

BIOS User Guide

B660GTQ

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BIOS Update

The BIOS can be updated using either of the following utilities:

- **BIOSTAR BIOS-FLASHER:** Using this utility, the BIOS can be updated from a file on a hard disk, a USB drive (a flash drive or a USB hard drive), or a CD-ROM.
- **BIOSTAR BIOS Update Utility:** It enables automated updating while in the Windows environment. Using this utility, the BIOS can be updated from a file on a hard disk, a USB drive (a flash drive or a USB hard drive), or a CD-ROM, or from the file location on the Web.

BIOSTAR BIO-FLASHER

Note

- » This utility only allows storage device with FAT32/16 format and single partition.
- » Shutting down or resetting the system while updating the BIOS will lead to system boot failure.

Updating BIOS with BIOSTAR BIO-FLASHER

1. Go to the website to download the latest BIOS file for the motherboard.
2. Then, copy and save the BIOS file into a USB flash (pen) drive. (Only supported FAT/FAT32 format)
3. Insert the USB pen drive that contains the BIOS file to the USB port.
4. Power on or reset the computer and then press <F12> during the POST process.

5. After entering the POST screen, the BIO-FLASHER utility pops out. Choose <fs0> to search for the BIOS file.



6. Select the proper BIOS file, and a message asking if you are sure to flash the BIOS file. Click "Yes" to start updating BIOS.



7. A dialog pops out after BIOS flash is completed, asking you to restart the system. Press the <Y> key to restart system.



8. While the system boots up and the full screen logo shows up, press key to enter BIOS setup.

After entering the BIOS setup, please go to the <Save & Exit>, using the <Restore Defaults> function to load Optimized Defaults, and select <Save Changes and Reset> to restart the computer. Then the BIOS Update is completed.

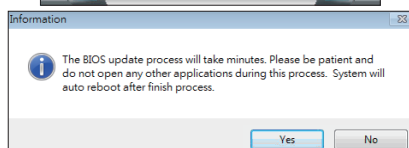
BIOS Update Utility (through the Internet)

1. Installing BIOS Update Utility from the DVD Driver.
2. Please make sure the system is connected to the internet before using this function.

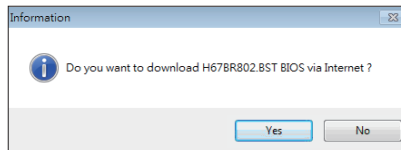
3. Launch BIOS Update Utility and click the “Online Update” button on the main screen.



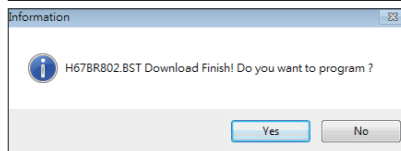
4. An open dialog will show up to request your agreement to start the BIOS update. Click “Yes” to start the online update procedure.



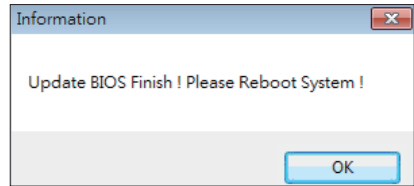
5. If there is a new BIOS version, the utility will ask you to download it. Click “Yes” to proceed.



6. After the download is completed, you will be asked to program (update) the BIOS or not. Click “Yes” to proceed.



7. After the updating process is finished, you will be asked you to reboot the system. Click “OK” to reboot.



8. While the system boots up and the full screen logo shows up, press key to enter BIOS setup.

After entering the BIOS setup, please go to the <Save & Exit>, using the <Restore Defaults> function to load Optimized Defaults, and select <Save Changes> and <Reset> to restart the computer. Then, the BIOS Update is completed.

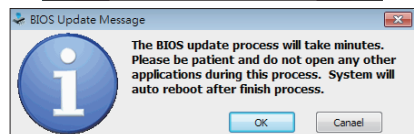
BIOS Update Utility (through a BIOS file)

1. Installing BIOS Update Utility from the DVD Driver.
2. Download the proper BIOS from <http://www.biostar.com.tw/>

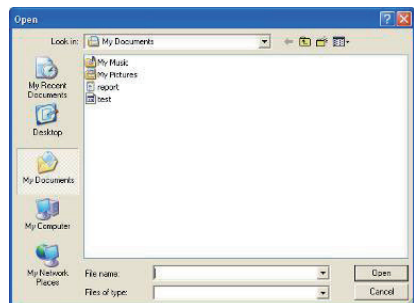
3. Launch BIOS Update Utility and click the “Update BIOS” button on the main screen.



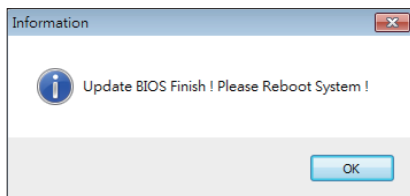
4. A warning message will show up to request your agreement to start the BIOS update. Click “OK” to start the update procedure.



5. Choose the location for your BIOS file in the system. Please select the proper BIOS file, and then click on “Open”. It will take several minutes, please be patient.



6. After the BIOS Update process is finished, click on "OK" to reboot the system.

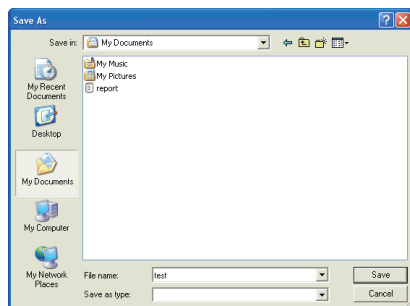


7. While the system boots up and the full screen logo shows up, press key to enter BIOS setup.

After entering the BIOS setup, please go to the <Save & Exit>, using the <Restore Defaults> function to load Optimized Defaults, and select <Save Changes and Reset> to restart the computer. Then, the BIOS Update is completed.

Backup BIOS

Click the Backup BIOS button on the main screen for the backup of BIOS, and select a proper location for your backup BIOS file in the system, and click "Save".



UEFI BIOS Setup

Introduction

The purpose of this manual is to describe the settings in the AMI UEFI BIOS Setup program on this motherboard. The Setup program allows users to modify the basic system configuration and save these settings to NVRAM.

UEFI BIOS determines what a computer can do without accessing programs from a disk. This system controls most of the input and output devices such as keyboard, mouse, serial ports and disk drives. BIOS activates at the first stage of the booting process, loading and executing the operating system. Some additional features, such as virus and password protection or chipset fine-tuning options are also included in UEFI BIOS.

The rest of this manual will to guide you through the options and settings in UEFI BIOS Setup.

Plug and Play Support

This AMI UEFI BIOS supports the Plug and Play Version 1.0A specification.

EPA Green PC Support

This AMI UEFI BIOS supports Version 1.03 of the EPA Green PC specification.

ACPI Support

AMI ACPI UEFI BIOS support Version 1.0/2.0 of Advanced Configuration and Power interface specification (ACPI). It provides ASL code for power management and device configuration capabilities as defined in the ACPI specification, developed by Microsoft, Intel and Toshiba.

PCI Bus Support

This AMI UEFI BIOS also supports Version 2.3 of the Intel PCI (Peripheral Component Interconnect) local bus specification.

Using Setup

When starting up the computer, press during the **Power-On Self-Test (POST)** to enter the UEFI BIOS setup utility.

