

# BIOS User Guide

TB150 PRO

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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 BIOS Flasher

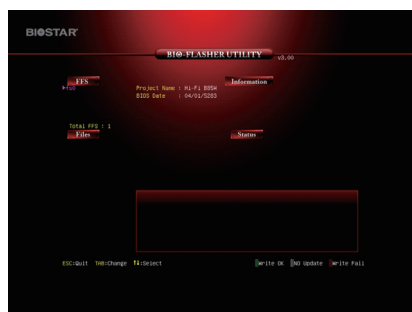
### ► Note

- » 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 BIOS 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.
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 BIOS-FLASHER utility pops out. Choose <fs0> to search for the BIOS file.

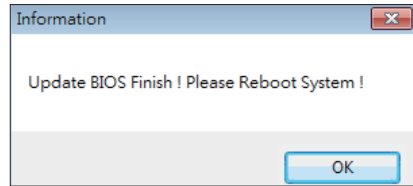


6. Select the proper BIOS file, and a message asking if you are sure to flash the BIOS file. Click "Yes" to start updating BIOS.





7. 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.

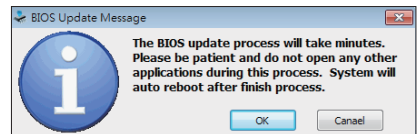
### **BIOS Update Utility (through a BIOS file)**

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

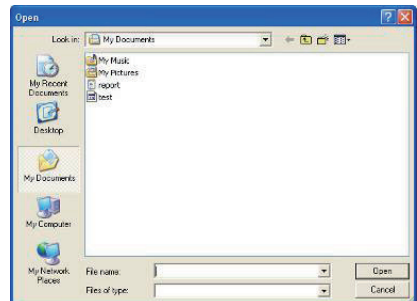
3. Launch BIOS Update Utility and click the “Update BIOS” button on the main screen.



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

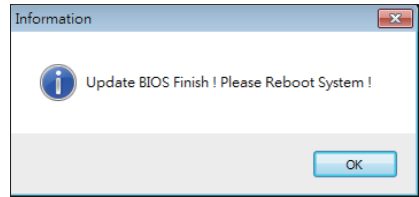


5. Choose the location for your BIOS file in the system. Please select the proper BIOS file, and then click on “Open”. It will take several minutes, please be patient.





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

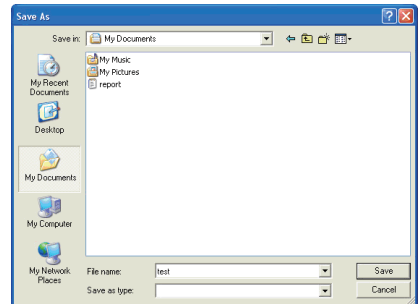


7. While the system boots up and the full screen logo shows up, press <DEL> key to enter BIOS setup.

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.

# 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.

## 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

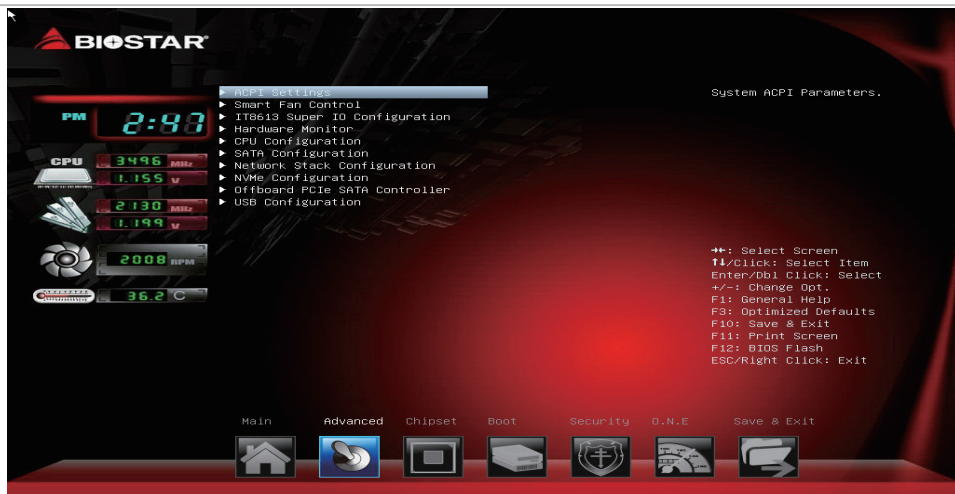
Set the system internal clock.

