BIOS User Guide

AMD B650 Standard Series

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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 <DEL> key to enter BIOS setup.

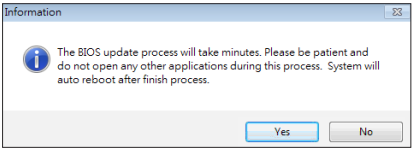
After entering the BIOS setup, please go to the <Save & Exit>, using the <Restore Defaults> function to load Optimized Defaults, and select <Save Changes and Reset> to restart the computer. Then the BIOS Update is completed.

BIOS Update Utility (through the Internet)

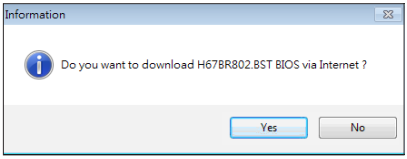
1. Installing BIOS Update Utility from the DVD Driver.
2. Please make sure the system is connected to the internet before using this function.

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

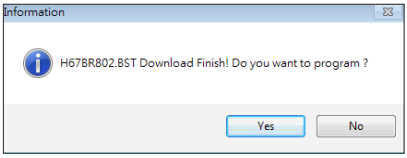
4. An open dialog will show up to request your agreement to start the BIOS update. Click “Yes” to start the online update procedure.



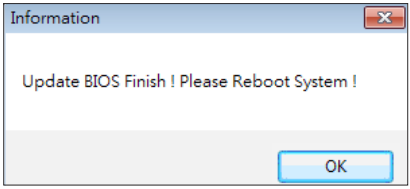
5. If there is a new BIOS version, the utility will ask you to download it. Click “Yes” to proceed.



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 <DEL> key to enter BIOS setup.

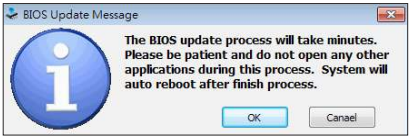
After entering the BIOS setup, please go to the <Save & Exit>, using the <Restore Defaults> function to load Optimized Defaults, and select <Save Changes> and <Reset> to restart the computer. Then, the BIOS Update is completed.

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/

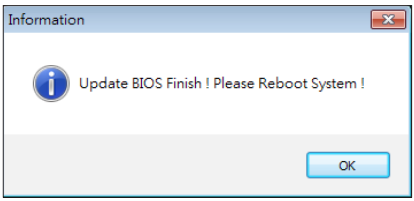
3. Launch BIOS Update Utility and click the “Update BIOS” button on the main screen.

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.

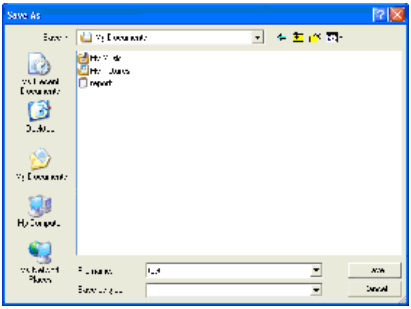


7. While the system boots up and the full screen logo shows up, press <DEL> key to enter BIOS setup.

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 **<Del>** 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.*

A.I FAN Control

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

1. **CPU FAN/ CPU OPT/ System1/ System2/ System3/ MOS FAN:** Click button to set the status value of CPU FAN, SYSTEM FAN and MOS FAN.
2. **PWM/ Temperature Panel:** According to the fan PWM value corresponding to CPU and system temperature to adjust the fan speed.

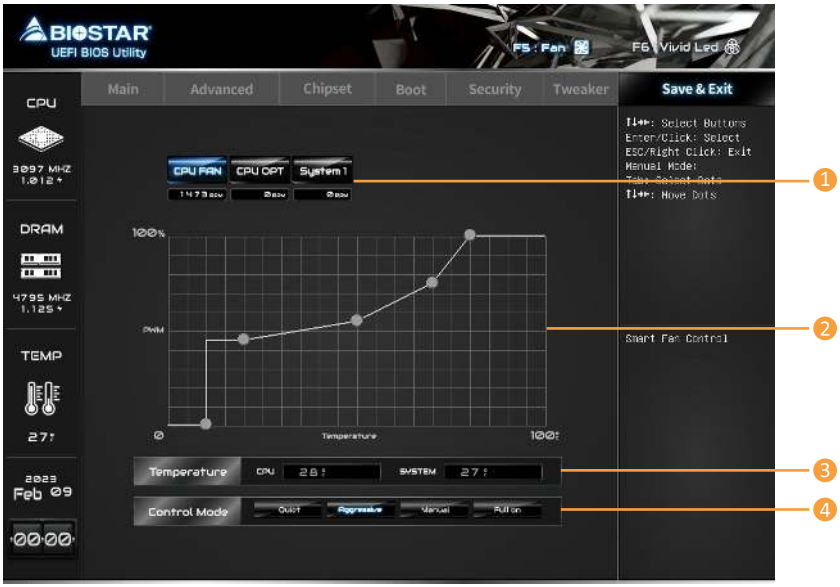
» *Allows you to adjust according to your preferences.*

