



Intel W790 Series

Motherboard

Software/BIOS Setup Guide

Version 1.0

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Contents

Chapter 1 Introduction	1
Chapter 2 Software and Utilities Operation	2
2.1 Auto Driver Installer (ADI)	2
2.1.1 Installing Drivers for the First Time	2
2.1.2 Updating Drivers	6
2.2 ASRock Live Update & APP Shop	7
2.2.1 Installing ASRock Live Update & APP Shop	7
2.2.2 UI Overview	8
2.2.3 Apps	9
2.2.4 BIOS & Drivers	12
2.2.5 Setting	13
2.3 ASRock Motherboard Utility (A-Tuning)	14
2.3.1 Installing ASRock Motherboard Utility (A-Tuning)	14
2.3.2 Using ASRock Motherboard Utility (A-Tuning)	14
2.4 Nahimic Audio	17
Chapter 3 UEFI SETUP UTILITY	19
3.1 Introduction	19
3.1.1 Entering BIOS Setup	19
3.1.2 UEFI Menu Bar	20
3.1.3 Navigation Keys	21
3.2 Main Screen	22
3.3 OC Tweaker Screen	23

3.4	Advanced Screen	44
3.4.1	CPU Configuration	45
3.4.2	Chipset Configuration	47
3.4.3	I/O Configuration	50
3.4.4	Storage Configuration	51
3.4.5	NVMe Configuration	53
3.4.6	Intel(R) Thunderbolt	54
3.4.7	ACPI Configuration	55
3.4.8	USB Configuration	56
3.4.9	Trusted Computing	57
3.4.10	Network Stack Configuration	59
3.4.11	MEBx	61
3.5	Hardware Health Event Monitoring Screen	62
3.6	Tools	66
3.7	Boot Screen	67
3.8	Security Screen	69
3.9	Exit Screen	74

Chapter 1 Introduction

This user guide is a complete setup guide for all Intel W790 motherboard series. The screenshots in this manual are for reference only. Settings and options may vary due to the motherboard you purchased.

In this documentation, Chapter 1 gives an overview of the setup guide. Chapter 2 contains the operation guide of the software and utilities. Chapter 3 contains the configuration guide of the BIOS setup.

Software Setup Guide

- Auto Driver Installer (ADI)
- ASRock Live Update & APP Shop
- ASRock Motherboard Utility (A-Tuning)
- Nahimic Audio

BIOS Setup Guide

- UEFI Setup Utility



Because the motherboard specifications and the software might be updated, the content of this documentation will be subject to change without notice. In case any modifications of this documentation occur, the updated version will be available on ASRock's website without further notice. If you require technical support related to this motherboard, please visit our website for specific information about the model you are using. ASRock website <http://www.asrock.com>.

Chapter 2 Software and Utilities Operation

2.1 Auto Driver Installer (ADI)

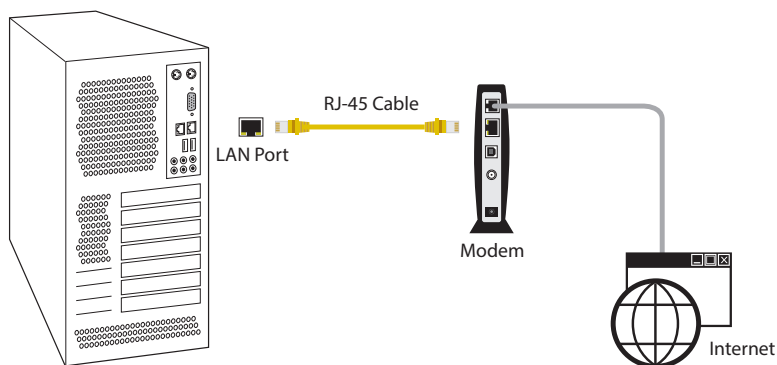
Optical drive or driver DVD is no longer needed for driver installation. ASRock motherboard already has its Ethernet driver prepacked in BIOS ROM. When you finish installing the operation system, simply use the Auto Driver Installer to download and install all necessary drivers automatically.

2.1.1 Installing Drivers for the First Time

Follow the instructions to install all necessary drivers via the Auto Driver Installer. Please note that the Internet access is required during the following procedures.

Step 1

After you install the Windows OS, connect your computer to the Internet.



Step 2

Boot into the system, and a notification will pop up in the lower right corner of your screen saying, "Do you want to one-step-install the latest drivers simply from ASRock Auto Driver Installer?".

Select "Yes" to install Auto Driver Installer.

Select "No" to skip the installation.



1. The Auto Driver Installer will automatically pop up for users to install drivers only when the "Auto Driver Installer" item under the "Tool" menu in the BIOS is set to [Enabled]. The item is enabled by default; therefore, for the first-time users, there is no need to change the setting in the BIOS.
2. An available Internet connection is a prerequisite for using the Auto Driver Installer. If you boot into the system without Internet, the Auto Driver Installer won't appear. Now connect your computer to the Internet, wait a few seconds, and then the Auto Driver Installer will pop up.
3. If you select "No" in Step 2 and skip the installation, the Auto Driver Installer will be removed. If you would like to run the application again, please enable the "Auto Driver Installer" item in the BIOS setting.

Step 3

When it's completed, you will see the Auto Driver Installer icon on your desktop and then the Auto Driver Installer appears.



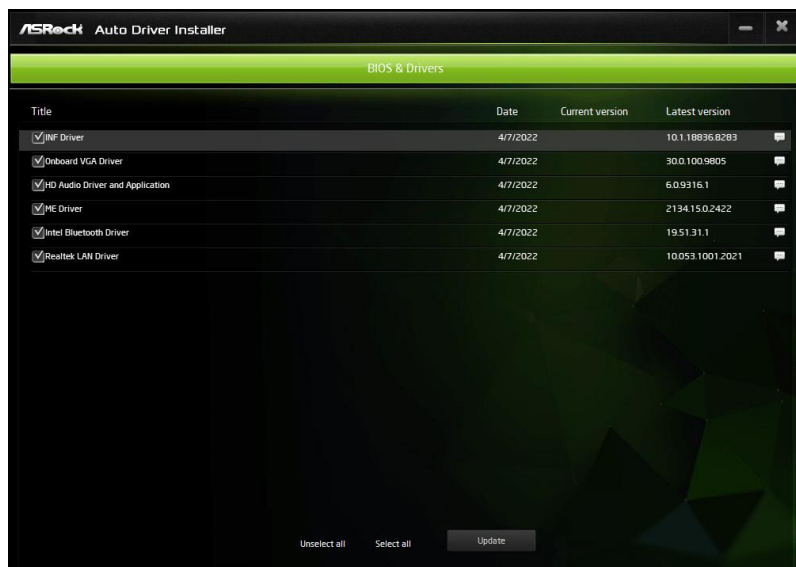
Step 4

The Auto Driver Installer panel lists all available drivers that your motherboard supports. Select one or more drivers to be installed.

Click "Select All" to select all items.

Click "Unselect All" to remove all of your selections.

Click "Update" to start downloading and installing drivers.



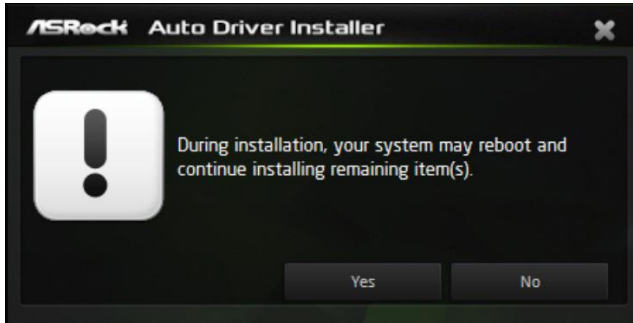
If there are no drivers to be installed, click "Finish" to exit. If you would like to run the application again, please enable the "Auto Driver Installer" item in the BIOS setting.

Step 5

A messages pops up saying, **"During installation, your system may reboot and continue installing remaining item(s)".**

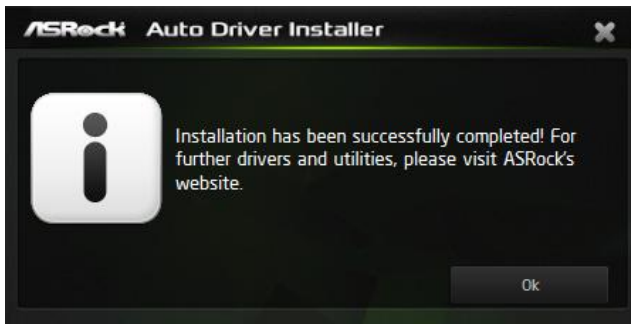
Click "Yes" to continue.

Click "No" to exit.

**Step 6**

Once all drivers are successfully installed, a message pops up saying, **"Installation has been successfully completed! For further drivers and utilities, please visit ASRock's website."**

Click "Ok" to complete the procedure.



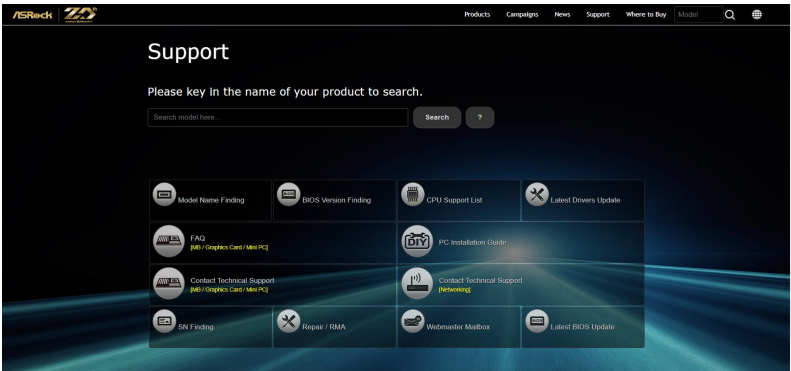
When driver installation is completed, the Auto Driver Installer tool will be uninstalled automatically from your computer.



After driver installation, the Auto Driver Installer will be removed. If you would like to run the application again, please go to the "Tool" menu in the BIOS setting, and set the "Auto Driver Installer" item to [Enabled].

2.1.2 Updating Drivers

Updating drivers ensures that your system work well without any issue. To update drivers, please go to ASRock' website (<https://www.asrock.com>) and select "Support" > "Latest Drivers Update".



2.2 ASRock Live Update & APP Shop

The ASRock Live Update & APP Shop is an online store for purchasing and downloading software applications for your ASRock computer. You can quickly and easily install various apps and support utilities. With ASRock Live Update & APP Shop, you can optimize your system and keep your motherboard up to date simply with a few clicks.

2.2.1 Installing ASRock Live Update & APP Shop

Please download the ASRock Live Update & APP Shop utility from the ASRock's website: "https://www.asrock.com".

Go to the product page of your motherboard, select "Support" > "Download" to download the APP Shop.

OverviewSpecificationSupportWhere to Buy


DownloadBIOSManualFAQCPU Support ListMemory QVL (Cezanne)

Memory QVL (Vermear)Memory QVL (Matiasse)Memory QVL (Renoir)Storage QVL

Download

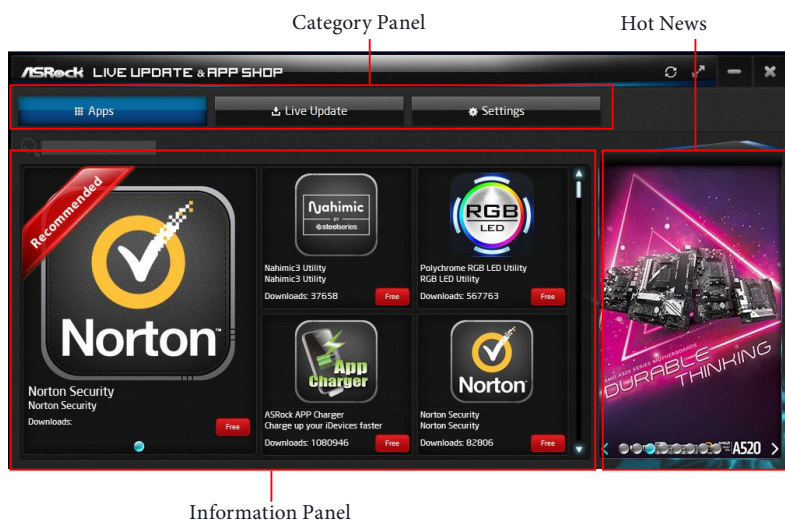
Select your OS: Windows 11 64bit

Description	OS	Size	Date	Download
Realtek high definition audio driver ver.3231.1_UAD_WHQL_Nahimic	Windows® 11 64bit	35.5MB	2021/10/12	Global FR China
AMD chipset driver ver.3.10.22.706	Windows® 11 64bit	50.33MB	2021/11/30	Global FR China
Killer Lan driver ver.3.0.1606	Windows® 11 64bit	38.8MB	2021/11/08	Global FR China
AMD RAIDXpert2 utility ver.9.2.0.158	Windows® 11 64bit	95.4MB	2021/5/31	Global FR China
SATA Floppy Image_CC ver.9.3.0.296	Windows® 11 64bit	361KB	2022/2/8	Global FR China
SATA Floppy Image_DID ver.9.3.0.296				
NVMe_DID Supported AMD processors: -AMD Ryzen™ 3000 Series Desktop Processors with Radeon™ Graphics (Picasso) -AMD Ryzen™ 4000 Series Desktop Processors with Radeon™ Graphics (Cezanne) -AMD Ryzen™ 5000 Series Desktop Processors with Radeon™ Graphics	Windows® 11 64bit	361KB	2022/2/8	Global FR China
VGA driver ver.21.30.02.210727a_0827	Windows® 11 64bit	587MB	2021/10/8	Global FR China
ASRock Motherboard Utility ver.3.0.466	Windows® 11 64bit	59.40MB	2022/5/17	Global FR China
APP Shop ver.1.0.52	Windows® 11 64bit	3.91MB	2021/5/31	Global FR China
Nahimic3 utility ver.210913_APO4	Windows® 11 64bit	85.3MB	2021/11/8	Global FR China
Norton Security ver.22.21.5	Windows® 11 64bit	232MB	2021/10/8	Global FR China
Restart to UEFI ver.1.0.9	Windows® 11 64bit	1.01MB	2021/10/8	Global FR China
Beta1 ASRock Motherboard Utility ver.3.0.441	Windows® 11 64bit	59.31MB	2021/12/14	Global FR China

After installation, double-click  on your desktop to access ASRock Live Update & APP Shop utility.

