NF894 Series

User's Manual

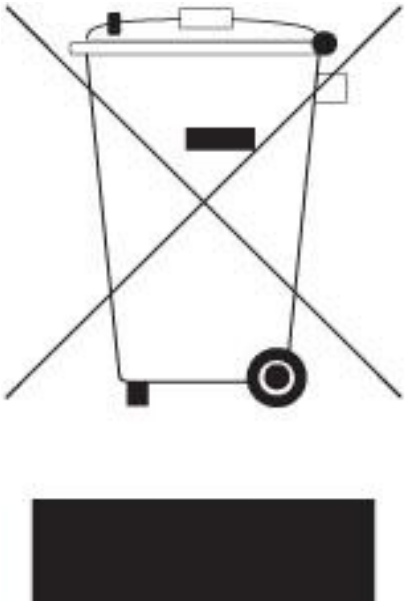
NO. G03-NF894-F

Revision: 5.0

Release date: January 24 2022

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.



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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 temperature comes from the request of the chassis and thermal solution)

- 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.

USER'S NOTICE

Manual Revision Information

Reversion	Revision History	Date
5.0	Fourth Edition	January 24, 2022

Item Checklist

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

Chapter 1
Introduction of the Motherboard

1-1 Feature of Motherboard

- Onboard Intel® Apollo Lake Series Processor, with low power consumption and high performance
- Support 2* DDR3L 1866MHz SO-DIMM with maximum memory capacity up to 8GB
- Onboard 32GB eMMC (Optional)
- Integrated with Intel i211AT Gigabit Ethernet LAN chip
- Integrated with Realtek HD Audio Codec
- Support USB 3.0 data transport demand
- Support 2 * HDMI + 1 * eDP or 1 * LVDS display
- Support 1* PCIE x1slot & 1* full-size Mini-PCIE slot
- Onboard 1 * M.2 M-key (type-2242/2280, SATA interface) slot
- Onboard 1 * SATAIII (6Gb/s) port connector
- Support 9V~36V DC-In
- Support Smart FAN function
- Supports ACPI S3 Function
- Compliance with ErP Standard
- Support Watchdog Timer Technology
- Solution for Industrial Automation, Industrial PPC, KIOSK and Digital Signage

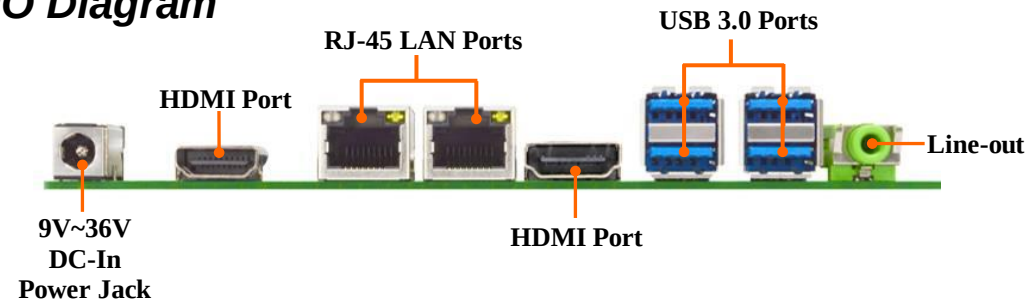
1-2 Specification

Spec	Description
Design	● Mini-ITX form factor; 6-layers; PCB size: 17.0x17.0cm
CPU	● Intel® Apollo Lake series CPU ** for detailed CPU support information please visit our website*
Memory Slot	● 2* DDR3L SO-DIMM slot ● Support DDR3L1866 MHz SDRAM up to 8GB ● Support dual channel function
Expansion Slot	● 1* PCIE x 1 slot (**PCIEX1**) ● 1* Full-size Mini-PCIE slot (**MPE1**) ● 1* SIM card slot (**SIMCARD**)
Storage	● 1* SATA III 6G/s connector (**SATA1**) ● 1* M.2 M-key,type-2242/2280, SATA interface slot (**M2**)
LAN Chip	● Integrated with 2* Intel i211AT Gigabit Ethernet 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* 9V~36V DC-IN power jack ● 2* HDMI port ● 2* RJ-45 LAN port ● 4* USB 3.0 port ● 1* Audio line-out connector ***Internal I/O Connectors, Headers & Wafers:*** ● 1* 2-Pin internal 9V~36V power connector ● 1* CPU FAN connector ● 1* SATA power out connector

	● 1* Front panel header ● 1* Front panel audio header ● 1* 3W Amplifier wafer ● 1* LAN Status LED header ● 1* 9-Pin USB 2.0 header for 2* USB 2.0/1.1 ports ● 1* 4-Pin USB 2.0 header for 1* USB 2.0/1.1 port ● 1* RS232/422/485 serial port header***(COM1)*** ● 5* RS232 serial port header***(COM2/3/4/5/6)*** ● 1* PS2 Keyboard & Mouse header ● 1* SMBUS header ● 1* GPIO header ● 1* EDP wafer ● 1* LVDS header ● 1* LVDS Inverter wafer ● 1*JSIM header

1-3 Layout Diagram

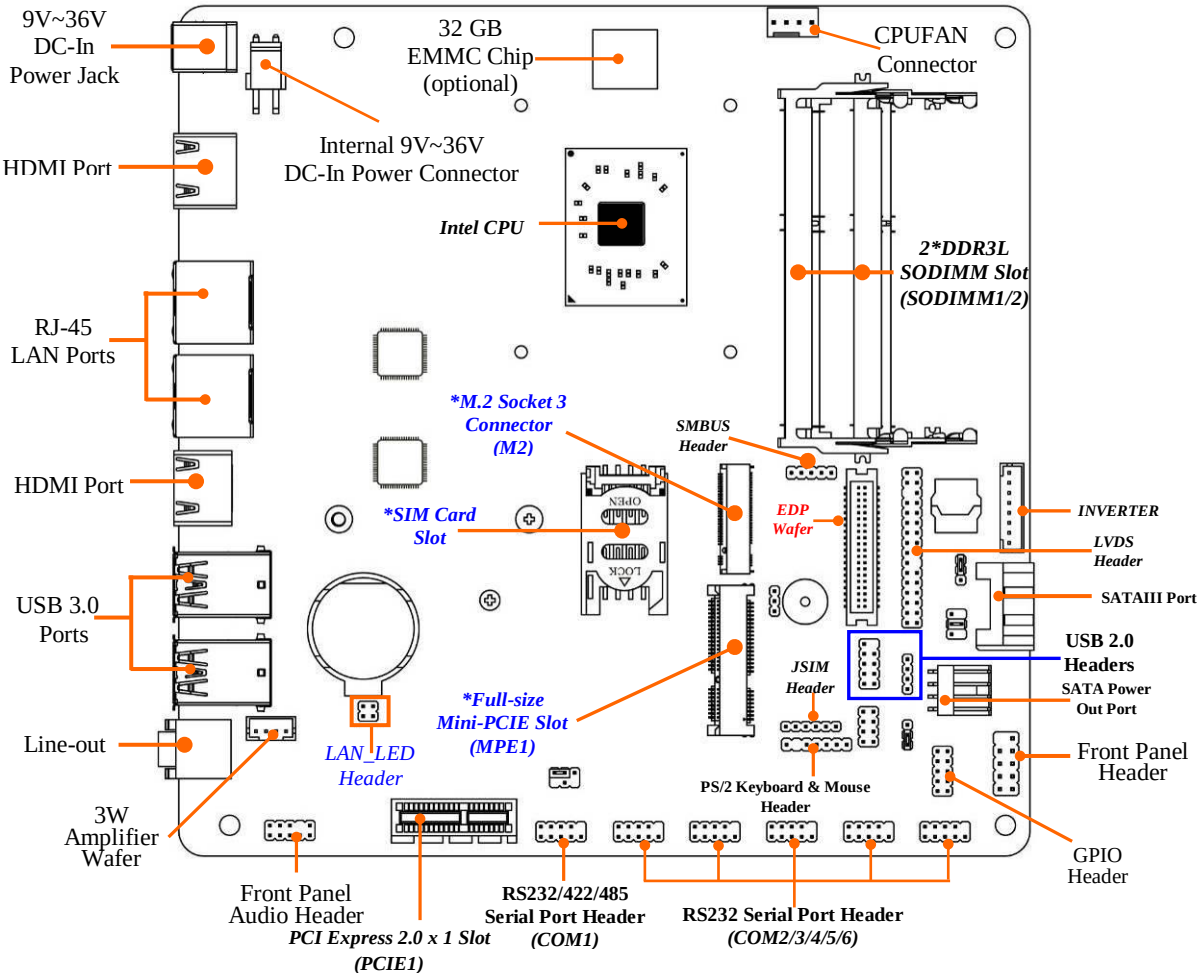
Rear IO Diagram



Warning!!

