MX310H

Intel® H310 PCH
Supports Coffee Lake (8th Gen)/
Coffee Lake Refresh (9th Gen)
i7/i5/i3/Pentium processors
(Supports "up to 6 Cores" and "up to TDP 65W" type processors only)
Mini-iTX Motherboard

User's Manual

Edition 1.00 – Sep, 2020

FCC Statement

THIS DEVICE SUPPORTS PART 15 FCC RULES. OPERATION IS SUBJECT TO THE FOLLOWING TWO CONDITIONS:

(1) THIS DEVICE MAY NOT CAUSE HARMFUL INTERFERENCE.

(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 "A" DIGITAL DEVICE, PURSUANT TO PART 15 OF THE FCC RULES.

THESE LIMITS ARE DESIGNED TO PROVIDE REASONABLE PROTECTION AGAINST HARMFUL INTERFERENCE WHEN THE EQUIPMENT IS OPERATED IN A COMMERCIAL ENVIRONMENT. THIS EQUIPMENT GENERATES, USES, AND CAN RADIATE RADIO FREQUENCY ENERGY AND, IF NOT INSTATLLED AND USED IN ACCORDANCE WITH THE INSTRUCTION MANUAL, MAY CAUSE HARMFUL INTERFERENCE TO RADIO COMMUNICATIONS.

OPERATION OF THIS EQUIPMENT IN A RESIDENTIAL AREA IS LIKELY TO CAUSE HARMFUL INTERFERENCE IN WHICH CASE THE USER WILL BE REQUIRED TO CORRECT THE INTERFERENCE AT HIS OWN EXPENSE.

Notice

This guide is designed for experienced users to setup the system within the shortest time. For detailed information, please always refer to the electronic user's manual.

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1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into body, or (b) support or sustain life and whose failure to perform, when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in significant injury to the user.

2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

A Message to the Customer

BCM Customer Services

Each and every BCM product is built to the most exacting specifications to ensure reliable performance in the harsh and demanding conditions typical of industrial environments. Whether your new BCM device is destined for the laboratory or the factory floor, you can be assured that your product will provide the reliability and ease of operation for which the name BCM has come to be known.

Your satisfaction is our primary concern. Here is a guide to BCM customer services. To ensure you get the full benefit of our services, please follow the instructions below carefully.

Technical Support

We want you to get the maximum performance from your products. So if you run into technical difficulties, we are here to help. For the most frequently asked questions, you can easily find answers in your product documentation. These answers are normally a lot more detailed than the ones we can give over the phone. So please consult the user's manual first.

To receive the latest version of the user's manual; please visit our Web site at:
http://www.bcmcom.com.

If you still cannot find the answer, gather all the information or questions that apply to your problem, and with the product close at hand, call your dealer. Our dealers are well trained and ready to give you the support you need to get the most from your BCM products. In fact, most problems reported are minor and are able to be easily solved over the phone.

In addition, free technical support is available from BCM engineers every business day. We are always ready to give advice on application requirements or specific information on the installation and operation of any of our products. Please do not hesitate to call or e-mail us.

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Product Warranty

BCM warrants to you, the original purchaser, that each of its products will be free from defects in materials and workmanship for two years from the date of purchase.

This warranty does not apply to any products which have been repaired or altered by persons other than repair personnel authorized by BCM, or which have been subject to misuse, abuse, accident or improper installation. BCM assumes no liability under the terms of this warranty as a consequence of such events. Because of BCM high quality-control standards and rigorous testing, most of our customers never need to use our repair service. If any of BCM products is defective, it will be repaired or replaced at no charge during the warranty period. For out-of-warranty repairs, you will be billed according to the cost of replacement materials, service time, and freight. Please consult your dealer for more details. If you think you have a defective product, follow these steps:

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 dealer 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 dealer. 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 dealer.

Manual Objectives

This manual describes in detail the BCM MX310H Main board.

We strongly recommend that you study this manual carefully before attempting to interface with this mainboard 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
1st (1.00)	Sep, 2020	Initial Release

Contents

Mainboard Specifications

Model	MX310H
Processor	Intel® H310 PCH Supports Coffee Lake (8th Gen) / Coffee Lake Refresh (9th Gen) i7/i5/i3/Pentium processors (Supports "up to 6 Cores" and "up to TDP 65W" type processors only)
Chipset	Intel® H310 PCH
Memory	2x 260-pins SODIMM sockets support 1.2V, Non-ECC, Un-buffered DDR4-2400 (PC4-19200) memory module, 2400 MHz up to 32GB (16GB maximum/slot)
Display	Intel® Integrated HD Graphic Engine
Maximum Resolution	DP: 4096 x 2304 @ 60Hz, 24bpp HDMI: 4096 x 2160 @ 30Hz, 24bpp LVDS: 1920x1200
SATA	4 x SATA III connectors
M.2	1x M.2 Type M 2260, 2280 Slot (with USB, PCIe x2 & SATA III) Does not support nVME type SSDs
	1 x M.2 Type E 2230 (with USB & PCIe x1)
USB	4 x USB 3.0 ports (2x stack-up @ Rear I/O)
	4 x USB 2.0 ports (2x Header)
Super I/O Controller	ITE® IT8768E
Serial Ports	3 x RS-232 (1x 2.0mm Locking Type Header, 2x COM ports on rear I/O) (with Voltage Selection)
PCIe	1 x PCIe x16 Slot
Watch Dog Timer	1sec ~ 255 min timer
HW Monitor	Yes
Audio	Realtek® ALC887
	HD Audio Codec with auto jack sensing
LAN	Intel® i211-AT PCIe Gigabit LAN
	1 x 10/100/1000 LAN Port
	Intel® i219-LM PHY Gigabit LAN
	1 x 10/100/1000 LAN Port
DIO	8 Bit
BIOS	AMI® UEFI BIOS
	AMI BIOS with 128Mb SPI ROM

TPM	1 x TPM 2.0 Security Device (Infineon® TPM Chip SLB9665)
Onboard I/O Headers	
SATA	4 x Std. SATA III Connectors (Some share SATA signal with M.2 connectors)
USB	2 x USB2.0 Header (2 ports/header)
RS232	1 x Header
Front Audio	1 x Header
Audio Amplifier	1 x Header
Front Panel	1 x Header
Fan Header	2 x Headers (12V, 4-pins)
LVDS	1 x Header for LVDS Panel Connection
	1 x Header for LVDS Panel Backlight Connector
SMBUS	1 x Header
I2C	1 x Header
GPIO	1 x Header
Chassis Intrusion	1 x Header
Onboard Jumpers	
COM Port Ring-In/ Power Select	3 x Headers provides power selection of "12V" or "5V" on COM ports
AT/ATX Select	1 x Header
Clear CMOS	1 x Header
LVDS PWM Backlight Power Select	1 x Header
Rear I/O Ports	
HDMI	1 x HDMI Connector
DP (Display Port)	1 x DP Connector
VGA	1 x VGA Connector
USB3.0	2x Stack up USB3.0 Connector
COM Port	2x Serial port Connectors
LAN	2 x 10/100/1000 LAN Ports
Audio	1 x Line-Out
	1 x Mic-In
Power & Connector	
	1 x 4 pin ATX Connector
	1x 24 pin ATX Connector
Form Factor	
	Mini-iTX 6.7" x 6.7"

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 of missing, please contact with your vendor.

1.2   Packing Contents

• **Mainboard**
   • **1 x MX310H**

• **Accessories**
   • **1 x MX310H I/O Shield**

1.3   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 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 components.**

1.4 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.**

1.4.1　Mounting Holes

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

⚠ **Do not over-tighten the screws! This may damage the mainboard.**
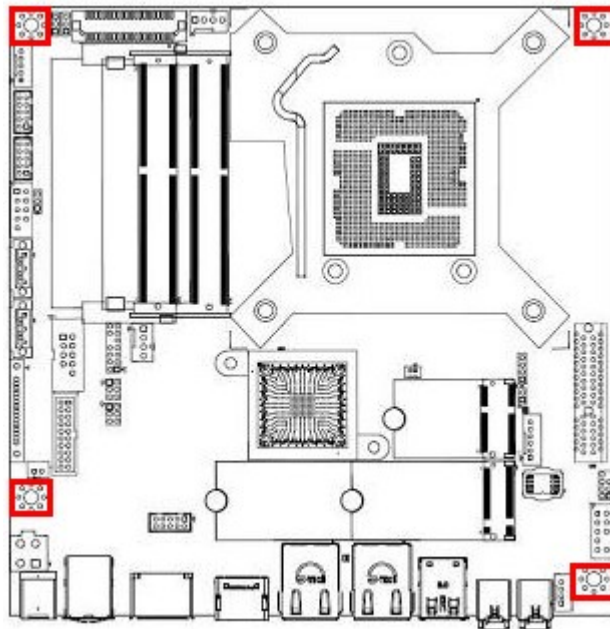
1.4.2 Mainboard Layout (Top View)
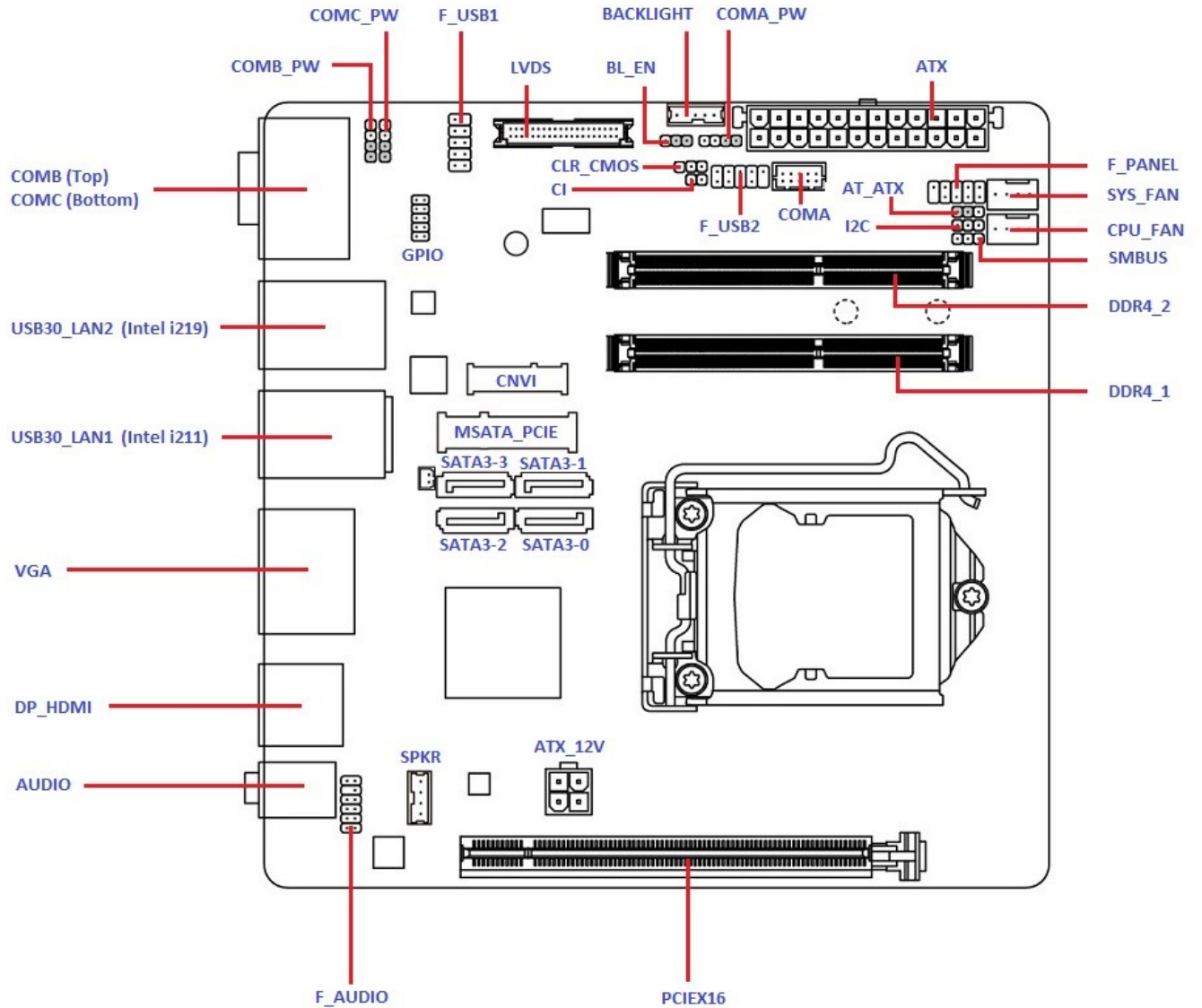
(Bottom View)
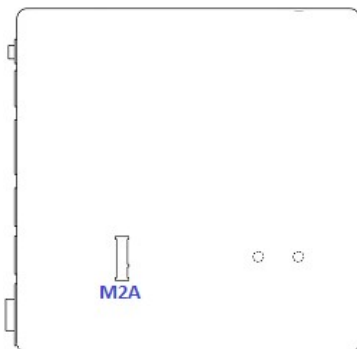
1.4.3   Layout Content List

• 1.4.3.1 Slots			
Label	Function	Note	Page
DDR4_1	260-pin DDR4 SODIMM slot 1	16MB maximum per slot	
DDR4_2	260-pin DDR4 SODIMM slot 2	16MB maximum per slot	
MSATA_PCIE	Supports MSATA SSDs		
M2A	Supports M.2 SATA SSDs	Supports 2260/ 2280 SATA SSD Only (It does not support nVME type SSD).	
CNVI	Supports E-Key WIFI modules.	Supports WIFI Cards (E-key) in 2230 Only	
PCIEX16	PCIe x16 slot		

• 1.4.3.2 Internal Jumpers			
Label	Function	Note	Page
BL_EN	LVDS Backlight Power Select (+3.3V (default) /+5V)	1 x 3 header, pitch 2.54mm	
CLR_CMOS	Clear CMOS	1 x 3 header, pitch 2.54mm	
AT_ATX	ATX/AT Mode Select (ATX Mode (default) / AT Mode)	1 x 3 header, pitch 2.54mm	
COMA_PW	COMA +12V/ +5V Power Select	1 x 4 header, pitch 2.54mm	
COMB_PW	COMB +12V/ +5V Power Select	1 x 4 header, pitch 2.54mm	
COMC_PW	COMC +12V/ +5V Power Select	1 x 4 header, pitch 2.54mm	

