PRIME/Pro/
ProArt/TUF
GAMING
B550/A520
Series

BIOS Manual

Motherboard

E16863
First Edition
June 2020

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Contents

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BIOS Setup

1.1   Knowing BIOS

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

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

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

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

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

- When downloading or updating the BIOS file for your motherboard, rename it as **XXXXX.CAP**. The name of the CAP file varies depending on models. Refer to the user manual that came with your motherboard for the name.

- BIOS settings and options may vary due to different BIOS release versions. Please refer to the latest BIOS version for settings and options.

1.2　BIOS setup program

Use the BIOS Setup to update the BIOS or configure its parameters. The BIOS screens 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 your motherboard manual for information on how to erase the RTC RAM.

- The BIOS setup program does not support Bluetooth devices.

BIOS menu screen

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

1.2.1   EZ Mode

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

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

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

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

Selects the display language of the BIOS setup program

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

Turns the RGB LED lighting or functional LED on or off
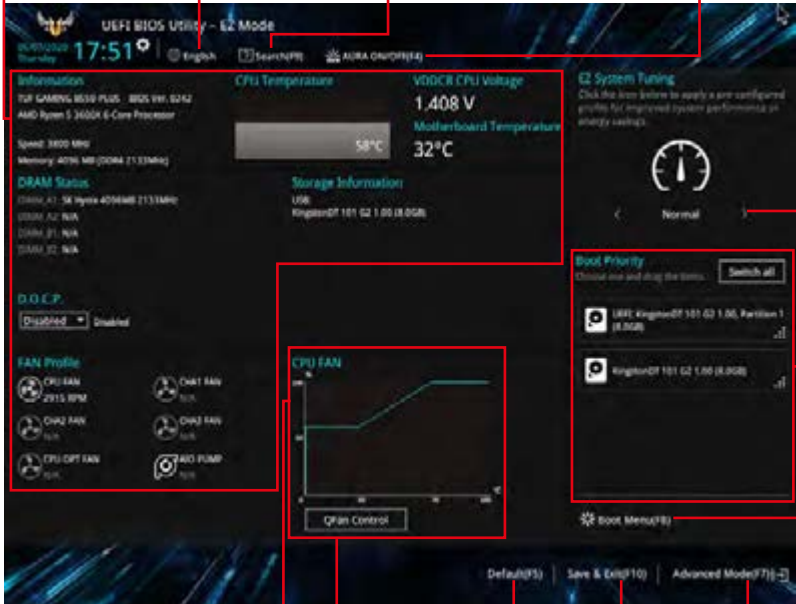
Enables or disables the SATA RAID mode for Intel Rapid Storage Technology

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

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.

- Menu bar
- Language
- MyFavorite(F3)
- Qfan Control(F6)
- Search(F9)
- AURA ON/OFF
- Scroll bar
- Menu items
- General help
- Pop-up Menu
- Last modified settings
- Go back to EZ Mode
- Hot keys
- submenu items
- Configuration fields
- Displays a quick overview of the system status

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

An arrow 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.

QFan 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 (F9)

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

AURA ON/OFF(F4)

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

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

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

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

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

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

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.

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. You can personalize this screen by adding or removing items.
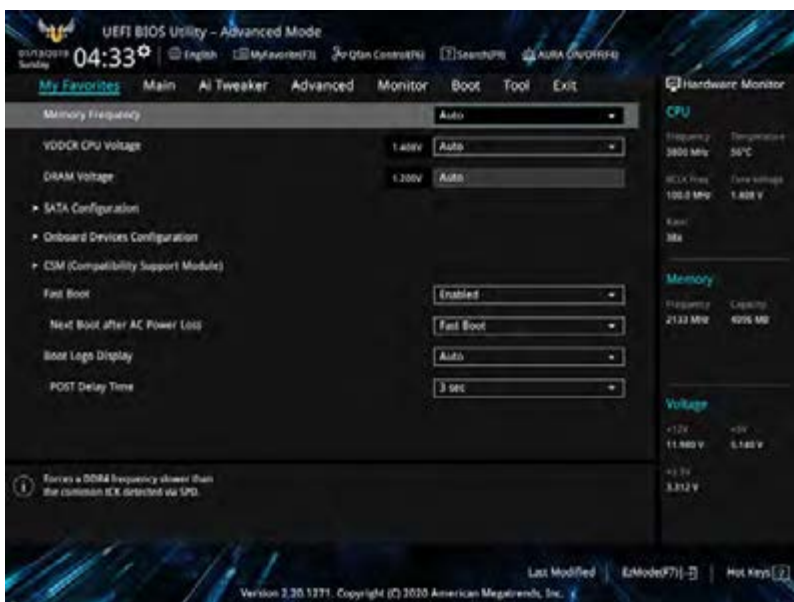
Adding items to My Favorites

To add BIOS items:

1.   Press <F3> on your keyboard or click **MyFavorites(F3)** from the BIOS screen to open Setup Tree Map screen.

2.   On the Setup Tree Map screen, select the BIOS items that you want to save in My Favorites screen.

Main menu panel

Submenu panel

Selected shortcut items

Delete all favorite items

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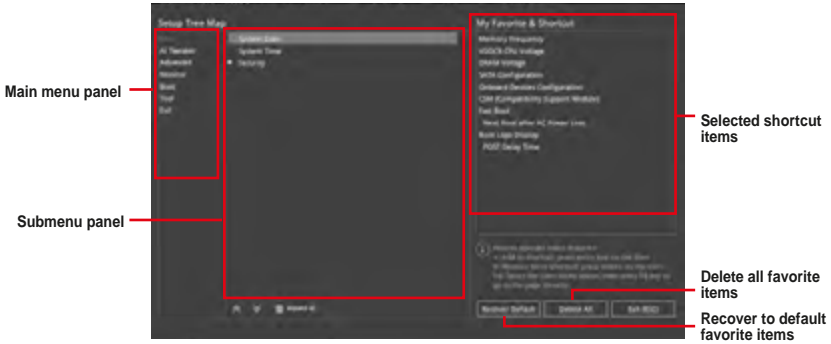
3.   Select an item from main menu panel, then click the submenu that you want to save as favorite from the submenu panel and click ✚ or press <Enter> on your keyboard.

