



MX610H

**Intel® 12th / 13th Generation Core™ Processor
Mini-ITX Motherboard With Intel® H610E
Chipset**

User's Manual

Edition 1.1 – July, 2023

FCC Statement

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

- 1) this device may not cause harmful interference, and
- 2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, 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 measures listed below:

- 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/television technician for help.

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1. Collect all the information about the problem encountered. (For example, CPU type and speed, BCM products model name, hardware & BIOS revision number, other hardware and software used, etc.) Note anything abnormal and list any on-screen messages you get when the problem occurs.
2. Call your vendor and describe the problem. Please have your manual, product, and any helpful information available.
3. If your product is diagnosed as defective, obtain an RMA (return material authorization) number from your vendor. This allows us to process your good return more quickly.
4. Carefully pack the defective product, a complete Repair and Replacement Order Card and a photocopy proof of purchase date (such as your sales receipt) in a shippable container. A product returned without proof of the purchase date is not eligible for warranty service.

Write the RMA number visibly on the outside of the package and ship it prepaid to your vendor.

Manual Objectives

This manual describes in detail the BCM MX610H Main board.

We strongly recommend that you study this manual carefully before attempting to interface with MX610H or change the standard configurations. Whilst all the necessary information is available in this manual, we would recommend that unless you are confident, you contact your supplier for guidance.

Please be aware that it is possible to create configurations within the CMOS RAM that make booting impossible. If this should happen, clear the CMOS settings, (see the description of the Jumper Settings for details).

If you have any suggestions or find any errors concerning this manual and want to inform us of these, please contact our Customer Service department with the relevant details.

Safety Precautions

Warning!



Always completely disconnect the power cord from your chassis whenever you work with the hardware. Do not make connections while the power is on. Sensitive electronic components can be damaged by sudden power surges. Only experienced electronics personnel should open the PC chassis.

Caution!



Always ground yourself to remove any static charge before touching the mainboard. Modern electronic devices are very sensitive to static electric charges. As a safety precaution, use a grounding wrist strap at all times. Place all electronic components in a static-dissipative surface or static-shielded bag when they are not in the chassis.

Document Amendment History

Revision	Date	Comment
0.1	Aug, 2022	Initial Draft
1.0	Oct, 2022	Initial Release

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Mainboard Specifications

Model	MX610H
Processor	Intel® Alder Lake-S Processor Up to 16 Cores 24 Threads Hybrid LGA1700 Supports Core i9, Core i7, Core i5, Core i3, Pentium, Celeron
Chipset	Intel® H610E
Memory	2 x DDR5 SO-DIMM slots (262 pin)
	Dual channel Non-ECC DDR5 4800 MHz , Up to 64GB
Display	Intel® UHD Graphic
	3 x independent displays supported ■ 1 x LVDS 18/24-Bit Dual Channel - Resolution up to 1366x768 @60Hz (18-Bit) - Resolution up to 1920x1200 @60Hz (24-Bit) ■ 1 x eDP (Optional) - Resolution up to 4096x2304 @60Hz ■ 2 x DP - Resolution up to 4096x2304 @60Hz ■ 1 x HDMI - Resolution up to 3840x2160 @30Hz
SATA	3 x SATA III connectors supports Data Transfer rates 6.0Gb/s, 3.0Gb/s and 1.5Gb/s
PCIe	1 x PCIe x16 Gen4 Slot
M.2	1 x 2230 M.2 slot E Key with PCIe x1 & USB 2.0 signal (CNVi Supported)
	1 x 2280 & 2242 M.2 Slot M Key with PCIe x4 & SATA 3.0 signal
USB	4 x USB 3.2 Gen 1 (4 x Rear I/O with USB 2.0 signal)
	2 x USB 2.0
	2 x USB 3.2 Gen 1 (2 x Internal I/O with USB 2.0 signal)
	4 x USB 2.0 (2 x Internal I/O)
TPM	Infineon® SLB 9670VQ2.0 FW7.85
Super I/O Controller	Fintek® F81966AB-I
Serial Ports	2 x RS232/422/485 COM port connector (COM1, COM2)
	2 x RS232 COM port connectors (internal COM3, COM4)
PS/2	1 x PS/2 KB/MS
Watch Dog Timer	1 ~ 255 sec timer
HW Monitor	Yes

Smart FAN	1 x PWM FAN for CPU 1 x PWM FAN for System
Audio	Realtek® ALC897 HD Audio Codec with Auto Jack Sensing
LAN	1 x Intel® I219-LM GbE LAN PHY 1 x Intel® i225-V 2.5GbE LAN
BIOS	AMI BIOS with 256Mb SPI ROM
Others IO	8-Bit Digital IO (4 x GPI, 4 x GPO) SMBus I2C
Expansion Slots	
PCIe	1 x PCIe x16 Gen 4 Slot
M.2	1 x 2230 M.2 slot E Key with PCIe x1 & USB 2.0 signal (CNVi Supported)
	1 x 2280 & 2242 M.2 Slot M Key with PCIe x4 Gen 3 & SATA3.0 signal
Internal I/O Headers	
SATA	3 x Std. SATA 3.0 Connectors
USB 2.0	2 x USB Headers (2 ports on headers)
USB 3.2 Gen 1	1 x USB Headers (2 ports on headers)
COM Port	4 x 2*5-pin Headers
PS/2	1 x 1*6-pin Header
Smart FAN	2 x 1*4-pin Headers
Front Audio	1 x 2*5-pin Header (Line-in, Mic)
Amplifier	1 x 1*4-pin Header
Front Panel	1 x 2*5-pin Header
Fan Header	2 x 1*4-pin Headers
Chassis Intrusion Header	1 x 1*2-pin Header
SMBus	1 x 1*4-pin Header
I2C	1 x 1*4-pin Header
Digital IO	1 x 2*5-pin Header
LVDS	1 x 2*20-pin Header
LVDS Inverter	1 x 1*5-pin Header
eDP	1 x 1*40-pin Header (Optional)
ATX-Power	1 x 2*12-pin Mini-Fit Connector
12V ATX-Power	1 x 2*4-pin Mini-Fit Connector
Internal Jumpers	

COM Port Ring-In/ Power Select	2 x 2*3-Pin Headers provide selections of “Ring-In”, or “12V” or “5V” on COM1&2 and COM3&COM4 ports
AT/ATX Select	1 x 1*3-Pin Header
Clear CMOS	1 x 1*3-Pin Header
ME FW Enable/Disable Select	1 x 1*3-Pin Header
LVDS Backlight Control Select	1 x 1*3-Pin Header
eDP Backlight Power Select	1 x 1*3-Pin Header (Optional)
Back I/O Panel	
Audio	1 x Dual Audio Jack (Line-Out, Mic)
LAN + USB 3.2	1 x GbE RJ45 + Dual USB 3.2 Gen1 Stacked Connector
	1 x 2.5GbE RJ45+Dual USB 3.2 Gen1 Stacked Connector
USB 2.0	1 x Stack up USB 2.0 Connectors
DisplayPort	1 x Stack up dual DisplayPort Connector
HDMI	1 x HDMI Connector
COM	1 x Stack up dual COMs Connector
Power & Connector	
	1 x 2*12-pin Mini-Fit ATX-Power Connector
	1 x 2*4-pin Mini-Fit 12V ATX-Power Connector
Form Factor	
	Mini-ITX (6.7-in x 6.7-in)
Certification	
	FCC Class B, CE

Chapter 1: System Setup

This chapter describes the mainboard features and the new technologies it supports.

1.1 Welcome!

The mainboard delivers a host of new features and latest technologies, making it another line of BCM long life mainboards! Before you start installing the mainboard and hardware devices on it, check the items in your package with the list below.

If any of the items listed below is damaged or missing, please contact your vendor.

1.2 Packing Contents

- **Mainboard**

- 1 x MX610H

- **Accessories**

- 1 x MX610H STD I/O Shield

- **Drivers**

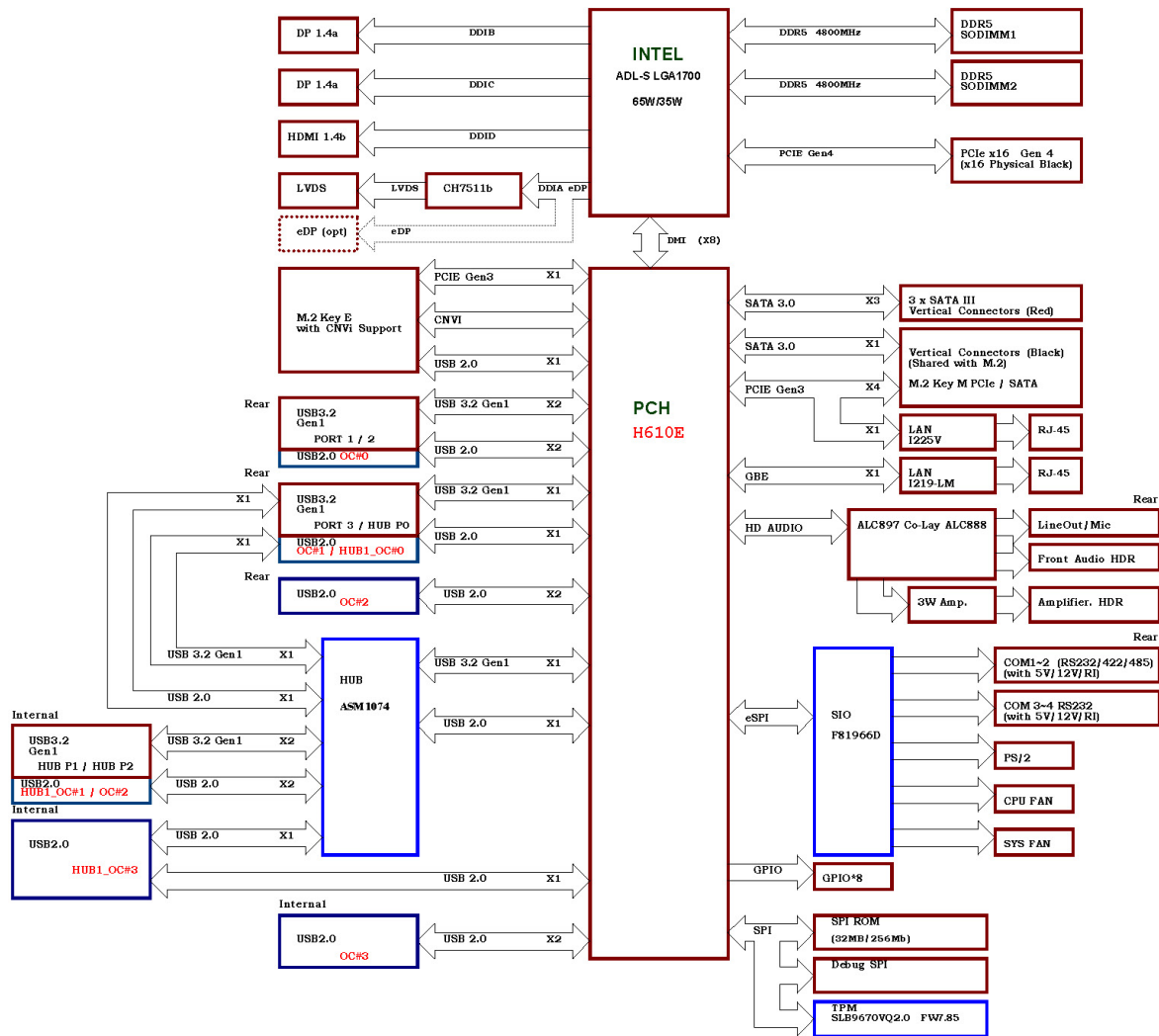
- Drivers is available for download at BCM website at WWW.BCMCOM.COM

- **Documentation**

- Latest Manual is available for download at BCM website at WWW.BCMCOM.COM

1.3 Features

MX610H block Diagram



1.4 Before you proceed

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

- Unplug the power cord from the wall socket before touching any component inside the system.
- Use a grounded wrist strap or touch a safely grounded object or to a metal object, such as the power supply case, before handling components 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 mainboard, peripherals, and/or component.

1.5 Mainboard Overview

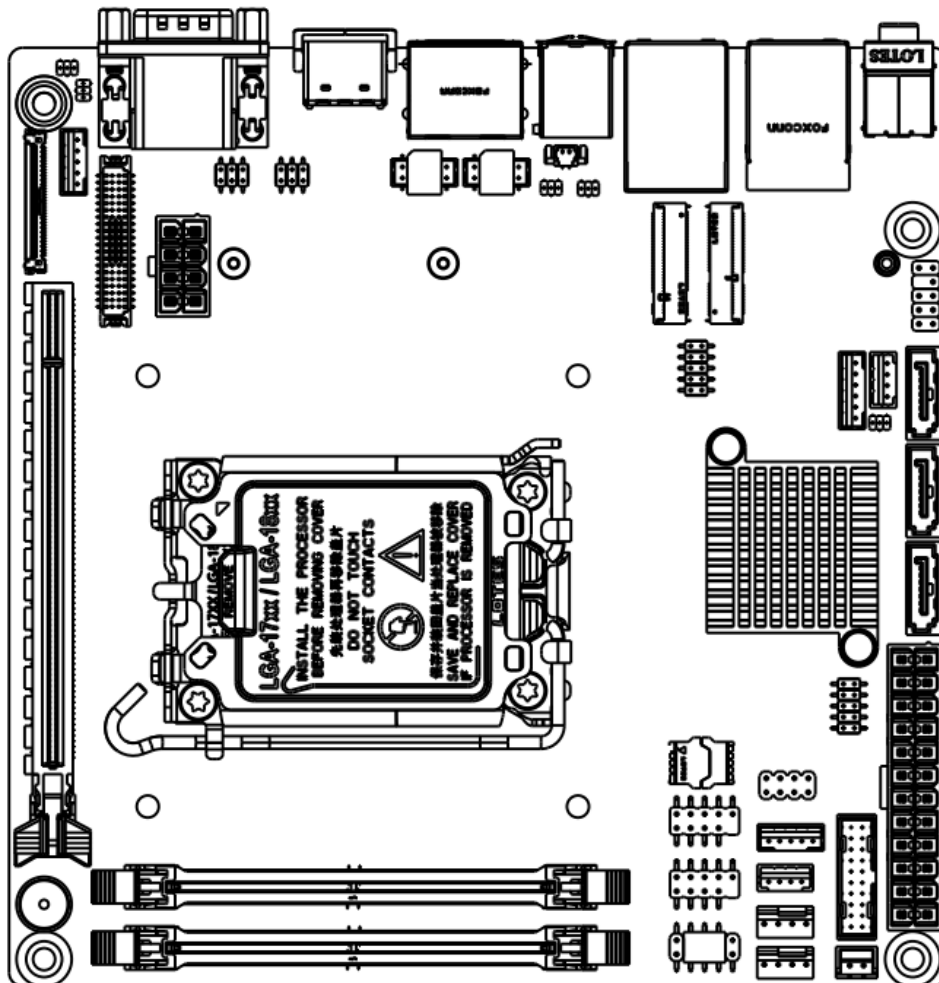
Before you install the mainboard, study the configuration of your chassis to ensure that the mainboard fits into it.



Make sure to unplug the power cord before installing or removing the mainboard. Failure to do so can cause you physical injury and damage mainboard components.

1.5.1 Placement Direction

When installing the mainboard, make sure that you place it into the chassis in the correct orientation. The edge with external port goes to the rear part of the chassis as indicated in the image below.

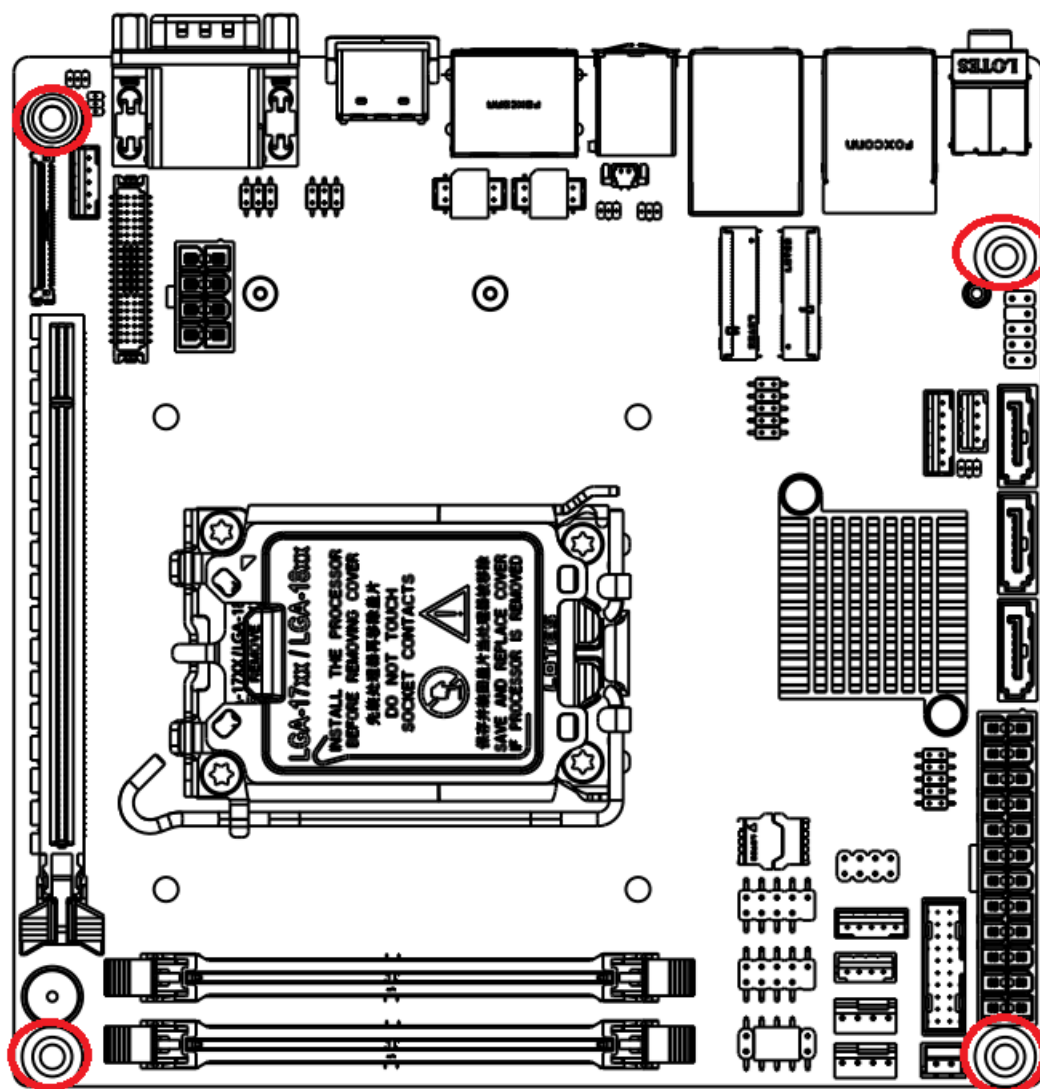


1.5.2 Mounting Holes

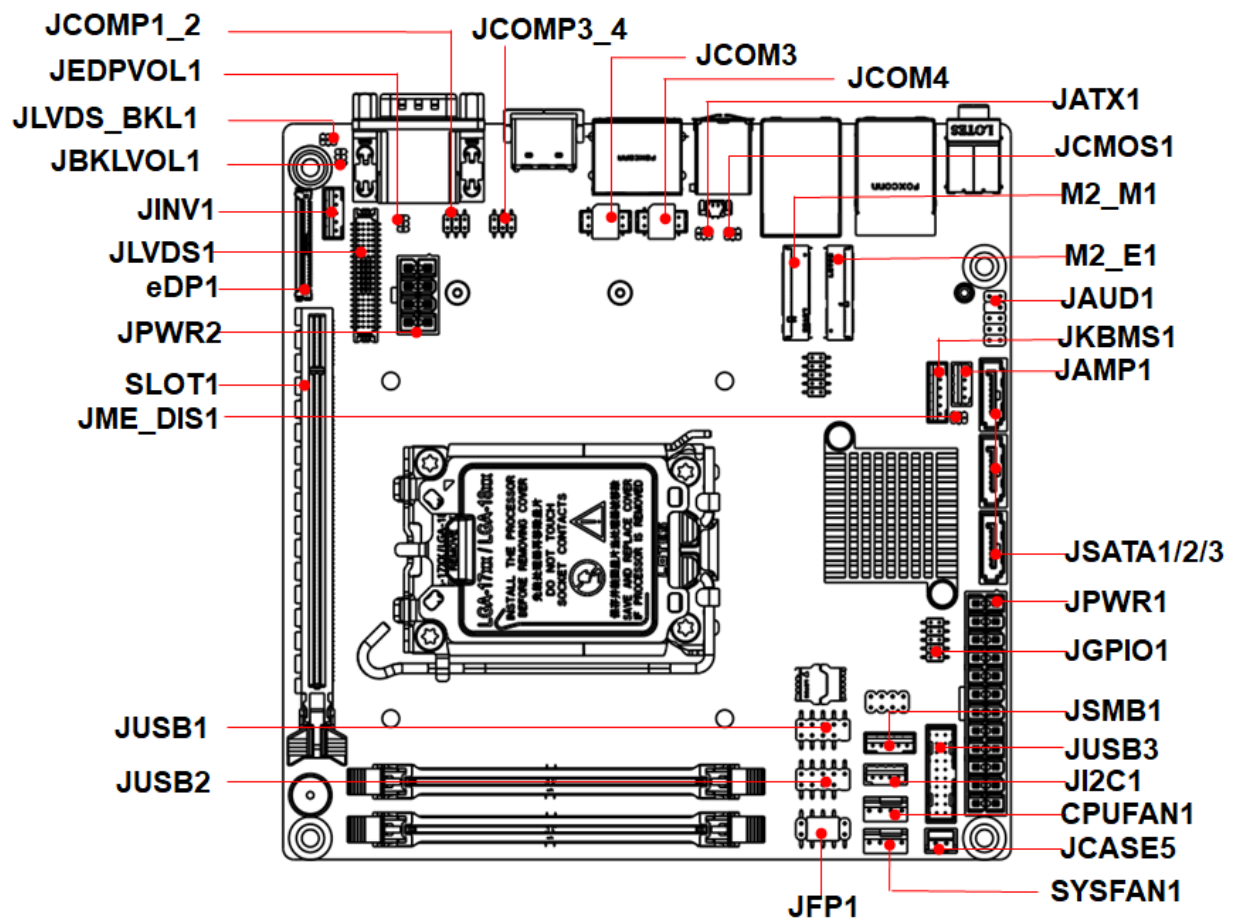
Place the screws into the mounting holes indicated by the red circles to secure the mainboard to the chassis.



