B860M-STX

User Manual

Contact Information

If you need to contact ASRock or want to know more about ASRock, you're welcome to visit ASRock's website at http://www.asrock.com; or you may contact your dealer for further information. For technical questions, please submit a support request form at https://event.asrock.com/tsd.asp

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Contents

Chapter 1 Introduction

Thank you for purchasing B860M-STX motherboard. In this documentation, Chapter 1 and 2 contains the introduction of the motherboard and step-by-step installation guides. Chapter 3 contains the operation guide of the software and utilities. Chapter 4 contains the configuration guide of the BIOS setup.

Because the motherboard specifications and the BIOS software might be updated, the content of this documentation will be subject to change without notice.

1.1 Package Contents

- B860M-STX Motherboard (Mini-STX Form Factor)
- B860M-STX Quick Installation Guide
- 1 x I/O Panel Shield
- 2 x Serial ATA(SATA) Data with Power Cable (Optional)
- 2 x Screws for M.2 Sockets (M2*2) (Optional)
- 1 x Screw for WiFi Module (M2*2) (Optional)

1.2 Specifications

Platform	• Mini-STX Form Factor • 8 Layer PCB
CPU	• Supports Intel® Core™ Ultra Processors (Series 2) (LGA1851) • Supports Intel® Hybrid Technology • Supports Intel® Turbo Boost Max 3.0 Technology • Supports Intel® Thermal Velocity Boost (TVB) • Supports Intel® Adaptive Boost Technology (ABT) • Integrated NPU for dedicated AI acceleration
Chipset	• Intel® B860
Memory	• Dual Channel DDR5 Memory Technology • 2 x DDR5 SO-DIMM Slots • Supports DDR5 non-ECC, un-buffered memory up to 5600+(OC) • Supports DDR5 CSODIMM memory modules up to 6400+(OC) • Max. capacity of system memory: 128GB • Supports Intel® Extreme Memory Profile (XMP) 3.0x
Expansion Slot	• 1 x M.2 Socket (Key E), supports type 2230 WiFi/BT module and Intel® CNVi (Integrated WiFi/BT)
Graphics	• Intel® UHD Graphics Built-in Visuals and the VGA outputs can be supported only with processors which are GPU integrated. • Intel® Xᵉ LPG Graphics Architecture • Supports Quad Display (four 4K displays) and Triple Display (two 4K displays and one 8K display) • 1 x HDMI 2.1 TMDS/FRL 8G Compatible, supports HDR, HDCP 2.3 and max. resolution up to 4K 120Hz • 2 x DisplayPort 1.4 with DSC (compressed), support HDCP 2.3 and max. resolution up to 8K 60Hz / 5K 120Hz

	• 1 x Intel® Thunderbolt™ 4, supports HDCP 2.3 and max. resolution up to 8K 60Hz / 5K 120Hz* * Only the CPU's embedded graphics can be displayed through Thunderbolt ports. If you want to display to a Thunderbolt monitor, please use CPU models with embedded graphics.
Audio	• Realtek ALC269 Audio Codec • 1 x Headphone/Headset Jack • 1 x MIC-In • 1 x Audio Header
LAN	• 2.5 Gigabit LAN 10/100/1000/2500 Mb/s • Dragon RTL8125BG • Supports Dragon 2.5G LAN Software - Smart Auto Adjust Bandwidth Control - Visual User Friendly UI - Visual Network Usage Statistics - Optimized Default Setting for Game, Browser, and Streaming Modes - User Customized Priority Control
Front Panel I/O	• 1 x Headphone/Headset Jack • 1 x USB 3.2 Gen1 Type-A Port (Supports ESD Protection) • 1 x USB 3.2 Gen2x2 Type-C Port (20 Gb/s) (Supports ESD Protection) • 1 x Microphone Input Jack
Rear Panel I/O	• 1 x DC Jack (Compatible with the 19V power adapter)* * Please use 120W power adapter for 65W CPU and 90W power adapter for 35W CPU. • 1 x HDMI Port • 2 x DisplayPort 1.4 • 1 x Thunderbolt™ 4 Type-C Port (40 Gb/s for USB4 protocol; 40Gb/s for Thunderbolt protocol)* * Supports USB PD 3.0 up to 5V@3A (15W) charging • 2 x USB 3.2 Gen1 Type-A Ports (Supports ESD Protection) • 1 x RJ-45 LAN Port

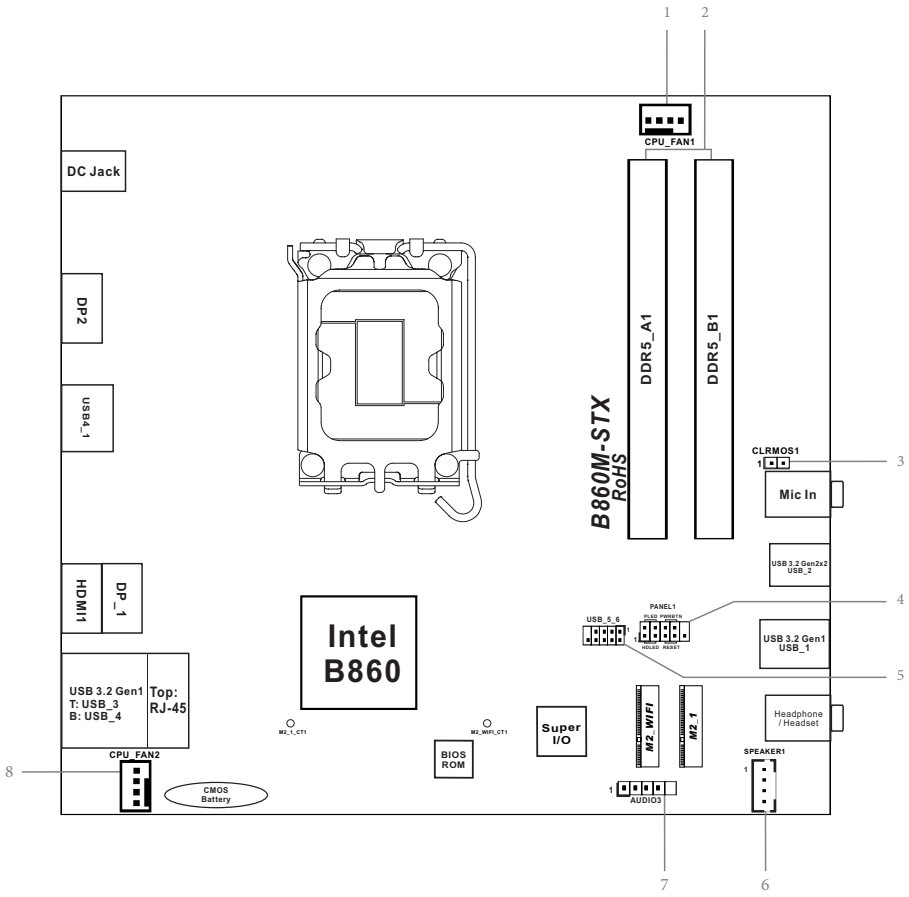
Storage	• 2 x SATA3 6.0 Gb/s Connectors • 1 x Blazing M.2 Socket (M2_1, Key M), supports type 2280 PCIe Gen5x4 (128 Gb/s) mode* • 1 x Hyper M.2 Socket (M2_2, Key M), supports type 2280 PCIe Gen4x4 (64 Gb/s) mode* * Supports Intel® OptaneTM Technology ** Supports Intel® Volume Management Device (VMD) * Supports NVMe SSD as boot disks
RAID	• Supports RAID 0 and RAID 1 for SATA storage devices
Connector	• 2 x CPU Fan Connectors (2 x 4-pin) • 1 x Internal Speaker Header • 1 x Front Panel Header • 1 x USB 2.0 Header (Supports 2 USB 2.0 ports) (Supports ESD Protection) • 1 x Audio Header
BIOS Feature	• AMI UEFI Legal BIOS with multilingual GUI support • ACPI 6.0 Compliant wake up events • SMBIOS 2.7 Support • DRAM Voltage Multi-adjustment
Hardware Monitor	• CPU Temperature Sensing • CPU Fan Tachometer • CPU Quiet Fan (Auto adjust chassis fan speed by CPU temperature) • CPU Fan Multi-Speed Control • Voltage monitoring: +12V, +5V, +3.3V, CPU Vcore
OS	• Microsoft® Windows® 10 64-bit / 11 64-bit
Certifications	• FCC, CE • ErP/EuP ready (ErP/EuP ready power supply is required)

Please realize that there is a certain risk involved with overclocking, including adjusting the setting in the BIOS, applying Untied Overclocking Technology, or using third-party overclocking tools. Overclocking may affect your system's stability, or even cause damage to the components and devices of your system. It should be done at your own risk and expense. We are not responsible for possible damage caused by overclocking.

