MF21 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
4.0	Fourth Edition	December 11, 2023

Item Checklist

- ☑ Motherboard
- ☑ Cable(s)

Chapter 1
Introduction of the Motherboard

1-1 Feature of Motherboard

- Onboard Intel® Elkhart Lake Series Processor, with low power consumption and high performance

- Support 1* DDR4 3200MHz SO-DIMM, up to 32GB

- Onboard 2* RTL8119I 1.0GbE RJ-45 LAN ports

- Onboard 1* M.2 M-key 2242/2280 slot (PCIe Gen.3 x2/SATA interface) support NVMe

- Onboard 1* M.2 E-key 2230 slot (PCIe Gen.3x1/USB2.0 interface)

- Onboard 1* M.2 B-key 3042/3052 slot (USB3.0 interface)

- Front I/O: 4* USB 2.0 Ports , 1* Audio (MIC + Line-out), 1* Line-in, 3* DisplayPort supports Triple Independent Display

- Rear I/O: 1* USB 2.0 Port, 2* USB 3.1(Gen.2) Ports, 1* 8bit GPIO & 2* RS232/422/485, (For MF21-62100B/64120B)

- Support CPU Smart FAN and Intel AES NI

- Onboard TPM 2.0 (by order)

- Onboard optional 32GB / 64GB eMMC (by order)

- Compliance with ErP standard

- Support Watchdog function

- Solution for Digital Signage, Cloud Applications, IoT & Industrial Automation

1-2　　Specification

Spec	Description
Design	● 3.5" form factor; PCB size: 14.8 cm x 10.2 cm
Embedded CPU	● Intel® Elkhart Lake series CPU ** for detailed CPU support information please visit our website*
Memory Slot	● 1* DDR4 SO-DIMM slot ● Support DDR4 3200MHz SO-DIMM up to 32GB
Expansion Slot	● M.2 E-key 2230 slot (PCIe Gen.3x1/USB2.0 interface) *(M2E1)* ● M.2 B-key 3042/3052 slot (USB 3.0 interface) *(M2B1)* ● 1* SIM card slot *(along with M.2 B-key)*
Storage	● M.2 M-key 2242/2280 slot (PCIe Gen.3 x2/SATA interface) support NVMe *(M2M1)*
LAN Chip	● Integrated with 2* Realtek RTL8119I Gigabit LAN chip ● Support Fast Ethernet LAN function of providing 10/100/1000Mbps Ethernet data transfer rate
Audio Chip	● Realtek HD audio chip
BIOS	● AMI Flash ROM
Front Panel I/O	● 1* Power Switch/LED Button ● 3* DisplayPort ● 4* USB 2.0 ports ● 1* Line-in Port ● 1* Audio (Line-out / MIC Combo) Port
Rear Panel I/O	● 2* 1.0Gbps RJ-45 LAN ports ● 1* 12V-36V DC-in power Jack (Lockable) *Only for MF21-62100B/MF21-64120B as follows* ● 1* USB 2.0 port ● 2* USB 3.1(Gen.2) ports ● 1* 8 bit GPIO Port & 2* RS232/422/485 COM1/COM2 Ports (Phoenix Connector 2* 9 Pin)
Internal I/O	● 1* CPUFAN connector ● 1* 2-pin internal 12V-36V DC-In power connector

1-3 Layout Diagram

Front IO Panel Diagram:

USB 2.0 Ports

Power Switch/LED Button

DisplayPorts

Line-out / MIC Combo Port

Line-in Port

Rear IO Panel Diagram:

MF21-62100B/64120B

1.0Gbps RJ-45 LAN Ports

12V~36V DC-in Power Jack (Lockable)

USB 2.0 Port

USB 3.1(Gen.2) Ports

1* 8 bit GPIO & COM1/COM2 (RS232/422/485) Ports

MF21-62100S/64120S

1.0Gbps RJ-45 LAN Ports

12V~36V DC-in Power Jack (Lockable)

Internal Diagram:

BATCON

USB 2.0 Port (optional)

M.2 M-key Slot (M2M1)

M.2 B-key Slot (M2B1)

Line-out / MIC Combo Port

Line-in Port

1.0Gbps RJ-45 LAN Ports

SIM Card Slot

USB 2.0 Ports

USB 3.1(Gen.2) Ports (optional)

CPUFAN Connector

M.2 E-key (M2E1)

DisplayPort

1* 8 bit GPIO (optional) &
COM1/COM2 (RS232/422/485) Port (optional)

1* DDR4 SODIMM Slots

12V~36V DC-in
Power Jack (Lockable)

Power Switch/LED Button

Internal 12~36V DC-In
Power Connector

Note: M2B1 slot co-functions with SIM card; please install compatible 3G/4G/LTE card into panel SIM card holder as well for full function

*Note: The diagrams in the manual are mostly taken from **MF21-62100B/64120B** series unless otherwise stated.*

