TECHNICAL MANUAL

Of

Intel Q170 Chipset

Based Mini-ITX M/B

NO.: G03-NF793-F

Revision: 3.0

Release date: October 1, 2019

Environmental Protection Announcement

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

TABLE OF CONTENT

⚠ CAUTION Environmental Safety Instruction

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

● 0 to 40 centigrade is the suitable temperature. (The temperature comes from the request of the chassis and thermal solution)

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

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

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

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Manual Revision Information

Reversion	Revision History	Date
3.0	Third Edition	October 1, 2019

Item Checklist

☑ Motherboard

Chapter 1

Introduction of the Motherboard

1-1   Feature of Motherboard

- Intel® LGA1151 Skylake/Kabylake Processor (TDP $\leqslant 65$ W)
- Intel® Q170 express chipset
- Support 2* DDR4 2133MHz SO-DIMM up to 32GB and dual channel function
- Integrated with RealTek ALC662 6-channel HD Audio Codec
- 2 * Intel Giga LAN
- Support 4 * SATA III (6Gb/s), support RAID 0, 1, 5, 10
- 3 *HDMI port with support triple displays
- 2 * External COM and 4 * internal COM
- 4 * External USB 3.0 & 2 * Internal USB1.1/2.0
- 1 * half-size Mini-PCIe slot & 1 * PCIe x4 side-slot
- 9 ~ 24V DC IN power
- 1* TPM (onboard option)
- Support Watchdog Timer Technology
- Support Smart FAN function
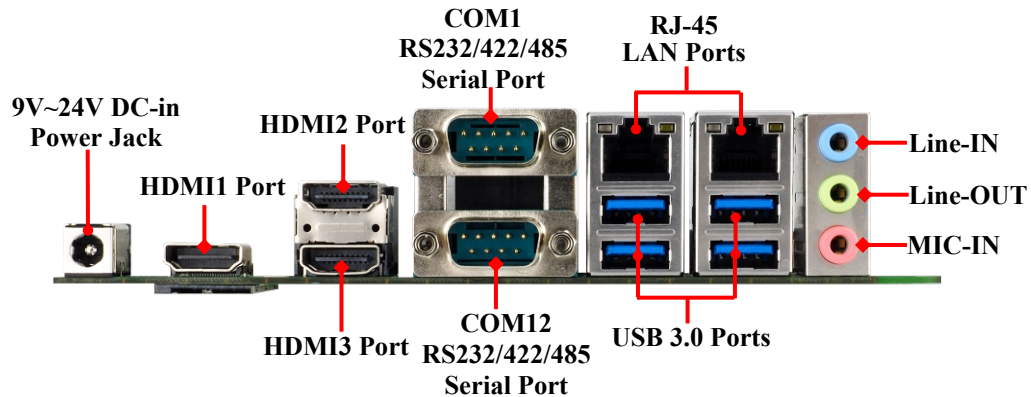- Supports ACPI S3 Function
- Compliance with ErP Standard

1-2 Specification

Spec	Description
Design	● Mini-ITX ; 6L; PCB size: 17.0x17.0cm
Chipset	● Intel Q170 Express Chipset
CPU	● Intel® LGA1151 Skylake/Kabylake Processor (TDP 65W) ** for detailed CPU support information please visit our website*
Memory Slot	● 2*DDR4 SO-DIMM slot ● Support DDR4 2133 MHz SO-DIMM up to 32GB ● Support dual channel function
Expansion Slot	● 1*Haft-size Mini-PCIe slot (**MPE**) ● 1* PCIe x4 side-slot (**PCIE1:**4 * PCIe x1 combo signals) ● *1* SIM card reader slot (*BSIMCARD)*
Storage	● 4* SATAIII 6G/s port with support RAID 0, 1, 5, 10 ● *1* Full-size MSATA slot(*MSATA)*
Gigabit LAN Chip	● Integrated with 1* Intel I219LM-F & 1*Intel I211AT Gigabit PCI-E 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
Multi I/O	*Rear Panel I/O:* ● 1* 9V~24V DC-input power jack ● 3 * HDMI port ● 2* Serial port (COM1_2: RS232/422/485) ● 2* RJ-45 port ● 4* USB 3.0 port ● 1* 3-jack audio connector (Line-in, Line-out, MIC)

Internal I/O Connectors & Headers:
● 1 * 2-pin internal 9V~24V power connector
● 1* CPUFAN connector & 1*SYSFAN connector
● 1* SATA power out connector
● 1*Front panel header
● 1*9-Pin USB 2.0 header for 2* USB 2.0 ports
● 1* Speaker & Power LED header
● 1*Front panel audio header
● 1*HDMI_ SPDIF header
● 1*LAN_LED header
● 4* RS232 serial port header
● 1* GPIO port header
● 1* SMBUS header
● 1* PS/2 keyboard & mouse header
● 1* SIM card expansion wafer (SIM)

1-3 Layout Diagram

Rear IO Diagram

Motherboard Internal Diagram-Front

SYSFAN Connector

CPUFAN Connector

9V~24V DC-In Power Jack

Internal 9V~24V Power Connector

LGA 1151 CPU Socket

HDMI1 Port

JPCOM2

SIM Card Slot Expansion Wafer (*SIM)

2*HDMI Port

PS/2 Keyboard &Mouse Header

2*RS232/422/485 Serial Port

JPME

2*DDR4 SODIMM Slot (SODIMM1/2)

Full-size MSATA Slot (*MSATA)

JBAT COPEN

2* RJ-45 LAN Port Over 4* USB 3.0 Ports

Half-size Mini PCIe Slot (MPE)

SPDIF_Out Header

LAN_LED Header

4*SATAIII Port (SATA1/2/3/4)

Audio Connectors

AT_MODE

SMBUS Header

SATA Power-out Connector

Front Panel Audio Header

USB 2.0 Header

Front Panel Header

GPIO Header

PCIE1: Sideway PCI Express x4 Slot

Speaker & Power LED Header

4*RS232 Serial Port Header (COM3/4/5/6)

Motherboard Internal Diagram-Back

*Note: 1. SIM card slot (**BSIMCARD**/expansion card from **SIM** wafer) only work **when** compatible SIM card installed & 3G LAN card installed in the **full-size MSATA** slot; 2. **BSIMCARD** and **SIM** wafer is optional, i.e., only one can work in the same time.*

Jumper

P/N	Name	Description
JPCOM2	COM2 Port Pin9 Function Select	4-pin Block
JPME	MPE slot VCC 3.3V/3VSB Select	3-pin Block
AT_ MODE	ATX Mode / AT Mode Select	3-pin Block
JBAT_COPEN	*Pin (1-2):* Clear CMOS RAM Settings *Pin (3-4):* Flash Descriptors Override *Pin (5-6):* Case Open Function Select	6-pin Block

Connectors

P/N	Name
DCIN	9~24 V DC-in Power Jack
HDMI1/HDMI2/HDMI3	HDMI Port Connector X3
COM1_COM2	RS232/422/485 Serial Port Connector X2
UL1/UL2	**Top:**RJ-45 LAN Connector X2 **Middle & Bottom**: USB 3.0 Port Connector X4
AUDIO	**Top:** Line-in Connector **Middle:** Line-out Connector **Bottom:** MIC Connector
DCIN1	Internal 9~24V DC–in power connector
CPUFAN	CPU Fan Connector
SYSFAN	System Fan Connector
SATAPW	SATA Power Out Connector
SATA1/2/3/4	SATAIII Port Connector X4

Headers & Wafers

P/N	Name	Description
JW_FP	Front Panel Header(PWR LED/ HD LED/Power Button /Reset)	9-pin Block
SPK_LED	Speaker Header +Power LED Header	7-pin Block
FP_USB1	USB 2.0 Port Header	9-pin Block
FP_AUDIO	Front Panel Audio Header	9-pin Block
SPDIF	HDMI_SPDIF Out Header	2-pin Block
LAN_LED	LAN Activity LED Header	4-pin Block
COM3/4/5/6	RS232 Serial Port Header	9-pin Block
SMBUS	SMBUS Header	4-pin Block
GPIO	GPIO Port Header	10-pin Block
PS2KBMS	PS/2 Keyboard & Mouse Header	6-pin Block
SIM	SIM Card Expansion Wafer	6-pin Block

