



Novakon Panel PC – NPP Series



NPP-215P01

Fanless Industrial Modular Panel PC
Intel® Celeron® J6412

User Manual

P/N:1306.0026 V1.1

Release Date: July, 2024

©2024 Copyrights Reserved



Warning!

This equipment generates, uses and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual, it may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

Electric Shock Hazard – Do not operate the machine with its back cover removed. There are dangerous high voltages inside.

Caution

Risk of explosion if the battery is replaced with an incorrect type. Batteries should be recycled where possible. Disposal of used batteries must be in accordance with local environmental regulations.

Safety Precautions

Follow the messages below to prevent your systems from damage:

- ◆ Avoid your system from static electricity on all occasions.
- ◆ Prevent electric shock. Do not touch any components of this card when the card is power-on. Always disconnect power when the system is not in use.
- ◆ Disconnect power when you change any hardware devices. For instance, when you connect a jumper or install any cards, a surge of power may damage the electronic components or the whole system.

Table of Contents

| | |
|--|-----------|
| Warning! | 1 |
| Caution | 1 |
| Safety Precautions | 1 |
| Chapter 1 Getting Started | 3 |
| 1.1 Features | 3 |
| 1.2 Specifications | 3 |
| 1.3 Dimensions & Rear I/O | 5 |
| 1.4 Brief Description of NPP-215P01 | 6 |
| 1.5 DC-IN Power Connector..... | 6 |
| 1.6 Remote Power Switch | 6 |
| 1.7 COM1,COM2,COM3,COM4 Port Pin Define | 7 |
| 1.8 Installation of Rubber Seal | 8 |
| 1.9 VESA Mounting | 9 |
| 1.10 Panel Mounting..... | 9 |
| Chapter 2 Hardware | 10 |
| 2.1 Motherboard Introduction | 10 |
| 2.2 Specifications | 10 |
| 2.3 Jumpers and Connectors Location | 12 |
| 2.4 Jumpers Setting and Connectors | 14 |
| Chapter 3 BIOS Setup | 23 |
| 3.1 Introduction | 23 |
| 3.1.1 How to Entering into BIOS menu | 23 |
| 3.1.2 Function Keys to setup in BIOS Setup program | 23 |
| 3.2 The Main Menu | 24 |
| 3.3 Advanced..... | 25 |
| 3.4 Chipset | 38 |
| 3.5 Security | 40 |
| 3.6 Boot | 43 |
| 3.7 Save & Exit..... | 44 |

Chapter 1 Getting Started

1.1 Features

- 21.5” Industrial Compact Size Panel PC
- Flat front panel touch screen
- Fanless design
- Intel® Celeron® J6412 (2.0 GHz) CPU
- DC 9~36V wide-ranging power input
- IP66 compliant front panel
- Projected capacitive touchscreen support 7H anti-scratch surface

1.2 Specifications

| NPP-215P01 | |
|--------------------------------|---|
| LCD | |
| LCD Size | 21.5 inches TFT-LCD |
| Touch Type | Projected Capacitive Touch |
| Luminance (cd/m ²) | 500 (Typical) |
| System | |
| CPU | Onboard Intel Celeron J6412 (2.0 GHz) |
| Chipset | SoC |
| Memory | 8GB DDR4 3200 MHz (16GB/32GB Optional) |
| I/O Port | |
| USB | 4 x USB 3.2 Gen 1, 1 x USB 2.0 (Optional) |
| Serial | 1 x DB9 (RS-232/422/485 & RI/5V/12V) (COM1 for optional) 1 x DB9 (RS-232/422/485) (COM2 for optional) 2 x DB9 (RS-232) (COM3/COM4 for optional) |
| Audio | 1 x Audio Line Out |
| LAN | 2 x GbE LAN RJ-45 |
| HDMI | 2 x HDMI 2.0 |
| Power | 1 x 2 pins terminal block for external power switch (Optional) 1 x 3 pins terminal block power connector 1 x power switch on/off |

| Storage Space | |
|--|--|
| Storage (SSD) | 1 x 2280 M.2 M-Key (PCIe x2, SATA 6Gb/s) |
| Expansion | |
| Expansion Slot | 1 x Full-size mini PCIe |
| Touch Screen – Projected Capacitive Type | |
| TS Control IC | Chip on board |
| Interface | USB |
| Light Transmission | Over 84% |
| Power | |
| Power Input | DC 9~36V |
| Mechanical | |
| Color | Silver (Pantone 877C) |
| Front Bezel Metal | Aluminum front bezel/ Steel for back cover |
| IP Rating | IP66 compliant front panel |
| Environmental | |
| Operating temperature | 0~50°C |
| Storage temperature | -20~60°C |
| Humidity | 10 to 90% @ 40°C, non- condensing |
| Certification | CE / FCC Class A |
| Operating System Support | |
| OS Support | Windows 10 IoT, Debian 11 |

1.3 Dimensions & Rear I/O

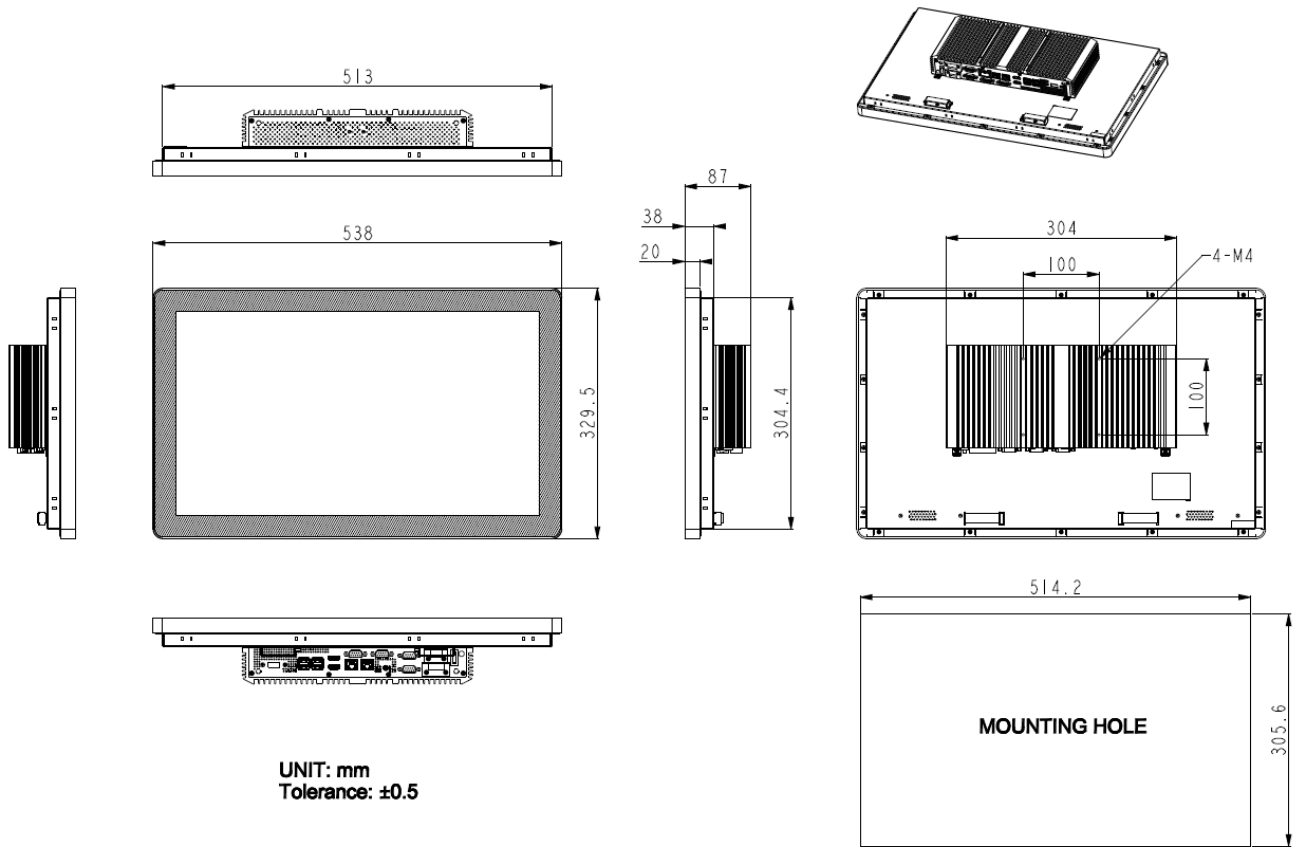


Figure 1.1: Dimensions of NPP-215P01

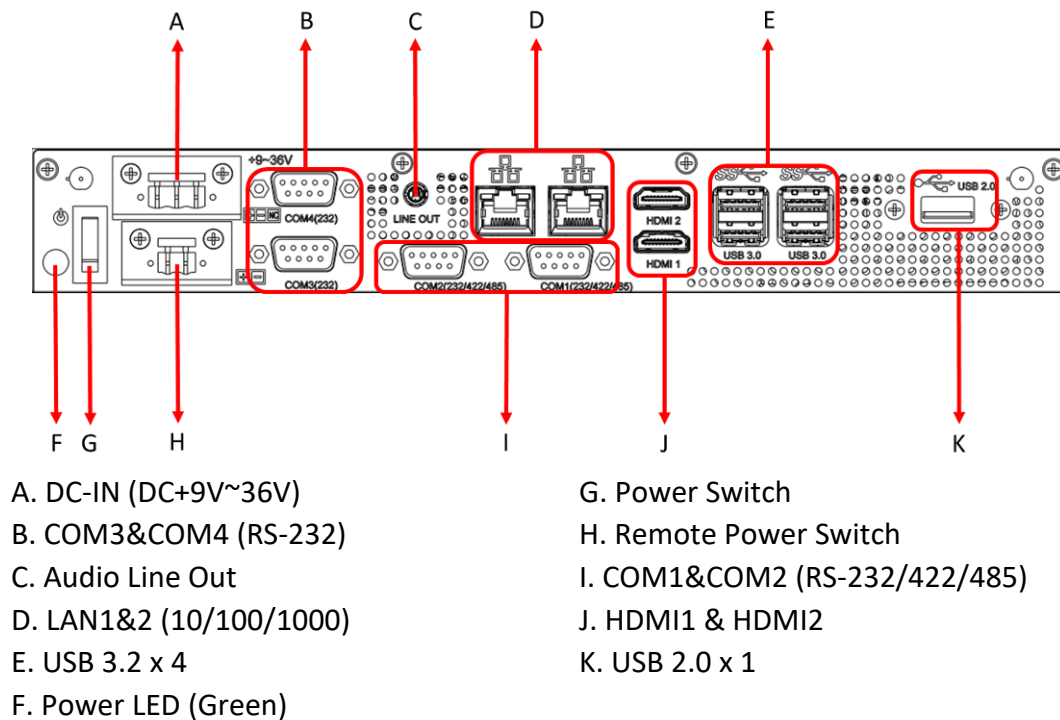


Figure 1.2: Rear I/O Port Placement

1.4 Brief Description of NPP-215P01

This is a 21.5" Industrial Compact Size Panel PC, which comes with flat front panel touch screen and fanless design. It is powered by Intel J6412(2.0 GHz) processor; and 8GB DDR4 3200MHz memory (16GB/32GB memory is for option). NPP-215P01 is DC 9~36V wide-ranging power input and IP66 compliant front panel. The model features projected capacitive touch supports 7H anti-scratch surface is ideal for use as PC-based controller for industrial automation & factory automation.

