Technical Manual

Of

Intel Kaby Lake U Series CPU

Based IPC M/B

NO. G03-NF752-F

Revision: 2.0

Release date: October 26, 2020

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.

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 60 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.

USER'S NOTICE

Manual Revision Information

Reversion	Revision History	Date
2.0	Second Edition	October 26, 2020

Item Checklist

☑ Motherboard
☑ Cable(s)

Chapter 1
Introduction of the Motherboard

1-1 Feature of Motherboard

- Onboard Intel® Kaby Lake U Core-i series SoC Processor, with low power consumption never denies high performance
- Support 2* DDR4 2133MHz SO-DIMM, maximum capacity up to 32GB
- Support 2* SATAIII Device
- Support 2 * RJ-45 gigabit Ethernet LAN port & 2* internal gigabit Ethernet
- Support 1* HDMI port, 1* VGA port, 1* LVDS port, 4* USB 3.0, 4* USB 2.0
- Support 2* RS232/422/485 port, 3* RS232 port, 2* GPIO port with isolated
- Onboard 2* full-size Mini-PCIE connector (USB 2.0 interface and PCIe x1) & 1* full-size Mini-PCIE connector (USB 2.0 interface)
- Support 1* full-size Mini-PCIE connector (only for mSATA/USB)
- Support 3* SIM card slot
- Support Watchdog function

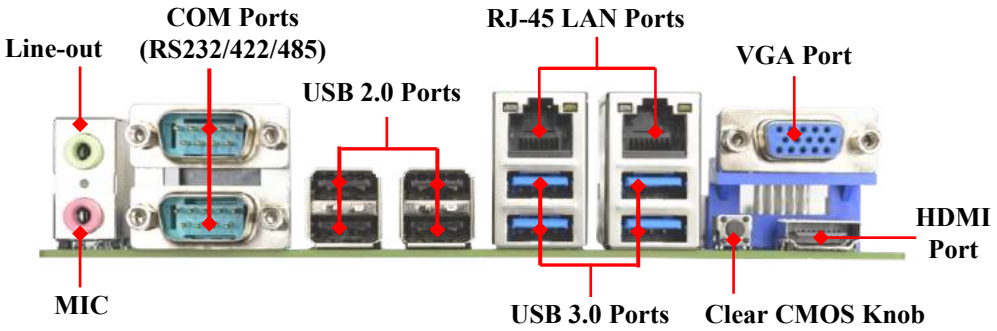
1-2 Specification

Spec	Description
Design	● Non-standard form factor; PCB size: 170 mm x 225 mm
Embedded CPU	● Intel® Kaby Lake U Core-i ***SoC*** CPU***** **CPU model varies from different IPC options. Please consult your dealer for more information of onboard CPU.*
Memory Slot	● 2 * DDR4 SO-DIMM slots ● Support 2* DDR4 2133 MHz SO-DIMM up to 32GB
Expansion Slot	● 2* Full-size Mini PCIe slots for WiFi/3G/4G/Capture Card ● 1* Full-size Mini PCIe slot USB interface for 4G LTE/GPS
Storage	● 2* SATA Port ● 1* Mini-PCIe slot (full size, only for mSATA/USB)
LAN Chip	● Integrated with 3* I210AT and 1* Intel I219LM PCI-E Gigabit LAN chips ● Support Fast Ethernet LAN function of providing 10/100/1000Mbps Ethernet data transfer rate
BIOS	● AMI Flash ROM
Front Panel I/O	● 3* SIM card slots ● 1* LVDS out ***(with DVI outlook)*** ***Note:** LVDS-out connector takes the form of DVI connector but with LVDS signals inside. User can only apply compatible LVDS cable to this connector. WRONG CABLE CONNECTION WILL CAUSE DEMAGE TO DISPLAY DEVICES OR THE BOARD!!* ● 1* Power Button/Power LED, 1* HDD LED, 1* reset knob ● 2* GPIO (Support Isolated) ● 2* RS232 port
Rear Panel I/O	● 1* Audio jack (Line-out /MIC) ● 2* RS232/422/485 COM port

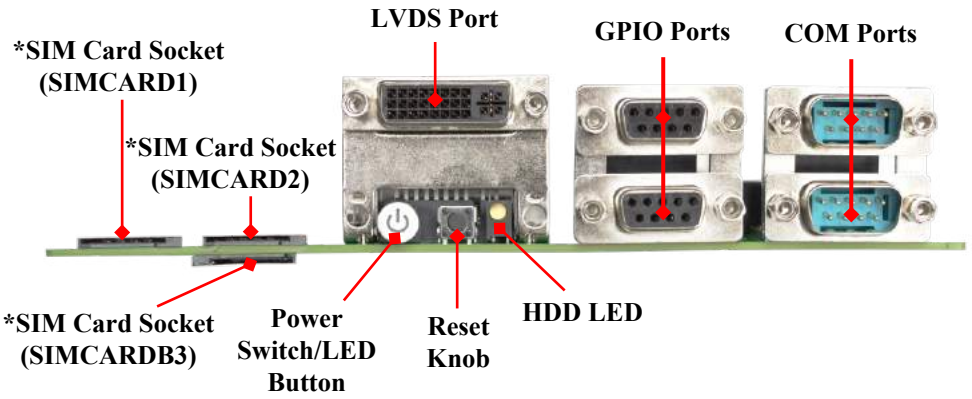
	● 4* USB 2.0 port ● 2* RJ-45 LAN port ● 4* USB 3.0 port ● 1* VGA port ● 1* Clear CMOS knob ● 1* HDMI port
Internal I/O	● 2* SATAIII Connector ● 2* SATA Power out Connector ● 1* CPU FAN Connector ● 1* 2-pin 12V DC-in Connector ● 1* Front Panel Audio Header ● 1* SPEAKER AMP. Header ● 2* Ethernet Header for Power over Ethernet (POE) ● 4* POE_LED Header ● 2* USB 2.0 Header for 4* USB2.0 Port ● 1* Serial Port Header ● 1* BUZZ Header ● 1* BUZZER ● 1* Power LED Header ● 1* Front Panel Header ● 1* PS/2 Keyboard & Mouse Header ● 1* SMBUS Header ● 1* LVDS Header ● 1* LVDS Inverter Header ● 1* Ignition Header

1-3 Layout Diagram

Rear Panel IO Diagram:

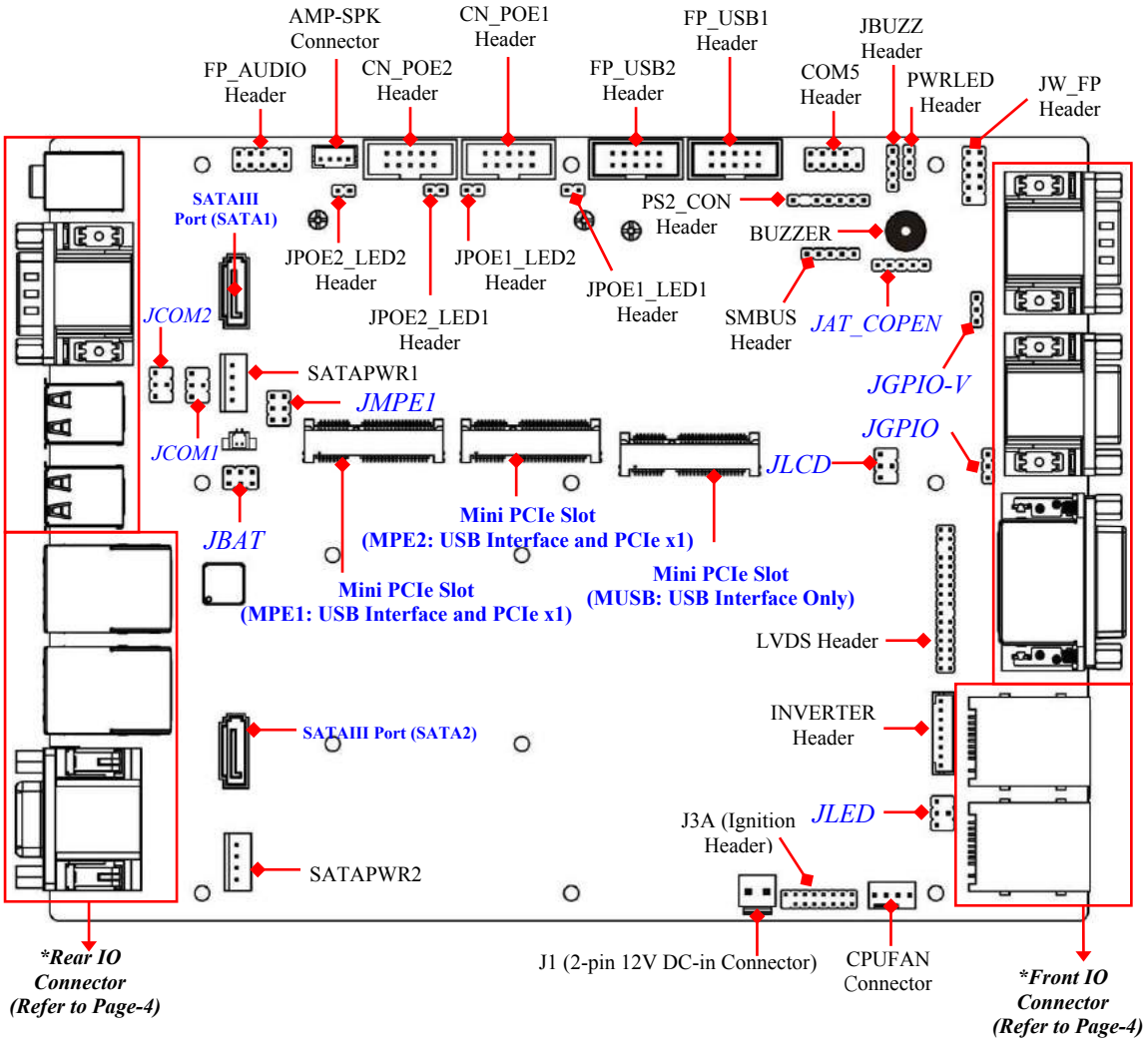


Front Panel IO Diagram:

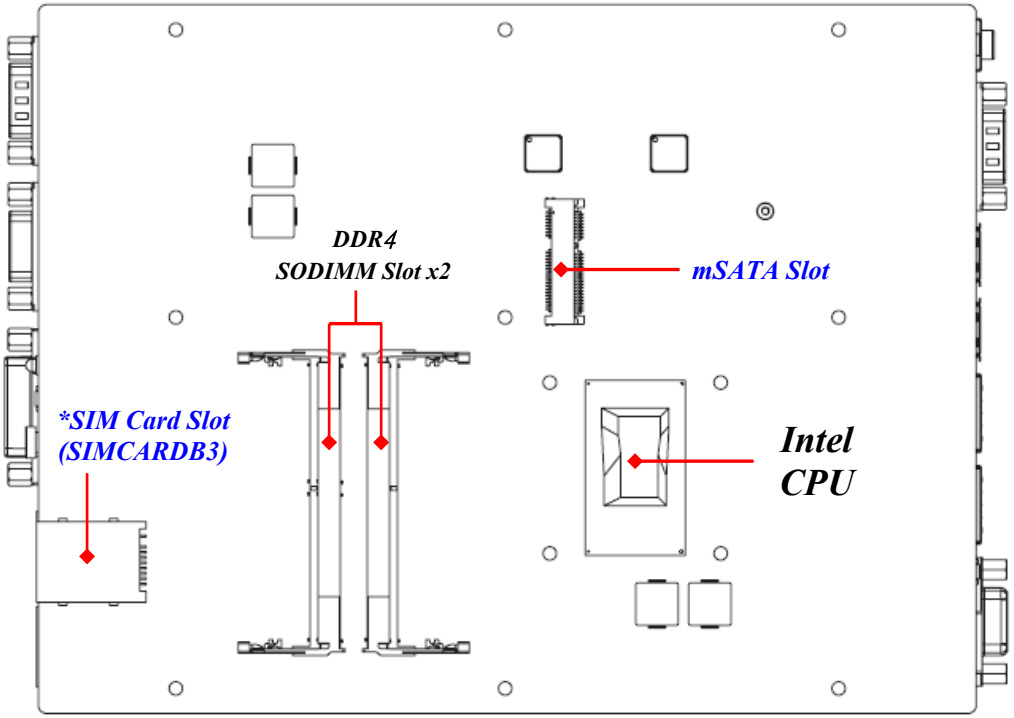


**** SIM Card No. must correspond to Mini PCIE slot No.: SIMCARD1 to MPE1, SIMCARD2 to MPE2, and SIMCARDB3 to MUSB (USB interface).***

