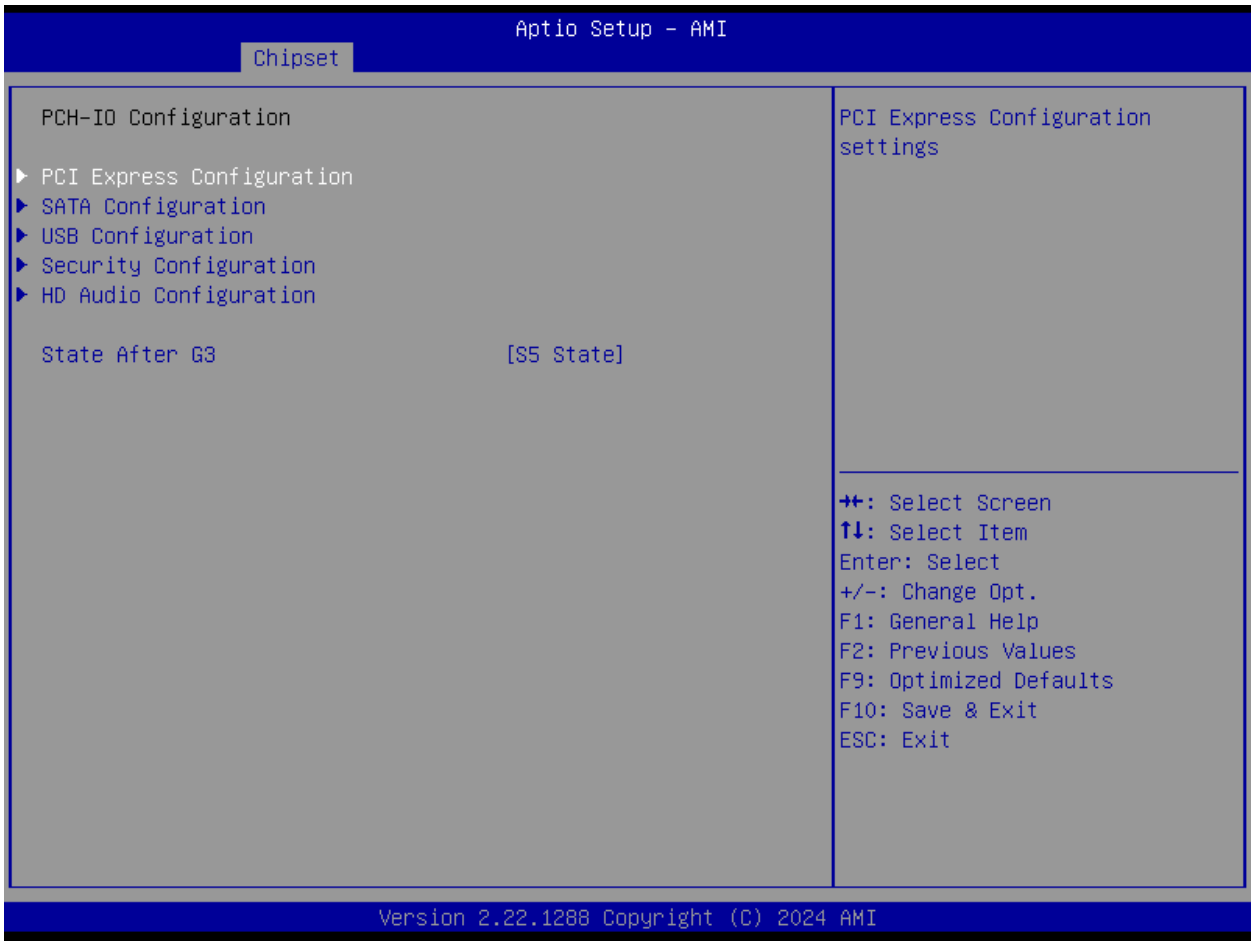
Select the chipset tab from the setup screen to enter the chipset BIOS Setup screen.



