

BIOS Setup

2.1 Knowing BIOS



The new 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 **Z170A.CAP** for this motherboard.

2.2 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> during the Power-On Self Test (POST). If you do not press <Delete>, 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 2.10 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 1.9 Onboard buttons and switches for information on how to erase the RTC RAM via the Clear CMOS button.
 - The BIOS setup program does not support the 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 the **Exit** menu or from the **Exit/Advanced Mode** screen.

2.2.1 EZ Mode

By default, the EZ Mode screen appears when you enter the BIOS setup program. 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, click **Exit/Advanced Mode**, then select **Advanced Mode** or press <F7> hotkey for the advanced BIOS settings.



The default screen for entering the BIOS setup program can be changed between EZ Mode or Advanced Mode. Refer to the Setup Mode item in section 2.8 Boot menu for details.

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

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

Selects the display language of the BIOS setup program

Creates storage RAID and configures system overclocking

Information
06/15/2015 14:58
Monday
English
EZ Tuning Wizard(F11)

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

Selects the display language of the BIOS setup program

Creates storage RAID and configures system overclocking

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

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

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



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

2.2.2 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.



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

The screenshot displays the ASUS UEFI BIOS Utility in Advanced Mode. The interface includes a top menu bar with options like Language, MyFavorite(F3), Qfan Control(F6), EZ Tuning Wizard(F11), and Quick Note(F9). The main area is divided into sections: My Favorites, Main, AI Tweaker, Advanced, Monitor, Boot, Tool, and Exit. The AI Tweaker section is currently selected, showing settings for BCLK Frequency, Initial BCLK Frequency, BCLK Amplitude, BCLK Slew Rate, BCLK Spread Spectrum, BCLK Frequency Slew Rate, ASUS MultiCore Enhancement, and CPU Core Ratio. The BCLK Frequency is set to 100.00, and the Initial BCLK Frequency is set to Auto. The BCLK Slew Rate is set to Auto. The BCLK Spread Spectrum is set to Auto. The BCLK Frequency Slew Rate is set to Auto. The ASUS MultiCore Enhancement is set to Auto. The CPU Core Ratio is set to Auto. The AI Overclock Tuner is set to Manual. A scroll bar is visible on the right side of the AI Tweaker section. The Hardware Monitor section on the right displays CPU and Memory information, including Frequency, Temperature, Core Voltage, Ratio, Capacity, and Voltage. The bottom of the screen shows the Version 2.17.1246, Copyright (C) 2015 American Megatrends, Inc. and the Last Modified settings. The EzMode(F7) button is also visible.

Configuration fields
Pop-up Menu
Menu bar
Language
MyFavorite(F3)
Qfan Control(F6)
EZ Tuning Wizard(F11)
Quick Note (F9)
Scroll bar
Hot Keys

My Favorites
Main
AI Tweaker
Advanced
Monitor
Boot
Tool
Exit

Target CPU Turbo-Mode Frequency : 2600MHz
Target DRAM Frequency : 2133MHz
Target Cache Frequency : 2600MHz

AI Overclock Tuner
Manual

BCLK Frequency
100.00

Initial BCLK Frequency
Auto

BCLK Amplitude
Auto

BCLK Slew Rate
Auto

BCLK Spread Spectrum
Auto

BCLK Frequency Slew Rate
Auto

ASUS MultiCore Enhancement
Auto

CPU Core Ratio
Auto

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

Hardware Monitor

CPU
Frequency 2200 MHz
Temperature 33°C
BCLK 100.0 MHz
Core Voltage 2.064 V
Ratio 22x

Memory
Frequency 2133 MHz
Voltage 2.416 V
Capacity 4096 MB

Voltage
+12V 12.096 V
+5V 5.040 V
+3.3V 3.344 V

Version 2.17.1246. Copyright (C) 2015 American Megatrends, Inc.

Last Modified
EzMode(F7) |

Menu items
Sub-menu item
General help
Last modified settings
Go back to EZ Mode
Displays the CPU temperature, CPU, and memory voltage output

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 **2.3 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 **2.2.3 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. It also allows you to change the motherboard's SATA mode from AHCI to RAID mode.



Refer to section **2.2.4 EZ Tuning Wizard** for more information.

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 support website. You can also scan the following QR code:



Quick Note (F9)

This button above the menu bar allows you to key in notes of the activities that you have done in BIOS.



-
- The Quick Note function does not support the following keyboard functions: delete, cut, copy, and paste.
 - You can only use the alphanumeric characters to enter your notes.
-

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 top right corner 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.

2.2.3 QFan Control

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



Select a profile to apply to your fans

Click to undo the changes

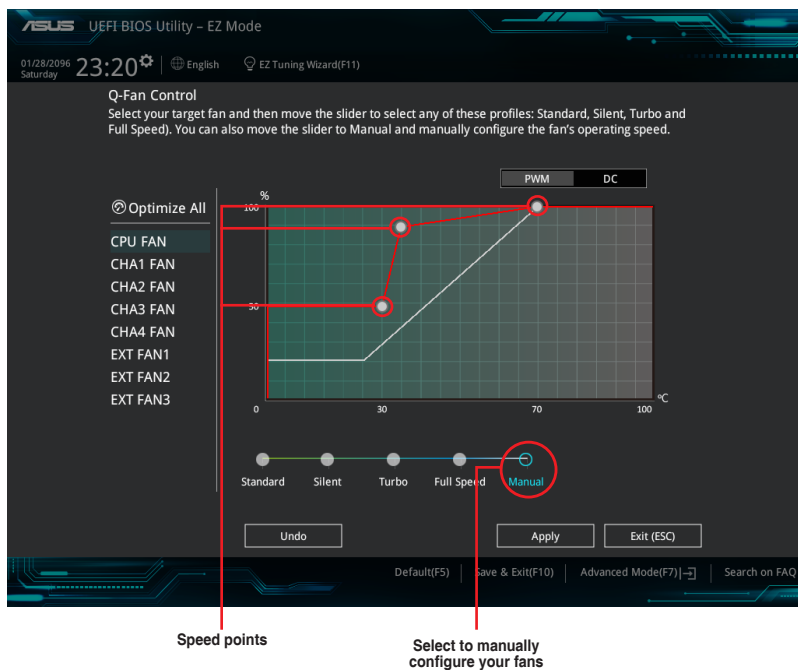
Click to apply the fan setting

Click to go back to main menu

Select to manually configure your fans

Configuring fans manually

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

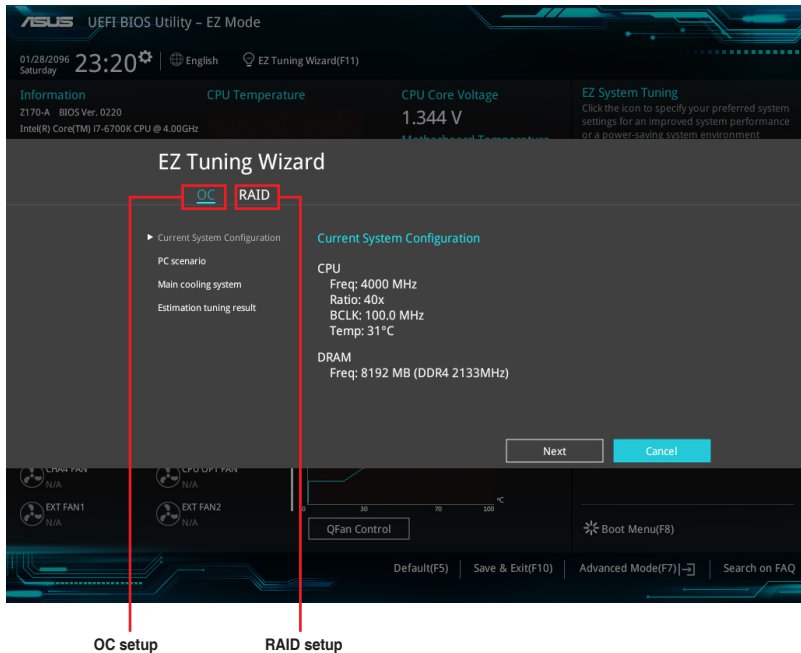


To configure your fans:

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)**.

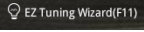
2.2.4 EZ Tuning Wizard

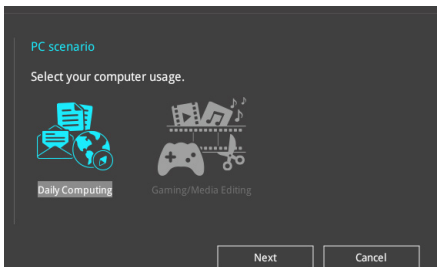
EZ Tuning Wizard allows you to easily overclock your CPU and DRAM, computer usage, and CPU fan to their best settings. You can also set RAID in your system using this feature.



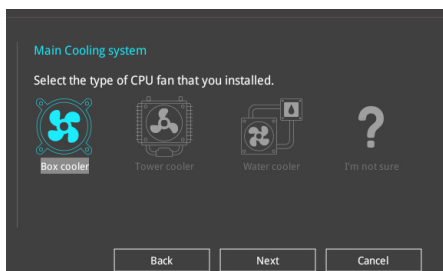
OC Tuning

To start OC Tuning:

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



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



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

Creating RAID

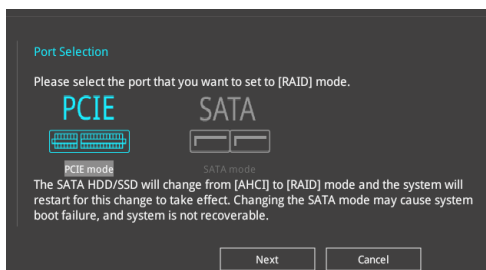
To create RAID:

1. Press <F11> on your keyboard or click **EZ Tuning Wizard(F11)** from the BIOS screen to open EZ Tuning Wizard screen.
2. Click **RAID** then click **Next**.

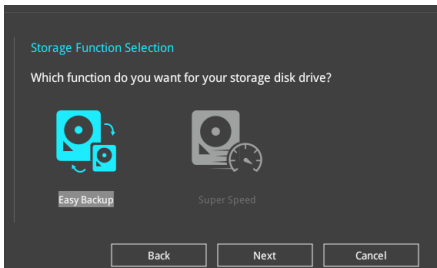


- Ensure that your HDDs have no existing RAID volumes.
- Ensure to connect your HDDs to Intel® SATA connectors.

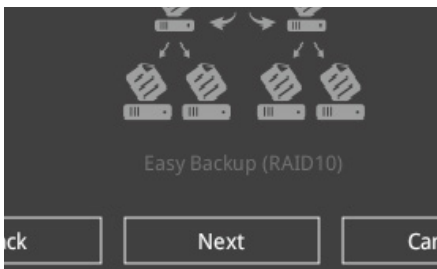
3. Select the port that you want to set to [RAID] mode, **PCIe** or **SATA**, then click **Next**.



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

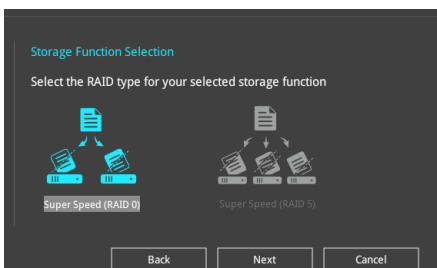


- a. For Easy Backup, click **Next** then select from **Easy Backup (RAID1)** or **Easy Backup (RAID10)**.



