User Manual

T1-AL50 V6.0



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T1-AL50 Product User Manual

(Version 6.0)

Version:		
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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.

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Chapter 1 Product Introduction

1.1 Brief Introduction

The T1-AL50 is an ultra-compact Mini PC powered by Intel® Alder Lake/Raptor Lake-P/H Series Processor.

1.2 Parameters

CPU: Alder Lake/Raptor Lake-P/H Series

CPU	Cores/Threads	Base Frequency	Max Turbo Frequency	Cache	TDP
i5-1240P	12C(8E+4P)/16T	1.7GHz	4.40GHz P-Core:4.40GHz E-Core:3.30GHz	12MB	28W (Max Turbo Power: 64W) Default PL1/PL2: 28W
i5-1340P	12C(8E+4P)/16T	/	4.60GHz P-Core:4.60GHz E-Core:3.40GHz	12MB	28W (Max Turbo Power: 64W) Default PL1/PL2: 28W
i7-1260P	12C(8E+4P)/16T	1.7GHz	4.70GHz P-Core:4.70GHz E-Core:3.40GHz	18MB	28W (Max Turbo Power: 64W) Default PL1/PL2: 28W
i7-1360P	12C(8E+4P)/16T	/	5.00GHz P-Core:5.00GHz E-Core:3.70GHz	18MB	28W (Max Turbo Power: 64W) Default PL1/PL2: 28W
i5-13420H	8C(4P+4E)/12T	1.30 GHz	4.60GHz P-Core: 4.60 GHz E-Core: 3.40 GHz	12MB	45W (Max Turbo Power: 115W) Default PL1/PL2: 35W
i5-13500H	12C(4P+8E)/16T	2.60 GHz	4.70GHz P-Core: 4.70 GHz E-Core: 3.50 GHz	18MB	45W (Max Turbo Power: 115W) Default PL1/PL2: 35W
i7-12700H	14C(6P+8E)/20T	2.20 GHz	4.70GHz P-Core: 4.70 GHz E-Core: 3.50 GHz	24MB	45W (Max Turbo Power: 115W) Default PL1/PL2: 35W

GPU: Integrated Intel® Iris® Xe Graphics eligible

CPU	GPU	Execution Units	Maximum Dynamic Freq.
i5-1240P	Intel® Iris® Xe Graphics eligible	80EU	1.30 GHz
i5-1340P	Intel® Iris® Xe Graphics eligible	80EU	1.45 GHz
i7-1260P	Intel® Iris® Xe Graphics eligible	96EU	1.45 GHz
i7-1360P	Intel® Iris® Xe Graphics eligible	96EU	1.50 GHz

i5-13420H	Intel® UHD Graphics for 13th Gen Intel® Processors	48EU	1.40 GHz
i5-13500H	Intel® Iris® Xe Graphics eligible	80EU	1.45 GHz
i7-12700H	Intel® Iris® Xe Graphics eligible	96EU	1.40 GHz

Display Interfaces: 1 × DisplayPort 1.4, 1 × HDMI 2.0, 1 × Thunderbolt™4

Memory: 2 × DDR4 SO-DIMM slots, supporting dual-channel memory at up to 3200 MT/s, with a maximum capacity of 64GB.

Storage/Expansion:

- 1 × M.2 Key M slot (labeled M.2_N on board), supports 2280 NVMe SSD.
- 1 × M.2 Key M slot (labeled M.2_N/S on board), supports 2280 NVMe/SATA SSD.
- 1 × M.2 Key E slot (labeled M.2_E on board), supports 2230 Wi-Fi & Bluetooth modules via PCIe/USB 2.0/CNVi.

Audio: SenaryTech SN6186 High-Definition Audio Codec, supporting 1 × CTIA 3.5 mm Audio Jack (Line-out + Mic-in in One).

Ethernet: 2 × Realtek RTL8125 Ethernet controllers, RJ45 interfaces.Data Rate Per Port: 10/100/1000/2500Mbps (2.5Gbps).

USB:

- 4 × USB 3.2 Gen 2 Type-A ports, up to 10 Gbps (labeled USB31/USB32/USB33 on board)
- 1 × Thunderbolt™4, up to 40 Gbps (labeled TBT on board)

TPM: External TPM module support (Infineon SLB9670TPM chip, optional).

Other I/O:

- 1 × 4-pin 5V CPU fan header (labeled CPUFAN on board, 1.25 mm)
- 1 × 4-pin 5V system fan header (labeled SYSFAN on board, 1.25 mm)

Power:

- 19V DC input (120W, 5.5 mm × 2.5 mm DC jack)
- Thunderbolt™4 PD power input (100W/120W)

Board Dimension: 120 mm × 120 mm

Chassis Dimension: 127 mm × 127 mm × 50.5 mm (L × W × H)

Operating Temperature: -20°C to 60°C

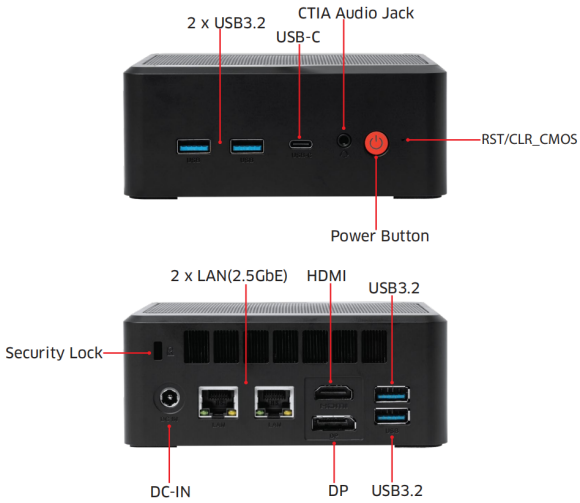
OS Support: Supports Windows 10 (21H2), Windows 11, Ubuntu 22.04 (Linux kernel 5.18 or later), and other compatible operating systems released from Q4 2021 onward.

Note: Windows 10 versions earlier than 21H2 and older Ubuntu versions are not supported.

For detailed processor compatibility information, please refer to the Microsoft Official Documentation.

1.3 Product Overview

I/O Interfaces

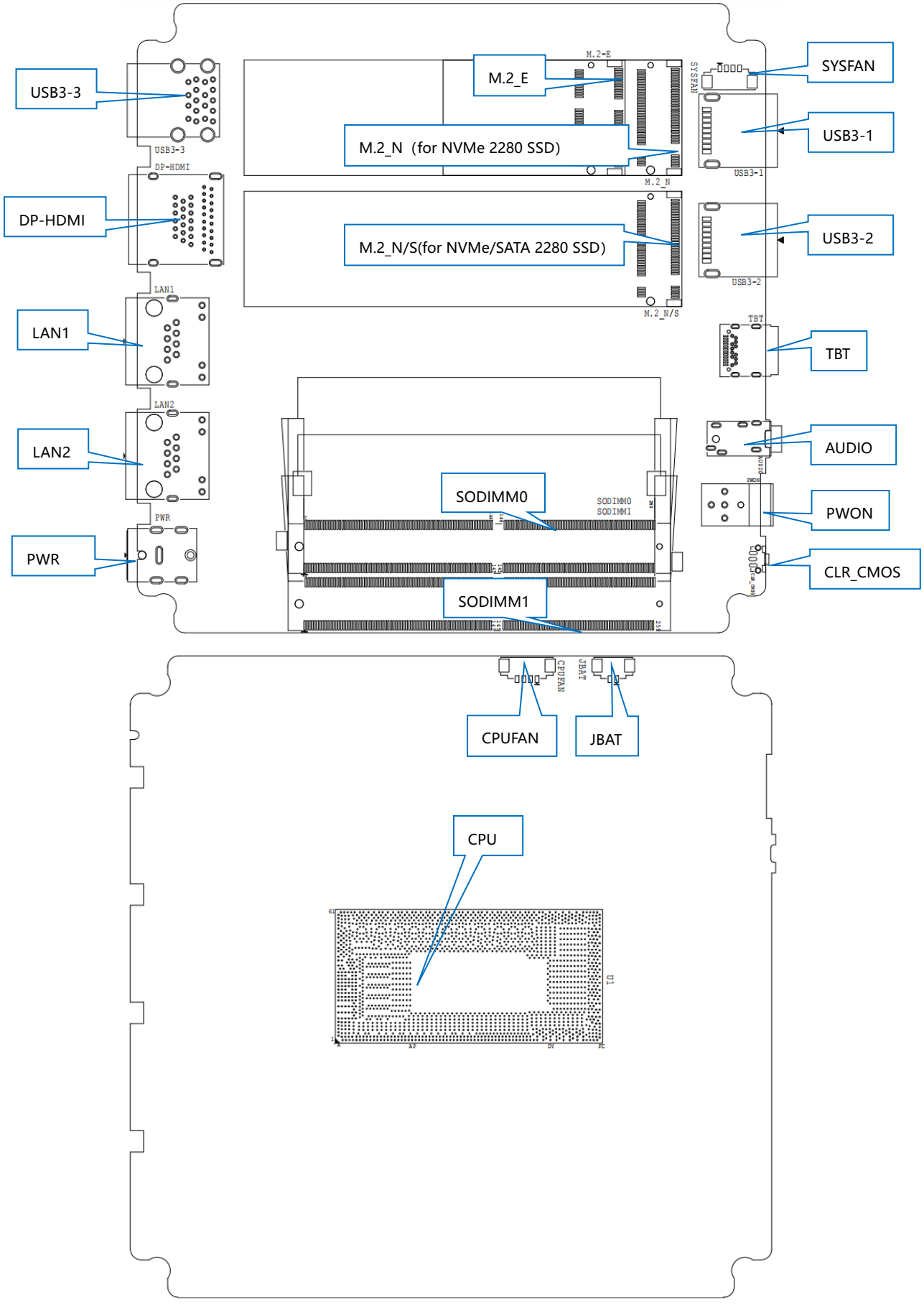








1.3 Connector Diagram



Chapter 2 Hardware

2.1 Installations

Please refer to the following steps for installation:

1. Read the user manual carefully to make sure all the adjustments on the T1-AL50 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 reinstall 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:

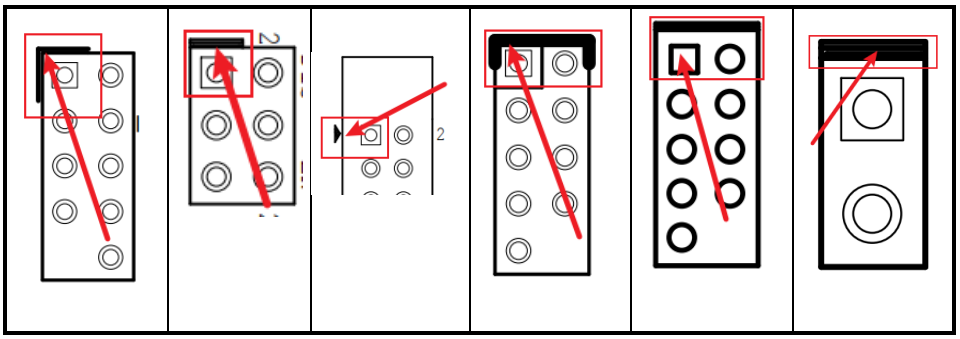
- Hold the board's edge when handing, and do not touch onboard pins, components, or plug sockets.
- When touching integrated circuit components (such as CPU, RAM, etc.), please wear an anti-static wrist strap/glove to avoid electrostatic discharge damage to the board or other sensitive components.
- 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.

Illustration:

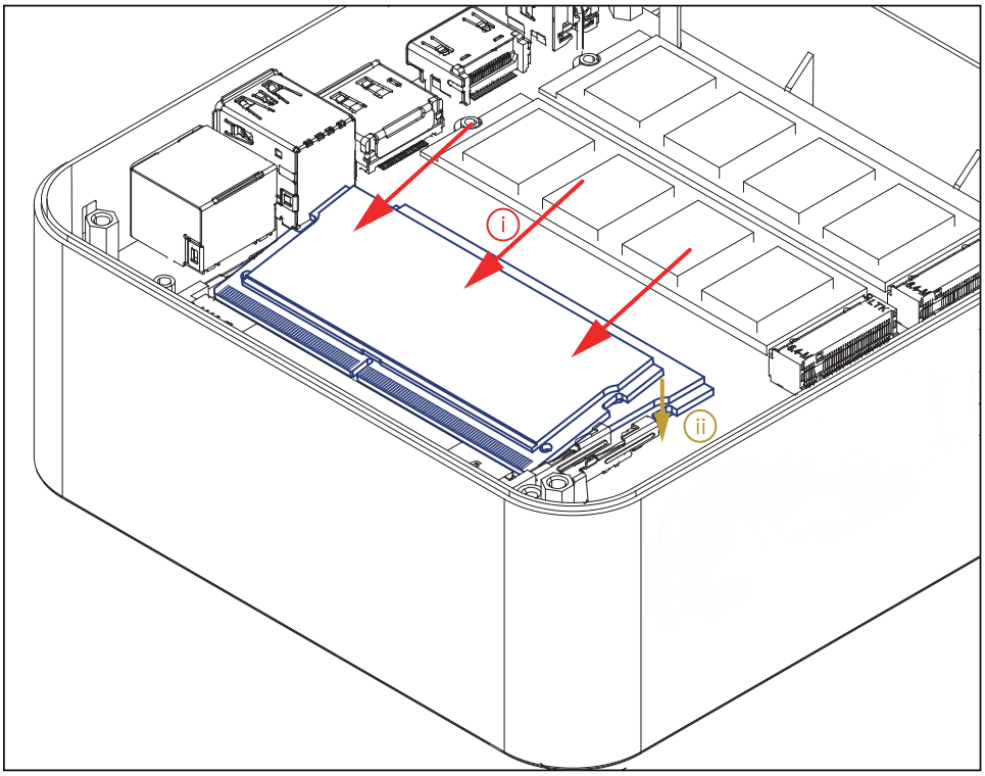


2.3 Memory Slots

The system is equipped with 2 × DDR4 SO-DIMM slots, supporting dual-channel memory at up to 3200 MT/s, with a maximum capacity of 64GB.