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

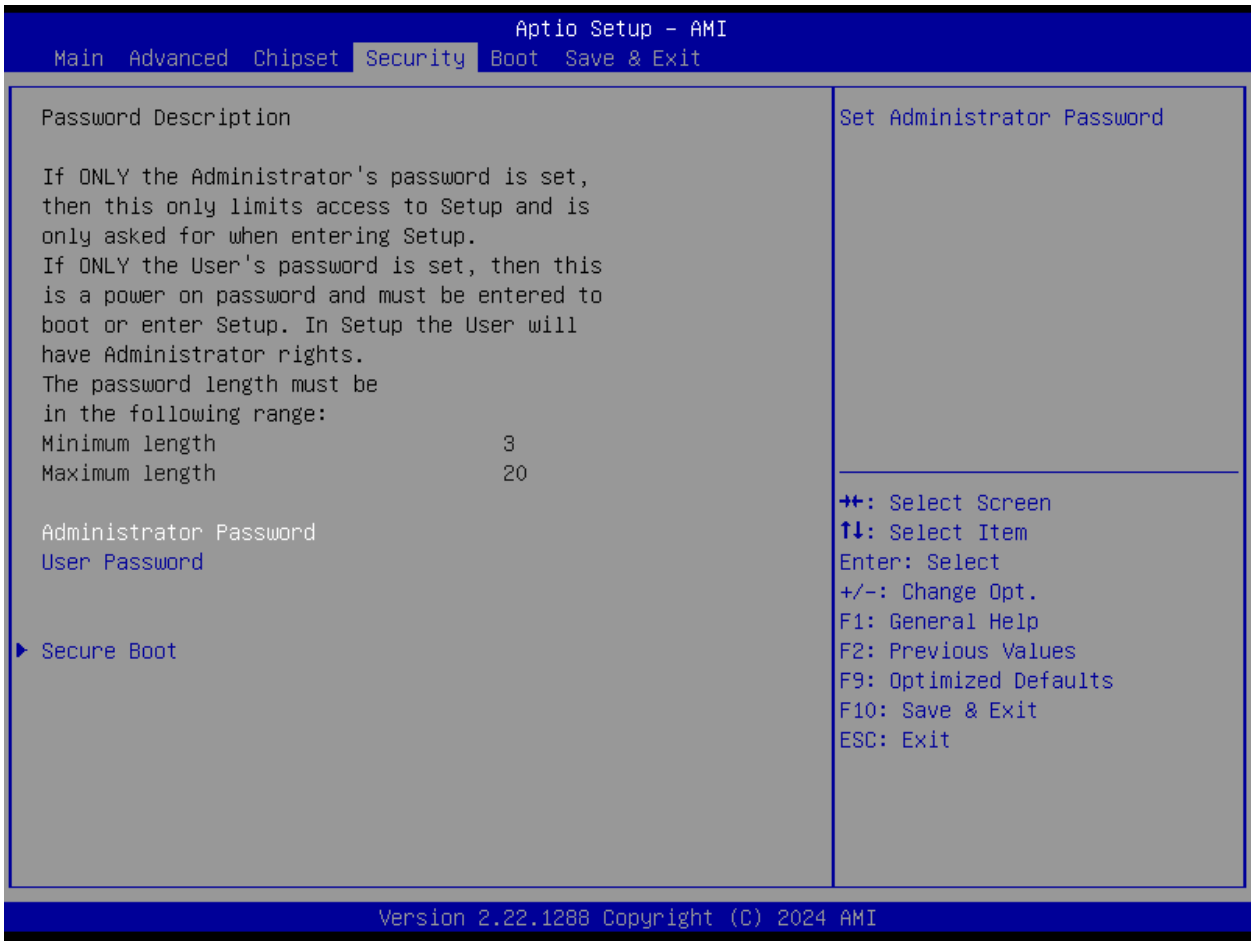
PCH-IO Configuration: Southbridge configuration options, including hard disk, audio codec and other options.

3.4.1 PCH-IO Configuration



1. **PCI Express Configuration**
2. **SATA Configuration**
3. **USB Configuration**
4. **Security Configuration**
5. **HD Audio Configuration**
6. **State After G3:**
   i. S0 State: Power-on self-start (system powers on automatically).
   ii. S5 State: Power-off state (system powers on but does not boot).