1-4 Mechanical Drawing
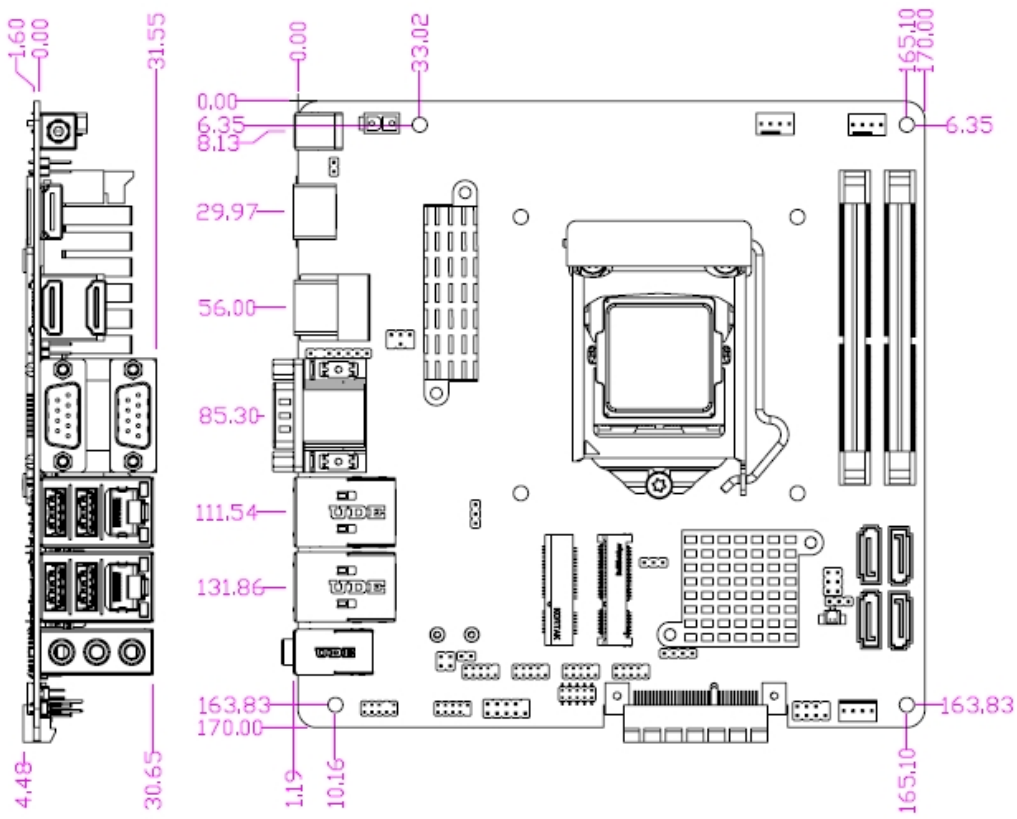
Unit=mm.

Chapter 2
Hardware Installation

2-1 Jumper Setting

JPCOM2 (4-pin): COM2 Port Pin9 Function Select

JPCOM2→COM2 Port Pin-9

```
 2  4  6          2  4  6          2  4  6
●──●  ●          ●──●  ●          ●  ●──●
●     ●          ●  ●  ●          ●  ●
 1  3  5          1  3  5          1  3  5
```

2-4 Closed: **3-4 Closed:**   **4-6 Closed:**
Pin9=RING(Default);   **Pin9 = 5V;**   **Pin9 = 12V.**

JPCOM2
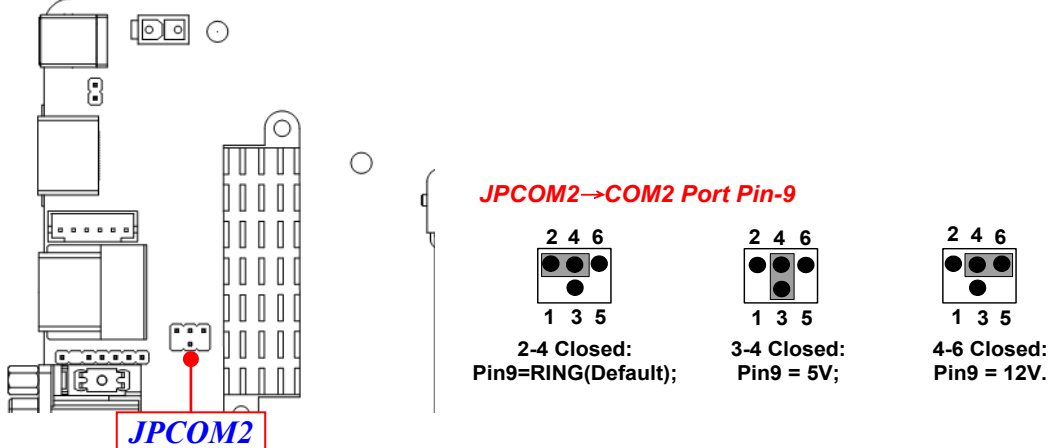
JPME (3-pin): MPE Slot VCC 3.3V/3VSB Select

JPME→ MPE VCC Select

```
■ 1
●
● 3
```

1-2 Closed: MPE VCC=3.3V;

```
■ 1
●
● 3
```

2-3 Closed: MPE VCC=3VSB.

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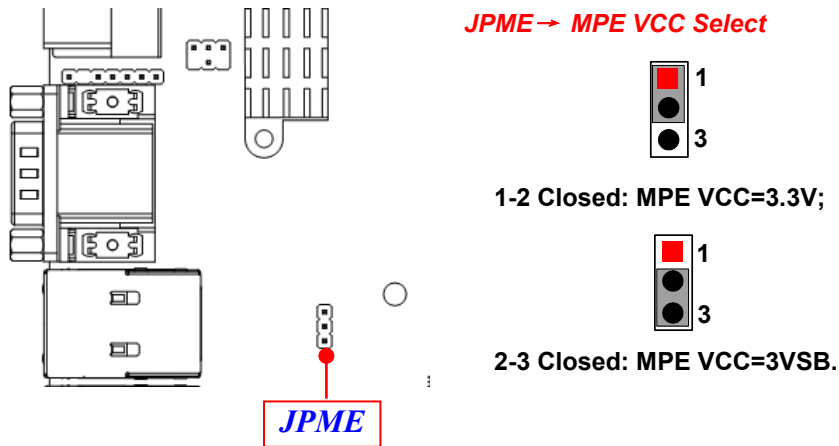
AT_MODE (3-pin): AT Mode /ATX Mode Select
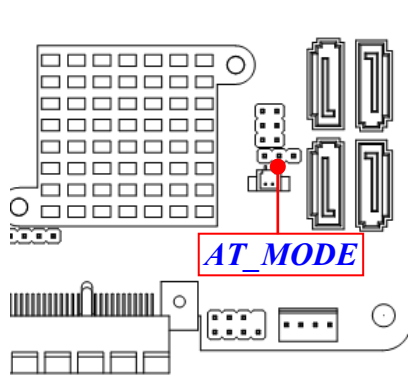
AT_MODE→ATX/AT Mode Select
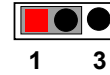
1-2 Closed: ATX Mode Selected;
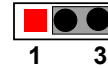
2-3 Closed: AT Mode Selected.

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

Pin 1&2 of JBAT_COPEN (6-pin): Clear CMOS RAM Setting
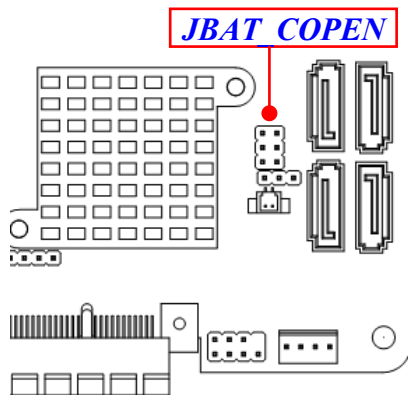
Pin (1&2) of JBAT_COPEN→ Clear CMOS

Pin 1 ⟶ ▢ ● 2
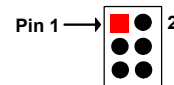
1-2 Open: Normal(Default);

Pin 1 ⟶ ▢ ● 2
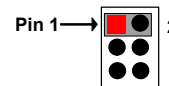
1-2 Closed: Clear CMOS(One Touch).

Pin 3&4 of JBAT_COPEN (6-pin): DFDS Override
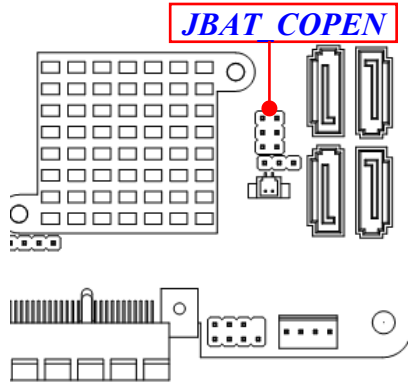
Pin (3&4) of JBAT_COPEN→DFDS Override

Pin 1 → 1 2
3 4
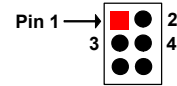
3-4 Open: Normal(Default);

Pin 1 → 1 2
3 4
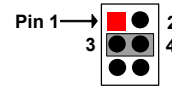
3-4 Closed: DFDS Override.

