MF32 Series

User's Manual

Revision: 2.0

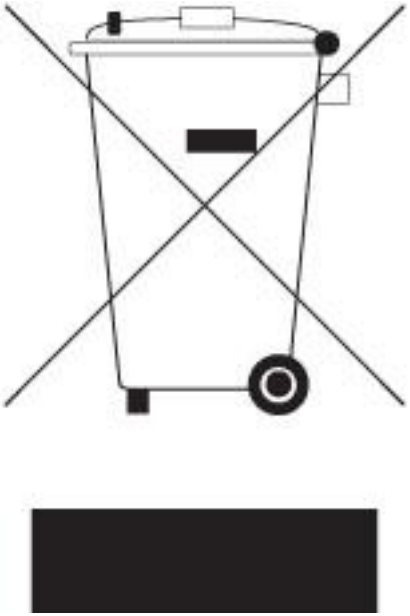
Release date: December 17, 2024

Trademark:

*** Specifications and Information contained in this documentation are furnished for information use only, and are subject to change at any time without notice, and should not be construed as a commitment by manufacturer.**

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.



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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
2.0	Second Edition	December 17, 2024

Item Checklist

☑ Motherboard
☑ Cable(s)

Chapter 1
Introduction of the Motherboard

1-1 Feature of Motherboard

- Onboard Intel® 13th Generation Core™ i5-1335UE / Celeron® U300 Processor SoC, TDP 15W
- Support 1* DDR5 4800MHz SO-DIMM, up to 32GB
- Integrated with 3* Intel® i226-V 2.5GbE, 1* Intel® i226-LM 2.5GbE
- 1* HDMI
- Onboard 1* M.2 M-key slot, type-2242/2280 (PCIe 4.0 x4) supports NVMe
- Onboard 1* M.2 E-key slot, type-2230 (USB2.0/PCIe 3.0 x1) for Wi-Fi / Bluetooth supports Intel CNVio technology
- Onboard 1* M.2 B-key slot, type-3042/3052 (USB 3.2 Gen 1/USB 2.0/PCIe 3.0 x1) support 4G/5G/LTE & 1* SIM card holder
- Onboard 1* 2-pin header and 1* 4-pin header for PoE Modules
- Optional Onboard TPM2.0 (refer to website)
- Support 1* SATAIII device
- Support 2* USB 3.2 Gen.2, 4* USB2.0
- Support 2* COM (***COM2 supports RS232/422/485**)
- Support 19V DC-in
- Support Watchdog function

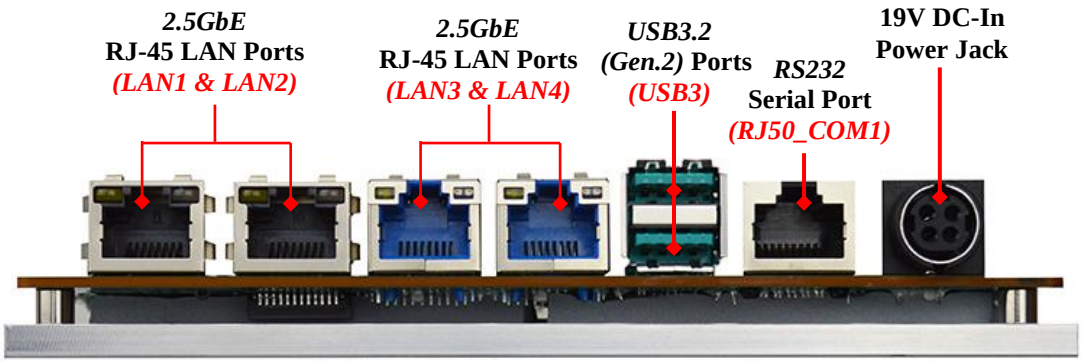
1-2 Specification

Spec	Description
Form Factor	● 3.5” SBC; PCB size: 14.8x 10.2 cm
CPU	● Integrated with Intel® 13th Generation Core™ i5-1335UE / Celeron® U300 Processor SoC, TDP 15W ** **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* DDR5 4800MHz SO-DIMM, up to 32GB ● Support single channel function ***Note:** For more memory compatibility information please consults your local dealer.*
Expansion Slot	● ***M2E1:*** 1* M.2 E-key type-2230 (USB2.0/PCIe 3.0 x1) slot supports CNVio ● ***M2B1:*** 1* M.2 B-key type-3042/3052 (USB 3.2 Gen 1/USB 2.0/PCIe 3.0 x1) slot supports 4G/5G/LTE Module ● ****SIMCARD1:***1* Nano-SIM card slot; co-function with **M2B1 slot** ***Note:** when **M2B1** installed with **4G/5G/LTE module** compatible card should be inserted into **SIMCARD** socket.*
Storage	● ***SATA1:***1* SATAIII 6Gb/s port ● ***M2M2:*** 1* M.2 M-key type-2242/2280 (PCIe 4.0 x4) slot supports NVMe from CPU
LAN Chip	● ***LAN1/LAN2/LAN3:*** 3* Intel **i226-V** LAN chip supports up to 2.5Gbps data transfer rate ● ***LAN4****:* 1* Intel **i226-LM** LAN chip supports up to 2.5Gbps data transfer rate ● Support 10/100/1000/2500Mbps Ethernet data transfer rate ***Note:** A high-speed transmission rate of **2500Mbps** is supported over **CAT 5e UTP cable or higher**.*
Graphics	***Intel® Iris Xe Graphics, shared memory for***: ● 1* HDMI
BIOS	● AMI Flash ROM
Rear I/O	● 4* 2.5GbE LAN port ● 2* USB3.2 Gen.2 port

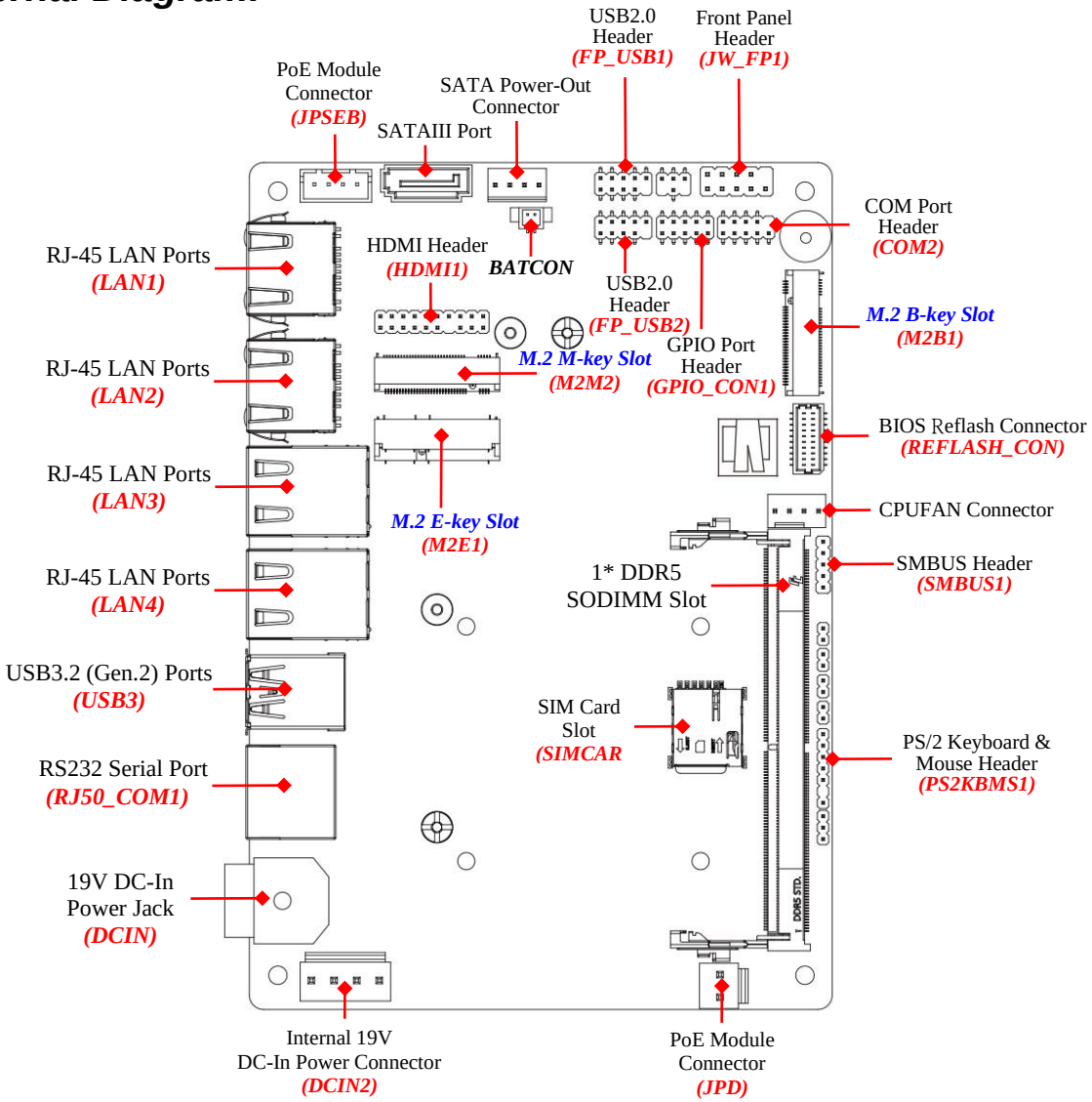
	● 1* RS232 ● 1* 19V DC-in power Jack *(***120W** Power adapter is recommended for stable performance)*
Internal I/O	● 2* 9-pin USB 2.0 header (Expansible to 4* USB 2.0 ports) ● 1* RS232/422/485 Serial port header ● 1* HDMI header ● 1* GPIO 8-bit/80 port header **(selectable by J80PORT1, default GPIO)** ● 1* SMBUS header ● 1* PS2 Keyboard & Mouse header ● 1* CPU FAN header ● 1* SIM Card slot ● 1* Front panel header ● 1* 3-pin internal AT/ATX power header ● 1* SATA power-out connector ● 1* CMOS battery connector
TPM 2.0	● Optional for **MF32-300E2 & MF32-133E2 Series**

