MI05 Series

User's Manual

NO. G03-MI05-F

Revision: 5.0

Release date: October 21, 2024

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.

- 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.

USER'S NOTICE

Manual Revision Information

Reversion	Revision History	Date
5.0	Fifth Edition	October 21, 2024

Item Checklist

- ☑ Motherboard
- ☑ Cable(s)
- ☑ I/O Back panel shield

Chapter 1

Introduction of the Motherboard

1-1 Feature of Motherboard

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

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

- Support 6* 10/100/1000/2500 Base-TX Ethernet Ports

- Support 1* SATAIII (6Gb/s) port

- Support 1* PCI Express x1 sideway slot *(only for MI05-0XK Series)*

- 1* EXT RS232 (RJ45 type), 2* INT RS232, 1* INT RS232/422/485

- Support 1* USB 3.1(Gen.2), 1* EXT USB 2.0, 2* INT USB 2.0, 1* INT HDMI

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

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

- 1* M.2 B-key (3042, USB3.1/PCIe Gen.3 x1 interface) *(only for MI05-0X Series)*

- 1* M.2 B-key (3042, USB3.1 interface) *(only for MI05-0XK Series)*

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

- Onboard 1* SIM card slot *(along with M.2 B-key)*

- Support Intel ACPI S3 NI Function

- Onboard TPM 2.0 *(by order)*

- Support CPU Smart FAN
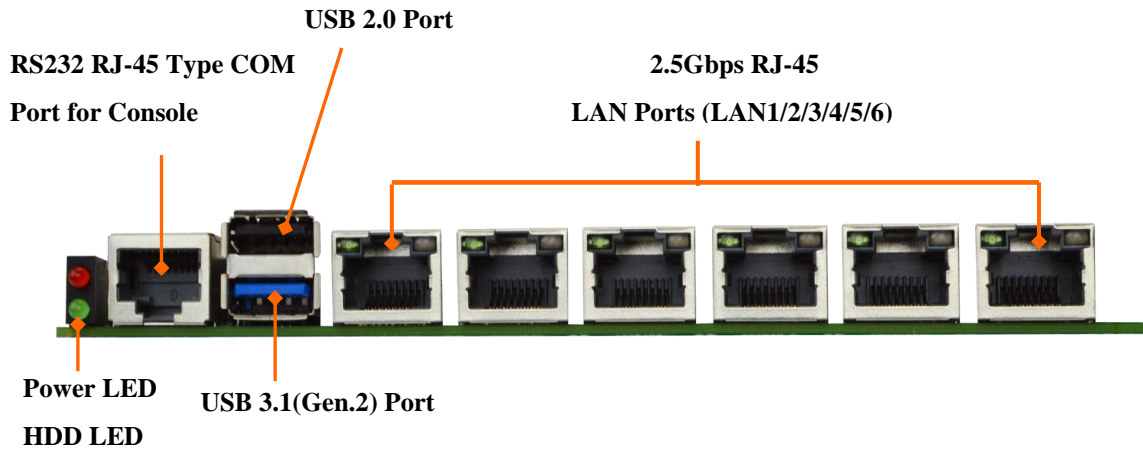
- Support Watchdog Technology

1-2 Specification

Spec	Description
Design	● Mini-ITX form factor 8 layers; PCB size: 17.0x17.0cm
Embedded CPU	● Intel® Elkhart Lake series CPU (TDP 10W) ** for detailed CPU support information please visit our website*
Memory Socket	● 1* DDR4 SO-DIMM slot ● Support 1* DDR4 3200MHz SO-DIMM, up to 32GB
Expansion Slot	● 1* PCIe x1 slot by sideway *(PCIE2) (only for MI05-0XK)* ● 1* M.2 B-key (3042, USB3.1 interface) *(only for MI05-0XK)* ● 1* M.2 B-key (3042, USB3.1/PCIe Gen.3 x1 interface) *(only for MI05-0X)* ● 1* M.2 E-key (2230, USB2.0/PCIe Gen.3 x1 interface) ● 1* SIM card slot *(along with M.2 B-key)*
Storage	● 1* SATAIII (6Gb/s) connector *(SATA1)* ● 1* M.2 M-key (2242, SATA/PCIe Gen.3 x2 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 6* Intel i225-V 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
Rear I/O	● 1* RS232 RJ45 Type COM port for console *(RJ45_COM1)* ● 1* USB 2.0 port ● 1* USB 3.1(Gen.2) port ● 6* 2.5Gbps RJ-45 LAN ports
Internal I/O	● 1* 2-pin internal 12V DC-in power connector ● 1* SATA HDD Power-Out Connector ● 1* SATAIII Port Connector ● 1* CPU FAN Connector ● 1* Front panel LED header *(FP_LED1)* ● 1* Front panel header *(JW_FP)*

	1* USB 2.0 header (Expansible to 2* USB 2.0 ports) 3* Serial port headers *(FP_COM2 support RS232/422/485; FP_COM3/4 support RS232)* 1* PS/2 keyboard & mouse header 1* HDMI port header 1* 8-pin LANLED header (LAN_LED1) 1* 4-pin LANLED header (LAN_LED2) 1* SMBUS header 1* GPIO port header 1* SIM Card Expansion Wafer

1-3 Layout Diagram

Rear IO Diagram

USB 2.0 Port

RS232 RJ-45 Type COM

Port for Console

2.5Gbps RJ-45

LAN Ports (LAN1/2/3/4/5/6)

Power LED

USB 3.1(Gen.2) Port

HDD LED

Motherboard Internal Diagram

FP_LED1 Header

Internal 12V
Power Connector

BP_LED Port

RS232 RJ-45 Type
COM Port

DDR4 SODIMM Slot

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

CPUFAN
Connector

2.5Gbps RJ-45 LAN Ports

(LAN1/2/3/4/5/6)

M.2 E-Key Slot (M2E1)

HDMI Port Header

M.2 M-Key Slot (M2M1)

SATA
Power-out
Connector

SATAIII Port
Connector

SIM Card Slot
Expansion Wafer
(*SIM)

USB 2.0 Header

SIM Card Slot

M.2 B-Key Slot (M2B1)

Serial Port
Headers
（COM2/3/4）

LAN_LED1
Header

PS/2 KB & MS Header

Front Panel
Header

LAN_LED2
Header

SMBUS
Header

GPIO Port
Header

Sideway
PCI Express x1 Slot

*Note: 1. SIM card slot (along with M.2 B-key) 2. Sideway PCI Express x1 slot (on MI05-0XK only)

3. M.2 B-Key option has USB/PCIe signal (MI05-0XK B-key only has USB signal)

Jumper Positions

M2B_PWR

M2M_PWR

AT_MODE

M2E_PWR

JBAT

JP80P

Connectors

Connector	Name
RJ45_COM1	RS232 RJ45 Type COM Port Connector for Console
USB31	Top: USB 2.0 Port Connector Bottom: USB 3.1(Gen.2) Port Connector
LAN1/2/3/4/5/6	2.5Gbps RJ-45 LAN Port Connector X6
SATA1	SATAIII Port Connector
SATAPWR	SATA Power out Connector
CPUFAN	CPUFAN Connector
DCIN1	2-Pin Internal 12V DC–in Power Connector

