Q670EI-IM-A

Industrial Motherboard

E20275
Revised Edition V2
May 2022

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Chapter 1
Product overview

1.1 Package contents

Check your industrial motherboard package for the following items.

☑ 1 x ASUS Q670EI-IM-A Motherboard

☑ 1 x Serial ATA 6.0 Gb/s cable

☑ 1 x M.2 screw package

☑ 1 x ASUS I/O Shield



NOTE: If any of the above items is damaged or missing, contact your distributor or sales representative immediately.

1.2 Features

- Intel® socket 1700 for 12th Gen Intel® Core™ i9/ i7/ i5/ i3, Pentium®, and Celeron® processors
- Two Dual Channel DDR5 4800 MHz SO-DIMMs up to 64GB
- 4 x SATA 6.0 Gb/s, 3 x USB 3.2 Gen 2, 4 x USB 3.2 Gen 1, 6 x USB 2.0, 5 x COM ports
- 1 x PCIe x16 slot, 1 x M.2 (Key E, 2230) for WiFi/BT devices, 1 x M.2 (Key M, 2242/2260/2280) with PCIe and SATA modes for SSD
- Multi-display: 3 x DisplayPorts, 1 x HDMI, 1 x LVDS/eDP

1.3 Specifications

CPU	Intel® socket 1700 for 12th Gen Intel® Core™ i9/ i7/ i5/ i3, Pentium®, and Celeron® processors Supports up to 65W TDP
Chipset	Intel® Q670E Chipset
Memory	2 x SO-DIMM, max. 64GB, DDR5 4800 MHz
Graphics	Integrated graphics processor - Intel® HD Graphics support Multi-VGA output support: DP/HDMI/eDP/LVDS ports - Supports 3x DisplayPort 1.4 outputs with a maximum resolution of 4k - Supports HDMI output - Supports either eDP or LVDS output (Switched by BIOS)
Expansion slots	1 x PCI Express 5.0 x16 slot* 1 x M.2 socket 1 (Key E, 2230) with PCIe and CNVi modes for WiFi/BT devices 1 x M.2 socket 3 (Key M, 2242/2260/2280) with PCIe and SATA modes *** Supports PCIe bifurcation (16x to 8x+8x).**
Storage	3 x SATA 6.0 Gb/s ports 1 x M.2 socket 3 (Key M, 2242/2260/2280) with PCIe and SATA modes
LAN	Dual Intel® Lan: 1 x Intel® I210AT (Co-lay I211AT), 1 x Intel® I225LM (Intel vPro supported)
Audio	Realtek ALC897 High Definition Audio CODEC
Rear panel I/O ports	1 x HDMI® port 3 x DisplayPorts 3 x USB 3.2 Gen 2 ports (2 x Type-A + 1 x Type-C®) 1 x USB 3.2 Gen 1 port 4 x USB 2.0 ports 2 x LAN (RJ45) ports 1 x P/S2 keyboard port 1 x P/S2 mouse port 1 x COM port (RS232/422/485) 2 x Audio jacks

(continued on the next page)

Internal I/O ports	4 x COM Port headers (1 x RS232/422/485, 3 x RS232) 1 x USB 3.2 Gen 1 connector supports additional 2 USB 3.2 Gen 1 ports 1 x USB 3.2 Gen 1 stick socket 1 x USB 2.0 header supports additional 2 USB 2.0 ports 1 x CPU Fan header with PWM mode 1 x Chassis Fan header with PWM mode 1 x Disable ME jumper 1 x LVDS/eDP selection connector 1 x Panel SW header 1 x Front Panel Audio header (AAFP) 1 x System Panel header 1 x S/PDIF header 1 x Chassis Intrude header 1 x Speaker header 1 x Clear CMOS header 1 x COM Debug header 1 x AT/ATX mode selection header 1 x 24-pin ATX Power connector 1 x 8-pin ATX Power connector 1 x SPI TPM header
GPIO	1 x 8-bit GPIO header
Manageability	WfM 2.0, DMI 2.0, WOL by PME
Watch dog timer	Yes
Power requirement	ATX mode 12V DC-IN (Supported by an additional cable)
Operation Temperature	0~60°C
Non-Operation Temperature	-40~85°C
Relative Humidity	5%~95%
OS support	Windows® 10 (64-bit) Windows® IoT Enterprise Ubuntu RedHat Enterprise Fedora Workstation OpenSUSE
Certification	CE, FCC
Form Factor	Mini-ITX Form Factor, 6.7”x 6.7” (17.0cm x 17.0cm)

NOTE: Specifications are subject to change without notice. Please refer to the ASUS website for the latest specifications.

Chapter 2
Motherboard information

2.1 Before you proceed

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



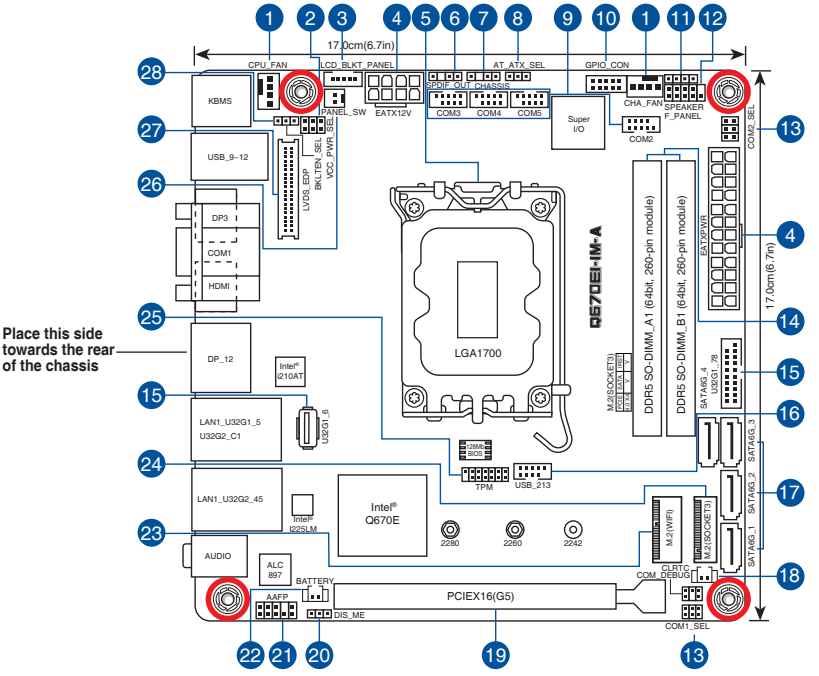
CAUTION!

- Unplug the power cord from the wall socket before touching any component.
- Before handling components, use a grounded wrist strap or touch a safely grounded object or a metal object, such as the power supply case, to avoid damaging them due to static electricity.
- Hold components by the edges to avoid touching the ICs on them.
- Whenever you uninstall any component, place it on a grounded antistatic pad or in the bag that came with the component.
- Before you install or remove any component, always remove the AC power by unplugging the power cord from the power outlet. Failure to do so may cause severe damage to the motherboard, peripherals, or components.

2.2 Motherboard layout

NOTE: Place four screws into the holes indicated by circles to secure the motherboard to the chassis.

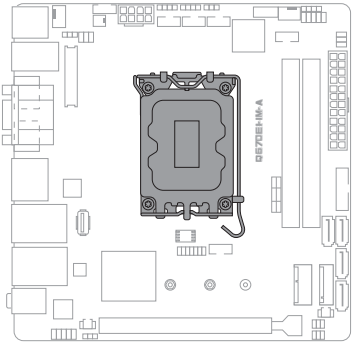
CAUTION! Do not overtighten the screws! Doing so can damage the motherboard.

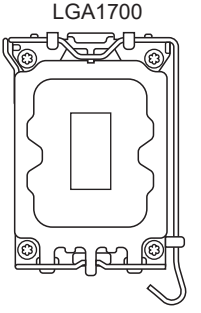


Connectors/Jumpers/Slots		Page
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28.	LVDS/eDP Panel Enable Signal Selection header (3-pin BKLTEN_SEL)	2-12

2.3 Central Processing Unit (CPU)

The motherboard comes with a surface mount LGA1700 socket designed for the Intel® 12th Generation Intel® Core™ i9 / Core™ i7 / Core™ i5 / Core™ i3, Pentium®, and Celeron® processors.



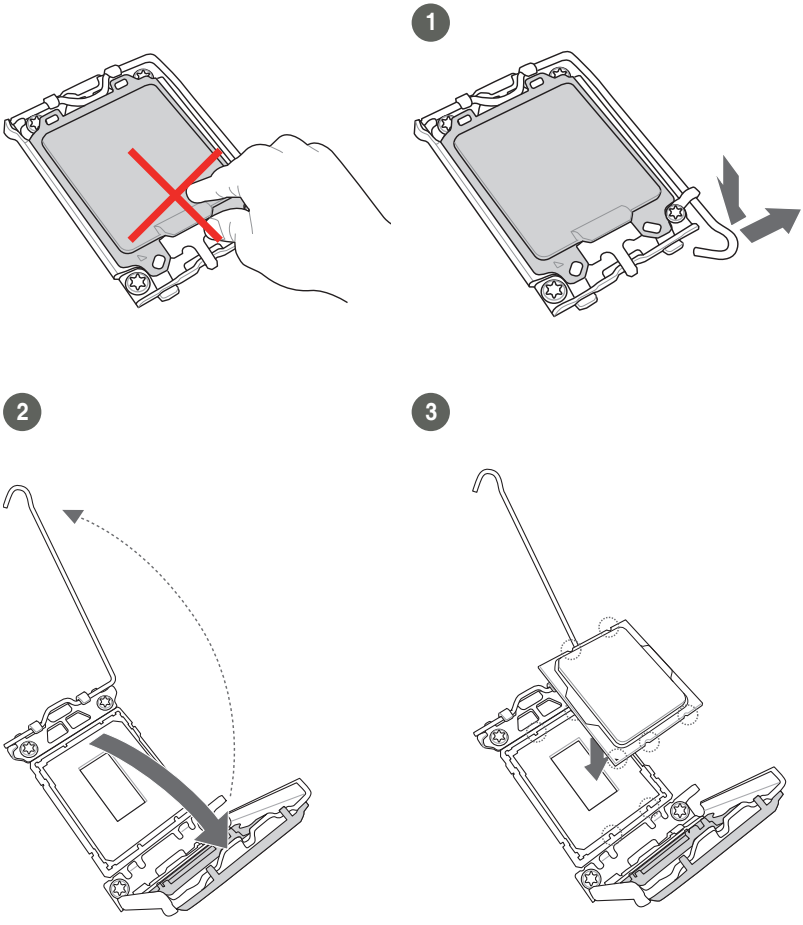


IMPORTANT! Unplug all power cables before installing the CPU.

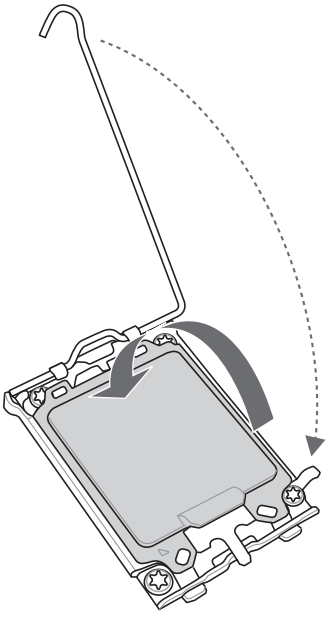
CAUTION!

- Upon purchase of the motherboard, ensure that the PnP cap is on the socket and the socket contacts are not bent. Contact your retailer immediately if the PnP cap is missing, or if you see any damage to the PnP cap/socket contacts/motherboard components. The manufacturer will shoulder the cost of repair only if the damage is shipment/transit-related.
- Keep the cap after installing the motherboard. The manufacturer will process Return Merchandise Authorization (RMA) requests only if the motherboard comes with the cap on the LGA1200 socket.
- The product warranty does not cover damage to the socket contacts resulting from incorrect CPU installation/removal, or misplacement/loss/ incorrect removal of the PnP cap.

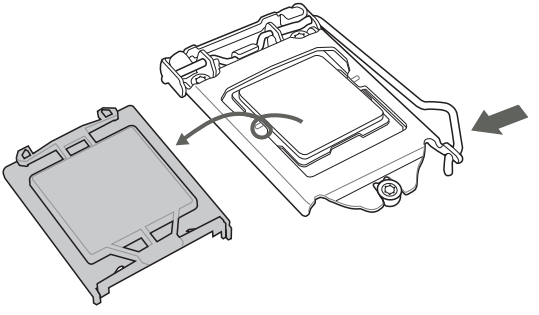
2.3.1 CPU installation



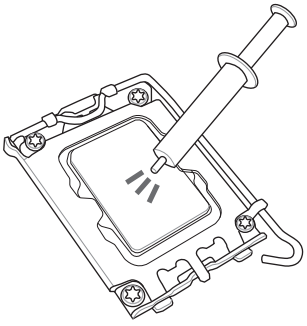
4



5

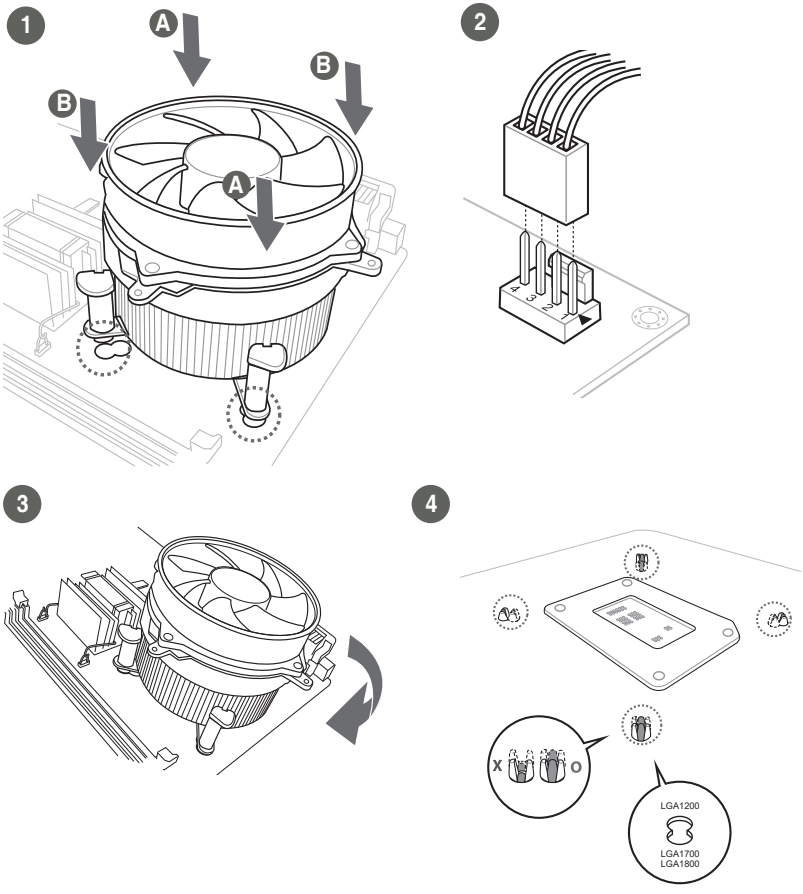


2.3.2 CPU heatsink and fan assembly installation



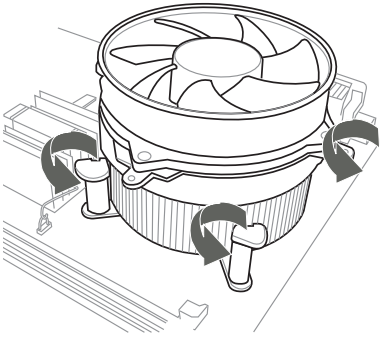
CAUTION! Apply the Thermal Interface Material to the CPU heatsink and CPU before you install the heatsink and fan if necessary.

To install the CPU heatsink and fan assembly

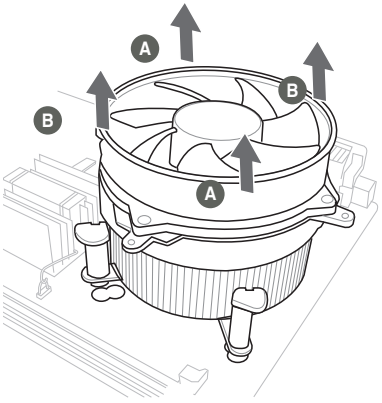


To uninstall the CPU heatsink and fan assembly

1

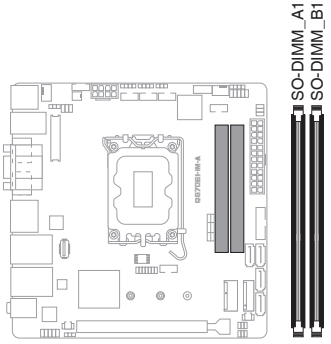


2



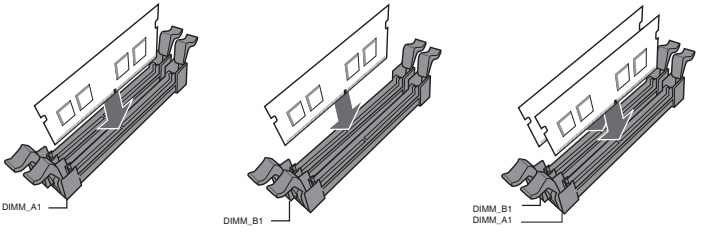
2.4 System memory

This motherboard comes with two Double Data Rate 5 (DDR5) Small Outline Dual Inline Memory Module (SO-DIMM) sockets. The figure below illustrates the location of the DDR5 SO-DIMM sockets:

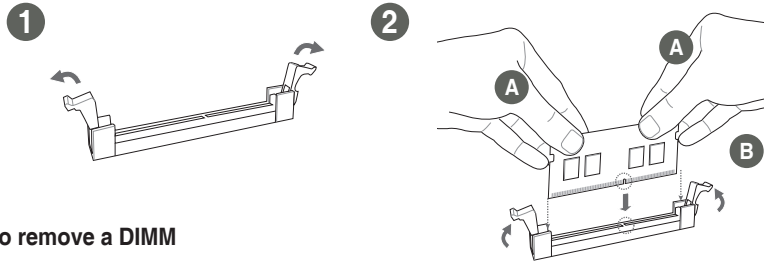


Channel	Sockets
Channel A	SO-DIMM_B1
Channel B	SO-DIMM_A1

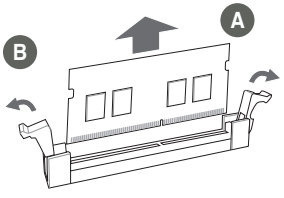
Recommended memory configuration



Installing a DIMM

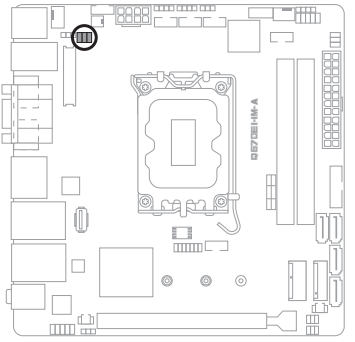


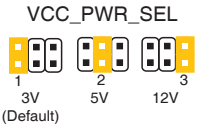
To remove a DIMM



2.5 Jumpers

1. Display panel VCC power selection (6-pin VCC_PWR_SEL)

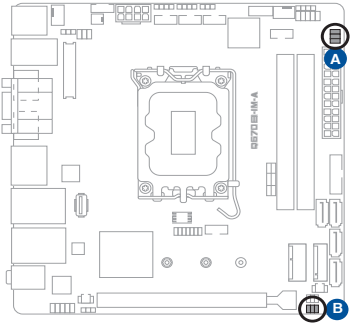


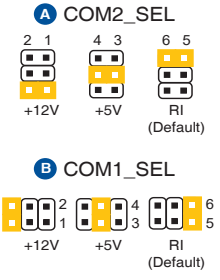


Setting	Pins
3V (Default)	1-2
5V	3-4
12V	5-6

Connector type	HEADER 2 x 3p, 2.54mm pitch, S/T

2. COM1/2 Ring/+5V/+12V selection (6-pin COM1_SEL, COM2_SEL)

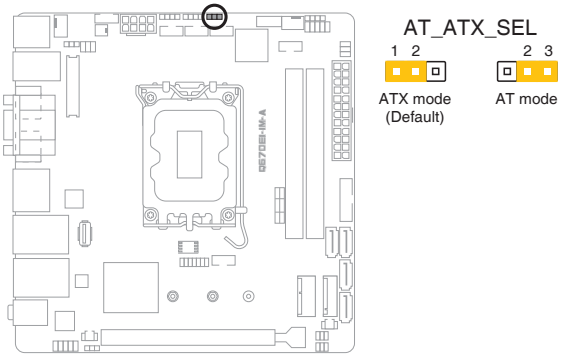




Setting	Pins
+12V	1-2
+5V	3-4
Ring (Default)	5-6

Connector type	HEADER 2x3p, 2.54mm pitch, S/T

3. AT/ATX mode selection (3-pin AT_ATX_SEL)

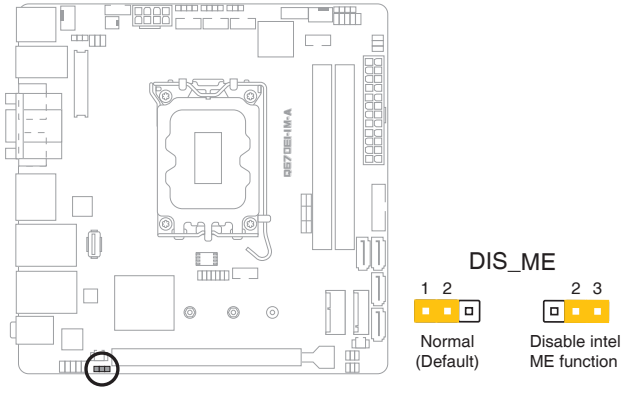


Pins	
1-2 (Default)	ATX mode
2-3	AT mode

Connector type	HEADER 1x3p, 2.54mm pitch, S/T

4. Disable ME jumper (3-pin DIS_ME)

This jumper allows you to enable or disable the Intel® ME function. Set this jumper to pins 1-2 to enable (default) the Intel® ME function and to pins 2-3 to disable it.

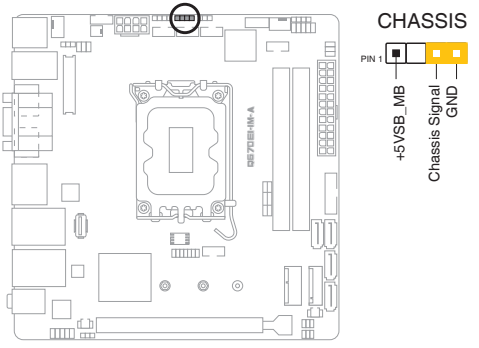


Connector type	HEADER 1x3p, 2.54mm pitch, S/T

5. Chassis intrusion header (4-1 pin CHASSIS)

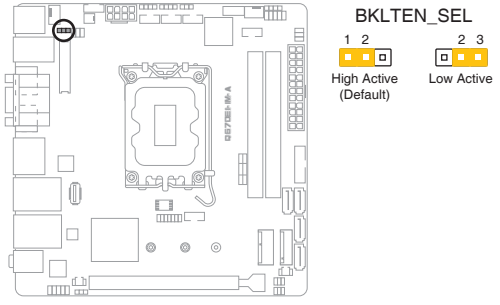
This header is for a chassis-mounted intrusion detection sensor or switch. Connect one end of the chassis intrusion sensor or switch cable to this connector. The chassis intrusion sensor or switch sends a high-level signal to this connector when a chassis component is removed or replaced. The signal is then generated as a chassis intrusion event.

By default, the pin labeled “Chassis Signal” and “Ground” are shorted with jumper caps. Remove the jumper caps only when you intend to use the chassis intrusion detection feature.



Connector type	HEADER 4p, K2, 2.54mm pitch

6. LVDS/EDP Panel Enable Signal Selection header (BKLTEN_SEL)

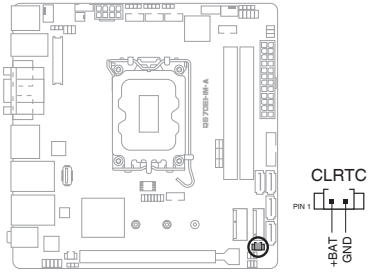


Pins	
1-2 (Default)	High Active
2-3	Low Active

Connector type	HEADER 1x3p, 2.54mm pitch, S/T

7. Clear CMOS header (2-pin CLRTC)

This header allows you to clear the CMOS RTC RAM data of the system setup information such as date, time, and system passwords.



Connector type	HEADER 1x2p, 1.25mm pitch, S/T

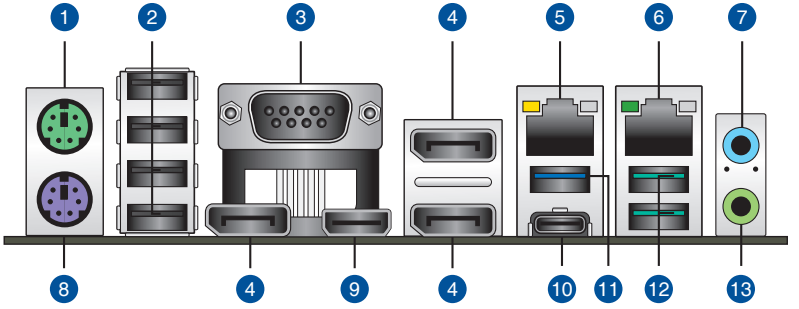
To erase the RTC RAM:

1. Turn OFF the computer and unplug the power cord.
2. Use a metal object such as a screwdriver to short the two pins.
3. Plug the power cord and turn ON the computer.
4. Hold down the **<Del>** key during the boot process and enter BIOS Setup to re-enter data.

NOTE: If the steps above do not help, remove the onboard battery and move the jumper again to clear the CMOS RTC RAM data. After clearing the CMOS, reinstall the battery.

2.6 Connectors

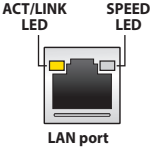
2.6.1 Rear panel connectors



1. **PS/2 mouse port (green).** This port is for a PS/2 mouse.
2. **USB 2.0 ports.** These 4-pin Universal Serial Bus (USB) ports are for USB 2.0/1.1 devices.
3. **Serial port (COM).** This port connects a modem or other device that conforms with serial specification.
4. **DisplayPorts.** These ports are for DisplayPort-compatible devices.
5. **LAN (RJ-45) port.** This port allows Gigabit connection to a Local Area Network (LAN) through a network hub.

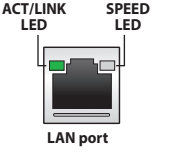
LAN port LED indications

Activity/Link LED		Speed LED	
Status	Description	Status	Description
Off	No link	OFF	10Mbps connection
Orange	Linked	ORANGE	100Mbps connection
Orange (Blinking)	Data activity	GREEN	1Gbps connection
Orange (Blinking then steady)	Ready to wake up from S5 mode		



6. **LAN (RJ-45) port.** This port allows Gigabit connection to a Local Area Network (LAN) through a network hub.

Activity/Link LED		Speed LED	
Status	Description	Status	Description
Off	No link	OFF	10Mbps/100Mbps connection
Green	Linked	ORANGE	1Gbps connection
Green (Blinking)	Data activity	GREEN	2.5Gbps connection
Green (Blinking then steady)	Ready to wake up from S5 mode		



7. **Line In port (light blue).** This port connects to the tape, CD, DVD player, or other audio sources.

8. **PS/2 keyboard port (purple).** This port is for a PS/2 keyboard.

9. **HDMI® port.** These ports are for a High-Definition Multimedia Interface (HDMI®) connector, and are HDCP compliant allowing playback of HD DVD, Blu-ray, and other protected content.

10. **USB 3.2 Gen 2 (up to 10Gbps) port (USB Type-C®).** This Universal Serial Bus (USB) port is for a USB 3.2 Gen 2 Type-C® device.

11. **USB 3.2 Gen 1 (up to 5Gbps) port.** This 9-pin Universal Serial Bus (USB) port is for a USB 3.2 Gen 1 device.



- USB 3.2 Gen 1 devices can only be used for data storage.
- We strongly recommend that you connect USB 3.2 Gen 1 devices to USB 3.2 Gen 1 ports for faster and better performance from your USB 3.2 Gen 1 devices.
- Due to the design of the Intel® 300 series chipset, all USB devices connected to the USB 2.0 and USB 3.2 Gen 1 ports are controlled by the xHCI controller. Some legacy USB devices must update their firmware for better compatibility.

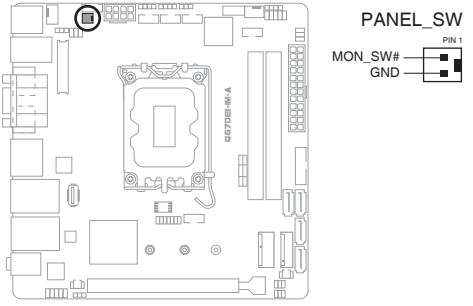
12. **USB 3.2 Gen 2 (up to 10Gbps) ports (teal blue, Type-A).** These 9-pin Universal Serial Bus (USB) ports are for USB 3.2 Gen 2 devices.

13. **Line Out port (lime).** This port connects to a headphone or a speaker. In the 4 and 5.1 channel configurations, the function of this port becomes Front Speaker Out.

2.6.2 Internal connectors

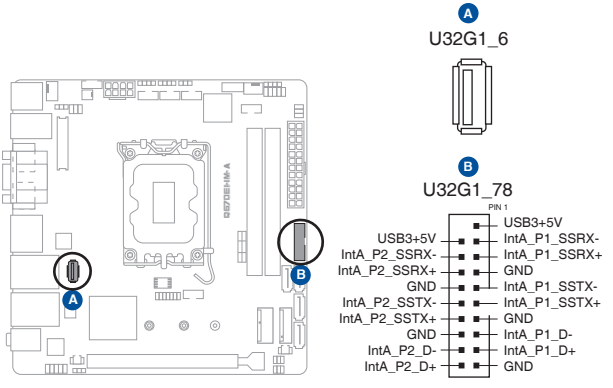
1. LCD panel monitor switch header (2-pin PANEL_SW)

This 2-pin header is for connecting a monitor switch that can turn off the LCD panel display backlight.



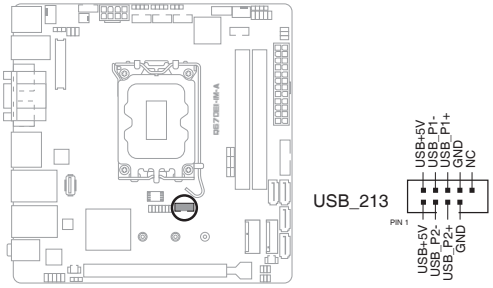
2. USB 3.2 Gen 1 connector (U32G1_6 / U32G1_78)

Connect a USB 3.2 Gen 1 module to any of these connectors for additional USB 3.2 Gen 1 front or rear panel ports. These connectors comply with USB 3.2 Gen 1 specifications and provide faster data transfer speeds of up to 5 Gbps, faster charging time for USB-chargeable devices, optimized power efficiency, and backward compatibility with USB 2.0.



3. USB 2.0 header (10-1 pin USB213)

This header is for an USB 2.0 port. Connect the USB cable to this header. This USB header complies with USB 2.0 specification that supports up to 480 Mbps connection speed.



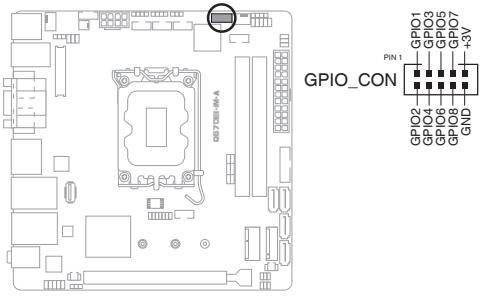
Connector type	Header 2x5p, K9, 2.0mm pitch

CAUTION! Never connect a 1394 cable to the USB connector. Doing so will damage the motherboard.

NOTE: The USB cable is purchased separately.

4. General purpose input/output connector (10-pin GPIO_CON)

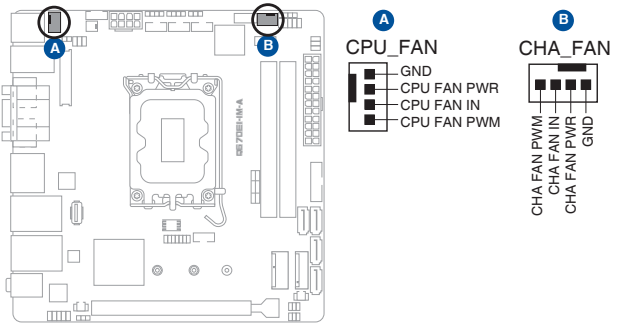
This connector is for a general purpose input/output module which allows you to customize the digital signal input/output.



Connector type	WAFER HD 2x5p, 2.0mm pitch, S/T

5. CPU and Chassis Fan headers (4-pin CPU_FAN, 4-pin CHA_FAN)

Connect the fan cables to the fan headers on the motherboard, ensuring that the black wire of each cable matches the ground pin of the header.

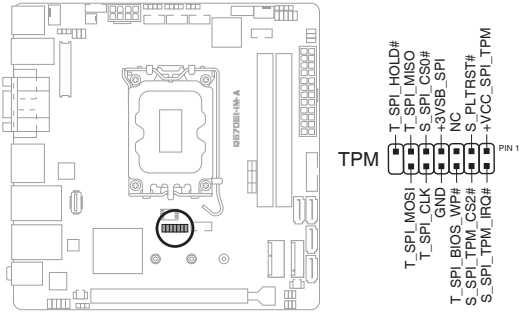


Connector type	WAFER HD 4p, 2.54mm pitch, S/T

CAUTION! Do not forget to connect the fan cables to the fan headers. Insufficient air flow inside the system may damage the motherboard components. These are not jumpers! Do not place jumper caps on the fan headers!

6. SPI TPM header (14-1 pin SPI_TPM)

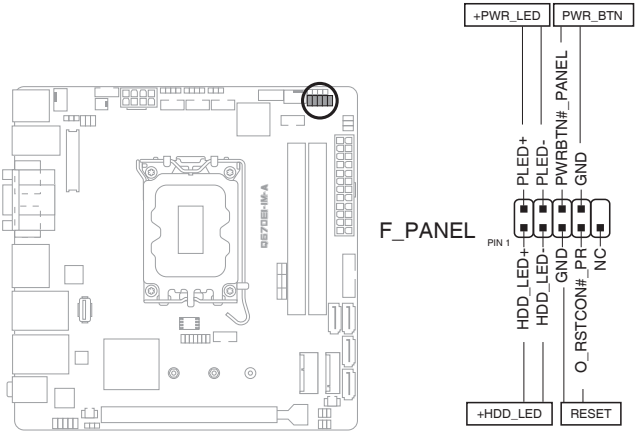
This header supports a Trusted Platform Module (TPM) system with a Serial Peripheral Interface (SPI), allowing you to securely store keys, digital certificates, passwords and data. A TPM system also enhances network security, protects digital identities, and ensures platform integrity.



Connector type	Header 2x7p, K14, 2.0mm pitch

7. Front Panel System Panel header (10-1 pin F_PANEL)

This header supports several chassis-mounted functions.



Connector type	Header 2x5p, K10, 2.54mm pitch

- **System power LED (2-pin +PWR_LED)**

  This 2-pin header is for the system power LED. Connect the chassis power LED cable to this header. The system power LED lights up when you turn on the system power, and blinks when the system is in sleep mode.
- **Hard disk drive activity LED (2-pin +HDD_LED)**

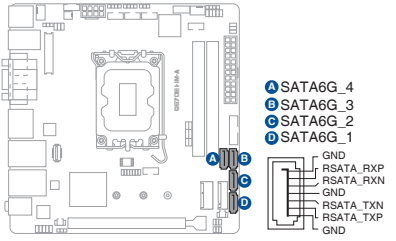
  This 2-pin header is for the HDD Activity LED. Connect the HDD Activity LED cable to this header. The IDE LED lights up or flashes when data is read from or written to the HDD.
- **ATX power button/soft-off button (2-pin PWR_BTN)**

  This 2-pin header is for the system power button.
- **Reset button (2-pin RESET)**

  This 2-pin header is for the chassis-mounted reset button for system reboot without turning off the system power.

8. Serial ATA 6.0Gb/s ports (7-pin SATA6G_1/2/3/4)

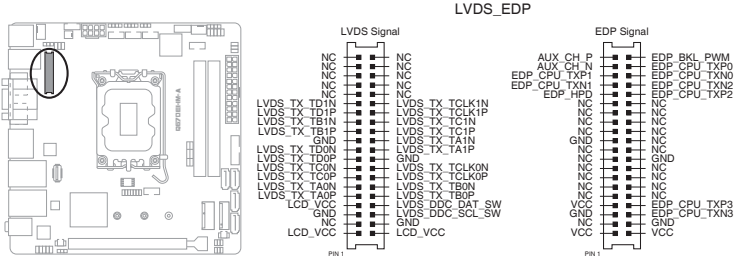
These ports connect to Serial ATA 6.0 Gb/s hard disk drives or an optical drive via Serial ATA 6.0 Gb/s signal cables.



Connector type	WAFER HD 7p, 1.27mm pitch

9. LVDS/eDP Signal Connector (40-pin LVDS_eDP)

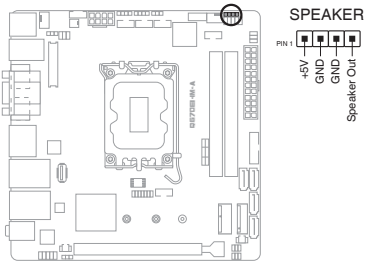
This header is for an LCD monitor that supports Low Voltage Differential Signaling (LVDS) interface or an internal embedded DisplayPort (eDP) connection.



Connector type	WAFER HD 2x20p, 1.25mm pitch

10. Speaker header (4-pin SPEAKER)

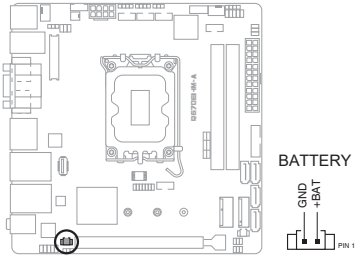
The 4-pin header is for the chassis-mounted system warning speaker. The speaker allows you to hear system beeps and warnings.



Connector type	HEADER 1x4p, 2.54mm pitch, S/T

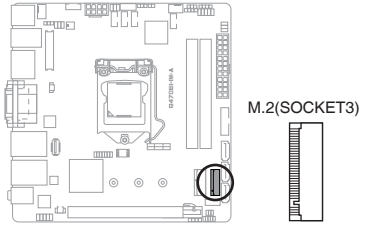
11. RTC Battery connector (2-pin BATTERY)

This connector is for the lithium CMOS battery.



12. M.2 socket 3

This socket allows you to install an M.2 SSD module.

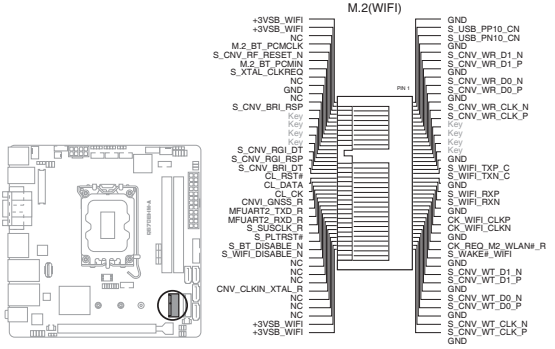


NOTES:

- The M.2 SSD module is purchased separately.
- This socket supports M Key and 2242/2260/2280 storage devices.

13. M.2 Wi-Fi

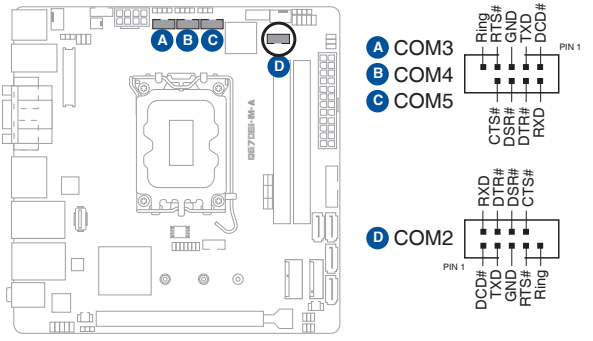
This socket connects to an M.2 Wi-Fi device.



NOTE: The M.2 Wi-Fi module is purchased separately.

14. Serial Port headers (10-1 pin COM2, COM3, COM4, COM5)

These headers are for serial (COM) ports. Connect the serial port cables to these headers, then install the module to a slot opening at the back of the system chassis.

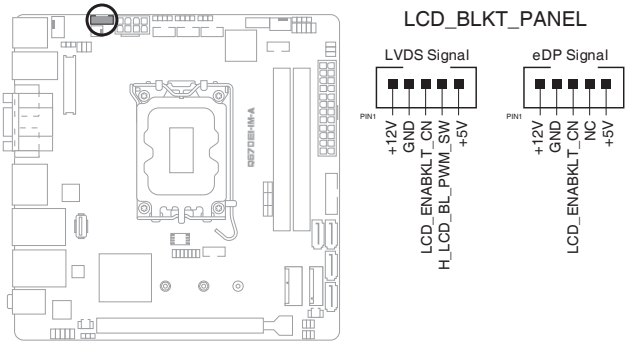


Connector type	BOX header 2x5p, K10, 2.0mm pitch

NOTE: The serial port cables are purchased separately.

15. Flat panel display brightness connector (5-pin LCD_BLKT_PANEL)

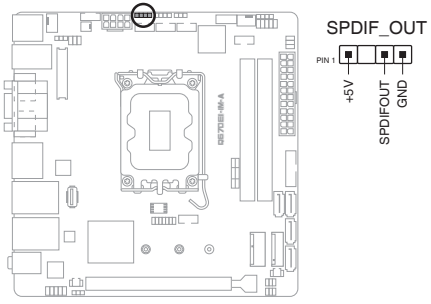
This connector is for the LVDS/eDP panel backlight voltage selection.



Connector type	WAFER 6p, 2.0mm pitch

16. Digital Audio header (4-1 pin SPDIF_OUT)

This header is for an additional Sony/Philips Digital Interface (S/PDIF) port. Connect the S/PDIF Out module cable to this header, then install the module to a slot opening at the back of the system chassis.

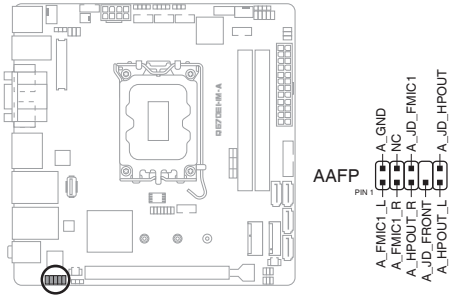


Connector type	HEADER 1x4p, K2, 2.54mm pitch

NOTE: The SPDIF Out module is purchased separately.

17. Front Panel Audio header (10-1 pin AAFP)

This header is for a chassis-mounted front panel audio I/O module that supports HD Audio standard. Connect one end of the front panel audio I/O module cable to this header.



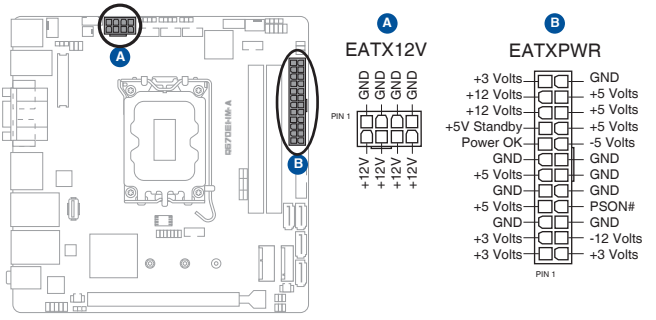
Connector type	HEADER 2x5p, K8, 2.54mm pitch

IMPORTANT!

- We recommend that you connect a high-definition front panel audio module to this header to avail of the motherboard's high-definition audio capability.
- If you want to connect a high-definition front panel audio module to this connector, set the HD Audio Controller item in the BIOS Setup to [Enabled].

18. ATX Power connectors (24-pin EATXPWR, 8-pin EATX12V)

Correctly orient the ATX power supply plugs into these connectors and push down firmly until the connectors completely fit.



DC Mode EATXPWR

Pins	Signal	Pins	Signal
1	+3.3V out	13	+3.3V out
2	+3.3V out	14	NC
3	GND	15	GND
4	+5V out	16	PSON#
5	GND	17	GND
6	+5V out	18	GND
7	GND	19	GND
8	NC	20	+12V out
9	NC	21	+5V out
10	+12V in	22	+5V out
11	+12V in	23	+5V out
12	+3.3V out	24	GND

DC Mode EATX12V

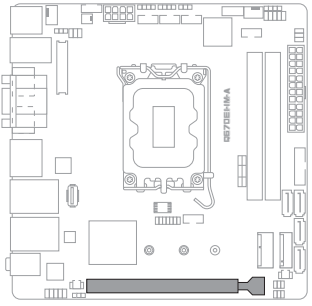
Pins	Signal	Pins	Signal
1	GND	5	+12V in
2	GND	6	+12V in
3	GND	7	+12V in
4	GND	8	+12V in

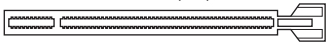
We recommend that you use a PSU with a higher power output when configuring a system with more power-consuming components. The system may become unstable or may not boot up if the power is inadequate.

2.7 Slot

1. PCI Express slot

This slot supports a PCIe 5.0 x16 graphics card that complies with the PCI Express specification.





Chapter 3
BIOS setup

Scan the QR code to view the BIOS update guide.

3.1 BIOS Setup program

Use the BIOS Setup program to configure its parameters. The BIOS screens include navigation keys and brief online help to guide you in using the BIOS Setup program.

Entering BIOS Setup at startup

To enter BIOS Setup at startup:

Press <Delete> or <ECS> during the Power-On Self Test (POST). If you do not press <Delete> or <ECS>, POST continues with its routines.

Entering BIOS Setup after POST

To enter BIOS Setup after POST:

- Press **<Ctrl>+<Alt>+<Del>** simultaneously.
- Press the reset button on the system chassis.
- Press the power button to turn the system off then back on. Do this option only if you failed to enter BIOS Setup using the first two options.

NOTE: Using the power button, reset button, or the <Ctrl>+<Alt>+<Del> keys to reboot a running operating system can cause damage to your data or system. Always shut down the system properly from the operating system.

IMPORTANT!

- Visit the ASUS website at www.asus.com to download the latest BIOS file for this motherboard.
- The default BIOS settings for this motherboard apply to most working conditions and ensures optimal performance. If the system becomes unstable after changing any BIOS settings, load the default settings to regain system stability. Select the option **Restore Defaults** under the Exit menu or press hotkey <F3>.
- The BIOS Setup screens shown in this section are for reference purposes only, and may not exactly match what you see on your screen.

BIOS menu screen

The menu bar on top of the screen has the following main items:

Main	For changing the basic system configuration.
Advanced	For changing the advanced system settings.
Hardware Monitor	For displaying the system temperatures, fan and power status, and changing smart fan settings.
Security	For configuring the system security settings.
Boot	For changing the system boot configuration.
Exit	For selecting the save options and default options.

To select an item on the menu bar, press the right or left arrow key on the keyboard until the desired item is highlighted.

3.2 Main menu

The Main menu provides you with an overview of the basic system information, and allows you to set the system date and the system time.

3.2.1 System Date [Day MM/DD/YYYY]

Allows you to set the system date.

3.2.2 System Time [HH:MM:SS]

Allows you to set the system time.

3.3 Advanced menu

The Advanced menu items allow you to change the settings for the CPU and other system devices.

Be cautious when changing the settings of the Advanced menu items. Incorrect field values can cause the system to malfunction.

3.3.1 LVDS Configuration

Switch to LVDS
Configuration options: [Disable Link] [Enabled]

The following item appears when you set **Switch to LVDS** to **[Enabled]**.

All-in-One Chassis
Allows you to select All-in-One (AiO) Chassis (if applicable) for simplified AiO configuration. Configuration options: [None] [1920*1080 LVDS1] [1920*1080 LVDS2] [1920*1080 LVDS3] [1600*900 LVDS4]

- Be cautious when selecting AiO chassis. Incorrect selection of AiO chassis can cause incorrect operation or potential damage to AiO chassis hardware.
- The following items appear only when you set **All-in-One Chassis** to **[None]**.

EDID Data Source
Configuration options: [Pre-Defined] [Flat Panel Display]

The following item appears when you set **EDID Data Source** to **[Pre-Defined]**.

LFP Panel Type
Allows you to select LFP panel used by Internal Graphics Device.
Configuration options: [VBIOS Default] [640x480] [800x600] [1024x768] [1280x1024] [1400x1050 LVDS1] [1400x1050 LVDS2] [1600x1200] [1366x768] [1680x1050] [1920x1200] [1440x900] [1600x900] [1024x768] [1280x800] [1920x1080] [2048x1536]

Inverter Polarity
Configuration options: [Normal] [Inverted]

Channel Select
Configuration options: [Dual Channel] [Single Channel]

Mode Select
Confuguration options: [JEIDA] [VESA 6bit] [VESA 8bit] [VESA 10bit]

DIGON enable to LVDS_ON enable(T2)

Configuration options: [0] ~[50]

LVDS_ON enable to BLON enable (T3)

Configuration options: [0] ~[1023]

BLON disable to LVDS_ON disable (T4)

Configuration options: [0] ~[1023]

LVDS_ON disable to DIGON disbale (T5)

Configuration options: [0] ~[50]

Completion of power down to power up (T7)

Configuration options: [0] ~[1023]

VARY_BL enable to BL_EN enable (T9)

Configuration options: [0] ~[1023]

BL_EN disable to VARY_BL disable (T10)

Configuration options: [0] ~[1023]

3.3.2 PCH-FW Configuration

This item allows you to configure Management Engine Technology parameters.

TPM Device Selection
Allows you to select TPM device.

[PTT] Enables PTT in SkuMgr.

[dTPM] Disables PTT in SkuMgr.

When PTT is disabled, all data saved on it will be lost.

3.3.3 Trusted Computing

Security Device Support
Allows you to enable or disable BIOS support for security device.
Configuration options: [Disabled] [Enabled]

The following items appear when a TPM device is installed on your motherboard.

SHA256 PCR Bank
Configuration options: [Disabled] [Enabled]

SHA384 PCR Bank
Configuration options: [Disabled] [Enabled]

SM3_256 PCR Bank
Configuration options: [Disabled] [Enabled]

Pending operation
Allows you to schedule an operation for security device.
Configuration options: [None] [TPM Clear]

Your computer will reboot during restart in order to change the state of security device.

Platform Hierarchy
Configuration options: [Disabled] [Enabled]

Storage Hierarchy
Configuration options: [Disabled] [Enabled]

Endorsement Hierarchy
Configuration options: [Disabled] [Enabled]

Physical Presence Spec Version
Allows you to select to tell O.S. to support PPI Spec Version 1.2 or 1.3.
Configuration options: [1.2] [1.3]

Some HCK tests might not support 1.3.

PH Randomization
Allows you to enable or disables Platform Hierarchy randomization. Configuration options: [Disabled] [Enabled]

Do not enable this question in production platforms. This is for development testing. OVERRIDE ChangePlatformAuth ELINK for production platforms supports TXT.

3.3.4 CPU Configuration

The items in this menu show CPU-related information the BIOS automatically detects.

Intel (VMX) Virtualization Technology
This item, when set to [enabled], will allow a VMM to utilize the additional hardware capacities provided by Vanderpool Technology.
Configuration options: [Disabled] [Enabled]

Hyper-Threading
Configuration options: [Disabled] [Enabled]

VT-d
Configuration options: [Disabled] [Enabled]

CPU - Power Management Control
This item allows you to manage and configure the CPU's power.

Intel® SpeedStep™
Allows your system to support more than two frequency ranges.
Configuration options: [Disabled] [Enabled]

Intel® Speed Shift Technology
Allows you to enable or disable Intel® Speed Shift Technology support. When enabled, CPPC v2 interface allows hardware controlled P-state.
Configuration options: [Disabled] [Enabled]

The following item appears only when **Intel® SpeedStep** or **Intel® Speed Shift** is available and enabled.

Turbo Mode
Configuration options: [Disabled] [Enabled]

C states
Allows you to enable or disable CPU Power Management. Configuration options: [Disabled] [Enabled]

The following item appears only when you set **C states** to **[Enabled]**.

Enhanced C-states
Allows you to enable or disable C1E. CPU will switch to minimum speed when all cores enter C-state. Configuration options: [Disabled] [Enabled]

Power Limit 1 Override

Allows you to enable or disable Power Limit 1 Override.

Configuration options: [Enabled] [Disabled]

The following item appears only when you set **Power Limit 1 Override** to **[Enabled]**.

Power Limit 1

Allows you to configure Power Limit 1 value in milliwatts.

Power Limit 2 Override

Allows you to enable or disable Power Limit 2 Override.
Configuration options: [Enabled] [Disabled]

The following item appears only when you set **Power Limit 2 Override** to **[Enabled]**.

Power Limit 2

Allows you to configure Power Limit 2 value in milliwatts.

3.3.5 Graphics Configuration

This item allows you to select a primary display from IGFX and PEG graphical devices.

Primary Display
Allows you to select which of the IGFX/PEG Graphics devices should be the primary display or select SG for switchable Gfx.
Configuration options: [Auto] [IGFX] [PEG Slot]

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

[Auto]	Keeps IGFX enabled base on the setup options.
[Disabled]	Disables internal graphics.
[Enabled]	Enables internal graphics.

RC6 (Render Standby)

Allows you to enable or disable render standby support.

Configuration options: [Disabled] [Enabled]

3.3.6 Power Management

This item allows you to configure system ACPI parameters.

Enable ACPI Auto Configuration
Allows you to enable or disable BIOS ACPI Auto Configuation.
Configuration options: [Disabled] [Enabled]

Enable Hibernation
Enables or disables system ability to Hibernate (0S/S4 Sleep State).
Configuration options: [Disabled] [Enabled]

ACPI Sleep State
Allows you to select the highest ACPI sleep state the system will enter when the SUSPEND button is pressed.
Configuration options: [S3 (Suspend to RAM)] [Suspend Disabled]

3.3.7 PCI Express Configuration

This item allows you to configure PCI Express settings.

PCIEX16 Slot
Allows you to configure the PCI Express Root Port settings.

