Technical Manual

Of

Intel Elkhart Lake Series CPU

Based IPC M/B

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

⚠ CAUTION Environmental Safety Instruction

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

- 0 to 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 SoC Processor, with low power consumption never denies high performance

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

- Support onboard optional 32GB / 64GB eMMC (by order)

- Support 4* i225V 2.5GbE LAN port & 1* RS232 RJ-45 type COM port

- Support 1* HDMI port, 1* USB 2.0, 1* USB3.1(Gen.2)

- Onboard 1* SIM card slot

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

- Onboard 1* M.2 B-key (3042/3052, USB3.1 interface) co-layout 1* M.2 M-key (2242, PCIe Gen.3 x2/SATA interface) support NVME

- Support Intel AES NI Function

- Onboard TPM 2.0 (by order)

- Compliance with ErP standard

- Support Watchdog function

- Solution for Firewall & IoT

1-2　Specification

Spec	Description
Design	● Non-standard form factor; PCB size: 114.6 mm x 103.6 mm
Embedded CPU	● Intel® Elkhart Lake SoC CPU *CPU model varies from different IPC options. Please consult your dealer for more information of onboard CPU.*
Memory Slot	● 1* DDR4 SO-DIMM slot ● Support 1* DDR4 3200MHz SO-DIMM up to 32GB
Expansion Slot	● 1* M.2 E-key (2230, PCIe Gen.3 x1/USB2.0 interface) ● 1* M.2 B-key (3042/3052, USB3.1 interface) co-layout M.2 M-key ● 1* SIM card slot *(along with M.2 B-key)*
Storage	● 1* M.2 M-key (2242, PCIe Gen.3 x2/SATA interface) support NVME (co-layout M.2 B-key) ● Onboard optional 32GB / 64GB eMMC (*by order*) ● *Note: Onboard eMMC capacity depends on the actual model purchased as technical specifications may update, without prior notice.*
LAN Chip	● Integrated with 4* Intel i225V PCI-E 2.5Gigabit LAN chips ● Support Fast Ethernet LAN function of providing 10/100/1000/2500Mbps Ethernet data transfer rate * *Note: 2500Mbps high-speed transmission rate is only supported over CAT 5e UTP cable.*
BIOS	● AMI Flash ROM
Front Panel I/O	● 1* HDMI port ● 1* USB 2.0 Port, 1* USB3.1(Gen.2) Port ● 1* power button & 1* reset knob
Rear Panel I/O	● 1* 12V DC-in power jack ● 4* 2.5GbE RJ-45 LAN ports ● 1* RS232 RJ-45 Type COM port for console (**RJ45_COM1**)
Internal I/O	● 1* 2-pin internal 12V DC-in power connector ● 1* GPIO header ● 1* SMBUS header

* Note: Many PCs now include XHCI USB controllers which can support USB 2.0, USB 3.1(Gen.2) and

higher USB speeds. The platform within the XHCI controllers has reduced the need for EHCI USB controllers. However, legacy operating systems (OS) may not natively recognize XHCI controllers. You might need to install a non-XHCI OS on Intel platforms which do not include EHCI controllers while you pre-install XHCI driver. Please contact your representative for more details.

1-3   Layout Diagram

Front IO Panel Diagram:
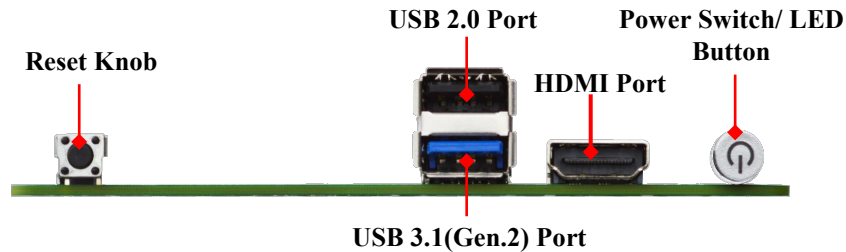
Rear IO Panel Diagram:
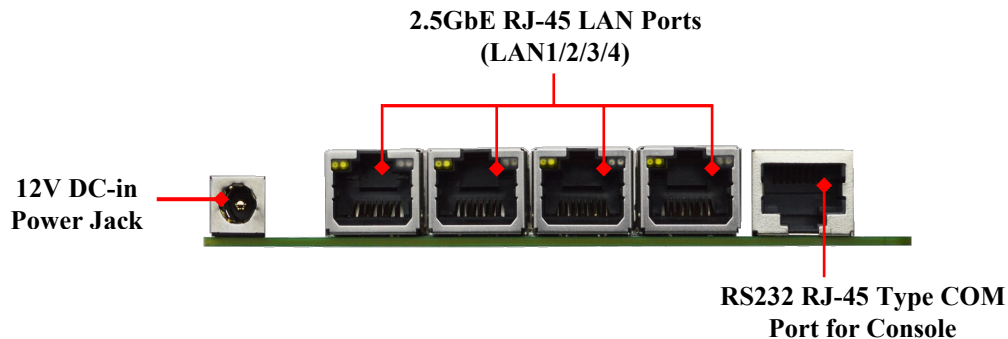
Internal Diagram-Front Side:

M2E_PWR

M2BM_PWR

M.2 E-Key Slot (M2E1)

GPIO Port Header

Internal 12V DC-In Power Connector

12V DC-in Power Jack

Power Switch/LED Button

M.2 B-Key Slot

(M2BM1)

HDMI Port

2.5GbE RJ-45 LAN Ports (LAN1/2/3/4)

*SIM Card Socket

USB 2.0 Port Over USB 3.1(Gen.2) Port

JPCAS_80P

*DDR4 SODIMM Slot

RS232 RJ-45 Type COM Port

Reset Knob

JPCOM1

BATCON

JBAT

AT_MODE

SMBUS Header
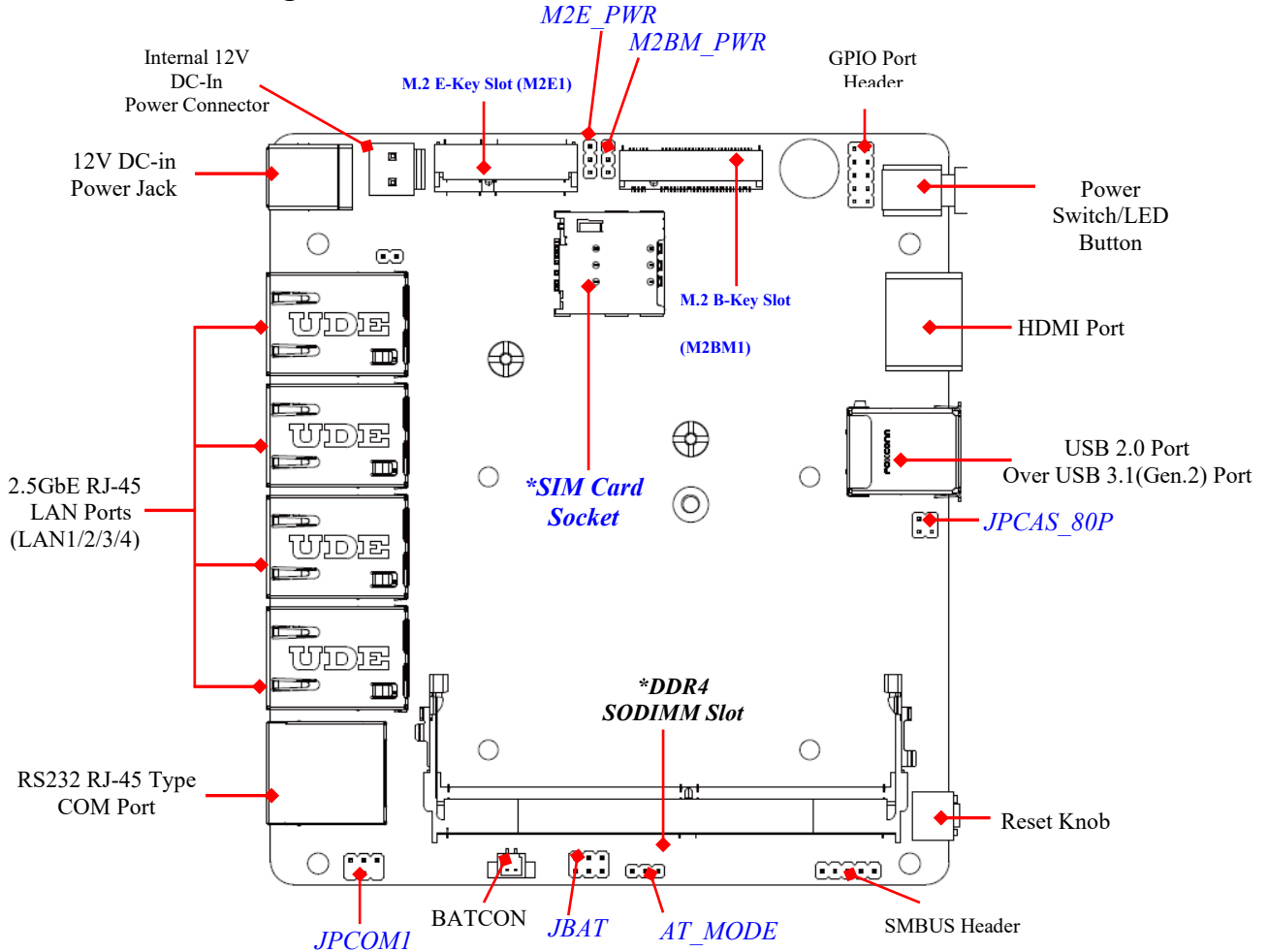
*Note: 1. DDR4 3200MHz SO-DIMM, maximum capacity up to 32GB.
2. SIM card slot only work when compatible SIM card installed & 3G LAN card installed in full-size along with M.2 B-key slot.