> You cannot add the following items to My Favorite items:
>
> •   Items with submenu options.
>
> •   User-managed items such as language and boot order.
>
> •   Configuration items such as Memory SPD Information, system time and date.

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

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

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.
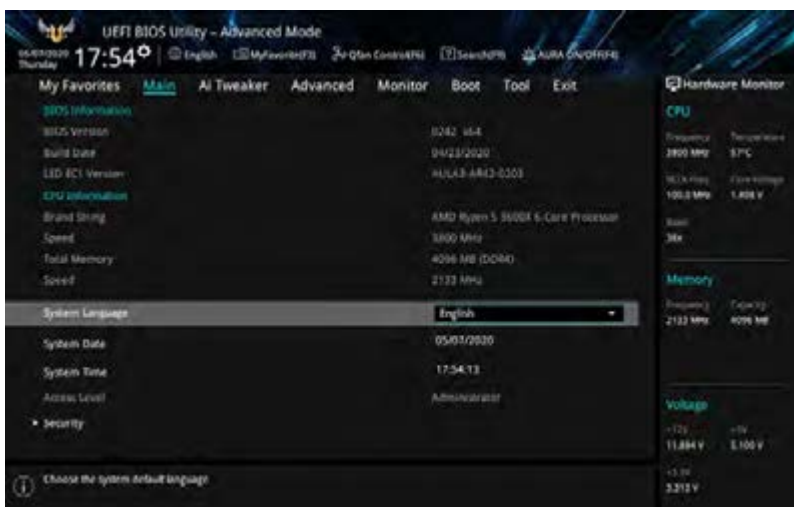
Security

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 for information on how to erase the RTC RAM via the Clear CMOS jumper.

- The Administrator or User Password items on top of the screen show the default **[Not Installed]**. After you set a password, these items show **[Installed]**.

Administrator Password

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

To set an administrator password:

1.　　Select the **Administrator Password** item and press <Enter>.

2.　　From the **Create New Password** box, key in a password, then press <Enter>.

3.　　Re-type to confirm the password then select **OK**.

To change an administrator password:

1.　　Select the **Administrator Password** item and press <Enter>.

2.　　From the **Enter Current Password** box, key in the current password, then press <Enter>.

3.　　From the **Create New Password** box, key in a new password, then press <Enter>.

4.　　Re-type to confirm the password then select **OK**.

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

User Password

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

To set a user password:

1.　　Select the **User Password** item and press <Enter>.

2.　　From the **Create New Password** box, key in a password, then press <Enter>.

3.　　Re-type to confirm the password then select **OK**.

To change a user password:

1.　　Select the **User Password** item and press <Enter>.

2.　　From the **Enter Current Password** box, key in the current password, then press <Enter>.

3.　　From the **Create New Password** box, key in a new password, then press <Enter>.

4.　　Re-type to confirm the password then select **OK**.

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

1.5 Ai Tweaker menu

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

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

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

Scroll down to display other BIOS items.
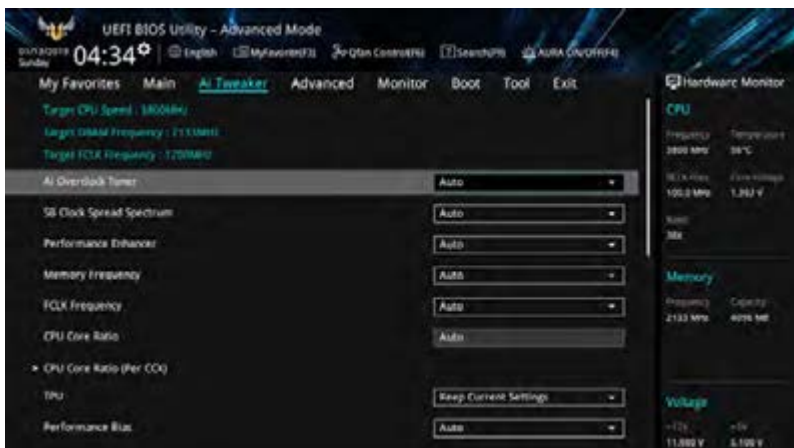
Ai Overclock Tuner

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

[Auto]   Loads the optimal settings for the system.

[Manual]   Allows you to individually set overclocking parameters.

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

BCLK Frequency

This item allows you to set the BCLK frequency to enhance the system performance. Use the <+> or <-> to adjust the value. The values range from 96.0 MHz to 118.0 MHz.

SB Clock Spread Spectrum

This item allows you to enable or disable CG1_PLL Spread Spectrum. Configuration options: [Auto] [Enabled] [Disabled]

Performance Enhancer

This item allows the CPU to maintain boost frequencies longer for a better performance.

Configuration options: [Auto] [Default] [Level 1] [Level 2] [Level 3 (OC)]

Memory Frequency

This item allows you to set the memory operating frequency. The configurable options vary with the BCLK (base clock) frequency setting. Select the auto mode to apply the optimized setting. Configuration options: [Auto] [DDR4-1333MHz] – [DDR4-6000MHz]

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

FCLK Frequency

This item allows you to specify the FCLK frequency.

Configuration options: [Auto] [666MHz] [800MHz] – [3000MHz]

CPU Core Ratio

This item allows you to set the CPU core ratio. Use the <+> or <-> keys to adjust the value. The values depend on the CPU installed.

CPU Core Ratio (Per CCX)

Core VID

This item allows you to set a custom CPU core VID. Use the <+> or <-> to adjust the value. The values range from 0.700 to 1.550.

CCX0/1 Ratio

This item allows you to set a custom Core Ratio for this CCX. Use the <+> or <-> to adjust the value. The values range from 28.00 to 63.75.

