

mITX-Q670B (MQ670BI-SI)

mITX-Q670B Mini-ITX Motherboard

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Packing List

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

Item	Quantity
mITX-Q670B MB	1
SATA power cable	1
I/O Shield	1

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

Warning!



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	○	○	○	○	○	○
Wires & Connectors for External Connections	○	○	○	○	○	○

○ : 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

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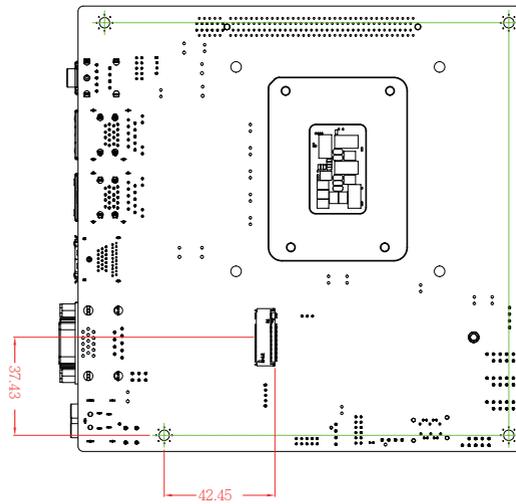
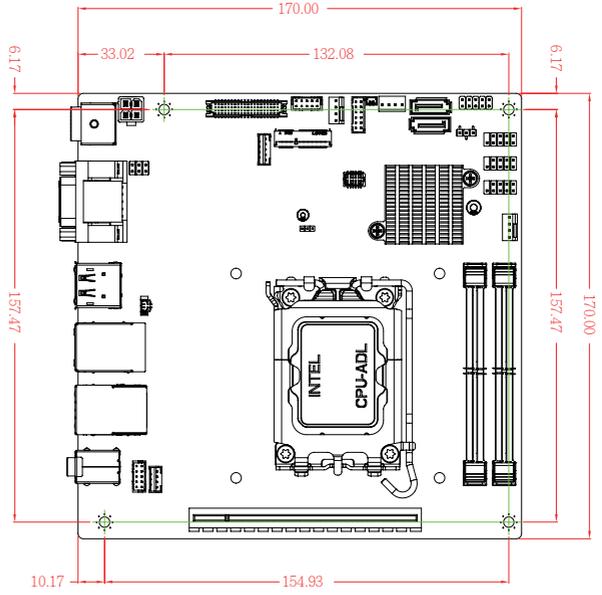
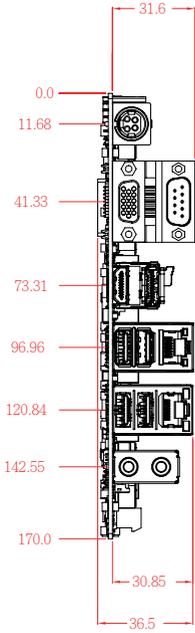
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Chapter 1

Chapter 1 - Product Specifications



1.1 Specifications

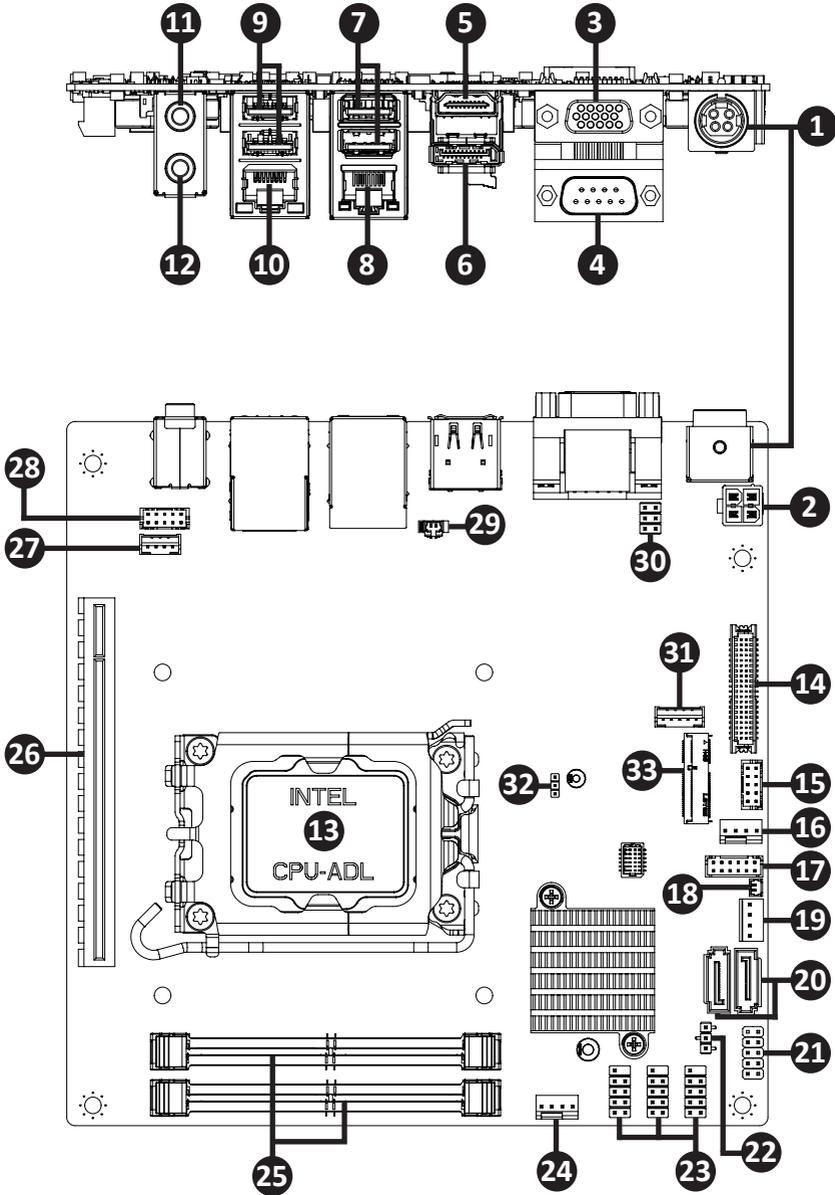
Motherboard	mITX-Q670B (MQ670BI-SI)
Form Factor	Mini-ITX 170W x 170D (mm)
CPU	Support for 14th/13th/12th Generation Intel® Core™ i9/ i7/ i5/ i3, Pentium® and Celeron® processors in the LGA1700 package TDP under 65W
Socket	1 x LGA 1700
Chipset	Intel® Q670 Chipset
Memory	2 x DDR5 SO-DIMM sockets, Max. Capacity 96 GB Support Dual channel DDR5 5600 MHz memory modules
Ethernet	1 x GbE LAN Port (Intel® I219LM) 1 x 2.5GbE LAN Port (Intel® I226V)
Video	Integrated Graphics Processor - depends on CPU: 1 x HDMI 2.0 port, supporting a maximum resolution of 4096x2160 @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® ALC897
Storage	2 x SATA 6Gb/s Ports
Raid	RAID 0/1
Expansion Slots	1 x PCIe x16 (Gen4 x16) 1 x 2280 M.2 M-Key (PCIe x4) 1 x 2230 M.2 E-Key (WiFi/BT)
Internal I/O	1 x 4-pin ATX main power connector 2 x SATA power connectors 1 x CPU fan header 1 x System fan header 1 x Front panel header 1 x Front panel audio header 1 x 2W Speaker out header 6 x USB 2.0 headers 1 x COM header (RS-232) 1 x GPIO (8 bits) & SMBus header 1 x Backlight Control header 1 x Clear CMOS jumper 1 x Buzzer header 1 x AT/ATX mode select jumper

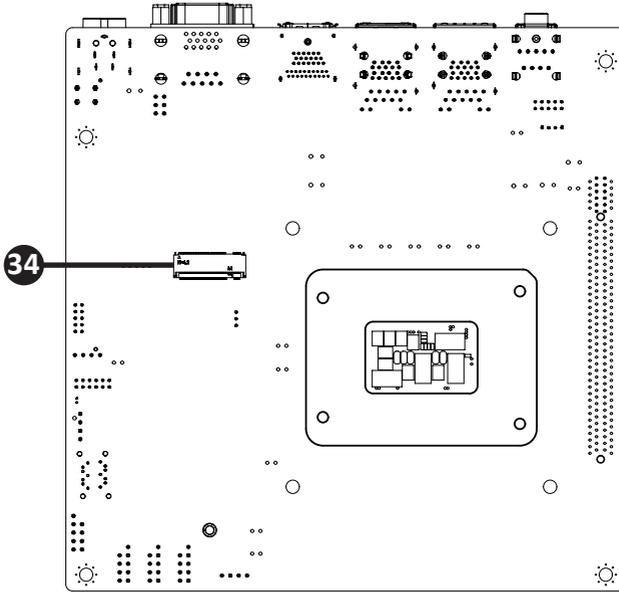
Motherboard	mITX-Q670B (MQ670BI-SI)
Rear I/O	2 x Audio Jacks (Line out, Mic in) 1 x COM Port (RS-232/422/485 & RI/5V/12V) 1 x HDMI 1 x Display Port 1 x D-Sub 2 x RJ45 LAN Ports 4 x USB 3.2 Gen 1 1 x DC Jack (+12V/+19V~+24VDC)
TPM	Onboard TPM 2.0 security chip INFINEON SLB9670VQ2.0
OS Compatibility	Windows 11 IoT Enterprise LTSC 2024 (x64) Windows 10 IoT Enterprise LTSC 2021 (x64)
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)
Order Information	Motherboard: 9MQ670BIMR-SI
Optional kit:	CPU Cooler : 25ST0-037820-Y0R CPU Cooler Backplate : 12KRH-0A1700-00R

Chapter 2

Chapter 2 – Hardware Information

2.1 Jumpers and Connectors

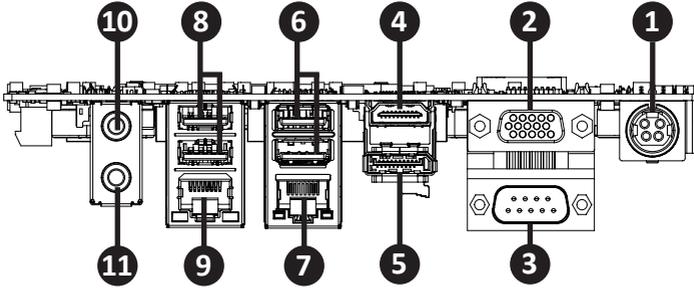




No	Code	Description
1	DC_IN1	DC In Jack 4 pin Din
2	DC_IN2	ATX 2x2 pin power Connector
3	VGA	VGA Port
4	COM1	COM1 Port (RS-232/422/485 & RI/5V/12V)
5	HDMI_DP	HDMI Connector
6		Display Port Connector
7	USB32_LAN1	USB 3.2 Gen 1 Connector
8		GbE LAN port
9	USB32_LAN2	USB 3.2 Gen 1 Connector
10		2.5GbE LAN port
11	AUDIO	Mic in port (Pink)
12		Line Out port (Green)
13	CPU Socket	1 x LGA 1700 Socket

No	Code	Description
14	LVDS	LVDS Connector
15	COM2	COM2 header (RS-232)
16	SYS_FAN	System Fan Connector
17	GPIO_CNT	General purpose input/output header
18	BUZZER	Buzzer header
19	SATA_PWR	SATA power Connector
20	SATA4, SATA5	SATA 6Gb/s Connector x 2
21	SYS_PANEL	System Panel header
22	CLR_CMOS	Clear CMOS jumper
23	FUSB2_1 FUSB2_2 FUSB2_3	USB 2.0 header
24	CPU_FAN	CPU FAN Connector
25	SODIMM1, SODIMM2	2 x DDR5 SO-DIMM Sockets
26	PCIEX16	1 x PCIe x16 (Gen4 x16 bus) slot
27	SPKR	Speaker out Connector
28	FP_AUDIO	Front Panel Audio header
29	BATTERY	Battery Connector
30	JCOM1	RI# pin RI#/5V/12V Select jumper for COM1 port
31	BKL_CN	Backlight Control connector
32	AT_CN	AT/ATX mode select jumper
33	M2E	M.2 Slot, 2230 E-Key
34	M2M	M.2 Slot, 2280 M-Key