Headers & Wafers

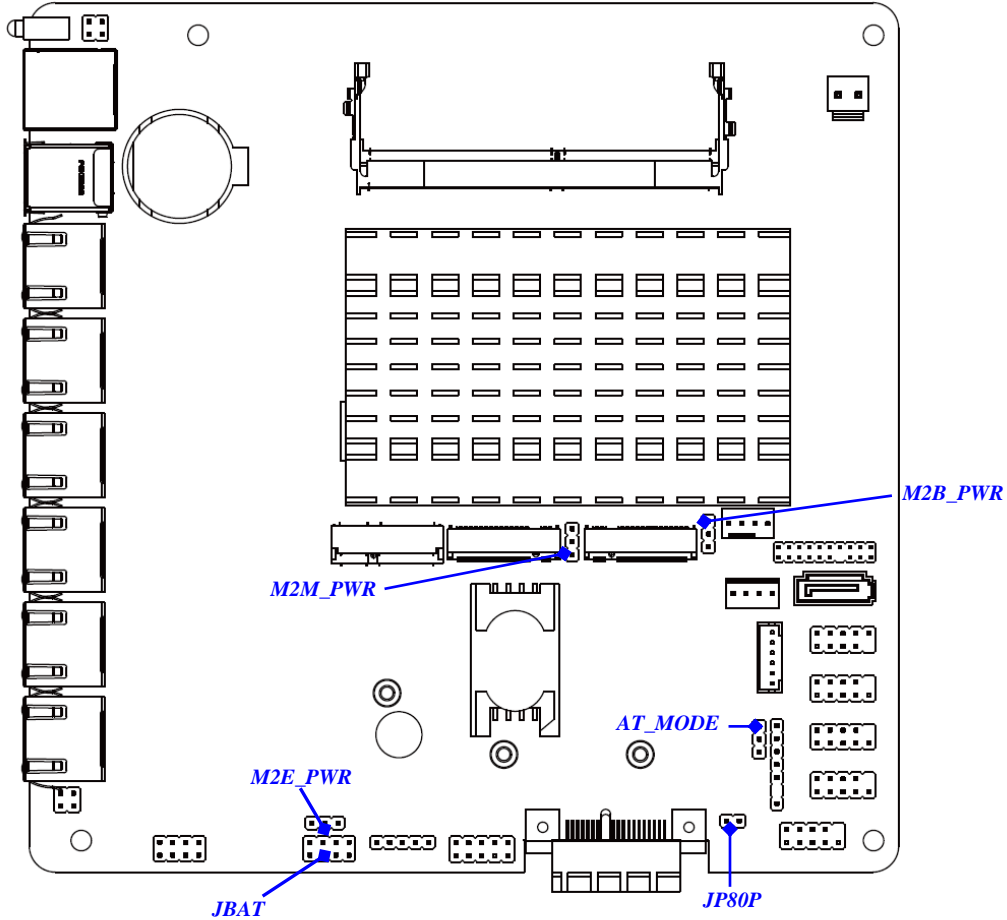| Header	Name	Description	Pitch
FP_LED1	PIN (1-2): Power LED PIN (3-4): HDD LED	4-pin Block	2.54mm
LAN_LED1	LAN1/2/3/4 Activity LED Header	8-pin Block	2.54mm
LAN_LED2	LAN5/6 Activity LED Header	4-pin Block	2.54mm
SMBUS	SMBUS Header	5-pin Block	2.54mm
GPIO	GPIO Header	10-pin Block	2.54mm
JW_FP	Front Panel Header	9-pin Block	2.54mm
FP_COM2	RS232/422/485 Serial Port Header	9-pin Block	2.54mm
FP_COM3/4	RS232 Serial Port Header	9-pin Block	2.54mm
PS2KBMS	PS/2 Keyboard & Mouse Header	6-pin Block	2.54mm
FP_USB21	USB 2.0 Port Header	9-pin Block	2.54mm
SIM	SIM Card Slot Wafer	6-pin Block	2.0mm
HDMI1	HDMI Port Header	19-pin Block	2.0mm

Jumpers

Jumper	Name	Description	Pitch
JBAT	Pin (1-2): Clear RTC Pin (3-4): Clear CMOS Pin (5-6): ME Disable Pin (7-8): CASE OPEN	8-Pin Block	2.54mm
AT_MODE	ATX Mode/ AT Mode Select	3-Pin Block	2.54mm
JP80P	Set GPIO_CON	2-Pin Block	2.54mm
M2E_PWR	M.2 E-key Power Select	3-Pin Block	2.54mm
M2M_PWR	M.2 M-key Power Select	3-Pin Block	2.54mm
M2B_PWR	M.2 B-key Power Select	3-Pin Block	2.54mm

Chapter 2
Hardware Installation

2-1 Jumper Setting

Pin (1-2) of JBAT (8pin): Clear RTC   Pitch=2.54mm

1-2 Open: Normal(Default)
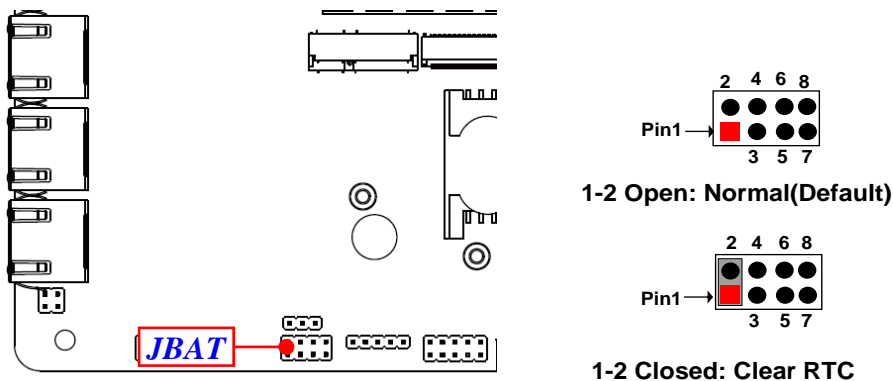
1-2 Closed: Clear RTC

Pin (3-4) of JBAT (8pin): Clear CMOS *Pitch=2.54mm*
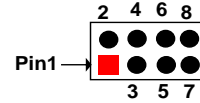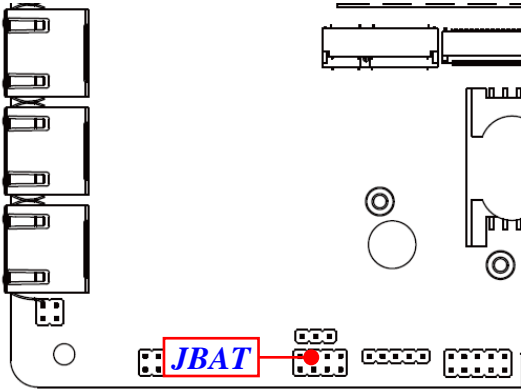
3-4 Open: Normal(Default)
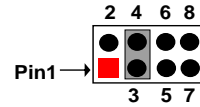
3-4 Closed: Clear CMOS