TPU

The TPU automatically overclocks the CPU frequency and voltage to enhance the system performance. It also boosts the CPU graphics performance according to the CPU graphics loading. Configuration options: [Keep Current Settings] [OC Tuner]

> 🖉 To keep the current overclocking tuner status, select **[Keep Current Settings]**.

Performance Bias

This item allows you to select different values to help different Software's performance. Configuration options: [Auto] [None] [CB15 Gentle] [Aida/Geekbench] [CBR15 Aggressive]

Precision Boost Overdrive

This item allows the processor to run beyond the defined values for PPT, VDD_CPU EDC, VDD_CPU TDC, VDD_SOC EDC, VDD_SOC TDC set as the boards limits, and allows it to boost at higher voltages for a longer duration.

Precision Boost Overdrive

This item allows you to set the precise boost overdrive. Configuration options: [Auto] [Disabled] [Enabled] [Manual]

Precision Boost Overdrive Scalar

This item allows you to set the scale of the CPU frequency boost. Configuration options: [Auto] [Manual]

Max CPU Boost Clock Override

This item allows you to increase the maximum CPU frequency that may be automatically achieved by the Precision Boost 2 algorithm. Configuration options: [Auto] [0MHz] [25MHz] [75MHz] [100MHz] [125MHz] [150MHz] [175MHz] [200MHz]

Platform Thermal Throttle Limit

This item allows you to decrease the maximum allowed processor temperature (celsius).Configuration options: [Auto] [Manual]

DRAM Timing Control

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

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

DRAM CAS# Latency

Configuration options: [Auto] [5] – [33]

Trcdrd

Configuration options: [Auto] [8] – [27]

Trcdwr

Configuration options: [Auto] [8] – [27]

DRAM RAS# PRE Time

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

DRAM RAS# ACT Time

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

Trc

Configuration options: [Auto] [29] – [135]

TrrdS

Configuration options: [Auto] [4] – [12]

TrrdL

Configuration options: [Auto] [4] – [12]

Tfaw

Configuration options: [Auto] [6] – [54]

TwtrS

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

TwtrL

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

Twr

Configuration options: [Auto] [10] – [81]

Trcpage

Configuration options: [Auto] [0] -[1023]

TrdrdScl

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

TwrwrScl

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

Trfc

Configuration options: [Auto] [60] – [1023]

Trfc2

Configuration options: [Auto] [60] – [1023]

Trfc4

Configuration options: [Auto] [60] – [990]

Tcwl

Configuration options: [Auto] [9] – [22]

Trtp

Configuration options: [Auto] [5] – [14]

Trdwr

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

Twrrd

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

TwrwrSc

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

TwrwrSd

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

TwrwrDd

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

TrdrdSc

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

TrdrdSd

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

TrdrdDd

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

Tcke

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

ProcODT

Configuration options: [Auto] [High Impedance] [480ohm] [240ohm] [160ohm] [120ohm] [96ohm] [80ohm] [68.6ohm] [60ohm] [53.3ohm] [48ohm] [43.6ohm] [40ohm] [36.9ohm] [34.3ohm] [32ohm] [30ohm] [28.2ohm]

Cmd2T

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

Gear Down Mode

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

Power Down Enable

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

RttNom

Configuration options: [Auto] [Rtt_Nom Disable] [RZQ/4] [RZQ/2] [RZQ/6] [RZQ/1] [RZQ/5] [RZQ/3] [RZQ/7]

RttWr

Configuration options: [Auto] [Dynamic ODT Off] [RZQ/2] [RZQ/1] [Hi-Z] [RZQ/3]

RttPark

Configuration options: [Auto] [Rtt_PARK Disable] [RZQ/4] [RZQ/2] [RZQ/6] [RZQ/1] [RZQ/5] [RZQ/3] [RZQ/7]

MemAddrCmdSetup

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

MemCsOdtSetup

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

MemCkeSetup

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

MemCadBusClkDrvStren

Configuration options: [Auto] [120.0 Ohm] [60.0 Ohm] [40.0 Ohm] [30.0 Ohm] [24.0 Ohm] [20.0 Ohm]

MemCadBusAddrCmdDrvStren

Configuration options: [Auto] [120.0 Ohm] [60.0 Ohm] [40.0 Ohm] [30.0 Ohm] [24.0 Ohm] [20.0 Ohm]

MemCadBusCsOdtDrvStren

Configuration options: [Auto] [120.0 Ohm] [60.0 Ohm] [40.0 Ohm] [30.0 Ohm] [24.0 Ohm] [20.0 Ohm]

MemCadBusCkeDrvStren

Configuration options: [Auto] [120.0 Ohm] [60.0 Ohm] [40.0 Ohm] [30.0 Ohm] [24.0 Ohm] [20.0 Ohm]

Mem Over Clock Fail Count

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

DIGI+ VRM

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

VDDCR CPU Load Line Calibration

Load-line 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 5 to adjust the load-line slope.
Configuration options: [Auto] [Default] [Level 1] - [Level 5]

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

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

VDDCR CPU Current Capability

This item allows you to set the shut off current limit for external voltage regulator. A higher setting will allow the voltage regulator to supply more current while a lower setting will cause the voltage regulator to shut off the system when the supplied current is higher than the set value. Configuration options: [100%] [110%] [120%] [130%]

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

VDDCR CPU Switching Frequency

This item allows you to set a higher frequency for a quicker transient response speed. Use the <+> or <-> to adjust the value. The values range from 200 to 350 with an interval of 50.

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

VDDCR CPU Power Phase Control

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

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

[Extreme]   Set to the full phase mode.

[Manual]   Phase number is adjusted by current(A) step.

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

Manual Adjustment

This item allows you to set the response time, selecting **[Regular]** will result in longer reaction times.
Configuration options: [Regular] [Medium] [Fast] [Ultra Fast]

VDDCR CPU Power Duty Control

This item allows you to set the duty cycle of each VRM phase based upon current and/or temperature.

