TECHNICAL MANUAL

Of

Intel H110 Express Chipset

Based Mini-ITX M/B

NO. G03-NF595-F

Revision: 2.0

Release date: October 1, 2019

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 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
2.0	Second Edition	October 1, 2019

Item Checklist

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

Chapter 1
Introduction of the Motherboard

1-1 Feature of Motherboard

- Intel® H110 express chipset
- Support LGA 1151 CPU socket Intel® Core™ i7 processors / Intel® Core™ i5 processors / Intel® Core™ i3 processors / Intel® Pentium™ processors , Intel® Celeron™ processors (TDP $\leqslant 65$ W).
- Support 2* DDR4 2133MHz SO-DIMM up to 32GB and dual channel function
- Integrated with Intel i219V Gigabit Ethernet LAN chip
- Integrated with RealTek ALC662-VD-GR 6-channel HD Audio Codec
- Support USB 3.0 data transport demand
- Support 2 * SATAIII (6Gb/s) Devices
- Support 1* PCIE 2.0 x1 slot and 1* full-size Mini-PCIE slot
- Support1* full-size mSATA slot
- Support Smart FAN function
- Supports ACPI S3 Function
- Compliance with ErP Standard
- Support Watchdog Timer Technology

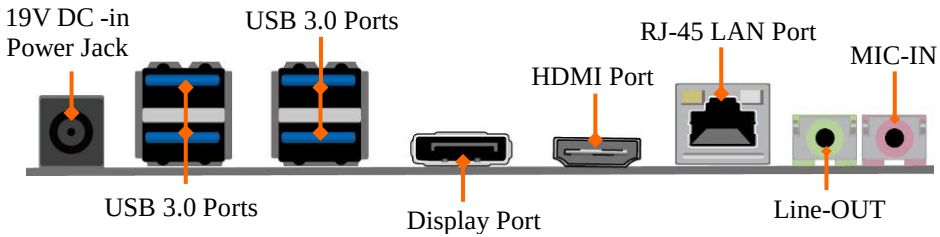
1-2 Specification

Spec	Description
Design	● Thin mini-ITX form factor 6 layers ; PCB size: 17.0x17.0cm
Chipset	● Intel H110 Express Chipset
CPU Socket	● Support Intel® LGA 1151 Socket Core™ i7 processors, Intel® Core™ i5 processors, Intel® Core™ i3 processors, Intel® Pentium™ processors, Intel® Celeron™ processors ** for detailed CPU support information please visit our website*
Memory Slot	● 2*DDR4 SO-DIMM slot ● Support DDR4 2133 MHz SO-DIMM up to 32GB ● Support dual channel function
Expansion Slot	● 1* PCIE x 1 slot ● 1* Full-size Mini-PCIE slot
Storage	● 2* SATA III 6G/s connector ● 1 * full-size M-SATA slot
Gigabit LAN Chip	● Integrated with Intel i219V Gigabit LAN PHY chip ● Support Fast Ethernet LAN function of providing 10/100/1000 Mbps Ethernet data transfer rate
Audio Chip	● Realtek ALC662-VD-GR 5.1 channel Audio Codec integrated ● Audio driver and utility included
BIOS	● 64M SMT Flash ROM
Multi I/O	***Rear Panel I/O:*** ● 1* 19V DC-in power jack ● 4* USB 3.0 port ● 1* Display port ● 1* HDMI port ● 1* RJ-45 port ● 1* Line-OUT jack ● 1* MIC-IN jack

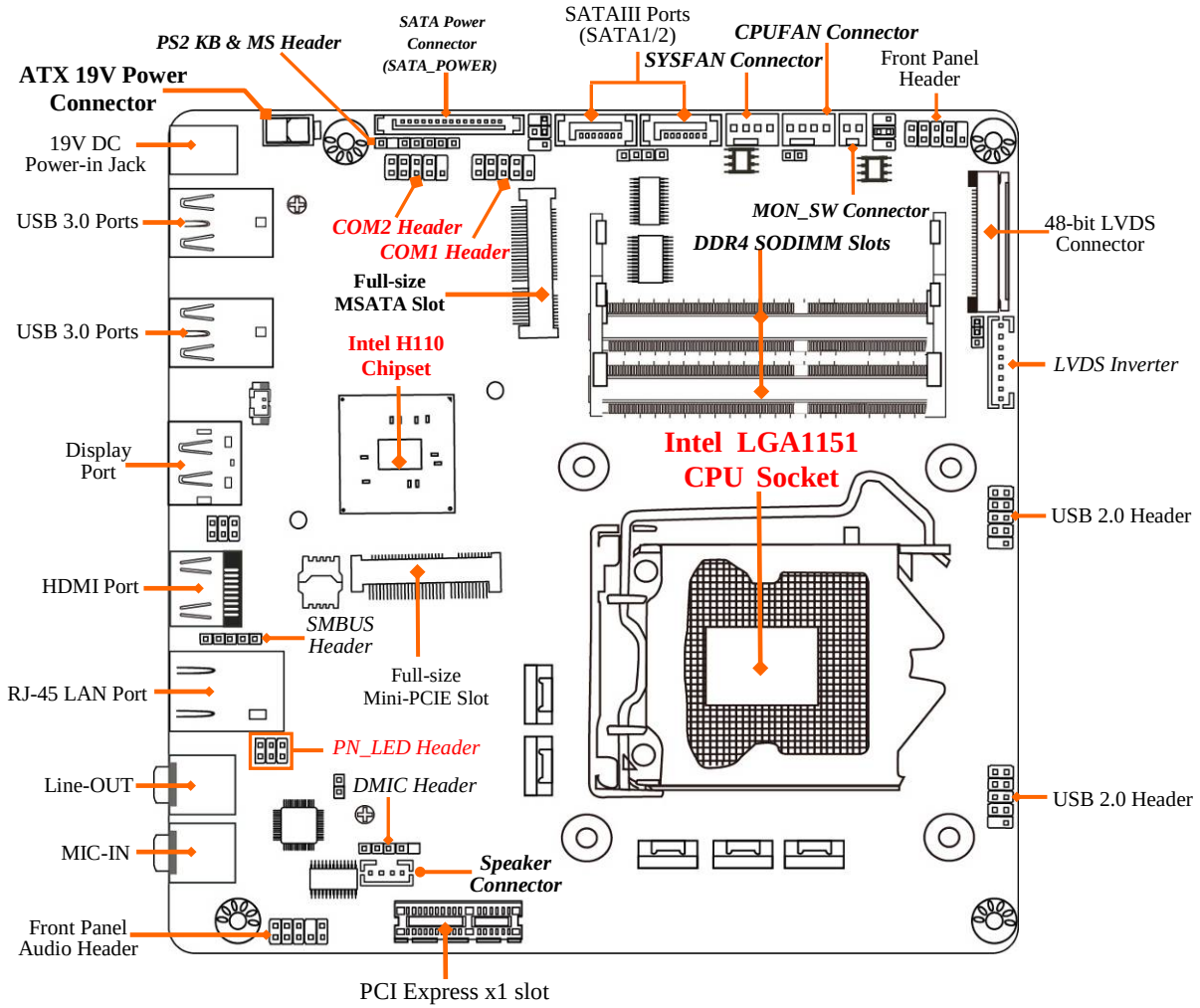
	Internal I/O Connectors& Headers: ● 1 *2-pin ATX19V internal power connector ● 1 * SATA power connector ● 1* SPEAK_CON connector ● 1*MON_SW connector ● 1*LVDS connector ● 1*LVDS inverter connector ● 1* EDP connector (optional) ● 1* CPUFAN connector & 1* SYSFAN connector ● 1*Front panel audio header ● 1* PN_LED header (for LAN activity LED/ Blue tooth activity LED/ WIFI activity LED) ● 1*DMIC_CON header ● 2 * 9-Pin USB 2.0/1.1 header for 4* USB 2.0/1.1 ports ● 1* SMBUS header ● 1*Front panel header ● 1* RS232/422/485 serial port header (COM1) ● 1* RS232 serial port header (COM2) ● 1 * PS2 Keyboard & Mouse header