**You need to be connected to the Internet to download apps from the ASRock Live Update & APP Shop.*

2.2.2 UI Overview



Category Panel: The category panel contains several category tabs or buttons that when selected the information panel below displays the relative information.

Information Panel: The information panel in the center displays data about the currently selected category and allows users to perform job-related tasks.

Hot News: The hot news section displays the various latest news. Click on the image to visit the website of the selected news and know more.

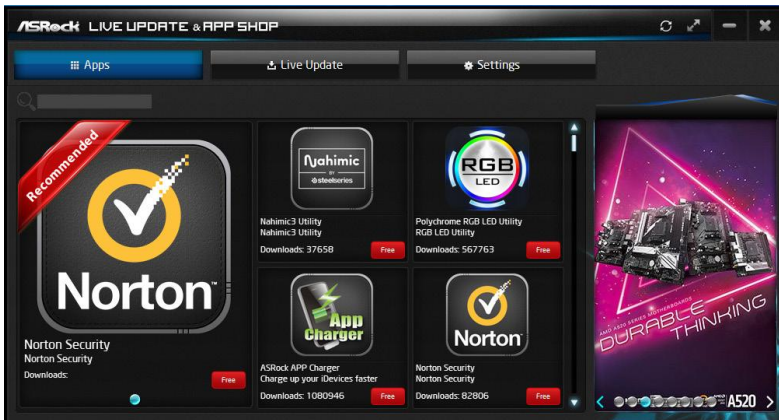
2.2.3 Apps

When the "Apps" tab is selected, you will see all the available apps on screen for you to download.

Installing an App

Step 1

Find the app you want to install.



The most recommended app appears on the left side of the screen. The other various apps are shown on the right. Please scroll up and down to see more apps listed.

You can check the price of the app and whether you have already installed it or not.



- The red icon displays the price or "Free" if the app is free of charge.




- The green "Installed" icon means the app is installed on your computer.

Step 2

Click on the app icon to see more details about the selected app.

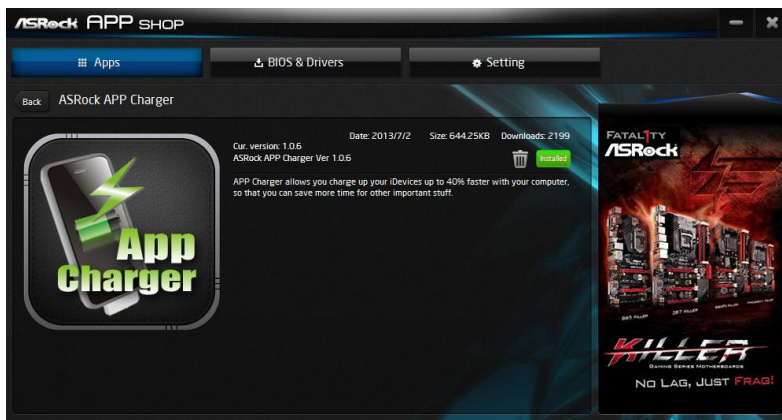
Step 3


If you want to install the app, click on the red icon  to start downloading.



Step 4

When installation completes, you can find the green "Installed" icon appears on the upper right corner.



To uninstall it, simply click on the trash can icon .

*The trash icon may not appear for certain apps.

Upgrading an App

You can only upgrade the apps you have already installed. When there is an available new version for your app, you will find the mark of "New Version" appears below the installed app icon.



Step 1

Click on the app icon to see more details.

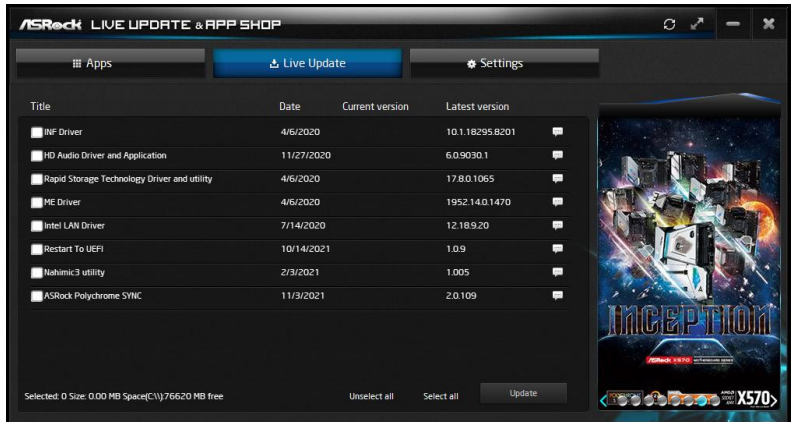
Step 2

Click on the yellow icon  to start upgrading.

2.2.4 BIOS & Drivers

Installing BIOS or Drivers

When the "BIOS & Drivers" tab is selected, you will see a list of recommended or critical updates for the BIOS or drivers. Please update them all soon.



Step 1

Please check the item information before update. Click on ⓘ to see more details.

Step 2

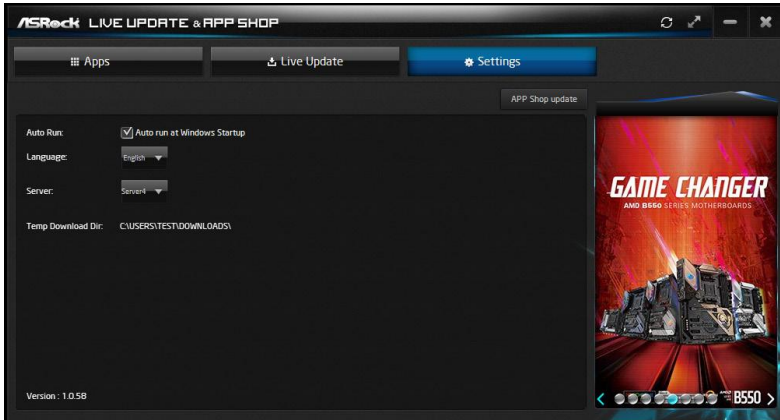
Click to select one or more items you want to update.

Step 3

Click Update to start the update process.

2.2.5 Setting

In the "Setting" page, you can change the language, select the server location, and determine if you want to automatically run the ASRock Live Update & APP Shop on Windows startup.



2.3 ASRock Motherboard Utility (A-Tuning)


ASRock Motherboard Utility (A-Tuning) is ASRock's multi purpose software suite with a new interface, more new features and improved utilities.

2.3.1 Installing ASRock Motherboard Utility (A-Tuning)

ASRock Motherboard Utility (A-Tuning) can be downloaded from ASRock Live Update & APP Shop.

You can also download the utility from the ASRock's website: "<https://www.asrock.com>". Go to the product page of your motherboard, select "Support" > "Download" to download "ASRock Motherboard Utility".

After the installation, you will find the icon "ASRock Motherboard Utility (A-Tuning)" on your desktop. Double-click the

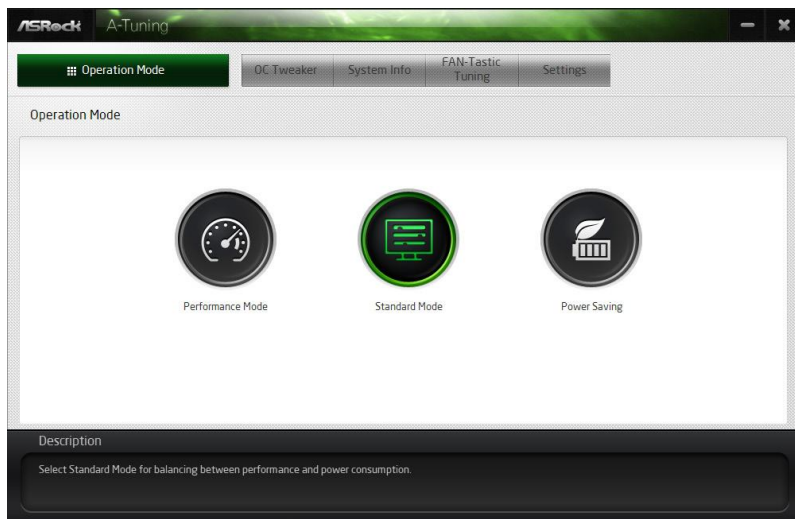
"ASRock Motherboard Utility (A-Tuning)" icon , ASRock Motherboard Utility (A-Tuning) main menu will pop up.

2.3.2 Using ASRock Motherboard Utility (A-Tuning)

There are five sections in ASRock Motherboard Utility (A-Tuning) main menu: Operation Mode, OC Tweaker, System Info, FAN-Tastic Tuning and Settings.

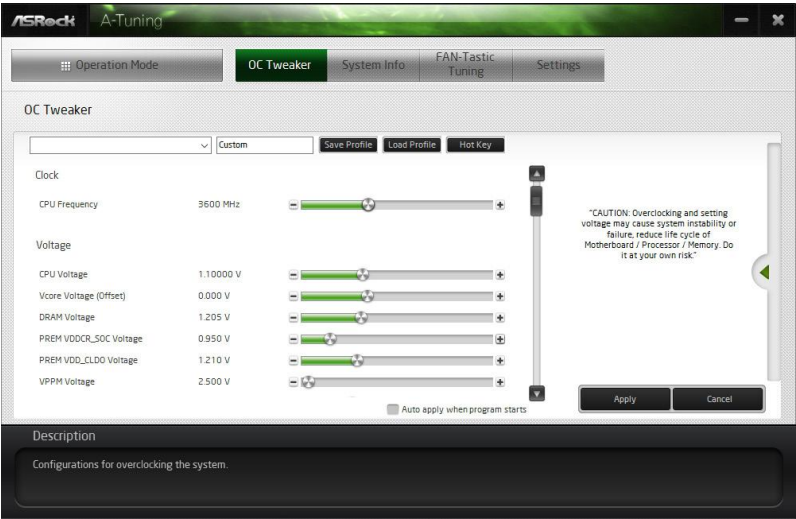
Operation Mode

Choose an operation mode for your computer.



OC Tweaker

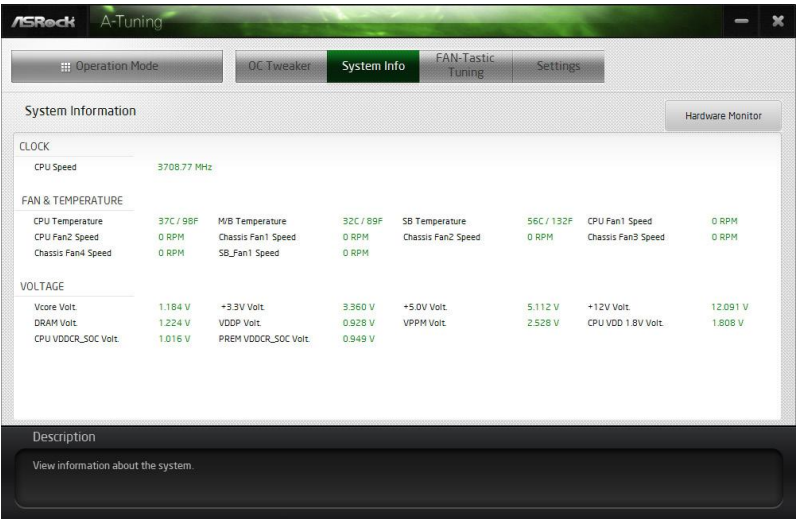
Configurations for overclocking the system.



System Info

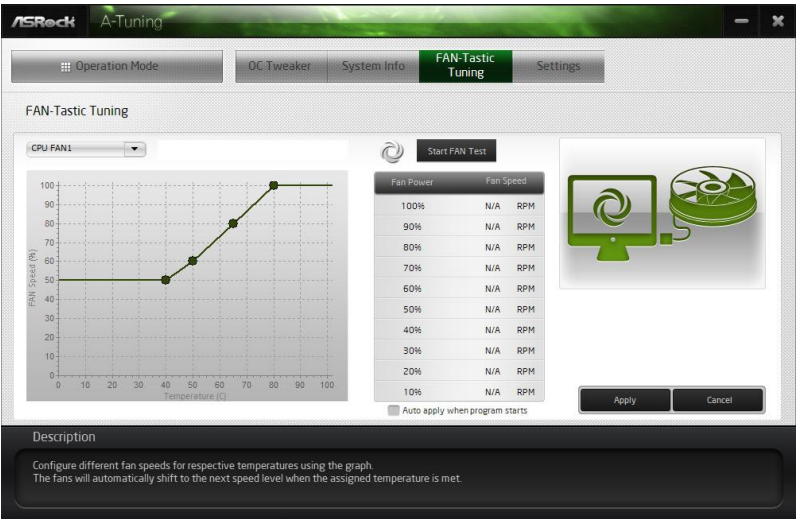
View information about the system.

