



AMD AM5 series BIOS

USER GUIDE

Motherboard

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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. However, it still has a CSM (Compatibility Support Module) mode to be compatible with older devices. That allows you to replace legacy devices with UEFI compatible devices during the transition.



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. And also eliminates the time to switch to CSM mode during POST.
- 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

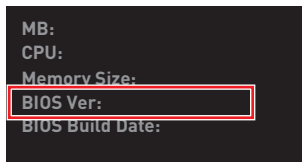
- 32-bit Windows operating system - this motherboard supports only Windows 10 64-bit operating system.
- Older graphics card - the system will detect your graphics card. When display a warning message There is no GOP (Graphics Output protocol) support detected in this graphics card.



We recommend that you to replace with a GOP/UEFI compatible graphics card or using integrated graphics from CPU for having normal function.

How to find the BIOS version?

After entering the BIOS, find the BIOS version at the top of the screen.



BIOS Setup

The default settings offer the 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.
- BIOS items are continuously updated for better system performance. Therefore, the description may be slightly different from the latest BIOS and should be for reference only. You could also refer to the **HELP** information panel for the BIOS item description.
- The BIOS options and settings for each motherboard may vary slightly with the BIOS version, please refer to the actual BIOS of your system for settings and options.

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

- F1:** General Help list
- F2:** Add/ Remove a favorite item
- F3:** Enter Favorites menu
- F4:** Enter CPU Specifications menu
- F5:** Enter Memory-Z 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).
- Ctrl+F:** Enter Search page

* When you press **F10**, a confirmation window appears and it provides the modification information. Select between Yes or No to confirm your choice.

BIOS Setting Mode

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

EZ Mode

In EZ mode, it provides the basic system information and allows you to enable or disable basic functions for system.



• **GAME BOOST** - click on this button to enable the GAME BOOST for overclocking. This function is only available when both of the motherboard and CPU are supporting this function.

Important

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

• **CREATOR GENIE** - click on this button to enable the CREATOR GENIE for performance optimization.

Important

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

• **A-XMP/ EXPO Profile** - allows you to select the A-XMP/ EXPO profile for memory to overclock. This function is only available when the system, memory and CPU are supporting these functions.

- **Setup Mode switch** - click on this button or the **F7** key to switch between Advanced mode and EZ mode.
- **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).
- **BIOS Search** - click on this button to enter the search page. On the search page, it allows you to search for the related BIOS items by entering the keyword. Move the mouse over a blank space and right-click the mouse to exit the search page.

Important

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

• **Smart Button** - click on this button to choose a system function for the smart button on the motherboard or for the reset button of the computer chassis to achieve. And then, you can enable the chosen function for the system by pressing the smart/ reset button.

- **Reset** - press the reset/ smart button to reset the system.
- **Mystic Light on/ off** - press the reset/ smart button to turn on/ off all the onboard LEDs.

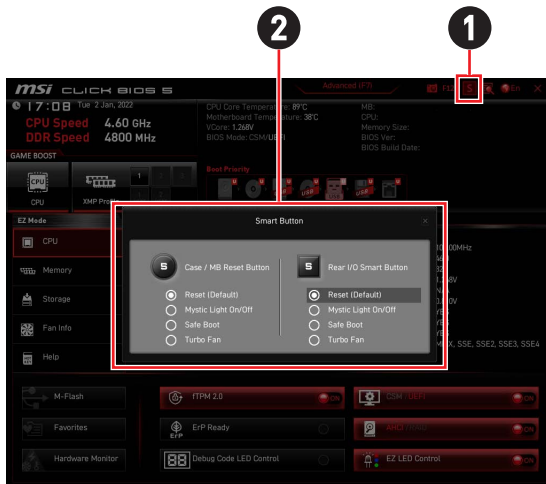
Important

The **Mystic Light on/ off** function mode is unavailable when the LED_SW1 (EZ LED Control) switch turns **OFF**.

- **Safe Boot** - click the 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** - press the reset button for all fans to operate full speed or default speeds.

Please follows the step below to select a system function for the smart/ reset button.

1. Click on **Smart Button**.
2. Select a system function for smart/ reset button.
3. Press **F10** to save the change and select **Yes** to restart the system.



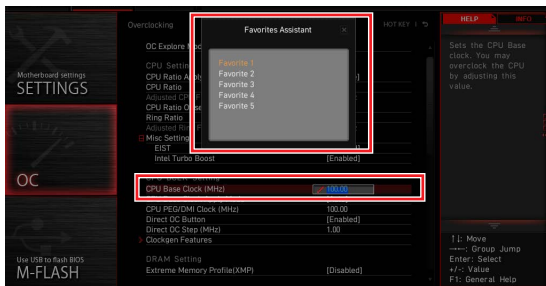
- **Language** - click on this button to select the display language of the BIOS setup program.
- **System information** - shows the system information about the motherboard, CPU, memory, and BIOS.
- **Boot device priority bar** - you can use the mouse to move the device icons to change the boot priority. The boot priority sequence from high to low is according to the left to right.
- **Component overview** - click the **CPU**, **Memory**, **Storage**, **Fan Info**, and **Help** buttons on the left area to show the overview of their respective status in the right area.
- **Function control** - these buttons allows you to enable or disable the system functions by BIOS. The button shows ON means its function will be enabled after you save the setting and restart the system..
 - **fTPM 2.0** - enables or disables the firmware TPM control.
 - **ErP Ready** - enables or disables the system power consumption according to ErP regulation.
 - **Debug Code LED Control** - enables or disables the debug code LED.
 - **HD Audio Controller** - enables or disables the HD audio controller.
 - **CSM/ UEFI** - selects the BIOS mode, default mode is UEFI mode (ON).
 - **AHCI/RAID** - select either AHCI or RAID mode for SATA devices.
 - **EZ LED Control** - turns on or turns off all the LEDs of motherboard.
- **M-Flash** - click this button to enter the **M-Flash** menu that provides the way to update BIOS with a USB flash drive.
- **Hardware Monitor** - Click this button to enter the **Hardware Monitor** menu that allows you to manually control and monitor the fan speed.

- **Favorites** - click on this button or press the **F3** key to show the Favorites window. It provides 5 menus for you to create personal BIOS menu where you can save and access favorite/ frequently-used BIOS setting items.



- **To add a BIOS item to a favorite menu**

1. Select a BIOS item not only on BIOS menu but also on search page.
2. Right-click or press **F2** key.
3. Choose a favorite page and click on **OK**.