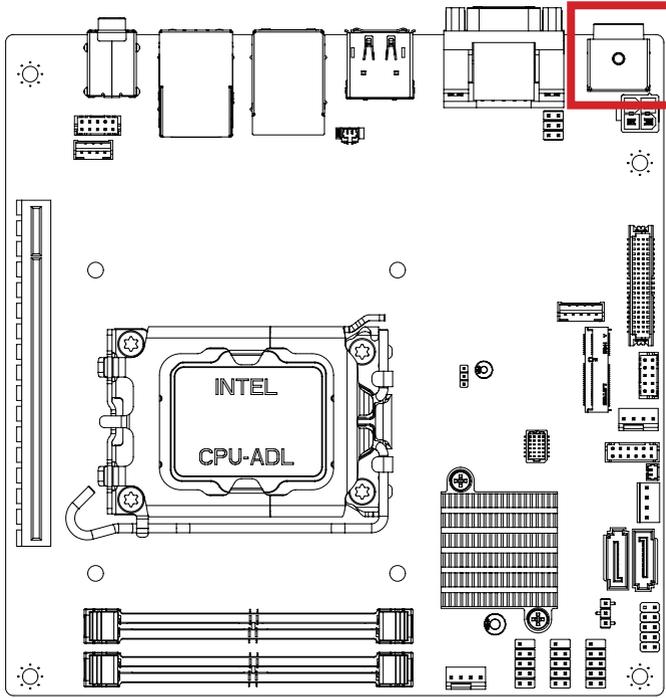
2.2.1 IO Connector Information



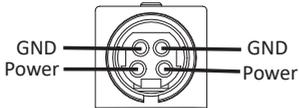
	Code	Description
1	DC_IN1	DC In Jack 4 pin Din
2	VGA	VGA Port
3	COM1	COM1 Port (RS-232/422/485 & RI/5V/12V)
4	HDMI_DP	HDMI Connector
5		Display Port Connector
6	USB32_LAN1	USB 3.2 Gen 1 Connector
7		GbE LAN port
8	USB32_LAN2	USB 3.2 Gen 1 Connector
9		2.5GbE LAN port
10	MIC_IN	Mic in port (Pink)
11	LINE_OUT	Line Out port (Green)

2.2.2 DC_IN1 (DC In Jack 4 Pin Din)

1



DC In Jack 4 Pin Din



Connector PN

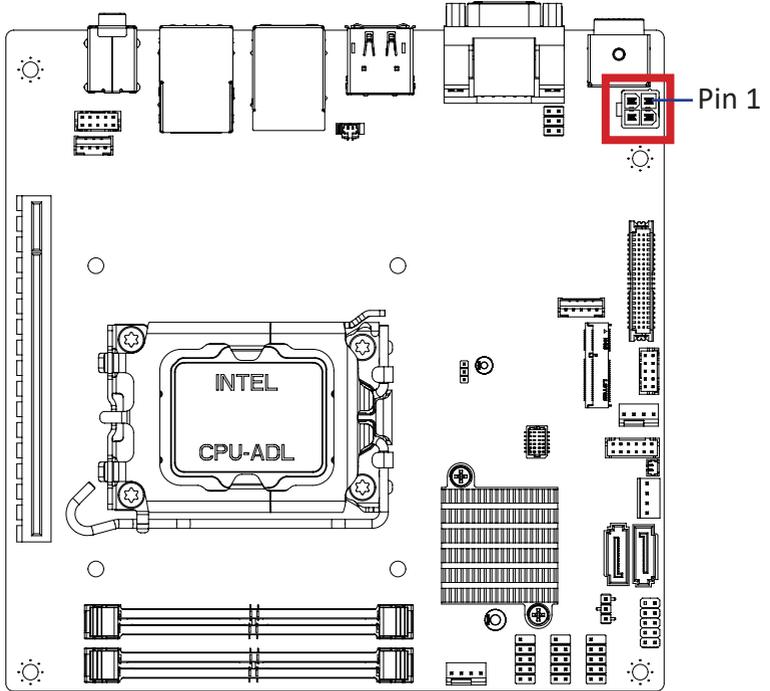
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Vendor

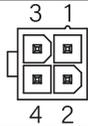
SINGATRON

2.2.3 DC_IN2 (ATX 2x2 Pin Power Connector)

2



Power Connector



Connector PN

740-81-04TW56

Vendor

PINREX

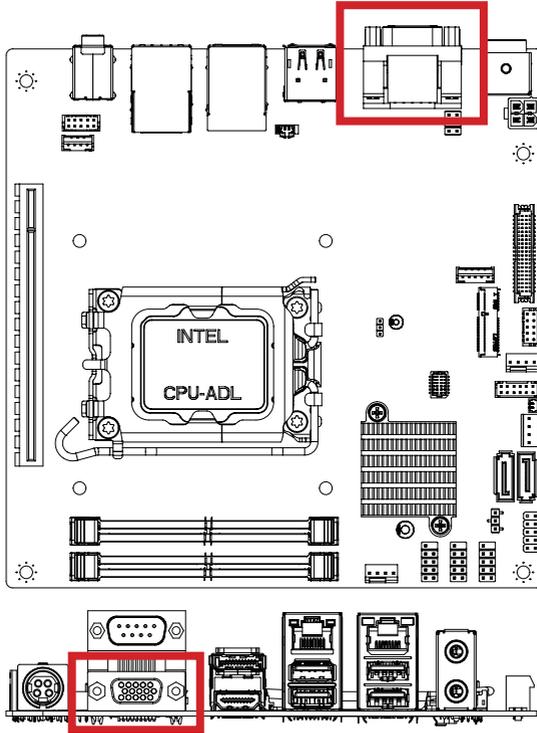
Connector type

2x2pin header, pitch 4.2mm

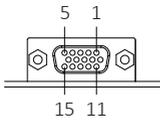
Pin No.	Definition
1	GND
2	GND
3	DC IN
4	DC IN

2.2.4 VGA (VGA Port)

3



D-sub Connector



Connector PN

D11069S1122E23DB

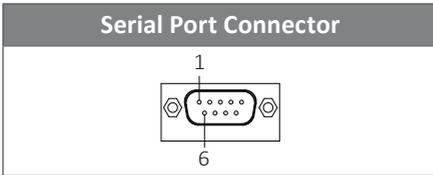
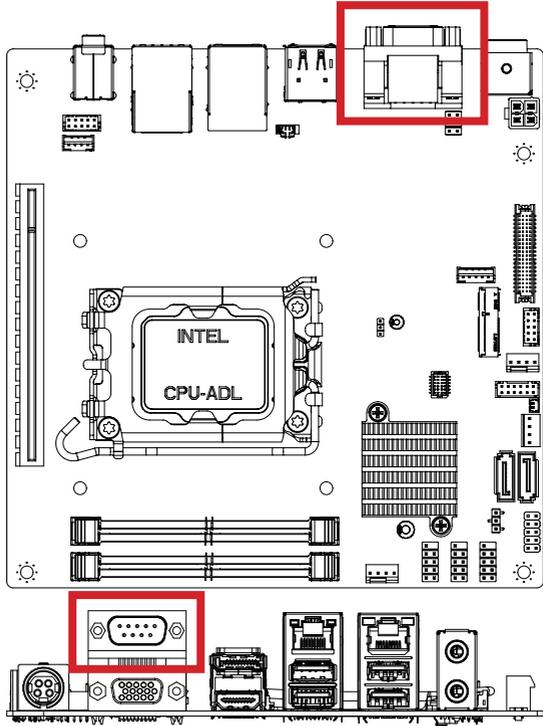
Vendor

FENYING

Pin No.	Definition	Pin No.	Definition
1	Red	9	5V
2	Green	10	GND
3	Blue	11	NC
4	NC	12	DDCSDA
5	GND	13	HSYNC
6	GND	14	VSYNC
7	GND	15	DDCSCS
8	GND		

2.2.5 COM1 (COM1 Port (RS-232/422/485 & RI/5V/12V))

4



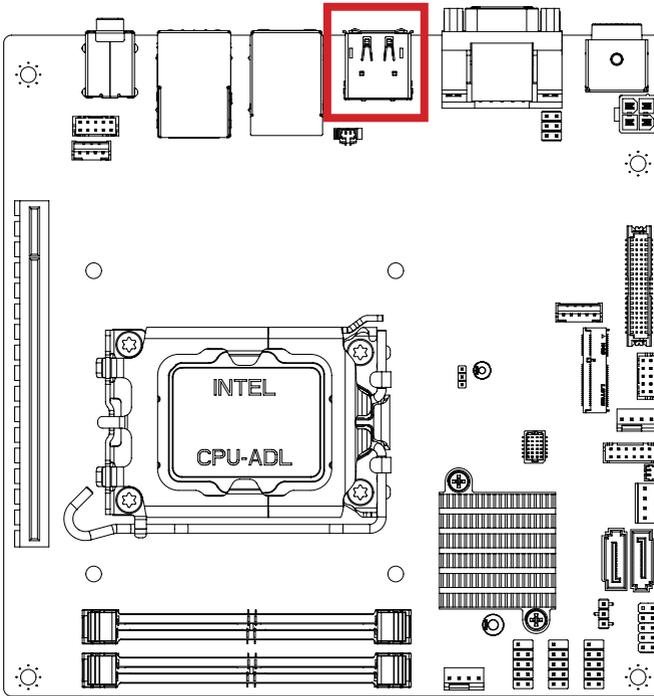
Connector PN	Vendor
DM10151-N5W3-4F	FOXCONN

Note :
For RI/5V/12V jumper setting, please see **P. 48**

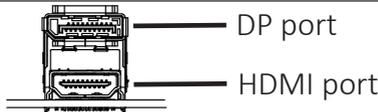
Pin No.	RS-232	RS-422 Full Duplex	RS-485 Half Duplex
1	DCD	TXD-	D-
2	RXD	TXD+	D+
3	TXD	RXD+	-
4	DTR	RXD-	-
5	GND		
6	DSR	-	-
7	RTS	-	-
8	CTS	-	-
9	RI/5V/12V	-	-

2.2.6 HDMI_DP (HDMI + DP Connector)

5 6



HDMI & DP Connector

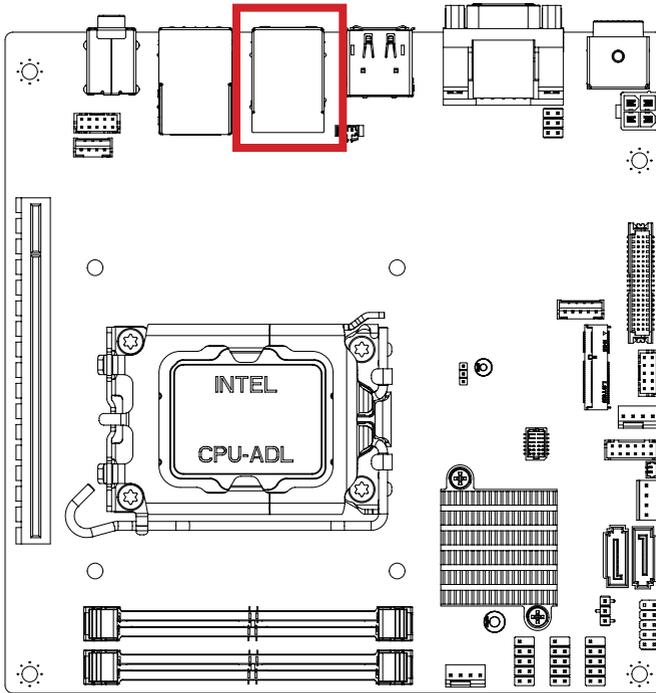


HDMI Connector			
Pin No.	Definition	Pin No.	Definition
1	TX2p	11	GND
2	GND	12	CLKn
3	TX2n	13	NC
4	TX1p	14	NC
5	GND	15	SCL
6	TX1n	16	SDA
7	TX0p	17	GND
8	GND	18	5V
9	TX0n	19	Hot Plug Detect
10	CLKp		

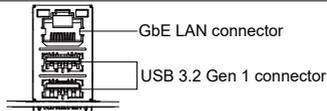
DP Connector			
Pin No.	Definition	Pin No.	Definition
1	TX0p	11	GND
2	GND	12	TX3n
3	TX0n	13	GND
4	TX1p	14	GND
5	GND	15	AUXp
6	TX1n	16	GND
7	TX2p	17	AUXn
8	GND	18	Hot Plug Detect
9	TX2n	19	3.3V
10	TX3p	20	3.3V

