

**ROG STRIX
X299-E
GAMING II**

BIOS Manual

ASUS[®]

Motherboard

E15994
First Edition
October 2019

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BIOS Setup

1. Knowing BIOS



The new ASUS UEFI BIOS is a Unified Extensible Interface that complies with UEFI architecture, offering a user-friendly interface that goes beyond the traditional keyboard-only BIOS controls to enable a more flexible and convenient mouse input. You can easily navigate the new UEFI BIOS with the same smoothness as your operating system. The term "BIOS" in this user manual refers to "UEFI BIOS" unless otherwise specified.

BIOS (Basic Input and Output System) stores system hardware settings such as storage device configuration, overclocking settings, advanced power management, and boot device configuration that are needed for system startup in the motherboard CMOS. In normal circumstances, the default BIOS settings apply to most conditions to ensure optimal performance. **DO NOT change the default BIOS settings** except in the following circumstances:

- An error message appears on the screen during the system bootup and requests you to run the BIOS Setup.
- You have installed a new system component that requires further BIOS settings or update.



Inappropriate BIOS settings may result to instability or boot failure. **We strongly recommend that you change the BIOS settings only with the help of a trained service personnel.**



- When downloading or updating the BIOS file, rename it as **X299SE2.CAP** for this motherboard.
 - BIOS settings and options may vary due to different BIOS release versions. Please refer to the latest BIOS version for settings and options.
-

2. BIOS setup program

Use the BIOS Setup to update the BIOS or configure its parameters. The BIOS screen include navigation keys and brief onscreen help to guide you in using the BIOS Setup program.

Entering BIOS at startup

To enter BIOS Setup at startup, press <Delete> or <F2> during the Power-On Self Test (POST). If you do not press <Delete> or <F2>, POST continues with its routines.

Entering BIOS Setup after POST

To enter BIOS Setup after POST:

- Press <Ctrl>+<Alt>+<Delete> simultaneously.
- Press the reset button on the system chassis.
- Press the power button to turn the system off then back on. Do this option only if you failed to enter BIOS Setup using the first two options.

After doing either of the three options, press <Delete> key to enter BIOS.



-
- The BIOS setup screens shown in this section are for reference purposes only, and may not exactly match what you see on your screen.
 - Ensure that a USB mouse is connected to your motherboard if you want to use the mouse to control the BIOS setup program.
 - If the system becomes unstable after changing any BIOS setting, load the default settings to ensure system compatibility and stability. Select the **Load Optimized Defaults** item under the **Exit** menu or press hotkey <F5>. See section **Exit Menu** for details.
 - If the system fails to boot after changing any BIOS setting, try to clear the CMOS and reset the motherboard to the default value. See section **Onboard jumpers** in your motherboard's user manual for information on how to erase the RTC RAM via the Clear CMOS jumper.
 - The BIOS setup program does not support the Bluetooth devices.
-



Please visit ASUS website for the detailed BIOS content manual.

BIOS menu screen

The BIOS Setup program can be used under two modes: **EZ Mode** and **Advanced Mode**. You can change modes from **Setup Mode** in **Boot menu** or by pressing the <F7> hotkey.

2.1 Advanced Mode

The Advanced Mode provides advanced options for experienced end-users to configure the BIOS settings. The figure below shows an example of the Advanced Mode. Refer to the following sections for the detailed configurations.



The default screen for entering the BIOS setup program can be changed. Refer to the **Setup Mode** item in section **Boot menu** for details.

The screenshot shows the ASUS UEFI BIOS Utility in Advanced Mode. The interface is dark-themed with red accents. At the top, there's a search bar (F9) and a scroll bar. Below the search bar is a menu bar with options: My Favorites, Main, Ai Tweaker (selected), Advanced, Monitor, Boot, Tool, and Exit. The main area is divided into several sections:

- Configuration fields:** Target CPU Turbo-Mode Frequency: 4500MHz, Target CPU @ AVX Frequency: 4000MHz, Target CPU @ AVX-512 Frequency: 4000MHz, Target DRAM Frequency: 2133MHz, Target Cache Frequency: 2400MHz.
- Pop-up Menu:** A dropdown menu for Ai Overclock Tuner with options: Auto (selected), Manual, and XMP.
- Menu items:** Various settings like ASUS MultiCore Enhancement, AVX Instruction Core Ratio Negative Offset, AVX-512 Instruction Core Ratio Negative Offset, Current AVX Instruction Core Ratio Negative Offset, Current AVX-512 Instruction Core Ratio Negative Offset, CPU Core Ratio (set to By Core Usage), and Min. CPU Cache Ratio.
- General help:** A help box at the bottom left explaining manual and XMP modes.
- Last modified settings:** A section at the bottom center showing 'Last Modified' and 'EZ Tuning Wizard'.
- Go back to EZ Mode:** A button at the bottom right.
- Search on the FAQ:** A search bar at the bottom right.
- Hardware Monitor:** A sidebar on the right showing system status and prediction.

CPU/Memory	
Frequency	Temperature
3300 MHz	50°C
BCLK	Core Voltage
100.0 MHz	0.936 V
Ratio	DRAM Freq.
33x	2133 MHz
Vol. ChA/CD	Capacity
1.200 V	4096 MB
1.200 V	
Prediction	
SP	Cooler
77	150 pts
V. Freq. for	2Core Load
4500MHz	Stable
1.184 V	4774 MHz
Heavy AVX	4Core Load
Stable	Stable
3808 MHz	4707 MHz
ALLCore Load	8Core Load
Stable	Stable
4602 MHz	N/A

At the bottom, there's a footer with 'Version 2.17.1246. Copyright (C) 2019 American Megatrends, Inc.' and a 'Search on FAQ' button.

Displays a quick overview of the system status and prediction

Menu bar

The menu bar on top of the screen has the following main items:

My Favorites	For saving the frequently-used system settings and configuration.
Main	For changing the basic system configuration
Ai Tweaker	For changing the overclocking settings
Advanced	For changing the advanced system settings
Monitor	For displaying the system temperature, power status, and changing the fan settings.
Boot	For changing the system boot configuration
Tool	For configuring options for special functions
Exit	For selecting the exit options and loading default settings

Menu items

The highlighted item on the menu bar displays the specific items for that menu. For example, selecting **Main** shows the Main menu items.

The other items (My Favorites, Ai Tweaker, Advanced, Monitor, Boot, Tool, and Exit) on the menu bar have their respective menu items.

Submenu items

A greater than sign (>) before each item on any menu screen means that the item has a submenu. To display the submenu, select the item and press <Enter>.

Language

This button above the menu bar contains the languages that you can select for your BIOS. Click this button to select the language that you want to display in your BIOS screen.

My Favorites(F3)

This button above the menu bar shows all BIOS items in a Tree Map setup. Select frequently-used BIOS settings and save it to MyFavorites menu.



Refer to section **My Favorites** for more information.

Q-Fan Control(F6)

This button above the menu bar displays the current settings of your fans. Use this button to manually tweak the fans to your desired settings.



Refer to section **QFan Control** for more information.

AI OC Guide(F11)

This button above the menu bar allows you to view the descriptions of AI overclocking and enable it.



-
- Refer to section **AI OC Guide** for more information.
 - This function is only enabled when using an unlocked CPU.
-

Search (F9)

This button allows you to search for BIOS items by entering its name, enter the item name to find the related item listing.

AURA (F4)

This button allows you to turn the RGB LED lighting or functional LED on or off.

[All On]: All LEDs (Aura or Functional) will be enabled.

[Aura Only]: Aura LEDs will be enabled and functional LEDs will be disabled.

[Aura Off]: Aura LEDs will be disabled, however functional LEDs will still be enabled.

[Stealth Mode]: All LEDs (Aura and Functional) will be disabled.

Search on FAQ

Move your mouse over this button to show a QR code, scan this QR code on your mobile device to connect to the BIOS FAQ web page of the ASUS support website. You can also scan the following QR code:



Scroll bar

A scroll bar appears on the right side of a menu screen when there are items that do not fit on the screen. Press the Up/Down arrow keys or <Page Up> / <Page Down> keys to display the other items on the screen.

General help

At the bottom of the menu screen is a brief description of the selected item. Use <F12> key to capture the BIOS screen and save it to the removable storage device.

Configuration fields

These fields show the values for the menu items. If an item is user-configurable, you can change the value of the field opposite the item. You cannot select an item that is not user-configurable.

A configurable field is highlighted when selected. To change the value of a field, select it and press <Enter> to display a list of options.

Hot keys

This button contains the navigation keys for the BIOS setup program. Use the navigation keys to select items in the menu and change the settings.

EZ Tuning Wizard

This button allows you to view and configure the RAID settings of your system.



Refer to section **EZ Tuning Wizard** for more information.

Last Modified button

This button shows the items that you last modified and saved in BIOS Setup.

2.2 EZ Mode

The EZ Mode provides you an overview of the basic system information, and allows you to select the display language, system performance, mode and boot device priority. To access the Advanced Mode, select **Advanced Mode** or press the <F7> hotkey for the advanced BIOS settings.



To switch from Advanced Mode to EZ Mode, click **EZ Mode(F7)** or press the <F7> hotkey.

Displays a quick overview of the system status

Displays the system properties of the selected mode. Click < > to switch modes

EZ Tuning Wizard

Selects the display language of the BIOS setup program

AI OC Guide(F11) Search(F9) AURA ON/OFF(F4)

UEFI BIOS Utility - EZ Mode

10/09/2019 Wednesday 03:42 English EZ Tuning Wizard AI OC Guide(F11) Search(F9) AURA ON/OFF(F4)

Information

ROG STRIX X299-E GAMING II BIOS Ver. 0224
 Intel(R) Core(TM) i7-7900X CPU @ 3.30GHz
 Speed: 3300 MHz
 Memory: 4096 MB (DDR4 2133MHz)

CPU Temperature 50°C

CPU Core Voltage 0.936 V

Motherboard Temperature 33°C

AI Overclocking

Click the icon below to enable the AI Overclocking feature. This feature can only be enabled when using an unlocked CPU.

Normal

DRAM Status

DIMM_A1: N/A
 DIMM_A2: N/A
 DIMM_B1: N/A
 DIMM_B2: N/A
 DIMM_C1: Apacer 4096MB 2133MHz
 DIMM_C2: N/A
 DIMM_D1: N/A
 DIMM_D2: N/A

X.M.P. Disabled

Storage Information

Intel Rapid Storage Technology

On Off

CPU FAN

100%
 50%
 0%
 0 50 100 °C

QFan Control

FAN Profile

CPU FAN 2903 RPM
 CHA FAN1 N/A
 CHA FAN2 N/A
 CPU OPT FAN N/A
 EXT FAN2 N/A
 CHA FAN1 N/A
 AIO PUMP N/A
 EXT FAN1 N/A
 EXT FAN3 N/A

Boot Priority

Choose one and drag the items. Switch all

Default(F5) Save & Exit(F10) Advanced Mode(F7) Search on FAQ

Enables or disables the SATA RAID mode for Intel Rapid Storage Technology

Displays the CPU Fan's speed. Click the button to manually tune the fans

Loads optimized default settings

Saves the changes and resets the system

Click to go to Advanced mode

Search on the FAQ

Click to display boot devices

Selects the boot device priority



The boot device options vary depending on the devices you installed to the system.

2.3 Q-Fan Control

The Q-Fan Control allows you to set a fan profile or manually configure the operating speed of your CPU and chassis fans.

The screenshot shows the Q-Fan Control interface. At the top, it says "Q-Fan Control" and provides instructions: "Select your target fan and then move the slider to select any of these profiles: Standard, Silent, Turbo and Full Speed. You can also move the slider to Manual and manually configure the fan's operating speed." A dropdown menu is set to "AUTO".

Annotations with red lines point to various elements:

- "Click to select a fan to be configured" points to the fan selection list on the left.
- "Click to select between Auto, PWM, and DC Mode" points to the "AUTO" dropdown menu.
- "Select a profile to apply to your fans" points to the "Standard" radio button in the profile selection area.
- "Click to undo the changes" points to the "Undo" button.
- "Click to apply the fan setting" points to the "Apply" button.
- "Click to go back to main menu" points to the "Exit (ESC)" button.
- "Select to manually configure your fans" points to the "Manual" radio button.

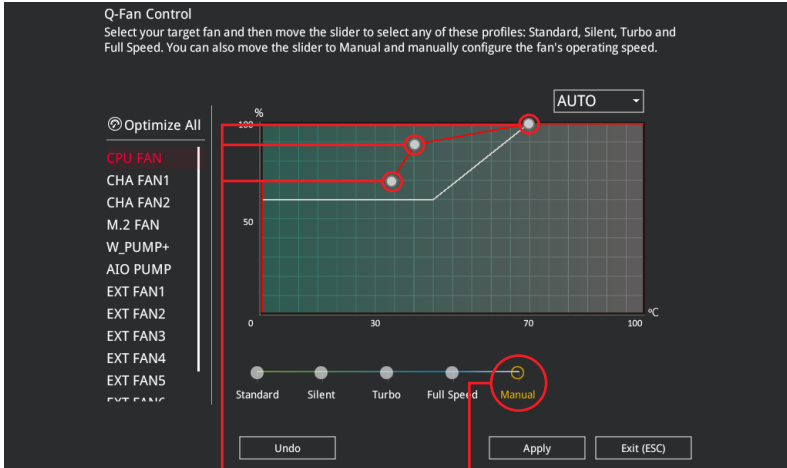
The fan selection list includes: CPU FAN, CHA FAN1, CHA FAN2, M.2 FAN, W_PUMP+, AIO PUMP, EXT FAN1, EXT FAN2, EXT FAN3, EXT FAN4, EXT FAN5, and EXT FAN6.

The profile selection area includes: Standard, Silent, Turbo, Full Speed, and Manual.

The graph shows fan speed (%) on the y-axis (0 to 100) and temperature (°C) on the x-axis (0 to 100). A yellow line shows a profile that is constant at 60% until 30°C, then rises to 100% at 70°C.

Configuring fans manually

Select **Manual** from the list of profiles to manually configure your fans' operating speed.



Speed points

Select to manually
configure your fans

To configure your fans:

1. Select the fan that you want to configure and to view its current status.
2. Click and drag the speed points to adjust the fans' operating speed.
3. Click **Apply** to save the changes then click **Exit (ESC)**.

2.4 AI OC Guide



- The screenshot shown in this section is for reference purposes only, and may not exactly match what you see on your screen.
- This function is only enabled when using an unlocked CPU.

The AI OC Guide allows you to enable the AI Overclocking feature, or view a quick guide of the AI Overclocking feature which highlights the recommended setup procedure and descriptions of the AI Overclocking.

Clicking on **Enable AI** will enable AI Overclocking.

The screenshot shows the 'AI Overclocking Guide' interface. On the left is a sidebar with a red box highlighting the 'Introduction' section and its sub-items: 'About the AI Overclocking monitor pane in UEFI', 'The AI Overclocking feature', and 'The following options are found within Extreme Tweaker> AI Features'. A red line connects this box to the label 'Quick guide topics'. The main content area contains several paragraphs of text explaining AI Overclocking stats. At the bottom, there are four buttons: 'Previous', 'Next', 'Enable AI', and 'Cancel'. Red lines connect these buttons to labels: 'Previous' to 'Click to view the previous topic in the quick guide', 'Next' to 'Click to view the next topic in the quick guide', 'Enable AI' to 'Click to enable AI Overclocking', and 'Cancel' to 'Click to go back to main menu'.

2.5 EZ Tuning Wizard

EZ Tuning Wizard allows you to easily set RAID in your system using this feature.

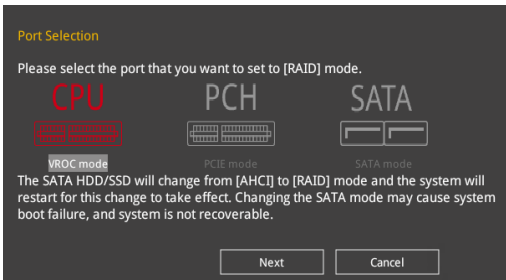
Creating RAID

To create RAID:

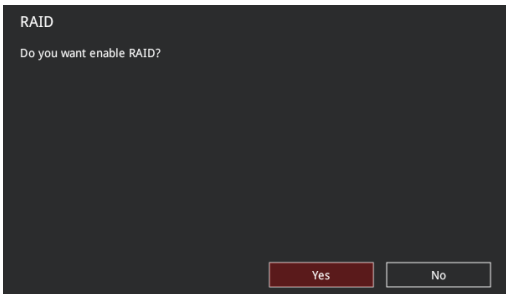
1. Click **EZ Tuning Wizard** from the BIOS screen to open EZ Tuning Wizard screen.
2. Click **RAID** then select the port that you want to set to [RAID] mode, **CPU**, **PCH** or **SATA**, then click **Next**.



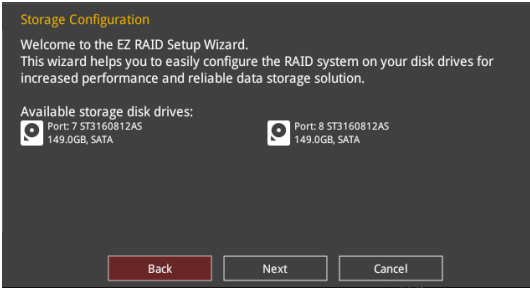
- Ensure that your HDDs have no existing RAID volumes.
- Ensure to connect your HDDs to Intel® SATA connectors.



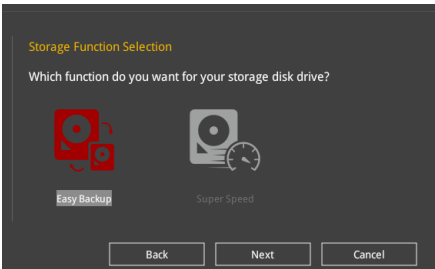
3. Select **Yes** to enable RAID.



