NOVAKON
www.novakon.com.tw

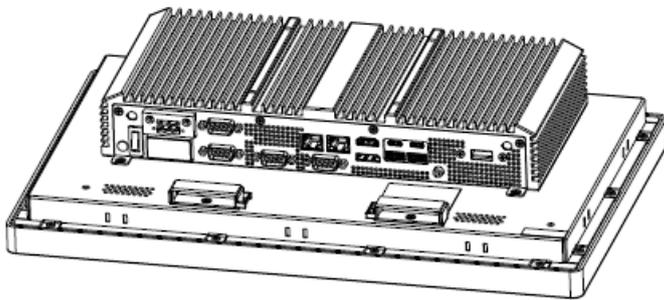# Novakon Panel PC – NPP Series

NPP-156P05

Fanless Industrial Modular Panel PC
Intel® Core™ i5-1335U Processor

User Manual

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.

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Chapter 1 Getting Started

1.1 Features

- 15.6" Industrial Compact Size Panel PC

- Flat front panel touch screen

- Fanless design

- Intel® Core™ i5-1335U Processor CPU

- DC 9~24V wide-ranging power input

- IP66 compliant front panel

- Projected capacitive touchscreen support 7H anti-scratch surface

1.2 Specifications

NPP-156P05	
LCD	
LCD Size	15.6 inches TFT-LCD
Touch Type	Projected Capacitive Touch
Luminance (cd/m^2)	350 (Typical)
System	
CPU	Onboard Intel® Core™ i5-1335U Processor
Chipset	SoC
Memory	2 x SO-DIMM, DDR5 4800MHz, up to 64GB
I/O Port	
USB	2 x USB 3.2 Gen 2 x 2 for Type C, 2 x USB 3.2 Gen 2 for Type A 1 x USB 2.0 for Type A
Serial	1 x DB9 (RS-232 & 5V/12V) 3 x DB9 (RS-232/422/485 & 5V/12V)
Audio	1 x Audio Line Out
LAN	2 x 2.5 GbE LAN RJ-45
HDMI	1 x HDMI 2.0
Display Port	1 x DP 1.4
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 M.2 (Key M 2242/2260/2280) with PCIe x4
Expansion	
Expansion Slot	1 x M.2 (key B, 3042/3052) with PCIE + USB3.0 w/ SIM slot , support 4G/5G
	1 x M.2 (Key E 2230) with USB2.0 + PCIex1, support CNVI
Touch Screen – Projected Capacitive Type	
TS Control IC	Chip On Board
Interface	USB
Light Transmission	Over 84%
Power	
Power Input	DC 9~24V
Mechanical	
Color	Black
Front Bezel Metal	Aluminum front bezel and steel chassis
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 10/11 IoT, Debian 11

1.3 Dimensions

MODEL NAME: NPP-156P05
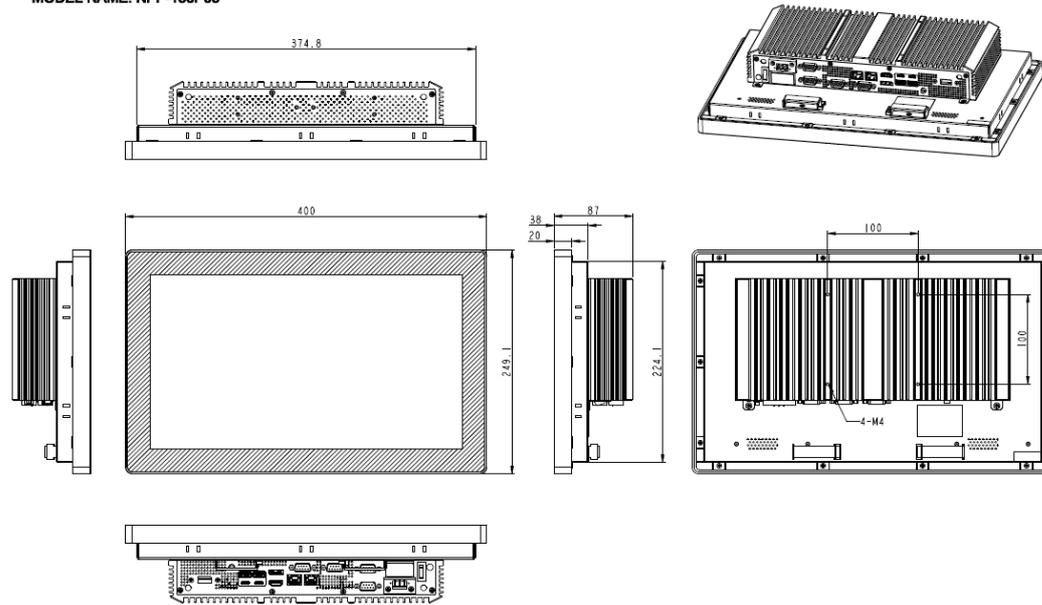
UNIT: mm
Tolerance: ±0.5

Figure 1.1: Dimensions of NPP-156P05

A. Power Switch

B. DC-IN (DC+9V~24V)

C. COM4(RS-232)

D. LAN1 & 2

E. HDMI

F. 2 x USB 3.2 Gen 2 x 2 for Type C

G. 1 x USB 2.0 for Type A

H. Power LED

I. Remote Power Switch

J. COM1/2/3 (RS-232/422/485)

K. Display Port

L. 2 x USB 3.2 Gen 2 for Type A

M. Audio Line Out

Figure 1.2: Rear I/O Port Placement

1.4 Brief Description of NPP-156P05

This is a 15.6" Industrial Compact Size Panel PC, which comes with flat front panel touch screen and fanless design. It is powered by Intel Core™ i5-1335U processor; and 16GB DDR5 4800MHz memory (64GB memory is for option). NPP-156P05 is DC 9~24V 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
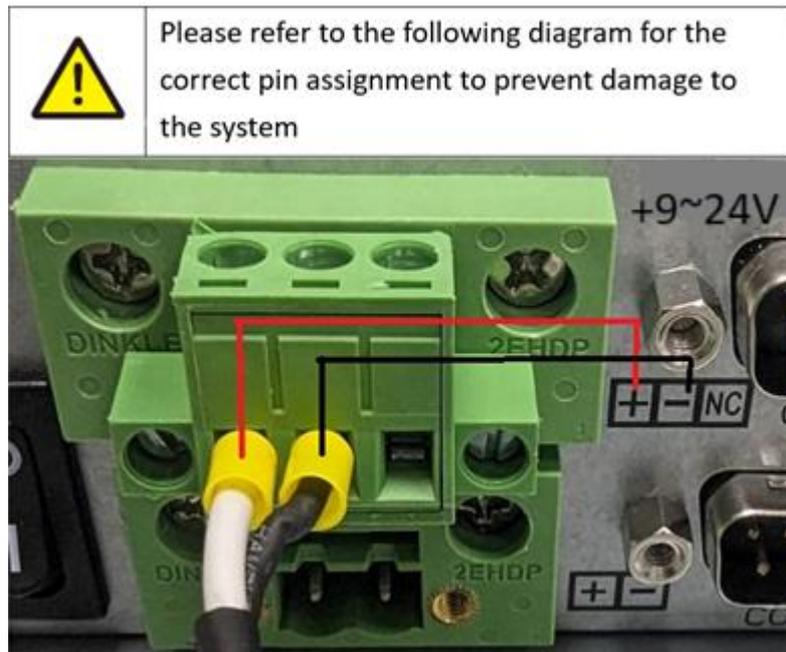
Figure 1.3: Power IN Cable & Connector Location

1.6 Remote Power Switch

Link the Remote Power Switch connector to the switch lines
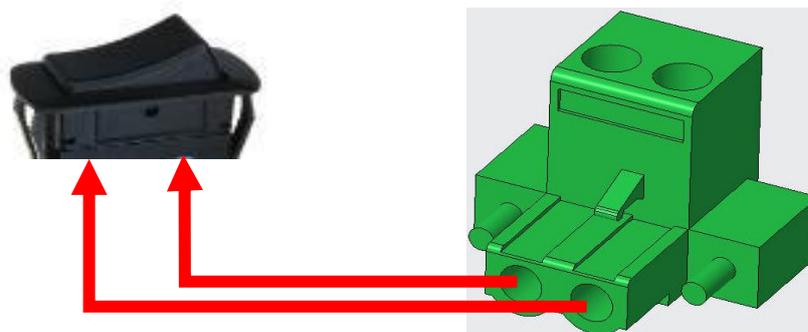
Figure 1.4: Power Switch Link Cable & Connector Layout

1.7 COM Port Pin Define
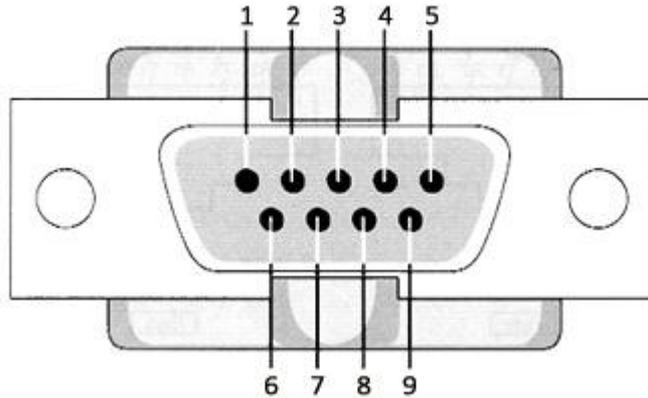
COM1/2/3
- Supports RS-232/422/485

COM4
- Supports RS-232

RS232		
PIN	**SIGNAL**	**DESCRIPTION**
1	NDCD	Data Carrier Detect
2	NSIN	Signal In
3	NSOUT	Signal Out
4	NDTR	Data Terminal Ready
5	GND	Signal Ground
6	NDSR	Data Set Ready
7	NRTS	Request To Send
8	NCTS	Clear To Send
9	VCC_COM/ NC	VCC_COM/ No Connection
10	No Pin	No Pin

RS422		
PIN	**SIGNAL**	**DESCRIPTION**
1	422 TXD-	Transmit Data, Negative
2	422 TXD+	Receive Data, Positive
3	422 RXD+	Transmit Data, Positive
4	422 RXD-	Receive Data, Negative
5	GND	Signal Ground
6	NC	No Connection
7	NC	No Connection
8	NC	No Connection
9	NC	No Connection
10	NC	No Connection

RS485		
PIN	**SIGNAL**	**DESCRIPTION**
1	TXD-	Transmit Data, Negative
2	TXD+	Transmit Data, Positive
3	NC	No Connection
4	NC	No Connection
5	GND	Signal Ground
6	NC	No Connection
7	NC	No Connection
8	NC	No Connection
9	NC	No Connection
10	NC	No Connection

1.8 Installation of Rubber Seal

Step 1	
Start installing Rubber Seal form the bottom center point of the NPP-156. (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-156P05 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.

SCREW x4
M4xL8mm
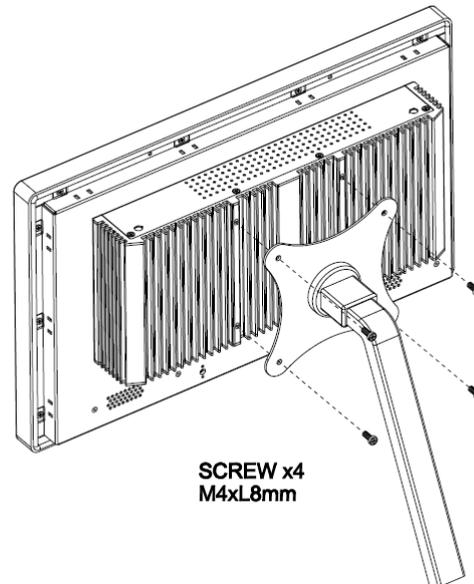
Figure 1.5: VESA Mounting

1.10 Panel Mounting

There are ten holes located along the four sides of NPP-156P05. Insert the clamp from the four sides and tighten them with the nuts provided.
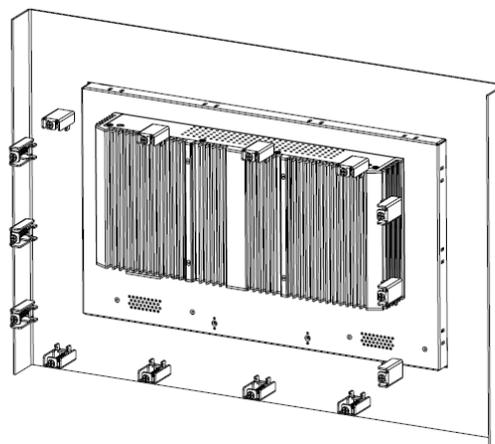
Figure 1.6: Panel Mounting