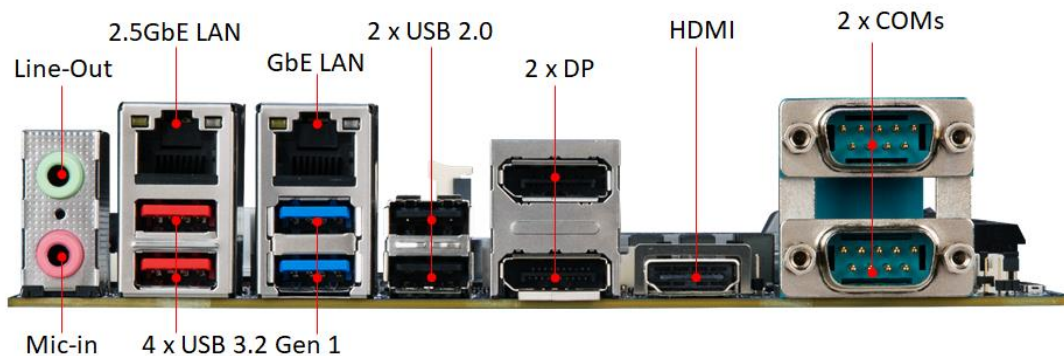
Do not over-tighten the screws! Doing so may damage the mainboard.



1.5.3 Mainboard Layout



• Back Panel:



1.5.4 Layout Content List

1.5.4.1 Slots

Label	Function	Note	Page
DIMM1	262-pin DIMM slot 1	If there is only one memory module being installed in the system, install it on this slot first.	24
DIMM2	262-pin DIMM slot 2		24
SLOT1	PCI express x16 slot		43
M2_E1	2230 M.2 slot E Key		44
M2_M1	2280 & 2242 M.2 Slot M Key		44

1.5.4.2 Internal Jumpers

Label	Function	Note	Page
JCMOS1	Clear CMOS	1 x 3 header, pitch 1.25mm	38
JME_DIS1	Enable/disable the Intel ME F/W	1 x 3 header, pitch 1.25mm	41
JATX1	AT/ATX Power Select	1 x 3 header, pitch 1.25mm	40
JLVDS_BKL1	LVDS Backlight Control Select	1 x 3 header, pitch 1.25mm	42
JBKLVOL1	LVDS Backlight Power 3V/5V Select	1 x 3 header, pitch 1.25mm	41
JEDPLVOL1	eDP Backlight Power 3V/5V Select	1 x 3 header, pitch 1.25mm	40
JCOMP1_2	COM1 & COM2 RI/+5V/+12V Select	2 x 3 header, pitch 2.0mm	39
JCOMP3_4	COM3 & COM4 RI/+5V/+12V Select	2 x 3 header, pitch 2.0mm	39
JATX1	AT/ATX Power Select	1 x 3 header, pitch 2.0mm	40

1.5.4.3 Internal Headers

Label	Function	Note	Page
JPWR1	ATX-Power Connector	2 x 12 header	25
JPWR2	12V ATX-Power Connector	2 x 4 header	26

JSATA1/2/3	Serial ATA Connectors	7-pin	29
CPUFAN1	CPU Fan Connector	1 x 4 wafer, pitch 2.54mm	29
SYSFAN1	System Fan Connector	1 x 4 wafer, pitch 2.54mm	29
JI2C1	I2C	1 x 4 wafer, pitch 2.0mm	36
JSMB1	SMBus	1 x 4 wafer, pitch 2.0mm	37
JFP1	System Panel Connector	2 x 5 header, pitch 2.54mm	33
JCOM3 JCOM4	Serial Port Connector 3, 4	2 x 5 wafer, pitch 2.0mm	32
JGPIO1	Digital I/O header	2 x 5 header, pitch 2.0mm	34
JCASE5	Chassis Intrusion Connector	1 x 2 wafer, pitch 2.0mm	30
JBMS1	PS/2 KB&MS	1 x 6 wafer, pitch 2.0mm	32
JUSB1 JUSB2	USB 2.0 Connector	2 x 5 header, pitch 2.54mm	31
JAMP1	Amplifier Connector	1 x 4 header, pitch 2.54mm	31
JUSB3	USB 3.2 Gen 1 Connector	2 x 10 Box header, pitch 2.0mm	34
JAUD1	Front Panel Audio Connector	2 x 5 header, pitch 2.54mm	31
JINV1	LVDS Inverter Connector	1 x 5 header, pitch 2.0mm	35
JLVDS1	LVDS Connector	2 x 20 header, pitch 1.25mm	35
eDP1	eDP Connector	1 x 40 header, pitch 0.5mm	36

1.5.4.4 Back Panel Connectors			
Label	Function	Note	Page
AUDIO1	1 x Audio Dual Jack (Line-Out, Mic)		17
Conn2	1 x 2.5GbE RJ45+Dual USB 3.2 Gen1 Stacked Connector		17
Conn1	1 x GbE RJ45 + Dual USB 3.2 Gen1 Stacked Connector		17
USB1	1 x Stack up USB 2.0 Connectors		17
DP1	1 x Stack up dual DisplayPort Connector		17
HDMI1	1 x HDMI Connector		17
JCOM1	1 x Stack up dual COMs Connector		17

1.5.4.5 Mating Connectors list

Connector/Header	Location	Mating P/N	Connector/Header P/N
Amplified Speakers	JAMP1	JST PHR-4 or equivalent	HORNG TONG WF04N22DJF006
Backlight	JINV1	JST PHR-5 or equivalent	HORNG TONG WF05N22WJQ006
COM Port	JCOM3; JCOM4	JST PHDR-10VS or equivalent	HORNG TONG WF10N63WAA210
eDP	EDP1	I-PEX 20453-040T-11	HIROSE KN38A-40S-0.5H(800)
Fan	CPUFAN1; SYSFAN1	Molex 470541000 or equivalent	HORNG TONG WF04R2JDJQ113
Front Audio	JAUD1	Molex 22-55-2101 or equivalent	HORNG TONG PH10R52BAJ008
Front Panel	JFP1	Molex 22-55-2101 or equivalent	HORNG TONG PH10R63YAAB18
GPIO	JGPIO1	Molex 51110-1250 or equivalent	HORNG TONG PH10N6-7BAAA00
I2C	JI2C1	JST PHR-4 or equivalent	HORNG TONG WF04N22DJF006
Keyboard/Mouse	JKBMS1	JST PHR-6 or equivalent	HORNG TONG WF06N22WJJ006
LVDS	JLVDS1	Hirose DF13-40DS-1.25C(10) or equivalent	HORNG TONG WF40H6-7BAA178
SMB	JSMB1	JST PHR-5 or equivalent	HORNG TONG WF05N22WJF006
USB 2.0	JUSB1; JUSB2	Molex 22-55-2101 or equivalent	HORNG TONG PH10R93BAAC09
USB 3.2 Gen 1	JUSB3	Molex 51110-2051 or equivalent	HORNG TONG BH20NQ3GAFL14

1.6 CPU (Central Processing Unit)

When installing the CPU, make sure that you install a cooler to prevent overheating. If you do not have a CPU cooler, consult your vendor before turning on the computer.



Overheating

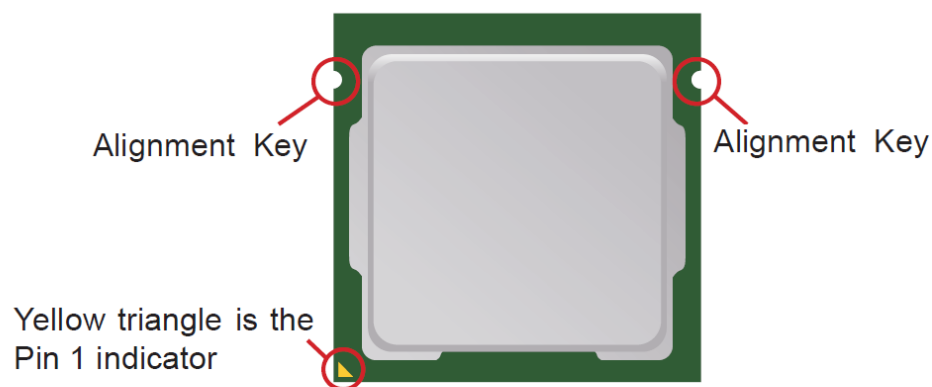
Overheating may seriously damage the CPU and system. Always make sure the cooling fan can work properly to protect the CPU from overheating. Make sure that you apply an even layer of thermal paste (or thermal tape) between the CPU and the heatsink to enhance heat dissipation.

Replacing the CPU

While replacing the CPU, always turn off the power supply or unplug the power supply's power cord from the grounded outlet first, to ensure the safety of CPU.

Introduction to LGA 1700 CPU

The surface of LGA 1700 CPU. Remember to apply some thermal paste on it for better heat dispersion.

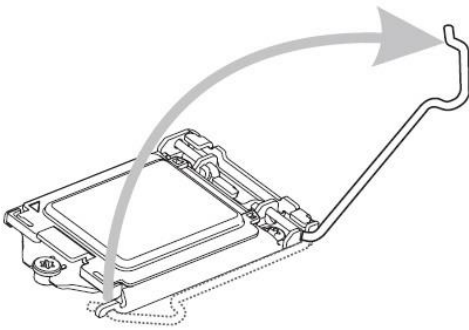


1.6.1 Installing CPU

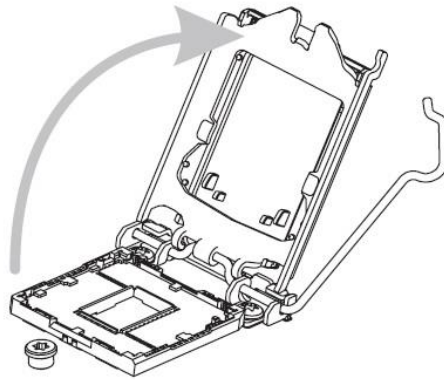
CPU Installation

After installing the CPU, **make sure the CPU has a cooler attached on the top to prevent overheating**. Meanwhile, do not forget to apply some thermal paste on CPU before installing the heat sink/cooler fan for better heat dispersion.

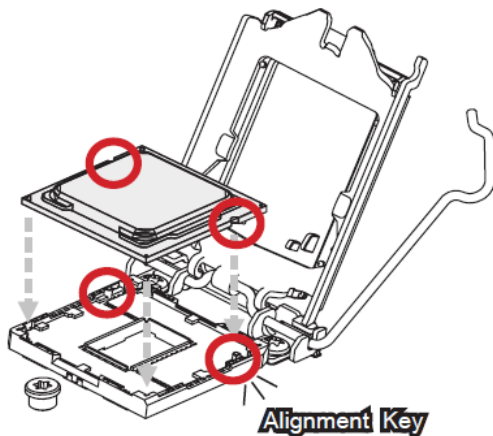
1. Open the load lever and remove the plastic cap.



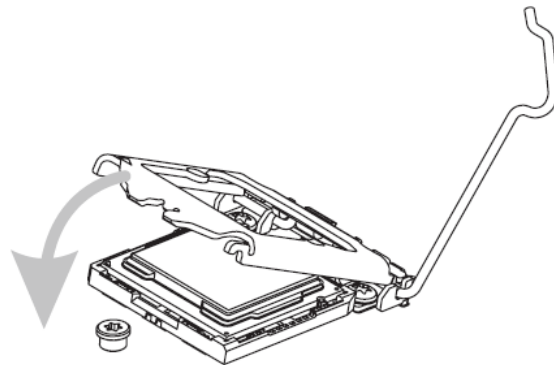
2. Lift the load lever up to fully open position.



3. After confirming the CPU direction for correct mating, put down the CPU in the socket housing frame. Be sure to grasp on the edge of the CPU base. Note that the alignment keys are matched.



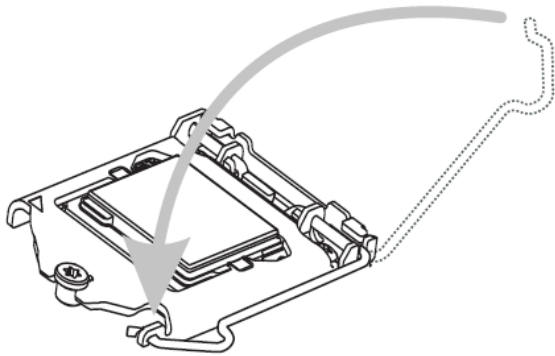
4. Engage the load lever while pressing down lightly onto the load plate.



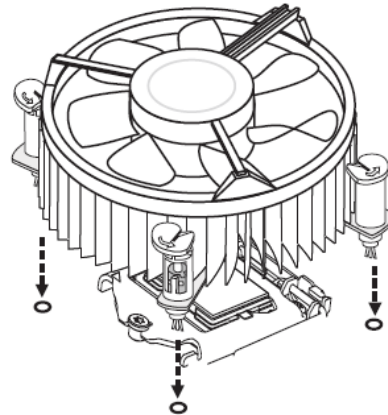
Important

Visually inspect if the CPU is seated well into the socket. If not, take out the CPU with pure vertical motion and reinstall.

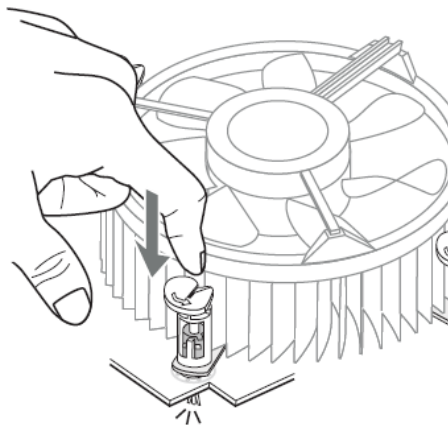
5. Secure the load lever with the hook under the retention tab.



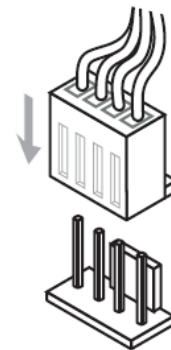
6. Make sure the four hooks are in proper position before you install the cooler. Align the holes on the motherboard with the cooler. Push down the cooler until its four clips get wedged into the holes of the motherboard.



7. Press the four hooks down to fasten the cooler. Turn over the motherboard to confirm that the clip-ends are correctly inserted.



8. Finally, attach the CPU Fan cable to the CPU fan connector on the motherboard.

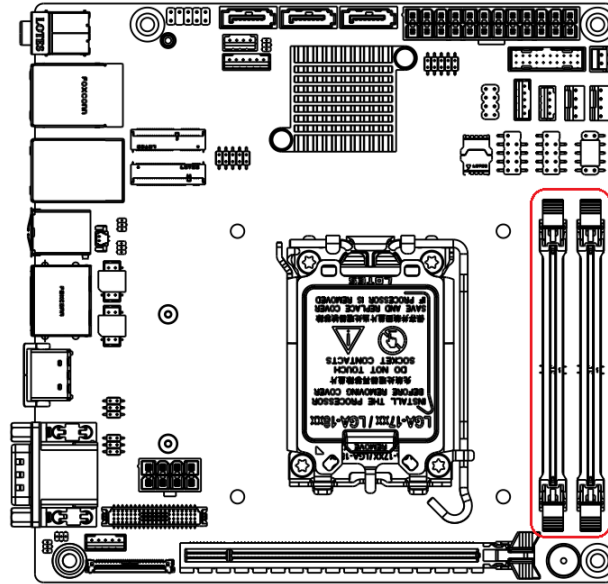


Important

- Confirm if your CPU cooler is firmly installed before turning on your system.
- Do not touch the CPU socket pins to avoid damage.
- Whenever CPU is not installed, always protect your CPU socket pins with the plastic cap covered.
- Please refer to the documentation in the CPU cooler package for more details about the CPU cooler installation.
- Read the CPU status in BIOS.

1.7 Installing DIMM

1.7.1 The SO-DIMM slot is intended for memory modules.



1.7.2 Installing a DDR5 SODIMM



Make sure to unplug the power supply before adding or removing SODIMMs or other system components. Failure to do so may cause severe damage to both the motherboard and the components.

1. Locate the SODIMM socket on the board.
2. Hold two edges of the SODIMM module carefully, and keep away of touching its connectors.
3. Align the notch key on the module with the rib on the slot.
4. Firmly press the modules into the socket which will automatically snap into the mounting notch. Do not force the SODIMM module in with extra force as the SODIMM module only fits in one direction.



- The DDR5 SODIMM sockets do not support DDR/DDR2/DDR3/DDR4 SODIMMs. DO NOT install DDR/DDR2/DDR3/DDR4 SODIMMs to the DDR5 SODIMM socket.

1.7.3 Removing a DDR5 SODIMM

1. Press the two ejector tabs on the slot outward simultaneously, and then pull out the DIMM module.

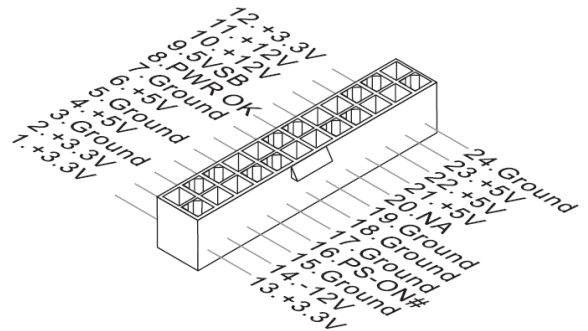
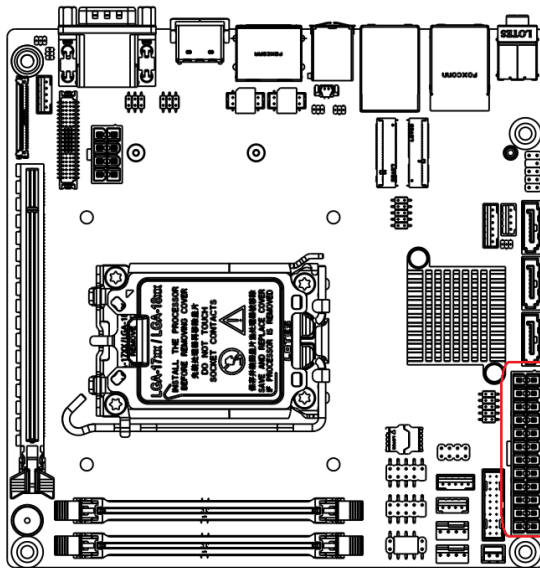


Support the SODIMM lightly with your fingers when pressing the ejector tabs. The SODIMM might get damaged when it flips out with extra force.