## 2. Advanced Menu

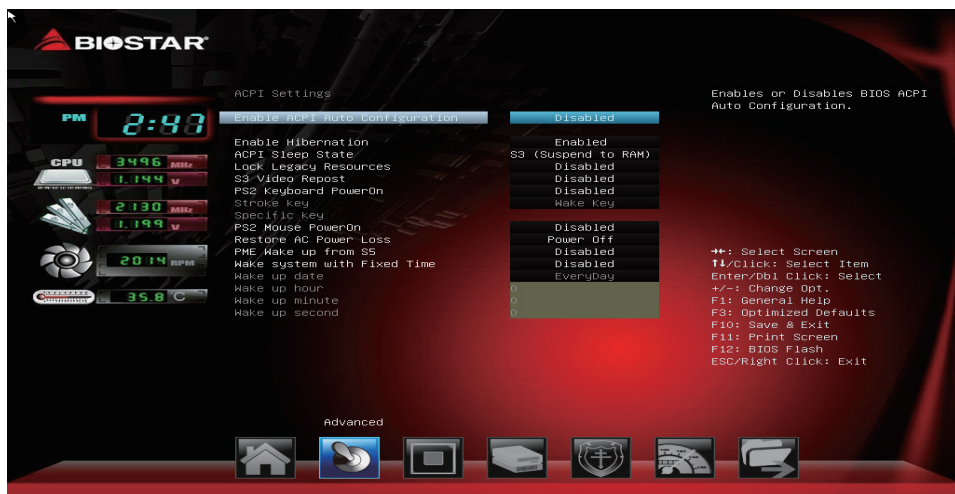
The Advanced Menu allows you to configure the settings of CPU, Super I/O, Power Management, and other system devices.

### Note

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



### 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 be not effective with some OS.

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 only (Suspend to RAM) (Default) / Suspend Disabled

**Lock Legacy Resources**

The item enables or disables Lock of Legacy Resources.

Options: Disabled (Default) / Enabled

**S3 Video Repost**

The item enables or disables S3 Video Repost.

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

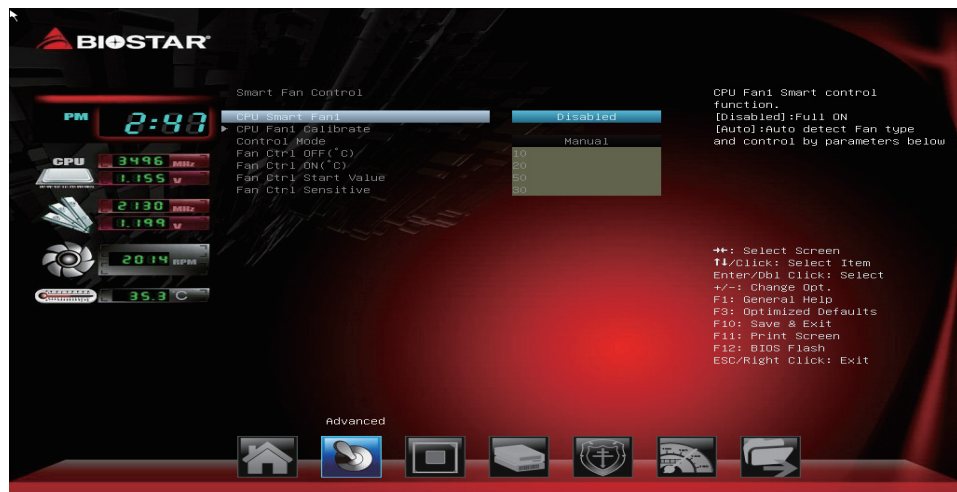
**Wake up date**

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.

## SMART FAN Control



### CPU Smart Fan1

This item allows you to control the CPU Smart Fan function.

Options: Disabled (Default) / Auto

#### Note

» The following items appear only when you set the Smart Fan function to [Auto].

### CPU Fan Calibrate

Press [ENTER] to calibrate CPU Fan speed.

### Control Mode

This item provides several operation modes of the fan.

Options: Quiet / Aggressive / Manual

### Fan Ctrl OFF(°C)

When CPU temperature is lower than this value, the CPU fan will keep lowest RPM.

Options: 10 (°C) (default)

### Fan Ctrl On(°C)

When CPU temperature is higher than this value, the CPU fan controller will turn on.

Options: 20 (°C) (Default)

### Fan Ctrl Start Value

This item sets CPU FAN Start Speed Value.

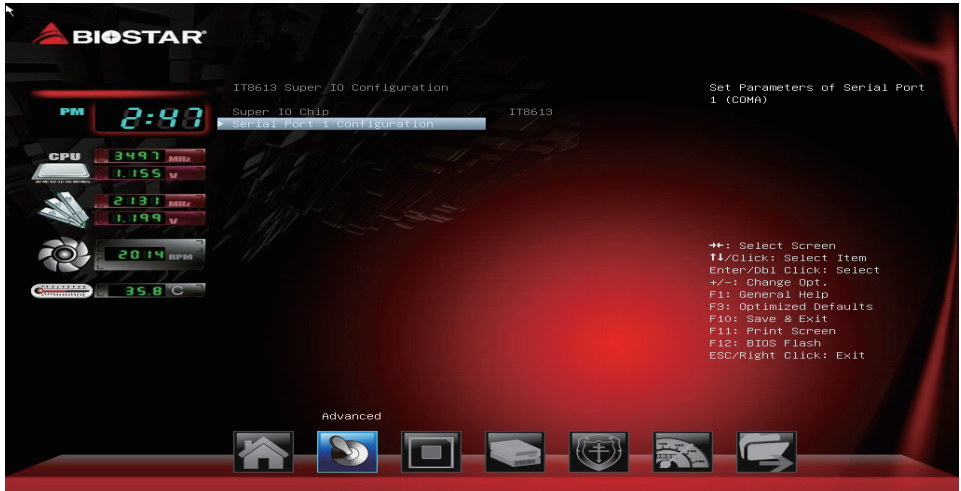
Options: 50 (Default)

