# Intel 800 series BIOS
## USER GUIDE

Motherboard

# Contents

# UEFI BIOS

MSI UEFI BIOS is compatible with UEFI (Unified Extensible Firmware Interface) architecture. UEFI has many new functions and advantages that traditional BIOS cannot achieve, and it will completely replace BIOS in the future. The MSI UEFI BIOS uses UEFI as the default boot mode to take full advantage of the new chipset's capabilities.

## ⚠ Important

The term BIOS in this user guide refers to UEFI BIOS unless otherwise noted.

## UEFI advantages

- Fast booting - UEFI can directly boot the operating system and save the BIOS self-test process.
- Supports for hard drive partitions larger than 2 TB.
- Supports more than 4 primary partitions with a GUID Partition Table (GPT).
- Supports unlimited number of partitions.
- Supports full capabilities of new devices - new devices may not provide backward compatibility.
- Supports secure startup - UEFI can check the validity of the operating system to ensure that no malware tampers with the startup process.

## Incompatible UEFI cases

- **32-bit Windows operating system** - this motherboard supports only Windows 11 64-bit operating system.
- **Older graphics card** - the system will detect your graphics card. If you use older graphics cards, it may display a warning message **There is no GOP (Graphics Output protocol) support detected in this graphics card**.

## ⚠ Important

We recommend that you replace it with a graphics card supporting GOP/UEFI or use CPU with integrated graphics for having normal function.

### How to find the BIOS version?

After entering the BIOS, find the BIOS version in the information box.

**Information**

MotherBoard
**Model Name**

BIOS Ver
**modellAMSI.ver**

MotherBoard Temperature
**Temp ºC**

BIOS Build Date
**Date**
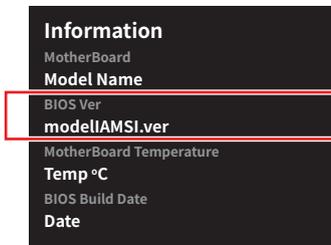
# BIOS Setup

The default settings offer optimal performance for system stability in normal conditions. You should **always keep the default settings** to avoid possible system damage or failure booting unless you are familiar with BIOS.

## ⚠️ *Important*

- *The BIOS setup screens, options, and settings in this manual are for reference only and may vary from the motherboard you purchased. Please refer to the actual BIOS version of your system for detailed screens, settings and options.*
- *In Advanced mode, you can find BIOS item descriptions at the bottom of the BIOS screen for information on the purpose and function of each BIOS setting. BIOS items are continuously updated for better system performance. Therefore, the description may differ slightly from the latest BIOS and should be for reference only.*

## Entering BIOS Setup

Press **Delete** key, when the **Press DEL key to enter Setup Menu, F11 to enter Boot Menu** message appears on the screen during the boot process.

### Function key

**+/ -:**      Increase / decrease the value

**Enter**:    Select the item

**ESC**:      Exit

**Tab**:      Next selection

**Ctrl+F**:  Enter Search menu

**F1**:        General Help list

**F2**:        Add/ Remove a favorite item

**F3**:        Enter Favorites menu

**F4**:        Enter CPU core center & memory center information menu

**F5**:        Enter Hardware Monitor menu

**F6**:        Load optimized defaults

**F7**:        Switch between Advanced mode and EZ mode

**F8**:        Load Overclocking Profile

**F9**:        Save Overclocking Profile

**F10**:      Save Change and Reset*

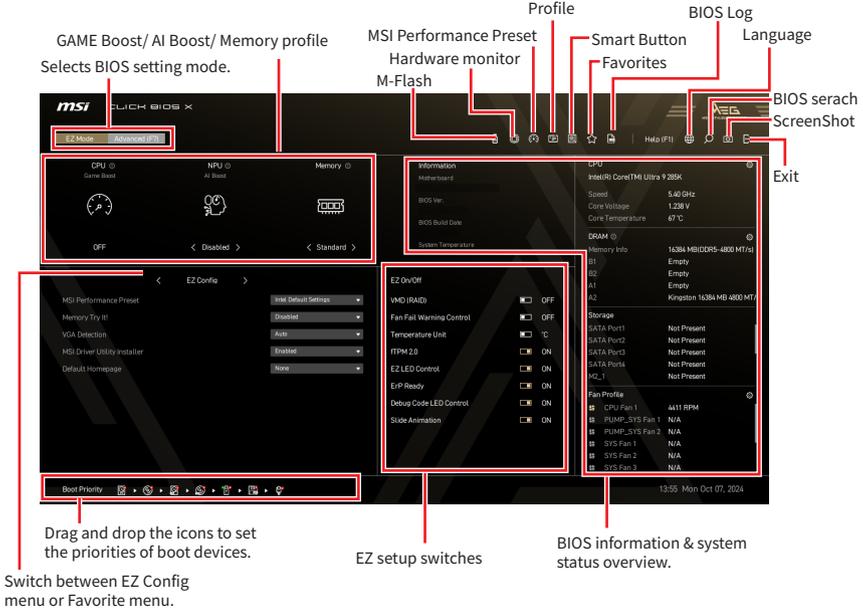**F12**:      Take a screenshot and save it to USB flash drive (FAT/ FAT32 format only).

* Pressing **F10** displays a confirmation message summarizing your changes. Select **Yes** or **No** to confirm.

# BIOS Setting Mode

We provide two modes for you to configure BIOS settings: **EZ** mode and **Advanced** mode. Click on the **EZ Mode/ Advanced (F7)** button or press the **F7** function key to switch between these two modes.

# EZ Mode

In EZ mode, it provides the basic setup functions for easy configuration and displays basic system information and status.

GAME Boost/ AI Boost/ Memory profile
Selects BIOS setting mode.

MSI Performance Preset
Hardware monitor
M-Flash

Profile

Smart Button
Favorites

BIOS Log
Language

BIOS serach
ScreenShot

Exit



Drag and drop the icons to set the priorities of boot devices.

Switch between EZ Config menu or Favorite menu.

EZ setup switches

BIOS information & system status overview.

## Game Boost

Enabling the GAME BOOST, the BIOS will automatically configure the CPU for optimal overclocking. However, this feature is only available if both your motherboard and CPU support it.

Click here to enable or disable the Game Boost/ Creation Boost function.
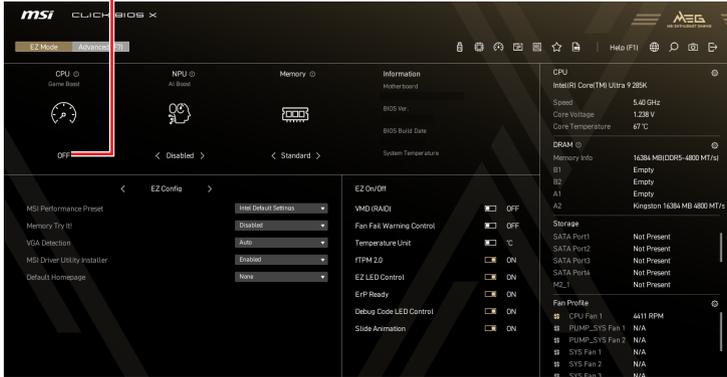


## ⚠️ *Important*

*Please don't make any changes in Overclocking menu and don't load defaults to keep the optimal performance and system stability after activating the **Game Boost** function.*

## Creation Boost

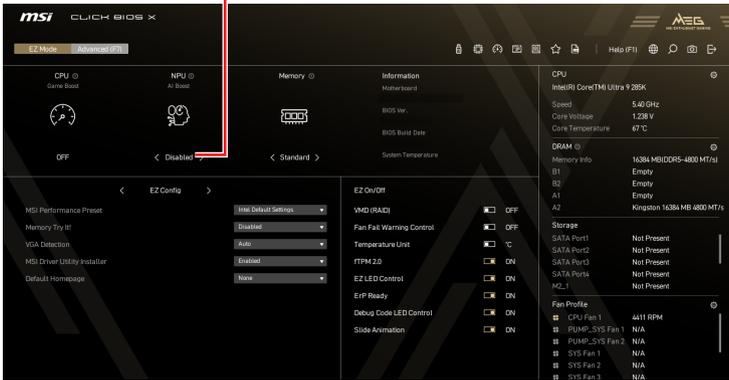Enabling the Creation BOOST for performance optimization.

## ⚠️ *Important*

*Please don't make any changes in Overclocking menu and don't load defaults to keep the optimal performance and system stability after activating the **Creation Boost function.***

## AI Boost

Enabling AI Boost allows the BIOS to automatically configure the NPU for optimal settings, enhancing AI processing performance. However, this feature is only available if both your motherboard and CPU support it.

Click here to enable or disable the AI OC function.



## ⚠️ *Important*

*Please don't make any changes in Overclocking menu and don't load defaults to keep the optimal performance and system stability after activating the **AI Boost** function.*

## XMP/ iEXPO Profile

It allows you to select a memory profile for overclocking memory. However, this feature is only available if your motherboard, memory and CPU support it.
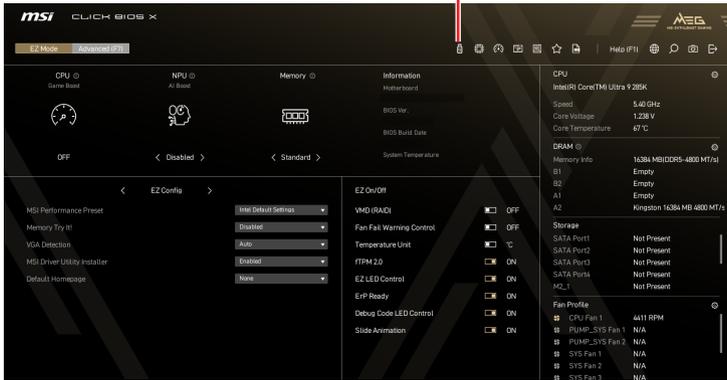
Select a memory profile
for overclocking memory.
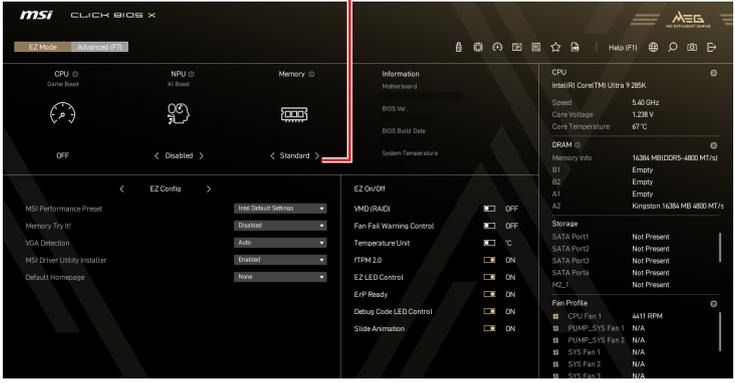
# M-Flash

M-Flash makes it easy to update system BIOS with a USB flash drive.

Click this icon to enter M-Flash procedure.



Before starting the M-Flash process, make sure you have:

- A USB flash drive with a capacity of 32GB or less that is formatted to FAT32.

## ⚠️ Important

*M-Flash only supports FAT32 format, and the USB flash drive should not exceed 32GB.*

- A computer with internet access.

Please follow the steps below to update BIOS:

1. Download the latest BIOS file from the MSI website that matches your motherboard model, and save it to the USB flash drive.
2. If your motherboard has a Multi-BIOS switch, switches it to the target BIOS ROM.
3. Insert the USB flash drive into your motherboard' s USB port.
4. Enter flash mode by either:
   - Rebooting and pressing Ctrl + F5 during POST, then clicking Yes to reboot the system.

   > Press <Ctrl+F5> to activate M-Flash for BIOS update.

   - Rebooting and pressing Del during POST to enter BIOS, then clicking the M-FLASH button and clicking Yes to reboot.

**5.** Selects a BIOS file and press enter.

Selects a BIOS file.



**6.** When prompted by a File Check message, click Yes to start the BIOS update.



File Check

Are you sure to select this file?

No    Yes

Once the update reaches 100%, the system will reboot automatically.

## Favorites

Favorites is a section where you can create a personalized BIOS setting menu. The favorite menu allows you to quickly and easily access your most commonly used BIOS settings.

Click this icon to enter Favorites main page.
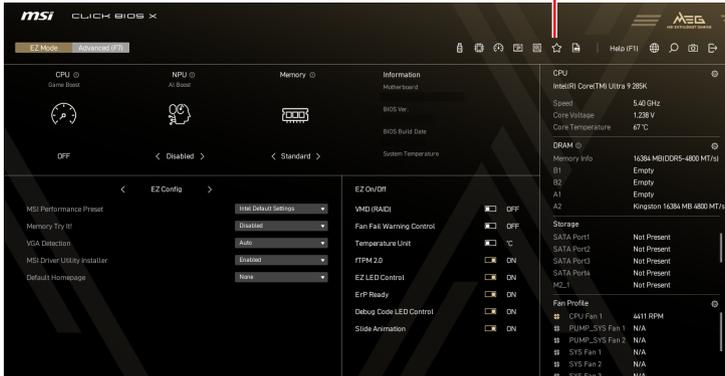


- • To add a BIOS item to a favorite menu
- **1.** Select a BIOS item on the BIOS sub-menu.
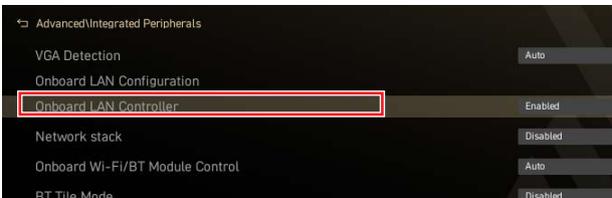


- **2.** **Right**-click or press **F2** key.
- **3.** Choose one **Favorite** menu to add this BIOS item.

• To delete a BIOS item from favorite menu
1. Select a BIOS item on **Favorite** menu.



2. **Right**-click or press **F2** key.
3. Choose **Delete** and click on **OK**.

## MSI Performance Preset

MSI Performance Preset provides levels of power limit control for different significant scenarios.

MSI Performance Preset
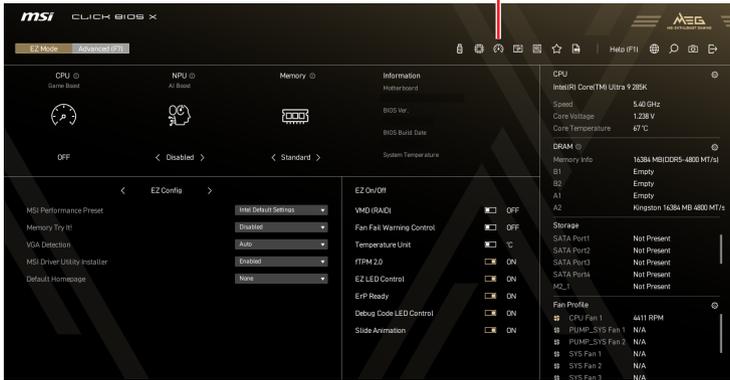
# Smart Button

Click this button to select a system function for either the smart button on the motherboard or the reset button on the computer chassis. The chosen function can then be activated by pressing the smart/ reset button.
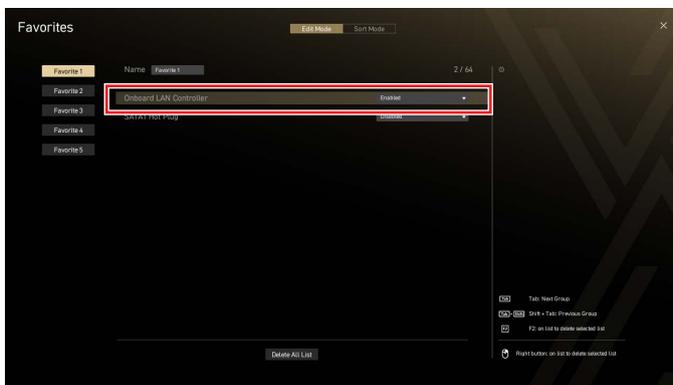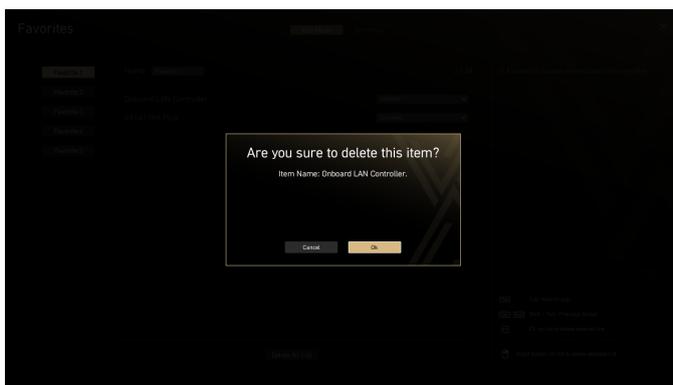
Click this icon to set the Smart button function
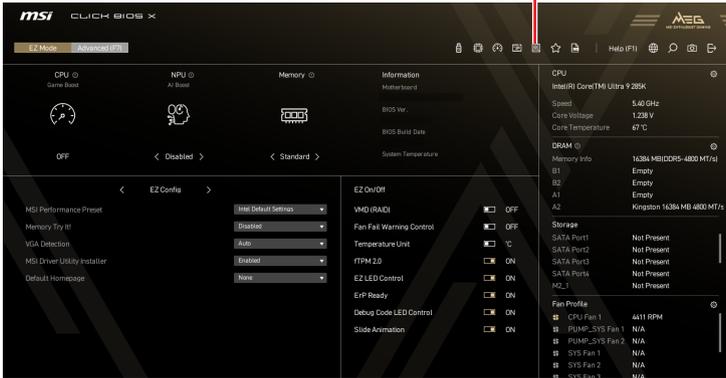


- Please follow the steps below to set the smart button function.