2.2.7 USB32_LAN1 (USB + GbE LAN Connector)

7 8



USB & LAN Connector



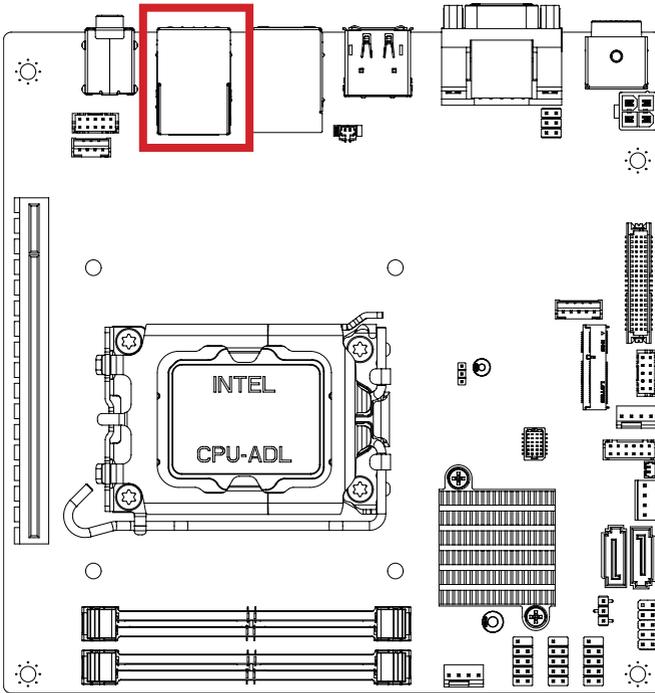
USB Connector			
Pin No.	Definition	Pin No.	Definition
1	5V	10	5V
2	D1n	11	D0n
3	D1p	12	D0p
4	GND	13	GND
5	USB3_RX1n	14	USB3_RX2n
6	USB3_RX1p	15	USB3_RX2p
7	GND	16	GND
8	USB3_TX1n	17	USB3_TX2n
9	USB3_TX1p	18	USB3_TX2p

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

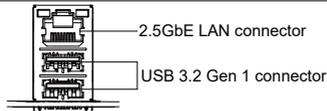
State	Description
Orange On	1Gbps data rate
Green On	100Mbps data rate
Off	10Mbps data rate

2.2.8 USB32_LAN2 (USB + 2.5GbE LAN Connector)

9 10



USB & LAN Connector



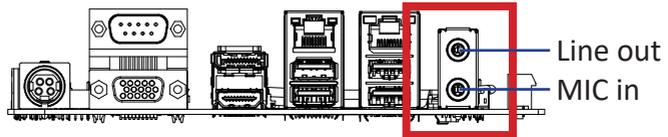
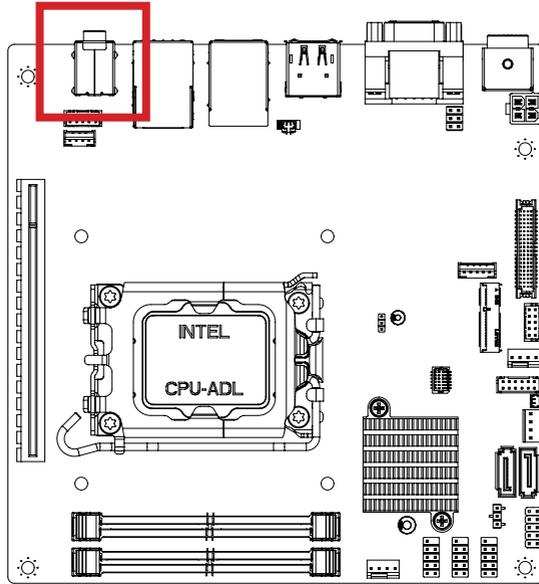
USB Connector			
Pin No.	Definition	Pin No.	Definition
1	5V	10	5V
2	D1n	11	D0n
3	D1p	12	D0p
4	GND	13	GND
5	USB3_RX1n	14	USB3_RX2n
6	USB3_RX1p	15	USB3_RX2p
7	GND	16	GND
8	USB3_TX1n	17	USB3_TX2n
9	USB3_TX1p	18	USB3_TX2p

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

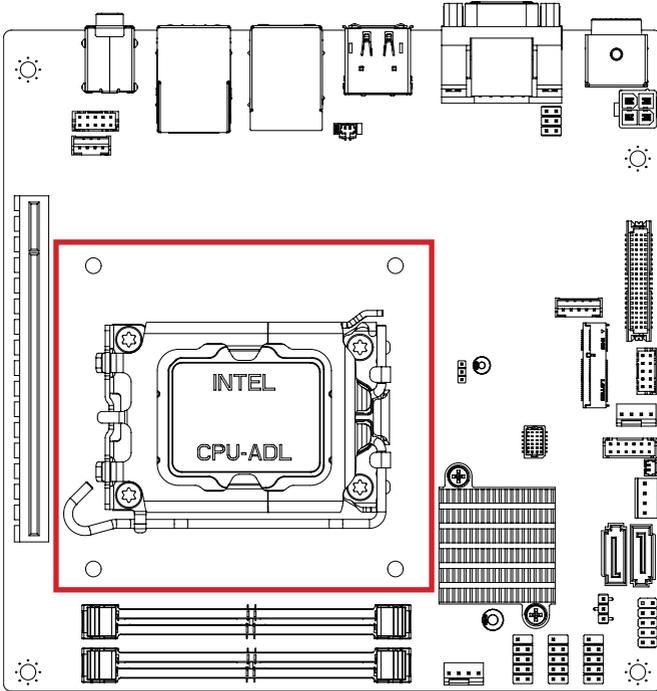
2.2.9 AUDIO (MIC in + Line out connector)

11 12



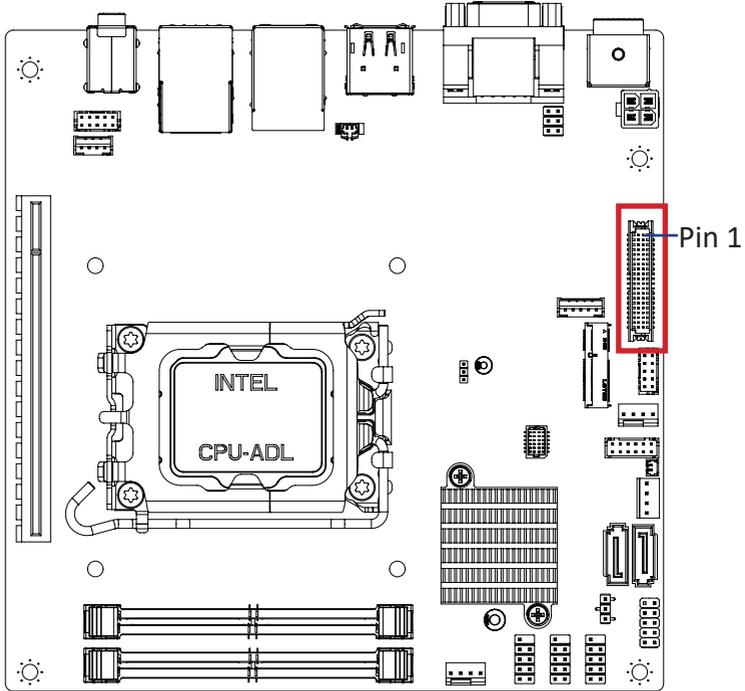
2.2.10 CPU Socket (LGA 1700 Socket)

13

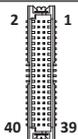


2.2.11 LVDS (LVDS Connector)

14



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	SPECO	25	GND
6	SPEDO	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-

Pin No.	Definition	Pin No.	Definition
16	A2+	36	CLK1-
17	A3-	37	GND
18	A2-	38	GND
19	GND	39	12V
20	GND	40	12V

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

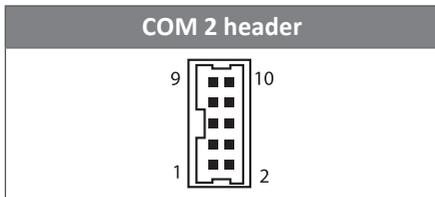
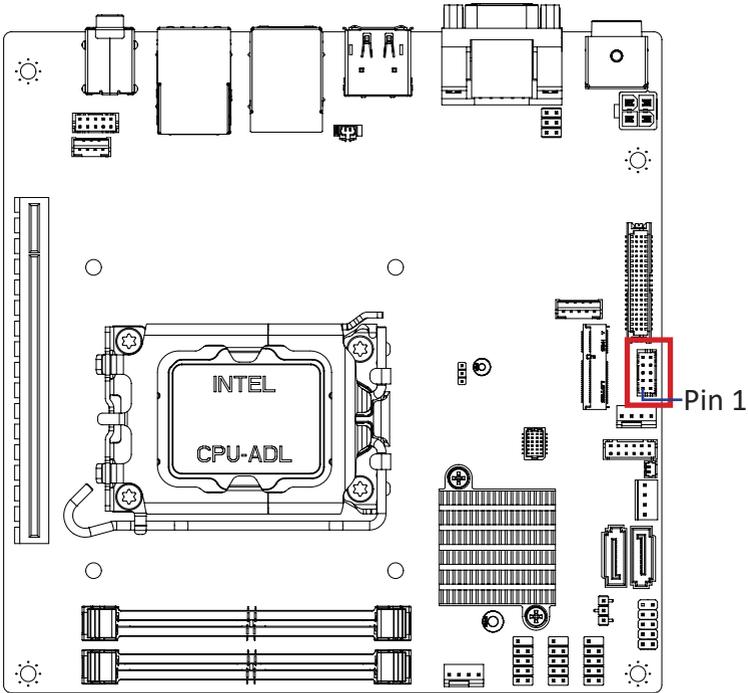
Connector type
2x20pin header, pitch 1.25mm

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.

2.2.12 COM2 (COM2 header (RS-232))

15



Pin No.	Definition
1	RXD
2	DCD
3	DTR
4	TXD
5	DSR
6	GND
7	CTS
8	RTS
9	No connect
10	RI

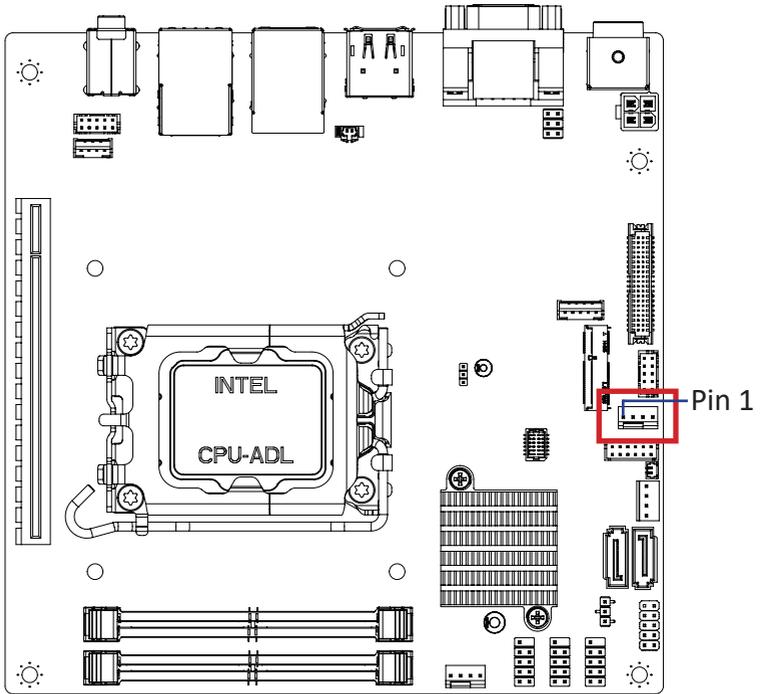
Connector PN	Vendor
725-81-10TW00	PINREX
A2004WV-2X05P46	JOINT-TECH

Connector type

2x5pin header, pitch 2.0mm

2.2.13 SYS_FAN (System Fan Connector)

16



System FAN



Connector PN

744-81-045R11

Vendor

PINREX

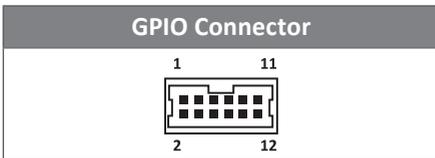
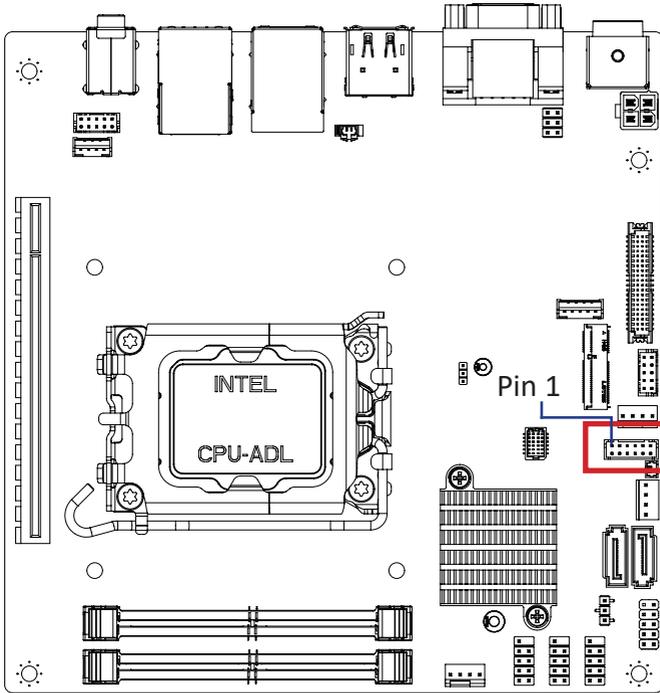
Connector type