In the UEFI BIOS setup utility, you will see **General Help** description at the top right corner, and this is providing a brief description of the selected item. **Navigation Keys** for that particular menu are at the bottom right corner, and you can use these keys to select item and change the settings.

Note

- » *The default UEFI BIOS settings apply for most conditions to ensure optimum performance of the motherboard. If the system becomes unstable after changing any settings, please load the default settings to ensure system's compatibility and stability. Use Load Setup Default under the Exit Menu.*
 - » *For better system performance, the UEFI BIOS firmware is being continuously updated. The UEFI BIOS information described in this manual is for your reference only. The actual UEFI BIOS information and settings on board may be slightly different from this manual.*
 - » *The content of this manual is subject to be changed without notice. We will not be responsible for any mistakes found in this user's manual and any system damage that may be caused by wrong-settings.*
-

EZ Mode

In EZ mode, it allows you to quickly operate the basic system setting. Press <F7> to display the EZ Mode menu.



1. **System Time:** Display the system clock.
2. **Boot Priority Bar:** you can move the device icons to change the boot priority.
3. **Hardware Information:** Shows the CPU/ MB temperature, memory size, BIOS version and build date.
4. **AHCI/ RAID/ CSM/ UEFI Function Settings Buttons:** Click on this button to set the AHCI/ RAID, CSM/ UEFI.
5. **Vivid Led DJ/ Erp Control/ LAN Option ROM Switch:** This item enables or disables the LAN Option ROM, ErP Ready, Vivid Led DJ LED.
6. **Setup Function Keys:** This item allows you to set Save & Exit. Press F7/ F12 key to switch between Advanced mode and BIO-Flasher.
7. **Language Settings:** This item allows you to change language.
8. **XMP Settings & AI FAN Palette Interface:** Enables or disables the XMP menu. It also allows you to click or press the A.I FAN button to enter the fan setting interface.
9. **CPU/ Memory/ Storage Information:** This item displays CPU/ Memory/ Storage information.

Note

» Menu contents will be different slightly, depending on different motherboard of users' computers.

A.I FAN Control

Press <F5> to display the A.I FAN Control menu.



1. **CPU FAN/ CPU OPT/ System1/ System2/ System3:** Click button to set the status value of CPU and system fan.
2. **PWM/ Temperature Panel:** According to the fan PWM value corresponding to CPU and system temperature to adjust the fan speed.
 - » Allows you to adjust according to your preferences.
3. **Temperature:** Shows the current CPU and system temperature.
4. **Control Mode:** Allows you to control mode of the fans.
 - **Quiet:** Enable Quiet mode.
 - **Aggressive:** Enable Aggressive mode.
 - **Manual:** Enable Manual mode.
 - **Full on:** Enable Full On mode.
5. **User Selection:** Sets the fan property controls the actual selection operation.
 - **Auto:** Allows you to adjust the Automatic detection Mode.
 - **DC:** Allows you to adjust the Direct Current (DC) Mode.
 - **PWM:** Allows you to adjust the Pulse Width Modulation (PWM) Mode.

Note

- » Menu contents will be different slightly, depending on different motherboard of users' computers.
- » Once you are finished making your selections, choose the <Save & Exit> menu to save.

VIVID LED Control

Press <F6> to display the VIVID LED DJ Control menu.



1. **LED SPARKLE:** Allows to you choose sparkle of the LEDs.

- **Permanent:** LEDs are constantly lit.
- **Breath:** LEDs gradually flash on and off.
- **Shine:** LEDs flash at a specific frequency.
- **OFF:** Allows you to enable or disable VIVID LED of a single item.

2. **LED COLOR:**

- **Auto:** LEDs will Automatically change the Color Palette and LED Brightness.
- » If you select Auto mode, the Color Palette and LED Brightness Bar will disabled.

- **Default:** All the setting are back to default.

3. **LED Type:** Select the LED lighting blocks.

- **SYSTEM:** System LED illuminations. (ARMOR GEAR LED)
- **12V LED:** The 12V LED illumination. (12V_LED Device)
- **5V LED:** The 5V LED illumination. (5V_LED Device)

4. **ON/OFF:** To enable or disable VIVID LED function.

5. **Color Palette:** Allows to you choose specific color of the LEDs.

6. **LED Brightness Bar:** Allows you to adjust the LED brightness.

Note

- » Menu contents will be different slightly, depending on different motherboard of users' computers.
- » Once you are finished making your selections, choose the <Save & Exit> menu to save.

1. Main Menu

Once you enter AMI UEFI BIOS Setup Utility, the Main Menu will appear on the screen providing an overview of the basic system information.



BIOS Information

It shows system information including UEFI BIOS version, Project Code, Model Name, Build Date and etc.

Total Memory

Shows system memory size, VGA shard memory will be excluded.

Memory Frequency

Shows the system memory frequency.

System Language

Choose the system default language.

System Date

Set the system date. Note that the 'Day' automatically changes when you set the date.

System Time

Set the system internal clock.

2. Advanced Menu

The Advanced Menu allows you to configure the settings of CPU, Super I/O, Power Management, and other system devices.

Note

» Beware of that setting inappropriate values in items of this menu may cause system to malfunction.



Connectivity Configuration

This item shows Configure Connectivity related options.

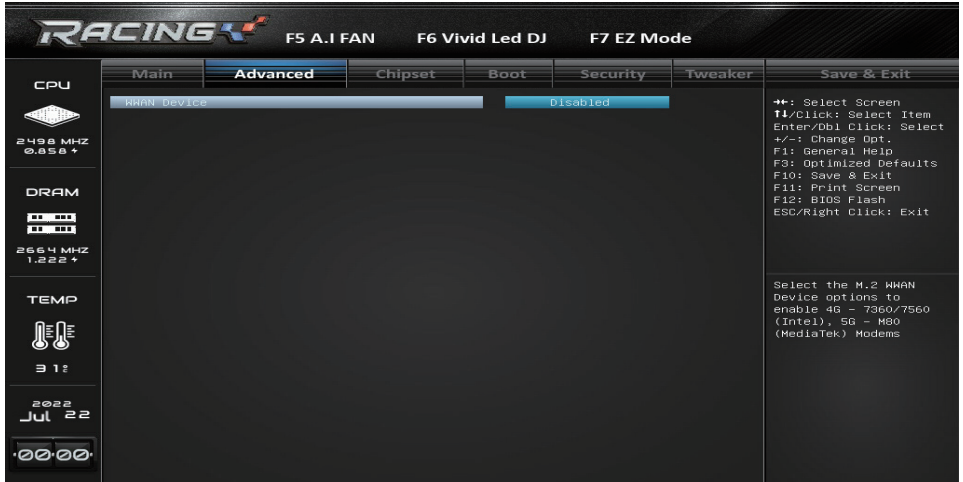


CNVi Mode

This item option configures connectivity.

Options: Auto Detection (Default) / Disable Integrated

WWAN Configuration



WWAN Device

This item enables or disables M.2 WWAN Device.

Options: Disabled (Default) / 4G - 7360/7560 / 5G - M80

Note

- » *The following items appear only when you set the WWAN Device function to [4G - 7360/7560 / 5G - M80].*

WWAN Reset Workaround

This item enabling this workaround will result in BIOS asserting FULL_CARD_POWER_OFF# WWAN signals before the WWAN Device Power-On Sequence is executed. Disabling it has no impact.