Internal Diagram-Front Side:



Internal Diagram-Back Side:



**** SIM Card Number must to correspond with Mini PCIE slot Number: SIMCARD1 to MPE1, SIMCARD2 to MPE2, and SIMCARDB3 to MUSB (USB interface).***

Note: *CPU is the most important part of the board and very fragile to any possible harm. Make sure that there is no damage to the CPU during any installation procedures!*

Jumpers

Jumper	Name	Description
JCOM1/2	COM1/2 Port Pin9 VCC Select	4-Pin Block
JBAT	Clear CMOS RAM Setting ***Pin(1-2):*** *Clear CMOS RAM Settings (Normal Open)* ***Pin (3-4):*** *Flash Descriptor Override (Normal Open)* ***Pin (5-6):*** *PWROK Override (Normal Open)*	6-pin Block
JMPE1	MPE1/2 (Mini PCI-E) Slot VCC3/3VSB Select	6-pin Block
JAT_COPEN	ATX/AT Mode select & Case open Select ***Pin(1-2):*** *ATX Mode* ***Pin(2-3):*** *AT Mode* ***Pin(4-5):*** *Case Open Message Display (Normal Open)*	5-Pin Block
JGPIO-V	GPO Voltage VCC/5VSB Select ***Pin(1-2):*** *VCC* ***Pin(2-3):*** *5VSB*	3-Pin Block
JGPIO	GPIO-PCOM Common Cathode Node Select ***Pin (1-2):*** *Normal* ***Pin (2-3):*** *COMMON*	3-Pin Block
JLCD	LVDS LCD VCC3.3V/5V/12V Select	4-Pin Block
JLED	LVDS LED 5V/12V/ADP12V Select	4-Pin Block

Connectors

Connector	Name
AUDIO	**Top**: Line-out Connector **Bottom:** MIC Connector

COM2-COM1	RS232/422/485 Serial Port Connector **Top**: COM1 **Bottom:** COM2
USB2 & USB3	USB2.0 Connector X4
USB1_LAN1	RJ-45 LAN Port over USB 3.0 Port **Top**: RJ-45 LAN **Bottom:** USB 3.0 Port x2
USB2_LAN2	RJ-45 LAN Port over USB 3.0 Port **Top**: RJ-45 LAN **Bottom:** USB 3.0 Port x2
VGA	VGA Connector
CLR_SW	Clear CMOS Knob
HDMI	HDMI Connector
SIMCARD1 & SIMCARD2 & SIMCARDB3	SIM Card Slot X3
LVDS1	LVDS Connector ***(with DVI outlook)*** *Note: LVDS-out connector takes the form of DVI connector but with LVDS signals inside. User can only apply compatible LVDS cable to this connector. WRONG CABLE CONNECTION WILL CAUSE DEMAGE TO DISPLAY DEVICES OR THE BOARD!!*
FP_PWRSW1	Power Button/LED
FRST_SW	Reset Knob
FP_LED1	HDD LED
ISOLATE_GPIO1	ISOLATE_GPIO1 **Top**: GPI x 6bit **Bottom:** GPO x 6 bit
COM3-COM4	RS232 Serial Port **Top**: COM3 **Bottom:** COM4

SATA1 & SATA2	SATAIII Connector X2
SATAPW1 & SATAPW2	SATA Power out Connector X2
CPUFAN	CPU FAN Connector
J1	12V DC-in Connector

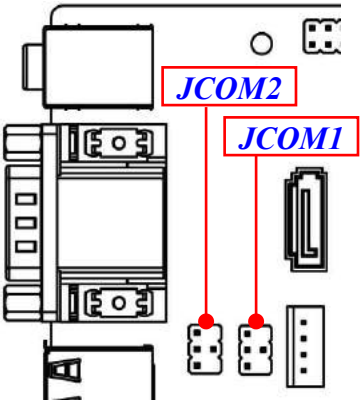
Headers

Header	Name	Description
FP_AUDIO	Front Panel Audio Header	9-pin Block
AMP-SPK	Line-out AMP. Speaker Header	4-pin Block
CN_POE1 & CN_POE2	Ethernet Header for Power over Ethernet (POE)	10-pin Block
JPOE2_LED2	CN_POE2 10/100/1000 LED	2-pin Block
JPOE2_LED1	CN_POE2 ACT LED	2-pin Block
JPOE1_LED2	CN_POE1 10/100/1000 LED	2-pin Block
JPOE1_LED1	CN_POE1 ACT LED	2-pin Block
FP_USB1 & FP_USB2	USB 2.0 Port Header x 2	9-pin Block
COM5	Serial Port Header	9-pin Block
PS2_CON	PS/2 Keyboard & Mouse Header	6-pin Block
SMBUS	SMBUS Header	5-pin Block
JBUZZ	Buzzer Header	4-pin Block
PWRLED	Power Status LED Header	3-pin Block
JW_FP	Front Panel Header (PWR LED/ HD LED/Power Button /Reset)	9-pin Block
LVDS	LVDS Header	30-pin Block
INVERTER	LVDS Inverter Header	8-pin Block
J3A	Ignition Header	15-pin Block

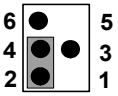
Chapter 2
Hardware Installation

2-1 Jumper Setting

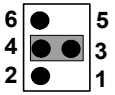
JCOM1/2 (4-pin): COM1/2 Port Pin9 Function Select



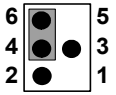
JCOM1/2→COM1/2 Port



2-4 Closed:
RI=RS232;

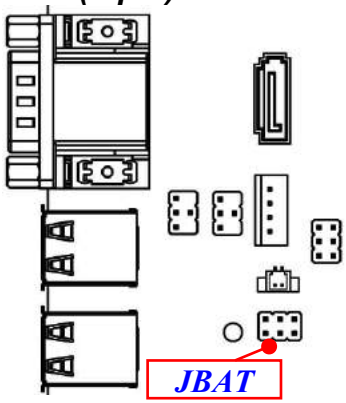


3-4 Closed:
RI= 5V;

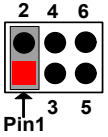


4-6 Closed:
RI= 12V.

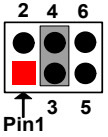
JBAT (6-pin): Mix Function PIN for Clear CMOS RAM Setting & Flash Function



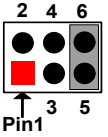
JBAT→ Clear CMOS RAM Settings



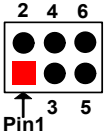
1-2 Closed:
Clear CMOS;



3-4 Closed:
Flash Override;

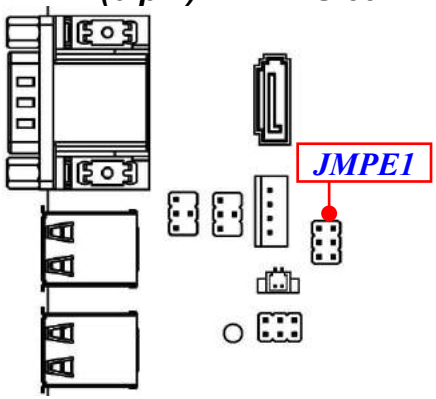


5-6 Closed:
POK Override;

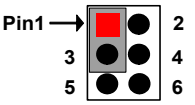


OPEN: Normal.

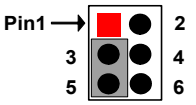
JMPE1 (6-pin): MPE1 Slot VCC3/3VSB Select



JMPE1→ MPE1 Slot VCC

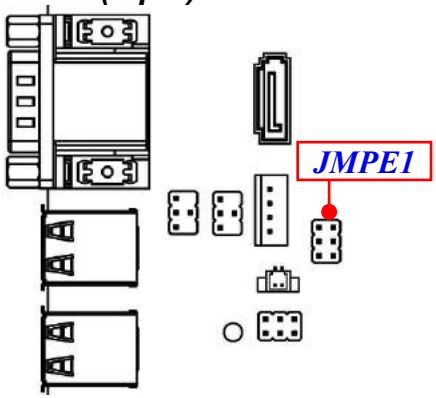


1-3 Closed:
VCC3 for MPE1;

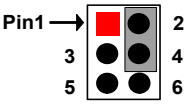


3-5 Closed:
3VSB for MPE1.

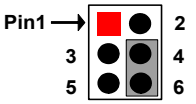
JMPE1 (6-pin): MPE2 Slot VCC3/3VSB Select



JMPE1→ MPE2 Slot VCC

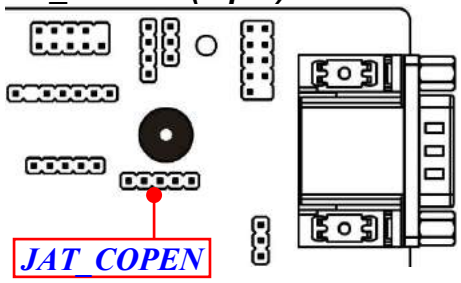


2-4 Closed:
VCC3 for MPE2;



4-6 Closed:
3VSB for MPE2.

JAT_COPEN (5-pin): Mix Function PIN for ATX/AT Mode Select & Case Open



JAT_COPEN → AT Mode / ATX Mode Select

Pin1→ 5

1-2 Closed: ATX Mode Selected;

Pin1→ 5

2-3 Closed: AT Mode Selected;

JAT_COPEN → Case Open Select

Pin1→ 5

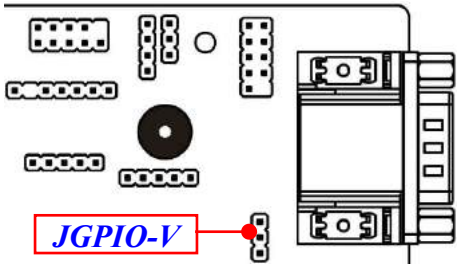
4-5 Open: Normal;

Pin1→ 5

4-5 Closed: Case Open.

***Note: ATX Mode Selected:** Press power button to power on after power input ready;*
***AT Mode Selected:** Directly power on as power input ready.*
User needs to restart the system for the settings to take effect.

JGPIO-V (3-pin): GPO Voltage 5V /5VSB Select for ISOLATE_GPIO1



JGPIO-V→ GPIO Voltage 5V/5VSB Select

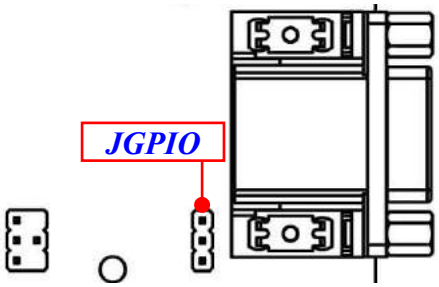
3
1

1-2 Closed: GPIO VCC= 5V;

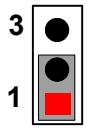
3
1

2-3 Closed: GPIO VCC= 5VSB.

