MU03 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

⚠️ 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 series SoC processor, with low power consumption never denies high performance

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

- Onboard 2* i225V 2.5GbE LAN port

- Support 2* HDMI, 1* DP

- Onboard 1* M.2 M-key slot, type-2260/2280 interface supports NVME

- Onboard 1* M.2 E-key slot,type-2230 interface

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

- Onboard TPM 2.0 (by order)

- Support 1* SATAIII device

- Support 2* USB 3.1(Gen.2) type-A ports, 2* USB 3.1(Gen.2) type-C ports, 3* USB 2.0 Ports

- Support 1* RS232/RS422/RS485 COM Port

- Support CPU Smart FAN

- Compliance with ErP standard

- Support Watchdog function

- Solution for Digital Signage/Cloud Applications/IoT /Industrial Automation

1-2 Specification

Spec	Description
Design	● NUC form factor; PCB size: 10.1 cm x 10.1 cm
Embedded CPU	● Integrated with Intel® Elkhart Lake series CPU (TDP 10W) *Note: CPU model varies from different IPC options. Please consult your dealer for more information of onboard CPU.TDP varies depending on CPU.*
Memory Slot	● 1* DDR4 SO-DIMM slot support 1* DDR4 3200MHz SDRAM up to 32GB *Note: Memory clock supporting range is decided by specific CPU of the model. For more memory compatibility information please consults your local dealer.*
Expansion Slot	● *M2E1:*1* M.2 E-key (2230, PCIe Gen.3 x1/USB2.0 interface)
Storage	● *SATA1:*1* SATAIII 6Gb/s port ● *M2M1:* 1* M.2 M-key (2260/2280, PCIe Gen.3 x2/SATA interface) support NVME ● 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 2* Intel i225V 2.5Gigabit LAN chip ● 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*
Audio Chip	● Realtek HD audio chip
BIOS	● AMI Flash ROM
Rear I/O	● 1* 12V DC-in power Jack ● 2* HDMI ports ● 1* Display Port ● 2* 2.5Gbps RJ-45 LAN ports ● 1* USB 3.1(Gen.2) port
Front I/O	● 2* USB 3.1 (Gen.2) type-C port supporting USB only ● 1* USB 3.1 (Gen.2) port ● 1* USB 2.0 port

	● 1* Line-out/MIC combo ● 1* Front panel power switch **(FP_SW)**
Internal I/O	● 1* SATA HDD Power Out wafer ● 1* JW_FPB1**(Backside)** power wafer ● 1* CPUFANB1 **(Backside)** fan wafer ● 1* SMBUS header ● 1* 9-Pin USB 2.0/1.1 header for 2* USB 2.0/1.1 ports ● 1* RS232/422/485 serial port header ● 1* GPIO header (default GPIO/selectable by jumper)
TPM 2.0	● Option (by order)

1-3 Layout Diagram

Rear IO Panel Diagram:

2.5Gbps RJ-45 LAN Ports
Display Port
12V DC-in Power Jack
HDMI Port
HDMI Port
USB 3.1(Gen.2) Port

Front IO Panel Diagram:

USB 2.0 Port
Type-C USB 3.1(Gen.2) Ports
Power On/Off Button
USB 3.1(Gen.2) Port
Line-OUT/MIC Combo Port
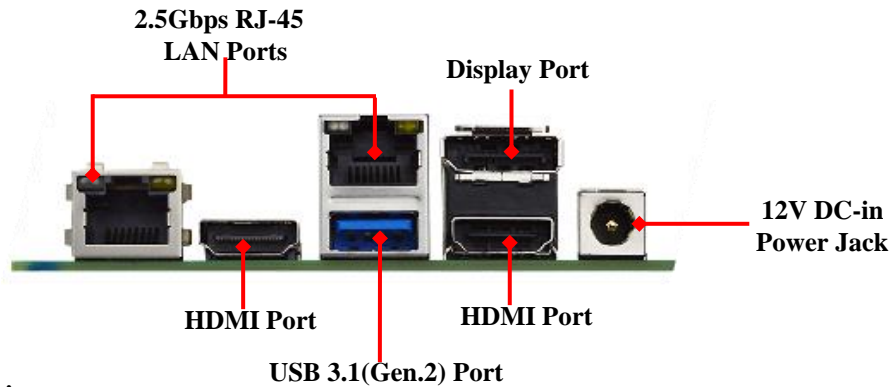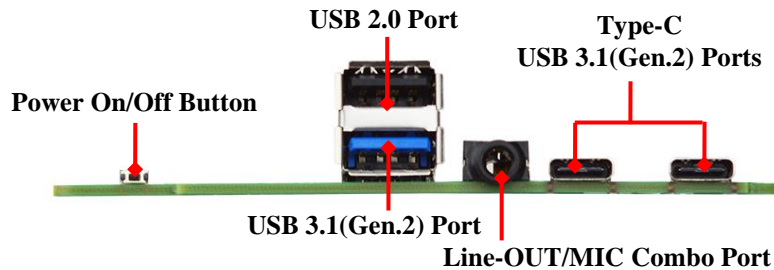
Internal Diagram-Front Side:

SMBUS Header

AT_MODE

SATA HDD Power-Out Wafer

SATAIII Port

BATCON

USB 2.0 Port Header

2.5Gbps RJ-45 LAN Port

M.2 M-Key Slot (M2M1)

M.2 E-Key Slot (M2E1)