• 1.4.3.3 Internal Headers			
Label	**Function**	**Note**	**Page**
ATX_12V	12V ATX Power Connector	2 x 2 header,	
ATX	24-pins ATX Power Connector	12 x 2 header	
CPU_FAN	CPU Fan Connector	1 x 4 wafer, Pitch 2.54mm	
SYS_FAN	System Fan Connector	1 x 4 wafer, Pitch 2.54mm	
SATA3-0 SATA3-1 SATA3-2 SATA3-3	Serial ATA 3.0 Connectors 0, 1, 2, 3	7-pin header	
MSATA_PCIE	MSATA Connector		
M2A	M.2 SSD Connector		
CNVI	Wifi Module Connector		
COMA	Serial Port A	2 x 5 wafer header, pitch 2.00mm	
F_USB1	USB2.0 Port 1	2 x 5 box header, pitch 2.54mm	
F_USB2	USB3.0 Port 2	2 x 5 box header, pitch 2.54mm	
F_PANEL	System Panel Connector	2 x 5 header, pitch 2.54mm	
F_AUDIO	Front Panel Audio Connector	2 x 5 header, pitch 2.54mm	
SPKR	Audio Amplifier Connector	1 x 4 wafer header, pitch 2.00mm	
LVDS	LVDS Panel Connector	2 x 20 header, 1.25mm pitch wire to board connector (WTB)	
BACKLIGHT	LVDS Panel Backlight Connector	1 x 5 wafer header, pitch 2.00mm	
I2C	I2C Connector	1 x 3 header, 2.54mm	
SMBUS	SMBUS Connector	1 x 3 header, 2.54mm	
GPIO	GPIO Connector	2 x 5 wafer header, 2.00mm	
CI	Chassis Intrusion Connector	1 x 2 wafer header, 2.54mm	

• 1.4.3.4 Back Panel Connectors (Rear I/O)			
Label	**Function**	**Note**	**Page**
COMB	Serial Port B		
COMC	Serial Port C		
USB3.0	USB3.0 Ports (4 ports)		
LAN1 (Intel i211)	Gigabit LAN RJ-45 Connector		
LAN2 (Intel i219)	Gigabit LAN RJ-45 Connector		
VGA	VGA Port		
DP	Display Port		
HDMI	HDMI Port		
AUDIO (LINE-OUT)	Line-Out Port (Lime)		
AUDIO (MIC-IN)	Microphone Port (Pink)		

1.5   Central Processing Unit (CPU)

This mainboard supports the Intel® LGA1151 socket for Intel® Core™i7/i5/i3/Pentium Coffee Lake (8TH Gen) and Coffee Lake Refresh (9th Gen) processors in LGA-1151 package (Supports "up to 6 Cores" and "up to TDP 65W" type processors only).

- Your boxed Intel® LGA1151 processor package should come with installation instructions for the CPU, fan, heatsink, and the retention assembly.
- Upon purchase of the mainboard, make sure that the PnP cap is on the socket and the socket pins are not bent. Contact your retailer immediately if the PnP cap is missing, or if you see any damage to the PnP cap/socket pins/mainboard components. BCM will shoulder the cost of repair only, if the damage is shipment/ transit-related.
- Keep the PnP cap after installing the mainboard. BCM will process Return Merchandise Authorization (RMA) requests only if the mainboard comes with the cap installed on the LGA1151 socket.
- The product warranty does not cover damage to the socket pins resulting from incorrect CPU installation/ removal, or misplacement/ loss/ incorrect removal of the PnP cap.

1. **Overheating: Overheating will seriously damage the CPU and mainboard. Always make sure the cooling fan can work properly to protect the CPU from overheating.**
2. **Make sure that you apply an even layer of thermal paste between the CPU and the heatsink to enhance heat dissipation.**
3. **Replacing the CPU: While replacing the CPU, always turn off the ATX power suppply or unplug the power supply's power cord from the grounded outlet first in order to prevent damage to the system.**

1.5.1 Installing the CPU

The CPU installation related information.

1. Locate the CPU socket (LGA1151 Socket) on the mainboard.
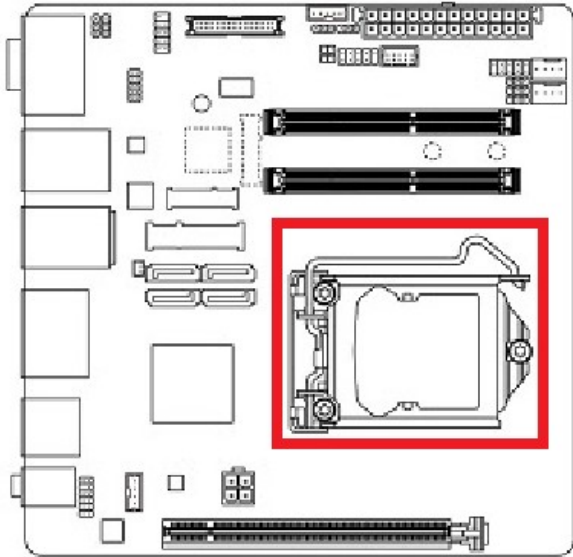
2. Unlatch the "CPU Socket Lever" by pressing the lever down and move it away from the main structure of the socket.
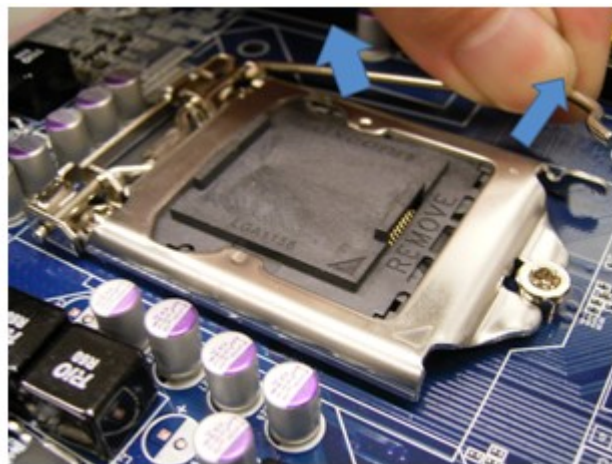
 To prevent damage to the socket pins, do not remove the "CPU Socket Cover" (PnP cap) unless you are going to install a CPU.

3. Lift the load lever up in the direction of the arrow to a 135° angle, so the metal "CPU Socket Cover" can also be lifted.
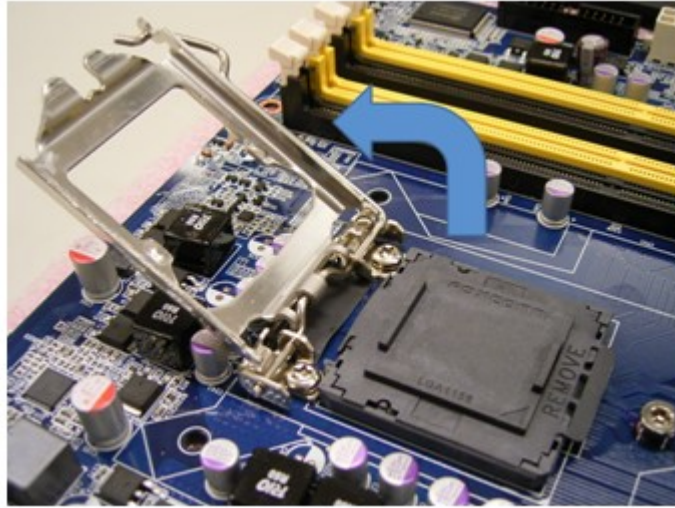
4. The CPU socket has a plastic protection cap installed on it (black color, a.k.a. "CPU Socket Cover", or "PnP cap") in order to protect the socket pins from damage. If you are going to install a CPU, remove the plastic protection cap away from the CPU socket by lifting it up

> **(NOTE: Please do not discard this plastic protection cap. Just in case if you need to RMA this board in the future, you need to install this plastic protection cap in order to protect the CPU socket)**
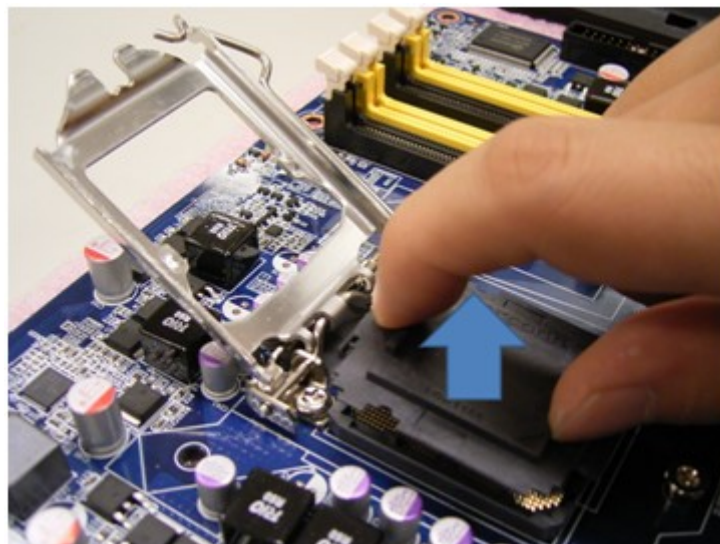
5. There are two notches on the CPU itself (one on each side), and there are two "Socket Alignment keys" on the CPU socket as well. Line up the two CPU notches with the "Socket Alignment Keys" on the socket, and insert the CPU into the CPU socket slowly.

Socket Alignment Key
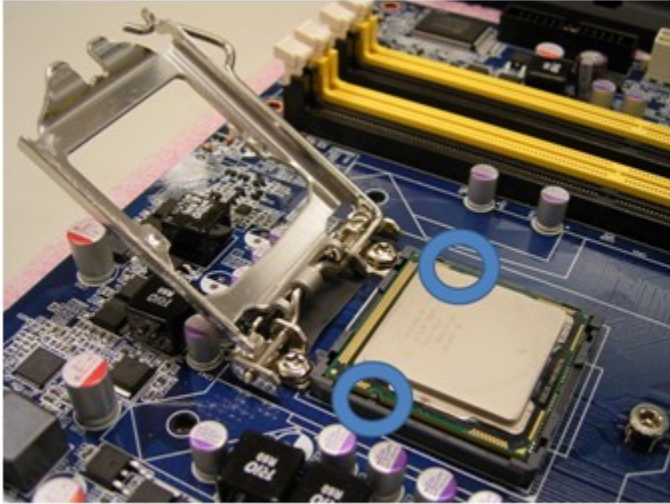
6. Visually inspect if the CPU is seated into the CPU socket evenly. The "Socket Alignment keys" should fit into the CPU notches.
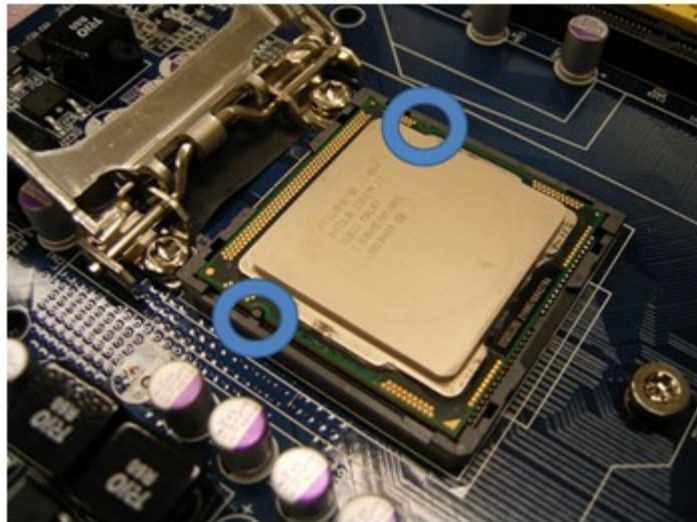
7. Close the "CPU Socket Cover" by lowering down the "CPU Socket Lever". Make sure the "CPU Socket Front Plates" are sliding underneath the "Shoulder Screw Cap".
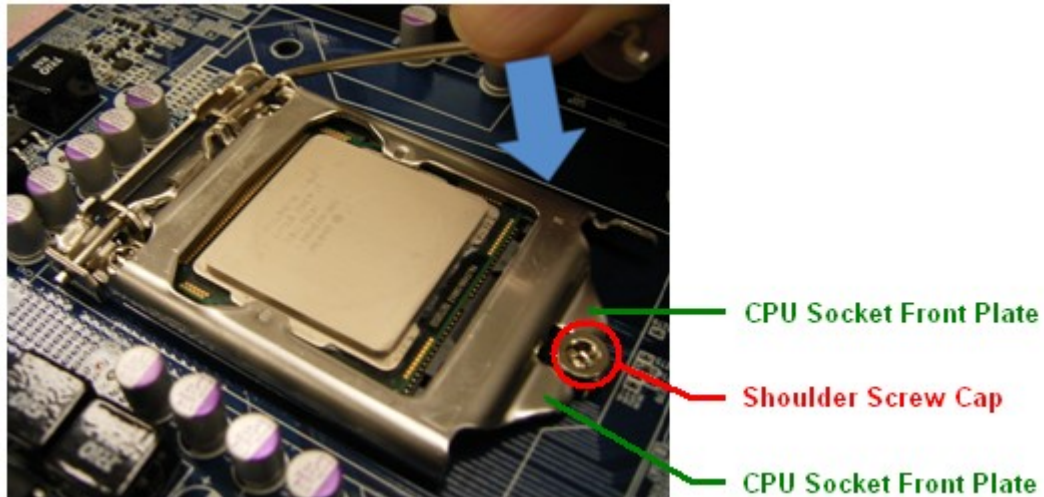
8. Secure the "CPU Socket Cover" by keep pressing down the "CPU Socket Lever" and move it toward and underneath the "Load Plate Tab".

The CPU fits in only one correct orientation, DO NOT force the CPU into the socket. Otherwise, it might damage the CPU and/or the CPU socket.

