

**ROG STRIX
X470-F
GAMING**

BIOS Manual

ASUS®

Motherboard

E14020
First Edition
March 2018

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BIOS Setup

1.1 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 **SX470FG.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.
-

1.2 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 1.10 **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 1.1.7 **Headers** in your user manual for information on how to erase the RTC RAM.
 - The BIOS setup program does not support Bluetooth devices.
-

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.

1.2.1 Advanced Mode

By default, the Advanced Mode screen appears when you enter the BIOS setup program. 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. To access the EZ Mode, click **EzMode(F7)** or press <F7>.



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 BIOS Advanced Mode interface with the following components highlighted:

- Menu items:** Language, MyFavorite(F3), Qfan Control(F6), EZ Tuning Wizard(F11), Search(F9), Scroll bar, AURA ON/OFF(F4).
- Menu bar:** My Favorites, Main, **AI Tweaker**, Advanced, Monitor, Boot, Tool, Exit.
- Submenu items:** AI Overclock Tuner, Memory Frequency, APU Multiplier, EPU Power Saving Mode, TPU, DRAM Timing Control, TDP Configuration, DIGI+ VRM.
- Configuration fields:** Target CPU Speed: 3100MHz, Target DRAM Frequency: 2133MHz, VDDCR CPU Voltage (1.300V), VDDCR SOC Voltage (1.012V).
- Pop-up Menu:** Auto, Manual, Offset mode.
- General help:** Information icon (i) next to VDDCR CPU Voltage.
- Hardware Monitor:** CPU (Frequency: 3100 MHz, Temperature: 34°C, APU Freq: 100.0 MHz, Ratio: 31x, Core Voltage: 1.068 V), Memory (Frequency: 2133 MHz, Voltage: 1.200 V, Capacity: 8192 MB), Voltage (+12V: +5V, 12.164 V, 5.150 V, +3.3V, 3.335 V).
- Footer:** Last Modified, EzMode(F7) [F7], Hot Keys [F7], Search on FAQ, Version 2.17.1246, Copyright (C) 2018 American Megatrends, Inc.

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 **1.3 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 **1.2.3 QFan Control** for more information.

EZ Tuning Wizard(F11)

This button above the menu bar allows you to view and tweak the overclocking settings of your system.



Refer to section **1.2.4 EZ Tuning Wizard** for more information.

Search (F9)

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

AURA (F4)

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

[ON] All AURA effects will be enabled. (Default mode)

[OFF] All AURA effects 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:



Hot keys

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

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.

Last Modified button

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

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

Displays the CPU/motherboard temperature, CPU voltage output, CPU/chassis fan speed, and SATA information

Creates storage RAID and configures system overclocking

Displays the system properties of the selected mode. Click < or > to switch EZ System Tuning modes

Selects the display language of the BIOS setup program

Searches by BIOS item name, enter the item name to find the related item listing

Turns the RGB LED lighting or functional LED on or off

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.

1.2.3 QFan Control

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

The screenshot shows the QFan Control interface with the following elements and annotations:

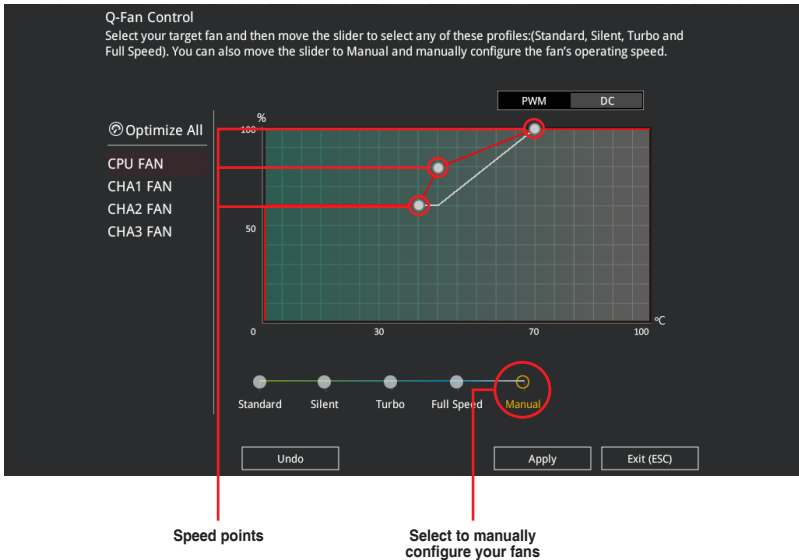
- Q-Fan Control** header with instructions: "Select your target fan and then move the slider to select any of these profiles: Standard, Silent, Turbo and Full Speed. You can also move the slider to Manual and manually configure the fan's operating speed."
- Mode Selector:** A switch between "PWM" and "DC".
- Graph:** A line graph showing fan speed (%) on the y-axis (0 to 100) and temperature (°C) on the x-axis (0 to 100). The profile starts at ~60% at 0°C, rises to ~65% at 30°C, and reaches 100% at 70°C.
- Profile Slider:** A horizontal slider with five positions: Standard, Silent, Turbo, Full Speed, and Manual. The "Standard" position is currently selected.
- Buttons:** "Undo", "Apply", and "Exit (ESC)".

Annotations with red lines pointing to specific UI elements:

- "Click to select a fan to be configured" points to the fan list: CPU FAN, CHA1 FAN, CHA2 FAN, CHA3 FAN.
- "Click to activate PWM Mode" points to the "PWM" mode selector.
- "Click to activate DC Mode" points to the "DC" mode selector.
- "Select a profile to apply to your fans" points to the "Standard" profile on the slider.
- "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" position on the slider.

Configuring fans manually

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

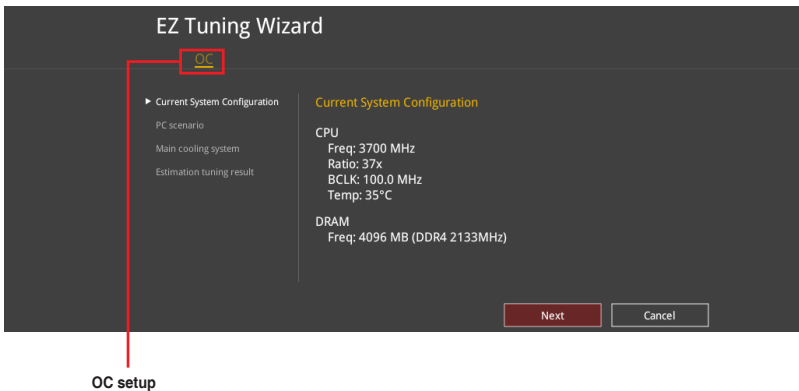


To configure your fans:

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)**.

1.2.4 EZ Tuning Wizard

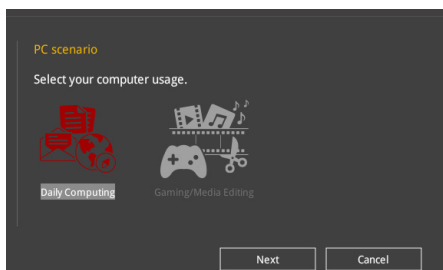
EZ Tuning Wizard allows you to easily overclock your CPU and DRAM, computer usage, and CPU fan to their best settings.



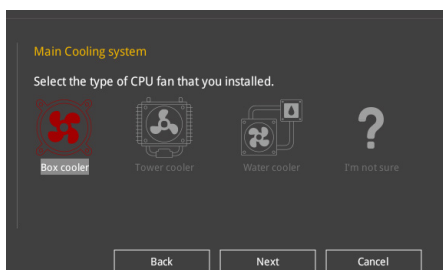
OC Tuning

To start OC Tuning:

1. Press <F11> on your keyboard or click **EZ Tuning Wizard(F11)** from the BIOS screen to open EZ Tuning Wizard screen, and then click **Next**.
2. Select a PC scenario **Daily Computing** or **Gaming/Media Editing**, then click **Next**.



3. Select a Main Cooling System **BOX cooler**, **Tower cooler**, **Water cooler**, or **I'm not sure**, then click **Next**.



