uATX-Q870A (MQ870AM)

Micro-ATX Motherboard

Copyright Notice

Acknowledgement

Packing List

Before setting up your product, please make sure the following items have been shipped:

Item	Quantity
uATX-Q870A (MQ870AM)	1
IO Shield	1
SATA cable	2

If any of these items are missing or damaged, please contact your distributor or sales representative immediately.

About this Document

This User's Manual contains all the essential information, such as detailed descriptions and explanations on the product's hardware and software features (if any), its specifications, dimensions, jumper/connector settings/definitions, and driver installation instructions (if any), to facilitate users in setting up their product.

Users may refer to the GIGAIPC.com for the latest version of this document.

Safety Precautions

Please read the following safety instructions carefully. It is advised that you keep this manual for future references

1. All cautions and warnings on the device should be noted.
2. Make sure the power source matches the power rating of the device.
3. Position the power cord so that people cannot step on it. Do not place anything over the power cord.
4. Always completely disconnect the power before working on the system's hardware.
5. No connections should be made when the system is powered as a sudden rush of power may damage sensitive electronic components.
6. If the device is not to be used for a long time, disconnect it from the power supply to avoid damage by transient over-voltage.
7. Always disconnect this device from any AC supply before cleaning.
8. While cleaning, use a damp cloth instead of liquid or spray detergents.
9. Make sure the device is installed near a power outlet and is easily accessible.
10. Keep this device away from humidity.
11. Place the device on a solid surface during installation to prevent falls
12. Do not cover the openings on the device to ensure optimal heat

dissipation.

13. Watch out for high temperatures when the system is running.

14. Do not touch the heat sink or heat spreader when the system is running

15. Never pour any liquid into the openings. This could cause fire or electric shock.

16. As most electronic components are sensitive to static electrical charge, be sure to ground yourself to prevent static charge when installing the internal components. Use a grounding wrist strap and contain all electronic components in any static-shielded containers.

17. If any of the following situations arises, please the contact our service personnel:
    i. Damaged power cord or plug
    ii. Liquid intrusion to the device
    iii. Exposure to moisture
    iv. Device is not working as expected or in a manner as described in this manual
    v. The device is dropped or damaged
    vi. Any obvious signs of damage displayed on the device

18. **DO NOT LEAVE THIS DEVICE IN AN UNCONTROLLED ENVIRONMENT WITH TEMPERATURES BEYOND THE DEVICE'S PERMITTED STORAGE TEMPERATURES (SEE CHAPTER 1) TO PREVENT DAMAGE.**

FCC Statement

This device complies with Part 15 FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received including interference that may cause undesired operation.

Caution:

There is a danger of explosion if the battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions and your local government's recycling or disposal directives.

Attention:

Il y a un risque d'explosion si la batterie est remplacée de façon incorrecte.
Ne la remplacer qu'avec le même modèle ou équivalent recommandé par le constructeur. Recycler les batteries usées en accord avec les instructions du fabricant et les directives gouvernementales de recyclage.

China RoHS Requirements (CN)

产品中有毒有害物质或元素名称及含量
GIGAIPC Main Board/ Daughter Board/ Backplane

部件名称	有毒有害物质或元素					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
印刷电路板及其电子组件	○	○	○	○	○	○
外部信号连接器及线材	○	○	○	○	○	○

○: 表示该有毒有害物质在该部件所有均质材料中的含量均在SJ/T 11363-2006 标准规定的限量要求以下。
X: 表示该有毒有害物质至少在该部件的某一均质材料中的含量超出SJ/T 11363-2006 标准规定的限量要求。
备注: 此产品所标示之环保使用期限, 系指在一般正常使用状况下。

China RoHS Requirement (EN)

Poisonous or Hazardous Substances or Elements in Products
GIGAIPC Main Board/ Daughter Board/ Backplane

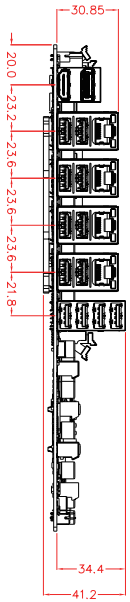
Component	Poisonous or Hazardous Substances or Elements					
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent Chromium (Cr(VI))	Polybrominated Biphenyls (PBB)	Polybrominated Diphenyl Ethers (PBDE)
PCB & Other Components	O	O	O	O	O	○
Wires & Connectors for External Connections	O	O	O	O	O	O

O : The quantity of poisonous or hazardous substances or elements found in each of the component's parts is below the SJ/T 11363-2006-stipulated requirement.
X: The quantity of poisonous or hazardous substances or elements found in at least one of the component's parts is beyond the SJ/T 11363-2006-stipulated requirement.
Note: The Environment Friendly Use Period as labeled on this product is applicable under normal usage only

Table Contents

Chapter 1

Chapter 1 - Product Specifications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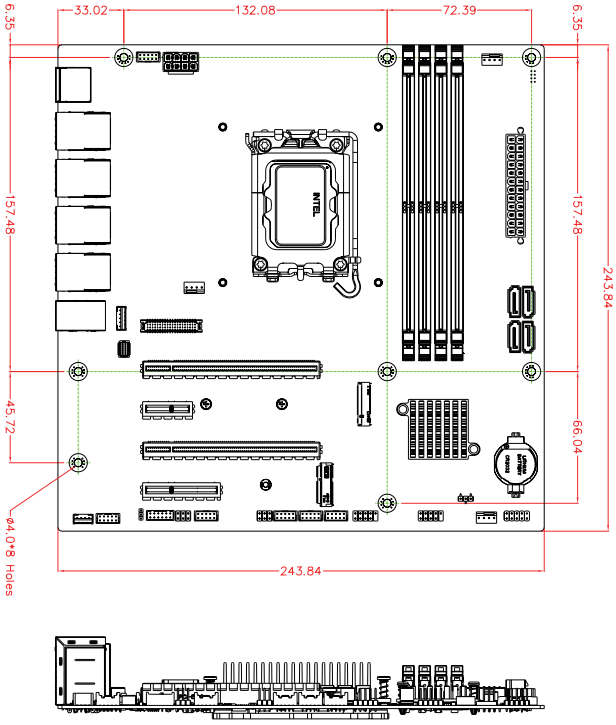
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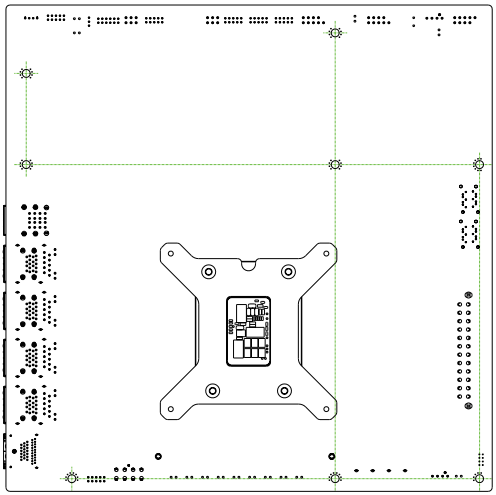


1.1 Specifications

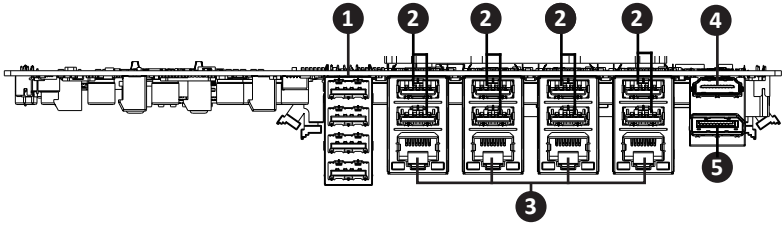
Motherboard	uATX-Q870A (MQ870AM)
Form Factor	Micro ATX 244W x 244D(mm)
CPU	Support for Intel® Core™ Ultra Processors (Series 2) TDP under 125W
Socket	1 x LGA 1851
Chipset	Intel® Q870 Chipset
Memory	4 x DDR5 DIMM sockets, Max. Capacity 192 GB Support for UDIMM: Dual Channel DDR5 5600 MHz (Non-ECC, Un-buffered) Support for CUDIMM: Dual Channel DDR5 6400 MHz (Clocked Un-buffered)
Ethernet	1 x 2.5GbE LAN Port (Intel® I226LM) 3 x 2.5GbE LAN Ports (Intel® I226V)
Video	Integrated Graphics Processor - depends on CPU: 1 x HDMI 2.1 port, supporting a maximum resolution of 7680x4320 @60Hz 1 x DP port, supporting a maximum resolution of 4096x2160 @60Hz 1 x VGA port, supporting a maximum resolution of 1920x1080 @60Hz 1 x LVDS port, supporting a maximum resolution of 1920x1200 @60Hz (4 independent display outputs)
Audio	Realtek® ALC 897
Storage	4 x SATA 6Gb/s Ports
RAID	RAID 0/1/5/10

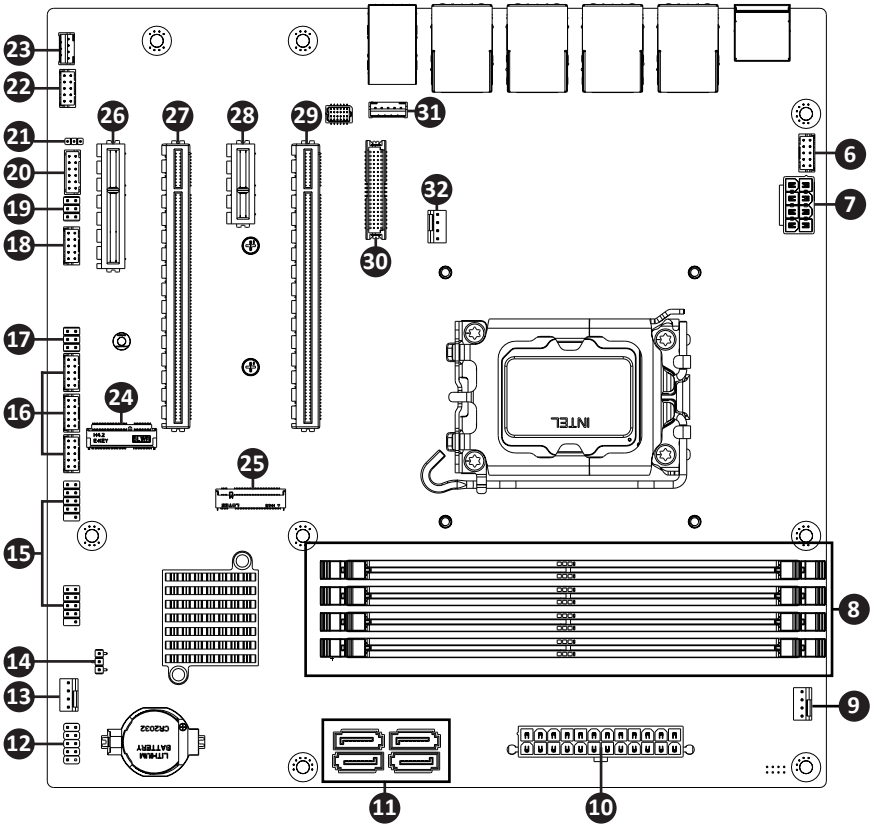
Motherboard	uATX-Q870A (MQ870AM)
Expansion Slots	1 x PCIe x16 (Gen 5x16)(PCIEX16_1) * The PCIEX16_1 slot shares bandwidth with the PCIEX16_2 slot. * The PCIEX16_1 slot operates at up to x8 mode when a device is installed in the PCIEX16_2 slot. 1 x PCIe x16 (Gen 5x8)(PCIEX16_2) 1 x PCIe x1 (Gen 4x1) 1 x PCIe x4 (Gen 4x4) 1 x 2280/2242 M.2 M-Key (PCIe Gen 4x4, NVME) 1 x 2230 M.2 E-Key
Internal I/O	1 x 24-pin ATX main power connector 1 x 8-pin ATX 12V power connector 1 x CPU fan header 2 x System fan headers 1 x Front panel header 1 x Front panel audio header 1 x Speaker out header 1 x VGA header 4 x USB 2.0 headers 2 x COM headers (RS-232/422/485 & RI/5V/12V) 2 x COM headers (RS-232) 1 x GPIO (8 bits) & SMBus header 1 x Backlight Control header 1 x Clear CMOS jumper 1 x AT/ATX mode select jumper
Rear I/O	1 x HDMI 1 x DisplayPort 4 x RJ45 LAN Ports 8 x USB 3.2 Gen 2x1 4 x USB 2.0
TPM	Onboard TPM 2.0 security chip INFINEON SLB9670VQ2.0
OS Compatibility	Windows 10 Enterprise 64bits_22H2 Windows 11 Enterprise 64bits_24H2 Windows 11 Enterprise 64bits_23H2 Windows 11 IoT Enterprise LTSC 2024 24H2 (64bits)
Operating Properties	Operating temperature: 0°C to 60°C Operating humidity: 60°C @ 20-95% (non-condensing) Non-operating temperature: -40°C to 85°C Non-operating humidity: 85°C @ 95% (non-condensing)

Chapter 2

Chapter 2 – Hardware Information

2.1 Jumpers and Connectors

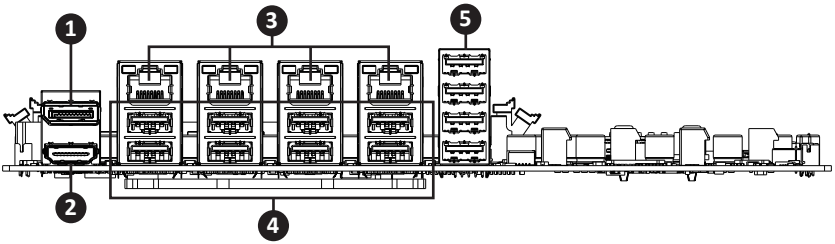




No	Code	Description
1	USB20	USB 2.0 Connector
2	USB32_LAN1 USB32_LAN2 USB32_LAN3 USB32_LAN4	USB 3.2 Gen 2x1 Connector
3		2.5GbE LAN Ports
4	HDMI_DP	HDMI Connector
5		Display Port Connector
6	VGA	VGA connector
7	ATX_12V	8-pin ATX 12V power connector (for CPU)
8	DIMM_A0, DIMM_A1 DIMM_B0, DIMM_B1	DDR5 DIMM Sockets x 4
9	SYS_FAN2	System Fan connector
10	ATX	24-pin ATX main power connector
11	SATA4, SATA5 SATA6, SATA7	SATA 6Gb/s Connector x 4
12	SYS_PANEL	Front panel header
13	SYS_FAN1	System Fan connector
14	CLR_CMOS	Clear CMOS jumper
15	FUSB2_1, FUSB2_2	USB 2.0 header
16	COM2, COM3, COM4	Serial Port header COM2 : RS-232/422/485 & RI/5V/12V COM3, COM4 : RS-232
17	JCOM2	RI pin RI/5V/12V Select jumper for COM2 Port
18	COM1	Serial Port header (RS-232/422/485 & RI/5V/12V)
19	JCOM1	RI pin RI/5V/12V Select jumper for COM1 Port
20	GPIO_CNT	General Purpose input/output header
21	AT_CN	AT/ATX mode select jumper

