

uATX-B650A (MB650MM)

Micro-ATX Motherboard

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Packing List

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

Item	Quantity
uATX-B650A (MB650MM)	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

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	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						

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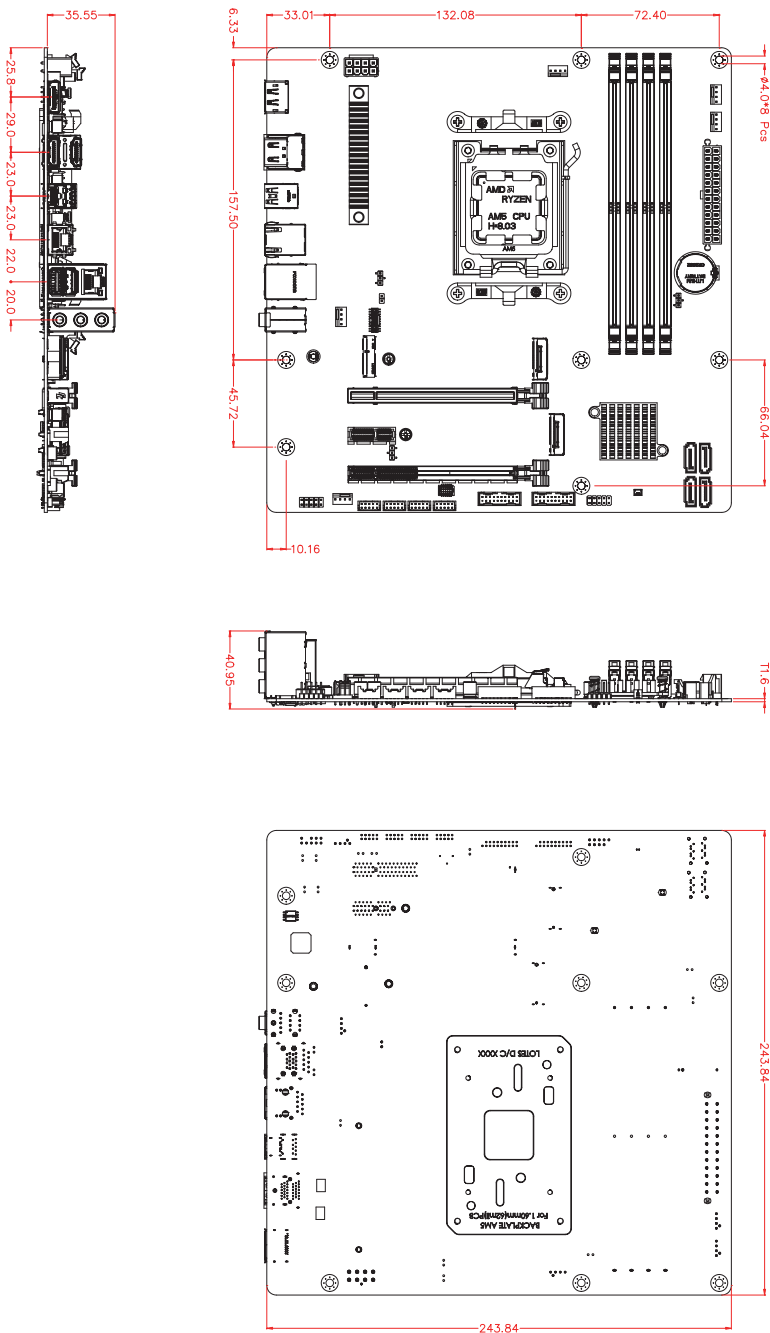
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Chapter 1

Chapter 1 - Product Specifications



1.1 Specifications

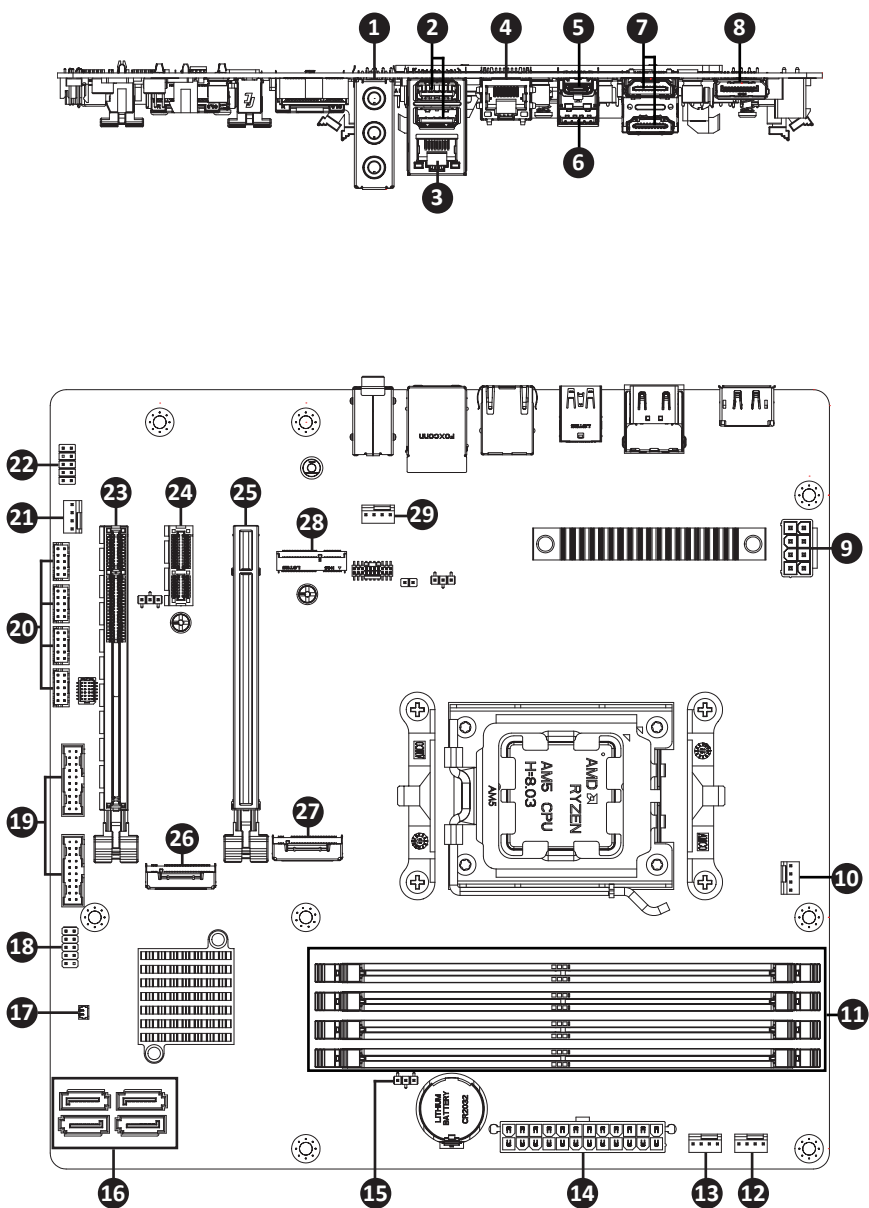
Motherboard	uATX-B650A (MB650MM)
Form Factor	Micro ATX 244W x 244D(mm)
CPU	Support AMD® RYZEN™ Embedded 7000/9000 Series Processors & AMD® EPYC™ Embedded 4005 Series Processors TDP under 105W
Socket	1 x Socket AM5
Chipset	AMD® B650
Memory	4 x DDR5 DIMM sockets, Max. Capacity 128 GB (32 GB single DIMM capacity) of system memory Dual channel memory architecture Support Non-ECC UDIMM memory modules (The CPU and memory configuration may affect the supported memory types, data rate (speed), and number of DRAM modules)
Ethernet	1 x 2.5G LAN Port (Realtek® RTL8125B) 1 x GbE DASH LAN Port (Realtek® RTL8111EPP)
Video	Integrated Graphics Processor - depends on CPU: 2 x HDMI 2.1 port (TMDS), supporting a maximum resolution of 4096x2160 @60Hz 1 x DP 1.2 port, supporting a maximum resolution of 4096x2160 @60Hz (3 independent display outputs)
Audio	Realtek® ALC 897 High Definition audio 7.1-channel
Storage	4 x SATA 6Gb/s Ports
RAID	RAID 0/1/10
Expansion Slots	1 x PCIe x16 (Gen5 x16) 1 x PCIe x16 (Gen4 x4) 1 x PCIe x1 (Gen4 x1) 2 x 2280 M.2 M-Key (PCIe Gen5 x4) 1 x 2230 M.2 E-Key (PCIe x1, USB 2.0)

Motherboard	uATX-B650A (MB650MM)
Internal I/O	1 x 24-pin ATX main power connector 1 x 8-pin ATX 12V power connector 1 x CPU fan header 4 x System fan headers 1 x Front panel header 1 x Front panel audio header 4 x USB 3.2 Gen 1 headers (5 Gbps) 4 x COM headers (RS-232) 1 x Clear CMOS jumper 1 x Buzzer header
Rear I/O	3 x Audio Jacks (Line in, Line out, Mic in) 2 x HDMI 1 x Display Port 2 x RJ45 LAN Ports 3 x USB 3.2 Gen 2x2 Type A (10 Gbps) 1 x USB 3.2 Type C (10 Gbps)
TPM	Onboard TPM 2.0 security chip INFINEON SLB9670VQ2.0
OS Compatibility	Windows 10 IoT Enterprise LTSC 2021, x64 Windows 11 IoT Enterprise, version 24H2 x64 Windows 11 IoT Enterprise LTSC 2024, x64 Windows 11 Enterprise LTSC 2024 Windows 11 IoT Enterprise, version 25H2, x64 Ubuntu 24.04.4 LTS
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

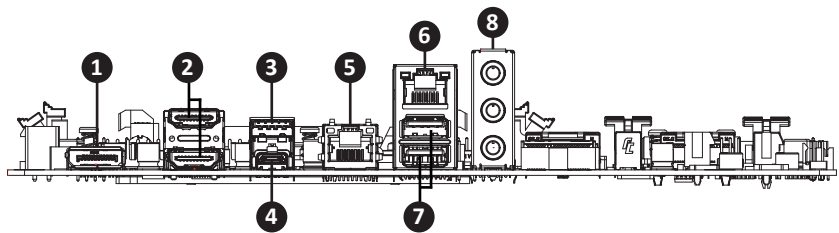
2.1 Jumpers and Connectors



No	Code	Description
1	AUDIO	3 x Audio Jacks (Line in, Line out, Mic in)
2	USB32_LAN1	USB 3.2 Gen 2x2 Type A (10 Gbps) Connector
3		GbE LAN Port
4	LAN2	2.5GbE LAN Port
5	USB32C	USB 3.2 Type C (10 Gbps) Connector
6	USB32	USB 3.2 Gen 2x2 Type A (10 Gbps) Connector
7	HDMI2_1	HDMI Connectors
8	DP	Display Port Connector
9	ATX_12V	8-pin ATX 12V power connector (for CPU)
10	CPU_FAN	CPU Fan connector
11	DIMM_A0, DIMM_A1 DIMM_B0, DIMM_B1	DDR5 DIMM Sockets x 4
12	SYS_FAN4	System Fan 4 connector
13	SYS_FAN2	System Fan 2 connector
14	ATX	24-pin ATX main power connector
15	CLR_CMOS	Clear CMOS jumper
16	SATA0, SATA1 SATA2, SATA3	SATA 6Gb/s Connector x 4
17	BUZZER	buzzer header
18	SYS_PANEL	Front panel header
19	F_USB3_1, F_USB3_2	USB 3.2 Gen 1 headers (5 Gbps)
20	COM1, COM2, COM3, COM4	Serial Port header (RS-232)
21	SYS_FAN3	System Fan 3 connector
22	F_AUDIO	Front panel audio header