1.8 Power Supply

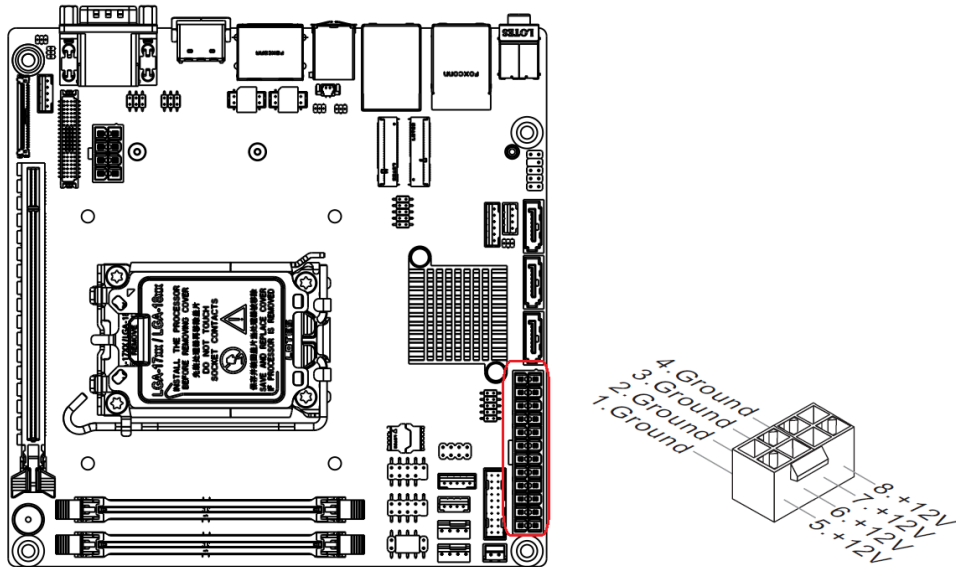
1.8.1 ATX Power Connector: JPWR1

This connector allows you to connect a power supply. To connect to the power supply, make sure the plug of the power supply is inserted in the proper orientation and the pins are aligned. Then push down the power supply firmly into the connector.



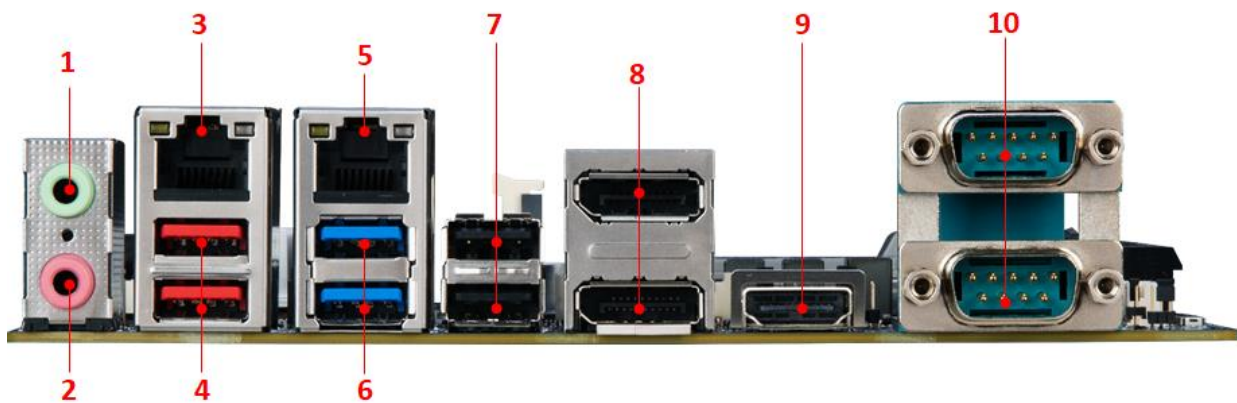
1.8.2 ATX 12V Power Connector: JPWR2



This connector is used to provide power to the CPU.



1.9 Back Panel

1.9.1 Back Panel Connectors



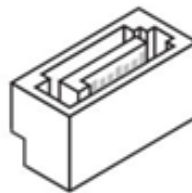
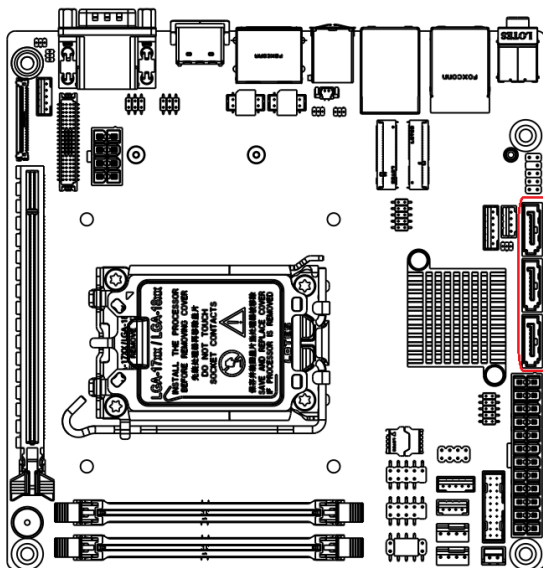
Item	Name	Function	Description																				
1	AUDIO1	Line-out port (Lime)	This port connects a headphone or a speaker.																				
2	AUDIO1	Microphone port (Pink)	This port connects a microphone.																				
3	Conn2	2.5 Gigabit LAN (RJ-45) Connectors <div><div>ACT/LINK LED</div><div>SPEED LED</div><div>LAN port</div></div>	<p>This port allows Gigabit connection to a Local Area Network (LAN) through a network hub. Refer to the table below for the LAN port LED indications.</p> <table><tr><th colspan="2">ACT/Link LED</th><th colspan="2">Speed LED</th></tr><tr><th>Status</th><th>Description</th><th>Status</th><th>Description</th></tr><tr><td>OFF</td><td>No link</td><td>OFF</td><td>10/100Mbps connection</td></tr><tr><td>Yellow</td><td>Linked</td><td>Green</td><td>1Gbps connection</td></tr><tr><td>Blinking</td><td>Data activity</td><td>Orange</td><td>2.5Gbps connection</td></tr></table>	ACT/Link LED		Speed LED		Status	Description	Status	Description	OFF	No link	OFF	10/100Mbps connection	Yellow	Linked	Green	1Gbps connection	Blinking	Data activity	Orange	2.5Gbps connection
ACT/Link LED		Speed LED																					
Status	Description	Status	Description																				
OFF	No link	OFF	10/100Mbps connection																				
Yellow	Linked	Green	1Gbps connection																				
Blinking	Data activity	Orange	2.5Gbps connection																				
4		USB 3.2 Gen 1 Connectors	These two 4-pin Universal Serial Bus (USB) ports are available for connecting USB 3.2 Gen 1/ 2.0 devices.																				
5	Conn1	Gigabit LAN (RJ-45) Connectors <div><div>ACT/LINK LED</div><div>SPEED LED</div><div>LAN port</div></div>	<p>This port allows Gigabit connection to a Local Area Network (LAN) through a network hub. Refer to the table below for the LAN port LED indications.</p> <table><tr><th colspan="2">ACT/Link LED</th><th colspan="2">Speed LED</th></tr><tr><th>Status</th><th>Description</th><th>Status</th><th>Description</th></tr><tr><td>OFF</td><td>No link</td><td>OFF</td><td>10Mbps connection</td></tr><tr><td>Yellow</td><td>Linked</td><td>Green</td><td>100Mbps connection</td></tr><tr><td>Blinking</td><td>Data activity</td><td>Orange</td><td>1Gbps connection</td></tr></table>	ACT/Link LED		Speed LED		Status	Description	Status	Description	OFF	No link	OFF	10Mbps connection	Yellow	Linked	Green	100Mbps connection	Blinking	Data activity	Orange	1Gbps connection
ACT/Link LED		Speed LED																					
Status	Description	Status	Description																				
OFF	No link	OFF	10Mbps connection																				
Yellow	Linked	Green	100Mbps connection																				
Blinking	Data activity	Orange	1Gbps connection																				
6		USB 3.2 Gen 1 Connectors	These two 4-pin Universal Serial Bus (USB) ports are available for connecting USB 3.2 Gen 1/ 2.0 devices.																				

7	USB	USB 2.0 Connectors	These two 4-pin Universal Serial Bus (USB) ports are available for connecting USB 2.0 devices.
8	DP	Dual DisplayPort	Provides “DisplayPort” type connection to monitor.
9	HDMI	HDMI	The High-Definition Multimedia Interface (HDMI) is an all-digital audio/video interface capable of transmitting uncompressed streams. HDMI supports all TV format, including standard, enhanced, or high-definition video, plus multi-channel digital audio on a single cable.
10	COM	Dual Serial port	The serial port is a 16550A high speed communications port that sends/receives 16 bytes FIFOs. With Auto-Flow Control and RI Function Support

1.10 Connectors/ Headers

1.10.1 Serial ATA Connectors: JSATA1/2/3

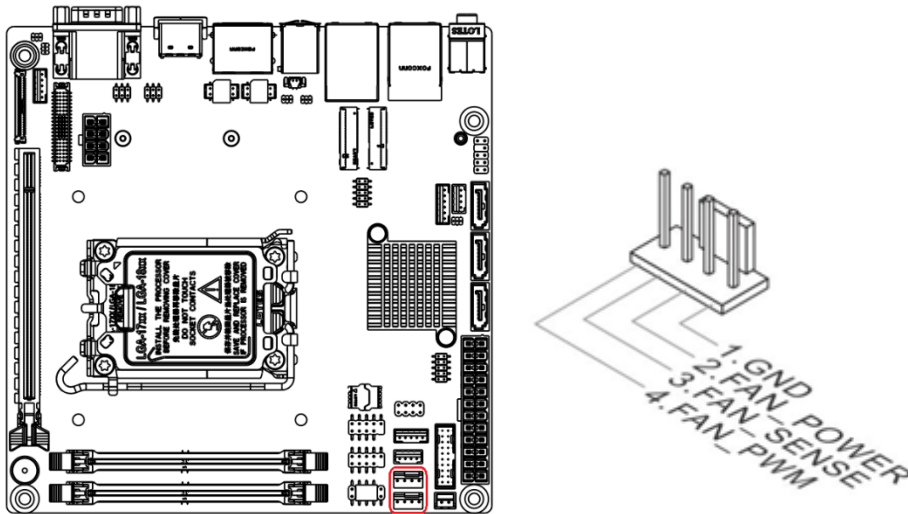
This connector is a high-speed Serial ATA interface port. Each connector can connect to one Serial ATA device. SATA3.0 standard, which is backward compatible with SATA2.0



Please do not fold the Serial ATA cable into 90-degree angle. Otherwise, data loss may occur during data transmission.

1.10.2 Fan Power Connectors: CPUFAN1, SYSFAN1

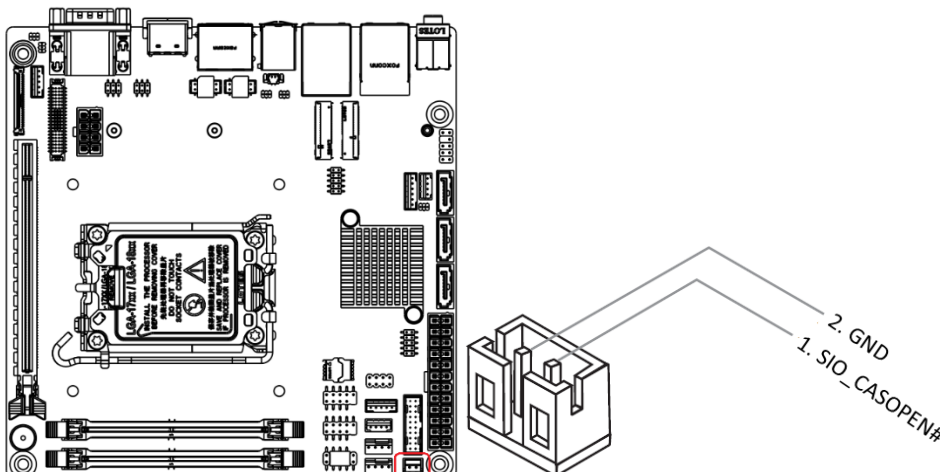
The fan power connectors support system cooling fan with +12V. When connecting the wire to these fan connectors, please note that the red wire is designated as “Power” and should be connected to “+12V” pin; the black wire is designated as “Ground” and should be connected to “GND”. In order to take the advantage of System Hardware Monitor, be sure to use a fan which is specifically designed with a speed sensor.



Please refer to the recommended CPU fans at processor’s official website or consult with a vendor for proper CPU cooling fan.

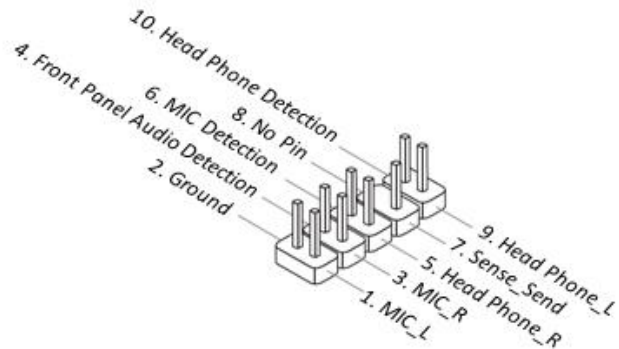
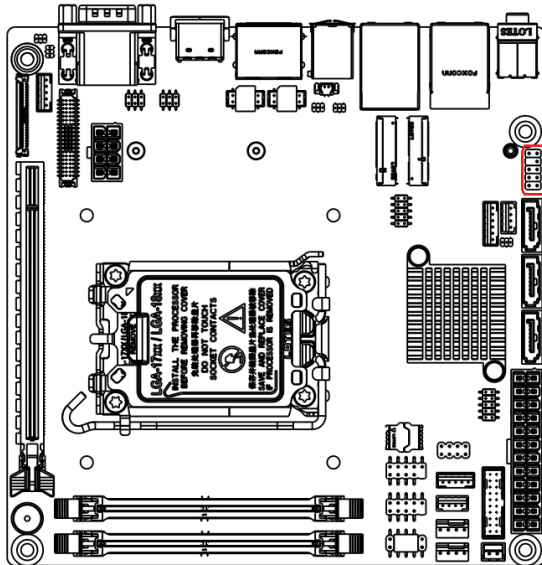
1.10.3 Chassis Intrusion Switch Connector: JCASE5

This connector connects to a 2-pin chassis switch. If the chassis is opened, the switch will be short. The system will record this status and show a warning message on the bootup screen. To clear the warning message, you must enter the BIOS and clear the record.



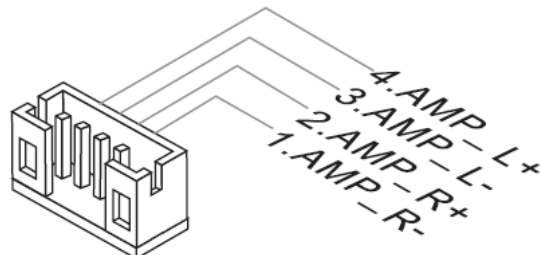
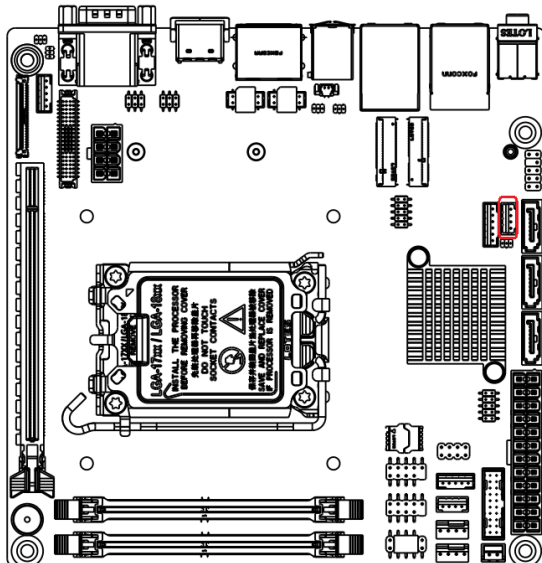
1.10.4 Front Panel Audio Connector: JAUD1

This connector allows you to connect the front panel audio and is compliant with the Intel® Front Panel I/O Connectivity Design Guide.



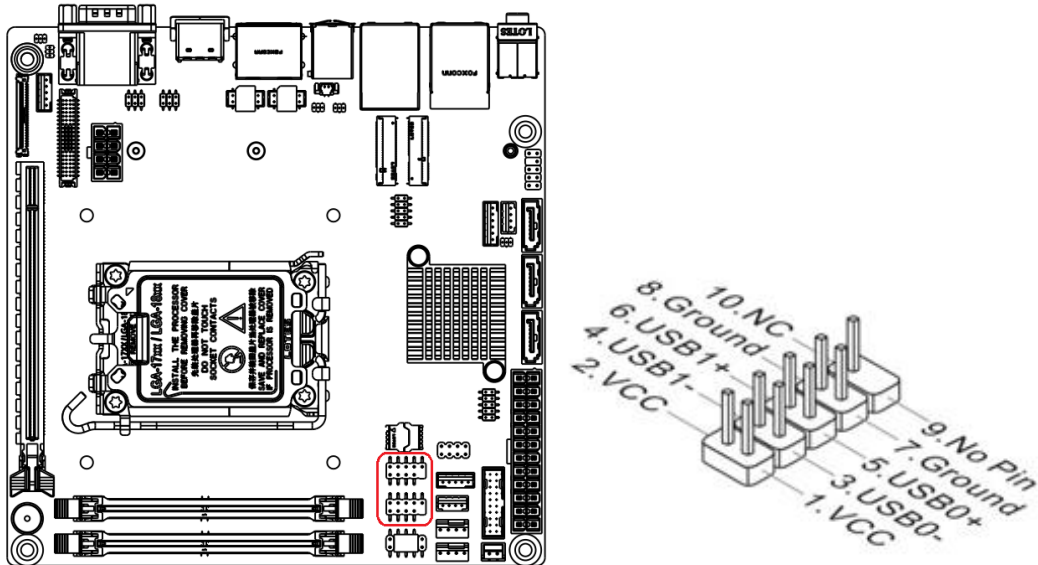
1.10.5 Amplifier Connector: JAMP1

This header provided amplified audio signals to external speakers (2-channels).



1.10.6 Front USB2.0 Headers: JUSB1&JUSB2

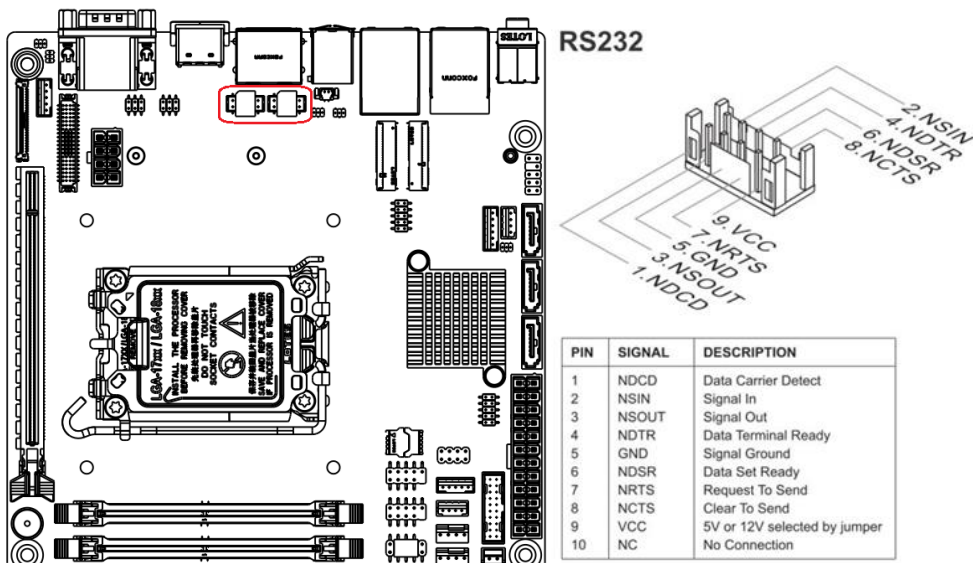
This connector is compliant with the Intel® I/O Connectivity Design Guide, which is ideal for connecting high-speed USB peripherals such as USB HDD, USB digital cameras, USB MP3 players, USB printers, etc.



Be sure the pins of VCC and GND is connected to the connector correctly.
Otherwise, it may cause damage to the USB port and/or the connected USB device.

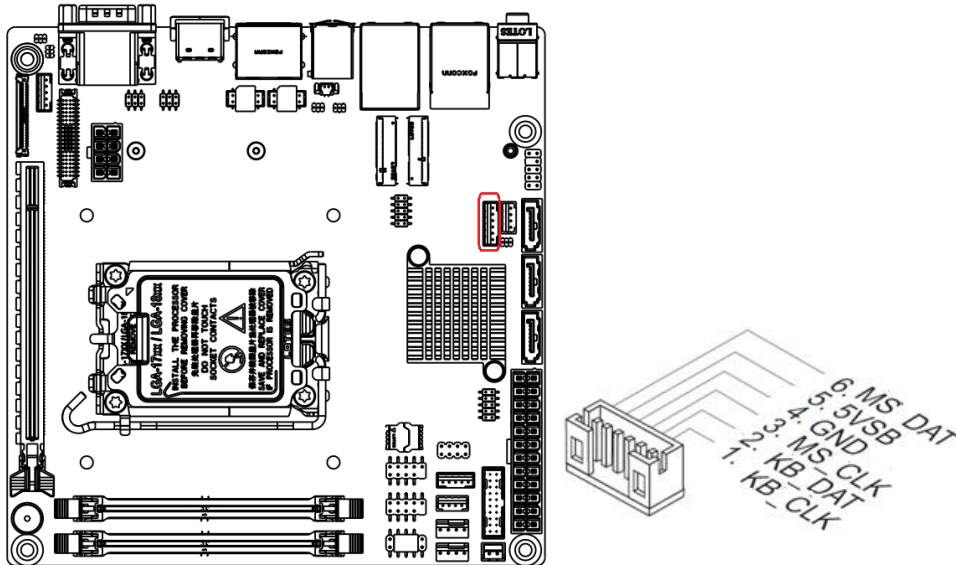
1.10.7 Serial Port Connectors: JCOM3, JCOM4

This connector is a 16550A high speed communications port that sends/receives 16 bytes FIFOs. You can attach a serial device to it. COM3~4 support RS232.