No	Code	Description
22	FP_AUDIO	Front panel audio header
23	SPEAKER	Speaker out header
24	M2E	M.2 Slot, 2230 E-Key
25	M2M	M.2 Slot, 2242/2280 M-key
26	PCIEX4	PCIe x4 Slot
27	PCIEX16_2	PCIe x16 Slot
28	PCIEX1	PCIe x1 Slot
29	PCIEX16_1	PCIe x16 Slot
30	LVDS	LVDS connector
31	BKL_CN	Backlight Control header
32	CPU_FAN	CPU Fan connector

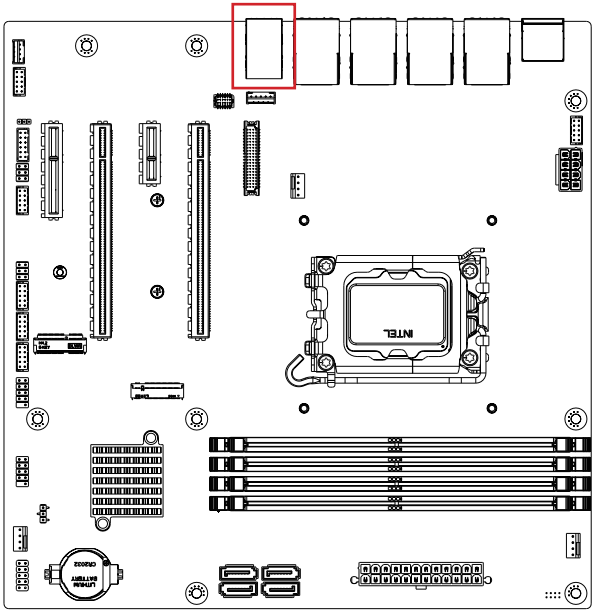
2.2.1 Rear I/O Connector

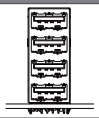


No	Code	Description
1	HDMI_DP	Display port
2		HDMI Port
3	USB32_LAN1 USB32_LAN2	2.5GbE LAN Ports
4	USB32_LAN3 USB32_LAN4	USB 3.2 Gen 2x1 Ports
5	USB20	USB 2.0 Ports

2.2.2 USB20 (USB 2.0 Connector)

1

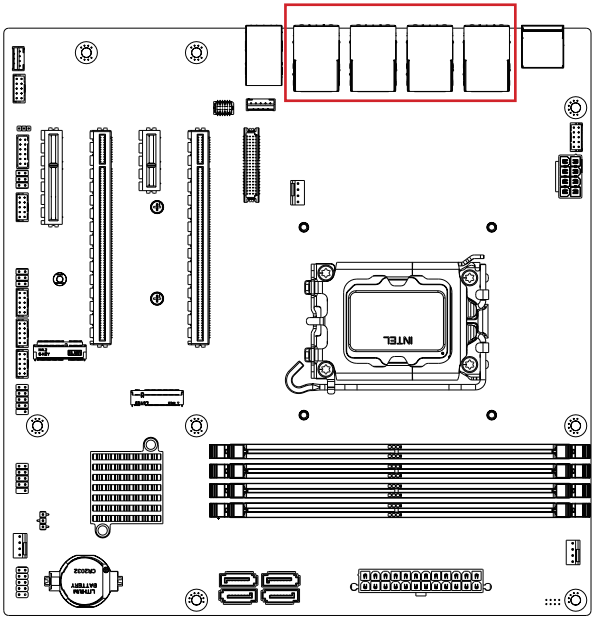


USB 2.0 Connector


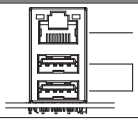
Pin No.	Definition
1	5V
2	D1n
3	D1p
4	GND
5	5V
6	D2n
7	D2p
8	GND
9	5V
10	D3n
11	D3p
12	GND
13	5V
14	D4n
15	D4p
16	GND

2.2.3 USB32_LAN1, USB32_LAN2, USB32_LAN3, USB32_LAN4 (USB 3.2 Gen 2x1 + 2.5GbE LAN Connector)

2 3



USB & LAN Connector



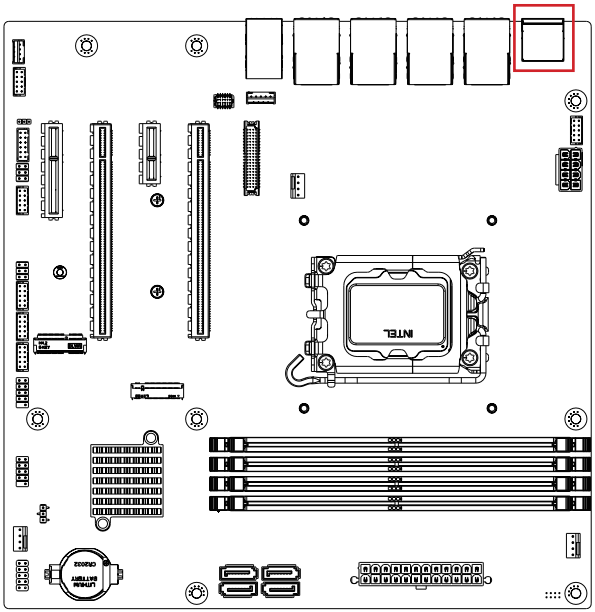
USB Connector			
Pin No.	Definition	Pin No.	Definition
1	5V	10	5V
2	D1n	11	D0n
3	D1p	12	D0p
4	GND	13	GND
5	USB3_RX1n	14	USB3_RX2n
6	USB3_RX1p	15	USB3_RX2p
7	GND	16	GND
8	USB3_TX1n	17	USB3_TX2n
9	USB3_TX1p	18	USB3_TX2p

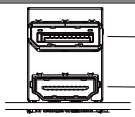
LAN Connector			
Pin No.	Definition	Pin No.	Definition
1	TX1+	4	TX3+
2	TX1-	5	TX3-
3	TX2+	7	TX4+
6	TX2-	8	TX4-

State	Description
Orange On	2.5Gbps data rate
Green On	1Gbps data rate
Off	100M&10Mbps data rate

2.2.4 HDMI_DP (HDMI + Display Port Connector)

4 5



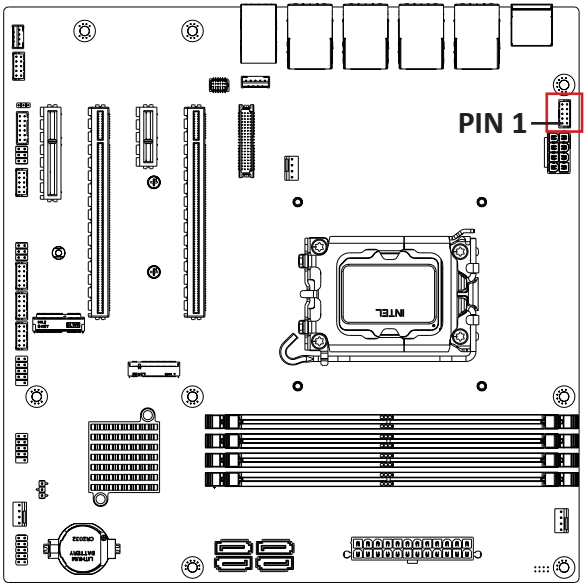
HDMI + DP Connector
 DP connector HDMI connector

DP Connector			
Pin No.	Definition	Pin No.	Definition
1	TX0p	11	GND
2	GND	12	TX3n
3	TX0n	13	GND
4	TX1p	14	GND
5	GND	15	AUXp
6	TX1n	16	GND
7	TX2p	17	AUXn
8	GND	18	Hot Plug Detect
9	TX2n	19	GND
10	TX3p	20	3.3V

HDMI Connector			
Pin No.	Definition	Pin No.	Definition
1	TX2p	11	GND
2	GND	12	CLKn
3	TX2n	13	NC
4	TX1p	14	NC
5	GND	15	SCL
6	TX1n	16	SDA
7	TX0p	17	GND
8	GND	18	5V
9	TX0n	19	Hot Plug Detect
10	CLKp		

2.2.5 VGA (VGA Connector)

6



VGA header
9 10 1 2

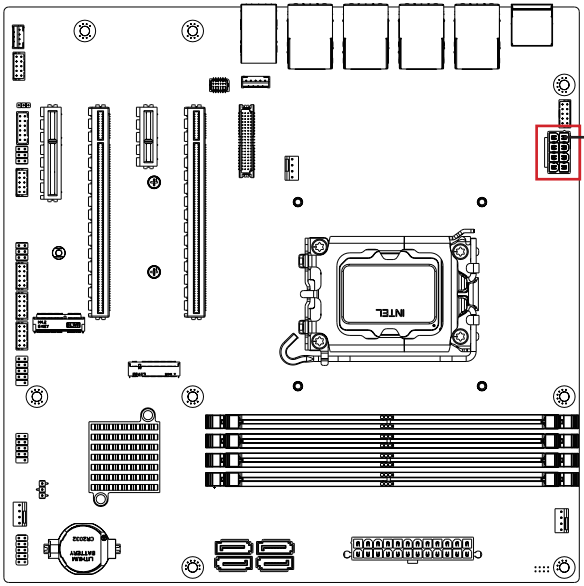
Pin No.	Definition
1	VSYNC
2	HSYNC
3	GND
4	GND
5	Red
6	GND
7	Green
8	DDCSCL
9	Blue
10	DDCSDA

Connector PN	Vendor
725-81-10TW00	PINREX

Connector type
2x5pin header, pitch 2.0mm

2.2.6 ATX_12V (8-pin ATX 12V power connector (for CPU))

7



ATX 12V Connector
5 1 8 4

Connector PN	Vendor
740-96-085B61	PINREX

Connector type
2x4pin header, pitch 4.2mm

Pin No.	Definition
1	GND
2	GND
3	GND
4	GND
5	+12V
6	+12V
7	+12V
8	+12V

2.2.7 DIMM_A0, DIMM_A1, DIMM_B0, DIMM_B1 (DDR5 DIMM Sockets)

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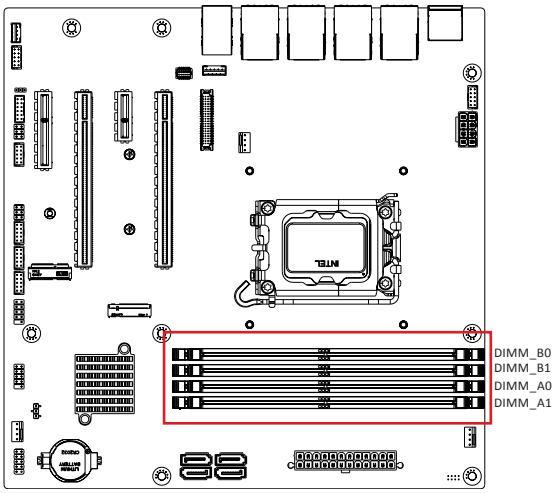


1 Rank memory	DIMM_B0	DIMM_B1	DIMM_A0	DIMM_A1	Max speed
single memory module	DS/SS	—	—	—	3200 MHz
	—	DS/SS	—	—	5600 MHz
	—	—	DS/SS	—	3200 MHz
	—	—	—	DS/SS	5600 MHz
2 memory modules	DS/SS	—	DS/SS	—	3200 MHz
	—	DS/SS	—	DS/SS	5600MHZ
4 memory modules	DS/SS	DS/SS	DS/SS	DS/SS	4800 MHz

("SS"=Single-Sided, "DS"=Double-Sided, "- -"=No Memory)

2 Rank memory	DIMM_B0	DIMM_B1	DIMM_A0	DIMM_A1	Max speed
single memory module	DS/SS	—	—	—	3200 MHz
	—	DS/SS	—	—	5600 MHz
	—	—	DS/SS	—	3200 MHz
	—	—	—	DS/SS	5600 MHz
2 memory modules	DS/SS	—	DS/SS	—	3200 MHz
	—	DS/SS	—	DS/SS	5600MHZ
4 memory modules	DS/SS	DS/SS	DS/SS	DS/SS	4400 MHz

("SS"=Single-Sided, "DS"=Double-Sided, "- -"=No Memory)

Dual Channel Memory Configuration

uATX-Q870A supports Dual Channel Technology. After the memory is installed, the BIOS will automatically detect the specifications and capacity of the memory. Enabling Dual Channel memory mode will double the original memory bandwidth.

Due to CPU limitations, please read the following guidelines before installing the memory in Dual Channel mode :

1. Dual Channel mode cannot be enabled if only one memory module is installed.
2. It is recommended to use the same capacity, brand, speed, and chips memory to enable Dual Channel mode.