### Fan Ctrl Sensitive

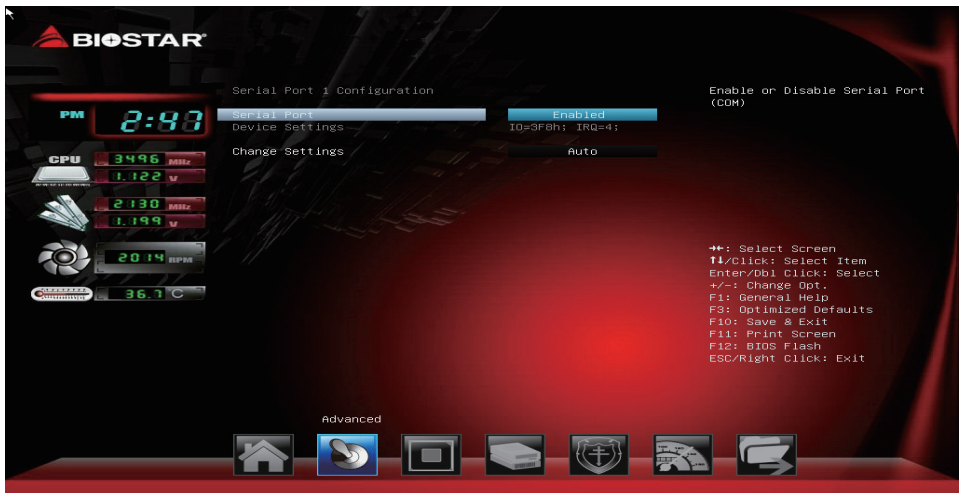
The bigger the numeral is, the higher the FAN speed is.

Options: 30 (Default)

## Super IO Configuration



## Serial Port 1 Configuration



### Serial Port

This item enables or disables Serial Port (COM).

Options: Enabled (Default) / Disabled

### Change Settings

This item selects an optimal setting 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



## 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

### CPU Configuration

This item shows CPU Information



### Hyper-threading

This item enables for Windows XP and Linux (OS optimized for Hyper-Threading Technology) and disables for other OS(OS not optimized for Hyper-Threading Technology). When disabled only on thread per enabled core is enabled.

Options: Enabled (Default) / Disabled



## Active Processor Cores

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

Options: All (Default) / 1 / 2 / 3

## Overclocking lock

This item sets Overclocking lock.

Options: Disabled (Default) / Enabled

## Intel Virtualization Technology

Virtualization Technology can virtually separate your system resource into several parts, thus enhance the performance when running virtual machines or multi interface systems.

Options: Enabled (Default) / Disabled

## Hardware Prefetcher

The processor has a hardware prefetcher that automatically analyzes its requirements and prefetches data and instructions from the memory into the Level 2 cache that are likely to be required in the near future. This reduces the latency associated with memory reads.

Options: Enabled (Default) / Disabled

## Adjacent Cache Line Prefetch

The processor has a hardware adjacent cache line prefetch mechanism that automatically fetches an extra 64-byte cache line whenever the processor requests for a 64-byte cache line. This reduces cache latency by making the next cache line immediately available if the processor requires it as well.

Options: Enabled (Default) / Disabled

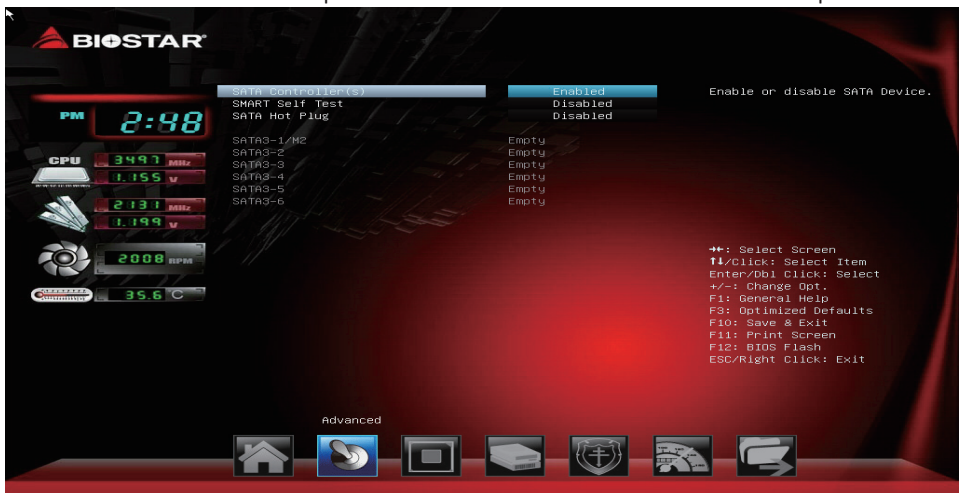
## CPU AES

This item sets CPU Advanced Encryption Standard instructions.