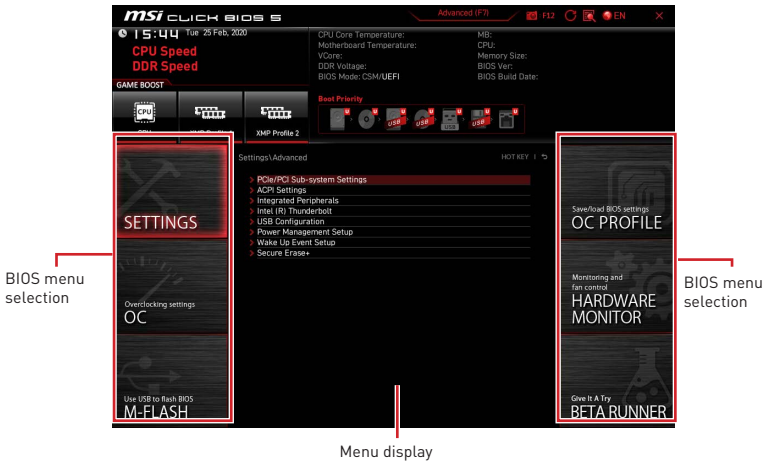
▪ **To delete a BIOS item from favorite menu**

1. Select a BIOS item on favorite menu.
2. Right-click or press **F2** key.
3. Choose Delete and click on **OK**.



Advanced Mode

Press **Setup Mode switch** or **F7** function key can switch between EZ Mode and Advanced Mode in BIOS setup.



- **BIOS menu selection** - the following options are available:
 - **SETTINGS** - allows you to specify the parameters for chipset and boot devices.
 - **OC** - allows you to adjust the frequency and voltage. Increasing the frequency may get better performance.
 - **M-FLASH** - provides the way to update BIOS with a USB flash drive.
 - **OC PROFILE** - allows you to manage overlocking profiles.
 - **HARDWARE MONITOR** - allows you to set the speeds of fans and monitor voltages of system.
 - **Beta Runner** - provides the beta functions or features for the user who craves the new experience. However, we welcome and expect you to give us some more feedback on user experience. That will be helpful in improving the functions.
 - **Menu display** - provides BIOS setting items and information to be configured.

SETTINGS Menu



System Status

► 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 (read only).

► DMI Information

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

Advanced

► PCIe/PCI Sub-system Settings

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

► 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. If the system supports 64-bit PCI/ PCIe decoding, please enable this item for compatible PCIe device. It is request from AMD Smart Access Memory technology. It is a requirement by AMD Smart Access Memory (SAM) technology.

► Above 4G memory/ Crypto Currency mining

Enables or disables 64-bit capable devices to be decoded in above 4G address space. It is only available if the system supports 64-bit PCI decoding.

[Enabled] Allows you to utilize more than 4x GPUs.

[Disabled] Disables this function.

► PCI_Ex Gen Switch

Sets PCI Express protocol for matching different installed devices.

► Chipset Gen Switch

Sets PCI Express protocol (from chipset) for matching different installed devices.

► PCI_Ex Lanes Configuration

PCIe lanes configuration is for MSI M.2 Xpander / MSI M.2 Xpander-Z / Other M.2 PCIe storage card. The options in this item will vary with the installed processor.

► 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 to fire when CPU core temperature reaches the set temperature.

► Integrated Peripherals

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

► VGA Detection

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

► Onboard LAN Controller

Enables or disables the onboard LAN controller.

► LAN Option ROM

Enables or disables the legacy network Boot Option ROM for detailed settings. This item will appear when **Onboard LAN Controller** is enabled. For CSM mode (Legacy) only.

[Enabled] Enables the onboard LAN Boot ROM.

[Disabled] Disables the onboard LAN Boot ROM.

► Network Stack

Sets **UEFI** network stack for optimizing IPv4 / IPv6 function. This item will appear 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.

► Onboard Wi-Fi Module Control

Enables or disables the onboard Wi-Fi module controller.

► SATA Mode

Sets the operation mode of the onboard SATA controller.

[AHCI Mode] Specify the AHCI mode for SATA storage devices. AHCI (Advanced Host Controller Interface) offers some advanced features to enhance the speed and performance of SATA storage device, such as Native Command Queuing (NCQ) and hot-plugging.

[RAID Mode] Enables RAID function for SATA storage devices.

► SATAx Hot Plug

Enables or disabled the SATAx port hot plug support.

► Onboard E-SATA Controller Mode

Sets the operation mode of the onboard E-SATA controller.

► HD Audio Controller

Enables or disables the onboard High Definition Audio controller.

► 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

This item allows you to set the UMA memory size manually or allows the system to allocate the system memory dynamically for integrated graphics.

► UMA Frame Buffer Size

Sets the system memory buffer size for onboard integrated graphics.

► USB Configuration

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

► XHCI Hand-off

Enables or disables XHCI hand-off support for the operating system without XHCI hand-off feature.

► Legacy USB Support

Sets Legacy USB function support.

[Auto] The system will automatically detect if any USB device is connected and enable the legacy USB support.

[Enabled] Enable the USB support under legacy mode.

[Disabled] The USB devices will be unavailable under legacy mode.

► 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 Configuration

Sets detailed configuration of serial(COM) port 0. Press **Enter** to enter the sub-menu.

► Serial (COM) Port 0

Enables or disables serial (COM) port 0.

► Serial (COM) Port 0 Settings

Sets serial (COM) port 0. If set to Auto, BIOS will optimize 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 optimize 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 and SPP]	Enhanced Parallel Port-1.9 mode + Standard Parallel Port 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 will not 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 previous state (power on/ power off) before AC power loss.

► System Power Fault Protection

Enables or disables the system to boot up when detecting abnormal voltage input.

[Enabled] Protect the system from unexpected power operating and remain the shut down status.

[Disabled] Disables this function.

► BIOS UEFI/ CSM Mode

Select CSM (Compatibility Support Module) or UEFI mode to meet the system requirement.

[CSM] For the non-UEFI driver add-on devices or non-UEFI mode OS.

[UEFI] For the UEFI driver add-on devices and UEFI mode OS.

► 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/PCI-E Device

Enables or disables the wake up function of installed PCI/ PCI-E expansion cards.

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

[Disabled] Disables this function.

► Resume by USB Device

Disables or enables system wake up from S3/S4 by USB device.

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

[Disabled] Disables this function.

► 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 you set the **Resume From S3/S4/S5 by PS/2 Keyboard** to **Hot Key**.

▶ **Secure Erase+**

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

▶ **M.2 XPANDER-Z GEN5 DUAL Fan Control**

Sets the fan duty cycle and the LED color of the M.2 XPANDER-A GEN5 Dual fan card. Press **Enter** to enter the sub-menu.

▶ **Realtek PCIe GBE Family Controller**

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

▶ **MSI Driver Utility Installer**

Enables or disables MSI driver utility installer support.