No	Code	Description
23	PCIEX4	PCIe x4 Slot
24	PCIEX1	PCIe x1 Slot
25	PCIEX16	PCIe x16 Slot
26	M2M_1	M.2 Slot, 2280 M-key
27	M2M_0	M.2 Slot, 2280 M-key
28	M2E	M.2 Slot, 2230 E-Key
29	SYS_FAN1	System Fan 1 connector

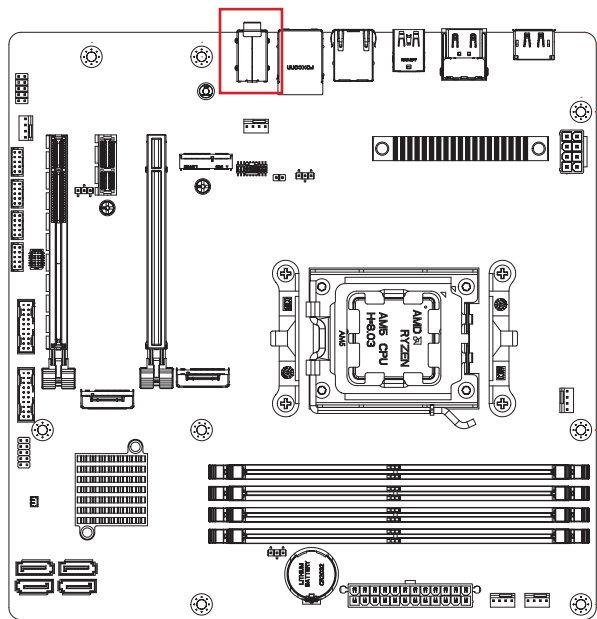
2.2.1 Rear I/O Connector



No	Code	Description
1	DP	Display port
2	HDMI2_1	HDMI Ports
3	USB32	USB 3.2 Gen 2x2 Type A Connector (10 Gbps)
4	USB32C	USB 3.2 Type C Connector (10 Gbps)
5	LAN2	2.5GbE LAN Port
6	USB32_LAN1	GbE LAN Port
7		USB 3.2 Gen 2x2 Type A Connector (10 Gbps)
8	AUDIO	3 x Audio Jacks (Line in, Line out, Mic in)

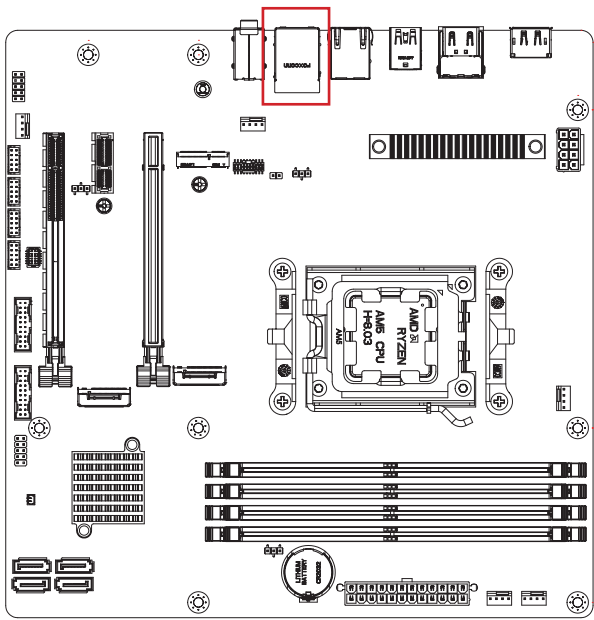
2.2.2 AUDIO (Line in, Line out, Mic in)

1

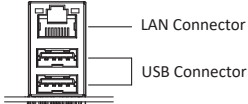


2.2.3 USB32_LAN1 (USB 3.2 Type A + GbE LAN Connector)

2 3



USB & LAN Connector



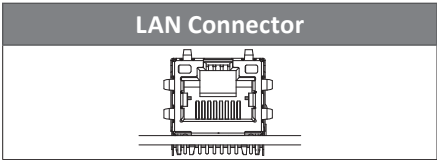
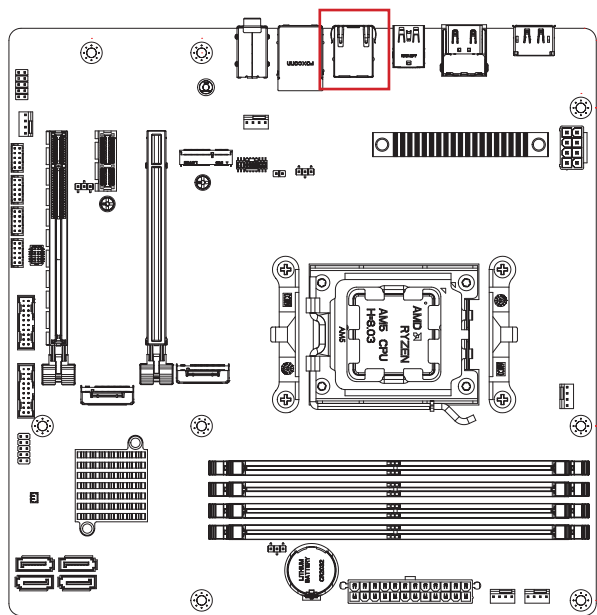
USB Connector			
Pin No.	Definition	Pin No.	Definition
1	5V	10	5V
2	D1n	11	D0n
3	D1p	12	D0p
4	GND	13	GND
5	USB3_RX1n	14	USB3_RX2n
6	USB3_RX1p	15	USB3_RX2p
7	GND	16	GND
8	USB3_TX1n	17	USB3_TX2n
9	USB3_TX1p	18	USB3_TX2p

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		1Gbps data rate	
Green On		100Mbps data rate	
Off		10Mbps data rate	

Micro-ATX Motherboard uATX-B650A (MB650MM)

2.2.4 LAN2 (2.5GbE LAN Connector)

4

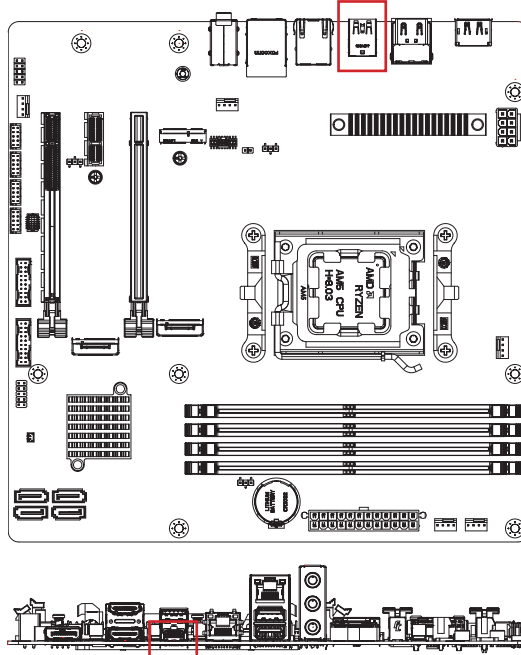


Pin No.	Definition	Pin No.	Definition
1	TX1+	4	TX3+
2	TX1-	5	TX3-
3	TX2+	7	TX4+
6	TX2-	8	TX4-

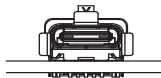
State	Description
Orange On	2.5Gbps data rate
Green On	1Gbps data rate
Off	100M&10Mbps data rate

2.2.5 USB32C (USB 3.2 Type C connector)

5



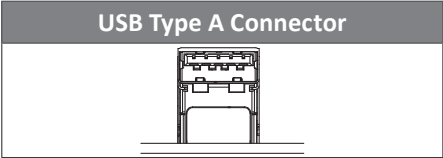
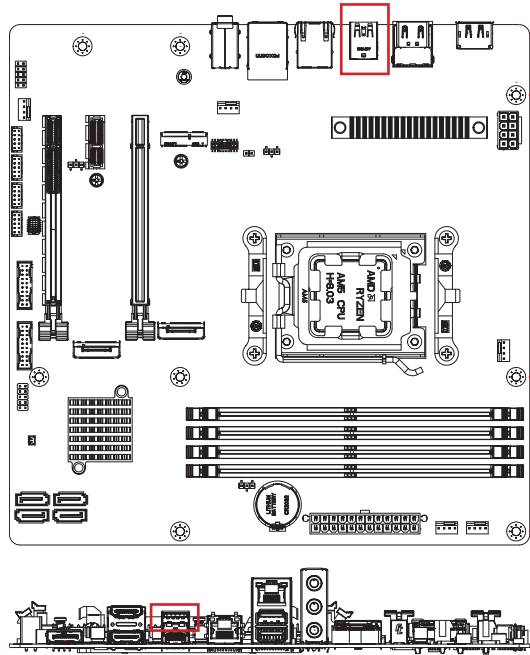
USB Type C Connector



Pin No.	Definition	Pin No.	Definition
A1	GND	B1	GND
A2	TX1+	B2	TX2+
A3	TX1-	B3	TX2-
A4	VBUS	B4	VBUS
A5	CC1	B5	CC2
A6	D+	B6	D+
A7	D-	B7	D-
A8	NC	B8	NC
A9	VBUS	B9	VBUS
A10	RX2-	B10	RX1-
A11	RX2+	B11	RX1+
A12	GND	B12	GND

2.2.6 USB32 (USB 3.2 Type A connector)

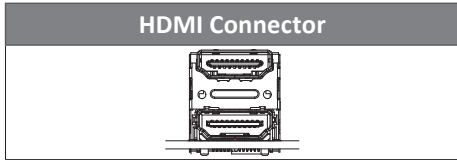
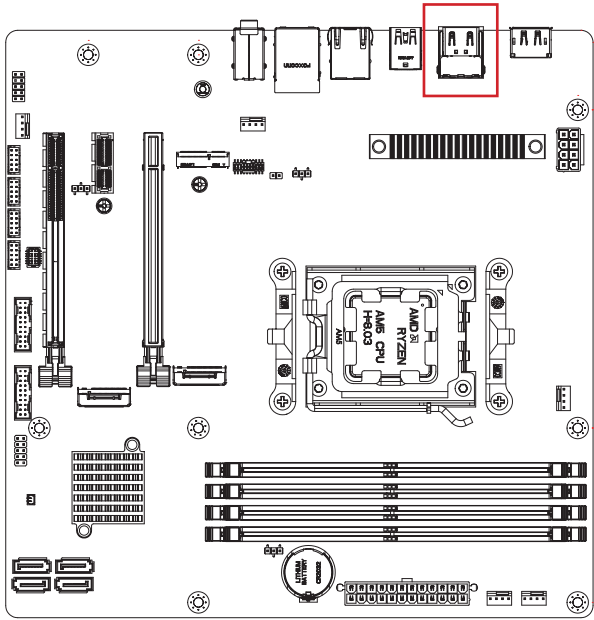
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Pin No.	Definition	Pin No.	Definition
1	5V	10	5V
2	D1n	11	D0n
3	D1p	12	D0p
4	GND	13	GND
5	USB3_RX1n	14	USB3_RX2n
6	USB3_RX1p	15	USB3_RX2p
7	GND	16	GND
8	USB3_TX1n	17	USB3_TX2n
9	USB3_TX1p	18	USB3_TX2p

2.2.7 HDMI2_1 (HDMI Connector)

7

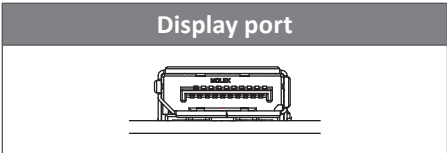
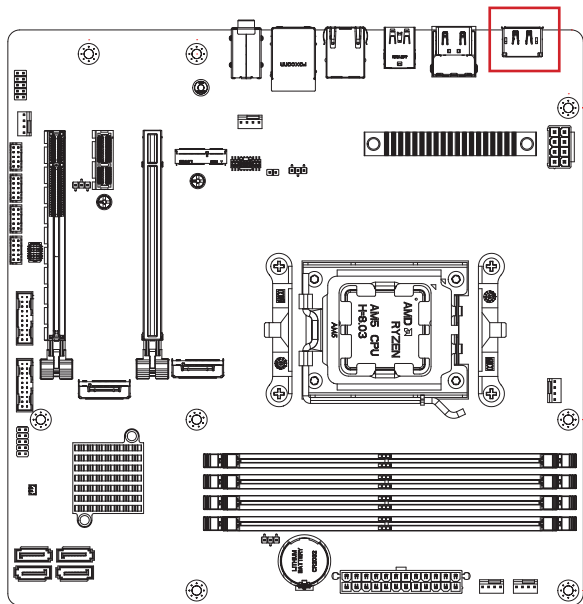