Connectors

Connector	Name
DCIN1	12V DC–in System Power Jack
LAN1/2/3/4	2.5Gbps RJ-45 LAN Port Connector x4
RJ45_COM1	RS232 RJ-45 Type COM Port Connector for Console
HDMI	HDMI Port Connector
USB31	**Top:** USB 2.0 Port Connector **Bottom:** USB 3.1(Gen.2) Port Connector
DCIN2	Internal 12V DC–in System Power Connector
SIMCARD1	SIM Card Socket

Headers

Header	Name	Description	Pitch
GPIO	GPIO Header	10-pin Block	2.0mm
SMBUS	SMBUS Header	5-pin Block	2.0mm

Jumpers

Jumper	Name	Description	Pitch
JPCOM1	RJ45_COM1 Port Pin5 VCC Select	4-Pin Block	2.0mm
JBAT	PIN (1-2) = Clear RTC PIN (3-4) = Clear CMOS PIN (5-6) = ME Disable	6-Pin Block	2.0mm
AT_MODE	ATX Mode/AT Mode Select	3-Pin Block	2.0mm
JPCAS_80P	PIN (1-2): Set CASE OPEN PIN (3-4): 80 PORT	4-Pin Block	2.0mm
M2BM_PWR	M2BM1 Power Select	3-Pin Block	2.0mm
M2E_PWR	M2E1 Power Select	3-Pin Block	2.0mm

Chapter 2
Hardware Installation
2-1 Jumper Setting

JPCOM1 (4-pin): RJ45_COM1 Port Pin5 VCC Select   Pitch=2.0mm
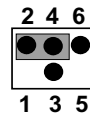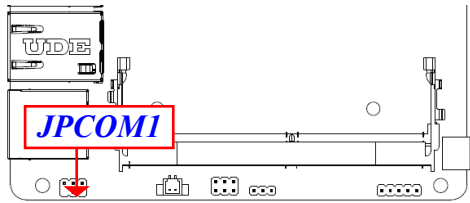
2-4 Closed:
Pin5=None;
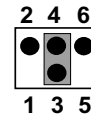
3-4 Closed:
Pin5 = +5V;
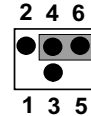
4-6 Closed:
Pin5 = +12V.

Note: Please make sure you set Pin (2-4) of Jumper JPCOM1 1 as closed from begining or you will cause the short circuit with the gerneral Console cable to RJ45-COM1 port (refer to page-11).

PIN (1-2) of JBAT (6-pin): Clear RTC   Pitch=2.0mm

2
Pin 1 →

1-2 Open: Normal (Default);

2
Pin 1 →
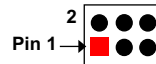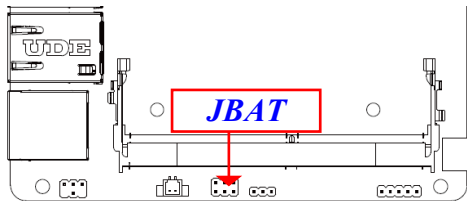
1-2 Closed:Clear RTC.

PIN (3-4) of JBAT (6-pin): Clear CMOS   *Pitch=2.0mm*
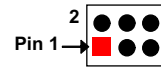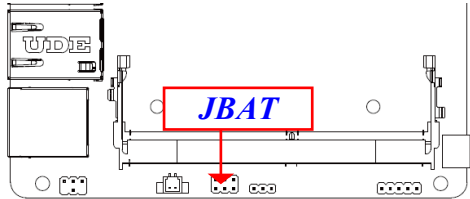
3-4 Open: Normal (Default);
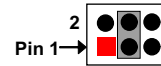
3-4 Closed: Clear CMOS.

PIN (5-6) of JBAT (6-pin): ME DISABLE   *Pitch=2.0mm*
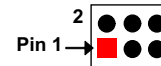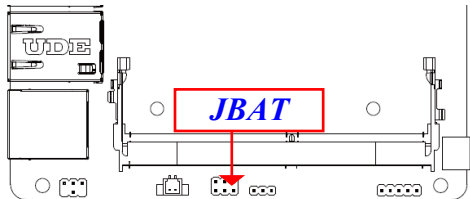
5-6 Open: Normal (Default);
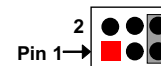
5-6 Closed: ME DISABLE.

