

**N5105I-IM-A**



# Industrial Motherboard

E18554  
First Edition  
July 2021

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# Chapter 1

## Product overview

### 1.1 Package contents

Check your industrial motherboard package for the following items.

- 1 x ASUS N5105I-IM-A Motherboard
- 1 x SATA 6.0 Gb/s cable
- 2 x SATA power cables
- 1 x ASUS I/O Shield



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

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### 1.2 Features

- Built-in Intel® Celeron® Quad-core N5105 SoC onboard Processors (Jasper Lake)
- Two DDR4 2933/2666/2400/2133 MHz Non-ECC Un-buffered SO-DIMMs up to 32GB
- 2 x SATA 6Gb/s, 4 x USB 3.2 Gen 1 ports, 2 x USB 2.0 headers, 3 x COM ports, 3 x COM Port headers
- 1 x PCIe 3.0/2.0 slot, 1 x mini PCIe (supports PCIe x1 / USB 2.0 mode) (w/SIM holder)
- Multi-display: 1 x VGA, 1 x HDMI™, 1 x LVDS (optional BOM colay with eDP)

### 1.3 Specifications

<b>CPU</b>	Built-in Intel® Celeron® Quad-Core N5105 SoC onboard Processors (Jasper Lake)
<b>Memory</b>	2 x SODIMM, max.32GB, DDR4 2933/2666/2400/2133 MHz Non-ECC, Unbuffered Memory
<b>Graphics</b>	Integrated graphics processor - Intel® HD Graphics support <ul style="list-style-type: none"> <li>- Supports VGA output with a maximum resolution of 1920 x 1200 @ 60Hz</li> <li>- Supports HDMI™ output with a maximum resolution of 4096 x 2160 @ 24Hz</li> <li>- Supports LVDS output with a maximum resolution of 1920 x 1200 @ 60Hz (Optional BOM colay with eDP)</li> </ul> Supports up to three displays simultaneously
<b>Expansion slots</b>	1 x PCI Express 3.0/2.0 x1 slot 1 x mini PCIe (supports PClex1 / USB 2.0 mode) (w/ SIM holder)
<b>Storage</b>	2 x SATA Gen 3.0, up to 6Gb/s ports
<b>Ethernet</b>	1 x Realtek® 8111H, supports WOL/PXE
<b>Audio</b>	Realtek® ALC897 High Definition Audio
<b>Rear panel I/O ports</b>	1 x VGA port 1 x HDMI™ port 4 x USB 3.2 Gen 1 ports 1 x LAN (RJ45) port 1 x RJ11 port for cash drawer, 12/24V switched by jumper 3 x COM ports (1 x RS232/422/485, 2 x RS232 5/12/Ring, switched by BIOS) 2 x Audio jacks 1 x 12V DC-IN lockable jack
<b>Internal Connectors</b>	3 x COM Port headers (RS232: Ring/5V/12V Select, switched by jumper) (Please keep your device voltage at around +/- 12V) 1 x Chassis Fan header (PWM Mode) 1 x Chassis Intrusion header 1 x Front Panel Audio header (AAFP) 1 x System panel header (10-1 pin) 1 x Clear CMOS header 1 x LVDS signal header 2 x USB 2.0 headers support additional 4 USB 2.0 ports 1 x 8-bit DIO header 1 x 4-pin ATX DC Power output connector 1 x 4-pin ATX DC Power input connector (DC-IN mode) 2 x SATA ports 2 x SATA Power connectors 1 x PS/2 keyboard and mouse header 1 x Speaker header

*(continued on the next page)*

<b>Internal Connectors</b>	1 x COM Debug header 1 x Parallel Port header 1 x Buzzer 1 x Mono Out amplifier header 1 x AMP IC 1 X SPI TPM header 1 x MSR Pin header 2 x MSR Definition Change jumper 1 x LCD Panel Monitor Switch jumper 1 x LVDS panel VCC power selection jumper 1 x LVDS Panel Enable Signal selection jumper 1 x LVDS Backlight Panel selection jumper 1 x AT/ATX selection jumper 1 x 2V/24V RJ11 VCC selection jumper
<b>Manageability</b>	WfM 2.0, WOL by PME
<b>Power requirement</b>	Power type: DC-IN mode Voltage (only one of the following type can be used at one time): - DC IN 12V - 4-pin internal DC mode 12V
<b>Operation Temperature</b>	0~60°C
<b>Non-Operation Temperature</b>	-40~85°C
<b>Relative Humidity</b>	15%~95%
<b>OS support</b>	Windows® 10 (64bit) – version after 20'H1, 20'H2 Ubuntu, RedHat Enterprise, Fedora Workstation, OpenSUSE
<b>Form Factor</b>	Mini-ITX Form Factor, 6.7" x 6.7" (17.0cm x 17.0cm)




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**NOTE:** Specifications are subject to change without notice.

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# 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.



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**CAUTION!**

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



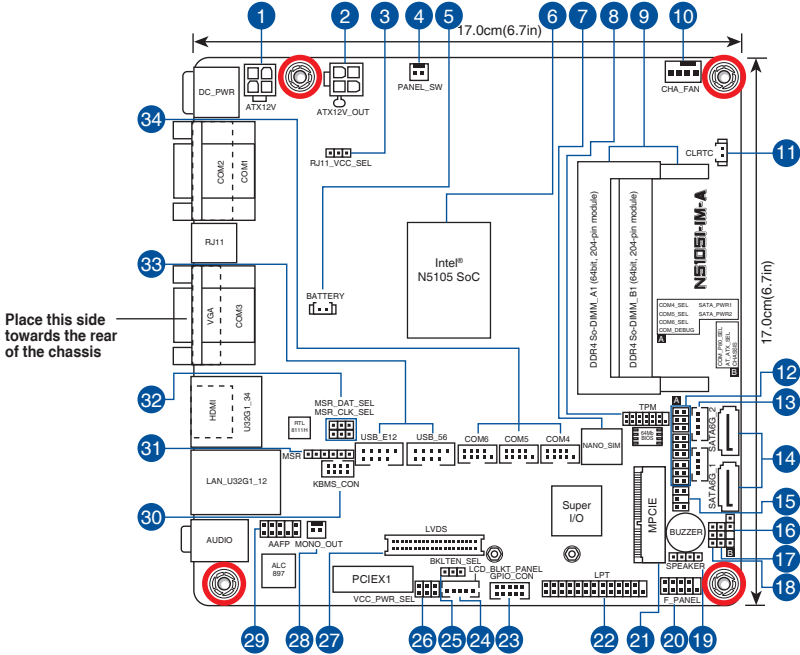
## 2.2 Motherboard layout



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



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

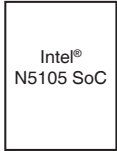
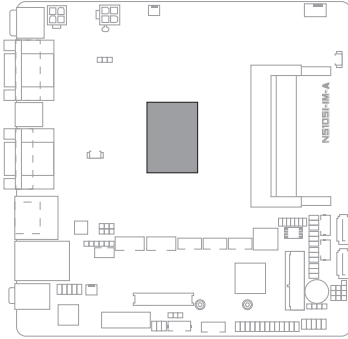


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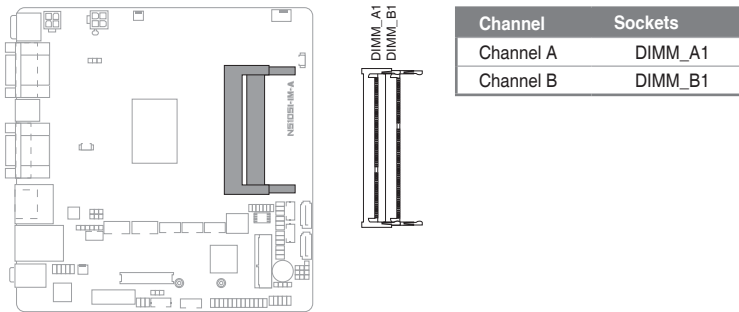
## 2.3 Central Processing Unit (CPU)

The motherboard comes with an onboard Intel® Celeron® Quad-core N5105 SoC processor (Jasper Lake).



## 2.4 System memory

This motherboard comes with two Double Data Rate 4 (DDR4) Small Outline Dual Inline Memory Module (SO-DIMM) sockets. The figure below illustrates the location of the DDR4 SO-DIMM sockets:



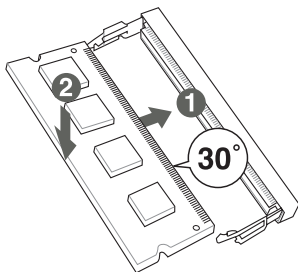
### IMPORTANT!

- 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.

