MIX-H310D1

Industrial Motherboard

Contents

Chapter 1

Product overview

1.1 Package contents

Check your industrial motherboard package for the following items.

☑ 1 x Industrial Motherboard

☑ 1 x SATA cable

☑ 1 x SATA power cable

☑ 1 x I/O Shield

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

1.2 Features

- Intel® Coffee Lake-S LGA 1151 Socket for 8th Generation Core™ i7 / Core™ i5 / Core™ i3, Pentium® / Celeron® processors up to 65W
- Two 260-pin Dual Channel DDR4 2400/2133MHz Non-ECC SO-DIMMs up to 64GB
- 2 x SATA 6.0 Gb/s, 4 x USB3.1 Gen 1, 5 x USB2.0, 2 x COM header
- 1 x PCI Express [x4]
- Multi Display: HDMI™ DP LVDS, eDP

1.3 Specifications

SYSTEM	
CPU	Coffee Lake-S LGA 1151 socket for Intel® 8th Generation Core™ i7 / Core™ i5 / Core™ i3, Pentium® / Celeron® processors
	Supports Intel® CPU Max. 65W TDPs
Chipset	Intel® H310 Express Chipset
Memory	2 x SO-DIMM, max. 64GB, non-ECC DDR4 2400 / 2133 MHz
	Dual-channel memory architecture
Graphics	Intel® UHD Graphics
I/O Chipset	NCT6793D
Storage	Intel® H310 Express Chipset support
Ethernet	2 x Realtek® 8111H PCIe Gigabit LAN
Audio	Realtek® ALC887 with Amp.
TPM	Nuvoton TPM version 2.0
Expansion slots	1 x PCIe[x4] (Gen 3) from CPU
	1 x M.2 M key (2242) at Top side, SATA only
	1 x M.2 E key (2230) for Wireless-wifi module (PCIe x1+USB)
BIOS	128Mbit Flash ROM, AMI BIOS
H/W Monitor	Temperature monitor on CPU/Chassis
	Voltage Monitor on Vcore/5V/12V
	Fan Monitor on CPU/Chassis
Watchdog Timer	1~255 steps by software program
Wake on LAN / PXE	Yes (WOL / PXE)
Smart Fan Control	CPU Fan / Chassis Fan
Power State	S3, S4, S5
GRAPHICS	
Graphics Chipset	Intel® UHD Graphics
Graphics Multi-Display	HDMI™1+HDMI™2, HDMI™1+DP2, DP1+HDMI™2, HDMI™1+LVDS, HDMI™2+LVDS, HDMI™1+eDP, HDMI™2+eDP, DP1+DP2, DP1+LVDS, DP2+LVDS, DP1+eDP, DP2+eDP
HDMI™	Up to 4096 x 2160 @ 24 Hz / 2560 x 1600 @ 60 Hz, with Digital Audio (HDMI™/DP Colay)
DisplayPort	Up to 4096 x 2160 @ 24 Hz / 3840 x 2160 @ 60 Hz, with Digital Audio (HDMI™/DP Colay)
LVDS/eDP	LVDS Up to 1920 x 1200 @60 Hz, Dual Channel 18/24 bit colay with
	eDP UP to 4096 x 2340 @ 60Hz (could only use 1 function at a time since only support 1 x inverter)
Backlight Control	Voltage / PWM

(continued on the next page)

I/O	
Storage	2 x SATA 6.0Gb/s
	4 pin SATA power (5V, 12V @1A)
USB	4 x USB 3.1 Gen 1 ports (4 ports in Rear IO)
	5 x USB 2.0 ports (5 ports for internal pin header)
Display I/O	1x LVDS, 1x eDP, 2x HDMI™ / DP (HDMI™ and DP colay, default: 1x HDMI™, 1x DP)
Audio I/O	Mic-in, Line-out, AAFP at internal connector for 2 additional channel(default Line-out, Mic-in), speaker
LAN I/O	2 x RJ-45
Serial port	1 x RS-232 (mid board)
	1 x RS-232/422/485 supports 5V/12V/RI option (mid board)
DIO	8-bit Digital I/O interface (4-in/4-out)
FAN	1 x CPU Fan connector (4-pin)
	1 x Chassis Fan connector (4-pin)
ENVIRONMENT, POWER, & ME	
Battery	Lithium battery
Power requirement	DC input: +12 (± 5%) VDC
	Back Panel DC jack (5.5/2.5mm)
	4-pin internal power connector
	NOTE: Please use fixed voltage power supply.
Operating Temperature	0~60°C
Operating Humidity	0% ~ 90%RH, non-condensing
Certificate	CE & FCC
Form Factor	Mini ITX Form Factor, 6.7"x 6.7" (170mmx170mm)
Weight	1.1 lb (0.5 Kg)
PLACEMENT	
Back I/O ports	1 x DC Jack
	1 x HDMI™/DP Colay (Default: HDMI™)
	1 x HDMI™/DP Colay (Default: HDMI™)
	2 x LAN (RJ45)
	4 x USB 3.1 Gen 1 ports
	1 x Audio jacks (Mic-In) pink connector
	1 x Audio jacks (Line-Out) green connector

(continued on the next page)

PLACEMENT	
Internal I/O connectors	1 x PCIe[x4] Slot
	1x M.2-M Key
	1x M.2-E Key
	2 x SATA 6.0Gb/s
	3 x USB 2.0 connectors support additional 5 USB ports (2.00 mm)
	2 x boxer header for COM (COM1: RS-232/422/485 supports 5V/12V/RI; COM2: RS-232)
	1 x LVDS connector (Top side)
	1 x eDP connector (Bottom side)
	1 x Panel 3.3V /5V jumper
	1 x Panel backlight DC / PWM mode jumper
	1 x Panel backlight connector (inverter)
	1 x Panel backlight 12V /5V jumper
	1 x Digital I/O box header
	1 x 4 PIN (2x2) internal power connector
	1 x 4 PIN CPU Fan connector
	1 x 4 PIN Chassis Fan connector
	1 x Front Panel connector
	1 x AAFP follow ASUS pin out
	1 x Speaker for 2W/4Ω
	1 x Chassis Intrusion follow ASUS pin out
	1 x Buzzer on board (Pin Header)
	1 x AT/ATX mode select jumper
	1 x clear CMOS jumper
OTHERS	
OS Support	Windows® 10
Accessories	1 x SATA cable
	1 x SATA power cable
	I/O Shield

NOTE: Specifications are subject to change without notice.

Chapter 2

Motherboard information

2.1   Before you proceed

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

CAUTION!

- Unplug the power cord from the wall socket before touching any component.

- Before handling components, use a grounded wrist strap or touch a safely grounded object or a metal object, such as the power supply case, to avoid damaging them due to static electricity.

- Hold components by the edges to avoid touching the ICs on them.

- Whenever you uninstall any component, place it on a grounded antistatic pad or in the bag that came with the component.