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.**

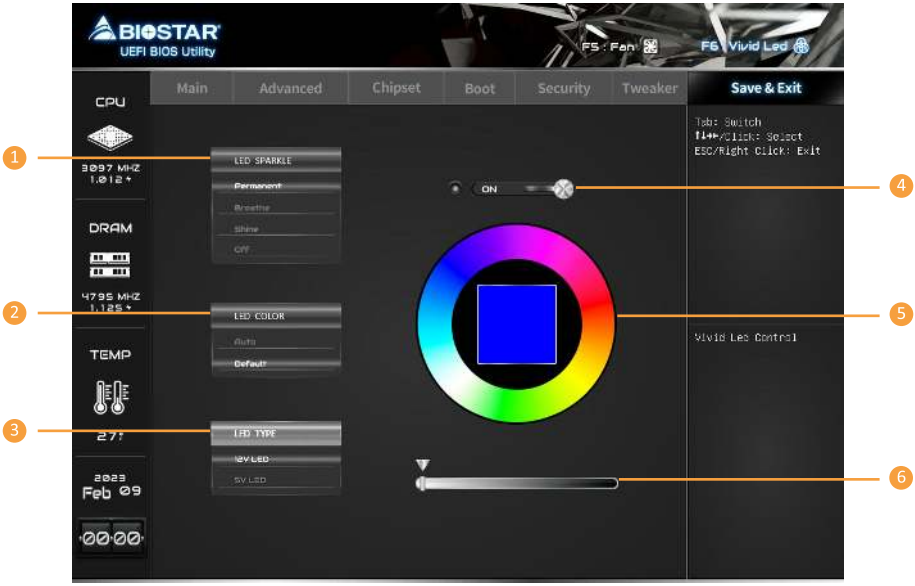
» *If you select Auto mode, the Color Pallette and LED Brightness Bar will disabled.*

   - **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

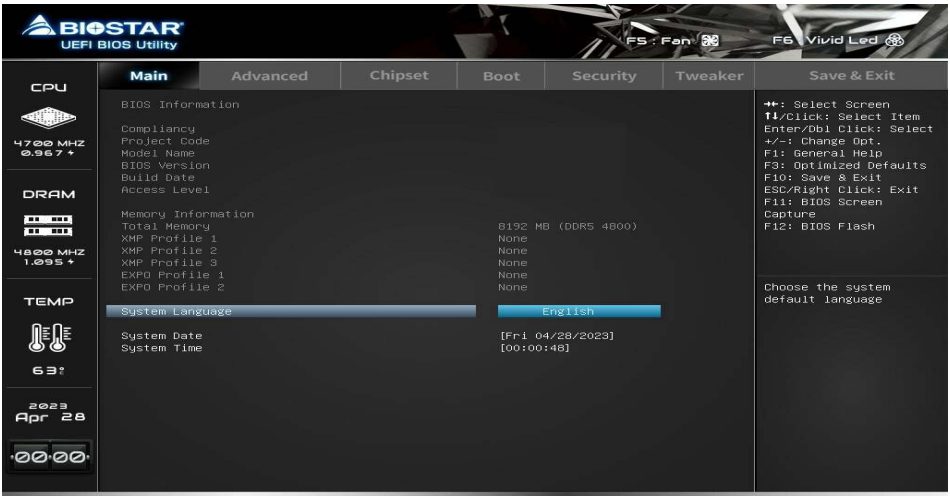
» *Menu contents will be different slightly, depending on different motherboard of users' computers.*

» *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.*

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.

TPM Type

TPM Type Control.

SHA256 PCR Bank

This item enables or disables SHA256 PCR Bank.

SHA384 PCR Bank

This item enables or disables SHA384 PCR Bank.

Pending operation

This item Schedule an Operation for the Security Device.

» *Your computer will reboot during restart in order to change state of Security Device.*

Platform Hierarchy

This item enables or disables Platform Hierarchy.

Storage Hierarchy

This item enables or disables Storage Hierarchy.

Endorsement Hierarchy

This item enables or disables Endorsement Hierarchy.

Physical Presence Spec Version

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

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

TPM2.0 UEFI Spec Version

This item 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.

ACPI Settings / WakeUp Event control

ErP Control

This item enables or disables ErP Control function. When ErP Enabled, system meets ErP requirment. All wake up events do not work except Power Button after power down system(S5).

ACPI Sleep State

This item allows you to select ACPI sleep state the system will enter when the SUSPEND button is pressed.

Restore AC Power Loss

The item specify what state to go to when power is re-applied after a power failure.

PME Wake up from S5

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

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.

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.

PS2 Keyboard PowerOn

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

Stroke Keys

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

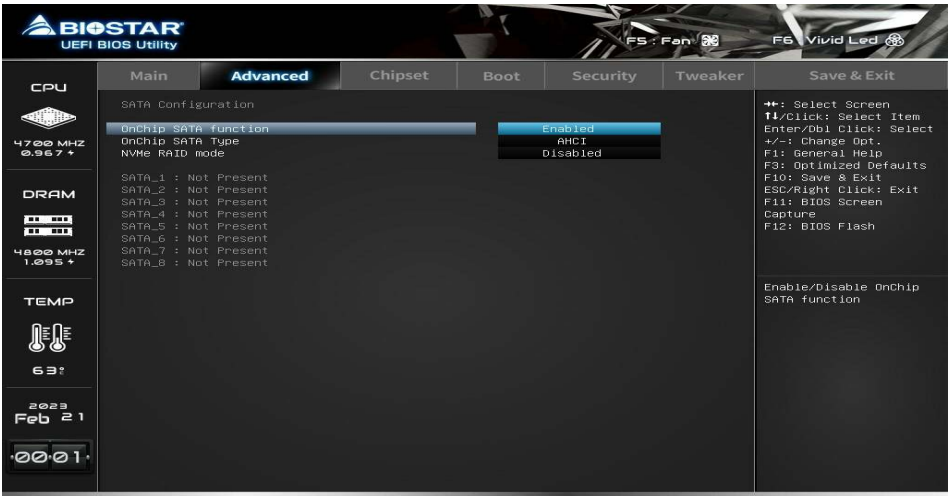
Specific Key

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.

SATA Configuration



OnChip SATA function

This item enables or disables OnChip SATA function.

OnChip SATA Type

This item select OnChip SATA Type.