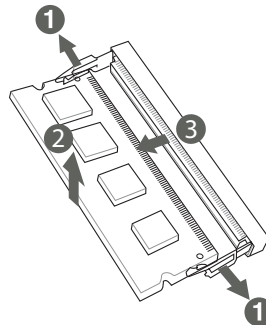


**NOTE:** Visit the ASUS website at [www.asus.com](http://www.asus.com) for the latest QVL.

### To install a SO-DIMM



### To remove a SO-DIMM

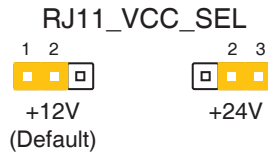
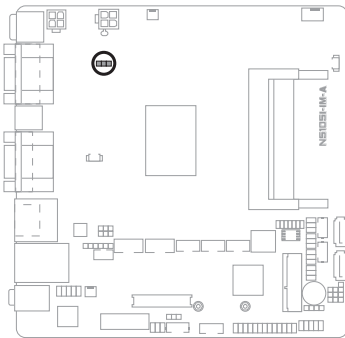


## 2.5 Jumpers

A jumper is a metal bridge that closes an electrical circuit. It consists of two metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To “close” (or turn ON) a jumper, you connect the pins with the clip. To “open” (or turn OFF) a jumper, you remove the clip. Sometimes a jumper consists of a set of three pins, labeled 1, 2, and 3. In this case, you connect either pins 1 and 2, or 2 and 3. A pair of needle-nose pliers may be useful when setting jumpers. You can configure your motherboard to match the needs of your application by setting the jumpers.

This section illustrates the default settings and configuration options of the jumpers, and provides instructions on how to configure your motherboard by setting them.

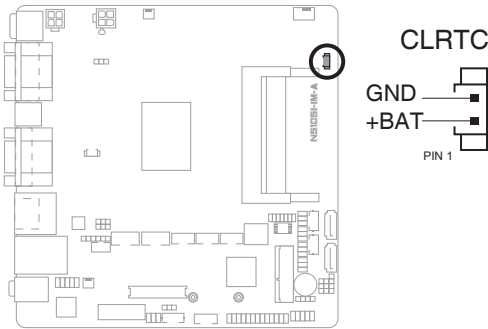
### 1. RJ11 VCC selection jumper (3-pin RJ11\_VCC\_SEL)



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

## 2. Clear RTC RAM (2-pin CLRTC)

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



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

### To erase the RTC RAM:

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

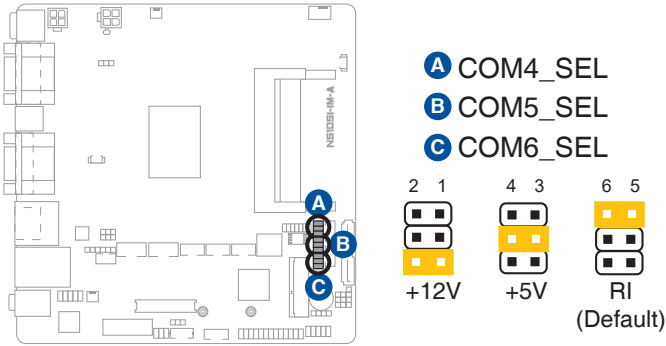


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**NOTE:** If the steps above do not help, remove the onboard battery and move the jumper again to clear the CMOS RTC RAM data. After clearing the CMOS, reinstall the battery.

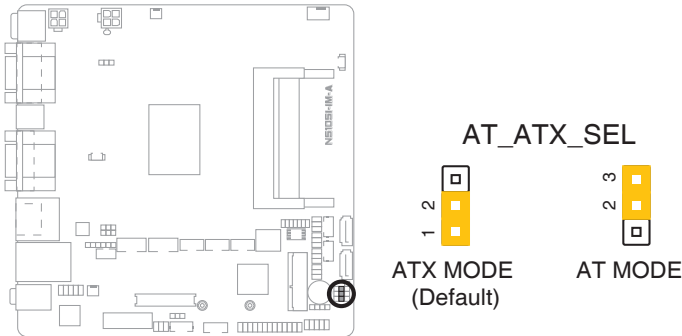
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3. COM Ring/+5V/+12V selection jumper (6-pin COM4/5/6\_SEL)



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

4. AT/ATX Mode selection jumper (3-pin AT\_ATX\_SEL)

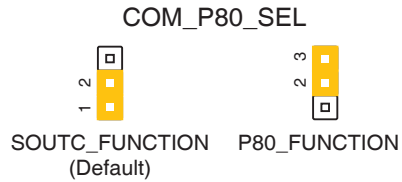
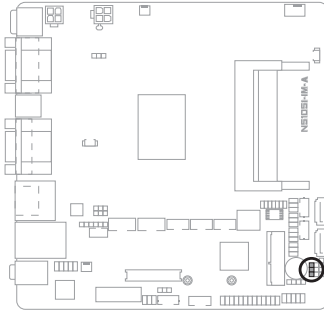


Pins	
1-2 (Default)	ATX mode
2-3	AT mode

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

## 5. COM/P80 selection jumper (3-pin COM\_P80\_SEL)

You can use this jumper to enable the TX signal of COM3 port or connect it to COM\_DEBUG header. By default (pin 1 & 2, SOUTC\_FUNCTION), the TX signal of COM3 port is enabled and can function normally. When pin 2 and pin 3 are shorted with the jumper cap, the TX signal is connected to COM\_DEBUG header, and the COM3 port fails to work.

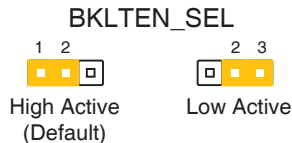
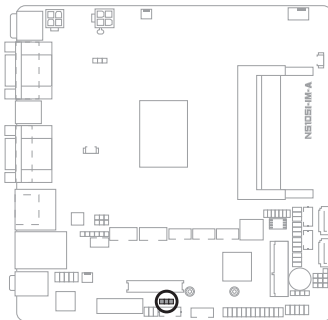


Pins	
1-2 (Default)	SOUTC_FUNCTION
2-3	P80_FUNCTION

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

## 6. LVDS Panel Enable Signal selection jumper (3-pin BKLTEN\_SEL)

You can use this jumper to select the EN signal of the LVDS screen as HIGH enable or LOW enable.

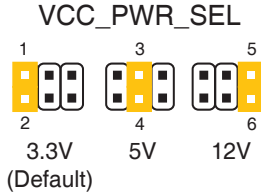
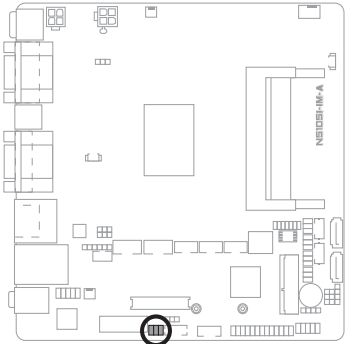


Pins	
1-2 (Default)	High Active
2-3	Low Active

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



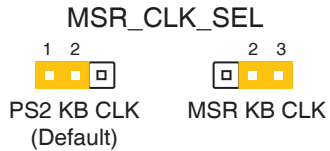
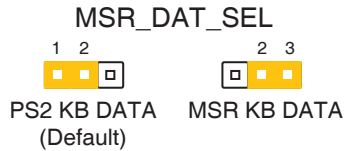
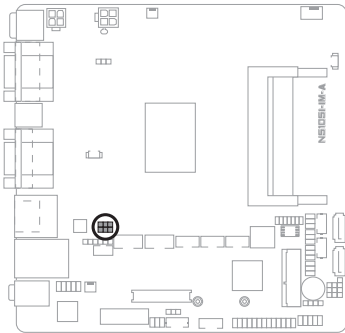
7. LVDS Panel VCC Power selection jumper (6-pin VCC\_PWR\_SEL)



Setting	Pins
12V	5-6
5V	3-4
3.3V (Default)	1-2

Connector type HEADER 1 x 6p, 2.54mm pitch, S/T

8. MSR Definition Change jumper (3-pin MSR\_DAT\_SEL, 3-pin MSR\_CLK\_SEL)

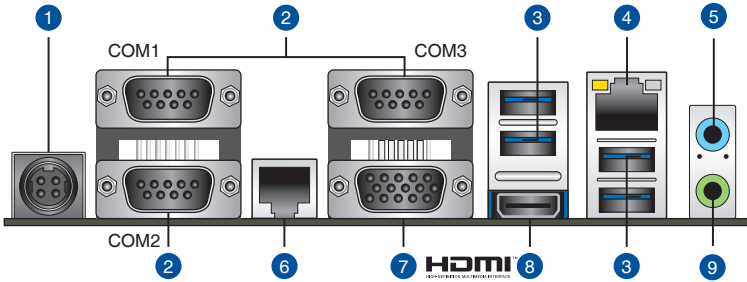


		Pins
MSR_DAT_SEL	PS2 KB DATA (default)	1-2
	MSR KB DATA	2-3
MSR_CLK_SEL	PS2 KB CLK (default)	1-2
	MSR KB CLK	2-3

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

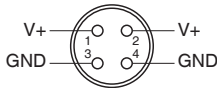
## 2.6 Connectors

### 2.6.1 Rear panel connectors

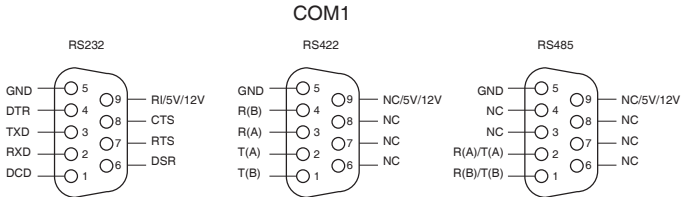


1. **DC power connector.** Insert the power adapter into this port.