1.5 DC-IN Power Connector

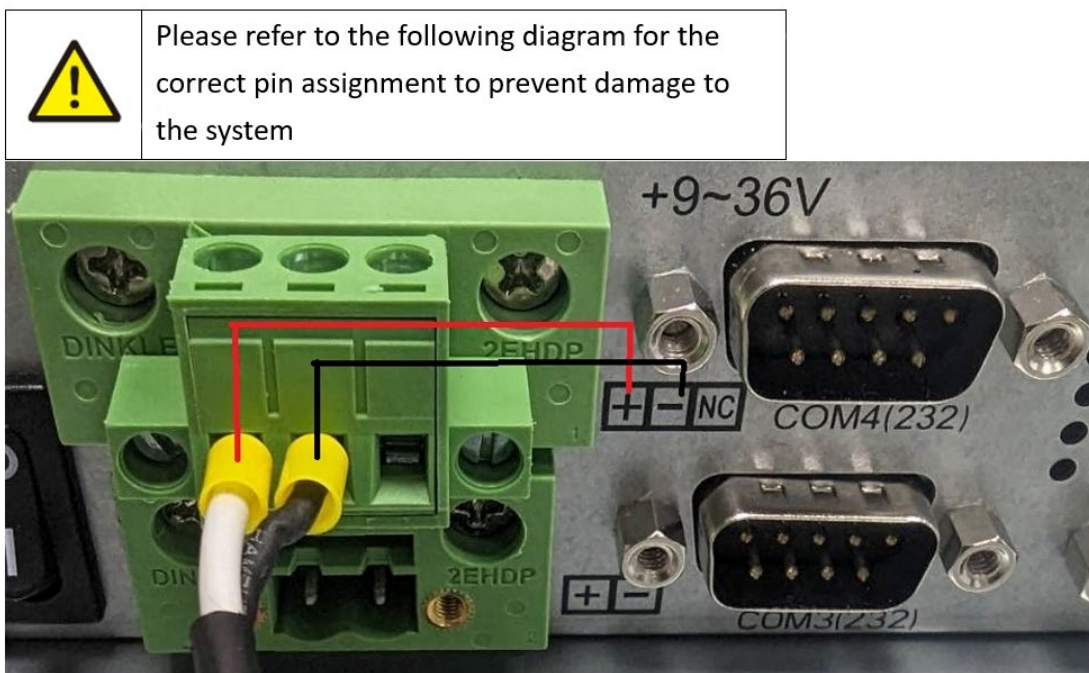


Figure 1.3: Power IN Cable & Connector Location

1.6 Remote Power Switch

Link the Remote Power Switch connector to the switch lines

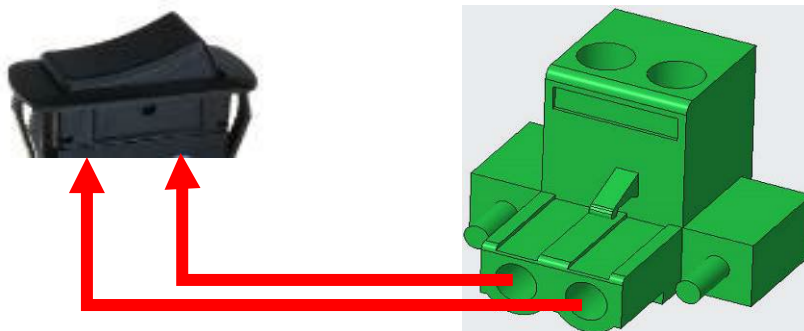
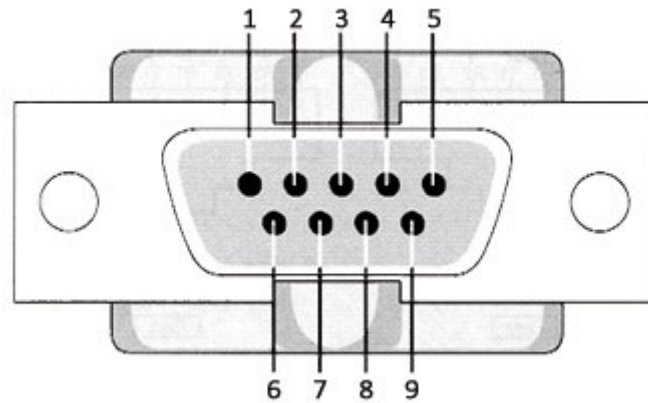


Figure 1.4: Power Switch Link Cable & Connector Layout

1.7 COM1,COM2,COM3,COM4 Port Pin Define



| Pin# | RS-232 | Pin No. | RS-232 |
|------|--------|---------|-----------------------|
| 1 | DCD | 6 | DSR |
| 2 | RXD | 7 | RTS |
| 3 | TXD | 8 | CTS |
| 4 | DTR | 9 | RI/5V/12V (COM1 Only) |
| 5 | GND | | |

| Pin# | RS-422 | Pin No. | RS-485 |
|------|--------|---------|--------|
| 1 | TXD- | 1 | D- |
| 2 | TXD+ | 2 | D+ |
| 3 | RXD+ | | |
| 4 | RXD- | | |

1.8 Installation of Rubber Seal

Step 1

Start installing Rubber Seal from the bottom center point of the NPP-215. (The position of the arrow in the picture.)



Step 2

Insert into the groove according to the frame.



Step 3

After installation, if there is excess Rubber Seal, you can use scissors to cut off the excess length.



1.9 VESA Mounting

The NPP-215P01 is designed to be VESA mounted as shown in Picture. Just carefully place the unit through the hole and tighten the given screws from the rear to secure the mounting.

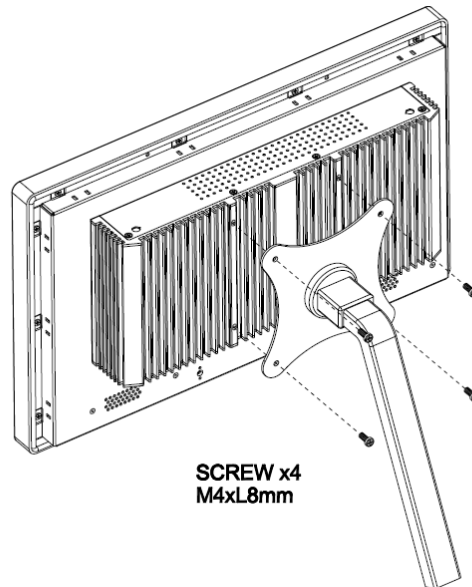


Figure 1.5: VESA Mounting

1.10 Panel Mounting

There are eight holes located along the four sides of NPP-215P01. Insert the clamp from the four sides and tighten them with the nuts provided.

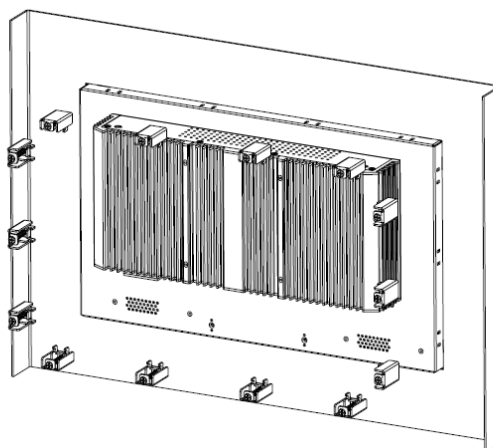


Figure 1.6: Panel Mounting

Chapter 2 Hardware

2.1 Motherboard Introduction

A 3.5" industrial motherboard developed on the basis of Intel Celeron Processors, which provides abundant peripheral interfaces to meet the needs of different customers. Also, it features dual GbE ports, 4-COM ports and one Mini PCIe configuration, five USB ports, two HDMI ports, one LVDS interface. To satisfy the special needs of high-end customers. The product is widely used in various sectors of industrial control.

2.2 Specifications

| Specifications | |
|---------------------------|---|
| Board Size | 146mm x 101.7mm |
| CPU Support | Onboard Intel® Celeron® J6412 2.0GHz, quad-core, 4 threads, (up to 2.6GHz) |
| Chipset | SoC |
| BIOS | AMI/UEFI |
| Memory Support | 2 x SO-DIMM, DDR4 3200MHz, up to 32GB |
| Graphics | Intel® UHD Graphics 400/800MHz |
| Display Mode | 2 x HDMI Ports 1 x LVDS (18/24-bit dual LVDS) |
| Support Resolution | Up to 4096 x 2160 for HDMI Up to 1920 x 1200 for LVDS |
| Triple Display | 2 x HDMI + LVDS |
| Storage | 1 x SATA 6Gb/s Port (CN13) |
| Ethernet | 2 x GbE LAN Ports (Intel® I211AT) (CN23) |
| USB | 4 x USB 3.2 Gen 1 External I/O port (CN25) 2 x USB 2.0 Pin headers (CN14) |
| Serial | 1 x COM header (RS-232/422/485 & RI/5V/12V) (CN6:COM1) 1 x COM header (RS-232/422/485) (CN6:COM2) 2 x COM headers (RS-232) (CN6:COM3, COM4) |
| Digital I/O | 1 x GPIO (8 bits) & SMBus header (CN15) |
| Battery | Support CR2032 battery by 2-pin header (CN21) |
| Audio | Realtek® Audio Codec Support Line-out (CN22) |

| | |
|------------------------------------|--|
| | Front panel audio header (CN8) |
| Expansion Slots | 1 x 2280 M.2 M-Key (PCIe x2, SATA 6Gb/s) (CN11) 1 x Full-size mini PCIe with SIM slot (CN19) |
| Power Management | Wide Range DC9V~36V input 1 x 4-pin power input connector (CN2) |
| Switches and LED Indicators | Front panel header 1 x Power on/off switch (CN10) 1 x Reset (CN10) 1 x Power LED status (CN10) 1 x HDD LED status (CN10) |
| External I/O port | 1 x Headphone Jack 2 x HDMI 2 x RJ45 LAN Ports 4 x USB 3.2 Gen 1 |
| Temperature | Operating: 0°C to 60°C Storage: -40°C to 85°C |
| Humidity | 0% - 90%, non-condensing, operating |
| EMI/EMS | Meet CE/FCC class A |