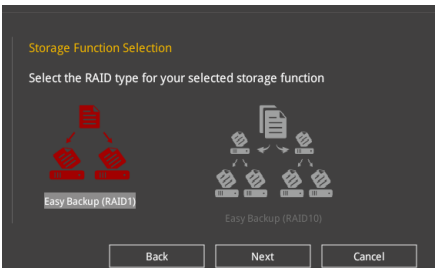
4. Click **Next** to proceed.



5. Select the type of storage for your RAID, **Easy Backup** or **Super Speed**, then click **Next**.

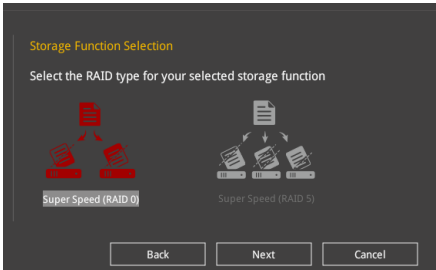


- a. For Easy Backup, click **Next** then select from **Easy Backup (RAID 1)** or **Easy Backup (RAID 10)**.



You can only select Easy Backup (RAID 10) if you connect four (4) HDDs.

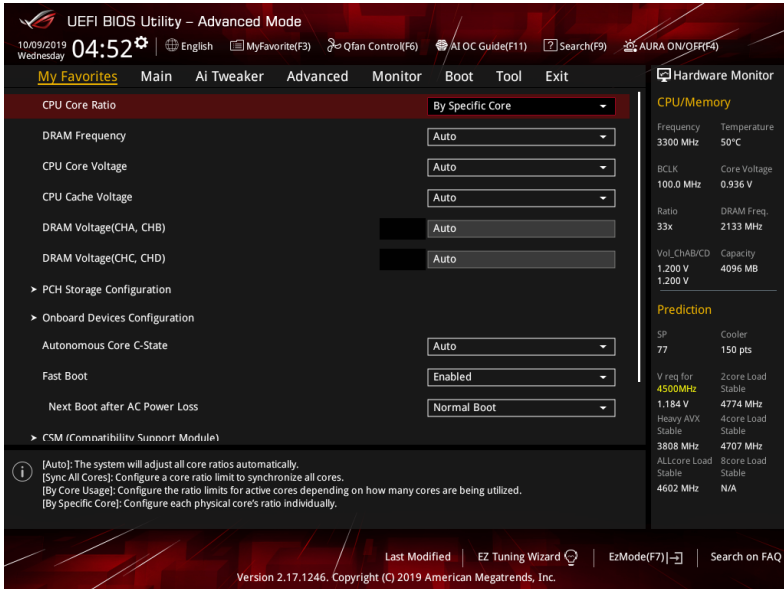
- b. For Super Speed, click **Next** then select from **Super Speed (RAID 0)** or **Super Speed (RAID 5)**.



6. After selecting the type of RAID, click **Next** then click **Yes** to continue the RAID setup.
7. After the RAID setup is done, click **Yes** to exit the setup then click **OK** to reset your system.

3. My Favorites

My Favorites is your personal space where you can easily save and access your favorite BIOS items.

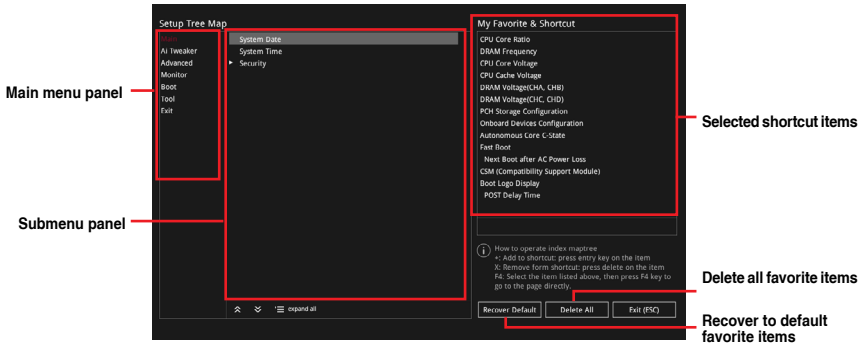


My Favorites comes with several performance, power saving, and fast boot related items by default. You can personalize this screen by adding or removing items.

Adding items to My Favorites

To add BIOS items:

1. Press <F3> on your keyboard or click **MyFavorite(F3)** from the BIOS screen to open Setup Tree Map screen.
2. On the Setup Tree Map screen, select the BIOS items that you want to save in My Favorites screen.



3. Select an item from main menu panel, then click the submenu that you want to save as favorite from the submenu panel and click **+** or press <Enter> on your keyboard.



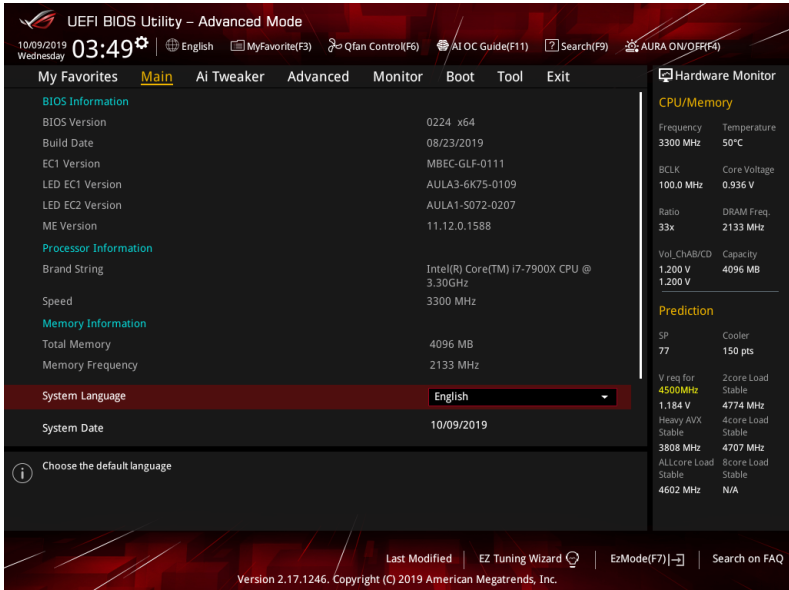
You cannot add the following items to My Favorite items:

- Items with submenu options
- User-managed items such as language and boot order
- Configuration items such as Memory SPD Information, system time and date.

4. Click **Exit (ESC)** or press <Esc> key to close Setup Tree Map screen.
5. Go to My Favorites menu to view the saved BIOS items.

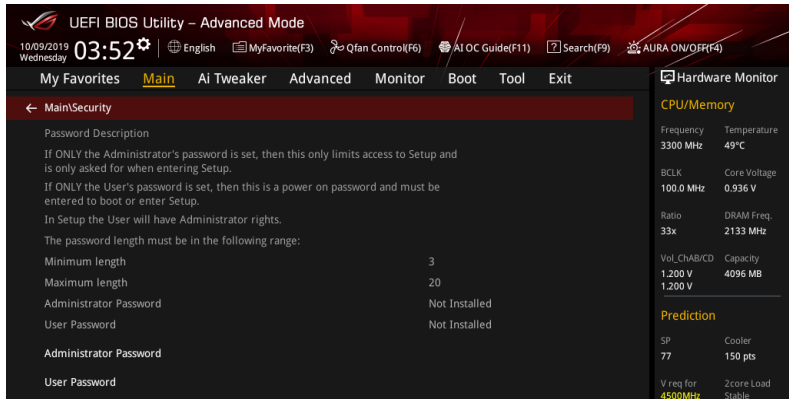
4. Main menu

The Main menu screen appears when you enter the Advanced Mode of the BIOS Setup program. The Main menu provides you an overview of the basic system information, and allows you to set the system date, time, language, and security settings.



Security

The Security menu items allow you to change the system security settings.



- If you have forgotten your BIOS password, erase the CMOS Real Time Clock (RTC) RAM to clear the BIOS password. See section **Onboard jumpers** in your motherboard's user manual for information on how to erase the RTC RAM via the Clear CMOS jumper.
- The Administrator or User Password items on top of the screen show the default **[Not Installed]**. After you set a password, these items show **[Installed]**.

Administrator Password

If you have set an administrator password, we recommend that you enter the administrator password for accessing the system. Otherwise, you might be able to see or change only selected fields in the BIOS setup program.

To set an administrator password:

1. Select the **Administrator Password** item and press <Enter>.
2. From the **Create New Password** box, key in a password, then press <Enter>.
3. Re-type to confirm the password then select **OK**.

To change an administrator password:

1. Select the **Administrator Password** item and press <Enter>.
2. From the **Enter Current Password** box, key in the current password, then press <Enter>.
3. From the **Create New Password** box, key in a new password, then press <Enter>.
4. Re-type to confirm the password then select **OK**.

To clear the administrator password, follow the same steps as in changing an administrator password, but leave other fields blank then select **OK** to continue. After you clear the password, the **Administrator Password** item on top of the screen shows **[Not Installed]**.

User Password

If you have set a user password, you must enter the user password for accessing the system. The User Password item on top of the screen shows the default **[Not Installed]**. After you set a password, this item shows **[Installed]**.

To set a user password:

1. Select the **User Password** item and press <Enter>.
2. From the **Create New Password** box, key in a password, then press <Enter>.
3. Re-type to confirm the password then select **OK**.

To change a user password:

1. Select the **User Password** item and press <Enter>.
2. From the **Enter Current Password** box, key in the current password, then press <Enter>.
3. From the **Create New Password** box, key in a new password, then press <Enter>.
4. Re-type to confirm the password then select **OK**.

To clear the user password, follow the same steps as in changing a user password, but leave other fields blank then select **OK** to continue. After you clear the password, the **User Password** item on top of the screen shows **[Not Installed]**.

5. Ai Tweaker menu

The Ai Tweaker menu items allow you to configure overclocking-related items.



Be cautious when changing the settings of the Extreme Tweaker menu items. Incorrect field values can cause the system to malfunction.



The configuration options for this section vary depending on the CPU and DIMM model you installed on the motherboard.

Scroll down to display other BIOS items.

UEFI BIOS Utility – Advanced Mode
10/09/2019 Wednesday 04:52 English MyFavorite(F3) Q/fan Control(F6) AI OC Guide(F11) Search(F9) AURA ON/OFF(F4)

My Favorites Main **Ai Tweaker** Advanced Monitor Boot Tool Exit

Target CPU Turbo-Mode Frequency : 4500MHz
Target CPU @ AVX Frequency : 4200MHz
Target CPU @ AVX-512 Frequency : 4200MHz
Target DRAM Frequency : 2133MHz
Target Cache Frequency : 2400MHz

AI Overclock Tuner **Auto**

ASUS MultiCore Enhancement **Auto**

AVX Instruction Core Ratio Negative Offset **Auto**

AVX-512 Instruction Core Ratio Negative Offset **Auto**

Current AVX Instruction Core Ratio Negative Offset 0

Current AVX-512 Instruction Core Ratio Negative Offset 0

CPU Core Ratio **By Specific Core**

> By Specific Core

Min CPU Core Ratio **Auto**

[Manual]: When the manual mode is selected, BCLK(base clock) frequency can be assigned manually.
[XMP]: When XMP(extreme memory profile) mode is selected, BCLK frequency and memory parameters will be optimized automatically.

Hardware Monitor

CPU/Memory

Frequency	Temperature
3300 MHz	49°C
BCLK	Core Voltage
100.0 MHz	0.936 V
Ratio	DRAM Freq.
33x	2133 MHz
Vol. CHAB/CD	Capacity
1.200 V	4096 MB
1.200 V	

Prediction

SP	Cooler
77	150 pts
Vreg for	Zcore Load
4500MHz	Stable
1.184 V	4774 MHz
Heavy AVX	4core Load
Stable	Stable
3808 MHz	4707 MHz
ALLcore Load	8core Load
Stable	Stable
4602 MHz	N/A

Last Modified | EZ Tuning Wizard | EzMode(F7) | Search on FAQ
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Overclocking Presets

Select this item to load various settings suitably tuned for your needs.

Ai Overclock Tuner

This item allows you to select the CPU overclocking options to achieve the desired CPU internal frequency. Select any of these preset overclocking configuration options:

- [Auto] Loads the optimal settings for the system.
- [Manual] When the manual mode is selected, the BCLK (base clock) frequency can be assigned manually.
- [XMP] If you install memory modules supporting the eXtreme Memory Profile (X.M.P.) Technology, choose this item to set the profiles supported by your memory modules for optimizing the system performance.



The **[XMP]** configuration option appears only when you install memory modules supporting the eXtreme Memory Profile(X.M.P.) Technology.



The following item appears only when you set **Ai Overclock Tuner** to **[XMP]**.

XMP

This item allows you to select your eXtreme Memory Profile (XMP). Each profile has its own DRAM frequency, timing and voltage.



The following items appear only when **Ai Overclocking Tuner** is set to **[Manual]** or **[XMP]**.

CPU Strap

Configuration options: [Auto] [100] [125 Disable Svid] [125] [167 Disable Svid] [167] [250 Disable Svid] [250]

BCLK Frequency

This item allows you to set the BCLK (base clock) frequency to enhance the system performance. Use the <+> or <-> to adjust the value. The values range from 80.0 MHz to 300.0 MHz.



We recommend you to set the value based on the CPU specification, as high BCLK frequencies may damage the CPU permanently.

ASUS MultiCore Enhancement

- [Auto] This item allows you to use ASUS optimized core ratio Turbo settings at default processor speeds.
- [Disabled] This item allows you to use Intel default Turbo core ratio settings.

AVX Instruction Core Ratio Negative Offset

This item allows you to subtract a value from your core ratio at which AVX applications run. Configuration options: [Auto] [0] – [31]

AVX-512 Instruction Core Ratio Negative Offset

This item allows you to subtract a value from your core ratio at which AVX applications run. Configuration options: [Auto] [0] – [31]

CPU Core Ratio

This item allows you to set the CPU core ratios.

Configuration options: [Auto] [Sync All Cores] [By Core Usage] [By Specific Core] [AI Optimized]



The **[AI Optimized]** item appears only when you use an unlocked CPU.



The following item appears only when you set **CPU Core Ratio** to **[Sync All Cores]**.

ALL-Core Ratio Limit

Enter **[Auto]** to apply the CPU default Turbo Ratio setting or manually assign a Core ratio limit to synchronize all cores.



The following item appears only when you set **CPU Core Ratio** to **[By Core Usage]**.

By Core Usage

Turbo Ratio Limit 0~7

Enter **[Auto]** to apply the CPU default TurboRatioLimits ratio or manually assign a ratio for TurboRatioLimits.

Turbo Ratio Cores 0~7

Enter **[Auto]** to apply the CPU default TurboRatioLimits core# or manually assign a core# for TurboRatioLimits.



The following item appears only when you set **CPU Core Ratio** to **[By Specific Core]**.

By Specific Core

Core-0~9 Max Ratio

Enter **[Auto]** to apply the CPU default Turbo Ratio setting or manually assign a 0~9-Core Limit value.

CPU Core-0~9 Voltage

This item allows you to configure the voltage supply to the CPU cores. Setting this item to **[Auto]** will scale voltage according to the applied CPU core ratio. Do not confuse this setting with VCCIN (CPU Input Voltage). Configuration options: [Auto] [Manual Mode] [Offset Mode] [Adaptive Mode]



The following item appears only when you set **CPU Core-0~9 Voltage** to **[Manual Mode]**.

CPU Core-0~9 Voltage Override

Configure the CPU core voltage. Use the <+> or <-> to adjust the value. The values range from 0.001 V to 1.920V.



All values changed here do not take effect until computer is restarted.



The following items appear only when you set **CPU Core-0-9 Voltage** to **[Offset Mode]** or **[Adaptive Mode]**.

Offset Mode Sign

[+] Offset the CPU core voltage by a positive value.

[-] Offset the CPU core voltage by a negative value.

CPU Core-0-9 Voltage Offset

Configure the CPU core voltage offset value. Use the <+> or <-> to adjust the value. The values range from 0.001 V to 0.999V.



All values changed here do not take effect until computer is restarted.



The following item appears only when you set **CPU Core-0-9 Voltage** to **[Adaptive Mode]**.

Additional Turbo Mode CPU Core-0-9 Voltage

Configure the amount of voltage fed to the CPU cores when running in Turbo mode. Increase the voltage when configuring a high CPU core frequency. This voltage will be affected by the offset value. Use the <+> or <-> to adjust the value. The values range from 0.001 V to 1.920V.

Min. CPU Cache Ratio

This item allows you to configure the minimum possible CPU cache ratio.

Configuration options: [Auto] [8] – [83]

Max. CPU Cache Ratio

This item allows you to configure the maximum possible CPU cache ratio.

Configuration options: [Auto] [8] – [83]

BCLK Frequency : DRAM Frequency Ratio

[Auto] The BCLK frequency to DRAM frequency ratio will be set to the optimized setting.

[100:133] The BCLK frequency to DRAM frequency ratio will be set to 100:133.

[100:100] The BCLK frequency to DRAM frequency ratio will be set to 100:100.

DRAM Frequency

This item allows you to set the memory operating frequency. The configurable options vary with the BCLK (base clock) frequency setting. Select the auto mode to apply the optimized setting.

Configuration options: [Auto] [DDR4-800MHz] - [DDR4-4400MHz]

CPU SVID Support

Disable this item to stop the CPU from communicating with the external voltage regulator.

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



It is recommended to set **CPU SVID Support** to **[Disabled]** when overclocking.

DRAM Timing Control

The sub-items in this menu allow you to set the DRAM timing control features. Use the <+> and <-> keys to adjust the value. To restore the default setting, type [Auto] using the keyboard and press the <Enter> key.