#### DC in Pin define



2. **Serial ports (COM 1~3).** These ports connect modems or other devices that conform with serial specification.

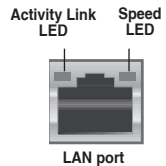


**NOTE:** COM1 supports RS232, RS422 and RS485 while COM2 & COM3 are RS232. You can select among RS232, RS422 or RS485 mode, and select the RI voltage among Ring, 5V or 12V from BIOS settings for COM1 port.

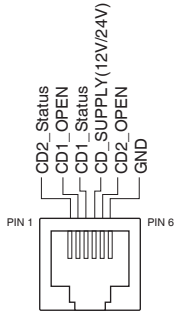
3. **USB 3.2 Gen 1 (up to 5Gbps) ports.** These 9-pin Universal Serial Bus (USB) ports are for USB 3.2 Gen 1 devices.
4. **LAN (RJ-45) port.** This port allows Gigabit connection to a Local Area Network (LAN) through a network hub.

#### LAN port LED indications

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



- 5. **Line In port (light blue).** This port connects to the tape, CD, DVD player, or other audio sources.
- 6. **RJ11 port.** This port connects to cash drawer.



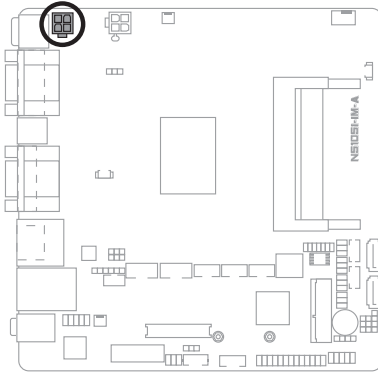
RJ11 Pin define

- 7. **Video Graphics Adapter (VGA) ports.** These 15-pin ports are for VGA monitors or other VGA-compatible devices.
- 8. **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.
- 9. **Line Out port (lime).** This port connects to a headphone or a speaker. In the 4 and 5.1 channel configurations, the function of this port becomes Front Speaker Out.

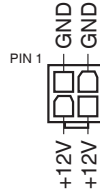
## 2.6.2 Internal connectors

### 1. ATX Power connector (4-pin ATX12V)

Correctly orient the ATX 12V power supply plugs into this connector and push down firmly until the connector completely fits.

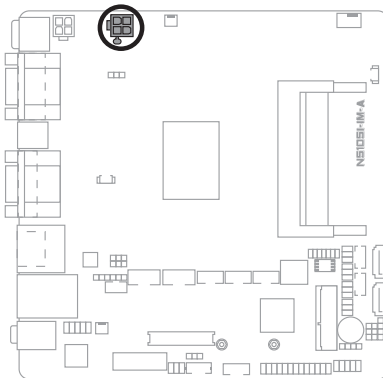


ATX12V

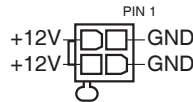


### 2. ATX12V OUT Power connector (4-pin ATX12V\_OUT)

Correctly orient the ATX12V OUT power supply plugs into this connector and push down firmly until the connector completely fits. This connector is for the second display.

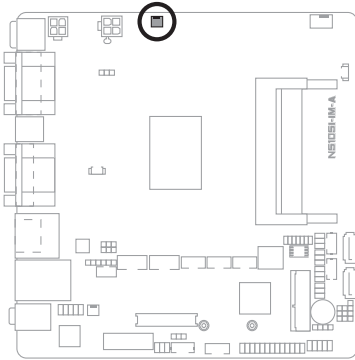


ATX12V\_OUT



**3. Panel switch (2-pin PANEL\_SW)**

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

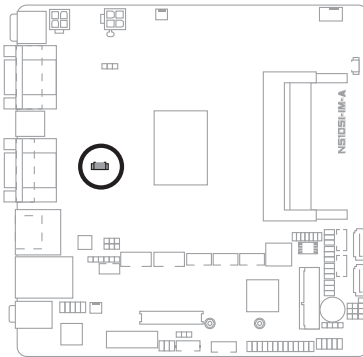


**PANEL\_SW**



**4. Battery header (2-pin BATTERY)**

This header is for the lithium CMOS battery.

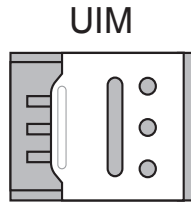
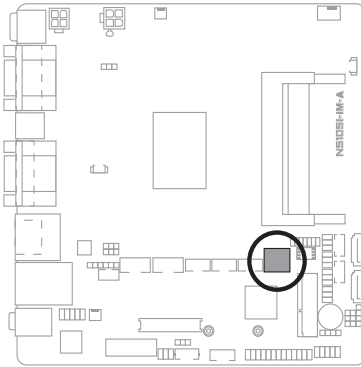


**BATTERY**



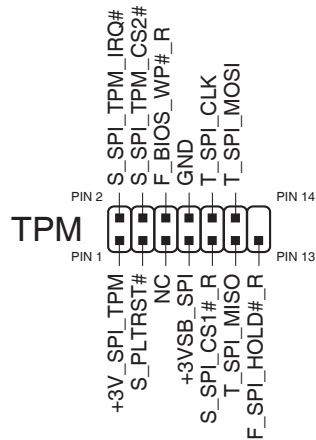
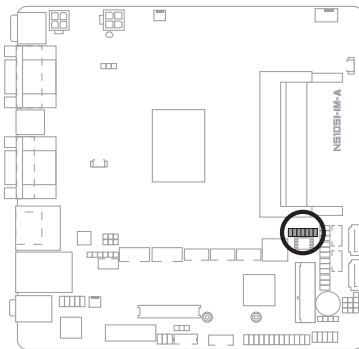
## 5. Nano SIM Card slot

This slot connects to a Nano SIM card.



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

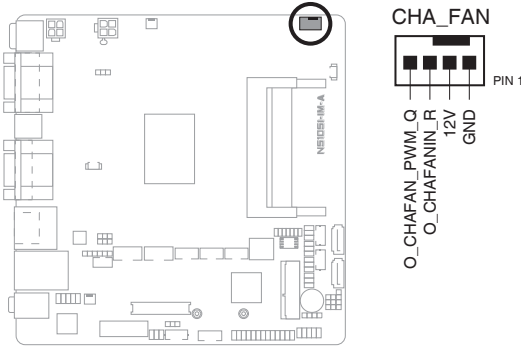
This header supports a Trusted Platform Module (TPM) system with a Serial Peripheral Interface (SPI), allowing you to securely store keys, digital certificates, passwords, and data. A TPM system also helps enhance network security, protects digital identities, and ensures platform integrity.



**Connector type** Header 2x7p, K14, 2.0mm pitch

**7. Chassis Fan header (4-pin CHA\_FAN)**

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



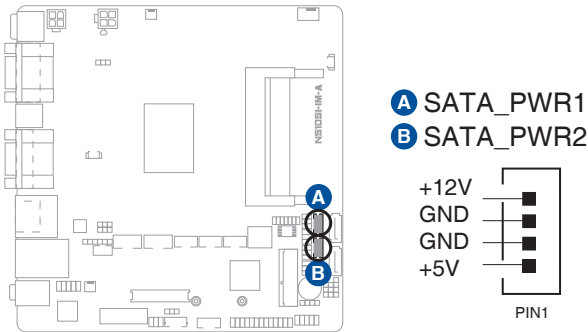
**Connector type** WAFER HD 4p, 2.54mm pitch, S/T



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

**8. SATA Power connectors (4-pin SATA\_PWR1/2)**

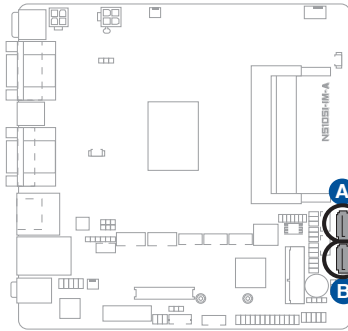
These connectors are for the SATA power cables. The power cable plug is designed to fit this connector in only one orientation. Find the proper orientation and push down firmly until the connector completely fit.



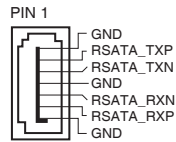
**IMPORTANT:** The SATA power connector supports 1A current to the maximum.