Pin (5-6) of JBAT (8pin): ME Disable *Pitch=2.54mm*
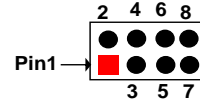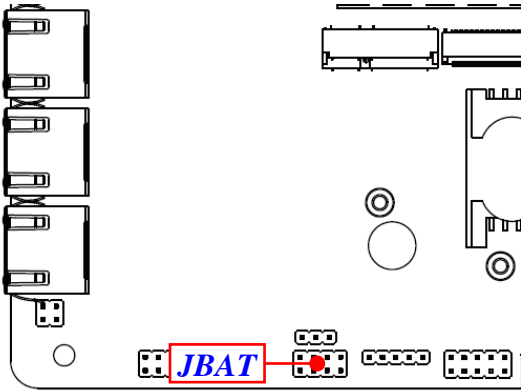
5-6 Open: Normal(Default)
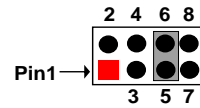
5-6 Closed: ME Disable

Pin (7-8) of JBAT (8pin): CASE OPEN   Pitch=2.54mm

2 4 6 8

Pin1 →

3 5 7
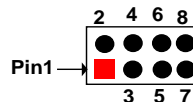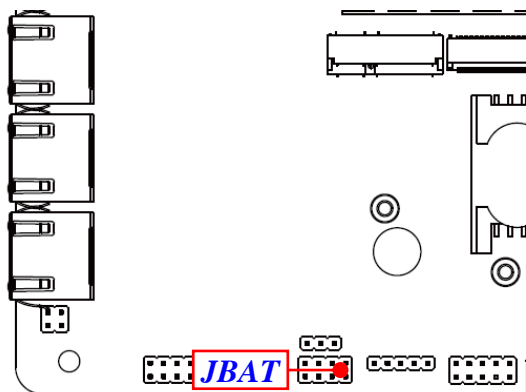
7-8 Open: Normal(Default)

2 4 6 8

Pin1 →

3 5 7
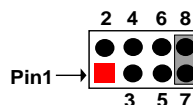
7-8 Closed: CASE OPEN

JBAT

Pin (7-8) 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. Refer to Page-32. In this case if your case is removed, next time when you restart your computer, a message will be displayed on screen to inform you of this.*

AT_MODE (3-pin): ATX Mode/ AT Mode Select   Pitch=2.54mm

3

1
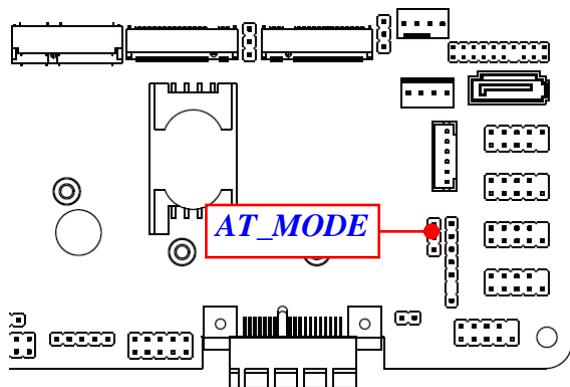
1-2 Closed：ATX Mode Selected;

3

1

2-3 Closed：AT Mode Selected.

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.*

JP80P (2-pin) :Set GPIO   Pitch=2.54mm

Pin1 → [red][black]
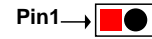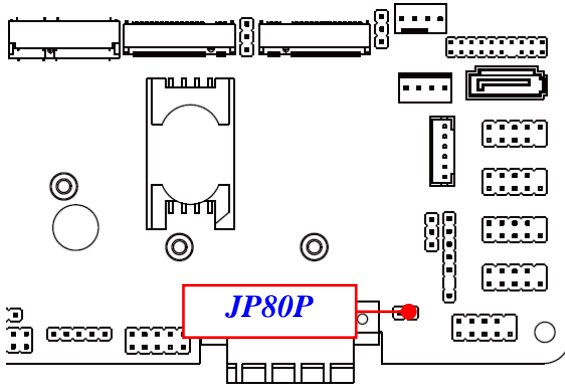
1-2 Open: GPIO=80 Port;

Pin1 → [red][black]
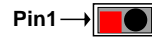
1-2 Closed: GPIO= GPIO Port (Default).

M2E_PWR (3-pin): M.2 E-key Power Select   Pitch=2.54mm

1   3
[red][black][black]

1-2 Closed:VCC=VCC3

1   3
[red][black][black]
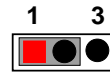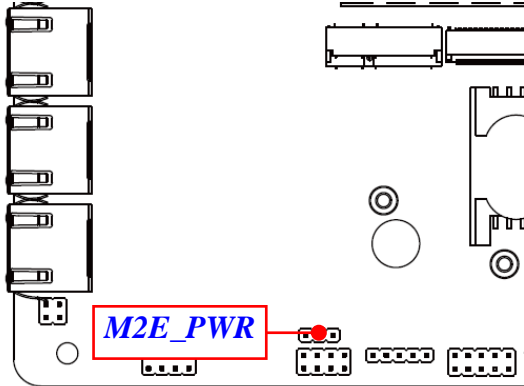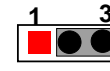
2-3 Closed: VCC=3VSB

M2M_PWR (3-pin): M.2 M-key Power Select   Pitch=2.54mm
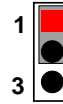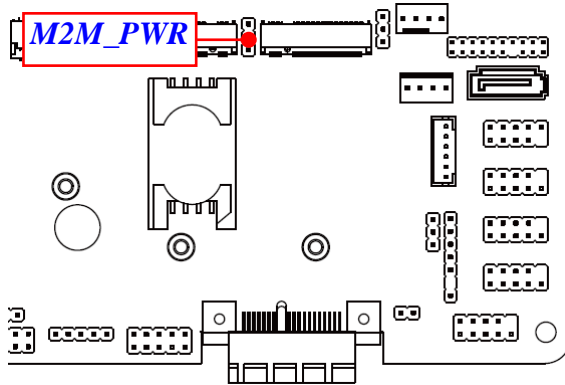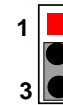
1-2 Closed: VCC=VCC3;

2-3 Closed: VCC=3VSB.

M2B_PWR (3-pin): M.2 B-key Power Select   Pitch=2.54mm
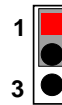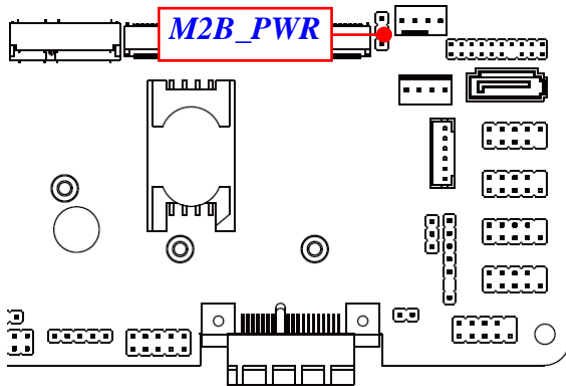
1-2 Closed: VCC=VCC3;

2-3 Closed: VCC=3VSB.

2-2 Connectors, Headers and Wafers
2-2-1 Connectors
(1) Rear I/O Connectors

Refer to Page-3 Rear IO Diagram.

Icon	Name	Function
	RS232 RJ-45 Type COM Port	Mainly for user to connect external MODEM or other devices that supports Serial Communications Interface.
	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.
	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).

