NMF891 Series

User's Manual

G03-NMF891-F

Rev: 5.0

Release date: February 15, 2024

Trademark:

*** Specifications and Information contained in this documentation are furnished for information use only, and are subject to change at any time without notice, and should not be construed as a commitment by manufacturer.**

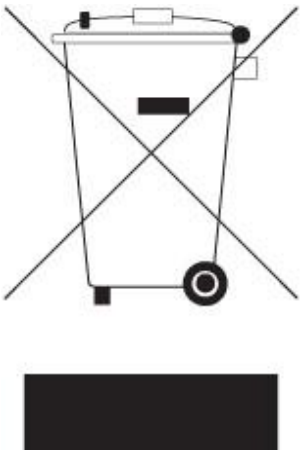
TABLE OF CONTENT

Environmental Safety Instruction

- Avoid the dusty, humidity and temperature extremes. Do not place the product in any area where it may become wet.
- 0 to 40 centigrade is the suitable temperature. (The figure comes from the request of the main chipset)
- Generally speaking, dramatic changes in temperature may lead to contact malfunction and crackles due to constant thermal expansion and contraction from the welding spots' that connect components and PCB. Computer should go through an adaptive phase before it boots when it is moved from a cold environment to a warmer one to avoid condensation phenomenon. These water drops attached on PCB or the surface of the components can bring about phenomena as minor as computer instability resulted from corrosion and oxidation from components and PCB or as major as short circuit that can burn the components. Suggest starting the computer until the temperature goes up.
- The increasing temperature of the capacitor may decrease the life of computer. Using the close case may decrease the life of other device because the higher temperature in the inner of the case.
- Attention to the heat sink when you over-clocking. The higher temperature may decrease the life of the device and burned the capacitor.

Environmental Protection Announcement

Do not dispose this electronic device into the trash while discarding. To minimize pollution and ensure environment protection of mother earth, please recycle.



USER'S NOTICE

Manual Revision Information

Reversion	Revision History	Date
5.0	Fifth Edition	2024-02-15

Item Checklist

- ☑ Motherboard
- ☑ Cable(s)
- ☑ I/O Back panel shield

Chapter 1
Introduction of the Motherboard

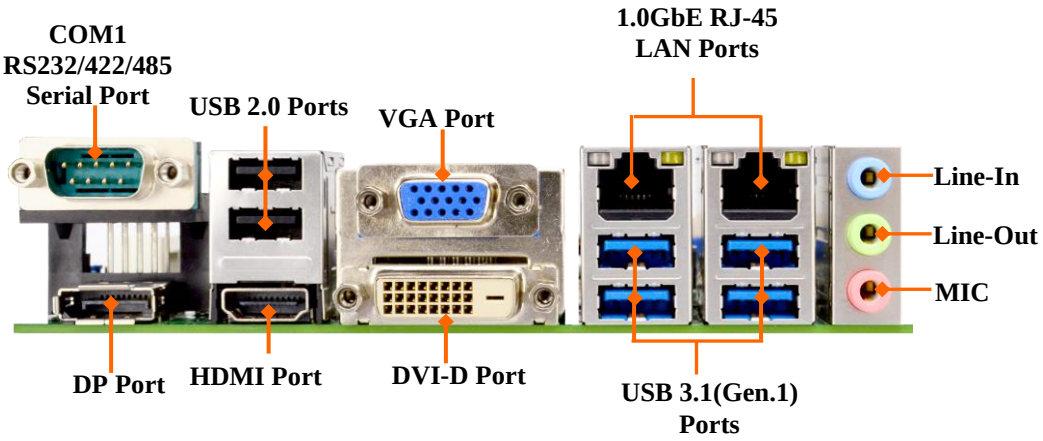
1-1 Specification

Spec	Description
Design	● Micro-ATX form factor; PCB size: 24.4 x24.4 cm
Chipset	● Intel® H310 Express Chipset
CPU Socket	● Intel® LGA 1151 Socket for Intel® 8th Generation Coffee Lake series processors(TDP 65W) * ***Note:*** *for detailed CPU support information please visit our website*
Memory Slots	● 2* DDR4 U-DIMM slot for 2* DDR4 RAM Module ● Support dual channel function *Maximum capacity: up to 64GB* *Maximum frequency: up to 2666MHz* **Memory frequency range also depends on CPU support*
Expansion Slots	● 1* PCI-Express x16 slot ***(PCIE1)*** ● 1* PCI-Express x1 slot ***(PCIE2)*** ● 2* PCI slot ***(PCI1/2)*** ● 1* Full-size Mini-PCIE slot ***(MPE)***
Storage	● 3* SATAIII 6Gb/s port ***(SATA1/2/3)*** ● 1* M.2 M-key slot, type-2242/2260/2280/22110 with SATA interface (***M2M***)
LAN Chip	● Integrated with 2* Realtek RTL8111H Gigabit PCI-E LAN chip ● Support Fast Ethernet LAN function of providing 10/100/1000Mbps Ethernet data transfer rate
Audio Chip	● Realtek HD Audio Codec integrated ● Audio driver and utility included
BIOS	● AMI Flash ROM
Multi I/O	***Rear Panel I/O:*** ● 1* RS232/422/485 COM port (***COM1***) ● 1* DP port ● 1* HDMI port ● 1* DVI-D port ● 1* VGA port ● 2* USB 2.0 port connector ● 2* 1.0GbE RJ-45 LAN port connector ● 4* USB 3.1(Gen.1) port connector ● 1* 3-phone audio jack (***Line-in, Line-out, MIC***) ***Internal I/O Connectors & Headers:*** ● 1* 24-pin main power connector ● 1* 8-pin 12V power connector ● 1* CPUFAN connector & 2* SYSFAN connector ● 1* Front panel header ● 1* Power LED & Speaker header ● 1* Front panel audio header ● 1* HDMI_SPDIF out header ● 2* LAN Status indicator header (**LAN1_LED/LAN2_LED**)

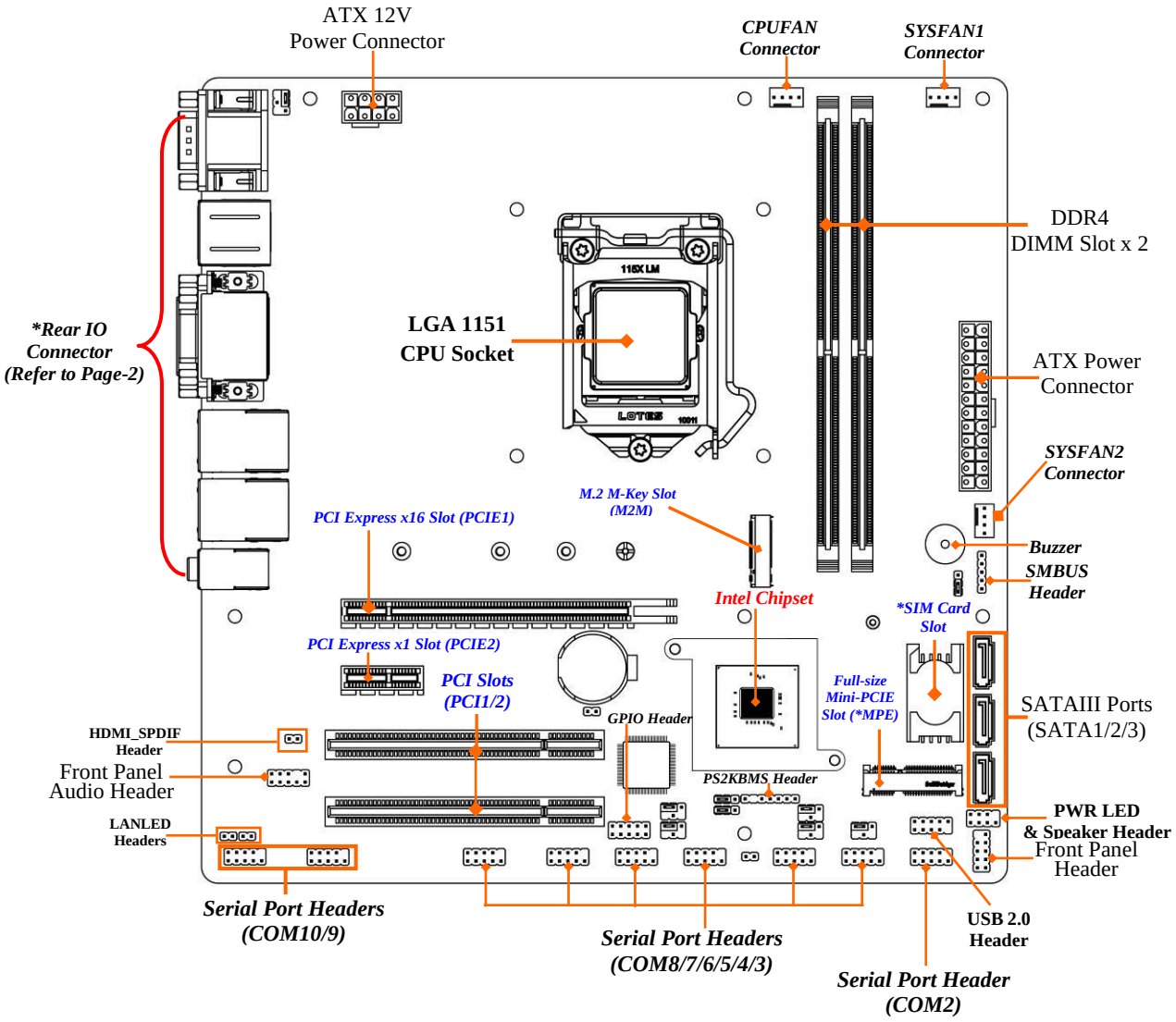
	● 1* PS/2 keyboard & mouse header ● 1* GPIO header ● 1* SMBUS header ● 1* 9-pin front panel USB 2.0 header for 2* expansion USB 2.0 port ● 1* RS232/422/485 COM port header (***COM2***) ● 8* RS232 COM port header *(**COM3/4/5/6/7/8/9/10**)*

1-2 Layout Diagram

Rear IO Diagram

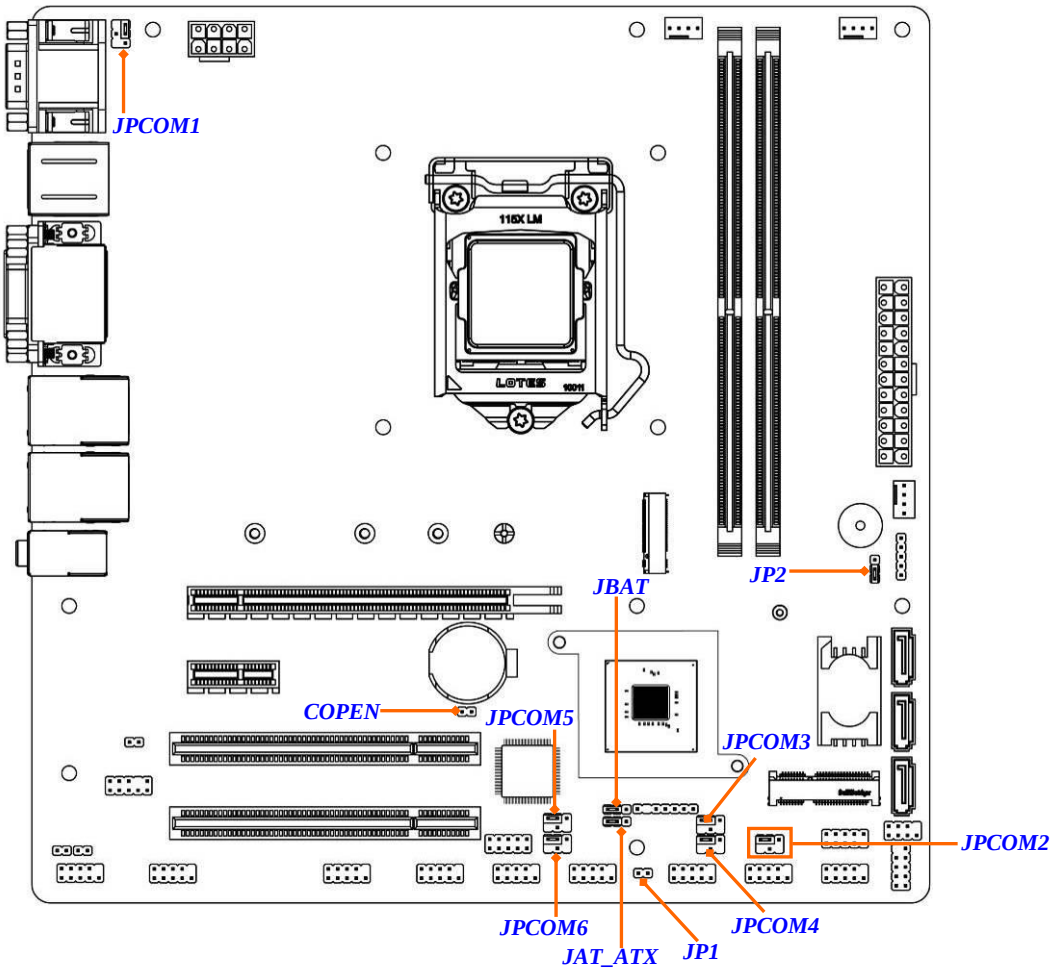


Motherboard Internal Diagram



***Note:** **SIM card slot** only work **when** compatible SIM card installed & LAN expansion card installed in **MPE** Mini-PCIE slot.*