JBAT

Type-C USB 3.1 (Gen.2) Ports

HDMI Port

GPIO Port Header

JPCAS_80P

COM1 Serial Port Header

JPCOM1

Line_Out / MIC Combo Port

2.5Gbps RJ-45 LAN Port Over USB 3.1(Gen.2) Port

Top: USB 2.0 Port
Bottom: USB 3.1(Gen.2) Port

Display Port Over HDMI Port

DDR4 SODIMM Slot

12V DC-in Power Jack

Front Panel Power Switch

Internal Diagram-Back Side:

JW_FPB1
Wafer

Intel CPU

CPUFANB1 Wafer
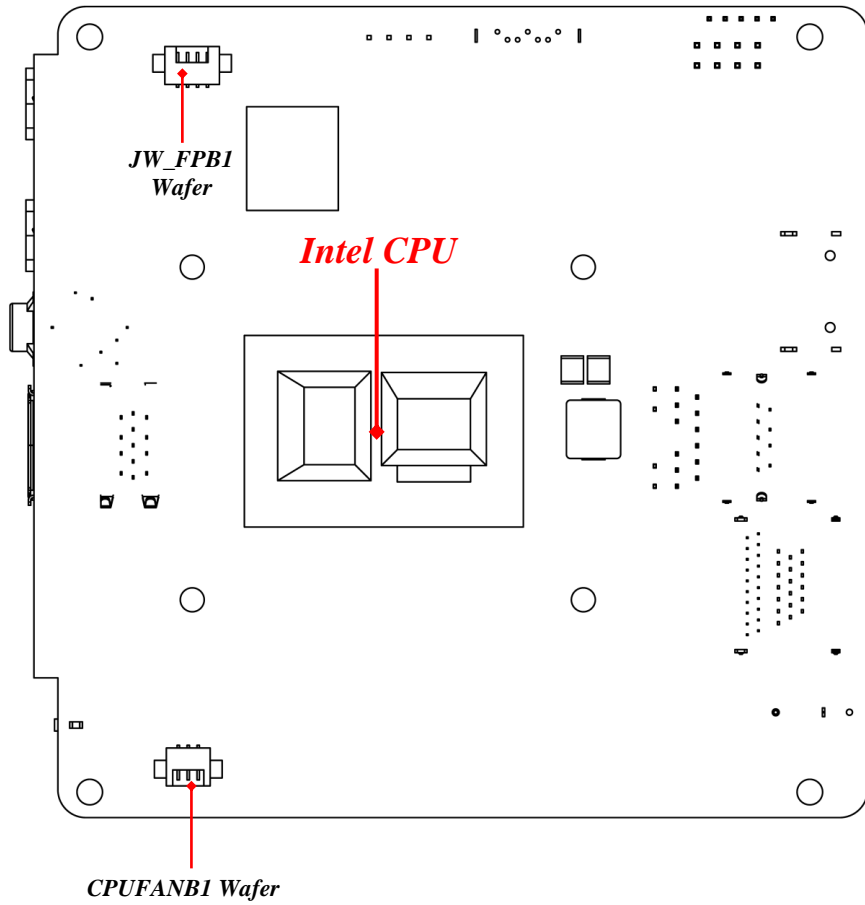
Connectors

Connector	Name
DCIN1	12V DC–in System Power Jack
DP1_HDMI2	*Top*: Display Port Connector *Bottom:* HDMI Connector
UL2	*Top*: 2.5Gbps RJ-45 LAN Port Connector *Bottom:* USB 3.1(Gen.2) Port Connector
HDMI1	HDMI Connector
LAN1	2.5Gbps RJ-45 LAN Port Connector
USB31	*Top*: USB 2.0 Port Connector *Bottom:* USB 3.1(Gen.2) Port Connector
AUDIO1	Line-Out/MIC Combo Connector
USBC1/USBC2	USB 3.1(Gen.2) Type-C Port Connector
SATA1	SATAIII Port Connector
SATAPWR	SATA HDD Power out Wafer
JW_FPB1 **(backside)**	Front Panel Power Wafer
*CPUFANB1***(backside)**	CPUFAN Wafer

Headers

Header	Name	Description	Pitch
SMBUS	SMBUS Header	5-pin Block	2.0mm
FP_USB21	USB 2.0 Port Header	9-pin Block	2.0mm
COM1	Serial Port Header	9-pin Block	2.0mm
GPIO	GPIO Header	10-pin Block	2.0mm

Jumper

Jumper	Name	Description	Pitch
AT_MODE	ATX Mode/ AT Mode Select	3-Pin Block	2.0mm
JPCAS_80P	*Pin (1-2):* Case Open Display Select *Pin (3-4):* GPIO/80 Port Function Select	4-Pin Block	2.0mm
JPCOM1	COM1 Port Pin9 Function Select	4-Pin Block	2.0mm
JBAT	*Pin (1-2):* Clear RTC *Pin (3-4):* Clear CMOS *Pin (5-6):* ME Disabled	6-Pin Block	2.0mm

Chapter 2
Hardware Installation

2-1 Jumper Setting

AT_MODE (2-pin): ATX Mode &AT Mode Select (Pitch:2.0mm)