AT_MODE (3-pin): ATX Mode/AT Mode Select   *Pitch=2.0mm*
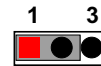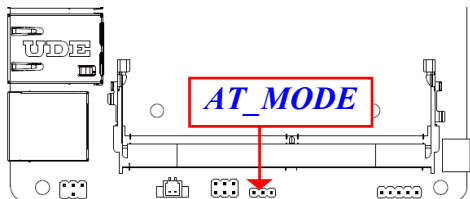
1-2 Closed:ATX Mode Selected
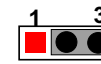
2-3 Closed:AT Mode Selected

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

PIN (1-2) of JPCAS_80P (4-pin): Set CASE OPEN   *Pitch=2.0mm*
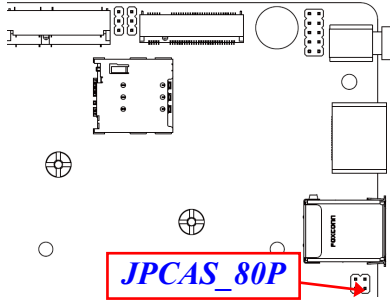
1-2 Open: Normal(Default);

1-2 SHORT:CASE OPEN

PIN (3-4) of JPCAS_80P (4-pin): Set 80 PORT   *Pitch=2.0mm*
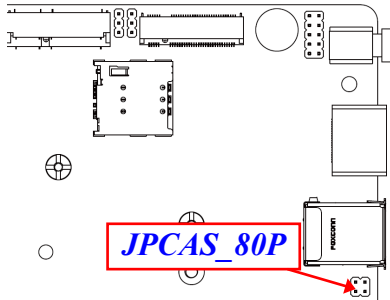
3-4 Open: GPIO;

3-4 SHORT:80 PORT

M2BM_PWR (3-pin): M2BM1 Power Select   *Pitch=2.0mm*
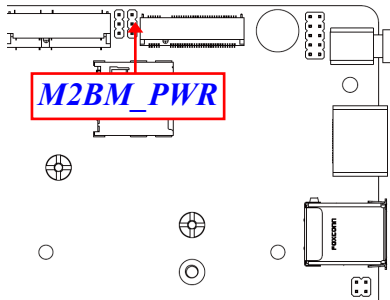
1-2 Closed: VCC=VCC3

2-3 Closed: VCC=3VSB

M2E_PWR (3-pin): M2E1 Power Select   *Pitch=2.0mm*

M2E_PWR

1
3

1-2 Closed: VCC=VCC3

1
3

2-3 Closed: VCC=3VSB

2-2   Connectors and Headers

2-2-1 Connectors

(1) External I/O:

Refer to Page-3.

Icon	Name	Function
	Power Connector	12V DC–in system power connector. For user to connect compatible power adapter to provide power supply for the system.
	2.5GbE RJ-45 LAN Port	This connector is standard 2.5Gbps RJ-45 LAN jack for Network connection. (*Note:2.5Gbps* is *only* supported with **CAT 5e UTP cable**)
	RJ-45 Type COM Port	This connector is a RS232 RJ-45 Type COM port for console function.
	HDMI Port	To connect display device that support HDMI specification.

	USB 2.0 Port	To connect USB keyboard, mouse or other devices compatible with USB specification.
	USB 3.1(Gen.2) Port	To connect USB keyboard, mouse or other devices compatible with USB 3.1(Gen.2) specification. Ports support up to 10Gbps data transfer rate.
	Power Button/LED	For user to power on/off the system, also function as power status LED.
	Reset knob	For user to reset the system.

(2) RJ-45 Ethernet Connector

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

**2.5GbE RJ-45 LAN Ports
(LAN1/2/3/4)**
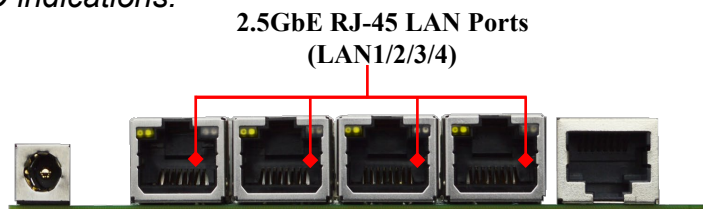
For 2.5Gbps RJ-45 LAN port:

Activity/Link   *Speed*
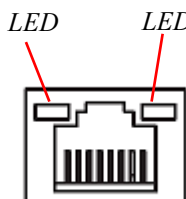
LED   *LED*

Activity/Link LED

Status	Description
Off	No Link
Blinking	Data Activity
On	Link

Speed LED

Status	Description
Off	10/100Mbps connection
Orange	1000Mbps connection
Green	2.5Gbps connection

** **Note:** **2.5Gbps** high-speed transmission rate is **only** supported over **CAT 5e UTP cable**.*

(3) RJ45_COM1 (8-pin block): RS232 RJ-45 Type COM Port Connector for Console

RJ45_COM1

Pin8 →
Pin1 →
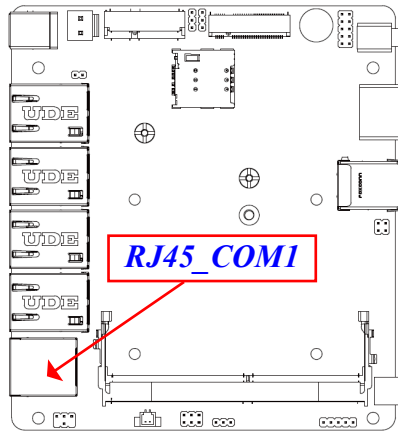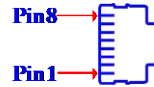
Pin No.	Definition
1	RTS
2	DTR
3	TXD
4	GND
5	GND/+5V/+12V
6	RXD
7	DSR
8	CTS