Memory Installation:

- Align the notch on the memory module with the key on the SO-DIMM slot and gently insert the module into the slot. Press down firmly on both sides of the module until the retaining clips secure it in place.
- Use memory modules that match the specifications supported by the motherboard to ensure proper installation and reliable system operation.



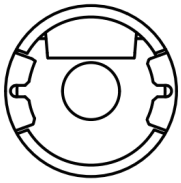
2.4 Power Supply (Labeled PWR on Board)

The system supports the following power input methods:

- Supports DC 19V/120W power input via a 5.5 × 2.5 mm DC-IN jack.
- Supports power input via the Thunderbolt™ 4 port using a 100W/120W USB Power Delivery (PD) adapter.

Note: The minimum PD power requirements for different processor configurations are listed below.

Processor	Minimum PD Power Requirement
Intel® Core™ i5-13500H	120W
Intel® Core™ i5-13420H	120W
Intel® Core™ i7-12650H	120W
Intel® Core™ i7-1360P	100W
Intel® Core™ i5-1340P	100W
Intel® Core™ i7-1260P	100W
Intel® Core™ i5-1240P	100W

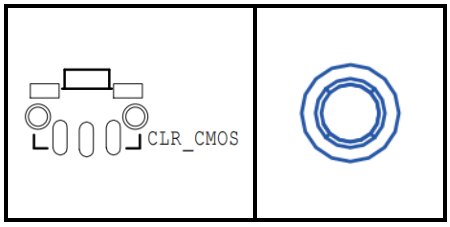
PWR: DC-IN Jack DC 19V/120W (5.5 × 2.5 mm) power input connector	
	

2.5 Reset/CMOS Clear Button (Labeled CLR_CMOS on Board)

The button labeled **CLR_CMOS** provides system reset and CMOS clear functions.

- When the system is powered on, pressing the button performs a system reset.
- When the system is powered off, pressing the button clears the CMOS data.

The CMOS is powered by the onboard battery. Clearing CMOS will permanently erase the previous BIOS configuration settings and restore the BIOS settings to factory defaults.



CMOS Clear Procedure:

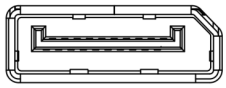
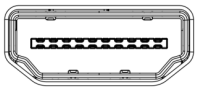
1. Shut down the system and disconnect the power supply.
2. Insert a SIM card ejector tool into the small hole next to the power button, then press and hold the **CLR_CMOS** button for more than 3 seconds.
3. Power on the system, press the **<Delete>** key to enter BIOS Setup, press **F9** to load optimized defaults, then save and exit BIOS settings.

Note: Do not clear CMOS while the system is powered on. Doing so may damage the motherboard.

2.6 Display Interface

The system supports the following display interfaces:

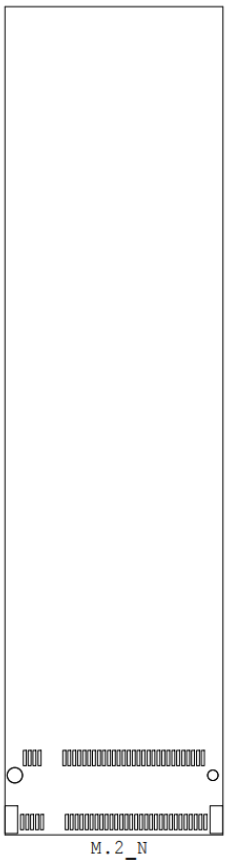
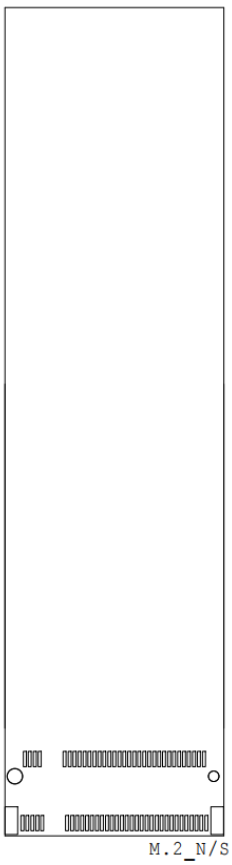
- 1 × DisplayPort 1.4
- 1 × HDMI 2.0
- 1 × Thunderbolt™4

DP1.4	HDMI2.0	Thunderbolt™4
		

2.7 Storage Interfaces (Labeled M.2_N, M.2_N/S on Board)

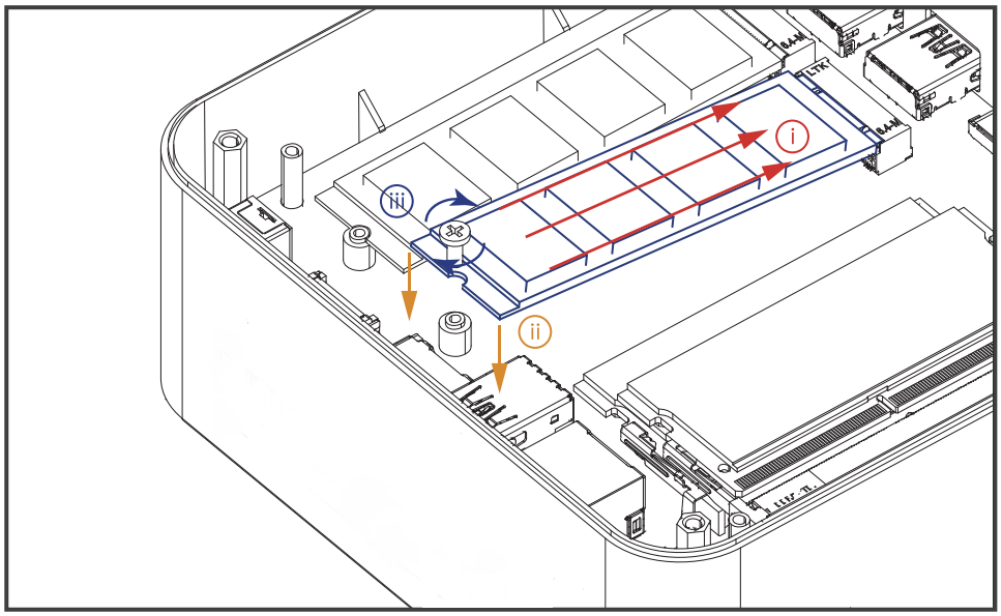
The system supports multiple storage devices through M.2 interfaces.

- 1 × M.2 Key M slot (labeled M.2_N on board), supporting 2280 NVMe SSD
- 1 × M.2 Key M slot (labeled M.2_N/S on board), supporting 2280 NVMe/SATA SSD

M.2_N	M.2_N/S
	

M.2 SSD Installation Notes:

1. Align the M.2 Key M 2280 SSD with the slot and gently insert it into the connector.
2. Press down the SSD until it is aligned with the mounting hole.
3. Secure the SSD with the screw.

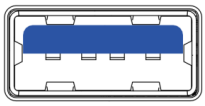


2.8 USB Interfaces (Labeled USB3-1, USB3-2, USB3-3, and TBT on Board)

The system provides the following USB interfaces:

- 4 × USB 3.2 Gen 2 Type-A ports, up to 10 Gbps (labeled USB3-1/USB3-2/USB3-3 on board)
- 1 × Thunderbolt™4, up to 40 Gbps (labeled TBT on board), supporting up to 15W power output for external devices

Note: For the minimum PD power requirements when powering the mini PC via the Thunderbolt™ 4 port, please refer to **Section 2.4 Power Supply.**

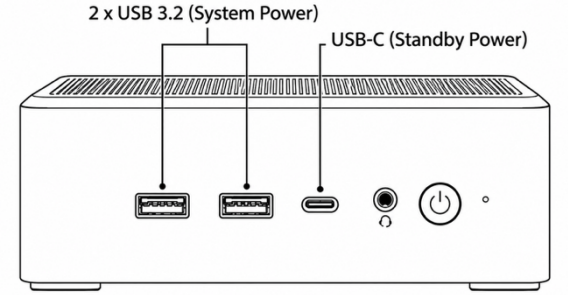
USB3-1/USB3-2/USB3-3	TBT/USB-C
	

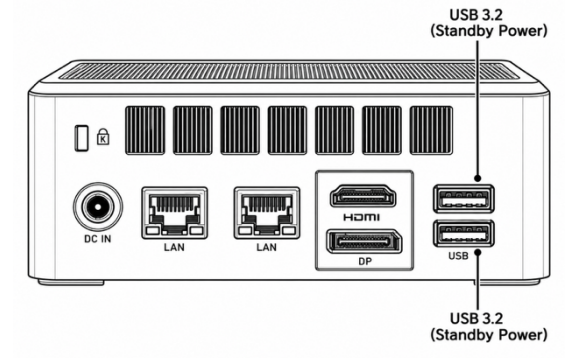
USB Power Supply and Wake-Up Support

The USB ports feature different power supply configurations:

- **5V Standby Power (5VSB):** The two rear USB 3.2 Gen 2 Type-A ports and the front Thunderbolt™ 4 port support system wake-up via a connected USB keyboard or mouse during sleep or shutdown (with external power connected). These ports also provide 5V/1A power output to external devices.
- **5V System Power:** The two front USB 3.2 Gen 2 Type-A ports are powered by the 5V system power rail.

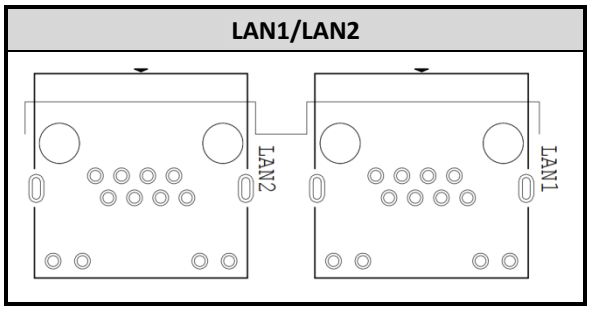
Note: The 5V/1A standby power output is separate from the Thunderbolt™ 4 port's 15W PD output capability.





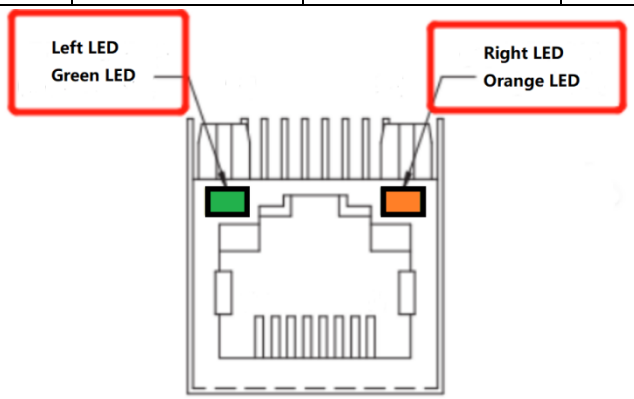
2.9 LAN Interfaces (Labeled LAN1/LAN2 on Board)

The system is equipped with 2 × RJ45 Ethernet ports, powered by Realtek RTL8125BG controllers, supporting data transfer rates up to 2.5 Gbps. Both ports support Wake-on-LAN (WoL) via Magic Packet and UEFI PXE network boot. Please note: To enable UEFI PXE network boot, enter the BIOS setup and set IPv4 PXE Support to Enabled.



LAN Port LED Indicators:

LI_LED (Green)	Function	ACTLED (Orange)	Function
On	Link Established	Blinking	Network Activity

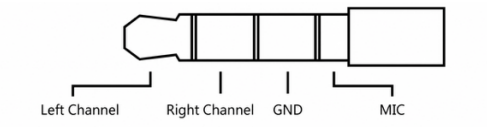


2.10 Audio Interface

The system integrates a SenaryTech SN6186 high-definition audio codec.