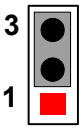
JGPIO (3-pin): **GPIO Common Cathode Node Normal/Common Select for ISOLATE_GPIO1**



JGPIO→ GPIO Common Cathode Node Normal/Common Select

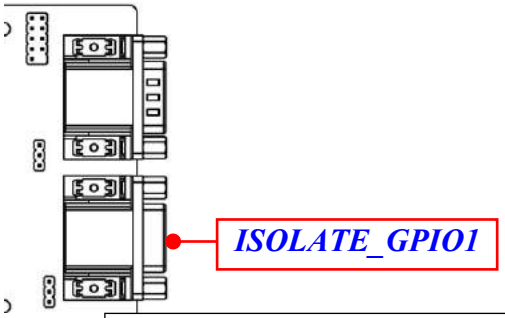


1-2 Closed: Normal;

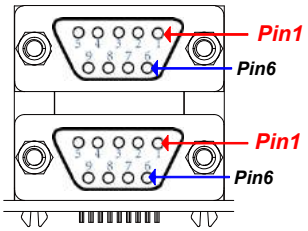


2-3 Closed: Common.

ISOLATE_GPIO1 (DUAL DB9 Female): GPIO Port Pin Define



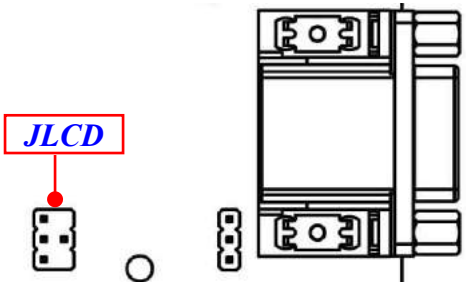
ISOLATE_GPIO1–GPI



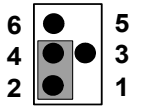
ISOLATE_GPIO1–GPO

Top: GPI x 6bit		Bottom: GPO x 6bit	
Pin NO.	**Pin Define**	**Pin NO.**	**Pin Define**
Pin 1	SIO_GPI80	Pin 1	SIO_GPO02
Pin 2	SIO_GPI82	Pin 2	SIO_GPO03
Pin 3	SIO_GPI84	Pin 3	SIO_GPO04
Pin 4	SIO_GPI86	Pin 4	SIO_GPO12
Pin 5	GND	Pin 5	GND
Pin 6	SIO_GPI72	Pin 6	SIO_GPO13
Pin 7	SIO_GPI74	Pin 7	SIO_GPO20
Pin 8	N.C	Pin 8	N.C
Pin 9	EXTERNAL PWR	Pin 9	GPO_COMMON

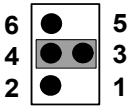
JLCD (4-pin): LVDS LCD VCC3.3V/5V/12V Select



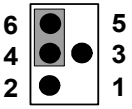
JLCD→ LVDS LCD VCC3.3V/5V/12V Select



2-4 Closed: LCD VCC=3.3V;

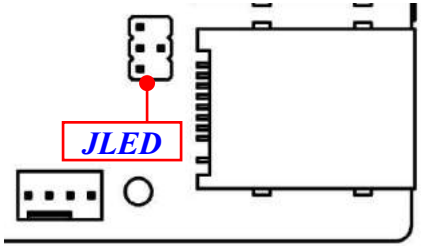


3-4 Closed: LCD VCC=5V;

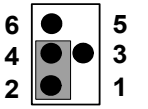


4-6 Closed: LCD VCC=12V.

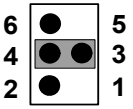
JLED (4-pin): LVDS LED 5V/12V Select



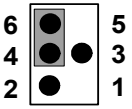
JLED→LVDS LED 5V/12V Select



2-4 Closed: LED=5V;



3-4 Closed: LED=12V;



4-6 Closed: LED=ADP12V.

2-2 Connectors and Headers

2-2-1 Connectors

IO Panel Connectors

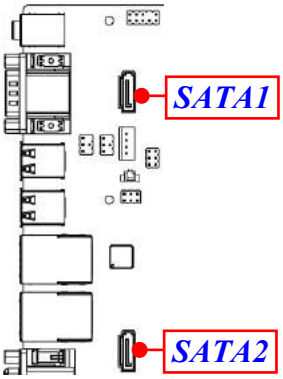
**Refer to Page-4 IO Diagram*

Icon	*Name*	*Function*
	**Audio Connectors**	**GREEN:** Line-out Connector **PINK :** MIC Connector
	**RS232/422/485 Serial Port**	Mainly for user to connect external MODEM or other devices that supports Serial Communications Interface. ***Note:** COM1/COM2 support RS232/422/485 function.*
	**USB 2.0 Port**	To connect USB keyboard, mouse or other devices compatible with USB 2.0 specification.
	**RJ-45 LAN Port**	This connector is standard RJ-45 LAN jack for Network connection.
	**HDMI Port**	To connect display device that support HDMI specification.
	**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.
	**VGA Port**	To connect display device that support VGA specification.
	**Clear CMOS Knob**	For user to Clear CMOS.

	**SIM Card Slot**	For user to install compatible SIM card.
	**LVDS Port**	LVDS connector (with DVI outlook.) ***Note:** LVDS-out connector which takes the form of DVI connector but with LVDS signal inside. User can only apply compatible LVDS cable to this connector. WRONG CONNECTION WILL CAUSE DEMAGE TO DISPLAY DEVICES OR THE BOARD!!*
	**Power Button/LED**	For user to power on/off the system, also function as power status LED.
	**Reset knob**	For user to reset the system.
	**HDD LED**	The LED activity light for the hard drive.
	**ISOLATE_GPIO Port**	Support Isolated DI/DO GPIO

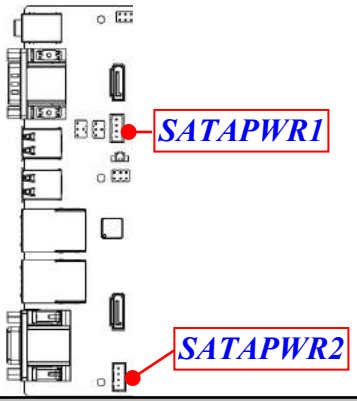
(1) SATA1/2 (7-pin): SATAIII Port Connector

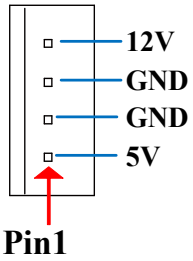
These are high-speed SATAIII port that supports 6GB/s transfer rate.



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

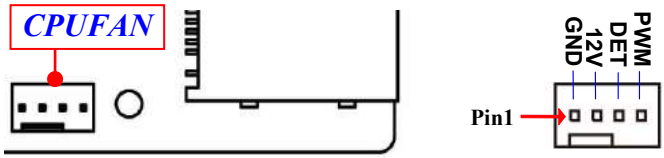
(2) SATAPWR1/2 (4-pin): SATA HDD Power-Out Connector



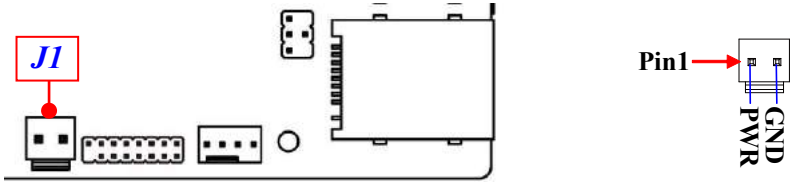


Warning: *Make sure that Pin-1 of compatible SATA Power connector is inserted into corresponding Pin-1 of* ***SATAPWR1 and SATAPWR2*** *connectors to avoid possible damage to the board and hard disk drive*

(3) CPUFAN (4-pin): Fan Connectors

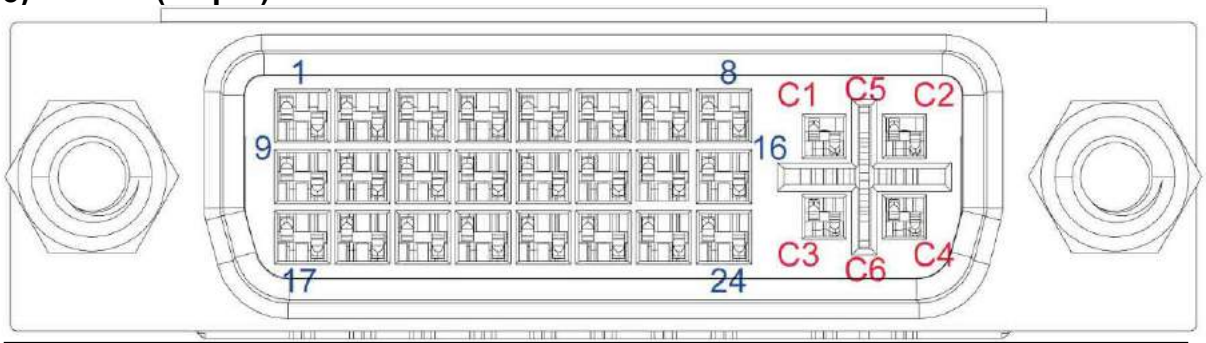


(4) J1 (2-pin): Internal 12V DC-in power connector



Warning: *Find Pin-1 position before connecting power cable to this 2-pin power connector.* ***WRONG INSTALLATION DIRECTION WILL DAMAGE THE BOARD!!***

(5) LVDS1 (17-pin): Front Panel LVDS connector

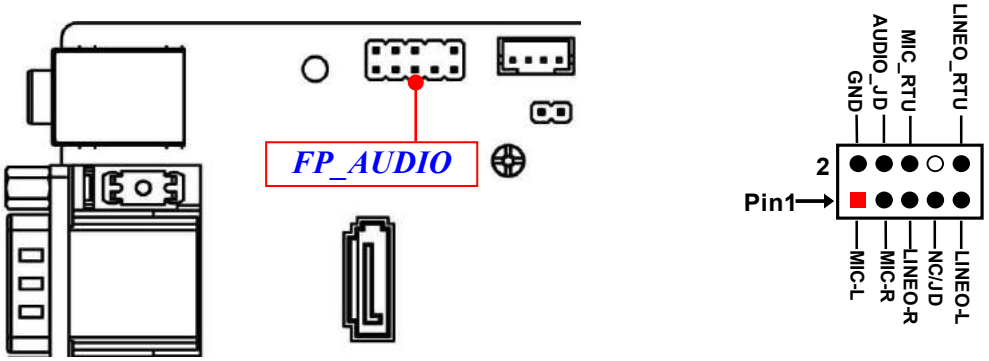


Pin NO.	Pin1	Pin2	Pin3	Pin4	Pin5	Pin6	Pin7	Pin8	Pin C1	Pin C5	Pin C2
Pin Define	B_DATA2N	B_DATA2P	GND	B_DATAN0	B_DATA0P	A_CLKN	A_CLKP	A_DATA0N	Backlight Up SW	Back Light LED VCC	Backlight Down SW
Pin NO.	Pin9	Pin10	Pin11	Pin12	Pin13	Pin14	Pin15	Pin16			
Pin Define	B_CLKN	B_CLKP	GND	B_DATA1N	B_DATA1P	A_DATA2N	A_DATA2P	A_DATA0P			
Pin NO.	Pin17	Pin18	Pin19	Pin20	Pin21	Pin22	Pin23	Pin24	Pin C3	Pin C6	Pin C4
Pin Define	B_DATA3N	B_DATA3P	LCD_VCC	A_DATA3N	A_DATA3P	GND	A_DATA1P	A_DATA1N	Backlight Enable	Back Light LED VCC	Backlight PWM

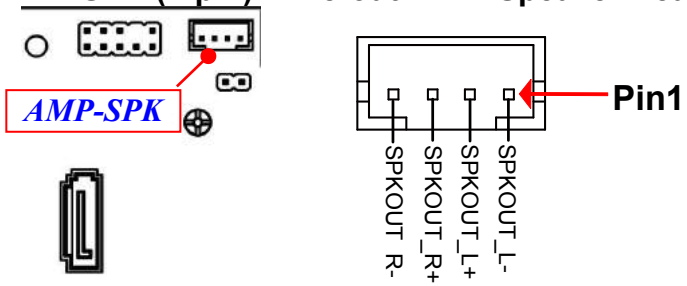
2-2-2 Headers

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

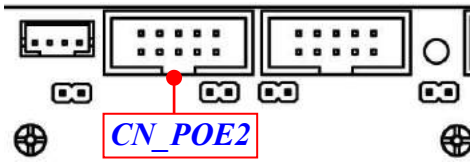
This header is connected to Front Panel Line-out, MIC connector with cable.