1. Click on **Smart Button**.
2. Select the system functions for the smart button and the reset button separately. And then click **OK**.



- Reset - it is used to reset the system.
- LED On/ Off - it is used turn on/ off all the onboard LEDs.

## ⚠️ *Important*

*The LED On/ Off function is unavailable when the LED_SW1 (EZ LED Control) switch turns OFF.*

- Safe Boot - click the reset/ smart button and start the system simultaneously to boot in Safe Boot mode. The system will boot with default and lower the PCIe (from CPU) mode.
- Turbo Fan - click the reset/ smart button for all fans to operate full speed or default speeds.

3. Press F10 to save the change and select Yes to restart the system.

## Profile

In the profile page, it allows you to load or store the BIOS profile from BIOS ROM/ USB flash driver.

Click this icon to enter the profile page
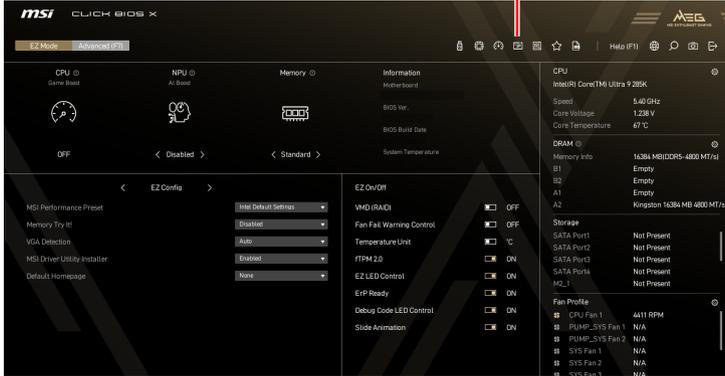


## ⚠ Important

*The USB flash drive should be FAT/ FAT32 format only.*

• Please follow the steps below to load profile.

1. Click on **Profile** icon.

2. Click **Load(F8)** to enter the load profile page.

3. Select a profile from ROM/ USB flash drive, and then press **Enter** to load the profile.
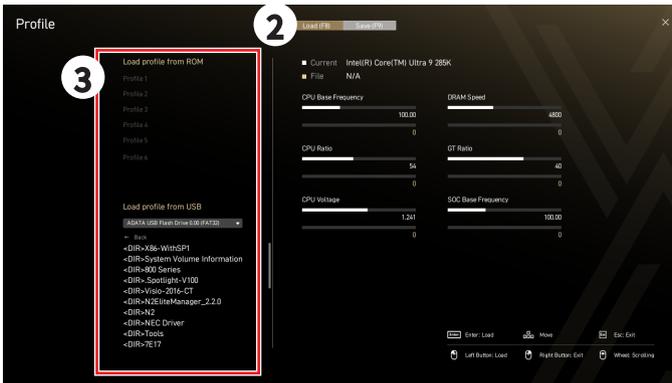
- Please follow the steps below to save profile.

1. Click on **Profile** icon.
2. Click **Save(F9)** to enter the save profile page.
3. Select the ROM or USB flash drive and press **Enter**.
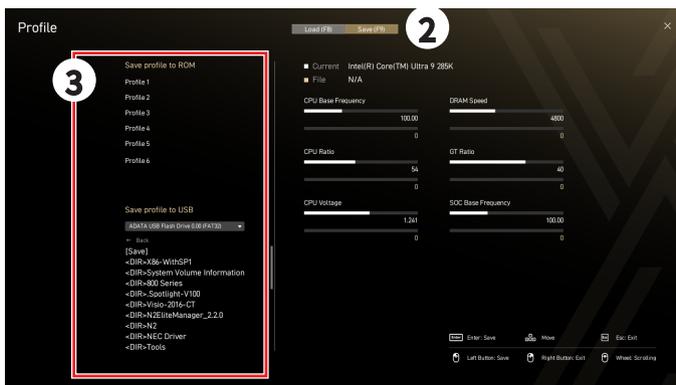


4. Click **OK** to save the current BIOS settings and create a profile.

# Hardware monitor

Hardware monitor detects and displays the voltages and temperatures of different components. It also provides a smart fan feature that allows you to adjust the fan speed manually.

Click this icon to enter the hardware monitor page.
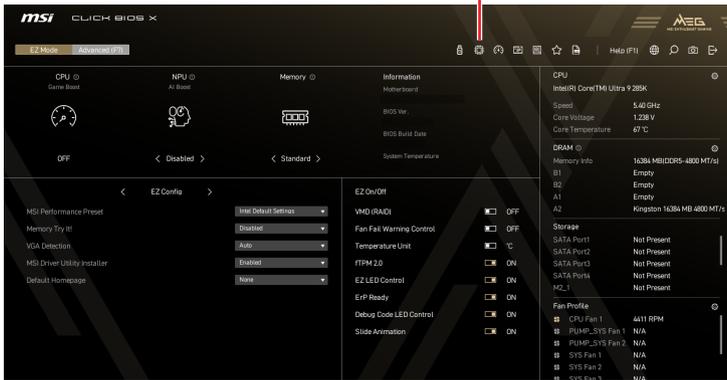


Smart Fan is an excellent feature that will adjust the CPU/ PUMP/ system fan speed automatically depending on the current CPU/ system temperature, avoiding overheating and damaging your system.
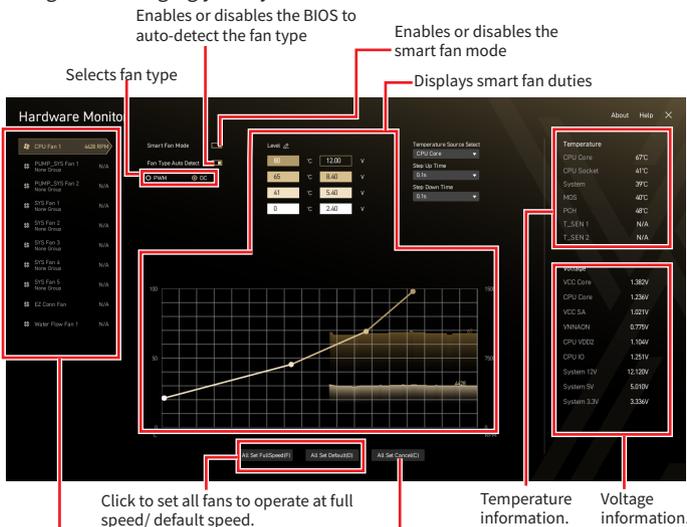
Enables or disables the BIOS to auto-detect the fan type

Enables or disables the smart fan mode

Selects fan type

Displays smart fan duties



Click to set all fans to operate at full speed/ default speed.

Temperature information.

Voltage information.

Displays the fan speeds in rotations per minute (RPM)

Click to discard current changes and restore previous settings for all fans.

⚠️ *Important*

*The appearance of this menu may differ based on your motherboard model. Please consult your motherboard's BIOS for specific settings and options.*

## Smart fan configuration

• Please follow the steps below to adjust fan speed (RPM).

1. Selects a fan you want to adjust.
2. Click and drag the duty points on the graph to adjust the desired fan speed (RPM).



• Please follow the steps below to add new fan duty for smart fan mode

1. Select a fan you want to adjust.
2. Double-click the icon next to **Level**.
3. Choose a temperature source for this fan duty point.
4. Enter a desired value within the smart mode range. Then click the "+" to add the new fan duty.



## ⚠️ *Important*

*Make sure fans are working properly after adjusting the fan speed and switching the fan mode.*

# BIOS Log

The BIOS log page displays a detailed list of BIOS configuration modifications during this period.

Click this icon to enter the BIOS log page.
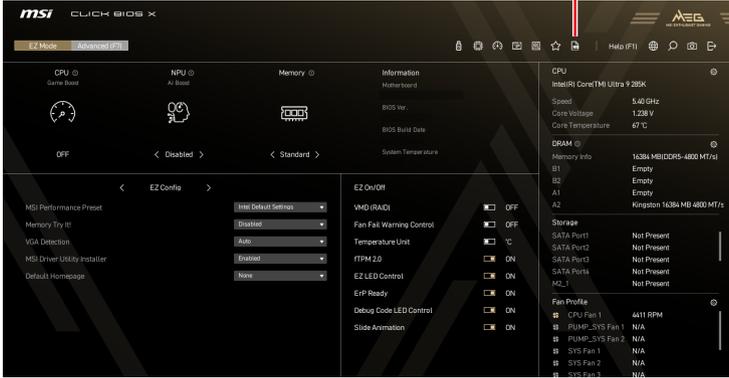
## Language

Click on this button to select the display language of the BIOS setup program.
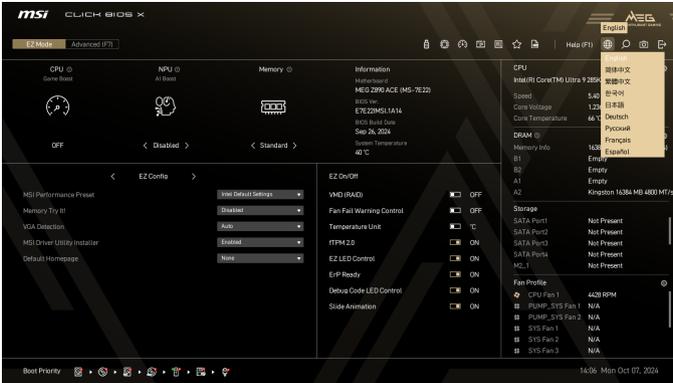
# BIOS Search

Click this icon to enter BIOS serach page
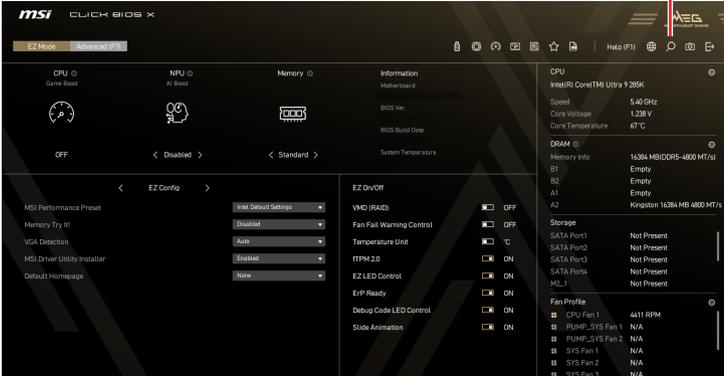


On the search page, it allows you to search for the related BIOS items by entering the keyword.



## ⚠️ *Important*

*On the search page, only the **F2**, **F6**, **F10** and **F12** function keys are available.*

## Screenshot

Click on this button or press the **F12** key to take a screenshot and save it to a USB flash drive (FAT/ FAT32 format only).

Click this icon to take a screenshot
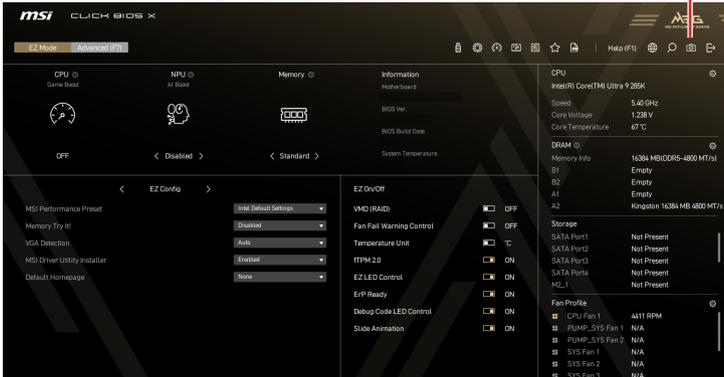
# Boot priority

Drag and drop the icons to set the boot order of devices. Devices from left to right will have boot priority in descending order (highest on the left).
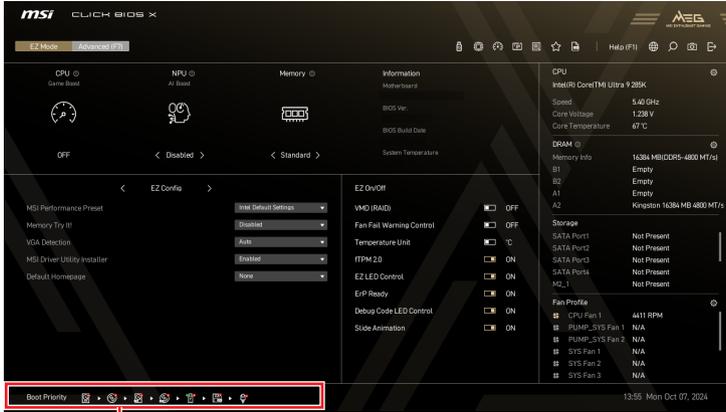


Boot device priority bar

# EZ On/Off

The Ez On/Off section provides easy-to-use controls for common functions.
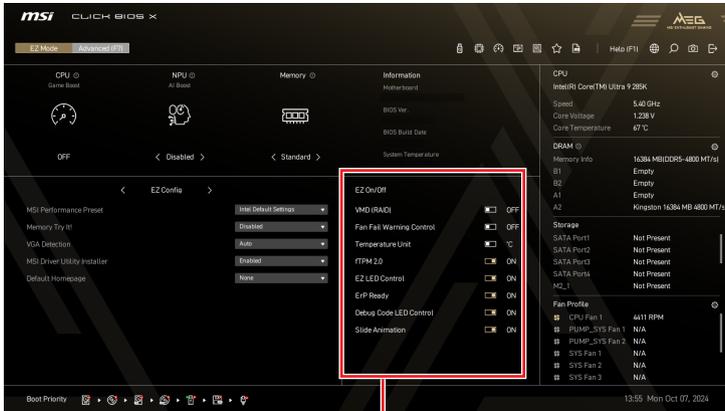


EZ setup swtiches

- **VMD (RAID)** - enables or disables the Intel VMD (RAID) function.
- **CPU Fan Fail Warning Control** - enables or disables the system to show the CPU fan fail warning message during the POST.
- **Temperature Unit** - change the temperature unit.
- **fTPM 2.0** - enables or disables the firmware TPM control.
- **EZ LED Control** - turns on or off all the LEDs of the motherboard.
- **ErP Ready** - enables or disables the system power consumption according to ErP regulation.
- **MSI Driver Utility Installer** - enables or disables the MSI Driver Utility Installer
- **Thunderbolt Control** - enables or disables the thunderbolt I/O device support.
- **Debug Code LED Control** - enables or disables the debug code LED.

## ⚠️ *Important*

*The appearance of this menu may differ based on your motherboard model. Please consult your motherboard's BIOS for specific settings and options.*

# EZ Config

The EZ Config section provides some specific BIOS setting shortcuts for quick accessing.
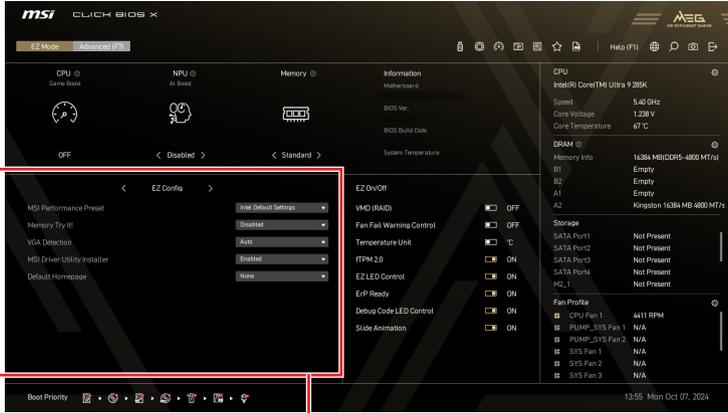


EZ Config menu

Within the EZ Config section, click the **<** or **>** icon next to EZ Config label to switch between EZ Config menu and Favorites menu.