1x4pin header, pitch 2.54mm

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

2.2.14 GPIO_CNT (General purpose input/out header)

17



Pin No.	Definition
9	SMBus Clock
10	SMBus DATA
11	5V
12	GND

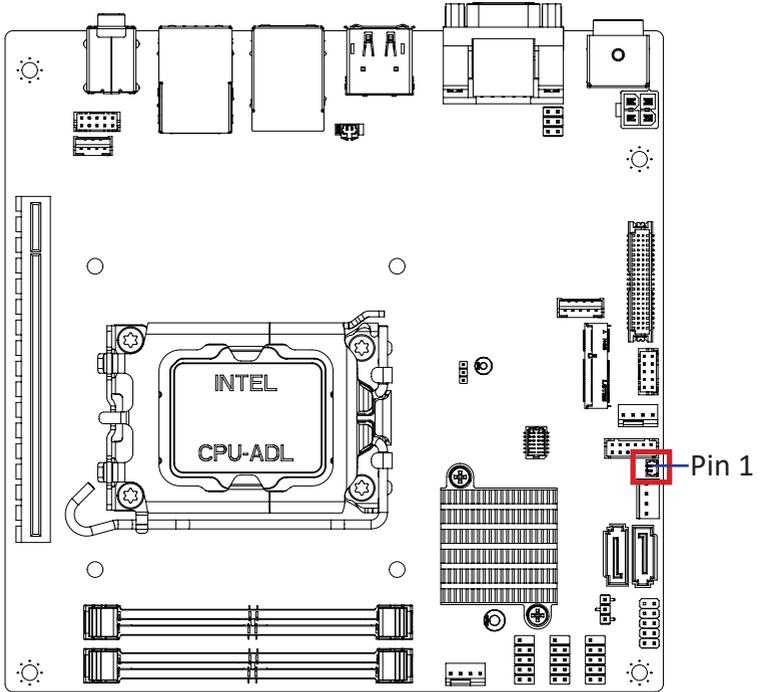
Pin No.	Definition
1	GPIO-output_1
2	GPIO-input_1
3	GPIO-output_2
4	GPIO-input_2
5	GPIO-output_3
6	GPIO-input_3
7	GPIO-output_4
8	GPIO-input_4

Connector PN	Vendor
725-81-12TW00	PINREX
A2004WV-2X06P46	JOINT-TECH

Connector type
2x6pin header, pitch 2.0mm

2.2.15 BUZZER (Buzzer header)

18



Buzzer

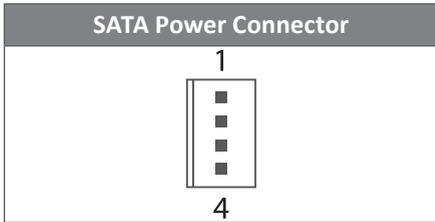
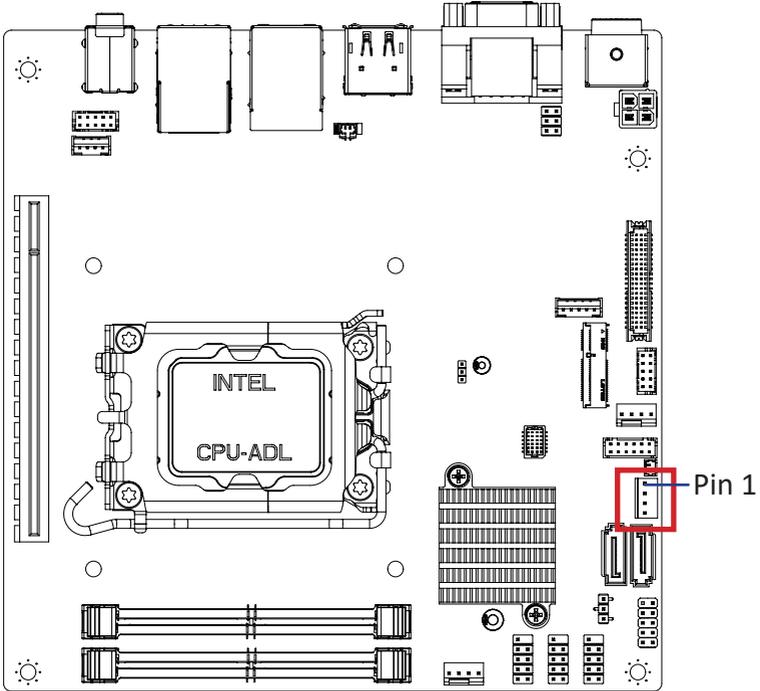

Connector PN	Vendor
712-71-02TW01	PINREX
A1250WV-02P	JOINT-TECH

Pin No.	Definition
1	Buzzer
2	5V

Connector type
1x2pin header, pitch 1.25mm

2.2.16 SATA_PWR (SATA Power Connector)

19



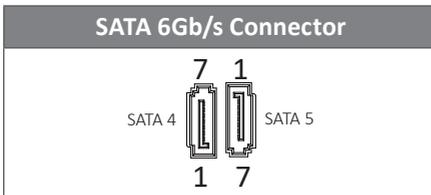
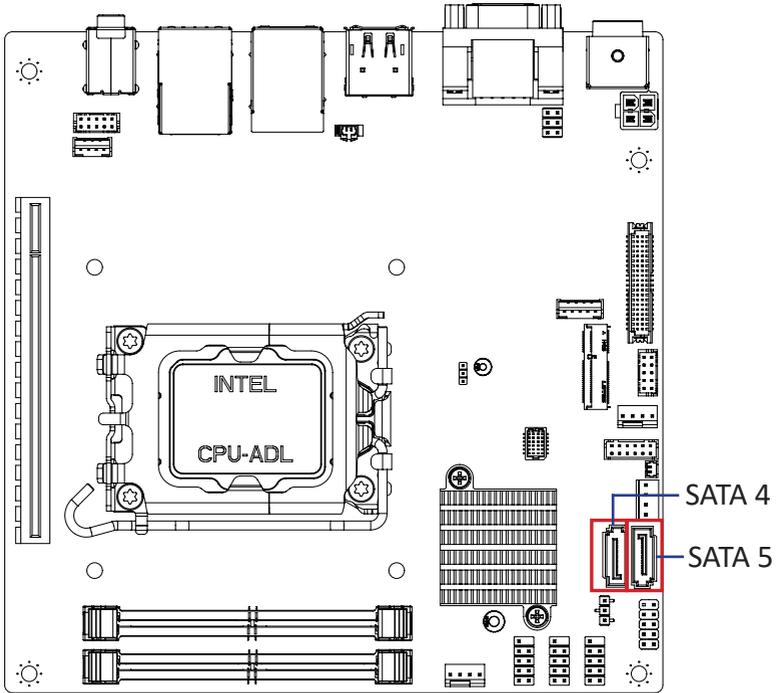
Connector PN	Vendor
743-81-04TW00	PINREX

Connector type
1x4pin header, pitch 2.54mm

Pin No.	Definition
1	5V
2	GND
3	GND
4	5V

2.2.17 SATA4, SATA5 (SATA 6Gb/s Connector)

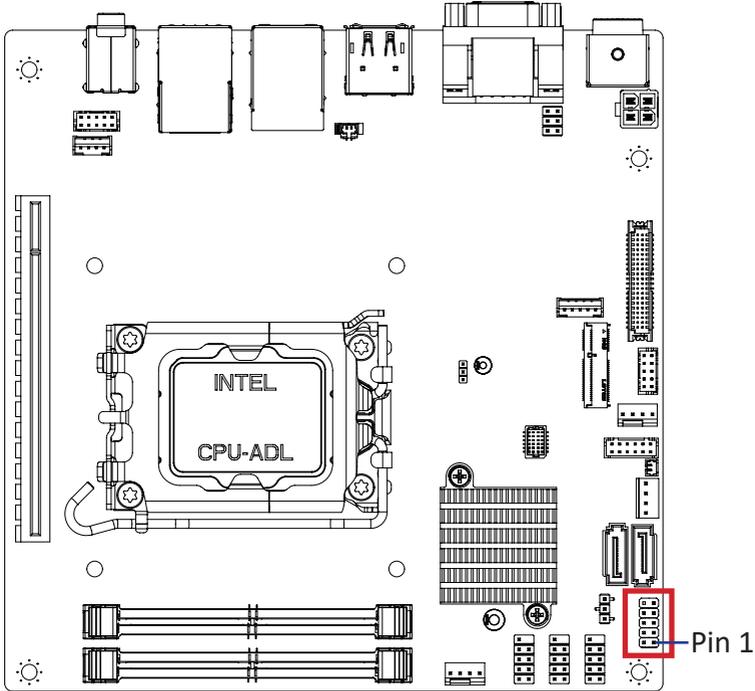
20



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

2.2.18 SYS_PANEL (System Panel header)

21



System Panel Header	
10 9	1
2 1	

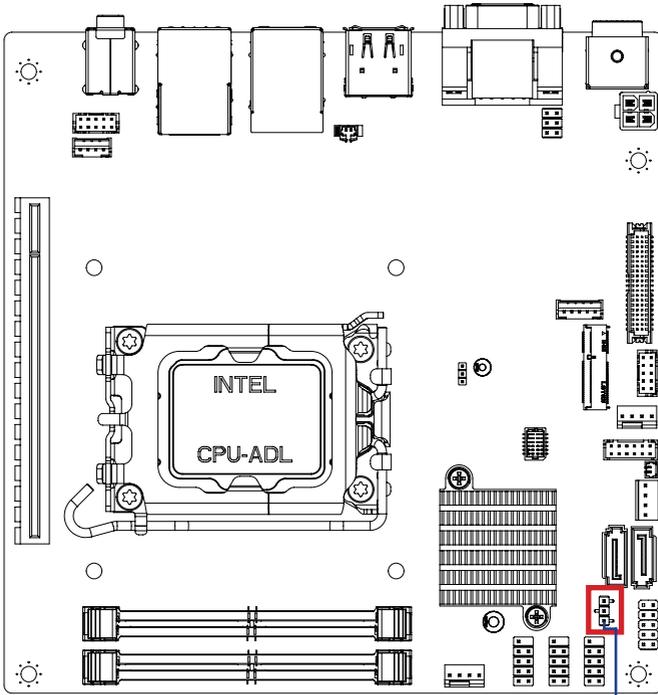
Connector PN	Vendor
210-92-05GW5W	PINREX

Connector type
2x5pin header, pitch 2.54mm

Pin No.	Definition
1	HD-P
2	MPD-P
3	HD-N
4	MPD-N
5	GND
6	POWER-ON
7	Reset
8	GND
9	Reserved
10	NC

2.2.19 CLR_CMOS (Clear CMOS jumper)

22



Pin 1

Clear CMOS Jumper



Connector PN

212-91-03GBE00K

Vendor

PINREX

Connector type

1x3pin header, pitch 2.54mm

Pin No.