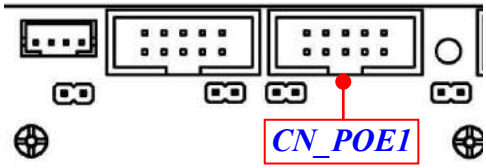


(2) AMP-SPK (4-pin): Line-out AMP. Speaker Header

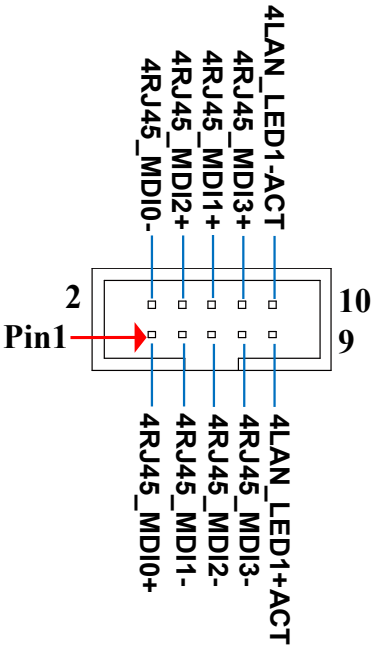


(3) CN_POE1 & CN_POE2 (10-pin): Ethernet Header for Power over Ethernet (POE)

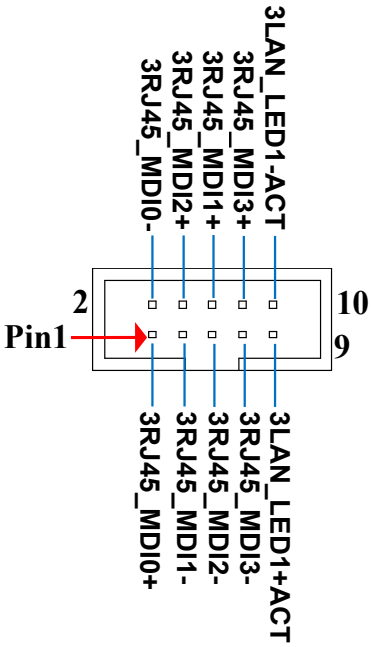




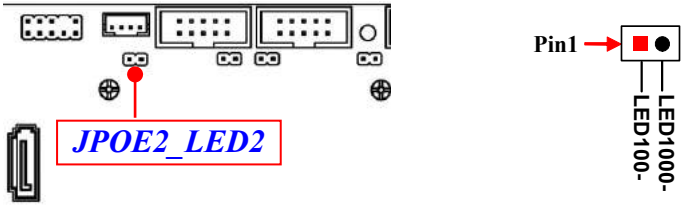
CN_POE2



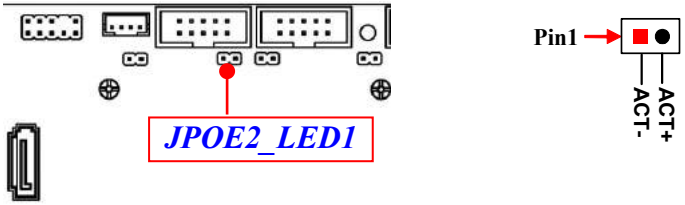
CN_POE1



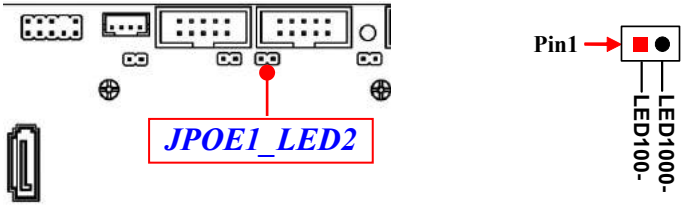
(4) JPOE2_LED2 (2-pin): Header for CN_POE2 10/100/1000 LED Setting



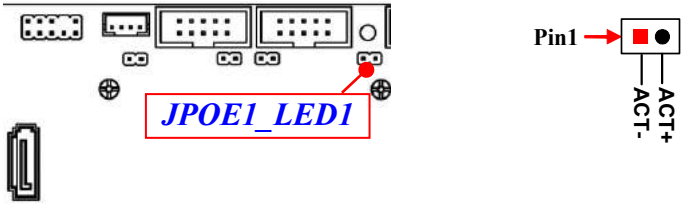
(5) JPOE2_LED1 (2-pin): Header for CN_POE2 ACT LED Setting



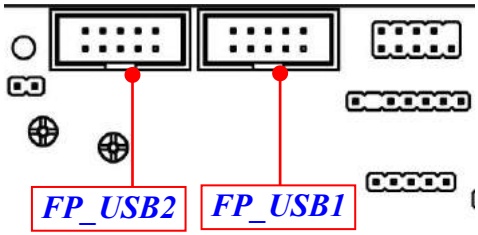
(6) JPOE1_LED2 (2-pin): Header for CN_POE1 10/100/1000 LED Setting

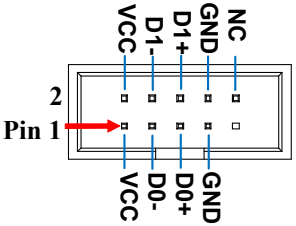


(7) JPOE1_LED1 (2-pin): Header for CN_POE1 ACT LED Setting

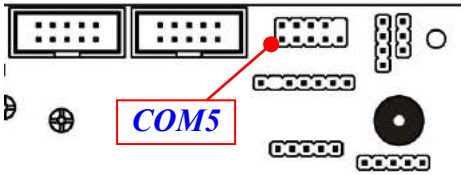


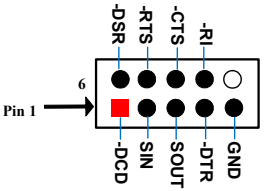
(8) FP_USB1 & FP_USB2 (9-pin): USB 2.0 Port Header



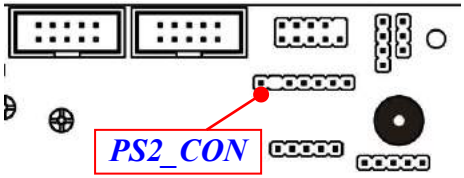


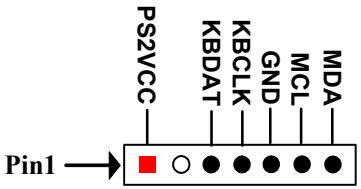
(9) COM5 (9-pin): Serial Port Header



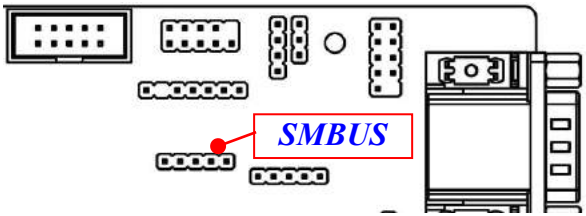


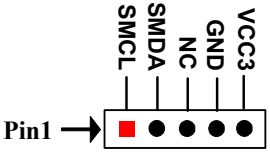
(10) PS2_CON (6-pin): PS/2 Keyboard & Mouse Header



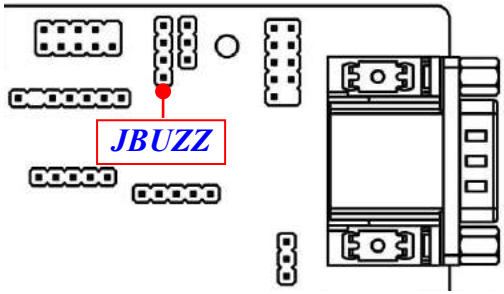


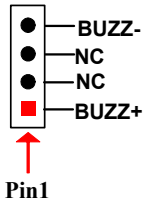
(11) SMBUS (5-pin): SMBUS Header



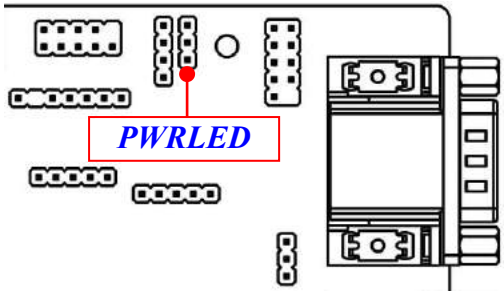


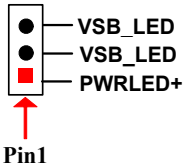
(12) JBUZZ (4-pin): Buzzer Header



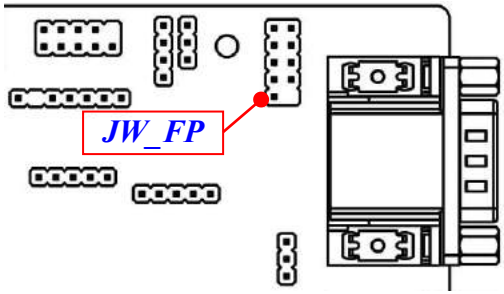


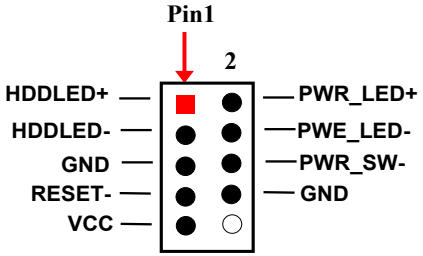
(13) PWRLED (3-pin): Power LED Header



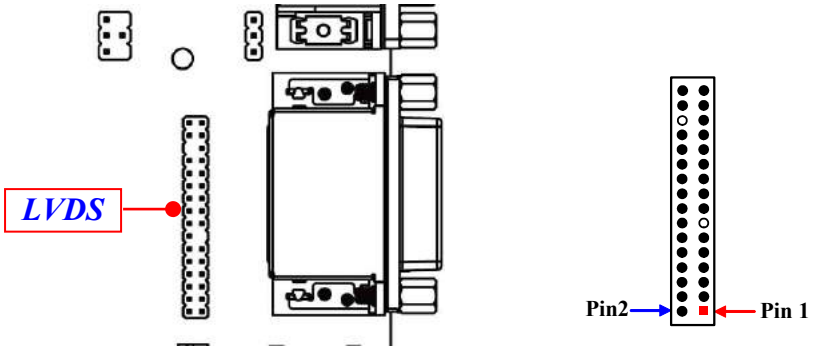


(14) JW_FP (9-pin): Front Panel Header



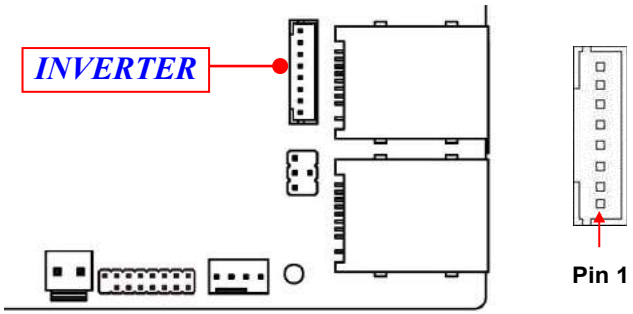


(15) LVDS (30-Pin): 24-bit dual channel LVDS Header



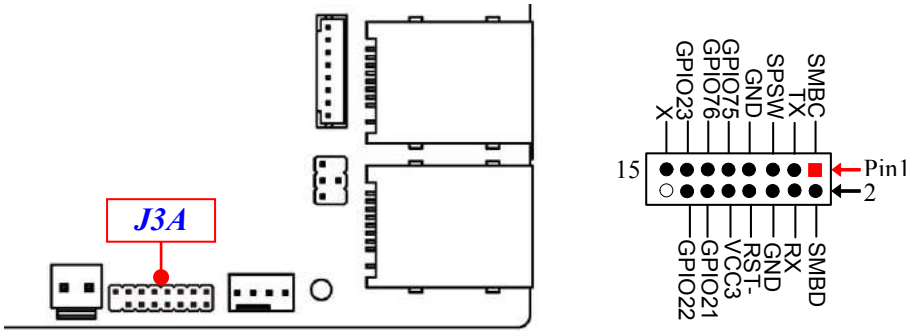
Pin NO.	Pin Define	Pin NO.	Pin Define
Pin 32	GND	Pin 31	GND
Pin 30	LCD_VCC	Pin 29	LCD_VCC
Pin 28	XX	Pin 27	LCD_VCC
Pin 26	A_DATA0N	Pin 25	A_DATA0P
Pin 24	A_DATA1N	Pin 23	A_DATA1P
Pin 22	A_DATA2N	Pin 21	A_DATA2P
Pin 20	A_CLKN	Pin 19	A_CLKP
Pin 18	A_DATA3N	Pin 17	A_DATA3P
Pin 16	GND	Pin 15	GND
Pin 14	GND	Pin 13	XX
Pin 12	SCL	Pin 11	SDA
Pin 10	B_DATA0P	Pin 9	B_DATAN0
Pin 8	B_DATA1P	Pin 7	B_DATA1N
Pin 6	B_DATA2P	Pin 5	B_DATA2N
Pin 4	B_CLKP	Pin 3	B_CLKN
Pin 2	B_DATA3P	Pin 1	B_DATA3N