4. After selecting the Main Cooling System, click **Next** then click **Yes** to start the OC Tuning.

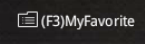
1.3 My Favorites

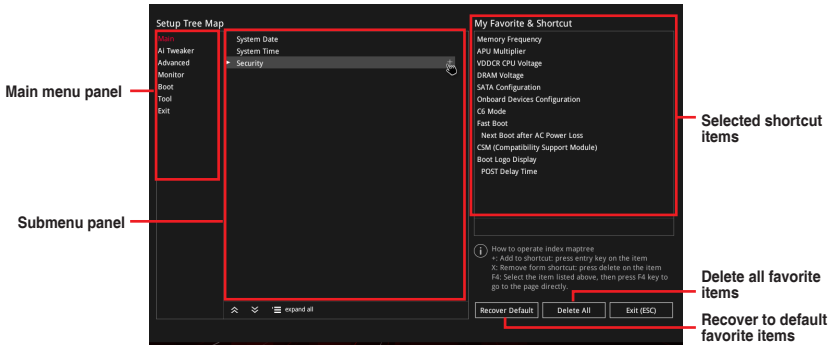
My Favorites is your personal space where you can easily save and access your favorite BIOS items. You can personalize this screen by adding or removing items.




Adding items to My Favorites

To add BIOS items:

1. Press <F3> on your keyboard or click  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 user-managed items such as language and boot order to My Favorites.

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.

1.4 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.

UEFI BIOS Utility – Advanced Mode

02/23/2018 Friday 21:38 English MyFavorite(F3) Qfan Control(F6) EZ Tuning Wizard(F11) Search(F9) AURA ON/OFF(F4)

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

BIOS Information

BIOS Version	0225 x64
Build Date	02/09/2018
EC Version	MBEC-X470-0106
LED EC1 Version	
LED EC2 Version	AULA1-S072-0203

CPU Information

Brand String	AMD A8-9600 RADEON R7, 10 COMPUTE CORES 4C+6G
Speed	3100 MHz
Total Memory	8192 MB (DDR4)
Speed	2133 MHz

System Language English

System Date 02/23/2018

System Time 21:38:04

Choose the default language

Hardware Monitor

CPU

Frequency	3100 MHz	Temperature	35°C
APU Freq	100.0 MHz	Ratio	31x
Core Voltage	1.090 V		

Memory

Frequency	2133 MHz	Voltage	1.200 V
Capacity	8192 MB		

Voltage

+12V	+5V
12.033 V	5.123 V
+3.3V	3.335 V

Security

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

UEFI BIOS Utility – Advanced Mode

02/23/2018 Friday 21:47 English MyFavorite(F3) Qfan Control(F6) EZ Tuning Wizard(F11) Search(F9) AURA ON/OFF(F4)

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

← MainSecurity

Password Description

If ONLY the Administrator's password is set, then this only limits access to Setup and is only asked for when entering Setup.

If ONLY the User's password is set, then this is a power on password and must be entered to boot or enter Setup.

In Setup the User will have Administrator rights.

The password length must be in the following range:

Minimum length	3
Maximum length	20
Administrator Password	Not Installed
User Password	Not Installed

Administrator Password

User Password

Hardware Monitor

CPU

Frequency	3100 MHz	Temperature	34°C
APU Freq	100.0 MHz	Ratio	31x
Core Voltage	1.079 V		

Memory

Frequency	2133 MHz	Voltage	1.200 V
Capacity	8192 MB		

Voltage



- If you have forgotten your BIOS password, erase the CMOS Real Time Clock (RTC) RAM to clear the BIOS password. See section 1.1.7 Headers in your motherboard 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]**.

1.5 Ai Tweaker menu

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

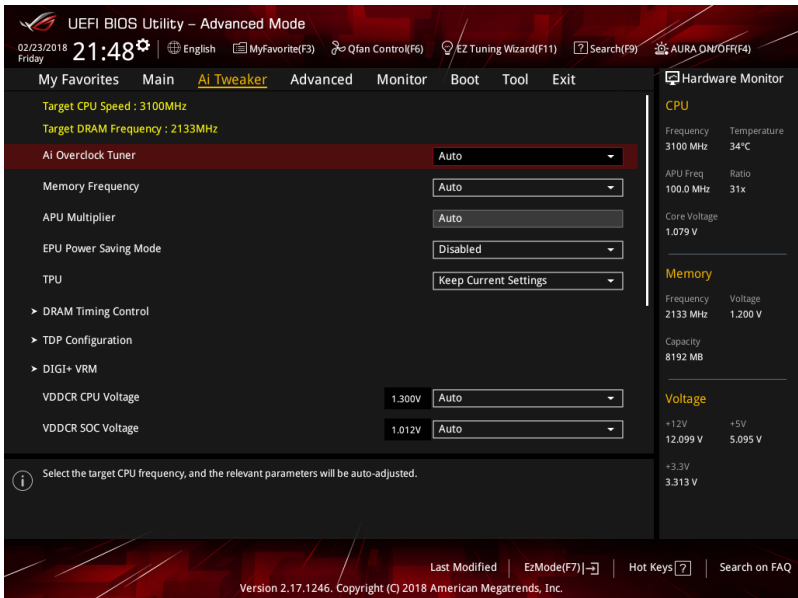


Be cautious when changing the settings of the Ai Tweaker menu items. Incorrect field values can cause the system to malfunction.



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.



Ai Overclock Tuner

Allows you to select the CPU overclocking options to achieve the desired CPU internal frequency. Configuration options:

- [Auto] Loads the optimal settings for the system.
- [Manual] Allows you to individually set overclocking parameters.



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

APU Frequency

Use the <+> and <-> keys to adjust the value. You can also key in the desired value using the numeric keypad. The values range from 90.0MHz to 300.0MHz.

Memory 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] [DDR4-1333MHz] [DDR4-1600MHz] [DDR4-1866MHz] [DDR4-2133MHz] [DDR4-2400MHz]



Selecting a very high memory frequency may cause the system to become unstable! If this happens, revert to the default setting.

APU Multiplier

Allows you to set the multiplier between the APU Core Clock and the APU Bus Frequency. Use the <+> and <-> keys to adjust the ratio. The valid value ranges vary according to your CPU model.

EPU Power Saving Mode

The ASUS EPU (Energy Processing Unit) sets the CPU in its minimum power consumption settings. Enabling this item will apply lower CPU Core/Cache Voltage and help save energy consumption. Set this item to disabled if you are over clocking the system. Configuration options: [Disabled] [Enabled]

TPU

This item allows you to automatically overclock the CPU and DRAM frequencies and voltage for an enhanced system performance.

[Keep Current Settings] Keep the current settings without changing anything.

[TPU I] Applies air cooling overclocking conditions.

[TPU II] Applies water cooling overclocking conditions.



Ensure to use water cooling device before selecting [TPU II].

