



V1605I-IM-A

R1505I-IM-A

User Manual

E23511

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About this manual

This manual provides information about the hardware and software features of your Industrial motherboard, organized through the following chapters:

Chapter 1: Specifications Summary

This chapter details the hardware and software features of your Industrial motherboard.

Chapter 2: Product Introduction

This chapter describes the features of the motherboard. It includes description of the connectors, and I/O ports on the motherboard.

Chapter 3: Upgrading your Industrial motherboard

This chapter provides you with information on how to upgrade the memory modules, wireless modules, and hard disk drive / solid state drive of your Industrial motherboard.

Chapter 4: BIOS Setup

This chapter tells how to change system settings through the BIOS Setup menus. Detailed descriptions of the BIOS parameters are also provided.

Appendix

This section includes notices and safety statements your Industrial motherboard.

Conventions used in this manual

To highlight key information in this manual, some text are presented as follows:

IMPORTANT! This message contains vital information that must be followed to complete a task.

NOTE: This message contains additional information and tips that can help complete tasks.

WARNING! This message contains important information that must be followed to keep you safe while performing certain tasks and prevent damage to your Industrial motherboard's data and components.

Typography

Bold text

Indicates a menu or an item to select.

Italic

This indicates sections that you can refer to in this manual.

Package contents

Your Industrial motherboard package contains the following items:

- 1 x V1605I-IM-A / R1505I-IM-A industrial motherboard
- 1 x Fansink
- 1 x SATA 6G cable
- 1 x M.2 screw pack
- 1 x I/O shield
- 1 x Fansink backplane

NOTE:

- Some bundled accessories may vary with different models. For details on these accessories, refer to their respective user manuals.
 - The device illustration is for reference only. Actual product specifications may vary with models.
 - If the device or its components fail or malfunction during normal and proper use within the warranty period, bring the warranty card to the ASUS Service Center for replacement of the defective components.
-

1

Specifications Summary

V1605I-IM-A / R1505I-IM-A

Specifications Summary

		V1605I-IM-A	R1505I-IM-A
Processor	CPU	AMD Ryzen™ Embedded V1605B APUs 2GHz Quad-core	AMD Ryzen™ Embedded R1505G APUs 2.4GHz Dual-core
	Chipset	Integrated	
Memory	Technology	DDR4 2400MHz, ECC support	
	Max.	32GB	
	Socket	2 x SO DIMM	
Graphics	Display Port	3 x DP++ supports DisplayPort 1.4 with max. resolution 4096 x 2160 @ 60 Hz 1 x DP++ supports DisplayPort 1.4 with max. resolution 4096 x 2160 @ 60 Hz (Optional, shared with LVDS and eDP)	2 x DP++ supports DisplayPort 1.4 with max. resolution 4096 x 2160 @ 60 Hz 1 x DP++ supports DisplayPort 1.4 with max. resolution 4096 x 2160 @ 60 Hz (Optional, shared with LVDS and eDP)
	LVDS (default option)	1 x LVDS supports LVDS with max. resolution 1920 x 1200 @ 60 Hz (Optional, shared with DisplayPort1 and eDP)	
	eDP (optional)	1 x eDP supports eDP 1.4 with max. resolution 3840 x 2160 @ 60 Hz (Optional, shared with DisplayPort1 and LVDS)	
	Multi Display	4 DP / 3 DP + eDP / 3 DP + LVDS Multi VGA output support: DP/ eDP / LVDS ports Supports up to 4 displays simultaneous under OS	2DP + LVDS / 2DP + eDP / 3DP (DP3 is not supported) Multi VGA output support: DP/ eDP / LVDS ports Supports up to 3 displays simultaneous under OS
Expansion slot	PCIe	1x PCIe 3.0 x8 slot (support x8 interface)	1x PCIe 3.0 x8 slot (support x4 interface)

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		V1605I-IM-A	R1505I-IM-A
Expansion slot	M.2	1 x M.2 (key B 2242 / 2260 / 2280) PCIe x2 (NVME) / SATA / USB mode for storage / 3G / LTE cat6 (USB3.2 Gen1) mechanical support for module sizes: - 3042 (width up to 30 mm) - 2260 (width up to 22 mm) - 2280 (width up to 22 mm) 1x M.2 E key for PCIe / USB 2.0 support - 2230 (width up to 22 mm)	1 x M.2 (key B 2242 / 2260 / 2280) PCIe x2 (NVME) / SATA / USB mode for storage / 3G / LTE cat4 (USB2.0) mechanical support for module sizes: - 3042 (width up to 30 mm) - 2260 (width up to 22 mm) - 2280 (width up to 22 mm)
Ethernet	Speed	10/100/1000Mbps	
	Controller	2 x Realtek® 8111H	
	Connector	2 x RJ45	
Audio	Codec	Realtek® ALC887 codec	
	Connector	2 x Audio jacks (1 x Mic in, 1 x Line out) 2 x 2W Stereo Speaker output 1 x 5.1 channel (Internal pin header)	
Storage		Option 1 (Default): - 1 x SATA port Gen 3.0, up to 6Gb/s - 1 x M.2 (Key B, 2242 / 2260 / 2280) PCIe x2 and SATA mode* - 1 x CFAST* * If CFAST is enabled, M.2 SATA mode will be disabled, and vice versa. You may configure this setting in the BIOS. Option 2 (per request): - 2 x SATA port Gen 3.0, up to 6Gb/s - 1 x M.2 (Key B, 2242 / 2260 / 2280) PCIe x2	

(continued on the next page)

	V1605I-IM-A	R1505I-IM-A
Rear I/O Display	3 x DisplayPorts 1 x Additional display output port (LVDS*, DisplayPort, or eDP) 2 x USB 3.2 Gen 2 Type A ports 2 x USB 2.0 ports 2 x Ethernet ports 2 x COM connectors (RS232 / 422 / 485) 1 x Mic in + Line out jack 1 x DC-in jack * Default option.	2 x DisplayPorts 1 x Additional display output port (LVDS*, DisplayPort, or eDP) 2 x USB 3.2 Gen 2 Type A ports 2 x USB 2.0 ports 2 x Ethernet ports 2 x COM connectors (RS232 / 422 / 485) 1 x Mic in + Line out jack 1 x DC-in jack * Default option.
Internal Connector	4 x Serial ports (RS-232), COM3 supports cctalk & COM4 supports TTL (optional) 1 x USB 3.2 Gen 1 Type A vertical connector 1 x USB 2.0 header (supports additional 2 x USB 2.0 connectors) 1 x CPU Fan connector (PWM Mode) 1 x Chassis Fan header (PWM Mode) 1 x Chassis Intrusion header 2 x Front Panel Audio header (AAFP) 1 x System Panel header 1 x Clear CMOS jumper 2 x SATA power headers 1 x LPC Debug header 1 x S/PDIF header	4 x Serial ports (RS-232), COM3 supports cctalk & COM4 supports TTL (optoinal) 1 x USB 2.0 Type A vertical connector 1 x USB 2.0 header (supports additional 2 x USB 2.0 connectors) 1 x CPU Fan connector (PWM Mode) 1 x Chassis Fan header (PWM Mode) 1 x Chassis Intrusion header 2 x Front Panel Audio header (AAFP) 1 x System Panel header 1 x Clear CMOS jumper 2 x SATA power headers 1 x LPC Debug header 1 x S/PDIF header

(continued on the next page)

		V1605I-IM-A	R1505I-IM-A
Internal Connector		1 x I ² C header 1 x GPIO header 1 x AT/ATX Select header 1 x 4-pin Power connector	1 x I ² C header 1 x GPIO header 1 x AT/ATX Select header 1 x 4-pin Power connector
Watchdog Timer (H/W)		Yes	
Security	TPM	1 x SPI TPM header	
Power	Power Type	DC-in (ATX and AT mode supported)	
	Voltage	DC-in 12V ~ 24V	
Operating System		Microsoft Windows Windows® 10 (64-bit) / Win10 IoT Enterprise Linux Ubuntu, RedHat Enterprise, Fedora Workstation, OpenSUSE	
Environment		Operating Temperature: 0~60° C Non-Operating Temperature: -40~85° C Relative Humidity: 0%~85%	
Dimension	Form Factor	Mini-ITX, 170 x 170 mm	
Certification	Safety	CE, FCC	

NOTE: Specifications are subject to change without notice.

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

2

Product Introduction

2.1 Before you proceed

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

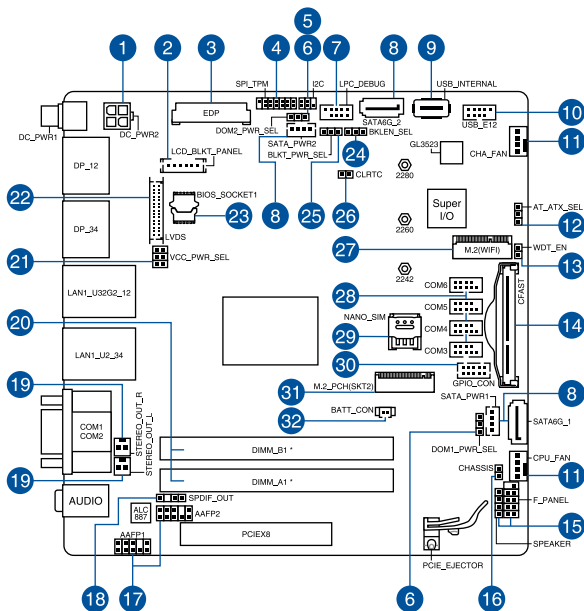
NOTE: The diagrams in this chapter are for reference only. The motherboard layout may vary with models.

IMPORTANT! Components shown in this section may require additional purchase. Refer to **Package contents** section for more information about the contents of your Industrial motherboard package.

WARNING!