1.5.2 Installing the CPU Heatsink and Fan

The Intel LGA1151 processor requires a specially designed heatsink and fan assembly to ensure optimum thermal condition and performance.

- When you purchase a boxed Intel® processor, the package includes the CPU fan and heatsink assembly. If you buy a CPU separately, make sure that you use only Intel®-certified multi-directional heatsink and fan.
- The boxed Intel® LGA1151 heatsink and fan assembly comes in a push-pin design and requires no tool to install.
- If you purchased a separate CPU heatsink and fan assembly, make sure that:

  a. The CPU heatsink and fan assembly is designed to withstand the "TDP" (Thermal Dissipation Power) specified by Intel specification of corresponding CPU that you are going to install.

  b. You have properly applied an even layer of "Thermal Interface Material" to between the CPU heatsink and the top of CPU before you install the heatsink and fan assembly (please check with your CPU fan/heatsink vendor for details).

To install the CPU heatsink and fan:

1. Place the CPU heatsink on top of the installed CPU, making sure that the four fasteners match the holes on the mainboard.
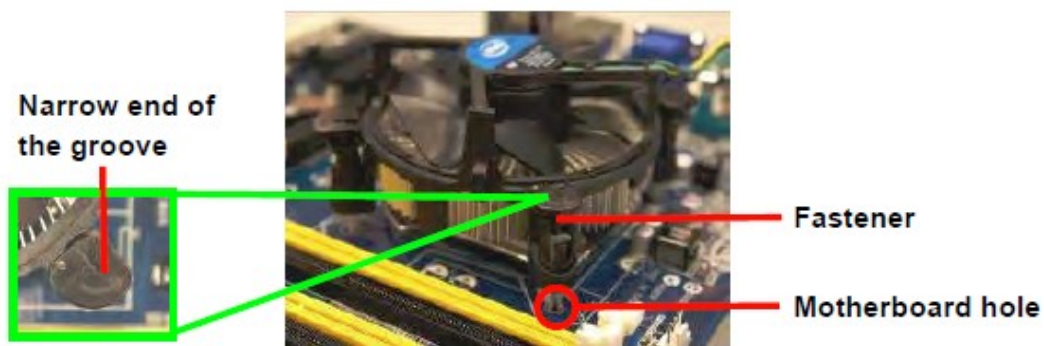
NOTE: Orient the heatsink and fan assembly such that the CPU fan cable is closest to the CPU fan connector).

Make sure to orient each fastener with the narrow end of the groove pointing outward.

(The photo shows the groove shaded for emphasis.)

2. Push down two fasteners at a time in a diagonal sequence to secure the heatsink and fan assembly in place.
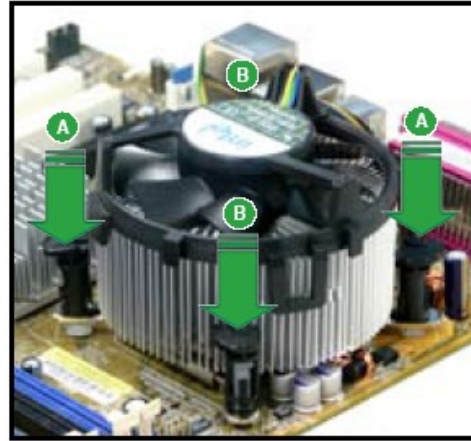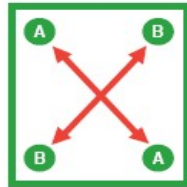
3. Connect the CPU fan cable to the connector on the mainboard labeled "CPU_FAN".
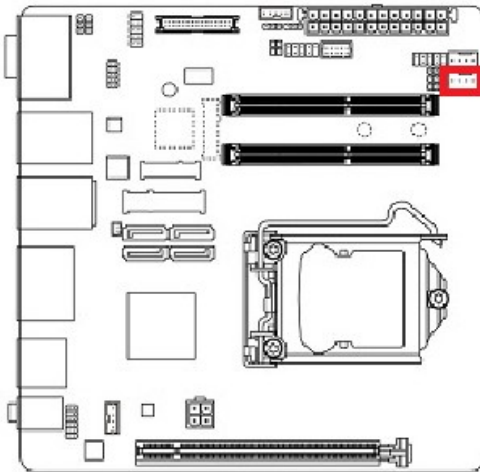
CPU_FAN

1. Ground
2. +12V
3. Fan Speed Sense
4. Fan Speed Control
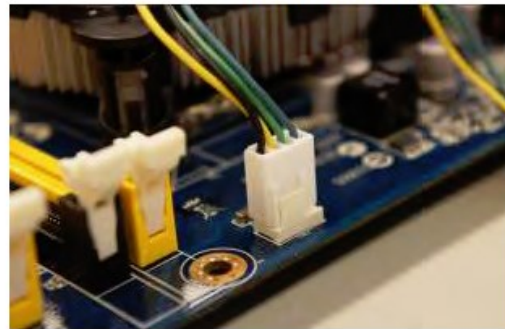
A. Do not forget to connect the CPU fan connector. Insufficient air flow inside the system chassis may damage the mainboard components. Hardware monitoring errors can occur if you fail to plug in this connector.

B. Do not install any jumper connector on the header "CPU_FAN", doing so may damage the mainboard.

1.5.3 Uninstalling the CPU Heatsink and Fan.

To uninstall the CPU heatsink and fan:

1. Disconnect the CPU fan cable from the fan connector on the mainboard.

2. Rotate each fastener counterclockwise.

3. Pull up two fasteners at a time in a diagonal sequence to disengage the heatsink and fan assembly from the mainboard.
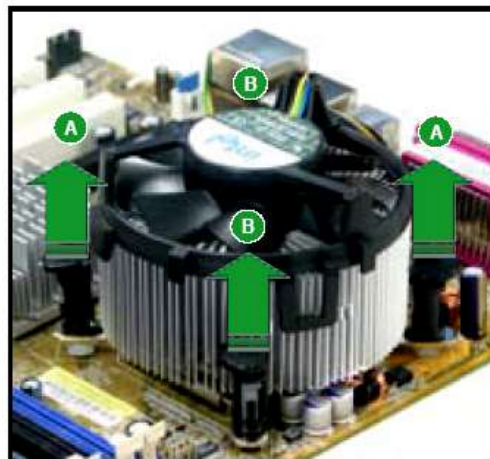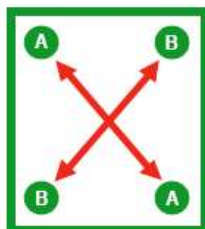
4. Rotate each fastener clockwise to ensure correct orientation when reinstalling.

Narrow end of the groove
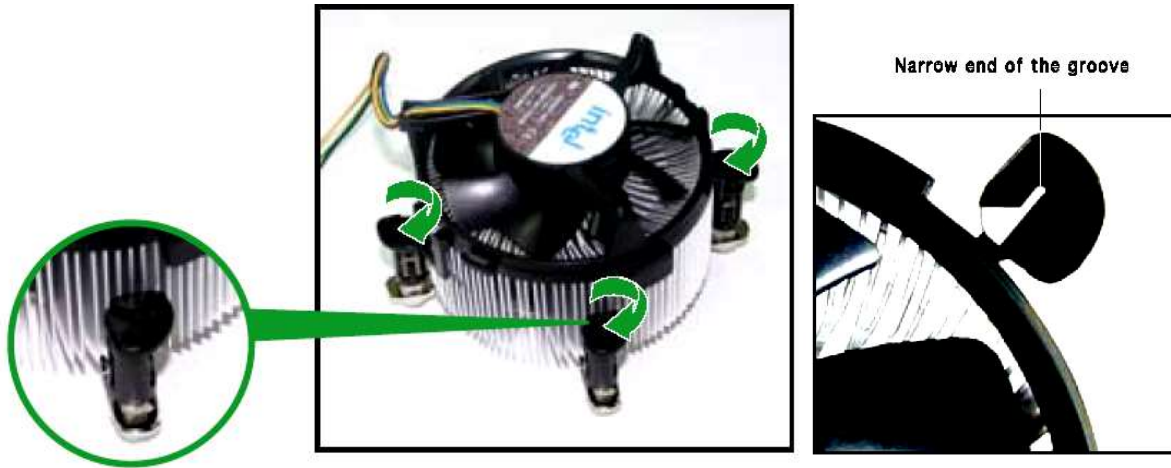
**The narrow end of the groove should point outward after resetting.
(The photo shows the groove shaded for emphasis.)**

1.6   System Memory

1.6.1   Overview

The mainboard comes with two 260-pin Double Data Rate 4 (DDR4) Dual Inline Memory Modules (SODIMM) sockets.

 DDR4 SDRAM, an abbreviation for double data rate fourth generation synchronous dynamic random-access memory, is a type of synchronous dynamic random-access memory (SDRAM) with a high bandwidth ("double data rate") interface. The primary advantages of DDR4 over its predecessor, DDR3, include higher module density and lower voltage requirements, coupled with higher data rate transfer speeds.

The following figure illustrates the location of the sockets:
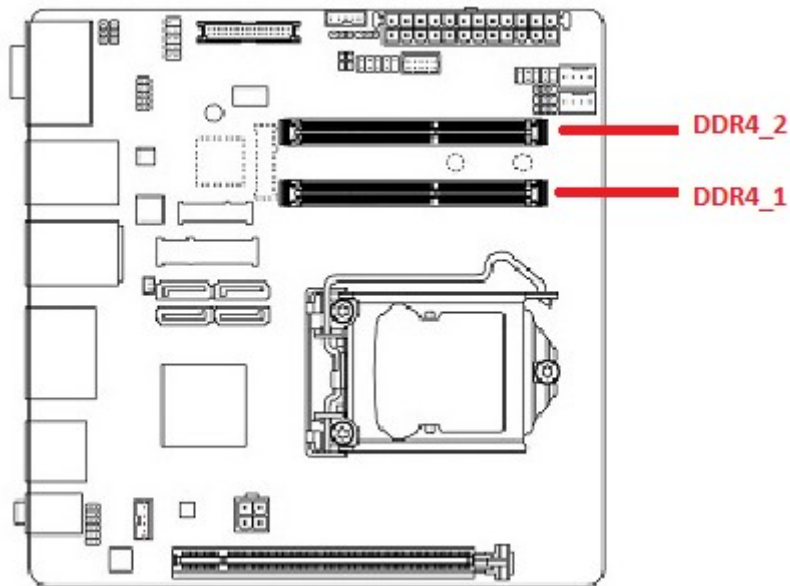
1.6.2   Memory Configurations

The MX310H board supports 1.2V, Non-ECC, Un-buffered, 260-pins DDR4-2400 (PC4-19200, 2400MHz) SODIMM up to 32GB (16GB maximum/slot).

- **When there is only one DDR4 memory module being installed, it is recommended to install it on "DDR4_1" slot.**

- **When two SODIMMs being populated, only install identical (same type, same size, same CAS latency) DDR4 SODIMMs.**

- **For optimum compatibility, it is recommended to obtain the exact same model (and same batch) of memory modules from the same SODIMM manufacturer.**

1.6.3   Installing the DDR4 SODIMM

Make sure to unplug the power supply before installing or removing SODIMMs, or other peripherals from the system. Failure to do so may cause severe damage to both the mainboard and the peripherals.

1.   Locate the SODIMM socket onboard.

2.   Hold two edges of the SODIMM module carefully, and keep away of touching its connectors.

3.   Align the notch key on the SODIMM module with the rib on the slot.

4.   Firmly press the SODIMM module into the socket which will be snapped into the mounting notch automatically. Do not force the SODIMM module in with extra force as the SODIMM module can only fits in one direction.
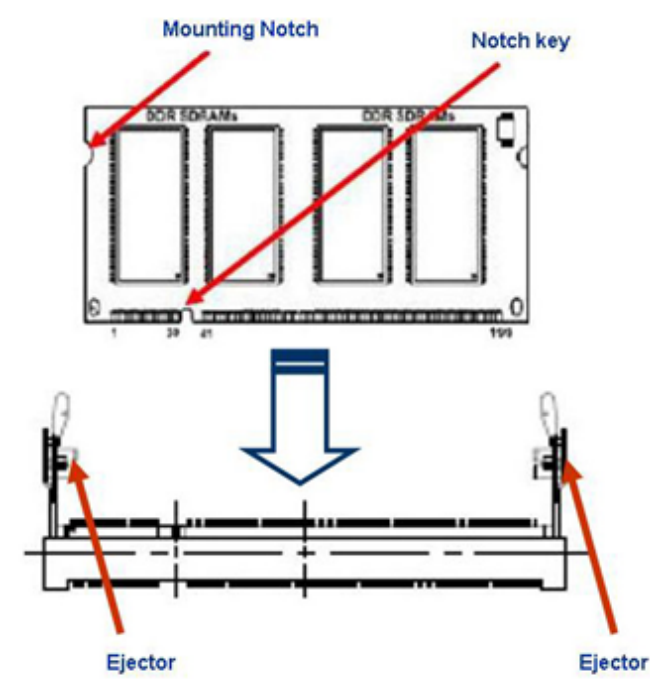
1. **A DDR4 memory module is keyed with a notch so that it fits in only one direction.**
2. **DO NOT force the memory module into the socket in order to avoid damaging the memory module and the slot.**
3. **DDR4 memory modules are not interchangeable with DDR or DDR2, or DDR3. Do not install DDR, DDR2, or DDR3 SODIMMs to the DDR4 SODIMM sockets.**

1.6.4   Removing the DDR4 SODIMM

Follow these steps to remove a SODIMM.