Changing the values in this menu may cause the system to become unstable! If this happens, revert to the default settings.

Primary Timings

DRAM CAS# Latency

Configuration options: [Auto] [1] – [31]

DRAM RAS# to CAS# Delay

Configuration options: [Auto] [1] – [31]

DRAM RAS# PRE Time

Configuration options: [Auto] [1] – [31]

DRAM RAS# ACT Time

Configuration options: [Auto] [1] – [63]

DRAM Command Rate

Configuration options: [Auto] [Timing 1T] [Timing 2T] [Timing 3T]

Secondary Timings

DRAM RAS# to RAS# Delay

Configuration options: [Auto] [1] – [7]

DRAM RAS# to RAS# Delay L

Configuration options: [Auto] [1] – [7]

DRAM REF Cycle Time

Configuration options: [Auto] [1] – [1023]

DRAM Refresh Interval

Configuration options: [Auto] [1] – [32767]

DRAM WRITE Recovery Time

Configuration options: [Auto] [1] – [31]

DRAM READ to PRE Time

Configuration options: [Auto] [1] – [15]

DRAM FOUR ACT WIN Time

Configuration options: [Auto] [1] – [63]

DRAM WRITE to READ Delay

Configuration options: [Auto] [1] – [15]

DRAM WRITE to READ Delay L

Configuration options: [Auto] [1] – [15]

DRAM CKE Minimum Pulse Width

Configuration options: [Auto] [0] – [15]

DRAM Write Latency

Configuration options: [Auto] [1] – [31]

ODT Control**RTT WR****ODT RTTWR (CHA D0~1)**

Configuration options: [Auto] [DIS] [80] [120] [240] [INF]

ODT RTTWR (CHB D0~1)

Configuration options: [Auto] [DIS] [80] [120] [240] [INF]

ODT RTTWR (CHC D0~1)

Configuration options: [Auto] [DIS] [80] [120] [240] [INF]

ODT RTTWR (CHD D0~1)

Configuration options: [Auto] [DIS] [80] [120] [240] [INF]

RTT NOM**ODT RTTNOM (CHA D0~1)**

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

ODT RTTNOM (CHB D0~1)

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

ODT RTTNOM (CHC D0~1)

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

ODT RTTNOM (CHD D0~1)

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

RTT PARK**ODT RTTPARK (CHA D0~1)**

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

ODT RTTPARK (CHB D0~1)

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

ODT RTTPARK (CHC D0~1)

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

ODT RTTPARK (CHD D0~1)

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

Skew Control**Data Rising Slope (CHAB)**

Configuration options: [Auto] [0] – [15]

Data Rising Slope (CHCD)

Configuration options: [Auto] [0] – [15]

Data Rising Slope Offset (CHAB)

Configuration options: [Auto] [0] [1]

Data Rising Slope Offset (CHCD)

Configuration options: [Auto] [0] [1]

Cmd Rising Slope (CHAB)

Configuration options: [Auto] [0] – [15]

Cmd Rising Slope (CHCD)

Configuration options: [Auto] [0] – [15]

Cmd Rising Slope Offset (CHAB)

Configuration options: [Auto] [0] [1]

Cmd Rising Slope Offset (CHCD)

Configuration options: [Auto] [0] [1]

Ctl Rising Slope (CHAB)

Configuration options: [Auto] [0] – [15]

Ctl Rising Slope (CHCD)

Configuration options: [Auto] [0] – [15]

Ctl Rising Slope Offset (CHAB)

Configuration options: [Auto] [0] [1]

Ctl Rising Slope Offset (CHCD)

Configuration options: [Auto] [0] [1]

Data Falling Slope (CHAB)

Configuration options: [Auto] [0] – [15]

Data Falling Slope (CHCD)

Configuration options: [Auto] [0] – [15]

Data Falling Slope Offset (CHAB)

Configuration options: [Auto] [0] [1]

Data Falling Slope Offset (CHCD)

Configuration options: [Auto] [0] [1]

Cmd Falling Slope Falling Slope (CHAB)

Configuration options: [Auto] [0] – [15]

Cmd Falling Slope Falling Slope (CHCD)

Configuration options: [Auto] [0] – [15]

Cmd Falling Slope Offset (CHAB)

Configuration options: [Auto] [0] [1]

Cmd Falling Slope Offset (CHCD)

Configuration options: [Auto] [0] [1]

Ctl Falling Slope (CHAB)

Configuration options: [Auto] [0] – [15]

Ctl Falling Slope (CHCD)

Configuration options: [Auto] [0] – [15]

Ctl Falling Slope Offset (CHAB)

Configuration options: [Auto] [0] [1]

Ctl Falling Slope Offset (CHCD)

Configuration options: [Auto] [0] [1]

IMC Interleaving

Configuration options: [Auto] [1-way Interleave] [2-way Interleave]

Channel Interleaving

Configuration options: [Auto] [1-way Interleave] [2-way Interleave] [3-way Interleave]

Rank Interleaving

Configuration options: [Auto] [1-way Interleave] [2-way Interleave] [4-way Interleave] [8-way Interleave]

IO Control**MC Data VREF****MC Vref(CHA)**

Configuration options: [Auto] [50] – [99.911]

MC Vref(CHB)

Configuration options: [Auto] [50] – [99.911]

MC Vref(CHC)

Configuration options: [Auto] [50] – [99.911]

MC Vref(CHD)

Configuration options: [Auto] [50] – [99.911]

RAM Data VREF**DRAM Vref (CHA)**

Configuration options: [Auto] [60] – [99]

DRAM Vref (CHB)

Configuration options: [Auto] [60] – [99]

DRAM Vref (CHC)

Configuration options: [Auto] [60] – [99]

DRAM Vref (CHD)

Configuration options: [Auto] [60] – [99]

CTL Data VREF**CTL Vref (CHA)**

Configuration options: [Auto] [1] – [255]

CTL Vref (CHB)

Configuration options: [Auto] [1] – [255]

CTL Vref (CHC)

Configuration options: [Auto] [1] – [255]

CTL Vref (CHD)

Configuration options: [Auto] [1] – [255]

Receiver DQ Pre-emphasis

Configuration options: [Auto] [0.700] – [2.000]

Receiver DQ De-emphasis [

Configuration options: [Auto] [0.700] – [2.000]

Transmitter DQ Pre-emphasis

Configuration options: [Auto] [0.700] – [2.000]

Transmitter DQ De-emphasis

Configuration options: [Auto] [0.700] – [2.000]

Receiver DQS Pre-emphasis

Configuration options: [Auto] [0.700] – [2.000]

Receiver DQS De-emphasis

Configuration options: [Auto] [0.700] – [2.000]

Transmitter DQS Pre-emphasis

Configuration options: [Auto] [0.700] – [2.000]

Transmitter DQS De-emphasis

Configuration options: [Auto] [0.700] – [2.000]

Receiver CMD Pre-emphasis

Configuration options: [Auto] [0.700] – [3.200]

Receiver CMD De-emphasis

Configuration options: [Auto] [0.700] - [3.200]

Transmitter CMD Pre-emphasis

Configuration options: [Auto] [0.700] – [3.200]

Transmitter CMD De-emphasis

Configuration options: [Auto] [0.700] – [3.200]

RTL IOL Control**DRAM RTL INIT Value**

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

DRAM RTL (CHA D0 R0)

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

DRAM RTL (CHA D0 R1)

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

DRAM RTL (CHA D1 R0)

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

DRAM RTL (CHA D1 R1)

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

DRAM RTL (CHB D0 R0)

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

DRAM RTL (CHB D0 R1)

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

DRAM RTL (CHB D1 R0)

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

DRAM RTL (CHB D1 R1)

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

DRAM RTL (CHC D0 R0)

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

DRAM RTL (CHC D0 R1)

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

DRAM RTL (CHC D1 R0)

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

DRAM RTL (CHC D1 R1)

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

DRAM RTL (CHD D0 R0)

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

DRAM RTL (CHD D0 R1)

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

DRAM RTL (CHD D1 R0)

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

DRAM RTL (CHD D1 R1)

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

DRAM IOL (CHA D0 R0)

Configuration options: [Auto] [0] – [15]

DRAM IOL (CHA D0 R1)

Configuration options: [Auto] [0] – [15]

DRAM IOL (CHA D1 R0)

Configuration options: [Auto] [0] – [15]

DRAM IOL (CHA D1 R1)

Configuration options: [Auto] [0] – [15]

DRAM IOL (CHB D0 R0)

Configuration options: [Auto] [0] – [15]

DRAM IOL (CHB D0 R1)

Configuration options: [Auto] [0] – [15]

DRAM IOL (CHB D1 R0)

Configuration options: [Auto] [0] – [15]

DRAM IOL (CHB D1 R1)

Configuration options: [Auto] [0] – [15]

DRAM IOL (CHC D0 R0)

Configuration options: [Auto] [0] – [15]

DRAM IOL (CHC D0 R1)

Configuration options: [Auto] [0] – [15]

DRAM IOL (CHC D1 R0)

Configuration options: [Auto] [0] – [15]

DRAM IOL (CHC D1 R1)

Configuration options: [Auto] [0] – [15]

DRAM IOL (CHD D0 R0)

Configuration options: [Auto] [0] – [15]

DRAM IOL (CHD D0 R1)

Configuration options: [Auto] [0] – [15]

DRAM IOL (CHD D1 R0)

Configuration options: [Auto] [0] – [15]

DRAM IOL (CHD D1 R1)

Configuration options: [Auto] [0] – [15]

DRAM IO COMP (CHA)

Configuration options: [Auto] [1] – [255]

DRAM IO COMP (CHB)

Configuration options: [Auto] [1] – [255]

DRAM IO COMP (CHC)

Configuration options: [Auto] [1] – [255]

DRAM IO COMP (CHD)

Configuration options: [Auto] [1] – [255]

Third Timings**tRRDR**

Configuration options: [Auto] [1] – [7]

tRRDD

Configuration options: [Auto] [1] – [7]

tRWDR

Configuration options: [Auto] [1] – [31]

tRWDD

Configuration options: [Auto] [0] – [31]

tWRDR

Configuration options: [Auto] [1] – [7]

tWRDD

Configuration options: [Auto] [1] – [7]

tWWDR

Configuration options: [Auto] [1] – [7]

tWWDD

Configuration options: [Auto] [1] – [7]

tRWSR

Configuration options: [Auto] [1] – [31]

tCCD

Configuration options: [Auto] [1] – [7]

tCCD_L

Configuration options: [Auto] [1] – [7]

tCCDWR

Configuration options: [Auto] [1] – [7]

tCCDWR_L

Configuration options: [Auto] [1] – [7]

tRRDS

Configuration options: [Auto] [1] – [7]

tRWDS

Configuration options: [Auto] [1] – [31]

tWRDS

Configuration options: [Auto] [1] – [31]

tWWDS

Configuration options: [Auto] [1] – [7]

Misc.**DRAM CLK Period**

Configuration options: [Auto] [1] – [28]

MRC Fast Boot

Allows you to enable, disable or automatically set the MRC fast boot.

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

Attempt Fast Boot

This item allows the portion of the memory reference code to be skipped when possible to increase boot speed.

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

Attempt Fast Cold Boot

This item allows the portion of the memory reference code to be skipped when possible to increase boot speed.

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

DRAM Training

[Auto] System automatically sets the status according to the installed DRAM.

[Ignore] System ignores the DRAM training test function.

[Enabled] System closes the DRAM channel when it has some issues.

[Smart] System automatically trains the DRAM for better stability.

WR CRC feature Control

[Auto] Sets it to the MRC default setting.

[Enabled] Enables Write CRC.

[Disabled] Disables this feature.

Duty Cycle Training

This item allows you to enable or disable Duty Cycle Training.

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

Read Vref Centering

This item allows you to enable or disable Read Vref Centering.

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

Eye Diagrams

This item allows you to enable or disable Rx and Tx Dq eye diagrams for each rank.

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

Turnaround Time Optimization

This item allows you to enable or disable optimal turnaround times.

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

PDA

This item allows you to enable or disable Per DRAM Addressing.

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

Write Vref Centering

This item allows you to enable or disable Write Vref Centering.

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

Enhanced Training(CHA/CHB/CHC/CHD)

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

External Digi+ Power Control

CPU Load-line Calibration

Load-line is defined by Intel® VRM specification and affects CPU power voltage.

The CPU working voltage decreases proportionally to CPU loading. Higher load-line calibration could get higher voltage and good overclocking performance, but increases the CPU and VRM thermal conditions.

Configuration options [Auto] [Level 1] – [Level 8]



The actual performance boost may vary depending on your CPU specification.



DO NOT remove the thermal module. The thermal conditions should be monitored.

CPU Current Capability

This item allows you to set the shut off current limit for external voltage regulator. A higher setting will allow the voltage regulator to supply more current while a lower setting will cause the voltage regulator to shut off the system when the supplied current is higher than the set value.

Configuration options: [Auto] [100%] [140%] [200%]



Configure higher values when overclocking or under a high loading for extra power support.

CPU VRM Switching Frequency

This item affects the VRM transient response speed and the component thermal production. Setting a higher switching frequency will result in better transient response at the expense of higher VRM temperatures. Active cooling of the VRM heatsink is recommended when running high CPU voltage and high load-line calibration values.

Configuration options: [Auto] [Manual]



DO NOT remove the thermal module. The thermal conditions should be monitored.



The following item appears only when **CPU VRM Switching Frequency** is set to **[Manual]**.

Fixed CPU VRM Switching Frequency (KHz)

This item allows you to set a higher frequency for a quicker transient response speed. Use the <+> or <-> to adjust the value. The values range from 300 KHz to 600 KHz.



The following item appears only when **CPU VRM Switching Frequency** is set to **[Auto]**.

VRM Spread Spectrum

This item allows reduced magnitude of peak noise from the VRM. Disable this settings when overclocking.

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

CPU Power Duty Control

CPU power duty control adjusts the duty cycle of each VRM phase based upon current and/or temperature.

[T. Probe] Sets the buck controller to balance VRM FET temperatures.

[Extreme] Sets the buck controller to balance per phase current.



DO NOT remove the VRM heatsink.

CPU Power Phase Control

This item allows you to set the power phase control of the CPU.
Configuration options: [Auto] [Standard] [Optimized] [Extreme]



DO NOT remove the VRM heatsink.

CPU Power Thermal Control

This item allows you to set the VRM thermal cut-off trip point. 115 Celsius is default and recommended for all overclocking and normal use. Can be set to a lower value if a lower thermal cut-off point is preferred. Use the <+> or <-> to adjust the value.



DO NOT remove the VRM heatsink.

DRAM Current Capability

This item allows you to set the shut off current limit for external DRAM voltage regulator. A higher setting will allow the voltage regulator to supply more current while a lower setting will cause the voltage regulator to shut off the system when the supplied current is higher than the set value.

Configuration options: [100%] [130%]



Configure higher values when overclocking or when using high current memory stress tests. Auto is configured to work with all configurations by default and should not need adjustments unless running very high memory frequencies with high density memory modules.

DRAM Switching Frequency

This item affects the VRM transient response speed and the component thermal production. Setting a higher switching frequency will result in better transient response at the expense of more switching noise.

Configuration options: [Auto] [Manual]



The following item appears only when you set **DRAM Switching Frequency** to [Manual].

Fixed DRAM Switching Frequency (KHz)

This item will affect the overclocking range and system stability. Configure a higher frequency to increase the overclocking range of a lower frequency to enhance the system stability. Use the <+> or <-> to adjust the value. The values range from 300 KHz to 500 KHz.

Boot Voltages

CPU Input Boot Voltage

This item will allow you to set the voltage for CPU at initial boot.
Configuration options: [Auto] [0.800] – [2.700]

CPU System Agent Boot Voltage

This item will allow you to set the CPU System Agent voltage at initial boot up.
Configuration options: [Auto] [0.700] – [1.800]

CPU VCCIO Boot Voltage

This item will allow you to set the CPU VCCIO voltage at initial boot up.
Configuration options: [Auto] [0.7000] – [1.8000]

Internal CPU Power Management

The subitems in this menu allow you to set the CPU ratio and features.

Enhanced Intel(R) SpeedStep(tm)

Allows the operating system to dynamically adjust the processor voltage and core frequency to decrease the average power consumption and decrease average heat production.

Configuration options: [Enabled] [Disabled]

Turbo Mode

Allows you to enable your processor cores to run faster than the base operating frequency when it is below power, current, and temperature specification limit.

Configuration options: [Disabled] [Enabled]



The following items appear only when **Turbo Mode** is set to **[Enabled]**.

Turbo Mode Parameters

Long Duration Package Power Limit

Known as the “power limit 1” and specified in Watts. The default value will be the TDP (thermal design power). Increasing the value will allow the Turbo ratio to be maintained for a longer duration under high current loads.

Configuration options: [Auto] [1] – [4095]

Package Power Time Window

An Intel parameter of “power limit 1” and specified in seconds. The value indicates the maintained duration for the turbo ratio to exceed TDP (thermal design power).

Configuration options: [Auto] [1] – [127]

Short Duration Package Power Limit

An Intel parameter known as “power limit 2” and specified in Watts. It is the second power limit to provide a rapid protection when the package power exceed power limit 1. The default setting is 1.25 times the power limit 1. According to Intel, the platform must be capable of supporting the duration for up to 10 msec when the turbo ratio exceeds the power limit 2. The ASUS motherboards can support the duration for a longer time.

Configuration options: [Auto] [1] – [4095]

CPU Integrated VR current Limit

This item allows you to set a higher current limit to prevent a frequency or power throttling when overclocking.