Pin No.	Definition	Pin No.	Definition
1	TX2p	11	GND
2	GND	12	CLKn
3	TX2n	13	NC
4	TX1p	14	NC
5	GND	15	SCL
6	TX1n	16	SDA
7	TX0p	17	GND
8	GND	18	5V
9	TX0n	19	Hot Plug Detect
10	CLKp		

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2.2.8 DP (Display port Connector)

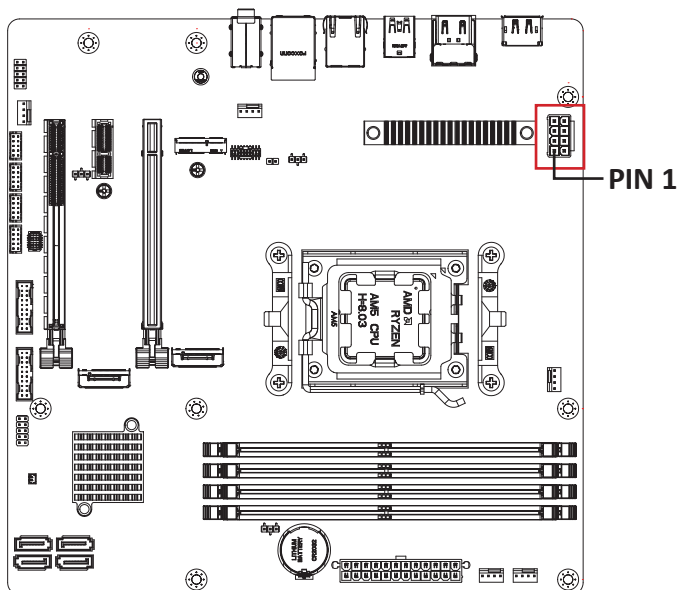
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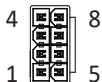
Pin No.	Definition	Pin No.	Definition
1	TX0p	11	GND
2	GND	12	TX3n
3	TX0n	13	GND
4	TX1p	14	GND
5	GND	15	AUXp
6	TX1n	16	GND
7	TX2p	17	AUXn
8	GND	18	Hot Plug Detect
9	TX2n	19	3.3V
10	TX3p	20	3.3V

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

9



ATX 12V Connector



Connector PN

740-96-085B61

Vendor

PINREX

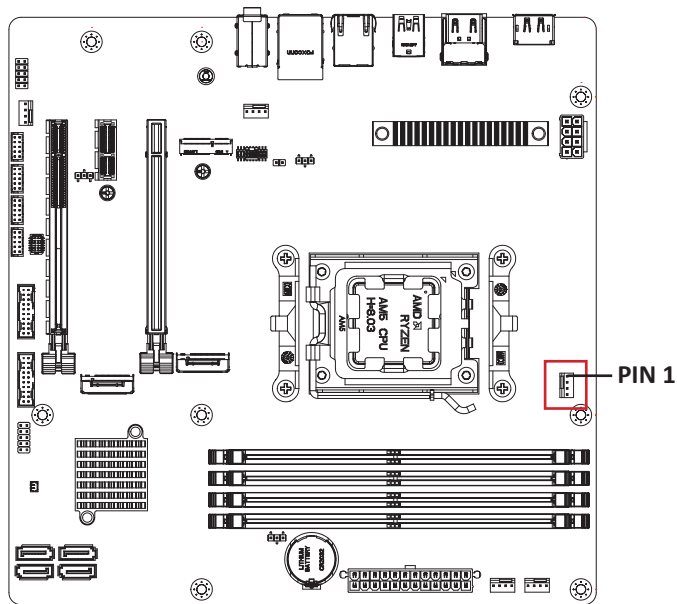
Connector type

2x4pin header, pitch 4.2mm

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

2.2.10 CPU_FAN (CPU Fan connector)

10



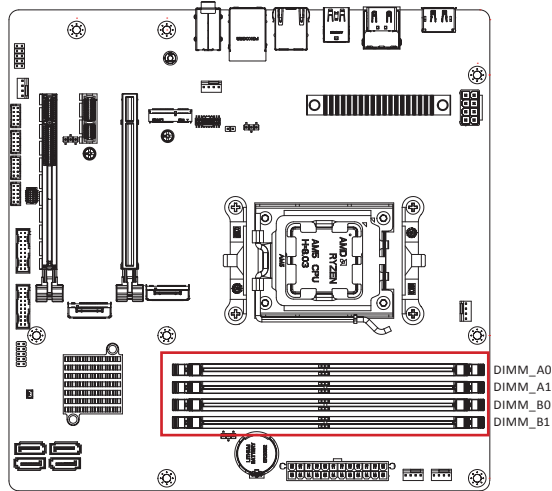
CPU FAN Connector	
	1 4

Connector PN	Vendor
744-91-045W11	PINREX
Connector type	
1x4pin header, pitch 2.54mm	

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

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

11



With AMD Ryzen 7000 Series	DIMM_A0	DIMM_A1	DIMM_B0	DIMM_B1	Max speed
single memory module	—	DS/SS	—	—	5200 MHz
	—	—	—	DS/SS	5200 MHz
2 memory modules	—	DS/SS	—	DS/SS	5200 MHz
4 memory modules	DS/SS	DS/SS	DS/SS	DS/SS	3600 MHz

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

With AMD Ryzen 9000 & 4005 Series	DIMM_A0	DIMM_A1	DIMM_B0	DIMM_B1	Max speed
single memory module	—	DS/SS	—	—	5600 MHz
	—	—	—	DS/SS	5600 MHz
2 memory modules	—	DS/SS	—	DS/SS	5600 MHz
4 memory modules	DS/SS	DS/SS	DS/SS	DS/SS	3600 MHz

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

Dual Channel Memory Configuration

uATX-B650A 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

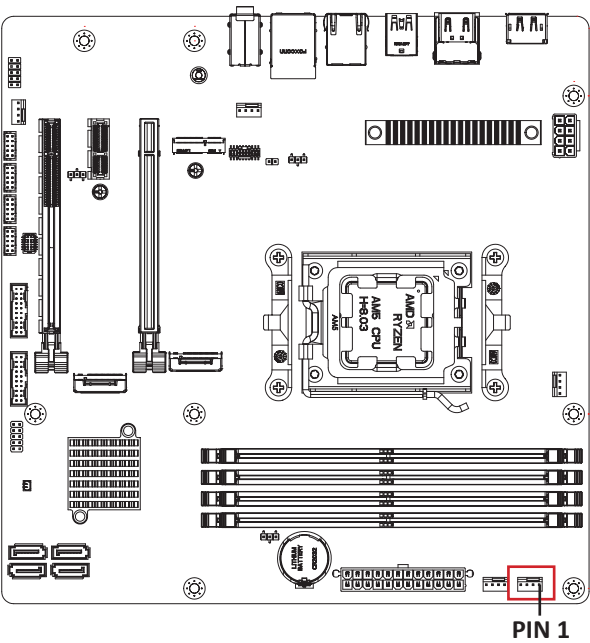
It is recommended to install memory as following orders to enable Dual Channel mode:

	DIMM_A0	DIMM_A1	DIMM_B0	DIMM_B1
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)

2.2.12 SYS_FAN4 (System Fan 4 connector)

12



System Fan Connector

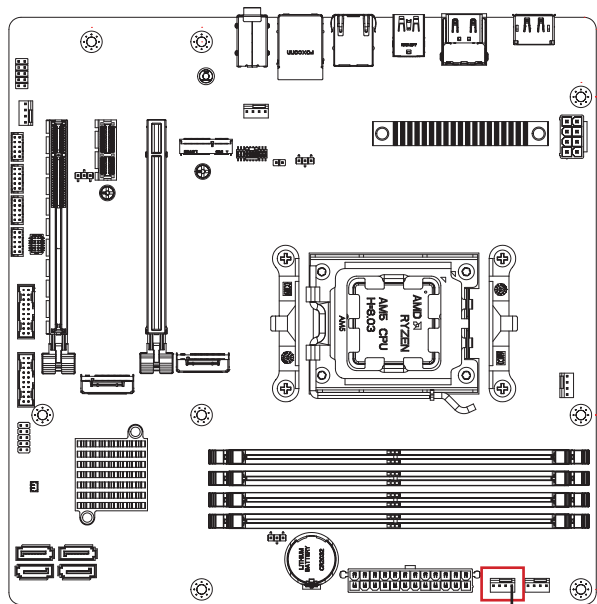
4 1

Connector PN	Vendor
744-91-045W11	PINREX
Connector type	
1x4pin header, pitch 2.54mm	

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

2.2.13 SYS_FAN2 (System Fan 2 connector)

13



PIN 1

System FAN Connector

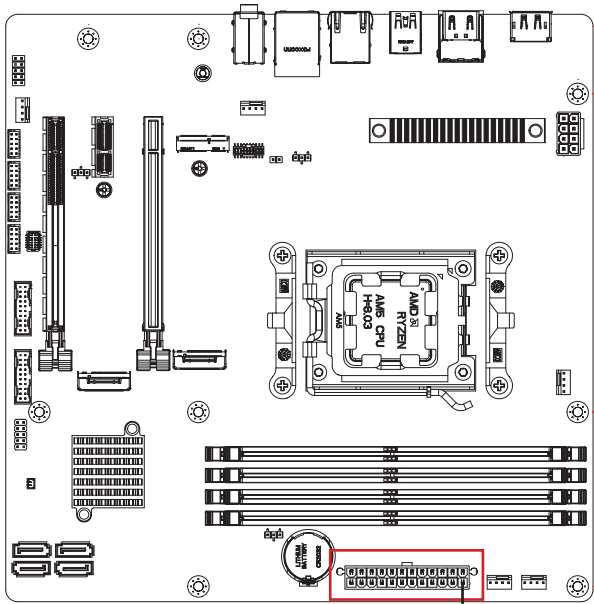
4 1

Connector PN	Vendor
744-91-045W11	PINREX
Connector type	
1x4pin header, pitch 2.54mm	

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

2.2.14 ATX (24-pin ATX main power connector)

14



PIN 1

ATX power connector			
24		13	
12		1	

Connector PN	Vendor
740-81-24TBYA	PINREX
AX10-82-12TB00-6B5	FNH

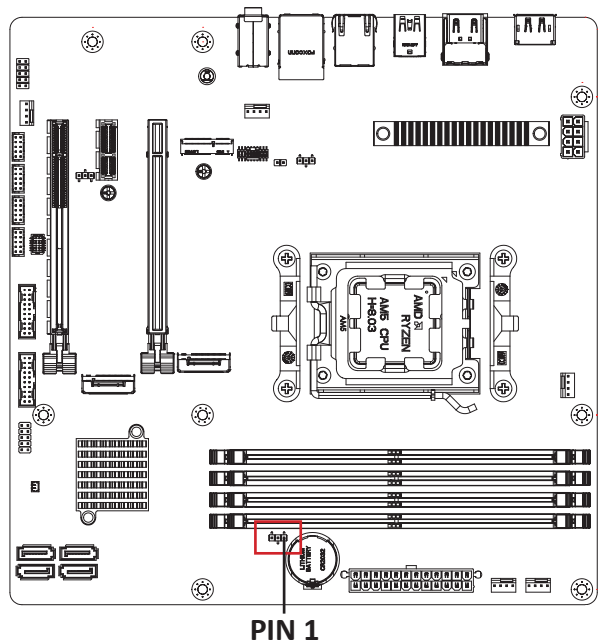
Connector type
2x12pin header, pitch 4.2mm