- Before you install or remove any component, always remove the AC power by unplugging the power cord from the power outlet. Failure to do so may cause severe damage to the motherboard, peripherals, or components.
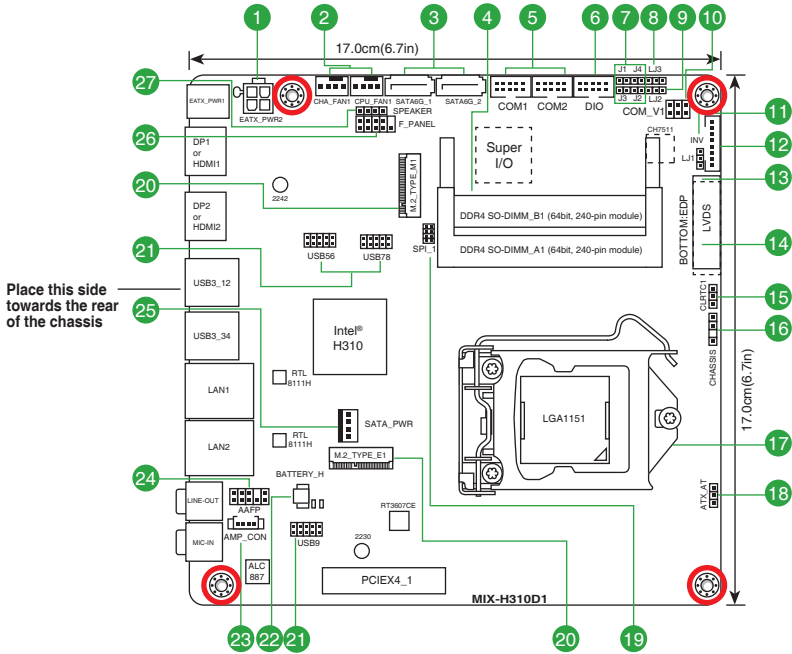
2.2 Motherboard layout

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

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

Connectors/Jumpers/Slots	Page
1. EATX power connector (4-pin EATX_PWR2)	2-25
2. CPU and chassis fan connectors (4-pin CPU_FAN1, 4-pin CHA_FAN1)	2-18
3. Serial ATA 6.0Gb/s connectors (7-pin SATA6G_1/2)	2-21
4. DDR4 SO-DIMM slots	2-11
5. Serial port connectors (10-pin COM1, COM2)	2-24
6. Digital I/O connector (10-pin DIO)	2-19
7. COM1 RS422/RS485 terminator (2-pin J1/J2/J3/J4)	2-15
8. Inverter Backlight Control mode selection (3-pin LJ3)	2-14
9. Inverter voltage selection (3-pin LJ2)	2-13
10. COM1 Ring/+5V/+12V selection (COM1_V)	2-13
11. LVDS panel voltage selection (3-pin LJ1)	2-13
12. Backlight inverter power connector (5-pin INV)	2-23
13. Embedded DisplayPort (40-pin EDP)	2-22
14. LVDS connector (40-pin LVDS)	2-18
15. Clear RTC RAM (CLRTC)	2-12
16. Chassis intrusion connector (4-1 pin CHASSIS)	2-19
17. Intel® LGA1151 CPU socket	2-6
18. AT/ATX mode jumper (3-pin ATX_AT)	2-14
19. BIOS programmable connector (8-pin SPI_1)	2-23
20. M.2 M-Key / E-Key slots	2-21
21. USB 2.0 connectors (10-pin USB56, USB78, USB9)	2-22
22. Battery connector (2-pin BATTERY_H)	2-23
23. Audio amplifier connector (4-pin AMP_CON)	2-17
24. Front panel audio connector (10-1 pin AAFP)	2-25
25. SATA power connector (4-pin SATA_PWR)	2-17
26. Front panel system panel connector (10-1 pin F_PANEL)	2-20
27. Speaker connector (4-pin SPEAKER)	2-21

2.3 Screw size

2.3.1 Component side
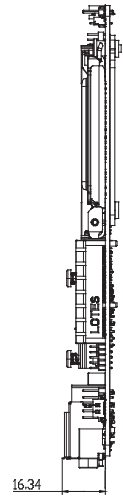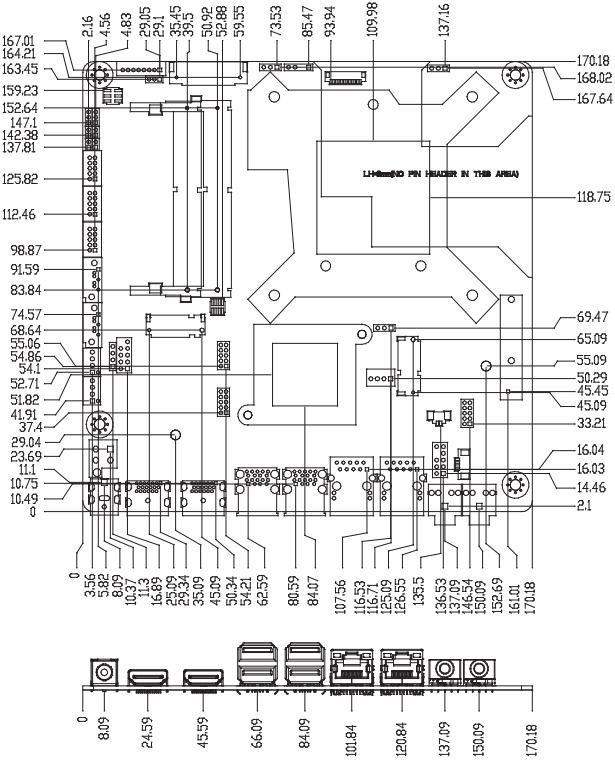
2.3.2 Solder side
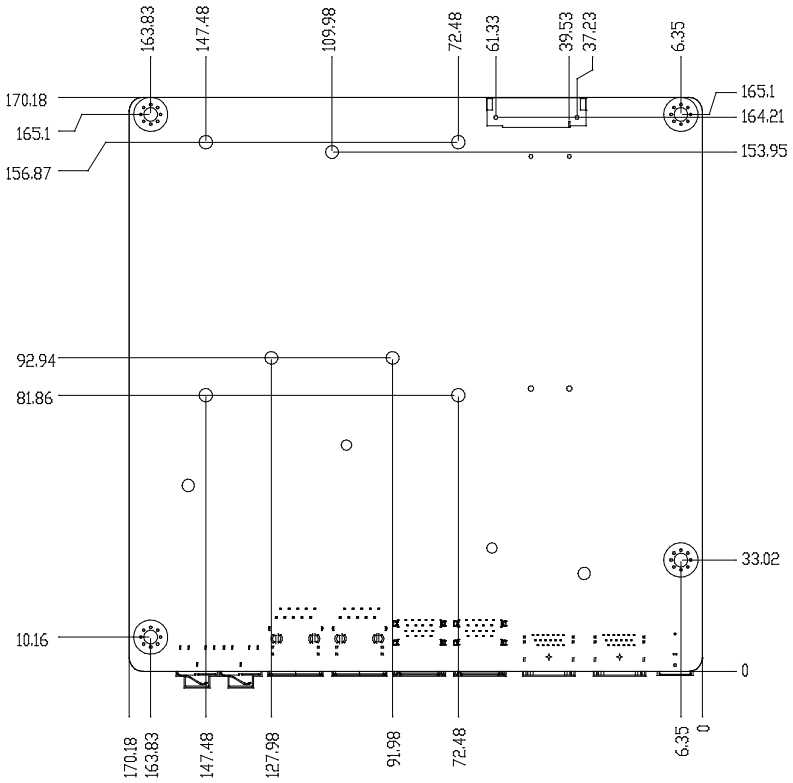
2.4 Central Processing Unit (CPU)

The motherboard comes with a surface mount LGA1151 socket designed for the Intel® 8th Generation Core™ i7 / Core™ i5 / Core™ i3, Pentium® / Celeron® processors.
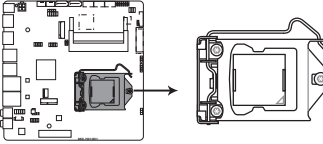
MIX-H310D1 CPU socket LGA1151

IMPORTANT: Unplug all power cables before installing the CPU.

CAUTION!

- Upon purchase of the motherboard, ensure that the PnP cap is on the socket and the socket contacts are not bent. Contact your retailer immediately if the PnP cap is missing, or if you see any damage to the PnP cap/socket contacts/motherboard components. The manufacturer will shoulder the cost of repair only if the damage is shipment/transit-related.

- Keep the cap after installing the motherboard. The manufacturer will process Return Merchandise Authorization (RMA) requests only if the motherboard comes with the cap on the LGA1151 socket.

- The product warranty does not cover damage to the socket contacts resulting from incorrect CPU installation/removal, or misplacement/loss/incorrect removal of the PnP cap.