PCI Express Root Port 2
Allows you to enable or disable the PCI Express Root Port.
Configuration options: [Disabled] [Enabled]

ASPM
Allows you to set the ASPM Level.
Configuration options: [Disabled] [L0s] [L1] [L0sL1]

PCIe Speed
Allows you to configure the PCIe speed.
Configuration options: [Auto] [Gen1] [Gen2] [Gen3] [Gen4] [Gen5]

Detect Timeout
Allows you to set the time (milliseconds) of waiting for link to exit Detect state for enabled ports before assuming there is no device and potentially disabling the port. Use the <+> and <-> keys to adjust the value or input the desired value.

Detect Non-Compliance Device

When set to [Enabled], this item allows you to detect the non-compliance device in PEG.
Configuration options: [Disabled] [Enabled]

3.3.8 AMT Configuration

This item allows you to configure Intel® Active Management Technology parameters.

AMT BIOS Features
Allows you to enable or disable AMT BIOS Features. When set to [Disabled], MEBx Setup will be inaccessible.
Configuration options: [Disabled] [Enabled]



This item does not disable Manageability Features in FW.

USB Provisioning of AMT
Allows you to enable or disable AMT USB Provisioning.
Configuration options: [Disabled] [Enabled]

Unconfigure ME
Allows you to unconfigure ME by resetting the MEBx password to default.

Configuration options: [Disabled] [Enabled]

End Of Post Message
Allows you to enable or disable End of Post message sent to ME.
Configuration options: [Disabled] [Send in DXE]

Secure Erase Configuration

Secure Erase mode
Allows you to change Secure Erase module behavior.
Configuration options: [Simulated] [Real]

[Simulated]	Performs SE flow without erasing SSD.
[Real]	Erases SSD.

Force Secure Erase
Allows you to force Secure Erase on next boot.
Configuration options: [Disabled] [Enabled]

3.3.9 Super IO Configuration

Serial Port 1 Configuration
This item allows you to set parameters of Serial Port 1 (COMA).

Serial Port
Allows you to enable or disable the serial port (COM).
Configuration options: [Disabled] [Enabled]

COM1 Control
Allows you to select COM1 mode.
Configuration options: [RS232] [RS422] [RS485]

Serial Port 2 Configuration
This item allows you to set parameters of Serial Port 2 (COMB).

Serial Port
Allows you to enable or disable the serial port (COM).
Configuration options: [Disabled] [Enabled]

COM2 Control
Allows you to select COM2 mode.
Configuration options: [RS232] [RS422] [RS485]

Serial Port 3 Configuration
This item allows you to set parameters of Serial Port 3 (COMC).

Serial Port
Allows you to enable or disable the serial port (COM).Configuration options: [Disabled] [Enabled]

Serial Port 4 Configuration
This item allows you to set parameters of Serial Port 4 (COMD).

Serial Port
Allows you to enable or disable the serial port (COM).Configuration options: [Disabled] [Enabled]

Serial Port 5 Configuration
This item allows you to set parameters of Serial Port 5 (COME).

Serial Port
Allows you to enable or disable the serial port (COM).Configuration options: [Disabled] [Enabled]

3.3.10 Serial Console Redirection

COM1(~5)

Console Redirection
Allows you enable or disable the console redirection feature.
Configuration options: [Enabled] [Disabled]

The following item is accessible when you set **Console Redirection** to **[Enabled]**.

Console Redirection Settings
The settings specify how the host computer and the remote computer (which the user is using) will exchange data. Both computers should have the same or compatible settings.

Terminal Type
Configuration options: [VT100] [VT100Plus] [VT-UTF8] [ANSI]

[VT100]	ASCII char set.
[VT100Plus]	Extends VT100 to support color, function keys, etc.
[VT-UTF8]	Uses UTF8 encoding to map Unicode chars onto 1 or more bytes.
[ANSI]	Extended ASCII char set.

Bits per second
Allows you to select serial port transmission speed. The speed must be matched on the other side. Long or noisy lines may require lower speeds.
Configuration options: [9600] [19200] [38400] [57600] [115200]

Data Bits
Configuration options: [7] [8]

Parity
A parity bit can be sent with the data bits to detect some transmission errors.
Configuration options: [None] [Even] [Odd] [Mark] [Space]

[None]	Disables parity check.
[Even]	Parity bit is 0 if the num of 1's in the data bits is even.
[Odd]	Parity bit is 0 if the num of 1's in the data bits is odd.

[Mark] Parity bit is always 1.

[Space] Parity bit is always 0.

Mark and Space Parity do not allow for error detection.

Stop Bits
Stop bits indicate the end of a serial data packet. The standard setting is 1 stop bit. Communication with slow devices may require more than 1 stop bit. Configuration options: [1] [2]

Flow Control
Flow control can prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a “stop” signal can be sent to stop the data flow. Once the buffers are empty, a “start” signal can be sent to re-start the flow. Hardware flow control uses two wires to send start/stop signals. Configuration options: [None] [Hardware RTS/CTS]

VT-UTF8 Combo Key Support
Allows you to enable or disable VT-UTF8 Combination Key Support for ANSI/ VT100 terminals. Configuration options: [Disabled] [Enabled]

Recorder Mode
With this mode enabled only text will be sent. This is to capture Terminal data. Configuration options: [Disabled] [Enabled]

Resolution 100x31
Allows you to enable or disable extended terminal resolution.
Configuration options: [Disabled] [Enabled]

Putty KeyPad
Allows you to select FunctionKey and KeyPad on Putty.
Configuration options: [VT100] [LINUX] [XTERMR6] [SCO] [ESCN] [VT400]

COM6(Pci Bus0,Dev0,Func0) (Disabled)

The following items can be configured only when AMT is provisioned.

Console Redirection Settings

Redirection COM Port
Allows you to select a COM port to display redirection of Legacy OS and Legacy OPROM Messages.
Configuration options: [COM1] [COM2] [COM3] [COM4] [COM5] [COM6(Pci Bus0,Dev0,Func0) (Disabled)]

Resolution
This allows you to set the number of rows and columns supported on the Legacy OS. Configuration options: [80x24] [80x25]

Redirect After POST
Configuration options: [Always Enable] [BootLoader]

[Always Enable]	Legacy Console Redirection is enabled for Legacy OS.
[BootLoader]	Legacy Console Redirection is disabled before booting to Legacy OS.

3.3.11 SATA Configuration

This item allows you to configure SATA device options settings.

SATA Controller(s)
Allows you to enables or disables the onboard SATA device.
Configuration options: [Disabled] [Enabled]

The following item appears only when you set **SATA Controller(s)** to **[Enabled]**.

SATA Mode Selection
Allows you to determine how SATA controller(s) operate. Configuration options: [AHCI]

SATA6G_ 1(~4)

Port 1(~4)
Allows you to enable or disable SATA Port.
Configuration options: [Disabled] [Enabled]

Hot Plug
Allows you to designate this port as Hot Pluggable.
Configuration options: [Disabled] [Enabled]

M.2_2
Configuration options: [Disabled] [Enabled]

3.3.12 VMD setup menu

Enable VMD controller
This item allows you to disable or enable VMD controller.
Configuration options: [Disabled] [Enabled]

3.3.13 Network Stack Configuration

Network Stack
This item allows you to disable or enable the UEFI Network Stack.
Configuration options: [Disabled] [Enabled]

The following items appear only when you set **Network Stack** to **[Enabled]**.

IPv4 PXE Support

Allows you to enable or disable IPv4 PXE boot support. If disabled, IPv4 PXE boot support will be unavailable. Configuration options: [Disabled] [Enabled]

IPv6 PXE Support

Allows you to enable or disable IPv6 PXE boot support. If disabled, IPv6 PXE boot support will be unavailable. Configuration options: [Disabled] [Enabled]

3.3.14 USB Configuration

XHCI Hand-off
This item functions as a workaround for OSes without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.
Configuration options: [Enabled] [Disabled]

USB Mass Storage Driver Support
Allows you to enable or disable USB Mass Storage Driver Support.
Configuration options: [Disabled] [Enabled]

U32G2X2_C1
Allows you to enable or disable USB port. Once set to [Disabled], any USB devices plugged into the connector will not be detected by BIOS or OS.
Configuration options: [Disabled] [Enabled]

U32G1_3
Allows you to enable or disable USB port. Once set to [Disabled], any USB devices plugged into the connector will not be detected by BIOS or OS.
Configuration options: [Disabled] [Enabled]

U32G2_4(~5)
Allows you to enable or disable USB port. Once set to [Disabled], any USB devices plugged into the connector will not be detected by BIOS or OS.
Configuration options: [Disabled] [Enabled]

U32G1_6(~8)
Allows you to enable or disable USB port. Once set to [Disabled], any USB devices plugged into the connector will not be detected by BIOS or OS.
Configuration options: [Disabled] [Enabled]

USB_2, USB_9(~13)
Allows you to enable or disable USB port. Once set to [Disabled], any USB devices plugged into the connector will not be detected by BIOS or OS.
Configuration options: [Disabled] [Enabled]

3.3.15 NVMe Configuration

The NVMe Configuration menu displays the NVMe controller and drive information of the devices connected and allows you to configure NVMe device options settings.

3.3.16 Onboard Devices Configuration

HD Audio Controller
Allows you to control detection of the HD-Audio device.
Configuration options: [Enabled] [Disabled]

[Enabled]	Enables the HD Audio Device unconditionally.
[Disabled]	Disables the HD Audio Device unconditionally.

LAN1 I225
Configuration options: [Disabled] [Enabled]

LAN2 I210
Configuration options: [Disabled] [Enabled]

M.2 WiFi
Allows you to enable or disable M.2 WiFi. Configuration options: [Disabled] [Enabled]

M.2 BT
Allows you to enable or disable M.2 BT.
Configuration options: [Disabled] [Enabled]

CPU PCIEX16 switch function
Configuration options: [2x8] [1x16]

3.3.17 Miscellaneous

DMI/OPI Configuration

DMI Gen3 ASPM
Configuration options: [Disabled] [Auto] [ASPM L0s] [ASPM L1] [ASPM L1] [ASPM L0sL1]

DMI ASPM

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

PCI Express Configuration

DMI Link ASPM Control
Allows you to disable or control Active State Power Management on SA side of the DMI link. Configuration options: [Disabled] [L1] [Auto]

3.3.18 APM Configuration

This item allows you to configure APM (Advanced Power Management) settings.

ErP Ready
Allows BIOS to switch off some power at S5 to get the system ready for ErP requirement. When set to [Enabled], all other PME options will be switched off.
Configuration options: [Disabled] [Enabled]

Restore AC Power Loss
Allows you to select AC power state when power is re-applied after a power failure.
Configuration options: [S5 State] [S0 State]

Power On By PCIE
Allows you to enable or disable the Wake-on-LAN function of the onboard LAN controller or other installed PCIe LAN cards.
Configuration options: [Disabled] [Enabled]

Power On By PS2
Configuration options: [Disabled] [Enabled]

Power On By Ring
Configuration options: [Disabled] [Enabled]

Power On By RTC
Configuration options: [Disabled] [Enabled]

The following items appear when you set **Power On By RTC** to **[Single event] or [Daily event]**.

Wake up hour
Allows you to enter a natural number within 0-23 for hour. For example, enter 3 for 3:00 am and 15 for 3:00 pm.

Wake up minute
Allows you to enter a natural number within 0-59 for minute.

Wake up second
Allows you to enter a natural number within 0-59 for second.

The following items appear when you set **Power On By RTC** to **[Weekly event]**.

Alarm day of Week
Allows you to select the day of the week when the system is to wake up.
Configuration options: [Sunday] [Monday] [Tuesday] [Wednesday] [Thursday] [Friday] [Saturday]

Wake up hour
Allows you to enter a natural number within 0-23 for hour. For example, enter 3 for 3:00 am and 15 for 3:00 pm.

Wake up minute
Allows you to enter a natural number within 0-59 for minute.

Wake up second
Allows you to enter a natural number within 0-59 for second.

The following items appear when you set **Power On By RTC** to **[Monthly event]**.

Day of the Month
Allows you to select the day of the month when the system is to wake up.

Wake up hour
Allows you to enter a natural number within 0-23 for hour. For example, enter 3 for 3:00 am and 15 for 3:00 pm.

Wake up minute
Allows you to enter a natural number within 0-59 for minute.

Wake up second
Allows you to enter a natural number within 0-59 for second.

3.3.19 EZ-Flash

This item allows you to enter EZ-Flash mode. After you press <Enter>, a confirmation message appears. Use the left/right arrow key to select between [Yes] or [No], then press <Enter> to confirm your choice.

3.3.20 Watchdog Timer

Watchdog Support
Configuration options: [Disabled] [Enabled]

The following items appear when you set **Watchdog Support** to **[Enable]**.

Watchdog Count mode
Allows you to select Watchdog Timer I count mode.
Configuration options: [Second Mode] [Minute Mode]

Watchdog Timer
Allows you to set the Watchdog Timer I Time-out value.

3.4 Hardware Monitor menu

The Hardware Monitor menu displays the system temperatures, fan and power status, and allows you to configure the smart fan.

3.4.1 Smart Fan Mode

Allows you to select the Smart Fan mode. Configuration options: [Disabled] [Normal] [Manual Mode]

The following items appear only when you set **Smart Fan Mode** to **[Manual Mode]**.

3.4.2 Smart Fan Function

Fan1 Setting

Temperature 1(~4)
Allows you to set the value of temperature1(~4).

FD/RPM 1(~4)
Allows you to set the value of Fan Duty/PRM 1(~4) when temperature is T1(~4).

3.5 Security menu

The Security menu allows a new password to be created or a current password to be changed. The menu also enables or disables the Secure Boot state and lets the user configure the System Mode state.

3.5.1 Administrator Password

If you have set an administrator password, we recommend that you enter the administrator password for accessing the system.

To set an administrator password:

1. Select the **Administrator Password** item and press <Enter>.
2. From the **Create New Password** box, key in a password, then press <Enter>.

To change an administrator password:

1. Select the **Administrator Password** item and press <Enter>.
2. From the **Enter Current Password** box, key in the current password, then press <Enter>.
3. From the **Create New Password box**, key in a new password, then press <Enter>.
4. Confirm the password when prompted.

To clear the administrator password, follow the same steps as in changing an administrator password, but press <Enter> when prompted to create/confirm the password.

3.5.2 User Password

If you have set a user password, you must enter the user password for accessing the system.

To set a user password:

1. Select the **User Password** item and press <Enter>.
2. From the **Create New Password** box, key in a password, then press <Enter>.
3. Confirm the password when prompted.

To change a user password:

1. Select the **User Password** item and press <Enter>.
2. From the **Enter Current Password** box, key in the current password, then press <Enter>.
3. From the **Create New Password** box, key in a new password, then press <Enter>.
4. Confirm the password when prompted.

To clear a user password:

1. Select the **Clear User Password** item and press <Enter>.
2. Select **Yes** from the Warning message window then press <Enter>.

3.5.3 Secure Boot

Secure Boot feature is active when Secure Boot is set to [Enabled], Platform Key (PK) is enrolled and the system is running in User mode. Changing the mode requires platform reset. Configuration options: [Disabled] [Enabled]

Secure Boot Mode
Allows you to select Secure Boot Mode. When set to [Custom], Secure Boot Policy variables can be configured by a physically present user without full authentication. Configuration options: [Standard] [Custom]

Key Management
Allows you to modify Secure Boot Policy variables without full authentication.

Platform Key (PK)
Configuration options: [Update]

Key Exchange Keys / Authorized Signatures
Configuration options: [Update] [Append]

Forbidden Signatures
Configuration options: [Update] [Append]

3.6 Boot menu

The items in the Boot menu allow you to change the system boot options.

Boot Configuration

CHASSIS INTRUDE
Allows you to enable or disable CHASSIS INTRUDE. Configuration options: [Disabled] [Enabled]

Setup Prompt Timeout
Allows you to set the number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.

Bootup NumLock State
Allows you to select the keyboard NumLock state. Configuration options: [On] [Off]

Quiet Boot
Configuration options: [Disabled] [Enabled]

Fast Boot
Allows you to enable or disable boot with initialization of a minimal set of devices required to launch active boot option. This has no effect for BBS boot options. Configuration options: [Disable Link] [Enabled]

[Enabled] Select to accelerate the boot speed.

[Disable Link] Select to go back to normal boot speed.

Boot mode select
Configuration options: [UEFI]

FIXED BOOT ORDER Priorities

Boot Option #1(~6)
Allows you to set the system boot order. Configuration options: [Hard Disk] [NVME] [CD/DVD] [SD] [USB Device] [Network] [Disabled]

3.7 Exit menu

The items in the Exit menu allow you to save or discard your changes to the BIOS items.

Save Changes and Exit
Allows you to exit the system setup program after saving the changes.

Discard Changes and Exit
Allows you to exit the system setup program without saving the changes you made. When you select this option or if you press <Esc>, a confirmation window appears. Select **Yes** to discard changes and exit.

Save Changes and Reset
Allows you to reset the system setup after saving the changes.

Discard Changes and Reset
Allows you to reset the system setup without saving the changes you made.

Save Options

Save Changes
Allows you to save changes done so far to any of the setup options.

Discard Changes
Allows you to discard changes done so far to any of the setup options.

Restore Defaults
Allows you to restore or load default values for all the setup options.

Save as User Defaults
Allows you to save the changes done so far as User Defaults.

Restore User Defaults
Allows you to restore the User Defaults to all the setup options.

Appendix

Notices

FCC Compliance Information

Responsible Party:	Asus Computer International
Address:	48720 Kato Rd., Fremont, CA 94538, USA
Phone / Fax No:	(510)739-3777 / (510)608-4555

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.

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CAN ICES-003(B)/NMB-003(B)

Déclaration de conformité de Innovation, Sciences et Développement économique Canada (ISED)

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Українська ASUSTeK Computer Inc. заявляє, що цей пристрій відповідає основним вимогам та іншим відповідним положенням відповідних Директив. Повний текст декларації відповідності стандартам ЄС доступний на: www.asus.com/support

Türkçe AsusTek Computer Inc., bu aygıtın temel gereksinimlerle ve ilişkili Yönergelerin diğer ilgili koşullarıyla uyumlu olduğunu beyan eder. AB uygunluk bildiriminin tam metni şu adreste bulunabilir: www.asus.com/support

Bosanski ASUSTeK Computer Inc. ovim izjavljuje da je ovaj uređaj usklađen sa bitnim zahtjevima i ostalim odgovarajućim odredbama vezanih direktiva. Cijeli tekst EU izjave o usklađenosti dostupan je na: www.asus.com/support

Service and Support

Visit our multi-language website at https://www.asus.com/support/

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