



BIOS User Guide

INTEL Z590 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

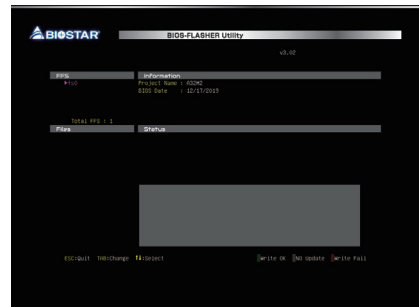
Note

- » 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.

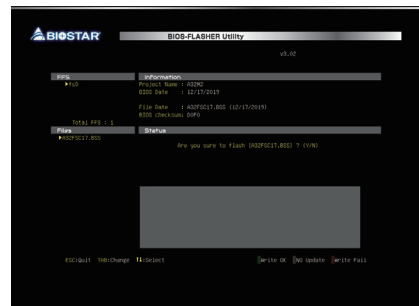
Updating BIOS with BIOSTAR BIO-FLASHER

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.

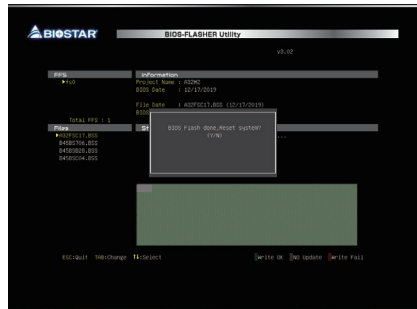
5. After entering the POST screen, the BIO-FLASHER utility pops out. Choose <fs0> to search for the BIOS file.



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 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.

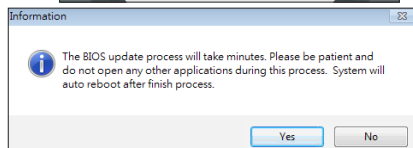
BIOS Update Utility (through the Internet)

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

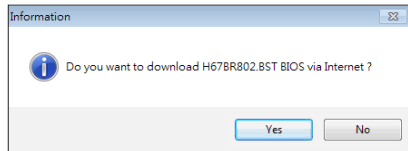
3. Launch BIOS Update Utility and click the “Online Update” button on the main screen.



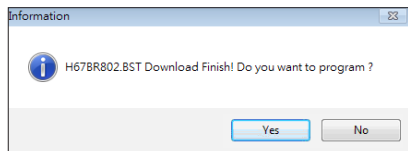
4. An open dialog will show up to request your agreement to start the BIOS update. Click “Yes” to start the online update procedure.



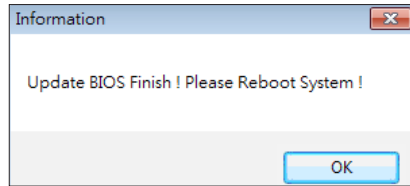
5. If there is a new BIOS version, the utility will ask you to download it. Click “Yes” to proceed.



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.

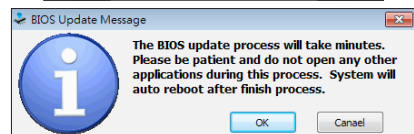
BIOS Update Utility (through a BIOS file)

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.



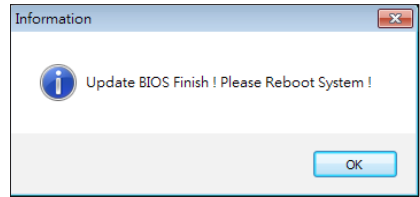
4. A warning message will show up to request your agreement to start the BIOS update. Click “OK” to start the update procedure.



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.

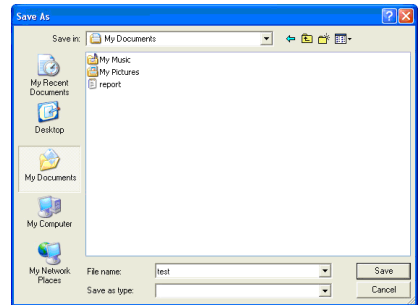


7. While the system boots up and the full screen logo shows up, press key to enter BIOS setup.

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.*

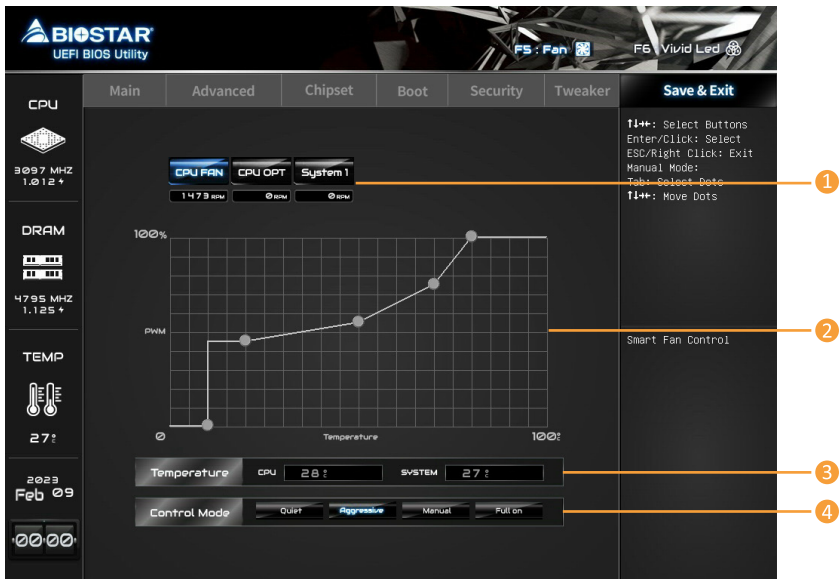
A.I FAN Control

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.

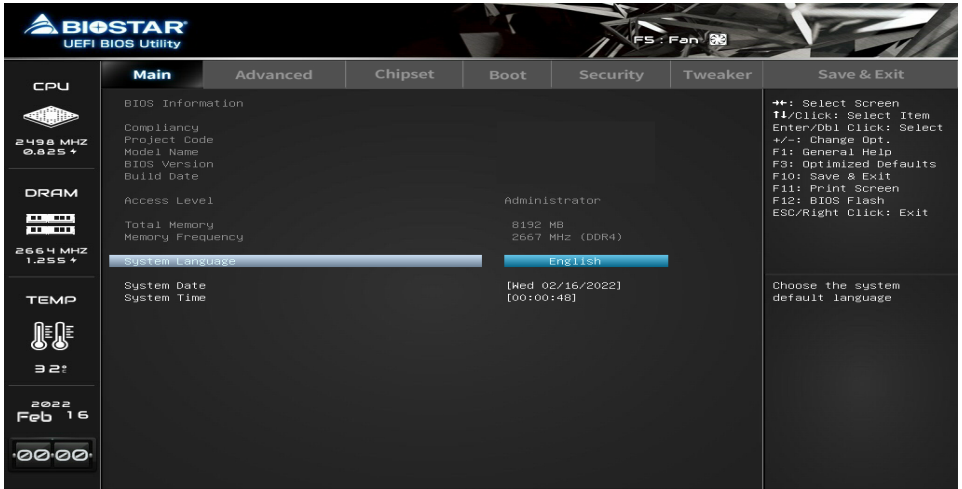
Note

- » 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.