Boot

Sets the sequence of system boot devices.

► Full Screen Logo Display

Enables or disables to show the full screen logo while system POST.

[Enabled] Shows the logo in full screen.

[Disabled] Shows the POST messages.

► Bootup NumLock State

Select the keyboard NumLock state upon bootup.

► Info Block effect

Sets the state of **Help** information block.

[Unlock] Sliding effect.

[Lock] Lock the **Help** information block on the screen.

► POST Beep

Enables or disables the POST beep.

► AUTO CLR_CMOS

Enables or disables the CMOS data to be resumed automatically when the system cannot boot to OS and reboot repeatedly.

► Boot Mode Select

Sets the system boot mode from legacy or UEFI architecture depending on OS installation requirement. This item will become un-selectable and will be configured automatically by BIOS when **BIOS UEFI/CSM Mode** sets to **UEFI**.

[UEFI] Enables UEFI BIOS boot mode support only.

[LEGACY+UEFI] Enables both Legacy BIOS boot mode and UEFI BIOS boot mode.

► FIXED BOOT ORDER Priorities

Sets device priority for system boot.

► Boot Option Priorities

These items are used to prioritize the installed boot devices.

Security

► 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 Clear

Enables or disables the clear CMOS behavior to clear a set password.

[Enabled] The password will be erased after clear CMOS.

[Disabled] The password will always be kept.



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.

► 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.

▶ **AMD fTPM switch**

Selects TPM device. This item will appear when **Security Device Support** is enabled.

[AMD CPU fTPM] Select it for AMD Firmware TPM.

[AMD CPU fTPM Disabled] Select it for Discrete TPM.

▶ **Active PCR Banks**

Shows the current active PCR banks.

▶ **Available PCR banks**

Shows all available PCR banks.

▶ **SHA-1 PCR Bank**

Enables or disables the SHA-1 160-bit encoding format.

▶ **SHA256 PCR Banks**

Enables or disables the SHA256 256-bit encodingn format.

▶ **TPM State**

Enables or disables the TPM support.

▶ **Pending operation**

Sets the action of pending TPM operation.

[None] Discard the seletion

[TPM Clear] Clear all data secured by TPM.

▶ **Platform Hierarchy**

Enables or disables the platform hierarchy.

▶ **Storage Hierarchy**

Enables or disables the storage hierarchy.

▶ **Endorsement Hierarchy**

Enables or disables the endorsement hierarchy.

▶ **Physical Presence Spec Version**

Sets the version of the testing tool (HCK) in OS.

▶ **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 is to select how the secure boot keys be loaded. 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 manually load the secure keys.

► Enroll all Factory Default keys

Allows you to install all factory default keys. The settings will be applied after reboot or at the next reboot. This item appears when "**Secure Boot Mode**" sets to **Custom**.

► Delete all Secure Boot variables

Allows you to delete all the Secure Boot keys(PK,KEK,db,dbt,dbx). The settings will be applied after reboot or at the next reboot. This item appears when "**Secure Boot Mode**" sets to **Custom**.

► Key Management

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

► Provision Factory Default keys

Enables or disables the factory default keys.

► Enroll all Factory Default keys

Allows you to install all factory default keys. The settings will be applied after reboot or at the next reboot.

► Delete all Secure Boot variables

Allows you to delete all the Secure Boot keys(PK,KEK,db,dbt,dbx). The settings will be applied after reboot or at the next reboot.

► Save all Secure Boot variables

Allows you to save all the Secure Boot keys(PK,KEK,db,dbt,dbx).

► Enroll Efi Image

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

► 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.

▶ **Set New Key**

Sets a new PK to your system.

▶ **Delete Key**

Deletes the PK from your system.

▶ **Key Exchange Keys: ? ? ?**

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

▶ **Set New Key**

Sets a new KEK to your system.

▶ **Append Key**

Loads an additional KEK from storage devices to your system.

▶ **Delete Key**

Deletes the KEK from your system.

▶ **Authorized Signatures: ? ? ?**

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

▶ **Set New Key**

Sets a new DB to your system.

▶ **Append Key**

Loads an additional DB from storage devices to your system.

▶ **Delete Key**

Deletes the DB from your system.

▶ **Forbidden Signatures : ? ? ?**

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

▶ **Set New Key**

Sets a new DBX to your system.

▶ **Append Key**

Loads an additional DBX from storage devices to your system.

▶ **Delete Key**

Deletes the DBX from your system.

▶ **Authorized TimeStamps: ? ? ?**

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

▶ **Set New Key**

Sets a new DBT to your system.

▶ **Append Key**

Loads an additional DBT from storage devices to your system.

▶ **OsRecovery Singnatures???**

Enroll factory defaults or load the keys from a file.

▶ **Image Execution Policy**

Press **Enter** to enter the sub-menu. Manage the image execution policy. This item will become available when "**Secure Boot Mode**" sets to **Custom**.

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.

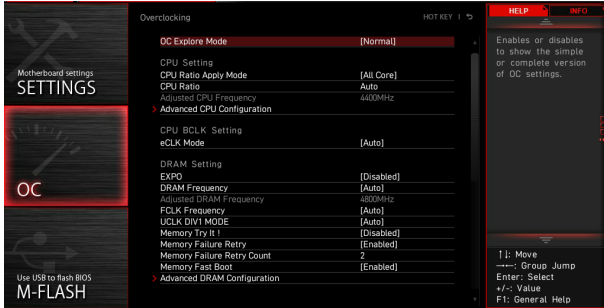
▶ **Restore Defaults**

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.

OC Menu



Important

- Overclocking your system 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/CREATOR GENIE** function or easy overclocking.
- The BIOS options and settings in OC 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**

Enables or disables to show the normal or expert version of OC settings.

[Normal] Provides the regular OC settings in BIOS setup.

[Expert] Provides the advanced OC settings for OC expert to configure in BIOS setup.

► **CPU Ratio Apply Mode**

Sets applied mode for CPU ratio.

► **CPU Ratio**

Sets the CPU ratio that is used to determine CPU clock speed. This item will appear when **CPU Ratio Apply Mode** is set to **All Core** and if the processor supports this function.

► **Adjusted CPU Frequency**

Shows the adjusted CPU frequency. Read-only.

► **CCD0 Ratio**

Sets the CPU CCD0 ratio. This item will appear when **CPU Ratio Apply Mode** is set to **Per CCD**.

▶ **CCD1 Ratio**

Sets the CPU CCD1 ratio. This item will appear when **CPU Ratio Apply Mode** is set to **Per CCD**.

▶ **CPU CCD Voltage**

Sets the CPU CCD voltage. This item will appear when **CPU Ratio Apply Mode** is set to **Per CCD**.