Options: Enabled (Default) / Disabled

## SATA 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/disables Serial ATA Device.

Options: Enabled (Default) / Disabled

## SMART Self Test

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

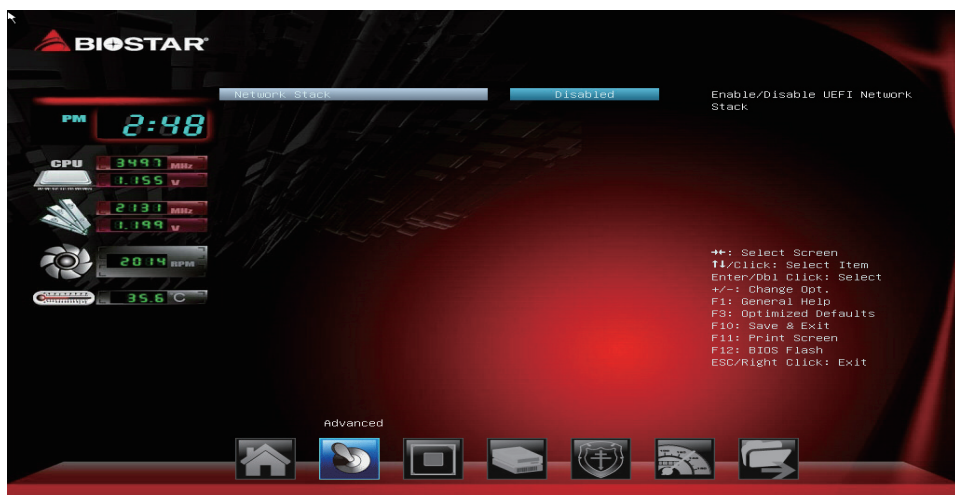
Options: Disabled (Default) / Enabled

## SATA Hot Plug

This item enables/disables SATA port as Hot Pluggable.

Options: Disabled (Default) / Enabled

## Network Stack



## 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 boot option will not be created.

Options: Enabled (Default) / Disabled

### IPv6 PXE Support

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

Options: Enabled (Default) / Disabled

### PXE boot wait time

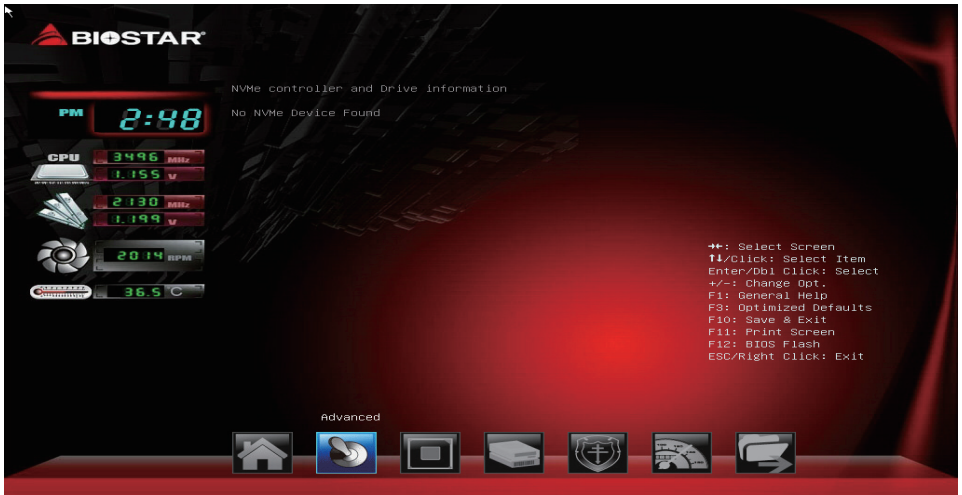
Wait time to press ESC key to abort the PXE boot.

### Media detect time

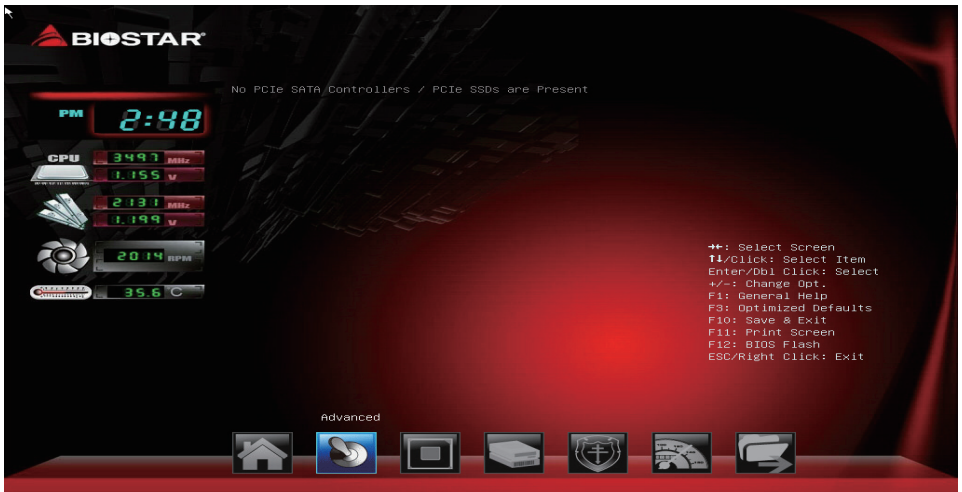
Wait time in sec to detect media.

## NVMe Configuration

The item shows NVMe controller and driver information.



## Offboard PCIe SATA Controller



## 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 allows you to enable or disable USB Mass Storage Driver Support.

Options: Enabled (Default) / Disabled

### Port 60/64 Emulation

The item allows you to enable or disable I/O port 60h/64h emulation support. This should be enabled for the complete USB keyboard legacy support for non-USB aware OSes.