Note

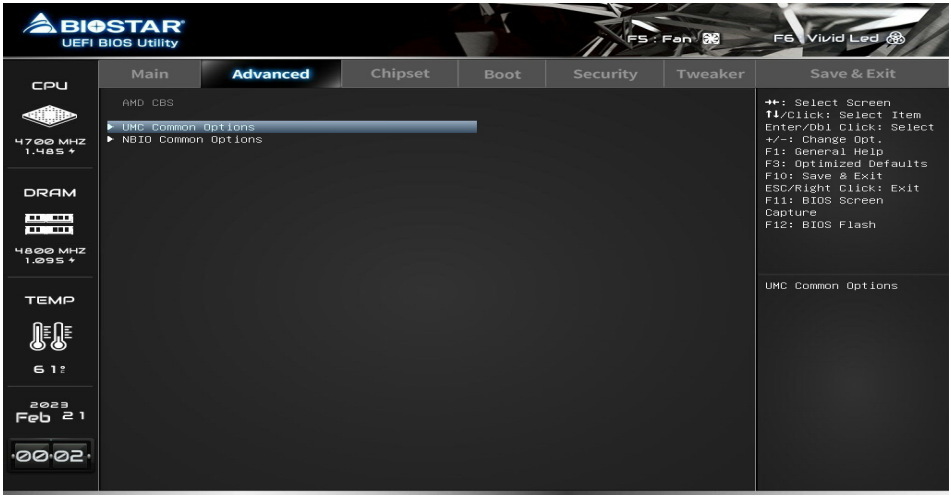
» *The following items appear only when you set the OnChip SATA Type function to [RAID]*

NVMe RAID mode

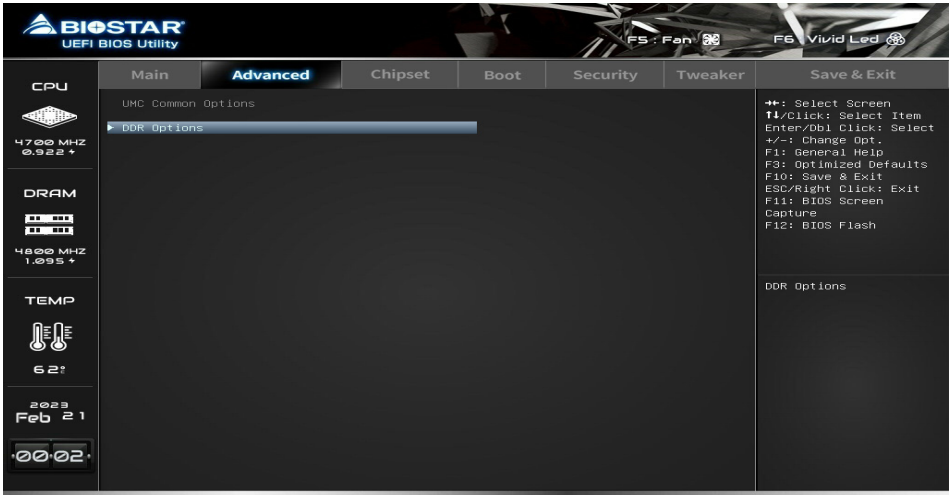
This item enables or disables NVMe RAID mode.