- 1 × 3.5 mm audio jack (labeled AUDIO on board)
  - Supports Line-out and Mic-in
  - CTIA standard

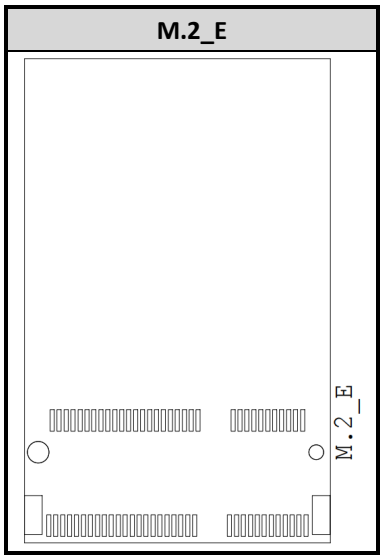
Audio Jack: 3.5 mm combo audio jack

AUDIO	
	

2.11 Expansion Slot (Labeled M.2_E on Board)

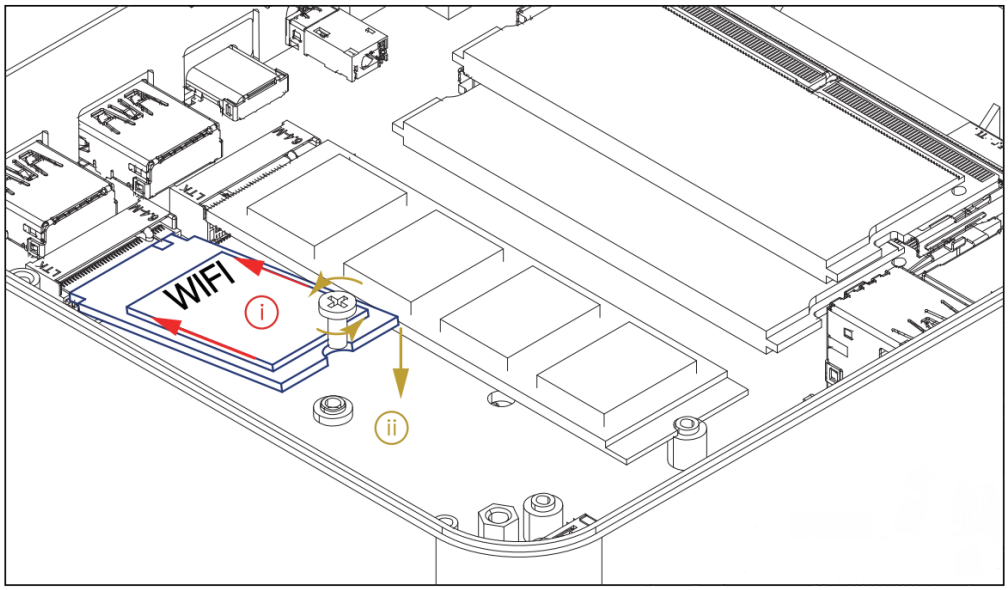
The motherboard provides an M.2 Key E slot for wireless module expansion.

- 1 × M.2 Key E slot (labeled M.2_E on board), supporting 2230 Wi-Fi & Bluetooth modules (PCIe/USB 2.0/CNVi)



M.2 Key E Wi-Fi & Bluetooth Module Installation:

1. Align the notch of the M.2 Key E 2230 Wi-Fi & Bluetooth module with the slot key and gently insert the module into the connector.
2. Press down the module until it aligns with the mounting hole, then secure it with the screw.
3. Attach the antenna connectors to the Wi-Fi & Bluetooth module until they click into place, indicating a secure connection.

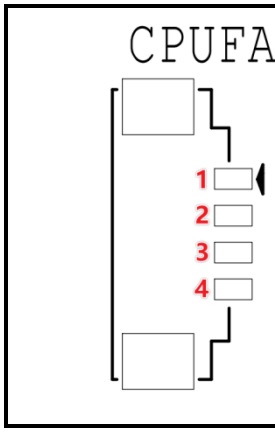


2.12 CPU Fan/System Fan Headers (Labeled CPUFAN and SYSFAN on Board)

The system provides fan headers for CPU and system cooling:

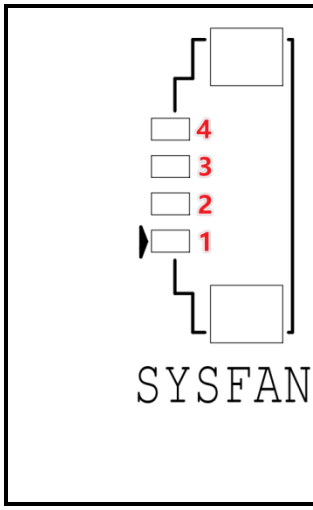
- 1 × 4-pin 5V CPU fan header (labeled CPUFAN on board, 1.25 mm pitch)
- 1 × 4-pin 5V system fan header (labeled SYSFAN on board, 1.25 mm pitch)

CPU Fan Header Definition (Labeled CPUFAN on Board):



Pin	1	2	3	4
Signal	GND	VCC	TAC	PWM

System Fan Header Definition (Labeled SYSFAN on Board):

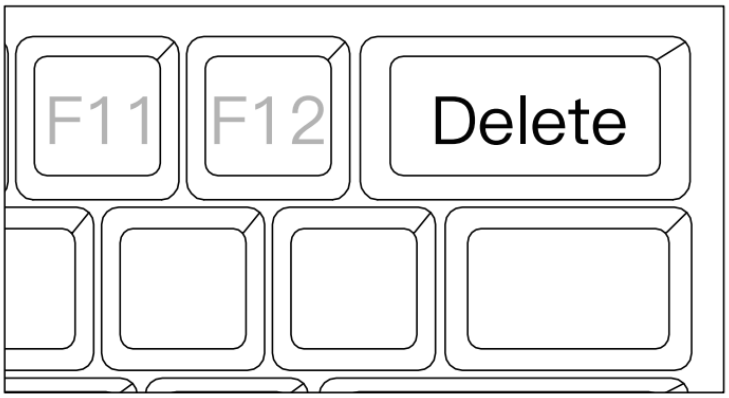


Pin	1	2	3	4
Signal	GND	VCC	TAC	PWM

Chapter 3 BIOS Setup

3.1 Entering the BIOS

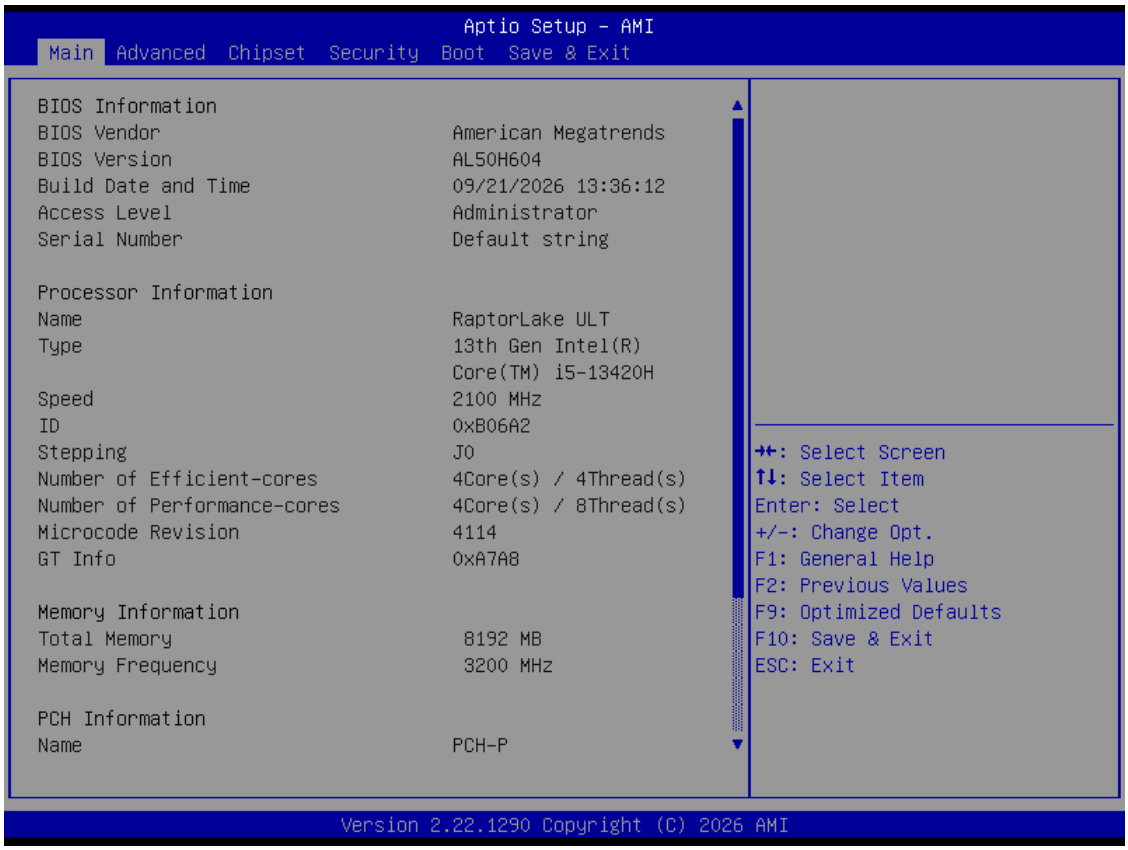
Entering BIOS Setup: Press the <Delete> key repeatedly during system startup to enter the BIOS Setup Utility.



BIOS Hot Keys:

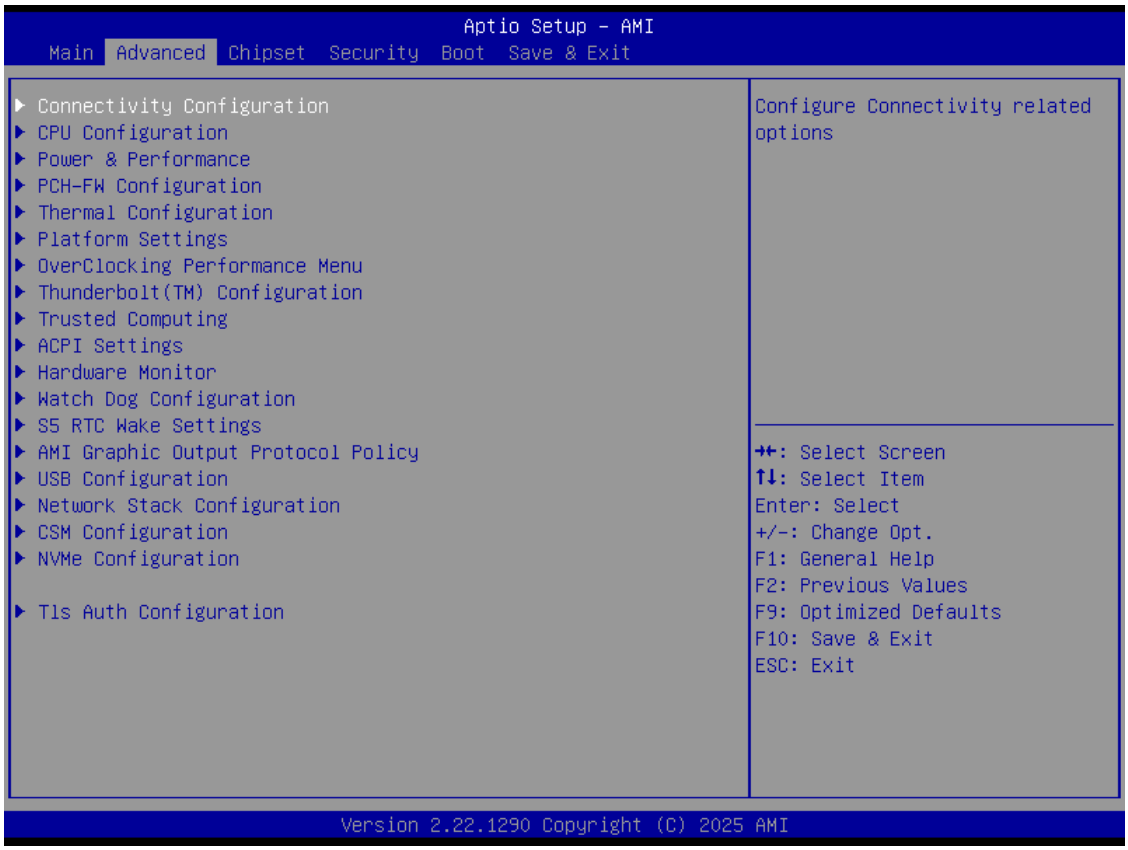
Key	Function	Description
→ ←	Select Screen	Navigate between menu screens.
↑↓	Select Item	Move between menu items or options.
Enter	Select	Open a submenu or confirm a selection.
+/-	Change Option	Adjust values or change settings.
F1	General Help	Displays helpful information for the selected item.
F2	Previous 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 Menu (BIOS Info, Date, Time)



- BIOS Vendor: Displays the BIOS vendor (American Megatrends).
- BIOS Version: Displays the current BIOS version.
- Build Date and Time: Displays the BIOS build date and time.
- Processor Information: Displays the installed processor information.
- Total Memory: Displays the total installed system memory.
- Memory Frequency: Displays the operating memory frequency.
- PCH Information: Displays the Platform Controller Hub (PCH) information.
- PCH SKU: Displays the chipset model.
- ME FW Version: Displays the Intel® 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



The Advanced menu provides access to the following system configuration options:

- Connectivity Configuration: Configures system connectivity settings.
- CPU Configuration: Configures processor-related settings.
- Power & Performance: Configures power management and system performance settings.
- PCH-FW Configuration: Configures Platform Controller Hub (PCH) firmware settings.
- Thermal Configuration: Configures system thermal management settings.
- Platform Settings: Configures platform-specific settings.
- OverClocking Performance Menu: Configures processor overclocking and performance-related settings.
- Thunderbolt(TM) Configuration: Configures Thunderbolt™ interface settings.
- Trusted Computing: Configures Trusted Platform Module (TPM) and security-related settings.
- ACPI Settings: Configures Advanced Configuration and Power Interface (ACPI) settings.
- Hardware Monitor: Displays system hardware monitoring information, including temperatures, voltages, and fan speeds (if supported).
- Watch Dog Configuration: Configures the system watchdog timer settings.
- S5 RTC Wake Settings: Configures scheduled system wake-up from the S5 (soft-off) state using the Real-Time Clock (RTC).
- AMI Graphic Output Protocol Policy: Configures AMI Graphics Output Protocol (GOP) settings.
- USB Configuration: Configures USB controller and device settings.
- Network Stack Configuration: Configures UEFI network stack and PXE boot settings.