Internal Jumper Positions:
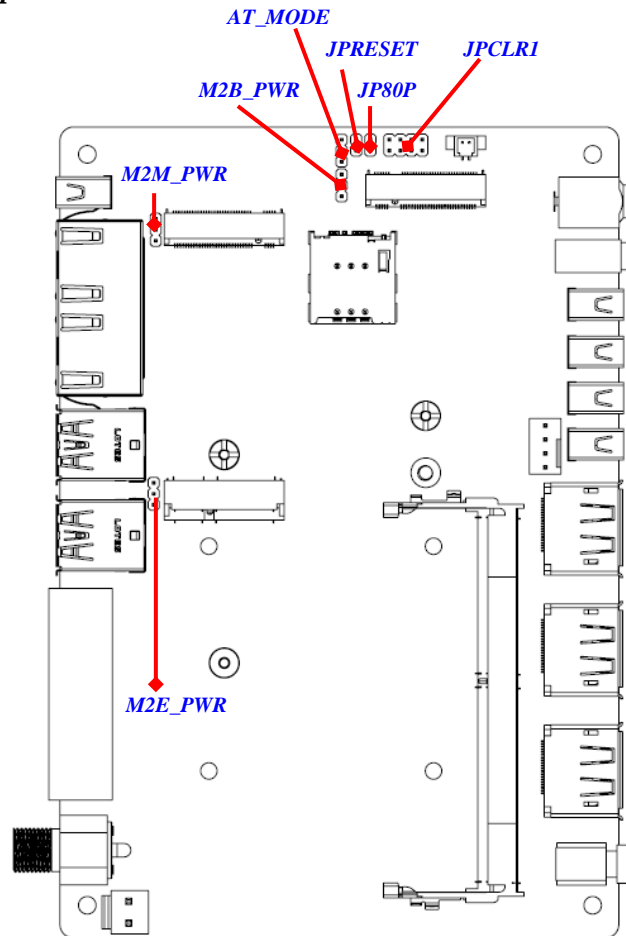
Jumper

Jumper	Name	Description	Pitch
AT_MODE	ATX Mode/AT Mode Select	3-Pin Block	2.0mm
JPRESET	SYSTEM RESET	2-Pin Block	2.0mm
JP80P	Set GPIO	2-Pin Block	2.0mm
JPCLR1	*Pin (1-2):* Clear RTC *Pin (3-4):* Clear CMOS *Pin (5-6):* ME Disable *Pin (7-8):* CASE OPEN	8-Pin Block	2.0mm
M2E_PWR/ M2M_PWR/ M2B_PWR	M2E1 & M2M1 & M2B1 Power Select	3-Pin Block	2.0mm

Connectors

Connector	Name
USB25 *(For MF21-62100B/64120B)*	USB 2.0 Port Connector
LAN1_1	1.0Gbps RJ-45 LAN Port Connector x2
USB31/USB32 *(For MF21-62100B/64120B)*	USB 3.1(Gen.2) Port Connector x2
GPIO *(For MF21-62100B/64120B)*	1* 8 bit GPIO COM1/COM2 (RS232/422/485) Port
DCIN3	Lockable 12V~36V DC-in power Jack
AUDIO1	Line-out/MIC Combo Connector
LIN_IN1	Audio Line in Connector
USB21/22/23/24	USB 2.0 Port Connector x4
DP1/2/3	DisplayPort x3

FP_PWR_SW	Power Switch/LED Button
DCIN2	Internal 12V~36V DC–in System Power Connector
CPUFAN	CPU FAN Connector

Chapter 2
Hardware Installation

2-1 Jumper Setting

AT_MODE (3-pin): ATX Mode/AT Mode Select   PITCH=2.0mm

1-2 Closed:
ATX MODE

2-3 Closed:
AT MODE
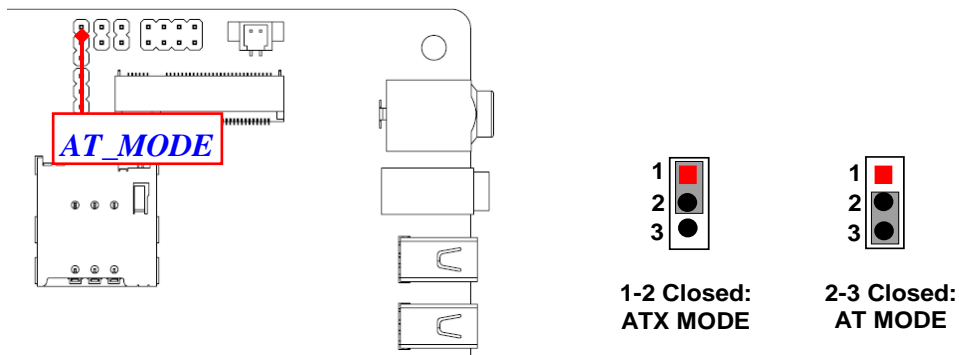
ATX Mode Selected: Press power button to power on after power input ready;

AT Mode Selected: Directly power on as power input ready

User needs to restart the system for the settings to take effect.

JPRESET (2-pin) : SYSTEM RESET *PITCH=2.0mm*

Pin1

RSTBTN-

GND
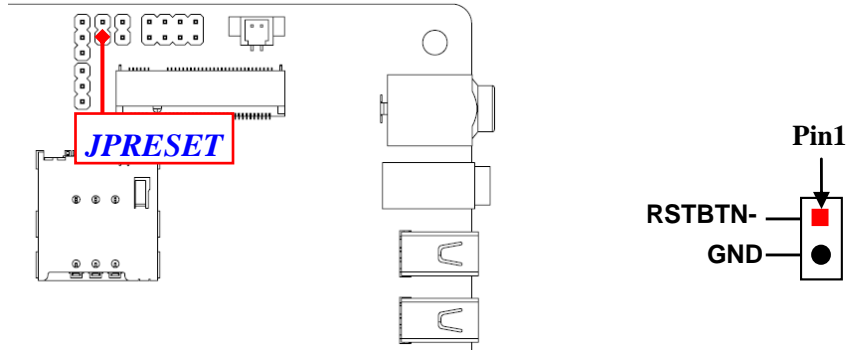
JP80P (2-pin) : Set GPIO *PITCH=2.0mm*

1

1-2 Open: GPIO =80 Port

1

1-2 Closed: GPIO =GPIO Port (Default)
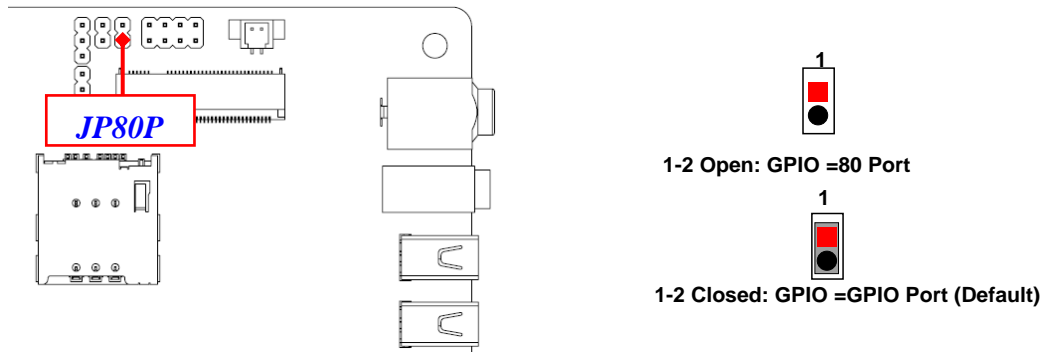
PIN (1-2) of JPCLR1 (8-pin): Clear RTC   *PITCH=2.0mm*
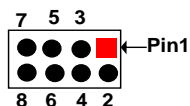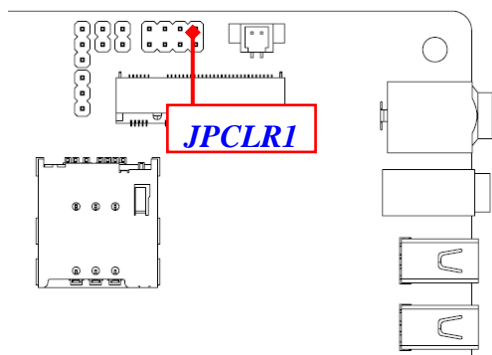
1-2 Open: Normal(Default)
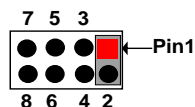
1-2 Closed: Clear RTC