1-3 Layout Diagram

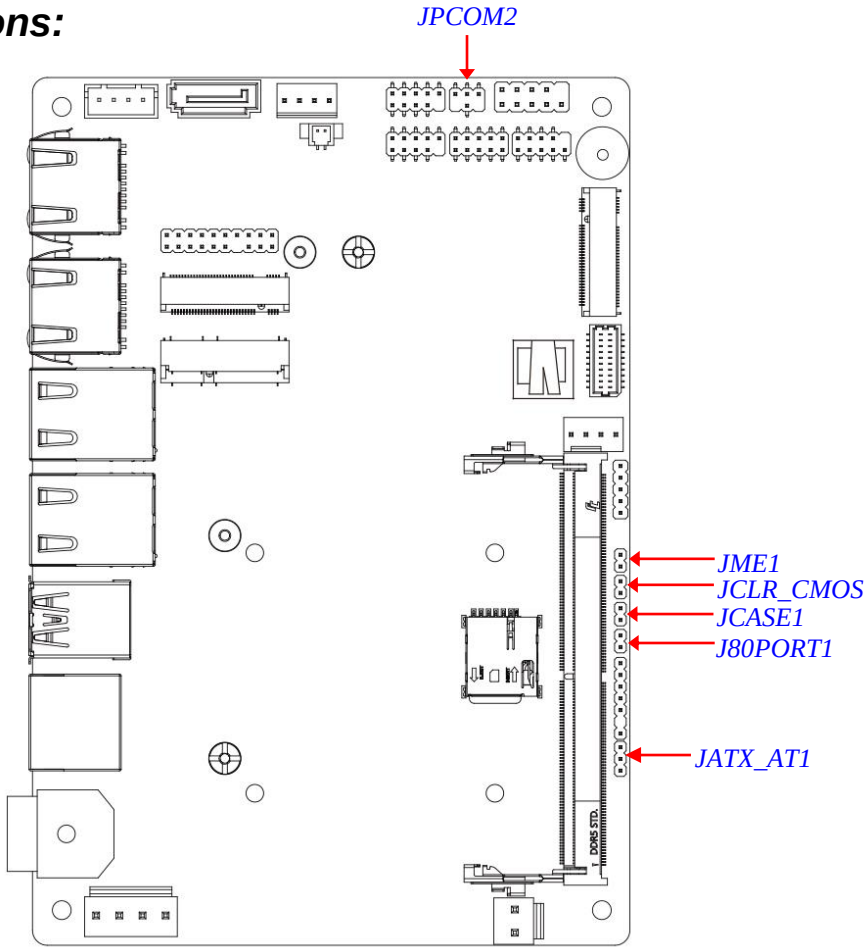
Rear IO Diagram:



Internal Diagram:



Jumper Positions:



Jumpers

Location	Name	Description	Pitch
JPCOM2	COM2 Header Pin-9 Function Select	4-Pin Block	2.0mm
JME1	Flash Override	2-Pin Block	2.0mm
JCLR_CMOS	Clear CMOS	2-Pin Block	2.0mm
JCASE1	Case Open Display Select	2-Pin Block	2.0mm
J80PORT1	Short GPIO	2-Pin Block	2.0mm
JATX_AT1	ATX/AT Mode Select	3-Pin Block	2.0mm

Connectors

Location	Name
LAN1/LAN2/LAN3	Intel **i226-V** 2.5GbE RJ-45 LAN Port Connector
LAN4	Intel **i226-LM** 2.5GbE RJ-45 LAN Port Connector
USB3	USB3.2 Gen. 2 Port Connector X2
RJ50_COM1	RS232 Serial Port Connector
DCIN	19V DC–In Power Jack
DCIN2	Internal 4-Pin 19V DC-in Power Connector
JPSEB	PoE Module Connector
SATA1	SATAIII Port Connector
SATAPW1	SATA Power out Connector
BATCON	CMOS Battery Connector
CPUFAN1	CPUFAN Connector
JPD	Output for PoE Module Connector POWER IN

***Note:** Only one of **DCIN1** or **DCIN2** can be selected at a time as the 19V input power source.*

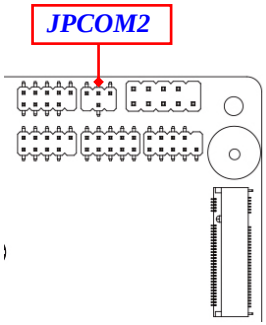
Headers & Wafers

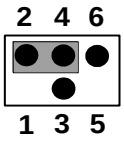
Location	Name	Description	Pitch
HDMI1	HDMI Header	20-pin Block	2.0mm
FP_USB1/ FP_USB2	USB 2.0 Header	9-pin Block	2.0mm
GPIO_CON1	GPIO Port Header	10-pin Block	2.0mm
JW_FP1	Front Panel Header (PWR LED/ HDD LED/Power Button /Reset)	9-pin Block	2.54mm
COM2	RS232/422/485 Serial Port Header	9-pin Block	2.0mm
SMBUS1	SMBUS Header	5-pin Block	2.0mm
PS2KBMS1	PS2 Keyboard & Mouse Header	6-pin Block	2.0mm

Chapter 2
Hardware Installation

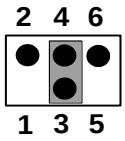
2-1 Jumper Settings

JPCOM2 (4-pin): COM2 Header Pin-9 Function Select (2.0mm pitch)

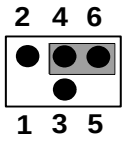




2-4 Closed: RI=RS232 (Default);



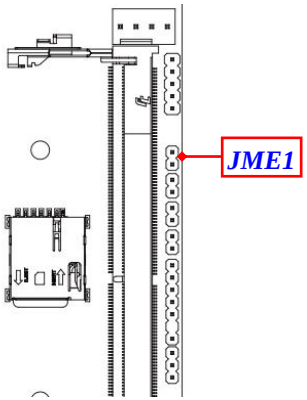
3-4 Closed: RI= +5V;

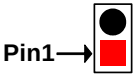


4-6 Closed: RI= +12V.

***Note:** Maximum current limit is 500mA while using 5V or 12V.*

JME1 (2-pin): ME Flash Override Select (2.0mm pitch)

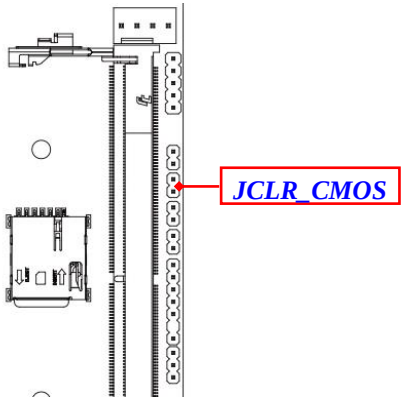


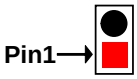


1-2 Open: Normal (Default);

1-2 Closed: ME Flash Override.

JCLR_CMOS (2-pin): Clear CMOS Settings (2.0mm pitch)

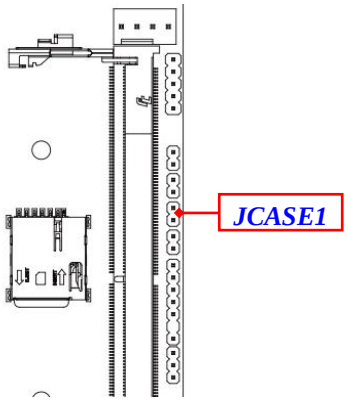


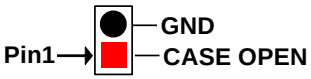


1-2 Open: Normal (Default);

1-2 Closed: Clear CMOS.