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

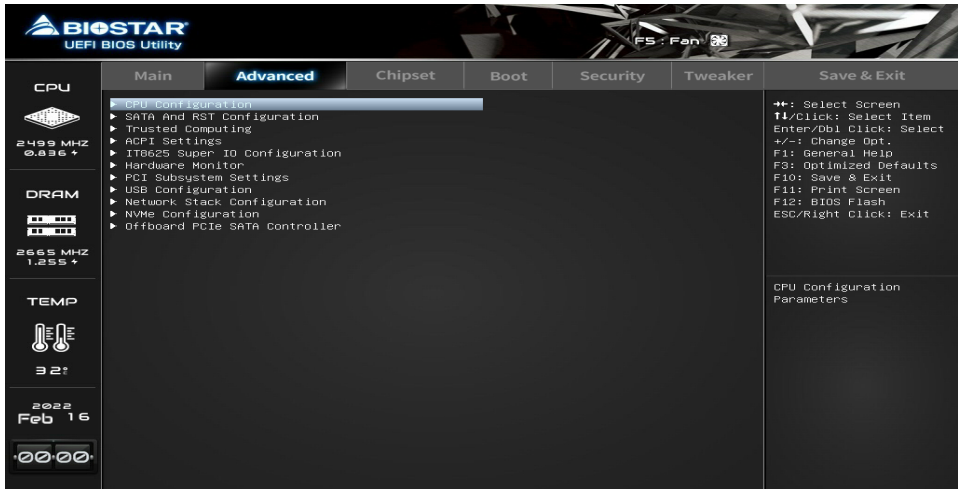
Set the system internal clock.

2. Advanced Menu

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

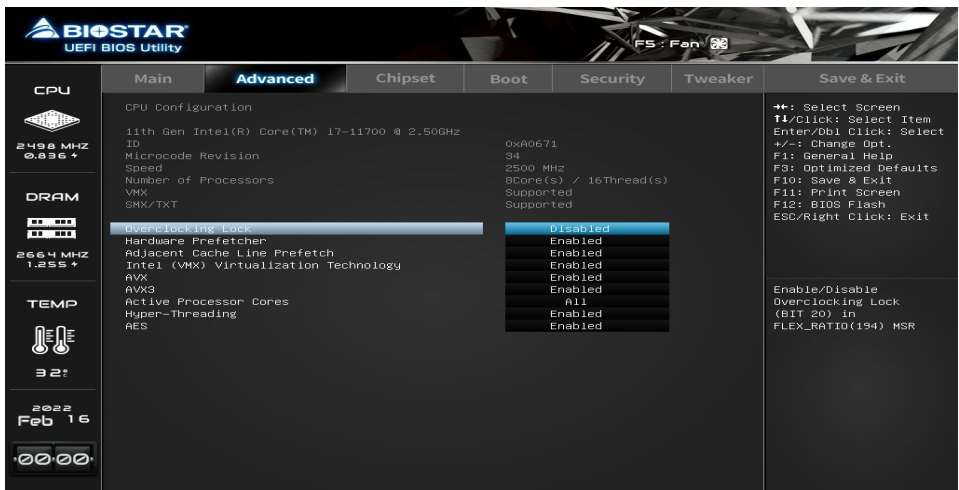
Note

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



CPU Configuration

This item shows CPU Information



Software Guard Extensions (SGX)

This item enables or disables Software Guard Extensions (SGX).

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

AVX

This item enables or disables the AVX 2/3 Instructions. This is applicable for big core only.

Options: Enabled (Default) / Disabled

AVX3

This item enables or disables the AVX 3 Instructions. This is applicable for big core only.

Options: Enabled (Default) / Disabled

Active Processor Cores

This item number of cores to enable in each processor package.

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

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

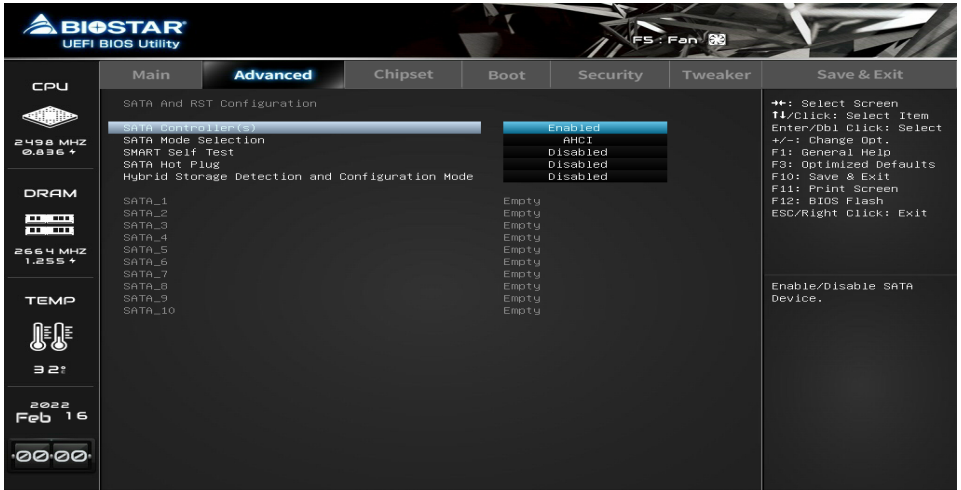
AES

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) / Intel RST Premium With Intel Optane System Acceleration

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

Hybrid Storage Detection and Configuration Mode

This item allows you select Hybrid Storage Detection and Configuration Mode.

Options: Disabled (Default) / Dynamic Configuration for Hybrid Storage Enable

Trusted Computing



TPM Device Selection

This item allows you to select TPM device: PTT or dTPM. PTT - Enables PTT in SkuMgr dTPM 1.2 - Disables PTT/ dTPM will be disabled and all data saved on it will be lost.

Options: PTT (Default) / dTPM

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

SHA-1 PCR Bank

This item enables or disables SHA-1 PCR Bank.

Options: Disabled (Default) / Enabled

SHA256 PCR Bank

This item enables or disables SHA256 PCR Bank.

Options: Enabled (Default) / Disabled

SHA384 PCR Bank

This item enables or disables SHA384 PCR Bank.

Options: Disabled (Default) / Enabled

SM3_256 PCR Bank

This item enables or disables SM3_256 PCR Bank.

Options: Disabled (Default) / Enabled

Pending operation

This item schedule an operation for the security device.

Options: None (Default) / TPM Clear

» Note: Your computer 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

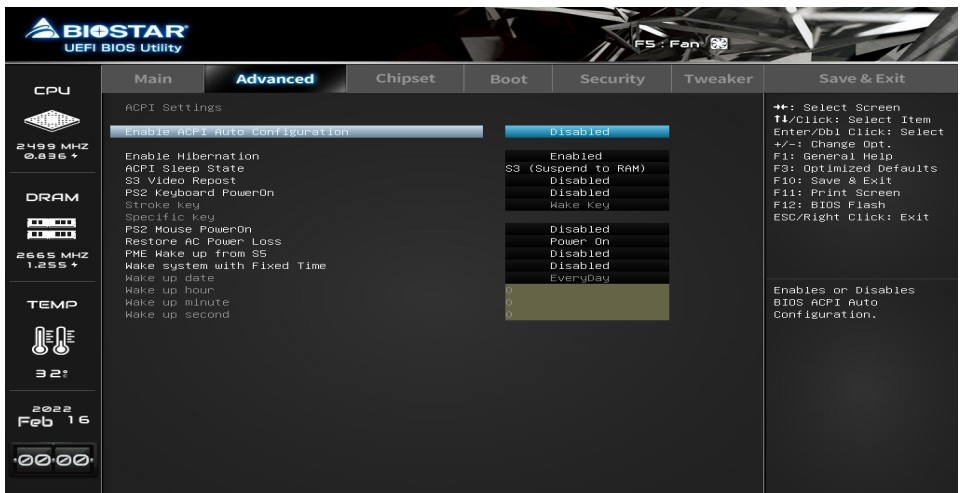
Physical Presence Spec Version

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) / Power Key / Ctrl+F1 / Ctrl+F2 / Ctrl+F3 / Ctrl +F4 / Ctrl+F5 / Ctrl+F6