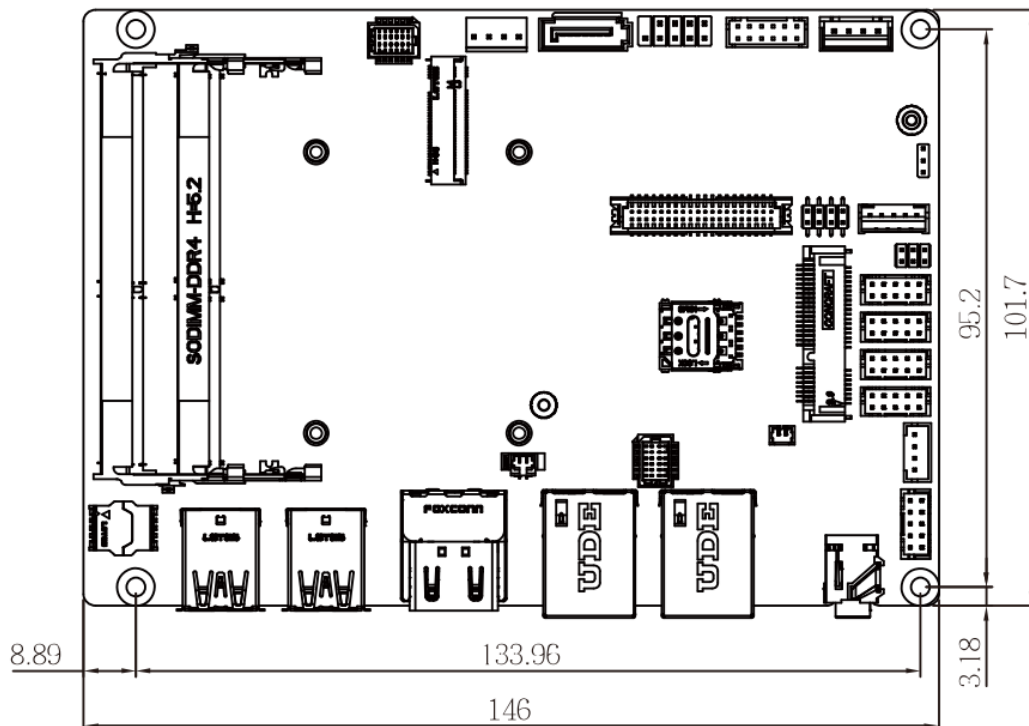


Figure 2.1: Motherboard Dimensions

2.3 Jumpers and Connectors Location

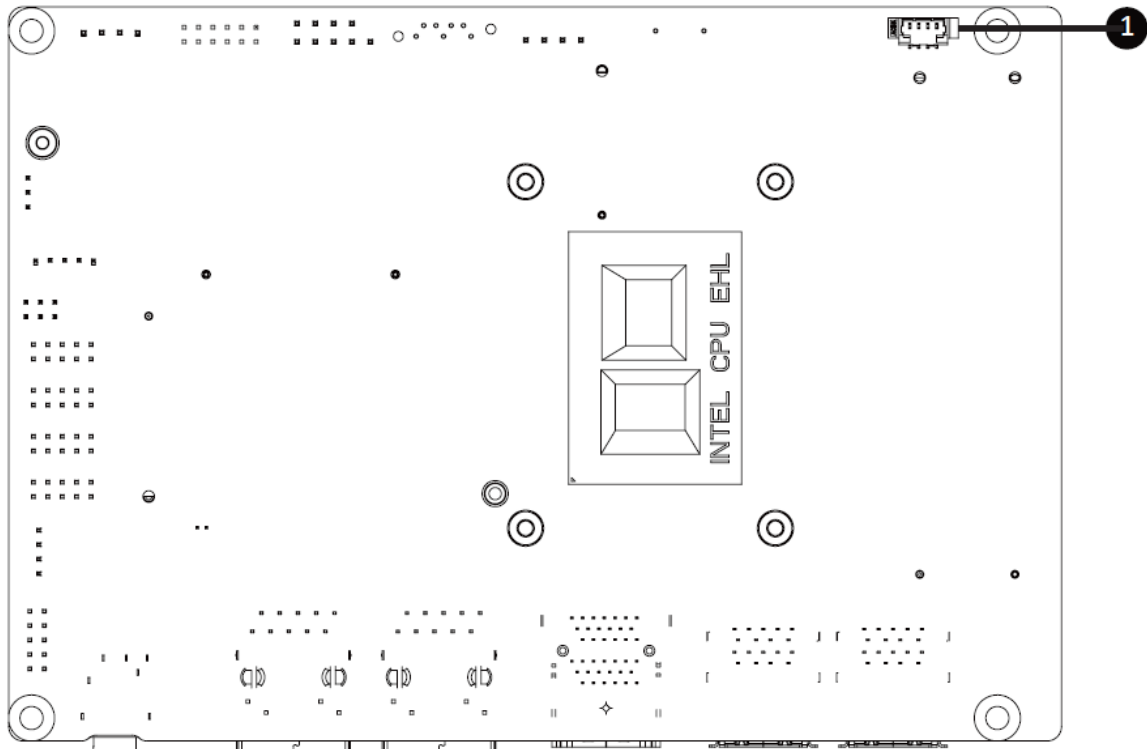


Figure 2.2: Connectors Location-Bottom Board

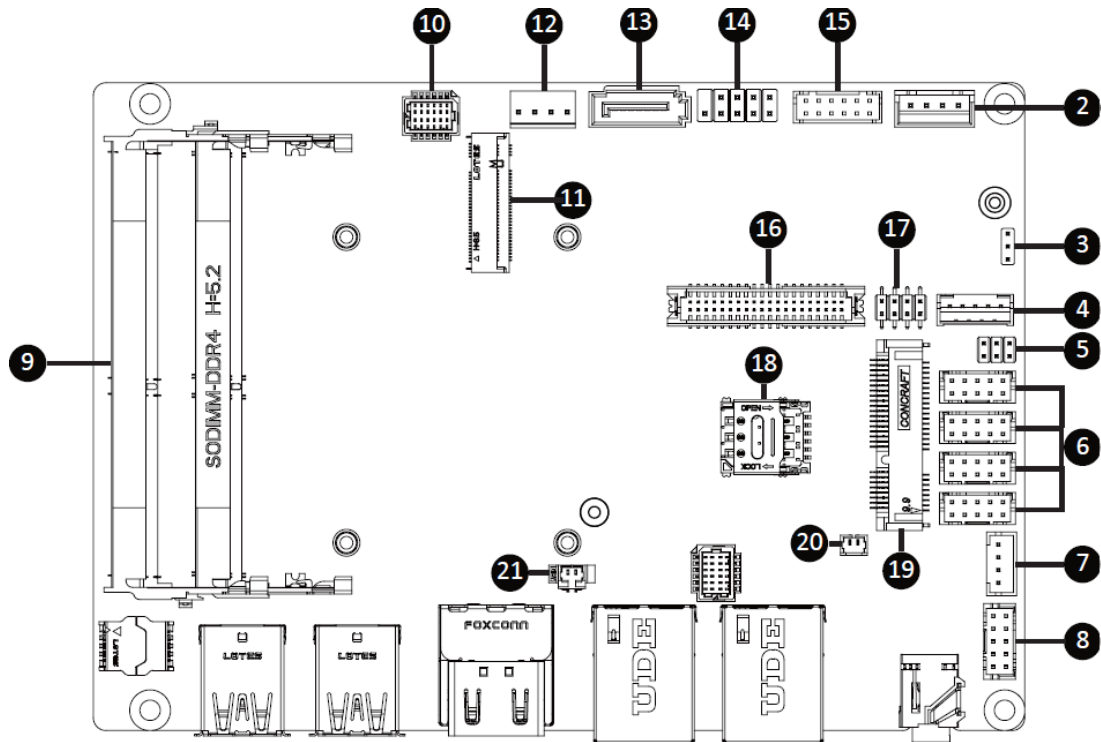


Figure 2.3: Connectors Location-Top Board

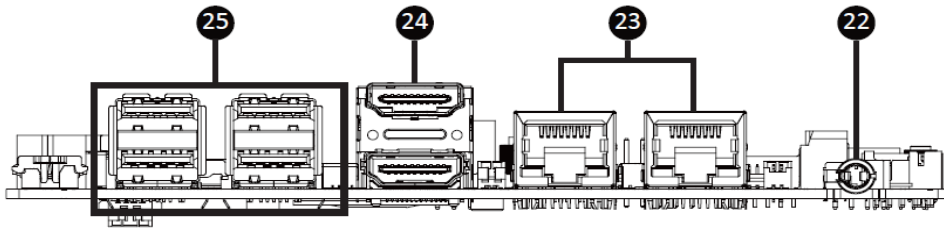


Figure 2.4: Rear I/O Connectors Location

| No | Code | Description |
|----|---------------------|---|
| 1 | FAN | FAN connector |
| 2 | DC_IN | DC IN 1x4pin power connector |
| 3 | AT_CN | AT/ATX mode select jumper |
| 4 | BKL_CN | Backlight Control connector |
| 5 | JCOM1 | RI# pin RI#/5V/12V select jumper for COM1 port |
| 6 | COM1 | Serial port header |
| | COM2 | COM1 : RS-232/422/485 & RI/5V/12V |
| | COM3 | COM2 : RS-232/422/485 |
| | COM4 | COM3, COM4 : RS-232 |
| 7 | SPKR | Speaker out connector |
| 8 | FP_AUDIO | Front panel audio header |
| 9 | SODIMMA SODIMMB | DDR4 SO-DIMM sockets x 2 |
| 10 | SYS_PANEL | Front panel header |
| 11 | M2M | M.2 slot, M-key, NGFF2280 |
| 12 | SATAPW | SATA power connector |
| 13 | SATAIII | SATA 6Gb/s connector |
| 14 | FUSB20 | USB 2.0 header |
| 15 | GPIO_CNT | General Purpose input/output header |
| 16 | LVDS | LVDS connector |
| 17 | LSW | LVDS resolution jumper |
| 18 | SIM_CARD | 3G/4G SIM slot |
| 19 | MPCIE | Mini-PCIe slot |
| 20 | BUZZER | Buzzer header |
| 21 | BATTERY | Battery cable connector |
| 22 | AUDIO | Line out connector (Headphone without microphone) |
| 23 | LAN1, LAN2 | LAN connector |
| 24 | HDMI | HDMI connector |
| 25 | USB31_1, USB31_2 | USB 3.2 Gen 1 connector x 4 |

2.4 Jumpers Setting and Connectors

1. FAN (FAN connector):

Fan connector cooling fans can be connected directly for use. You may set the rotation condition of cooling fan in menu of BIOS CMOS Setup. (1.25mm Pitch 1x4 Pin Header)

| Pin# | Signal Name |
|------|---------------|
| 1 | Ground |
| 2 | +12VCC |
| 3 | FAN_Sense |
| 4 | Speed_Control |

2. DC_IN (Power Connector):


DC12V System power input connector (2.5mm Pitch DC-IN 1x4pin Wafer Pin Header)

| Pin# | Signal Name |
|------|--------------------|
| 1 | Ground |
| 2 | Power Input DC+12V |
| 3 | Power Input DC+12V |
| 4 | Ground |

2.1 Remote Power Switch (System option):

This is used to connect power switch button. These two pins are disconnected under normal condition. You may short them temporarily to control system startup and shutdown or awaken the system from sleep mode.

3. AT_CN (AT/ATX mode select jumper)

| AT/ATX mode select jumper | |
|---|--|
|  | 1-2 Close : AT mode. |
| | 2-3 Close : ATX mode. (Default setting) |

| Pin# | Definition |
|------|------------|
| 1 | AT MODE |
| 2 | Detect |
| 3 | ATX MODE |

4. BKL_CN (Backlight Control connector):




(2.0mm Pitch 1x5 wafer Pin Header) Backlight control connector for LVDS.

| Pin# | Signal Name |
|------|-------------|
| 1 | DC5V |
| 2 | BKLT_PWM |
| 3 | BKLT_EN |
| 4 | Ground |
| 5 | DC12V |

5. JCOM1 (RI#/5V/12V Select jumper for COM1 Port):

COM1 Pin 1 to 6 are used to select signal out & pin 9 out voltage port.

(1.0mm Pitch 2x3 Pin Header)

| JCOM1 Jumper Select | |
|---|-------------------------------|
|  | 1-2 Close: 5V (Power COM) |
|  | 3-4 Close: RI (Stand COM) |
|  | 5-6 Close: 12V (Power COM) |

6. COM1, COM2, COM3, COM4 (Serial port header):

COM1 : Support RS-232/422/485 & RI/5V/12V For RI/5V/12V jumper setting, please see

COM2 : Support RS-232/422/485

COM3 & COM4 : Support RS-232 only

| Pin# | RS-232 | RS-422 | | Pin No. | RS-232 | RS-422 | |
|------|--------|-------------|-------------|---------|------------|-------------|-------------|
| | | Full Duplex | Half Duplex | | | Full Duplex | Half Duplex |
| 1 | RXD | TXD+ | D+ | 6 | GND | - | - |
| 2 | DCD | TXD- | D- | 7 | CTS | - | - |
| 3 | DTR | RXD- | - | 8 | RTS | - | - |
| 4 | TXD | RXD+ | - | 9 | No Connect | - | - |
| 5 | DSR | - | - | 10 | RI/5V/12V | - | - |

7. SPKR (Speaker out connector):

| Pin# | Definition |
|------|----------------|
| 1 | Speaker Out L+ |
| 2 | Speaker Out L- |
| 3 | Speaker Out R- |
| 4 | Speaker Out R+ |

8. FP_AUDIO (Front panel audio header):

(2.0mm Pitch 2X5 Pin Header), Front Audio, An onboard Realtek codec is used to provide high-quality audio I/O ports. Line Out can be connected to a headphone or amplifier. Line In is used for the connection of external audio source via a Line in cable. MIC is the port for microphone input audio.

| Pin# | Definition | Pin# | Definition |
|------|------------|------|------------------|
| 1 | MIC-LEFT | 6 | GND |
| 2 | GND | 7 | JACKSENCE Detect |
| 3 | MIC-RIGHT | 8 | NC |
| 4 | Detect | 9 | LINE-LEFT |
| 5 | LINE-RIGHT | 10 | GND |

9. SODIMMA, SODIMMB (DDR4 SO-DIMM sockets):

2 x DDR4 SO-DIMM sockets, Max Capacity 32 GB Support Dual Channel DDR4 3200 MHz memory modules

10. SYS_PANEL (Front panel header):

| Pin# | Definition | Pin# | Definition |
|------|------------|------|--------------|
| 1 | HD-p | 7 | Reset Button |
| 2 | MPD-p | 8 | GND |
| 3 | HD-n | 9 | No Connect |
| 4 | MPD-n | 10 | No Connect |
| 5 | GND | 11 | No Connect |
| 6 | POWER-ON | 12 | No Connect |

11. M2M (M.2 Slot, M-Key, NGFF 2280)

Please install the module card into the M.2 slot

| Pin | Definition | Pin | Definition | 29 | PCIE1 RXn | 30 | NC |
|-----|------------|-----|------------|----|-------------------|----|------------|
| 1 | GND | 2 | 3.3V | 31 | PCIE1 RXp | 32 | NC |
| 3 | GND | 4 | 3.3V | 33 | GND | 34 | NC |
| 5 | NC | 6 | NC | 35 | PCIE2 TXn | 36 | NC |
| 7 | NC | 8 | NC | 37 | PCIE2 TXp | 38 | NC |
| 9 | GND | 10 | SSD LED | 39 | GND | 40 | NC |
| 11 | NC | 12 | 3.3V | 41 | PCIE0 RXn/SATA Bp | 42 | NC |
| 13 | NC | 14 | 3.3V | 43 | PCIE0 RXp/SATA Bn | 44 | NC |
| 15 | GND | 16 | 3.3V | 45 | GND | 46 | NC |
| 17 | NC | 18 | 3.3V | 47 | PCIE0 TXn/SATA An | 48 | NC |
| 19 | NC | 20 | NC | 49 | PCIE0 TXp/SATA Ap | 50 | PCI Reset |
| 21 | GND | 22 | NC | 51 | GND | 52 | PCIE Clock |
| 23 | NC | 24 | NC | 53 | PCIE Clock n | 54 | NC |
| 25 | NC | 26 | NC | 55 | PCIE Clock p | 56 | NC |
| 27 | GND | 28 | NC | 57 | GND | 58 | NC |

12. SATA Power (SATA power connector):

One onboard 5V&12V output connector is reserved to provide power for SATA devices.