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

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

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

VDDCR SOC Load Line Calibration

Configuration options: [Auto] [Level 1] – [Level 5]

VDDCR SOC Current Capability

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

VDDCR SOC Switching Frequency

Use the <+> or <-> to adjust the value. The values range from 200 to 350 with an interval of 50.

VDDCR SOC Power Phase Control

Configuration options: [Optimized] [Extreme] [Manual]

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

Manual Adjustment

This item allows you to set the response time, selecting **[Regular]** will result in longer reaction times.
Configuration options: [Regular] [Medium] [Fast] [Ultra Fast]

VDDCR CPU Voltage

Configuration options: [Auto] [Manual] [Offset mode]

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

VDDCR CPU Voltage Override

Configuration options: [Auto] [0.750] - [2.000]

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

VDDCR CPU Offset Mode Sign

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

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

VDDCR CPU Offset Voltage

Configuration options: [Auto] [-0.00625] - [+0.50000]

VDDCR SOC Voltage

Configuration options: [Auto] [Manual] [Offset mode]

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

VDDCR SOC Voltage Override

Configuration options: [Auto] [0.750] - [2.000]

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

VDDCR SOC Offset Mode Sign

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

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

VDDCR SOC Offset Voltage

Configuration options: [Auto] [-0.00625] - [+0.50000]

DRAM Voltage

Configuration options: [Auto] [1.20] – [1.80]

VDDG CCD Voltage Control

Configuration options: [Auto] [0.700] – [1.80]

VDDG IOD Voltage Control

Configuration options: [Auto] [0.700] – [1.80]

CLDO VDDP voltage

Configuration options: [Auto] [0.700] – [1.80]

1.05V SB Voltage

Configuration options: [Auto] [1.05] – [1.1]

2.5V SB Voltage

Configuration options: [Auto] [2.50] – [2.55]

CPU 1.80V Voltage

Configuration options: [Auto] [1.80] – [2.20]

VTTDDR Voltage

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

VPP_MEM Voltage

Configuration options: [Auto] [2.500] – [2.800]

VDDP Standby Voltage

Configuration options: [Auto] [0.900] – [1.050]

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.
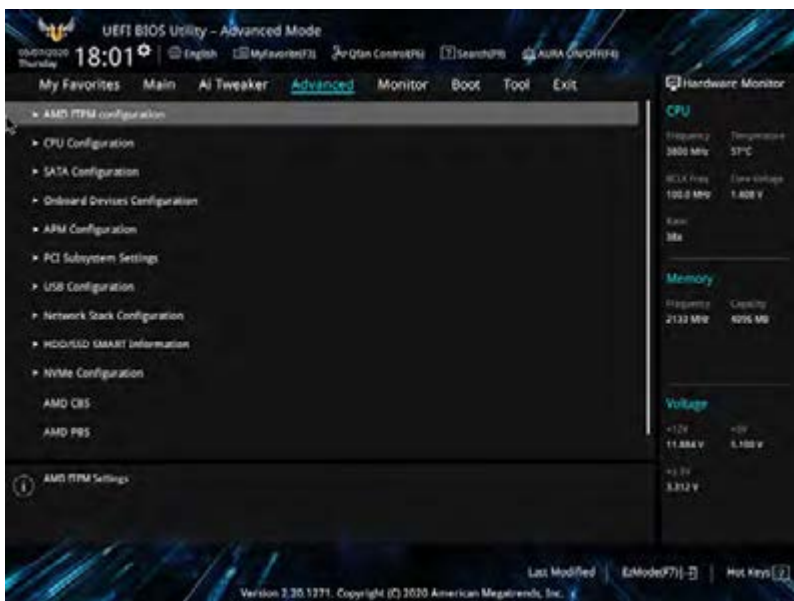
1.6.1 AMD fTPM configuration

The items in this menu show the AMD fTPM configuration options.
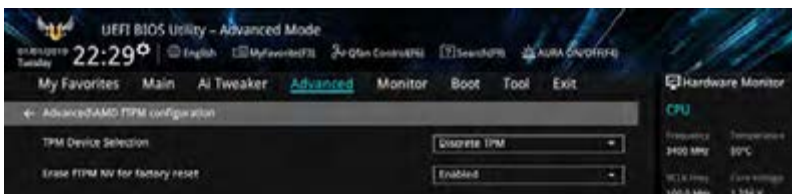
TPM Device Selection

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

When Firmware TPM is set to disabled all saved data on it will be lost.

Erase fTPM NV for factory reset

This item allows you to enable or disable fTPM reset for newly installed CPUs.

[Disabled]   Keep previous fTPM records and continue system boot, fTPM will not be enabled with the new CPU unless fTPM is reset (reinitialized). Swapping back to the old CPU may allow you to recover TPM related keys and data.

[Enabled]   Reset fTPM, if you have Bitlocker or encryption-enabled system, the system will not boot without a recovery key.

1.6.2 CPU Configuration

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

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

PSS Support

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

NX Mode

This item allows you enable or disable No-execute page protection function.

Configuration options: [Disabled] [Enabled]

SVM Mode

This item allows you enable or disable CPU Virtualization.

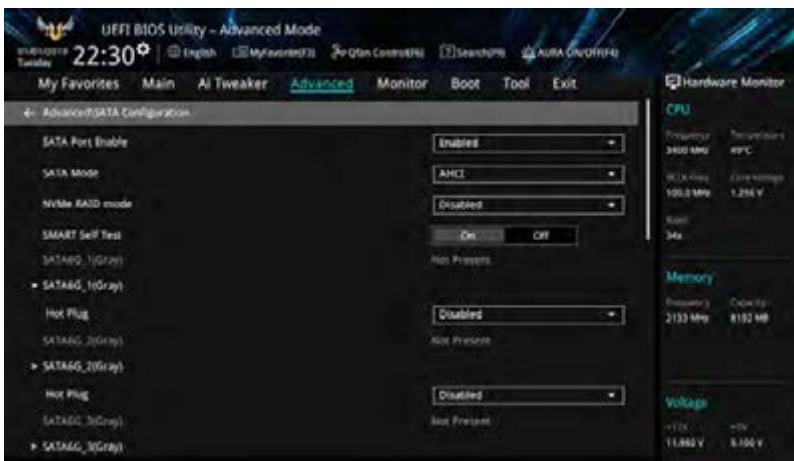Configuration options: [Disabled] [Enabled]

SMT Mode

Configuration options: [Auto] [Disabled]

Core Leveling Mode

This item allows you to change the number of compute units in the system.