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

Micro-ATX Motherboard uATX-B650A (MB650MM)

2.2.15 CLR_CMOS (Clear CMOS jumper)

15



Clear CMOS connector


1

Pin No.	Definition
1	NC
2	Clear CMOS
3	GND

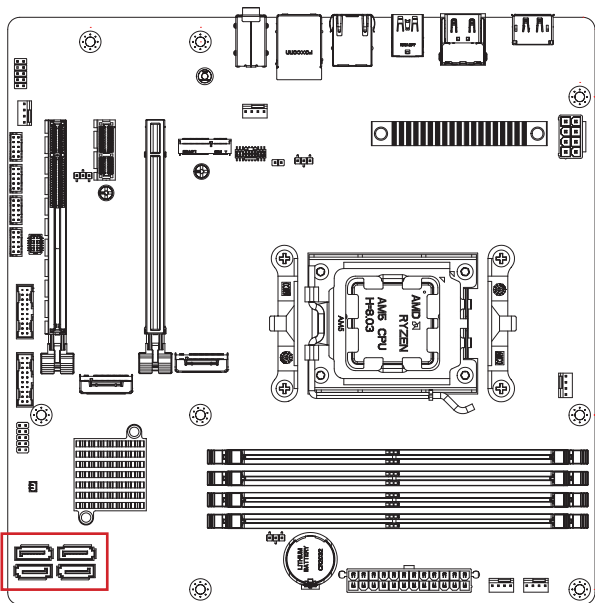
1-2 Close:
Normal Operation (Default setting)
2-3 Close:
Clear CMOS data

Connector PN	Vendor
212-91-03GBE00K	PINREX

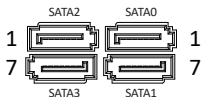
Connector type
1x3pin header, pitch 2.54mm

2.2.16 SATA0, SATA1, SATA2, SATA3 (SATA 6Gb/s Connector)

16



SATA 6Gb/s Connector



Connector PN

WATM-07ABNB2BAUW3
770-83-07SW19

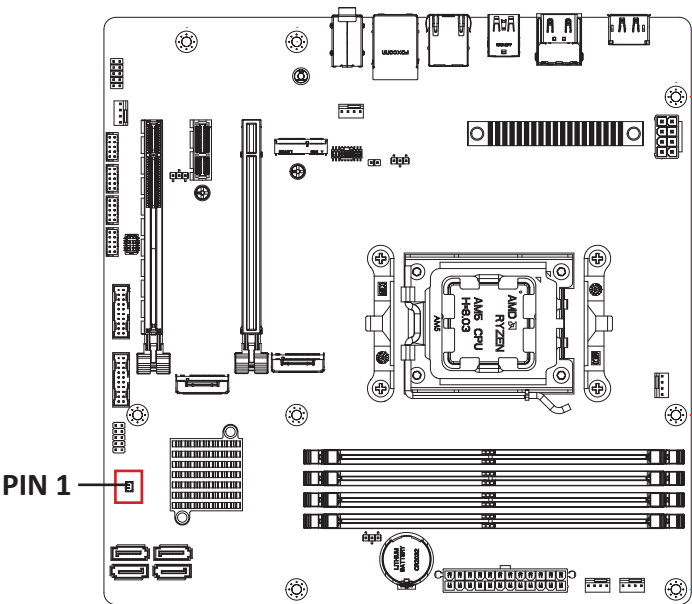
Vendor

WINWIN
PINREX

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

2.2.17 BUZZER (buzzer header)

17



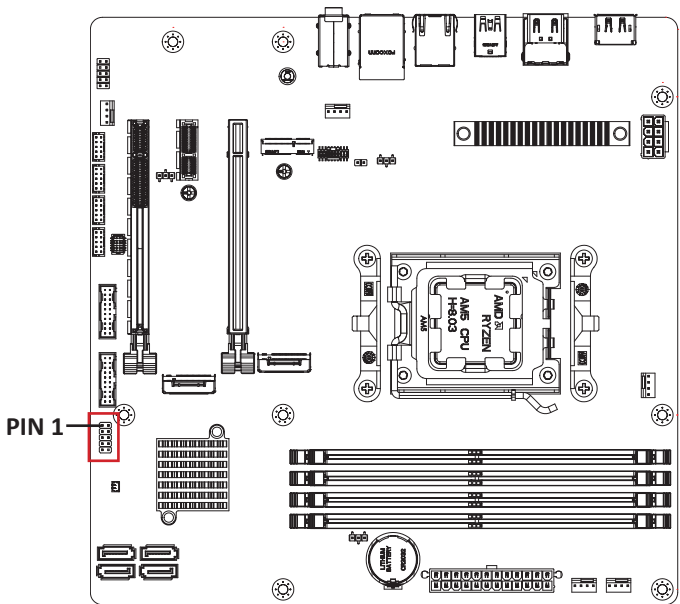
Buzzer	
Pin No.	Definition
1	Buzzer
2	5V

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

Connector type
1x2pin header, pitch 1.25mm

2.2.18 SYS_PANEL (Front panel header)

18



Front panel header



Connector PN

210-92-05GW5W

Vendor

PINREX

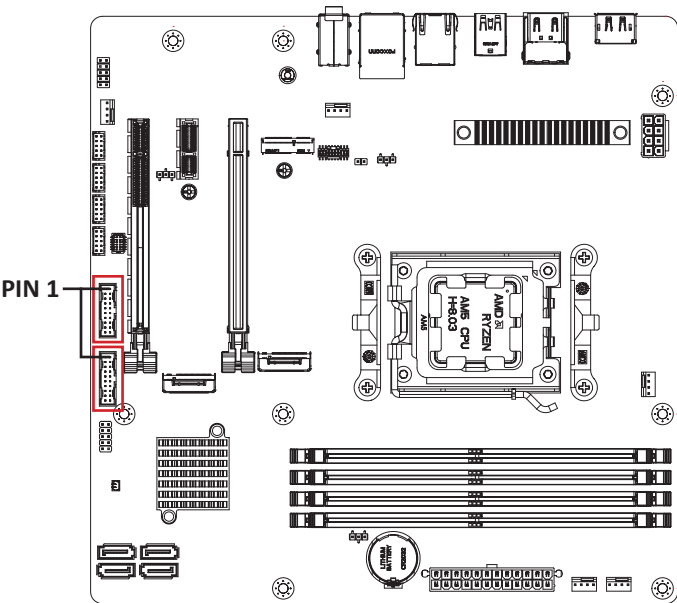
Connector type

2x5pin header, pitch 2.54mm

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

2.2.19 F_USB3_1, F_USB3_2 (USB 3.2 Gen 1 headers)

19

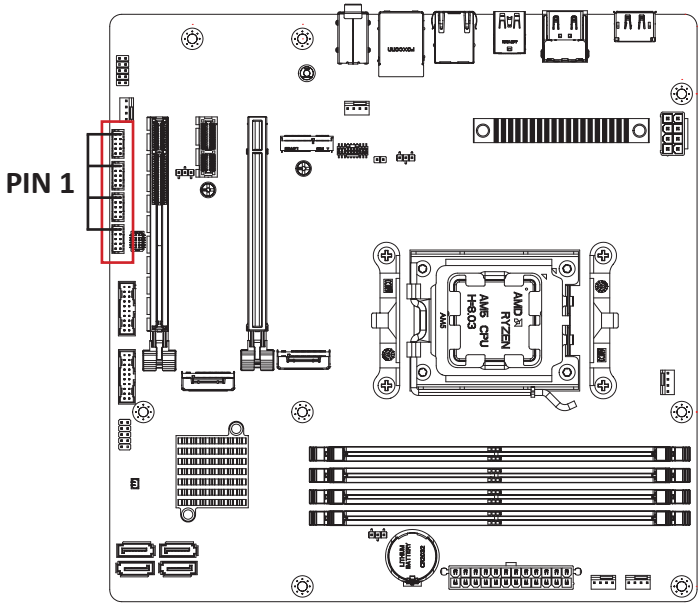


USB 3.2 Gen 1 header	
Pin No.	Definition
1	5V
2	RX1n
3	RX1p
4	GND
5	TX1n
6	TX1p
7	GND
8	D1n
9	D1p
10	OC

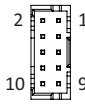
Pin No.	Definition
11	D2p
12	D2n
13	GND
14	TX2p
15	TX2n
16	GND
17	RX2p
18	RX2n
19	5V
20	NC
Connector PN	
WUIR-19A9N4BU3W	
Vendor	
WINWIN	
Connector type	
2x10pin header, pitch 2.0mm	

2.2.20 COM1, COM2, COM3, COM4 (Serial Port header)

20



Serial port Header



Connector PN

725-81-10TW00

Vendor

PINREX

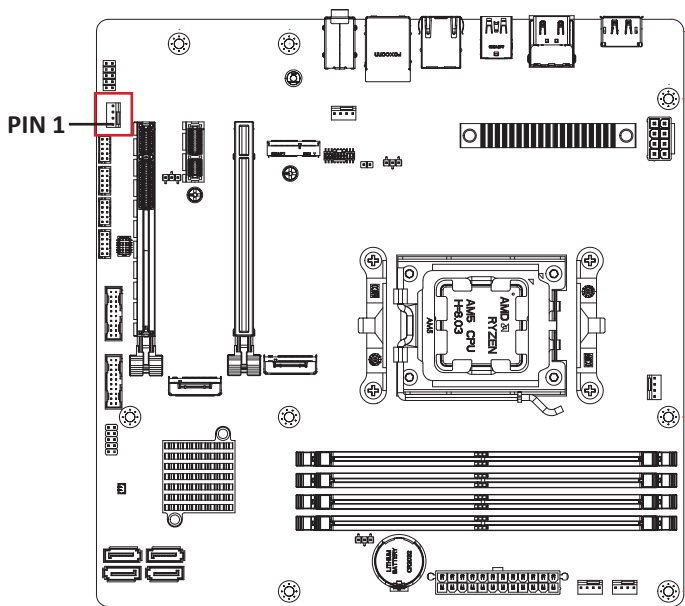
Connector type

2x5pin header, pitch 2.0mm

Pin No.	Definition
1	RXD
2	DCD
3	DTR
4	TXD
5	DSR
6	GND
7	CTS
8	RTS
9	No Connect
10	RI/5V/12V

2.2.21 SYS_FAN3 (System Fan 3 connector)

21



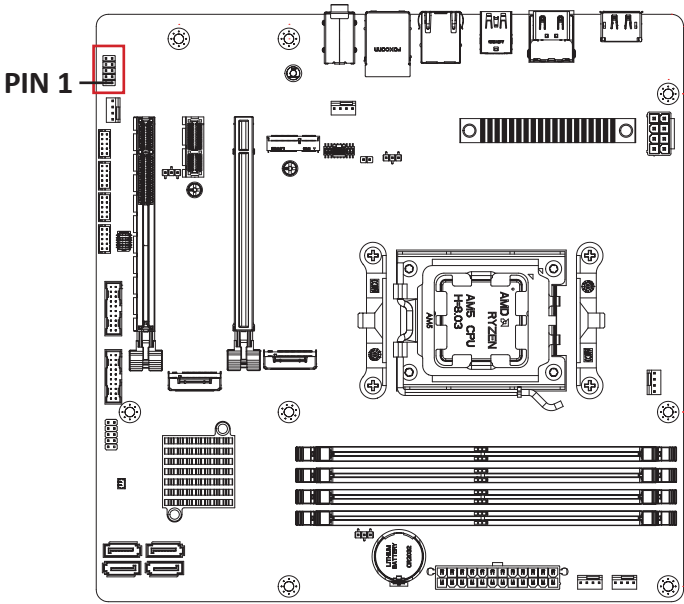
System FAN Connector	
4	
1	

Connector PN	Vendor
744-91-045W11	PINREX
Connector type	
1x4pin header, pitch 2.54mm	