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

Pin1 ⟶ [|||||||] ⟵ Pin8
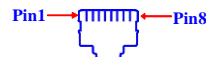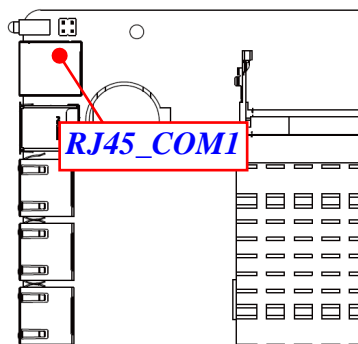
RJ45_COM1

Pin No.	Definition
1	RTS
2	DTR
3	TXD
4	GND
5	NC
6	RXD
7	DSR
8	CTS

(3) 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.

2.5Gbps RJ-45

LAN Ports (LAN1/2/3/4/5/6)
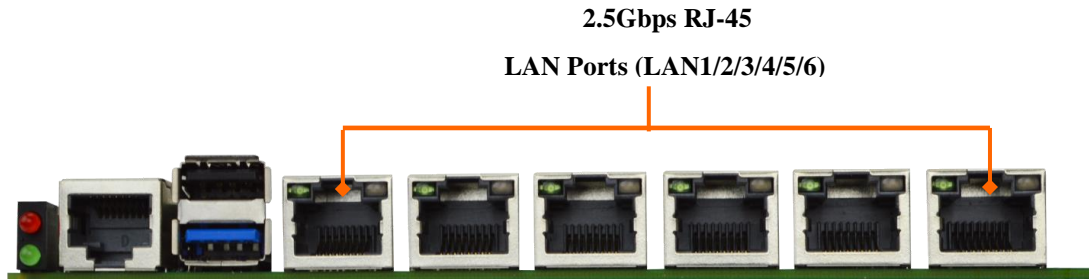
For 2.5Gbps RJ-45 LAN port:

Activity/Link *Speed*
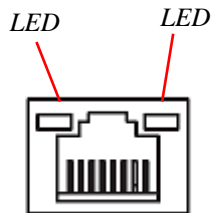
LED *LED*

Activity/Link LED

Status	Description
Off	No Link
Blinking	Data Activity
On	Link

Speed LED

Status	Description
Off	10/100Mbps connection
Red	1Gbps connection
Green	2.5Gbps connection

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

(4) SATA1 (7-pin): SATAIII Port Connector

SATA1 is a high-speed SATAIII port that supports 6Gb/s transfer rate.
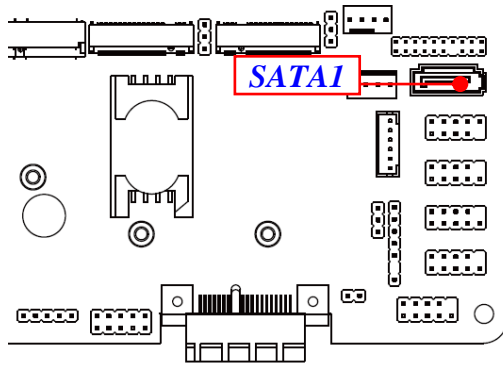
Pin No.	Definition
1	GND
2	TXP
3	TXN
4	GND
5	RXN
6	RXP
7	GND
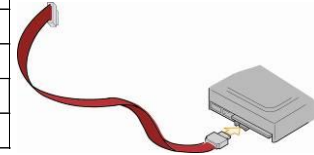
(5) SATAPWR (4-pin): SATA Power Out Connector

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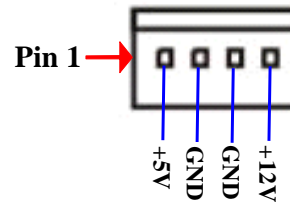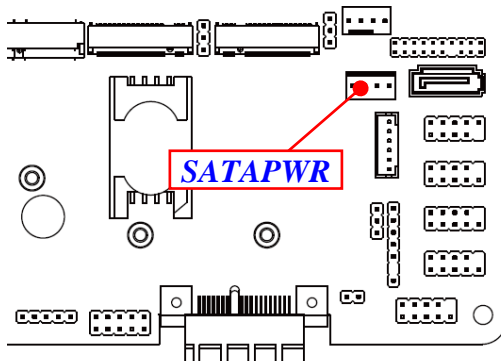
Warning: *Make sure that Pin-1 of compatible SATA Power connector is inserted into corresponding Pin-1 of* **SATAPWR** *connector to avoid possible damage to the board and hard disk driver!*

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

CPUFAN

+12V Fan Power
Fan Speed
Control
GND

Pin1

(7) DCIN1 (2-pin) : Internal 12V DC-in power connector

DCIN1

Pin1

Pin No.	Definition
1	+12V DC_IN
2	GND
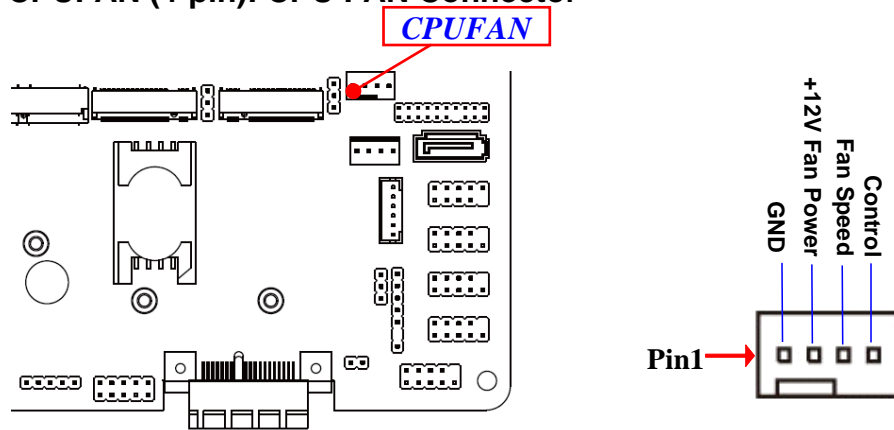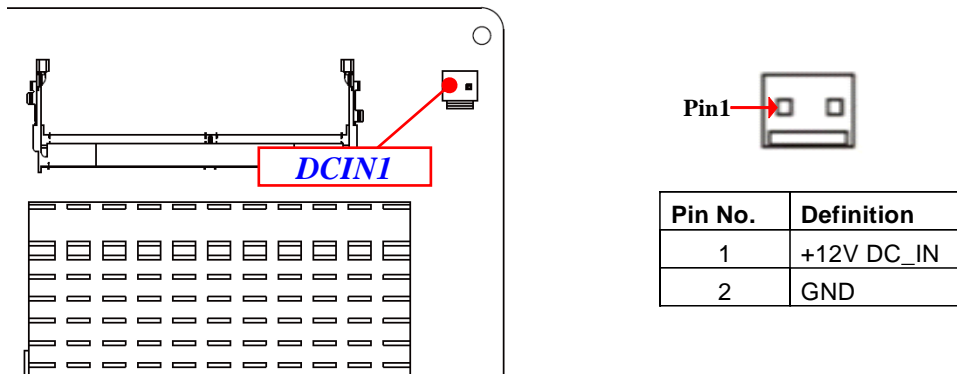
Warning: *Find Pin-1 position before connecting power cable to this 2-pin power connector* **WRONG INSTALLATION DIRECTION WILL DAMAGE THE BOARD!!**

2-2-2 Headers & Wafers

(1) PIN (1-2) of FP_LED1 (4-pin):Power LED   *Pitch=2.54mm*
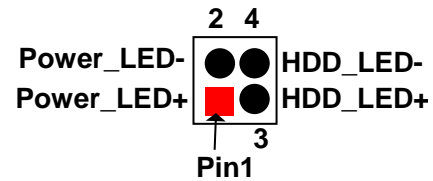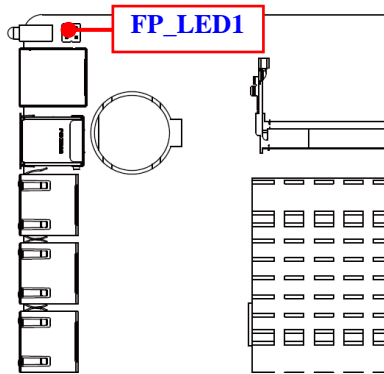
(2) PIN (3-4) of FP_LED1 (4-pin):HDD LED   *Pitch=2.54mm*
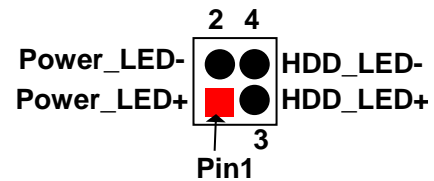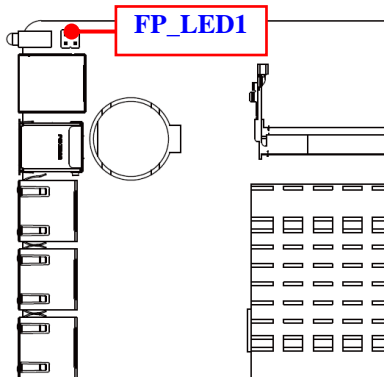
(3) LAN_LED1 (8-pin): LAN1 & LAN2 & LAN3 & LAN4 Activity LED Header
Pitch=2.54mm
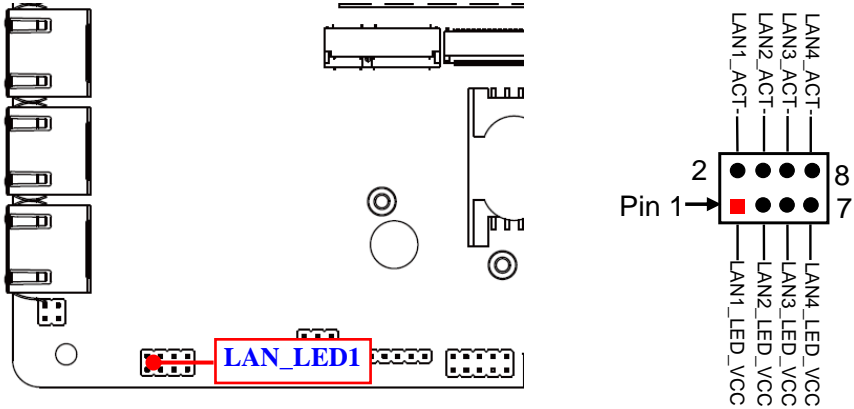
(4) LAN_LED2 (4-pin): LAN5 & LAN6 Activity LED Header   *Pitch=2.54mm*
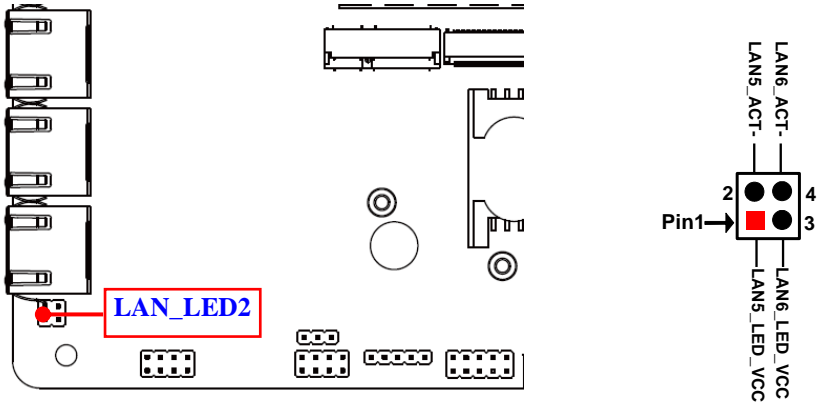
(5) SMBUS (5-pin):SM BUS Header   *Pitch=2.54mm*

SMBUS_CLK
SMBUS_DATA
NC
GND
VCC3

Pin1 →

SMBUS
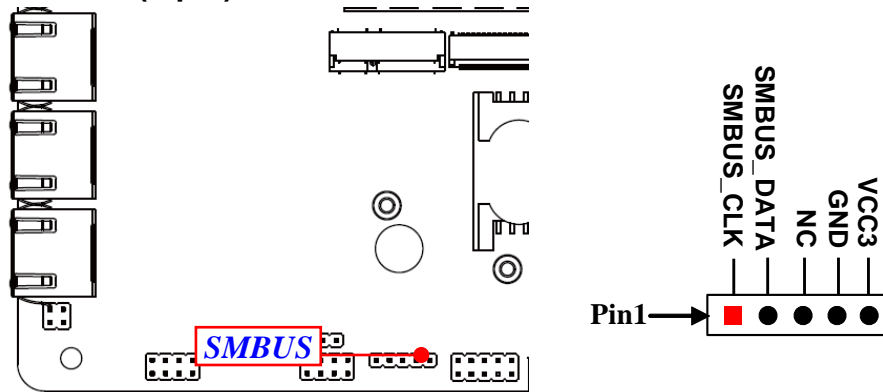
(6) GPIO (10-pin):GPIO Header   *Pitch=2.54mm*

GPIO81
GPIO83
GPIO85
GPIO87
VCC

2
Pin 1 →
10
9

GPIO80
GPIO82
GPIO84
GPIO86
GND
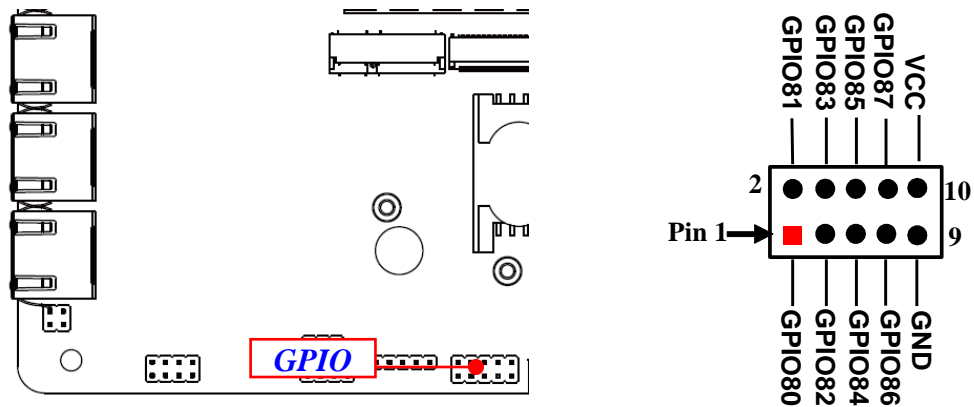
GPIO

*Note: Please refer to **Page-10 JP80P** jumper setting for GPIO **80Port** or **GPIO Port** function select*

(7) JW_FP (9-pin):Front Panel Header *Pitch=2.54mm*
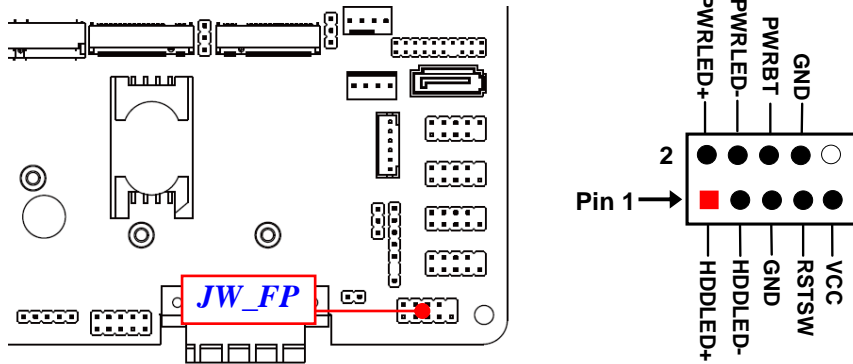
(8) FP_COM2 (9-pin): Serial Port Header (support RS232/422/485)
FP_COM3 / FP_COM4 (9-pin): Serial Port Header (support RS232)
Pitch=2.54mm
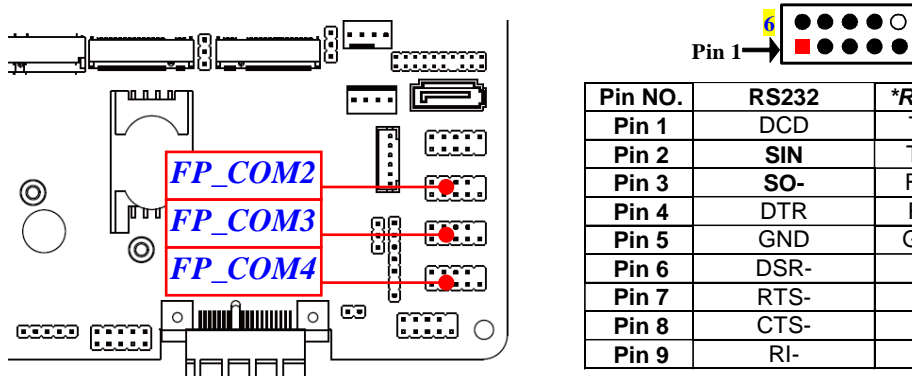
Pin NO.	RS232	*RS422	*RS485
Pin 1	DCD	TX-	DATA-
Pin 2	SIN	TX+	DATA+
Pin 3	SO-	RX+	NC
Pin 4	DTR	RX-	NC
Pin 5	GND	GND	GND
Pin 6	DSR-	NC	NC
Pin 7	RTS-	NC	NC
Pin 8	CTS-	NC	NC
Pin 9	RI-	NC	NC

Note: RS422, RS485 function is supported by FP_COM2 header only, with compatible COM cable for RS422 or RS485 function. User also needs to go to BIOS to set 'Transmission Mode Select' for FP_COM2 (refer to Page 32).

(9) PS2KBMS (6-pin): PS/2 Keyboard & Mouse Header *Pitch=2.54mm*

- MS_DATA
- MS_CLK
- GND
- KB_CLK
- KB_DATA
- VCC

Pin 1
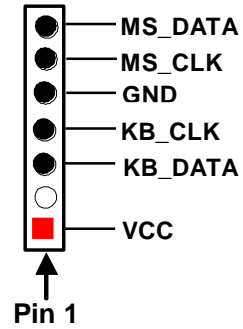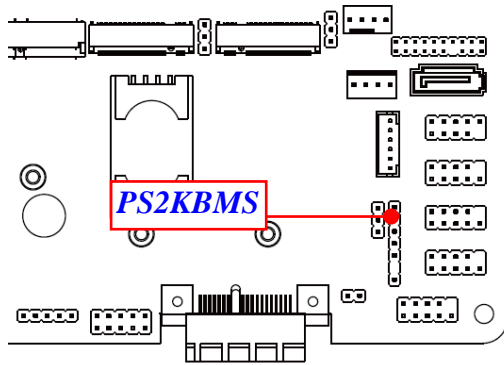
(10) FP_USB21 (9-pin):USB 2.0 Port Header *Pitch=2.54mm*

VCC
-DATA
+DATA
GND
NC

2

Pin 1

VCC
-DATA
+DATA
GND
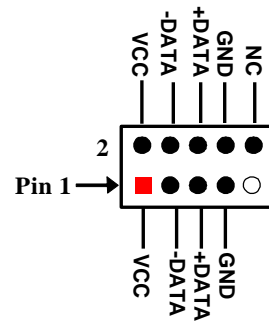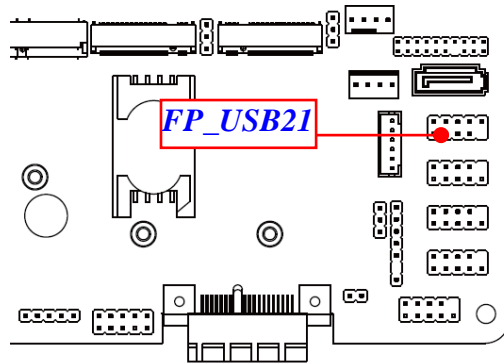
(11)   SIM (6-pin): SIM Card Expansion Wafer   *Pitch=2.0mm*
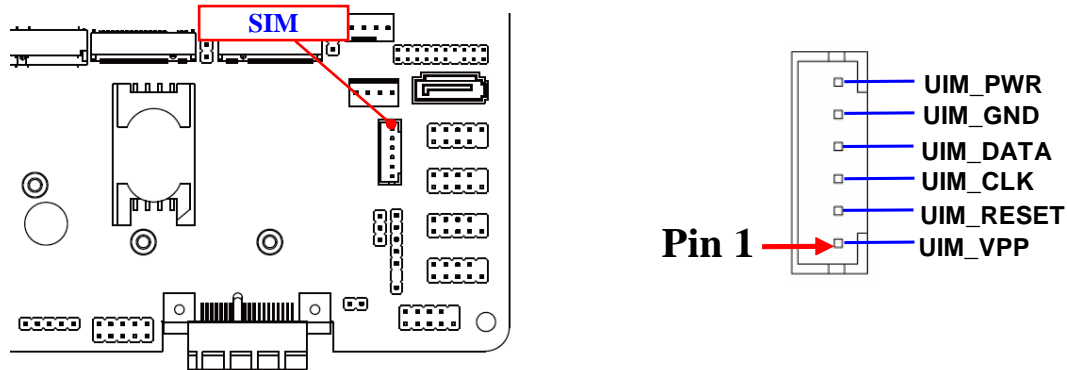
Note: *The board provides internal SIM card slot, and provide SIM card header when user need to insert SIM card externally. Once use SIM card header, the internal SIM card slot will be disable.*