1. Press the two ejector tables on the slot outward simultaneously

2. Remove the SODIMM module from the socket.
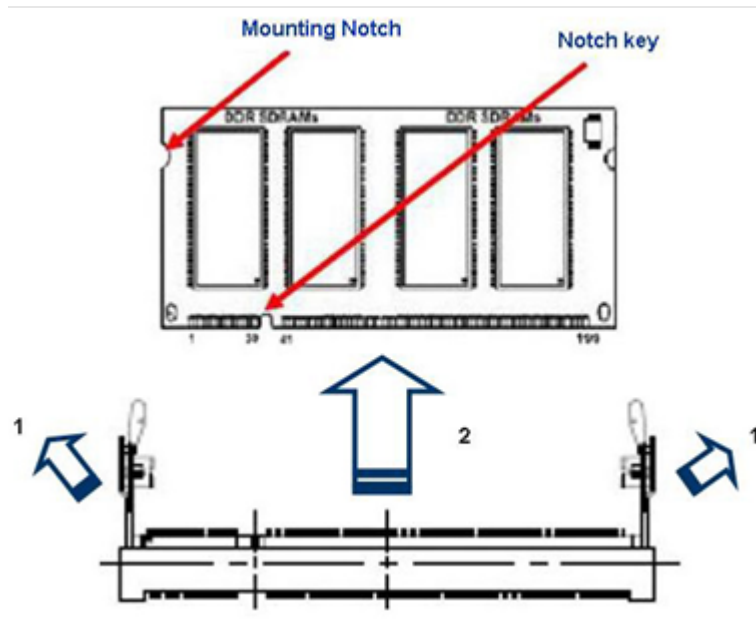
⚠ **Hold the SODIMM module gently when pressing the ejector tabs. The SODIMM might get damaged when it flips out with extra force.**

1.7   Power Supply

1.7.1   ATX Power Connectors: ATX,   ATX_12V

These ATX power connectors provide connections from power supply unit (PSU) to the mainboard. Both connectors need to be installed in order for the mainboard to function properly. The power supply plugs are designed to fit with these ATX power connectors in one orientation only. To connect these power supply plugs; find the proper orientation first, and then push down the power supply plugs firmly until the connectors are completely inserted.

If you'd like to use the 20-pin ATX power supply, please align the 20-pin power connector from PSU to pin 1 & pin 13 of "ATX" connector. There is also a foolproof design on pin 11, 12, 23, & 24 to avoid wrong installation.
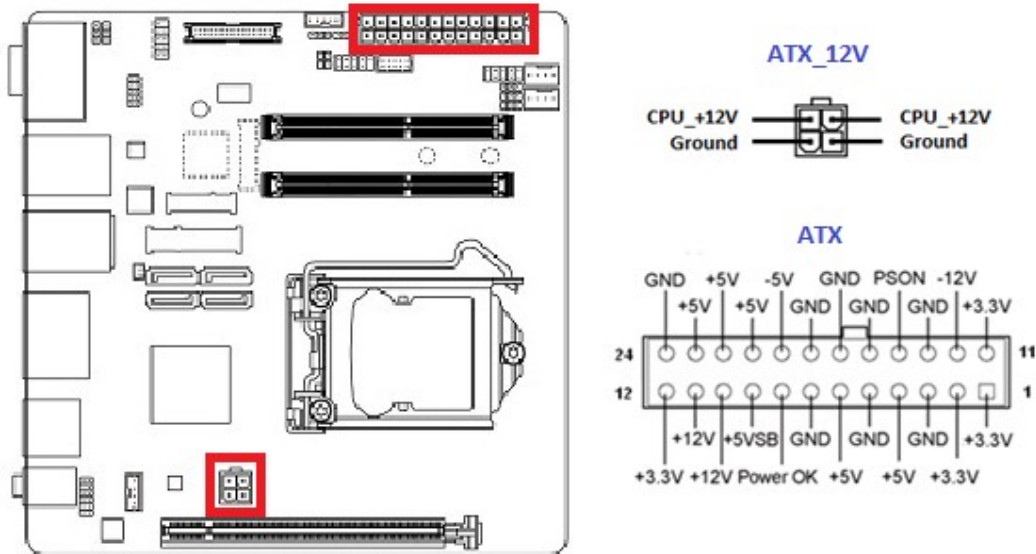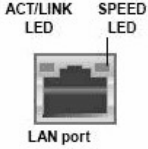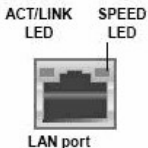
1. It is recommended that you use a power supply unit (PSU) that complies with ATX 12V specification 2.0 (or later version), and provides a minimum power of 500W. If you are planning to fully load the slots and/or use a PCI-E x16 graphic card, a power supply with minimum power of 600W or more might be needed.

2. Do not forget to connect the 4-pin "ATX_12V" power plug; otherwise, the system will not boot.

3. Use of a PSU with a higher power output is recommended when configuring a system with more power-consuming devices. The system may become unstable or may not boot if the power supply is inadequate.

1.8   Back Panel   (Rear I/O Ports)

1.8.1   Back Pane Connectors

Item	Name	Function	Description
1	COMC	Serial Port	Serial Port C.
2	USB3.0	USB3.0 Ports	The USB3.0 Port Connectors.
3	USB3.0	USB3.0 Ports	The USB3.0 Port Connectors.
4	HDMI	HDMI Port	The HDMI Port Connector.
5	AUDIO (MIC-IN)	Microphone port (Pink)	This port connects a microphone.
6	COMB	Serial Port	Serial Port B.
7	LAN2 (Intel i219)	Gigabit LAN (RJ-45) Connectors	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.

For item 7, the following LED indication table is shown:

ACT/Link LED		Speed LED	
Status	Description	Status	Description
OFF	No link	OFF	10Mbps connection
Orange	Linked	Green	100Mbps connection

Blinking	Data activity	Orange	1Gbps connection

Item	Name	Function	Description
8	LAN1 (Intel i211)	Gigabit LAN (RJ-45) Connectors	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.

ACT/Link LED		Speed LED	
Status	Description	Status	Description
OFF	No link	OFF	10Mbps connection
Orange	Linked	Green	100Mbps connection
Blinking	Data activity	Orange	1Gbps connection

Item	Name	Function	Description
9	VGA	VGA Port	The VGA 15-Pins Connector.
10	DP	Display Port	This Port Provides Display Port Monitor Connection.
11	AUDIO (LINE-OUT)	Line-out port (Lime)	This port connects a headphone or a speaker.

1.9   Connectors/ Headers

1.9.1   Front Panel Connectors: F_PANEL

These connectors are for electrical connections to the front panel switches and LEDs. The "F_PANEL" connector is compliant with Intel® Front Panel I/O Connectivity Design Guide.
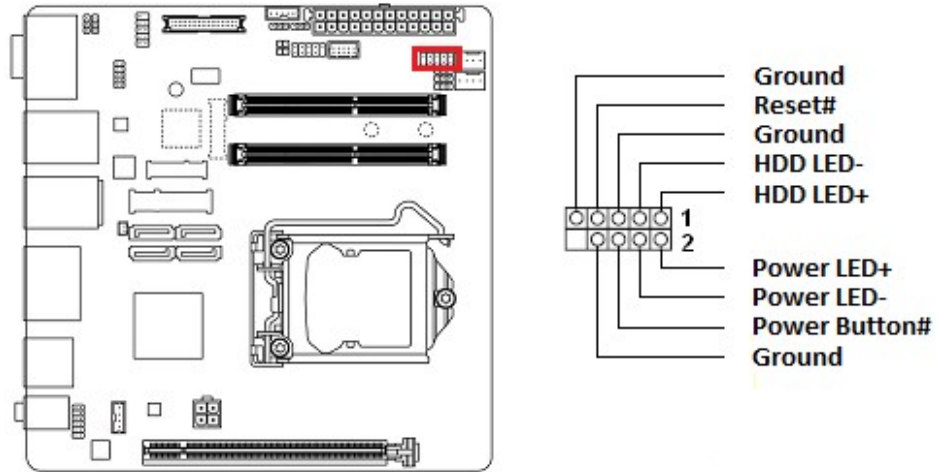
1.9.2   CPU & System Fan Connectors: CPU_FAN,   SYS_FAN

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 connected to "Ground". In order to take the advantage of System Hardware Monitor and Smartfan feature, be sure to use the fan which is specifically designed with speed sensor.
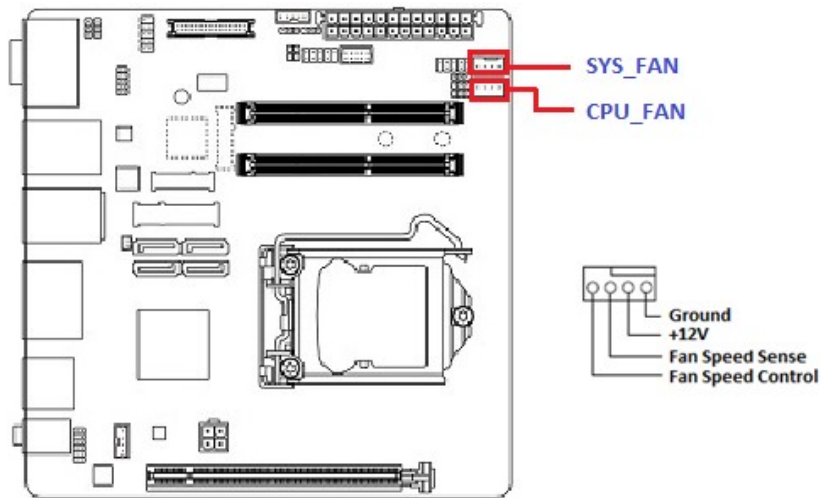
Please refer to the recommended CPU fans at processor's official website or consult with the fan vendor for proper CPU cooling fan.

1.9.3 Serial ATA 3.0 Connectors: SATA3-0, SATA3-1, SATA3-2, SATA3-3

SATA ports "SATA3-0", "SATA3-1", "SATA3-2", "SATA3-3" support SATA3.0 standard.
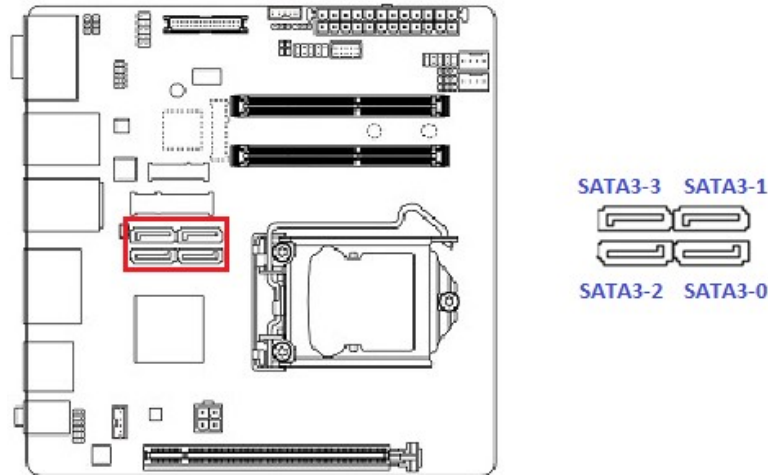
NOTE:

1. **"SATA3-2" is sharing SATA signal with "MSATA_PCIE" connector, both headers can't be connected with SATA device simultaneously (can only choose to use either one of these 2 headers).**

2. **"SATA3-3" is sharing SATA signal with "M2A" header (at bottom side of board), both headers can't be connected with SATA device simultaneously (can only choose to use either one of these 2 headers).**

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

1.9.4 MSATA_PCIE Connector: MSATA_PCIE

This connector supports mSATA type SSDs.
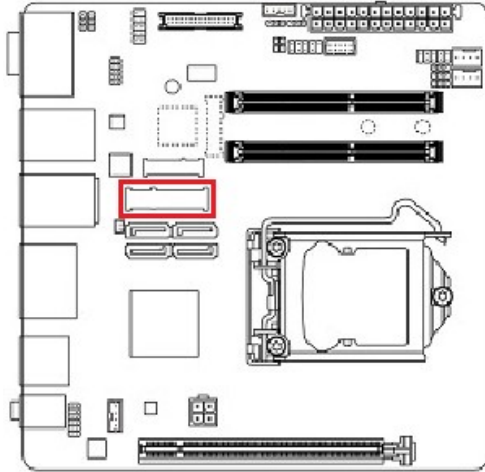
NOTE:

"MSATA_PCIE" is sharing SATA signal with "SATA3-2" connector, both headers can't be connected with SATA device simultaneously (can only choose to use either one of these 2 headers).

1.9.5 CNVI Connector (E-Key, Supports WIFI Cards in 2230 Only): CNVI

This connector supports WIFI cards in 2230.
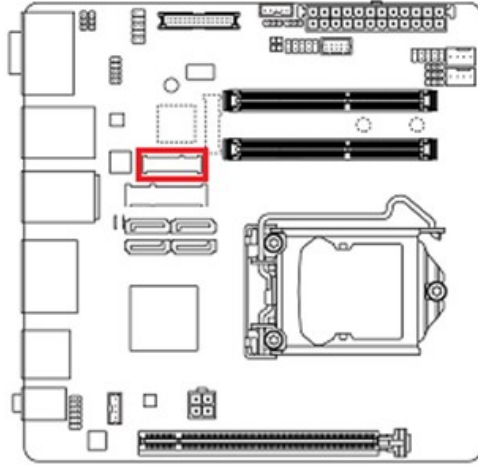
1.9.6 M.2 SATA SSD Connector (On the Bottom Side of Board): M2A

This M.2 connector is located at bottom side of MX310H board. It supports 2260/ 2280 SATA SSD Only (nVME type SSD is not supported).
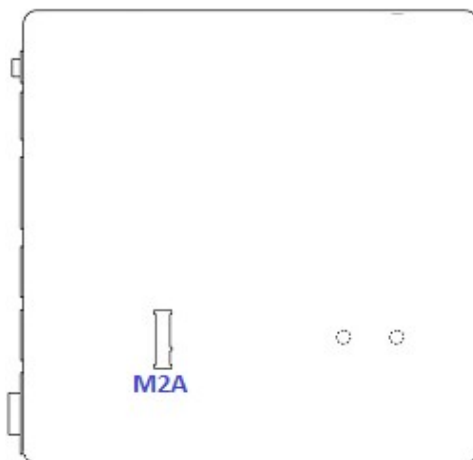
NOTE:

"M2A" is sharing SATA signal with "SATA3-3" header, both headers can't be connected with SATA device simultaneously (can only choose to use either one of these 2 headers).