JCASE1 (2-pin): Case Open Message Display Function (2.0mm pitch)

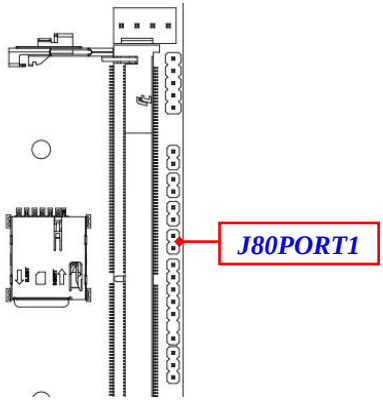


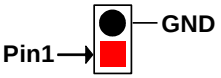


Default: Open.

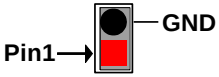
Pin 1-2 Short: *When Case open function pin short to GND, the Case open function was detected. When Used, needs to enter BIOS and enable 'Case Open Detect' function. In this case if your case is removed, next time when you restart your computer, a message will be displayed on screen to inform you of this.*

J80PORT1 (2-pin): GPIO_CON1 80 Port/GPIO Function Select (2.0mm pitch)





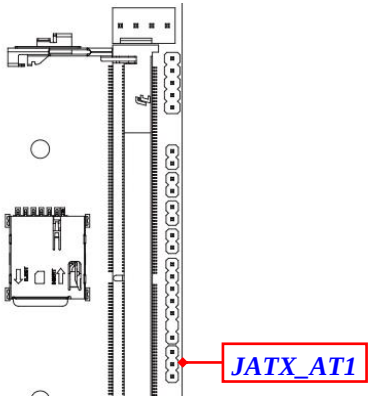
1-2 Open: GPIO_CON=80 Port;

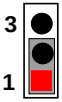


1-2 Closed: GPIO_CON=GPIO Port (Default)

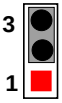
***Note:** Maximum current limit is **1.0A** while using 5V working voltage.*

JATX_AT1 (3-pin): AT Mode /ATX Mode Select (2.0mm pitch)





1-2 Closed: ATX Mode Selected (Default);



2-3 Closed: AT Mode Selected.

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

2-2 Connectors, Headers and Wafers

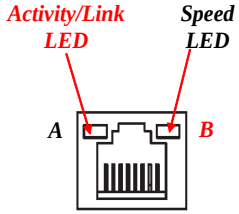
2-2-1 Rear I/O Panel Connectors

Icon	*Name*	*Function*
	**RJ-45 LAN Port**	**RJ-45 LAN Port:** This connector is standard RJ-45 LAN jack for Network connection which supports10/100/1000/2500 Mbps Ethernet data transfer rate ***(*Note: 2.5Gbps** is **only** supported with **CAT 5e UTP cable).***
	**RJ-45 LAN Port**	**RJ-45 LAN Port:** This connector is standard RJ-45 LAN jack for Network connection which supports10/100/1000/2500 Mbps Ethernet data transfer rate ***(*Note: 2.5Gbps** is **only** supported with **CAT 5e UTP cable).***

	**USB3.2 Gen. 2 Port**	**USB3.2 Gen.2 Port:** to connect USB keyboard, mouse or other devices compatible with USB3.2 Gen. 2 specification. Ports support up to 10Gbps data transfer rate.
	**RS232 Serial Port**	Mainly for user to connect external MODEM or other devices that supports Serial Communications Interface.
	**19V DC-in Power Jack**	For user to connect compatible power adapter to provide power supply for the system.

(1) 2.5GbE RJ-45 Ethernet Connectors

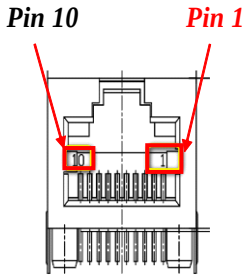
*** There are two LED next to the RJ-45 LAN port. Please refer to the table below for LAN port LED indications.*



A: Activity/Link LED		B: Speed LED	
Status	**Description**	**Status**	**Description**
Off	No Link	Off	10/100Mbps connection
Blinking	Data Activity	**Orange**	1000Mbps connection
On	Link	**Green**	2.5Gbps connection

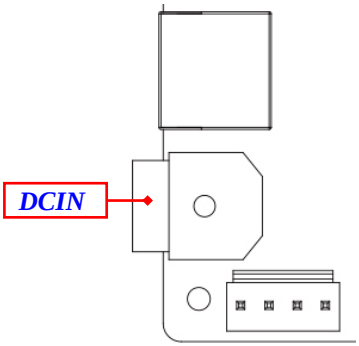
** **Note:** **2.5Gbps** high-speed transmission rate is **only** supported over **CAT 5e UTP cable**.*

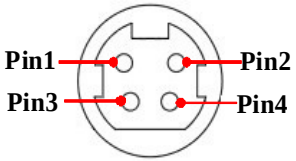
(2) RJ-50 RS232 Serial Port



Pin No.	Signal	Pin No.	Signal
1	N.C	6	GND
2	RI-	7	DTR-
3	CTS-	8	SO-
4	RTS-	9	SIN-
5	DSR-	10	DCD

(3) DCIN (4-pin): Mini-DIN 19V DC-In Power Connector

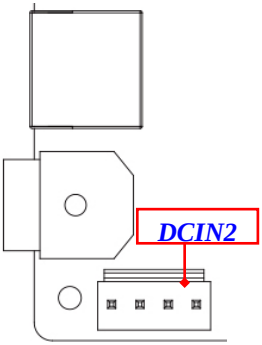


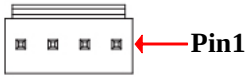


Pin No.	Definition
1	+19V DC_IN
2	+19V DC_IN
3	GND
4	GND

2-2-2 Motherboard Internal Connectors

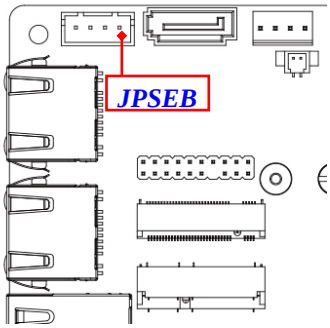
(1) DCIN2 (4-pin): Internal 19V DC-in Power Connector (3.96mm pitch)

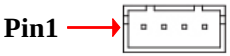




Pin No.	Definition
1	+19V DC-In
2	+19V DC-In
3	GND
4	GND

(2) JPSEB (4-pin): PoE Module Connector (2.5mm pitch)

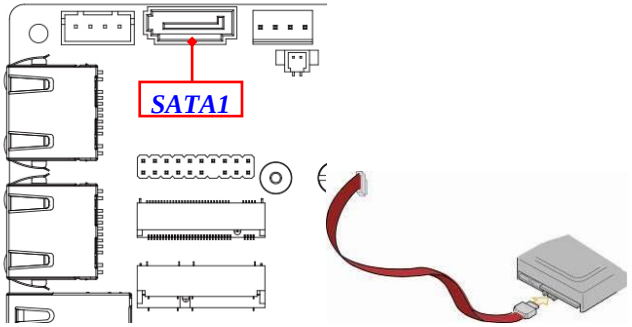




Pin No.	Definition
1	POE-PORT1B_N
2	POE-PORT1B_P
3	POE-PORT2B_P
4	POE-PORT2B_N

(3) SATA1 (7-pin): SATAIII Port connector

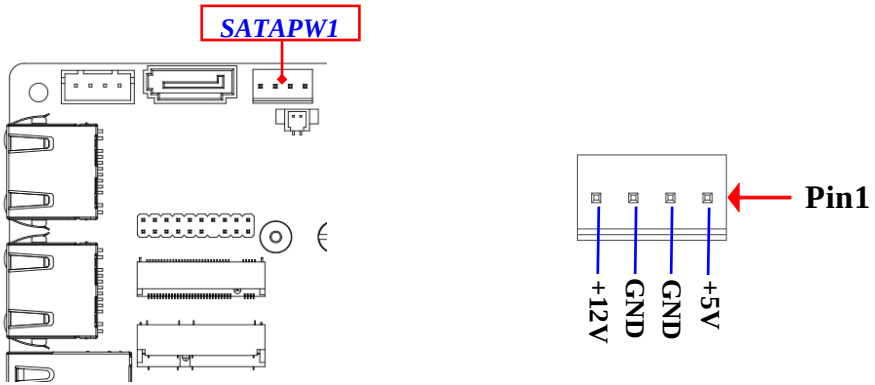
This is a high-speed SATAIII port that supports 6GB/s transfer rate.