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

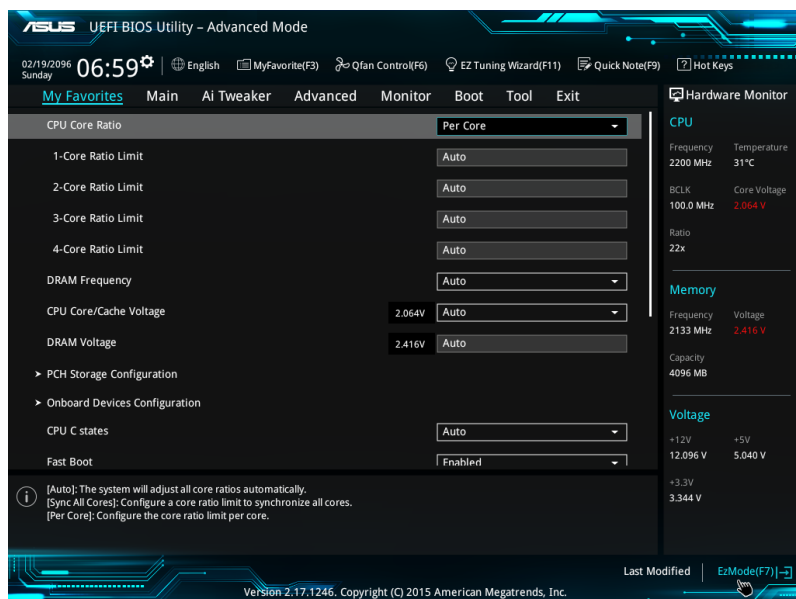
- b. For Super Speed, click **Next** then select from **Super Speed (RAID0)** or **Super Speed (RAID5)**.



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

2.3 My Favorites

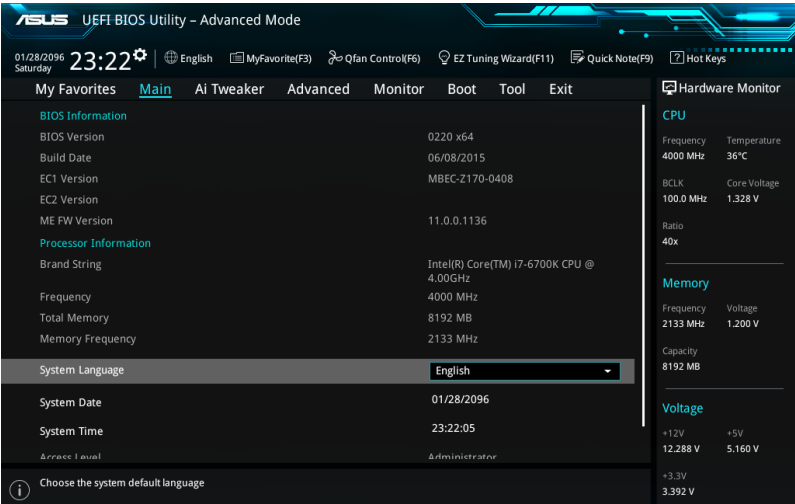
My Favorites is your personal space where you can easily save and access your favorite BIOS items.



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.

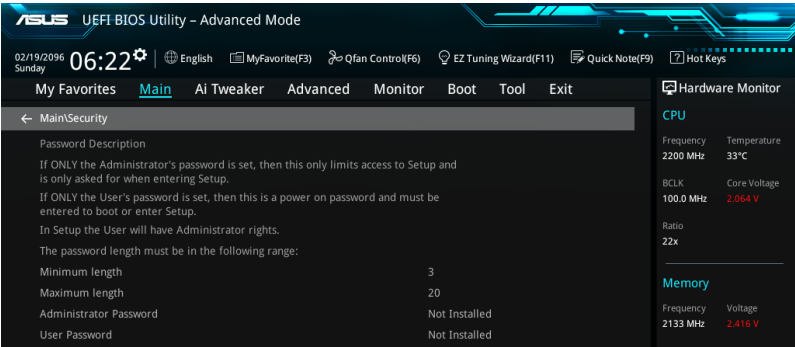
2.4 Main menu

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 1.9 Onboard buttons and switches for information on how to erase the RTC RAM via the Clear CMOS button.
- 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. Confirm the password when prompted.

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. Confirm the password when prompted.

To clear the administrator password, follow the same steps as in changing an administrator password, but press <Enter> when prompted to create/confirm the password. 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. Confirm the password when prompted.

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. Confirm the password when prompted.

To clear the user password, follow the same steps as in changing a user password, but press <Enter> when prompted to create/confirm the password. After you clear the password, the **User Password** item on top of the screen shows **[Not Installed]**.

2.5 Ai Tweaker menu

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

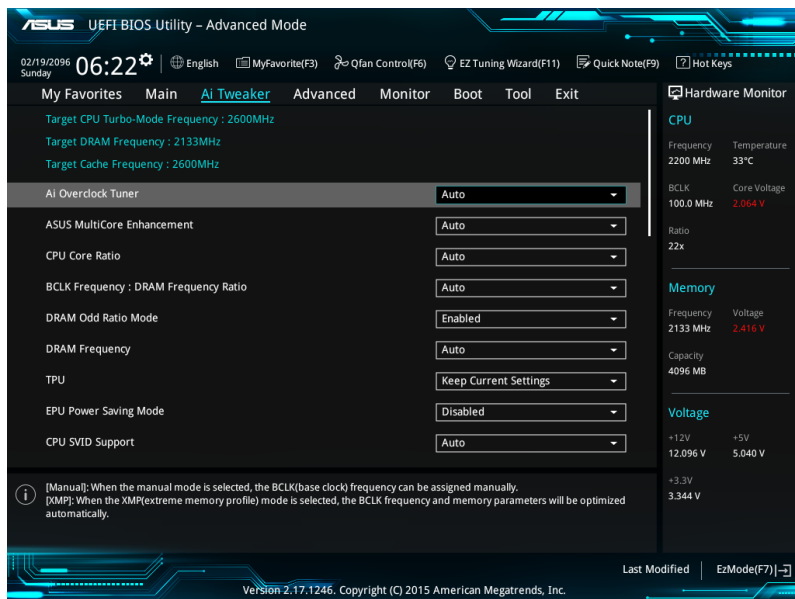


Be cautious when changing the settings of the Ai Tweaker menu items. Incorrect field values can cause the system to malfunction.



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 [Auto]

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] Automatically optimizes the CPU ratio and BCLK frequency.
- [XMP] If you install memory modules supporting the eXtreme Memory Profile (XMP) Technology, choose this item to set the profiles supported by your memory modules for optimizing the system performance.



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

BCLK Frequency [100.00]

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 40.0 MHz to 500.0 MHz.



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

MultiCore Enhancement [Auto]

[Auto] This item allows you to maximize the overlocking performance optimized by core ratio settings.

[Disabled] This item allows you to set to default core ratio settings.

CPU Core Ratio [Auto]

This item allows you to set the CPU core ratio limit per core or synchronize automatically to all cores.

Configuration options: [Auto] [Sync All Cores] [Per Core]



When the CPU Core Ratio is set to **[Synch All Cores]**, the following item appears:

1-Core Ratio Limit [Auto]

Select **[Auto]** to apply the CPU default Turbo Ratio setting or manually assign a 1-Core Limit value that must be higher than or equal to the 2-Core Ratio Limit.



When the CPU Core Ratio is set to **[Per Core]**, the following item appears:

1-Core Ratio Limit [Auto]

Select **[Auto]** to apply the CPU default Turbo Ratio setting or manually assign a 1-Core Limit value that must be higher than or equal to the 2-Core Ratio Limit.

2-Core Ratio Limit [Auto]

Select **[Auto]** to apply the CPU default Turbo Ratio setting or manually assign a 2-Core Limit value that must be higher than or equal to the 3-Core Ratio Limit.

3-Core Ratio Limit [Auto]

Select **[Auto]** to apply the CPU default Turbo Ratio setting or manually assign a 3-Core Limit value that must be higher than or equal to the 4-Core Ratio Limit.

4-Core Ratio Limit [Auto]

Select **[Auto]** to apply the CPU default Turbo Ratio setting or manually assign a 4-Core Limit value that must be higher than or equal to the 3-Core Ratio Limit.



If you assign a value for more Core Ratio Limit, do not set the less Core Ratio Limit to **[Auto]**.

BCLK Frequency : DRAM Frequency Ratio [Auto]

This item allows you to change the BCLK frequency to DRAM frequency ratio.

Configuration options: [Auto] [100:133] [100:100]

DRAM Odd Ratio Mode [Enabled]

This item allows you to enable or disable the odd ratio mode for better granularity.

Configuration options: [Disabled] [Enabled]

DRAM Frequency [Auto]

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: [DDR4-2133MHz] [DDR4-2200MHz] [DDR4-2266MHz] [DDR4-2300MHz] [DDR4-2400MHz] [DDR4-2500MHz] [DDR4-2533MHz] [DDR4-2600MHz] [DDR4-2666MHz] [DDR4-2700MHz] [DDR4-2800MHz] [DDR4-2900MHz] [DDR4-2933MHz] [DDR4-3000MHz] [DDR4-3066MHz] [DDR4-3100MHz] [DDR4-3200MHz] [DDR4-3333MHz] [DDR4-3466MHz] [DDR4-3600MHz] [DDR4-3733MHz] [DDR4-3866MHz] [DDR4-4000MHz] [DDR4-4133MHz] [DDR4-4266MHz]

TPU [Keep Current Settings]

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].

EPU Power Saving Mode [Disabled]

The EPU (Energy Processing Unit) sets the CPU in its minimum power consumption settings.