Motherboard Jumper Position



Jumper

Jumper	Name	Description	Pitch
JPCOM1	COM1 Port Pin9 Function Select	4-pin Block	2.54mm
JPCOM2	COM2 Header Pin9 Function Select	4-pin Block	2.54mm
JPCOM3	COM3 Header Pin9 Function Select	4-pin Block	2.54mm
JPCOM4	COM4 Header Pin9 Function Select	4-pin Block	2.54mm
JPCOM5	COM5 Header Pin9 Function Select	4-pin Block	2.54mm
JPCOM6	COM6 Header Pin9 Function Select	4-pin Block	2.54mm
JBAT	Clear CMOS RAM Settings	3-pin Block	2.54mm
JAT_ATX	ATX/AT Mode Select	3-pin Block	2.54mm
JP1	ME Features Select	2-pin Block	2.54mm
COPEN	Case Open Message Display Detect	2-pin Block	2.54mm
JP2	MPE (Mini PCI-E)Slot VCC3.3V/3.3VSB Select	3-pin Block	2.54mm

Connectors

Connector	Name
COM1	RS232/422/485 Serial Port Connector
DP	Display Port Connector
HDMI	High-Definition Multimedia Interface Connector
USB1	USB 2.0 Port Connector X2
CRT	VGA Port Connector
DVI1	DVI-D Port Connector
UL1/UL2	**Top:** 1.0GbE RJ-45 LAN Connector X2 **Middle & Bottom**: USB 3.1(Gen.1) Port Connector X4
AUDIO	**Top:** Line-in Connector **Middle:** Line-out Connector **Bottom:** MIC Connector
ATXPWR	ATX Type Main Power Connector
ATX12V	ATX 12V Power Connector
CPUFAN	CPU FAN Connector
SYSFAN1/2	System FAN Connector
SATA1/2/3	SATAIII Connector X3

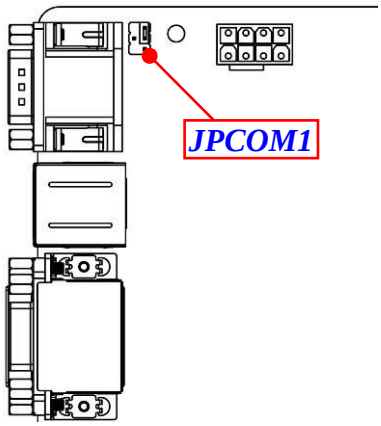
Headers

Header	Name	Description	Pitch
FP	Front Panel Header (PWR LED/ HD LED/Power Button /Reset)	9-pin Block	2.54mm
SPK_LED	Power LED & Speaker Header	7-pin Block	2.54mm
FP_AUDIO	Front Panel Audio Header	9-pin Block	2.54mm
HDMI_SPDIF	HDMI_SPDIF Out Header	2-pin Block	2.54mm
LAN1_LED / LAN2_LED	LAN LED Activity Header	2-pin Block	2.54mm
PS2KBMS	PS/2 Keyboard & Mouse Header	6-pin Block	2.54mm
GPIO_CON	GPIO Header	10-pin Block	2.54mm
SMBUS	SMBUS Header	5-pin Block	2.54mm
USB2	USB 2.0 Port Header	9-pin Block	2.54mm
COM2	RS232/422/485 Serial Port Header	9-pin Block	2.54mm
COM3/4/5/6/7/8/9/10	RS232 Serial Port Header	9-pin Block	2.54mm

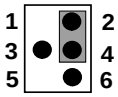
Chapter 2
Hardware Installation

2-1 Jumper Setting

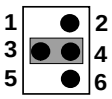
JPCOM1 (4-pin): COM1 Port Pin9 Function Select ***Pitch=2.54mm***



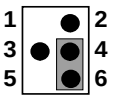
JPCOM1→COM1 Port



2-4 Closed:
RI=RS232;

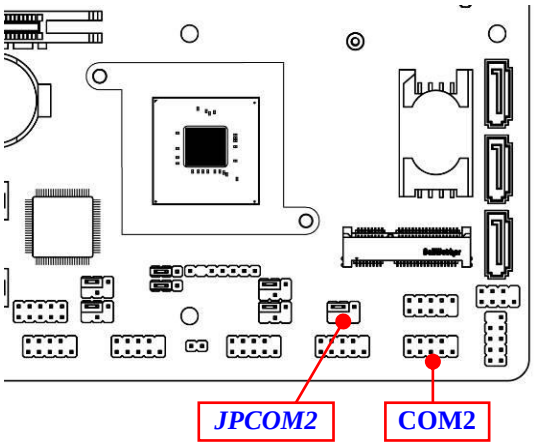


3-4 Closed:
RI= 5V;

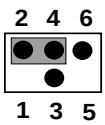


4-6 Closed:
RI= 12V;

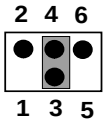
JPCOM2 (4-pin): COM2 Header Pin9 Function Select ***Pitch=2.54mm***



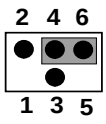
JPCOM2→COM2 Header



2-4 Closed:
RI=RS232;

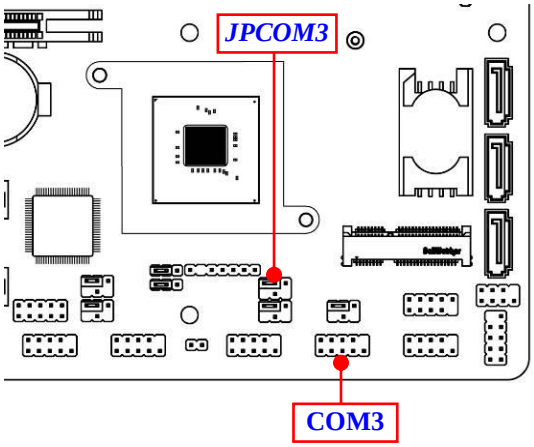


3-4 Closed:
RI= 5V;

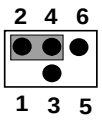


4-6 Closed:
RI= 12V.

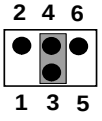
JPCOM3 (4-pin): COM3 Header Pin9 Function Select ***Pitch=2.54mm***



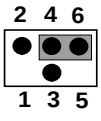
JPCOM3→COM3 Header



2-4 Closed:
RI=RS232;

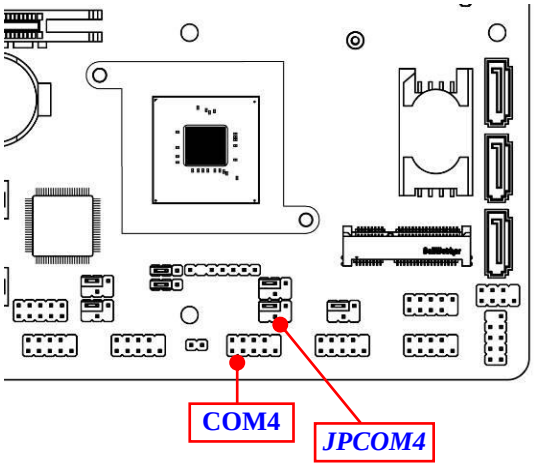


3-4 Closed:
RI= 5V;

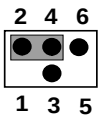


4-6 Closed:
RI= 12V.

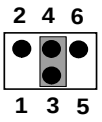
JPCOM4 (4-pin): COM4 Header Pin9 Function Select Pitch=2.54mm



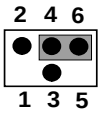
JPCOM4→COM4 Header



2-4 Closed:
RI=RS232;

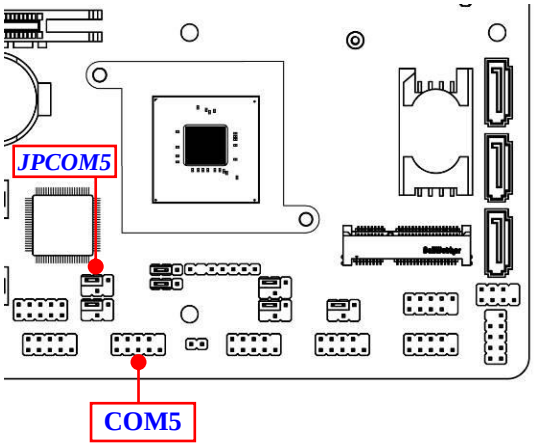


3-4 Closed:
RI= 5V;

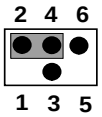


4-6 Closed:
RI= 12V.

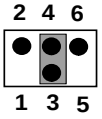
JPCOM5 (4-pin): COM5 Header Pin9 Function Select Pitch=2.54mm



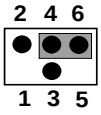
JPCOM5→COM5 Header



2-4 Closed:
RI=RS232;

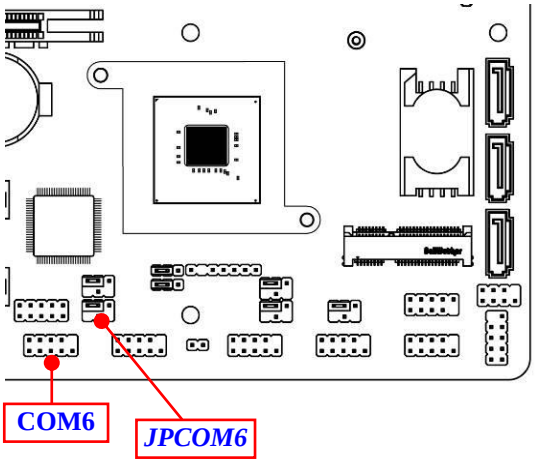


3-4 Closed:
RI= 5V;

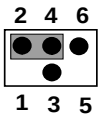


4-6 Closed:
RI= 12V.

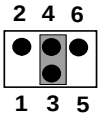
JPCOM6 (4-pin): COM6 Header Pin9 Function Select Pitch=2.54mm



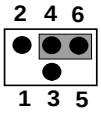
JPCOM6→COM6 Header



2-4 Closed:
RI=RS232;

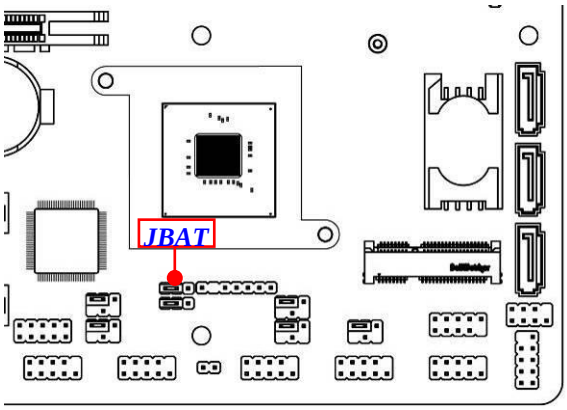


3-4 Closed:
RI= 5V;

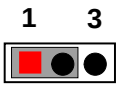


4-6 Closed:
RI= 12V.

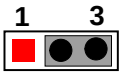
JBAT (3-pin): Clear CMOS RAM Settings *Pitch=2.54mm*



JBAT→Clear CMOS

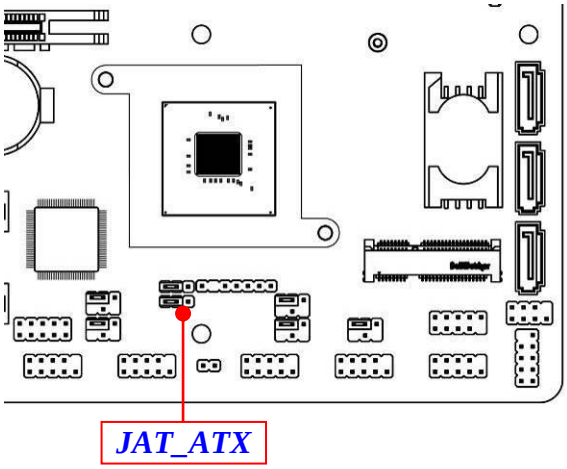


1-2 Closed: Normal;

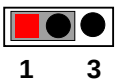


2-3 Closed: Clear CMOS.