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] [5] ~ [33]

DRAM RAS# to CAS# Delay

Configuration options: [Auto] [2] ~ [19]

DRAM RAS# PRE Time

Configuration options: [Auto] [5] ~ [27]

DRAM RAS# ACT Time

Configuration options: [Auto] [8] ~ [58]

DRAM COMMAND Mode

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

Secondary Timings**DRAM Row Cycle Time**

Configuration options: [Auto] [10] ~ [78]

DRAM READ to PRE Time

Configuration options: [Auto] [4] ~ [14]

DRAM RAS# to RAS# Delay

Configuration options: [Auto] [1] ~ [13]

DRAM RAS# to RAS# Delay L

Configuration options: [Auto] [1] ~ [13]

DRAM WRITE to READ Delay

Configuration options: [Auto] [2] ~ [14]

DRAM WRITE to READ Delay L

Configuration options: [Auto] [2] ~ [14]

DRAM CAS# Write Latency

Configuration options: [Auto] [5] ~ [17]

DRAM WRITE Recovery Time

Configuration options: [Auto] [5] ~ [26]

DRAM FOUR ACT WIN Time

Configuration options: [Auto] [6] ~ [50]

DRAM REF Cycle Time

Configuration options: [Auto] [1] ~ [2047]

Txs

Configuration options: [Auto] [48] ~ [698]

Tref

Configuration options: [Auto] [1] ~ [65535]

Tmod

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

Tmrd

Configuration options: [Auto] [2] ~ [15]

Trcpage

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

Tzqcs

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

Tzqoper

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

Tstag

Configuration options: [Auto] [1] ~ [254]

Tvrefdq

Configuration options: [Auto] [0]

TrdrdBan

Configuration options: [Auto] [0]

TrdrdSdSc

Configuration options: [Auto] [1] ~ [11]

TrdrdSdDc

Configuration options: [Auto] [2] ~ [11]

Twrrd

Configuration options: [Auto] [1] ~ [11]

TrdrdDd

Configuration options: [Auto] [2] ~ [11]

TrdrdSdScL

Configuration options: [Auto] [1] ~ [11]

TwrrdSdScL

Configuration options: [Auto] [1] ~ [11]

TrwtWB

Configuration options: [Auto] [3] ~ [28]

TrwtTO

Configuration options: [Auto] [2] ~ [27]

TwrrdSdSc

Configuration options: [Auto] [1] ~ [11]

TwrrdSdDc

Configuration options: [Auto] [2] ~ [11]

TwrrdDd

Configuration options: [Auto] [2] ~ [11]

TdIlk

Configuration options: [Auto] [0]

PowerDownEn

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

Third Timings**CKE drive strength**

Configuration options: [Auto] [120 ohms] [60 ohms] [40 ohms] [30 ohms] [24 ohms] [20 ohms]

CS/ODT drive strength

Configuration options: [Auto] [120 ohms] [60 ohms] [40 ohms] [30 ohms] [24 ohms] [20 ohms]

Address/command drive strength

Configuration options: [Auto] [120 ohms] [60 ohms] [40 ohms] [30 ohms] [24 ohms] [20 ohms]

MEMCLK drive strength

Configuration options: [Auto] [120 ohms] [60 ohms] [40 ohms] [30 ohms] [24 ohms] [20 ohms]

Data drive strength

Configuration options: [Auto] [480 ohms] [240 ohms] [160 ohms] [120 ohms] [96 ohms] [80 ohms] [68 ohms] [60 ohms] [53.3 ohms] [48 ohms] [43.6 ohms] [40 ohms] [36.9 ohms] [34.3 ohms] [32 ohms] [30 ohms] [28.2 ohms] [26.7 ohms]

DQS drive strength

Configuration options: [Auto] [480 ohms] [240 ohms] [160 ohms] [120 ohms] [96 ohms] [80 ohms] [68 ohms] [60 ohms] [53.3 ohms] [48 ohms] [43.6 ohms] [40 ohms] [36.9 ohms] [34.3 ohms] [32 ohms] [30 ohms] [28.2 ohms] [26.7 ohms]

Processor on-die termination

Configuration options: [Auto] [480 ohms] [240 ohms] [160 ohms] [120 ohms] [96 ohms] [80 ohms]

CKE setup time

Configuration options: [Auto] [1/2 MEMCLK DELAY] [1 MEMCLK DELAY]

CKE fine delay

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

CS/ODT setup time

Configuration options: [Auto] [1/2 MEMCLK DELAY] [1 MEMCLK DELAY]

CS/ODT fine delay

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

Address/command setup time

Configuration options: [Auto] [1/2 MEMCLK DELAY] [1 MEMCLK DELAY]

Address/command fine delay

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

ODT RTT WR

Configuration options: [Auto] [Disabled] [80 ohms] [120 ohms] [240 ohms] [HI-Z]

ODT RTT NOM

Configuration options: [Auto] [Disabled] [34.3 ohms] [40 ohms] [48 ohms] [60 ohms] [80 ohms] [120 ohms] [240 ohms]

ODT RTT PARK

Configuration options: [Auto] [Disabled] [34.3 ohms] [40 ohms] [48 ohms] [60 ohms] [80 ohms] [120 ohms] [240 ohms]

TDP Configuration



This item appears depending on the APU type installed.

Target TDP

Allows you to manually set up a TDP (Thermal Design Power) value. The processor will run within the specified TDP to constrain power consumption.

DIGI+ VRM

VDDCR CPU Load-line Calibration

Load-line is defined by Intel® 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. Select from levels 1 to 8 to adjust the load-line slope. 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.

VDDCR 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%] [110%] [120%] [130%] [140%]



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

VDDCR CPU Switching Frequency

This item affects the VRM transient response speed and the component thermal production. Select [**Manual**] to configure a higher frequency for a quicker transient response speed. Configuration options: [Auto] [Manual]



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



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

Fixed VDDCR CPU Switching Frequency

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 with an interval of 50 KHz.



Do not remove the thermal module when the manual mode is selected. The thermal conditions should be monitored.



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

VRM Spread Spectrum

This item allows to enhance the system stability. Configuration options:
[On] [Off]

VDDCR CPU Power Duty Control

DIGI + VRM Duty Control adjusts the current of every VRM phase and the thermal conditions of every phase component.

[T. Probe] Select to set the VRM thermal balance mode.

[Extreme] Select to set the VRM current balance mode.



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

VDDCR CPU Power Phase Control

This item allows you to set the power phase control of the CPU.

[Standard] The phase control will be based on the CPU command.

[Optimized] Set to the ASUS optimized phase tuning profile.

[Extreme] Set to the full phase mode.

[Manual] The phase number will be adjusted by current(A) step.



DO NOT remove the thermal module when setting this item to **[Extreme]** or **[Manual]**. The thermal conditions should be monitored.



The following item appears only when the **CPU Power Phase Control** is set to **[Manual]**.

Manual Adjustment

This item allows to select the reaction time. Configuration options: [Regular]
[Medium] [Fast] [Ultra Fast]

VDDCR SOC Load-line Calibration

This item allows you to select the VDDSOC Load-line Calibration. Select from levels 1 to 8 to adjust the load-line slope. 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.

VDDCR SOC Switching Frequency

This item affects the VRM transient response speed and the component thermal production. Select **[Manual]** to configure a higher frequency for a quicker transient response speed. Configuration options: [Auto] [Manual]



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



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

Fixed VDDCR SOC 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 400 KHz to 600 KHz with an interval of 50 KHz.



Do not remove the thermal module when the manual mode is selected. The thermal conditions should be monitored.

VDDCR SOC Power Phase Control

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



DO NOT remove the thermal module when setting this item to **[Extreme]** or **[Manual]**. The thermal conditions should be monitored.



The following item appears only when the **VDDCR SOC Power Phase Control** is set to **[Manual]**.

Manual Adjustment

This item allows to select the reaction time. Configuration options: [Regular] [Medium] [Fast] [Ultra Fast]

VDDCR CPU Voltage

Configures the mode of Voltage fed to the cores of the processor. Configuration options: [Auto] [Manual] [Offset Mode]



The following items appear only when you set the **VDDCR CPU Voltage** to **[Manual]**.

VDDCR CPU Voltage Override

Allows you to configure the CPU Core voltage. Configuration options: [Auto] [0.75000V] ~ [2.00000V]



The following items appear only when you set the **VDDCR CPU Voltage** to **[Offset Mode]**.

VDDCR CPU Offset Mode Sign

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

VDDCR CPU Offset Voltage

This item allows you to configure the CPU core voltage offset value. Configuration options: [Auto] [0.00625V] - [0.50000V]

VDDCR SOC Voltage

Configures the mode of Voltage fed to the VDDSOC. Configuration options: [Auto] [Manual] [Offset Mode]



The following items appear only when you set the **VDDCR SOC Voltage** to [Manual].

VDDCR SOC Voltage Override

Allows you to configure the VDDSOC voltage. Configuration options: [Auto] [0.75000V] ~ [1.80000V]



The following items appear only when you set the **VDDCR SOC Voltage** to [Offset Mode].