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

2.2.22 F_AUDIO (Front panel audio header)

22



Front panel audio header	
10	9
2	1

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

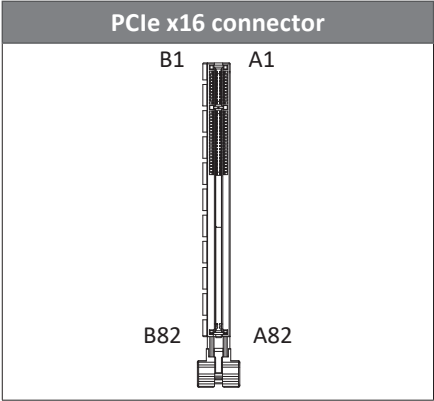
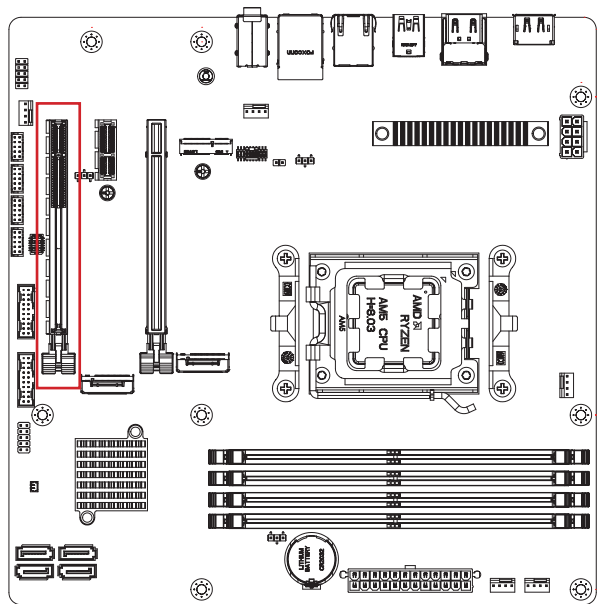
Connector PN	Vendor
210-92-05GG06	PINREX
PH10-92-05GG08-6P1	FNH

Connector type
2x5pin header, pitch 2.54mm

Micro-ATX Motherboard uATX-B650A (MB650MM)

2.2.23 PCIeX4 (PCIe x16 (Gen4 x4) Slot)

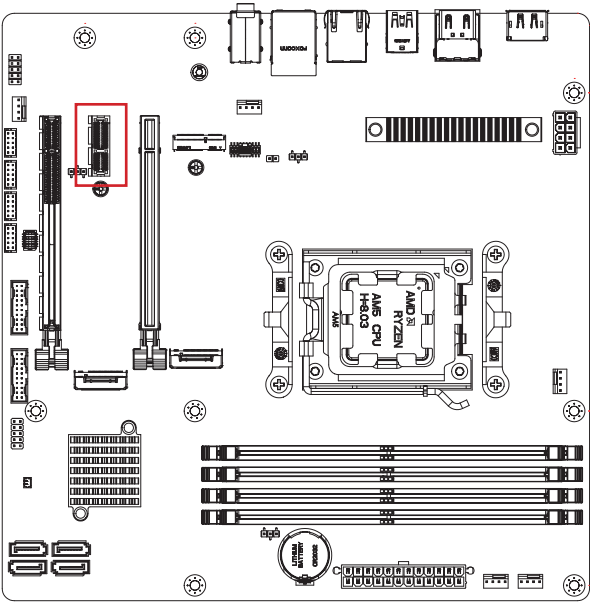
23



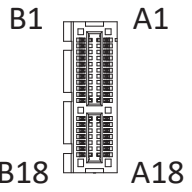
Connector PN	Vendor
APCI0187-K002C	LOTES
2EGE3241-G8B2-4F	FOXCONN

2.2.24 PCIEX1 (PCIe x1 Slot)

24



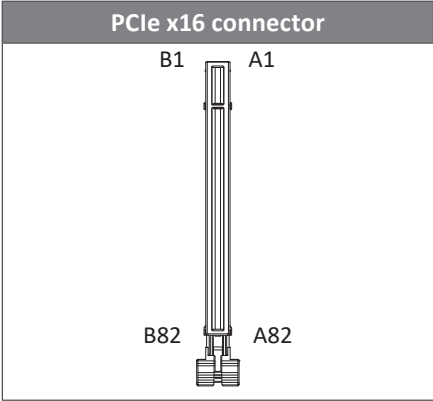
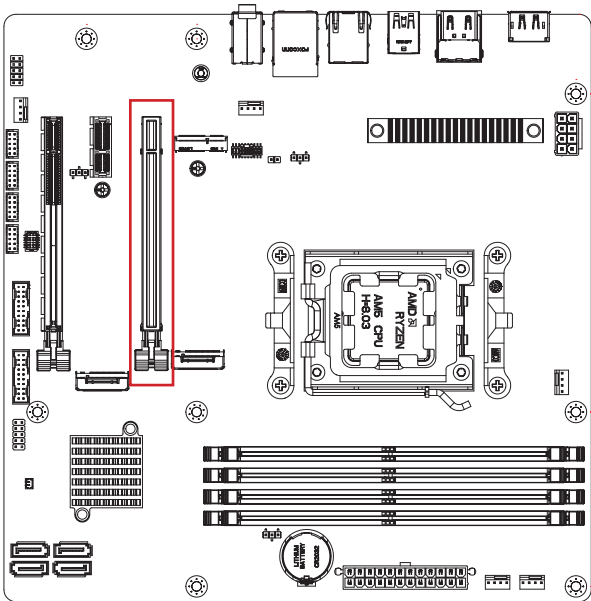
PCIe x1 connector



Connector PN	Vendor
WPES-036AN41B22UWS	WINWIN
2EG01811-D7D-DF	FOXCONN

2.2.25 PCIe x16 (PCIe x16 (Gen5 x16) Slot)

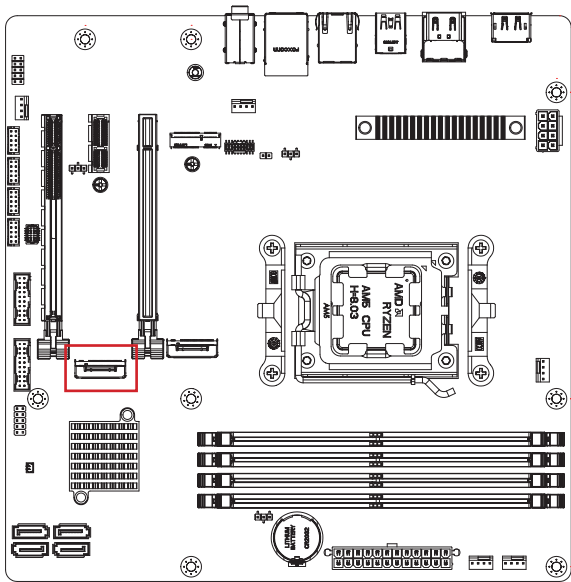
25



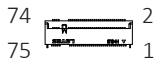
Connector PN	Vendor
2EH5823-G89BS-3F	FOXCONN

2.2.26 M2M_1 (M.2 Slot, 2280 M-Key)

26



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

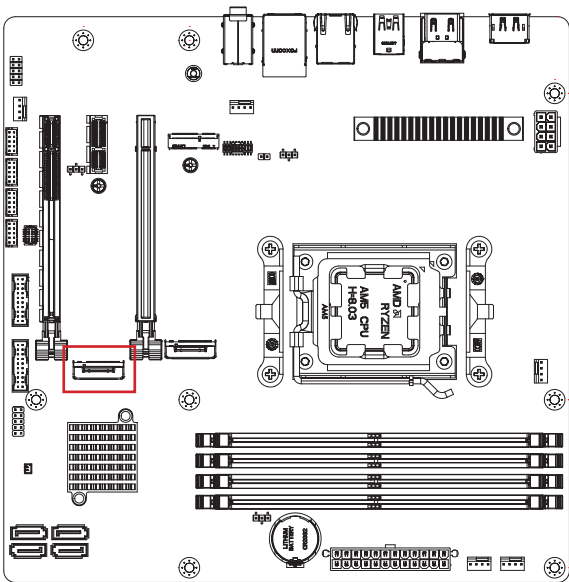
Pin No.	Definition	Pin No.	Definition
37	PCIe1 TXp	38	NC
39	GND	40	NC
41	PCIe0 RXp	42	NC
43	PCIe0 RXn	44	NC
45	GND	46	NC
47	PCIe0 TXn	48	NC
49	PCIe0 TXp	50	Reset
51	GND	52	Clock Request
53	Clockn	54	Wakeup
55	Clockp	56	NC
57	GND	58	NC

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
APCIA216-P001BC	LOTES

2.2.27 M2M_0 (M.2 Slot, 2280 M-Key)

27



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

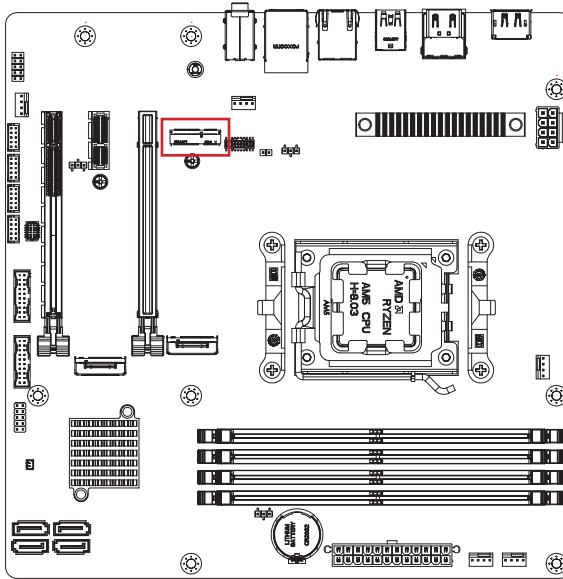
Pin No.	Definition	Pin No.	Definition
37	PCIE1 TXp	38	NC
39	GND	40	NC
41	PCIE0 RXp	42	NC
43	PCIE0 RXn	44	NC
45	GND	46	NC
47	PCIE0 TXn	48	NC
49	PCIE0 TXp	50	Reset
51	GND	52	Clock Request
53	Clockn	54	Wakeup
55	Clockp	56	NC
57	GND	58	NC

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	
APCIA216-P001BC		LOTES	

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

28



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

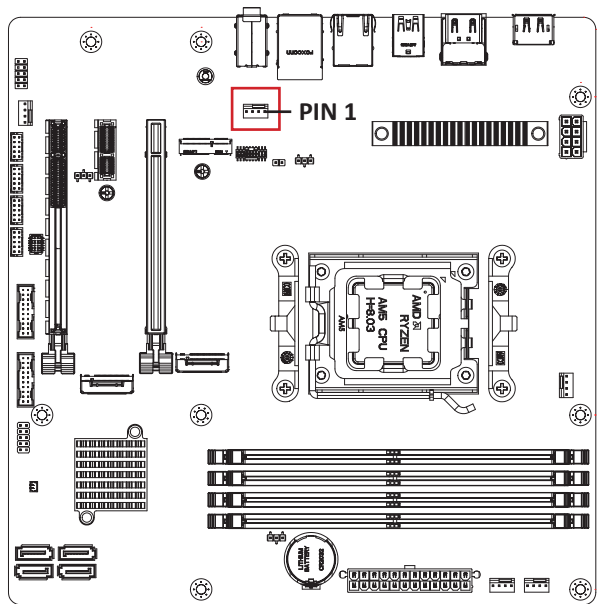
Pin No.	Definition	Pin No.	Definition
33	GND	32	NC
35	PCIE_TXp	34	NC

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

2.2.29 SYS_FAN1 (System Fan 1 connector)

29



System FAN Connector	

Connector PN	Vendor
744-91-045W11	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

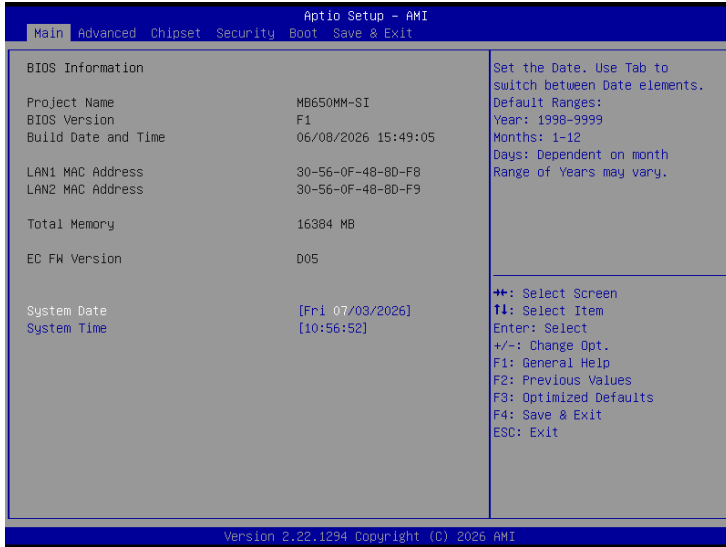
Once the system is power on, press the key as soon as possible to access into BIOS Setup program.