2.4.1   Installing the CPU
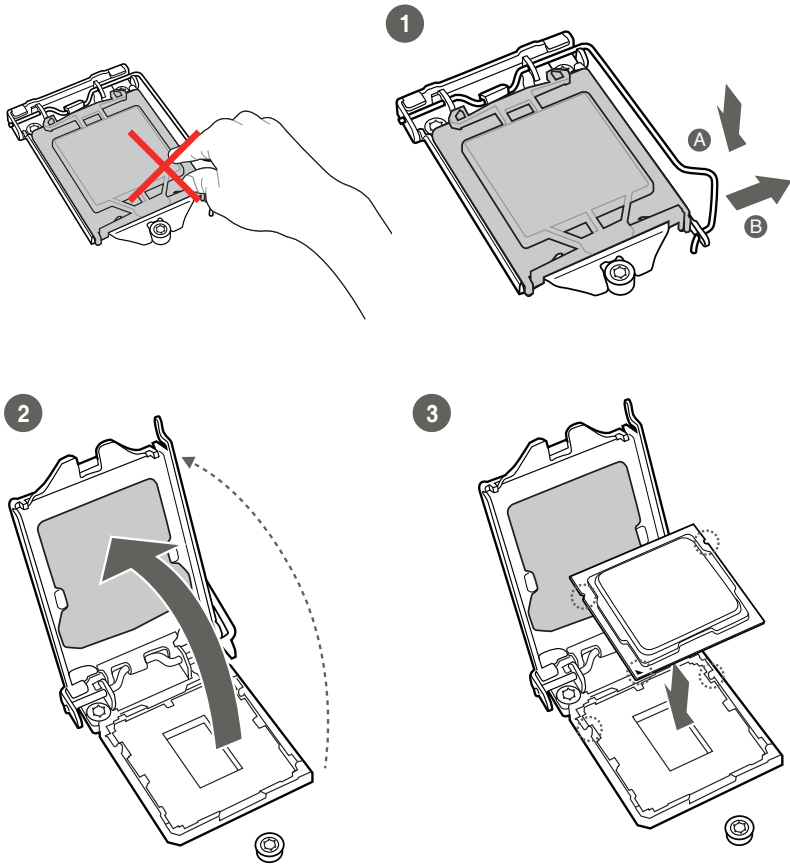
> **CAUTION!**   LGA1156 CPU is not compatible with the LGA1151 socket. DO NOT install an LGA1156 CPU on the LGA1151 socket.
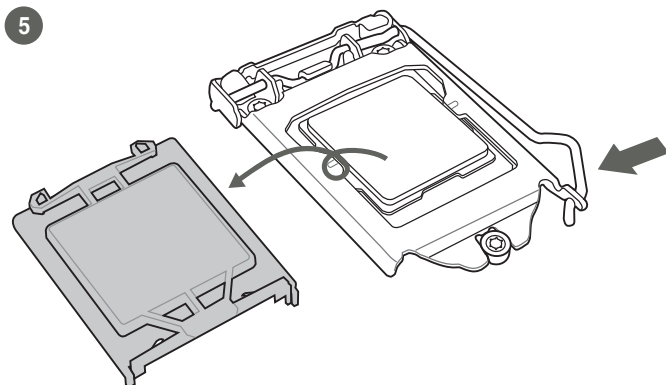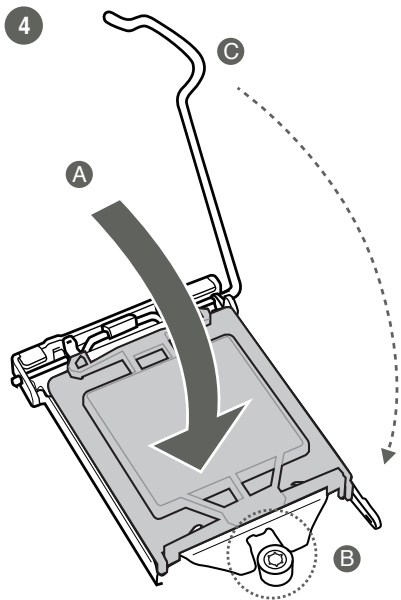
2.4.2 CPU heatsink and fan assembly installation
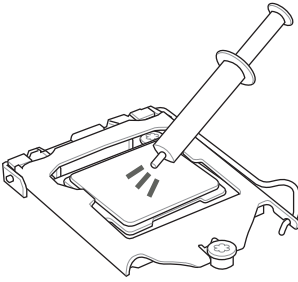
CAUTION! Apply the Thermal Interface Material to the CPU heatsink and CPU before you install the heatsink and fan if necessary.

To install the CPU heatsink and fan assembly
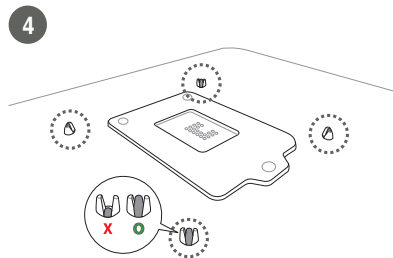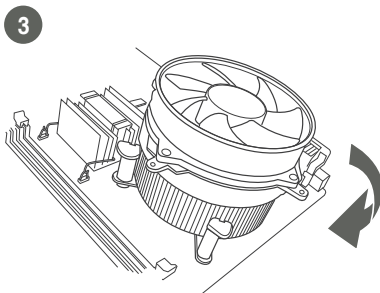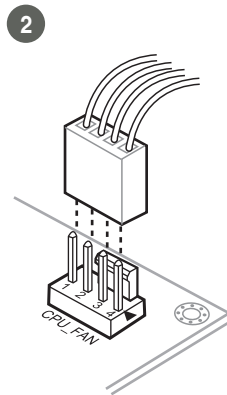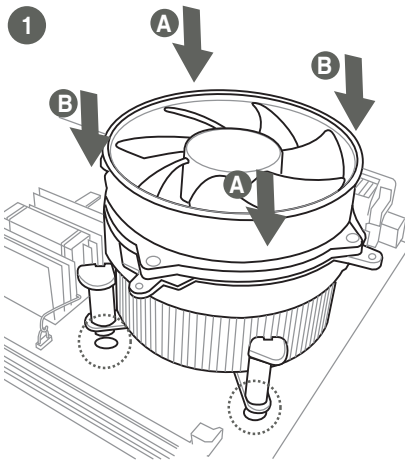
To uninstall the CPU heatsink and fan assembly
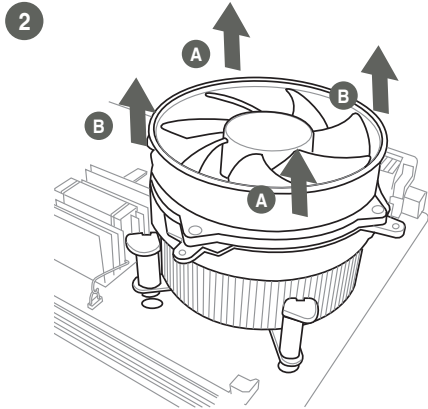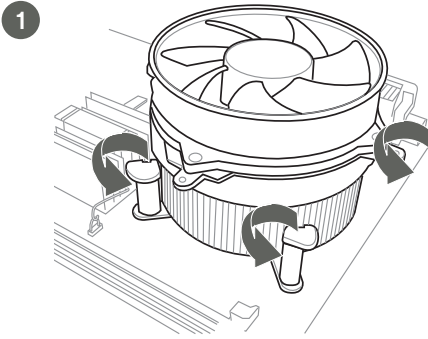
2.5   System memory

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

Channel	Sockets
Channel A	SO-DIMM_A1
Channel B	SO-DIMM_B1
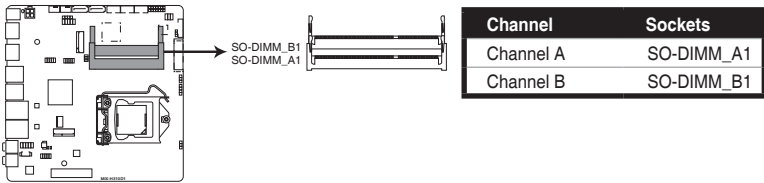
MIX-H310D1 240-pin DDR4 SO-DIMM sockets