Configuration options: [Auto] [0.125] – [1023.875]

CPU Internal Power Fault Control

CPU Integrated VR Fault Management [Auto]

Disable this item to prevent tripping the FIVR (Fully Integrated Voltage Regulator) when doing over-voltage. We recommend you to disable this item when overclocking.

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

CPU Internal Power Configuration

CPU Integrated VR Efficiency Management

[Auto] Set to default mode.

[High Performance] Allow the FIVR (fully integrated voltage regulator) to work at high performance at all times.

[Balanced] Improve power saving when the CPU is in a low power state.

Tweaker's Paradise

VIN Tracker

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

Self-tracked Clocking

Set this item to **[Enabled]** to improve BCLK Overclock.

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

PCIe Gen3 PLL Clock Control

This item allows you to enable or disable PCIe Gen3 PLL Clock Control.

Configuration options: [Disabled] [Enabled]

PLL Post Divider Adjust

Set this item to **[Enabled]** when using a High base clock.

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

Change PLLTRIM Prefix

This item allows you to change the PLLTRIM prefix.

Configuration options: [+] [-]

Change PIITrim Value

This item allows you to change the PII value to between +50 and -50.

Configuration options: [Auto] [0] – [50]

Change MC-PLLTRIM Prefix

This item allows you to change the MC-PLLTRIM prefix.

Configuration options: [+] [-]

Change MC-PIITrim Value

This item allows you to change the MC-PII value to between +50 and -50.

Configuration options: [Auto] [0] – [50]

Turbo Residence Tweak 0~3

Setting smaller values may result in more optimistic turbo boosting. Use the <+> or <-> to adjust the value. The values range from 0 to 16.

Initial BCLK Frequency

This item allows you to set a different BCLK value during POST. May be useful for setting a lower BCLK in scenarios where memory training is not stable at a higher BCLK (a large frequency gap between BCLK Frequency and Initial frequency is not recommended). Applies the same value as BCLK Frequency if left at default. Use the <+> or <-> to adjust the value. The values range from 40.0 MHz to 650.0 MHz.

CPU BCLK Amplitude

This item allows you to set the magnitude of the reference BCLK supplied to the processor. Higher values may improve overclocking stability.

Configuration options: [Auto] [700mV] [800mV] [900mV] [1000mV]

CPU BCLK Spread Spectrum

This item allows you to reduce the EMI. Disable to get more accurate base clocks.

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

CPU BCLK Frequency Slew Rate

This item allows you set the frequency update rate. Lower values speed up clock changes.

Configuration options: [Auto] [Ultra fast] [Fast] [Normal] [Slow]

CPU BCLK Slew Rate

This item allows you set the speed at which the base clock rises or falls. Set a high value for overclocking stability.

Configuration options: [Auto] [1.5V/ns] [2.5V/ns] [3.5V/ns] [4.5V/ns]

PCIe/DMI Slew Rate

This item allows you set the speed at which the base clock rises or falls. Set a high value for overclocking stability.

Configuration options: [Auto] [1.5V/ns] [2.5V/ns] [3.5V/ns] [4.5V/ns]

CPU AUX1 Voltage

This item allows you to configure the voltage for the CPU AUX1.

Configuration options: [Auto] [0.000V] – [2.700V]

CPU AUX2 Voltage

This item allows you to configure the voltage for the CPU AUX2.

Configuration options: [Auto] [0.000V] – [2.700V]

CPU Input Reset Voltage

This item allows you to configure the input voltage for the CPU by the external voltage regulator when reset.

Configuration options: [Auto] [0.800V] – [2.700V]

VTDDR Voltage (CHA, CHB)

This item allows you to configure the termination voltage for memory channel A and channel B. 50% of DRAM voltage is default. A setting of Auto scales this setting at 50% of the applied DRAM voltage.

Configuration options: [Auto] [0.500V] – [1.300V]

VTDDR Voltage (CHC, CHD)

This item allows you to configure the termination voltage for memory channel C and channel D. A setting of Auto scales this setting at 50% of the applied DRAM voltage.

Configuration options: [Auto] [0.500V] – [1.300V]

VPPDDR Voltage (CHA, CHB)

Auxiliary power supply to the DDR4 DRAM Modules on the left.

Configuration options: [Auto] [1.865V] – [3.135V]

VPPDDR Voltage (CHC, CHD)

Auxiliary power supply to the DDR4 DRAM Modules on the right.

Configuration options: [Auto] [1.865V] – [3.135V]

AI Features

The items in this menu allows you to enable or disable different AI Features.

Debug AI Parameter

You may view the Debug AI Parameters in this option.

Package Temperature Threshold

Frequency will adjust to stay below this package temperature threshold when regulation is enabled.

Configuration options: [Auto] [30] – [115]

Regulate Frequency by above threshold

Frequency will adjust to stay below the **Package Temperature Threshold** when this item is enabled. SVID must be enabled for this to work.

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

Cooler Efficiency Customize

[Keep Training] Continuous evaluations will be performed on Cooler efficiency and updated accordingly.

[Stop Training] Cooler efficiency evaluations will stop and current evaluated efficiency will be used.

[User Specify] Manually specify the Cooler efficiency and all predictions will be based off this manual setting.



The following item appears only when **Cooler Efficiency Customize** is set to [User Specify].

Cooler Score

Configuration options: [1] – [2000]

Recalibrate Cooler

This item allows you to recalibrate your cooler efficiency.

Cooler Re-evaluation Algorithm

This item allows you to set how inclined the re-evaluation will update.

Configuration options: [Normal] [More inclined to update] [Very inclined to update] [Less inclined to update] [Least inclined to update]

Optimism Scale

This item allows you to set the optimism of the predictions. The higher the value, the more optimistic the predictions and vice versa.

Configuration options: [50] – [150]

Extreme Over-voltage

This item is only enabled when the onboard CPU-OV jumper is switched on. When set to [Enabled] it allows higher voltages for overclocking, but the CPU lifetime will not be guaranteed.

CPU Core Voltage

Configures the mode of Voltage fed to the cores of the processor. A setting of Auto will scale the voltage according to the applied ratio. Do not confuse this setting with VCCIN (CPU Input voltage).

Configuration options: [Auto] [Manual Mode] [Offset Mode] [Adaptive Mode]



The following items appear only when **CPU Core Voltage** is set to **[Manual Mode]**.

CPU Core Voltage Override

Allows you to configure the CPU Core voltage.

Configuration options: [Auto] [0.001V] – [1.920V]



The following items appear only when **CPU Core Voltage** is set to **[Offset Mode]** or **[Adaptive Mode]**.

Offset Mode Sign

[+] To offset the voltage by a positive value.

[-] To offset the voltage by a negative value.

CPU Core Voltage Offset

This item allows you to configure the input voltage for the CPU by the external voltage regulator.

Configuration options: [Auto] [0.001V] – [0.999V]



You need to save the changes and reset the system for the changes to take effect.



The following item appears only when **CPU Core Voltage** is set to **[Adaptive Mode]**.

Additional Turbo Mode CPU Core Voltage

This item allows you to configure the amount of voltage fed to the CPU cores when running in Turbo Mode. Increase the voltage when configuring a high CPU core frequency. This voltage will be affected by the offset value.

Configuration options: [Auto] [0.001V] – [1.920V]

CPU Cache Voltage

Configures the mode of Voltage fed to the CPU cache (ring). A setting of Auto will scale voltage according to the applied CPU cache ratio.

Configuration options: [Auto] [Manual Mode] [Offset Mode] [Adaptive Mode]



The following items appear only when **CPU Cache Voltage** is set to **[Manual Mode]**.

CPU Cache Voltage Override

Allows you to configure the CPU cache voltage.

Configuration options: [Auto] [0.001V] – [1.920V]



You need to save the changes and reset the system for the changes to take effect.



The following items appear only when **CPU Cache Voltage** is set to **[Offset Mode]** or **[Adaptive Mode]**.

Offset Mode Sign

- [+] To offset the voltage by a positive value.
- [-] To offset the voltage by a negative value.

CPU Cache Voltage Offset

This item allows you to configure the CPU cache voltage offset value.
Configuration options: [Auto] [0.001V] – [0.999V]



You need to save the changes and reset the system for the changes to take effect.



The following item appears only when **CPU Cache Voltage** is set to **[Adaptive Mode]**.

Additional Turbo Mode CPU Cache Voltage

This item allows you to configure the amount of voltage fed to the CPU cache when running in Turbo Mode. Increase the voltage when configuring a high CPU cache frequency. This voltage will be affected by the offset value.
Configuration options: [Auto] [0.001V] – [1.920V]

Uncore Voltage Offset

This item allows you to specify the Offset Voltage applied to the Uncore domain. This voltage is specified in millivolts. Uses Mailbox MSR 0x150, cmd 0x11. The values range from -1000 mV to 1000 mV.

Uncore Voltage Offset Prefix

- [+] To offset the value by a positive value.
- [-] To offset the value by a negative value.

CPU Input Voltage

This item allows you to configure the input voltage for the CPU by the external voltage regulator.
Configuration options: [Auto] [0.800V] – [2.700V]

DRAM Voltage(CHA, CHB)

This item allows you to configure the voltage for the DRAM.
Configuration options: [Auto] [1.000V] – [2.100V]

DRAM Voltage(CHC, CHD)

This item allows you to configure the voltage for the DRAM.
Configuration options: [Auto] [1.000V] – [2.100V]

CPU VCCIO Voltage

This item allows you to configure the voltage for the CPU VCCIO.

Configuration options: [Auto] [0.900V] – [1.800V]

CPU System Agent Voltage

This item allows you to configure the voltage for the CPU System Agent.

Configuration options: [Auto] [0.700V] – [1.800V]

PCH Core Voltage

This item allows you to configure the voltage for the PCH Core.

Configuration options: [Auto] [0.700V] – [1.800V]

PLL Reference Offset Mode Sig

[+] Offset the PLL reference value by a positive value.

[-] Offset the PLL reference value by a negative value.

PLL Reference Offset Value

This item will add or subtract the entered voltage from the PLL reference base voltage (in conjunction with the Voltage Offset Sign setting). Use the <+> or <-> to adjust the value.

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

6. Advanced menu

The Advanced menu items allow you to change the settings for the CPU and other system devices.

Scroll down to display the other BIOS items.



Be cautious when changing the settings of the Advanced menu items. Incorrect field values can cause the system to malfunction.

UEFI BIOS Utility – Advanced Mode

10/09/2019 Wednesday 04:53 English MyFavorite(F3) Q/fan Control(F6) AI OC Guide(F11) Search(F9) AURA ON/DR(F4)

My Favorites Main **Advanced** Monitor Boot Tool Exit

Hardware Monitor

CPU/Memory

Frequency	Temperature
3300 MHz	47°C
BCLK	Core Voltage
100.0 MHz	0.936 V
Ratio	DRAM Freq.
33x	2133 MHz
Vol. CHAB/CD	Capacity
1.200 V	4096 MB
1.200 V	

Prediction

SP	Cooler
77	150 pts
V req for	2core Load
4500MHz	Stable
1.184 V	4774 MHz
Heavy AVX	4core Load
Stable	Stable
3808 MHz	4707 MHz
ALLcore Load	8core Load
Stable	Stable
4602 MHz	N/A

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6.1 CPU Configuration

The items in this menu show the CPU-related information that the BIOS automatically detects.

Scroll down to display other BIOS items.



The items in this menu may vary based on the CPU installed.

UEFI BIOS Utility – Advanced Mode

10/14/2019 Monday 20:56 English MyFavorite(F3) Qfan Control(F6) AI OC Guide(F11) Search(F9) AURA ON/OFF(F4)

My Favorites Main Ai Tweaker **Advanced** Monitor Boot Tool Exit

← Advanced\CPU Configuration

CPU Configuration

Type	Intel(R) Core(TM) i7-7900X CPU @ 3.30GHz
CPU Signature	0x50654
Microcode Patch	0200005E
Max CPU Speed	3300 MHz
Min CPU Speed	1200 MHz
CPU Speed	3300 MHz
Processor Cores	10Core(s) / 20Thread(s)
Hyper-Threading Technology	Supported
Intel VT-x Technology	Supported
Intel SMX Technology	Not Supported
64-bit	Supported
EIST Technology	Supported
CPU C3 state	Not Supported
CPU C6 state	Supported

Hardware Monitor

CPU/Memory

Frequency	4000 MHz	Temperature	61°C
BCLK	100.0 MHz	Core Voltage	1.097 V
Ratio	40x	DRAM Freq.	2133 MHz
Vol. CHABCD	1.200 V	Capacity	4096 MB

Prediction

SP	Cooler
77	117 pts
V reg for 4500MHz	2core Load Stable
1.207 V	4556 MHz
Heavy AVX	4core Load Stable
3600 MHz	4000 MHz

Hyper-Threading [ALL]

This item allows you to enable or disable the Hyper-Threading for logical processor threads. Configuration options: [Disabled] [Enabled]

Max CPUID Value Limit

This should be enabled in order to boot legacy OSES that cannot support CPUs with extended CPUID functions.

Configuration options: [Disabled] [Enabled]

Execute Disable Bit

When disabled, forces the XD feature flag to always return 0.

Configuration options: [Disabled] [Enabled]

Hardware Prefetcher

This item allows you to enable or disable the MLC streamer prefetcher.

Configuration options: [Disabled] [Enabled]

Adjacent Cache Line Prefetch

This item allows you to prefetch adjacent cache lines, reducing the DRAM loading time and improving the system performance.

Configuration options: [Disabled] [Enabled]

VMX

When set to **[Enabled]**, VMX can utilize the additional hardware capabilities provided by Vanderpool Technology.

Configuration options: [Disabled] [Enabled]

Boot performance mode

This item allows you to select the CPU performance state during system boot before the operating system takes control. The CPU runs at a selected performance ratio based on CPU configuration.

Configuration options: [Max Performance] [Max Efficient] [Set by Intel Node Manager]

Maximum CPU Core Temperature

This item allows you to set the maximum allowable temperature for CPU cores. The CPU will throttle or shutdown when it reaches this temperature to prevent damaging the cores.

Configuration options: [Auto] [60] – [110]



Do not set this value too high as high temperature may damage the CPU permanently.

Active Processor Cores

The items in this submenu will allow you to enable or disable each processor package.

Active Physical Processor Core 0~9

This item allows you to enable or disable Processor Core 0~9.

Configuration options: [Disabled] [Enabled]



Physical Cores may not always map directly to Logical Cores.

CPU Power Management Configuration

This item allows you to manage and configure the CPU's power.

Enhanced Intel SpeedStep Technology

This item allows your system to adjust the CPU's voltage and cores frequency, resulting in decreased power consumption and heat production.

[Disabled] The CPU runs at its default speed.

[Enabled] The system controls the CPU speed.

Turbo Mode

This item allows you to automatically set the CPU cores to run faster than the base operating frequency when it is below the operating power, current and temperature specification limit.

Configuration options: [Disabled] [Enabled]

Autonomous Core C-State

This item allows you to set the power saving of the CPU states.

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



The following items appear only when **Autonomous Core C-state** is set to **[Enabled]**.

Enhanced Halt State (C1E)

Core C1E auto promotion Control.

Configuration options: [Enabled] [Disabled]



You need to save the changes and reset the system for the changes to take effect.

CPU C6 Report

This item allows you to disable or enable the CPU C6 report to the operating system.

Configuration options: [Enabled] [Disabled]

Package C State

This item allows you to set the a C-state support for the CPU package.

Configuration options: [Auto] [C0/C1 state] [C2 state] [C6(non Retention) state] [C6(Retention) state]

Intel(R) Speed Shift Technology

This item allows you to enable or disable Intel(R) Speed Shift Technology support.

Enabling will expose the CPPC v2 interface for hardware controlled P-states.

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

MFC Mode Override

This item allows you to select the MFC Mode the BIOS will enforce.

Configuration options: [OS Native Support] [MFC Driver Override]

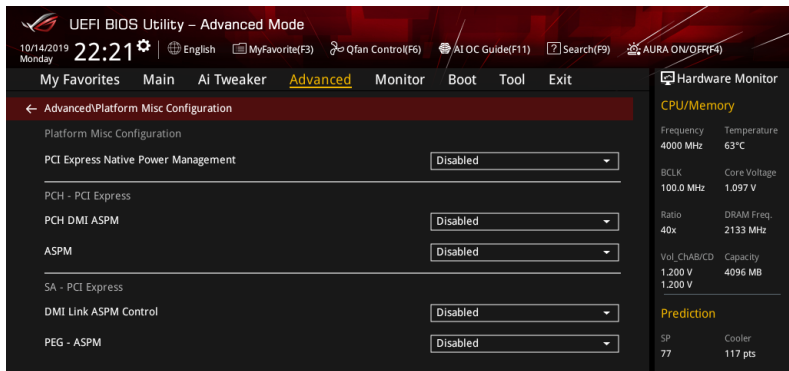
MSR Lock Control

This item allows you to lock MSR 3Ah, MSR 0E2h, and CSR 80h when set to [Enabled].

Configuration options: [Disabled] [Enabled]

6.2 Platform Misc Configuration

The items in this menu allow you to change the ASPM for PCH and SA PCI Express.



PCI Express Native Power Management

This item allows you to enhance the power saving feature of PCI Express and perform Active State power Management (ASPM) operations in the operating system.

Configuration options: [Disabled] [Enabled]



The following item appears only when **PCI Express Native Power Management** is set to **[Enabled]**.

Native ASPM

- | | |
|------------|-----------------------|
| [Auto] | Default settings. |
| [Disabled] | BIOS controlled ASPM. |
| [Enabled] | OS controlled ASPM. |

PCH - PCI Express

PCH DMI ASPM

This item allows you to configure the Active State Power Management setting.

Configuration options: [Disabled] [Enabled]

ASPM

This item allows you to select the ASPM state for energy-saving conditions.