*The System Browser tab may not appear for certain models.



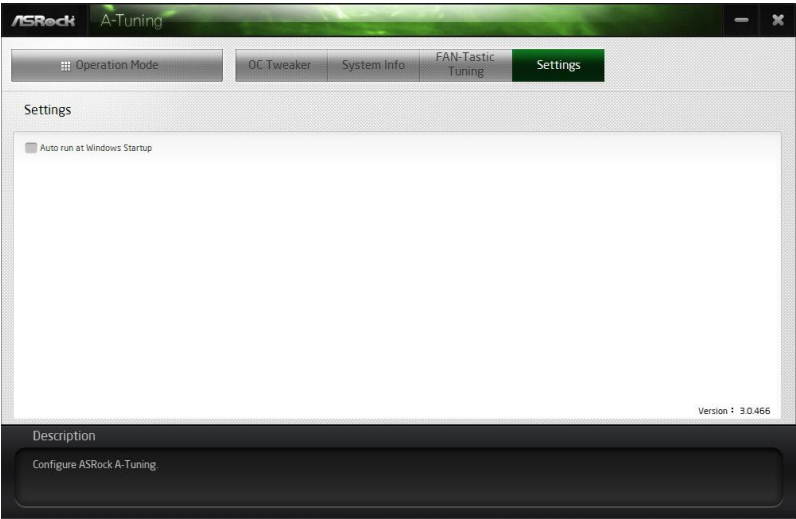
FAN-Tastic Tuning

Configure up to five different fan speeds using the graph. The fans will automatically shift to the next speed level when the assigned temperature is met.



Settings

Configure ASRock ASRock Motherboard Utility (A-Tuning). Click to select "Auto run at Windows Startup" if you want ASRock Motherboard Utility (A-Tuning) to be launched when you start up the Windows operating system.



2.4 Nahimic Audio

Nahimic audio software provides an incredible high definition sound technology which boosts the audio and voice performance of your system. Nahimic Audio interface is composed of four tabs: Audio, Microphone, Sound Tracker and Settings.

Download this utility from the ASRock Live Update & APP Shop. You can also download the utility from the ASRock's website: "<https://www.asrock.com>". Go to the product page of your motherboard, select "Support" > "Download" to download the Nahimic utility.



There are four functions in Nahimic audio:

No.	Function	Description
1	Audio	From this tab, you can mute the current audio device, choose between four factory audio profiles, turn all audio effects on/off, restores the current profile to its default settings and access Surround Sound and various features.
2	Microphone	From this tab, you can mute the current mic device, choose between two factory mic profiles, turn/off all microphone effects, restore the current profile to its default settings, and access Static Noise Suppression and various features.
3	Sound Tracker	The Sound Tracker provides a visual indication localizing the sources of the sounds while in a game. These are represented by dynamic segments pointing the direction of the sounds: the more opaque they are, the stronger the sounds are.

4	Settings	From this tab, you can access all settings and information of the software.
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Chapter 3 UEFI SETUP UTILITY

3.1 Introduction

ASRock UEFI (Unified Extensible Firmware Interface) is a BIOS utility which offers tweak-friendly options in an advanced viewing interface. The UEFI system works with a USB mouse and offers users a faster, sleeker experience.

This BIOS utility can perform the Power-On Self-Test (POST) during system startup, record hardware parameters of the system, load operating system, and so on. The battery on the motherboard supplies the power needed to the CMOS when the system power is turned off, and the values configured in the UEFI utility are kept in the CMOS.

Please note that inadequate BIOS settings may cause system instability, malfunction or boot failure. We strongly recommend that you do not alter the UEFI default configurations or change the settings only with the assistance of a trained service person.

If the system becomes unstable or fails to boot after you change the setting, try to clear the CMOS values and reset the board to default values. See your motherboard manual for instructions.

3.1.1 Entering BIOS Setup

You may run the UEFI SETUP UTILITY by pressing <F2> or right after you power on the computer; otherwise, the Power-On-Self-Test (POST) will continue with its test routines. If you wish to enter the UEFI SETUP UTILITY after POST, restart the system by pressing <Ctl> + <Alt> + <Delete>, or by pressing the reset button on the system chassis. You may also restart by turning the system off and then back on.

This setup guide explains how to use the UEFI SETUP UTILITY to configure all the supported system. The screenshots in this manual are for reference only. UEFI Settings and options may vary owing to different BIOS release versions or CPU installed. Please refer to the actual BIOS version of the motherboard you purchased for detailed screens, settings and options.

3.1.2 UEFI Menu Bar

The top of the screen has a menu bar with the following selections:

Main	For setting system time/date information
OC Tweaker	For overclocking configurations
Advanced	For advanced system configurations
H/W Monitor	Displays current hardware status
Tool	Useful tools
Boot	For configuring boot settings and boot priority
Security	For security settings
Exit	Exit the current screen or the UEFI Setup Utility



Because the UEFI software is constantly being updated, the following UEFI setup screens and descriptions for reference purpose only, and may vary from the latest BIOS and do not exactly match what you see on your screen.



Please realize that there is a certain risk involved with overclocking, including adjusting the setting in the BIOS, applying Untied Overclocking Technology, or using third-party overclocking tools. Overclocking may affect your system's stability, or even cause damage to the components and devices of your system. It should be done at your own risk and expense. We are not responsible for possible damage caused by overclocking.

3.1.3 Navigation Keys

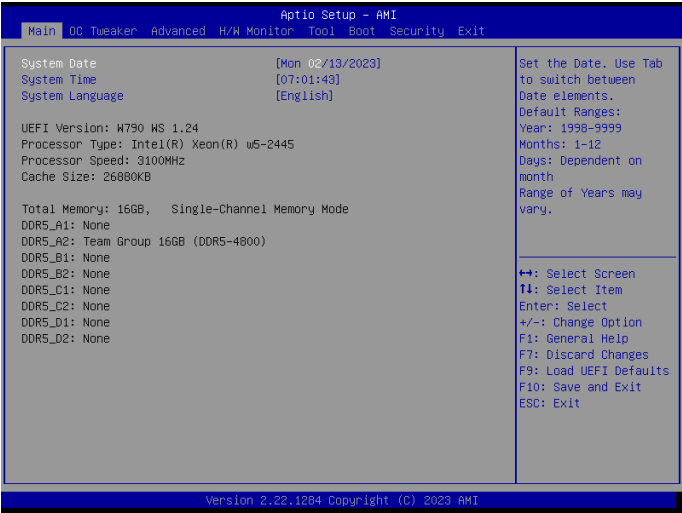
Use <←→> key or <→> key to choose among the selections on the menu bar, and use <↑> key or <↓> key to move the cursor up or down to select items, then press <Enter> to get into the sub screen. You can also use the mouse to click your required item.

Please check the following table for the descriptions of each navigation key.

Navigation Key(s)	Description
+ / -	To change option for the selected items
<Tab>	Switch to next function
<PGUP>	Go to the previous page
<PGDN>	Go to the next page
<HOME>	Go to the top of the screen
<END>	Go to the bottom of the screen
<F1>	To display the General Help Screen
<F7>	Discard changes and exit the SETUP UTILITY
<F9>	Load optimal default values for all the settings
<F10>	Save changes and exit the SETUP UTILITY
<F12>	Print screen
<ESC>	Jump to the Exit Screen or exit the current screen

3.2 Main Screen

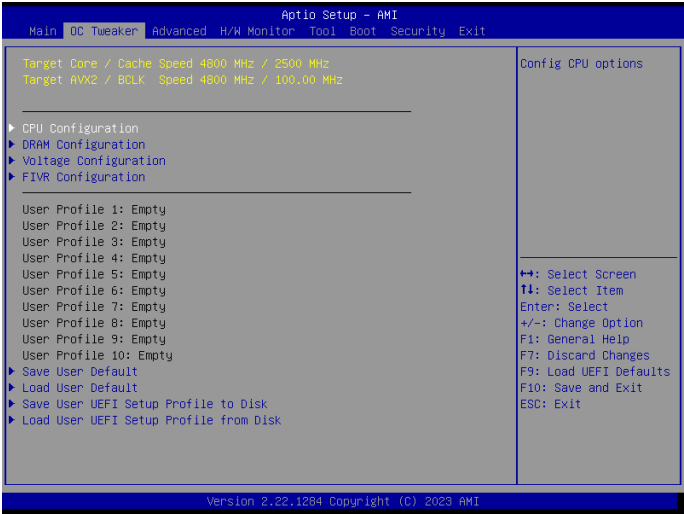
When you enter the UEFI SETUP UTILITY, the Main screen will appear and display the system overview.



Because the UEFI software is constantly being updated, the following UEFI setup screens and descriptions are for reference purpose only, and they may not exactly match what you see on your screen. Options may also vary depending on the features of your motherboard.

3.3 OC Tweaker Screen

In the OC Tweaker screen, you can set up overclocking features.



CPU Configuration

CPU Core Ratio

The CPU speed is determined by the CPU P-Core Ratio multiplied with the BCLK. Increasing the CPU P-Core Ratio will increase the internal CPU clock speed without affecting the clock speed of other components.

Configuration options: [Auto] [All Core] [Per Core] [Specific Per Core]

AVX2 Ratio Offset

AVX2 Ratio Offset specifies a negative offset from the CPU Ratio for AVX workloads. AVX is a more stressful workload that lower the AVX ratio to ensure maximum possible ratio for SSE workloads.

CPU Cache Ratio

The CPU Internal Bus Speed Ratio. The maximum should be the same as the CPU Ratio.

Min Cache Ratio

The CPU internal bus speed minimum ratio. To align cache ratio with P-Core ratio for non-K CPU, you can try to sync Min Cache Ratio Limit with CPU Cache Ratio.

CPU BCLK Frequency

The CPU speed is determined by the CPU Ratio multiplied with the BCLK. Increasing the BCLK will increase the internal CPU clock speed but also affect the clock speed of other components.

BCLK Advanced Setting

Press [Enter] to configure BCLK Advanced Setting.

Intel Turbo Boost Technology

Intel Turbo Boost Technology enables the processor to run above its base operating frequency when the operating system requests the highest performance state.

Configuration options: [Enabled] [Disabled]

Intel SpeedStep Technology

Intel SpeedStep technology allows processors to switch between multiple frequencies and voltage points for better power saving and heat dissipation.

Intel Speed Shift Technology

Allows you to enable or disable the Intel Speed Shift Technology support. Enabling will expose the CPPC v2 interface to allow for hardware controlled P-states. To get the best support for Intel Turbo Boost Max Technology 3.0 (ITBMT 3.0), you have to enable Intel Speed Shift Technology. If your CPU does not support ITBMT 3.0, option will still be grayed out.

Configuration options: [Enabled] [Disabled]

Intel Turbo Boost Max Technology 3.0

Allows you to enable or disable the Intel Turbo Boost Max Technology 3.0 (ITBMT 3.0) support. Disabling will report the maximum ratio of the slowest core in _CPC object. Processors supporting the ITBMT 3.0 feature contain at least one processor core whose maximum ratio is higher than the others.

Configuration options: [Enabled] [Disabled]

Boot Performance Mode

Default is Max Non-Turbo performance mode. It will keep cpu Flex-ratio till OS handoff. Max Battery mode will set CPU ratio as x8 till OS handoff. This option is suggested for BCLK overclocking.

Configuration options: [Max Battery] [Max Non-Turbo Performance] [Turbo Performance]

BCLK Aware Adaptive Voltage

Allows you to set BCLK Aware Adaptive Voltage as enabled or disabled. When it is enabled, pcode will be aware of the BCLK frequency when calculating the CPU V/F curves. This is ideal for BCLK OC to avoid high voltage overrides.

Configuration options: [Enabled] [Disabled]

Filter PLL

Enable sets GPIO8 low (0) to enable the Filter PLL for high BCLK overclocking levels.

UnderVolt Protection

When UnderVolt Protection is enabled, user will not be able to program under voltage in OS runtime. It is recommended to keep it enabled by default.

[Enabled] The item allows BIOS undervolting, but enables UnderVolt Protection in Runtime.

[Disabled] No UnderVolt Protection in Runtime.

CPU Tj Max

Allows you to set CPU Tj Max to adjust TCC Target Temperature. It supports Tj Max in the range of 62 to 115 deg Celsius.

Current Limit Override

[Disabled] No Current Limit Override.

[Enabled] The item allows overriding current limitation in 1/8 A increments.

Current Limit

This value represents the maximum instantaneous current allowed at any given time.

PL1 Power Limit

Allows you to configure Package Power Limit 1 in watts. When the limit is exceeded, the CPU ratio will be lowered after a period of time. A lower limit can protect the CPU and save power, while a higher limit may improve performance.