(2.5mm Pitch 1x4 box Pin Header)

| Pin# | Signal Name |
|------|-------------|
| 1 | 12V |
| 2 | Ground |
| 3 | Ground |
| 4 | 5V |

13. SATAIII (SATA 6Gb/s Connector):

One SATA connector is provided with transfer speed up to 6.0Gb/s. (SATA 7Pin+15Pin)

| Definition | |
|------------|-----|
| 1 | GND |
| 2 | TXp |
| 3 | TXn |
| 4 | GND |
| 5 | RXn |
| 6 | RXp |
| 7 | GND |

14. FUSB20 (USB 2.0 header)

| Pin# | Definition | Pin# | Definition |
|------|------------|------|------------|
| 1 | 5V | 6 | D1p |
| 2 | 5V | 7 | GND |
| 3 | D2n | 8 | GND |
| 4 | D1n | 9 | No Pin |
| 5 | D2p | 10 | No Connect |

15. GPIO_CNT (General Purpose input/output header):

(2.0mm Pitch 2X6 Pin Header) For expand connector, it provides eight GPIO.

| Pin# | Definition | Pin# | Definition |
|------|---------------|------|---------------|
| 1 | GPIO-output_1 | 7 | GPIO-output_4 |
| 2 | GPIO-input_1 | 8 | GPIO-input_4 |
| 3 | GPIO-output_2 | 9 | SMBus Clock |
| 4 | GPIO-input_2 | 10 | SMBus DATA |
| 5 | GPIO-output_3 | 11 | 5V |
| 6 | GPIO-input_3 | 12 | GND |

16. LVDS (LVDS connector):

(1.25mm Pitch 2x20 Connector, DF13-40P), for 18/24-bit LVDS output connector, fully supported by DP to LVDS, the interface features dual channel 24-bit output. Low Voltage Differential Signaling, A high speed, low power data transmission standard used for display.

| Pin | Definition | Pin | Definition | Pin | Definition | Pin | Definition |
|-----|------------|-----|------------|-----|------------|-----|------------|
| 1 | 3.3V | 11 | A1- | 21 | A5+ | 31 | GND |
| 2 | 5V | 12 | A0- | 22 | A4+ | 32 | GND |
| 3 | 3.3V | 13 | GND | 23 | A5- | 33 | CLK2+ |
| 4 | 5V | 14 | GND | 24 | A4- | 34 | CLK1+ |
| 5 | SPECO | 15 | A3+ | 25 | GND | 35 | CLK2- |
| 6 | SPEDO | 16 | A2+ | 26 | GND | 36 | CLK1- |
| 7 | GND | 17 | A3- | 27 | A7+ | 37 | GND |
| 8 | GND | 18 | A2- | 28 | A6+ | 38 | GND |
| 9 | A1+ | 19 | GND | 29 | A7- | 39 | 12V |
| 10 | A0+ | 20 | GND | 30 | A6- | 40 | 12V |

17. LSW (LVDS resolution jumper)

| LVDS Resolution Jumper | |
|---------------------------|---------------------------|
| Jumper Setting | Resolution |
| 21.5": G156HCE-LN1(INX) | 800 x 600 18bit (default) |
| 18.5": G185HAN01.004(AUO) | 1024 x 768 /18bit |
| 21.5": G215HAN01.501(AUO) | 1024 x 768 /24bit |

18. SIM_CARD (3G/4G SIM Slot)

19. MPCIE (Mini PCIe slot)

Please install the Wi-Fi/ Bluetooth card into the M.2 slot.

| Pin | Definition | Pin | Definition | 27 | GND | 28 | NC |
|-----|--------------------|-----|--------------|----|----------|----|-----------|
| 1 | PCIE WAKE | 2 | 3.3V | 29 | GND | 30 | SMB Clock |
| 3 | NC | 4 | GND | 31 | PCIE TXn | 32 | SMB DATA |
| 5 | NC | 6 | NC | 33 | PCIE TXp | 34 | GND |
| 7 | PCIE Clock Request | 8 | SIM VCC | 35 | GND | 36 | USB Dn |
| 9 | GND | 10 | SIM DATA | 37 | GND | 38 | USB Dp |
| 11 | PCIE Clock n | 12 | SIM Clock | 39 | 3.3V | 40 | GND |
| 13 | PCIE Clock p | 14 | SIM Reset | 41 | 3.3V | 42 | NC |
| 15 | GND | 16 | UIM VPP3 | 43 | GND | 44 | NC |
| 17 | NC | 18 | GND | 45 | NC | 46 | NC |
| 19 | NC | 20 | WLAN_DISABLE | 47 | NC | 48 | NC |
| 21 | GND | 22 | Reset | 49 | NC | 50 | GND |
| 23 | PCIE RXn | 24 | 3.3V | 51 | NC | 52 | 3.3V |
| 25 | PCIE RXp | 26 | GND | 53 | GND | 54 | GND |

20. BUZZER (Buzzer header):

External buzzer

| Pin# | Definition |
|------|------------|
| 1 | Buzzer |
| 2 | 5V |

21. BATTERY:

(1.25mm Pitch 1x2 Wafer Pin Header) 3.0V Li battery is embedded to provide power for CMOS.

| Pin# | Signal Name |
|------|-------------|
| 1 | VBAT |
| 2 | Ground |

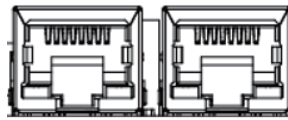
22. AUDIO (Line out connector)

HD Audio port an onboard Realtek codec is used to provide high quality audio I/O ports.

Line Out can be connected to a headphone or amplifier. (Diameter 3.5mm Jack)



23. LAN1 & LAN2 (RJ-45 Connector):

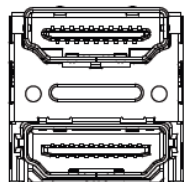


| Status | Description |
|-----------|-------------------|
| Orange On | 1Gbps data rate |
| Green On | 100Mbps data rate |
| Off | 10Mbps data rate |

| Pin# | Definition | Pin No. | Definition |
|------|------------|---------|------------|
| 1 | TX1+ | 4 | TX3+ |
| 2 | TX1- | 5 | TX3- |
| 3 | TX2+ | 7 | TX4+ |
| 6 | TX2- | 8 | TX4- |

24. HDMI x2 (HDMI connector x2):

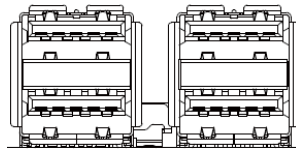
(2xHDMI 19P Connector), High Definition Multimedia Interface connector.



| Pin | Definition | Pin | Definition | Pin | Definition | Pin | Definition |
|-----|------------|-----|-----------------|-----|------------|-----|-----------------|
| 1 | TX2p | 11 | GND | 21 | GND | 31 | CLKn |
| 2 | GND | 12 | CLKn | 22 | TX2n | 32 | NC |
| 3 | TX2n | 13 | NC | 23 | TX1p | 33 | NA |
| 4 | TX1p | 14 | NA | 24 | GND | 34 | DDC Clock |
| 5 | GND | 15 | DDC Clock | 25 | TX1n | 35 | DDC Data |
| 6 | TX1n | 16 | DDC Data | 26 | TX0p | 36 | GND |
| 7 | TX0p | 17 | GND | 27 | GND | 37 | 5V |
| 8 | GND | 18 | 5V | 28 | TX0n | 38 | Hot Plug Detect |
| 9 | TX0n | 19 | Hot Plug Detect | 29 | CLKp | | |
| 10 | CLKp | 20 | TX2p | 30 | GND | | |

25. USB31_1, USB31_2 (USB 3.2 Gen 1 Connector):

The USB (Universal Serial Bus) port is for attaching USB devices such as keyboards, mouse, or other USB-compatible devices. USB 3.2 Gen 1 supports data transfer rates up to **5 Gbps**.



| Pin# | Definition | Pin No. | Definition |
|------|------------|---------|------------|
| 1 | 5V | 10 | 5V |
| 2 | D1n | 11 | D0n |
| 3 | D1p | 12 | D0p |
| 4 | GND | 13 | GND |
| 5 | USB3_RX1n | 14 | USB3_RX2n |
| 6 | USB3_RX1p | 15 | USB3_RX2p |
| 7 | GND | 16 | GND |
| 8 | USB3_TX1n | 17 | USB3_TX2n |
| 9 | USB3_TX1p | 18 | USB3_TX2p |

Chapter 3 BIOS Setup

3.1 Introduction

BIOS (Basic input/output system) provides hardware detailed information and boot-up options, which include firmware to control, set-up and test all hardware settings. Therefore, BIOS is the communication bridge between OS/application software and hardware.

3.1.1 How to Entering into BIOS menu

Once the system is power on, press the <Delete> key as soon as possible to access into BIOS Setup program.

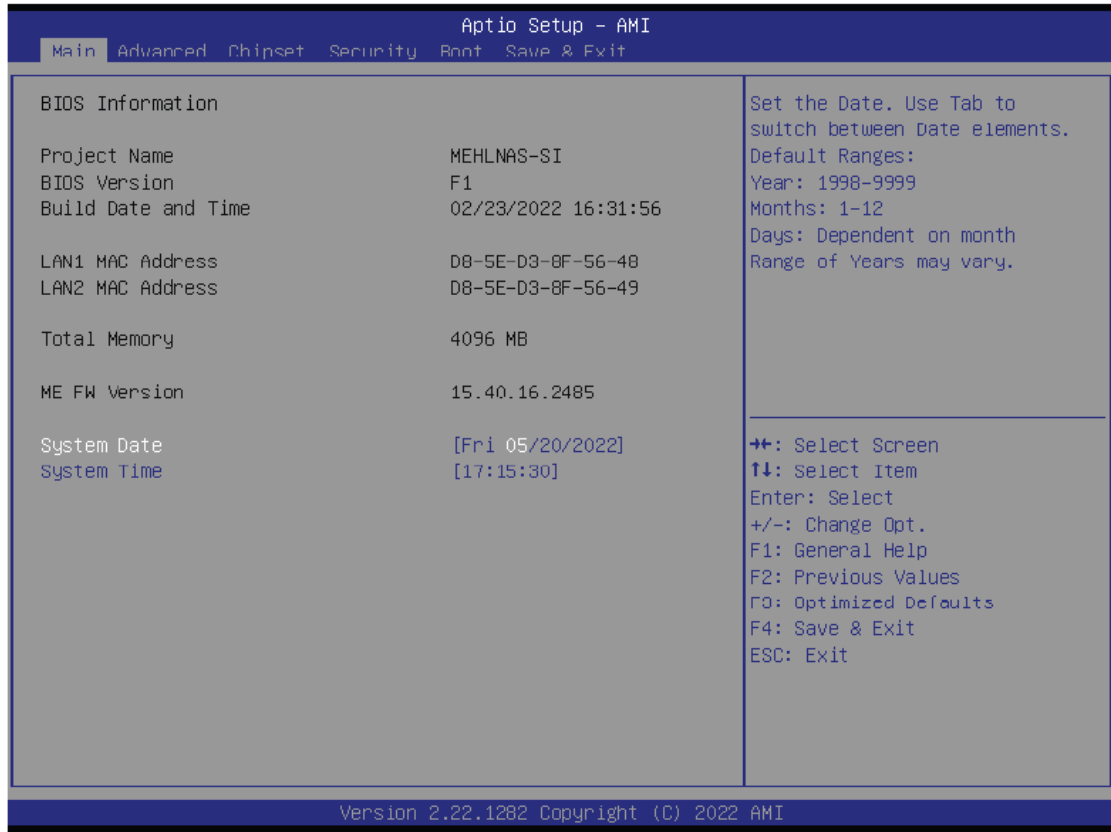
3.1.2 Function Keys to setup in BIOS Setup program

| Function keys | Description |
|---------------|--|
| →← | Select Screen |
| ↑↓ | Select Item |
| Enter | Execute command or enter the submenu |
| + | Increase the numeric value or make changes |
| — | Decrease the numeric value or make changes |
| F1 | General Help |
| F2 | Previous Values |
| F3 | Load Optimized Defaults Settings |
| F4 | Save changes & Exit the BIOS Setup program |
| ESC | Exit the BIOS Setup program |

3.2 The Main Menu

The main menu shows the basic system information.

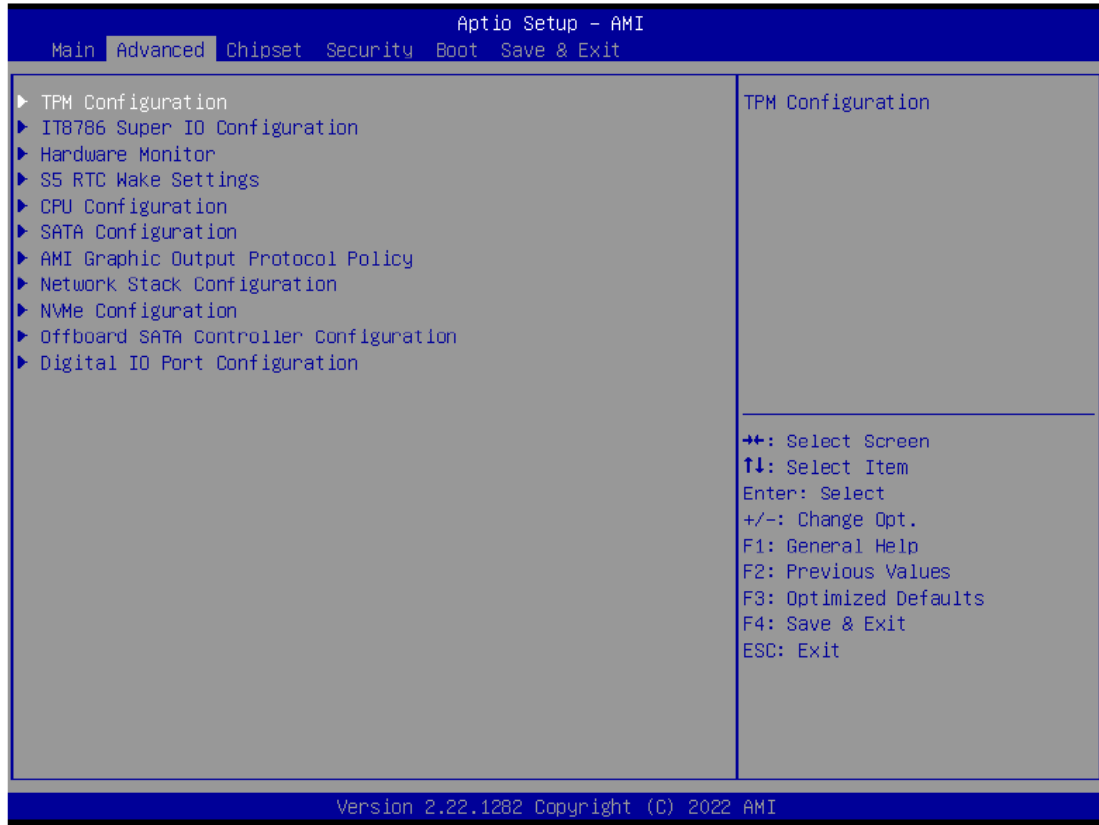
Use arrow keys to move among the items.