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

SA - PCI Express

DMI Link ASPM Control

This item allows you to enable or disable the control of Active State Power Management on SA side of the DMI link.

Configuration options: [Disabled] [L1]

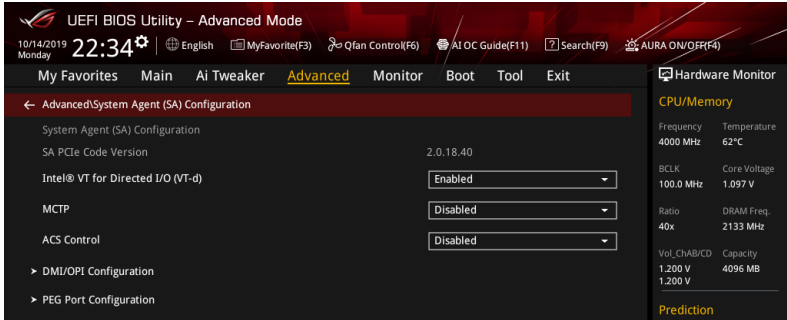
PEG - ASPM

This item allows you to control the ASPM support for an active PEG 0 device.

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

6.3 System Agent (SA) Configuration

The items in this menu allow you to adjust the Link Speed for PEG Port and Multi-Monitor.



Intel® VT for Directed I/O (VT-d)

Allows you to enable or disable Intel® VT for Directed I/O (VT-d) by reporting the I/O device assignment to VMM through DMAR ACPI Tables.

Configuration options: [Disabled] [Enabled]

MCTP

Allows you to enable or disable MCTP.

Configuration options: [Disabled] [Enabled]

ACS Control

Configuration options: [Disabled] [Enabled]

DMI/OPI Configuration

This item allows you to control various DMI (direct media interface) functions.

DMI

Link Speed

This item allows you to set DMI speed for this PCIe port.

Configuration options: [Auto] [Gen1 (2.5 GT/s)] [Gen2 (5 GT/s)] [Gen3 (8 GT/s)]

PEG Port Configuration

This item allows you to configure the PEG Port settings.

PCIEx16_1~3

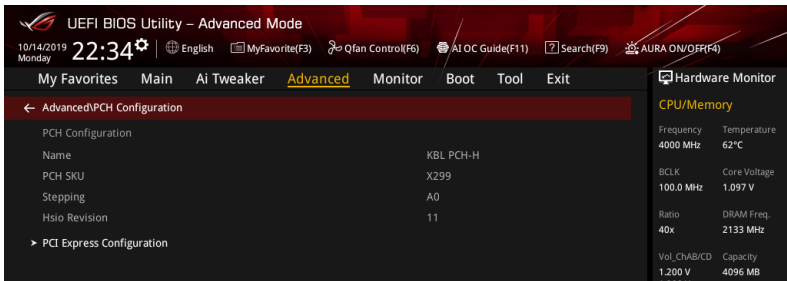
Link Speed

This item allows you to set link speed for this PCIe port

Configuration options: [Auto] [Gen1 (2.5 GT/s)] [Gen2 (5 GT/s)] [Gen3 (8 GT/s)]

6.4 PCH Configuration

The items in this menu allow you to adjust the PCH PCI Express speed.



PCI Express Configuration

This item allows you to configure the PCI Express slots.

PCIe Speed

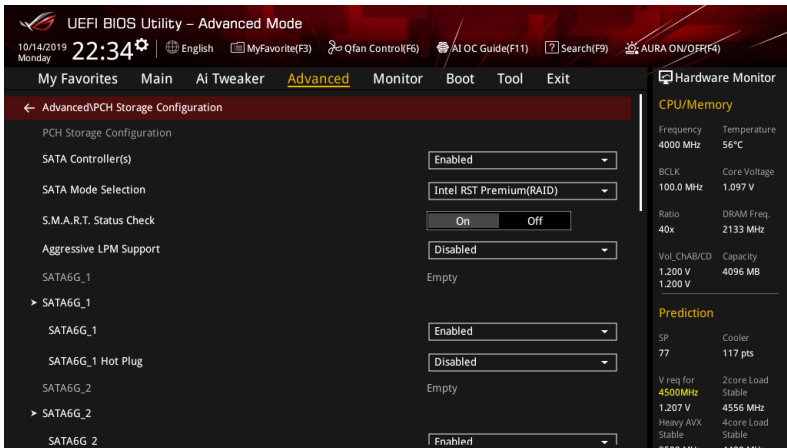
This item allows you to set the speed for the PCIe.

Configuration options: [Auto] [Gen1 (2.5 GT/s)] [Gen2 (5 GT/s)] [Gen3 (8 GT/s)]

6.5 PCH Storage Configuration

While entering Setup, the BIOS automatically detects the presence of SATA devices. The SATA Port items show **Empty** if no SATA device is installed to the corresponding SATA port.

Scroll down to display the other BIOS items.



SATA Controller(s)

This item allows you to enable or disable the SATA Device.

Configuration options: [Disabled] [Enabled]



The following items appear only when **SATA Controller(s)** is set to **[Enabled]**.

SATA Mode Selection

This item allows you to set the SATA configuration.

[AHCI]	Set to [AHCI] when you want the SATA hard disk drives to use the AHCI (Advanced Host Controller Interface). The AHCI allows the onboard storage driver to enable advanced Serial ATA features that increases storage performance on random workloads by allowing the drive to internally optimize the order of commands.
[Intel RST Premium (RAID)]	Set to [Intel RST Premium (RAID)] when you want to create a RAID configuration from the SATA hard disk drives.

Aggressive LPM support

This item is designed for LPM (link power management) support with a better energy saving conditions. When disabled, the hot plug function of SATA ports are disabled.

Configuration options: [Disabled] [Enabled]

S.M.A.R.T. Self Test

S.M.A.R.T. (Self-Monitoring, Analysis and Reporting Technology) is a monitoring system that shows a warning message during POST (Power-on Self Test) when an error occurs in the hard disks.

Configuration options: [On] [Off]

Aggressive LPM Support

When this item is set to **[Enabled]**, it will allow PCH to aggressively enter link power state.

Configuration options: [Disabled] [Enabled]

SATA6G_1 - SATA6G_8

SATA6G_1 - SATA6G_8

This item allows you to enable or disable the selected SATA port.

Configuration options: [Disabled] [Enabled]

SATA6G_1 - SATA6G_8 Hot Plug

These items appears only when the SATA Mode Selection is set to **[AHCI]** and allows you to enable or disable SATA Hot Plug Support.

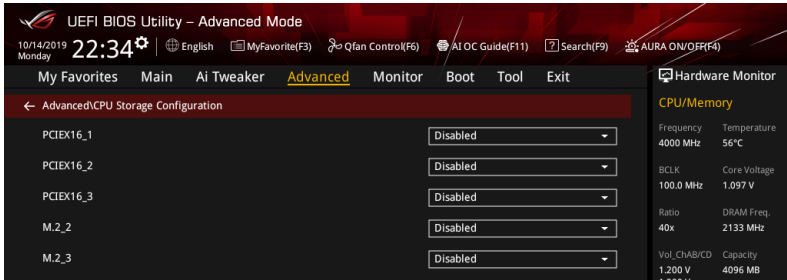
Configuration options: [Disabled] [Enabled]

6.6 CPU Storage Configuration

The items in this menu allow you to configure CPU storage configurations.



- This menu will appear only when an Intel® Core™ X-series Processors (6-core or above) is installed.
- Due to CPU behavior, CPU RAID functions with Intel® CPU RSTe only supports Intel® Core™ X-series Processors (6-core or above) and Intel® SSD modules.



PCIEX16_1~3

[PCIe SSD X4 Card]

When PCIe SSD X4 is selected, only storage devices will be supported in this slot. Save your changes, exit the BIOS Setup and reboot the system. Enter the BIOS Setup again and go to **Advanced** menu > **Intel Virtual RAID on CPU** to configure your settings.

[HYPER M.2 X16 (VROC)]

When Hyper M.2 X16 for VROC mode is selected, only the Hyper M.2 X16 card will be supported in this slot. Please check the speed of your PCIe X16 slot before installing the Hyper M.2 X16 Card. Save your changes, exit the BIOS Setup and reboot the system. Enter the BIOS Setup again and go to **Advanced** menu > **Intel Virtual RAID on CPU** to configure your settings.

[HYPER M.2 X16 (data)]

Supports up to 4 x M.2 drives via the Hyper M.2 X16 expansion card without VROC support.

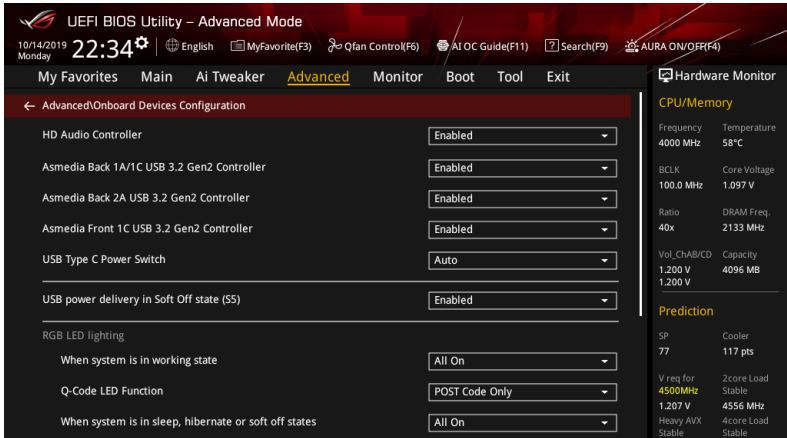
M.2_2~3

Configuration options: [Disabled] [M.2 SSD (VROC)]

6.7 Onboard Devices Configuration

The items in this menu allow you to switch between PCIe Lanes and configure onboard devices.

Scroll down to view the other BIOS items.



HD Audio Controller

This item allows you to enable or disable the Azalia High Definition Audio Controller.

Configuration options: [Disabled] [Enabled]

Asmedia Back 1A/1C USB 3.2 Gen2 Controller

This item allows you to enable or disable the Asmedia Back 1A/1C USB 3.2 Gen2 Controller.

Configuration options: [Disabled] [Enabled]

Asmedia Back 2A USB 3.2 Gen2 Controller

This item allows you to enable or disable the Asmedia Back 2A USB 3.2 Gen2 Controller.

Configuration options: [Disabled] [Enabled]

Asmedia Front 1C USB 3.2 Gen2 Controller

This item allows you to enable or disable the Asmedia Front 1C USB 3.2 Gen2 Controller.

Configuration options: [Disabled] [Enabled]

USB Type C Power Switch

[Auto] The system will automatically detect your USB Type C devices and provide suitable power if needed.

[Enabled] The USB Type C port will always provide power to your devices.

USB power deliver in Soft Off state (S5)

This item allows you to enable or disable USB power when your PC is in the S5 state.

Configuration options: [Disabled] [Enabled]

RGB LED lighting

When system is in working state

This item allows you to turn the RGB LED lighting on or off when the system is in the working state.

[All On]:	All LEDs (Aura or Functional) will be enabled.
[Stealth Mode]:	All LEDs (Aura and Functional) will be disabled.
[Aura Only]:	Aura LEDs will be enabled and functional LEDs will be disabled.
[Aura Off]:	Aura LEDs will be disabled, however functional LEDs will still be enabled.



The RGB Header(s) and Addressable Header(s) will only work under the S0 (working) state.

Q-Code LED Function

[Disabled]	Disable the Q-Code LED.
[POST Code Only]	Show POST (Power-On Self-Test) code on Q-Code LED.
[Auto]	Automatically display POST (Power-On Self-Test) code and CPU temperature on Q-Code LED.

When system is in sleep, hibernate or soft off states

This item allows you to turn the RGB LED lighting on or off when the system is in the sleep, hibernate or soft off states.

[All On]:	All LEDs (Aura or Functional) will be enabled.
[Stealth Mode]:	All LEDs (Aura and Functional) will be disabled.
[Aura Only]:	Aura LEDs will be enabled and functional LEDs will be disabled.
[Aura Off]:	Aura LEDs will be disabled, however functional LEDs will still be enabled.



The RGB Header(s) and Addressable Header(s) will only work under the S0 (working) state.

Wi-Fi 6 (802.11ax)

This item allows you to enable or disable the Wi-Fi 6 (802.11ax) controller.

Configuration options: [Disabled] [Enabled]

Bluetooth Controller

This item allows you to enable or disable the Bluetooth Controller.

Configuration options: [Disabled] [Enabled]

Intel LAN Controller

This item allows you to enable or disable the Intel LAN controllers.

Configuration options: [Disabled] [Enabled]



The following item appears only when **Intel LAN Controller** is set to **[Enabled]**.

Intel LAN PXE Option ROM

This item allows you to enable or disable the Intel PXE Option Rom launch.
Configuration options: [Disabled] [Enabled]

Realtek 2.5G LAN Controller

This item allows you to enable or disable the Realtek 2.5G LAN controllers.
Configuration options: [Disabled] [Enabled]

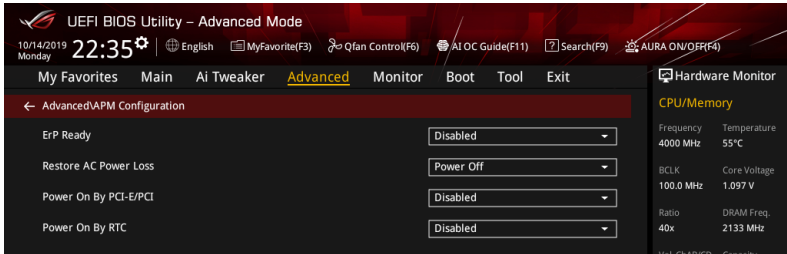


The following item appears only when **Realtek 2.5G LAN Controller** is set to **[Enabled]**.

Realtek PXE Option ROM

This item allows you to enable or disable the Realtek PXE Option Rom launch.
Configuration options: [Disabled] [Enabled]

6.8 APM Configuration



ErP Ready

This item allows you to switch off some power at S4+S5 or S5 to get the system ready for ErP requirement. When set to **[Enabled]**, all other PME options are switched off.
Configuration options: [Disabled] [Enabled (S4+S5)] [Enabled (S5)]

Restore AC Power Loss

This item allows your system to go to ON state, OFF state, or both states after an AC power loss. When setting your system to [Last State], it goes to the previous state before the AC power loss.
Configuration options: [Power Off] [Power On] [Last State]

Power On By PCI-E

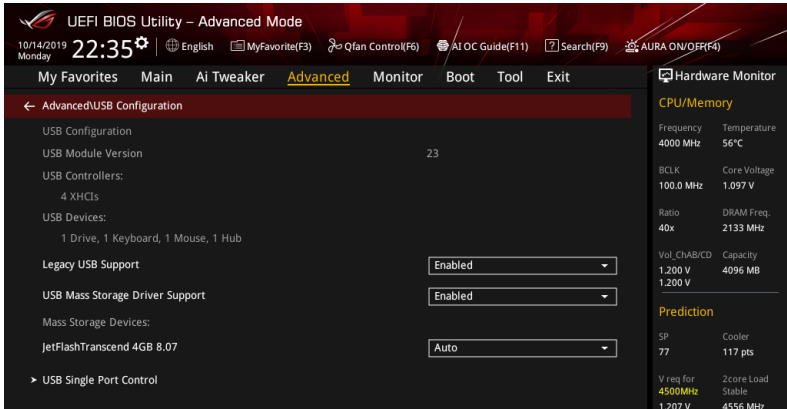
This item allows you to enable or disable the Wake-on-LAN function of the onboard LAN controller or other installed PCI-E LAN cards.
Configuration options: [Disabled] [Enabled]

Power On By RTC

This item allows you to enable or disable the RTC (Real-Time Clock) to generate a wake event and configure the RTC alarm date. When enabled, you can set the days, hours, minutes, or seconds to schedule an RTC alarm date.
Configuration options: [Disabled] [Enabled]

6.9 USB Configuration

The items in this menu allow you to change the USB-related features.



The **Mass Storage Devices** item shows the auto-detected values. If no USB device is detected, the item shows **None**.

Legacy USB Support

- [Enabled] Your system supports the USB devices in legacy operating systems.
- [Disabled] Your USB devices are available only for EFI applications.
- [Auto] Your system automatically disables the Legacy USB support if USB devices are not connected.

USB Mass Storage Driver Support

This item allows you to enable or disable USB Mass Storage Driver Support.
Configuration options: [Disabled] [Enabled]

USB Single Port Control

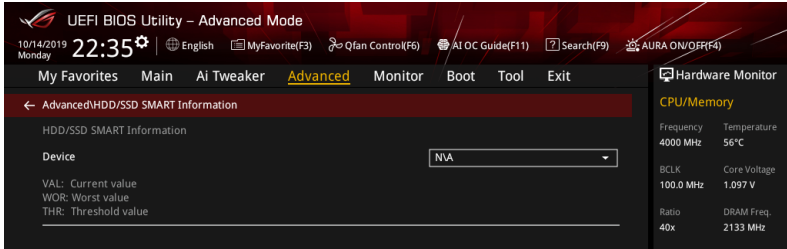
This item allows you to enable or disable the individual USB ports.



Refer to section **Motherboard layout** in your motherboard's user manual for the location of the USB ports.

6.10 HDD/SSD SMART Information

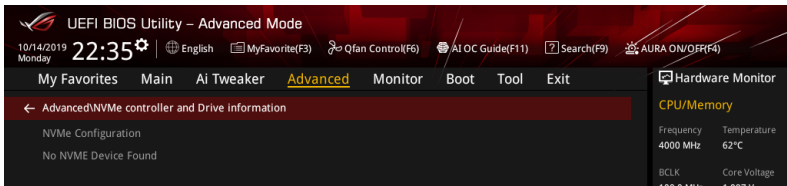
This menu displays the SMART information of the connected devices.