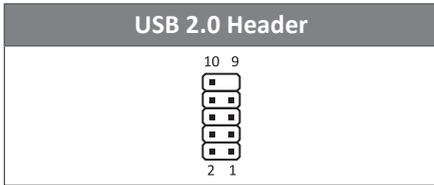
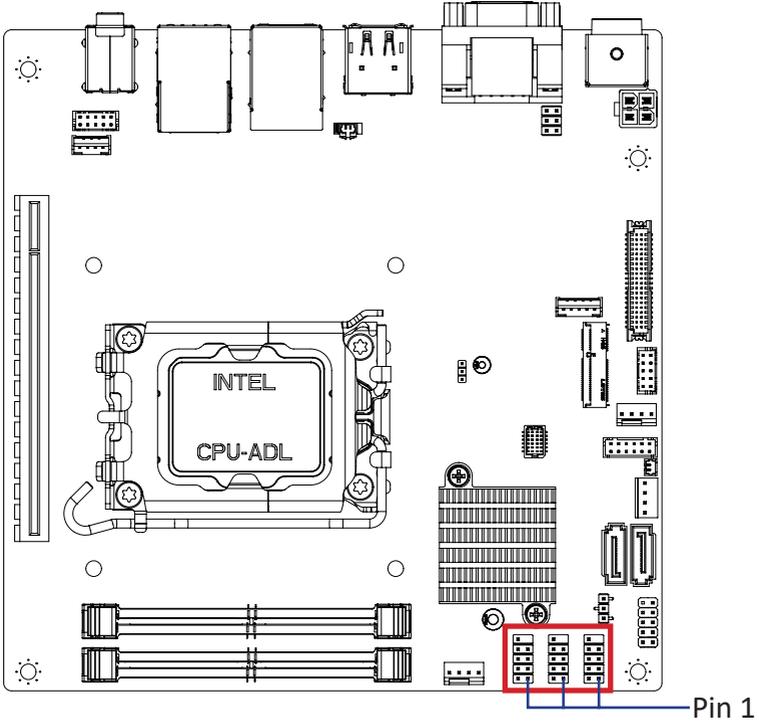
Definition

1	NC
2	GND
3	Clear CMOS

1-2 Close:
Normal Operation (Default setting)
2-3 Close:
Clear CMOS data

2.2.20 FUSB2_1, FUSB2_2, FUSB2_3 (USB 2.0 header)

23



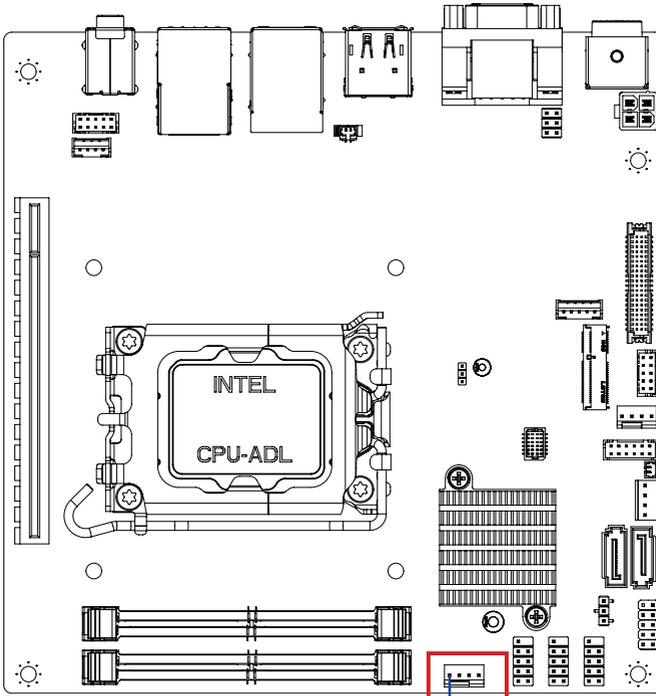
Pin No.	Definition
1	5V
2	5V
3	D2n
4	D1n
5	D2p
6	D1p
7	GND
8	GND
9	No Pin
10	NC

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

Connector type
2x5pin header, pitch 2.54mm

2.2.21 CPU_FAN (CPU FAN Connector)

24



Pin 1

CPU Fan Connector



Connector PN

744-81-045W1Z

Vendor

PINREX

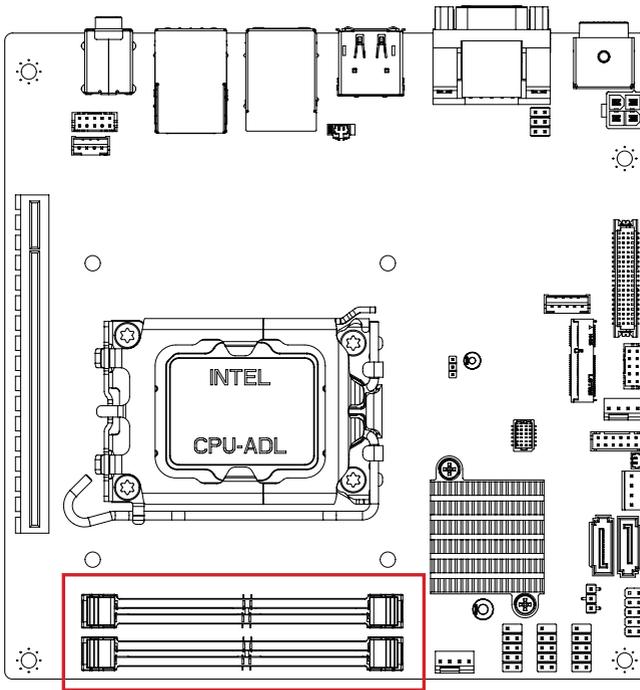
Connector type

1x4pin header, pitch 2.54mm

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

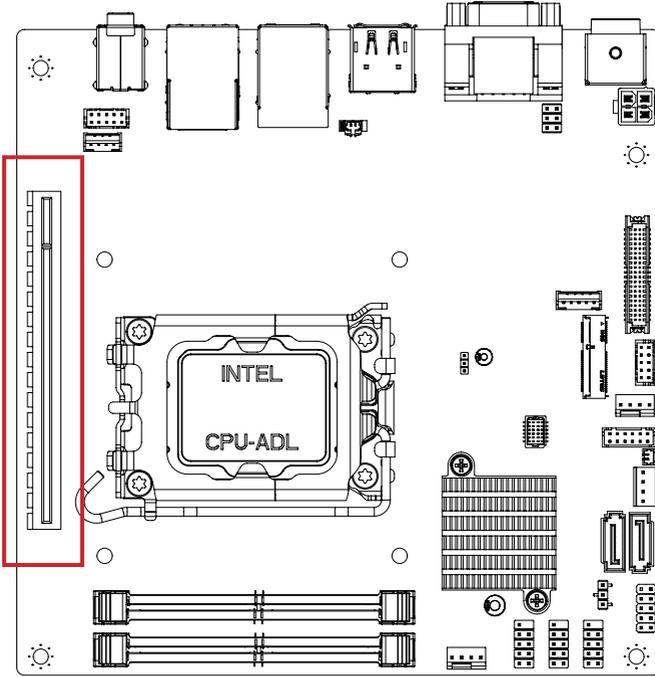
2.2.22 SODIMM1, SODIMM2 (2 x DDR5 SO-DIMM Sockets)

25

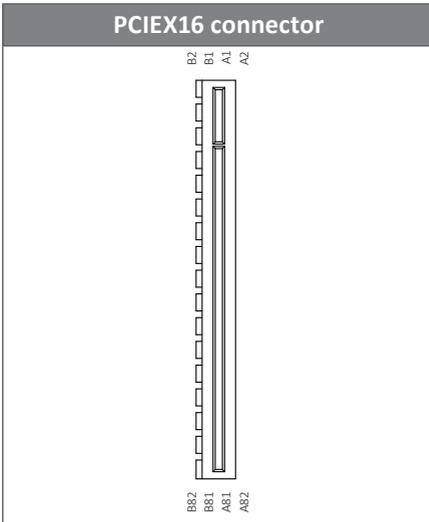


2.2.23 PCIEX16 (1 x PCIe x16 (Gen4 x16 Bus) Slot)

26

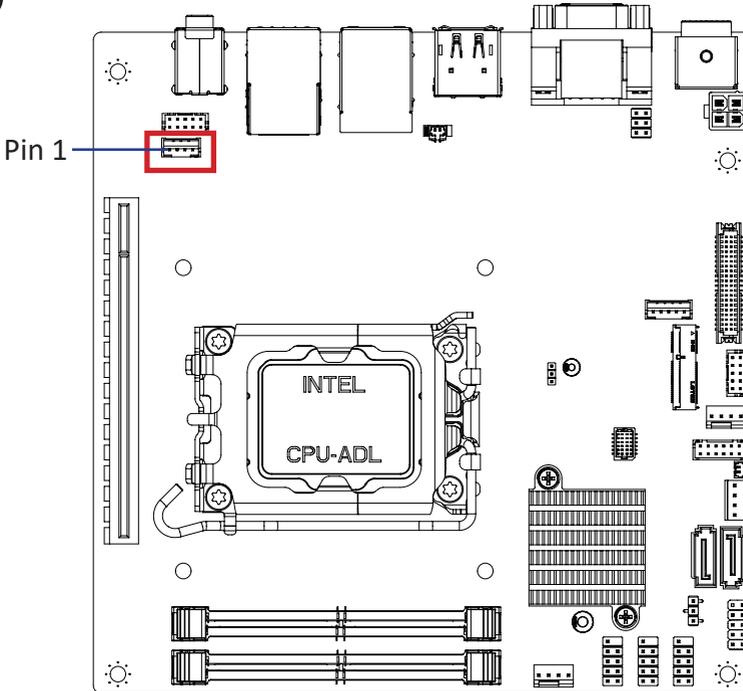


PCIEX16 connector



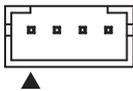
2.2.24 SPKR (Speaker Out Connector)

27



Speaker Out Connector

1



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

Connector PN

721-81-045W00

A2001WV-04P146

Vendor

PINREX

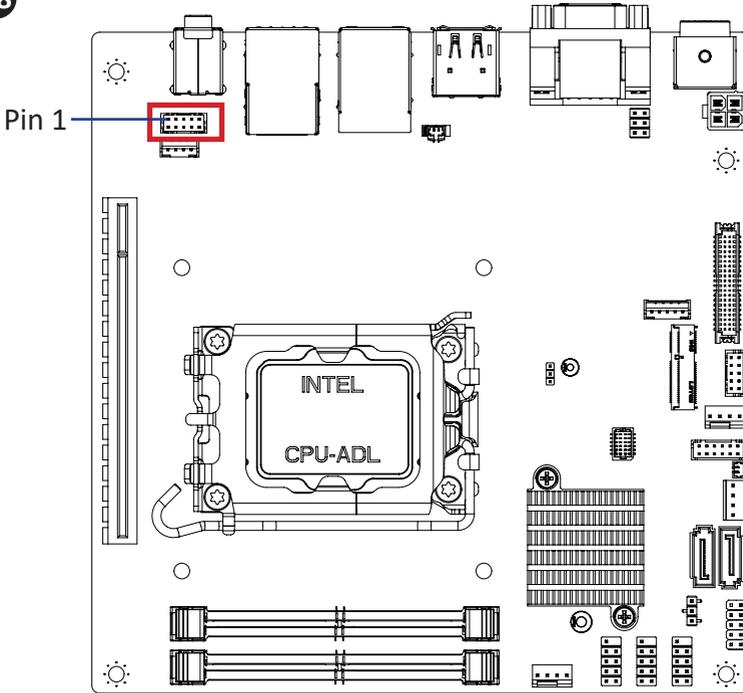
JOINT-TECH

Connector type

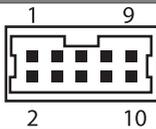
1x4pin header, pitch 2.0mm

2.2.25 FP_AUDIO (Front Panel Audio header)

28



Front Audio Connector



Connector PN

725-81-10TW00

A2004WV-2X05P46

Vendor

PINREX

JOINT-TECH

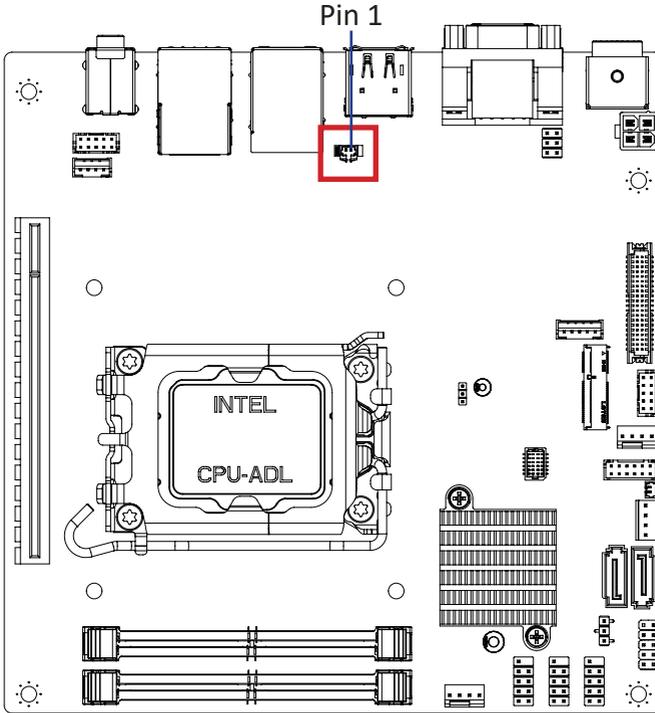
Connector type

2x5pin header, pitch 2.0mm

Pin No.	Definition	Pin No.	Definition
1	MIC-LEFT	6	GND
2	GND	7	JACKSENSE DETECT
3	MIC-RIGHT	8	NC
4	DETECT	9	LINE-LEFT
5	LINE-RIGHT	10	GND