▶ **Performance Switch**

This item allows you to specify a level to upgrade the CPU performance based on the CPU quality. This item will appear when **CPU Ratio Apply Mode** is set to **Adaptive**.

▶ **CCD0 Ratio**

Sets the CPU CCD0 ratio. This item will appear when **Performance Switch** is set to **Advanced**.

▶ **Performance Current Limit**

This item allows you to set the current limit. This item will appear when **Performance Switch** is set to **Advanced**.

▶ **Performance Current Limit Hysteresis**

This item allows you to set the current limit of hysteresis. This item will appear when **Performance Switch** is set to **Advanced**.

▶ **Trigger Counts**

This item allows you to set the time of each trigger count. This item will appear when **Performance Switch** is set to **Advanced**.

▶ **CPU Performance Voltage**

Sets the CPU CCD voltage. This item will appear when **Performance Switch** is set to **Advanced**.

▶ **Advanced CPU Configuration**

Press **Enter** to enter the sub-menu. You can set the parameters about CPU power/ current/ overclocking.



Important

The system may become unstable or unbootable after changing the power parameters. If it occurs, please clear the CMOS data and restore the default settings.

▶ **AMD Overclocking**

Press **Enter** to enter the sub-menu. You can set the parameters about CPU overclocking. This sub-menu will appear when the CPU and chipset support this function.

▶ **Precision Boost Overdrive**

Enables or disables Precision Boost Overdrive (PBO) that is a performance-maximizing technology available in AMD CPU. This item will appear only when the CPU supports this function.

▶ **PBO Limits**

Sets the PBD limits control mode. This item will appear when **Precision Boost Overdrive** is set to **Advanced**.

▶ **PPT Limit [W]**

Sets PPT (Package Power Tracking) limit. This item will appear when **PBO Limits** is set to **Manual**.

▶ **TDC Limit [A]**

Sets TDC (Thermal Design Current) limit. This item will appear when **PBO Limits** is set to **Manual**.

▶ **EDC Limit [A]**

Sets EDC (Electrical Design Current) limit. This item will appear when **PBO Limits** is set to **Manual**.

▶ **Precision Boost Overdrive Scalar Ctrl**

Sets to control the PBO automatically or manually.

▶ **Precision Boost Overdrive Scalar**

Sets PBO scalar. This item will appear when **Precision Boost Overdrive Scalar Ctrl** is set to **Manual**.

▶ **CPU Boost Clock Override**

If enabled, it allows you to override the CPU boost clock. If set to **Auto**, BIOS will configure the clock. This item will appear when **Precision Boost Overdrive** is set to **Advanced**.

▶ **Max CPU Boost Clock Override(+)**

It allows you to increase the maximum CPU frequency that may be automatically achieved by the Precision Boost 2 algorithm.

▶ **Max CPU Boost Clock Override(-)**

It allows you to decrease the maximum CPU frequency that may be automatically achieved by the Precision Boost 2 algorithm.

▶ **GPU Boost Clock Override**

It allows you to set GPU boost clock. If set to **Auto**, BIOS will configure the clock.

▶ **Platform Thermal Throttle Limit**

It allows you to set the maximum processor temperature. If set to **Auto**, BIOS will configure this settings. This item will appear when **Precision Boost Overdrive** is set to **Advanced**.

▶ **GFX Curve Optimizer**

Press **Enter** to enter the sub-menu. This item will appear when **Precision Boost Overdrive** is set to **Advanced**.

▶ **GFX Curve Optimizer**

Enables or disables the curve optimizer for integrated graphics.

▶ **GFX Core Curve Optimizer Sign**

Sets the shifting direction of the curve for integrated graphics. This item will appear when **GFX Curve Optimizer** is set to **Enabled**.

▶ **GFX Curve Optimizer Magnitude**

Sets Curve Optimizer value for all cores. This item will appear when **GFX Curve Optimizer** is set to **Enabled**.

▶ **Curve Optimizer**

Press **Enter** to enter the sub-menu. This item will appear when **Precision Boost Overdrive** is set to **Advanced**.

▶ **Curve Optimizer**

Enables or disables the Curve Optimizer for entire CPU cores or specific cores.

▶ **All Core Curve Optimizer Sign**

Sets the shifting direction of the curve for the entire CPU cores. This item will appear when **Curve Optimizer** is set to **All Cores**.

▶ **All Core Curve Optimizer Magnitude**

Sets Curve Optimizer value for the entire CPU cores. This item will appear when **Curve Optimizer** is set to **All Cores**.

▶ **Core[n] Curve Optimizer Sign**

Sets the shifting direction of the curve for specific cores. This item will appear when **Curve Optimizer** is set to **Per Core**.

▶ **Core[n]s Curve Optimizer Magnitude**

Sets Curve Optimizer value for specific cores. This item will appear when **Curve Optimizer** is set to **Per Core**.

▶ **SMT Control**

Enables or disables the symmetric multi-threading.

▶ **LN2 Mode**

Enables or disables the LN2 mode. LN2 mode provides additional stability at extreme cold operating temperatures.

▶ **LCLK Frequency Control (I/O Clock)**

Sets this item to Manual allows you to set the LCLK frequency manually in the following item. If set to **Auto**, BIOS will configure the frequency automatically.

▶ **Maximum Frequency**

This item allows you to set the LCLK frequency manually. This item will appear when **LCLK Frequency Control (I/O Clock)** is set to **Manual**.

▶ AMD CBS

Press **Enter** to enter the sub-menu. This sub-menu will appear when the CPU supports this function.

▶ Core Performance Boost

Enables or disables the Core Performance Boost (CPB). This item appears when the installed CPU supports CPB.

[Auto] Allows the processor to dynamically overclocking when the system request the highest performance state.

[Disabled] Disables this function.

▶ Global C-state Control

Enables or disables IO based C-state generation and DF C-states.

▶ Opcache Control

Enables or disables opcache control.

▶ IOMMU

Enables or disables the IOMMU (I/O Memory Management Unit) for I/O virtualization.

▶ PCIe ARI Support

Enables or disables the ARI (Alternative Routing ID Interpretation) support.

▶ PCIe ARI Enumeration

Enables or disables the ARI (Alternative Routing ID Interpretation) enumeration.

▶ PSPP Policy

Sets the PCIe Speed Power Policy (PSPP).

▶ TDP Control

This item allows you to set the TDP manually or the TDP is controlled by BIOS automatically.

▶ TDP

Sets the TDP value. This item will appear when **TDP Control** is set to **Manual**.

▶ PPT Control

This item allows you to set the PPT (Package Power Tracking) manually or the PPT is controlled by BIOS automatically.