PIN (3-4) of JPCLR1 (8-pin): Clear CMOS   *PITCH=2.0mm*
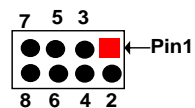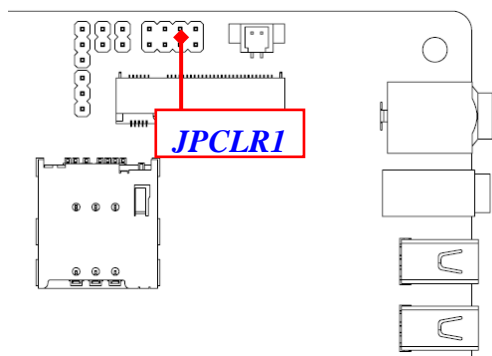
3-4 Open: Normal(Default)
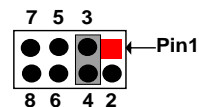
3-4 Closed: Clear CMOS

***Note:** Due to Intel MRC Code design factor, the first reboot after Clear CMOS will run a full Memory Sizing, and the boot time will take about 40 seconds (normal reboot time length, not function failure).*

PIN (5-6) of JPCLR1 (8-pin): ME Disable   *PITCH=2.0mm*
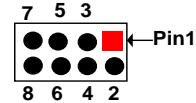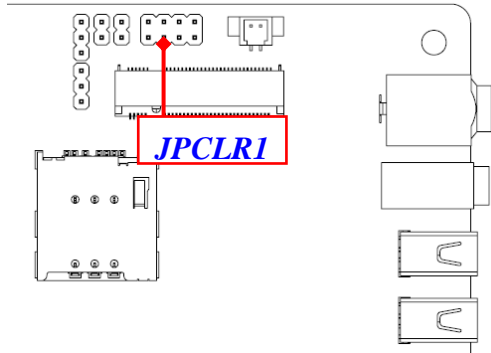
5-6 Open: Normal(Default)
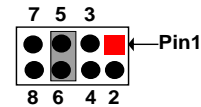
5-6 Closed: ME Disable

PIN (7-8) of JPCLR1 (8-pin): CASE OPEN   *PITCH=2.0mm*
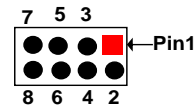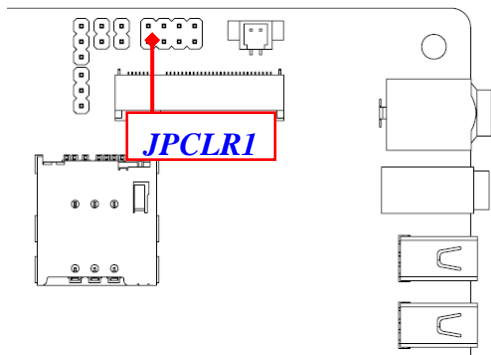
7-8 Open: Normal(Default)
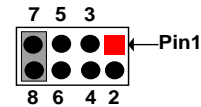
7-8 Closed: CASE OPEN

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.*

M2B_PWR & M2E_PWR & M2M_PWR (3-pin): M2B1 & M2E1 & M2M1 Power Select *PITCH=2.0mm*

1-2 Closed:
VCC= VCC3

2-3 Closed:
VCC= 3VSB
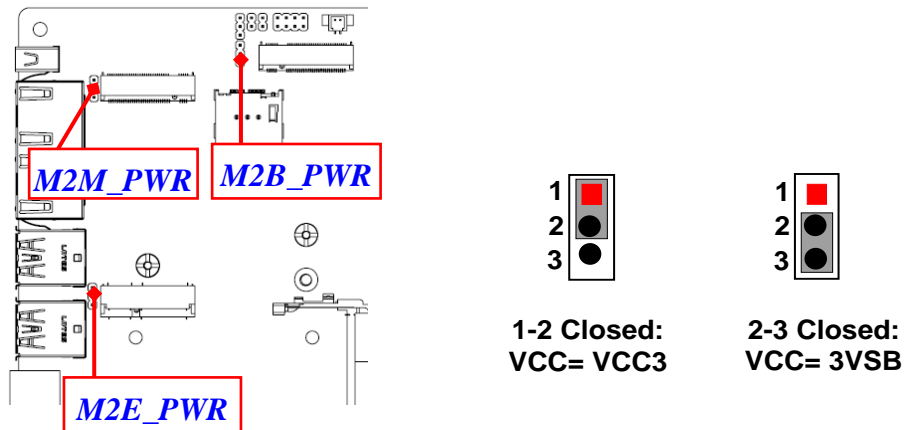
2-2   Connectors and Headers

2-2-1 Connectors

Front IO Panel Diagram:

USB 2.0 Ports

Line-out / MIC
Combo Port

Power Switch/LED
Button

DisplayPorts

Line-in Port

Rear IO Panel Diagram:

MF21-62100B/64120B

12V~36V DC-in

Power Jack (Lockable)

1.0Gbps RJ-45 LAN Ports

USB 2.0 Port

USB 3.1(Gen.2) Ports

1* 8 bit GPIO &
COM1/COM2 (RS232/422/485) Port

MF21-62100S/64120S

12V~36V DC-in

Power Jack (Lockable)
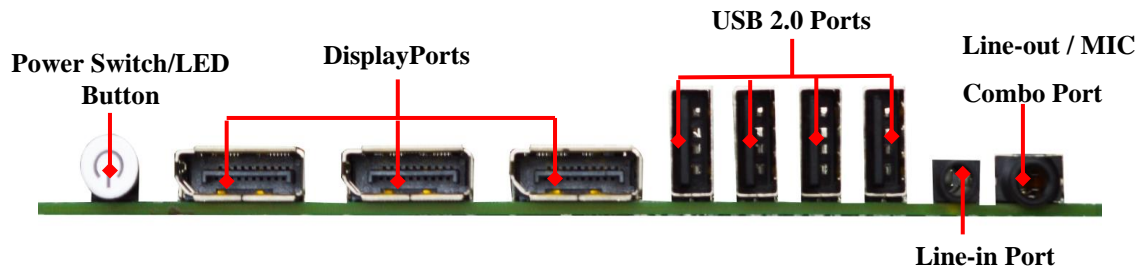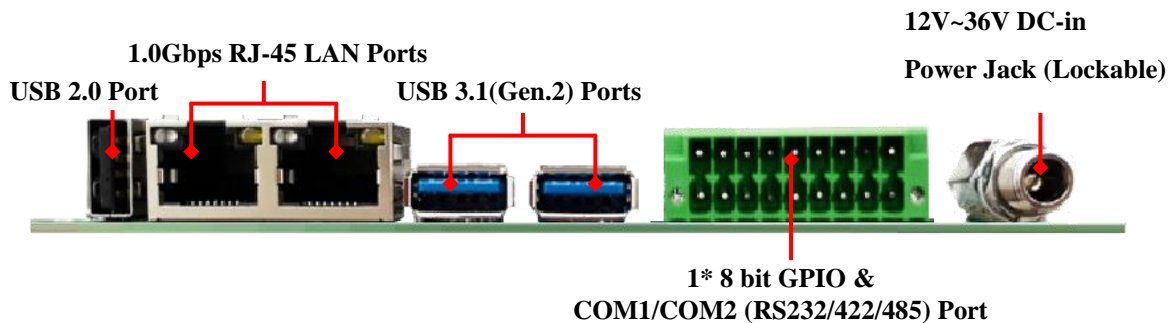
1.0Gbps RJ-45 LAN Ports

Icon	Name	Function
	Power Button/LED	For user to power on/off the system, also function as power status LED.
	DisplayPort	To the system to corresponding display device with compatible DP cable.
	USB 2.0 Ports	To connect USB keyboard, mouse or other devices compatible with USB specification.

	Line-in Connector	For user to connect external microphone, etc to transfer external microphone into system.
	Line-out/MIC Combo Connector	This connector can functions as audio Line-out jack and MIC jack with compatible cables & devices.
	1.0Gbps RJ-45 LAN Port	This connector is standard 1.0Gbps RJ-45 LAN jack for Network connection.
	USB 3.1(Gen.2) Port	To connect USB keyboard, mouse or other devices compatible with USB specification. USB 3.1(Gen.2) ports supports up to 10Gbps data transfer rate.
	1* 8 bit GPIO & COM1/COM2 (RS232/422/485) Port	GPIO: To connect device that support GPIO 4IN/4OUT specification with isolator. COM1/2: To connect external MODEM or other devices that supports Serial Communications Interface
	12V~36V DC-in Power Connector (Lockable)	For user to connect compatible power adapter to provide power supply for the system.

1.0Gbps RJ-45 LAN Port

** There are two LED next to the LAN port. Please refer to the table below for the LAN port LED indications

Speed LED   *Activity/Link LED*

A: Speed LED	
Off	10Mbps Connection
Green	100Mbps Connection
Orange	1Gbps Connection
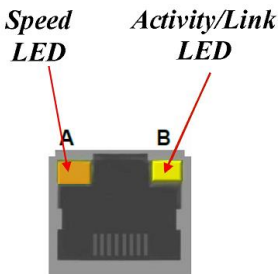
B: Activity/Link LED	
Status	Description
Off	No Link
Blinking	Data Activity
On	Link

CPUFAN (4-pin): CPU FAN Connector

Control
Fan Speed
+12V Fan Power
GND
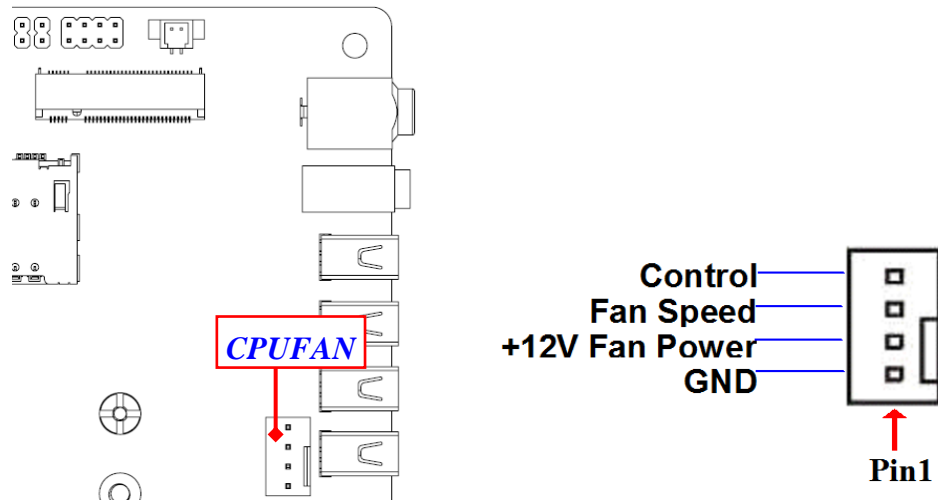
Pin1

GPIO (2*9 pin Phoenix Terminal): For GPIO (Pin6~9, 15~18)

If you need to use the voltage, you can use it on Pin14

+5V

10   18

Pin1   9

GND
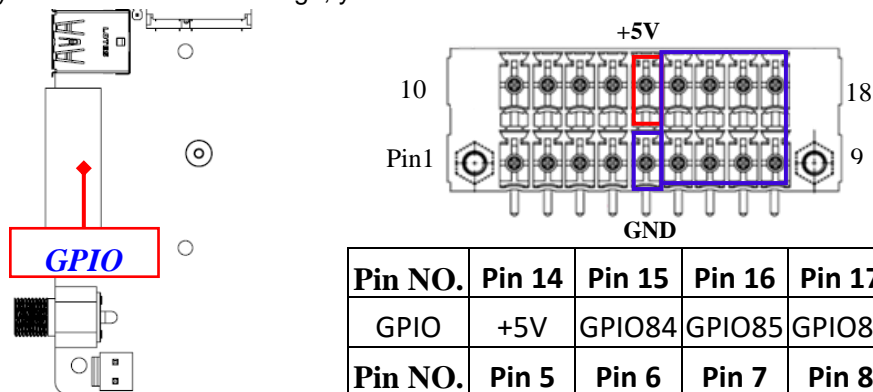
Pin NO.	Pin 14	Pin 15	Pin 16	Pin 17	Pin 18
GPIO	+5V	GPIO84	GPIO85	GPIO86	GPIO87
Pin NO.	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
GPIO	GND	GPIO80	GPIO81	GPIO82	GPIO83

GPIO (2*9 pin Phoenix Terminal): For 2x COM
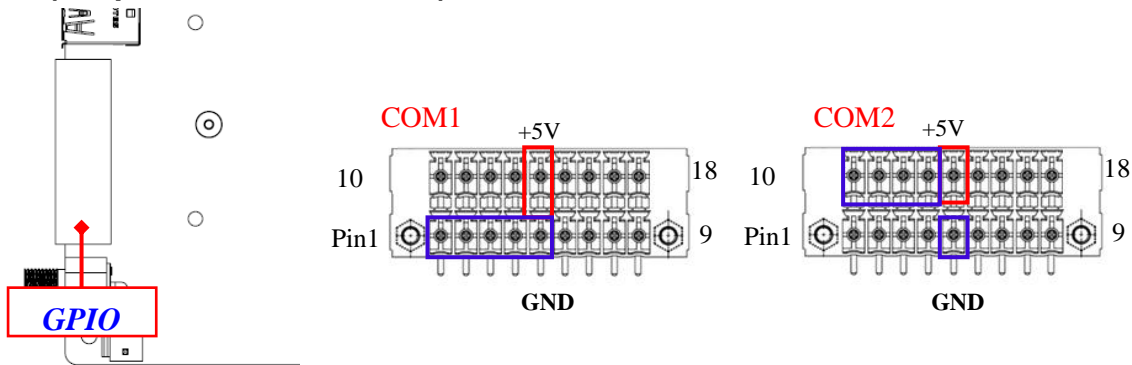
Pin NO.	COM1 RS232	COM1 RS422	COM1 RS485
Pin1	NC	TX-	DATA-
Pin2	SIN_A	TX+	DATA+
Pin3	SOU_A	RX+	NC
Pin4	NC	RX-	NC
Pin5	GND	GND	GND
Pin NO.	COM2 RS232	COM2 RS422	COM2 RS485
Pin10	NC	TX-	DATA-
Pin11	SIN_B	TX+	DATA+
Pin12	SOU_B	RX+	NC
Pin13	NC	RX-	NC
Pin5	GND	GND	GND

Pin NO.	COM1/COM2 RS232	COM1/COM2 RS422	COM1/COM2 RS485
Pin14	+5V	+5V	+5V

Note: If you need to use the voltage, you can use it on Pin14

DCIN2 (2-pin):12~36V DC-in Power Connector

← **Pin1**
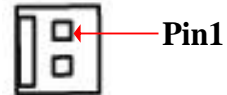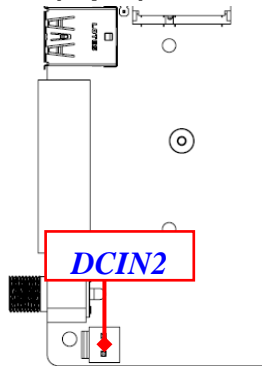
Pin No.	Definition
1	+12V~36VC DC-In
2	GND

BATCON (2-pin): Battery Connector

BATCON
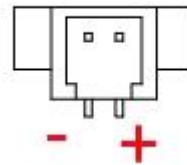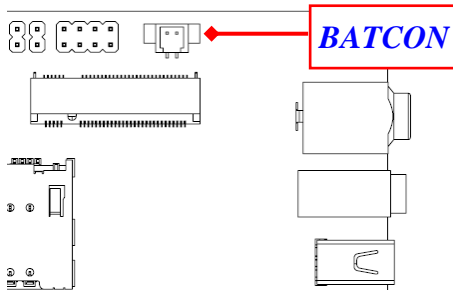
2-2-2 Maximum Voltage & Current Limit

Below is a list of maximum voltage & Current Limit specification for motherboard interface (including but not limited to slots, connectors, wafers and headers) for setup reference:

Location	Function	Working Voltage	Current Support
USB21/22/23/24/25	USB2.0	5V	0.5A
USB31/USB32	USB3.1(Gen.2)	5V	1.5A
GPIO	1* 8 bit GPIO & COM1/COM2 (RS232/422/485)	5V	1A
CPUFAN	CPU FAN	5V	0.5A
M2E_PWR/ M2M_PWR/ M2B_PWR	M2B1 & M2E1 & M2M1 Power	3.3V	2A

Chapter 3
Introducing BIOS

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

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

3-1   Entering Setup

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

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

3-2　BIOS Menu Screen

The following diagram show a general BIOS menu screen:

Menu Bar

Aptio Setup — AMI

Main Advanced Chipset Security Boot Save & Exit

BIOS Information	
BIOS Vendor	American Megatrends
Core Version	5.19
Filename	BAWF2A01
Build Date and Time	08/23/2022 14:31:37
Access Level	Administrator
ME FW Version	15.40.26.2619
System Language	[English]
System Date	[Thu 09/01/2022]
System Time	[10:02:19]

Set the Date. Use Tab to
switch between Date elements.
Default Ranges:
Year: 1998-9999
Months: 1-12
Days: Dependent on month
Range of Years may vary.

General Help Items

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

Current Setting Value

Function Keys

Menu Items

Version 2.21.1280 Copyright (C) 2022 AMI

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 - AMI
      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                5.19                    Default Ranges:
      Filename                    BAWF2A01                Year: 1998-9999
      Build Date and Time         08/23/2022 14:31:37     Months: 1-12
      Access Level                Administrator           Days: Dependent on month
                                                          Range of Years may vary.
      ME FW Version               15.40.26.2619

      System Language             [English]

      System Date                 [Thu 09/01/2022]
      System Time                 [10:02:19]              →←: Select Screen
                                                          ↑↓: Select Item
                                                          Enter: Select
                                                          +/-: Change Opt.
                                                          F1: General Help
                                                          F2: Previous Values
                                                          F3: Optimized Defaults
                                                          F4: Save & Exit
                                                          ESC: Exit


                              Version 2.21.1280 Copyright (C) 2022 AMI
```

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

```
                            Aptio Setup - AMI
     Main  Advanced  Chipset  Security  Boot  Save & Exit

   ▶ CPU Configuration                          CPU Configuration Parameters
   ▶ Intel(R) Time Coordinated Computing
   ▶ Trusted Computing
   ▶ ACPI Settings
   ▶ Super IO Configuration
   ▶ PC Health Status
   ▶ USB Configuration
   ▶ Network Stack Configuration
   ▶ NVMe Configuration
   ▶ Wake-up Function Settings
   ▶ PTT Configuration

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



                    Version 2.21.1280 Copyright (C) 2022 AMI
```

▸ **CPU Configuration**

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

Boot Performance Mode

Use this item to select the performance state that the BIOS will set starting from reset vector.

The optional settings: [Max Battery]; [Max Non-Turbo Performance]; [Turbo Performance]

Intel(R) SpeedStep(tm)

Use this item to allows more than two frequency ranges to be supported.

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

When set as [Enabled], user can make more settings for the following sub-items:

Turbo Mode

Use this item to enable/disable processor turbo mode (requires EMTTM enabled too). AUTO means enabled.

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

C states

Use this item to enable/disable CPU Power Management. Allows CPU to go to C states when it's not 100% utilized.

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

When set as [Enabled], user can make more settings for the following sub-items:

Enhanced C-states

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

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

Package C State Limit

Use this item to maximum package C State Limit Setting. CPU Default: Leaves to Factory default value.

Auto: Initializes to deepest available package C State Limit

The optional settings: [C0/C1]; [C2]; [C3]; [C6]; [C7]; [C7S]; [C8]; [C9]; [C10]; [Cpu Default]; [Auto]

Power Limit 1 Override

Use this item to enable/disable Power Limit 1 override. If this option is disabled, BIOS will program the default values for Power Limit 1 and Power Limit 1 Time Window.

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

When set as [Enabled], user can make more settings for the following sub-items:

Power Limit 1

Use this item to power Limit 1 in Milli watts. BIOS will round to the nearest 1/8W when

programming. 0=no custom override. 12.50W, enter 12500. Overclocking SKU: Value must be between Max and Min Power Limits (specified by PACKAGE_POWER_SKU_MSR). Other SKUs:This value must be between Min Power Limit and TDP Limit. If value is 0, BIOS will program TDP value.

Power Limit 1 Time Window

Use this item to power Limit 1 Time Window value in seconds. The value may vary from 0 to 128. 0=default value (28 sec for Mobile and 8 sec for desktop). Defines time Window which TDP value should be maintained.

The optional settings: [0]; [1]; [2]; [3] ; [4] ; [5] ; [6] ; [7] ; [8] ; [10] ; [12] ; [14] ; [16] ; [20] ; [24] ; [28] ; [32] ; [40] ; [48] ; [56] ; [64] ; [80] ; [96] ; [112] ; [128]

Power Limit 2 Override

Use this item to enabled/disable power Limit 2 override. If this option is disabled, BIOS will program the default values for Power Limit 2.

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

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

Power Limit 2

Use this item to power Limit 2 vallue in Milli watts. BIOS will round to the nearest 1/8W when programming. If the value is 0, BIOS will program this value as 1.25*TDP. For 12.50W, enter 12500. Processor applies control policies such that the package power does not exceed this limit.

▸ **Intel(R) Time Coordinated Computing**

Use this item to Intel(R) Time Coordinated Computing (Intel (R) TCC) options

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

In tel(R) TCC Mode

Use this item to enable or disable Intel(R) TCC mode. when enabled, this will modify system settings to improve real-time performance. The full list of settings and their current state are displayed below when Intel(R) TCC mode is enabled

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

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

Intel(R) TCC Authentication

Use this item to enabled/disable authentication of Intel(R) TCC configuration data.

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

When set **Intel(R) TCC Mode** as [Disabled], user can make further settings in the following items:

IO Fabric Low Latency

Use this item to enabled or disable IO Fabric Low Latency. This will turn off some power management in the PCH IO fabrics. This option provides the most aggressive IO Fabric performance setting. S3 state is NOT supported

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

GT CLOS

Use this item to enabled or disable Graphics Technology(GT) Class of Service. Enable will reduce Gfx LLC allocation to minimize impact of Gfx workload on LLC.

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

▸ **Trusted Computing**
Press [Enter] to enable or disable '**Security Device Support**'.
   TPM20 Device Found

   Security Device Support
   Use this item to enable or disable BIOS support for security device.
   The optional settings: [Disabled]; [Enabled].
   When set **Security Device Support** as [Enabled], user can make further settings in the following items:
   Active PCR Banks
   Available PCR Banks
   SHA-1 PCR Bank
   Use this item to enable or disable SHA-1 PCR Bank

The optional settings: [Disabled]; [Enabled].
SHA256 PCR Bank
Use this item to enable or disable SHA256 PCR Bank
SHA384 PCR Bank
Use this item to enable or disable SHA384 PCR Bank
Pending Operation
Use this item to schedule an operation for the security device.
NOTE: Your computer will reboot during restart in order to change state of security device.
The optional settings: [None]; [TPM Clear]

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

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

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

► **Serial Port 1 Configuration**
Press [Enter] to make settings for the following items:
Serial Port 1 Configuration

Serial Port
Use this item to enable or disable serial port (COM).
The optional settings are: [Disabled]; [Enabled].
When set as [Enabled], user can make further settings in the following items:
Device Settings
Change Settings

Use this item to select an optimal settings for Super IO Device.

The optional settings are: [Auto]; [IO=3F8h; IRQ=4]; [IO=2F8h; IRQ=3]; [IO=3E8h; IRQ=4]; [IO=2E8h; IRQ=3].

Transmission Mode Select

The optional settings are: [RS422]; [RS232(TX/RX Only)]; [RS485].

Mode Speed Select

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 1 Configuration

Serial Port

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

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

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

Device Settings

Change Settings

Use this item to select an optimal settings for Super IO Device.

The optional settings are: [Auto]; [IO=3F8h; IRQ=4]; [IO=2F8h; IRQ=3]; [IO=3E8h; IRQ=4]; [IO=2E8h; IRQ=3].

Transmission Mode Select

The optional settings are: [RS422]; [RS232(TX/RX Only)]; [RS485].

Mode Speed Select

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

ERP Support

Use this item to energy-related products function.

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

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

Case Open Detect

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

The optional settings: [Disabled]; [Enabled].
When set as [Enabled], system will detect if COPEN has been short or not (*refer to JPCLR1 jumper setting for Case Open Detection*); if Pin 7&8 of *JPCLR1* are short, system will show Case Open Message during POST

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

WatchDog Reset Timer Value
User can set a value in the range of [10] to [255].

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

WatchDog Wake-up Timer
This item support WDT wake-up.
The optional settings are: [Enabled]; [Disabled].
When set as [Enabled], the following sub-items shall appear:

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

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

ATX Power Emulate AT Power
This item support Emulate AT power function, MB power On/Off control by power supply. Use needs to select 'AT or ATX Mode' on MB jumper at first (refer to AT_MODE jumper setting Pin 1&2 of for ATX Mode & Pin 2&3 of AT Mode Select).

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

'**SmartFAN Configuration**'.

▶ **SmartFAN Configuration**

Press [Enter] to make settings for SmartFan Configuration:

***SmartFAN Configuration**_

CPUFAN Smart Mode

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

When set as [Enabled], 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 this pre-set temperature.

CPUFAN Full-Speed Duty

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

CPUFAN Idle-Speed Temperature

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

CPUFAN Idle-Speed Duty

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

▸ **USB Configuration**

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

***USB Configuration**_

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

Use this item to enable/disable 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.
‣ **Network Stack Configuration**
Press [Enter] to go to '**Network Stack**' screen to make further settings.
Network Stack
The optional settings are: [Enabled]; [Disabled].
When set as [Enabled], the following sub-items shall appear:
Ipv4 PXE Support
The optional settings are: [Disabled]; [Enabled].
Use this item to enable Ipv4 PXE Boot Support. When set as [Disabled], Ipv4 boot option will not be created.
Ipv6 PXE Support
The optional settings are: [Disabled]; [Enabled].
Use this item to enable Ipv6 PXE Boot Support. When set as [Disabled], Ipv6 boot option will not be created.
PXE Boot Wait Time
Use this item to set wait time to press [ESC] key to abort the PXE boot.

Use either +/- or numeric keys to set the value

Media Detect Count

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

Use either +/- or numeric keys to set the value

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

► **NVMe Configuration**

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

► **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 Hour

Use this item to 0-23. For example, 3 for 3am and 15 for 3pm

Wake-up Minute

Use this item to 0-59

Wake-up Second

Use this item to 0-59

When set **Wake-up System with Fixed Time** as [Enabled], user can make further settings in the following items:

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).

Wake-up Time Increase

Use this item to 1 to 60 minute(s)

USB Power Gating S4- S5

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

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

*****Note**: This function is supported when '**ERP Support**' is set as [Disabled].*

PCIE Wake-up from S3-S5

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

► **PTT Configuration**
TPM Device Selection

Use this item to selects TPM device: PTT or dTPM. PTT-Enables PTT IN SkuMgr dTPM – Disables PTT in SkuMgr

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

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

3-8 Chipset Menu

```
                          Aptio Setup - AMI
     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                     │
 │                                            │                               │
 │                                            │                               │
 └──────────────────────────────────────────┴───────────────────────────────┘
                  Version 2.21.1280 Copyright (C) 2022 AMI
```
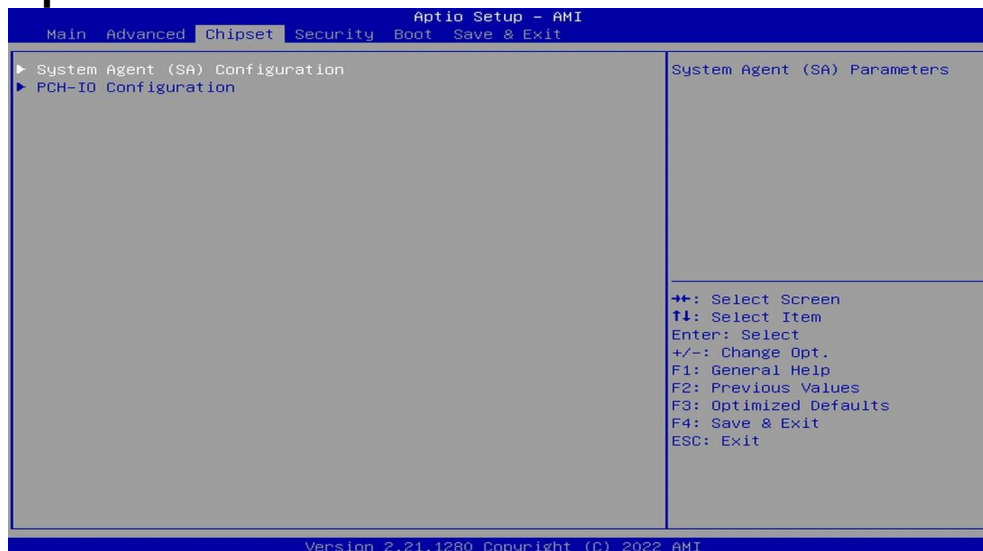
‣ **System Agent(SA) Configuration**

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

GTT Size

Use this item to select the GTT Size.

The optional settings: [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: [0M]; [4M]; [8M]; [12M]; [16M]; [20M]; [24M]; [28M]; [32M]; [36M]; [40M]; [44M]; [48M]; [52M]; [56M] ; [60M] ; [64M] ; [96M] ; [128M] ; [160M]

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: [128M]; [256M]; [MAX].

Total Memory

▶ **PCH-IO Configuration**
Press [Enter] to make further settings in south bridge parameters.

▶ **PCI Express Configuration**

Press [Enter] to make further settings in south bridge parameters.

Peer Memory Write Enable
The optional settings: [Enabled]; [Disabled].

▶ **SATA Configuration**
Press [Enter] to make settings for the following sub-items:
SATA Controller
Use this item to enable/disable SATA Device
When set as [Enabled], the following sub-items shall appear:
SATA Mode Selection
Use this item to determines how SATA controller(s) operate.
The optional settings: [AHCI]
M.2 B1
M.2 B1
The optional settings: [Enabled]; [Disabled].
M.2 M1
M.2 M1
The optional settings: [Enabled]; [Disabled].
HD-Audio Support
The optional settings: [Enabled]; [Disabled].
SCS eMMC Support
The optional settings: [Enabled]; [Disabled].
System State after Power Failure
Use this item to specify what state to go to when power is re-applied after a power failure
The optional settings: [Always On]; [Always Onff]; [Former State]
PinCntrl Driver GPIO Scheme
Use this item to enable/disable PinCntrl Driver GPIO Scheme

The optional settings: [Enabled]; [Disabled]

3-9 Security Menu

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



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```

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

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

administrator password.

User Password

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

▸ **Secure Boot**

Press [Enter] to make customized secure settings:

Secure Boot Control

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

Secure Boot can be enabled if 1. System running in user mode with enrolled Platform Key (PK); 2. CSM function is disabled.

Secure Boot Mode

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

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

When set as [Custom], user can make further settings in 'Key Management'.

▸ **Restore Factory Keys**

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

▸ **Reset To Setup Mode**

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

▸ **Key Management**

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

Provision Factory Default Keys

This item is for user to install factory default secure boot keys when system is in Setup Mode.

▸ **Enroll all Factory Default Keys**

This item forces system to User Mode-install all Factory Default keys.

▸ **Save all Secure Boot Variables**

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

▸ **Platform Key (PK)/Key Exchange Keys/Authorized Signature/Forbidden Signature/ Authorized TimeStamps/OS Recovery Signatures**
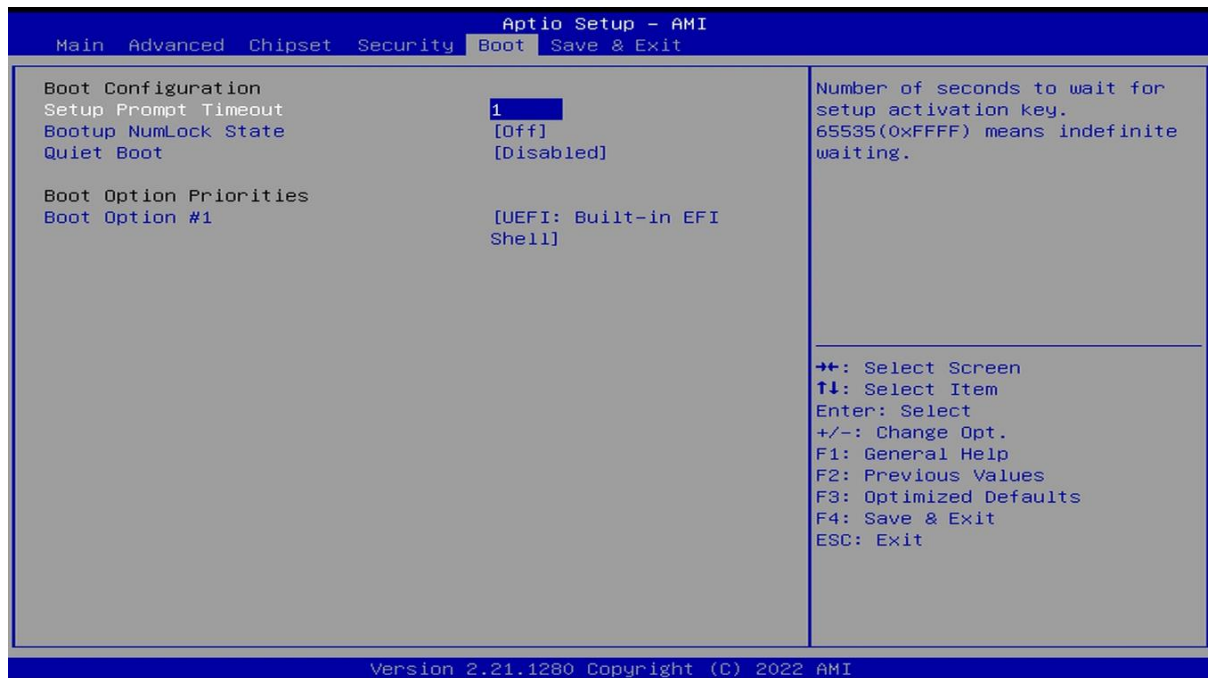
Use this item to enroll Factory Defaults or load the keys from a file with:

1. Public Key Certificate in:
  a) EFI_SIGNATURE_LIST
  b) EFI_ CERT_X509 (DER encoded)
  c) EFI_ CERT_RSA2048 (bin)
  d) EFI_ CERT_SHA256 (bin)
2. Authenticated UEFI Variable

3-10 Boot Menu