PL1 Time Window

Allows you to configure the period of time until the CPU ratio is lowered when the Long Duration Power Limit is exceeded.

PL2 Power Limit

Allows you to configure Package Power Limit 2 in watts. When the limit is exceeded, the CPU ratio will be lowered immediately. A lower limit can protect the CPU and save power, while a higher limit may improve performance.

PL2 Time Window

Allows you to configure the period of time until the CPU ratio is lowered when the Long Duration Power Limit is exceeded.

DRAM Configuration

Memory Information

Allows you to browse the serial presence detect (SPD) and Intel extreme memory profile (XMP) for memory modules.

DRAM Timing Configuration

DRAM Frequency

If [Auto] is selected, the motherboard will detect the memory module(s) inserted and assign the appropriate frequency automatically.

Primary Timing

CAS# Latency (tCL)

The time between sending a column address to the memory and the beginning of the data in response.

RAS# to CAS# Delay (tRCD)

RAS# to CAS# Delay : The number of clock cycles required between the opening of a row of memory and accessing columns within it.

Row Precharge (tRP)

The number of clock cycles required between the issuing of the precharge command and opening the next row.

RAS# Active Time (tRAS)

The number of clock cycles required between a bank active command and issuing the precharge command.

Secondary Timing

Write Recovery Time (tWR)

The amount of delay that must elapse after the completion of a valid write operation, before an active bank can be precharged.

Refresh Cycle Time 2 (tRFC)

The number of clocks from a Refresh command until the first Activate command to the same rank.

Refresh Cycle Time 2 (tRFC2)

The number of clocks from a Refresh command until the first Activate command to the same rank.

Refresh Cycle Time per Bank (tRFCpb)

The number of clocks from a Refresh command (per bank) until the first Activate command to the same rank.

RAS to RAS Delay (tRRD_L)

The number of clocks between two rows activated in different banks of the same rank.

RAS to RAS Delay (tRRD_S)

The number of clocks between two rows activated in different banks of the same rank.

Read to Precharge (tRTP)

The number of clocks that are inserted between a read command to a row pre-charge command to the same rank.

Four Activate Window (tFAW)

The time window in which four activates are allowed the same rank.

CAS Write Latency (tCWL)

Configure CAS Write Latency.

Third Timing

tREFI

Configure refresh cycles at an average periodic interval.

tREF Block

Configure the Number of H clocks to block scheduler before checking returned safe signals.

tCKE

Configure the period of time the DDR4 initiates a minimum of one refresh command internally once it enters Self-Refresh mode.

tRC

Configure the minimum active to active/Refresh Time.

Fourth Timing

tPRPDEN

Configure tPRPDEN. tPRPDEN, tACTPDEN, tREFPDEN will use this single value.

tXP

Configure tXP. CKE low exit time before a new command can be sent after CKE comes up

tRDPDEN

Configure tRDPDEN. CASrd to CKE low time.

tWRPDEN

Configure tWRPDEN. CASwr to CKE low time.

tSTAGGER_Ref

Configure tSTAGGER_Ref. Limits the rate of refresh commands sent to a single channel.

tRDA

Configure tRDA. Read CAS w/AutoPrecharge to Activate delay.

tWRA

Configure tWRA. Write CAS w/AutoPrecharge to Activate delay.

tWRPRE

Configure tWRPRE. Write CAS to Precharge delay.

tWRRDA

Configure tWRRDA. Write CAS to Read CAS with AutoPrecharge delay.

tMRD

Configure tMRD. DDR tMRD timing parameter. MRS to MRS minimum delay in number of DCLK.

tCPDED

Configure tCPDED. This is the tCPDED parameter, only used with DDR5.

tCPED2SRX

Configure tCPED2SRX. This is the minimum time in SR for RDIMMs (RCD) without clock stop; the time from the SRE single CK CS# assertion to the SRX command to the RCD.

tCSSR

Configure tCSSR. This is the tCSL timing parameter for UDIMMs (no RCD) and the tCSSR timing parameter for RDIMMs (RCD).

tSRX2SRX

Configure tCPED2SRX. This is the minimum time in SR for RDIMMs (RCD) without clock stop; the time from the SRE single CK CS# assertion to the SRX command to the RCD.

tCSSR

Configure tCSSR. This is the tCSL timing parameter for UDIMMs (no RCD) and the tCSSR timing parameter for RDIMMs (RCD).

tSRX2SRX

Configure tSRX2SRX. This is the tCSH_SRExit timing parameter for UDIMMs (no RCD) and the tSRX2SRX timing parameter for RDIMMs (RCD).

tSTAB

Configure tSTAB. This is the tCKACT + tSTAB timing parameter for RDIMMs (RCD); the time from the de-assertion of CS#, which starts the RCD DCK (tCKACT), plus time for the clock to stabilize, to the earliest time that the RCD SRX command can be issued.

tXSDLL

Configure tXSDLL. Exit Self Refresh to commands requiring a locked DLL.

tZQOPER

Configure tZQOPER. Normal operation Full calibration time.

tMOD

Configure tMOD. Mode Register Set command update delay.

tXSOFFSET

Configure tXSOFFSET. Set this field to the number of 1/2 the number of Dclks to get 10ns.

Turn Around Timing

TAT Training Value

tRRSG

Configure tRRSG training value. Read CAS to Read CAS delay, same bank group. tRRSG needs to be greater than or equal to tRRSR.

tWWSG

Configure tWWSG training value. Write CAS to Write CAS delay, same bank group. tWWSG needs to be greater than or equal to tWWSR.

tRWSG

Configure tRWSG training value. Read CAS to Write CAS delay, same bank group. tRWSG needs to be greater than or equal to tRWSR.

tWRSG

Configure tWRSG training value. Write CAS to Read CAS delay, same bank group. tWRSG needs to be greater than or equal to tWRSR.

tRRSR

Configure tRRSR training value. Read CAS to Read CAS delay, same rank, different bank groups. tRRSG needs to be greater than or equal to tRRSR.

tWWSR

Configure tWWSR training value. Write CAS to Write CAS delay, same rank, different bank groups. tWWSG needs to be greater than or equal to tWWSR.

tRWSR

Configure tRWSR training value. Read CAS to Write CAS delay, same rank, different bank groups. tRWSG needs to be greater than or equal to tRWSR.

tWRSR

Configure tWRSR training value. Write CAS to Read CAS delay, same rank, different bank groups. tWRSG needs to be greater than or equal to tWRSR.

tRRDR

Configure tRRDR training value. Read CAS to Read CAS delay, different rank.

tWWDR

"Configure tWWDR training value. Write CAS to Write CAS delay, different rank.

tRWDR

Configure tRWDR training value. Read CAS to Write CAS delay, different rank.

tWRDR

Configure tWRDR training value. Write CAS to Read CAS delay, different rank.

tRRDD

Configure tRRDD training value. Read CAS to Read CAS delay, different DIMM.

tWWDD

Configure tWWDD training value. Write CAS to Write CAS delay, different DIMM.

tRWDD

Configure tRWDD training value. Read CAS to Write CAS delay, different DIMM.

tWRDD

Configure tWRDD training value. Write CAS to Read CAS delay, different DIMM.

tRRDS

Configure tRRDS training value. Read CAS to Read CAS delay, different SubRanks.

tWWDS

Configure tWWDS training value. Write CAS to Write CAS delay, different SubRanks.

tRWDS

Configure tRWDS training value. Read CAS to Write CAS delay, different SubRanks.

tWRDS

Configure tWRDS training value. Write CAS to Read CAS delay, different SubRanks.

TAT Runtime Value**tRRSG**

Configure tRRSG runtime value. Read CAS to Read CAS delay, same bank group. tRRSG needs to be greater than or equal to tRRSR.

tWWSG

Configure tWWSG runtime value. Write CAS to Write CAS delay, same bank group. tWWSG needs to be greater than or equal to tWWSR.

tRWSG

Configure tRWSG runtime value. Read CAS to Write CAS delay, same bank group. tRWSG

needs to be greater than or equal to tRWSR.

tWRSG

Configure tWRSG runtime value. Write CAS to Read CAS delay, same bank group. tWRSG needs to be greater than or equal to tRWSR.

tRRSR

"Configure tRRSR runtime value. Read CAS to Read CAS delay, same rank, different bank groups. tRRSG needs to be greater than or equal to tRRSR.

tWWSR

Configure tWWSR runtime value. Write CAS to Write CAS delay, same rank, different bank groups. tWWSG needs to be greater than or equal to tWWSR.

tRWSR

Configure tRWSR runtime value. Read CAS to Write CAS delay, same rank, different bank groups. tRWSG needs to be greater than or equal to tRWSR.

tWRSR

Configure tWRSR runtime value. Write CAS to Read CAS delay, same rank, different bank groups. tWRSG needs to be greater than or equal to tWRSR.

tRRDR

Configure tRRDR runtime value. Read CAS to Read CAS delay, different rank.

tWWDR

Configure tWWDR runtime value. Write CAS to Write CAS delay, different rank.

tRWDR

Configure tRWDR runtime value. Read CAS to Write CAS delay, different rank.

tWRDR

Configure tWRDR runtime value. Write CAS to Read CAS delay, different rank.

tRRDD

Configure tRRDD runtime value. Read CAS to Read CAS delay, different DIMM.

tWWDD

Configure tWWDD runtime value. Write CAS to Write CAS delay, different DIMM.

tRWDD

Configure tRWDD runtime value. Read CAS to Write CAS delay, different DIMM.

tWRDD

Configure tWRDD runtime value. Write CAS to Read CAS delay, different DIMM.

tRRDS

Configure tRRDS runtime value. Read CAS to Read CAS delay, different SubRanks.

tWWDS

Configure tWWDS runtime value. Write CAS to Write CAS delay, different SubRanks.

tRWDS

Configure tRWDS runtime value. Read CAS to Write CAS delay, different SubRanks.

tWRDS

Configure tWRDS runtime value. Write CAS to Read CAS delay, different SubRanks.

ODT Setting**ODT WR (A1)**

Configure the memory on die termination resistors' WR.

Configuration options: [Auto] [34] [40] [48] [60] [80] [120] [240] [Disabled]

ODT WR (A2)

Configure the memory on die termination resistors' WR.

Configuration options: [Auto] [34] [40] [48] [60] [80] [120] [240] [Disabled]

ODT WR (B1)

Configure the memory on die termination resistors' WR.

Configuration options: [Auto] [34] [40] [48] [60] [80] [120] [240] [Disabled]

ODT WR (B2)

Configure the memory on die termination resistors' WR.

Configuration options: [Auto] [34] [40] [48] [60] [80] [120] [240] [Disabled]

ODT WR (C1)

Configure the memory on die termination resistors' WR.

Configuration options: [Auto] [34] [40] [48] [60] [80] [120] [240] [Disabled]

ODT WR (C2)

Configure the memory on die termination resistors' WR.

Configuration options: [Auto] [34] [40] [48] [60] [80] [120] [240] [Disabled]

ODT WR (D1)

Configure the memory on die termination resistors' WR.

Configuration options: [Auto] [34] [40] [48] [60] [80] [120] [240] [Disabled]

ODT WR (D2)

Configure the memory on die termination resistors' WR.

Configuration options: [Auto] [34] [40] [48] [60] [80] [120] [240] [Disabled]

ODT NOM Rd (A1)

Configure the memory on die termination resistors' NOM Rd.

Configuration options: [Auto] [34] [40] [48] [60] [80] [120] [240] [Disabled]

ODT NOM Rd (A2)

Configure the memory on die termination resistors' NOM Rd.

Configuration options: [Auto] [34] [40] [48] [60] [80] [120] [240] [Disabled]

ODT NOM Rd (B1)

Configure the memory on die termination resistors' NOM Rd.

Configuration options: [Auto] [34] [40] [48] [60] [80] [120] [240] [Disabled]

ODT NOM Rd (B2)

Configure the memory on die termination resistors' NOM Rd.

Configuration options: [Auto] [34] [40] [48] [60] [80] [120] [240] [Disabled]

ODT NOM Rd (C1)

Configure the memory on die termination resistors' NOM Rd.

Configuration options: [Auto] [34] [40] [48] [60] [80] [120] [240] [Disabled]

ODT NOM Rd (C2)

Configure the memory on die termination resistors' NOM Rd.

Configuration options: [Auto] [34] [40] [48] [60] [80] [120] [240] [Disabled]

ODT NOM Rd (D1)

Configure the memory on die termination resistors' NOM Rd.

Configuration options: [Auto] [34] [40] [48] [60] [80] [120] [240] [Disabled]

ODT NOM Rd (D2)

Configure the memory on die termination resistors' NOM Rd.

Configuration options: [Auto] [34] [40] [48] [60] [80] [120] [240] [Disabled]

ODT NOM Wr (A1)

Configure the memory on die termination resistors' NOM Wr.

Configuration options: [Auto] [34] [40] [48] [60] [80] [120] [240] [Disabled]

ODT NOM Wr (A2)

Configure the memory on die termination resistors' NOM Wr.

Configuration options: [Auto] [34] [40] [48] [60] [80] [120] [240] [Disabled]

ODT NOM Wr (B1)

Configure the memory on die termination resistors' NOM Wr.