▶ PPT

Sets the PPT value. This item will appear when **PPT Control** is set to **Manual**.

▶ Thermal Control

This item allows you to set the Tctl limit temperature manually or the temperature is controlled by BIOS automatically.

▶ **TjMax**

Sets the maximum Tctl limit temperature value. This item will appear when **Thermal Control** is set to **Manual**.

▶ **TDC Control**

This item allows you to set the TDC (Thermal Design Current) manually or the TDC is controlled by BIOS automatically.

▶ **TDC_VDDCR_VDD**

Sets the VDDCR_VDD TDC value. This item will appear when **TDC Control** is set to **Manual**.

▶ **PROCHOT Control**

This item allows you to set the PROCHOT deassertion ramp time manually. If set to Auto, the default PROCHOT deassertion ramp time is enabled.

▶ **PROCHOT Deassertion Ramp Time**

Sets the PROCHOT deassertion ramp time.

▶ **VDDP Voltage Control**

This item allows you to control the manually or the TDC is controlled by BIOS automatically.

▶ **VDDP Voltage**

Sets the VDDP voltage. This item will appear when **VDDP Voltage Control** is set to **Manual**.

▶ **Infinity Fabric Frequency and Dividers**

Sets the infinity fabric frequency (FCLK) and dividers. If set to **Auto**, BIOS will configure the frequency.

▶ **FEATURE FCLK DPM**

Enables or disables the FCLK DPM.

▶ **Config TDP**

Selects one group of the specified values for TDP (W), PPT (W), TDC (A), and EDC (A). If set to **Auto**, BIOS will configure the default values automatically.

▶ **PSS Support**

Enables or disables the generation of ACPI_PPC, _PSS, and _PCT objects.

▶ **PPC Adjustment**

Sets the Pstate mode. This item will appear when **PSS Support** is set to **Enabled**.

▶ **NX Mode**

Enables or disables the AMD NX (No execute) protections.

▶ **SVM Mode**

Enables or disables the AMD SVM (Secure Virtual Machine) Mode.

► **AVX Control**

Enables or disables the AVX control.

► **AVX2 Control**

Enables or disables the AVX2 control.

► **AVX512 Control**

Enables or disables the AVX512 control. This item would be available after the **AVX2 Control** sets to **Auto**.

► **FCH Spread Spectrum**

Enables or disables the FCH spread spectrum. If set to **Auto**, BIOS will configure the setting automatically.

[Enabled] Enables the spread spectrum function to reduce the EMI (Electromagnetic Interference) problem.

[Disabled] Enhances the overclocking ability of CPU Base clock.



Important

Remember to disable Spread Spectrum if you are overclocking because even a slight jitter can introduce a temporary boost in clock speed which may just cause your overclocked processor to lock up.

► **eCLK Mode**

This allows you to set the CPU clock and PCIe clock synchronously or not. If set to **Auto**, BIOS will configure this setting automatically.

► **CPU/ PCIe Base Clock (MHz)**

This allows you to set the base clock of the CPU and PCIe synchronously. This item will appear when **eCLK** is set to **eCLK0**.

► **CPU Base Clock (MHz)**

Sets the CPU base clock. You may overclock the CPU by adjusting this item. Please note that overclocking behavior and stability is not guaranteed. This item will appear when **eCLK** is set to **eCLK1**.

► **CPU Base Clock Apply Mode**

Sets the applying mode for adjusted CPU base clock. This item will appear when **eCLK** is set to **eCLK1**.

[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.

► **CPU Base Clock Offset**

Sets the offset value for CPU base clock. If set to **Auto**, BIOS will configure this setting automatically.

► **Direct OC Button**

Specifies the base clock or the CPU ratio for the OC button/ header to overclock CPU in real time.

▶ **Direct OC Step (MHz)**

Sets the increase or decrease value for base clock when press the OC button (+ or -) once.

▶ **FCH Base Clock (MHz)**

Sets the FCH base clock. Please note that overclocking behavior and stability is not guaranteed. If set to **Auto**, BIOS will configure this setting automatically.

▶ **A-XMP**

Selects and loads memory XMP profile with optimized timing and voltage settings supported by installed memory module. This item is available only when the installed processor, memory modules and motherboard support this function.

▶ **EXPO**

Selects and loads memory EXPO profile with optimized timing and voltage settings supported by installed memory module. This item is available only when the installed processor, memory modules and motherboard support this function.

▶ **DRAM Frequency**

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

▶ **Adjusted DRAM Frequency**

Shows the adjusted DRAM frequency. Read-only.

▶ **FCLK Frequency**

Sets the FCLK frequency (Internal Data Fabric clock of DRAM). Please note the overclocking behavior is not guaranteed.

▶ **UCLK DIV1 MODE**

Sets UCLK (Internal memory controller clock) mode.

▶ **Memory Try It !**

It can improve memory compatibility or performance by choosing optimized memory preset.

▶ **Memory Context Restore**

Enables or disables the memory context restoring. If enabled, the POST latency will be minimized.

▶ **Advanced DRAM Configuration**

Press **Enter** to enter the sub-menu. User can set the memory timing for each/ all memory channel. The system may become unstable or unbootable after changing memory timing. If it occurs, please clear the CMOS data and restore the default settings. (Refer to the Clear CMOS jumper section to clear the CMOS data, and enter the BIOS to load the default settings.)

▶ **A-XMP User Profile**

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

▶ **A-XMP User Profile DIMM A1/ A2/ B1/ B2**

Press **Enter** to enter the sub-menu. You can set memory profile manually.

▶ **Load Setting To Item**

Load the current settings or the A-XMP profile to the user profile.

▶ **Write User Profile To Memory**

Write the user profile to memory or erase the user profile from memory.

▶ **Save Memory User Profile To BIOS**

Save the user profile to BIOS.

▶ **Load BIOS User Profile To Item**

Load the user profile to the selected item.

▶ **A-XMP User Profile 1/ 2**

▶ **DRAM Frequency**

Sets the DRAM frequency for A-XMP user profile 1/ 2.

▶ **DRAM Voltage**

Sets the DRAM voltage for A-XMP user profile 1/ 2.

▶ **DRAM VDDQ Voltage**

Sets the DRAM VDDQ voltage for A-XMP user profile 1/ 2.

▶ **DRAM VPP Voltage**

Sets the DRAM VPP voltage for A-XMP user profile 1/ 2.

▶ **Memory Controller Voltage**

Sets the memory controller voltage for A-XMP user profile 1/ 2.

▶ **tCL**

Sets the CAS (Column Address Strobe) latency time for A-XMP user profile 1/ 2.

▶ **tRCD**

Sets the RAS to CAS delay time for A-XMP user profile 1/ 2.