Options: Enabled (Default) / Disabled

CPU Configuration

This item shows CPU Information

Item	Value
CPU Configuration	
12th Gen Intel(R) Core(TM) i5-12400	
ID	0x90672
Microcode Revision	1E
Speed	2500 MHz
Number of Performance-cores	6Core(s) / 12Thread(s)
VMX	Supported
SMX/TXT	Not Supported
Overclocking Lock	Enabled
Hardware Prefetcher	Disabled
Adjacent Cache Line Prefetch	Enabled
Intel (VMX) Virtualization Technology	Enabled
AVX	Enabled
Active Performance-cores	All
Hyper-Threading	Enabled
AES	Enabled
Legacy Game Compatibility Mode	Disabled

Overclocking Lock

This item enables or disables Overclocking Lock (BIT 20) in FLEX_RATIO(194) MSR.

Options: Disabled (Default) / Enabled

Hardware Prefetcher

This item allows you to turn on / off the MLC streamer prefetcher.

Options: Enabled (Default) / Disabled

Adjacent Cache Line Prefetch

This item to turn on / off prefetching of adjacent cache lines.

Options: Enabled (Default) / Disabled

Intel (VMX) Virtualization Technology

The item allows you to enable or disable Intel (VMX) Virtualization Technology, when enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.

Options: Enabled (Default) / Disabled

Hyper-Threading

This item enables or disables Hyper-Threading. Enabled for Windows XP and Linux (OS optimized for Hyper-Threading Technology) and Disabled for other OS (OS not optimized for Hyper-Threading Technology).

Options: Enabled (Default) / Disabled

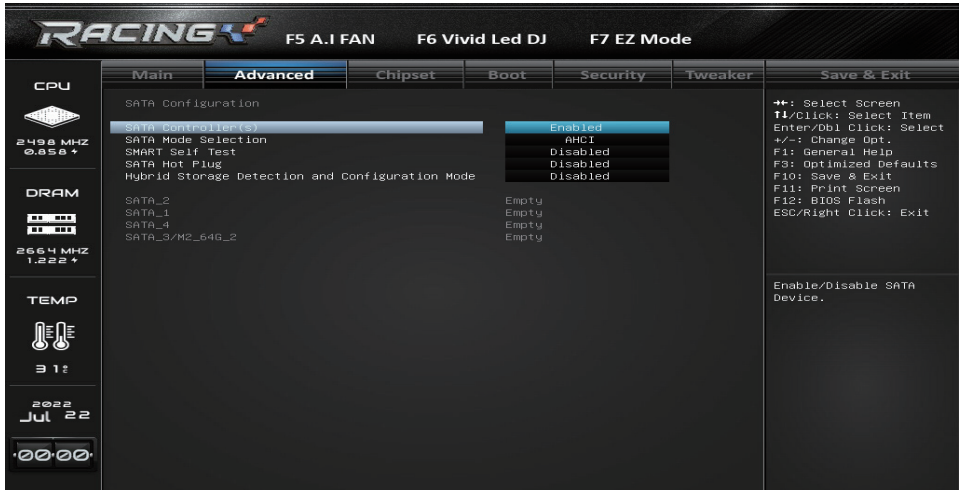
AES

This item enables or disables AES (Advanced Encryption Standard).

Options: Enabled (Default) / Disabled

SATA and RST Configuration

The BIOS will automatically detect the presence of SATA devices. There is a sub-menu for each SATA device. Select a device and press <Enter> to enter the sub-menu for detailed options.



SATA Controller(s)

This item enables or disables Serial ATA Device.

Options: Enabled (Default) / Disabled

SATA Mode Selection

This item determines how SATA controller(s) operate.

Options: AHCI (Default) / RAID

SMART Self Test

This item runs SMART Self Test on all HDDs during POST.

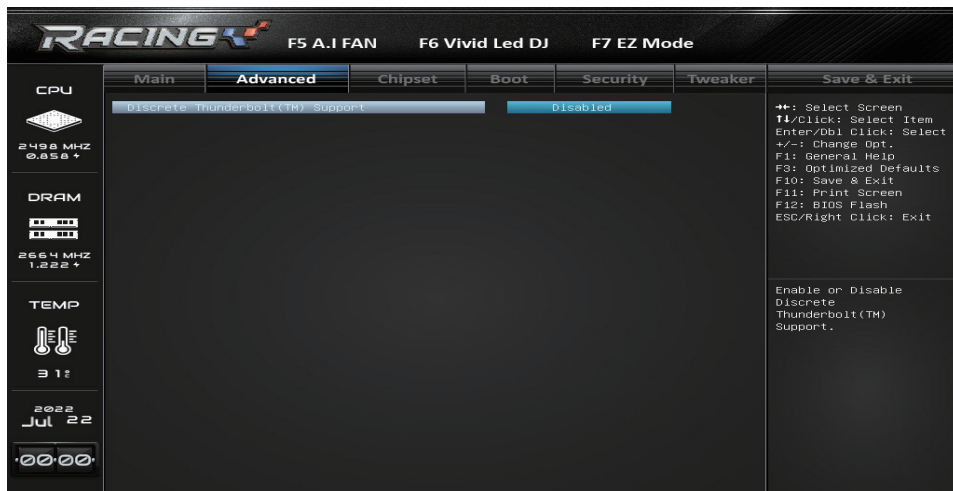
Options: Disabled (Default) / Enabled

SATA Hot Plug

This item Designates SATA port as Hot Pluggable.

Options: Disabled (Default) / Enabled

Thunderbolt (TM) Configuration



Discrete Thunderbolt(TM) support

This item enables or disables Discrete Thunderbolt (TM) support.

Options: Disabled (Default) / Enabled

Note

» The following items appear only when you set the Discrete Thunderbolt(TM) function to [Enabled].

DTbt Root Port Type

This item allows you to select the TBT Root Port Type. PCH or PEG

Options: PCH Root Port (Default) / PEG Root Port

Trusted Computing



Security Device Support

This item enables or disables BIOS support for security device. O.S will not show Security Device. TCG EFI protocol and INT1A interface will not be available.

Options: Enabled (Default) / Disabled

SHA256 PCR Bank

This item enables or disables SHA256 PCR Bank.

Options: Enabled (Default) / Disabled

Pending operation

This item schedule an operation for the security device.

Options: None (Default) / TPM Clear

» *Note: Your comuter will reboot during restart in order to change state of security device.*

Platform Hierarchy

This item enables or disables Platform Hierarchy.

Options: Enabled (Default) / Disabled

Storage Hierarchy

This item enables or disables Storage Hierarchy.

Options: Enabled (Default) / Disabled

Endorsement Hierarchy

This item enables or disables Endorsement Hierarchy.

Options: Enabled (Default) / Disabled

TPM2.0 UEFI Spec Version

This item allows you to select the TCG2 Spec Version Support. TCG_1_2: the compatible mode for Win8/ Win10; TCG_2: Support new TCG2 protocol and event format for Win10 or later.

Options: TCG_2 (Default) / TCG_1_2

Physical Presence Spec Version

This item select to tell O.S. to support PPI Spec Version 1.2 or 1.3.

