Intel 800 Series

Motherboard

Software/BIOS Setup Guide

Version 1.0
Published August 2024

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Contents

Chapter 1 Introduction

This user guide is a complete setup guide for all Intel 800-series motherboards. 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)
- ASRock Motherboard Utility (Phantom Gaming Tuning)
- ASRock Polychrome SYNC
- 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)

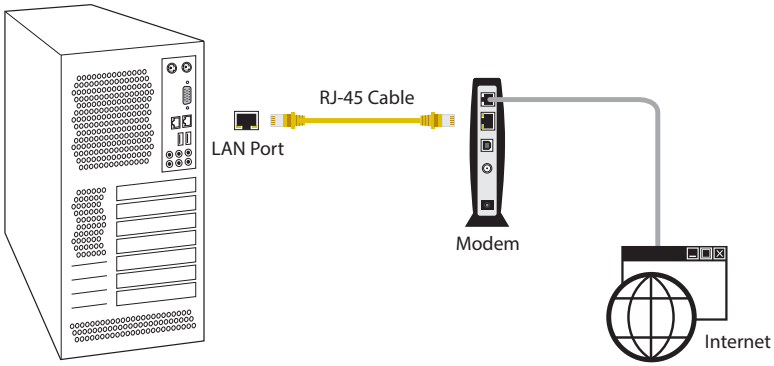
Optical drive or driver DVD is no longer needed for driver installation. ASRock motherboard already has its Ethernet driver prepacked in BIOS ROM. When you finish installing the operation system, simply use the Auto Driver Installer to download and install all necessary drivers automatically.

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.

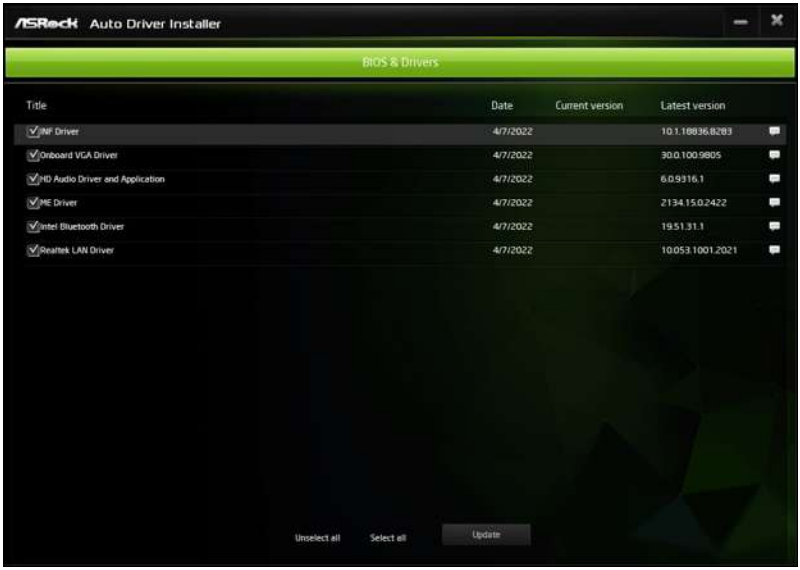
Step 4

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.**"

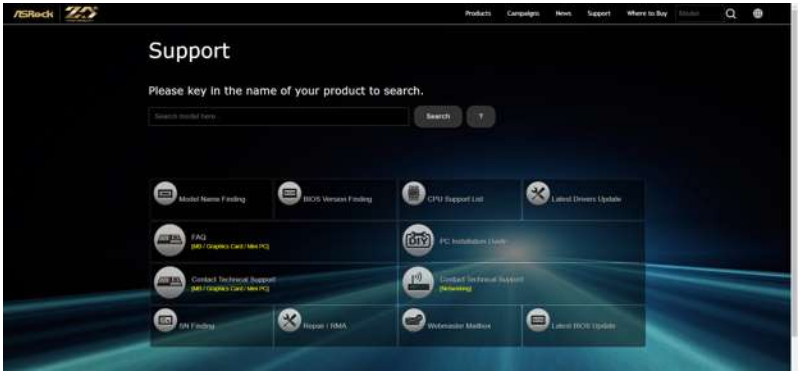
Click "Ok" to complete the procedure.

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".



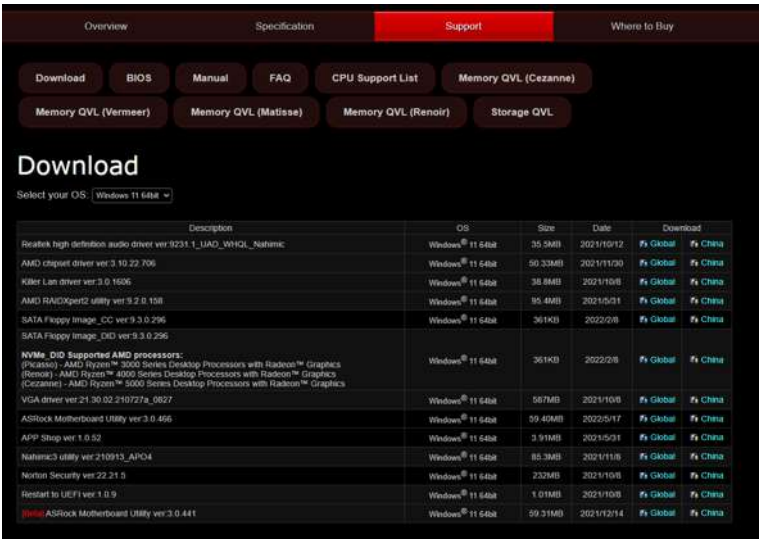
2.2 ASRock Live Update & APP Shop

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".

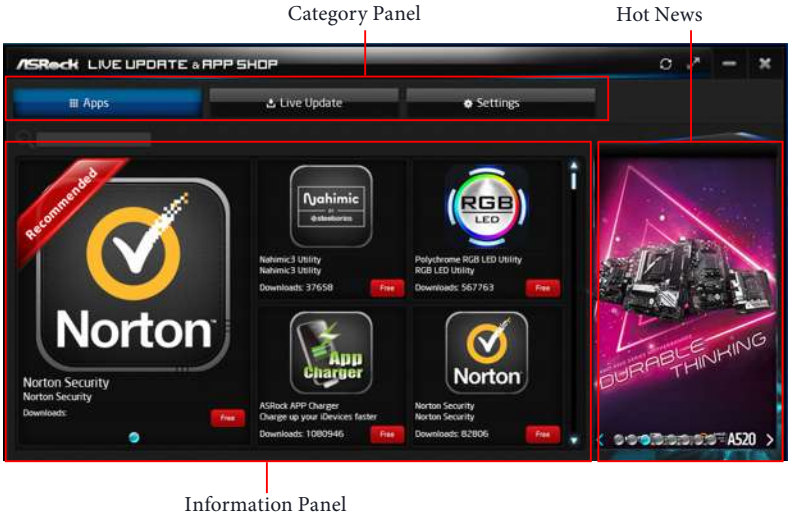
Go to the product page of your motherboard, select "Support" > "Download" to download the APP Shop.



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 intalled it or not.

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

Installed - 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 Free 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

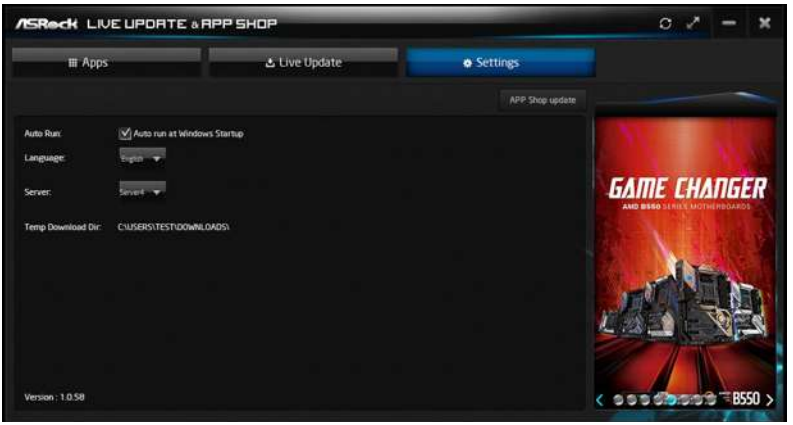
Click to select one or more items you want to update.

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".

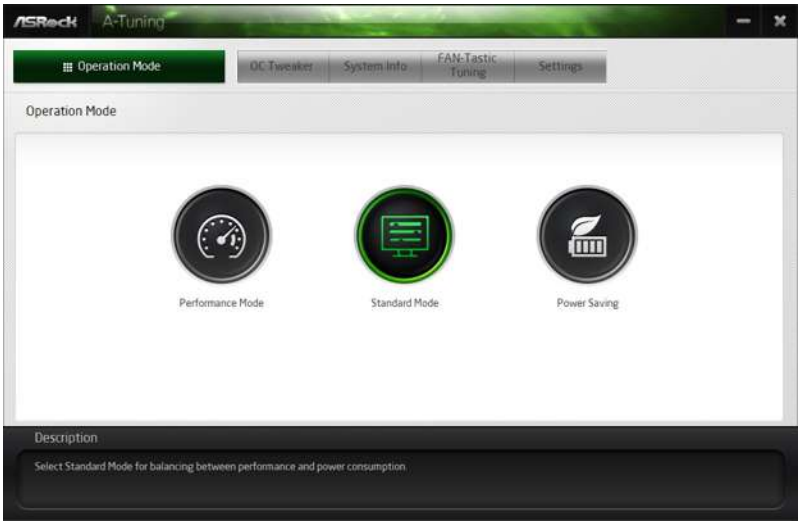
After the installation, you will find the icon "ASRock Motherboard Utility (A-Tuning)" on your desktop. Double-click the "ASRock Motherboard Utility (A-Tuning)" icon , ASRock Motherboard Utility (A-Tuning) main menu will pop up.

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.



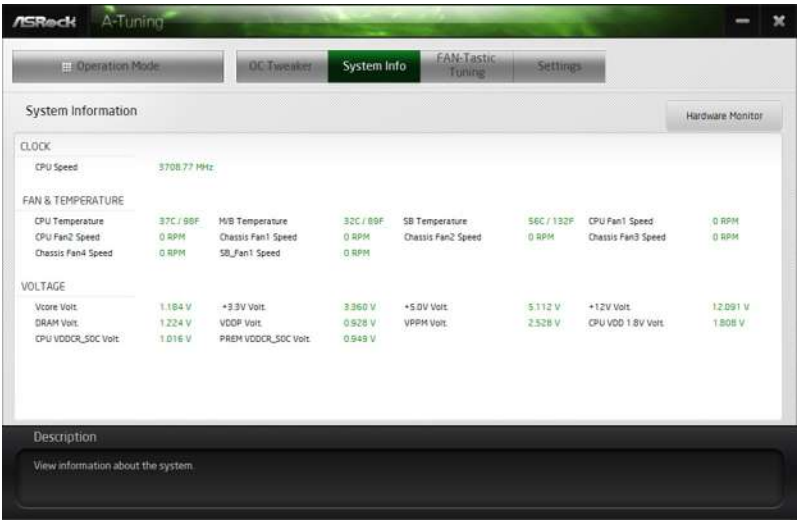
OC Tweaker

Configurations for overclocking the system.

