

***Technical Manual***  
***Of***  
***Intel Gemini Lake Series CPU***  
***Based SBC***

***NO. G03-NP891-F***

***Revision: 2.0***

***Release date: October 1, 2019***

**Trademark:**

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

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## Environmental Protection Announcement

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



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## Environmental Safety Instruction

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- 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.

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## Manual Revision Information

Reversion	Revision History	Date
2.0	Second Edition	October 1, 2019

## Item Checklist

Motherboard

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# Chapter 1

## Introduction of the Motherboard

### 1-1 Feature of Motherboard

- Onboard Intel® Gemini Lake Series Processor, with low power consumption and high performance
- Support 1\* DDR4 2400 MHz SO-DIMM, up to 8GB
- 2\* HDMI port & 1\* EDP, supports triple independent display
- Onboard 1\* full-size Mini-PCIE slot & 1\* SIM card slot
- Onboard 1\* SATAIII port & 1\* M.2 SATA slot (M-Key, type-2242)
- Support RJ-45 gigabit Ethernet LAN port
- Support USB 3.0 data transport demand
- Compliance with ErP standard
- Support Watchdog function
- Solution for IoT, Machine Control & Intelligent Home

## 1-2 Specification

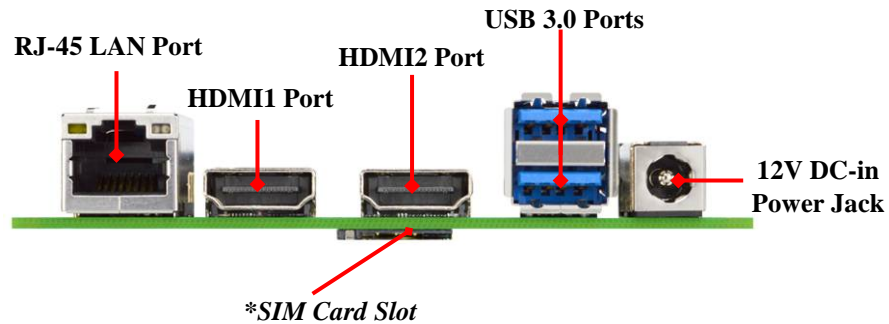
Spec	Description
Design	<ul style="list-style-type: none"> <li>8-layer 2.5" SBC, Pico-size form factor;</li> <li>PCB size: 10.1cm x 7.2cm</li> </ul>
Embedded CPU	<ul style="list-style-type: none"> <li>Intel® Gemini Lake series SoC CPU</li> </ul> <p><i>* Note: for detailed CPU support information please visit our website</i></p>
Memory	<ul style="list-style-type: none"> <li>1*DDR4 SO-DIMM slot to support DDR4 2400MHz SO-DIMM up to 8GB(<i>Memory frequency depending on CPU support</i>)</li> <li>32GB EMMC flash ROM (<i>*Optional to customized models</i>)</li> </ul>
Expansion Slot	<ul style="list-style-type: none"> <li>1* full-size Mini-PCIE slot (<b>MPE1</b>)</li> <li>1* SIM card slot (<b>SIMCARDB1</b>)</li> </ul>
Storage	<ul style="list-style-type: none"> <li>1* SATAIII 6Gb/s port</li> <li>1* M.2 M-key, type-2242 slot with SATA interface (<b>M_2</b>)</li> </ul>
LAN Chip	<ul style="list-style-type: none"> <li>Integrated with Realtek 8111H Gigabit LAN chip</li> <li>Support Fast Ethernet LAN function of providing 10/100/1000Mbps Ethernet data transfer rate</li> </ul>
Audio Chip	<ul style="list-style-type: none"> <li>Realtek ALC662VD HD audio chip</li> </ul>
BIOS	<ul style="list-style-type: none"> <li>AMI Flash ROM</li> </ul>
Rear Panel I/O	<ul style="list-style-type: none"> <li>1* 12V DC-in power connector</li> <li>2* USB 3.0 port</li> <li>2* HDMI port</li> <li>1* RJ-45 LAN port</li> </ul>
Internal I/O	<ul style="list-style-type: none"> <li>1* SATA Power-out connector</li> <li>1* Front panel header</li> <li>1* 9-Pin USB 2.0/1.1 header for 2* USB 2.0/1.1 ports</li> <li>1* SMBUS header</li> <li>1* RS232 serial port (<b>COM1</b>)</li> <li>1* GPIO port header</li> <li>1* Front panel audio header</li> <li>1* LAN activity LED header</li> <li>1* EDP header</li> <li>1* Buzzer header (from <b>Pin7&amp;8</b> of <b>JPCLR</b> block)</li> </ul>

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## 1-3 Layout Diagram

*IO Panel Diagram:*



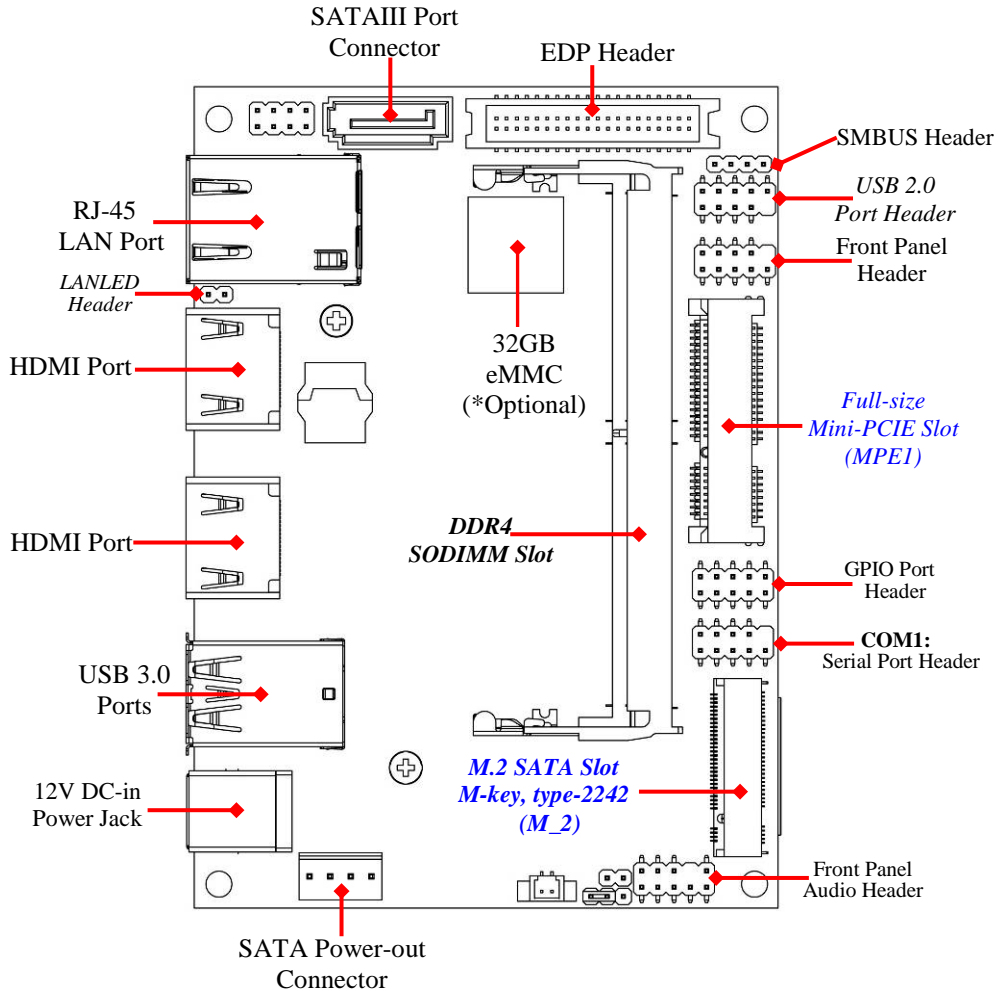
**Note:** *SIM card slot* is on the back side of the board and only works **when** compatible SIM card installed & 3G LAN card installed in full-size Mini-PCIE (**MPE1**) slot.