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

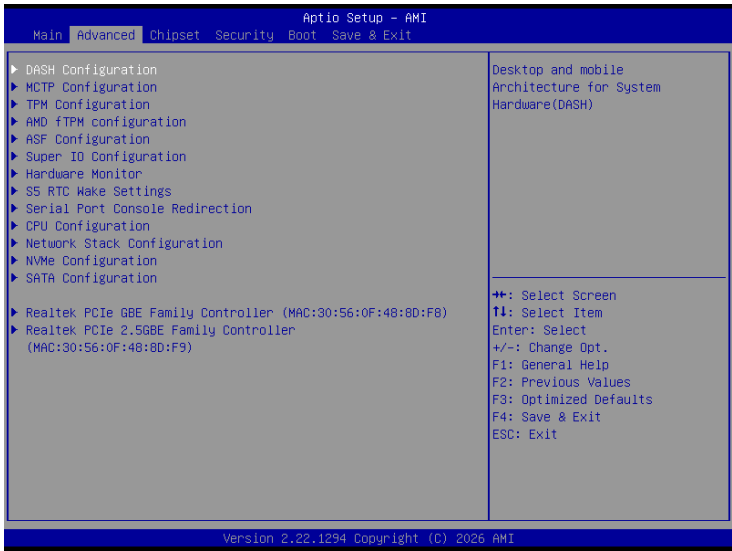
The main menu shows the basic system information.
Use arrow keys to move among the items.



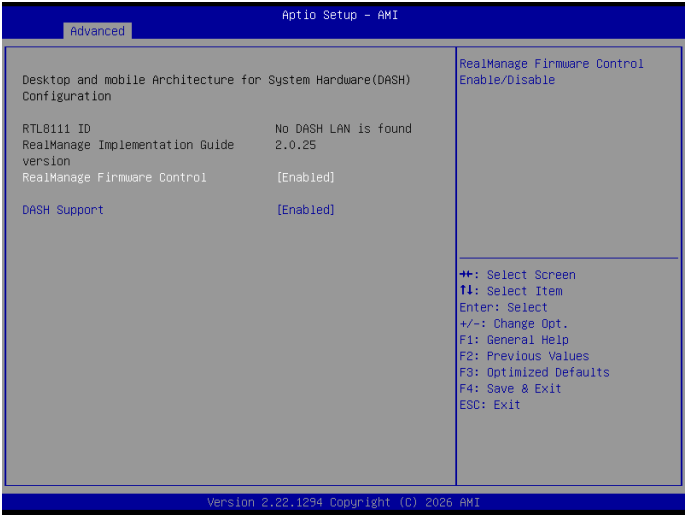
Items	Description
Project Name	Shows Project name information
BIOS Version	Shows the BIOS version of the system
Build Date and Time	Shows the Build Date and Time when the BIOS was created.
LAN1 MAC Address	Shows LAN 1 MAC Address information
LAN2 MAC Address	Shows LAN 2 MAC Address information
Total Memory	Shows the total memory size of the installed memory
EC FW version	Shows EC 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 DASH Configuration



Item	Description
RTL8111 ID	shows the vendor ID information.
RealManage Implementation Guide version	shows RealManage Implementation Guide version.
RealManage Firmware Control	Disabled : Disables RealManage Firmware Control Enabled : Enables RealManage Firmware Control (Default setting)
DASH Support	Disabled : Disables DASH Support Enabled : Enables DASH Support (Default setting)

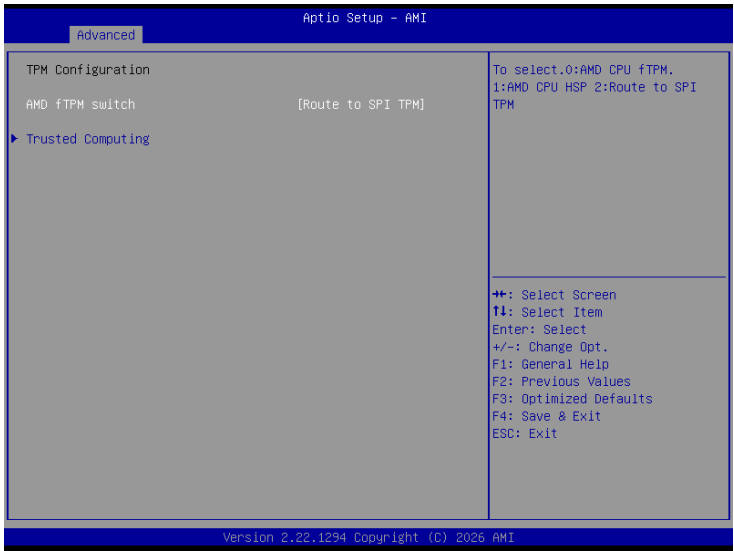
3.3.2 MCTP Configuration



Item	Description
MCTP Support	Disabled : Disables MCTP Support Enabled : Enables MCTP Support (Default setting)
PLDM for SMBIOS	Disabled : Disables PLDM for SMBIOS Enabled : Enables PLDM for SMBIOS (Default setting)
PLDM for BIOS Control and Configuration	Disabled : Disables PLDM for BIOS Control and Configuration Enabled : Enables PLDM for BIOS Control and Configuration (Default setting)
PLDM for Platform Monitoring	Disabled : Disables PLDM for Platform Monitoring Enabled : Enables PLDM for Platform Monitoring (Default setting)

3.3.3 TPM Configuration

Use TPM Configuration submenu to choose TPM interface.



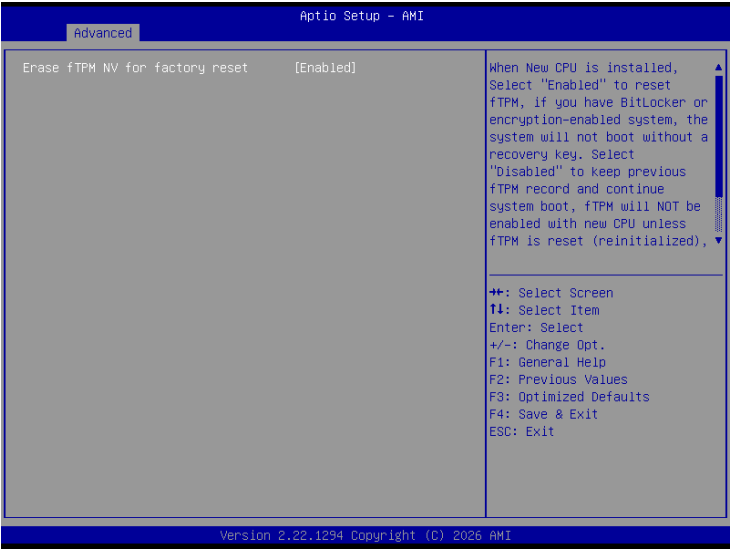
Item	Description
AMD fTPM switch	AMD CPU fTPM : Enables AMD CPU firmwarm TPM Route to SPI TPM : Enables to route to LPC TPM (Default setting)

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



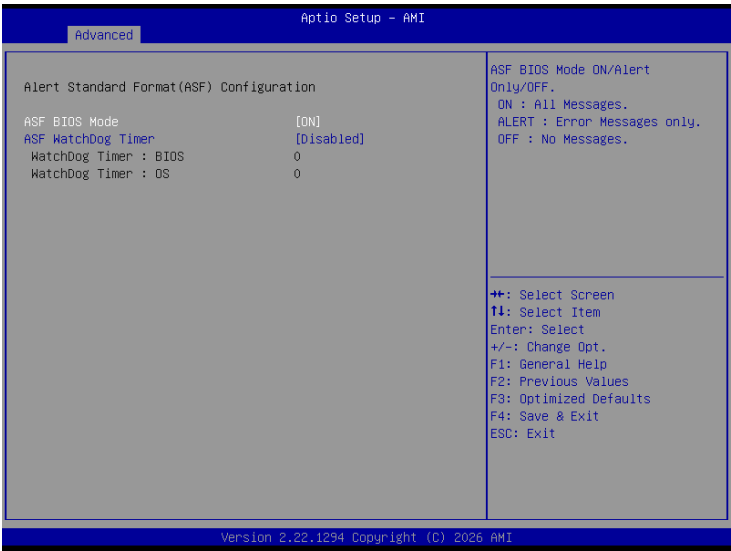
Item	Description
Security Device Support	Enabled : Enables TPM feature (Default setting) Disabled : Disables TPM feature
Pending operation	None : No execution will be conducted (Default setting) TPM clear : Set to clear data on TPM
PH Randomization	Enabled : Enables Platform Hierarchy (PH) Randomization.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

3.3.4 AMD fTPM Configuration



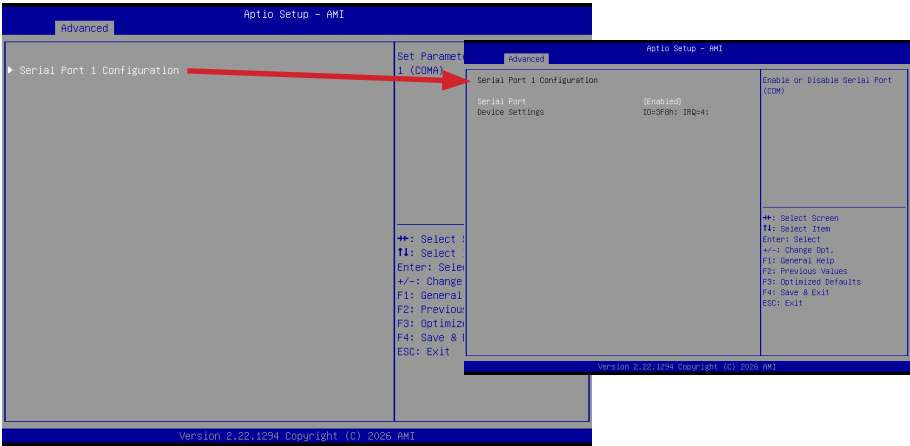
Item	Description
Erase fTPM NV for factory reset	Enabled : When a new CPU is installed, the system will erase the old fTPM keys, and generate a new set of fTPM keys to pair with the new hardware configuration. However, if you are using BitLocker or operating on an encryption-enabled system, a recovery key will be required to boot your system. Disabled : The system will keep the previous fTPM record. The new CPU will not be able to activate the fTPM function, which will cause the TPM function to fail. Before choosing Disabled or replacing the CPU, you must first decrypt your drives (or back up your BitLocker recovery key) before changing the hardware configuration."