3.5 Security

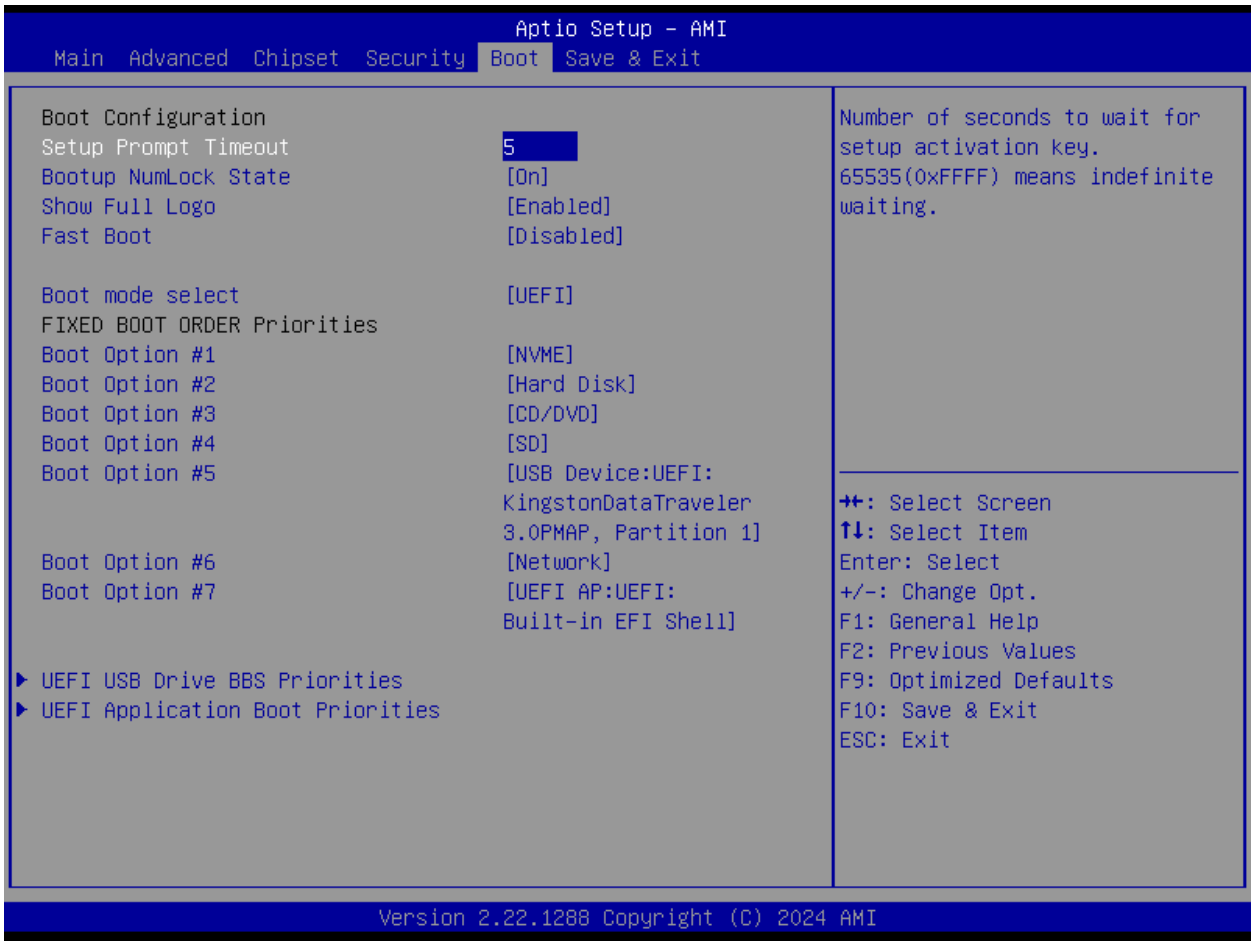


Administrator Password: Set the Administrator Password.