(16) INVERTER (8-pin): LVDS Inverter Header



Pin No.	Definition
8	Backlight Down SW
7	Backlight Up SW
6	GND
5	GND
4	Back Light LED VCC
3	Back Light LED VCC
2	Backlight PWM
1	Backlight Enable

(17) J3A (15-Pin): Ignition Header



Chapter 3
Introducing BIOS

Notice!	The BIOS options in this manual are for reference only. Due to constant update/upgrade, the BIOS screens in the manual (usually first version) may be different from the actual available version. 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.

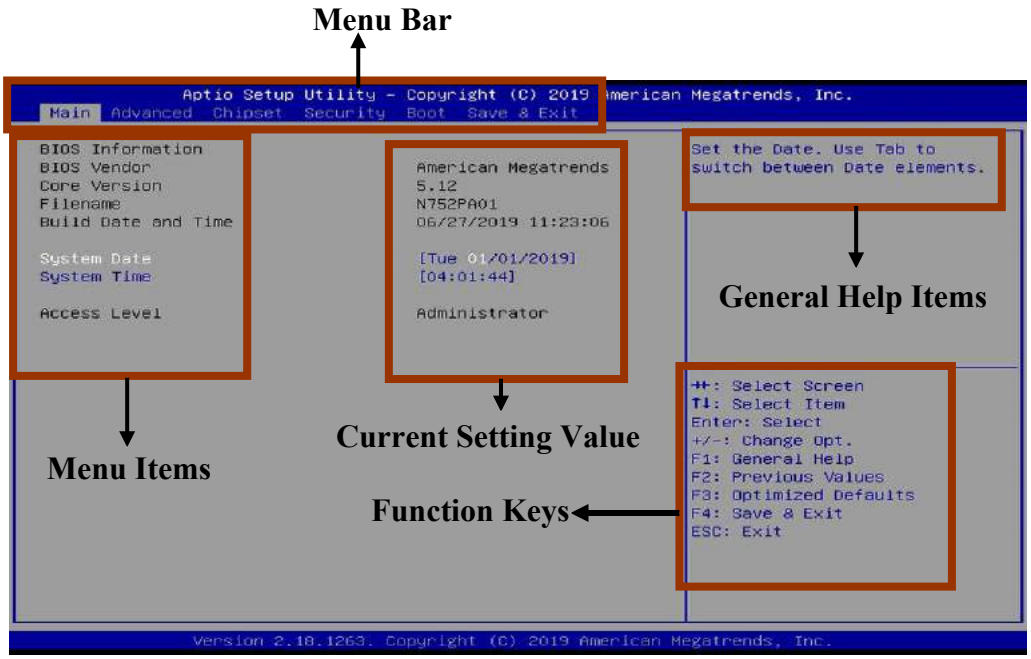
3-1 Entering Setup

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.

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

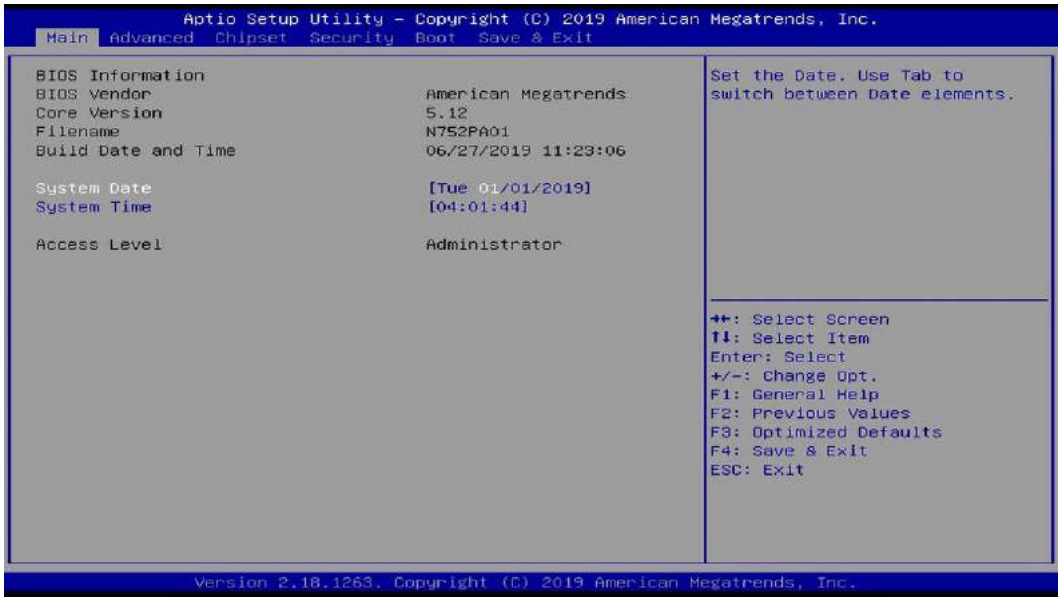
There are six menu bars on top of BIOS screen:

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.

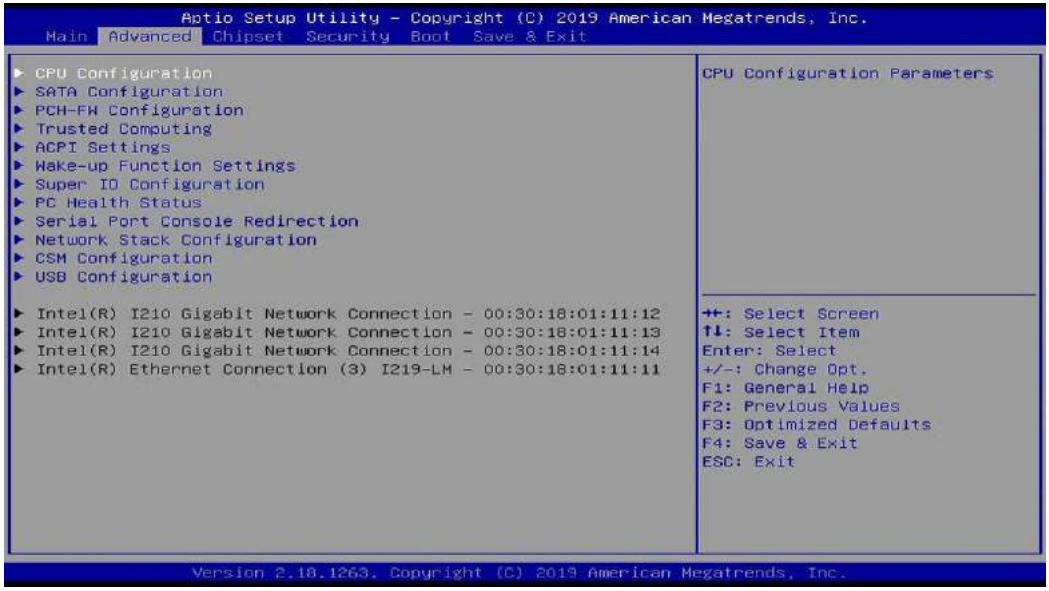
3-6 Main Menu

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



- **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 Virtualization Technology

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

  When set as [Enabled], a VMM can utilize the additional hardware capabilities

provided by Vanderpool Technology.

Hardware Prefetcher

Use this item to turn on/off the MLC streamer prefetcher.

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

Adjacent Cache Line Prefetch

Use this item to turn on/off prefetching of adjacent cache lines.

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

Intel(R) SpeedStep(tm)

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

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

CPU C States

Use this item to enable or disable CPU power management. This item allows CPU to go to C states when it's not 100% utilized.

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

Package C State Limit

Use this item to select the maximum Package C State limit setting.

The optional settings are: [C0/C1]; [C2]; [C3]; [C6]; [C7]; [C7S]; [C8]; [C9]; [C10]; [CPU default]; [AUTO].

[CPU Default]: Leaves to factory default value.

[AUTO]: Initializes to deepest available Package C State Limit.

- **SATA Configuration**

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

SATA Controller(s)

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

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

SATA Mode Selection

The default setting is: [AHCI].

SATA1

Port

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

Use this item to enable or disable SATA port.

Hot Plug
The optional settings: [Disabled]; [Enabled].
mSATA
Port
The optional settings: [Disabled]; [Enabled].
Use this item to enable or disable device connected to MSATA port.
SATA2
Port
The optional settings: [Disabled]; [Enabled].
Use this item to enable or disable SATA port.
Hot Plug
The optional settings: [Disabled]; [Enabled].

- **PCH-FW Configuration**

Press [Enter] to view ME information and make settings in the following sub-items:
TPM Device Selection
Use this item to select TPM device. The optional settings: [dTPM]; [PTT].
[dTPM]: Disable PTT in SkuMgr.
[PTT]: Enable PTT in SkuMgr.
Warnning!! PTT/dTPM will be disabled and all data saved on it will be lost!

- **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: [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 enable or disable Security Device Support.

Configuration

Security Device Support

Use this item to enable or disable BIOS support for security device. TCG EFI protocol and INT1A interface will not be available.

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

- **ACPI Settings**

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

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: [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

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

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

USB S3/S4 Wake-up

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

** **Note**: 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: [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/ Serial Port 3 Configuration/ Serial Port 4 Configuration/ Serial Port 5 Configuration/ Serial Port 6 Configuration**

**** Note:** Serial Port 6 is only for Ignition Interface.*
Super IO 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: [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
** **Note**: This function is for Serial Port 1 and Serial Port 2.*
USB S3/S4 Wake-up
The optional settings are: [RS422]; [RS232]; [RS485].
Mode Speed Select
** **Note**: This function is for Serial Port 1 and Serial Port 2.*
The optional settings are: [RS232/RS422/RS485=250kbps]; [RS232=1Mbps,

RS422/RS485=10Mbps].

Serial Port FIFO Mode

The optional settings are: [16-Byte FIFO]; [32-Byte FIFO]; [64-Byte FIFO]; [128-Byte FIFO].

WatchDog Reset Timer

Use this item to enable or disable WDT reset function.
The optional settings: [Disabled]; [Enabled].
When set as [Enabled], the following sub-items shall appear:

WatchDog Reset Timer Value

The setting range is from [4] to [255].