*Note: Please set **Pin (2-4)** of Jumper **JPCOM1** as closed, when apply Console cable to RJ45-COM1 port (refer to page-6).*

(4) DCIN2 (2-pin): Internal 12V DC-in power connector
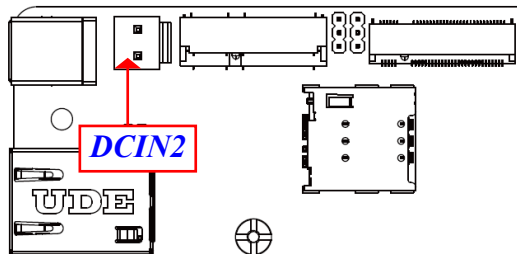
Pin1 →

Pin No.	Definition
1	+12V 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!!**

(5) DCIN2 (2-pin): Internal 12V DC-in power connector
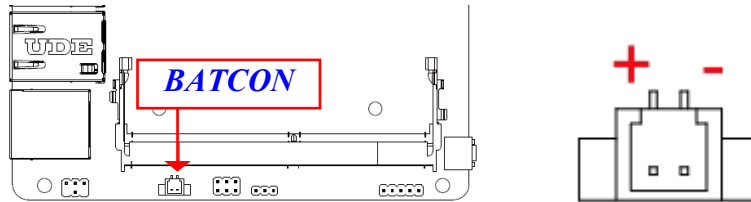
2-2-2 Headers

GPIO (10-pin): GPIO Port Header *Pitch=2.0mm*
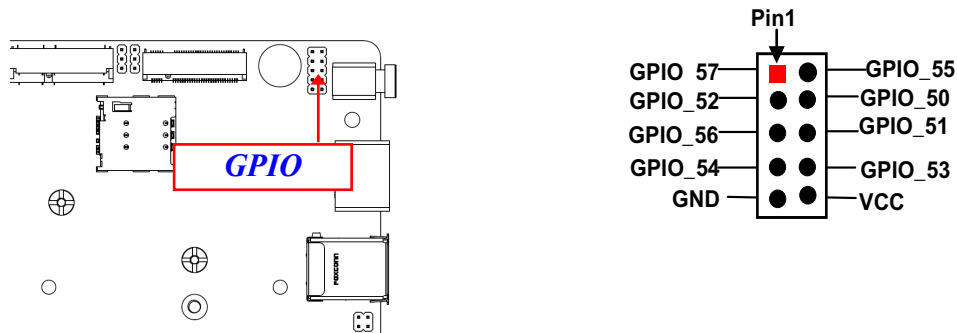
Note: Please refer to Page-8 JPCAS_80P jumper setting for GPIO header GPIO Port or 80 Port function select:

- **Pin 3&4 of JPCAS_80P Open:** *For Normal 8-bit GPIO Function;*
- **Pin 3&4 of JPCAS_80P Closed:** *For 80Port Function*

SMBUS (5-Pin): SMBUS Header *Pitch=2.0mm*
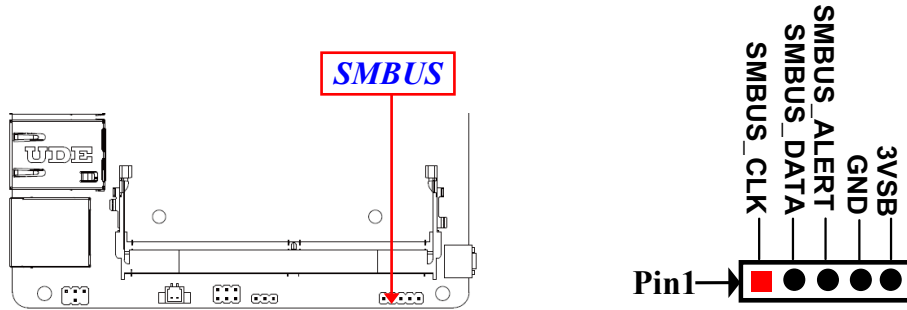
2-2-3 Maximum Voltage & Current Limit

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
USB31	USB2.0/USB3.1(Gen.2)	5V	1.5A
GPIO	GPIO/80 Port	5V	1.5A
SMBUS	SMBUS	5V	0.3A
JPCOM1	RJ45_COM1	5V or 12V	0.5A
M2BM_PWR	M2BM1 Power	2V	3.3A
M2E_PWR	M2E1 Power	2V	3.3A

Chapter 3
Introducing BIOS

Notice!	The BIOS options in this manual are for reference only. Due to constant update/upgrade, the BIOS screens in the manual (usually first version) may be different from the actual available version. Users are welcome to download the latest BIOS version form our official website.

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

3-1   Entering Setup

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

Press   **<Del>** to enter Setup.