AT_MODE
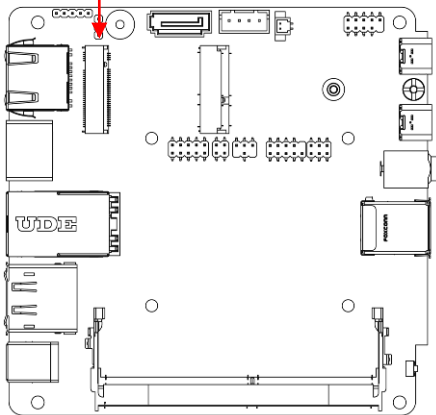
AT_MODE→ATX/AT Mode Select

1
3

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.*

Pin 1&2 of JPCAS_80P (4-pin): Case Open Display Select *(Pitch 2.0mm)*
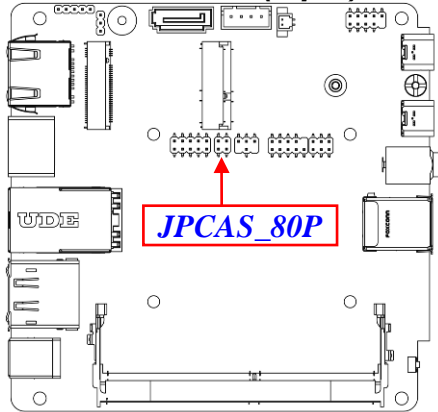
Pin 1&2 of JPCAS_80P
→*Case Open Detection*
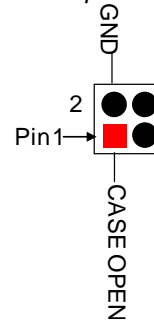
Pin (1&2) short: *When Case open function pin short to GND, the Case open function was detected. When used, needs to enter BIOS and enable '**Case Open Detect**' function. In this case if your case is removed, next time when you restart your computer, a message will be displayed on screen to inform you of this.*

Pin 3&4 of JPCAS_80P (4-pin): GPIO Header GPIO/80 Port Select *(Pitch 2.0mm)*
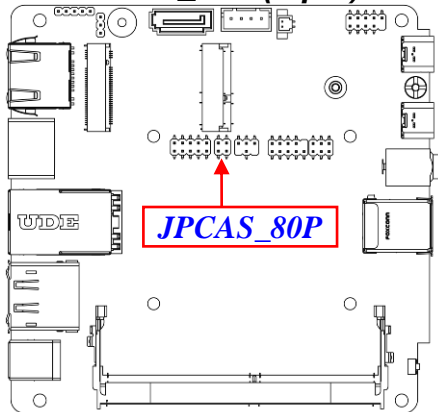
Pin 3&4 of JPCAS_80P
→*GPIO/80 Port Select*
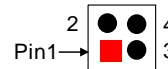
3-4 Open: GPIO =GPIO Port(defult);
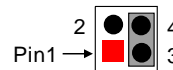
3-4 Closed: GPIO=80 Port.

JPCOM1 (4-pin): COM1 Port Pin9 Function Select   *(Pitch:2.0mm)*
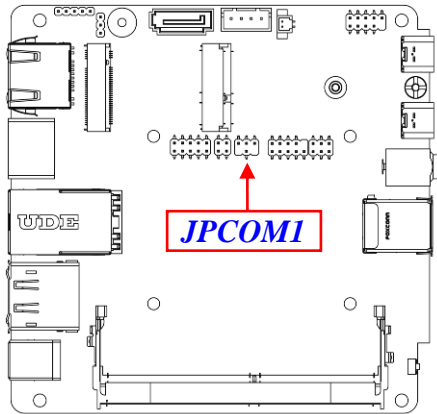
JPCOM1→COM1 Port

2 4 6

1 3 5

2-4 Closed:
RI=RS232;

2 4 6

1 3 5

3-4 Closed:
RI= 5V;

2 4 6

1 3 5
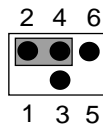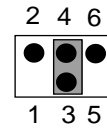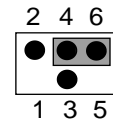
4-6 Closed:
RI= 12V.

Pin 1&2 of JBAT (6-pin): Clear RTC *(Pitch:2.0mm)*
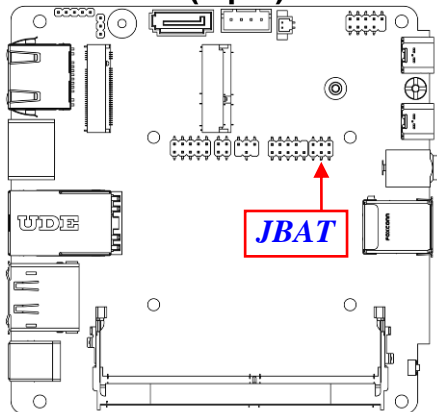
Pin 1&2 of JBAT→ Clear RTC

2

Pin1→
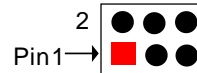
1-2 Open: Normal (Default);

2

Pin1→
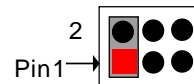
1-2 Closed: Clear RTC.

Pin (3&4) of JBAT (6-pin): Clear CMOS RAM Settings *(Pitch:2.0mm)*
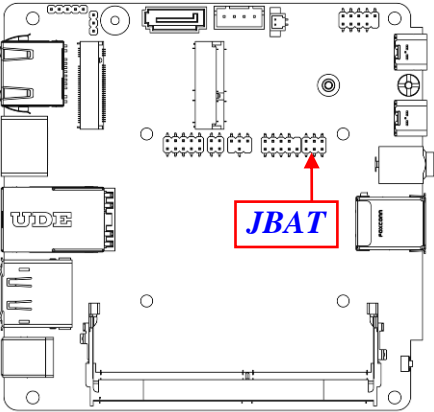
Pin 3&4 of JBAT→ Clear CMOS
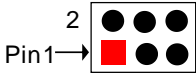
3-4 Open: Normal (Default);
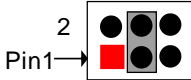
3-4 Closed: Clear CMOS.