AMD CBS

AMD CBS Setup Page

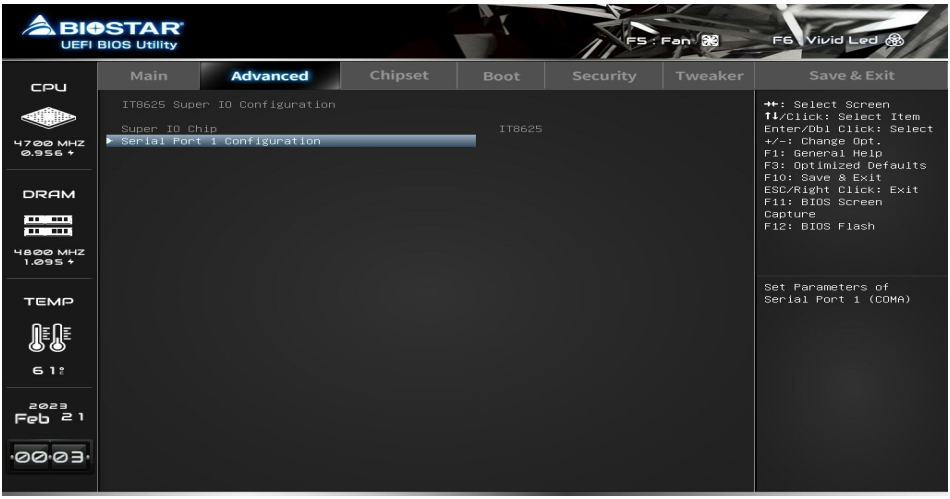


UMC Common Optiona

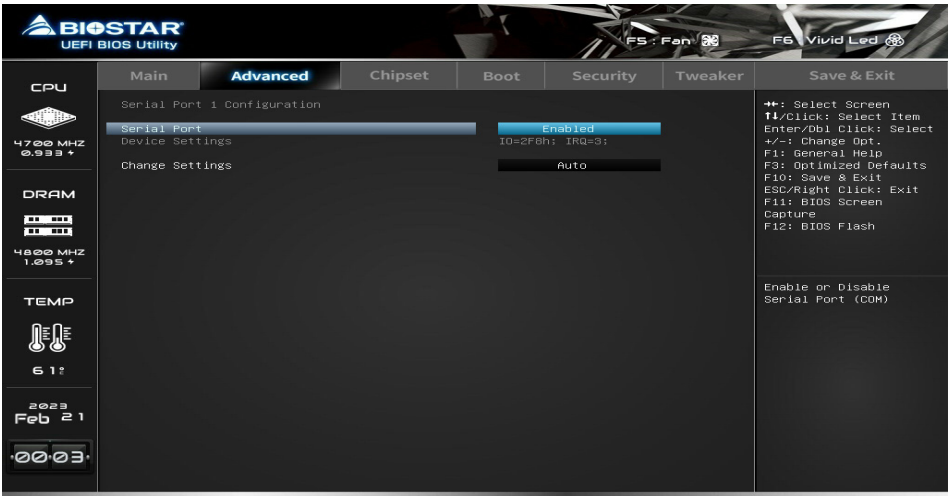


NBIO Common Options

IT8625 Super IO Configuration



Serial Port Configuration



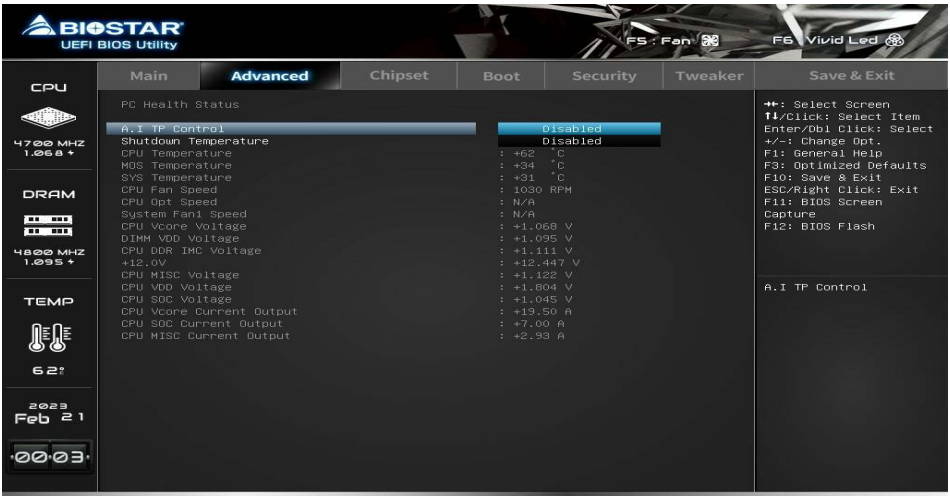
Serial Port

This item enables or disables serial Port.

Change Settings

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

H/W Monitor



A.I TP Control

Shutdown Temperature

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

CPU Configuration

This item shows CPU Information.

PowerNow

This item enables or disables the generation of ACPI _PPC, _PSS, and _PCT objects.

NX Mode

This item enables or disables No-execute page protection Function.

SVM Mode

This item enables or disables CPU Virtualization.

CPB Mode

This item specifies the method of core performance boost enablement.

Global C-state Control

This item allows you to controls IO based C-state generation and DF C-states.

Power Supply Idle Control

This item enables or disables C6.

SMT Mode

This item enables or disables Simultaneous multithreading. WARNING - S3 is NOT SUPPORTED on systems where SMT is disabled.

PCI Subsystem Settings

ABove 4G Decoding

This item enables or disables 64bit capable Devices to be Decoded in Above 4G Address Space (Only if System Supports 64bit PCI Decoding).

Re-Size BAR Support

If system has Resizable BAR capable PCIe Devices, this option Enables or Disables Resizable BAR Support.

SR-IOV Support

If system has SR-IOV capable PCIe Devices, this option Enables or Disables Single Root IO Virtualization Support.

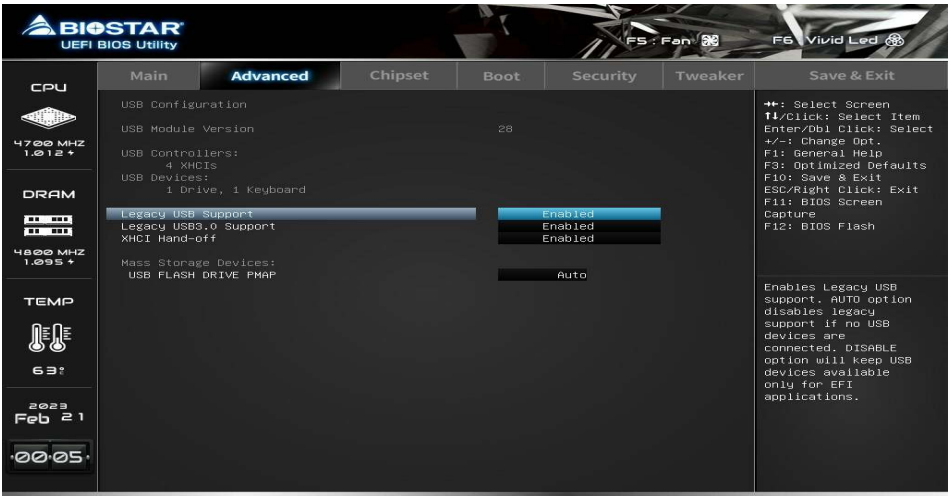
BME DMA Mitigation

Re-enable Bus Master Attribute disabled during Pci enumeration for PCI Bridges after SMM Locked.

Hot-Plug Support

Globally Enables or Disables Hot-Plug support for the entire system. If system has Hot-Plug capable Slots and this option set to Enabled, it provides a Setup screen for selecting PCI resource padding for Hot-Plug.

USB Configuration



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.

Legacy USB3.0 Support

The item enables or disables legacy USB3.0 support.