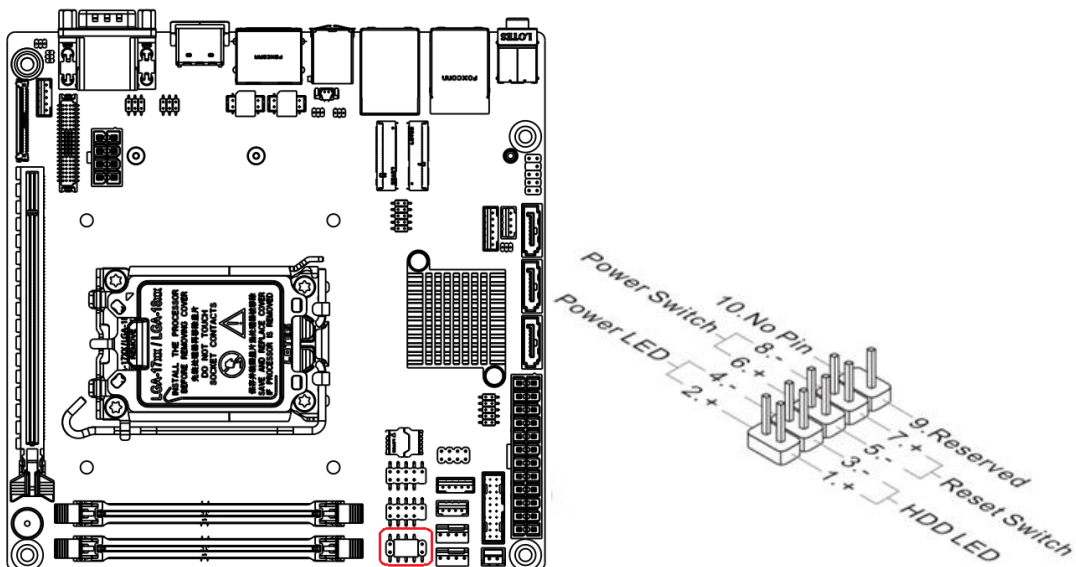
1.10.8 PS/2 Port Connector: JKBMS1

This connector is provided to connect a keyboard and a mouse.



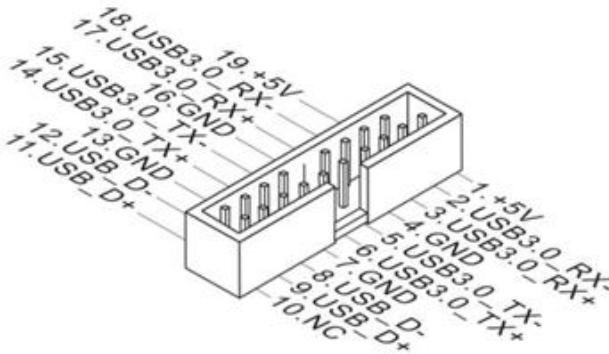
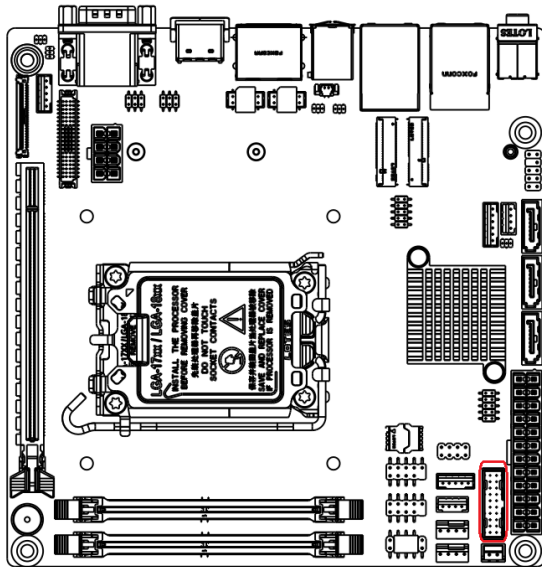
1.10.9 Front Panel Connectors: JFP1

This front panel connector is provided for electrical connection to the front panel switches & LEDs and is compliant with the Intel Front Panel I/O Connectivity Design Guide.



1.10.10 USB 3.2 Gen1 Connector: JUSB3

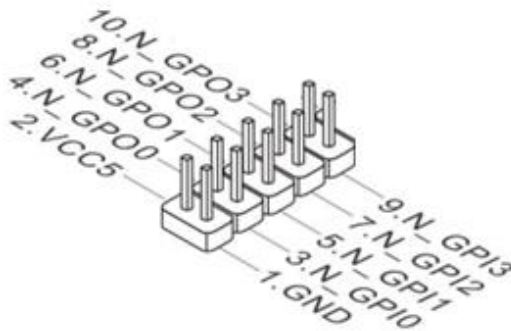
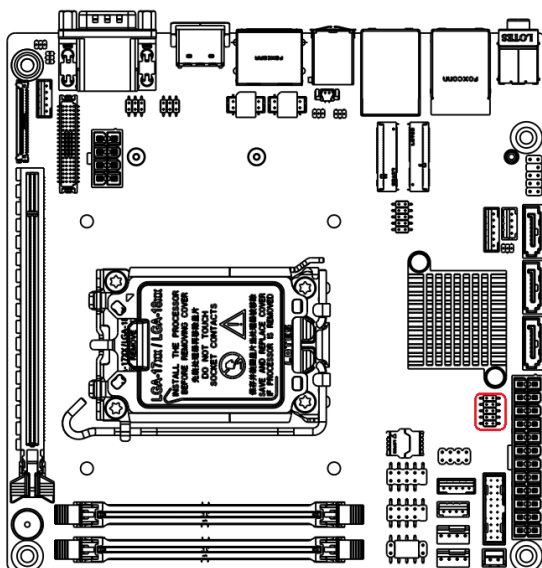
The USB 3.2 Gen 1 port is backwards compatible with USB 2.0 devices. It supports up to 5 Gbit/s (SuperSpeed) data transfer rate.



1. Note that the pins of VCC and GND must be connected correctly to avoid possible damage.
2. To use a USB 3.2 Gen1 device, you must connect the device to a USB 3.2 Gen1 port through an optional USB 3.2 Gen 1 compliant cable.

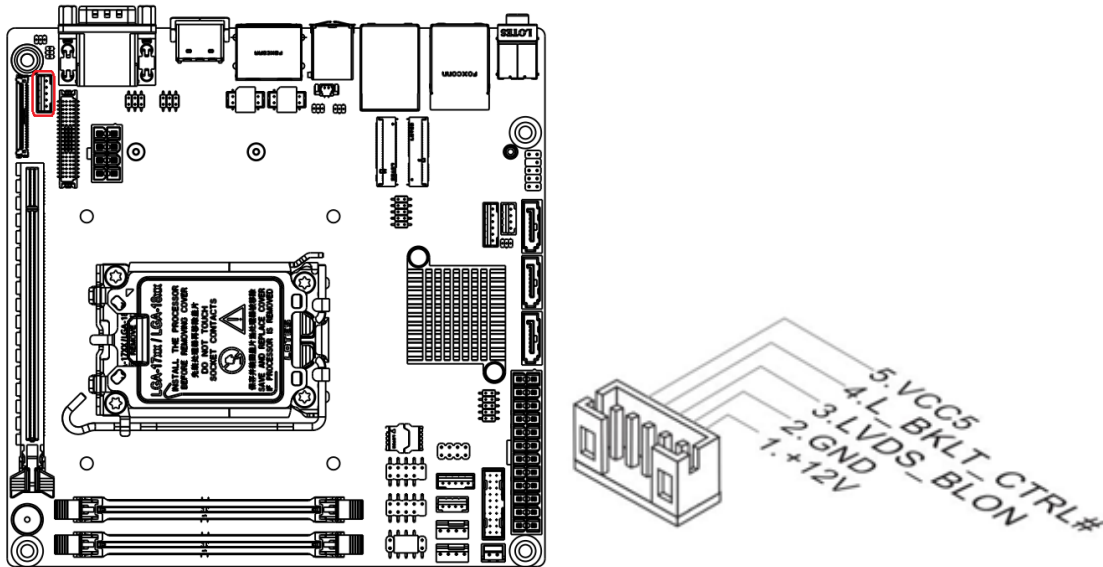
1.10.11 Digital I/O Connector: JGPIO1

This connector is provided for the General-Purpose Input/Output (GPIO) peripheral module.



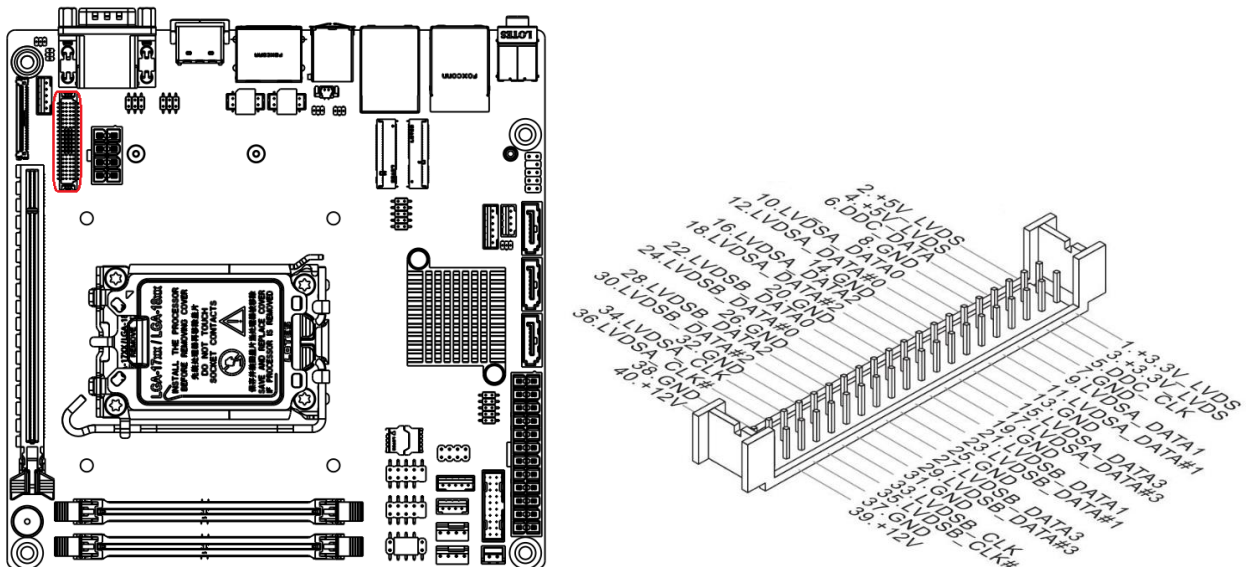
1.10.12 LVDS Inverter Connector: JINV1

The connector is provided for LCD backlight options.



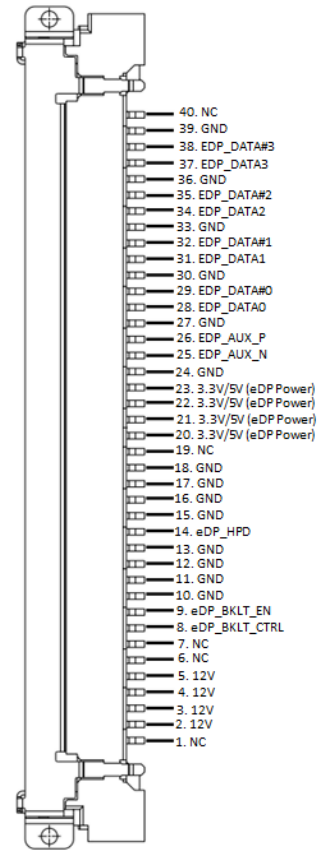
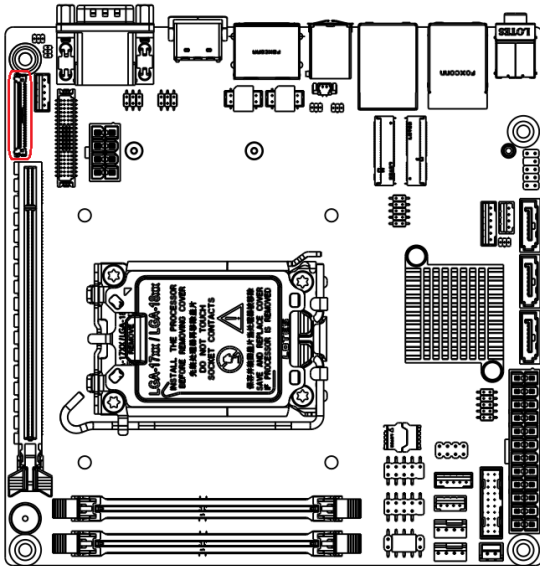
1.10.13 LVDS Connector: JLVDS1

The LVDS (Low Voltage Differential Signal) connector provides a digital interface typically used with flat panels. After connecting an LVDS interface flat panel to the JLVDS1, be sure to check the panel datasheet and set the LVDS jumper to proper power voltage.

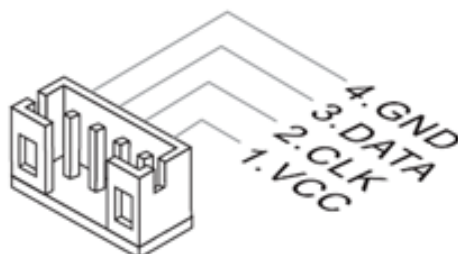
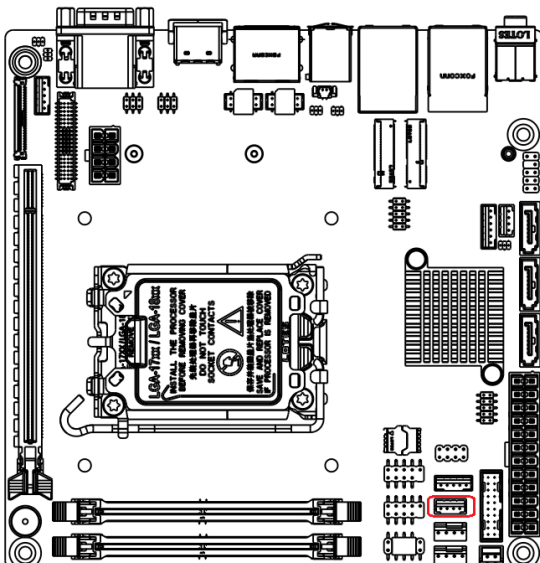


1.10.14 eDP Connector: EDP1 (Optional)

This connector is for connecting a flat EDP cable.

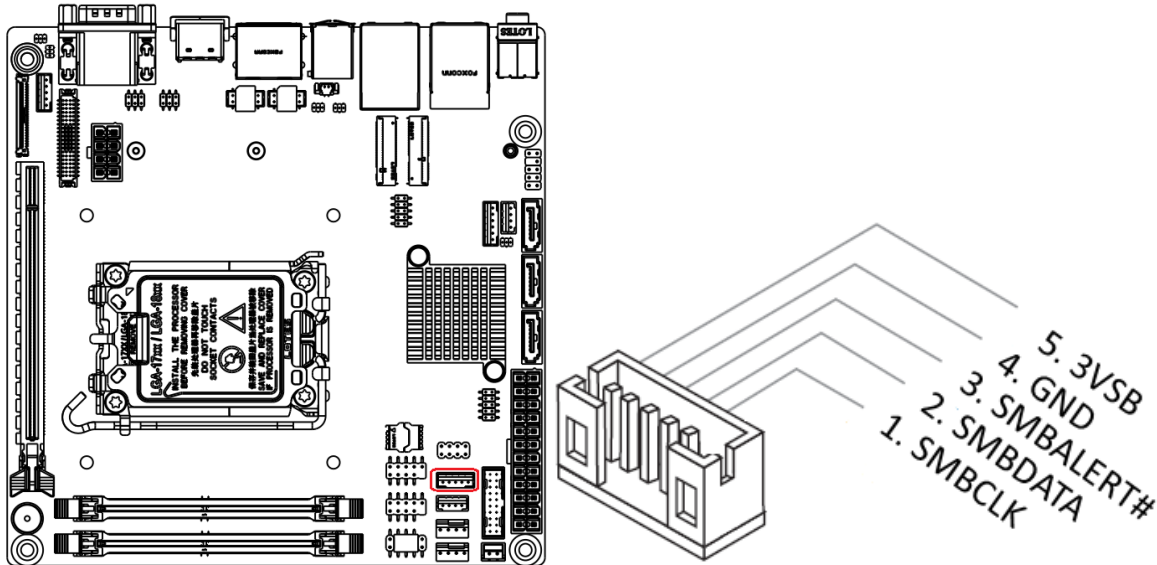


1.10.15 I2C Connector: JI2C1



1.10.16 SMBus Connector: JSMB1

This connector, known as I2C, is for users to connect System Management Bus (SMBus) interface.



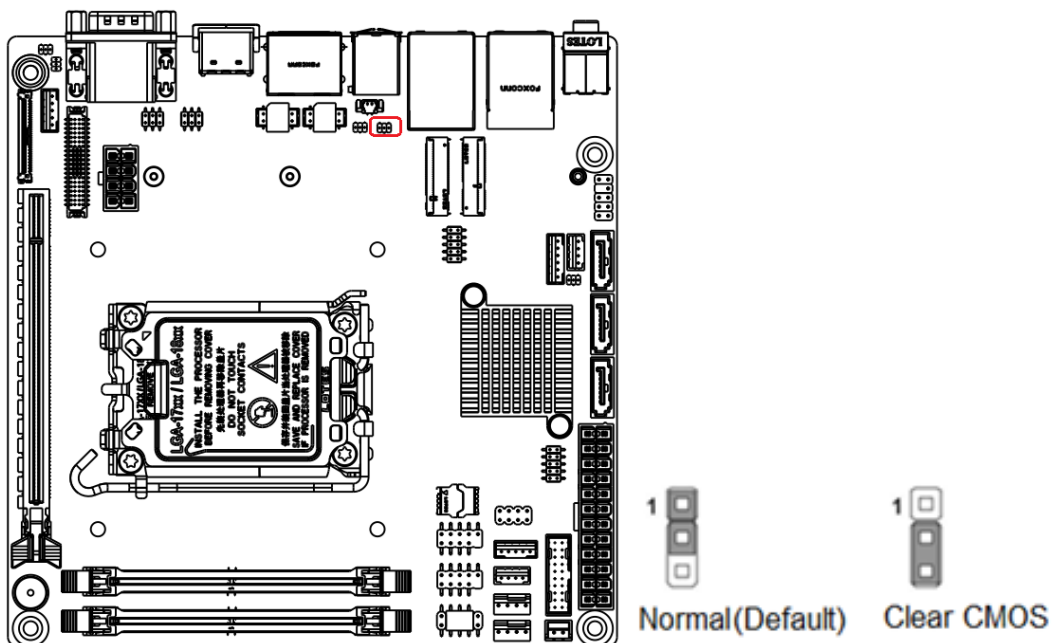
1.11 Jumpers

1.11.1 Clear CMOS Jumper: JCMOS1

There is a CMOS RAM onboard that has a power supply from an external battery to keep the system configuration data.

For normal state (default), the jumper is set on pin location 1 and 2.