The four memory sockets are divided into two channels and each channel has two memory sockets as following :

→ Channel A: DIMM_A0, DIMM_A1

→ Channel B: DIMM_B0, DIMM_B1

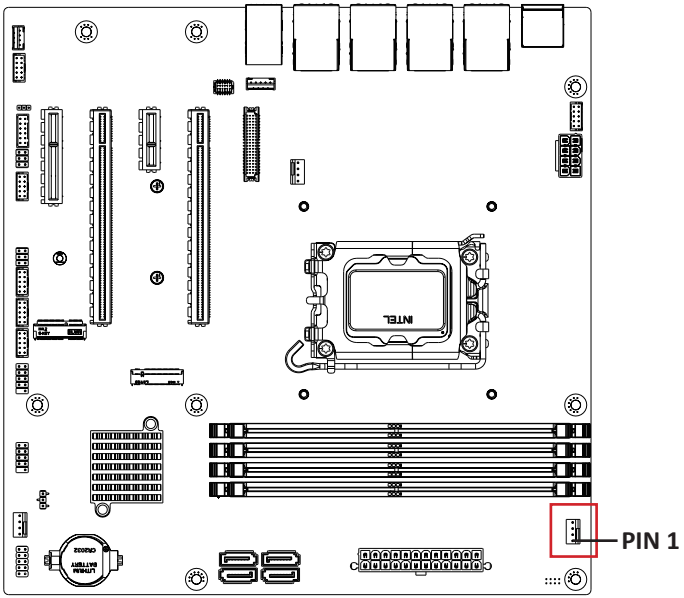
It is recommended to install memory as following orders to enable Dual Channel mode:

	DIMM_B0	DIMM_B1	DIMM_A0	DIMM_A1
2 memory modules	—	DS/SS	—	DS/SS
4 memory modules	DS/SS	DS/SS	DS/SS	DS/SS

("SS"=Single-Sided, "DS"=Double-Sided, "- -"=No Memory)

2.2.8 SYS_FAN2 (System Fan connector)

9



System FAN Connector
4 1

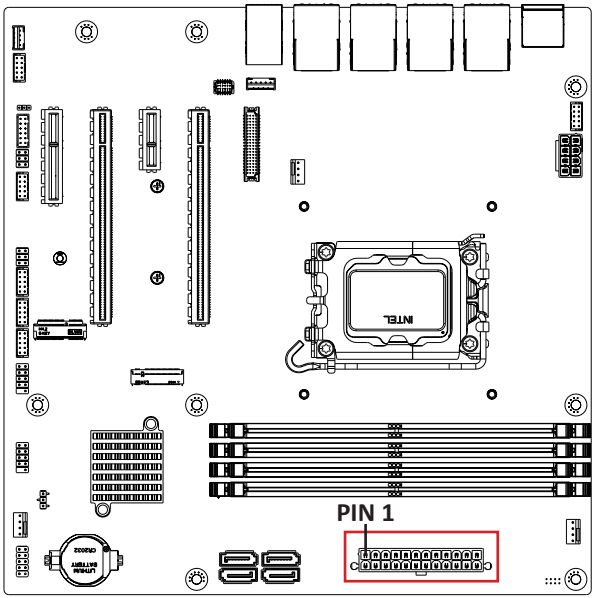
Connector PN	Vendor
744-81-045R11	PINREX

Connector type
1x4pin header, pitch 2.54mm

Pin No.	Definition
1	GND
2	12V
3	Detect
4	Speed Control

2.2.9 ATX (24-pin ATX main power connector)

10



ATX power connector


Connector PN	Vendor
740-96-245B70	PINREX

Connector type
2x12pin header, pitch 4.2mm

Pin No.	Definition	Pin No.	Definition
1	3.3V	13	3.3V
2	3.3V	14	-12V
3	GND	15	GND
4	+5V	16	PS_ON
5	GND	17	GND
6	+5V	18	GND
7	GND	19	GND
8	Power Good	20	-5V
9	5VSB	21	+5V
10	+12V	22	+5V
11	+12V	23	+5V
12	3.3V	24	GND

2.2.10 SATA4, SATA5, SATA6, SATA7 (SATA 6Gb/s Connector)

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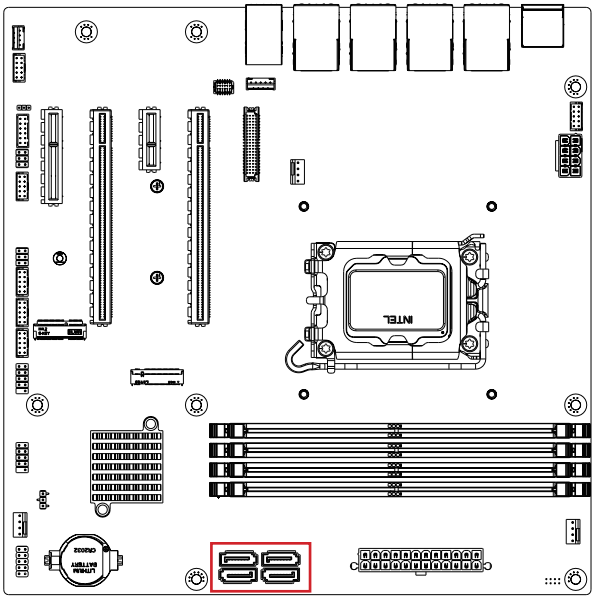
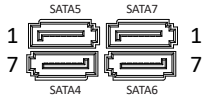


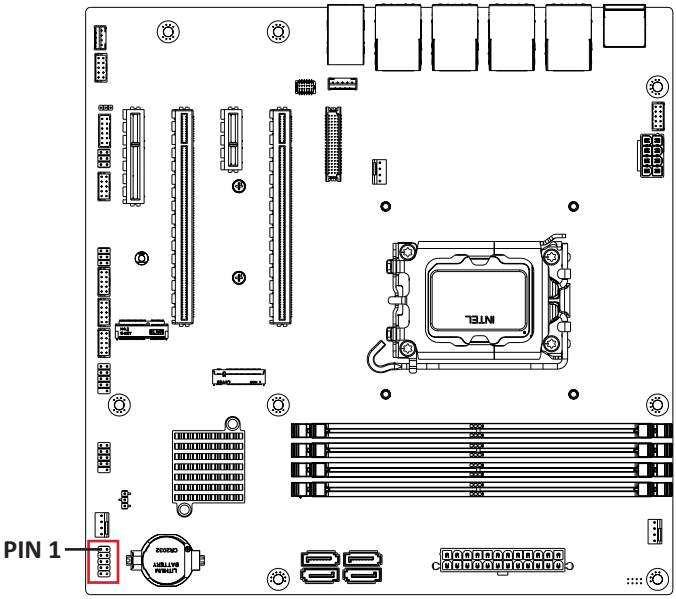
SATA 6Gb/s Connector


Connector PN	Vendor
WATM-07ABNB2BAUW3	WINWIN
770-83-07SW19	PINREX

Pin No.	Definition
1	GND
2	TXp
3	TXn
4	GND
5	RXn
6	RXp
7	GND

2.2.11 SYS_PANEL (Front panel header)

12



Front panel header
1 2 9 10

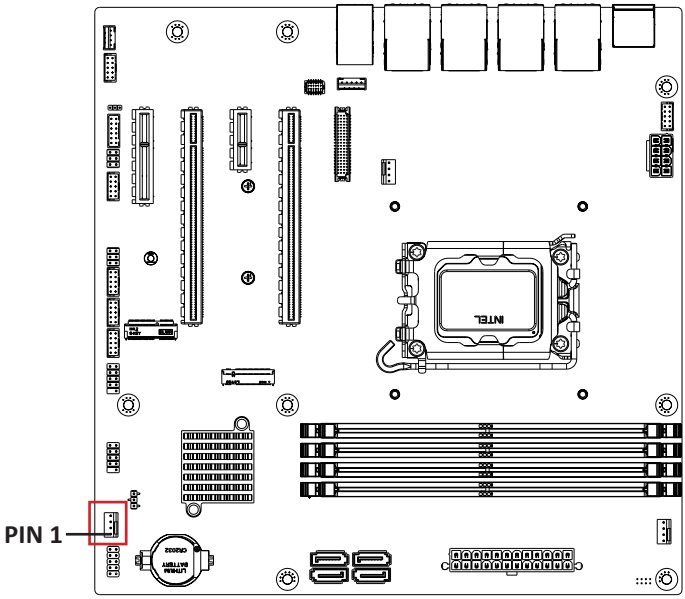
Connector PN	Vendor
725-81-10TW00	PINREX

Connector type
2x5pin header, pitch 2.0mm

Pin No.	Definition
1	HDD LED+
2	Power LED+
3	HDD LED-
4	Power LED-
5	GND
6	Power button+
7	Reset button
8	Power button-
9	No connect
10	No pin

2.2.12 SYS_FAN1 (System Fan connector)

13



System FAN Connector
4 1

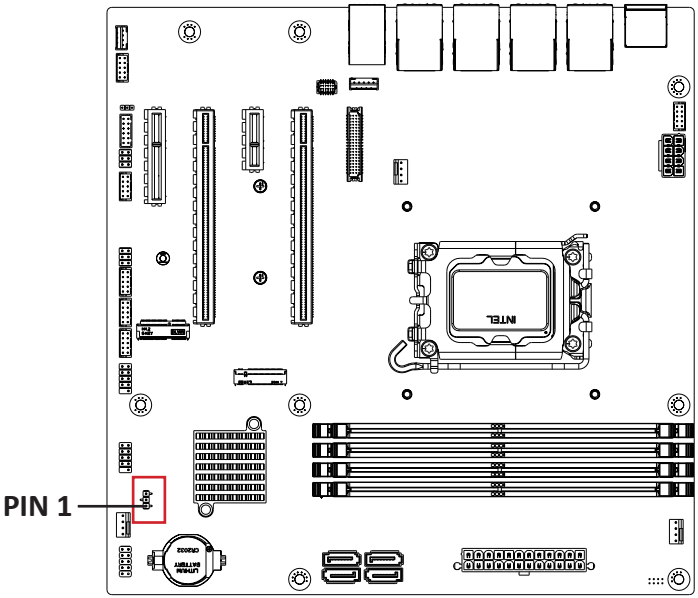
Connector PN	Vendor
744-81-045R11	PINREX

Connector type
1x4pin header, pitch 2.54mm

Pin No.	Definition
1	GND
2	12V
3	Detect
4	Speed Control

2.2.13 CLR_CMOS (Clear CMOS jumper)

14



Clear CMOS connector
1

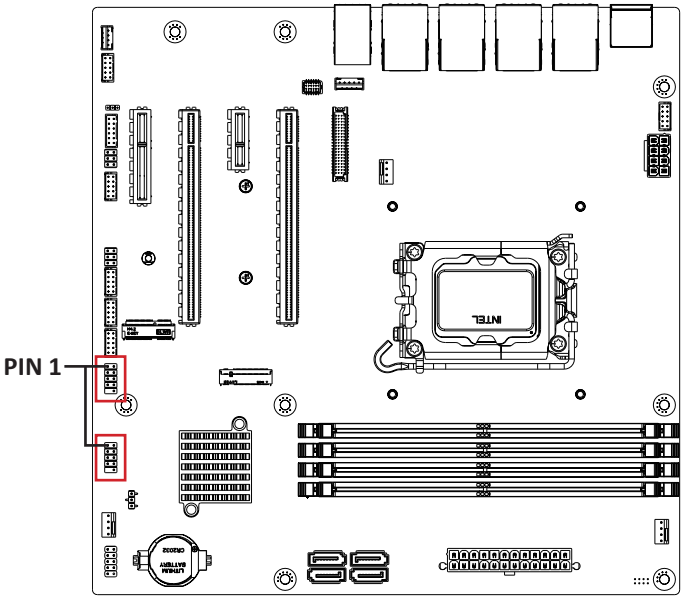
Pin No.	Definition
1	NC
2	GND
3	Clear CMOS
1-2 Close: Normal Operation (Default setting) 2-3 Close: Clear CMOS data	

Connector PN	Vendor
212-91-03GBE00K	PINREX

Connector type
1x3pin header, pitch 2.54mm

2.2.14 FUSB2_1, FUSB2_2 (USB 2.0 header)

15



USB 2.0 header

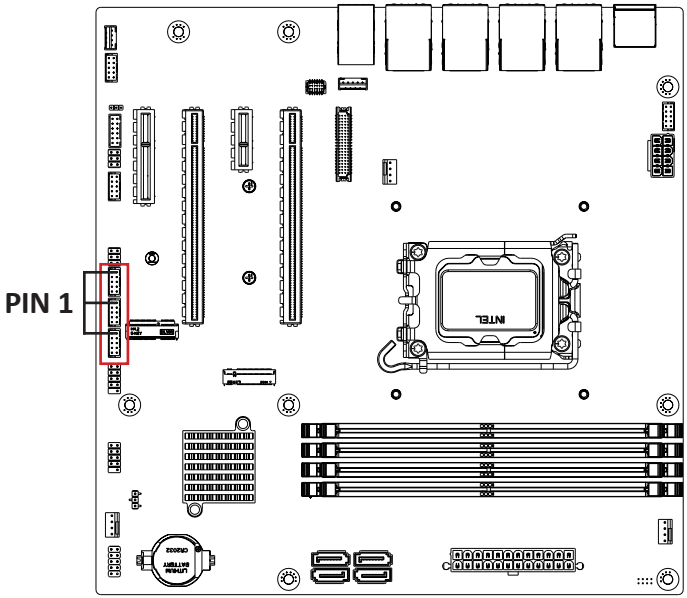

Pin No.	Definition
1	5V
2	5V
3	D2n
4	D1n
5	D2p
6	D1p
7	GND
8	GND
9	No Pin
10	No Connect

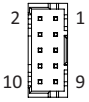
Connector PN	Vendor
210-92-05GB04	PINREX
PH10R53BAZ009	HORNGTONG

Connector type
2x5pin header, pitch 2.54mm

2.2.15 COM2, COM3, COM4 (Serial Port header)

16



Serial port Header


Connector PN	Vendor
725-81-10TW00	PINREX

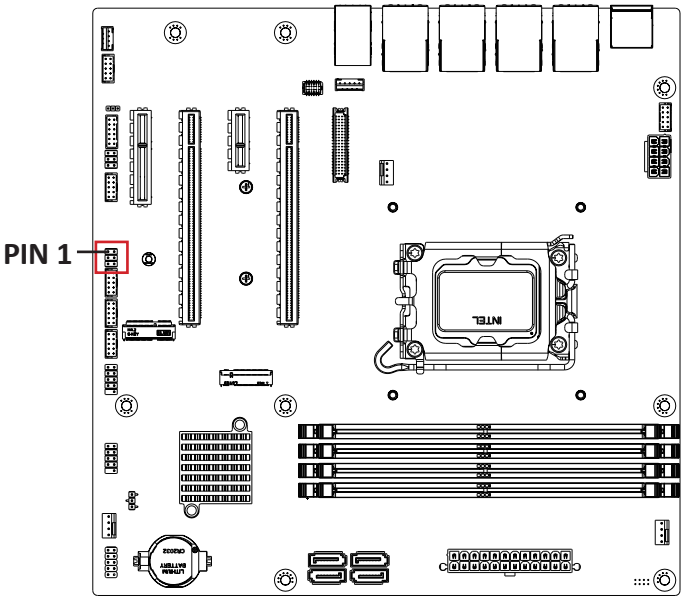
Connector type
2x5pin header, pitch 2.0mm

Pin No.	RS-232	RS-422 Full Duplex	RS-485 Half Duplex
1	RXD	TXD+	D+
2	DCD	TXD-	D-
3	DTR	RXD-	—
4	TXD	RXD+	—
5	DSR	—	—
6	GND	—	—
7	CTS	—	—
8	RTS	—	—
9	No Connect	—	—
10	RI/5V/12V	—	—

Note :
COM2 : Support RS-232/422/485 & RI/5V/12V
For RI/5V/12V jumper setting, please see **P. 39**
COM3, COM4 : Support RS-232 only

2.2.16 JCOM2 (RI pin RI/5V/12V Select jumper for COM2 Port)

17



JCOM2 header
1 2 5 6

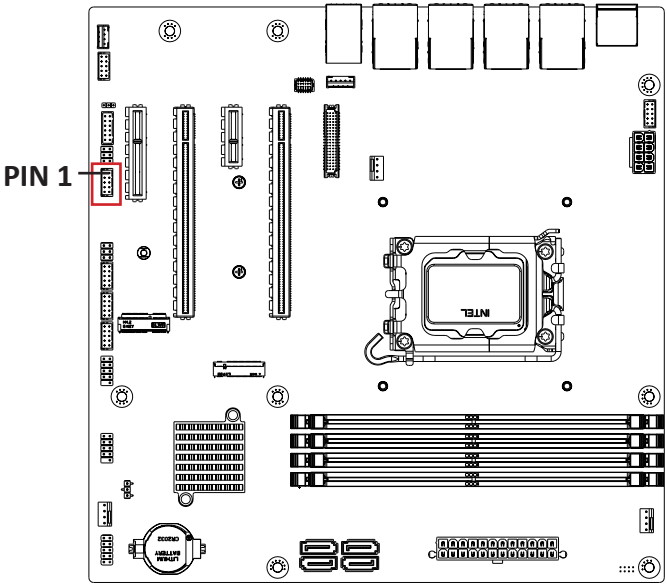
JCOM2 Jumper	
1 2 5 6	1-2 Close: 5V (Power COM)
1 2 5 6	3-4 Close: RI (Stand COM)
1 2 5 6	5-6 Close: 12V (Power COM)

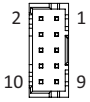
Connector PN	Vendor
210-92-03GB01	PINREX
PH06R53BAZ000	HORNGTONG

Connector type
2x3pin header, pitch 2.54mm

2.2.17 COM1 (Serial Port header)

18



Serial port Header


Connector PN	Vendor
725-81-10TW00	PINREX

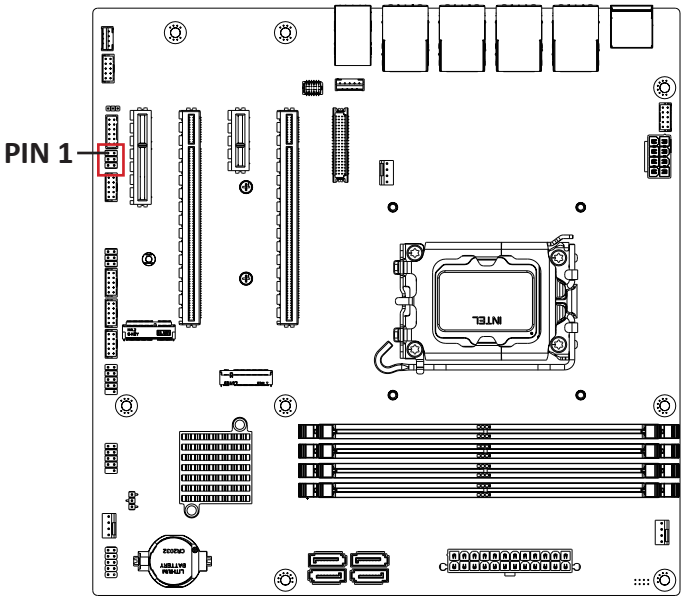
Connector type
2x5pin header, pitch 2.0mm

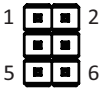
Pin No.	RS-232	RS-422 Full Duplex	RS-485 Half Duplex
1	RXD	TXD+	D+
2	DCD	TXD-	D-
3	DTR	RXD-	—
4	TXD	RXD+	—
5	DSR	—	—
6	GND	—	—
7	CTS	—	—
8	RTS	—	—
9	No Connect	—	—
10	RI/5V/12V	—	—

Note :
For RI/5V/12V jumper setting, please see **P. 41**

2.2.18 JCOM1 (RI pin RI/5V/12V Select jumper for COM1 Port)

19



JCOM1 header


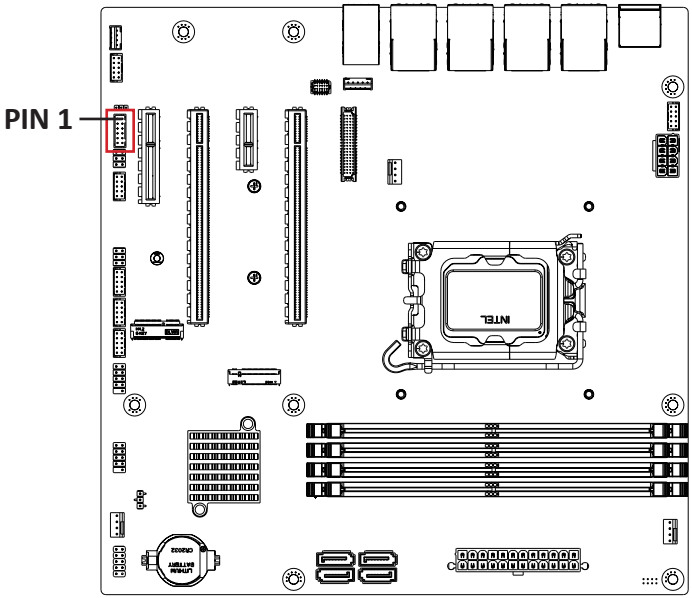
JCOM1 Jumper	
	1-2 Close: 5V (Power COM)
	3-4 Close: RI (Stand COM)
	5-6 Close: 12V (Power COM)

Connector PN	Vendor
210-92-03GB01	PINREX
PH06R53BAZ000	HORNGTONG

Connector type
2x3pin header, pitch 2.54mm

2.2.19 GPIO_CNT (General Purpose input/output header)

20



GPIO Connector

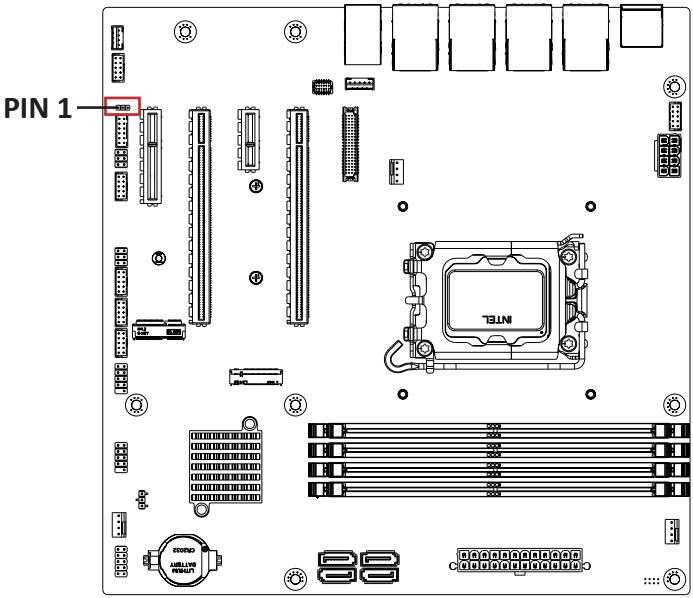

Pin No.	Definition
1	GPIO-output_1
2	GPIO-input_1
3	GPIO-output_2
4	GPIO-input_2
5	GPIO-output_3
6	GPIO-input_3
7	GPIO-output_4
8	GPIO-input_4
9	SMBus Clock
10	SMBus DATA
11	5V
12	GND

Connector PN	Vendor
725-81-12TW00	PINREX

Connector type
2x6pin header, pitch 2.0mm

2.2.20 AT_CN (AT/ATX mode select jumper)

21



AT/ATX mode select jumper
 1

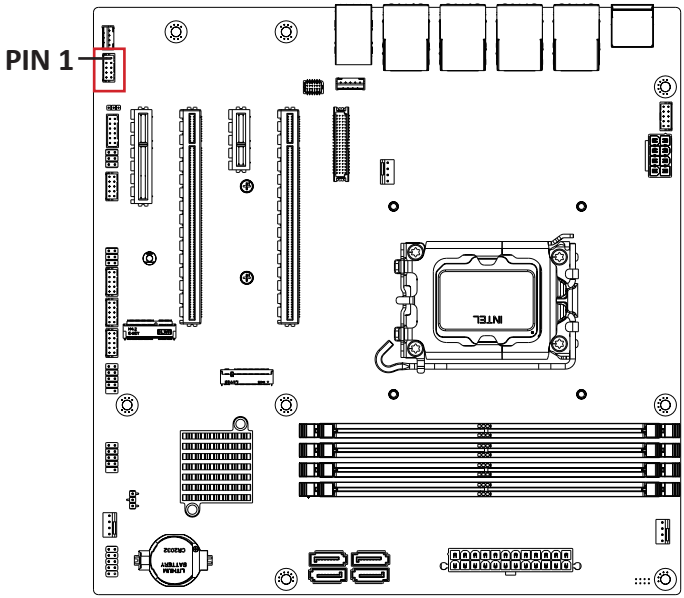
Connector PN	Vendor
220-96-03GB001K	PINREX

Connector type
1x3pin header, pitch 2.0mm

Pin No.	Definition
1	AT MODE
2	Detect
3	ATX MODE
Jumper setting 1-2 Close : AT mode. 2-3 Close : ATX mode.(Default setting)	

2.2.21 FP_AUDIO (Front panel audio header)

22



Front panel audio header
2 1 10 9

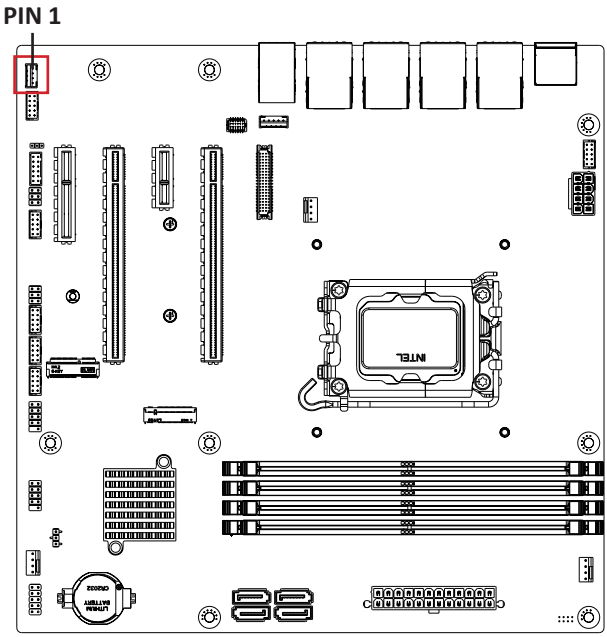
Pin No.	Definition
1	MIC_LEFT
2	GND
3	MIC_RIGHT
4	Detect
5	LINE_RIGHT
6	GND
7	JACKSENSE Detect
8	No connect
9	LINE_LEFT
10	GND

Connector PN	Vendor
725-81-10TW00	PINREX

Connector type
2x5pin header, pitch 2.0mm

2.2.22 SPEAKER (speaker out connector)

23



Speaker out header
1 4

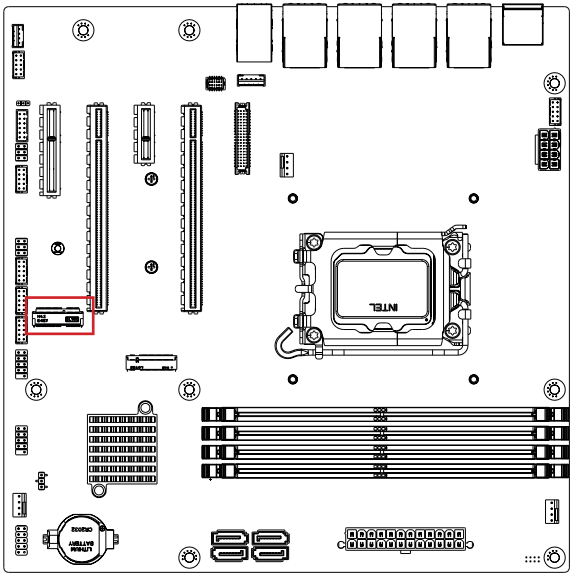
Connector PN	Vendor
A2001WV-04P146	JOINT-TECH

Connector type
1x4pin header, pitch 2.0mm

Pin No.	Definition
1	SPEAKER L+
2	SPEAKER L-
3	SPEAKER R-
4	SPEAKER R+

2.2.23 M2E (M.2 Slot, 2230 E-Key)

24



M.2 E Key Connector	
74	2
75	1

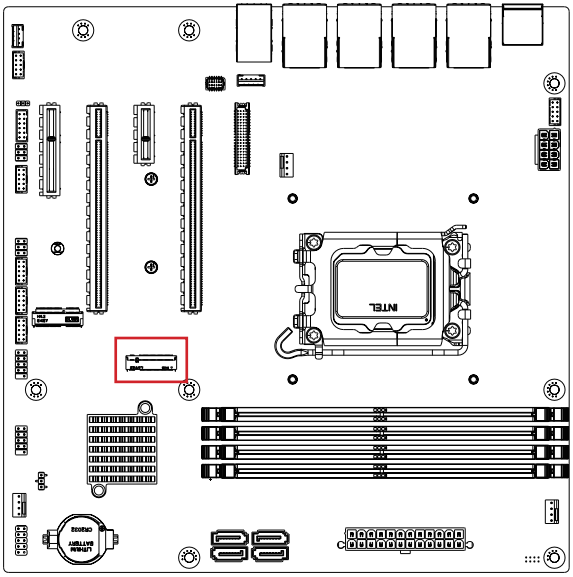
Pin No.	Definition	Pin No.	Definition
1	GND	2	3.3V
3	D1p	4	3.3V
5	D1n	6	NC
7	GND	8	NC
9	NC	10	NC
11	NC	12	NC
13	NC	14	NC
15	NC	16	NC
17	NC	18	GND
19	NC	20	NC
21	NC	22	NC
23	NC		