VDDCR SOC Offset Mode Sign

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

VDDCR SOC Offset Voltage

This item allows you to configure the VDDSOC voltage offset value. Configuration options: [Auto] [0.00625V] - [0.50000V]

DRAM Voltage

Configuration options: [Auto] [1.2V] ~ [1.35V]

1.05V SB Voltage

Configuration options: [Auto] [1.05V] ~ [1.1V]

2.5V SB Voltage

Configuration options: [Auto] [2.5V] ~ [2.55V]

VDDP Voltage

Configuration options: [Auto] [1.05V] ~ [1.2V]

CPU 1.80V Voltage

Configuration options: [Auto] [1.80V] ~ [2.20V]

VTTDDR Voltage

Configuration options: [Auto] [0.600V] ~ [1/2VDDQ+0.2V]

VPP_MEM Voltage

Configuration options: [Auto] [2.500V] ~ [2.800V]

VDDP Standby Voltage

Configuration options: [Auto] [1.050V] ~ [1.200V]

1.6 Advanced menu

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



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

02/23/2018 Friday 22:07 English MyFavorite(F3) Qfan Control(F6) EZ Tuning Wizard(F11) Search(F9) AURA ON/OFF(F4)

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

- > AMD fTPM configuration
- > CPU Configuration
- > NB Configuration
- > SATA Configuration
- > Onboard Devices Configuration
- > APM Configuration
- > PCI Subsystem Settings
- > Network Stack Configuration
- > HDD/SSD SMART Information
- > USB Configuration

AMD fTPM Settings

Hardware Monitor

CPU

Frequency	Temperature
3100 MHz	34°C

APU Freq Ratio

100.0 MHz	31x
-----------	-----

Core Voltage

1.079 V

Memory

Frequency	Voltage
2133 MHz	1.200 V

Capacity

8192 MB

Voltage

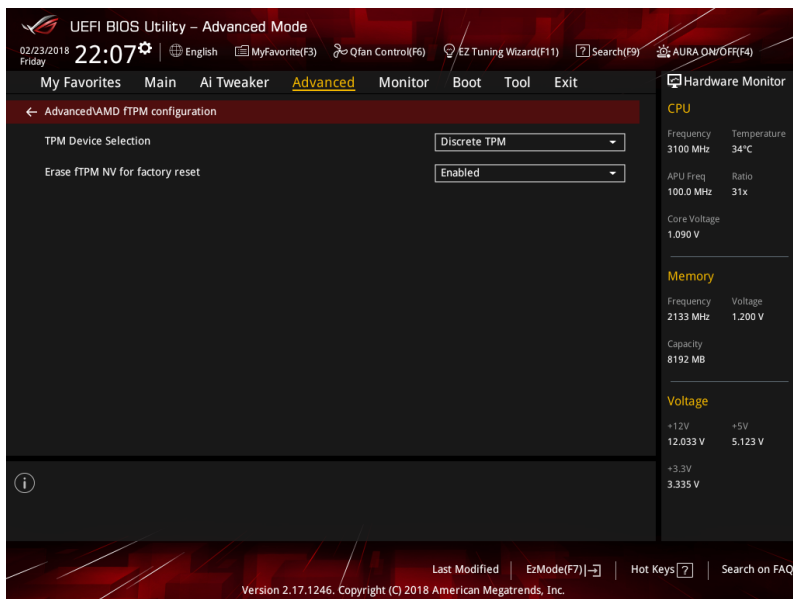
+12V	+5V
12.099 V	5.123 V
+3.3V	
3.335 V	

Last Modified | EzMode(F7) | Hot Keys | Search on FAQ

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1.6.1 AMD fTPM Configuration

The items in this menu allow you to configure the TPM settings.



TPM Device Selection

This item allows you to select the TPM device. Configuration options: [Firmware TPM]
[Discrete TPM]

Erase fTPM NV for factory reset

- [Enabled] When new CPU is installed, select this option to reset fTPM. If you are using BitLocker or encryption-enabled system, your system cannot boot up without a recovery key.
- [Disabled] Select this option to keep previous fTPM record and continue system boot. fTPM will NOT be enabled with new CPU unless fTPM is reset (reinitialized). You can swap back to the old CPU to recover TPM related keys and data.

1.6.2 CPU Configuration

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



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

UEFI BIOS Utility – Advanced Mode

02/23/2018 Friday 22:17 English MyFavorite(F3) Qfan Control(F6) EZ Tuning Wizard(F11) Search(F9) AURA ON/OFF(F4)

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

← Advanced CPU Configuration

CPU Configuration

AMD A8-9600 RADEON R7, 10 COMPUTE CORES 4C+6G

4 Core(s) Running @ 3096 MHz, 1050 mV

Max Speed: 3100 MHz

Microcode Patch Level: 6006118

----- Cache per core -----

L1 Instruction Cache: 96 KB/3-way

L1 Data Cache: 32 KB/8-way

L2 Cache: 512 KB/16-way

No L3 Cache Present

PSS Support Enabled

NX Mode Enabled

SVM Mode Enabled

CPB Mode Enabled

CPU

Frequency	Temperature
3100 MHz	34°C

APU Freq: 100.0 MHz Ratio: 31x

Core Voltage: 1.079 V

Memory

Frequency	Voltage
2133 MHz	1.200 V

Capacity: 8192 MB

Voltage

+12V	+5V
12.099 V	5.095 V
+3.3V	
3.335 V	

Last Modified | EZMode(F7) | Hot Keys | Search on FAQ

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PSS Support

This item allows you enable or disable the generation of ACPI_PPC, _PSS, and _PCT objects. Configuration options: [Disabled] [Enabled]

NX Mode

This item allows you enable or disable no-execute page protection function. Configuration options: [Disabled] [Enabled]

SVM Mode

This item allows you enable or disable CPU Virtualization. Configuration options: [Disabled] [Enabled]

CPB Mode

Disables the CPB (Core Performance Boost) mode or set it to [Auto] for automatic configuration. Configuration options: [Enabled] [Disabled]

C6 Mode

Enables or disables C6 mode. Configuration options: [Enabled] [Disabled]

IOMMU

Set this item to [Enabled] to show IOMMU Mode. Configuration options: [Enabled] [Disabled] [Auto]

Bank Interleaving

Enables or disables the bank memory interleaving. Configuration options: [Enabled] [Disabled]

Channel Interleaving

Enables or disables the channel memory interleaving. Configuration options: [Enabled] [Disabled]

Core Leveling Mode

Allows you to change the number of Compute Units on the system. Configuration options: [Automatic mode] [One Compute Unit]

1.6.3 NB Configuration



NB Configuration function is not support when using an AMD Ryzen processor.

The screenshot shows the UEFI BIOS Utility in Advanced Mode. The main menu includes 'My Favorites', 'Main', 'Ai Tweaker', 'Advanced', 'Monitor', 'Boot', 'Tool', and 'Exit'. The 'Advanced' menu is expanded to show 'AdvancedNB Configuration' with three settings: 'IGFX Multi-Monitor' (Disabled), 'Primary Video Device' (PCIe Video), and 'UMA Frame Buffer Size' (Auto). The 'Hardware Monitor' panel on the right displays the following data:

CPU	
Frequency	3100 MHz
Temperature	34°C
APU Freq	100.0 MHz
Ratio	31x
Core Voltage	1.079 V

Memory	
Frequency	2133 MHz
Voltage	1.200 V
Capacity	8192 MB

Voltage	
+12V	+5V
12.033 V	5.123 V
+3.3V	
3.335 V	

The bottom status bar shows 'Version 2.17.1246. Copyright (C) 2018 American Megatrends, Inc.' and navigation options like 'Last Modified', 'EZ Mode (F7)', 'Hot Keys', and 'Search on FAQ'.

IGFX Multi-Monitor

Enables or disables the Internal Graphics Device Multi-Monitor support for add-on VGA devices. And the memory size of Internal Graphics Device will keep memory reserved.
Configuration options: [Disabled] [Enabled]



The **IGFX Multi-Monitor** item must be enabled before using AMD Dual Graphics technology.