2.2.26 BATTERY (Battery Connector)

29

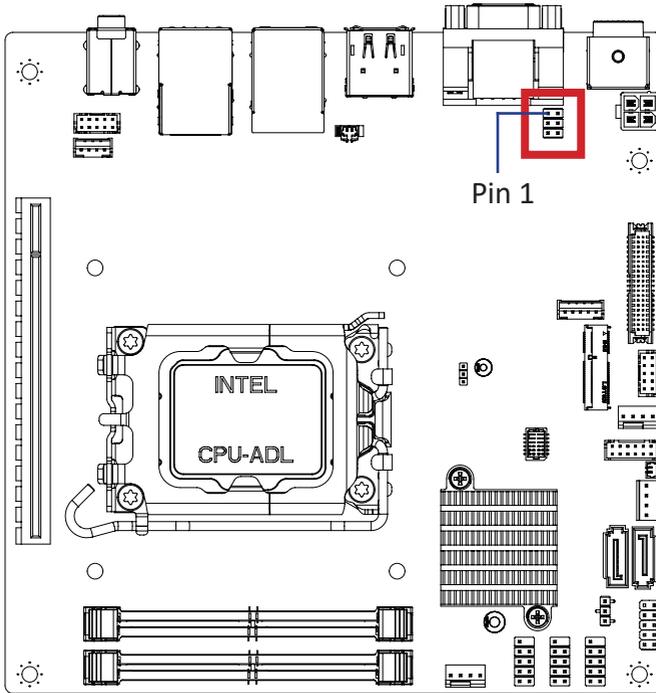


Battery Connector	
Pin No.	Definition
1	3V
2	GND

Connector PN	Vendor
85205-0270L	ACES
A1250WV-S-02PC	JOINT-TECH
Connector type	
1x2pin header, pitch 1.25mm	

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

30



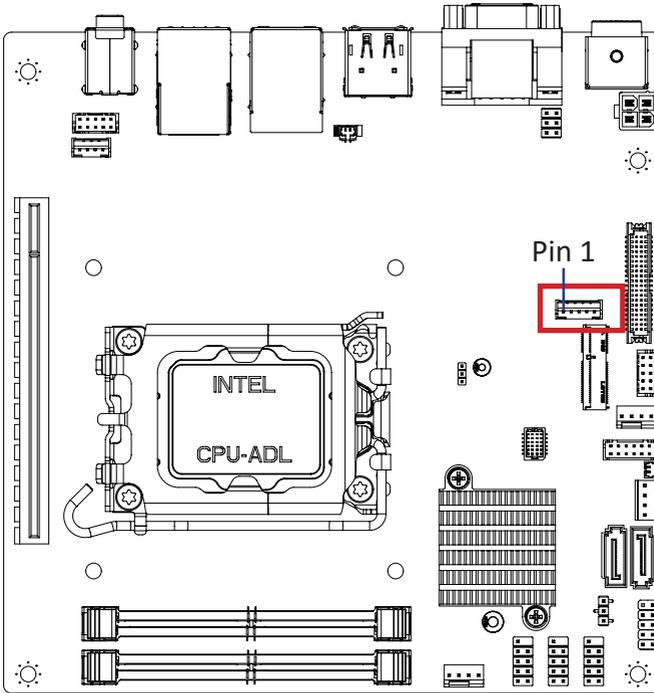
JCOM1 Jumper Select	
	1-2 Close: 5V (Power COM)
	3-4 Close: RI (Stand COM)
	5-6 Close: 12V (Power COM)

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

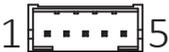
Connector type
2x3pin header, pitch 2.54mm

2.2.28 BKL_CN (Backlight Control Connector)

31



Backlight Control Connector



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

Connector PN

721-81-05TW00

A2001WV-05P146

Vendor

PINREX

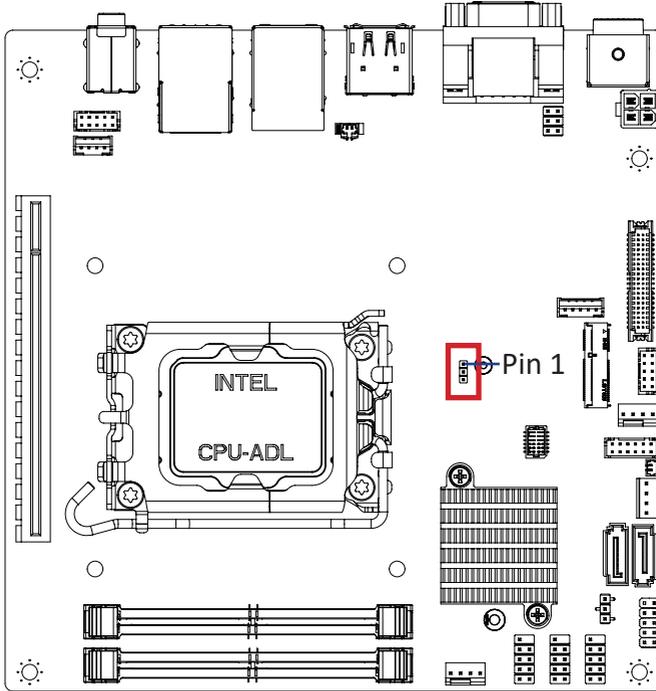
JOINT-TECH

Connector type

1x5pin header, pitch 2.0mm

2.2.29 AT_CN (AT/ATX mode select jumper)

32



AT/ATX mode select jumper



Connector PN

220-96-03GB001K

Vendor

PINREX

Connector type

1x3pin header, pitch 2.0mm

Pin No.	Definition
1	AT MODE
2	Detect
3	ATX MODE

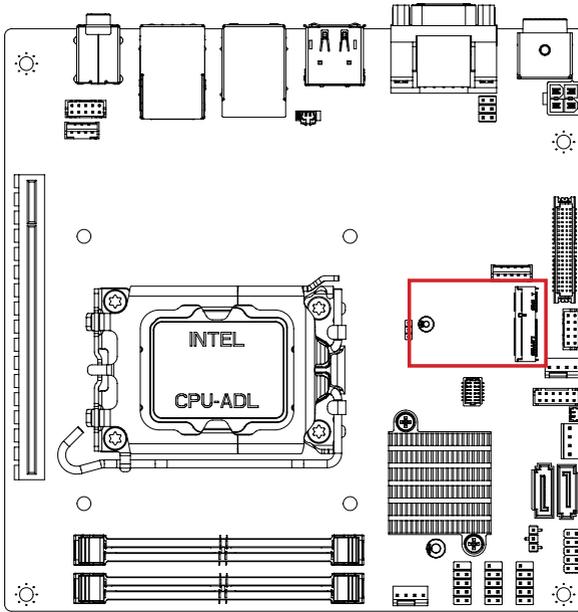
Jumper setting

1-2 Close : AT mode.

2-3 Close : ATX mode.(Default setting)

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

33



M.2 E Key Connector



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	GND	14	NC
15	NC	16	NC
17	NC	18	GND
19	GND	20	NC
21	NC	22	NC
23	NC		

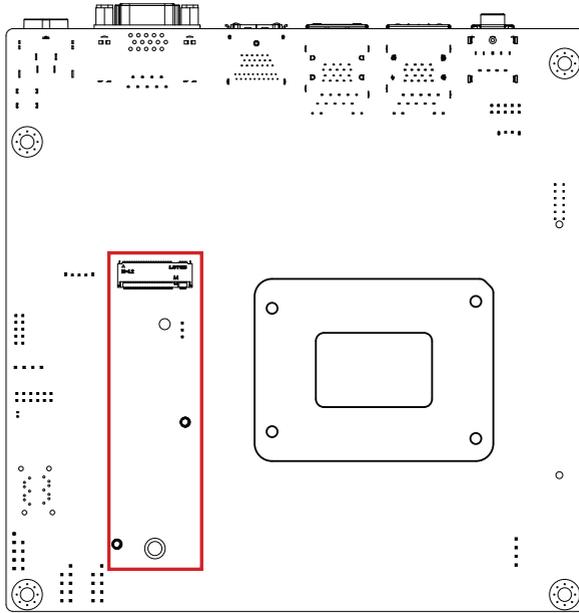
Pin No.	Definition	Pin No.	Definition
33	GND	32	NC
35	PCIE_TXp	34	NC
37	PCIE_TXn	36	NC
39	GND	38	CL_Reset

41	PCIE_RXp	40	CL_DATA
43	PCIE_RXn	42	CL_Clock
45	GND	44	NC
47	PCIE CLOCKp	46	NC
49	PCIE CLOCKn	48	NC
51	GND	50	SUSCLK
53	PCIE Clock Request	52	PCIRST
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

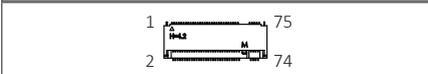
Connector PN	Vendor
2E0BC21-S85BE-7H	FOXCONN
80152-8521	BELLWETHER
APCI0095-P002A	LOTES

2.2.31 M2M (M.2 Slot, 2280 M-Key)

34



M.2 M Key Connector



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	DEVSLP
39	GND	40	NC
41	PCIe0 RXn	42	NC
43	PCIe0 RXp	44	NC
45	GND	46	NC
47	PCIe0 TXn	48	NC
49	PCIe0 TXp	50	PCI Reset
51	GND	52	PCIe Clock Request
53	PCIe Clockn	54	Wakeup
55	PCIe 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
AS0BC21-S40BM-7H	FOXCONN
APCI0073-P001A	LOTES

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

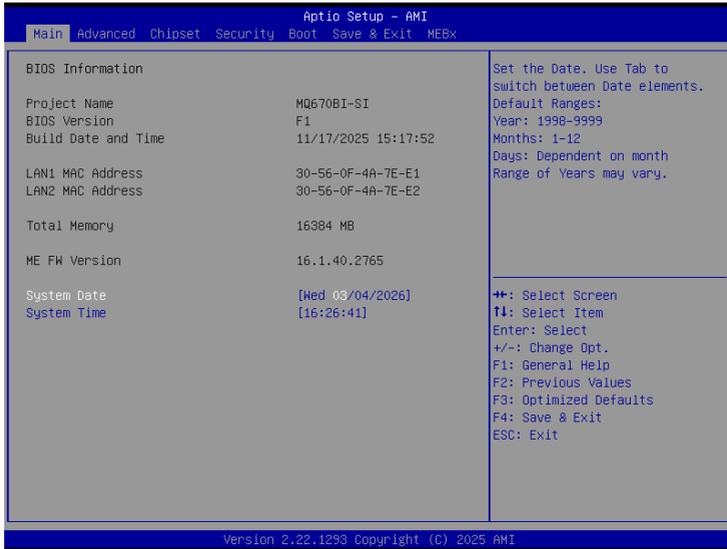
Once the system is power on, press the key as soon as possible to access into BIOS Setup program.

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

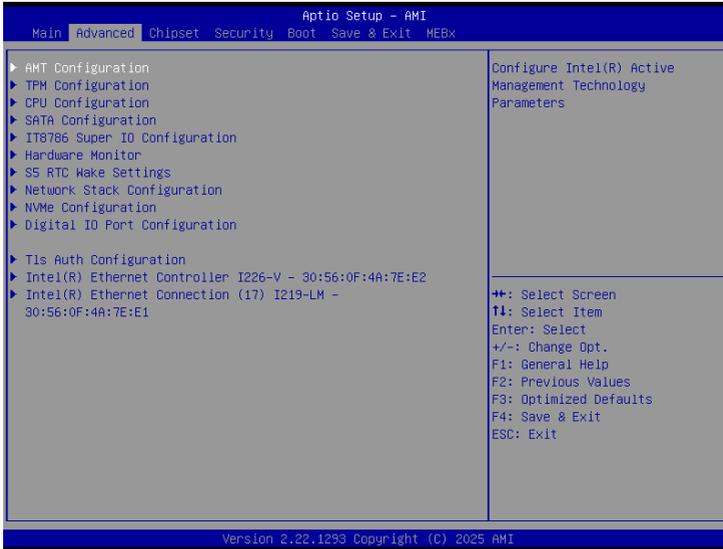
The main menu shows the basic system information. Use arrow keys to move among the items.



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
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.