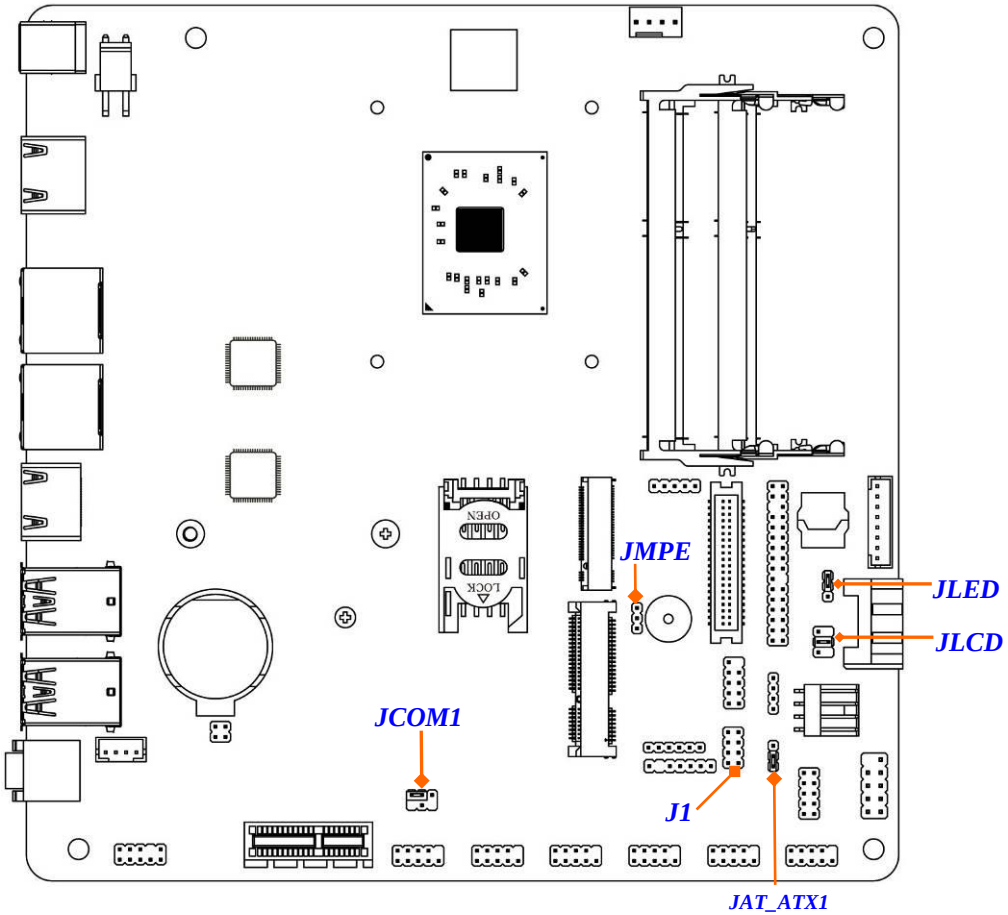
The board has a 9V~36V DC-in power jack **(DCIN3)** in I/O back panel and an internal 9V~36V power connector **(DCIN2)**. User can only connect one type of compatible power supply to one of them to power the system.

Motherboard Internal Diagram



***Note:** **1.** SIM card slot **(SIMCARD/** expansion card drawn from **JSIM** header**)** only work **when** compatible SIM card installed & LAN expansion card installed in the **full-size MPE** slot (**MPE1**); 2. **SIMCARD** and **JSIM** is optional, i.e., only one can work at the same time.*

Motherboard Jumper Position



Connectors

Connector	Name
DCIN3	9V~36V DC–in Power Jack
HDMI2/HDMI1	HDMI Port Connector X2
LAN1/ LAN 2	RJ-45 LAN Connector X2
USB30-1/ USB30-2	USB 3.0 Port Connector X2
FP_HP	Audio Line-out Port
DCIN2	2-Pin Internal 9V~36V DC-in Power Connector
SATA1	SATAIII Connector
SATAPWR1	SATA Power out Connector
CPUFAN1	CPU FAN Connector

Headers

Header	Name	Description
JW_FP	Front Panel Header(PWR LED/ HD LED/Power Button /Reset)	9-pin Block
FP_AUDIO	Front Panel Audio Header	9-pin Block
AMP_SPK1	3W Amplifier Wafer	4-pin Block
JLANLED	LAN Activity Status LED Header	4-pin Block
FP_USB20-1	USB2.0 Port Header	4-pin Block
FP_USB20-2	USB2.0 Port Header	9-pin Block
COM1	RS232/422/485 Serial Port Header	9-pin Block
COM2/3/4/5/6	RS232 Serial Port Header	9-pin Block
PS2KBMS	PS2 Keyboard & Mouse Port Header	6-pin Block
SMBUS	SMBUS Header	5-pin Block
GPIO_CON	GPIO Port Header	10-pin Block
EDP	EDP Wafer	40-pin Block
LVDS	LVDS Port Header	32-pin Block
INVERTER	LVDS Inverter Header	8-pin Block
JSIM	SIM Card Expansion Header	6-pin Block

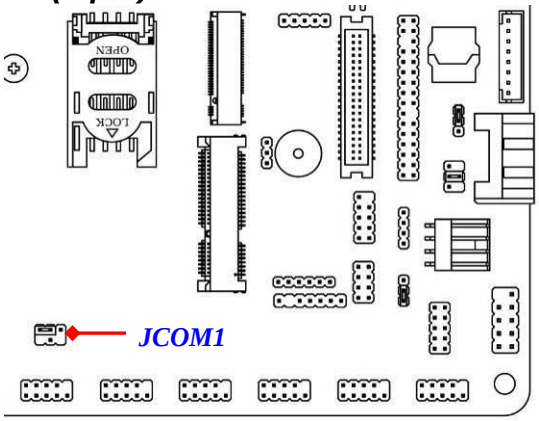
Jumper

Jumper	Name	Description
JCOM1	COM1 Port Pin9 Function Select	4-pin Block
JLCD	LCD Panel VCC Select	4-pin Block
JLED	Inverter Backlight VCC Select	3-pin Block
JMPE	MPE1 Slot VCC Select	3-pin Block
JAT_ATX1	ATX/AT Mode Select	3-pin Block
J1	***Pin (1-2):*** Clear CMOS RAM Settings ***Pin (3-4):*** RTC Reset ***Pin (5-6):*** TXE Override ***Pin (7-8):*** Case Open Function	8-pin Block

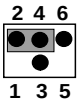
Chapter 2
Hardware Installation

2-1 Jumper Setting

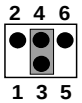
JCOM1 (4-pin): COM1 Port Pin9 Function Select



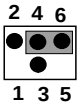
JCOM1→COM1 Port Pin-9



2-4 Closed:
RI=RS232(Default);

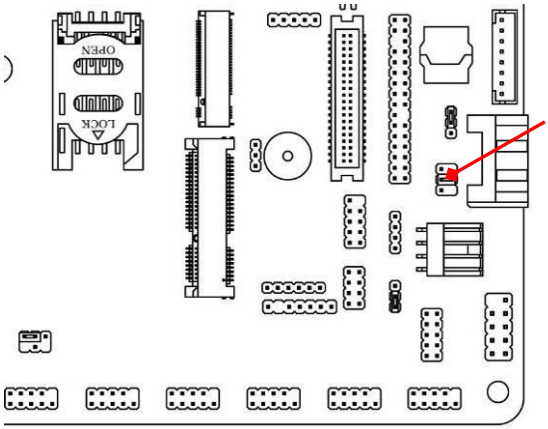


3-4 Closed:
RI= 5V;

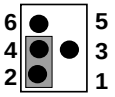


4-6 Closed:
RI= 12V.

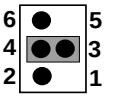
JLCD (4-pin): LCD Panel VCC Select



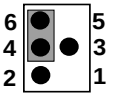
JLCD→LCD Panel VCC Select



2-4 Closed: VCC=3.3V;

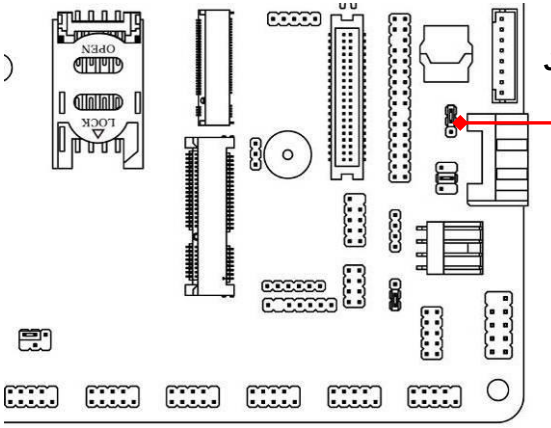


3-4 Closed: VCC= 5V;

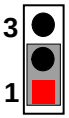


4-6 Closed: VCC= 12V.

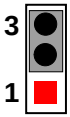
JLED (3-pin): LCD Backlight VCC Select



JLED→Inverter Backlight VCC Select

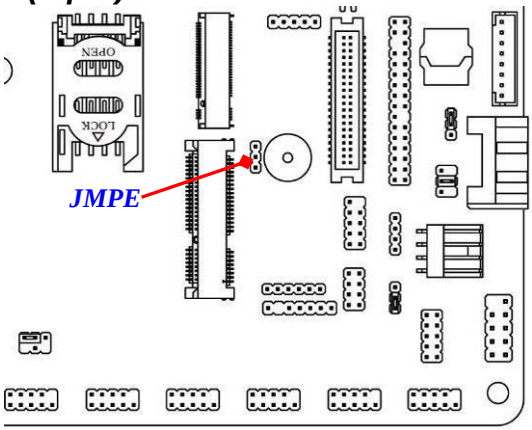


1-2 Closed: Inverter 5V Selected;

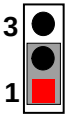


2-3 Closed: Inverter 12V Selected

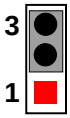
JMPE (3-pin): MPE1 Slot VCC Select



JMPE→MPE1 Slot Power VCC Select

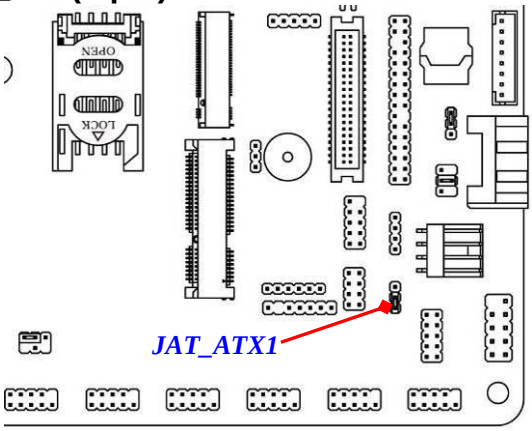


1-2 Closed: MPE Slot Power VCC= 3.3V;

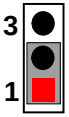


2-3 Closed: MPE Slot Power VCC= 3.3VSB.