# Advanced Mode

In Advanced mode, it provides detailed BIOS settings for experienced users to fine-tune performance and overclocking.

Selects BIOS setting mode. Or press F7 to change setting mode.
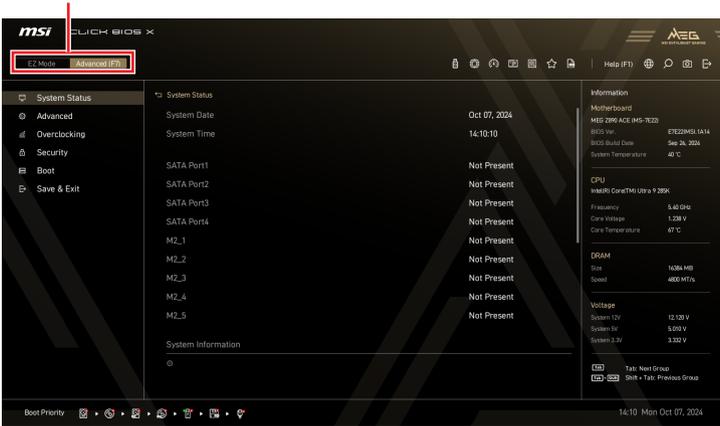


The left side of the BIOS screen displays several BIOS menus, including the following items:

- **System Status** - This menu displays comprehensive system information and allows you to adjust system date and time settings.
- **Advanced** - This menu allows you to specify the parameters and adjust settings for the devices and components of your system.
- **Overclocking** - This menu allows you to adjust the frequency and voltage. Remember, higher settings can mean better performance, but also raise the risk of damage.
- **Security** - This menu allows you to set administrator and user passwords, and manage TPM settings for enhanced system security using this menu.
- **Boot** - This menu allows you to set the system boot devices.
- **Save & Exit** - This menu provides options for restoring default settings, saving customized settings, or discarding any unsaved changes.

# System Status

The System Status menu allows you to set the system clock and view system information.
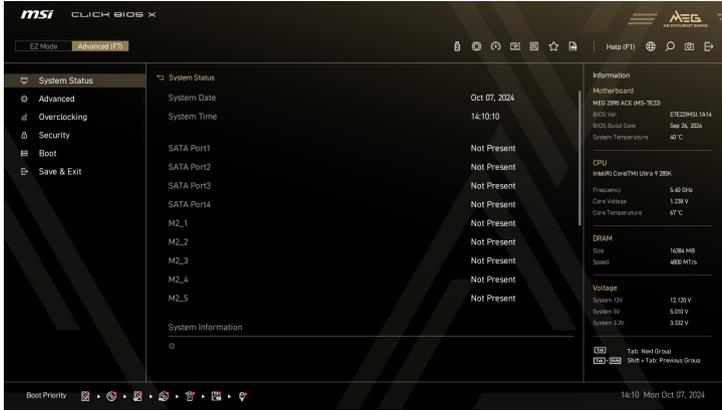


▸ **System Date**

Sets the system date. Use **Tab** key to switch between date elements.

The format is <day> <month> <date> <year>.

<day>       Day of the week, from Sun to Sat, determined by BIOS. Read-only.

<month>     The month from Jan. through Dec.

<date>      The date from 1 to 31 can be keyed by numeric function keys.

<year>      The year can be adjusted by users.

▸ **System Time**

Sets the system time. Use tab key to switch between time elements. The time format is <hour> <minute> <second>.

▸ **SATA PortX/ M2_X**

Shows the information of connected SATA/ M.2 devices.

## ⚠ *Important*

*If the connected SATA/ M.2 device is not displayed, turn off computer and re-check SATA/ M.2 cable and power cable connections of the device and motherboard.*

▸ **System Information**

Shows detailed system information, including CPU type, BIOS version, and Memory information. (Read only).

▸ **DMI Information**

Shows system information, desktop Board Information and chassis Information. (Read only).

# Advanced

The Advanced menu allows you to adjust and set the parameters and behaviors of PCIe, ACPI, integrated peripherals, integrated graphics, USB, power management and Windows.
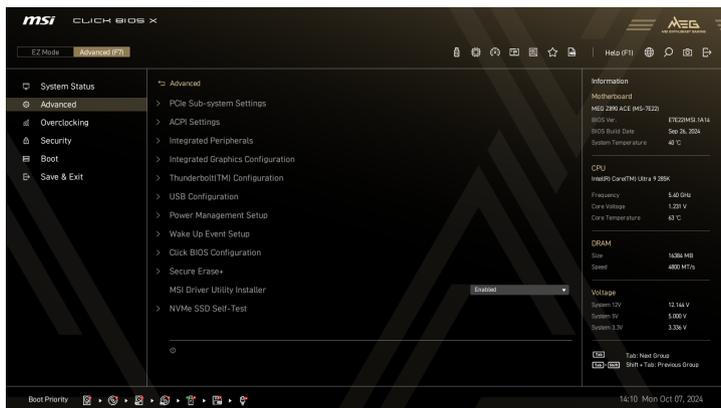


▸ **PCIe Sub-system Settings**

Sets PCI, PCI express interface protocol and latency timer. Press Enter to enter the sub-menu.

  ▸ **M.2_X Gen Mode**

  Sets PCI Express protocol for M.2_X slot to match different installed M.2 devices.

  [Auto]          This item will be configured automatically by BIOS.
  [Gen1]          Enables PCIe Gen1 support only.
  [Gen2]          Enables PCIe Gen2 support only.
  [Gen3]          Enables PCIe Gen3 support only.
  [Gen4]          Enables PCIe Gen4 support only.
  [Gen5]          Enables PCIe Gen5 support only.

  ▸ **PCI_E1 Gen Mode**

  Sets PCI Express protocol for PCI_E1 slot to match different installed PCIe devices.

  [Auto]          This item will be configured automatically by BIOS.
  [Gen1]          Enables PCIe Gen1 support only.
  [Gen2]          Enables PCIe Gen2 support only.
  [Gen3]          Enables PCIe Gen3 support only.
  [Gen4]          Enables PCIe Gen4 support only.
  [Gen5]          Enables PCIe Gen5 support only.

‣ **PCI_E2 Gen Mode**

Sets PCI Express protocol for PCI_E2 slot to match different installed PCIe devices.

[Auto]          This item will be configured automatically by BIOS.

[Gen1]          Enables PCIe Gen1 support only.

[Gen2]          Enables PCIe Gen2 support only.

[Gen3]          Enables PCIe Gen3 support only.

[Gen4]          Enables PCIe Gen4 support only.

[Gen5]          Enables PCIe Gen5 support only.

‣ **CPU PCIe Lanes Configuration**

Configures the PCIe lanes from the CPU to adapt to multiple PCIe devices' usages.

‣ **PCI Latency Timer**

Sets latency timer for PCI interface device.

‣ **Max TOLUD**

Sets the maximum TOLUD (Top of Low Usable DRAM) value.

‣ **Re-Size BAR Support**

Enables or disables the Resize BAR (Base Address Register) support. It is only available if the system supports 64-bit PCI/ PCIe decoding. Enables it when the system supports 64-bit PCI/ PCIe decoding for compatible PCIe devices.

‣ **PCIe Native Power Management**

Enables or disables the ASPM (Active State Power Management) for PCIE in OS.

‣ **Native ASPM**

If enabled, ASPM will be controlled by the operating system. If disabled, ASPM will be controlled by the BIOS.

‣ **PCIe ASPM Settings**

Sets PCIe ASPM (Active State Power Management) state for different installed devices. Press Enter to enter the sub-menu.

‣ **PEG 0 ASPM**

Sets PCI Express ASPM (Active State Power Management) state for power saving.

‣ **PEG 1 ASPM**

Sets PCI Express ASPM (Active State Power Management) state for power saving.

‣ **PEG 2 ASPM**

Sets PCI Express ASPM (Active State Power Management) state for power saving.

‣ **PEG 3 ASPM**

Sets PCI Express ASPM (Active State Power Management) state for power saving.

‣ **PCI Express Root Port 1 ASPM**

Sets PCI Express ASPM (Active State Power Management) state for power saving.

‣ **PCI Express Root Port 5 ASPM**

Sets PCI Express ASPM (Active State Power Management) state for power saving.

▸ **PCI Express Root Port 7 ASPM**

Sets PCI Express ASPM (Active State Power Management) state for power saving.

▸ **PCI Express Root Port 8 ASPM**

Sets PCI Express ASPM (Active State Power Management) state for power saving.

▸ **PCI Express Root Port 9 ASPM**

Sets PCI Express ASPM (Active State Power Management) state for power saving.

▸ **PCI Express Root Port 21 ASPM**

Sets PCI Express ASPM (Active State Power Management) state for power saving.

▸ **ACPI Settings**

Sets ACPI parameters of onboard power LED behaviors. Press Enter to enter the sub-menu.

▸ **Power LED**

Sets shining behaviors of the onboard Power LED.

[Dual Color]    The power LED turns to another color to indicate the S3 state.

[Blinking]       The power LED blinks to indicate the S3 state.

▸ **CPU Over Temperature Alert**

Enables or disables the CPU overheating alert sound and message when CPU temperature is over 80 and 94 degrees centigrade.

▸ **Temperature Display On Debug Code**

Selects a thermal detection point and then the detected temperature will display on the debug code LED when the system is on.

▸ **Integrated Peripherals**

Sets integrated peripherals' parameters, such as LAN, HDD, USB and audio. Press **Enter** to enter the sub-menu.

▸ **Graphics Card Detection**

Allows the system to detect if there is any discrete graphics card or integrated graphics unit.

▸ **Onboard LAN Controller**

Enables or disables the onboard LAN controller.

▸ **Network Stack**

Sets UEFI network stack for optimizing IPv4 / IPv6 function. This item is available when **Onboard LAN Controller** is enabled.

[Enabled]       Enables UEFI network stack.

[Disabled]      Disables UEFI network stack.

▸ **Ipv4 PXE Support**

When Enabled, the system UEFI network stack will support Ipv4 protocol. This item will appear when **Network Stack** is Enabled.

[Enabled]       Enables the Ipv4 PXE boot support.

[Disabled]      Disables the Ipv4 PXE boot support.

‣ **Ipv6 PXE Support**

When Enabled, the system UEFI network stack will support Ipv6 protocol. This item will appear when **Network Stack** is enabled.

[Enabled]　　　Enables the Ipv6 PXE boot support.

[Disabled]　　　Disables the Ipv6 PXE boot support.

‣ **BT Tile Mode**

If enabled, it allows the Tile APP of your smartphone to locate your computer.

‣ **Onboard CNVi Module Control**

Enables or disables the Wi-Fi and Bluetooth functions of the Intel CNVi module.

‣ **Onboard Wi-Fi/BT Module Control**

Enables or disables the onboard Wi-Fi and Bluetooth functions. If Auto, the both of Wi-Fi and bluetooth are be enabled.

‣ **Onboard IEEE1394 Controller**

Enables or disables the onboard IEEE1394 controller.

‣ **RAID Configuration (Intel VMD)**

Enables or disables the RAID configuration. Press **Enter** to enter the sub-menu.

‣ **Enable VMD controller**

Enables or disables Intel VMD controller.

‣ **Enable VMD Global Mapping**

Enables or disables Intel VMD mapping. Enabling VMD Global Mapping can significantly improve the performance and manageability of your storage system, especially when running virtualized workloads.

‣ **RAID0**

Enables or disables RAID 0.

‣ **RAID1**

Enables or disables RAID 1.

‣ **RAID5**

Enables or disables RAID 5.

‣ **RAID10**

Enables or disables RAID 10.

‣ **Intel Rapid Recovery Technology**

Enables or disables Intel Rapid Recovery Technology. Intel® Rapid Recover Technology (Intel® RRT) is a feature of Intel® Rapid Storage Technology (Intel® RST). It uses RAID 1 (mirroring) functionality to copy data from a designated master drive to a designated recovery drive.

‣ **RRT volumes can span internal and eSATA drives**

Enables or disables the RRT volumes to span internal and eSATA drives.

‣ **ZPODD**
Enables or disabled the ZPODD (Zero Power optical disk drive).

‣ **SATA1 Hot Plug**
Enables or disabled the SATA1 port hot plug support.

‣ **SATA2 Hot Plug**
Enables or disabled the SATA2 port hot plug support.

‣ **SATA3 Hot Plug**
Enables or disabled the SATA3 port hot plug support.

‣ **SATA4 Hot Plug**
Enables or disabled the SATA4 port hot plug support.

‣ **SATA5 Hot Plug**
Enables or disabled the SATA5 port hot plug support.

‣ **SATA6 Hot Plug**
Enables or disabled the SATA6 port hot plug support.

‣ **Onboard E-SATA Controller Mode**
Sets the operation mode of the onboard E-SATA controller.

‣ **External SATA 6GB/s Controller Mode**
Sets the operation mode of the external SATA controller.

‣ **SATAA Hot Plug**
Enables or disabled the SATAA port hot plug support.

‣ **SATAB Hot Plug**
Enables or disabled the SATAB port hot plug support.

‣ **HD Audio Controller**
Enables or disables the onboard High Definition Audio controller.

‣ **Smart Button (Front)**
Sets the front smart button function.

‣ **Smart Button (Rear)**
Sets the rear smart button function.

‣ **Integrated Graphics Configuration**
Adjusts integrated graphics settings for optimum system. Press **Enter** to enter the sub-menu. This sub-menu is only available with the CPU integrate with IGP.

‣ **Initiate Graphic Adapter**
Selects a graphics device as the primary boot device.
[IGD]        Integrated Graphics Display.
[PEG]        PCI-Express Graphics Device.

▸ **Integrated Graphics Share Memory**

Selects a fixed amount of system memory allocated to the onboard graphics. This item will appear when an external graphics card be installed and the **IGD Multi-Monitor** is enabled.

▸ **IGD Multi-Monitor**

Enables or disables the multi-screen output from integrated graphics and external graphics card. This item appears when **Initiate Graphic Adapter** set to PEG.

[Enabled]      Enables multi-screen function for both integrated and external graphics cards.

[Disabled]     Disables this function.

▸ **Thunderbolt(TM) Configuration**

Sets the thunderbolt device function. Press **Enter** to enter the sub-menu.

▸ **PCIE Tunneling over USB4**

Enables or disables the PCI-E Tunnel protocol over USB4.

▸ **USB4 CM Mode**

Select a connection manager mode for the USB4 port.

▸ **Integrated Thunderbolt(TM) Support**

Enables or disables the integrated thunderbolt.

▸ **Integrated Thunderbolt(TM) Configuration**

Sets the thunderbolt device configuration. Press **Enter** to enter the sub-menu.

▸ **Os Native Resource Balance**

Enables or disables the OS native resource balance.

▸ **Connect Topology Timeout value for ITBT**

Sets the connecting topology timeout value for integrated Thunderbolt device.

▸ **Force Poweron timeout value for ITBT**

Sets the force power-on timeout value for integrated Thunderbolt device.

▸ **ITBT RTD3**

Enables or disables the RTD3 (Run time D3) for integrated thunderbolt device.

▸ **ITBT RTD3 EXIT DELAY**

Sets the delay time for thunderbolt device wake from RTD3.

▸ **PCIE RTD3 POLLING LINK ACTIVE TIMEOUT**

This setting determines how often the system checks if a PCIe device in RTD3 state needs to be awakened.

▸ **ITBT Root Port 0/1 Configuration**

Sets the ITBT configuration. Press **Enter** to enter the sub-menu.

▸ **ITBT Root Port 0/ 1**
Enables or disables ITBT port 0/ 1.

▸ **Root Port 0/ 1 Resource Allocation**

▸ **Extra Bus Reserved**
Sets the extra bus for ITBT port0/ 1.

▸ **Reserved Memory**
Sets reserved memory size for the ITBT port 0/ 1.

▸ **Memory Alignment**
Sets the memory alignment.

▸ **Reserved PMemory**
Sets reserved prefetchable memory size for the ITBT port 0/ 1.