(12)   HDMI1 (19-pin):HDMI Port Header   *Pitch=2.0mm*
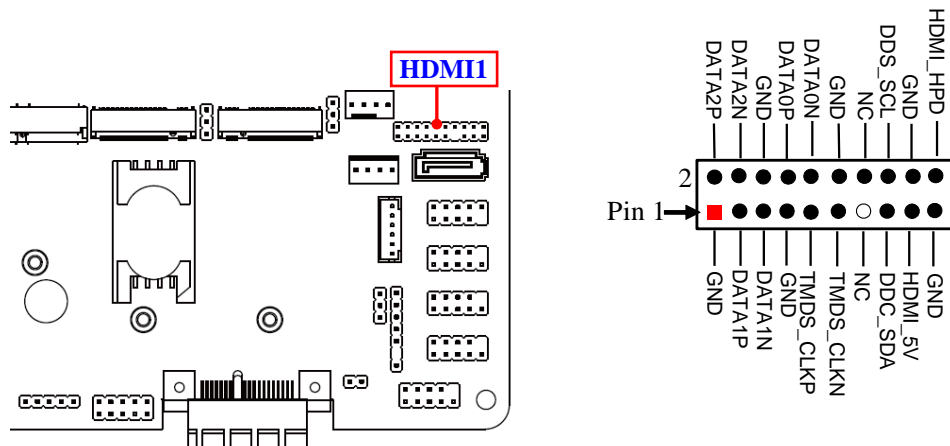
2-2-3 Maximum Voltage & Current Limit

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:

Parts		Working Voltage	Current Support
USB Port from	USB31 (USB 3.1)	5V	900mA
	USB31 (USB 2.0)	5V	500mA
SATAPWR		5V/12V	1A
CPUFAN		12V	1.5A
SMBUS		3.3V	500mA
GPIO		5V	1A
JW_FP		5V	1A
PS2KBMS		5V	500mA
M2E_PWR		3.3V	2A
M2M_PWR		3.3V	2A
M2B_PWR		3.3V	2A

Chapter 3
Introducing BIOS

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

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

3-1 Entering Setup

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

Press **<Del>** to enter Setup; press < **F7**> for Pop Menu.

3-2 BIOS Menu Screen

The following diagram show a general BIOS menu screen:

Menu Bar
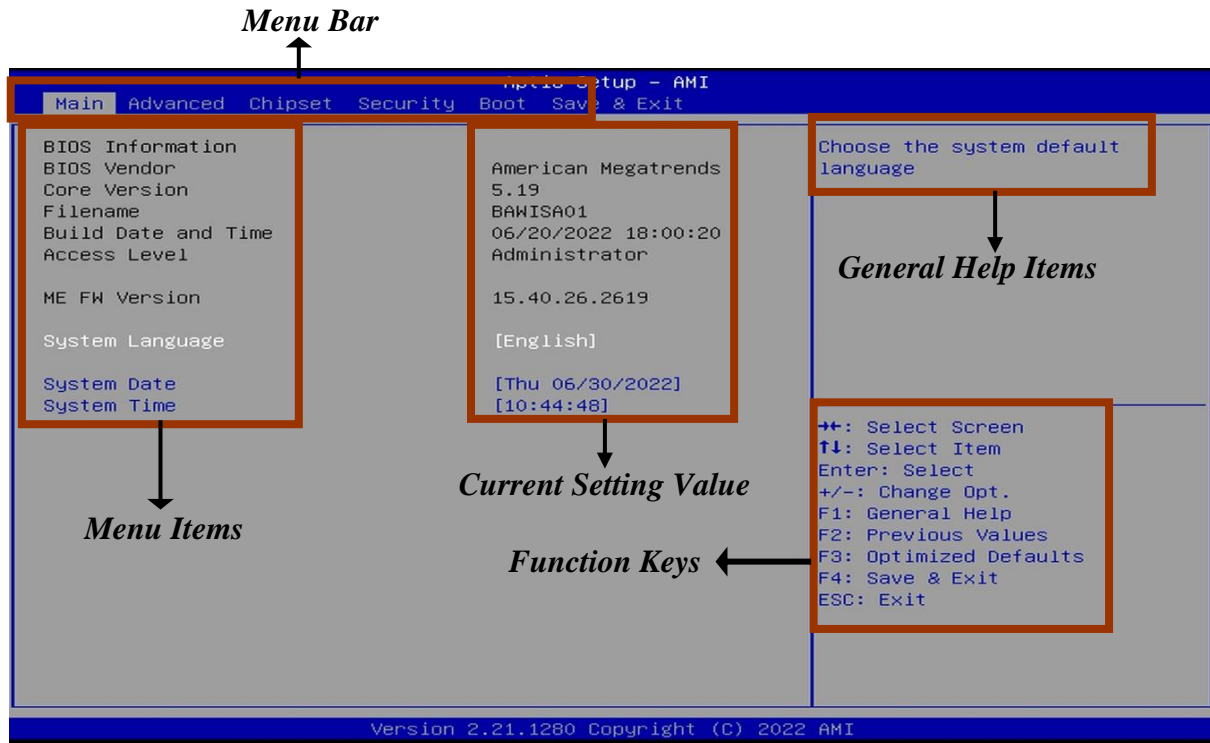
BIOS Menu Screen

3-3 Function Keys

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

- Press←→ (left, right) to select screen;
- Press ↑↓ (up, down) to choose, in the main menu, the option you want to confirm or to modify.
- Press **<Enter>** to select.
- Press **<+>/<–>** keys when you want to modify the BIOS parameters for the active option.
- **[F1]:** General help.
- **[F2]:** Previous 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                                    Choose the system default
    BIOS Vendor                  American Megatrends    language
    Core Version                 5.19
    Filename                     BAWISA01
    Build Date and Time          06/20/2022 18:00:20
    Access Level                 Administrator

    ME FW Version                15.40.26.2619

    System Language              [English]

    System Date                  [Thu 06/30/2022]
    System Time                  [10:44:48]
                                                        →←: 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 data elements.
System Time
Set the time. Please use [Tab] to switch between time elements.

3-7 Advanced Menu


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

   ▶ CPU Configuration                          CPU Configuration Parameters
   ▶ Intel(R) Time Coordinated Computing
   ▶ Trusted Computing
   ▶ ACPI Settings
   ▶ Super IO Configuration
   ▶ 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 enable or disable '**Security Device Support**'.

__Configuration__

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 allow more than two frequency ranges to be supported.

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

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

Turbo Mode

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

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

C states

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

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

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

Enhanced C-states

Use this item to enable or disable C1E.

When enabled, CPU will switch to minimum speed when all cores enter C-State

The optional settings: [Disabled]; [Enabled]

Package C State Limit

Use this item to maximum package C State limit setting. CPU default: Leaves to factory default value. Auto: Initializes to deepest available package C State limit.

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

Power Limit 1 Override

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

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

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

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

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

▸ **Serial Port 1 Configuration/ Serial Port 3 Configuration/ Serial Port 4 Configuration**
Press [Enter] to make settings for the following items:
Serial Port
Use this item to enable or disable serial port (COM).
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.
The optional settings are: [Auto]; [IO=3F8h; IRQ=4]; [IO=2F8h; IRQ=3]; [IO=3E8h; IRQ=4]; [IO=2E8h; IRQ=3] for '**Serial Port 1 Configuration**'.
The optional settings are: [Auto]; [IO=3F8h; IRQ=10]; [IO=2F8h; IRQ=10]; [IO=3E8h; IRQ=10]; [IO=2E8h; IRQ=10]; [IO=2F0h; IRQ=10] ; [IO=2E0h; IRQ=10] for '**Serial Port 3 Configuration**' & '**Serial Port 4 Configuration**'.