▶ **tRP**

Sets the row precharge time for A-XMP user profile 1/ 2.

▶ **tRAS**

Sets the RAS (Row Address strobe) active time for A-XMP user profile 1/ 2.

▶ **tRC**

Sets the Active to Active/ Refresh delay time for A-XMP user profile 1/ 2.

▶ **tWR**

Sets the write recover time for A-XMP user profile 1/ 2.

▶ **tRFC1**

Sets the refresh recovery delay time for A-XMP user profile 1/ 2.

▶ **tRFC2**

Sets the refresh recovery delay time for A-XMP user profile 1/ 2.

▶ **tRFCSB**

Sets the refresh recovery delay time for A-XMP user profile 1/ 2.

▶ **Command Rate**

Sets the command rate for A-XMP user profile 1/ 2.

▶ **EXPO User Profile**

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

▶ **EXPO User Profile DIMMA1/ A2/ B1/ B2**

Press **Enter** to enter the sub-menu. You can set memory profile manually.

▶ **Load Setting To Item**

Load the current settings or the EXPO profile to the user profile.

▶ **Write User Profile To Memory**

Write the user profile to memory or erase the user profile from memory.

▶ **Save Memory User Profile To BIOS**

Save the user profile to BIOS.

▶ **Load BIOS User Profile To Item**

Load the user profile to the selected item.

▶ **DRAM Frequency**

Sets the DRAM frequency for EXPO user profile 1/ 2.

▶ **DRAM Voltage**

Sets the DRAM voltage for EXPO user profile 1/ 2.

▶ **DRAM VDDQ Voltage**

Sets the DRAM VDDQ voltage for EXPO user profile 1/ 2.

▶ **DRAM VPP Voltage**

Sets the DRAM VPP voltage for EXPO user profile 1/ 2.

▶ **tCL**

Sets the CAS (Column Address Strobe) latency time for EXPO user profile 1/ 2.

▶ **tRCD**

Sets the RAS to CAS delay time for EXPO user profile 1/ 2.

▶ **tRP**

Sets the row precharge time for EXPO user profile 1/ 2.

▶ **tRAS**

Sets the RAS (Row Address strobe) active time for EXPO user profile 1/ 2.

▶ **tRC**

Sets the Active to Active/ Refresh delay time for EXPO user profile 1/ 2.

▶ **tWR**

Sets the write recover time for EXPO user profile 1/ 2.

▶ **tRFC1**

Sets the refresh recovery delay time for EXPO user profile 1/ 2.

▶ **tRFC2**

Sets the refresh recovery delay time for EXPO user profile 1/ 2.

▶ **tRFCSB**

Sets the refresh recovery delay time for EXPO user profile 1/ 2.

▶ **Main Timing Configuration**

▶ **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.

▶ **tRC**

Sets the Active to Active/ Refresh delay time.

▶ **tWR**

Sets the write recover time.

▶ **tRFC1**

Sets the refresh recovery delay time.

▶ **tRFC2**

Sets the refresh recovery delay time.

▶ **tRFCSB**

Sets the refresh recovery delay time.

▶ **Sub Timing Configuration**

▶ **tRTP**

Sets read to precharge command delay time.

▶ **tRRDL**

Sets the activate to activate delay time for same bank group.

▶ **tRRDS**

Sets the activate to activate delay time for different bank groups.

▶ **tFAW**

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

▶ **tWTR_L**

Sets the internal write transaction to internal read command time for same bank group.

▶ **tWTR_S**

Sets the internal write transaction to internal read command time for different bank groups.

▶ **Turn Around Timing Configuration**

▶ **tRDRDSC**

Sets the CAS to CAS delay time for same bank group.

▶ **tRDRDSC**

Sets the read to read turnaround time in the same chipselect.

▶ **tRDRDSD**

Sets the read to read turnaround time in the same DIMM.

▶ **tRDRDDD**

Sets the read to read turnaround time in the different DIMM.

▶ **tWRWRSCL**

Sets the write to write turnaround time for same bank group.

▶ **tWRWRSC**

Sets the write to write turnaround time in the same chipselect.

▶ **tWRWRSD**

Sets the write to write turnaround time in the same DIMM.

▶ **tWRWRDD**

Sets the write to write turnaround time in the different DIMM.

▶ **tWRRD**

Sets the write to read turnaround time.

▶ **tRDWR**

Sets the read to write turnaround time.

▶ **Misc item**

▶ **Power Down Enable**

Enables or disables DDR power down mode.

▶ **ECC**

Enables or disables DRAM ECC.

▶ **TSME**

Enables or disables TSME feature (Transparent Secure Memory Encryption).

▶ **Data Scramble**

Enables or disables data scrambling.

▶ **Chipset Interleaving**

This item allows you to set the interleave memory blocks across DRAM chip selects for node 0.

▶ **Address Hash Bank**

Enables or disables the bank address hashing.

▶ **Address Hash CS**

Enables or disables the CS address hashing.

▶ **Bank Swap Mode**

Selects the bank swap mode.

▶ **DFE Read Training**

Perform 2D Read Training with DFE.

▶ **DDR Bus Configuration**

▶ **Processor CA drive strengths**

Selects the drive strength for all CA0-13 IOs.

▶ **Processor DQ drive strengths**

Selects the drive strength for all DQ and DMI IOs.

▶ **Processor DOT impedance**

Selects the DOT impedance for all DBYTE IOs.

▶ **Dram DQ driver strengths**

Selects the DRAM drive strength for all DQ and DMI IOs.

▶ **Dram DOT impedance RTT_NOM_WR**

Selects the DRAM on-die termination impedance for RTT_NOM_WR.

▶ **Dram DOT impedance RTT_NOM_RD**

Selects the DRAM on-die termination impedance for RTT_NOM_RD.

▶ **Dram DOT impedance RTT_WR**

Selects the DRAM on-die termination impedance for RTT_WR.

▶ **Dram DOT impedance RTT_PARK**

Selects the DRAM on-die termination impedance for RTT_PARK.

▶ **DigitALL Power**

Press **Enter** to enter the sub-menu. Controls the digital powers related to CPU PWM.

▶ **CPU Loadline Calibration Control**

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

▶ **CPU Over Voltage Protection**

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

▶ **CPU Under Voltage Protection**

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

▶ **CPU Over Current Protection**

Sets the current limit for CPU over-current protection. If set to **Auto**, BIOS will configure this setting automatically.

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

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

▶ **CPU Switching Frequency**

Sets the PWM working speed to stabilize CPU 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.

▶ **CPU VRM Over Temperature Protection**

Sets the temperature limit on CPU VRM for over-temperature protection. The CPU frequency may be throttled when CPU temperature over the specified temperature. If set to **Auto**, BIOS will configure this settings.