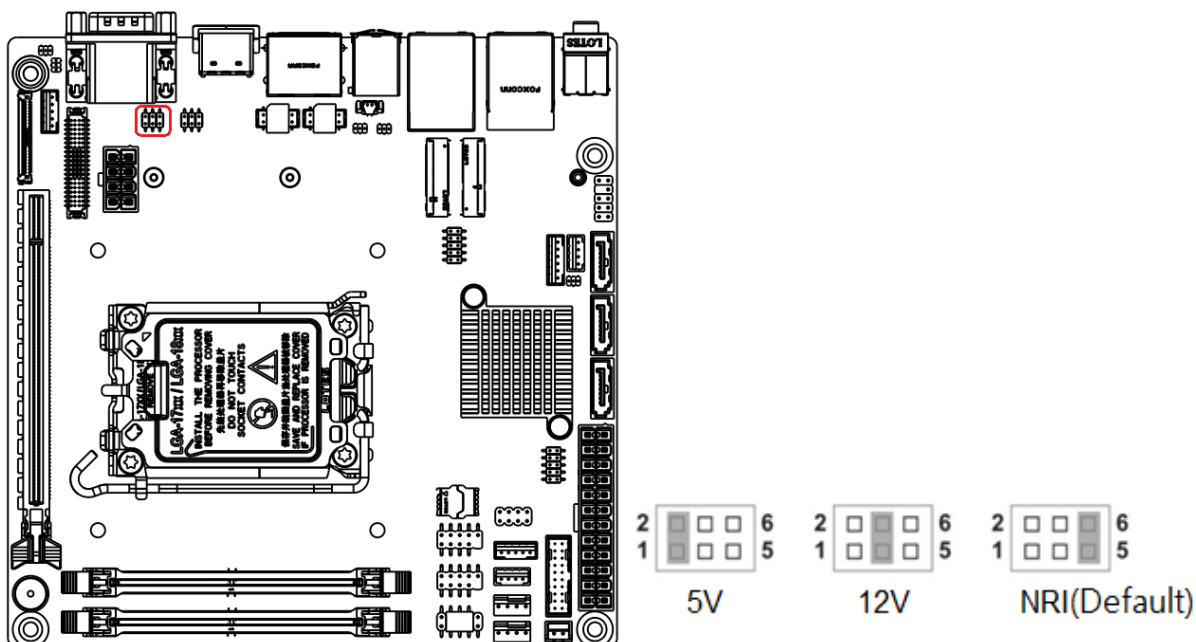
To clear the CMOS, set the jumper to pin location 2 and 3 for at least 30 seconds while the system is off.



1. You can clear CMOS by shorting pin 2-3 for at least 30 seconds (while the system is OFF), then place the jumper back to pin 1-2 for normal operation.
2. Avoid clearing the CMOS while the system is ON; this may damage the mainboard.

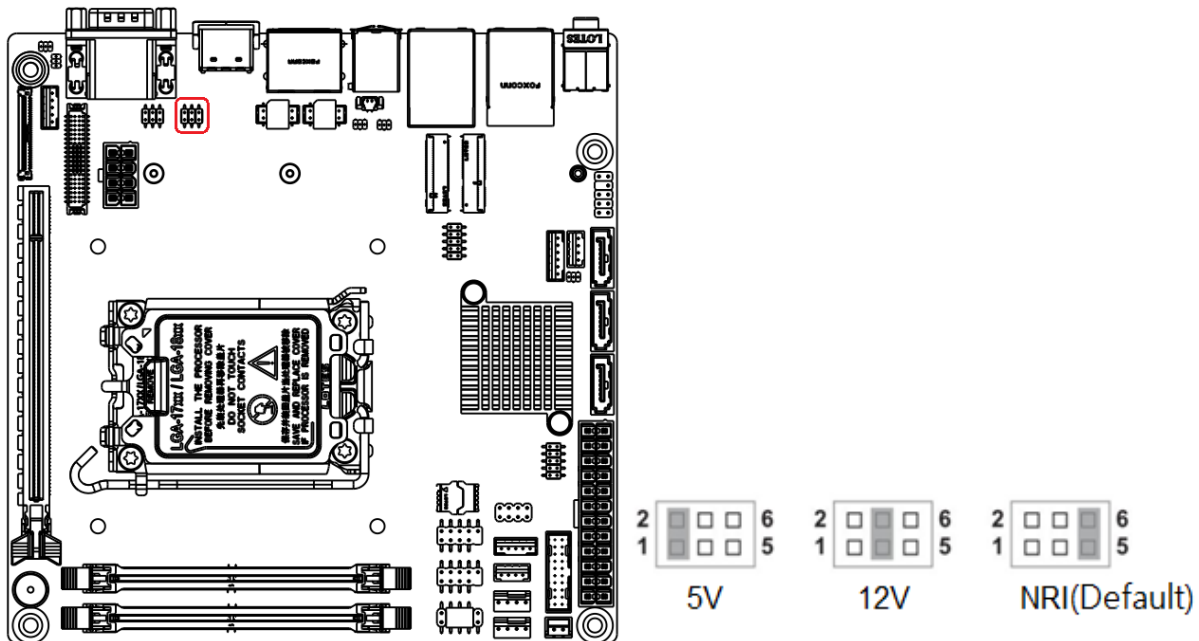
1.11.2 COM1, COM2, Ring-in/ +12V/ +5V Power Select: JCOMP1_2

These headers provide ring-in, 5V, or 12V on the COM ports.



1.11.2.1 COM3, COM4, Ring-in/ +12V/ +5V Power Select: JCOMP3_4

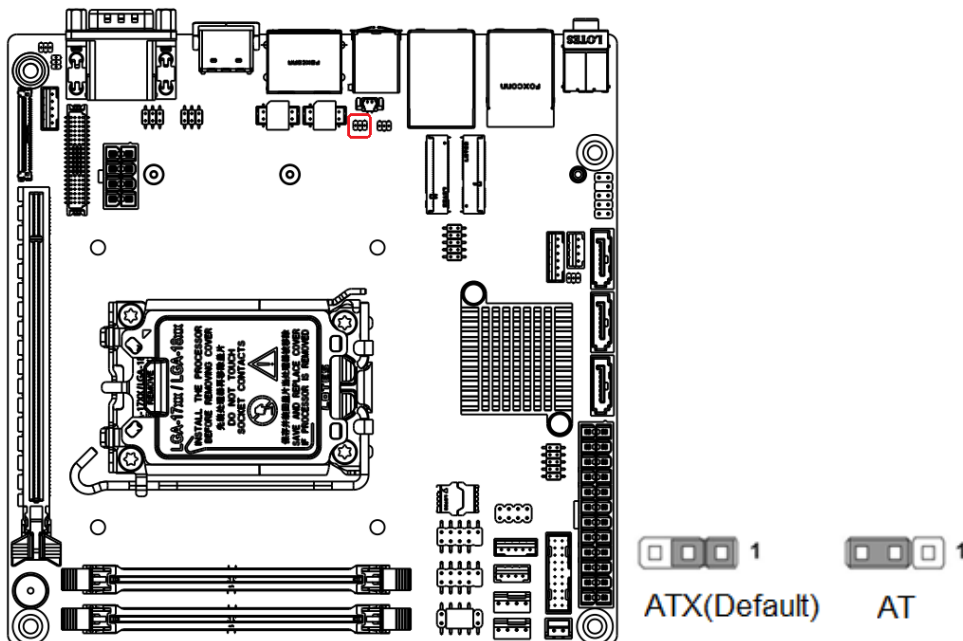
These headers provide ring-in, 5V, or 12V on the COM ports.



1.11.3 ATX/AT Mode Selection: JATX1

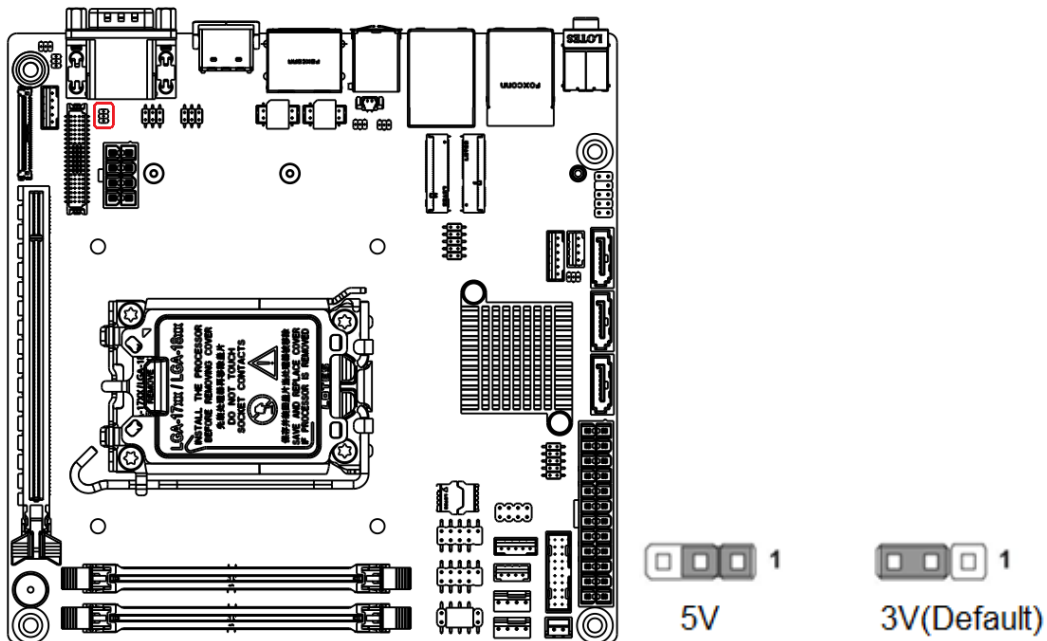
This header provides the option to boot the system in the form of ATX mode (default) or AT mode.

When the system is set in AT mode, the system power on/off will be controlled directly by the power switch on the power supply, but some of the power saving modes will not function as ATX mode provides.



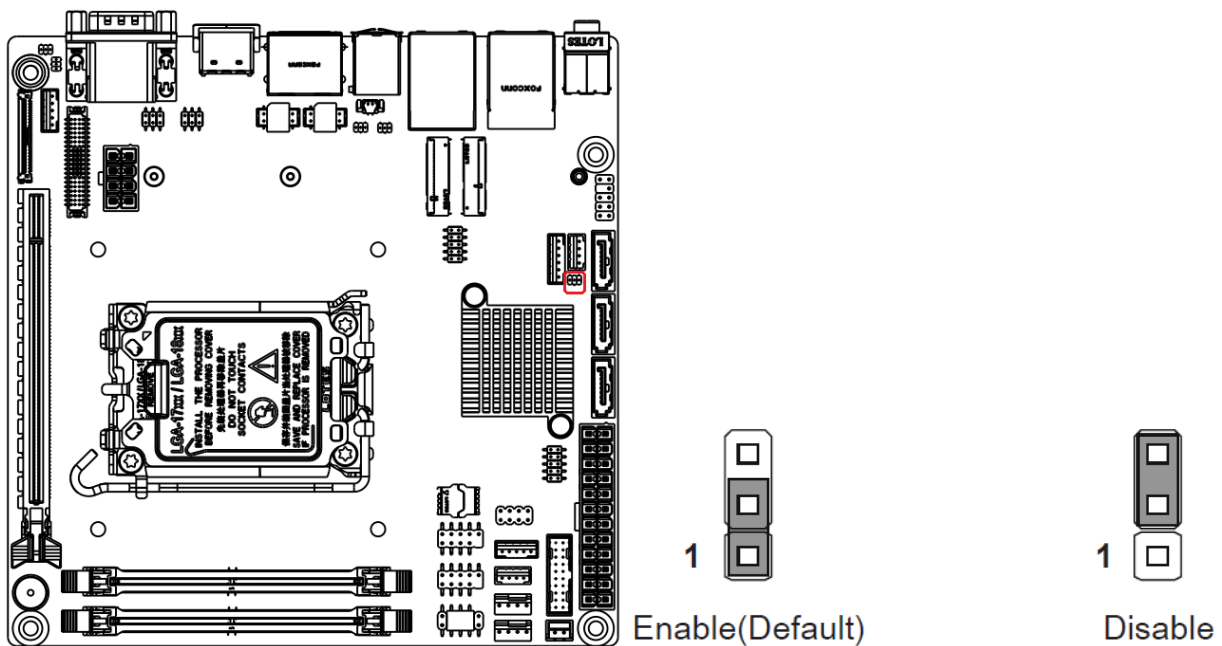
1.11.4 eDP Backlight Control Jumper: JEDPVOL1 (Optional)

Use this jumper to specify the operation voltage of the eDP display.



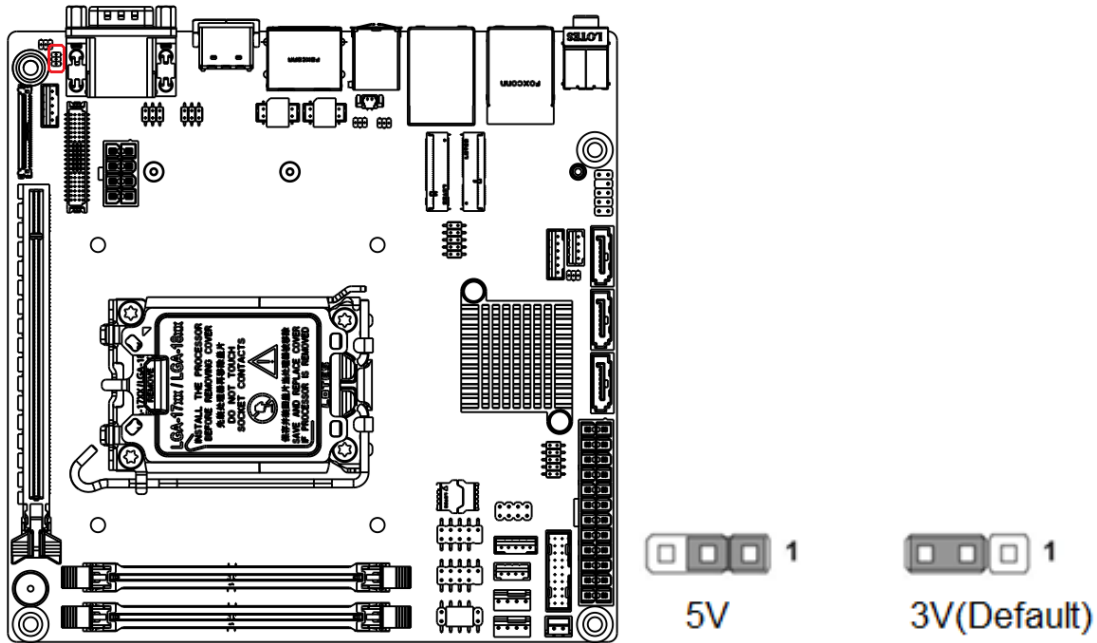
1.11.5 ME F/W Jumper: JME_DIS1

This jumper is used to enable/disable the Intel ME function.



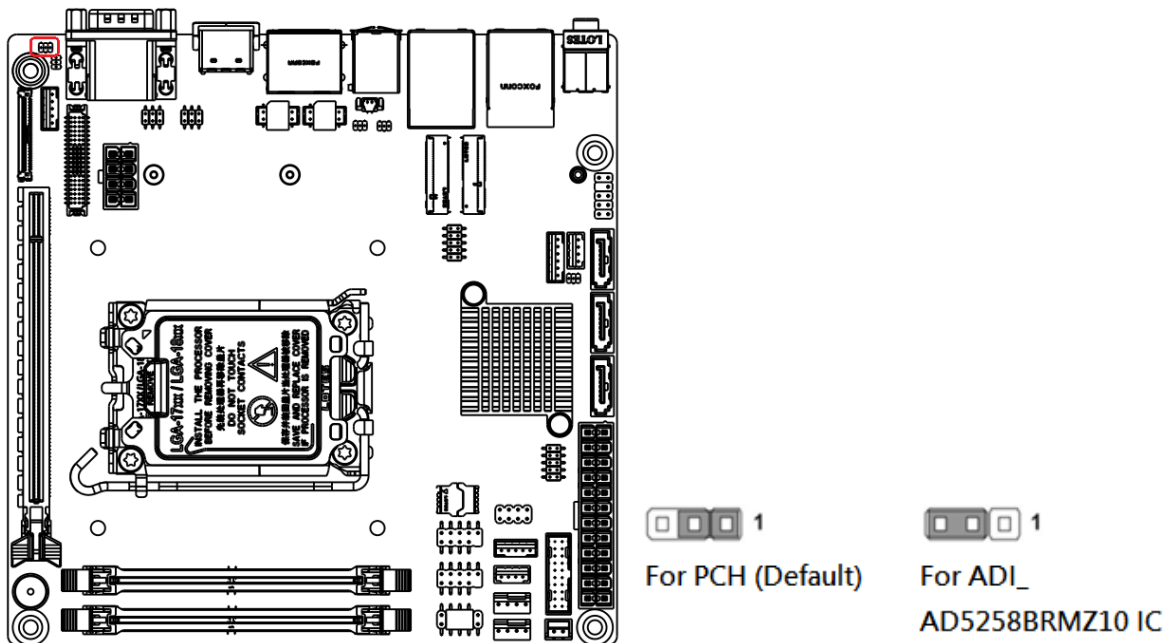
1.11.6 LVDS Backlight Power Jumper: JBKLVOL1

Use this jumper to specify the operation voltage of the LVDS display.



1.11.7 LVDS Backlight Control Jumper: JLVDS_BKL1

Use this jumper to specify the backlight control of the LVDS display's backlight.



1.12 The Expansion Slots

In the future, you may need to install expansion cards. The following sub-sections describe the expansion slots and the expansion cards they support.



Make sure to unplug the power cord before adding or removing expansion cards. Failure to do so may cause you physical injury and damage mainboard components.

1.12.1 Installation of Expansion Card

To install an expansion Card:

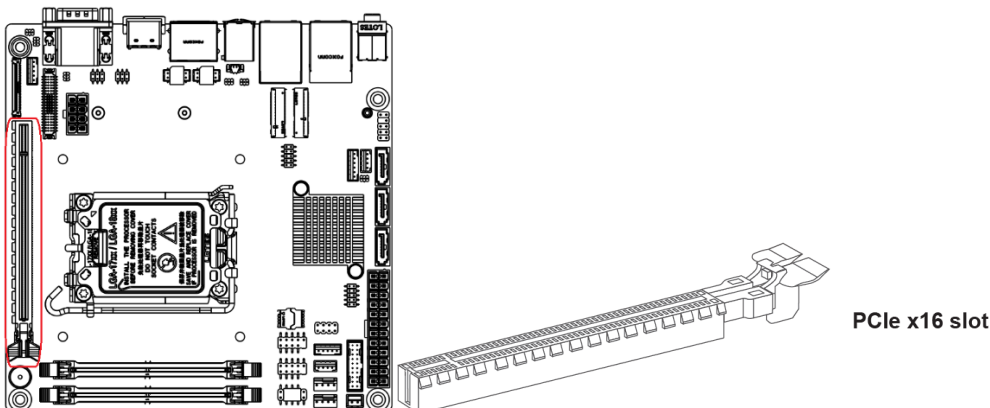
1. Before installing an expansion card, read the documentation that came with it and make the necessary hardware setting for the card.
2. Remove the chassis cover (if the mainboard is installed in a chassis).
3. Remove the expansion slot bracket from the chassis on the slot that you intend to use. Keep the screw for later use.
4. Align the card connector with the slot and press it firmly until the card is completely seated on the slot.
5. Secure the card to the chassis with the screw that have been removed earlier (in step 3).
6. Place the chassis cover back on.

1.12.2 PCI (Peripheral Component Interconnect) Express Slot

The PCI Express slot supports the PCI Express interface expansion card.

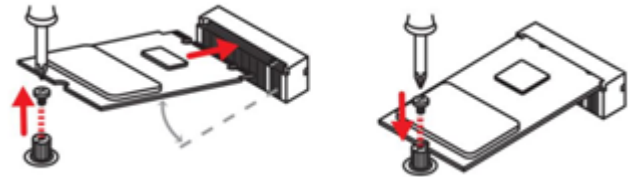
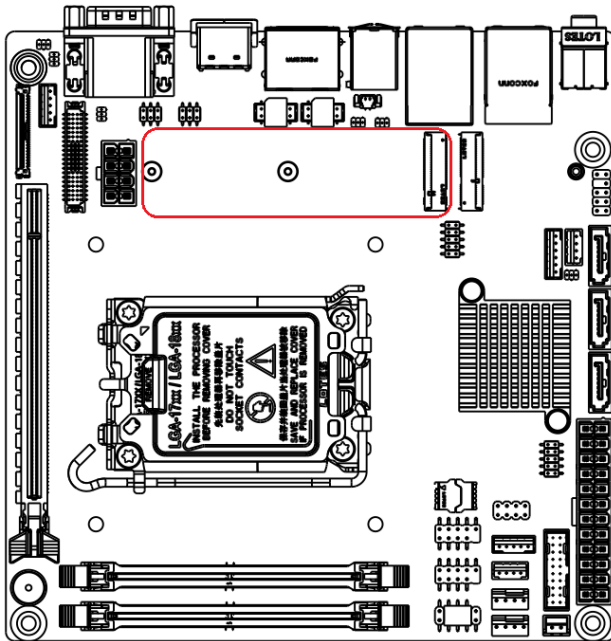
1.12.2.1 PCIe x16 Slot: SLOT1

The PCI Express x16 Gen4 Bandwidth supports up to 252 GT/s.



