

BIOS setup

Knowing BIOS



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

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

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



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

BIOS setup program

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

Entering BIOS at startup

To enter BIOS Setup at startup:

- Press <Delete> during the Power-On Self Test (POST). If you do not press <Delete>, POST continues with its routines.

Entering BIOS Setup after POST

To enter BIOS Setup after POST:

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



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- 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 **3.10 Exit Menu** for details.
 - If the system fails to boot after changing any BIOS setting, try to clear the CMOS and reset the motherboard to the default value. See section **1.2.6 Jumpers** for information on how to erase the RTC RAM.
 - The BIOS setup program does not support the bluetooth devices.
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BIOS menu screen

The BIOS Setup program can be used under two modes: **EZ Mode** and **Advanced Mode**. You can change modes from the **Exit** menu or from the **Exit/Advanced Mode** screen.

EZ Mode

By default, the EZ Mode screen appears when you enter the BIOS setup program. The EZ Mode provides you an overview of the basic system information, and allows you to select the display language, system performance mode and boot device priority. To access the Advanced Mode, click **Exit/Advanced Mode**, then select **Advanced Mode** or press <F7> hot key 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 3.7 **Boot menu** for details.

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

Selects the display language of the BIOS setup program

Exits the BIOS setup program without saving the changes, saves the changes and resets the system, or enters the Advanced Mode

System Performance

Power Saving Normal ASUS Optimal Performance Energy Saving Quiet

Boot Priority

Use the mouse to drag or keyboard to navigate to decide the boot priority.

Shortcut (F3) Advanced Mode (F7) Boot Menu (F8) Default (F5)

Selects the Advanced mode functions

Displays the Advanced mode menus

Selects the boot device priority

Displays the system properties of the selected mode on the right hand side

Selects the boot device priority

Loads optimized default settings



- The boot device options vary depending on the devices you installed to the system.
- The **Boot Menu(F8)** button is available only when the boot device is installed to the system.

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 access the Advanced Mode, click **Exit**, then select **Advanced Mode** or press **F7** hotkey.

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

Back button

This button appears when entering a submenu. Press <Esc> or use the USB mouse to click this button to return to the previous menu screen.

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>.

Pop-up window

Select a menu item and press <Enter> to display a pop-up window with the configuration options for that item.

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.

Navigation keys

At the bottom right corner of the menu screen are the navigation keys for the BIOS setup program. Use the navigation keys to select items in the menu and change the settings.

General help

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

Configuration fields

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

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

Quick Note button

This button allows you to enter notes of the activities that you have done in BIOS.

Last Modified button

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

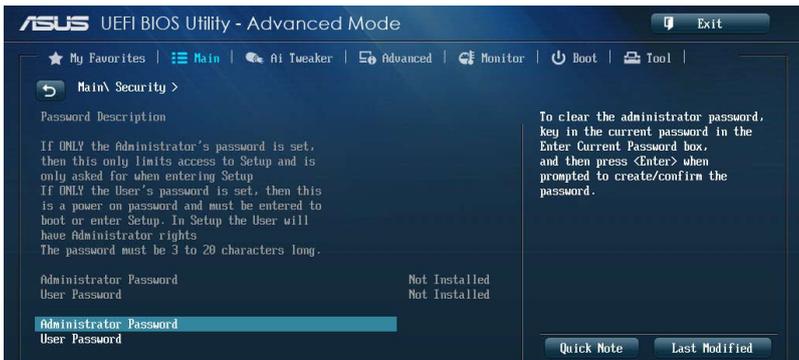
Main menu

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



Security

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



- If you have forgotten your BIOS password, erase the CMOS Real Time Clock (RTC) RAM to clear the BIOS password. See section 1.2.6 Jumpers for information on how to erase the RTC RAM.
- The Administrator or User Password items on top of the screen show the default [Not Installed]. After you set a password, these items show [Installed].

Administrator Password

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

To set an administrator password:

1. Select the **Administrator Password** item and press <Enter>.
2. From the **Create New Password** box, key in a password, then press <Enter>.
3. Confirm the password when prompted.

To change an administrator password:

1. Select the **Administrator Password** item and press <Enter>.
2. From the **Enter Current Password** box, key in the current password, then press <Enter>.
3. From the **Create New Password** box, key in a new password, then press <Enter>.
4. Confirm the password when prompted.

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

User Password

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

To set a user password:

1. Select the **User Password** item and press <Enter>.
2. From the **Create New Password** box, key in a password, then press <Enter>.
3. Confirm the password when prompted.

To change a user password:

1. Select the **User Password** item and press <Enter>.
2. From the **Enter Current Password** box, key in the current password, then press <Enter>.
3. From the **Create New Password** box, key in a new password, then press <Enter>.
4. Confirm the password when prompted.

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

Ai Tweaker menu

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

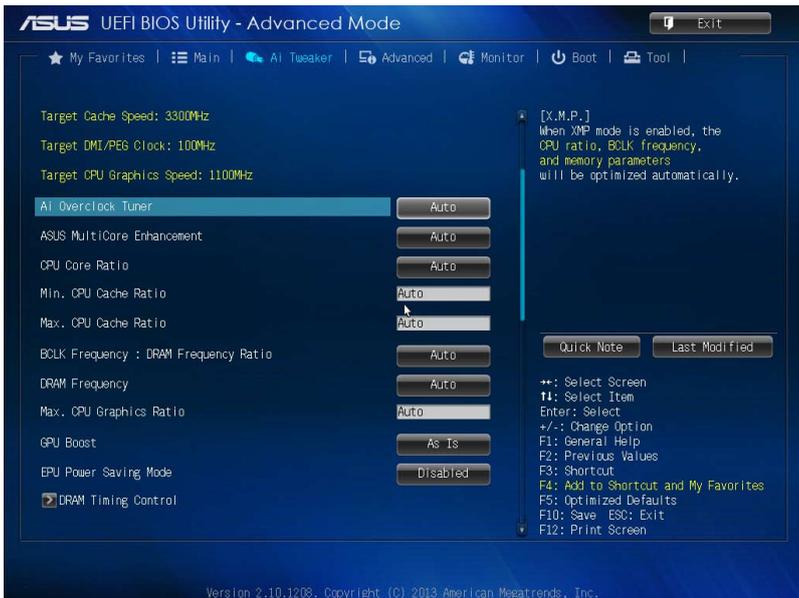


Be cautious when changing the settings of the Ai Tweaker menu items. Incorrect field values can cause the system to malfunction.



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

Scroll down to display other BIOS items.



Ai Overclock Tuner [Auto]

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

[Auto] Loads the optimal settings for the system.