Options: 1.3 (Default) / 1.2

» *Note some HCK tests might not support 1.3.*

ACPI Settings



Enable ACPI Auto Configuration

This item enables or disables BIOS ACPI auto configuration function.

Options: Disabled (Default) / Enabled

Enable Hibernation

This item enables or disables system ability to Hibernate (OS/S4 sleep state). This option may not be effective with some OSs.

Options: Enabled (Default) / Disabled

ACPI Sleep State

This item selects the highest ACPI sleep state the system will enter when the SUSPEND button is pressed.

Options: S3 (Suspend to RAM) (Default) / Suspend Disabled

S3 Video Repost

The item enables or disables S3 Video Repost. On enabling, Video Option ROM will be dispatched during S3 resume.

Options: Disabled (Default) / Enabled

PS2 Keyboard PowerOn

This item allows you to control the keyboard power on function.

Options: Disabled (Default) / Any Key / Stroke Key / Specific Key

Stroke Keys

This item will show only when Keyboard PowerOn is set "Stroke Key."

Options: Wake Key (Default)

Specific Key

This item will show only when Keyboard PowerOn is set "Specific Key." Press Enter to set Specific key.

PS2 Mouse PowerOn

This item allows you to control the mouse power on function.

Options: Disabled (Default) / Enabled

Restore AC Power Loss

Specify what state to go to when power is re-applied after a power failure.

Options: Power Off (Default) / Power On / Last State

PME Wake up from S5

The item enables the system to wake from S5 using PME event.

Options: Disabled (Default) / Enabled

Wake system with Fixed Time

This item enables or disables the system to wake on by alarm event. When this item is enabled, the system will wake on the hr::min::sec specified.

Options: Disabled (Default) / Enabled

Wake up date

You can choose which date the system will boot up.

Wake up hour / Wake up minute / Wake up second

You can choose the system boot up time, input hour, minute and second to specify.

IT8625 Super IO Configuration



Serial Port Configuration



Serial Port

This item enables or disables serial Port (COM).

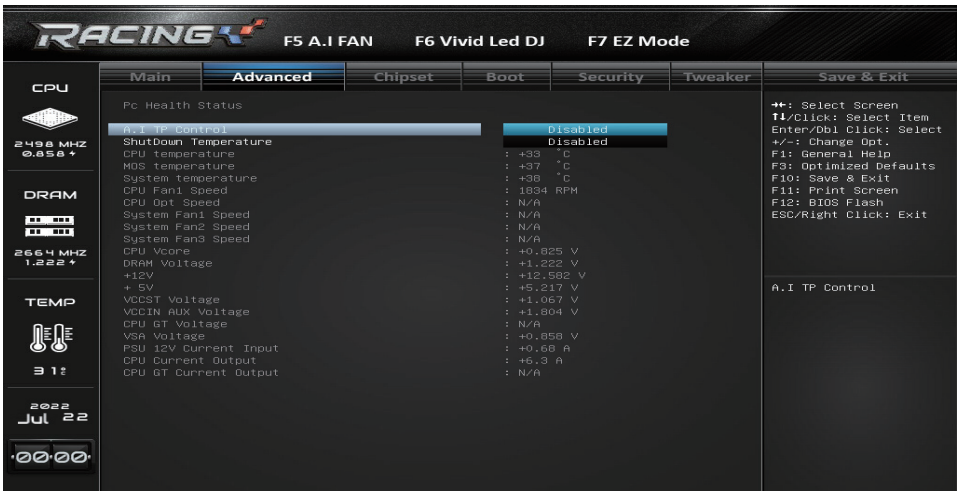
Options: Enabled (Default) / Disabled

Change Settings

This item allows you to select an optimal settings for Super IO Device.

Options: Auto (Default) / IO=2F8h; IRQ=3 / IO=3F8h; IRQ=3,4,5,6,7,9,10,11,12 / IO=2F8h; IRQ=3,4,5,6,7,9,10,11,12 / IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12 / IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12

H/W Monitor



Shutdown Temperature

This item allows you to set up the CPU shutdown Temperature.

Options: Disabled (Default) / 70°C/158°F / 75°C/167°F / 80°C/176°F / 85°C/185°F / 90°C/194°F

USB Configuration

Category	Item	Value
CPU	USB Configuration	
	USB Module Version	28
	USB Controllers:	1 XHCI
	USB Devices:	1 Drive, 1 Keyboard, 3 Hubs
	Legacy USB Support	Enabled
	XHCI Hand-off	Disabled
	USB Mass Storage Driver Support	Enabled
	USB hardware delays and time-outs:	
	USB transfer time-out	20 sec
	Device reset time-out	20 sec
Device power-up delay	Auto	
TEMP	Mass Storage Devices:	
	USB FLASH DRIVE PMAP	Auto

++: Select Screen
 ↑/Click: Select Item
 Enter/Obj Click: Select
 +/-: Change Opt.
 F1: General Help
 F3: Optimized Defaults
 F10: Save & Exit
 F11: Print Screen
 F12: BIOS Flash
 Esc/Right Click: Exit

Enables Legacy USB support. AUTO option disables legacy support if no USB devices are connected. DISABLE option will keep USB devices available only for EFI applications.

Legacy USB Support

The item allows you to enable Legacy USB support. AUTO option disables legacy support if no USB devices are connected. DISABLE option will keep USB devices available only for EFI applications.
Options: Enabled (Default) / Disabled / Auto

XHCI Hand-off

This is a workaround for OSeS without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.
Options: Disabled (Default) / Enabled

USB Mass Storage Driver Support

The item enables or disables USB Mass Storage Driver Support.
Options: Enabled (Default) / Disabled

USB transfer time-out

The time-out value for Control, Bulk, and Interrupt transfers.
Options: 20 sec (Default) / 1 sec / 5 sec / 10 sec

Device reset time-out

The item sets USB mass storage device Start Unit command time-out.
Options: 20 sec (Default) / 10 sec / 30 sec / 40 sec

Device power-up delay

Maximum time the device will take before it properly reports itself to the Host Controller. "Auto" uses default value: for a Root port it is 100ms, for a Hub port the delay is taken from Hub descriptor.
Options: Auto (Default) / Manual

Note

» The following items appear only when you set the Device power-up delay function to [Manual].

Device power-up delay in seconds

Delay range is 1 ~ 40 seconds, in one second increments.

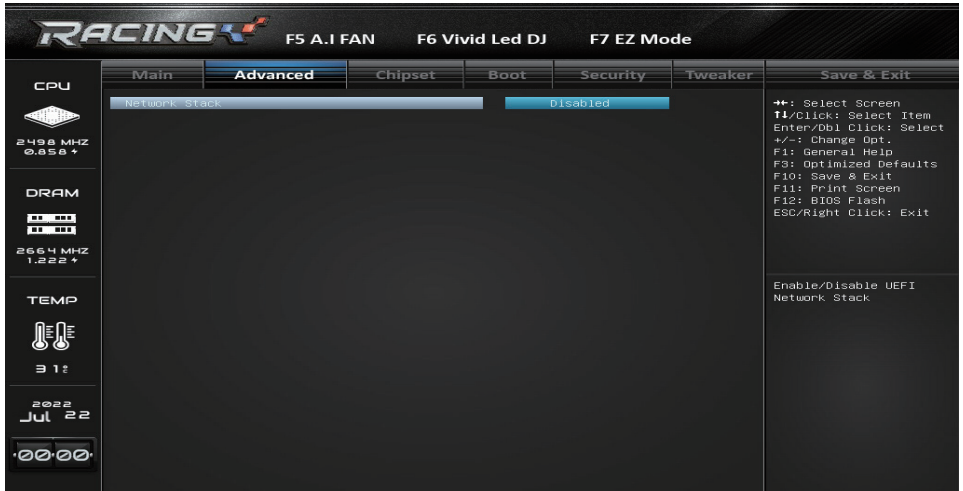
Options: 5 (Default)

USB FLASH DRIVE PMAP

This item Mass storage device emulation type. 'AUTO' enumerates devices according to their media format. Optical drives are emulated as 'CDROM', drives with no media will be emulated according to a drive type.