NVM Express devices do not support SMART information.

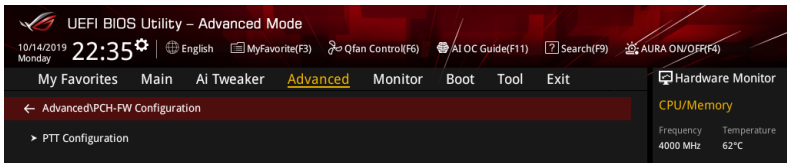
6.11 NVMe Configuration

This menu displays the NVMe controller and Drive information of the connected devices.



6.12 PCH-FW Configuration

This item allows you to configure the firmware TPM.



PTT Configuration

The items in this submenu allow you to configure PTT.

PTT

This item allows you to enable or disable PTT in SkuMgr.

Configuration options: [Disabled] [Enabled]

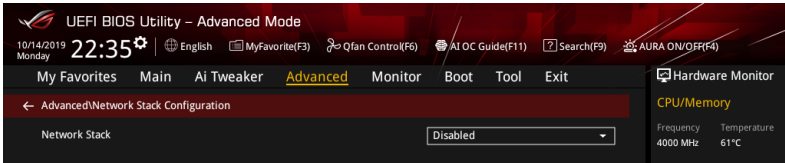
PTP aware OS

This item allows you to select whether or not the OS you will boot to will be PTP aware.

Configuration options: [PTP Aware] [Not PTP Aware]

6.13 Network Stack Configuration

The items in this menu allow you to configure Ipv4 / Ipv6 PXE support.



Network stack

This item allows you to disable or enable the UEFI network stack.

Configuration options: [Disable] [Enable]



The following item appears only when **Network Stack** is set to **[Enabled]**.

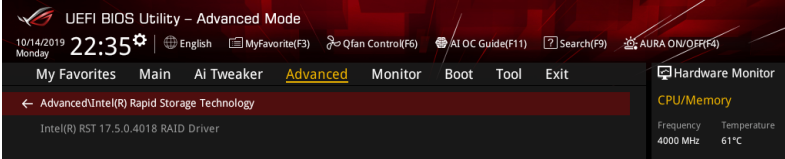
Ipv4/Ipv6 PXE Support

This item allows you to enable or disable the Ipv4/Ipv6 PXE wake event.

Configuration options: [Disabled] [Enabled]

6.14 Intel(R) Rapid Storage Technology

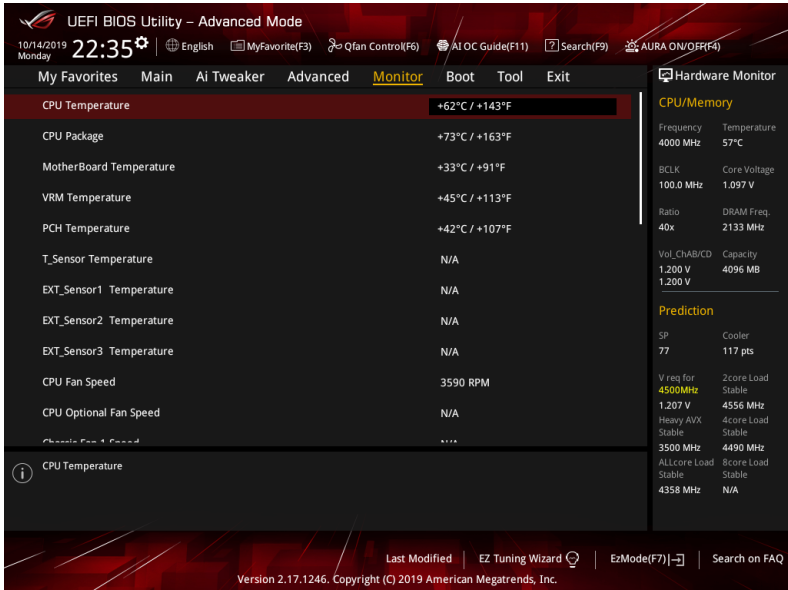
Allows you to manage RAID volumes on the Intel(R) RAID Controller.



7. Monitor menu

The Monitor menu displays the system temperature/power status, and allows you to change the fan settings.

Scroll down to display the other BIOS items.



CPU Temperature, CPU Package, Motherboard Temperature, VRM Temperature, PCH Temperature, T Sensor Temperature, EXT_Sensor1-3 Temperature [xxx°C/xxx°F]

The onboard hardware monitor automatically detects and displays the component and sensor temperatures. Select **[Ignore]** if you do not wish to display the detected temperatures.

CPU Fan Speed, CPU Optional Fan Speed, Chassis Fan 1-2 Speed, M.2 fan Speed, Water Pump+ Speed, AIO Pump Speed, HS Fan Speed, Extension Fan 1-6 Speed [xxxx RPM]

The onboard hardware monitor automatically detects and displays the fan and pump speeds in rotations per minute (RPM). If the fan or pump is not connected to the motherboard, the field shows N/A. Select **[Ignore]** if you do not wish to display the detected speed.

CPU Core Voltage, 3.3V Voltage, 5V Voltage, 12V Voltage [x.xxxx V]

The onboard hardware monitor automatically detects the voltage output through the onboard voltage regulators. Select **[Ignore]** if you do not want to detect this item.

Q-Fan Configuration

Q-Fan Tuning

Click this item to automatically detect the lowest speed and configure the minimum duty cycle for each fan.

CPU Q-Fan Control

This item allows you to set the CPU Q-Fan operating mode.

[Auto]	Detects the type of CPU fan installed and automatically switches the control modes.
[PWM Mode]	Enables the CPU Q-Fan Control feature in PWM mode for 4-pin CPU fan.
[DC Mode]	Enables the CPU Q-Fan Control feature in DC mode for 3-pin CPU fan.
[Disabled]	Disables the Q-Fan Control.



The following items appear only when **CPU Q-Fan Control** is set to **[Auto]**, **[PWM Mode]**, or **[DC Mode]**.

CPU Fan Step Up

This item allows you to set the value of the CPU fan step up.

Configuration options: [0 sec] [2.1 sec] [2.8 sec] [3.6 sec] [4.2 sec] [5.0 sec] [6.3 sec] [8.5 sec] [12 sec] [25 sec]

CPU Fan Step Down

This item allows you to set the value of the CPU fan step down.

Configuration options: [0 sec] [2.1 sec] [2.8 sec] [3.6 sec] [4.2 sec] [5.0 sec] [6.3 sec] [8.5 sec] [12 sec] [25 sec]

CPU Fan Speed Low Limit

This item allows you to set the low limit warning for CPU Fan speed.

Configuration options: [Ignore] [200 RPM] [300 RPM] [400 RPM] [500 RPM] [600 RPM]

CPU Fan Profile

This item allows you to set the appropriate performance level of the CPU fan.

[Standard]	Set to make the CPU fan adjust automatically depending on the CPU temperature.
[Silent]	Set to minimize the fan speed for quiet CPU fan operation.
[Turbo]	Set to achieve maximum CPU fan speed.
[Manual]	Set to assign the detailed fan speed control parameters.



The following items appear only when **CPU Fan Profile** is set to **[Manual]**.

CPU Upper Temperature

Use the <+> or <-> keys to adjust the upper limit of the CPU Fan temperature. The CPU Fan will operate at the maximum duty cycle when the temperature source is higher than the limit.



The CPU upper temperature cannot be lower than the CPU lower temperature.

CPU Fan Max. Duty Cycle (%)

Use the <+> or <-> keys to adjust the maximum CPU Fan duty cycle. When the temperature source reaches the upper limit, the CPU Fan will operate at the maximum duty cycle.



The CPU fan max. duty cycle cannot be lower than the CPU fan min. duty cycle.

CPU Middle Temperature

Use the <+> or <-> keys to adjust the middle limit of the CPU temperature.

CPU Fan Middle. Duty Cycle (%)

Use the <+> or <-> keys to adjust the CPU Fan middle duty cycle.

CPU Lower Temperature

Use the <+> or <-> keys to adjust the lower limit of the CPU temperature. The CPU Fan will operate at the minimum duty cycle when the temperature source is lower than the limit.

CPU Fan Min. Duty Cycle(%)

Use the <+> or <-> keys to adjust the minimum CPU Fan duty cycle. When the temperature source is under the limit, the CPU Fan will operate at the minimum duty cycle.

Chassis Fan(s) Configuration

Chassis Fan 1-2 Q-Fan Control

This item allows you to set the chassis fan operating mode.

[Auto]	Detects the type of chassis fan installed and automatically switches the control modes.
[PWM Mode]	Enables the Chassis Fan Q-Fan Control feature in PWM mode for 4-pin chassis fan.
[DC Mode]	Enables the Chassis Fan Q-Fan Control feature in DC mode for 3-pin chassis fan.
[Disabled]	Disables the Q-Fan control.



The following items appear only when **Chassis Fan 1-2 Q-Fan Control** is set to **[Auto]**, **[PWM Mode]**, or **[DC Mode]**.

Chassis Fan 1-2 Q-Fan Source

The assigned fan will be controlled according to the selected temperature source. Configuration options: [CPU] [MotherBoard] [VRM] [PCH] [T Sensor] [EXT_Sensor1] [EXT_Sensor2] [EXT_Sensor3] [Multiple Sources]



- For T_Sensor and EXT_Sensor1-3, connect a Thermistor cable to one of these connectors, then tape the other end on a critical component to control its temperature. An ASUS FAN EXTENSION CARD is required to enable these items.
 - For Multiple Sources, select up to three temperature sources and the fan will automatically change based on the highest temperature.
-

Chassis Fan 1-2 Step Up

This item allows you to set the value of the chassis fan step up.

Configuration options: [0 sec] [12 sec] [25 sec] [51 sec] [76 sec] [102 sec] [127 sec] [153 sec] [178 sec] [204 sec]

Chassis Fan 1-2 Step Down

This item allows you to set the value of the chassis fan step down.

Configuration options: [0 sec] [12 sec] [25 sec] [51 sec] [76 sec] [102 sec] [127 sec] [153 sec] [178 sec] [204 sec]

Chassis Fan 1-2 Fan Speed Low Limit

This item allows you to disable or set the chassis fan warning speed.

Configuration options: [Ignore] [200 RPM] [300 RPM] [400 RPM] [500 RPM] [600 RPM]

Chassis Fan 1-2 Profile

This item allows you to set the appropriate performance level of the chassis fan.

- | | |
|------------|--|
| [Standard] | Set to make the chassis fan adjust automatically depending on the CPU temperature. |
| [Silent] | Set to minimize the fan speed for quiet chassis fan operation. |
| [Turbo] | Set to achieve maximum chassis fan speed. |
| [Manual] | Set to assign the detailed chassis speed control parameters. |



The following items appear only when **Chassis Fan 1-2 Profile** is set to **[Manual]**.

Chassis Fan 1-2 Upper Temperature

Use the <+> or <-> keys to adjust the upper limit of the Chassis Fan 1-2 temperature. The Chassis Fan 1-2 will operate at the maximum duty cycle when the temperature source is higher than the limit.



The chassis fan 1-2 upper temperature cannot be lower than the chassis fan 1-2 lower temperature.

Chassis Fan 1-2 Max. Duty Cycle (%)

Use the <+> or <-> keys to adjust the maximum Chassis Fan 1-2 duty cycle. When the temperature source reaches the upper limit, the Chassis Fan 1-2 will operate at the maximum duty cycle.



The chassis fan 1-2 max. duty cycle cannot be lower than the chassis fan 1-2 min. duty cycle.

Chassis Fan 1-2 Middle Temperature

Use the <+> or <-> keys to adjust the middle limit of the Chassis Fan 1-2 temperature.

Chassis Fan 1-2 Middle. Duty Cycle (%)

Use the <+> or <-> keys to adjust the Chassis Fan 1-2 middle duty cycle.

Chassis Fan 1-2 Lower Temperature

Use the <+> or <-> keys to adjust the lower limit of the Chassis Fan 1-2 temperature. The Chassis Fan 1-2 will operate at the minimum duty cycle when the temperature source is lower than the limit.

Chassis Fan 1-2 Min. Duty Cycle(%)

Use the <+> or <-> keys to adjust the minimum Chassis Fan 1-2 duty cycle. When the temperature source is under the limit, the Chassis Fan 1-2 will operate at the minimum duty cycle.

Chassis Fan 1-2 Allow Fan Stop

This function allows the fan to run at 0% duty cycle when the temperature of the source drops below the lower temperature.

Configuration options: [Disabled] [Enabled]

M.2 Fan Control

This item allows you to set the M.2 Fan operating mode.

[Auto]	Detects the type of M.2 fan installed and automatically switches the control modes.
[PWM Mode]	Enables the M.2 Q-Fan Control feature in PWM mode for 4-pin M.2 Fan.
[DC Mode]	Enables the M.2 Q-Fan Control feature in DC mode for 3-pin M.2 Fan.
[Disabled]	Disables the Q-Fan Control.

M.2 Fan Q-Fan Source

The assigned fan will be controlled according to the selected temperature source.

Configuration options: [CPU] [MotherBoard] [VRM] [PCH] [T Sensor] [EXT_Sensor1] [EXT_Sensor2] [EXT_Sensor3] [Multiple Sources]



- For T_Sensor and EXT_Sensor1-3, connect a Thermistor cable to one of these connectors, then tape the other end on a critical component to control its temperature. An ASUS FAN EXTENSION CARD is required to enable these items.
- For Multiple Sources, select up to three temperature sources and the fan will automatically change based on the highest temperature.

M.2 Fan Step Up

This item allows you to set the value of the M.2 fan step up.

Configuration options: [0 sec] [12 sec] [25 sec] [51 sec] [76 sec] [102 sec] [127 sec] [153 sec] [178 sec] [204 sec]

M.2 Fan Step Down

This item allows you to set the value of the M.2 fan step down.

Configuration options: [0 sec] [12 sec] [25 sec] [51 sec] [76 sec] [102 sec] [127 sec] [153 sec] [178 sec] [204 sec]

M.2 Fan Speed Low Limit

This item allows you to disable or set the M.2 fan warning speed.

Configuration options: [Ignore] [200 RPM] [300 RPM] [400 RPM] [500 RPM] [600 RPM]

M.2 Fan Profile

This item allows you to set the appropriate performance level of the M.2 fan.

- | | |
|------------|--|
| [Standard] | Set to make the M.2 fan adjust automatically depending on the CPU temperature. |
| [Silent] | Set to minimize the fan speed for quiet M.2 fan operation. |
| [Turbo] | Set to achieve maximum M.2 fan speed. |
| [Manual] | Set to assign the detailed fan speed control parameters. |



The following items appear only when **M.2 Fan Profile** is set to **[Manual]**.

M.2 fan Upper Temperature

Use the <+> or <-> keys to adjust the upper limit of the M.2 fan temperature. The M.2 fan will operate at the maximum duty cycle when the temperature source is higher than the limit.



The M.2 Fan upper temperature cannot be lower than the M.2 Fan lower temperature.

M.2 fan Max. Duty Cycle (%)

Use the <+> or <-> keys to adjust the maximum M.2 fan duty cycle. When the temperature source reaches the upper limit, the M.2 fan will operate at the maximum duty cycle.



The M.2 Fan max. duty cycle cannot be lower than the M.2 Fan min. duty cycle.

M.2 fan Middle Temperature

Use the <+> or <-> keys to adjust the middle limit of the M.2 fan temperature.

M.2 fan Middle. Duty Cycle (%)

Use the <+> or <-> keys to adjust the M.2 fan middle duty cycle.

M.2 fan Lower Temperature

Use the <+> or <-> keys to adjust the lower limit of the M.2 fan temperature. The M.2 fan will operate at the minimum duty cycle when the temperature source is lower than the limit.

M.2 fan Min. Duty Cycle (%)

Use the <+> or <-> keys to adjust the minimum M.2 fan duty cycle. When the temperature source is under the limit, the M.2 fan will operate at the minimum duty cycle.

M.2 fan Allow Fan Stop

This function allows the fan to run at 0% duty cycle when the temperature of the source drops below the lower temperature.

Configuration options: [Disabled] [Enabled]

Ext. Fan(s) Configuration



An ASUS FAN EXTENSION CARD is required to configure these items.

Extension Fan 1-6 Q-Fan Control

[Auto]	Detects the type of extension fan installed and automatically switches the control modes.
[PWM Mode]	Enables the Extension Q-Fan Control feature in PWM mode for 4-pin extension Fan.
[DC Mode]	Enables the Extension Q-Fan Control feature in DC mode for 3-pin extension Fan.
[Disabled]	Disables the Q-Fan Control.

Extension Fan 1-6 Q-Fan Source

The assigned fan will be controlled according to the selected temperature source.
Configuration options: [CPU] [MotherBoard] [VRM] [PCH] [T Sensor] [EXT_Sensor1] [EXT_Sensor2] [EXT_Sensor3] [Multiple Sources]



- For T_Sensor and EXT_Sensor1-3, connect a Thermistor cable to one of these connectors, then tape the other end on a critical component to control its temperature. An ASUS FAN EXTENSION CARD is required to enable these items.
 - For Multiple Sources, select up to three temperature sources and the fan will automatically change based on the highest temperature.
-

Extension Fan 1-6 Fan Step Up

This item allows you to set the value of the extension fan step up.

Configuration options: [0 sec] [12 sec] [25 sec] [51 sec] [76 sec] [102 sec] [127 sec] [153 sec] [178 sec] [204 sec]

Extension Fan 1-6 Fan Step Down

This item allows you to set the value of the extension fan step down.