[X.M.P.] Allows your system to automatically optimize the CPU ratio, BCLK frequency, and memory parameters. If you install memory modules supporting the eXtreme Memory Profile (X.M.P.) Technology, select this item to set the profiles supported by your memory modules for optimizing the system performance.

MultiCore Enhancement [Enabled]

[Enabled] Default set to [Enabled] for maximum performance under XMP/Manual/ User-defined memory frequency mode.

[Disabled] Allows you to set to default core ratio settings.

CPU Core Ratio [Auto]

Allows you to set the CPU ratio and sync automatically, per core or 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]

Allows you to set the 1-Core Ratio Limit. Select [Auto] to apply the CPU default Turbo Ratio setting or manually assign a 1-Core Ratio Limit value that is higher than or equal to the 2-Core Ratio Limit.

2-Core Ratio Limit [Auto]

This item becomes configurable only when you set **CPU Core Ratio** to [Per Core] and allows you to set the 2-Core Ratio Limit. Select [Auto] to apply the CPU default Turbo Ratio setting or manually assign a 2-Core Ratio Limit value that is higher than or equal to the 3-Core Ratio Limit. 1-Core Limit must not be set to [Auto].

3-Core Ratio Limit [Auto]

This item becomes configurable only when you set **CPU Core Ratio** to [Per Core] and allows you to set the 3-Core Ratio Limit. Select [Auto] to apply the CPU default Turbo Ratio setting or manually assign a 3-Core Ratio Limit value that is higher than or equal to the 4-Core Ratio Limit. 1-Core/2-Core Ratio Limit must not be set to [Auto].

4-Core Ratio Limit [Auto]

This item becomes configurable only when you set **CPU Core Ratio** to [Per Core] and allows you to set the 4 Core Ratio Limit. Select [Auto] to apply the CPU default Turbo Ratio setting or manually assign a 4-Core Ratio Limit value that is higher than or equal to the 3-Core Ratio Limit. 1-Core/2-Core/3-Core Limit must not be set to [Auto].

Min CPU Cache Ratio [Auto]

Allows you to set the uncore ratio of the processor to its possible minimum value. Configuration options: [Auto] [1] - [30]

Max CPU Cache Ratio [Auto]

Allows you to set the uncore ratio of the processor to its possible maximum value. Configuration options: [Auto] [1] - [30]

BCLK Frequency: DRAM Frequency Ratio [Auto]

Allows you to set the CPU bus speed to DRAM speed ratio mode.

[Auto] DRAM speed is set to the optimized settings.

[100:133] The CPU bus speed to DRAM speed ratio is set to 100:133.

[100:100] The CPU bus speed to DRAM speed ratio is set to 100:100.

Memory Frequency [Auto]

Allows you to set the memory operating frequency. The configuration options vary with the BCLK Frequency: DRAM Frequency Ratio item settings.

CPU Graphics Max. Ratio [Auto]

[Auto] The CPU Graphics Max. Ratio is set to its optimized setting depending on the system loading.

[Manual] Use the <+> or <-> keys to adjust the optimal CPU Graphics Max. Ratio. The frequency may vary depending on the system load.

GPU Boost [As is]

GPU Boost accelerates the integrated GPU for extreme graphics performance. Configuration options: [As is] [Enabled]

EPU Power Saving Mode [Disabled]

Allows you to enable or disable the EPU power saving function. Configuration options: [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.

Primary Timings

DRAM CAS# Latency [Auto]

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

DRAM RAS# to CAS# Delay [Auto]

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

DRAM RAS# PRE Time [Auto]

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

DRAM RAS# ACT Time [Auto]

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

DRAM COMMAND Rate [Auto]

Configuration options: [Auto] [1] – [3]

Secondary Timings

DRAM RAS# to RAS# Delay [Auto]

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

DRAM REF Cycle Time [Auto]

Configuration options: [Auto] [1] – [511]

DRAM Refresh Interval [Auto]

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

DRAM WRITE Recovery Time [Auto]

Configuration options: [Auto] [1] – [16]

DRAM READ to PRE Time [Auto]

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

DRAM FOUR ACT WIN Time [Auto]

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

DRAM WRITE to READ Delay [Auto]

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

DRAM CKE Minimum pulse width [Auto]

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

DRAM CAS# Write to Latency [Auto]

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

RTL IOL control

DRAM RTL initial Value [Auto]

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

DRAM RTL (CHA_R0D0) [Auto]

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

DRAM RTL (CHA_R0D1) [Auto]

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

DRAM RTL (CHA_R1D0) [Auto]

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

DRAM RTL (CHA_R1D1) [Auto]

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

DRAM RTL (CHB_R0D0) [Auto]

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

DRAM RTL (CHB_R0D1) [Auto]

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

DRAM RTL (CHB_R1D0) [Auto]

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

DRAM RTL (CHB_R1D1) [Auto]

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

DRAM IO-L (CHA_R0D0) [Auto]

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

DRAM IO-L (CHA_R0D1) [Auto]

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

DRAM IO-L (CHA_R1D0) [Auto]

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

DRAM IO-L (CHA_R1D1) [Auto]
Configuration options: [Auto] [1] - [15]

DRAM IO-L (CHB_R0D0) [Auto]
Configuration options: [Auto] [1] - [15]

DRAM IO-L (CHB_R0D1) [Auto]
Configuration options: [Auto] [1] - [15]

DRAM IO-L (CHB_R1D0) [Auto]
Configuration options: [Auto] [1] - [15]

DRAM IO-L (CHB_R1D1) [Auto]
Configuration options: [Auto] [1] - [15]

Third Timings

tRDRD [Auto]

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

tRDRD_dr [Auto]

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

tRDRD_dd [Auto]

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

tWRRD [Auto]

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

tWRRD_dr [Auto]

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

tWRRD_dd [Auto]

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

tWRWR [Auto]

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

tWRWR_dr [Auto]

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

tWRWR_dd [Auto]

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

Dec_WRD

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

tRDWR [Auto]

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

tRDWR_dr [Auto]

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

tRDWR_dd [Auto]

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

MISC

MRC Fast Boot [Auto]

Allows you to enable, disable or automatically set the MRC fast boot. Configuration options: [Auto] [Enable] [Disable]

DRAM CLK Period [Auto]

Configuration options: [Auto] [1] – [14]

Channel A DIMM Control [Enable Bot...]

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

Channel B DIMM Control [Enable Bot...]

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

Scrambler Setting [Optimized ...]