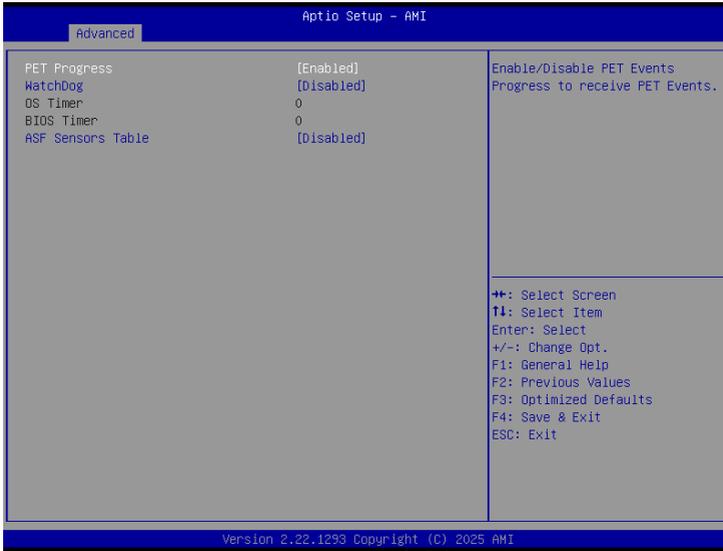


3.3.1 AMT Configuration



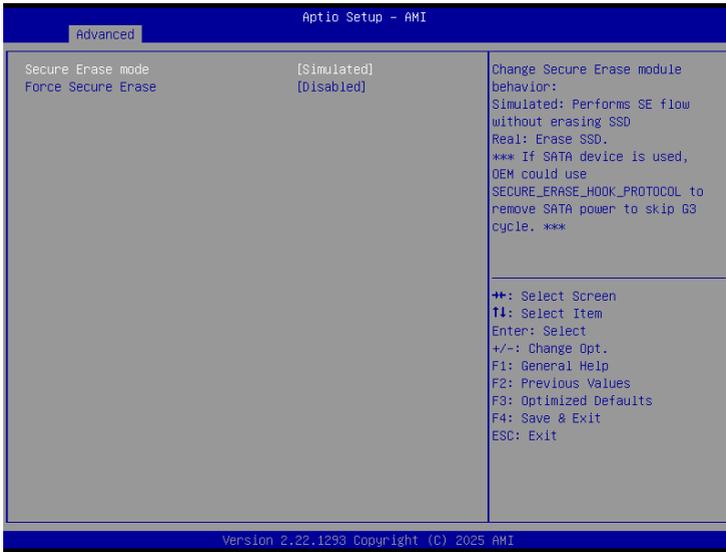
Item	Description
USB Provisioning of AMT	Inserting a specially formatted USB drive into a system, to let the other system remotely control. Disabled : Disables USB Provisioning of AMT Enabled : Enables USB Provisioning of AMT (Default setting)
MAC Pass Through	Disabled : Disables MAC Pass Through function (Default setting) Enabled : Enables MAC Pass Through function
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 Configuration



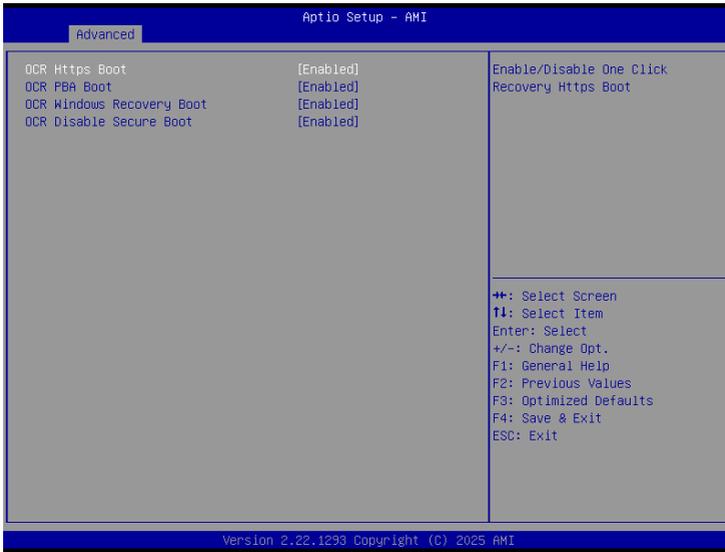
Item	Description
PET Progress	Choose to receive PET events or not Disabled : Disables PET Progress Enabled : Enables PET Progress (Default setting)
WatchDog	Choose to enables watchdog timer or not Disabled : Disables watchdog Timer (Default setting) Enabled : Enables watchdog Timer
OS Timer	Sets OS Watchdog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

Secure Erase Configuration



Item	Description
Secure Erase mode	Choose to enables secure erase mode or not. Simulated : Performs SE flow without erasing SSD (Default setting) Real : Erase SSD
Force Secure Erase	Force Secure Erase on next boot. Disabled : Disables Force Secure Erase (Default setting) Enabled : Enables Force Secure Erase

One Click Recovery (OCR) Configuration



Item	Description
OCR Https Boot	Enabled : Enables One Click Recovery Https Boot. (Default setting) Disabled : Disables One Click Recovery Https Boot.
OCR PBA Boot	Enabled : Enables One Click Recovery PBA Boot. (Default setting) Disabled : Disables One Click Recovery PBA Boot.
OCR Windows Recovery Boot	Enabled : Enables One Click Recovery Windows recovery boot. (Default setting) Disabled : Disables One Click Recovery Windows recovery boot.
OCR Disable Secure Boot	Allows CSME to request Secureboot to be disabled for One Click Recovery. Enabled : Enables One Click Recovery disable Secure Boot function. (Default setting) Disabled : Disables One Click Recovery disable Secure Boot function.

3.3.2 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)

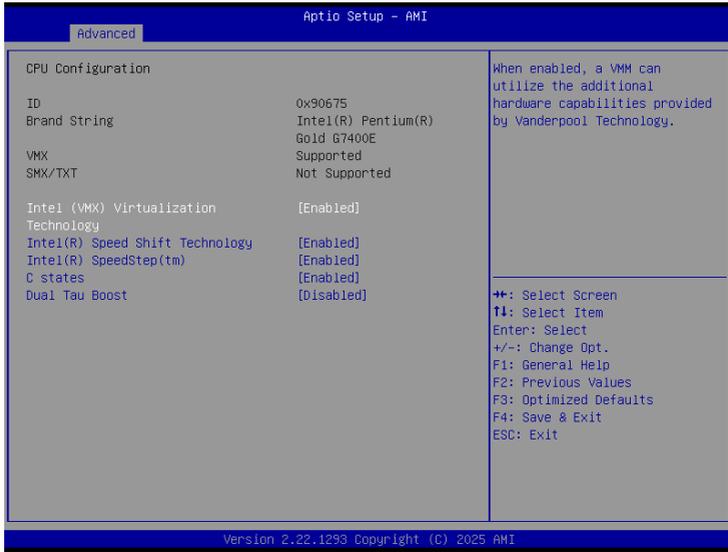
Trusted Computing : Shows TPM information, and TPM module configuration setting.



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

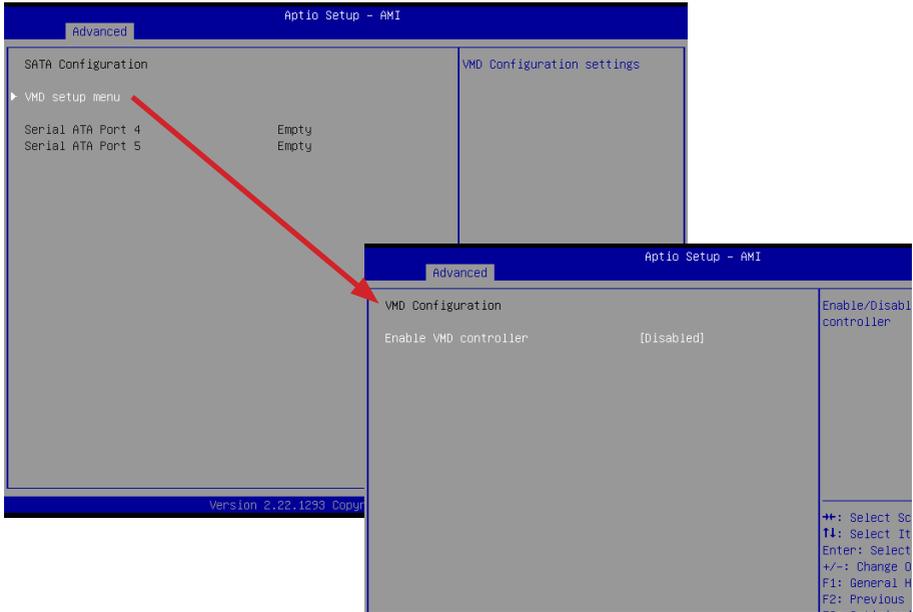
3.3.3 CPU Configuration

This submenu shows detailed CPU informations.



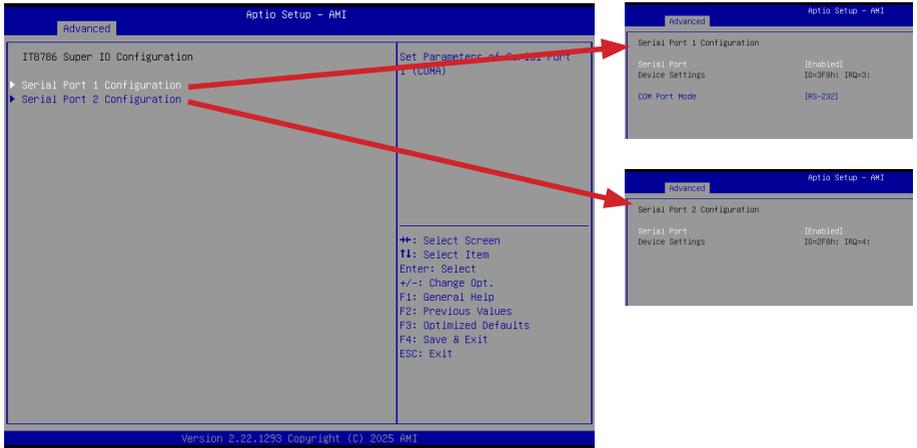
Item	Description
Intel (VMX) Virtualization Technology	Virtualization enhanced by Intel® Virtualization Technology will allow a platform to run multiple operating systems and applications in independent partitions. With virtualization, one computer system can function as multiple virtual systems. Enabled : Enables Intel Virtualization Technology (Default setting) Disabled : Disables Intel Virtualization Technology
Intel(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
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
Dual Tau Boost	To optimize CPU performance. Enabled : Enables Dual Tau Boost function Disabled : Disables Dual Tau Boost function (Default setting)

3.3.4 SATA Configuration



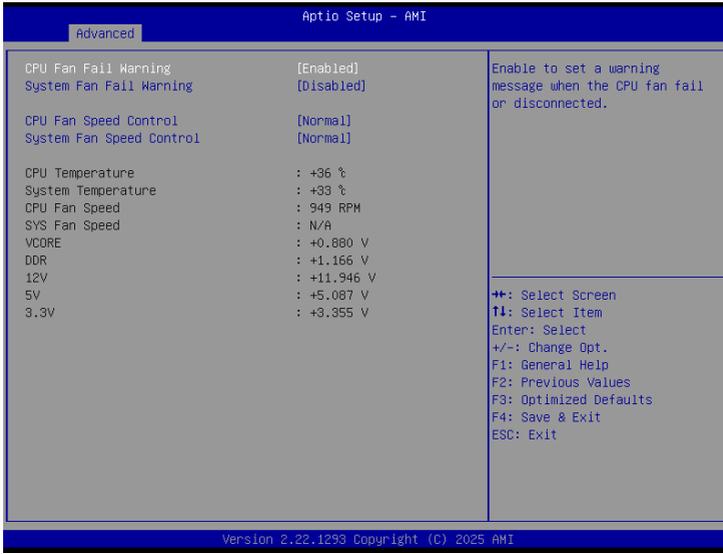
Item	Description
VMD setup menu / Enable VMD controller	Intel VMD feature helps you to control and manage NVMe PCIe SSD. Enabled : Enables Intel VMD feature Disabled : Disables Intel VMD feature (Default setting)
Serial ATA Port 4	shows 2.5" SATA HDD/SSD information
Serial ATA Port 5	shows 2.5" SATA HDD/SSD information

3.3.5 IT8786 Super IO Configuration



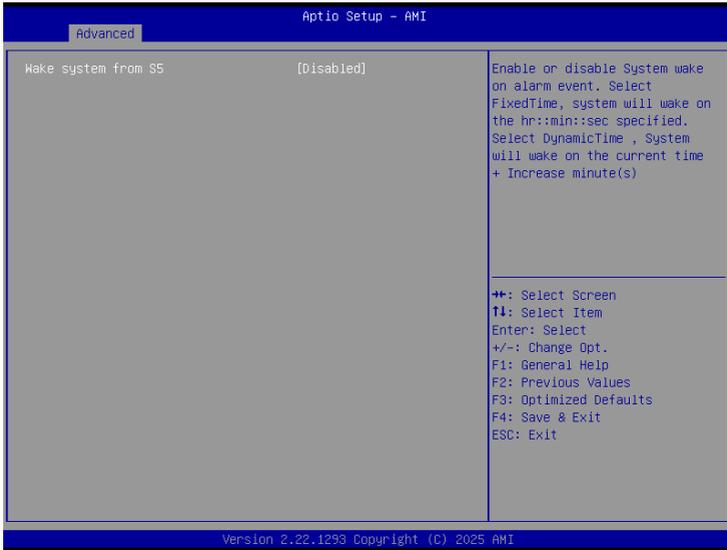
Item	Description
Serial Port 1 Configuration	<p>Press [Enter] to configure advanced items :</p> <p>Serial Port : Enabled : Enables allows you to configure the serial port settings Disabled : if Disabled, displays no configuration for the serial port</p> <p>Device settings : Display the specified Serial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