Configuration options: [Auto] [34] [40] [48] [60] [80] [120] [240] [Disabled]

ODT NOM Wr (B2)

Configure the memory on die termination resistors' NOM Wr.

Configuration options: [Auto] [34] [40] [48] [60] [80] [120] [240] [Disabled]

ODT NOM Wr (C1)

Configure the memory on die termination resistors' NOM Wr.

Configuration options: [Auto] [34] [40] [48] [60] [80] [120] [240] [Disabled]

ODT NOM Wr (C2)

Configure the memory on die termination resistors' NOM Wr.

Configuration options: [Auto] [34] [40] [48] [60] [80] [120] [240] [Disabled]

ODT NOM Wr (D1)

Configure the memory on die termination resistors' NOM Wr.

Configuration options: [Auto] [34] [40] [48] [60] [80] [120] [240] [Disabled]

ODT NOM Wr (D2)

Configure the memory on die termination resistors' NOM Wr.

Configuration options: [Auto] [34] [40] [48] [60] [80] [120] [240] [Disabled]

ODT PARK (A1)

Configure the memory on die termination resistors' PARK.

Configuration options: [Auto] [34] [40] [48] [60] [80] [120] [240] [Disabled]

ODT PARK (A2)

Configure the memory on die termination resistors' PARK.

Configuration options: [Auto] [34] [40] [48] [60] [80] [120] [240] [Disabled]

ODT PARK (B1)

Configure the memory on die termination resistors' PARK.

Configuration options: [Auto] [34] [40] [48] [60] [80] [120] [240] [Disabled]

ODT PARK (B2)

Configure the memory on die termination resistors' PARK.

Configuration options: [Auto] [34] [40] [48] [60] [80] [120] [240] [Disabled]

ODT PARK (C1)

Configure the memory on die termination resistors' PARK.

Configuration options: [Auto] [34] [40] [48] [60] [80] [120] [240] [Disabled]

ODT PARK (C2)

Configure the memory on die termination resistors' PARK.

Configuration options: [Auto] [34] [40] [48] [60] [80] [120] [240] [Disabled]

ODT PARK (D1)

Configure the memory on die termination resistors' PARK.

Configuration options: [Auto] [34] [40] [48] [60] [80] [120] [240] [Disabled]

ODT PARK (D2)

Configure the memory on die termination resistors' PARK.

Configuration options: [Auto] [34] [40] [48] [60] [80] [120] [240] [Disabled]

ODT PARK DQS (A1)

Configure the memory on die termination resistors' PARK DQS.

Configuration options: [Auto] [34] [40] [48] [60] [80] [120] [240] [Disabled]

ODT PARK DQS (A2)

Configure the memory on die termination resistors' PARK DQS.

Configuration options: [Auto] [34] [40] [48] [60] [80] [120] [240] [Disabled]

ODT PARK DQS (B1)

Configure the memory on die termination resistors' PARK DQS.

Configuration options: [Auto] [34] [40] [48] [60] [80] [120] [240] [Disabled]

ODT PARK DQS (B2)

Configure the memory on die termination resistors' PARK DQS.

Configuration options: [Auto] [34] [40] [48] [60] [80] [120] [240] [Disabled]

ODT PARK DQS (C1)

Configure the memory on die termination resistors' PARK DQS.

Configuration options: [Auto] [34] [40] [48] [60] [80] [120] [240] [Disabled]

ODT PARK DQS (C2)

Configure the memory on die termination resistors' PARK DQS.

Configuration options: [Auto] [34] [40] [48] [60] [80] [120] [240] [Disabled]

ODT PARK DQS (D1)

Configure the memory on die termination resistors' PARK DQS.

Configuration options: [Auto] [34] [40] [48] [60] [80] [120] [240] [Disabled]

ODT PARK DQS (D2)

Configure the memory on die termination resistors' PARK DQS.

Configuration options: [Auto] [34] [40] [48] [60] [80] [120] [240] [Disabled]

Advanced Setting

MRC Promote Warnings

Determines if warnings are promoted to system level.

Promote Warnings

Determines if MRC warnings are promoted to system level.

MemTest

[Enabled]: This item enables memory test during normal boot.

[Disabled]: This item disables this feature.

MemTest Loops

Number of memory test loops during normal boot, set to 0 to run memtest infinitely.

MemTest on Cold Fast Boot

When enabled, memory test will be executed during cold fast boot.

Attempt Fast Boot

When enabled, portions of memory reference code will be skipped when possible to increase boot speed.

Attempt Fast Cold Boot

When enabled, portions of memory reference code will be skipped when possible to increase boot speed on cold boots.

Voltage Configuration

Voltage Mode

[OC Mode]: Larger range voltage for overclocking.

[Stable Mode]: Smaller range voltage for stable system.

CPU VCCIN Voltage

Input voltage for the processor by the external voltage regulator.

CPU VCCIN Load-Line Calibration

Load-Line is defined by Intel VRM Spec and affects the CPU power voltage. CPU Load-Line Calibration helps prevent CPU voltage droop when the system is under heavy loading. Higher load-line (Level 1) calibration gets higher voltage and good overclocking performance but increases the CPU and VRM thermal.

Configuration options: [Auto] [Level 1] [Level 2] [Level 3] [Level 4] [Level 5]

*[Level 1] and [Level 2] options appear depending on the CPU you use on your motherboard.

CPU FIVRA Voltage

Input voltage for the processor by the external voltage regulator.

CPU FIVRA Load-Line Calibration

CPU FIVRA Load-Line Calibration helps prevent CPU FIVRA voltage droop when the system is under heavy load.

Configuration options: [Auto] [Level 1] [Level 2] [Level 3] [Level 4] [Level 5]

*[Level 1] and [Level 2] options appear depending on the CPU you use on your motherboard.

CPU VCCINFAON Voltage

Input voltage for the processor by the external voltage regulator.

CPU VCCINFAON Load-Line Calibration

CPU VCCINFAON Load-Line Calibration helps prevent CPU VCCINFAON voltage droop when the system is under heavy load.

Configuration options: [Auto] [Level 1] [Level 2] [Level 3] [Level 4] [Level 5]

*[Level 1] and [Level 2] options appear depending on the CPU you use on your motherboard.

CPU VCCFA_EHV Voltage

Input voltage for the processor by the external voltage regulator.

CPU VCCD_HV Voltage

Input voltage for the processor by the external voltage regulator.

CPU VCCD_HV Load-Line Calibration

CPU VCCD_HV Load-Line Calibration helps prevent CPU VCCD_HV voltage droop when the system is under heavy load.

Configuration options: [Auto] [Level 1] [Level 2] [Level 3] [Level 4] [Level 5]

*[Level 1] and [Level 2] options appear depending on the CPU you use on your motherboard.

VNN Voltage

Allows you to configure the voltage for the VNN.

+0.82V PCH Voltage

Allows you to configure the voltage for the +0.82V PCH.

DDR5 PMIC Configuration

Secure Mode

Allows you to Auto/Enable/Disable PMIC Secure Mode.

+0.82V PCH Voltage

Allows you to configure the voltage for the +0.82V PCH.

+1.05 PCH Voltage

Allows you to configure the voltage for the +1.05 PCH.

DDR5 PMIC Configuration

PMIC Voltage Option

[United] Allows you to adjust DIMM PMIC altogether.

[Separate] Allows you to individually adjust DIMM PMIC.

VDD Voltage

Allows you to configure the VDD Voltage supported by PMIC at DRAM side. The VDD output can be measured through PMIC ADC with step size 0.015V. VDD information is contained in memory SPD and XMP, you can check it via Memory Information tool.

VDDQ Voltage

Allows you to configure the VDDQ Voltage supported by PMIC at DRAM side. The VDDQ output can be measured through PMIC ADC with step size 0.015V. VDDQ information is contained in memory SPD and XMP. You can check it via the Memory Information tool.

Configuration options: [JEDEC Standard] [OC Demand]

VDDQ Voltage Range

JEDEC Standard ranges from 0.800V to 1.435V. OC Demand ranges from 0.800V to 2.070V. OC Demand may not be applied if PMIC OC CAP is JEDEC PMIC. You can check it via the Memory Information tool.

Configuration options: [JEDEC Standard] [OC Demand]

VPP Voltage

Allows you to configure the VPP Voltage supported by PMIC at DRAM side. The VPP output can be measured through PMIC ADC with step size 0.015V. VPP information is contained in memory SPD and XMP. You can check it via the Memory Information tool.

FIVR Configuration

Ring Voltage Mode

Selects between adaptive and Override Voltage modes. In Override Mode the voltage selected will be applied overall operating frequencies. In Adaptive Mode the voltage is interpolated only in turbo mode.

Configuration options: [Adaptive] [Override]

Extra Turbo Voltage

Specifies the extra turbo voltage applied while ring is operating in turbo mode.

Ring Voltage Offset

Specifies the Offset Voltage applied to the Ring domain. This voltage is specified in millivolts.

VCCCFN Voltage Override

Specifies the Override Voltage applied to the VCCCFN domain. This voltage is specified in millivolts. Uses Mailbox MSR 0x150, cmd 0x11. Range 0-2050 mV. Type 1200 means 1200mV and default 0 means no override.

VCCIO Voltage Override

Specifies the Override Voltage applied to the VCCIO domain. This voltage is specified in millivolts. Uses Mailbox MSR 0x150, cmd 0x11. Range 0-2050 mV. Type 1200 means 1200mV and default 0 means no override.

VCCMDFIA Voltage Override

Specifies the Override Voltage applied to the VCCMDFIA domain. This voltage is specified in millivolts. Uses Mailbox MSR 0x150, cmd 0x11. Range 0-2050 mV. Type 1200 means 1200mV and default 0 means no override.

VCCMDFI Voltage Override

Specifies the Override Voltage applied to the VCCMDFI domain. This voltage is specified in millivolts. Uses Mailbox MSR 0x150, cmd 0x11. Range 0-2050 mV. Type 1200 means 1200mV and default 0 means no override.

VCCDDRDR Voltage Override

Specifies the Override Voltage applied to the VCCDDRDR domain. This voltage is specified in millivolts. Uses Mailbox MSR 0x150, cmd 0x11. Range 0-2050 mV. Type 1200 means 1200mV and default 0 means no override.

VCCDDRA Voltage Override

Specifies the Override Voltage applied to the VCCDDRA domain. This voltage is specified in millivolts. Uses Mailbox MSR 0x150, cmd 0x11. Range 0-2050 mV. Type 1200 means 1200mV and default 0 means no override.

Core PLL Voltage Offset

PLL Voltage Offset ranges from 0 to 15 bins, each bin is 15mV. Adding 5 or more bins will help increase the range of this domain frequency in extreme overclocking conditions. The best bins will be different on each processor, user has to find the best bins for your own processor.

Ring PLL Voltage Offset

PLL Voltage Offset ranges from 0 to 15 bins, each bin is 15mV. Adding 5 or more bins will help increase the range of this domain frequency in extreme overclocking conditions. The best bins will be different on each processor, user has to find the best bins for your own processor.

MC PLL Voltage Override

PLL Voltage Offset ranges from 0 to 15 bins, each bin is 15mV. Adding 5 or more bins will help increase the range of this domain frequency in extreme overclocking conditions. The best bins will be different on each processor, user has to find the best bins for your own processor.

SVID/FIVR

SVID support

Set this item to [Enabled] when overclocking your system. Disabling this item stops the CPU from communicating with the external voltage regulator.

SVID Voltage Override

This item allows you to set the SVID Voltage override. By default, this item takes the standard value of the installed CPU.

FIVR Faults

Disable FIVR Faults to raise the threshold to trigger CPU over current protection and over voltage protection for better overclocking capabilities.

FIVR Efficiency Management

Enable FIVR Efficiency Management for power saving. Disable for better performance and overclocking capabilities.

Save User Default

Type a profile name and press enter to save your settings as user default.

Load User Default

Load previously saved user defaults.

Save User UEFI Setup Profile to Disk

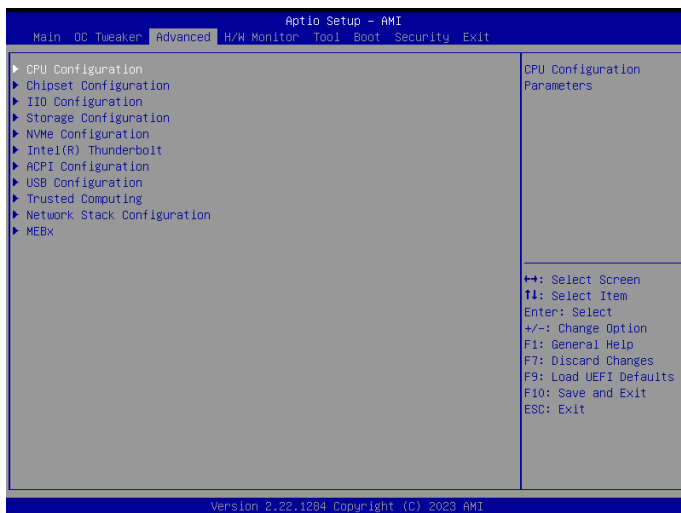
It helps you to save current UEFI settings as an user profile to disk.

Load User UEFI Setup Profile from Disk

You can load previous saved profile from the disk.