Pin No.	Definition	Pin No.	Definition
33	GND	32	NC
35	PCIE_TXp	34	NC
37	PCIE_TXn	36	NC
39	GND	38	NC
41	PCIE_RXp	40	NC
43	PCIE_RXn	42	NC
45	GND	44	NC
47	PCIE CLOCKp	46	NC
49	PCIE CLOCKn	48	NC
51	GND	50	SUSCLK
53	PCIE Clock Request	52	Reset
55	PCIE wake up	54	BT_Disable
57	GND	56	WLAN_Disable
59	NC	58	NC
61	NC	60	NC
63	GND	62	NC
65	NC	64	NC
67	NC	66	NC
69	GND	68	NC
71	NC	70	NC
73	NC	72	3.3V
75	GND	74	3.3V

Connector PN	Vendor
APCI0076-P002A	LOTES

2.2.24 M2M (M.2 Slot, 2242/2280 M-Key)

25



M.2 M Key Connector			
74			2
75			1

Pin No.	Definition	Pin No.	Definition
1	GND	2	3.3V
3	GND	4	3.3V
5	PCIE3 RXn	6	NC
7	PCIE3 RXp	8	NC
9	GND	10	SSD LED
11	PCIE3 TXn	12	3.3V
13	PCIE3 TXp	14	3.3V
15	GND	16	3.3V
17	PCIE2 RXn	18	3.3V
19	PCIE2 RXp	20	NC
21	GND	22	NC
23	PCIE2 TXn	24	NC
25	PCIE2 TXp	26	NC
27	GND	28	NC
29	PCIE1 RXn	30	NC
31	PCIE1 RXp	32	NC
33	GND	34	NC
35	PCIE1 TXn	36	NC

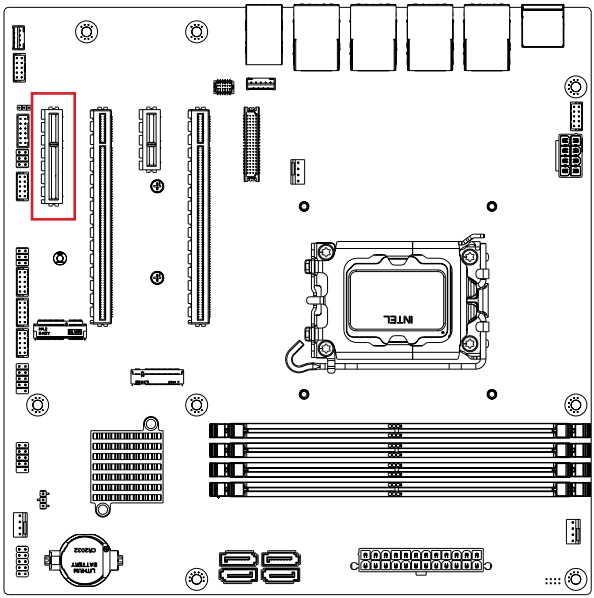
Pin No.	Definition	Pin No.	Definition
37	PCIE1 TXp	38	NC
39	GND	40	NC
41	PCIE0 RXp	42	NC
43	PCIE0 RXn	44	NC
45	GND	46	NC
47	PCIE0 TXn	48	NC
49	PCIE0 TXp	50	Reset
51	GND	52	Clock Request
53	Clockn	54	Wakeup
55	Clockp	56	NC
57	GND	58	NC

Pin No.	Definition	Pin No.	Definition
67	NC	68	SUSCLK
69	Detect	70	3.3V
71	GND	72	3.3V
73	GND	74	3.3V
75	GND		

Connector PN	Vendor
80159-8521	BELLWETHER
APCI0096-P002A	LOTES
AS0BC21-S85BM-7H	FOXCONN

2.2.25 PCIEX4 (PCIe x4 Slot)

26

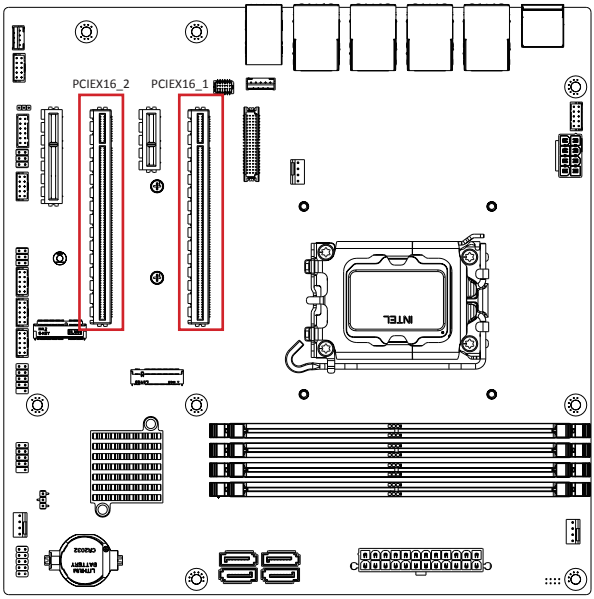


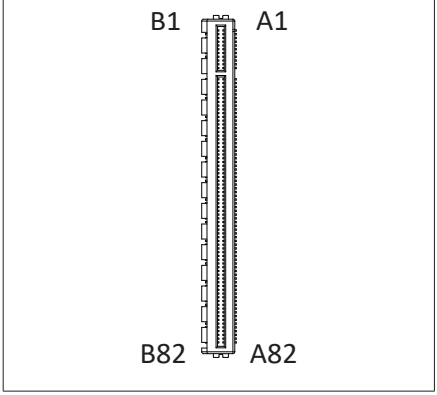
PCIe x4 connector
B1 A1  B49 A49

Connector PN	Vendor
APCI0472-P001A	LOTES
2EF5323-DA9D0-8H	FOXCONN

2.2.26 PCIEX16_2, PCIEX16_1 (PCIe x16 Slot)

27 29



PCIe x16 connector


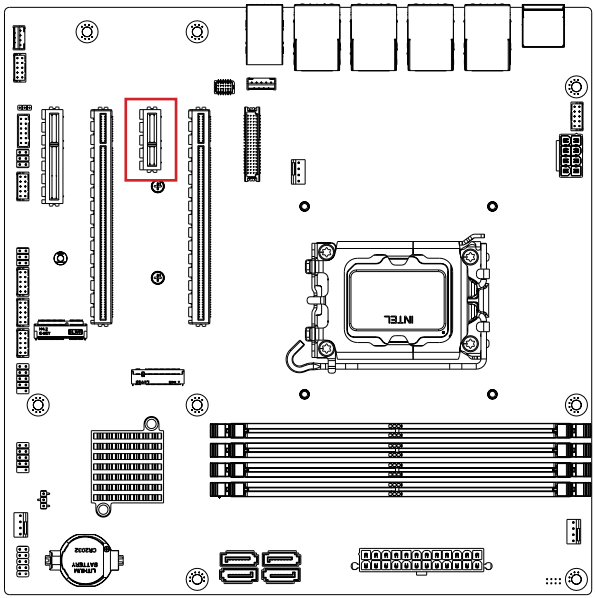
Connector PN	Vendor
APC50010-P003CC	LOTES
10146070-113Y0LF	AMPHENOL
5-2364427-8	TE

* Below are the possible configurations :

code name	PCIEX16_1	PCIEX16_2
Config. 1	Signal at x16	0
Config. 2	Signal at x8	Signal at x8

2.2.27 PCIEX1 (PCIe x1 Slot)

28

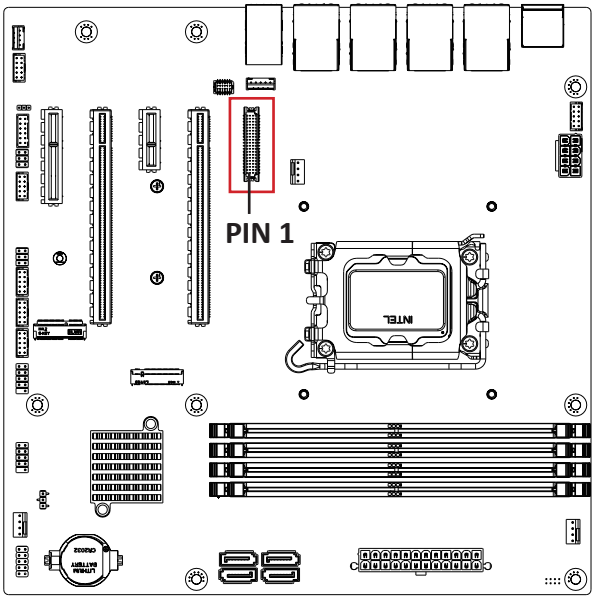


PCIe x1 connector
B1 A1 B18 A18

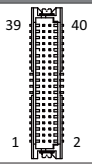
Connector PN	Vendor
2EF5183-DA9D0-8H	FOXCONN

2.2.28 LVDS (LVDS connector)

30



LVDS Connector



Pin No.	Definition	Pin No.	Definition
1	3.3V	21	A5+
2	5V	22	A4+
3	3.3V	23	A5-
4	5V	24	A4-
5	SPEC0	25	GND
6	SPED0	26	GND
7	GND	27	A7+
8	GND	28	A6+
9	A1+	29	A7-
10	A0+	30	A6-
11	A1-	31	GND
12	A0-	32	GND
13	GND	33	CLK2+
14	GND	34	CLK1+
15	A3+	35	CLK2-
16	A2+	36	CLK1-
17	A3-	37	GND
18	A2-	38	GND
19	GND	39	12V
20	GND	40	12V

Connector PN	Vendor
712-76-40GWE0	PINREX
A1252WV-SF-2X20PD01	JOINT-TECH

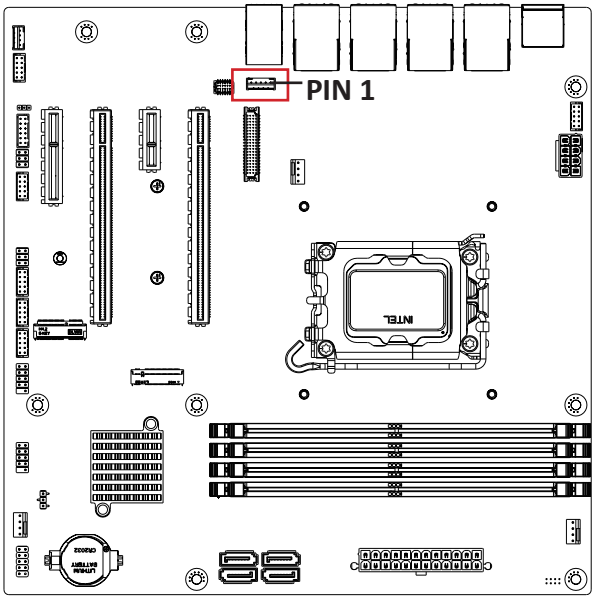
Connector type
2x20pin header, pitch 1.25mm

For each model support LVDS function.
But below model no need to add.
A0~A3 is odd channel 0~3, A4~A7 is even channel.

Note: *The LVDS output connector of the unit is only intended to be connected to an UL/IEC/EN approval equipment with fire enclosure.

2.2.29 BKL_CN (Backlight Control header)

31



Backlight control header
5 1

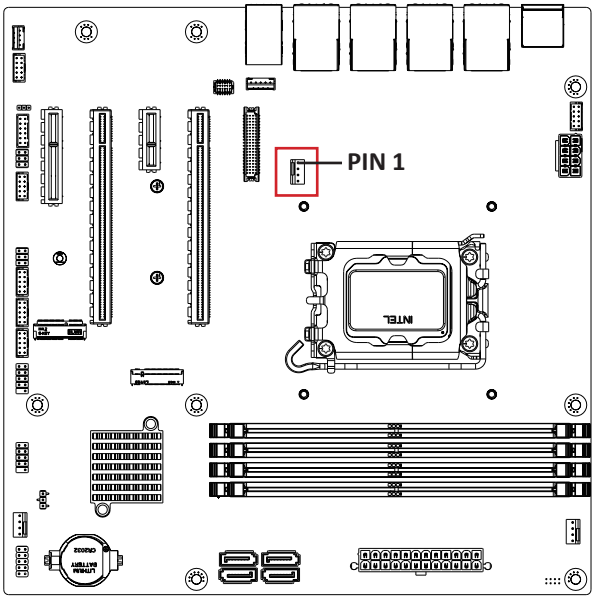
Connector PN	Vendor
721-81-05TW00	PINREX

Connector type
1x5pin header, pitch 2.0mm

Pin No.	Definition
1	5V (option 12V)
2	PWM
3	Backlight Enable
4	GND
5	12V

2.2.30 CPU_FAN (CPU Fan connector)

32



CPU FAN Connector
 1 4

Connector PN	Vendor
744-81-045W1Z	PINREX

Connector type
1x4pin header, pitch 2.54mm

Pin No.	Definition
1	GND
2	12V
3	Detect
4	Speed Control

Chapter 3

Chapter 3 – BIOS

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

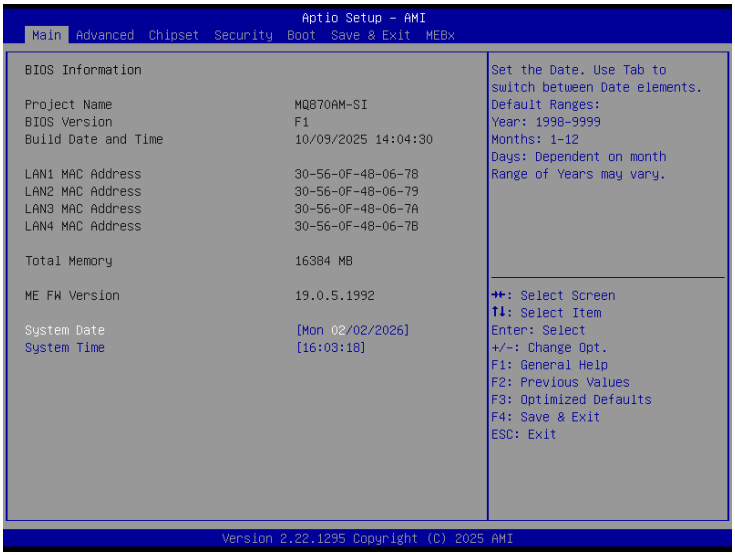
Once the system is power on, press the <DEL> key as soon as possible to access into BIOS Setup program.

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

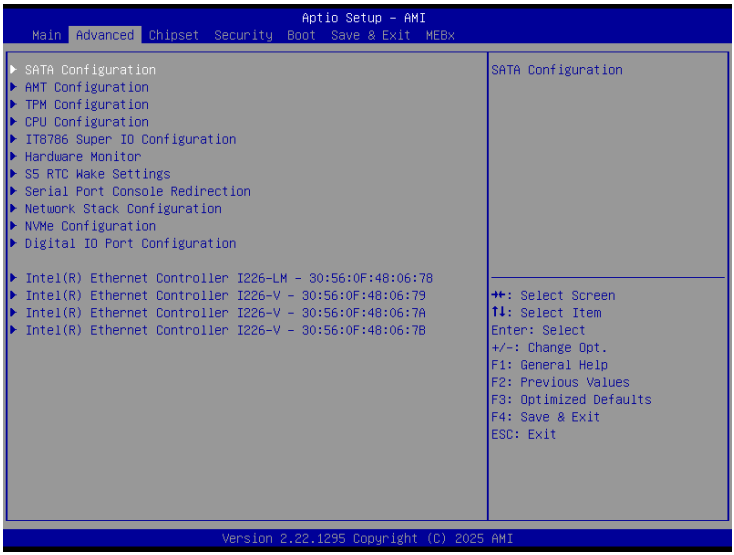
The main menu shows the basic system information.
Use arrow keys to move among the items.



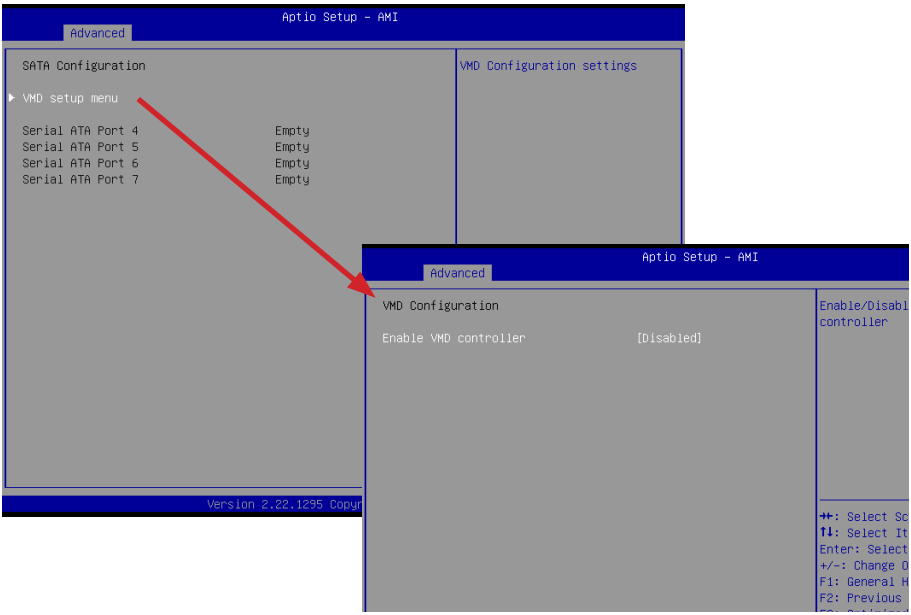
Items	Description
Project Name	Shows Project name information
BIOS Version	Shows the BIOS version of the system
Build Date and Time	Shows the Build Date and Time when the BIOS was created.
LAN1 MAC Address	Shows LAN 1 MAC Address information
LAN2 MAC Address	Shows LAN 2 MAC Address information
LAN3 MAC Address	Shows LAN 3 MAC Address information
LAN4 MAC Address	Shows LAN 4 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.

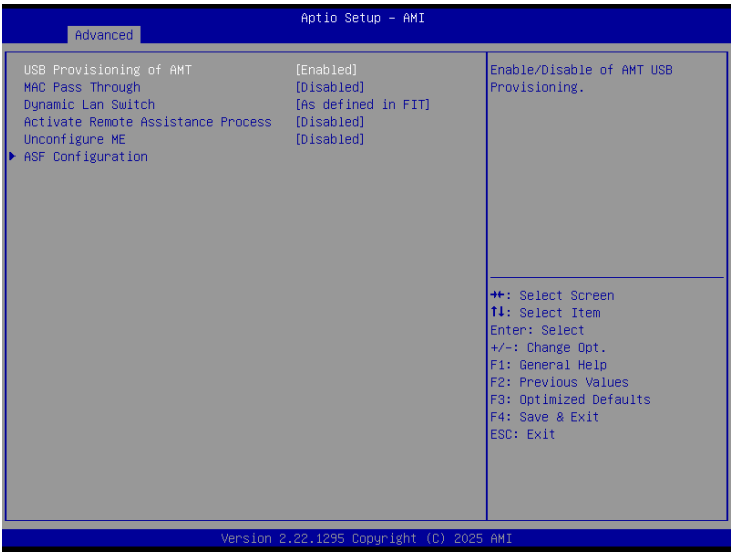


3.3.1 SATA Configuration



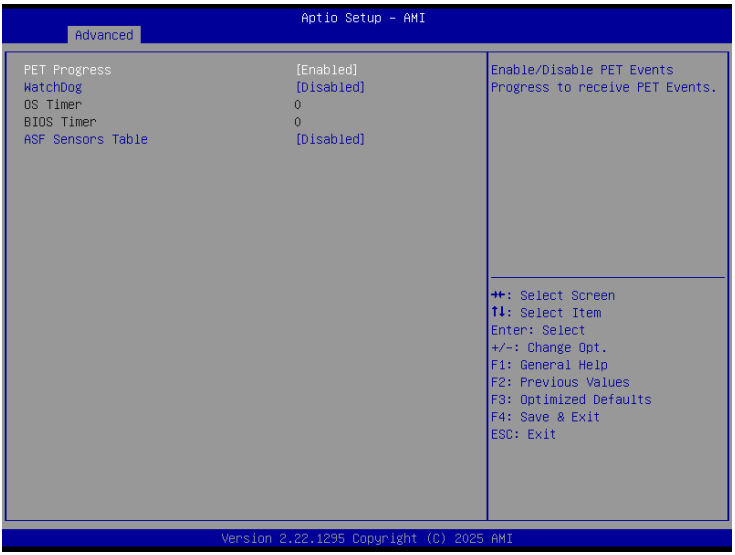
Item	Description
VMD setup menu / Enable VMD controller	Intel VMD feature helps you to control and manage NVMe PCIe SSD. **Enabled : Enables Intel VMD feature** **Disabled : Disables Intel VMD feature (Default setting)**
Serial ATA Port 4 **Serial ATA Port 5** **Serial ATA Port 6** **Serial ATA Port 7**	shows SATA HDD/SSD information

3.3.2 AMT Configuration



Item	Description
USB Provisioning of AMT	Inserting a specially formatted USB drive into a system, to let the other system remotely control. **Disabled : Disables USB Provisioning of AMT** **Enabled : Enables USB Provisioning of AMT (Default setting)**
MAC Pass Through	**Disabled : Disables MAC Pass Through function (Default setting)** **Enabled : Enables MAC Pass Through function**
Dynamic Lan Switch	Allow switching AMT support from Integrated LAN to Discrete LAN. **Option items : As defined in FIT (Default setting), Integrated LAN, Discrete LAN.**
Activate Remote Assistance Process	Trigger CIRA boot **Disabled : Disables TPM feature (Default setting)** **Enabled : Enables TPM feature**
Unconfigure ME	To Un-configure ME without password. **Disabled : Disables Unconfigure ME (Default settings)** **Enabled : Enables Unconfigure ME**

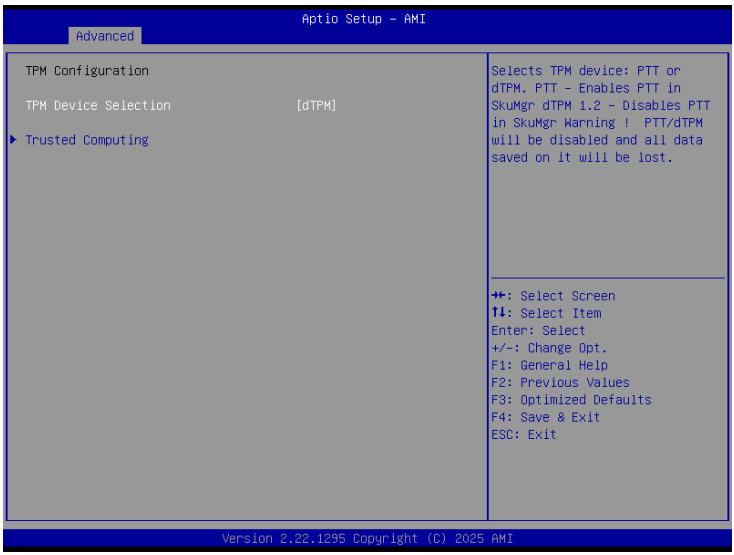
ASF Congifuration



Item	Description
PET Progress	Choose to receive PET events or not **Disabled : Disables PET Progress** **Enabled : Enables PET Progress (Default setting)**
WatchDog	Choose to enables watchdog timer or not **Disabled : Disables watchdog Timer (Default setting)** **Enabled : Enables watchdog Timer**
OS Timer	Sets OS Watchdog Timer.
BIOS Timer	Sets BIOS Timer.
ASF Sensors Table	**Disabled : Disables ASF Sensors Table (Default setting)** **Enabled : Enables ASF Sensors Table**

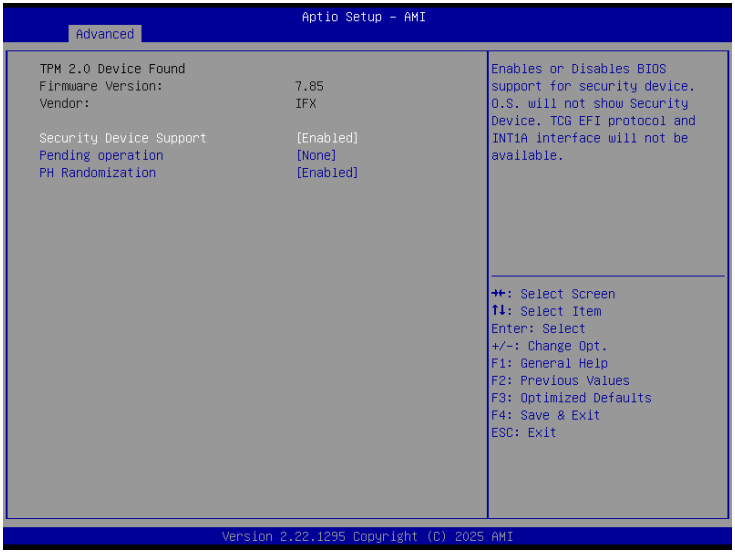
3.3.3 TPM Configuration

Use TPM Configuration submenu to choose TPM interface.



Item	Description
TPM Device Selection	**PTT : Internal TPM** **dTPM : External TPM (When using External TPM module or having TPM chip on MB) (Default setting)**

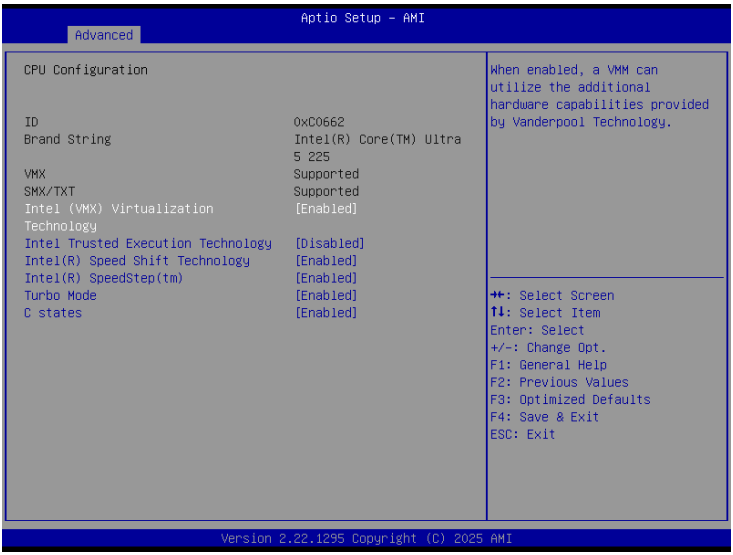
Trusted Computing : Shows TPM information, and TPM module configuration setting.



Item	Description
Security Device Support	**Enabled : Enables TPM feature (Default setting)** **Disabled : Disables TPM feature**
Pending operation	**None : No execution will be conducted (Default setting)** **TPM clear : Set to clear data on TPM**
PH Randomization	**Enabled : Enables Platform Hiearchy (PH) Randomization. (Default setting)** **Disabled : Disables Platform Hiearchy (PH) Randomization.**

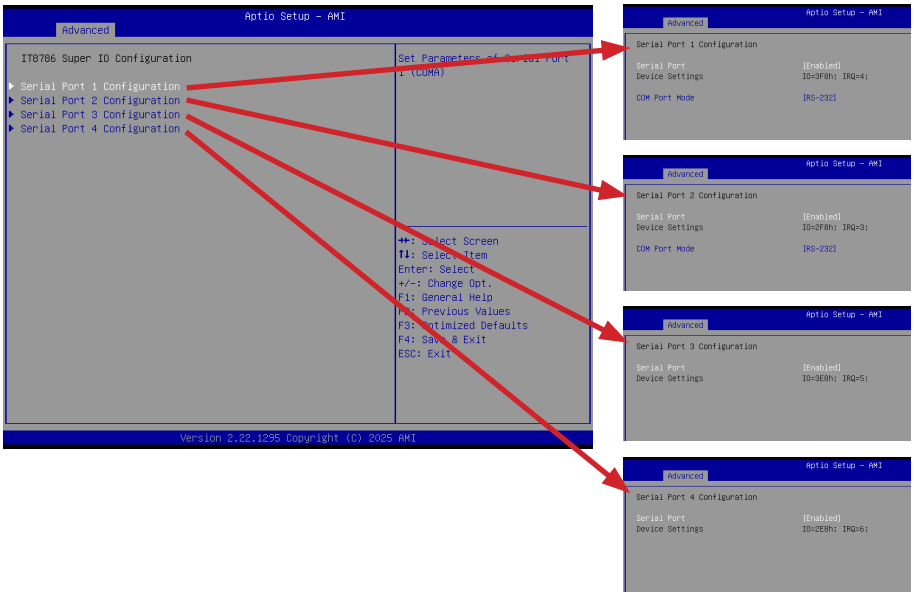
3.3.4 CPU Configuration

This submenu shows detailed CPU informations.



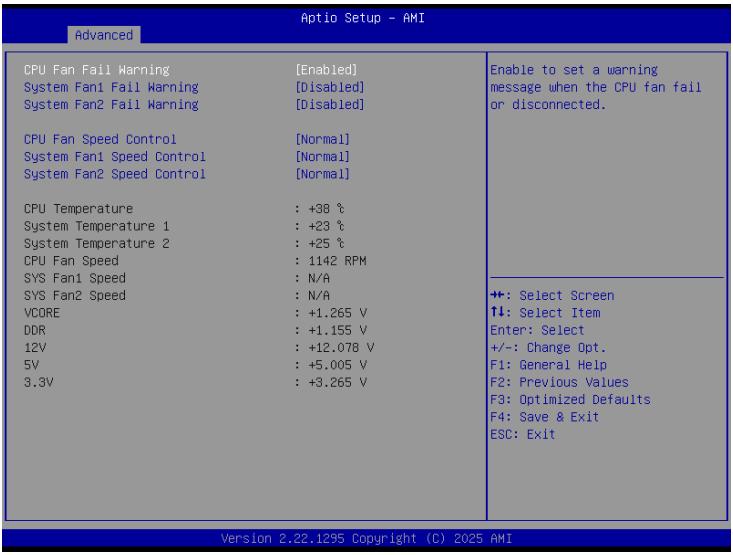
Item	Description
Intel (VMX) Virtualization Technology	Virtualization enhanced by Intel® Virtualization Technology will allow a platform to run multiple operating systems and applications in independent partitions. With virtualization, one computer system can function as multiple virtual systems. **Enabled : Enables Intel Virtualization Technology (Default setting)** **Disabled : Disables Intel Virtualization Technology**
Intel Trusted Execution Technology	**Disabled : Disables Intel Trusted Execution Technology (Intel® TXT) (Default setting)** **Enabled : Enables Intel Trusted Execution Technology (Intel® TXT)**
Intel(R) Speed Shift Technology	To speed up CPU frequency transition time from basic frequency to maximum frequency. **Enabled : Enables Intel(R) Speed Shift Technology Interrupt control (Default setting)** **Disabled : Disables Intel(R) Speed Shift Technology Interrupt control**
Intel(R) SpeedStep(tm)	According to Intel CPU loading, Intel SpeedStep Technology will automatically adjust the CPU voltage and core frequency to decrease heat and power consumption for power saving. **Enabled : Enables Intel SpeedStep Technology (Default setting)** **Disabled : Disables Intel SpeedStep Technology**
Turbo Mode	**Enabled : Enables Turbo Mode (Default setting)** **Disabled : Disables Turbo Mode**
C states	Command CPU to enter into low power consumption mode when CPU is under idle mode. **Enabled : Enables CPU C states function (Default setting)** **Disabled : Disables CPU C states function**

3.3.5 IT8786 Super IO Configuration



Item	Description
Serial Port 1 Configuration **Serial Port 2 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** 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 **Serial Port 4 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** Device settings : Display the specified Serial Port base I/O address and IRQ

3.3.6 Hardware Monitor



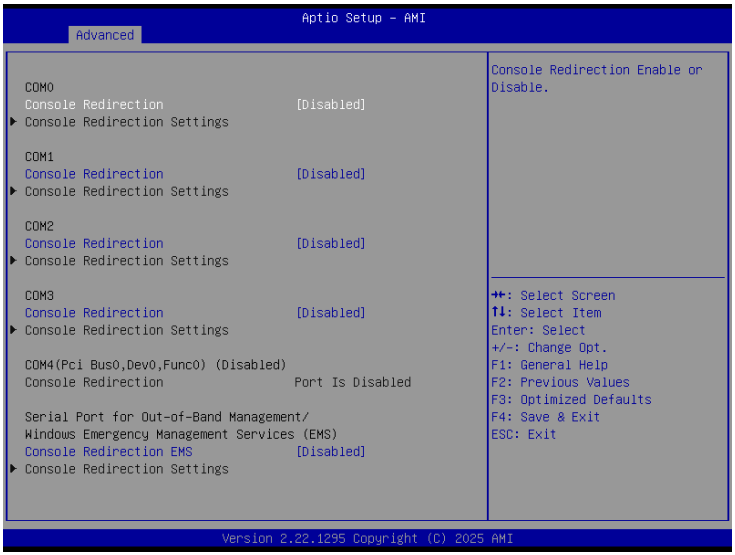
Item	Description
CPU Fan Fail Warning	Enabled : Enables CPU FAN Fail warning alert function (Default setting) Disabled : Disables CPU FAN Fail warning alert function
System Fan1 Fail Warning	Enabled : Enables System FAN 1 Fail warning alert function Disabled : Disables System FAN 1 Fail warning alert function (Default setting)
System Fan2 Fail Warning	Enabled : Enables System FAN 2 Fail warning alert function Disabled : Disables System FAN 2 Fail warning alert function (Default setting)
CPU Fan Speed Control	Normal : Fan speed set by BIOS default (Default setting) Full Speed : Set Fan operates at full speed
System Fan1 Speed Control	Normal : Fan speed set by BIOS default (Default setting) Full Speed : Set Fan operates at full speed
System Fan2 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 1	Shows current system temperature
System Temperature 2	Shows current system temperature
CPU Fan Speed	Shows current CPU fan Speed
SYS Fan1 Speed	Shows current System fan 1 Speed
SYS Fan2 Speed	Shows current System fan 2 Speed

3.3.7 S5 RTC Wake Settings

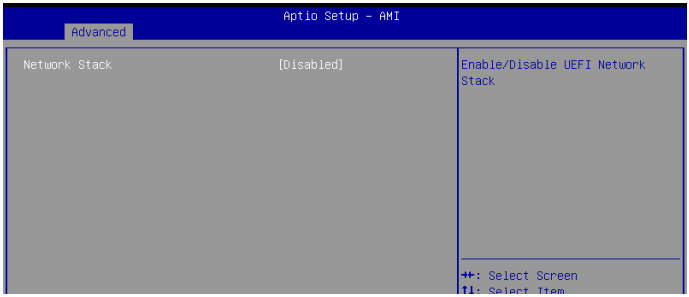
Item	Description
Wake system from S5	Enable or Disable System to wake on a specific time. **Disabled : Disables system to wake on a specific time (Default setting)** **Fixed Time : Enables system to wake on a specific time (Format : hr : min : sec)**

3.3.8 Serial Port Console Redirection

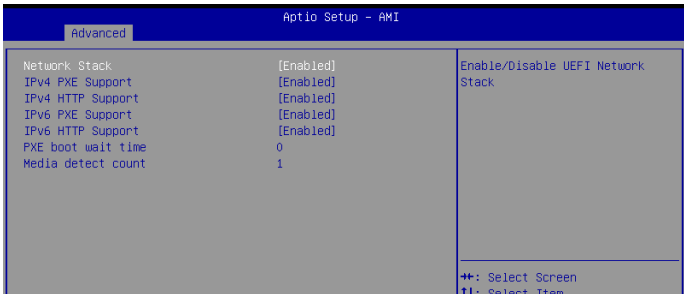


Item	Description
Output Select	Choose default monitor output when there are more than one monitor plugged on the motherboard.

3.3.9 Network Stack Configuration



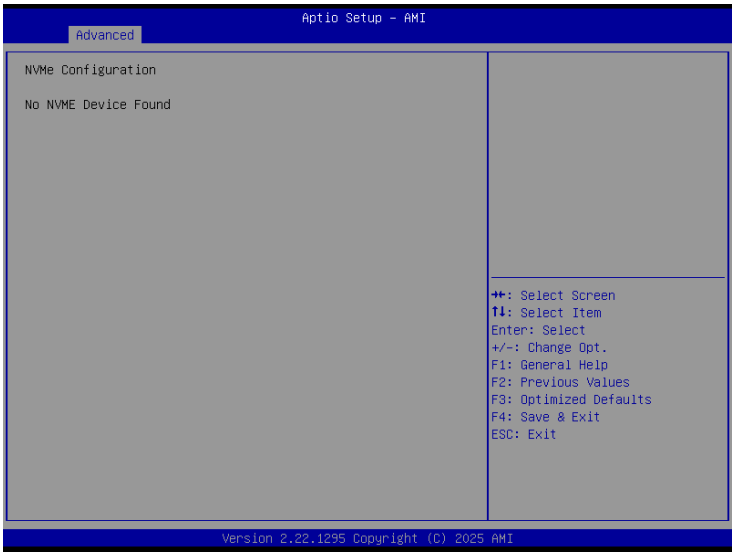
When Network stack is enabled :



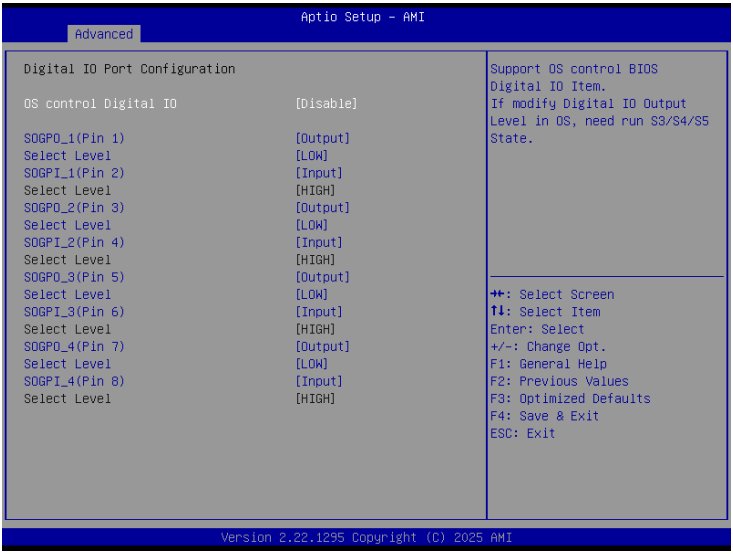
Item	Description
Network Stack	When system is power on, install LAN driver under UEFI mode **Disabled : Disables UEFI Network Stack (Default setting)** **Enabled : Enables UEFI Network Stack**
IPv4 PXE Support	When Network stack is enabled : **Disabled : Disables IPv4 PXE Support** **Enabled : Enables IPv4 PXE Support**
IPv4 HTTP Support	When Network stack is enabled : **Disabled : Disables IPv4 HTTP Support** **Enabled : Enables IPv4 HTTP Support**
IPv6 PXE Support	When Network stack is enabled : **Disabled : Disables IPv6 PXE Support** **Enabled : Enables IPv6 PXE Support**
IPv6 HTTP Support	When Network stack is enabled : **Disabled : Disables IPv6 HTTP Support** **Enabled : Enables IPv6 HTTP Support**
PXE boot wait time	Wait time in seconds, or use ESC key to abort the PXE boot.
Media detect count	Number of times the presence of media will be checked.

3.3.10 NVMe Configuration

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



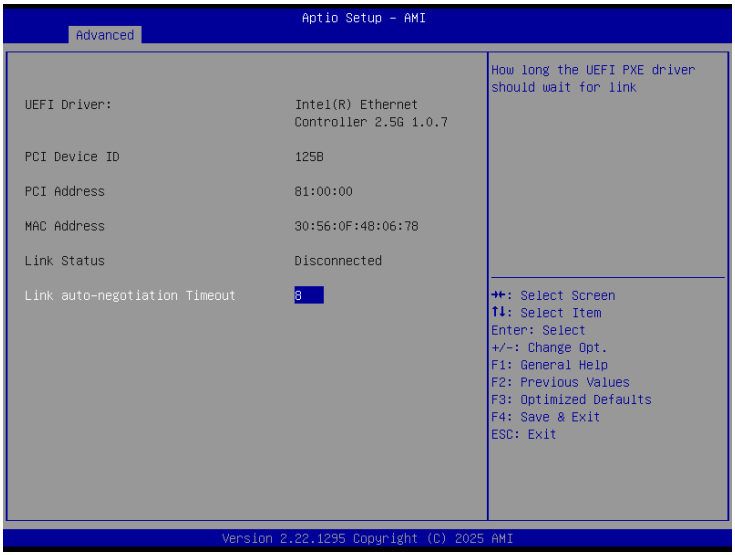
3.3.11 Digital IO Port Configuration



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.