1.9.7 Front Panel Audio Connector: F_AUDIO

This connector is prepared for a chassis-mounted front panel audio I/O module that supports HD Audio standard. Connect one end of the front panel audio I/O module cable to this connector. "F_AUDIO" volume can be adjusted through OS volume control.
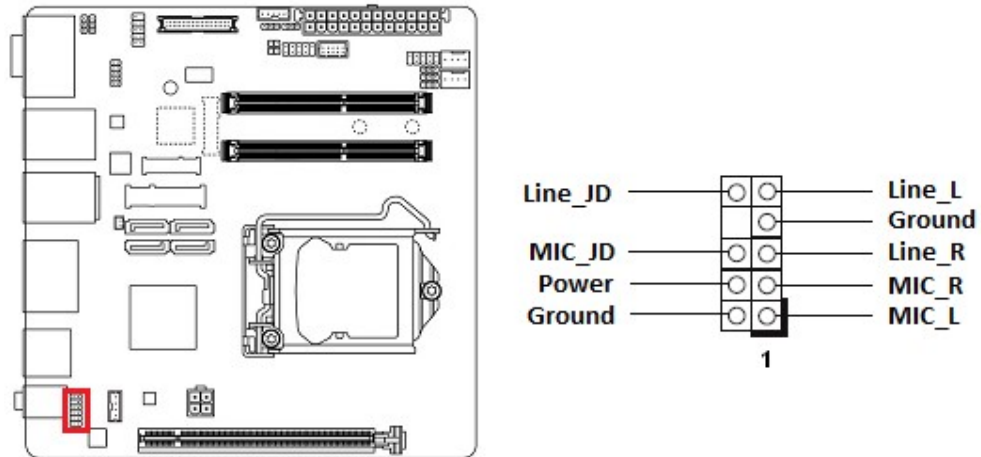
1.9.8 Audio Amplifier Connector: SPKR

This header provides amplified audio signals to external speakers (2-channels). The BIOS option "AMP SE-Input Stereo-Output Gain select" supports its volume control.
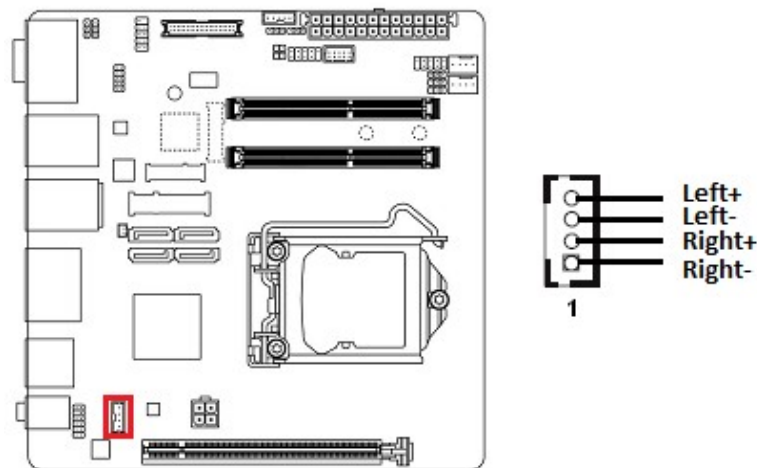
1.9.9   Front USB2.0 Headers: F_USB1,   F_USB2

This header provides two USB2.0 connections (An USB2.0 cable is required).
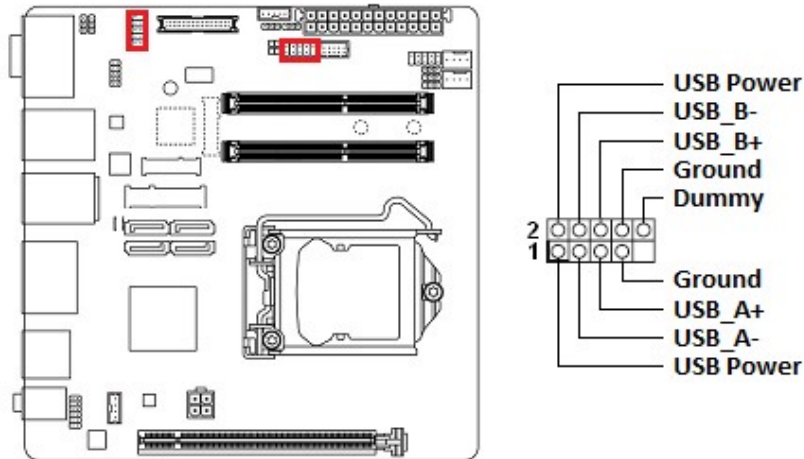
Be sure the pins of USB+5V and GND signals on USB2.0 cable are connected to the corresponding USB2.0 headers correctly. Otherwise, it may cause damage to the USB port and/or the connected USB device.

1.9.10   Serial Port Connector A: COMA

This header provides serial connections with serial port COM A (COMA).
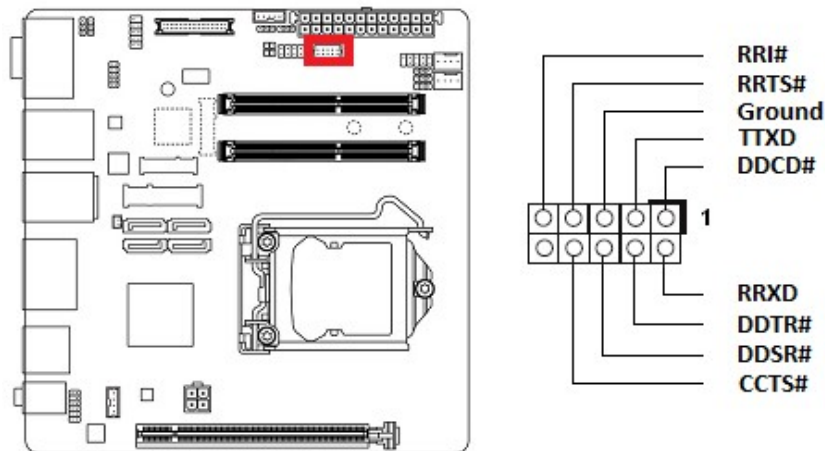
1.9.11   LVDS Header: LVDS

This header provides connection to LVDS type panels (800x600 18-bit Single channel to 1920x1200 24-bit dual channel).
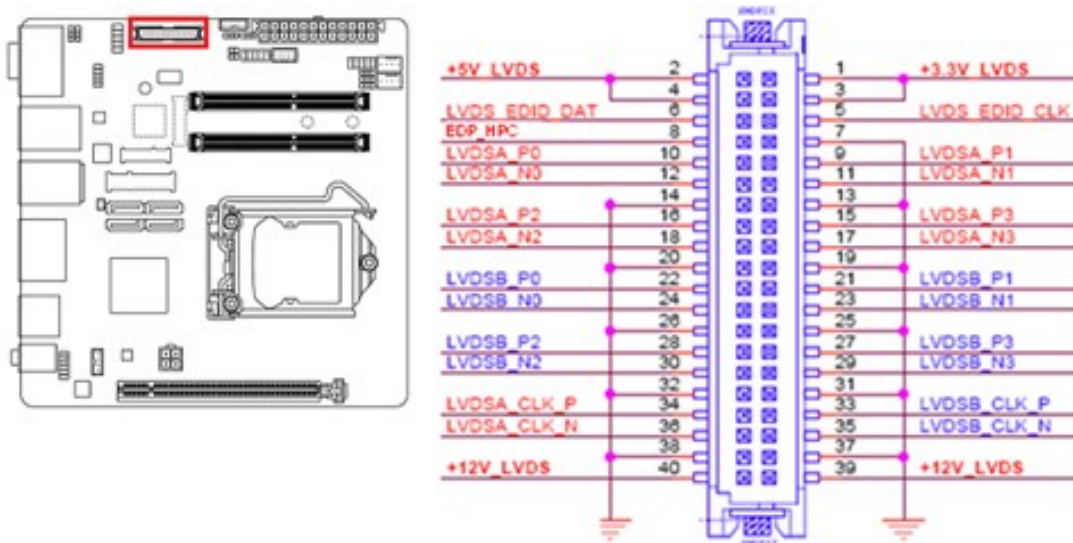
1.9.12   LVDS Panel Backlight Connector: BACKLIGHT

This header provides connection for LVDS panel backlight control connections.
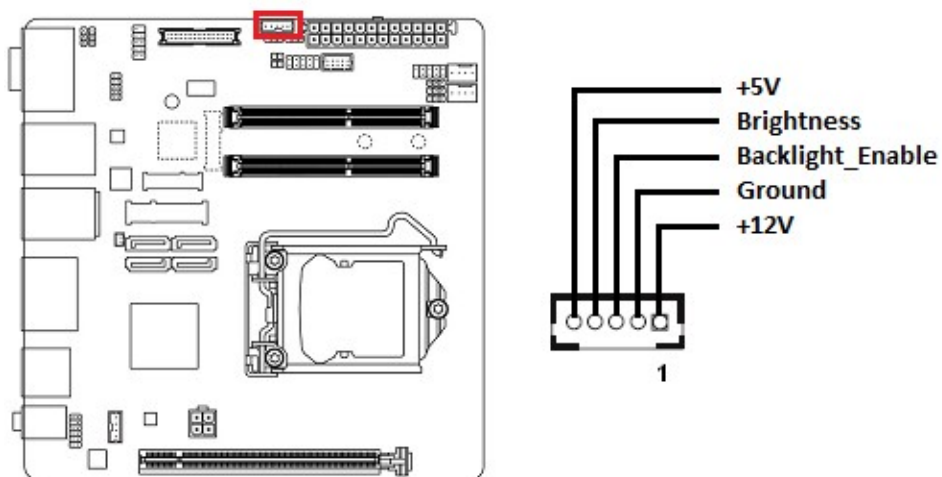
1.9.13 SMBUS Header: SMBUS

This header provides SMBUS signal connections.
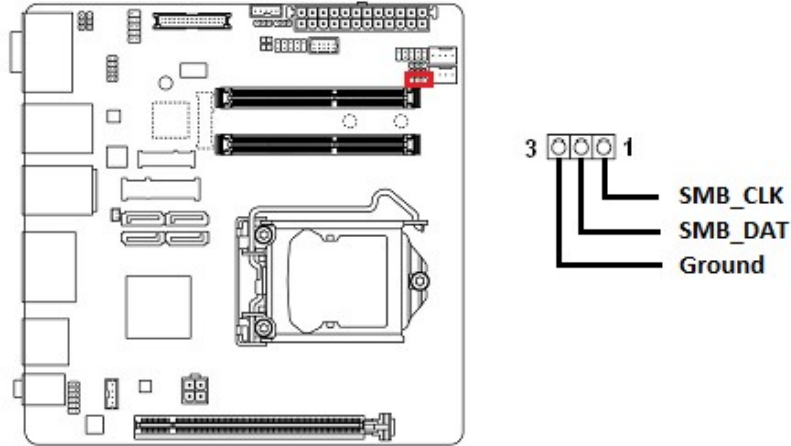
1.9.14 GPIO Header: GPIO

This header provides GPIO signal connections.
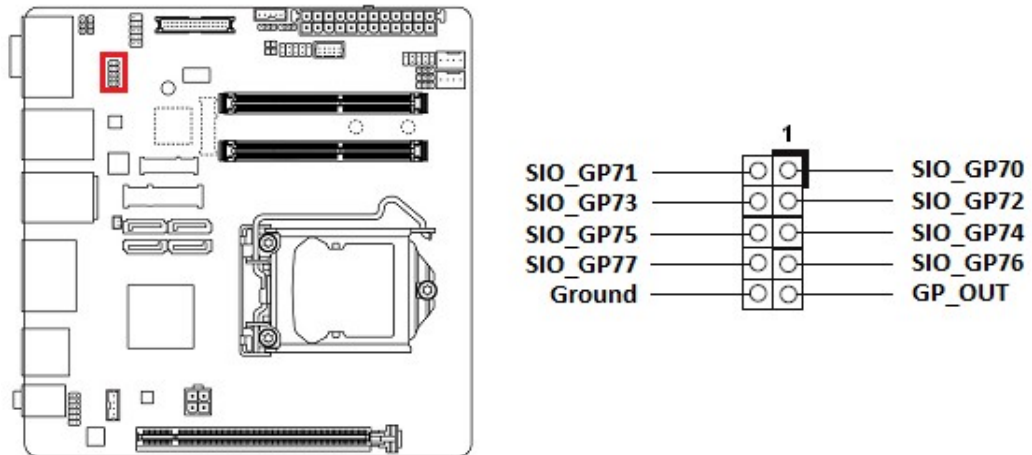
1.9.15 I2C Header: I2C

This header provides I2C signal connections.
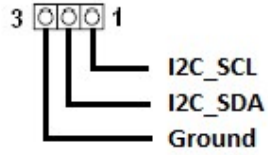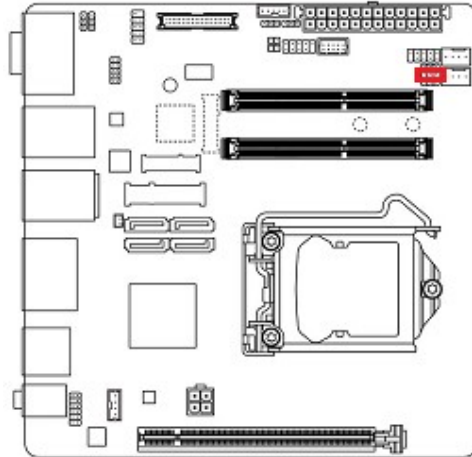
1.9.16 Chassis Intrusion Header: CI

This 2-pins header provides chassis intrusion warning connection.
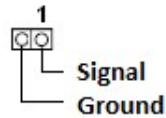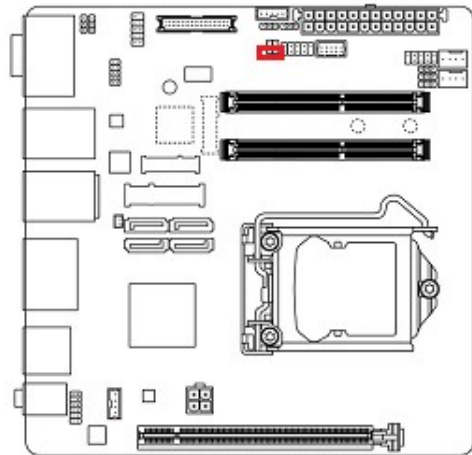
1.10   Jumpers

1.10.1   ATX/AT Mode Selection: AT_ATX

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. And some of the power saving modes will not function as ATX mode provided.
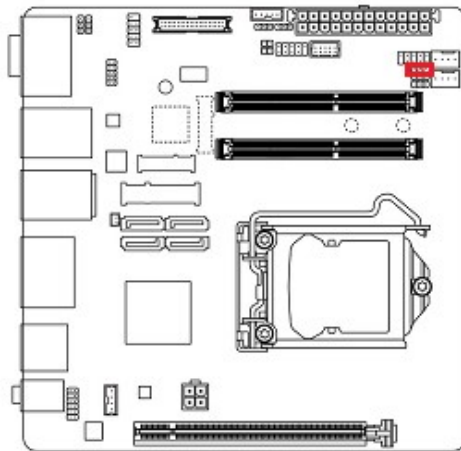
1-2: AT Mode
2-3: ATX Mode (Default)

1.10.2   LVDS Backlight Power Select: BL_EN

This header provides the options for selecting the LVDS backlight control power in "+3.3V" (default) or "+5V".
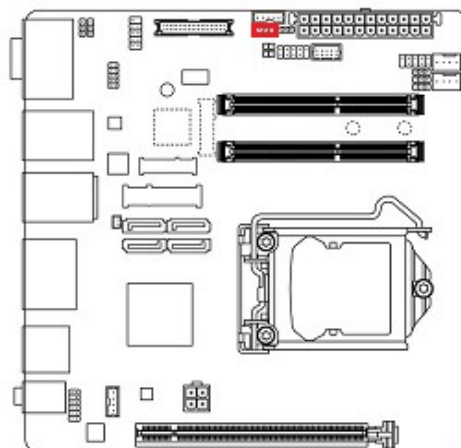
Pin 1-2: +3.3V (default)
Pin 2-3: +5V

1.10.3 COM Ports +12V/ +5V Power Select:
COMA_PW, COMB_PW, COMC_PW

These headers provide the options of selecting the COM port power in "+5V", or "+12V" for corresponding COM port.

COMA_PW   COMB_PW, COMC_PW

1   1

Pin 1-2: +12V
Pin 2-3: +5V
Pin 3-4: Default
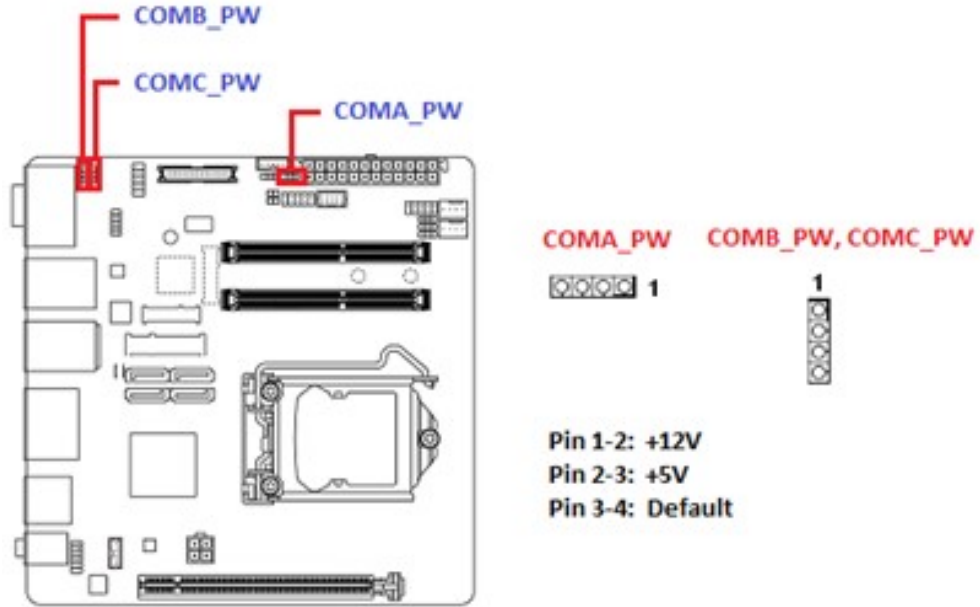
1.10.4   Clear CMOS Header: CLR_CMOS

There is a CMOS RAM onboard that has the power supplied from an external battery to maintain the registry settings of system configuration.

For normal state (default), the jumper is set on pin location 2 and 3.

To clear the CMOS, disconnect all power connections to MX310H first, then set the "CLR_CMOS" jumper to pin location 1 and 2 for **at least 30 seconds while the system is Disconnected from the power**.
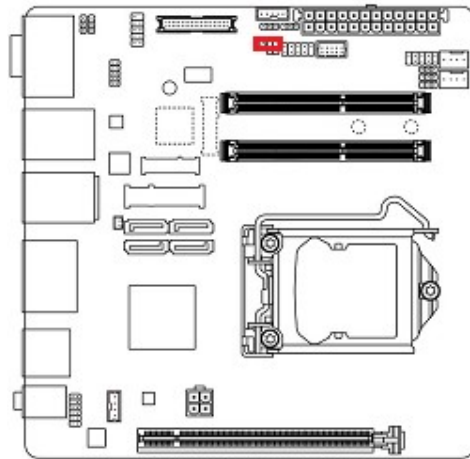
Pin 1-2: Clear CMOS
Pin 2-3: Normal (Default)

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

2. Avoid clearing the CMOS while the system is ON; this may damage the mainboard.

1.11   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 that they support.

Make sure to unplug the power cord before adding or removing expansion cards.

Fail to do so may cause injury and damage mainrboard.

1.11.1   Installation of Expansion Card

To install an expansion Card:

1. Before install the expansion card, read the documentation that came with it and make the necessary hardware setting for the card.

2. Be sure there is no power connection to the system.

3. Remove the chassis cover (if the mainboard is installed in a chassis).

4. Remove the expansion slot bracket from the chassis on the slot that you intend to use. Keep the screw for later use.

5. Align the card connector with the slot and press it firmly until the card is completely seated on the slot.

6. Secure the card to the chassis with the screw that have been removed earlier (in step 4).

7. Place the chassis cover back on.

1.11.2   Setup An Expansion Card

After installing the expansion card, configure it by adjusting the software settings.

1. Turn on the system and change the BIOS settings if necessary. See Chapter 2 for information

   on BIOS setup.

2. Assign an IRQ to the card if necessary.

3. Install the software drivers for the expansion card (provided by expansion card manufacturer).

1.11.3   PCIe x16 Slot: PCIEX16

The PCIe x16 slot supports PCIe x1, PCIe x4, PCIe x16 cards (e.g. PCIe LAN cards, or some of the PCIe x16 video cards.
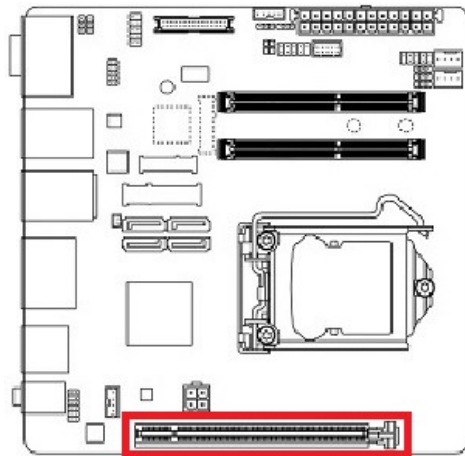
Chapter 2: Starting Up the System

2.1   Starting Up Your System

1. After all connections are made, close your computer case cover.

2. Be sure all the switches are off, and check that the power supply input voltage is set to the local voltage, usually in-put voltage is 220V~240V or 110V~120V depending on your country's voltage used.

3. Connect the power supply cord into the power supply located on the back of your system case according to your system user's manual.

4. Turn on your peripheral in following order:

    a. Your monitor.
    b. The 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.

5. The power LED on the front panel of the system case will light on. The system will then run power-on test.   While the test is running, the BIOS will alarm beeps or additional message will appear on the screen.

    If you do not observe any activity on the screen within 30 seconds from the time you turn on the power, the system may have failed on power-on test. Recheck your jumper settings and connections or contact with your retailer for assistance.

Beep	Meaning
One short beep when displaying logo	No error during POST
Long beeps in an endless loop	No DRAM installed 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

NOTE:

1. During system power-on (system post), press <Del> key to enter BIOS setup. Follow the instructions in BIOS SETUP.

2. 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 (system post); a menu with all detected bootable devices which are attached to the system will be displayed. Then you may select the desired first bootable device from this menu.

3. **Power off your computer:** You must first exit or shut down your operating system before switch 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 shut down.

Chapter 3: BIOS Setup

3.1   BIOS Flash Related Procedure

1. **After the BIOS is flashed, shut down the system.**

2. **Disconnect all power connections from power supply to the mainboard.**

3. **Clear the CMOS (For at least 30 seconds).**

4. **Reconnect all power connections from power supply to the mainboard.**

5. **When the system is booting at first time after the new BIOS is flashed, it is recommended to enter the BIOS; load the option "Load Optimized Defaults", and then "Save and Exit Setup".**

> ⚠ **IF ANY OF THE ABOVE STEPS IS NOT FOLLOWED, IT MAY CAUSE THE FLASHED BIOS NOT FUNCTION PROPERLY.**

3.2   Introducing BIOS

The BIOS is a program located on a Flash Memory on the motherboard.   This program is a bridge between motherboard and operating system.   When you start the computer, the BIOS program gains control.   The BIOS first operates an auto-diagnostic test called POST (power on self test) for all the necessary hardware, it detects the entire hardware device and configures the parameters of the hardware synchronization.   Only when these tasks are completed done it gives up control of the computer to operating system (OS).   Since the BIOS is the only channel for hardware and software to communicate, it is the key factor for system stability, and in ensuring that your system performance as its best.

In the BIOS Setup main menu of Figure 3-1, you can see several options.   We will explain these options step by step in the following pages of this chapter, but let us first see a short description of the function keys you may use here:

- Press <Esc> to quit the BIOS Setup.

- Press ↑↓←→ (up, down, left, right) to choose, in the main menu, the option you want to confirm or to modify.

- Press <F10> when you have completed the setup of BIOS parameters to save these parameters and to exit the BIOS Setup menu.

- Press Page Up/Page Down or +/– keys when you want to modify the BIOS parameters for the active option.

3.3   Entering BIOS Setup Menu

Power on the computer and by pressing <DEL> immediately allows you to enter BIOS Setup Menu.

If you are not able to enter the BIOS menu but you still wish to enter Setup, restart the system to try again by turning it OFF then ON or pressing the "RESET" button on the system case.   You may also restart 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.
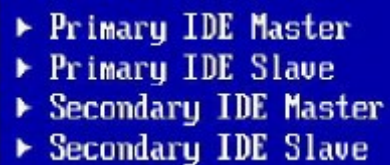
3.4   Getting Help

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 (as shown in the picture below) 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.

3.5　　BIOS Menu Screen

When entering the BIOS, the following screen appears. The BIOS menu screen displays the items that allow user to make changes to the system configuration. To access the menu items, press the up/down/right/left arrow key on the keyboard until the desired item is highlighted, then press [Enter] to access the specific menu.

```
         Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
 Main  Advanced  Chipset  Boot  Security  Save & Exit

 BIOS Information                                          Set the Date. Use Tab to
 BIOS Vendor                  American Megatrends          switch between Data elements.
 Core Version                 4.6.4.0   0.01 x64
 Compliency                   UEFI 2.0
 BIOS Version                 1.01
 Build Date and Time          08/18/2011 15:12:38

 Memory Information
 Total Memory                 2048 MB (DDR3 1067)

 System Date                  [Sun 01/02/2005]
 System Time                  [08:42:18]

 Access Level                 Administrator              →←: Select Screen
                                                         ↑↓: Select Item
                                                         Enter: Select
                                                         +/-: Change Opt.
                                                         F1: General Help
                                                         F2: Previous Values
                                                         F3: Optimized Defaults
                                                         F4: Save & Exit
                                                         ESC: Exit

         Version 2.11.1210. Copyright (C) 2011 American Megatrends, Inc.    B4
```

3.6   Main Menu

This menu gives user an overview of the general system specifications, such as time, date etc.

```
         Aptio Setup Utility - Copyright (C) 2020 American Megatrends, Inc.
  Main  Advanced  Chipset  Security  Boot  Save & Exit

  System Information                                    Set the Date. Use Tab to
  Model Name                    MX310H                  switch between Date elements.
  BIOS Version                  1.01                    Default Ranges:
  BIOS Date                     09/21/2020              Year: 2005-2099
                                                        Months: 1-12
  Access Level                  Administrator           Days: dependent on month
  Total Memory                  32768 MB
  Memory Frequency               2400 MHz

  ME FW Version                 12.0.49.1534
  ME Firmware SKU               Consumer SKU


  System Date                   [Thu 09/24/2020]        →←: Select Screen  ↑↓: Select
  System Time                   [07:24:02]              Item
                                                        Enter: Select
                                                        +/-/PU/PD: Change Opt.
                                                        F1  : General Help
                                                        F5  : Previous Values
                                                        F7  : Optimized Defaults
                                                        F9  : System Information
                                                        F10 : Save & Exit
                                                        F12 : Print Screen(FAT16/32
                                                        Format Only)
                                                        ESC : Exit

         Version 2.20.1271. Copyright (C) 2020 American Megatrends, Inc.
```

3.6.1   BIOS Information

Displays the auto-detected BIOS information.

3.6.2   System Date

The date format is in <Day>,<Month>,<Year>.

3.6.3   System Time

The time format is in <Hour>,<Minute>,<Second>.

3.7 Advanced Menu

Select the "Advanced" tab from the BIOS menu screen to enter the Advanced BIOS Setup screen.

⚠ **NOTE:**
Take caution when change the settings of the Advanced menu items.
Incorrect field values can cause the system not to function properly.

```
                 Aptio Setup Utility - Copyright (C) 2020 American Megatrends, Inc.
         Main   Advanced   Chipset   Security   Boot   Save & Exit

     AMP SE-Input Stereo-Output Gain        [11 dB]          AMP SE-Input Stereo-Output
     Select                                                  Gain Select
     Restore AC Power Loss                  [Always Off]

     Watch Dog                              [Disabled]
     Target Time                            255
     Initial Display Output                 [PCIe x16 Slot]
     i211 Gigabit LAN Controller            [Enabled]
     Intel Platform Trust Technology        [Disabled]
     (PTT)
   ▶ CPU Configuration
   ▶ Trusted Computing
   ▶ ACPI Settings
   ▶ PC Health Status                                        ──────────────────────────
   ▶ Super IO Configuration                                  ←→: Select Screen  ↑↓: Select
   ▶ USB Configuration                                       Item
   ▶ Network Stack Configuration                             Enter: Select
   ▶ Plug in Devices Info                                    +/-/PU/PD: Change Opt.
   ▶ SATA And RST Configuration                              F1  : General Help
                                                             F5  : Previous Values
                                                             F7  : Optimized Defaults
   ▶ Intel(R) I211 Gigabit  Network Connection -             F9  : System Information
     00:04:5F:46:01:37                                       F10 : Save & Exit
   ▶ Intel(R) Ethernet Connection (7) I219-V - 88:88:88:88:87:88  F12 : Print Screen(FAT16/32
                                                             Format Only)
                                                             ESC : Exit

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```

3.7.1 AMP SE-Input Stereo-Output Gain Select

AMP SE-Input Stereo Output Gain Select for volume control on header "SPKR".

3.7.2 Restore AC Power Loss

Determine the state of the system after the power returns after AC power loss.

Available options: Last State, Always On, Always Off (Default).

3.7.3   Watchdog

Enable/Disable Watch Dog feature.

3.7.4   Initial Display Output

Select which video display output will be enabled during POST.

3.7.5   i211 Gigabit LAN Controller

This option provides enable/disable control of onboard i211 Gigabit LAN controller (LAN1).

3.7.6   Intel Platform Trust Technology (PTT)

This option enable/disable the Intel Platform Trust Technology (PTT).

3.7.7   CPU Configuration

This menu provides CPU related information and settings.

```
              Aptio Setup Utility - Copyright (C) 2020 American Megatrends, Inc.
   Advanced

  CPU Configuration                                          When enabled, a VMM can
                                                             utilize the additional
  Type                         Intel(R) Core(TM)             hardware capabilities provided
                               i5-8500 CPU @ 3.00GHz         by Vanderpool Technology.
  ID                           0x906EA
  Speed                        3000 MHz
  L1 Data Cache                32 KB x 6
  L1 Instruction Cache         32 KB x 6
  L2 Cache                     256 KB x 6
  L3 Cache                     9 MB
  L4 Cache                     N/A
  VMX                          Supported
  SMX/TXT                      Supported
                                                             ➡⬅: Select Screen  ⬆⬇: Select
  Intel (VMX) Virtualization   [Enabled]                     Item
  Technology                                                 Enter: Select
  Active Processor Cores       [All]                         +/-/PU/PD: Change Opt.
  CPU Enhanced Halt(C1E)       [Enabled]                     F1  : General Help
  Intel(R) Speed Shift Technology [Enabled]                  F5  : Previous Values
  C-States Control             [Enabled]                     F7  : Optimized Defaults
  CPU EIST Function            [Enabled]                     F9  : System Information
  Intel Trusted Execution Technology [Disabled]              F10 : Save & Exit
                                                             F12 : Print Screen(FAT16/32
                                                             Format Only)
                                                             ESC : Exit

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```

3.7.7.1   Intel (VMX) Virtualization Technology

When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.

3.7.7.2   Active Processor Cores

Number of cores to enable in each processor package.

3.7.7.3   CPU Enhanced Halt (C1E)

When enabled, the CPU core frequency and voltage will be reduced during system halt state to decrease power consumption.

3.7.7.4   Intel® Speed Shift Technology

Enable/Disable Intel® Speed Shift Technology support. Enabling will expose the CPPC v2 interface to allow for hardware controlled P-states.

3.7.7.5   C-State Control

C-State Control.

3.7.7.6   CPU EIST Function

Intel's EIST technology dynamically and effectively reduces the CPU Vcore and the CPU frequency to decrease the average power consumption and heat production.

3.7.7.7   Intel Trusted Execution Technology

Enable utilization of additional hardware capabilities provided by Intel® Trust Execution Technology. Changes require a full power cycle in order to take effect

3.7.8   Trusted Computing

Trust Computing (TPM) Settings.

3.7.8.1   Security Device Support

Enable/disable the TPM support.

NOTE:

When "TPM Support" is enabled, it requires to save and exit BIOS once. And reboot the system in order to initiate the TPM support at BIOS.

PRECAUTION:

When TPM is enabled and utilized through TPM software under OS, there is a possibility that the encrypted data will not be accessible, or recoverable if one of the following situations occurred:

1. Lost of TPM password.

2. System or board failure, or being replaced.

3. Hard Drive failure.

3.7.9   ACPI Settings

System ACPI Parameters.

3.7.9.1   ACPI Sleep State

Select the highest ACPI sleep state the system will enter when the SUSPEND button is pressed.

3.7.10　　PC Health Status

This option displays information about CPU/system voltage levels, temperatures detected at CPU, system, PCH, VRM MOS, and connected fan speed.

```
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  Advanced

 Reset Case Open Status          [Disabled]          Select enable to clear the
 Case Open                        YES                 record of previous chassis
 CPU Vcore                        1.032 V             intrusion status
 CPU VCCSA                        1.056 V             notifications. The 'Case Open'
 DRAM Channel A/B Voltage         1.212 V             field will show 'No' at next
 +3.3V                            3.344 V             boot.
 +5V                              5.040 V
 +12V                            12.240 V
 CPU                              28.0 °C
 System                           33.0 °C
 PCH                              33.0 °C
 VRM MOS                          33.0 °C
 CPU Fan Speed                   1534 RPM
 System Fan Speed                   0 RPM
                                                      →←: Select Screen  ↑↓: Select
 CPU Fan Speed Control           [Normal]             Item
 CPU Fan Speed Percentage        [0.75 PWM value /°C] Enter: Select
 CPU Temperature Control Interval 1                   +/-/PU/PD: Change Opt.
 System Fan Speed Control        [Normal]             F1  : General Help
 System Fan Speed Percentage     [0.75 PWM value /°C] F5  : Previous Values
 System Temperature Control       1                   F7  : Optimized Defaults
 Interval                                             F9  : System Information
                                                      F10 : Save & Exit
                                                      F12 : Print Screen(FAT16/32
                                                      Format Only)
                                                      ESC : Exit

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```

3.7.10.1　CPU Fan Speed Control

Set CPU fan speed configurations.

"Normal" mode (default): Fan speed set by BIOS default.

"Silent" mode: Will reduce fan speed for quieter operation, but may raise temperature.

"Manual" mode: Adjust CPU fan speed by percentage (at BIOS option "CPU Fan Speed Percentage").

"Full Speed" mode: The CPU fan speed will be operated at its maximum speed.

3.7.10.2　CPU Fan Speed Percentage

Determine CPU fan speed manually by percentage of maximum potential fan speed.

3.7.10.3   CPU Temperature Control Interval

This option provides CPU fan temperature sensitivity tolerance. Default Ranges: 0~3.

3.7.10.4   System Fan Speed Control

Set System fan speed configurations.

"Normal" mode (default): Fan speed set by BIOS default.

"Silent" mode: Will reduce fan speed for quieter operation, but may raise temperature.

"Manual" mode: Adjust System fan speed by percentage (at BIOS option "System Fan Speed Percentage").

"Full Speed" mode: The System fan speed will be operated at its maximum speed.

3.7.10.5   System Fan Speed Percentage

Determine system fan speed manually by percentage of maximum potential fan speed.

3.7.10.6   System Temperature Control Interval

This option provides system fan temperature sensitivity tolerance. Default Ranges: 0~3.

3.7.11 Super IO Configuration

System Super IO chip parameters.

3.7.11.1 Serial Port A Configuration

Set parameters of serial port A (Header "COMA").

3.7.11.2 Serial Port B Configuration

Set parameters of serial port B (rear I/O port "COMB").

3.7.11.3 Serial Port C Configuration

Set parameters of serial port C (rear I/O port "COMC").

3.7.12 USB Configuration

USB configuration parameters.

3.7.12.1 Legacy USB Support

Enables Legacy USB support.

"Auto" option disables legacy support if no USB devices are connected.

"Disable" option will keep USB devices available only for EFI applications.

3.7.12.2 XHCI Hand-off

This is a workaround for OS without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.

3.7.12.3 USB Mass Storage Driver Support

Enable/Disable USB mass storage driver support.

3.7.12.4 Port 60/64 Emulation

Enables I/O port 60h/64h emulation support. This should be enabled for the complete USB keyboard legacy support for non-USB aware OS.

3.7.13　　Network Stack Configuration

Network Stack settings.

3.7.13.1　IPv4 PXE Support

Enable/Disable IPv4 PXE boot support. If disabled, IPv4 PXE boot support will not be available.

3.7.13.2　IPv4 HTTP Support

Enable/Disable IPv4 HTTP boot support. If disabled, IPv4 HTTP boot support will not be available.

3.7.13.3　IPv6 PXE Support

Enable/Disable IPv6 PXE boot support. If disabled, IPv6 PXE boot support will not be available.

3.7.13.4　IPv6 HTTP Support

Enable/Disable IPv4 HTTP boot support. If disabled, IPv6 HTTP boot support will not be available.

3.7.13.5　IPSEC Certificate

Support to Enable/Disable IPSEC certificate for Ikev.

3.7.13.6　PXE boot wait time

Wait time in seconds to press ESC key to abort the PXE boot. Use either +/- or numeric keys to set the value.

3.7.13.7　Media detect count

Number of times the presence of media will be checked. Use either +/- or numeric keys to set the value.

3.7.14   Plug in Devices Info

Show plug in devices info.

3.7.15   SATA & RST Configuration

SATA device options settings.

3.7.15.1   SATA Controllers

Enable/Disable SATA device.

3.7.15.2   SATA Mode Selection

Determines how SATA Controller(s) operate.

3.7.15.3   Serial ATA Port 0

Enable or disable SATA Port0.

3.7.15.4   Serial ATA Port 1

Enable or disable SATA Port1.

3.7.15.5   Serial ATA Port 2

Enable or disable SATA Port2.

3.7.15.6   Serial ATA Port 3

Enable or disable SATA Port3.

3.7.16   Intel® I211 Gigabit Network Connection

Configure Gigabit Ethernet device parameters.

3.7.17   Intel® Ethernet Connection (7) I219-V

Configure Gigabit Ethernet device parameters.

3.8 Chipset

The Chipset related BIOS options.

```
                 Aptio Setup Utility - Copyright (C) 2020 American Megatrends, Inc.
     Main   Advanced   Chipset   Security   Boot   Save & Exit

     VT-d                              [Enabled]              VT-d capability
     Internal Graphics                [Auto]
     LVDS Support                     [Disabled]
     LVDS Mode Select                 [1024*768@18bit]
     DVMT Pre-Allocated               [64M]
     DVMT Total Gfx Mem               [256M]
     Audio Controller                 [Enabled]
     Above 4G Decoding                [Disabled]

     i219V Gigabit PHY LAN Controller [Enabled]
     Wake on LAN Enable               [Disabled]
     IOAPIC 24-119 Entries            [Enabled]
     Aperture Size                    [256MB]
                                                             →←: Select Screen  ↑↓: Select
                                                             Item
                                                             Enter: Select
                                                             +/-/PU/PD: Change Opt.
                                                             F1  : General Help
                                                             F5  : Previous Values
                                                             F7  : Optimized Defaults
                                                             F9  : System Information
                                                             F10 : Save & Exit
                                                             F12 : Print Screen(FAT16/32
                                                             Format Only)
                                                             ESC : Exit

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```

3.8.1 VT-d

Intel VT-d support.

3.8.2 Internal Graphics

Keep IGFX enabled based on the setup options.

3.8.3 LVDS Support

LVDS support enabled/disabled.

3.8.4 LVDS Mode Select

Select the supported resolution of connected LVDS panel.

3.8.5   DVMT Pre-Allocated

Select DVMT 5.0 Pre-Allocated (Fixed) graphic memory size used by the Internal graphics device.

3.8.6   DVMT Total Gfx Mem

Select DVMT 5.0 total graphic memory size used by the internal graphic device.

3.8.7   Audio Controller

Control detection of the HD-Audio device.

3.8.8   Above 4G Decoding

Enables or disables 64bit capable devices to be decoded in above 4G address space (only if system supports 64 bit PCI decoding).

3.8.9   i219V Gigabit PHY LAN Controller

Enable/disable onboard i219 NIC.

3.8.10   Wake on LAN Enable

Enable/disable integrated LAN to wake the system.

3.8.11   IOAPIC 24-119 Entries

Enables/disables IOAPIC 24-119 Entries. IRQ 24-119 may be used by PCH devices. Disabling those interrupts may cause certain devices failure.

3.8.12   Aperture Size

Select the Aperture Size.

Note: Above 4GB MMIO BIOS assignment is automatically enabled when selecting 2048MB aperture.

3.9   Security

If ONLY the Administrator's password is set, then this only limits access to setup and is only asked for when entering setup.

If ONLY the User's password is set, then this is a power on password and must be entered to boot or enter setup. In setup the user will have administrator rights.

The password length must be in the following range:

Minimum length: 3

Maximum length: 20

```
          Aptio Setup Utility - Copyright (C) 2020 American Megatrends, Inc.
    Main  Advanced  Chipset  Security  Boot  Save & Exit

    Password Description                              Set Administrator Password

    If ONLY the Administrator's password is set,
    then this only limits access to Setup and is
    only asked for when entering Setup.
    If ONLY the User's password is set, then this
    is a power on password and must be entered to
    boot or enter Setup. In Setup the User will
    have Administrator rights.
    The password length must be
    in the following range:
    Minimum length                3
    Maximum length                20
                                                      →←: Select Screen  ↑↓: Select
                                                      Item
    Administrator Password                            Enter: Select
    User Password                                     +/-/PU/PD: Change Opt.
                                                      F1  : General Help
  ▶ Secure Boot                                       F5  : Previous Values
                                                      F7  : Optimized Defaults
                                                      F9  : System Information
                                                      F10 : Save & Exit
                                                      F12 : Print Screen(FAT16/32
                                                      Format Only)
                                                      ESC : Exit

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```

3.9.1   Secure Boot

Customizable secure boto settings. Customer needs to provide the code to the board manufacture in order to insert the code to the BIOS. Customer also needs to embedded the corresponding key in their OS image.

3.10   Boot

Setup Boot related features.