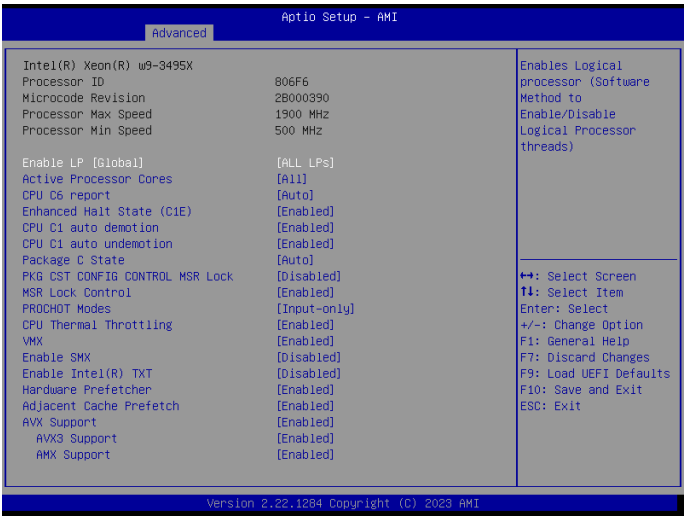
3.4 Advanced Screen

In this section, you may set the configurations for the following items: CPU Configuration, Chipset Configuration, IIO Configuration, Storage Configuration, NVMe Configuration, Intel(R) Thunderbolt, ACPI Configuration, USB Configuration, Trusted Computing, Network Stack Configuration and MEBx.



Setting wrong values in this section may cause the system to malfunction.

3.4.1 CPU Configuration



Enable LP [Global]

Enables Logical processor (Software Method to Enable/Disable Logical Processor threads).

Active Processor Cores

Select the number of cores to enable in each processor package.

CPU C6 State Support

Enable C6 deep sleep state for lower power consumption.

Enhanced Halt State(C1E)

Enable Enhanced Halt State (C1E) for lower power consumption.

Package C State Support

Allows you to enable CPU, PCIe, Memory, Graphics C State Support for power saving.

Configuration options: [Auto] [Enabled] [Disabled]

MSR Lock Control

Enable - MSR 3Ah and CSR 80h will be locked. Power Good reset is needed to remove lock bits.

CPU Thermal Throttling

Allows you to enable CPU internal thermal control mechanisms to keep the CPU from overheating.

Configuration options: [Enabled] [Disabled]

VMX

Enables the Vanderpool Technology, takes effect after reboot.

Enable SMX

Enables Safer Mode Extensions.

Enable Intel(R) TXT

Enables Intel(R) TXT.

Hardware Prefetcher

Allows you to enable or disable Hardware Prefetcher that automatically prefetches data and code for the processor. Enable this item for better performance.

Configuration options: [Enabled] [Disabled]

Adjacent Cache Prefetch

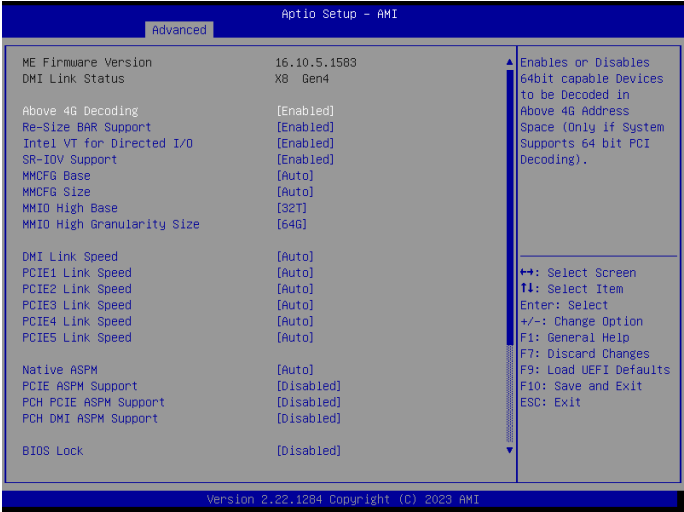
Allows you to enable or disable Adjacent Cache Prefetch that automatically prefetches the subsequent cache line while retrieving the currently requested cache line. Enable this item for better performance.

Configuration options: [Enabled] [Disabled]

AVX Support

Enable/Disable AVX/2/3 instructions.

3.4.2 Chipset Configuration



Above 4G Decoding

Allows you to enable or disable above 4G MemoryMappedIO decoding. This is disabled automatically when Aperture Size is set to 2048MB.

Configuration options: [Enabled] [Disabled]

Re-Size BAR support

If system has Resizable BAR capable PCIe Devices, this option enables or disables Resizable BAR Support (Only if System Supports 64 bit PCI Decoding).

Intel VT for Directed I/O (VT-d)

Press <Enter> to bring up the Intel Virtualization for Directed I/O (VT-d) Configuration menu.

SR-IOV Support

If system has SR-IOV capable PCIe Devices, this option Enables or Disables Single Root IO Virtualization Support.

Configuration options: [Enabled] [Disabled]

DMI Link Speed

Allows you to configure DMI Slot Link Speed.

Configuration options: [Gen1] [Gen2] [Gen3] [Gen4]

PCIE1 Link Speed

Allows you to configure PCIE1 Slot Link Speed. Auto mode is optimizing for overclocking.

Configuration options: [Auto] [Gen1] [Gen2] [Gen3] [Gen4] [Gen5] (Options vary depending on your motherboard.)

PCIE2 Link Speed

Allows you to configure PCIE2 Slot Link Speed. Auto mode is optimizing for overclocking.

Configuration options: [Auto] [Gen1] [Gen2] [Gen3] [Gen4] [Gen5] (Options vary depending on your motherboard.)

PCIE3 Link Speed

Allows you to configure PCIE3 Slot Link Speed. Auto mode is optimizing for overclocking.

Configuration options: [Auto] [Gen1] [Gen2] [Gen3] [Gen4] (Options vary depending on your motherboard.)

PCIE4 Link Speed

Allows you to configure PCIE4 Slot Link Speed. Auto mode is optimizing for overclocking.

Configuration options: [Auto] [Gen1] [Gen2] [Gen3] [Gen4] [Gen5] (Options vary depending on your motherboard.)

PCIE5 Link Speed

Allows you to configure PCIE5 Slot Link Speed. Auto mode is optimizing for overclocking.

Configuration options: [Auto] [Gen1] [Gen2] [Gen3] [Gen4] (Options vary depending on your motherboard.)

Native ASPM

Windows OS controls the ASPM (active state power management) support for devices.

PCIE ASPM Support

This option controls the ASPM support for all CPU downstream devices.

Configuration options: [Disabled] [L0s] [L1] [L0sL1]

PCH PCIE ASPM Support

This option controls the ASPM support for all PCH downstream devices.

Configuration options: [Disabled] [L1] [Auto]

PCH DMI ASPM Support

Allows you to enable or disable the ASPM support for all PCH DMI devices.

Configuration options: [Enabled] [Disabled]

BIOS Lock

Enable/disable the PCH BIOS Lock Enable feature. Enable this item to ensure System Management Mode (SMM) protection of flash.

Memory Encryption (TME)

Enable/Disable Memory Encryption (TME).

Onboard HD Audio

Allows you to enable or disable the onboard HD audio controller. Set this item to [Auto] to enable the onboard HD and automatically disable it when a sound card is installed.

Configuration options: [Auto] [Enabled] [Disabled]

Onboard WAN Device

Allows you to enable or disable the onboard WAN device.

Configuration options: [Enabled] [Disabled].

Deep Sleep

Allows you to configure deep sleep mode for power saving when the computer is shut down. We recommend disabling Deep Sleep for better system compatibility and stability.

Configuration options: [Enabled] [Enabled in S5] [Enabled in S4-S5]

Restore on AC/Power Loss

Allows you to select the power state after a power failure.

[Power Off] sets the power to remain off when the power recovers.

[Power On] sets the system to start to boot up when the power recovers.

Onboard Button LED

Allows you to control onboard Power button and Reset button LED.

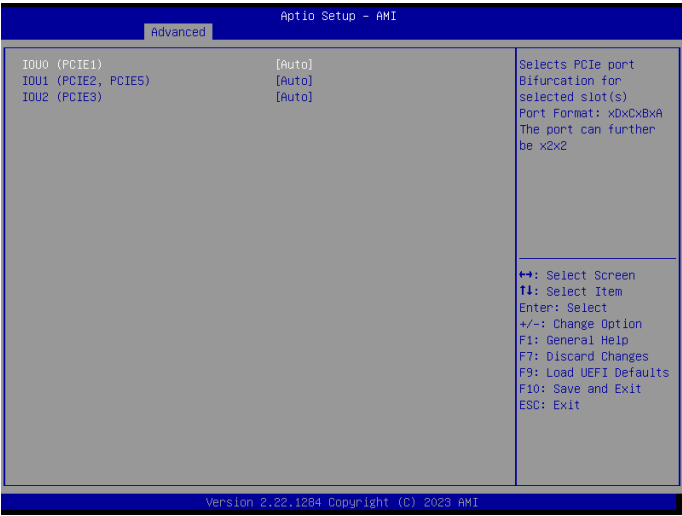
Configuration options: [On] [Off]

Onboard Debug Port LED

Allows you to control onboard Dr. Debug LED.

Configuration options: [On] [Off]

3.4.3 IIO Configuration



IOU1 (PCIE1)

Select PCIe port Bifurcation for selected slot(s).

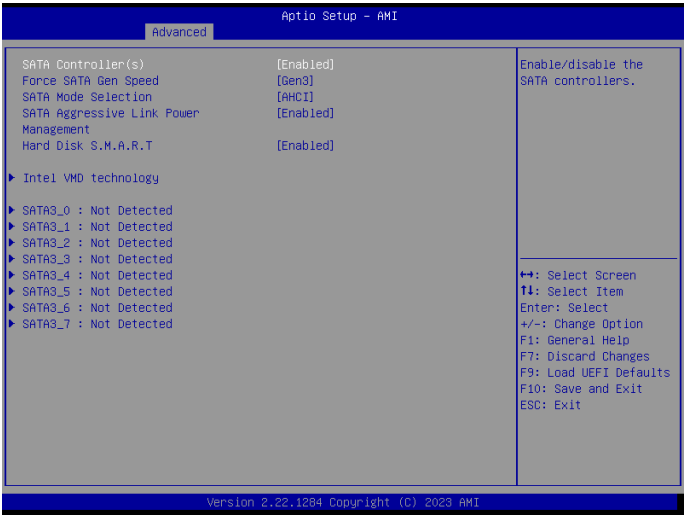
IOU0 (PCIE2, PCIE5)

Select PCIe port Bifurcation for selected slot(s).

IOU1 (PCIE3)

Select PCIe port Bifurcation for selected slot(s).

3.4.4 Storage Configuration



SATA Controller(s)

Allows you to enable or disable the SATA controllers.

Configuration options: [Enabled] [Disabled]

Forced SATA Gen Speed

Allows you to configure the Forced SATA Gen Speed.

SATA Mode Selection

AHCI: Supports new features that improve performance.

Configuration option: [AHCI]

SATA Aggressive Link Power Management

SATA Aggressive Link Power Management allows SATA devices to enter a low power state during periods of inactivity to save power. It is only supported by AHCI mode.

Configuration options: [Enabled] [Disabled]

Hard Disk S.M.A.R.T.

S.M.A.R.T stands for Self-Monitoring, Analysis, and Reporting Technology. It is a

monitoring system for computer hard disk drives to detect and report on various indicators of reliability.

Configuration options: [Enabled] [Disabled]

VMD Configuration

Press [Enter] to view the followings items for VMD configurations.

Enable VMD Controller

Allows you to enable or disable the Intel VMD controller.

This following items appear when it is set to [Enabled].

Configuration options: [Enabled] [Disabled]

Enable VMD Global Mapping

Allows you to enable or disable the VMD Global Mapping.

Configuration options: [Enabled] [Disabled]

Map this Root Port under VMD

Allows you to map or unmap this Root Port to VMD. This item is allowed to be configured when "Enable VMD Global Mapping" is set to [Disabled].

Configuration options: [Enabled] [Disabled]

Root Port BDF details

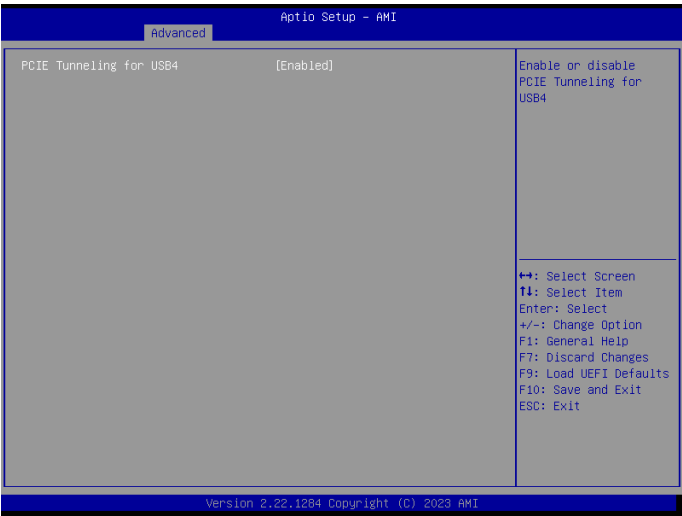
Displays the Root Port BDF details.

3.4.5 NVMe Configuration



The NVMe Configuration displays the NVMe controller and Drive information

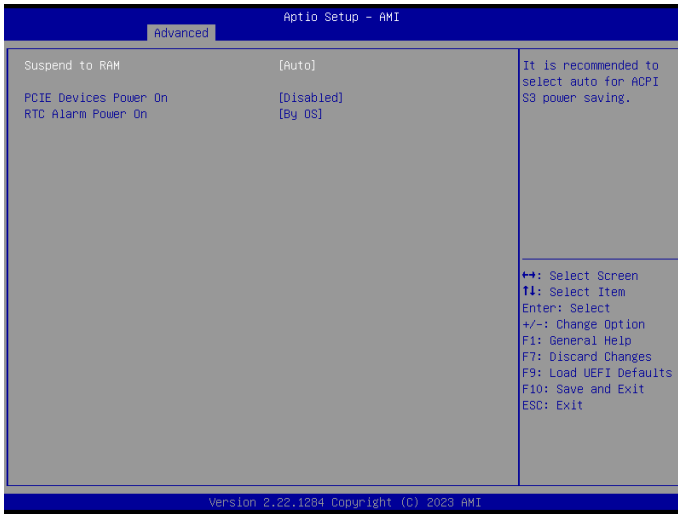
3.4.6 Intel(R) Thunderbolt



PCIE Tunneling for USB4

Enable or disable PCIE Tunneling for USB4

3.4.7 ACPI Configuration



Suspend to RAM

Allows you to select [Disabled] for ACPI suspend type S1. It is recommended to select [Auto] for ACPI S3 power saving.

Configuration options: [Auto] [Disabled]

PCIE Devices Power On

Allows the system to be waked up by a PCIE device and enable wake on LAN.

Configuration options: [Enabled] [Disabled]

RTC Alarm Power On

Allows the system to be waked up by the real time clock alarm. Set it to By OS to let it be handled by your operating system.

Configuration options: [Enabled] [Disabled] [By OS]

3.4.8 USB Configuration

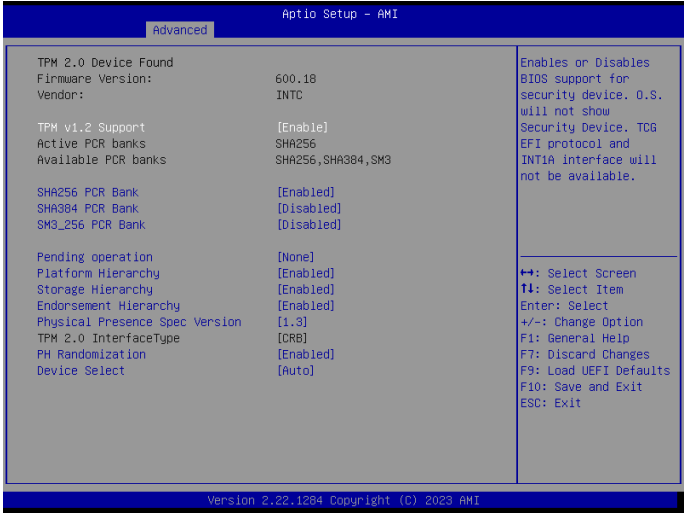


XHCI Hand-off

This is a workaround for Oses without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.

Configuration options: [Enabled] [Disabled]

3.4.9 Trusted Computing



NOTE: Options vary depending on the version of your connected TPM module.

Security Device Support

Allows you to enable or disable BIOS support for security device. O.S. will not show Security Device. TCG EFI protocol and INT1A interface will not be available.

Configuration options: [Enabled] [Disabled]

Active PCR banks

This item displays active PCR Banks.

Available PCR Banks

This item displays available PCR Banks.

SHA256 PCR Bank

Allows you to enable or disable SHA256 PCR Bank.

Configuration options: [Enabled] [Disabled]

SHA384 PCR Bank

Allows you to enable or disable SHA384 PCR Bank.

Configuration options: [Enabled] [Disabled]

SM3_256 PCR Bank

Allows you to enable or disable SM3_256 PCR Bank.

Configuration options: [Enabled] [Disabled]

Pending Operation

Allows you to schedule an Operation for the Security Device.

NOTE: Your computer will reboot during restart in order to change State of the Device.

Configuration options: [None] [TPM Clear]

Platform Hierarchy

Allows you to enable or disable Platform Hierarchy.

Configuration options: [Enabled] [Disabled]

Storage Hierarchy

Allows you to enable or disable Storage Hierarchy.

Configuration options: [Enabled] [Disabled]

Endorsement Hierarchy

Allows you to enable or disable Endorsement Hierarchy.

Configuration options: [Enabled] [Disabled]

Physical Presence Spec Version

Select this item to tell OS to support PPI spec version 1.2 or 1.3. Please note that some HCK tests might not support version 1.3.

Configuration options: [1.2] [1.3]

TPM 2.0 InterfaceType

Allows you to view the Communication Interface to TPM 2.0 Device: CRB or ITS.

Device Select

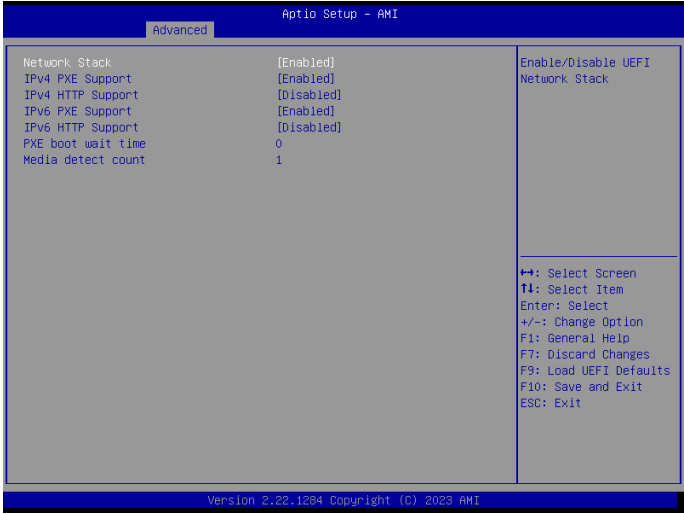
Allows you to select the TPM device to be supported.

[TPM 1.2] restricts support to TPM 1.2 devices.

[TPM 2.0] restricts support to TPM 2.0 devices.

[Auto] supports both TPM 1.2 and TPM 2.0 devices with the default set to TPM 2.0 devices. If TPM 2.0 devices are not found, TPM 1.2 devices will be enumerated.

3.4.10 Network Stack Configuration



Network Stack

Use this item to enable or disable UEFI Network Stack.

Ipv4 PXE Support

Use this item to enable or disable IPv4 PXE boot support. If disabled, IPv4 PXE boot support will not be available.

Ipv4 HTTP Support

Use this item to enable or disable IPv4 HTTP boot support. If disabled, IPv4 HTTP boot support will not be available.

Ipv6 PXE Support

Use this item to enable or disable IPv6 PXE boot support. If disabled, IPv6 PXE boot support will not be available.

Ipv6 HTTP Support

Use this item to enable or disable IPv6 HTTP boot support. If disabled, IPv6 HTTP boot support will not be available.

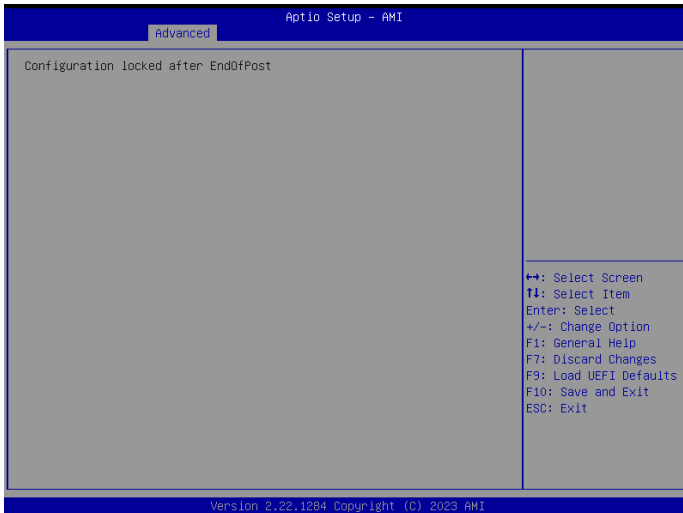
PXE boot wait time

Wait time in seconds to press ESC key to abort the PXE boot. Use either +/- or numeric keys to set the value.

Media detect count

Number of times the presence of media will be checked. Use either +/- or numeric keys to set the value.

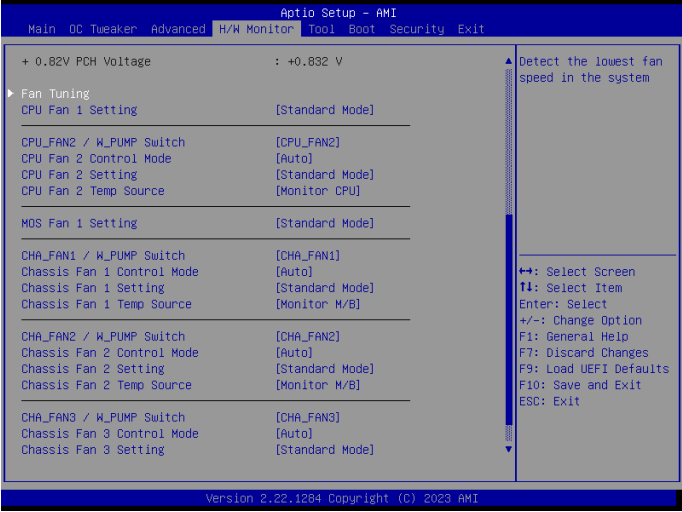
3.4.11 MEBx



This Formset contains forms for configuring MEBx.

3.5 Hardware Health Event Monitoring Screen

This section allows you to monitor the status of the hardware on your system, including the parameters of the CPU temperature, motherboard temperature, fan speed and voltage.



NOTE: Options vary depending on the features of your motherboard.

Fan Tuning

When selected, the BIOS will proceed to detect the lowest fan speeds for fans connected to the motherboard. This process will take a few minutes to complete.

Note: Please note CAM settings applied within the OS will overwrite settings made within the BIOS.

CPU Fan 1 Setting

Allows you to select a fan mode for CPU Fan 1, or choose [Customize] to set 5 CPU temperatures and assign a respective fan speed for each temperature.

Configuration options:

[Customize] [Silent Mode] [Standard Mode] [Performance Mode] [Full Speed]

CPU_FAN2 / W_PUMP Switch

Allows you to switch CPU_Fan2 or Water Pump mode.

Configuration options: [CPU_FAN2] [W_PUMP]

CPU Fan 2 Control Mode

Allows you to select PWM mode or DC mode for CPU Fan 2.

[Auto] Select this mode to detect the type of installed fan and automatically switch the control modes.

[DC Mode] Select this mode for 3-pin fan.

[PWM Mode] Select this mode for 4-pin fan.

CPU Fan 2 Setting

Allows you to select a fan mode for CPU Fan 2, or choose [Customize] to set 5 CPU temperatures and assign a respective fan speed for each temperature.

Configuration options:

[Customize] [Silent Mode] [Standard Mode] [Performance Mode] [Full Speed]

CPU Fan 2 Temp Source

Allows you to select a fan temperature source for CPU Fan.

[Monitor M/B] Select this item to set motherboard as the fan temperature source.

[Monitor CPU] Select this item to set CPU as the fan temperature source.

MOS Fan1 Setting

Allows you to select a fan mode for Fan, or choose Customize to set 5 CPU temperatures and assign a respective fan speed for each temperature.

Configuration options:

[Customize] [Silent Mode] [Standard Mode] [Performance Mode] [Full Speed]

CHA_FAN1 / W_PUMP Switch

Allows you to select Chassis Fan 1 or Water Pump mode.

Configuration options: [CHA_FAN1] [W_PUMP]

Chassis Fan 1 Control Mode

Allows you to select PWM mode or DC mode for Chassis Fan 1.

[Auto] Select this mode to detect the type of installed fan and automatically switch the control modes.

[DC Mode] Select this mode for 3-pin fan.

[PWM Mode] Select this mode for 4-pin fan.

Chassis Fan 1 Setting

Allows you to select a fan mode for Chassis Fan 1, or choose [Customize] to set 5 CPU temperatures and assign a respective fan speed for each temperature.

Configuration options:

[Customize] [Silent Mode] [Standard Mode] [Performance Mode] [Full Speed]

Chassis Fan 1 Temp Source

Allows you to select a fan temperature source for Chassis Fan 1.

[Monitor M/B] Select this item to set motherboard as the fan temperature source.

[Monitor CPU] Select this item to set CPU as the fan temperature source.

CHA_FAN2 / W_PUMP Switch

Allows you to select Chassis Fan 2 or Water Pump mode.

Configuration options: [CHA_FAN2] [W_PUMP]

Chassis Fan 2 Control Mode

Allows you to select PWM mode or DC mode for Chassis Fan 2.

[Auto] Select this mode to detect the type of installed fan and automatically switch the control modes.

[DC Mode] Select this mode for 3-pin fan.

[PWM Mode] Select this mode for 4-pin fan.