| Items | Description |
|----------------------------|---|
| Project Name | Shows Project name information |
| BIOS Version | Shows the BIOS version of the system |
| Build Date and Time | Shows the Build Date and Time when the BIOS was created. |
| LAN1 MAC Address | Shows LAN1 MAC Address information |
| LAN2 MAC Address | Shows LAN2 MAC Address information |
| Total Memory | Shows the total memory size of the installed memory |
| ME FW version | Shows ME firmware version |
| System Date | Set the Date for the system (Format : Week - Month - Day - Year) |
| System Time | Set the time for the system (Format : Hour - Minute - Second) |

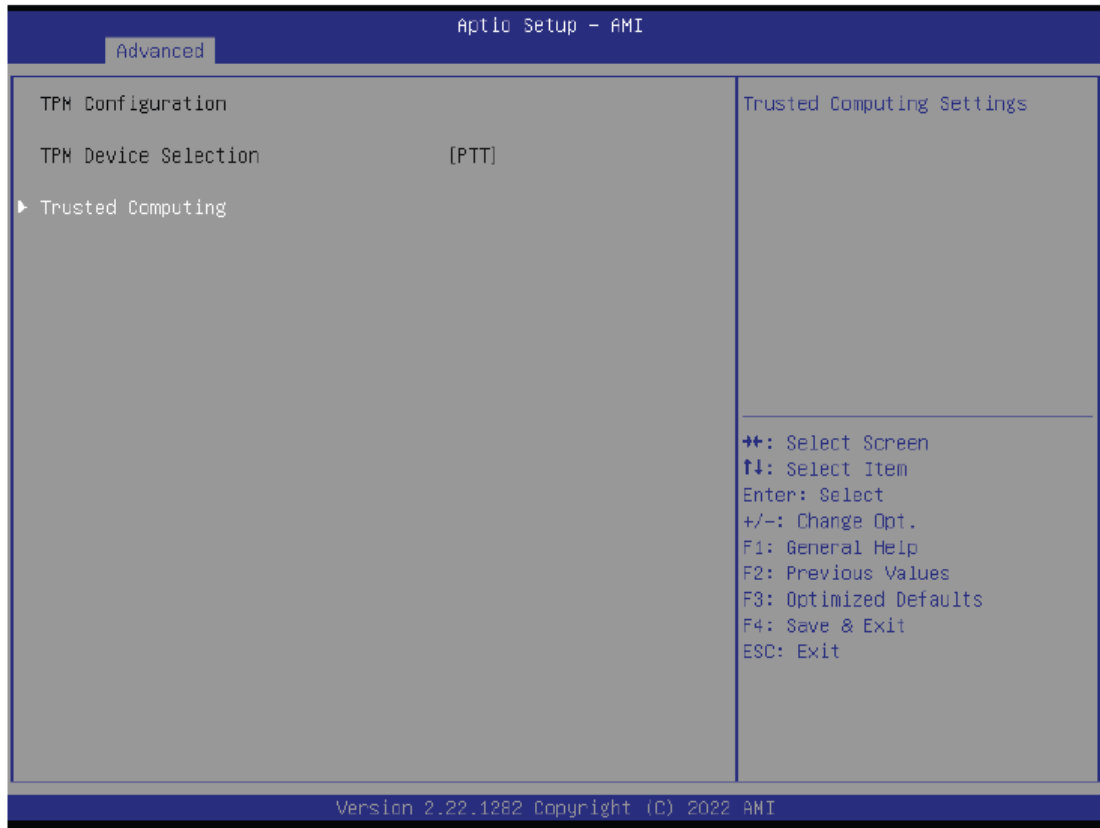
3.3 Advanced

The Advanced menu is to configure the functions of hardware settings through submenu. Use arrow keys to move among the items, and press <Enter> to access into the related submenu.



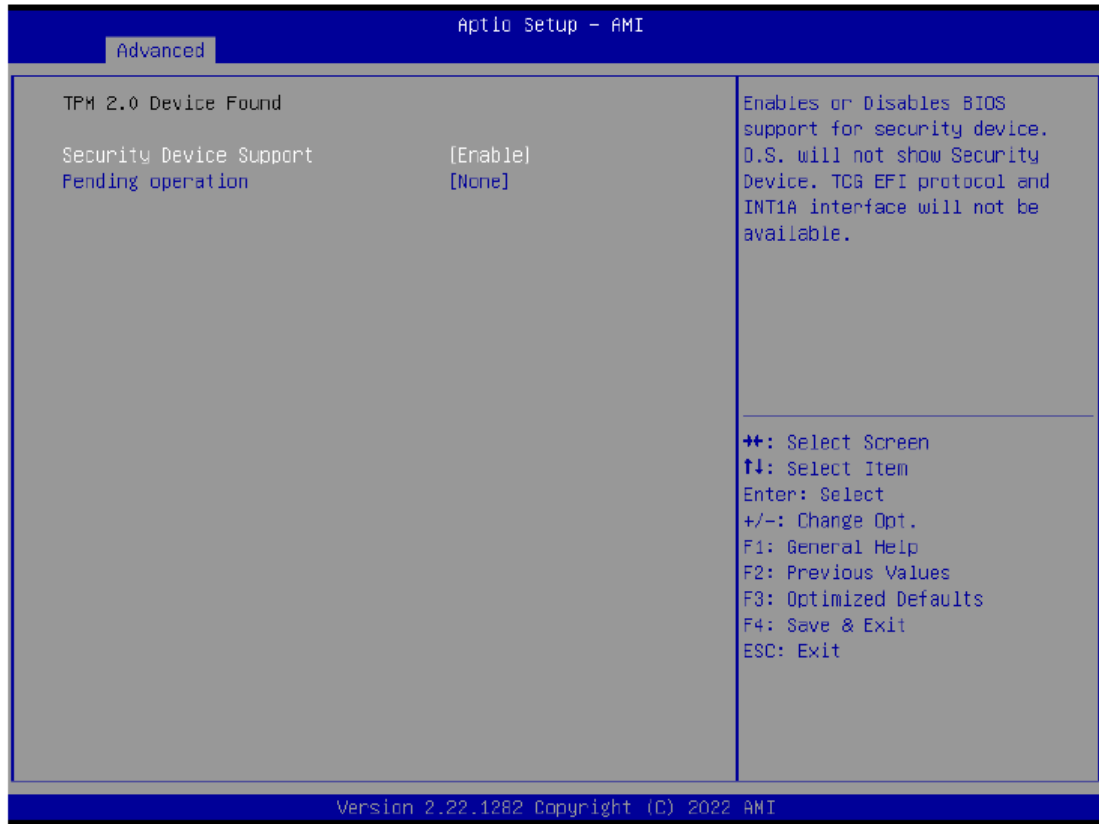
3.3.1 TPM Configuration

Use TPM Configuration submenu to choose TPM interface.



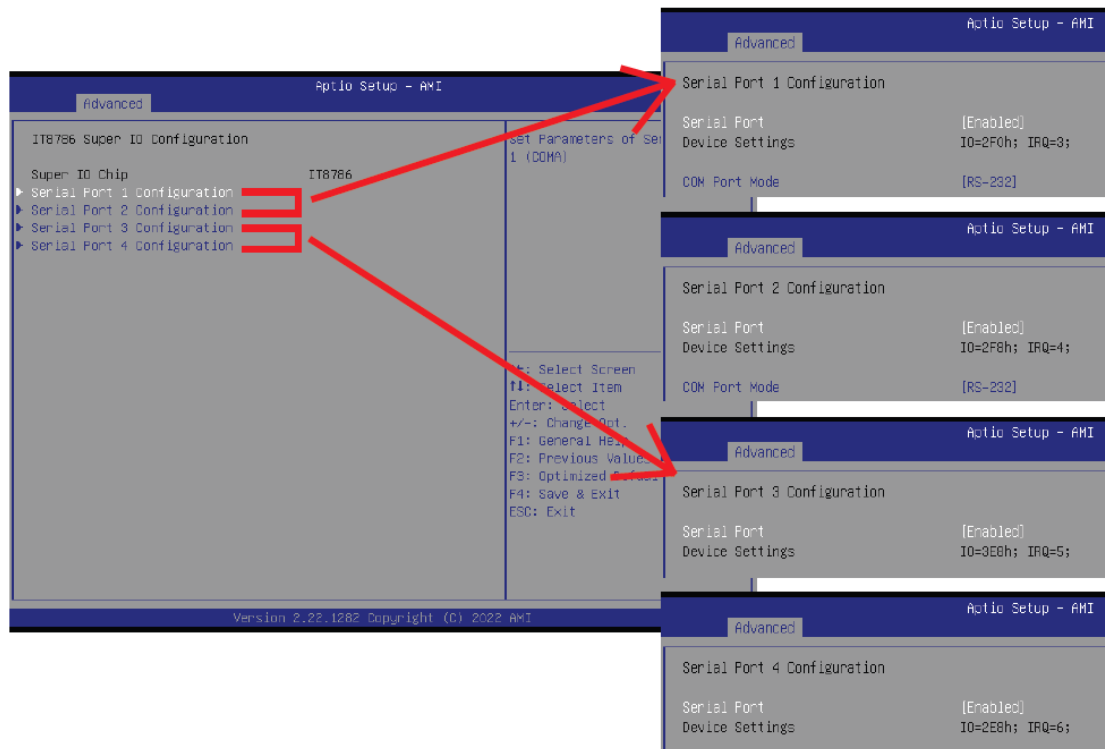
| Item | Description |
|-----------------------------|---|
| TPM Device Selection | PTT : Internal TPM (Default setting) |

Trusted Computing: Shows TPM information, and TPM module configuration settings.



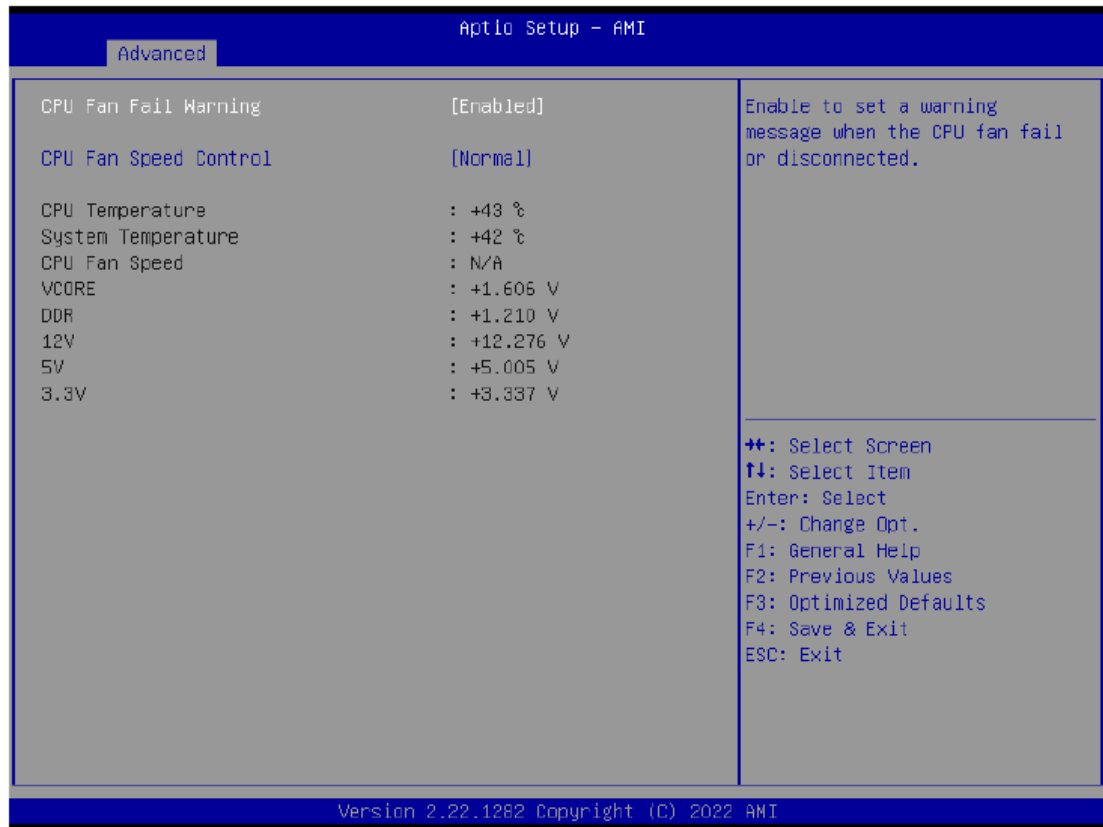
| Item | Description |
|-------------------------|---|
| Security Device support | Enabled : Enables TPM feature (Default setting) Disabled : Disables TPM feature |
| Item | Description |
| Pending operation | None : No execution will be conducted (Default setting) TPM clear : Set to clear data on TPM |

3.3.2 IT8786 Super IO Configuration



| Item | Description |
|------------------------------------|---|
| Super IO Chip | Shows Super I/O chip model |
| Serial Port 1 Configuration | Press [Enter] to configure advanced items : Serial Port : Enabled : Enables allows you to configure the serial port settings Disabled : if Disabled, displays no configuration for the serial port |
| Serial Port 2 Configuration | Device settings : Display the specified Serial Port base I/O address and IRQ COM Port Mode : Choose RS-232, RS-422, or RS-485 feature |
| Serial Port 3 Configuration | Press [Enter] to configure advanced items : Serial Port : Enabled : Enables allows you to configure the serial port settings Disabled : if Disabled, displays no configuration for the serial port |
| Serial Port 4 Configuration | Device settings : Display the specified Serial Port base I/O address and IRQ |

3.3.3 Hardware Monitor



| Item | Description |
|------------------------------|--|
| CPU Fan Fail Warning | Enabled : Enables CPU FAN Fail warning alert function (Default setting) Disabled : Disables CPU FAN Fail warning alert function |
| CPU Fan Speed Control | Normal : Fan speed set by BIOS default (Default setting) Full Speed : Set Fan operates at full speed |
| CPU temperature | Shows current CPU temperature |
| System temperature | Shows current system temperature |
| CPU Fan Speed | Shows current CPU fan Speed |

Note: This model will not use the CPU Fan setting.