3-2 BIOS Menu Screen

The following diagram show a general BIOS menu screen:

Menu Bar

```
                              Aptio Setup - AM
 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               BAWZSA01                      Year: 1998-9999
 Build Date and Time    06/20/2022 18:07:11          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 06/30/2022]
 System Time            [20:29:39]                   →←: 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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```

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 - 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                      BAWZSA01                   Year: 1998-9999
   Build Date and Time           06/20/2022 18:07:11        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 06/30/2022]
   System Time                   [20:29:39]                →←: Select Screen
                                                           ↑↓: Select Item
                                                           Enter: Select
                                                           +/-: Change Opt.
                                                           F1: General Help
                                                           F2: Previous Values
                                                           F3: Optimized Defaults
                                                           F4: Save & Exit
                                                           ESC: Exit




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```

System 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 – 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                   │                         │
│ ► Serial Port Console Redirection          │                         │
│ ► 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 further settings in the following items:

Turbo Mode

Use this item to enabled/disable processor Turbo Mode (requires EMTTM) enabled too) AUTO means enabled

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

C states

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

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

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

Enhanced C-states

Use this item to enabled/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 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 enabled/disable power Limit 1 override. If this option is disabled, BIOS will program the default values for power Limit 1 time Window.

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

When set as [Enabled], user can make further settings in the following 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 Intek(R) Time Coordinated Computing (Intel(R) TCC) options

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

Intel(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. O.S. will not show Security Device. TCG EFI protocol and INT1A interface will not be available. The optional settings: [Disabled]; [Enabled].

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

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.

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

SHA384 PCR Bank

Use this item to enable or disable SHA384 PCR Bank.

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

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-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 IO 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: [Disabled]; [Enabled].

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

Change Settings

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

may conflict with system resources.

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

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

Case Open Detect
Use this item to detect if case have ever been opened. 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 JPCAS_80P jumper setting for Case Open Detection*); if Pin 1-2 is short, system will show Case Open Message during POST.

WatchDog Reset Timer
Use this item to enable or disable WatchDog Timer 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] when '**WatchDog Reset Timer Unit**' is set as [Sec.], or [1] to [255] when '**WatchDog Reset Timer Unit**' is set as [Min.].

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 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).

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

▶ **Console Redirection Settings**
The settings specify how the host computer and the remote computer (which the user is using) will exchange data. Both computers should have the same or compatible settings.
Press [Enter] to make settings for the following items:
COM1
Console Redirection Settings
Terminal Type
The optional settings: [VT100]; [VT100+]; [VT-UTF8]; [ANSI].
Emulation: [ANSI]: Extended ASCII char set; [VT100]: ASCII char set; [VT100+]: Extends VT100 to support color, function keys, etc.; [VT-UTF8]: Uses UTF8 encoding to map Unicode chars onto 1 or more bytes.

Bits per second
Use this item to select serial port transmission speed. The speed must be matched on the other side. Long or noisy lines may require lower speeds.
The optional settings: [9600]; [19200]; [38400]; [57600]; [115200].

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

Parity
A parity bit can be sent with the data bits to detect some transmission errors.
The optional settings: [None]; [Even]; [Odd]; [Mark]; [Space].
[Even]: parity bit is 0 if the num of 1's in the data bits is even; [Odd]: parity bit is 0 if num of 1's in the data bits is odd; [Mark]: parity bit is always 1; [Space]: Parity bit is always 0; [Mark] and [Space] Parity do not allow for error detection.

Stop Bits
Stop bits indicate the end of a serial data packet. (A start bit indicates the beginning). The standard setting is 1 stop bit. Communication with slow devices may require more than 1 stop bit.
The optional settings: [1]; [2].

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

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

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

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

Putty KeyPad
Use this item to select Function Key and Key Pad on Putty.
The optional settings: [VT100]; [LINUX]; [XTERMR6]; [SCO]; [ESCN]; [VT400].

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

Console Redirection EMS
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.
The optional settings: [Disabled]; [Enabled].
When set as [Enabled], user can make further settings in 'Console Redirection Settings':

‣ **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 sub-items.
Out-of-Band Mgmt Port
Microsoft Windows Emergency Management Services (EMS) allows for remote management of a Windows Server OS through a serial port.
The default setting is: [COM1].
Terminal Type EMS
The optional settings: [VT100]; [VT100+]; [VT-UTF8]; [ANSI].
[VT-UTF8] is the preferred terminal type for out-of-band management. The next best choice is [VT100+] and them [VT100]. See above, in Console Redirection Settings page, for more help with Terminal Type/Emulation.
Bits per second EMS
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 EMS
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

▸ **USB Configuration**
Press [Enter] to make settings for the following sub-items:
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: [Disabled]; [Enabled]
USB Mass Storage Driver Support
Use this item to enable/disable USB Mass storage Driver Support
The optional settings: [Disabled]; [Enabled]
USB Hardware Delays and Time-outs
USB Transfer Time-out
The time-out value for Control bulk and interrupt transfers
The optional settings: [1 sec]; [5 sec] ; [10 sec] ; [20 sec]
Device Reset Time-out
Use this item to USB mass storage device start unit command time-out
The optional settings: [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.

When set as [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 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 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 number of times presence of media will be checked.

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

► **NVMe Configuration**

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

__Note__: options only when NVME device is available.

▸ **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: [Disabled]; [Enabled].

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

Wake-up Hour

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

Wake-up Minute

Use this item to select 0-59.

Wake-up Second

Use this item to select 0-59.

Wake-up System with Dynamic Time

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

System will wake on the current time + Increase minute(s).

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, Pleaxe disable ERP before activating this function in S4.

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

PCIe Wake-up from S3-S5

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

► **PTT Configuration**

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

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



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```
