MF94 Series

User's Manual

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
1.0	First Edition	April 22, 2020

Item Checklist

☑ Motherboard
☑ Cable(s)

Chapter 1
Introduction of the Motherboard

1-1 Feature of Motherboard

■ Onboard Intel® ApolloLake series processor, with low power consumption never denies high performance

■ Support 1* DDR3L 1866MHz SO-DIMM, maximum capacity up to 8GB

■ Onboard 2*RJ-45 gigabit Ethernet LAN port

■ Support 1* HDMI, 1*EDP, 1*LVDS

■ Onboard 1* M.2 M-key slot, type-2242 SATA interface

■ Onboard 1* M.2 B-key slot,type-3042,support 3G/4G card

■ Onboard 1* Mini-PCIe slot, USB 2,0 and PCIex1 interface

■ Support 1 * SATAIII device

■ Support 3* USB 3.1 Gen.1 + 3* USB 2.0

■ Support 2* COM (***COM1** supports RS232/422/485)

■ Support CPU Smart FAN

■ Compliance with ErP standard

■ Support Watchdog function

■ Solution for Industrial PCs / Factory Automation / IoT Solution

1-2 Specification

Spec	Description
Design	● 3.5"SBC; 8-Layers; PCB size: 14.8x 10.2 cm
Embedded CPU	● Integrated with Intel® ApollLake series CPU * ***Note:*** *CPU model varies from different IPC options. Please consult your dealer for more information of onboard CPU.TDP varies depending on CPU.*
Memory Slot	● 1*DDR3L SO-DIMM slot support 1* DDR3L 1866MHz non-ECC SO-DIMM up to 8GB * ***Note:*** *Memory clock supporting range is decided by specific CPU of the model. For more memory compatibility information please consults your local dealer.*
Expansion Slot	● 1* Full-size Mini-PCIE slot supports USB 2.0/PCIex1 interface (***MPE***) ● 1* M.2 B-key 3042 slot supports USB 3.0/ PCIex1interface (***M2B***) ● 1* SIM card slot functions with M.2 B-key,3042 slot (***SIMCARD***)
Storage	● 1* M.2 M-key 2242 slot supports SATA interface (***M2M***) ● 1* SATAIII 6Gb/s port
LAN Chip	● Integrated with 2*Intel i211AT Gigabit LAN chip ● Support Fast Ethernet LAN function of providing 10/100/1000Mbps Ethernet data transfer rate
Audio Chip	● Realtek ALC662VD 6-CH HD audio chip
BIOS	● AMI Flash ROM
Rear I/O	● 1* 9~36V DC-in power Jack ● 1* HDMI port ● 3* USB 3.1 (Gen.1) port ● 1* USB 2.0 port ● 1* SIM card slot (function with M.2 B-key, 3042 slot) ● 2* RJ-45 LAN port ● 1* Audio Line Out port
Internal I/O	● 1* 2-pin internal 9~36V DC-in power connector ● 1* SATA Power-out connector ● 1* CPU FAN connector

	● 1* Front panel header
	● 1* 9-pin USB 2.0 header (Expansible to 2* USB 2.0 ports)
	● 2* Serial port header (**COM1~COM2**;**COM1** supports RS232/422/485)
	● 1* Front panel audio header
	● 1* GPIO header
	● 1* EDP header
	● 1* LVDS header
	● 1* LVDS inverter header
	● 1* I2C_CON header
	● 1* SMBUS header

1-3 Layout Diagram

Rear IO Diagram:
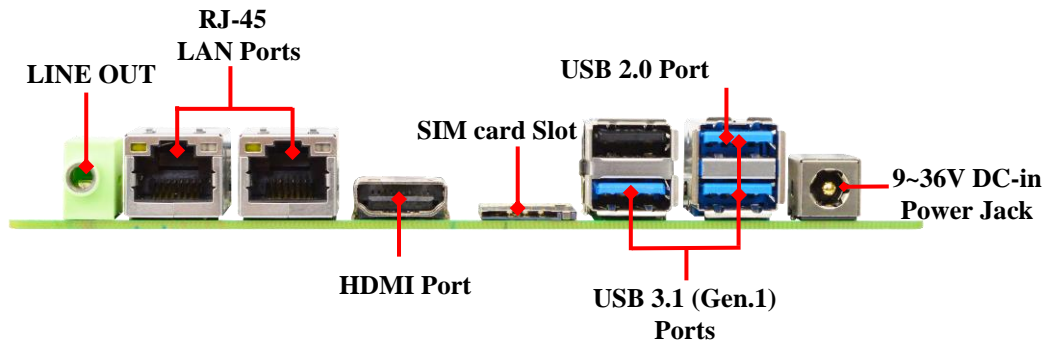
Warning!!

The board has a 9~36V DC-in power connector **(DCIN1)** in I/O back panel and an internal 9~36V power connector **(DCIN).** User can only connect one type of compatible power supply to one of them to power the system.

Diagram-Front Side:

Front Panel Audio Header

SATAIII Port

INVERTER

USB 2.0 Header

Serial Port Headers (COM1~2)

GPIO Port Header

SATA Power-out Connector

Line-out Port

LVDS Header

M.2 B-key Slot (M2B)

RJ-45 LAN Ports

Mini-PCIe Slot (MPE)

M.2 M-key Slot (M2M)

CPUFAN Connector

HDMI Port

I2C Header

SIM Card Slot

1*DDR3L SODIMM Slot

SMBUS

Front Panel Header (JW_FP)

Top: USB2.0 Port
Bottom: USB 3.1 (Gen.1) Port

EDP Header

USB 3.1 (Gen.1) Ports

9~36V DC-In Power Jack

Internal 9~36V DC-In Power Connector

BATCON

Jumper Positions:

Jumpers

Jumper	Name	Description
JPCOM1	COM1 Header Pin-9 Function Select	4-Pin Block(2.0 pitch)
JPCOM2	COM2 Header Pin-9 Function Select	4-Pin Block(2.0 pitch)
JPLCD	LCD Panel VCC Select	4-Pin Block(2.0 pitch)
JPBKLT	LCD BACKLIGHT VCC Select	3-Pin Block(2.0 pitch)
JEDPLCD	eDP LCD Panel VCC Select	4-Pin Block(2.0 pitch)
JEDPBKLT	eDP LCD BACKLIGHT VCC Select	4-Pin Block(2.0 pitch)
JM2B	M.2 B-key Power Select	3-Pin Block(2.0 pitch)
JMPE	Mini-PCIe Power Select	3-Pin Block(2.0 pitch)
JPCLR	PIN(1-2) = Clear ME_RTC PIN (3-4) = Clear CMOST PIN (5-6) = TXE Override PIN (7-8) = CASE OPEN	8-Pin Block(2.54 pitch)
AT_MODE	AT Mode Select	3-Pin Block(2.0 pitch)

Connectors

Connector	Name
DCIN1	9~36V DC–in Power Jack
USB1	**Top:** USB 2.0 Port Connector **Bottom:** USB 3.1 (Gen.1) Port Connector
USB2	USB 3.1 (Gen.1) Port Connector X2
SIMCARD	SIM card slot
HDMI	HDMI Port Connector
LAN1/LAN2	RJ-45 LAN Port Connector X2
LINE_OUT	Audio Line Out Connector
DCIN	Internal 2-Pin 9~36V DC-in Power Connector
SATA	SATAIII Port Connector
SATAPWR	SATA Power out Connector
CPUFAN	CPUFAN Connector

Headers

Header	Name	Description
JW_FP	Front Panel Header(PWR LED/ HDD LED/Power Button /Reset)	8-pin Block(2.54 pitch)
FP_USB1	USB 2.0 Header	9-pin Block(2.0 pitch)
FP_AUDIO	Front Panel Audio Header	9-pin Block(2.0 pitch)
GPIO_CON	GPIO Port Header	10-pin Block(2.0 pitch)
COM1~COM2	Serial Port Header	9-pin Block(2.0 pitch)
EDP	EDP Port Header	30-pin Block(2.0 pitch)
LVDS	LVDS Port Header	30-pin Block(1.25 pitch)
INVERTER	LVDS Inverter	8-pin Block(2.0 pitch)
I2C	I2C Header	5-pin Block(2.0 pitch)
SMBUS	SMBUS Header	5-pin Block(2.0 pitch)