Pin 5&6 of JBAT (6-pin): ME Disabled *(Pitch:2.0mm)*
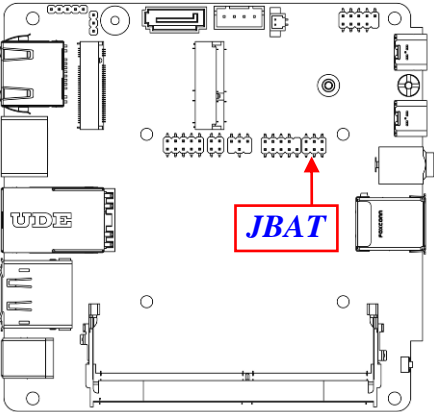
Pin 5&6 of JBAT→ ME Disabled
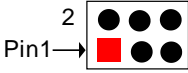
5-6 Open:Normal(Default);
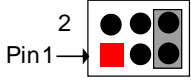
5-6 Closed: ME Disabled.

2-2   Connectors,Wafers and Headers

2-2-1 Connectors & Wafers

Rear IO Panel Diagram:

2.5Gbps RJ-45
LAN Ports

Display Port

12V DC-in
Power Jack

HDMI Port

HDMI Port

USB 3.1 (Gen.2) Port

Front IO Panel Diagram:

USB 2.0 Port

Type-C
USB 3.1 (Gen.2) Ports

Power On/Off Button

USB 3.1 (Gen.2) Port

Line-OUT/MIC
Combo Port
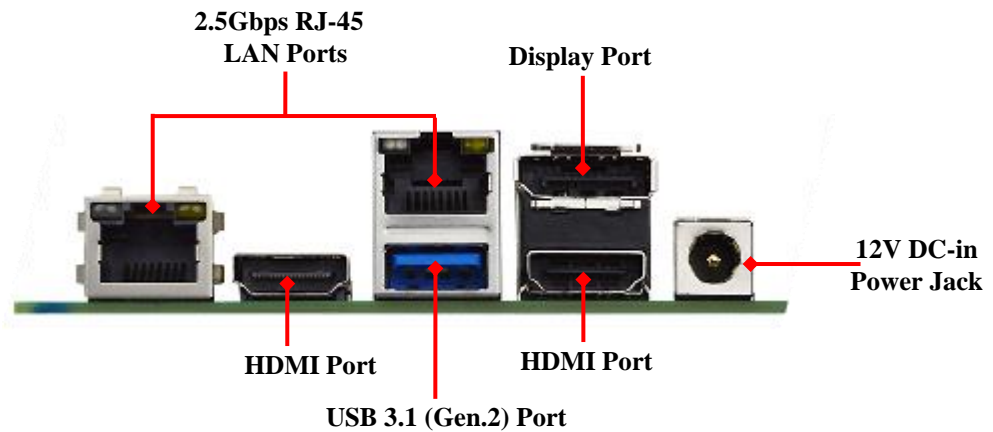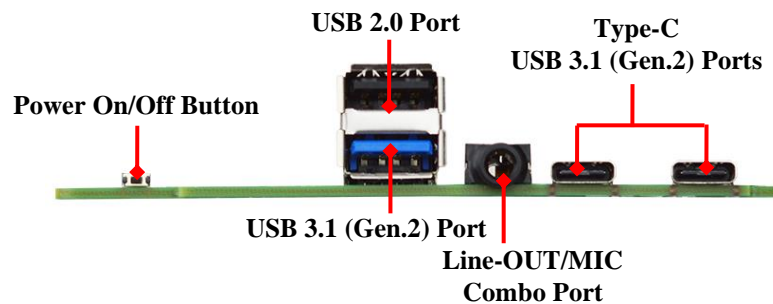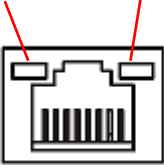
Icon	Name	Function
	Power Connector	12V DC–in system power connector For user to connect compatible power adapter to provide power supply for the system.
	2.5Gbps RJ-45 LAN Port	This connector is standard 2.5Gbps RJ-45 LAN jack for Network connection. *(*Note: 2.5Gbps is only supported with CAT 5e UTP cable).*
	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 5Gbps data transfer rate.
	HDMI Port	To connect display device that support HDMI specification.
	Display Port	To the system to corresponding display device with compatible display port cable.
	Line-Out/MIC Combo Connector	This connector can functions as audio Line-Out jack and MIC jack with compatible cables & devices.
	USB 2.0 Port	To connect USB keyboard, mouse or other devices compatible with USB 2.0 specification.
	Type-C USB Port	Type-C USB3.1 (Gen.2) port supports USB device connection.
	Power Button	For user to power on/off the system.