2.5.1   Installing a DIMM

To install a DIMM
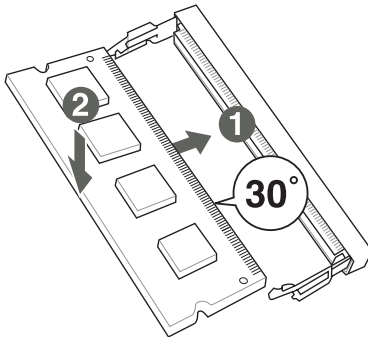
To remove a DIMM
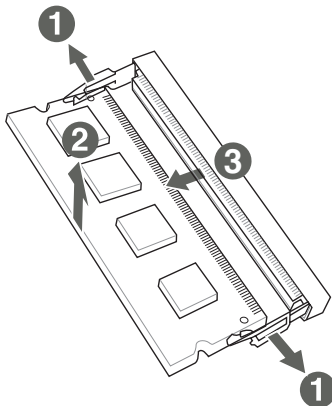
2.6   Jumpers

1.   Clear RTC RAM (CLRTC)

This jumper allows you to clear the Real Time Clock (RTC) RAM in CMOS. You can clear the CMOS memory of system setup parameters by erasing the CMOS RTC RAM data. The onboard button cell battery powers the RAM data in CMOS, which include system setup information such as system passwords.
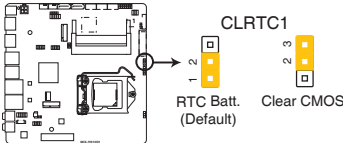
MIX-H310D1 Clear RTC RAM

To erase the RTC RAM:

1.   Turn OFF the computer and unplug the power cord.

2.   Move the jumper cap from pins 1-2 (default) to pins 2-3. Keep the cap on pins 2-3 for about 5~10 seconds, then move the cap back to pins 1-2.

3.   Plug the power cord and turn ON the computer.

4.   Hold down the **<Del>** key during the boot process and enter BIOS setup to reenter data.

CAUTION! Except when clearing the RTC RAM, never remove the cap on CLRTC jumper default position. Removing the cap will cause system boot failure!

NOTES:

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

- You do not need to clear the RTC when the system hangs due to overclocking. For system failure due to overclocking, use the CPU Parameter Recall (C.P.R) feature. Shut down and reboot the system so the BIOS can automatically reset parameter settings to default values.

2. COM1 Ring/+5V/+12V selection (COM1_V1)
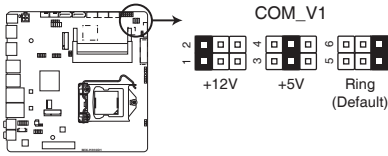
MIX-H310D1 COM1 Ring/+5V/+12V Selection

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

3. LVDS panel voltage selection (3-pin LJ1)
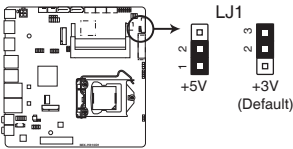
MIX-H310D1 LVDS Panel Voltage Selection

	Pins
+5V	1-2
+3.3V (Default)	2-3

4. Inverter voltage selection (3-pin LJ2)
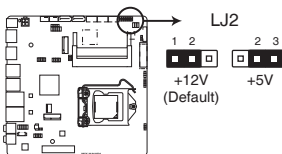
MIX-H310D1 Inverter Voltage Selection

	Pins
+12V (Default)	1-2
+5V	2-3

5. Inverter Backlight Control mode selection (3-pin LJ3)
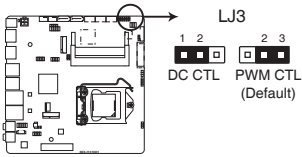
**MIX-H310D1 Mode Selection for Back
Light Control of Inverter**

	Pins
DC Voltage Control	1-2
PWM Control (Default)	2-3

6. AT/ATX Mode selection (2-pin ATX_AT)
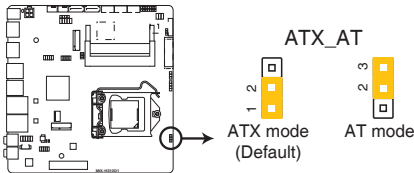
MIX-H310D1 H/W AT/ATX mode selection

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

NOTE: Jumper setting of **AT_ATX** should be consistent with the setting of **Power Mode** in BIOS. Refer to section **3.3.8 Power Management** in Chapter 3.

7. COM1 operating mode selection jumpers (2-pin J1/J2/J3/J4)

COM1_J1~4

RS232 (Default)

RS485/RS422
with terminator
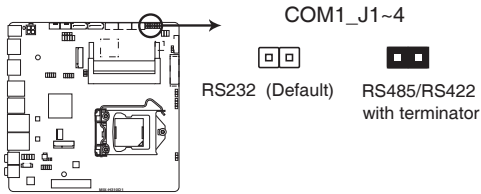
**MIX-H310D1 COM1 RS422/RS485
Terminator (J1/J2/J3/J4)**

Setting	Pins
Open jumpers J1, J2, J3 and J4 (Default)	1-2 RS232
Short-circuit jumpers J1, J2, J3 and J4	RS485/RS422 with terminator

2.7 Connectors

2.7.1 Rear panel connectors
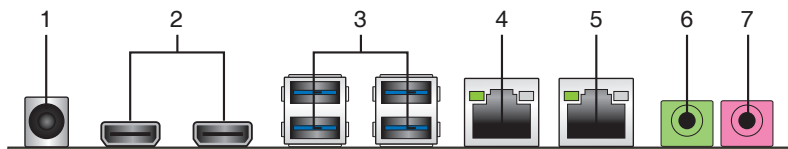
1. **DC-In power jack.** This jack connects to a DC power adapter.

2. **HDMI™ ports.** These ports are for High-Definition Multimedia Interface (HDMI™), and are HDCP compliant, allowing playback of HD DVD, Blu-ray, and other protected content.

3. **USB 3.1 Gen 1 ports.** These 9-pin Universal Serial Bus (USB) ports connect to USB 3.1 Gen 1 / 2.0 devices.

NOTES:

- DO NOT connect a keyboard / mouse to any USB 3.1 Gen 1 port when installing Windows® operating system.

- Due to USB 3.0 controller limitation, USB 3.1 Gen 1 devices can only be used under Windows® OS environment and after the USB 3.0 driver installation.

- We strongly recommend that you connect USB 3.1 Gen 1 devices to USB 3.1 Gen 1 ports for faster and better performance for your USB 3.0 devices.

4. **LAN (RJ-45) ports.** These ports allow Gigabit connection to a Local Area Network (LAN) through a network hub. Refer to the table below for the LAN port LED indications.

LAN port LED indications

ACT/LINK LED		SPEED LED	
Status	Description	Status	Description
OFF	No link	OFF	10 Mbps connection
GREEN	Linked	ORANGE	100 Mbps connection
BLINKING	Data activity	GREEN	1 Gbps connection

Activity Link LED   Speed LED

LAN port
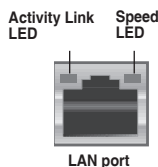
5. **Line Out port (green).** This port connects to a headphone or a speaker. In a 4-channel, 6-channel and 8-channel configurations, the function of this port becomes Front Speaker Out.

6. **Microphone port (pink).** This port connects a microphone.

NOTE: Refer to the audio configuration table for the function of the audio ports in the 2, 4, 6, or 8-channel configuration.

Audio 2, 4, 6, or 8-channel configuration

Port	Headset 2-channel	4-channel	6-channel	8-channel
Pink (Rear panel)	Mic In	Mic In	Bass/Center	Bass/Center
Green (Rear panel)	Line Out	Front Speaker Out	Front Speaker Out	Front Speaker Out

2.7.2   Internal connectors

1. **SATA power connector (4-pin SATA_PWR)**

    This connector is for the SATA power cable. The power cable plug is designed to fit this connector in only one orientation. Find the proper orientation and push down firmly until the connector completely fit.
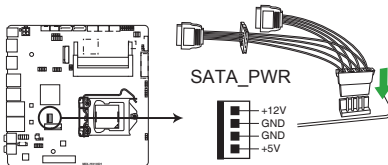
MIX-H310D1 SATA POWER connector

2. **Audio amplfier connector (4-pin AMP_CON)**

    This connector is for an internal stereo amplifier speakers support (2W/4Ω via WtoB header).
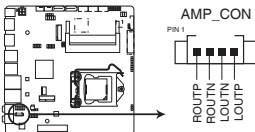
MIX-H310D1 Audio Stere. Output with Amp connector

3. **CPU and chassis fan connectors (4-pin CPU_FAN1, 4-pin CHA_FAN1)**

   Connect the fan cables to the fan connectors on the motherboard, ensuring that the black wire of each cable matches the ground pin of the connector.

CHA_FAN1 CPU_FAN1

PWM SENSE VCC GND   PWM SENSE VCC GND
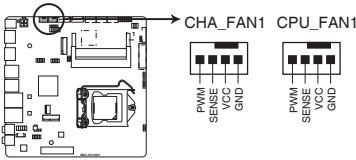
MIX-H310D1 Fan connectors

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

NOTE: The CPU_FAN connector supports a CPU fan of maximum 2A (24 W) fan power.

4. **LVDS connector (40-pin LVDS)**

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

LVDS

PIN 40
SPD1
NC
+BLVCC
+BLVCC
+BLVCC
LVDS1_CLK-
LVDS1_CLK+
VCON
INV_ENABKL
SPC1
GND
GND
GND
LVDS0_CLK-
LVDS0_CLK+
GND
GND
GND
+3V
NC
+V_PANEL
+V_PANEL
+V_PANEL
GND
LVDS1_D0-
LVDS1_D0+
LVDS1_D1-
LVDS1_D1+
LVDS1_D2-
LVDS1_D2+
LVDS1_D3-
LVDS1_D3+
LVDS0_D0-
LVDS0_D0+
LVDS0_D1-
LVDS0_D1+
LVDS0_D2-
LVDS0_D2+
LVDS0_D3-
LVDS0_D3+
PIN 1
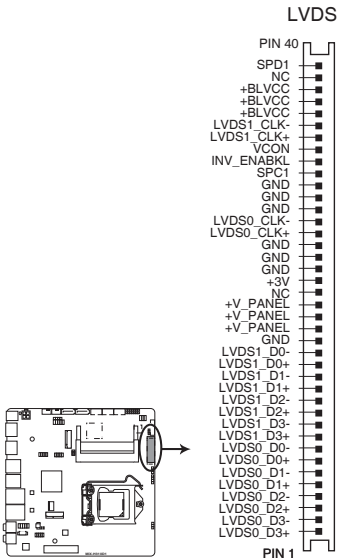
MIX-H310D1 LVDS connector

5. **Chassis intrusion connector (4-1 pin CHASSIS)**

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

    By default, the pins labeled "Intruder" are shorted with a jumper cap. Remove the jumper caps only when you intend to use the chassis intrusion detection feature.
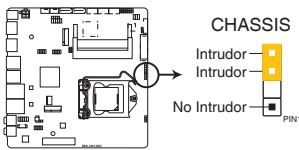
MIX-H310D1 Chassis intrusion connector

6. **Digital I/0 connector (10-pin DIO)**

    This connector includes 8 I/O lines (In/Out programmable). All of the Digital I/O lines are programmable and each I/O pin can be individually programmed to support various devices.
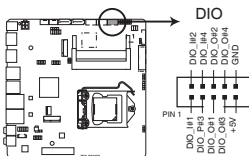
MIX-H310D1 DIO connector

NOTE: To configure the I/O pins in BIOS, go to the **Advanced** tab > **Digital IO Port Configuration**. See section **3.3.9 Digital IO Port Configuration** for details.

7. Front panel system panel connector (10-1 pin F_PANEL)

This connector supports several chassis-mounted functions.
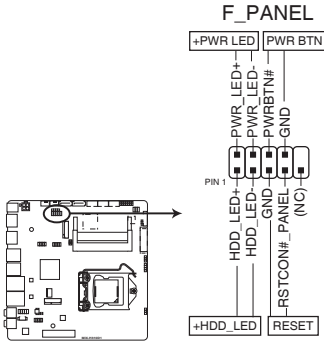
F_PANEL

MIX-H310D1 System panel connector

- **System power LED (2-pin +PWR_LED)**

  This 2-pin connector is for the system power LED. Connect the chassis power LED cable to this connector. The system power LED lights up when you turn on the system power, and blinks when the system is in sleep mode.

- **Hard disk drive activity LED (2-pin +HDD_LED)**

  This 2-pin connector is for the HDD Activity LED. Connect the HDD Activity LED cable to this connector. The IDE LED lights up or flashes when data is read from or written to the HDD.

- **ATX power button/soft-off button (2-pin PWR_BTN)**

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

- **Reset button (2-pin RESET)**

  This 2-pin connector is for the chassis-mounted reset button for system reboot without turning off the system power.

8. Serial ATA 6.0Gb/s connectors (7-pin SATA6G_1/2)

These connector connects to Serial ATA 6.0 Gb/s hard disk drives or an optical drive via Serial ATA 6.0 Gb/s signal cables.
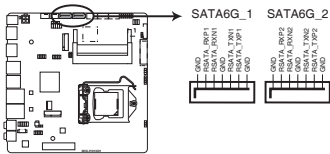
MIX-H310D1 SATA 6.0Gb/s connectors

NOTE: You must install Windows® 10 or later version before using Serial ATA hard disk drives.

9. Speaker connector (4-pin SPEAKER)

The 4-pin connector is for the chassis-mounted system warning speaker. The speaker allows you to hear system beeps and warnings.
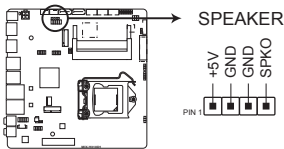
MIX-H310D1 SPEAKER connector

10. M.2 M-key / E-Key sockets

These sockets allow you to install an M.2 (NGFF) SSD module.
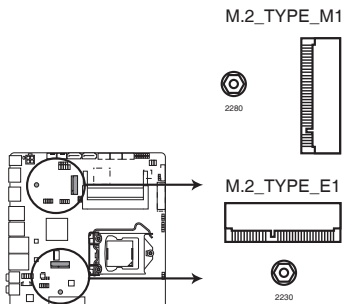
MIX-H310D1 M.2(SOCKET3)s

NOTE: The M.2 SSD module is purchased separately.

11. USB 2.0 connectors (10-pin USB56, USB78, USB9)

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

MIX-H310D1 USB2.0 connectors
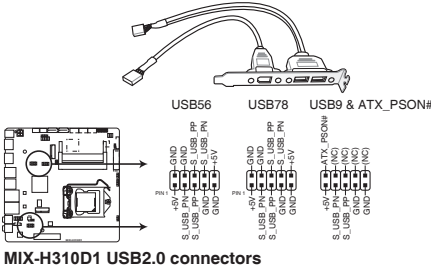
CAUTION! Never connect a 1394 cable to the USB connector. Doing so will damage the motherboard.

NOTE: The USB cable is purchased separately.

12. Embedded DisplayPort (40-pin EDP)

This connector is for an internal embedded DisplayPort connection.

MIX-H310D1 Embedded Display Port
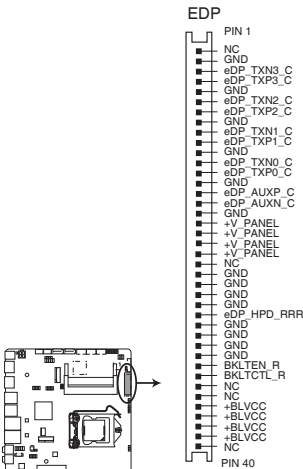
13. BIOS programmable connector (8-pin SPI_1)

Use this connector to flash the BIOS ROM.