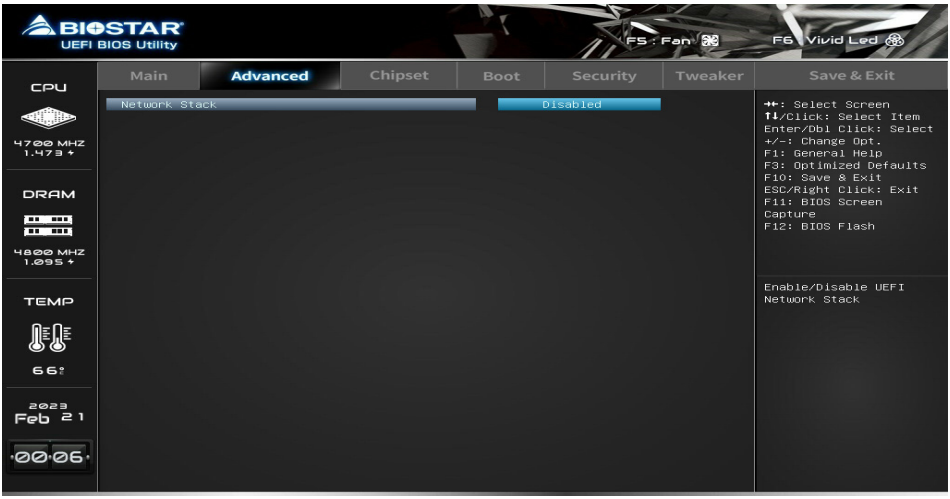
XHCI Hand-off

This is a workaround for OSes without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.

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.

Network Stack Configuration



Network Stack

This item enables or disables UEFI network stack

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 option will not be created.

IPv4 HTTP Support

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

IPv6 PXE Support

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

IPv6 HTTP Support

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

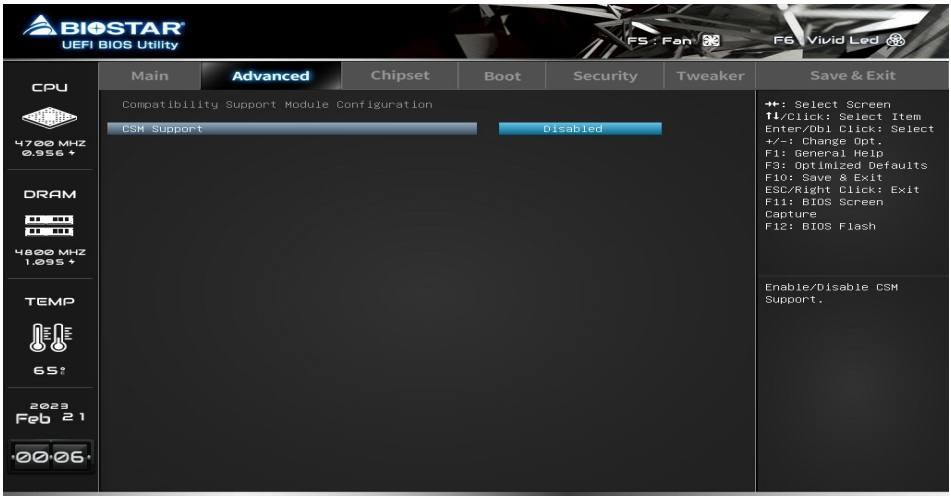
PXE boot wait time

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

Media detect count

Number of times presence of media will be checked.

CSM Configuration



CSM Support

This option enables or disables CSM support.

GateA20 Active

Upon Request – GA20 can be disabled using BIOS services. Always – do not allow disabling GA20; this option is useful when any RT code is executed above 1MB.

Option ROM Messages

This item set display mode for Option ROM.

INT19 Trap Response

This item BIOS reaction on INT19 trapping by Option ROM: IMMEDIATE - execute the trap right away ; POSTPONED - execute the trap during legacy boot.

HDD Connection Order

This some OS require HDD handles to be adjusted, i.e. OS is installed on drive 80h.

Boot option filter

This option controls Legacy/UEFI ROMs priority.

Network

This option controls the execution of UEFI and Legacy Network OpROM

Storage

This option controls the execution of UEFI and Legacy Storage OpROM

Video

This option controls the execution of UEFI and Legacy Video OpROM

Other PCI device ROM priority

This item for PCI devices other than Network, Mass storage or Video defines which OpROM to launch.

NVMe Configuration

The item shows NVMe controller and driver information.

AMD Overclocking

AMD Overclocking Setup Page

Realtek PCIe 2.5GBE Family Controller

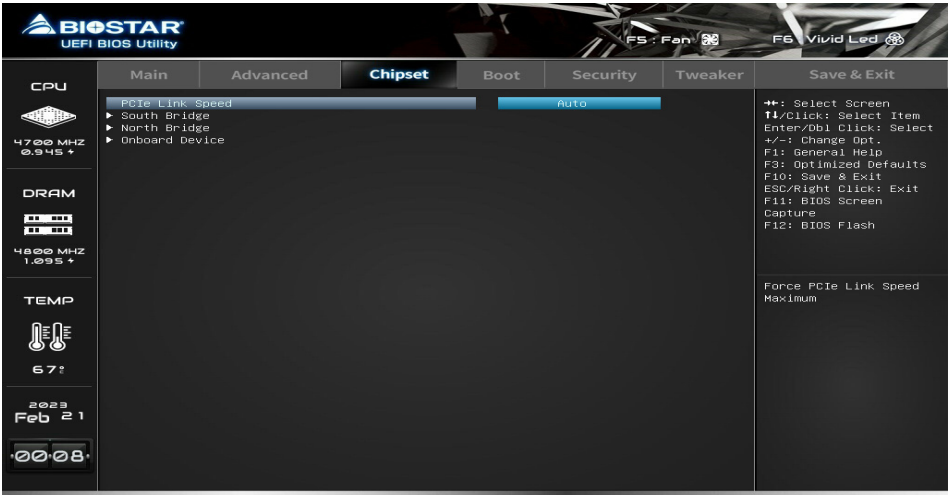
Get driver information and configure Realtek ethernet controller parameter.