1-3 Layout Diagram

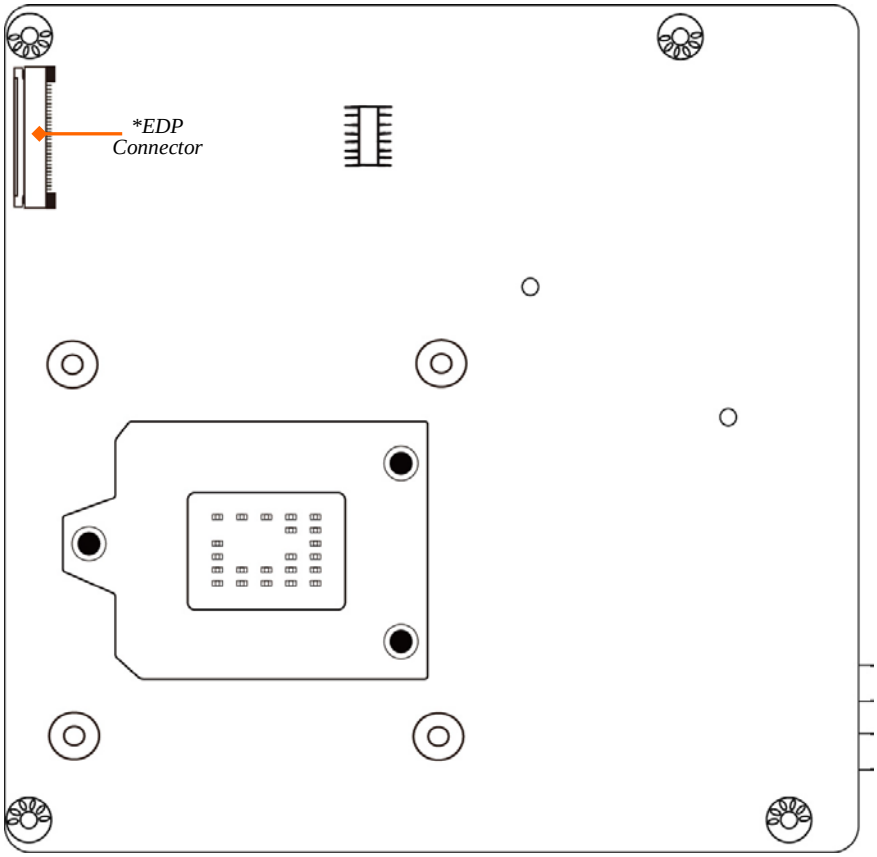
Rear IO Diagram



Motherboard Internal Diagram-Front

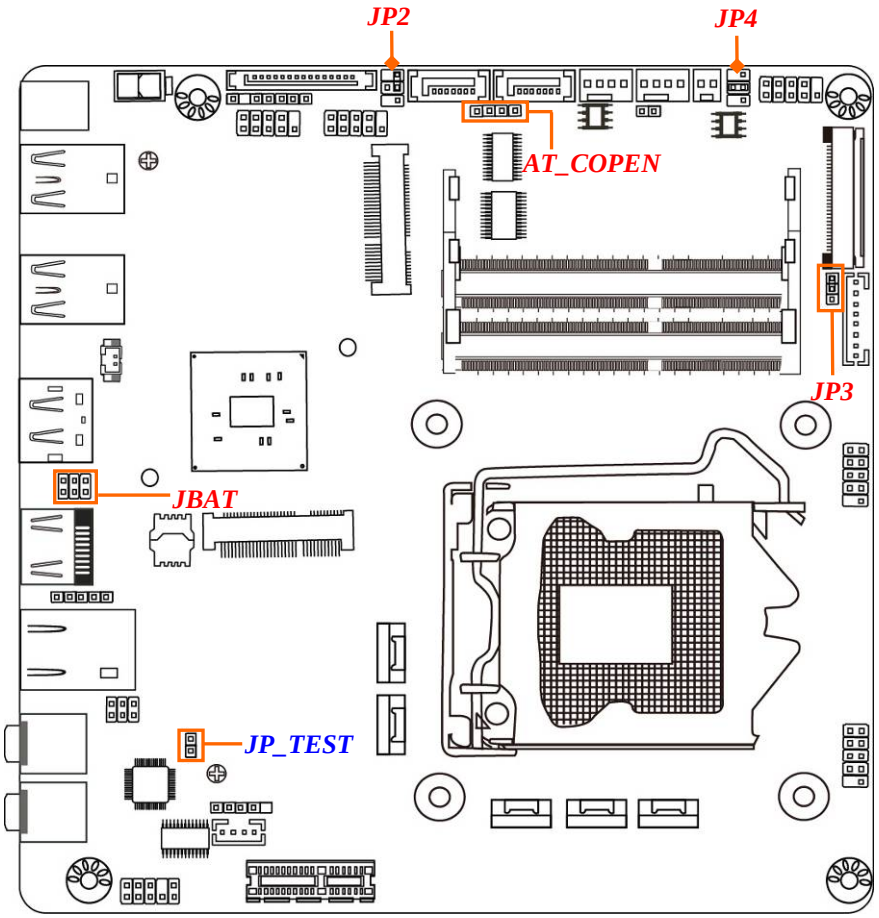


Motherboard Internal Diagram-Back



***Note: EDP connector** is only optional by order.*

Motherboard Jumper Position



Connectors

Connector	Name
DCIN	19V DC-in Power Jack
ATX2P	Internal 19V DC-in Power Connector
USB30/USB31	USB 3.0 Connector X4
DP	Display Port Connector
HDMI	High-Definition Multimedia Interface
LAN	RJ-45 LAN Connector
FP_HP	Front Panel Line-out Connector
FP_MIC	Front Panel MIC-in Connector
SATA_POWER	SATA Power Connector
SATA1/2	SATAIII Connector
MSATA	Full-size MSATA Connector
MPE	Full-size Mini-PCIE Connector
SPEAK_CON	Speaker Connector
MON_SW	Monitor Switch Connector
LVDS	LVDS Connector
INVERTER	Panel Inverter Connector
EDP (Optional)	EDP Connector
SYSFAN,CPUFAN	FAN Connector X2

Headers

Header	Name	Description
FP_AUDIO	Front Panel Audio Header	9-pin Block
PN_LED	LED Header (LAN/Bluetooth/WIFI Activity LED)	6-pin Block
DMIC_CON	DMIC Header	4-pin Block
FP_USB20/FP_USB21	USB Header X2	9-pin Block
SMBUS	SMBUS Header	5-pin Block
JW_FP	Front Panel Header(PWR LED/ HD LED/Power Button /Reset)	9-pin Block

COM1/COM2	Serial Port Header	9-pin Block
PS2KBMS	PS2 Keyboard & Mouse Header	6-pin Block

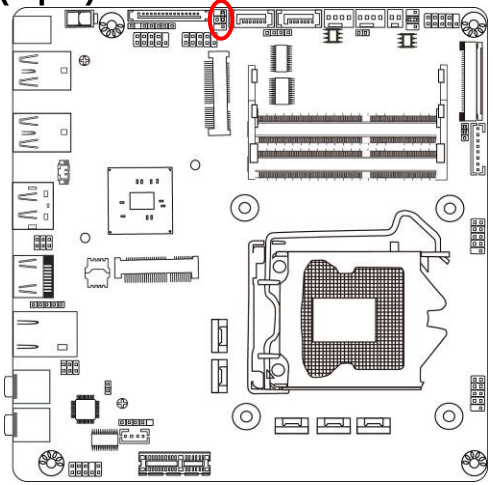
Jumper

Jumper	Name	Description
JP2	COM1 Port Pin9 Function Select	4-pin Block
JP4	LCD Panel VCC 3.3V /5V/12V Select	4-pin Block
JP3	Inverter Backlight VCC 12V/19V Select	3-pin Block
AT_COEPN	***Pin (1-2):*** ATX Mode / AT Mode Select ***Pin (3-4):*** Case Open Message Display Function	4-pin Block
JBAT	***Pin(1-2)***:Clear CMOS RAM Setting ***Pin(3-4):*** Flash Descriptor Security Override ***Pin(5-6):***POK Override	6-pin Block

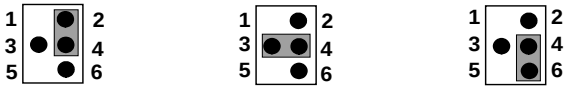
Chapter 2
Hardware Installation

2-1 Jumper Setting

JP2 (4-pin): COM1 Port Pin9 Function Select



JP2→COM1Header Pin-9

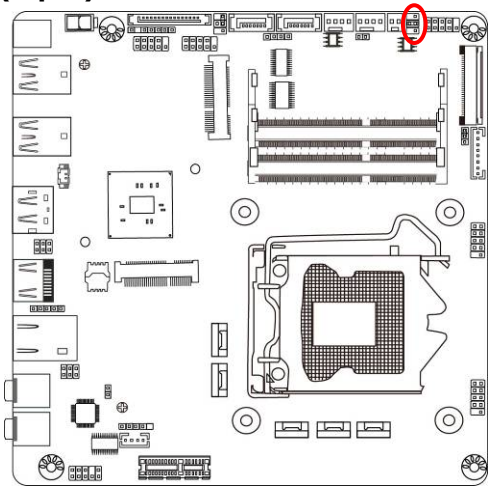


2-4 Closed: Pin9=RING;

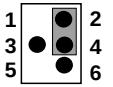
3-4 Closed: Pin9=5V;

4-6 Closed: Pin9=12V.

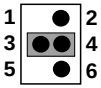
JP4 (4-pin): LCD Panel VCC 3.3V/5V/12V Select



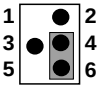
JP4→LCD Panel VCC



2-4 Closed: LCD VCC= 3.3V;

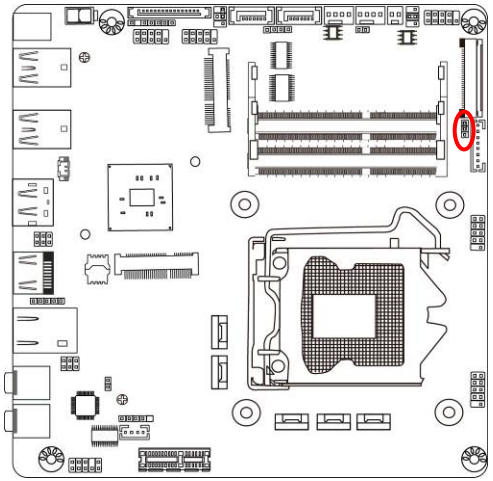


3-4 Closed: LCD VCC= 5V;

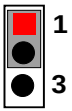


4-6 Closed: LCD VCC= 12V.