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

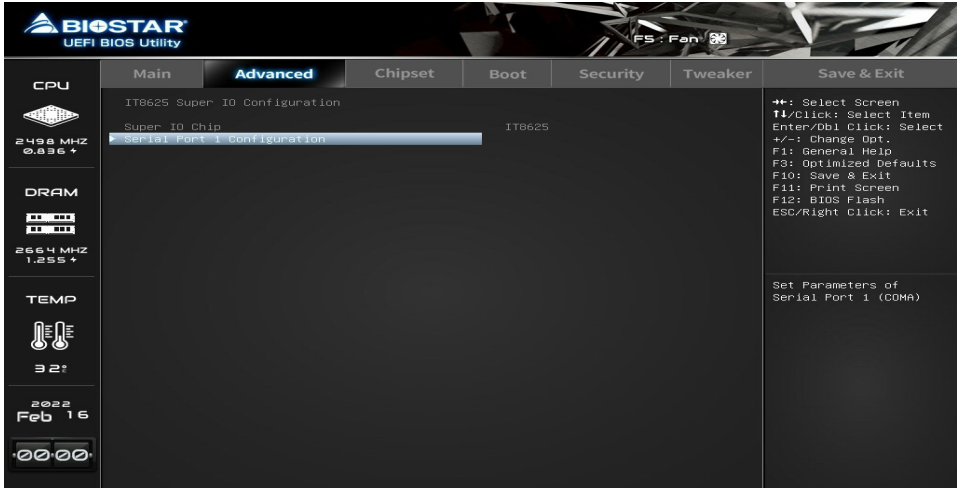
Wake up date

You can choose which date the system will boot up.

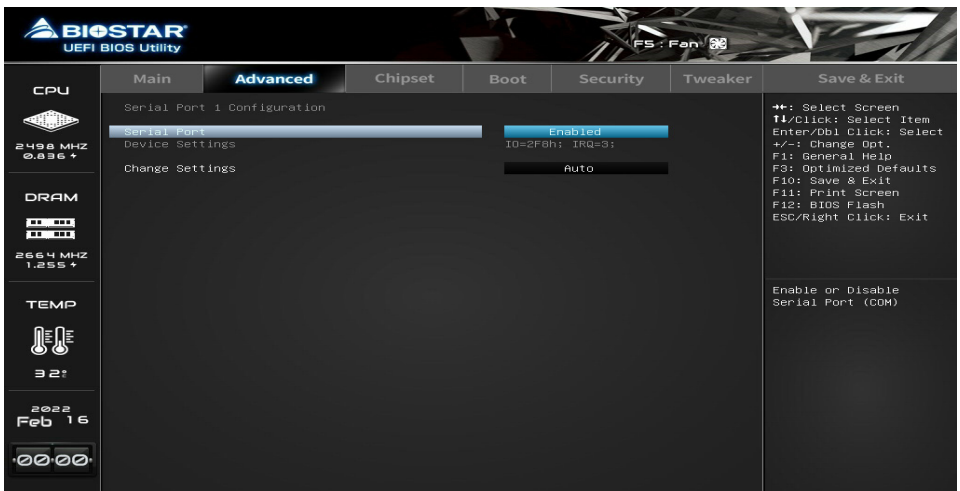
Wake up hour / Wake up minute / Wake up second

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.

Options: Enabled (Default) / Disabled

Change Settings

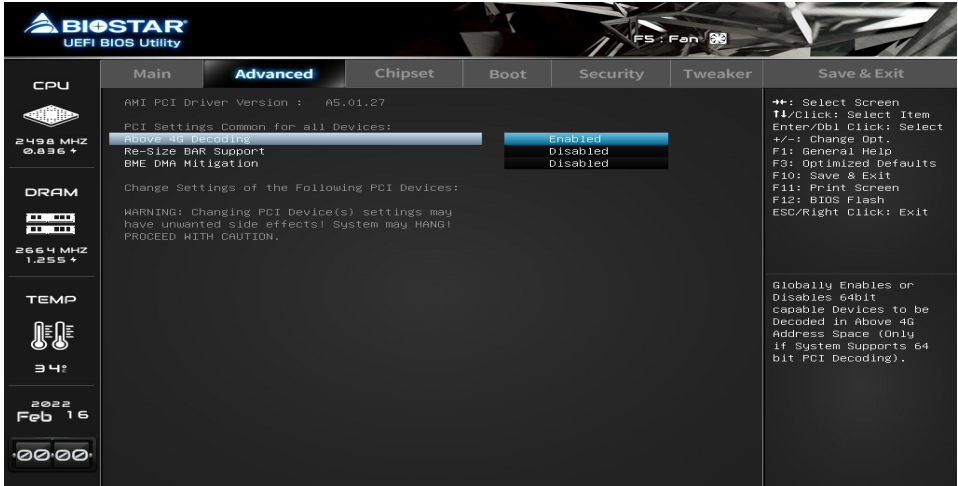
This item allows you to select an optimal settings for Super IO Device.

Options: Auto (Default) / IO=3F8h; IRQ=4 / 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

PCI Subsystem Settings



Above 4G Decoding

This item enables or disables Above 4G Decoding. Globally enables or disables 64bit capable Devices to be Decoded in Above 4G Address Space (Only if system supports 64bit PCI decoding).
Options: Enabled (Default) / Disabled

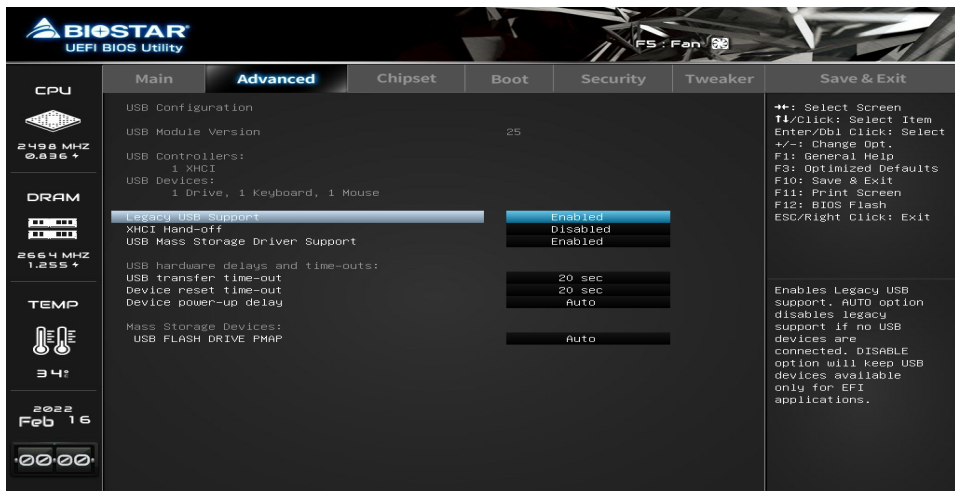
Re-Size BAR Support

If system has Resizable BAR capable PCIe Devices, this option Enables or Disables Resizable BAR Support (Only if system supports 64 bit PCI Decoding).
Options: Disabled (Default) / Auto