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## Internal Diagram-Front Side:

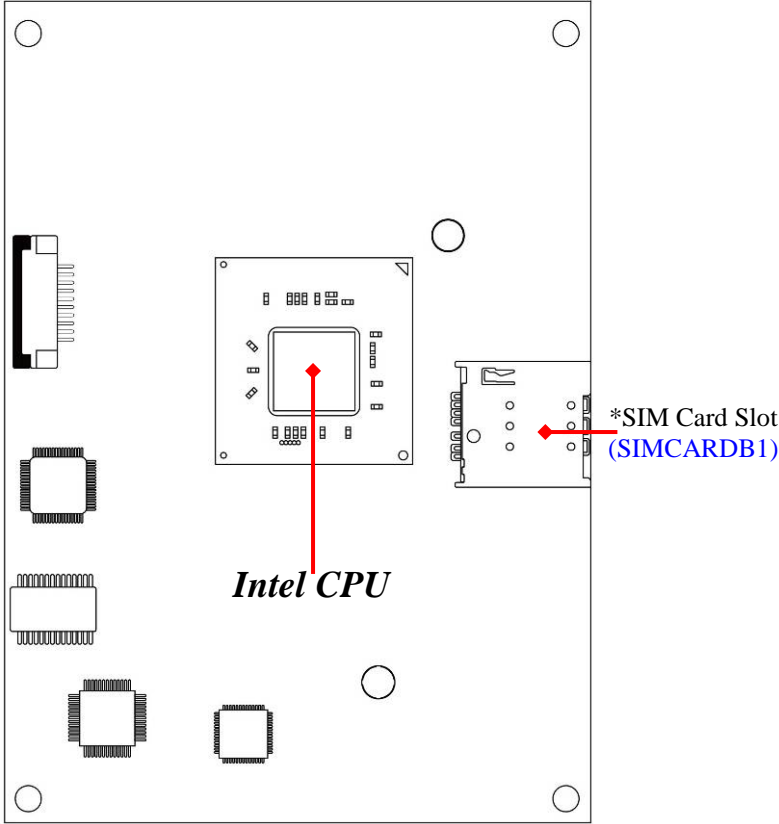


**\*Note:** EMMC is only optional to customized models. Please refer to the product you purchase for actual specifications.

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**Internal Diagram-Back Side:**

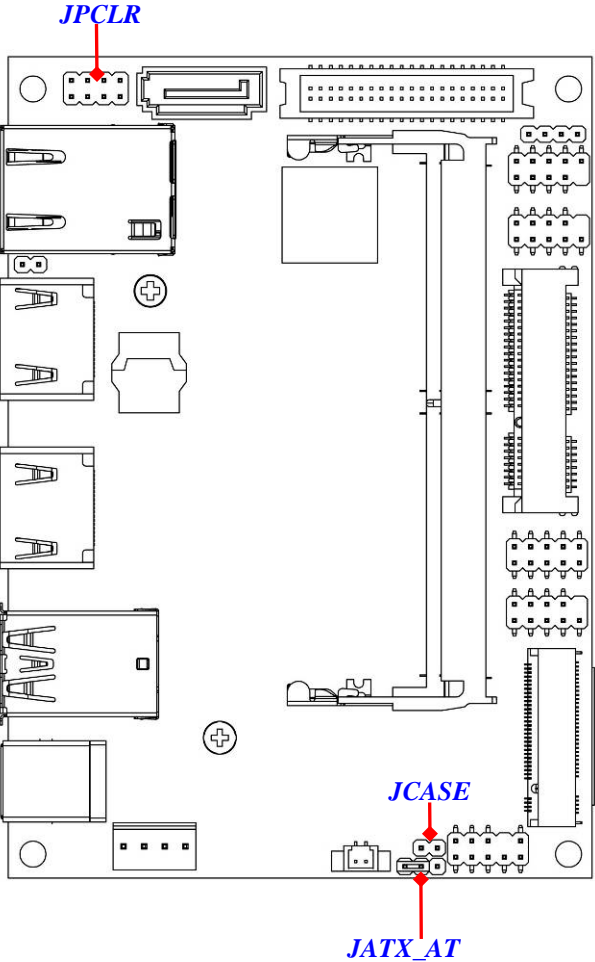


**\*Note:** SIM card slot only work when compatible SIM card installed & 3G LAN card installed in full-size Mini-PCIE (MPE1) slot.

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**Motherboard Jumper Positions:**



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## Jumper

Jumper	Name	Description
JPCLR	<b>Pin (1-2):</b> RTC Reset <b>Pin (3-4):</b> Clear CMOS <b>Pin (5-6):</b> TXE Override	8-Pin Block
JATX_AT	ATX/AT Mode Select	3-Pin Block
JCASE	For Case Open Message Display	2-Pin Block

## Connectors

Connector	Name
DCIN1	12V DC-in System Power Jack
USB1	USB 3.0 Port Connector x2
HDMI1/2	HDMI Port Connectorx2
LAN1	RJ-45 LAN Port Connector
SATA1	SATAIII Port Connector
PWROUT1	SATA Power out Connector

## Headers

Header	Name	Description
FP	Front Panel Header(PWR LED/ HD LED/Power Button /Reset)	9-pin Block
FP_USB	USB 2.0 Port Header	9-pin Block
SMBUS	SMBUS Header	4-pin Block
COM1	RS232 Serial Port Header	9-pin Block
GPIO_CON	GPIO Port Header	10-pin Block
FP_AUDIO	Front Panel Audio Header	9-pin Block
JLANLED	LAN Activity LED Header	2-pin Block
EDP	EDP Header	40-pin Block
JPCLR	<b>Pin (7-8):</b> Buzzer Header	8-pin Block

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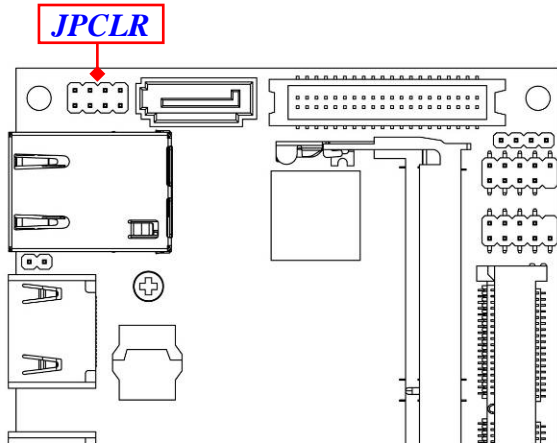
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# Chapter 2

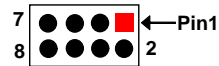
## Hardware Installation

### 2-1 Jumper Settings

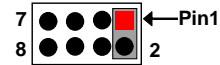
*Pin 1&2 of JPCLR (8-pin): RTC Reset for Clear Flash*



*Pin (1&2) of JPCLR →  
Reset RTC for Clear Flash*

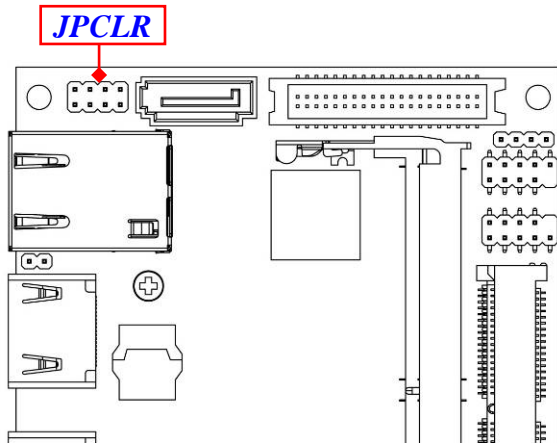


1-2 Open: Normal;

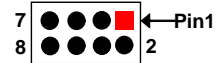


1-2 Closed: Reset RTC.

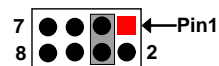
*Pin 3&4 of JPCLR(6-pin): Clear CMOS RAM Settings*



*Pin (3&4) of JPCLR → Clear CMOS*



3-4 Open: Normal;

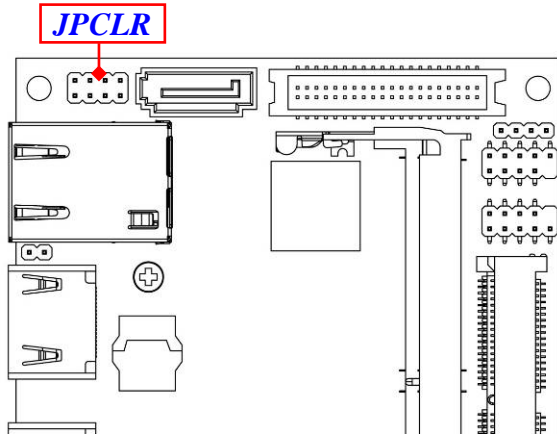


3-4 Closed: Clear CMOS.

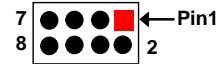
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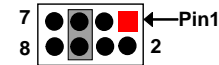
**Pin 5&6 of JPCLR(8-pin): TXE Override**



**Pin 5&6 of JPCLR→TXE Override**

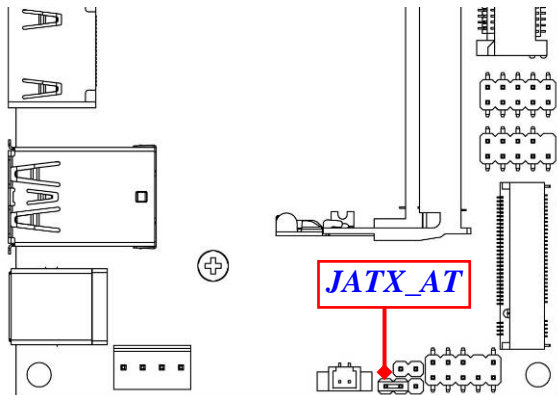


**5-6 Open: Enable Security Measures in the Flash Descriptor(Default);**

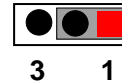


**5-6 Closed: Disable Security Measures in the Flash Descriptor(Override).**

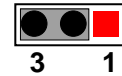
**JATX\_AT (3-pin): ATX Mode / AT Mode Select**



**JATX\_AT→ATX/AT Mode Select**



**1-2 Closed: ATX Mode Selected;**



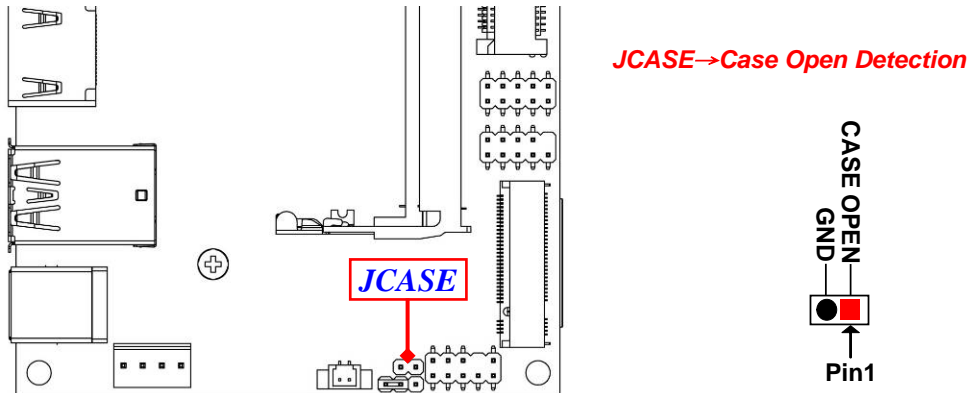
**2-3 Closed: AT Mode Selected.**

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

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## JCASE(2-pin): Jumper for Case Open Detection

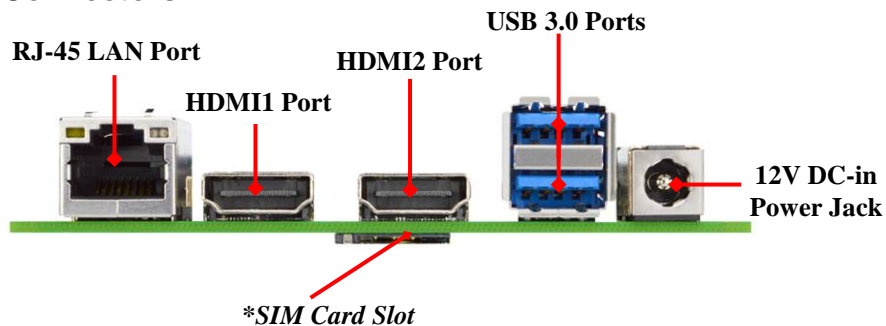






**JCASE short:** When Case open function pin short to GND, the Case open function was detected. When used, needs to enter BIOS and enable 'Case Open Detect' function. In this case if your case is removed, next time when you restart your computer, a message will be displayed on screen to inform you of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

## 2-2 Connectors and Headers

### 2-2-1 Connectors

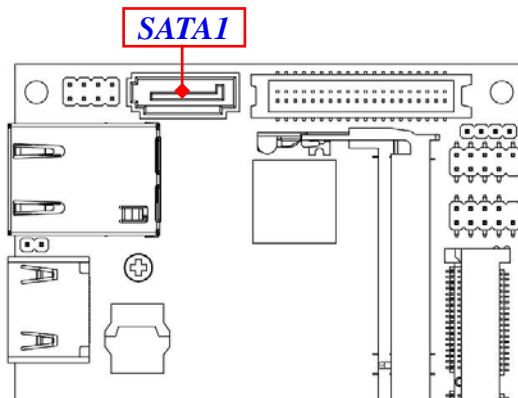
#### (1) Rear Panel Connectors



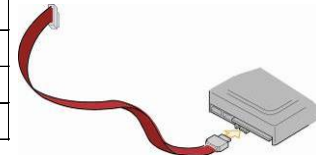
Icon	Name	Function
	<b>RJ-45 LAN Port</b>	This connector is standard RJ-45 LAN jack for Network connection.
	<b>HDMI Port</b>	To connect display device that support HDMI specification.
	<b>USB 3.0 Port</b>	To connect USB keyboard, mouse or other devices compatible with USB specification. USB 3.0 ports supports up to 5Gbps data transfer rate.
	<b>Power Connector</b>	12V DC-in system power connector For user to connect compatible power adapter to provide power supply for the system.

## (2) SATA1 (7-pin Block): SATAIII Port connector

The board comes with a SATAIII port that supports 6GB/s transfer rate.

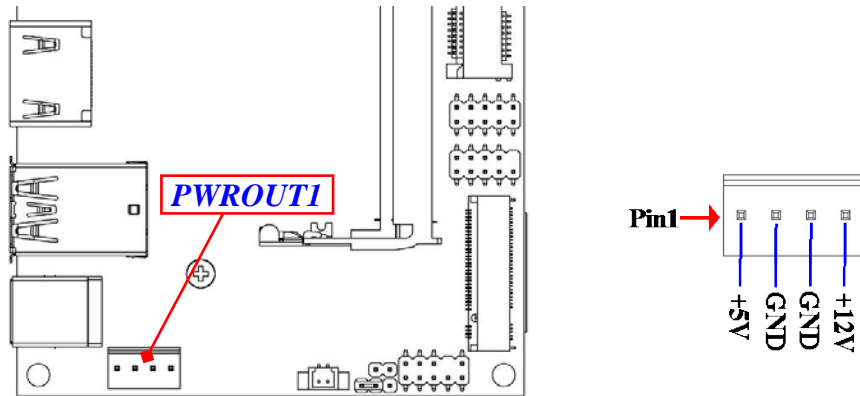


Pin No.	Definition
1	GND
2	TXP
3	TXN
4	GND
5	RXN
6	RXP
7	GND





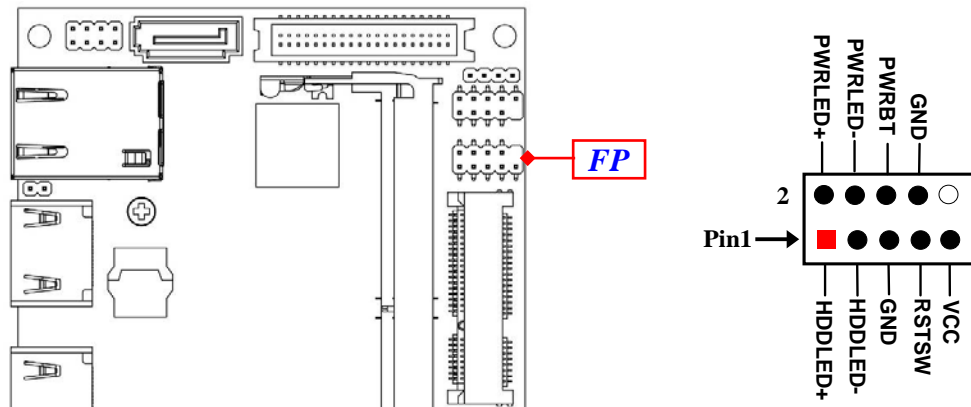
### (3) PWROUT1(4-pin): SATA HDD Power-Out Connector



**Warning:** Make sure that Pin-1 of compatible SATA Power connector is inserted into corresponding Pin-1 of **PWROUT1** connector to avoid possible damage to the board and hard disk driver!

## 2-2-2 Headers

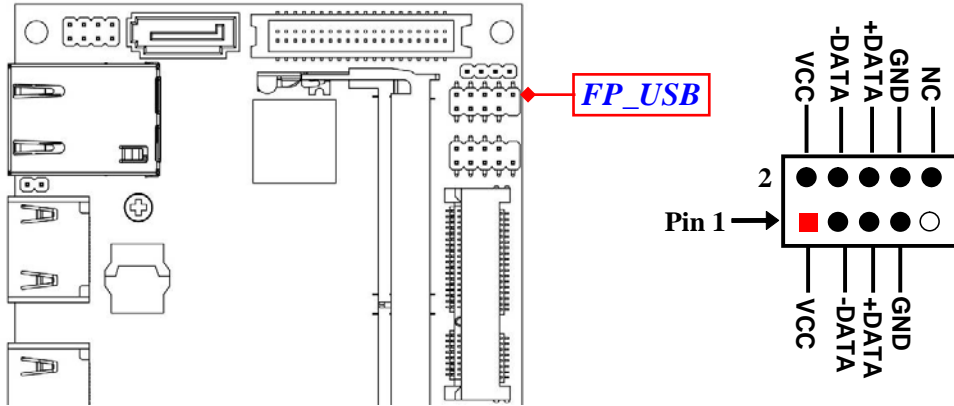
### (1) FP (9-pin): Front Panel Header



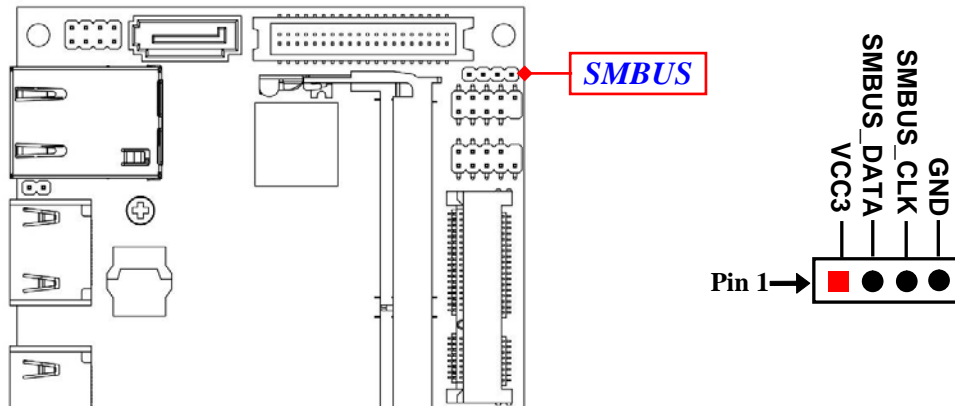
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**(2) FP\_USB (9-pin): USB 2.0 Port Header**



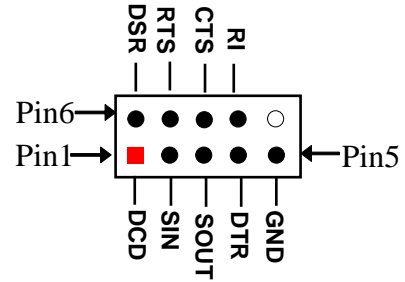
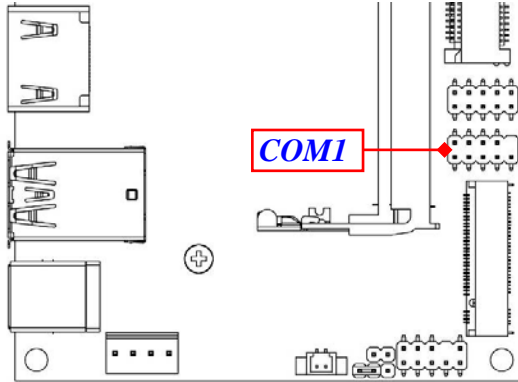
**(3) SMBUS (4-Pin): SMBUS Header**



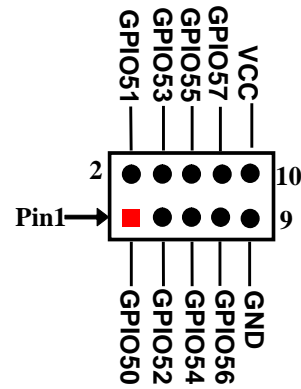
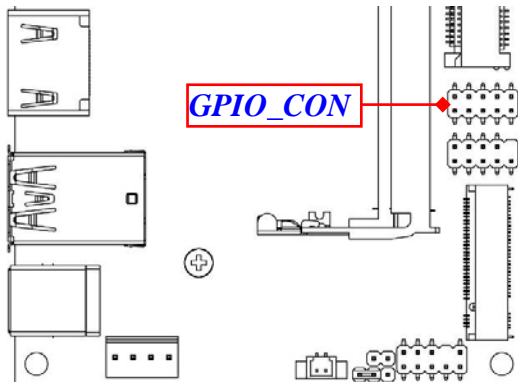
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**(4) COM1 (9-pin): RS232 Serial Port Header**



**(5) GPIO\_CON (10-pin): GPIO Port Header**

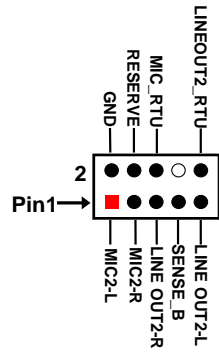
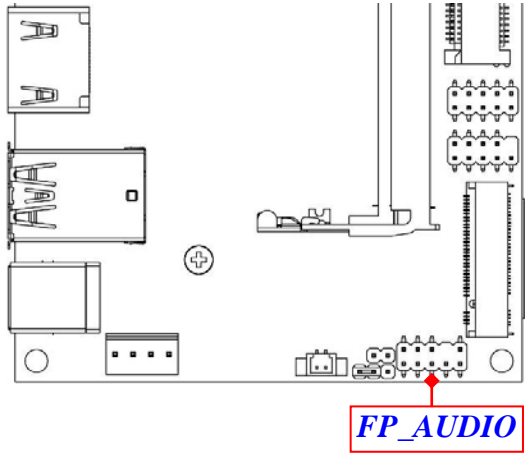


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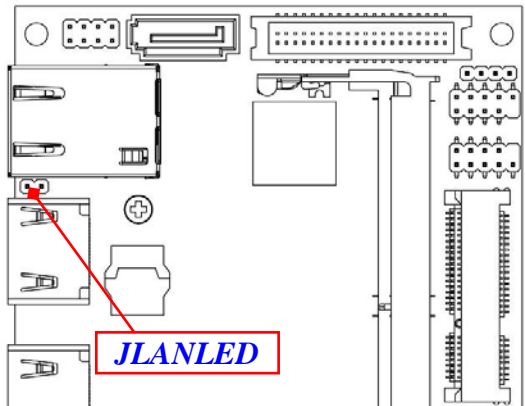
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**(6) FP\_AUDIO (9-pin): Line-Out, MIC-In Header**

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



**(7) JLANLED (2-pin): LAN Activity LED Header**

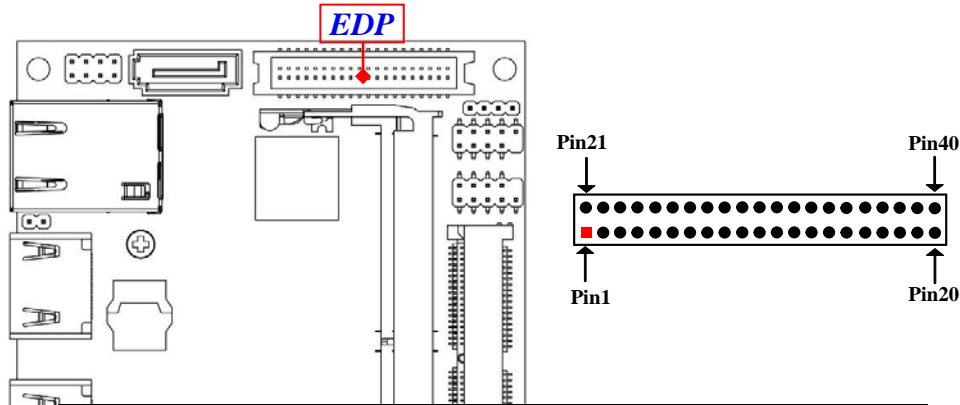


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### (8) EDP (40-pin): 4-Lane EDP Header

The onboard header supports EDP panel with Panel 3.3V, Backlight 12V specifications.

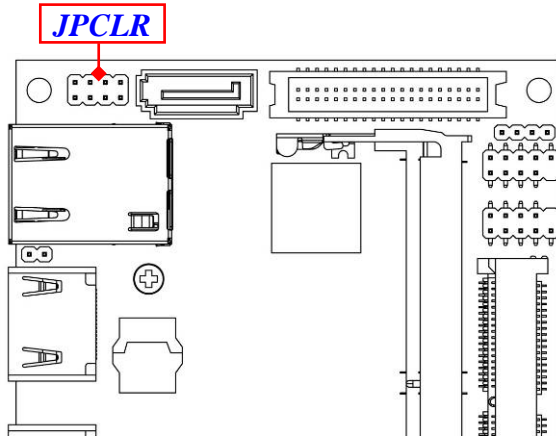


Pin NO.	Pin Define	Pin NO.	Pin Define
Pin 1	NC	Pin 21	NC
Pin 2	GND	Pin 22	NC
Pin 3	Lane3_N	Pin 23	GND
Pin 4	Lane3_P	Pin 24	GND
Pin 5	GND	Pin 25	GND
Pin 6	Lane2_N	Pin 26	GND
Pin 7	Lane2_P	Pin 27	HPD
Pin 8	GND	Pin 28	GND
Pin 9	Lane1_N	Pin 29	GND
Pin 10	Lane1_P	Pin 30	GND
Pin 11	GND	Pin 31	GND
Pin 12	Lane0_N	Pin 32	BL_ENABLE
Pin 13	Lane0_P	Pin 33	BL_PWM_DIM
Pin 14	GND	Pin 34	NC
Pin 15	AUX_CH_P	Pin 35	NC
Pin 16	AUX_CH_N	Pin 36	BL_PWR (12V)
Pin 17	GND	Pin 37	BL_PWR (12V)
Pin 18	LCD_VCC (3.3V)	Pin 38	BL_PWR (12V)
Pin 19	LCD_VCC (3.3V)	Pin 39	BL_PWR (12V)
Pin 20	LCD_VCC (3.3V)	Pin 40	BL_PWR (12V)

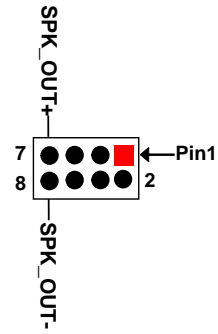
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(9) Pin 7&8 of JPCLR(8-pin): for Buzzer Header



Pin 7&8 of JPCLR → for Buzzer



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# Chapter 3

## Introducing BIOS

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

The BIOS is a program located on a Flash Memory on the motherboard. This program is a bridge between motherboard and operating system. When you start the computer, the BIOS program will gain control. The BIOS first operates an auto-diagnostic test called POST (power on self test) for all the necessary hardware, it detects the entire hardware device and configures the parameters of the hardware synchronization. Only when these tasks are completed done it gives up control of the computer to operating system (OS). Since the BIOS is the only channel for hardware and software to communicate, it is the key factor for system stability, and in ensuring that your system performance as its best.

### 3-1 Entering Setup

Power on the computer and by pressing <Del> immediately allows you to enter Setup. If the message disappears before your respond and you still wish to enter Setup, restart the system to try again by turning it OFF then ON or pressing the “RESET” button on the system case. You may also restart by simultaneously pressing <Ctrl>, <Alt> and <Delete> keys. If you do not press the keys at the correct time and the system does not boot, an error message will be displayed and you will again be asked to

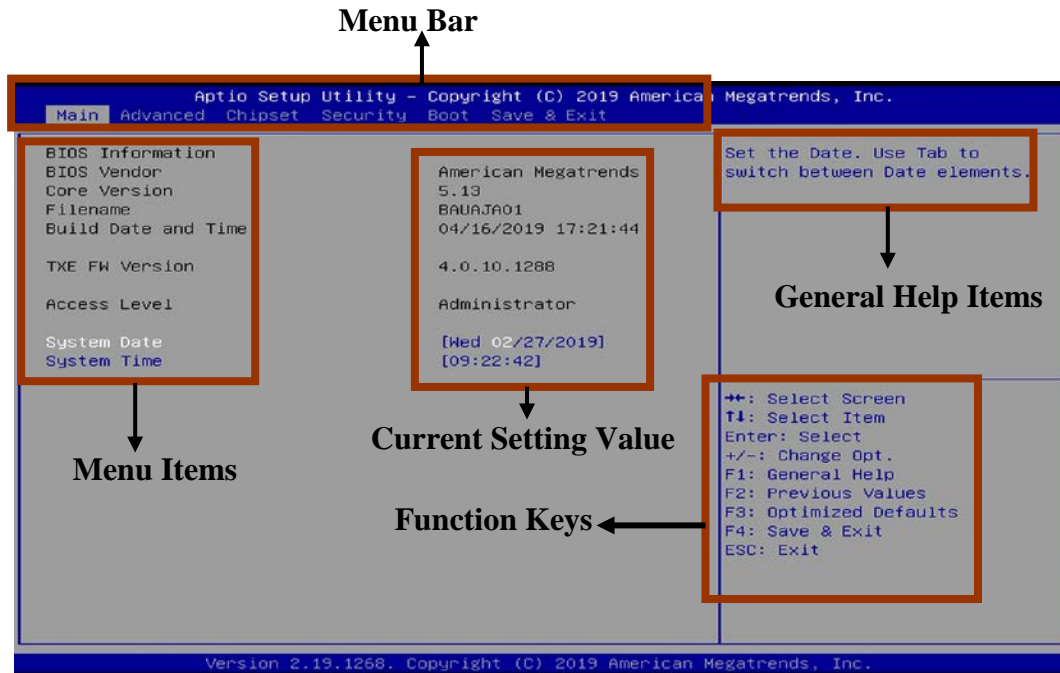
Press <Del> to enter Setup/ Press <F7> to enter Popup Menu.

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## 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:

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

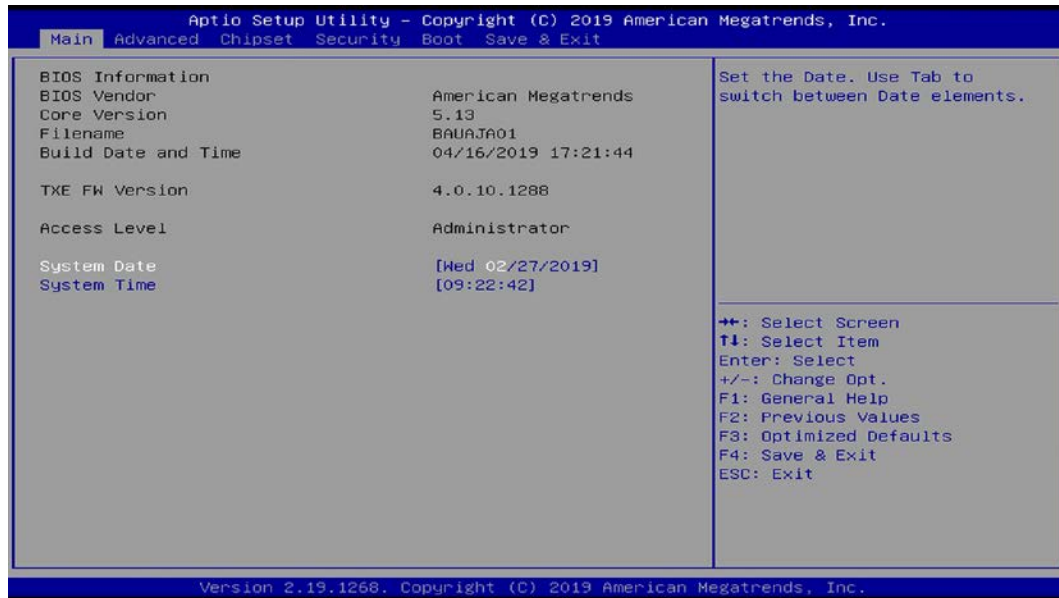
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User can press the right or left arrow key on the keyboard to switch from menu bar. The selected one is highlighted.

### 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.

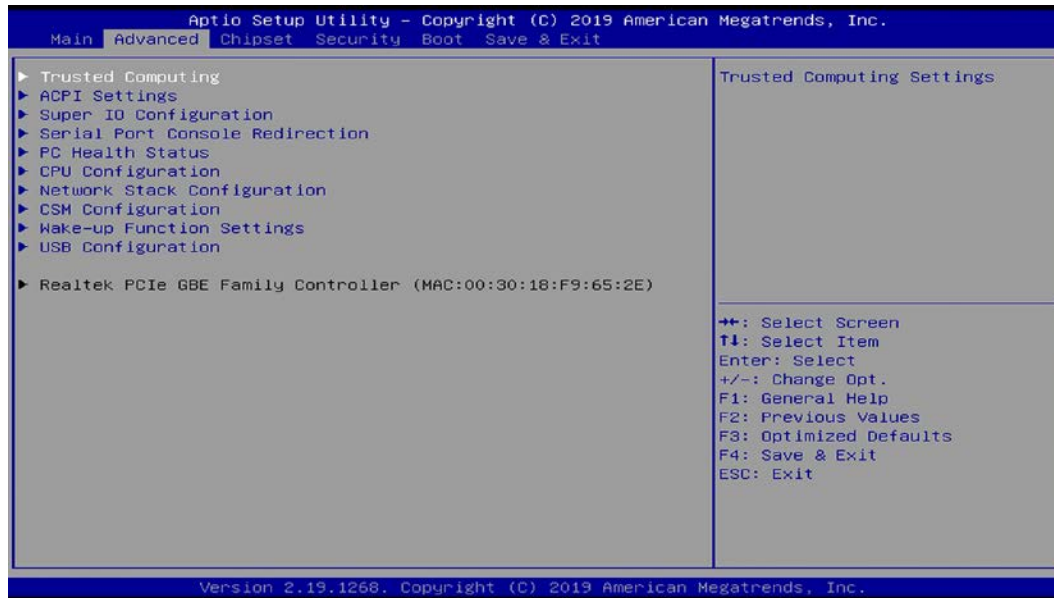
#### System Time

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

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## 3-7 Advanced Menu



### ▶ **Trusted Computing**

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

#### **TPM20 Device Found**

##### **Security Device Support**

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

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

##### **Active PCR Banks**

The optional setting is: [SHA-1].

##### **Available PCR Banks**

The optional setting is: [SHA-1, SHA256].

##### **SHA-1 PCR Bank**

Use this item to enable or disable SHA-1 PCR Bank.

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

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### **SHA256 PCR Bank**

Use this item to enable or disable SHA256 PCR Bank.

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

#### ▶ **ACPI Settings**

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

##### **ACPI Settings**

#### **ACPI Sleep State**

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

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

#### ▶ **Super I/O Configuration**

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

##### **Super IO Configuration**

#### ▶ **Serial Port 1 Configuration**

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

##### **Serial Port 1 Configuration**

#### **Serial Port**

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

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

#### **Change Settings**

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

#### **ERP Support**

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

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

#### **Case Open Detect**

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

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

When set as [Enabled], system will detect if Jumper **JCASE** has been short or not (refer to Page 10); if **Pin 1&2 of JCASE** is short, system will show Case Open Message during POST.

### **WatchDog Reset Timer**

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

#### ***WatchDog Reset Timer Value***

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

#### ***WatchDog Reset Timer Unit***

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

### **WatchDog Wake-up Timer**

This item support WDT wake-up.

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

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

#### ***WatchDog Wake-up Timer Value***

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

#### ***WatchDog Wake-up Timer Unit***

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

### **ATX Power Emulate AT Power**

This item support Emulate AT power function, MB power On/Off control by power supply. Use needs to select 'AT or ATX Mode' on MB jumper at first (refer to **Page 9**, Jumper JATX\_AT block for ATX Mode & AT Mode Select).

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▶ **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.

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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].

### **Putty KeyPad**

Use this item to select FunctionKey and KeyPad on Putty.

The optional settings: [VT100]; [Intel Linux]; [XTERMR6]; [SCO]; [ESCN]; [VT400].

## **Legacy Console Redirection**

### **▶ Legacy Console Redirection Settings**

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

### **Legacy Console Redirection Settings**

#### **Legacy Serial Redirection Port**

For user to select a COM port to display redirection of legacy OS and Legacy OPROM messages.

The default setting is: [COM1].

#### **Legacy OS Redirection Resolution**

On Legacy OS, this item is for user to select the number of Rows and Columns

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supported redirection.

The optional settings are: [80x24]; [80x25].

### **Redirection After BIOS POST**

The optional settings are: [Always Enable]; [Bootloader].

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

## **Serial Port for Out-of-Band Management/**

### **Windows Emergency Management Services (EMS)**

#### **Console Redirection**

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

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

#### ▶ **Console Redirection Settings**

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

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

#### **Out-of-Band Mgmt Port**

The optional setting is: [COM1].

#### **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 then [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**



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Flow control can prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a “stop” signal can be sent to stop the data flow. Once the buffers are empty, a “start” signal can be sent to re-start the flow. Hardware flow control uses two wires to send start/stop signals.

The optional settings: [None]; [Hardware RTS/CTS]; [Software Xon/Xoff].

**Data Bits**

The default setting is: [8].

*\*This item may or may not show up, depending on different configuration.*

**Parity**

The default setting is: [None].

*\*This item may or may not show up, depending on different configuration.*

**Stop Bits**

The default setting is: [1].

*\*This item may or may not show up, depending on different configuration.*

▶ **PC Health Status**

Press [Enter] to view current hardware health status.

▶ **CPU Configuration**

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

**VT-d**

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

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

**EIST**

Use this item to enable or disable Intel SpeedStep.

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

**C-States**

Use this item to enable or disable C State.

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

**Enhanced C-states**

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

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

**Max Package C State**

This item controls Max Package C state that the processor will support.

The optional settings: [s0ix default]; [PC1]; [C0].

**Max Core C State**

This item controls the max Core C State that cores will support.

The optional settings: [Fused Value]; [Core C10]; [Core C9] [Core C8]; [Core C7]; [Core C6]; [Core C1]; [Unlimited].

▶ **Network Stack Configuration**

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

**Network Stack**

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

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

**Ipv4 PXE Support**

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

Use this item to enable IPv4 PXE Boot Support. When set as [Disabled], IPv4 boot support will not be available.

**Ipv6 PXE Support**

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

Use this item to enable IPv6 PXE Boot Support. When set as [Disabled], IPv6 boot support will not be available.

**PXE Boot Wait Time**

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

**Media Detect Count**

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

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

▶ **CSM Configuration**

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

**Compatibility Support Module Configuraton**

**Boot option filter**

This item controls Legacy/UEFI ROMs priority.

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

### **Network**

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

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

### **Storage**

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

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

### **Other PCI devices**

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

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

## ▶ **Wake-up Function Settings**

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

### **Wake-up System with Fixed Time**

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

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

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

### **Wake-up System with Dynamic Time**

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

System will wake on the current time + Increase minutes.

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

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

## ▶ **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.

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### **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.

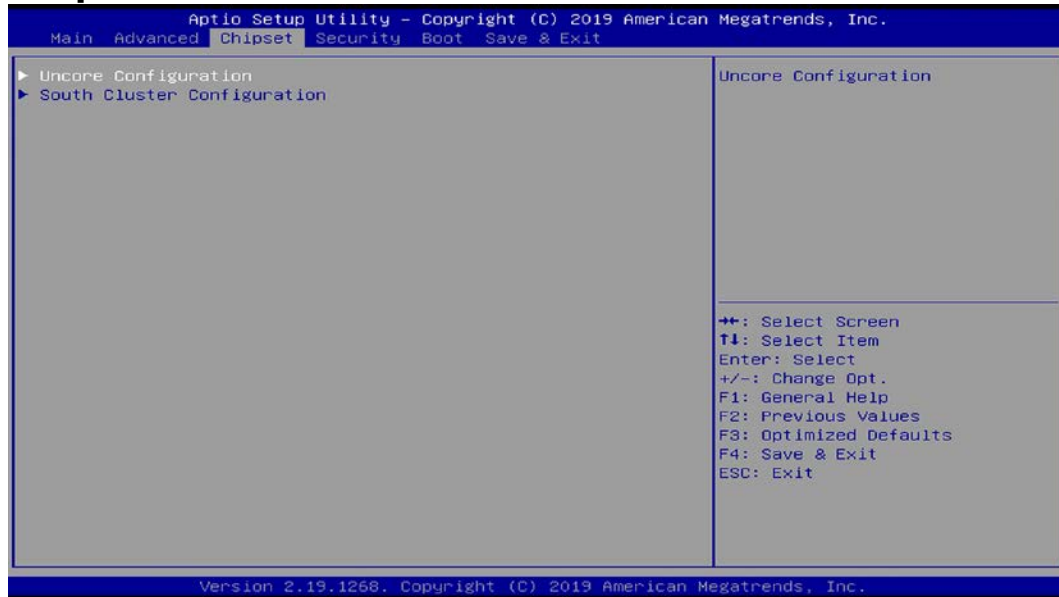
▶ **Realtek PCIe GBE Family Controller(MAC:XX:XX:XX:XX:XX:XX)**

These items show current network brief information.

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## 3-8 Chipset Menu



► **Uncore Configuration**

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

**GTT Size**

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

**DVMT Pre-Allocated**

Use this item to select DVMT 5.0 pre-allocated (fixed) graphics memory size used by the internal graphics device.

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

**DVMT Total Gfx Mem**

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

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

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### **Primary IGFX Boot Display**

Use this item to select the video device which will be activated during POST. This has no effect if external graphics present. Secondary boot display selection will appear based on your selection.

The optional settings are: [Auto]; [eDP]; [HDMI1]; [HDMI2].

### **Secondary IGFX Boot Display**

Secondary boot display selection will appear based on your selection.

The optional settings are: [Disabled]; [HDMI1]; [HDMI2].

### **Active LFP**

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

*\*When set as [eDP], 'GMCH BLC Control' will show up for user to make further settings.*

### **GMCH BLC Control**

Use this item to set backlight control settings for EDP device.

The optional settings are: [PWM-Inverted]; [PWM-Normal].

### **Memory Information**

The working memory information will be on display.

## ▶ **South Cluster Configuration**

### ▶ **PCI Express Configuration**

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

#### **Peer Memory Write Enable**

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

#### **Compliance Mode**

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

### ▶ **SATA Configuration**

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

#### **SATA Controller**

Use this item to enable or disable each SATA port.

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

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

**SATA Mode Selection**

The default setting is: [AHCI].

**SATA Port**

**SATA Port**

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

**M.2**

**M.2**

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

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

**HD-Audio Support**

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

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

**SCC eMMC Support (D28:F0)**

Use this item to enable or disable SCC eMMC Support.

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

*When set as [Enabled], 'eMMC Max Speed' will show up for user to make further settings.*

**eMMC Max Speed**

Use this item to select the eMMC max speed allowed.

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

**System State after Power Failure**

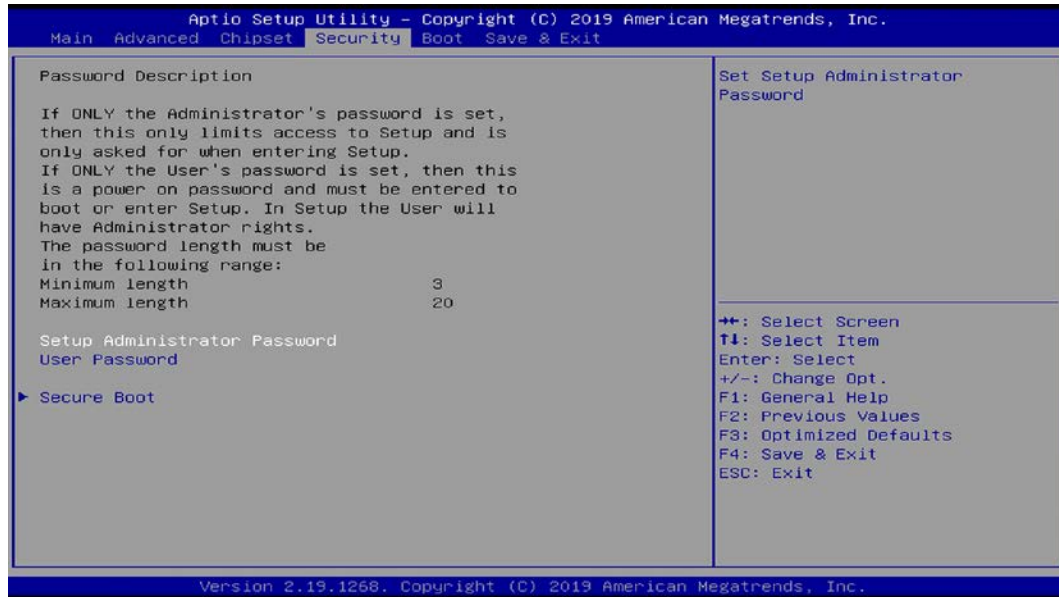
Use this item to specify what state to go to when power re-applied after a power failure (G3 state).

The optional settings are: [Always On]; [Always Off]; [Former State].

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## 3-9 Security Menu



Security menu allow users to change administrator password and user password settings.

### Setup Administrator Password

If there is no password present on system, please press [Enter] to create new setup administrator password. If password is present on system, please press [Enter] to verify old password then to clear/change password. Press again to confirm the new administrator password.

### User Password

If there is no password present on system, please press [Enter] to create new user password. If password is present on system, please press [Enter] to verify old password then to clear/change password. Press again to confirm the new user password.



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▶ **Secure Boot**

Press [Enter] to make customized secure settings:

**Secure Boot**

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

Secure Boot feature is active if Secure Boot is enabled, Platform Key (PK) is enrolled and the system is in User mode. The mode change requires platform reset.

**Secure Boot Mode**

The optional settings are: [Standard]; [Custom].

Set UEFI Secure Boot Mode to Standard mode or Custom mode. This change is effective after save. After reset, this mode will return to Standard mode.

In Custom mode, Secure Boot Policy variables can be configured by a physically present user without full authentication.

*\*When set as [Custom], user can make further settings in the following items that show up:*

▶ **Restore Factory Keys**

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

▶ **Reset To Setup Mode**

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

▶ **Key Management**

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

**Factory Key Provision**

This item is for user to install factory default secure boot keys after the platform reset and while the system is in Setup mode.

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

▶ **Restore Factory Keys**

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

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▶ **Reset to Setup Mode**

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

▶ **Export Secure Boot variables**

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

▶ **Enroll Efi Image**

This item allows the image to run in Secure Boot Mode.

Enroll SHA256 Hash certificate of a PE image into Authorized Signature Database (db).

**Device Guard Ready**

▶ **Remove 'UEFI CA' from DB**

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

▶ **Restore DB defaults**

Use this item to restore DB variable to factory defaults.

**Secure Boot Variable/Size/Keys/Key Source**

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

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

1. Public Key Certificate in:

- a) EFI\_SIGNATURE\_LIST
- b) EFI\_CERT\_X509 (DER)
- c) EFI\_CERT\_RSA2048 (bin)
- d) EFI\_CERT\_SHAXXX

2. Authenticated UEFI Variable

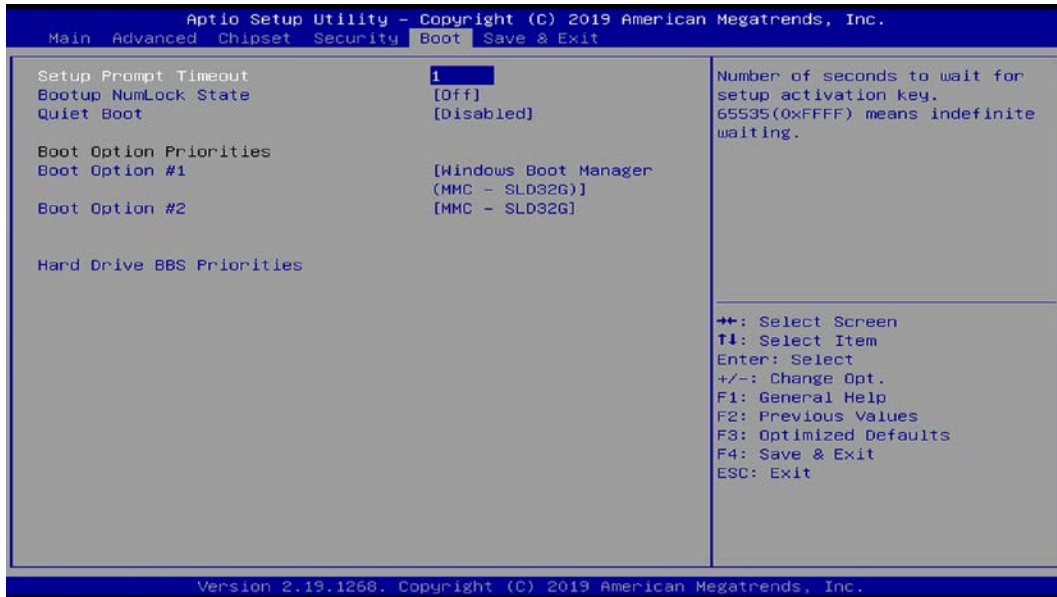
3. EFI PE/COFF Image (SHA256)

Key Source: Factory, External, Mixed.

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## 3-10 Boot Menu



### **Setup Prompt Timeout**

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

### **Bootup Numlock State**

Use this item to select keyboard numlock state.

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

### **Quiet Boot**

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

### **Boot Option Priorities**

#### **Boot Option #1/ Boot Option #2...**

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

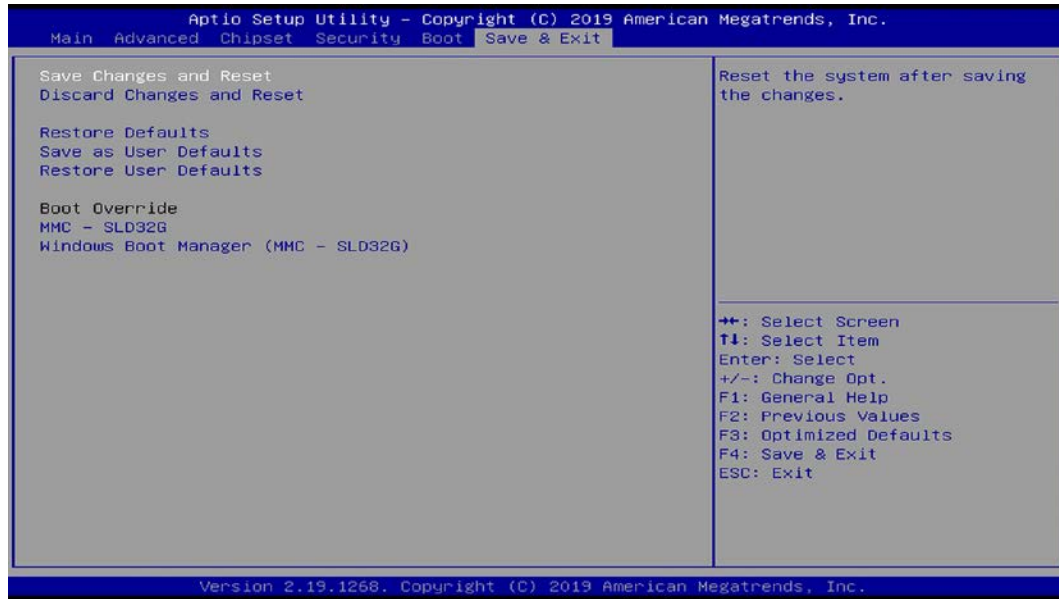
### **Hard Driver BBS Priorities**

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

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## 3-11 Save & Exit Menu



### **Save Changes and Reset**

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

### **Discard Changes and Reset**

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

### **Restore Defaults**

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

### **Save as User Defaults**

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

### **Restore User Defaults**

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

### **Boot Override**

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