▸ **PMemory Alignment**
Sets prefetchable memory alignment.

▸ **USB Configuration**
Sets the onboard USB controller and device function. Press **Enter** to enter the sub-menu.

▸ **USB3 Port #X**
Enables or disables the individual USB 3.0 ports of the motherboard.

▸ **USB2 Port #X**
Enables or disables the individual USB 2.0 ports of the motherboard.

▸ **Super IO Configuration**
Sets system Super I/O chip parameters including LPT and COM ports. Press **Enter** to enter the sub-menu.

▸ **Serial (COM) Port 0/1 Configuration**
Sets detailed configuration of serial (COM) port 0/1. Press **Enter** to enter the sub-menu.

▸ **Serial (COM) Port 0/1**
Enables or disables serial (COM) port 0/1.

▸ **Serial (COM) Port 0/1 Settings**
Sets serial (COM) port 0/1. If set to Auto, BIOS will set the IRQ automatically or you can set it manually.

▸ **Parallel (LPT) Port Configuration**
Sets detailed configuration of parallel port (LPT). Press Enter to enter the sub-menu.

▸ **Parallel (LPT) Port**

Enables or disables parallel (LPT) port.

▸ **Parallel (LPT) Port Settings**

Sets parallel port (LPT). If set to **Auto**, BIOS will set the IRQ automatically or you can set it manually.

▸ **Device Mode**

Selects an operating mode for parallel port.

| | |
|---|---|
| [STD Printer Mode] | Printer port mode |
| [SPP] | Standard Parallel Port mode |
| [EPP-1.9/ 1.7 + SPP] | Enhanced Parallel Port-1.9/ 1.7 mode + Standard Parallel Port mode. |
| [ECP] | Extended Capability Port mode |
| [ECP + EPP-1.9/ 1.7] | Extended Capability Port mode + Enhanced Parallel Port-1.9/ 1.7 mode. |

▸ **Power Management Setup**

Sets system Power Management of ErP and AC Power Loss behaviors. Press **Enter** to enter the sub-menu.

▸ **ErP Ready**

Enables or disables the system power consumption according to ErP regulation.

| | |
|---|---|
| [Enabled] | Optimize the system power consumption according to ErP regulation. It doesn't support S4 & S5 wake up by USB, PCI and PCIe devices. |
| [Disabled] | Disables this function. |

▸ **Restore after AC Power Loss**

Sets the system behaviors while encountering the AC power loss.

| | |
|---|---|
| [Power Off] | Leaves the system in power off state after restoring AC power. |
| [Power On] | Boot up the system after restoring AC power. |
| [Last State] | Restores the system to the last state. |

▸ **System Power Fault Protection**

Enables or disables the protection (shut down status) for system when detecting abnormal voltage input.

| | |
|---|---|
| [Enabled] | Protect the system from unexpected power operation and remain the shut down status. |
| [Disabled] | Disables this function. |

▸ **USB Standby Power at S4/S5**

Enables or disables the standby power for all USB ports. This item will be available when **Resume By USB Device** is disabled.

▸ **Wake Up Event Setup**

Sets system wake up behaviors for different sleep modes. Press Enter to enter the sub-menu.

▸ **Wake Up Event By**

Selects the wake up event by BIOS or operating system.

[BIOS]          Activates the following items, set wake up events of these items.

[OS]            The wake up events will be defined by OS.

▸ **Resume By RTC Alarm**

Disables or enables the system wake up by RTC Alarm.

[Enabled]       Enables the system to boot up on a scheduled time/ date.

[Disabled]      Disables this function.

▸ **Date (of month) Alarm/ Time (hh:mm:ss) Alarm**

Sets RTC alarm date/ Time. If Resume By RTC Alarm is set to [Enabled], the system will automatically resume (boot up) on a specified date/hour/minute/second in these fields (using the **+** and **-** keys to select the date & time settings).

▸ **Resume By PCI-E/ Networking Device**

Enables or disables the wake up function of installed PCI-E expansion cards, integrated LAN controllers,  onboard WiFi or USB devices which are supported by third party integrated chips.

[Enabled]       Enables the system to be awakened from the power saving modes when activity or input signal of PCI/ PCIe/ LAN/ WiFi device is detected.

[Disabled]      Disables this function.

▸ **Resume By Intel Onboard LAN**

Enables or disables the system wake up by Onboard Intel LAN.

[Enabled]       Enables the system to be awakened from the power saving modes when activity or input signal of Intel LAN device is detected.

[Disabled]      Disables this function.

▸ **Resume By Intel Onboard LAN/CNVi**

Enables or disables the system wake up by onboard Intel LAN/ CNVi wireless.

[Enabled]       Enables the system to be awakened from the power saving modes when activity or input signal of Intel LAN/ CNVi device is detected.

[Disabled]      Disables this function.

▸ **Resume By Intel CNVi**

Enables or disables the system wake up by Intel CNVi wireless module.

[Enabled]       Enables the system to be awakened from the power saving modes when activity or input signal of Intel CNVi device is detected.

[Disabled]      Disables this function.

‣ **Resume by USB Device**

Enables or disables the system wake up by USB devices.

[Enabled]      Enables the system to be awakened from sleep state when activity of USB device is detected.

[Disabled]     Disables this function.

‣ **Resume by Intel TBT Device**

Enables or disables the system wake up from S3/ S4/ S5 by Intel TBT device.

‣ **Resume From S3/S4/S5 by PS/2 Mouse**

Enables or disables the system wake up by PS/2 mouse.

[Enabled]      Enables the system to be awakened from S3/ S4/ S5 state when activity of PS/2 mouse is detected.

[Disabled]     Disables this function.

‣ **Resume From S3/S4/S5 by PS/2 Keyboard**

Enables or disables the system wake up by PS/2 keyboard.

[Any Key]      Enables the system to be awakened from S3/ S4/ S5 state when activity of any key on PS/2 keyboard is detected.

[Hot Key]      Enables the system to be awakened from S3/ S4/ S5 state when activity of hot key on PS/2 keyboard is detected.

[Disabled]     Disables this function.

‣ **Hot Key**

Selects a combination of keys as a hot key to wake the system. This item appears when the **Resume From S3/S4/S5 by PS/2 Keyboard** sets to Hot Key.

‣ **Click BIOS Configuration**

Configures BIOS setup related items. Press **Enter** to enter the sub-menu.

‣ **Slide Animation**

Enables or disables the sliding function for BIOS main menu block.

‣ **Default Homepage**

Selects a BIOS menu as the BIOS main page.

‣ **Show Application At First Time**

Selects an application to launch when entering BIOS menu at the next startup.

‣ **Secure Erase+**

Enables or disables Secure Erase+ function. Secure Erase+ is the best way to effectively wipe all data from an SSD. Please note that the data of SSD will be **erased** after enabling Secure Erase+.

‣ **MSI Driver Utility Installer**

Enables or disables the MSI driver utility support. If enabled, platform drivers will be downloaded automatically through **Windows Update** after the first OS installation.

⚠ *Important*

• *MSI Driver Utility Installer needs to be installed over the internet.*

• *The MSI Driver Utility Installer will only pop up once. If you cancel or close it during the process, please refer to the Live Update chapter of the MSI Center manual to install the drivers. You can also go to www.msi.com to search your motherboard and download the drivers.*

‣ **NVME SSD Self-Test**

This setting enables or disables a built-in diagnostic function within the NVMe SSD. Press Enter to start the NVME SSD self test.

‣ **SR-IOV Support**

Enables or disables the Intel SR-IOV (Single Root I/O Virtualization).

‣ **M.2 XPANDER Card Settings**

You can set the fan duty percentage according LED color of the M.2 XPANDER card fan. If set to **Auto**, BIOS will set the fan duty automatically.

‣ **Realtek PCIe GBE Family Controller**

Shows driver information and configuration of the ethernet controller parameter. This item will appear when **Network Stack** is enabled.

‣ **Intel ( R ) Ethernet Connection I219-V -(MAC**

Shows driver information and configuration of the ethernet controller parameter. This item will appear when **Network Stack** is enable.

# Overclocking

This menu allows you to configure the frequencies and voltages for overclocking. Please note that, higher frequency and voltage may benefit overclocking capability but cause system instability.



## ⚠ Important

• *Overclocking your PC manually is only recommended for advanced users.*

• *Overclocking is not guaranteed, and if done improperly, it could void your warranty or severely damage your hardware.*

• *If you are unfamiliar with overclocking, we advise you to use Game Boost/ Creation Boost function or easy overclocking.*

• *The BIOS options and settings in Overclocking menu will vary from the motherboard you purchased. Please refer to the actual BIOS of your system for the BIOS settings and options.*

▸ **OC Explore Mode**

Selects the normal or expert mode of overclocking settings.

[Normal]        Provides the regular settings in overclocking menu.

[Expert]        Provides the advanced settings in overclocking menu.

▸ **MSI Performance Preset**

It provides various power limit controls for different usage scenarios.

▸ **Advanced CPU Configuration**

Press **Enter** to enter the sub-menu. User can set the parameters about CPU power/ current. The system may become unstable or un-bootable after changing the parameters. If it occurs, please clear the CMOS data and restore the default settings.

   ▸ **Extreme OC Setup**

   Sets the optimal BIOS setting for extreme overclocking.

‣ **Per Core Control**
Press **Enter** to enter the sub-menu.

‣ **Per P-Core Control**
Enables or disables every single P-core control.

‣ **P-Core 0**
Enables or disables the P-core 0.

‣ **P-Core 1**
Enables or disables the P-core 1.

‣ **P-Core 2**
Enables or disables the P-core 2.

‣ **P-Core 3**
Enables or disables the P-core 3.

‣ **P-Core 4**
Enables or disables the P-core 4.

‣ **P-Core 5**
Enables or disables the P-core 5.

‣ **P-Core 6**
Enables or disables the P-core 6.

‣ **P-Core 7**
Enables or disables the P-core 7.

‣ **Per E-Core Control**
Enables or disables every single E-core control.

‣ **E-Core 0**
Enables or disables the E-core 0.

‣ **E-Core 1**
Enables or disables the E-core 1.

‣ **E-Core 2**
Enables or disables the E-core 2.

‣ **E-Core 3**
Enables or disables the E-core 3.

‣ **E-Core 4**
Enables or disables the E-core 4.

‣ **E-Core 5**
Enables or disables the E-core 5.

‣ **E-Core 6**
Enables or disables the E-core 6.

‣ **E-Core 7**

Enables or disables the E-core 7.

▸ **Active P-Cores**

Allows you to select the number of active P-cores.

▸ **Active E-Cores**

Allows you to select the number of active E-cores.

▸ **Intel Adaptive Thermal Monitor**

Enables or disables the Intel adaptive thermal monitor function to protect the CPU from overheating.

[Enabled]      Throttles down the CPU core clock speed when the CPU is over the adaptive temperature.

[Disabled]     Disables this function.

▸ **Intel C-State**

Enables or disables the Intel C-state. C-state is a processor power management technology defined by ACPI.

[Auto]         This setting will be configured automatically by BIOS.

[Enabled]      Detects the idle state of system and reduce CPU power consumption accordingly.

[Disabled]     Disable this function.

▸ **C1E Support**

Enables or disables the C1E function for power-saving in halt state. This item appears when **Intel C-State** is enabled.

[Enabled]      Enables C1E function to reduce the CPU frequency and voltage for power-saving in halt state.

[Disabled]     Disables this function.

▸ **Package C State Limit**

This item allows you to select a CPU C-state level for power-saving when system is idle. The options of C-state depend on the installed CPU. This item appears when **Intel C-State** is enabled.

▸ **Intel Speed Shift Technology**

Enables or disables Intel Speed Shift Technology. It can optimize energy efficiency. This item is only available with the CPU that supports this technology.

▸ **EIST**

Enables or disables the Enhanced Intel® SpeedStep Technology.

[Enabled]      Enables the EIST to adjust CPU voltage and core frequency dynamically. It can decrease average power consumption and average heat production.

[Disabled]     Disables EIST.

▸ **Intel Turbo Boost**

Enables or disables the Intel® Turbo Boost. This item appears when a CPU that support **Turbo Boost** is installed.

[Enabled]      Enables this function to boost CPU performance automatically over specification when system request the highest performance state.

[Disabled]     Disables this function.

▸ **Enhanced Turbo**

Enables or disables turbo function for all CPU cores to boost the CPU performance.

▸ **Long Duration Power Limit (W)**

Sets the long duration TDP power limit for CPU in Turbo Boost mode.

▸ **Long Duration Maintained (s)**

Sets the maintaining time for Long duration power Limit(W).

▸ **Short Duration Power Limit (W)**

Sets the short duration TDP power limit for CPU in Turbo Boost mode.

▸ **CPU Current Limit (A)**

Sets maximum current limit of CPU package in Turbo Boost mode. When the current is over the specified value, the CPU will automatically reduce the core frequency for reducing the current.

▸ **CPU DLVR Control**

Enables or disables CPU DLVR (Digital Linear Voltage Regulator) control. Set Auto, BIOS will configure this setting automatically.

▸ **CPU Lite Load Control**

Sets the CPU Lite Load control mode.

▸ **CPU Lite Load**

Sets the CPU Lite Load mode. Higher mode loads the higher CPU voltage by user demand and Auto is recommended. This item appears when **CPU Lite Load Control** is set to **Normal**.

▸ **CPU AC Loadline**

Sets the CPU AC load-line value. A higher typically results in less voltage droop but may increase the risk of voltage overshoot. This item appears when **CPU Lite Load Control** is set to **Advanced**.

▸ **CPU Over Temperature Protection**

Sets the temperature limit of CPU for over-temperature protection. The CPU frequency may be throttled when CPU temperature is over the specified value. The higher temperature indicates less protection. When set to Auto, BIOS will configure this setting automatically.

▸ **CPU Ratio Extension**

Enables or disables the CPU ratio extension under LN2 conditions for CPU overclocking. When set to Auto, BIOS will configure this setting automatically.

▸ **CPU FLL OC Mode**

Sets CPU FLL OC mode for extreme overclocking.

▸ **TVB Ratio Clipping**

If enabled, the CPU core frequency will be reduced when the CPU temperature reaches the threshold with the TVB (Thermal Velocity Boost) feature. If disabled, the core frequency may be achieved higher when the temperature is high. This item appears when the installed CPU supports **TVB**.

▸ **TVB Voltage Optimizations**

Enables or disables the thermally based voltage optimization for the processor with TVB (Thermal Velocity Boost) feature. This item appears when the installed CPU supports **TVB**.

▸ **PVD Ratio Threshold For SOC**

Sets PVD ratio threshold for SOC to overclock the base clock.

▸ **PVD Mode select For SOC**

Sets PVD mode for SOC.

▸ **PVD Ratio Threshold For CPU**

Sets PVD ratio threshold for CPU to overclock the base clock.

▸ **PVD Mode select For CPU**

Sets PVD mode for CPU.

▸ **SA PLL Frequency**

Sets SA PLL frequency for BCLK overclocking.

▸ **Core HW Fixup During TSC Copy**

Enables or disables core hardware fix-up during TSC copy for BCLK overclocking.

▸ **IA CEP Support**

Enables or disables IA CEP (Current Excursion Protection) support.

▸ **GT CEP Support**

Enables or disables GT CEP (Current Excursion Protection) support.

▸ **SA CEP Support**

Enables or disables SA CEP (Current Excursion Protection) support.

▸ **IA SIRP Support**

Enables or disables IA SIRP (SoC Iccmax Reactive Protector) support.

▸ **DMI Link Speed**

Sets DMI speed Gen1/ Gen2/ Gen3/ Gen4.

▸ **P-Core Ratio Apply Mode**

Sets applied mode for P-Core ratio. This item only appears when a CPU that supports **Turbo Boost** is installed.

▸ **P-Core Ratio**

Sets the P-Core ratio that is used to determine CPU clock speed. This item only appears when **P-Core Ratio Apply Mode** set to **All Core**.

‣ **Min CPU Ratio**

Sets the minimum CPU ratio.

‣ **Adjusted CPU Frequency**

Shows the adjusted CPU frequency. Read-only. This item only appears when **P-Core Ratio Apply Mode** set to **All Core** or **Turbo Ratio**.

‣ **Numbers of P-Core Cores of Group 1**

Sets the number of P cores for group 1 to run the target value. The next group should be more than the former one in the P core number. This item only appears when **P-Core Ratio Apply Mode** set to **Turbo Ratio**.