- CSM Configuration: Configures Compatibility Support Module (CSM) settings for legacy boot support.
- NVMe Configuration: Displays information about connected NVMe storage devices.
- Tls Auth Configuration: Configures Transport Layer Security (TLS) authentication settings.

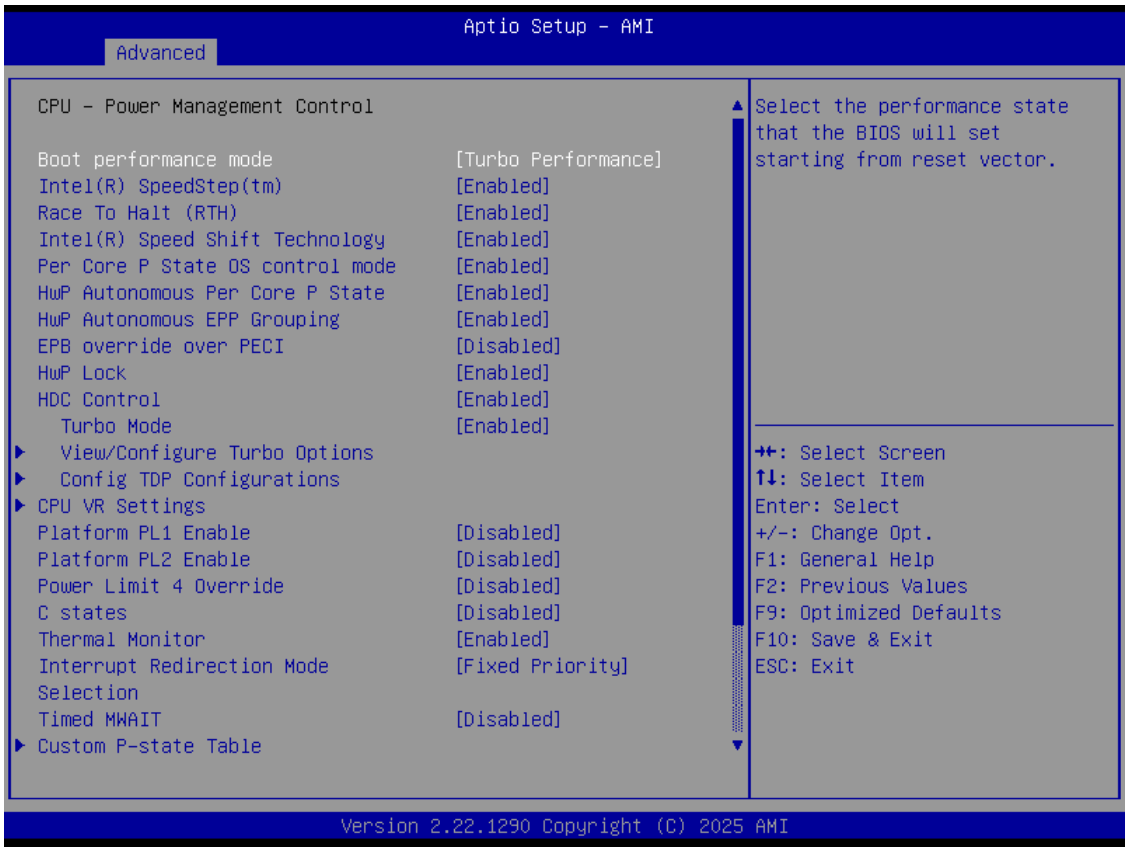
3.3.1 Power & Performance



This menu provides access to CPU and integrated graphics power management settings.

- CPU-Power Management Control: Configures CPU power management and performance-related settings.
- GT-Power Management Control: Configures integrated graphics power management and performance-related settings.

3.3.2 CPU-Power Management Control

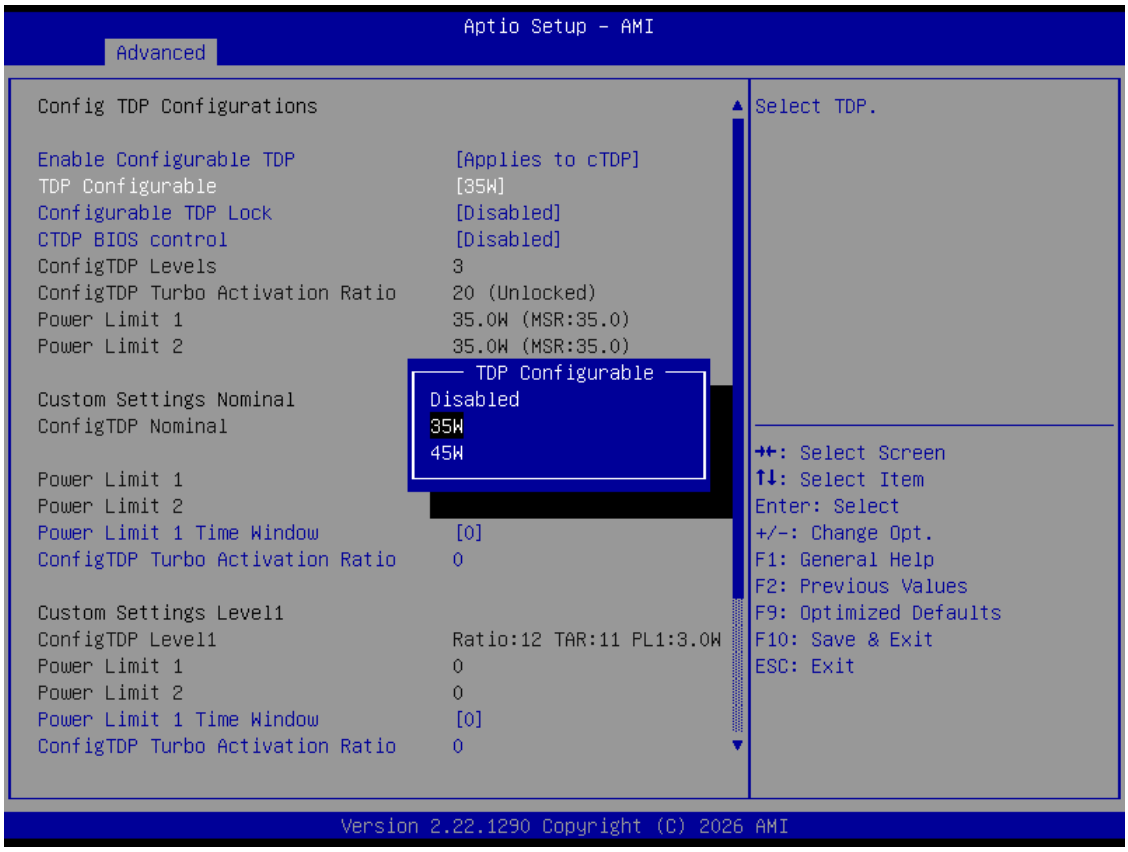


This menu allows users to configure CPU power management, performance optimization, and power-saving features.

- Boot Performance Mode: Configures CPU performance during boot. Default: Turbo Performance. Available options: Max Battery, Max Non-Turbo Performance, and Turbo Performance.
- Intel® SpeedStep™: Dynamically adjusts CPU frequency and voltage based on workload to optimize power consumption and thermal performance.
- Intel® Speed Shift Technology: Enables hardware-controlled CPU frequency adjustments for faster response to changing workloads. Default: Enabled.
- Per Core P State OS Control Mode: Configures operating system control over individual CPU core performance states (P-states).
- HWP Autonomous Per Core P State: Configures autonomous hardware-managed performance states for individual CPU cores.
- HWP Autonomous EPP Grouping: Configures Energy Performance Preference (EPP) grouping for hardware-managed performance states.
- EPB Override over PCIe: Configures Energy Performance Bias (EPB) override settings via PCIe.
- HWP Lock: Configures locking of Hardware-Controlled Performance State (HWP) settings.
- HDC Control: Configures Hardware Duty Cycling (HDC) for CPU power management.
- Turbo Mode: Enables or disables Intel® Turbo Boost Technology. Default: Enabled.
- View/Configure Turbo Options: Displays and configures CPU Turbo Boost settings.

- Config TDP Configuration: Configures CPU Thermal Design Power (TDP) settings. Refer to Section 3.3.3 for details.
- CPU VR Settings: Configures CPU voltage regulator (VR) settings.
- Platform PL1 Enable: Enables or disables the platform's long-duration power limit (PL1). Default: Disabled.
- Platform PL2 Enable: Enables or disables the platform's short-duration power limit (PL2). Default: Disabled.
- Power Limit 4 Override: Enables or disables the CPU Power Limit 4 (PL4) override. Default: Disabled.
- C States: Enables or disables CPU idle power-saving states. Deeper C-states reduce power consumption but may increase wake-up latency. Default: Enabled.
- Enhanced C States: Enables additional CPU idle-state power-saving optimizations. Default: Enabled.

3.3.3 Config TDP Configuration



This menu allows users to configure the processor's Thermal Design Power (TDP). Available TDP settings vary depending on the processor model.

Intel® Core™ i5-13500H / i5-13420H / i7-12650H/i7-12700H

- Default TDP: 35W
- Configurable TDP: 35W / 45W

Intel® Core™ i7-1260P / i5-1240P/i5-1340P/ i7-1360P

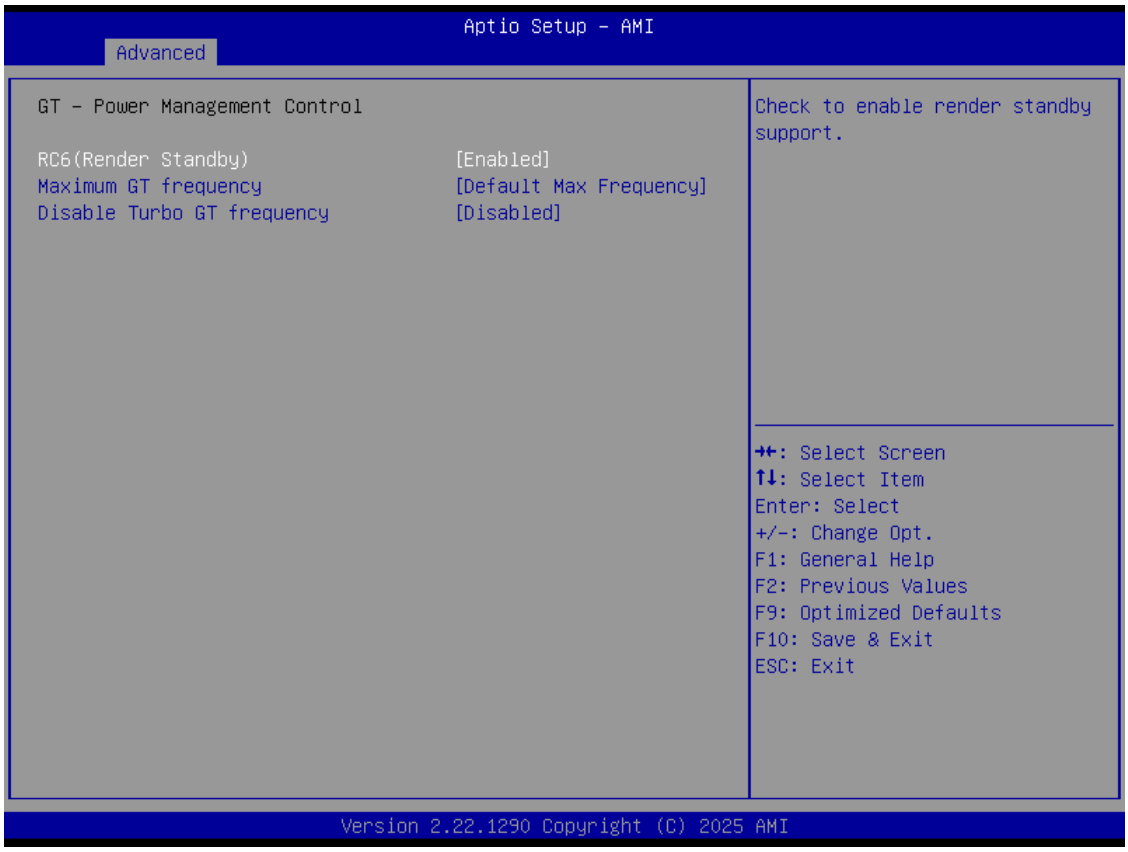
- Default TDP: 28W
- Configurable TDP: 28W / 35W

BIOS Navigation Path:

"Advanced > Power & Configuration > CPU-Power Management Control > Config TDP Configuration > TDP Configurable"

Note: Changing the TDP setting may affect system performance, power consumption, and thermal output.

3.3.4 GT-Power Management Control



This menu allows users to configure integrated graphics power management and performance settings.

- RC6 (Render Standby): Enables or disables the integrated graphics render standby feature to reduce power consumption during idle periods. Default: Enabled.
- Maximum GT Frequency: Configures the maximum operating frequency of the integrated graphics processor. Default: Default Max Frequency.
- Disable Turbo GT Frequency: Enables or disables the restriction on integrated graphics Turbo frequency. Default: Disabled (Turbo frequency remains enabled).