BME DMA Mitigation

This item enables or disables BME DMA Mitigation. Re-enable Bus Master Attribute disabled during Pci enumeration for PCI Bridges after SMM Locked.
Options: Disabled (Default) / Auto

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.
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

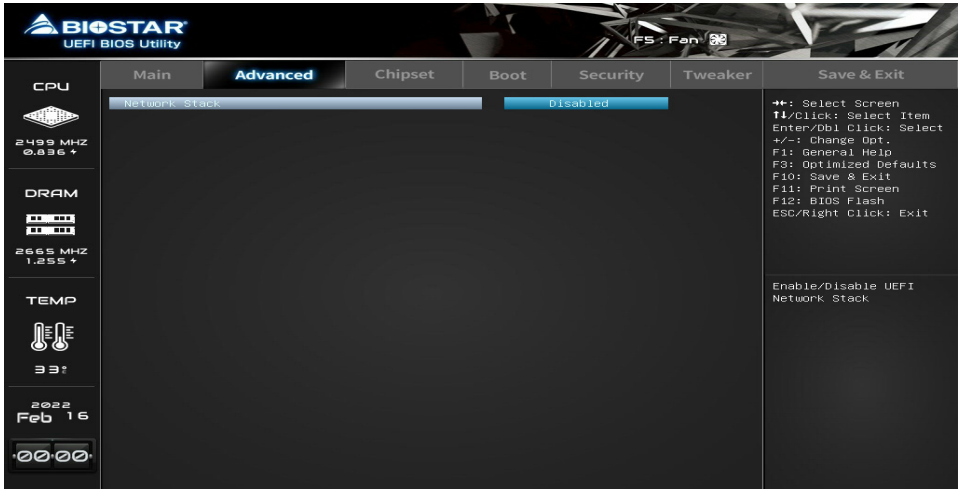
Delay range is 1 ~ 40 seconds, in one second increments.

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

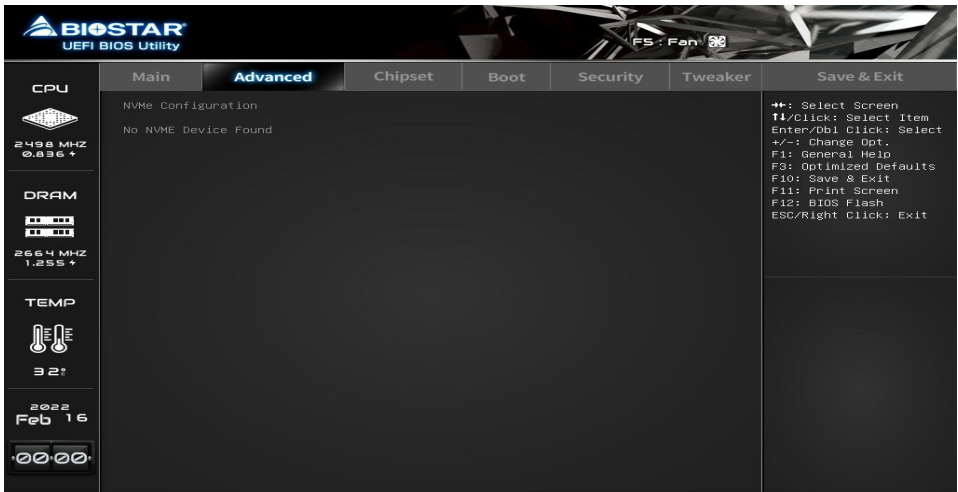
Wait time to press ESC key to abort the PXE boot.

Media detect count

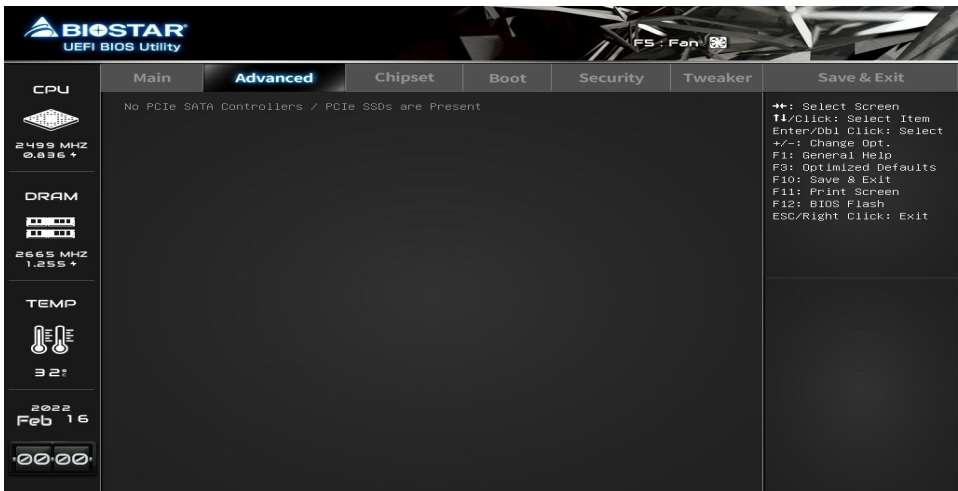
Number of times presence of media will be checked.

NVMe Configuration

The item shows NVMe controller and driver information.