Allows you to set the optimized setting for stability. Configuration options: [Optimized ()] [Default (MRC)]

DIGI+ VRM

CPU Load-Line Calibration [Auto]

Load-line is defined by Intel VRM specification and affects CPU voltage. The CPU working voltage will decrease proportionally to CPU loading. Higher value gets a higher voltage and better overclocking performance, but increases the CPU and VRM thermal conditions. This item allows you to adjust the voltage range from the following percentages to boost the system performance: 0% (Regular), 25% (Medium), 50% (High), 75% (Ultra High), and 100% (Extreme). Configuration options: [Auto] [Regular] [Medium] [High] [Ultra High] [Extreme]



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

CPU Fixed Frequency [XXX]

This item allows you to set a fixed CPU frequency. Use the <+> or <-> keys to adjust the value. The values range from 200kHz to 350kHz with a 50kHz interval.

CPU Power Phase Control [Auto]

Allows you to set the power phase based on the CPU. Configuration options: [Auto] [Standard] [Optimized] [Extreme] [Manual Adjustment]



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



This following item appears only when you set the CPU Power Phase Control item to [Manual Adjustment].

Manual Adjustment [Fast]

Allows you to set a response for the CPU power phase control. Configuration options: [Ultra Fast] [Fast] [Medium] [Regular]

CPU Power Duty Control [T.Probe]

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

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

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 Power Management

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

Enhanced Intel SpeedStep Technology [Enabled]

Allows you to enable or disable the Enhanced Intel® SpeedStep Technology (EIST).
[Disabled] Disables this function.

[Enabled] The operating system dynamically adjusts the processor voltage and core frequency which may result in decreased average consumption and decreased average heat production.

Turbo Mode [Enabled]

Allows you to enable your core processor's speed to run faster than the marked frequency in a specific condition. Configuration options: [Disabled] [Enabled]



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

Turbo Mode Parameters

Long Duration Package Power Limit [Auto]

Allows you to limit the turbo ratio's long duration package power. Use the <+> and <-> keys to adjust the value.

Package Power Time Window [Auto]

Allows you to maintain the turbo ratio's package power time window. Use the <+> and <-> keys to adjust the value.

Short Duration Package Power Limit [Auto]

Allows you to limit the turbo ratio's short duration power. Use the <+> and <-> keys to adjust the value.

CPU Integrated VR Current Limit [Auto]

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

CPU Internal Power Switching Frequency

Frequency Tuning Mode [Auto]

Allows you to increase or decrease the switching frequency of the internal regulator. Decrease to help consume less power or increase to help voltage stability. Configuration options: [Auto] [+] [-]

CPU Internal Power Fault Control

Thermal Feedback [Auto]

Allows your system to take precautionary actions to be taken by the CPU when the thermal conditions of the external regulator exceeds the threshold. Configuration options: [Auto] [Disabled] [Enabled]

CPU Integrated VR Fault Management [Auto]

Disable this item to prevent tripping the Fully Integrated Voltage Regulator when doing over-voltage. We recommend you to disable this item when overclocking. Configuration options: [Auto] [Disabled] [Enabled]

CPU Internal Power Configuration

CPU Integrated VR Efficiency Management [Auto]

Allows you to improve power saving when the processor is in low power state. Disable to make the Fully Integrated Voltage Regulator work in high performance at all times. Configuration options: [Auto] [High Performance] [Balanced]

Power Decay Mode [Auto]

Allows your system to improve the power saving mode on the Fully Integrated Voltage Regulator as the processor goes into low current state. Configuration options: [Auto] [Disabled] [Enabled]

Idle Power-in Response [Auto]

Allows you to set the slew rate for the Fully Integrated Voltage Regulator as it enters manual override mode. Configuration options: [Auto] [Regular] [Fast]

Idle Power-out Response [Auto]

Allows you to set the slew rate for the Fully Integrated Voltage Regulator as it exits manual override mode. Configuration options: [Auto] [Regular] [Fast]

Power Current Slope [Auto]

Allows you to set the gradient of the high-speed active phase current balance during load transients to eliminate current imbalance that can result from a load current oscillating near the switching frequency. Configuration options: [Auto] [LEVEL -4] - [LEVEL 4]

Power Current Offset [Auto]

Allows you to increase or decrease the output current sensed by the CPU. It finds the balance between optimal regulating while staying below the current threshold. Configuration options: [Auto] [100%] [87.5%] [75.0%] [62.5%] [50.0%] [37.5%] [25.0%] [12.5%] [0%] [-12.5%] [-25.0%] [-37.5%] [-50.0%] [-62.5%] [-75.0%] [-87.5%] [-100%]

Power Fast Ramp Response [Auto]

Allows you to increase to enhance the response of the voltage regulator during the load transient. Configuration options: [Auto] [0.00] - [1.50]

CPU Internal Power Saving Control

Power Saving Level 1 Threshold [Auto]

Lower value provides sufficient overclocking tolerance to enlarge the overclocking potential. Higher value provides better power-saving condition. Use <+> and <-> key to adjust the value. The values range from 0A to 80A at 1Amp increment.

Power Saving Level 2 Threshold [Auto]

Lower value provides sufficient overclocking tolerance to enlarge the overclocking potential. Higher value provides better power-saving condition. Use <+> and <-> key to adjust the value. The values range from 0A to 50A at 1Amp increment.

Power Saving Level 3 Threshold [Auto]

Lower value provides sufficient overclocking tolerance to enlarge the overclocking potential. Higher value provides better power-saving condition. Use <+> and <-> key to adjust the value. The values range from 0A to 30A at 1Amp increment.

Extreme OV [Disabled]

This item allows you to enable or disable extreme over-voltage. Configuration options: [Enabled] [Disabled]

CPU Core Voltage [Auto]

Allows you to configure the amount of voltage fed to the cores of the processor. Increase the amount of voltage when increasing core frequency. Configuration options: [Auto] [Manual Mode] [Offset Mode] [Adaptive 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 CPU Core Voltage override. Use the <+> or <-> keys to adjust the value. The values range from 0.001V to 1.920V with a 0.001V interval.



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

Offset Mode Sign [+]

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

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

CPU Core Voltage Offset

Use the <+> or <-> keys to adjust the value. The values range from 0.001V to 0.999V with a 0.001V interval.



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

Additional Turbo Mode CPU Core Voltage [Auto]

This item allows you to add voltage for Turbo Mode CPU core. Use the <+> or <-> keys to adjust the value. The values range from 0.001V to 1.920V with a 0.001V interval.