Options: Auto (Default) / Floppy / Forced FDD / Hard Disk / CD-ROM

Network Stack Configuration



Network Stack

This item enables or disables UEFI network stack.

Options: Disabled (Default) / Enabled

Note

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

IPv4 PXE Support

This item enables or disables IPv4 PXE Boot Support. If disabled IPv4 PXE boot support will not be available.

Options: Disabled (Default) / Enabled

IPv4 HTTP Support

This item enables or disables IPv4 HTTP Boot Support. If disabled IPV4 HTTP boot support will not be available.

Options: Disabled (Default) / Enabled

IPv6 PXE Support

This item enables or disables IPv6 PXE Boot Support. If disabled IPv6 PXE boot support will not be available.

Options: Disabled (Default) / Enabled

IPv6 HTTP Support

This item enables or disables IPv6 HTTP Boot Support. If disabled IPv6 HTTP boot support will not be available.

Options: Disabled (Default) / Enabled

PXE boot wait time

Wait time to press ESC key to abort the PXE boot.

Media detect count

Number of times presence of media will be checked.

NVMe Configuration

The item shows NVMe controller and driver information.



No PCIe SATA Controller / PCIe SSDs are Present



3. Chipset Menu

This section describes configuring the PCI bus system. PCI, or Personal Computer Interconnect, is a system which allows I/O devices to operate at speeds nearing the speed of the CPU itself uses when communicating with its own special components.

Note

» Beware of that setting inappropriate values in items of this menu may cause system to malfunction.



System Agent (SA) Configuration



Internal Graphics

This item keeps IGFX enabled based on the setup options.

Options: Auto (Default) / Enabled / Disabled

Primary Display

This item selects which of IGFX/ PEG/ PCI Graphics device should be Primary Display or select SG for Switchable Gfx.

Options: Auto (Default) / IGFX / PEG Slot / PCH PCI

GTT Size

This item select the GTT Size.

Options: 8MB (Default) / 2MB / 4MB

Aperture Size

This item selects Aperture Size.

Options: 256MB (Default) / 128MB / 512MB / 1024MB

PSMI Support

This item selects PSMI Enable / Disable.

Options: Disable (Default) / Enable

DVMT Pre-Allocated

This item selects DVMT 5.0 Pre-Allocated (Fixed) Graphics Memory size used by the Internal Graphics Device.

Options: 60M (Default) / 0M / 32M / 64M / 96M / 128M / 160M / 4M / 8M / 12M / 16M / 20M / 24M / 28M / 32M/F7 / 36M / 40M / 44M / 48M / 52M / 56M

DVMT Total Gfx Mem

This item selects DVMT5.0 Total Graphic Memory size used by the Internal Graphics Device.

Options: 256MB (Default) / 128MB / MAX

PAVP Enable

This item enables or disables PAVP.

Options: Enabled (Default) / Disabled

Max TOLUD

Maximum Value of TOLUD. Dynamic assignment would adjust TOLUD automatically based on largest MMIO length of installed graphic controller.

Options: Dynamic (Default) / 1 GB / 1.25 GB / 1.5 GB / 1.75 GB / 2 GB / 2.25 GB / 2.5 GB / 2.75 GB / 3 GB / 3.25 GB / 3.5GB

VT-d

This item enables or disables VT-d capability.

Options: Enabled (Default) / Disabled

Above 4GB MMIO BIOS assignment

This item enables or disables above 4GB Memory Mapped IO BIOS assignment. This is enabled automatically when Aperture Size is set to 2048MB.

Options: Enabled (Default) / Disabled

PCH-IO Configuration

Category	Item	Value
PCH-IO Configuration	PCI Express Configuration	
	HD Audio	Enabled
	ErP Control	Disabled
	BIOS Lock	Disabled

HD Audio

Control Detection of the HD-Audio device. Disabled = HDA will be unconditionally disabled. Enabled = HDA will be unconditionally enabled. Auto = HDA will be enabled if present, disabled otherwise.

Options: Enabled (Default) / Auto / Disabled

ErP Control

When ErP is enabled, the system will meet ErP requirement.

Options: Disabled (Default) / Enabled in S4-S5

PCI Express Configuration

Category	Item	Value
PCI Express Configuration	PCI Express Configuration	
	PCIe Speed	Auto
	PCIe Speed	Auto

Onboard Device



Onboard LAN1

This item enables or disables Onboard LAN1.

Options: Enabled (Default) / Disabled

4. Boot Menu

This menu allows you to setup the system boot options.



Setup Prompt Timeout

This item sets number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.

Options: 1 (Default)

Bootup NumLock State

This item selects the keyboard NumLock state.

Options: Off (Default) / On

Full Screen Logo Display

This item enables or disables Full Screen Logo Show function.

Options: Enabled (Default) / Disabled

Boot Success Beep

When this item is set to Enabled, BIOS will let user know boot success with beep.

Options: Enabled (Default) / Disabled

BIOS Flash protection

While enabled, it can't flash write and flash erase by SMI.

Options: Enabled (Default) / Disabled

Fast Boot

This item allows you to enable or disable boot with initialization of a minimal set of devices required to launch active boot option. Has no effect for BBS boot options.

Options: Disabled (Default) / Enabled

Note

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

SATA Support

If All SATA Devices, all SATA devices, all SATA devices will be available in OS and Post.

Options: Last Boot SATA Devices Only (Default) / All SATA Devices

VGA Support

If Auto, only install Legacy OpRom with Legacy OS and logo would NOT be shown during post. EFI driver will still be installed with EFI OS.

Options: EFI Driver (Default) / Auto

USB Support

If Disabled, all USB devices will NOT be available until after OS boot. If Partial Initial, USB Mass Storage and specific USB port/device will NOT be available before OS boot. If Enabled, all USB devices will be available in OS and Post.

Options: Full Initial (Default) / Disabled / Partial Initial

PS2 Devices Support

If Disabled, PS2 devices will be skipped.

Options: Enabled (Default) / Disabled

Network Stack Driver Support

If Disabled, Network Stack Drivers will be skipped.

Options: Disabled (Default) / Enabled

Redirection Support

If Disabled, Redirection function will be disabled.

Options: Disabled (Default) / Enabled

CSM Support

This option enables or disables CSM support.

Options: Enabled (Default) / Disabled

Note

» *The following items appear only when you set the CSM Support function to [Enabled]*

Network

This option controls the execution of UEFI and Legacy PXE OpROM.