3.3.6 Hardware Monitor



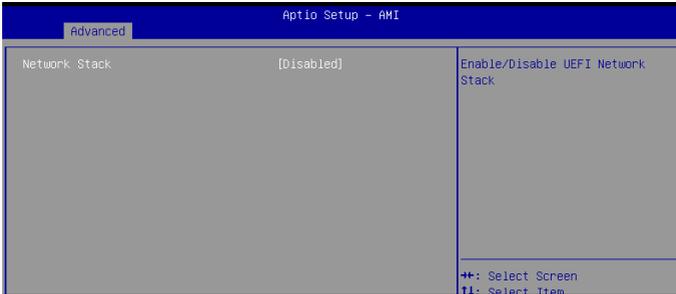
Item	Description
CPU Fan Fail Warning	Enabled : Enables CPU FAN Fail warning alert function (Default setting) Disabled : Disables CPU FAN Fail warning alert function
System Fan Fail Warning	Enabled : Enables System FAN Fail warning alert function Disabled : Disables System FAN Fail warning alert function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

3.3.7 S5 RTC Wake Settings

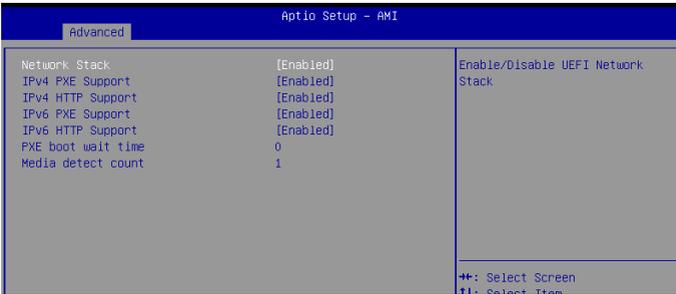


Item	Description
Wake system from S5	Enable or Disable System to wake on a specific time. Disabled : Disables system to wake on a specific time (Default setting) Fixed Time : Enables system to wake on a specific time (Format : hr : min : sec)

3.3.8 Network Stack Configuration



When Network stack is enabled :



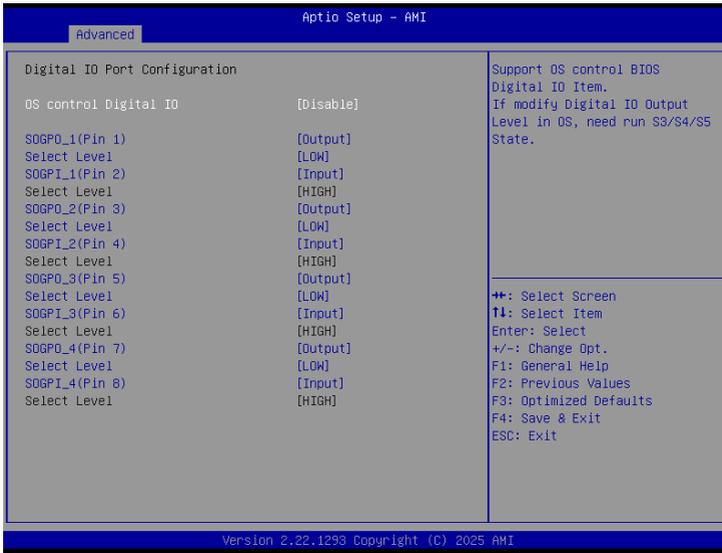
Item	Description
Network Stack	When system is power on, install LAN driver under UEFI mode Disabled : Disables UEFI Network Stack (Default setting) Enabled : Enables UEFI Network Stack
IPv4 PXE Support	When Network stack is enabled : Disabled : Disables IPv4 PXE Support Enabled : Enables IPv4 PXE Support
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.

3.3.9 NVMe Configuration

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

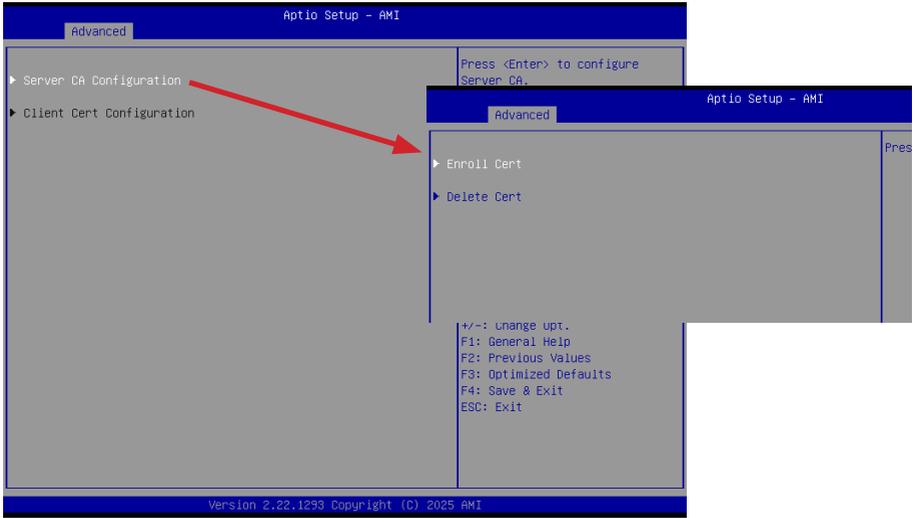


3.3.10 Digital IO Port Configuration



Item	Description
OS control Digital IO	<p>Disabled : If Digital IO Output value/level is modified in OS, they will not be memorized and kept. (Default setting)</p> <p>Enabled : If Digital IO Output value/level is modified in OS, they will be memorized and kept.</p>
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.

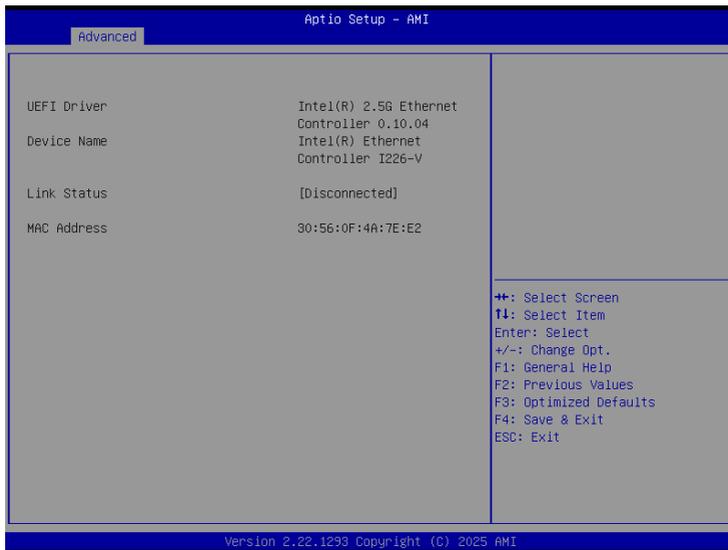
3.3.11 Tls Auth Configuration



Item	Description
Enroll Cert	<p>Press [Enter] to configure advanced items :</p> <p>Server CA Configuration : Enroll Cert : 1. Enroll Cert Using File 2. Cert GUID : Input digit character in 11111111-2222-3333-4444-1234567 890ab format. 3. Commit Changes and Exit 4. Discard Changes and Exit</p>

3.3.12 Intel(R) Ethernet Controller I226-V - 30:56:0F:4A:7E:E2 (MAC address may varied based on different motherboard)

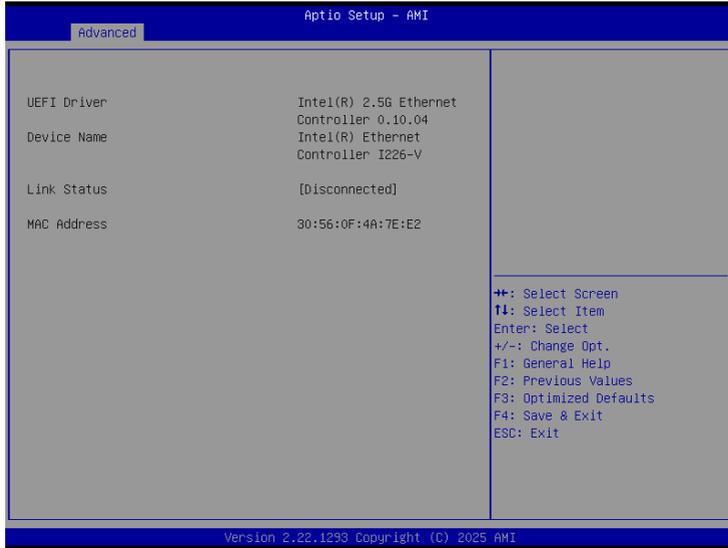
Shows Intel Ethernet controller information



NOTE : MAC address may varied based on different motherboard

3.3.13 Intel(R) Ethernet Connection (17) I219-LM - 30:56:0F:4A:7E:E1 (MAC address may varied based on different motherboard)

Shows Intel Ethernet controller information



NOTE : MAC address may varied based on different motherboard

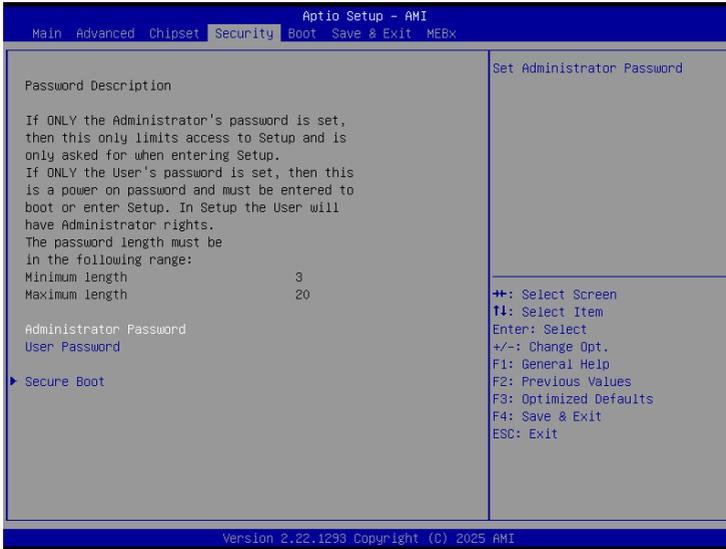
3.4 Chipset



Item	Description
VT-d	Enabled : Enables VT-d function (Default setting) Disabled : Disables VT-d function
DVMT Pre-Allocated	Use DVMT Pre-Allocated to set the amount of system memory which is installed to the integrated graphics processor Option items : 32M , 64M, 128M, 256M (Default setting)
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 LAN1 Onboard LAN2	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.)
ErP Lowest Power State Mode	Enable/Disable power saving function Enabled : Enables ErP Lowest Power State Mode Disabled : Disabled ErP Lowest Power State Mode (Default setting)
Restore AC Power Loss	To set which option the system should returns if a sudden power loss occurred Power off : Do not power on when the power is back (Default setting) Power on : System power on when the power is back Last state : Restore the system to the state before power loss occurs
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
Control Iommu Pre-boot Behavior	Enable/Disable Control Iommu Pre-boot behavior Disabled : Disables IOMMU during boot (Default setting) Enabled : Enables IOMMU during boot
BIOS Lock	Enable/Disable BIOS Lock function Enabled : Enables BIOS Lock function (Default setting) Disabled : Disabled BIOS Lock function

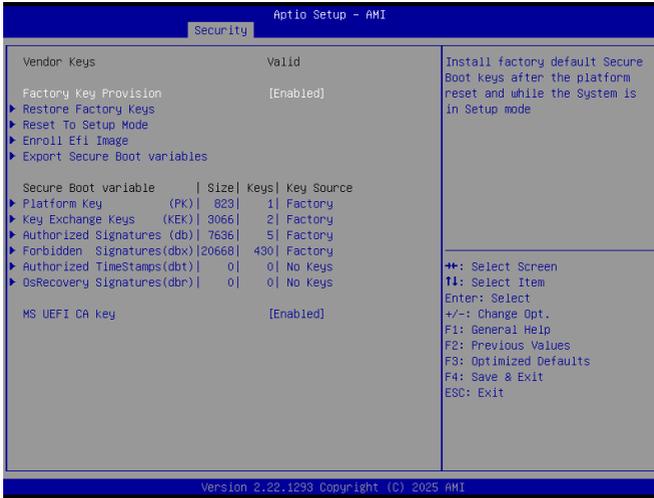
3.5 Security



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 Priorities	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