System Info

View information about the system.

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

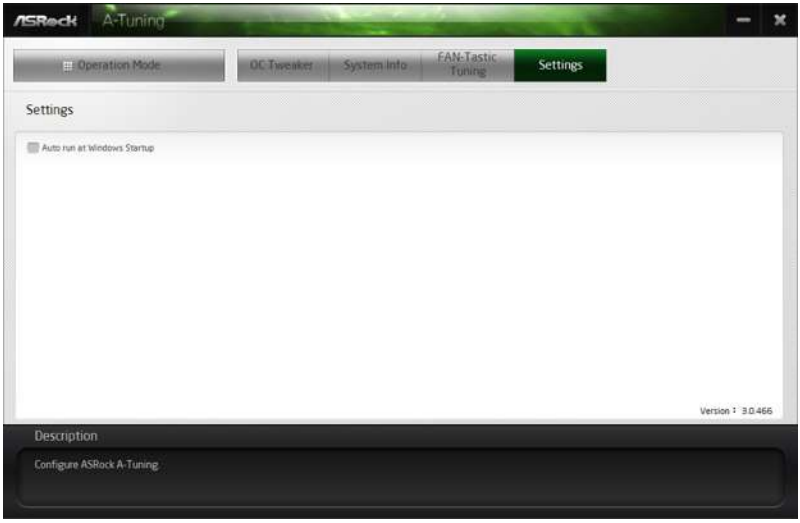


FAN-Tastic Tuning

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 ASRock Motherboard Utility (Phantom Gaming Tuning)

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

2.4.1 Installing ASRock Motherboard Utility (Phantom Gaming Tuning)

ASRock Motherboard Utility (Phantom Gaming 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".

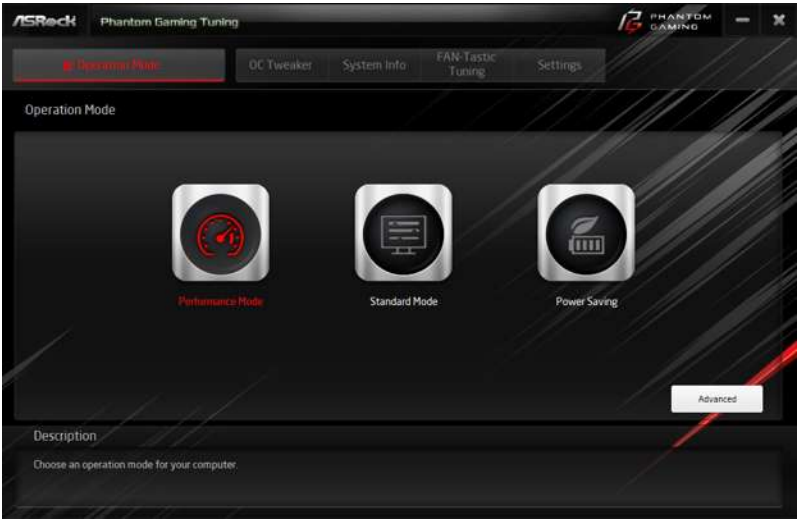
After the installation, you will find the icon "Phantom Gaming Tuning" on your desktop. Double-click the "Phantom Gaming Tuning"  icon, Phantom Gaming Tuning main menu will pop up.

2.4.2 Using ASRock Motherboard Utility (Phantom Gaming Tuning)

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

Operation Mode

Choose an operation mode for your computer.



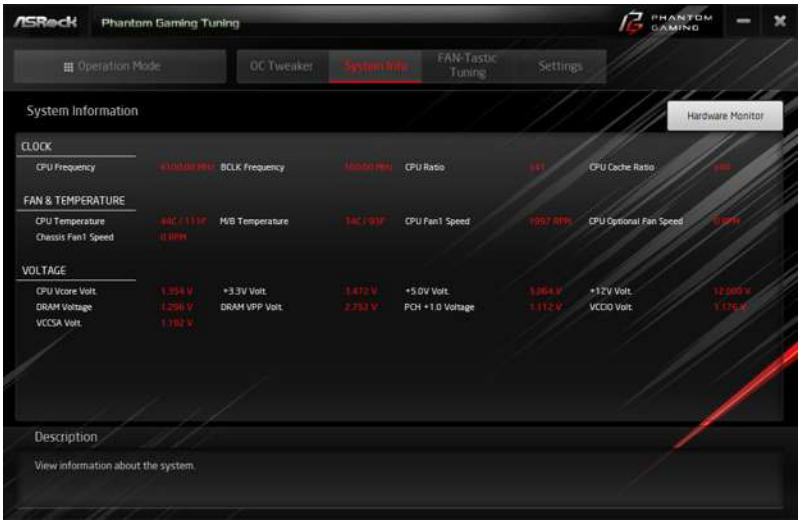
OC Tweaker

Configurations for overclocking the system.

System Info

View information about the system.

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

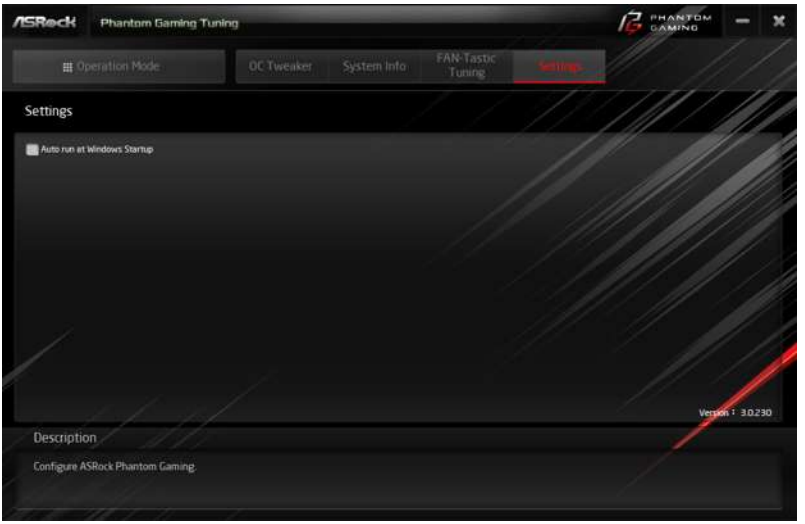


FAN-Tastic Tuning

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 Phantom Gaming Tuning. Click to select "Auto run at Windows Startup" if you want Phantom Gaming Tuning to be launched when you start up the Windows operating system.

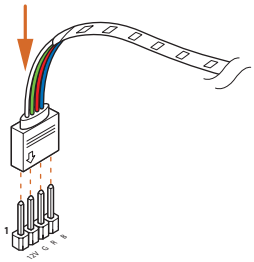


2.5 ASRock Polychrome SYNC

ASRock Polychrome SYNC is a lighting control utility specifically designed for unique individuals with sophisticated tastes to build their own stylish colorful lighting system. Simply by connecting the LED strip, you can customize various lighting schemes and patterns, including Static, Breathing, Strobe, Cycling, Music, Wave and more.

2.5.1 Connecting the LED Strip

Connect your RGB LED strip to the **RGB LED Header** on the motherboard.



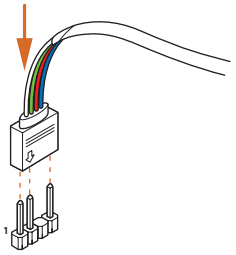
RGB LED Header

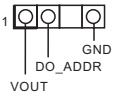
1. *Never install the RGB LED cable in the wrong orientation; otherwise, the cable may be damaged.*
2. *Before installing or removing your RGB LED cable, please power off your system and unplug the power cord from the power supply. Failure to do so may cause damages to motherboard components.*

1. *Please note that the RGB LED strips do not come with the package.*
2. *The RGB LED header supports standard 5050 RGB LED strip (12V/G/R/B), with a maximum power rating of 3A (12V) and length within 2 meters.*

2.5.2 Connecting the Addressable RGB LED Strip

Connect your Addressable RGB LED strip to the **Addressable LED Header** on the motherboard.





Addressable LED Header

1. *Never install the Addressable LED cable in the wrong orientation; otherwise, the cable may be damaged.*
2. *Before installing or removing your Addressable LED cable, please power off your system and unplug the power cord from the power supply. Failure to do so may cause damages to motherboard components.*

1. *Please note that the Addressable LED strips do not come with the package.*
2. *The Addressable LED header supports WS2812B addressable RGB LED strip (5V/ Data/GND), with a maximum power rating of 3A (5V) and length within 2 meters.*

2.5.3 Installing ASRock Polychrome SYNC Utility

After connecting the required LED strips, download the ASRockPolychrome SYNC 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 ASRock Polychrome RGB.

Now you can adjust the RGB LED color through this utility and start coloring your PC style your way!

2.6 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.