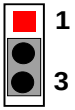
JP3 (3-pin): INVERTER Backlight VCC 12V/19V Select



JP3→INVERTER Backlight VCC

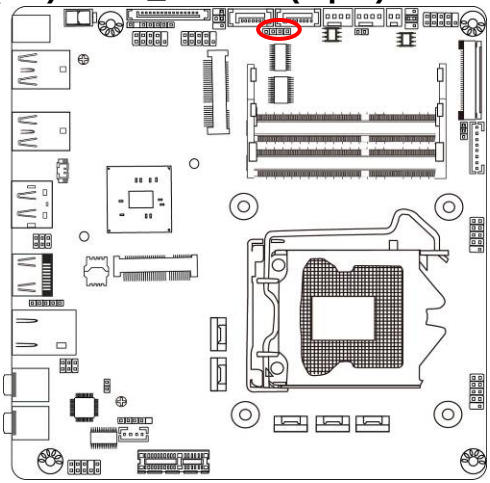


1-2 Closed: Inverter backlight VCC= 12V;



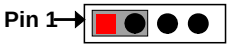
2-3 Closed: Inverter backlight VCC=19V.

Pin (1-2) of AT_COPEN (4-pin): ATXMode/ AT Mode Select



Pin(1-2) of AT_COPEN→ATX/AT Mode Select

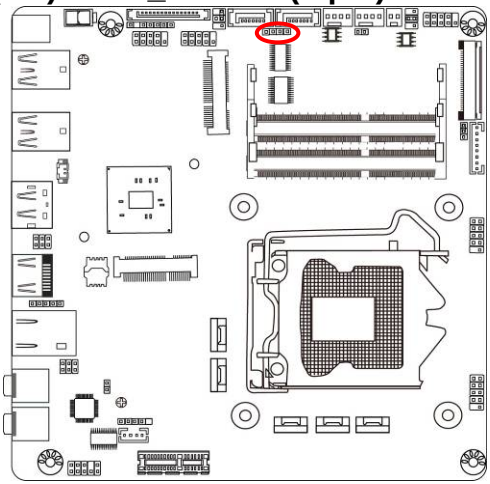
1-2 Open: ATX Mode Selected(Default);



1-2 Close: 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 (3-4) of AT_COPEN (4-pin):Case Open Message Display Function Select



Pin(3-4) of AT_COPEN→Case Open Dectection

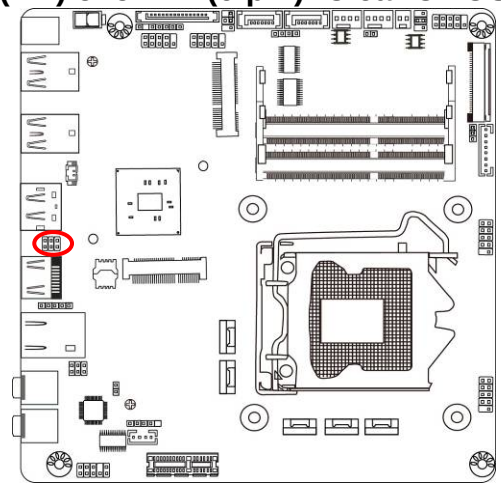
3-4 Open: Normal(Default);

3-4 Close: Case Open Function Selected (One Touch).

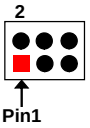
Pin (3-4) Close: *When Case open function pin short to GND, the Case open function was detected. When Used, needs to enter BIOS and enable 'Case Open*

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.

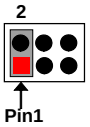
Pin (1-2) of JBAT (6-pin): Clear CMOS RAM Setting



Pin (1-2) of JBAT→ Clear CMOS

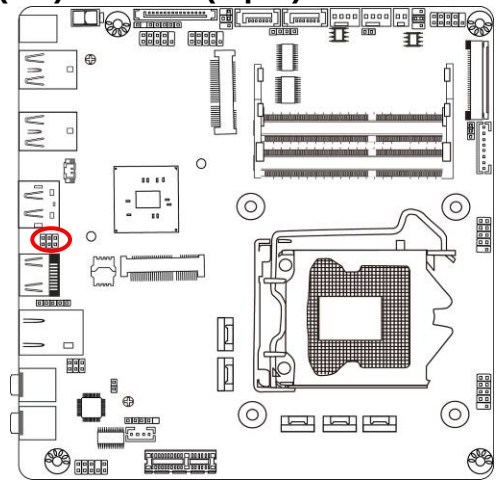


1-2 Open: Normal(Default);

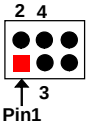


1-2 Closed: Clear CMOS.

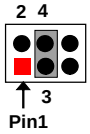
Pin (3-4) of JBAT (6-pin): Flash Descriptor Security Override



Pin (3-4) of JBAT→ Flash Override

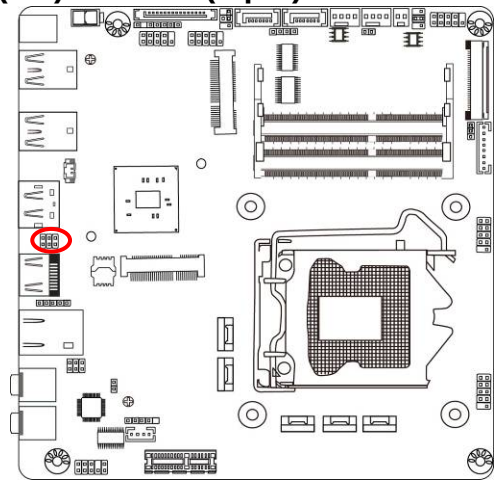


3-4 Open: Enable Security Measures in the Flash Descriptor(Default);

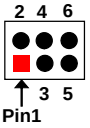


3-4 Closed: Disable Security Measures in the Flash Descriptor(Override).

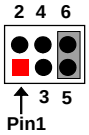
Pin (5-6) of JBAT (6-pin): POK Override



Pin (5-6) of JBAT→POK Override



5-6 Open: Normal(Default);

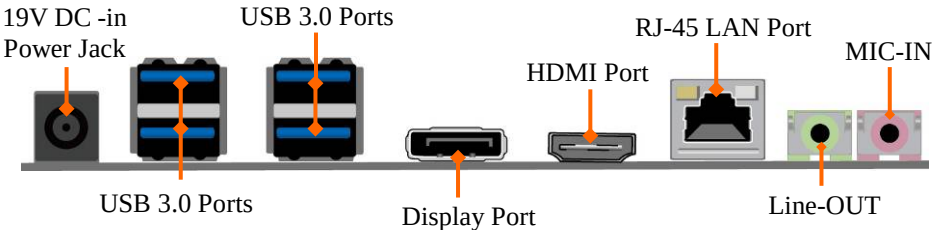


5-6 Closed: POK Override.

2-2 Connectors and Headers

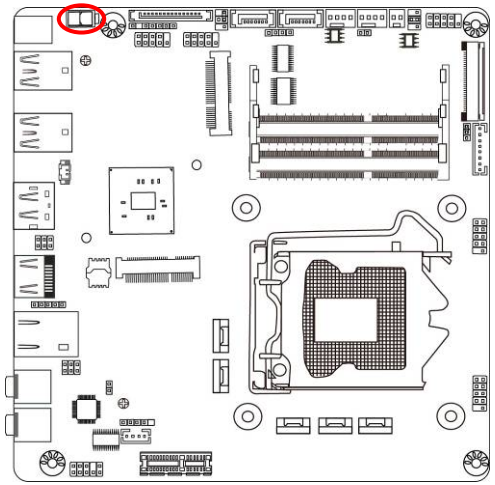
2-2-1 Connectors

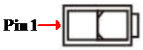
(1) Rear Panel Connectors



Icon	Name	Function
	**19V DC-in Power Connector**	For user to connect compatible power adapter to provide power supply for the system.
	**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.
	**Display Port**	To the system to corresponding display device with compatible display port cable.
	**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.
	**Line-Out Connector**	For user to connect external speaker, earphones, etc to transfer system audio output.
	**MIC Connector**	User can connect microphone device to this port.

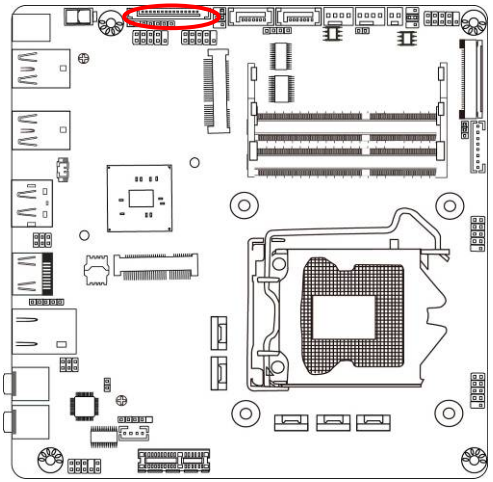
(2) ATX2P (2-pin block): ATX19V Type power connector