Chapter 2
Hardware Installation

2-1 Jumper Settings

JPCOM1/JPCOM2 (4-pin): COM1/COM2 Header Pin-9 Function Select (2.0 pitch)
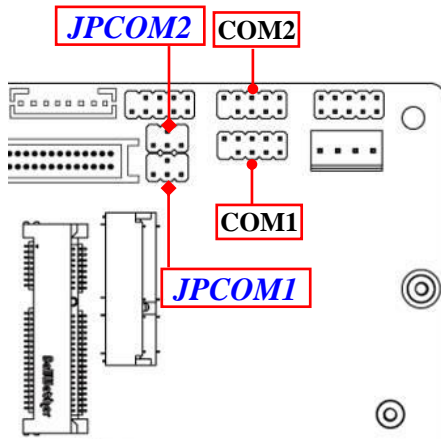
JPCOM1→COM1 Header Pin-9 VCC
JPCOM2→COM2 Header Pin-9 VCC
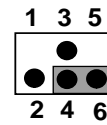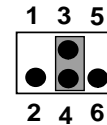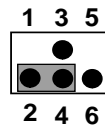
2-4 Closed: RI=RS232	**3-4 Closed:** RI= +5V	**4-6 Closed:** RI= +12V

JPLCD (4-pin): LCD Panel VCC Select (2.0 pitch)
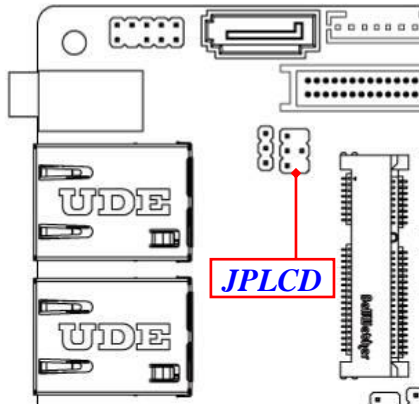
JPLCD→LCD Panel VCC Select
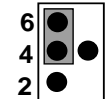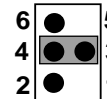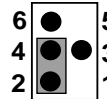
2-4 Closed: VCC= +3.3V	**3-4 Closed:** VCC= +5V	**4-6 Closed:** VCC= +12V

JPBKLT (3-pin): LCD BACKLIGHT VCC Select (2.0 pitch)
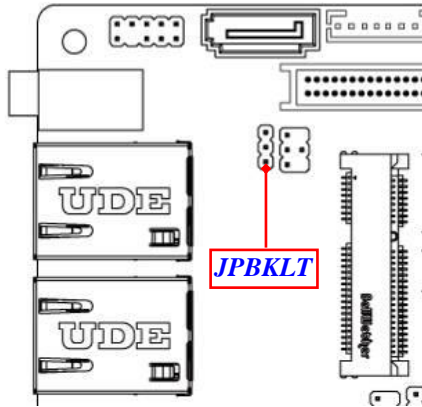
JPBKLT→LCD BACKLIGHT VCC Select
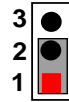
1-2 Closed:
VCC= +5V

2-3 Closed:
VCC= +12V

JEDPLCD (4-pin): eDP LCD Panel VCC Select (2.0 pitch)
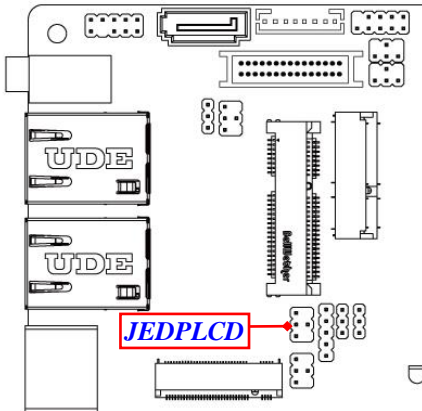
JEDPLCD→eDP LCD Panel VCC Select
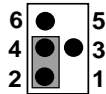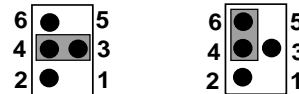
2-4 Closed:
VCC= +3.3V
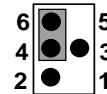
3-4 Closed:
VCC=+5V

4-6 Closed:
VCC= +12V

JEDPBKLT (3-pin): eDP LCD BACKLIGHT VCC Select (2.0 pitch)
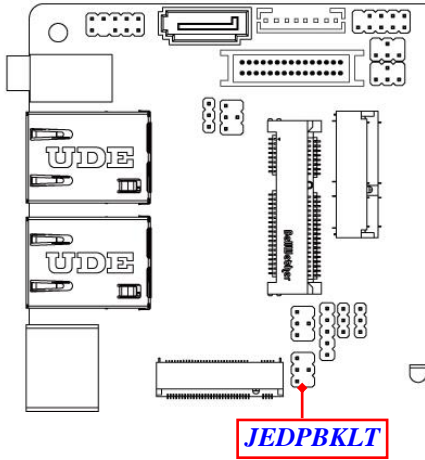
JEDPBKLT→eDP BACKLIGHT Panel VCC Select

2-4 Closed:	3-4 Closed:	4-6 Closed:
VCC= +5V	VCC= +12V	VCC= ADP12V

JEDPBKLT
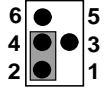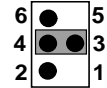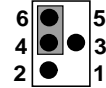
JM2B(3-pin): M.2 B-key Power Select (2.0 pitch)
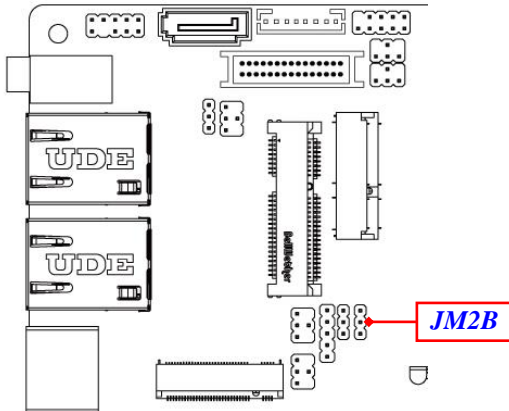
JM2B→M.2 B-key Power Select

1-2 Closed:	2-3 Closed:
VCC= VCC3	VCC= 3VSB

JM2B
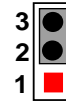
JMPE(3-pin): Mini-PCIe Power Select (2.0 pitch)

JMPE→Mini-PCIe Power Select

3 ●	3 ●
2 ●	2 ●
1 ■	1 ■
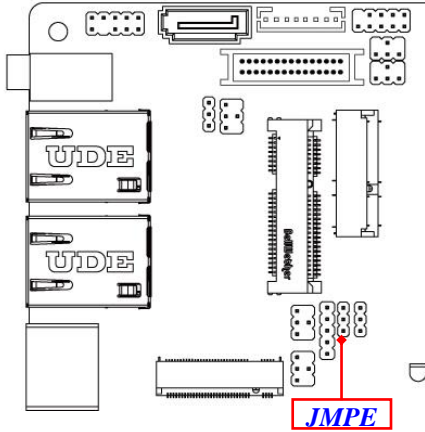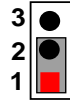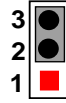
1-2 Closed:
VCC= VCC3

2-3 Closed:
VCC= 3VSB

PIN(1-2) of JPCLR (8-pin): Clear ME_RTC (2.0 pitch)

PIN(1-2) Clear ME_RTC

```
8 ● ● 7
6 ● ● 5
4 ● ● 3
2 ● ■ ←Pin1
```
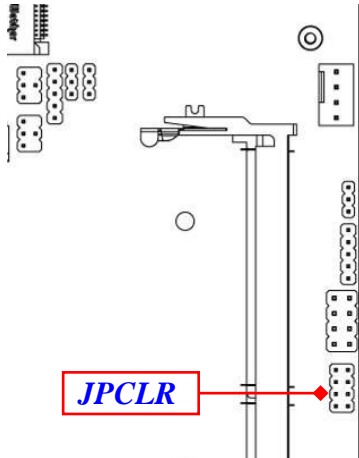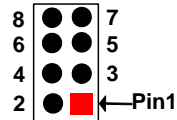
1-2 Open: Normal(Default)

```
8 ● ● 7
6 ● ● 5
4 ● ● 3
2 ■ ■ ←Pin1
```
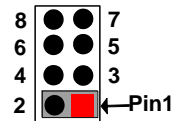
1-2 Closed: Clear ME_RTC

PIN(3-4) of JPCLR (8-pin): Clear CMOST (2.0 pitch)
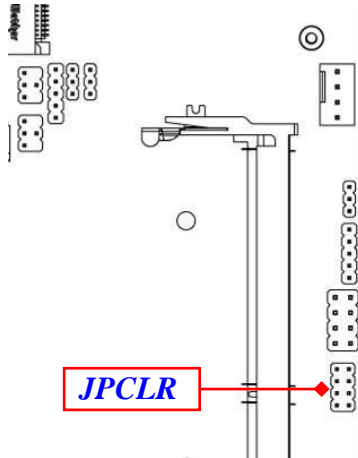
PIN(3-4) Clear CMOST
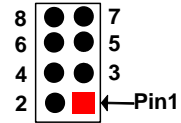
```
8 ● ● 7
6 ● ● 5
4 ● ● 3
2 ● ■ ←Pin1
```
3-4 Open: Normal(Default)
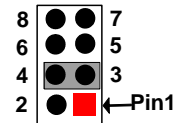
```
8 ● ● 7
6 ● ● 5
4 ● ● 3
2 ● ■ ←Pin1
```
3-4 Closed: Clear CMOST

JPCLR

PIN(5-6) of JPCLR (8-pin): TXE Override (2.0 pitch)
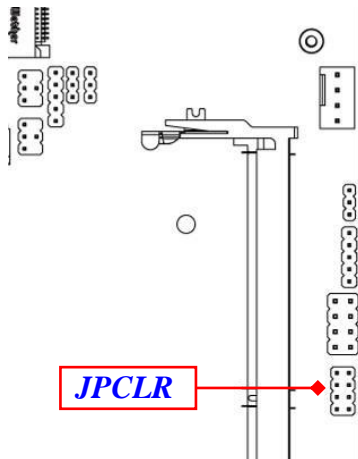
PIN(5-6) TXE Override
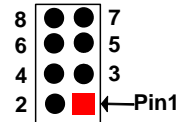
```
8 ● ● 7
6 ● ● 5
4 ● ● 3
2 ● ■ ←Pin1
```
5-6 Open: Normal(Default)
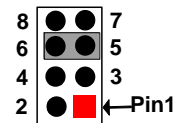
```
8 ● ● 7
6 ● ● 5
4 ● ● 3
2 ● ■ ←Pin1
```
5-6 Closed: TXE Override

JPCLR

PIN(7-8) of JPCLR (8-pin): CASE OPEN (2.0 pitch)

PIN(7-8) CASE OPEN

```
8 ● ● 7
6 ● ● 5
4 ● ● 3
2 ● ■ ←Pin1
```
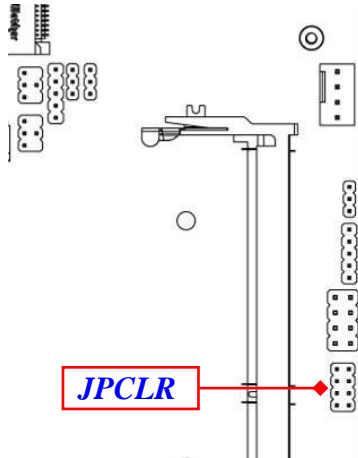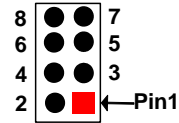
7-8 Open: Normal(Default)

```
8 ● ● 7
6 ● ● 5
4 ● ● 3
2 ● ■ ←Pin1
```
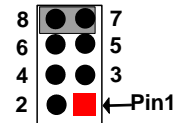
7-8 Closed: CASE OPEN

JPCLR

Pin (7-8) Closed: *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.*

AT_MODE(3-pin): ATX Mode/AT Mode Select (2.0 pitch)
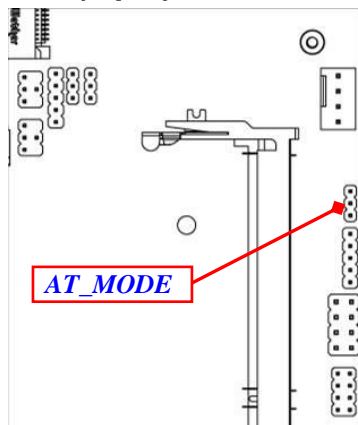
AT_MODE→ATX Mode/AT Mode Select

```
3 ●        3 ●
2 ●        2 ●
1 ■        1 ■
```

1-2 Closed: **2-3 Closed:**
ATX MODE   **AT MODE**

AT_MODE

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

2-2   Connectors and Headers
2-2-1 Connectors
(1) Rear I/O Connectors
* *Refer to Page-3 Rear IO Diagram.*

Icon	*Name*	*Function*
	9~36V DC-in Power Jack	For user to connect compatible power adapter to provide power supply for the system.
	USB 3.1 (Gen.1) Port	To connect USB keyboard, mouse or other devices compatible with USB 3.1 (Gen.1) specification. Ports support up to 5Gbps data transfer rate.
	USB 2.0 Port	To connect USB keyboard, mouse or other devices compatible with USB specification.
	***SIM Card Slot**	For user to install compatible SIM card.
	HDMI Port	**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.

*Note: SIM card is supported when **M2B (M.2 B-Key 3042)** slot is installed with 3G/4G/LTE card.

(2) DCIN(2-pin) : Internal 9~36V DC-in Power Connector
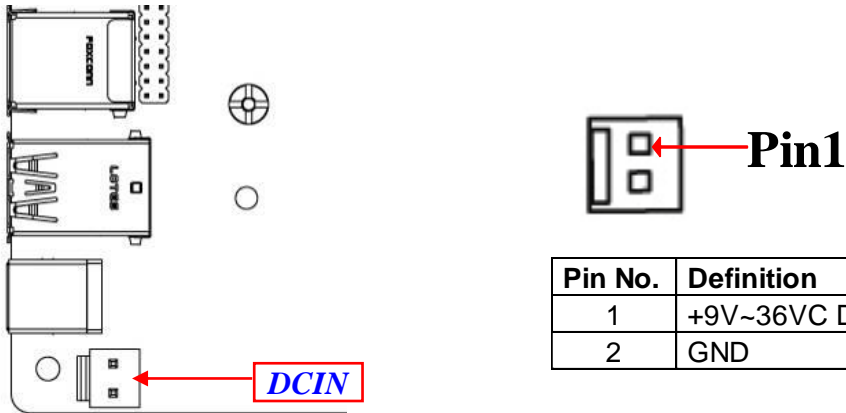
DCIN

Pin1

Pin No.	Definition
1	+9V~36VC DC-In
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) SATA(7-pin): SATAIII Port connector

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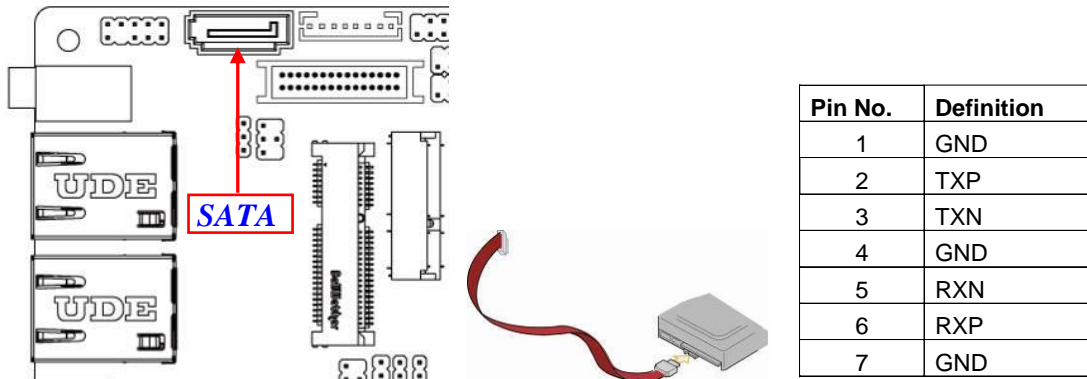
SATA

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

(4) SATAPWR (4-pin): SATA HDD Power-Out Connector

SATAPWR

Pin1

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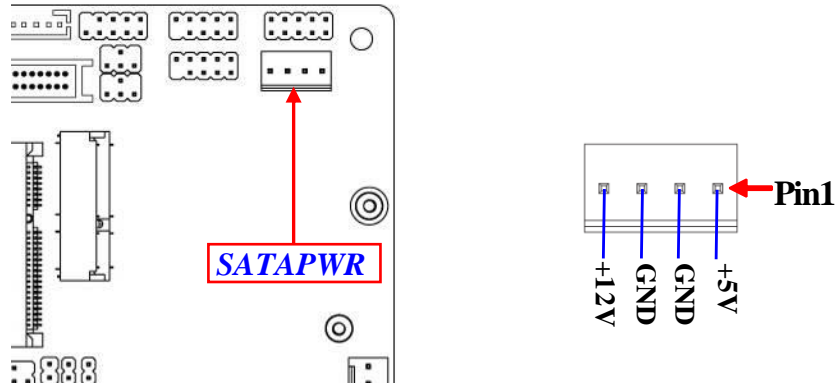
Warning: Make sure that Pin-1 of compatible SATA Power out connector is inserted into corresponding Pin-1 of SATAPWR connector to avoid possible damage to the board and hard disk driver!

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

CPUFAN

Pin1

Control
Fan Speed
+12V Fan Power
GND
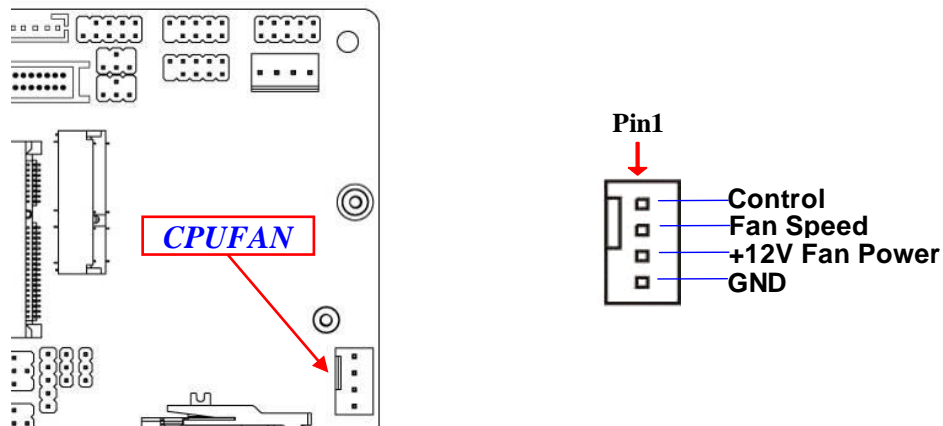
2-2-2 Headers

JW_FP (8-pin): Front Panel Header (2.54 pitch)

JW_FP

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

2

Pin1
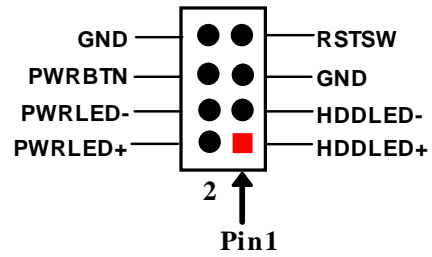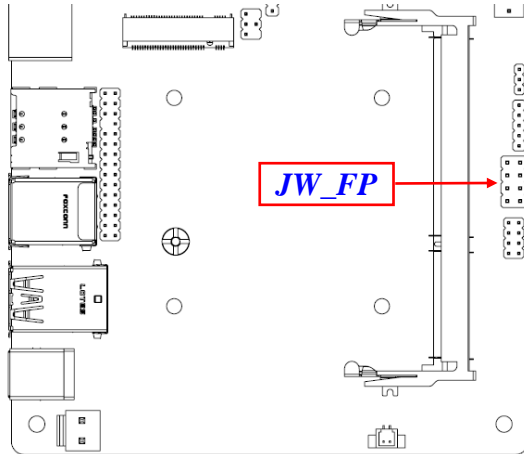
FP_USB1 (9-pin): USB 2.0 Port Header (2.0 pitch)

FP_USB1

GND +DATA -DATA VCC ← Pin 1

2

NC GND +DATA -DATA VCC
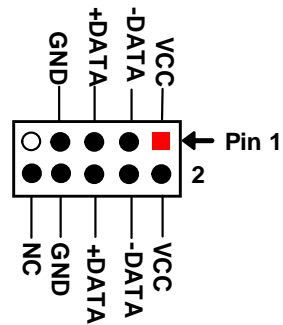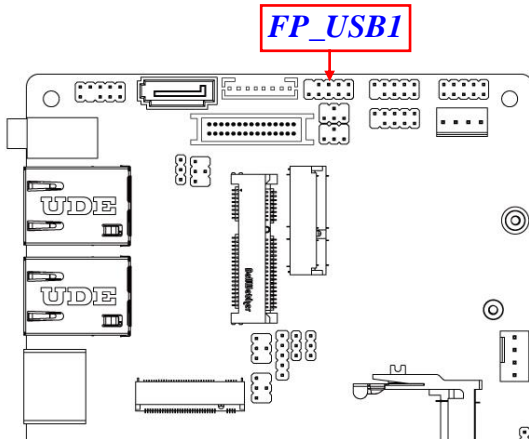
FP_AUDIO (9-pin): Line-Out, MIC-In Header (2.0 pitch)

This header connects to Front Panel Line-out, MIC-In connector with cable.
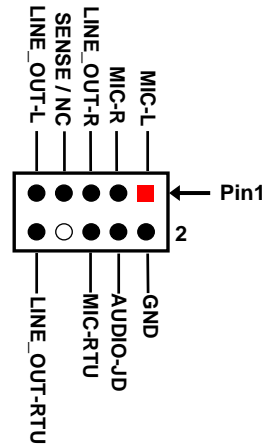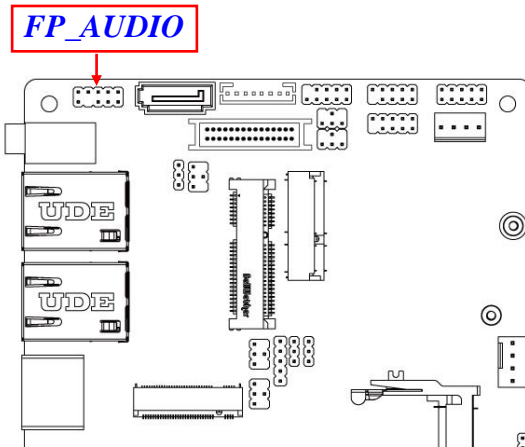
GPIO_CON (10-pin): GPIO Header (2.0 pitch)
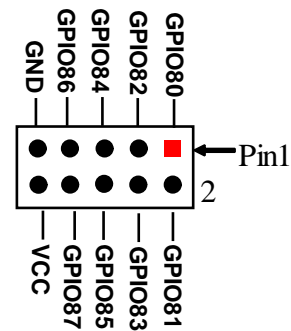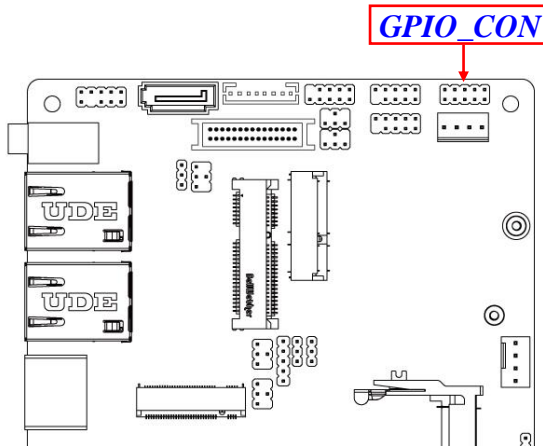
COM1/2 (9-pin): Serial Port Headers (2.0 pitch)

COM1: RS232/422/485 Serial Port Header.
COM2: RS232 Serial Port Header.
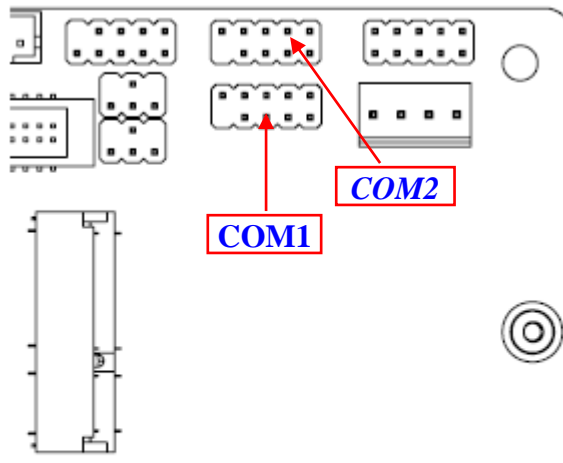
Pin NO.	RS232	*RS422 (optional)	*RS485 (optional)
Pin 1	DCD	TX-	DATA-
Pin 2	RXD	TX+	DATA+
Pin 3	TXD	RX+	NC
Pin 4	DTR	RX-	NC
Pin 5	GND	GND	GND
Pin 6	DSR	NC	NC
Pin 7	RTS	NC	NC
Pin 8	CTS	NC	NC
Pin 9	RI	NC	NC

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

EDP (29-pin): 4-lane eDP Header (2.0 pitch)
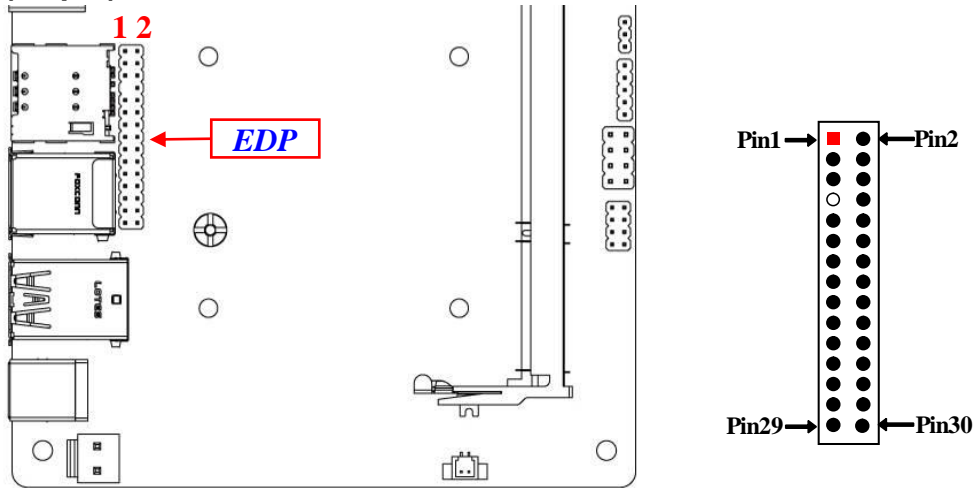
Pin Define	Pin No.	Pin No.	Pin Define
BKLT_PW	Pin 1	Pin 2	BKLT_PW
BKLT_PW	Pin 3	Pin 4	GND
GND	Pin 5	Pin 6	GND
N/A	Pin 7	Pin 8	NC
EDP_VDD	Pin 9	Pin 10	NC
EDP_VDD	Pin 11	Pin 12	L_BKLT_PWM
GND	Pin 13	Pin 14	GND
L_BKLT_EN	Pin 15	Pin 16	EDP_AUXP_C
EDP_HPD	Pin 17	Pin 18	EDP_AUXN_C
GND	Pin 19	Pin 20	GND
EDP_LANE+3	Pin 21	Pin 22	EDP_LANE-3
EDP_LANE+2	Pin 23	Pin 24	EDP_LANE-2
GND	Pin 25	Pin 26	GND
EDP_LANE+1	Pin 27	Pin 28	EDP_LANE-1
EDP_LANE+0	Pin 29	Pin 30	EDP_LANE-0

LVDS (30-pin): 24-bit Dual Channel LVDS Header (1.25 pitch)
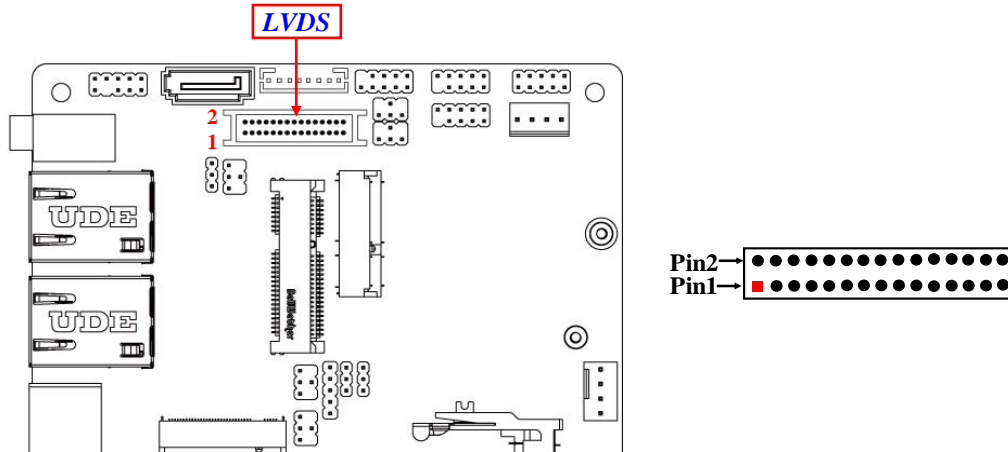
Pin Define	Pin NO.	Pin NO.	Pin Define
LVDSB_DATAN3	Pin 1	Pin 2	LVDSB_DATAP3
LVDS_CLKBN	Pin 3	Pin 4	LVDS_CLKBP
LVDSB_DATAN2	Pin 5	Pin 6	LVDSB_DATAP2
LVDSB_DATAN1	Pin 7	Pin 8	LVDSB_DATAP1
LVDSB_DATAN0	Pin 9	Pin 10	LVDSB_DATAP0
NC/DDC_DATA	Pin 11	Pin 12	NC/DDC_CLK
GND	Pin 13	Pin 14	GND
GND	Pin 15	Pin 16	GND
LVDSA_DATAP3	Pin 17	Pin 18	LVDSA_DATAN3
LVDS_CLKAP	Pin 19	Pin 20	LVDS_CLKAN
LVDSA_DATAP2	Pin 21	Pin 22	LVDSA_DATAN2
LVDSA_DATAP1	Pin 23	Pin 24	LVDSA_DATAN1
LVDSA_DATAP0	Pin 25	Pin 26	LVDSA_DATAN0
LCD VCC	Pin 27	Pin 28	LCD VCC
LCD VCC	Pin 29	Pin 30	LCD VCC

INVERTER (8-pin): LVDS Inverter Connector (2.0 pitch)
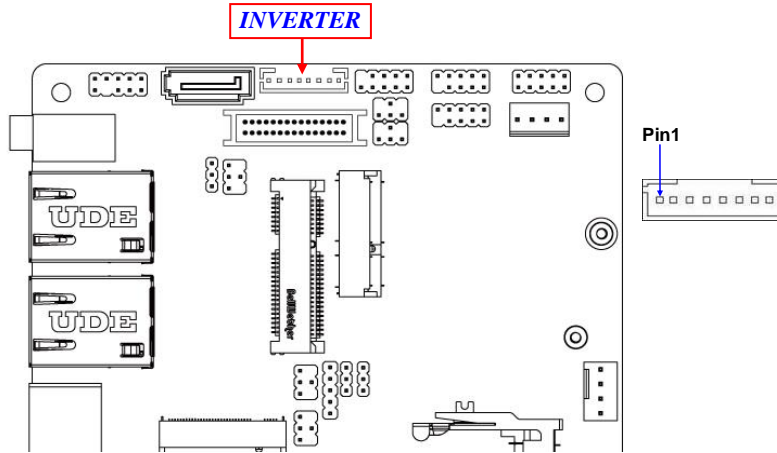
Pin1

Pin No.	Definition
1	Backlight Enable
2	Backlight PWM
3	PVCC
4	PVCC
5	GND
6	GND
7	Backlight Up SW
8	Backlight Down SW

*Warning! Find **Pin-1** location of the inverter and make sure that the installation direction is correct! Otherwise serious harm will occur to the board/display panel!!*

I2C (5-pin): I2C Header (2.0 pitch)

Int
VDD
I2C_SCL
I2C_SDA
GND

Pin1
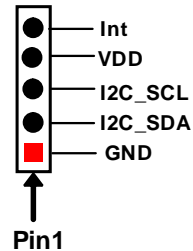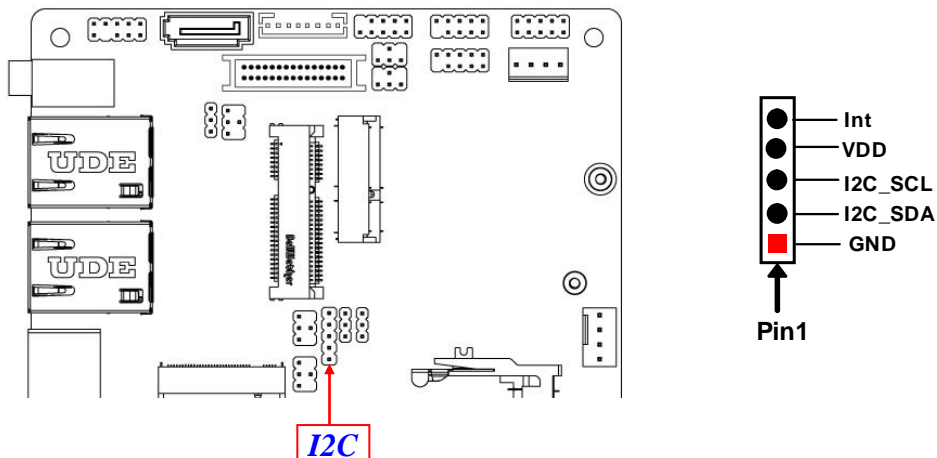
SMBUS (5-pin): SMBUS Header (2.0 pitch)

VCC3
GND
SMBUS_ALERT
SMBUS_DATA
SMBUS_CLK

Pin1
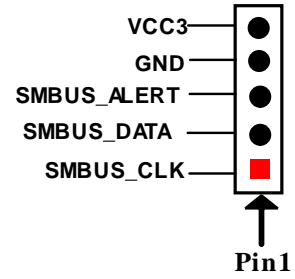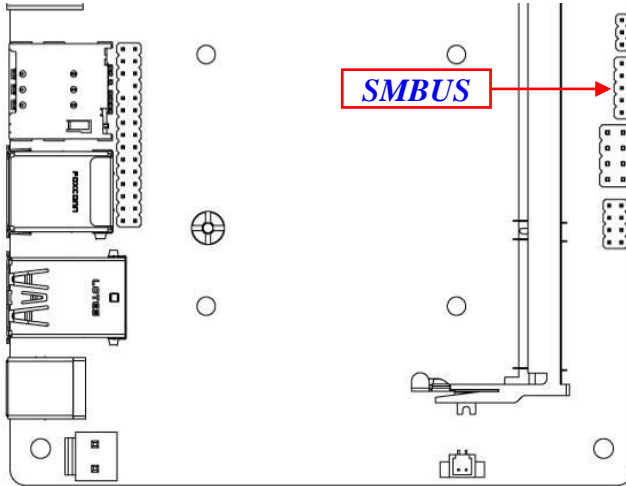
Chapter 3
Introducing BIOS

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 pop-up Boot menu.

3-2 BIOS Menu Screen

The following diagram show a general BIOS menu screen:

Menu Bar


```
         Aptio Setup Utility - Copyright (C) 2020 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                 BAM9NA01
 Build Date and Time      02/13/2020 10:07:47

 TXE FW Version           3.1.70.2334

 Access Level             Administrator

 System Date              [Tue 01/01/2019]
 System Time              [10:10:35]
                                                          ++: 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) 2020 American Megatrends, Inc.
```

General Help Items

Current Setting Value

Menu Items

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.

```
             Aptio Setup Utility - Copyright (C) 2020 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                 BAM9NA01
      Build Date and Time      02/13/2020 10:07:47

      TXE FW Version           3.1.70.2334

      Access Level             Administrator

      System Date              [Tue 01/01/2019]
      System Time              [10:10:35]
                                                            →←: 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) 2020 American Megatrends, Inc.
```

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

```
              Aptio Setup Utility - Copyright (C) 2020 American Megatrends, Inc.
      Main  Advanced  Chipset  Security  Boot  Save & Exit

      OS Selection                      [Windows]                  Select the target OS.

      ▶ Trusted Computing
      ▶ ACPI Settings
      ▶ Super IO Configuration
      ▶ Serial Port Console Redirection
      ▶ PC Health Status
      ▶ CPU Configuration
      ▶ Network Stack Configuration
      ▶ CSM Configuration
      ▶ Wake-up Function Settings
      ▶ USB Configuration

      ▶ Intel(R) I211 Gigabit  Network Connection -     →←: Select Screen
        00:30:18:28:21:2B                               ↑↓: Select Item
      ▶ Intel(R) I211 Gigabit  Network Connection -     Enter: Select
        00:30:18:28:21:2C                               +/-: Change Opt.
                                                        F1: General Help
                                                        F2: Previous Values
                                                        F3: Optimized Defaults
                                                        F4: Save & Exit
                                                        ESC: Exit

              Version 2.18.1263. Copyright (C) 2020 American Megatrends, Inc.
```

OS Selection

Use this item to select the target OS.

The optional settings are: [Windows]; [Intel Linux]; [MSDOS].

▶ **Trusted Computing**
   Configuration
   Security Device Support
   Press [Enter] to enable or disable BIOS support for security device. O.S. will not show Security Device. TCG EFI protocol and INT1A interface will not be available.
   The optional settings are: [Disabled]; [Enabled].
   TPM20 Device Found

Security Device Support
Use this item to enable or disable BIOS support for security device. O.S will not show Security Device. TCG EFI protocol and INT1A interface will not be available.
The optional settings are: [Disabled]; [Enabled].
When set as [Enabled], the following items shall appear:
SHA-1 PCR Bank
Use this item to enable or disable SHA-1 PCR Bank.
The optional settings are: [Disabled]; [Enabled].
SHA256 PCR Bank
Use this item to enable or disable SHA256 PCR Bank.
The optional settings are: [Disabled]; [Enabled]

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

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

▸ **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
Use this item to enable or disable Serial Port (COM).
The optional settings are: [Disabled]; [Enabled]
When set as [Enabled], the following items shall appear:
Device Settings

Change Settings

Use this item to select an optimal settings 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;].

Transmission Mode Select

Use this item to select transmission mode.

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

Mode Speed Select

Use this item to select RS232/RS422/RS485 speed.

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

▶ **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).

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

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

Device Settings

Change Settings

Use this item to select an optimal settings 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

Use this item to select Energy-Related Products function. This item should be set as [Disabled] if you wish to have all active wake-up functions.

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

Case Open Detect

Use this item to detect if case have ever been opened. Show message in POST.

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

When set as [Enabled], system will detect if COPEN has been short or not (refer to the *jumper setting of JPCLR for CASE OPEN Select*); if **Pin7-8 of JPCLR** is short, system will show Case Open Message during POST.

WatchDog Reset Timer
Use this item to enable or disable WatchDog Timer Control.
The optional settings are: [Disabled]; [Enabled].
When set as [Enabled], the following sub-items shall appear:
WatchDog Reset Timer Value
User can set a value in the range of [10] ~ [255] seconds, or [1] ~ [255] minutes.
WatchDog Reset Timer Unit
The optional settings are: [Sec.]; [Min.].
WatchDog Wake-up Timer
This item support WDT wake-up while ERP function is set as [Enabled].
The optional settings: [Disabled]; [Enabled].
When set as [Enabled], the following sub-items shall appear:

WatchDog Wake-up Timer Value
The setting range is [10] ~ [4095] seconds, or [1] ~ [4095] minutes.

WatchDog Wake-up Timer Unit
The optional settings are: [Sec.]; [Min.].

ATX Power Emulate AT Power
This item displays current Emulate AT Power Status, motherboard power On/Off control by power supply. User needs to select 'AT or ATX Mode' on MB at first (refer to the *jumper setting of AT_MODE for ATX Mode & AT Mode Select*).

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

▸ **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 are: [VT100]; [VT100+]; [VT-UTF8]; [ANSI].

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 are: [9600]; [19200]; [38400]; [57600]; [115200].

Data Bits

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

Parity

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

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

Recorder Mode

With this mode enable only text will be sent. This is to capture Terminal data.

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

Resolution 100x31

Use this item to enable or disable extended terminal resolution.

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

Legacy OS Redirection Resolution

On Legacy OS, the Number of Rows and Columns supported redirection.

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

Putty KeyPad

Use this item to select FunctionKey and KeyPad on Putty.

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

Redirect After BIOS POST

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

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

Serial Port for Out-of-Band Management/

Windows Emergency Management Services (EMS)

Console Redirection

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

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

▶ **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 default setting is: [COM1].

Terminal Type

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

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 are: [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 are: [None]; [Hardware RTS/CTS]; [Software Xon/Xoff].

Data Bits

The default setting is: [8].

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

Parity

The default setting is: [None].

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

Stop Bits

The default setting is: [1].

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

‣ **PC Health Status**

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

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

CPUFAN Smart Mode

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

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

CPUFAN Full-Speed Temperature

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

CPUFAN Full-Speed Duty

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

CPUFAN Idle-Speed Temperature

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

CPUFAN Idle-Speed Duty

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

▸ **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 are: [Disabled]; [Enabled].

EIST

Use this item to enable or disable Intel SpeedStep.

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

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

Turbo Mode

Use this item to enable or disable Turbo Mode.

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

C-States

Use this item to enable or disable C state to OS.

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

When set as [Enabled], the following item shall appear for setting:

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 Package C State
This item controls the Max Package C state that the processor will support.
The optional settings are: [PC2]; [PC1]; [C0].
Max Core C State
This item controls the Max Core C state that cores will support.
The optional settings are: [Fused Value]; [Core C10]; [Core C9]; [Core C8]; [Core C7]; [Core C6]; [Core C1]; [Unlimited].

▸ **Network Stack Configuration**
Press [Enter] to go to '**Network Stack**' screen to make further settings.
Network Stack
The optional settings are: [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 optional will not be created.
Ipv6 PXE Support
The optional settings are: [Disabled]; [Enabled].
Use this item to enable Ipv6 PXE boot support. When set as [Disabled], IPV6 PXE boot optional will not be created.
PXE Boot Wait Time
Use this item to set wait time to press [ESC] key to abort the PXE boot.
Media Detect Count
Use this item to set media detect count.

▸ **CSM Configuration**
Press [Enter] to make settings for the following sub-items:
Compatibility Support Module Configuration

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-up by RTC alarm.

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

When set as [Enabled], system will wake on the Hour/Minute/Second specified.

Wake-up System with Dynamic Time

Use this item to enable or disable system wake-up by RTC alarm.

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

When set as [Enabled], system will wake on the current time + increased minute(s).The settings range is from [1] ~ [60] minute(s).

USB Wake-up from S4

Use this item to enable or disable USB Wake-up by ERP function in S4.

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

*This item is only supported when **'ERP Support'** is set as [Disabled]. 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 applications.
[Auto]: To disable legacy support if no USB devices are connected.
XHCI Hand-off
This is a workaround for OSes without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.
The optional settings are: [Enabled]; [Disabled].
USB Mass Storage Driver Support
The optional settings are: [Disabled]; [Enabled].
USB Hardware Delays and Time-outs:
USB Transfer Time-out
Use this item to set the time-out value for control, bulk, and interrupt transfers.
The optional settings are: [1 sec]; [5 sec]; [10 sec]; [20 sec].
Device Reset Time-out
Use this item to set USB mass storage device start unit command time-out.
The optional settings are: [10 sec]; [20 sec]; [30 sec]; [40 sec].
Device Power-up Delay
Use this item to set maximum time the device will take before it properly reports itself to the Host Controller.
The optional settings: [Auto]; [Manual].
'Auto' uses default value: for a Root port it is 100 ms, for a Hub port the delay is taken from Hub descriptor.
Select [Manual] you can set value for the following sub-item: '**Device Power-up Delay in Seconds'.**
Device Power-up Delay in Seconds

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

▸ **Intel(R) I211 Gigabit Network Connection- XX:XX:XX:XX:XX:XX**

▸ **Intel(R) I211 Gigabit Network Connection- XX:XX:XX:XX:XX:XX**

3-8 Chipset Menu


```
                  Aptio Setup Utility – Copyright (C) 2020 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

Use this item to select the 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 Memory

Use this item to select DVMT5.0 Total Graphics Memory size used by the Internal Graphics Device.

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

Active LFP

Use this item to enable or disable LFP.

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

When set as [Enabled], the following item shall appear for setting:

LCD Panel Type

Use this item to select LCD panel used by Internal Graphics Device by selecting the appropriate setup item.

The optional settings are: [800x480   1ch 18-bit]; [800x600   1ch 18-bit]; [800x600   1ch 24-bit]; [1024x600   1ch 18-bit]; [1024x768   1ch 18-bit]; [1024x768   1ch 24-bit]; [1280x768   1ch 24-bit]; [1280x800   1ch 18-bit]; [1280x800   1ch 24-bit]; [1366x768   1ch 18-bit]; [1366x768   1ch 24-bit]; [1440x900   2ch 18-bit]; [1440x900   2ch 24-bit]]; [1280x1024   2ch 24-bit]; [1680x1050   2ch 24-bit]; [1920x1080   2ch 24-bit].

GMCH BLC Control

Use this item to control Back Light Control Setting.

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 selection. VGA modes will be supported only on primary display.

The optional settings are: [Auto]; [eDP]; [HDMI]; [LVDS].

This item is only supported when 'Active LFP' is set as [Enabled]. Please enable Active LFP before activating this function.

Secondary IGFX Boot Display

Use this item to select Secondary Display Device

The optional settings are: [Disabled]; [HDMI]; [LVDS].

This item is only supported when 'Active LFP' is set as [Enabled]. Please enable

Active LFP before activating this function.

▶ **South Cluster Configuration**
Press [Enter] to further setting South Cluster Configuration.

▶ **PCI Express Configuration**
Press [Enter] to further setting.
Peer Memory Write Enable
The optional settings are: [Disabled]; [Enabled].
Compliance Mode
The optional settings are: [Disabled]; [Enabled].
Onboard PCIE LAN1
The optional settings are: [Disabled]; [Enabled].
Onboard PCIE LAN2
The optional settings are: [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 for setting:
SATA Mode Selection
Use this item to determine how SATA controller operate.
The default setting is: [AHCI].
SATA Port
SATA Port
Use this item to enable or disable SATA Port.
The optional settings are: [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.
The optional settings are: [Always On]; [Always Off]; [Former State].
Note: [Always On] and [Former State] options are affected by ERP function.
Please disable ERP to support [Always On] and [Former State].

3-9 Security Menu

```
          Aptio Setup Utility – Copyright (C) 2020 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.

Setup 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 user password. If password is present on system, please press [Enter] to verify old password then to clear/change password. Press again to confirm the new user password.

▶ **Secure Boot**

Press [Enter] to make customized secure settings:

Secure Boot Control

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

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

Secure Boot Mode

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

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

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

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

▶ **Key Management**

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

Provision Factory Default Keys

Use this item to install factory default Secure Boot Keys when System is in Setup Mode.

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

▶ **Enroll All Factory Default Keys**
Use this item to force System to User Mode- install all Factory Default Keys.

▶ ***Save All Secure Boot Variables***
Secure Boot Variable/Size/Key#/Key Source

▶ **Platform Key (PK)/Key Exchange Keys/Authorized Signature/Forbidden Signature/ Authorized TimeStamps/OsRecovery Signatures**
Use this item to enroll Factory Defaults or load the keys from a file with:
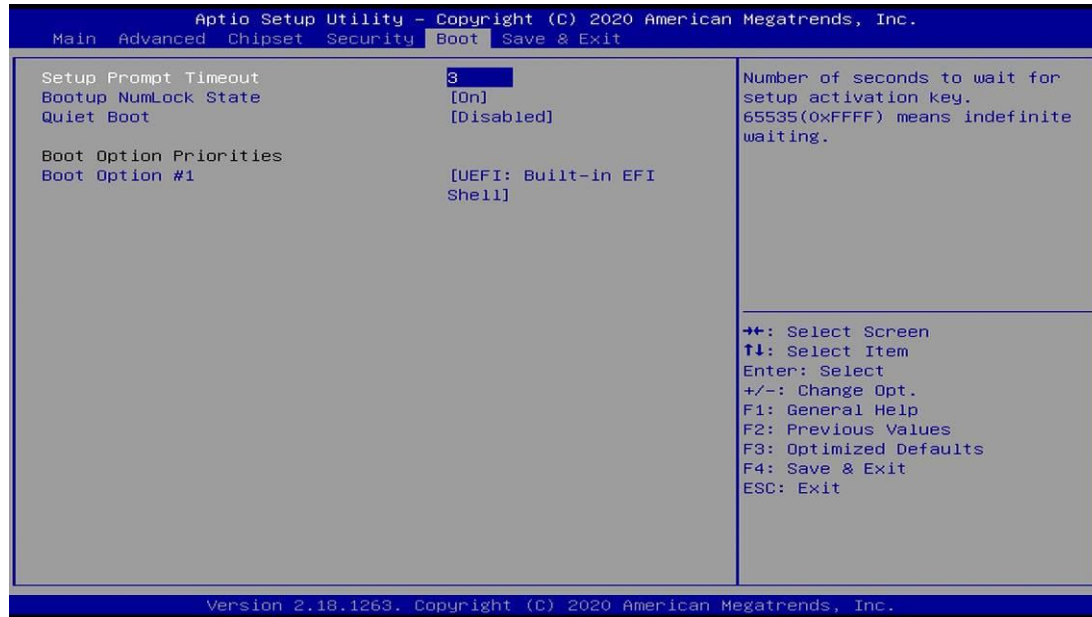1. Public Key Certificate in:
 a) EFI_SIGNATURE_LIST
 b) EFI_ CERT_X509 (DER)
 c) EFI_ CERT_RSA2048 (bin)
 d) EFI_ CERT_SHA256 (bin)
2. Authenticated UEFI Variable
Key: Vendor, Custom, Mixed, Test(*) modified from Setup menu.

3-10 Boot Menu

```
              Aptio Setup Utility - Copyright (C) 2020 American Megatrends, Inc.
       Main  Advanced  Chipset  Security  Boot  Save & Exit

    Setup Prompt Timeout           3                      Number of seconds to wait for
    Bootup NumLock State           [On]                   setup activation key.
    Quiet Boot                     [Disabled]             65535(0xFFFF) means indefinite
                                                          waiting.
    Boot Option Priorities
    Boot Option #1                 [UEFI: Built-in EFI
                                   Shell]




                                                          →←: 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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```

Setup Prompt Timeout
Use this item to set number of seconds to wait for setup activation key. 65535(0xFFF)
means indefinite waiting.
Bootup NumLock State
Use this item to select keyboard numlock state.
The optional settings are: [On]; [Off].
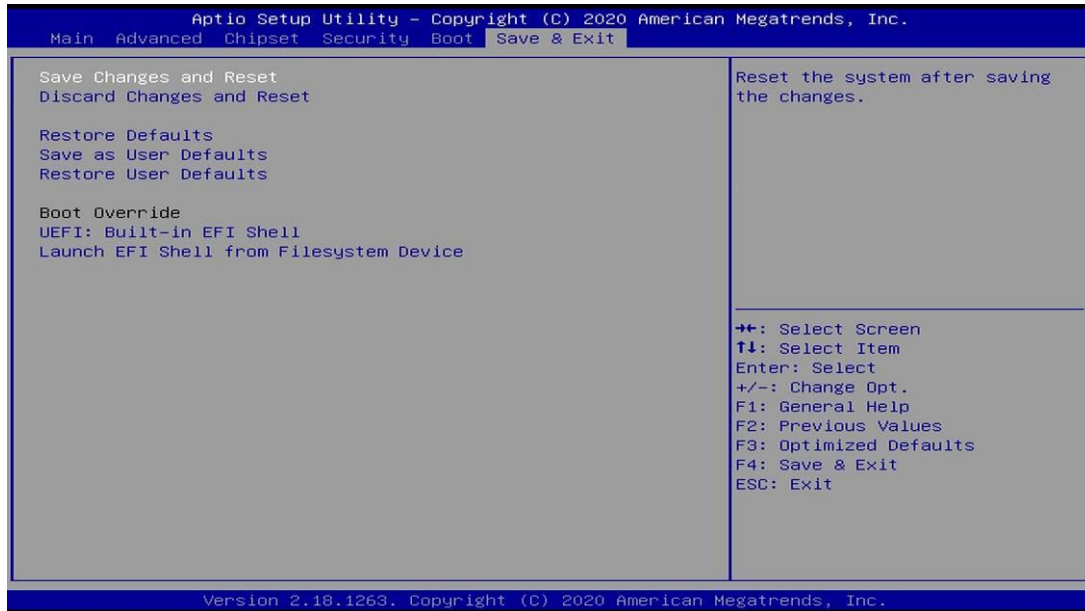**Quiet Boot**
The optional settings are: [Disabled]; [Enabled].
Boot Option Priorities

Boot Option #1
Use this item to decide system boot order from available options.
The optional settings are: [UEFI: Built-in EFI Shell]; [Disabled].

3-11 Save & Exit Menu

Save Changes and Reset
This item allows user to reset the system after saving the changes.
Discard Changes and Reset
This item allows user to reset the system without saving any changes.

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

UEFI; Built-in EFI Shell
Use this item to save configuration and reset.
Launch EFI Shell from Filesystem Device
Use this item to save configuration and reset.