WatchDog Reset Timer Unit

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

WatchDog Wake-up Timer in ERP

This item support WDT wake-up while '**ERP Support**' is set as [Auto].
The optional settings: [Disabled]; [Enabled].
When set as [Enabled], the following sub-items shall appear:

WatchDog Timer Value in ERP

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

WatchDog Timer Unit in ERP

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 12**, Pin (1~3) of jumper **AT_COPEN** 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: [Disabled]; [Enabled].
When set as [Enabled], system will detect if COPEN has been short or not (*refer to*

***Page 12**, Pin (4-5) of jumper **AT_COPEN** for case open detect*); if COPEN is short, system will show Case Open Message during POST.

- **PC Health Status**

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

- **SmartFAN Configuration**

Press [Enter] to make settings for SmartFAN Configuration:

SmartFAN Configuration

CPUFAN Smart Mode

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

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

CPUFAN Full-Speed Temperature

Use this item to set CPUFAN full speed temperature. Fan will run at full speed when above the preset temperature.

CPUFAN Full-Speed Duty

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

CPUFAN Idle-Speed Temperature

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

CPUFAN Idle-Speed Duty

Use this item to set CPUFAN idle speed duty. Fan will run at idle speed when below the 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].

- **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: [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: [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 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: [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]; [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
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.*

- **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 PXE boot option will not be created.

Ipv4 HTTP Support

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

Use this item to enable Ipv4 HTTP Boot Support. When set as [Disabled], Ipv4 HTTP boot option 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 PXE boot option will not be created.

Ipv6 HTTP Support

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

Use this item to enable Ipv6 HTTP Boot Support. When set as [Disabled], Ipv6 HTTP boot option 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:

Option ROM execution

Network

This item controls the execution of UEFI and legacy PXE OpROM.
The optional settings are: [Do not launch]; [Legacy].

Storage

This item controls the execution of UEFI and Legacy Storage OpROM.
The optional settings are: [Do not launch]; [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].

- **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) I210 Gigabit Network Connection -XX:XX:XX:XX:XX:XX/… Intel(R) Ethernet Connection (3) I219-LM -XX:XX:XX:XX:XX:XX**

  These items give Intel gigabit ethernet controller basic driver information.

3-8 Chipset Menu

- **System Agent (SA) Configuration**

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

  VT-d

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

  ► **Graphics Configuration**

  Press [Enter] to make further settings for Graphics Configuration.

  Graphics Configuration

  GTT Size

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

  Aperture Size

  The optional settings are: [128MB]; [256MB]; [512MB]; [1024MB].

  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]; [96M]; [128M]; [160M]; [192M]; [224M]; [256M]; [288M]; [320M]; [352M]; [384M]; [416M]; [448M]; [480M]; [512M]; [1024M]; [1536M]; [2048M]; [4M]; [8M]; [12M]; [16M]; [20M]; [24M]; [28M]; [32M/F7];[36M]; [40M]; [44M]; [48M]; [52M]; [56M]; [60M].

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].

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: [VBIOS Default]; [HDMI]; [CRT]; [LVDS].
**** Note**: When set as [HDMI], [CRT] or* [LVDS]*, user can make further settings in '**Second IGFX Boot Display**'.*

Second IGFX Boot Display

Use this item to select secondary IGFX boot device.
The optional settings are: [Disabled]; [HDMI]; [CRT].

Active LFP

Use this item to select Active LFP Configuration.
The optional settings are: [Disabled]; [Enabled].
**** Note**: When set as [*Enabled*], user can make further settings in '**Backlight Control**'*

Backlight Control

Use this item to select Back Light Control setting.
The optional settings are: [PWM inverted]; [PWM Normal].

Panel Type

Use this item to select Panel Type.
The optional settings are: [800x480 18bit Single]; [800x600 18bit Single]; [800x600 24bit Single]; [1024x600 18bit Single]; [1024x768 18bit Single];

[1024x768 24bit Single]; [1280x768 24bit Single]; [1280x800 18bit Single]; [1280x800 24bit Single]; [1366x768 18bit Single]; [1366x768 24bit Single]; [1440x900 18bit Dual]; [1440x900 24bit Dual]; [1280x1024 24bit Dual]; [1680x1050 24bit Dual]; [1920x1080 24bit Dual].

LVDS FW Write Protect

Use this item to select LVDS FW Update/Protect.

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

► **Memory Configuration**

Press [Enter] to view brief information for the working memory module.

► **PCH-IO Configuration**

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

USB Controller

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

Use this item to enable or disable the USB physical connector. Once disabled, any USB devices plugged into the connector will not be detected by BIOS or OS.

HD Audio

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

Onboard Lan1 Controller

Use this item to enable or disable LAN1 NIC.

When set as [Enabled], user can make further settings in '**Wake on LAN**' item:

Wake on LAN

Use this item to enable or disable integrated LAN to wake the system.

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

Onboard Lan2/ Lan3/ Lan4 Controller

***Note:** Lan3 and Lan4 options are for HBFEF752 model POE function only. HBFGF752I model only supports 'Onboard LAN2 Controller'.*

Use this item to enable or disable LAN2/ LAN 3/ LAN 4 device or controller.

MPE1/MPE2 Slot

Use this item to enable or disable device or controller installed on MPE1/MPE2 slot.

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

Speed

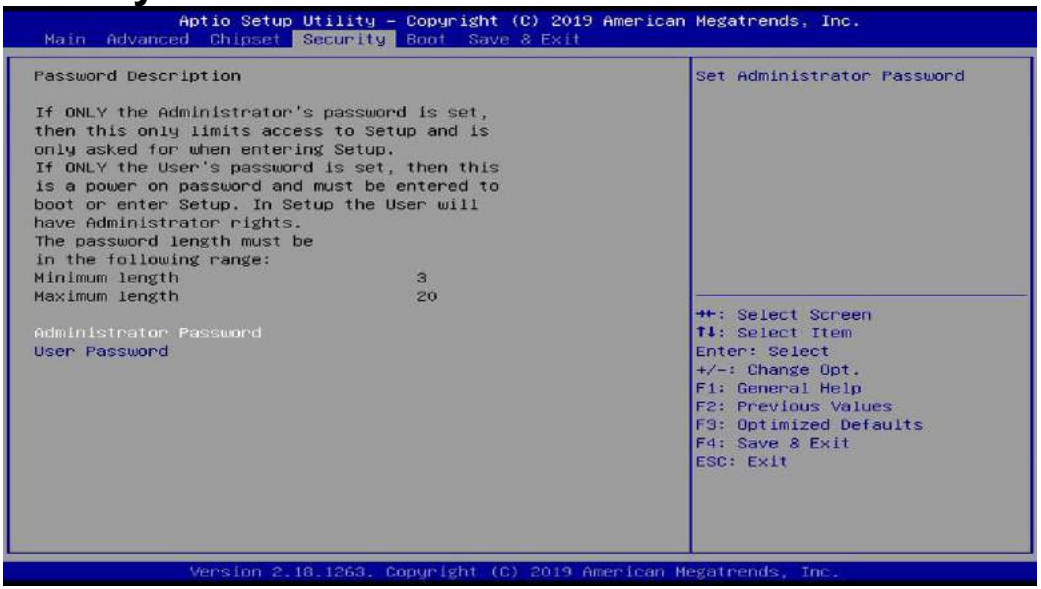
The optional settings are: [Auto]; [Gen1]; [Gen2]; [Gen3].

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

Press [Enter] to create new administrator password. Press again to confirm the new administrator password.

User Password

Press [Enter] to create new user password. Press again to confirm the new user password.

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
Use this item to decide system boot order from available options.
The optional settings are: [UEFI: Built-in EFI Shell]; [Disabled].
UEFI Boot
The optional settings are: [Disabled]; [Enabled].

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 the user defaults to all the setup options.

Boot Override

Launch EFI Shell from filesystem device

This item is used for attempts to launch EFI shell application from one of the available file system devices.

Quick Installation Manual

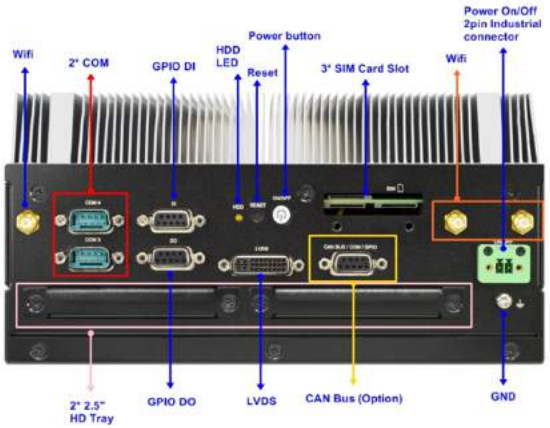
NO. G03-NF752-F

Revision: 2.0

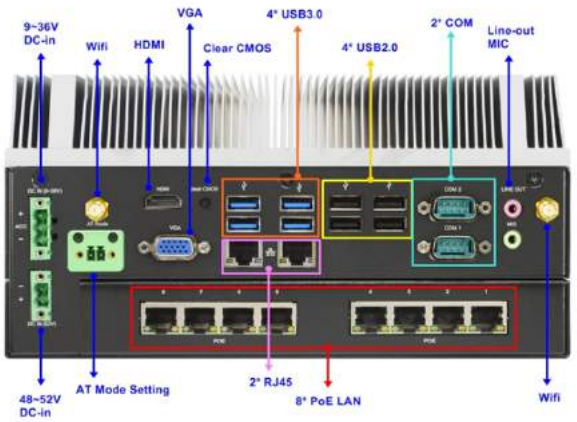
Release date: October 26, 2020

I/O Outlets

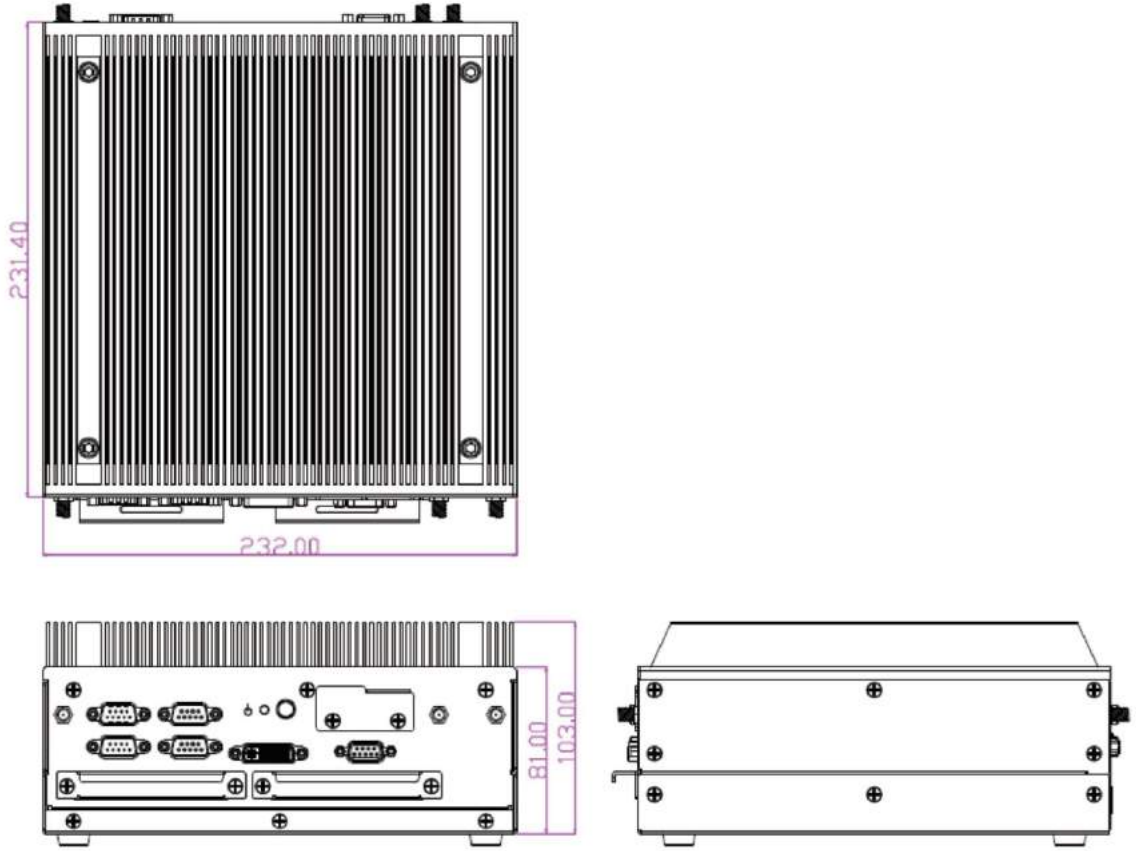
Front



Rear

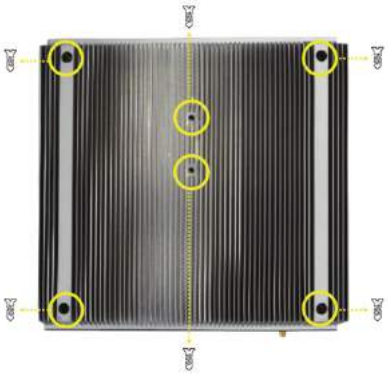


Dimension and Outlines

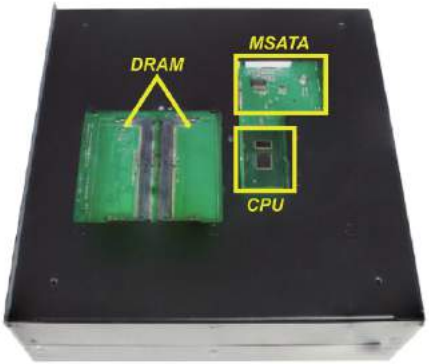


I. To Install DRAM & MSATA

1. Remove the 6*screws (M4) marked in circles as below to dissemble the aluminum heat sink from the top side of the system.