```
                          Aptio Setup - AMI
   Main  Advanced  Chipset  Security  Boot  Save & Exit

   Boot Configuration                               Number of seconds to wait for
   Setup Prompt Timeout            1                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]



                                                    →←: 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.

Bootup Numlock State

Use this item to select keyboard numlock state.

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

Quiet Boot

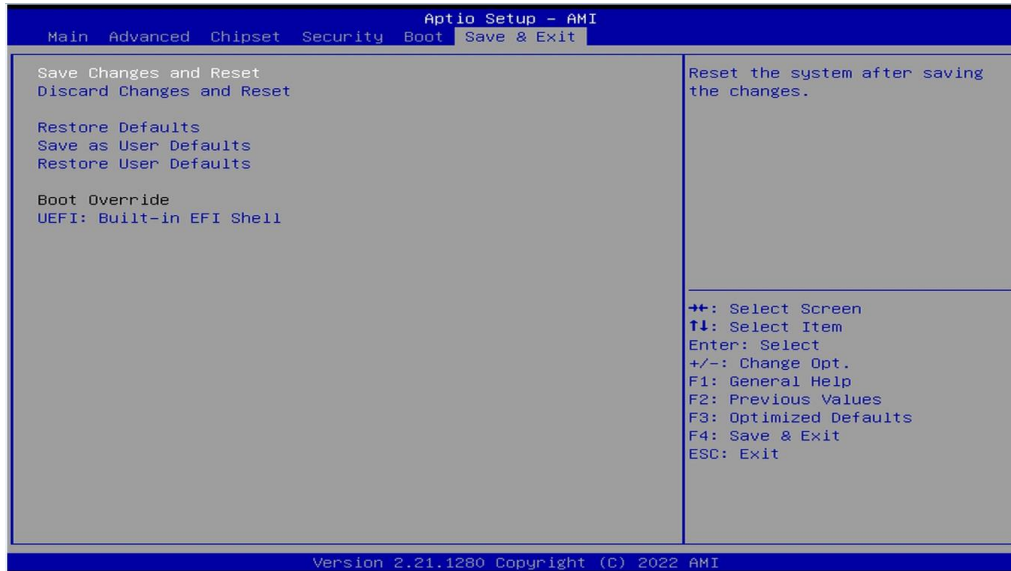The optional settings: [Disabled]; [Enabled].

Boot Option Priorities

Boot Option #1

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

The optional settings: [UEFI: Bulit-in EFI Shell]; [Disabled].

3-11 Save & Exit Menu

```
                        Aptio Setup - AMI
   Main  Advanced  Chipset  Security  Boot  Save & Exit

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

 Restore Defaults
 Save as User Defaults
 Restore User Defaults

 Boot Override
 UEFI: Built-in EFI Shell

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

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```

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

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

Boot Override
UEFI:Built-in EFI Shell
Press this item to select the device as boot disk after save configuration and reset.