▶ **CPU NB Loadline Calibration Control**

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

► CPU NB Over Current Protection

Sets the current limit for CPU-NB over-current protection. If set to **Auto**, BIOS will configure this setting automatically.

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

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

► CPU NB Switching Frequency

Sets the PWM working speed to stabilize CPU-NB 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.

► VR 12VIN OCP Expander

Expands the limitation of VR Over Current Protection with 12V input voltage. The higher expanding value indicates less protection. Therefore, please adjust the current carefully if needed, or it may damage the CPU/ VR MOS. If set to "Auto", BIOS will configure this setting automatically.

► CPU Core Voltage

Sets the CPU Core voltage mode. If set to **Auto**, BIOS will configure this setting automatically.

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

[Override Mode] Allows you to set the voltage manually.

[Offset Mode] Allows you to set the offset voltage and select the voltage offset mode.

[AMD Overclocking] Sets the adaptive voltage automatically for optimizing the system performance.

[Override + Offset] Sets the voltage manually and allows you to set the offset voltage.

► Override CPU Core Voltage

It allows you to set CPU core voltage. If set to **Auto**, BIOS will set the voltage automatically. This item will appear when **CPU Core Voltage** sets to **Override mode** or **AMD Overclock**.

► CPU Offset Mode Mark

Sets the CPU offset mode. This item will appear when **CPU Core Voltage** sets to **Offset mode** or **Override + Offset Mode**.

► CPU Offset Voltage

Sets the CPU offset voltage. This item will appear when **CPU Core Voltage** sets to **Offset mode** or **Override + Offset Mode**.

► CPU NB/SoC Voltage

Sets the CPU NB/ SoC voltage mode. If set to **Auto**, BIOS will configure this setting automatically.

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

[Override Mode] Allows you to set the voltage manually.

[Offset Mode] Allows you to set the offset voltage and select the voltage offset mode.

[AMD Overclocking] Sets the adaptive voltage automatically for optimizing the system performance.

► Override CPU NB/SoC Voltage

Sets CPU NB/SoC voltage. If set to **Auto**, BIOS will set the voltage automatically. This item will appear when **CPU NB/SoC Voltage** sets to **Override mode**.

► CPU NB/SoC Offset Mode Mark

Sets the CPU NB/SoC offset mode. This item will appear when **CPU NB/SoC Voltage** sets to **Offset mode**.

► CPU NB/SoC Offset Voltage

Sets the CPU NB/SoC offset voltage value. This item will appear when **CPU NB/SoC Voltage** sets to **Offset mode**.

► SOC Voltage

Sets CPU VDD_SOC voltage. If set to **Auto**, BIOS will set the voltage automatically. This item will appear when **CPU NB/SoC Voltage** sets to **AMD Overclocking**.

► VDDG Voltage Control

► VDDG Voltage Control

Selects apply mode for all the VDDG-related voltages.

► Global VDDG CCD Voltage

Sets the global VDDG CCD voltage. If set to **Auto**, BIOS will set the voltage automatically.

► Global VDDG IOD Voltage

Sets the global VDDG IOD voltage. If set to **Auto**, BIOS will set the voltage automatically.

► CCD0- CCD VDDG Voltage

Sets the VDDG CCD voltage for CCD0. If set to **Auto**, BIOS will set the voltage automatically.

► CCD0-IOD VDDG Voltage

Sets the VDDG IOD voltage for CCD0. If set to **Auto**, BIOS will set the voltage automatically.

▶ **CCD1- CCD VDDG Voltage**

Sets the VDDG CCD voltage for CCD1. If set to **Auto**, BIOS will set the voltage automatically.

▶ **CCD1-IOD VDDG Voltage**

Sets the VDDG IOD voltage for CCD1. If set to **Auto**, BIOS will set the voltage automatically.

▶ **VDDP Voltage Control**

▶ **VDDP Voltage Control**

If set to **Auto**, BIOS will set the voltage automatically. If set to **Manual**, you can set the voltage manually.

▶ **VDDP Voltage Adjust**

Sets CPU VDDP voltage. If set to **Auto**, BIOS will set the voltage automatically.

▶ **DRAM Voltage**

Sets DRAM voltage. If set to **Auto**, BIOS will set the voltage automatically. This item will appear when the **DRAM Voltage mode** sets to **Link**.

▶ **DRAM VDDQ Voltage**

Sets the DRAM VDDQ voltage. If set to **Auto**, BIOS will set these voltages automatically. This item will appear when the **DRAM Voltage mode** sets to **Link**.

▶ **DRAM VPP Voltage**

Sets DRAM VPP voltage. If set to **Auto**, BIOS will set the voltage automatically. This item will appear when the **DRAM Voltage mode** sets to **Link**.

▶ **CPU VDDIO Voltage**

Sets CPU VDDIO voltage. If set to **Auto**, BIOS will set the voltage automatically.

▶ **CPU 1P8 Voltage**

Sets CPU 1P8 voltage. If set to **Auto**, BIOS will set the voltage automatically.

▶ **Chipset Core Voltage**

Sets chipset core voltage. If set to **Auto**, BIOS will set the voltage automatically.

▶ **Chipset 1P8 Voltage**

Sets chipset 1P8 voltage. If set to **Auto**, BIOS will set the voltage automatically.

▶ **Memory Changed Detect**

Enables or disables the system to issue a warning message during boot when the 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.

▶ **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.

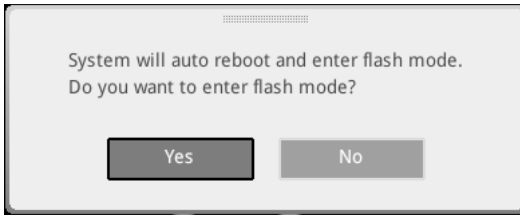
▶ **X.M.P Support Information**

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

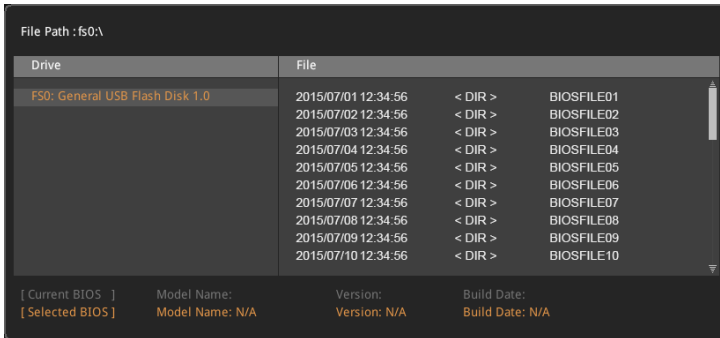
M-FLASH Menu

M-FLASH provides the way to update BIOS with a USB flash drive. Please download the latest BIOS file that matches your motherboard model from MSI website, save the BIOS file into your USB flash drive. And then follow the steps below to update BIOS.