SPI_1

(NC)	(NC)
SPI_MOSI	SPI_MISO
SPI_CLK	SPI_CS#
GND	+3V_SPI

PIN 1
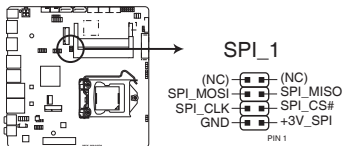
MIX-H310D1 BIOS Programmable connector

NOTE: The flash BIOS cable is purchased separately.

---

14. Battery connector (2-pin BATTERY_H)

This connector is for the lithium CMOS battery.

BATTERY_H

GND

+BAT

PIN 1
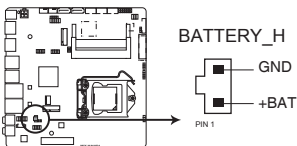
MIX-H310D1 Battery Holder connector

15. Backlight inverter power connector (5-pin INV)

Connect the backlight inverter power cable to this connector.

INV

BLDN#_R
BLUP#_R
GND
GND
+BLVCC
+BLVCC
VCON
INV_ENABKL

PIN1
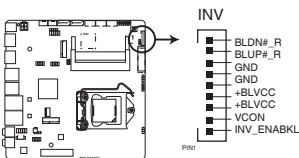
MIX-H310D1 Inverter connector

NOTE: The backlight inverter power cable and the inverter module are purchased separately.

---

16. Serial port connectors (10-pin COM1, COM2)

These connectors are for serial (COM) ports. Connect the serial port cables to these connectors, then install the module to a slot opening at the back of the system chassis.
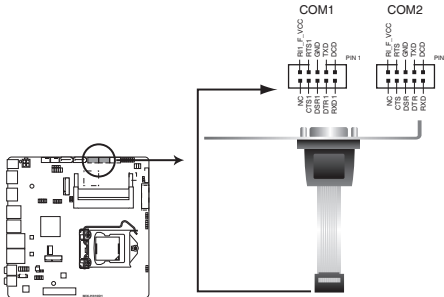
MIX-H310D1 Serial port connectors

Pin	Signal	Pin	Signal
1	DCD (422TXD-/485DATA-	2	RXD (422RXD+ /485DATA+)
3	TXD (422TXD+)	4	DTR (422RXD-)
5	GND	6	DSR
7	RTS	8	CTS
9	RI/+12V/+5V	10	N.C.

NOTES:

• The serial port cables are purchased separately.

• Only COM1 can support RS-422 and RS-485.

17. EATX power connector (4-pin EATX_PWR2)

This connector is for EATX power supply plug. The power supply plug is designed to fit this connector in only one orientation. Find the proper orientation and push down firmly until the connector completely fit.
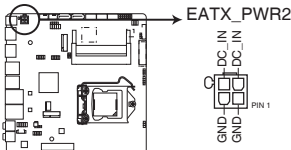
MIX-H310D1 1 x 4 PIN (2x2) internal power connector

18. Front panel audio connector (10-1 pin AAFP)

This connector is for a chassis-mounted front panel audio I/O module that supports HD Audio standard. Connect one end of the front panel audio I/O module cable to this connector.
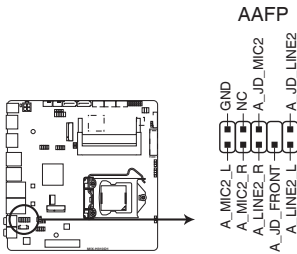
MIX-H310D1 Front panel audio connector

IMPORTANT!

- We recommend that you connect a high-definition front panel audio module to this connector to avail of the motherboard's high-definition audio capability.

- If you want to connect a high-definition front panel audio module to this connector, set the Front Panel Type item in the BIOS setup to [HD].

2.8 Power Supply Considerations

⚠️ **CAUTION!**

- The external DC jack (5.5/2.5mm) is the primary power input connector of MIX-H310D1. However, the desktop board also provides an internal 2 x 2 power connector that can be used in custom-developed systems that have an internal power supply.

- There is no isolation circuitry between the external DC jack and the internal 2 x 2 power connector. It is the system integrator's responsibility to ensure no more than one power supply unit is or can be attached to the board at any time and to ensure the external DC jack is covered if the internal 2 x 2 power connector is to be used.

- Simultaneous connection of both external and internal power supply units could result in potential damage to the desktop board, power supplies, or other hardware.

- System power requirements will depend on actual system configurations chosen by the integrator, as well as end user expansion preferences. It is the system integrator's responsibility to ensure an appropriate power budget for the system configuration is properly assessed based on the system-level components chosen.

- Considering the power conversion efficiency between Vin (+12V), the Vout (+12V) output voltage is set around 11.6V.

Chapter 3

BIOS setup

3.1 BIOS setup program

Use the BIOS Setup program to update the BIOS or configure its parameters. The BIOS screens include navigation keys and brief online help to guide you in using the BIOS Setup program.

Entering BIOS Setup at startup

To enter BIOS Setup at startup:

Press <Delete> during the Power-On Self Test (POST). If you do not press <Delete>, POST continues with its routine.

Entering BIOS Setup after POST

To enter BIOS Setup after POST:

* Press **<Ctrl>**+**<Alt>**+**<Del>** simultaneously.

* Press the reset button on the system chassis.

* Press the power button to turn the system off then back on. Do this option only if you failed to enter BIOS Setup using the first two options.

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

IMPORTANT:

* The default BIOS settings for this motherboard apply to most working conditions and ensures optimal performance. If the system becomes unstable after changing any BIOS settings, load the default settings to regain system stability. Select the option **Restore Defaults** under the Save & Exit Menu. See section **3.7 Save & Exit**.

* The BIOS setup screens shown in this section are for reference purposes only, and may not exactly match what you see on your screen.

3.1.1   BIOS menu screen

3.1.2   Menu bar

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

Main   For changing the basic system configuration.

Advanced   For changing the advanced system settings.

Chipset   For viewing and changing chipset settings.

Security   For setting up BIOS security settings.

Boot   For changing the system boot configuration.

Save & Exit   For selecting the exit options and loading default settings.

To select an item on the menu bar, press the right or left arrow key on the
keyboard until the desired item is highlighted.

3.2   Main menu

The Main menu provides you an overview of the basic system information, and
allows you to set the system date, time, language, and security settings.

3.2.1   System Date [Day MM/DD/YYYY]

Allows you to set the system date.

3.2.2   System Time [HH:MM:SS]

Allows you to set the system time.

3.3   Advanced menu

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

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

Case Open Warning [Disabled]

Allows you to enable or disable case open warning function. Configuration options:
[Disabled] [Enabled] [Clear]

3.3.1   CPU Configuration

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

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

Intel (VMX) Virtualization Technology [Enabled]

[Enabled]   Allows a hardware platform to run multiple operating
                                 systems separately and simultaneously, enabling one
                                 system to virtually function as several systems.

[Disabled]   Disables this function.

3.3.2   Trusted Computing

Security Device Support [Enable]

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

SHA-1 PCR Bank [Enabled]

Allows you to enable or disable SHA-1 PCR Bank. Configuration options:
[Disabled] [Enabled]

SHA256 PCR Bank [Enable]

Allows you to enable or disable SHA256 PCR Bank. Configuration options:
[Disabled] [Enabled]

Pending operation [None]

Allows you to schedule an operation for the Security Device. Configuration options:
[None] [TPM Clear]

The computer reboots during restart in order to change the state of the Security
Device.

Platform Hierarchy [Enabled]

Allows you to enable or disable Platform Hierarchy. Configuration options:
[Enabled] [Disabled]

Storage Hierarchy [Enabled]

Allows you to enable or disable Storage Hierarchy. Configuration options:
[Enabled] [Disabled]

Endorsement Hierarchy [Enabled]

Allows you to enable or disable Endorsement Hierarchy. Configuration options:
[Enabled] [Disabled]

TPM2.0 UEFI Spec Version [TCG_2]

[TCG_1_2]   Selects this spec version to support the compatible
                                 mode for Windows® 8 / Windows® 10.

[TCG_2]   Supports new TCG2 protocol and event format for
                                 Winows® 10 or later operating systems.

Physical Presence Spec Version [1.3]

Selects to tell operating system to support PPI S pec Version 1.2 or 1.3. Some
HCK tests might not support 1.3. Configuration options: [1.2] [1.3]

Device Select [Auto]

Allows you to select the TPM device. Configuration options: [Auto] [TPM1.2] [TPM2.0]

3.3.3   SATA Configuration

The BIOS automatically detects the presence of SATA devices. The Serial ATA Ports listed will display **Empty** if there are no Serial devices connected to the ports.

SATA Controller(s) [Enabled]

Configuration options: [Enabled] [Disabled].

> The following items appear only when you set **SATA Controller(s)** to [Enabled]

SATA Mode Selection [AHCI]

Allows you to set the SATA configuration.

[AHCI]   Set to [AHCI] when you want the SATA hard disk drives to use the AHCI (Advanced Host Controller Interface). The AHCI allows the onboard storage driver to enable advanced Serial ATA features that increases storage performance on random workloads by allowing the drive to internally optimize the order of commands.

Serial ATA Port 0, 1

Port 0, 1 [Enabled]

These items allow you to enable/disable the SATA port(s). Configuration options: [Disabled] [Enabled]

Hot Plug [Disabled]

These items allow you to enable/disable SATA Hot Plug Support. Configuration options: [Disabled] [Enabled]

M.2 SATA Port

Port 2 [Enabled]

These items allow you to enable/disable the SATA port(s). Configuration options: [Disabled] [Enabled]

3.3.4   USB Configuration

> The USB Devices item lists auto-detected values. If no USB device is detected, the item shows None.

Legacy USB Support [Enabled]

[Enabled]   Enables the support for USB devices on legacy operating systems (OS).

[Disabled]   USB devices are only available when running BIOS Setup.

[Auto]   Allows the system to detect the presence of USB devices
                  at startup. If detected, the USB controller legacy mode is
                  enabled. If no USB device is detected, the legacy USB support
                  is disabled.

3.3.5   Hardware Monitor

The items in this menu allow you to configure the smart fan.

Smart Fan Configuration

CPU Smart Fan Control [Enabled]

Allows you to enable or disable CPU Smart Fan Control. Configuration options:
[Enabled] [Disabled]

> The following sub-items appear only when you set **CPU Smart Fan Control** to
> [Enabled].

Fan Control Mode [SMART FAN IV Mode]

Select fan control mode. Configuration options: [Manual Mode] [Thermal
Cruise Mode] [SMART FAN IV Mode]

> The following 6 items appear only when you set Fan Control Mode to [Smart
> FAN IV Mode].

Temperature source [PECI Agent 0]

Temperature 1~4 [xx]

Input temperature setting. The values range from 0~255.

Fan PWM 1~4 [xx]

Input amount of Fan PWM 4 for Smart Fan IV Mode. The values
range from 0~255.

Tolerance of Temperature [xx]

Input tolerance of target temperature. The values range from 0~7.

Critical Temperature [xx]

Determines the time that Fan Out takes to decrease its value by
one step. The values range from 0~255.

Critical Temp Tolerance [xx]

Input tolerance of critical temperature. The values range from 0~7.

> The following item appears only when you set Fan Control Mode to [Manual
> Mode].

PWM/DC Voltage Output [255]

Sets the voltage allocated for Fan Control. Input value range: [0~255]

📎 The following item appears only when you set Fan Control Mode to [Thermal Cruise Mode].

Temperature source [PECI Agent 0]

Target Temperature [xx]

Input fan control target temperature. The values range from 0~127.

Tolerance of Temperature [xx]

Input tolerance of target temperature. The values range from 0~7.

Fan Out Start-up Value [xx]

Input fan out start-up value. The values range from 0~255.

Fan Stop Duty [Down to 0]

This item allows you to set the temperature for CPU Fan when CPU temperature is out of the target temperature. Configuration fields: [Down to 0] [To Fan out stop Vaule]

Fan Out Stop Value [xx]

The Fan out value decreases to this value if the temperature stays below the lowest temperature limit.

Fan Out Stop Time [xx]

Determines the amount of time it takes Fan out value to fall from the stop value to zero. The values range from 0~255.

Critical Temperature [xx]

Determines the time that Fan Out takes to decrease its value by one step. The values range from 0~255.

Fan Out Step Up Time [xx]

Determines the time that Fan Out takes to increase its value by one step. The values range from 0~255.

Fan Out Step Down Time [xx]

Determines the time that Fan Out takes to decrease its value by one step. The units are intervals of 0.1 second. The values range from 0~255.

System Smart Fan Control [Enabled]

Allows you to enable or disable System Smart Fan Control. Configuration options: [Enabled] [Disabled]

Fan Control Mode [SMART FAN IV Mode]

Select fan control mode. Configuration options: [Manual Mode] [Thermal Cruise Mode] [SMART FAN IV Mode]

The following 6 items appear only when you set Fan Control Mode to [Smart FAN IV Mode].

Temperature source [SYSTIN]

Temperature 1~4 [xx]

Input temperature setting. The values range from 0~255.

Fan PWM 1~4 [xx]

Input amount of Fan PWM 4 for Smart Fan IV Mode. The values range from 0~255.

Tolerance of Temperature [xx]

Input tolerance of target temperature. The values range from 0~7.

Critical Temperature [xx]

Determines the time that Fan Out takes to decrease its value by one step. The values range from 0~255.

Critical Temp Tolerance [xx]

Input tolerance of critical temperature. The values range from 0~7.

The following item appears only when you set Fan Control Mode to [Manual Mode].

PWM/DC Voltage Output [255]

Sets the voltage allocated for Fan Control. Input value range: [0~255]

The following item appears only when you set Fan Control Mode to [Thermal Cruise Mode].

Temperature source [SYSTIN]

Target Temperature [xx]

Input fan control target temperature. The values range from 0~127.

Tolerance of Temperature [xx]

Input tolerance of target temperature. The values range from 0~7.

Fan Out Start-up Value [xx]

Input fan out start-up value. The values range from 0~255.

Fan Stop Duty [Down to 0]

This item allows you to set the temperature for CPU Fan when CPU temperature is out of the target temperature. Configuration fields: [Down to 0] [To Fan out stop Vaule]

Fan Out Stop Value [xx]

The Fan out value decreases to this value if the temperature stays below the lowest temperature limit.

Fan Out Stop Time [xx]

Determines the amount of time it takes Fan out value to fall from the stop value to zero. The values range from 0~255.

Critical Temperature [xx]

Determines the time that Fan Out takes to decrease its value by one step. The values range from 0~255.

Fan Out Step Up Time [xx]

Determines the time that Fan Out takes to increase its value by one step. The values range from 0~255.

Fan Out Step Down Time [xx]

Determines the time that Fan Out takes to decrease its value by one step. The units are intervals of 0.1 second. The values range from 0~255.

3.3.6   SIO Configuration

The items in this menu allow you to configure Super IO settings.

[*Active*] Serial Port 1

Use this device [Enabled]

Allows you to enable or disable this logical device. Configuration options: [Enabled] [Disabled]

The following two items appear only when you set **Use this device** to [Enabled].

Possible [Use Automatic Settings]

Allows you to select an optimal setting for Super I/O devices. Configuration options: [Use Automatic Settings] [IO=3F8h; IRQ=4;] [IO=3E8h; IRQ=7]

Mode [RS-232]

Allows you to select the Serial Port mode. Configuration options: [RS-232] [RS-422] [RS-485]

[*Active*] Serial Port 2

Use this device [Enabled]

Allows you to enable or disable this logical device. Configuration options:
[Enabled] [Disabled]

Possible [Use Automatic Settings]

This item appears only when you set **Use this device** to [Enabled] and
allows you to select an optimal setting for Super I/O devices. Configuration
options: [Use Automatic Settings] [IO=3E8h; IRQ=7] [IO=3F8h; IRQ=4;]

3.3.7 PCH-FW Configuration

The items listed in this screen display firmware related information.

Firmware Update Configuration

Me FW Image Re-Flash [Disabled]

Allows you to enable or disable Me firmware Image Re-Flash function.
Configuration options: [Disabled] [Enabled]

Local FM Update [Enabled]

This item allows you to enable or disable Local FM Update function. Configuration
options: [Disabled] [Enabled]

3.3.8 Power Management

Power Mode [ATX Type]

Select power supply mode. Configuration options: [ATX Type] [AT Type]

The following items appear when you set Power Mode to [ATX Type].

Restore AC Power Loss [Last State]

[Last State]   The system goes into either off or on state, whatever the system
                state was.

[Always On]   The system goes into on state after an AC power loss.

[Always Off]   The system goes into off state after an AC power loss.

RI Wake Event [Disabled]

Enable or disable system to wake up from RI#. Configuration options: [Enabled]
[Disabled]

RTC Wake system from S5 [Disabled]

[Disabled]   Disables system wake up from S5.

[Fixed Time]   The system will wake up at the specified hr::min::sec.

[Dynamic Time]   The system will wake up at the current time plus a specified number of minutes.

> The following items appear when Fixed Time is enabled.

Wake up day/hour/minute/second [0]
Specify the values for day/hour/minute/second.

> The following item appears when Wake System with Dynamic Time is enabled.

Wake up minute increase [1]

Specify the number of minutes added to the current time before waking up system. Input value range: [1~5]

3.3.9   Digital IO Port Configuration

The items listed in this screen configure Digital IO settings.

DI0 Port1~DI0 Port4 [Output]

Configuration options: [Input] [Output]

> The following item appears only when you set **DI0 Port1/2/3/4** to [Output].

Output Level [High]
Configuration options: [High] [Low]

DI0 Port5~DI0 Port8 [Input]

Configuration options: [Input] [Output]

3.4 Chipset menu

The Chipset menu items allow you to change the settings for the chipset.

3.4.1 System Agent (SA) Configuration

Primary Display [Auto]

Allows you to decide which graphics controller to use as the primary boot device. Configuration options: [Auto] [IGFX] [PEG]

> **Primary IGFX Boot Display [VBIOS Default]**
>
> Select the video device which will be activated during POST. This setting has no effect if an external graphics device is present. The secondary boot display selection appears based on your selection and the VGA mode is supported only on primary display. Configuration options: [VBIOS Default] [DP] [eDP] [LVDS] [HDMI]

Primary IGFX Boot Display [VBIOS Default]

Select the video device which will be activated during POST. This setting has no effect if an external graphics device is present. The secondary boot display selection appears based on your selection and the VGA mode is supported only on primary display.Configuration options: [VBIOS Default] [HDMI] [eDP] [LVDS] [DP]

PCIEX4 Gen Speed [Auto]

Allows you to select the PCI Express port speed. Configuration options: [Auto] [Gen1] [Gen2] [Gen 3]

LVDS [Enabled]

Allows you to enable or disable LVDS (CH7511). Configuration options: [Disabled] [Enabled]

3.4.2 PCH-IO Configuration

HD Audio [Enabled]

This item controls the detection of HD Audio devices. Configuration options: [Disabled] [Enabled]

3.5 Security menu

The Security menu items allow you to change the system security settings.

3.5.1 Administrator Password

If you have set an administrator password, we recommend that you enter the administrator password for accessing the system. Otherwise, you might be able to see or change only selected fields in the BIOS setup program.

To set an administrator password:

1. Select the Administrator Password item and press <Enter>.

2. From the Create New Password box, key in a password, then press <Enter>.

3. Confirm the password when prompted.

To change an administrator password:

1. Select the Administrator Password item and press <Enter>.

2. From the Enter Current Password box, key in the current password, then press <Enter>.

3. From the Create New Password box, key in a new password, then press <Enter>.

4. Confirm the password when prompted.

To clear the administrator password, follow the same steps as in changing an administrator password, but press <Enter> when prompted to create/confirm the password. After you clear the password, the Administrator Password item on top of the screen shows Not Installed.

3.5.2 User Password

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

To set a user password:

1. Select the User Password item and press <Enter>.

2. From the Create New Password box, key in a password, then press <Enter>.

3. Confirm the password when prompted.

To change a user password:

1. Select the User Password item and press <Enter>.

2. From the Enter Current Password box, key in the current password, then press <Enter>.

3. From the Create New Password box, key in a new password, then press <Enter>.

4. Confirm the password when prompted.

To clear the user password, follow the same steps as in changing a user assword, but press <Enter> when prompted to create/confirm the password. After you clear the password, the **User Password** item on top of the screen shows **Not Installed**.

3.6   Boot menu

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

Boot Configuration

Quiet Boot [Enabled]

This item enables/disables Quiet Boot. Configuration options: [Disabled] [Enabled

Network Stack [Disabled]

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

Launch PXE ROM [Do not launch]

This item controls the execution of Legacy PXE OpROM. Configuration options: [Legacy] [Do not Launch]

Boot Option Priorities

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

- To select the boot device during system startup, press <F7> during POST.

- To access Windows OS in Safe Mode, do any of the following:

    - Press <F5> during POST.
    - Press <F8> after POST.

Boot Override

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

3.7   Save & Exit menu

Save Changes and Reset

Once you are finished making your selections, choose this option from the Save & Exit menu to ensure the values you selected are saved. When you select this option, a confirmation window appears. Select Yes to save changes and reset.

Discard Changes and Reset

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

Save Options

Save or discard changes to current configuration.

Restore Defaults

Save or restore User Defaults to all setup options.

Save as User Defaults

This item saves current configuration as User Default.

Restore User Defaults

This option restores User Defaults to all setup options.

Appendix

Notices

Federal Communications Commission Statement

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

• This device may not cause harmful interference.

• 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 in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with manufacturer's instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

• Reorient or relocate the receiving antenna.

• Increase the separation between the equipment and receiver.

• Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.

• Consult the dealer or an experienced radio/TV technician for help.

WARNING! The use of shielded cables for connection of the monitor to the graphics card is required to assure compliance with FCC regulations. Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

DO NOT throw the motherboard in municipal waste. This product has been designed to enable proper reuse of parts and recycling. This symbol of the crossed out wheeled bin indicates that the product (electrical and electronic equipment) should not be placed in municipal waste. Check local regulations for disposal of electronic products.

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

電子信息產品污染控制標示：圖中之數字為產品之環保使用期限。僅指電子信息產品中含有的有毒有害物質或元素不致發生外洩或突變從而對環境造成污染或對人身、財產造成嚴重損害的期限。

有毒有害物質或元素的名稱及含量說明標示：

部件名稱	有害物質或元素					
	鉛 (Pb)	汞 (Hg)	鎘 (Cd)	六 價 鉻 (Cr(VI))	多溴聯苯 (PBB)	多溴二苯醚 (PBDE)
印刷電路板及其電子組件	×	○	○	○	○	○
外部信號連接頭及線材	×	○	○	○	○	○

○：表示該有毒有害物質在該部件所有均質材料中的含量均在 SJ/T 11363-2006 標准規定的限量要求以下。

×：表示該有毒有害物質至少在該部件的某一均質材料中的含量超出 SJ/T 11363-2006 標准規定的限量要求，然該部件仍符合歐盟指令 2002/95/EC 的規范。

備註：此產品所標示之環保使用期限，係指在一般正常使用狀況下。