CPU Graphics Voltage [Auto]

Allows you to configure the amount of voltage fed to the onboard graphics unit on the processor. Increase the amount of voltage when increasing iGPU frequency. Configuration options: [Auto] [Manual Mode] [Offset Mode] [Adaptive Mode]



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

CPU Graphics Voltage Override [Auto]

Allows you to set the CPU Graphics Voltage override. Use the <+> or <-> keys to adjust the value. The values range from 0.001V to 1.920V with a 0.001V interval.



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

Offset Mode Sign [+]

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

CPU Graphics Voltage Offset

Use the <+> or <-> keys to adjust the value. The values range from 0.001V to 0.999V with a 0.001V interval.



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

Additional Turbo Mode CPU Graphics Voltage [Auto]

This item allows you to add voltage for Turbo Mode CPU Graphics. Use the <+> or <-> keys to adjust the value. The values range from 0.001V to 1.920V with a 0.001V interval.

CPU Cache Voltage [Auto]

Allows you to configure the amount of voltage fed to the uncore of the processor including its cache. Increase the voltage when increasing Ring frequency. Configuration options: [Auto] [Manual Mode] [Offset Mode] [Adaptive Mode]



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

CPU Cache Voltage Override [Auto]

Allows you to set the CPU Cache Voltage override. Use the <+> or <-> keys to adjust the value. The values range from 0.001V to 1.920V with a 0.001V interval.



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

Offset Mode Sign [+]

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

CPU Cache Voltage Offset

Allows you to set the CPU cache voltage offset. Use the <+> or <-> keys to adjust the value. The values range from 0.001V to 0.999V with a 0.001V interval.



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

Additional Turbo Mode CPU Cache Voltage [Auto]

Allows you to add voltage for Turbo Mode CPU Graphics. Use the <+> or <-> keys to adjust the value. The values range from 0.001V to 1.920V with a 0.001V interval.

CPU System Agent Voltage Offset Mode Sign [+]

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

CPU System Agent Voltage Offset [Auto]

Allows you to configure the amount of voltage fed to the system agent of the processor including its PCIe controller and power control unit. Increase the amount of voltage when increasing DRAM frequency. Use the <+> or <-> keys to adjust the value. The values range from 0.001V to 0.999V with a 0.001V interval.

CPU Analog I/O Voltage Offset Mode Sign [+]

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

CPU Analog I/O Voltage Offset [Auto]

Allows you to configure the amount of voltage fed to the analog portion of the I/O on the processor. Increase the amount of voltage when increasing DRAM frequency. Use the <+> or <-> keys to adjust the value. The values range from 0.001V to 0.999V with a 0.001V interval.

CPU Digital I/O Voltage Offset Mode Sign [+]

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

CPU Digital I/O Voltage Offset [Auto]

Allows you to configure the amount of voltage fed to the digital portion of the I/O on the processor. Increase the amount of voltage when increasing DRAM frequency. Use the <+> or <-> keys to adjust the value. The values range from 0.001V to 0.999V with a 0.001V interval.

SVID Support [Auto]

Disabling SVID support stops the processor from communicating with the external voltage regulator. Configuration options: [Auto] [Disabled] [Enabled]



-
- We recommend that you disable this function when overclocking.
 - The following item appears only when you set SVID Support to **[Enabled]**.
-

SVID Voltage Override [Auto]

Allows you to set the SVID Voltage override. Use the <+> or <-> keys to adjust the value. The values range from 0.001V to 2.440V with a 0.001V interval.

CPU Input Voltage (VCCIN) [Auto]

Allows you to set a CPU input voltage for the processor by the external voltage regulator. Use the <+> or <-> keys to adjust the value. The values range from 0.800V to 2.700V with a 0.010V interval.

DRAM Voltage [Auto]

Allows you to set the DRAM voltage. The values range from 1.185V to 1.800V with a 0.005V interval.



According to Intel CPU specifications, DIMMs with voltage requirement over 1.65V may damage the CPU permanently. We recommend that you install the DIMMs with the voltage requirement below 1.65V.

PCH VLX Voltage [Auto]

Allows you to set the voltage for the I/O on the PCH. Use the <+> or <-> keys to adjust the value. The values range from 1.185V to 2.135V with a 0.005V interval.

PCH Voltage [Auto]

Allows you to set the Platform Controller Hub voltage. Use the <+> or <-> keys to adjust the value. The values range from 0.735V to 1.500V with a 0.005V interval.



The system may need better cooling system to work stably under high voltage settings.

DRAM CTRL REF Voltage [Auto]

Allows you to set a fraction of DRAM voltage as reference on the control lines. Use the <+> or <-> keys to adjust the value. The values range from 0.3950x to 0.6300x with a 0.0050x interval.

DRAM DATA REF Voltage on CHA/CHB [Auto]

Allows you to set the DRAM DATA Reference Voltage on Channel A/B. The values range from 0.3950x to 0.6300x with a 0.0050x interval. Different ratio might enhance DRAM overclocking ability.

CPU Spread Spectrum [Auto]

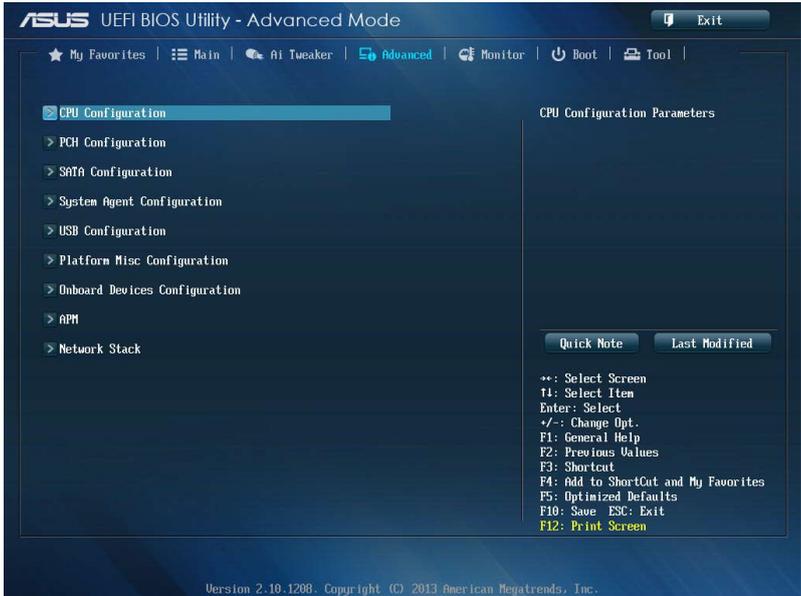
- [Auto] Automatic configuration.
- [Disabled] Enhances the BCLK overclocking ability.
- [Enabled] Sets to [Enabled] for EMI control.