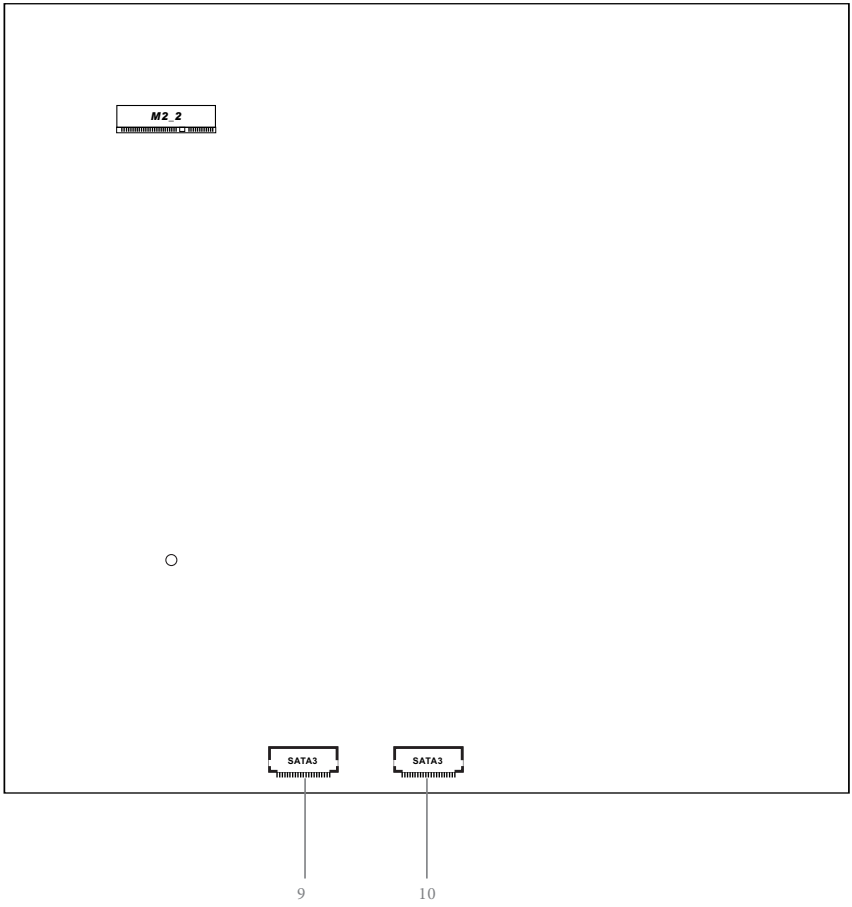
Mini-STX Chassis Support List

Vendor	Model
SilverStone Technology Inc.	VT01S
AKasa	A-STX04-A1B / A-STX04-M1B

1.3 Motherboard Layout

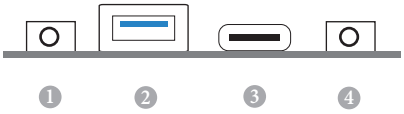


Back Side View



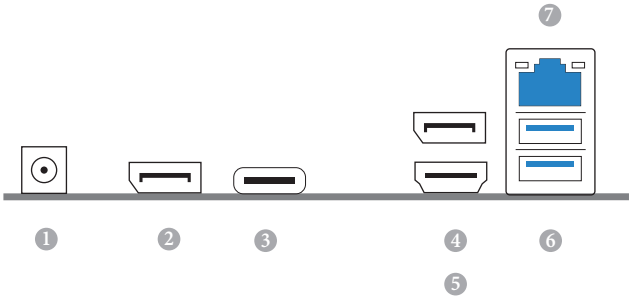
No.	Description
1	CPU Fan Connector (CPU_FAN1)
2	2 x 260-pin DDR5 SO-DIMM Slots (DDR5_A1, DDR5_B1)
3	Clear CMOS Jumper (CLRMOS1)
4	System Panel Header (PANEL1)
5	USB 2.0 Header (USB_5_6)
6	MONO Speaker Header (SPEAKER1)
7	Audio Header (AUDIO3)
8	CPU Fan Connector (CPU_FAN2)
9	SATA3 Connector (SATA2)
10	SATA3 Connector (SATA1)

1.4 Front Panel



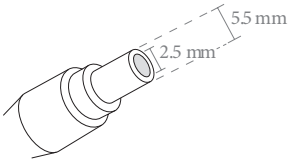
No.	Description	No.	Description
1	Headphone/Headset Jack (AUDIO1)	3	USB 3.2 Gen2x2 Type-C Port (USB_2)
2	USB 3.2 Gen1 Type-A Port (USB_1)	4	Microphone Input (AUDIO2)

1.5 Rear Panel

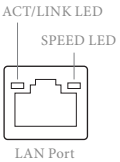


No.	Description	No.	Description
1	DC Jack*	5	HDMI Port
	(Supports 19V DC Power Adapters)	6	USB 3.2 Gen1 Type-A Ports
2	DisplayPort 1.4 (DP2)		(USB_34)
3	Thunderbolt™ 4 Type-C Port (USB4_1)	7	2.5G LAN RJ-45 Port**
4	DisplayPort 1.4 (DP_1)		

**Specification for DC plug*



** There are two LEDs on each LAN port. Please refer to the table below for the LAN port LED indications.*



Activity / Link LED		Speed LED	
Status	Description	Status	Description
Off	No Link	Off	10Mbps connection
Blinking	Data Activity	Orange	100Mbps/1Gbps connection
On	Link	Green	2.5Gbps connection

Chapter 2 Installation

This is a Mini-STX form factor motherboard. Before you install the motherboard, study the configuration of your chassis to ensure that the motherboard fits into it.

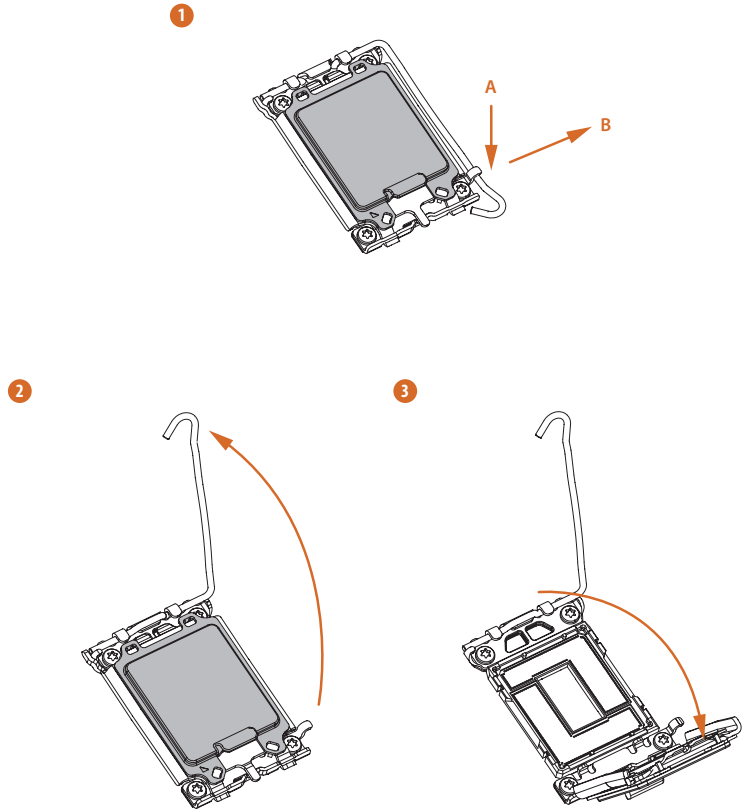
Pre-installation Precautions

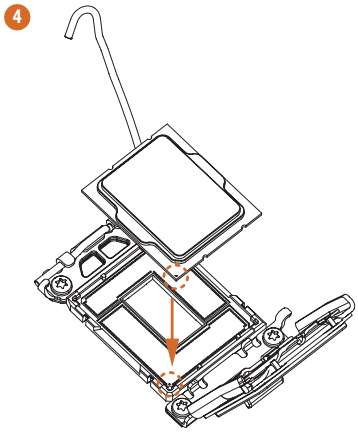
Take note of the following precautions before you install motherboard components or change any motherboard settings.

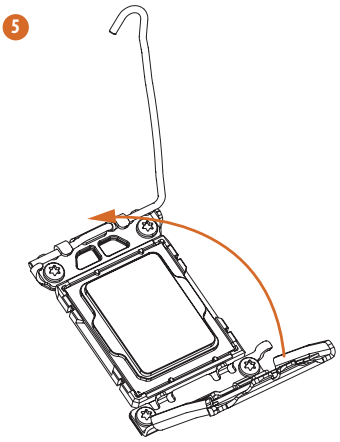
- Make sure to unplug the power cord before installing or removing the motherboard components. Failure to do so may cause physical injuries and damages to motherboard components.
- In order to avoid damage from static electricity to the motherboard's components, NEVER place your motherboard directly on a carpet. Also remember to use a grounded wrist strap or touch a safety grounded object before you handle the components.
- Hold components by the edges and do not touch the ICs.
- Whenever you uninstall any components, place them on a grounded anti-static pad or in the bag that comes with the components.
- When placing screws to secure the motherboard to the chassis, please do not over-tighten the screws! Doing so may damage the motherboard.

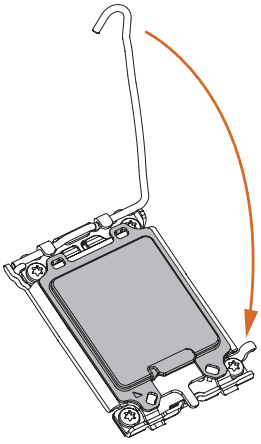
2.1 Installing the CPU

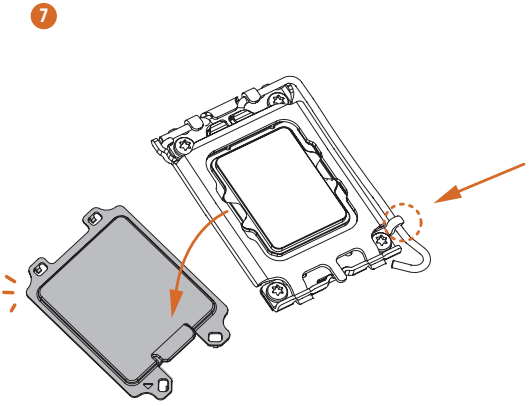
1. *Before you insert the 1700-Pin CPU into the socket, please check if the **PnP cap** is on the socket, if the CPU surface is unclean, or if there are any **bent pins** in the socket. Do not force to insert the CPU into the socket if above situation is found. Otherwise, the CPU will be seriously damaged.*
2. *Unplug all power cables before installing the CPU.*





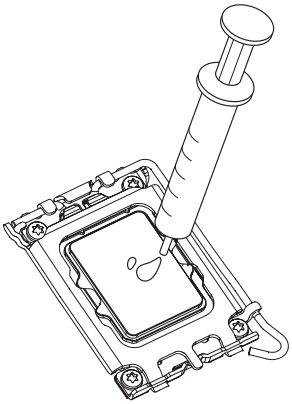




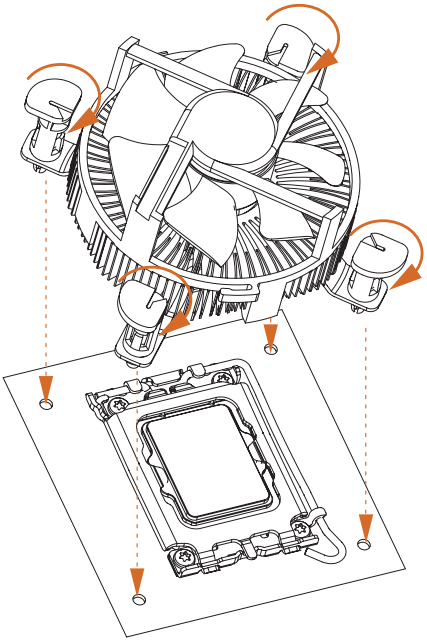


Please save and replace the cover if the processor is removed. The cover must be placed if you wish to return the motherboard for after service.

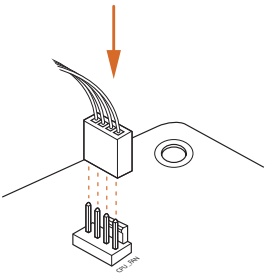
2.2 Installing the CPU Fan and Heatsink



1



2

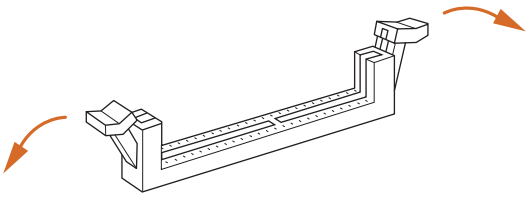


2.3 Installing Memory Modules (SO-DIMM)

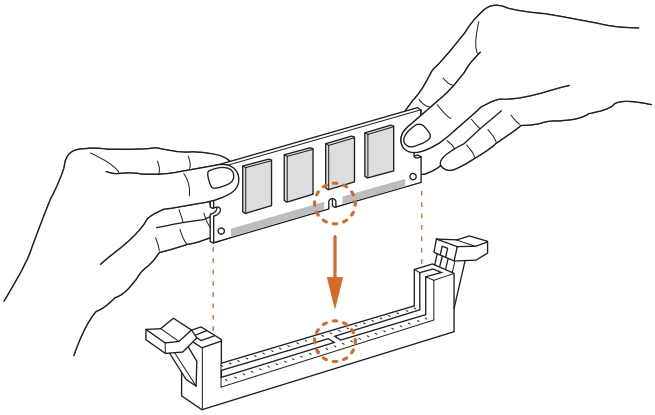
This motherboard provides two 260-pin DDR5 (Double Data Rate 5) SO-DIMM slots, and supports Dual Channel Memory Technology.