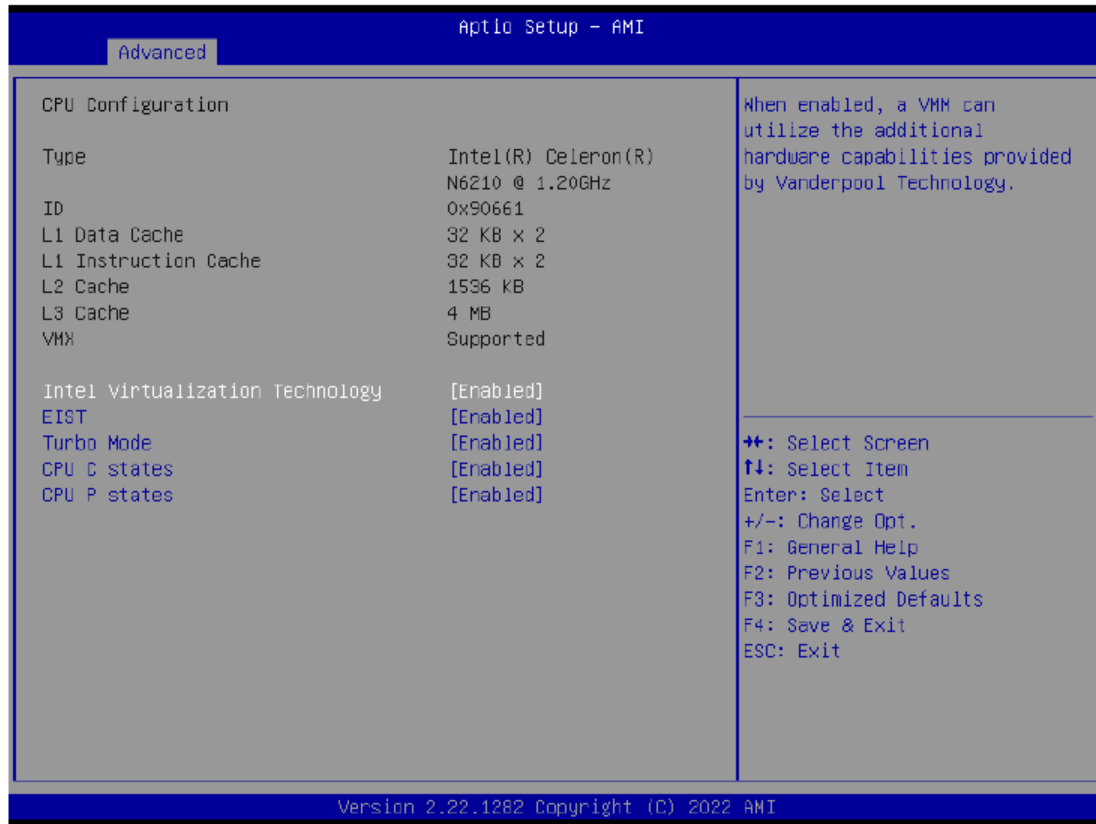
3.3.4 S5 RTC Wake Settings



| Item | Description |
|---------------------|---|
| Wake system from S5 | Enable or Disable System to wake on a specific time. Disabled : Disables system to wake on a specific time (Default setting) Fixed Time : Enables system to wake on a specific time (Format : hr : min : sec) |

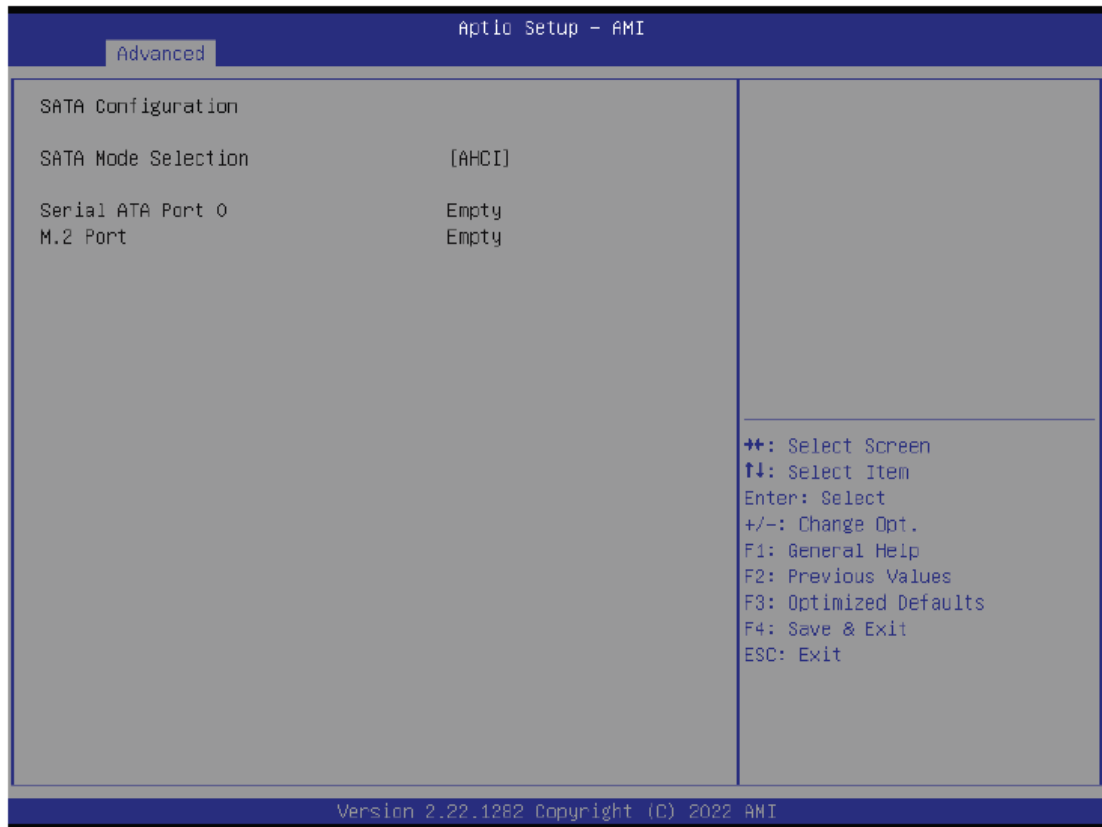
3.3.5 CPU Configuration

This submenu shows detailed CPU information.



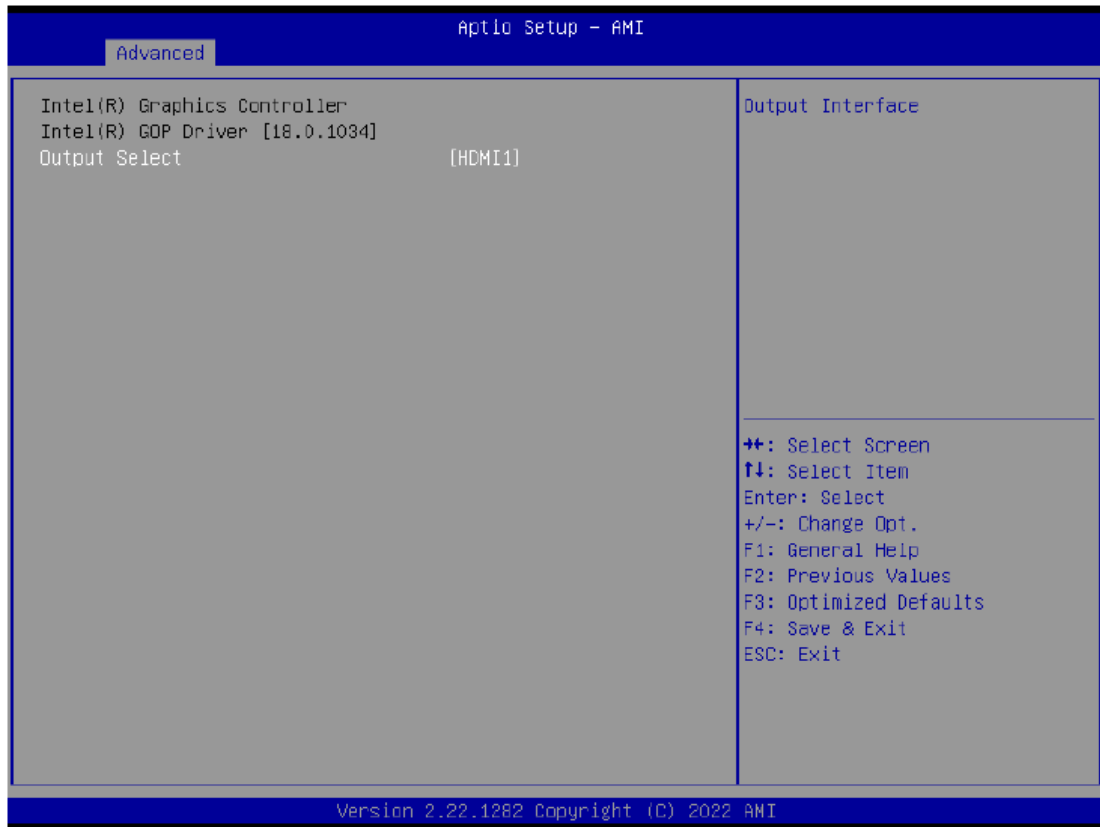
| Item | Description |
|--|--|
| Intel Virtualization Technology | Virtualization enhanced by Intel® Virtualization Technology will allow a platform to run multiple operating systems and applications in independent partitions. With virtualization, one computer system can function as multiple virtual systems. Enabled : Enables Intel Virtualization Technology (Default setting) Disabled : Disables Intel Virtualization Technology |
| EIST | According to System loading, Enhanced Intel SpeedStep Technology (EIST) will automatically adjust the CPU voltage and core frequency to decrease heat and power consumption for power saving. Enabled : Enables EIST Technology (Default setting) Disabled : Disables EIST Technology |
| Turbo Mode | Enabled : Enables Turbo Mode (Default setting) Disabled : Disables Turbo Mode |
| CPU C states | Command CPU to enter into low power consumption mode when CPU is under idle mode. Enabled : Enables C states (Default setting) Disabled : Disables C states |
| CPU P states | CPU will adjust frequency depends on it's loading. Enabled : Enables CPU P states function (Default setting) Disabled : Disables CPU P states function |