For 2.5Gbps RJ-45 LAN port:

Speed LED

Activity/Link LED

Speed LED

Activity/Link LED

Speed LED

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

Activity/Link LED

Status	Description
Off	No Link
Blinking	Data Activity
On	Link

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

SATA1 (7-pin Block): SATAIII Port connector
The board comes with a SATAIII port that supports 6GB/s transfer rate.
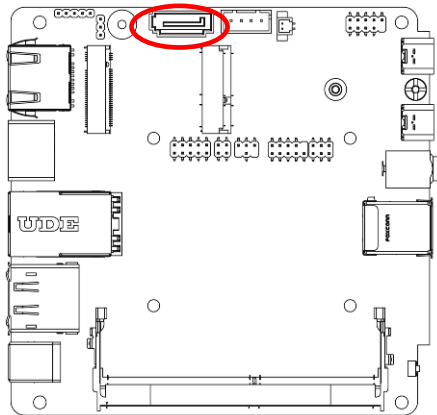
Pin No.	Definition
1	GND
2	TXP
3	TXN
4	GND
5	RXN
6	RXP
7	GND
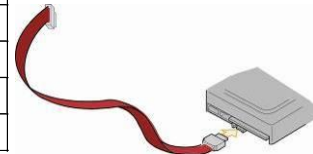
SATAPWR (4-pin): SATA HDD Power-Out Wafer *(Pitch:2.5mm)*

Pin1
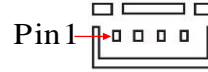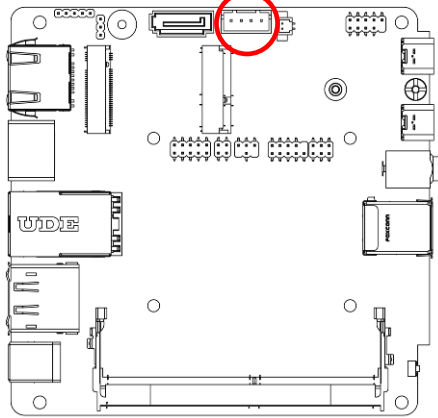
Pin No.	Definition
1	+5V
2	GND
3	GND
4	+12V

JW_FPB1 (4-pin): Front Panel Wafer *(Pitch:1.25mm)*

Pin1
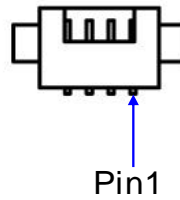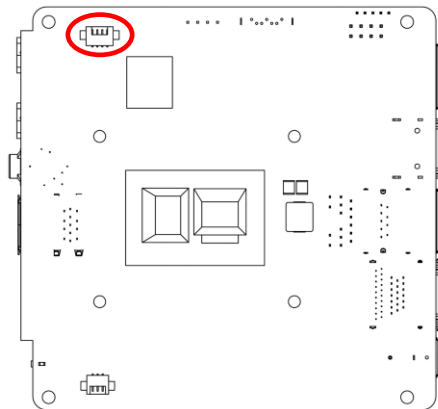
(Backside)

Pin No.	Definition
1	Power_SW
2	GND
3	PWRLED -
4	PWRLED+

CPUFANB1 (3-pin): CPUFAN Wafer *(Pitch:1.25mm)*

Pin1
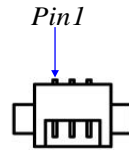
Pin No.	Definition
1	+5V
2	GND
3	Fan Detect

(Backside)

BATCON (2-pin): Battery Connector
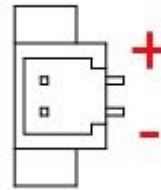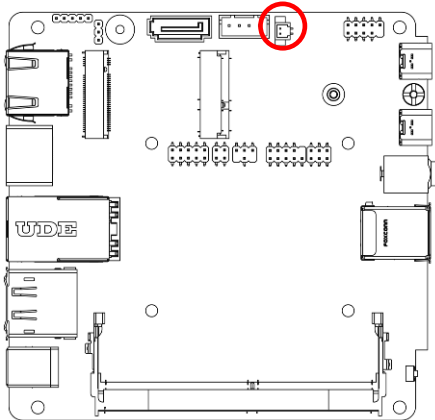
2-2-2 Headers

SMBUS (5-Pin): SM BUS Header *(Pitch:2.0mm)*

SMBUS

SMBUS_ALERT
SMBUS_DATA
SMBUS_CLK
VCC3
GND
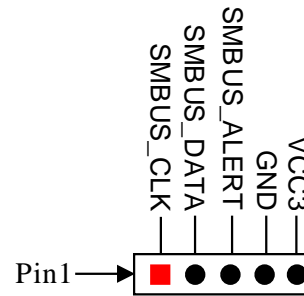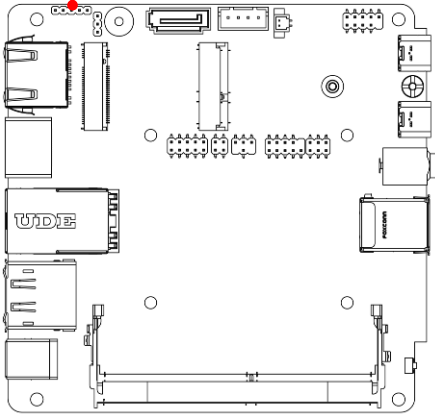
Pin1