Pin 5&6 of JBAT_COPEN (6-pin): Case Open Message Display Function Select
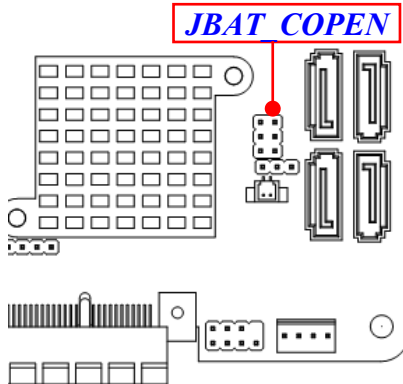
Pin (5&6) of JBAT_COPEN→Case Open Detect

Pin 1 → 1 2
3 4
5 6
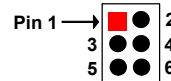
5-6 Open: Normal(Default);

Pin 1 → 1 2
3 4
5 6
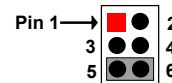
**5-6 Closed: Case Open Detect
Function Selected(One Touch).**

Pin (1-2) Close: *When Case open function pin short to GND, the Case open function was detected. When Used, needs to enter BIOS and enable 'Case Open Detect' function. In this case if your case is removed, next time when you restart your computer, a message will be displayed on screen to inform you of this.*

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

(1) Rear Panel Connectors

Refer to Page-4 Rear IO Diagram

Icon	Name	Function
	DC-in 9-24V Power Connector	For user to connect compatible power adapter to provide power supply for the system.
	HDMI Port	To connect display device that support HDMI specification.
	RS232/422/485 Serial Port	Mainly for user to connect external MODEM or other devices that supports Serial Communications Interface.
	RJ-45 LAN Port	This connector is standard RJ-45 LAN jack for Network connection.
	USB 3.0 Port	To connect USB keyboard, mouse or other devices compatible with USB specification. USB 3.0 ports supports up to 5Gbps data transfer rate.
	Audio Connectors	**Blue:** Line-in Connector **Green:** Line-out Connector **Pink :** MIC Connector

(2) COM1_COM2: RS232/422/485 Port

COM1/COM2 port can function as RS232/422/485 port. In normal settings COM1/COM2 functions as RS232 port. With compatible COM cable COM1/COM2 can function as RS422 or RS 485 port. User also needs to go to BIOS to set **'Transmission Mode Select'** for COM1/COM2 at first, before using specialized cable to connect different pins of this port.

For RS422 Mode   *For RS485 Mode*
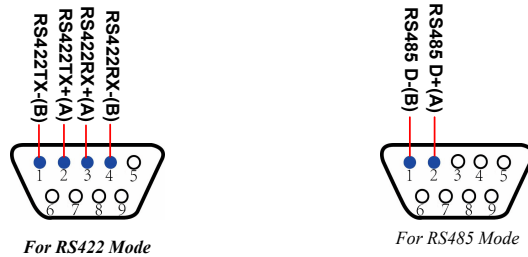
(3) DCIN1(2-pin): Internal 9V~24V DC-in power connector
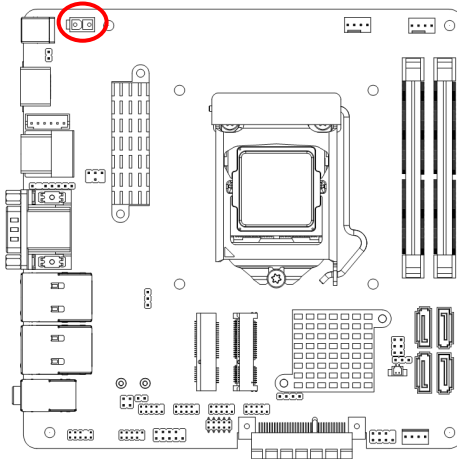
Pin No.	Definition
1	GND
2	+9V~+24V

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

Control
Fan Speed
+12V Fan Power
GND
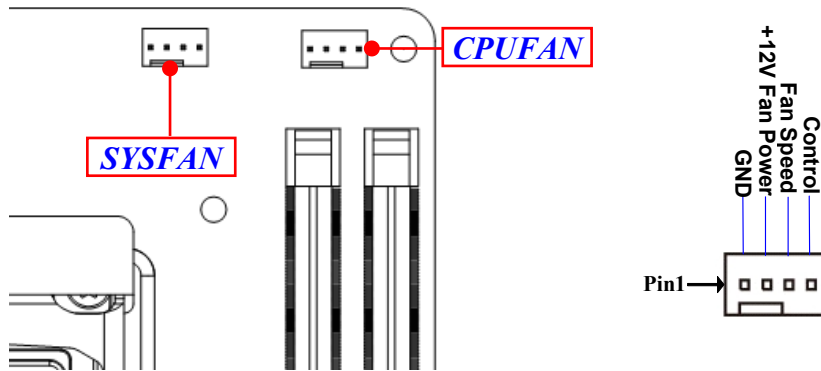
Pin1

(5) SATAPW(4-pin): SATA Hard Disk Power-out Connector

Pin 1

+5V
GND
GND
+12V
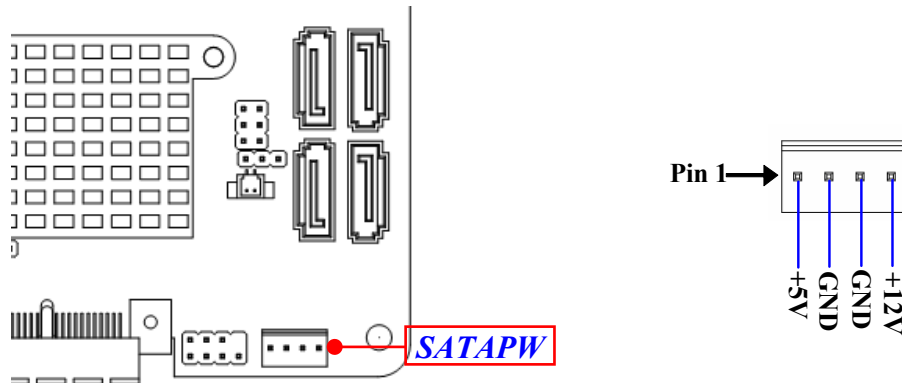
SATAPW

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

(6) SATA1/2/3/4(7-pin) :SATAIII Port connector

SATA1/2/3/4 port are high-speed SATAIII ports that support 6GB/s transfer rate.

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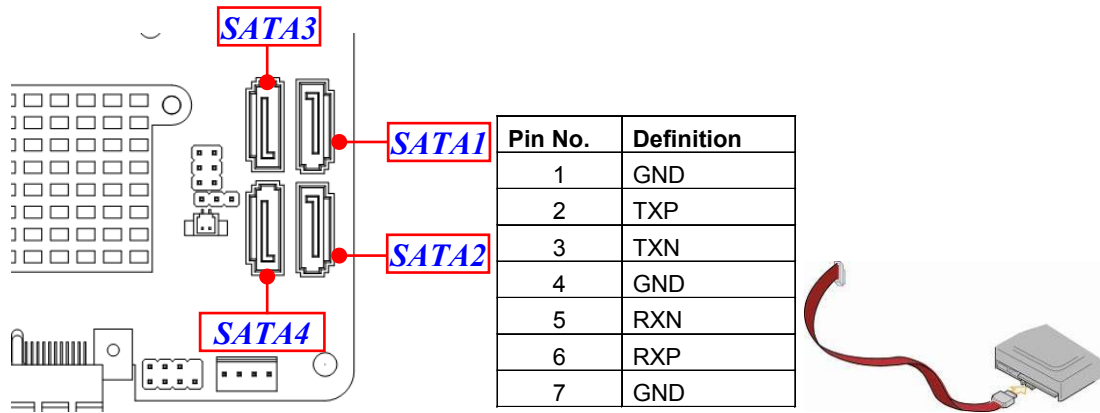
2-2-2 Headers