- 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, ensure that the ATX power supply is switched off or the power cord is detached from the power supply. Failure to do so may cause severe damage to the motherboard, peripherals, or components.
-

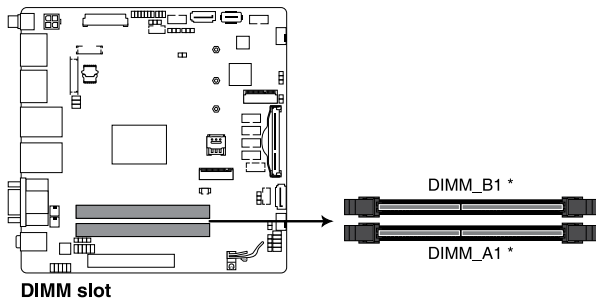
2.2 Motherboard layout



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2.3 System memory

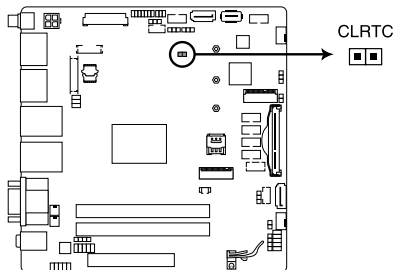
The motherboard comes with two (2) Small Outline Dual Inline Memory Module (SODIMM) slot designed for DDR4 memory modules.



2.4 Onboard jumpers

1. Clear RTC RAM jumper

The Clear RTC RAM 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.



Clear CMOS jumper

To erase the RTC RAM:

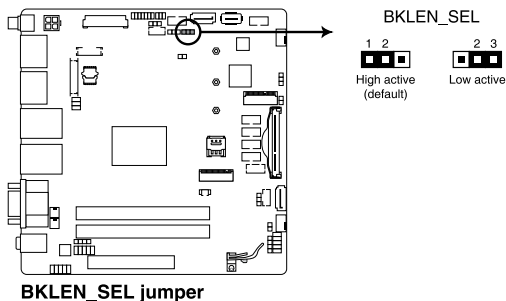
1. Turn OFF the computer and unplug the power cord.
2. Short-circuit pin 1-2 with a metal object or jumper cap for about 5-10 seconds.
3. Plug the power cord and turn ON the computer.
4. Hold down the key during the boot process and enter BIOS setup to re-enter data.

WARNING! DO NOT remove the jumper cap from its default position except when clearing the RTC RAM. Removing the jumper cap will cause system boot failure!

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

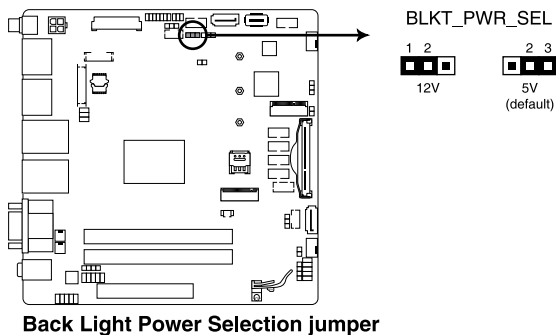
2. Back Light Power Enable Mode jumper

The Back Light Power Enable Mode jumper allow you to select the High/Low active for the LVDS power enable.



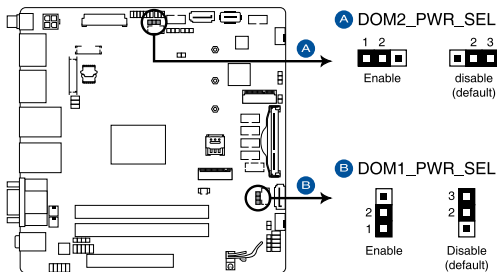
3. Back Light Power Selection jumper

The Back Light Power Selection jumper allows you to select the voltage for the LVDS back light module.



4. SATADOM Power jumper

Set to pin 1-2 to enable SATA DOM power to support SATADOM device.

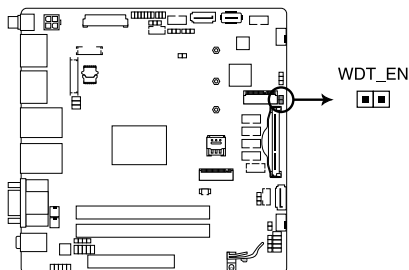


SATADOM Power jumper

NOTE: Only set the pins to 1-2 when using a SATA DOM device.

5. HW WDT Enable jumper

A watchdog timer is an electronic timer that is used to detect and recover from computer malfunctions. The HW WDT (watchdog timer) Enable jumper allows the HW watchdog resets the system automatically even when the system crashes.

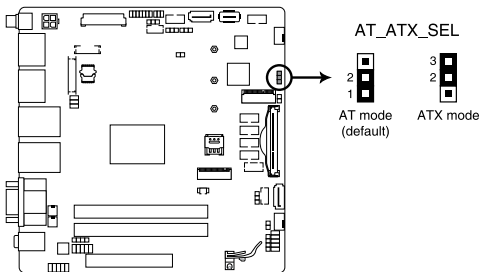


HW WDT Enable jumper

NOTE: The default setting for this jumper is set to HW WDT enabled with a jumper cap attached.

6. AT/ATX Mode Configuration jumper

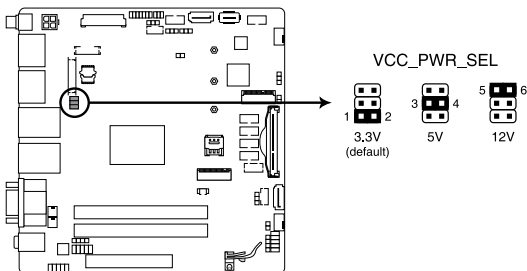
The AT/ATX Mode Configuration jumper allows you to switch between AT or ATX modes. The default setting for this jumper is set to AT mode with a jumper on pins 1-2, to switch to ATX mode move the jumper to pins 2-3.



AT/ATX Mode Selection jumper

7. Display Panel VCC Power Selection jumper

The Display Panel VCC Power Selection jumper allows you to select the voltage for the panel power.

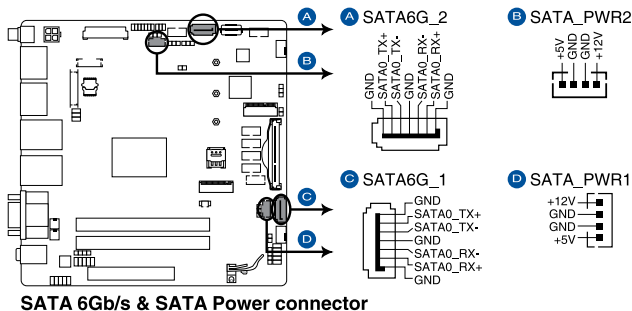


Display Panel VCC Power Selection jumper

2.5 Internal connectors

1. SATA 6Gb/s & SATA Power connector

The SATA 6Gb/s and SATA Power connectors allow you to connect SATA devices such as optical disc drives and hard disk drives via a SATA cable and power cable.



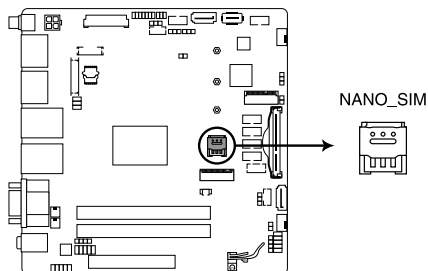
Connector type

Wafer HD 4P, 2.0mm pitch

NOTE: Ensure to use the bundled cable when connecting a storage device to this connector.

2. Nano SIM Card slot

The Nano SIM Card slot allows you to install a Nano SIM card.

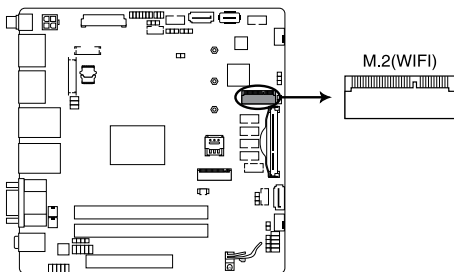


Nano SIM Card slot

NOTE: The Nano SIM card is purchased separately.

3. M.2 Wi-Fi slot

The M.2 Wi-Fi slot allows you to install an M.2 Wi-Fi module (E-key, type 2230).



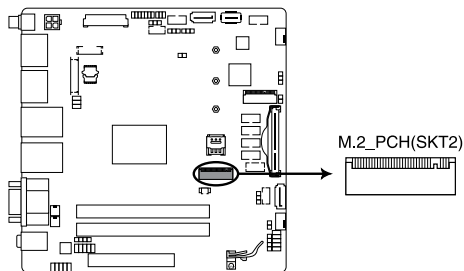
M.2 Wi-Fi slot

NOTE:

- The M.2 Wi-Fi module is purchased separately.
 - We recommend using a PH1 screwdriver with a torque of 2.0 ± 0.2 kgf-cm when tightening the screw.
-

4. M.2 B-Key slot

The M.2 B-Key slot allows you to install a 2242, 2260, or 2280 M.2 devices such as 2242, 2260, or 2280 M.2 SSD modules.



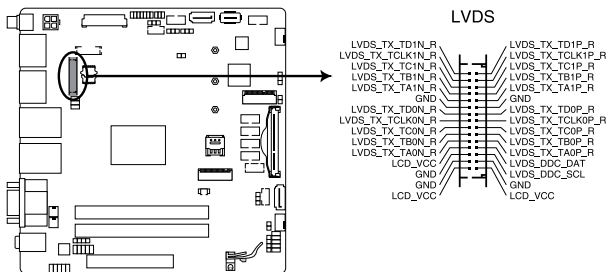
M.2 B-Key slot

NOTE:

- The M.2 SSD module is purchased separately.
 - We recommend using a PH1 screwdriver with a torque of 2.0 ± 0.2 kgf-cm when tightening the screw.
-

5. LVDS connector

The LVDS connector allows you to connect a LCD monitor that supports a Low-voltage Differential Signaling (LVDS) interface.



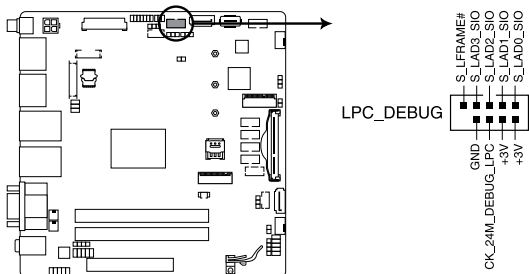
LVDS connector

Connector type

WAFER HD 2X15P 1.25MM pitch

6. Low Pin Count connector

The Low Pin Count connector allows you to connect a low pin count (LPC) debug card that offers a faster, more efficient motherboard troubleshooting solution. When connected to a debug card, users can view error and debugging codes on the card and get a better idea of initialization and recovery processes.