Configuration options: [Automatic mode] [Two core per processor] [Four core per processor]

1.6.3 SATA 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.

SATA Port Enable

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

Configuration options: [Disabled] [Enabled]

SATA Mode

This item allows you to set the SATA configuration.

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

NVMe RAID Mode

This item allows you to enable or disable the NVMe RAID mode.

Configuration options: [Disabled] [Enabled]

SMART Self Test

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

SATA6G_1(Gray) - SATA6G_6(Gray)

SATA6G_1 - SATA6G_6

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

The number of the SATA ports varies by motherboard models.

Hot Plug

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

M.2_1(Gray) - M.2_2(Gray)

M.2_1 - M.2_2

This item allows you to rename the AMD M.2 slots.

The number of the M.2 slots varies by motherboard models.

1.6.4   Onboard Devices Configuration

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

The items in this menu may vary by motherboard models.

HD Audio Controller

This item allows you to use the Azalia High Definition Audio Controller
Configuration options: [Disabled] [Enabled]

PCIEX16_1 Mode

This item allows you to select the link speed for PCIEX16_1 slot.

Configuration options: [Auto] [Gen 1] [Gen 2] [Gen 3] [Gen 4]

M.2_1 Link Mode

This item allows you to select the link speed for M.2_1 slot.

Configuration options: [Auto] [Gen 1] [Gen 2] [Gen 3] [Gen 4]

SB Link Mode

This item allows you to select the link speed for Southbridge.

Configuration options: [Auto] [Gen 1] [Gen 2] [Gen 3]

PCIEX1 Mode

This item allows you to select the link speed for PCIEX1 slot.

Configuration options: [Auto] [Gen 1] [Gen 2] [Gen 3]

PCIEX16_1 Bandwidth

This item allows you to select the bandwidth for PCIEX16_1 slot.

Configuration options: [Auto Mode] [PCIe RAID Mode]

PCIEX16_2 4X-1X Switch

This item allows you to configure PCIEX16_2 operating mode.

[Auto]   Auto detect and switch. PCIEX16_2 runs x4 mode by default. If a PCIE device is installed on PCIEX1_1, PCIEX1_2 or PCIEX1_3, PCIEX16_2 will run x1 mode.

[1X]   Force PCIEX16_2 to run x1 mode.

[4X]   Force PCIEX16_2 to run x4 mode.

> The operating mode options of PCIEX16_2 vary by motherboard models.

LED lighting

When system is in working state

This item allows you to configure the RGB LED lighting effect when the system is in the working state. Configuration options: [All On] [Stealth Mode] [Aura Only] [Aura Off]

When system is in sleep, hibernate or soft off states

This item allows you to configure the RGB LED lighting effect when the system is in the sleep, hibernate or soft off states. Configuration options: [All On] [Stealth Mode] [Aura Only] [Aura Off]

> RGB LED availability varies by motherboard models.

Realtek 2.5G LAN Controller

This item allows you to enable or disable the Realtek 2.5G LAN controller.

Configuration options: [On] [Off]

2.5G LAN Controller availability varies by motherboard models.

Realtek PXE OPROM

This item allows you to enable or disable Realtek PXE OPROM launch.

Configuration options: [On] [Off]

Wi-Fi Controller

This item allows you to enable or disable the Wi-Fi controller.

Configuration options: [Disabled] [Enabled]

Wi-Fi Controller availability varies by motherboard models.

Bluetooth Controller

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

Configuration options: [Disabled] [Enabled]

Bluetooth Controller availability varies by motherboard models.

USB power delivery in Soft Off state (S5)

This item allows you to enable or disable the USB power delivery when your PC is in the S5 state. Configuration options: [Enabled] [Disabled]

Serial Port Configuration

Serial port availability varies by motherboard models.

Serial Port

Allows you to enable or disable Serial Port.
Configuration options: [On] [Off]

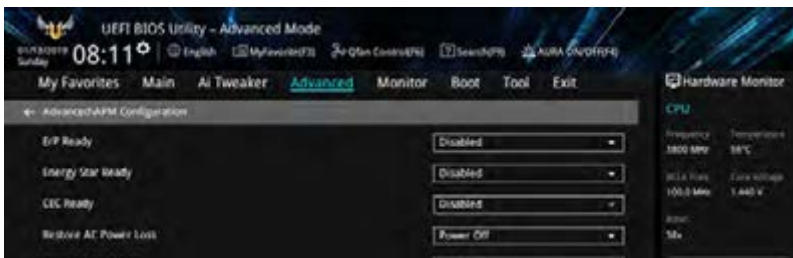The following item appears only when you set **Serial Port** to **[On]**.

Change Settings

Allows you to choose the setting for Super IO device.
Configuration options: [IO=3F8h; IRQ=4] [IO=2F8h; IRQ=3] [IO=3E8h; IRQ=4] [IO=2E8h; IRQ=3]

1.6.5   APM Configuration

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

ErP Ready

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

Configuration options: [Disabled] [Enable(S4+S5)] [Enable(S5)]

Energy Star Ready

This item allows you to enable or disable Energy Star. Configuration options: [Disabled] [Enabled]

CEC Ready

Enable this option to allow your system to comply with CEC (California Energy Commission). regulations and save more power under S0 state. Configuration options: [Disabled] [Enabled]