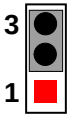
JAT_AT1(3-pin): ATX Mode/ AT Mode Select



JAT_ATX1→ATX/AT Mode Select



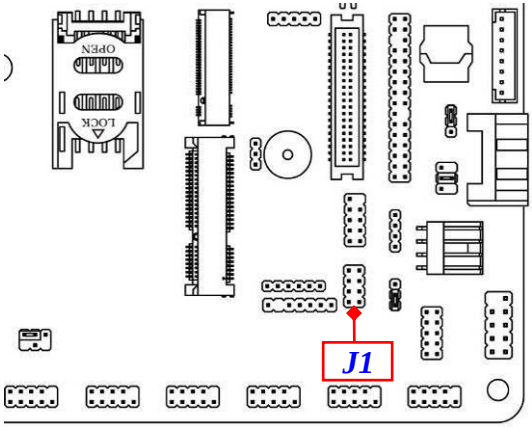
1-2 Closed: ATX Mode Selected;



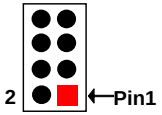
2-3 Closed: AT Mode Selected.

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

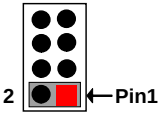
Pin 1&2 of J1(8-pin): Clear CMOS RAM Setting



Pin 1&2 of J1→Clear CMOS

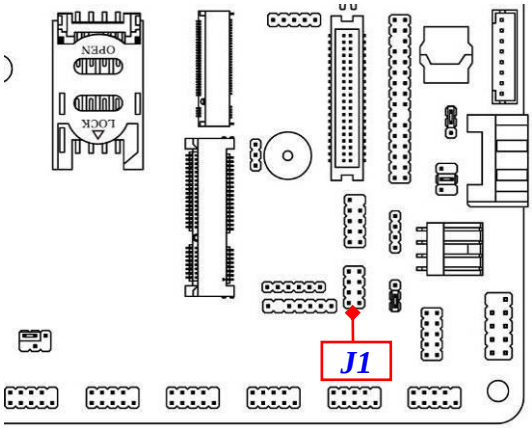


1-2 Open: Normal(Default);

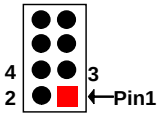


1-2 Closed: Clear CMOS(One Touch).

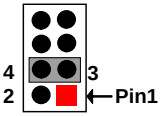
Pin 3&4 of J1(8-pin): RTC Reset



Pin 3&4 of J1→RTC Reset

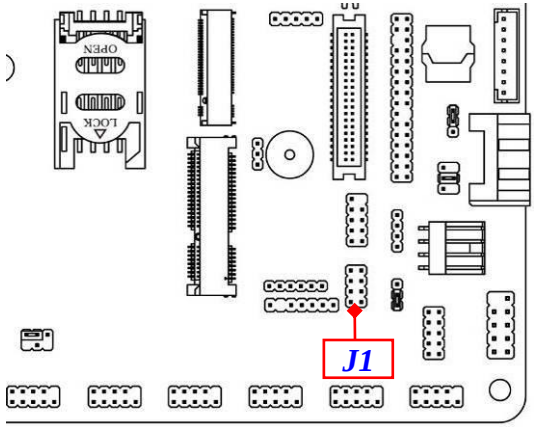


3-4 Open: Normal(Default);

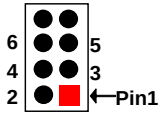


3-4 Closed: RTC Reset(One Touch).

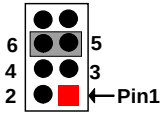
Pin 5&6 of J1(8-pin): TXE Override



Pin 5&6 of J1→TXE Override

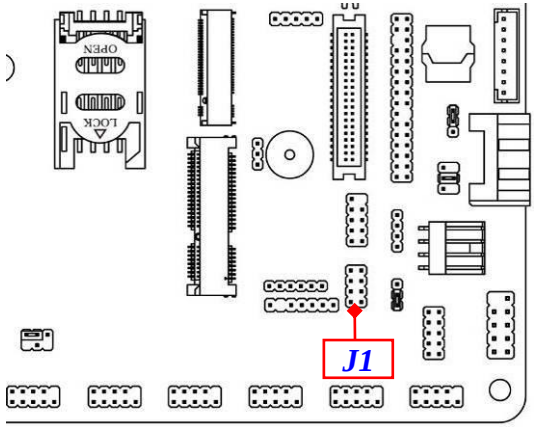


3-4 Open: Normal(Default);

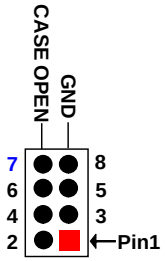


3-4 Closed: TXE Override.

Pin 7&8 of J1(8-pin): Case Open Detection Select



Pin 7&8 of J1→Case Open Detection



Pin (7&8) Closed: *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.*

2-2 Connectors, Headers and Wafers

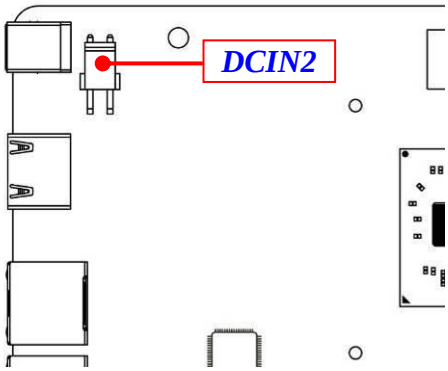
2-2-1 Connectors

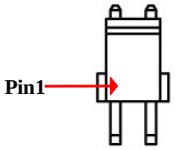
(1) Rear Panel Connectors

***refer to Page-3.**

Icon	*Name*	*Function*
	**DC-In Power Jack**	9V~36V DC–in system power connector For user to connect compatible power adapter to provide power supply for the system.
	**HDMI Port**	To connect display device that support HDMI specification.
	**RJ-45 LAN Port**	This connector is standard RJ-45 LAN jack for Network connection.
	**USB 3.0 Port**	To connect USB keyboard, mouse or other devices compatible with USB specification. USB 3.0 ports supports up to 5Gbps data transfer rate.
	**Line-Out**	This connector can functions as audio Line-Out jack and MIC jack with compatible cables & devices.

(2) DCIN2 (2-pin): Internal 9V~36V DC-in power connector





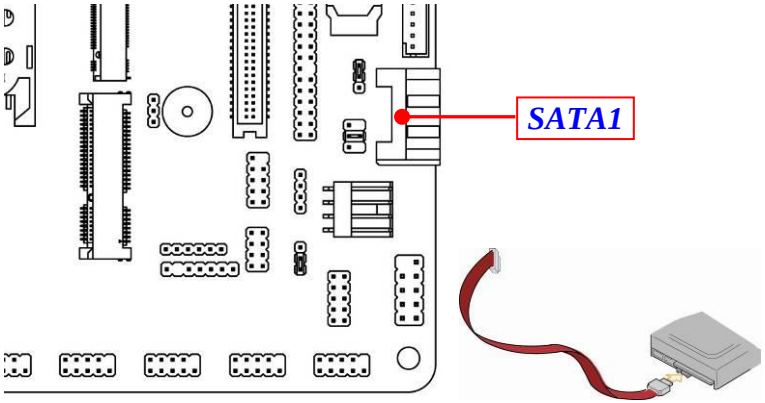
Pin No.	Definition
1	9V~36V DC_IN
2	GND

Warning!!

The board has a 9V~36V DC-in power jack **(DCIN3)** in I/O back panel and an internal 9V~36V power connector **(DCIN2)**. User can only connect one type of compatible power supply to one of them to power the system.

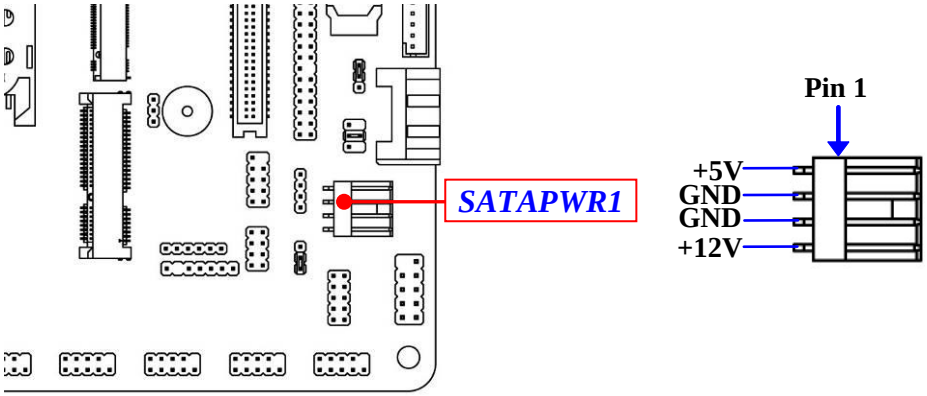
(3) SATA1 (7-pin block):SATAIII Port connector

This connector is a high-speed SATAIII port that supports 6 GB/s transfer rate.