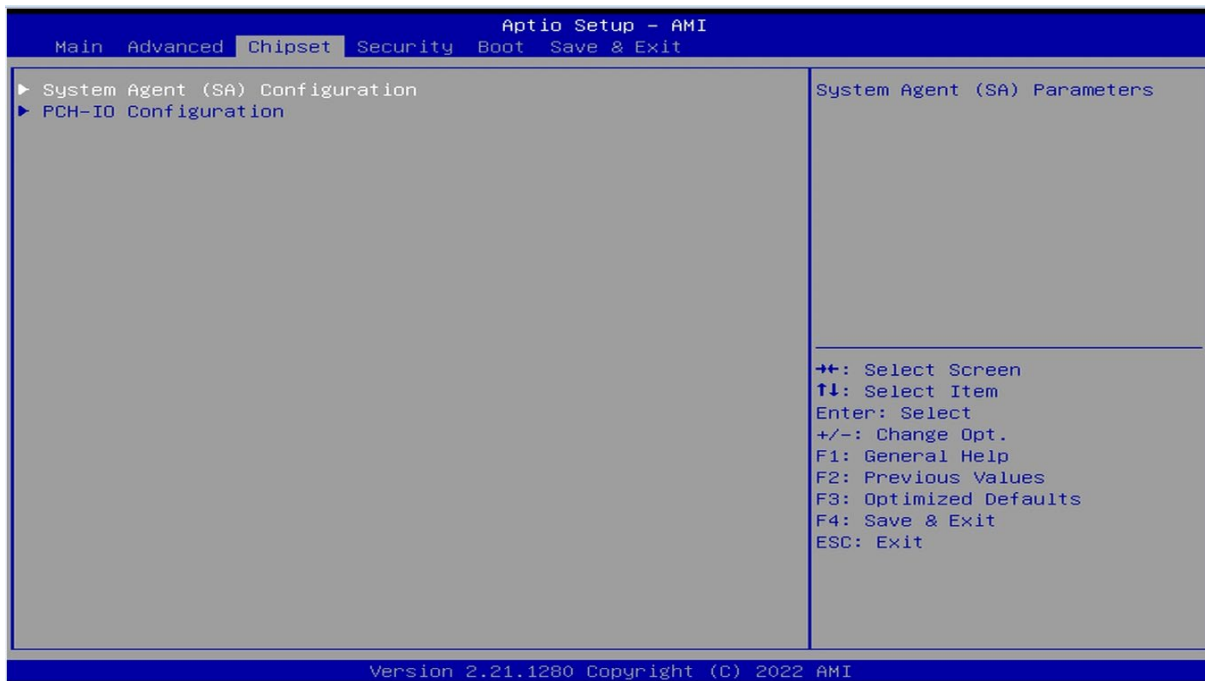
▶ **System Agent (SA) Configuration**
   Press [Enter] to make settings for the following sub-items:
   System Agent (SA) Configuration
   GTT Size
   Use this item to select the GTT Size.

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 Graphic Memory size used by the Internal Graphics Device.
The optional settings: [128M]; [256M]; [MAX].
Total Memory

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

    ▸ **PCI Express Configuration**
Peer Memory Write Enable
Use this item to enable or disable peer memory write.
The optional settings: [Disabled]; [Enabled].
M2B Function Select
The optional settings: [PCIex1/PCIex1]; [PCIex1/USB3.0]; [SATA/USB3.0].

    ▸ **SATA Configuration**
SATA Controller
Use this item to enable or disable SATA device.
The optional settings: [Disabled]; [Enabled].
When set as **[Enabled]**, the following sub-items shall appear:
SATA Mode Selection
This item determines how SATA controller(s) operate.
The optional settings: [AHCI].
M.2
M.2

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

HD-Audio Support
The optional settings: [Disabled]; [Enabled].
SCS eMMC Support
The optional settings: [Disabled]; [Enabled].
HD-Audio Support
The optional settings: [Disabled]; [Enabled].
SCS eMMC Support
The optional settings: [Disabled]; [Enabled].
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 Off]; [Former State].
PinCntrl Driver GPIO Scheme
Use this item to enable/disable PinCntrl Driver GPIO Scheme
The optional settings: [Disabled]; [Enabled].

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

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


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```

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

Administrator Password

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

User Password

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

‣ **Secure Boot**

Press [Enter] to make customized secure settings:

System Mode

Secure Boot

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

Secure Boot Mode

Set UEFI Secure Boot Mode to Standard mode or Custom mode. This change is effective after save. After reset, this mode will return to Standard mode.
In Custom mode, Secure Boot Policy variables can be configured by a physically present user without full authentication.
The optional settings: [Standard]; [Custom].
When set as [**Custom**], user can make further settings in the following items that show up:

▸ **Restore Factory Keys**

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

▸ **Reset To Setup Mode**

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

▸ **Key Management**

This item enables expert users to modify Secure Boot Policy variables without full authentication, which includes the following items:
Vendor Keys

Factory Key Provision

This item is for user to install factory default Secure Boot keys after the platform reset and while the System is in Setup mode.
The optional settings: [Disabled]; [Enabled].

▸ **Restore Factory Keys**

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

key databases.

▶ **Reset To Setup Mode**

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

▶ **Export Secure Boot variables**

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

▶ **Enroll Efi Image**

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

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

Device Guard Ready

▶ **Remove 'UEFI CA' from DB**

▶ **Restore DB defaults**

Use this item to restore DB variable to factory defaults.

Secure Boot variable/Size/Keys/Key Source

▶ **Platform Key(PK)/Key Exchange Keys/Authorized Signatures/Forbidden Signatures/ Authorized TimeStamps/OsRecovery Signatures**

Use this item to enroll Factory Defaults or load certificates from a file:

1. Public Key Certificate:
  a) EFI_SIGNATURE_LIST
  b) EFI_ CERT_X509 (DER)
  c) EFI_ CERT_RSA2048 (bin)
  d) EFI_ CERT_SHAXXX
2. Authenticated UEFI Variable
3. EFI PE/COFF Image (SHA256)
Key Source: Factory, External, Mixed

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 are: [On]; [Off].
Quiet Boot
The optional settings are: [Disabled]; [Enabled].
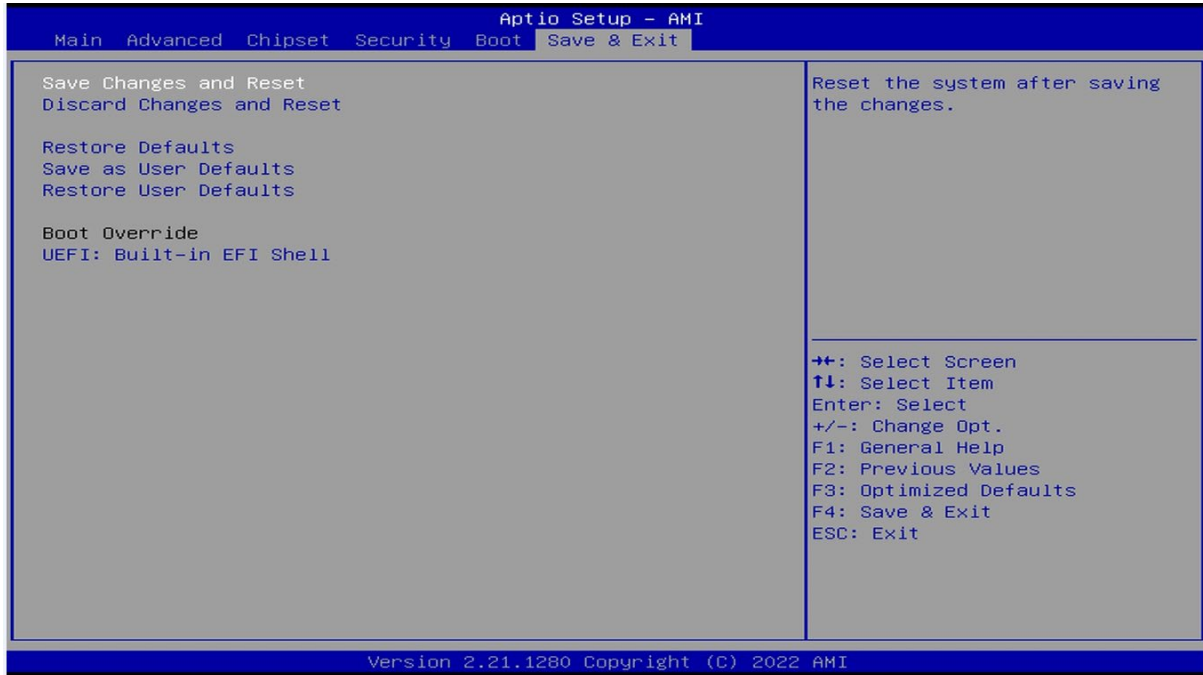*Boot Option Priorities*

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

```
                             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

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

Launch EFI Shell from filesystem device
This item is used for attempts to launch EFI shell application from one of the available file system devices.