Primary Video Device

Selects the primary display device. Configuration options: [IGFX Video] [PCIe Video]

UMA Frame Buffer Size [Auto]

Configuration options: [Auto] [32M] [64M] [128M] [256M] [512M] [1G] [2G]

1.6.4 SATA 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.

The screenshot displays the UEFI BIOS Utility in Advanced Mode. The top navigation bar includes 'My Favorites', 'Main', 'Ai Tweaker', 'Advanced' (selected), 'Monitor', 'Boot', 'Tool', and 'Exit'. The 'Advanced' menu is open, showing 'Advanced SATA Configuration'. The settings for SATA ports are as follows:

SATA Port	Configuration
SATA Port Enable	Enabled
SATA Mode	AHCI
NVMe RAID mode	Disabled
SMART Self Test	On / Off
SATA6G_1 (Black)	Empty
SATA6G_1 (Black) - Hot Plug	Disabled
SATA6G_2 (Black)	Empty
SATA6G_2 (Black) - Hot Plug	Disabled
SATA6G_3 (Black)	Empty
SATA6G_3 (Black) - Hot Plug	Disabled

The 'Hardware Monitor' panel on the right shows the following system metrics:

CPU	
Frequency	Temperature
3100 MHz	34°C
APU Freq	
Ratio	31x
100.0 MHz	
Core Voltage	
1.079 V	
Memory	
Frequency	Voltage
2133 MHz	1.200 V
Capacity	
8192 MB	
Voltage	
+12V	+5V
12.164 V	5.123 V
+3.3V	
3.335 V	

The bottom status bar shows 'Version 2.17.1246. Copyright (C) 2018 American Megatrends, Inc.' and various utility icons like 'Last Modified', 'EZ Mode(F7)', 'Hot Keys(F7)', and 'Search on FAQ'.

SATA Port Enable

This item allows you to enable or disable the SATA Device. Configuration options: [Disabled] [Enabled]

SATA Mode

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.

[RAID] Set to [RAID] when you want to create a RAID configuration from the SATA hard disk drives.

NVMe RAID mode

This item allows you enable or disable the NVMe RAID mode. Configuration options: [Disabled] [Enabled]

SMART 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]

SATA6G_1(Black) - SATA6G_6(Black)

SATA6G_1 - SATA6G_6

This item allows you to rename the selected SATA port. Configuration options: [OK] [Cancel]

Hot Plug

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

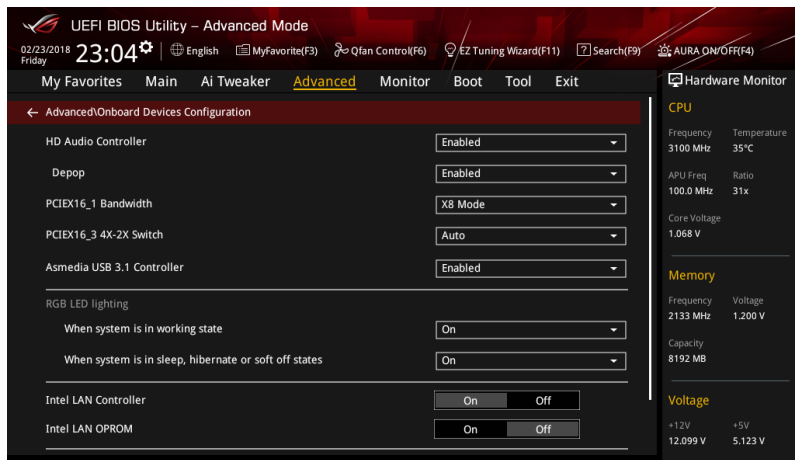
M.2_1(Black), M.2_2(Black)

Click to assign a new name for the M.2 port.

1.6.5 Onboard Devices Configuration

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

Scroll down to display 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]

Depop

Configuration options: [Disabled] [Enabled]

PCIEX16_1 Bandwidth

This item displays on AMD Ryzen™ with Radeon™ Vega Graphics/ 7th Generation A-Series/ Athlon X4 processors.

[X8 Mode] The PCIe x16_1 slot runs at x8 mode.

[PCIe RAID Mode] The Hyper M.2 x16 card and other add-on M.2 devices all run at x4 mode, which allows you to create a PCIe RAID array.



Use PCIe RAID Mode when installing the Hyper M.2 x16 card or other M.2 adapter cards. Installing other devices when using PCIe RAID Mode may cause your PC to fail to boot up.

PCIEX16_2 Bandwidth

This item displays on AMD Ryzen™ 2nd Generation/ Ryzen™ 1st Generation processors.

[X8 Mode] The PCIe x16_2 slot runs at x8 mode.

[PCIe RAID Mode] The Hyper M.2 x16 card and other add-on M.2 devices all run at x4 mode, which allows you to create a PCIe RAID array.

PCIEX16_3 4X-2X Switch

This item allows you to set the PCIEX16_3 Mode. Configuration options: [Auto] [2X] [4X]

[Auto] Automatic configuration.

If PCIe mode M.2 device is inserted to M.2_2, switches PCIEx16_3 to X4 mode;

Else if no device or SATA mode M.2 device is inserted to M.2_2, whenever PCIEx1_1 or PCIEx1_3 is occupied, switches PCIEx16_3 to X2 mode;

When a device (with bandwidth >= 4X) is inserted into PCIEX16_3 and no device is inserted into both PCIEx1_1 and PCIEx1_3, switches PCIEX16_3 to X4 mode.

[2X] Forces PCIEX16_3 to run at X2 mode.

[4X] Forces PCIEX16_3 to run at X4 mode.

Asmedia USB 3.1 Controller

[Disabled] Disables the controller.

[Enabled] Enables the rear USB 3.1 controller.

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. Configuration options: [On] [Off]

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. Configuration options: [On] [Off]

Intel LAN Controller

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

[On] [Off]



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

Intel LAN OPROM

This item allows you to enable or disable the PXE Option Rom of the Intel LAN controller. Configuration options: [On] [Off]

Charging USB devices in Power State S5 [Disabled]

[Enabled] Charges USB devices even when the system is in Power State S5.

[Disabled] Disables this function.

Serial Port Configuration

The sub-items in this menu allow you to set the serial port configuration.

Serial Port 1 [On]

Allows you to enable or disable the serial port (COM). Configuration options: [On] [Off]

Change Settings [IO=3F8h; IRQ=4]

This item appears only when you set the **Serial Port** to [On] and allows you to select the Serial Port base address. Configuration options: [IO=3F8h; IRQ=4] [IO=2F8h; IRQ=3] [IO=3E8h; IRQ=4] [IO=2E8h; IRQ=3]

1.6.6 APM Configuration

The items in this menu allow you to set system wake and sleep settings.



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 Ring

[Disabled] Disables Ring to generate a wake event.

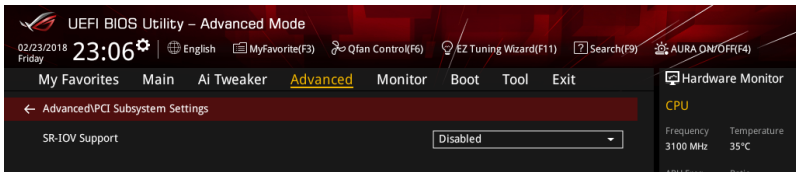
[Enabled] Enables Ring to generate a wake event.

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]

1.6.7 PCI Subsystem Settings

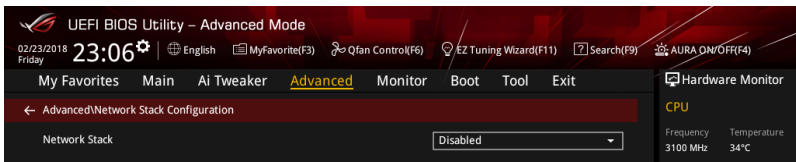


SR-IOV Support

This item allows you to enable or disable the Single Root IO Virtualization support if your system has SR-IOV capable PCIe devices.