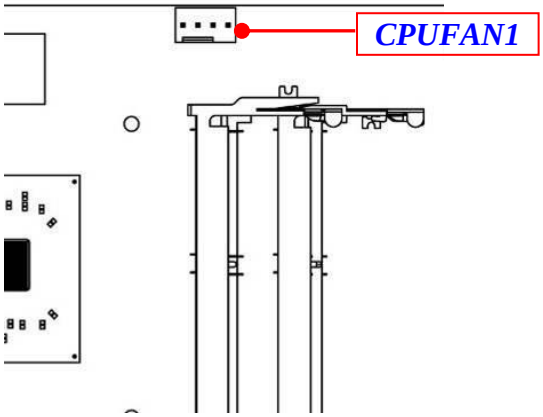


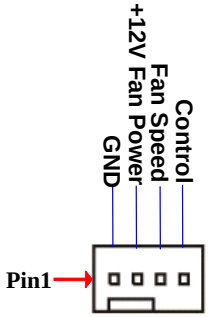
Pin No.	Definition
1	GND
2	TXP
3	TXN
4	GND
5	RXN
6	RXP
7	GND

(4) SATAPWR1 (4-pin) : SATA Power-out Connector



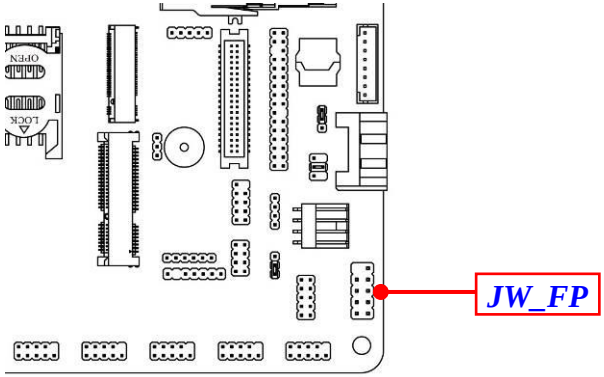
(5) CPUFAN1 (4-pin): CPU FAN Connector

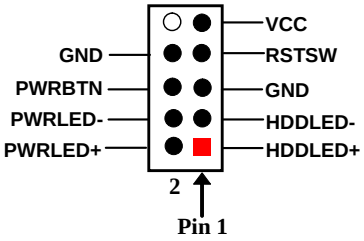




2-2-2 Headers & Wafers

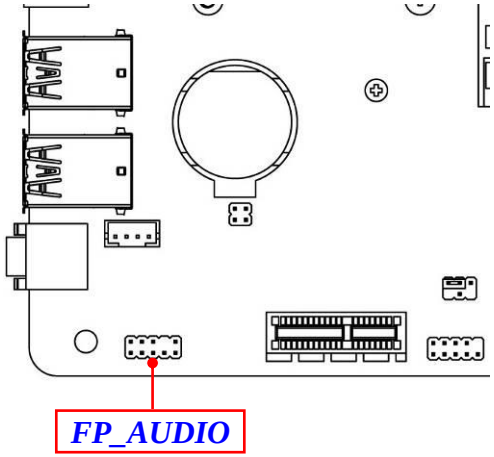
(1) JW_FP (9-pin): Front Panel Header

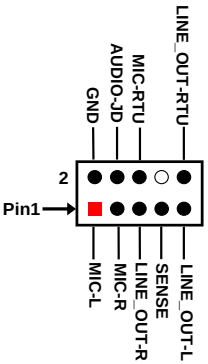




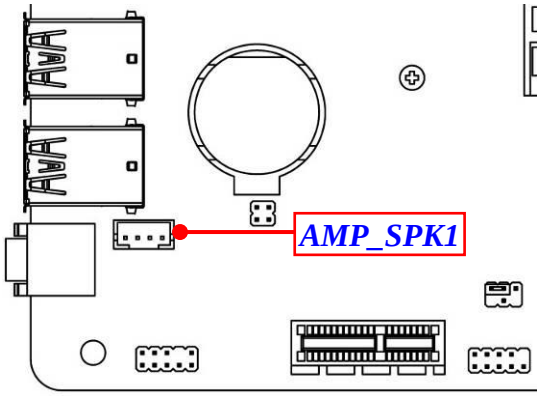
(2) FP_AUDIO (9-pin): Line-Out, MIC-In Header

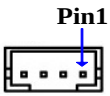
This header connects to Front Panel Line-out, MIC-In connector with cable.





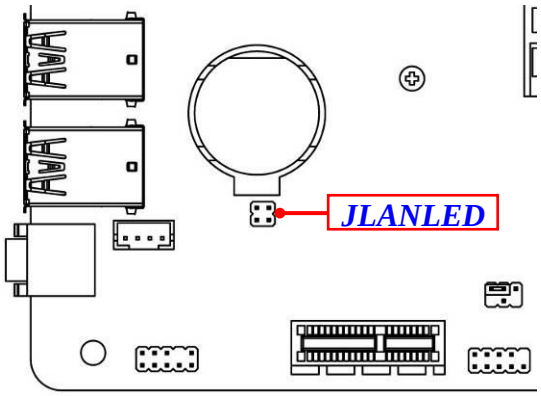
(3) AMP_SPK1 (4-pin): 3W Amplifier Wafer

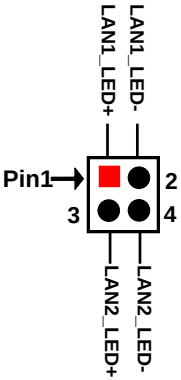




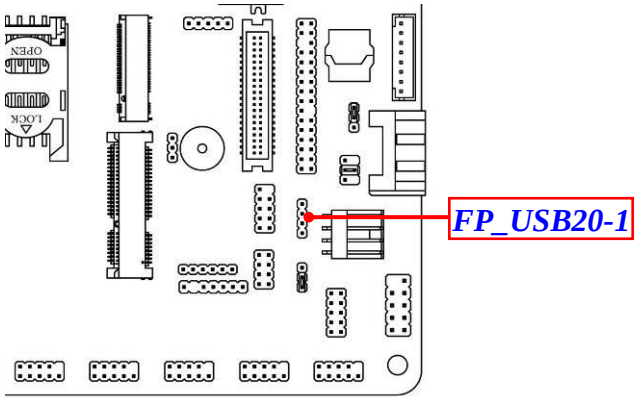
Pin No.	Definition
1	L-
2	L+
3	R+
4	R-

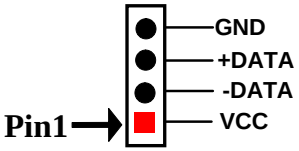
(4) JLANLED (4-pin): LAN Activity LED Headers



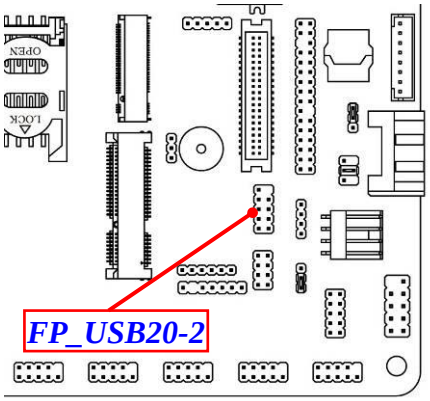


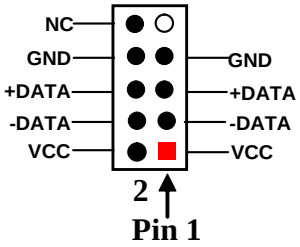
(5) FP_USB20-1(4-pin): USB 2.0 Port Header



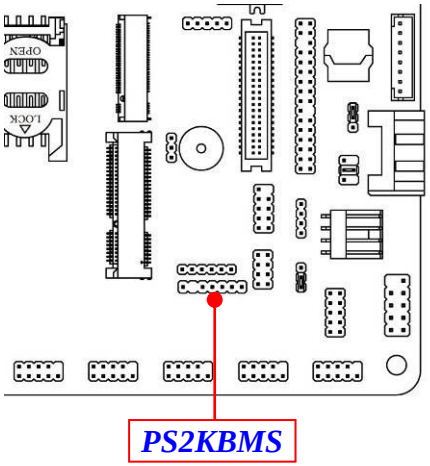


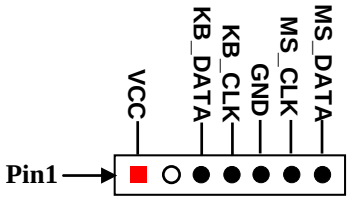
(6) FP_USB20-2 (9-pin): USB 2.0 Port Header





(7) PS2KBMS (6-pin): PS/2 Keyboard & Mouse Port Header

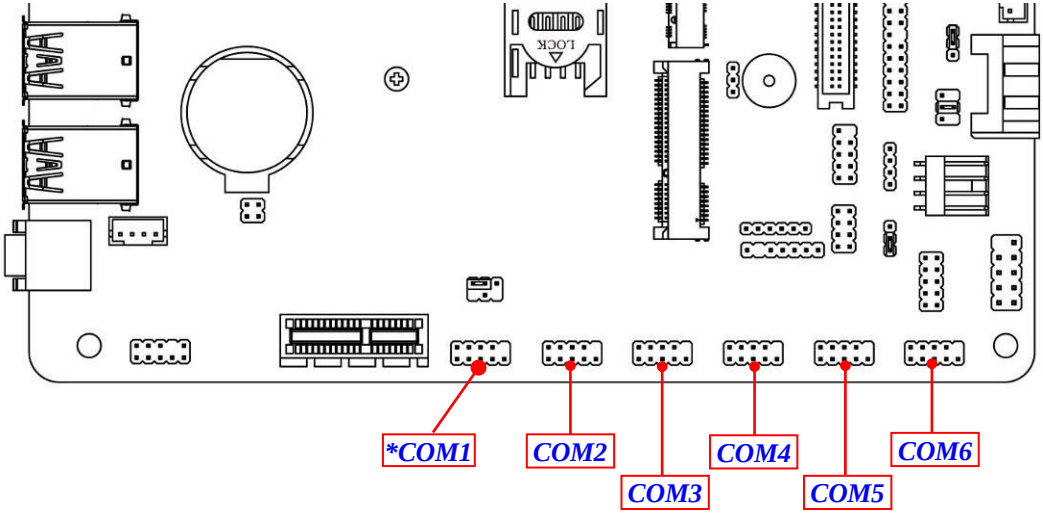


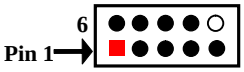


(8) COM1/2/3/4/5/6 (9-pin): Serial Port Header

COM1：RS232/422/485 Serial Port Header;

COM2/3/4/5/6：RS232 Serial Port Header.