3.3.6 SATA Configuration



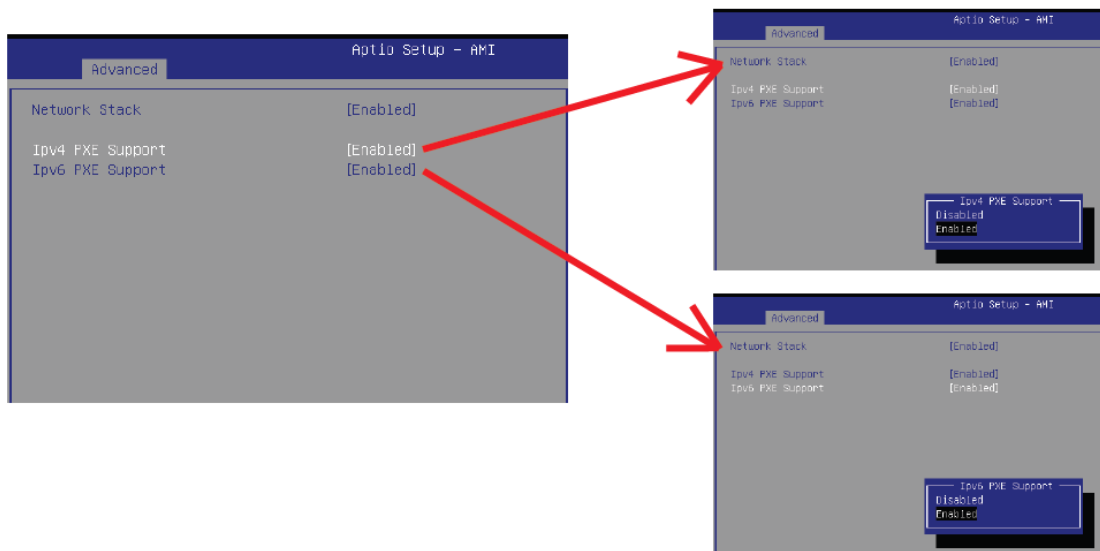
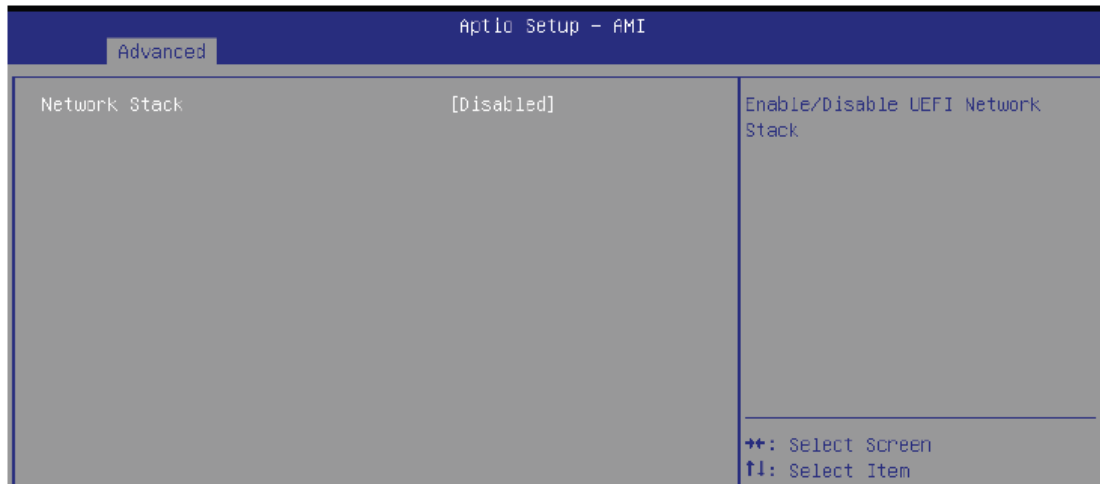
| Item | Description |
|----------------------------|---|
| SATA Mode Selection | AHCI : Configures the SATA controllers to AHCI mode. (Default setting) |
| Serial ATA Port 0 | shows 2.5" SATA HDD/SSD information |
| M.2 | shows M.2 SATA interface SSD information |

3.3.7 AMI Graphic Output Protocol Policy



| Item | Description |
|----------------------|--|
| Output Select | Choose default monitor output when there are more than one monitor plugged on the motherboard. |

3.3.8 Network Stack Configuration



| Item | Description |
|-------------------------|---|
| Network Stack | When system is power on, install LAN driver under UEFI mode Disabled : Disables UEFI Network Stack (Default setting) Enabled : Enables UEFI Network Stack |
| Ipv4 PXE Support | When Network stack is enabled : Disabled : Disables Ipv4 PXE Support Enabled : Enables Ipv4 PXE Support |
| Ipv6 PXE Support | When Network stack is enabled : Disabled : Disables Ipv6 PXE Support Enabled : Enables Ipv6 PXE Support |

3.3.9 NVME Configuration

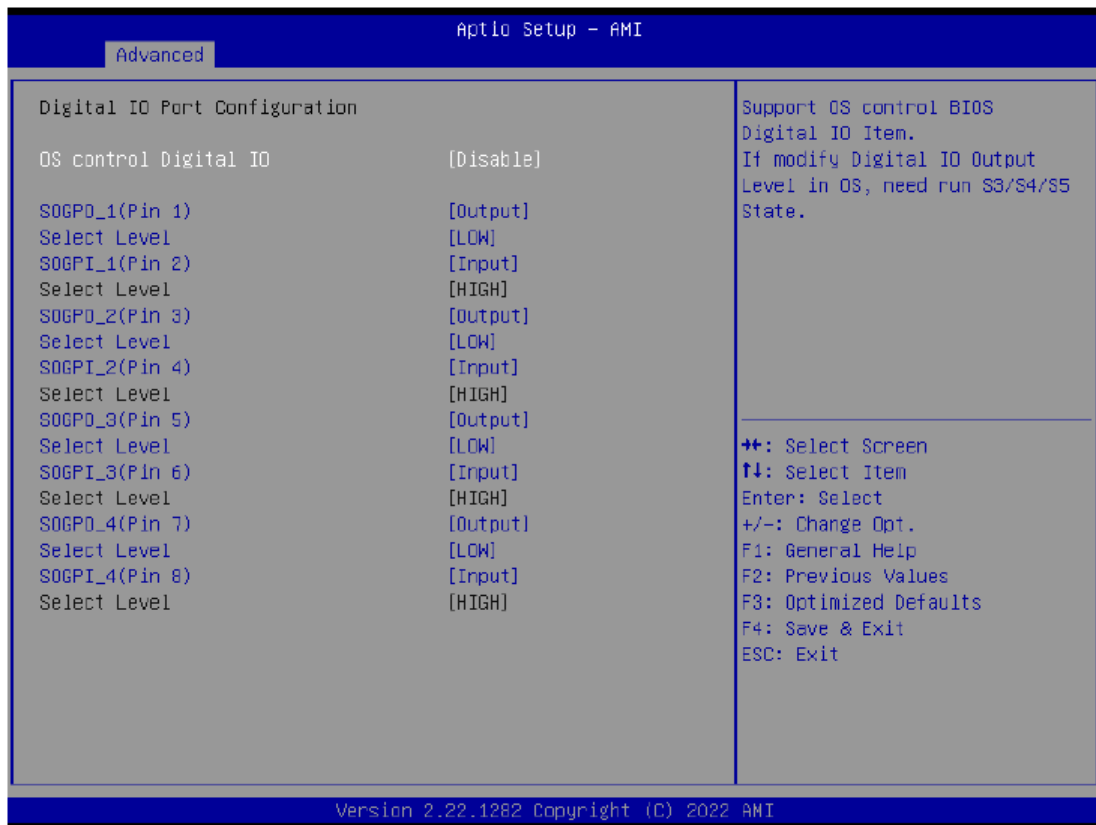
NVME Configuration shows information when your M.2 NVME PCIe SSD is installed



3.3.10 Offboard SATA Controller Configuration

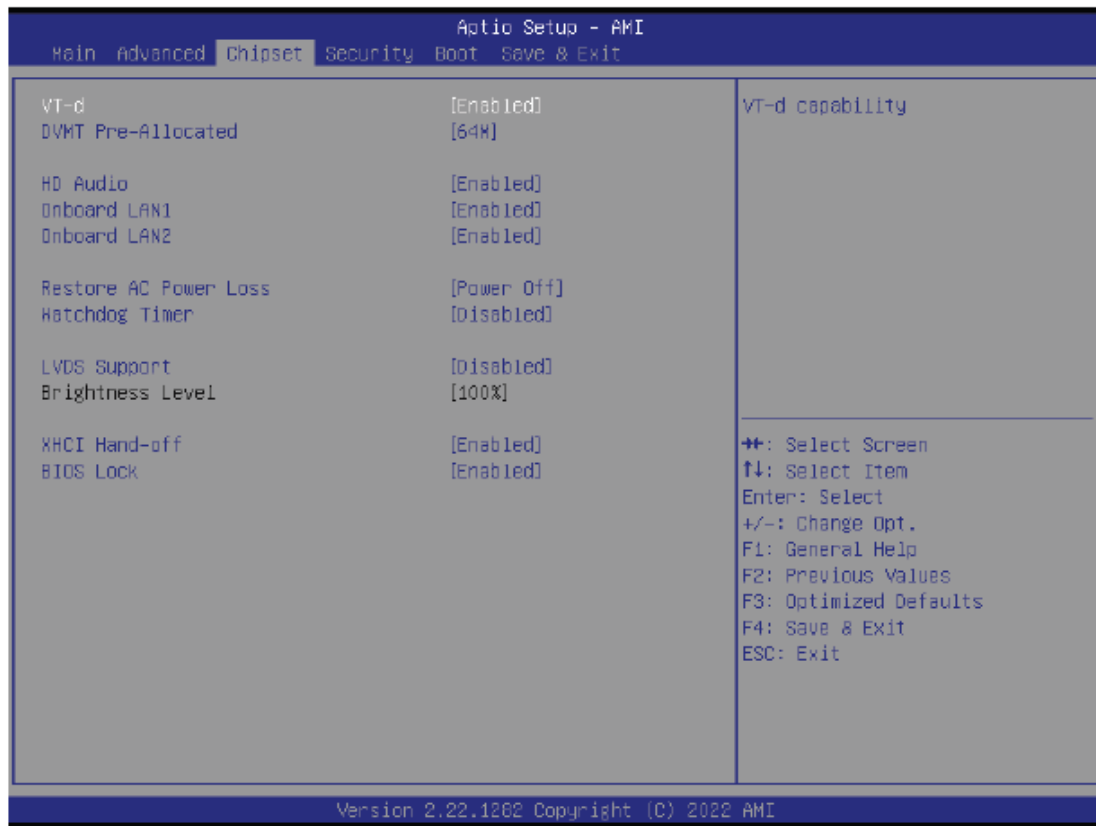


3.3.11 Digital IO Port Configuration



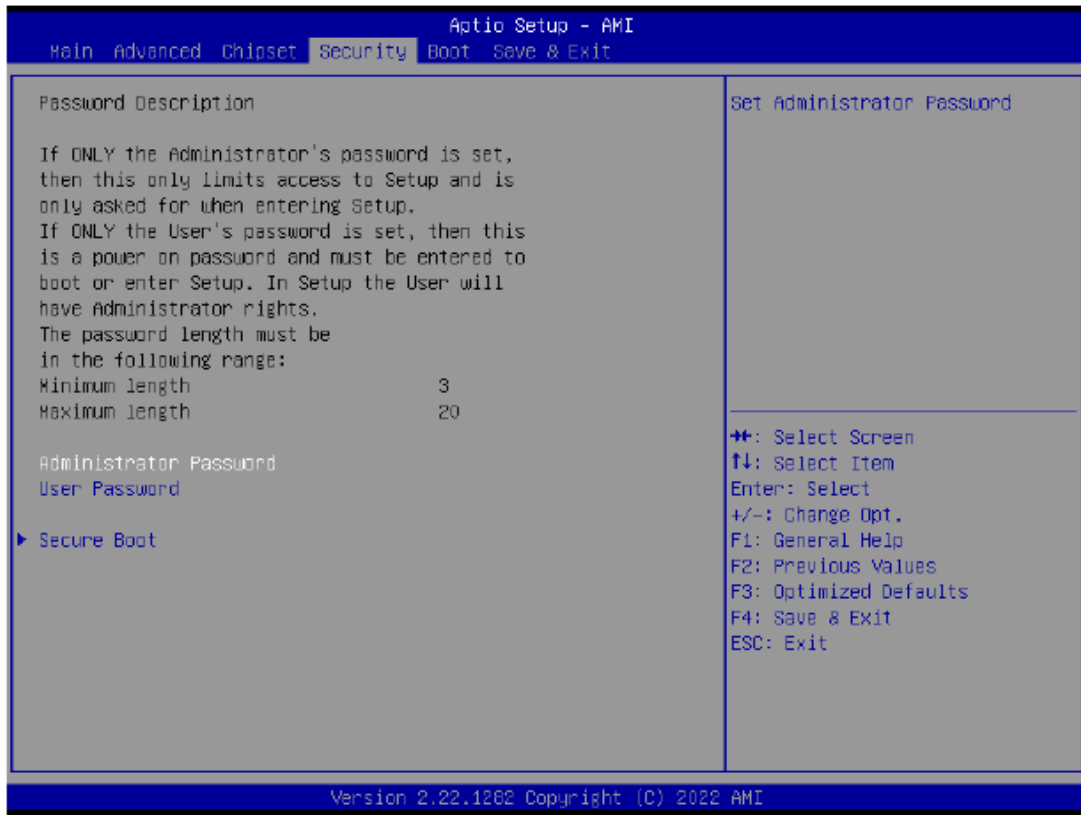
| Item | Description |
|--|---|
| OS control Digital IO | Disabled : If Digital IO Output value/level is modified in OS, they will not be memorized and kept. (Default setting) Enabled : If Digital IO Output value/level is modified in OS, they will be memorized and kept. |
| SOGPO_1 (Pin 1) SOGPI_1 (Pin 2) SOGPO_2 (Pin 3) SOGPI_2 (Pin 4) SOGPO_3 (Pin 5) SOGPI_3 (Pin 6) SOGPO_4 (Pin 7) SOGPI_4 (Pin 8) | Configure Digital IO Input or Output values for each pin. |