3.3.5 ASF Configuration

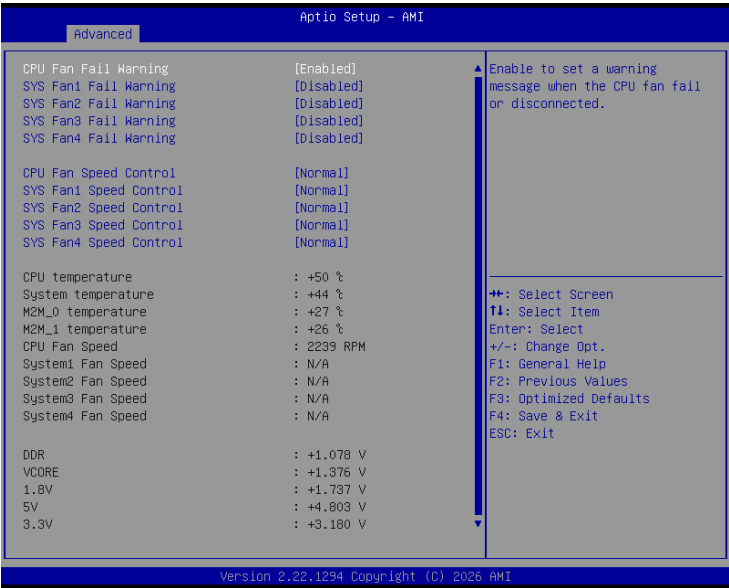


Item	Description
ASF BIOS Mode	Optional items : OFF : No messages. ON : All messages. (Default setting) Alert Only : Error messages only.
ASF WatchDog Timer	Choose to enables watchdog timer or not Disabled : Disables ASF watchdog Timer (Default setting) Enabled : Enables ASF watchdog Timer
WatchDog Timer : BIOS	Sets BIOS Watchdog Timer.
WatchDog Timer : OS	Sets OS Watchdog Timer.

3.3.6 Super IO Configuration



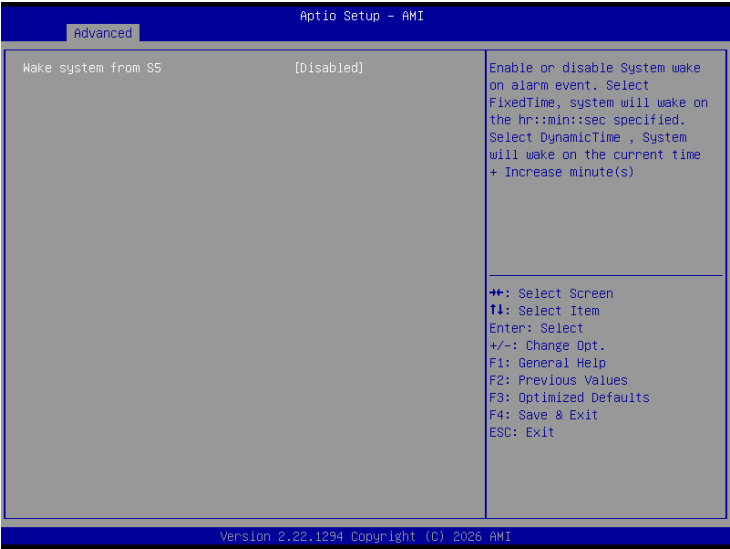
3.3.7 Hardware Monitor



Item	Description
CPU Fan Fail Warning	Enabled : Enables CPU FAN Fail warning alert function (Default setting) Disabled : Disables CPU FAN Fail warning alert function
SYS Fan1 Fail Warning	Enabled : Enables System FAN 1 Fail warning alert function Disabled : Disables System FAN 1 Fail warning alert function (Default setting)
SYS Fan2 Fail Warning	Enabled : Enables System FAN 2 Fail warning alert function Disabled : Disables System FAN 2 Fail warning alert function (Default setting)
SYS Fan3 Fail Warning	Enabled : Enables System FAN 3 Fail warning alert function Disabled : Disables System FAN 3 Fail warning alert function (Default setting)
SYS Fan4 Fail Warning	Enabled : Enables System FAN 4 Fail warning alert function Disabled : Disables System FAN 4 Fail warning alert function (Default setting)

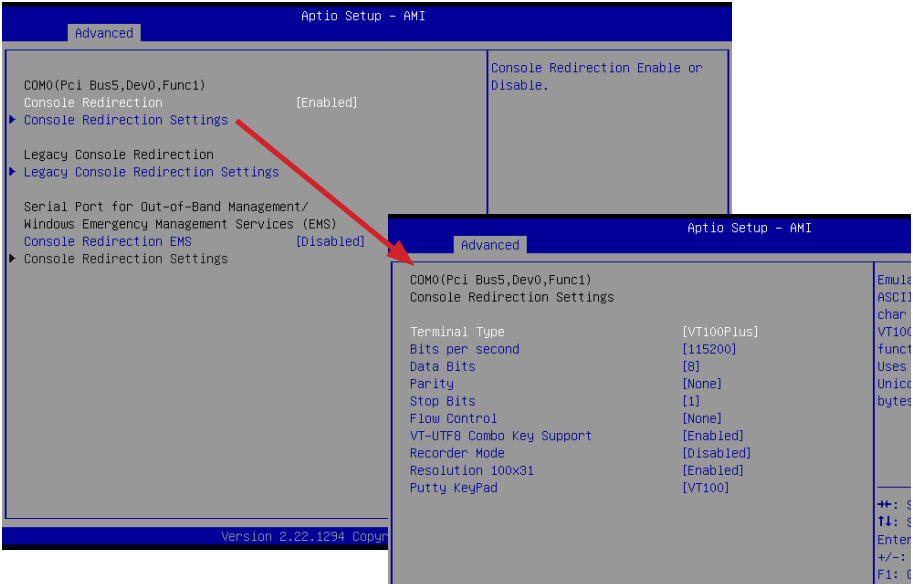
CPU Fan Speed Control	Normal : Fan speed set by BIOS default (Default setting) Full Speed : Set Fan operates at full speed
SYS Fan1 Speed Control	Normal : Fan speed set by BIOS default (Default setting) Full Speed : Set Fan operates at full speed
SYS Fan2 Speed Control	Normal : Fan speed set by BIOS default (Default setting) Full Speed : Set Fan operates at full speed
SYS Fan3 Speed Control	Normal : Fan speed set by BIOS default (Default setting) Full Speed : Set Fan operates at full speed
SYS Fan4 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
M2M_0 temperature	Temperature of the M.2 SSD at the M2M_0 Slot
M2M_1 temperature	Temperature of the M.2 SSD at the M2M_1 Slot
CPU Fan Speed	Shows current CPU fan Speed
System1 Fan Speed	Shows current System1 fan Speed
System2 Fan Speed	Shows current System2 fan Speed
System3 Fan Speed	Shows current System3 fan Speed
System4 Fan Speed	Shows current System4 fan Speed

3.3.8 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)

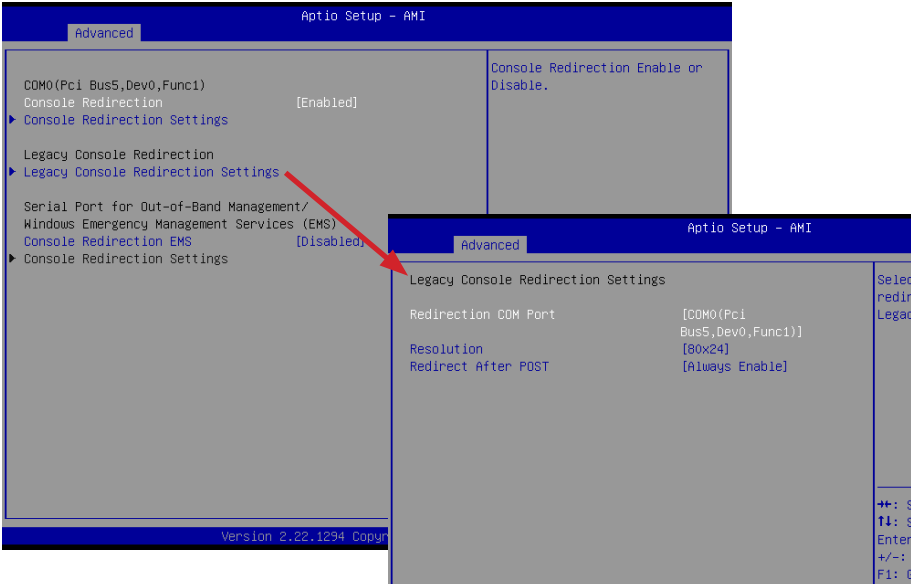
3.3.9 Serial Port Console Redirection-1



Item	Description
Console Redirection	Disabled : Disables Console Redirection Enabled : Enables Console Redirection (Default setting)
Console Redirection settings	Press [Enter] to configure advanced items : Terminal Type : Optional items : VT100, VT100Plus (Default setting), VT-UTF8, ANSI Bits per second : Selects serial port transmission speed. Optional items : 9600, 19200, 38400, 57600, 115200 (Default setting), 230400, 460800, 921600 Data Bits : Selects the number of data bits used for console redirection. Optional items : 7, 8 (Default setting)

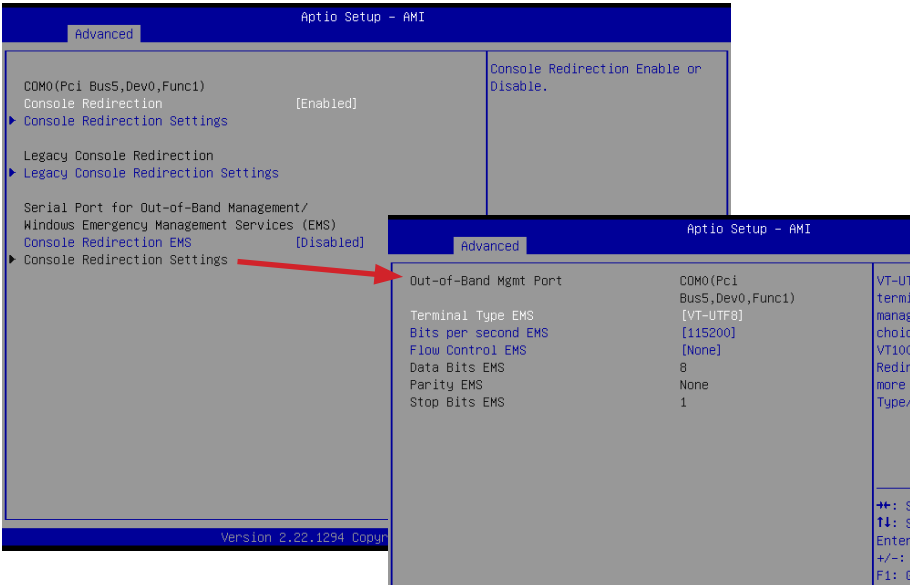
Console Redirection settings	Parity : A parity bit can be sent with the data bits to detect some transmission errors. Optional items : None (Default setting) Even : parity bit is 0 if the num of 1's in the data bits is even. odd : parity bit is 0 if num of 1's in the data bits is odd. Mark : parity bit is always 1. Space : parity bit is always 0. *Mark and Space Parity do not allow for error detection. Stop Bits : Stop bits indicate the end of a serial data packet. (A start bit indicates the beginning). The standard setting is 1 stop bit. Communication with slow devices may require more than 1 stop bit. Optional items : 1 (Default setting) , 2 Flow Control : Flow control can prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a "stop" signal can be sent to stop the data flow. Once the buffers are empty, a "start" signal can be sent to re-start the flow. Hardware flow control uses two wires to send start/stop signals. Optional items : None (Default setting), Hardware RTS/CTS VT-UTF8 Combo Key Support : Enabled : Enables VT-UTF8 Combo Key Support Disabled : Disables VT-UTF8 Combo Key Support Recorder Mode : With this mode enabled only text will be sent. This is to capture Terminal data. Enabled : Enables Recorder Mode Disabled : Disables Recorder Mode Resolution 100x31 : Enabled : Enables Resolution 100x31 function Disabled : Disables Resolution 100x31 function Putty Keypad : Select Function key and Keypad on Putty. Optional items : VT100 (Default setting), LINUX, XTERMR6, SC0, ESCN, VT400
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3.3.9 Serial Port Console Redirection-2