FP_USB21 (9-pin): USB 2.0 Port Header *(Pitch:2.0mm)*

FP_USB21

-DATA
+DATA
VCC
GND
NC

2

Pin 1

VCC
-DATA
+DATA
GND
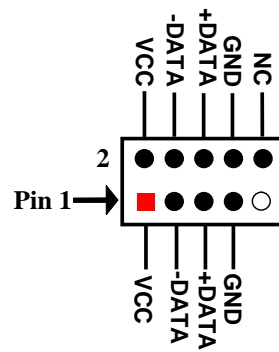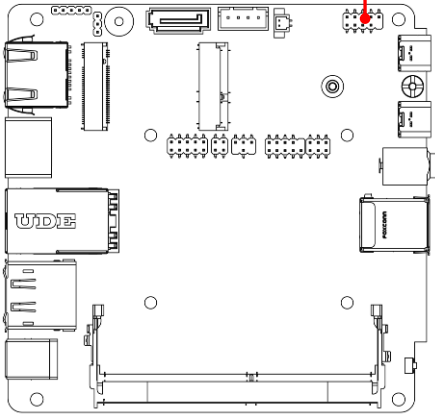
COM1 (9-pin Block): RS232/422/485 Serial Port Header *(Pitch:2.0mm)*
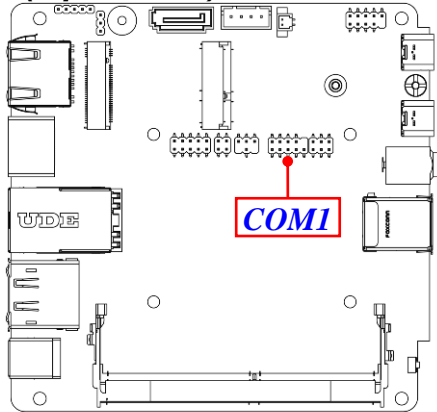
Pin NO.	RS232	RS42	RS485
Pin 1	DCD	TX-	DATA-
Pin 2	RXD	TX+	DATA+
Pin 3	TXD	RX+	NC
Pin 4	DTR	RX-	NC
Pin 5	GND	GND	GND
Pin 6	DSR	NC	NC
Pin 7	RTS	NC	NC
Pin 8	CTS	NC	NC
Pin 9	RI	NC	NC
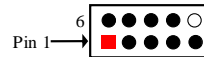
COM1 port can function as RS232/422/485 port. In normal settings COM1 functions as RS232 port. With compatible COM cable they can function as RS422 or RS 485 port.User also needs to go to BIOS to set '*Transmission Mode Select*' for COM1 (refer to **Page-28**) at first, before using specialized cable to connect different pins of this port.

GPIO(10-pin): GPIO Header *(Pitch:2.0mm)*
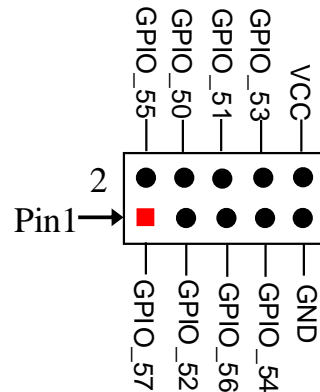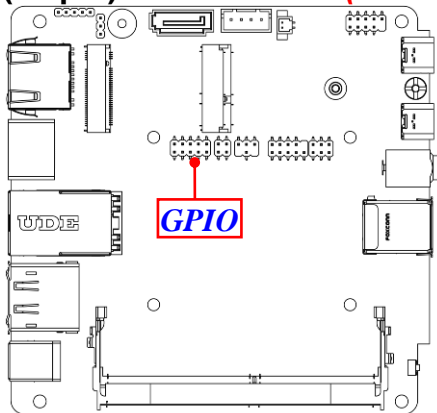
*Note: Please refer to **Page-8** JPCAS_80P jumper setting for GPIO header **GPIO**

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.*

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	USB3.2 x2	5V	1.5A
FP_USB21	USB2.0 x2	5V	1.5A
USBC1	Type-C ALT	5V	3A
USBC2	Type-C ALT	5V	3A
GPIO	GPIO/80 Port	5V	1A
CPUFANB1	CPU FAN	5V	0.5A
SATAPW1	SATA 4Pin Power	5V	1A
SMBUS	SMBUS	5V	0.3A

Chapter 3
Introducing BIOS

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

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

3-1 Entering Setup

Power on the computer and by pressing <Del> immediately allows you to enter Setup. If the message disappears before your respond and you still wish to enter Setup, restart the system to try again by turning it OFF then ON or pressing the "**RESET**" button on the system case. You may also restart by simultaneously pressing **<Ctrl>**, **<Alt>** and **<Delete>** keys.   If you do not press the keys at the correct time and the system does not boot, an error message will be displayed and you will again be asked to
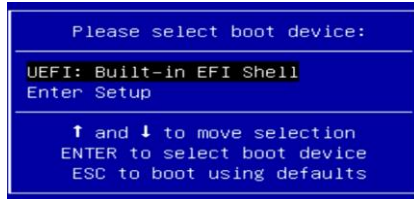
Press **<Del>** to enter Setup; press < **F7**> to enter pop-up Boot menu.
BIOS Boot Menu Screen (boot device options please refer to actual configuration)