Chapter 2 Hardware

2.1 Motherboard Introduction

A 3.5" industrial motherboard developed on the basis of Intel i5-1335U Processors, which provides abundant peripheral interfaces to meet the needs of different customers. Also, it features dual 2.5 GbE ports, 4-COM ports, 5-USB 3.2 ports, 4-USB 2.0 ports one HDMI port, one Display Port and 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	148mm x 102mm x 1.6mm
CPU Support	Onboard Intel® Core™ i5-1335U Processor
Chipset	EDP to LVDS: CH7513A-BFI LAN controller: I226V/I226LM – (Wide range temperature: I226-IT) Audio Codec: ALC897 Audio Amplifier: ALC105 Super IO: IT8786 Note: Audio codec/Amplifier/Buzzer are not support wide range temperature
BIOS	UEFI only
Memory Support	2 x 262-pin socket support DDR5 4800Mhz SO-DIMM, up to 64 GB
Graphics	Intel® Integrated Graphics (Multi-display: Quad display, include 2 x Type-C display)
Display Mode	1 x HDMI 2.0, 1 x DP 1.4, 2 x Type-C (support DP1.4) 1 x LVDS /eDP
Support Resolution	Up to 4096 x 2160 for HDMI, DP, Up to 1920 x 1200 for LVDS/eDP
Triple Display	1 x HDMI + 1 x DP + LVDS
Storage	1 x SATA 3.0
Ethernet	2 x 2.5 GbE LAN Ports (Intel® I226V)
USB	5 X USB3.2 (1) 2 x USB3.2 Gen2x2 (20G) signal for 2 x Type-C connectors

	(2) 2 x USB3.2 Gen2(10G) signal for 2 x Type-A connectors. (3) 1 x USB3 for M.2 3042/3052 B Key with PCIe and USB. Integrated Nano SIM Card slot 4 X USB2 GEN1 (1) 2 x USB2.0 for 2*5pin internal header (2) 1 x USB2.0 signal for M.2 2230 E Key (3) 1 x USB2.0 signal for M.2 B Key
Serial	3 x COM header (RS-232/422/485 & 0V/5V/12V) (COM1/COM2/COM3) 1 x COM header (RS-232) (COM4)
Digital I/O	8-Bit DIO header, GPIO power support 5V/12V switch by jump. (default 5V) 1 x 2*5 Pin header
Battery	CR2032 battery by 2-pin wafer header
Audio	Audio Codec: ALC897+ ALC105 (1) 1 x 2*5 2.0mm box header for Front Audio ● MIC-in ● Line-out ● Line-In (2) 1 x 1*4 2.0mm box header for Speaker out (2W)
TPM	TPM 2.0 chip onboard TPM IC: SLB9670. (SLB9672 for wide range temperature)
Buzzer	1 x Buzzer
Hardware monitor	CPU/System temperature, Voltage monitoring for VCC, 3.3, 5, 12V...
Watchdog Timer	Reset; 1 sec.~255 min. and 1 sec. or 1 min. /step
RTC	Internal RTC, supports Wake On RTC
Expansion Slots	(1) 1 x M.2 Key E Type 2230, support USB 2.0, PCIex1 and Intel CNVi (2) 1 x M.2 Key B Type 3042/3052 with PCIex1 and USB3.2 with SIM Slots (3) 1 x M.2 Key M Type 2242/2260/2280 w/ PCIex4 for SSD
Power Management	DC-IN 9~24V, terminal block connector Support AT/ATX function switch, default ATX
Switches and LED Indicators	Front panel header 1 x 2*7 Pin header
External I/O port	1 x HDMI 1 x Display Port 2 x Type-C (support DP1.4 / USB3.2 Gen2x2) 2 x USB3.0 Type-A connector 2 x RJ45 connector, support 2.5GbE

Onboard connector& pin-header	Expansion slots
	2 x 262-pin DDR5 SO-DIMM sockets
	1 x M.2 Key B with SIM Card Slot
	1 x M.2 Key E
	1 x M.2 Key M
	SATA
	1 x SATA3 7pin connector with 1x 1*4 pin power
	Display (LVDS/EDP)
	1 x 2*20 Pin header for eDP/LVDS
	1 x 2*3 Pin header for LCD voltage select (3.3V/5V/12V)
	1 x 1*8 pin pitch 1.25 box header for LVDS Inverter
	Audio
	1 x 2*5 pin box header for MIC_in, Line_out, Line_In
	1 x 1*4 pin box header for Speaker_out
	1 x Buzzer
	USB
	1 x 2*5 pin header, support 2 x USB2.0
	Power
	1 x terminal block connector
	1 x 1*3 pin header for AT/ATX power select.
	Serial Port
	1 x 2*5 Box Header for RS232
	3 x 2*5 Box Header for RS232/422/485
	4 x 1*3 pin header for voltage select for 5/12V switch.
	Others
	1 x 1*2 pin battery header
	1 x 2*5 8-bit DIO pin header
	1 x 1*4 pin CPU Smart Fan(+12V) connector
	1 x 1*3 pin clear CMOS.
	1 x 1*3 pin header, support DIO PWR 12V/5V. Default 5V.
	1 x Power LED onboard for APCI power status
	1 x 2*7 front panel pin header 2.0 pitch.
Temperature	0ºC ~ 60ºCHumidity: 5% ~ 90%
	-40ºC ~ 85ºCHumidity: 5% ~ 90%
O.S. support	Windows 10 Pro/IoT Enterprise 22H2 64-bit
	Linux : Ubuntu 22.04

EMI/ESD	Contact with 4Kv, Air with 8Kv EMI class A	

Figure 2.1: Motherboard placement

2.3 Jumpers and Connectors
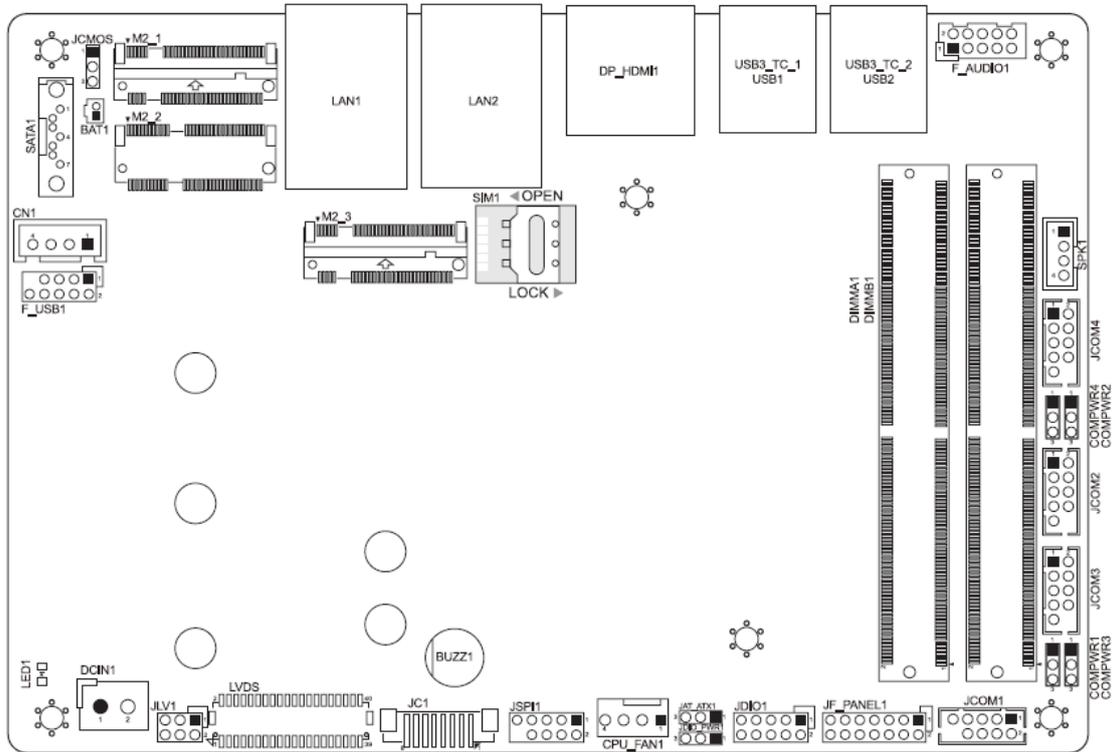
Figure 2.2: Top View
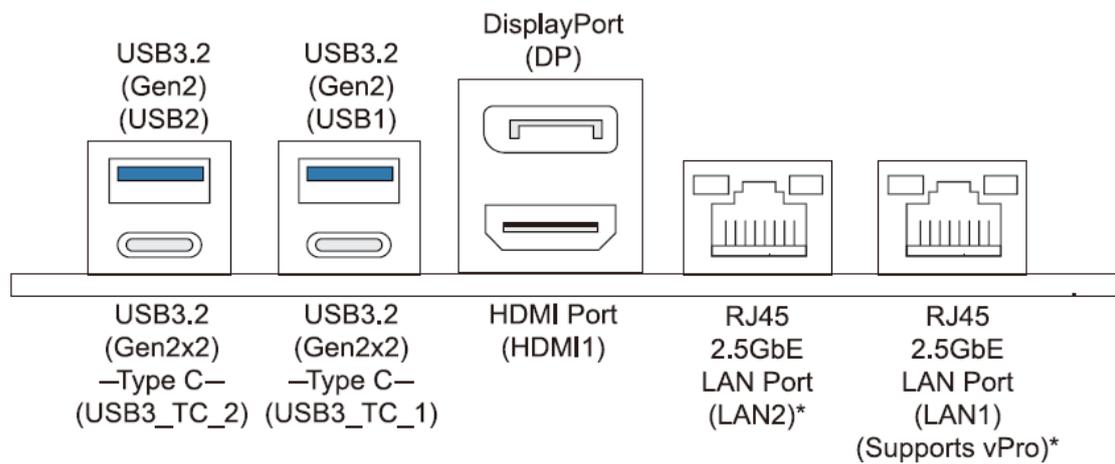
Figure 2.3: Rear Panel Connectors

2.4 Jumpers Setting and Connectors

1. Fan Headers:

CPU_FAN1: CPU Fan Header.
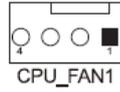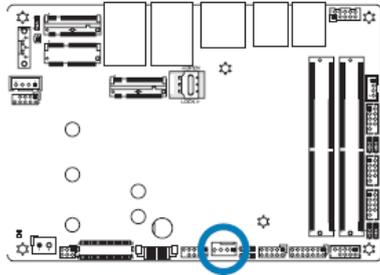
Pin	Assignment
1	GND
2	VCC12S
3	FAN1_TACH
4	FAN1_CTL

2. System Memory:

DIMM1: DDR5 Memory Module (262pin SO-DIMM).
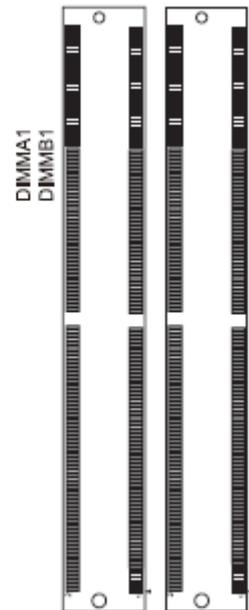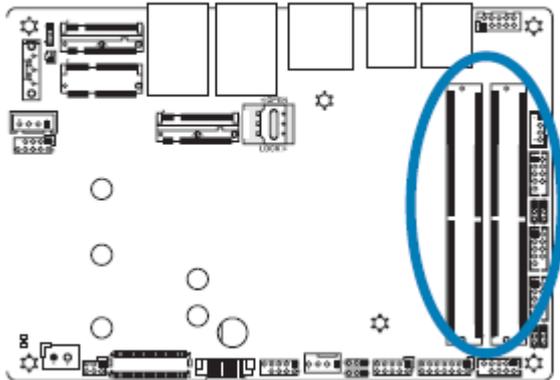
Memory Capacity

DIMM Socket Location	DDR5 Module	Total Memory Size
DIMMA1	8GB/16GB/32GB	Max is 64GB
DIMMB1	8GB/16GB/32GB	

3. M2_1: M.2 (Key M) Slot:

The M.2 slot supports M.2 Type 2242/2260/2280 module. When installing M.2 module, please place the screw and hex pillar to correct position.
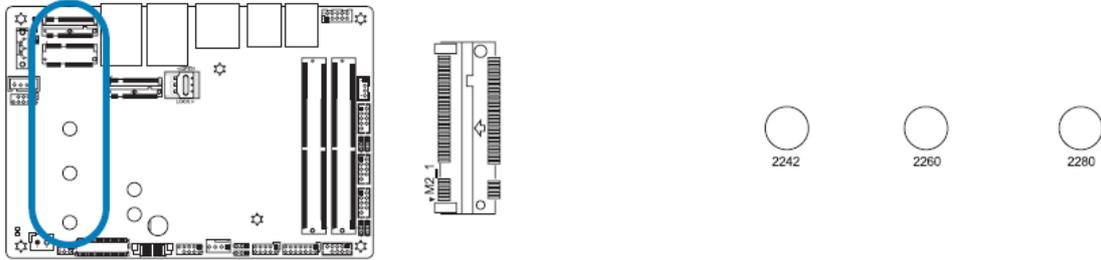
M.2 KEY M			
Pin	Assignment	Assignment	Pin
1	GND	+V3.3S	2
3	GND	+V3.3S	4
5	NC	NC	6
7	NC	NC	8
9	GND	M2_DAS	10
11	NC	+V3.3S	12
13	NC	+V3.3S	14
15	GND	+V3.3S	16
17	NC	+V3.3S	18
19	NC	NC	20
21	GND	NC	22
23	NC	NC	24
25	NC	NC	26
27	GND	NC	28
29	PCIE_RX7_DN	NC	30
31	PCIE_RX7_DP	NC	32
33	GND	NC	34
35	PCIE_TX7_DN	NC	36
37	PCIE_TX7_DP	NC	38
39	GND	NC	40
41	SELOUT1_RXN	NC	42
43	SELOUT1_RXP	NC	44
45	GND	NC	46
47	SELOUT1_TXN	NC	48
49	SELOUT1_TXP	PCIRST1_N	50
51	GND	PCIE_CLKREQ2_N	52
53	PCIE_REFCLK2_DN	WAKE_N	54
55	PCIE_REFCLK2_DP	NC	56
57	GND	NC	58
67	NC	NC	68
69	NC	+V3.3S	70
71	GND	+V3.3S	72
73	GND	+V3.3S	74
75	GND		

4. M2_2: M.2 (E Key) Socket:

Support M.2 socket 2230 type module.

