



J6412I-EM-A

Industrial Motherboard

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Product overview

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Chapter 1

Product overview

1.1 Package contents

Check your industrial motherboard package for the following items.

- ☒ 1 x ASUS J6412I-EM-A Motherboard
- ☒ 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

- Built-in Intel® Celeron® Quad-core Processor J6412
- Two DDR4 3200/2666/2400/2133 MHz Non-ECC Un-buffered SO-DIMMs up to 32 GB
- 2 x SATA 6Gb/s, 4 x USB 3.2 Gen 1, 4 x USB 2.0, 1 x COM headers
- 1 x PCIe 3.0/2.0 x4 slot, 1 x M.2 Socket 1 with E key, 1 x M key, type 2242/2260/2280 supports NVMe
- Multi-display: 1 x HDMI™, 1 x DisplayPort++, 1 x VGA

1.3 Specifications

CPU	Built-in Intel® J6412 SoC onboard Processor (Elkhart Lake) Supports 10W processors
Memory	2 x So-DIMM slots, Max.32GB, DDR4 3200/2666/2400/2133 MHz Non-ECC, Unbuffered Memory
Graphics	Integrated graphics processor - Intel® UHD Graphics support - Supports HDMI™ output with a maximum resolution of 3840 x 2160 @ 30Hz - Supports DisplayPort++ output with a maximum resolution of 4096 x 2160 @ 60Hz - Supports VGA output with a maximum resolution of 1920 x 1200 @ 60Hz
Expansion slots	1 x PCI Express 3.0/2.0 x4 slot 1 x M.2 Socket with E key, type 2230 for WIFI/BT device 1 x M.2 Socket 3 with M key, type 2242/2260/2280 supports NVMe
Storage	2 x SATA Gen 3.0 up to 6.0 Gb/s ports
Ethernet	2 x Realtek® 8111H, supports WOL/PXE
Audio	Realtek® ALC897 High Definition Audio
Rear panel I/O ports	1 x HDMI™ port 1 x DisplayPort 1 x VGA port 4 x USB 3.2 Gen 1 ports 4 x USB 2.0 ports 1 x COM port 2 x LAN (RJ45) ports 1 x Audio jack 1 x DC-IN jack
Internal Connectors	5 x Serial Port headers (5 x RS232) 1 x USB 2.0 header supports additional 2 USB 2.0 ports 1 x LPT header 2 x Chassis Fan headers (PWM Mode) 1 x Front Panel Audio header (AAFP) 1 x System Panel header (10-1 pin) 1 x Chassis Intrusion header 1 x Speaker header 1 x Clear CMOS jumper 1 x 8-bit GPIO header 1 x COM Debug header 1 x 4-pin ATX 12V power connector

(continued on the next page)

Internal Connectors	2 x SATA power connectors 2 x SATA ports 1 x SPI TPM header 1 x AT/ATX selection header
Watchdog timer	Yes
Power requirement	12V DC-in (1x external DC jack; 1 x internal 4-pin power connector)
Operation Temperature	0~60°C
Non-Operation Temperature	-40~85°C
Relative Humidity	0%~85%
BIOS	UEFI AMI BIOS
OS support	Windows® 10 (64-bit) / Windows® 10 IoT Enterprise Ubuntu, RedHat Enterprise, Fedora Workstation, OpenSUSE
Certification	CE
Form Factor	Thin Mini-ITX Form Factor, 6.7"x 6.7" (17.0cm x 17.0cm)



NOTE: Specifications are subject to change without notice.

This image shows a full page of a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page, providing a guide for writing. There are no margins, text, or other markings on the paper.

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!

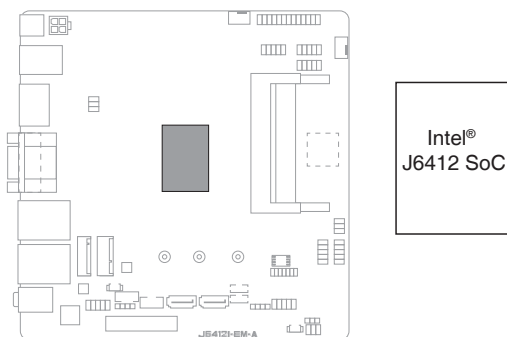
- Unplug the power cord from the wall socket before touching any component.
 - Before handling components, use a grounded wrist strap or touch a safely grounded object or a metal object, such as the power supply case, to avoid damaging them due to static electricity.
 - Hold components by the edges to 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.
-



Connectors/Jumpers/Slots	Page
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2. Built-in Intel® Celeron® Quad-core Processor J6412	2-4
3. SPI_TPM header (14-1 pin SPI_TPM)	2-22
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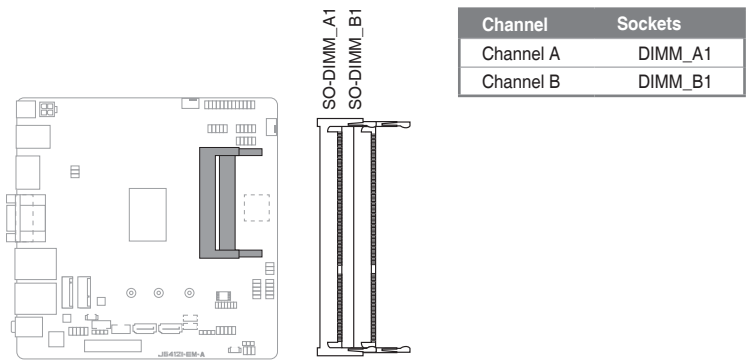
2.3 Central Processing Unit (CPU)

The motherboard comes with an onboard Intel® processor J6412.



2.4 System memory

This motherboard comes with two Double Data Rate 4 Low Voltage (DDR4L) Small Outline Dual Inline Memory Module (SO-DIMM) sockets. The figure illustrates the location of the DDR4L DIMM socket:



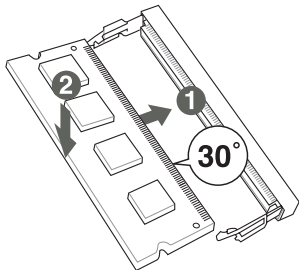
IMPORTANT!

- You may install varying memory sizes in Channel A and Channel B. The system maps the total size of the lower-sized channel for the dual-channel configuration. Any excess memory from the higher-sized channel is then mapped for single-channel operation.
- Always install the DIMMS with the same CAS Latency. For an optimum compatibility, we recommend that you install memory modules of the same version or data code (D/C) from the same vendor. Check with the vendor to get the correct memory modules.
- According to Intel® CPU spec, DIMM voltage below 1.35V is recommended to protect the CPU.

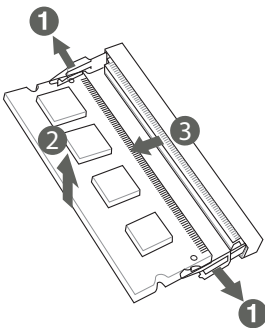


NOTE: Visit the ASUS website at www.asus.com for the latest QVL.

To install a SO-DIMM



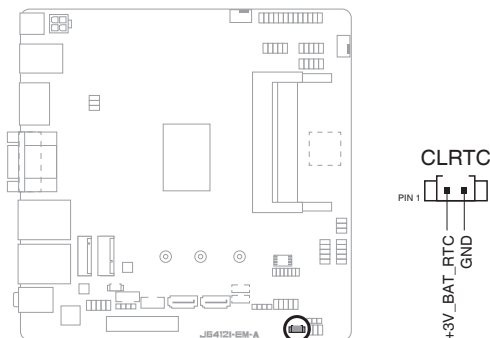
To remove a SO-DIMM



2.5 Jumpers

1. Clear CMOS jumper (2-pin CLRTC)

The Clear CMOS jumper allows you to clear the Real Time Clock (RTC) RAM in the CMOS, which contains the date, time, system passwords, and system setup parameters.



Connector type	HEADER 1x2p, 2.54mm pitch, S/T
----------------	--------------------------------

To erase the RTC RAM:

1. Turn OFF the computer and unplug the power cord.
2. Short-circuit pin 1-2 with a metal object or jumper cap for about 5-10 seconds.
3. Plug the power cord and turn ON the computer.
4. Hold down the key during the boot process and enter BIOS setup to re-enter data.

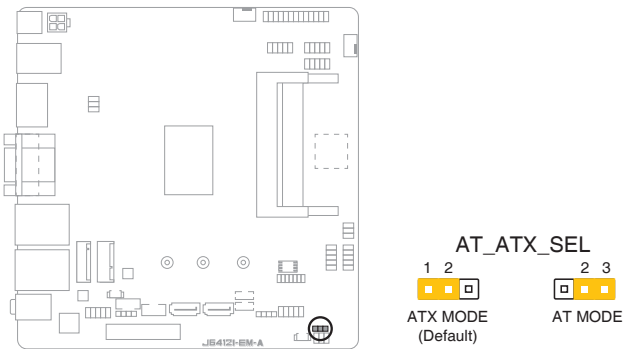


CAUTION! DO NOT short-circuit the pins except when clearing the RTC RAM. Short-circuiting or placing a jumper cap will cause system boot failure!



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.

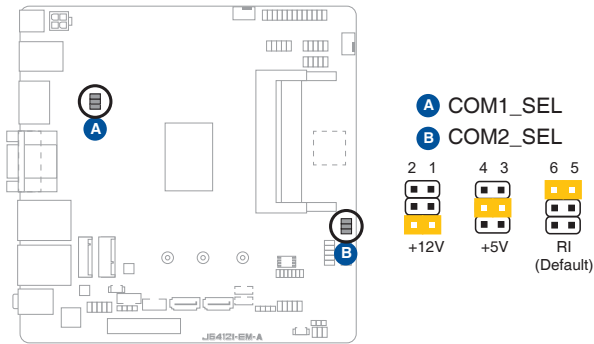
2. AT/ATX Mode Selection jumper (3-pin AT_ATX_SEL)



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

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

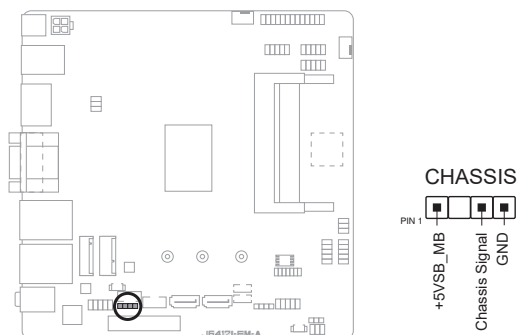
3. COM Ring/+5V/+12V Selection jumpers (6-pin COM1_SEL, COM2_SEL)



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

4. 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 low-level signal to this connector when a chassis component is installed. The signal is then generated as a chassis intrusion event.

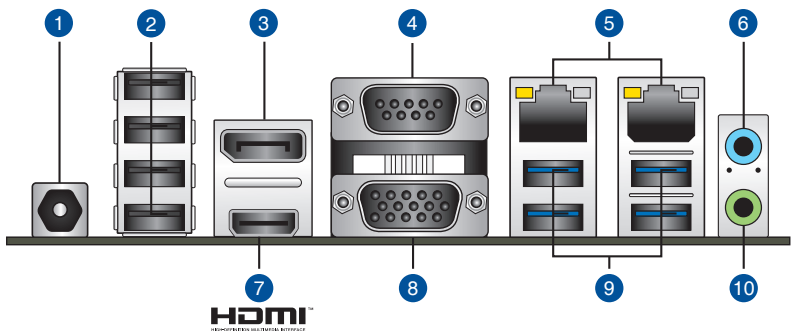


Connector type

HEADER 4p, K2, 2.54mm pitch

2.6 Connectors

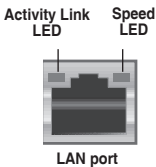
2.6.1 Rear panel connectors



1. **DC power connector.** Insert the power adapter into this port.
2. **USB 2.0 ports.** These Universal Serial Bus (USB) ports are for USB 2.0 devices.
3. **DisplayPort.** This port connects a device with DisplayPort connector.
4. **COM port.** This 9-pin COM port is for a pointing device or other serial devices.
5. **LAN (RJ-45) ports.** These ports allow 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		



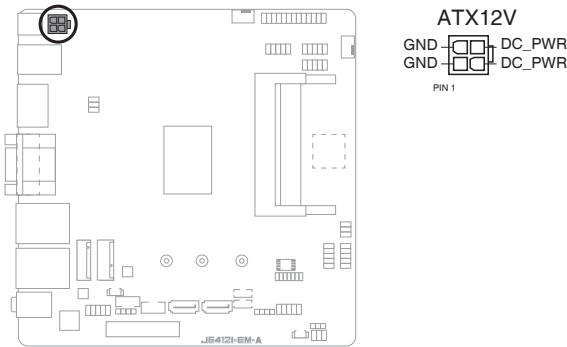
6. **Line In port (light blue).** This port connects the tape, CD, DVD player, or other audio sources.
7. **HDMI™ port.** This port is for a High-Definition Multimedia Interface (HDMI™) connector, and is HDCP compliant allowing playback of HD DVD, Blu-Ray, and other protected content.
8. **Video Graphics Adapter (VGA) port.** This 15-pin port is for a VGA monitor or other VGA-compatible devices.

9. **USB 3.2 Gen 1 (up to 5Gbps) ports.** These Universal Serial Bus (USB) ports connect to USB 3.2 Gen 1 devices.
10. **Line Out port (lime).** This port connects to a headphone or a speaker. In the 4.1, and 5.1 channel configurations, the function of this port becomes Front Speaker Out.

2.6.2 Internal connectors

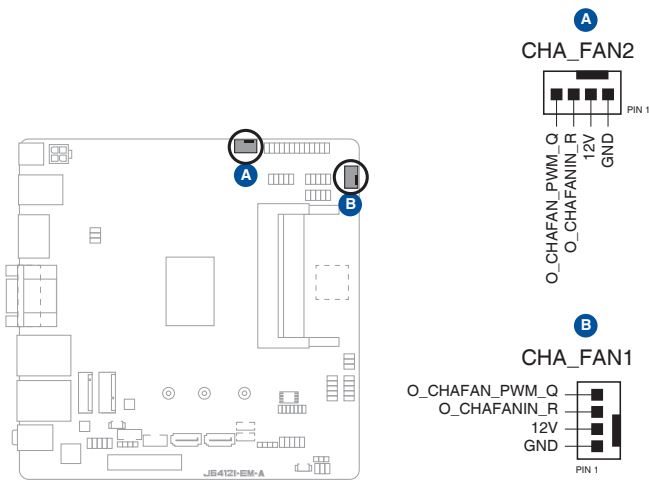
1. ATX Power connector (4-pin ATX12V)

Correctly orient the ATX power supply plug into this connector and push down firmly until the connector completely fits.



2. Chassis Fan headers (4-pin CHA_FAN1, CHA_FAN2)

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 headers.



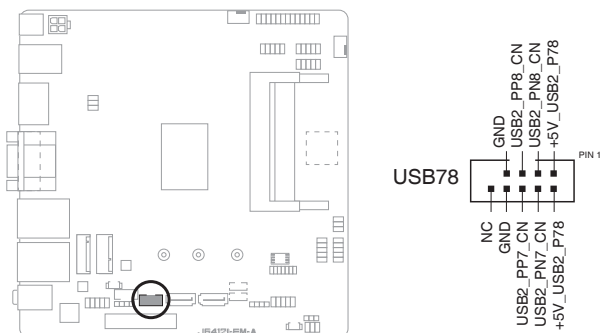
Connector type WAFER HD 4p, 2.54mm pitch, S/T



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!

3. USB 2.0 header (10-pin USB_78)

This header is for USB 2.0 ports. Connect a 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, 2.54mm pitch
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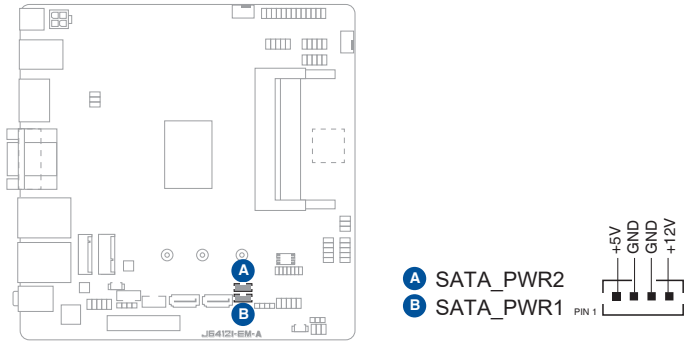
CAUTION! Never connect a 1394 cable to the USB header. Doing so will damage the motherboard.



NOTE: The USB cable is purchased separately.

4. **SATA Power connectors (4-pin SATA_PWR1, SATA_PWR2)**

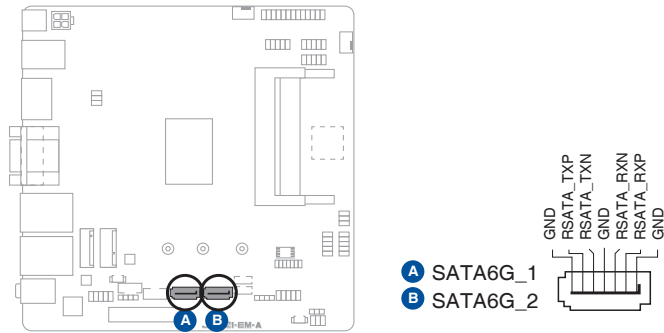
These connectors are for the SATA power cables. The power cable plugs are designed to fit these connectors in only one orientation. Find the proper orientation and push down firmly until the connectors completely fit.



IMPORTANT: The SATA power connectors support 1A current to the maximum.

5. **SATA 6.0 Gb/s ports (7-pin SATA6G1, SATA6G2)**

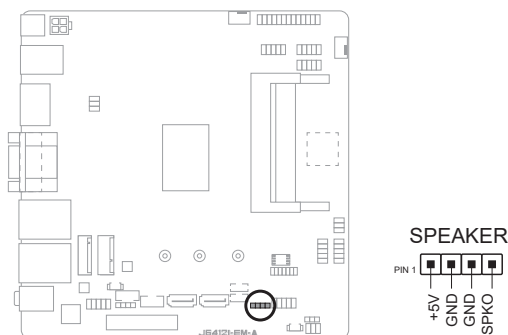
These ports connect to SATA 6.0 Gb/s hard disk drives or optical drives via SATA 6.0 Gb/s signal cables.



Connector type	WAFER HD 7p, 1.27mm pitch
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6. Speaker header (4-pin SPEAKER)

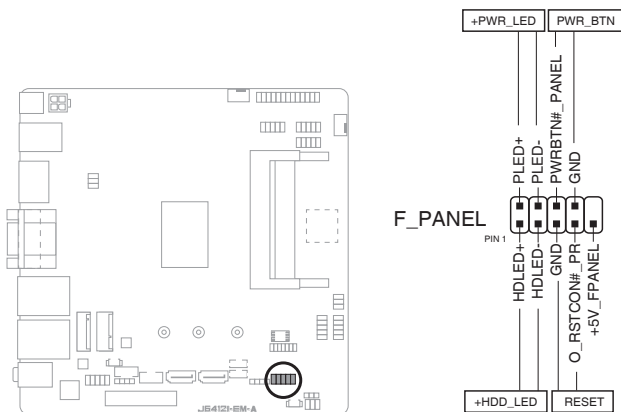
The 4-pin header is for the chassis-mounted system warning speaker. The speaker allows you to hear system beeps and warnings.



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

7. 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)**

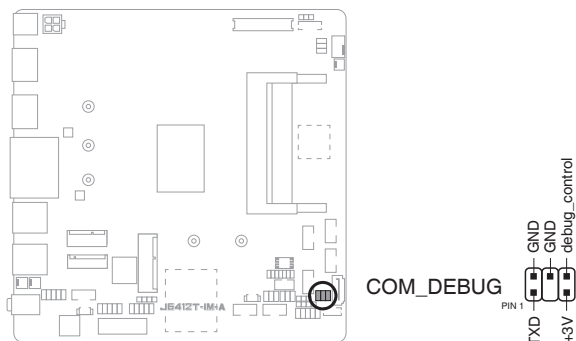
This 2-pin header is for the system power button.

- **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. COM Debug header

This header allows connection to a COM Debug card.



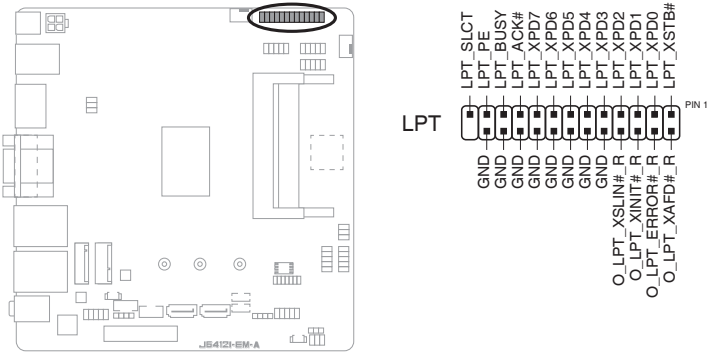
Connector type	HEADER 2x3p, K3, 2.54mm pitch
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NOTE: The COM Debug card is purchased separately.

9. LPT header (26-pin LPT)

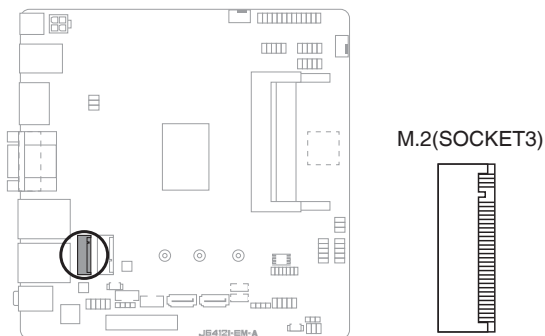
The LPT (Line Printing Terminal) header supports devices such as a printer. LPT is standardized as IEEE 1284, which is the parallel port interface on IBM PC-compatible computers.



Connector type HEADER 2x13p, K26, 2.54mm pitch, S/T

10. M.2 socket 3 (M.2_SOCKET3)

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

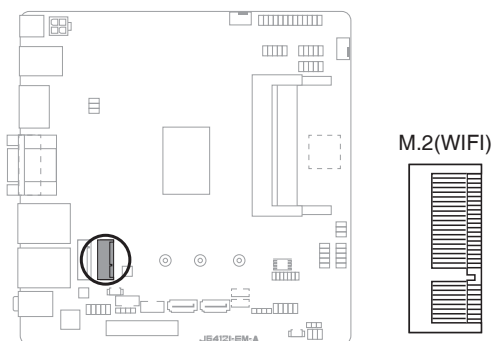


NOTES:

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

11. M.2 Wi-Fi slot

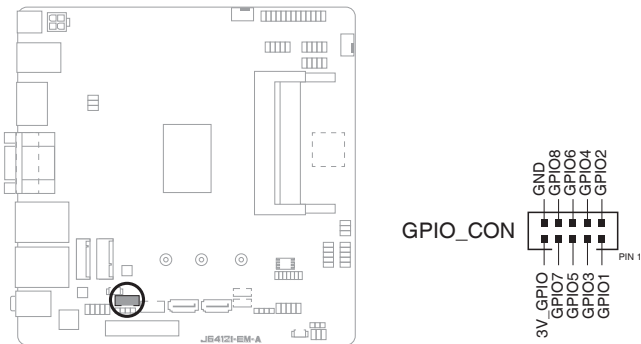
This slot connects to an M.2 Wi-Fi device.



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

12. General Purpose Input/output header (GPIO_CON)

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

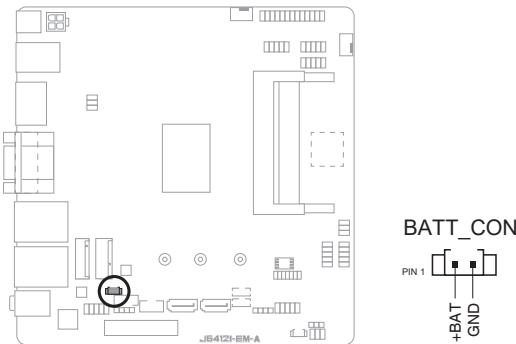


Connector type

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

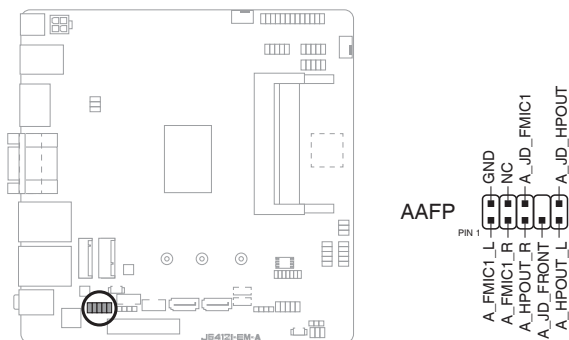
13. RTC Battery header (2-pin BATT_CON)

This header is for the lithium CMOS battery.



14. 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

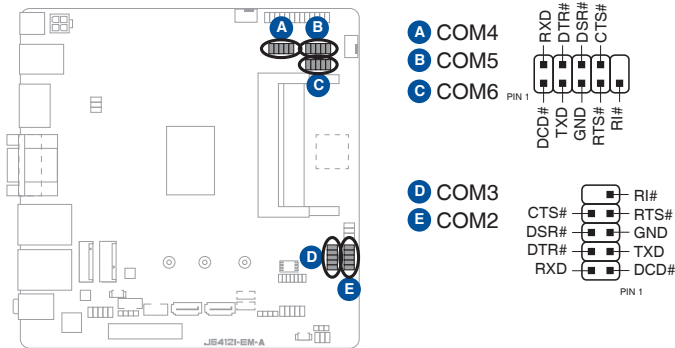


IMPORTANT!

- 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 header, set the HD Audio Controller item in the BIOS setup to [Enabled].

15. COM Port headers (10-pin COM1~COM6)

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.



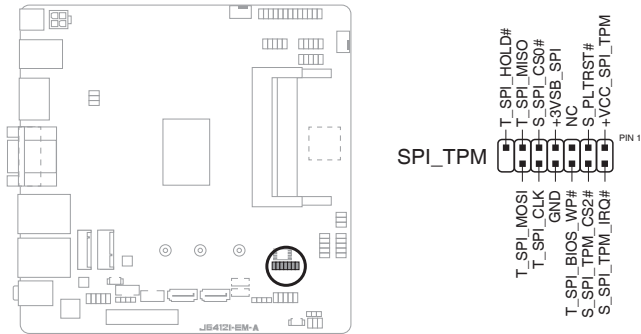
Connector type BOX header 2x5p, K10, 2.00mm pitch



NOTE: The serial port cables are purchased separately.

16. SPI TPM header (14-1 pin TPM)

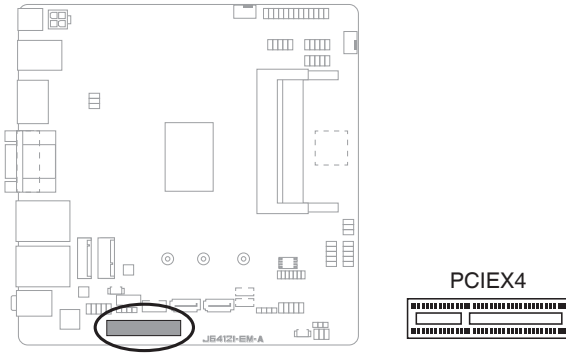
This header supports a Trusted Platform Module (TPM) system with a Serial Peripheral Interface (SPI), allowing you to securely store keys, digital certificates, passwords, and data. A TPM system also helps enhance network security, protects digital identities, and ensures platform integrity.



Connector type	Header 2x7p, K14, 2.0mm pitch
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17. PCIe 3.0/2.0 x4 slot (PCIEX4)

This slot supports a PCIe 3.0/2.0 x4 graphics card that complies with the PCI Express specification.



This image shows a full page of blank, lined paper. It features approximately 20 evenly spaced horizontal grey lines across its entire width, providing a guide for handwriting or typing. The background is a clean, solid white color.

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

Entering BIOS Setup after POST

To enter BIOS Setup after POST:

- Press <Ctrl>+<Alt>+ 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>+ 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.

3.1.1 BIOS menu screen

Menu bar

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 temperature and changing the 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 an overview of the basic system information, and allows you to set the system date, time, language, and security settings.

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.



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

3.3.1 PCH-FW Configuration

TPM Device Selection

This item allows you to select the TPM device. Configuration options: [dTPM] [PTT]

3.3.2 Trusted Computing

Security Device Support

This item allows you to enable or disable BIOS support for security devices. Configuration options: [Disabled] [Enabled]

SHA256 PCR Bank

Configuration options: [Disabled] [Enabled]

SHA384 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.

3.3.3 CPU Configuration

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



NOTE: The items shown in the submenu may be different depending on the type of CPU installed.

Intel Virtualization Technology

When set to **[Enabled]**, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology. Configuration options: **[Disabled]** **[Enabled]**

CPU — Power Management Control

This item allows you to manage and configure the CPU's power.

Intel(R) SpeedStep(tm)

This item allows you to enable or disable Intel SpeedStep technology. Configuration options: **[Disabled]** **[Enabled]**

Intel(R) Speed Shift Technology

This item allows you to enable or disable Intel Speed Shift technology. Configuration options: **[Disabled]** **[Enabled]**

Turbo Mode

This item allows you to enable or disable Turbo Mode for your processor. Configuration options: **[Disabled]** **[Enabled]**

C states

[Disabled] Disables the CPU C states.
[Enabled] Enables the CPU C states.

Enhanced C-states

[Disabled] Disables enhanced C1E state.
[Enabled] Enables enhanced C1E state.

Power Limit 1 Override

[Disabled] Disables power limit 1 override.
[Enabled] Enables power limit 1 override.



NOTE: The following item appears only when you set the previous item to **[Enabled]**.

Power Limit 1

This item allows you to provide rapid protection when the package power exceeds Power Limit 1. Use <+> and <-> to adjust the value.

Power Limit 2 Override

[Disabled] Disables power limit 2 override.
[Enabled] Enables power limit 2 override.



NOTE: The following item appears only when you set the previous item to **[Enabled]**.

Power Limit 2

This item allows you to provide rapid protection when the package power exceeds Power Limit 2. Use <+> and <-> to adjust the value.

3.3.4 Graphics Configuration

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 device should be the Primary Display. Configuration options: [Auto] [IGFX] [PEG]

Internal Graphics

[Auto] Keep IGFX enabled base on the setup options.

[Disabled] Disables internal graphics.

[Enabled] Enables internal graphics.

RC6(Render Standby)

Allows you to enable to disable render standby support. RC6 should be enabled if S0ix is enabled. Configuration options: [Disabled] [Enabled]

3.3.5 PCI Express Configuration

PCIe_x4 Slot

PCIe_x4 Slot

This item allows you to control the PCI Express root port.

Configuration options: [Disabled] [Enabled]

PCIe Speed

Configures the speed of PCIe_x4 slot. Configuration options: [Auto] [Gen1] [Gen2] [Gen3]

Detect Timeout

This item allows you to set the number of milliseconds to wait before assuming there is no device and potentially disabling the port. Use <+> and <-> to adjust the value.

Detect Non-Compliance Device

These items allow you to enable/disable detection of non-compliant PCI express devices. Configuration options: [Disabled] [Enable]

3.3.6 Super IO Configuration

Super IO Chip: NCT6126D

Serial Port 1 Configuration

Serial Port

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



NOTE: The following items appear only when you set the previous item to [Enabled].

COM1 Control

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

Serial Port 2~6 Configuration

Serial Port

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

Parallel Port Configuration

Parallel Port

Allows you to enable or disable the Parallel Port (LPT/LPTE). Configuration options: [Disabled] [Enabled]

Device Mode

Allows you to change the Printer Port mode. Configuration options: [STD Printer Mode] [SPP Mode] [EPP-1.9 and SPP Mode] [EPP-1.7 and SPP Mode] [ECP Mode] [ECP and EPP 1.9 Mode] [ECP and EPP 1.7 Mode]

3.3.7 Serial Console Redirection

COM1~COM6

Console Redirection

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



NOTE: The following item appears only when you set the previous item to [Enabled].

Console Redirection Settings

These items become configurable only when you enable the Console Redirection item. 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

Allows you to set the terminal type.

[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

Selects 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. [Mark] and [Space] parity do not allow for error detection.

[None]	None
[Even]	parity bit is 0 if the num of 1's in the data bits is even
[Odd]	parity bit is 0 if num of 1's in the data bits is odd
[Mark]	parity bit is always 1
[Space]	parity bit is always 0

Stop Bits

Stop bits indicate the end of a serial data packet. (A start bit indicates the beginning.) 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

This allows you to enable the 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

This allows you to set the number of rows and columns supported on the Legacy OS. Configuration options: [Disabled] [Enabled]

Putty Keypad

This allows you to select the FunctionKey and Keypad on Putty. Configuration options: [VT100] [LINUX] [XTERM6] [SCO] [ESCN] [VT400]

3.3.8 SATA Configuration

SATA Controller(s)

Allow you to enable/disable SATA device(s). Configuration options: [Enabled] [Disabled]

SATA Mode Selection

This item allows you to select what mode the controller uses for memory devices. Configuration options: [AHCI]

SATA 6G_1~2

This item allows you to enable/disable the SATA port. Configuration options: [Disabled] [Enabled]

3.3.9 Network Stack Configuration

Network Stack

This item allows user to disable or enable the UEFI network stack. Configuration options: [Disabled] [Enabled]



NOTE: The following items appear only when you set the previous item to [Enabled].

Ipv4 PXE Support

This item allows user to disable or enable the Ipv4 PXE Boot support. Configuration options: [Disabled] [Enabled]

Ipv6 PXE Support

This item allows user to disable or enable the Ipv6 PXE Boot support. Configuration options: [Disabled] [Enabled]

3.3.10 USB Configuration

XHCI Hand-off

Allows you to enable or disable XHCI Hand-off. Set to **[Disabled]** to support operating systems without a built-in USB 3.0 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]

U32G1_E1~4

Allows you to enable or disable the 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_3~8

Allows you to enable or disable the 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]

3.3.11 NVMe Configuration

This page displays the NVMe controller and drive information.

3.3.12 Onboard Device Configuration

HD Audio

[Disabled] Disables the HD Audio Device.

[Enabled] Enables the HD Audio Device.

Realtek LAN 1 Controller

[Disabled] Disables Realtek LAN 1 Controller.

[Enabled] Enables Realtek LAN 1 Controller.

Realtek LAN 2 Controller

[Disabled] Disables Realtek LAN 2 Controller.

[Enabled] Enables Realtek LAN 2 Controller.

M.2 M-Key(PCIE)

[Disabled] Disables the M.2 M-key (PCIE) controller.

[Enabled] Enables the M.2 M-key (PCIE) controller.

M.2(WiFi)

PCIE Port(WiFi)

[Disabled] Disables the M.2 WiFi (PCIE Port) controller.

[Enabled] Enables the M.2 WiFi (PCIe Port) controller.

USB Port (BT)

Allows you to enable or disable M.2 (WiFi) USB port, which is also known as the BT controller of M.2 (WiFi) devices. Once set to **[Disabled]**, any USB devices plugged into the connector will not be detected by BIOS or OS.

Configuration options: [Disabled] [Enabled]

3.3.13 APM Configuration

ErP Ready

Allows you 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

[S5 State] The system goes into off state after an AC power loss.

[S0 State] The system goes into on state after an AC power loss.

Power On By PCIe

This item 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 Ring

[Disabled] Disables the Ring devices to generate a wake event.

[Enabled] Enables the Ring devices to generate a wake event.

Power On By RTC

Allows you to set your system to power up to execute tasks on a set schedule or on a particular day. Configuration options: [Disabled] [Single event] [Daily event] [Weekly event] [Monthly event]

3.3.14 Watchdog Timer

Watchdog Support

This item allows you to enable or disable Watchdog timer. Configuration options: [Disabled] [Enabled]



NOTE: The following items appear only when you set the previous item to [Enabled].

Watchdog Count Mode

This item allows you to select a Watchdog timer | count mode.

Configuration options: [Second Mode] [Minute Mode]

Watchdog Timer

Use the <+> and <-> keys to adjust the value or input the desired value directly. The value ranges from 1 to 255.

3.3.15 EZ-Flash

Enter Ez-Flash mode

This item allows you to run EzFlash utility. When 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.

3.4 Hardware Monitor menu

The items in this menu provide you an overview of system status including temperature, fan speed and voltage, and allow you to configure the smart fan.

Smart Fan Mode

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



NOTE: The following item appears only when you set **Smart Fan Mode** to [Manual Mode].

Smart Fan Function

CHA FAN Setting

Temperature 1/2/3/4

Input value range: [0~255]

FD/RPM 1/2/3/4

Input value range: [0~255]

3.5 Security menu

This 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.

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>.
3. Confirm the password when prompted.

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.



NOTE: 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.

User Password

If you have set a user password, you must enter the user password for accessing the system. The **User Password** item on top of the screen shows the default **Not Installed**. After you set a password, this item shows **Installed**.

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>.

Secure Boot

Secure Boot

Secure Boot can be enabled if the system is running in User mode with enrolled platform Key (EPK) or if the CSM function is disabled. Configuration options: [Disabled] [Enabled]

Secure Boot Mode

In Custom mode, Secure Boot policy variables can be configured by a physically present user without full authentication. Configuration options: [Standard] [Custom]

Key Management

The Key Management item allows you to modify Secure Boot variables and set Key Management page.

Platform Key (PK)

Configuration options: [Update]

Key Exchange Keys / Authorized Signatures / Forbidden Signatures

Configuration options: [Update] [Append]

3.6 Boot menu

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

Boot Configuration

CHASSIS INTRUDE

Allows you to enable or disable the chassis intrusion detection function.

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. Configuration options: [1] - [65535]

Post Time Delay

This item allows you to select the desired additional POST waiting time to easily enter the BIOS setup. (Delay time = value * 500ms). Configuration options: [0] - [12]

Bootup NumLock State

[On] Set the power-on state of the NumLock to [On].

[Off] Set the power-on state of the NumLock to [Off].

Quiet Boot

Allows you to enable or disable the Quiet Boot option.

Configuration options: [Disabled] [Enabled]

Fast Boot

[Disabled] Select to go back to normal boot.

[Enabled] Select to accelerate the boot speed.

FIXED BOOT ORDER Priorities

Boot Option #1~#6

This item allows you to set the system boot order for available devices. The number of device items that appears on the screen depends on the number of devices installed in the system. Configuration options: [Hard Disk] [NVME] [CD/DVD] [SD] [USB Device] [Network] [Disabled]

3.7 Exit menu

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

Save Changes & Exit

This option allows you to save your changes and exit the Setup program. When you select this option or if you press <Esc>, a confirmation window appears. Select **Yes** to save changes and exit.

Discard Changes & Exit

This option allows you to exit the Setup program without saving your changes. When you select this option or if you press <Esc>, a confirmation window appears. Select **Yes** to discard changes and exit.

Save Changes & Reset

This option allows you to exit the Setup program after saving changes.

Discard Changes & Reset

This option allows you to exit the Setup program without saving changes.

Save Changes

This option allows you to save changes to any of the setup options you have made so far.

Discard Changes

This option allows you to discard changes to any of the setup options you have made so far.

Restore Defaults

Restore/load default values for all the setup options.

Save as User Defaults

This option allows you to save the changes you have made so far as user defaults.

Restore User Defaults

Restore the user defaults with 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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HDMITM

HIGH-DEFINITION MULTIMEDIA INTERFACE

Compliance Statement of Innovation, Science and Economic Development Canada (ISED)

This device complies with Innovation, Science and Economic Development Canada licence exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

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

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

Le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

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

VCCI: Japan Compliance Statement

Class B ITE

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取扱説明書に従って正しい取り扱いをして下さい。

V C C I - B

KC: Korea Warning Statement

B급 기기 (가정용 방송통신기자재)

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Declaration of compliance for product environmental regulation

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

Please refer to <http://csr.asus.com/Compliance.htm> for information disclosure based on regulation requirements ASUS is complied with:

EU REACH and Article 33

Complying with the REACH (Registration, Evaluation, Authorisation, and Restriction of Chemicals) regulatory framework, we published the chemical substances in our products at ASUS REACH website at <http://csr.asus.com/english/REACH.htm>.

EU RoHS

This product complies with the EU RoHS Directive. For more details, see <http://csr.asus.com/english/article.aspx?id=35>

India RoHS

This product complies with the “India E-Waste (Management) Rules, 2016” and prohibits use of lead, mercury, hexavalent chromium, polybrominated biphenyls (PBBs) and polybrominated diphenyl ethers (PBDEs) in concentrations exceeding 0.1% by weight in homogenous materials and 0.01% by weight in homogenous materials for cadmium, except for the exemptions listed in Schedule II of the Rule.

Vietnam RoHS

ASUS products sold in Vietnam, on or after September 23, 2011, meet the requirements of the Vietnam Circular 30/2011/TT-BCT.

Các sản phẩm ASUS bán tại Việt Nam, vào ngày 23 tháng 9 năm 2011 trở về sau, đều phải đáp ứng các yêu cầu của Thông tư 30/2011/TT-BCT của Việt Nam.

Türkiye RoHS

AEEE Yönetmeliğine Uygundur

ASUS Recycling/Takeback Services

ASUS recycling and takeback programs come from our commitment to the highest standards for protecting our environment. We believe in providing solutions for you to be able to responsibly recycle our products, batteries, other components as well as the packaging materials. Please go to <http://csr.asus.com/english/Takeback.htm> for detailed recycling information in different regions.



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.



DO NOT throw the mercury-containing button cell battery in municipal waste. This symbol of the crossed out wheeled bin indicates that the battery should not be placed in municipal waste.

Simplified UKCA Declaration of Conformity

English ASUSTeK Computer 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: www.asus.com/support.

Simplified EU Declaration of Conformity

English ASUSTeK Computer 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: www.asus.com/support.

Français ASUSTeK Computer Inc. déclare par la présente que cet appareil est conforme aux critères essentiels et autres clauses pertinentes des directives concernées. La déclaration de conformité de l'UE peut être téléchargée à partir du site Internet suivant : www.asus.com/support.

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Italiano ASUSTeK Computer Inc. con la presente dichiara che questo dispositivo è conforme ai requisiti essenziali e alle altre disposizioni pertinenti con le direttive correlate. Il testo completo della dichiarazione di conformità UE è disponibile all'indirizzo: www.asus.com/support.

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Ελληνικά Με το παρόν, η ASUSTeK Computer Inc. δηλώνει ότι αυτή η συσκευή συμμορφώνεται με τις θεμελιώδεις απαιτήσεις και άλλες σχετικές διατάξεις των Οδηγιών της ΕΕ. Το πλήρες κείμενο της δήλωσης συμμόρφωσης είναι διαθέσιμο στη διεύθυνση: www.asus.com/support.

Magyar Az ASUSTeK Computer Inc. ezenel kijelenti, hogy ez az eszköz megfelel a kapcsolódó irányelvek lényeges követelményeinek és egyéb vonatkozó rendelkezéseinek. Az EU megfeleléségi nyilatkozat teljes szövege innen letölthető: www.asus.com/support.

Latviski ASUSTeK Computer Inc. ar šo paziņo, ka šī ierīce atbilst saistīto Direktīvu būtiskajām prasībām un citiem citiem saistošajiem nosacījumiem. Pilns ES atbilstības paziņojuma teksts pieejams šeit: www.asus.com/support.

Lietuviai „ASUSTeK Computer Inc.“ šiuo tvirtina, kad šis įrenginys atitinka pagrindinius reikalavimus ir kitas svarbias susijusių direktyvų nuostatas. Visą ES atitikties deklaracijos tekstą galima rasti: www.asus.com/support.

Norsk ASUSTeK Computer Inc. erklærer herved at denne enheten er i samsvar med hovedsaklige krav og andre relevante forskrifter i relaterte direktiver. Fullstendig tekst for EU-samsvarserklæringen finnes på: www.asus.com/support.

Polski Firma ASUSTeK Computer Inc. niniejszym oświadczą, że urządzenie to jest zgodne z zasadniczymi wymogami i innymi właściwymi postanowieniami powiązanych dyrektyw. Pełny tekst deklaracji zgodności UE jest dostępny pod adresem: www.asus.com/support.

Português A ASUSTeK Computer Inc. declara que este dispositivo está em conformidade com os requisitos essenciais e outras disposições relevantes das Diretivas relacionadas. Texto integral da declaração da UE disponível em: www.asus.com/support.

Română ASUSTeK Computer Inc. declară că acest dispozitiv se conformează cerințelor esențiale și altor prevederi relevante ale directivelor conexe. Textul complet al declarației de conformitate a Uniunii Europene se găsește la: www.asus.com/support.

Srpski ASUSTeK Computer Inc. ovim izjavljuje da je ovaj uređaj u saglasnosti sa osnovnim zahtevima i drugim relevantnim odredbama povezanih Direktiva. Pun tekst EU deklaracije o usaglasnosti je dostupan da adres: www.asus.com/support.

Slovensky Spoločnosť ASUSTeK Computer Inc. týmto vyhlasuje, že toto zariadenie vyhovuje základným požiadavkám a ostatným príslušným ustanoveniam príslušných smerníc. Celý text vyhlásenia o zhode pre štáty EÚ je dostupný na adrese: www.asus.com/support.

Slovenščina ASUSTeK Computer Inc. izjavlja, da je ta naprava skladna z bistvenimi zahtevami in drugimi ustreznimi določbami povezanih direktiv. Celotno besedilo EU-izjave o skladnosti je na voljo na spletnem mestu: www.asus.com/support.

Español Por la presente, ASUSTeK Computer Inc. declara que este dispositivo cumple los requisitos básicos y otras disposiciones pertinentes de las directivas relacionadas. El texto completo de la declaración de la UE de conformidad está disponible en: www.asus.com/support.

Svenska ASUSTeK Computer Inc. förklarar härmed att denna enhet överensstämmer med de grundläggande kraven och andra relevanta föreskrifter i relaterade direktiv. Fulltext av EU-försäkran om överensstämmelse finns på: www.asus.com/support.

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 Yönergelere diğer ilgili koşullarla 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

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