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, mulfunction 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

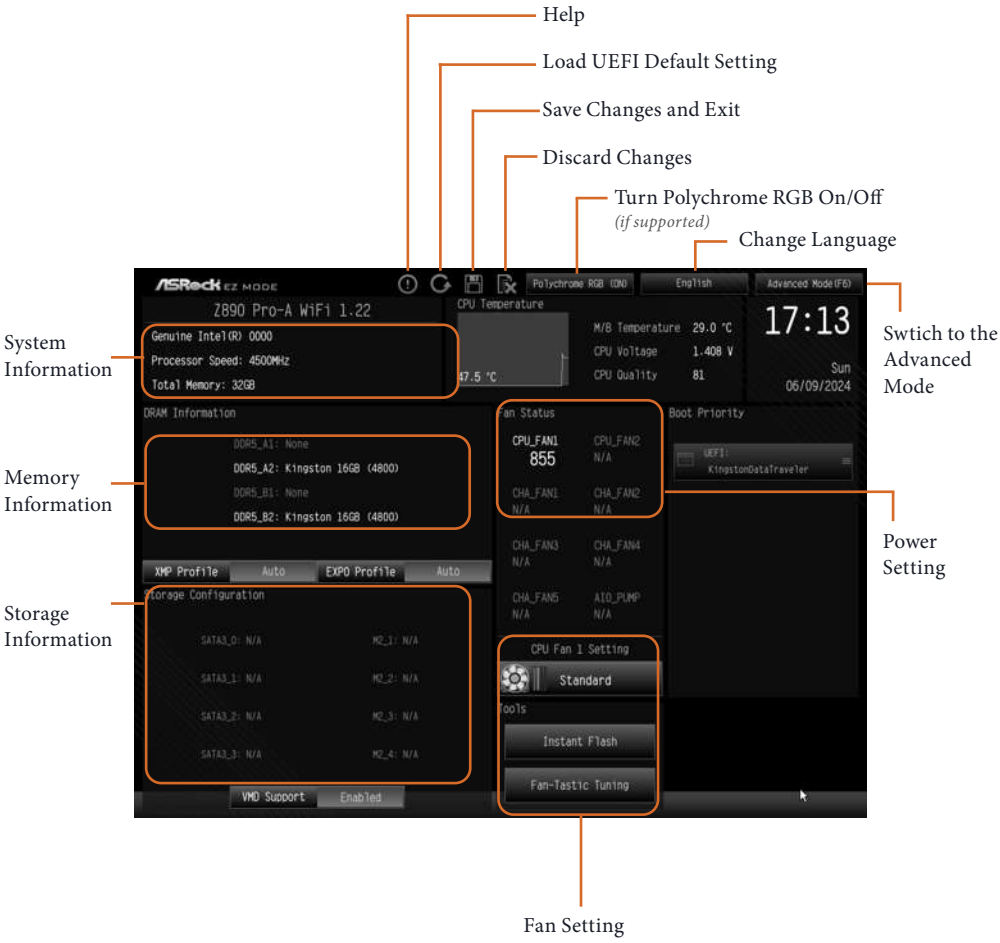
You may run the UEFI SETUP UTILITY by pressing <F2> or <Del> right after you power on the computer; otherwise, the Power-On-Self-Test (POST) will continue with its test routines. If you wish to enter the UEFI SETUP UTILITY after POST, restart the system by pressing <Ctl> + <Alt> + <Delete>, or by pressing 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 EZ Mode

The EZ Mode screen appears when you enter the BIOS setup program by default. EZ mode is a dashboard which contains multiple readings of the system's current status. You can check the most crucial information of your system, such as CPU speed, DRAM frequency, SATA information, fan speed, etc.

Press <F6> or click the "Advanced Mode" button at the upper right corner of the screen to switch to "Advanced Mode" for more options.



3.1.3 Advanced Mode

The Advanced Mode provides more options to configure the BIOS settings. Refer to the following sections for the detailed configurations.

To access the EZ Mode, press <F6> or click the "EZ Mode" button at the upper right corner of the screen.

3.1.4 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
Tool	Useful tools
H/W Monitor	Displays current hardware status
Security	For security settings
Boot	For configuring boot settings and boot priority
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.

3.1.5 Navigation Keys

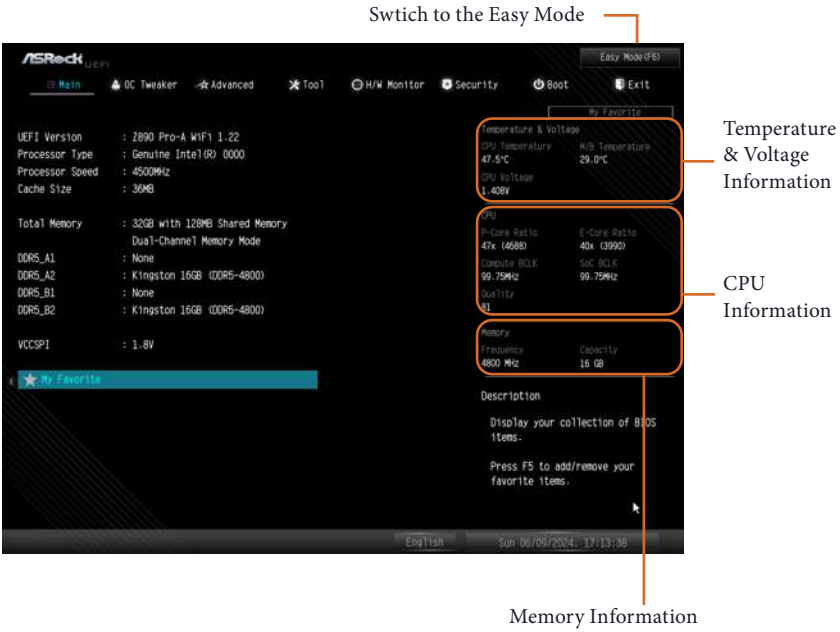
Use <←> key or <→> key to choose among the selections on the menu bar, and use < ↑ > key or < ↓ > key to move the cursor up or down to select items, then press <Enter> to get into the sub screen. You can also use the mouse to click your required item.

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
<F4>	Search for BIOS item
<F6>	Switch between Easy Mode and Advanced Mode
<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 (Advanced Mode)

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



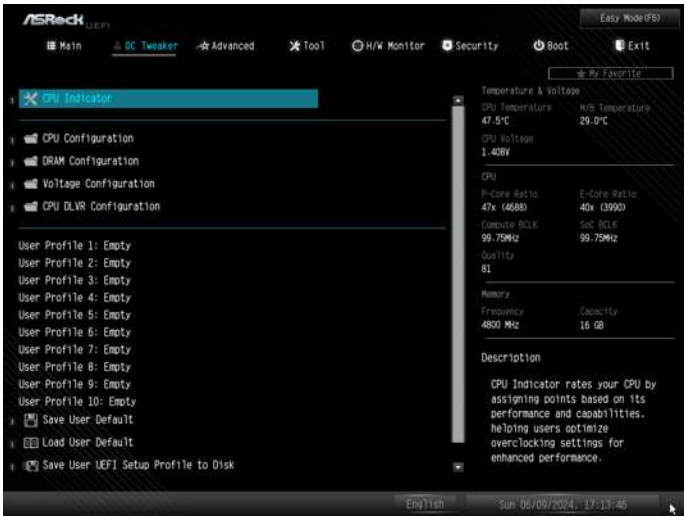
My Favorite

Display your collection of BIOS items. Press F5 to add/remove your favorite items.

> *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 Indicator

CPU Indicator rates your CPU by assigning points based on its performance and capabilities, helping users optimize overclocking settings for enhanced performance.

CPU Configuration

CPU Turbo Ratio Information

Press [Enter] to view the CPU Turbo Ratio information.

CPU P-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 E-Core Ratio

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

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

Granular Ratio

User can limit the core frequency to a sub-bin ratio below P0. Granular ratio only applies to P-Core and E-Core in SSE. Bin in units of 16.67 Hhz.

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.

MemSS Max OC Ratio

Allows you to set the maximum OC Ratio for memory subsystem. Range non-turbo max - 109.

NGU Max OC Ratio

Allows you to set the maximum OC Ratio for NGU. Range non-turbo max - 34.

GT Frequency

Allows you to configure the frequency of the integrated GPU in MHz. This item appears when you use the onboard graphics.

CPU D2D Ratio

Allows you to set CPU D2D Ratio from Range 15 to 40.

PVD Ratio Threshold for CPU

Allows you to select PVD Ratio Threshold Value from Range 1 to 63. 0 - Static PVD ration specified by PvdMode for CPU.

PVD Mode Select for CPU

Allows you to select PVD Mode value from Range 1 to 3.
0x0 = div-1 (VCO = Output clock)
0x1 = div-2 (VCO = 2x Output clock)
0x2 = div-4 (VCO = 4x Output clock)
0x3 = div-8 (VCO = 8x Output clock)

PVD Ratio Threshold for SOC

Allows you to select PVD Ratio Threshold Value from Range 1 to 63. 0 - Static PVD ration specified by PvdMode for SOC.

PVD Mode Select for SOC

Allows you to select PVD Mode.
DIV-1 VCO = Output clock.
DIV-2 VCO = 2x Output clock.
DIV-4 VCO = 4x Output clock.
DIV-8 VCO = 8x Output clock.

SOC BCLK Frequency

Allows you to configure SOC-die internal BCLK frequency.

SOC-Die SSC

Allows you to configure SOC-die spread spectrum clocking.

SOC BCLK Source

Allows you to configure for SOC BCLK. The BCLK affect memory, iGPU, NPU, D2D Fabric, SAF/NOC Fabric.

Compute BCLK Frequency

Allows you to configure compute-die internal BCLK frequency.

Compute -Die SSC

Allows you to configure Compute-die spread spectrum clocking.

Compute BCLK Source

Allows you to configure for compute BCLK. To control the compute BCLK independently, please select Compute-Die Internal BCLK. The BCLK affect P-Core, E-Core, and Cache.

Configuration options: [Auto] [Compute-Die Internal BCLK] [Sync with SOC BCLK]

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]

Boot Max Frequency

Allows you to enable or disable Boot Maximum Frequency in CPU strap.

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]

CPU BGREF Mode

Allows you to select CPU Bandgap Reference Mode between Normal and Bandgap Bypassed. CPU Bandgap Reference Mode - the default voltage is Normal.

Configuration options: [Normal] [Bandgap Bypassed]

VCCIA Boot Voltage

Allows you to select VCCIA boot voltage between Nominal and High Voltage. VCCIA boot Voltage - the default voltage is Nominal, to support the high voltage, BIOS can program VCCIA boot voltage higher than 1.65v (max 2.01v).

VCCSA Boot Voltage

Allows you to select VCCSA boot voltage between Nominal and High Voltage(up to 1.2/1.3V). VCCSA boot Voltage - the default voltage is Nominal, to support the high voltage, BIOS can program the EPOC2 bits to bump up voltage to up to 1.2/1.3V. 0 - Nominal. 1 - High Voltage(up to 1.2/1.3V).

Configuration options: [Nominal] [High Voltage]

Ring to Core Ratio Offset

Disable Ring to Core Ratio Offset so the ring and core can run at the same frequency.

Configuration options: [Enabled] [Disabled]

FLL Overclock Mode

Allows you to select FLL Mode Value from Range 1 to 3.
0x0 = no overclocking.
0x1 = ratio overclocking with nominal (0.5-1x) reference clock frequency.
0x2 = BCLK overclocking with extreme elevated (3-5x) reference clock frequency and ratio limited to 63.

SA PLL Frequency

Allows you to configure SA PLL Frequency.

Configuration options: [Auto] [3200 MHz] [1600 MHz]

BCLK TSC HW Fixup

BCLK TSC HW Fixup is disabled during TSC copy from PMA to APIC.

Configuration options: [Enabled] [Disabled]

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.

Intel SpeedStep Technology

Intel SpeedStep technology allows processors to switch between multiple frequencies and voltage points for better power saving and heat dissipation. CPU turbo ratio can be fixed when Intel SpeedStep Technology is set to Disabled and Intel Turbo Boost Technology is set to Enabled.

Configuration options: [Enabled] [Disabled]

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 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 ITMBT 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: [Auto] [Enabled] [Disabled]

Intel Dynamic Tuning Technology

Allows you to enable or disable Intel Dynamic Platform Thermal Framework.

Intel Thermal Velocity Boost Voltage Optimizations

This service controls thermal based voltage optimizations for processors that implement the Intel Thermal Velocity Boost (TVB) feature.

Configuration options: [Enabled] [Disabled]

Enhanced Thermal Velocity Boost

When this item is enabled, the user will be clipped when the temperatures reaches the default threshold on supported products. Recommended to disable it for overclocking. This item appears depending on the CPU you use on your motherboard.

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

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.

Long Duration 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.

Long Duration Maintained

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

Short Duration 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.

CPU Core Unlimited Current Limit

To unlock voltage regulator current limit completely, you can set this option to [Enabled].

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

CPU Core Current Limit

Voltage Regulator Current Limit. This value represents the Maximum instantaneous current allowed at any given time.

GT Unlimited Current Limit

To unlock voltage regulator current limit completely, you can set this option to [Enabled]. This item appears when you use the onboard graphics.

GT Current Limit

Voltage Regulator Current Limit. This value represents the Maximum instantaneous current allowed at any given time. This item appears when you use the onboard graphics.

IA CEP Enable

Allows you to enable or disable CEP (Current Excursion Protection) Support.

GT CEP Enable

Allows you to enable or disable CEP (Current Excursion Protection) Support.

Process Vmax Limit

This option allows user to disable P-core Power Density Throttling for overclocking purpose. Once disabled, BIOS cannot enable it in the same reset cycle. A warm or cold reset is required to enable protection again.

P-core Power Density Throttle

Throttling for overclocking purpose. Once disabled, BIOS cannot enable it in the same reset cycle. A warm or cold reset is required to enable protection again.

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

Load XMP Setting

Allows you to load XMP settings to overclock the memory and perform beyond standard specifications.

Configuration options: [Auto] [Profile 1] [Profile 2]

Dynamic Memory Boost

Allows you to enable or disable Dynamic Memory Boost feature. You can automatically switch between the default SPD Profile frequency and the selected XMP profile frequency. Only valid if an XMP Profile is selected.

Configuration options: [Enabled] [Disabled]

Realtime Memory Frequency

Allows you to enable or disable Realtime Memory Frequency feature. You can manually switch in runtime between the default SPD Profile frequency and the selected XMP profile frequency. Only valid if an XMP Profile is selected.

Configuration options: [Enabled] [Disabled]

Load EXPO Setting

Allows you to load AMD EXPO (Extended Profiles for Overclocking) settings to overclock the DDR5 memory and perform beyond standard specifications.

Configuration options: [Auto] [Profile 1] [Profile 2]

Memory Ratio

The frequency will equal PLL Ratio * Gear Ratio(2 or 4) * Reference Clock (33.33).

DRAM Frequency

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

DRAM Gear Mode

Allows you to select the DRAM Gear Mode. High gear is good for high frequency.

Configuration options: [Auto] [2] [4]

SAGV

Allows you to enable or disable System Agent Geyserville. When it is enabled, the follow options appear for configurations:

SA GV Mask

System Agent Geyserville. This item allows you set the BIT(s) for which points to use in frequency switching.

Configuration options:
[Enable Points: 1st and 2nd]
[Enable Points: 1st, 2nd and 3rd]
[Enable All Points: 1st, 2nd, 3rd, and 4th]

1st Point Frequnecy

Allows you to specify the frequency for the given point.

1st Point Gear

Gear ratio for this SAGV point.

Configuration options: [Auto] [2] [4]

2nd Point Frequnecy

Allows you to specify the frequency for the given point.

2nd Point Gear

Gear ratio for this SAGV point.

Configuration options: [Auto] [2] [4]

3rd Point Frequnecy

Allows you to specify the frequency for the given point.

3rd Point Gear

Gear ratio for this SAGV point.

Configuration options: [Auto] [2] [4]

4th Point Frequnecy

Allows you to specify the frequency for the given point.

4th Point Gear

Gear ratio for this SAGV point.

Configuration options: [Auto] [2] [4]

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.

RAS# Cycle Time (tRC)

Allows to configure the minimum active to active/Refresh Time.

Command Rate (CR)

The delay between when a memory chip is selected and when the first active command can be issued.

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 (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.

Refresh Delay Same Bank (tREFSBRD)

Allows you to configure tREFSBRD, Same Bank Refresh to ACT delay.

Refresh Interval x9 (tREFIx9)

Allows you to configure tREFIx9 for max time between refreshes per rank.

Refresh Interval (tREFI)

Allows you to configure refresh cycles at an average periodic interval.

CAS to CAS CMD Delay (tCCD_L)

Allows you to configure Internal Write to Read Command Delay Time.

Write CAS to CAS CMD Delay (tCCD_L_WR)

Allows you to configure Internal Write to Write Command Delay Time.

Write to Read Delay (tWTR_L)

The number of clocks between the last valid write operation and the next read command to the same internal bank.

Write to Read Delay (tWTR_S)

The number of clocks between the last valid write operation and the next read command to the same internal bank.

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.

Power Down Timing

tCKE

Configure the period of time the DDR5 initiates a minimum of one refresh command internally once it enters Self-Refresh mode.

tXP

Allows you to configure tXP.

tCPDED

Allows you to configure tCPDED.

tRDPDEN

Allows you to configure tRDPDEN.

tWDPDEN

Allows you to configure tWDPDEN.

tCKCKEH

Allows you to configure tCKCKEH.

tCSH

Allows you to configure tCSH.

tCSH

Allows you to configure tCSH.

tCSL

Allows you to configure tCSL.

tCA2CS

Allows you to configure tCA2CS.

tPRPDEN

Allows you to configure tPRPDEN.

tOSCO

Allows you to configure tOSCO.

tMRR

Allows you to configure tMRR.

MISC Timing

tRPab

Allows you to configure tRPab.

tRDPRE

Allows you to configure tRDPRE.

tPPD

Allows you to configure tPPD.

tWRPRE

Allows you to configure tWRPRE.

DeratingExt

Allows you to configure DeratingExt.

DecTcwl

Allows you to configure DecTcwl.

AddTcwl

Allows you to configure AddTcwl.

tCCDByteCasDelta

Allows you to configure tCCDByteCasDelta.

tPrefRi

Allows you to configure tOrefRi.

RefreshHpWm

Allows you to configure RefreshHpWm.

RefreshPanicWm

Allows you to configure RefreshPanicWm.

RefreshPanicWm

Allows you to configure RefreshAbrRelease.

tRFM

Allows you to configure tRFM.

tXSR

Allows you to configure tXSR.

tSR

Allows you to configure tSR.

tXSDLL

Allows you to configure tXSDLL.

tZQCS

Allows you to configure tZQCS.

tZQCAL

Allows you to configure tZQCAL.

tZQCSPeriod

Allows you to configure tZQCSPeriod.

tMRD

Allows you to configure tMRD.

Turn Around Timing

TAT Training Value

tRDRD_sg

Configure between module read to read delay.

Configuration options: [Auto] [0] - [127]

tRDRD_dg

Configure between module read to read delay.

Configuration options: [Auto] [0] - [127]

tRDRD_dr

Configure between module read to read delay.

Configuration options: [Auto] [0] - [255]

tRDRD_dd

Configure between module read to read delay.

Configuration options: [Auto] [0] - [255]

tRDWR_sg

Configure between module read to write delay.

Configuration options: [Auto] [0] - [255]

tRDWR_dg

Configure between module read to write delay.

Configuration options: [Auto] [0] - [255]

tRDWR_dr

Configure between module read to write delay.

Configuration options: [Auto] [0] - [255]

tRDWR_dd

Configure between module read to write delay.

Configuration options: [Auto] [0] - [255]

tWRRD_sg

Configure between module write to read delay.

Configuration options: [Auto] [0] - [511]

tWRRD_dg

Configure between module write to read delay.

Configuration options: [Auto] [0] - [511]

tWRRD_dr

Configure between module write to read delay.

Configuration options: [Auto] [0] - [127]

tWRRD_dd

Configure between module write to read delay.

Configuration options: [Auto] [0] - [127]

tWRWR_sg

Configure between module write to write delay.

Configuration options: [Auto] [0] - [127]

tWRWR_dg

Configure between module write to write delay.

Configuration options: [Auto] [0] - [127]

tWRWR_dr

Configure between module write to write delay.

Configuration options: [Auto] [0] - [127]

tWRWR_dd

Configure between module write to write delay.

Configuration options: [Auto] [0] - [255]

TAT Runtime Value

tRDRD_sg

Configure between module write to read delay.

Configuration options: [Auto] [0] - [127]

tRDRD_dg

Configure between module write to read delay.

Configuration options: [Auto] [0] - [127]

tRDRD_dr

Configure between module write to read delay.

Configuration options: [Auto] [0] - [255]

tRDRD_dd

Configure between module write to read delay.

Configuration options: [Auto] [0] - [255]

tRDWR_sg

Configure between module write to read delay.

Configuration options: [Auto] [0] - [255]

tRDWR_dg

Configure between module write to read delay.

Configuration options: [Auto] [0] - [255]

tRDWR_dr

Configure between module write to read delay.

Configuration options: [Auto] [0] - [255]

tRDWR_dd

Configure between module write to read delay.

Configuration options: [Auto] [0] - [255]

tWRRD_sg

Configure between module write to read delay.

Configuration options: [Auto] [0] - [511]

tWRRD_dg

Configure between module write to read delay.

Configuration options: [Auto] [0] - [511]

tWRRD_dr

Configure between module write to read delay.

Configuration options: [Auto] [0] - [127]

tWRRD_dd

Configure between module write to read delay.

Configuration options: [Auto] [0] - [127]

tWRWR_sg

Configure between module write to write delay.

Configuration options: [Auto] [0] - [127]

tWRWR_dg

Configure between module write to write delay.

Configuration options: [Auto] [0] - [127]

tWRWR_dr

Configure between module write to write delay.

Configuration options: [Auto] [0] - [127]

tWRWR_dd

Configure between module write to write delay.

Configuration options: [Auto] [0] - [255]

Round Trip Timing

Round Trip Level

Configure round trip level.

Configuration options: [Tightest] [Tighter] [Tight] [Normal] [Loose] [Looser] [Loosest]

Initial RTL IO Delay Offset

Configure round trip latency IO delay initial offset.

Initial RTL FIF0 Delay Offset

Configure round trip latency FIF0 delay initial offset.

Initial RTL (MC0 C0 A1/A2)

Configure round trip latency initial value.

Initial RTL (MC0 C1 A1/A2)

Configure round trip latency initial value.

Initial RTL (MC1 C0 B1/B2)

Configure round trip latency initial value.

Initial RTL (MC1 C1 B1/B2)

Configure round trip latency initial value.

RTL (MC0 C0 A1/A2)

Configure round trip latency.

RTL (MC0 C1 A1/A2)

Configure round trip latency.

RTL (MC1 C0 B1/B2)

Configure round trip latency.

RTL (MC1 C1 B1/B2)

Configure round trip latency.

ODT Setting

Dimm0 RttWr

Configure Dimm0 Odt RttWr Value Setting.

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

Dimm0 RttNomRd

Configure Dimm0 Odt RttNomRd Value Setting.

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

Dimm0 RttNomWr

Configure Dimm0 Odt RttNomRd Value Setting.

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

Dimm0 RttPark

Configure Dimm0 Odt RttPark Value Setting.

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

Dimm0 RttParkDqs

Configure Dimm0 Odt RttParkDqs Value Setting.

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

Dimm0 RttCa A

Configure Dimm0 Odt RttCa GroupA Value Setting.

Configuration options: [Auto] [40] [60] [80] [120] [240] [480] [Disabled]

Dimm0 RttCs A

Configure Dimm0 Odt RttCs GroupA Value Setting.

Configuration options: [Auto] [40] [60] [80] [120] [240] [480] [Disabled]

Dimm0 RttCk A

Configure Dimm0 Odt RttCk GroupA Value Setting.

Configuration options: [Auto] [40] [60] [80] [120] [240] [480] [Disabled]

Dimm0 RttCa B

Configure Dimm0 Odt RttCa GroupB Value Setting.

Configuration options: [Auto] [40] [60] [80] [120] [240] [480] [Disabled]

Dimm0 RttCs B

Configure Dimm0 Odt RttCs GroupB Value Setting.

Configuration options: [Auto] [40] [60] [80] [120] [240] [480] [Disabled]

Dimm0 RttCk B

Configure Dimm0 Odt RttCk GroupB Value Setting.

Configuration options: [Auto] [40] [60] [80] [120] [240] [480] [Disabled]

Dimm1 RttWr

Configure Dimm1 Odt RttWr Value Setting.

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

Dimm1 RttNomRd

Configure Dimm1 Odt RttNomRd Value Setting.

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

Dimm1 RttNomWr

Configure Dimm1 Odt RttNomRd Value Setting.

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

Dimm1 RttPark

Configure Dimm1 Odt RttPark Value Setting.

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

Dimm1 RttParkDqs

Configure Dimm1 Odt RttParkDqs Value Setting.

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

Dimm1 RttCa A

Configure Dimm1 Odt RttCa GroupA Value Setting.

Configuration options: [Auto] [40] [60] [80] [120] [240] [480] [Disabled]

Dimm1 RttCs A

Configure Dimm1 Odt RttCs GroupA Value Setting.

Configuration options: [Auto] [40] [60] [80] [120] [240] [480] [Disabled]

Dimm1 RttCk A

Configure Dimm1 Odt RttCk GroupA Value Setting.

Configuration options: [Auto] [40] [60] [80] [120] [240] [480] [Disabled]

Dimm1 RttCa B

Configure Dimm1Odt RttCa GroupB Value Setting.

Configuration options: [Auto] [40] [60] [80] [120] [240] [480] [Disabled]

Dimm1RttCs B

Configure Dimm1 Odt RttCs GroupB Value Setting.

Configuration options: [Auto] [40] [60] [80] [120] [240] [480] [Disabled]

Dimm1 RttCk B

Configure Dimm1 Odt RttCk GroupB Value Setting.

Configuration options: [Auto] [40] [60] [80] [120] [240] [480] [Disabled]

Memory Training Algorithms

Press [Enter] to configure Memory Training Algorithms options.

Early Command Training

Allows you to enable or disable Early Command Training.

SenseAmp Offset Training

Allows you to enable or disable SenseAmp Offset Training.

Early ReadMPR Timing Centering 2D

Allows you to enable or disable Early ReadMPR Timing Centering 2D.

Read MPR Training

Allows you to enable or disable Read MPR Training.

Receive Enable Training

Allows you to enable or disable Receive Enable Training.

Jedec Write Leveling

Allows you to enable or disable Jedec Write Leveling.

Early Write Time Centering 2D

Allows you to enable or disable Early Write Time Centering 2D.

Early Read Time Centering 2D

Allows you to enable or disable Early Read Time Centering 2D.

Unmatched Write Time Centering 1D

Allows you to enable or disable Unmatched Write Time Centering 1D.

Write Timing Centering 1D

Allows you to enable or disable Write Timing Centering 1D.

Write Voltage Centering 1D

Allows you to enable or disable Write Voltage Centering 1D.

Read Timing Centering 1D

Allows you to enable or disable Read Timing Centering 1D.

Read Voltage Centering 1D

Allows you to enable or disable Read Voltage Centering 1D.

Write Voltage Centering 2D

Allows you to enable or disable Write Voltage Centering 2D.

Read Voltage Centering 2D

Allows you to enable or disable Read Voltage Centering 2D.

DDR5 ODT Timing Config

Allows you to enable or disable DDR5 ODT Timing Config.

View Pin Calibration

Allows you to enable or disable View Pin Calibration.

Read DQS ODT Training

Allows you to enable or disable Read DQS On-Die Termination Training.

Read DQ ODT Training

Allows you to enable or disable Read DQ On-Die Termination Training.

Read Equalization Training

Allows you to enable or disable Read Equalization Training.

Read CTLE Training

Allows you to enable or disable Read CTLE Training.

Post Package Repair

Allows you to enable or disable Post Package Repair.

Write Timing Centering 2D

Allows you to enable or disable Write Timing Centering 2D.

Read Timing Centering 2D

Allows you to enable or disable Read Timing Centering 2D.

Write Voltage Centering 2D

Allows you to enable or disable Write Voltage Centering 2D.

Read Voltage Centering 2D

Allows you to enable or disable Read Voltage Centering 2D.

RxVref Per-Bit Training

Allows you to enable or disable RxVref Per-Bit Training.

Command Voltage Centering

Allows you to enable or disable Command Voltage Centering.

Late Command Training

Allows you to enable or disable Late Command Training.

Turn Around Timing Optimization

Allows you to enable or disable Turn Around Timing Optimization.

Rank Margin Tool

Allows you to enable or disable Rank Margin Tool.

LVR Auto Trim

Allows you to enable or disable VLR Auto Trim.

DIMM SPD Alias Test

Test to determine if the SPD has been corrupted to cause memory aliasing.

Retrain Margin Check

Allows you to enable or disable Retrain Margin Check.

Row Hammering Prevention

Allows you to enable or disable Row Hammering Prevention.

Dimm ODT Training

Dimm On-Die Termination Training. ODT values will be optimized by this traning.

DIMM RON Training

Allows you to enable or disable DIMM RON Training.

TxDqTCO Comp Training

Allows you to enable or disable TxDqTCO Training.

ClkTCO Comp Training

Allows you to enable or disable ClkTCO Training.

CMD CTL CLK Slew Rate

Allows you to enable or disable CMD CTL CLK Slew Rate.

CMD/CTL Drive Strength

Allows you to enable or disable CMD/CTL Drive Strength.

CMD/CTL Tx Equalization

Allows you to enable or disable CMD/CTL Tx Equalization.

DIMM CA ODT Training

Allows you to enable or disable DIMM CA ODT Training.

DIMM CA ODT Split Training

Allows you to enable or disable DIMM CA ODT Split Training.

CMD/CTL Drive Strength Split

Allows you to enable or disable CMD/CTL Drive Strength Split.

CMD/CTL CLK Slew Split Rate

Allows you to enable or disable CMD/CTL CLK Slew Split Rate.

Write DQ/DQS Retrain

Allows you to enable or disable Write DQ/DQS Retrain.

Power Saving Meter Update

Allows you to enable or disable Power Saving Meter Update.

Pre Training Comp Calibration

Allows you to enable or disable Pre Training Comp Calibration.

Read Vref Decap Training

Allows you to enable or disable Read Vref Decap Training.

Vddq Training

Allows you to enable or disable Vddq Training.

Rank Margin Tool Per Bit

Allows you to enable or disable Rank Margin Tool Per Bit.

DQ/DQS Swizzle Training

Allows you to enable or disable DQ/DQS Swizzle Training.

Ref PI Calibration

Allows you to enable or disable Ref PI Calibration.

Rx SAL Calibration

Allows you to enable or disable Rx SAL Calibration.

VccClk FF Offset Correction

Allows you to enable or disable Vcc FF Offset Correction.

Duty Cycle Correction Training

Allows you to enable or disable Duty Cycle Correction Training.

Duty Cycle Correction Downstream Training

Allows you to enable or disable Duty Cycle Correction Downstream Training - PI Serializer/LUT.

Duty Cycle Correction QCLK Calibration

Allows you to enable or disable Duty Cycle Correction QCLK Calibration.

Duty Cycle Correction Rise/Fall Training

Allows you to enable or disable Duty Cycle Correction Rise/Fall Training.

Functional Duty Cycle Correction for DDR5 DQS

Allows you to enable or disable Functional Duty Cycle Correction for DDR5 DQS.

Functional Duty Cycle Correction for DDR5 CLK

Allows you to enable or disable Functional Duty Cycle Correction for DDR5 CLK.

Functional Duty Cycle Correction for LP5 WCK

Allows you to enable or disable Functional Duty Cycle Correction for LP5 WCK.

Functional Duty Cycle Correction for Data DQ

Allows you to enable or disable Functional Duty Cycle Correction for Data DQ.

Data PI Linearity Calibration

Allows you to enable or disable Data PI Linearity Calibration.

Ddr5 Rx Cross-Talk Cancellation

Allows you to enable or disable Ddr5 Rx Cross-Talk Cancellation.

Duty Cycle Correction for LP5 DCA

Allows you to enable or disable Duty Cycle Correction for LP5 DCA.

Unmatched Rx Calibration

Allows you to enable or disable Unmatched Rx Calibration.

Read Rank-to-Rank Training

Allows you to enable or disable Read Rank-to-Rank Training.

Comp Optimization

Allows you to enable or disable Comp Optimization.

DIMM DFE Training

Allows you to enable or disable DIMM DFE Training.

Write Drive Strength

Allows you to enable or disable Write Drive Strength.

Write Equalizationq

Allows you to enable or disable Write Equalizationq.

Margin Check Limit

Checks Margin to Limit to see if next boot memory needs to be retrained.

Realtime Memory Timing

Enable/Disable realtime memory timings. When enabled, the system will allow performing realtime memory changes after MRC_DONE.

Force Reset Type

Force Reset Type after F10 save Changes and Exit.

Configuration options: [Auto] [Cold Reset] [Warm Reset] [Shut Down Reset] [Platform Specific Reset]

Retrain on Fast Fail

Restart MRC in Cold mode if SW MemTest fails during Fast flow. Default option is set to Enabled.

Configuration options: [Enabled] [Disabled]

Retrain to Working Channel

Restart MRC in Cold mode after disabling failing channel. Default option is set to Disabled.

Exit On Failure (MRC)

Exit On Failure for MRC training steps.

Force ColdReset

Force ColdReset OR Choose MrcColdBoot Mode, which Coldboot is required during MRC execution. Note: If ME 5.0MB is present, ForceColdReset is required!

Reset for MRC Failed

Reset system after MRC training is failed.

Configuration options: [Enabled] [Disabled]

MRC Training on Warm Boot

When enabled, memory training will be executed when warm boot.

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

MRC Fast Boot

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

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

Voltage Configuration

Voltage Mode

[OC Mode]: Larger range voltage for overclocking.

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

CPU GT Voltage

Allows you to input voltage for the processor by the external voltage regulator.

Configuration options: [Auto] [Offset Mode] [Fixed Mode]

CPU GT Load-Line Calibration

CPU GT Load-Line Calibration helps prevent GT 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.

System Agent Voltage

Input voltage for the processor by the external voltage regulator.

Configuration options: [Auto] [Offset Mode] [Fixed Mode]

System Agent Load-Line Calibration

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

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

VR Hot Offset

Allows you to configure the VR Hot Offset.

+VNNAON Voltage

Allows you to configure the voltage for the +VNNAON.

+VCCIO Voltage

Allows you to configure the voltage for the +VCCIO.

+0.82V PCH Voltage

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

VCC1.8V Voltage

Allows you to configure the voltage for the VCC1.8V.

VDD2 Voltage

Allows you to configure the voltage for the VDD2.

+VCC1.8V QUIET Voltage

Allows you to configure the voltage for the +VCC1.8V QUIET.

+VCC1.8V DDR Voltage

Allows you to configure the voltage for the +VCC1.8V DDR.

+VCC1.8V CPU Voltage

Allows you to configure the voltage for the +VCC1.8V CPU.

MRC Voltage Configuration

Vdd2Mv Voltage

The VR Rail tied to the DRAM. Usually, it equals to or lower than VDD2 voltage.

Vddq Voltage

Allows you to configure CPU FIVR TX Vddq.

Vcclog Voltage

Allows you to configure CPU FIVR VCC IOG.

VccClk Voltage

Allows you to configure CPU FIVR VCC CLK.

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.

VDD 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]

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.

PMIC Protection Unlock

Allows you to configure PMIC Protection Unlock settings.

Configuration options: [Auto] [Enabled]

Current Limiter VDD

Allows you to configure Output current limiter warning threshold setting.

Configuration options: [Auto] [3.0 A] [3.5 A] [4.0 A] [Max TDC]

Current Limiter VDD

Allows you to configure Output current limiter warning threshold setting.

Configuration options: [Auto] [3.0 A] [3.5 A] [4.0 A] [Max TDC]

Current Limiter VPP

Allows you to configure Output current limiter warning threshold setting.

Configuration options: [Auto] [0.5 A] [1.0 A] [Reserved] [Max TDC]

PLL Voltage Configuration

P-Core PLL Voltage Offset

PLL Voltage Offset value ranges from 0 to 15 bins, and each bin is 17.5mV.

E-Core PLL Voltage Offset

PLL Voltage Offset value ranges from 0 to 15 bins, and each bin is 17.5mV.

Ring PLL Voltage Offset

PLL Voltage Offset value ranges from 0 to 15 bins, and each bin is 17.5mV.

SOC System Agent PLL Voltage Offset

PLL Voltage Offset value ranges from 0 to 15 bins, and each bin is 17.5mV.

CPU System Agent PLL Voltage Offset

PLL Voltage Offset value ranges from 0 to 15 bins, and each bin is 17.5mV.

Memory Controller PLL Voltage Offset

PLL Voltage Offset value ranges from 0 to 15 bins, and each bin is 17.5mV.

P-Core PLL IRefTune Offset

PLL Current Reference Tuning Offset, Range 0-15. The value provided in this field is added to the PLL fuse. The Value after adding offset cannot exceed 0xF, if it does, FW clips the value to 0xF before writing back the value to fuse.

E-Core PLL IRefTune Offset

PLL Current Reference Tuning Offset, Range 0-15. The value provided in this field is added to the PLL fuse. The Value after adding offset cannot exceed 0xF, if it does, FW clips the value to 0xF before writing back the value to fuse.

Ring PLL IRefTune Offset

PLL Current Reference Tuning Offset, Range 0-15. The value provided in this field is added to the PLL fuse. The Value after adding offset cannot exceed 0xF, if it does, FW clips the value to 0xF before writing back the value to fuse.

AVX Configuration

AVX2 Voltage Guardband Scale Factor

AVX2 Voltage Guardband Scale Factor controls the voltage guardband applied to AVX2 workloads. A value > 1.00 will increase the voltage guardband, and < 1.00 will decrease the voltage guardband.

Max Voltage Configuration

P-Core Max Voltage Limits

Configure Max voltage limits. The max voltage should be 200mV greater than Vfused P0.

E-Core Max Voltage Limits

Configure Max voltage limits. The max voltage should be 200mV greater than Vfused P0.

Ring Max Voltage Limits

Configure Max voltage limits. The max voltage should be 200mV greater than Vfused P0.

GT Max Voltage Limits

Configure Max voltage limits. The max voltage should be 200mV greater than Vfused P0.

SA Max Voltage Limits

Configure Max voltage limits. The max voltage should be 200mV greater than Vfused P0.

EMemSS Max Voltage Limits

Configure Max voltage limits. The max voltage should be 200mV greater than Vfused P0.

NGU Max Voltage Limits

Configure Max voltage limits. The max voltage should be 200mV greater than Vfused P0.

VR Configuration

IA AC Loadline

The nominal CPU VID voltage may be adjusted by AC Load Line. Higher AC loadline get higher VID, especially for high frequency or heavy loading. AC Loadline in mOhms. Range is 0-20.00. 0 = AUTO/HW default.

IA DC Loadline

The power calculations done by the CP may be adjusted by DC Load Line. DC Loadline in mOhms. Range is 0-20.00. 0 = AUTO/HW default.

CPU DLVR Configuration

CPU DLVR Mode

Allows you to select CPU DLVR Mode.

Configuration options: [Regulation Mode] [Bypassed Mode]

Voltage Mode

Allows you to select Voltage Mode.

Configuration options:
[OC Mode] : Larger tange voltage for overclocking.
[Stable Mode] : Smaller range voltage for stable system.

Core Input Voltage

Allows you to configure Input voltage for the processor by the external voltage regulator.

Configuration options: [Auto] [Offset Mode] [Fixed Mode]

Core Input Voltage Load-Line Calibration

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

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

Core Selection Mode

Allows both all cores VF curve or per-core VF curve configuration.

Configuration options: [All-core] [Per-Core]

Core 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]

P-Core Adaptive Voltage

Specifies the adaptive voltage applied while Performance-core is operating in adaptive mode. Unit is in millivolts. Range 0-2000 mV.

VF Offset Mode

Selects between Legacy and Selection modes. Need Reset System after enabling Over-Clocking Feature to Initialize the default value. In Legacy Mode, setting a global offset for the entire VF curve. In Selection modes, setting a selected VF point.

Configuration options: [Legacy] [Selection]

Core Voltage Offset

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

MemSS 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]

MemSS Adaptive Voltage

Specifies the adaptive voltage applied while memory subsystem is operating in adaptive mode. Uses Mailbox MSR 0x150, cmd 0x10, 0x11. Range: 0-2000 mV.

VF Offset Mode

Selects between Legacy and Selection modes. Need Reset System after enabling Over-Clocking Feature to Initialize the default value. In Legacy Mode, setting a global offset for the entire VF curve. In Selection modes, setting a selected VF point.

Configuration options: [Legacy] [Selection]

MemSS Voltage Offset

Specifies the Offset Voltage applied to the memory subsystem domain. This voltage is specified in millivolts. Range: -500 to 500 mV.

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]

Ring Adaptive Voltage

Specifies the adaptive voltage applied while ring is operating in adaptive mode. Unit is in millivolts. Range: 0-2000 mV.

VF Offset Mode

Selects between Legacy and Selection modes. Need Reset System after enabling Over-Clocking Feature to Initialize the default value. In Legacy Mode, setting a global offset for the entire VF curve. In Selection modes, setting a selected VF point.

Configuration options: [Legacy] [Selection]

Ring Voltage Offset

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

GT 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]

GT Adaptive Voltage

Specifies the adaptive voltage applied while GT is operating in adaptive mode. Unit is in millivolts. Range: 0-2000 mV.

VF Offset Mode

Selects between Legacy and Selection modes. Need Reset System after enabling Over-Clocking Feature to Initialize the default value. In Legacy Mode, setting a global offset for the entire VF curve. In Selection modes, setting a selected VF point.

Configuration options: [Legacy] [Selection]

GT Voltage Offset

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

NGU Memory Fabric 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]

NGU Adaptive Voltage

Specifies the adaptive voltage applied while NGU is operating in adaptive mode. Uses Mailbox MSR 0x150, cmd 0x10, 0x11. Range: 0-2000 mV.

VF Offset Mode

Selects between Legacy and Selection modes. Need Reset System after enabling Over-Clocking Feature to Initialize the default value. In Legacy Mode, setting a global offset for the entire VF curve. In Selection modes, setting a selected VF point.

Configuration options: [Legacy] [Selection]

NGU Voltage Offset

Specifies the Offset Voltage applied to the NGU domain. This voltage is specified in millivolts. Range: -500 to 500mV.

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, Storage Configuration, Intel(R) Thunderbolt, ACPI Configuration, USB Configuration, Trusted Computing, Network Stack Configuration and Intel(R) Rapid Storage Technology.

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

UEFI Configuration

UEFI Setup Style

Allows you to select the default mode when entering the UEFI setup utility.

Configuration options: [Easy Mode] [Advanced Mode]

Active Page on Entry

Allows you to select the default page when entering the UEFI setup utility.

Configuration options: [My Favorite] [Main] [OC Tweaker] [Advanced] [Tool] [H/W Monitor] [Security] [Boot] [Exit]

Full HD UEFI

[Auto]
When [Auto] is selected, the resolution will be set to 1920 x 1080 if the monitor supports Full HD resolution. If the monitor does not support Full HD resolution, then the resolution will be set to 1024 x 768.

[Disabled]
When [Disabled] is selected, the resolution will be set to 1024 x 768 directly.

3.4.1 CPU Configuration

Processor P-Core Information

Press [Enter] to view P-Core Information.

Processor E-Core Information

Press [Enter] to view E-Core Information.

Per Core Disable Configuration

Allows you to enable or disable Per COre Disable. When Per Core Disable Configuration is enabled, selection of Active Cores and Active Efficient-cores will be disabled.

Active P-Cores

Allows you to select the number of cores to enable in each processor package. Note: Number of P-Cores and E-Cores are lokked at together. When both are {0,0}, Pcode will enable all cores.

Active Processor E-Cores

Allows you to select the number of E-Cores to enable in each processor package. Note: Number of P-Cores and E-Cores are looked at together. When both are {0,0}, Pcode will enable all cores.

CPU C States Support

Allows you to enable CPU C States Support for power saving. It is recommended to keep C3, C6 and C7 all enabled for better power saving.

Configuration options: [Enabled] [Disabled]

Enhanced Halt State (C1E)

Allows you to enable Enhanced Halt State (C1E) for lower power consumption.

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

C-State Auto Demotion

Allows you to configure C-State Auto Demotion.

Configuration options: [C1] [Disabled]

CState Un-demotion

Allows you to configure C-State Un-demotion.

Configuration options: [C1] [Disabled]

Package C-State Demotion

Allows you to enable or disable Package C-State Demotion.

Package CState Un-demotion

Allows you to enable or disable Package C-State Un-demotion.

CState Pre-Wake

Allows you to enable or disable Cstate Pre-Wake. Disable - to 1 to disable the Cstate Pre-Wake.

IO MWAIT Redirection

Allows you to configure IO MWAIT Redirection. When set, will map IO_read instructions sent to IO registers PMG_IO_BASE_ADDRBASE+offset tp MWAIT(offset).

Configuration options: [Enabled] [Disabled]

Package C State Support

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

DC6 Latency WA

Allows you to configure DC6 Latency WA.

CPU Thermal Throttling

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

Configuration options: [Enabled] [Disabled]

Intel AVX/AVX2

Allows you to enable or disable the Intel AVX and AVX2 Instructions. This is applicable for Big Core only.

Configuration options: [Enabled] [Disabled]

Intel Virtualization Technology

Intel Virtualization Technology allows a platform to run multiple operating systems and applications in independent partitions, so that one computer system can function as multiple virtual systems.

Configuration options: [Enabled] [Disabled]

X2APIC Enable

Allows you to enable or disable X2APIC Operating Mode.\nWhen this option is configured as 'Enabled', 'VT-d' option must be 'Enabled' and 'X2APIC Opt Out' option must be 'Disabled' as well.\nThis option will be grayed out when 'VT-d' option is configured as 'Disabled'.

Legacy Game Compatibility Mode

When enabled, pressing the scroll lock key will toggle the Efficient cores between being parked when Scroll Lock LED is on and un-parked when LED is off.

Configuration options: [Enabled] [Disabled]

3.4.2 Chipset Configuration

Primary Graphics Adapter

Allows you to select a primary VGA.

Configuration options: [Auto] [Onboard] [PCIE1] (Options vary when you've installed a graphics card on your motherboard.)

Re-Size BAR Support

If system has Resizable BAR capable PCIe Devices, this option Enables or Disables Resizable BAR Support.

VT-d

Intel® Virtualization Technology for Directed I/O helps your virtual machine monitor better utilize hardware by improving application compatibility and reliability, and providing additional levels of manageability, security, isolation, and I/O performance.

Configuration options: [Enabled] [Disabled]

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 PCIE3 Slot Link Speed. Auto mode is optimizing for overclocking.

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

PCI Express Native Control

Select Enabled for enhanced PCI Express power saving in OS.

Configuration options: [Enabled] [Disabled]

PCIE ASPM Support

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

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

PCH PCIE ASPM Support

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

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

PCH DMI ASPM Support

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

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

DMI ASPM Support

Allows you to configure the PCH DMI ASPM Setting.

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

PCIE Bifurcation

Allows you to select the width of PCIE1.

IGPU Multi-Monitor

Select [Disabled] to disable the integrated graphics when an external graphics card is installed. Select [Enabled] to keep the integrated graphics enabled at all times.

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

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]

Front Panel

Allows you to select Front Panel type.

[HD] sets the front panel audio connector mode to high definition audio.

[AC 97] sets the front panel audio connector mode to legacy AC'97.]

Onboard HDMI HD Audio

Allows you to enable or disable audio for the onboard digital outputs.
This item appears when you've installed a graphics card on your motherboard.

Configuration options: [Enabled] [Disabled].

Realtek 2.5G Ethernet Controller

Allows you to enable or disable Onboard LAN.

Configuration options: [Enabled] [Disabled]

Intel(R) Ethernet Connection I219-V

Allows you to enable or disable Onboard LAN.

Configuration options: [Enabled] [Disabled]

Intel(R) Ethernet Connection I226-V

Allows you to enable or disable Onboard LAN.

Configuration options: [Enabled] [Disabled]

Killer E3100G

Allows you to enable or disable Onboard LAN.

Configuration options: [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.

Turn On Onboard LED in S5

Allows you to turn on or off the Onboard LED in the ACPI S5 state.

Configuration options: [Enabled] [Disabled]

Restore Onboard LED Default

Allows you to restore Onboard LED default value.

Configuration options: [Disabled] [Apply]

RGB LED

Allows you to enable or disable the RGB LED.

Configuration options: [On] [Off]

NPU Device

Allows you to enable or disable NPU (Neural Processing Unit) Device.

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 Storage Configuration

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]

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 PCH SATA Controller Under VMD

Allows you to configure Map/Unmap this Root Port to VMD.

Configuration options: [Enabled] [Disabled]

RAID0

Allows you to enable or disable RAID0 support.

Configuration options: [Enabled] [Disabled]

RAID1

Allows you to enable or disable RAID1 support.

Configuration options: [Enabled] [Disabled]

RAID5

Allows you to enable or disable RAID5 support.

Configuration options: [Enabled] [Disabled]

RAID10

Allows you to enable or disable RAID10 support.

Configuration options: [Enabled] [Disabled]

ZPODD

Allows you to enable or disable ZPODD. The option is only needed to be enabled when ZP0DD is connected in VMD mode,

Configuration options: [Enabled] [Disabled]

3.4.4 Intel(R) Thunderbolt

PCIE Tunneling over USB4

Allows you to enable or disable PCIE Tunneling over USB4.

Configuration options: [Enabled] [Disabled]

Integrated Thunderbolt(TM) Enable

Allows you to enable or disable the Intergrated Thunderbolt(TM).

Configuration options: [Enabled] [Disabled]

Discrete Thunderbolt(TM) Enable

Allows you to enable or disable Discrete Thunderbolt(TM).

Configuration options: [Enabled] [Disabled]

When this option is set to enabled, the following options appeear for configurations.

USB4 Host Router Class Code

Option for class code to be applied to Host Router for loading different driver.

Configuration options:
Auto: Determined by OSPM USB support
Intel USB4 Ver2: Intel USB4 Ver2 driver
USB4 Standard: OS inbox driver

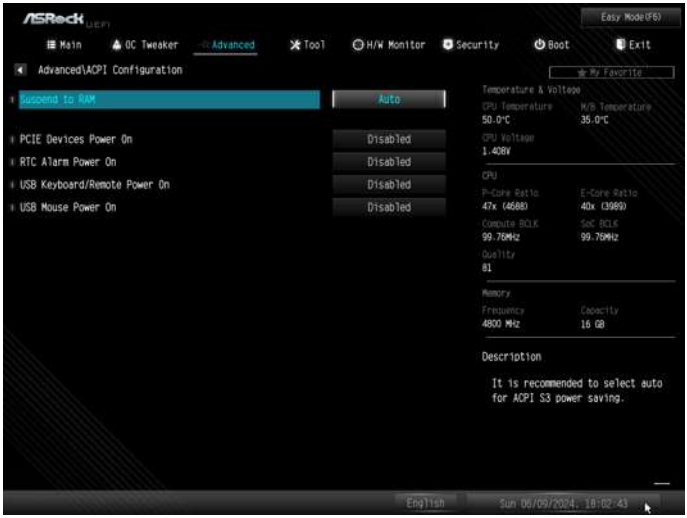
Configuration options: [Auto] [Intel USB4 Ver2] [USB4 Standard]

Barlow Ridge to MFDP on Win10 support

DTBT Windows 10 Thunderbolt support, Barlow Ridge will run in MFDP mode on golden configuration if Windows 10 is detected.

Configuration options: [Enabled + RTD3] [Disabled]

3.4.5 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]

USB Keyboard/Remote Power On

Allows the system to be waked up by an USB keyboard or remote controller.

Configuration options: [Enabled] [Disabled]

USB Mouse Power On

Allows the system to be waked up by an USB mouse.

Configuration options: [Enabled] [Disabled]

3.4.6 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]

3.4.7 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

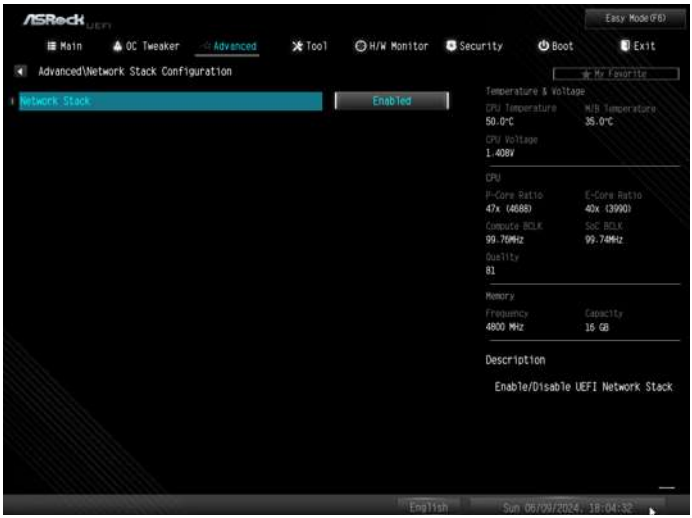
Allows you to select the TPM device to be supported.

[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.