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

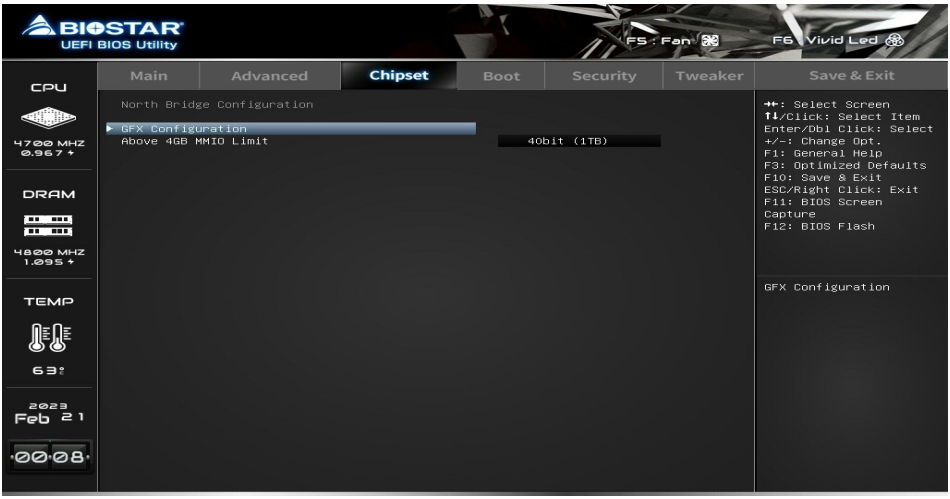
» *Beware of that setting inappropriate values in items of this menu may cause system to malfunction.*



PCIe Link Speed

South Bridge

North Bridge



GFX Configuration

Note

» *The menu contents of the GFX Configuration will be slightly different depending on the CPU of the motherboard configuration.*

Integrated Graphics

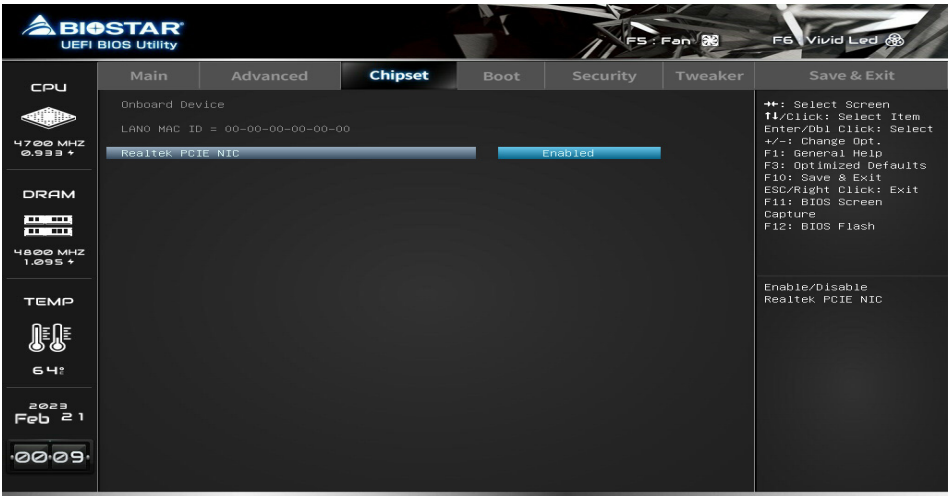
Enable Integrate Graphics Controller.

UMA Frame Buffer Size

PCIEX16_1 Lanes Configuration

Surround View

Onboard Device



Realtek PCIE NIC

This item enables or disables Intel PCIE NIC.

Onboard LAN Option ROM

This item enables or disables Onboard LAN Option ROM.

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.

Bootup NumLock State

This item selects the keyboard NumLock state.

Full Screen Logo Display

This item enable or disable Full Screen Logo Show function.

Fast Boot

This item 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.

Note

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

SATA Support

If Last Boot HDD Only, Only last boot HDD device will be available in Post. If All Sata Devices, all SATA devices will be available in OS and Post.

NVMe Support

This item enable or disable NVMe Support. If Disabled, NVMe device will be skipped.

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.

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.

PS2 Devices Support
If Disabled, PS2 devices will be skipped.

Network Stack Driver Support
If Disabled, Network Stack Drivers will be skipped.

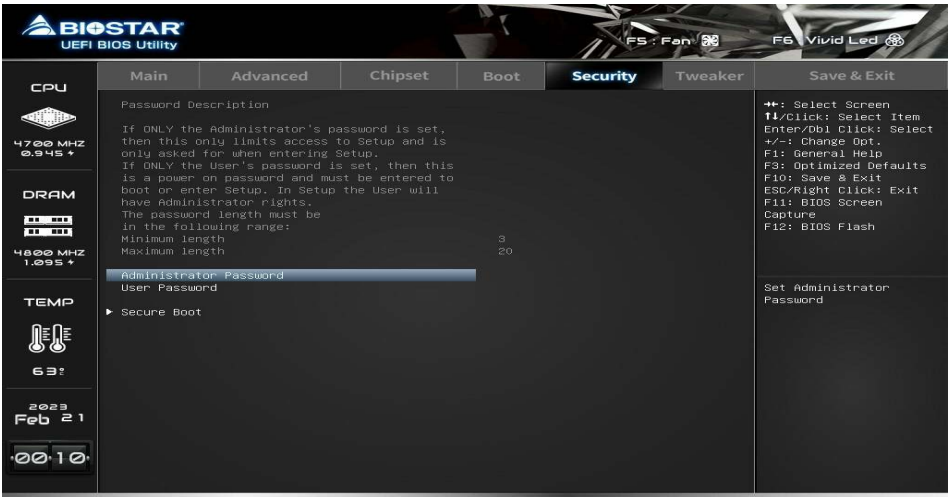
ROM Armor 3 Support

ROM Armor 3 function.