Configuration options: [0 sec] [12 sec] [25 sec] [51 sec] [76 sec] [102 sec] [127 sec] [153 sec] [178 sec] [204 sec]

Extension Fan 1-6 Fan Speed Low Limit

This item allows you to disable or set the extension fan warning speed.

Configuration options: [Ignore] [200 RPM] [300 RPM] [400 RPM] [500 RPM] [600 RPM]

Extension Fan 1-6 Profile

This item allows you to set the appropriate performance level of the extension fan.

[Standard]	Set to make the extension fan adjust automatically depending on the CPU temperature.
[Silent]	Set to minimize the fan speed for quiet extension fan operation.
[Turbo]	Set to achieve maximum extension fan speed.
[Manual]	Set to assign the detailed fan speed control parameters.



The following items appear only when **Extension Fan Profile 1-6** is set to **[Manual]**.

Extension Fan 1-6 Upper Temperature

Use the <+> or <-> keys to adjust the upper limit of the extension fan temperature. The extension fan will operate at the maximum duty cycle when the temperature source is higher than the limit. Once the extension fan temperature reaches 75 degrees, fan will run up to full speed.

Extension Fan 1-6 Max. Duty Cycle (%)

Use the <+> or <-> keys to adjust the maximum extension fan duty cycle. When the temperature source reaches the upper limit, the extension fan will operate at the maximum duty cycle. Once the extension fan temperature reaches 75 degrees, fan will run up to full speed.

Extension Fan 1-6 Middle Temperature

Use the <+> or <-> keys to adjust the middle limit of the extension fan temperature.

Extension Fan 1-6 Middle. Duty Cycle (%)

Use the <+> or <-> keys to adjust the extension fan middle duty cycle.

Extension Fan 1-6 Lower Temperature

Use the <+> or <-> keys to adjust the lower limit of the extension fan temperature. The extension fan will operate at the minimum duty cycle when the temperature source is lower than 40 degrees.

Extension Fan 1-6 Min. Duty Cycle(%)

Use the <+> or <-> keys to adjust the minimum extension fan duty cycle. When the temperature source is lower than 40 degrees, the extension fan will operate at the minimum duty cycle.

Heatsink Fan(s) Configuration

Heatsink Fan Q-Fan Control

[PWM Mode] Enables the Heatsink Q-Fan Control feature in PWM mode for 4-pin Heatsink Fan.

[Disabled] Disables the Q-Fan Control.

Heatsink Fan Step Up

This item allows you to set the value of the heatsink fan step up.
Configuration options: [0 sec] [2 sec] [4 sec] [8 sec] [16 sec] [32 sec]



HS Fan speeds will only change immediately when the Step Up and Step Down time is set to 0 secs.

Heatsink Fan Step Down

This item allows you to set the value of the heatsink fan step up.
Configuration options: [0 sec] [2 sec] [4 sec] [8 sec] [16 sec] [32 sec]



HS Fan speeds will only change immediately when the Step Up and Step Down time is set to 0 secs.

Heatsink Fan Speed Low Limit

This item allows you to disable or set the heatsink fan warning speed.

Configuration options: [Ignore] [200 RPM] [300 RPM] [400 RPM] [500 RPM] [600 RPM]

Heatsink fan Upper Temperature

Use the <+> or <-> keys to adjust the upper limit of the heatsink fan temperature. The heatsink fan will operate at the maximum duty cycle when the temperature source is higher than the limit.



The Heatsink fan upper temperature cannot be lower than the Heatsink fan lower temperature.

Heatsink Fan Max. Duty Cycle (%)

Use the <+> or <-> keys to adjust the maximum heatsink fan duty cycle. When the temperature source reaches the upper limit, the heatsink fan will operate at the maximum duty cycle.



The Heatsink fan max. duty cycle cannot be lower than the Heatsink fan min. duty cycle.

Heatsink fan Middle Temperature

Use the <+> or <-> keys to adjust the middle limit of the Heatsink fan temperature.

Heatsink fan Middle. Duty Cycle (%)

Use the <+> or <-> keys to adjust the Heatsink fan middle duty cycle.

Heatsink fan Lower Temperature

Use the <+> or <-> keys to adjust the lower limit of the heatsink fan temperature. The heatsink fan will operate at the minimum duty cycle when the temperature source is lower than the limit.

Heatsink fan Min. Duty Cycle (%)

Use the <+> or <-> keys to adjust the minimum heatsink fan duty cycle. When the temperature source is under the limit, the heatsink fan will operate at the minimum duty cycle.

Water Pump+ Control

[Auto]	Detects the type of Water Pump+ installed and automatically switches the control modes.
[PWM Mode]	Enables the Water Pump+ Q-Fan Control feature in PWM mode for 4-pin Water Pump+.
[DC Mode]	Enables the Water Pump+ Q-Fan Control feature in DC mode for 3-pin Water Pump+.
[Disabled]	Disables the Q-Fan Control.



The following items appear only when **Water Pump+ Control** is set to **[Auto]**, **[DC mode]**, or **[PWM mode]**.

Water Pump+ Q-Fan Source

The assigned fan will be controlled according to the selected temperature source.

Configuration options: [CPU] [MotherBoard] [VRM] [PCH] [T Sensor] [EXT_Sensor1] [EXT_Sensor2] [EXT_Sensor3] [Multiple Sources]



- For T_Sensor and EXT_Sensor1-3, connect a Thermistor cable to one of these connectors, then tape the other end on a critical component to control its temperature. An ASUS FAN EXTENSION CARD is required to enable these items.
 - For Multiple Sources, select up to three temperature sources and the fan will automatically change based on the highest temperature.
-

Water Pump+ Upper Temperature

Use the <+> or <-> keys to adjust the upper limit of the Water Pump+ temperature. The Water Pump+ will operate at the maximum duty cycle when the temperature source is higher than the limit.



The Water Pump+ upper temperature cannot be lower than the Water Pump+ Fan lower temperature.

Water Pump+ Max. Duty Cycle (%)

Use the <+> or <-> keys to adjust the maximum Water Pump+ duty cycle. When the temperature source reaches the upper limit, the Water Pump+ will operate at the maximum duty cycle.



The Water Pump+ Fan max. duty cycle cannot be lower than the Water Pump+ Fan min. duty cycle.

Water Pump+ Middle Temperature

Use the <+> or <-> keys to adjust the middle limit of the Water Pump+ temperature.

Water Pump+ Middle. Duty Cycle (%)

Use the <+> or <-> keys to adjust the Water Pump+ middle duty cycle.

Water Pump+ Lower Temperature

Use the <+> or <-> keys to adjust the lower limit of the Water Pump+ temperature. The Water Pump+ will operate at the minimum duty cycle when the temperature is lower than the limit.

Water Pump+ Min. Duty Cycle(%)

Use the <+> or <-> keys to adjust the minimum Water Pump+ duty cycle. When the temperature source is under the limit, the Water Pump+ will operate at the minimum duty cycle.

AIO Pump Control

[Auto]	Detects the type of AIO Pump installed and automatically switches the control modes.
[PWM Mode]	Enables the AIO Pump Q-Fan Control feature in PWM mode for 4-pin AIO Pump.
[DC Mode]	Enables the AIO Pump Q-Fan Control feature in DC mode for 3-pin AIO Pump.
[Disabled]	Disables the Q-Fan Control.



The following items appear only when **AIO Pump Control** is set to **[Auto]**, **[DC mode]**, or **[PWM mode]**.

AIO Pump Q-Fan Source

The assigned fan will be controlled according to the selected temperature source.

Configuration options: [CPU] [MotherBoard] [VRM] [PCH] [T Sensor] [EXT_Sensor1] [EXT_Sensor2] [EXT_Sensor3] [Multiple Sources]



- For T_Sensor and EXT_Sensor1-3, connect a Thermistor cable to one of these connectors, then tape the other end on a critical component to control its temperature. An ASUS FAN EXTENSION CARD is required to enable these items.
 - For Multiple Sources, select up to three temperature sources and the fan will automatically change based on the highest temperature.
-

AIO Pump Upper Temperature

Use the <+> or <-> keys to adjust the upper limit of the AIO Pump temperature. The AIO Pump will operate at the maximum duty cycle when the temperature source is higher than the limit.

AIO Pump Max. Duty Cycle (%)

Use the <+> or <-> keys to adjust the maximum AIO Pump duty cycle. When the temperature source reaches the upper limit, the AIO Pump will operate at the maximum duty cycle.



The AIO Pump Fan max. duty cycle cannot be lower than the AIO Pump Fan min. duty cycle.

AIO Pump Middle Temperature

Use the <+> or <-> keys to adjust the middle limit of the AIO Pump temperature.

AIO Pump Middle. Duty Cycle (%)

Use the <+> or <-> keys to adjust the AIO Pump middle duty cycle.

AIO Pump Lower Temperature

Use the <+> or <-> keys to adjust the lower limit of the AIO Pump temperature. The AIO Pump will operate at the minimum duty cycle when the temperature is lower than the limit.

AIO Pump Min. Duty Cycle(%)

Use the <+> or <-> keys to adjust the minimum AIO Pump duty cycle.
When the temperature source is under the limit, the AIO Pump will operate at the minimum duty cycle.

8. Boot menu

The Boot menu items allow you to change the system boot options.

Scroll down to display the other BIOS items.

UEFI BIOS Utility – Advanced Mode
10/14/2019 Monday 22:35 English MyFavorite(F3) Q fan Control(F6) AI OC Guide(F11) Search(F9) AURA ON/OFF(F4)

My Favorites Main Ai Tweaker Advanced Monitor **Boot** Tool Exit Hardware Monitor

Boot Configuration

Fast Boot Enabled

Next Boot after AC Power Loss Normal Boot

Above 4G Decoding On Off

> Boot Configuration

> CSM (Compatibility Support Module)

> Secure Boot

Boot Option Priorities

Boot Option #1 UEFI: JetFlashTranscend 4GB 8.0

Boot Override

UEFI: JetFlashTranscend 4GB 8.07, Partition 1 (4.0GB)

AMI Native NVMe Driver Support On Off

Enables or disables boot with initialization of a minimal set of devices required to launch active boot option. Has no effect for BBS boot options.

Frequency 4000 Mhz Temperature 57°C

BCLK 100.0 Mhz Core Voltage 1.097 V

Ratio 40x DRAM Freq. 2133 Mhz

Vol. CHAB/CD 1.200 V Capacity 4096 MB

1.200 V

Prediction

SP 77 Cooler 117 pts

V req for 2core Load Stable 4500Mhz

1.207 V 4556 Mhz

Heavy AVX 4core Load Stable

3500 Mhz 4490 Mhz

ALLcore Load Stable

4358 Mhz N/A

Last Modified | EZ Tuning Wizard | EzMode(F7) | Search on FAQ

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Fast Boot

[Disabled] Allows your system to go back to its normal boot speed.

[Enabled] Allows your system to accelerate the boot speed.



The following item appears only when **Fast Boot** is set to **[Enabled]**.

Next Boot after AC Power Loss

[Normal Boot] Returns to normal boot on the next boot after an AC power loss.

[Fast Boot] Accelerates the boot speed on the next boot after an AC power loss.

Above 4G Decoding

This item enables or disables 64-bit capable devices to be decoded in above 4G address space if your system supports 64-bit PCI Decoding.

Configuration options: [On] [Off]

Boot Configuration

Boot Logo Display

[Auto] Auto adjustments for Windows requirements.

[Full Screen] Maximize the boot logo size.

[Disabled] Hide the logo during POST.



The following item appears only when **Boot Logo Display** is set to **[Auto]** or **[Full Screen]**.

Post Delay Time

This item allows you to select a desired additional POST waiting time to easily enter the BIOS Setup. You can only execute the POST delay time during normal boot.

Configuration options: [0 sec] – [10 sec]



This feature only works when set under normal boot.



The following item appears only when **Boot Logo Display** is set to **[Disabled]**.

Post Report

This item allows you to select a desired POST report waiting time or until ESC is pressed.

Configuration options: [1 sec] – [10 sec] [Until Press ESC]

Boot up NumLock State

This item allows you to enable or disable keyboard NumLock during the system boot.

Configuration options: [Disabled] [Enabled]

Wait For 'F1' If Error

This item allows your system to wait for the <F1> key to be pressed when error occurs.

Configuration options: [Disabled] [Enabled]

Option ROM Messages

[Force BIOS] The Option ROM Messages will be shown during the POST.

[Keep Current] Only the ASUS logo will be shown during the POST.

Interrupt 19 Capture

[Enabled] Execute the trap right away.

[Disabled] Execute the trap during legacy boot.

Setup Mode

[Advanced Mode] This item allows you to go to Advanced Mode of the BIOS after POST.

[EZ Mode] This item allows you to go to EZ Mode of the BIOS after POST.

Boot Sector (MBR/GPT) Recovery Policy

This item allows you to set the Boot Sector Policy.

[Auto Recovery] Follow UEFI Rule.

[Local User Control] You can enter setup page and select Boot Sector (MBR/GPT) Recovery Policy to recovery MBR/GPT on the next boot time.



The following item appears only when **Boot Sector (MBR/GPT) Recovery Policy** is set to **[Local User Control]**.

Next Boot Recovery Action

Choose the (MBR/GPT) recovery action on the next boot.

Configuration options: [Skip] [Recovery]

CSM (Compatibility Support Module)

This item allows you to configure the CSM (Compatibility Support Module) items to fully support the various VGA, bootable devices and add-on devices for better compatibility.

Launch CSM

[Auto] The system automatically detects the bootable devices and the add-on devices for CSM support.

[Enabled] For better compatibility, enable the CSM to fully support the non-UEFI driver add-on devices or the Windows® UEFI mode.

[Disabled] Disable the CSM to fully support the non-UEFI driver add-on devices or the Windows® UEFI mode.



The following items appear only when **Launch CSM** is set to **[Enabled]**.

Boot Device Control

This item allows you to select the type of devices that you want to boot. Devices with the selected mode will appear in the boot priority list.

Configuration options: [UEFI and Legacy OPROM] [Legacy OPROM only] [UEFI only]

Boot from Network Devices

This item allows you to select the type of onboard LAN controllers and installed LAN cards. Network devices will run the selected type during the system boot.

Configuration options: [Ignore] [Legacy only] [UEFI driver first]

Boot from Storage Devices

This item allows you to select the type of storage devices to run first during the system boot. It is recommended to select either Legacy only or UEFI drivers first by the devices specification for better stability.

Configuration options: [Ignore] [Legacy only] [UEFI driver first]

Boot from PCI-E/PCI Expansion Devices

This item allows you to select the type of PCI-E/PCI expansion devices to run first during the system boot.

Configuration options: [Legacy only] [UEFI driver first]

Secure Boot

This item allows you to configure the Windows® Secure Boot settings and manage its keys to protect the system from unauthorized access and malwares during POST.

OS Type

[Windows UEFI Mode] This item allows you to select your installed operating system. Execute the Microsoft® Secure Boot check. Only select this option when booting on Windows® UEFI mode or other Microsoft® Secure Boot compliant OS.

[Other OS] Get the optimized function when booting on Windows® non-UEFI mode. Microsoft® Secure Boot only supports Windows® UEFI mode.



The Microsoft® secure boot can only function properly on Windows® UEFI mode.

Key Management

Install Default Secure Boot keys

This item allows you to immediately load the default Security Boot keys, Platform key (PK), Key-exchange Key (KEK), Signature database (db), and Revoked Signatures (dbx). When the default Secure boot keys are loaded, the PK state will change from Unloaded mode to loaded mode.



You need to save the changes and reset the system for the changes to take effect.

Clear Secure Boot Keys

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

Save Secure Boot Keys

This item allows you to save all secure boot keys to a USB storage device.

PK Management

The Platform Key (PK) locks and secures the firmware from any permissible changes. The system verifies the PK before your system enters the OS.

Save To File

This item allows you to save the PK to a USB storage device.

Set New key

This item allows you to load the downloaded PK from a USB storage device.

Delete key

This item allows you to delete the PK from your system. Once the PK is deleted, all the system's Secure Boot keys will not be active.

Configuration options: [Yes] [No]



The PK file must be formatted as a UEFI variable structure with time-based authenticated variable.

KEK Management

The KEK (Key-exchange Key or Key Enrollment Key) manages the Signature database (db) and Revoked Signature database (dbx).



Key-exchange Key (KEK) refers to Microsoft® Secure Boot Key-Enrollment Key (KEK).

Save to file

This item allows you to save the KEK to a USB storage device.

Set New key

This item allows you to load the downloaded KEK from a USB storage device.

Append Key

This item allows you to load the additional KEK from a storage device for an additional db and dbx loaded management.

Delete key

This item allows you to delete the KEK from your system.

Configuration options: [Yes] [No]



The KEK file must be formatted as a UEFI variable structure with time-based authenticated variable.

DB Management

The db (Authorized Signature database) lists the signers or images of UEFI applications, operating system loaders, and UEFI drivers that you can load on the single computer.

Save to file

This item allows you to save the db to a USB storage device.

Set New key

This item allows you to load the downloaded db from a USB storage device.

Append Key

This item allows you to load the additional db from a storage device for an additional db and dbx loaded management.

Delete key

This item allows you to delete the db file from your system.

Configuration options: [Yes] [No]



The db file must be formatted as a UEFI variable structure with time-based authenticated variable.

DBX Management

The dbx (Revoked Signature database) lists the forbidden images of db items that are no longer trusted and cannot be loaded.

Save to file

This item allows you to save the dbx to a USB storage device.

Set New key

This item allows you to load the downloaded dbx from a USB storage device.

Append Key

This item allows you to load the additional dbx from a storage device for an additional db and dbx loaded management.

Delete key

This item allows you to delete the dbx file from your system.
Configuration options: [Yes] [No]



The dbx file must be formatted as a UEFI variable structure with time-based authenticated variable.