Pin No.	Definition
1	GND
2	+19V

(3) SATAPWR (15-pin block): SATA power connector

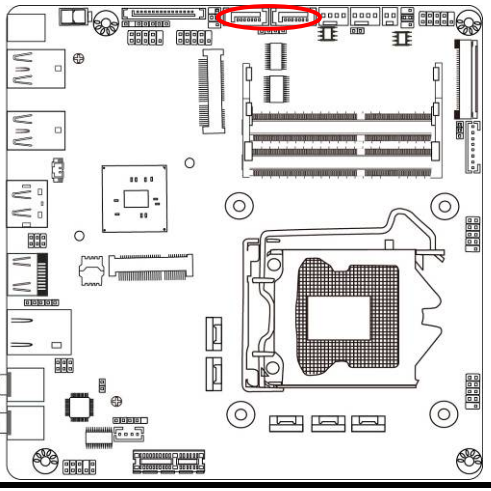


SATA Power Connector

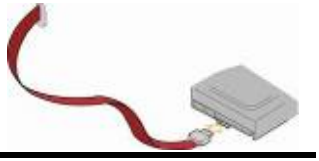
Pin NO.	Definition
Pin 1	NC
Pin 2	NC
Pin 3	NC
Pin 4	GND1
Pin 5	GND1
Pin 6	GND1
Pin 7	+5V
Pin 8	+5V
Pin 9	+5V
Pin 10	GND2
Pin 11	NC
Pin 12	GND2
Pin 13	+12V
Pin 14	+12V
Pin 15	+12V

(4) SATA1/SATA2 (7-pin): SATA III Port connector

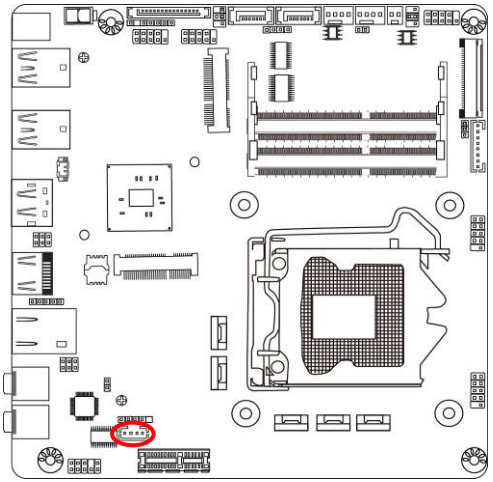
SATA1&SATA2 are high-speed SATAIII port that supports 6 GB/s transfer rate.

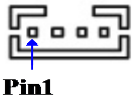


Pin No.	Defnition
1	GND
2	TXP
3	TXN
4	GND
5	RXN
6	RXP
7	GND



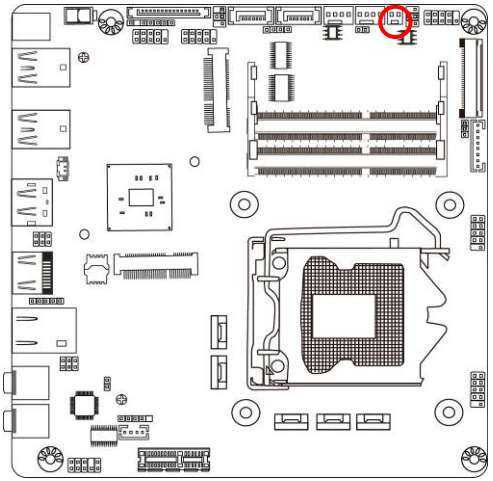
(5) SPEAK_CON (4-pin block): Speaker Connector

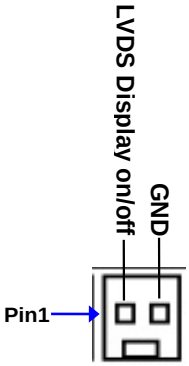




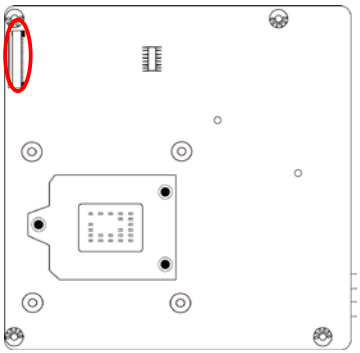
Pin No.	Definition
1	L-
2	L+
3	R+
4	R-

(6) MON_SW (2-Pin): Monitor Switch Connector





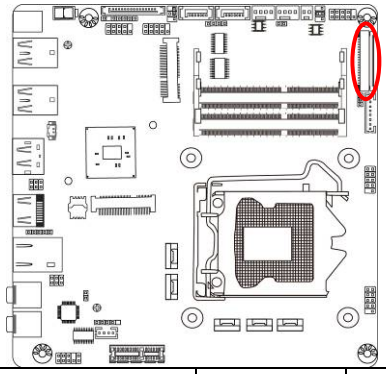
(7) EDP(40-pin): EDP Connector



EDP connector is optional by order.

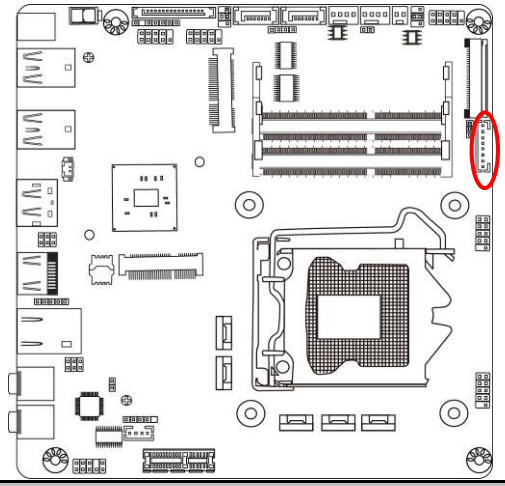
Pin No.	Pin Define	Pin No.	Pin Define
Pin 1	NC	Pin 2	GND
Pin 3	EDP_DATA3N	Pin 4	EDP_DATA3P
Pin 5	GND	Pin 6	EDP_DATA2N
Pin 7	EDP_DATA2P	Pin 8	GND
Pin 9	EDP_DATA1N	Pin 10	EDP_DATA1P
Pin 11	GND	Pin 12	EDP_DATA0N
Pin 13	EDP_DATA0P	Pin 14	GND
Pin 15	EDP_AUXP	Pin 16	EDP_AUXN
Pin 17	GND	Pin 18	LCD_VCC
Pin 19	LCD_VCC	Pin 20	LCD_VCC
Pin 21	LCD_VCC	Pin 22	NC
Pin 23	GND	Pin 24	GND
Pin 25	GND	Pin 26	GND
Pin 27	EDP_HPD	Pin 28	GND
Pin 29	GND	Pin 30	GND
Pin 31	GND	Pin 32	LCD_BKLT_EN
Pin 33	LCD_BKLT_PWR	Pin 34	NC
Pin 35	NC	Pin 36	LVDS_BKLT_PWR Option
Pin 37	LVDS_BKLT_PWR Option	Pin 38	LVDS_BKLT_PWR Option
Pin 39	LVDS_BKLT_PWR Option	Pin 40	NC

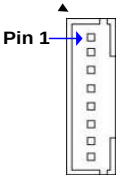
(8) LVDS(40-pin): 48-bit LVDS Connector



Pin No.	Pin Define	Pin No.	Pin Define
Pin 1	LVDSA_DATAP3	Pin 2	LVDSA_DATAN3
Pin 3	LVDSA_DATAP2	Pin 4	LVDSA_DATAN2
Pin 5	LVDSA_DATAP1	Pin 6	LVDSA_DATAN1
Pin 7	LVDSA_DATAP0	Pin 8	LVDSA_DATAN0
Pin 9	LVDSB_DATAP3	Pin 10	LVDSB _DATAN3
Pin 11	LVDSB_DATAP2	Pin 12	LVDSB _DATAN2
Pin 13	LVDSB_DATAP1	Pin 14	LVDSB _DATAN1
Pin 15	LVDSB_DATAP0	Pin 16	LVDSB _DATAN0
Pin 17	GND	Pin 18	LCD_VCC
Pin 19	LCD_VCC	Pin 20	LCD_VCC
Pin 21	NC	Pin 22	EDID_3V3 Option
Pin 23	GND	Pin 24	GND
Pin 25	GND	Pin 26	LVDS_CLKAP
Pin 27	LVDS_CLKAN	Pin 28	GND
Pin 29	GND	Pin 30	GND
Pin 31	LVDS_DDC_CLK	Pin 32	LCD_BKLT_EN
Pin 33	LCD_BKLT_PWM	Pin 34	LVDS_CLKBP
Pin 35	LVDS_CLKBN	Pin 36	LVDS_BKLT_PWR option
Pin 37	LVDS_BKLT_PWR option	Pin 38	LVDS_BKLT_PWR option
Pin 39	NC	Pin 40	LVDS_DDC_DATA

(9) INVERTER (8-pin): LVDS Inverter Connector

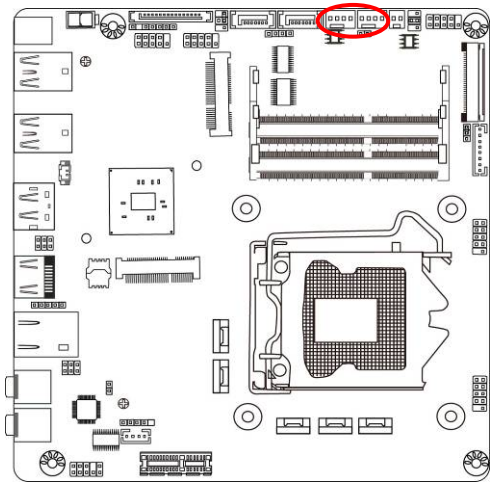


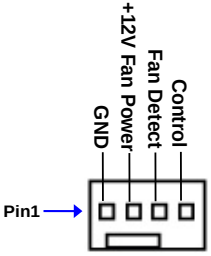


Pin No.	Definition
1	Backlight Enable
2	Backlight Duty
3	PVCC
4	PVCC
5	GND
6	GND
7	Brightness up
8	Brightness down