Configuration options: [Disabled] [Enabled]

CPU SVID Support

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

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

DRAM Timing Control

The subitems in this menu allow you to set the DRAM timing control features. Use the <+> or <-> 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 [Auto]

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

DRAM RAS# to CAS# Delay [Auto]

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

DRAM RAS# ACT Time [Auto]

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

DRAM COMMAND Rate [Auto]

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

Secondary Timings

DRAM RAS# to RAS# Delay L [Auto]

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

DRAM RAS# to RAS# Delay S [Auto]

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

DRAM REF Cycle Time [Auto]

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

DRAM Refresh Interval [Auto]

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

DRAM WRITE Recovery Time [Auto]

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

DRAM READ to PRE Time [Auto]

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

DRAM FOUR ACT WIN Time [Auto]

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

DRAM WRITE to READ Delay [Auto]

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

DRAM WRITE to READ Delay L [Auto]

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

DRAM WRITE to READ Delay S [Auto]

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

DRAM CKE Minimum Pulse Width [Auto]

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

DRAM Write Latency [Auto]

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

Skew Control

ODT RTT WR (CHA) [Auto]

Configuration options: [Auto] [0 DRAM CLOCK] [80 DRAM CLOCK] [120 DRAM CLOCK] [240 DRAM CLOCK] [255 DRAM CLOCK]

ODT RTT PARK (CHA) [Auto]

Configuration options: [Auto] [0 DRAM CLOCK] [34 DRAM CLOCK] [40 DRAM CLOCK] [48 DRAM CLOCK] [60 DRAM CLOCK] [80 DRAM CLOCK] [120 DRAM CLOCK] [240 DRAM CLOCK]

ODT RTT NOM (CHA) [Auto]

Configuration options: [Auto] [0 DRAM CLOCK] [34 DRAM CLOCK] [40 DRAM CLOCK] [48 DRAM CLOCK] [60 DRAM CLOCK] [80 DRAM CLOCK] [120 DRAM CLOCK] [240 DRAM CLOCK]

ODT RTT WR (CHB) [Auto]

Configuration options: [Auto] [0 DRAM CLOCK] [80 DRAM CLOCK] [120 DRAM CLOCK] [240 DRAM CLOCK] [255 DRAM CLOCK]

ODT RTT PARK (CHB) [Auto]

Configuration options: [Auto] [0 DRAM CLOCK] [34 DRAM CLOCK] [40 DRAM CLOCK] [48 DRAM CLOCK] [60 DRAM CLOCK] [80 DRAM CLOCK] [120 DRAM CLOCK] [240 DRAM CLOCK]

ODT RTT NOM (CHB) [Auto]

Configuration options: [Auto] [0 DRAM CLOCK] [34 DRAM CLOCK] [40 DRAM CLOCK] [48 DRAM CLOCK] [60 DRAM CLOCK] [80 DRAM CLOCK] [120 DRAM CLOCK] [240 DRAM CLOCK]

Data Rising Slope [Auto]

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

Data Rising Slope Offset [Auto]

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

CMD Rising Slope [Auto]

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

CMD Rising Slope Offset [Auto]

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

Ctl Rising Slope [Auto]

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

Ctl Rising Slope Offset [Auto]

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

Clk Rising Slope [Auto]

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

Clk Rising Slope Offset [Auto]

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

Data Falling Slope [Auto]

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

Data Falling Slope Offset [Auto]

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

CMD Falling Slope [Auto]

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

CMD Falling Slope Offset [Auto]

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

Ctl Falling Slope [Auto]

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

Ctl Falling Slope Offset [Auto]

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

Clk Falling Slope [Auto]

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

Clk Falling Slope Offset [Auto]

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

RTL IOL control

DRAM RTL INIT Value [Auto]

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

DRAM RTL (CHA DIMM0 Rank0) [Auto]

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

DRAM RTL (CHA DIMM0 Rank1) [Auto]

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

DRAM RTL (CHA DIMM1 Rank0) [Auto]

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

DRAM RTL (CHA DIMM1 Rank1) [Auto]

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

DRAM RTL (CHB DIMM0 Rank0) [Auto]

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

DRAM RTL (CHB DIMM0 Rank1) [Auto]

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

DRAM RTL (CHB DIMM1 Rank0) [Auto]

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

DRAM RTL (CHB DIMM1 Rank1) [Auto]

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

DRAM IOL (CHA DIMM0 Rank0) [Auto]

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

DRAM IOL (CHA DIMM0 Rank1) [Auto]

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

DRAM IOL (CHA DIMM1 Rank0) [Auto]

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

DRAM IOL (CHA DIMM1 Rank1) [Auto]

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

DRAM IOL (CHB DIMM0 Rank0) [Auto]

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

DRAM IOL (CHB DIMM0 Rank1) [Auto]

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

DRAM IOL (CHB DIMM1 Rank0) [Auto]

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

DRAM IOL (CHB DIMM1 Rank1) [Auto]

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

IO Latency offset

CHA IO_Latency_offset

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

CHB IO_Latency_offset

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

IO Latency RFR delay

CHA RFR delay

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

CHB RFR delay

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

Third Timings

tRDRD_sg [Auto]

Configuration options: [Auto] [0] - [63]

tRDRD_dg [Auto]

Configuration options: [Auto] [0] - [63]

tRDWR_sg [Auto]

Configuration options: [Auto] [0] - [63]

tRDWR_dg [Auto]

Configuration options: [Auto] [0] - [63]

tWRWR_sg [Auto]

Configuration options: [Auto] [0] - [63]

tWRWR_dg [Auto]

Configuration options: [Auto] [0] - [63]

tWRRD_sg [Auto]

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

tWRRD_dg [Auto]

Configuration options: [Auto] [0] - [63]

tRDRD_dr [Auto]

Configuration options: [Auto] [0] - [63]

tRDRD_dd [Auto]

Configuration options: [Auto] [0] - [63]

tRDWR_dr [Auto]

Configuration options: [Auto] [0] - [63]

tRDWR_dd [Auto]

Configuration options: [Auto] [0] - [63]

tWRWR_dr [Auto]

Configuration options: [Auto] [0] - [63]

tWRWR_dd [Auto]

Configuration options: [Auto] [0] - [63]

tWRRD_dr [Auto]

Configuration options: [Auto] [0] - [63]

tWRRD_dd[Auto]

Configuration options: [Auto] [0] - [63]

TWRPRE [Auto]

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

TRDPRE [Auto]

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

tREFIX9 [Auto]

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

OREF_RI[Auto]

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

Misc.**MRC Fast Boot [Auto]**

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

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

DRAM CLK Period [Auto]

Configuration options: [Auto] [1] - [40]

Memory Scrambler [Enabled]

Set this item to enable or disable memory scrambler support.

Configuration options: [Enabled] [Disabled]

Channel A DIMM Control [Enable Both DIMMS]

Allows you to enable or disable the Channel A DIMM slots.

Configuration options: [Enable Both DIMMS] [Disable DIMM0] [Disable DIMM1]
[Disable Both DIMMS]

Channel B DIMM Control [Enable Both DIMMS]

Allows you to enable or disable the Channel B DIMM slots.

Configuration options: [Enable Both DIMMS] [Disable DIMM0] [Disable DIMM1]
[Disable Both DIMMS]

MCH Full Check [Auto]

Enable this item to enhance the stability of your system. Disable this item to enhance the DRAM overclocking capability.

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

DLLBwEn [Auto]

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

PLL Bandwidth [Auto]

Configuration options: [Auto] [Level 0] - [Level 10]

External DIGI+ VRM

VRM Initialization Check [Disabled]

Enable or disable this item if any error occurs during VRM initialization.
Configuration options [Disabled] [Enabled]

CPU Load-line Calibration [Auto]

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 CPU power voltage from 0% to 100%.

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 [Auto]

This item provides a total power range for CPU overclocking. A higher value setting provides higher power consumption delivery and extends the overclocking frequency range simultaneously.

Configuration options: [Auto] [100%] [110%] [120%] [130%] [140%]



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

CPU VRM Switching Frequency [Auto]

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 CPU VRM Switching Frequency to [Manual].

Fixed CPU VRM Switching Frequency (KHz) [300]

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 CPU VRM Switching Frequency is set to **[Auto]**.

VRM Spread Spectrum [Disabled]

This item allows to enhance the system stability.

Configuration options: [Disabled] [Enabled]

CPU Power Duty Control [T.Probe]

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.

CPU Power Phase Control [Auto]

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

Configuration options: [Auto] [Standard] [Optimized] [Extreme]



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

CPU Graphic Load-line Calibration [Auto]

Load-line is defined by Intel®R 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 7 to adjust the CPU power voltage from 0% to 100%.

[Auto] [Level 1] - [Level 7]

CPU Graphics Current Capability [Auto]

The GT current capability adjusts the total power range for GT overclocking. A higher value provides a wider total power range and extends the overclocking frequency range simultaneously.

Configuration options: [Auto] [100%] [110%] [120%] [130%]

CPU Graphics [Auto]

The switching frequency will affect the GT transient response speed and the component thermal production. Select the manual mode to configure a higher frequency to get a quicker transient response speed.

[Auto] [Manual]



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

Fixed VCCGT Switching Frequency(KHz) [300]

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.

GT Power Phase Control [Auto]

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

Configuration options: [Auto] [Standard] [Optimized] [Extreme]



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

Boot Voltages

CPU Core/Cache Boot Voltage [Auto]

Configuration options: [Auto] [0.600] - [1.700]

DMI Boot Voltage [Auto]

Configuration options: [Auto] [0.300] - [1.900]

CPU System Agent Boot Voltage [Auto]

Configuration options: [Auto] [0.7000] - [1.8000]

CPU VCCIO Boot Voltage [Auto]

Configuration options: [Auto] [0.7000] - [1.8000]

CPU Standby Boot Voltage [Auto]

The voltage for CPU standby at initial Boot.

Configuration options: [Auto] [0.7000] - [1.8000] [0.700~2.200]

Internal CPU Power Management

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

Intel(R) SpeedStep(tm) [Enabled]

Allows the operating system to dynamically adjust the processor voltage and cores frequency to decrease the average power consumption and decrease average heat production. Configuration options: [Enabled] [Disabled]

Turbo Mode [Enabled]

Allows you to enable your processor cores to run faster than the base operating frequency when it is below power, current and specification limit. Configuration options: [Disabled] [Enabled]



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

Turbo Mode Parameters

Long Duration Package Power Limit [Auto]

Allows you to limit the Turbo Ratio's time duration that exceeds the TDP (Thermal Design Power) for maximum performance. Use the <+> and <-> keys to adjust the value.

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

Package Power Time Window [Auto]

Also known as Power Limit 1, and allows you to maintain the time window for Turbo Ratio over TDP (Thermal Design Power). Use the <+> and <-> keys to adjust the value.

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

Short Duration Package Power Limit [Auto]

Also known as Power Limit 2, and allows you to provide rapid protection when the package power exceeds the Power Limit 1. Use the <+> and <-> keys to adjust the value.

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

IA AC Load Line [Auto]

This item allows you to set the AC loadline defined in 1/100 mOhms. Use the <+> and <-> keys to adjust the value.

Configuration options: [Auto] [0.01] - [62.49]

IA DC Load Line [Auto]

This item allows you to set the DC loadline defined in 1/100 mOhms. Use the <+> and <-> keys to adjust the value.

Configuration options: [Auto] [0.01] - [62.49]

Tweaker's Paradise

Initial BCLK Frequency [Auto]

This item allows you to start overclocking the system from the initial BCLK (base clock) frequency to the assigned BCLK frequency. Use the <+> or <-> to adjust the value. The values range from 40.0 MHz to 500.0 MHz.

BCLK Amplitude [Auto]

This item allows you to set the magnitude of the base clock driven for the processor. Configuration options: [Auto] [700mV] [800mV] [900mV] [1000mV]

BCLK Slew Rate [Auto]

This item allows you to set the speed at which each clock rises and falls. Configuration options: [Auto] [1.5V/ns] [2.5V/ns] [3.5V/ns] [4.5V/ns]

BCLK Spread Spectrum [Auto]

This item allows you to reduce the EMI. Disable to get more accurate base clocks. Configuration options: [Auto] [Disabled] [-0.22] [-0.34] [-0.46] [+0.12] [+0.22] [+0.28] [+0.38] [+0.17]

BCLK Frequency Slew Rate [Auto]

Configuration options: [Auto] [Disabled] [32us/MHz] [64us/MHz] [128us/MHz] [512us/MHz]

DRAM VTT Voltage [Auto]

Configuration options: [Auto] [0.500] - [1.300]

VPPDDR Voltage [Auto]

Configuration options: [Auto] [1.86500] - [2.70000]

DMI Voltage [Auto]

Configuration options: [Auto] [0.30000] - [1.90000]

Core PLL Voltage [Auto]

Configuration options: [Auto] [0.70000] - [2.40000]

PLL Bandwidth [Auto]

Configuration options: [Auto] [Level 0] - [Level 10]

CPU Core/Cache Current Limit Max. [Auto]

This item allows you to configure a higher current limit to prevent a frequency or power throttling when overclocking. Use the <+> and <-> keys to adjust the value.