Boot Success Beep

This item BIOS boot post beep message.

5. Security Menu



Administrator Password

This item sets Administrator Password.

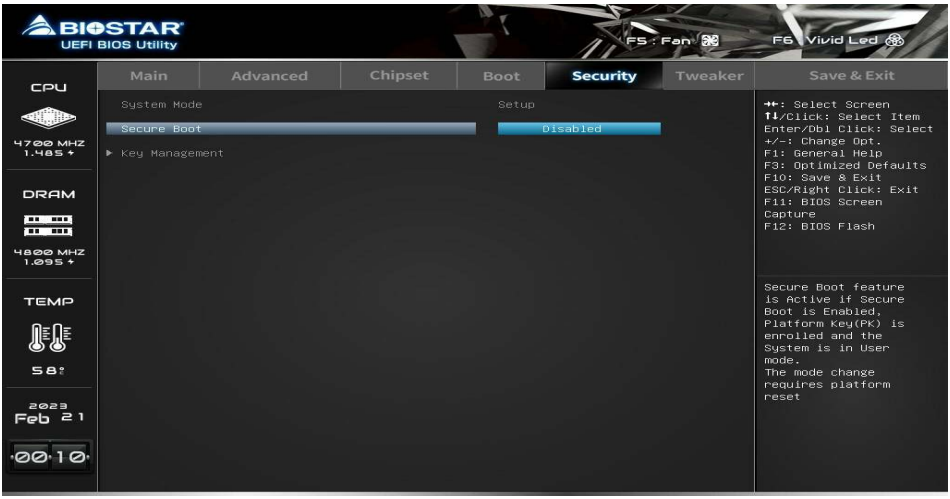
User Password

This item sets User Password.

STIBP Status

This item Single Thread Indirect Branch Predictor(STIBP) is a method to mitigate indirect branch target injection attacks on AMD products.

Secure Boot



Secure Boot

Secure Boot flow control. Secure Boot can be enabled only when 1. Platform Key (PK) is enrolled and Platform is operating in user mode and 2.CSM function is disabled in Setup.

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

Key Management

Restore Factory keys

Force System to User Mode. Force system to user.

Reset To Setup Mode

This item delete NVRAM content of all UEFI Secure Boot Key databases.

Platform Key (PK)

Key Exchange Keys

Authorized Signatures

Forbidden Signatures

Authorized Timestamps

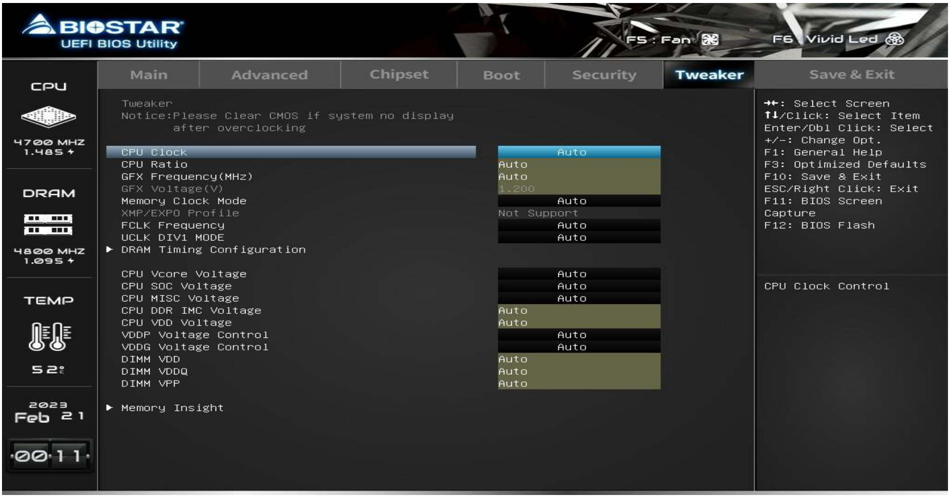
OsRecovery Signatures

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



Note

» *The menu contents of the Tweaker will be slightly different depending on the CPU of the motherboard configuration.*

CPU Base Clock

CPU Base Clock

CPU Ratio

Set the CPU Ratio

Memory Clock Mode

If XMP/EXPO, use Ryzen XMP/EXPO memory better. If Auto, the DRAM speed will be based on SPDs. If Manual, the DRAM speed specified will be programmed regardless of SPD.

Memory Frequency

Select the memory clock value in MHz

XMP/EXPO Profile

FCLK Frequency

Specifies the FCLK Frequency.

UCLK DIV1 MODE

Set UCLK DIV mode

DRAM Timing Configuration

DRAM Timing Configuration

CPU Vcore Voltage

CPU Vcore Voltage Control

CPU SOC Voltage

CPU SOC Voltage Contril

CPU SOC Adjust Voltage

CPU SOC Adjust Voltage Range: 1.000V - 2.000V

CPU SOC Offset Prefix

CPU SOC Offset Prefix

CPU SOC Offset Voltage

CPU SOC Offset Voltage Range: 0.000V - 0.635V

CPU MISC Voltage

CPU MISC Voltage Control

CPU MISC Adjust Voltage

CPU MISC Adjust Voltage Range: 1.000V - 2.000V

CPU MISC Offset Prefix

CPU MISC Offset Prefix

CPU MISC Offset Voltage

CPU MISC Offset Voltage Range: 0.000V - 0.635V

CPU DDR IMC Voltage

CPU DDR IMC Voltage Control.