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!!*

(10) CPUFAN/SYSFAN (4-pin): Fan Connector

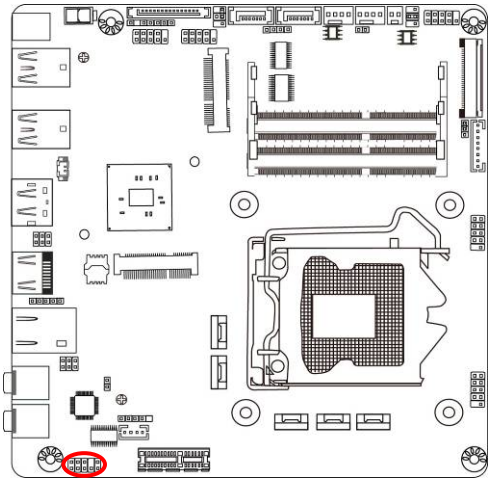


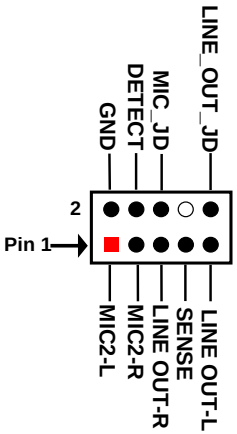


2-2-2 Headers

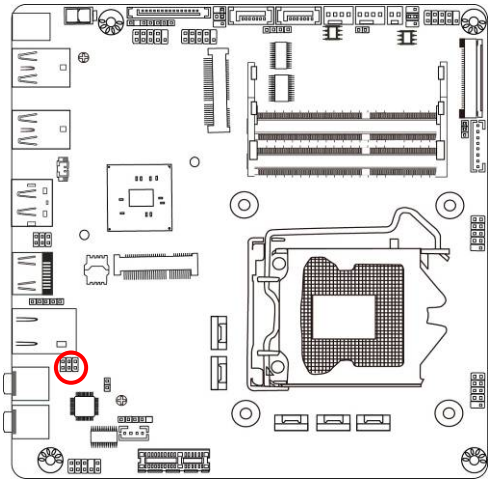
(1) FP_AUDIO (9-pin): Line-Out, MIC-In Header

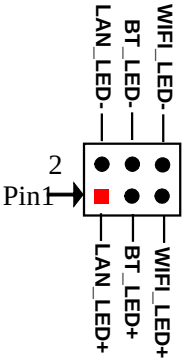
This header connects to Front Panel Line-out, MIC-In connector with cable.



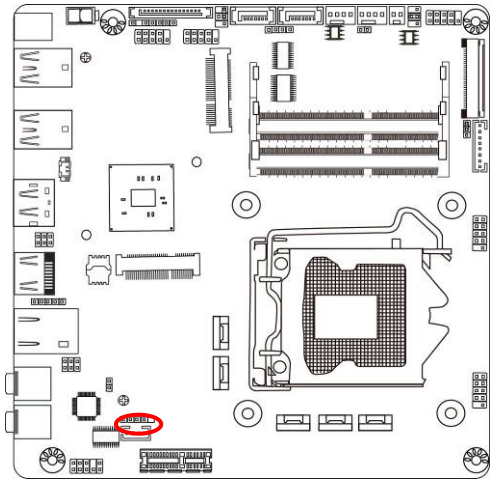


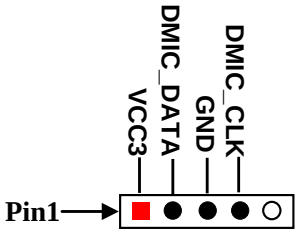
(2) PW_LED (6-pin): LED Header



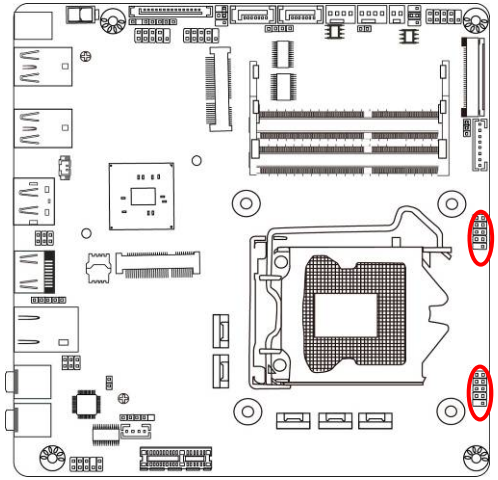


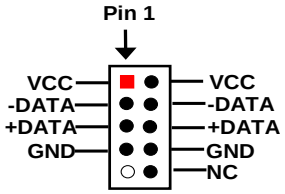
(3) DMIC_CON (4-Pin): DMIC Header



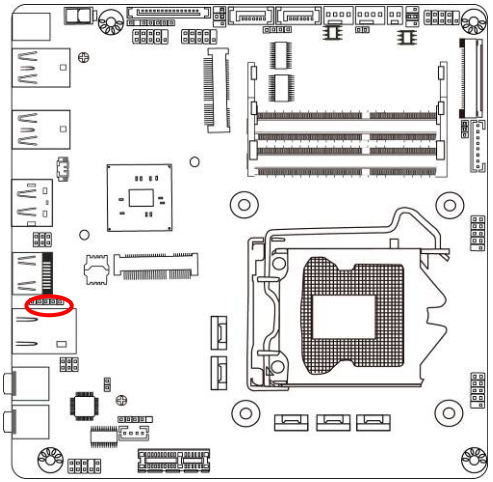


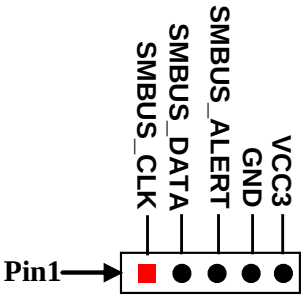
(4) F_USB20/F_USB21 (9-pin): USB 2.0 Port Headers



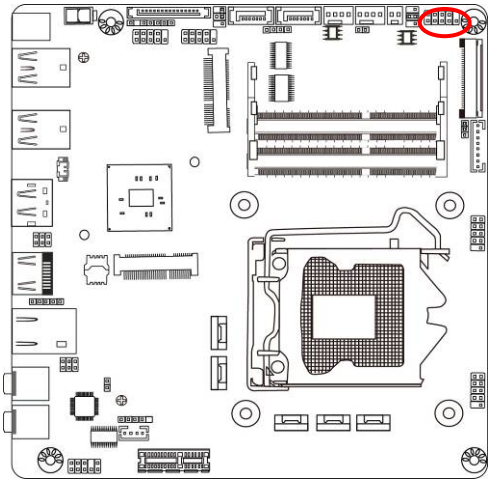


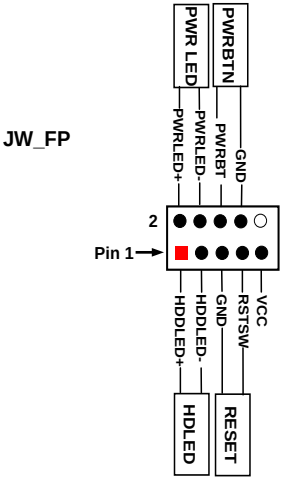
(5) SMBUS (4-Pin): SMBUS Header



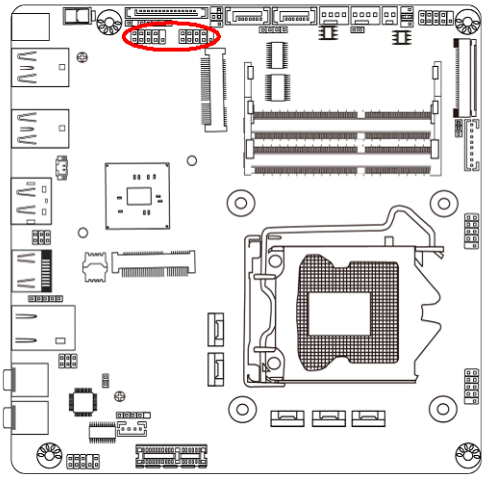


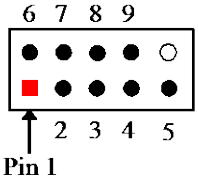
(6) JW-FP (9-pin): Front Panel Header





(7) COM1/COM2 (9-pin): RS232(/422/485) Serial Port Header

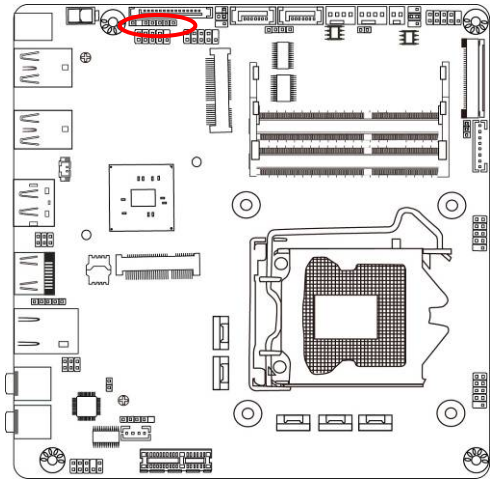


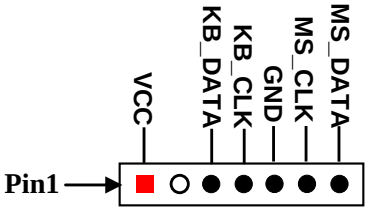


Pin NO.	RS232	*RS422 (COM1)	*RS485 (COM1)
Pin 1	DCD	TX-	DATA-
Pin 2	RXD	TX+	DATA+
Pin 3	TXD	RX+	NC
Pin 4	DTR	RX-	NC
Pin 5	GND	GND	GND
Pin 6	DSR	NC	NC
Pin 7	RTS	NC	NC
Pin 8	CTS	NC	NC
Pin 9	RI	NC	NC

Notice: COM1 servers as RS232 serial port header in most cases.RS422 & RS485 function is only optional to customized models. *User also needs to go to BIOS to set '**Transmission Mode Select**' for COM1 as [RS422] or [RS485] for boards that support RS422/485 function before connecting compatible COM cable to COM1 header.*

(8) PS2KBMS (6-pin): PS/2 Keyboard & Mouse 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.