Supports USB 2.0, PCIex1 and Intel CNVi.
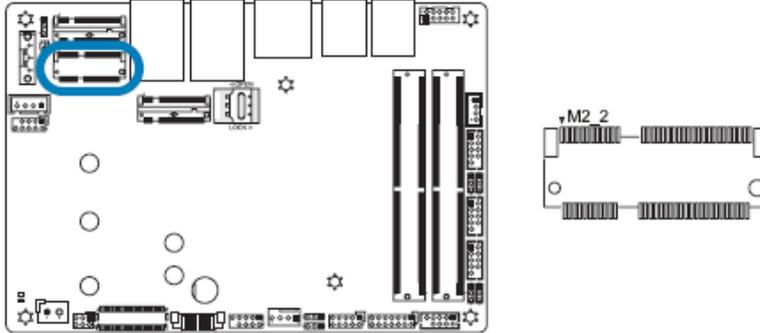
	M.2 KEY E		
Pin	Assignment	Assignment	Pin
1	GND	+V3.3A	2
3	USB2_P10_DP	+V3.3A	4
5	USB2_P10_DN	NC	6
7	GND	M2_BT_PCMCLK	8
9	CNV_WR_D1_DN	M2_BT_PCMFRM_CRF_RST_N	10
11	CNV_WR_D1_DP	M2_BT_PCMFRM_CRF_RST_N	12
13	GND	M2_BT_PCMOUT_CLKREQ	14
15	CNV_WR_D0_DN	NC	16
17	CNV_WR_D0_DP	+V3.3A	18
19	GND	GPPC_A8_UART_WAKE_N	20
21	CNV_WR_CLK_DN	GPPC_F1_CNV_BRI_RSP	22
23	CNV_WR_CLK_DP		24
33	GND	GPPC_F2_CNV_RGI_DT	32
35	PCIE_TX7_DP	GPPC_F3_CNV_RGI_RSP	34
37	PCIE_TX7_DN	GPPC_F0_CNV_BRI_DT	36
39	GND	MLK_RST_N	38
41	PCIE_RX7_DP	MLK_DATA	40
43	PCIE_RX7_DN	MLK_CLK	42
45	GND	GPPC_F6_CNV_PA_BLANKING	44
47	PCIE_REFCLK4_DP	CNV_MFUART2_TXD	46
49	PCIE_REFCLK4_DN	CNV_MFUART2_RXD	48
51	GND	PMC_SUSCLK	50
53	PCIE_CLKREQ4_N	PCIRST1_N	52
55	NC	GP_A13_BT_KILL_N	54
57	GND	GP_E3_WIFI_KILL_N	56
59	CNV_WT_D1_DN	NC	58
61	CNV_WT_D1_DP	NC	60
63	GND	NC	62
65	CNV_WT_D0_DN	NC	64
67	CNV_WT_D0_DP	NC	66
69	GND	NC	68
71	CNV_WT_CLK_DN	NC	70
73	CNV_WT_CLK_DP	+V3.3A	72
75	GND	+V3.3A	74

5. M2_3: M.2 (Key B) Slot:

The M.2 slot supports M.2 Type 3042/3052 module. When installing M.2 module, please place the screw and hex pillar to correct position.
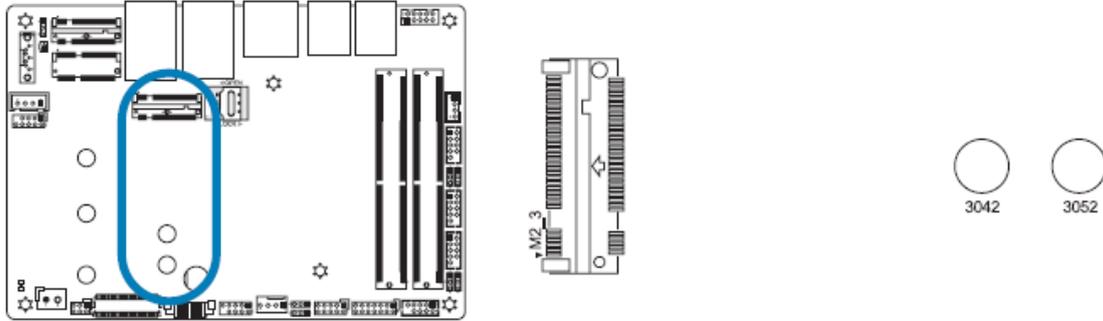
M.2 KEY B			
Pin	Assignment	Assignment	Pin
1	M2_B_CFG3	+V3.3A	2
3	GND	+V3.3A	4
5	GND	FULL_CARD_PWROFF	6
7	USB2_P3_DP	WWAN_DISABLE	8
9	USB2_P3_DN	WWAN_LED_DAS	10
11	GND		
21	M2_B_CFG0	NC	20
23	NC	NC	22
25	NC	NC	24
27	GND	NC	26
29	USB3_P3_RX_DN	NC	28
31	USB3_P3_RX_DP	UIM_RESET	30
33	GND	UIM_CLK	32
35	USB3_P3_TX_DN	UIM_DATA	34
37	USB3_P3_TX_DP	SIM_PWR_B	36
39	GND	M2_B_DEVSLP	38
41	PCIE_RX2_DN	NC	40
43	PCIE_RX2_DP	NC	42
45	GND	NC	44
47	PCIE_TX2_DN	NC	46
49	PCIE_TX2_DP	NC	48
51	GND	PLTRST_N	50
53	PCIE_REFCLK1_DN	PCIE_CLKREQ1_N	52
55	PCIE_REFCLK1_DP	WAKE_N	54
57	GND	NC	56
59	NC	NC	58
61	NC	NC	60
63	NC	NC	62
65	NC	NC	64
67	M2_WWAN_RST_N	SIM_DET	66
69	M2_B_CFG1	NC	68
71	GND	+V3.3A	70
73	GND	+V3.3A	72
75	M2_B_CFG2	+V3.3A	74

6. CN1: SATA Power Connector:
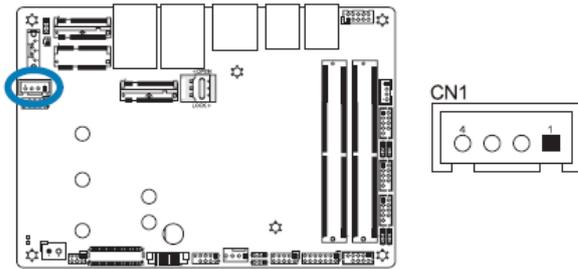
Pin	Assignment
1	VCC5
2	GND
3	GND
4	VCC12

7. SATA1: Serial ATA 6.0 Gb/s Connectors:

The connector supports the thin Serial ATA cable for primary internal storage devices
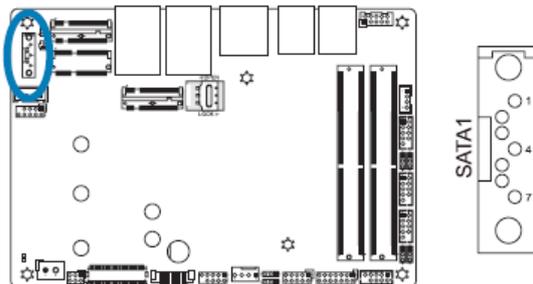
Pin	Assignment
1	GND
2	SSATA_TXP1
3	SSATA_TXN1
4	GND
5	SSATA_RXN1
6	SSATA_RXP1
7	Detect

8. F_USB1: USB Header:
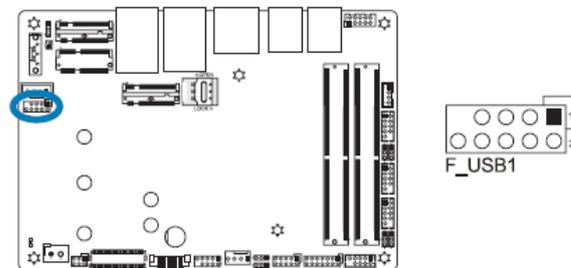
Pin	Assignment
1	PWR_RUSB2
2	PWR_RUSB2
3	USB2_P7_DN
4	USB2_P8_DN
5	USB2_P7_DP
6	USB2_P8_DP
7	GND
8	GND
9	
10	NI

9. F_AUDIO1: Front Panel Audio Header:
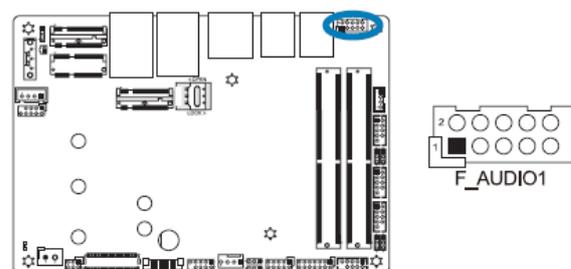
Pin	Assignment
1	FMIC1
2	GND
3	FLINE1_LL(LINE IN)
4	GND
5	FLINE1_RR(LINE IN)
6	GND
7	FLINE2_LL(LINE OUT)
8	GND
9	FLINE2_RR(LINE OUT)
10	GND

10. LVDS/EDP: WAFER 2X15 1.25MM :
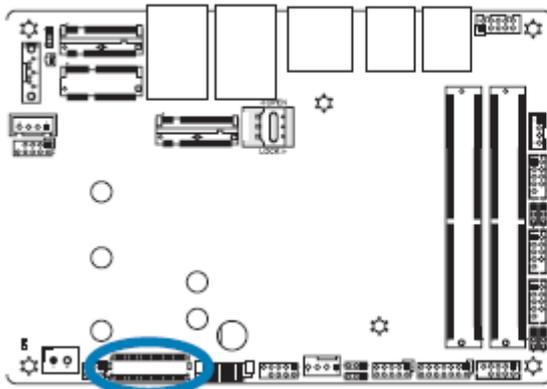
Pin	Assignment
1	LVDSB_DATA0_N
2	PVDD2
3	LVDSB_DATA0_P
4	PVDD2
5	GND
6	GND
7	LVDSB_DATA1_N
8	GND
9	LVDSB_DATA1_P
10	LVDSA_DATA0_N
11	GND
12	LVDSA_DATA0_P (eDP_HPD)
13	LVDSB_DATA2_N
14	GND
15	LVDSB_DATA2_P
16	LVDSA_DATA1_N(eDP_TX1N)
17	GND
18	LVDSA_DATA1_P(eDP_TX1P)
19	LVDSB_CLK_N
20	GND

Pin	Assignment
21	LVDSB_CLK_P
22	LVDSA_DATA2_N(eDP_TX0N)
23	GND
24	LVDSA_DATA2_P(eDP_TX0P)
25	LVDSB_DATA3_N
26	GND
27	LVDSB_DATA3_P
28	LVDSA_CLK_N(eDP_AUXN)
29	+VCC5S
30	LVDSA_CLK_P(eDP_AUXP)
31	
32	GND
33	+V3.3S
34	LVDSA_DATA3_N
35	
36	LVDSA_DATA3_P
37	PVDD2
38	GND
39	PVDD2
40	

11. JC1: Backlight Control Header:
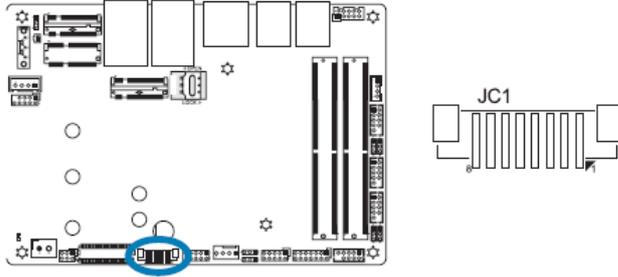
Pin	Assignment
1	VCC12S
2	VCC12S
3	+VCC5S
4	BKLTEN_LVDS
5	GND
6	GND
7	GND
8	EDPA_BKLT_CTRL

12. JSPK1: Chassis Speaker Header:
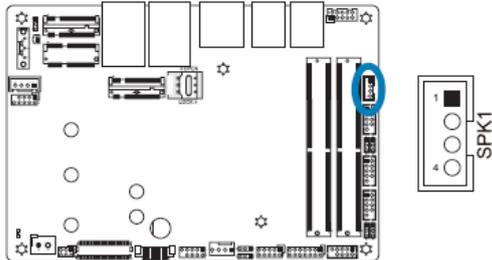
Pin	Assignment
1	SPKLP
2	SPKLN
3	SPKRN
4	SPKRP

13. JCOM1, JCOM2, JCOM3: RS232/RS422/RS485 Header:
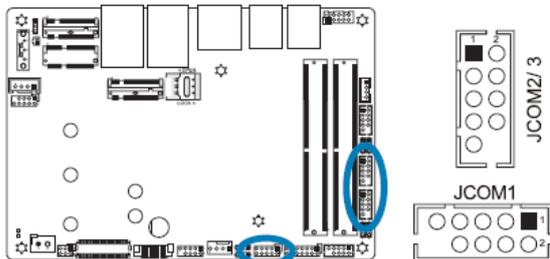
Pin	Assignment
1	COM_DCD/RS422_TX-/RS485_R-T-
2	COM_RXD/RS422_TX+/RS485_R+T+
3	COM_TXD/RS422_RX+
4	COM_DTR/RS422_RX-
5	GND
6	COM_DSR
7	COM_RTS
8	COM_CTS
9	COM_PWR
10	NI

14. JCOM4: RS232 Header:
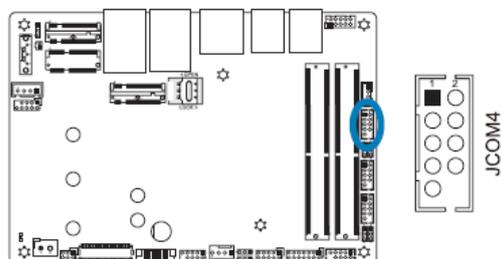
Pin	Assignment
1	COM_DCD
2	COM_RXD
3	COM_TXD
4	COM_DTR
5	GND
6	COM_DSR
7	COM_RTS
8	COM_CTS
9	COM_PWR
10	NI

15. JDIO1: DIO Header:
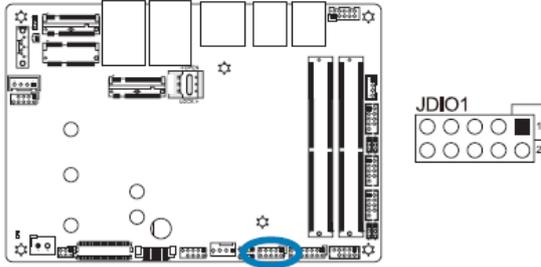
Pin	Assignment
1	VDIO_POWER
2	DO0
3	DI0
4	DO1
5	DI1
6	DO2
7	DI2
8	DO3
9	DI3
10	GND

16. JF_PANEL1: Front Panel Header:
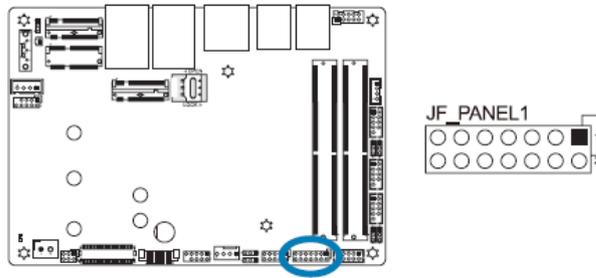
Pin	Assignment
1	POWER_LED+
2	SPKR-
3	GND
4	SPKR_CNTL
5	GND
6	SPKR-
7	NI
8	+VCC5S pull high
9	GND
10	PWRSW+
11	GND
12	HWRST+
13	HDD_LED-
14	HDD_LED+

17. DCIN1: DC_JACK Header:
   PHOENIX CONN 2P
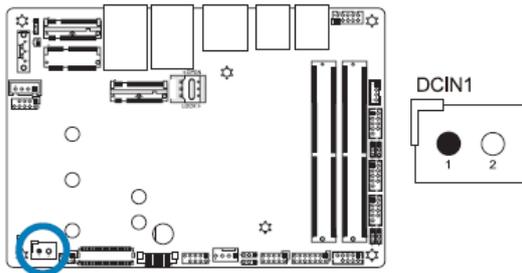
Pin	Assignment
1	GND
2	VCC(9V ~ 24V)

18. BAT1: WAFER 1X2 1.25MM:
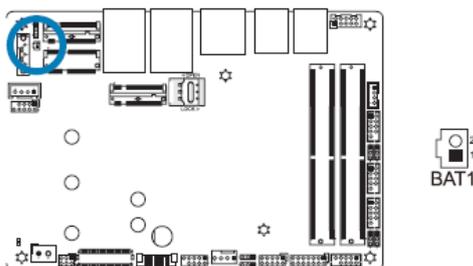
Pin	Assignment
1	BAT_IN
2	GND

19. SIM1: SIM Slot:
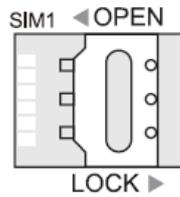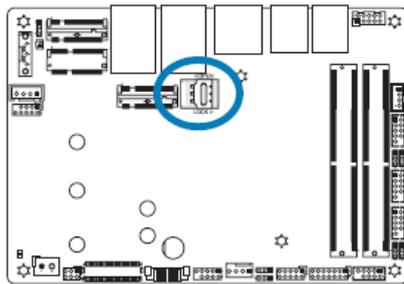
Pin	Assignment
1	UIM_PWR
2	UIM_Reset
3	UIM_CLK
4	N/A
5	GND
6	VPP
7	Data

20. JCMOS: Clear CMOS Jumper:

Placing the jumper on pin2-3 allows user to restore the BIOS safe setting and the CMOS data. Please carefully follow the procedures to avoid damaging the motherboard..

Pin 1-2 Close: Normal Operation (Default)

Pin 2-3 Close: Clear CMOS data
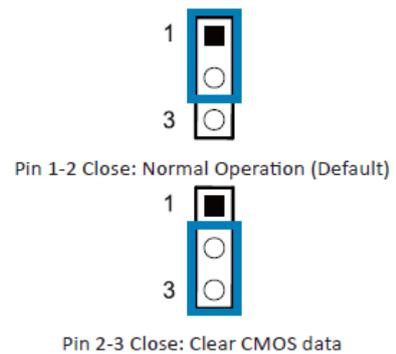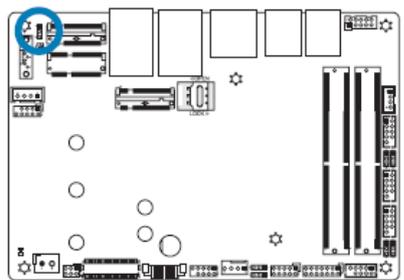
Clear CMOS Procedures:

1. Remove AC power line.

2. Set the jumper to "Pin 2-3 close".

3. Wait for five seconds.

4. Set the jumper to "Pin 1-2 close".

5. Power on the AC.

6. Reset your desired password or clear the CMOS data.

21. JLV1: LCD panel power select Header:
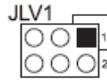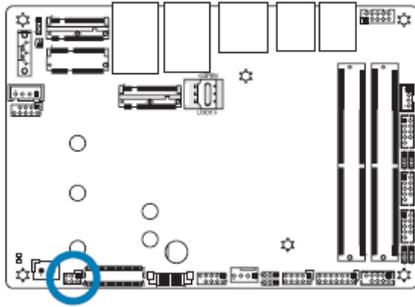
JLV1	
1-2	+V3.3S
3-4	+VCC5S
5-6	VCC12S

22. JAT_ATX1: HEADER 1X3:

JAT_ATX1	
1-2	ATX
2-3	AT

23. COMPWR 1/2/3/4:
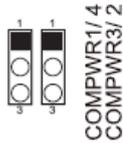
COMPWR	
1-2	+VCC5S
2-3	VCC12S

24. JDIO-PWR1: JDIO-POWER:
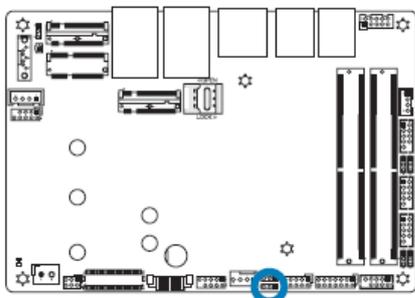
JDIO_PWR1	
1-2	VCC12S
2-3	+VCC5S (Default)

Chapter 3 BIOS Setup

3.1 Introduction

The purpose of this manual is to describe the settings in the AMI UEFI BIOS Setup program on this motherboard. The Setup program allows users to modify the basic system configuration and save these settings to NVRAM.

UEFI BIOS determines what a computer can do without accessing programs from a disk. This system controls most of the input and output devices such as keyboard, mouse, serial ports and disk drives. BIOS activates at the first stage of the booting process, loading and executing the operating system. Some additional features, such as virus and password protection or chipset fine-tuning options are also included in UEFI BIOS.

The rest of this manual will to guide you through the options and settings in UEFI BIOS Setup.

3.1.1 How to Entering into BIOS Menu

Once the system is power on, press the <DEL> or <F2> key to enter BIOS Setup.

3.2 The Menu Bar

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

  BIOS Information                                    Choose the system default
  BIOS Vendor                American Megatrends      language
  Core Version               5.27
  Model Name                 BIRPL-PAT
  Project Code               BIRPL-PAT
  Compliancy                 UEFI 2.8; PI 1.7
  Access Level               Administrator

  Total Memory               16384 MB
  Memory Frequency            5200 MHz

  System Language            [English]

  System Date                [Mon 07/15/2024]        →←: Select Screen
  System Time                [00:02:57]              ↑↓: Select Item
                                                     Enter: Select
                                                     +/-: Change Opt.
                                                     F1: General Help
                                                     F9: Optimized Defaults
                                                     F10: Save & Exit
                                                     ESC: Exit



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```

➢ **Main Menu**
➢ **Advanced Menu**
➢ **Chipset Menu**
➢ **Boot Menu**
➢ **Security Menu**
➢ **Exit Menu**

3.2.1 Main Menu

Once you enter AMI UEFI BIOS Setup Utility, the Main Menu will appear on the screen providing an overview of the basic system information.

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

   BIOS Information                                    Choose the system default
   BIOS Vendor              American Megatrends        language
   Core Version             5.27
   Model Name               BIRPL-PAT
   Project Code             BIRPL-PAT
   Compliancy               UEFI 2.8; PI 1.7
   Access Level             Administrator

   Total Memory             16384 MB
   Memory Frequency          5200 MHz

   System Language          [English]

   System Date              [Mon 07/15/2024]          →←: Select Screen
   System Time              [00:02:57]                ↑↓: Select Item
                                                      Enter: Select
                                                      +/-: Change Opt.
                                                      F1: General Help
                                                      F9: Optimized Defaults
                                                      F10: Save & Exit
                                                      ESC: Exit




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```

BIOS Information

• Shows system information including UEFI BIOS version, model name, marketing name, built date, etc.

System Language

• Choose the system default language.

System Date

• Set the system date. Note that the 'Day' automatically changes when you set the date.

System Time

• Set the system internal clock.

3.2.2 Advanced Menu

The Advanced Menu allows you to configure the settings of CPU, Super I/O, Power Management, and other system devices.

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

   ▶ Connectivity Configuration                    Configure Connectivity related
   ▶ CPU Configuration                             options
   ▶ SATA Configuration
   ▶ Trusted Computing
   ▶ ACPI Settings
   ▶ Smart Fan Control
   ▶ IT8786 Super IO Configuration
   ▶ Hardware Monitor
   ▶ USB Configuration
   ▶ Network Stack Configuration
   ▶ NVMe Configuration


   ▶ Driver Health                                 →←: Select Screen
                                                   ↑↓: Select Item
                                                   Enter: Select
                                                   +/-: Change Opt.
                                                   F1: General Help
                                                   F9: Optimized Defaults
                                                   F10: Save & Exit
                                                   ESC: Exit




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```

```
                                    Aptio Setup – AMI
        Advanced

    CNVi CRF Present              No                      This option configures
    CNVi Configuration                                   Connectivity.
      CNVi Mode                   [Auto Detection]        [Auto Detection] means that if
      Wi-Fi Core                  [Enabled]               Discrete solution is
      BT Core                     [Enabled]               discovered it will be enabled
      BT Audio Offload            [Enabled]               by default. Otherwise
      BT RF-Kill Delay Time       0                       Integrated solution (CNVi)
    RFI Mitigation                [Enabled]               will be enabled;
                                                          [Disable Integrated] disables
    CoExistence Manager           [Disabled]              Integrated Solution.
                                                          NOTE: When CNVi is present,
    Preboot BLE                   [Disabled]

  ▶ WWAN Configuration                                    →←: Select Screen
                                                          ↑↓: Select Item
                                                          Enter: Select
                                                          +/-: Change Opt.
                                                          F1: General Help
                                                          F9: Optimized Defaults
                                                          F10: Save & Exit
                                                          ESC: Exit



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```

Connectivity Configuration

• Configure Connectivity related options

CNVi Configuration

CNVi Mode

• This option configures Connectivity.

• [Auto Detection] means that if Discrete solution is discovered it will be enabled by default. Otherwise Integrated solution (CNVi) will be enabled;

• [Disable Integrated] disables Integrated Solution. 30 | Chapter 3: BIOS Setup

• NOTE: When CNVi is present, the GPIO pins that are used for radio interface cannot be assigned to the other native function.

RFI Mitigation

• This is an option intended to Enable/Disable DDR-RFIM feature for Connectivity

• This RFI mitigation feature may result in temporary slowdown of the DDR speed.

Preboot BLE

• This will be used to enable Preboot Bluetooth function.

WWAN Configuration

• Configure WWAN related options

WWAN Device

• Enable or Disable M.2 WWAN Device

```
                        Aptio Setup - AMI
   Advanced

   CPU Configuration                              When enabled, a VMM can
                                                  utilize the additional
   ID                       0xB06A3               hardware capabilities provided
   VMX                      Supported             by Vanderpool Technology.
   SMX/TXT                  Supported

   Intel (VMX) Virtualization   [Enabled]
   Technology
   Hyper-Threading              [Enabled]
   C states                     [Enabled]
   Turbo Mode                   [Enabled]


                                                  →←: Select Screen
                                                  ↑↓: Select Item
                                                  Enter: Select
                                                  +/-: Change Opt.
                                                  F1: General Help
                                                  F9: Optimized Defaults
                                                  F10: Save & Exit
                                                  ESC: Exit



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```

CPU Configuration

CPU Configuration Parameters

Intel (VMX) Virtualization Technology

• When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.