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.



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.

Intel Adaptive Thermal Monitor [Enabled]

[Enabled] Enables the overheated CPU to throttle its clock speed to cool down.

[Disabled] Disables the CPU thermal monitor function.

Hyper-threading [Enabled]

The Intel Hyper-Threading Technology allows a hyper-threading processor to appear as two logical processors to the operating system, allowing the operating system to schedule two threads or processes simultaneously.

[Enabled] Two threads per activated core are enabled.

[Disabled] Only one thread per activated core is enabled.

Active Processor Cores [All]

Allows you to choose the number of CPU cores to activate in each processor package.
Configuration options: [All] [1] [2] [3]

Limit CPUID Maximum [Disabled]

[Enabled] Allows legacy operating systems to boot even without support for CPUs with extended CPUID functions.

[Disabled] Disables this function.

Execute Disable Bit [Enabled]

[Enabled] Enables the No-Execution Page Protection Technology.

[Disabled] Forces the XD feature flag to always return to zero (0).

Intel Virtualization Technology [Disabled]

[Enabled] Allows a hardware platform to run multiple operating systems separately and simultaneously, enabling one system to virtually function as several systems.

[Disabled] Disables this function.

Hardware Prefetcher [Enabled]

[Enabled] Allows a hardware platform to automatically analyze the requirements and prefetch data and codes for the CPU.

[Disabled] Disables this function.

Adjacent Cache Line Prefetch [Enabled]

[Enabled] Allows a hardware platform to perform adjacent cache line prefetching.

[Disabled] Disables this function.

Boot Performance mode [Max Non-Tu...]

Allows you to select the performance state that the BIOS will set before OS handoff.

Configuration options: [Max Non-Turbo performance] [Max Battery] [Turbo Performance]

CPU Power Management Configuration

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

Enhanced Intel SpeedStep Technology [Enabled]

Allows your system to adjust the processor's voltage and cores frequency, resulting in decreased power consumption and heat production.

[Disabled] The CPU runs at its default speed.

[Enabled] The system controls the CPU speed.

Turbo Mode [Enabled]

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

CPU C States

Allows you to enable or disable the CPU C states. Configuration options: [Auto] [Enabled] [Disabled]



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

Enhanced C1 state [Enabled]

Allows your processor to reduce power when the system is in idle mode.
Configuration options: [Enabled] [Disabled]

CPU C3 Report [Enabled]

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

CPU C6 Report [Enabled]

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

C6 Latency [Short]

Allows you to set the duration of C6 latency for C6 state. Configuration options: [Short] [Long]

CPU C7 Report [CPU C7s]

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

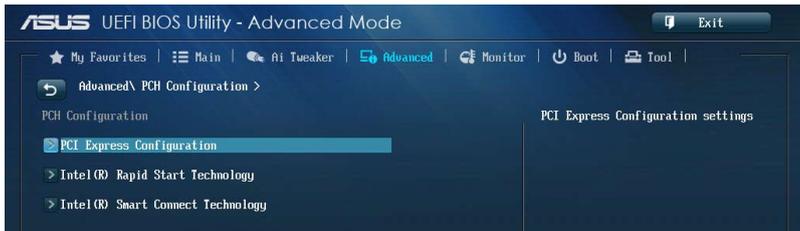
C7 Latency [Long]

Allows you to set the duration of C7 latency for C7 state. Configuration options: [Short] [Long]

Package C State Support [Auto]

Allows you to set the a C-state according to the following configuration options: [Auto] [Enabled] [C0/C1] [C2] [C3] [C6] [CPU C7] [CPU C7s]

PCH Configuration



PCI Express Configuration

Allows you to configure the PCI Express slots.

DMI Link ASPM Control [Auto]

Allows you to control the ASPM (Active State Power Management) on both Northbridge side and Southbridge side of the DMI Link. Configuration options: [Disabled] [Enabled] [Auto]

ASPM Support [Disabled]

Allows you to set the ASPM level. Configuration options: [Disabled] [Auto] [L0s] [L1] [L0sL1]

PCIe Speed [Auto]

Allows you to select the PCI Express port speed. Configuration options: [Auto] [Gen1] [Gen2]

Intel Rapid Start Technology [Disabled]

Allows you to enable or disable Intel Rapid Start Technology. Configuration options: [Enabled] [Disabled]



The following items appear only when you set the Intel Rapid Start Technology to **[Enabled]**.

Entry on S3 RTC Wake [Enabled]

The system automatically wakes up and set to Rapid Start Technology S4 mode. Configuration options: [Enabled] [Disabled]

Entry After [0]

Allows you to set the wake-up time. The values range from 0 (Immediately) to 120 minutes.

Active Page Threshold Support [Enabled]

The system automatically goes into sleep mode when the partition size is not enough for the Intel® Rapid Start Technology to work. Configuration options: [Enabled] [Disabled]

Active Memory Threshold [0]

Key in the value for the additional partition size for Rapid Start Technology to work.



Ensure that the caching partition size is larger than the total memory size.

Hybrid Hard Disk Support [Disabled]

Allows you to enable or disable the hybrid hard disk support. Configuration options: [Enabled] [Disabled]

Intel Smart Connect Technology

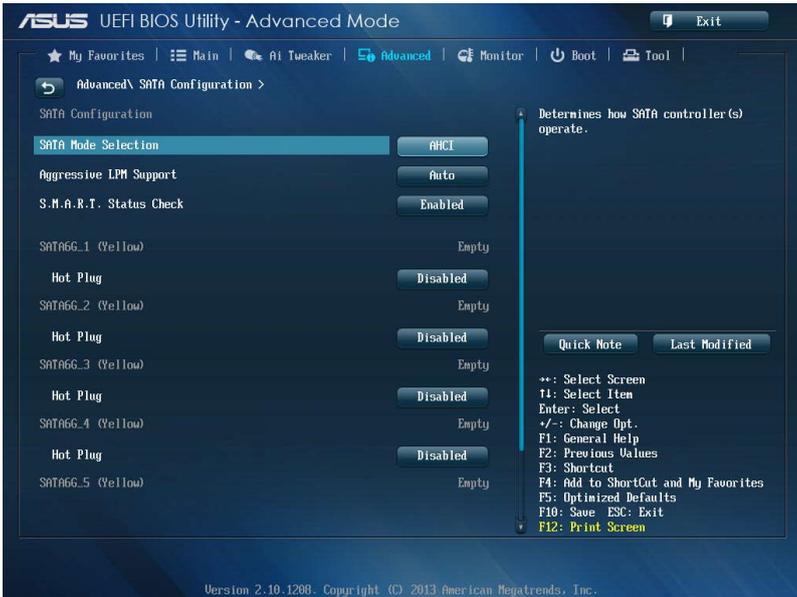
ISCT Support [Disabled]

Allow you to enable or disable the Intel® Smart Connect Technology. Configuration options: [Enabled] [Disabled]

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.