Configuration options: [Auto] [0.00] - [255.50]

CPU Graphics Current Limit Max. [Auto]

This item allows you to set a higher current limit to prevent a frequency or power throttling when overclocking. Use the <+> and <-> keys to adjust the value.

Configuration options: [Auto] [0.00] - [255.50]

Min. CPU Cache Ratio [Auto]

This item allows you to set the minimum possible CPU cache ratio. Use the <+> and <-> keys to adjust the value.

Configuration options: [Auto] [8] - [26]

Max. CPU Cache Ratio [Auto]

This item allows you to set the maximum possible CPU cache ratio. Use the <+> and <-> keys to adjust the value.

Configuration options: [Auto] [8] - [26]

Max. CPU Graphics Ratio [Auto]

This item allows you to set the CPU graphics ratio. The ratio may vary depending on the system loading. Use the <+> and <-> keys to adjust the value.

Configuration options: [Auto] [1] - [19]

Extreme Over-voltage [Disabled]

Enable this item to allow higher voltages for overclocking, but the CPU lifetime will not be guaranteed.

Configuration options: [Enabled] [Disabled]



This item can only be enabled when the onboard CPU_OV jumper is switched on.

CPU Core/Cache Voltage [Auto]

Configures the mode of Voltage fed to the cores of the processor.

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

DRAM Voltage [Auto]

Configuration options: [Auto] [1.0000] - [2.0000]

CPU VCCIO Voltage [Auto]

Configuration options: [Auto] [0.70000] - [1.80000]

CPU System Agent Voltage [Auto]

Configuration options: [Auto] [0.70000] - [1.80000]

CPU Graphics Voltage Mode [Auto]

[Auto] The system automatically determines the CPU Graphics Voltage.

[Manual Mode] This item allows user-defined values.

[Offset Mode] This item allows you to modify values by SVID.

PCH Core Voltage [Auto]

Configuration options: [Auto] [0.70000] - [1.80000]

CPU Standby Voltage [Auto]

Configuration options: [Auto] [0.80000] - [1.80000]

DRAM REF Voltage Control

DRAM CTRL REF Voltage on CHA/CHB [Auto]

Configures the DRAM reference voltage on the control lines. The reference voltage will be the DRAM voltage times the configured value.

Configuration options: [Auto] [0.39500] - [0.63000]

DRAM DATA REF Voltage on CHA DIMM0 Rank0 BL0-7 [Auto]

Configures the DRAM Data REF Voltage.

Configuration options: [Auto] [0] - [63]

DRAM DATA REF Voltage on CHA DIMM0 Rank1 BL0-7 [Auto]

Configures the DRAM Data REF Voltage.

Configuration options: [Auto] [0] - [63]

DRAM DATA REF Voltage on CHA DIMM1 Rank0 BL0-7 [Auto]

Configures the DRAM Data REF Voltage.

Configuration options: [Auto] [0] - [63]

DRAM DATA REF Voltage on CHA DIMM1 Rank1 BL0-7 [Auto]

Configures the DRAM Data REF Voltage.

Configuration options: [Auto] [0] - [63]

DRAM DATA REF Voltage on CHB DIMM0 Rank0 BL0-7 [Auto]

Configures the DRAM Data REF Voltage.

Configuration options: [Auto] [0] - [63]

DRAM DATA REF Voltage on CHB DIMM0 Rank1 BL0-7 [Auto]

Configures the DRAM Data REF Voltage.

Configuration options: [Auto] [0] - [63]

DRAM DATA REF Voltage on CHB DIMM1 Rank0 BL0-7 [Auto]

Configures the DRAM Data REF Voltage.

Configuration options: [Auto] [0] - [63]

DRAM DATA REF Voltage on CHB DIMM1 Rank1 BL0-7 [Auto]

Configures the DRAM Data REF Voltage.

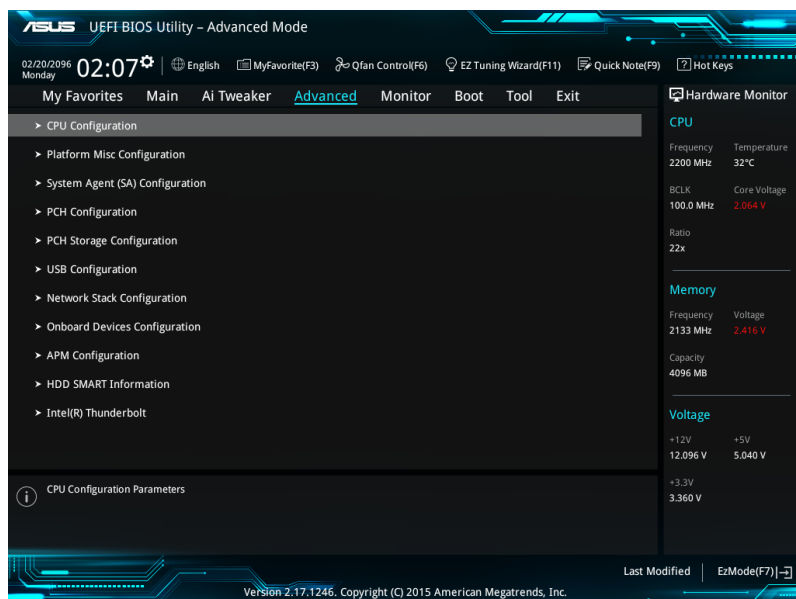
Configuration options: [Auto] [0] - [63]

2.6 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.

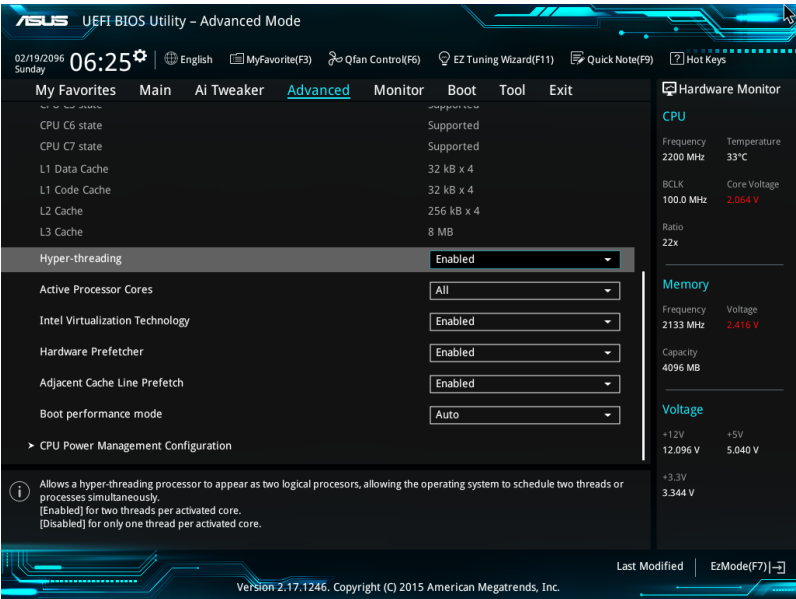


2.6.1 CPU Configuration

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.



Hyper-threading [Enabled]

This item allows a hyper-threading processor to appear as two logical processors, allowing the operating system to schedule two threads or processors simultaneously.

Configuration options: [Disabled] [Enabled]

Active Processor Cores [All]

This item allows you to select the number of CPU cores to activate in each processor package.

Configuration options: [All] [1] [2] [3]

Intel Virtualization Technology [Enabled]

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

Configuration options: [Disabled] [Enabled]

Hardware Prefetcher [Enabled]

This item allows the CPU to prefetch commands and data in the L2 cache, reduces the DRAM loading time and improves the system performance.

Configuration options: [Disabled] [Enabled]

Adjacent Cache Line Prefetcher [Enabled]

This item allows the mid level cache (L2) to prefetch adjacent cache lines, reducing the DRAM loading time and improves the system performance.

Configuration options: [Disabled] [Enabled]

Boot Performance Mode [Auto]

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: [Auto] [Max Non-Turbo Performance] [Max Battery] [Turbo Performance]

CPU Power Management Configuration

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

Intel SpeedStep(tm) [Enabled]

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 [Enabled]

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: [Enabled] [Disabled]

CPU C-States [Enabled]

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

Configuration options: [Disabled] [Enabled]



The following items appear only when you set the CPU C-States to **[Enabled]**.

Enhanced C-States [Disabled]

When enabled, CPU will switch to minimum speed when all cores enter C-State.

Configuration options: [Enabled] [Disabled]

CPU C3 Report [Enabled]

This item allows you to disable or enable the CPU C3 report to the operating system.

Configuration options: [Enabled] [Disabled]

CPU C6 Report [Enabled]

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

Configuration options: [Enabled] [Disabled]

Package C State Limit [Auto]

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

Configuration options: [C0/C1] [C2] [C3] [C6] [C7] [C7s] [Auto]

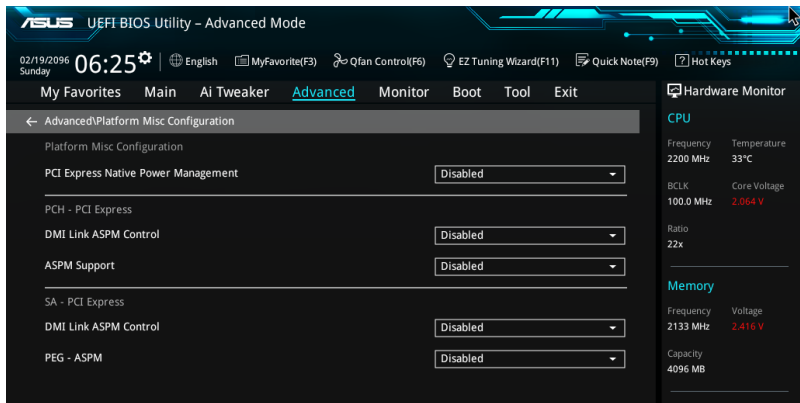
CFG Lock [Enabled]

This item allows you to disable or enable the CFG Lock.

Configuration options: [Enabled] [Disabled]

2.6.2 Platform Misc Configuration

The items in this menu allow you to configure the platform-related features.



PCIe Native Power Management [Disabled]

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

Configuration options: [Disabled] [Enabled]



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

Native ASPM [Disabled]

[Enabled] Windows® Vista OS controls the ASPM (active state power management) support for devices.

[Disabled] BIOS controls the ASPM support for the device.

PCH - PCI Express

DMI Link ASPM Control [Disabled]

This item allows you to control the Active State Power Management on both NB (NorthBridge) side and SB (SouthBridge) side of the DMI Link.