```
          Aptio Setup Utility - Copyright (C) 2020 American Megatrends, Inc.
    Main  Advanced  Chipset  Security  Boot  Save & Exit

    Boot Configuration                                ▲  Sets the system boot order
    Setup Prompt Timeout            1
    Bootup NumLock State            [On]
    Full Screen LOGO Show           [Disabled]
    Fast Boot                       [Disabled]



    Boot mode select               [UEFI]
    LAN PXE Boot Option ROM        [Disabled]
    Other PCI devices              [UEFI]

    FIXED BOOT ORDER Priorities                          ──────────────────────────
    Boot Option #1              [USB Key]             →←: Select Screen  ↑↓: Select
    Boot Option #2              [USB CD/DVD]           Item
    Boot Option #3              [USB Floppy]           Enter: Select
    Boot Option #4              [CD/DVD]               +/-/PU/PD: Change Opt.
    Boot Option #5              [Hard Disk:Windows     F1  : General Help
                                 Boot Manager (P3:     F5  : Previous Values
                                 ADATA SU800NS38)]     F7  : Optimized Defaults
    Boot Option #6              [Network]              F9  : System Information
    Boot Option #7              [UEFI AP:UEFI:         F10 : Save & Exit
                                 Built-in EFI Shell]   F12 : Print Screen(FAT16/32
                                                       Format Only)
                                                    ▼  ESC : Exit

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```

3.10.1   Setup Prompt Timeout

Number of second to wait for setup activation key.

3.10.2   Bootup NumLock State

Select the keyboard NumLock state.

3.10.3   Full Screen LOGO Show

Enable or disables Quiet Boot option.

3.10.4   Fast Boot

Enables or disables boot with initialization of a minimal set of devices required to launch active boot option. Has no effect for BBS boot options.

3.10.5   **Boot mode select**

Select boot mode in Legacy or UEFI (default).

NOTE:

If user needs to switch the boot mode between UEFI and Legacy; then user needs to select the desired boot mode first, then save and exit BIOS. The system needs to reboot once in order for the selected boot mode to take effect.

3.10.6   **LAN PXE Boot Option ROM**

Enable or disable boot option for Legacy Network Devices.

3.10.7   **Other PCI devices**

Determines OpROM execution policy for devices other than Network, Storage, or Video (e.g. PCIe RAID card).

3.10.8   **Fixed BOOT ORDER Priorities**

Setup the boot priority of the system.

The following is the default boot priorities:

Boot Option #1: USB key (USB thumb drive)

Boot Option #2: USB CD/DVD

Boot Option #3: USB Floppy

Boot Option #4: CD/DVD (connected to SATA port)

Boot Option #5: Hard Disk (connected to SATA ports, or M.2 port, or MSAT port).

Boot Option #6: Network

Boot Option #7: UEFI Shell (only available when boot mode is set on "UEFI" mode).

User can override the boot priorities manually by highlight the preferred boot option, and change the boot device. Then save and exit BIOS.

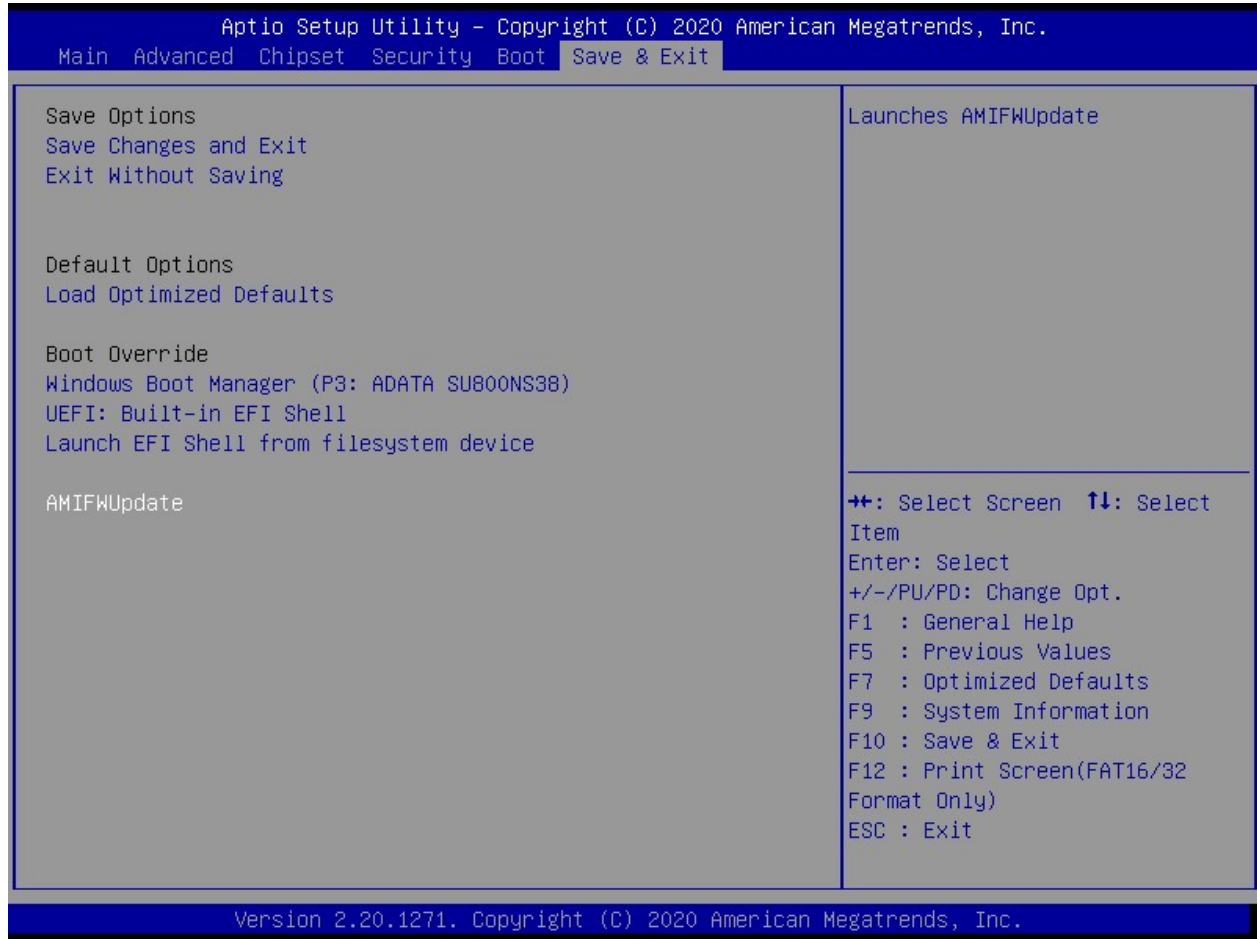### 3.10.9   **UEFI Hard Disk Drive BBS Priorities**

Specifies the boot device priority sequence from available UEFI hard disk drives. In other words, if there are multiple hard disk drives installed at the system, user may set the hard disk drive boot priorities through this option.

3.10.10   **UEFI Application Boot Priorities**

Specifies the boot device priority sequence from available UEFI application

3.11   Save & Exit

Save and Exit BIOS settings.

```
             Aptio Setup Utility - Copyright (C) 2020 American Megatrends, Inc.
   Main   Advanced   Chipset   Security   Boot   Save & Exit

   Save Options                                        Launches AMIFWUpdate
   Save Changes and Exit
   Exit Without Saving


   Default Options
   Load Optimized Defaults

   Boot Override
   Windows Boot Manager (P3: ADATA SU800NS38)
   UEFI: Built-in EFI Shell
   Launch EFI Shell from filesystem device
                                                       →←: Select Screen  ↑↓: Select
   AMIFWUpdate                                         Item
                                                       Enter: Select
                                                       +/-/PU/PD: Change Opt.
                                                       F1  : General Help
                                                       F5  : Previous Values
                                                       F7  : Optimized Defaults
                                                       F9  : System Information
                                                       F10 : Save & Exit
                                                       F12 : Print Screen(FAT16/32
                                                       Format Only)
                                                       ESC : Exit

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```

3.11.1   Save Changes and Exit

Exit system setup after saving the changes.

3.11.2   Exit Without Saving

Exit BIOS without saving any changes made.

3.11.3   Load Optimized Defaults

Automatically load optimal BIOS settings.

NOTE:

Loading this option is recommended after BIOS update. Then save and exit BIOS.

3.11.4 Boot Override

Choose the desired boot device to be the first boot device at next reboot.

NOTE:

This function will only function once after rebooted. If user prefers to set the boot device boot order permanently, then the change will need to be made under "Boot" menu.

3.11.5 AMIFWUpdate

User may use this utility to update BIOS by selecting the desired BIOS file.

Chapter 4: Application Note

Please read the following application notes before proceed with the system setup and/or OS installation:

4.1   Windows 10 Drivers Installation

It is recommended to load the MX310H drivers with the following sequence:

1. Install "Intel INF Driver".

2. Install "Intel Video Driver".

3. Install "Intel LAN Driver".

4. Install "Realtek Audio Driver".

5. Install "Intel ME Driver".

6. Install "Intel Serial IO Driver".

7. Install "Intel RST Driver".

8. Make sure there is no exclamation mark shown for any device under Windows "Device Manager".

NOTE:

If any of the driver listed above can't be installed, you may update Win10 to the latest version through Windows Update by connecting ethernet cable to one of two MX310H onboard LANs.

4.2   Display through PCIe video card (installed on "PCIEX16" slot)

1. Enter BIOS.

2. Enter BIOS option "Chipset"; change "Internal Graphics" to "Enabled".

3. Save & exit BIOS.

4. Power off the system and disconnect all power connections to MX310H board.

5. Install the PCIex16 VGA card on "PCIEX16" slot while the system is off and not connected with power.

6. Turn on the system (the PCIex16 VGA card will be the only video output available during system post (before entering the Windows 10 desktop).

7. Boot the system into Windows 10 desktop (If you also have a dedicated monitor connected to one of MX310H's video ports, both monitors will have video outputs, unless it needs further tuning under Display property).

8. Check under "Device Manager", and make sure the installed PCIe video card is being detected. (NOTE: If the installed PCIe video card is not being detected under device manager, it means this PCIe card is not compatible with MX310H board).

9. Install the PCIe video card Win10 driver provided by PCIe video card manufacturer.

10. Reboot the system.

11. After the system rebooted and entered Win10 desktop. There should be no any exclamation mark shown for the installed PCIe video card. And there will be video output shown on monitor connected to PCIe video card.

NOTE:

1. Due to the limitation of Intel video driver, the MX310H can only support maximum up to 2 video outputs simultaneously.

2. Besides the installed PCIex16 video card with its monitor connection, if you also have another dedicated monitor connected to one of MX310H's video ports, both monitors will have video outputs once the system entered Windows 10 desktop (after the Intel video driver and the PCIex16 video card driver are installed).

3. If there is only one video output, or you want to assign the video output to different video port (connected with its dedicated monitor), the adjustment can be made through Windows "Display Settings" or "Intel Graphics Command Center" (preferred, it can be obtained through Microsoft Store, and be installed after the Intel video driver is installed).

4.3   Boot Mode

1. The default boot mode is set as "UEFI". If you want to switch the boot mode to "Legacy", it can be changed through BIOS option "Boot"->"Boot Mode Select". Then save and exit BIOS once in order for the new boot mode to take effect.

4.4   PXE Boot

A. In "UEFI" mode:

1. Under BIOS option "Boot"->"Boot mode select"; change it to "UEFI".

2. Under BIOS option "Boot"->"LAN PXE Boot Option ROM"; change it to "Enabled".

3. Under BIOS option "Advance"->"Network Stack Configuration":

    a. Change "Network Stack" to "Enabled".

    b. Enable "Ipv4 PXE Support".

4. Save and exit BIOS.

5. **After system reboot, enter BIOS again.**

6. **Under BIOS option "Boot"->"UEFI NETWORK Drive BBS Priorities", set the desired PXE LAN port as "Boot Option #1".**

7. **Press "ESC" key to get back to "Boot" menu.**

8. **Under BIOS option "Boot"->"Boot Option #1"; change the 1st boot device to the desired PXE LAN that selected under step 6.**

9. **Save and Exit BIOS.**

10. **The device will show the MAC address, and display message "Start PXE over IPv4…", which means the UEFI mode PXE is established with PXE server.**

B. In "Legacy" Mode:

1. **Under BIOS option "Boot"->"Boot mode select"; change it to "Legacy".**

2. **Under BIOS option "Boot"->"LAN PXE Boot Option ROM"; change it to "Enabled".**

3. **Save and exit BIOS.**

4. **After system reboot, enter BIOS again.**

5. **Under BIOS option "Boot"->"NETWORK Drive BBS Priorities", set the desired PXE LAN port as "Boot Option #1".**

6. **Press "ESC" key to get back to "Boot" menu.**

7. **Under BIOS option "Boot"->"Boot Option #1"; change the 1st boot device to the desired PXE LAN that selected under step 5.**

8. **Save and Exit BIOS.**

9. **The system shall reboot once, and display the MAC address, and some message like "PXE-E79: NBP…", which means the legacy mode PXE is established with PXE server.**

4.5   The Header "SPKR"

1. **BIOS option "AMP SE-Input Stereo-Output Gain select" supports volume control of speaker header "SPKR".**

4.6   The Header "F_AUDIO"

1. **The front audio Header "F_AUDIO" volume can be adjusted through OS volume control.**

4.7 The connectors "SATA3-2" and "MSATA_PCIE" are sharing the SATA signals

1. "SATA3-2" is sharing SATA signal with "MSATA_PCIE" connector, both headers can't be connected with SATA device simultaneously (can only choose to use either one of these 2 headers)

4.8 The connectors "SATA3-3" and "M2A" are sharing the SATA signals

1. "SATA3-3" is sharing SATA signal with "M2A" header (at bottom side of board), both headers can't be connected with SATA device simultaneously (can only choose to use either one of these 2 headers).