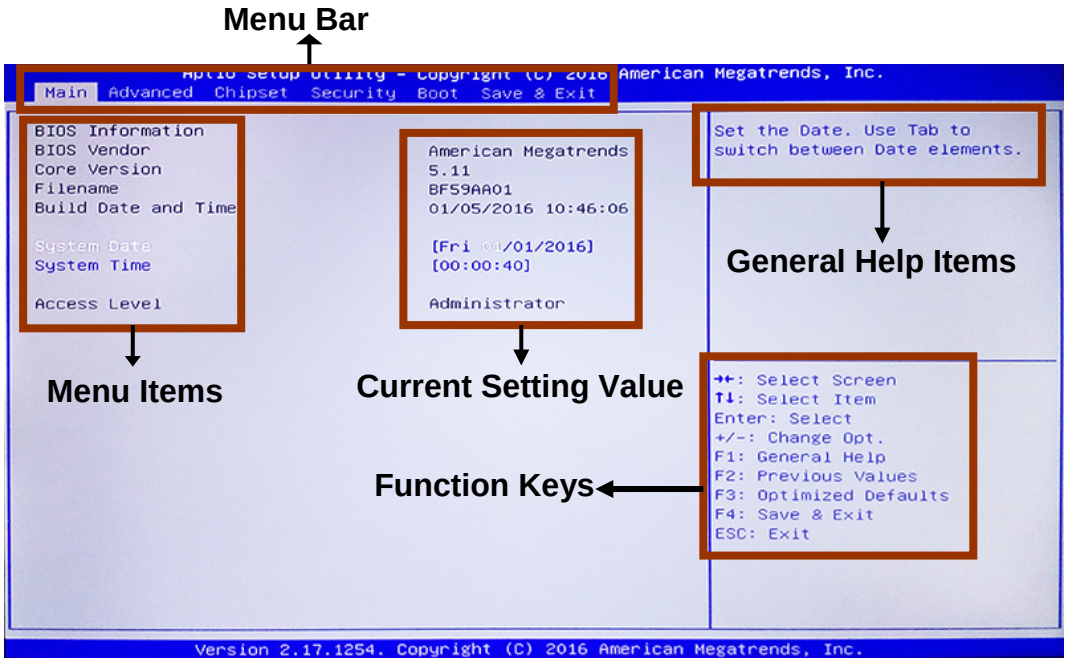
3-1 Entering Setup

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

3-2 BIOS Menu Screen

The following diagram show a general BIOS menu screen:



BIOS Menu Screen

3-3 Function Keys

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

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

- Press <+>/<–> keys when you want to modify the BIOS parameters for the active option.
- [F1]: General help.
- [F2]: Previous values.
- [F3]: Optimized defaults.
- [F4]: Save & Exit.
- Press <Esc> to exit from BIOS Setup.

3-4 Getting Help

Main Menu

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

Status Page Setup Menu/Option Page Setup Menu

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

3-5 Menu Bars

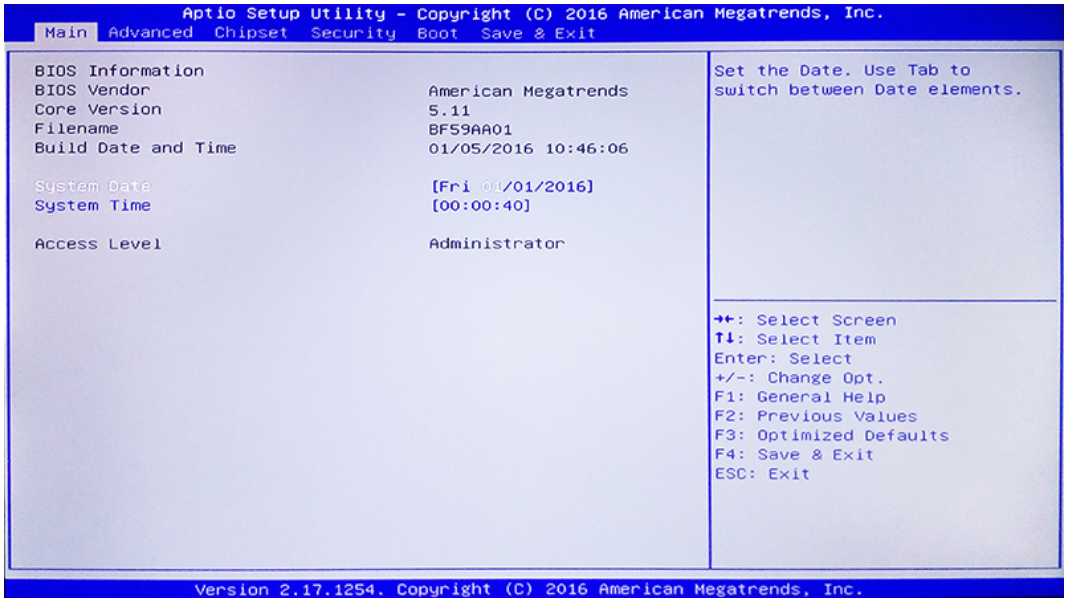
There are six menu bars on top of BIOS screen:

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

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

3-6 Main Menu

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



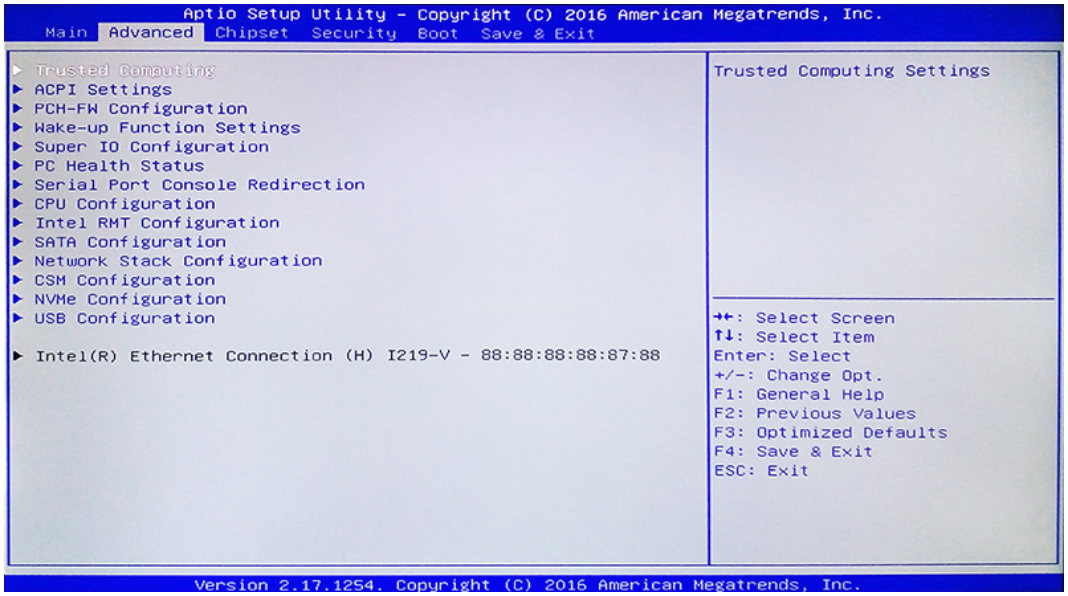
System Date

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

System Time

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

3-7 Advanced Menu



► **Trusted Computing**

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

Security Device Support

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

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

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

TPM State

Use this item to enable or disable security device. Your computer will reboot during restart to change state of device.

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

Pending Operation

Use this item to schedule an operation for the security device. Your computer will reboot during restart to change state of device.

The optional settings: [None]; [TPM Clear].

Device Select
The optional settings: [TPM 1.2]; [TPM 2.0]; [Auto].
TPM 1.2 will restrict support to TPM 1.2 devices. TPM 2.0 will restrict support to TPM 2.0 devices. Auto will support both with de default set to TPM 2.0 devices if not found, TPM 1.2 devices will be enumerated.
**Note: 'Device Select' will only show up when user goes to → 'PCH-FW Configuration'→ 'TPM Device Selection' and set 'TPM Device Selection' as [dTPM1.2], save this settings & exit and restart the system.*

► **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)].

► **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: [dTPM1.2]; [PTT].
[PTT]: Enable PTT in SkuMgr.
[dTPM1.2]: Enable dTPM1.2 in SkuMgr.
***Warning:** PTT/dTPM will be disabled and all data saved on it will be lost.PPT supports UEFI OS only.