Options: Legacy (Default) / UEFI / Do not launch

Storage

This option controls the execution of UEFI and Legacy Storage OpROM.

Options: Legacy (Default) / UEFI / Do not launch

Video

This option controls the execution of UEFI and Legacy Video OpROM.

Options: Legacy (Default) / UEFI / Do not launch

Other PCI device

Determines OpROM execution policy for devices other than Network, Storage, or Video.

Options: UEFI (Default) / Legacy / Do not launch

Fixed Boot Order Priorities

Boot Option #1/ #2/ #3/ #4/ #5/ #6/ #7/ #8/ #9/ #10/ #11/ #12/ #13/ #14/ #15

#1 Options: UEFI Hard Disk (Default)

#2 Options: UEFI NVME (Default)

#3 Options: UEFI CD/DVD (Default)

#4 Options: UEFI USB Hard Disk (Default)

#5 Options: UEFI USB CD/DVD (Default)

#6 Options: UEFI USB Key (Default)

#7 Options: UEFI Network (Default)

#8 Options: Hard Disk (Default)

#9 Options: NVME (Default)

#10 Options: CD/DVD (Default)

#11 Options: USB Hard Disk (Default)

#12 Options: USB CD/DVD (Default)

#13 Options: USB Key (Default)

#14 Options: USB Floppy (Default)

#15 Options: Network (Default)

5. Security Menu

RACING F5 A.I FAN F6 Vivid Led DJ F7 EZ Mode

CPU	Main	Advanced	Chipset	Boot	Security	Tweaker	Save & Exit
 2498 MHz 0.836 °C	Password Description If ONLY the Administrator's password is set, then this only limits access to Setup and is only asked for when entering Setup. If ONLY the User's password is set, then this is a power on password and must be entered to boot or enter Setup. In Setup the User will have Administrator rights. The password length must be in the following range: Minimum length: 3 Maximum length: 20						++: Select Screen ↑/Click: Select Item Enter/Obl Click: Select +/-: Change Opt. F1: General Help F3: Optimized defaults F10: Save & Exit F11: Print Screen F12: BIOS Flash Esc/Right Click: Exit
DRAM 2664 MHz 1.222 °C	Administrator Password User Password						Set Administrator Password
TEMP 33°C 2022 Jul 22 00:00	▶ Secure Boot						

Administrator Password

This item sets Administrator Password.

User Password

This item sets User Password.

Secure Boot Menu

RACING F5 A.I FAN F6 Vivid Led DJ F7 EZ Mode

CPU	Main	Advanced	Chipset	Boot	Security	Tweaker	Save & Exit
 2496 MHz 0.792 °C	System Mode Setup						++: Select Screen ↑/Click: Select Item Enter/Obl Click: Select +/-: Change Opt. F1: General Help F3: Optimized defaults F10: Save & Exit F11: Print Screen F12: BIOS Flash Esc/Right Click: Exit
DRAM 2662 MHz 1.222 °C	Secure Boot Disabled						
TEMP 33°C 2022 Jul 22 00:00	Secure Boot Mode Not Active ▶ Restore Factory Keys Custom ▶ Reset To Setup Mode ▶ Key Management						Secure Boot feature is Active if Secure Boot is Enabled. Platform Key(PK) is enrolled and the System is in User mode. The mode change requires platform reset

Secure Boot

Secure Boot feature is active if secure boot is Enabled, when Platform Key(PK) is enrolled and the System is in User mode. The mode change requires platform reset.

Options: Disabled (Default) / Enabled

Secure Boot Mode

Secure Boot mode options: Standard or Custom mode. In Custom mode, Secure Boot Policy variables can be configured by a physically present user without full authentication.

Options: Custom (Default) / Standard

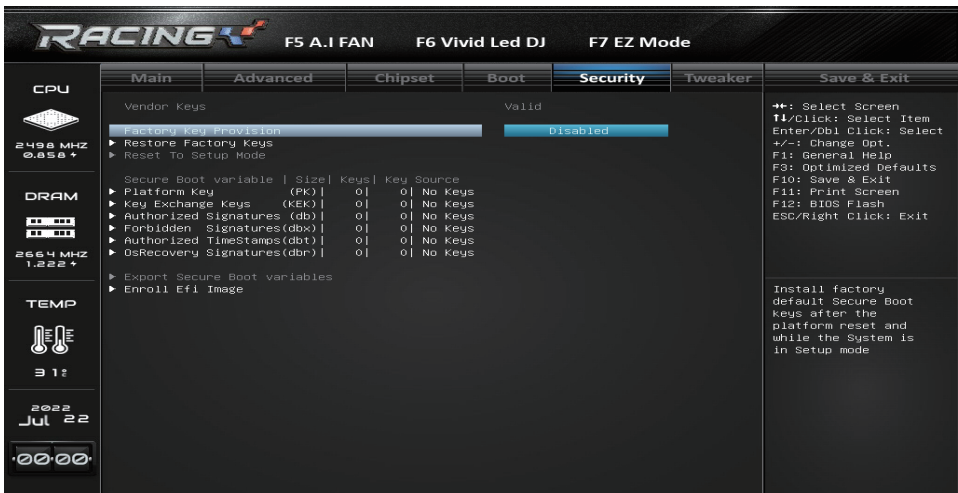
Restore Factory Keys

Force System to User Mode. Configure NVRAM to contain OEM-defined factory default Secure Boot Keys.

Restore To Setup Mode

Delete NVRAM content of all UEFI Secure Boot Key databases.

Key Management



Factory Key Provision

Install factory default Keys on next re-boot only when system in setup mode.

Options: Disabled (Default) / Enabled

Restore Factory Keys

Force System to User Mode. Configure NVRAM to contain OEM-defined factory default Secure Boot Keys.

Restore To Setup Mode

Delete NVRAM content of all UEFI Secure Boot Key databases.

Platform Key (PK)

Options: Details / Export / Update / Delete

Key Exchange Keys

Options: Details / Export / Update / Append / Delete

Authorized Signatures

Options: Details / Export / Update / Append / Delete

Forbidden Signatures

Options: Details / Export / Update / Append / Delete

Authorized Timestamps

Options: Update / Append

OsRecovery Signatures

Options: Update / Append

Export Secure Boot variables

Copy NVRAM content of Secure Boot variables to files in a root folder on a file system device.

Enroll Efi Image

Allow the image to run in Secure Boot mode. Enroll SHA256 Hash certificate of a PE image into Authorized Signature Database (db).

6. Tweaker Menu

This submenu allows you to change voltage and clock of various devices.

Note

- » We suggest you use the default setting. Changing the voltage and clock improperly may damage the device.
- » The options and default settings might be different by RAM or CPU models.
- » Beware of that setting inappropriate values in items of this menu may cause system to malfunction.
 - Values in Red: Danger
 - Values in Yellow: Warning
 - Values in White: Normal



Start Page

You can set the entrance page when you enter UEFI BIOS Setup.

Options: Page – Main (Default) / Page – Advanced / Page – Chipset / Page – Boot / Page – Security / Page – Tweaker / Page – Save & Exit

P-core Ratio Mode

This item can sets P-core Ratio Mode.