Configuration options: [Disabled] [Enabled]

ASPM Support [Disabled]

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

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

SA - PCI Express

DMI Link ASPM Control [Disabled]

This item allows you to control the Active State Power Management on both CPU and PCH (platform controller hub) Both DMI link ASPM control items of the CPU and PCH sides must be enabled for the ASPM to take effect.

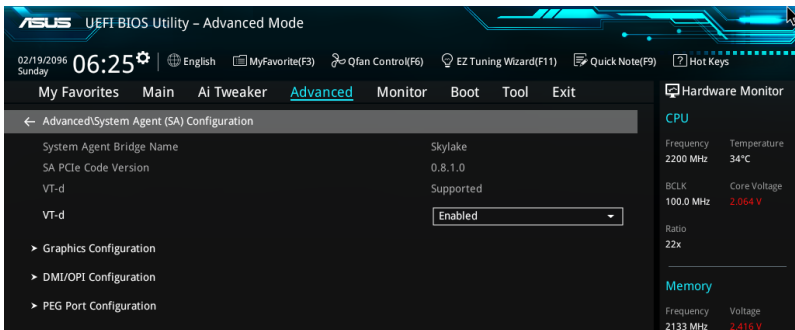
Configuration options: [Disabled] [L1]

PEG ASPM Support [Disabled]

This item allows you to select the ASPM state for energy-saving conditions, or use the optimized energy saving profile.

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

2.6.3 System Agent (SA) Configuration



VT-d [Enabled]

Allows you to enable virtualization technology function on memory control hub.

Configuration options: [Enabled] [Disabled]

Graphics Configuration

This item allows you to select a primary display from CPU and PCIe graphical devices.

Primary Display [Auto]

This item allows you to select the primary display from CPU and PCIe devices.

Configuration options: [Auto] [IGFX] [PEG] [PCIE]

iGPU Multi-Monitor [Disabled]

This item allows you to enable the iGPU Multi-Monitor. The iGPU shared system memory size is fixed 64 MB.

Configuration options: [Disabled] [Enabled]

DMI/OPI Configuration

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

DMI Max Link Speed [Auto]

Set this item to [Enabled] to set DMI speed.

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

PEG Port Configuration

This item allows you to configure the PEG Port settings.

PCIEx16_1 Link Speed [Auto]

This item allows you to configure the PCIEx16_1 slot.

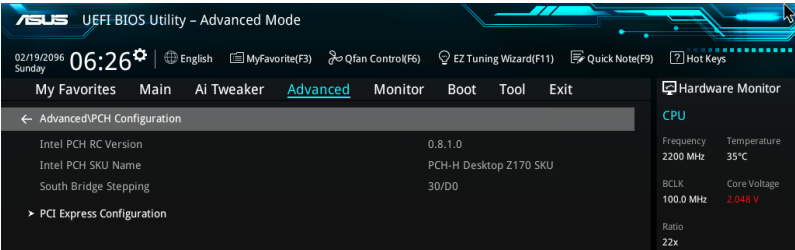
Configuration options: [Auto] [Gen1] [Gen2] [Gen3]

PCIEx16_2 Link Speed [Auto]

This item allows you to configure the PCIEx16_2 slot.

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

2.6.4 PCH Configuration



PCI Express Configuration

This item allows you to configure the PCI Express slots.

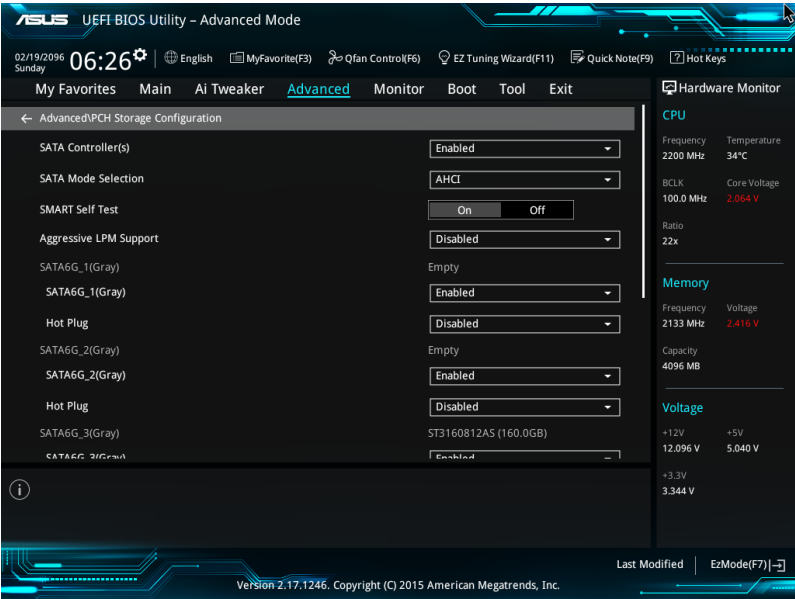
PCIe Speed [Auto]

This item allows your system to automatically select the PCI Express port speed.
Configuration options: [Auto] [Gen1] [Gen2] [Gen3]

2.6.5 PCH Storage Configuration

While entering Setup, the BIOS automatically detects the presence of SATA devices. The SATA Port items show **Not Present** if no SATA device is installed to the corresponding SATA port.

Scroll down to display the other BIOS items.



SATA Controller(s) [enabled]

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

Configuration options: [Disabled] [Enabled]

SATA Mode Selection [AHCI]

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.



The following item appears only when you set the SATA Mode Selection to **[RAID]**.

M.2 PCIE Storage RAID Support [Disabled]

This item allows you to enable or disable PCIE port to SATA for RAID Remapping.

Configuration options: [Disabled] [Enabled]

SATA Express PCIE Storage RAID Support [Disabled]

This item allows you to enable or disable PCIE port to SATA for RAID Remapping.

Configuration options: [Disabled] [Enabled]

PCIEX16_3 PCIE Storage RAID Support [Disabled]

This item allows you to enable or disable PCIE port to SATA for RAID Remapping.

Configuration options: [Disabled] [Enabled]

Aggressive LPM Support [Disabled]

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]

SATA6G_1(Gray) - SATA6G_6(Gray)

SATA6G_1(Gray) - SATA6G_6(Gray) [Enabled]

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

Configuration options: [Disabled] [Enabled]

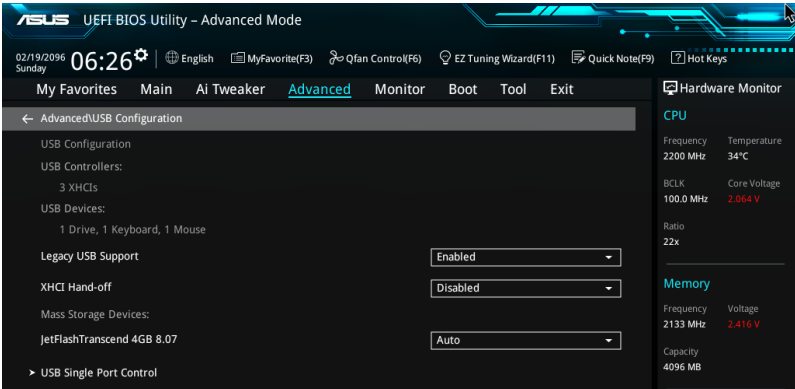
Hot Plug [Disabled]

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]

2.6.6 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]

- [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 [Disabled]

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

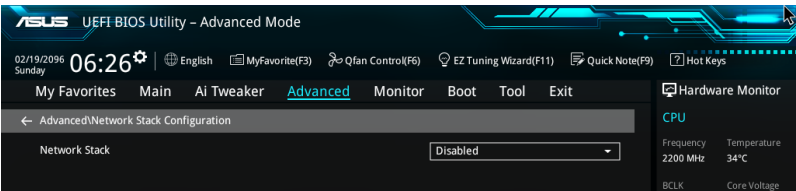
USB Single Port Control

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



Refer to section **1.2.3 Motherboard layout** for the location of the USB ports.

2.6.7 Network Stack Configuration



Network stack [Disable]

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].

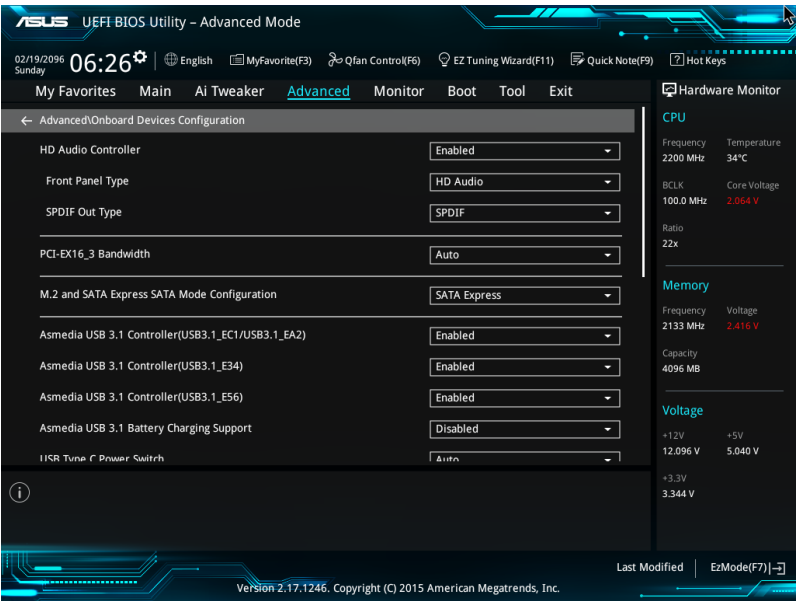
Ipv4/Ipv6 PXE Support [Enabled]

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

Configuration options: [Disabled] [Enabled]

2.6.8 Onboard Devices Configuration

Scroll down to view the other BIOS items.



HD Audio Controller [Enabled]

This item allows you to use the Azalia High Definition Audio Controller

Configuration options: [Disabled] [Enabled]



The following items appear only when you set the HD Audio Controller to **[Enabled]**.

Front Panel Type [HD Audio]

This item allows you to set the front panel audio connector (AAFP) mode to legacy AC'97 or high-definition audio depending on the audio standard that the front panel audio module supports.

[HD Audio] Sets the front panel audio connector (AAFP) mode to high definition audio.

[AC97] Sets the front panel audio connector (AAFP) mode to legacy AC'97

SPDIF Out Type [SPDIF]

[SPDIF] Sets to an SPDIF audio output.

[HDMI] Sets to an HDMI audio output.

PCI-EX16_3 Bandwidth [Enabled]

[Auto] Run at X2 mode with SATA6G_56 enabled.

[X4 mode] Run at X4 mode for high performance support with SATA6G_56.

M.2 and SATA Express Mode Configuration [SATA Express]

[M.2] SATA mode will be switched to M.2. SATA Express can only support PCIe devices.

[SATA Express] SATA mode will be switched to SATA Express. M.2 can only support PCIe devices.

ASMedia USB 3.1 Controller [Enabled]

This item allows you to disable or enable the ASMedia® USB 3.1 controller of your system.

Configuration options: [Disabled] [Enabled]

ASMedia USB 3.1 Battery Charging Support [Disabled]

This item allows you to disable or enable the ASMedia USB 3.1 battery charging support of your system.