## 9. SATA 6.0 Gb/s ports (7-pin SATA6G\_1/2)

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



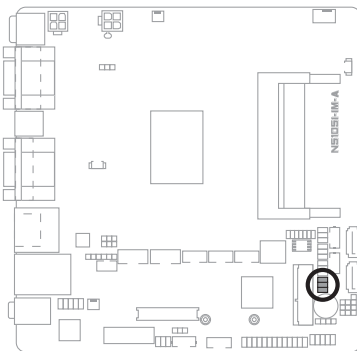
- A** SATA6G\_2
- B** SATA6G\_1



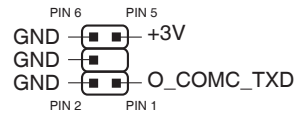
**Connector type** WAFER HD 7p, 1.27mm pitch

## 10. COM Debug header

This header allows connection to a COM Debug card.



### COM\_DEBUG



**Connector type** HEADER 2x3p, K3, 2.54mm pitch

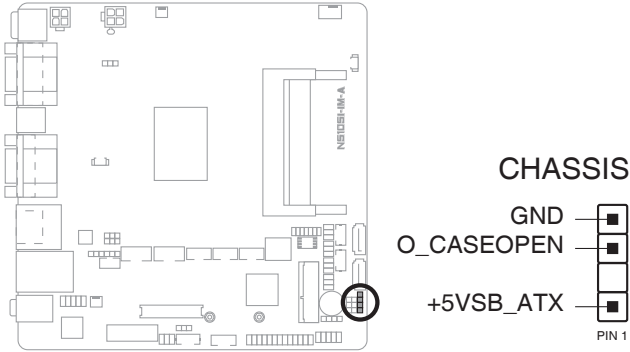


**NOTE:** The COM Debug card is purchased separately.



### 11. Chassis intrusion header (4-1 pin\_CHASSIS)

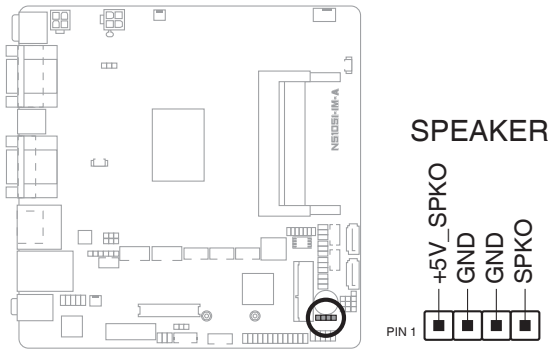
This header is for a chassis-mounted intrusion detection sensor or switch. Connect one end of the chassis intrusion sensor or switch cable to this connector. The chassis intrusion sensor or switch sends a low-level signal to this connector when a chassis component is installed. The signal is then generated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



**Connector type** HEADER 4p, K2, 2.54mm pitch

### 12. Speaker header (4-pin SPEAKER)

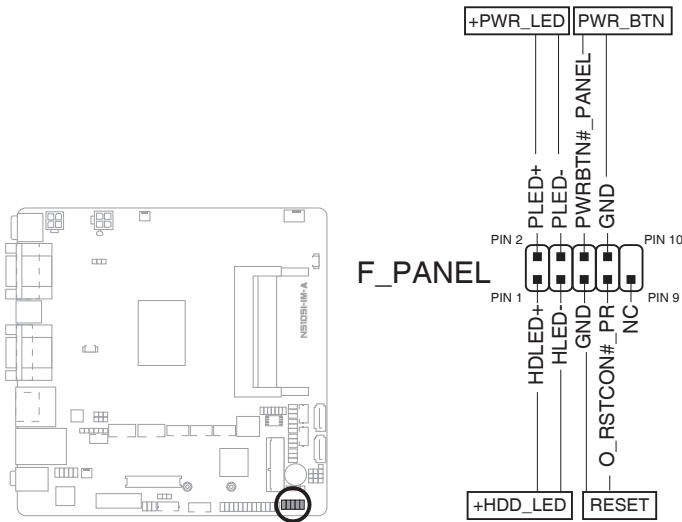
The 4-pin header is for the chassis-mounted system warning speaker. The speaker allows you to hear system beeps and warnings.



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

### 13. 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)**

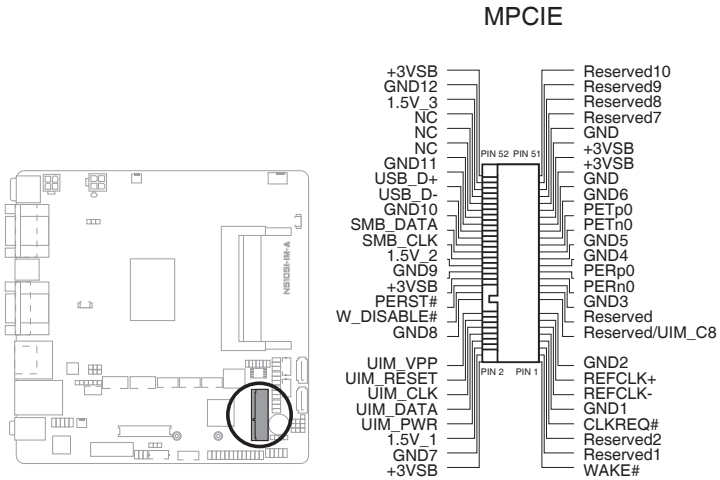
This 2-pin header is for the system power button.

- **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.

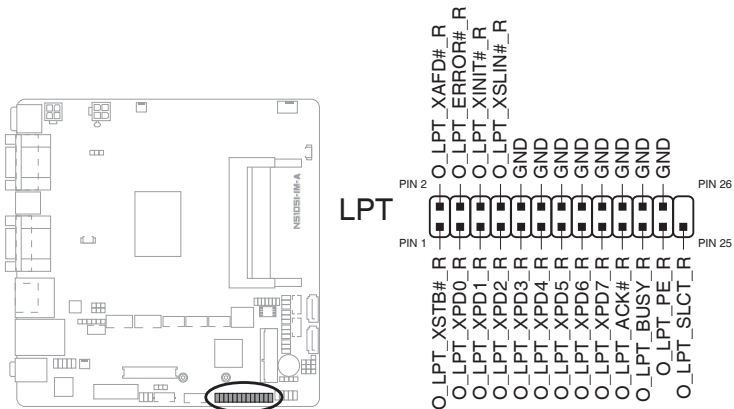
## 14. MPCIE slot

This slot allows you to install a full length mini-PCIe card, providing you with expandability and connectivity solutions for an optimal system performance.



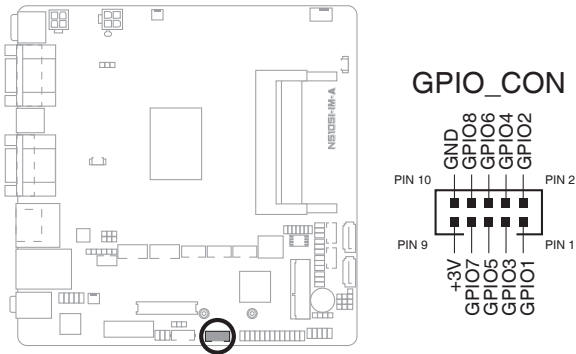
## 15. LPT header (26-1 pin LPT)

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.



## 16. General Purpose Input/output header (GPIO\_CON)

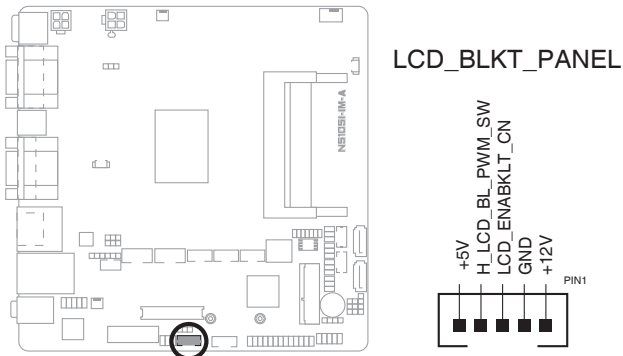
This header is for a general purpose input/output module which allows you to customize the digital signal input/output.



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

## 17. LVDS Backlight Panel selection header (5-pin LCD\_BLKT\_PANEL)

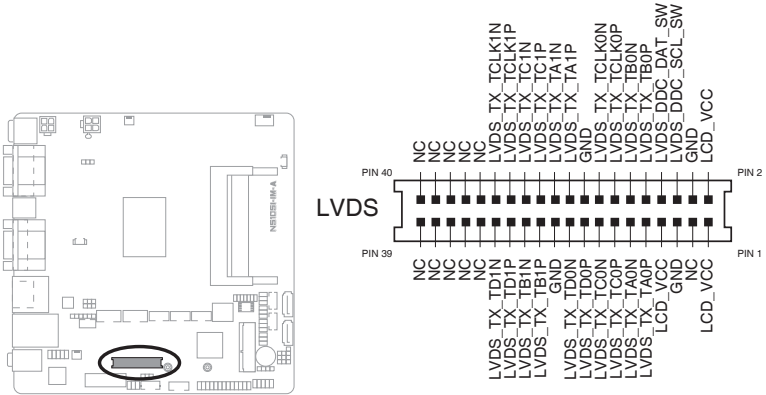
This header is for the LVDS backlight panel selection.