Restore AC Power Loss

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

Power On By PCI-E

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

Power On By RTC

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

1.6.6 PCI Subsystem Settings

The items in this menu allow you to set PCI, PCI-X, and PCI Express settings.
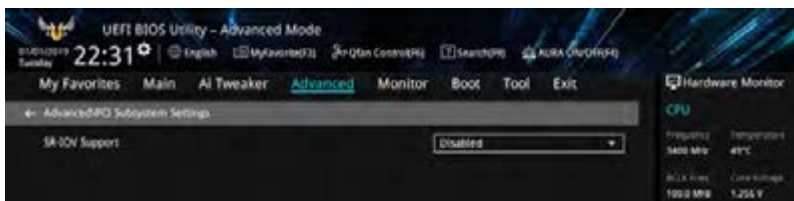
SR-IOV Support

This option enables or disables Single Root IO Virtualization Support if the system has SR-IOV capable PCIe devices. Configuration options: [Disabled] [Enabled]

1.6.7 USB Configuration

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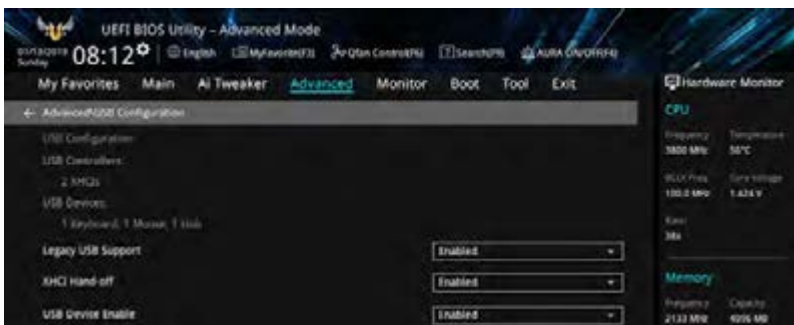
Legacy USB Support

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

XHCI Hand-off

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

USB Device Enable

This item allows you to enable or disable USB devices.

Configuration options: [Disabled] [Enabled]

USB Single Port Control

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

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

1.6.8   Network Stack Configuration

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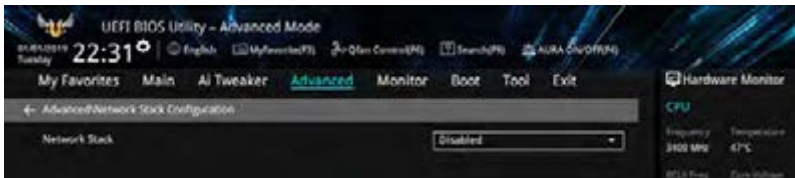
Network stack

This item allows you to disable or enable the UEFI network stack.
Configuration options: [Disable] [Enable]

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

Ipv4/Ipv6 PXE Support

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

1.6.9   HDD/SSD SMART Information

This menu displays the SMART information of the connected devices.

> NVM Express devices do not support SMART information.

1.6.10 NVMe Configuration

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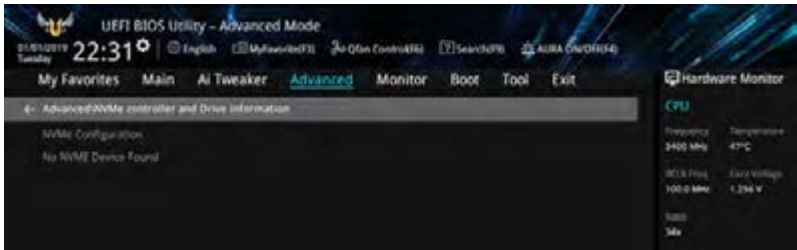
1.6.11 AMD CBS

The items in this menu shows the AMD Common BIOS Specifications.
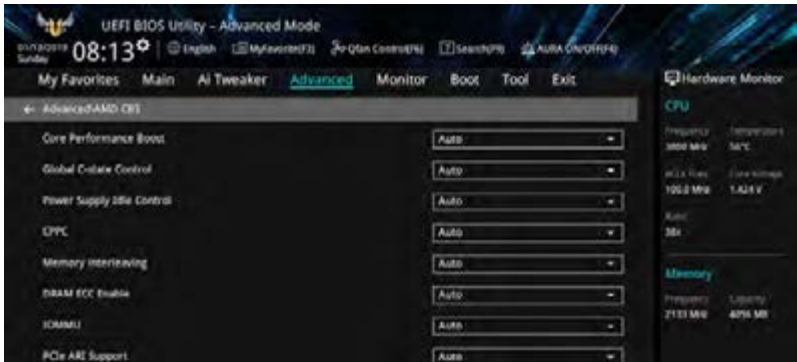
Core Performance Boost

Configuration options: [Auto] [Disabled]

Global C-state Control

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

Power Supply Idle Control

Configuration options: [Auto] [Low Current Idle] [Typical Current Idle]

CPPC

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

Memory interleaving

Configuration options: [Auto] [Disabled]

DRAM ECC Enable

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

IOMMU

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

PCIe ARI Support

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

PCIe Ten Bit Tag Support

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

1.6.12   AMD PBS

The items in this menu shows the AMD PBS Setup Page.
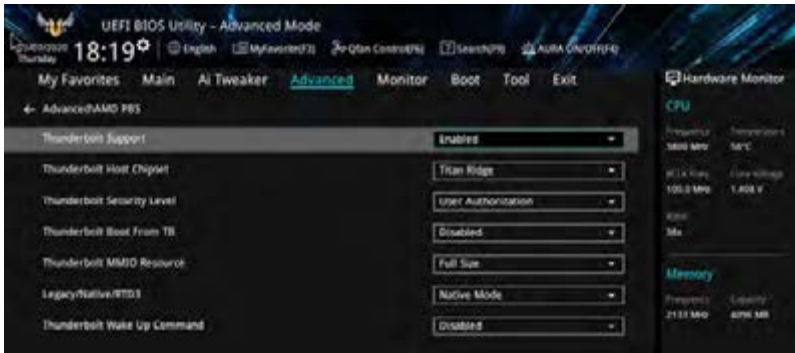
Thunderbolt Support

This option allows you to enable or disable Thunderbolt support. Configuration options: [Disabled] [Enabled]

> The following items appear only when you set **Thunderbolt Support** to **[Enabled]**.