Scroll down to display the other BIOS items.



SATA Mode Selection [AHCI]

Allows you to set the SATA configuration.

[Disabled] Disables the SATA function.

[IDE] Set to [IDE Mode] when you want to use the Serial ATA hard disk drives as Parallel ATA physical storage devices.

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

Aggressive LPM Support [Auto]

This item appears only when you set the SATA Mode Selection item to [AHCI] or [RAID], and allow you to enable the PCH to aggressively enter link power state. Configuration options:

[Disabled] [Enabled] [Auto]

IDE Legacy / Native Mode Selection [Native]

This item appears only when you set the SATA Mode Selection item to [IDE]. Configuration options: [Native] [Legacy]

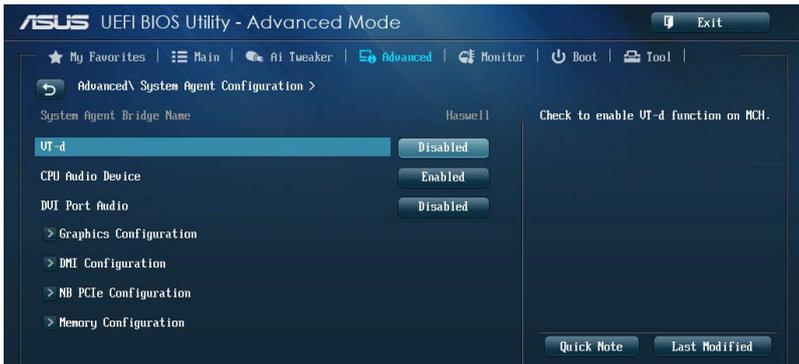
S.M.A.R.T. Status Check [Enabled]

S.M.A.R.T. (Self-Monitoring, Analysis and Reporting Technology) is a monitor system. When read/write of your hard disk errors occur, this feature allows the hard disk to report warning messages during the POST. Configuration options: [Enabled] [Disabled]

Hot Plug [Disabled]

This item appears only when you set the SATA Mode Selection item to [AHCI] or [RAID], and allow you to enable/disable SATA Hot Plug Support. Configuration options: [Disabled] [Enabled]

3.6.4 System Agent Configuration



VT-d [Disabled]

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

[Enabled] Enables the function.

[Disabled] Disables this function.

CPU Audio Devices [Enabled]

Allows you to enable or disable CPU SA Audio devices. Configuration options: [Enabled] [Disabled]

DVI Port Audio [Disabled]

Allows you to enable or disable the DVI port. Configuration options: [Enabled] [Disabled]

Graphics Configuration

Allows you to select a primary display from iGPU, and PCIe graphical devices.

Primary Display [Auto]

Allows you to select which of the iGPU/PCIE Graphics device for Primary Display. Configuration options: [Auto] [iGPU] [PCIE] [PCI]

iGPU Memory [Auto]

Allows you to set the system memory size allocated to DVMT 5.0 used by the iGPU. Configuration options: [Auto] [32M] [64M] [96M] [128M] ~ [448M] [480M] [512M] [1024M]

Render Standby [Auto]

Allows you to enable or disable Intel® Graphics Render Standby support to reduce iGPU power use when the system is idle. Configuration options: [Auto] [Disabled] [Enabled]

iGPU Multi-Monitor [Disabled]

Allows you to enable the iGPU Multi-Monitor. For LucidLogix Virtu MVP function support, set this item to [Enabled] to empower both integrated and discrete graphics. The iGPU shared system memory size will be fixed at 64MB. Configuration options: [Disabled] [Enabled]

DMI Configuration

Allows you to control various DMI (Desktop Management Interface) functions.

DMI Gen 2 [Auto]

Allows you to enable or disable DMI Gen 2. Configuration options: [Auto] [Enabled] [Disabled]

NB PCIe Configuration

Allows you to configure the NB PCI Express settings.

PCIEx16_1 Link Speed [Auto]

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

DMI Link ASPM Control [Disabled]

Allows you to enable or disable the control of Active State Power Management on SA side of the DMI Link. Configuration options: [Disabled] [L0s] [L1] [L0sL1]

PEG - ASPM [Disabled]

Allows you to control ASPM support for the PEG device. Configuration options: [Disabled] [Auto] [ASPM L0s] [ASPM L1] [ASPM L0sL1]

Memory Configuration

Allows you to configure the memory configuration parameters.

Memory Scrambler [Enabled]

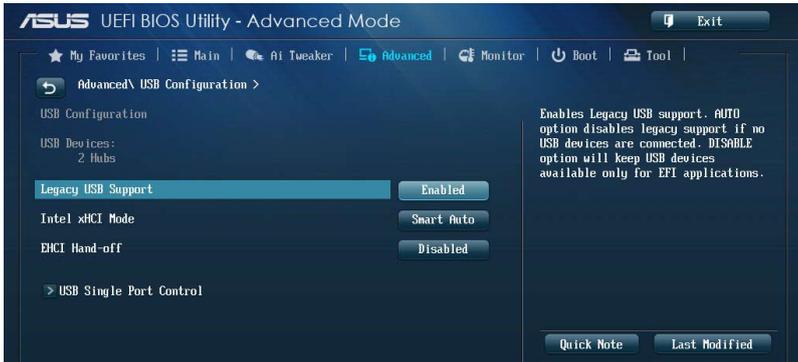
Allows you to enable or disable the Memory Scrambler support. Configuration options: [Enabled] [Disabled]

Memory Remap [Enabled]

Allows you to enable remapping the memory above 4GB. Configuration options: [Enabled] [Disabled]

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] Enables the support for USB devices on legacy operating systems (OS).
- [Disabled] The USB devices can be used only for the BIOS setup program. It cannot be recognized in boot devices list.
- [Auto] Allows the system to detect the presence of USB devices at startup. If detected, the USB controller legacy mode is enabled. If no USB device is detected, the legacy USB support is disabled.

Intel xHCI Mode [Smart Auto]

- [Auto] Keeps the last operation of xHCI controller in OS during bootup.
- [Smart Auto] Enables the operation of xHCI controller.
- [Enabled] Enables the xHCI controller.
- [Disabled] Disables the xHCI controller.