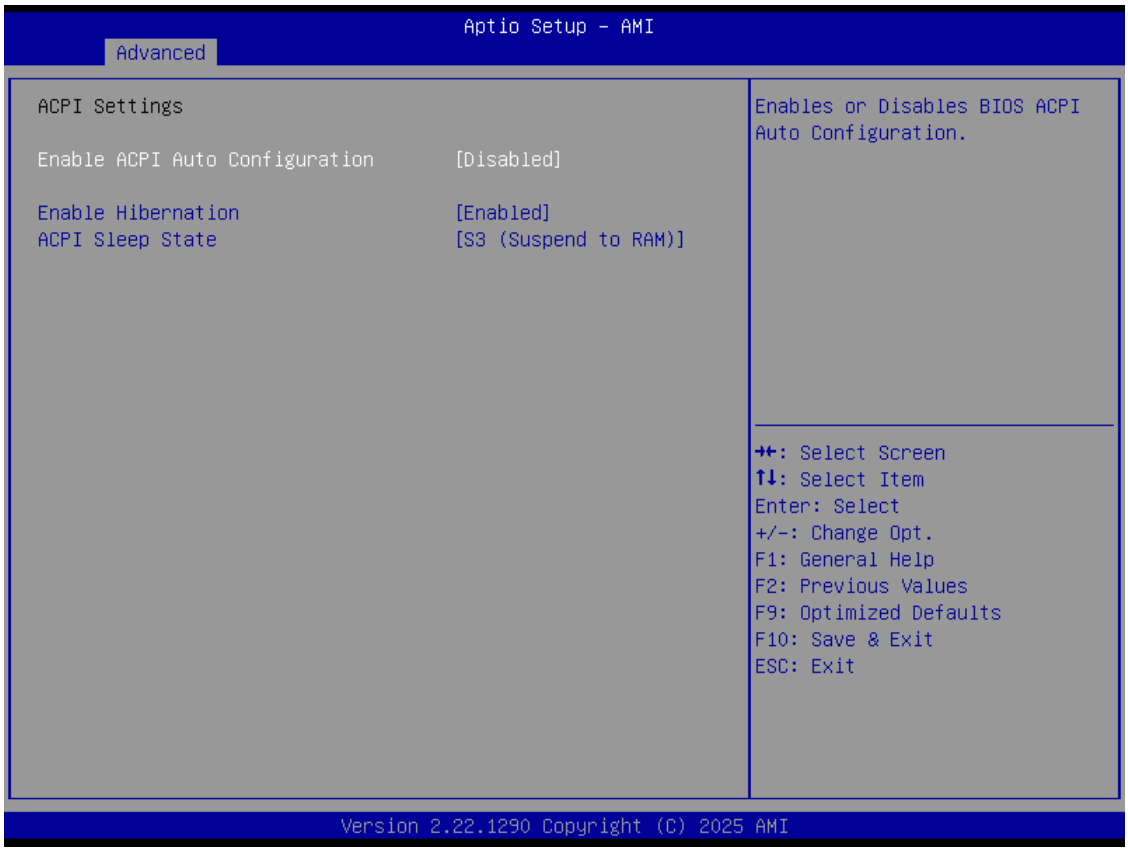
3.3.5 Thermal Configuration



This menu allows users to configure CPU and platform thermal management settings to regulate system temperature and optimize thermal performance.

- Enable All Thermal Functions: Enables or disables all supported thermal management functions.
- CPU Thermal Configuration: Configures CPU thermal management and temperature control settings.
- Platform Thermal Configuration: Configures platform-level thermal management settings.
- Intel® Dynamic Tuning Technology Configuration: Configures Intel® Dynamic Tuning Technology (DTT) settings to dynamically optimize system performance, power consumption, and thermal behavior based on operating conditions.

3.3.6 ACPI Settings

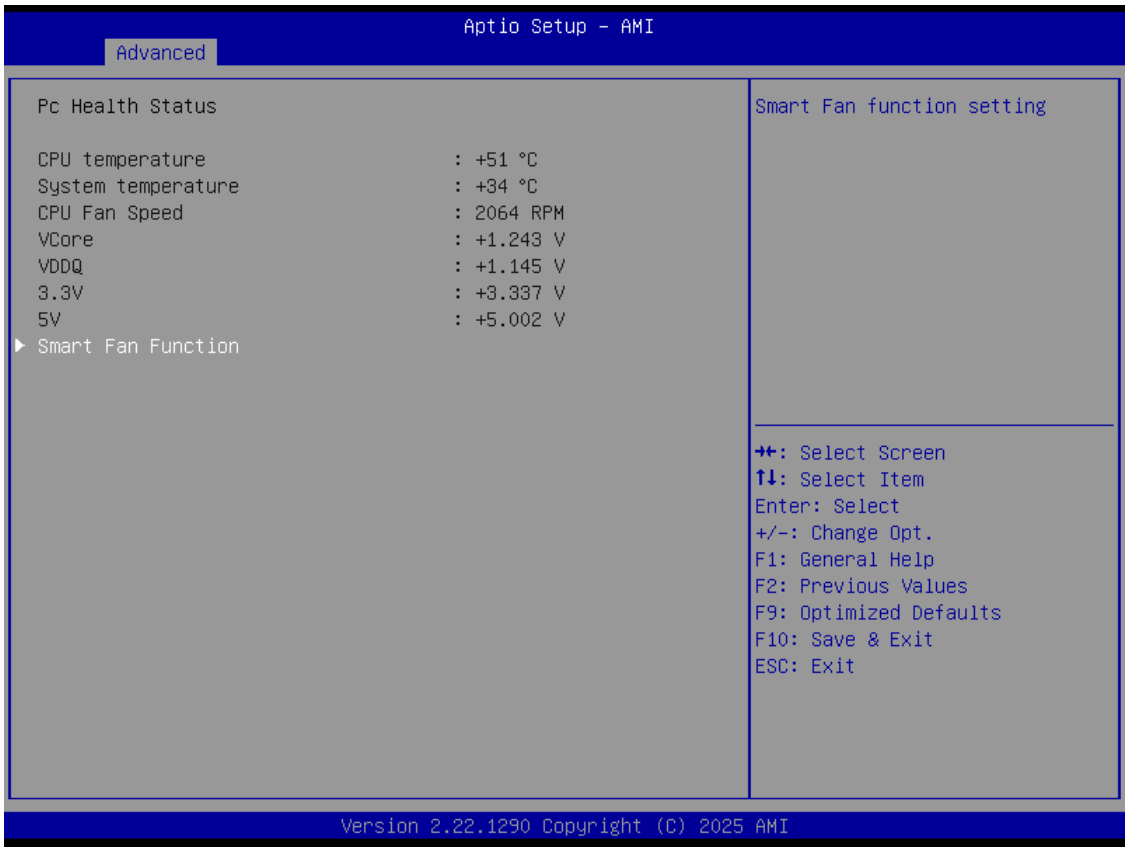


This menu allows users to configure Advanced Configuration and Power Interface (ACPI) settings for system power management and sleep states.

- Enable ACPI Auto Configuration: Enables or disables automatic ACPI configuration.
- Enable Hibernation: Enables or disables system hibernation (S4 state).
- ACPI Sleep State: Configures the ACPI sleep state the system enters when the operating system initiates sleep mode.

Note: The available ACPI sleep states and default settings depend on the BIOS configuration. These should be verified against the actual BIOS interface before publication.

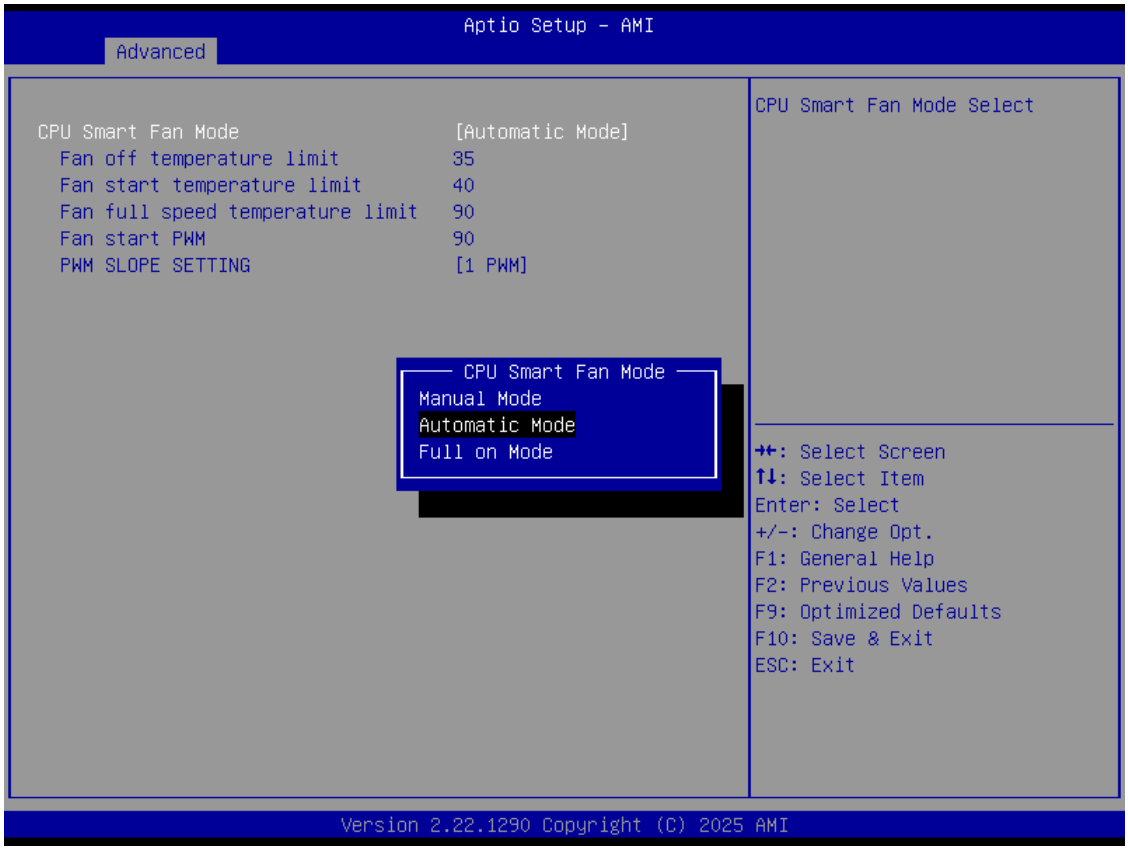
3.3.7 Hardware Monitor



The Hardware Monitor menu displays real-time system health information, including CPU and system temperatures, fan speeds, and voltage readings.

PC Health Status

- CPU Temperature: Displays the current CPU temperature.
- System Temperature: Displays the current system temperature.
- CPU Fan Speed: Displays the CPU fan speed in RPM.
- System Fan Speed: Displays the system fan speed in RPM.
- Vcore: Displays the CPU core voltage.
- VDDQ: Displays the memory I/O voltage.
- 3.3V_SYS: Displays the system 3.3V power rail voltage.
- 5V_SYS: Displays the system 5V power rail voltage.

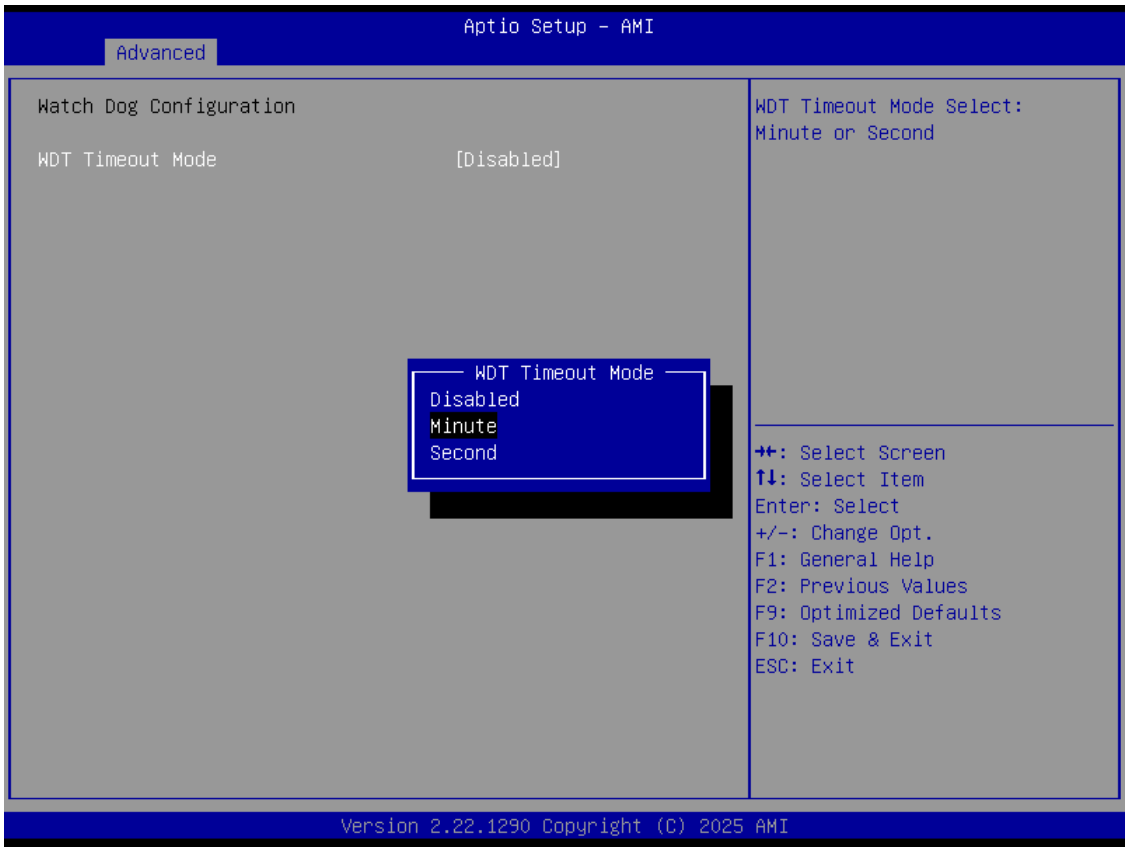


Smart Fan Function

This menu allows users to configure CPU and system fan operation modes to optimize cooling performance and noise levels.