Thunderbolt Host Chipset

This item allows you to select the name of Thunderbolt Host Card chipset.
Configuration options: [Alpine Ridge] [Titan Ridge]

Thunderbolt Security Level

This item allows you to select the security selection.
Configuration options: [No security] [User Authorization] [Secure Connect] [Display Port and USB] [USB Docking Only]

Thunderbolt Boot from TB

This item allows you to enable or disable Thunderbolt (Boot On) command execution before/after PCI Enumeration.
Configuration options: [Disabled] [Enabled]

Thunderbolt MMIO Resource

This item allows you to select the Thunderbolt PCIE MMIP Resource.
Configuration options: [Full Size] [Half Size] [Three Quarters]

Legacy/Native/RTD3

This item allows you to select the Thunderbolt legacy/native/RTD3 mode.
Configuration options: [Legacy Mode] [Native Mode] [Native + RTD3Hot] [Native + RTD3Cold]

Thunderbolt Wake Up Command

This item allows you to select the Thunderbolt wake-up command.
Configuration options: [Disabled] [GO2SX Command] [GO2SX_NO_WAKE Command]

> The following item appears depending on the CPU model you installed on the motherboard.

Data Link Feature Exchange

This option allows you to enable or disable Data Link Feature Exchange. Try to disable it if any Legacy Endpoint cannot boot. Configuration options: [Disabled] [Enabled]

1.6.13   AMD Overclocking

The items in this menu allows you to configure the AMD Overclocking setup page.

> Damage caused by use of your AMD processor outside of specification or in excess of factory settings are not covered by your system manufacturers warranty.

1.7 Monitor menu

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

Scroll down to display the other BIOS items.

CPU Temperature, CPU Package Temperature, MotherBoard Temperature, Chipset Temperature, T_Sensor Temperature [xxx°C/xxx°F]

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

CPU Fan Speed, CPU Optional Fan Speed, Chassis Fan 1-3 Speed, AIO PUMP Speed, PCH Fan Speed [xxxx RPM]

The onboard hardware monitor automatically detects and displays the CPU fan, CPU optional fan, chassis fan, and AIO pump 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 [x.xxxx V]

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

Q-fan Configuration

Q-fan Tuning

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

CPU Q-Fan Control

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

[Auto]   Detects the type of CPU fan installed and automatically switches the control modes.

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

[DC Mode]   Enables the CPU Q-Fan Control feature in DC mode for 3-pin CPU fan.

[Disabled]   Disables the Q-Fan Control.

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

CPU Fan Step Up/Down

This item allows you to set the value of the CPU fan step up/down.
Configuration options: [0 sec] [2.1 sec] [2.8 sec] [3.6 sec] [4.2 sec] [5.0 sec] [6.3 sec] [8.5 sec] [12 sec] [25 sec]

CPU Fan Speed Lower Limit

This item allows you to set the low limit warning for CPU Fan speed.
Configuration options: [Ignore] [200 RPM] [300 RPM] [400 RPM] [500 RPM] [600 RPM]

CPU Fan Profile

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

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

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

[Turbo]   Set to achieve maximum CPU fan speed.

[Manual]   Set to assign the detailed fan speed control parameters.

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

CPU Upper Temperature

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

CPU Fan Max. Duty Cycle(%)

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

CPU Middle Temperature

Use the <+> and <-> keys to adjust the CPU middle temperature.

CPU Fan Middle. Duty Cycle(%)

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

CPU Lower Temperature

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

CPU Fan Min. Duty Cycle(%)

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

Chassis Fan(s) Configuration

The number of the Chassis Fan varies by motherboard models.

Chassis Fan 1-3 Q-Fan Control

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

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

Chassis Fan 1-3 Q-Fan Source

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

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

Chassis Fan 1-3 Step Up/Down

This item allows you to set the value of the CPU fan 1-2 step up/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 1-3 Fan Speed Low Limit

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

Chassis Fan 1-3 Profile

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

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

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

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

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

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

Chassis Fan 1-3 Upper Temperature

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

Chassis Fan 1-3 Max. Duty Cycle (%)

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

Chassis Fan 1-3 Middle Temperature

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

Chassis Fan 1-3 Middle. Duty Cycle (%)

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

Chassis Fan 1-3 Lower Temperature

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

Chassis Fan 1-3 Min. Duty Cycle(%)

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

AIO PUMP Control

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

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

AIO Pump Upper Temperature

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

AIO Pump Max. Duty Cycle (%)

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

AIO Pump Middle Temperature

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

AIO Pump Middle. Duty Cycle (%)

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

**AIO Pump Lower Temperature**

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

AIO Pump Min. Duty Cycle(%)

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

1.8   Boot menu

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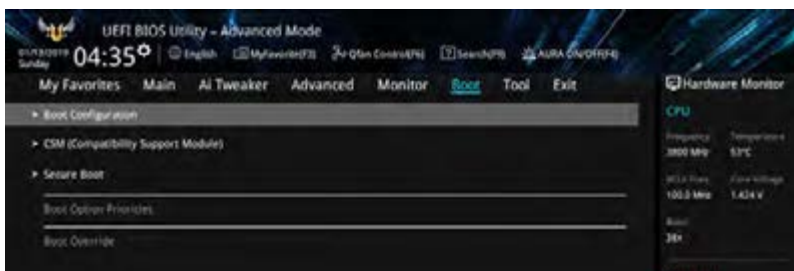
Boot Configuration

Fast Boot

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

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

> The following items appear only when you set the Fast Boot to **[Enabled]**.

Next Boot after AC Power Loss

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

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

Boot Logo Display

[Auto]   Sets the boot logo to display during POST.

[Full Screen]   Sets the boot logo display in full screen during POST.

[Disabled]   Disables the boot logo display during POST.

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

Post Delay Time

This item allows you to select a desired additional POST waiting time to easily enter the BIOS Setup. You can only execute the POST delay time during normal boot.
Configuration options: [0 sec] - [10 sec]

> This feature only works when set under normal boot.

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

Post Report

This item allows you to select a desired POST report waiting time.
Configuration options: [1 sec] - [10 sec] [Until Press ESC]

Boot up NumLock State

This item allows you to enable or disable power-on state of the NumLock.
Configuration options: [On] [Off]

Wait For 'F1' If Error

This item allows your system to wait for the <F1> key to be pressed when error occurs.
Configuration options: [Disabled] [Enabled]

Option ROM Messages

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

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

Interrupt 19 Capture

[Enabled]   Execute the trap right away.

[Disabled]   Execute the trap during legacy boot.

AMI Native NVMe Driver Support

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

Setup Mode

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

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

CSM (Compatibility Support Module)

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

Launch CSM

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

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

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

Boot Device Control

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

Boot from Network Devices

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

Boot from Storage Devices

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

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

Boot from PCI-E/ PCI Expansion Devices

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

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

Secure Boot

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

OS Type

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

Key Management

Clear Secure Boot keys

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

Save 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 permissible changes. The system verifies the PK before your system enters the OS.

Save to file

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

Set New key

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

Delete key

This item allows you to delete the PK from your system. Once the PK is deleted, all the system's Secure Boot keys will not be active.
Configuration options: [Yes] [No]

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

KEK Management

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

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

Save to file

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

Set New key

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

Append Key

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

Delete key

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

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

DB Management

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

Save to file

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

Set New key

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

Append Key

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

Delete key

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

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

DBX Management

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

Save to file

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

Set New key

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

Append Key

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

Delete key

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

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

Boot Option Priorities

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

- To access Windows® OS in Safe Mode, press <F8 > after POST (Windows® 8 not supported).

- To select the boot device during system startup, press <F8> when ASUS Logo appears.

Boot Override

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

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.
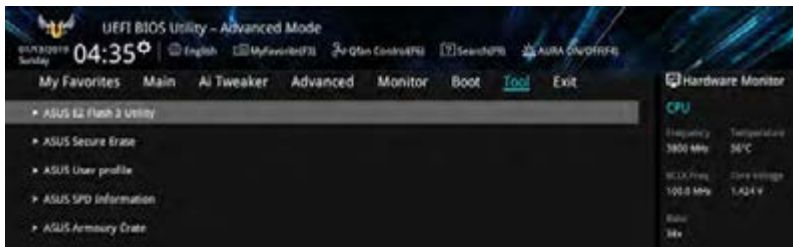
1.9.1 ASUS EZ Flash 3 Utility

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 ASUS Secure Erase

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

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

> Check the ASUS support site for a full list of SSDs tested with ASUS Secure Erase. The drive may become unstable if you run ASUS 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.

Displays the available SSDs
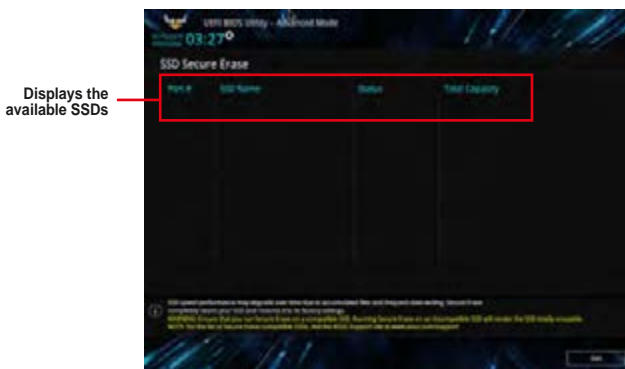
Status definition:

- **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 ASUS 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 ASUS Secure Erase.

1.9.3   ASUS User Profile

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

Load from Profile

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

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

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

Profile Name

This item allows you to key in a profile name.

Save to Profile

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

Load/Save Profile from/to USB Drive

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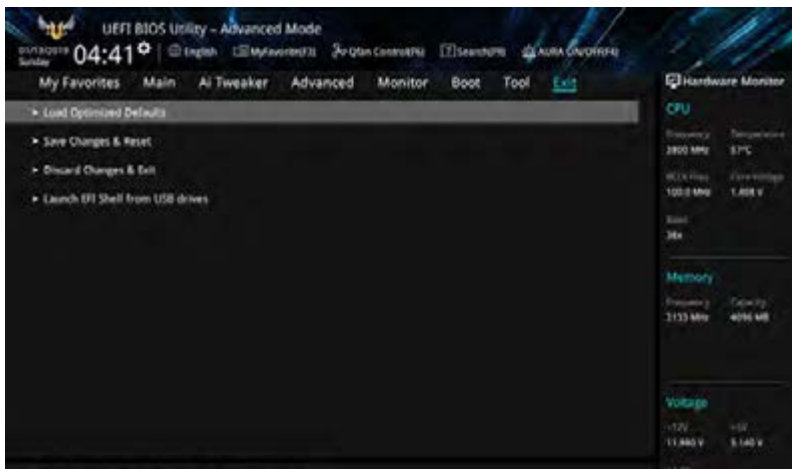
1.9.4   ASUS SPD Information

This item allows you to view the DRAM SPD information.

1.9.5   ASUS Armoury Crate

This item allows you to enable Armoury Crate download process.

1.10   Exit menu

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

Load Optimized Defaults

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

Save Changes & Reset

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

Discard Changes & Exit

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

Launch EFI Shell from USB drives

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

1.11   Updating BIOS

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

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

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

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

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

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

1.11.1   EZ Update

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

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

1.11.2   ASUS EZ Flash 3

The ASUS EZ Flash 3 feature allows you to update the BIOS without using an OS-based utility.

Ensure to load the BIOS default settings to ensure system compatibility and stability. Select the **Load Optimized Defaults** item under the **Exit** menu or press hotkey **<F5>**.

To update the BIOS by USB:

- 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!

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

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

3.   Select **via Storage Device(s)**.

4.   Press <Tab> to switch to the **Drive** field.

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

6.   Press <Tab> to switch to the **Folder** 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.

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 a USB flash drive that contains the BIOS file.

> If you want to use the latest 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 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!