CPU VDD Voltage

CPU VDD Voltage Control.

VDDP Voltage Control

Manual = User can set customized VDDP voltage.

VDDP Voltage

VDDP is a voltage for the DDR5 bus signaling.

VDDG Voltage Control

Manual = User can set customized VDDG voltage.

VDDG CCD Voltage

VDDG CCD represents voltage for the data portion of the Infinity Fabric.

VDDG IOD Voltage

VDDG IOD represents voltage for the data portion of the Infinity Fabric.

DIMM VDD

DIMM VDD Voltage

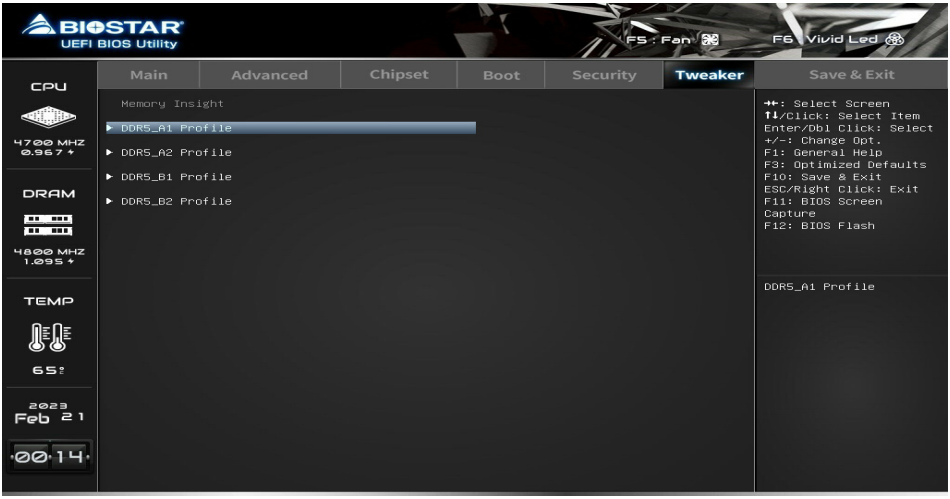
DIMM VDDQ

DIMM VDDQ Voltage

DIMM VPP

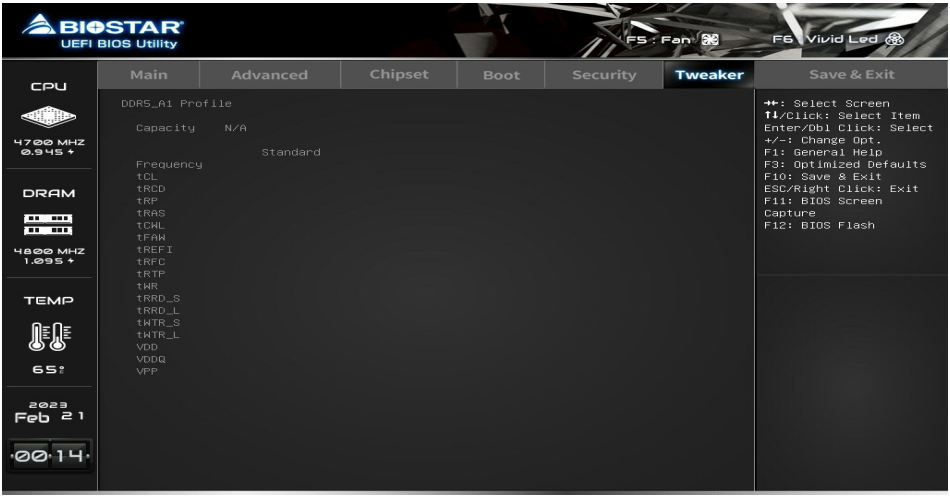
DIMM VPP Voltage

Memory Insight



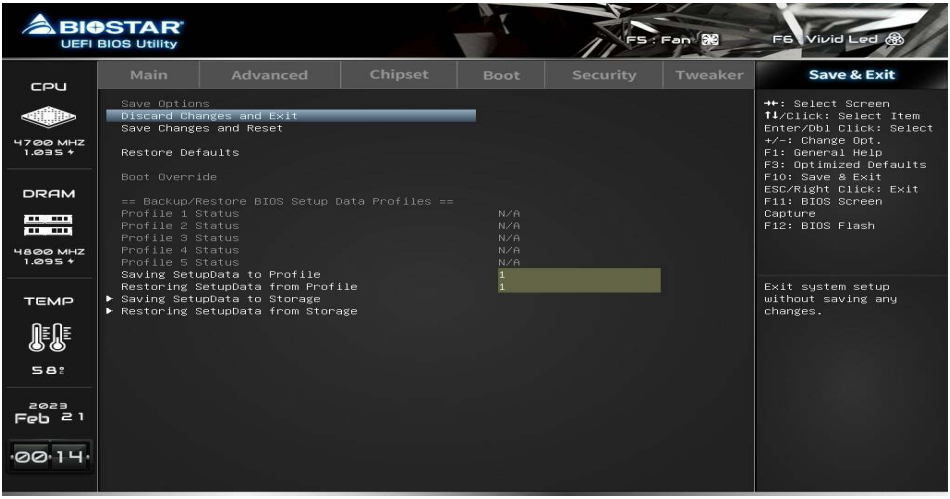
DIMM Profile

These items display memory information.



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.

Saving SetupData to Profile

This item Saving SetupData to Profile.

Restoring SetupData from Profile

This item Restoring SetupData from Profile.

Saving SetupData to Storage

This item saves your current BIOS Setup Data to storage devices.

Restoring SetupData from Storage

This item restores your BIOS Setup Data from storage devices.