Boot Option Priorities

These items specify the boot device priority sequence from the available devices. The number of device items that appears on the screen depends on the number of devices installed in the system.



- To access Windows® OS in Safe Mode, press <F8 > after POST (Windows® 8 not supported).
 - To select the boot device during system startup, press <F8> when ASUS Logo appears.
-

Boot Override

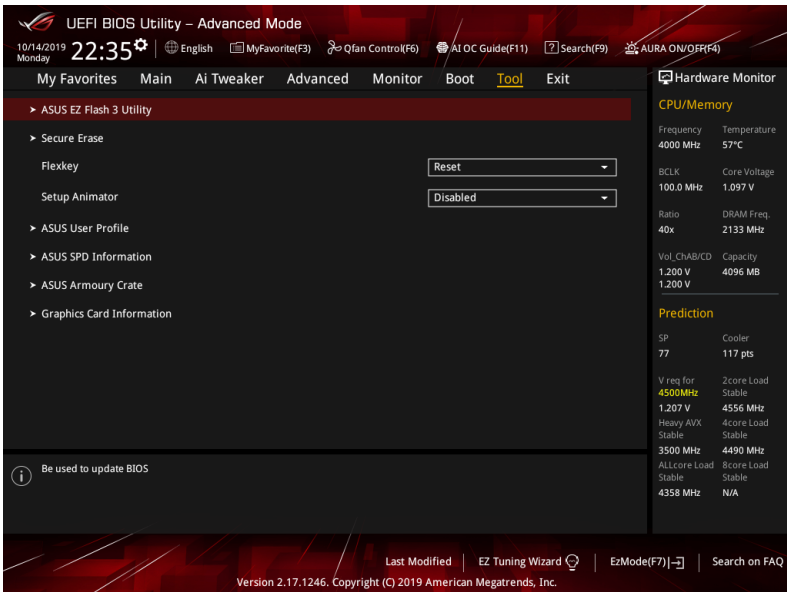
These item displays the available devices. The number of device items that appear on the screen depends on the number of devices installed in the system. Click an item to start booting from the selected device.

AMI Native NVMe Driver Support

This item allows you to enable or disable all NVMe device native OpROM.
Configuration options: [On] [Off]

9. Tool menu

The Tool menu items allow you to configure options for special functions. Select an item then press <Enter> to display the submenu.



Flexkey

This item allows you to assign a different function to the Reset button (Flexkey).

[Reset] Reboots the system.

[Aura On/Off] Enable or Disable Aura LEDs. This setting does not sync with the BIOS/software option.

[DirectKey] Boot directly into the BIOS.

Setup Animator

This item allows you to enable or disable the Setup animator.

Configuration options: [Disabled] [Enabled]

9.1 ASUS EZ Flash 3 Utility

This item allows you to run ASUS EZ Flash 3. When you press <Enter>, a confirmation message appears. Use the left/right arrow key to select between [Yes] or [No], then press <Enter> to confirm your choice.



For more details, refer to section 1.11.2 ASUS EZ Flash 3.

9.2 Secure Erase

SSD speeds may lower over time as with any storage medium due to data processing. Secure Erase completely and safely cleans your SSD, restoring it to factory performance levels.



Secure Erase is only available in AHCI mode. Ensure to set the SATA mode to AHCI. Click **Advanced > PCH Storage Configuration > SATA Mode Selection > AHCI**.

To launch Secure Erase, click **Tool > Secure Erase** on the Advanced mode menu.



- The time to erase the contents of your SSD may take a while depending on its size. Do not turn off the system during the process.
- Secure Erase is only supported on Intel SATA port. For more information about Intel SATA ports, refer to section **Motherboard layout** in your motherboard's user manual.

Displays the available SSDs

Port #	SSD Name	Status	Total Capacity
P2	ADATA S596 Turbo	Frozen	64.0GB

SSD speed performance may degrade over time due to accumulated files and frequent data-writing. Secure Erase completely cleans your SSD and restores it to its factory settings.
WARNING: Ensure that you run Secure Erase on a compatible SSD. Running Secure Erase on an incompatible SSD will render the SSD totally unusable.
NOTE: For the list of Secure Erase compatible SSDs, visit the ASUS Support site at www.asus.com/support

EXIT

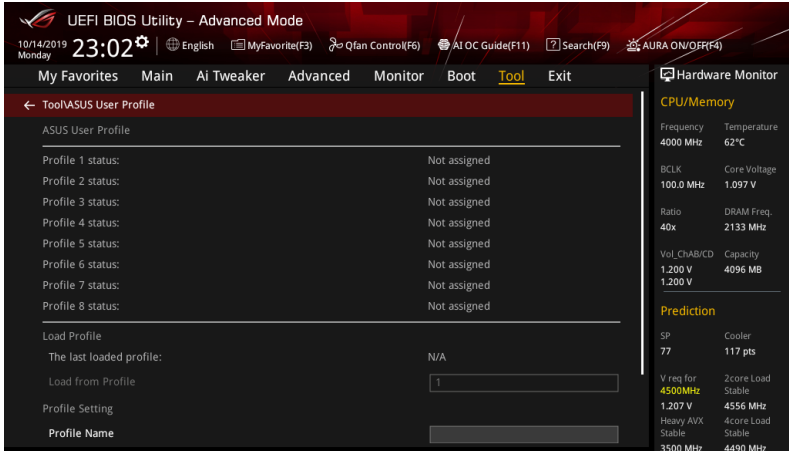


Status definition:

- **Frozen.** The frozen state is the result of a BIOS protective measure. The BIOS guards drives that do not have password protection by freezing them prior to booting. If the drive is frozen, a power off or hard reset of your PC must be performed to proceed with the Secure Erase.
- **Locked.** SSDs might be locked if the Secure Erase process is either incomplete or was stopped. This may be due to a third party software that uses a different password defined by ASUS. You have to unlock the SSD in the software before proceeding with Secure Erase.

9.3 ASUS User Profile

This item allows you to store or load multiple BIOS settings. Scroll down to display the other BIOS items.



Load from Profile

This item allows you to load the previous BIOS settings saved in the BIOS Flash. Key in the profile number that saved your BIOS settings, press <Enter>, and then select **Yes**.



- DO NOT shut down or reset the system while updating the BIOS to prevent the system boot failure!
- We recommend that you update the BIOS file only coming from the same memory/CPU configuration and BIOS version.

Profile Name

This item allows you to key in a profile name.

Save to Profile

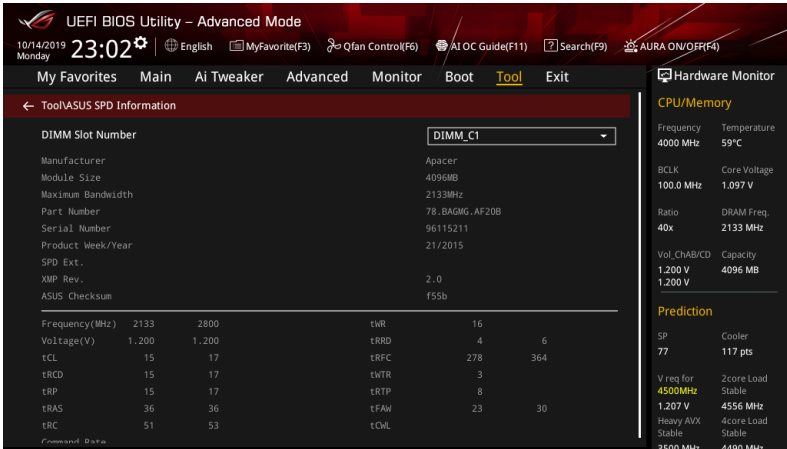
This item allows you to save the current BIOS settings to the BIOS Flash, and create a profile. Key in a profile number from one to eight, press <Enter>, and then select **Yes**.

Load/Save Profile from/to USB Drive

This item allows you to load or save profile from your USB drive, load and save profile to your USB drive.

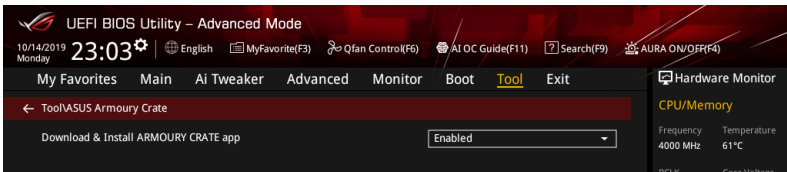
9.4 ASUS SPD Information

This item allows you to view the DRAM SPD information.



9.5 ASUS Armoury Crate

This item allows you to enable or disable downloading and installing of the Armoury Crate app in the Windows® OS. The Armoury Crate app can help you manage and download the latest ROG drivers and utilities for your motherboard.



Download & Install ARMOURY CRATE app

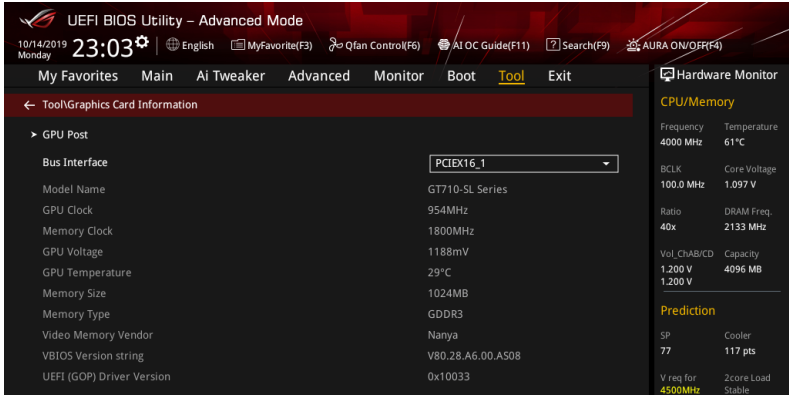
This item allows you to enable Armoury Crate download process. Armoury Crate can help you manage and download the latest ROG drivers and utility updates for your motherboard. Configuration options: [Disabled] [Enabled]

9.6 Graphics Card Information

This item displays the information and recommended configuration for the PCIe slots that the graphics card is installed in your system.



The items in this menu may vary depending on the graphics card installed in your system.



GPU Post

This item displays the information and recommended configuration for the PCIe slots that the graphics card is installed in your system.



This feature is only supported on selected ASUS graphics cards.

Bus Interface

This item allows you to select the bus interface.



Only the information of the selected ASUS graphics cards will be shown.

10. Exit menu

The Exit menu items allow you to load the optimal default values for the BIOS items, and save or discard your changes to the BIOS items. You can access the EZ Mode from the Exit menu.



Load Optimized Defaults

This option allows you to load the default values for each of the parameters on the Setup menus. When you select this option or if you press <F5>, a confirmation window appears. Select **OK** to load the default values.

Save Changes & Reset

Once you are finished making your selections, choose this option from the Exit menu to ensure the values you selected are saved. When you select this option or if you press <F10>, a confirmation window appears. Select **OK** to save changes and exit.

Discard Changes & Exit

This option allows you to exit the Setup program without saving your changes. When you select this option or if you press <Esc>, a confirmation window appears. Select **Yes** to discard changes and exit.

Launch EFI Shell from USB drives

This option allows you to attempt to launch the EFI Shell application (shellx64.efi) from one of the available filesystem devices.

11. Updating BIOS

The ASUS website publishes the latest BIOS versions to provide enhancements on system stability, compatibility, and performance. However, BIOS updating is potentially risky. If there is no problem using the current version of BIOS, DO NOT manually update the BIOS. Inappropriate BIOS updating may result in system's failure to boot. Carefully follow the instructions in this chapter to update your BIOS when necessary.



Visit <http://www.asus.com> to download the latest BIOS file for this motherboard.

The following utilities allow you to manage and update the motherboard BIOS setup program.

1. EZ Update: Updates the BIOS in Windows® environment.
2. ASUS EZ Flash 3: Updates the BIOS using a USB flash drive.
3. ASUS CrashFree BIOS 3: Restores the BIOS using the motherboard support DVD or a USB flash drive when the BIOS file fails or gets corrupted.

11.1 EZ Update

The EZ Update is a utility that allows you to update the motherboard BIOS in Windows® environment.



- EZ Update requires an Internet connection either through a network or an ISP (Internet Service Provider).
 - This utility is available in the support DVD or support USB that comes with the motherboard package.
-

11.2 ASUS EZ Flash 3

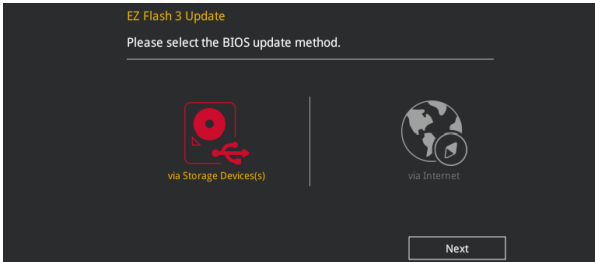
ASUS EZ Flash 3 allows you to download and update to the latest BIOS through the Internet without having to use a bootable floppy disk or an OS-based utility.



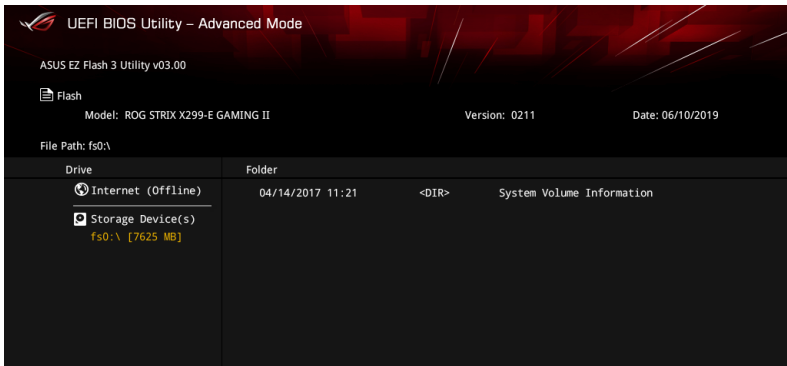
Updating through the Internet varies per region and Internet conditions. Check your local Internet connection before updating through the Internet.

To update the BIOS by USB:

1. Insert the USB flash disk that contains the latest BIOS file to the USB port.
2. Enter the **Advanced** Mode of the BIOS setup program. Go to the **Tool** menu to select **ASUS EZ Flash 3 Utility** and press <Enter>.
3. Select **via Storage Device(s)**.



4. Press <Tab> to switch to the Drive field.
5. Press the Up/Down arrow keys to find the USB flash disk that contains the latest BIOS, and then press <Enter>.
6. Press <Tab> to switch to the Folder Info field.
7. Press the Up/Down arrow keys to find the BIOS file, and then press <Enter> to perform the BIOS update process. Reboot the system when the update process is done.





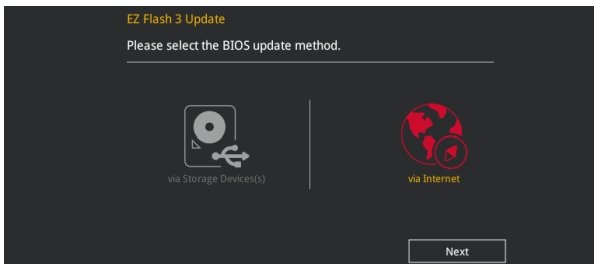
-
- This function can support devices such as a USB flash disk with FAT 32/16 format and single partition only.
 - DO NOT shut down or reset the system while updating the BIOS to prevent system boot failure!
-



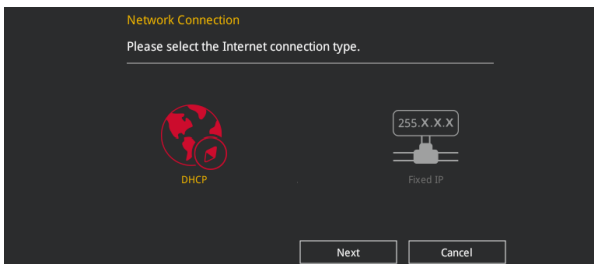
Ensure to load the BIOS default settings to ensure system compatibility and stability. Select the **Load Optimized Defaults** item under the Exit menu. See section **Exit Menu** for details.

To update the BIOS by Internet:

1. Enter the Advanced Mode of the BIOS setup program. Go to the Tool menu to select **ASUS EZ Flash Utility** and press <Enter>.
2. Select **via Internet**.



3. Press the Left/Right arrow keys to select an Internet connection method, and then press <Enter>.



4. Follow the onscreen instructions to complete the update.
5. Reboot the system when the update process is done.



Ensure to load the BIOS default settings to ensure system compatibility and stability. Select the **Load Optimized Defaults** item under the Exit menu. See section **Exit Menu** for details.

11.3 ASUS CrashFree BIOS 3

The ASUS CrashFree BIOS 3 utility is an auto recovery tool that allows you to restore the BIOS file when it fails or gets corrupted during the updating process. You can restore a corrupted BIOS file using the motherboard support DVD or a USB flash drive that contains the BIOS file.



The BIOS file in the motherboard support DVD may be older than the BIOS file published on the ASUS official website. If you want to use the newer BIOS file, download the file at <https://www.asus.com/support/> and save it to a USB flash drive.

Recovering the BIOS

To recover the BIOS:

1. Turn on the system.
2. Insert the motherboard support DVD to the optical drive, or the USB flash drive containing the BIOS file to the USB port.
3. The utility automatically checks the devices for the BIOS file. When found, the utility reads the BIOS file and enters ASUS EZ Flash 3 automatically.
4. The system requires you to enter BIOS Setup to recover the BIOS setting. To ensure system compatibility and stability, we recommend that you press <F5> to load default BIOS values.



DO NOT shut down or reset the system while updating the BIOS! Doing so can cause system boot failure!