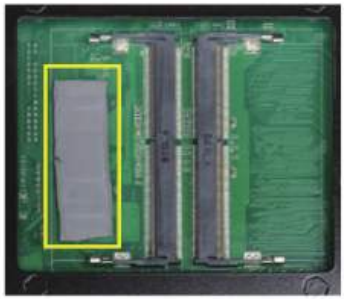


2. After the heat sink removed, you can see the slots reserved for DRAM & MSATA installation.

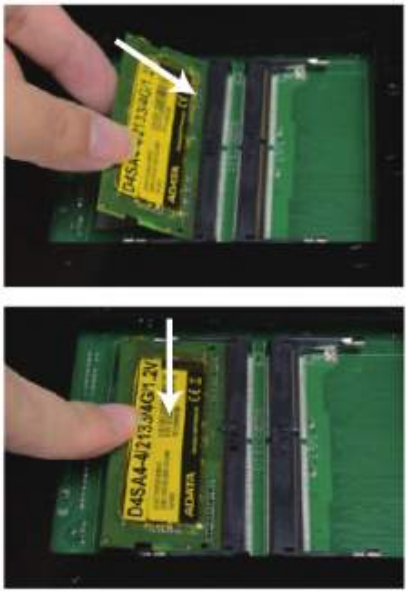


※Please check if the 25x25x1mm thermal pad above the CPU is complete. If it is broken, please take out the new product replacement in the accessory box. (P/N:HCS501HS2-F)

3. To install DRAM :



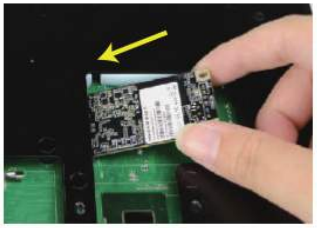
3-1. Paste the thermal pad of 45*15*2.0mm in the marked spot before DRAM installation to ensure that DRAM can operate normally while the vehicle is running. (P/N:HCS501HS1-F)



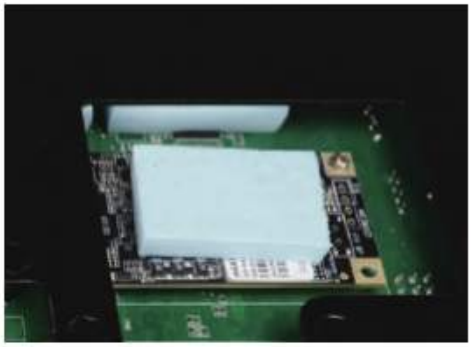
3-2. Then install the DRAM.

3-3. Finally, another thermal pad of 60*20*5 mm should be placed on top of the installed DRAM. (P/N:HCS3XXHS8-F)

4. To install MSATA card:



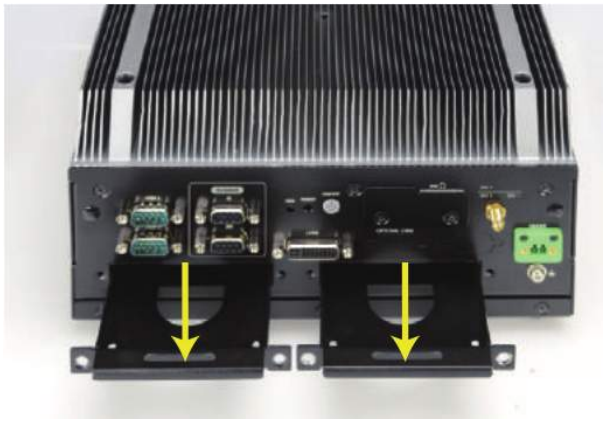
4-1. Install the MSATA Card.



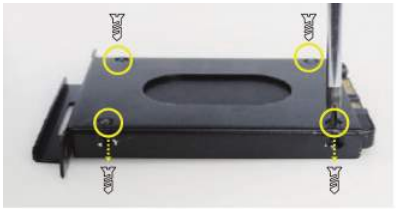
4-2. To effectively reduce the MSATA operating temperature, please attach a thermal pad of 30*20*5 mm on the top of the installed MSATA card. (P/N:HCS3XXHS8-F * 0.5pcs)

II. Install 2.5” HDD

1. Remove the 2* screws (M4) from the spots marked in circles to remove the HDD tray;



2. Fix the 2.5 "storage device on the tray by installing compatible screws (M3) to screw holes in the left & right sides and bottom side.



Reminder:
Traditional 2.5 "hard drives are not suitable for vibration situations, so it is recommended that customers install SSD as a better choice.

III. Install the mini-PCIE expansion card

1. Remove the bottom cover:

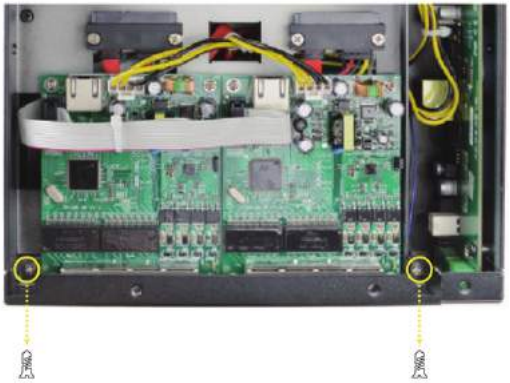
1-1. First put the bottom of the whole system up.

There are a total of 12* screws (M4) to be removed:

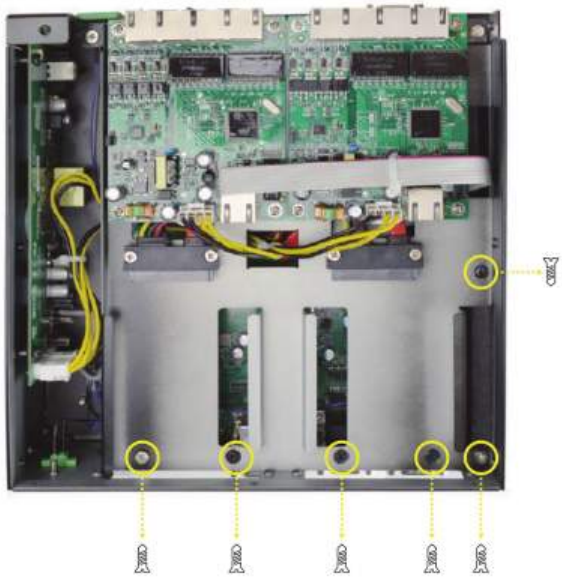
A. 3* screws at the bottom,
B. 3* screws beneath the HDD trays,
C. 3* screws on the right side
D. 3* screws on the left side of the bottom.

2. Remove the HDD tray.

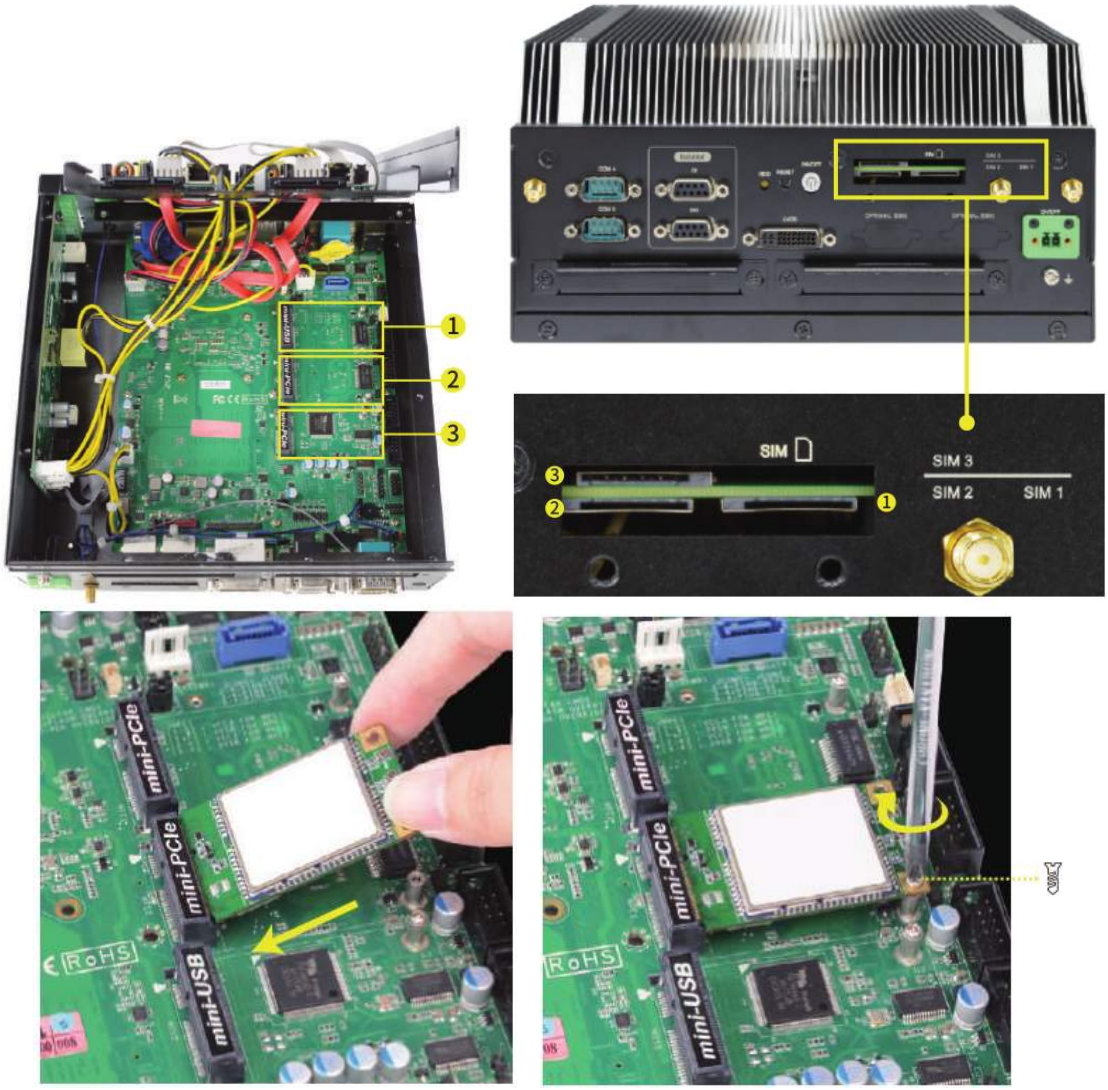
3. Remove the 2* screws (M4) in the marked circles that lick the POE cover.