(1) JW_FP(9-pin): Front Panel Header
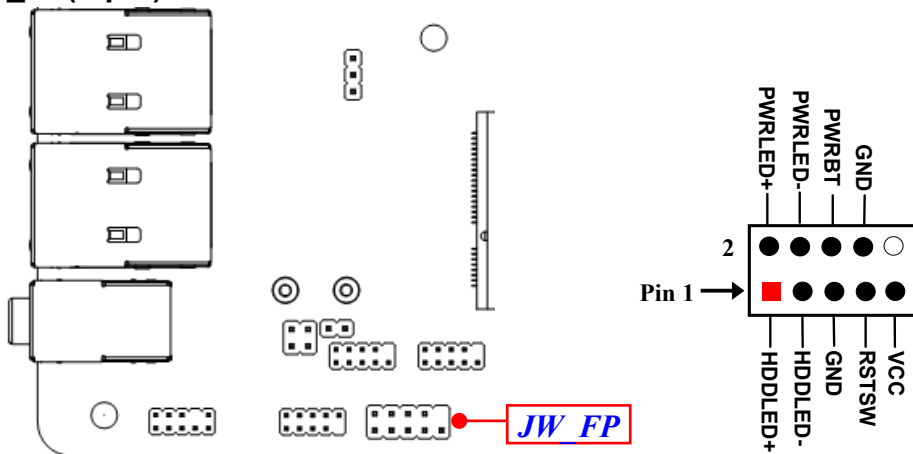
(2) SPK_LED(7-pin): PWR LED Header & Speaker Header

SPK_LED
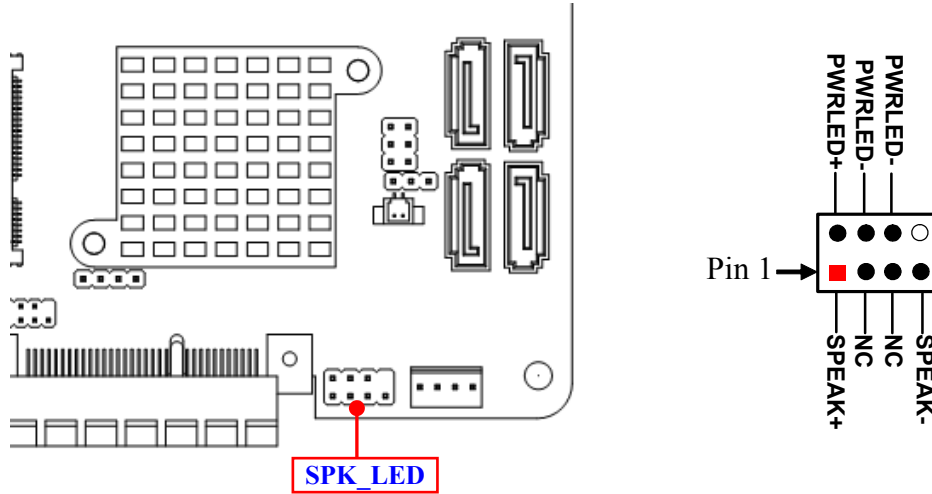
(3) FP_USB1 (9-pin): USB 2.0 Port Header

FP_USB1
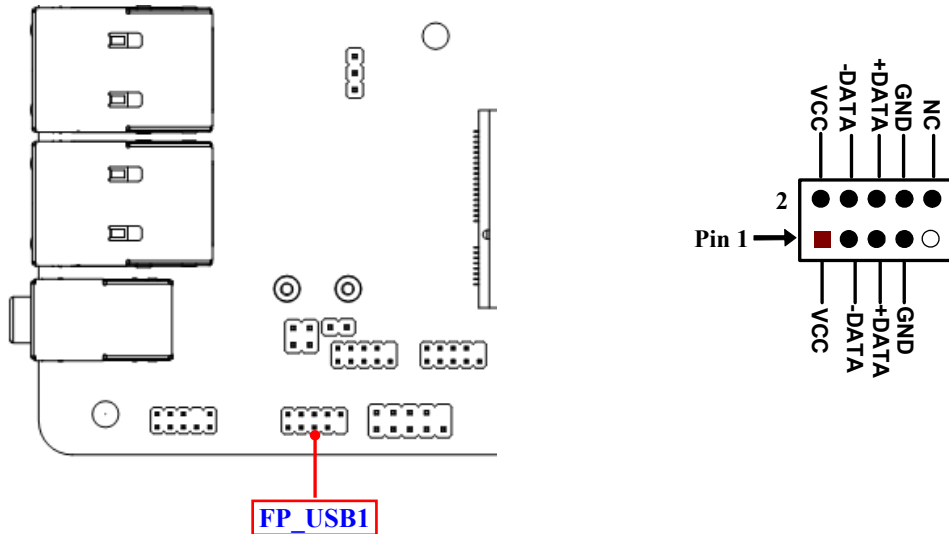
(4) FP_AUDIO (9-pin): Line-Out, MIC-In Header

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

FP_AUDIO
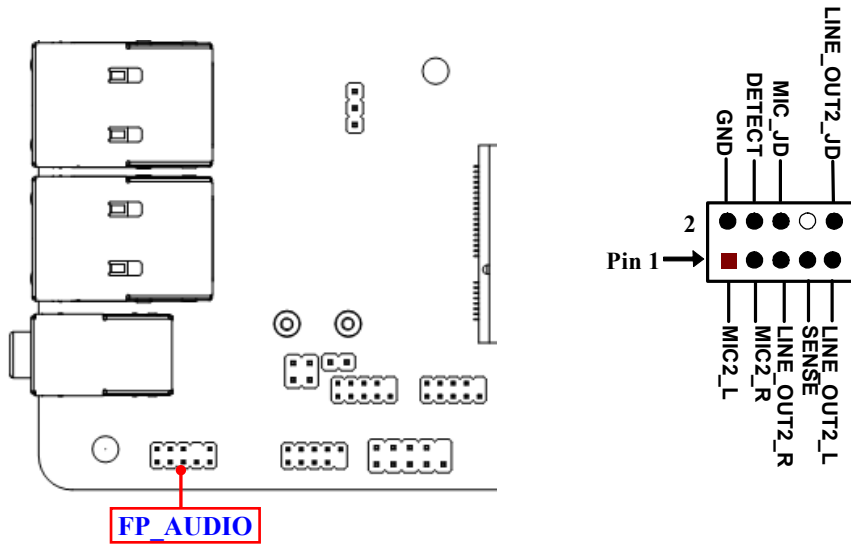
(5) SPDIF(2-pin): HDMI SPDIF Out Header

SPDIF
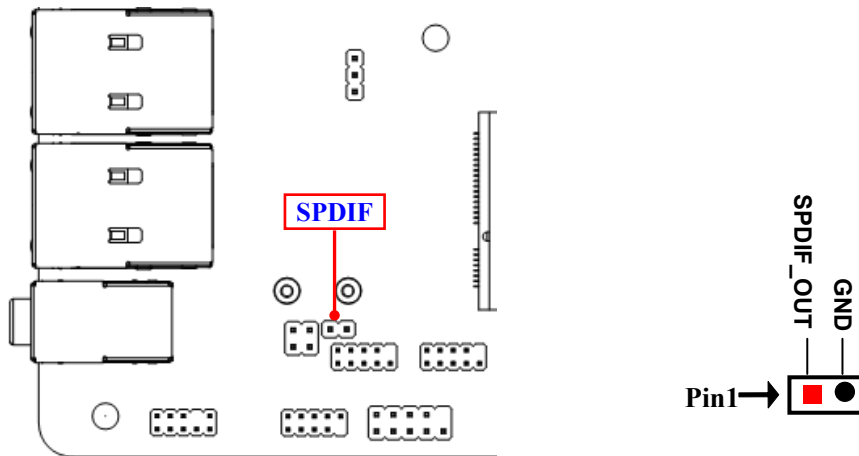
(6) LAN_LED(4-pin): LAN Activity LED Header
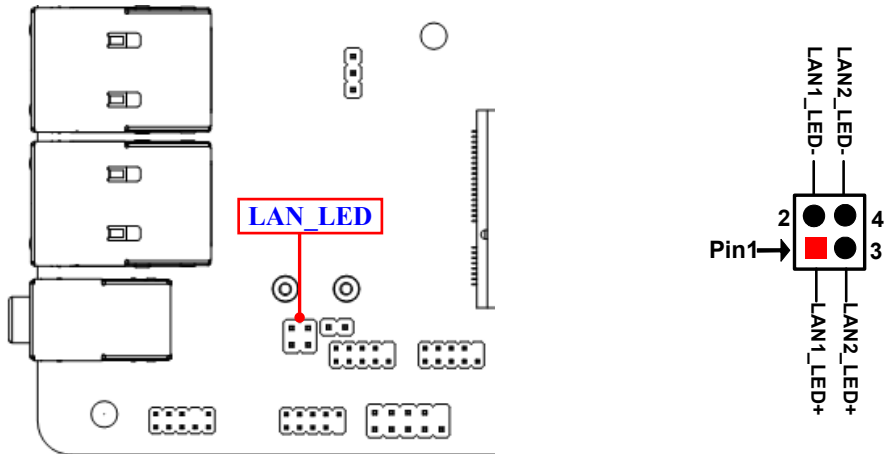
(7) COM3/4/5/6 (9-Pin): RS232 Serial Port Header
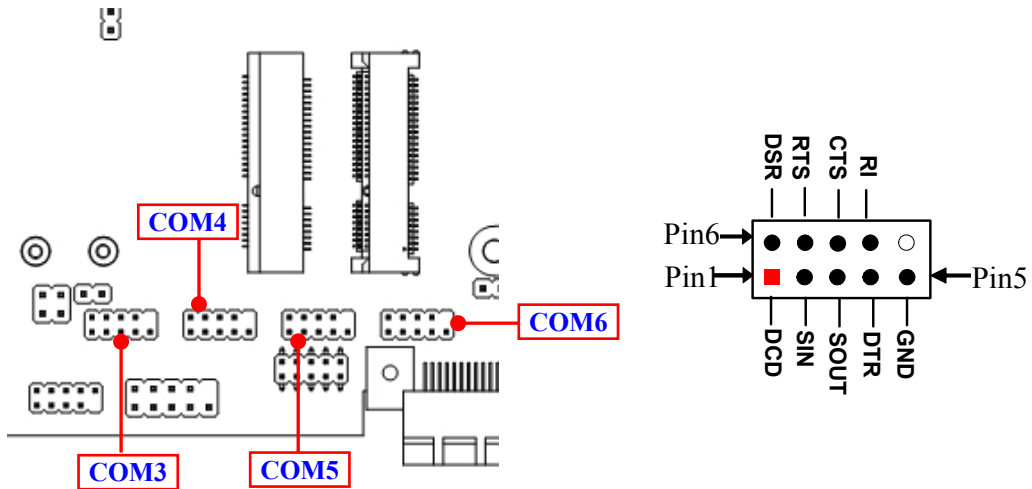
(8) GPIO_CON (10-pin): GPIO Port Header