1. *For dual channel configuration, you always need to install identical (the same brand, speed, size and chip-type) DDR5 SO-DIMM pairs.*
2. *It is unable to activate Dual Channel Memory Technology with only one memory module installed.*
3. *It is not allowed to install a DDR, DDR2 , DDR3 or DDR4 memory module into a DDR5 slot; otherwise, this motherboard and SO-DIMM may be damaged.*
4. *The SO-DIMM only fits in one correct orientation. It will cause permanent damage to the motherboard and the SO-DIMM if you force the SO-DIMM into the slot at incorrect orientation.*

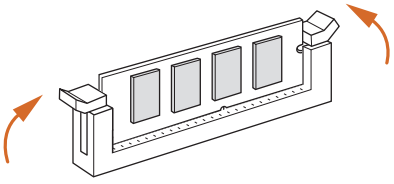
1



2

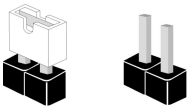


3



2.4 Jumpers Setup

The illustration shows how jumpers are setup. When the jumper cap is placed on the pins, the jumper is "Short". If no jumper cap is placed on the pins, the jumper is "Open".



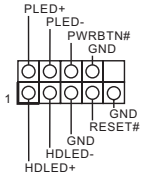
Clear CMOS Jumper (CLRCMOS1) (see p.6, No. 3)	 2-pin Jumper	Short: Clear CMOS Open: Default

CLRCMOS1 allows you to clear the data in CMOS. The data in CMOS includes system setup information such as system password, date, time, and system setup parameters. To clear and reset the system parameters to default setup, please turn off the computer and unplug the power cord, then use a jumper cap to short the pins on CLRCMOS1 for 3 seconds. Please remember to remove the jumper cap after clearing the CMOS. If you need to clear the CMOS when you just finish updating the BIOS, you must boot up the system first, and then shut it down before you do the clear-CMOS action.

2.5 Onboard Headers and Connectors

Onboard headers and connectors are NOT jumpers. Do NOT place jumper caps over these headers and connectors. Placing jumper caps over the headers and connectors will cause permanent damage to the motherboard.

System Panel Header
(9-pin PANEL1)
(see p.6, No. 4)



Connect the power button, reset button and system status indicator on the chassis to this header according to the pin assignments below. Note the positive and negative pins before connecting the cables.

PWRBTN (Power Button):
Connect to the power button on the chassis front panel. You may configure the way to turn off your system using the power button.

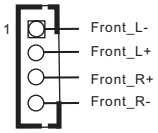
RESET (Reset Button):
Connect to the reset button on the chassis front panel. Press the reset button to restart the computer if the computer freezes and fails to perform a normal restart.

PLED (System Power LED):
Connect to the power status indicator on the chassis front panel. The LED is on when the system is operating. The LED keeps blinking when the system is in S1/S3 sleep state. The LED is off when the system is in S4 sleep state or powered off (S5).

HDLED (Hard Drive Activity LED):
Connect to the hard drive activity LED on the chassis front panel. The LED is on when the hard drive is reading or writing data.

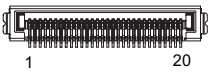
The front panel design may differ by chassis. A front panel module mainly consists of power button, reset button, power LED, hard drive activity LED, speaker and etc. When connecting your chassis front panel module to this header, make sure the wire assignments and the pin assignments are matched correctly.

MONO Speaker Header
(4-pin SPEAKER1)
(see p.6, No. 6)



Please connect the chassis speaker to this header.

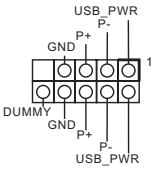
Serial ATA3 Connectors
(see p.7, No. 9 and 10)



These two SATA3 connectors support SATA data cables for internal storage devices with up to 6.0 Gb/s data transfer rate.
*The SATA3 connectors support 2.5-inch hard drive (+5V) and do not support 3.5-inch hard drive (+12V)

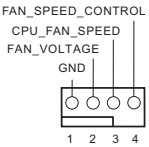
PIN	Signal Name	PIN	Signal Name
1	GND	**11**	N/A
2	LVDS_TX+	**12**	5V
3	LVDS_TX-	**13**	5V
4	GND	**14**	5V
5	GND	**15**	5V
6	LVDS_RX-	**16**	5V
7	LVDS_RX+	**17**	N/A
8	GND	**18**	GND
9	GND	**19**	GND
10	GND	**20**	GND

USB 2.0 Header
(9-pin USB_5_6)
(see p.6, No. 5)

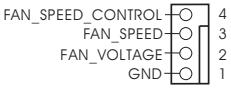


There is one header on this motherboard. This USB 2.0 header can support two ports.

CPU Fan Connectors
(4-pin CPU_FAN1)
(see p.6, No. 1)

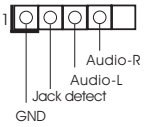


(4-pin CPU_FAN2)
(see p.6, No. 8)



This motherboard provides two 4-Pin CPU fan (Quiet Fan) connectors. If you plan to connect a 3-Pin CPU fan, please connect it to Pin 1-3.
*The fan speed can not be adjusted if you connect a 3-Pin CPU fan.

English

Audio Header (5-pin AUDIO3) (see p.6, No. 7)		This Audio header allows you to connect the audio cable for headphone.

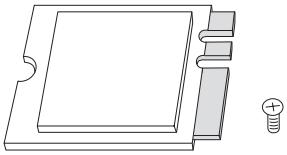
2.6 M.2 WiFi/BT Module and Intel® CNVi (Integrated WiFi/BT) Installation Guide

The M.2 is a small size and versatile card edge connector that aims to replace mPCIe and mSATA. The M.2 Socket (Key E) supports type 2230 WiFi/BT module and Intel® CNVi (Integrated WiFi/BT).

* The M.2 socket does not support SATA M.2 SSDs.

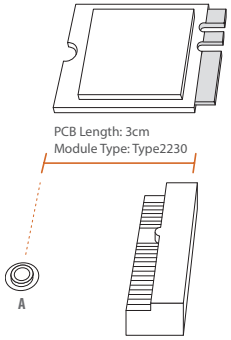
Before you install Intel® Integrated Connectivity (CNVi) module, be sure to turn off the AC power.

Installing the WiFi/BT module or Intel® CNVi (Integrated WiFi/BT)



Step 1

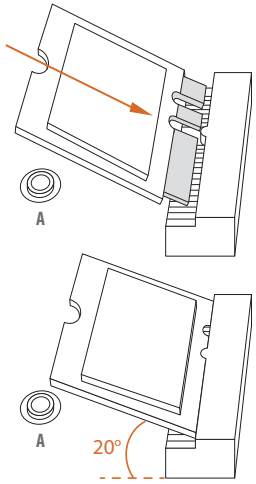
Prepare a type 2230 WiFi/BT module or Intel® CNVi (Integrated WiFi/BT) and the screw.



Step 2

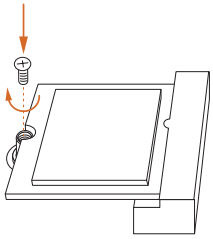
Find the nut location to be used.

English



Step 3

Gently insert the WiFi/BT module or Intel® CNVi (Integrated WiFi/ BT) into the M.2 slot. Please be aware that the module only fits in one orientation.



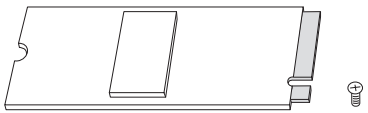
Step 4

Tighten the screw with a screwdriver to secure the module into place. Please do not overtighten the screw as this might damage the module.

2.7 M.2 SSD Installation Guide

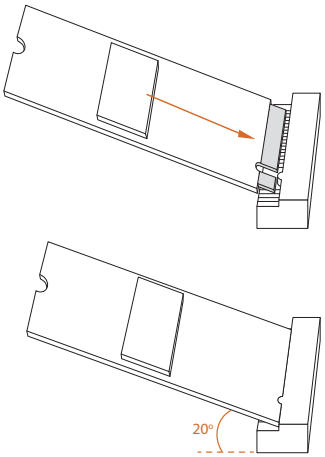
The M.2 is a small size and versatile card edge connector that aims to replace mPCIe and mSATA. The Blazing M.2 Socket (M2_1, Key M) supports type 2280 PCIe Gen5x4 (128 Gb/s) mode. The Hyper M.2 Socket (M2_2, Key M) supports type 2280 PCIe Gen4x4 (64 Gb/s) mode.

Installing the M.2 SSD



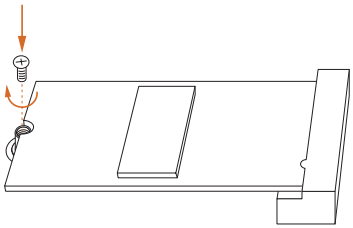
Step 1

Prepare a M.2 SSD and the screw.



Step 2

Gently insert the M.2 SSD into the M.2 slot. Please be aware that the M.2 SSD only fits in one orientation.



Step 3

Tighten the screw with a screwdriver to secure the module into place. Please do not overtighten the screw as this might damage the module.

M.2 SSD Support List

Vendor	Interface	P/N
ADATA	PCIe	ADATA ASX7000NPC-512GT-C (XPG SX7000) (NVMe)
ADATA	PCIe	ADATA ASX8000NPC-512GM-C (XPG ASX8000) (NVMe)
Apacer	PCIe	Apacer Z280 AP240GZ280-240G (NVMe)
Intel	PCIe	Intel Optane Memory 32GB (MEMPEK1W032GA)(NVMe)
Intel	PCIe	Intel Optane Memory 16GB (MEMPEK1W016GA)(NVMe)
INTEL	PCIe	INTEL 600P-SSDPEKKW256G7-256GB (NVMe)
INTEL	PCIe	INTEL 600P-SSDPEKKW128G7-128GB (NVMe)
INTEL	PCIe	INTEL 6000P-SSDPEKKF256G7-256GB (NVMe)
INTEL	PCIe	INTEL 6000P-SSDPEKKF512G7-512GB (NVMe)
Kingston	PCIe	Kingston SHPM2280P2/240G
PATRIOT	PCIe	PATRIOT Hellfire M2 (240G) (NVMe)
PLEXTOR	PCIe	PLEXTOR PX-256M8PeG (NVMe)
PLEXTOR	PCIe	PLEXTOR PX-256M8SeGN (NVMe)
Samsung	PCIe	Samsung XP941-512G (MZHPU512HCGL)
Samsung	PCIe	Samsung 950Pro-512G (NVMe)
Samsung	PCIe	Samsung 950Pro-256G (NVMe)
Samsung	PCIe	Samsung MZ-VLW1280 (PM961) (NVMe)
Samsung	PCIe	Samsung MZ-VPW1280 (SM961) (NVMe)
TOSHIBA	PCIe	TOSHIBA XG3-128G (NVMe)
TOSHIBA	PCIe	TOSHIBA OCZ RD400-256G (NVMe)
WD	PCIe	WD WDS512G1X0C-00ENX0 (NVMe)
WD	PCIe	WD WDS256G1X0C-00ENX0 (NVMe)

For the latest updates of M.2_SSD (NFGG) module support list, please visit our website for details.