- System Smart Fan Mode: Configures the system fan operating mode.
- CPU Smart Fan Mode: Configures the CPU fan operating mode.
- Automatic Mode: Automatically adjusts fan speed based on system temperature.
- Full on Mode: Runs the fan at full speed for maximum cooling performance.
- Manual Mode: Allows users to manually configure fan speed settings.

3.3.8 Watch Dog Configuration

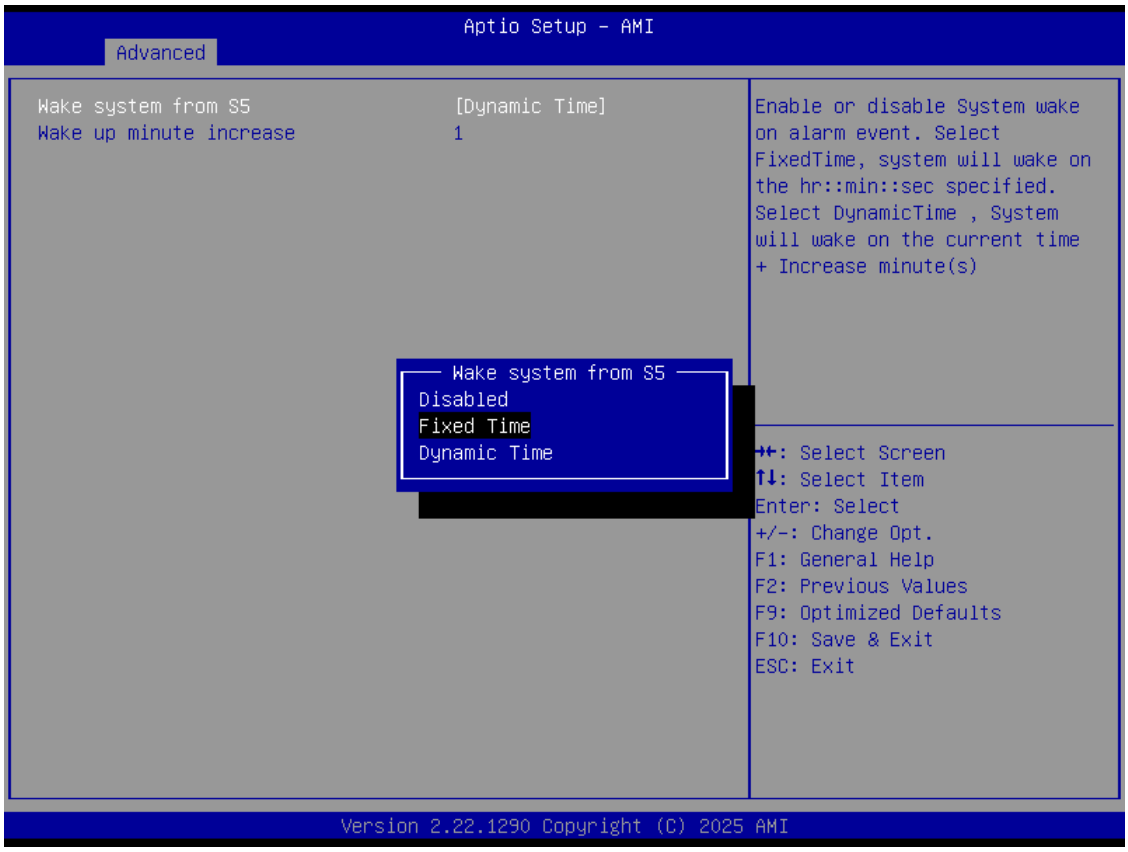


This menu allows users to configure the Watchdog Timer (WDT) settings for system monitoring and recovery.

WDT Timeout Mode: Configures the watchdog timer timeout mode. Available options:

- Disabled: Disables the watchdog timer.
- Minute: Sets the timeout period in minutes.
- Second: Sets the timeout period in seconds.

3.3.9 S5 RTC Wake Settings

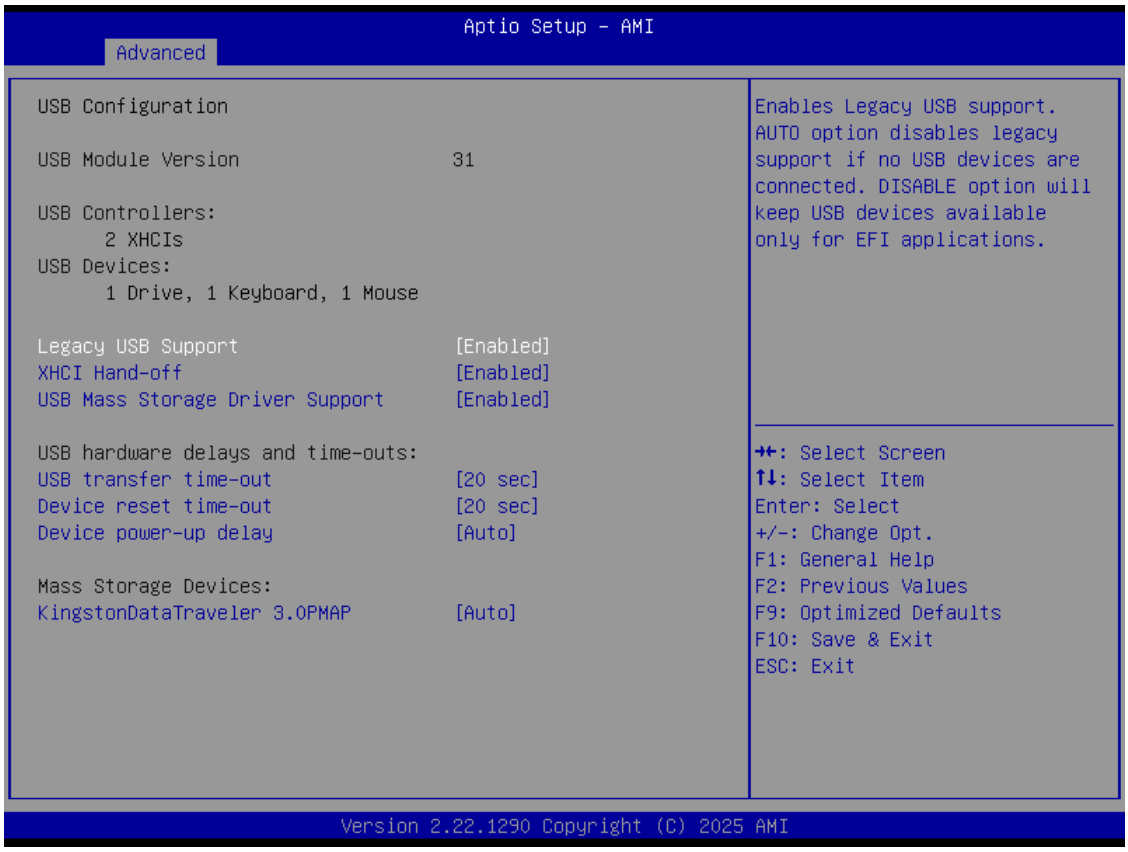


This menu allows users to configure automatic system wake-up from the S5 (soft-off) state using the Real-Time Clock (RTC). The system must remain connected to a power source for this function to operate.

- Wake System From S5: Enables or disables scheduled system wake-up. Available options include:
  - Disabled: Disables automatic RTC wake-up.
  - Fixed Time: Automatically powers on the system at a specified time each day.
  - Dynamic Time: Configures dynamic RTC wake-up timing.
- Wake Up Hour: Sets the wake-up hour.
- Wake Up Minute: Sets the wake-up minute.
- Wake Up Second: Sets the wake-up second.

Note: The system must remain connected to a power source for scheduled wake-up to function. The specific behavior of Dynamic Time should be verified against the BIOS interface

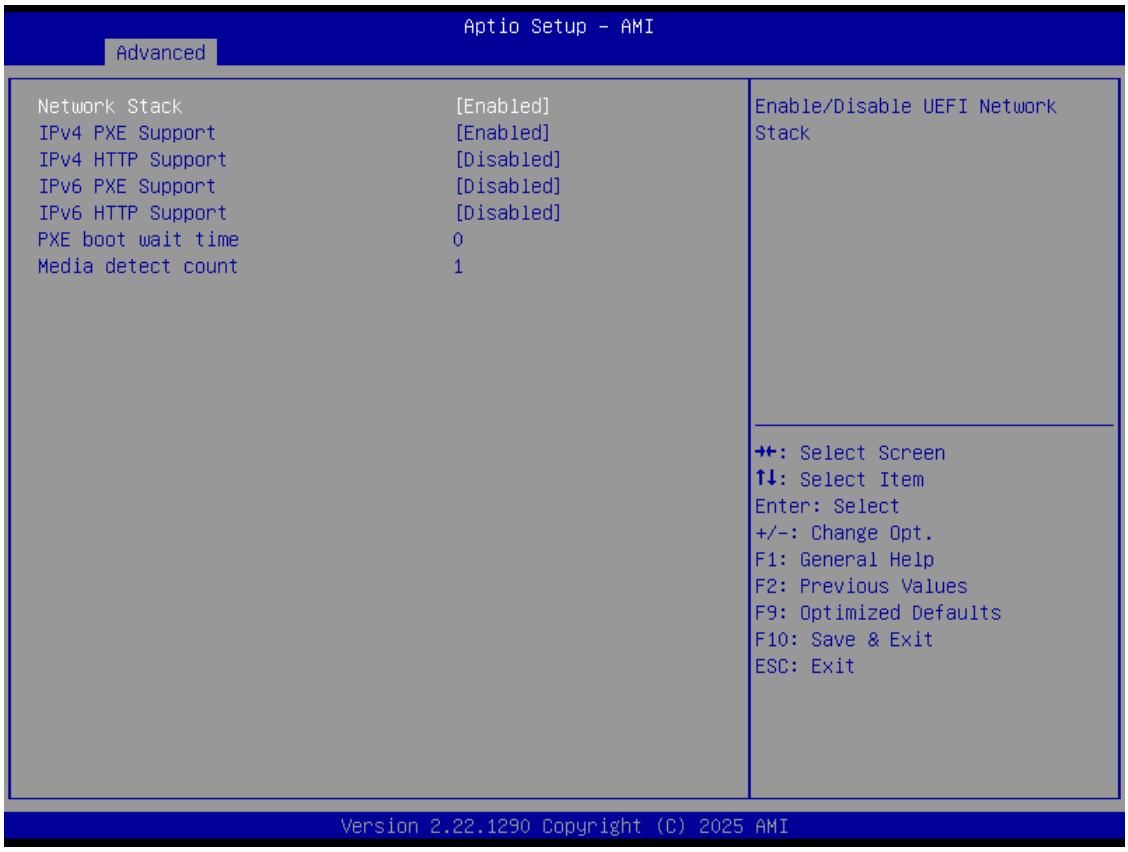
3.3.10 USB Configuration



This menu allows users to configure USB controller settings, device compatibility, and timeout parameters.

- Legacy USB Support: Enables or disables legacy USB support for devices such as USB keyboards, mice, and storage devices in pre-boot environments.
- XHCI Hand-off: Enables or disables the hand-off of USB xHCI controller ownership from BIOS to the operating system.
- USB Mass Storage Driver Support: Enables or disables USB mass storage device support. Set to Enabled to allow USB storage devices to be recognized by the BIOS.
- USB Transfer Time-out: Sets the timeout period for USB control, bulk, and interrupt transfers. Default: 20 seconds.
- Device Reset Time-out: Sets the timeout period for USB mass storage devices to complete initialization after a reset command. Default: 20 seconds.
- Device Power-up Delay: Sets the maximum time allowed for USB devices to initialize and report their presence to the host controller after power-on.