Chassis Fan 2 Setting

Allows you to select a fan mode for Chassis Fan 2, or choose [Customize] to set 5 CPU temperatures and assign a respective fan speed for each temperature.

Configuration options:

[Customize] [Silent Mode] [Standard Mode] [Performance Mode] [Full Speed]

Chassis Fan 2 Temp Source

Allows you to select a fan temperature source for Chassis Fan 2.

[Monitor M/B] Select this item to set motherboard as the fan temperature source.

[Monitor CPU] Select this item to set CPU as the fan temperature source.

Chassis Fan 3 Control Mode

Allows you to select PWM mode or DC mode for Chassis Fan 3.

[Auto] Select this mode to detect the type of installed fan and automatically switch the control modes.

[DC Mode] Select this mode for 3-pin fan.

[PWM Mode] Select this mode for 4-pin fan.

Chassis Fan 3 Setting

Allows you to select a fan mode for Chassis Fan 3, or choose [Customize] to set 5 CPU temperatures and assign a respective fan speed for each temperature.

Configuration options:

[Customize] [Silent Mode] [Standard Mode] [Performance Mode] [Full Speed]

Chassis Fan 3 Temp Source

Allows you to select a fan temperature source for Chassis Fan 3.

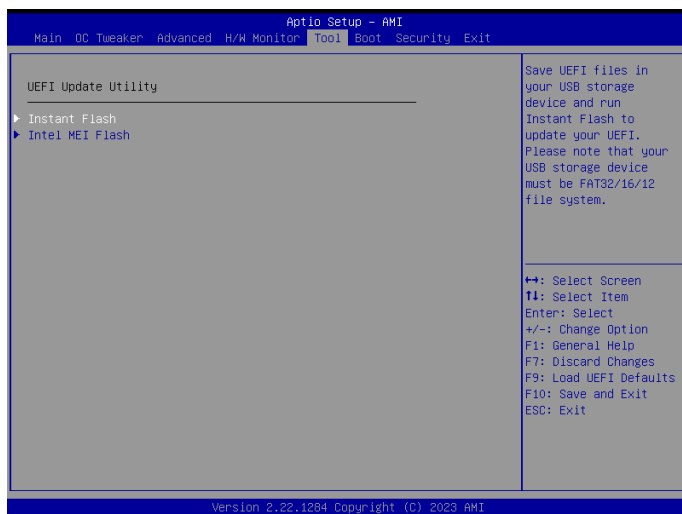
[Monitor M/B] Select this item to set motherboard as the fan temperature source.

[Monitor CPU] Select this item to set CPU as the fan temperature source.

Case Open Feature

Enable or disable Case Open Feature to detect whether the chassis cover has been removed.

3.6 Tools



Instant Flash

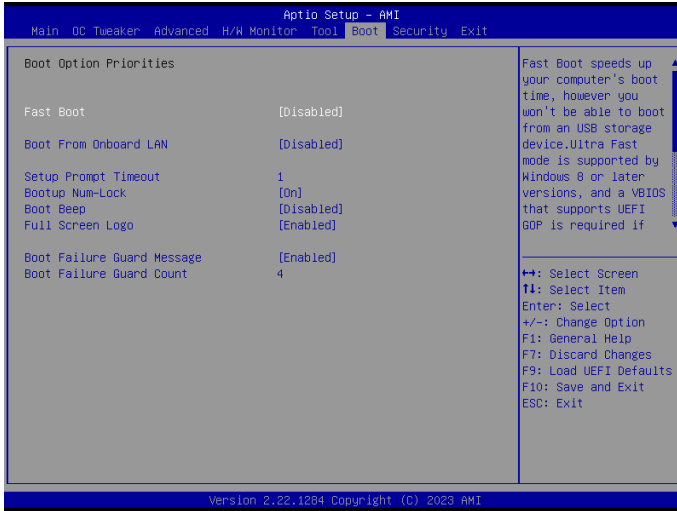
Allows you to save UEFI files in your USB storage device and run Instant Flash to update your UEFI. Please note that your USB storage device must be FAT32/16/12 file system.

Intel MEI Flash

This function can update and flash Intel MEI. If you can't overclock BCLK or CPU turbo ratio, it can be fixed by this function. You will need BIOS ROM file for MEI Update & Flash. Please note that your USB storage device must be FAT32/16/12 file system.

3.7 Boot Screen

This section displays the available devices on your system for you to configure the boot settings and the boot priority.



Fast Boot

Fast Boot speeds up your computer's boot time; however, you won't be able to boot from an USB storage device. Ultra Fast mode is supported by UEFI aware OS or later versions, and a VBIOS that supports UEFI GOP is required if you are using an external graphics card. Please note that Ultra Fast mode boots so fast that the only way to enter this UEFI Setup Utility is to clear CMOS or run the Restart to UEFI utility in Windows.

Configuration options: [Disabled] [Ultra Fast]

Boot From Onboard LAN

Allows the system to be waked up by the onboard LAN.

Configuration options: [Enabled] [Disabled]

Setup Prompt Timeout

Allows you to configure the number of seconds to wait for the UEFI setup utility.

Configuration options: [1] - [65535]

Bootup Num-Lock

Allows you to select whether Num Lock should be turned on or off when the system boots up.

Configuration options: [On] [Off]

Boot Beep

Allows you to select whether the Boot Beep should be turned on or off when the system boots up. Please note that a buzzer is needed.

Configuration options: [Enabled] [Disabled]

Full Screen Logo

[Enabled] Select this item to display the boot logo.

[Disabled] Select this item to show normal POST messages.

Boot Failure Guard Message

If the computer fails to boot for a number of times the system automatically restores the default settings.

Configuration options: [Enabled] [Disabled]

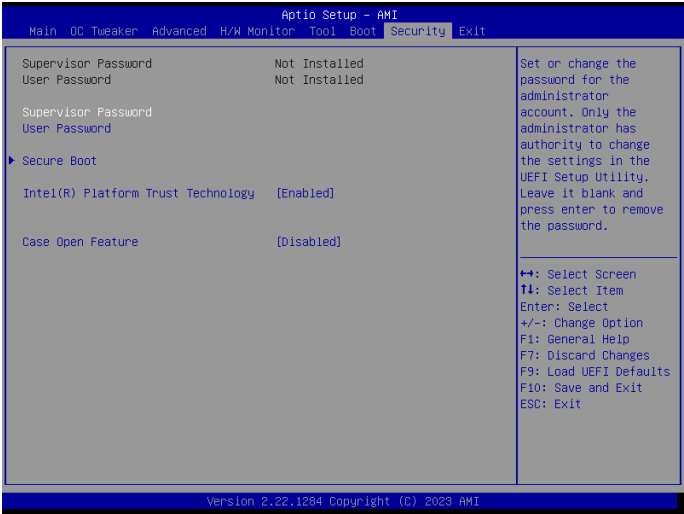
Boot Failure Guard Count

Allows you to configure the number of attempts to boot until the system automatically restores the default settings

Configuration options: [2] - [250]

3.8 Security Screen

In this section you may set or change the supervisor/user password for the system. You may also clear the user password.



Supervisor Password

Set or change the password for the administrator account. Only the administrator has authority to change the settings in the UEFI Setup Utility. Leave it blank and press enter to remove the password.

User Password

Set or change the password for the user account. Users are unable to change the settings in the UEFI Setup Utility. Leave it blank and press enter to remove the password.

Secure Boot

Press [Enter] to configure the Secure Boot Settings. The feature protects the system from unauthorized access and malwares during POST.

Secure Boot Mode

[Standard] Select this item and the system will automatically load the Secure Boot keys from the BIOS database.

[Custom] Select this item and Secure Boot Policy variables can be configured by a physically present user without full authentication.

Install Default Secure Boot Keys

Please install default secure boot keys if it's the first time you use secure boot.

Clear Secure Boot Keys

This item appears only when you load the default Secure Boot keys. Use this item to clear all default Secure Boot keys.

Key Management

This item enables expert users to modify Secure Boot Policy variables without full authentication. This appears only when you set Secure Boot Mode to [Custom].

Factory Key Provision

Allows you to install factory default Secure Boot keys after the platform reset and while the System is in Setup mode.

Install Default Secure Boot Keys

Please install default secure boot keys if it's the first time you use secure boot.

Clear Secure Boot Keys

This item appears only when you load the default Secure Boot keys. Use this item to clear all default Secure Boot keys.

Enroll Efi Image

Allows Efi image to run in Secure Boot Mode. Enroll SHA256 Hash certificate of a PE image into Authorized Signature Database (db).

Export Secure Boot variables

Allows you to copy NVRAM content of Secure Boot variables to files in a root folder on a file_system device.

Platform Key(PK)

Enroll Factory Defaults or load certificates from a file:

1. Public Key Certificate:

- a) EFI_SIGNATURE_LIST
- b) EFI_CERT_X509 (DER)
- c) EFI_CERT_RSA2048 (bin)
- d) EFI_CERT_SHAXXX

2. Authenticated UEFI Variable

3. EFI PE/COFF Image(SHA256)

Key Source: Factory, Modified, Mixed

Key Exchange Keys

Enroll Factory Defaults or load certificates from a file:

1. Public Key Certificate:

a) EFI_SIGNATURE_LIST

b) EFI_CERT_X509 (DER)

c) EFI_CERT_RSA2048 (bin)

d) EFI_CERT_SHAXXX

2. Authenticated UEFI Variable

3. EFI PE/COFF Image(SHA256)

Key Source: Factory, Modified, Mixed

Authorized Signatures

Enroll Factory Defaults or load certificates from a file:

1. Public Key Certificate:

a) EFI_SIGNATURE_LIST

b) EFI_CERT_X509 (DER)

c) EFI_CERT_RSA2048 (bin)

d) EFI_CERT_SHAXXX

2. Authenticated UEFI Variable

3. EFI PE/COFF Image(SHA256)

Key Source: Factory, Modified, Mixed

Forbidden Signatures

Enroll Factory Defaults or load certificates from a file:

1. Public Key Certificate:

a) EFI_SIGNATURE_LIST

b) EFI_CERT_X509 (DER)

c) EFI_CERT_RSA2048 (bin)

d) EFI_CERT_SHAXXX

2. Authenticated UEFI Variable

3. EFI PE/COFF Image(SHA256)

Key Source: Factory, Modified, Mixed

Authorized TimeStamps

Enroll Factory Defaults or load certificates from a file:

1. Public Key Certificate:

a) EFI_SIGNATURE_LIST

b) EFI_CERT_X509 (DER)

c) EFI_CERT_RSA2048 (bin)

d) EFI_CERT_SHAXXX

2. Authenticated UEFI Variable

3. EFI PE/COFF Image(SHA256)

Key Source: Factory, Modified, Mixed

OsRecovery Signatures

Enroll Factory Defaults or load certificates from a file:

1. Public Key Certificate:

a) EFI_SIGNATURE_LIST

b) EFI_CERT_X509 (DER)

c) EFI_CERT_RSA2048 (bin)

d) EFI_CERT_SHAXXX

2. Authenticated UEFI Variable

3. EFI PE/COFF Image(SHA256)

Key Source: Factory, Modified, Mixed

Intel(R) Platform Trust Technology

Allows you to enable or disable Intel PTT function.

[Enabled] Enables Intel PTT in ME.

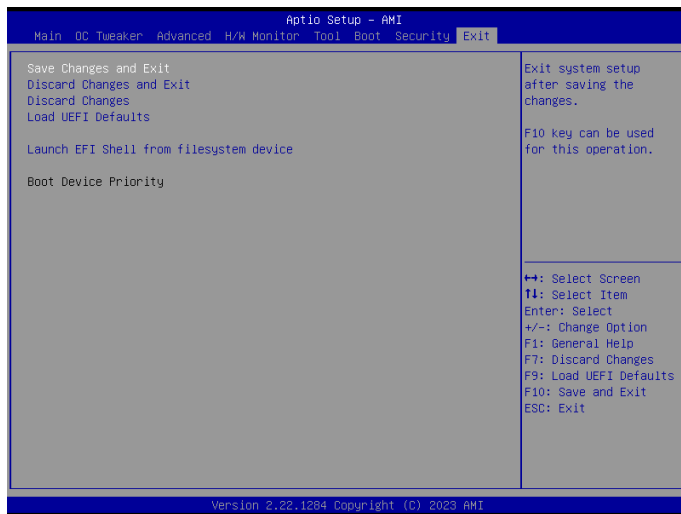
[Disabled] Disables Intel PTT in ME. Use a discrete TPM Module.

Configuration options: [Enabled] [Disabled]

Case Open Feature

Enable or disable Case Open Feature to detect whether the chassis cover has been removed.

3.9 Exit Screen



Save Changes and Exit

When you select this option the following message, “Save configuration changes and exit setup?” will pop out. Press <F10> key or select [Yes] to save the changes and exit the UEFI SETUP UTILITY.

Discard Changes and Exit

When you select this option the following message, “Discard changes and exit setup?” will pop out. Press <ESC> key or select [Yes] to exit the UEFI SETUP UTILITY without saving any changes.

Discard Changes

When you select this option the following message, “Discard changes?” will pop out. Press <F7> key or select [Yes] to discard all changes.

Load UEFI Defaults

Allows you to load UEFI default values for all options. The F9 key can be used for this operation.

Launch EFI Shell from filesystem device

Allows you to copy shellx64.efi to the root directory to launch EFI Shell.