3.4.8 Network Stack Configuration

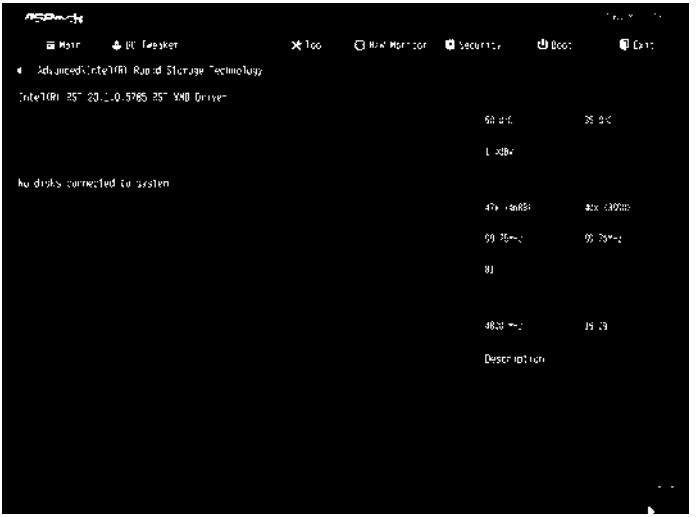


Network Stack

This allows you to enable or disable UEFI Network Stack.

Configuration options: [Enabled] [Disabled]

3.4.9 Intel(R) Rapid Storage Technology



This formset allows the user to manage RAID volumes on the Inter(R) RAID Controller. The page displays the disk information when there are disks connected to the system.

Create RAID Volume

Press [Enter] to enter the page that allows you to create a RAID volume.

Name

Enter a unique volume name that has no special characters and is 16 characters or less.

RAID Level

Use this item to select RAID Level. Options vary depending on the disks conencted,

Configuration options: [RAID0 (Stripe)] [RAID1 (Mirror)] [RAID5(Parity)]

Select Disks

Use this item to select the hard drives to be included in the RAID array.

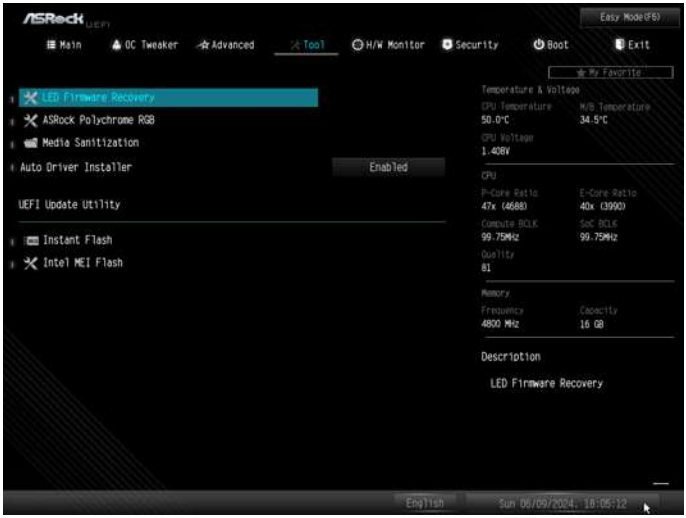
Stripe Size

Use this item to select a stripe size for the RAID array.

Create Volume

Create a volume with the settings specified above.

3.5 Tools



LED Firmware Recovery

Allows you to operate LED Firmware recovery.

ASRock Polychrome RGB

Allows you to select LED lighting color.

Media Sanitization

Use this tool to securely erase SSD. This tool only lists the SSDs that support the Secure Erase function. After you Sanitize SSD, all user data will be permanently destroyed on the SSD and cannot be recovered.

Auto Driver Installer

Allows you to download and install all necessary drivers automatically.

[Enabled]

Select this item to enable the Auto Driver Installer tool. When it is enabled, after entering to Windows with available Internet access, the Auto Driver Installer tool will appear automatically.

[Disabled]

Select this item to disable the Auto Driver Installer tool.

UEFI Update Utility

Instant Flash

Allows you to save UEFI files in your USB storage device and run Instant Flash to update your UEFI. Pleaes 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.

3.6 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.

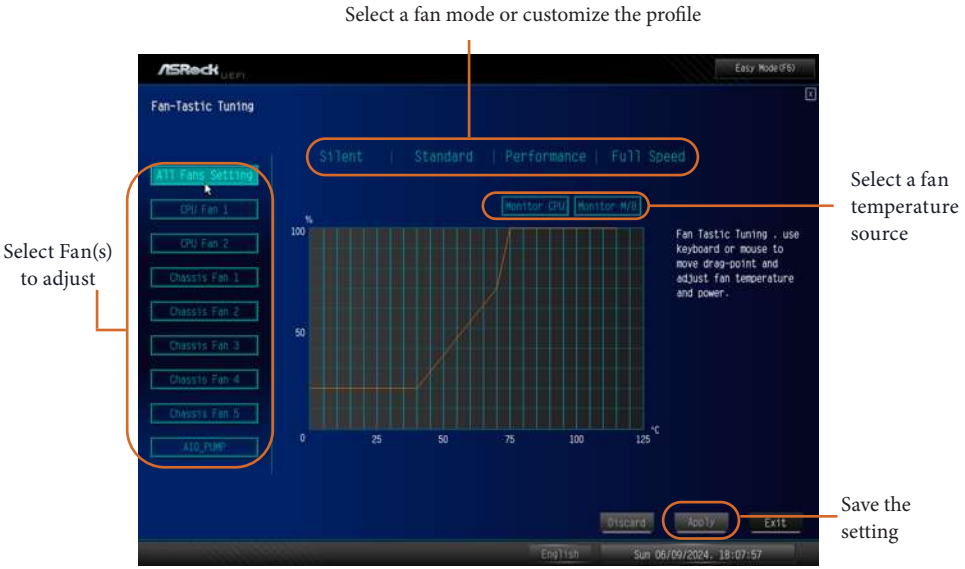
Fan Tuning

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 ro complete.

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

Fan-Tastic Tuning

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



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]

Fan Configuration

Press [Enter] to configure Fan settings.

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.

CPU_FAN2 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.

CHA_FAN1 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 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]

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 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 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]

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.

CHA_FAN3 Switch

Allows you to select Chassis Fan 3 or Water Pump mode.

Configuration options: [CHA_FAN3] [W_PUMP]

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 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]

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.

CHA_FAN4 Switch

Allows you to select Chassis Fan 4 or Water Pump mode.

Configuration options: [CHA_FAN4] [W_PUMP]

Chassis Fan 4 Control Mode

Allows you to select PWM mode or DC mode for Chassis Fan 4.

[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 4 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]

Chassis Fan 4 Temp Source

Allows you to select a fan temperature source for Chassis Fan 4.

[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_FAN5 Switch

Allows you to select Chassis Fan 5 or Water Pump mode.

Configuration options: [CHA_FAN5] [W_PUMP]

Chassis Fan 5 Control Mode

Allows you to select PWM mode or DC mode for Chassis Fan 5.

[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 5 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]

Chassis Fan 5 Temp Source

Allows you to select a fan temperature source for Chassis Fan 5.

[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.

AIO_PUMP Control Mode

Allows you to select PWM mode or DC mode for AIO_PUMP.

[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.

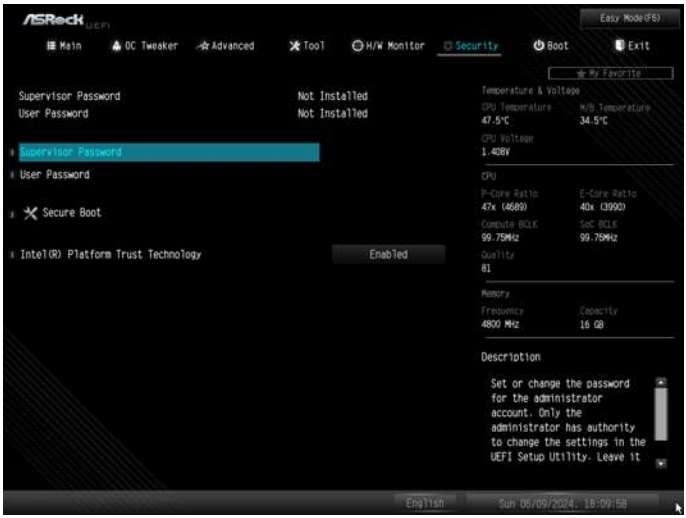
AIO_PUMP Setting

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]

3.7 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.

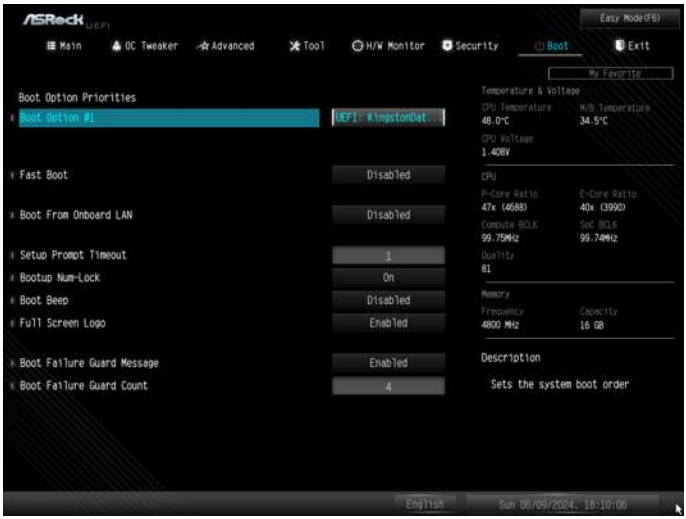
[Enabled] Enables Intel PTT in ME.

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

Configuration options: [Enabled] [Disabled]

3.8 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 configures 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.

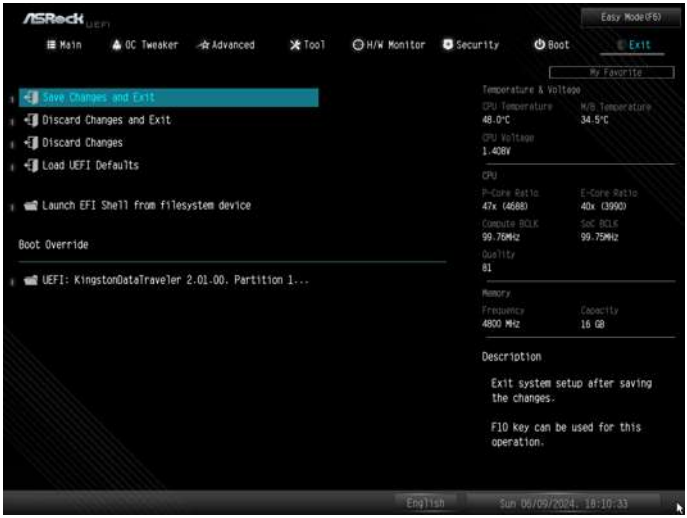
Configuration options: [Enabled] [Disabled]

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]

3.9 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.