Item	Description
Legacy Console Redirection Settings	Redirection COM Port : Select a COM port to display redirection of Legacy OS and Legacy OPROM Messages
	Resolution : 80 x 24 (Default setting) or 80 x 25
	Redirect After POST : Always Enable (Default setting) or BootLoader

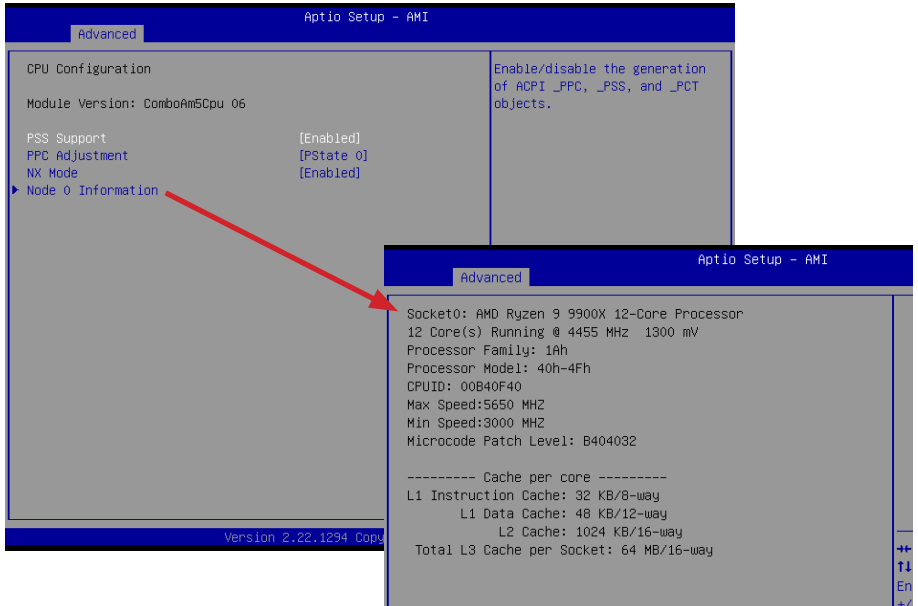
3.3.9 Serial Port Console Redirection-3



Item	Description
Console Redirection Settings	When Console Redirection EMS enables, you can enter into "Console Redirection Settings" menu to modify several settings :
	Terminal Type EMS : VT100, VT100Plus, VT-UTF8 (Default setting), ANSI
	Bits per second EMS : 9600, 19200, 57600, 115200 (Default setting)
	Flow Control EMS : None (Default setting), Hardware RTS/CTS, Software Xon/Xoff

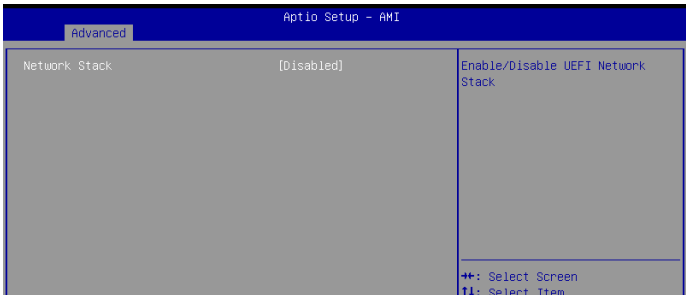
3.3.10 CPU Configuration

This submenu shows detailed CPU informations.

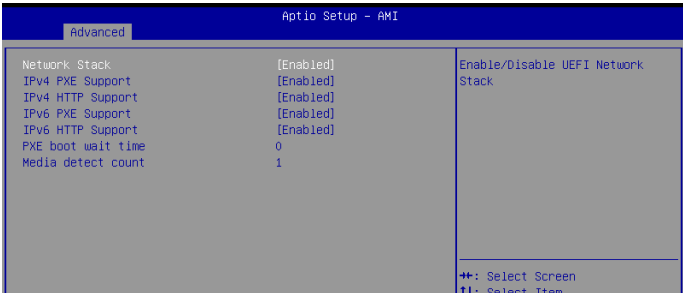


Item	Description
PSS Support	Allows you to get PState information Enabled : Enables to get PState information (Default setting) Disabled : Disables to get PState information
PPC Adjustment	To adjust the PState of the CPU Option items : PState 0 (Default setting), PState 1
NX Mode	Enables or Disables the No-execute page-protection function. Enabled : Enables NX Mode (Default setting) Disabled : Disables NX Mode
Node 0 Information	Shows AMD CPU information

3.3.11 Network Stack Configuration



When Network stack is enabled :



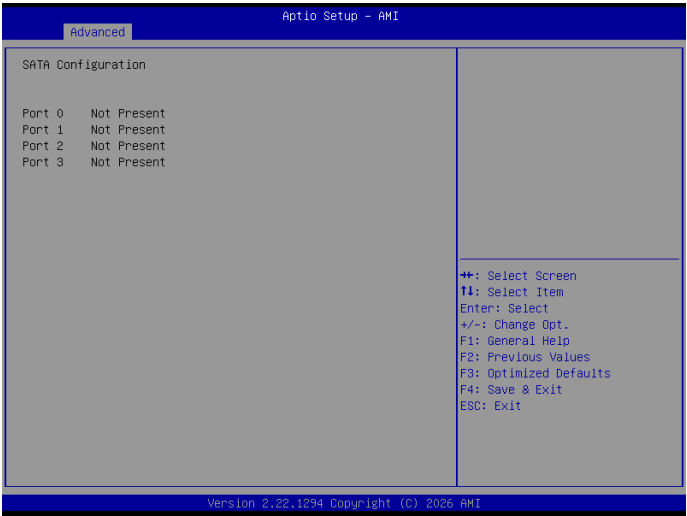
Item	Description
Network Stack	When system is power on, install LAN driver under UEFI mode Disabled : Disables UEFI Network Stack (Default setting) Enabled : Enables UEFI Network Stack
IPv4 PXE Support	When Network stack is enabled : Disabled : Disables IPv4 PXE Support Enabled : Enables IPv4 PXE Support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

3.3.12 NVMe Configuration

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



3.3.13 SATA Configuration



Item	Description
Port 0 Port 1 Port 2 Port 3	shows 2.5" SATA HDD/SSD information

3.3.14 Realtek PCIe GBE Family Controller (MAC:30:56:0F:48:8D:F8) (MAC address may varied based on different motherboard)

Shows Realtek Ethernet controller information

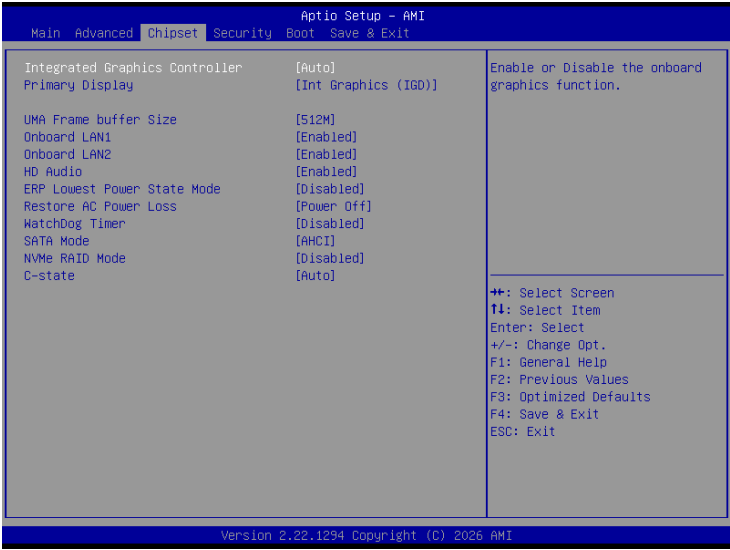


3.3.15 Realtek PCIe 2.5GBE Family Controller (MAC:30:56:0F:48:8D:F9) (MAC address may varied based on different motherboard)

Shows Realtek Ethernet controller information



3.4 Chipset



Item	Description
Internal Graphics Controller	Enables or Disables Integrated Graphics controller. Auto : System will automatically enables or disables the onboard graphics depending on the graphics card being installed. (Default setting) Disabled : Disables the onboard graphics function. Enabled : Enables the onboard graphics function.
Primary Display	Int Graphics (IGD) : Force Internal Graphics as the primary display device. Ext Graphics (PEG) : Force External Graphics as the primary display device
UMA Frame buffer size	Set UMA FB size. Optional items : 64M, 128M, 256M, 512M (Default setting), 1G, 2G, 4G, 8G, 16G
Onboard LAN 1 Onboard LAN 2	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
ERP Lowest Power State Mode	Enable/Disable power saving funtion 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 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
Watchdog Timer	Enable/Disable Watchdog Timer function Disabled : Disables Watchdog Timer function (Default setting) Enabled : Enables Watchdog Timer function
SATA Mode	Select SATA Type Optional item : AHCI (Default setting), RAID
NVMe RAID Mode	Enables or Disables NVMe RAID mode Disabled : Disables NVMe RAID mode (Default setting) Enabled : Enables NVMe RAID mode
C-state	Command CPU to enter into low power consumption mode when CPU is under idle mode. Optional items : Disabled, Enabled, Auto (Default setting)

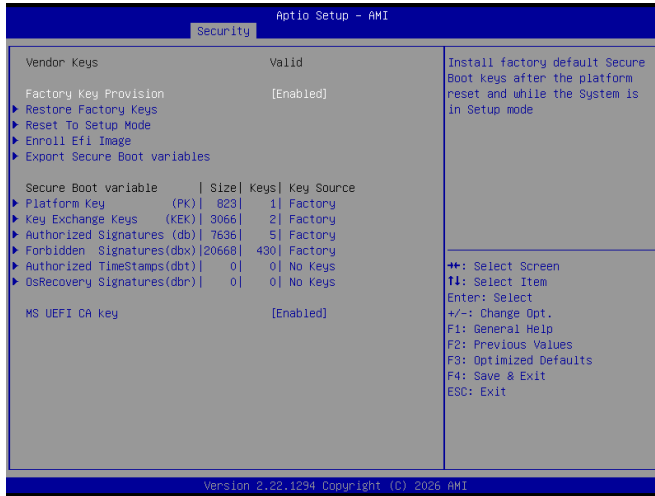
3.5 Security



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)	Device Guard ready system must not list 'Microsoft UEFI CA' Certificate in Authorized Signature database(db)
MS UEFI CA Key	

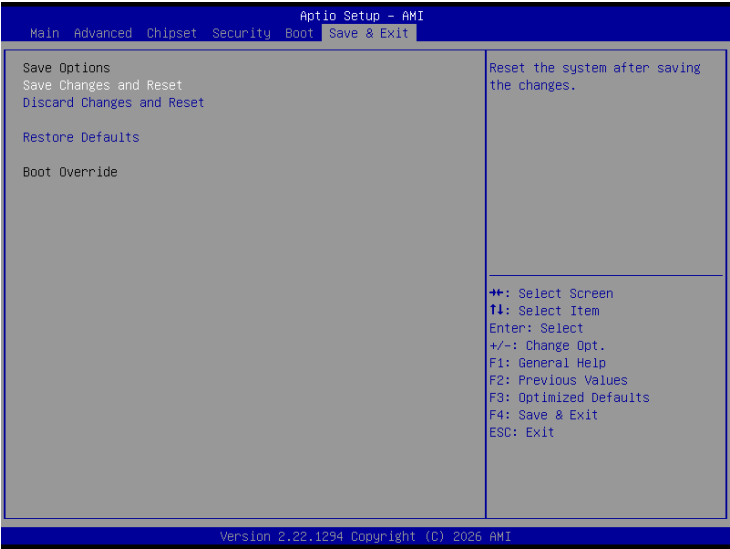
3.6 Boot

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