Chapter 3 Auto Driver Installer

After you install the Windows OS and boot into the system, a notification will pop up to help you to install and update required drivers.

Chapter 4 UEFI SETUP UTILITY

4.1 Introduction

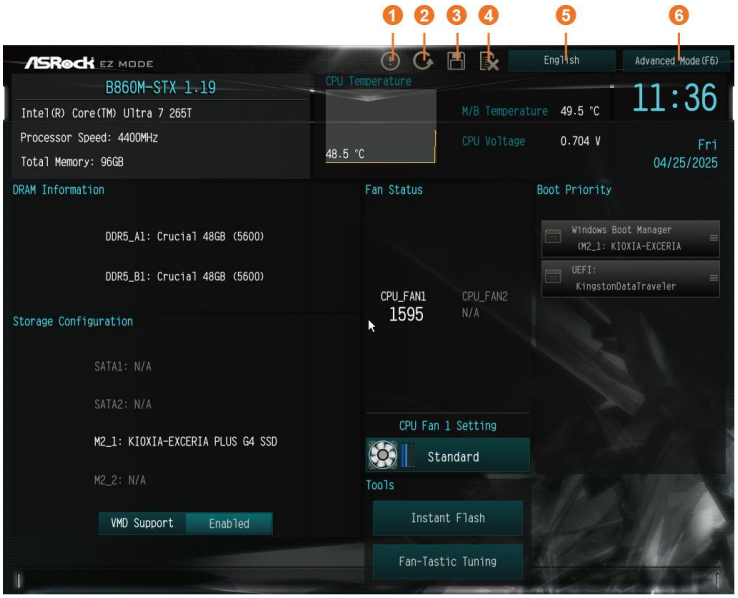
This section explains how to use the UEFI SETUP UTILITY to configure your system. You may run the UEFI SETUP UTILITY by pressing <F2> or <Del> right after you power on the computer, otherwise, the Power-On-Self-Test (POST) will continue with its test routines. If you wish to enter the UEFI SETUP UTILITY after POST, restart the system by pressing <Ctl> + <Alt> + <Delete>, or by pressing the reset button on the system chassis. You may also restart by turning the system off and then back on.

Because the UEFI software is constantly being updated, the following UEFI setup screens and descriptions are for reference purpose only, and they may not exactly match what you see on your screen.

4.2 EZ Mode

The EZ Mode screen appears when you enter the BIOS setup program by default. EZ mode is a dashboard which contains multiple readings of the system's current status. You can check the most crucial information of your system, such as CPU speed, DRAM frequency, SATA information, fan speed, etc.

Press <F6> or click the "Advanced Mode" button at the upper right corner of the screen to switch to "Advanced Mode" for more options.



No.	Function
1	Help
2	Load UEFI Defaults
3	Save Changes and Exit
4	Discard Changes
5	Change Language
6	Switch to Advanced Mode

4.3 Advanced Mode

The Advanced Mode provides more options to configure the BIOS settings. Refer to the following sections for the detailed configurations.

To access the EZ Mode, press <F6> or click the "EZ Mode" button at the upper right corner of the screen.

4.3.1 UEFI Menu Bar

The top of the screen has a menu bar with the following selections:

Main	For setting system time/date information
OC Tweaker	For overclocking configurations
Advanced	For advanced system configurations
Tool	Useful tools
H/W Monitor	Displays current hardware status
Security	For security settings
Boot	For configuring boot settings and boot priority
Exit	Exit the current screen or the UEFI Setup Utility

4.3.2 Navigation Keys

Use <←> key or <→> key to choose among the selections on the menu bar, and use < ↑ > key or < ↓ > key to move the cursor up or down to select items, then press <Enter> to get into the sub screen. You can also use the mouse to click your required item.

Please check the following table for the descriptions of each navigation key.

Navigation Key(s)	Description
+ / -	To change option for the selected items
<Tab>	Switch to next function
<PGUP>	Go to the previous page
<PGDN>	Go to the next page
<HOME>	Go to the top of the screen
<END>	Go to the bottom of the screen
<F1>	To display the General Help Screen
<F5>	Add / Remove Favorite
<F7>	Discard changes and exit the SETUP UTILITY
<F9>	Load optimal default values for all the settings
<F10>	Save changes and exit the SETUP UTILITY
<F12>	Print screen
<ESC>	Jump to the Exit Screen or exit the current screen

4.4 Main Screen

When you enter the UEFI SETUP UTILITY, the Main screen will appear and display the system overview.

The availability and location of BIOS settings can be different for different models and BIOS versions.

My Favorite

Display your collection of BIOS items. Press F5 to add/remove your favorite items.

4.3 OC Tweaker Screen

In the OC Tweaker screen, you can set up overclocking features.

Base Frequency Boost

Allows you to enjoy the base frequency boost with the hidden power of processors immediately. This item appears depending on the motherbod model you use.

CPU Configuration

CPU Turbo Ratio Information

Press [Enter] to view the CPU Turbo Ratio information.

CPU P-Core Ratio

The CPU speed is determined by the CPU P-Core Ratio multiplied with the BCLK. Increasing the CPU P-Core Ratio will increase the internal CPU clock speed without affecting the clock speed of other components.

Configuration options: [Auto] [All Core] [Per Core] [Specific Per Core]

AVX2 Ratio Offset

AVX2 Ratio Offset specifies a negative offset from the CPU Ratio for AVX workloads. AVX is a more stressful workload that lower the AVX ratio to ensure maximum possible ratio for SSE workloads.

CPU E-Core Ratio

The E-Core speed is determined by the E-Core Ratio multiplied with the BCLK. Increasing the E-Core Ratio will increase the internal E-Core clock speed without affecting the clock speed of other components.

Configuration options: [Auto] [All Core] [Per Core] [Specific Per Core]

CPU Cache Ratio

The CPU Internal Bus Speed Ratio. The maximum should be the same as the CPU Ratio.

Min Cache Ratio

The CPU internal bus speed minimum ratio. To align cache ratio with P-Core ratio for non-K CPU, you can try to sync Min Cache Ratio Limit with CPU Cache Ratio.

MemSS Max OC Ratio

Allows you to set the maximum OC Ratio for memory subsystem. Range non-turbo max - 109.

NGU Max OC Ratio

Allows you to set the maximum OC Ratio for NGU. Range non-turbo max - 34.

GT Frequency

Allows you to configure the frequency of the integrated GPU in MHz. This item appears when you use the onboard graphics.

CPU D2D Ratio

Allows you to set CPU D2D Ratio from Range 15 to 40.

BCLK Aware Adaptive Voltage

Allows you to set BCLK Aware Adaptive Voltage as enabled or disabled. When it is 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.

Configuration options: [Enabled] [Disabled]

Boot Max Frequency

Allows you to enable or disable Boot Maximum Frequency in CPU strap.

Boot Performance Mode

Default is Max Non-Turbo performance mode. It will keep cpu Flex-ratio till OS handoff. Max Battery mode will set CPU ratio as x8 till OS handoff. This option is suggested for BCLK overclocking.

Configuration options: [Max Battery] [Max Non-Turbo Performance] [Turbo Performance]

CPU BGREF Mode

Allows you to select CPU Bandgap Reference Mode between Normal and Bandgap Bypassed. CPU Bandgap Reference Mode - the default voltage is Normal.

Configuration options: [Normal] [Bandgap Bypassed]

VCCIA Boot Voltage

Allows you to select VCCIA boot voltage between Nominal and High Voltage. VCCIA boot Voltage - the default voltage is Nominal, to support the high voltage, BIOS can program VCCIA boot voltage higher than 1.65v (max 2.01v).

VCCSA Boot Voltage

Allows you to select VCCSA boot voltage between Nominal and High Voltage(up to 1.2/1.3V). VCCSA boot Voltage - the default voltage is Nominal, to support the high voltage, BIOS can program the EPOC2 bits to bump up voltage to up to 1.2/1.3V. 0 - Nominal. 1 - High Voltage(up to 1.2/1.3V).

Configuration options: [Nominal] [High Voltage]

Ring to Core Ratio Offset

Disable Ring to Core Ratio Offset so the ring and core can run at the same frequency.

Configuration options: [Enabled] [Disabled]

FLL Overclock Mode

Allows you to select FLL Mode Value from Range 1 to 3.
0x0 = no overclocking.
0x1 = ratio overclocking with nominal (0.5-1x) reference clock frequency.
0x2 = BCLK overclocking with extreme elevated (3-5x) reference clock frequency and ratio limited to 63.

SA PLL Frequency

Allows you to configure SA PLL Frequency.

Configuration options: [Auto] [3200 MHz] [1600 MHz]

BCLK TSC HW Fixup

BCLK TSC HW Fixup is disabled during TSC copy from PMA to APIC.

Configuration options: [Enabled] [Disabled]

Intel SpeedStep Technology

Intel SpeedStep technology allows processors to switch between multiple frequencies and voltage points for better power saving and heat dissipation. CPU turbo ratio can be fixed when Intel SpeedStep Technology is set to Disabled and Intel Turbo Boost Technology is set to Enabled.

Configuration options: [Enabled] [Disabled]

Intel Turbo Boost Technology

Intel Turbo Boost Technology enables the processor to run above its base operating frequency when the operating system requests the highest performance state.

Configuration options: [Enabled] [Disabled]

Intel Speed Shift Technology

Allows you to enable or disable the Intel Speed Shift Technology support. Enabling will expose the CPPC v2 interface to allow for hardware controlled P-states. To get the best support for Intel Turbo Boost Max Technology 3.0 (ITBMT 3.0), you have to enable Intel Speed Shift Technology. If your CPU does not support ITMBT 3.0, option will still be grayed out.

Configuration options: [Enabled] [Disabled]

Intel Turbo Boost Max Technology 3.0

Allows you to enable or disable the Intel Turbo Boost Max Technology 3.0 (ITBMT 3.0) support. Disabling will report the maximum ratio of the slowest core in _CPC object. Processors supporting the ITBMT 3.0 feature contain at least one processor core whose maximum ratio is higher than the others.

Configuration options: [Auto] [Enabled] [Disabled]

Intel Dynamic Tuning Technology

Allows you to enable or disable Intel Dynamic Platform Thermal Framework.

Intel Thermal Velocity Boost Voltage Optimizations

This service controls thermal based voltage optimizations for processors that implement the Intel Thermal Velocity Boost (TVB) feature.

Configuration options: [Enabled] [Disabled]

Enhanced Thermal Velocity Boost

When this item is enabled, the user will be clipped when the temperatures reaches the

default threshold on supported products. Recommended to disable it for overclocking. This item appears depending on the CPU you use on your motherboard.

Configuration options: [Auto] [Enabled] [Disabled]

CPU Tj Max

Allows you to set CPU Tj Max to adjust TCC Target Temperature. It supports Tj Max in the range of 62 to 115 deg Celsius.

Long Duration Power Limit

Allows you to configure Package Power Limit 1 in watts. When the limit is exceeded, the CPU ratio will be lowered after a period of time. A lower limit can protect the CPU and save power, while a higher limit may improve performance.

Long Duration Maintained

Allows you to configure the period of time until the CPU ratio is lowered when the Long Duration Power Limit is exceeded.

Short Duration Power Limit

Allows you to configure Package Power Limit 2 in watts. When the limit is exceeded, the CPU ratio will be lowered immediately. A lower limit can protect the CPU and save power, while a higher limit may improve performance.

CPU Core Current Limit

Voltage Regulator Current Limit. This value represents the Maximum instantaneous current allowed at any given time.

GT Current Limit

Voltage Regulator Current Limit. This value represents the Maximum instantaneous current allowed at any given time. This item appears when you use the onboard graphics.

IA CEP Enable

Allows you to enable or disable CEP (Current Excursion Protection) Support.

GT CEP Enable

Allows you to enable or disable CEP (Current Excursion Protection) Support.

Process Vmax Limit

This option allows user to disable P-core Power Density Throttling for overclocking purpose. Once disabled, BIOS cannot enable it in the same reset cycle. A warm or cold reset is required to enable protection again.

P-core Power Density Throttle

Throttling for overclocking purpose. Once disabled, BIOS cannot enable it in the same reset cycle. A warm or cold reset is required to enable protection again.

DRAM Configuration

Memory Information

Allows you to browse the serial presence detect (SPD) and Intel extreme memory profile (XMP) for memory modules.

DRAM Timing Configuration

Memory Ratio

The frequency will equal PLL Ratio * Gear Ratio(2 or 4) * Reference Clock (33.33).

DRAM Frequency

If [Auto] is selected, the motherboard will detect the memory module(s) inserted and assign the appropriate frequency automatically.

DRAM Gear Mode

Allows you to select the DRAM Gear Mode. High gear is good for high frequency.

Configuration options: [Auto] [2] [4]

SAGV

Allows you to enable or disable System Agent Geyserville. When it is enabled, the follow options appear for configurations:

SA GV Mask

System Agent Geyserville. This item allows you set the BIT(s) for which points to use in frequency switching.

Configuration options:
[Enable Points: 1st and 2nd]
[Enable Points: 1st, 2nd and 3rd]
[Enable All Points: 1st, 2nd, 3rd, and 4th]

1st Point Frequnecy

Allows you to specify the frequency for the given point.

1st Point Gear

Gear ratio for this SAGV point.

Configuration options: [Auto] [2] [4]

2nd Point Frequnecy

Allows you to specify the frequency for the given point.

2nd Point Gear

Gear ratio for this SAGV point.

Configuration options: [Auto] [2] [4]

3rd Point Frequnecy

Allows you to specify the frequency for the given point.

3rd Point Gear

Gear ratio for this SAGV point.

Configuration options: [Auto] [2] [4]

4th Point Frequnecy

Allows you to specify the frequency for the given point.

4th Point Gear

Gear ratio for this SAGV point.

Configuration options: [Auto] [2] [4]

Primary Timing

CAS# Latency (tCL)

The time between sending a column address to the memory and the beginning of the data in response.

RAS# to CAS# Delay (tRCD)

RAS# to CAS# Delay : The number of clock cycles required between the opening of a row of memory and accessing columns within it.

Row Precharge (tRP)

The number of clock cycles required between the issuing of the precharge command and opening the next row.

RAS# Active Time (tRAS)

The number of clock cycles required between a bank active command and issuing the precharge command.

RAS# Cycle Time (tRC)

Allows to configure the minimum active to active/Refresh Time.

Command Rate (CR)

The delay between when a memory chip is selected and when the first active command can be issued.

Secondary Timing

Write Recovery Time (tWR)

The amount of delay that must elapse after the completion of a valid write operation, before an active bank can be precharged.

Refresh Cycle Time 2 (tRFC2)

The number of clocks from a Refresh command until the first Activate command to the same rank.

Refresh Cycle Time per Bank (tRFCpb)

The number of clocks from a Refresh command (per bank) until the first Activate command to the same rank.

Refresh Delay Same Bank (tREFSBRD)

Allows you to configure tREFSBRD, Same Bank Refresh to ACT delay.

Refresh Interval x9 (tREFIx9)

Allows you to configure tREFIx9 for max time between refreshes per rank.

Refresh Interval (tREFI)

Allows you to configure refresh cycles at an average periodic interval.

CAS to CAS CMD Delay (tCCD_L)

Allows you to configure Internal Write to Read Command Delay Time.

Write CAS to CAS CMD Delay (tCCD_L_WR)

Allows you to configure Internal Write to Write Command Delay Time.

Write to Read Delay (tWTR_L)

The number of clocks between the last valid write operation and the next read command to the same internal bank.

Write to Read Delay (tWTR_S)

The number of clocks between the last valid write operation and the next read command

to the same internal bank.

RAS to RAS Delay (tRRD_L)

The number of clocks between two rows activated in different banks of the same rank.

RAS to RAS Delay (tRRD_S)

The number of clocks between two rows activated in different banks of the same rank.

Read to Precharge (tRTP)

The number of clocks that are inserted between a read command to a row pre-charge command to the same rank.

Four Activate Window (tFAW)

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

CAS Write Latency (tCWL)

Configure CAS Write Latency.

Power Down Timing

tCKE

Configure the period of time the DDR5 initiates a minimum of one refresh command internally once it enters Self-Refresh mode.

tXP

Allows you to configure tXP.

tCPDED

Allows you to configure tCPDED.

tRDPDEN

Allows you to configure tRDPDEN.

tWDPDEN

Allows you to configure tWDPDEN.

tCKCKEH

Allows you to configure tCKCKEH.

tCSH

Allows you to configure tCSH.

tCSH

Allows you to configure tCSH.

tCSL

Allows you to configure tCSL.

tCA2CS

Allows you to configure tCA2CS.

tPRPDEN

Allows you to configure tPRPDEN.

tOSCO

Allows you to configure tOSCO.

tMRR

Allows you to configure tMRR.

MISC Timing

tRPab

Allows you to configure tRPab.

tRDPRE

Allows you to configure tRDPRE.

tPPD

Allows you to configure tPPD.

tWRPRE

Allows you to configure tWRPRE.

DeratingExt

Allows you to configure DeratingExt.

DecTcwl

Allows you to configure DecTcwl.

AddTcwl

Allows you to configure AddTcwl.

tCCDByteCasDelta

Allows you to configure tCCDByteCasDelta.

tPrefRi

Allows you to configure tOrefRi.

RefreshHpWm

Allows you to configure RefreshHpWm.

RefreshPanicWm

Allows you to configure RefreshPanicWm.

RefreshPanicWm

Allows you to configure RefreshAbrRelease.

tRFM

Allows you to configure tRFM.

tXSR

Allows you to configure tXSR.

tSR

Allows you to configure tSR.

tXSDLL

Allows you to configure tXSDLL.

tZQCS

Allows you to configure tZQCS.

tZQCAL

Allows you to configure tZQCAL.

tZQCSPeriod

Allows you to configure tZQCSPeriod.

tMRD

Allows you to configure tMRD.

Turn Around Timing

TAT Training Value

tRDRD_sg

Configure between module read to read delay.

Configuration options: [Auto] [0] - [127]

tRDRD_dg

Configure between module read to read delay.

Configuration options: [Auto] [0] - [127]

tRDRD_dr

Configure between module read to read delay.

Configuration options: [Auto] [0] - [255]

tRDRD_dd

Configure between module read to read delay.

Configuration options: [Auto] [0] - [255]

tRDWR_sg

Configure between module read to write delay.

Configuration options: [Auto] [0] - [255]

tRDWR_dg

Configure between module read to write delay.

Configuration options: [Auto] [0] - [255]

tRDWR_dr

Configure between module read to write delay.

Configuration options: [Auto] [0] - [255]

tRDWR_dd

Configure between module read to write delay.

Configuration options: [Auto] [0] - [255]

tWRRD_sg

Configure between module write to read delay.

Configuration options: [Auto] [0] - [511]

tWRRD_dg

Configure between module write to read delay.

Configuration options: [Auto] [0] - [511]

tWRRD_dr

Configure between module write to read delay.

Configuration options: [Auto] [0] - [127]

tWRRD_dd

Configure between module write to read delay.

Configuration options: [Auto] [0] - [127]

tWRWR_sg

Configure between module write to write delay.

Configuration options: [Auto] [0] - [127]

tWRWR_dg

Configure between module write to write delay.

Configuration options: [Auto] [0] - [127]

tWRWR_dr

Configure between module write to write delay.

Configuration options: [Auto] [0] - [127]

tWRWR_dd

Configure between module write to write delay.

Configuration options: [Auto] [0] - [255]

TAT Runtime Value

tRDRD_sg

Configure between module write to read delay.

Configuration options: [Auto] [0] - [127]

tRDRD_dg

Configure between module write to read delay.

Configuration options: [Auto] [0] - [127]

tRDRD_dr

Configure between module write to read delay.

Configuration options: [Auto] [0] - [255]

tRDRD_dd

Configure between module write to read delay.

Configuration options: [Auto] [0] - [255]

tRDWR_sg

Configure between module write to read delay.

Configuration options: [Auto] [0] - [255]

tRDWR_dg

Configure between module write to read delay.

Configuration options: [Auto] [0] - [255]

tRDWR_dr

Configure between module write to read delay.

Configuration options: [Auto] [0] - [255]

tRDWR_dd

Configure between module write to read delay.

Configuration options: [Auto] [0] - [255]

tWRRD_sg

Configure between module write to read delay.

Configuration options: [Auto] [0] - [511]

tWRRD_dg

Configure between module write to read delay.

Configuration options: [Auto] [0] - [511]

tWRRD_dr

Configure between module write to read delay.

Configuration options: [Auto] [0] - [127]

tWRRD_dd

Configure between module write to read delay.

Configuration options: [Auto] [0] - [127]

tWRWR_sg

Configure between module write to write delay.

Configuration options: [Auto] [0] - [127]

tWRWR_dg

Configure between module write to write delay.

Configuration options: [Auto] [0] - [127]

tWRWR_dr

Configure between module write to write delay.

Configuration options: [Auto] [0] - [127]

tWRWR_dd

Configure between module write to write delay.

Configuration options: [Auto] [0] - [255]

Round Trip Timing

Round Trip Level

Configure round trip level.

Configuration options: [Tightest] [Tighter] [Tight] [Normal] [Loose] [Looser] [Loosest]

Initial RTL IO Delay Offset

Configure round trip latency IO delay initial offset.

Initial RTL FIF0 Delay Offset

Configure round trip latency FIF0 delay initial offset.

Initial RTL (MC0 A1)

Configure round trip latency initial value.

Initial RTL (MC0 A1)

Configure round trip latency initial value.

Initial RTL (MC1 B1)

Configure round trip latency initial value.

Initial RTL (MC1 B1)

Configure round trip latency initial value.

RTL (MC0 A1)

Configure round trip latency.

RTL (MC0 A1)

Configure round trip latency.

RTL (MC1 B1)

Configure round trip latency.

RTL (MC1 B1)

Configure round trip latency.