▸ **Serial Port 2 Configuration**
Press [Enter] to make settings for the following items:
Serial Port
Use this item to enable or disable serial port (COM).
When set as **[Enabled]**, user can make further settings in the following items:
Change Settings
Use this item to select an optimal settings for Super IO Device.
Use this item to select an optimal setting for super IO device.

The optional settings are: [Auto]; [IO=3F8h; IRQ=4]; [IO=2F8h; IRQ=3]; [IO=3E8h; IRQ=4]; [IO=2E8h; IRQ=3] for '**Serial Port 2 Configuration**'.

Transmission Mode Select

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

Mode Speed Select

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

ERP Support

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

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 JBAT jumper setting for Case Open Detection*); if Pin 7-8 is short, system will show Case Open Message during POST.

WatchDog Reset Timer

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

WatchDog Reset Timer Value

User can 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 are: [Sec.]; [Min.].

WatchDog Wake-up Timer

This item support WDT wake-up.

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

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

WatchDog Wake-up Timer Value

User can select a value in the range of [10] to [4095] seconds when '**WatchDog**

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

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

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

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

> ▸ **Console Redirection Settings**
> The settings specify how the host computer and the remote computer (which the user is using) will exchange data. Both computers should have the same or compatible settings.
> Press [Enter] to make settings for the following items:
> **Terminal Type**
> The optional settings: [VT100]; [VT100+]; [VT-UTF8]; [ANSI].
> Emulation: [ANSI]: Extended ASCII char set; [VT100]: ASCII char set; [VT100+]: Extends VT100 to support color, function keys, etc.; [VT-UTF8]: Uses UTF8 encoding to map Unicode chars onto 1 or more bytes.
> **Bits per second**
> Use this item to select serial port transmission speed. The speed must be matched on the other side. Long or noisy lines may require lower speeds.
> The optional settings: [9600]; [19200]; [38400]; [57600]; [115200].
> **Data Bits**
> The optional settings: [7]; [8].
> **Parity**
> A parity bit can be sent with the data bits to detect some transmission errors.

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

[Even]: parity bit is 0 if the num of 1's in the data bits is even; [Odd]: parity bit is 0 if num of 1's in the data bits is odd; [Mark]: parity bit is always 1; [Space]: Parity bit is always 0; [Mark] and [Space] Parity do not allow for error detection.

Stop Bits

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

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

Flow Control

Flow control can prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a "stop" signal can be sent to stop the data flow. Once the buffers are empty, a "start" signal can be sent to re-start the flow. Hardware flow control uses two wires to send start/stop signals.

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

VT-UTF8 Combo Key Support

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

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

Recorder Mode

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

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

Resolution 100x31

Use this item to enable or disable extended terminal resolution.

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

Legacy OS Redirection Resolution

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

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

Putty KeyPad

Use this item to select FunctionKey and KeyPad on Putty.

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

Serial Port for Out-of-Band Management/

Windows Emergency Management Services (EMS)

Console Redirection EMS
The optional settings: [Disabled]; [Enabled]. When set as [Enabled], the following sub-items shall appear:

▶ **Console Redirection Settings**
The settings specify how the host computer and the remote computer (which the user is using) will exchange data. Both computers should have the same or compatible settings.
Press [Enter] to make settings for the following items:
Out-of-Band Mgmt Port
The optional 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
Use this item to select serial port transmission speed. The speed must be matched on the other side. Long or noisy lines may require lower speeds.
The optional settings: [9600]; [19200]; [57600]; [115200].
Flow Control
Flow control can prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a "stop" signal can be sent to stop the data flow. Once the buffers are empty, a "start" signal can be sent to re-start the flow. Hardware flow control uses two wires to send start/stop signals.
The optional settings: [None]; [Hardware RTS/CTS]; [Software Xon/Xoff].
Data Bits
The default setting is: [8].
This item may or may not show up, depending on different configuration.
Parity
The default setting is: [None].
This item may or may not show up, depending on different configuration.
Stop Bits
The default setting is: [1].

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

▸ **PC Health Status**
Press [Enter] to view current hardware health status, set shutdown temperature, or make further settings in '**Smart Fan Configuration**'.

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

CPUFAN Smart Mode
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 temperature.
CPUFAN Full-Speed Duty
Use this item to set CPUFAN full speed duty. Fan will run at full speed when above the pre-set duty.
CPUFAN Idle-Speed Temperature
Use this item to set CPUFAN idle speed temperature. Fan will run at idle speed when below this temperature.
CPUFAN Idle-Speed Duty
Use this item to set CPUFAN idle speed duty. Fan will run at idle speed when below the pre-set duty.

▸ **USB Configuration**
Press [Enter] to make settings for the following sub-items:
USB Configuration
XHCI Hand-off
This is a workaround for OSes without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.
The optional settings are: [Enabled]; [Disabled].
USB Mass Storage Driver Support
The optional settings are: [Disabled]; [Enabled].
USB Hardware Delays and Time-outs:
USB Transfer Time-out

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

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

Device Reset Time-out

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

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

Device Power-up Delay

Use this item to set maximum time the device will take before it properly reports itself to the host controller.

The optional settings: [Auto]; [Manual].

'Auto' uses default value: for a root port it is 100 ms, for a hub port the delay is taken from hub descriptor.

Select [Manual] you can set value for the following sub-item: '**Device Power-up Delay in Seconds'.**

Device Power-up Delay in Seconds

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

‣ **Network Stack Configuration**

Press [Enter] to go to '**Network Stack**' screen to make further settings.

Network Stack

Use this item to enable or disable UEFI Network Stack.

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

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

Ipv4 PXE Support

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

Use this item to enable Ipv4 PXE Boot Support. When set as [Disabled], Ipv4 boot option will not be created.

Ipv6 PXE Support

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

Use this item to enable Ipv6 PXE Boot Support. When set as [Disabled], Ipv6 boot option will not be created.

PXE boot wait time

Use this item to wait time in seconds to press ESC key to about the PXE boot. Use either +/- or numeric Keys to set the value.

Media Detect Count

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

The optional setting range is 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 on alarm event.

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

When set as [Enabled], system will wake on the hour/min/sec specified.

Wake-up Hour

Use this item to 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 on alarm event.

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

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

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].

LAN3&4 Bypass State @ PowerOn

Use this item to Bypass State at Power On

The optional settings: [Bypass]; [Passthrough].

LAN3&4 Bypass State @ PowerOff

Use this item to Bypass State at Power Off

The optional settings: [Bypass]; [Passthrough].

LAN5&6 Bypass State @ PowerOn

Use this item to Bypass State at Power On

The optional settings: [Bypass]; [Passthrough].

LAN5&6 Bypass State @ PowerOff

Use this item to Bypass State at Power Off

The optional settings: [Bypass]; [Passthrough].

▸ **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

     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

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

User Password

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

▸ **Secure Boot**

Press [Enter] to make customized secure settings:

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




                                                      →←: 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.
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

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


                                                  →←: 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.