Options: Auto (Default) / All Cores / Per Core / Fixed

Note

- » The following items appear only when you set the CPU Ratio Mode function to [All Cores & Fixed]

Ring Ratio Mode

This item can sets Ring Ratio Mode.

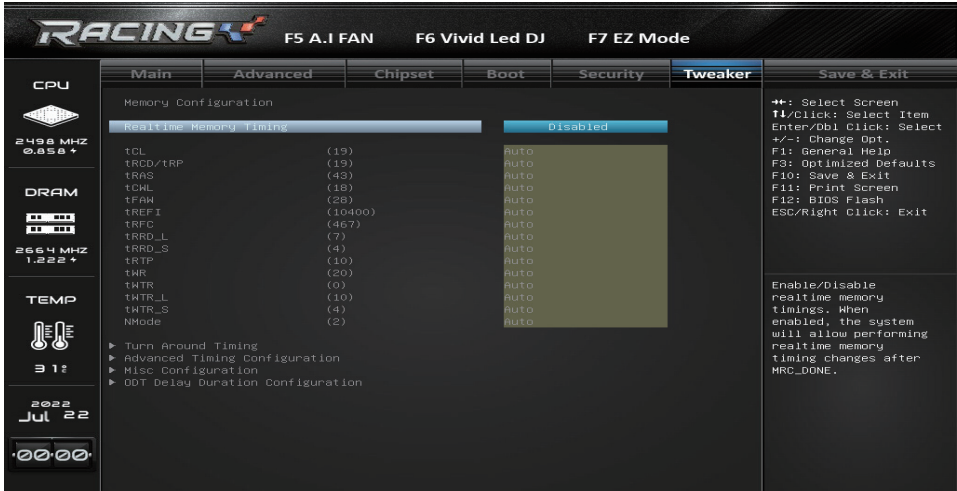
Options: Auto (Default) / Fixed

Memory Profile

Select DIMM timing profile. The below values start with the currently running values and don't auto populate.

Options: Default profile (Default) / Custom profile

Memory Configuration



Item	Value	Options
RealTime Memory Timing	Disabled	Auto, Enabled
tCL	(19)	0: AUTO, max: 36
tRCD/trp	(19)	0: AUTO, max: 63
tRAS	(43)	0: AUTO, max: 90
tCWL	(18)	0: AUTO, max: 34
tFAW	(28)	0: AUTO, max: 127
tREFI	(10400)	0: AUTO, max: 65535
tRFC	(467)	0: AUTO, max: 1023
tRRD_LL	(7)	0: AUTO, max: 31
tRRD_LS	(4)	0: AUTO, max: 31
tRTP	(10)	0: AUTO, max: 31
tWR	(20)	0: AUTO, max: 31
tWTR	(0)	0: AUTO, max: 31
tWTR_LL	(10)	0: AUTO, max: 31
tWTR_LS	(4)	0: AUTO, max: 31
NMode	(2)	0: AUTO, max: 31

Realtime Memory Timing

This item enables or disables realtime memory timings. When enabled, the system will allow performing realtime memory timing changes after MRC_DONE.

Options: Disabled (Default) / Enabled

tCL

This item allows you to select CAS Latency, 0: AUTO, max: 36

Options: Auto (Default)

tRCD/trp

This item allows you to select RAS to CAS delay time and Row Prechrg delay time, 0: AUTO, max: 63

Options: Auto (Default)

tRAS

This item allows you to select RAS Active Time, 0: AUTO, max: 90

Options: Auto (Default)

tCWL

This item allows you to select Min CAS Write Latency Delay Time, 0: AUTO, max: 34

Options: Auto (Default)

tFAW

This item allows you to select Min Four Activate Window Delay Time, 0: AUTO, max: 127

Options: Auto (Default)

tREFI

This item allows you to select Refresh Interval, 0: AUTO, max: 65535

Options: Auto (Default)

tRFC

This item allows you to select Min Refresh Recovery Delay Time, 0: AUTO, max: 1023

Options: Auto (Default)

tRRD_L

This item allows you to select Min Row Active to Row Active Delay Time, Same Bank Group, 0: AUTO, max: 31

Options: Auto (Default)

tRRD_S

This item allows you to select Min Row Active to Row Active Delay Time, Different Bank Group, 0: AUTO, max: 31

Options: Auto (Default)

tRTP

This item allows you to select Min Internal Read to Precharge Delay Time. Shall be set to half of tWR value, 0: AUTO, max: 15. DDR4 legal values: 5, 6, 7, 8, 9, 10, 12

Options: Auto (Default)

tWR

This item allows you to select Min Write Recovery Time, 0: AUTO, legal values: 5, 6, 7, 8, 10, 12, 14, 16, 18, 20, 24, 28, 30, 32, 34, 38, 40, 44

Options: Auto (Default)

tWTR_L

This item allows you to select Min Internal Write to Read Command Delay Time, Same Bank Group, 0: AUTO, max: 60

Options: Auto (Default)

tWTR_S

This item allows you to select Min Internal Write to Read Command Delay Time, Different Bank Group, 0: AUTO, max: 28

Options: Auto (Default)

NMode

This item allows you to select System command rate, range 0-2, 0 = auto, 1 = 1N, 2 = 2N

Options: Auto (Default)

Voltage Configuration



BCLK Aware Adaptive Voltage

This item enables or disables BCLK Aware Adaptive Voltage. When enabled, pcode will be aware of the BCLK frequency when calculating the CPU V/F curves. This is ideal for BCLK OC to avoid high voltage overrides.

Options: Enabled (Default) / Disabled

CPU Vcore Voltage

This item allows you to configure the CPU voltage.

Options: Auto (Default) / Override / Adaptive

CPU Load-Line Calibration

This item adjust CPU Load Line Calibration function.

Options: Auto (Default) / Level 1 / Level 2 / Level 3 / Level 4 / Level 5 / Level 6 / Level 7

CPU GT Voltage

This item allows you to configure the CPU GT voltage fixed or offset value

Options: Auto (Default) / Override / Adaptive

Note

» The following items appear only when you set the CPU GT Over Voltage to [Override]

CPU GT Adjust Voltage

Options: 0.800V (Default)

Note

» The following items appear only when you set the CPU GT Voltage to [Adaptive]

CPU GT Offset Prefix

Options: + (Default) / -

CPU GT Offset Voltage

Options: Auto (Default)

DRAM Voltage

This item sets DRAM Voltage.

Options: Auto (Default)

PCH Voltage

This item sets PCH Voltage.

Options: Auto (Default)

CPU VccIO Voltage

This item sets CPU High Frequency I/O Logic power supply.

Options: Auto (Default)

Vcc PLL Voltage

This item sets VCC PLL OC Voltage.

Options: Auto (Default)

Vcc ST Voltage

This item sets VCC ST OC Voltage.

Options: Auto (Default)

CPU SA Voltage

This item sets CPU System Agent Power Supply.

Options: Auto (Default)

DDR VPP Voltage

This item sets DRAM Activating Power Supply.

Options: Auto (Default)

CPU Power Management



Intel(R) SpeedStep(tm)

This item allows more than two frequency ranges to be supported.

Options: Enabled (Default) / Disabled

Power Limit 1 Override

This item enables or disables Power Limit 1 Override. If this option is disabled, BIOS will program the default values for Power Limit 1 and Power Limit 1 Time Window.