GPIO_CON

Pin layout:
- 2 ... 10
- Pin 1 → 9

Top labels (left to right): GPIO81, GPIO83, GPIO85, GPIO87, VCC

Bottom labels (left to right): GPIO80, GPIO82, GPIO84, GPIO86, GND
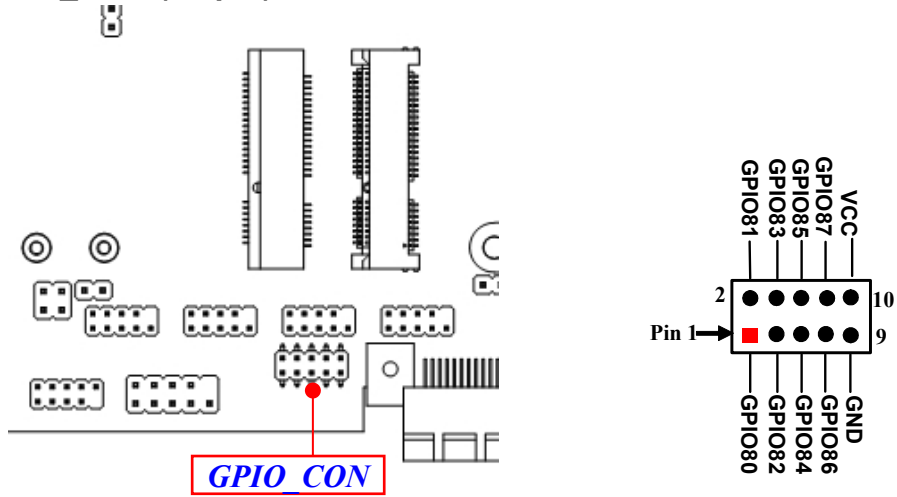
(9) SMBUS (5-Pin): SMBUS Header

SMBUS

Pin1 →

Labels (left to right): VCC, SMBUS_CLK, GND, SMBUS_DATA
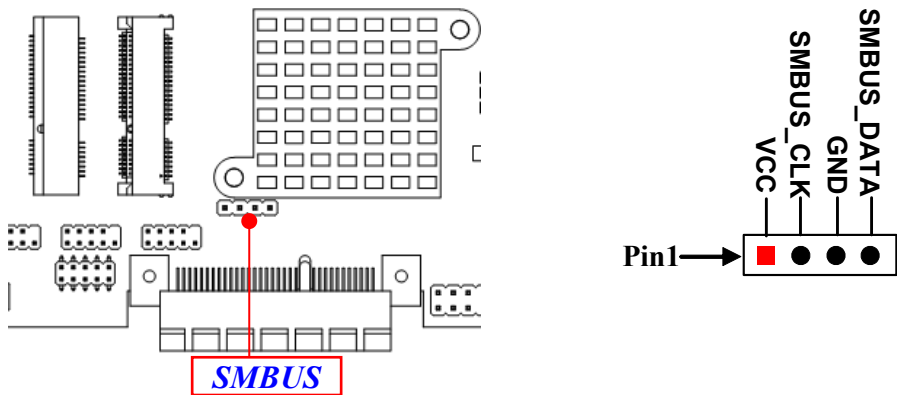
(10) PS2KBMS (6-pin): PS/2 Keyboard & Mouse Header

Pin 1 →

VCC
KB_DATA
KB_CLK
GND
MS_CLK
MS_DATA
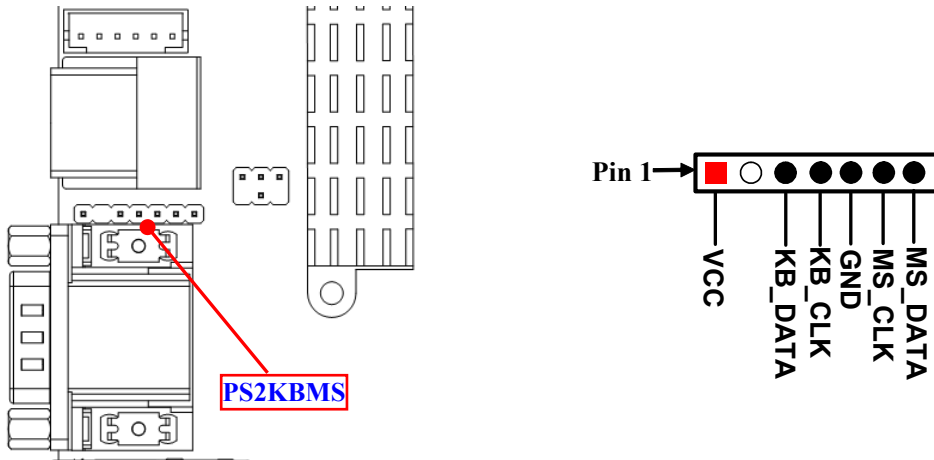
(11) SIM (6-pin): SIM Card Expansion Wafer

SIM

Pin 1 →

UIM_VPP
UIM_RESET
UIM_CLK
UIM_DATA
UIM_GND
UIM_PWR
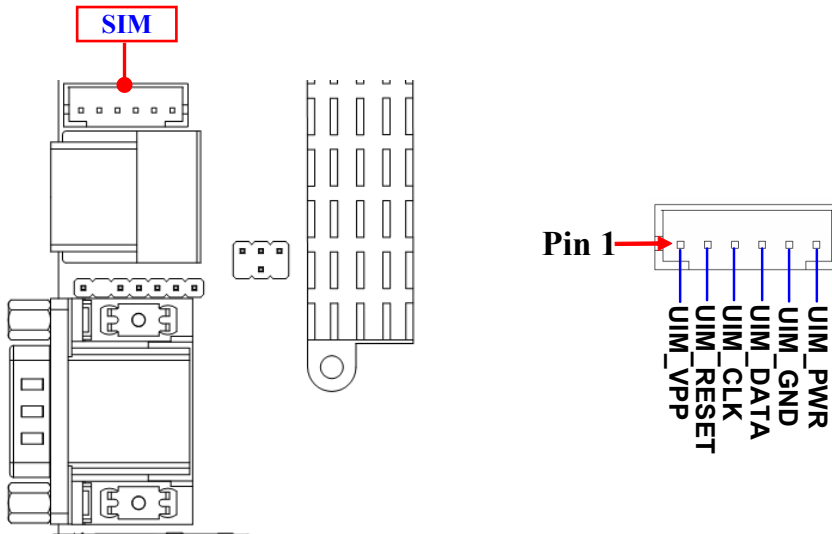
Chapter 3
Introducing BIOS

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

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

3-1   Entering Setup
Power on the computer and by pressing <Del> immediately allows you to enter Setup. If the message disappears before your respond and you still wish to enter Setup, restart the system to try again by turning it OFF then ON or pressing the "RESET" button on the system case. You may also restart by simultaneously pressing <Ctrl>, <Alt> and <Delete> keys.   If you do not press the keys at the correct time and the system does not boot, an error message will be displayed and you will again be asked to

     Press   **<Del>** to enter Setup

3-2   BIOS Menu Screen

The following diagram show a general BIOS menu screen:

Menu Bar
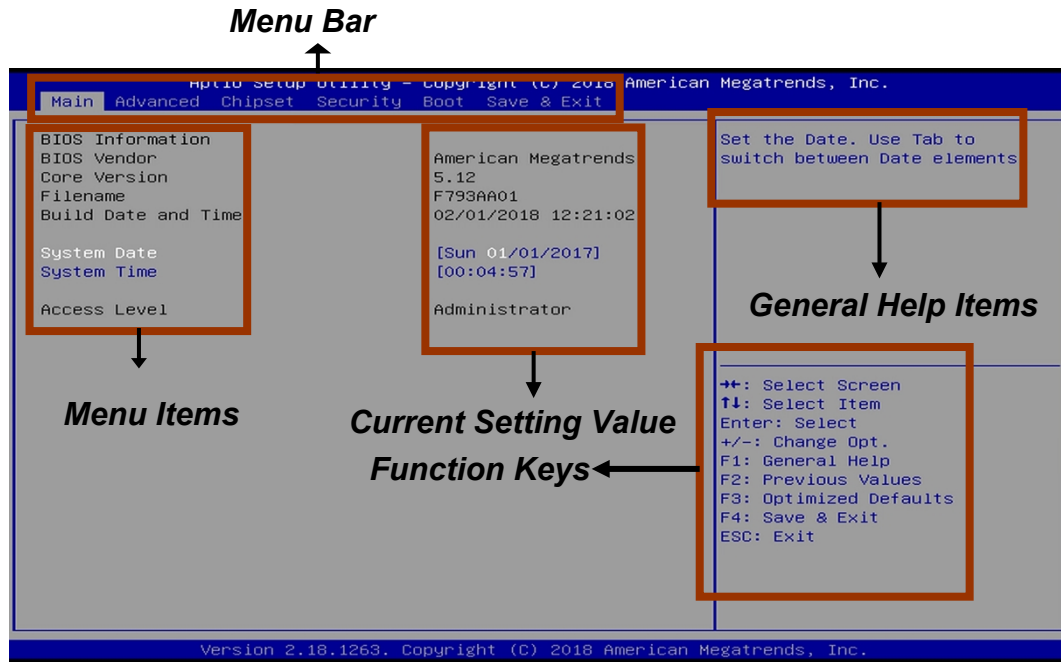
BIOS Menu Screen

3-3   Function Keys

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

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

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

3-4   Getting Help

Main Menu

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

Status Page Setup Menu/Option Page Setup Menu

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

3-5 Menu Bars

There are six menu bars on top of BIOS screen:

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

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

3-6   Main Menu

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

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

    BIOS Information                                                Set the Date. Use Tab to
    BIOS Vendor                    American Megatrends              switch between Date elements.
    Core Version                   5.12
    Filename                       F793AA01
    Build Date and Time            02/01/2018 12:21:02

    System Date                    [Sun 01/01/2017]
    System Time                    [00:04:57]

    Access Level                   Administrator


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


           Version 2.18.1263. Copyright (C) 2018 American Megatrends, Inc.
```

System Date
Set the date. Please use [Tab] to switch between data elements.
System Time
Set the time. Please use [Tab] to switch between time elements.

3-7 Advanced Menu
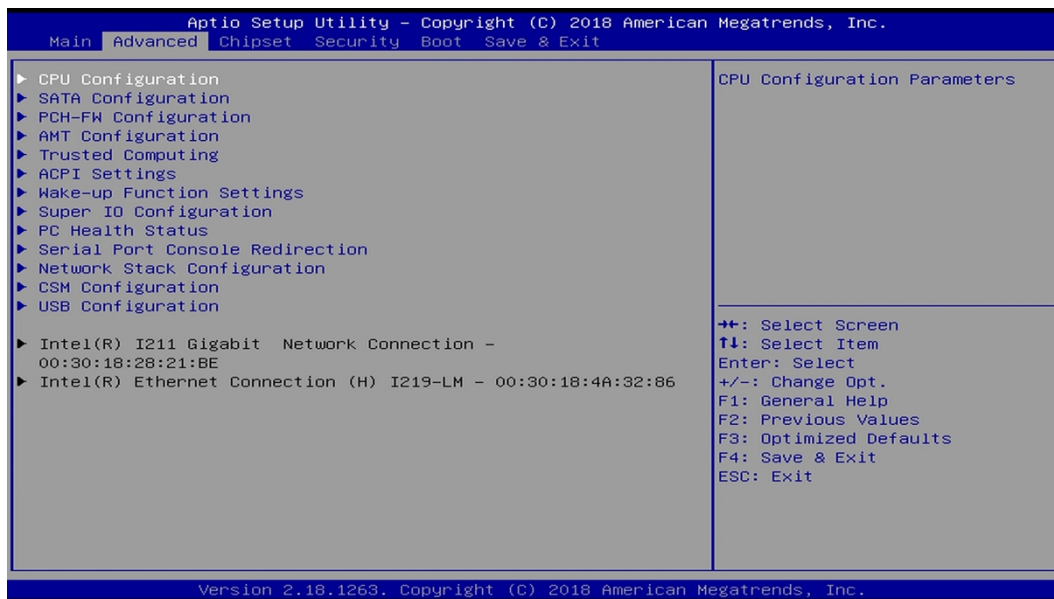
► **CPU Configuration**
Press [Enter] to view current CPU configuration and make settings for the following sub-items:
Intel Virtualization Technology
The optional settings: [Enabled]; [Disabled].
When set as [Enabled], a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.
Hardware Prefetcher
Use this item to turn on/off the MLC streamer prefecher.
The optional settings: [Disabled]; [Enabled].
Adjacent Cache Line Prefetch
Use this item to turn on/off prefeching of adjacent cache lines.
The optional settings: [Disabled]; [Enabled].
Intel(R) SpeedStep(tm)
This item allows more than two frequency ranges to be supported.

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

CPU C Status

Use this item to enable or disable CPU power management.

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

When set as [Enabled], it allows CPU to go to C states when it is not 100% utilized.

Package C State Limit

The optional settings are: [C0/C1]; [C2]; [C3]; [C6]; [C7]; [C7s]; [C8]; ; [C9]; [C10]; [Cpu Default]; [Auto].

► **SATA Configuration**

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

SATA Controller(s)

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

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

SATA Mode Selection

The optional settings: [AHCI]; [RAID].

SATA1/2/3/4

Port

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

Use this item to enable or disable device connected respective port.

Hot Plug

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

mSATA

Port

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

Use this item to enable or disable device connected to MSATA port.

► **PCH-FW Configuration**

Press [Enter] to view ME information and make settings in the following sub-items:

TPM Device Selection

Use this item to select TPM device.

The optional settings: [dTPM]; [PPT].

Warning!! PTT/dTPM will be disabled and all data saved on it will be lost.

  ► **Firmware Update Configuration**

Use this item to configure Management Engine Technology parameters.
Press [Enter] to make settings for '**ME FW Image RE-Flash**'.
ME FW Image Re-Flash
Use this item to enable or disable ME FW Image Re-Flash function.
The optional settings: [Disabled]; [Enabled].

** In the case that user needs to update ME firmware, user should set **'ME FW
Image Re-Flash**' as [**Enabled**], save the settings and exit. The system will turn off
and reboot after 4 seconds. If the user goes to BIOS screen again will find this item
is set again as [**Disabled**], but user can still re-flash to update firmware next time.*

► **AMT Configuration**
Press [Enter] to configure Intel (R) Active Management Technology parameters.
Intel AMT
The optional settings: [Disabled]; [Enabled].
When set as [Disabled] AMT BIOS features are no longer supported and user is
no longer able to access MEBx setup. This option does not disable Manageability
Features in FW.
When set as [Enabled], user can make further settings in the following items that
show up:
HIDE Un-Configure ME Confirmation Prompt
Use this item to hide un-configure ME confirmation prompt when attempting ME
un-configuration.
The optional settings: [Disabled]; [Enabled].
MEBx Debug Message Output
Use this item to enable MEBx debug message output.
The optional settings: [Disabled]; [Enabled].
Un-Configure ME
Use this item to unconfigure ME with resetting MEBx password to default.
The optional settings: [Disabled]; [Enabled].
ASF
Use this item to enable or disable Alert Standard Format support.
The optional settings: [Disabled]; [Enabled].

Activate Remote Assistance Process
This item is for user to trigger CIRA boot. Network Access must be activated first from MEBx setup.
The optional settings: [Disabled]; [Enabled].
USB Configure
Use this item to enable or disable AMT USB provisioning.
The optional settings: [Disabled]; [Enabled].
PET Prgress
Use this item to enable or disable PET Events Progress to receive PET Events.
The optional settings: [Disabled]; [Enabled].
AMT CIRA Timeout
The default setting is [0].
WatchDog
Use this item to enable or disable WatchDog Timer. When set as [Enabled], the following sub-items shall appear:
OS Timer
Use this item to set OS Watchdog Timer.
BIOS Timer
Use this item to set BIOS Watchdog Timer.

► **Trusted Computing**
Press [Enter] to enable or disable '**Security Device Support**'.
Security Device Support
Use this item to enable or disable BIOS support for security device.
The optional settings: [Disabled]; [Enabled].

► **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)].

► **Wake-up Function Settings**
Press [Enter] to make settings for the following sub-items:
Wake-up System with Fixed Time
Use this item to enable or disable system wake on alarm event.
The optional settings: [Disabled]; [Enabled].
When set as [Enabled], system will wake on the hour/min/sec specified.
Wake-up System with Dynamic Time
Use this item to enable or disable system wake on alarm event.
System will wake on the current time + Increase minutes.
The optional settings: [Disabled]; [Enabled].
When set as [Enabled], system will wake on the current time + increased minute(s).
PS2 KB/MS Wake-up
The optional settings: [Enabled]; [Disabled].
Use this item to enable or disable PS2 KB/MS wake-up from S3/S4/S5.
**Note: This function is supported when 'ERP Support' is set as [Disabled].
USB S3/S4 Wake-up
Use this item to enable or disable USB S3/S4 wakeup. This function is only supported when ERP function is disabled.
**Note: This function is supported when 'ERP Support' is set as [Disabled].
USB S5 Power
Use this item to enable or disable USB power after power shutdown.
*This function is supported when 'ERP Support' is set as [Disabled].
RING Wake-up
Use this item to enable or disable RING Wake-up function.

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

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

► **Serial Port 1 Configuration/ Serial Port 2 Configuration**

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

Serial Port

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

Change Settings

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

The optional settings are: [IO=3F8h; IRQ=4]; [IO=3F8h;
IRQ=3,4,5,6,7,9,10,11,12]; [IO=2F8h; IRQ=3,4,5,6,7,9,10,11,12]; [IO=3E8h;
IRQ=3,4,5,6,7,9,10,11,12]; [IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12] for '**Serial Port 1 Configuration**'.

The optional settings are: [IO=2F8h; IRQ=3]; [IO=3F8h;
IRQ=3,4,5,6,7,9,10,11,12]; [IO=2F8h; IRQ=3,4,5,6,7,9,10,11,12]; [IO=3E8h;
IRQ=3,4,5,6,7,9,10,11,12]; [IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12] for '**Serial Port 2 Configuration**'.

Transmission Mode Select

The optional settings are: [RS422]; [RS232]; [RS485].

Mode Speed Select

The optional settings are: [RS232/RS422/RS485=250kbps]; [RS232 =1Mbps,
RS422/RS485=10Mbps].

Serial Port FIF0 Mode

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

► **Serial Port 3 Configuration/ Serial Port 4 Configuration/ Serial Port 5 Configuration/ Serial Port 6 Configuration**

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

Serial Port

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

Change Settings

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

The optional settings are: [IO=3E8h; IRQ=10]; [IO=3F8h;
IRQ=3,4,5,6,7,9,10,11,12]; [IO=2F8h; IRQ=3,4,5,6,7,9,10,11,12]; [IO=3E8h;
IRQ=3,4,5,6,7,9,10,11,12]; [IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12] ; [IO=3E0h;
IRQ=3,4,5,6,7,9,10,11,12]; [IO=2E0h; IRQ=3,4,5,6,7,9,10,11,12] for '**Serial Port 3**

Configuration'.
The optional settings are: [IO=2E8h; IRQ=10]; [IO=3F8h;
IRQ=3,4,5,6,7,9,10,11,12]; [IO=2F8h; IRQ=3,4,5,6,7,9,10,11,12]; [IO=3E8h;
IRQ=3,4,5,6,7,9,10,11,12]; [IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12] ; [IO=3E0h;
IRQ=3,4,5,6,7,9,10,11,12]; [IO=2E0h; IRQ=3,4,5,6,7,9,10,11,12] for '**Serial Port 4 Configuration**'.
The optional settings are: [IO=3E0h; IRQ=11]; [IO=3F8h;
IRQ=3,4,5,6,7,9,10,11,12]; [IO=2F8h; IRQ=3,4,5,6,7,9,10,11,12]; [IO=3E8h;
IRQ=3,4,5,6,7,9,10,11,12]; [IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12] ; [IO=3E0h;
IRQ=3,4,5,6,7,9,10,11,12]; [IO=2E0h; IRQ=3,4,5,6,7,9,10,11,12] for '**Serial Port 5 Configuration**'.
The optional settings are: [IO=2E0h; IRQ=11]; [IO=3F8h;
IRQ=3,4,5,6,7,9,10,11,12]; [IO=2F8h; IRQ=3,4,5,6,7,9,10,11,12]; [IO=3E8h;
IRQ=3,4,5,6,7,9,10,11,12]; [IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12] ; [IO=3E0h;
IRQ=3,4,5,6,7,9,10,11,12]; [IO=2E0h; IRQ=3,4,5,6,7,9,10,11,12] for '**Serial Port 6 Configuration**'.

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

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

WatchDog Reset Timer Value
User can set a value in the range of [4] to [255].

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

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

WatchDog Wake-up Timer Value in ERP
User can select a value in the range of [10] to [4095] seconds when '**WatchDog**

Reset Timer Unit' set as [Sec]; or in the range of [1] to [4095] minutes when '**WatchDog Reset Timer Unit** ' set as [Min].

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

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

Case Open Detect
Use this item to detect case has already open or not, show message in POST.
The optional settings: [Disabled]; [Enabled].

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

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

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

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

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

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

CPUFAN/SYSFAN Idle-Speed Duty
Use this item to set CPUFAN/SYSFAN idle speed duty. Fan will run at idle speed

when below this pre-set duty.
Shutdown Temperature
Use this item to select system shutdown temperature.
The optional settings are: [Disabled]; [$70^{o}C/156^{o}F$]; [$75^{o}C/164^{o}F$]; [$80^{o}C/172^{o}F$]; [$85^{o}C/180^{o}F$]; [$90^{o}C/188^{o}F$].

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

▸ **Console Redirection Settings**
The settings specify how the host computer and the remote computer (which the user is using) will exchange data. Both computers should have the same or compatible settings.
Press [Enter] to make settings for the following items:
Terminal Type
The optional settings: [VT100]; [VT100+]; [VT-UTF8]; [ANSI].
Emulation: [ANSI]: Extended ASCII char set; [VT100]: ASCII char set; [VT100+]: Extends VT100 to support color, function keys, etc.; [VT-UTF8]: Uses UTF8 encoding to map Unicode chars onto 1 or more bytes.
Bits per second
Use this item to select serial port transmission speed. The speed must be matched on the other side. Long or noisy lines may require lower speeds.
The optional settings: [9600]; [19200]; [38400]; [57600]; [115200].
Data Bits
The optional settings: [7]; [8].
Parity
A parity bit can be sent with the data bits to detect some transmission errors.
The optional settings: [None]; [Even]; [Odd]; [Mark]; [Space].
[Even]: parity bit is 0 if the num of 1's in the data bits is even; [Odd]: parity bit is 0 if num of 1's in the data bits is odd; [Mark]: parity bit is always 1; [Space]: Parity bit is always 0; [Mark] and [Space] Parity do not allow for error detection.

Stop Bits
Stop bits indicate the end of a serial data packet. (A start bit indicates the beginning). The standard setting is 1 stop bit. Communication with slow devices may require more than 1 stop bit.
The optional settings: [1]; [2].
Flow Control
Flow control can prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a "stop" signal can be sent to stop the data flow. Once the buffers are empty, a "start" signal can be sent to re-start the flow. Hardware flow control uses two wires to send start/stop signals.
The optional settings: [None]; [Hardware RTS/CTS].
VT-UTF8 Combo Key Support
Use this item to enable VT-UTF8 Combination Key Support for ANSI/VT100 terminals.
The optional settings: [Disabled]; [Enabled].
Recorder Mode
With this mode enable only text will be sent. This is to capture Terminal data.
The optional settings: [Disabled]; [Enabled].
Resolution 100x31
Use this item to enable or disable extended terminal resolution.
The optional settings: [Disabled]; [Enabled].
Legacy OS Redirection Resolution
On Legacy OS, the Number of Rows and Columns supported redirection.
The optional settings: [80x24]; [80x25].
Putty KeyPad
Use this item to select FunctionKey and KeyPad on Putty.
The optional settings: [VT100]; [Linux]; [XTERMR6]; [SCO]; [ESCN]; [VT400].
Redirection After BIOS POST
The optional settings are: [Always Enable]; [BootLoader].
Whet Bootloader is selected, then Lagecy 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 settings: [COM1]; [COM1(Pci Bus0, Dec0,Func0) (Disabled)].

Terminal Type
The optional settings: [VT100]; [VT100+]; [VT-UTF8]; [ANSI].
[VT-UTF8] is the preferred terminal type for out-of-band management. The next best choice is [VT100+] and them [VT100]. See above, in Console Redirection Settings page, for more help with Terminal Type/Emulation.

Bits per second
Use this item to select serial port transmission speed. The speed must be matched on the other side. Long or noisy lines may require lower speeds.
The optional settings: [9600]; [19200]; [57600]; [115200].

Flow Control
Flow control can prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a "stop" signal can be sent to stop the data flow. Once the buffers are empty, a "start" signal can be sent to re-start the flow. Hardware flow control uses two wires to send start/stop signals.
The optional settings: [None]; [Hardware RTS/CTS]; [Software Xon/Xoff].

Data Bits
The default setting is: [8].
This item may or may not show up, depending on different configuration.

Parity

The default setting is: [None].
This item may or may not show up, depending on different configuration.
Stop Bits
The default setting is: [1].
This item may or may not show up, depending on different configuration.

► **Network Stack Configuration**
Press [Enter] to go to '**Network Stack**' screen to make further settings.
Network Stack
Use this item to enable or disable UEFI Network Stack.
The optional settings: [Disabled]; [Enabled].
When set as [Enabled], the following sub-items shall appear:
Ipv4 PXE Support
The optional settings are: [Disabled]; [Enabled].
Use this item to enable Ipv4 PXE Boot Support. When set as [Disabled], IPv4 PXE boot support will not be created.
Ipv4 HTTP Support
The optional settings are: [Disabled]; [Enabled].
Use this item to enable Ipv4 HTTP Boot Support. When set as [Disabled], Ipv4 HTTP boot 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 PXE boot support will not be available.
Ipv6 HTTP Support
The optional settings are: [Disabled]; [Enabled].
Use this item to enable Ipv6 HTTP Boot Support. When set as [Disabled], Ipv6 HTTP boot 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.

► **CSM Configuration**

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

Option ROM execution

Network

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

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

Storage

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

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

Other PCI devices

This item is for user to determine OpROM execution policy for devices other than Network, storage or video.

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

► **USB Configuration**

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

USB Configuration

Legacy USB Support

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

[**Enabled**]: To enable legacy USB support.

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

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

XHCI Hand-off

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

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

USB Mass Storage Driver Support

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

USB hardware delay and time-out

USB Transfer time-out

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

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

Device reset time-out

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

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

Device power-up delay

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

► **Intel(R) I211 Gigabit Network Connection:XX:XX:XX:XX:XX:XX/ Intel(R) Ethernet Connection(2) I219-LM: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

 ▶ System Agent (SA) Configuration                        System Agent (SA) Parameters
 ▶ PCH-IO 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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```

► **System Agent (SA) Configuration**

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

VT-d

The optional settings are: [Enabled]; [Disabled]. This item might not be available depending on configuration.

▶ **Graphics Configuration**

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

Graphics Configuration

GTT Size

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

Aperture Size

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

DVMT Pre-Allocated

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

The optional settings are: [32M]; [64M]; [96M]; [128M]; [160M]; [192M]; [224M]; [256M]; [288M]; [320M]; [352M]; [384M]; [416M]; [448M]; [480M]; [512M]; [1024M] ; [1536M] ; [2048M] ; [4M] ; [8M] ; [12M] ; [16M] ; [20M]; [24M] ; [28M] ; [32M/F7] ;[36M]; [40M]; [44M]; [48M]; [52M]; [56M]; [60M].

DVMT Total Gfx Mem

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

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

Primary IGFX Boot Display

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

The optional settings are: [VBIOS Default]; [HDMI1]; [HDMI2]; [HDMI3].

* Note: When set as [HDMI1], [HDMI2] or [HDMI3], user can make further settings in 'Second IGFX Boot Display'.

Second IGFX Boot Display

Use this item to select second display device.

The optional settings are: [Disabled]; [HDMI1]; [HDMI2]; [HDMI3].

▶ **Memory Configuration**

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

► **PCH-IO Configuration**
Press [Enter] to make settings for the following sub-items:

USB Controller
The optional settings are: [Disabled]; [Enabled].
HD Audio
The optional settings are: [Disabled]; [Enabled]; [Auto].
PCIE Slot
Use this item to control the PCI Express root port.
The optional settings are: [Disabled]; [Enabled]; [Auto].
Onboard Lan1 Controller
Use this item to enable or disable LAN1 device or controller.
   Wake on LAN1
   Use this item to enable or disable integrated LAN to wake the system.
   The optional settings are: [Disabled]; [Enabled].
Onboard Lan2 Controller
Use this item to enable or disable LAN2 device or controller.
MPE Slot
Use this item to control the PCI Express root port.
The optional settings are: [Enabled]; [Disabled].
   Speed
   Use this item to configure Mini-PCIE device speed.
   The optional settings are: [Auto] ; [Gen1] ; [Gen2]; [Gen3].
System State after Power Failure
Use this item to specify what state to go to when power re-applied after a power failure (G3 state).
The optional settings are: [Always On]; [[Always Off]; Former State].

3-9 Security Menu