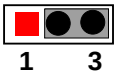
JAT_ATX (3-pin): AT Mode /ATX Mode Select *Pitch=2.54mm*



JAT_ATX→ATX/AT Mode Select



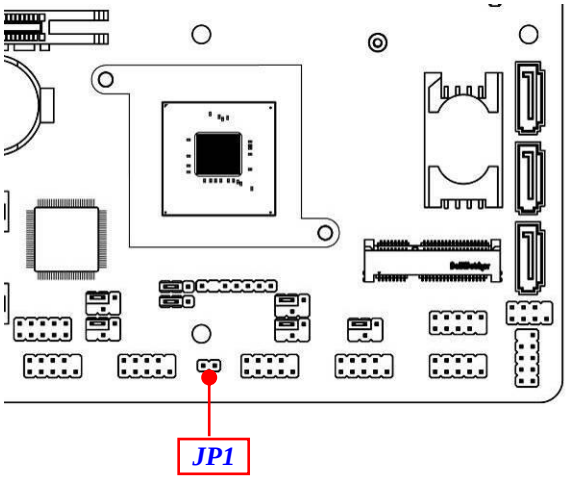
1-2 Closed: ATX Mode Selected;



2-3 Closed: AT Mode Selected.

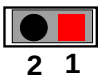
***ATX Mode Selected:** Press power button to power on after power input ready;*
***AT Mode Selected:** Directly power on as power input ready.*

JP1 (2-pin): ME Features Select *Pitch=2.54mm*



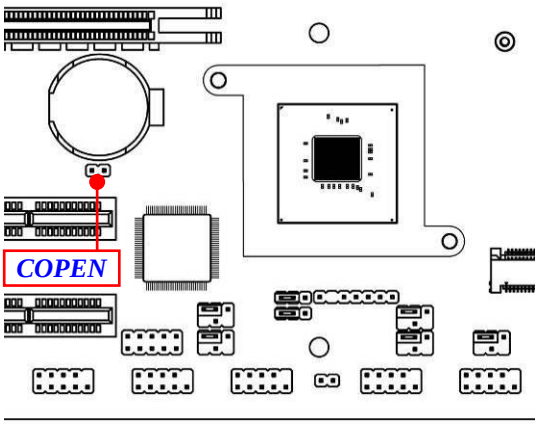
JP1→ME Features

1-2 Open:ME Features Enabled;

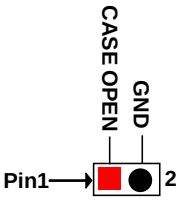


1-2 Closed:ME Features Disabled.

COPEN (2-pin): Case Open Message Display Function ***Pitch=2.54mm***

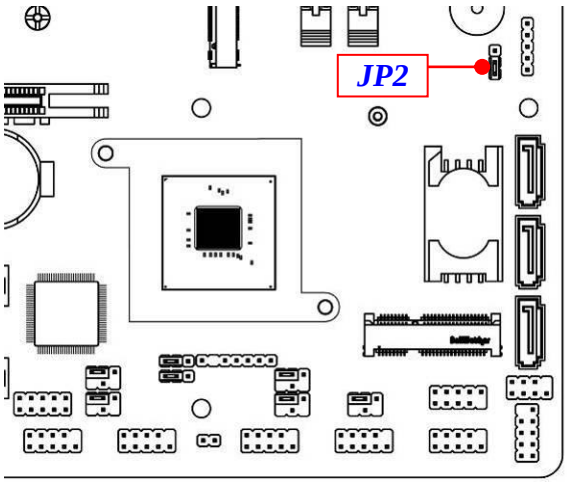


COPEN→ Case Open Detection

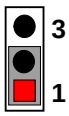


Pin 1-2 Short: *When Case open function pin short to GND, the Case open function was detected. When Used, needs to enter BIOS and enable 'Case Open Detect' function. In this case if your case is removed, next time when you restart your computer, a message will be displayed on screen to inform you of this.*

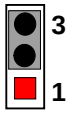
JP2 (3-pin): MPE (Mini PCI-E) Slot VCC 3.3V/3.3VSB Select ***Pitch=2.54mm***



JP2→ Mini-PCIE Slot VCC Select



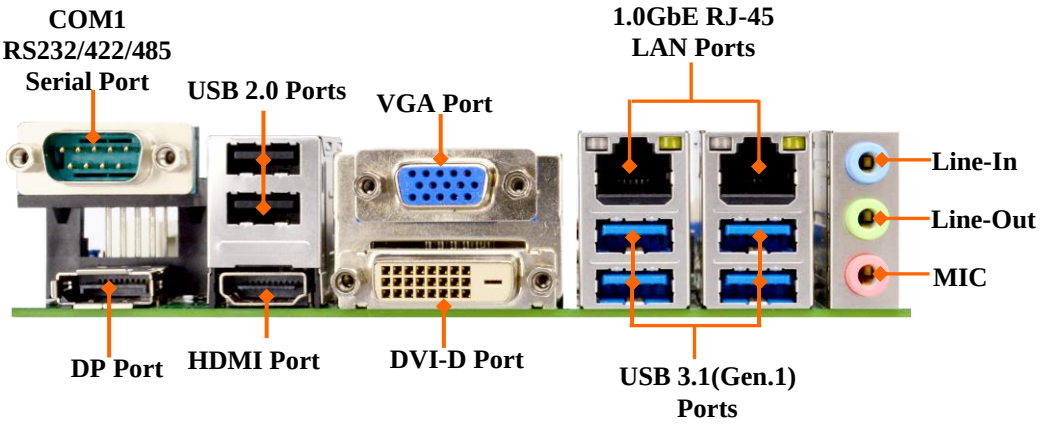
1-2 Closed: MINI PCI-E Slot VCC= 3.3V;



2-3 Closed: MINI PCI-E Slot VCC = 3.3VSB.

2-2 Connectors and Headers

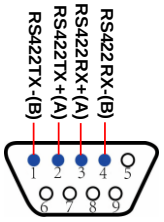
2-2-1 Rear I/O Back Panel Connectors



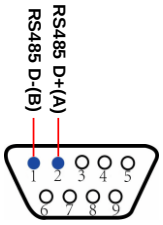
Icon	Name	Function
	**RS232/422/485 Serial Port**	Mainly for user to connect external MODEM or other devices that supports Serial Communications Interface. ***Note:** COM1 supports RS232/422/485 function.*
	**Display Port**	To the system to corresponding display device with compatible DP cable.
	**HDMI Port**	To connect display device that support HDMI specification.
	**DVI-D Port**	To connect display device that support DVI specification.
	**VGA Port**	VGA connector is the 15-pin D-subminiature female connector; it is for the display devices, such as the CRT monitor, LCD monitor and so on.
	**USB 2.0 Port**	To connect USB keyboard, mouse or other devices compatible with USB 2.0 specification.
	**USB 3.1(Gen.1) Port**	To connect USB keyboard, mouse or other devices compatible with USB 3.1 (Gen.1) specification. Ports support up to 5Gbps data transfer rate.
	**1.0GbE RJ-45 LAN Port**	This connector is standard 1.0Gbps RJ-45 LAN jack for Network connection.
	**Audio Connectors**	**BLUE:** Line-in Connector **GREEN:** Line-out Connector **PINK :** MIC Connector

COM1 (9-pin Block): RS232/422/485 Port

COM1 port can function as RS232/422/485 port. In normal settings COM1 functions as RS232 port. With compatible COM cable COM1 can function as RS422 or RS 485 port. User also needs to go to BIOS to set **'Transmission Mode Select'** for COM1 at first, before using specialized cable to connect different pins of this port.



For RS422 Mode



For RS485 Mode

2-2-2 Motherboard Internal Connectors

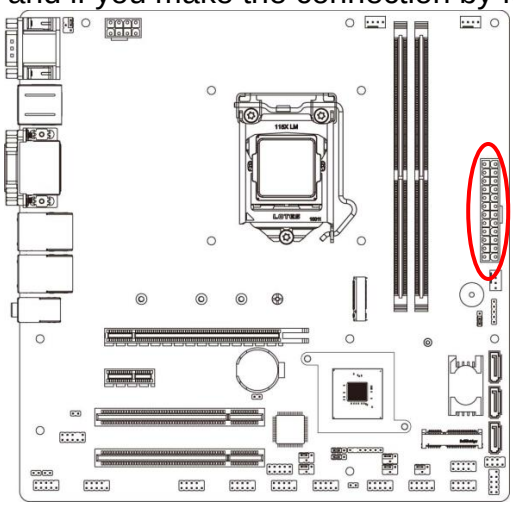
(1) ATXPWR (24-pin block): Main Power Connector

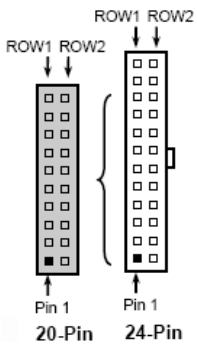
ATX Power Supply connector: This is a new defined 24-pins connector that usually comes with ATX case. The ATX Power Supply allows using soft power on momentary switch that connect from the front panel switch to 2-pins Power On jumper pole on the motherboard. When the power switch on the back of the ATX power supply turned on, the full power will not come into the system board until the front panel switch is momentarily pressed. Press this switch again will turn off the power to the system board.

** We recommend that you use an ATX 12V Specification 2.0-compliant power supply unit (PSU) with a minimum of 350W power rating. This type has 24-pin and 4-pin power plugs.

** If you intend to use a PSU with 20-pin and 4-pin power plugs, make sure that the 20-pin power plug can provide at least 15A on +12V and the power supply unit has a minimum power rating of 350W. The system may become unstable or may not boot up if the power is inadequate.

** If you are using a 20-pin power plug, please refer to Figure1 for power supply connection. Power plug form power supply and power connectors from motherboard both adopt key design to avoid mistake installation. You can insert the power plug into the connector with ease only in the right direction. If the direction is wrong it is hard to fit in and if you make the connection by force if is possible.





PIN	ROW1	ROW2
1	+3.3V	+3.3V
2	+3.3V	-12V
3	GND	GND
4	+5V	Soft Power on
5	GND	GND
6	+5V	GND
7	GND	GND
8	Power OK	-5V
9	+5V Stand by	+5V
10	+12V	+5V
11	+12V	+5V
12	+3.3V	GND

24-pin Main Power Connector

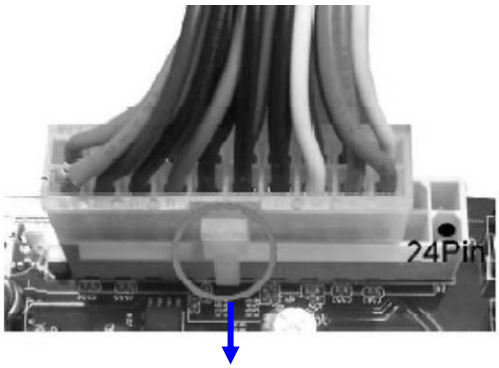


Figure1：20-pin power plug

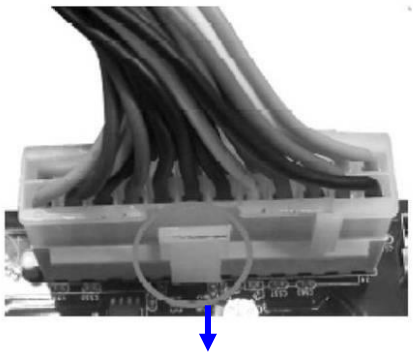
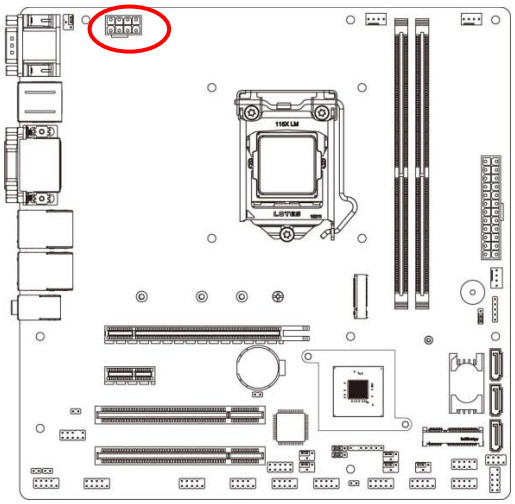
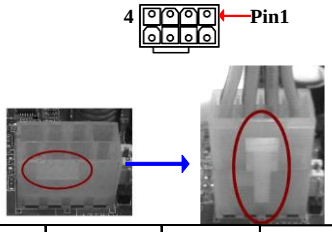


Figure 2：24-pin power plug

(2) ATX12V (8-pin block): 12V Power Connector

This is a new defined 8-pin connector that usually comes with ATX Power Supply that supports extra 12V voltage to maintain system power consumption. Without this connector might cause system unstable because the power supply can not provide sufficient current for system.

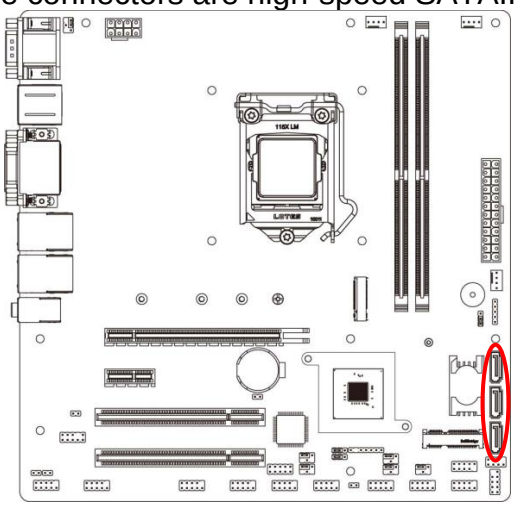


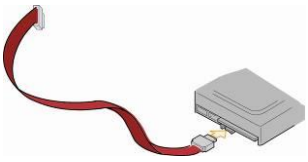


Pin No.	Definition	Pin No.	Definition
1	GND	5	+12V
2	GND	6	+12V
3	GND	7	+12V
4	GND	8	+12V

(3) SATA1/2/3 (7-pin): SATAIII Port connector

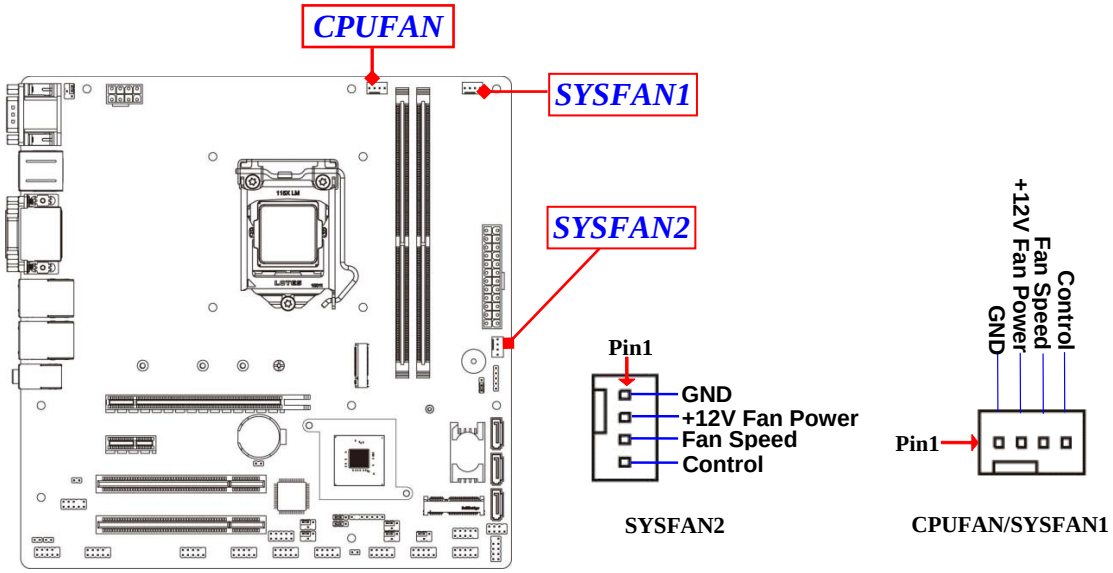
These connectors are high-speed SATAIII ports that support 6GB/s transfer rate.





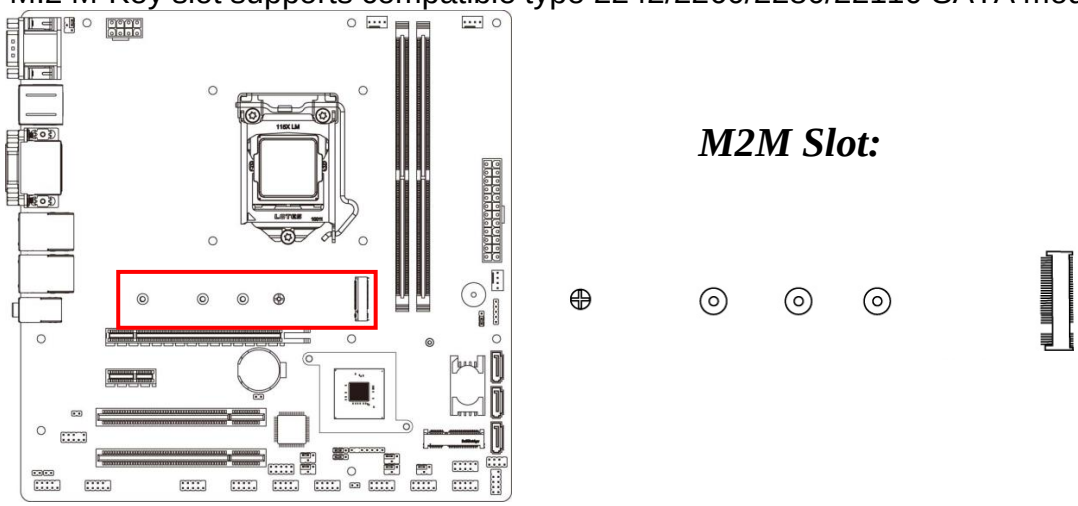
Pin No.	Definition
1	GND
2	TXP
3	TXN
4	GND
5	RXN
6	RXP
7	GND

(4) CPUFAN/SYSFAN1/SYSFAN2 (4-pin): Fan Connectors

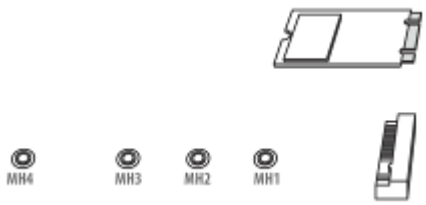


(5) M2M: M.2 M-Key Slot

M2M M.2 M-Key slot supports compatible type 2242/2260/2280/22110 SATA module.



M.2 Module Installation Guide



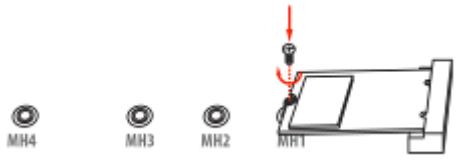
1. Prepare compatible M.2 SATA or M.2 SSD card. Deferent type of cards has different length. Find corresponding nut location for further installation.

Nut Location	MH1	MH2	MH3	MH4
Card Length	4.2 cm	6 cm	8 cm	11 cm
Module Type	Type- 2242	Type- 2260	Type- 2280	Type- 22110

2. Remove the screw post and nut fixed at location **MH4** by default (Skip step 2 & 3 and go straight to Step 4 if you are going to use the default nut).

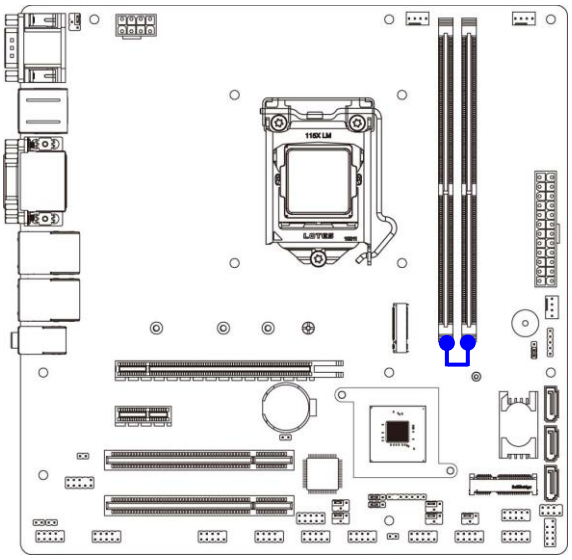
3. Lock the screw post into the location corresponding to the length of the module.

4. Align and insert corresponding M.2 module, as the photo shows.



5. Tighten up the screw to secure the module into the M.2 connector. Mare sure not overtighten the screw to avoid possible damage to the module.

(6) Dual Channel Memory Installation



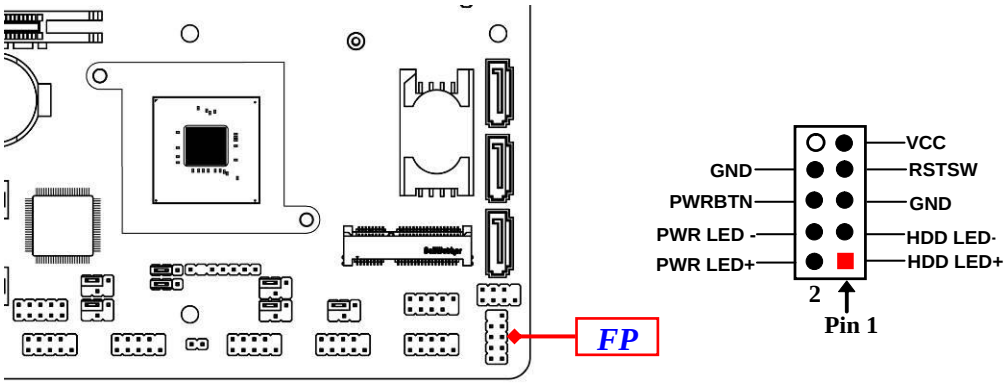
config	DIMM1	DIMM2
1	install	--
2	--	install
3	install	install

Notice!

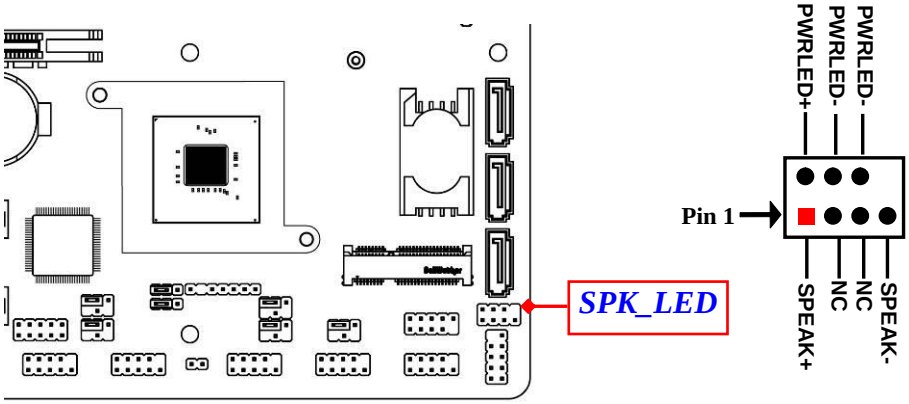
- For dual channel installation, you need to install the same brand, speed, size and type memory module.
- It is unable to activate dual channel feature if you install only one memory module. Slot order can be from left-to-right or right-to-left, and it must be installed in pairs.
- If you install memory modules in wrong direction, it will damage the motherboard and memory module.

2-2-3 Header Pin Definition

(1) FP (9-pin): Front Panel Header *Pitch=2.54mm*

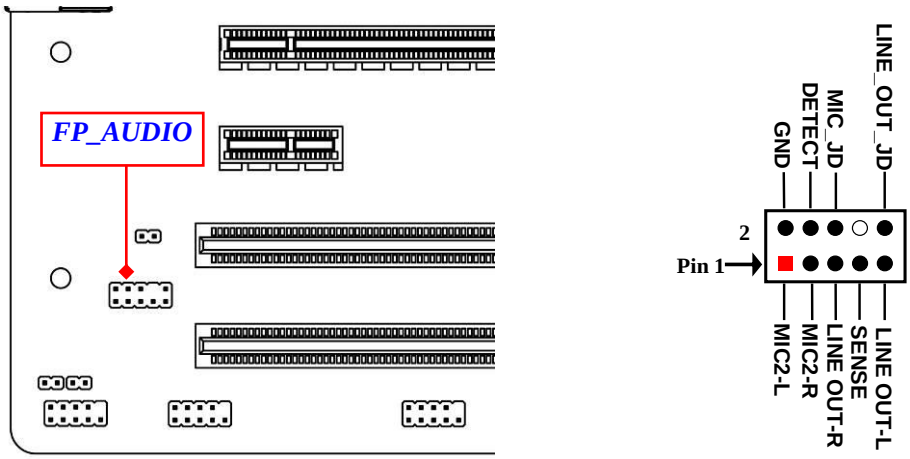


(2) SPK_LED (7-pin): PWR LED Header & Speaker Header *Pitch=2.54mm*

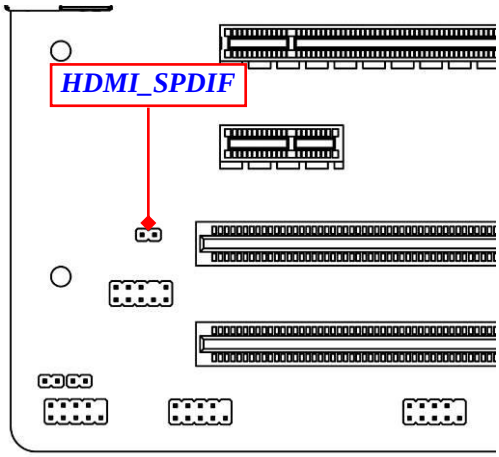


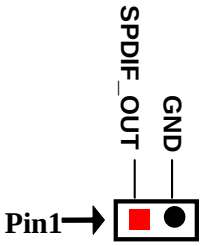
(3) FP_AUDIO (9-pin): Line-Out, MIC-In Header *Pitch=2.54mm*

This header is connected to Front Panel Line-out, MIC connector with cable.

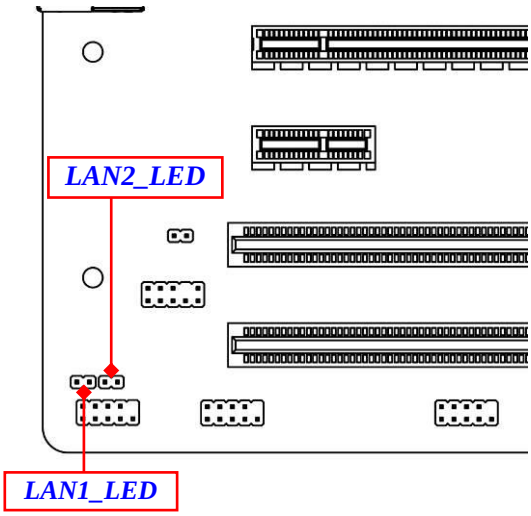


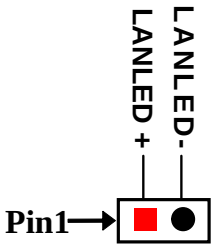
(4) HDMI_SPDIF (2-pin): HDMI-SPDIF Out header *Pitch=2.54mm*



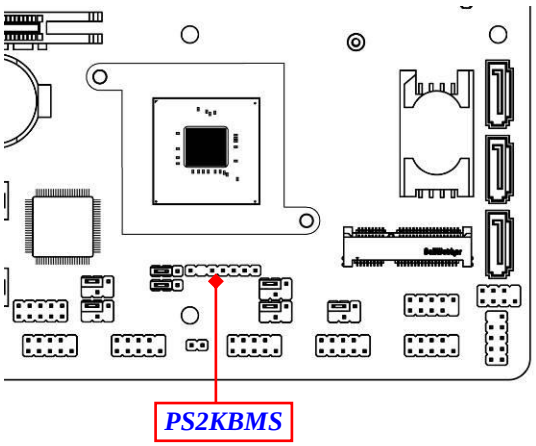


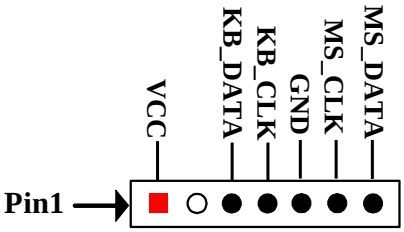
(5) LAN1_LED/ LAN2_LED (2-pin): LAN LED Header *Pitch=2.54mm*



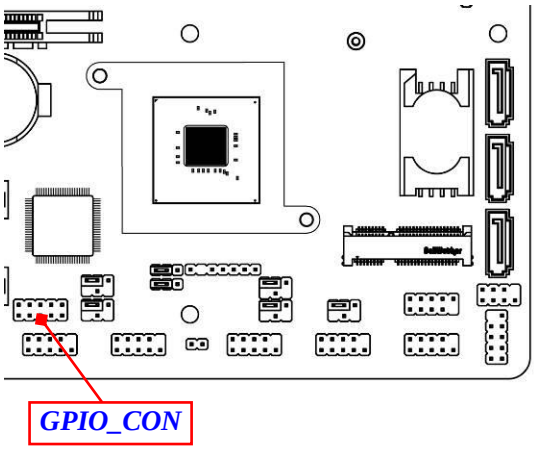


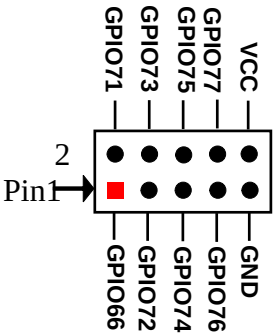
(6) PS2KBMS (6-pin): PS/2 Keyboard & Mouse Header *Pitch=2.54mm*



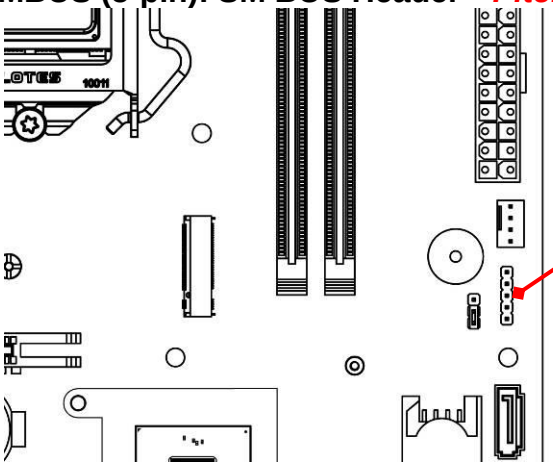


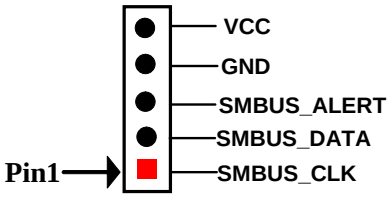
(7) GPIO_CON (10-pin): GPIO Header *Pitch=2.54mm*



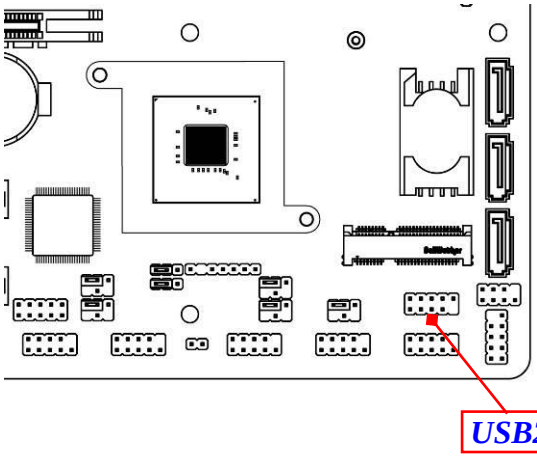


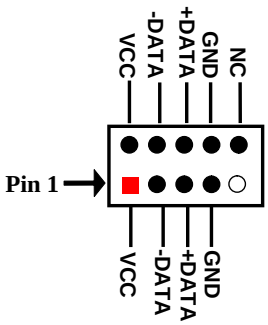
(8) SMBUS (5-pin): SM BUS Header *Pitch=2.54mm*





(9) USB2 (9-pin): USB 2.0 Port Header *Pitch=2.54mm*

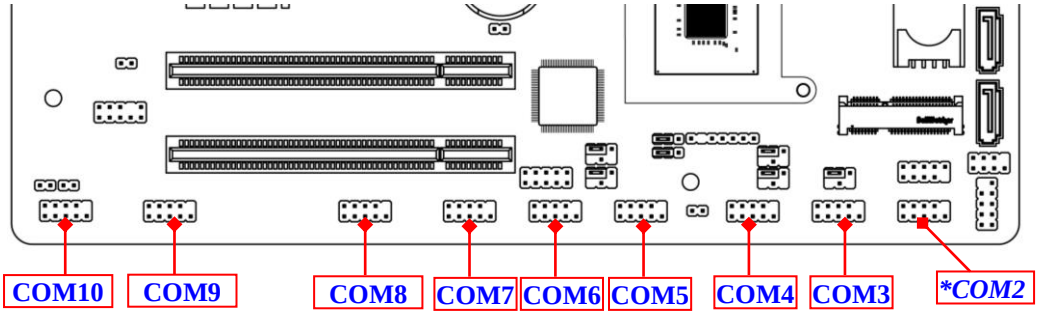


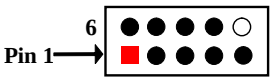


(10) COM2/3/4/5/6/7/8/9/10 (9-pin): Serial Port Header *Pitch=2.54mm*

COM2:RS232/422/485 Serial Port;

COM3/4/5/6/7/8/9:RS232 Serial Port Header.





Pin NO.	RS232	*RS422 (optional)	*RS485 (optional)
Pin 1	DCD	TX-	DATA-
Pin 2	RXD	TX+	DATA+
Pin 3	TXD	RX+	NC
Pin 4	DTR	RX-	NC
Pin 5	GND	GND	GND
Pin 6	DSR	NC	NC
Pin 7	RTS	NC	NC
Pin 8	CTS	NC	NC
Pin 9	RI	NC	NC

***Notice: COM2 header can function as RS232/422/485 port header.** In normal settings COM2 functions as RS232 header. With compatible COM cable COM2 can function as RS422 or RS 485 header. User also needs to go to BIOS to set '**Transmission Mode Select**' for COM2 (refer to Page-24) at first, before using specialized cable to connect different pins of this port.*

Chapter 3
Introducing BIOS

Notice!	The BIOS options in this manual are for reference only. Different configurations may lead to difference in BIOS screen and BIOS screens in manuals are usually the first BIOS version when the board is released and may be different from your purchased motherboard. Users are welcome to download the latest BIOS version form our official website.

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 will gain 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.

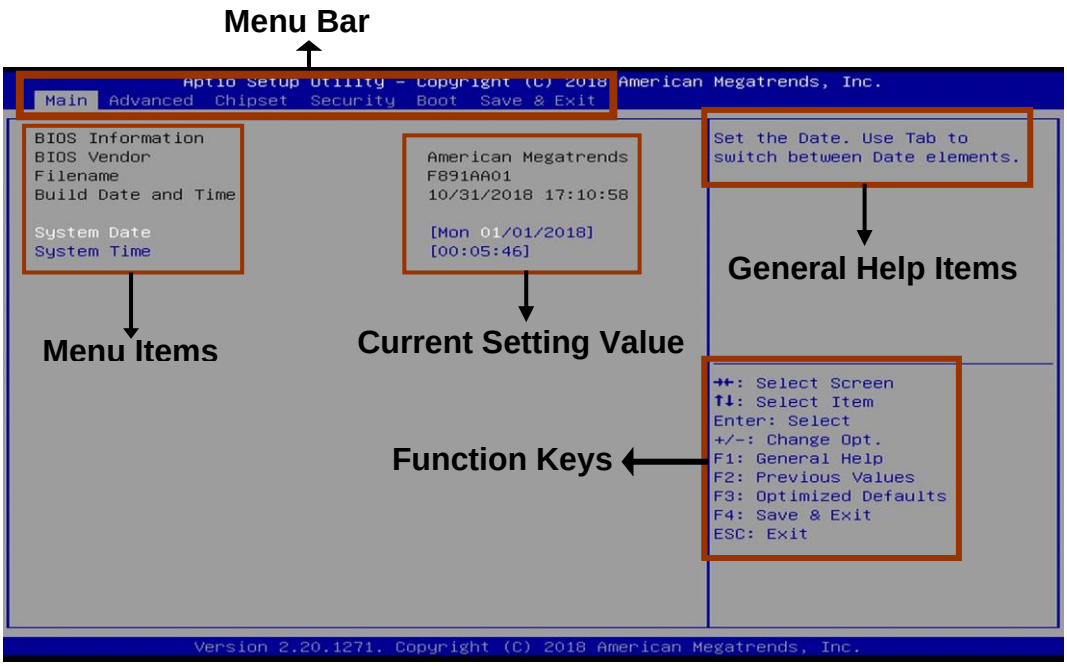
3-1 Entering Setup

Power on the computer and by pressing <Del> immediately allows you to enter Setup. If the message disappears before your respond and 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. If you do not press the keys at the correct time and the system does not boot, an error message will be displayed and you will again be asked to

Press **<Del>** to enter Setup; press < **F7**> to enter pop-up Boot menu.

3-2 BIOS Menu Screen

The following diagram show a general BIOS menu screen:



BIOS Menu Screen

3-3 Function Keys

In the above BIOS Setup main menu of, 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←→ (left, right) to select screen;
- Press ↑↓ (up, down) to choose, in the main menu, the option you want to confirm or to modify.
- Press <Enter> to select.
- Press <+>/<–> keys when you want to modify the BIOS parameters for the active option.
- [F1]: General help.
- [F2]: Previous values.
- [F3]: Optimized defaults.
- [F4]: Save & Exit.
- Press <Esc> to exit from BIOS Setup.

3-4 Getting Help

Main Menu

The on-line description of the highlighted setup function is displayed at the top right corner the screen.

Status Page Setup Menu/Option Page Setup Menu

Press【F1】to pop up a small help window that describes the appropriate keys to use and the possible selections for the highlighted item. To exit the Help Window, press <**Esc**>.

3-5 Menu Bars

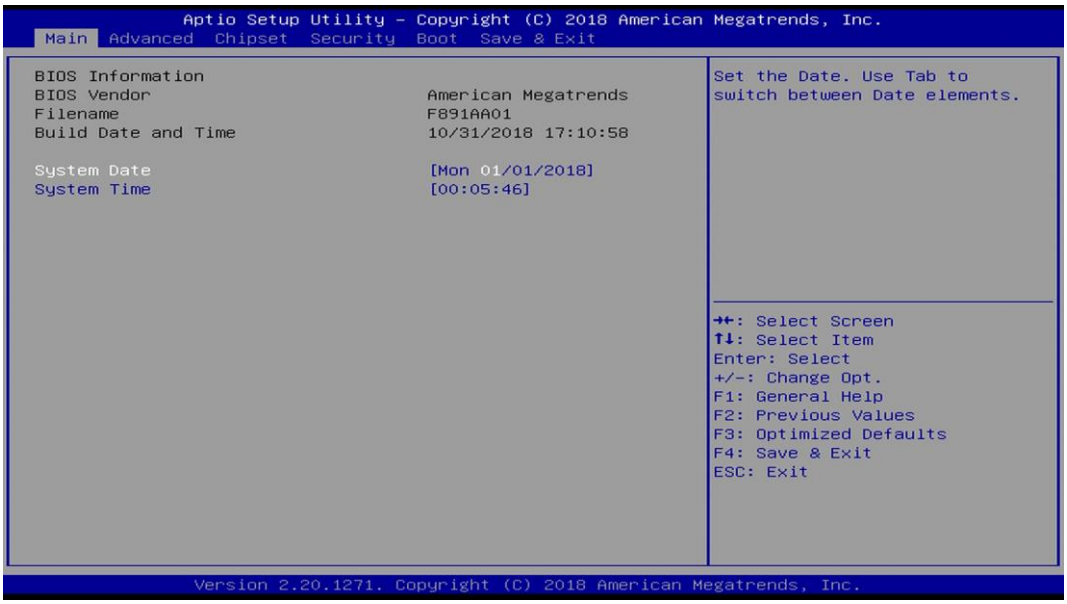
There are six menu bars on top of BIOS screen:

Main	To change system basic configuration
Advanced	To change system advanced configuration
Chipset	To change chipset configuration
Security	Password settings
Boot	To change boot settings
Save & Exit	Save setting, loading and exit options.

User can press the right or left arrow key on the keyboard to switch from menu bar. The selected one is highlighted.

3-6 Main Menu

Main menu screen includes some basic system information. Highlight the item and then use the <+> or <-> and numerical keyboard keys to select the value you want in each item.



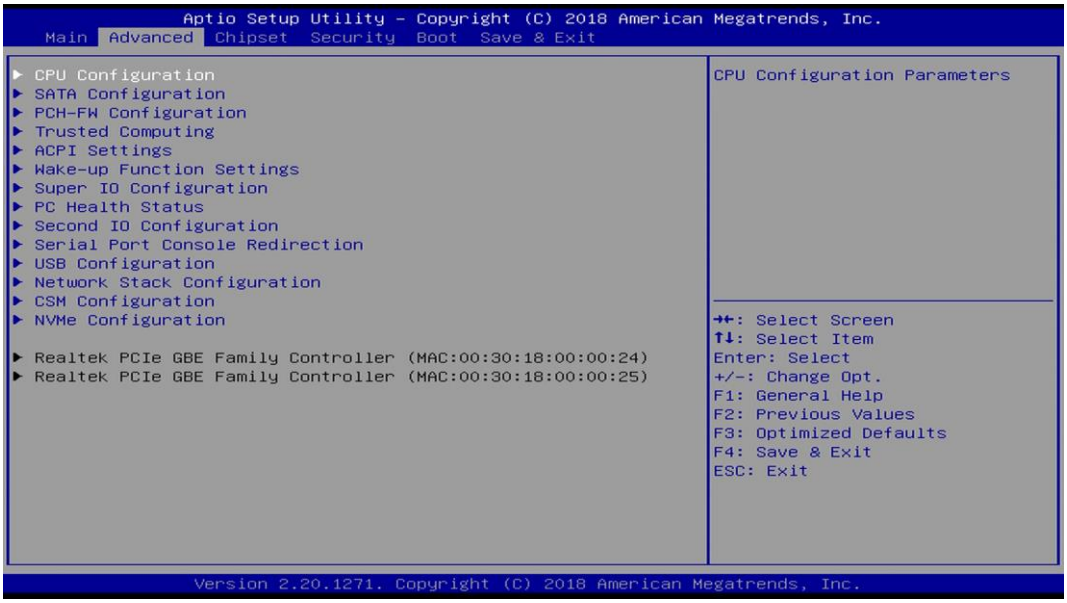
System Date

Set the date. Please use [Tab] to switch between date elements.

System Time

Set the time. Please use [Tab] to switch between time elements.

3-7 Advanced Menu



- **CPU Configuration**

  Press [Enter] to view current CPU configuration and make settings for the following sub-items:

  Hyper-Threading

  The optional settings: [Disabled]; [Enabled].

  When set as [Disabled] only one thread per enabled core is enabled.

  [Enabled]: for Windows and Linux (OS optimized for Hyper-Threading Technology).

  [Disabled]: for other OS (OS optimized not for Hyper-Threading Technology).

  **Note: 'Hyper-Threading' item may or may not show up, depending on different CPU.*

  Intel (VMX) Virtualization Technology

  The optional settings are: [Enabled]; [Disabled].

  When set as [Enabled], a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.

  Intel(R) SpeedStep(tm)

  This item allows more than two frequency ranges to be supported.

  The optional settings are: [Disabled]; [Enabled].

  C states

  The optional settings are: [Disabled]; [Enabled].

  Use this item to enable or disable CPU Power Management.

  When set as [Enabled], it allows CPU to go to C states when it's not 100% utilized.

  Turbo Mode

  Use this item to enable or disable Turbo Mode.

  **This item might not be available depending on configuration.*

- **SATA Configuration**

  Press [Enter] to make settings for the following sub-items:

  SATA Controller(s)

  Use this item to enable of disable SATA device.

  The optional settings are: [Enabled]; [Disabled].

  When set as [Enabled], the following items shall appear:

SATA Mode Selection
This item controls how SATA controller(s) operate.
The optional setting: [AHCI].

SATA1/SATA2/SATA3

Port
The optional settings are: [Disabled]; [Enabled].
Use this item to enable or disable SATA port.

Hot Plug
Use this item to designate this port as Hot Pluggable.
The optional settings are: [Disabled]; [Enabled].

M.2

Port
Use this item to enable or disable device connected to M.2 SATA port.
The optional settings are: [Disabled]; [Enabled].

- **PCH-FW Configuration**
  Press [Enter] to view Management Engine technology parameters and make settings in the following sub-item:
  - **Firmware Update Configuration**

  Press [Enter] to make settings for '**ME FW Image Re-Flash**'.
  ME FW Image Re-Flash
  Use this item to enable or disable ME FW Image Re-Flash function.
  The optional settings are: [Disabled]; [Enabled].

  ** In the case that user needs to update ME firmware, user should set **'ME FW Image Re-Flash**' as [**Enabled**], save the settings and exit. The system will turn off and reboot after 4 seconds. If the user goes to BIOS screen again will find this item is set again as [**Disabled**], but user can still re-flash to update firmware next time.*

- **Trusted Computing**
  Press [Enter] to view current status information, or make further settings in the following sub-items:
  Security Device Support
  Use this item to enable or disable BIOS support for security device. O.S. will not show security device. TGG EFI protocol and INT1A interface will not be available.
  The optional settings are: [Disabled]; [Enabled].
  When set as **[Enabled], user can make further settings in the following items:*
  Pending Operation
  Use this item to schedule an operation for the security device. Your computer will reboot during restart to change state of device.
  The optional settings are: [None]; [TPM Clear].
  TPM2.0 UEFI Spec Version
  Use this item to select the TCG2 Spec Version Support.
  The optional settings are: [TCG_1_2]; [TCG_2].

- **ACPI Settings**
  Press [Enter] to make settings for the following sub-items:
  ACPI Settings

  ACPI Sleep State
  Use this item to select the highest ACPI sleep state the system will enter when the suspend button is pressed.

The optional settings are: [Suspend Disabled]; [S3 (Suspend to RAM)].

- **Wake-up Function Settings**

Press [Enter] to make settings for the following sub-items:

Wake-up System With Fixed Time

Use this item to enable or disable system wake on alarm event.

The optional settings are: [Disabled]; [Enabled].

When set as [Enabled], system will wake on the hour/min/sec specified.

Wake-up System With Dynamic Time

Use this item to enable or disable system wake on alarm event.

System will wake on the current time + Increase minute(s).

The optional settings are: [Disabled]; [Enabled].

When set as [Enabled], system will wake on the current time + increased minute(s).

Wake-up Minute Increase

The settings range is from 1 to 60.

PS2 KB/MS Wake-up

The optional settings are: [Enabled]; [Disabled].

Use this item to enable or disable PS2 KB/MS wake-up from S3/S4/S5.

This function is supported when 'ERP Support**' is set as [Disabled].*

USB S3/S4 Wake-up

The optional settings are: [Enabled]; [Disabled].

Use this item to enable or disable USB wake-up from S3/S4 state.

This function is supported when 'ERP Support'** is set as [Disabled].*

USB S5 Power

Use this item to enable or disable USB power after power shutdown.

This function is supported when 'ERP Support**' is set as [Disabled].*

- **Super IO Configuration**

Press [Enter] to make settings for the following sub-items:

Super IO Configuration

ERP Support

The optional settings are: [Disabled]; [Auto].

This item should be set as [Disabled**] if you wish to have all active wake-up functions.*

- **Serial Port 1 Configuration/Serial Port 2 Configuration**

Press [Enter] to make settings for the following items:

Serial Port

Use this item to enable or disable serial port (COM).

The optional settings are: [Disabled]; [Enabled].

When set as **[Enabled], user can make further settings in the following items:*

Change Settings

Use this item to select an optimal setting for super IO device. Changing setting may conflict with system resources.

Transmission Mode Select

The optional settings are: [RS422]; [RS232]; [RS485].

Mode Speed Select

The optional settings are: [RS232/RS422/RS485=250kbps]; [RS232=1Mbps, RS422/RS485=10Mbps].

► **Serial Port 3 Configuration/ Serial Port 4 Configuration/ Serial Port 5 Configuration/ Serial Port 6 Configuration**

Press [Enter] to make settings for the following items:

Serial Port

Use this item to enable or disable serial port (COM).

The optional settings are: [Disabled]; [Enabled].

When set as **[Enabled], user can make further settings in the following items:*

Change Settings

Use this item to select an optimal setting for super IO device. Changing setting may conflict with system resources.

WatchDog Reset Timer

Use this item to enable or disable WDT reset function.

When set as [Enabled**], the following sub-items shall appear:*

WatchDog Reset Timer Value

User can set a value in the range of [4] to [255].

WatchDog Reset Timer Unit

The optional settings are: [Sec.]; [Min.].

ATX Power Emulate AT Power

This item support Emulate AT power function, MB power On/Off control by power supply. Use needs to select 'AT or ATX Mode' on MB jumper at first (refer to ***Page-8***, **JAT_ATX** jumper for ATX Mode & AT Mode Select).

Case Open Detect

Use this item to detect case has already open or not, show message in POST.

The optional settings are: [Disabled]; [Enabled].

When set as [Enabled], system will detect if COPEN has been short or not (refer to ***Page-9***, **COPEN** jumper for Case Open Detection); if Pin 1&2 of **COPEN** is short, system will show Case Open Message during POST.

PC Health Status

Press [Enter] to view current hardware health status, make further settings in '**SmartFAN Configuration**' and set value in '**Shutdown Temperature**'.

► **SmartFAN Configuration**

Press [Enter] to make settings for '**SmartFan Configuration**':

SmartFAN Configuration

CPUFAN / SYSFAN1/ SYSFAN2 Smart Mode

The optional settings are: [Disabled]; [Enabled].

When set as [Enabled], the following sub-items shall appear:

CPUFAN / SYSFAN1/ SYSFAN2 Full-Speed Temperature

Use this item to set CPUFAN/SYSFAN1/SYSFAN2 full speed temperature. Fan will run at full speed when above this pre-set temperature.