1.12.3 M.2 Slot (Key M, 2280 & 2242): M2_M1

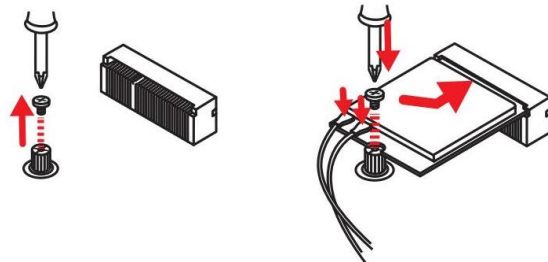
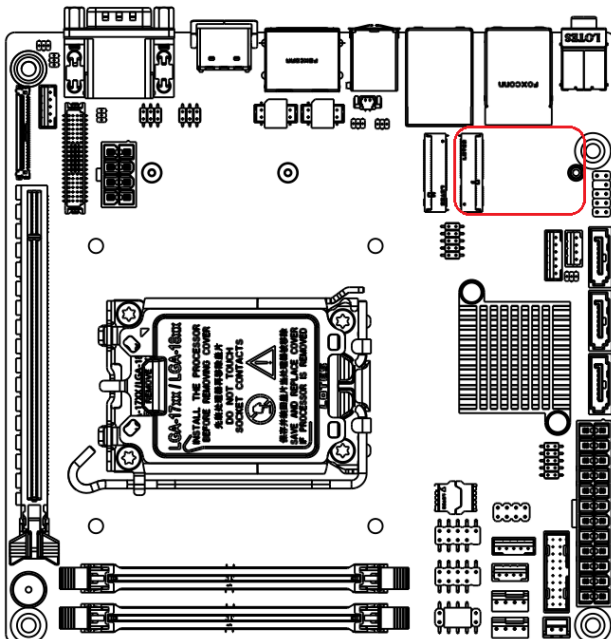
Please install the M.2 solid-state drive (SSD) into the M.2 slot as shown below.



When adding or removing expansion cards, make sure the system power is OFF.

1.12.4 M.2 Slot (Key E, 2230): M2_E1

Please install the Wi-Fi/ Bluetooth card into the M.2 slot as shown below.





When adding or removing expansion cards, make sure that you unplug the power supply first. Meanwhile, read the documentation for the expansion card to configure any necessary hardware or software settings for the expansion card, such as jumpers, switches or BIOS configuration.

Chapter 2: Starting Up the System

2.1 Starting Up Your System

1. After all connections are made, close your computer case cover.
2. Connect the power supply cord into the power supply located on the back of your system case according to your system user's manual.
3. Turn on your peripheral in following order:
 - a. Your monitor.
 - b. Other external peripheral (Printer, Scanner, External Modem etc...)
 - c. Your system power. For ATX power supplies, you need to turn on the power supply and press the ATX power switch on the front side of the case.
4. The system will then run power-on self test. While the test is running, the BIOS will alarm beeps or additional message will appear on the screen.

If you do not see anything within 30 seconds from the time you turn on the power. The system may have failed during power-on self test. Recheck your jumper settings and connections or call your vendor for assistance.

Beep	Meaning
One short beep when displaying logo	No error during POST
Long beeps in an endless loop	No DRAM install or detected
One long beep followed by three short beeps	Video card not found or video card memory bad
High frequency beeps when system is working	CPU overheated System running at a lower frequency

5. During power-on, press key to enter BIOS setup. Follow the instructions in BIOS SETUP.
6. If you wish to boot from a different bootable device other than the default arrangement under the BIOS, you may press <F11> key during the system power-on self test. A menu with all detected bootable devices which are attached to the system will be displayed. Then you may select the desired bootable device from this menu.
7. **Power off your computer:** You must first exit or shut down your operating system before switching off the power switch. If you use Windows Operating Systems, click “**Start**” button, click “**Shut down**” and then click “**Shut down the computer**” The power supply should turn off after Windows shuts down.

Chapter 3: BIOS SETUP

This chapter provides information on the BIOS Setup program and allows users to configure the system for optimal use. Users may need to run the Setup program when:

1. An error message appears on the screen at system startup and requests users to run SETUP.
2. Users want to change the default settings for customized features.



Please note that BIOS update assumes technician-level experience.

As the system BIOS is under continuous update for better system performance, the illustrations in this chapter should be held for reference only.

Entering Setup

Power on the computer and the system will start POST (Power On Self Test) process. When the message below appears on the screen, press or <F2> key to enter Setup.

If the message disappears before you respond and you still wish to enter Setup, restart the system by turning it OFF and On or pressing the RESET button. You may also restart the system by simultaneously pressing <Ctrl>, <Alt>, and <Delete> keys.



The items under each BIOS category described in this chapter are under continuous update for better system performance. Therefore, the description may be slightly different from the latest BIOS and should be held for reference only.

Control Keys

← →	Select Screen
↑ ↓	Select Item
Enter	Select
+ -	Change Option
F1	General Help
F7	Previous Values
F9	Optimized Defaults
F10	Save & Reset
Esc	Exit

Getting Help

After entering the Setup menu, the first menu you will see is the Main Menu.

Main Menu

The main menu lists the setup functions you can make changes to. You can use the arrow keys (↑↓) to select the item. The on-line description of the highlighted setup function is displayed at the bottom of the screen.

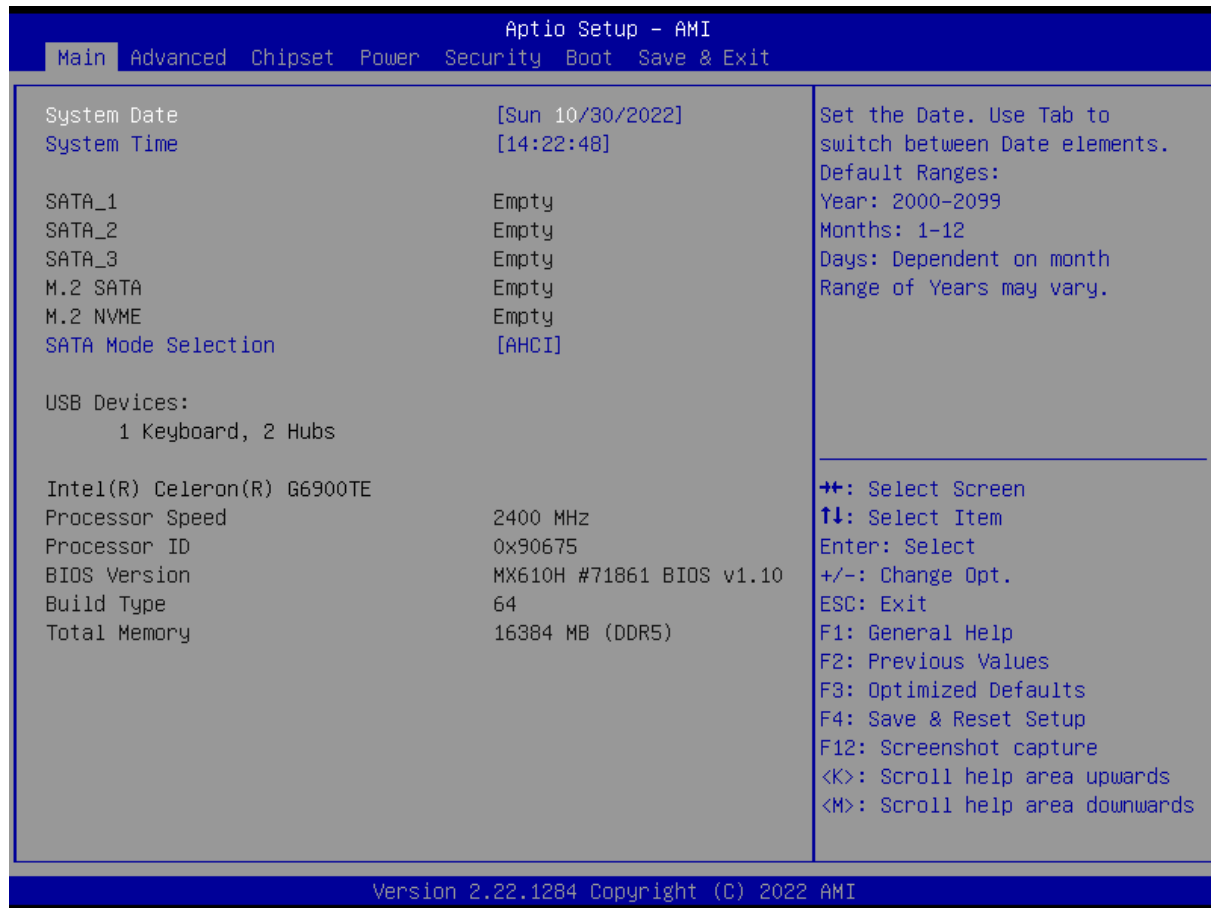
Sub-Menu

If you find a right pointer symbol appears to the left of certain fields that means a sub-menu can be launched from this field. A sub-menu contains additional options for a field parameter. You can use arrow keys (↑↓) to highlight the field and press <Enter> to call up the sub-menu. Then you can use the control keys to enter values and move from field to field within a sub-menu. If you want to return to the main menu, just press the <Esc>.

General Help <F1>

The BIOS setup program provides a General Help screen. You can call up this screen from any menu by simply pressing <F1>. The Help screen lists the appropriate keys to use and the possible selections for the highlighted item. Press <Esc> to exit the Help screen.

3.1 The Menu Bar



► Main

Use this menu for basic system configurations, such as time, date, etc.

► Advanced

Use this menu to set up the items of special enhanced features.

► Chipset

This menu controls the advanced features of the on-board chipset.

► Power

Use this menu to specify your settings for power management.

► Security

Use this menu to set administrator and user passwords.

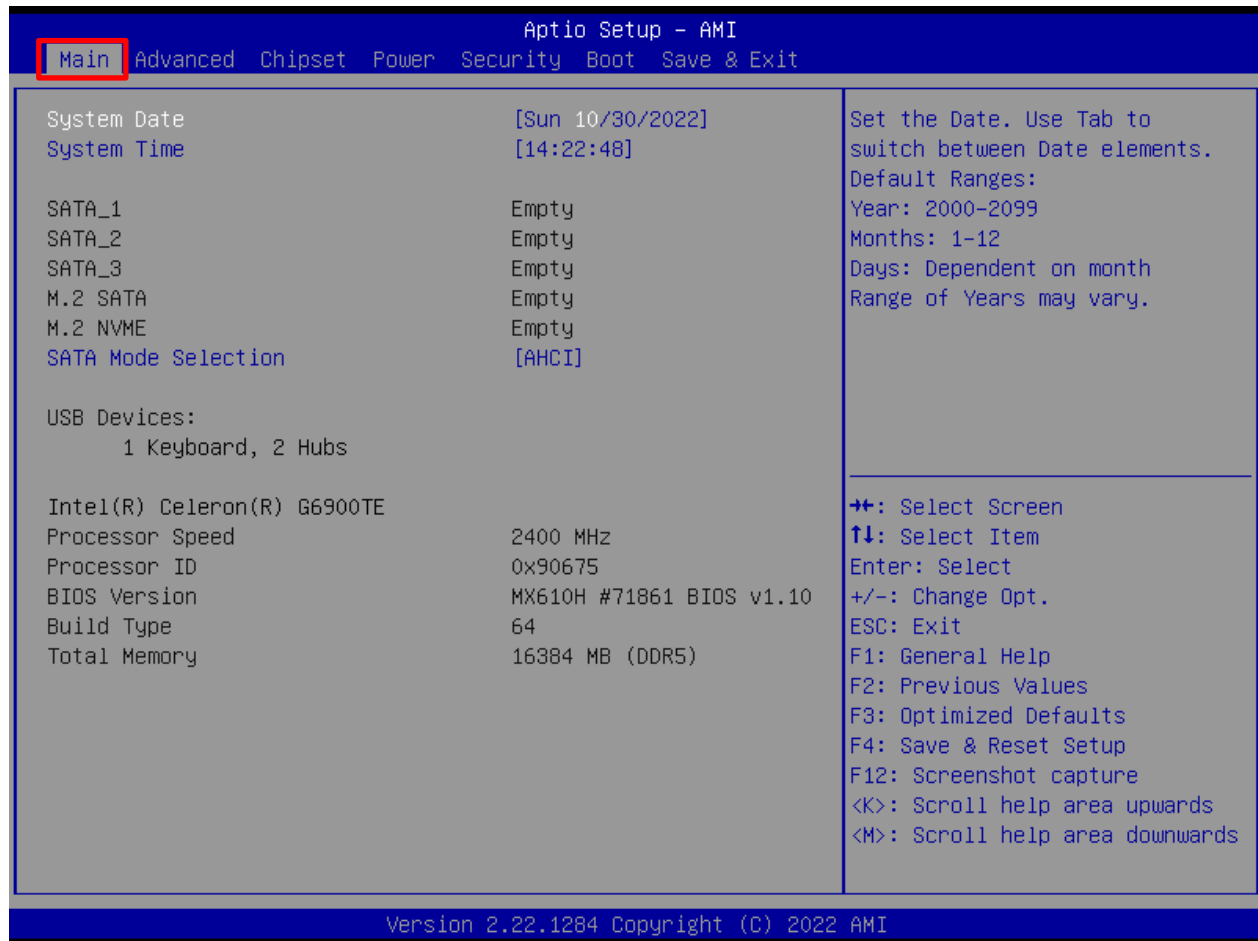
► Boot

Use this menu to specify the priority of boot devices.

► Save & Exit

This menu allows you to load the BIOS default values or factory default settings into the BIOS and exit the BIOS setup utility with or without changes.

3.2 Main



► System Date

This setting allows you to set the system date.

Format: <Day> <Month> <Date> <Year>.

► System Time

This setting allows you to set the system time.

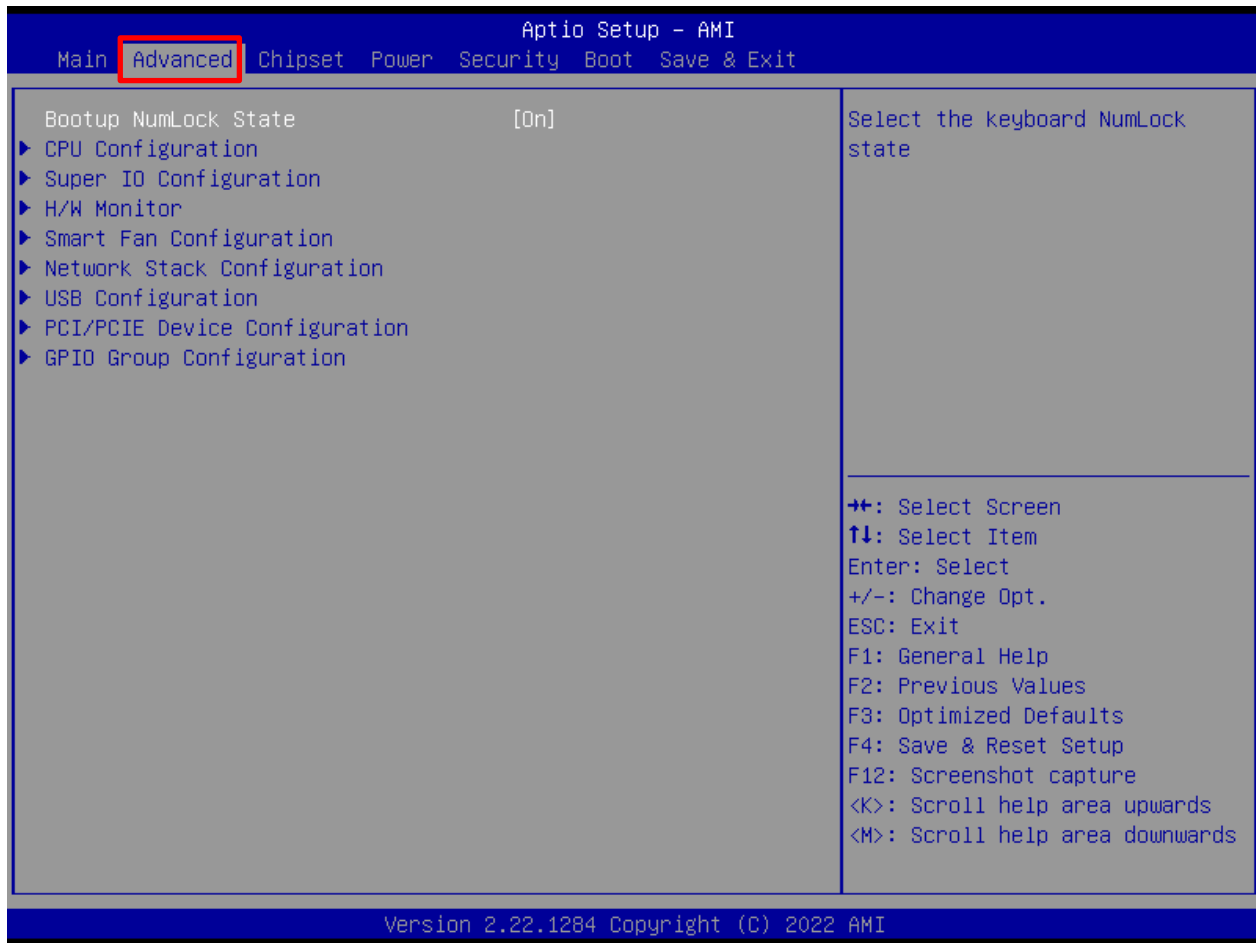
Format: <Hour> <Minute> <Second>.

► SATA Mode Selection

This setting specifies the SATA controller mode.

[AHCI] AHCI (Advanced Host Controller Interface), is a technical standard for an interface that allows the software to communicate with Serial ATA (SATA) devices. It offers advanced SATA features such as Native Command Queuing (NCQ) and hot-plugging.

3.3 Advanced



► Bootup NumLock State

This setting is to set the Num Lock status when the system is powered on.

[On] Turn on the Num Lock key when the system is powered on.

[Off] Allow users to use the arrow keys on the numeric keypad.

3.3.1 CPU Configuration

Aptio Setup - AMI		
Advanced		
CPU Configuration		When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.
Intel(R) Celeron(R) G6900TE		
Frequency	2400 MHz	
Processor ID	0x90675	
P-core Information		
L1 Data Cache	48 KB x 2	
L1 Instruction Cache	32 KB x 2	
L2 Cache	1280 KB x 2	
L3 Cache	4 MB	
Intel Virtualization Technology	[Enabled]	
Active Performance-cores	[All]	
Intel(R) SpeedStep(tm)	[Enabled]	
C states	[Enabled]	
		++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. ESC: Exit F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset Setup F12: Screenshot capture <K>: Scroll help area upwards <M>: Scroll help area downwards

► Intel Virtualization Technology

Virtualization enhanced by Intel Virtualization Technology will allow a platform to run multiple operating systems and applications in independent partitions. With Virtualization, one computer system can function as multiple “virtual” systems.

► Active Processor Cores

This setting specifies the number of active processor cores.

► Intel(R) SpeedStep(TM)

EIST (Enhanced Intel SpeedStep Technology) allows the system to dynamically adjust processor voltage and core frequency, which can result in decreased average power consumption and decreased average heat production.

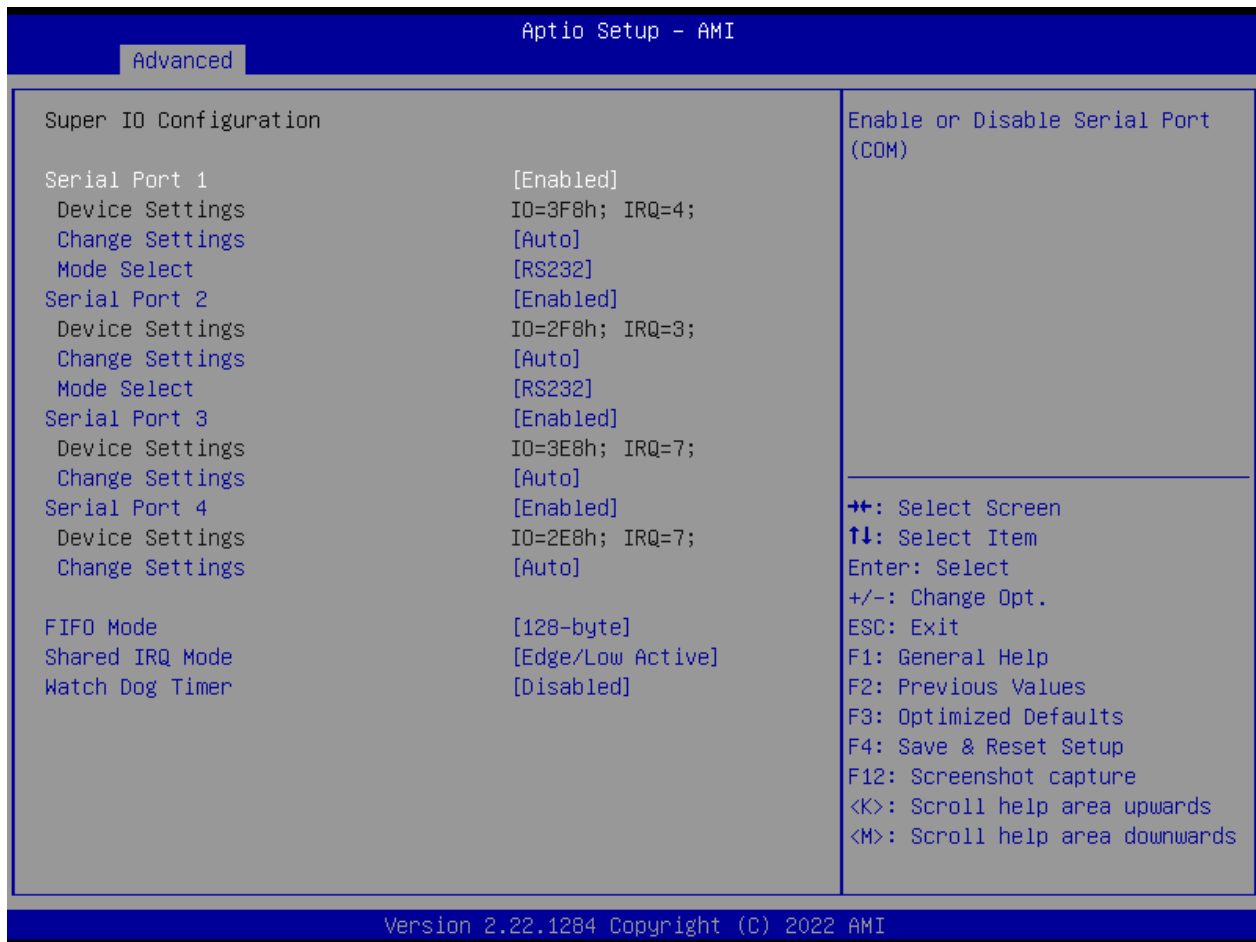
► C States

This setting controls the C-States (CPU Power states).