Offboard PCIe SATA Controller

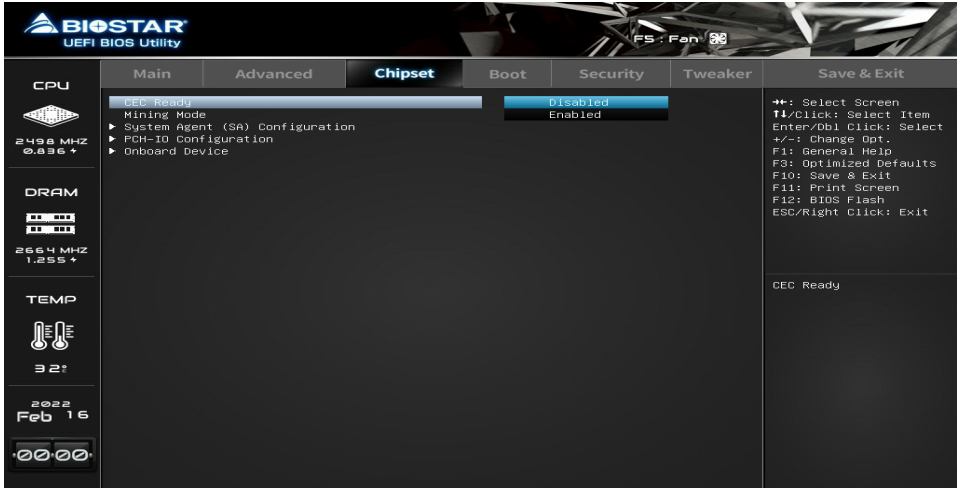


3. Chipset Menu

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

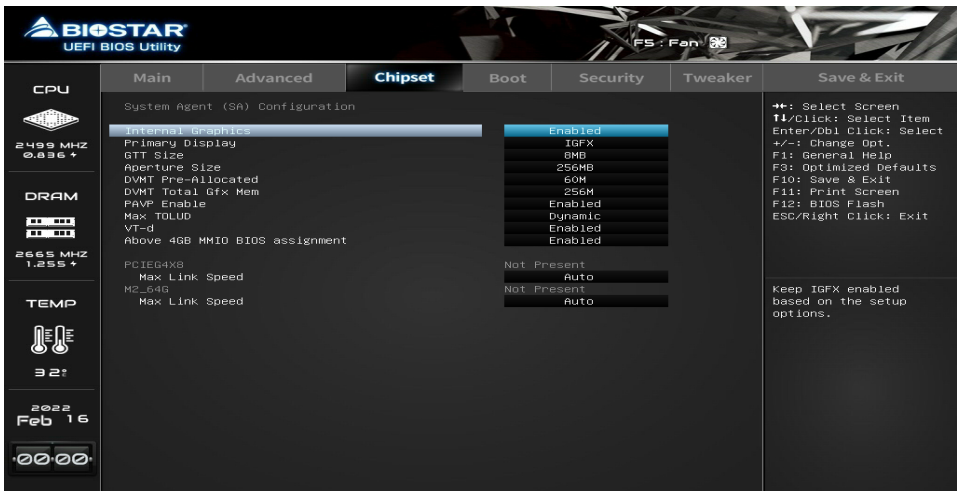
» Beware of that setting inappropriate values in items of this menu may cause system to malfunction.



CEC Ready

Options: Disabled (Default) / Enabled

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 / 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

» *Note : Above 4GB MMIO BIOS assignment is automatically enabled when selecting 2048MB aperture.
To use this feature, please disable CSM Support.*

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 / 60M

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

PCIEG4X8

Max Link Speed

Configure Link and Speed Information.

Options: Auto (Default) / Gen1 / Gen2 / Gen3 / Gen4

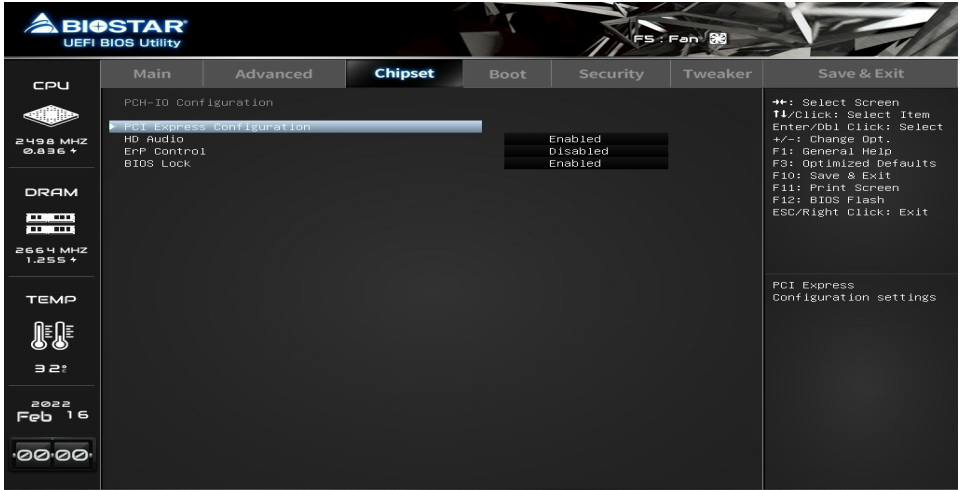
M2_64G

Max Link Speed

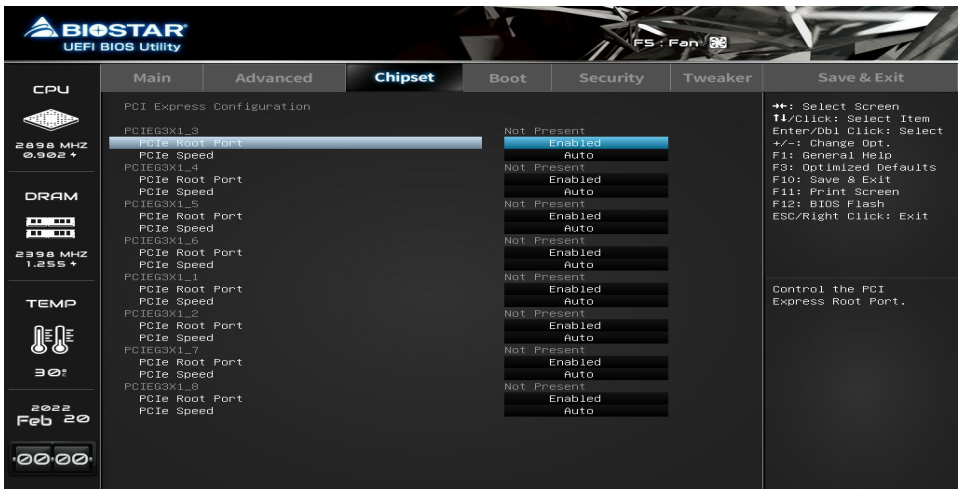
Configure M2_64G Max Speed.