3-2 BIOS Menu Screen

The following diagram show a general BIOS menu screen:
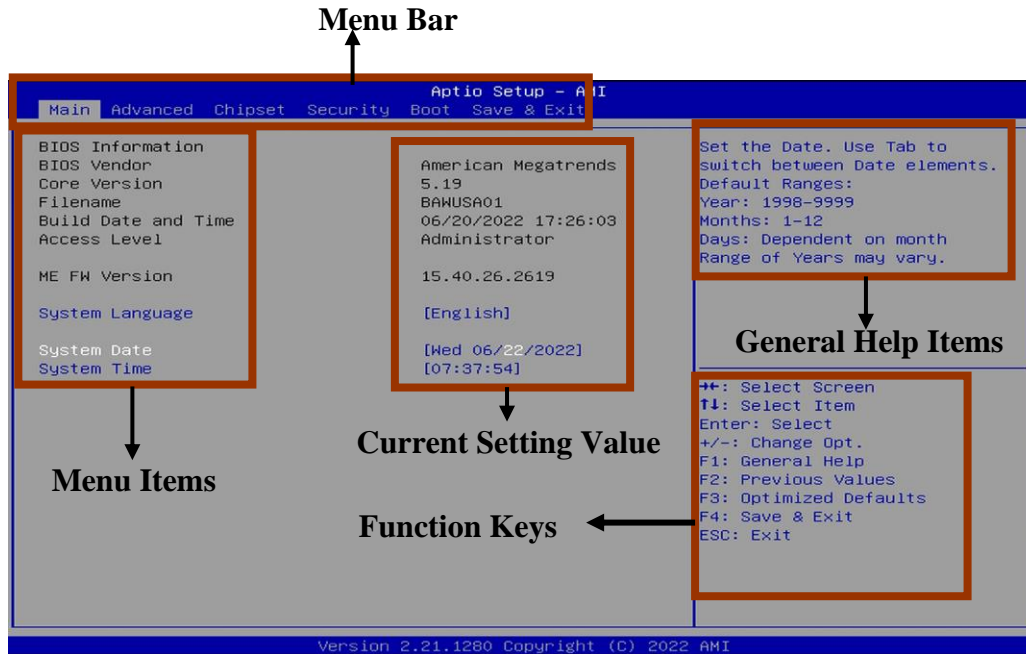
3-3 Function Keys

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

● Press←→ (left, right) to select screen;
● Press ↑↓ (up, down) to choose, in the main menu, the option you want to confirm or to modify.
● Press <Enter> to select.
● Press <+>/<−> keys when you want to modify the BIOS parameters for the active option.
● [F1]: General help.
● [F2]: Previous 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                     BAWUSA01               Year: 1998-9999
   Build Date and Time          06/20/2022 17:26:03    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                  [Wed 06/22/2022]
   System Time                  [07:37:54]             →←: 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


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```

► **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-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: [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**
Use this item to set parameters of Serial Port 1 (COMA).
Press [Enter] to make settings for the following items:
Serial Port
The optional settings: [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 setting for Super IO Device.
The optional settings: [Auto]; [IO=3F8h; IRQ=4;]; [IO=2F8h; IRQ=3;]; [IO=3E8h; IRQ=4;]; [IO=2E8h; IRQ=3;].

Transmission Mode Select
The optional settings: [RS422]; [RS232]; [RS485].
Mode Speed Select
Use this item to select RS232/RS422/RS485 Speed.
The optional settings: [RS232/RS422/RS485=250kbps]; [RS232=1Mbps, RS422/RS485=10Mbps].

ERP Support
This item is Energy-Related Products function.
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 WDT reset function.
The optional settings: [Disabled]; [Enabled].
When set as [Enabled], the following sub-items shall appear:

WatchDog Reset Timer Value
User can select a value in the range of [10] to [255] seconds when 'WatchDog

Reset Timer Unit' set as [Sec]; or in the range of [1] to [255] minutes when 'WatchDog Reset Timer Unit' set as [Min].

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

WatchDog Wake-up Timer
This item support WDT wake-up.
The optional settings: [Disabled]; [Enabled].
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: [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
Use this item to enable or disable Console Redirection.
The optional settings: [Disabled]; [Enabled].
When set as [Enabled], user can make further settings in the following items:

 ‣ **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.

COM1
Console Redirection Settings

Terminal Type

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

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

Bits per second

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

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

Data Bits

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

Parity

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

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

[Even]: parity bit is 0 if the num of 1's in the data bits is even;

[Odd]: parity bit is 0 if num of 1's in the data bits is odd;

[Mark]: parity bit is always 1;

[Space]: parity bit is always 0;

[Mark] and **[Space]**: parity do not allow for error detection.

Stop Bits

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

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

Flow Control

Flow control can prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a "stop" signal can be sent to stop the data flow.

Once the buffers are empty, a "start" signal can be sent to re-start the flow. Hardware flow control uses two wires to send start/stop signals.

The optional settings: [None]; [Hardware RTS/CTS].

VT-UTF8 Combo Key Support

Use this item to enable VT-UTF8 Combination Key Support for ANSI/VT100 terminals.

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

Recorder Mode

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

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

Resolution 100x31

Use this item to enable or disable extended terminal resolution.

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

Legacy OS Redirection Resolution

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

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

Putty KeyPad

Use this item to select FunctionKey and KeyPad on Putty.

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

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

Console Redirection

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

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

▸ **Console Redirection Settings**

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

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

Out-of-Band Mgmt Port

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

Data Bits

The default setting is: [8].

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

Parity

The default setting is: [None].

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

Stop Bits

The default setting is: [1].

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

► **PC Health Status**

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

   ► **SmartFAN Configuration**

Press [Enter] to make settings for SmartFan Configuration:

SmartFAN Configuration

CPUFAN Smart Mode
The optional settings: [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:

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

Use this item to enable or disable UEFI Network Stack.

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

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

Ipv4 PXE Support

Use this item to enable Ipv4 PXE Boot Support. If disabled, IPV4 PXE boot optional will not be created.

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

Ipv6 PXE Support

Use this item to enable Ipv6 PXE Boot Support. If disabled, IPV6 PXE boot optional will not be created.