‣ **Target P-Core Turbo Ratio Group 1**

Sets the target turbo ratio value for P-Core Group 1. The target ratio value should not be higher than the former one. This item only appears when **P-Core Ratio Apply Mode** set to **Turbo Ratio**.

‣ **Numbers of P-Core Cores of Group 2**

Sets the number of P cores for group 2 to run the target value. The next group should be more than the former one in the P core number. This item only appears when **P-Core Ratio Apply Mode** set to **Turbo Ratio**.

‣ **Target P-Core Turbo Ratio Group 2**

Sets the target turbo ratio value for P-Core Group 2. The target ratio value should not be higher than the former one. This item only appears when **P-Core Ratio Apply Mode** set to **Turbo Ratio**.

‣ **Numbers of P-Core Cores of Group 3**

Sets the number of P cores for group 3 to run the target value. The next group should be more than the former one in the P core number. This item only appears when **P-Core Ratio Apply Mode** set to **Turbo Ratio**.

‣ **Target P-Core Turbo Ratio Group 3**

Sets the target turbo ratio value for P-Core Group 3. The target ratio value should not be higher than the former one. This item only appears when **P-Core Ratio Apply Mode** set to **Turbo Ratio**.

‣ **Numbers of P-Core Cores of Group 4**

Sets the number of P cores for group 4 to run the target value. The next group should be more than the former one in the P core number. This item only appears when **P-Core Ratio Apply Mode** set to **Turbo Ratio**.

‣ **Target P-Core Turbo Ratio Group 4**

Sets the target turbo ratio value for P-Core Group 4. The target ratio value should not be higher than the former one. This item only appears when **P-Core Ratio Apply Mode** set to **Turbo Ratio**.

‣ **Numbers of P-Core Cores of Group 5**

Sets the number of P cores for group 5 to run the target value. The next group should be more than the former one in the P core number. This item only appears when **P-Core Ratio Apply Mode** set to **Turbo Ratio**.

▸ **Target P-Core Turbo Ratio Group 5**

Sets the target turbo ratio value for P-Core Group 5. The target ratio value should not be higher than the former one. This item only appears when **P-Core Ratio Apply Mode** set to **Turbo Ratio**.

▸ **Numbers of P-Core Cores of Group 6**

Sets the number of P cores for group 6 to run the target value.  The next group should be more than the former one in the P core number. This item only appears when **P-Core Ratio Apply Mode** set to **Turbo Ratio**.

▸ **Target P-Core Turbo Ratio Group 6**

Sets the target turbo ratio value for P-Core Group 6. The target ratio value should not be higher than the former one. This item only appears when **P-Core Ratio Apply Mode** set to **Turbo Ratio**.

▸ **Numbers of P-Core Cores of Group 7**

Sets the number of P cores for group 7 to run the target value. The next group should be more than the former one in the P core number. This item only appears when **P-Core Ratio Apply Mode** set to **Turbo Ratio**.

▸ **Target P-Core Turbo Ratio Group 7**

Sets the target turbo ratio value for P-Core Group 7. The target ratio value should not be higher than the former one. This item only appears when **P-Core Ratio Apply Mode** set to **Turbo Ratio**.

▸ **Numbers of P-Core Cores of Group 8**

Sets the number of P cores for group 8 to run the target value. The next group should be more than the former one in the P core number. This item only appears when **P-Core Ratio Apply Mode** set to **Turbo Ratio**.

▸ **Target P-Core Turbo Ratio Group 8**

Sets the target turbo ratio value for P-Core Group 8. The target ratio value should not be higher than the former one. This item only appears when **P-Core Ratio Apply Mode** set to **Turbo Ratio**.

▸ **Turbo Ratio Offset Value**

Sets the P core Turbo ratio offset value. This item only appears when **P-Core Ratio Apply Mode** set to **Turbo Ratio Offset**.

▸ **Per P-Core Ratio Limit**

If set to manual, you can set every single P-core ratio manually with the following items.

▸ **P-Core 0**

Sets the ratio for this single P-core if the CPU supports this function. The target speed of each single P core in favored index may varied by different CPU. This item only appears when **P-Core Ratio Limit** set to **Manual**.

▸ **P-Core 1**

Sets the ratio for this single P-core if the CPU supports this function. The target speed of each single P core in favored index may varied by different CPU. This item only appears when **P-Core Ratio Limit** set to **Manual**.

‣ **P-Core 2**

Sets the ratio for this single P-core if the CPU supports this function. The target speed of each single P core in favored index may varied by different CPU. This item only appears when **P-Core Ratio Limit** set to **Manual**.

‣ **P-Core 3**

Sets the ratio for this single P-core if the CPU supports this function. The target speed of each single P core in favored index may varied by different CPU. This item only appears when **P-Core Ratio Limit** set to **Manual**.

‣ **P-Core 4**

Sets the ratio for this single P-core if the CPU supports this function. The target speed of each single P core in favored index may varied by different CPU. This item only appears when **P-Core Ratio Limit** set to **Manual**.

‣ **P-Core 5**

Sets the ratio for this single P-core if the CPU supports this function. The target speed of each single P core in favored index may varied by different CPU. This item only appears when **P-Core Ratio Limit** set to **Manual**.

‣ **P-Core 6**

Sets the ratio for this single P-core if the CPU supports this function. The target speed of each single P core in favored index may varied by different CPU. This item only appears when **P-Core Ratio Limit** set to **Manual**.

‣ **P-Core 7**

Sets the ratio for this single P-core if the CPU supports this function. The target speed of each single P core in favored index may varied by different CPU. This item only appears when **P-Core Ratio Limit** set to **Manual**.

‣ **Per P-Core Granular Ratio**

Sets the P-Core granular ratio control mode. This item appears when the CPU support this function.

‣ **P-Core 0 current**

Sets the P-core 0 ratio to determine the current. This item only appears when **Per P-Core Granular** set to **Manual**.

‣ **P-Core 1 current**

Sets the P-core 1 ratio to determine the current. This item only appears when **Per P-Core Granular** set to **Manual**.

‣ **P-Core 2 current**

Sets the P-core 2 ratio to determine the current. This item only appears when **Per P-Core Granular** set to **Manual**.

‣ **P-Core 3 current**

Sets the P-core 3 ratio to determine the current. This item only appears when **Per P-Core Granular** set to **Manual**.

▸ **P-Core 4 current**

Sets the P-core 4 ratio to determine the current. This item only appears when **Per P-Core Granular** set to **Manual**.

▸ **P-Core 5 current**

Sets the P-core 5 ratio to determine the current. This item only appears when **Per P-Core Granular** set to **Manual**.

▸ **P-Core 6 current**

Sets the P-core 6 ratio to determine the current. This item only appears when **Per P-Core Granular** set to **Manual**.

▸ **P-Core 7 current**

Sets the P-core 7 ratio to determine the current. This item only appears when **Per P-Core Granular** set to **Manual**.

▸ **E-Core Ratio Apply Mode**

Sets applied mode for E-core ratio. This item only appears when a CPU that supports **E-Core** and **Turbo Boost** is installed.

▸ **E-Core Ratio**

Sets the E-Core ratio that is used to determine CPU clock speed. This item appears when the CPU support E-Core.

▸ **Adjusted E-Core Frequency**

Shows the adjusted CPU frequency. Read-only. This item appears when **E-Core Ratio Apply Mode** set to **All Core**.

▸ **Numbers of E-Core of Group 1**

Sets a number of E cores for group 1 to run target E-Core Turbo Ratio Group 1. The next group should be more than the former one in E core number. This item only appears when **E-Core Ratio Apply Mode** set to **Turbo Ratio**.

▸ **Target E-Core Turbo Ratio Group 1**

Sets the target E-Core Turbo ratio value for E-Core group 1. The target Turbo Ratio value should not be higher than the former one. This item only appears when **E-Core Ratio Apply Mode** set to **Turbo Ratio**.

▸ **Numbers of E-Core of Group 2**

Sets a number of E cores for a group 2 to run target E-Core Turbo Ratio Group 2. The next group should be more than the former one in E core number. This item only appears when **E-Core Ratio Apply Mode** set to **Turbo Ratio**.

▸ **Target E-Core Turbo Ratio Group 2**

Sets the target E-Core Turbo ratio value for E-Core group 2. The target Turbo Ratio value should not be higher than the former one. This item only appears when **E-Core Ratio Apply Mode** set to **Turbo Ratio**.

▸ **Numbers of E-Core of Group 3**

Sets a number of E cores for a group 3 to run target E-Core Turbo Ratio Group 3. The next group should be more than the former one in E core number. This item only appears when **E-Core Ratio Apply Mode** set to **Turbo Ratio**.

▸ **Target E-Core Turbo Ratio Group 3**

Sets the target E-Core Turbo ratio value for E-Core group 3. The target Turbo Ratio value should not be higher than the former one. This item only appears when **E-Core Ratio Apply Mode** set to **Turbo Ratio**.

▸ **Numbers of E-Core of Group 4**

Sets a number of E cores for a group 4 to run target E-Core Turbo Ratio Group 4. The next group should be more than the former one in E core number. This item only appears when **E-Core Ratio Apply Mode** set to **Turbo Ratio**.

▸ **Target E-Core Turbo Ratio Group 4**

Sets the target E-Core Turbo ratio value for E-Core group 4. The target Turbo Ratio value should not be higher than the former one. This item only appears when **E-Core Ratio Apply Mode** set to **Turbo Ratio**.

▸ **Numbers of E-Core of Group 5**

Sets a number of E cores for a group 5 to run target E-Core Turbo Ratio Group 5. The next group should be more than the former one in E core number. This item only appears when **E-Core Ratio Apply Mode** set to **Turbo Ratio**.

▸ **Target E-Core Turbo Ratio Group 5**

Sets the target E-Core Turbo ratio value for E-Core group 5. The target Turbo Ratio value should not be higher than the former one. This item only appears when **E-Core Ratio Apply Mode** set to **Turbo Ratio**.

▸ **Numbers of E-Core of Group 6**

Sets a number of E cores for a group 6 to run target E-Core Turbo Ratio Group 6. The next group should be more than the former one in E core number. This item only appears when **E-Core Ratio Apply Mode** set to **Turbo Ratio**.

▸ **Target E-Core Turbo Ratio Group 6**

Sets the target E-Core Turbo ratio value for E-Core group 6. The target Turbo Ratio value should not be higher than the former one. This item only appears when **E-Core Ratio Apply Mode** set to **Turbo Ratio**.

▸ **Numbers of E-Core of Group 7**

Sets a number of E cores for a group 7 to run target E-Core Turbo Ratio Group 7. The next group should be more than the former one in E core number. This item only appears when **E-Core Ratio Apply Mode** set to **Turbo Ratio**.

▸ **Target E-Core Turbo Ratio Group 7**

Sets the target E-Core Turbo ratio value for E-Core group 7. The target Turbo Ratio value should not be higher than the former one. This item only appears when **E-Core Ratio Apply Mode** set to **Turbo Ratio**.

▸ **Numbers of E-Core of Group 8**

Sets a number of E cores for a group 8 to run target E-Core Turbo Ratio Group 8. The next group should be more than the former one in E core number. This item only appears when **E-Core Ratio Apply Mode** set to **Turbo Ratio**.

▸ **Target E-Core Turbo Ratio Group 8**

Sets the target E-Core Turbo ratio value for E-Core group 8. The target Turbo Ratio value should not be higher than the former one. This item only appears when **E-Core Ratio Apply Mode** set to **Turbo Ratio**.

▸ **E-Core Turbo Ratio Offset Value**

Sets the E-core Turbo ratio offset value. This item only appears when **E-Core Ratio Apply Mode** set to **Turbo Ratio Offset**.

▸ **Per E-Core Ratio Limit**

If set to manual, you can set E-core ratio manually with the following items.

▸ **E-Core 0-3**

Sets the ratio for E core 0~3.

▸ **E-Core 4-7**

Sets the ratio for E core 4~7.

▸ **E-Core 8-11**

Sets the ratio for E core 8~11.

▸ **E-Core 12-15**

Sets the ratio for E core 12~15.

▸ **Per E-Core Granular Ratio**

Sets the E-Core granular ratio control mode. This item appears when the CPU support this function.

▸ **E-Core 0 current**

Sets the E-core 0 ratio to determine the current. This item only appears when **Per E-Core Granular** set to **Manual**.

▸ **E-Core 1 current**

Sets the E-core 1 ratio to determine the current. This item only appears when **Per E-Core Granular** set to **Manual**.

▸ **E-Core 2 current**

Sets the E-core 2 ratio to determine the current. This item only appears when **Per E-Core Granular** set to **Manual**.

▸ **E-Core 3 current**

Sets the E-core 3 ratio to determine the current. This item only appears when **Per E-Core Granular** set to **Manual**.

‣ **E-Core 4 current**

Sets the E-core 4 ratio to determine the current. This item only appears when **Per E-Core Granular** set to **Manual**.

‣ **E-Core 5 current**

Sets the E-core 5 ratio to determine the current. This item only appears when **Per E-Core Granular** set to **Manual**.

‣ **E-Core 6 current**

Sets the E-core 6 ratio to determine the current. This item only appears when **Per E-Core Granular** set to **Manual**.

‣ **E-Core 7 current**

Sets the E-core 7 ratio to determine the current. This item only appears when **Per E-Core Granular** set to **Manual**.

▸ **CPU Ratio Mode**

Selects the CPU Ratio operating mode. This item will appear when you set the CPU ratio manually.

[Fixed Mode]          Fixes the CPU ratio.
[Dynamic Mode]    CPU ratio will be changed dynamically according to the CPU loading.

‣ **+CPU AVX Control**

  ‣ **AVX Support**

  Enables or disables AVX (Advanced Vector Extensions) support.

  ‣ **CPU Ratio Offset When Running AVX**

  Sets a offset value to lower the CPU core ratio. It could be helpful for heat dissipation when running AVX instructions. When set to Auto, BIOS will configure this setting automatically. This item appears when the installed CPU and chipset support this function.

  ‣ **AVX Voltage Guardband Scale**

  Sets the extra voltage for fine-tuning CPU core voltage when running AVX.

‣ **Ring Ratio**

Sets the ring ratio. The valid value range depends on the installed CPU.

‣ **Min Ring Ratio**

Sets the minimum Ring ratio.

‣ **Adjusted Ring Frequency**

Shows the adjusted Ring frequency. Read-only.

‣ **GT Ratio**

Sets the integrated graphics ratio along with preset GT voltage. The valid value range depends on the installed CPU.

‣ **Adjusted GT Frequency**

Shows the adjusted integrated graphics frequency. Read-only.

‣ **NGU Ratio**

Sets the ratio of memory fabric in the CPU range from 6 to 63.

‣ **CPU D2D Ratio**

Sets the ratio between CPU dies range from 15 to 40.

‣ **CPU BCLK PLL Config**

Enables or disables the CPU Bask clock settings.

‣ **CPU Base Clock (MHz)**

Sets the CPU Base clock. You may overclock the CPU by adjusting this value. Please note that overclocking behavior and stability are not guaranteed. This item only appears when **CPU BCLK PLL Config** is set to **On-Internal OC PLL** and a CPU that supports this function is installed.

‣ **CPU Base Clock Apply Mode**

Sets the applying mode for adjusted CPU base clock.  This item only appears when **CPU BCLK PLL Config** set to **On-Internal OC PLL**.
[Auto]          This setting will be configured automatically by BIOS.
[Next Boot]    CPU will run the adjusted CPU base clock next boot.
[Immediate]    CPU runs the adjusted CPU base clock immediately.

‣ **SOC BCLK PLL Config**

Enables or disables the SOC Bask clock settings.

‣ **SOC Base Clock (MHz)**

Sets the SOC Base clock. This item only appears when **SOC BCLK PLL Config** set to **On-Internal OC PLL**.

‣ **SOC Base Clock Apply Mode**

Sets the applying mode for adjusted CPU base clock.  This item only appears when **SOC BCLK PLL Config** set to **On-Internal OC PLL**.
[Auto]          This setting will be configured automatically by BIOS.
[Next Boot]    SOC runs the adjusted SOC base clock next boot.
[Immediate]    SOC runs the adjusted SOC base clock immediately.

‣ **SOC Base Clock Offset**

Sets the offset value of SOC Base clock.

‣ **CPU PEG/DMI Clock (MHz)**

Sets the CPU PEG/ DMI clock.

‣ **Dashboard OC Button Control**

Enables or disables the dashboard OC button for real time overclocking.

‣ **Dashboard OC Button Step (MHz)**

Sets the increase/ decrease value for the base clock when the +/ - button is pressed each time.