3.3.11 Network Stack Configuration

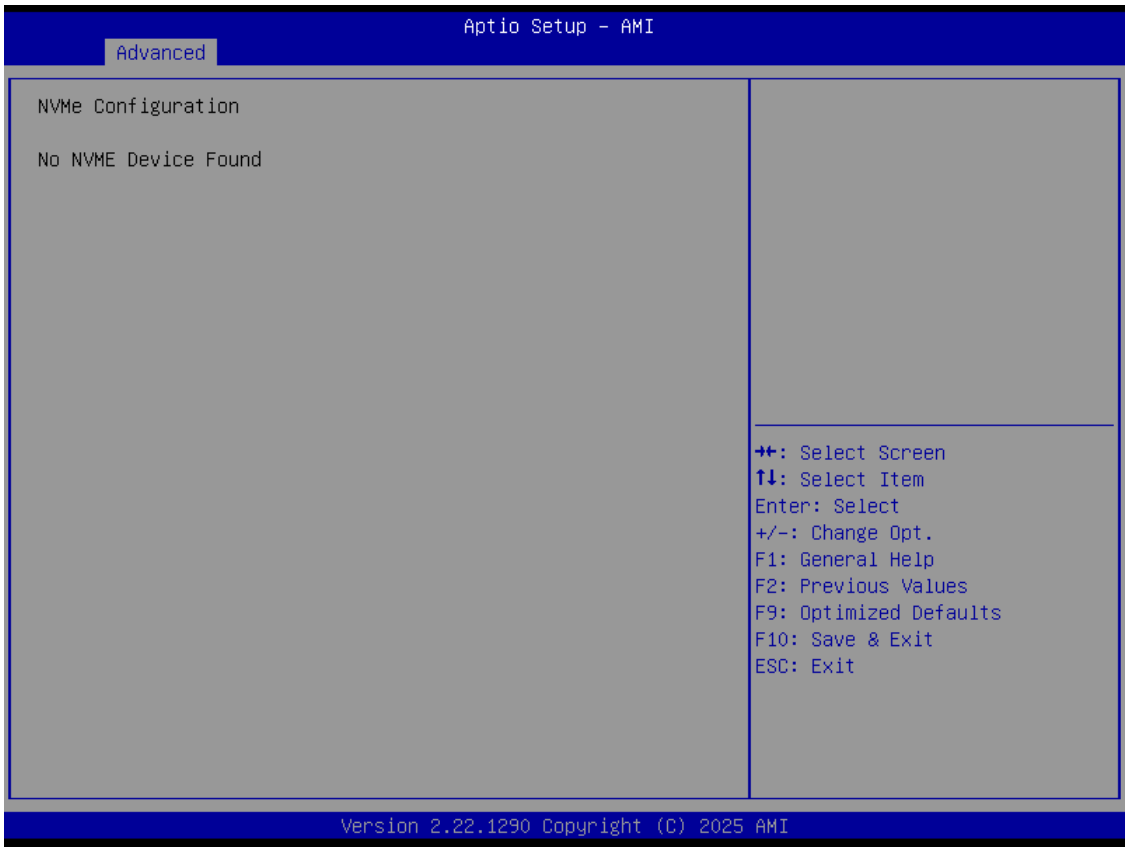


This menu allows users to configure UEFI network boot settings, including PXE and HTTP boot support over IPv4 and IPv6.

- Network Stack: Enables or disables the UEFI network stack for network boot functionality. Default: Disabled.
- IPv4 PXE Support: Enables or disables PXE network boot over IPv4.
- IPv4 HTTP Support: Enables or disables HTTP network boot over IPv4.
- IPv6 PXE Support: Enables or disables PXE network boot over IPv6.
- IPv6 HTTP Support: Enables or disables HTTP network boot over IPv6.
- PXE Boot Wait Time: Sets the waiting time before proceeding with PXE boot.
- Media Detect Count: Sets the number of attempts to detect network media during network boot initialization.

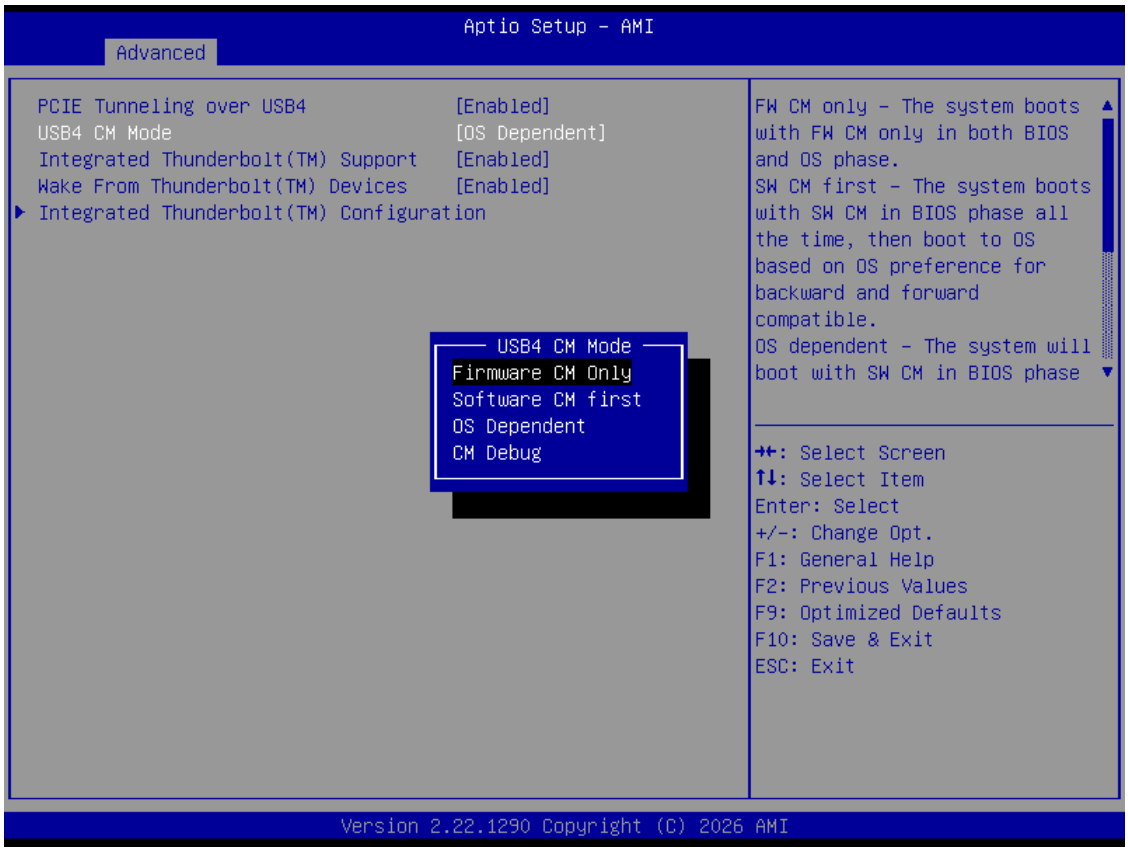
Note: To enable UEFI PXE network boot, set Network Stack to Enabled and enable the corresponding IPv4 or IPv6 PXE support option.

3.3.12 NVMe Configuration



This menu displays information about connected NVMe storage devices, including the drive model and storage capacity.

3.3.13 Thunderbolt (TM) Configuration



This menu allows users to configure Thunderbolt™ 4/USB4 connection management settings to ensure compatibility with connected devices.

USB4 CM Mode: Configures the USB4 Connection Manager (CM) mode. Default: OS Dependent.

- OS Dependent: Allows the operating system to manage USB4 connections. The interface may appear as a USB4 device in Windows Device Manager.
- Firmware CM Only: Enables firmware-based connection management. Select this mode when required for Thunderbolt™ 4 device compatibility and install the appropriate Thunderbolt™ 4 driver.

BIOS Navigation Path:

Advanced > Thunderbolt(TM) Configuration > USB4 CM Mode > Firmware CM Only

Note: Changing the USB4 CM mode may affect device recognition and compatibility. Actual device identification depends on the operating system, firmware, and installed drivers.

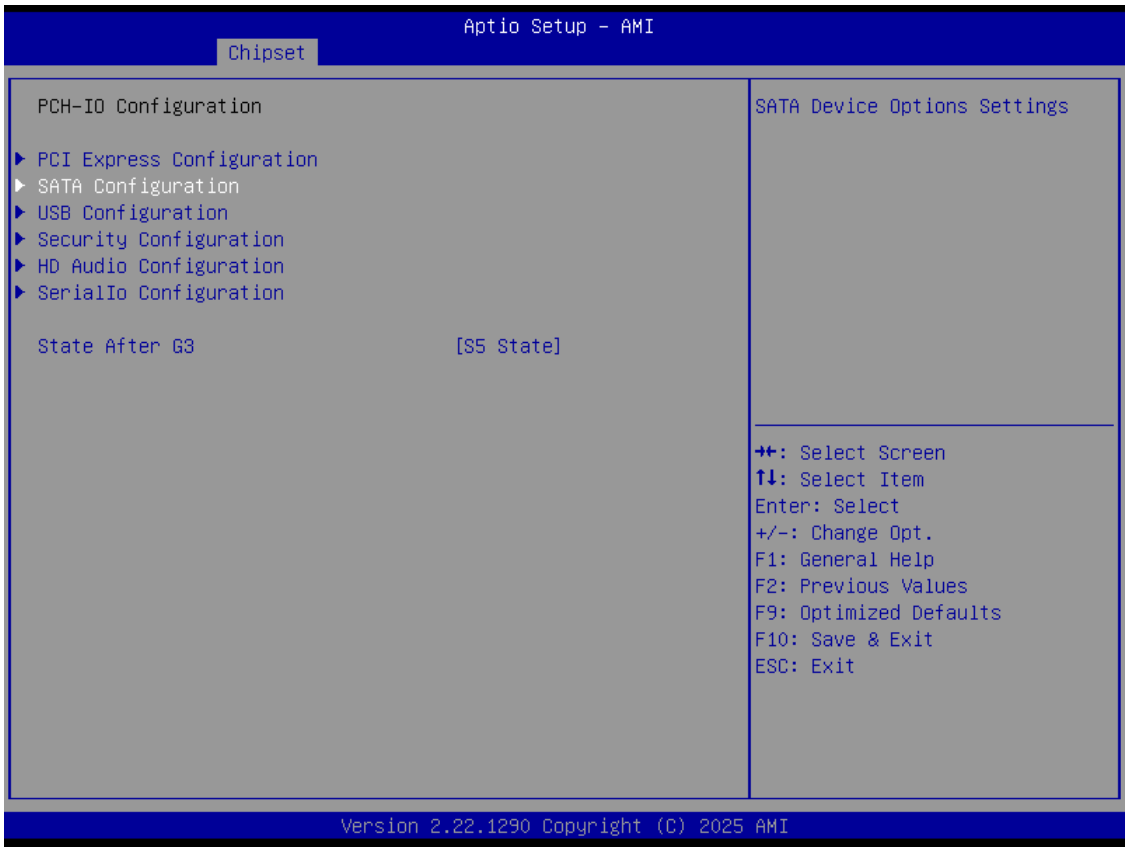
3.4 Chipset



This menu allows users to configure chipset-related settings, including integrated graphics, display interfaces, storage, and onboard devices.

- System Agent (SA) Configuration: Configures System Agent settings, including integrated graphics, graphics memory allocation, and display-related options.
- PCH-IO Configuration: Configures Platform Controller Hub (PCH) I/O settings, including storage controllers, onboard audio, and other integrated peripherals.

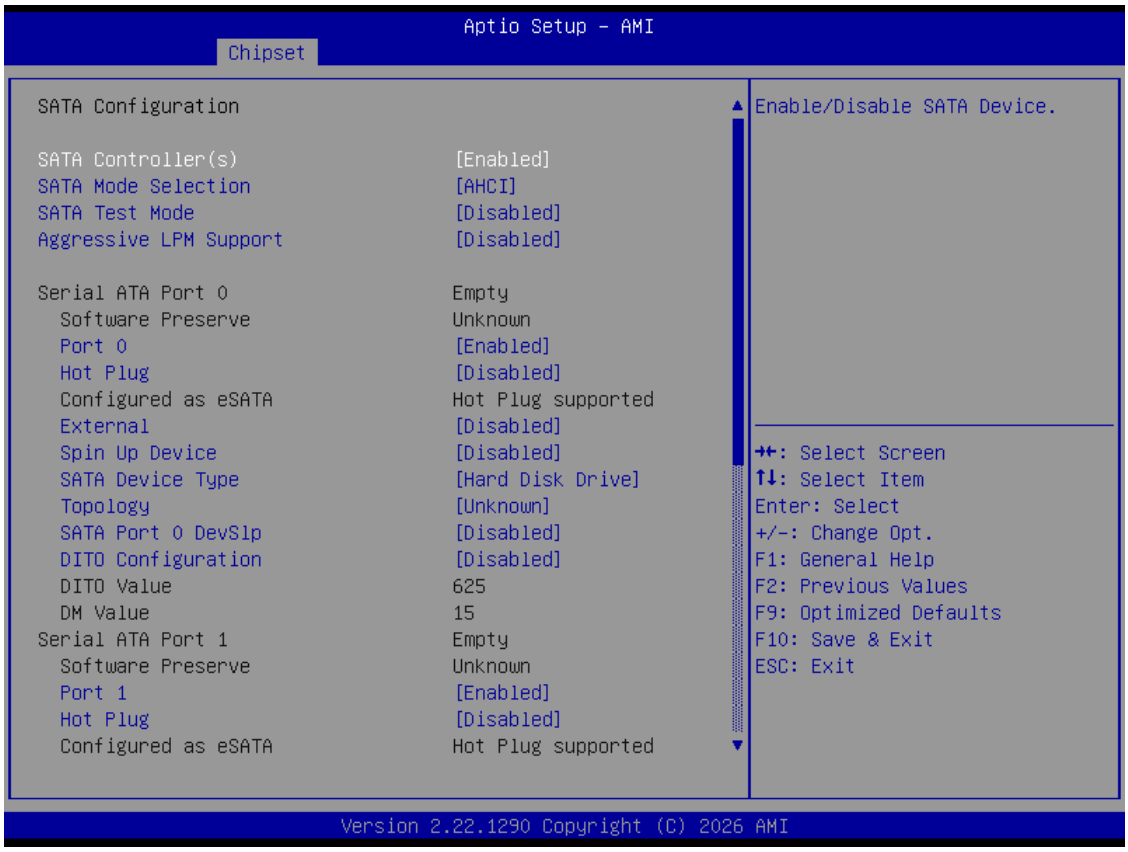
3.4.1 State After G3



The PCH-IO Configuration menu allows users to configure chipset I/O settings, including PCIe, SATA, USB, onboard audio, and system power recovery behavior.