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

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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```
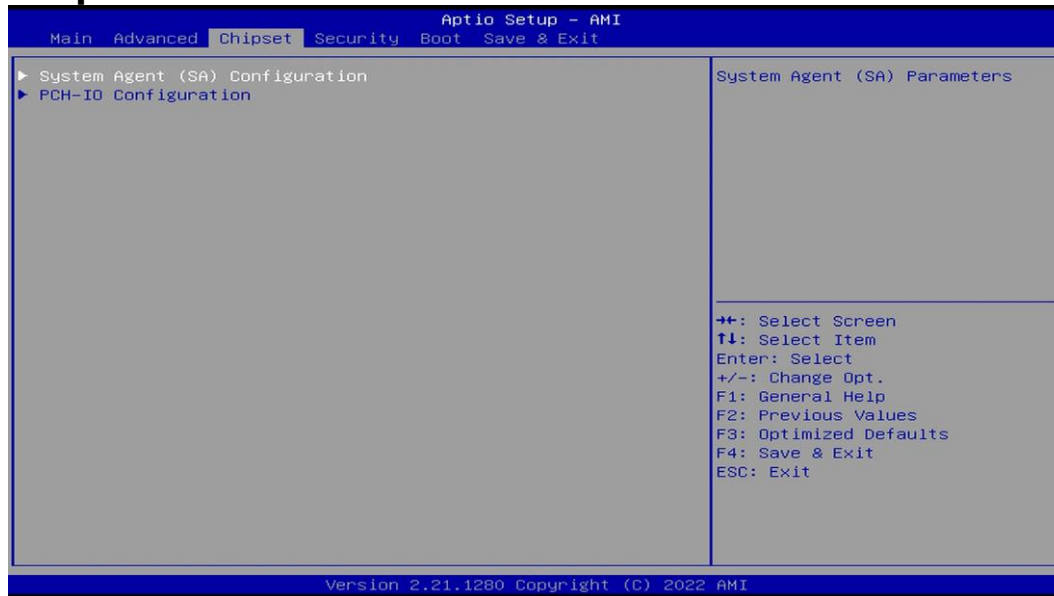
▶ **System Agent (SA) Configuration**
   Press [Enter] to make settings for the following sub-items:
   System Agent (SA) Configuration
   GTT Size
   Use this item to select the GTT Size.
   The optional settings: [2MB]; [4MB]; [8MB].

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].

  ▸ **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].
SATA Port
SATA Port
The optional settings: [Disabled]; [Enabled].
   Hot Plug

Use this item to designates this port as Hot Pluggable
The optional settings: [Disabled]; [Enabled]
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].
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
                                                 →←: Select Screen
   Administrator Password                        ↑↓: Select Item
   User Password                                 Enter: Select
                                                 +/-: Change Opt.
   ► Secure Boot                                 F1: General Help
                                                 F2: Previous Values
                                                 F3: Optimized Defaults
                                                 F4: Save & Exit
                                                 ESC: Exit


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```

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

Administrator Password

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

User Password

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

▸ **Secure Boot**
Press [Enter] to make customized secure settings:
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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```

Setup Prompt Timeout
Use this item to set number of seconds to wait for setup activation key. 65535 (0xFFFF) means indefinite waiting.
Bootup NumLock State
Use this item to select the 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 set the system boot order.

The optional settings: [Windows Boot Manager (MMC – BJTD4R)]; [MMC - BJTD4R]; [UEI: Built-in EFI Shell]; [Disabled].

Hard Drive BBS Priorities

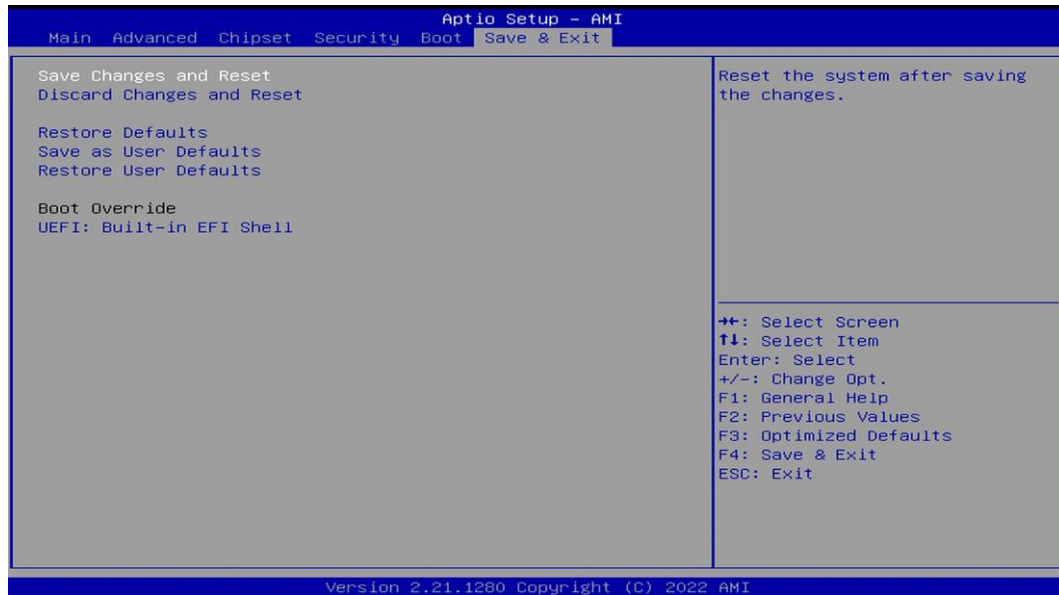Use this item to set the order of the legacy devices in this group.

Press [Enter] to make customized secure settings:

Boot Option#1

Use this item to set the system boot order.

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 defaults to all the setup options.

Boot Override

The available options here are dynamically updated and make system boot to any boot option selected.
UEFI: Built-in EFI Shell
Use this item to save or reset configuration of UEFI.