Hyper-Threading

• Enable or Disable Hyper-Threading Technology.

C states

• Enable/Disable CPU Power Management. Allows CPU to go to C states when it's not 100% utilized.

Turbo Mode

• Enable/Disable processor Turbo Mode (requires EMTTM enabled too). AUTO means enabled.

```
                          Aptio Setup - AMI
   Advanced

 SATA Configuration                                  Enable/Disable SATA Device.

 SATA Controller(s)           [Enabled]

 M2                           Empty
 SATA1                        Empty




                                                     ↔: Select Screen
                                                     ↑↓: Select Item
                                                     Enter: Select
                                                     +/-: Change Opt.
                                                     F1: General Help
                                                     F9: Optimized Defaults
                                                     F10: Save & Exit
                                                     ESC: Exit




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```
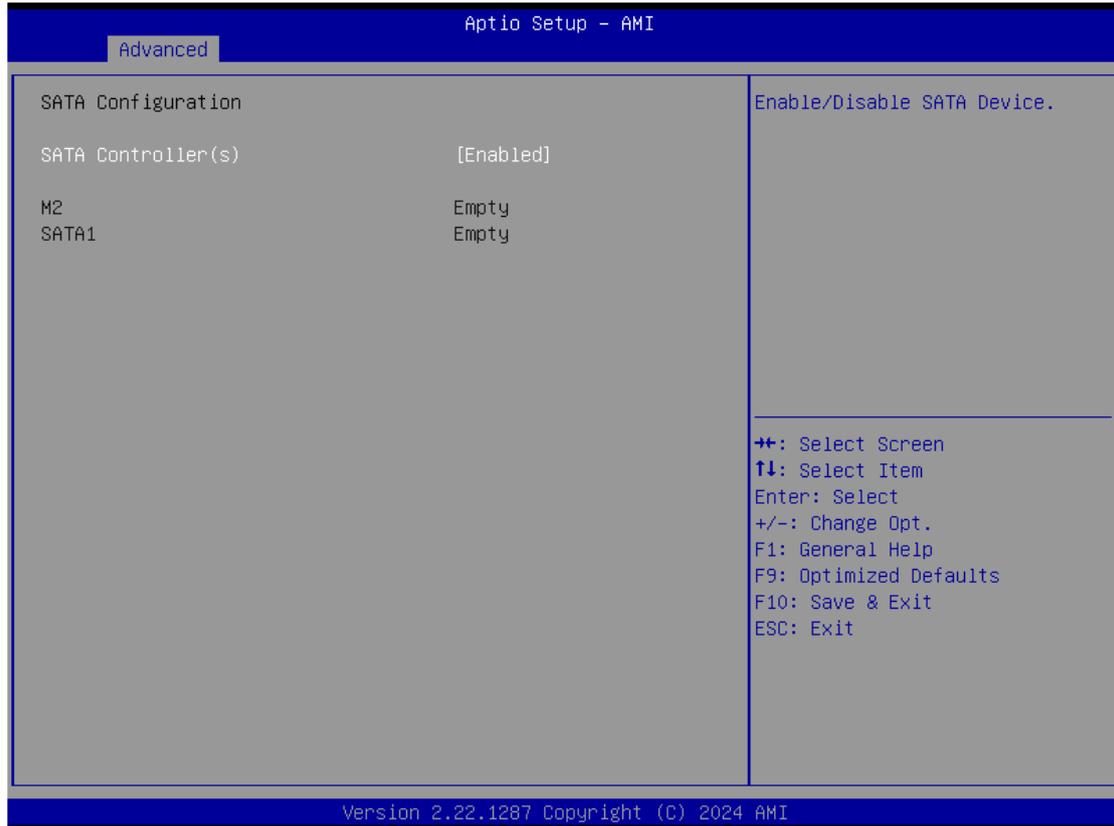
SATA Configuration

• SATA Device Options Settings

SATA Controller(s)

• Enable/Disable SATA Device.

```
                              Aptio Setup - AMI
        Advanced

     TPM 2.0 Device Found                              Selects TPM device: PTT or
     Firmware Version:            600.18               dTPM. PTT - Enables PTT in
     Vendor:                      INTC                 SkuMgr dTPM 1.2 - Disables PTT
                                                       in SkuMgr Warning !  PTT/dTPM
     TPM Device Selection         [PTT]                will be disabled and all data
     Security Device Support      [Enable]             saved on it will be lost.
     Active PCR banks             SHA256
     Available PCR banks          SHA256,SHA384,SM3


                                                       ++: Select Screen
                                                       ↑↓: Select Item
                                                       Enter: Select
                                                       +/-: Change Opt.
                                                       F1: General Help
                                                       F9: Optimized Defaults
                                                       F10: Save & Exit
                                                       ESC: Exit



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```

Trusted Computing

• Trusted Computing Settings

TPM Device Selection

• Selects TPM device: PTT or dTPM. PTT - Enables PTT in SkuMgr dTPM 1.2 - Disables PTT in SkuMgr Warning ! PTT/dTPM will be disabled and all data saved on it will be lost.

Security Device Support

• 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.

```
                              Aptio Setup - AMI
        Advanced

  ACPI Settings                                          Select the highest ACPI sleep
                                                         state the system will enter
                                                         when the SUSPEND button is
  ACPI Sleep State               [S3 (Suspend to RAM)]   pressed.

  USB S3 Power Control           [ON]
  PME Wake up from S5            [Disabled]
  Wake system with Fixed Time    [Disabled]
  Wake up date                   [EveryDay]
  Wake up hour                   0
  Wake up minute                 0
  Wake up second                 0
  Restore AC Power Loss          [Power Off]
                                                         ──────────────────────────
                                                         →←: Select Screen
                                                         ↑↓: Select Item
                                                         Enter: Select
                                                         +/-: Change Opt.
                                                         F1: General Help
                                                         F9: Optimized Defaults
                                                         F10: Save & Exit
                                                         ESC: Exit



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```

ACPI Settings

System ACPI Parameters.

ACPI Sleep State

• Select the highest ACPI sleep state the system will enter when the SUSPEND button is pressed.

USB S3 Power Control

• USB S3 Power Control.

PME Wake up from S5

• Enable system to wake from S5 using PME event.

Wake system with Fixd Time

• Enable or disable System wake on alarm event. When enabled, System will wake on the hr::min::sec specified

Wake up date

• Select wakeup date

Wake up hour

• select 0-23 For example enter 3 for 3am and 15 for 3pm

Wake up minute

• 0 - 59

Wake up second

• 0 - 59

Restore AC Power Loss

• Specify what state to go to when power is re-applied after a power failure.

```
                              Aptio Setup - AMI
    Advanced

    Smart Fan Control                                      CPU Fan control function.
                                                           [Disabled]:Full ON
    CPU Smart Fan1                   [Disabled]            [Auto]:Auto detect Fan type
    Fan Ctrl OFF(°C)                 10                    and control by parameters below
    Fan Ctrl ON(°C)                  20
    Fan Ctrl FULL(°C)                70
    Fan Ctrl Start Value             50
    Fan Ctrl Sensitive               30



                                                           →←: Select Screen
                                                           ↑↓: Select Item
                                                           Enter: Select
                                                           +/-: Change Opt.
                                                           F1: General Help
                                                           F9: Optimized Defaults
                                                           F10: Save & Exit
                                                           ESC: Exit




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```

Smart Fan Mode Configuration

• Smart Fan Mode Select

Smart Fan Function

• Enable or Disable Smart Fan

```
                              Aptio Setup - AMI
    Advanced

    IT8786 Super IO Configuration                            Set Parameters of Serial Port
                                                             1 (COMA)
    Super IO Chip                    IT8786
  ► Serial Port 1 Configuration
  ► Serial Port 2 Configuration
  ► Serial Port 3 Configuration
  ► Serial Port 4 Configuration


    Watch Dog Degree                 [Second]
    Watch Dog Timer                  0


                                                             ──────────────────────────────
                                                             ↔: Select Screen
                                                             ↑↓: Select Item
                                                             Enter: Select
                                                             +/-: Change Opt.
                                                             F1: General Help
                                                             F9: Optimized Defaults
                                                             F10: Save & Exit
                                                             ESC: Exit



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```

```
                              Aptio Setup - AMI
    Advanced

    Serial Port 1 Configuration                              Enable or Disable Serial Port
                                                             (COM)
    Serial Port                      [Enabled]
    Device Settings                  IO=3F8h; IRQ=4;

    Change Settings                  [Auto]
    COM1 Port Type                   [RS-232]
    Auto Flow Control                [Enabled]
    RTS# Polarity                    [Normal]




                                                             ──────────────────────────────
                                                             ↔: Select Screen
                                                             ↑↓: Select Item
                                                             Enter: Select
                                                             +/-: Change Opt.
                                                             F1: General Help
                                                             F9: Optimized Defaults
                                                             F10: Save & Exit
                                                             ESC: Exit



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```

IT8786 Super IO Configuration

• **System Super IO Chip Parameters.**

Serial Port 1 Configuration

• **Set Parameters of Serial Port 1 (COMA)**

Serial Port

• **Enable or Disable Serial Port (COM)**

Change Settings

• **Select an optimal settings for Super IO Device**

COM1 Port Type

• **COM Port Type selection**

Auto Flow Control

• **Auto Flow Control.**

RST# Polarity

• **RST# Polarity.**

Serial Port 2 Configuration

• **Set Parameters of Serial Port 2 (COMA)**

Serial Port

• **Enable or Disable Serial Port (COM)**

Change Settings

• Select an optimal settings for Super IO Device

COM1 Port Type

• COM Port Type selection

Auto Flow Control

• Auto Flow Control.

RST# Polarity

• RST# Polarity.

Serial Port 3 Configuration

• Set Parameters of Serial Port 3 (COMA)

Serial Port

• Enable or Disable Serial Port (COM)

Change Settings

• Select an optimal settings for Super IO Device

COM1 Port Type

• COM Port Type selection

Auto Flow Control

• Auto Flow Control.

RST# Polarity

• RST# Polarity.

Serial Port 4 Configuration

• Set Parameters of Serial Port 4 (COMA)

Serial Port

• Enable or Disable Serial Port (COM)

Change Settings

• Select an optimal settings for Super IO Device36 | Chapter 3: BIOS Setup

Watch Dog Degree

• Select Watch Dog degree is minute or second

Watch Dog Timer

• Set 0 will disabled Minimu 1 Maximum 65535

```
                          Aptio Setup - AMI
     Advanced

   Pc Health Status

   MOS temperature                    : +52  ˚C
   System temperature                 : +47  ˚C
   CPU temperature                    : +63  ˚C
   CPU Fan Speed                      : N/A
   CPU Vcore                          : +0.638 V
   VCCIO Voltage                      : +1.133 V
   DC Voltage                         : +12.078 V
   + 5V                               : +4.991 V

                                                   ↔: Select Screen
                                                   ↑↓: Select Item
                                                   Enter: Select
                                                   +/-: Change Opt.
                                                   F1: General Help
                                                   F9: Optimized Defaults
                                                   F10: Save & Exit
                                                   ESC: Exit



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```
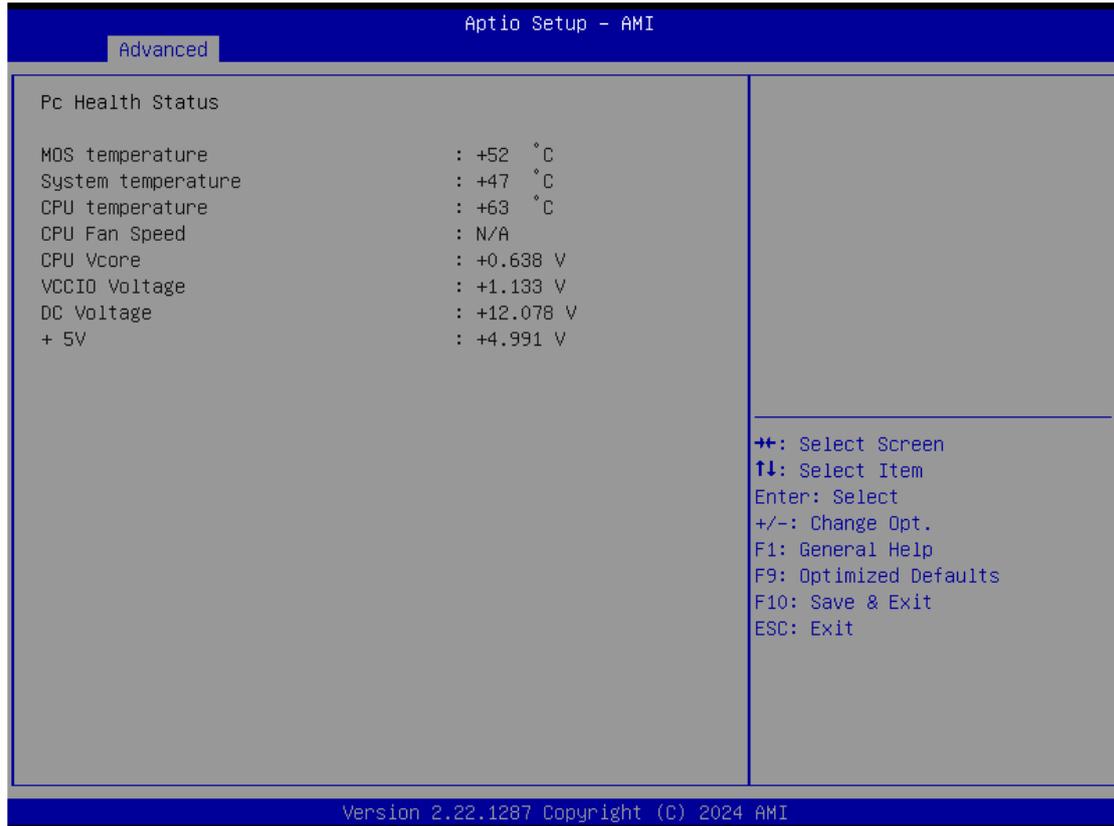
Hardware Monitor

Monitor hardware status