Options: Disabled (Default) / Enabled

Note

» The following items appear only when you set the Power Limit 1 Override function to [Enabled]

Power Limit 1

This item Power Limit 1 value in Milli Watts. BIOS will round to the nearest 1/8W when programming. 0 = no custom override. For 12.50W, enter 12500.

Options: 0 (Default)

Power Limit 2 Override

This item enables or disables Power Limit 2 Override. If this option is disabled, BIOS will program the default values for Power Limit 2.

Options: Disabled (Default) / Enabled

Note

» The following items appear only when you set the Power Limit 2 Override function to [Enabled]

Power Limit 2

This item Power Limit 2 value in Milli Watts. BIOS will round to the nearest 1/8W when programming. If the value is 0, BIOS will program this value as 1.25*TDP. For 12.50W, enter 12500. Processor applies control policies such that the package power does not exceed this limit.

Options: 0 (Default)

C states

This item enables or disables CPU Power Management. Allows CPU to go to C states when it's not 100% utilized.

Options: Enabled (Default) / Disabled

Enhanced C-states

This item enables or disables C1E. When enabled, CPU will switch to minimum speed when all cores enter C-State.

Options: Enabled (Default) / Disabled

C-States Auto Demotion

This item sets C-State Auto Demotion.

Options: C1 (Default) / Disabled

C-States Un-demotion

This item sets C-State Un-demotion.

Options: C1 (Default) / Disabled

Package C-State Demotion

This item sets Package C state Demotion.

Options: Enabled (Default) / Disabled

Package C-State Un-demotion

This item sets Package C-State Un-demotion.

Options: Enabled (Default) / Disabled

CState Pre-Wake

Disable - Sets bit 30 of POWER_CTL MSR(0x1FC) to 1 to disable the Cstate Pre-Wake.

Options: Enabled (Default) / Disabled

IO MWAIT Redirection

This item set enables, will map IO_read instructions sent to IO registers PMG_IO_BASE_ADDRBASE+Offset to MWAIT (offset)

Options: Disabled (Default) / Enabled

Dual Tau Boost

This item enables Dual Tau Boost feature. This is only applicable for Desktop 35W/65W/125W sku.

Options: Disabled (Default) / Enabled

CFG Lock

This item configire MSR 0xE2[15], CFG lock bit.

Options: Disabled (Default) / Enabled

Thermal Monitor

This item enables or disables Thermal Monitor.

Options: Enabled (Default) / Disabled

AVX2 Ratio Offset

This item AVX2 Ratio Offset. Specifies number of bins to decrease AVX ratio vs. Core Ratio. AVX is a more stressful workload, it is helpful to lower the AVX ratio to ensure maximum possible ratio for SSE workloads.

Options: Auto (Default)

TjMax Offset

This item TjMax Offset. Specified value here is clipped by pCode to support TjMax in the range of 62 to 115 deg Celsius.

Options: Auto (Default)

GT Power Management



RC6(Render Standby)

This item enables or disables Render Standby.

Options: Enabled (Default) / Disabled

Maximum GT frequency

This item maximum GT frequency limited by te user. Value beyond the range will be clipped to min/max supported by SKU.

Options: Auto (Default)

Disable Turbo GT frequency

This item Disable Turbo GT frequency. Enabled: Disables Turbo GT frequency. Disabled: GT frequency is no limited.

Options: Disabled (Default) / Enabled

Memory Insight

The screenshot shows the BIOS Tweaker menu with the following tabs: Main, Advanced, Chipset, Boot, Security, Tweaker, and Save & Exit. The Tweaker tab is active, and the Memory Insight section is expanded to show the following options:

- DDR4_A1 Profile (highlighted)
- DDR4_A2 Profile
- DDR4_B1 Profile
- DDR4_B2 Profile

On the right side of the Tweaker menu, the following keyboard shortcuts are listed:

- ↑↓: Select Screen
- ↑/Click: Select Item
- Enter/Ob1 Click: Select
- +/-: Change Opt.
- F1: General Help
- F3: Optimized Defaults
- F10: Save & Exit
- F11: Print Screen
- F12: BIOS Flash
- Esc/Right Click: Exit

At the bottom of the Tweaker menu, the selected profile is shown as DDR4_A1 Profile.

DIMM Profile

These items display memory information.

The screenshot shows the BIOS Tweaker menu with the following tabs: Main, Advanced, Chipset, Boot, Security, Tweaker, and Save & Exit. The Tweaker tab is active, and the DIMM Profile section is expanded to show the following information:

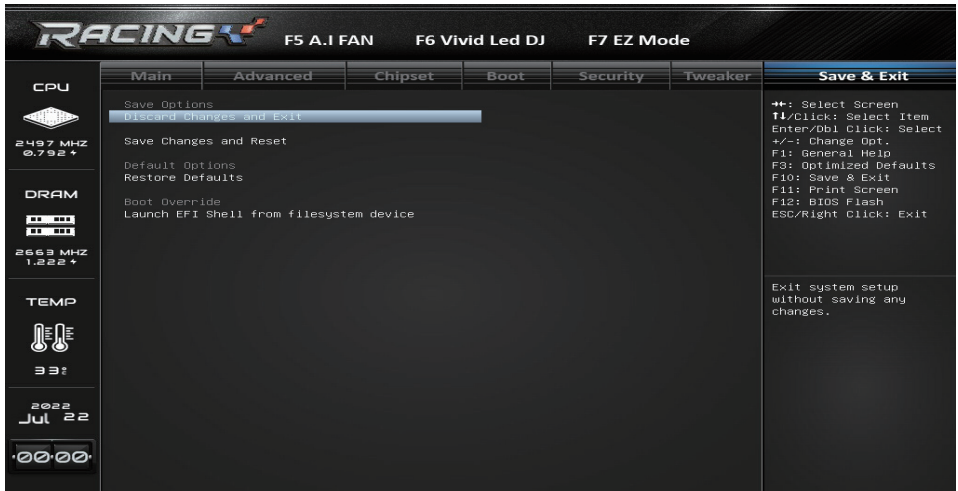
- DDR4_A1 Profile
- Capacity: N/A
- Frequency: Standard, Custom, XMP1, XMP2
- TCL
- TRRD
- TRAS
- TCWL
- TFAW
- TRREFI
- TRFC
- TRRD
- TRTP
- EMR
- EMTR
- TRRD_L
- TRRD_S
- EMTR_L
- EMTR_S
- NMode
- Voltage

On the right side of the Tweaker menu, the following keyboard shortcuts are listed:

- ↑↓: Select Screen
- ↑/Click: Select Item
- Enter/Ob1 Click: Select
- +/-: Change Opt.
- F1: General Help
- F3: Optimized Defaults
- F10: Save & Exit
- F11: Print Screen
- F12: BIOS Flash
- Esc/Right Click: Exit

7. Save & Exit Menu

This menu allows you to load the optimal default settings, and save or discard the changes to the BIOS items.



Discard Changes and Exit

Abandon all changes made during the current session and exit setup.

Save Changes and Reset

Reset the system after saving the changes.

Restore Defaults

Restore/Load Default values for all the setup options.

Launch EFI Shell from filesystem device

Attempts to Launch EFI Shell application (Shell.efi) from one of the available filesystem devices.