► **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.*

► **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

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

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

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

USB S3/S4 Wake-up

Use this item to enable or disable USB S3/S4 wakeup. This function is only supported when ERP function is disabled.

**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 I/O 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**

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

Serial Port

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

Change Settings

Use this item to select an optimal setting for super IO device.

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 FIF0 Mode

The optional settings are: [16-Byte FIF0]; [32-Byte FIF0]; [64-Byte FIF0]; [128-Byte FIF0].

► **Serial Port 2 Configuration**

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

Serial Port

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

Change Settings

Use this item to select an optimal setting for super IO device.

WatchDog Reset Timer

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

WatchDog Reset Timer Value

User can set a value in the range of [10] to [255].

WatchDog Reset Timer Unit in ERP

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

ATX Power Emulate AT Power
This item support Emulate AT power function, MB power On/Off control by power supply. Use needs to select 'AT or ATX Mode' on MB jumper at first (refer to ***Page 10*** , AT_MODE jumper for ATX Mode & AT Mode Select).

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

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

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

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

Shutdown Temperature

Use this item to select system shutdown temperature.

The optional settings are: [Disabled]; [70°C/156°F]; [75°C/164°F]; [80°C/172°F]; [85°C/180°F]; [90°C/188°F].

- **Serial Port Console Redirection**

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

COM1

Console Redirection

Use this item to enable or disable COM1 Console Redirection.

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

*When set as [Enabled], user can make further settings in the '**Console Redirection Settings**' screen:*

- **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 sub-items.

Terminal Type

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

Bits per second

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

Data Bits

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

Parity

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

Stop Bits

The optional settings are: [1]; [2].

Flow Control

The optional settings are: [None]; [Hardware RTS/CTS].

VT-UTF8 Combo Key Support
The optional settings are: [Disabled]; [Enabled].
Recorder Mode
The optional settings are: [Disabled]; [Enabled].
Resolution 100x31
The optional settings are:[Disabled]; [Enabled].
Legacy OS Redirection Resolution
The optional settings are: [80x24]; [80x25].
Putty Keypad
The optional settings are: [VT100]; [LINUX]; [XTERMR6]; [SCO]; [ESCN]; [VT400].
Redirection After BIOS POST
The optional settings are: [Always Enable]; [BootLoader].

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

Console Redirection
The optional settings: [Disabled]; [Enabled].
*When set as [Enabled], user can make further settings in '**Console Redirection Settings**' screen:*

- **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 sub-items.
Out-of-Band Mgmt Port
The optional settings are: [COM1]; [COM1(Pci Bus0, Dev0, Func0) (Disabled)].
Terminal Type
The optional settings are: [VT100]; [VT100+]; [VT-UTF8]; [ANSI].
Bits per second
The optional settings are: [9600]; [19200]; [57600]; [115200].
Flow Control
The optional settings are: [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.*

► **CPU Configuration**

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

Intel Virtualization Technology
The optional settings: [Enabled]; [Disabled].
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 prefecher.
The optional settings: [Disabled]; [Enabled].

Adjacent Cache Line Prefetch
Use this item to turn on/off prefeching 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 Status
Use this item to enable or disable CPU C status.
The optional settings: [Disabled]; [Enabled].

Package C State Limit
The optional settings are: [C0/C1]; [C2]; [C3]; [C6]; [C7]; [C7s]; [C8]; [AUTO].

► **Intel RMT Configuration**

Press [Enter] to go to next screen to enable or disable '**Intel Ready Mode**

Technology'.
Intel Ready Mode Technology
The optional settings: [Disabled]; [Enabled].

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

Intel RMT State
Use this item to enable or disable Intel RMT enabling status in BIOS.

► **SATA Configuration**
Press [Enter] to make settings for the following sub-items:
SATA Controller(s)
The optional settings: [Disabled]; [Enabled].
SATA Mode Selection
The default setting is: [AHCI].
mS ATA
Port
The optional settings: [Disabled]; [Enabled].
Use this item to enable or disable device connected to mSATA.
SATA1/ SATA2
Port
The optional settings: [Disabled]; [Enabled].
Use this item to enable or disable each SATA port.
Hot Plug
The optional settings: [Disabled]; [Enabled].

► **Network Stack Configuration**
Press [Enter] to go to '**Network Stack**' screen to make further settings.
Network Stack
Use this item to enable or disable UEFI Network Stack.
The optional settings: [Disabled]; [Enabled].
When set as [Enabled], the following sub-items shall appear:
Ipv4 PXE Support
The optional settings are: [Disabled]; [Enabled].

Use this item to enable Ipv4 PXE Boot Support. When set as [Disabled], Ipv4 boot 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 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.

► **CSM Configuration**

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

CSM Support

Use this item to enable or disable CSM Support

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

Boot option filter

Use this item to control Legacy/UEFI ROMs priority.

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

Option ROM execution

Network

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

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

Storage

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

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

Video

Use this item to control the execution of UEFI and Legacy video OpROM.

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

Other PCI devices

This item is for PCI devices other than Network, Mass storage or video defines which OpROM to launch.

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

► **NVMe Configuration**

Press [Enter] to check NVMe controller and driver information.

► **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 delay and time-out

USB Transfer time-out

Use this item to set the time-out value for control, bulk, and interrupt transfers.

The optional settings are: [1 sec]; [5 sec]; [10 sec]; [20 sec].

Device reset time-out

Use this item to set USB mass storage device start unit command time-out.

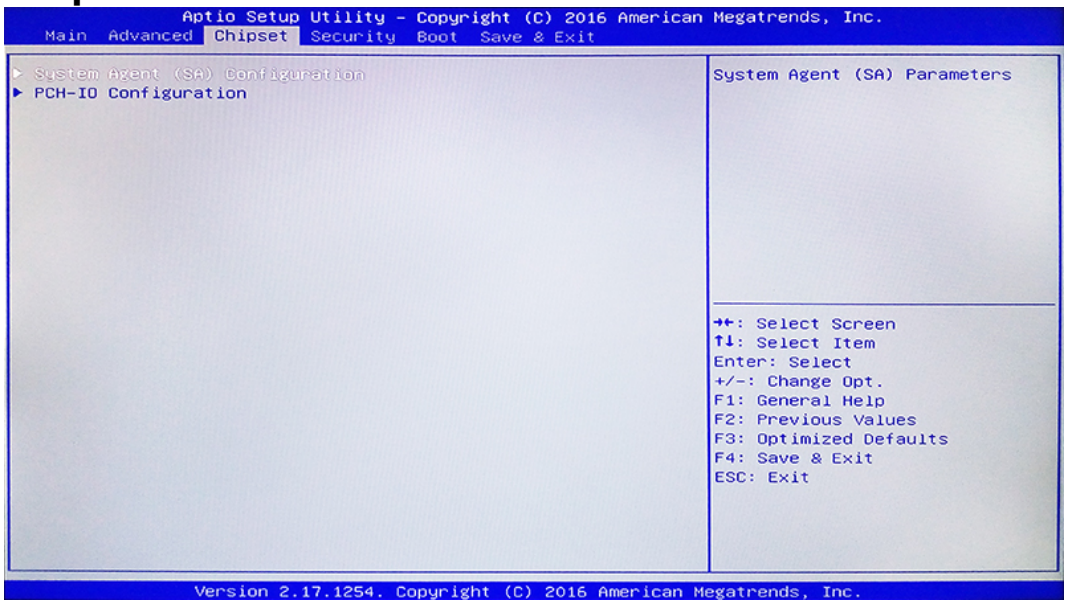
The optional settings are: [10 sec]; [20 sec]; [30 sec]; [40 sec].

Device power-up delay

Use this item to set maximum time the device will take before it properly reports itself to the host controller. 'Auto' uses default value: for a root port it is 100 ms, for a hub port the delay is taken from hub descriptor. The optional settings: [Auto]; [Manual].Select [Manual] you can set value for the following sub-item: **Device Power-up delay in seconds,** the delay range in from 1 to 40 seconds, in one second increments.

► **Intel(R) Ethernet Connection (H) I219-V- XX:XX:XX:XX:XX:XX**
This item shows current network brief 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: [Enabled]; [Disabled].

► **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. VGA modes will be supported only on primary display.

The default setting is: [VBIOS Default].

Active LFP

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

**** Note**: When set as 'Enabled', user can make further settings in '**Panel Type**'.*

Panel Type

Use this item to manually select LCD panel type.

The optional setting are: [800x 480 18-bit Single]; [800x 600 18-bit Single]; [800x 600 24-bit Single]; [1024 x 600 18-bit Single]; [1024 x 768 18-bit Single]; [1024 x 768 24-bit Single]; [1280 x 768 24-bit Single]; [1280 x 800 18-bit Single]; [1280 x 800 24-bit Single]; [1366 x 768 18-bit Single]; [1366 x 768 24-bit Single]; [1440 x 900 18-bit Dual]; [1440 x 900 24-bit Dual]; [1280 x 1024 24-bit Dual]; [1680 x 1050 24-bit Dual]; [1920 x 1080 24-bit Dual].

LVDS FW Write Protect

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

► **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].

HD Audio

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

Onboard Lan1 Controller

Use this item to enable or disable onboard NIC

Wake on LAN

Use this item to enable or disable integrated LAN to wake the system.The Wake on LAN can not be disabled if ME is on at Sx state.

PCIE Slot

Use this item to enable or disable the PCI Express root port.

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

Speed

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

MPE Slot

Use this item to enable or disable the PCI Express root port.