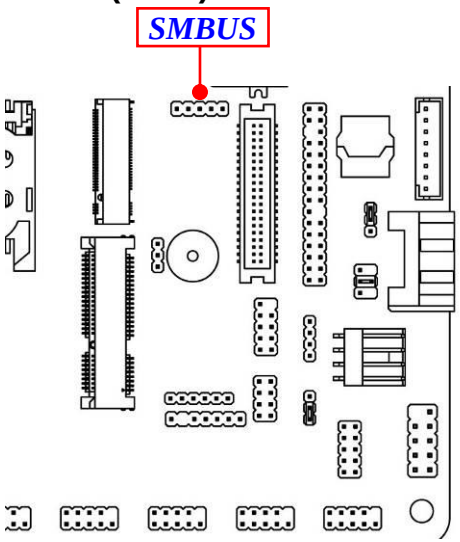


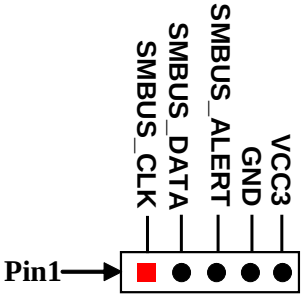


Pin NO.	RS232	*RS422	*RS485
Pin 1	DCD	TX-	DATA-
Pin 2	**RXD**	TX+	DATA+
Pin 3	**TXD**	RX+	NC
Pin 4	DTR	RX-	NC
Pin 5	GND	GND	GND
Pin 6	DSR	NC	NC
Pin 7	RTS	NC	NC
Pin 8	CTS	NC	NC
Pin 9	RI	NC	NC

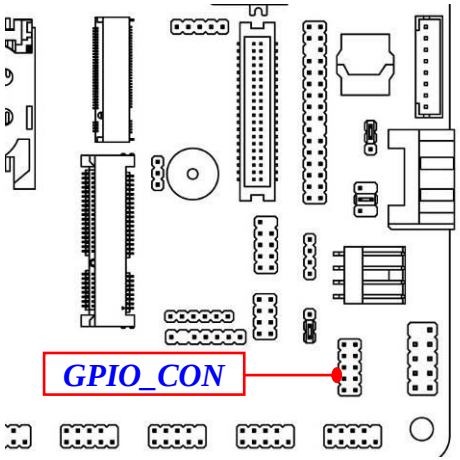
***Note:** In the case that COM1 header supports RS422, RS485 function, besides connecting compatible COM cable for RS422 or RS 485 function, user also needs to go to BIOS to set corresponding '**Transmission Mode Select'** for COM1 (refer to Page-28).*

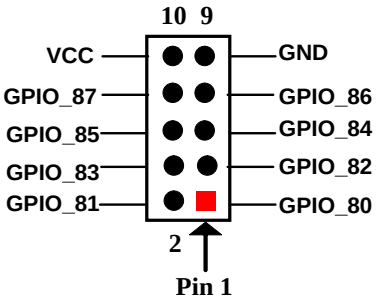
(9) SMBUS (5-Pin): SMBUS Header



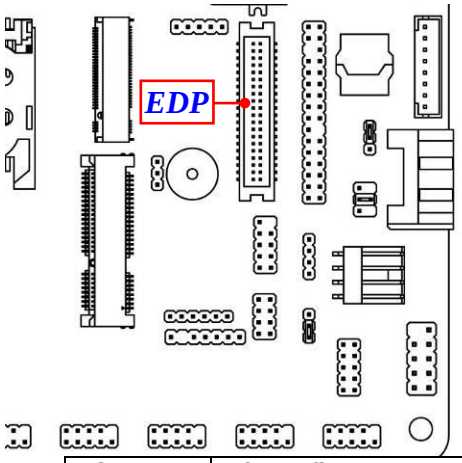


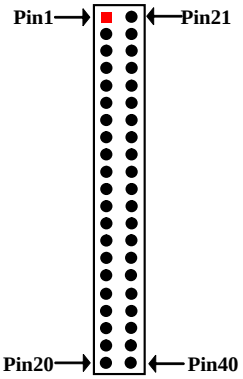
(10) GPIO_CON(10-pin): GPIO Port Header





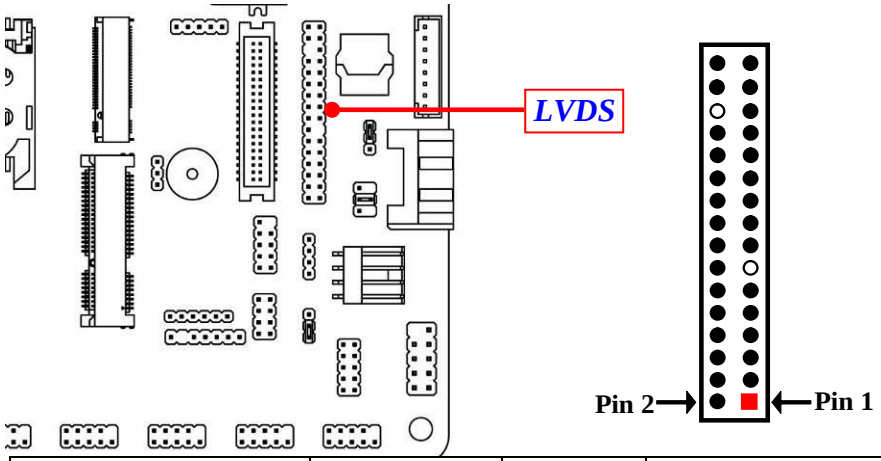
(11) EDP (40-pin): 4-Lane EDP Wafer





Pin NO.	Pin Define	Pin NO.	Pin Define
Pin 1	NC	Pin 21	NC
Pin 2	GND	Pin 22	NC
Pin 3	Lane3_N	Pin 23	GND
Pin 4	Lane3_P	Pin 24	GND
Pin 5	GND	Pin 25	GND
Pin 6	Lane2_N	Pin 26	GND
Pin 7	Lane2_P	Pin 27	HPD
Pin 8	GND	Pin 28	GND
Pin 9	Lane1_N	Pin 29	GND
Pin 10	Lane1_P	Pin 30	GND
Pin 11	GND	Pin 31	GND
Pin 12	Lane0_N	Pin 32	BL_ENABLE
Pin 13	Lane0_P	Pin 33	BL_PWM_DIM
Pin 14	GND	Pin 34	NC
Pin 15	AUX_CH_P	Pin 35	NC
Pin 16	AUX_CH_N	Pin 36	BL_PWR
Pin 17	GND	Pin 37	BL_PWR
Pin 18	LCD_VCC	Pin 38	BL_PWR
Pin 19	LCD_VCC	Pin 39	BL_PWR
Pin 20	LCD_VCC	Pin 40	NC

(12) LVDS (32-Pin): 24-bit dual channel LVDS Header

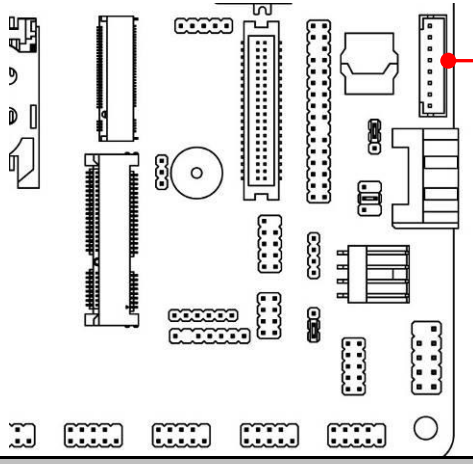


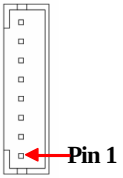
Pin Define	Pin NO.	Pin NO.	Pin Define
GND	Pin 32	Pin 31	GND
LCD_VCC	Pin 30	Pin 29	LCD_VCC
XX	Pin 28	Pin 27	LCD_VCC
LVDSA -DATAN0	Pin 26	Pin 25	LVDSA-DATAP0
LVDSA -DATAN1	Pin 24	Pin 23	LVDSA-DATAP1
LVDSA -DATAN2	Pin 22	Pin 21	LVDSA-DATAP2
LVDSA -CLKN	Pin 20	Pin 19	LVDSA -CLKP
LVDSA -DATAN3	Pin 18	Pin 17	LVDSA -DATAP3
GND	Pin 16	Pin 15	GND
GND	Pin 14	Pin 13	XX
NC	Pin 12	Pin 11	NC
LVDSB -DATAP0	Pin 10	Pin 9	LVDSB -DATAN0
LVDSB -DATAP1	Pin 8	Pin 7	LVDSB -DATAN1
LVDSB -DATAP2	Pin 6	Pin 5	LVDSB -DATAN2
LVDSB -CLKP	Pin 4	Pin 3	LVDSB -CLKN
LVDSB -DATAP3	Pin 2	Pin 1	LVDSB -DATAN3