EHCI Hand-off [Disabled]

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

USB Single Port Control

Allows you to enable or disable the individual USB port.



Refer to section **1.2.2 Motherboard layout** for the location of the USB ports.

Platform Misc Configuration

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



PCI Express Native Power Management [Disabled]

Allows you to enhance the power saving feature of PCI Express and perform ASPM operations in the operating system. Configuration options: [Disabled] [Enabled]



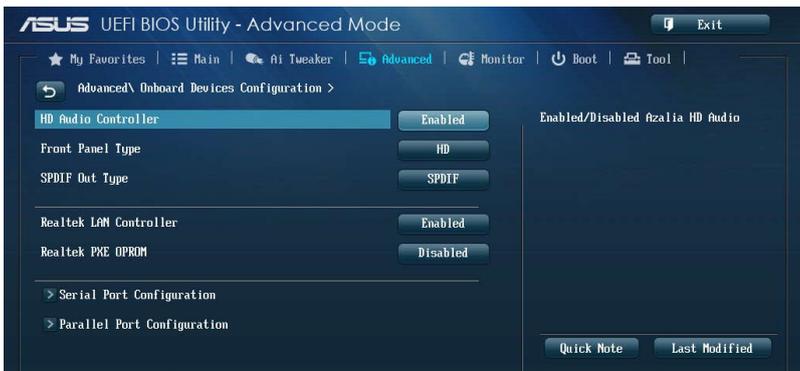
The following item appears only when you set the PCI Express Native Power Management to **[Enabled]**.

Native ASPM [Disabled]

- [Enabled] Vista controls the ASPM support for the device.
- [Disabled] BIOS controls the ASPM support for the device.

Onboard Devices Configuration Scroll down

to view the other BIOS items.



HD Audio Controller [Enabled]

- [Enabled] Enables the High Definition Audio Controller.
[Disabled] Disables the controller.



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

Front Panel Type [HD]

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

- [HD] Sets the front panel audio connector (AAFP) mode to high definition audio.
[AC97] Sets the front panel audio connector (AAFP) mode to legacy AC'97

SPDIF Out Type [SPDIF]

- [SPDIF] Sets to an SPDIF audio output.
[HDMI] Sets to an HDMI audio output.

Realtek LAN Controller [Enabled]

- [Enabled] Enables the Realtek® LAN controller.
[Disabled] Disables the Realtek® LAN controller.



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

Realtek PXE OPROM [Disabled]

Allows you to enable or disable the PXE OptionRom of the Realtek LAN controller.
Configuration options: [Enabled] [Disabled]

Serial Port Configuration

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



This item functions only if there is a serial port (COM1) connector on the motherboard.

Serial Port [Enabled]

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

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

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]

Parallel Port Configuration

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

Parallel Port [Enabled]

Allows you to enable or disable the parallel port (LPT/LPTE).
Configuration options: [Enabled] [Disabled]



The following items appear only when you set the **Parallel Port Configuration** item to [Enabled].

Change Settings [Auto]

Allows you to select an optimal setting for Super I/O devices. Configuration options: [Auto] [IO=378h; IRQ=5:] [IO=378h; IRQ=5,6,7,9,10,11,12:] [IO=278h; IRQ=5,6,7,9,10,11,12:] [IO=3BCh; IRQ=5,6,7,9,10,11,12:]

Device Mode [STD Printe...]

Allows you to select the Printer Port mode. Configuration options: [STD Printer Mode] [SPP Mode] [EPP-1.9 and SPP Mode] [EPP-1.7 and SPP Mode] [ECP Mode] [ECP and EPP 1.9 Mode] [ECP and EPP 1.7 Mode]

APM



Deep S4 [Disabled]

When enabled, the system in S4 state will further reduce power usage and will power off the USB and PS/2 devices. The system in deep S4 state can be woken up via the power button, devices in LAN, or other ways except via the USB and PS/2 devices. Configuration options: [Disabled] [Enabled]

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 PS/2 Keyboard [Disabled]

- [Disabled] Disables the Power On by a PS/2 keyboard.
- [Space Bar] Sets the Space Bar on the PS/2 keyboard to turn on the system.
- [Ctrl-Esc] Sets the Ctrl+Esc key on the PS/2 keyboard to turn on the system.
- [Power Key] Sets Power key on the PS/2 keyboard to turn on the system. This feature requires an ATX power supply that provides at least 1A on the +5VSB lead.

Power On By PCIE/PCI [Disabled]

- [Disabled] Disables the PCIE/PCI devices to generate a wake-on-LAN feature of the Realtek LAN device or other installed PCIE/PCI LAN devices.
- [Enabled] Enables the PCIE/PCI devices to generate a wake-on-LAN feature of the Realtek LAN device or other installed PCIE/PCI LAN devices.

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]

- [Disabled] Disables RTC to generate a wake event.
- [Enabled] When set to [Enabled], the items **RTC Alarm Date (Days)** and **Hour/Minute/Second** will become user-configurable with set values.

Network Stack



Network Stack [Disabled]

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



The following items appear only when you set the Network Stack to **[Enabled]**.

Ipv4/Ipv6 PXE Support [Enabled]

Allows you to enable or disable the Ipv4/Ipv6 PXE boot option. Configuration options: [Disabled] [Enabled]

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 [xxx°C/xxx°F]

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

CPU Fan Speed [xxxx RPM] or [Ignore] / [N/A], Chassis Fan 1/2 Speed [xxxx RPM] or [Ignore] / [N/A]

The onboard hardware monitor automatically detects and displays the CPU and chassis 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 Input Voltage (VCCIN), 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.

CPU Q-Fan Control [Auto]

- [Disabled] Disables the CPU Q-Fan control feature.
[Enabled] Enables the CPU Q-Fan control feature.



The following items appear only when you set the **CPU Q-Fan Control** item to **[Advance Mode]**.

CPU Fan Speed Low Limit [200 RPM]

Allows you to disable or set the CPU fan warning speed. Configuration options: [Ignore] [100 RPM] [200 RPM] [300 RPM] [400 RPM] [500 RPM]

CPU Fan Profile [Standard]

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 detailed fan speed control parameters.



The following four 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 20°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 Lower Temperature [20]

Displays the lower limit of the CPU temperature.

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 40°C, the CPU fan will operate at the minimum duty cycle.

Chassis1/2 Q-Fan Control [Enabled]

- [Disabled] Disables the Chassis Q-Fan control feature.
- [Enabled] Enables the Chassis Q-Fan control feature.



The following items appear only when you set the **Chassis1/2 Q-Fan Control** items to **[Enabled]**.