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

“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

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**Note**

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

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**Device power-up delay in seconds**

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

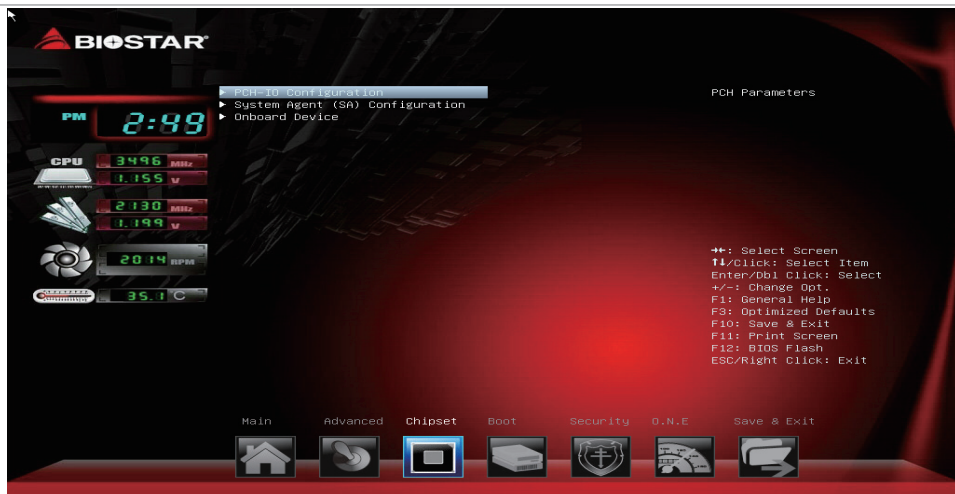
Options: 5 (Default)

## 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.



### PCH-IO Configuration





## PCI Express Configuration



PEX1\_1/ PEX1\_2/ PEX1\_3/ PEX16\_2

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

## HD Audio

Control Detection of the HD-Audio device. Disabled = HDA will be unconditionally disabled.

Enabled = HDA will be enabled.

Options: Auto (Default) / Disabled / Enabled

## EuP Control

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

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

## System Agent (SA) Configuration



## **VT-d**

This item enables or disables VT-d capability.

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

## **Internal Graphics**

This item keeps IGD enabled based on the setup options.

Options: Auto (Default) / Disabled / Enabled

## **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 / PCIE

## **GTT Size**

This item selects GTT Size.

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

## **Aperture Size**

This item selects Aperture Size. Note : Above 4GB MMIO BIOS assignment is automatically enabled when selecting 2048MB aperture. To use this feature, please disable CSM Support.

Options: 256MB (Default) / 128MB / 512MB / 1024MB / 2048MB / 4096MB

## **DVMT Pre-Allocated**

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

## **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

## **RC6 (Render Standby)**

This item enables or disables render standby support.

Options: Enabled (Default) / Disabled

## **PEX16\_1**

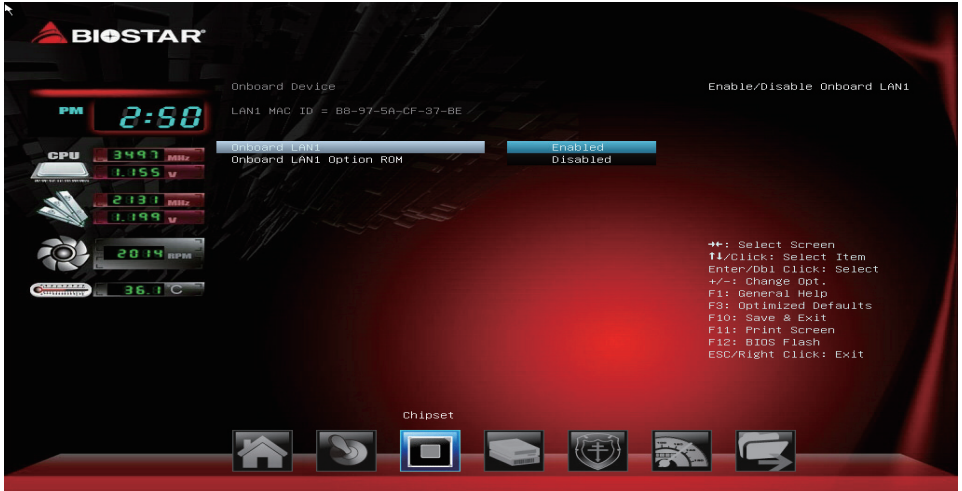
### **MAX Link Speed**

Configure PEX16\_1 Max Speed.

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



## Onboard Device



### Onboard LAN1

This item enables/disables Onbaord LAN1.

Options: Enabled (Default) / Disabled

### Onboard LAN1 Option ROM

This item enables/disables Onboard LAN1 Option ROM.

Options: Disabled (Default) / Enabled

## 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.

Options: 1 (Default)

### Bootup NumLock State

This item selects the keyboard NumLock state.

Options: On (Default) / Off

### Full Screen Logo Display

This item allows you to enable/disable 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/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**

Options: All Sata Devices (Default) / Last Boot HDD Only

**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.

Options: EFI Driver (Default) / Auto

**USB Support**

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

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

**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 disable, 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: Enabled (Default) / Disabled

**Boot option filter**

This option controls what devices system can boot to.

Options: UEFI and Legacy (Default) / Legacy only / UEFI only

**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

For PCI devices other than Network, Mass storage or video defines which OpROM to launch.

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

## New Boot Option Policy

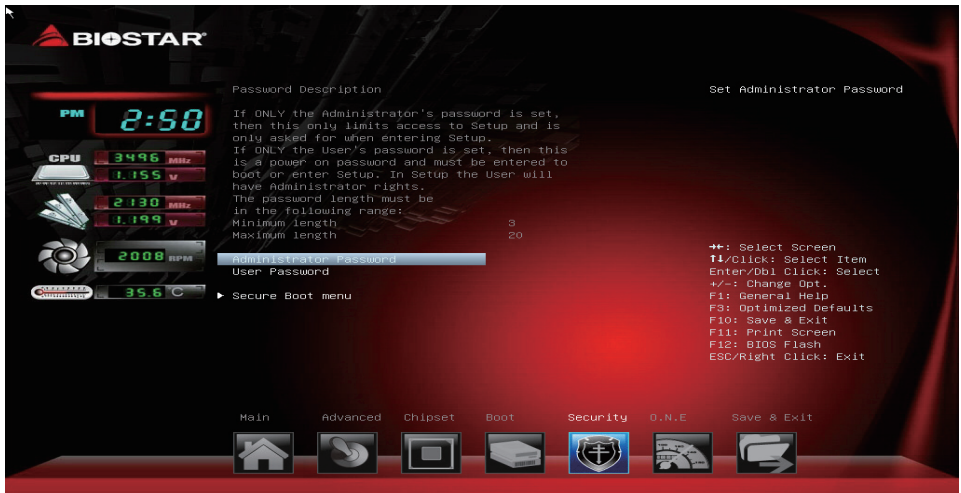
It controls the placement of newly detected UEFI boot options.

Options: Default (Default) / Place First / Place Last

## Boot Option Priorities

The items specify the boot device priority sequence from the available devices. The number of device items that appears on the screen depends on the number of devices installed in the system.

## 5. Security Menu



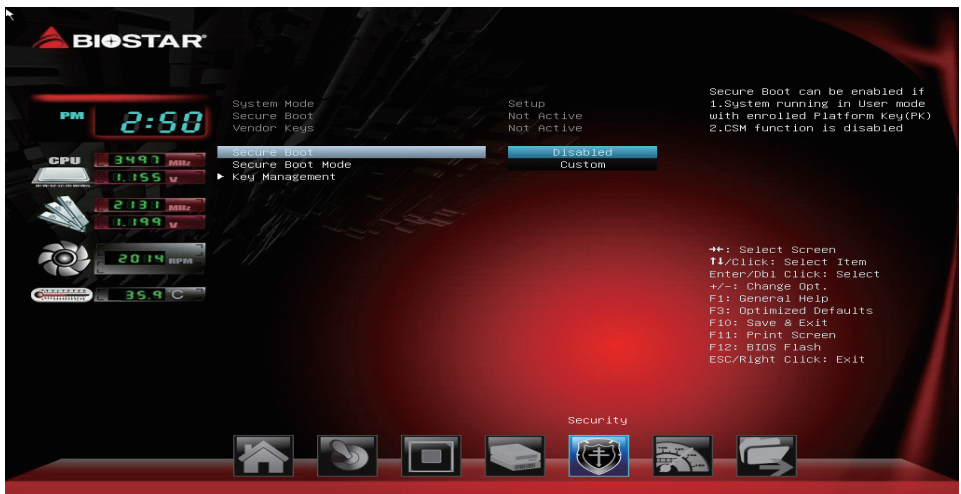
### Administrator Password

This item sets Administrator Password.

### User Password

This item sets User Password.

### Secure Boot Menu



## Secure Boot

Secure Boot can be enabled if 1. System running in user mode with enrolled Platform Key(PK)  
2.CSM function is disabled.

Options: Disabled (Default) / Enabled

## Secure Boot Mode

Secure Boot mode selector. 'Custom' mode enables users to change Image Execution policy and manage Secure Boot Keys.

Options: Custom (Default) / Standard

## Key Management



### Provision Factory Default Keys

Install factory default Secure Boot Keys when system is in setup mode.

Options: Disabled (Default) / Enabled

### Enroll all Factory Default Keys

Force System to User Mode - install all Factory Default Keys(PK, KEK, , dbt, dbx). Change takes effect after reboot.

### Save all Factory Default Keys

Save NVRAM content of all Secure Boot Variables to the files (EFI\_SIGNATURE\_LIST data format) in root folder on a target file system device.

### Platform Key (PK)

Delete Key – Allows you to delete the PK file from your system.

Set new Key – Allows you set new PK file.

### Key Exchange Key

Delete Key – Allows you to delete the KEK file from your system.

Set new Key – Allows you set new KEK file.

Append Key – Allows you append Var to KEK.

### Authorized Signature

Delete Key – Allows you to delete the DB file from your system.

Set new Key – Allows you set new DB file.

Append Key – Allows you append Var to DB.

**Forbidden Signature**

Delete Key – Allows you to delete the DBX file from your system.

Set new Key – Allows you set new DBK file.

Append Key – Allows you append Var to DBX.

**Authorized Timestamps**

Set new Key – Allows you set new DBT file.

Append Key – Allows you append Var to DBT.

## 6. O.N.E 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 – O.N.E / Page – Save & Exit

### CPU Ratio Mode

This item sets CPU Ratio Mode.