```
                              Aptio Setup - AMI
   Advanced

 USB Configuration

 USB Module Version            30

 USB Controllers:
       2 XHCIs
 USB Devices:
       1 Drive, 1 Keyboard



                                              ↔: Select Screen
                                              ↑↓: Select Item
                                              Enter: Select
                                              +/-: Change Opt.
                                              F1: General Help
                                              F9: Optimized Defaults
                                              F10: Save & Exit
                                              ESC: Exit




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```
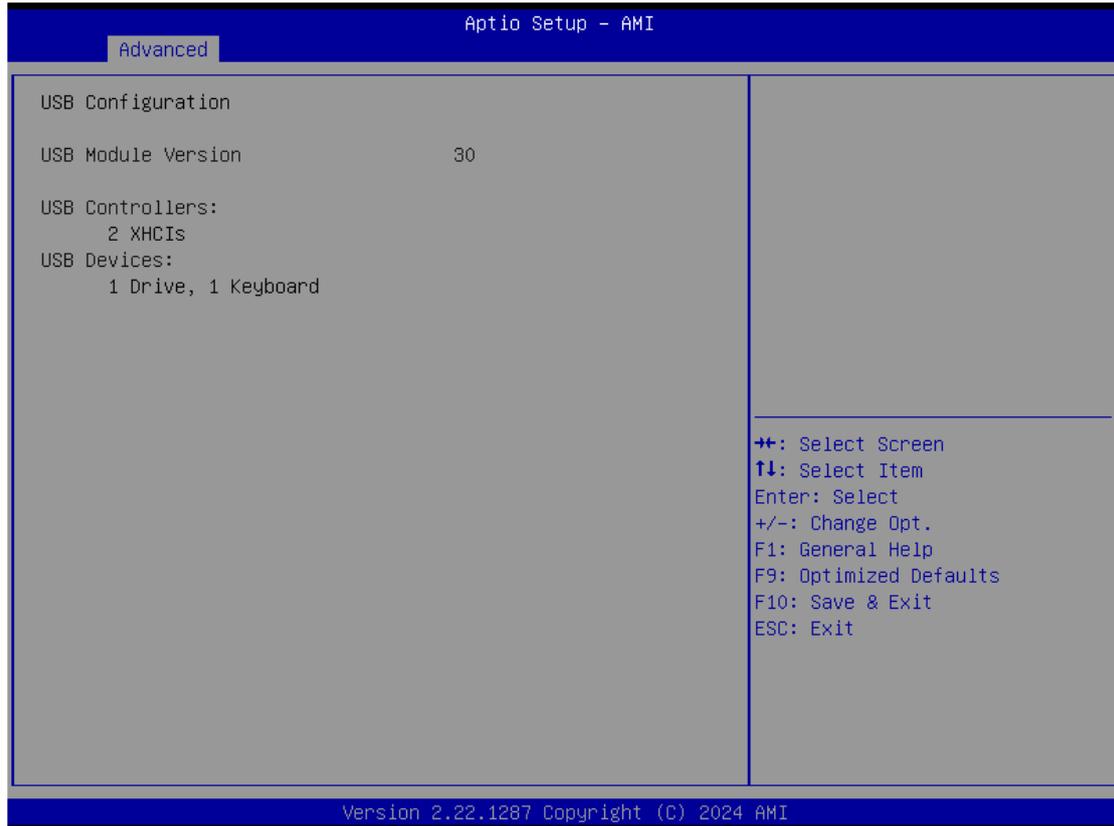
USB Configuration

USB Configuration settings

```
                              Aptio Setup – AMI
     Advanced

 Network Stack                      [Disabled]              Enable/Disable UEFI Network
                                                            Stack




                                                            _____
                                                            ↔: Select Screen
                                                            ↑↓: Select Item
                                                            Enter: Select
                                                            +/-: Change Opt.
                                                            F1: General Help
                                                            F9: Optimized Defaults
                                                            F10: Save & Exit
                                                            ESC: Exit



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```

Network Stack Configuration

Network Stack Settings

Network Stack

Enable/Disable UEFI Network Stack

```
                              Aptio Setup - AMI
    Advanced

    NVMe Configuration

    No NVME Device Found

                                              ↔: Select Screen
                                              ↑↓: Select Item
                                              Enter: Select
                                              +/-: Change Opt.
                                              F1: General Help
                                              F9: Optimized Defaults
                                              F10: Save & Exit
                                              ESC: Exit

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```
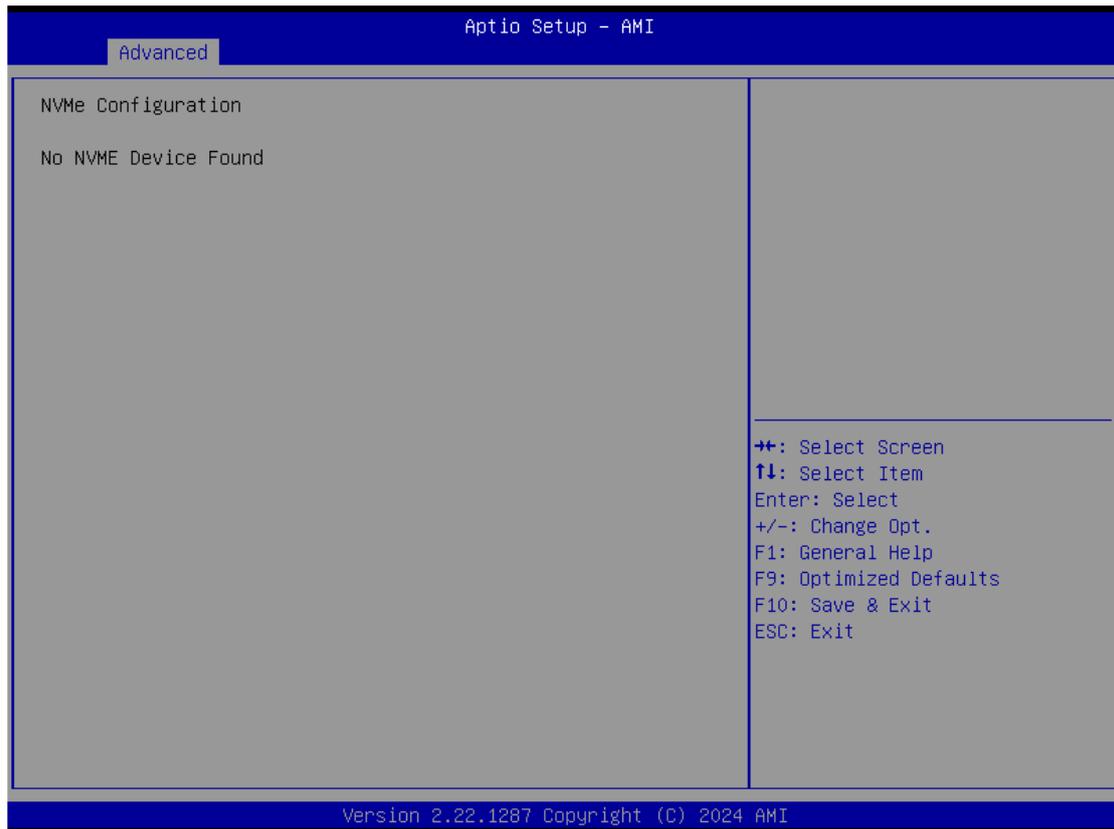
NVMe Configuration

• **NVMe Device Options Settings**
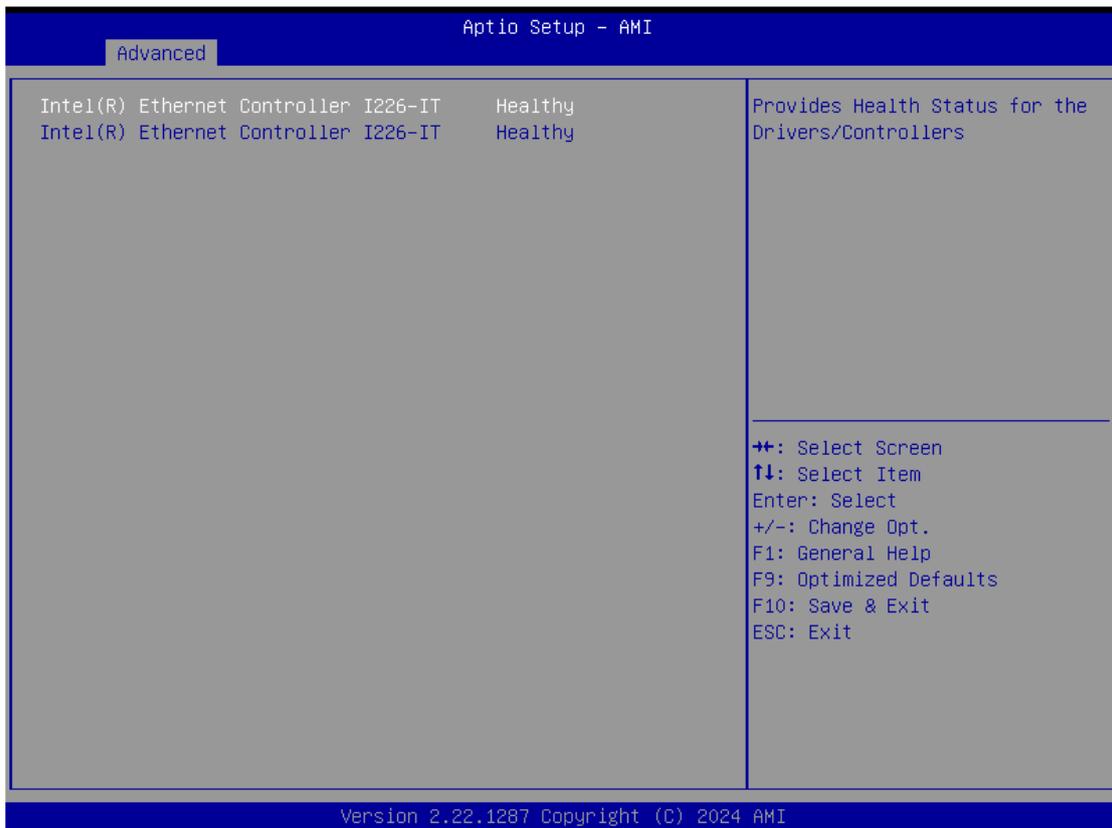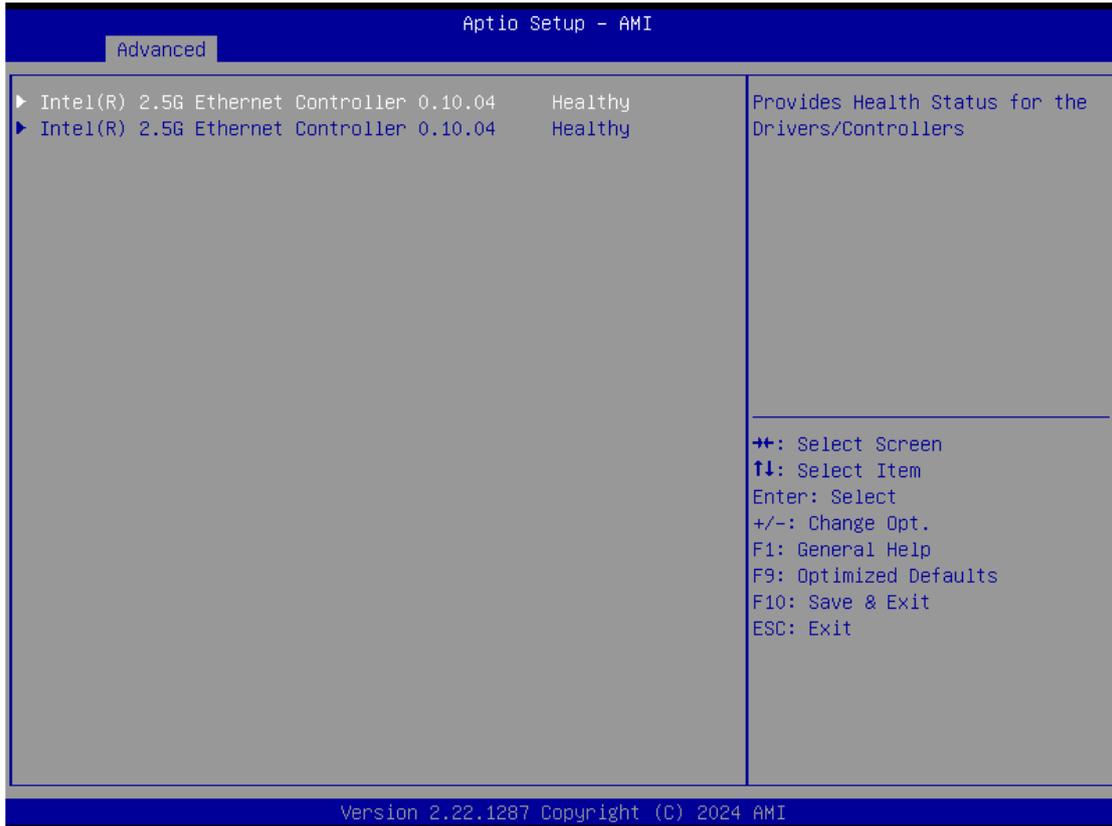
Driver Health

• **Provides Health Status for the Drivers/Controllers.**

3.2.3 Chipset Menu

This section describes configuring the PCI bus system. PCI, or Personal Computer Interconnect, is a system which allows I/O devices to operate at speeds nearing the speed of the CPU itself uses when communicating with its own special components.