ODT Setting

Force Reset Type

Force Reset Type after F10 save Changes and Exit.

Configuration options: [Auto] [Cold Reset] [Warm Reset] [Shut Down Reset] [Platform Specific Reset]

Retrain on Fast Fail

Restart MRC in Cold mode if SW MemTest fails during Fast flow. Default option is set to Enabled.

Configuration options: [Enabled] [Disabled]

Retrain to Working Channel

Restart MRC in Cold mode after disabling failing channel. Default option is set to Disabled.

Exit On Failure (MRC)

Exit On Failure for MRC training steps.

Force ColdReset

Force ColdReset OR Choose MrcColdBoot Mode, which Coldboot is required during MRC execution. Note: If ME 5.0MB is present, ForceColdReset is required!

Reset for MRC Failed

Reset system after MRC training is failed.

Configuration options: [Enabled] [Disabled]

MRC Training on Warm Boot

When enabled, memory training will be executed when warm boot.

Configuration options: [Auto] [Enabled] [Disabled]

MRC Fast Boot

When enabled, portions of memory reference code will be skipped when possible to increase boot speed.

Configuration options: [Auto] [Enabled] [Disabled]

Voltage Configuration

Voltage Mode

[OC Mode]: Larger range voltage for overclocking.

[Stable Mode]: Smaller range voltage for stable system.

CPU GT Voltage

Allows you to input voltage for the processor by the external voltage regulator.

Configuration options: [Auto] [Offset Mode] [Fixed Mode]

CPU GT Load-Line Calibration

CPU GT Load-Line Calibration helps prevent GT voltage droop when the system is under heavy load.

Configuration options: [Auto] [Level 1] [Level 2] [Level 3] [Level 4] [Level 5]
*[Level 1] and [Level 2] options appear depending on the CPU you use on your motherboard.

System Agent Voltage

Input voltage for the processor by the external voltage regulator.

Configuration options: [Auto] [Offset Mode] [Fixed Mode]

System Agent Load-Line Calibration

System Agent Load-Line Calibration helps prevent System Agent voltage droop when the system is under heavy load.

Configuration options: [Auto] [Level 1] [Level 2] [Level 3] [Level 4] [Level 5]

Vcore Offset

Allows you to configure the voltage for the Vcore Offset.

VCCGT Voltage

Allows you to configure the voltage for the VCCGT.

VDD_CPU Voltage

Allows you to configure the voltage for the VDD_CPU.

MRC Voltage Configuration

Vdd2Mv Voltage

The VR Rail tied to the DRAM. Usually, it equals to or lower than VDD2 voltage.

Vddq Voltage

Allows you to configure CPU FIVR TX Vddq.

Vcclog Voltage

Allows you to configure CPU FIVR VCC IOG.

VccClk Voltage

Allows you to configure CPU FIVR VCC CLK.

DDR5 PMIC Configuration

PMIC Voltage Option

[United] Allows you to adjust DIMM PMIC altogether.

[Separate] Allows you to individually adjust DIMM PMIC.

VDD Voltage

Allows you to configure the VDD Voltage supported by PMIC at DRAM side. The VDD output can be measured through PMIC ADC with step size 0.015V. VDD information is contained in memory SPD and XMP, you can check it via Memory Information tool.

VDD Voltage Range

JEDEC Standard ranges from 0.800V to 1.435V. OC Demand ranges from 0.800V to 2.070V. OC Demand may not be applied if PMIC OC CAP is JEDEC PMIC. You can check it via the Memory Information tool.

Configuration options: [JEDEC Standard] [OC Demand]

VDDQ Voltage

Allows you to configure the VDDQ Voltage supported by PMIC at DRAM side. The VDDQ output can be measured through PMIC ADC with step size 0.015V. VDDQ information is contained in memory SPD and XMP. You can check it via the Memory Information tool.

Configuration options: [JEDEC Standard] [OC Demand]

VDDQ Voltage Range

JEDEC Standard ranges from 0.800V to 1.435V. OC Demand ranges from 0.800V to 2.070V. OC Demand may not be applied if PMIC OC CAP is JEDEC PMIC. You can check it via the Memory Information tool.

Configuration options: [JEDEC Standard] [OC Demand]

VPP Voltage

Allows you to configure the VPP Voltage supported by PMIC at DRAM side. The VPP output can be measured through PMIC ADC with step size 0.015V. VPP information is contained in memory SPD and XMP. You can check it via the Memory Information tool.

PMIC Protection Unlock

Allows you to configure PMIC Protection Unlock settings.

Configuration options: [Auto] [Enabled]

Current Limiter VDD

Allows you to configure Output current limiter warning threshold setting.

Configuration options: [Auto] [3.0 A] [3.5 A] [4.0 A] [Max TDC]

Current Limiter VDD

Allows you to configure Output current limiter warning threshold setting.

Configuration options: [Auto] [3.0 A] [3.5 A] [4.0 A] [Max TDC]

Current Limiter VPP

Allows you to configure Output current limiter warning threshold setting.

Configuration options: [Auto] [0.5 A] [1.0 A] [Reserved] [Max TDC]

PLL Voltage Configuration

P-Core PLL Voltage Offset

PLL Voltage Offset value ranges from 0 to 15 bins, and each bin is 17.5mV.

E-Core PLL Voltage Offset

PLL Voltage Offset value ranges from 0 to 15 bins, and each bin is 17.5mV.

SOC System Agent PLL Voltage Offset

PLL Voltage Offset value ranges from 0 to 15 bins, and each bin is 17.5mV.

CPU System Agent PLL Voltage Offset

PLL Voltage Offset value ranges from 0 to 15 bins, and each bin is 17.5mV.

Memory Controller PLL Voltage Offset

PLL Voltage Offset value ranges from 0 to 15 bins, and each bin is 17.5mV.

P-Core PLL IRefTune Offset

PLL Current Reference Tuning Offset, Range 0-15. The value provided in this field is added to the PLL fuse. The Value after adding offset cannot exceed 0xF, if it does, FW clips the value to 0xF before writing back the value to fuse.

E-Core PLL IRefTune Offset

PLL Current Reference Tuning Offset, Range 0-15. The value provided in this field is added to the PLL fuse. The Value after adding offset cannot exceed 0xF, if it does, FW clips the value to 0xF before writing back the value to fuse.

Ring PLL IRefTune Offset

PLL Current Reference Tuning Offset, Range 0-15. The value provided in this field is added to the PLL fuse. The Value after adding offset cannot exceed 0xF, if it does, FW clips the value to 0xF before writing back the value to fuse.

AVX Configuration

AVX2 Voltage Guardband Scale Factor

AVX2 Voltage Guardband Scale Factor controls the voltage guardband applied to AVX2 workloads. A value > 1.00 will increase the voltage guardband, and < 1.00 will decrease the voltage guardband.

Max Voltage Configuration

P-Core Max Voltage Limits

Configure Max voltage limits. The max voltage should be 200mV greater than Vfused P0.

E-Core Max Voltage Limits

Configure Max voltage limits. The max voltage should be 200mV greater than Vfused P0.

Ring Max Voltage Limits

Configure Max voltage limits. The max voltage should be 200mV greater than Vfused P0.

GT Max Voltage Limits

Configure Max voltage limits. The max voltage should be 200mV greater than Vfused P0.

SA Max Voltage Limits

Configure Max voltage limits. The max voltage should be 200mV greater than Vfused P0.

EMemSS Max Voltage Limits

Configure Max voltage limits. The max voltage should be 200mV greater than Vfused P0.

NGU Max Voltage Limits

Configure Max voltage limits. The max voltage should be 200mV greater than Vfused P0.

VR Configuration

IA AC Loadline

The nominal CPU VID voltage may be adjusted by AC Load Line. Higher AC loadline get higher VID, especially for high frequency or heavy loading. AC Loadline in mOhms. Range is 0-20.00. 0 = AUTO/HW default.

IA DC Loadline

The power calculations done by the CP may be adjusted by DC Load Line. DC Loadline in mOhms. Range is 0-20.00. 0 = AUTO/HW default.

CPU DLVR Configuration

CPU DLVR Mode

Allows you to select CPU DLVR Mode.

Configuration options: [Regulation Mode] [Bypassed Mode]

Voltage Mode

Allows you to select Voltage Mode.

Configuration options:
[OC Mode] : Larger tange voltage for overclocking.
[Stable Mode] : Smaller range voltage for stable system.

Core Input Voltage

Allows you to configure Input voltage for the processor by the external voltage regulator.

Configuration options: [Auto] [Offset Mode] [Fixed Mode]

Core Input Voltage Load-Line Calibration

CPU Load-Line Calibration helps prevent CPU voltage droop when the system is under heavy load.

Configuration options: [Auto] [Level 1] [Level 2] [Level 3] [Level 4] [Level 5]

Save User Default

Type a profile name and press enter to save your settings as user default.

Load User Default

Load previously saved user defaults.

Save User UEFI Setup Profile to Disk

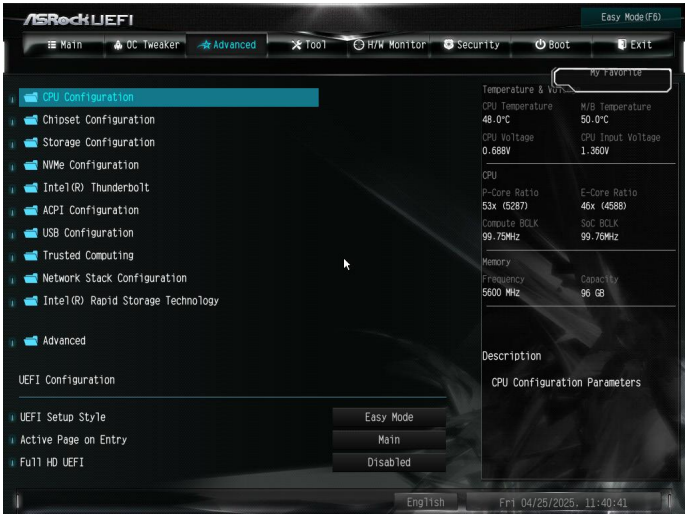
It helps you to save current UEFI settings as an user profile to disk.

Load User UEFI Setup Profile from Disk

You can load previous saved profile from the disk.

4.4 Advanced Screen

In this section, you may set the configurations for the following items: CPU Configuration, Chipset Configuration, Storage Configuration, Intel(R) Thunderbolt, ACPI Configuration, USB Configuration, Trusted Computing, Network Stack Configuration and Intel(R) Rapid Storage Technology.



Setting wrong values in this section may cause the system to malfunction.

UEFI Configuration

UEFI Setup Style

Allows you to select the default mode when entering the UEFI setup utility.

Configuration options: [Easy Mode] [Advanced Mode]

Active Page on Entry

Allows you to select the default page when entering the UEFI setup utility.

Configuration options: [My Favorite] [Main] [OC Tweaker] [Advanced] [Tool] [H/W Monitor] [Security] [Boot] [Exit]

Full HD UEFI

[Auto]
When [Auto] is selected, the resolution will be set to 1920 x 1080 if the monitor supports Full HD resolution. If the monitor does not support Full HD resolution, then the resolution will be set to 1024 x 768.

[Disabled]
When [Disabled] is selected, the resolution will be set to 1024 x 768 directly.

4.4.1 CPU Configuration

Processor P-Core Information

Press [Enter] to view P-Core Information.

Processor E-Core Information

Press [Enter] to view E-Core Information.

Active P-Cores

Allows you to select the number of cores to enable in each processor package. Note: Number of P-Cores and E-Cores are lokked at together. When both are {0,0}, Pcode will enable all cores.

Active Processor E-Cores

Allows you to select the number of E-Cores to enable in each processor package. Note: Number of P-Cores and E-Cores are looked at together. When both are {0,0}, Pcode will enable all cores.

CPU C States Support

Allows you to enable CPU C States Support for power saving. It is recommended to keep C3, C6 and C7 all enabled for better power saving.

Configuration options: [Enabled] [Disabled]

C-State Auto Demotion

Allows you to configure C-State Auto Demotion.

Configuration options: [C1] [Disabled]

CState Un-demotion

Allows you to configure C-State Un-demotion.

Configuration options: [C1] [Disabled]

Package C-State Demotion

Allows you to enable or disable Package C-State Demotion.

Package CState Un-demotion

Allows you to enable or disable Package C-State Un-demotion.

CState Pre-Wake

Allows you to enable or disable Cstate Pre-Wake. Disable - to 1 to disable the Cstate Pre-Wake.

IO MWAIT Redirection

Allows you to configure IO MWAIT Redirection. When set, will map IO_read instructions sent to IO registers PMG_IO_BASE_ADDRBASE+offset tp MWAIT(offset).

Configuration options: [Enabled] [Disabled]

Package C State Support

Allows you to enable CPU, PCIe, Memory, Graphics C State Support for power saving.

DC6 Latency WA

Allows you to configure DC6 Latency WA.

CPU Thermal Throttling

Allows you to enable CPU internal thermal control mechanisms to keep the CPU from overheating.

Configuration options: [Enabled] [Disabled]

Intel AVX/AVX2

Allows you to enable or disable the Intel AVX and AVX2 Instructions. This is applicable for Big Core only.

Configuration options: [Enabled] [Disabled]

Intel Virtualization Technology

Intel Virtualization Technology allows a platform to run multiple operating systems and applications in independent partitions, so that one computer system can function as multiple virtual systems.

Configuration options: [Enabled] [Disabled]

X2APIC Enable

Allows you to enable or disable X2APIC Operating Mode.\nWhen this option is configured as 'Enabled', 'VT-d' option must be 'Enabled' and 'X2APIC Opt Out' option must be 'Disabled' as well.\nThis option will be grayed out when 'VT-d' option is configured as 'Disabled'.

Legacy Game Compatibility Mode

When enabled, pressing the scroll lock key will toggle the Efficient cores between being parked when Scroll Lock LED is on and un-parked when LED is off.

Configuration options: [Enabled] [Disabled]

4.4.2 Chipset Configuration

Modern Standby

Allows you to set Modern Standby.

Re-Size BAR Support

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

VT-d

Intel® Virtualization Technology for Directed I/O helps your virtual machine monitor better utilize hardware by improving application compatibility and reliability, and providing additional levels of manageability, security, isolation, and I/O performance.

Configuration options: [Enabled] [Disabled]

SR-IOV Support

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

Configuration options: [Enabled] [Disabled]

DMI Link Speed

Allows you to configure DMI Slot Link Speed.

Configuration options: [Gen1] [Gen2] [Gen3] [Gen4]

PCI Express Native Control

Select Enabled for enhanced PCI Express power saving in OS.

Configuration options: [Enabled] [Disabled]

PCIE ASPM Support

This option controls the ASPM support for all CPU downstream devices.

Configuration options: [Disabled] [L0s] [L1] [L0sL1] [Auto]

PCH PCIE ASPM Support

This option controls the ASPM support for all PCH downstream devices.

Configuration options: [Disabled] [L0s] [L1] [L0sL1] [Auto]

PCH DMI ASPM Support

Allows you to enable or disable the ASPM support for all PCH DMI devices.

Configuration options: [Disabled] [L0s] [L1] [L0sL1] [Auto]

DMI ASPM Support

Allows you to configure the PCH DMI ASPM Setting.

Configuration options: [Disabled] [L0s] [L1] [L0sL1] [Auto]

PCIE Bifurcation

Allows you to select the width of PCIE1.

Onboard HD Audio

Allows you to enable or disable the onboard HD audio controller. Set this item to [Auto] to enable the onboard HD and automatically disable it when a sound card is installed.

Configuration options: [Auto] [Enabled] [Disabled]

Front Panel

Allows you to select Front Panel type.

[HD] sets the front panel audio connector mode to high definition audio.

[AC 97] sets the front panel audio connector mode to legacy AC'97.]

Onboard HDMI HD Audio

Allows you to enable or disable audio for the onboard digital outputs.
This item appears when you've installed a graphics card on your motherboard.

Configuration options: [Enabled] [Disabled].

Realtek 2.5G Ethernet Controller

Allows you to enable or disable Onboard LAN.

Configuration options: [Enabled] [Disabled]

Onboard WAN Device

Allows you to enable or disable the onboard WAN device.

Configuration options: [Enabled] [Disabled].

Deep Sleep

Allows you to configure deep sleep mode for power saving when the computer is shut down. We recommend disabling Deep Sleep for better system compatibility and stability.

Configuration options: [Enabled] [Enabled in S5] [Enabled in S4-S5]

Restore on AC/Power Loss

Allows you to select the power state after a power failure.

[Power Off] sets the power to remain off when the power recovers.

[Power On] sets the system to start to boot up when the power recovers.

NPU Device

Allows you to enable or disable NPU (Neural Processing Unit) Device.

4.4.3 Storage Configuration

SATA Controller(s)

Enable/disable the SATA controllers.

SATA Aggressive Link Power Management

SATA Aggressive Link Power Management allows SATA devices to enter a low power state during periods of inactivity to save power. It is only supported by AHCI mode.

Configuration options: [Enabled] [Disabled]

4.4.4 Intel(R) Thunderbolt

PCIE Tunneling over USB4

Allows you to enable or disable PCIE Tunneling over USB4.

Configuration options: [Enabled] [Disabled]

Integrated Thunderbolt(TM) Enable

Allows you to enable or disable the Intergrated Thunderbolt(TM).

Configuration options: [Enabled] [Disabled]

Discrete Thunderbolt(TM) Enable

Allows you to enable or disable Discrete Thunderbolt(TM).

Configuration options: [Enabled] [Disabled]

When this option is set to enabled, the following options appeear for configurations.

4.4.5 ACPI Configuration

Suspend to RAM

Allows you to select [Disabled] for ACPI suspend type S1. It is recommended to select [Auto] for ACPI S3 power saving.

Configuration options: [Auto] [Disabled]

PCIE Devices Power On

Allows the system to be waked up by a PCIE device and enable wake on LAN.

Configuration options: [Enabled] [Disabled]

RTC Alarm Power On

Allows the system to be waked up by the real time clock alarm. Set it to By OS to let it be handled by your operating system.

Configuration options: [Enabled] [Disabled] [By OS]

USB Keyboard/Remote Power On

Allows the system to be waked up by an USB keyboard or remote controller.

Configuration options: [Enabled] [Disabled]

USB Mouse Power On

Allows the system to be waked up by an USB mouse.

Configuration options: [Enabled] [Disabled]

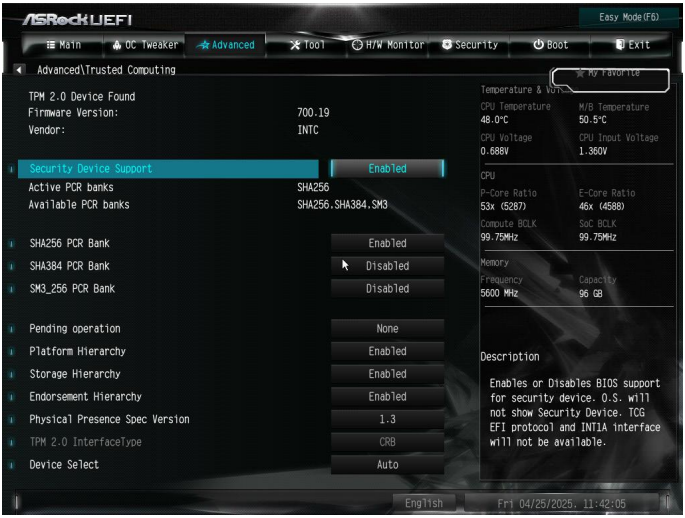
4.4.6 USB Configuration

XHCI Hand-off

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

Configuration options: [Enabled] [Disabled]

4.4.7 Trusted Computing



NOTE: Options vary depending on the version of your connected TPM module.

Security Device Support

Allows you to enable or disable BIOS support for security device. O.S. will not show Security Device. TCG EFI protocol and INT1A interface will not be available.

Configuration options: [Enabled] [Disabled]

Active PCR banks

This item displays active PCR Banks.

Available PCR Banks

This item displays available PCR Banks.

SHA256 PCR Bank

Allows you to enable or disable SHA256 PCR Bank.

Configuration options: [Enabled] [Disabled]

SHA384 PCR Bank

Allows you to enable or disable SHA384 PCR Bank.

Configuration options: [Enabled] [Disabled]

SM3_256 PCR Bank

Allows you to enable or disable SM3_256 PCR Bank.

Configuration options: [Enabled] [Disabled]

Pending Operation

Allows you to schedule an Operation for the Security Device.

NOTE: Your computer will reboot during restart in order to change State of the Device.

Configuration options: [None] [TPM Clear]

Platform Hierarchy

Allows you to enable or disable Platform Hierarchy.

Configuration options: [Enabled] [Disabled]

Storage Hierarchy

Allows you to enable or disable Storage Hierarchy.

Configuration options: [Enabled] [Disabled]

Endorsement Hierarchy

Allows you to enable or disable Endorsement Hierarchy.

Configuration options: [Enabled] [Disabled]

Physical Presence Spec Version

Select this item to tell OS to support PPI spec version 1.2 or 1.3. Please note that some HCK tests might not support version 1.3.

Configuration options: [1.2] [1.3]

TPM 2.0 InterfaceType

Allows you to view the Communication Interface to TPM 2.0 Device: CRB or ITS.

Device Select

Allows you to select the TPM device to be supported.

[TPM 1.2] restricts support to TPM 1.2 devices.

[TPM 2.0] restricts support to TPM 2.0 devices.

[Auto] supports both TPM 1.2 and TPM 2.0 devices with the default set to TPM 2.0 devices. If TPM 2.0 devices are not found, TPM 1.2 devices will be enumerated.

4.4.8 Network Stack Configuration

Network Stack

This allows you to enable or disable UEFI Network Stack.

Configuration options: [Enabled] [Disabled]

4.4.9 Intel(R) Rapid Storage Technology

This formset allows the user to manage RAID volumes on the Inter(R) RAID Controller. The page displays the disk information when there are disks connected to the system.

Create RAID Volume

Press [Enter] to enter the page that allows you to create a RAID volume.

Name

Enter a unique volume name that has no special characters and is 16 characters or less.

RAID Level

Use this item to select RAID Level. Options vary depending on the disks conencted,

Configuration options: [RAID0 (Stripe)] [RAID1 (Mirror)] [RAID5(Parity)]

Select Disks

Use this item to select the hard drives to be included in the RAID array.

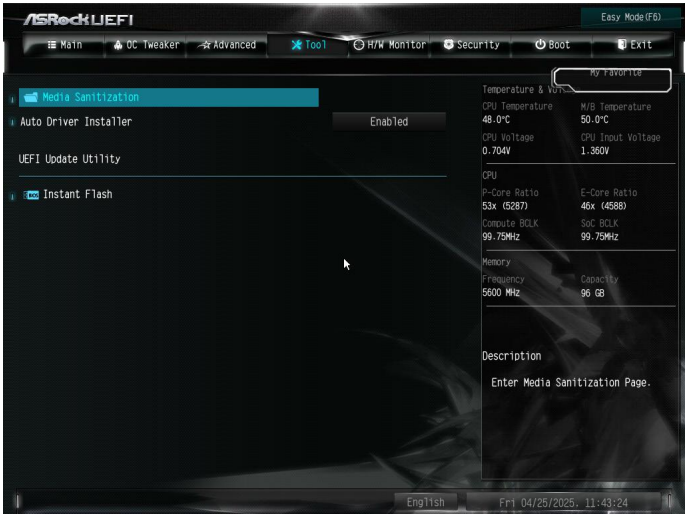
Stripe Size

Use this item to select a stripe size for the RAID array.

Create Volume

Create a volume with the settings specified above.

4.5 Tools



Media Sanitization

Use this tool to securely erase SSD. This tool only lists the SSDs that support the Secure Erase function. After you Sanitize SSD, all user data will be permanently destroyed on the SSD and cannot be recovered.

Auto Driver Installer

Allows you to download and install all necessary drivers automatically.

[Enabled]

Select this item to enable the Auto Driver Installer tool. When it is enabled, after entering to Windows with available Internet access, the Auto Driver Installer tool will appear automatically.

[Disabled]

Select this item to disable the Auto Driver Installer tool.

UEFI Update Utility

Instant Flash

Allows you to save UEFI files in your USB storage device and run Instant Flash to update your UEFI. Pleaes note that your USB storage device must be FAT32/16/12 file system.

3.6 Hardware Health Event Monitoring Screen

This section allows you to monitor the status of the hardware on your system, including the parameters of the CPU temperature, motherboard temperature, fan speed and voltage.

NOTE: Options vary depending on the features of your motherboard.

Fan Tuning

Measure Fan Min Duty Cycle.

Fan-Tastic Tuning

Select a fan mode for CPU Fan, or choose Customize to set 5 CPU temperatures and assign a respective fan speed for each temperature.

CPU Fan 1 Setting

Select a fan mode for CPU Fan 1, or choose Customize to set 5 CPU temperatures and assign a respective fan speed for each temperature.

CPU Fan 2 Setting

Select a fan mode for CPU Fan 2, or choose Customize to set 5 CPU temperatures and assign a respective fan speed for each temperature.

CPU Fan 2 Temp Source

Select a fan temperature source for CPU Fan 2.

4.7 Security Screen

In this section you may set or change the supervisor/user password for the system. You may also clear the user password.

Supervisor Password

Set or change the password for the administrator account. Only the administrator has authority to change the settings in the UEFI Setup Utility. Leave it blank and press enter to remove the password.

User Password

Set or change the password for the user account. Users are unable to change the settings in the UEFI Setup Utility. Leave it blank and press enter to remove the password.

Secure Boot

Use this item to enable or disable support for Secure Boot.

Intel(R) Platform Trust Technology

Enable/disable Intel PTT in ME. Disable this option to use discrete TPM Module.

4.8 Boot Screen

This section displays the available devices on your system for you to configure the boot settings and the boot priority.

Fast Boot

Fast Boot speeds up your computer's boot time; however, you won't be able to boot from an USB storage device. Ultra Fast mode is supported by UEFI aware OS or later versions, and a VBIOS that supports UEFI GOP is required if you are using an external graphics card. Please note that Ultra Fast mode boots so fast that the only way to enter this UEFI Setup Utility is to clear CMOS or run the Restart to UEFI utility in Windows.

Configuration options: [Disabled] [Ultra Fast]

Boot From Onboard LAN

Allows the system to be waked up by the onboard LAN.

Configuration options: [Enabled] [Disabled]

Setup Prompt Timeout

Allows you to configures the number of seconds to wait for the UEFI setup utility.

Configuration options: [1] - [65535]

Bootup Num-Lock

Allows you to select whether Num Lock should be turned on or off when the system boots up.

Configuration options: [On] [Off]

Boot Beep

Allows you to select whether the Boot Beep should be turned on or off when the system boots up. Please note that a buzzer is needed.

Configuration options: [Enabled] [Disabled]

Full Screen Logo

[Enabled] Select this item to display the boot logo.

[Disabled] Select this item to show normal POST messages.

Boot Failure Guard Message

If the computer fails to boot for a number of times the system automatically restores the default settings.

Configuration options: [Enabled] [Disabled]

Boot Failure Guard Count

Allows you to configure the number of attempts to boot until the system automatically restores the default settings

Configuration options: [2] - [250]

4.9 Exit Screen

Save Changes and Exit

When you select this option the following message, “Save configuration changes and exit setup?” will pop out. Press <F10> key or select [Yes] to save the changes and exit the UEFI SETUP UTILITY.

Discard Changes and Exit

When you select this option the following message, “Discard changes and exit setup?” will pop out. Press <ESC> key or select [Yes] to exit the UEFI SETUP UTILITY without saving any changes.

Discard Changes

When you select this option the following message, “Discard changes?” will pop out. Press <F7> key or select [Yes] to discard all changes.

Load UEFI Defaults

Allows you to load UEFI default values for all options. The F9 key can be used for this operation.

Launch EFI Shell from filesystem device

Allows you to copy shellx64.efi to the root directory to launch EFI Shell.

Version 1.0
Published May 2025

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FCC Compliance Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) this device may not cause harmful interference, and

(2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Button Battery Safety Notice

⚠WARNING

- **INGESTION HAZARD:** This product contains a button cell or coin battery.
- **DEATH** or serious injury can occur if ingested.
- A swallowed button cell or coin battery can cause **Internal Chemical Burns** in as little as **2 hours**.
- **KEEP** new and used batteries **OUT OF REACH of CHILDREN**
- **Seek immediate medical attention** if a battery is suspected to be swallowed or inserted inside any part of the body.

- Remove and immediately recycle or dispose of used batteries according to local regulations and keep away from children. Do NOT dispose of batteries in household trash or incinerate.
- Even used batteries may cause severe injury or death.
- Call a local poison control center for treatment information.
- Battery type: CR2032
- Battery voltage: 3V
- Non-rechargeable batteries are not to be recharged.
- Do not force discharge, recharge, disassemble, heat above (manufacturer's specified temperature rating) or incinerate. Doing so may result in injury due to venting, leakage or explosion resulting in chemical burns.
- This product contains an irreplaceable battery.
- This icon indicates that a swallowed button battery can cause serious injury or death. Please keep batteries out of sight or reach of children.

CALIFORNIA, USA ONLY

The Lithium battery adopted on this motherboard contains Perchlorate, a toxic substance controlled in Perchlorate Best Management Practices (BMP) regulations passed by the California Legislature. When you discard the Lithium battery in California, USA, please follow the related regulations in advance.

"Perchlorate Material-special handling may apply, see www.dtsc.ca.gov/hazardouswaste/perchlorate"

CALIFORNIA, USA ONLY

WARNING: Risk of cancer and reproductive harm from exposure to Lead. See www.P65Warnings.ca.gov

CE Conformity

CE

ASRock INC. hereby declares that this device is in compliance with the essential requirements and other relevant provisions of related Directives. Full text of EU declaration of conformity is available at: http://www.asrock.com

ASRock follows the green design concept to design and manufacture our products, and makes sure that each stage of the product life cycle of ASRock product is in line with global environmental regulations. In addition, ASRock disclose the relevant information based on regulation requirements.

Please refer to https://www.asrock.com/general/about.asp?cat=Responsibility for information disclosure based on regulation requirements ASRock is complied with.

UKCA Conformity

UK CA

ASRock INC. hereby declares that this device is in compliance with the essential requirements and other relevant provisions of related UKCA Directives. Full text of UKCA declaration of conformity is available at: http://www.asrock.com

Consumer Limited Warranty - Australia

Our goods come with guarantees that cannot be excluded under the Australian Consumer Law. You are entitled to a replacement or refund for a major failure and compensation for any other reasonably foreseeable loss or damage caused by our goods. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure. If you require assistance please call ASRock Tel : +886-2-28965588 ext.123 (Standard International call charges apply)

WARNING

THIS PRODUCT CONTAINS A BUTTOON BATTERY
If swallowed, a button battery can cause serious injury or death.
Please keep batteries out of sight or reach of children.

Proper Disposal

DO NOT throw the motherboard in municipal waste. This product has been designed to enable proper reuse of parts and recycling. This symbol of the crossed out wheeled bin indicates that the product (electrical and electronic equipment) should not be placed in municipal waste. Check local regulations for disposal of electronic products.

Class B ITE

この装置は、クラスB情報技術装置です。この装置は、家庭環境で使用することを目的としていますが、この装置がラジオやテレビジョン受信機に近接して使用されると、受信障害を引き起こすことがあります。取扱説明書に従って正しい取り扱いをして下さい。

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HDMI®
HIGH-DEFINITION MULTIMEDIA INTERFACE

DECLARATION OF CONFORMITY

Per FCC Part 2 Section 2.1077(a)

Product Name : Motherboard

Model Number : B860M-STX

Conforms to the following specifications:

☒ FCC Part 15, Subpart B, Unintentional Radiators

Supplementary Information:

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

EU Declaration of Conformity

For the following equipment:

Motherboard

(Product Name)

B860M-STX

(Model Designation / Trade Name)

EMC Directive – 2014/30/EU

EN 55032: 2015 / A11: 2020, EN 55035: 2017 / A11: 2020

EN IEC 61000-3-2: 2019, EN 61000-3-3: 2013

RoHS directive - 2011/65/EU, and (EU) 2015/863

EN IEC63000:2018

CE (EU conformity marking)

UK
CA

EU Declaration of Conformity

Product:

Product	Motherboard
Model	B860M-STX

Authorized Representative (UK-GB):

Name:	Gary Tsui
Address:	Bijsterhuizen 11-11, 6546 AR Nijmegen,The Netherlands
Contact person:	Gary Tsui

This declaration is issued under the sole responsibility of the mentioned Manufacturer. The subject equipment under declaration is in conformity with the UK-GB Regulation(s) below:

The Electromagnetic Compatibility Regulations 2016 (S.I. 2016/1091)

EN 55032: 2015 / A11: 2020, EN 55035: 2017 / A11: 2020, EN IEC 61000-3-2: 2019, EN 61000-3-3: 2013

The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012

2015/863/EU, EN IEC 63000:2018

The following manufacturer outside the UK-GB is responsible for this declaration: