Technical Manual

of

Intel Apollo Lake Series CPU

Based

3.5'' SBC

NO.: G03-NF832-F

Revision: 2.0

Release date: October 1, 2019

Trademark:

Environmental Protection Announcement

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

TABLE OF CONTENT

⚠ Environmental Safety Instruction

- Avoid the dusty, humidity and temperature extremes. Do not place the product in any area where it may become wet.

- 0 to 60 centigrade is the suitable temperature. (The figure comes from the request of the main chipset)

- Generally speaking, dramatic changes in temperature may lead to contact malfunction and crackles due to constant thermal expansion and contraction from the welding spots' that connect components and PCB. Computer should go through an adaptive phase before it boots when it is moved from a cold environment to a warmer one to avoid condensation phenomenon. These water drops attached on PCB or the surface of the components can bring about phenomena as minor as computer instability resulted from corrosion and oxidation from components and PCB or as major as short circuit that can burn the components. Suggest starting the computer until the temperature goes up.

- The increasing temperature of the capacitor may decrease the life of computer. Using the close case may decrease the life of other device because the higher temperature in the inner of the case.

- Attention to the heat sink when you over-clocking. The higher temperature may decrease the life of the device and burned the capacitor.

USER'S NOTICE

Manual Revision Information

Reversion	Revision History	Date
2.0	Second Edition	October 1, 2019

Item Checklist

☑ Motherboard

Chapter 1
Introduction of the Motherboard

1-1 Feature of Motherboard

- Intel® Apollo Lake series SoC Processor, with low power consumption never denies high performance

- Support 1 * DDR3L SO-DIMM, up to 8GB

- 2* HDMI & 1* eDP with syupport for Triple Display

- Onboard 1* full-size Mini-PCIE slot & SIM card slot

- Onboard 1 * M.2 M-key (type-2242/2280, SATA interface) slot & 1 * M.2 E-key (type-2230, Mini-PCIE interface) slot

- Support 1 * SATAIII device

- Support1 * RS232 COM port

- 4 * External USB 3.0 & 2 * Internal USB 2.0

- Compliance with ErP standard

- Support Watchdog function

- Solution for Digital Signage, Panel PC, Transportation, Automation and Telecom

1-2 Specification

Spec	Description
Design	● 3.5'' SBC; 6 layers; PCB size: 14.8x 10.2 cm
Embedded CPU	● Intel® Apollo Lake *SoC* CPU *CPU model varies from different IPC options. Please consult your dealer for more information of onboard CPU.*
Memory Slot	● 1*DDR3L SO-DIMM slot ● Support DDR3L 1866 MHz SO-DIMM up to 8GB
Expansion Slot	● 1* full-size Mini-PCIE slot(**MPE**) ● 1* SIM card slot (**SIMCARD**) ● 1* M.2 PCIE slot (**M2.E**: E-key, PCIE interface, 2230)
Storage	● 1 * SATAIII 6Gb/s port *(SATA1)* ● 1* M.2 SATA slot (**M2.M**:M-key, SATA interface, 2242/2280)
LAN Chip	● Integrated with Realtek RTL8111H PCI-E Gigabit LAN chip ● Support Fast Ethernet LAN function of providing 10/100/1000Mbps Ethernet data transfer rate
Audio Chip	● Realtek ALC662 6-channel Audio Codec integrated ● Audio driver and utility included
BIOS	● AMI Flash ROM
Rear I/O	● 1* 12V DC-in power Jack ● 4* USB 3.0 port ● 2* HDMI port ● 1* RJ-45 LAN port ● 1* Audio Line-out port
Internal I/O	● 1* 2-pin internal 12V DC-in power connector ● 1* SATA Power-out connector ● 1* CPU FAN connector

	1* Front panel header 1* SMBUS header 1* Front panel audio header 1* LAN LED activity header 1* SIM card expansion header (**JSIM**) 1* 9-pin USB 2.0 header (Expansible to 2* USB 2.0 ports) 1* Serial port header (**COM1**) 1* GPIO header 1* EDP header

1-3   Layout Diagram

Rear IO Diagram:
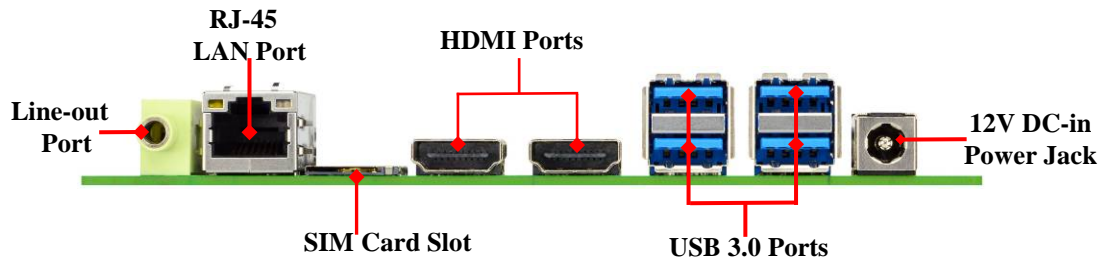
Warning!!

The board has a 12V DC-in power connector **(DCIN1)** in I/O back panel and an internal 12V power connector **(DCIN).** User can only connect one type of compatible power supply to one of them to power the system.

Internal Diagram-Front Side:

Internal 12V DC-in Connector

12V DC-in Power Jack

USB 3.0 Ports

DDR3L SODIMM Slot

Front Panel Header (JW_FP1)

SMBUS Header

Full-size Mini-PCIE Slot (*MPE)

HDMI Ports

CPUFAN

EDP Header

SIM Card Header (*JSIM)

SIM Card Slot (*SIMCARD)

M.2 SATA Slot (M2.M)

M.2 PCIE Slot (M2.E)

RJ-45 LAN Ports

SATA Power-out Connector

JLAN_LED Header

Line-out Port

GPIO Port Header

Serial Port Header (COM1)

USB 2.0 Port Header

SATAIII Port

Front Panel Audio Header

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

Internal Diagram-Back Side:

Intel CPU

Jumper Position:

J1

JATX_AT

JM2-E — JMPE1

JLED

JLCD
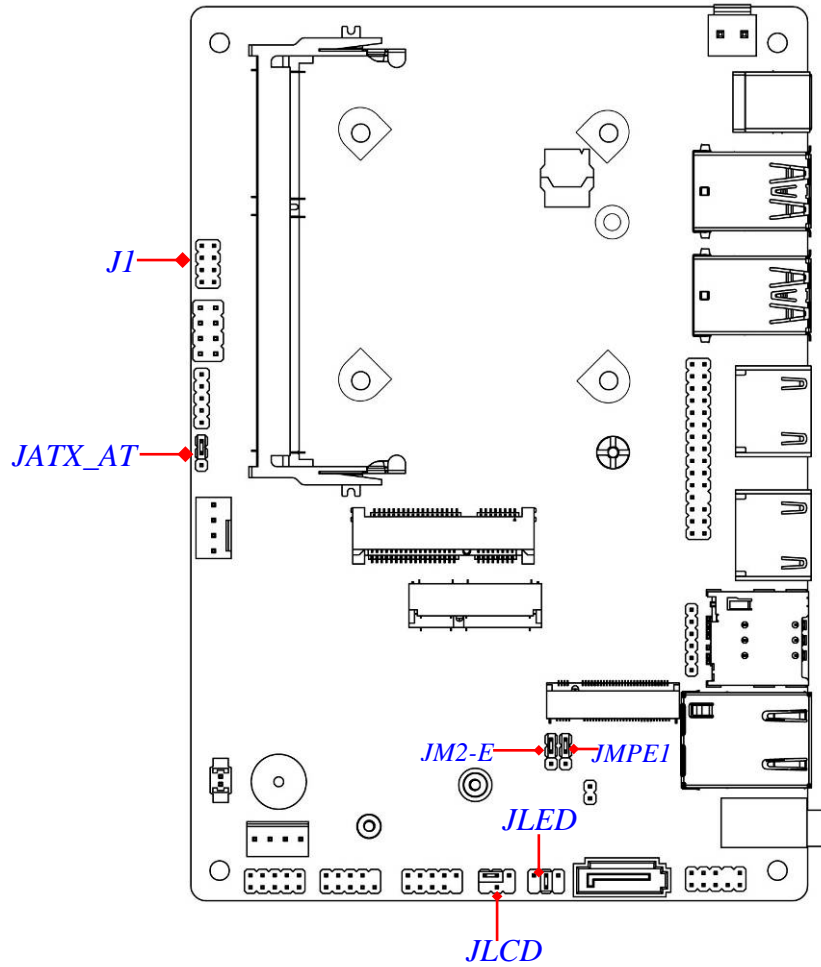
Jumper

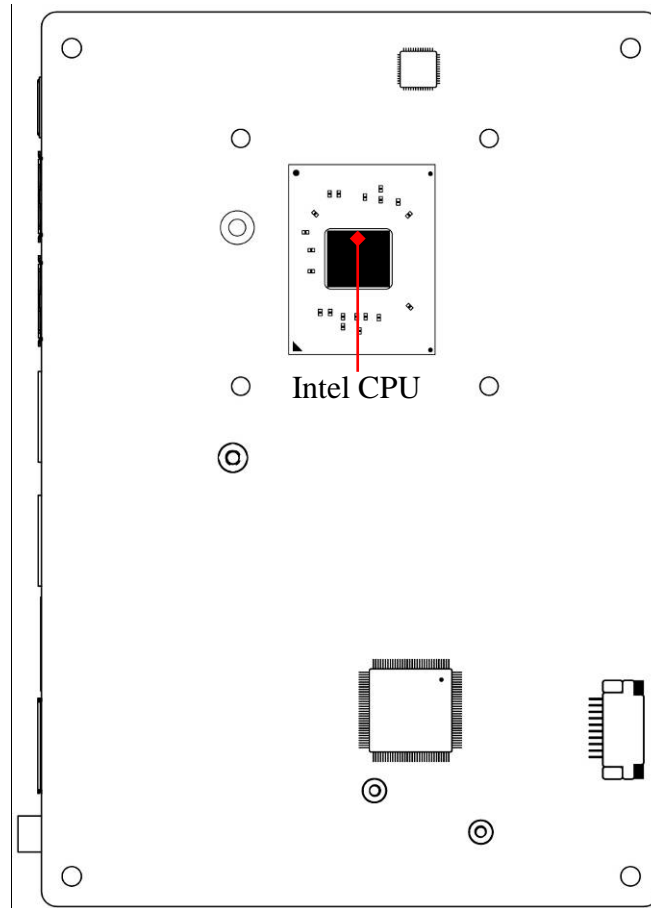| Jumper	Name	Description
J1	*Pin (1-2):* RTC Reset *Pin (3-4):* Clear CMOS *Pin (5-6):* ME Flash Override *Pin (7-8):* Case Open	8-Pin Block
JAT_ATX	AT Mode/ATX Mode Select	3-Pin Block
JMPE1	MPE Slot Voltage Select	3-Pin Block
JM2-E	M2.E Slot Voltage Select	3-Pin Block
JLCD	Panel LCD Voltage Select	4-Pin Block
JLED	Panel Backlight LED Voltage Select	4-Pin Block

Connectors

Connector	Name
DCIN1	12V DC–in Power Jack
USB1/USB2	USB 3.0 Port Connector X4
HDMI1/HDMI2	HDMI Port Connector X2
LAN1	RJ-45 LAN Port Connector
AUDIO	Audio Line Out Connector
DCIN	Internal 2-Pin 12V DC-in Power Connector
SATA1	SATAIII Port Connector
SATAPWR1	SATA Power out Connector
CPUFAN	CPUFAN Connector

Headers

Header	Name	Description
JW_FP1	Front Panel Header(PWR LED/ HDD LED/Power Button /Reset)	8-pin Block
SMBUS	SMBUS Header	5-pin Block
FP_AUDIO	Front Panel Audio Header	9-pin Block
JLAN_LED	LAN Activity LED Headers	2-pin Block
JSIM	SIM Expansion Header	6-pin Block
FP_USB1	USB 2.0 Header	9-pin Block
COM1	Serial Port Header	9-pin Block
GPIO_CON	GPIO Port Header	10-pin Block
EDP1	EDP Header	29-pin Block

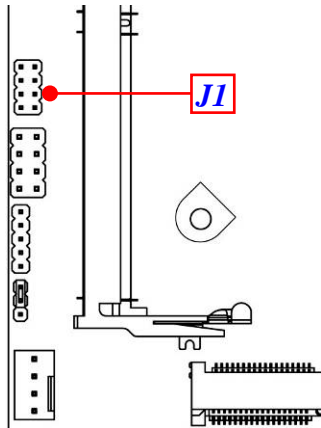# Chapter 2
Hardware Installation

2-1 Jumper Setting

Pin (1-2) of J1 (8-pin): RTC Reset

Pin (1-2) of J1→RTC Reset

Pin1→ ■ ● 2
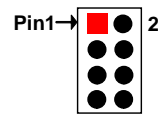
1-2 Open: Normal(Default);

Pin1→ ■ ● 2
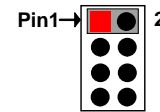
1-2 Closed: RTC Reset.

Pin (3-4) of J1 (8-pin): Clear CMOS RAM Settings
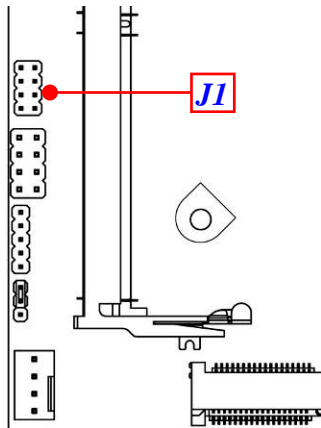
Pin (3-4) of J1→Clear CMOS

Pin1→ ■ ● 2
3 ● ● 4
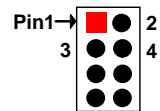
3-4 Open: Normal(Default);

Pin1→ ■ ● 2
3 ● ● 4
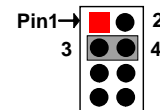
3-4 Closed: Clear CMOS.

Pin (5-6) of J1 (8-pin): ME Flash Override Select
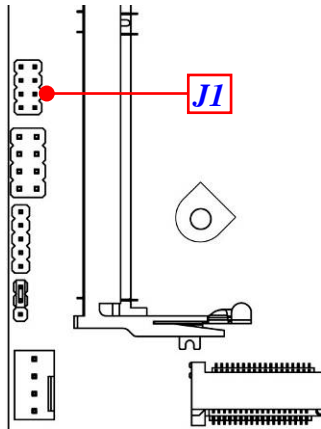
Pin (5-6) of J1→ME Flash Override

Pin1→ ■ ● 2
3 ● ● 4
5 ● ● 6
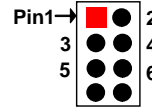
5-6 Open: Normal(Default);

Pin1→ ■ ● 2
3 ● ● 4
5 ● ● 6
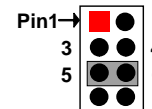
5-6 Closed: ME Flash Overide.

Pin (7-8) of J1 (8-pin): Case Open Message Display Function Select

Pin (7-8) of J1→Case Open

Pin1→ ■ ● 2
3 ● ● 4
5 ● ● 6
7 ● ● 8
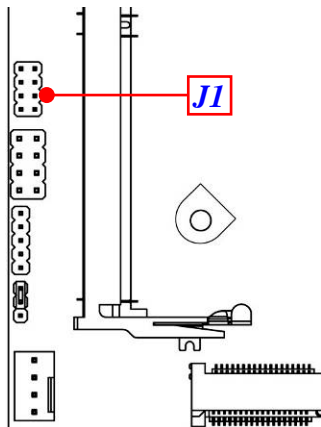
GND
CASE OPEN
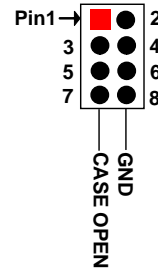
7-8 Short: Case Open Detect

*Pin 7-8 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.*

JAT_ATX (3-pin): AT Mode /ATX Mode Select
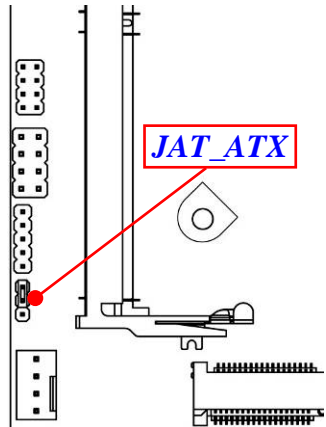
JAT_ATX→ATX/AT Mode Select
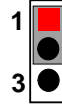
1-2 Closed: ATX Mode Selected;

2-3 Closed: AT Mode Selected.

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

JMPE1(3-pin): MPE (Mini-PCIe) Slot Voltage Select
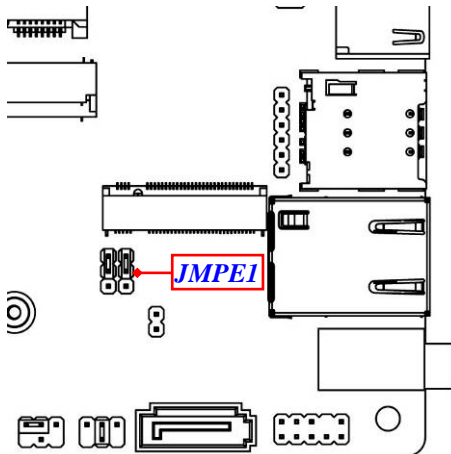
JMPE1→MPE Slot Voltage Select

1-2 Closed: Voltage=VCC3;

2-3 Closed: Voltage=3VSB.

JM2-E(3-pin): M2. E (M.2 PCIe) Slot Voltage Select

JM2-E

JM2-E→M2.E Slot Voltage Select

1
3

1-2 Closed: Voltage=VCC3;

1
3
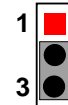
2-3 Closed: Voltage=3VSB.

JLCD (4-pin): Panel LCD Voltage Select
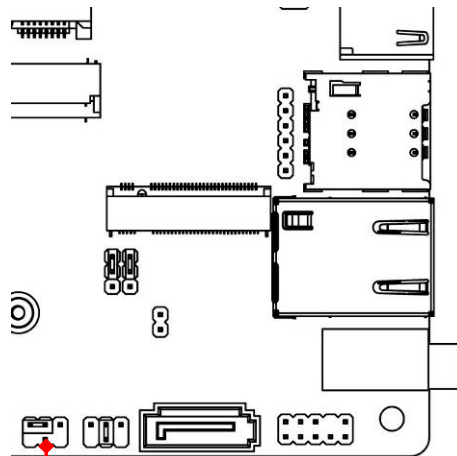
JLCD→Panel LCD Voltage Select
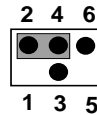
2 4 6	2 4 6	2 4 6
1 3 5	1 3 5	1 3 5
2-4 Closed: Voltage=3.3V;	**3-4 Closed: Voltage=VCC;**	**4-6 Closed: Voltage= 12V.**
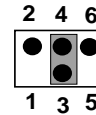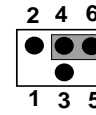
JLCD

JLED (4-pin): Panel Backlight LED Voltage Select
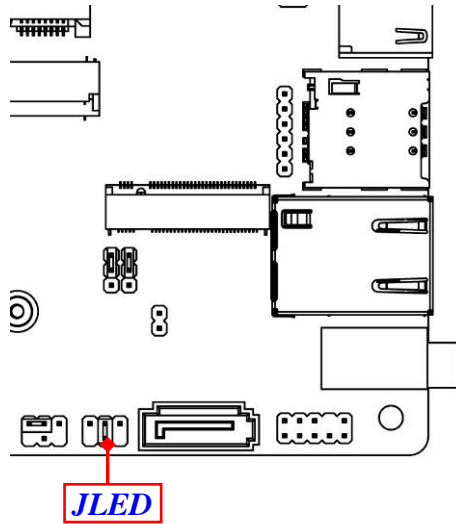
JLED→Panel Backlight LED Voltage Select
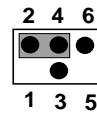
2 4 6	2 4 6	2 4 6
1 3 5	1 3 5	1 3 5
2-4 Closed: Voltage=5V;	**3-4 Closed:** Voltage=12V;	**4-6 Closed:** Voltage=Adapter 12V.
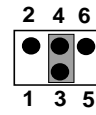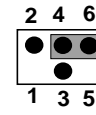
JLED

2-2 Connectors and Headers
2-2-1 Connectors

(1) Rear I/O Connectors
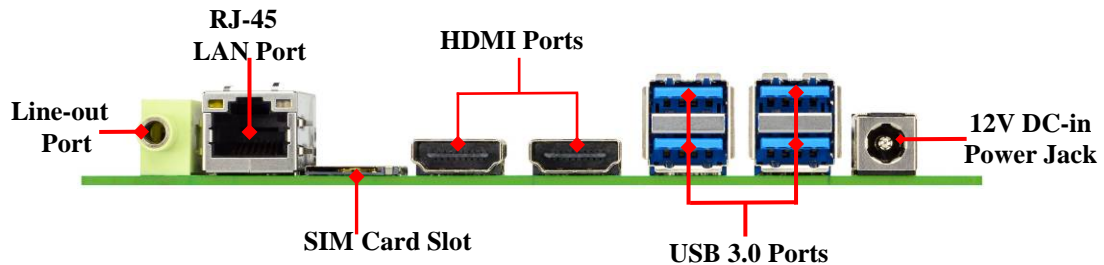
Icon	Name	Function
	12V DC-in Power Jack	For user to connect compatible power adapter to provide power supply for the system.
	USB 3.0 Port	To connect USB keyboard, mouse or other devices compatible with USB specification. USB 3.0 ports supports up to 5Gbps data transfer rate.
	HDMI Port	To connect display 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.

(2) DCIN(2-pin) : Internal 12V DC-in Power Connector

DCIN

Pin1

Pin No.	Definition
1	+12V
2	GND
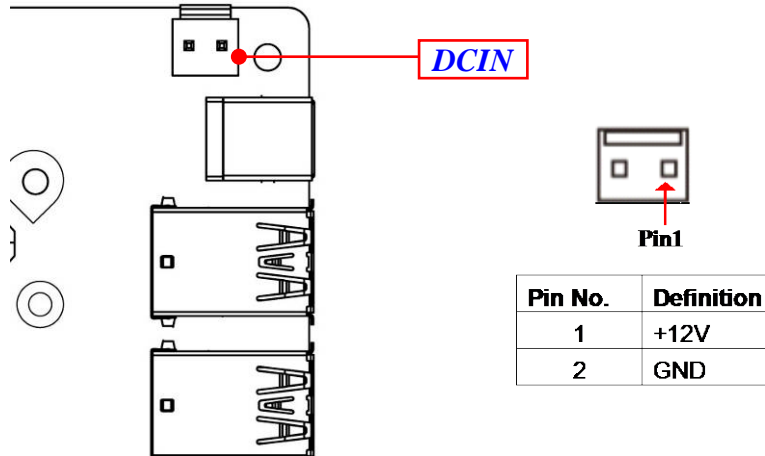
*Warning: Find Pin-1 position before connecting power cable to this 2-pin power connector. **WRONG INSTALLATION DIRECTION WILL DAMAGE THE BOARD!!***

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

SATA1 port is a high-speed SATAIII port that supports 6GB/s transfer rate.

SATA1

Pin No.	Definition
1	GND
2	TXP
3	TXN
4	GND
5	RXN
6	RXP
7	GND
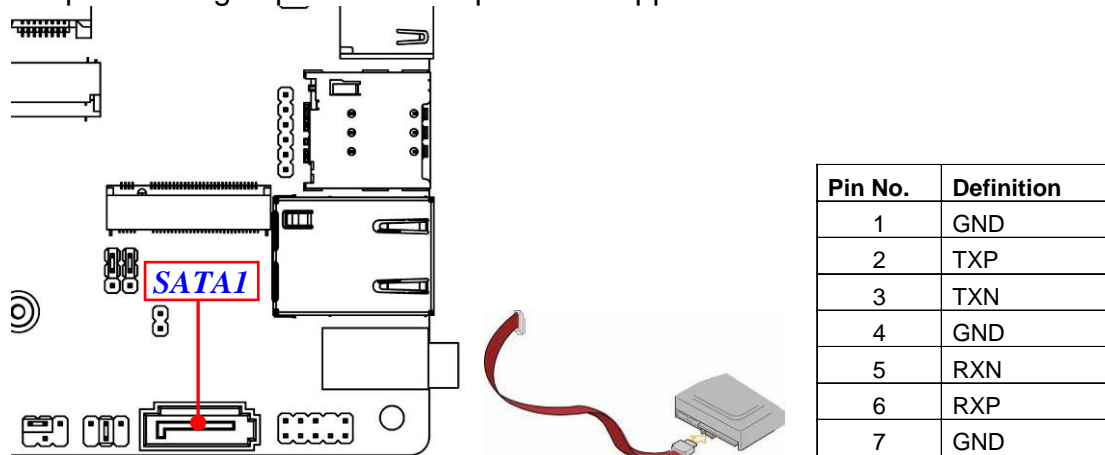
(4) SATAPWR1 (4-pin): SATA HDD Power-out Connector

SATAPWR1

Pin1 →

+5V GND GND +12V
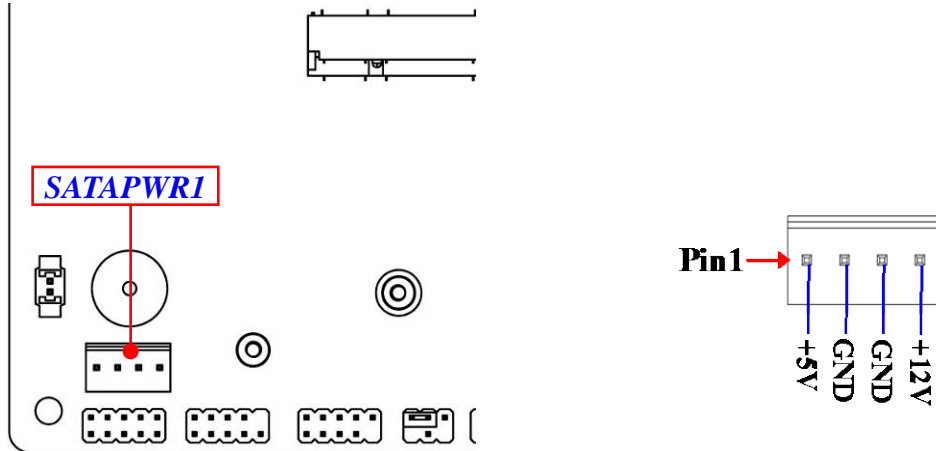
Warning: *Make sure that Pin-1 of compatible SATA Power connector is inserted into corresponding Pin-1 of SATAPWR1 connector to avoid possible damage to the board and hard disk driver!*

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

CPUFAN

Control
Fan Speed
+12V Fan Power
GND

Pin 1
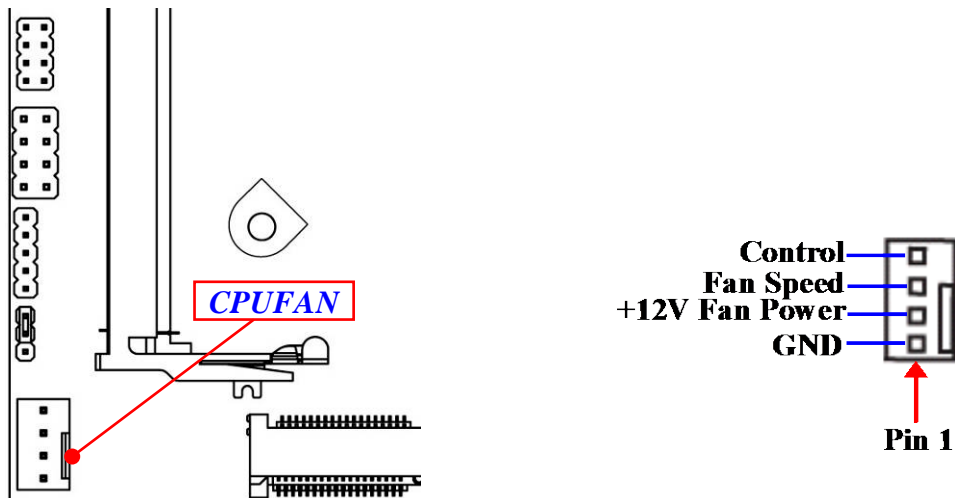
2-2-2 Headers

JW_FP1 (8-pin): Front Panel Header

Pin 1

HDDLED+	PWRLED+
HDDLED-	PWRLED -
GND	PWRBTN
RSTSW	GND

SMBUS (5-pin): SMBUS Header

Pin1

- SMBUS_CLK
- SMBUS_DATA
- SMBUS_ALERT
- GND
- 3VSB
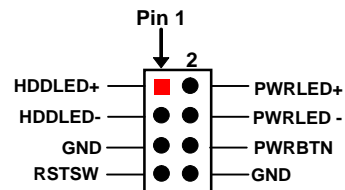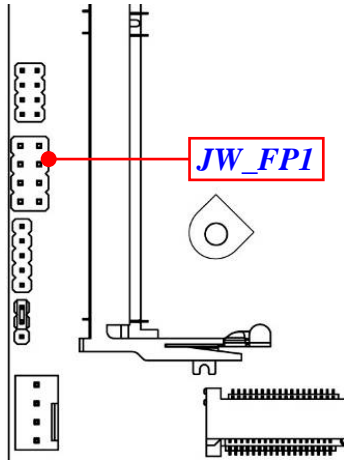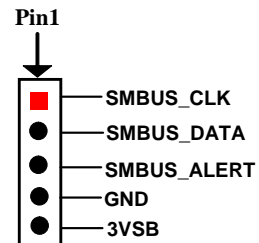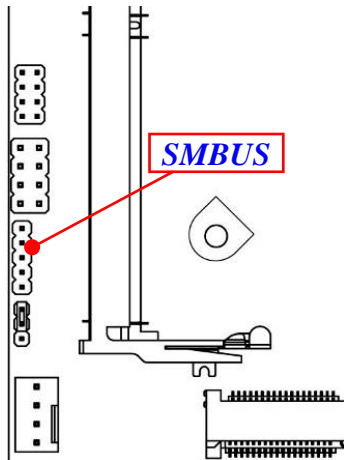
FP_AUDIO (9-pin): Line-Out, MIC-In Header

This header connects to Front Panel Line-out, MIC-In connector with cable.
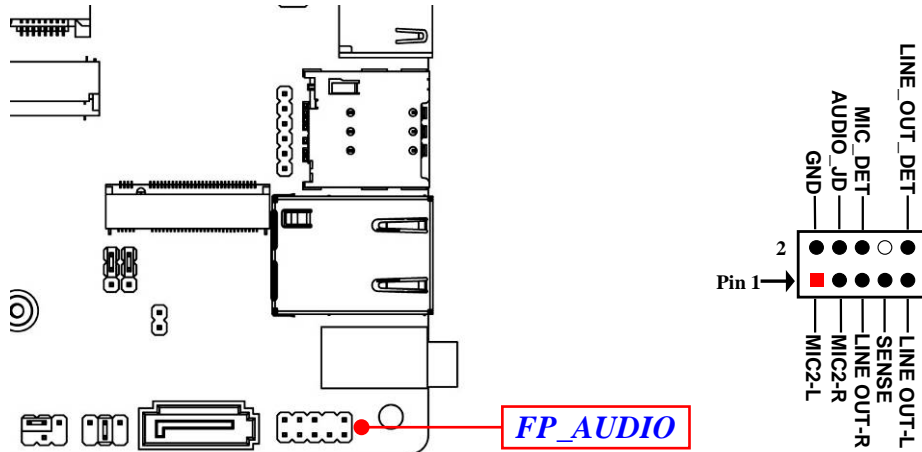
JLAN_LED (2-pin): LAN Activity LED Headers
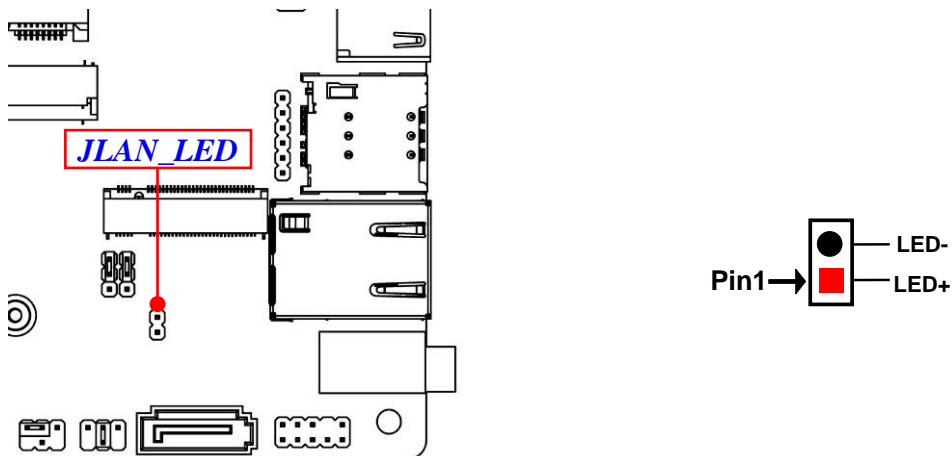
JSIM (6-pin): SIM Card Expansion Header

Pin1

- PWR1
- GND
- DATA
- CLK
- Reset
- PWR2
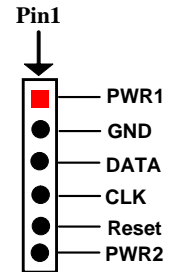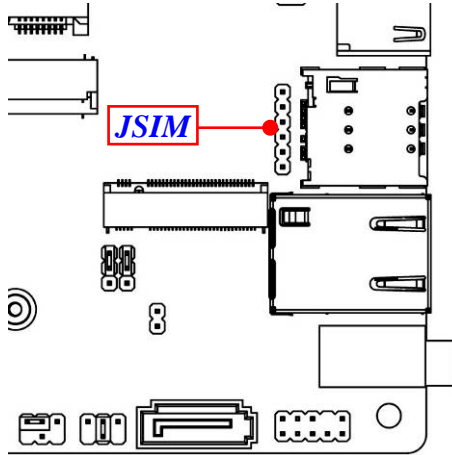
FP_USB1 (9-pin): USB 2.0 Port Header

VCC
-DATA
+DATA
GND
NC

2

Pin 1

VCC
-DATA
+DATA
GND
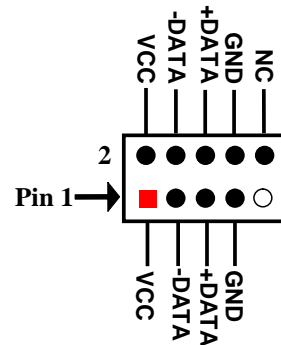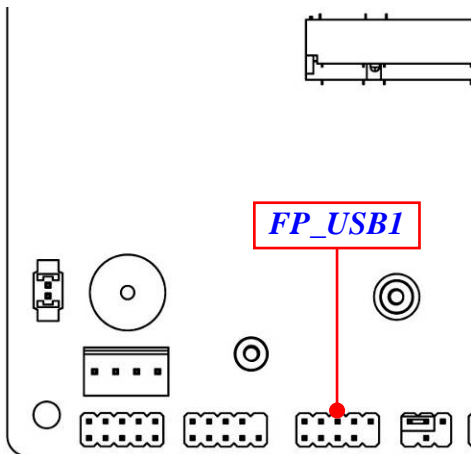
COM1 (9-pin): RS232 Serial Port Header
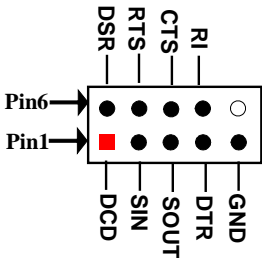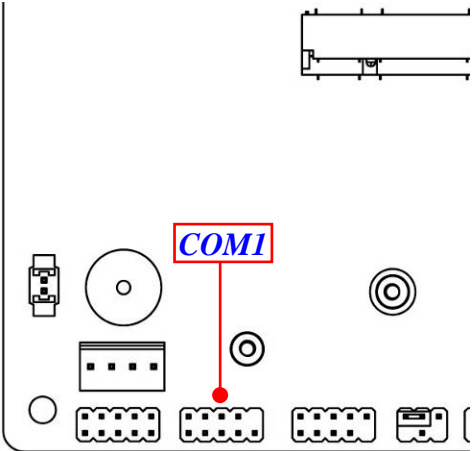
GPIO_CON (10-pin): GPIO Port Header
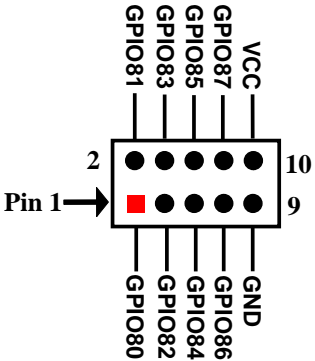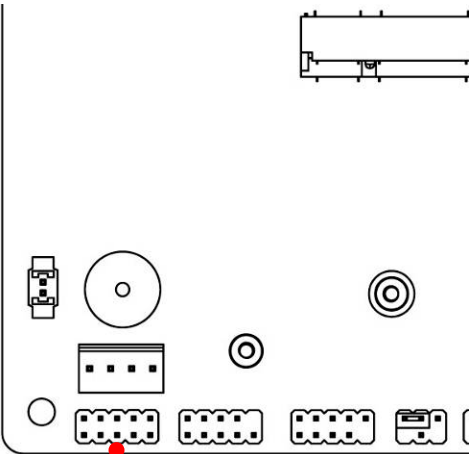
EDP1 (29-pin): eDP Port Header
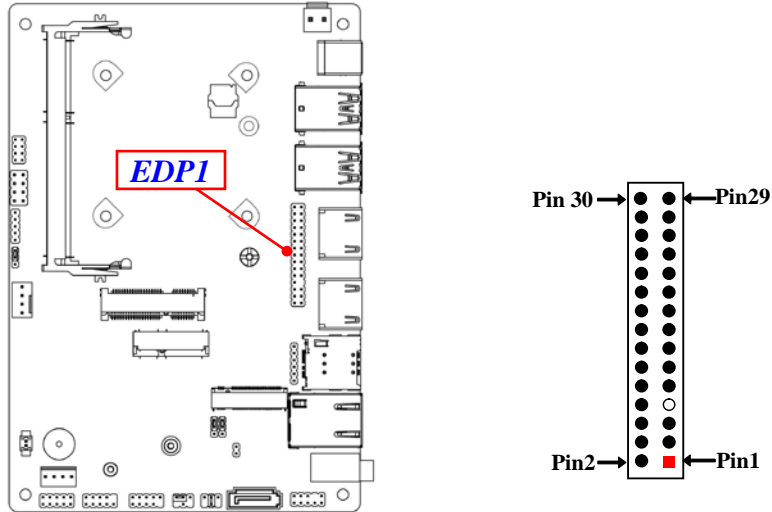
Pin NO.	Pin Define	Pin NO.	Pin Define
Pin 30	EDP_LANE-0	Pin 29	EDP_LANE+0
Pin 28	EDP_LANE-1	Pin 27	EDP_LANE+1
Pin 26	GND	Pin 25	GND
Pin 24	EDP_LANE-2	Pin 23	EDP_LANE+2
Pin 22	EDP_LANE-3	Pin 21	EDP_LANE+3
Pin 20	GND	Pin 19	GND
Pin 18	EDP_AUXN_C	Pin 17	EDP_HPD
Pin 16	EDP_AUXP_C	Pin 15	L_BKLT_EN
Pin 14	GND	Pin 13	GND
Pin 12	L_BKLT_PWM	Pin 11	EDP_VDD
Pin 10	NC	Pin 9	EDP_VDD
Pin 8	NC	Pin 7	N/A
Pin 6	GND	Pin 5	GND
Pin 4	GND	Pin 3	BKLT_PW
Pin 2	BKLT_PW	Pin 1	BKLT_PW

Chapter 3
Introducing BIOS

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

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

3-1   Entering Setup

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

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

3-2 BIOS Menu Screen

The following diagram show a general BIOS menu screen:

Menu Bar

General Help Items

Menu Items   **Current Setting Value**
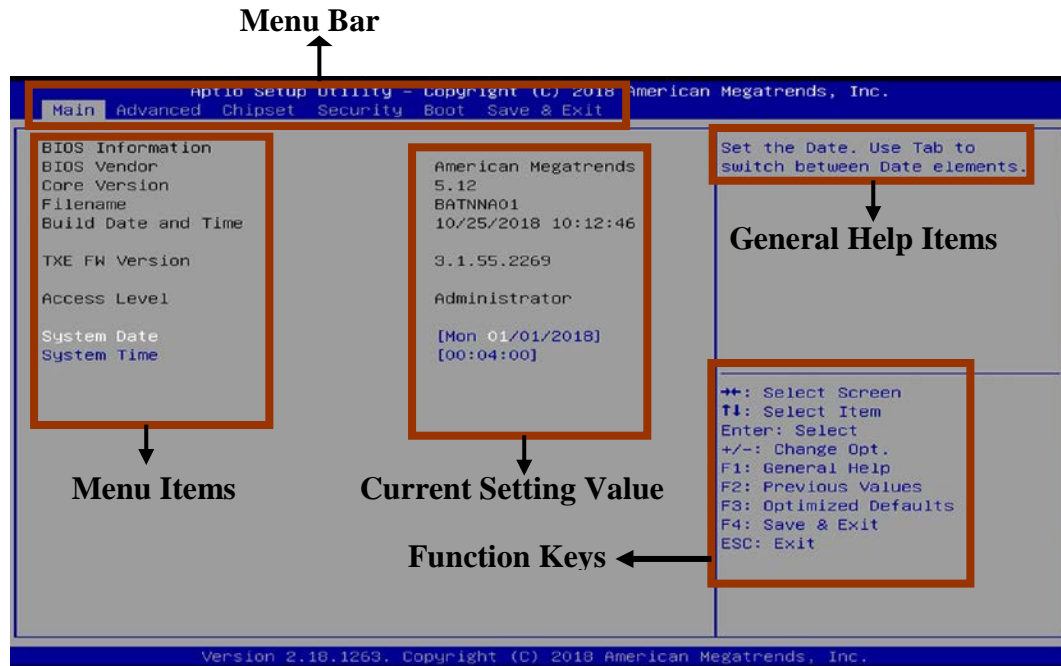
Function Keys

3-3 Function Keys

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

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

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

3-4   Getting Help
Main Menu

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

Status Page Setup Menu/Option Page Setup Menu

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

3-5 Menu Bars

There are six menu bars on top of BIOS screen:

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

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

3-6   Main Menu

Main menu screen includes some basic system information. Highlight the item and then use the <+> or <-> and numerical keyboard keys to select the value you want in each item.
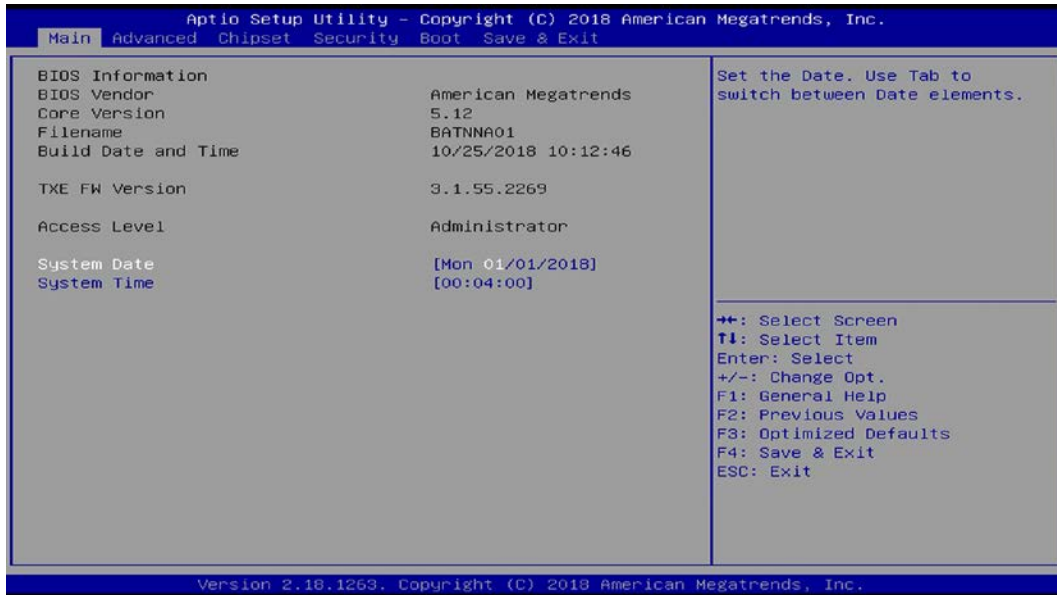
System Date
Set the date. Please use [Tab] to switch between date elements.
System Time
Set the time. Please use [Tab] to switch between time elements.

3-7 Advanced Menu
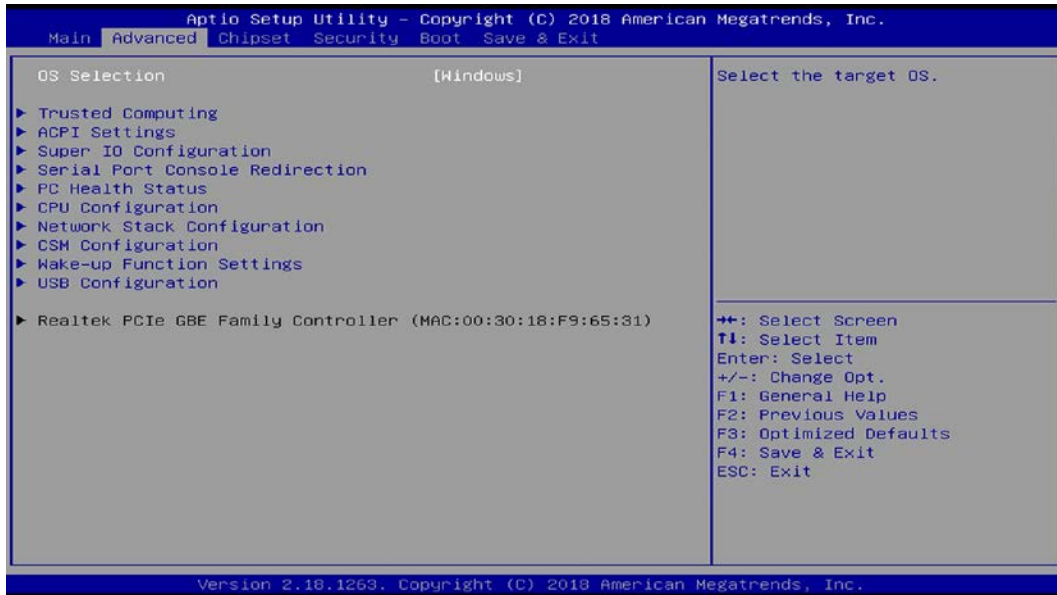
OS Selection
The optional settings: [Windows]; [Intel Linux]; [MSDOS].
Note: User need to go to this item to select the OS mode before installing corresponding OS driver, otherwise problems will occur when installing the driver.

▸ **Trusted Computing**
Press [Enter] to enable or disable '**Security Device Support**'.
Configuration

Security Device Support
Use this item to enable or disable BIOS support for security device.
The optional settings: [Disabled]; [Enabled].

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

ACPI Settings

ACPI Sleep State
Use this item to select the highest ACPI sleep state the system will enter when the suspend button is pressed.
The optional settings are: [Suspend Disabled]; [S3 (Suspend to RAM)].

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

▸ **Serial Port 1 Configuration**
Press [Enter] to make settings for the following items:
Serial Port 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.**
The optional settings are: [Auto]; [IO=3F8h; IRQ=4]; [IO=2F8h; IRQ=3]; [IO=3E8h; IRQ=4]; [IO=2E8h; IRQ=3].

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

Case Open Detect
Use this item to detect case has already open or not, show message in POST.
The optional settings: [Disabled]; [Enabled].
When set as [Enabled], system will detect if COPEN has been short or not (refer to Page 10); if **Pin 7&8 of J1** is short, system will show Case Open Message during POST.

WatchDog Reset Timer
Use this item to enable or disable WDT reset function.
The optional settings: [Disabled]; [Enabled].
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 11*, jumper **JATX_AT** for ATX Mode & AT Mode Select).

▸ **Serial Port Console Redirection**
COM1
Console Redirection
The optional settings: [Disabled]; [Enabled]. When set as [Enabled], the following sub-items shall appear:

‣ Console Redirection Settings

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

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

COM1

Console Redirection Settings

Terminal Type

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

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

Bits per second

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

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

Data Bits

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

Parity

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

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

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

Stop Bits

Stop bits indicate the end of a serial data packet. (A start bit indicates the beginning). The standard setting is 1 stop bit. Communication with slow devices may require more than 1 stop bit.

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

Flow Control

Flow control can prevent data loss from buffer overflow. When sending data, if

the receiving buffers are full, a "stop" signal can be sent to stop the data flow. Once the buffers are empty, a "start" signal can be sent to re-start the flow. Hardware flow control uses two wires to send start/stop signals.
The optional settings: [None]; [Hardware RTS/CTS].

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

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

Resolution 100x31
Use this item to enable or disable extended terminal resolution.
The optional settings: [Disabled]; [Enabled].

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

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

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

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

Console Redirection

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

‣ **Console Redirection Settings**
The settings specify how the host computer and the remote computer (which the user is using) will exchange data. Both computers should have the same or compatible settings.
Press [Enter] to make settings for the following items:
Out-of-Band Mgmt Port
The optional setting is: [COM1].
Terminal Type
The optional settings: [VT100]; [VT100+]; [VT-UTF8]; [ANSI].
[VT-UTF8] is the preferred terminal type for out-of-band management. The next best choice is [VT100+] and them [VT100]. See above, in Console Redirection Settings page, for more help with Terminal Type/Emulation.
Bits per second
Use this item to select serial port transmission speed. The speed must be matched on the other side. Long or noisy lines may require lower speeds.
The optional settings: [9600]; [19200]; [57600]; [115200].
Flow Control
Flow control can prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a "stop" signal can be sent to stop the data flow. Once the buffers are empty, a "start" signal can be sent to re-start the flow. Hardware flow control uses two wires to send start/stop signals.
The optional settings: [None]; [Hardware RTS/CTS]; [Software Xon/Xoff].
Data Bits
The default setting is: [8].
This item may or may not show up, depending on different configuration.
Parity
The default setting is: [None].
This item may or may not show up, depending on different configuration.
Stop Bits

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

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

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

CPUFAN Smart Mode
The optional settings are: [Disabled]; [Enabled].
*When set as **[Enabled]**, user can make further settings in the following sub-items:*
CPUFAN Full-Speed Temperature
Use this item to set CPUFAN full speed temperature. Fan will run at full speed when above this pre-set temperature.
CPUFAN Full-Speed Duty
Use this item to set CPUFAN full-speed duty. Fan will run at full speed when above this pre-set duty.
CPUFAN Idle-Speed Temperature
Use this item to set CPUFAN idle speed temperature. Fan will run at idle speed when below this pre-set temperature.
CPUFAN Idle-Speed Duty
Use this item to set CPUFAN idle speed duty. Fan will run at idle speed when below this pre-set duty.

▸ **CPU Configuration**
Press [Enter] to view current CPU configuration and make settings for the following sub-items:
VT-d
Use this item to enable or disable CPU VT-d.
The optional settings: [Enabled]; [Disabled].

EIST

Use this item to enable or disable Intel SpeedStep.

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

C-States

Use this item to enable or disable C-State.

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

Enhanced C-states

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

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

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 C 7]; [Core C 6]; [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 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 option will not be created.

PXE Boot Wait Time

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

Media Detect Count

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

The optional settings range 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.
The optional settings are: [UEFI and Legacy]; [Legacy only]; [UEFI only].
Network
This item controls the execution of UEFI and Legacy PXE OpROM.
The optional settings are: [Do not launch]; [UEFI]; [Legacy].
Storage
This item controls the execution of UEFI and Legacy Storage OpROM.
The optional settings are: [Do not launch]; [UEFI]; [Legacy].
Video
This item controls the execution of UEFI and Legacy Video OpROM.
The optional settings are: [UEFI]; [Legacy].
Other PCI devices
This item determines OpROM execution policy for devices other than Network, storage or video.
The optional settings are: [Do not launch]; [UEFI]; [Legacy].

▶ **Wake-up Function Settings**
Press [Enter] to make settings for the following sub-items:
Wake-up System with Fixed Time
Use this item to enable or disable system wake on alarm event.
The optional settings: [Disabled]; [Enabled].
When set as [Enabled], system will wake on the hour/min/sec specified.
*****Note***: This function is supported when 'ERP Support' is set as [Disabled].*
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 Wake-up from S4

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

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

▸ **USB Configuration**

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

USB Configuration

Legacy USB Support

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

[Enabled]: To enable legacy USB support.

[Disabled]: To keep USB devices available only for EFI specification,

[Auto]: To disable legacy support if no USB devices are connected.

XHCI Hand-off

This is a workaround for OSes without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.

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

USB Mass Storage Driver Support

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

USB Hardware Delays and Time-outs:

USB Transfer Time-out

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

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

Device Reset Time-out

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

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

Device Power-up Delay

Use this item to set maximum time the device will take before it properly reports itself to the host controller.

The optional settings: [Auto]; [Manual].

'Auto' uses default value: for a root port it is 100 ms, for a hub port the delay is taken from hub descriptor.

Select [Manual] you can set value for the following sub-item: '**Device Power-up Delay in Seconds'.**

Device Power-up Delay in Seconds

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

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

3-8 Chipset Menu

```
          Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
   Main  Advanced  Chipset  Security  Boot  Save & Exit

 ► Uncore Configuration                              Uncore Configuration
 ► South Cluster Configuration




                                                    ↔: Select Screen
                                                    ↑↓: Select Item
                                                    Enter: Select
                                                    +/-: Change Opt.
                                                    F1: General Help
                                                    F2: Previous Values
                                                    F3: Optimized Defaults
                                                    F4: Save & Exit
                                                    ESC: Exit



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```

► **Uncore Configuration**
Press [Enter] to make settings for the following sub-items:
GTT Size
The optional settings are: [2MB]; [4MB]; [8MB].

DVMT Pre-Allocated
Use this item to select DVMT 5.0 pre-allocated (fixed) graphics memory size used by the internal graphics device.
The optional settings are: [64M]; [96M]; [128M]; [160M]; [192M]; [224M]; [256M]; [288M]; [320M]; [352M]; [384M]; [416M]; [448M]; [480M]; [512M].
DVMT Total Gfx Mem
Use this item to select DVMT 5.0 total graphics memory size used by the internal graphics device.
The optional settings are: [128M]; [256M]; [MAX].
Active LFP
The optional settings are: [Disabled]; [eDP].
* When set as [eDP], user can make further setting in the following item:
GMCH BLC Control
Use this item to select back light control settings.
The optional settings are: [PWM-Inverted]; [PWM-Normal].
Primary IGFX Boot Display
Use this item to select the video device which will be activated during POST. This has no effect if external graphics present. Secondary boot display selection will appear based on your selection.
The optional settings are: [Auto]; [eDP]; [HDMI1]; [HDMI2].
Secondary IGFX Boot Display
Use this item to select Secondary Display Device.
The optional settings are: [Disabled]; [HDMI1]; [HDMI2].

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:
    PCI Express Configuration
    Peer Memory Write Enable

The optional settings: [Disabled]; [Enabled].
Compliance Mode
The optional settings: [Disabled]; [Enabled].
Onboard PCIE LAN
The optional settings: [Disabled]; [Enabled].

‣ **SATA Configuration**
Press [Enter] to make settings for the following sub-items:
SATA Controller
The optional settings are: [Enabled]; [Disabled].
When set as [Enabled], the following items shall appear:
SATA Mode Selection
The default setting is: [AHCI].
SATA Port
SATA Port
Use this item to enable or disable each SATA port.
The optional settings: [Disabled]; [Enabled].
M.2
M.2
Use this item to enable or disable M.2 SATA port.
The optional settings: [Disabled]; [Enabled].
HD-Audio Support
Use this item to enable or disable HD-Audio Support.
The optional settings are: [Disabled]; [Enabled].
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