4. Dissemble the HDD&POE plate holder by removing the 6*screws (M4) in the marked spots as below.



5. To install compatible Mini-PCIE expansion card in one of the 3 reserved spots as the photo shows



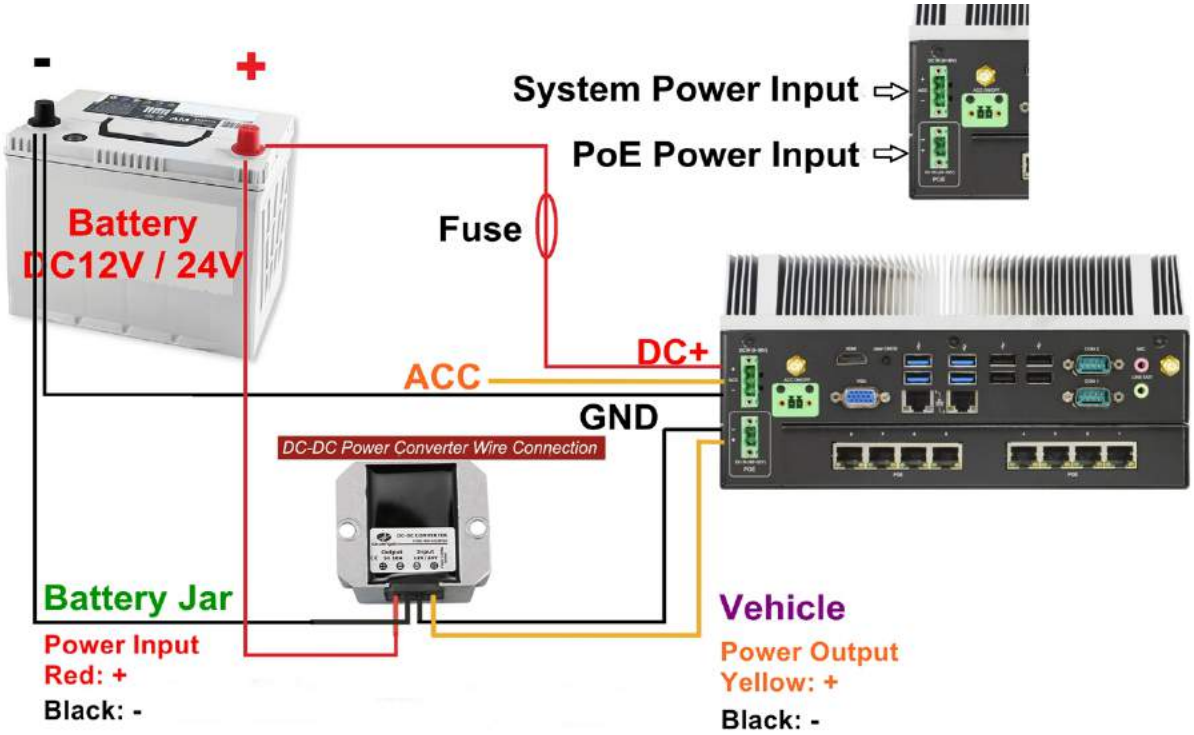
IV. Install SIM card

1. Remove screws (M4) that lock SIM card protective cover to the system; then remove the SIM card cover.

2. There are a total of 3* SIM card slots. Choose one of them to install SIM card.

3. Insert compatible SIM card into the slot with this side up.

IV. Power Connection Description



※ 3 wires from system power:

Positive (+): connecting to the positive pole of the battery (DC-12V).

**When the battery jar voltage is lower than 11.6V, the system has no power supply and cannot start.*

**When the battery jar voltage is higher than 36V, the built-in fuse in the system will automatically cut off the power.*

Negative (-): connecting to the negative pole of the battery (GND).

ACC contact fire line (Ignition).

Voltage detection range: 12V~36V

High voltage: power on; Low voltage: power off.

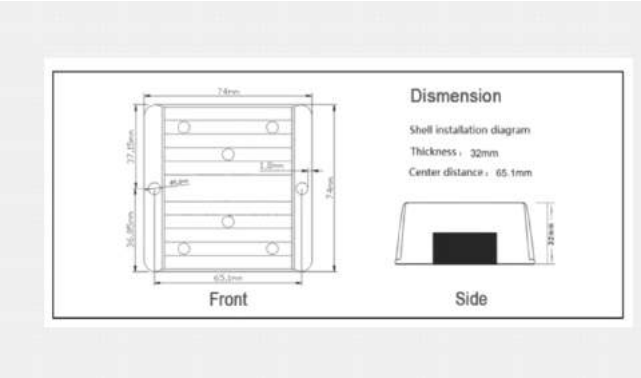
The maximum electric current for NF752 MB working voltage is within 10A.The fuse of the built-in TTPS power board in this system that will automatically cut off the power when system electric current exceeds 10A.

1. The diameter of positive/negative (+/-) power wires must be more than 1.5 mm.
2. Make sure that the voltage of the battery jar is within 9~36V range. Over voltage may burn out the system.
3. The host machine will automatically delay switch on when the car key turns on, and automatically delay switch off when the car key turns off.
4. Please seek advice from automaker for whether or not to connect fuse when installing the battery jar.

※Optional

POE power supply should be within DC 48~52V range. Users can purchase POE power module from us, or choose to purchase compatible POE power module on their own.

Brand	szwengao
Model	WG-12S4804
Input Voltage	12V DC
Input Voltage Range	9-16V DC
Conversion Efficiency	94%
Output Voltage	48V
Output Current	4A
Output Rated Power	192W
Operating Temperature	-35° - 80°
Waterproof Level	IP68
Overcurrent Protection	YES
Overload Protection	YES
Over Temperature Protection	YES
Dimension	74*74*32mm



Input(+): Red Wire
Input(-): Black Wire
Output(+): Yellow (White) Wire
Output(-): Black Wire

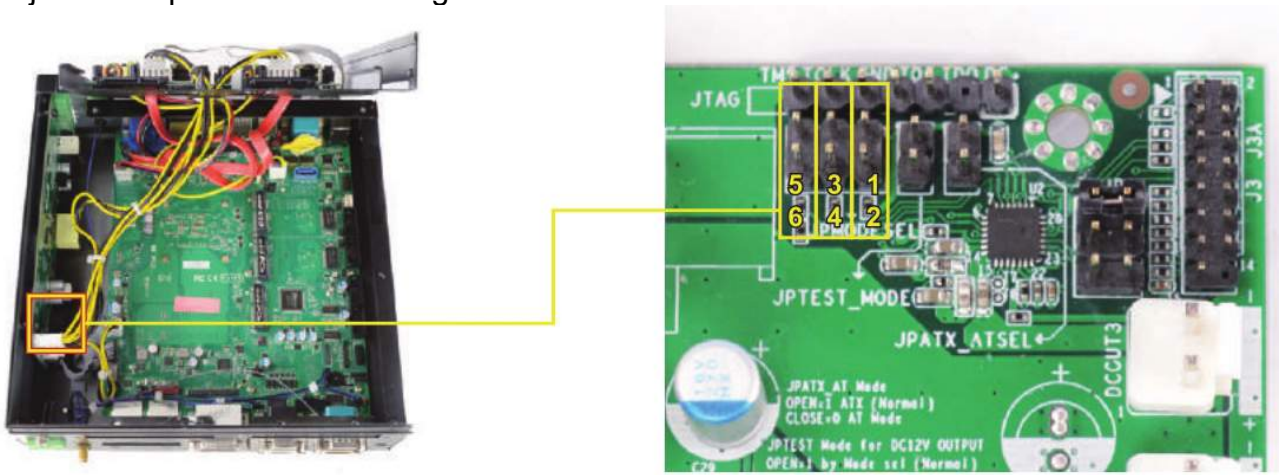
V. Introduction of Power Delay Start Mode

● With connection to ACC to control computer switch by starting vehicle ignition:

JPMODESEL						
Power mode	（1-2）	（3-4）	（5-6）	ACC_ON	ACC_OFF	ACC_OFF
				Power delay	Shutdown delay	Forced power outrage
Mode 1	CLOSED	CLOSED	CLOSED	5 Sec	15 Sec	25 Sec
Mode 2	OPEN	CLOSED	CLOSED	10 Sec	30 Sec	50 Sec
Mode 3	CLOSED	OPEN	CLOSED	30 Sec	60 Sec	90 Sec
Mode 4	OPEN	OPEN	CLOSED	60 Sec	180 Sec	210 Sec

Factory default setting is MODE 1, with 5 Sec for power delay, 15 sec for shutdown delay and 25 sec for forced power outrage.

※If you need to adjust Power Delay Start mode, you need to open the chassis and re-adjust ITPS power board settings:

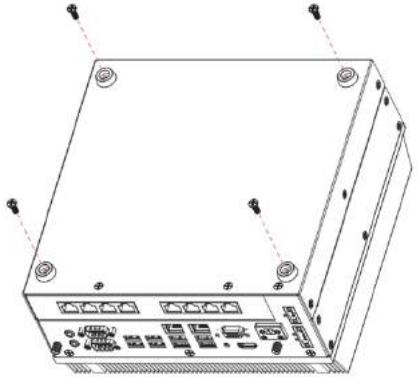


- User can also manually control the computer switch without ACC connection:

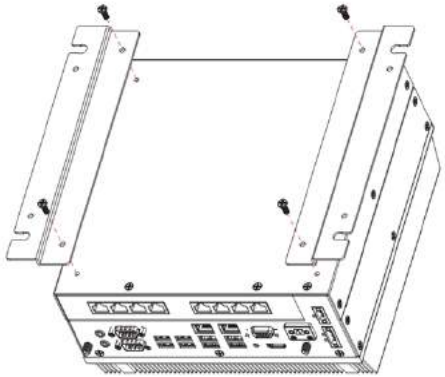
※In this case, please short circuit the ACC ON/OFF connector so that the switch can be changed to manual control mode.

VI. Shockproof Bracket Installation Steps

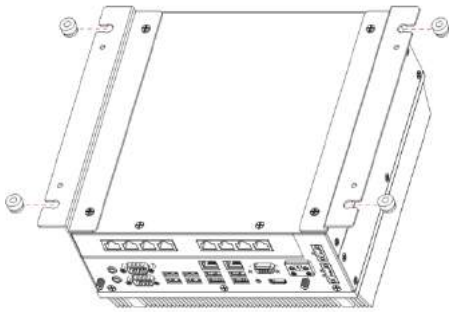
1. Turn over the machine with this side up and remove the 4 pads in the marked spots.



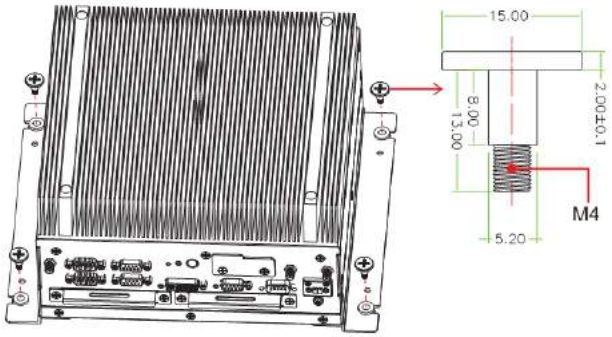
2. Find the shockproof brackets from the accessories package and lock the holders to system back cover with M4 screws, as the illustration shows.



3. Find the shockproof washers from the accessories package and plug the washers into corresponding spots of the shockproof brackets, as the illustration shows.



4. Turn over the system with the heat sink side upwards. Pick out the shockproof screws and lock them to corresponding spots of the washers, as the illustration shows.



※ Measurement Chart of Shockproof Brackets: