STRIX B250G GAMING

BIOS Manual

Motherboard

E12720
First Edition
March 2017

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Contents

BIOS Setup

1.1 Knowing BIOS

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

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

- An error message appears on the screen during the system bootup and requests you to run the BIOS Setup.

- You have installed a new system component that requires further BIOS settings or update.

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

When downloading or updating the BIOS file, rename it as **B250GG.CAP** for this motherboard.

1.2   BIOS setup program

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

Entering BIOS at startup

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

Entering BIOS Setup after POST

To enter BIOS Setup after POST:

•   Press <Ctrl>+<Alt>+<Delete> simultaneously.

•   Press the reset button on the system chassis.

•   Press the power button to turn the system off then back on. Do this option only if you failed to enter BIOS Setup using the first two options.

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

•   The BIOS setup screens shown in this section are for reference purposes only, and may not exactly match what you see on your screen.

•   Ensure that a USB mouse is connected to your motherboard if you want to use the mouse to control the BIOS setup program.

•   If the system becomes unstable after changing any BIOS setting, load the default settings to ensure system compatibility and stability. Select the **Load Optimized Defaults** item under the **Exit** menu or press hotkey **<F5>**. See section **1.10 Exit Menu** for details.

•   If the system fails to boot after changing any BIOS setting, try to clear the CMOS and reset the motherboard to the default value. See the motherboard manual for information on how to erase the RTC RAM via the Clear CMOS jumper.

•   The BIOS setup program does not support the Bluetooth devices.

Please visit ASUS website for the detailed BIOS content manual.

BIOS menu screen

The BIOS Setup program can be used under two modes: **EZ Mode** and **Advanced Mode**. Press <F7> to change between the two modes.

1.2.1   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 **Advanced Mode(F7)** or press <F7>.

The default screen for entering the BIOS setup program can be changed. Refer to the **Setup Mode** item in section **1.8 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 fan speed, and SATA information

Selects the display language of the BIOS setup program

UEFI BIOS Utility – EZ Mode

03/30/2017 Thursday 07:21 ⚙ | ⊕ English

Information
STRIX B250G GAMING   BIOS Ver. 0403
Intel(R) Celeron(R) CPU G3900TE @ 2.30GHz
Speed: 2300 MHz
Memory: 4096 MB (DDR4 2133MHz)

CPU Temperature
32°C

CPU Core Voltage
0.928 V
Motherboard Temperature
29°C

EZ System Tuning
Click the icon to specify your preferred system settings for a power-saving system environment
Quiet
Performance
Energy Saving
Normal

DRAM Status
DIMM_A1: N/A
DIMM_A2: N/A
DIMM_B1: SK Hynix 4096MB 2133MHz
DIMM_B2: N/A

SATA Information
SATA6G_1: N/A
SATA6G_2: N/A
SATA6G_3: N/A
SATA6G_4: N/A
SATA6G_5: N/A
SATA6G_6: N/A

Boot Priority
Choose one and drag the items.   Switch all

3SYSTEM USB Flash Disk 1.00 (7639MB)

UEFI: 3SYSTEM USB Flash Disk 1.00 (7639MB)

X.M.P.
Disabled   Disabled

Intel Rapid Storage Technology
On   Off

FAN Profile
CPU FAN
1575 RPM

CHA FAN
N/A

CPU FAN
%
100
50
0   30   70   100

QFan Control

Boot Menu(F8)

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

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

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

Loads optimized default settings

Saves the changes and resets the system

Click to go to Advanced mode

Search on the FAQ

Click to display boot devices

Selects the boot device priority

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

1.2.2   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(F7)** or press the <F7> hotkey.

Pop-up Menu
Configuration fields
Menu bar　　**Language**　　**MyFavorite(F3)**　**Qfan Control(F6)**　**Hot Keys**　　　　　**Scroll bar**

Submenu items　　**General help**　　　　　**Last modified settings**　**Go back to EZ Mode**

Menu items

Search on the FAQ

**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 **1.3 My Favorites** for more information.

Q-Fan Control(F6)

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

Refer to section **1.2.3 QFan Control** for more information.

Search on FAQ

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

Hot keys

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

Scroll bar

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

General help

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

Configuration fields

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

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

Last Modified button

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

1.2.3   QFan Control

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

Click to select a fan to be configured

Click to activate PWM Mode

Click to activate DC Mode

Q-Fan Control
Select your target fan and then move the slider to select any of these profiles: Standard, Silent, Turbo and Full Speed). You can also move the slider to Manual and manually configure the fan's operating speed.

PWM   DC

⊘ Optimize All

CPU FAN
CHA FAN

%
100

50

0   30   70   100   ℃

⊖
Standard   Silent   Turbo   Full Speed   Manual

Undo   Apply   Exit (ESC)

Select a profile to apply to your fans

Click to apply the fan setting

Click to undo the changes

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.

Q-Fan Control
Select your target fan and then move the slider to select any of these profiles:(Standard, Silent, Turbo and
Full Speed). You can also move the slider to Manual and manually configure the fan's operating speed.
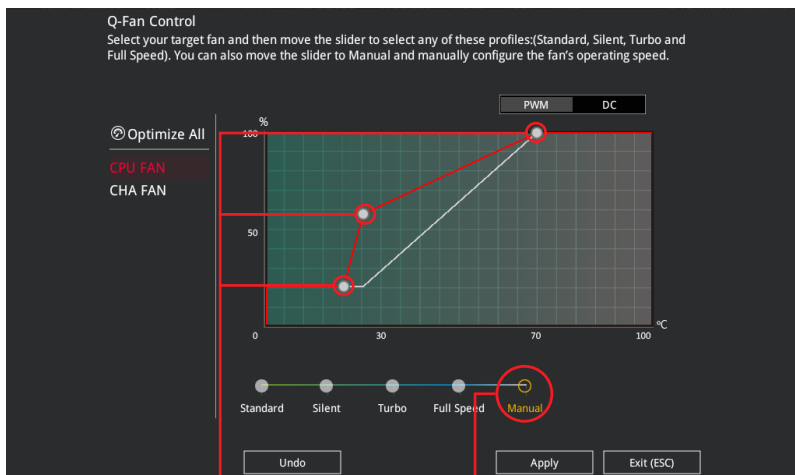
Speed points

**Select to manually
configure your fans**

To configure your fans:

1.   Select the fan that you want to configure and to view its current status.

2.   Click and drag the speed points to adjust the fans' operating speed.

3.   Click **Apply** to save the changes then click **Exit (ESC)**.

1.3   My Favorites

My Favorites is your personal space where you can easily save and access your favorite BIOS items.
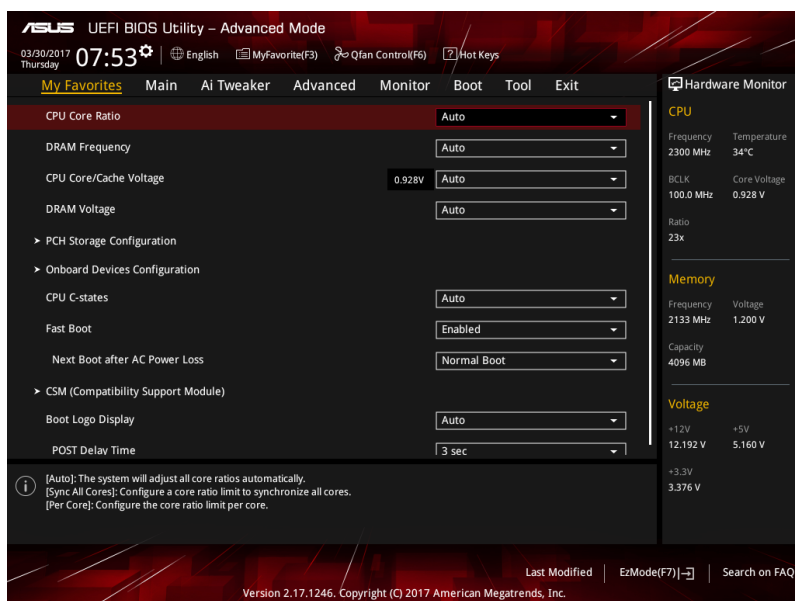
My Favorites comes with several performance, power saving, and fast boot related items by default. You can personalize this screen by adding or removing items.

Adding items to My Favorites

To add BIOS items:

1. Press <F3> on your keyboard or click [🖳(F3)MyFavorite] from the BIOS screen to open Setup Tree Map screen.

2. On the Setup Tree Map screen, select the BIOS items that you want to save in My Favorites screen.
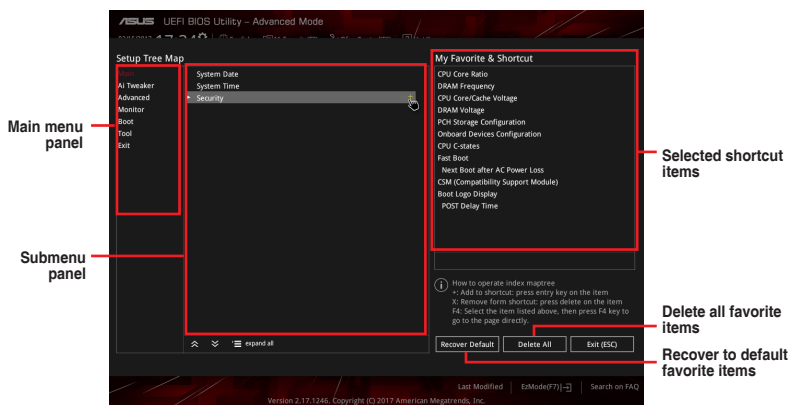
3. Select an item from main menu panel, then click the submenu that you want to save as favorite from the submenu panel and click [+] or press <Enter> on your keyboard.

You cannot add user-managed items such as language and boot order to My Favorites.

4. Click **Exit (ESC)** or press <Esc> key to close Setup Tree Map screen.

5. Go to My Favorites menu to view the saved BIOS items.

1.4 Main menu

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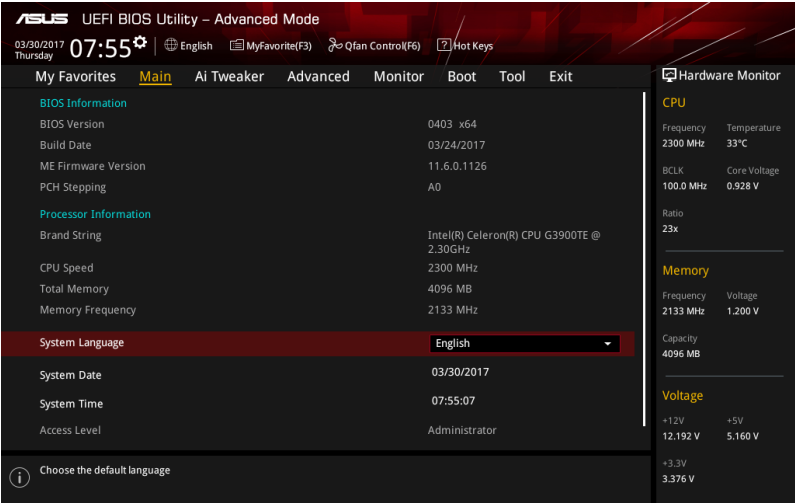
Security

The Security menu items allow you to change the system security settings.
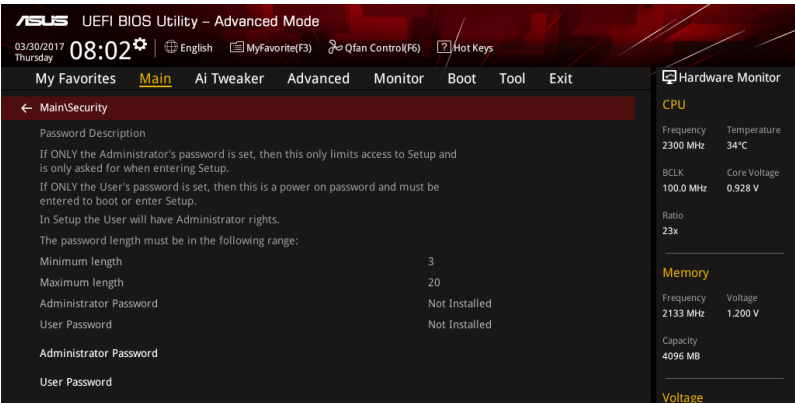
- If you have forgotten your BIOS password, erase the CMOS Real Time Clock (RTC) RAM to clear the BIOS password. See the motherboard manual for information on how to erase the RTC RAM via the Clear CMOS button.

- 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.

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**.

1.5   Ai Tweaker menu

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

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

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

Scroll down to display other BIOS items.
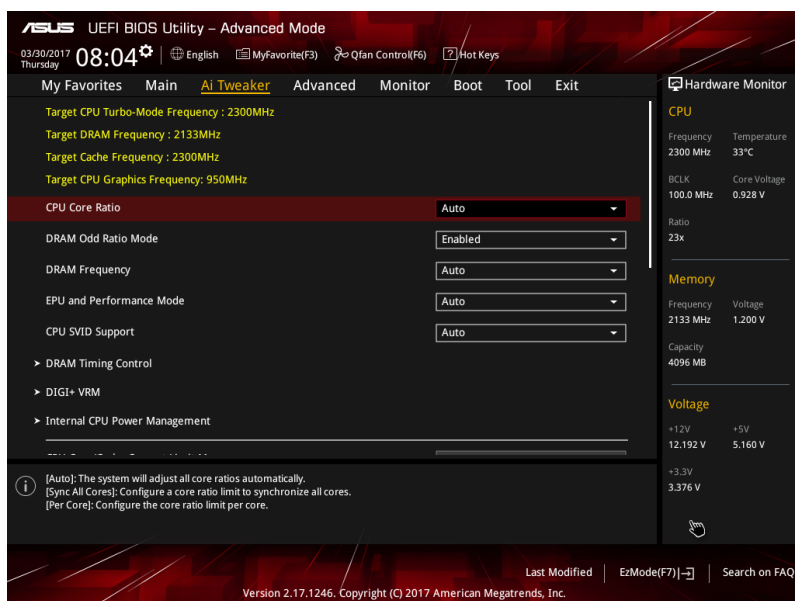
CPU Core Ratio

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 [Sync All Cores] or [Per Core], the following items appear.

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.

> If you assign a value for 2-Core Ratio Limit, do not set the 1-Core Ratio Limit to [Auto].

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.

> If you assign a value for 3-Core Ratio Limit, do not set the 1-Core Ratio Limit and 2-Core Ratio Limit to **[Auto]**.

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 4-Core Ratio Limit, do not set the 1-Core Ratio Limit, 2-Core Ratio Limit, and 3-Core Ratio to **[Auto]**.

DRAM Odd Ratio Mode [Enabled]

Allows you to enable or disable the DRAM Odd Ratio Mode, which provides 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: [Auto] [DDR4-800MHz] [DDR4-933MHz] [DDR4-1066MHz] [DDR4-1200MHz] [DDR4-1333MHz] [DDR4-1400MHz] [DDR4-1500MHz] [DDR4-1600MHz] ~ [DDR4-4266MHz]

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

EPU and Performance Mode [Auto]

EPU and Performance Mode lets you configure the power usage to boost or enhance system performance.

[Auto]	Automatically adjusts the power usage based on the system load.
[Max Power-Saving Mode]	Enables all power-saving settings for maximum energy-saving condition.
[EPU Mode]	Lowers the CPU core/cache voltage for the best energy-saving condition.
[Performance Mode]	Disables all power-saving settings to achieve a high system performance.

CPU SVID Support [Auto]

Disabling SVID Support stops the processor 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 <+> and <-> keys to adjust the value. To restore the default setting, type [auto] using the keyboard and press the <Enter> key.

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

DIGI+ VRM

CPU Load-Line Calibration [Auto]

Load-line is defined by Intel VRM specification and affects the CPU power voltage. The CPU working voltage will decrease proportionally depending on the CPU loading. Higher levels of the load-line calibration can get a higher voltage and a better overclocking performance but increases the CPU and VRM thermal. Configuration options: [Auto] [Level 1] [Level 2] ~ [Level 6] [Level 7]

> The boosted performance may vary depending on the CPU specification. Do not remove the thermal module.

CPU Current Capability [Auto]

Allows you to configure the total power range, and extends the overclocking frequency range simultaneously. Configuration options: [Auto] [100%] [110%] [120%] [130%] [140%]

> Choose a higher value 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) [250]

This item allows you to set a higher frequency for a quicker transient response speed. Use the <+> and <-> keys to adjust the value. The values range from 250KHz to 500KHz with a 50KHz interval.

CPU Power Duty Control [T.Probe]

DIGI + VRM Duty control adjusts the current and thermal conditions of every component's phase.

[T. Probe]   Select to maintain the VRM thermal balance.

[Extreme]   Select to maintain the current VRM balance.

CPU Power Phase Control [Auto]

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

CPU Graphics Load-Line Calibration [Auto]

Load-line is defined by Intel VRM specification and affects the GT power voltage. The GT working voltage will decrease proportionally depending on the GT loading. Higher levels of the load-line calibration can get a higher voltage and a better overclocking performance but increases the GT and VRM thermal. Select from level 1 to 7 to adjust the GT power voltage from 0% to 100%. Configuration options: [Auto] [Level 1] [Level 2] [Level 3] [Level 4] [Level 5] [Level 6] [Level 7]

> The boosted performance may vary depending on the GT specification. Do not remove the thermal module.

CPU Graphics Current Capability [Auto]

Allows you to configure the total power range, and extends the overclocking frequency range simultaneously. Configuration options: [Auto] [100%] [110%] [120%] [130%] [140%]

> Choose a higher value when overclocking, or under a high GT loading for extra power support.

CPU Graphics Switching Frequency [Auto]

This item affects the GT 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 GT VRM Switching Frequency to **[Manual]**.

Fixed CPU Graphics Switching Frequency (KHz) [250]

This item allows you to set a higher frequency for a quicker transient response speed. Use the <+> and <-> keys to adjust the value. The values range from 250KHz to 500KHz with a 50KHz interval.

CPU Graphics Power Duty Control [T.Probe]

The CPU Graphics power duty control adjusts the current of every VRM phase and thermal production of every phase.

[T. Probe]   Select to maintain the VRM thermal balance.

[Extreme]   Select to maintain the current VRM balance.

CPU Graphics Power Phase Control

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

Internal CPU Power Management

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

Intel(R) SpeedStep(tm) [Auto]

This item allows the operating system to dynamically adjust the processor voltage and cores frequency, resulting to a decreased average power consumption and decreased average heat production. Configuration options: [Auto] [Disabled] [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 <+> or <-> keys to adjust the value. The values range from 1 W to 4095 W.

Package Power Time Window [Auto]

Also known as Power Limit 1, this item allows you to maintain the time window for Turbo Ratio over TDP (Thermal Design Power). Use the <+> or <-> keys to adjust the value. The values range from 1 to 127 in seconds.

Short Duration Package Power Limit [Auto]

Also known as Power Limit 2, this item allows you to provide rapid protection when the package power exceeds the Power Limit 1. Use the <+> or <-> keys to adjust the value. The values range from 1 W to 4095 W.

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]

CPU Core/Cache Current Limit Max. [Auto]

Allows you to set a higher current limit to prevent a frequency or power throttling when overclocking. Use the <+> or <-> keys to adjust the value. The values range from 0.00A to 255.50A with a 0.25A interval.

CPU Graphics Current Limit [Auto]

Allows you to configure a higher current limit to prevent a frequency or power throttling when overclocking. The values range from 0.00A to 255.50A with a 0.25A interval.

Min. CPU Cache Ratio [Auto]

Allows you to set the minimum possible CPU cache ratio. Use the <+> or <-> keys to adjust the value. The values range from 8 to 23 with a 1 interval.

Max. CPU Cache Ratio [Auto]

Allows you to set the maximum possible CPU cache ratio. Use the <+> or <-> keys to adjust the value. The values range from 8 to 23 with a 1 interval.

Max. CPU Graphics Ratio [Auto]

This item allows you to set the maximum possible CPU graphics ratio. Use the <+> and <-> keys to adjust the value. Configuration options: [Auto] [1] - [19]

CPU Core/Cache Voltage [Auto]

This item allows you to configure the amount of voltage fed to the CPU cores. Increase the voltage when setting a high Core Frequency value. Configuration options: [Auto] [Manual Mode] [Offset Mode]

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

CPU Core Voltage Override [Auto]

Allows you to set the input voltage for the CPU by the external voltage regulator. Use the <+> or <-> keys to adjust the value. The values range from 0.600V to 1.700V with a 0.005V interval.

The following item appears only when you set the CPU Core/Cache Voltage to [Offset Mode].

Offset Mode Sign [+]

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

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

CPU Core Voltage Offset

Use the <+> or <-> keys to adjust the value. The values range from 0.005V to 0.635V with a 0.005V interval.

DRAM Voltage [Auto]

This item allows you to set the voltage for the DRAM. Configuration options: [Auto] [1.20V] [1.25V] [1.35V] [1.40V]

CPU VCCIO Voltage [Auto]

This item allows you to set the voltage for the CPU VCCIO. Configuration options: [Auto] [0.95V] [1.00V]

CPU System Agent Voltage [Auto]

This item allows you to set the voltage for the CPU System Agent. Configuration options: [Auto] [1.05V] [1.10V]

CPU Graphics Voltage Mode [Auto]

This item allows you to configure the mode of voltage fed to the CPU Graphics Voltage. Manual mode allows user-defined values. Offset mode modifies values by SVID. Configuration options: [Auto] [Manual Mode] [Offset Mode].

> 🖉 The following item appears only when you set the CPU Graphics Voltage Mode to **[Manual Mode]**

CPU Graphics Voltage Override [Auto]

This item allows you to configure the CPU Graphics Voltage Override. Use the <+> or <-> keys to adjust the value. The values range from 0.600V to 1.700V with a 0.005V interval.

> 🖉 The following item appears only when you set the CPU Core Voltage Mode to **[Offset Mode]**.

Offset Mode Sign [+]

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

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

CPU Graphics Voltage Offset [Auto]

This item allows you to configure the CPU Graphics Voltage Offset. Use the <+> or <-> keys to adjust the value. The values range from 0.005V to 0.635V with a 0.005V interval.

PCH Core Voltage [Auto]

This item allows you to set the PCH core voltage. [Auto] [1.00V] [1.05V]

Internal PLL Voltage [Auto]

This item allows you to configure the offset for the Core PLL VCC Trim. Use the <+> or <-> keys to adjust the value. The values range from 0.900V to 1.845V with a 0.015V interval.

DRAM REF Voltage Control

DRAM CTRL REF Voltage on CHA [Auto]

Allows you to set the DRAM reference voltage on the control lines of channel A. You can use the <+> or <-> keys to adjust the value. The values range from 0.39500V to 0.63000V with a 0.00500V interval.

DRAM DATA REF Voltage on CHB [Auto]

Allows you to set the DRAM reference voltage on the data lines of channel B. You can use the <+> or <-> keys to adjust the value. The values range from 0.39500V to 0.63000V with a 0.00500V interval.

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]

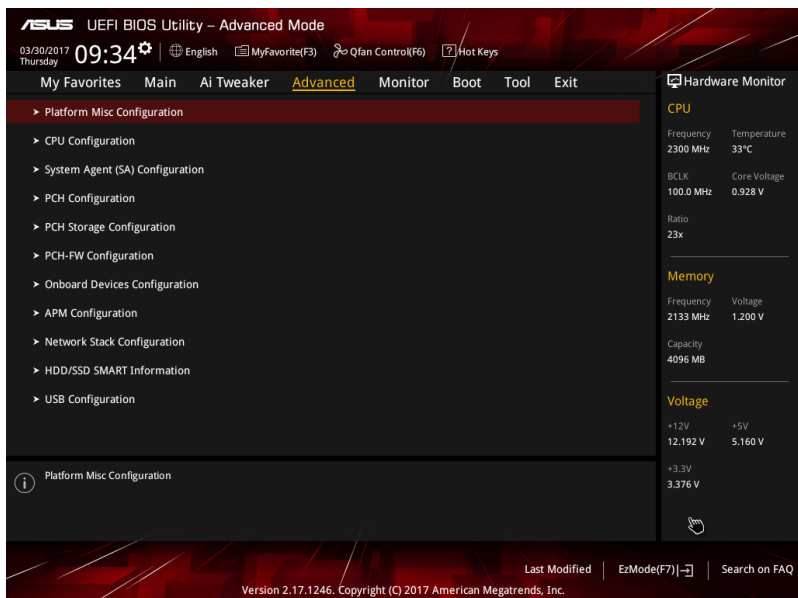**DRAM DATA REF Voltage on CHB DIMM1 Rank1 BL0-7 [Auto]**

Configures the DRAM Data REF Voltage. Configuration options: [Auto] [0] - [63]

1.6   Advanced menu

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

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

1.6.1   Platform Misc Configuration

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

PCI Express 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.
[Auto]	Automatic configuration.

PCH - PCI Express options

PCH DMI ASPM

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 [Disabled]

This item allows you to select the ASPM state for energy-saving conditions. Configuration options: [Disabled] [L0s] [L1] [L0sL1] [Auto]

SA - PCI Express options

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 [Disabled]

This item allows you to select the ASPM state for energy-saving conditions, or use the ASUS optimized energy saving profile. Configuration options: [Disabled] [Auto] [ASPM L0s] [ASPM L1] [ASPM L0sL1]

1.6.2   CPU Configuration

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

> The items shown in submenu may be different due to the CPU you installed.

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]

For some CPU types, only [All] and [1] appear.

Intel Virtualization Technology [Disabled]

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 Prefetch [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]

SW Guard Extensions [Software Controlled]

This item enables/disables the Software Guard Extensions (SGX). Configuration options: [Disabled] [Software Controlled]

Tcc Offset Time Window [Auto]

This item allows you to specify the time window for the Running Average Temperature Limit (RATL) feature. Configuration options: [Auto] [Disabled] [5 ms] [10 ms] [55 ms] [156 ms] [375 ms] [500 ms] [750 ms] ~ [448 sec]

CPU Power Management Control

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

Intel(R) SpeedStep(tm) [Auto]

This item allows your system to support more than two frequency ranges. Configuration options: [Auto] [Disabled] [Enabled]

CPU C-States [Auto]

This item allows you to set the power saving of the CPU states. Configuration options: [Auto] [Disabled] [Enabled]

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

Enhanced C states [Enabled]
[Enabled]   Enables enhanced C1 state.

[Disabled]   Disables enhanced C1 state.

CPU C3 Report [Enabled]
Allows you to disable or enable the CPU C3 report to OS. Configuration options: [Enabled] [Disabled]

CPU C6 Report [Enabled]
Allows you to disable or enable the CPU C6 report to OS. Configuration options: [Enabled] [Disabled]

CPU C7 Report [CPU C7s]
Allows you to disable or enable the CPU C7 report to OS. Configuration options: [Disabled] [CPU C7] [CPU C7s]

CPU C8 Report [Enabled]
Allows you to disable or enable the CPU C8 report to OS. Configuration options: [Enabled] [Disabled]

Package C State Limit [Auto]
Allows you to disable or enable the whole C-State package support. Configuration options: [C0/C1] [C2] [C3] [C6] [C7] [C7s] [C8] [Auto] [Enabled]

CFG lock [Disabled]

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

1.6.3   System Agent (SA) Configuration

VT-d [Disabled]

Allows you to enable or disable VT-d function on MCH. Configuration options: [Enabled] [Disabled]

Above 4G Decoding [Disabled]

Allows you to enable or disable the 4G decoding for 64-bit devices when the system supports the 64-bit PCI decoding. Configuration options: [Enabled] [Disabled]

Graphics Configuration

Allows you to select a primary display from CPU, PCIE and PCI graphical devices.

Primary Display [Auto]

Allows you to select the primary display from CPU, PCIE and PCI graphics devices Configuration options: [Auto] [CPU Graphics] [PCIE]

iGPU Multi-Monitor [Disabled]

This item allows you to empower both integrated and discrete graphics devices for the multi-monitor output. The CPU graphics shared system memory size is fixed at 64 MB. Configuration options: [Disabled] [Enabled]

RC6 (Render Standby) [Enabled]

Allows you to enable or disable render standby support. Configuration options: [Disabled] [Enabled]

DVMT Pre-Allocated [64M]

Allows you to select the DVMT 5.0 pre-allocated (fixed) graphics memory size used by the internal graphics device. Configuration options: [32M] [64M] [96M] ~ [1024M]

DMI/OPI Configuration

This item allows you to control various DMI (direct media interface) to run at PCI-E 3.0 speed.

DMI Max Link Speed [Auto]

Allows you to configure the DMI speed. Configuration options: [Auto] [Gen1] [Gen2] [Gen3]

PEG Port Configuration

Allows you to configure the PEG Port settings.

PCIEx16_1 Link Speed [Auto]

Allows you to configure the PCIEx16 speed for slot 1. Configuration options: [Auto] [Gen1] [Gen2] [Gen3]

Memory Configuration

Allows you to configure the memory configuration parameters.

Memory Remap [Enabled]

Set this item to [Enabled] to support DRAM address remapping for 64-bit operating systems. Configuration options: [Enabled] [Disabled]

1.6.4   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. When set to [Gen1], the PCIe port runs at PCIe 1.0 speed. When set to [Gen2], the PCIe port runs at PCI-E 2.0 speed. Configuration options: [Auto] [Gen1] [Gen2]

IOAPIC 24-119 Entries [Enabled]

This item allows you to enable/disable the IOAPIC 24-119 Entries. IRQ24-119 may be used by PCH devices. Disabling those interrupts may cause certain devices to fail. Configuration options: [Enabled] [Disabled]

1.6.5   PCH Storage Configuration

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

Hyper Kit Mode [Disabled]

Disable this option for M.2 devices. Enable this option for ASUS Hyper Kit card. Configuration options: [Disabled] [Enabled]

SATA Controller(s) [Enabled]

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

SATA Mode Selection [AHCI]

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.

Aggressive LPM Support [Disabled]

This item allows you to enable or disable PCH entering link power state aggressively Configuration options: [Disabled] [Enabled]

SMART Self Test [On]

SMART (Self-Monitoring, Analysis and Reporting Technology) is a monitoring system that shows a warning message during POST (Power-on Self Test) when an error occurs in the hard disks. Configuration options: [On] [Off]

SATA6G_1~6(Charcoal Black) [Enabled]

Allow you to enable/disable the SATA6G_1~6 port. Configuration options: [Disabled] [Enabled]

Hot Plug [Disabled] (SATA6G_1 ~ SATA6G_6)

These items allow you to enable/disable SATA Hot Plug Support. Configuration options: [Disabled] [Enabled]

1.6.6   PCH-FW Configuration

TPM Device Selection [Discrete TPM]

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

1.6.7   Onboard Devices Configuration

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 item to [Enabled].

DVI Port Audio [Disabled]

Configuration options: [Enabled] [Disabled]

Depop [Enabled]

Configuration options: [Enabled] [Disabled]

SupremeFX LED Lighting [Breathing Mode]

Allows you to set the behavior of the audio LED. Configuration options: [Disabled] [Still Mode] [Breathing Mode]

M.2_1 Configuration [Auto]

[Auto]   Auto-detects the M.2 device mode. If a SATA device is detected, SATA6G_1 will be disabled.

[SATA]   Only supports M.2 SATA devices. SATA6G_1 port cannot be used in this mode.

[PCIE]   Only supports M.2 PCIE devices.

Intel LAN Controller [Enabled]

[Enabled]   Enables the Intel LAN controller.

[Disabled]   Disables the controller.

Intel PXE Option ROM [Off]

This item appears only when you enable the Intel LAN controller. This item allows you to enable or disable the PXE OptionRom of the Intel LAN controller. Configuration options: [On] [Off]

Serial Port Configuration

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

Serial Port 1 [On]

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

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

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

1.6.8   APM Configuration

ErP Ready [Disabled]

Allows BIOS to switch off some power at S5 to get the system ready for ErP requirement. When set to [Enabled], all other PME options will be switched off. Configuration options: [Enable(S4+S5)] [Enable(S5)] [Disabled]

Restore AC Power Loss [Power Off]

[Power On]   The system goes into on state after an AC power loss.

[Power Off]   The system goes into off state after an AC power loss.

[Last State]   The system goes into either off or on state, whatever the system state was before the AC power loss.

Power On By PCI-E [Disabled]

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

Power On By Ring [Disabled]

[Disabled]   Disables Ring to generate a wake event.

[Enabled]   Enables Ring to generate a wake event.

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]

1.6.9 Network Stack Configuration

Network Stack [Disabled]

This item allows user to disable or enable the UEFI network stack. Configuration options: [Disabled] [Enabled]

> The following two items appear only when you set the previous item to [Enabled].

Ipv4 / Ipv6 PXE Support [Enabled]

This item allows you to enable or disable the Ipv4/Ipv6 PXE wake event. Configuration options: [Disable Link] [Enabled]

1.6.10 HDD/SSD SMART Information

This menu displays the SMART information of the connected devices.

1.6.11 USB Configuration

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

> The USB 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 the manual for the location of the USB ports.

1.7 Monitor menu

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

CPU / MotherBoard Temperature [xxx°C/xxx°F] or [Ignore]

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

CPU / Chassis Fan Speed [xxxx RPM] or [Ignore] / [N/A]

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

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

The subitems in this menu allows you to configure the Q-Fan features.

Qfan 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]　　　　　Enables the CPU Q-Fan control for 4-pin CPU fan.

[PWM Mode]　　Enable the CPU Q-Fan control in PWM mode for 4-pin CPU fan.

[DC Mode]　　　Enable the CPU Q-Fan control in DC mode for 3-pin CPU fan.

CPU Fan Speed Lower Limit [200 RPM]

This item appears only when you enable the CPU Q-Fan Control feature and allows you to disable or set the CPU fan warning speed. Configuration options: [Ignore] [200RPM] [300 RPM] [400 RPM] [500 RPM] [600RPM]

CPU Fan Profile [Standard]

This item appears only when you enable the CPU Q-Fan Control feature and allows you to set the appropriate performance level of the CPU fan.

[Standard]　　　Sets to [Standard] to make the CPU fan automatically adjust depending on the CPU temperature.

[Silent]　　　　Sets to [Silent] to minimize the fan speed for quiet CPU fan operation.

[Turbo]　　　　Sets to [Turbo] to achieve maximum CPU fan speed.

[Manual]　　　　Sets to [Manual] to assign detailed fan speed control parameters.

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

CPU Upper Temperature [70]

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

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

Use the <+> and <-> 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 set the value for CPU Middle Temperature. The range of the values depends on the CPU installed.

CPU Fan Middle Duty Cycle(%) [20]

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

CPU Lower Temperature [20]

Use the <+> or <-> keys to adjust the CPU fan's lower temperature. The values range from 0°C to 75°C.

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

Use the <+> and <-> keys to adjust the minimum CPU fan duty cycle. The values range from 20% to 100%. When the CPU temperature is under the lower limit, the CPU fan will operate at the minimum duty cycle.

Chassis Fan(s) Configuration

The subitems in this menu allows you to configure the chassis Q-Fan features.

Chassis Fan Q-Fan Control [Auto]

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

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

Chassis Fan Q-Fan Source [CPU]

This item controls the assigned fan according to the selected temperature source. Configuration options: [CPU] [Motherboard]

Chassis Fan Speed Low Limit [200 RPM]

This item allows you to disable or set the chassis fan warning speed. Configuration options: [Ignore] [200RPM] [300 RPM] [400 RPM] [500 RPM] [600 RPM]

Chassis Fan 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 Profile to [Manual].

Chassis Fan Upper Temperature [70]

Use the <+> or <-> keys to adjust the upper limit of the CPU temperature. The values range from 0°C to 75°C.

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

Use the <+> or <-> keys to adjust the maximum chassis fan duty cycle. The values range from 60% to 100%. When the chassis temperature reaches the upper limit, the chassis fan will operate at the maximum duty cycle.

Chassis Fan Middle Temperature [45]

Use the <+> or <-> keys to set the value for Chassis Fan Middle Temperature.

Chassis Fan Middle Duty Cycle(%) [60]

Use the <+> or <-> keys to adjust the chassis fan middle duty cycle. The values range from 60% to 100%.

Chassis Fan Lower Temperature [40]

Use the <+> or <-> keys to adjust the chassis fans' lower temperature. The values range from 0°C to 75°C.

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

Use the <+> or <-> keys to adjust the minimum chassis fan duty cycle. The values range from 60% to 100%. When the CPU temperature is under the lower limit, the chassis fan operates at the minimum duty cycle.

1.8   Boot menu

The Boot menu items allow you to change the system boot options.
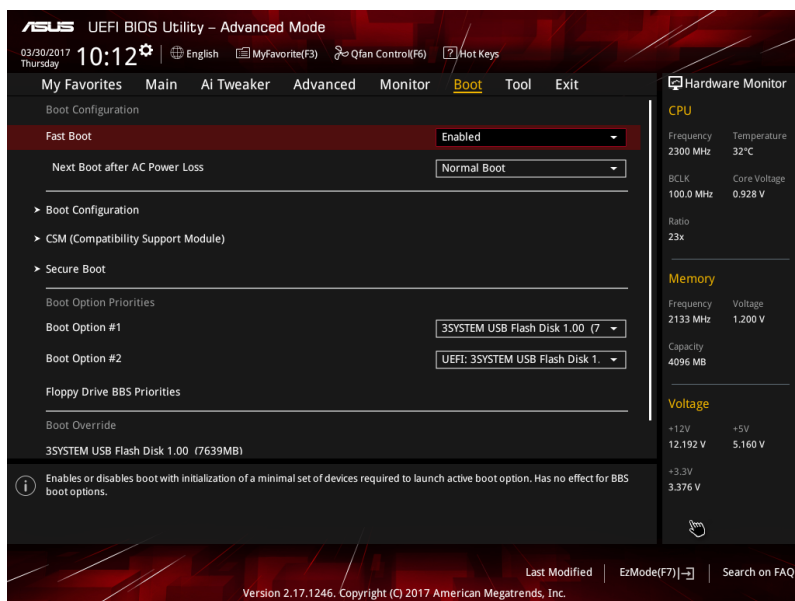
Fast Boot [Enabled]

[Enabled]   Select to accelerate the boot speed.

[Disabled]   Select to go back to normal boot speed.

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

Next Boot after AC Power Loss [Normal Boot]

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

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

Boot Configuration

Boot Logo Display [Auto]

[Auto]   Adjusts logo automatically based on Windows® display requrements.

[Full Screen]   Maximize the boot logo size.

[Disabled]   Hide the logo during POST.

POST Delay Time [3 sec]

This item appears only when you set Boot Logo Display to [Auto] and [Full Screen]
This item allows you to select the 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 will only work under normal boot.

Post Report [5 sec]

This item appears only when you set Boot Logo Display to [Disabled]. 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]

Wait for 'F1' If Error [Enabled]

When this item is set to [Enabled], the system waits for the F1 key to be pressed when error
occurs. Configuration options: [Disabled] [Enabled]

Option ROM Messages [Force BIOS]

[Force BIOS]   The third-party ROM messages will be forced to display during the
                    boot sequence.

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

Interrupt 19 Capture [Disabled]

This item allows you to trap Interrupt 19 by the option ROMs. Configuration options:
[Disabled] [Enabled]

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)

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 Windows® Security Update and Security Boot.

The following four items appear when you set Launch CSM to [Enabled].

Boot Device Control [UEFI and Legacy OPROM]

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

Boot from Network Devices [Legacy only]

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

Boot from Storage Devices [Legacy Only]

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

Boot from PCI-E Expansion Devices [Legacy Only]

Allows you to select the type of PCI-E expansion devices that you want to launch. Configuration options: [Legacy only] [UEFI driver first]

Secure Boot

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 [Other OS]

Allows you to select your installed operating system.

| [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

This allows you to manage the Secure Boot keys.

Clear Secure Boot keys

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

Save all Secure Boot variables

This item allows you to save all the Secure Boot keys to a USB storage device.

PK Management

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

Save to File

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

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.

KEK Management

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

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

Save to File

Allows you to save the downloaded KEK to a USB storage device.

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 public key certificate or UEFI variable structure with time-based authenticated variable.

Delete key

Allows you to delete the Key from your system. Configuration options: [Yes] [No]

DB Management

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

Save to File

Allows you to save the downloaded db to a USB storage device.

Set New Key

Allows you to load the downloaded db 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 db file must be formatted as a UEFI variable structure with time-based authenticated variable.

Delete Key

Allows you to delete the db file from your system. Configuration options: [Yes] [No]

DBX Management

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

Save to File

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

Set New Key

Allows you to load the downloaded dbx 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 dbx file must be formatted as a UEFI variable structure with time-based authenticated variable.

Delete key

Allows you to delete the Key from your system. Configuration options: [Yes] [No]

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 select the boot device during system startup, press <F8> when ASUS 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.

1.9 Tool menu

The Tool menu items allow you to configure options for special functions. Select an item then press <Enter> to display the submenu.
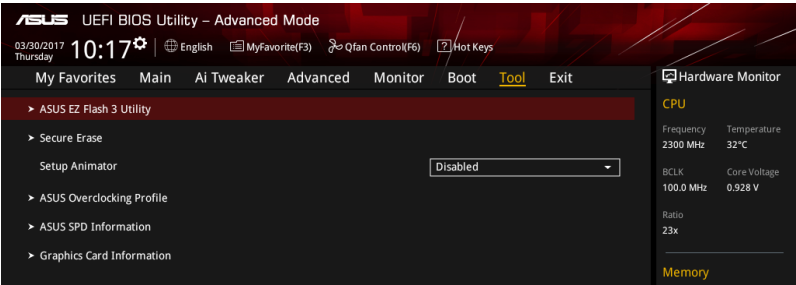
1.9.1 ASUS EZ Flash 3 Utility

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

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

1.9.2 Secure Erase

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

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

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

> Check the ASUS 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 the motherboard manual.

Displays the available SSDs

Port #	SSD Name	Status	Total Capacity
P2	ADATA SS96 Turbo	Frozen	64.0GB

SSD Secure Erase

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

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Status definition:

- **Frozen.** The frozen state is the result of a BIOS protective measure. The BIOS guards drives that do not have password protection by freezing them prior to booting. If the drive is frozen, a power off or hard reset of your PC must be performed to proceed with the Secure Erase.

- **Locked.** SSDs might be locked if the Secure Erase process is either incomplete or was stopped. This may be due to a third party software that uses a different password defined by ASUS. You have to unlock the SSD in the software before proceeding with Secure Erase.

1.9.3   ASUS Overclocking Profile

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

Load Profile

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

- DO NOT shut down or reset the system while updating the BIOS to prevent the system boot failure!

- We recommend that you update the BIOS file only coming from the same memory/CPU configuration and BIOS version.

Profile Name

This item allows you to key in a profile name.

Save to Profile

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

Load/Save Profile from/to USB Drive

This item allows you to load or save profile from your USB drive, load and save profile to your USB drive.

1.9.4   ASUS SPD Information

This item allows you to view the DRAM SPD information.

1.9.5   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.

> This feature is only supported on selected ASUS graphics cards.

1.10   Exit menu

The Exit menu items allow you to load the optimal default values for the BIOS items, and save or discard your changes to the BIOS items. You can access the EZ Mode from the Exit menu.
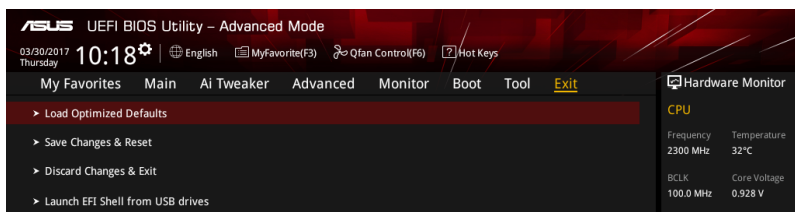
Load Optimized Defaults

This option allows you to load the default values for each of the parameters on the Setup menus. When you select this option or if you press <F5>, a confirmation window appears. Select **OK** to load the default values.

Save Changes & Reset

Once you are finished making your selections, choose this option from the Exit menu to ensure the values you selected are saved. When you select this option or if you press <F10>, a confirmation window appears. Select **OK** to save changes and exit.

Discard Changes & Exit

This option allows you to exit the Setup program without saving your changes. When you select this option or if you press <Esc>, a confirmation window appears. Select **Yes** to discard changes and exit.

Launch EFI Shell from USB drives

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

1.11 Updating BIOS

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

> Visit http://www.asus.com to download the latest BIOS file for this motherboard.

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

1. EZ Update: Updates the BIOS in Windows® environment.

2. ASUS EZ Flash 3: Updates the BIOS using a USB flash drive.

3. ASUS CrashFree BIOS 3: Restores the BIOS using the motherboard support DVD or a USB flash drive when the BIOS file fails or gets corrupted.

1.11.1 EZ Update

The EZ Update is a utility that allows you to update the motherboard BIOS in Windows® environment.

> • EZ Update requires an Internet connection either through a network or an ISP (Internet Service Provider).
>
> • This utility is available in the support DVD that comes with the motherboard package.

1.11.2 ASUS EZ Flash 3

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

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

To update the BIOS by USB:

1. Enter the Advanced Mode of the BIOS setup program. Go to the Tool menu to select **ASUS EZ Flash 3 Utility** and press <Enter>.

2. Insert the USB flash disk that contains the latest BIOS file to the USB port.

3. Select **via Storage Devices.**
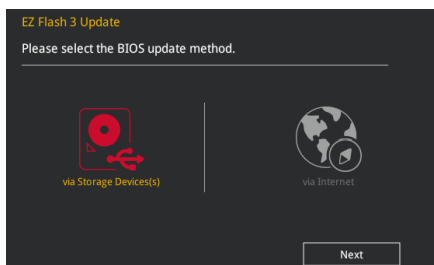
4. Press <Tab> to switch to the Drive field.

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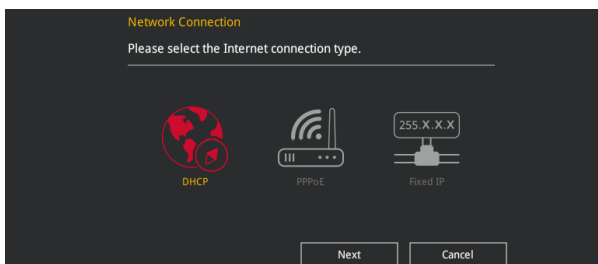
> ✍️ Ensure to load the BIOS default settings to ensure system compatibility and stability. Select the Load Optimized Defaults item under the Exit menu. See section **1.10 Exit Menu** for details.

To update the BIOS via Internet:

1. Enter the Advanced Mode of the BIOS setup program. Go to the Tool menu to select **ASUS EZ Flash 3 Utility** and press <Enter>.

2. Select **via Internet.**
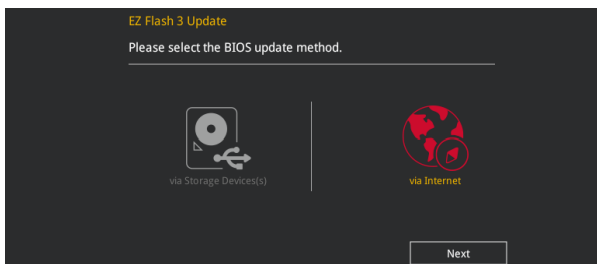
3. Press the Left/Right arrow keys to select an Internet connection method, and then press <Enter>.

4. Follow the onscreen instructions to complete the update.

5. Reboot the system when the update process is done.

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

1.11.3   ASUS CrashFree BIOS 3

The ASUS CrashFree BIOS 3 utility is an auto recovery tool that allows you to restore the BIOS file when it fails or gets corrupted during the updating process. You can restore a corrupted BIOS file using the motherboard support DVD or a USB flash drive that contains the BIOS file.

> The BIOS file in the motherboard support DVD may be older than the BIOS file published on the ASUS official website. If you want to use the newer BIOS file, download the file at https://www.asus.com/support/ and save it to a USB flash drive.

Recovering the BIOS

To recover the BIOS:

1. Turn on the system.

2. Insert the motherboard support DVD to the optical drive, or the USB flash drive containing the BIOS file to the USB port.

3. The utility automatically checks the devices for the BIOS file. When found, the utility reads the BIOS file and enters ASUS EZ Flash 3 automatically.

4. The system requires you to enter BIOS Setup to recover the BIOS setting. To ensure system compatibility and stability, we recommend that you press <F5> to load default BIOS values.

> DO NOT shut down or reset the system while updating the BIOS! Doing so can cause system boot failure!