1.6.8 Network Stack Configuration

The items in this menu allow you to enable or disable the UEFI network stack.



Network stack

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

Configuration options: [Disable] [Enable]



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

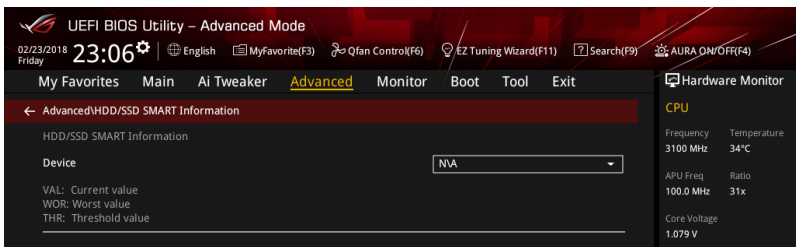
Ipv4/Ipv6 PXE Support

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

Configuration options: [Disabled] [Enabled]

1.6.9 HDD/SSD SMART Information

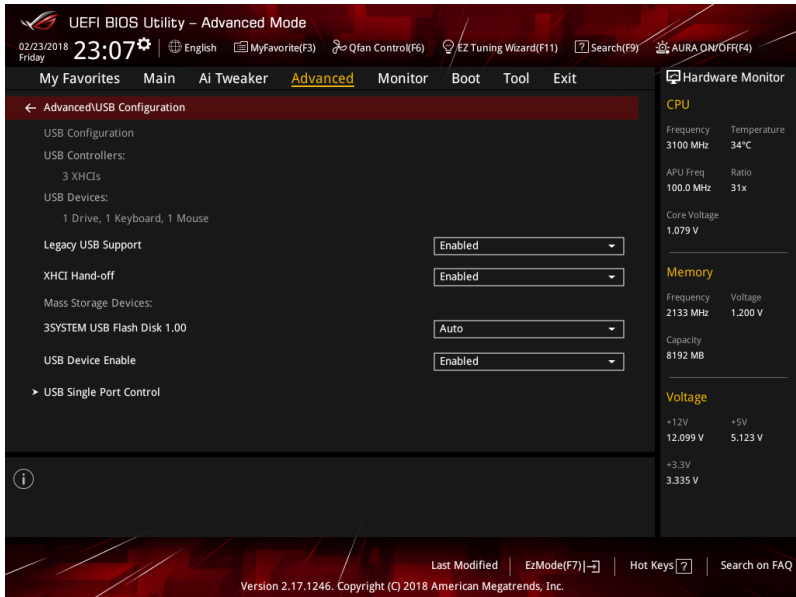
This menu displays the SMART information of the connected devices.



NVM Express devices do not support SMART information.

1.6.10 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 can be used for BIOS setup only and cannot be recognized in the boot devices list.
- [Auto] Your system automatically detects the presence of USB devices at startup. If any USB devices are detected, the legacy USB support is enabled.

XHCI Hand-off

- [Enabled] Enables the support for operating systems without an XHCI hand-off feature.
- [Disabled] Disables the XHCI Hand-off support.

USB Single Port Control

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

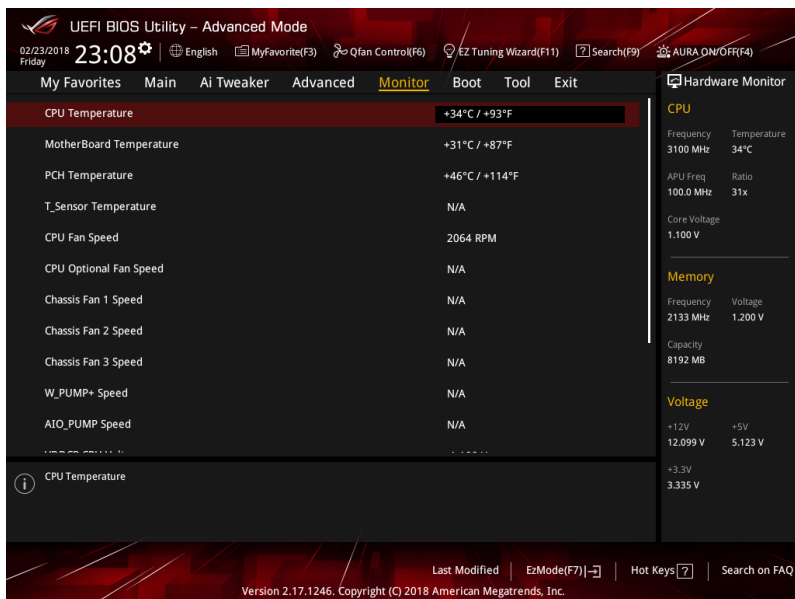


Refer to section 1.1.2 **Motherboard layout** in your user manual for the location of the USB ports.

1.7 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, Motherboard Temperature, PCH temperature, T_Sensor Temperature [xxx°C/xxx°F]

The onboard hardware monitor automatically detects and displays the CPU, motherboard, PCH, and T_Sensor temperatures. Select **[Ignore]** if you do not wish to display the detected temperatures.

CPU Fan Speed, Chassis Fan 1/2/3 Speed, W_Pump+ Speed, AIO Pump Speed [xxxx RPM]

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

VDDCR CPU 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

Qfan 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 CPU Q-Fan control feature. |



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

CPU Fan Smoothing Up/Down Time

This item allows you to set the CPU Fan Smoothing Up/Down Time. Configuration options: [0 sec] [2.6 sec] [3.8 sec] [5.1 sec] [6.4 sec] [7.7 sec] [15.9 sec] [31.9 sec] [63.8 sec] [255 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 you set the **CPU Fan Profile** to **[Manual]**.

CPU Upper Temperature

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

CPU Fan Max. Duty Cycle(%)

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

CPU Middle Temperature

Use the <+> and <-> keys to adjust the CPU middle 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 CPU temperature is lower than the limit.

CPU Fan Min. Duty Cycle(%)

Use the <+> and <-> keys to adjust the minimum CPU fan duty cycle. When the CPU temperature is lower than the lower limit, the CPU fan will operate at the minimum duty cycle.

Chassis Fan(s) Configuration

Chassis Fan 1/2/3 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 chassis Q-Fan control feature. |

Chassis Fan 1/2/3 Q-Fan Source

The assigned fan will be controlled according to the selected temperature source. Configuration options: [CPU] [MotherBoard] [PCH] [T_Sensor] [Multiple Sources]



For Multiple Sources, select up to three temperature sources and the fan will automatically change based on the highest temperature.

Chassis Fan 1/2/3 Smoothing Up/Down Time

This item allows you to set the Chassis Fan Smoothing Up/Down Time. Configuration options: [0 sec] [2.6 sec] [3.8 sec] [5.1 sec] [6.4 sec] [7.7 sec] [15.9 sec] [31.9 sec] [63.8 sec] [255 sec]

Chassis Fan 1/2/3 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 1/2/3 Profile

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

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



The following items appear only when you set **Chassis Fan 1/2/3 Profile** to **[Manual]**.

Chassis Fan 1/2/3 Upper Temperature

Use the <+> or <-> keys to adjust the upper limit of the Chassis Fan 1/2/3 temperature. The Chassis Fan 1/2/3 will operate at the maximum duty cycle when the temperature source is higher than the limit.

Chassis Fan 1/2/3 Max. Duty Cycle (%)

Use the <+> or <-> keys to adjust the maximum Chassis Fan 1/2/3 duty cycle. When the temperature source reaches the upper limit, the Chassis Fan 1/2/3 will operate at the maximum duty cycle.

Chassis Fan 1/2/3 Middle Temperature

Use the <+> or <-> keys to adjust the middle limit of the Chassis Fan 1/2/3 temperature.

Chassis Fan 1/2/3 Middle. Duty Cycle (%)

Use the <+> or <-> keys to adjust the Chassis Fan 1/2/3 middle duty cycle.

Chassis Fan 1/2/3 Lower Temperature

Use the <+> or <-> keys to adjust the lower limit of the Chassis Fan 1/2/3 temperature. The Chassis Fan 1/2/3 will operate at the minimum duty cycle when the temperature source is lower than the limit.