```
           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.
                                                          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

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

User Password

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

3-10 Boot Menu

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

 Boot Configuration                                    Number of seconds to wait for
 Setup Prompt Timeout            2                     setup activation key.
 Bootup NumLock State            [Off]                 65535(0xFFFF) means indefinite
 Quiet Boot                      [Disabled]            waiting.

 Boot Option Priorities
 Boot Option #1                  [UEFI: Built-in EFI
                                 Shell]

 UEFI Boot                       [Enabled]



                                                       →←: 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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```

Boot Configuration
Setup Prompt Timeout
Use this item to set number of seconds to wait for setup activation key.
User can select a value in the range of [1] to [65535] seconds
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.
UEFI Boot
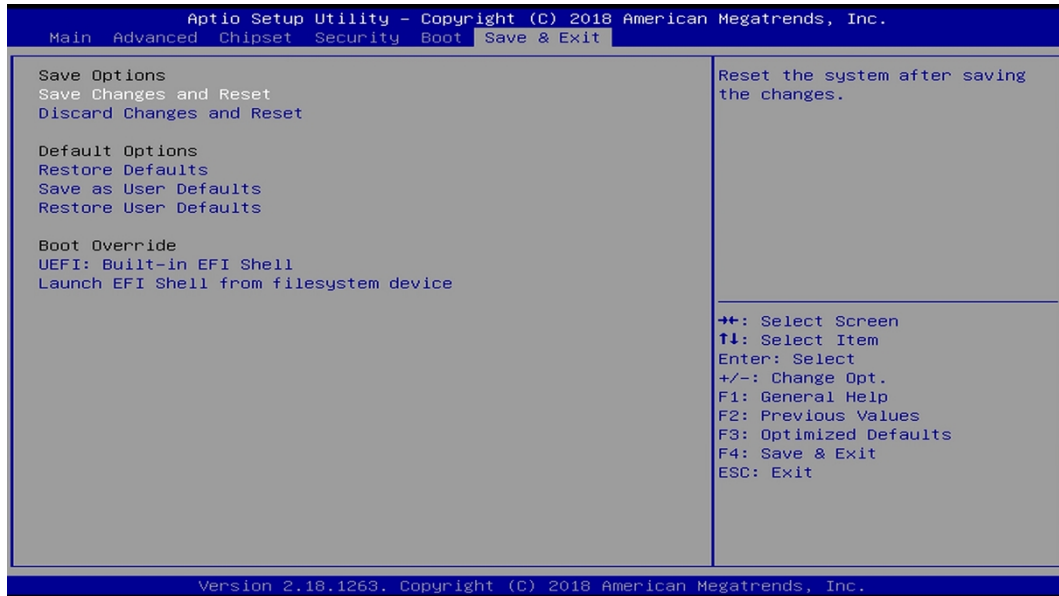The optional settings are: [Disabled]; [Enabled].
[Enabled]: To enable all UEFI boot options.

[Disabled]:To disabled all UEFI boot options.

3-11 Save & Exit Menu

```
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   Main   Advanced   Chipset   Security   Boot   Save & Exit

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

   Default Options
   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 Options:

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.
Default Options:

Restore Defaults
Use this item to restore /load default values for all the setup options.
Save as User Defaults
Use this item to save the changes done so far as user defaults.
Restore User Defaults
Use this item to restore defaults to all the setup options.
Boot Override

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