***Note:** User can choose between LVDS and EDP display options, but **only one of them can function at the same time**. Before connecting compatible cable to corresponding header/wafer, user should go*

*to BIOS settings→**Chipset**→ **Uncore Configuration**→ **Active LFP**, and set it as **[LVDS]** or **[EDP]** based on actual configuration.*

(13) INVERTER (8-Pin): LVDS Inverter



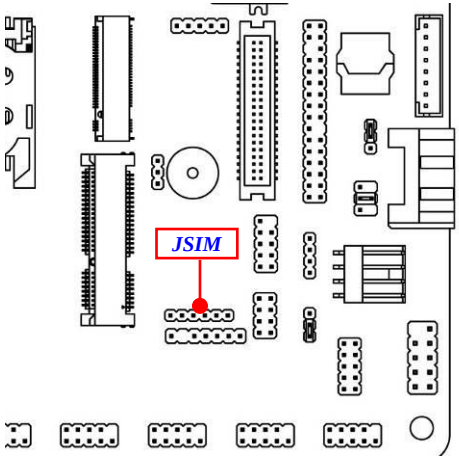


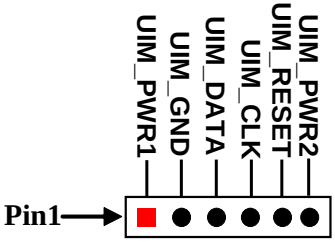
INVERTER

Pin No.	Definition
1	Backlight Enable
2	Backlight Duty
3	Backlight Power
4	Backlight Power
5	GND
6	GND
7	Backlight+ SW
8	Backlight- SW

***Warning!** Find Pin-1 location of the inverter and make sure that the installation direction is correct! Otherwise serious harm will occur to the board/display panel!!*

(14) JSIM(6-Pin): SIM Card Expansion Header





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.

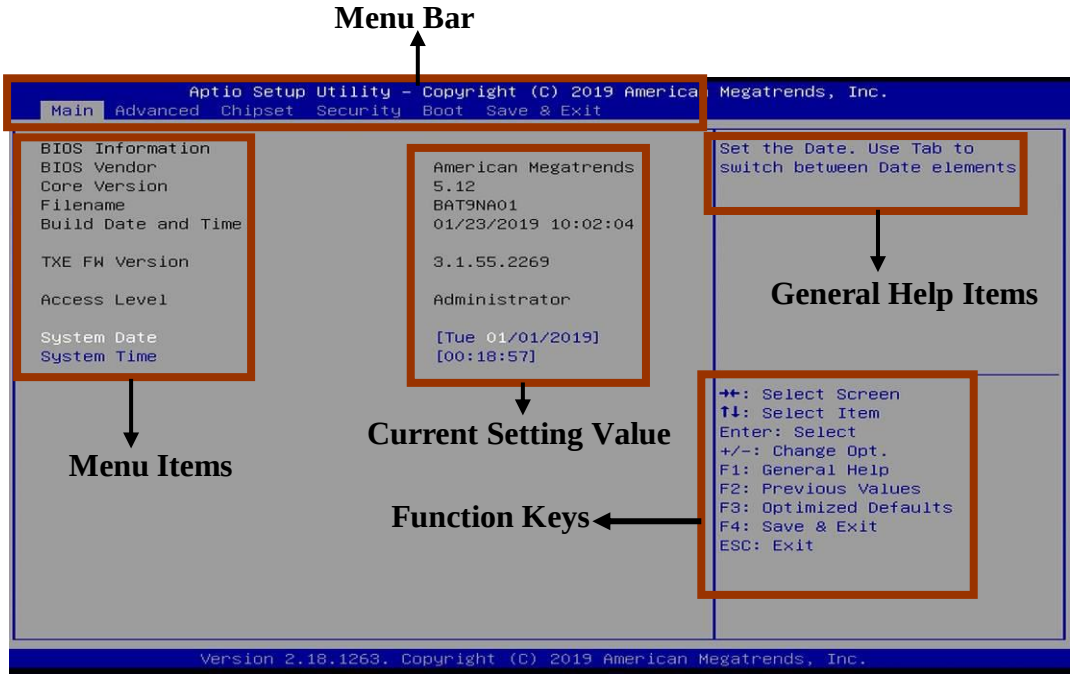
3-1 Entering Setup

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 Popup Menu.

3-2 BIOS Menu Screen

The following diagram show a general 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 value.
- [F3]: Optimized defaults.
- [F4]: Save & Exit.
- Press <Esc> to quit the 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

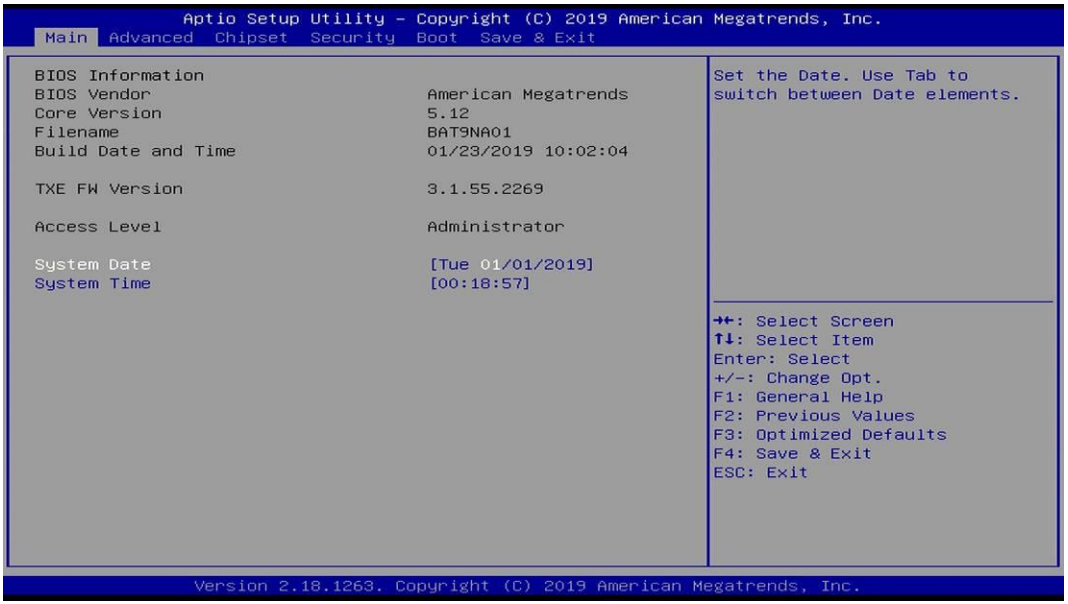
There are six menu bars on top of BIOS screen:

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.



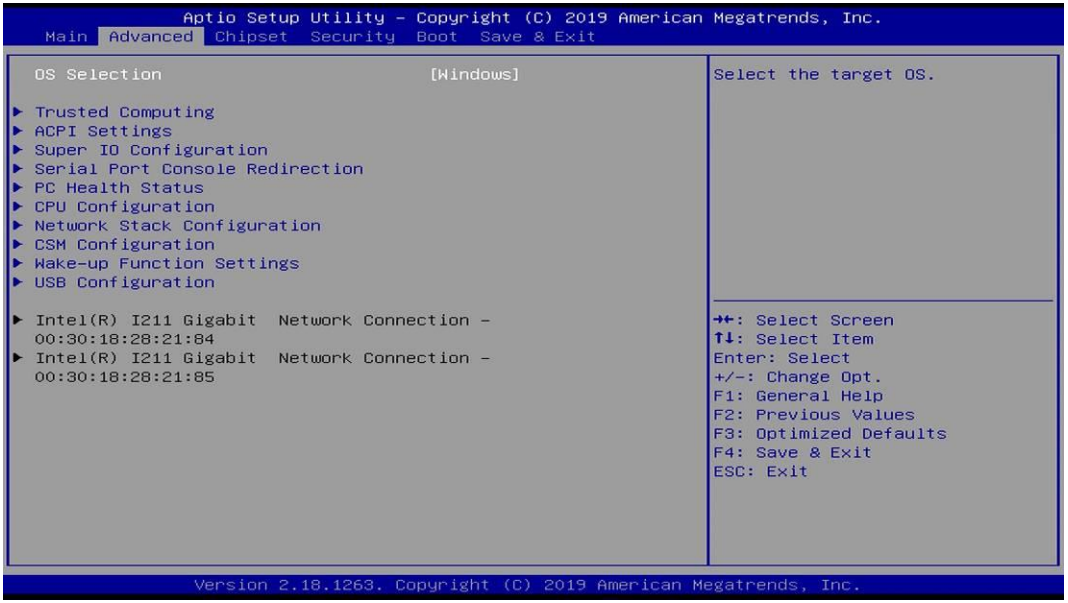
System Date

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



OS Selection

The optional settings: [Windows]; [Intel Linux]; [MSDOS].

**** Note:** User need to go to this item to select the OS mode before installing corresponding OS driver, otherwise problems will occur when installing the driver.*

► **Trusted Computing**

Press [Enter] to enable or disable '**Security Device Support**'.

Configuration

Security Device Support

Use this item to enable or disable BIOS support for security device.

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

► **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)].