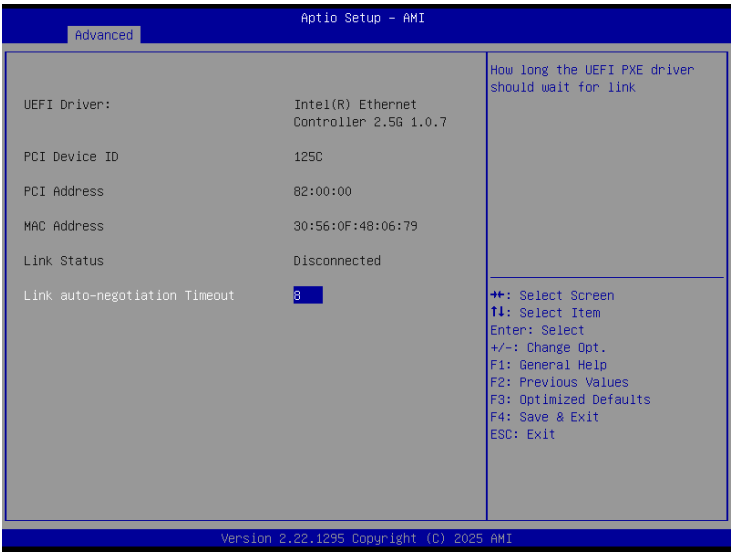
3.3.12 Intel(R) Ethernet Controller I226-LM - 30:56:0F:48:06:78 (MAC address may varied based on different motherboard)

Shows Intel Ethernet controller information



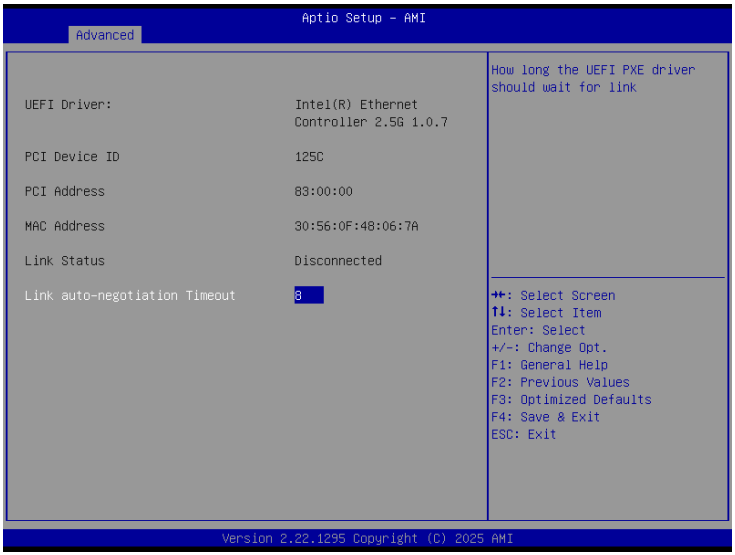
3.3.13 Intel(R) Ethernet Controller I226-V - 30:56:0F:48:06:79 (MAC address may varied based on different motherboard)

Shows Intel Ethernet controller information



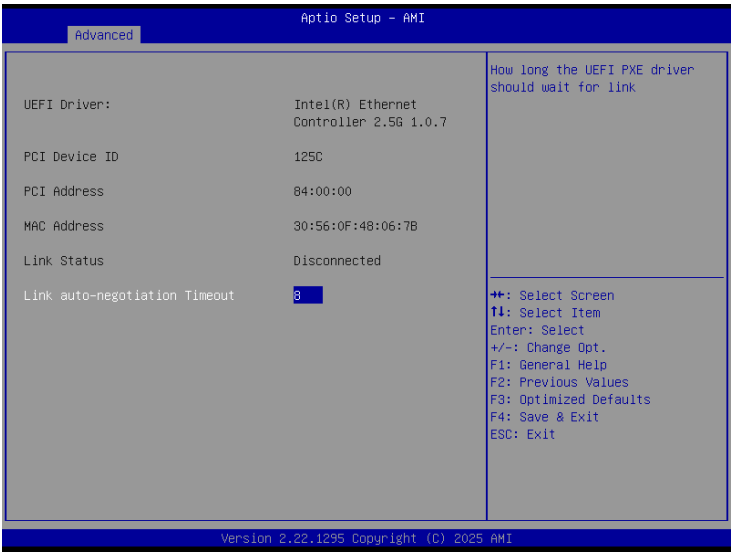
3.3.14 Intel(R) Ethernet Controller I226-V - 30:56:0F:48:06:7A (MAC address may varied based on different motherboard)

Shows Intel Ethernet controller information

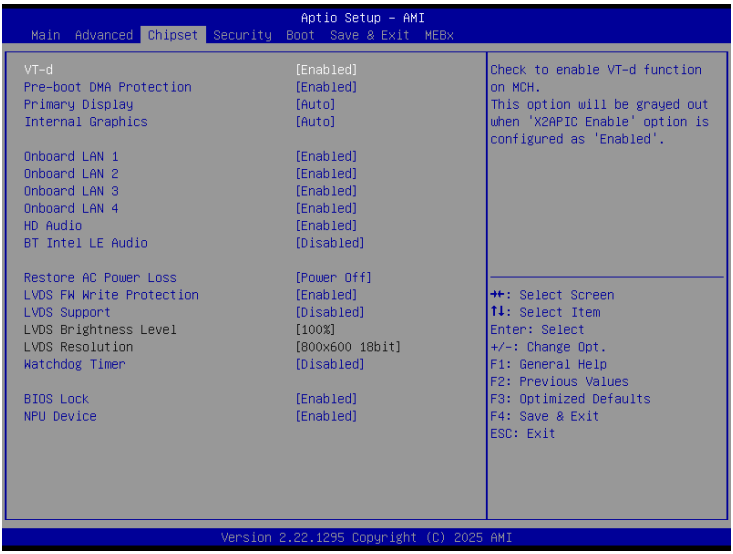


3.3.15 Intel(R) Ethernet Controller I226-V - 30:56:0F:48:06:7B (MAC address may varied based on different motherboard)

Shows Intel Ethernet controller information



3.4 Chipset

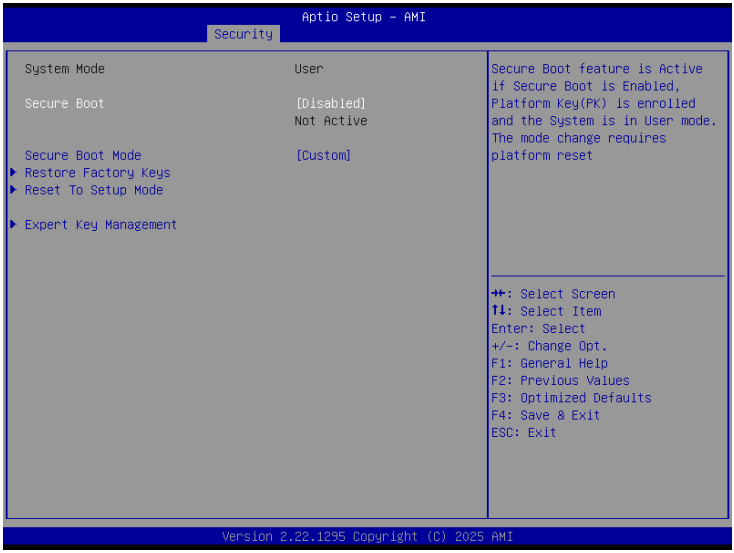


Item	Description
VT-d	**Enabled : Enables VT-d function (Default setting)** **Disabled : Disables VT-d function**
Pre-boot DMA Protection	**Enabled : Enables Pre-boot DMA Protection (Default setting)** **Disabled : Disables Pre-boot DMA Protection**
Primary Display	**Auto : When detects PCIe Graphic card, primary display will set to PCIe (Default setting)** **IGFX : Force IGFX Graphic card as the primary display device** **PEG : Force PEG Graphic card as the primary display device**
Internal Graphics	Enables or disables the onboard graphics function **Auto : Detects display device automatically (Default setting)** **Enabled : Enables onboard graphics** **Disabled : Disables onboard graphics**
Onboard LAN 1 **Onboard LAN 2** **Onboard LAN 3** **Onboard LAN 4**	Enable/Disable onboard LAN controller **Enabled : Enables onboard LAN controller (Default setting)** **Disabled : Disables onboard LAN controller**

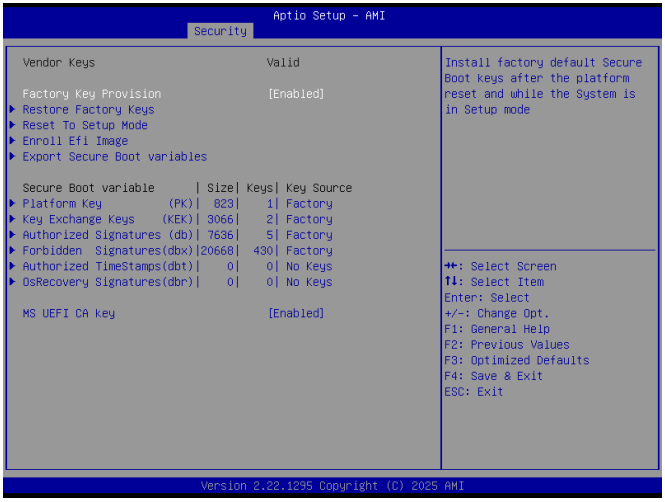
HD Audio	Enable/Disable onboard audio controller **Enabled : Enables onboard audio controller (Default setting)** **Disabled : Disables onboard audio controller**
BT Intel LE Audio	Enable/Disable BT Intel LE Audio function **Enabled : Enables BT Intel LE Audio function** **Disabled : Disabled BT Intel LE Audio function (Default setting)** (※Bluetooth LE Audio is not supported on Windows 10 and Windows 11, version 21H2.)
Restore AC Power Loss	To set which option the system should returns if a sudden power loss occured **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 occures**
LVDS FW Write Protection	Prevent accidental firmware overwrite or removal. **Disabled : Disables LVDS FW Write Protection** **Enabled : Enables LVDS FW Write Protection (Default setting)**
LVDS Support	**Disabled : Disables LVDS Support (Default setting)** **Enabled : Enables LVDS Support**
LVDS Brightness Level	When LVDS Support is enabled : To modified the backlight brightness of the LVDS panel **Option items : 10%, 20%, 30%, 40%, 50%, 60%, 70%, 80%, 90%, 100% (Default Setting)**
LVDS Resolution	When LVDS Support is enabled : To modified the LVDS resolution **Option items : 800x600 18bit (Default Setting) , 1024x768 18bit, 1024x768 24bit, 1024x600 18bit, 1280x800 18bit, 1280x960 18bit, 1280x1024 24bit, 1366x768 18bit, 1366x768 24bit, 1440x900 24bit, 1400x1050 24bit, 1600x900 24bit, 1680x1050 24bit, 1600x1200 24bit, 1920x1080 24bit, 1920x1200 24bit**
Watchdog Timer	Enable/Disable Watchdog Timer function **Disabled : Disables Watchdog Timer function (Default setting)** **Enabled : Enables Watchdog Timer function**
BIOS Lock	Enable/Disable BIOS Lock function **Enabled : Enables BIOS Lock function (Default setting)** **Disabled : Disabled BIOS Lock funtion**
NPU Device	Enable/Disable NPU Device function **Enabled : Enables NPU Device function (Default setting)** **Disabled : Disabled NPU Device funtion** ※Suggest to disable this function when using Windows 10

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**
Expert Key Management	Enables expert users to modify Secure boot policy variables without full authentication Press <Enter> to configure the advanced items

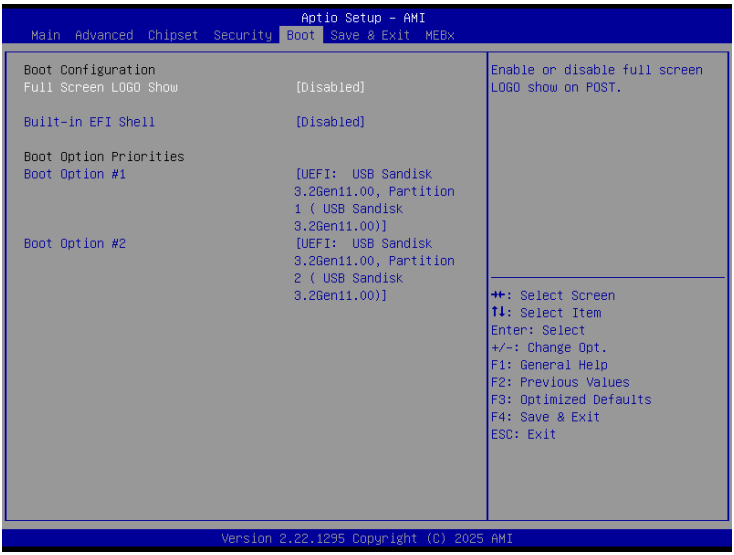


Item	Description
Factory Key Provision	Install factory default Secure Boot keys after the platform reset and while the system is in Setup mode **Enabled : Enables Factory Key Provision (Default setting)** **Disabled : Disables Factory Key Provision**
Restore Factory Keys	To restore factory settings **Yes : 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**
Enroll Efi Image	Allow the image to run in Secure Boot mode
Export Secure Boot variables	Copy NVRAM content of Secure Boot variables to files in a root folder on a file system device

Item	Description
Platform Key (PK)	These items allows you to enroll factory defaults or load Certificates from a file.
Key Exchange Keys (KEK)	
Authorized Signatures (db)	
Forbidden Signatures (dbx)	
Authorized TimeStamps (dbt)	
OsRecovery Signatures (dbr)	
MS UEFI CA Key	Device Guard ready system must not list 'Microsoft UEFI CA' Certificate in Authorized Signature database(db)

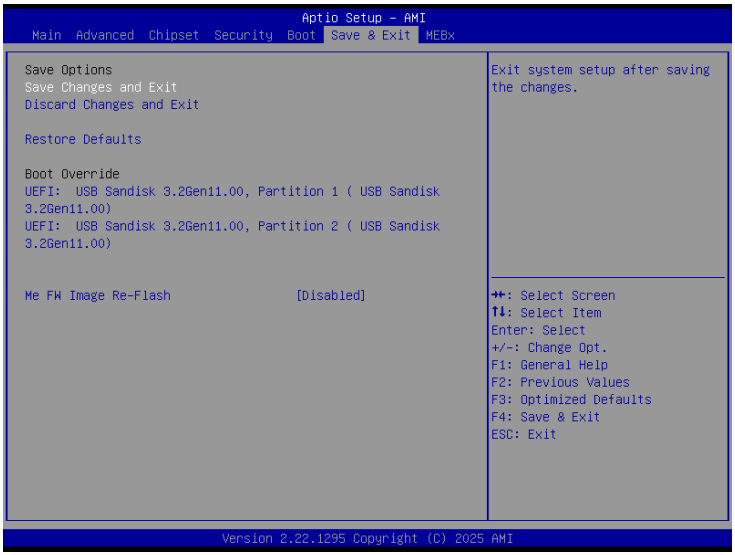
3.6 Boot

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)**
Built-in EFI Shell	Enable/Disable Built-in EFI Shell **Enabled : Enables Built-in EFI Shell** **Disabled : Disables Built-in EFI Shell (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-Flash	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)**

3.8 MEBx

Item	Description
Intel(R) ME Password	For MEBx Login