3.4 Chipset



| Item | Description |
|------------------------------|---|
| VT-d | Enabled : Enables VT-d function (Default setting) Disabled : Disables VT-d function |
| DVMT Pre-Allocated | Use DVMT Pre-Allocated to set the amount of system memory which is installed to the integrated graphics processor Option items : 32M , 64M(Default setting) , 128M , 256M |
| HD Audio | Enable/Disable onboard audio controller Enabled : Enables onboard audio controller (Default setting) Disabled : Disables onboard audio controller |
| Onboard LAN1 Onboard LAN2 | Enable/Disable onboard LAN controller Enabled : Enables onboard LAN controller (Default setting) Disabled : Disables onboard LAN controller |
| Restore AC Power Loss | To set which option the system should returns if a sudden power loss occurred Power off : Do not power on when the power is back (Default setting) Power on : System power on when the power is back Last state : Restore the system to the state before power loss occurs |
| Watchdog Timer | Enable/Disable Watchdog Timer function Enabled : Enables Watchdog Timer function Disabled : Disabled Watchdog Timer function (Default setting) |
| LVDS Support | Disabled : Disables LVDS Support (Default setting) Enabled : Enables LVDS Support |
| Brightness Level | To modified the backlight brightness of the LVDS panel Option items : 10%, 20%, 30%, 40%, 50%, 60%, 70%, 80%, 90%, 100% (Default Setting) |
| XHCI Hand-off | Enable/Disable XHCI Hand-off function Enabled : Enables XHCI Hand-off function (Default setting) Disabled : Disables XHCI Hand-off function |
| BIOS Lock | Enable/Disable BIOS Lock function Enabled : Enables BIOS Lock function (Default setting) Disabled : Disabled BIOS Lock funtion |

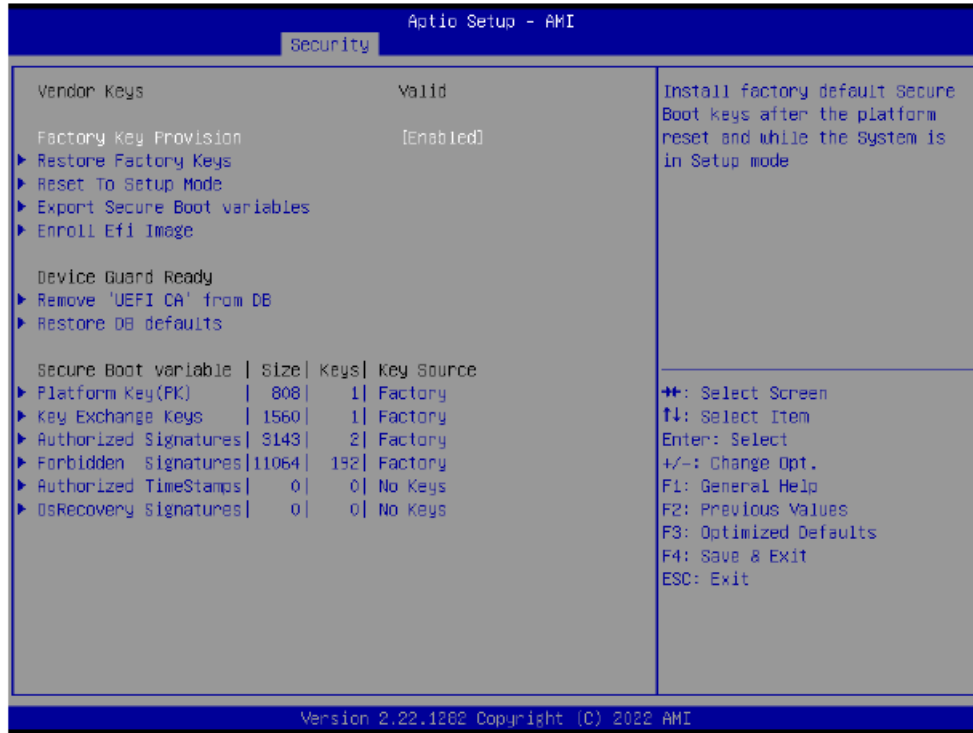
3.5 Security



| Item | Description |
|------------------------|---|
| Administrator Password | To set up Administrator's password Minimum length : 3 Maximum length : 20 |
| User Password | To set up User's password Minimum length : 3 Maximum length : 20 |
| Secure Boot | Press <Enter> to configure the advanced items |



| Item | Description |
|-----------------------------|--|
| Secure Boot | Secure Boot requires all the applications that are running during the booting process to be pre-signed with valid digital certificates Enabled : Enables Secure Boot function Disabled : Disables Secure Boot function (Default setting) |
| Secure Boot Mode | Standard : Standard mode Custom : Custom mode (Default setting) |
| Restore Factory Keys | To restore factory settings Yes : Agree to restore factory settings No : Cancel to restore factory settings |
| Reset To Setup Mode | Yes : Agree to setup mode No : Cancel to setup mode |
| Key Management | Enables expert users to modify Secure boot policy variables without full authentication Press <Enter> to configure the advanced items |

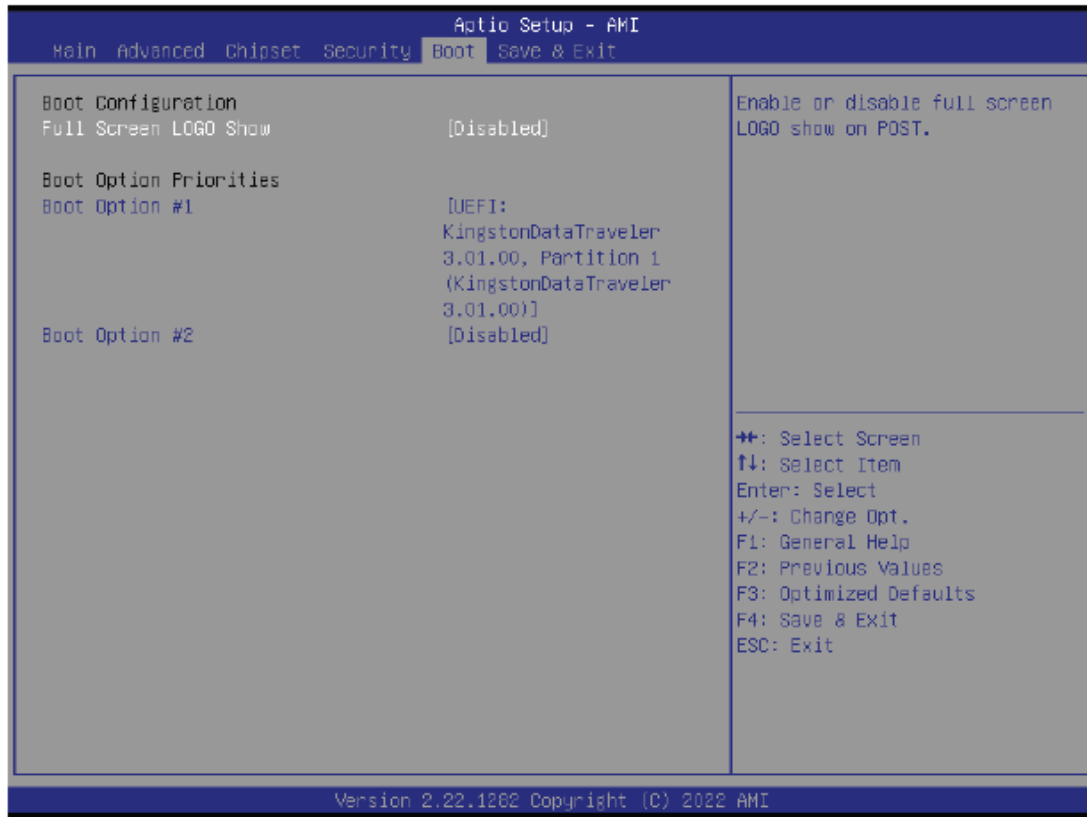


| Item | Description |
|-------------------------------------|---|
| Factory Key Provision | Install factory default Secure Boot keys after the platform reset and while the system is in Setup mode Enabled : Enables Factory Key Provision (Default setting) Disabled : Disables Factory Key Provision |
| Restore Factory Keys | To restore factory settings Yes : Agree to restore factory settings No : Cancel to restore factory settings |
| Reset To Setup Mode | Yes : Agree to setup mode No : Cancel to setup mode |
| Export Secure Boot variables | Copy NVRAM content of Secure Boot variables to files in a root folder on a file system device |
| Enroll Efi Image | Allow the image to run in Secure Boot mode |
| Remove 'UEFI CA' from DB | To remove 'UEFI CA' from database Yes : Agree to remove 'UEFI CA' from database No : Cancel to remove 'UEFI CA' from database |
| Restore DB defaults | Restore DB variables to factory defaults Yes : Agree to restore DB defaults No : Cancel to restore DB defaults |

| Item | Description |
|------------------------------|---|
| Platform Key (PK) | These items allows you to enroll factory defaults or load Certificates from a file. |
| Key Exchange Keys | |
| Authorized Signatures | |
| Forbidden Signatures | |
| Authorized TimeStamps | |
| OsRecovery Signatures | |

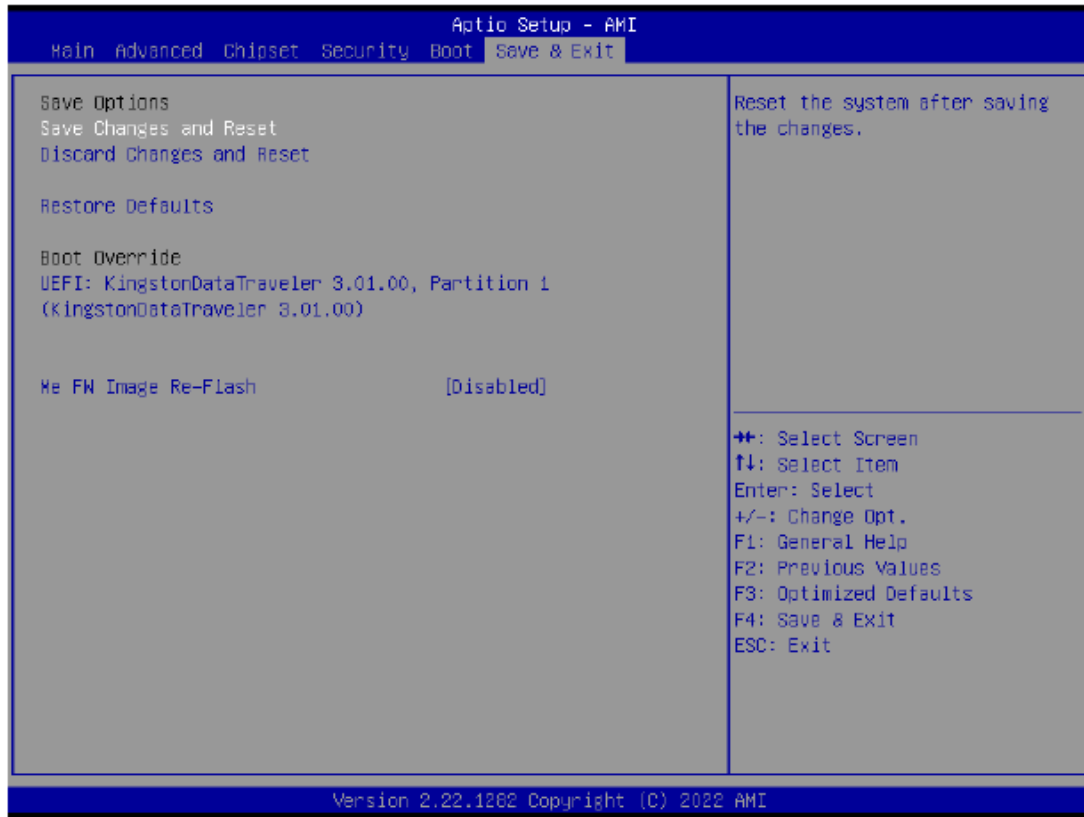
3.6 Boot

This Boot menu allows you to set/change system boot options



| Item | Description |
|--|---|
| Full Screen LOGO Show | Enable/Disable full screen LOGO show on POST screen Enabled : Enables Full screen LOGO Show on POST screen Disabled : Disables Full screen LOGO Show on POST screen (Default setting) |
| Boot Option #1 Boot Option #2 | Shows the information of the storage that be installed in the system Choose/set the boot priority |

3.7 Save & Exit



| Item | Description |
|---------------------------|---|
| Save Changes and Reset | After configuring all the options that you wish to change, choose this option to save all the changes and reboot the system Yes : Agree to save and reset No : Cancel to save and reset |
| Discard Changes and Reset | Choose this option to reboot the system without saving any changes Yes : Agree to discard changes and reset No : Cancel to discard changes and reset |
| Restore Defaults | Restore/Load default values for all the setup options Yes : Agree to load optimized defaults No : Cancel to load optimized defaults |
| Me FW Image Re-Flahs | Enable/Disable Me FW image re-flash function Enabled : Enables Me FW image re-flash function Disabled : Disables Me FW image re-flash function (Default setting) |