Configuration options: [Disabled] [Enabled]

USB Type C Power Switch [Auto]

[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.

Intel LAN Controller [Enabled]

This item allows you to enable or disable the Intel LAN1/2 controllers.

Configuration options: [Disabled] [Enabled]



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

Intel PXE OPROM [Disabled]

This item allows you to enable or disable the PXE OptionRom of the Intel® LAN controller.

Configuration options: [Enabled] [Disabled]

LED Design Switch [Auto]

[Auto] LEDs will only light up when the system is fully powered and operating.

[Enabled] LEDs will always light up at the S0(Working), S3(Sleep), and S5(Soft off) states, but not light up at the S5 state when the “ErP Ready” is enabled.

[Disabled] LEDs will not light up.

Serial Port Configuration

The items in this menu allow you to set the parameters of the serial port.



This item in this menu works only if a serial port connector is installed on the motherboard.

Serial Port [On]

This item allows you to enable/disable the serial port.

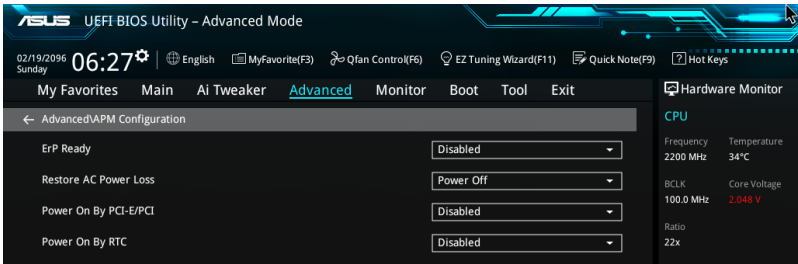
Configuration options: [On] [Off]

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

This item allows you to select an optimal setting for Super IO device.

Configuration options: [IO=3F8h; IRQ=4] [IO=2F8h; IRQ=3] [IO=3E8h; IRQ=4] [IO=2E8h; IRQ=3]

2.6.9 APM Configuration



ErP Ready [Disabled]

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 [Power Off]

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/PCI [Disabled]

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]

This item allows you to enable/disable the Power On by Ring feature of your motherboard.

Configuration options: [Disabled] [Enabled]

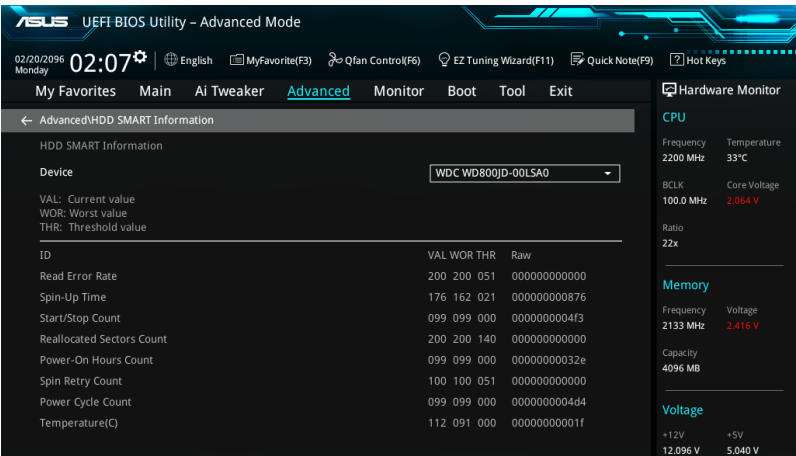
Power On By RTC [Disabled]

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.

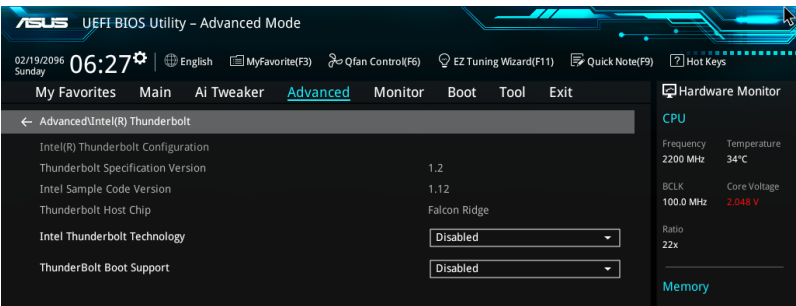
Configuration options: [Disabled] [Enabled]

2.6.10 HDD/SSD SMART Information

This menu displays the SMART information of the connected devices.



2.6.11 Intel(R) Thunderbolt



Intel Thunderbolt Technology [Disabled]

This item allows you to disable or enable the Intel Thunderbolt Technology.

Configuration options: [Fully Disabled] [Disabled] [Enabled]

Thunderbolt Boot Support [Disabled]

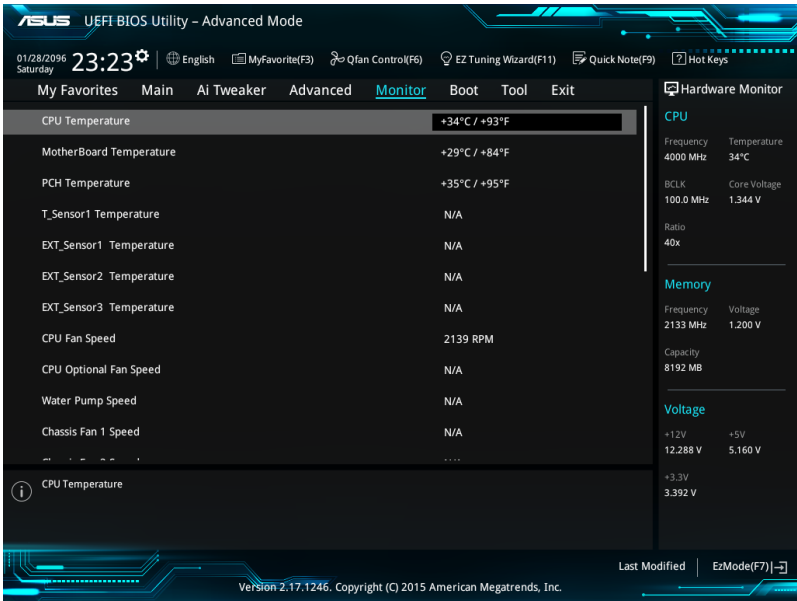
This item allows you to disable or enable the Thunderbolt Boot Support.

Configuration options: [Disabled] [Enabled]

2.7 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 / MB Temperature / VRM Temperature / PCH Core Temperature / T_SENSOR1 Temperature / EXT_SENSOR1-3 Temperature [xxx°C/xxx°F]

The onboard hardware monitor automatically detects and displays the CPU, motherboard, VRM, PCH Core, and SENSOR1 temperatures. Select **[Ignore]** if you do not wish to display the detected temperatures.

CPU Fan Speed, CPU Optional Fan, Water Pump Speed, Chassis Fan 1-4 Speed, EXT Fan 1-3 [xxxx RPM] or [Ignore] / [N/A]

The onboard hardware monitor automatically detects and displays the CPU, chassis, and power fan speed 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.

CPU Core Voltage, 3.3V Voltage, 5V Voltage, 12V Voltage

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 [Auto]

- | | |
|------------|---|
| [Auto] | Detect the type of CPU fan installed and automatically switches the mode control. |
| [PWM Mode] | Enable the CPU Q-Fan control feature in PWM mode for 4-pin CPU fan. |
| [DC Mode] | Enable the CPU Q-Fan control feature in DC mode for 3-pin CPU fan. |
| [Disabled] | Disable the Q-Fan control. |

CPU Fan Step Up [0 sec]

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] [4.5 sec] [5.0 sec] [6.3 sec] [8.5 sec] [12 sec] [25 sec]

CPU Fan Step Down [0 sec]

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] [4.5 sec] [5.0 sec] [6.3 sec] [8.5 sec] [12 sec] [25 sec]

CPU Fan Speed Lower Limit [200 RPM]

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 [Standard]

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 [70]

Use the <+> or <-> keys to adjust the upper limit of the CPU temperature. The values range from 25 to 75.

CPU Fan Max. Duty Cycle (%) [100]

Use the <+> or <-> keys to adjust the maximum CPU fan duty cycle. The values range from 20% to 100%. When the CPU temperature reaches the upper limit, the CPU fan will operate at the maximum duty cycle.

CPU Middle Temperature [25]

Use the <+> or <-> keys to adjust the middle limit of the CPU temperature. The values range from 20 to 75.

CPU Fan Middle. Duty Cycle (%) [20]

Use the <+> or <-> keys to adjust the maximum CPU fan duty cycle. The values range from 20% to 100%. When the CPU temperature reaches the upper limit, the CPU fan will operate at the maximum duty cycle.

CPU Lower Temperature [20]

Use the <+> or <-> keys to adjust the lower limit of the CPU temperature. The values range from 20 to 75. The CPU fan will operate at the minimum duty cycle when the temperature is lower than the limit.

CPU Fan Min. Duty Cycle(%) [20]

Use the <+> or <-> keys to adjust the minimum CPU fan duty cycle. The values range from 0% to 100%. When the CPU temperature is under the limit, the CPU fan will operate at the minimum duty cycle.

Chassis Fan 1-4 Q-Fan Control [DC Mode]

- [Disabled] Disable the Chassis Q-Fan control feature.
- [DC mode] Enable the Chassis Q-Fan control in DC mode for 3-pin chassis fan.
- [PWM mode] Enable the Chassis Q-Fan control in PWM mode for 4-pin chassis fan.

Chassis Fan 1-4 Q-Fan Source [CPU]

The assignment fan will be controlled according to the selected temperature source.
Configuration options: [CPU] [MotherBoard] [VRM] [PCH] [T_SENSOR1] [EXT_Sensor1] [EXT_Sensor2] [EXT_Sensor3]



For EXT_Sensor1-3, connect a Thermistor cable to the EXT_TS1-3 header then place the other end to the component to get the temperature.

Chassis Fan 1-4 Step Up [0 sec]

This item allows you to set the value of the CPU 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 1-4 Step Down [0 sec]

This item allows you to set the value of the CPU 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 1-4 Fan Speed Low Limit [200 RPM]

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 1-4 Profile [Standard]

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 four items appear only when you set Chassis Fan 1-4 Profile to **[Manual]**.

Chassis Fan 1-4 Upper Temperature [70]

Use the <+> or <-> keys to adjust the upper limit of the Chassis Fan 1-4 temperature. The values range from 20 to 75.

Chassis Fan 1-4 Max. Duty Cycle (%) [100]

Use the <+> or <-> keys to adjust the maximum Chassis Fan 1-4 duty cycle. The values range from 20% to 100%. When the CPU temperature reaches the upper limit, the Chassis Fan 1-4 will operate at the maximum duty cycle.

Chassis Fan 1-4 Middle Temperature [45]

Use the <+> or <-> keys to adjust the middle limit of the Chassis Fan 1-4 temperature. The values range from 20 to 75.

Chassis Fan 1-4 Middle. Duty Cycle (%) [60]

Use the <+> or <-> keys to adjust the maximum Chassis Fan 1-4 duty cycle. The values range from 20% to 100%. When the CPU temperature reaches the upper limit, the Chassis Fan 1-4 will operate at the maximum duty cycle.

Chassis Fan 1-4 Lower Temperature [40]

Use the <+> or <-> keys to adjust the lower limit of the Chassis Fan 1-4 temperature. The values range from 20 to 75. The Chassis Fan 1-4 will operate at the minimum duty cycle when the temperature is lower than the limit.

Chassis Fan 1-4 Min. Duty Cycle(%) [60]

Use the <+> or <-> keys to adjust the minimum Chassis Fan 1-4 fan duty cycle. The values range from 0% to 100%. When the CPU temperature is under the limit, the Chassis Fan 1-4 fan will operate at the minimum duty cycle.

FAN EXTENSION CARD is required to configure these items

Extension Fan 1-3 Q-Fan Control [DC Mode]

- | | |
|------------|---|
| [Disabled] | Disable the Extension Fan Q-Fan control feature. |
| [DC mode] | Enable the Extension Fan Q-Fan control in DC mode for 3-pin chassis fan. |
| [PWM mode] | Enable the Extension Fan Q-Fan control in PWM mode for 4-pin chassis fan. |

Extension Fan 1-3 Q-Fan Source [CPU]

The assignment fan will be controlled according to the selected temperature source.
Configuration options: [CPU] [MotherBoard] [VRM] [PCH] [T_SENSOR1] [EXT_Sensor1] [EXT_Sensor2] [EXT_Sensor3]



For EXT_Sensor1-3, connect a Thermistor cable to the EXT_TS1-3 header then place the other end to the component to get the temperature.

Extension Fan 1-3 Fan Speed Low Limit [200 RPM]

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]

Extension Fan 1-3 Profile [Standard]

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 Extension Fan Profile to **[Manual]**.

Extension Fan 1-4 Upper Temperature [70]

Use the <+> or <-> keys to adjust the upper limit of the Extension Fan 1-4 temperature. The values range from 20 to 75.

Extension Fan 1-4 Max. Duty Cycle (%) [100]

Use the <+> or <-> keys to adjust the maximum Extension Fan 1-4 duty cycle. The values range from 20% to 100%. When the CPU temperature reaches the upper limit, the Extension Fan 1-4 will operate at the maximum duty cycle.

Extension Fan 1-4 Middle Temperature [45]

Use the <+> or <-> keys to adjust the middle limit of the Extension Fan 1-4 temperature. The values range from 20 to 75.

Extension Fan 1-4 Middle. Duty Cycle (%) [60]

Use the <+> or <-> keys to adjust the maximum Extension Fan 1-4 duty cycle. The values range from 20% to 100%. When the CPU temperature reaches the upper limit, the Extension Fan 1-4 will operate at the maximum duty cycle.

Extension Fan 1-4 Lower Temperature [40]

Use the <+> or <-> keys to adjust the lower limit of the Extension Fan 1-4 temperature. The values range from 20 to 75. The Extension Fan 1-4 will operate at the minimum duty cycle when the temperature is lower than the limit.

Extension Fan 1-4 Min. Duty Cycle(%) [60]

Use the <+> or <-> keys to adjust the minimum Extension Fan 1-4 duty cycle. The values range from 0% to 100%. When the CPU temperature is under the limit, the Extension Fan 1-4 will operate at the minimum duty cycle.

Water Pump Control [Disabled]

- | | |
|------------|--|
| [Disabled] | Disable the Water Pump control feature. |
| [DC mode] | Enable the Water Pump control in DC mode for 3-pin chassis fan. |
| [PWM mode] | Enable the Water Pump control in PWM mode for 4-pin chassis fan. |



The following items appear only when you set the Water Pump Control to **[DC mode]** or **[PWM mode]**.

Water Pump Upper Temperature [25]

Use the <+> or <-> keys to adjust the upper limit of the Water Pump temperature. The values range from 20 to 75.

Water Pump Max. Duty Cycle (%) [100]

Use the <+> or <-> keys to adjust the maximum Extension Fan 1-4 duty cycle. The values range from 20% to 100%. When the CPU temperature reaches the upper limit, the Water Pump will operate at the maximum duty cycle.

Water Pump Middle Temperature [45]

Use the <+> or <-> keys to adjust the middle limit of the Water Pump temperature. The values range from 20 to 75.

Water Pump Middle. Duty Cycle (%) [20]

Use the <+> or <-> keys to adjust the maximum Water Pump duty cycle. The values range from 20% to 100%. When the CPU temperature reaches the upper limit, the Water Pump will operate at the maximum duty cycle.

Water Pump Lower Temperature [20]

Use the <+> or <-> keys to adjust the lower limit of the Water Pump temperature. The values range from 20 to 75. The Water Pump will operate at the minimum duty cycle when the temperature is lower than the limit.

Water Pump Min. Duty Cycle(%) [20]

Use the <+> or <-> keys to adjust the minimum Water Pump duty cycle. The values range from 0% to 100%. When the CPU temperature is under the limit, the Water Pump will operate at the minimum duty cycle.

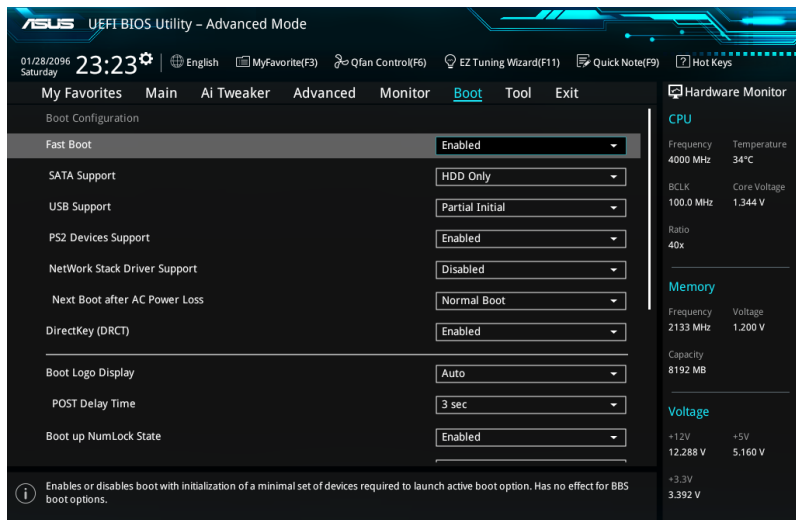
Anti Surge Support [On]

Enable this item for Over Voltage Protection (OVP) and Under Voltage Protection (UVP) functions.

Configuration options: [On] [Off]

2.8 Boot menu

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



Fast Boot [Enabled]

- [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]**.

SATA Support [HDD Only]

- [All Sata Devices] All devices connected to SATA ports are available during POST. This process extends the POST time.
- [HDD Only] Only hard drives connected to SATA ports are detected during POST.
- [Last Boot HDD Only] Only boot drives connected to a SATA ports are detected during POST.

USB Support [Partial Initial]

- [Disabled] All USB devices will not be available until OS boot up for a fastest POST time.
- [Full Initial] All USB devices will be available during POST. This process will extend the POST time.
- [Partial Initial] For a faster POST time, only USB ports with keyboard and mouse connections will be detected.

PS2 Devices Support [Enabled]

Allows you to enable or disable control of the PS2 devices' availability during POST.
Configuration options: [Enabled] [Disabled]

Network Stack Driver Support [Disabled]

- [Disabled] Select to skip the network stack driver from loading during POST.
- [Enabled] Select to load the network stack driver during POST.

Next Boot after AC Power Loss [Normal Boot]

- [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.

DirectKey (DRCT) [Enabled]

- [Disabled] Disables the DirectKey button. The system will only power on or off when you press the DirectKey button.
- [Enabled] Allows the system to power on and go to the BIOS Setup directly when you press the Reset button. Connect the 2-pin connector of the chassis reset button cable to the onboard DRCT header.

Boot Logo Display [Auto]

- [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 [3 sec]

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. The values range from 0 to 10 seconds.



This feature only works when set under normal boot.



The following items appear only when you set the Boot Logo Display to **[Disabled]**.

Post Report [5 sec]

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

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

Bootup NumLock State [Enabled]

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

Configuration options: [Disabled] [Enabled]

Above 4G Decoding [Disabled]

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: [Enabled] [Disabled]

Wait For 'F1' If Error [Enabled]

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]

- [Force BIOS] The Option ROM Messages will be shown during the POST.
- [Disabled] Only the logo will be shown during the POST.

Interrupt 19 Capture [Disabled]

- [Enabled] Execute the trap right away.
- [Disabled] Execute the trap during legacy boot.

Setup Mode [EZ 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 [Enabled]

- | | |
|------------|---|
| [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 Devices Control [UEFI and Legacy OPROM]

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 [Legacy only]

This item allows you to select the type of network devices that you want to launch.

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

Boot from Storage Devices [Legacy only]

This item allows you to select the type of storage devices that you want to launch.

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

Boot from PCI-E/PCI Expansion Devices [Legacy only]

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]

- | | |
|---------------------|--|
| [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 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

Set New Key

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



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

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]

KEK Management



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

Delete Key

Allows you to delete the KEK from your system.

Configuration options: [Yes] [No]

Set New Key

Allows you to load the downloaded KEK from a USB storage device.

Append Key

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



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

DB Management

Delete Key

Allows you to delete the db file from your system.

Configuration options: [Yes] [No]

Set New Key

Allows you to load the downloaded db from a USB storage device.

Append Key

Allows you to load the additional db from a storage device so that more images can be loaded securely.



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

DBX Management

Delete Key

Allows you to delete the dbx file from your system.

Set New Key

Allows you to load the downloaded dbx from a USB storage device.

Configuration options: [Yes] [No]

Append Key

Allows you to load the additional dbx from a storage device so that more db's images cannot be loaded.



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.



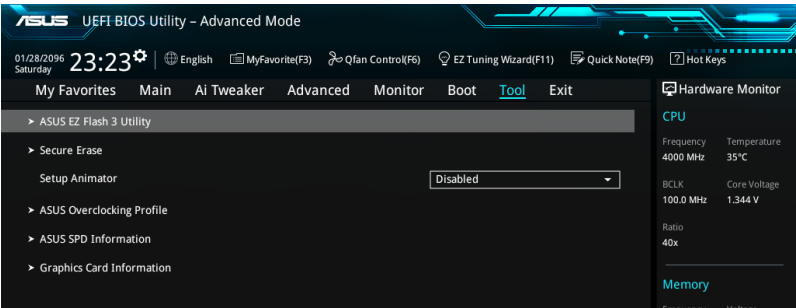
- To access Windows® OS in Safe Mode, press <F8> after POST (Windows® 8 not supported).
 - To select the boot device during system startup, press <F8> when the Logo appears.
-

Boot Override

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

2.9 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]

2.9.1 EZ Flash 3 Utility

This item allows you to run 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 2.11.2 EZ Flash 3.

2.9.2 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 > SATA Configuration > AHCI**.

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



Check the support site for a full list of SSDs tested with Secure Erase. The drive may become unstable if you run Secure Erase on an incompatible SSD.



- 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 1.2.3 of this manual.