1. Insert the USB flash drive that contains the update file into the computer.
2. Click on **M-FLASH** tab, a demand message will be prompted. Click on **Yes** to reboot and enter the flash mode.



3. The system will enter the flash mode and a file selection menu will appear after rebooting.



4. Select a BIOS file to perform the BIOS update process.
5. After the flashing process is 100% completed, the system will reboot automatically.

OC PROFILE Menu



► Overlocking Profile 1/ 2/ 3/ 4/ 5/ 6

Overlocking Profile 1/ 2/ 3/ 4/ 5/ 6 management. Press **Enter** to enter the sub-menu.

► Set Name for Overlocking Profile 1/ 2/ 3/ 4/ 5/ 6

Set a name the current overlocking profile.

► Save Overlocking Profile 1/ 2/ 3/ 4/ 5/ 6

Save the current overlocking profile.

► Load Overlocking Profile 1/ 2/ 3/ 4/ 5/ 6

Load the current overlocking profile.

► Clear Overlocking Profile 1/ 2/ 3/ 4/ 5/ 6

Clear the current overlocking profile.

► OC Profile Load from ROM

Load OC profile from BIOS ROM.

► OC Profile Save to USB

Save OC profile to the USB flash drive. The USB flash drive should be FAT/ FAT32 format only.

► OC Profile Load from USB

Load OC profile from the USB flash drive. The USB flash drive should be FAT/ FAT32 format only.

HARDWARE MONITOR Menu

This menu allows you to adjust the fan speed manually and monitor CPU/ system voltage.

Select a temperature curve line (white) to be showed in Fan operating window

Select a fan mode for target fan

Select a fan to be configured

Click to enable the Smart Fan

Smart Fan duty information

Fan operating window

Setting Buttons

Temperature information

Voltage information

CPU	System	MOS	PCH	PCI-E 1	PCI-E 2	M.2 1	T_SEN 1	T_SEN 2
32°C	31°C	35°C	40°C	32°C	31°C	29°C	0°C	0°C
89°F	87°F	95°F	104°F	89°F	87°F	84°F	32°F	32°F

0.991	0.944	1.052	1.044	11.928	4.810	3.096	1.192
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► Smart Fan Mode

This item enables/disables the Smart Fan function. Smart Fan is an excellent feature which will adjust the CPU/ system fan speed automatically depending on the current CPU/ system temperature, avoiding the overheating to damage your system.

► Settings Buttons

- **All Full Speed** - configures all fans to run at full operating speed.
- **All Set Default** - configures all fans' speeds return the BIOS default values.
- **All Set Cancel** - discards current changes and restores previous settings for all fan .

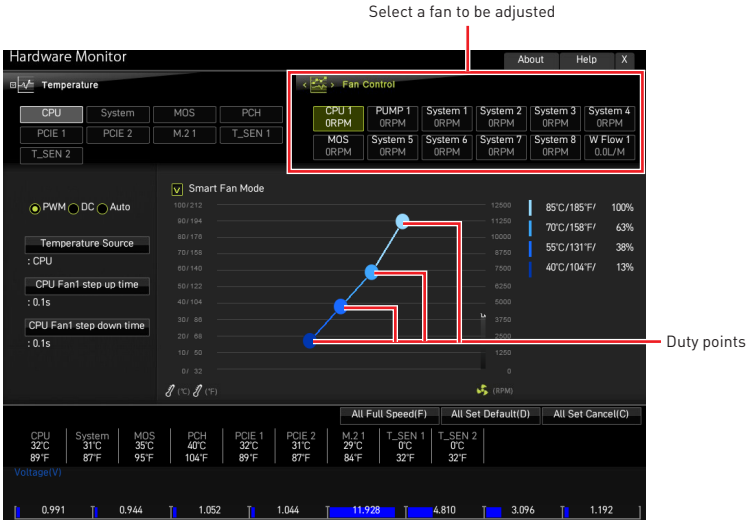


Important

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

Adjusting fans

1. Selects a fan that you want to adjust and to display the fan duty curve line (yellow) in fan operating windows.
2. Click and drag the duty points to adjust the fan speed.



Resetting BIOS

You might need to restore the default BIOS setting to solve certain problems. There are several ways to reset BIOS:

- Go to BIOS and press **F6** to load optimized defaults.
- Short the Clear CMOS jumper on the motherboard.
- Press the Clear CMOS button (optional) on the rear I/O panel.



Important

Be sure the computer is off before clearing CMOS data. Please refer to the Clear CMOS jumper/ button section in the user guide for resetting BIOS.

Updating BIOS

Updating BIOS with M-FLASH

Before updating:

Please download the latest BIOS file that matches your motherboard model from MSI website. And then save the BIOS file into the USB flash drive.

Updating BIOS:

1. Switch to the target BIOS ROM by Multi-BIOS switch. Skip this step if your motherboard does not have this switch.
2. Insert the USB flash drive that contains the update file into the USB port.
3. Please refer the following methods to enter flash mode.
 - Reboot and press **Ctrl + F5** key during **POST** and click on Yes to reboot the system.
 - Reboot and press **Del** key during **POST** to enter BIOS. Click the M-FLASH button and click on Yes to reboot the system.
4. Select a BIOS file to perform the BIOS update process.
5. When prompted click on **Yes** to start recovering BIOS.
6. After the flashing process is 100% completed, the system will reboot automatically.

Updating the BIOS with MSI Center

Before updating:

- Make sure the LAN driver is already installed and the internet connection is set properly.
- Please close all other application software before updating the BIOS.

To update BIOS:

1. Install and launch MSI Center and go to **Support** page.
2. Select **Live Update** and click on the **Advanced** button.
3. Select the BIOS file and click on the **Install** button.
4. The installation reminder will appear, then click the **Install** button on it.
5. The system will automatically restart to update BIOS.
6. After the flashing BIOS process is 100% completed, the system will restart automatically.

Updating BIOS with Flash BIOS Button

1. Please download the latest BIOS file that matches your motherboard model from the MSI® website.
2. **Rename** the BIOS file to **MSI.ROM**, and save it to the root of your USB flash drive.
3. Connect the power supply to **CPU_PWR1** and **ATX_PWR1**. (No need to install CPU and memory.)
4. Plug the USB flash drive that contains the **MSI.ROM** file into the **Flash BIOS Port** on the rear I/O panel.
5. Press the **Flash BIOS Button** to flash BIOS, and the LED starts flashing.
6. The LED will be turned off when the process is completed.

Notices

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