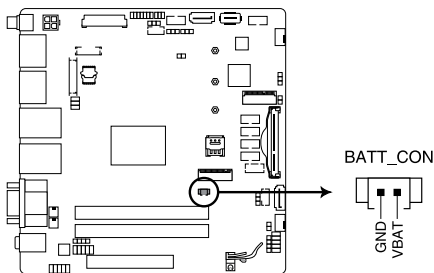
Low Pin Count connector

Connector type

BOX header 2x5p, K10, 2.0mm pitch

7. Battery connector

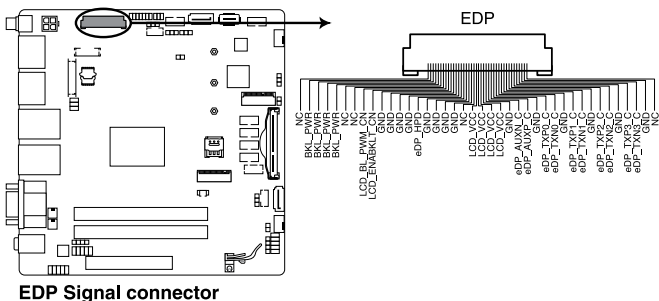
The Battery connector allows you to connect the lithium CMOS battery.



Battery connector

8. EDP Signal connector (on selected models)

The EDP Signal connector allows you to connect an internal embedded DisplayPort.

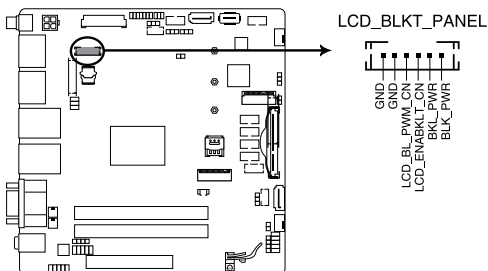


Connector type

WtoB CON 40P 0.5MM,R/A
ACES/88341-4001

9. Flat panel display brightness connector

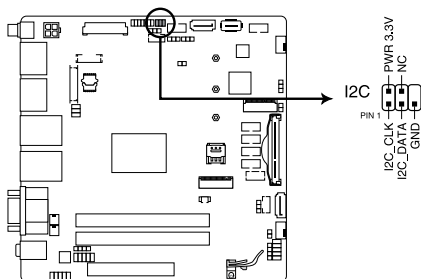
This connector is for the LCD panel brightness controls



Flat panel display brightness connector

10. I²C header

The I²C (Inter-Integrated Circuit) connector allows you to connect an I²C compatible IoT security module.



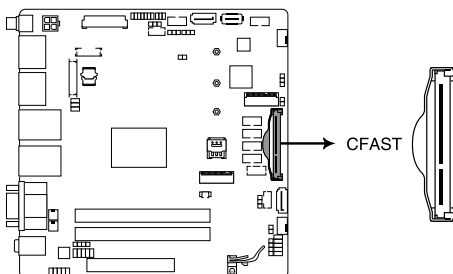
Inter-Integrated Circuit connector

Connector type

Header 2x3p, K6, 2.0mm pitch

11. CFAST connector

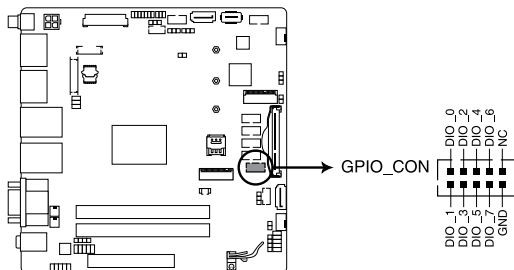
The CFAST connector allows you to install an CFAST card.



CFAST connector

12. GPIO connector

The GPIO connector allows you to connect a general purpose input/output module which allows you to customize the digital signal input/output.



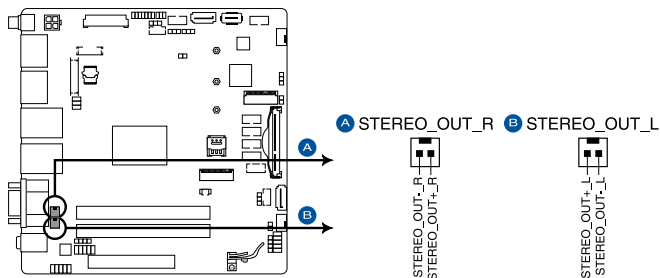
GPIO connector

Connector type

BOX header 2x5p, 2.0mm pitch

13. Stereo Out header

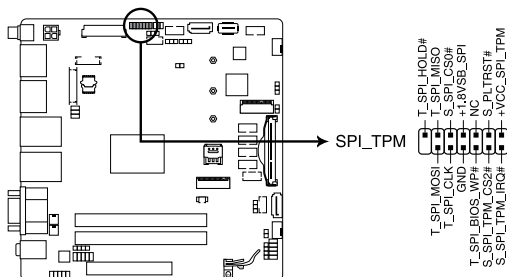
The Stereo Out header is for the Stereo speaker. This header supports 2W @ 4Ω stereo speakers.



Stereo Out header

14. SPI TPM connector

The SPI TPM connector supports a Trusted Platform Module (TPM) system, which can securely store keys, digital certificates, passwords, and data. A TPM system also helps enhance network security, protects digital identities, and ensures platform integrity.



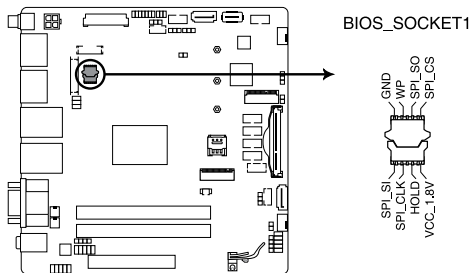
SPI TPM connector

Connector type

Header 2x7p,K14, 2.0mm pitch

15. BIOS socket

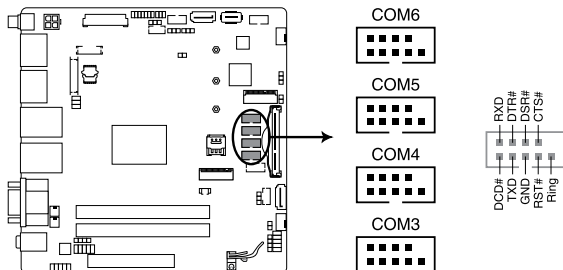
The BIOS socket is for replacing the BIOS flash.



BIOS socket

16. Serial Port connector

The Serial (COM) Port connector allows you to connect a serial port module. Connect the serial port module cable to this connector, then install the module to a slot opening on the system chassis.



Serial Port connector

Connector type

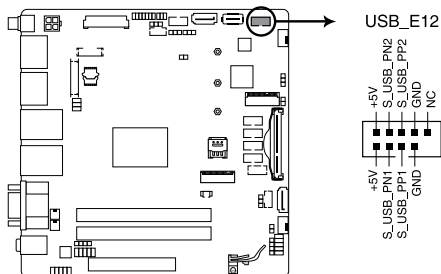
BOX header 2x5p, K10, 2.0mm pitch

NOTE:

- The serial port module is purchased separately.
- **COM1** and **COM2** support RS-232/422/485.
- **COM 3**, **COM4**, **COM5**, and **COM6** support RS-232.

17. USB 2.0 header

The USB 2.0 header allows you to connect a USB module for additional USB 2.0 ports. The USB 2.0 connector provides data transfer speeds of up to 480 MB/s connection speed.



USB 2.0 connector

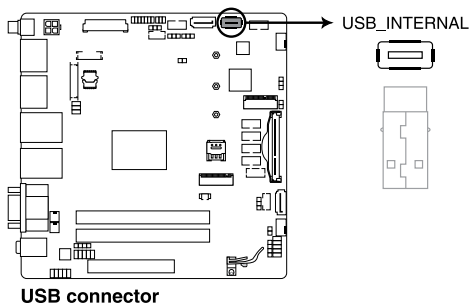
Connector type
BOX header 2x5p, K9, 2.0mm pitch

WARNING! DO NOT connect a 1394 cable to the USB connectors. Doing so will damage the motherboard!

NOTE: The USB 2.0 module is purchased separately.

18. Internal USB Type-A connector

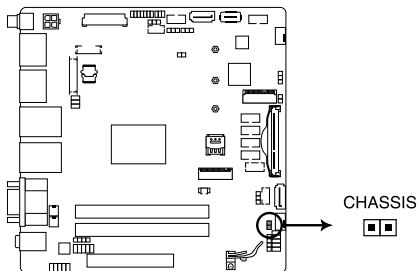
The USB port may vary between models. For V1605I-IM-AA this port will be USB 3.2 Gen 1, whilst for R1505I-IM-AA this port will be USB 2.0.



NOTE: This port may vary between models

19. Chassis Intrusion connector

The Chassis Intrusion connector allows you to connect a intrusion sensor or microswitch for the chassis intrusion detection feature. When you remove any chassis component, the sensor or microswitch triggers and sends a high level signal and records a chassis intrusion event.

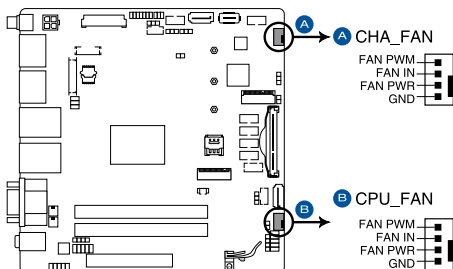


Chassis Intruder connector

NOTE: By default, a jumper cap that disables the intrusion detection feature is installed on the connector to prevent accidental triggers.

20. Fan header

The Fan header allows you to connect a fan to cool the system.



Fan connector

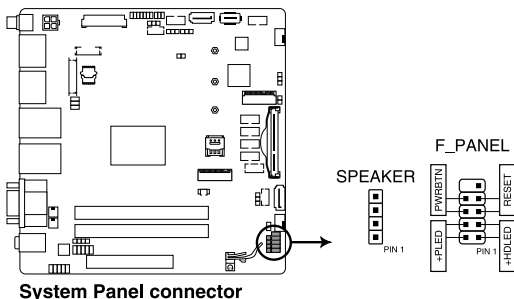
Connector type	WAFER HD 4P 2.54mm pitch
----------------	--------------------------

WARNING!

- DO NOT forget to connect the fan cable to the fan header. Insufficient air flow inside the system may damage the motherboard components. These are not jumpers! Do not place jumper caps on the fan headers!
- Ensure the cable is fully inserted into the header.

21. System Panel header

The System Panel header supports several chassis-mounted functions.



System Panel connector

Connector type

HD 2X5P K10 2.54mm pitch

- **System Power LED header (PLED)**

The 2-pin header allows you to connect the System Power LED. The System Power LED lights up when the system is connected to a power source, or when you turn on the system power, and blinks when the system is in sleep mode.

- **Storage Device Activity LED header (HLED)**

The 2-pin header allows you to connect the Storage Device Activity LED. The Storage Device Activity LED lights up or blinks when data is read from or written to the storage device or storage device add-on card.

- **System Warning Speaker header (SPEAKER)**

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

(continued on the next page)

- **Power Button/Soft-off Button header (PWRBTN)**

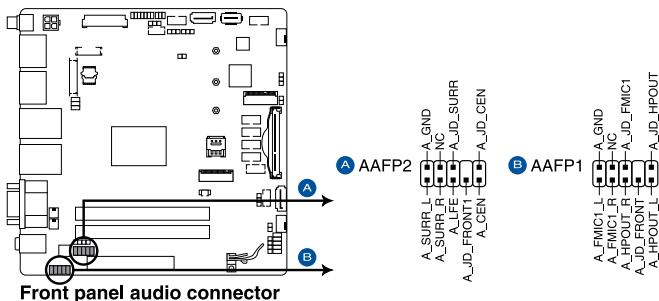
The 3-1 pin header allows you to connect the system power button. Press the power button to power up the system, or put the system into sleep or soft-off mode (depending on the operating system settings).

- **Reset button header (RESET)**

The 2-pin header allows you to connect the chassis-mounted reset button. Press the reset button to reboot the system.

22. Front panel audio connector

The connector 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 connector.

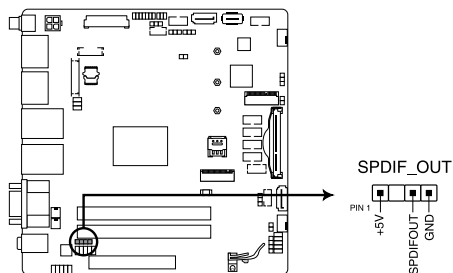


Connector type

Header 2x5p, K8, 2.54mm pitch

23. Digital Audio header

The Digital Audio header allows you to connect the Sony/Philips Digital Interface (S/PDIF) Out module.

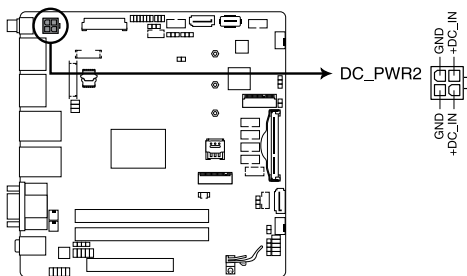


Digital Audio header

NOTE: The S/PDIF module is purchased separately.

24. DC-in 4-Pin Power connector

The DC-in 4-pin Power connector is for DC power input. Using a compatible power cable and power board.



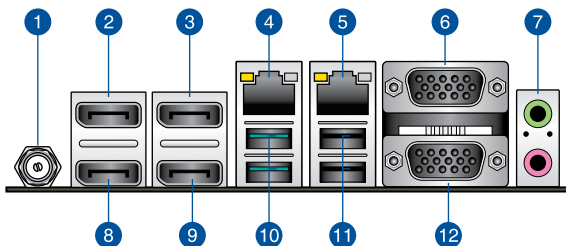
DC-in 4-pin Power connector

Connector type	POWER CON 4P W/P
-----------------------	------------------

WARNING! Only connect a single power connector (**DC_PWR2** or **DC_PWR1 power input**) at a time, connecting both power connectors at the same time may cause damage to your Industrial motherboard.

2.6 I/O connectors

Front panel



Front panel connectors

- | | |
|-----|---|
| 1. | Power input |
| 2. | DisplayPort 1 (this port shares signal with the optional eDP and optional LVDS, if either of those were selected, this port will be disabled) |
| 3. | DisplayPort 3 (on selected models) |
| 4. | LAN (RJ-45) ports |
| 5. | LAN (RJ-45) ports |
| 6. | COM connectors (RS232 / 422 / 485) |
| 7. | Line out and Mic in jacks |
| 8. | DisplayPort 2 |
| 9. | DisplayPort 4 |
| 10. | USB 3.2 Gen 2 Type A ports |
| 11. | USB 2.0 ports |
| 12. | COM connectors (RS232 / 422 / 485) |

3

***Upgrading your Industrial
motherboard***

IMPORTANT!

- Ensure that your hands are dry before proceeding with the rest of the installation process. Before installing any of the features in this guide, use a grounded wrist strap or touch a safely grounded object or metal object to avoid damaging them due to static electricity.
 - Turn off the power of your Industrial motherboard, and allow it to cool for at least 10 minutes before performing any installation/uninstallation process.
-

NOTE: The illustrations in this section are for reference only. The slots may vary depending on model.

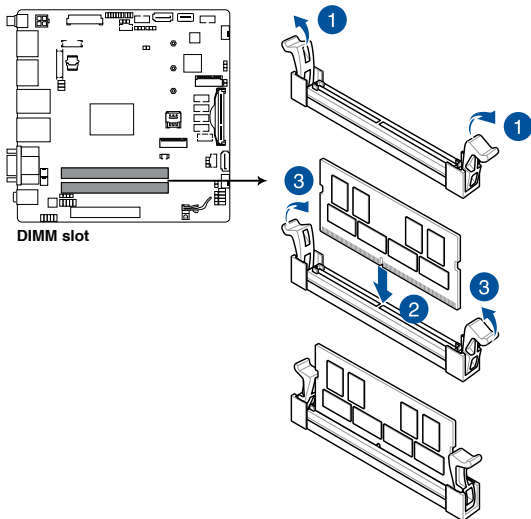
3.1 Installing memory modules

Your motherboard comes with a SO-DIMM memory slot that allow you to install a DDR4 SO-DIMM.

1. Press the retaining clips outward to unlock the memory slot.
2. Align a memory module to the slot such that the notch on the memory module matches the memory slot key on the socket.

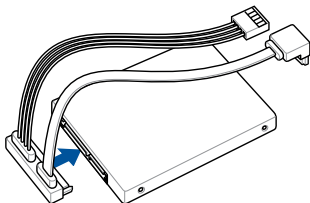
NOTE: A memory module is keyed with a notch so that it fits in only one direction. DO NOT force a memory module into a slot in the wrong direction to avoid damaging the memory module.

3. Push the memory module into the memory slot until both retaining clips snap back into place to ensure the memory module is securely seated in place.

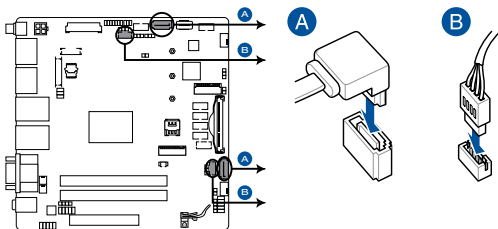


3.2 Installing 2.5" storage device

1. Connect the storage device cable to the storage device.



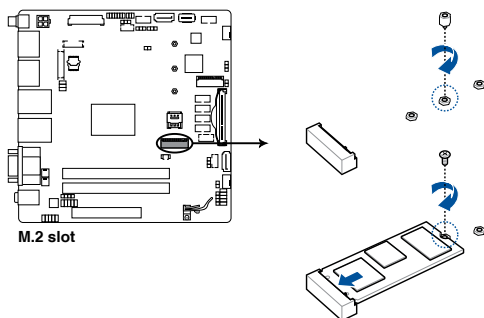
2. Connect the storage device cable to the **SATA6G** and **SATA_PWR** connectors on the motherboard.



3.3 Installing an M.2 SSD

1. Install the stand screw.
2. Align and insert the M.2 SSD into its slot inside the Industrial motherboard, then gently push down the M.2 SSD on top of the stand screw hole and fasten it using a screw.

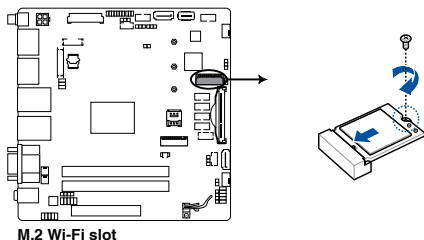
NOTE: We recommend using a PH1 screwdriver with a torque of 2.0 ± 0.2 kgf-cm when tightening the screw.



3.4 Installing the wireless card

1. Remove the M.2 stand screw.
2. Align and insert the wireless card into its slot on the motherboard, then gently push down the wireless card on top of the screw hole and fasten it using the previously removed stand screw.

NOTE: We recommend using a PH1 screwdriver with a torque of 2.0 ± 0.2 kgf-cm when tightening the screw.



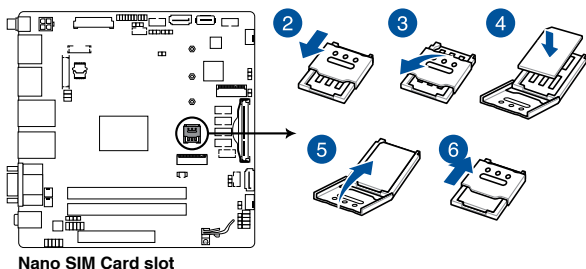
3. (optional) Connect the antennas to your wireless card.