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

    USBC PD Connector               [Disabled]          Enabled or Disabled device in
  ▶ System Agent (SA) Configuration                     ACPI support based on
  ▶ PCH-IO Configuration                                configuration
  ▶ Onboard Device
  ▶ eDP/LVDS Panel Setting


                                                        →←: Select Screen
                                                        ↑↓: Select Item
                                                        Enter: Select
                                                        +/-: Change Opt.
                                                        F1: General Help
                                                        F9: Optimized Defaults
                                                        F10: Save & Exit
                                                        ESC: Exit




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```

USBC PD Connector

• Enabled or disabled device in ACPI support based on configuration.

```
                              Aptio Setup - AMI
           Chipset

  System Agent (SA) Configuration                        Select the GTT Size

  GTT Size                        [8MB]
  Aperture Size                   [256MB]
  DVMT Pre-Allocated              [60M]
  DVMT Total Gfx Mem              [256M]
  PAVP Enable                     [Enabled]
  VT-d                            [Enabled]
  Above 4GB MMIO BIOS assignment  [Enabled]


                                                      _____

                                                      →←: Select Screen
                                                      ↑↓: Select Item
                                                      Enter: Select
                                                      +/-: Change Opt.
                                                      F1: General Help
                                                      F9: Optimized Defaults
                                                      F10: Save & Exit
                                                      ESC: Exit




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```
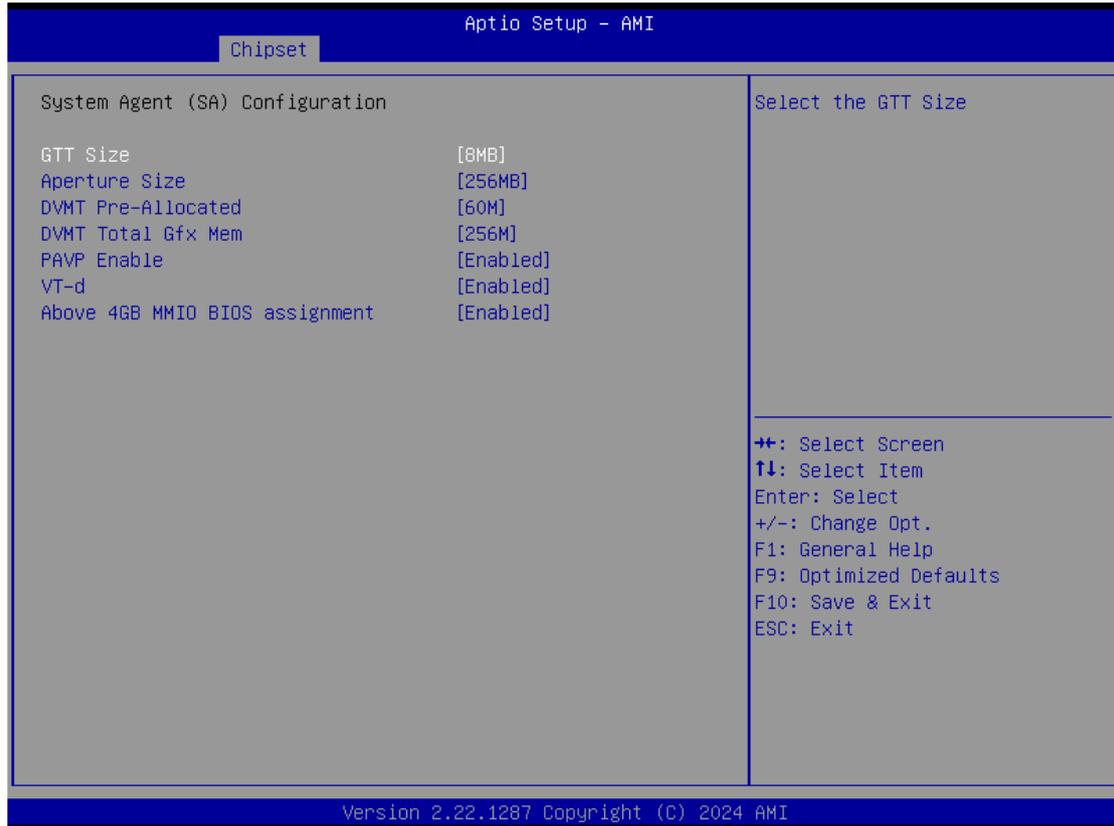
System Agent (SA) Configuration

• System Agent (SA) Parameters

GTT Size

• Select the GTT Size 40 | Chapter 3: BIOS Setup

Aperture Size

• Select the Aperture Size

• Note : Above 4GB MMIO BIOS assignment is automatically enabled when selecting 2048MB aperture. To use this feature, please disable CSM Support.

DVMT Pre-Allocated

• Select DVMT 5.0 Pre-Allocated (Fixed) Graphics Memory size used by the Internal Graphics Device.

DVMT Total Gfx Mem

• Select DVMT5.0 Total Graphic Memory size used by the Internal Graphics Device.

PAVP Enable

• Enable/Disable PAVP.

VT-d

• VT-d capability

Above 4GB MMIO BIOS assignment

• Enable/Disable above 4GB MemoryMappedIO BIOS assignment This is enabled automatically when Aperture Size is set to 2048MB.

```
                          Aptio Setup - AMI
              Chipset

    PCH-IO Configuration                           Control Detection of the
                                                   HD-Audio device.
    HD Audio                    [Enabled]          Disabled = HDA will be
    BIOS Lock                   [Enabled]          unconditionally disabled
                                                   Enabled = HDA will be
                                                   unconditionally enabled.



                                                   →←: Select Screen
                                                   ↑↓: Select Item
                                                   Enter: Select
                                                   +/-: Change Opt.
                                                   F1: General Help
                                                   F9: Optimized Defaults
                                                   F10: Save & Exit
                                                   ESC: Exit



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```
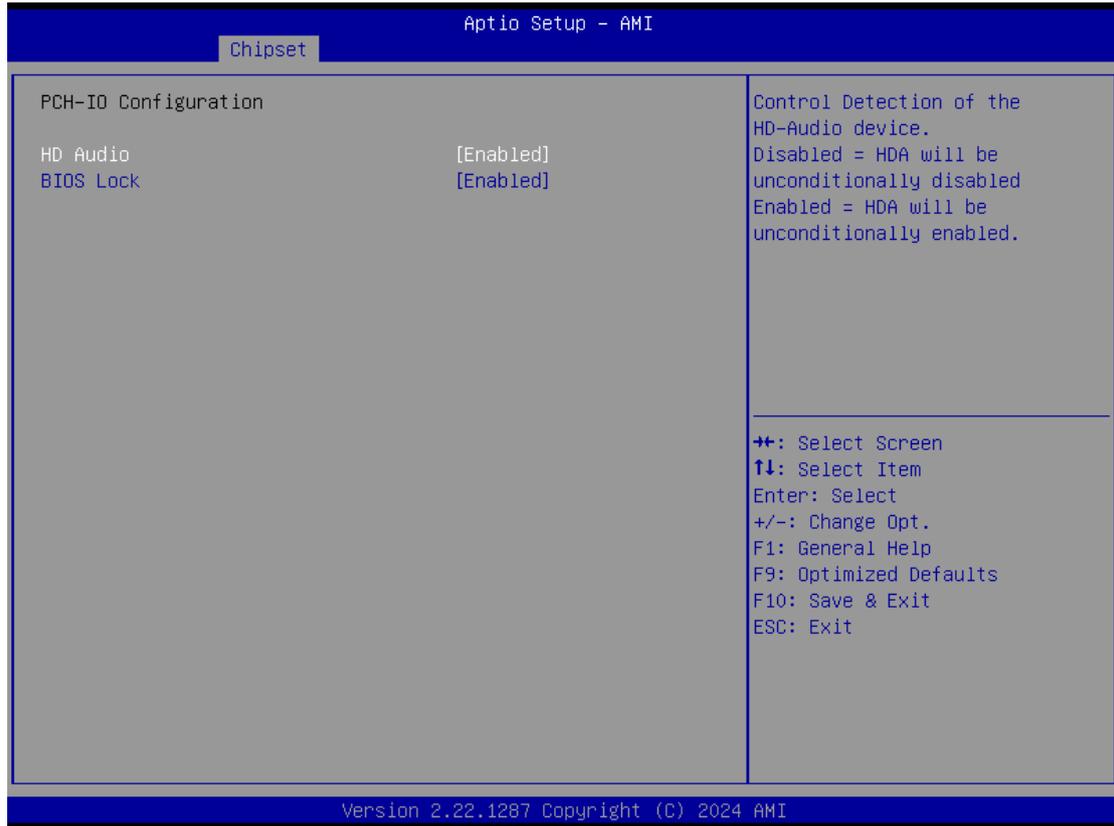
PCH-IO Configuration

• PCH Parameters

HD Audio

• Control Detection of the HD-Audio device.

• Disabled = HDA will be unconditionally disabled

• Enabled = HDA will be unconditionally enabled.

BIOS Lock

• Enable/Disable the PCH BIOS Lock Enable feature. Required to be enabled to ensure SMM protection of flash.

```
                        Aptio Setup – AMI
         Chipset

Onboard Device                              Enable/Disable Onboard LAN1

LAN1 MAC ID = F4-B5-20-65-72-3F
LAN2 MAC ID = F4-B5-20-65-72-40

Onboard LAN1                 [Enabled]
Onboard LAN2                 [Enabled]


                                            ↔: Select Screen
                                            ↑↓: Select Item
                                            Enter: Select
                                            +/-: Change Opt.
                                            F1: General Help
                                            F9: Optimized Defaults
                                            F10: Save & Exit
                                            ESC: Exit



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```
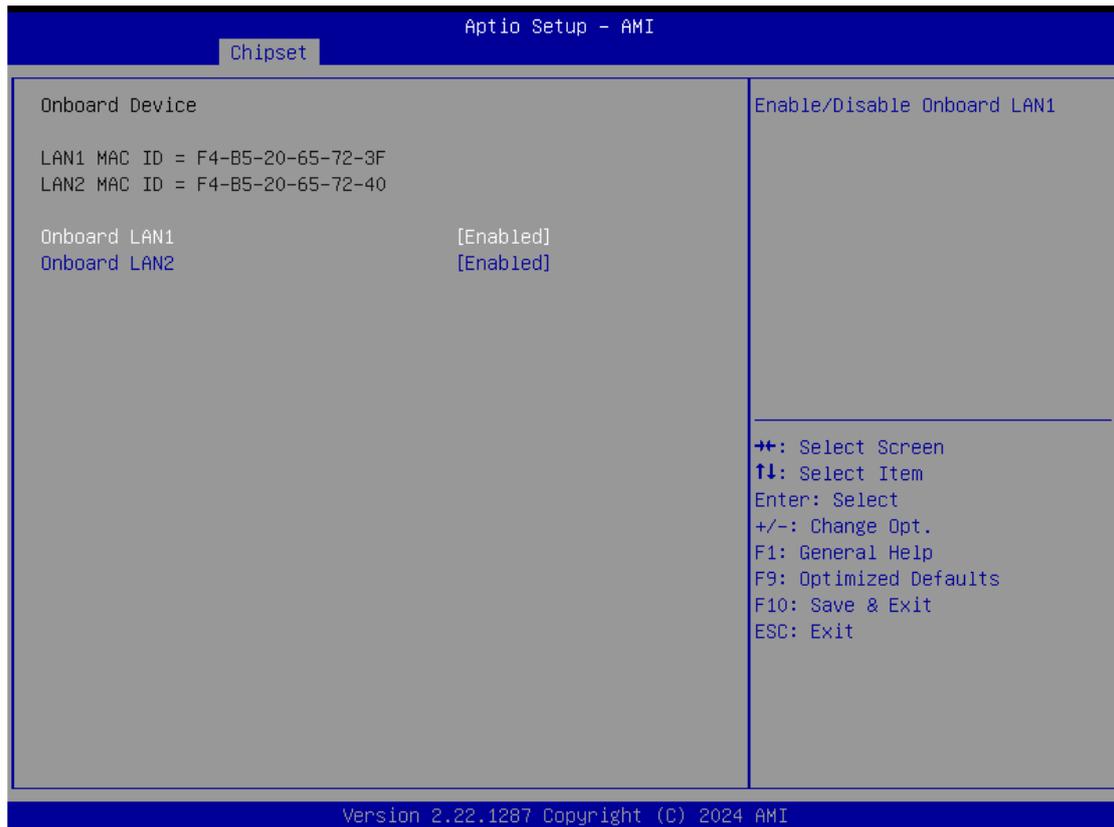
Onboard Device

• Onboard Device Parameters

Onboard Gigabit LAN 1

• Enable/Disable Onboard Gigabit LAN 1.

Onboard Gigabit LAN 2

• Enable/Disable Onboard Gigabit LAN 2.

```
                              Aptio Setup - AMI
        Chipset

  eDP/LVDS Panel Setting                              Select LCD panel used by
  eDP/LCD Panel Type              [1280 x 800 18Bit 1CH]   Internal Graphics Device by
                                                      selecting the appropriate
                                                      setup item.




                                                      _____

                                                      →←: Select Screen
                                                      ↑↓: Select Item
                                                      Enter: Select
                                                      +/-: Change Opt.
                                                      F1: General Help
                                                      F9: Optimized Defaults
                                                      F10: Save & Exit
                                                      ESC: Exit




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```
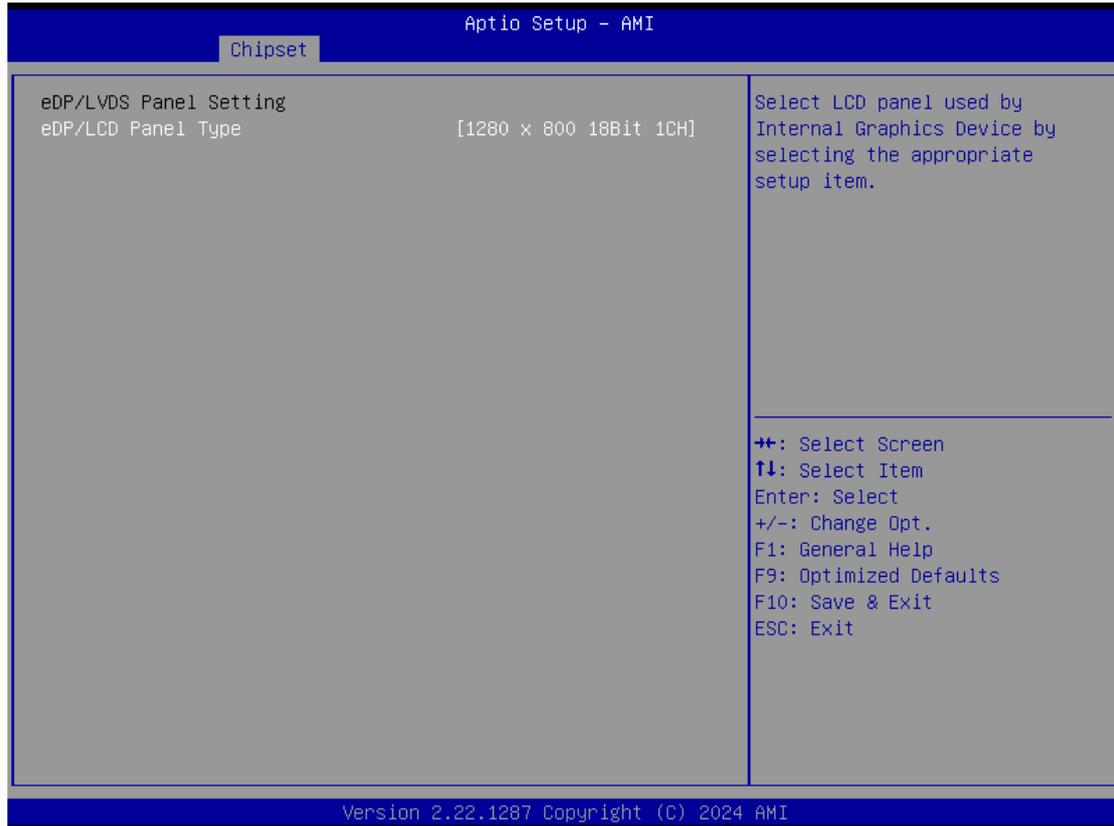
eDP/LVDS Panel Setting

• onboard Device Parameters

eDP/LCD Panel Type

• Select LCD panel used by Internal Graphic Device by selecting the appropriate
setup item.

3.2.4 Boot Menu

This menu allows you to setup the system boot options.

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

    Boot Configuration                                      Number of seconds to wait for
    Setup Prompt Timeout           1                        setup activation key.
    Bootup NumLock State           [Off]                    65535(0xFFFF) means indefinite
    Quiet Boot                     [Enabled]                waiting.
    Boot Success Beep              [Enabled]

    CSM Support                    [Disabled]

    Boot Option Priorities


                                                            ↔: Select Screen
                                                            ↑↓: Select Item
                                                            Enter: Select
                                                            +/-: Change Opt.
                                                            F1: General Help
                                                            F9: Optimized Defaults
                                                            F10: Save & Exit
                                                            ESC: Exit




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```

Boot Configuration

Setup Prompt Timeout

• Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.

Bootup NumLock State

• Select the keyboard NumLock state.

Quiet Boot

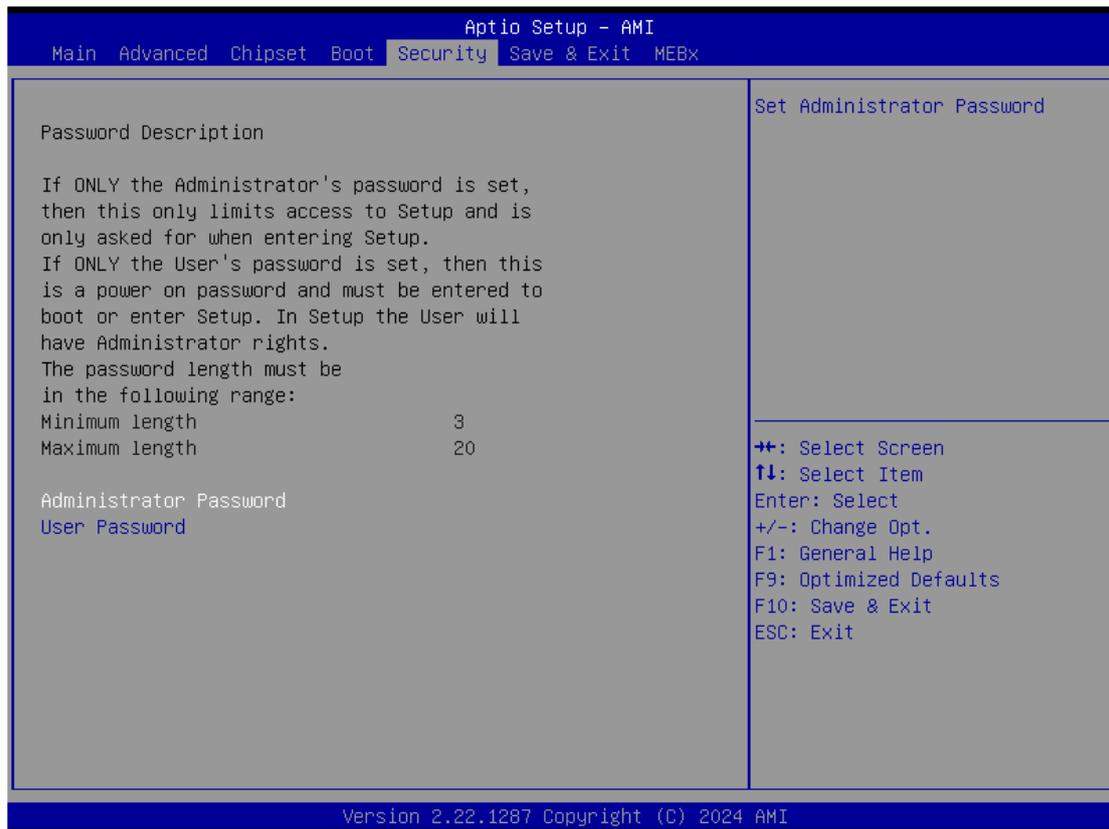• Enables or disables Quiet Boot option.

Boot Success Beep

• BIOS boot post beep message.

CSM Support

• Enable/Disable CSM Support.

Boot Option Priorities

3.2.5 Security Menu

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

                                                    Set Administrator Password
   Password Description

   If ONLY the Administrator's password is set,
   then this only limits access to Setup and is
   only asked for when entering Setup.
   If ONLY the User's password is set, then this
   is a power on password and must be entered to
   boot or enter Setup. In Setup the User will
   have Administrator rights.
   The password length must be
   in the following range:
   Minimum length                3
   Maximum length                20              →←: Select Screen
                                                 ↑↓: Select Item
   Administrator Password                        Enter: Select
   User Password                                 +/-: Change Opt.
                                                 F1: General Help
                                                 F9: Optimized Defaults
                                                 F10: Save & Exit
                                                 ESC: Exit




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```
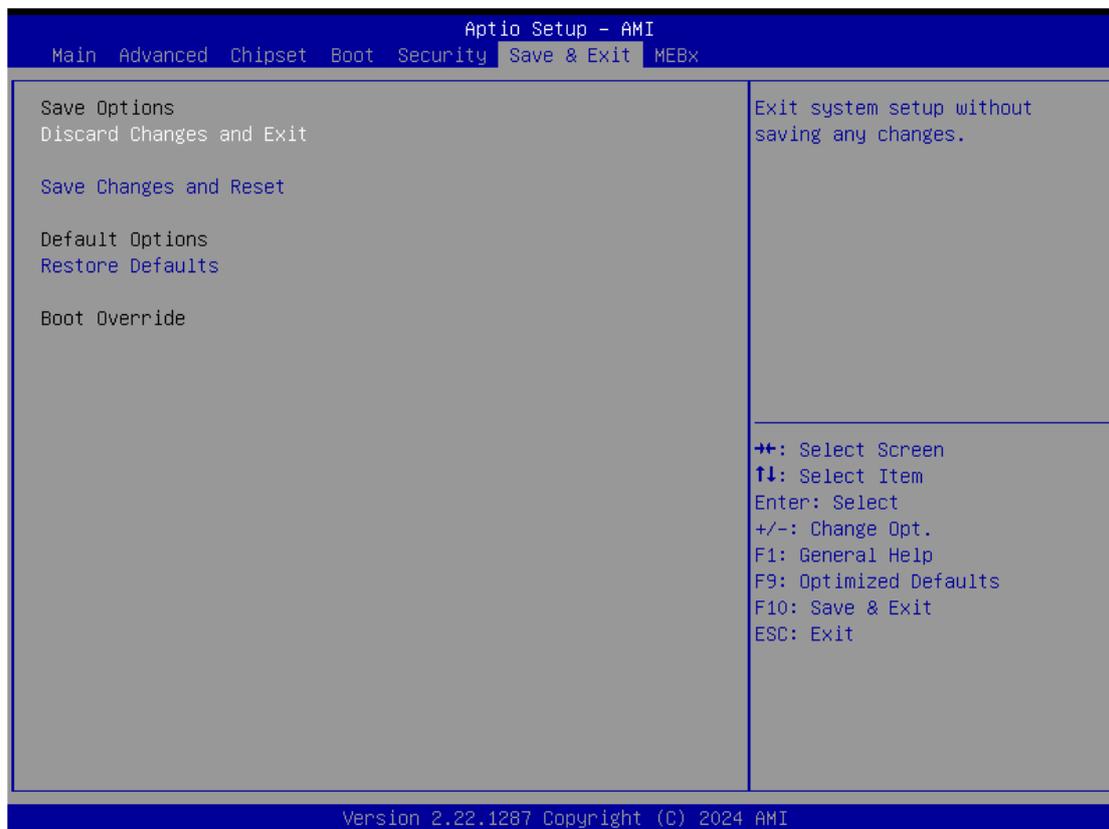
Administrator Password

• This item sets Administrator Password.

User Password

• This item sets User Password.

3.2.6 Exit Menu

This menu allows you to load the optimal default settings, and save or discard the changes to the BIOS items.

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

    Save Options                            Exit system setup without
    Discard Changes and Exit                saving any changes.

    Save Changes and Reset

    Default Options
    Restore Defaults

    Boot Override


                                            ⇄: Select Screen
                                            ↑↓: Select Item
                                            Enter: Select
                                            +/-: Change Opt.
                                            F1: General Help
                                            F9: Optimized Defaults
                                            F10: Save & Exit
                                            ESC: Exit



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```

Discard Changes and Exit

• Abandon all changes made during the current session and exit setup.

Save Changes and Reset

• Reset the system after saving the changes.

Restore Defaults

• This selection allows you to reload the BIOS when problem occurs during system booting sequence. These configurations are factory settings optimized for this system.