► **Super I/O Configuration**
Press [Enter] to make settings for the following sub-items:
Super IO Configuration

► **Serial Port 1 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].
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 2 Configuration/Serial Port 3 Configuration/Serial Port 4 Configuration/Serial Port 5 Configuration/Serial Port 6 Configuration**
Press [Enter] to make settings for the following sub-items:
Serial Port
Use this item to enable or disable serial port (COM).
The optional settings are: [Disabled]; [Enabled].
Change Settings
Use this item to select an optimal setting for super IO device. **Changing setting may conflict with system resources.**

ERP Support
The optional settings: [Disabled]; [Enabled].
This item should be set as [**Disabled**] if you wish to have all active wake-up functions.

Case Open Detect
Use this item to detect case has already open or not, show message in POST.
The optional settings: [Disabled]; [Enabled].
When set as [Enabled], system will detect if COPEN has been short or not (refer to Page 11); if **Pin 7&8 of J1** is short, system will show Case Open Message during POST.

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 select a value in the range of [10] to [255] seconds when '**WatchDog Reset Timer Unit**' set as [Sec]; or in the range of [1] to [255] minutes when '**WatchDog Reset Timer Unit**' set as [Min].

WatchDog Reset Timer Unit
The optional settings are: [Sec.]; [Min.].

WatchDog Wake-up Timer
This item support WDT wake-up.
The optional settings are: [Enabled]; [Disabled].
When set as [Enabled], the following sub-items shall appear:

WatchDog Wake-up Timer Value
User can select a value in the range of [10] to [4095] seconds when '**WatchDog Wake-up Timer Unit**' set as [Sec]; or in the range of [1] to [4095] minutes when '**WatchDog Wake-up Timer Unit**' set as [Min].

WatchDog Wake-up 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 9***, jumper **JATX_AT1** for ATX Mode & AT Mode Select).

- **Serial Port Console Redirection**

COM1

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:

Terminal Type

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

Emulation: 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; ANSI: Extended ASCII char set.

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]; [38400]; [57600]; [115200].

Data Bits

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

Parity

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

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

Even: parity bit is 0 if the data bits is odd; 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: [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: [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: [Disabled]; [Enabled].

Recorder Mode

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

Resolution 100x31

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

Legacy OS Redirection Resolution

On Legacy OS, the Number of Rows and Columns supported redirection.
The optional settings: [80x24]; [80x25].

Putty KeyPad

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

Redirection After BIOS POST

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

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

The optional setting is: [COM1].

Terminal Type

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

Emulation: 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; ANSI: Extended ASCII char set.

VT-UTF8 is the preferred terminal type for out-of-band management. The next best choice is VT100+ and them VT100.

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.*

► **PC Health Status**

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

► **SmartFAN Configuration**

Press [Enter] to make settings for SmartFan Configuration:

SmartFAN Configuration

CPUFAN Smart Mode

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

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

CPUFAN Full-Speed Temperature

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

CPUFAN Full-Speed Duty

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

CPUFAN Idle-Speed Temperature

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

CPUFAN Idle-Speed Duty

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

► **CPU Configuration**

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

VT-d

Use this item to enable or disable CPU VT-d.

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

EIST

Use this item to enable or disable Intel SpeedStep.

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

C-States

Use this item to enable or disable C-State.

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

Enhanced C-states

Use this item to enable or disable C1E. When enabled, CPU will switch to minimum speed when all cores enter C-state.

Max Core CStates

Use this option to controls the max Core C state that cores will support.

The optional settings are: [Fused value]; [Core C10]; [Core C9]; [Core C8]; [Core C 7]; [Core C6]; [Core C1]; [Unlimited].

- **Network Stack Configuration**

Press [Enter] to go to '**Network Stack**' screen to make further settings.

Network Stack

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

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 optional will not be created.

Ipv6 PXE Support

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

Use this item to enable Ipv6 PXE Boot Support. When set as [Disabled], Ipv6 boot optional will not be created.

PXE Boot Wait Time

Use this item to set wait time to press [ESC] key to abort the PXE boot.

Media Detect Count

Use this item to set number of times presence of media will be checked.

The optional settings range from [1] to [50].

- **CSM Configuration**

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

Compatibility Support Module Configuraton

Boot option filter

This item controls Legacy/UEFI ROMs priority.

The optional settings are: [UEFI and Legacy]; [Legacy only]; [UEFI only].

Network

This item controls the execution of UEFI and Legacy PXE OpROM.

The optional settings are: [Do not launch]; [UEFI]; [Legacy].

Storage

This item controls the execution of UEFI and Legacy Storage OpROM.

The optional settings are: [Do not launch]; [UEFI]; [Legacy].

Video

This item controls the execution of UEFI and Legacy Video OpROM.

The optional settings are: [UEFI]; [Legacy].

Other PCI devices

This item determines OpROM execution policy for devices other than Network, storage or video.

The optional settings are: [Do not launch]; [UEFI]; [Legacy].

► **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: [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 minutes.

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

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

PS2 KB/MS Wake-Up from S3-S5

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

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

******Note****: PS2 KB/MS Wake-up is affected by ERP function in S4-S5. Please disable ERP before activating this function in S4-S5.*

EXT-USB Power Gating in S4-S5

Use this item to enable or disable external USB wakeup from S3/S4.

******Note****: USB Wake-up is affected by ERP function in S4. Please disable ERP before activating this function in S4.*

INT-USB Power Gating in S4-S5

Use this item to enable or disable internal USB S3/S4 wakeup from S3/S4
**Note: USB Wake-up is affected by ERP function in S4. Please disable ERP before activating this function in S4.*

- **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

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.
The optional settings: [Auto]; [Manual].
'Auto' uses default value: for a root port it is 100 ms, for a hub port the delay is taken from hub descriptor.
Select [Manual] you can set value for the following sub-item: '**Device Power-up Delay in Seconds'.**

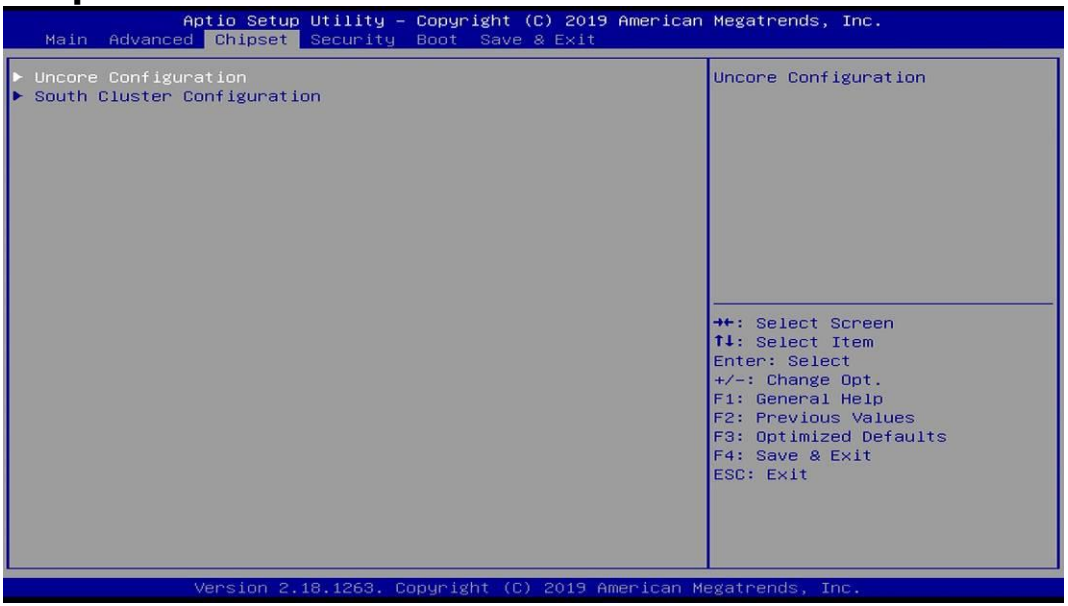
Device Power-up Delay in Seconds

The delay range is from [1] to [40] seconds, in one second increments.

► **Intel(R) I211 Gigabit Network Connection-XX:XX:XX:XX:XX:XX/ Intel(R) I211 Gigabit Network Connection-XX:XX:XX:XX:XX:XX**

These items show current network brief information.

3-8 Chipset Menu



► **Uncore Configuration**

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

GTT Size

The optional settings are: [2MB]; [4MB]; [8MB].

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: [64M]; [96M]; [128M]; [160M]; [192M]; [224M]; [256M]; [288M]; [320M]; [352M]; [384M]; [416M]; [448M]; [480M]; [512M].

DVMT Total Gfx Mem

Use this item to select DVMT 5.0 total graphics memory size used by the internal

graphics device.
The optional settings are: [128M]; [256M]; [MAX].

Active LFP

Use this item to select the active configuration.
The optional settings are: [Disabled]; [LVDS]; [eDP].

***Note:** When set as **[LVDS]**, user can make further settings in '**LVDS Panel Type**' and '**LVDS FW Protect**':*

LVDS Panel Type

Use this item to select LCD panel used by Internal Graphics Device by selecting the appropriate setup item.
The optional settings are: [800 x 480 1ch 18bit]; [800 x 600 1ch 18bit]; [800 x 600 1ch 24bit]; [1024 x 600 1ch 18bit]; [1024 x 768 1ch 18bit]; [1024 x 768 1ch 24bit]; [1280 x 768 1ch 24bit]; [1280 x 800 1ch 18bit]; [1280 x 800 1ch 24bit]; [1366 x 768 1ch 18bit]; [1366 x 768 1ch 24bit]; [1440 x 900 2ch 18bit]; ; [1440 x 900 2ch 24bit]; [1280 x 1024 2ch 24bit]; [1680 x 1050 2ch 24bit]; [1920 x 1080 2ch 24bit].

LVDS FW Protect

Use this item to set LVDS FW Protect function.
The optional settings are: [Enabled]; [Disabled].

***Note:** When set as **[LVDS] or [eDP]** , user can make further settings in '**GMCH BLC Control**':*

GMCH BLC Control

Use this item to set backlight control settings.
The optional settings are: [PWM-Inverted]; [PWM-Normal].

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. Secondary boot display selection will appear based on your selection.
The optional settings are: [Auto]; [LFP]; [HDMI1]; [HDMI2].

Secondary IGFX Boot Display

Use this item to select Secondary Display Device.
The optional settings are: [Disabled]; [HDMI1]; [HDMI2].

Memory Configuration

The working memory information will be on display.

► **South Cluster Configuration**

▸ **PCI Express Configuration**

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

PCI Express Configuration

Peer Memory Write Enable

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

Compliance Mode

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

▸ **SATA Configuration**

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

SATA Controller

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

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

SATA Mode Selection

Use this item to determine how SATA controller(s) operate.

The default setting is: [AHCI].

SATA Port

SATA Port

Use this item to enable or disable each SATA port.

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

M.2

M.2

Use this item to enable or disable M.2 SATA port.

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

HD-Audio Support

Use this item to enable or disable HD-Audio Support.

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

SCC eMMC Support

Use this item to enable or disable SCC eMMC Support.

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

***Note: 'SCC eMMC Support' item is optional for boards with EMMC integrated.*

eMMC Max Speed

Use this item to select the eMMC max speed allowed.

The optional settings are: [HS400]; [HS200]; [DDR50].

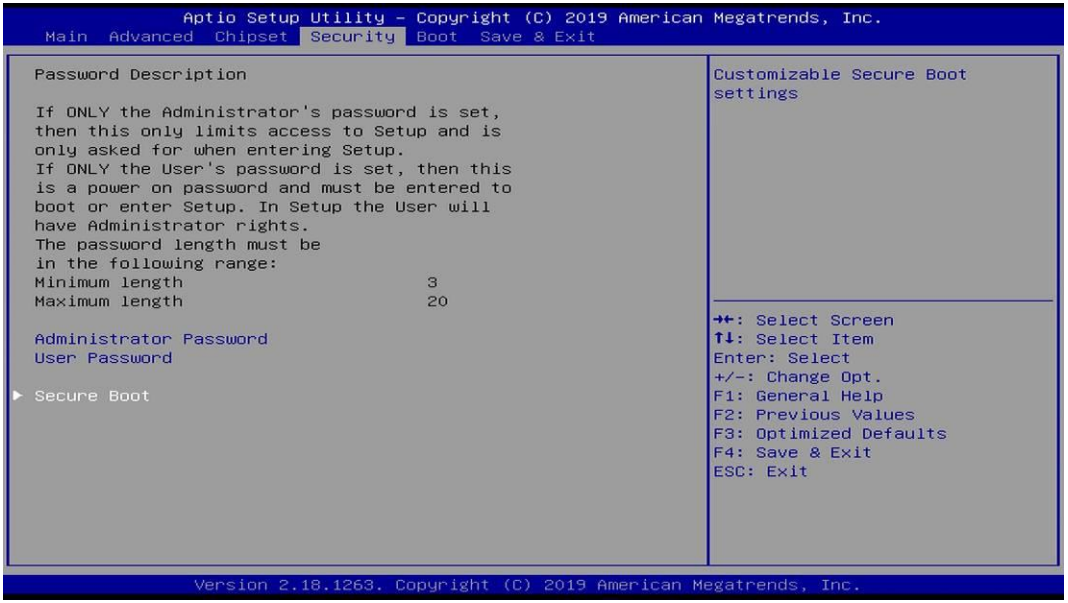
***Note: 'eMMC Max Speed' item is optional for boards with EMMC integrated.*

System State after Power Failure

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 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.

- **Secure Boot**

  Press [Enter] to make customized secure settings:

  Secure Boot Control

The optional settings are: [Disabled]; [Enabled].
Secure Boot can be enabled if 1. System running in user mode with enrolled Platform Key (PK); 2. CSM function is disabled.

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.
**When set as [Custom], user can make further settings in 'Key Management'.*

- **Key Management**

This item enables experienced users to modify Secure Boot variables, witch includes the following items:

Provision Factory Default Keys

This item is for user to install factory default secure boot keys when system is in Setup Mode.

- **Enroll All Factory Default Keys**

This item forces system to User Mode-install all Factory Default keys.
This item shows up when 'Provision Factory Default Keys**' is set as [Enabled].*

- **Delete All Factory Default Keys**

This item forces system to Setup Mode-clear all Secure Boot Variables.
*This item shows up when '**Provision Factory Default Keys**' is set as [Disabled].

- **Save all Secure Boot Variables**

This item will save NRRAM content of all Secure Boot variables to the files (WFI_SIGNATURE_LIST data format) in root folder on a target file system device.

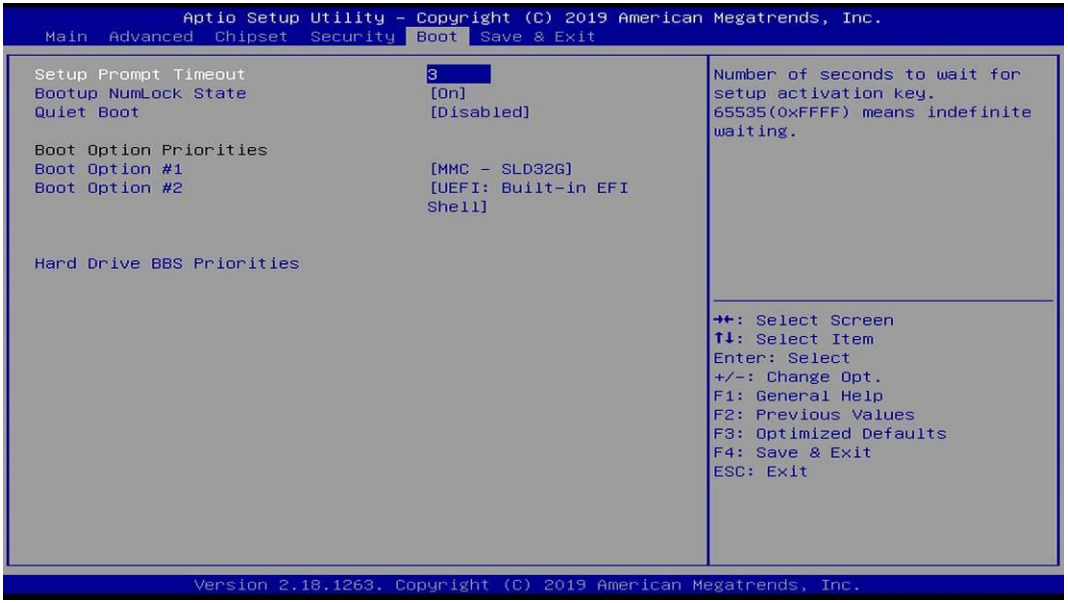
- **Platform Key (PK)/Key Exchange Keys/Authorized Signature/Forbidden Signature/ Authorized TimeStamps/OS Recovery Signatures**

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_SHA256 (bin)

2. Authenticated UEFI Variable

3-10 Boot Menu



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

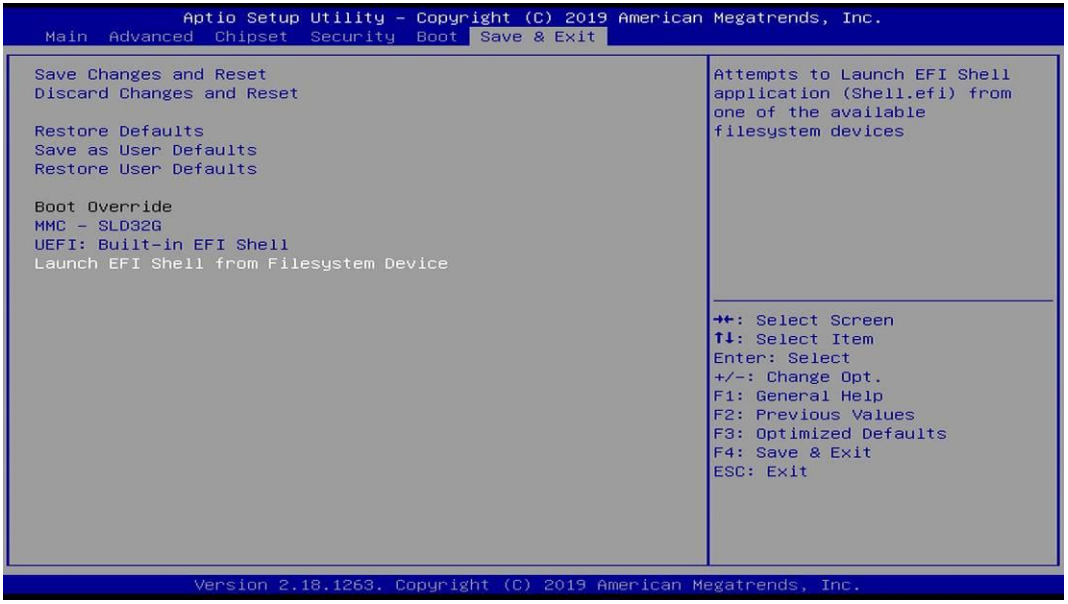
Boot Option #1/ Boot Option #2…

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

Hard Drive BBS Priorities

Use this item to set the order of the legacy devices in the available group,

3-11 Save & Exit Menu



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.

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 defaults to all the setup options.

Boot Override

The available options here are dynamically updated and make system boot to any

boot option selected.

Lauch EFI Shell from filesystem device

Use this item to launch EFI shell application (shell.efi) from one of the available filesystem device.