Displays the available SSDs

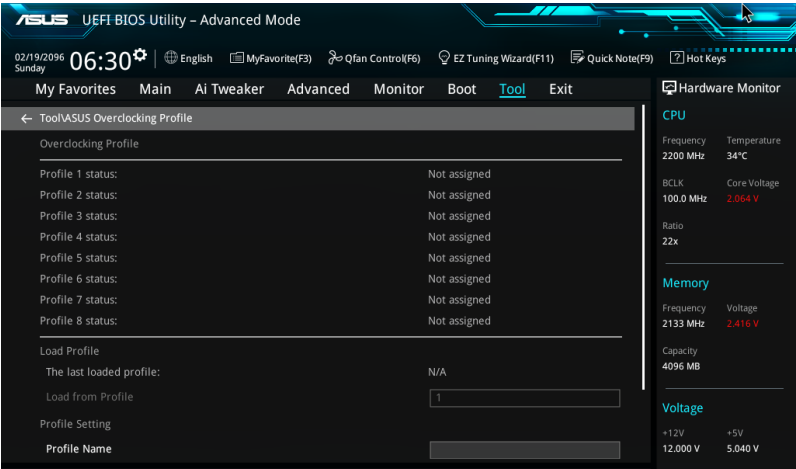


Status definition:

- **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 . You have to unlock the SSD in the software before proceeding with Secure Erase.

2.9.3 O.C. 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

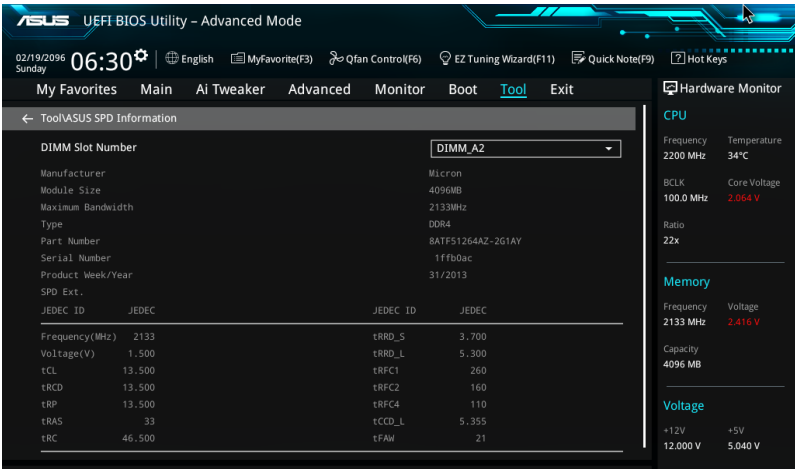
This item allows you to save the current BIOS settings to the BIOS Flash, and create a profile. Key in a profile number from one to eight, press <Enter>, and then select **Yes**.

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.

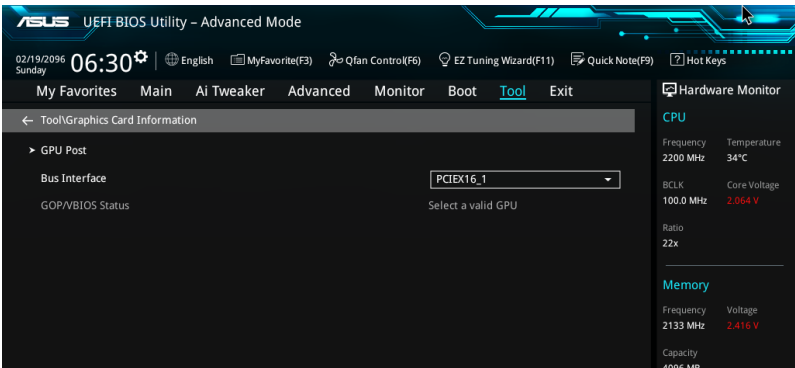
2.9.4 DRAM SPD Information

This item allows you to view the DRAM SPD information.



2.9.5 Graphics Card Information

This item displays the information about 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.

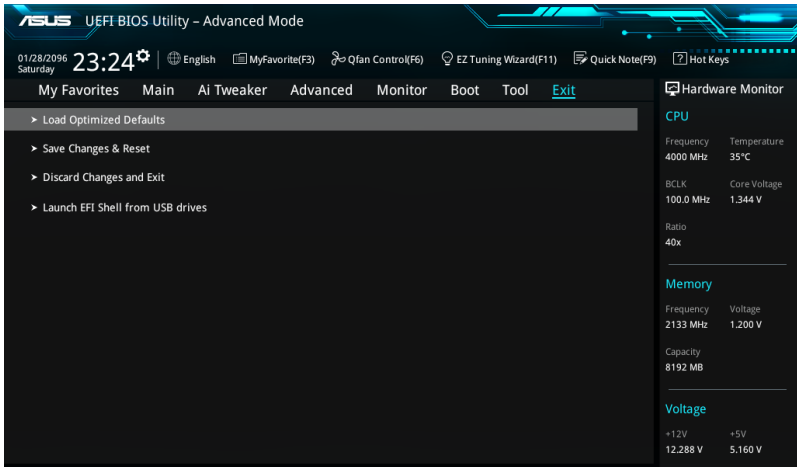
Bus Interface

This item allows you to select the bus interface.

Configuration options: [PCIEX16_1] [PCIEX16_2]

2.10 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 filesystem device

This option allows you to attempt to launch the EFI Shell application (shellx64.efi) from one of the available filesystem devices.

2.11 Updating BIOS

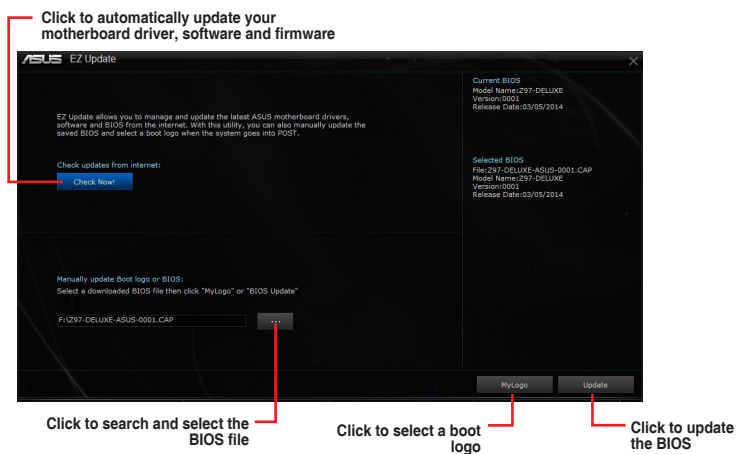
The website publishes the latest BIOS versions to provide enhancements on system stability, compatibility, and performance. However, BIOS updating is potentially risky. If there is no problem using the current version of BIOS, DO NOT manually update the BIOS. Inappropriate BIOS updating may result to system's failure to boot. Carefully follow the instructions in this chapter to update your BIOS when necessary.

The following utilities allow you to manage and update the motherboard BIOS setup program.

1. EZ Update: Updates the BIOS in Windows® environment.
2. EZ Flash 3: Updates the BIOS using a USB flash drive.
3. CrashFree BIOS 3: Restores the BIOS using the motherboard support DVD or a USB flash drive when the BIOS file fails or gets corrupted.

2.11.1 EZ Update

EZ Update is a utility that allows you to automatically update your motherboard's softwares, drivers, and the BIOS version easily. With this utility, you can also manually update the saved BIOS and select a boot logo when the system goes into POST.



EZ Update requires an Internet connection either through a network or an ISP (Internet Service Provider).

2.11.2 EZ Flash 3

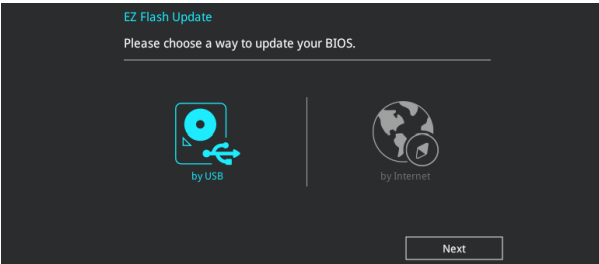
EZ Flash 3 allows you to download and update to the latest BIOS through the Internet without having to use a bootable floppy disk or an OS-based utility.



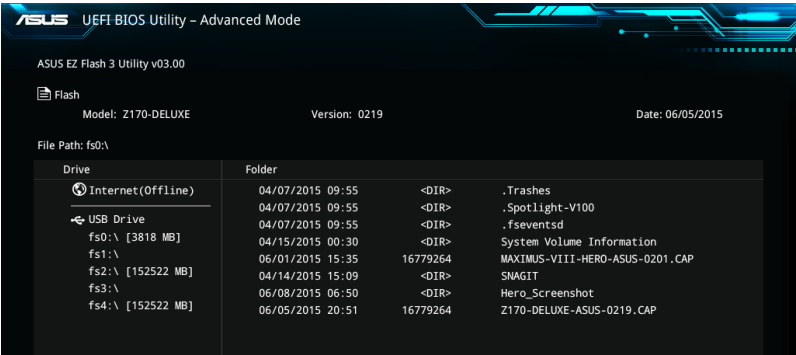
Updating through the Internet varies per region and Internet conditions. Check your local Internet connection before updating through the Internet.

To update the BIOS by USB:

- 1. Enter the Advanced Mode of the BIOS setup program. Go to the Tool menu to select **EZ Flash Utility** and press <Enter>.
- 2. Insert the USB flash disk that contains the latest BIOS file to the USB port.
- 3. Select **by USB**.



- 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.





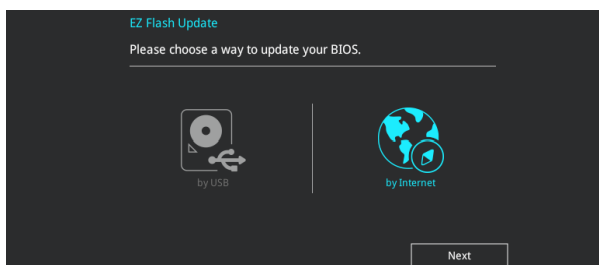
- This function can support devices such as a USB flash disk with FAT 32/16 format and single partition only.
- DO NOT shut down or reset the system while updating the BIOS to prevent system boot failure!



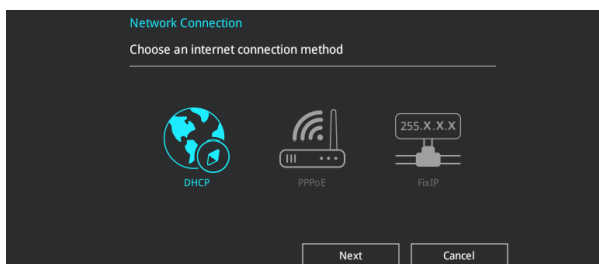
Ensure to load the BIOS default settings to ensure system compatibility and stability. Select the Load Optimized Defaults item under the Exit menu. See section 2.10 **Exit Menu** for details.

To update the BIOS by Internet:

1. Enter the Advanced Mode of the BIOS setup program. Go to the Tool menu to select **EZ Flash Utility** and press <Enter>.
2. Select **by 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 2.10 **Exit Menu** for details.

2.11.3 CrashFree BIOS 3

The 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 official website. If you want to use the newer BIOS file, download the file 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 EZ Flash 2 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!