Chassis Fan 1/2/3 Min. Duty Cycle(%)

Use the <+> or <-> keys to adjust the minimum Chassis Fan 1/2/3 duty cycle. When the temperature source is under the limit, the Chassis Fan 1/2/3 will operate at the minimum duty cycle.

AIO_Pump/W_Pump+ Control

[Disabled]	Disable the AIO_Pump/W_Pump+ control feature.
[Auto]	Detects the type of AIO_Pump/W_Pump+ installed and automatically switches the control modes.
[DC mode]	Enable the AIO_Pump/W_Pump+ control in DC mode for 3-pin chassis fan.
[PWM mode]	Enable the AIO_Pump/W_Pump+ control in PWM mode for 4-pin chassis fan.



The following items appear only when you set the **AIO_Pump/W_Pump+ Control** to **[Auto]**, **[DC mode]** or **[PWM mode]**.

AIO_Pump/W_Pump+ Upper Temperature

Use the <+> or <-> keys to adjust the upper limit of the AIO_Pump/W_Pump+ temperature.

AIO_Pump/W_Pump+ Max. Duty Cycle (%)

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

AIO_Pump/W_Pump+ Middle Temperature

Use the <+> or <-> keys to adjust the middle limit of the AIO_Pump/W_Pump+ temperature.

AIO_Pump/W_Pump+ Middle. Duty Cycle (%)

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

AIO_Pump/W_Pump+ Lower Temperature

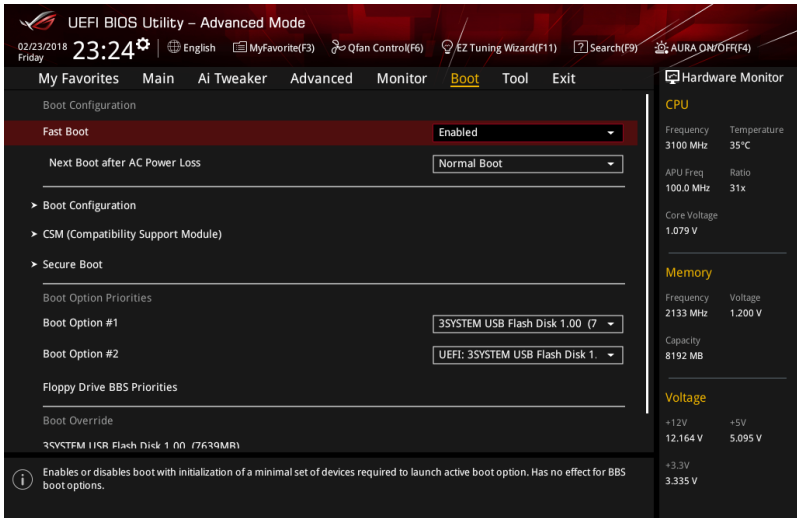
Use the <+> or <-> keys to adjust the lower limit of the AIO_Pump/W_Pump+ temperature. The AIO_Pump/W_Pump+ will operate at the minimum duty cycle when the temperature is lower than the limit.

AIO_Pump/W_Pump+ Min. Duty Cycle(%)

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

1.8 Boot menu

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



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 items appear only when you set the Fast Boot 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.

Boot Configuration

Boot Logo Display

- [Auto] Sets the boot logo to display during POST.
- [Full Screen] Sets the boot logo display in full screen during POST.
- [Disabled] Disables the boot logo display during POST.



The following item appears only when you set the **Boot Logo Display** to **[Auto]** and **[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 you set the **Boot Logo Display** to **[Disabled]**.

Post Report

This item allows you to select a desired POST report waiting time.

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

Boot up NumLock State

This item allows you to enable or disable power-on state of the NumLock.

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 third-party ROM messages will be forced to display during the boot sequence.

[Keep Current] The third-party ROM messages will be displayed only if the third-party manufacturer had set the add-on device to do so.

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.

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.

[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 you set the Launch CSM to **[Enabled]**.

Boot Device Control

This item allows you to select the type of devices that you want to boot.
Configuration options: [UEFI and Legacy OPROM] [Legacy OPROM only] [UEFI only]

Boot from Network Devices

This item allows you to select the type of network devices that you want to launch.
Configuration options: [Ignore] [Legacy only] [UEFI driver first]

Boot from Storage Devices

This item allows you to select the type of storage devices that you want to launch.
Configuration options: [Ignore] [Legacy only] [UEFI driver first]

Boot from PCI-E Expansion Devices

This item allows you to select the type of PCI-E/PCI expansion devices that you want to launch.
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. |

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.

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 the PK (Platform 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 Key Exchange Keys (KEK) manages the Signature database (db) and Forbidden Signature database (dbx).



Key Exchange Keys (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.



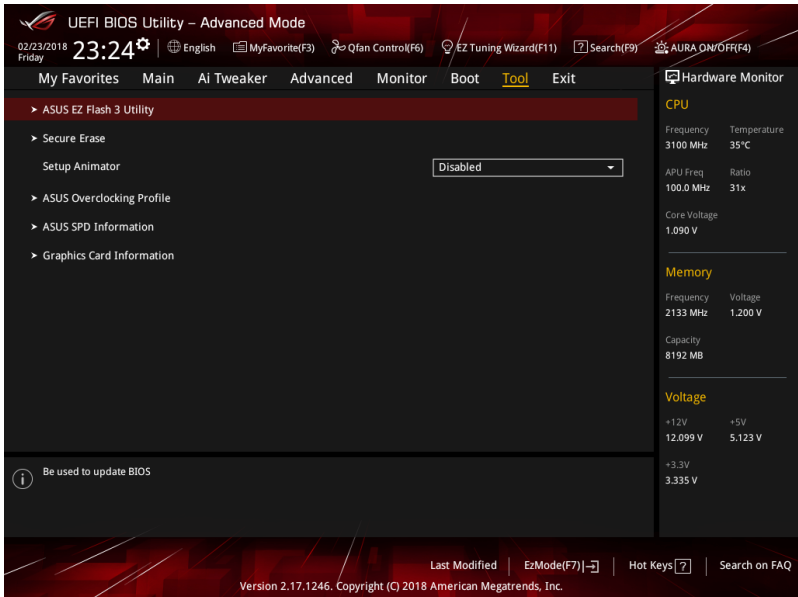
-
- To access Windows® OS in Safe Mode, press <F8 > after POST.
 - To select the boot device during system startup, press <F8> when ASUS Logo appears.
-

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.

1.9 Tool menu

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



Setup Animator

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

Configuration options: [Disabled] [Enabled]

1.9.1 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.

1.9.2 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.

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



Secure Erase is only supported on selected SATA SSDs, and cannot erase NVMe storage devices.



- 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 the SATA port. For more information about the SATA ports, refer to section **1.1.2 Motherboard layout** in your user manual.

Displays the available SSDs

Port #	SSD Name	Status	Total Capacity
P2	ADATA 5596 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.

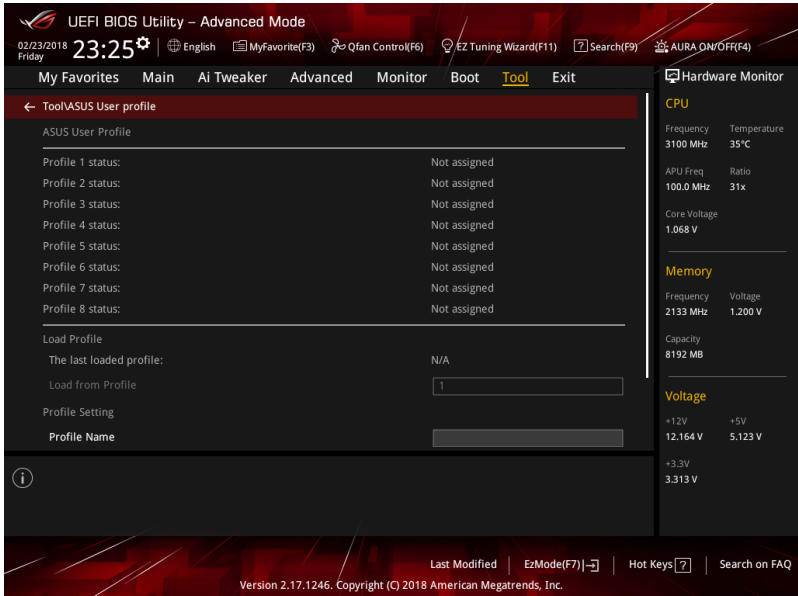


Status definition:

- **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.