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

Show Full Logo:

Enabled/Disabled Displays customized boot logo.

Boot Option #1~#7:

Set the system boot order from Number 1 to Number 7.

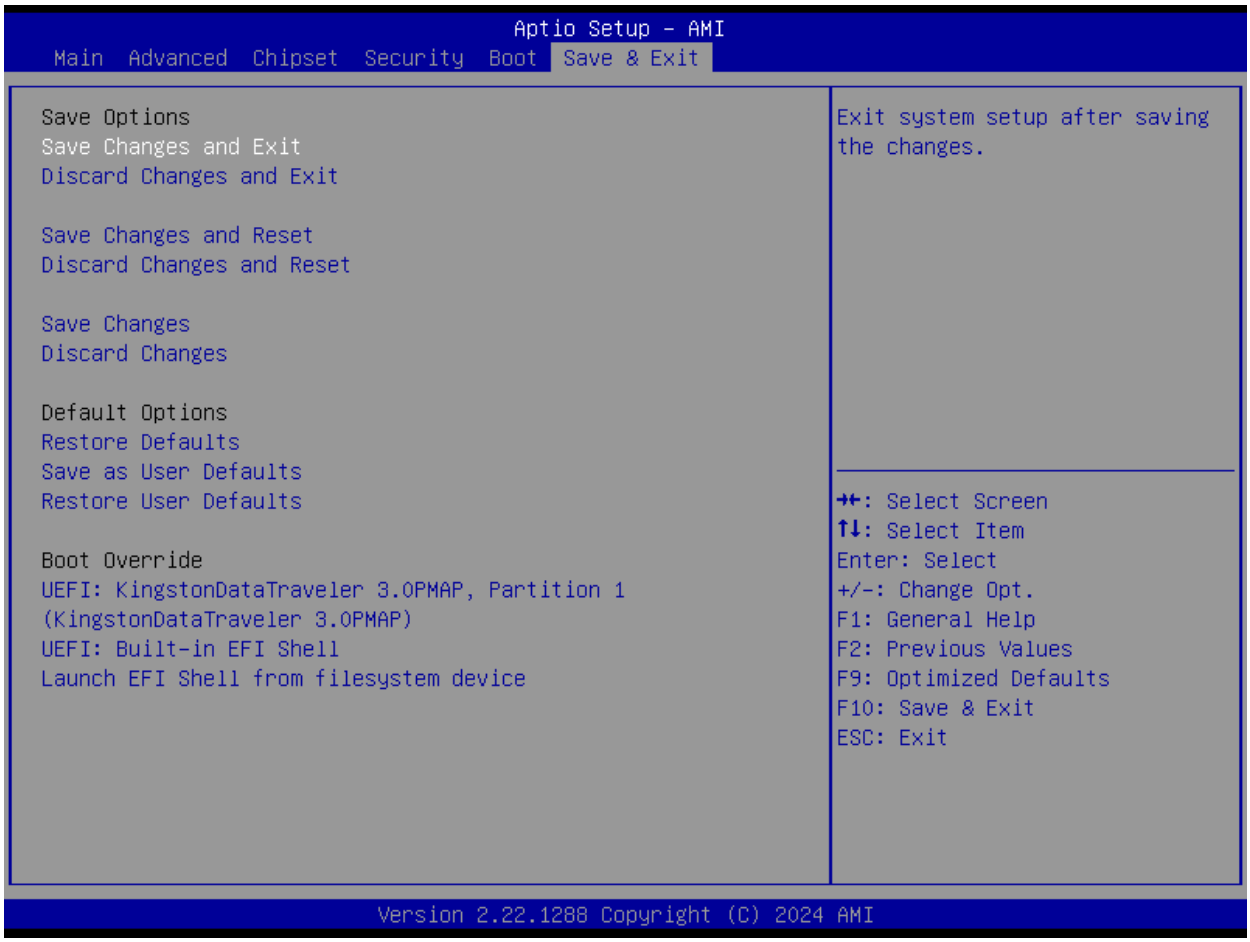
UEFI USB Drive BBS Priorities:

UEFI USB Drive BBS 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.