[Enabled] Detects the idle state of system and reduce CPU power consumption accordingly.

[Disabled] Disables this function.

3.3.2 Super IO Configuration



► Serial Port 1/ 2/ 3/ 4

This setting enables/disables the specified serial port.

» Change Settings

This setting is used to change the address & IRQ settings of the specified serial port.

» Mode Select

Select an operation mode for Serial Port 1/ 2.

► FIFO Mode

This setting controls the FIFO (First In First Out) data transfer mode.

► Shared IRQ Mode

This setting provides the system with the ability to share interrupts among its serial ports.

► Watch Dog Timer

You can enable the system watchdog timer, a hardware timer that generates a reset when the software that it monitors does not respond as expected each time the watchdog polls it.

3.3.3 H/W Monitor (PC Health Status)

These items display the current status of all monitored hardware devices/components such as voltages, temperatures and all fans' speeds.

Aptio Setup - AMI	
Advanced	
Pc Health Status	
CPU Temperature	: +32 C
System Temperature	: +31 C
CPUFAN Speed	: N/A
SYSFAN1 Speed	: 727 RPM
VCC_CORE	: +0.760 V
VCC3	: +3.312 V
VCC5	: +5.045 V
+12V	: +11.968 V
VSBB3V	: +3.280 V
VSBB5V	: +5.016 V
VBAT	: +3.104 V
++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. ESC: Exit F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset Setup F12: Screenshot capture <K>: Scroll help area upwards <M>: Scroll help area downwards	
Version 2.22.1284 Copyright (C) 2022 AMI	

3.3.4 Smart Fan Configuration

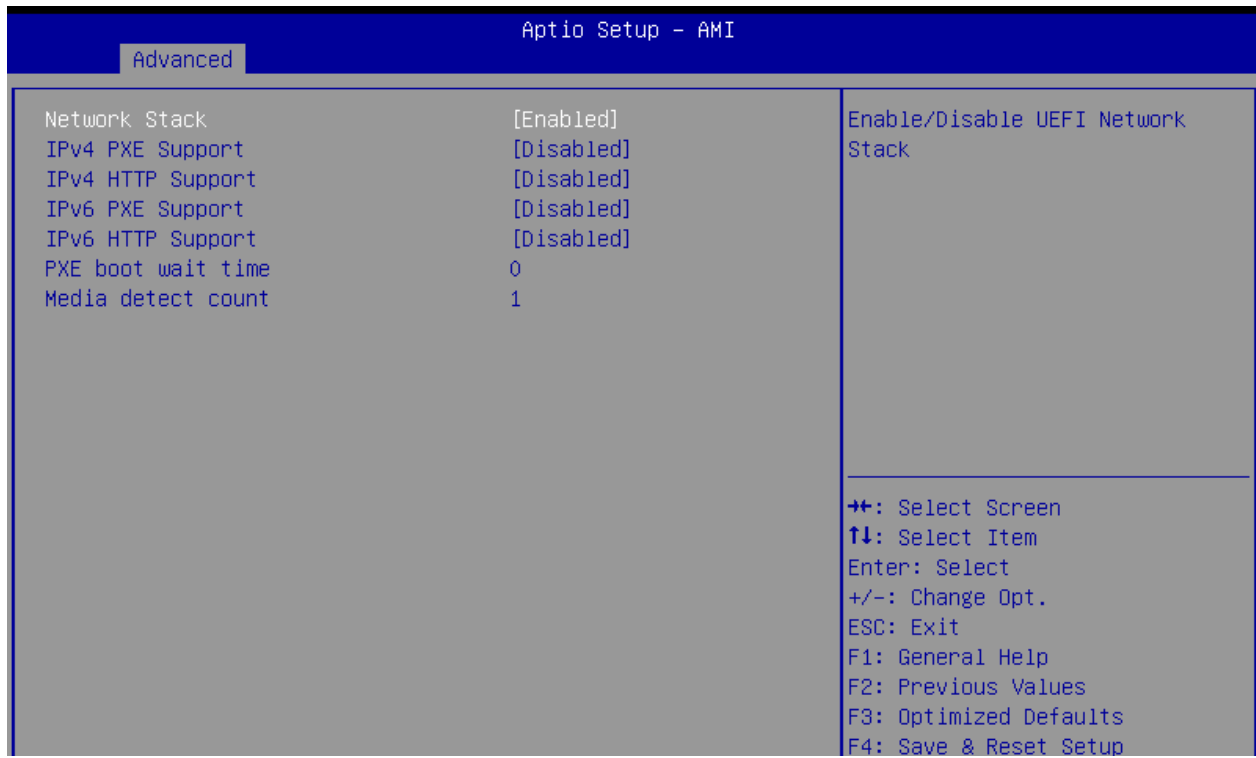
Aptio Setup - AMI	
Advanced	
Configuration Smart FAN	Disabled/Enabled Smart Fan Function
Smart CPUFAN Target	[55 C]
Min. Speed (%)	[12.5%]
Smart SYSFAN1 Target	[55 C]
Min. Speed (%)	[12.5%]

► Smart CPUFAN/ SYSFAN Target

This setting enables/ disables the Smart Fan function. Smart Fan is an excellent feature which will adjust the system fan speed automatically depending on the current system temperature, avoiding the situation of the system overheating.

3.3.5 Network Stack Configuration

This menu provides Network Stack settings for users to enable network boot (PXE) from BIOS.



► Network Stack

This menu provides Network Stack settings for users to enable network boot (PXE) from BIOS.

The following items will display when **Network Stack** is enabled.

» IPv4 PXE Support

Enables or disables IPv4 PXE boot support.

» IPv4 HTTP Support

Enables or disables IPv4 HTTP support.

» IPv6 PXE Support

Enables or disables IPv6 PXE boot support.

» IPv6 HTTP Support

Enables or disables IPv6 HTTP support.

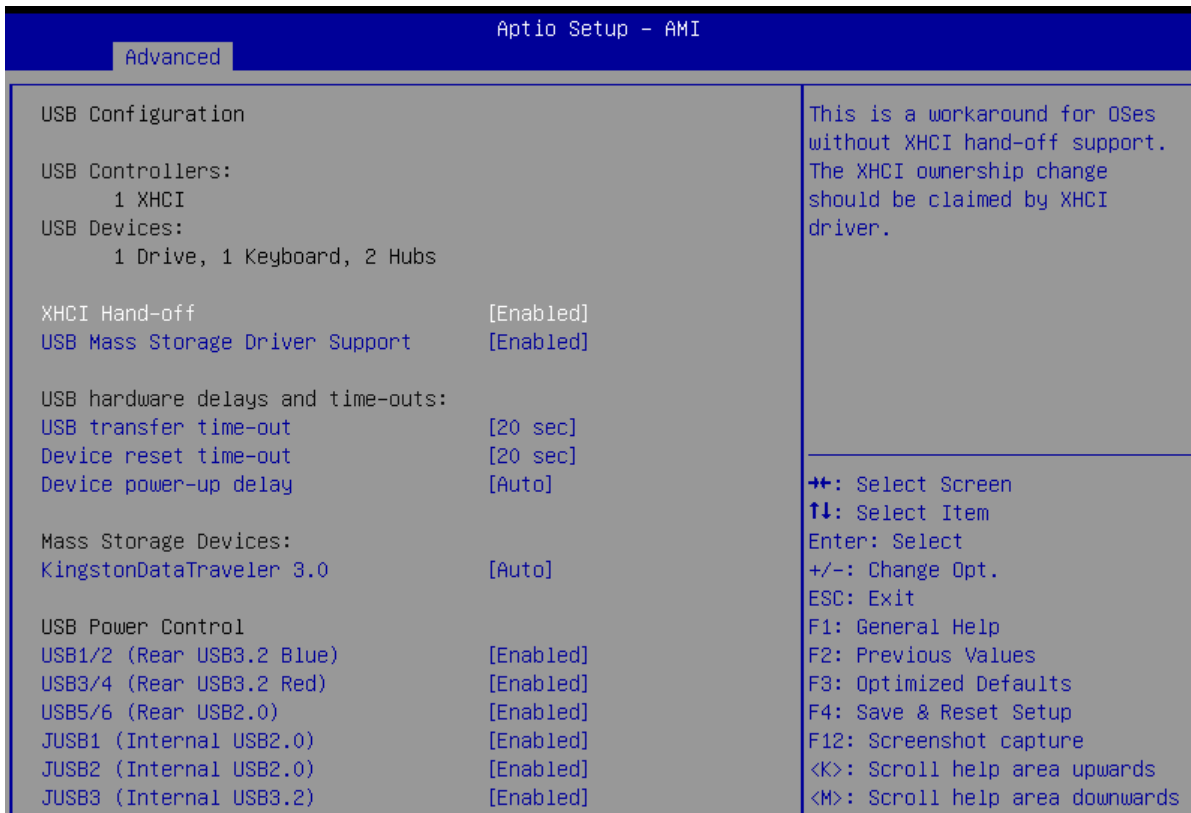
» PXE boot wait time

This option specifies the wait time to press the ESC key for aborting the PXE boot. Press “+” or “-” on your keyboard to change the value. The default setting is 0.

» Media detect count

This option specifies the number of times media will be checked. Press “+” or “-” on your keyboard to change the value. The default setting is 1.

3.3.6 USB Configuration



► XHCI Hand-off

This setting controls the XHCI (eXtensible Host Controller Interface) Hand-off.

[Enabled] On-board USB 3.2 ports functions like a regular 3.2 port.

[Disabled] On-board USB 3.2 ports functions like a 2.0 port.

► USB Mass Storage Driver Support

A USB mass storage driver setting enables/disables the ability to communicate with external drives and other removable devices connected through the USB port, such as external HDDs/SSDs and flash drives.

► USB transfer time-out

Set the USB core's wait time for Control, Bulk, and Interrupt transfers.

► Device reset time-out

Set the amount of time that the POST (Power On Self Test) will wait for the USB mass storage device to be detected.

► Device power-up delay

Set the maximum time that a USB device will wait before reporting itself to the host controller.

► USB Power Control

This setting enables/disables USB Ports.

3.3.7 PCI/ PCIE Device Configuration

Aptio Setup - AMI		
Advanced		
Audio Controller	[Enabled]	Control Detection of the Audio Controller. Disabled = Audio Controller will be unconditionally
Lan1/2 Controller	[Enabled]	

► Audio Controller

This setting enables/disables the onboard audio controller.

► Lan1/ 2 Controller

This setting enables/disables the onboard LAN 1/2 controllers.

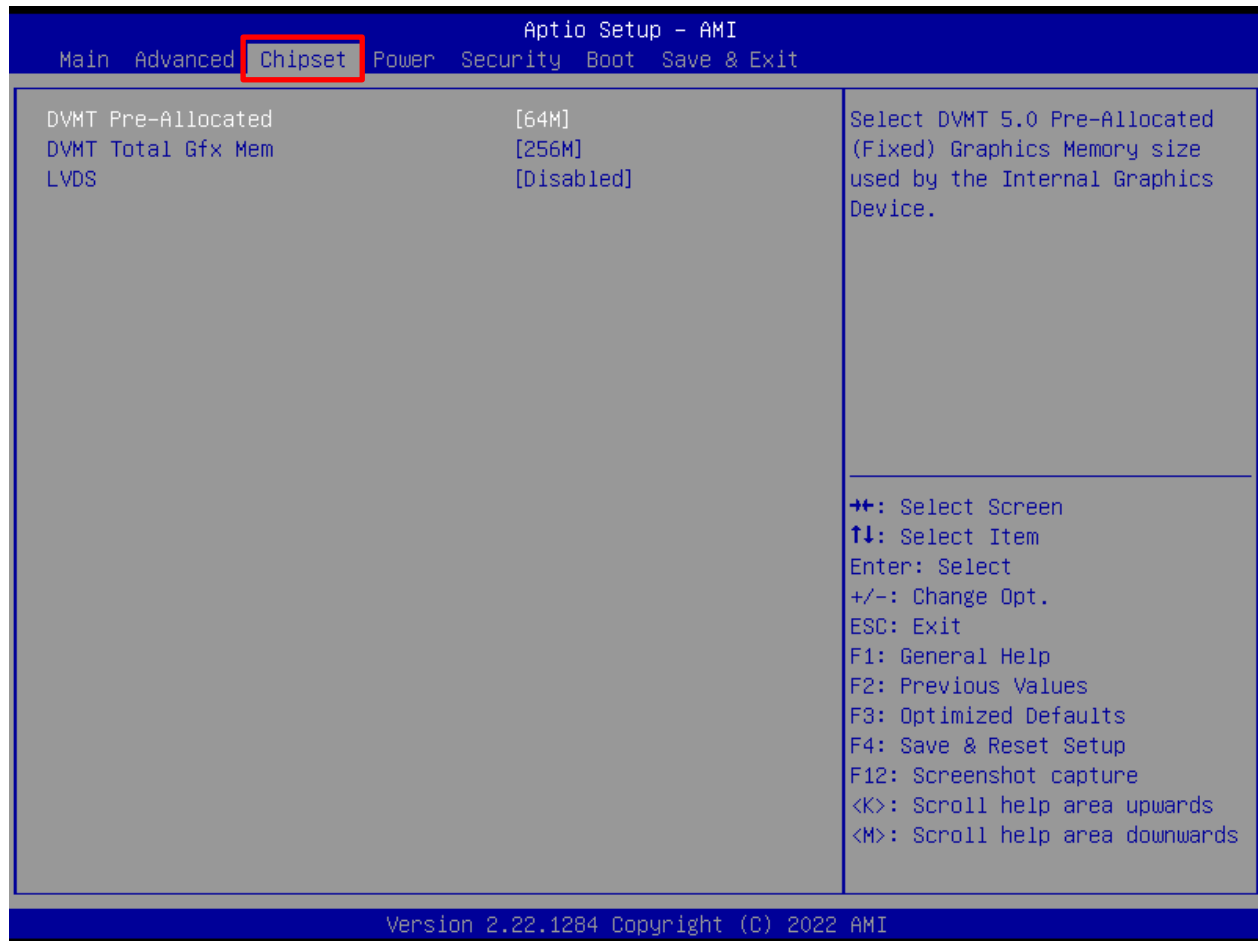
3.3.8 GPIO Group Configuration

Aptio Setup - AMI		
Advanced		
GPIO0	[Low]	Set GPIO0 to output High/Low
GPIO1	[Low]	
GPIO2	[Low]	
GPIO3	[Low]	

► GPIO0 ~ GPIO3

These settings control the operation mode of the specified GPIO.

3.4 Chipset



► DVMT Pre-Allocated

This setting specifies the pre-allocated graphics memory size for DVMT (Dynamic Video Memory Technology).

► DVMT Total Gfx Mem

This setting specifies the total graphics memory size for DVMT.

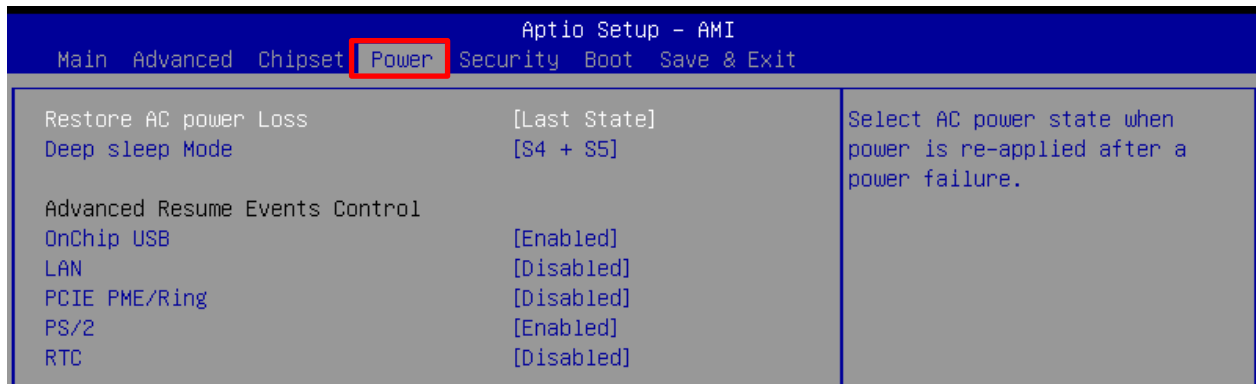
► LVDS

This setting enables/disables LVDS.

► LCD Panel Type

This setting specifies the LCD Panel's resolution and distribution formats. The item will display when **LVDS is enabled**.

3.5 Power



► Restore AC Power Loss

This setting specifies whether your system will reboot after a power failure or interrupt occurs.

Available settings are:

[Power Off] Leaves the computer in the power off state.

[Power On] Leaves the computer in the power on state.

[Last State] Restores the system to the previous status before power failure or interrupt occurred.

► Deep Sleep Mode

The setting enables/disables the Deep S5 power saving mode. S5 is almost the same as G3 Mechanical Off, except that the PSU still supplies minimum power to the power button to allow returning to S0. A full reboot is required. No previous memory content is retained. Other components may remain powered so the computer can “wake” on input from the keyboard, clock, modem, LAN, or USB device.

► OnChip USB

The item allows the activity of the OnChip USB device to wake up the system from S4/ S5 sleep state.

► LAN

Enables or disables the system to be awakened from the power saving modes when activity or input signal of Intel LAN device is detected.

► PCIE PME/Ring

Enables or disables the system to be awakened from power saving modes when activity or input signal of onboard PCIE PME/Ring is detected.

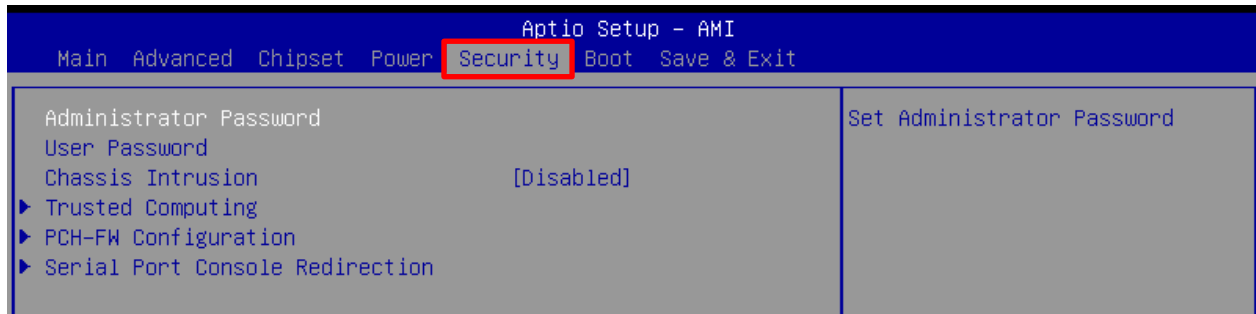
► PS/2

Enables or disables the system wake up by PS/2 devices, such as keyboard or mouse.

► RTC

When [Enabled], you can set the date and time at which the RTC (real-time clock) alarm awakens the system from suspend mode.

3.6 Security



► Administrator Password

Administrator Password controls access to the BIOS Setup utility.

► User Password

User Password controls access to the system at boot and to the BIOS Setup utility.

► Chassis Intrusion

Detects whether the chassis has been opened when used with the Chassis Intrusion header.