1.9.3 ASUS User Profile

This item allows you to store or load multiple BIOS settings.



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.

1.9.4 ASUS SPD Information

This item allows you to view the DRAM SPD information.

UEFI BIOS Utility – Advanced Mode
02/23/2018 Friday 23:26 English MyFavorite(F3) Qfan Control(F6) EZ Tuning Wizard(F11) Search(F9) AURA ON/OFF(F4)

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

← ToolASPD Information

DIMM Slot Number: DIMM_A2

Manufacturer: Samsung
Module Size: 8192MB
Maximum Bandwidth: 2133MHz
Type: DDR4
Part Number: M378A1G43DB0-CPB
Serial Number: 02726b94
Product Week/Year: 51/2014
SPD Ext.:
ASUS Checksum: 89a1

JEDEC ID	JEDEC	JEDEC ID	JEDEC
Frequency (MHz)	2133	tRRD_S	4
Voltage (V)	1.200	tRRD_L	6
tCL	15	tRFC1	2.2
tCRD	15	tRFC2	171
tRP	15	tRFC4	118
tRAS	36	tFAW	23
tRFC	60	tFCR	2

Hardware Monitor

CPU
Frequency: 3100 MHz
Temperature: 35°C
APU Freq: 100.0 MHz
Ratio: 31x
Core Voltage: 1.079 V

Memory
Frequency: 2133 MHz
Voltage: 1.200 V
Capacity: 8192 MB

Voltage
+12V: +5V
12.099 V: 5.123 V
+3.3V: 3.335 V

1.9.5 Graphics Card Information

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.

UEFI BIOS Utility – Advanced Mode
02/23/2018 Friday 23:26 English MyFavorite(F3) Qfan Control(F6) EZ Tuning Wizard(F11) Search(F9) AURA ON/OFF(F4)

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

← ToolGraphics Card Information

GPU Post

GOP/BIOS Status: Select a valid GPU

Hardware Monitor

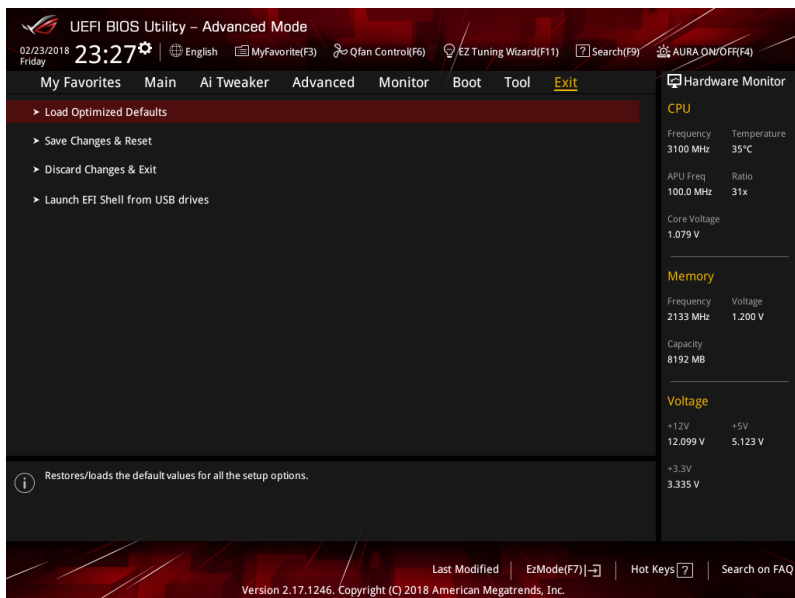
CPU
Frequency: 3100 MHz
Temperature: 35°C
APU Freq: 100.0 MHz
Ratio: 31x
Core Voltage: 1.079 V

GPU Post

This item displays the information and recommended configuration for the PCIE slots that the graphics card is installed in your system.

1.10 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.

1.11 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 to 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.

1.11.1 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 that comes with the motherboard package.
-

1.11.2 ASUS EZ Flash 3

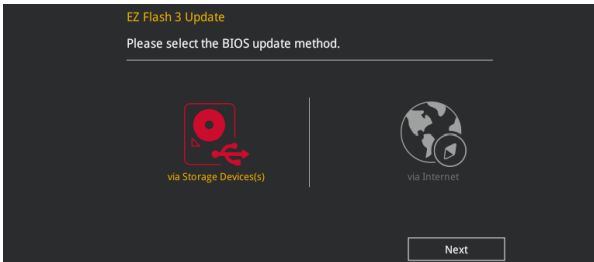
ASUS EZ Flash 3 allows you to download and update to the latest BIOS through the Internet without having to use a bootable floppy disk or an OS-based utility.



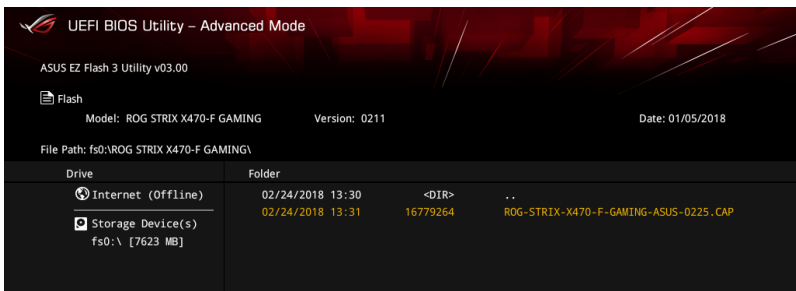
Updating through the Internet varies per region and Internet conditions. Check your local Internet connection before updating through the Internet.

To update the BIOS by USB:

1. Enter the Advanced Mode of the BIOS setup program. Go to the Tool menu to select **ASUS EZ Flash 3 Utility** and press <Enter>.
2. Insert the USB flash disk that contains the latest BIOS file to the USB port.
3. Select **via Storage Device(s)**.



4. Press the Up/Down arrow keys to find the USB flash disk that contains the latest BIOS, and then press <Enter>.
5. 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.





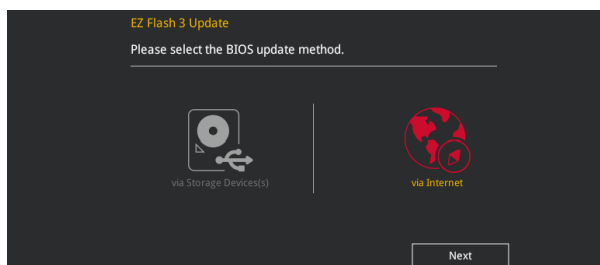
- This function can support devices such as a USB flash disk with FAT 32/16 format and single partition only.
- DO NOT shut down or reset the system while updating the BIOS to prevent system boot failure!



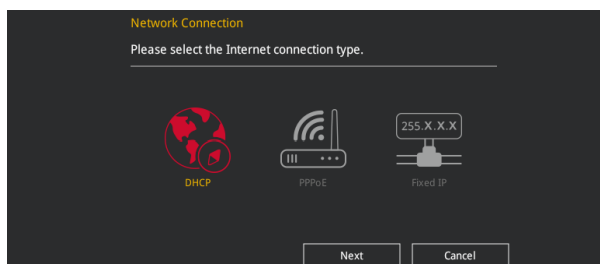
Ensure to load the BIOS default settings to ensure system compatibility and stability. Select the Load Optimized Defaults item under the Exit menu. See section 1.10 **Exit Menu** for details.

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 3 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 1.10 **Exit Menu** for details.

1.11.3 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!