NOTE:

- Connecting antennas to your wireless card may strengthen the wireless signal.
 - A soft clicking sound indicates that the antenna has been securely attached on the wireless card.
 - The antennas are purchased separately.
-

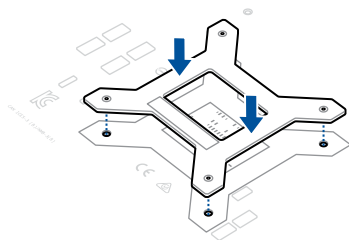
3.5 Installing a Nano SIM card

1. (optional) Remove the Mini PCIe card if there is a Mini PCIe card installed by removing the two (2) screws securing the Mini PCIe card first, then removing the Mini PCIe card.
2. Push the Nano SIM cover in the direction shown in the illustration.
3. Lift the Nano SIM cover.
4. Place the Nano SIM into the Nano SIM slot.
5. Replace the Nano SIM cover.
6. Push the Nano SIM cover back to secure the Nano SIM card.



3.6 Installing the backplane

1. Prepare the bundled backplane.
2. Peel off the plastic film from the bottom of the backplane.
3. Flip your Industrial motherboard over, then orient and align the backplane so that the backplane is within the backplane guidelines on the Industrial motherboard.
4. Place the adhesive side of the backplane onto the Industrial motherboard.



4

BIOS Setup

4.1 Getting to know your BIOS

The BIOS (Basic Input and Output System) stores system hardware settings such as Storage Device Configuration, Advanced Power Management, and Boot Device Configuration that are needed for system startup. Under normal circumstances, the default BIOS settings apply to most conditions to ensure optimal performance. DO NOT change the default BIOS settings except in the following circumstances:

- An error message appears on the screen during the system bootup and requests you to run the BIOS setup.
- You have installed a new system component that requires further BIOS settings or update.

WARNING! Inappropriate BIOS settings may result to instability or boot failure. We strongly recommend that you change the BIOS settings only with the help of a trained service personnel.

NOTE:

- BIOS settings and options may vary due to different BIOS release versions or according to your motherboard. Please refer to the latest BIOS version for settings and options.
 - The BIOS setup screens shown in this chapter are for reference purposes only, and may not exactly match what you see on your screen.
-

4.2 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 <F2> during the Power-On Self Test (POST). If you do not press <Delete> or <F2>, POST continues with its routines.

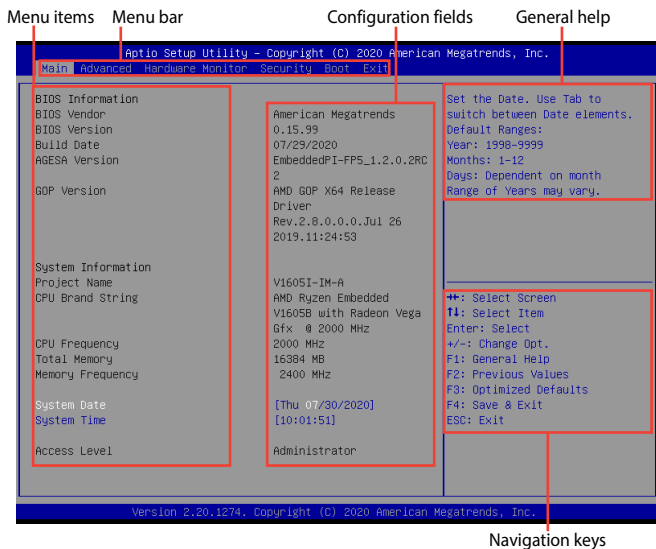
Entering BIOS Setup after POST

To enter BIOS Setup after POST:

- Press <Ctrl>+<Alt>+<Delete> simultaneously.
- 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 option.

BIOS menu screen

This section provides a brief introduction of the BIOS Interface of your Industrial motherboard.



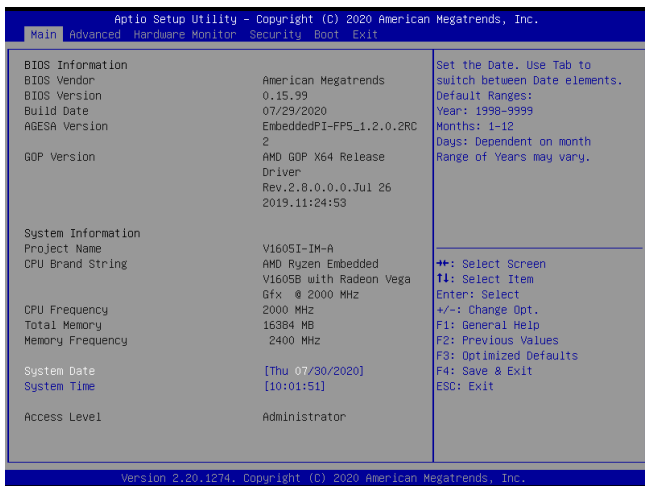
Menu bar

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, power status, and changing the fan settings.
Security	For changing the security settings
Boot	For changing the system boot configuration
Save & Exit	For selecting the save and exit options or loading default settings

4.3 Main Menu

When you enter the BIOS Setup program, the Main menu screen appears. The Main menu provides you an overview of the basic system information, and allows you to set the system date and time. Scroll down to display the other BIOS items.



System Date [Day xx/xx/xxxx]

Allows you to set the system date.

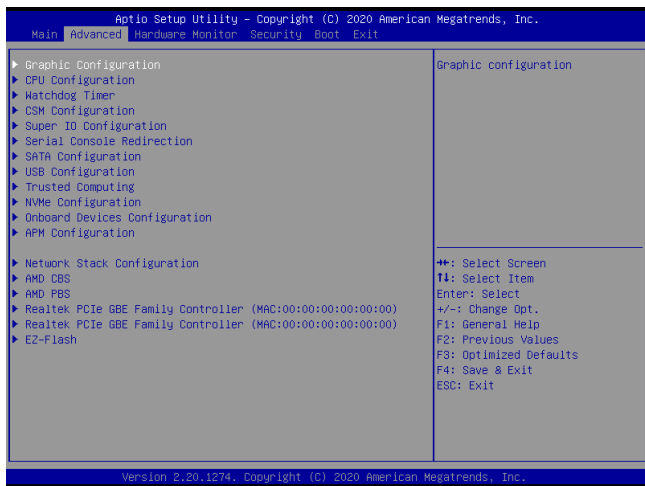
System Time [xx:xx:xx]

Allows you to set the system time.

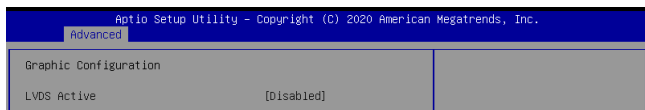
4.4 Advanced menu

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

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



4.4.1 Graphic Configuration



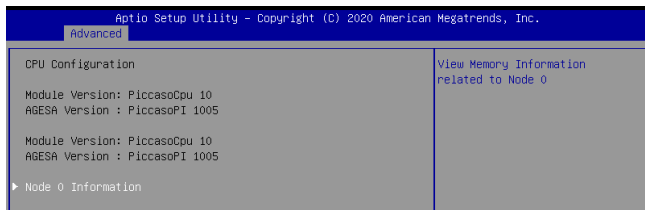
NOTE: The following item is only available when a LVDS monitor is connected.

LVDS Active

Configuration options: [Disabled] [Enabled]

4.4.2 CPU Configuration

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



Node 0 Information

Allows you to view memory information related to Node 0.

4.4.3 Watchdog Timer

Aptio Setup Utility - Copyright (C) 2020 American Megatrends, Inc.	
Advanced	
Watchdog Support [Disabled]	Enable/Disable Watchdog Support

Watchdog Support

Allows you to enable or disable Watchdog Support.

Configuration options: [Disabled] [Enabled]

NOTE: The following item appears only when **Watchdog Support** is set to **[Enabled]**.

Watchdog Timer

Allows you to input the Watchdog Timer | Time-out value in seconds.

4.4.4 CSM Configuration

Aptio Setup Utility - Copyright (C) 2020 American Megatrends, Inc.	
Advanced	
Compatibility Support Module Configuration CSM Support [Disabled]	Enable/Disable CSM Support.

CSM Support

Allows you to enable or disable the CSM Support.

Configuration options: [Disabled] [Enabled]

NOTE: The following items appear only when **CSM Support** is set to **[Enabled]**.

GateA20 Active

This allows you to set the GA20 option.

[Upon Request]	GA20 can be disabled using BIOS services.
[Always]	Do not allow disabling GA20; this option is useful when any RT code is executed above 1MB.

Boot Option filter

This option allows you to control the Legacy/UEFI ROMs priority.

Configuration options: [UEFI and Legacy] [Legacy only] [UEFI only]

Network / Storage / Video

This option allows you to control the execution of UEFI and Legacy PXE / Storage / Video OpROM.

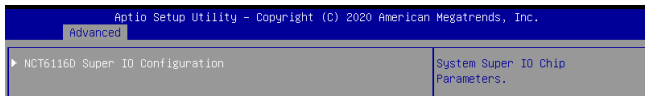
Configuration options: [Do not launch] [UEFI] [Legacy]

Other PCI devices

This item determines the OpROM execution policy for devices other than Network, Storage, or Video.

Configuration options: [Do not launch] [UEFI] [Legacy]

4.4.5 Super IO Configuration



NCT6116D Super IO Configuration

Serial Port 1-2 Configuration

Allows you to set the parameters of Serial Port 1-2.

Serial Port

Allows you to enable or disable Serial Port.

Configuration options: [Disabled] [Enabled]

NOTE: The following item appears only when **Serial Port** is set to **[Enabled]**.

Change Settings

Allows you to choose the setting for Super IO device.

Configuration options: [Auto] [IO=3F8h; IRQ=4;] [IO=3F8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;] [IO=2F8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;] [IO=3E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;] [IO=2E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;]

COM1-2 Control

Allows you to choose the COM1 mode.

Configuration options: [RS232] [RS485] [RS422]

Serial Port 3-6 Configuration

Allows you to set the parameters of Serial Port 3-6.

Serial Port

Allows you to enable or disable Serial Port.

Configuration options: [Disabled] [Enabled]

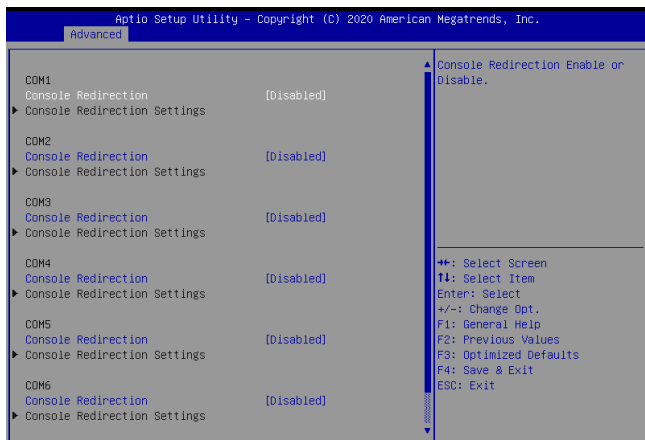
NOTE: The following item appears only when **Serial Port** is set to **[Enabled]**.

Change Settings

Allows you to choose the setting for Super IO device.

Configuration options: [Auto] [IO=3F8h; IRQ=4;] [IO=3F8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;] [IO=2F8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;] [IO=3E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;] [IO=2E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;]

4.4.6 Serial Console Redirection



COM1-6

Console Redirection

Allows you to enable or disable the console redirection feature.

Configuration options: [Disabled] [Enabled]

NOTE: The following item appears only when **Console Redirection** is set 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.

[VT100+] 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]

Legacy Console Redirection Settings

Redirection COM Port

Allows you to select a COM port to display redirection of Legacy OS and Legacy OPRM Messages.

Configuration options: [COM1] [COM2] [COM3] [COM4] [COM5] [COM6]

Resolution

This allows you to set the number of rows and columns supported on the Legacy OS.

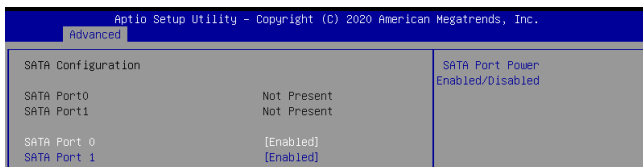
Configuration options: [80x24] [80x25]

Redirection After POST

[Always Enable] Legacy Console Redirection is enabled for legacy OS.

[Bootloader] Legacy Console Redirection is disabled before booting to legacy OS.

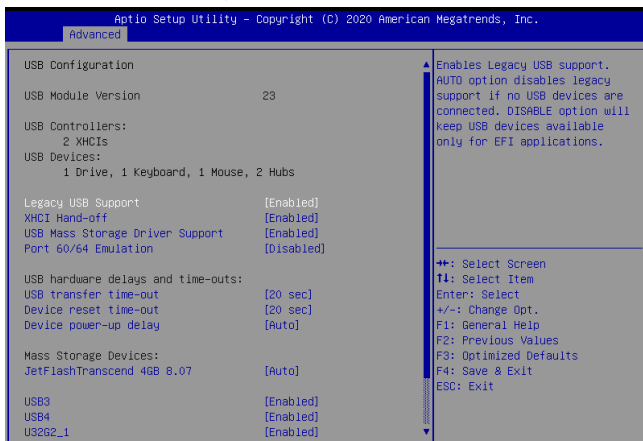
4.4.7 SATA Configuration



SATA Port 0-1

Allows you to enable or disable the SATA port power.
Configuration options: [Disabled] [Enabled]

4.4.8 USB Configuration



NOTE: The **USB Devices** item shows the auto-detected values. If no USB device is detected, the item shows **None**.

Legacy USB Support

- [Disabled] The USB devices can be used only for the BIOS setup program. It cannot be recognized in boot devices list.
- [Enabled] Enables the support for USB devices on legacy operating systems (OS).
- [Auto] Allows the system to detect the presence of USB devices at startup. If detected, the USB controller legacy mode is enabled. If no USB device is detected, the legacy USB support is disabled.

XHCI Hand-off

NOTE: This item is set to **[Disabled]** by default for the EHCI (enhanced host controller interface) support by XHCI drivers in operating systems.

- [Disabled] Support XHCI by XHCI drivers for operating systems with XHCI support.
- [Enabled] Support XHCI by BIOS for operating systems without XHCI support.

USB Mass Storage Driver Support

Allows you to enable or disable the USB Mass Storage driver support.
Configuration options: [Disabled] [Enabled]

Port 60/64 Emulation

Allows you to enable or disable I/O port 60h/64h emulation support. This should be enabled for the complete keyboard legacy support for non-USB aware OSes.
onfiguration options: [Disabled] [Enabled]

USB hardware delays and time-outs

USB transfer time-out

Allows you to select time-out value for Control, Bulk, and Interrupt transfers.
Configuration options: [1 sec] [5 sec] [10 sec] [20 sec]

Device reset time-out

Allows you to select time-out value for USB mass storage device Start Unit command.

Configuration options: [10 sec] [20 sec] [30 sec] [40 sec]

Device power-up delay

Allows you to select maximum time the device will take before it properly reports itself to the Host Controller. **[Auto]** uses the default value, for a Root port, it is 100 ms. For a Hub port, the delay is taken from Hub descriptor.

Configuration options: [Auto] [Manual]

NOTE: The following item appears only when **Device power-up delay** is set to **[Manual]**.

Device power-up delay in seconds

Allows you to set the device power-up delay in seconds. Use the <+> or <-> to adjust the value. The values range from 1 to 40.

USB3

Allows you to enable or disable this port.

Configuration options: [Disabled] [Enabled]

USB4

Allows you to enable or disable this port.

Configuration options: [Disabled] [Enabled]

U32G2_1

Allows you to enable or disable this port.

Configuration options: [Disabled] [Enabled]

U32G2_2

Allows you to enable or disable this port.

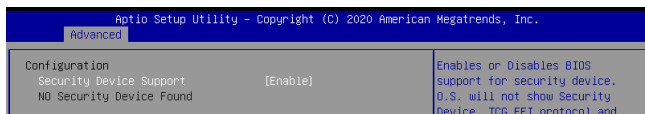
Configuration options: [Disabled] [Enabled]

USB_INTERNAL/USB_E1/USB_E2

Allows you to enable or disable this port.

Configuration options: [Disabled] [Enabled]

4.4.9 Trusted Computing



Security Device Support

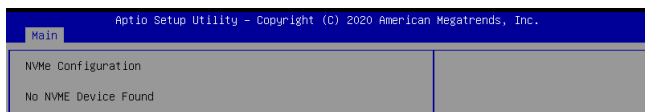
Allows you to enable or disable the BIOS support for security device.

Configuration options: [Disable] [Enable]

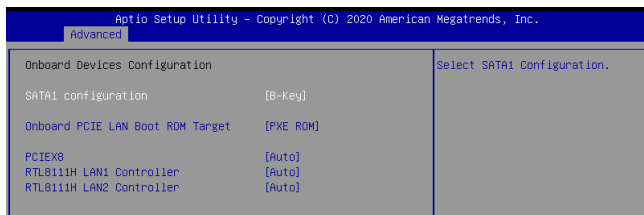
NOTE: OS will not show Security Device. TCG EFI protocol and INT1A interface will not be available.

4.4.10 NVMe Configuration

This page will display the NVMe controller and drive information.



4.4.11 Onboard Devices Configuration



SATA1 configuration

This item allows you to set the SATA1 configuration.

Configuration option: [CFAST] [B-Key]

Onboard PCIE LAN Boot ROM Target

Allows you to select the Onboard PCIE LAN Boot ROM target.

Configuration options: [Disabled] [PXE ROM] [iSCSI]

PCIEX8

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

RTL8111H LAN1 Controller

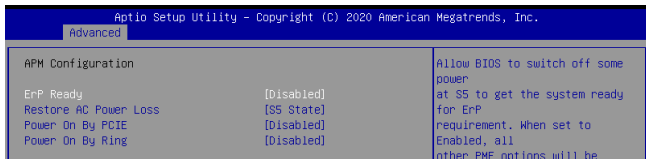
Configuration options: [Auto] [Disabled] [Enabled]

RTL8111H LAN2 Controller

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

4.4.12 APM Configuration

Allows you to configure the Advance Power Management (APM) settings.



ErP Ready

Allows you to switch off some power at S4+S5 or 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(S4+S5)] [Enabled(S5)]

Restore AC Power Loss

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

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

Power On By PCI-E

Allows you to enable or disable the wake-on-LAN function for the onboard LAN controller or other installed PCI-E LAN cards.

Configuration options: [Disabled] [Enabled]

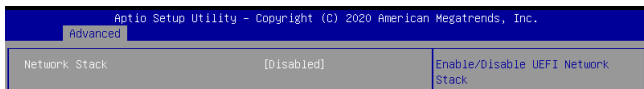
Power On By Ring

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

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

4.4.13 Network Stack Configuration

Allows you to configure the network stack configuration.



Network Stack

Allows you to enable or disable UEFI Network Stack.

Configuration options: [Disabled] [Enabled]

NOTE: The following items appear only when **Network Stack** is set to **[Enabled]**.

Ipv4 PXE Support

Enables or disables the Ipv4 PXE Boot Support. If disabled, Ipv4 PXE boot option will not be created.

Configuration options: [Disabled] [Enabled]

Ipv4 HTTP Support

Enables or disables the Ipv4 HTTP Boot Support. If disabled, Ipv4 HTTP boot option will not be created.

Configuration options: [Disabled] [Enabled]

Ipv6 PXE Support

Enables or disables the Ipv6 PXE Boot Support. If disabled, Ipv6 PXE boot option will not be created.

Configuration options: [Disabled] [Enabled]

Ipv6 HTTP Support

Enables or disables the Ipv6 HTTP Boot Support. If disabled, Ipv6 HTTP boot option will not be created.

Configuration options: [Disabled] [Enabled]

PXE boot wait time

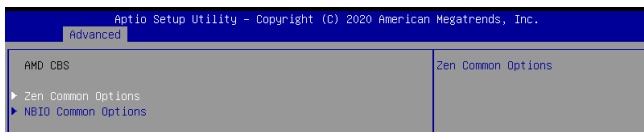
Wait time to press ESC key to abort the PXE boot.

Media detect time

Wait time (in seconds) to detect media.

4.4.14 AMD CBS

The items in this menu shows the AMD Common BIOS Specifications.



Zen Common Options

Core Performance Boost

Configuration options: [Disabled] [Auto]

Global C-state Control

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

Core/Thread Enhancement

This item allows you to set core/threads.

Warning! S3 is not supported on systems where cores/threads have been removed/disabled.

NBIO Common Options

GFX Configuration

Integrated Graphics Controller

This item allows you to enable or disable Integrated Graphics controller.
Configuration options: [Disabled] [Forces] [Auto]

NOTE: The following items appear only when **Integrated Graphics Controller** is set to [Forces].

UMA Mode

Configuration options: [Auto] [UMA_SPECIFIED] [UMA_AUTO]

UMA Version

Configuration options: [Legacy] [Non-Legacy] [Hybrid Secure] [Auto]

UMA Above 4G

If requested UMA fram buffer size can't be fit under 4GB or this system has enough available memory above 4GB, this option may be set to [Enabled] to allow UMA frame buffer size to be allocated successfully.
Configuration options: [Disabled] [Enabled] [Auto]

NOTE: The following item appears only when **Integrated Graphics Controller** is set to [Forces] or [Auto].

NB Azalia

This item allows you to enable or disable Integrate HD Audio controller.
Configuration options: [Disabled] [Enabled] [Auto]

NB Configuration

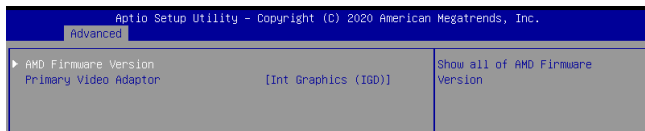
IOMMU

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

Audio IOs

Configuration options: [Auto] [MAX HDA / MIN SoundWire] [MAX mHDA / MIN SoundWire] [MAX SoundWire / MIN HDA] [MAX SoundWire / MIN mHDA] [I2S/TDM] [DISABLE AUDIO IOs] [SoundWire]

4.4.15 AMD PBS



AMD Firmware Version

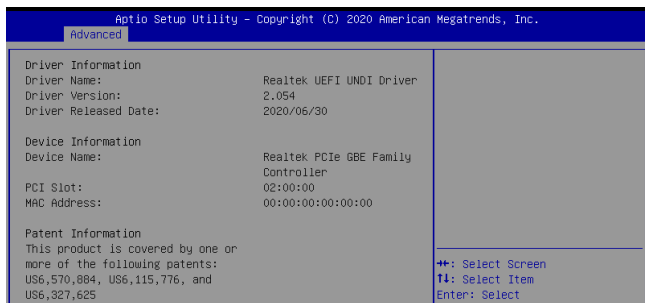
This item displays the AMD firmware version information.

Primary Video Adaptor

This item allows you to select the internal or external graphics.
Configuration options: [Int Graphics (IGD)] [Ext Graphics (PEG)]

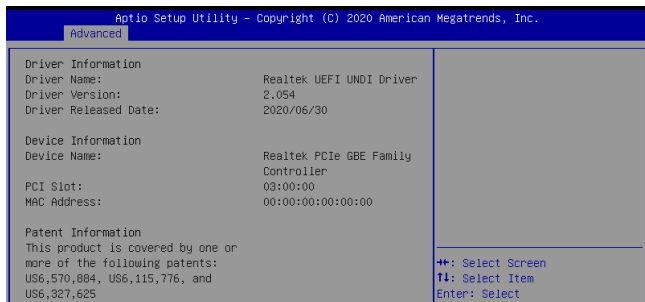
4.4.16 Realtek PCIe GBE Family Controller (MAC:00:00:00:00:00:00)

The menu displays driver information and configure Realtek ethernet controller parameter.

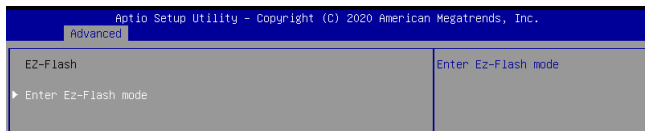


4.4.17 Realtek PCIe GBE Family Controller (MAC:00:00:00:00:00:00)

The menu displays driver information and configure Realtek ethernet controller parameter.



4.4.18 EZ-Flash

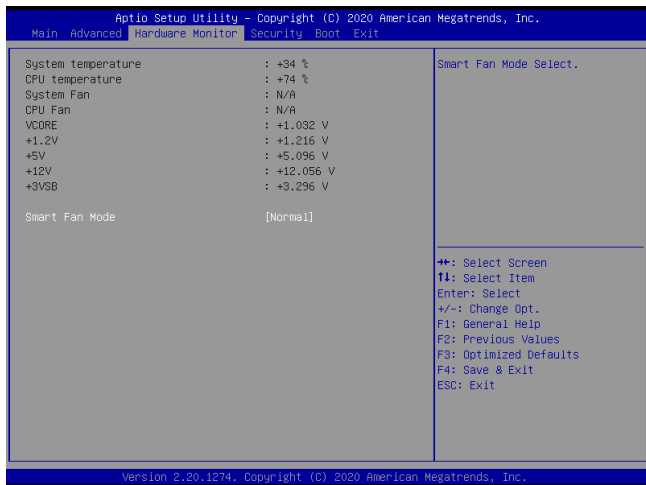


Enter Ez-Flash mode

This item allows you to enter Ez-Flash mode.

4.5 Hardware Monitor menu

The Hardware Monitor menu displays the system temperature/power status, and allows you to change the fan settings.



Smart Fan Mode

This item allows you to select the Smart Fan mode.

Configuration options: [Disabled] [Normal] [Manual Mode]

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

Smart Fan Function

System Fan Setting / CPU Fan Setting

Fan step time

This item allows you to set the amount of time Fan takes to increase/decrease its value by one step. (Units are in intervals of 0.01 second)
Configuration options: [0] - [255]

Fan step value

This item allows you to set the duty per step.
Configuration options: [0] - [15]

Temperature 1

Configuration options: [0] - [255]

Temperature 2

Configuration options: [0] - [255]

Temperature 3

Configuration options: [0] - [255]

Temperature 4

Configuration options: [0] - [255]

FD/RPM 1

This item allows you to set the value of Fan Duty/RPM 1 when the temperature is Temperature 1.
Configuration options: [0] - [255]

FD/RPM 2

This item allows you to set the value of Fan Duty/RPM 2 when the temperature is Temperature 2.
Configuration options: [0] - [255]

FD/RPM 3

This item allows you to set the value of Fan Duty/RPM 3 when the temperature is Temperature 3.
Configuration options: [0] - [255]

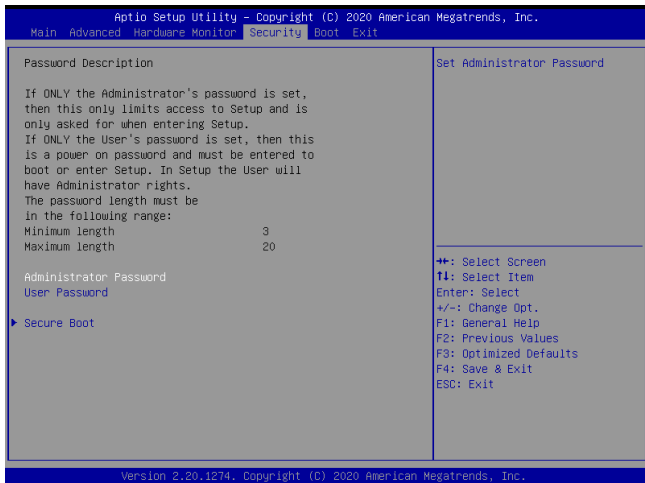
FD/RPM 4

This item allows you to set the value of Fan Duty/RPM 4 when the temperature is Temperature 4.

Configuration options: [0] - [255]

4.6 Security

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

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

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 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

This item allows you to select Secure Boot Mode. When [Custom] is selected, Secure Boot Policy variables can be configured by a physically present user without full authentication.

Configuration options: [Standard] [Custom]

NOTE: The following item appears only when **Secure Boot Mode** is set to **[Custom]**.

Key Management

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

PK Management

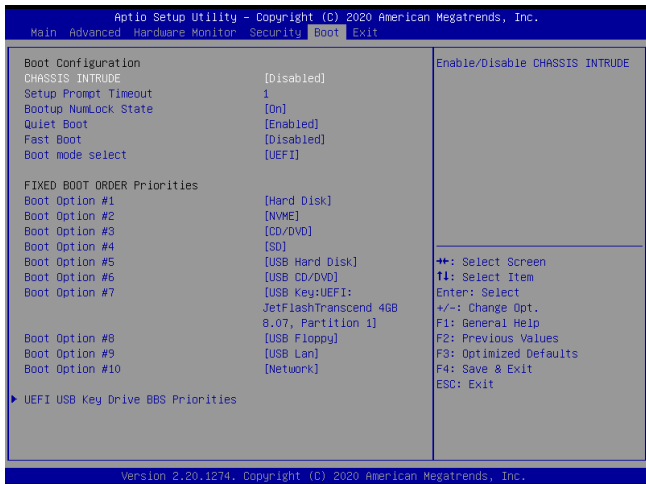
Configuration options: [Update]

Key Exchange Keys (KEK) / Authorized Signatures (DB) / Forbidden Signatures (DBX)

Configuration options: [Update] [Append]

4.7 Boot menu

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



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 that the firmware waits before initiating the original default boot selection. 65535(0xFFFF) means indefinite waiting. Use the <+> or <-> to adjust the value.

Bootup NumLock State

Allows you to select the power-on state for the NumLock.
Configuration options: [Off] [On]

Quiet Boot

Allows you to enable or disable Quiet Boot option.

Configuration options: [Disabled] [Enabled]

Fast Boot

[Disabled] Allows your system to go back to its normal boot speed.

[Enabled] Allows your system to accelerate the boot speed.

Boot mode select

Allows you to select the boot mode.

Configuration options: [LEGACY] [UEFI]

FIXED BOOT ORDER Priorities

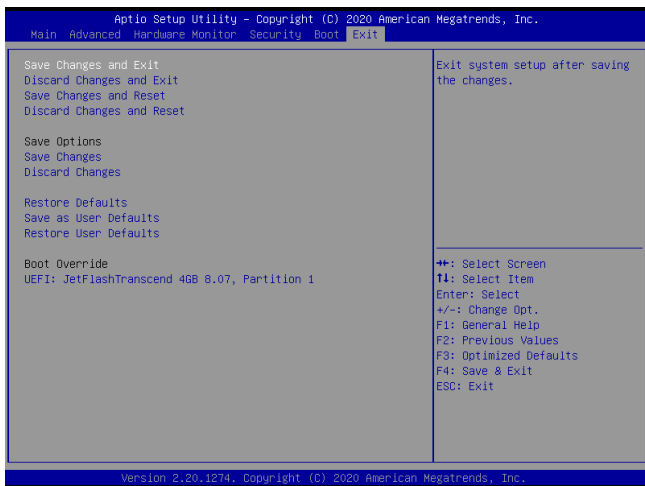
These items specify the boot device priority sequence from the available devices. The number of device items that appears on the screen depends on the number of devices installed in the system.

UEFI USB Key Drive BBS Priorities

These items specify the boot device priority sequence from the UEFI USB Key Drives. The number of device items that appears in this item depends on the number of devices installed in the system.

4.8 Save & Exit menu

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



Save Changes and Exit

Exit System setup after saving the changes.

Discard Changes and Exit

Exit System setup without saving any changes.

Save Changes and Reset

Reset the system after saving the changes.

Discard Changes and Reset

Reset the system without saving any changes.

Save Options

Save Changes

Save changes done so far to any of the setup options.

Discard Changes

Discard changes done so far to any of the setup options.

Restore Defaults

Restore/load default values for all the setup options.

Save as User Defaults

Save the changes done so far as User Defaults.

Restore User Defaults

Restore the User Defaults to all the setup options.

Boot Override

This item displays the available devices. The number of device items that appear on the screen depends on the number of devices installed in the system. Click an item to start booting from the selected device.

4.9 Updating your BIOS

The following utilities allow you to manage and update the motherboard Basic Input/Output System (BIOS) setup:

1. **ASUS CrashFree BIOS**

To recover the BIOS using a bootable USB flash disk drive when the BIOS file fails or gets corrupted.

2. **ASUS EzFlash**

Updates the BIOS using a USB flash disk.

4.9.1 **ASUS CrashFree BIOS**

The ASUS CrashFree BIOS is an auto recovery tool that allows you to restore the BIOS file when it fails or gets corrupted during the updating process. You can update a corrupted BIOS file using a USB flash drive that contains the updated BIOS file.

IMPORTANT! Prepare a USB flash drive containing the updated BIOS before using ASUS CrashFree BIOS.

Recovering the BIOS from a USB flash drive

To recover the BIOS from a USB flash drive:

1. Insert the USB flash drive with the original or updated BIOS file to a USB port on the system.
2. Reset the system, the system should auto-detect your USB flash drive and check if a compatible BIOS file is available.
3. Select your USB flash drive, then select the BIOS file to begin the recovery.
4. Once the recovery process is completed, your system should reset.

WARNING! DO NOT shut down or reset the system while recovering the BIOS! Doing so would cause system boot failure!

NOTE:

- The recovered BIOS may not be the latest BIOS version for this motherboard. Visit the ASUS website at www.asus.com to download the latest BIOS file.
 - Ensure the downloaded BIOS file is correctly renamed to **A10007.CAP**.
-

4.9.2 ASUS EzFlash Utility

The ASUS EzFlash Utility feature allows you to update the BIOS using a USB flash disk without having to use a DOS-based utility.

IMPORTANT! Download the latest BIOS from the ASUS website at www.asus.com before using this utility.

NOTE: The succeeding BIOS screens are for reference only. The actual BIOS screen displays may not be the same as shown.

To update the BIOS using EzFlash Utility:

1. Insert the USB flash disk that contains the latest BIOS file to the USB port.
2. Enter the BIOS setup program. Go to the **Advanced** menu to select **Start ASUS EzFlash** and press <Enter> to enter EZ-Flash mode.

WARNING! Ensure to back up your Bitlocker recovery key and suspend Bitlocker encryption in the operating system before updating your BIOS.



3. Your system should reboot and enter EZ-Flash mode.
4. Press the Up/Down arrow keys to find the USB flash disk that contains the latest BIOS then press <Enter>.
5. Press the Up/Down arrow keys to find the BIOS file then press <Enter>.
6. Your system will reboot when the update process is done.

WARNING

- This function can support devices such as a USB flash disk with FAT 32/16 format and single partition only.
 - DO NOT shut down or reset the system while updating the BIOS to prevent system boot failure!
-

Appendix

Safety information

Your Industrial motherboard is designed and tested to meet the latest standards of safety for information technology equipment. However, to ensure your safety, it is important that you read the following safety instructions.

Setting up your system

- Read and follow all instructions in the documentation before you operate your system.
- Do not use this product near water or a heated source.
- Set up the system on a stable surface.
- Peripherals with extended temperature tolerance (such as industrial grade DRAM, SSD, etc.) will allow this product to be used in environments with ambient temperatures between -20°C and 60°C, with a 0.1m/s air flow. If you plan to use a 2.5" HDD with this product, please use this product in environments with ambient temperatures between 0°C~45°C, with a 0.1m/s air flow.
- The product should be used in environments with an ambient temperature of 45°C when using the 65W adapter, whilst using HDD or SSD only and without the PoE module installed.
- If you use an extension cord, make sure that the total ampere rating of the devices plugged into the extension cord does not exceed its ampere rating.
- This equipment should be installed and operated with a minimum distance of 20cm between the radiator and your body.
- Restricted Access Location:
The equipment should only be installed in a Restricted Access Area where both these conditions apply:
 - access can only be gained by USERS who have been instructed about the reasons for the restrictions applied to the location and about any precautions that shall be taken; and
 - access is through the use of a TOOL or lock and key, or other means of security, and is controlled by the authority responsible for the location.
- This device shall not be connected to an Ethernet network with outside plant routing.

Care during use

- Do not walk on the power cord or allow anything to rest on it.
- Do not spill water or any other liquids on your system.
- When the system is turned off, a small amount of electrical current still flows. Always unplug the power cord from the power outlets before cleaning the system.
- If you encounter the following technical problems with the product, unplug the power cord and contact a qualified service technician or your retailer.
 - The power cord or plug is damaged.
 - Liquid has been spilled into the system.
 - The system does not function properly even if you follow the operating instructions.
 - The system was dropped or the cabinet is damaged.
 - The system performance changes.

Lithium-Ion Battery Warning

CAUTION: Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

NO DISASSEMBLY

The warranty does not apply to the products that have been disassembled by users



DO NOT throw the Industrial 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, electronic equipment, and mercury-containing button cell battery) should not be placed in municipal waste. Check local technical support services for product recycling.

Regulatory notices

REACH

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

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 the detailed recycling information in different regions.

COATING NOTICE

IMPORTANT! To provide electrical insulation and maintain electrical safety, a coating is applied to insulate the device except on the areas where the I/O ports are located.

RF exposure warning

This equipment must be installed and operated in accordance with provided instructions and the antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter. End-users and installers must be provide with antenna installation instructions and transmitter operating conditions for satisfying RF exposure compliance.

Federal Communications Commission Statement

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

- This device may not cause harmful interference, and
- 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 A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

IMPORTANT! Outdoor operations in the 5.15~5.25 GHz band is prohibited. This device has no Ad-hoc capability for 5250~5350 and 5470~5725 MHz.

CAUTION! Any changes or modifications not expressly approved by the grantee of this device could void the user's authority to operate the equipment.

ISED Radiation Exposure Statement for Canada

This equipment complies with ISED radiation exposure limits set forth for an uncontrolled environment. To maintain compliance with ISED RF exposure compliance requirements, please avoid direct contact to the transmitting antenna during transmitting. End users must follow the specific operating instructions for satisfying RF exposure compliance.

Operation is subject to the following two conditions:

- This device may not cause interference and
- This device must accept any interference, including interference that may cause undesired operation of the device.

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-3(A)/NMB-3(A)

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-3(A)/NMB-3(A)

Wireless Operation Channel for Different Domains

N. America	2.412-2.462 GHz	Ch01 through CH11
Japan	2.412-2.484 GHz	Ch01 through Ch14
Europe ETSI	2.412-2.472 GHz	Ch01 through Ch13

Japan JATE

本製品は電気通信事業者（移動通信会社、固定通信会社、インターネットプロバイダ等）の通信回線（公衆無線LANを含む）に直接接続することができません。本製品をインターネットに接続する場合は、必ずルータ等を経由し接続してください。」等が考えられる。

Regional notice for Singapore

Complies with
IMDA Standards
DB103778

This ASUS product complies with IMDA Standards.

Regional notice for Malaysia



ENERGY STAR® Qualified Product



ENERGY STAR® is a joint program of the U.S. Environmental Protection Agency and the U.S. Department of Energy helping us all save money and protect the environment through energy efficient products and practices.

All ASUS products with the ENERGY STAR® logo comply with the ENERGY STAR® standard, and the power management feature is enabled by default. The monitor is automatically set to sleep within 10 minutes of user inactivity; the computer is automatically set to sleep within 30 minutes of user inactivity. To wake your computer, click the mouse, press any key on the keyboard, or press the power button.

Please visit <https://www.energystar.gov/powermanagement> for detailed information on power management and its benefits to the environment. In addition, please visit <https://www.energystar.gov> for detailed information on the ENERGY STAR® joint program.

NOTE: ENERGY STAR® is NOT supported on FreeDOS and Linux-based products.

Service and Support

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



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	Address:	1F., No. 15, Lide Rd., Beitou Dist., Taipei City 112
Authorised representative in Europe	ASUSTeK Computer GmbH	
	Address:	Harkortstrasse 21-23, 40880 Ratingen, Germany

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