Chassis1/2 Fan Speed Low Limit [600 RPM]

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

Chassis1/2 Fan Profile [Standard]

Allows you to set the appropriate performance level of the chassis 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 detailed fan speed control parameters.



The following four items appear only when you set the Chassis1/2 Fan Profile items to **[Manual]**.

Chassis1/2 Upper Temperature [70]

Use the <+> and <-> keys to adjust the upper limit of the chassis temperature. The values range from 40°C to 75°C.

Chassis1/2 Fan Max. Duty Cycle(%) [100]

Use the <+> and <-> 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.

Chassis1/2 Lower Temperature [40]

Displays the lower limit of the chassis temperature.

CPU Fan1/2 Min. Duty Cycle(%) [60]

Use the <+> and <-> keys to adjust the minimum chassis fan duty cycle. The values range from 60% to 100%. When the chassis temperature is under 40°C, the chassis fan will operate at the minimum duty cycle.

Anti Surge Support [Enabled]

This item allows you to enable or disable the Anti Surge function. Configuration options: [Disabled] [Enabled]

Boot menu

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



Boot Configuration

Fast Boot [Enabled]

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

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



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

USB Support [Partial In...]

[Disabled] All USB devices will not be available until OS boot up for a fastest POST time.

[Full Initialization] All USB devices will be available during POST. This process will extend the POST time.

[Partial Initialization] For a faster POST time, only USB ports with keyboard and mouse connections will be detected.

PS/2 Keyboard and Mouse Support [Auto]

Select any of these settings when PS/2 keyboard and mouse are installed. These settings only apply when Fast Boot is enabled.

- [Auto] For a faster POST time, PS/2 devices will only be available when the system boots up or rebooted when the PS/2 devices have not been reconnected or changed. If you disconnect or change PS/2 devices before restarting the system, PS/2 devices will not be available and BIOS setup program will not be accessible via PS/2 devices.
- [Full Initialization] For full system control, PS/2 devices will be available during POST at any circumstances. This process will extend POST time.
- [Disabled] For the fastest POST time, all PS/2 devices will not be available until your computer enters the operating system.

Network Stack Driver Support [Disabled]

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

Next Boot after AC Power Loss [Normal Boot]

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

Boot Logo Display [Enabled]

- [Enabled] Display the boot logo during POST.
- [Disabled] Hide the logo during POST.

Boot Logo Size Control [Auto]

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

- [Auto] Automatically adjust the boot logo size according to Windows® requirements.
- [Full Screen] Display the boot logo in full screen.

Post Delay Time [3 sec]

This item appears only when you set the Boot Logo Display item to [Enabled]. This item allows you to select a desired additional POST waiting time to easily enter the BIOS Setup. You can only execute the POST delay time during normal boot. The values range from 0 to 10 seconds.



This feature will only work when set under normal boot.

Post Report [5 sec]

This item appears only when you set the Boot Logo Display item 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 [On]

[On] Set the power-on state of the NumLock to **[On]**.

[Off] Set the power-on state of the NumLock to **[Off]**.

Wait For 'F1' If Error [Enabled]

[Disabled] Disables the function.

[Enabled] The system waits for the <F1> key to be pressed when error occurs.

Option ROM Messages [Force BIOS]

[Force BIOS] The third-party ROM messages will be displayed 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]

[Enabled] Allows the option ROMs to trap Interrupt 19.

[Disabled] Disables this function.

Setup Mode [EZ Mode]

[Advanced Mode] Allows you to go to Advanced Mode of the BIOS after POST.

[EZ Mode] 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. Configuration options: [UEFI and Legacy OpROM] [Legacy OpROM only] [UEFI only]

Boot from Network Devices [Legacy OpROM first]

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

Boot from Storage Devices [Legacy OpROM first]

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

Boot from PCIe/PCI Expansion Devices [Legacy OpROM first]

Allows you to select the type of PCIe/PCI expansion devices that you want to launch. Configuration options: [Legacy OpROM first] [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 [Windows UEFI mode]

[Windows UEFI Mode] 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, Windows® Vista/ Windows® XP, or other Microsoft® Secure Boot non-compliant OS. Microsoft® Secure Boot only supports Windows® UEFI mode.

Key Management

This item appears only when you set OS Type to [Windows UEFI Mode]. It allows you to manage the Secure Boot keys.

Install Default Secure Boot keys

Allows you to immediately load the default Security Boot keys, Platform key (PK), Key-exchange Key (KEK), Signature database (db), and Revoked Signatures (dbx). When the default Secure boot keys are loaded, all the Secure boot keys' state will change from Unloaded mode to loaded mode. The settings are applied after reboot.

Save Secure Boot Keys

Allows you to save all the Security 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.

Delete PK

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]

Load PK from File

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

[Yes] Load the default PK.

[Enabled] Load from a USB storage device.



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

KEK Management

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



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

Delete the KEK

Allows you to delete the KEK from your system. Once the KEK is deleted, the db and dbx cannot be updated under operating system. Configuration options: [Yes] [No]

Load KEK from File

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

[Yes] Load the default KEK.

[Enabled] Load from a USB storage device.

Append KEK from File

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

[Yes] Load the default KEK.

[Enabled] Load from a USB storage device.



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

db Management

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

Delete the db

Allows you to delete the db file from your system. Deleting the db file may cause boot failure. Configuration options: [Yes] [No]

Load db from File

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

[Yes] Load the default db.

[Enabled] Load from a USB storage device.

Append db from File

Allows you to load the additional db from a storage device so that more custom signed UEFI executable files can be loaded. UEFI executable files include UEFI boot loaders, drivers and applications.

[Yes] Load the default db.

[Enabled] Load from a USB storage device.



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

dbx Management

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

Delete the dbx

Allows you to delete the dbx file from your system. Deleting the dbx exposes your system to security threats.

Load dbx from File

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

[Yes] Load the default dbx.

[Enabled] Load from a USB storage device.

Append dbx from File

Allows you to load the additional dbx from a storage device so that more custom signed UEFI executable files can be loaded. UEFI executable files include UEFI boot loaders, drivers and applications.

[Yes] Load the default dbx.

[Enabled] Load from a USB storage device.



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.



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- To access Windows® OS in Safe Mode, do any of the following:
 - Press <F5> when BIOS Logo appears.
 - Press <F8> after POST.
 - To select the boot device during system startup, press <F8> when BIOS Logo appears.
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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.

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 Yes 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 **Yes** 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.

EZ Mode

This option allows you to enter the EZ Mode screen.

Launch EFI Shell from filesystem device

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