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

Speed

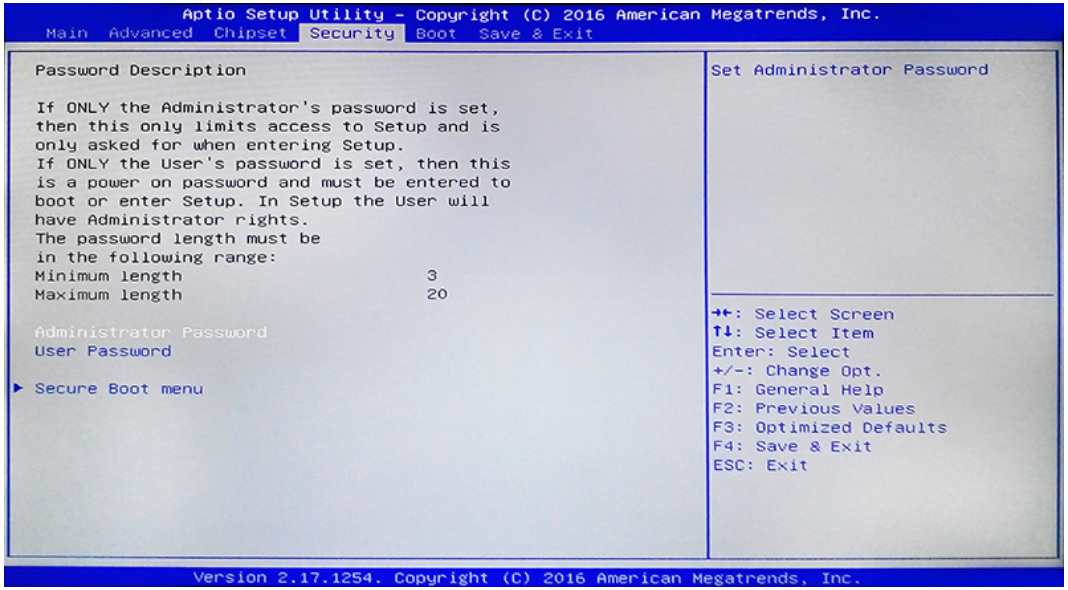
The optional settings are: [Auto]; [Gen1]; [Gen2]; [Gen3].

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.

- **Secure Boot Menu**

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

  Secure Boot

  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].
'Custom' mode enables user to change Image Execution policy and manage secure boot keys.
When set as **[Custom], experience user can make further settings in 'Key Management' to modify Secure Boot variables.*

► **Key Management**

Press [Enter] to make further settings in the following items.

Provision Factory Default Keys

Use this item to install factory default secure boot keys when system is in Setup mode.
The optional settings are: [Disable]; [Enable].
When set as **[Disabled], a dialog box will show up on the screen for user to decide whether to install factory default keys.*

► **Enroll all Factory Default keys**

Use this item to force system to User Mode-install all factory default keys (PK, kek, db, dbt, dbx). Change will take effect after system reboot.
When press **[Enter], a dialog box will show up on the screen for user to decide whether to install factory default keys.*

► **Enroll all Factory Default keys**

Use this item to save NVRAM content of all Secure Boot variables to the files (EFI_SIGANATURE_LIST data format) in root folder on a target file system device.

Secure Boot Variable / Size / Key# / Key source

Enroll Factory Defaults or load the keys from a file with:
1. Public Key Certification in:
a) EFI_SIANATURE_LIST
b) EFI_CERT_X509 (DER encoded)
c) EFI_CERT_RSA2048(bin)
d) EFI_CERT_SHA256(bin)
2. Authenticated UEFI Variable

Key source: Default, Custom, Mixed(*) modified from setup menu.

► **Platform Key (PK)**

Press [Enter] and a 'Key Management' dialog box will show up for user to

decide from ‘Set New Key’ or ‘Delete Key’.

► **Key Exchange Keys**

Press [Enter] and a ‘Key Management’ dialog box will show up for user to decide from ‘Set New Key’,’ Append Key’ or ‘Delete Key’.

► **Authorized Signatures**

Press [Enter] and a ‘Key Management’ dialog box will show up for user to decide from ‘Set New Key’,’ Append Key’ or ‘Delete Key’.

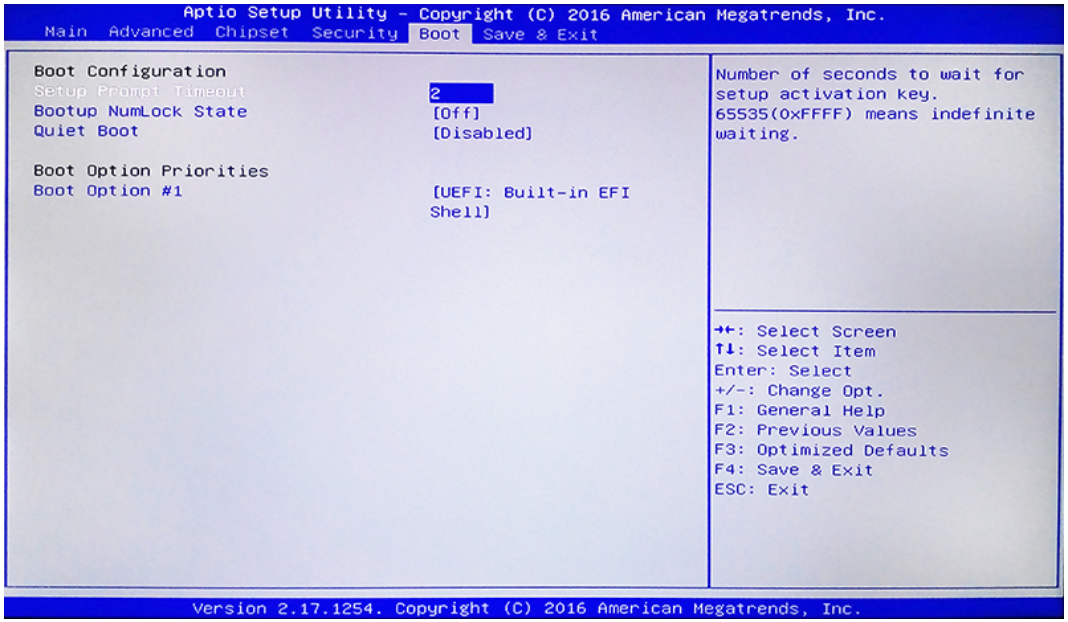
► **Forbidden Signatures**

Press [Enter] and a ‘Key Management’ dialog box will show up for user to decide from ‘Set New Key’,’ Append Key’ or ‘Delete Key’.

► **Authorized TimeStamps**

Press [Enter] and a ‘Key Management’ dialog box will show up for user to decide from ‘Set New Key’ or ‘Append Key’.

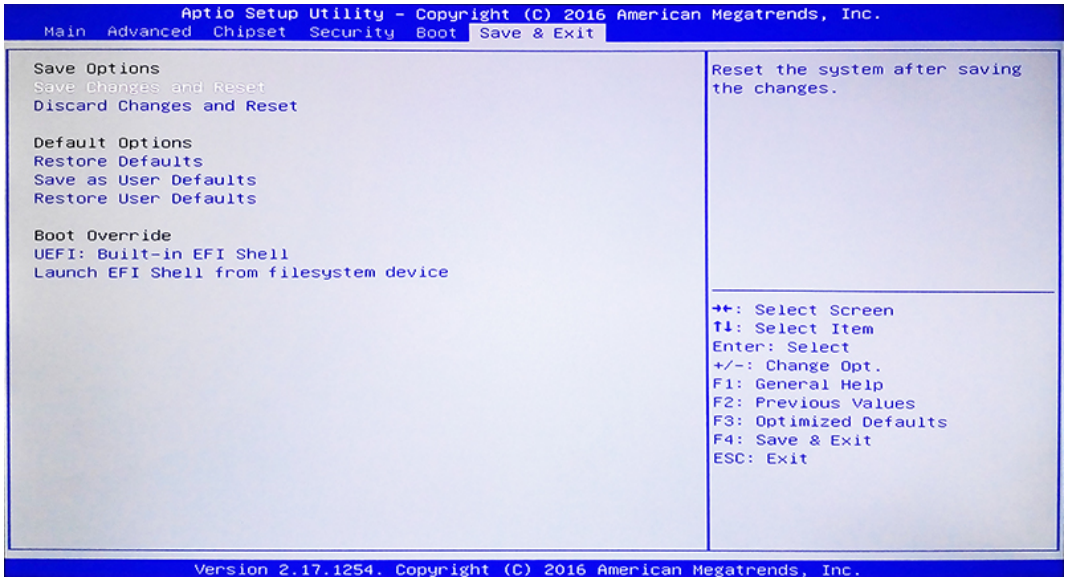
3-10 Boot Menu



Boot Configuration

Setup Prompt Timeout
Use this item to set number of seconds to wait for setup activation key.
Bootup Numlock State
Use this item to select keyboard numlock state.
The optional settings are: [On]; [Off].
Quiet Boot
The optional settings are: [Disabled]; [Enabled].
Boot Option Priorities
Boot Option #1/ Boot Option #2…
Use this item to decide system boot order from available options.

3-11 Save & Exit Menu



Save 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

UEFI:xx/…
Press this item to select the device as boot disk after save configuration and reset
Launch EFI Shell from filesystem device
Press this item to launch EFI Shell application (Shell.efi) from one of the available file system device.