```
              Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
       Main  Advanced  Chipset  Security  Boot  Save & Exit

   Password Description                                    Set Administrator Password

   If ONLY the Administrator's password is set,
   then this only limits access to Setup and is
   only asked for when entering Setup.
   If ONLY the User's password is set, then this
   is a power on password and must be entered to
   boot or enter Setup. In Setup the User will
   have Administrator rights.
   The password length must be
   in the following range:
   Minimum length                    3
   Maximum length                    20

                                                           ++: Select Screen
   Administrator Password                                  ↑↓: Select Item
   User Password                                           Enter: Select
                                                           +/-: Change Opt.
   ▶ Secure Boot                                           F1: General Help
                                                           F2: Previous Values
                                                           F3: Optimized Defaults
                                                           F4: Save & Exit
                                                           ESC: Exit


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```

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

Administrator Password

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

User Password

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

▶ **Secure Boot**
Press [Enter] to make customized secure settings:
Secure Boot Control
The optional settings are: [Disabled]; [Enabled].
Secure Boot can be enabled if 1. System running in user mode with enrolled Platform Key (PK); 2. CSM function is disabled.
Secure Boot Mode
The optional settings are: [Standard]; [Custom].
Set UEFI Secure Boot Mode to Standard mode or Custom mode. This change is effective after save. After reset, this mode will return to Standard mode.
When set as [Custom], user can make further settings in 'Key Management'.

▶   **Key Management**
This item enables experienced users to modify Secure Boot variables, which includes the following items:
Provision Factory Default Keys
This item is for user to install factory default secure boot keys when system is in Setup Mode.
The optional settings are: [Disabled]; [Enabled].

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

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

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

▶ **Platform Key (PK)/Key Exchange Keys/Authorized Signature/Forbidden**

Signature/ Authorized TimeStamps/OS Recovery Signatures
   Use this item to enroll Factory Defaults or load the keys from a file with:
   1. Public Key Certificate in:
     a) EFI_SIGNATURE_LIST
     b) EFI_ CERT_X509 (DER encoded)
     c) EFI_ CERT_RSA2048 (bin)
     d) EFI_ CERT_SHA256 (bin)
   2. Authenticated UEFI Variable

3-10 Boot Menu
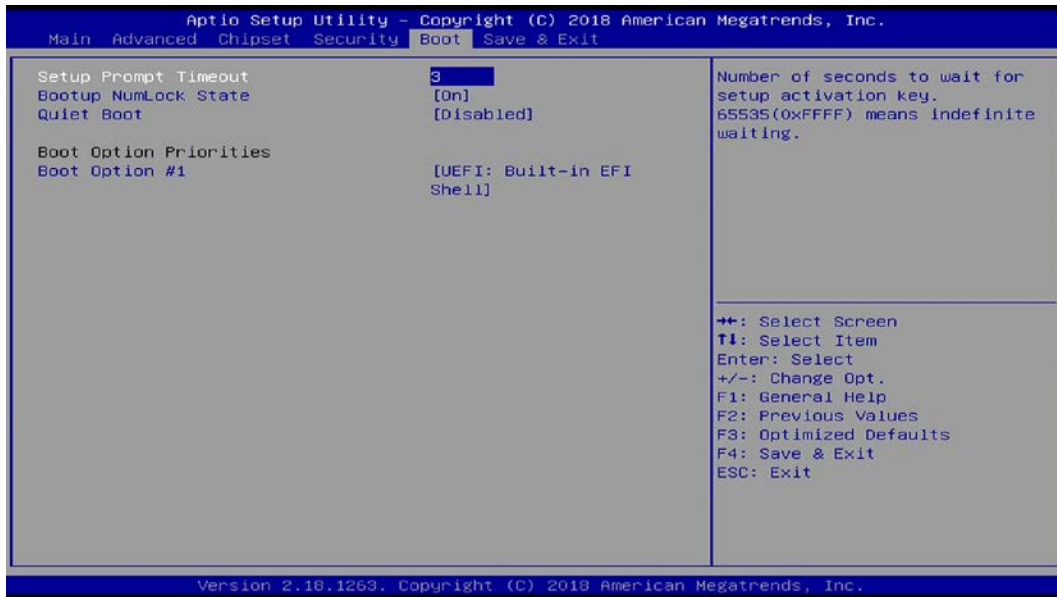
Setup Prompt Timeout
Use this item to set number of seconds to wait for setup activation key.
Bootup Numlock State
Use this item to select keyboard numlock state.
The optional settings are: [On]; [Off].

Quiet Boot
The optional settings are: [Disabled]; [Enabled].
__Boot Option Priorities__

Boot Option#1/…
For user to set system boot order from available options.

3-11 Save & Exit Menu

```
           Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
     Main  Advanced  Chipset  Security  Boot  Save & Exit

   Save Changes and Reset                          Reset the system after saving
   Discard Changes and Reset                       the changes.

   Restore Defaults
   Save as User Defaults
   Restore User Defaults

   Boot Override
   UEFI: Built-in EFI Shell
   Launch EFI Shell from Filesystem Device

                                                   →←: Select Screen
                                                   ↑↓: Select Item
                                                   Enter: Select
                                                   +/-: Change Opt.
                                                   F1: General Help
                                                   F2: Previous Values
                                                   F3: Optimized Defaults
                                                   F4: Save & Exit
                                                   ESC: Exit

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```
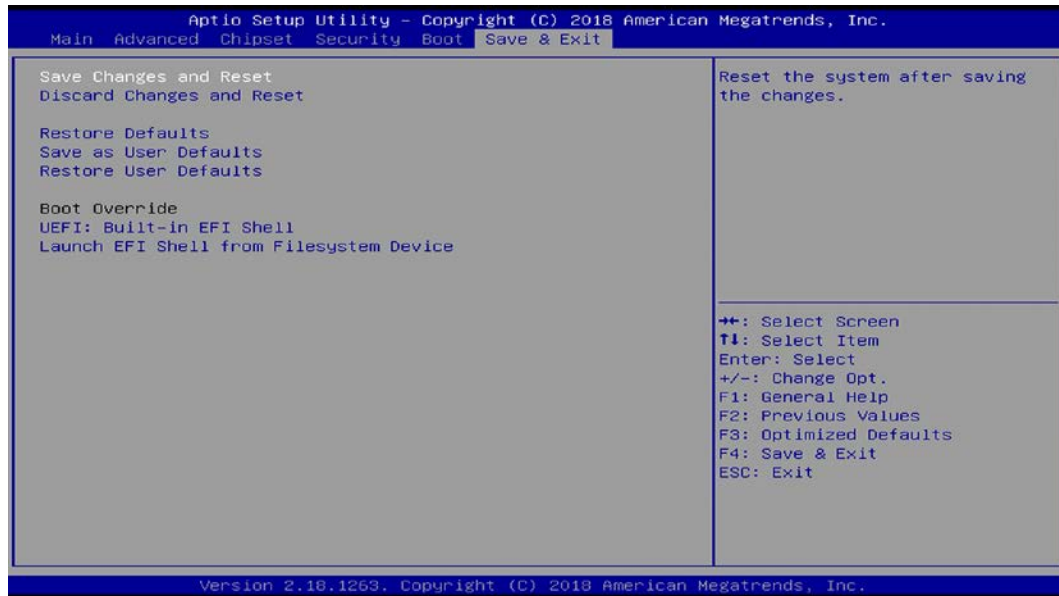
Save Changes and Reset
This item allows user to reset the system after saving the changes.
Discard Changes and Reset
This item allows user to reset the system without saving any changes.
Restore Defaults
Use this item to restore /load Default values for all the setup options.
Save as User Defaults
Use this item to save the changes done so far as User Defaults.

Restore User Defaults
Use this item to restore User Defaults to all the setup options.
__Boot Override__

UEFI: Built-in EFI Shell
Press this item and a dialogue box shall appear to ask if user wish to save configuration and reset.
Lauch EFI Shell from filesystem device
Use this item to launch EFI shell application (shell.efi) from one of the available filesystem device.