‣ **Direct OC Button**

Enables or disables the direct OC button for real time overclocking.

‣ **Direct OC Step (MHz)**

Sets the increase/ decrease value for the base clock when the +/ - button is pressed each time.

‣ **Extreme Memory Profile (XMP)**

XMP (Extreme Memory Profile) is the overclocking technology by memory module. Please enable XMP or select a profile of the memory module for overclocking the memory. This item will be available when the memory modules that support **XMP** are installed.

‣ **iEXPO**

Selects and loads the memory profile containing the optimized timing and voltage settings.

‣ **CPU IMC : DRAM Clock**

Selects the DRAM gear type for CPU IMC (Integrated Memory Controller). This item appears when a CPU supporting this adjustment is installed.
[Gear 1]          Higher bandwidth and lower latency time.
[Gear 2]          Balance both of bandwidth and latency time.
[Gear 4]          Lower bandwidth and higher latency time.

‣ **DRAM Speed**

Sets the DRAM speed. Please note the overclocking behavior is not guaranteed.

‣ **Adjusted DRAM Speed**

Shows the adjusted DRAM speed. Read-only.

‣ **Load Memory Presets**

Load OC Memory presets will optimize the timing, voltage of installed memory module.

‣ **Memory Try It !**

It can improve memory compatibility or performance by choosing optimized memory preset. It is a more easy method to overclock memory.

‣ **Memory Extension Mode**

Selects the memory extension mode.

‣ **DRAM Timing Mode**

Selects the memory timing mode.
[Auto]            The setting will be configured automatically by BIOS.
[Link]            Allows user to configure the DRAM timing for all memory channel.
[UnLink]          Allows user to configure the DRAM timing for respective memory
                  channel.

▸ **Advanced DRAM Configuration**

Press Enter to enter the sub-menu. You can set the memory timing for each/ all memory channel. The system may become un-stable or un-bootable after changing memory timing. If it occurs, please clear the CMOS data and restore the default settings. Refer to the **Clear CMOS jumper/ button** section in motherboard user guide to clear the CMOS data, and enter the BIOS to load the default settings.

▸ **Memory Force**

It allows the BIOS setup menu to show the overclocking status of memory on the HELP window. The more the memory is overclocked, the shorter the bar will be.

▸ **XMP User Profile**

Press Enter to enter the sub-menu, and you can set the XMP memory profile manually.

▸ **SA GV**

Enables or disables the SAGV (System Agent Geyserville). SAGV can dynamically tune the memory frequencies according to the system conditions.

▸ **Dynamic Memory Boost**

Enables or disables the dynamic memory boost feature. MRC (Memory Reference Code) will train the default SPD profile, in addition to the selected XMP profile.

▸ **Realtime Memory Frequency**

Enables or disables the real-time memory frequency feature. MRC (Memory Reference Code) will train the default SPD profile, in addition to the selected XMP profile.

▸ **SPD Write Disable**

Enables or disables SPD write Disable For security recommendations, it is necessary to set the SPD write disable bit.

▸ **DRAM Training Configuration**

You can enable or disable the different DRAM training algorithms in this sub-menu. When set to Auto, BIOS will configure this setting automatically.

▸ **Training Mode**

Selects the DRAM training mode. When set to **Auto**, BIOS will configure this setting automatically.

▸ **DRAM PMIC Features**

▸ **VDD Current Limit**

Sets VDD current limit.

▸ **VDD High Current Threshold**

Sets VDD high current threshold.

▸ **VDD Switching Mode**

Sets VDD switching mode.

▸ **VDD Switching Frequency**
Sets VDD switching frequency.

▸ **VDDQ Current Limit**
Sets VDDQ current limit.

▸ **VDDQ High Current Threshold**
Sets VDDQ high current threshold.

▸ **VDDQ Switching Mode**
Sets VDDQ switching mode.

▸ **VDDQ Switching Frequency**
Sets VDDQ switching frequency.

▸ **VPP Current Limit**
Sets VPP current limit.

▸ **VPP High Current Threshold**
Sets VPP high current threshold.

▸ **VPP Switching Mode**
Sets VPP switching mode.

▸ **VPP Switching Frequency**
Sets VPP switching frequency.

▸ **High Temperature Threshold**
Sets High Temperature Threshold value.

▸ **Command Rate**
Sets the command rate.

▸ **tCL**
Sets the CAS (Column Address Strobe) latency time.

▸ **tRCD**
Sets the RAS to CAS delay time.

▸ **tRP**
Sets the row precharge time.

▸ **tRAS**
Sets the RAS (Row Address strobe) active time.

▸ **tRFC**
Sets the refresh to active/ refresh cycle time.

‣ **+Sub Timing Configuration**

‣ **tRFCPB**
Sets the refresh to active/ refresh cycle time per bank.

‣ **tREFI**
Sets the REFI time.

‣ **tWR**
Sets the write recover time.

‣ **tWTR**
Sets the write to read delay time.

‣ **tWTR_L**
Sets the internal write transaction to internal read command time .

‣ **tRRD**
Sets the RAS to RAS delay time.

‣ **tRRD_L**
Sets the RAS to RAS delay time in different bank of the same rank.

‣ **tRTP**
Sets read to precharge command delay time.

‣ **tFAW**
Sets the time window in which four activates are allowed the same rank.

‣ **tCWL**
Sets CAS write latency time.

‣ **tCKE**
Sets CKE minimum time.

‣ **tCCD**
Sets cycle command delay time from the same rank separation parameter.

‣ **tCCD_L**
Sets cycle command delay time from the same bank group separation parameter.

‣ **+Turn Around Timing Configuration**

‣ **Turn Around Timing Setting Mode**
Selects the memory turn around timing mode.

‣ **tRDRDSG**
Sets the read to read delay time between different rank separation parameter.

‣ **tRDRDDG**
Sets the read to read delay time between different module.

‣ **tRDRDDR**
Sets the read to read delay time between different rank separation parameter.

‣ **tRDRDDD**
Sets the read to read delay time between different module.

‣ **tWRWRSG**
Sets the write to write delay time between different rank separation parameter.

‣ **tWRWRDG**
Sets the write to write delay time between different module.

‣ **tWRWRDR**
Sets the write to write delay time between different rank separation parameter.

‣ **tWRWRDD**
Sets the write to write delay time between different module.

‣ **tRDWRSG**
Sets the read to write delay time between different rank separation parameter.

‣ **tRDWRDG**
Sets the read to write delay time between different module.

‣ **tRDWRDR**
Sets the read to write delay time between different rank separation parameter.

‣ **tRDWRDD**
Sets the read to write delay time between different module.

‣ **tWRRDSG**
Sets the write to read delay time between different rank separation parameter.

‣ **tWRRDDG**
Sets the write to read delay time between different module.

‣ **tWRRDDR**
Sets the write to read delay time between different rank separation parameter.

‣ **tWRRDDD**
Sets the write to read delay time between different module.

‣ **+Advanced Timing Configuration**

‣ **tWPRE**
Sets the tWPRE time.

‣ **tRPRE**
Sets the tRPRE time.

‣ **tWRPRE**
Sets the tWRPRE time.

‣ **tRDPRE**
Sets the tRDPRE time.

‣ **tPPD**
Sets the tPPD time.

‣ **tXG**
Sets the tXG time.

‣ **tXP**
Sets the tXP time.

‣ **tPRPDEN**
Sets the tPRPDEN time.

‣ **tRDPDEN**
Sets the tRDPDEN time.

‣ **tWRPDEN**
Sets the tWRPDEN time.

‣ **tCPDED**
Sets the tCPDED time.

‣ **tREFIx9**
Sets the tREFIx9 time.

‣ **tXSDLL**
Sets the tXSDLL time.

‣ **tMOD**
Sets the tMOD time.

‣ **tZQCS**
Sets the tZQCS time.

‣ **tZQCAL**
Sets the tZQCAL time.

‣ **tXSR**
Sets the tXSR time.

‣ **tREFSBRD**
Sets the tREFSBRDS time.

‣ **tCSH**
Sets the tCSH time.

‣ **tCSL**
Sets the tCSL time.

‣ **tCA2CS**
Sets the tCA2CS time.

‣ **tCKCKEH**
Sets the tCKCKEH time.

‣ **tRFM**
Sets the tRFM time.

‣ **OREFRI**
Sets the OREFRI time.

‣ **+Misc Item**

‣ **Safe Boot Retry**
Enables this item to meet the best memory compatibility while booting.

‣ **Stop And Go Training**
Enables or disables stop and go training.

‣ **Divide Memory Timing**
Enables or disables divide the memory timing. Set Auto/ Enabled, memory timing will be auto-divided when speeds exceed 9600.

‣ **Memory Bandwidth Enhanced**
Enables or disables the memory bandwidth enhanced mode.

‣ **VTT ODT**
Enables or disables the VTT ODT function.

‣ **Enhanced Interleave**
Enables or disables the Enhanced Interleave support.

‣ **Drv Vref Configuration**

‣ **DQ ODT Verf Up**
Sets the DRAM ODT Vref (Voltage reference) up time.

‣ **DQ ODT Verf Dn**
Sets the DRAM ODT Vref (Voltage reference) down time.

‣ **DQ Drv Verf Up**
Sets the DRAM drive strength Vref (Voltage reference) up time.

‣ **DQ Drv Verf Dn**
Sets the DRAM drive strength Vref (Voltage reference) down time.

‣ **CMD Drv Vref Up**
Sets the CMD drive Vref (Voltage reference) up time.

‣ **CMD Drv Vref Dn**
Sets the commend drive Vref (Voltage reference) down time.

‣ **CTL Drv Vref Up**
Sets the CTL drive Vref (Voltage reference) up time.

‣ **CTL Drv Vref Dn**
Sets the CTL drive Vref (Voltage reference) down time.

‣ **CLK Drv Vref Up**
Sets the CLK drive Vref (Voltage reference) up time.

‣ **CLK Drv Vref Dn**
Sets the CLK drive Vref (Voltage reference) down time.

‣ **+On-Die Termination Configuration**

‣ **ODT Setting mode**
Select the setting mode for On-Die Termination configuration.

‣ **DIMMB1**

‣ **Rtt Wr (CH1/D0)**
Sets ODT RTT_WR for DIMMB1 slot.

‣ **Rtt Nom Rd(CH1/D0)**
Sets ODT RTT_NOM_RD time for DIMMB1 slot.

‣ **Rtt Nom Wr(CH1/D0)**
Sets ODT RTT_NOM_WR time for DIMMB1 slot.

‣ **Rtt Park (CH1/D0)**
Sets ODT RTT_PARK for DIMMB1 slot.

‣ **Rtt Park Dqs (CH1/D0)**
Sets ODT RTT_PARK DQS for DIMMB1 slot.

‣ **DIMMB2**

‣ **Rtt Wr (CH1/D01)**
Sets ODT RTT_WR for DIMMB2 slot.

‣ **Rtt Nom Rd(CH1/D1)**
Sets ODT RTT_NOM_RD time for DIMMB2 slot.

‣ **Rtt Nom Wr(CH1/D1)**
Sets ODT RTT_NOM_WR time for DIMMB2 slot.

‣ **Rtt Park (CH1/D1)**
Sets ODT RTT_PARK for DIMMB2 slot.

‣ **Rtt Park Dqs (CH1/D1)**
Sets ODT RTT_PARK DQS for DIMMB2 slot.

‣ **DIMMA1**

‣ **Rtt Wr (CH0/D0)**
Sets ODT RTT_WR for DIMMA1 slot.

‣ **Rtt Nom Rd(CH0/D0)**
Sets ODT RTT_NOM_RD time for DIMMA1 slot.

‣ **Rtt Nom Wr(CH0/D0)**
Sets ODT RTT_NOM_WR time for DIMMA1 slot.

‣ **Rtt Park (CH0/D0)**
Sets ODT RTT_PARK for DIMMA1 slot.

‣ **Rtt Park Dqs (CH0/D0)**
Sets ODT RTT_PARK DQS for DIMMA1 slot.

‣ **DIMMA2**

‣ **Rtt Wr (CH0/D1)**
Sets ODT RTT_WR for DIMMA2.

‣ **Rtt Nom Rd(CH0/D1)**
Sets ODT RTT_NOM_RD time for DIMMA2 slot.

‣ **Rtt Nom Wr(CH0/D1)**
Sets ODT RTT_NOM_WR time for DIMMA2 slot.

‣ **Rtt Park (CH0/D1)**
Sets ODT RTT_PARK for DIMMA2 slot.

‣ **Rtt Park Dqs (CH0/D1)**
Sets ODT RTT_PARK DQS for DIMMA2 slot.

‣ **+On-Die Termination Configuration**

‣ **ODT Setting mode**
Select the setting mode for On-Die Termination configuration.

‣ **DIMMB1**

‣ **Rtt Wr (CH1/D0)**
Sets ODT RTT_WR for DIMMB1 slot.

‣ **Rtt Nom Rd(CH1/D0)**
Sets ODT RTT_NOM_RD time for DIMMB1 slot.

‣ **Rtt Nom Wr(CH1/D0)**
Sets ODT RTT_NOM_WR time for DIMMB1 slot.

‣ **Rtt Park (CH1/D0)**
Sets ODT RTT_PARK for DIMMB1 slot.

‣ **Rtt Park Dqs (CH1/D0)**
Sets ODT RTT_PARK DQS for DIMMB1 slot.

‣ **DIMMB2**

‣ **Rtt Wr (CH1/D01)**
Sets ODT RTT_WR for DIMMB2 slot.

‣ **Rtt Nom Rd(CH1/D1)**
Sets ODT RTT_NOM_RD time for DIMMB2 slot.

‣ **Rtt Nom Wr(CH1/D1)**
Sets ODT RTT_NOM_WR time for DIMMB2 slot.

‣ **Rtt Park (CH1/D1)**
Sets ODT RTT_PARK for DIMMB2 slot.

‣ **Rtt Park Dqs (CH1/D1)**
Sets ODT RTT_PARK DQS for DIMMB2 slot.

‣ **DIMMA1**

‣ **Rtt Wr (CH0/D0)**
Sets ODT RTT_WR for DIMMA1 slot.

‣ **Rtt Nom Rd(CH0/D0)**
Sets ODT RTT_NOM_RD time for DIMMA1 slot.

‣ **Rtt Nom Wr(CH0/D0)**
Sets ODT RTT_NOM_WR time for DIMMA1 slot.

‣ **Rtt Park (CH0/D0)**
Sets ODT RTT_PARK for DIMMA1 slot.

‣ **Rtt Park Dqs (CH0/D0)**
Sets ODT RTT_PARK DQS for DIMMA1 slot.

‣ **DIMMA2**

‣ **Rtt Wr (CH0/D1)**
Sets ODT RTT_WR for DIMMA2.

‣ **Rtt Nom Rd(CH0/D1)**
Sets ODT RTT_NOM_RD time for DIMMA2 slot.

‣ **Rtt Nom Wr(CH0/D1)**
Sets ODT RTT_NOM_WR time for DIMMA2 slot.

‣ **Rtt Park (CH0/D1)**
Sets ODT RTT_PARK for DIMMA2 slot.

‣ **Rtt Park Dqs (CH0/D1)**
Sets ODT RTT_PARK DQS for DIMMA2 slot.

‣ **+On-Die Termination Configuration 2**

‣ **DIMMB1**

‣ **CA ODT (CH1/D0/ GA)**
Sets CA ODT for DIMMB1 slot.

‣ **CS ODT (CH1/D0/ GA)**
Sets CS ODT for DIMMB1 slot.

‣ **CK ODT (CH1/D0/ GA)**
Sets CK ODT for DIMMB1 slot.

‣ **CA ODT (CH1/D0/ GB)**
Sets CA ODT for DIMMB1 slot.

‣ **CS ODT (CH1/D0/ GB)**
Sets CS ODT for DIMMB1 slot.

‣ **CK ODT (CH1/D0/ GB)**
Sets CK ODT for DIMMB1 slot.

‣ **DIMMB2**

‣ **CA ODT (CH1/D1/ GA)**
Sets CA ODT for DIMMB2 slot.

‣ **CS ODT (CH1/D1/ GA)**
Sets CS ODT for DIMMB2 slot.

‣ **CK ODT (CH1/D1/ GA)**
Sets CK ODT for DIMMB2 slot.

‣ **CA ODT (CH1/D1/ GB)**
Sets CA ODT for DIMMB2 slot.

‣ **CS ODT (CH1/D1/ GB)**
Sets CS ODT for DIMMB2 slot.