**Connector type** WAFER 5p, 2.0mm pitch

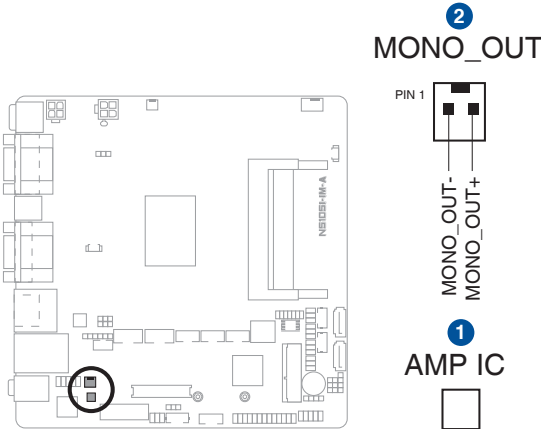
### 18. LVDS header (40-pin LVDS)

This connector is for an LCD monitor that supports Low Voltage Differential Signalling (LVDS) interface.



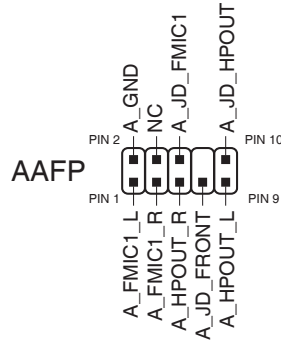
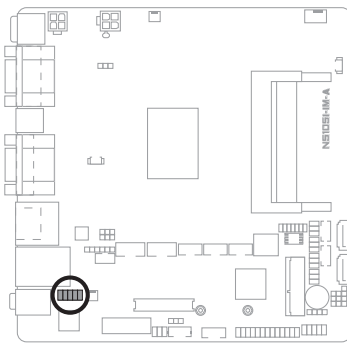
### 19. Mono Out header (2-pin MONO\_OUT)

This internal mono out header allows connection to an internal, low power speaker for basic system sound capability. The subsystem is capable of driving a speaker load of 4 Ohms at 2 Watts (rms). If an AMP IC (1) is available, the mono out header (2) can drive a speaker load of 4 Ohms at 3 Watts (rms).



## 20. 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

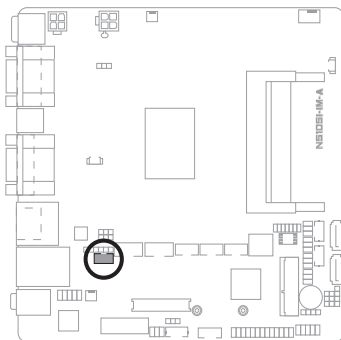


### IMPORTANT!

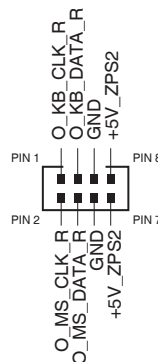
- We recommend that you connect a high-definition front panel audio module to this header to avail of the motherboard's high-definition audio capability.
- If you want to connect a high-definition front panel audio module to this header, set the HD Audio Controller item in the BIOS setup to [Enabled].

## 21. PS/2 Keyboard & Mouse header (6-pin KBMS\_CON)

This header is for an IBM PS/2-compatible keyboard or mouse.

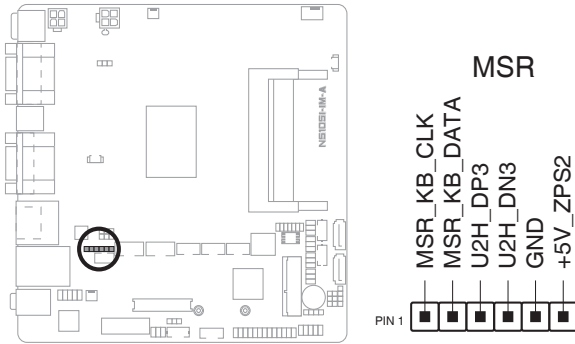


### KBMS\_CON



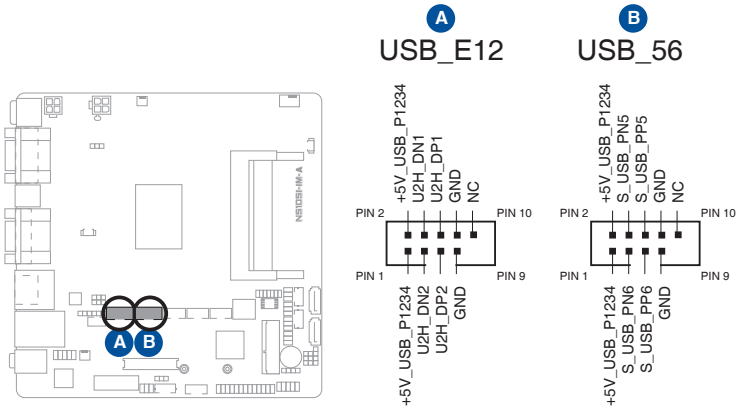
## 22. MSR header (6-pin MSR)

MSR(Magnetic Stripe Reader) header is for a card reader.



## 23. USB 2.0 headers (10-pin USB\_E12, USB\_56)

These headers are for USB 2.0 ports. Connect the USB cables to these headers. These USB headers comply with USB 2.0 specification that supports up to 480 Mbps connection speed.



**Connector type** Header 2x5p, K9, 2.54mm pitch



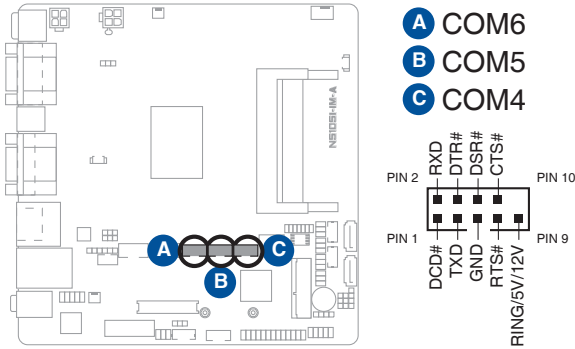
**CAUTION!** Never connect a 1394 cable to the USB headers. Doing so will damage the motherboard.



**NOTE:** The USB cables are purchased separately.

## 24. COM Port headers (10-pin COM4–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



### NOTES:

- N5105I-IM-A supports six serial ports. COM1 supports RS-232/422/485 and COM2~6 are RS-232. COM4~6 also supports Ring/5V/12V according to jumper selection. You can select among RS-232/422/485 mode, and select the RI voltage among Ring/5V/12V from BIOS settings for COM1 port.
- You can connect serial devices such as a mouse, a printer or a communications network device to the COM ports. The IRQ and address ranges for all the ports are fixed. However, you can disable the port or change the parameters via the system BIOS setup. Various devices implement the RS-232/422/485 standards in different manners.
- If problem with a serial device occurs, it is recommended that you check the connector pin assignments.
- The serial port cable is purchased separately.





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



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



##### IMPORTANT:

- Visit the ASUS website at [www.asus.com](http://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 User 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

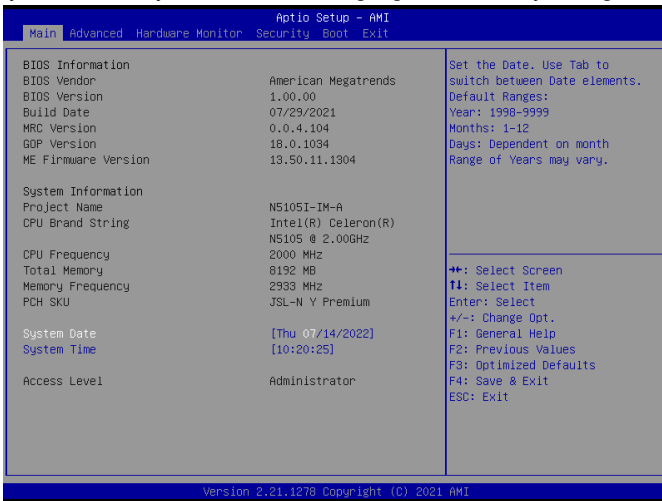
The menu bar on top of the screen has the following main items:

- 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.



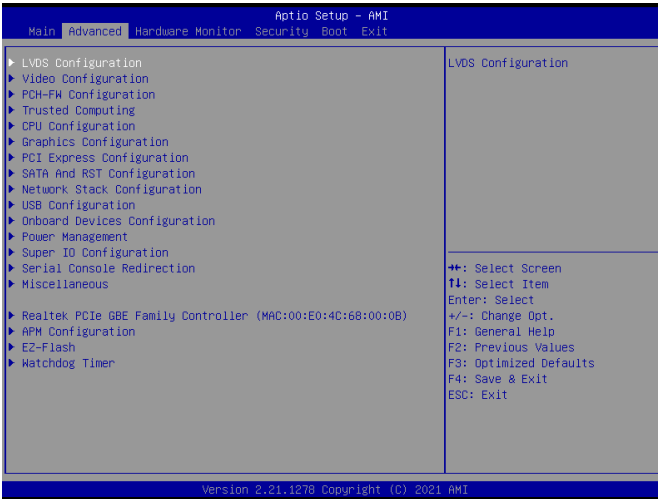
#### 3.2.1 System Date [Day MM/DD/YYYY]

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



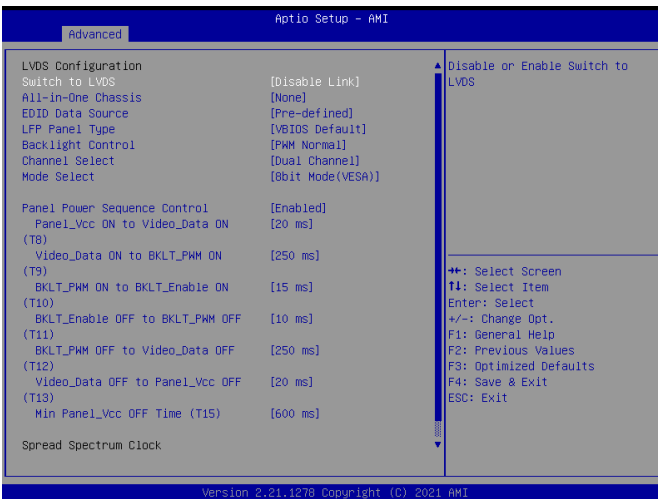
The Advanced menu items allow you to change the settings for the CPU and other system devices.



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

#### 3.3.1 LVDS Configuration

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



## Switch to LVDS

Allows you to disable or enable switching to LVDS. Configuration options: [Disable Link] [Enabled]

## All-in-One Chassis

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



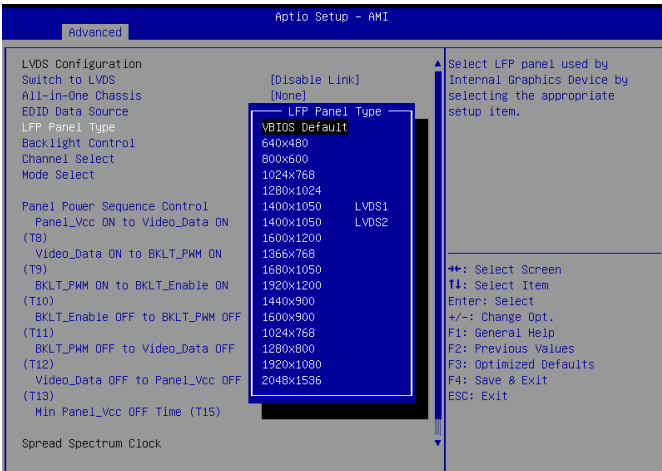
Improper selection of AiO chassis may result in incorrect operation or potential damage to AiO chassis hardware.

## EDID Data Source

Allows you to select the EDID data source. Configuration options: [Pre-defined] [Flat Panel Display]

## LFP Panel Type

This item appears only when you set the previous item to [Pre-defined] and allows you to select the LFP panel used by internal graphics device. Configuration options: [VBIOS Default] [640x480] [800x600] [1024x768] [1280x1024] [1400x1050 LVDS1] [1400x1050 LVDS2] [1600x1200] [1366x768] [1680x1050] [1920x1200] [1440x900] [1600x900] [1024x768] [1280x800] [1920x1080] [2048x1536]



## Backlight Control

Allows you to select the way of backlight control. Configuration options: [PWM Inverted] [PWM Normal]

### **Channel Select**

Allows you to select the channel. Configuration options: [Dual Channel] [Single Channel]

### **Mode Select**

Allows you to select the mode. Configuration options: [8bit Mode (JEIDA)] [8bit Mode (VESA)] [6bit Mode (VESA and JEIDA)]

### **Panel Power Sequence Control**

Allows you to enable or disable panel power sequence control. Configuration options: [Enabled] [Disabled]

### **Panel\_Vcc ON to Video\_Data ON (T8)**

Allows you to select the Panel\_Vcc ON to Video\_Data ON (T8). Configuration options: [10ms] [20ms] [30ms] [40ms]

### **Video\_Data ON to BKLT\_PWM ON (T9)**

Allows you to select the Video\_Data ON to BKLT\_PWM ON (T9). Configuration options: [100ms] [200ms] [250ms] [300ms]

### **BKLT\_PWM ON to BKLT\_Enable ON (T10)**

Allows you to select the BKLT\_PWM ON to BKLT\_Enable ON (T10). Configuration options: [10ms] [15ms] [20ms] [25ms]

### **BKLT\_Enable OFF to BKLT\_PWM OFF (T11)**

Allows you to select the BKLT\_Enable OFF to BKLT\_PWM OFF (T11). Configuration options: [5ms] [10ms] [15ms] [20ms]

### **BKLT\_PWM OFF to Video\_Data OFF (T12)**

Allows you to select the BKLT\_PWM OFF to Video\_Data OFF (T12). Configuration options: [100ms] [200ms] [250ms] [300ms]

### **Video\_Data OFF to Panel\_Vcc OFF (T13)**

Allows you to select the Video\_Data OFF to Panel\_Vcc OFF (T13). Configuration options: [10ms] [20ms] [30ms] [40ms]

### **Min Panel\_Vcc OFF Time (T15)**

Allows you to select the minimum Panel\_Vcc OFF time (T15). Configuration options: [600ms] [700ms] [800ms] [1000ms]

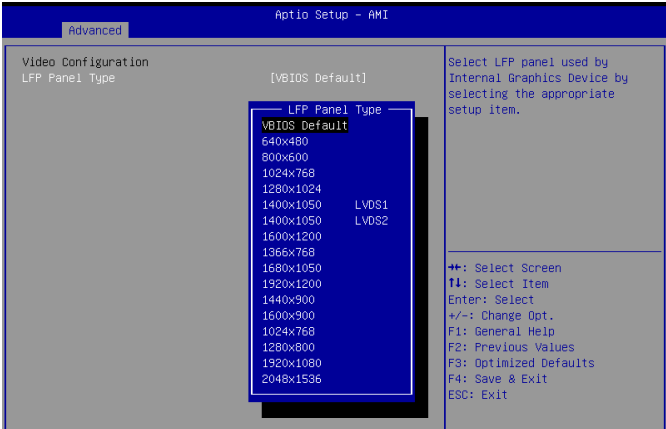
### **LVDS Spread Spectrum Control**

Allows you to configure the LVDS spread spectrum clocking. Configuration options: [Disabled] [+/- 0.5%% Center Spread] [+/- 1%% Center Spread]

### 3.3.2 Video Configuration

#### LFP Panel Type

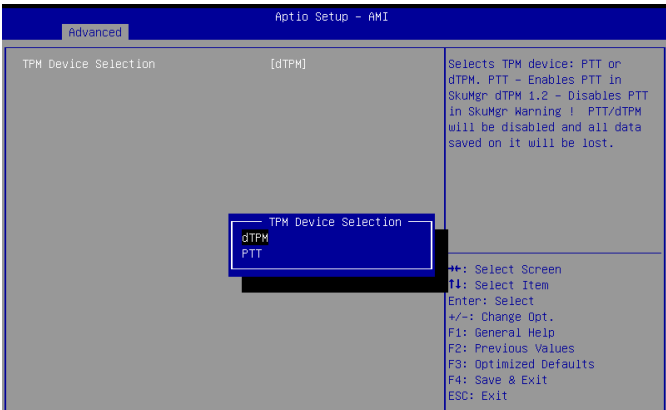
This item allows you to select the LFP panel type. Configuration options: [VBIOS Default] [640x480] [800x600] [1024x768] [1280x1024] [1400x1050 LVDS1] [1400x1050 LVDS2] [1600x1200] [1366x768] [1680x1050] [1920x1200] [1440x900] [1600x900] [1024x768] [1280x800] [1920x1080] [2048x1536]



### 3.3.3 PCH-FW Configuration

#### TPM Device Selection

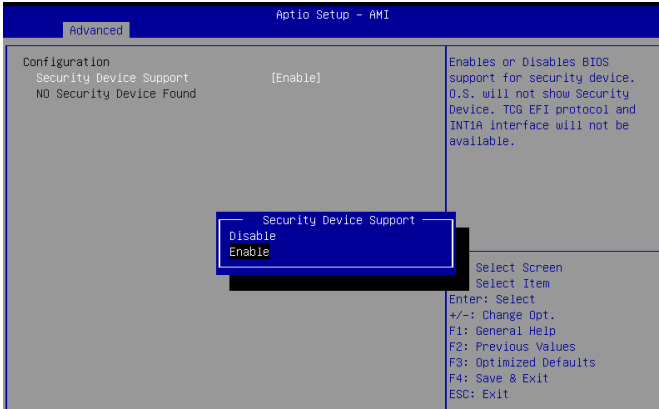
This item allows you to select the TPM device. Configuration options: [dTPM] [PTT]



### 3.3.4 Trusted Computing

#### Security Device Support

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

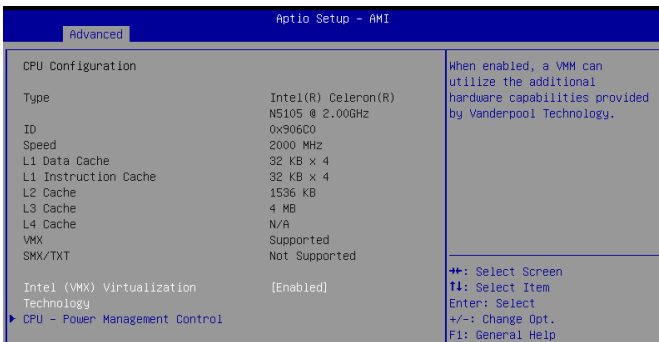


### 3.3.5 CPU Configuration

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



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



#### Intel (VMX) Virtualization

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(R) Speed Shift Technology support. When enabled, CPPC v2 interface allows hardware controlled P-state. Configuration options: [Disabled] [Enabled]

### Turbo Mode

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

### C states

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

### Enhanced C-states

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



---

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

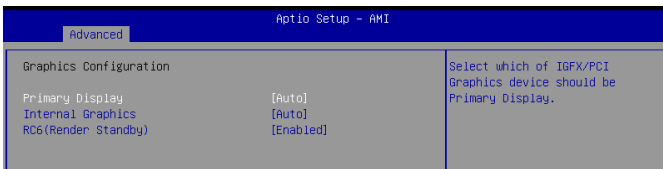
---

### Package C State Limit

Allows you to control the maximum Package C State that the processor supports. Configuration options: [C0/C1] [C2] [C3] [C6] [C7] [C7S] [C8] [C9] [C10] [Cpu Default] [Auto]

## 3.3.6 Graphic Configuration

Allows you to select a primary display from supported graphical devices.



### Primary Display

Allows you to select a display device to be the primary one. Configuration options: [AUTO] [IGFX] [PCI]

### Internal Graphics

Allows you to enable or disable internal graphics. Configuration options: [AUTO] [Disabled] [Enabled]

### RC6 (Render Standby)

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

### 3.3.7 PCI Express Configuration



#### PCI Express Root Port 5/6/7

##### PCI Express Root Port 5

This item allows you to control the PCI Express root port 5/6/7. Configuration options: [Disabled] [Enabled]

##### ASPM

This item allows you to control the Active State Power Management on both NB (NorthBridge) side and SB (SouthBridge) side of the DMI Link. Configuration options: [Disable] [L0s] [L1] [L0sL1] [Auto]

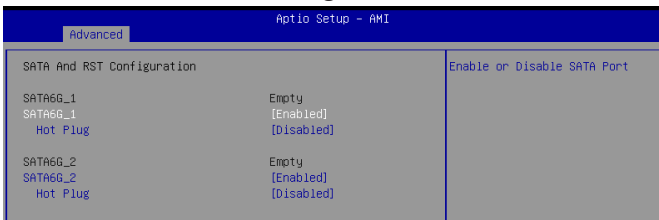
##### L1 Substates

This item allows you to select the PCI Express L1 Substates settings. Configuration options: [Disabled] [L1.1] [L1.1 & L1.2]

##### PCIe Speed

Configures the speed of PCIEX16\_2 slot. Configuration options: [Auto] [Gen1] [Gen2] [Gen3]

### 3.3.8 SATA And RST Configuration



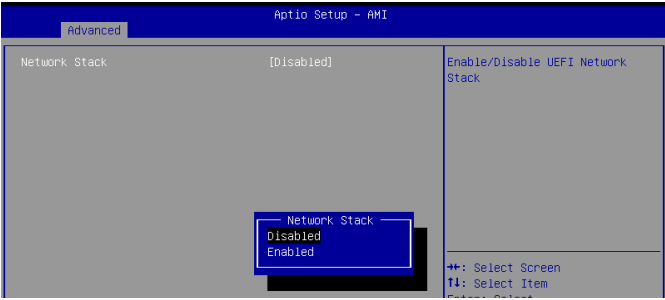
#### SATA6G\_1/2

Allow you to enable/disable the SATA6G\_1/2 port. Configuration options: [Disabled] [Enabled]

##### Hot Plug

These items allow you to enable/disable SATA Hot Plug support. 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]



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

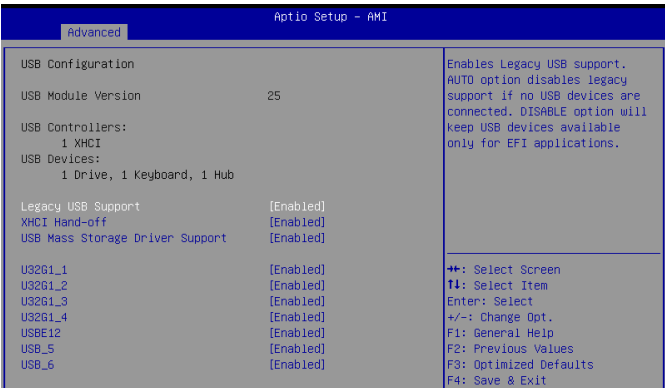
#### Ipv4 PXE Support

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



#### Legacy USB Support

- [Enabled]            Enables Legacy USB support.
- [Disabled]         Keeps USB devices available only for EFI applications.
- [Auto]              Allows the system to detect the presence of USB devices at

startup. If any USB device(s) is detected, the USB controller legacy mode is enabled. If none is detected, the legacy USB support is disabled.

### XHCI Hand-off

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

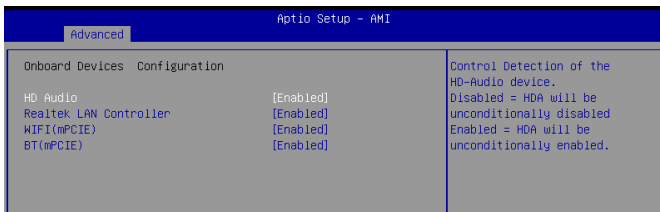
### USB Mass Storage Driver Support

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

### U32G1\_1/2/3/4, USBE12, USB\_5/6

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

## 3.3.11 Onboard Devices Configuration



### HD Audio

[Enabled] Enables the HD Audio Device.

[Disabled] Disables the HD Audio Device.

### Realtek LAN Controller

[Enabled] Enables the Realtek LAN controller.

[Disabled] Disables the controller.

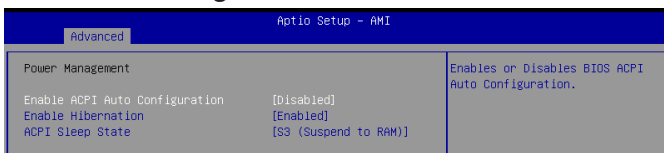
### WIFI(mPCIE)

Allow you to enable or disable WiFi (mPCIE) function. Configuration options: [Enabled] [Disabled]

### BT(mPCIE)

Allow you to enable or disable BT (mPCIE) function. Configuration options: [Enabled] [Disabled]

### 3.3.12 Power Management



#### Enable ACPI Auto Configuration

Allow you to enable/disable the ACPI Auto configuration. Configuration options: [Disabled] [Enabled]

#### Enable Hibernation

Allow you to enable or disable S4 hibernation. Configuration options: [Disabled] [Enabled]

#### ACPI Sleep State

Allow you to select the ACPI sleep state. Configuration options: [Suspend Disabled] [S3 (Suspend to RAM)]

### 3.3.13 Super IO Configuration



#### Serial Port 1 Configuration

##### Serial Port

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

##### COM1 Control

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

##### RI# Pin Function

Allows you to select the voltage offset. Configuration options: [Ring] [+5V] [+12V]

## Serial Port 2/3 Configuration

### Serial Port

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

### RI# Pin Function

Allows you to select the voltage offset. Configuration options: [Ring] [+5V] [+12V]

## Serial Port 4/5/6 Configuration

### Serial Port

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

## Parallel Port Configuration

Allows you to set parameters of parallel port.

### Parallel Port

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



---

The following item appears only when you set **Serial Port** to **[Enabled]**.

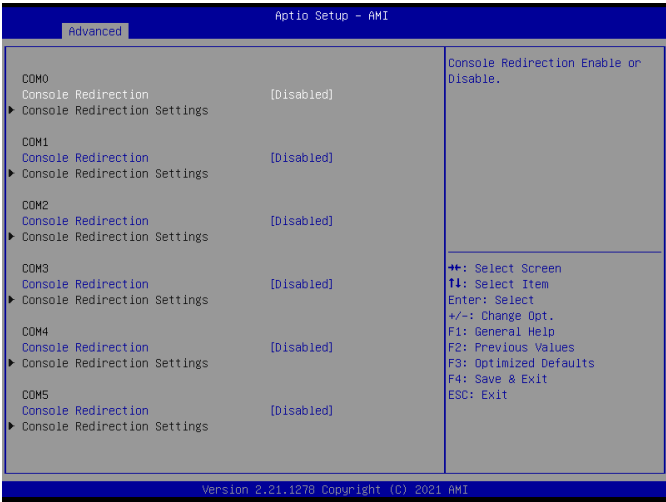
---

### Device Mode

This item 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]

### 3.3.14 Serial Console Redirection

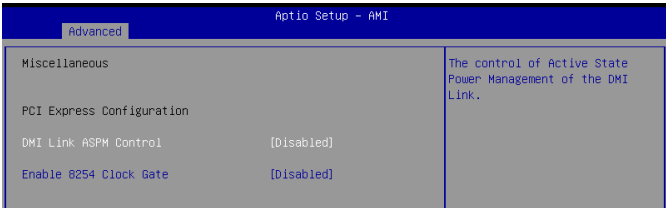


#### COM0~COM5

#### Console Redirection

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

### 3.3.15 Miscellaneous



#### PCI Express Configuration

#### DMI Link ASPM Control

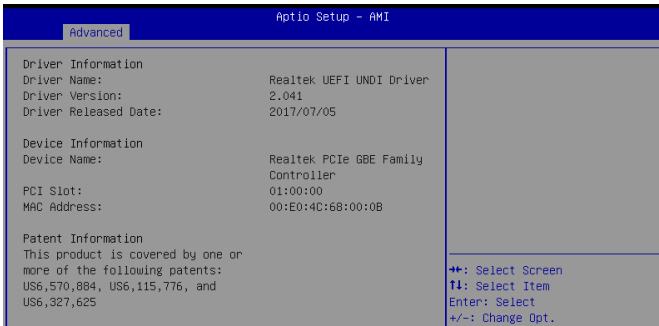
Allows you to disable or control Active State Power Management on SA side of the DMI link. Configuration options: [Disabled] [L0s] [L1] [L0sL1] [Auto]

#### Enable 8254 Clock Gate

Allows you to disable or enables 8254 clock gate. Configuration options: [Disabled] [Enabled] [Enabled In Runtime and S3 Resume]

### 3.3.16 Realtek PCIe GBE Family Controller (MAC:00:E0:4C:68:00:0B)

This item displays the information of the Realtek PCIe GBE Family controller.



### 3.3.17 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 PS2

[Enabled] Enables the PS2 devices to generate a wake event.

[Disabled] Disables the PS2 devices to generate a wake event.

#### Power On By Ring

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

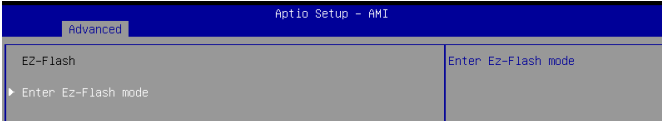
[Disabled] Disables the Ring devices to generate a wake event.



### Power On By RTC

Allows you to select whether to enable Wake Up on Alarm, to turn on your system on a specified day of the month or week, or daily. Configuration options: [Disabled] [Single event] [Daily event] [Weekly event] [Monthly event]

### 3.3.18 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.

### 3.3.19 Watchdog Timer



#### Watchdog Support

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



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

#### Watchdog Count mode

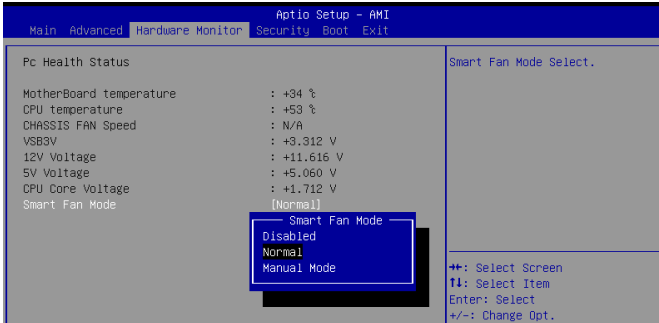
Allows you to select Watchdog Timer I count mode. Configuration options: [Second Mode] [Minute Mode]

#### Watchdog Timer

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

## 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

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



---

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

---

### Smart Fan Function

**Temperature 1 [25] / Temperature 2 [35] / Temperature 3 [45] / Temperature 4 [55]**

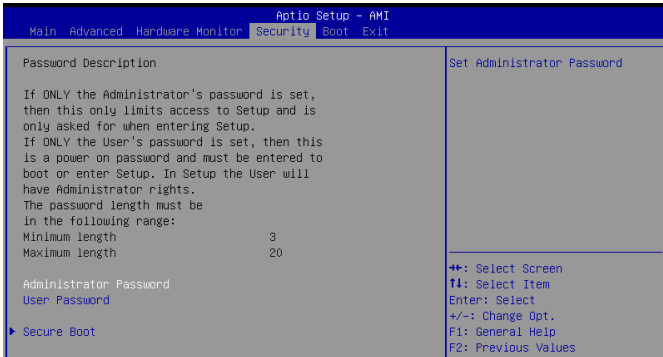
Sets the temperature value for the Smart Fan IV mode.

**FD/RPM 1 [140] / FD/RPM 2 [170] / FD/RPM 3 [200] / FD/RPM 4 [230]**

Sets the Fan PWM value for the Manual Mode.

## 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.



---

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.

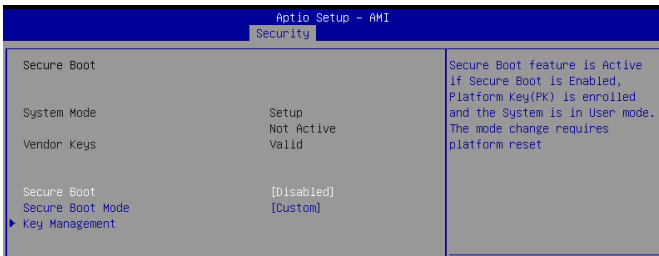
### To change a user password:

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.

#### **Factory Key Provision**

Allows you to install factory default Secure Boot keys after the platform reset and while the system is in Setup mode. Configuration options: [Disabled] [Enabled]

#### **Restore Factory Keys**

Allows you to force the system to run in User Mode and install factory default Secure Boot key databases.

#### **Enroll Efi Image**

Allows the image to run in Secure Boot mode. Enroll SHA256 Hash certificate of a PE image into Authorized Signature Database (db).

#### **Platform Key (PK)**

Configuration options: [Update]

#### **Key Exchange Keys / Authorized Signatures / Forbidden Signatures/Authorized TimeStamps/OsRecovery 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]

#### 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

[Enable] Select to accelerate the boot speed.

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

#### Boot mode select

Allows you to select the boot mode. Configuration options: [LEGACY] [UEFI]

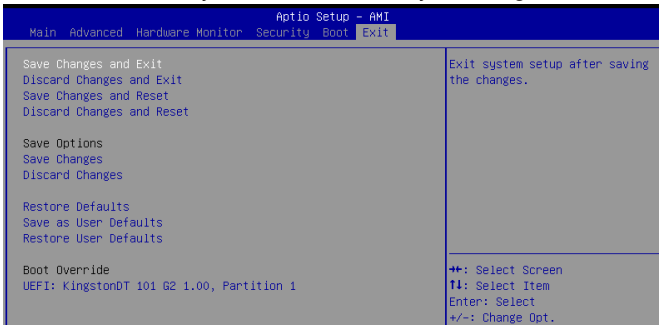
### FIXED BOOT ORDER Priorities

#### Boot Option #1-#6

This item allows you to set the system boot order. Configuration options: [Hard Disk] [NVME] [CD/DVD] [SD] [USB Device] [Network] [Disabled]

## 3.7 Exit menu

The 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.



## 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)

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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。

VCCI-B

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

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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>

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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.

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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.

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AEEE Yönetmeliğine Uygundur

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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.

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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.

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## Regional notice for California



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[www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)

## Service and Support

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<b>Authorized Representative in Europe</b>	ASUS COMPUTER GmbH
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<b>Country</b>	Germany
<b>Authorized Representative in United Kingdom</b>	ASUSTEK (UK) LIMITED
<b>Address</b>	1st Floor, Sackville House, 143-149 Fenchurch Street, London, EC3M 6BL, England
<b>Country</b>	United Kingdom