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

### Ring Max OC Ratio

This sets the maximum overclocking ratio for the Ring Domain.

Options: 39 (Default)

### Ring Min OC Ratio

This sets the minimum overclocking ratio for the Ring Domain.

Options: 8 (Default)

### GT Slice Frequency

Overclocked GT Frequency in multiples of 50 MHz.

Options: 23 (Default)



## Memory Profile

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

Options: Auto (Default) / Manual

### Note

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

## Memory Reference Clock

This sets the memory reference clock in Automatic, 133MHz or 100MHz.

Options: Auto (Default) / 133 / 100

## Memory Ratio

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

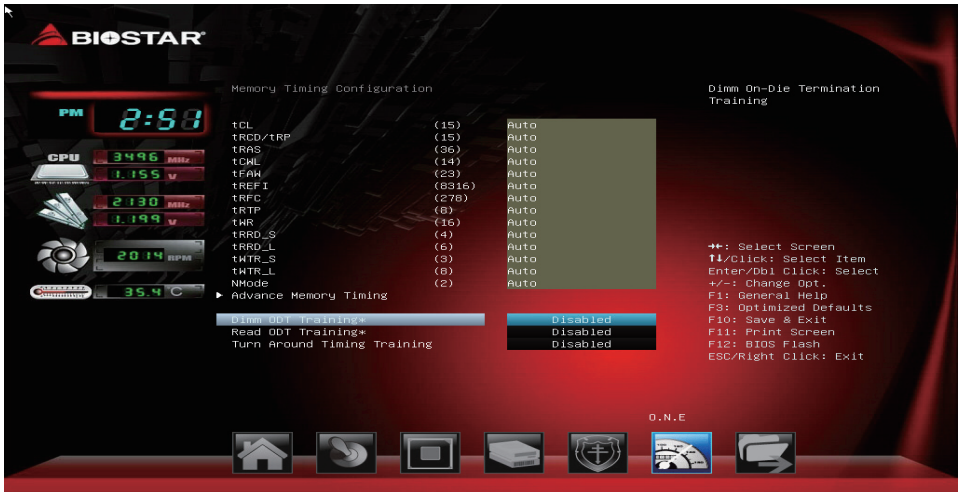
Options: Auto (Default) / DDR4 1066Mhz / DDR4 1333Mhz / DDR4 1600Mhz / DDR4 1866Mhz / DDR4 2133Mhz

## QCLK Odd Ratio

Adds 133 or 100 MHz to QCLK frequency, depending on ReClk.

Options: Disabled (Default) / Enabled

## Memory Timing Configuration



### Note

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

### tCL

This item allows you to select CAS Latency, 0: AUTO, max: 31

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 Row Active Time, 0: AUTO, max: 64

Options: Auto (Default)

**tCWL**

This item allows you to select Minimum CAS Write Latency Range, 0: AUTO, max: 20

Options: Auto (Default)

**tFAW**

This item allows you to select Four Active Window Delay, 0: AUTO, max: 63

Options: Auto (Default)

**tREFI**

This item allows you to select Maximum tREFI time,, 0: AUTO, max: 65535

Options: Auto (Default)

**tRFC**

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

Options: Auto (Default)

**tRTP**

This item allows you to select Read to Precharge Delay, 0: AUTO, max: 15. DDR4 legal values: 5, 6, 7, 8, 9, 10, 12

Options: Auto (Default)

**tWR**

This item allows you to select Internal Write to Read Command Delay, 0: AUTO, legal values: 5, 6, 7, 8, 10, 12, 14, 16, 18, 20, 24

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: 10

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: 15

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: 4

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: 11

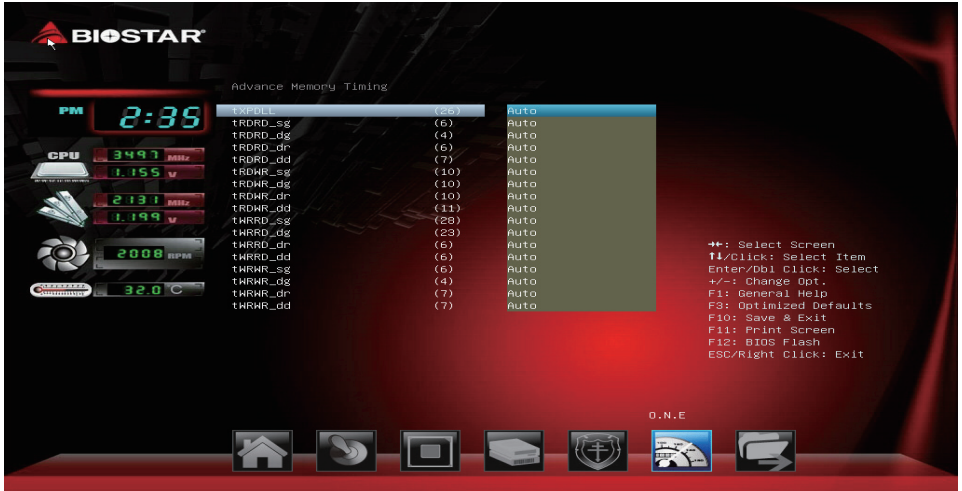
Options: Auto (Default)

**NMode**

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

Options: Auto (Default)

## Advance Memory Timing



### Dimm ODT Training\*

Dimm On-Die Termination Training

Options: Disabled (Default) / Enabled

### Read ODT Training\*

Read On-Die Termination Training

Options: Disabled (Default) / Enabled

### Turn Around Timing Training

Turn Around Timing Training

Options: Disabled (Default) / Enabled

## Voltage Configuration



### CPU Vcore Over Voltage

This item sets CPU Vcore Over Voltage.

Options: Auto (Default) / Override / Adaptive

#### Note

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

### CPU Vcore Adjust Voltage

Options: 1.130V (Default), Range: 1.000V-1.800V

#### Note

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

### CPU Vcore Offset Prefix

Options: + (Default) / -

### CPU Vcore Offset Voltage

Options: Auto (Default), Range: 0.0V-0.635V

### CPU GT Over Voltage

This item sets CPU GT Over Voltage.

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), Range: 0.600V-1.500V

#### Note

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

### CPU GT Offset Prefix

Options: + (Default) / -

**CPU GT Offset Voltage**

Options: Auto (Default), Range: 0.0V-0.635V

**DRAM Voltage**

This item sets DRAM Over Voltage.

Options: Auto (Default) / 1.20V / 1.35V

**CPU Power Management****Intel(R) SpeedStep(tm)**

This item enables/disables Enhanced Intel SpeedStep Technology.

Options: Enabled (Default) / Disabled

**Turbo Mode**

This item enables/disables CPU Turbo Mode.

Options: Enabled (Default) / Disabled

**Package Power Limit MSR Lock**

This item enables or disables locking of Package Power Limit settings. When enabled, PACKAGE\_POWER\_LIMIT MSR will be locked and a reset will be required to unlock the register.

Options: Disabled (Default) / Enabled

**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

**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: Enabled (Default) / Disabled

**Power Limit 2**

This item sets the Power Limit 2 value in Watt and stepsize is 1W.

Options: 118(Default)

### **CPU C states**

This item enables or disables CPU C states.

Options: Auto (Default) / Enabled / 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 and C3 (Default) / C1 / C3/ Disabled

### **C-states Un-demotion**

This item sets C-State Un-demotion.

Options: C1 and C3 (Default) / C1 / C3/ Disabled

### **Package C state Demotion**

This item sets Package C state Demotion.

Options: Disabled (Default) / Enabled

### **Package C state Undemotion**

This item sets Package C state undemotion.

Options: Disabled (Default) / Enabled

### **CState Pre-Wake**

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

Options: Enabled (Default) / Disabled

### **Package C State limit**

This item sets Package C State Limit.

Options: Auto (Default) / C0/C1 / C2 / C3 / C6 / C7 / C7s / C8

### **CFG lock**

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

Options: Enabled (Default) / Disabled

### **RSR**

This item enables or disables Reliability Stress Restrictor (RSR) feature.

Options: Enabled (Default) / Disabled

### **AC Loadline**

AC Loadline defined in 1/100 mOhms. A value of 100=1.00 mOhm, and 1255 =12.55 mOhm. Range is 0-6249 (0-62.49 mOhms). 0=AUTO/HW default.

Options: Auto (Default)

### **DC Loadline**

DC Loadline defined in 1/100 mOhms. A value of 100=1.00 mOhm, and 1255 =12.55 mOhm. Range is 0-6249 (0-62.49 mOhms). 0=AUTO/HW default.

Options: Auto (Default)

## Memory Insight



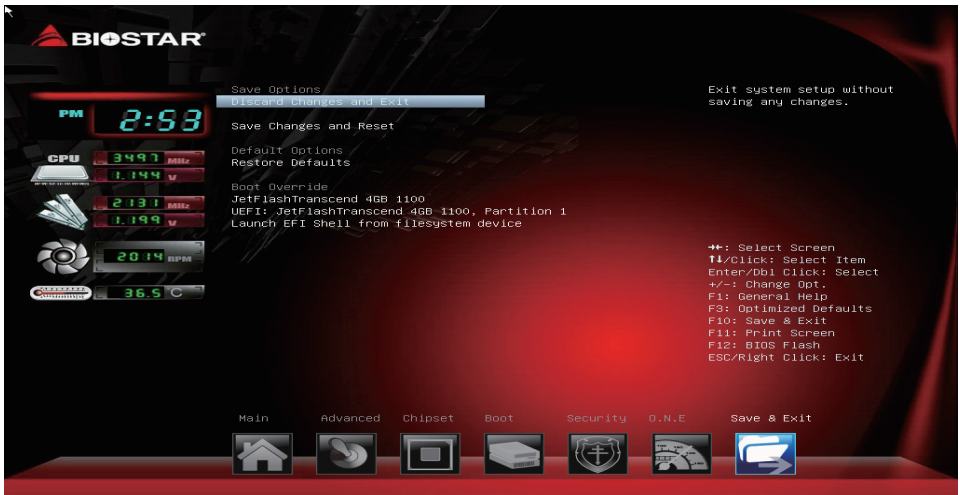
## DIMM Profile

These items display memory information.



## 7. 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

This selection allows you to reload the BIOS when problem occurs during system booting sequence. These configurations are factory settings optimized for this system.

Launch EFI Shell from filesystem device

This item attempts to EFI Shell application (Shellx64.efi) from one of the available filesystem devices.