‣ **CK ODT (CH1/D1/ GB)**
Sets CK ODT for DIMMB2 slot.

‣ **DIMMA1**

‣ **CA ODT (CH0/D0/ GA)**
Sets CA ODT for DIMMA1 slot.

‣ **CS ODT (CH0/D0/ GA)**
Sets CS ODT for DIMMA1 slot.

‣ **CK ODT (CH0/D0/ GA)**
Sets CK ODT for DIMMA1 slot.

‣ **CA ODT (CH0/D0/ GB)**
Sets CA ODT for DIMMA1 slot.

‣ **CS ODT (CH0/D0/ GB)**
Sets CS ODT for DIMMA1 slot.

‣ **CK ODT (CH0/D0/ GB)**
Sets CK ODT for DIMMA1 slot.

‣ **DIMMA2**

‣ **CA ODT (CH0/D1/ GA)**
Sets CA ODT for DIMMA2 slot.

‣ **CS ODT (CH0/D1/ GA)**
Sets CS ODT for DIMMA2 slot.

‣ **CK ODT (CH0/D1/ GA)**
Sets CK ODT for DIMMA2 slot.

‣ **CA ODT (CH0/D1/ GB)**
Sets CA ODT for DIMMA2 slot.

‣ **CS ODT (CH0/D1/ GB)**
Sets CS ODT for DIMMA2 slot.

‣ **CK ODT (CH0/D1/ GB)**
Sets CK ODT for DIMMA2 slot.

‣ **+Power Down Control**

‣ **Power Down Mode**
Enables of disables power down mode.

‣ **Min PDWN Idle Counter**
Sets minimum power down idle counter.

‣ **Max PDWN Idle Counter**

Sets maximum power down idle counter.

‣ **APD**

Sets APD time.

‣ **PPD**

Sets PPD time.

‣ **Global PD**

Sets global PD time.

‣ **Memory Fast Boot**

Enables or disables the initiation and training for memory every booting.

[Auto]         The setting will be configured automatically by BIOS.

[Enabled]      System will completely keep the archives of first intiation and training for memory. And then the memory will not be initialed and trained when booting to accelerate the system booting time.

[Disabled]     The memory will be initialed and trained every booting.

[No Training]  The memory will not be trained every booting.

[SlowTraining] The memory will be trained every booting.

‣ **DigitALL PWN Features**

Press Enter to enter the sub-menu. In the sub-menu, you can setup some protecting conditions about voltage/ current/ temputure for CPU.

‣ **Core Loadline Calibration Control**

The core voltage will decrease proportionally according to CPU loading. Higher load-line calibration could get higher voltage and good overclocking performance, but increase the temperatures of the CPU and VRM. If set to **Auto**, BIOS will configure this setting automatically.

‣ **Core Loadline Saturation Control**

Enables or disables core loadline saturation control. If set to **Auto**, BIOS will configure this setting automatically.

‣ **Core Loadline Saturation level(A)**

Sets the core loadline saturation level. If set to **Auto**, BIOS will configure this setting automatically.

‣ **Core Over Voltage Protection**

Sets the value for core over-voltage protection. If set to **Auto**, BIOS will configure this setting automatically. Higher voltage provides less protection and may damage the system.

‣ **Core Over Current Protection**

Enables the core over current protection.

[Auto]         This setting will be configured automatically by BIOS.

[Enhanced]     Extends the current range for over-current protection.

▸ **Core Switching Frequency**

Sets the PWM working speed to stabilize core voltage and minimize ripple range. Increasing the PWM working speed will cause higher temperature of MOSFET. So please make sure a cooling solution is well-prepared for MOSFET before you increase the value. If set to Auto, BIOS will configure this setting automatically.

▸ **Core VRM Over Temperature Protection**

Enables or disables the core VRM over temperature protection.

▸ **GT Loadline Calibration Control**

The voltage of the GPU embedded in CPU will decrease proportionally according to GPU loading. Higher load-line calibration could get higher voltage and good overclocking performance, but increase the temperature of the CPU and VRM.

▸ **GT Over Voltage Protection**

Sets the value for GPU over-voltage protection. If set to **Auto**, BIOS will configure this setting automatically. Higher voltage provides less protection and may damage the system.

▸ **GT Over Current Protection**

Enables the GPU over current protection.

[Auto]        This setting will be configured automatically by BIOS.

[Enhanced]    Extends the current range for over-current protection.

▸ **GT Switching Frequency**

Sets the PWM working speed to stabilize CPU GT voltage and minimize ripple range. Increasing the PWM working speed will cause higher temperature of MOSFET. So please make sure a cooling solution is well-prepared for MOSFET before you increase the value. If set to **Auto**, BIOS will configure this setting automatically.

▸ **GT VRM Over Temperature Protection**

Enables or disables the GPU VRM over temperature protection.

▸ **SA Loadline Calibration Control**

The SA voltage will decrease proportionally according to SA loading. Higher load-line calibration could get higher voltage and good overclocking performance, but increase the temperature of the CPU and VRM.

▸ **Voltage Related Controls**

Press Enter to enter the sub-menu.

▸ **CPU Under Voltage Protection**

Enables or disables CPU under voltage protection.

▸ **CPU High Voltage Protection (VMAX Limit)**

Enables or disables CPU high voltage protection.

▸ **CPU P-Core Voltage Limit**

Sets the value of the CPU P-core voltage limit.

‣ **CPU E-Core Voltage Limit**
Sets the value of the CPU E-core voltage limit.

‣ **CPU Ring Voltage Limit**
Sets the value of the CPU ring voltage limit.

‣ **SOC SA Voltage Limit**
Sets the value of the SOC SA voltage limit.

‣ **SOC NGU Voltage Limit**
Sets the value of the SOC NGU voltage limit.

‣ **CPU GT Voltage Limit**
Sets the value of the CPU GT voltage limit.

‣ **CPU VR Voltage Limit**
Sets the value of the CPU VR voltage limit.

‣ **GT VR Voltage Limit**
Sets the value of the GT VR voltage limit.

‣ **SA VR Voltage Limit**
Sets the value of the SA VR voltage limit.

‣ **VCC Core Voltage Mode**
Sets the VCC Core voltage mode.
[Auto]             This setting will be configured automatically by BIOS.
[Override]         Allows you to set the voltage manually.
[Offset Mode]      Allows you to set offset voltage.

‣ **VCC Core Voltage**
Sets the VCC core voltage. If set to **Auto**, BIOS will set these voltages automatically or you can set it manually.

‣ **VCC Core Voltage Offset Mode**
Selects the VCC Core voltage offset mode.

‣ **CPU Core Voltage Offset**
Sets the offset value for VCC core voltage.

‣ **CPU Core Voltage Apply Mode**
Sets applied mode for CPU Core voltage.

‣ **CPU Core Voltage Mode**

Sets the CPU core voltage mode to adapt to varying CPU loads. This item appears when the motherboard and the CPU support this function.

[Auto]              This setting will be configured automatically by BIOS.
[Adaptive Mode]     Sets the adaptive voltage automatically for optimizing the system performance.
[Override Mode]     Allows you to set the voltage manually.
[Offset Mode]       Allows you to set the offset voltage and select the voltage offset mode.
[Adaptive + Offset] Sets the adaptive voltage automatically and allows you to set the offset voltage.
[Advanced Offset]   Allows you to set the voltage and the offset voltage in the sub-menu manually.

‣ **CPU Core Voltage**

Sets the CPU core voltage. If set to **Auto**, BIOS will set these voltages automatically or you can set it manually.

‣ **CPU Core Voltage Offset Mode**

Selects the CPU Core voltage offset mode.

‣ **CPU Core Voltage Offset**

Sets the offset value for CPU core voltage.

‣ **Advanced Offset Mode**

Press Enter to enter the sub-menu.

   ‣ **Set Voltage Offset When Running CPU Ratio x8**

   ‣ **Voltage Offset Control**
   Selects the voltage offset mode.

   ‣ **Voltage Offset Target**
   Sets the offset value.

   ‣ **Set Voltage Offset When Running CPU Ratio x25**

   ‣ **Voltage Offset Control**
   Selects the voltage offset mode.

   ‣ **Voltage Offset Target**
   Sets the offset value.

   ‣ **Set Voltage Offset When Running CPU Ratio x35**

   ‣ **Voltage Offset Control**
   Selects the voltage offset mode.

   ‣ **Voltage Offset Target**
   Sets the offset value.

‣ **Set Voltage Offset When Running CPU Ratio x43**

‣ **Voltage Offset Control**
Selects the voltage offset mode.

‣ **Voltage Offset Target**
Sets the offset value.

‣ **Set Voltage Offset When Running CPU Ratio x48**

‣ **Voltage Offset Control**
Selects the voltage offset mode.

‣ **Voltage Offset Target**
Sets the offset value.

‣ **Set Voltage Offset When Running CPU Ratio x50**

‣ **Voltage Offset Control**
Selects the voltage offset mode.

‣ **Voltage Offset Target**
Sets the offset value.

‣ **Set Voltage Offset When Running CPU Ratio x51**

‣ **Voltage Offset Control**
Selects the voltage offset mode.

‣ **Voltage Offset Target**
Sets the offset value.

‣ **CPU E-Core Voltage Mode**
Sets the CPU E-core voltage mode to adapt to varying CPU loads. This item appears when the motherboard and the CPU support this function.

| | |
|---|---|
| [Auto] | This setting will be configured automatically by BIOS. |
| [Adaptive Mode] | Sets the adaptive voltage automatically for optimizing the system performance. |
| [Override Mode] | Allows you to set the voltage manually. |
| [Offset Mode] | Allows you to set the offset voltage and select the voltage offset mode. |
| [Adaptive + Offset] | Sets the adaptive voltage automatically and allows you to set the offset voltage. |
| [Advanced Offset] | Allows you to set the voltage and the offset voltage in the sub-menu manually. |

‣ **CPU E-Core Voltage**
Sets the CPU E-core voltage. If set to **Auto**, BIOS will set these voltages automatically or you can set it manually.

‣ **CPU E-Core Voltage Offset Mode**

Selects the CPU E-Core voltage offset mode.

‣ **CPU E-Core Voltage Offset**

Sets the offset value for CPU E-core voltage.

‣ **Advanced Offset Mode For CPU E-Core**

Press Enter to enter the sub-menu.

‣ **CPU Ring Voltage Mode**

Sets the CPU ring voltage mode.

‣ **CPU Ring Voltage**

Sets the CPU ring voltage. If set to **Auto**, BIOS will set these voltages automatically or you can set it manually.

‣ **CPU Ring Voltage Offset Mode**

Selects the CPU ring voltage offset mode.

‣ **CPU Ring Voltage Offset**

Sets the offset value for CPU ring voltage.

‣ **Advanced Offset Mode For CPU Ring**

Press Enter to enter the sub-menu.

‣ **VCC SA Voltage Mode**

Sets the VCC SA voltage mode.

‣ **VCC SA Voltage**

Sets the VCC SA voltage. If set to **Auto**, BIOS will set these voltages automatically or you can set it manually.

‣ **VCC SA Voltage Offset Mode**

Selects the VCC SA voltage offset mode.

‣ **VCC SA Voltage Offset**

Sets the offset value for VCC SA voltage.

‣ **SOC SA Voltage Mode**

Sets the SOC SA voltage mode.

‣ **SOC SA Voltage**

Sets the SOC SA voltage. If set to **Auto**, BIOS will set these voltages automatically or you can set it manually.

‣ **SOC NGU/SA Voltage Mode**

Sets the SOC NGU/SA voltage mode.

‣ **SOC NGU Voltage**

Sets the SOC NGU voltage. If set to **Auto**, BIOS will set these voltages automatically or you can set it manually.

‣ **SOC NGU Voltage Offset Mode**

Selects the SOC NGU voltage offset mode.

‣ **SOC NGU Voltage Offset**

Sets the offset value for SOC NGU voltage.

‣ **Advanced Offset Mode For SOC NGU**

Press Enter to enter the sub-menu.

‣ **VCC GT Voltage Mode**

Sets the VCC GT voltage mode.

‣ **VCC GT  Voltage**

Sets the VCC GT voltage. If set to **Auto**, BIOS will set these voltages automatically or you can set it manually.

‣ **VCC GT  Voltage Offset Mode**

Selects the VCC GT voltage offset mode.

‣ **VCC GT  Voltage Offset**

Sets the offset value for VCC GT voltage.

‣ **CPU GT Voltage Mode**

Sets the CPU GT voltage mode.

‣ **CPU GT Voltage**

Sets the CPU GT voltage. If set to **Auto**, BIOS will set these voltages automatically or you can set it manually.

‣ **CPU GT Voltage Offset Mode**

Selects the CPU GT voltage offset mode.

‣ **CPU GT Voltage Offset**

Sets the offset voltage for CPU GT voltage.

‣ **Advanced Offset Mode CPU GT**

Press Enter to enter the sub-menu.

‣ **CPU VNNAON Voltage**

Sets the CPU VNNAON voltage. If set to **Auto**, BIOS will set these voltages automatically or you can set it manually.

‣ **CPU VDD2 Voltage**

Sets the CPU VDD2 voltage. If set to **Auto**, BIOS will set these voltages automatically or you can set it manually.

‣ **CPU IO Voltage**

Sets the CPU IO voltage. If set to **Auto**, BIOS will set these voltages automatically or you can set it manually.

▸ **CPU PROC 1.8 Voltage**

Sets the CPU PROC 1.8  voltage. If set to **Auto**, BIOS will set these voltages automatically or you can set it manually.

▸ **CPU SOC 1.8 Voltage**

Sets the CPU SOC 1.8  voltage. If set to **Auto**, BIOS will set these voltages automatically or you can set it manually.

▸ **CPU DDR 1.8 Voltage**

Sets the CPU DDR 1.8  voltage. If set to **Auto**, BIOS will set these voltages automatically or you can set it manually.

▸ **DRAM High Voltage Mode**

Enables or disables the DRAM high voltage mode. This is a non-standard method for adjusting the voltage output of a PMIC and may lead to instability and damage to the device.

▸ **DRAM Voltage Mode**

Selects the DRAM voltage mode.
[Link]          Allows you to configure the DRAM voltage for all memory channels.
[UnLink]        Allows you to configure the DRAM voltage for the respective memory channel.

▸ **DRAM Voltage**

Sets the DRAM voltage for all memory channels. If set to **Auto**, BIOS will set these voltages automatically or you can set it manually.

▸ **DRAM DIMMB1 Voltage**

Sets the DRAM DIMMB1 voltage separately. If set to **Auto**, BIOS will set these voltages automatically or you can set it manually.

▸ **DRAM DIMMB2 Voltage**

Sets the DRAM DIMMB2 voltage separately. If set to **Auto**, BIOS will set these voltages automatically or you can set it manually.

▸ **DRAM DIMMA1 Voltage**

Sets the DRAM DIMMA1 voltage separately. If set to **Auto**, BIOS will set these voltages automatically or you can set it manually.

▸ **DRAM DIMMA2 Voltage**

Sets the DRAM DIMMA2 voltage separately. If set to **Auto**, BIOS will set these voltages automatically or you can set it manually.

▸ **DRAM VDDQ Voltage**

Sets the DRAM VDDQ voltage. If set to **Auto**, BIOS will set these voltages automatically or you can set it manually.

‣ **DRAM DIMMB1 VDDQ Voltage**

Sets the DRAM VDDQ voltage for DIMMB1 slot. If set to **Auto**, BIOS will set these voltages automatically or you can set it manually.

‣ **DRAM DIMMB2 VDDQ Voltage**

Sets the DRAM VDDQ voltage for DIMMB2 slot. If set to **Auto**, BIOS will set these voltages automatically or you can set it manually.

‣ **DRAM DIMMA1 VDDQ Voltage**

Sets the DRAM VDDQ voltage for DIMMA1 slot. If set to **Auto**, BIOS will set these voltages automatically or you can set it manually.

‣ **DRAM DIMMA2 VDDQ Voltage**

Sets the DRAM VDDQ voltage for DIMMA2 slot. If set to **Auto**, BIOS will set these voltages automatically or you can set it manually.

‣ **DRAM VPP Voltage**

Sets the DRAM VPP voltage. If set to **Auto**, BIOS will set these voltages automatically or you can set it manually.

‣ **DRAM DIMMB1 VPP Voltage**

Sets the DRAM VPP voltage for DIMMB1 slot. If set to **Auto**, BIOS will set these voltages automatically or you can set it manually.