3.6.1 Trusted Computing

Aptio Setup - AMI		
Security		
TPM 2.0 Device Found		Enables or Disables BIOS support for security device. O.S. will not show Security Device. TCG EFI protocol and INT1A interface will not be available.
Firmware Version:	7.85	
Vendor:	IFX	
Security Device Support	[Enable]	
Active PCR banks	SHA256	
Available PCR banks	SHA256	
SHA256 PCR Bank	[Enabled]	
Pending operation	[None]	
Platform Hierarchy	[Enabled]	+/: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt.
Storage Hierarchy	[Enabled]	
Endorsement Hierarchy	[Enabled]	
Physical Presence Spec Version	[1.3]	
TPM 2.0 InterfaceType	[TIS]	
Device Select	[TPM 2.0]	

► Security Device Support

This setting enables/disables BIOS support for security device. When set to [Disable], the OS will not show security device. TCG EFI protocol and INT1A interface will not be available.

► SHA256 PCR Bank

These settings enable/disable the SHA-1 PCR Bank and SHA256 PCR Bank.

► Pending Operation

When **Security Device Support** is set to [Enable], **Pending Operation** will appear. Set this item to [TPM Clear] to clear all data secured by TPM or [None] to discard the selection. It is advised that users should routinely back up their TPM secured data.

► Platform Hierarchy, Storage Hierarchy, Endorsement Hierarchy

These settings enable/disable the Platform Hierarchy, Storage Hierarchy and Endorsement Hierarchy.

► Physical Presence Spec Version

This settings show the Physical Presence Spec Version.

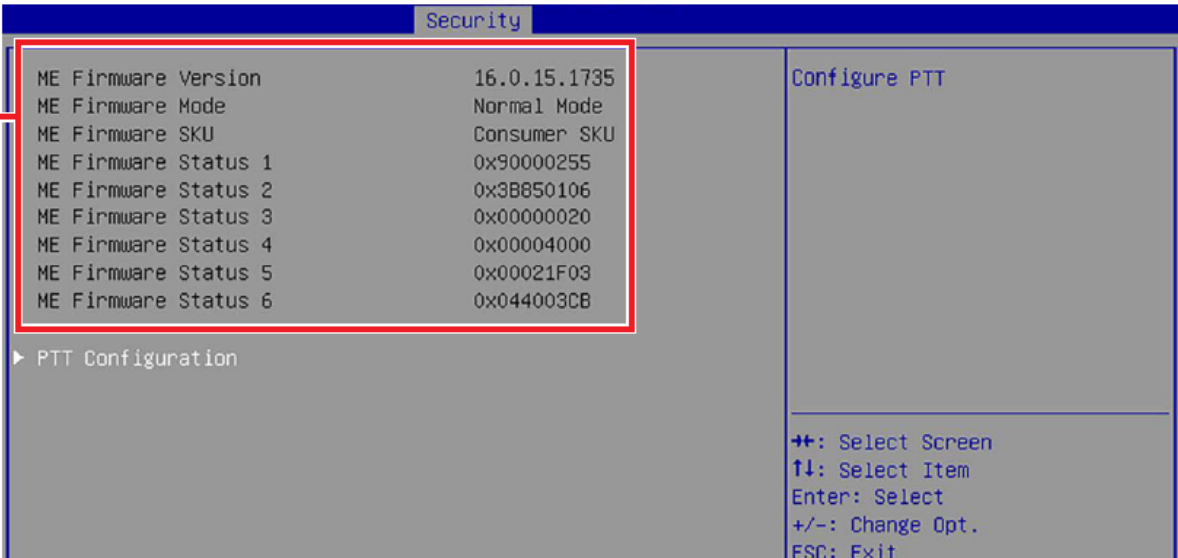
► TPM 2.0 Interface Type

This setting shows the TPM 2.0 Interface Type.

► Device Select

Select your TPM device through this setting.

3.6.2 PCH-FW Configuration



The screenshot shows the 'Security' menu in a BIOS/UEFI interface. A red box highlights the 'ME Firmware' section, which lists the following information:

ME Firmware Version	16.0.15.1735
ME Firmware Mode	Normal Mode
ME Firmware SKU	Consumer SKU
ME Firmware Status 1	0x90000255
ME Firmware Status 2	0x3B850106
ME Firmware Status 3	0x00000020
ME Firmware Status 4	0x00004000
ME Firmware Status 5	0x00021F03
ME Firmware Status 6	0x044003CB

Below this, there is a 'PTT Configuration' option. To the right, there is a 'Configure PTT' option. At the bottom right, there are navigation instructions:

- ++: Select Screen
- ↑↓: Select Item
- Enter: Select
- +/-: Change Opt.
- ESC: Exit


Below the screenshot, there is a 'Firmware Information' section with a table:

Firmware Information	
ME Firmware Version	System Integrity Value
ME Firmware Mode	ME Firmware Status 1-6
ME Firmware SKU	

To the right of this table, there is a text box that reads: 'These settings show the firmware information of the Intel ME (Management Engine).'

3.6.2.1 PTT Configuration

Intel Platform Trust Technology (PTT) is a platform functionality for credential storage and key management used by Microsoft Windows.



The screenshot shows the 'Aptio Setup - AMI' interface with the 'Security' menu selected. The following settings are visible:

Setting	Value	Description
PTT Capability / State	1 / 0	Selects TPM device: PTT or dTPM. PTT - Enables PTT in SkuMgr
TPM Device Selection	[dTPM]	dTPM 1.2 - Disables PTT in SkuMgr
TPM 1.2 Deactivate	[Disabled]	Warning! PTT/dTPM will be disabled and all data will be lost.

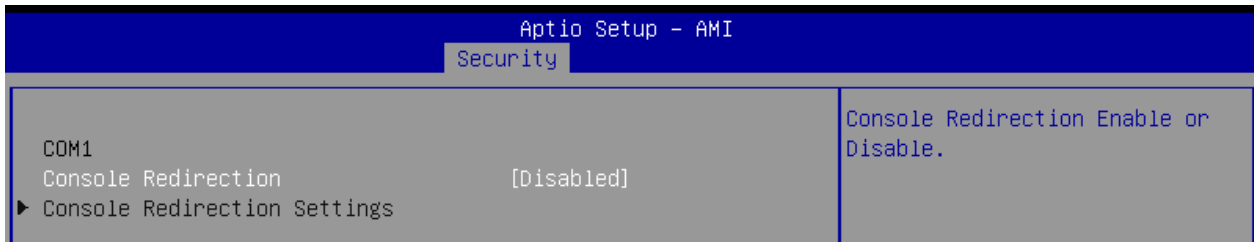
» TPM Device Selection

Select TPM (Trusted Platform Module) devices from PTT or dTPM (Discrete TPM).

[PTT] Enables PTT in SkuMgr.

[dTPM] Disables PTT in SkuMgr. **Warning! PTT/ dTPM will be disabled and all data saved on it will be lost.**

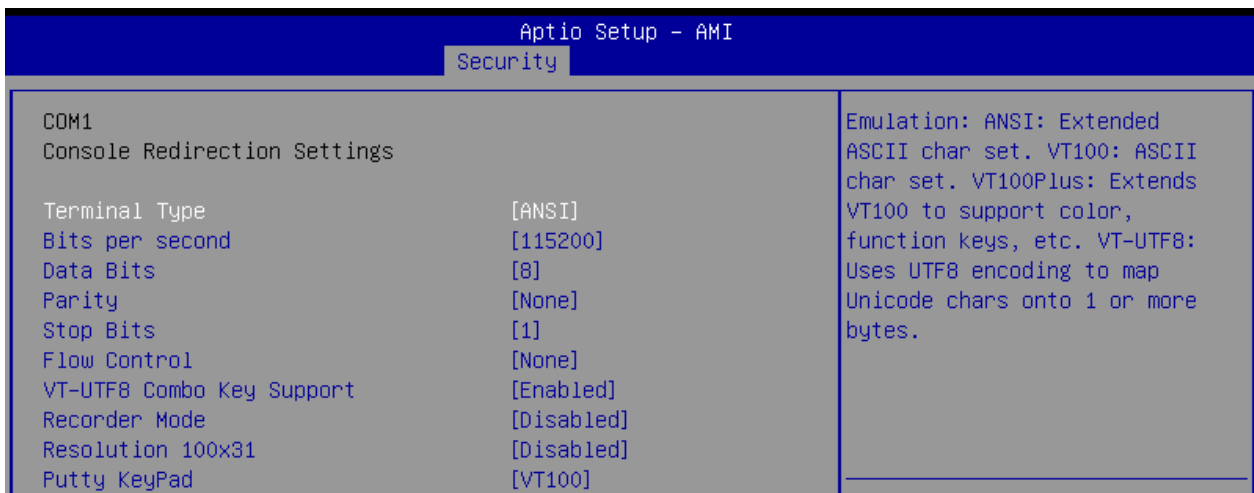
3.6.3 Serial Port Console Redirection



► Console Redirection

Console Redirection operates in host systems that do not have a monitor and keyboard attached. This setting enables/disables the operation of console redirection. When set to [Enabled], BIOS redirects and sends all contents that should be displayed on the screen to the serial COM port for display on the terminal screen. All data received from the serial port is interpreted as keystrokes from a local keyboard.

3.6.3.1 Console Redirection Settings (COM1)



» Terminal Type

To operate the system's console redirection, you need a terminal supporting ANSI terminal protocol and a RS-232 null modem cable connected between the host system and terminal. You can select emulation for the terminal from this setting.

[ANSI] Extended ASCII character set.

[VT100] ASCII character set.

[VT100Plus] Extends VT100 to support color, function keys, etc.

[VT-UTF8] Uses UTF8 encoding to map Unicode characters onto one or more bytes.

» Bits per second, Data Bits, Parity, Stop Bits

These setting specifies the transfer rate (bits per second, data bits, parity, stop bits) of Console Redirection.

» Flow Control

Flow control is the process of managing the rate of data transmission between two nodes. It's the process of adjusting the flow of data from one device to another to ensure that the receiving device can handle all of the incoming data. This is particularly important where the sending device is capable of sending data much faster than the receiving device can receive it.

» VT-UTF8 Combo Key Support

This setting enables/disables the VT-UTF8 combination key support for ANSI/VT100 terminals.

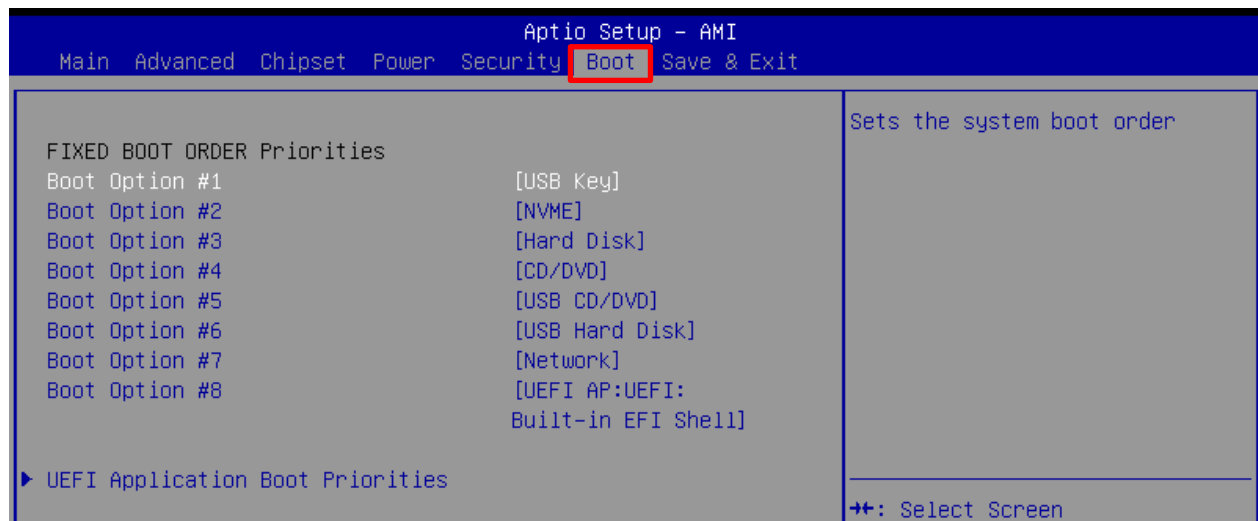
» Recorder Mode, Resolution 100x31

These settings enable/disable the recorder mode and the resolution 100x31.

» Putty KeyPad

PuTTY is a terminal emulator for Windows. This controls the numeric keypad for use in PuTTY.

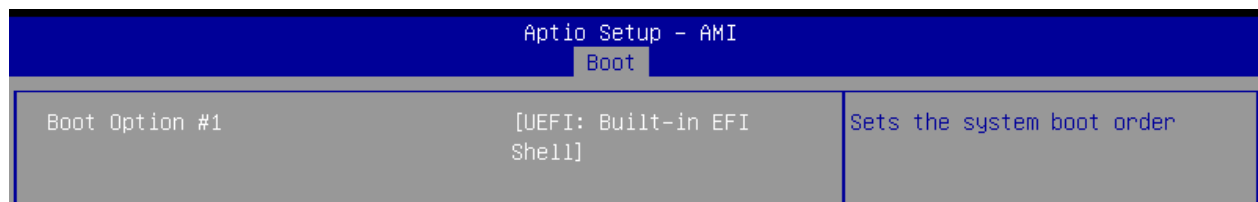
3.7 Boot



► Boot Option #1-8

This setting allows users to set the boot device sequence.

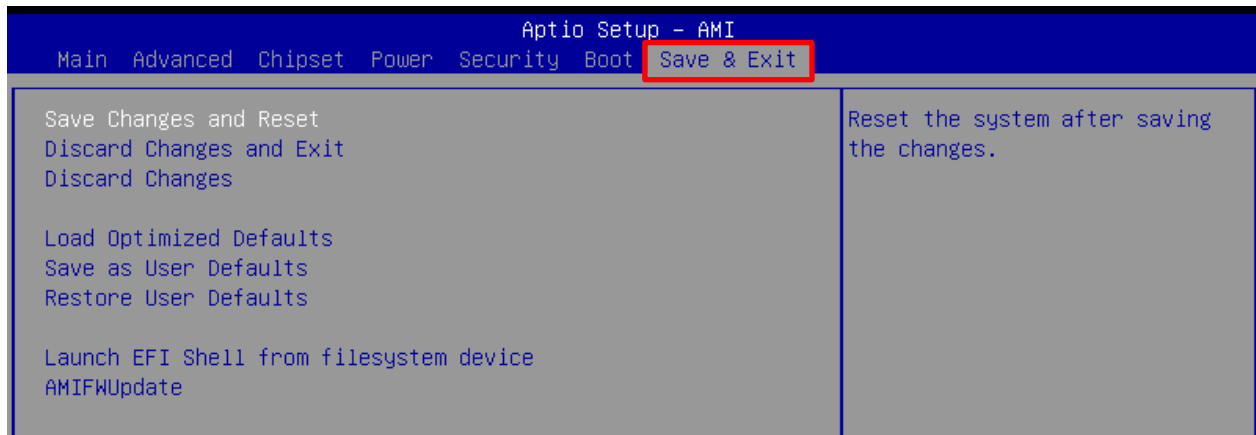
3.7.1 UEFI Application Boot Priorities



► Boot Option #1

This setting allows users to set the system boot order.

3.8 Save & Exit



► Save Changes and Reset

Save changes to CMOS and reset the system.

► Discard Changes and Exit

Abandon all changes and exit the BIOS menu.

► Discard Changes

Abandon all changes from current session.

► Load Optimized Defaults

Use this menu to load the default values set by the motherboard manufacturer specifically for optimal performance of the motherboard.

► Save as User Defaults

Save changes as the user's default profile.

► Restore User Defaults

Restore the user's default profile.

► Launch EFI Shell from filesystem device

This setting helps to launch the EFI Shell application from one of the available file system devices.

► AMIFWUpdate

Launch AMIFWUpdate for updating the BIOS.

Chapter 4: WDT&GPIO&Backlight

In this chapter, code examples are based on C programming. **GetPhysLong**, **SetPhyLong** functions used for operate a specific physical address and defined as following.

GetPhysLong: retrieve the value obtained from the physical memory location.

SetPhyLong: write the value to the physical memory location.

4.1 General Purposed IO – GPIO/DIO

The GPIO port configuration addresses listed in the following table:

Name	IO Port	IO address	Name	IO Port	IO address
N_GPIO0	0xE0690840	Bit 1	N_GPO0	0xE0690800	Bit 0
N_GPIO1	0xE0690850	Bit 1	N_GPO1	0xE0690810	Bit 0
N_GPIO2	0xE0690860	Bit 1	N_GPO2	0xE0690820	Bit 0
N_GPIO3	0xE0690870	Bit 1	N_GPO3	0xE0690830	Bit 0

4.1.1 Set output value of GPO

1. Read the value from GPO port.
2. Set the value of GPO address.
3. Write the value back to GPO port.

Example: Set **N_GPO0** output “high”

```
val=0;
addr=0xE0690800;
GetPhysLong((PBYTE) addr, &val); // Read value from N_GPO0 port.
val = val & (DWORD)(1<<0); // Set N_GPO0 address (bit 0) to 1 (output “high”).
SetPhysLong((PBYTE)addr, val); // Write back to N_GPO0 port.
```

Example: Set **N_GPO1** output “low”


```

val=0;
addr=0xE0690810;
GetPhysLong((PBYTE) addr, &val); // Read value from N_GPO1 port.
val = val & (DWORD)(~(1<<0)); // Set N_GPO1 address (bit 0) to 0 (output "low").
SetPhysLong((PBYTE)addr, val); // Write back to N_GPO1 port.

```

4.1.2 Read input value from GPI

1. Read the value from GPI port.
2. Get the value of GPI address.

Example: Get N_GPI2 input value.

```

val=0;
GetPhysLong((PBYTE) 0xE0690860, &val); // Read value from N_GPI2 port.
val = val & (DWORD)(1<<1) != 0 // Read N_GPI2 address (bit 1).
if (val) printf ("Input of N_GPI2 is High");
else printf ("Input of N_GPI2 is Low");

```

4.2 WDT Sample Code

The base address (WDT_BASE) of WDT configuration registers is 0xA10.

4.2.1 Set WDT Time Unit

```

val = Inportb (WDT_BASE + 0x05); // Read current WDT setting
val = val | 0x08; // minute mode. val = val & 0xF7 if second mode
Outportb (WDT_BASE + 0x05, val); // Write back WDT setting

```

4.2.2 Set WDT Time

```

Outportb (WDT_BASE + 0x06, Time); // Write WDT time, value 1 to 255.

```

4.2.3 Enable WDT

```

val = Inportb (WDT_BASE + 0x0A); // Read current WDT_PME setting
val = val | 0x01; // Enable WDT OUT: WDOUT_EN (bit 0) set to 1.

```

```

Outportb (WDT_BASE + 0x0A, val);    // Write back WDT setting.
val = Inportb (WDT_BASE + 0x05);    // Read current WDT setting
val = val | 0x20;                    // Enable WDT by set WD_EN (bit 5) to 1.
Outportb (WDT_BASE + 0x05, val);    // Write back WDT setting.

```

4.2.4 Disable WDT

```

val = Inportb (WDT_BASE + 0x05);    // Read current WDT setting
val = val & 0xDF;                    // Disable WDT by set WD_EN (bit 5) to 0.
Outportb (WDT_BASE + 0x05, val);    // Write back WDT setting.

```

4.2.5 Check WDT Reset Flag

If the system has been reset by WDT function, this flag will set to 1.

```

val = Inportb (WDT_BASE + 0x05);    // Read current WDT setting.
val = val & 0x40;                    // Check WDTMOUT_STS (bit 6).
if (val)    printf ("timeout event occurred");
else        printf ("timeout event not occurred");

```

4.2.6 Clear WDT Reset Flag

```

val = Inportb (WDT_BASE + 0x05);    // Read current WDT setting
val = val | 0x40;                    // Set 1 to WDTMOUT_STS (bit 6);
Outportb (WDT_BASE + 0x05, val);    // Write back WDT setting

```

4.3 Backlight Sample Code

```
#define DEFAULT_AD5258_ADDR  0x18
```

```

void InitAD5258 (
    IN SETUP_DATA          *SetupData
)
{
    IoWrite32(0xCF8, 0x80000000 | (0x0 << 16) | (0x1F << 11) | (0x4 << 8) | (0x20 & 0xfc)); // Bus 0,
    Device 0x1F, Function 4, offset 0x20 : SMBus Controller IO_Bar

```

```

SmbusBase = IoRead16(0xCFC | (UINT8)(0x20 & 2)) & 0xFFE0;

IoWrite8(SmbusBase+0x0, 0xFF);                // Clear status
IoWrite8(SmbusBase+0x5, SetupData.AD5258BackLightControl); // Brightness new value.
IoWrite8(SmbusBase+0x3, 0x00);                // Byte 00
IoWrite8(SmbusBase+0x4, (DEFAULT_AD5258_ADDR<<1)); // Slave Address

Delay_Loop();    // Delay Loop, waiting for SMBus ready.
}

```