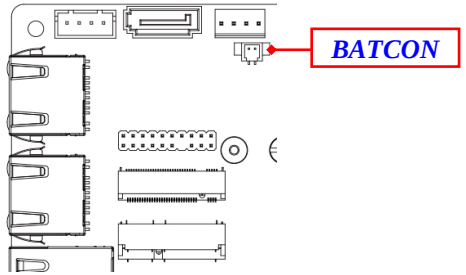
Pin No.	Definition
1	GND
2	TXP
3	TXN
4	GND
5	RXN
6	RXP
7	GND

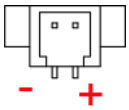
(4) SATAPW1 (4-pin): SATA HDD Power-Out Connector

Warning: *Make sure that Pin-1 of compatible SATA Power out connector is inserted into corresponding Pin-1 of* ***SATAPW1*** *connector to avoid possible damage to the board and hard disk driver!*

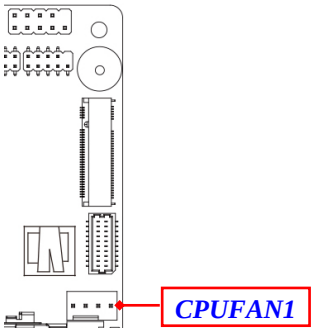


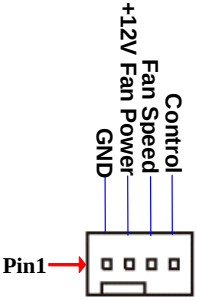
(5) BATCON (2-pin): CMOS Battery Connector





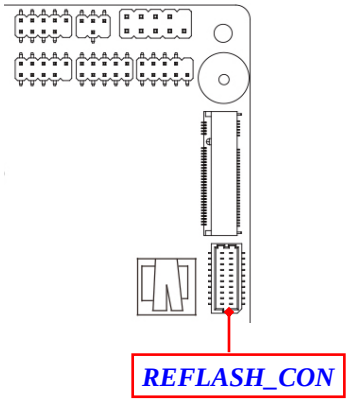
(6) CPUFAN1 (4-pin): CPU FAN Connector

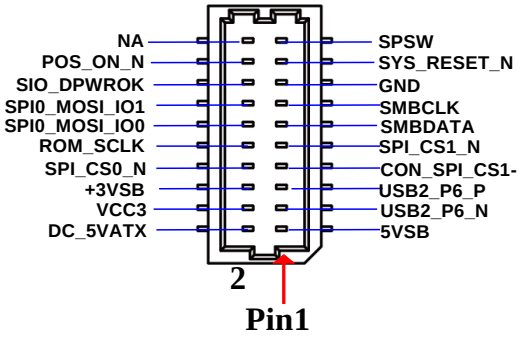




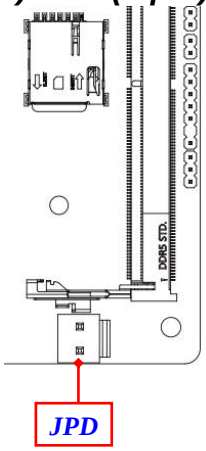
***Note:** Maximum current limit is **1.5A** while using 12V working voltage.*

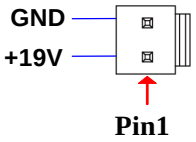
(7) REFLASH_CON (20-pin): BIOS Reflash Connector (1.0mm pitch)





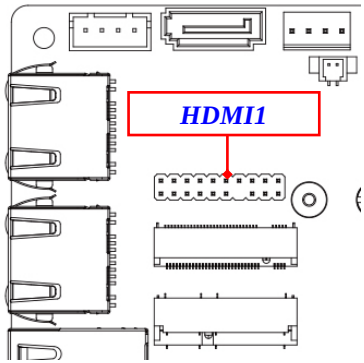
(8) JPD (2-pin): PoE Module Connector (3.96mm pitch)

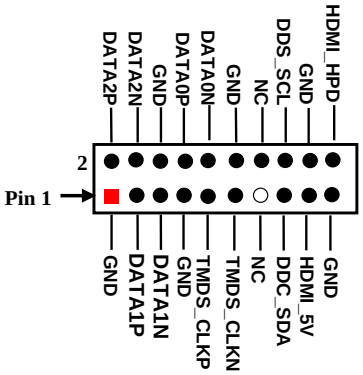




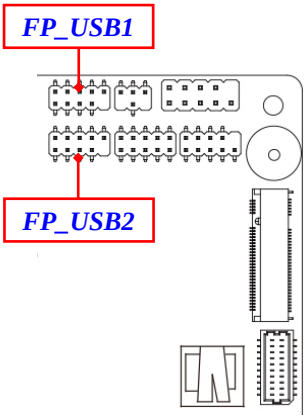
2-2-3 Pin Definition for Headers & Wafers

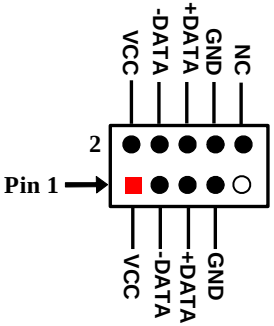
HDMI1 (19-pin): HDMI Port Header (2.0mm pitch)





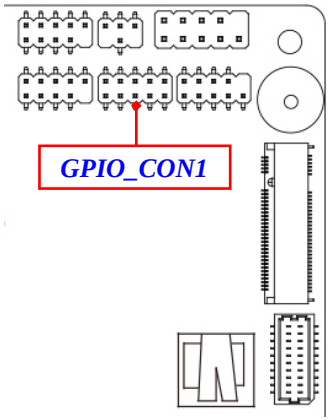
FP_USB1 / FP_USB2 (9-pin): USB2.0 Header (2.0mm pitch)

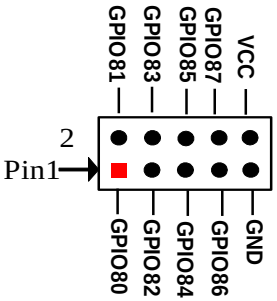




***Note:** Maximum current limit is **1.0A** in total while using 5V working voltage.*

GPIO_CON1 (10-pin): GPIO 8-bit Port or 80 Port Header (2.0mm pitch)

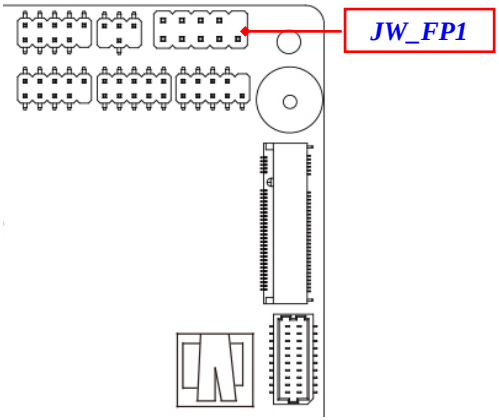


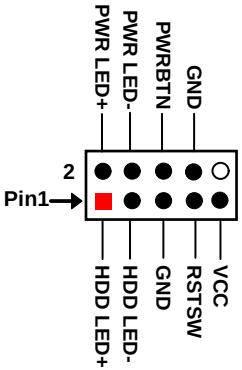


J80PORT1 Closed: Normal 8-bit GPIO;
J80PORT1 Open: For 80Port Function.

Note*: ***1. Maximum* *current limit is 1.0A while using 5V working voltage;* ***2.*** *Please refer to* ***Page-9 J80PORT1*** *jumper settings for* ***GPIO_CON1 80Port*** *or* ***GPIO Port*** *function select.*

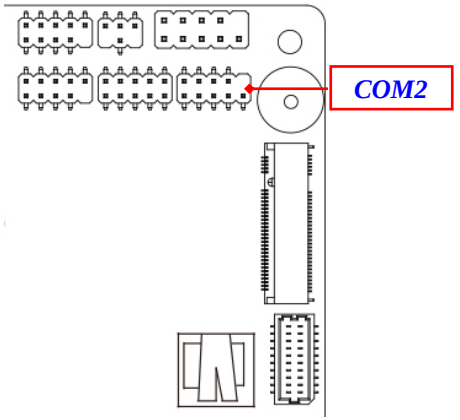
JW_FP1 (8-pin): Front Panel Header (2.54mm pitch)

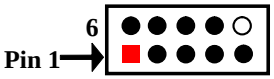




***Note:** Maximum current limit is **1A** while using 5V working voltage.*

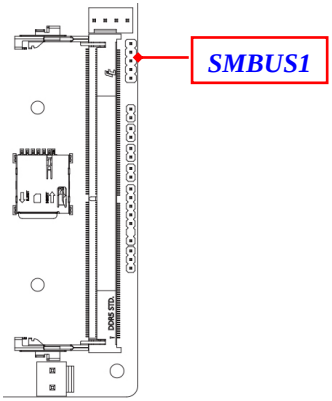
COM2 (9-pin): RS232/422/485 Serial Port Headers (2.0mm pitch)

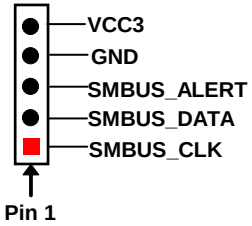




Pin NO.	RS232	*RS422*	*RS485*
Pin 1	DCD	TX-	DATA-
Pin 2	**SIN**	TX+	DATA+
Pin 3	**SO-**	RX+	NC
Pin 4	DTR	RX-	NC
Pin 5	GND	GND	GND
Pin 6	DSR-	NC	NC
Pin 7	RTS-	NC	NC
Pin 8	CTS-	NC	NC
Pin 9	RI-	NC	NC

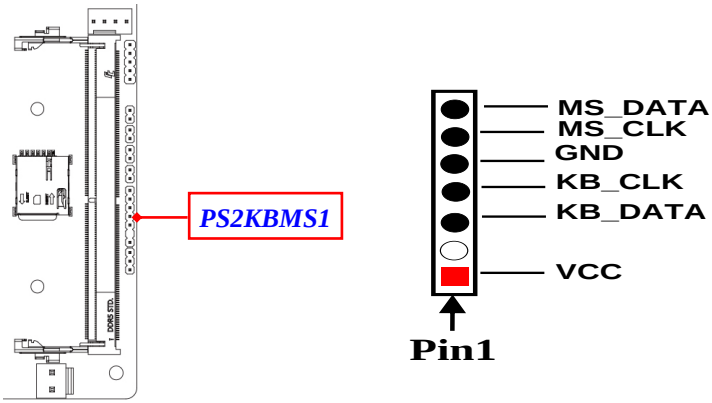
SMBUS1 (5-Pin): SMBUS Header (2.0mm pitch)





***Note:** Maximum current limit is **500mA** while using **3V** working voltage.*

PS2KBMS1 (6-pin): PS/2 Keyboard & Mouse Header (2.0mm pitch)



***Note:** Maximum current limit is **0.5A** while using 5V working voltage.*

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 and headers) for setup reference:

Parts		Working Voltage	Current Support
USB Ports from	***USB3***	5V	900mA x2
	FP_USB1/ FP_USB 2	5V	1.0A
RJ50_COM1		5V/12V	0.5A
COM2		5V/12V	0.5A
SATAPW1		5V/12V	1.0A
CPUFAN1		12V	1.5A
JW_FP1		5V	1A
GPIO_CON1		5V	1.0A
SMBUS1		3.3V	0.5A
PS2KBMS1		5V	0.5A

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

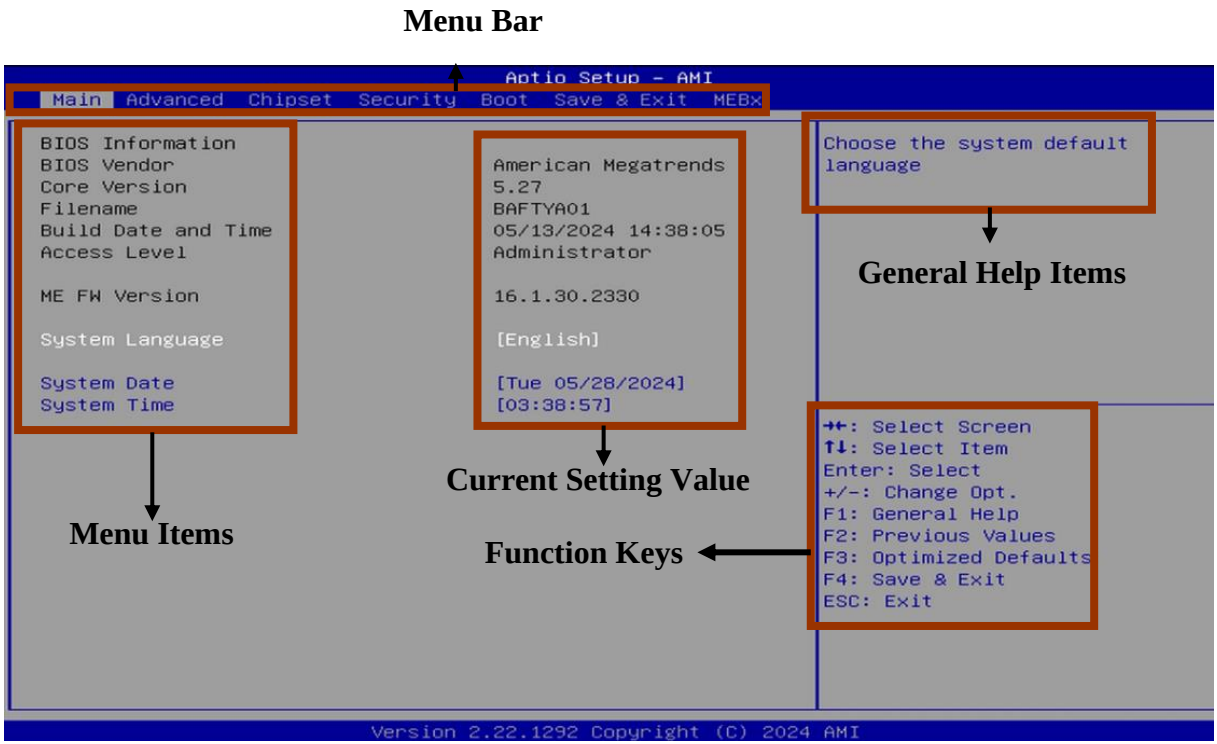
Power on the computer and by pressing <Del> immediately allows you to enter Setup. If the message disappears before your respond and you still wish to enter Setup, restart the system to try again by turning it OFF then ON or pressing the “RESET” button on the system case. You may also restart by simultaneously 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 values.
- [F3]: Optimized defaults.
- [F4]: Save & Exit.
- Press <Esc> to exit from 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

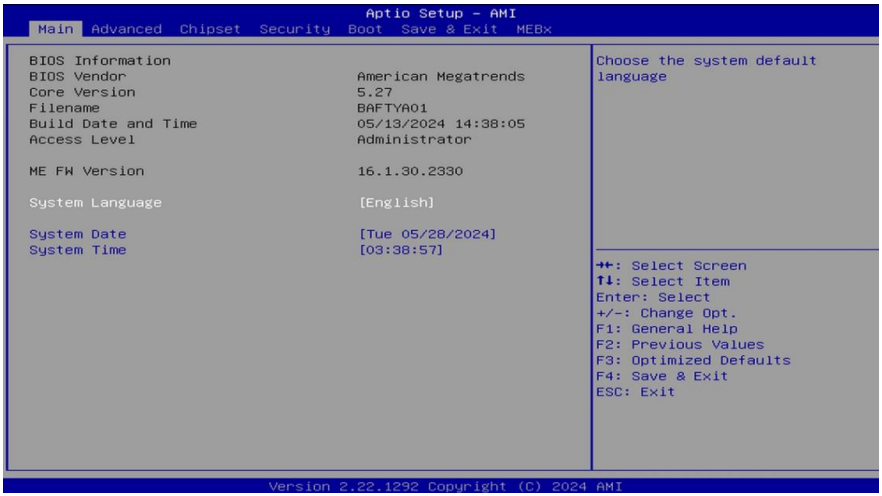
There are six menu bars on top of BIOS screen:

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.

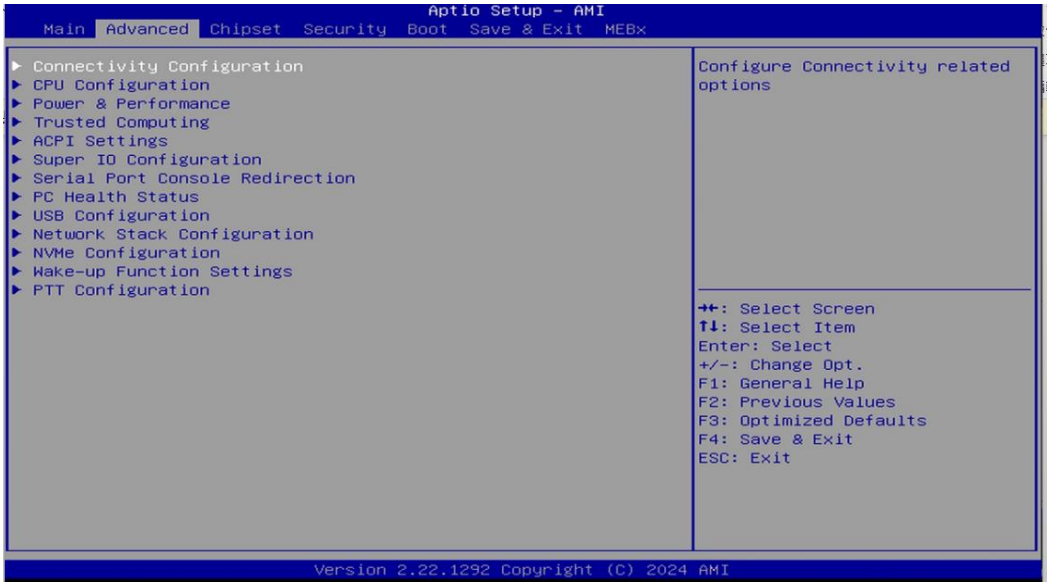
3-6 Main Menu

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.



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



- **Connectivity Configuration**
  Use this item to configure Connectivity related options. Press [Enter] to make settings for the following sub-items:
  CNVi CRF Present
  CNVi Mode
  This option configures Connectivity.
  CNVi Mode Set the default value to: [Auto Detection]
  The optional settings: [Disabled Integrated]; [Auto Detection].
  [Auto Detection] means that if Discrete solution is discovered it will be enabled

by default. Otherwise Integrated solution (CNVi) will be enabled;
[Disabled Integrated] disables Integrated Solution.

- **CPU Configuration**

Press [Enter] to view current CPU configuration and make settings for the following sub-items:

- **Efficient-Core Information**

Use this item to displays the E-Core information.
Press [Enter] to make settings for the following sub-items:

L1 Date Cache/L1 Instruction Cache/L2 Cache/L3 Cache

- **Performance-Core Information**

Use this item to displays the P-Core information.
Press [Enter] to make settings for the following sub-items:

L1 Date Cache/L1 Instruction Cache/L2 Cache/L3 Cache

Boot Performance Mode

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

Boot Performance Mode Set the default value to: [Turbo Performance]

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

Intel(R) SpeedStep(tm)

This item allows more than two frequency ranges to be supported.
Intel(R) SpeedStep(tm) Set the default value to: [Enabled]

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

Turbo Mode

Use this item to enable or disable processor Turbo Mode (requires Intel Speed Step or Intel Speed Shift to be available and enabled).
Turbo Mode Set the default value to: [Enabled]

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

***Note:** **'Turbo Mode'** is only for MF32 single board model; Disabled only for*

Barebone model used).

C states

Use this item to enable or disable CPU Power Management. When set as [Enabled], it allows CPU to go to C states when it's not 100% utilized.

C states Set the default value to: [Enabled]

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

Enhanced C-states

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

Enhanced C-states Set the default value to: [Enabled]

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.

Package C State Limit Set the default value to: [Auto]

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

- **Power & Performance**

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

Power & Performance

- **CPU – Power Management Control**

CPU-Power Management Control Options.

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

Power Limit 1

Use this item to set Power Limit 1 in Milli Watts. BIOS will round to the nearest 1/8W when programming.

0 = no custom override. For 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 Processor Base Power (TDP) Limit. If value is 0, BIOS will program Processor Base Power (TDP)

value.
Power Limit 1 Set the default value to: [0]

Power Limit 1 Time Window

Use this item to set 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 Processor Base Power (TDP) value should be maintained.

Power Limit 1 Time Window Set the default value to: [0]

The optional settings are: [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

Use this item to set Power Limit 2 Value in Milli Watts. BIOS will round to the nearest 1/8W when programming.

0=no custom override. For 12.50w, enter 12500. Processor applies control policies such that the package power does not exceed this limit.

Power Limit 2 Set the default value to: [0]

Power Limit 4 Override

Use this item to enabled/disable power Limit 4 override. If this option is disabled, BIOS will program the default values for Power Limit 4.

Power Limit 4 Override Set the default value to: [Disabled]

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

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

Power Limit 4

Use this item to power Limit 4 in Milli watts. BIOS will round to the nearest 1/8W when programming. For 12.50W, enter 12500. If the value is 0, BIOS leaves default.

Power Limit 4 Set the default value to: [0]

- **GT-Power Management Control**

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

RC6(Render Standby)

Use this item to check to enable render standby support.

RC6(Render Standby) Set the default value to: [Enabled]

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

Maximum GT frequency

Use this item to Maximum GT frequency limited by the user. Choose between 200MHZ (RPN) and 1200MHZ (RP0). Value beyond the range will be clipped to min/max supported by SKU.

Maximum GT frequency Set the default value to: [Default Max Frequency]

The optional settings: [Default Max Frequency]; [100Mhz] ; [150Mhz] ; [200Mhz] ; [250Mhz] ; [300Mhz] ; [350Mhz] ; [400Mhz] ; [450Mhz] ; [500Mhz] ; [550Mhz] ; [600Mhz] ; [650Mhz] ; [700Mhz] ; [750Mhz] ; [800Mhz] ; [850Mhz] ; [900Mhz] ; [950Mhz] ; [1000Mhz] ; [1050Mhz] ; [1100Mhz] ; [1150Mhz] ; [1200Mhz].

Disable Turbo GT frequency

Use this item to enabled: disables turbo GT frequency. Disabled: GT frequency is not limited.

Disable Turbo GT frequency Set the default value to: [Disabled]

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

- **Trusted Computing**

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

  Security Device Support

  Use this item to enables or disables 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].

  Security Device Support Set the default value to: [Enabled]

  When set as [Enabled], user can make setting in the following items that appear:

  SHA256 PCR Bank

  Use this item to enable or disable SHA256 PCR Bank.

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

  SHA256 PCR Bank Set the default value to: [Enabled]

  SHA384 PCR Bank

Use this item to enable or disable SHA384 PCR Bank.
The optional settings: [Disabled]; [Enabled].
SHA384 PCR Bank Set the default value to: [Disabled]

Pending Operation

Use this item to schedule an operation for security device.
The optional settings: [None]; [TPM Clear].
Pending Operation Set the default value to: [None]

Note: Your computer will reboot during restart in order to change State of Security Device.

- **ACPI Settings**

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

ACPI Settings

ACPI Sleep State

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

- **Super IO Configuration**

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

Super IO Configuration

- **Serial Port 1 Configuration**

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

Serial Port

Use this item to enable or disable serial port (COM).
The optional settings: [Disabled]; [Enabled].
Serial Port Set the default value to: [Enabled]
When set as [Enabled], user can make settings in the following items that appear:

Change Settings

Use this item to select an optimal settings for super IO device.
The optional settings are: [Auto]; [IO=3F8h; IRQ=4]; [IO=2F8h; IRQ=3]; [IO=3E8h;

IRQ=4]; [IO=2E8h; IRQ=3].

Change Settings Set the default value to: [Auto]

- **Serial Port 2 Configuration**

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

  Serial Port

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

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

  Serial Port Select Set the default value to: [Enabled]

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

  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].

  Change Settings Set the default value to: [Auto]

  Transmission Mode Select

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

  Transmission Mode Select Set the default value to: [RS232]

  Mode Speed Select

  Use this item to RS232/RS422/RS485 Speed Select.

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

  Mode Speed Select Set the default value to: [RS232=1Mbps, RS422/RS485=10Mbps]

  ERP Support

  Use this item to make setting for energy-related products function. Disable ERP to active all wake-up function.

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

  ERP Support Set the default value to: [Disabled]

  Case Open Detect

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

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

Case Open Detect Set the default value to: [Disabled]
When set as [Enabled], system will detect if COPEN has been short or not (*refer to **JCASE1** jumper setting for Case Open Detection*); if Pin 1&2 of ***JCASE1*** are short, system will show Case Open Message during POST.

WatchDog Reset Timer
Use this item to support WDT reset function.
The optional settings: [Disabled]; [Enabled].
WatchDog Reset Timer Set the default value to: [Disabled]
When set as [Enabled], user can make settings in the following items that appear:
WatchDog Reset Timer Value
User can set a value in the range of [10] to [255] seconds or [1] to [255] minutes.
WatchDog Reset Timer Value Set the default value to: [10]
WatchDog Reset Timer Unit
The optional settings are: [Sec.]; [Min.].
WatchDog Reset Timer Unit Set the default value to: [Sec]
WatchDog Wake-up Timer
Use this item to support WDT Wake-up.
The optional settings are: [Disabled]; [Enabled].
WatchDog Wake-up Timer Set the default value to: [Disabled]
When set as [Enabled], user can make settings in the following items that appear:
WatchDog Wake-up Timer Value
User can set a value in the range of [10]~[4095] seconds, or [1]~[4095] minutes.
WatchDog Reset Timer Value Set the default value to: [10]
WatchDog Wake-up Timer Unit
The optional settings are: [Sec.]; [Min.].
WatchDog Reset Timer Unit Set the default value to: [Sec]

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 J**ATX_AT1** jumper setting Pin 1&2 of for **ATX Mode** & Pin 2&3 of **AT Mode**

Select).

- **Serial Port Console Redirection**

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

  COM1

  Console Redirection

  Console Redirection enable or disable.

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

  Console Redirection Set the default value to: [Disabled]

  When set as **[Enabled**], user can make further settings in the '**Console Redirection Settings**' screen:

- **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：

  Terminal Type

  The optional settings: [VT100]; [VT100Plus]; [VT-UTF8]; [ANSI].

  [ANSI]: Extended ASCII char set;

  [VT100]: ASCII char set;

  [VT100Plus]: Extends VT100 to support color, function keys, etc.

  [VT-UTF8]: Uses UTF8 encoding to map Unicode chars onto 1 or more bytes.

  Terminal Type Set the default value to: [ANSI]

  Bits per second

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

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

  Bits per second Set the default value to: [115200]

  Data Bits

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

  Data Bits Set the default value to: [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;
Parity Set the default value to: [None]
[Mark] and **[Space]**: parity do not allow for error detection. They can be used as an additional data bit.

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].
Stop Bits Set the default value to: [1]

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].
Flow Control Set the default value to: [None]

VT-UTF8 Combo Key Support

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

Recorder Mode

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

The optional settings: [Disabled]; [Enabled].
Recorder Mode Set the default value to: [Disabled]

Resolution 100x31

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

Putty KeyPad

Use this item to select FunctionKey and KeyPad on Putty.
The optional settings: [VT100]; [LINUX]; [XTERMR6]; [SCO]; [ESCN]; [VT400].
Putty KeyPad Set the default value to: [VT100]

- **Legacy Console Redirection Settings**

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

  Redirection COM Port

  Use this item to select a COM port to display redirection of Legacy OS and Legacy OPROM Messages.
  The optional settings: [COM1].
  Redirection COM Port Set the default value to: [COM1]

  Resolution

  Use this item to on legacy OS, the number of rows and columns supported redirection.
  The optional settings: [80x24]; [80x25].
  Resolution Set the default value to: [80x24]

  Redirect After POST

  When bootloader is selected, then legacy console redirection is disabled before booting to legacy OS. When always enable is selected, the legacy console redirection is enabled for legacy OS. Default setting for this option is set to always enable.
  The optional settings: [Always Enable]; [BootLoader].
  Redirect After POST Set the default value to: [Always Enable]

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

Console Redirection EMS

Use this item to enable or disable console redirection.

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

Console Redirection EMS Set the default value to: [Disabled]

When set as **[Enabled]**, user can make further settings in '**Console Redirection Settings**' screen:

- **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.

Terminal Type EMS

The optional settings: [VT100]; [VT100Plus]; [VT-UTF8]; [ANSI].

[VT-UTF8] is the preferred terminal type for out-of-band management. The next best choice is **[VT100+]** and then **[VT100]**. See above, in Console Redirection Settings page, for more help with Terminal Type/Emulation.

Terminal Type EMS Set the default value to: [VT-UTF8]

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].

Bits per second EMS Set the default value to: [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].

Flow Control EMS Set the default value to: [None]

Data Bits EMS

The default setting is: [8].
**This item may or may not show up, depending on different configuration.*

Parity EMS

The default setting is: [None].
**This item may or may not show up, depending on different configuration.*

Stop Bits EMS

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**' and set value in '**Shutdown Temperature**'.

- **SmartFAN Configuration**

  Press [Enter] to make settings for SmartFAN Configuration:

  SmartFAN Configuration

  CPUFAN Smart Mode
  The optional settings: [Disabled]; [Enabled].
  CPUFAN Smart Mode Set the default value to: [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 Temperature Set the default value to: [75]
  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 Full-Speed Duty Set the default value to: [100]
  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 Temperature Set the default value to: [40]
  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.

CPUFAN Idle-Speed Duty Set the default value to: [40]

- **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: [Enabled]; [Disabled].

XHCI Hand-off Set the default value to: [Enabled]

USB Mass Storage Driver Support

Use this item to enable or disable USB Mass storage driver support.

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

USB Mass Storage Driver Support Set the default value to: [Enabled]

USB hardware delay and time-out

USB Transfer time-out

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

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

USB Transfer time-out Set the default value to: [20 sec]

Device reset time-out

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

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

Device reset time-out Set the default value to: [20 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. ‘Auto’ uses default value: for a root port it is 100 ms, for a hub port the delay is taken from hub descriptor.

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

Device power-up delay Set the default value to: [Auto]

Select **[Manual]** you can set value for the following sub-item: '**Device power-up delay in seconds**'**,** the delay range is 1 .. 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].
Network Stack Set the default value to: [Disabled]
When set as **[Enabled]**, the following sub-items shall appear:

IPv4 PXE Support

Use this item to enable/disable IPv4 PXE Boot Support. When set as [Disabled], IPv4 PXE boot support will not be available.
The optional settings: [Disabled]; [Enabled].
IPv4 PXE Support Set the default value to: [Enabled]

IPv6 PXE Support

Use this item to enable/disable IPv6 PXE Boot Support. When set as [Disabled], IPv6 PXE boot support will not be available.
The optional settings: [Disabled]; [Enabled].
IPv6 PXE Support Set the default value to: [Disabled]

PXE boot wait time

Wait time in seconds to press [ESC] key to abort the PXE boot.
Use either [+]/[-] or numeric keys to set the value.
PXE boot wait time Set the default value to: [5]

Media detect count

Use this item to set number of times presence of media will be checked.
Use either [+]/[-] or numeric keys to set the value.
Media detect count Set the default value to: [2]

- **NVMe Configuration**

Use this item to set NVMe Device options settings.

NVMe Configuration

- **Wake-up Function Settings**

Wake-up System With Fixed Time

This item will only show when* *'Wake-up System with Dynamic Time'*** *is set as [Disabled].*

Use this item to enable or disable system wake-up by RTC alarm. When this function is enabled, system will wake on the time (hr::min::sec) specified.

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

Wake-up System With Fixed Time Set the default value to: [Disabled]

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

Wake-up Hour

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

Wake-up Hour Set the default value to: [0]

Wake-up Minute

Use this item to select 0-59.

Wake-up Minute Set the default value to: [0]

Wake-up Second

Use this item to select 0-59.

Wake-up Second Set the default value to: [0]

Wake-up System with Dynamic Time

This item will only show when* *'Wake-up System with Fixed Time'*** *is set as [Disabled].*

Use this item to enable or disable system wake-up by RTC alarm. When enabled, system will wake on the current time + Increase minute(s).

Wake-up System with Dynamic Time Set the default value to: [Disabled]

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

Wake-up Minute Increase

Use this item to select 1-60 minute(s).

Wake-up Minute Increase Set the default value to: [1]

PS2 KB/MS Wake-Up from S3-A5

Use this item to PS2 KB/MS Wake-up is affected by ERP function in S4-S5. Please disable ERP before activating this function in S4-S5.
PS2 KB/MS Wake-Up from S3-A5 Set the default value to: [Disabled]

USB Power Gating S4-S5

USB Wake-up is affected by ERP function in S4. Please disable ERP before activating this function in S4.
The optional settings: [Disabled]; [Enabled].
USB Power Gating S4-S5 Set the default value to: [Enabled]

PCIE Wake-up from S3-S5

The optional settings: [Disabled]; [Enabled].
PCIE Wake-up from S3-S5 Set the default value to: [Disabled]

- **PTT Configuration**

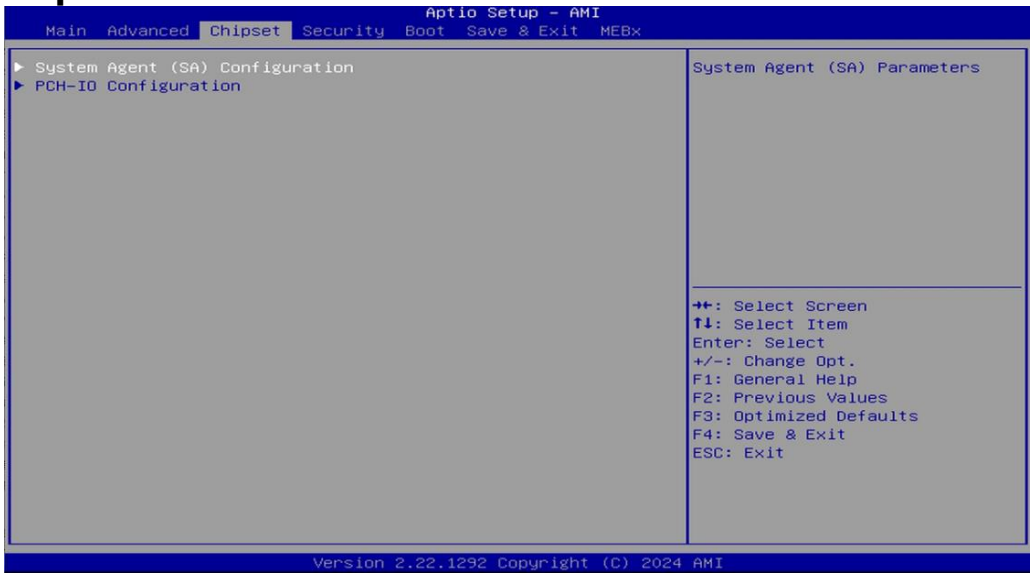
Press [Enter] to make settings for the following sub-items:

PTT Capability/state

TPM Device Selection

TPM Device Selection Set the default value to: [dTPM]

3-8 Chipset Menu



- **System Agent (SA) Configuration**

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

  System Agent (SA) Configuration

  - **VMD Setup Menu**

  Press [Enter] to view brief information for the working memory module.

- **VMD setup menu**

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

  Enable VMD controller

  Use this item to enable/disable to VMD controller.

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

  Enable VMD controller Set the default value to: [Disabled]

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

  Enable VMD Global Mapping

  Use this item to enable/disable to VMD global mapping.

The optional settings: [Disabled]; [Enabled].
Enable VMD Global Mapping Set the default value to: [Enabled]
When set as [Disabled], the following sub-items shall appear:
Map this Root Port under VMD
Use this item to Map/UnMap this root port to VMD.
The optional settings: [Disabled]; [Enabled].
Map this Root Port under VMD Set the default value to: [Enabled]

Root Port BDF details

GTT Size
Use this item to select GTT Size.
The optional settings are: [2MB]; [4MB]; [8MB].
GTT Size Set the default value to: [8MB]

DVMT Pre-Allocated
Select DVMT 5.0 Pre-Allocated (Fixed) Graphics Memory size used by the Internal Graphics Device.
The optional settings: [32M]; [64M]; [96M]; [128M]; [160M]; [8M]; [12M]; [16M]; [20M]; [24M]; [28M]; [32M/F7]; [36M]; [40M]; [44M]; [48M]; [52M]; [56M]; [60M].
DVMT Pre-Allocated Set the default value to: [128M]

- **PCH-IO Configuration**
  Press [Enter] to make settings for the following sub-items:
  PCH-IO Configuration
- **SATA Configuration**
  SATA Device Options Settings.
  SATA Configuration
  SATA Controller(s)
  Use this item to enable/disable SATA Device.
  The optional settings are: [Enabled]; [Disabled].
  SATA Controller(s) Set the default value to: [Enabled]
  When set as [Enabled], the following sub-items shall appear:
  SATA Port
  Port

Use this item to enable or disable SATA Port.
The optional settings are: [Disabled]; [Enabled].
Port Set the default value to: [Enabled]

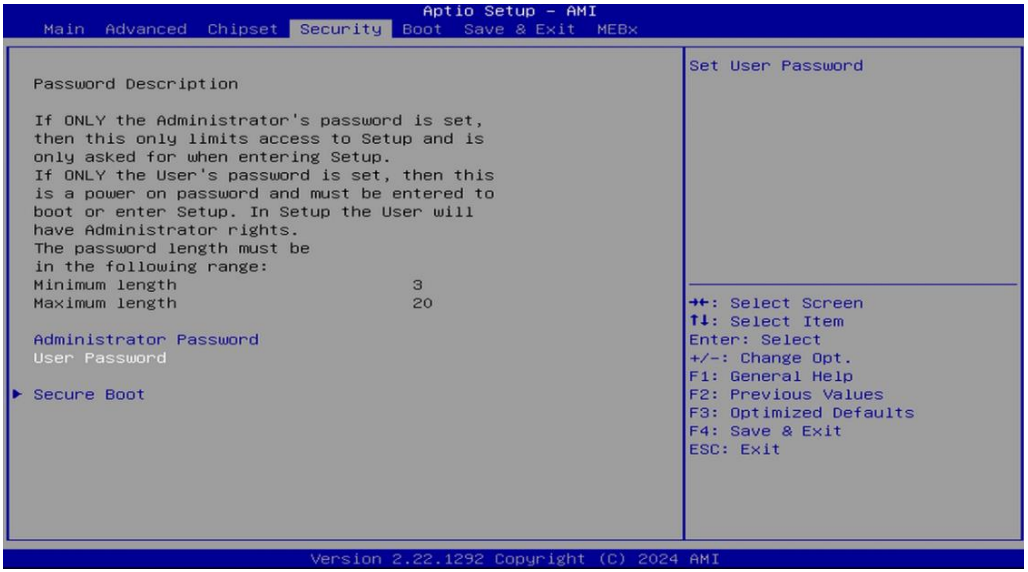
System State after Power Failure

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].

System State after Power Failure Set the default value to: [Always Off]

3-9 Security Menu



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 Set the default value to: [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].

  Secure Boot Mode Set the default value to: [Standard]

  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].

Factory Key Provision Set the default value to: [Disabled]

- **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).

- **Export Secure Boot variables**

Use this item to save NVRAM content of Secure Boot variables to a file.

- **Platform Key(PK)/Key Exchange Keys(KEK)/Authorized Signatures(db)/Forbidden Signatures(dbx)/ Authorized TimeStamps(dbt)/OsRecovery Signatures(dbr)**

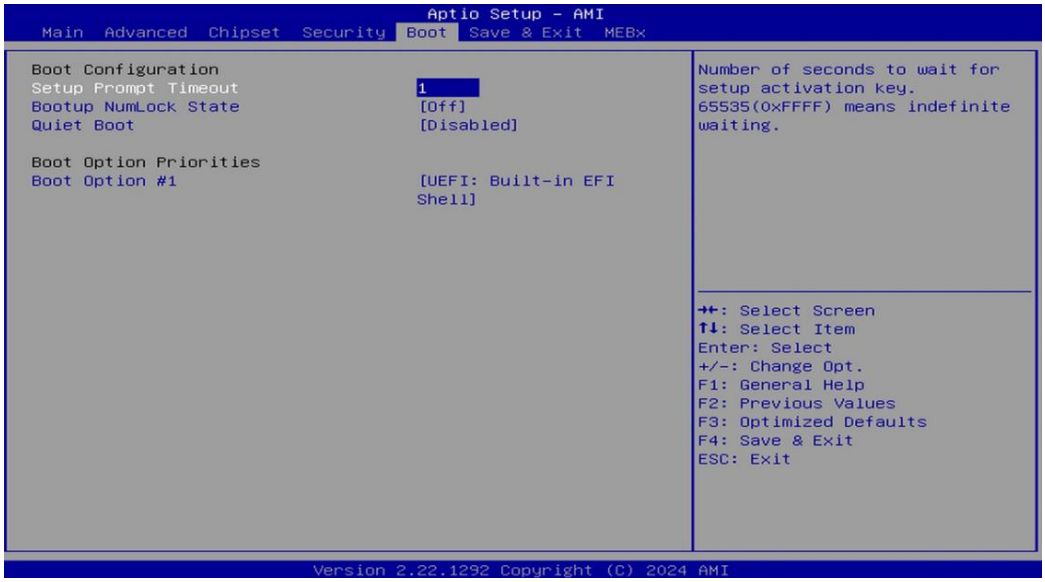
Use this item to enroll Factory Defaults or load certificates from a file:

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, Modified, Mixed

3-10 Boot Menu



Boot Configuration

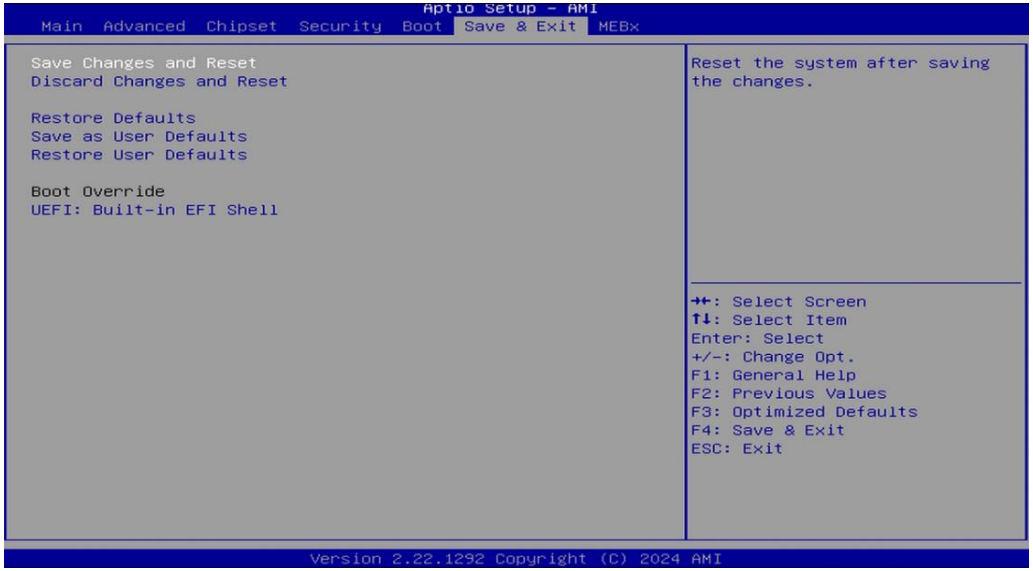
Setup Prompt Timeout

Use this item to set number of seconds to wait for setup activation key. 65535 (0xFFFF) means indefinite waiting.

Setup Prompt Timeout Set the default value to: [1]

Bootup NumLock State
Use this item to select keyboard NumLock state.
The optional settings: [On]; [Off].
Bootup NumLock State Set the default value to: [Off]
Quiet Boot
The optional settings: [Disabled]; [Enabled].
Quiet Boot Set the default value to: [Disabled]
Boot Option Priorities
Boot Option #1
Use this item to sets the system boot order.
The optional settings: [UEFI: Built-in EFI Shell]; [Disabled].
Boot Option #1 Set the default value to: [UEFI: Built-in EFI Shell]

3-11 Save & Exit Menu



Save Changes and Reset

This item allows user to reset the system after saving the changes.

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

Restore Defaults
Use this item to restore /load default values for all the setup options.

Save as User Defaults
Use this item to save the changes done so far as user defaults.

Restore User Defaults
Use this item to restore the user defaults to all the setup options.

Boot Override

UEFI: Built-in EFI Shell
Use this item to save configuration and rest.

3-12 MEBx

- **Intel(R) ME Password**
  Use this item to MEBx Login.