- PCI Express Configuration: Configures PCIe interface settings.
- SATA Configuration: Configures SATA controller and storage settings.
- USB Configuration: Configures chipset USB controller settings.
- Security Configuration: Configures chipset-related security settings.
- HD Audio Configuration: Configures onboard HD audio settings.
- SerialIO Configuration: Configures serial I/O controller settings.
- State After G3: Determines the system power state after AC power is restored. Available options:
    - S0 State: Automatically powers on the system when power is restored.
    - S5 State: Keeps the system powered off after power is restored. Default: S5 State.

3.4.2 SATA Configuration

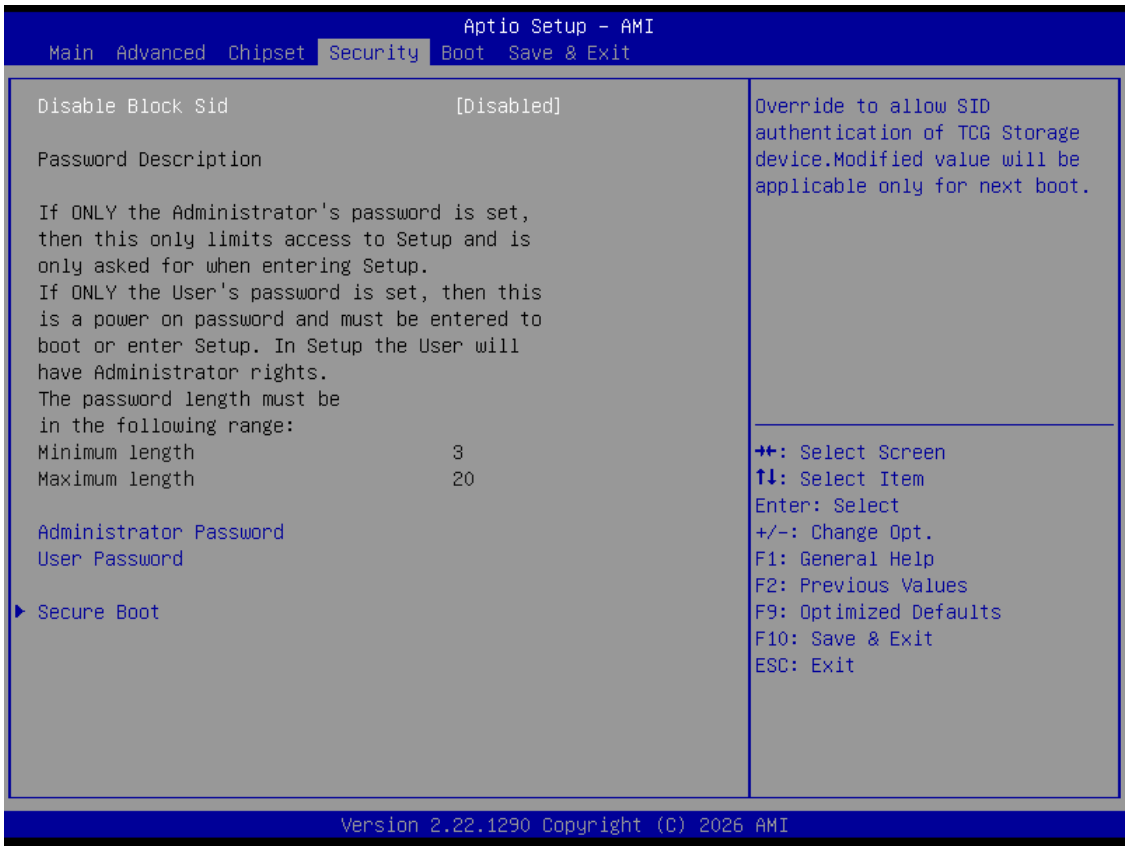


This menu displays information about connected SATA storage devices, including the drive model and storage capacity.

BIOS Navigation Path:

Chipset > PCH-IO Configuration > SATA Configuration

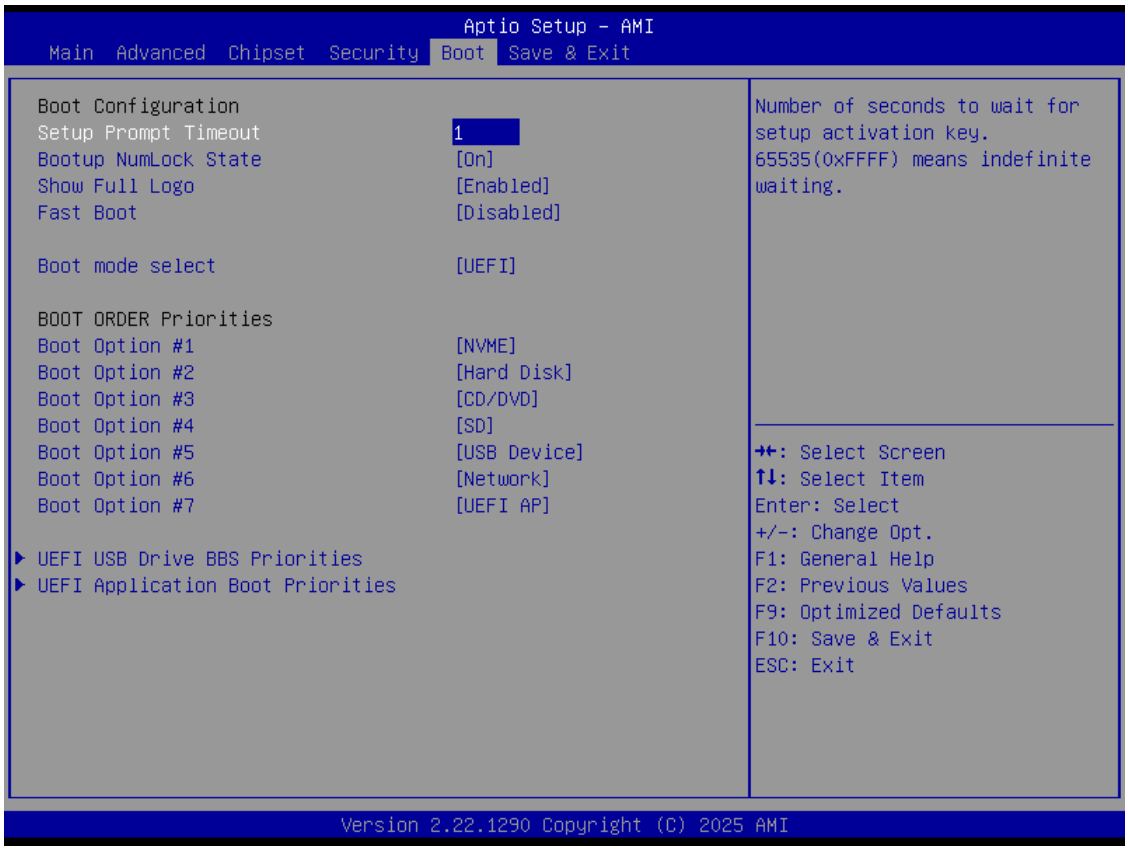
3.5 Security



This menu allows users to configure BIOS passwords and system security settings to prevent unauthorized access.

- Administrator Password: Sets or changes the administrator password for accessing and modifying BIOS settings.
- User Password: Sets or changes the user password for accessing the BIOS with limited privileges.
- Secure Boot: Configures Secure Boot settings to help prevent unauthorized software from loading during system startup.

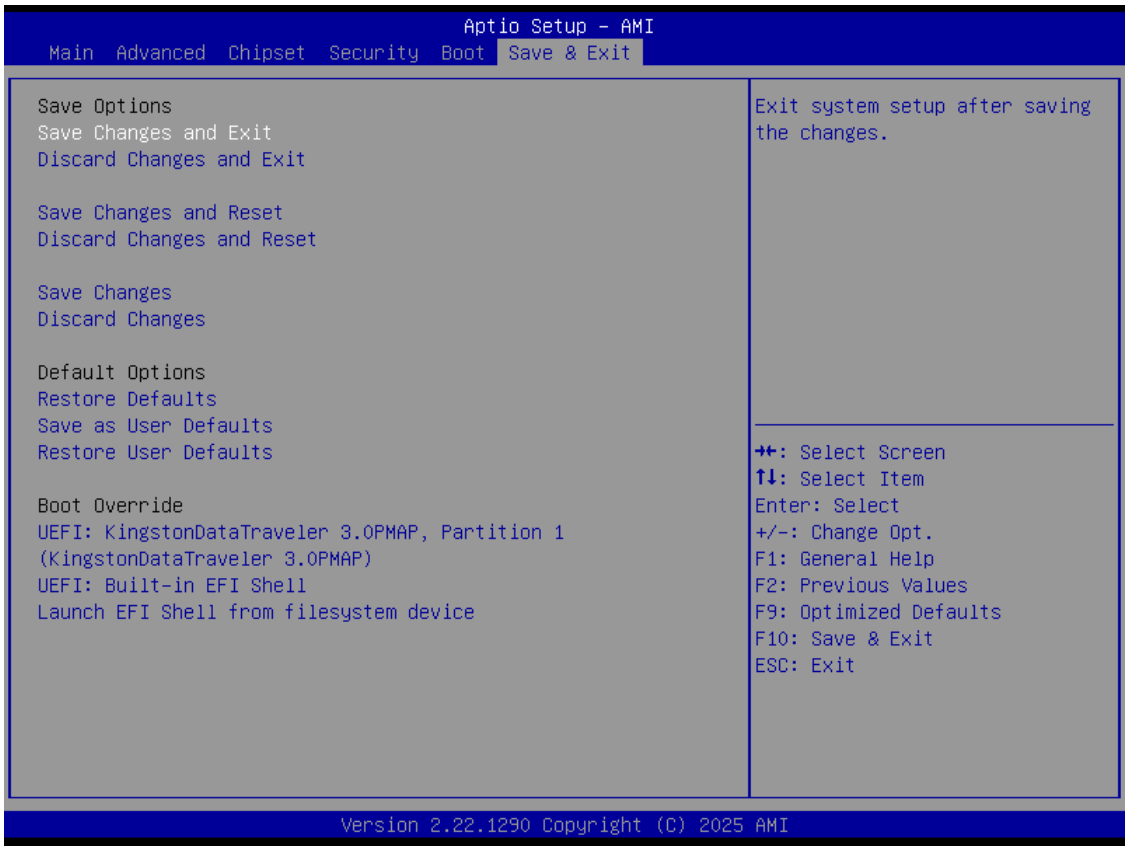
3.6 Boot



This menu allows users to configure system boot settings, startup behavior, and boot device priorities.

- Setup Prompt Timeout: Sets the time allowed for pressing the Delete key to enter BIOS Setup during startup. The system continues booting if no key is pressed within the specified time.
- Bootup NumLock State: Configures the NumLock state during system startup. Default: On.
    - On: Enables the numeric keypad.
    - Off: Sets the numeric keypad to cursor control mode.
- Quiet Boot: Enables or disables the display of the full-screen boot logo. Default: Enabled.
    - Enabled: Displays the boot logo.
    - Disabled: Displays POST messages instead of the boot logo.
- Fast Boot: Enables or disables Fast Boot to reduce system startup time.
- Boot Option #1–#7: Configures the boot priority order of available boot devices.
- UEFI Hard Disk Drive BBS Priorities: Configures the boot priority order of UEFI hard disk drives.
- UEFI Application Boot Priorities: Configures the boot priority order of available UEFI applications.

3.7 Save & Exit



This menu allows users to save or discard BIOS configuration changes, restore default settings, and select a boot device.

- Save Changes and Exit: Saves BIOS configuration changes and exits BIOS Setup to continue system startup.
- Discard Changes and Exit: Discards BIOS configuration changes and exits BIOS Setup to continue system startup.
- Save Changes and Reset: Saves BIOS configuration changes and restarts the system.
- Discard Changes and Reset: Discards BIOS configuration changes and restarts the system.
- Save Changes: Saves the current BIOS configuration changes without exiting BIOS Setup.
- Discard Changes: Discards unsaved BIOS configuration changes without exiting BIOS Setup.
- Restore Defaults: Restores the BIOS settings to their factory defaults.
- Save as User Defaults: Saves the current BIOS configuration as user-defined default settings.
- Restore User Defaults: Restores the previously saved user-defined default settings.
- Boot Override: Allows users to select a specific boot device, such as a SATA drive, USB drive, EFI Shell, or PXE network boot option, for a one-time boot without changing the configured boot priority.