CPUFAN / SYSFAN1/ SYSFAN2 Full-Speed Duty

Use this item to set CPUFAN/SYSFAN1/SYSFAN2 full-speed duty. Fan will run at full speed when above this pre-set duty.

CPUFAN / SYSFAN1/ SYSFAN2 Idle-Speed Temperature

Use this item to set CPUFAN/SYSFAN1/SYSFAN2 idle speed temperature. Fan will run at idle speed when below this pre-set temperature.

CPUFAN / SYSFAN1/ SYSFAN2 Idle-Speed Duty

Use this item to set CPUFAN/SYSFAN1/SYSFAN2 idle speed duty. Fan will run at idle speed when below this pre-set duty.

Shutdown Temperature

Use this item to select system shutdown temperature.

The optional settings are: [Disabled]; [70°C/158°F]; [75°C/167°F]; [80°C/176°F]; [85°C/185°F]; [90°C/194°F].

► **Second IO Configuration**

Second IO Configuration

► **Serial Port 7 Configuration/Serial Port 8 Configuration/Serial Port 9 Configuration/Serial Port 10 Configuration**

Press [Enter] to make settings for the following sub-items:

Serial Port

Use this item to enable or disable serial port (COM).

Change Settings

Use this item to select an optimal setting for super IO device. Changing setting may conflict with system resources.

► **Serial Port Console Redirection**

COM1

Console Redirection

The optional settings are: [Disabled]; [Enabled]. When set as [Enabled], the following sub-items shall appear:

► **Console Redirection Settings**

The settings specify how the host computer and the remote computer (which the user is using) will exchange data. Both computers should have the same or compatible settings.

Press [Enter] to make settings for the following items:

COM1

Console Redirection Settings

Terminal Type

The optional settings are: [VT100]; [VT100+]; [VT-UTF8]; [ANSI].

Emulation: [ANSI]: Extended ASCII char set; [VT100]: ASCII char set; [VT100+]: Extends VT100 to support color,function keys, etc.; [VT-UTF8]: Uses UTF8 encoding to map Unicode chars onto 1 or more bytes.

Bits per second

Use this item to select serial port transmission speed. The speed must be matched on the other side. Long or noisy lines may require lower speeds.

The optional settings are: [9600]; [19200]; [38400]; [57600]; [115200].

Data Bits

The optional settings are: [7]; [8].

Parity

A parity bit can be sent with the data bits to detect some transmission errors.

The optional settings are: [None]; [Even]; [Odd]; [Mark]; [Space].

[Even]: parity bit is 0 if the num of 1's in the data bits is even; [Odd]: parity bit is 0 if num of 1's in the data bits is odd; [Mark]: parity bit is always 1; [Space]: Parity bit is always 0; [Mark] and [Space] Parity do not allow for error detection.

Stop Bits

Stop bits indicate the end of a serial data packet. (A start bit indicates the

beginning). The standard setting is 1 stop bit. Communication with slow devices may require more than 1 stop bit.
The optional settings are: [1]; [2].

Flow Control

Flow control can prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a “stop” signal can be sent to stop the data flow. Once the buffers are empty, a “start” signal can be sent to re-start the flow. Hardware flow control uses two wires to send start/stop signals.
The optional settings are: [None]; [Hardware RTS/CTS].

VT-UTF8 Combo Key Support

Use this item to enable VT-UTF8 Combination Key Support for ANSI/VT100 terminals.
The optional settings are: [Disabled]; [Enabled].

Recorder Mode

With this mode enable only text will be sent. This is to capture Terminal data.
The optional settings are: [Disabled]; [Enabled].

Resolution 100x31

Use this item to enable or disable extended terminal resolution.
The optional settings: [Disabled]; [Enabled].

Putty KeyPad

Use this item to select FunctionKey and KeyPad on Putty.
The optional settings are: [VT100]; [Linux]; [XTERMR6]; [SCO]; [ESCN]; [VT400].

Legacy Console Redirection

▸ **Legacy Console Redirection Settings**

Press [Enter] to make settings for the following item:

Legacy Console Redirection Settings

Legacy Serial Redirection Port

For user to select a COM port to display redirection of legacy OS and Legacy OPROM messages.
The optional settings are: [COM1]; [COM1(Pci Bus0, Dev0, Func0) (Disabled)].

Resolution

This item is for user to select the number of Rows and Columns supported redirection.
The optional settings are: [80x24]; [80x25].

Redirect After POST

The optional settings are: [Always Enable]; [Bootloader].
When [**Bootloader**] is selected, then Legacy Console Redirection is disabled before booting to legacy OS. When [**Always Enabled**] is selected, then Legacy Console Redirection is enabled for legacy OS. Default setting for this option is set to [**Always Enabled**].

Serial Port for Out-of-Band Management/
Windows Emergency Management Services (EMS)

Console Redirection

The optional settings: [Disabled]; [Enabled]. When set as [Enabled], the following sub-items shall appear:

▸ **Console Redirection Settings**

The settings specify how the host computer and the remote computer (which the

user is using) will exchange data. Both computers should have the same or compatible settings.
Press [Enter] to make settings for the following items:

Out-of-Band Mgmt Port

Microsoft Windows Emergency Management Services (EMS) allows for remote management of a Windows Server OS through a serial port.
The optional settings: [COM1]; [COM1(Pci Bus0, Dev0, Func0)(Disabled)].

Terminal Type

The optional settings: [VT100]; [VT100+]; [VT-UTF8]; [ANSI].
[VT-UTF8] is the preferred terminal type for out-of-band management. The next best choice is [VT100+] and them [VT100]. See above, in Console Redirection Settings page, for more help with Terminal Type/Emulation.

Bits per second

Use this item to select serial port transmission speed. The speed must be matched on the other side. Long or noisy lines may require lower speeds.
The optional settings: [9600]; [19200]; [57600]; [115200].

Flow Control

Flow control can prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a “stop” signal can be sent to stop the data flow. Once the buffers are empty, a “start” signal can be sent to re-start the flow. Hardware flow control uses two wires to send start/stop signals.
The optional settings: [None]; [Hardware RTS/CTS]; [Software Xon/Xoff].

Data Bits

The default setting is: [8].
**This item may or may not show up, depending on different configuration.*

Parity

The default setting is: [None].
**This item may or may not show up, depending on different configuration.*

Stop Bits

The default setting is: [1].
**This item may or may not show up, depending on different configuration.*

- **USB Configuration**

Press [Enter] to make settings for the following sub-items:

USB Configuration

Legacy USB Support

The optional settings are: [Enabled]; [Disabled]; [Auto].
[**Enabled**]: To enable legacy USB support.
[**Disabled]**: to keep USB devices available only for EFI specification,
[**Auto**]: To disable legacy support if no USB devices are connected.

XHCI Hand-off

This is a workaround for OSes without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.
The optional settings are: [Enabled]; [Disabled].

USB Mass Storage Driver Support

Use this item to enable or disable USB mass storage driver support.
The optional settings are: [Disabled]; [Enabled].

USB hardware delays and time-outs

USB Transfer time-out
Use this item to set the time-out value for control, bulk, and interrupt transfers.
The optional settings are: [1 sec]; [5 sec]; [10 sec]; [20 sec].
Device reset time-out
Use this item to set USB mass storage device start unit command time-out.
The optional settings are: [10 sec]; [20 sec]; [30 sec]; [40 sec].
Device power-up delay
Use this item to set maximum time the device will take before it properly reports itself to the host controller. 'Auto' uses default value: for a root port it is 100 ms, for a hub port the delay is taken from hub descriptor.
The optional settings: [Auto]; [Manual].
Select [Manual] you can set value for the following sub-item: '**Device Power-up delay in seconds**'**,** the delay range in from 1 to 40 seconds, in one second increments.

- **Network Stack Configuration**

Press [Enter] to go to '**Network Stack**' screen to make further settings.
Network Stack
Use this item to enable or disable UEFI Network Stack.
The optional settings are: [Disabled]; [Enabled].
**When set as [Enabled], the following sub-items shall appear:*
Ipv4 PXE Support
The optional settings are: [Disabled]; [Enabled].
Use this item to enable IPv4 PXE boot support.
When set as [Disabled], IPv4 boot support will not be available.
Ipv6 PXE Support
The optional settings are: [Disabled]; [Enabled].
Use this item to enable IPv6 PXE boot support. When set as [Disabled], IPv6 boot support will not be available.
PXE boot wait time
Use this item to set wait time to press [ESC] key to abort the PXE boot.
Use either [+] / [-] or numeric keys to set the value.
Media Detect Count
Use this item to set number of times presence of media will be checked.
Use either [+] / [-] or numeric keys to set the value.

- **CSM Configuration**

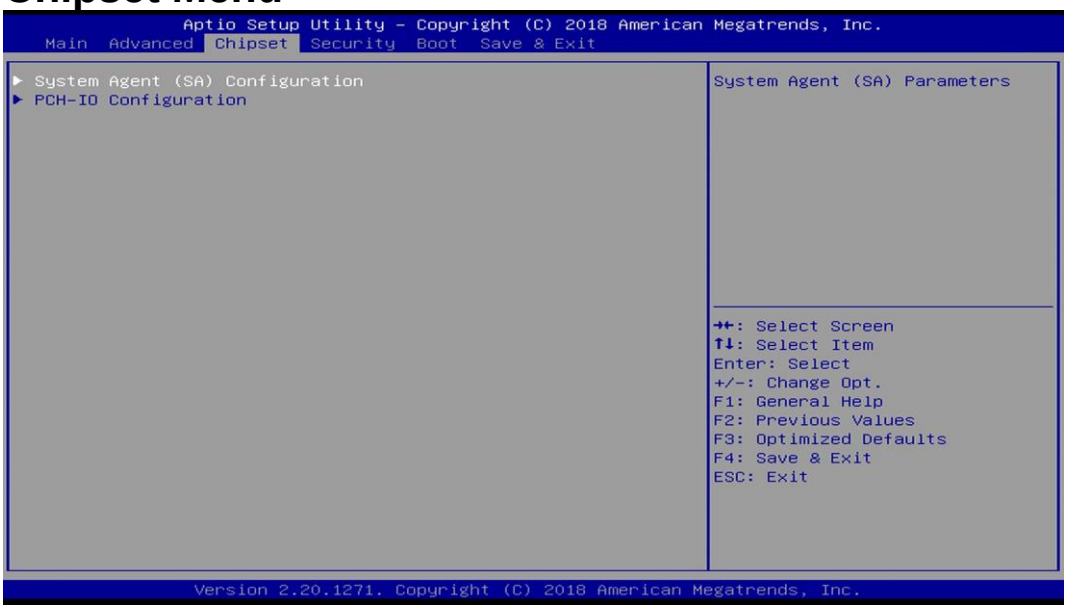
Press [Enter] to make settings for the following sub-items:
Compatibility Support Module Configuration
CSM Support
Use this item enable or disable CSM support.
The optional settings are: [Disabled]; [Enabled].
**When set as [Enabled], the following sub-items shall appear:*
Option ROM execution
Network
This option controls the execution of network OpROM.
The optional settings are: [Do not launch]; [Legacy].
Storage
This option controls the execution of UEFI and Legacy Storage OpROM.
The optional settings are: [Do not launch]; [UEFI]; [Legacy].

Other PCI devices
This item is for system to determine OpROM execution policy for devices other than Network, Storage or Video.
The optional settings are: [Do not launch]; [UEFI]; [Legacy].

- **NVMe Configuration**
  Press [Enter] to view current NVMe Configuration.
  **Note: options only when NVME device is available.*

- **Realtek PCIe GBE Family Controller(MAC:XX:XX:XX:XX:XX:XX)/ Realtek PCIe GBE Family Controller(MAC:XX:XX:XX:XX:XX:XX)**
  These items show current network brief information.

3-8 Chipset Menu



- **System Agent (SA) Configuration**
  Press [Enter] to make settings for the following sub-items:
  VT-d
  Use this item to enable or disable VT-d capability.
  The optional settings are: [Enabled]; [Disabled].
  - **Memory Configuration**
    Press [Enter] to view brief information for the working memory module.
  - **Graphics Configuration**
    Press [Enter] to make further settings for Graphics Configuration.

Graphics Configuration

Primary Display
Use this item to select which graphics device should be Primary Display.
The optional settings are: [Auto]; [IGFX]; [PEG]; [PCI].

Primary IGFX Boot Display
Use this item to select the video device which will be activated during POST. This has no effect if external graphics present.
The optional settings are: [VBIOS Default]; [DP]; [HDMI]; [DVI]; [VGA].

****Note:** In the case that the '**Primary IGFX Boot Display'** is select as [DP], [HDMI], [DVI] or [VGA], user can make further settings in '**Secondary IGFX Boot Display**'*:

Secondary IGFX Boot Display
Use this item to select the secondary Display device.
The optional settings are: [Disabled]; [DP]; [HDMI]; [DVI].
Internal Graphics
Use this item to keep IGFX enabled based on the setup options.
The optional settings are: [Auto]; [Disabled]; [Enabled].
Aperture Size
Use this item to select the Aperture Size. Above 4GB MMIO BIOS assignment is automatically enabled when selecting 2048MB aperture. To use this feature, please disable CSM Support.
The optional settings are: [128MB]; [256MB]; [512MB]; [1024MB]; [2048MB].
DVMT Pre-allocated
Use this item to select DVMT 5.0 Pre-Allocated (Fixed) Graphics Memory size used by the Internal Graphics Device.
The optional settings are: [32M]; [64M].
DVMT Total Gfx Mem
Use this item to select DVMT 5.0 Total Graphic Memory size used by the Internal Graphics Device.
The optional settings are: [128M]; [256M]; [MAX].

► **PEG Port Configuration**
Press [Enter] to make further settings for PEG port options.
PEG Port Configuration

PCIE1 Slot

Enable Root Port
Use this item to enable or disable the root port.
The optional settings are: [Disabled]; [Enabled]; [Auto].
Max Link Speed
Use this item to select slot max speed.
The optional settings are: [Auto]; [Gen1]; [Gen2]; [Gen3].
Max Link Width
This item is for user to force PEG link to restrain to X1/2/4/8.
The optional settings are: [Auto]; [Force X1]; [Force X2]; [Force X4]; [Force X 8].

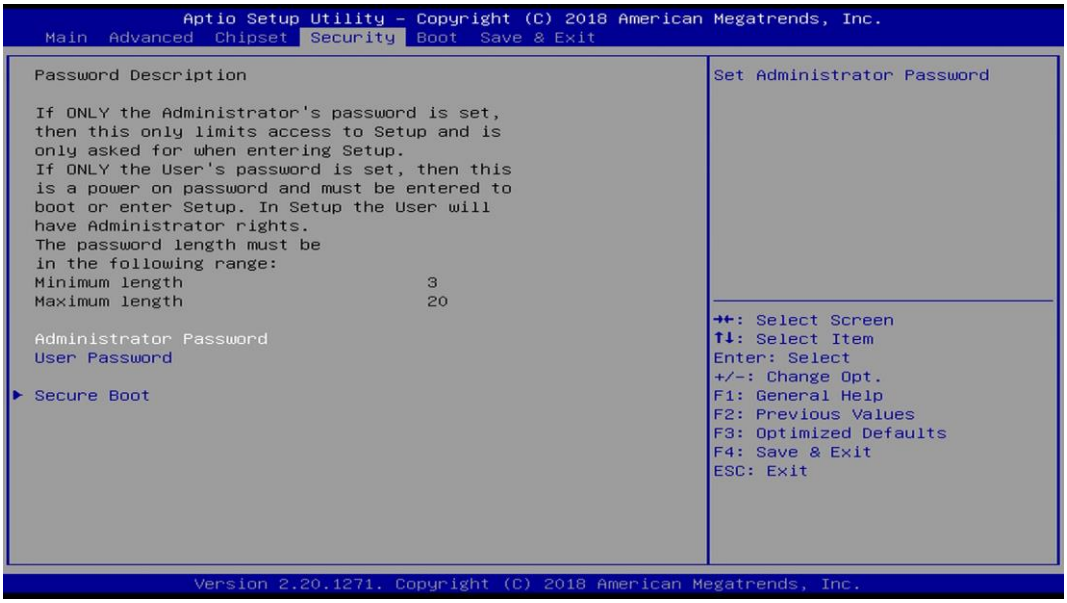
Detect Non-Compliance Device
This item is for user to detect Non-Compliance PCI Express Device in PEG.
The optional settings are: [Disabled]; [Enabled].

► **PCH-IO Configuration**
Press [Enter] to make settings for the following sub-items:
PCH-IO Configuration

HD Audio
This item controls detection of the HD-Audio device.
The optional settings are: [Disabled]; [Enabled].
[**Disabled**]: HDA will be unconditionally disabled.
[**Enabled**]: HAD will be unconditionally enabled.
Onboard Lan1 Controller
Use this item to enable or disable corresponding onboard NIC device or controller.
The optional settings are: [Disabled]; [Enabled].

Onboard Lan2 Controller
Use this item to enable or disable Lan2 onboard NIC device or controller.
The optional settings are: [Disabled]; [Enabled].
PCIE2 Slot
Use this item to control respective PCI Express Root Port.
The optional settings are: [Disabled]; [Enabled].
MPE Slot
Use this item to enable or disable MPE slot function.
The optional settings are: [Disabled]; [Enabled].
Speed
The optional settings are: [Auto]; [Gen1]; [Gen2].
System after G3
Use this item to specify what state to go to when power re-applied after a power failure (G3 state).
The optional settings are: [Always On]; [Always Off]; [Former State].

3-9 Security Menu



Security menu allow users to change administrator password and user password settings.
Administrator Password
If there is no password present on system, please press [Enter] to create new administrator password. If password is present on system, please press [Enter] to verify old password then to clear/change password. Press again to confirm the new administrator password.
User Password
If there is no password present on system, please press [Enter] to create new user password. If password is present on system, please press [Enter] to verify old password then to clear/change password. Press again to confirm the new user password.

- **Secure Boot**
  Press [Enter] to make customized secure settings:

Secure Boot
The optional settings are: [Disabled]; [Enabled].
Secure Boot feature is active if Secure Boot is enabled, Platform Key (PK) is enrolled and the system is in User mode. The mode change requires platform reset.
Secure Boot Mode
The optional settings are: [Standard]; [Custom].
Set UEFI Secure Boot Mode to Standard mode or Custom mode. This change is effective after save. After reset, this mode will return to Standard mode.
In Custom mode, Secure Boot Policy variables can be configured by a physically present user without full authentication.
When set as [Custom**], user can make further settings in the following items that show up:*

- **Restore Factory Keys**

Use this item to force system to User Mode, to install factory default Secure Boot key databases.

- **Reset To Setup Mode**

Use this item to delete all Secure Boot Key databases from NVRAM.

- **Key Management**

This item enables experienced users to modify Secure Boot variables, which includes the following items:
Factory Key Provision
This item is for user to install factory default secure boot keys after the platform reset and while the system is in Setup mode.
The optional settings are: [Disabled]; [Enabled].

- **Restore Factory Keys**

Use this item to force system into User Mode.Install factory default Secure Boot Key databases.

- **Reset to Setup Mode**

Use this item to delete all Secure Boot key databases from NVRAM.

- **Export Secure Boot variables**

Use this item to copy NVRAM content of Secure Boot variables to files in a root folder on a file system device.

- **Enroll Efi Image**

This item allows the image to run in Secure Boot Mode.
Enroll SHA256 Hash certificate of a PE image into Authorized Signature Database (db).
Device Guard Ready

- **Remove 'UEFI CA' from DB**

Device Guard ready system must not list 'Microsoft EFI CA' Certificate in Authorized Signature database (db).

- **Restore DB defaults**

Use this item to restore DB variable to factory defaults.
Secure Boot Variable/Size/Keys/Key Source

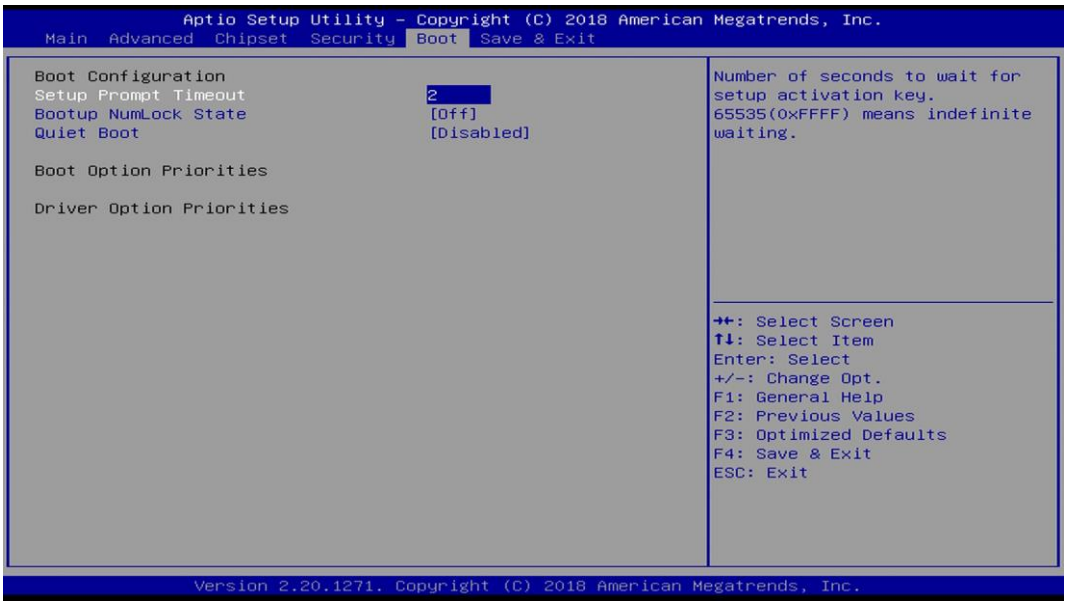
- **Platform Key (PK)/Key Exchange Keys/Authorized Signature/Forbidden Signature/ Authorized TimeStamps/OS Recovery Signatures**

Use this item to enroll Factory Defaults or load the keys from a file with:

1. Public Key Certificate in:
   a) EFI_SIGNATURE_LIST
   b) EFI_ CERT_X509 (DER encoded)
   c) EFI_ CERT_RSA2048 (bin)
   d) EFI_ CERT_SHAXXX (bin)
2. Authenticated UEFI Variable
3. EFI PE/COFF Image (SHA256)

Key Source: Factory, External, Mixed.

3-10 Boot Menu



Boot Configuration

Setup Prompt Timeout

Use this item to set number of seconds to wait for setup activation key.

Bootup Numlock State

Use this item to select keyboard numlock state.

The optional settings are: [On]; [Off].

Quiet Boot

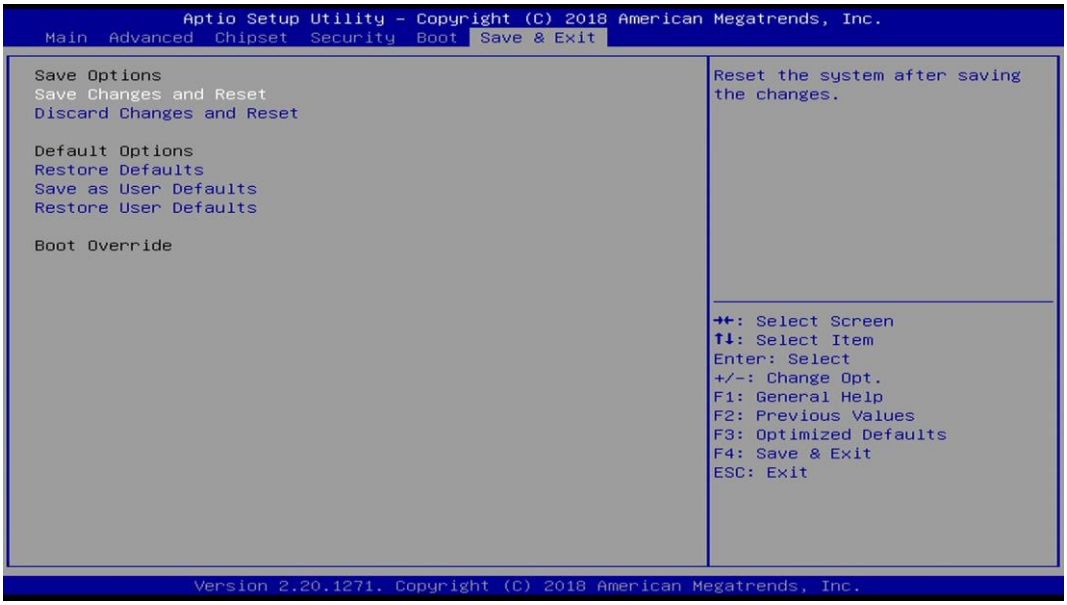
The optional settings are: [Disabled]; [Enabled].

Boot Option Priorities

Boot Option #1/ Boot Option #2…

Use this item to decide system boot order from available options.

3-11 Save & Exit Menu



Save Options

Save Changes and Reset

This item allows user to reset the system after saving the changes.

Discard Changes and Reset

This item allows user to reset the system without saving any changes.

Default Options

Restore Defaults

Use this item to restore /load default values for all the setup options.

Save as User Defaults

Use this item to save the changes done so far as user defaults.

Restore User Defaults

Use this item to restore the user defaults to all the setup options.

Boot Override

UEFI: Built-in EFI Shell

Press this item and a dialogue box shall appear to ask if user wish to save configuration and reset.