‣ **DRAM DIMMB2 VPP Voltage**

Sets the DRAM VPP voltage for DIMMB2 slot. If set to **Auto**, BIOS will set these voltages automatically or you can set it manually.

‣ **DRAM DIMMA1 VPP Voltage**

Sets the DRAM VPP voltage for DIMMA1 slot. If set to **Auto**, BIOS will set these voltages automatically or you can set it manually.

‣ **DRAM DIMMA2 VPP Voltage**

Sets the DRAM VPP voltage for DIMMA2 slot. If set to **Auto**, BIOS will set these voltages automatically or you can set it manually.

‣ **PLL Trim Controls**

Press Enter to enter the sub-menu.

    ‣ **P-Core PLL Trim Voltage Offset**
    Sets the offset value for P-core PLL voltage.

    ‣ **Ring PLL Trim Voltage Offset**
    Sets the offset value for Ring PLL voltage.

    ‣ **SOC SA PLL Trim Voltage Offset**
    Sets the offset value for SOC SA PLL voltage.

    ‣ **E-Core PLL Trim Voltage Offset**
    Sets the offset value for E-core PLL voltage.

‣ **MC PLL Trim Voltage Offset**

Sets the offset value for MC PLL voltage.

‣ **CPU SA PLL Trim Voltage Offset**

Sets the offset value for CPU SA PLL voltage.

‣ **P-Core PLL IREF Tune Offset**

Sets the offset value for P-core PLL IREF voltage.

‣ **E-Core PLL IREF Tune Offset**

Sets the offset value for E-core PLL IREF voltage.

▸ **Memory OC Retry Count**

Sets the number of memory overclocking retry attempts. If memory overclocking fails after the specified number of retries, the system will boot using the last successful memory settings.

▸ **CPU Memory Changed Detect**

Enables or disables the system to issue a warning message during boot when the CPU or memory has been replaced.

[Enabled]       The system will issue a warning message during boot and then you have to load the default settings for new devices.

[Disabled]      Disables this function and keeps the current BIOS settings.

▸ **OC Quick View Timer**

Sets the duration of OC setting values showN on the screen. If set to **Disabled**,  BIOS will not show the variations of OC setting.

▸ **CPU Specifications**

Press **Enter** to enter the sub-menu. This sub-menu displays the information of installed CPU. You can also access this information menu at any time by pressing **F4**. Read only.

‣ **CPU Technology Support**

Press **Enter** to enter the sub-menu. The sub-menu shows the key features of installed CPU. Read only.

▸ **MEMORY-Z**

Press **Enter** to enter the sub-menu. This sub-menu displays all the settings and timings of installed memory. You can also access this information menu at any time by pressing **F5**.

‣ **DIMMx Memory SPD**

Press Enter to enter the sub-menu. The sub-menu displays the information of installed memory. Read only.

‣ **CPU Features**

Press **Enter** to enter the sub-menu.

    ‣ **Limit CPUID Maximum**

Enables or disables the extended CPUID value.

[Enabled]      BIOS limits the maximum CPUID input value to circumvent boot problems with older operating system that do not support the processor with extended CPUID value.

[Disabled]     Use the actual maximum CPUID input value.

    ‣ **Intel Virtualization Tech**

Enables or disables Intel Virtualization technology.

[Enabled]      Enables Intel Virtualization technology and allows a platform to run multiple operating systems in independent partitions. The system can function as multiple systems virtually.

[Disabled]     Disables this function.

    ‣ **Intel VT-D Tech**

Enables or disables Intel VT-D (Intel Virtualization for Directed I/O) technology.

    ‣ **Control IOMMU Pre-boot Behavior**

Enables or disables the IOMMU (I/O Memory Management Unit) in the pre-boot environment. This item is available when the **Intel VT-D** is set to **Enabled**.

    ‣ **DMA Control Guarantee**

Enables or disables the DMA (Direct Memory Access) control guarantee. This item is available when the **Intel VT-D** sets to **Enabled**.

    ‣ **CPU AES Instructions**

Enables or disables the CPU AES (Advanced Encryption Standard-New Instructions) support. This item appears when a CPU supports this function.

    ‣ **CFG Lock**

Lock or un-lock the MSR 0xE2[15], CFG lock bit.

[Enabled]      Locks the CFG lock bit.

[Disabled]     Un-locks the CFG lock bit.

    ‣ **Intel Dynamic Tuning Technology**

Enables or disables the Intel Dynamic Tuning technology.

    ‣ **Total Memory Encryption**

Enables or disables Total Memory Encryption (TME), which protects the diverse data stored in the DRAM from hardware attacks.

    ‣ **NPU Device**

Enables or disables NPU (Neural Processing Unit) device.

# Security

Use this menu to set the administrator password and the user password for system security. This menu also allows you to set the TPM (Trusted Platform Module) function.
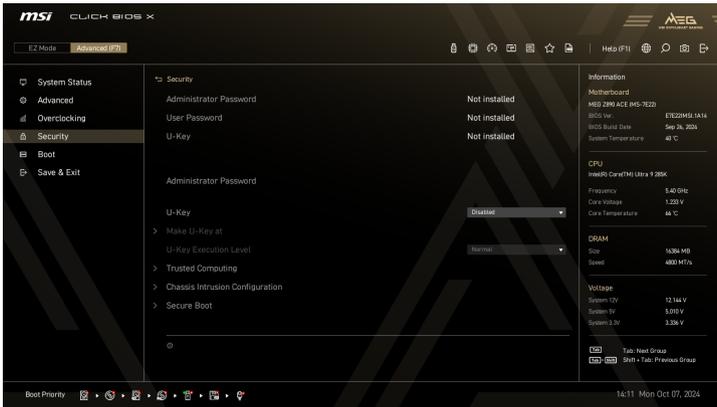


▶ **Administrator Password**

Sets administrator password for system security. User has full rights to change the BIOS items with administrator password. After setting the administrator password, the state of this item will show Installed.

▶ **User Password**

Sets User Password for system security. User has limited rights to change the BIOS items with user password. This item will be available when administrator password is set. After setting the user password, the state of this item will show Installed.

▶ **Password Check**

Selects a condition that will request the password.

[Setup]          A password will be requested for entering the BIOS Setup.

[Boot]           A password will be requested for booting the system.

▶ **Password Protection**

To maintain flexibility in password management, set the password protection to **Normal** to allow password removal via a CMOS reset or BIOS update. To enhance security and prevent unauthorized password clearing, set it to **Enforce**.

## ⚠ *Important*

*When selecting the **Administrator / User Password** items, a password box will appear on the screen. Type the password then press **Enter.** The password typed now will replace any previous set password from CMOS memory. You will be prompted to confirm the password. You may also press **Esc** key to abort the selection.*

*To clear a set password, press **Enter** when you are prompted to enter a new password. A message will confirm the password is being disabled. Once the password is disabled, you can enter the setup and OS without authorization.*

▸ **U-Key**

Enables or disables the USB flash drive as a key.

▸ **Make U-Key at**

Specify a USB flash drive as a key to lock your computer. Only people with that specific USB flash drive can use the computer.

▸ **U-Key Execution Level**

Set Enforce, the system can be configured to lock when the USB security key is absent. However, the security setting can be reset to normal mode via a CMOS reset or BIOS update in case of a lost USB key.

▸ **Trusted Computing**

Sets TPM (Trusted Platform Module) function.

 ▸ **Security Device Support**

 Enables or disables the TPM function to build the endorsement key for accessing the system.

 ▸ **TPM Device Selection**

 Sets the security device.
 [dTPM]        For hardware TPM.
 [fTPM 2.0]    For software TPM.

 ▸ **SHA256 PCR Bank**

 Enables or disables the SHA256 PCR bank.

 ▸ **SHA384 PCR Bank**

 Enables or disables the SHA384 PCR bank.

 ▸ **SM3_256 PCR Bank**

 Enables or disables the SM3_256 PCR bank.

 ▸ **Pending operation**

 Sets the action of pending TPM operation.
 [None]         Discard the selelction
 [TPM Clear]    Clear all data secured by TPM.

 ▸ **Platform Hierarchy**

 Enables or disables platform hierarchy.

 ▸ **Storage Hierarchy**

 Enables or disables storage hierarchy.

 ▸ **Endorsement Hierarchy**

 Enables or disables endorsement hierarchy.

 ▸ **Physical Presence Spec Version**

 Selects the PPI (Physical Presence Interface) Spec version.

‣ **Chassis Intrusion Configuration**

Press **Enter** to enter the sub-menu.

‣ **Chassis Intrusion**

Enables or disables recording messages while the chassis is opened. This function is ready for the chassis equips a chassis intrusion switch.

[Enabled]      Once the chassis is opened, the system will record and issue a warning message.

[Reset]        Clear the warning message. After clearing the message, please return to Enabled or Disabled.

[Disabled]     Disables this funcion.

‣ **Secure Boot**

Press **Enter** to enter the sub-menu.

‣ **Secure Boot**

Secure Boot function can be enabled only when the Platform Key (PK) is enrolled and running accordingly.

‣ **Secure Boot Mode**

Selects the secure boot mode. This item appears when **Secure Boot** is enabled.

[Standard]     The system will automatically load the secure keys from BIOS.

[Custom]       Allows user to configure the secure boot settings and load the secure keys manually.

‣ **Secure Boot Preset**

Set Hardware/OS Compatibility to support non-UEFI or non-compliant hardware/OS with optimizied settings, or enforce Maximum Security to ensure complete validation of all system components.

‣ **Key Management**

Press **Enter** to enter the sub-menu. Manage the secure boot keys. This item appears when "**Secure Boot Mode**" sets to **Custom**.

‣**Factory Key Provision**

Enables or disables the factory default keys.

‣**Restore Factory Keys**

Allows you to install all factory default keys.

▸ **Reset To Setup Mode**

Allows you to delete all the Secure Boot keys from NVRAM.

▸ **Enroll Efi Image**

Allows the image to run in Secure Boot mode. Enroll the SHA256 Hash certificate of a PE image into the authorized signature database (db).

▸ **Export Secure Boot Variables**

Export the NVRAM contents of serure boot variables to a file.

▸ **Platform Key(PK)**

The Platform Key (PK) can protect the firmware from any un-authenticated changes. The system will verify the PK before your system enters the OS. Platform Key (PK) is used for updating KEK.

▸ **Key Exchange Keys (KEK)**

Key Exchange Key (KEK) is used for updating DB or DBX.

▸ **Authorized Signatures (db)**

Authorized Signatures(DB) lists the signatures that can be loaded.

▸ **Forbidden Signatures (dbx)**

Forbidden Signatures (DBX) lists the forbidden signatures that are not trusted and cannot be loaded.

▸ **Authorized TimeStamps (dbt)**

Authorized TimeStamps (DBT) lists the the authentication signatures with authorization time stamps.

▸ **OsRecovery Singnatures(dbr)**

Lists the available signatures for OS recovery.

# Boot

Sets the sequence of system boot devices.



▸ **Full Screen Logo Display**

Enables or disables to show the full screen logo during POST (Power-On Self-Test).

[Enabled]          Shows the logo in full screen.

[Disabled]         Shows the POST messages.

▸ **GO2BIOS**

Allows system to enter BIOS setup directly by pressing the Power button for 5 seconds upon bootup.

[Enabled]          The system boots straight to the BIOS setup by long pressing the power button for about 5 seconds when the system is off (S5 state).

[Disabled]         Disables this function.

▸ **Bootup NumLock State**

Selects the keyboard NumLock state while system is booting.

▸ **POST Beep**

Enables or disables the beep sound during POST (Power-On Self-Test).

▸ **MSI Fast Boot**

MSI Fast Boot is the fastest way to boot the system. When enabled, the USB, PS2 and SATA devices will not be detected while booting.

[Enabled]          Enables the MSI Fast Boot function to speed up booting time. And the following Fast Boot field will be disabled and fixed.

[Disabled]         Disables MSI Fast Boot.

## ⚠️ *Important*

*When MSI Fast Boot is enabled, you are not allowed to enter BIOS setup until you disable MSI Fast Boot in MSI Center.*

▸ **Fast Boot**

Enables or disables the Windows 10 fast boot feature. This item will only be available when **MSI Fast Boot** is disabled.
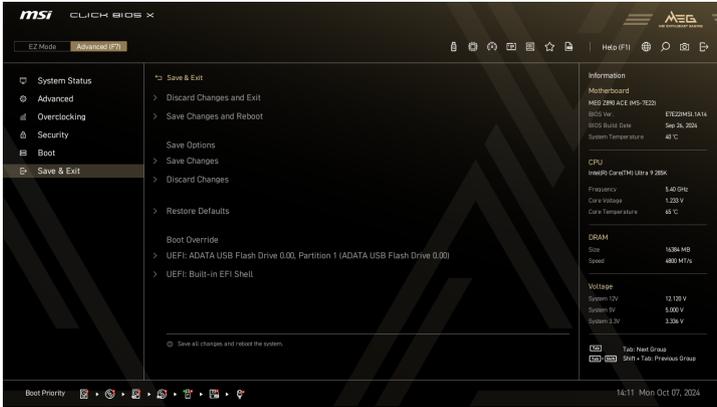
▸ **Boot Option #1/ #2/ #3/ #4/ #5/ #6/ #7**

These items specify the boot device priority sequence.

▸ **UEFI USB Key Drivers BBS Priorities**

This item is used to prioritize the installed USB key drivers.

# Save & Exit



‣ **Discard Changes and Exit**

Exit BIOS setup without saving any change.

‣ **Save Changes and Reboot**

Save all changes and reboot the system.

‣ **Save Changes**

Save current changes.

‣ **Discard Changes**

Discard all changes and restore to the previous values.

‣ **Restore Defaults**

Restore or load all default values.

‣ **Boot Override**

The installed boot-able devices will appear on this menu, you can select one of them to be the boot device.

# Resetting BIOS

If you encounter certain issues with your computer, restoring the default BIOS settings might help. You can reset the BIOS settings using the following methods:

- Enter the BIOS setup and press **F6** to load the optimized defaults.
- Use the **Clear CMOS jumper** on the motherboard to reset the BIOS.
- If your motherboard has a **Clear CMOS button** on the rear I/O panel, press it to reset the BIOS.

## ⚠ Important

*Ensure the computer is powered off before clearing the CMOS data. For more details, refer to the **Clear CMOS jumper/button** section in the manual.*

# Updating BIOS

## Updating BIOS with M-FLASH

Before starting the M-Flash process, make sure you have:

- A USB flash drive with a capacity of 32GB or less that is formatted to FAT32.

## ⚠ Important

*M-Flash only supports FAT32 format, and the USB flash drive should not exceed 32GB.*

- A computer with internet access.
- A standard power charger.

Please follow the steps below to update BIOS:

1. Download the latest BIOS file from the MSI website that matches your motherboard model, and save it to the USB flash drive.
2. If your motherboard has a Multi-BIOS switch, switch to the target BIOS ROM.
3. Insert the USB flash drive into your motherboard' s USB port.
4. Enter flash mode by either:
   - Rebooting and pressing **Ctrl + F5** during POST, then clicking **Yes** to reboot the system.
   - Rebooting and pressing **Del** during POST to enter BIOS, then clicking the M-FLASH button and clicking **Yes** to reboot.
5. Select a BIOS file from the **M-FLASH File** menu and press **Enter**.
6. When prompted by a File Check message, click **Yes** to start the BIOS update.

Once the update reaches 100%, the system will reboot automatically.

## Updating the BIOS with MSI Center

Before updating:

- Ensure the LAN driver is installed, and the internet connection is working properly.
- Close all other applications before updating the BIOS.

To update BIOS:

1. Install and launch MSI Center, then go to **Support** page.
2. Select **Live Update** and click on **Advance** button.
3. Select the BIOS file and click on **Install** button.
4. The installation reminder will appear, then click the **Install** button.

The system will automatically restart to update the BIOS. Once the flashing process is complete, the system will restart.

## Updating BIOS with Flash BIOS Button

1. Download the latest BIOS file from the MSI website that matches your motherboard model.
2. Rename the BIOS file to **MSI.ROM**, and save it to the root directory of a USB flash device.
3. Connect the power supply to **CPU_PWR1** and **ATX_PWR1**. (You don' t need to install the CPU and memory.)
4. Plug the USB flash device with the **MSI.ROM** file into the **Flash BIOS Port** on the rear I/O panel.
5. Press the **Flash BIOS Button** to start flashing the BIOS. The LED will start flashing to indicate the process has begun.

The LED will turn off when the process is complete.

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## Revision History

Version 1.0, 2024/10, First release