Options: Auto (Default) / Gen1 / Gen2 / Gen3 / Gen4

PCH-IO Configuration



PCI Express Configuration



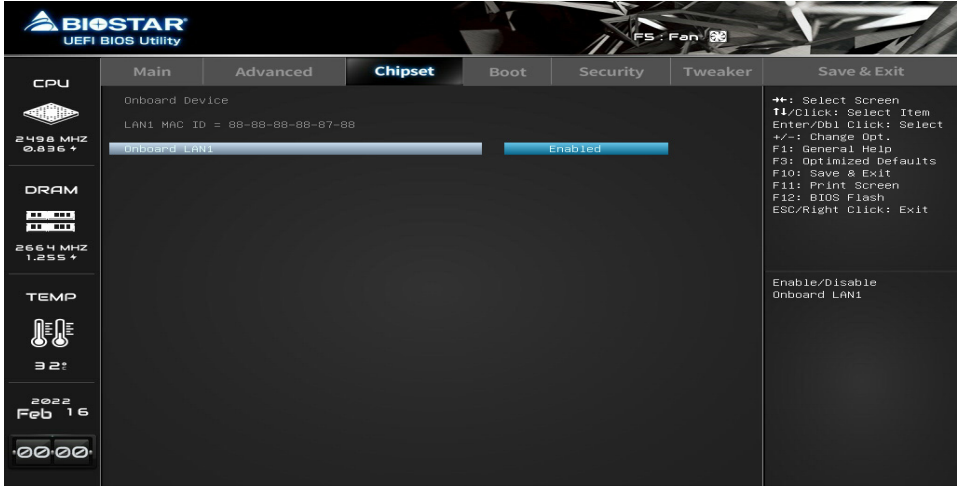
PCIEG3X4

PCIe Speed

Configure PCIe Speed

Options: Auto(Default) / Gen1 / Gen2 / Gen3

Onboard Device



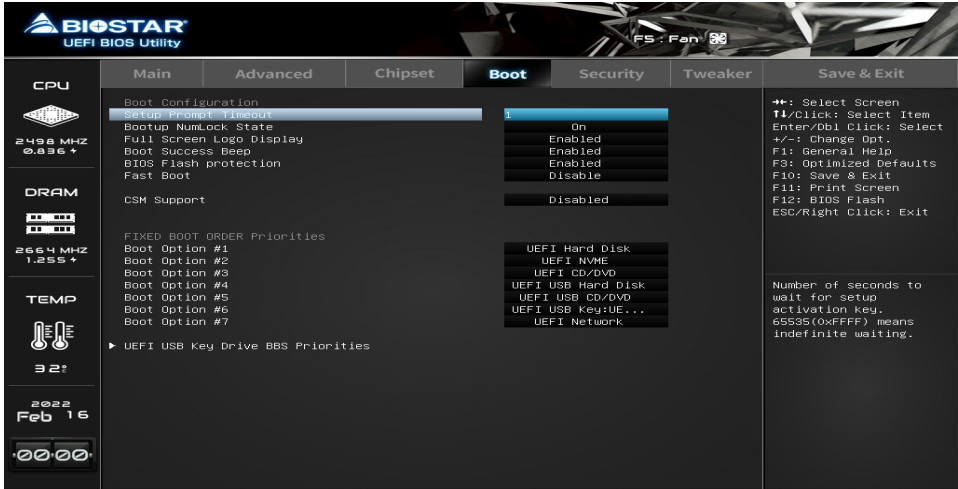
Onboard LAN1

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: On (Default) / Off

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

Options: Last Boot HDD 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 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

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

Options: Upon Request (Default) / Always

Option ROM Messages

This item sets the display mode for Option ROM.

Options: Force BIOS (Default) / Keep Current

CSM Support

This option enables or disables CSM support.

Options: Disabled (Default) / Enabled

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

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

It controls the placement of newly detected UEFI boot options.

#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)

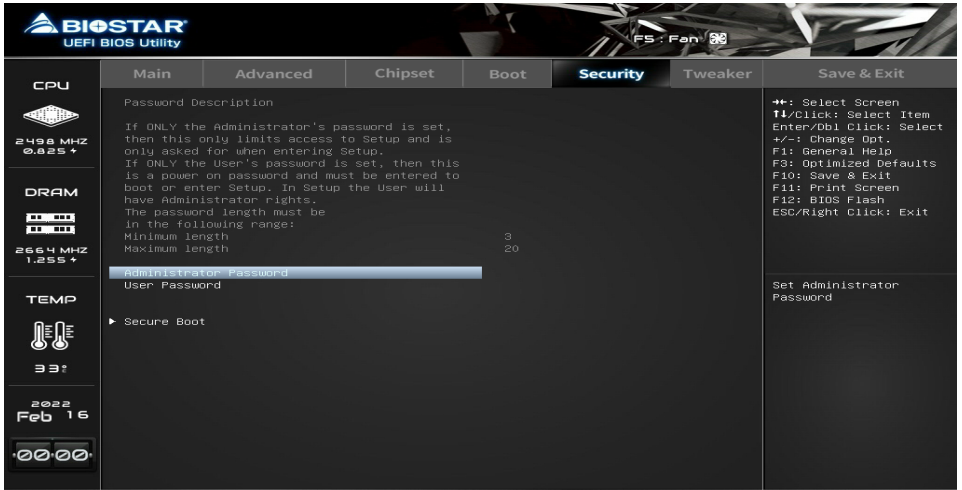
#12 Options: USB CD/DVD (Default)

#13 Options: USB Key (Default)

#14Options: USB Floppy (Default)

#15 Options: Network (Default)

5. Security Menu



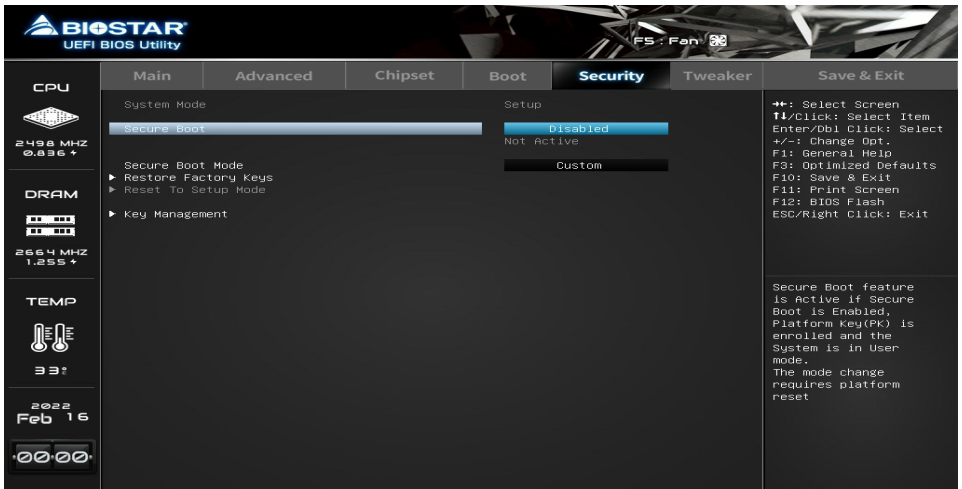
Administrator Password

This item sets Administrator Password.

User Password

This item sets User Password.

Secure Boot Menu



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

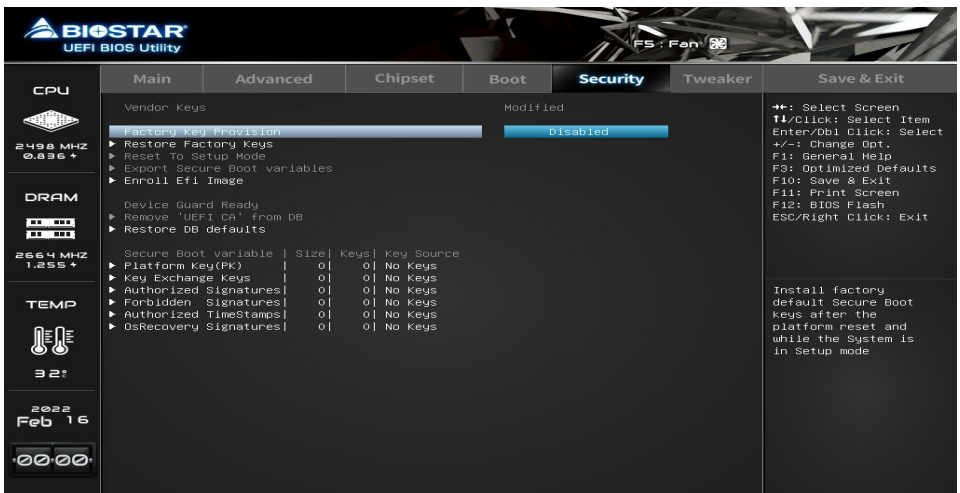
Restore Factory Keys

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.

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).

Remove 'UEFI CA' from DB

Device Guard ready system must not list 'Microsoft UEFI CA' Certificate in Authorized Signature database (db).

Restore DB defaults

Restore DB variable to factory defaults.

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

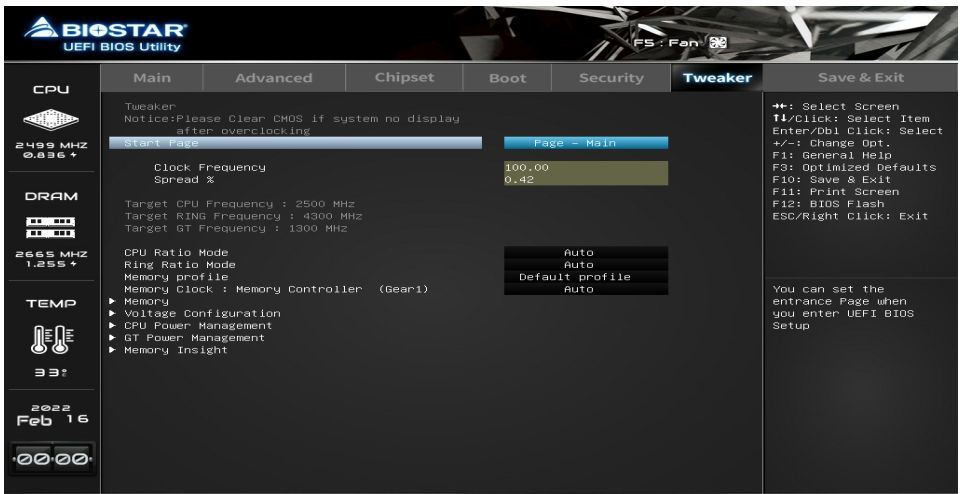
Options: Update / Append

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

CPU Base Clock

This item CPU Base Clock.

Options: 100.00 (Default)

PEG/DMI Base Clock

This item PEG/DMI Base Clock.

Options: 100.00 (Default)

Spread Spectrum

This item Spread Spectrum can help reduce noise and interference. (EMI)

Options: Auto (Default) / Enabled / Disabled

CPU Ratio Mode

This item sets CPU 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 Max OC Ratio

This sets the maximum overclocking ratio for the CPU Ring.

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

Note

» The following items appear only when you set the Memory Profiles function to [Custom profile]

Memory Frequency

Automatic or the frequency will equal ratio times reference clock. Set to Auto to recalculate memory timings listed below.

Options: DDR4 3200MHz (Default)

Memory Configuration

The screenshot shows the BIOS Tweaker menu with the following settings:

| Item | Value | Unit |
|----------|---------|------|
| tCL | (19) | |
| tRCD/trP | (19) | |
| tRAS | (43) | |
| tCWL | (18) | |
| tFAW | (28) | |
| tREFI | (10400) | |
| tRFC | (467) | |
| tRRD | (4) | |
| tRRD_L | (7) | |
| tRRD_S | (4) | |
| tRTP | (10) | |
| tWR | (20) | |
| tWTR | (0) | |
| tWTR_L | (10) | |
| tWTR_S | (4) | |
| NMode | (2) | |

Realtime Memory Timing is set to **Enabled**.

Additional options listed below the table:

- ▶ Turn Around Timing
- ▶ Advanced Timing Configuration
- ▶ Misc Configuration
- ▶ ODT Delay Duration Configuration

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: Enabled (Default) / Disabled

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

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

Options: Auto (Default)

tRRD_L

This item allows you to select Min Row Active to Row Active Delay Time for 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

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

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

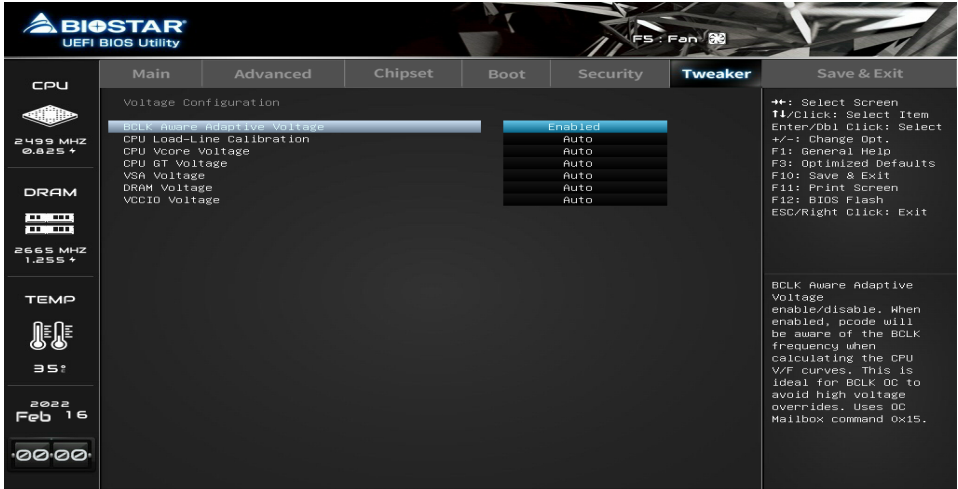
Options: Auto (Default)

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 Load-Line Calibration

This item adjust CPU Load Line Calibration function.

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

CPU Vcore Voltage

This item CPU Vcore Voltage.

Options: Auto (Default) / Override / Adaptive

Note

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

CPU Vcore Adjust Voltage

Options: 0.948 (Default), Range: 0.800V-1.800V

Note

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

VSA Voltage

This item CPU Vcore Voltage.

Options: Auto (Default) / Override / Adaptive

Note

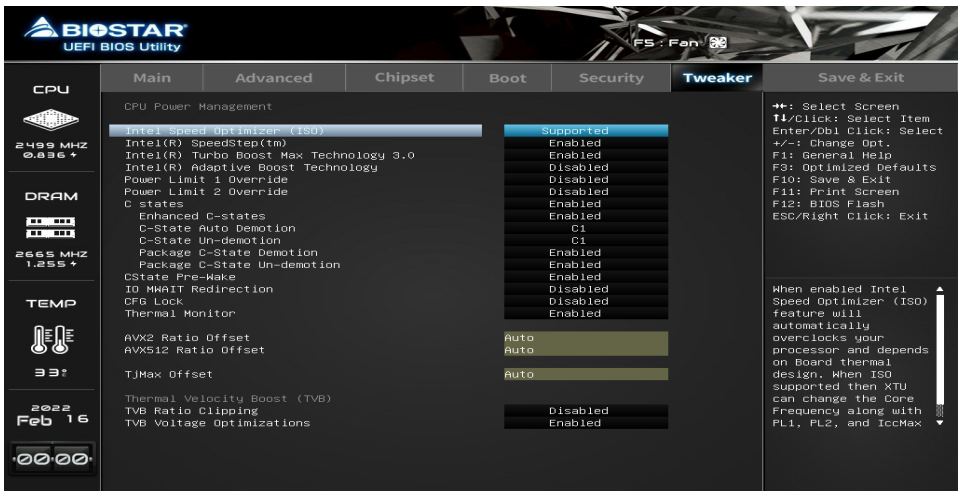
» The following items appear only when you set the VSA Voltage to [Override]

DRAM Voltage

This item sets DRAM Voltage (1.0V~2.200V), default 1.200V.

Options: Auto (Default)

CPU Power Management



Intel(R) Speed Optimizer (ISO)

This item allows you to set Intel Speed Optimizer (ISO).

Options: Supported (Default) / Unsupported

Intel(R) SpeedStep(tm)

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

Options: Enabled (Default) / Disabled

Intel(R) Turbo Boost Mas Technology 3.0

This item enables or disables Intel(R) Turbo Boost Max Technology 3.0 support. Disabling will report the maximum ratio of the slowest core in _CPC object.

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 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]*

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 allows you to set IO MWAIT Redirection. When set, will map IO_read instructions sent to IO registers PMG_IO_BASE_ADDRBASE+0 fffset to MWAIT (offset)

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)

TVB Ratio Clipping

This service controls Core frequency reduction caused by high package temperatures for processors that implement the Intel Thermal Velocity Boost (TVB) feature.

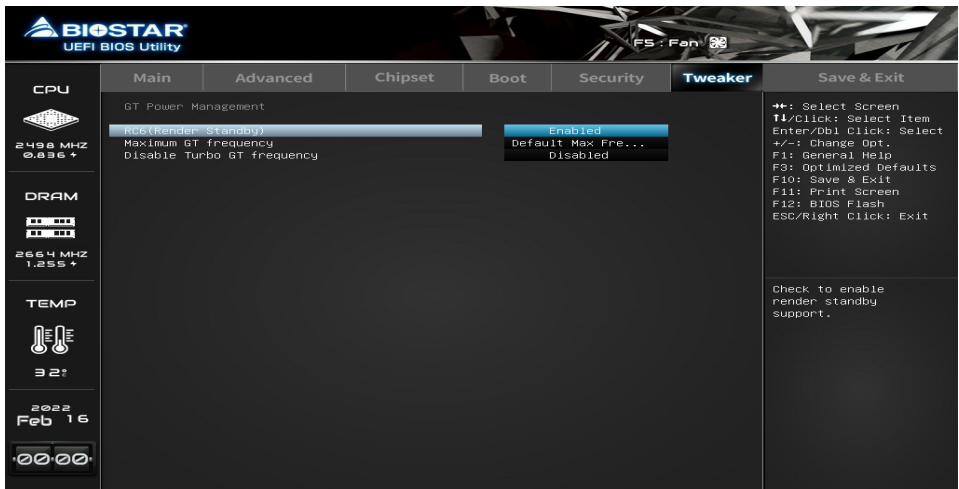
Options: Disabled (Default) / Enabled

TVB Voltage Optimizations

This service controls thermal based voltage optimizations for processors that implement the Intel Thermal Velocity Boost (TVB) feature. Uses Overclocking Mailbox command 0x18/ 0x19

Options: Enabled (Default) / Disabled

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 the user. Value beyond the range will be clipped to min/max supported by SKU.

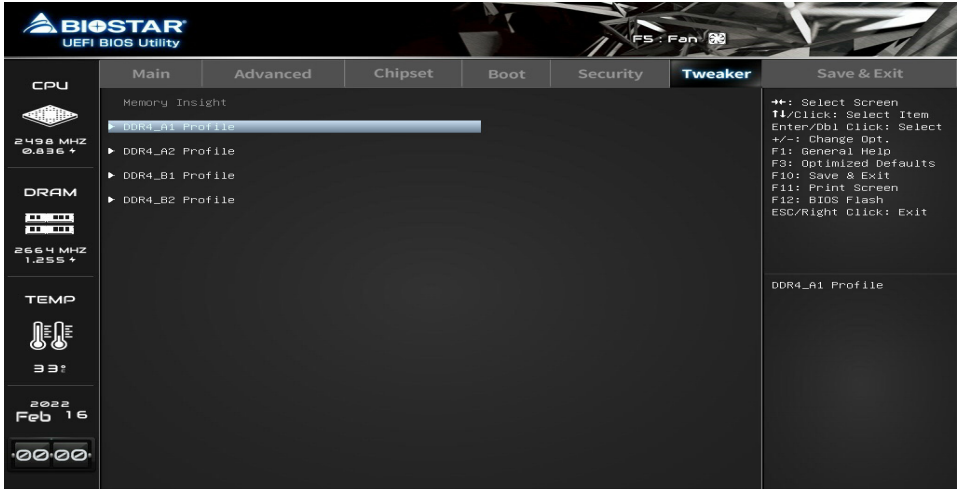
Options: Default Max Frequency (Default)

Disable Turbo GT frequency

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

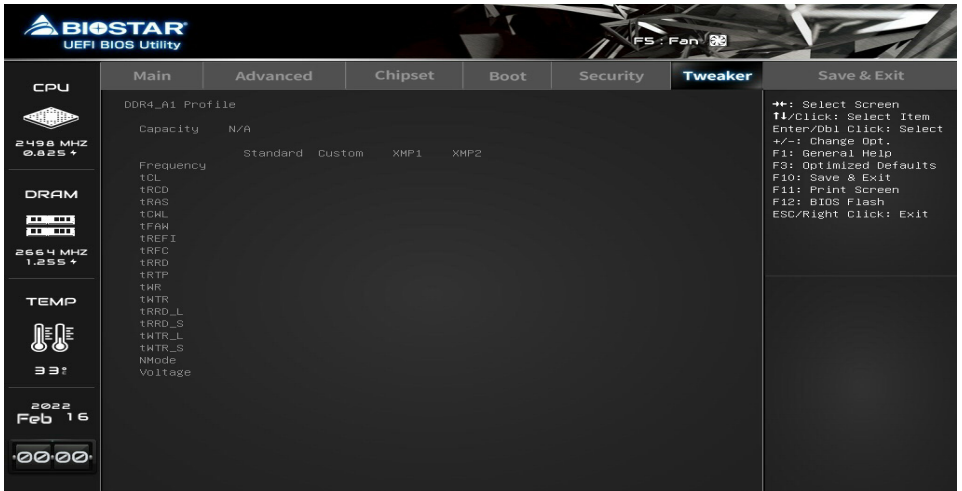
Options: Disabled (Default) / Enabled

Memory Insight



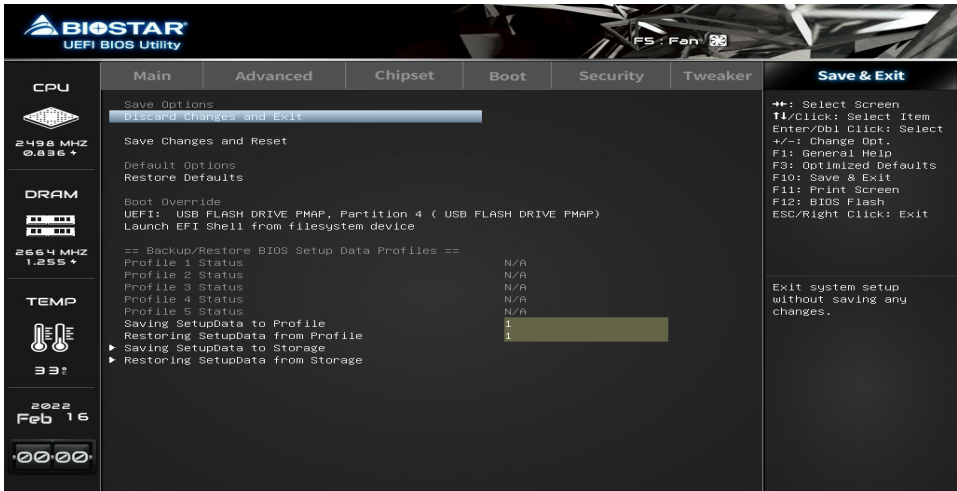
DIMM Profile

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.

Launch EFI Shell from filesystem device

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

Saving SetupData to Profile

Saving SetupData to Profile.

Restoring SetupData from Profile

Restoring SetupData from Profile.

Saving SetupData to Storage

Saving SetupData to Storage.

Restoring SetupData from Storage

Saving SetupData to Storage.

