

UP Element i12 Edge

UP Element i12 System Powered by the
Intel[®] NUC 12 Compute Element

User's Manual 5th Ed

Copyright Notice

This document is copyrighted, 2024. All rights are reserved. The original manufacturer reserves the right to make improvements to the products described in this manual at any time without notice.

No part of this manual may be reproduced, copied, translated, or transmitted in any form or by any means without the prior written permission of the original manufacturer. Information provided in this manual is intended to be accurate and reliable. However, the original manufacturer assumes no responsibility for its use, or for any infringements upon the rights of third parties that may result from its use.

The material in this document is for product information only and is subject to change without notice. While reasonable efforts have been made in the preparation of this document to assure its accuracy, AAEMON assumes no liabilities resulting from errors or omissions in this document, or from the use of the information contained herein.

AAEMON reserves the right to make changes in the product design without notice to its users.

Acknowledgement

All other products' name or trademarks are properties of their respective owners.

- Microsoft Windows® is a registered trademark of Microsoft Corp.
- ITE is a trademark of Integrated Technology Express, Inc.
- IBM, PC/AT, PS/2, and VGA are trademarks of International Business Machines Corporation
- Intel®, Celeron®, and Iris® are registered trademarks of Intel Corporation.
- Intel Core™ is a trademark of Intel Corporation.
- Linux® is the registered trademark of Linus Torvalds in the U.S. and other countries.

All other product names or trademarks are properties of their respective owners. Ownership is not implied nor claimed by the publisher of this document for any product or product names not herein listed.

Packing List

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

Item	Quantity
● UP Element i12 Edge	1
● Screw Bag for VESA	1
● Wi-Fi Antenna	2
● Plug & Push Terminal Block	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 product page at AAEON.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 WHERE THE STORAGE TEMPERATURE IS BELOW -20° C (-4°F) OR ABOVE 60°C (140°F) TO PREVENT DAMAGE.**

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.

产品中有毒有害物质或元素名称及含量

AAEON System

QO4-381 Rev.A0

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	×	○	○	○	○	○
外壳	○	○	○	○	○	○
中央处理器 与内存	×	○	○	○	○	○
硬盘	×	○	○	○	○	○
液晶模块	×	○	○	○	○	○
光驱	×	○	○	○	○	○
触控模块	×	○	○	○	○	○
电源	×	○	○	○	○	○
电池	×	○	○	○	○	○

本表格依据 SJ/T 11364 的规定编制。

○：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 GB/T 26572 标准规定的限量要求以下。

×：表示该有害物质的某一均质材料超出了 GB/T 26572 的限量要求，然而该部件仍符合欧盟指令 2011/65/EU 的规范。

备注：

- 一、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。
- 二、上述部件物质中央处理器、内存、硬盘、光驱、电源为选购品。
- 三、上述部件物质液晶模块、触控模块仅一体机产品适用。

China RoHS Requirement (EN)

Hazardous and Toxic Materials List

AAEON System

QQ4-381 Rev.A0

Component Name	Hazardous or Toxic Materials or Elements					
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent Chromium (Cr(VI))	Polybrominated biphenyls (PBBs)	Polybrominated ethers (PBDEs)
PCB and Components	X	O	O	O	O	O
Wires & Connectors for Ext.Connections	X	O	O	O	O	O
Chassis	O	O	O	O	O	O
CPU & RAM	X	O	O	O	O	O
HDD Drive	X	O	O	O	O	O
LCD Module	X	O	O	O	O	O
Optical Drive	X	O	O	O	O	O
Touch Control Module	X	O	O	O	O	O
PSU	X	O	O	O	O	O
Battery	X	O	O	O	O	O

This form is prepared in compliance with the provisions of SJ/T 11364.

O: The level of toxic or hazardous materials present in this component and its parts is below the limit specified by GB/T 26572.

X: The level of toxic of hazardous materials present in the component exceed the limits specified by GB/T 26572, but is still in compliance with EU Directive 2011/65/EU (RoHS 2).

Notes:

1. The Environment Friendly Use Period indicated by labelling on this product is applicable only to use under normal conditions.
2. Individual components including the CPU, RAM/memory, HDD, optical drive, and PSU are optional.
3. LCD Module and Touch Control Module only applies to certain products which feature these components.

Table of Contents

Chapter 1 - Product Specifications	1
1.1 Specifications	2
1.2 Block Diagram	5
Chapter 2 – Hardware Information	6
2.1 Dimensions	7
2.2 I/O Location.....	8
2.3 List of Connectors.....	9
2.3.1 Power Button (1).....	10
2.3.2 LAN 2 Ethernet Port (Intel® I225-IT) & USB 3.2 Gen 2 (2).....	10
2.3.3 LAN 1 Ethernet Port (Intel® I219-LM) & USB 3.2 Gen 2 (3)	10
2.3.4 LAN 3 Ethernet Port (Realtek RTL8111H) (4).....	11
2.3.5 USB 2.0 (1/2) (5)	11
2.3.6 USB Type-C 3.0 (6)	12
2.3.7 DP 1.4 & HDMI 2.0 (7)	12
2.3.8 COM 1/2 (Pin Header) (8)	13
2.3.9 GPIO (9).....	14
2.3.10 Mic-In/Line-Out (10).....	15
2.3.11 DC Jack (11)	15
2.3.12 Reset Button (12).....	15
2.4 List of Internal Slots	16
2.4.1 M.2 2280 M-Key	17
2.4.2 M.2 3052 B-Key.....	17
Chapter 3 – Operating System and Certification	18
3.1 Operating System.....	19
3.1.1 OS Version Support.....	19
3.1.2 Certification Specification	19

Appendix A – Cables and Connectors..... 20

 A.1 Cables and Connectors.....21

Appendix B – M.2 2280 Installation..... 22

 B.1 M.2 2280 Device Installation23

Chapter 1

Product Specifications

1.1 Specifications

System

CPU	Intel® Core™ i5-1235U Processor SoC
Memory	Onboard LPDDR5, 8GB/16GB
Graphics	Intel® Iris® Xe Graphics
Storage	Optional with M.2 2280 M-Key x 2
Ethernet	Intel® I225-IT x 1 (2.5GbE) Intel® I219-LM GbE x 1 Realtek RTL8111H GbE x 1
Wi-Fi/BT	Intel® AX211 Wi-Fi 6E (802.11ax)
Expansion Slot	M.2 3052 B-Key x 1 (with Nano SIM Slot) M.2 2280 M-Key x 2 (PCIe 3.0 [x2])
Security	TPM 2.0/Watchdog timer
OS Support	Microsoft Windows® 10 Linux: Ubuntu 22.04 LTS

I/O

USB	USB 3.2 Gen 2 (Type-A) x 2 USB 2.0 (Type-A) x 2 USB 3.2 Gen 2 (Type-C) x 1, supports DP 1.4
Display	HDMI 2.0b x 1 DP 1.4 x 1
Ethernet	RJ-45 x 3 for GbE/2.5GbE LAN (Supports PXE function)
COM	RS-232/422/485 x 2 (Pin Header type, RS-422/485 supports 9600 baud rate)
Audio	Mic-In x 1/Line-Out x 1
GPIO	Isolation GPIO x 8 in/8 out (Pin Header Type)

Power Supply

Power Requirement	9V ~ 36V
Power Supply Type	Ø2.5 Lockable connector
Power Consumption	Intel® Core™ i5-1235U, LPDDR5 5200MHz 32GB, 4.47A @12V (Typical) Intel® Core™ i5-1235U, LPDDR5 5200MHz 32GB, 9.6A @12V (Maximum)

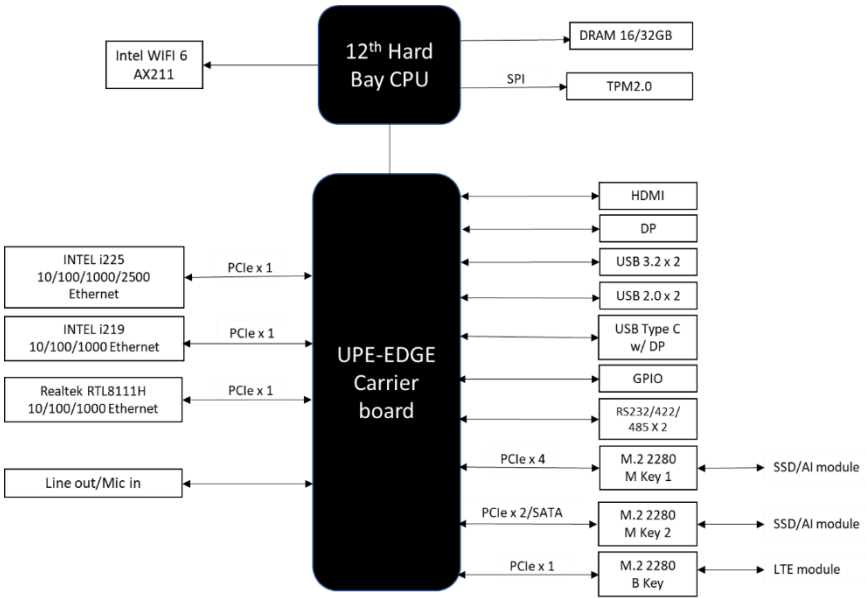
Mechanical

Mounting	75mm x 75mm VESA Mount Wallmount
Dimensions	5.9" x 4.9" x 1.8" (152mm x 125mm x 48mm)
Gross Weight	3.31 lb. (1.5Kg)
Net Weight	2.21 lb. (1Kg)

Environmental

Operating Temperature	With Heatsink: 32°F ~ 140°F (0°C ~ 60°) with air flow 0.5m/s
Storage Temperature	-40°F ~ 140°F (-40°C ~ 60°C)
Operating Humidity	0% ~ 90% relative humidity, non-condensing
Certification	CE/FCC Class A, RED, RoHS Compliant, REACH Shock: MIL-STD-202G Method 213B, Table 213-I Condition A Vibration: IEC 60068-2-6: 1G, 5-500Hz, 3 axes IEC 60068-2-64: Operating 5Grms, 5-500 Hz, 3 axes

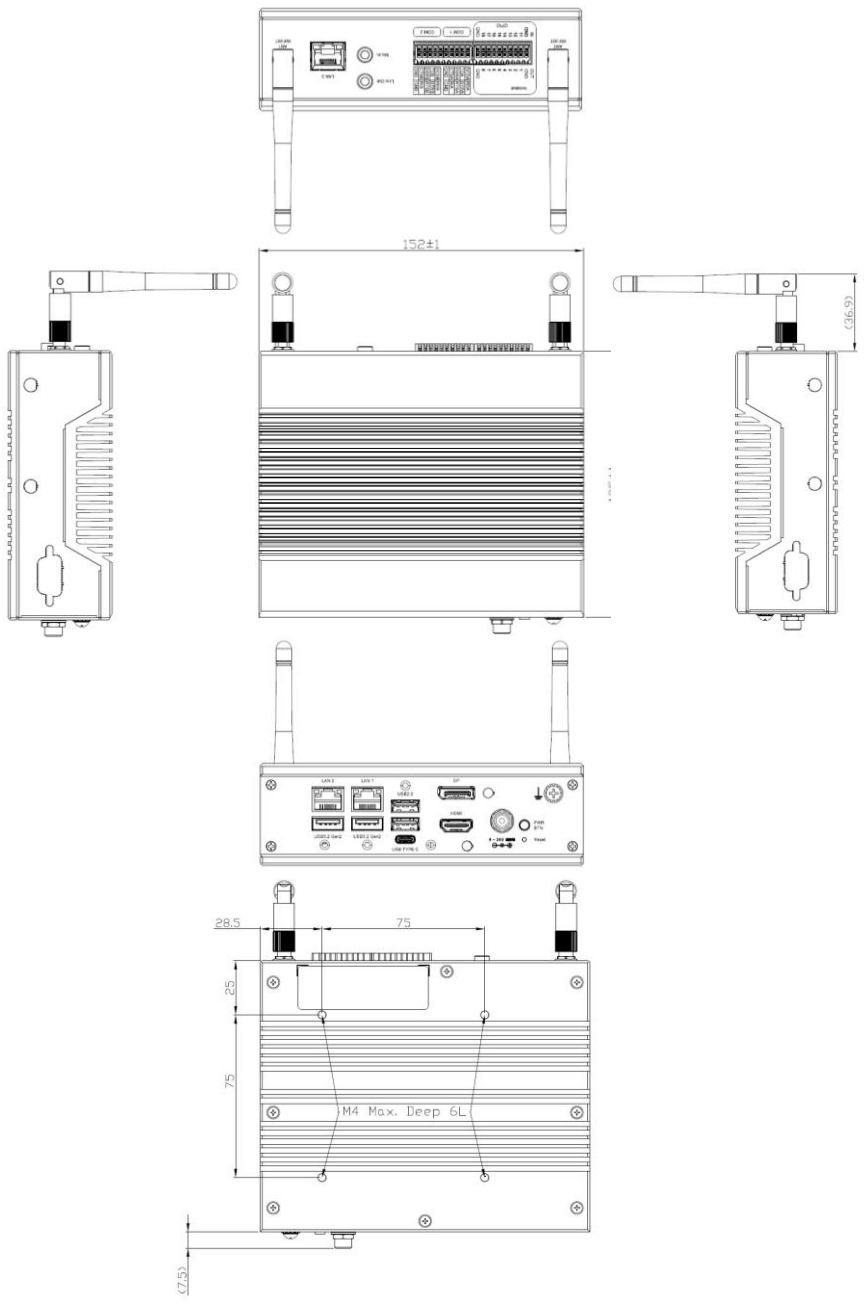
1.2 Block Diagram



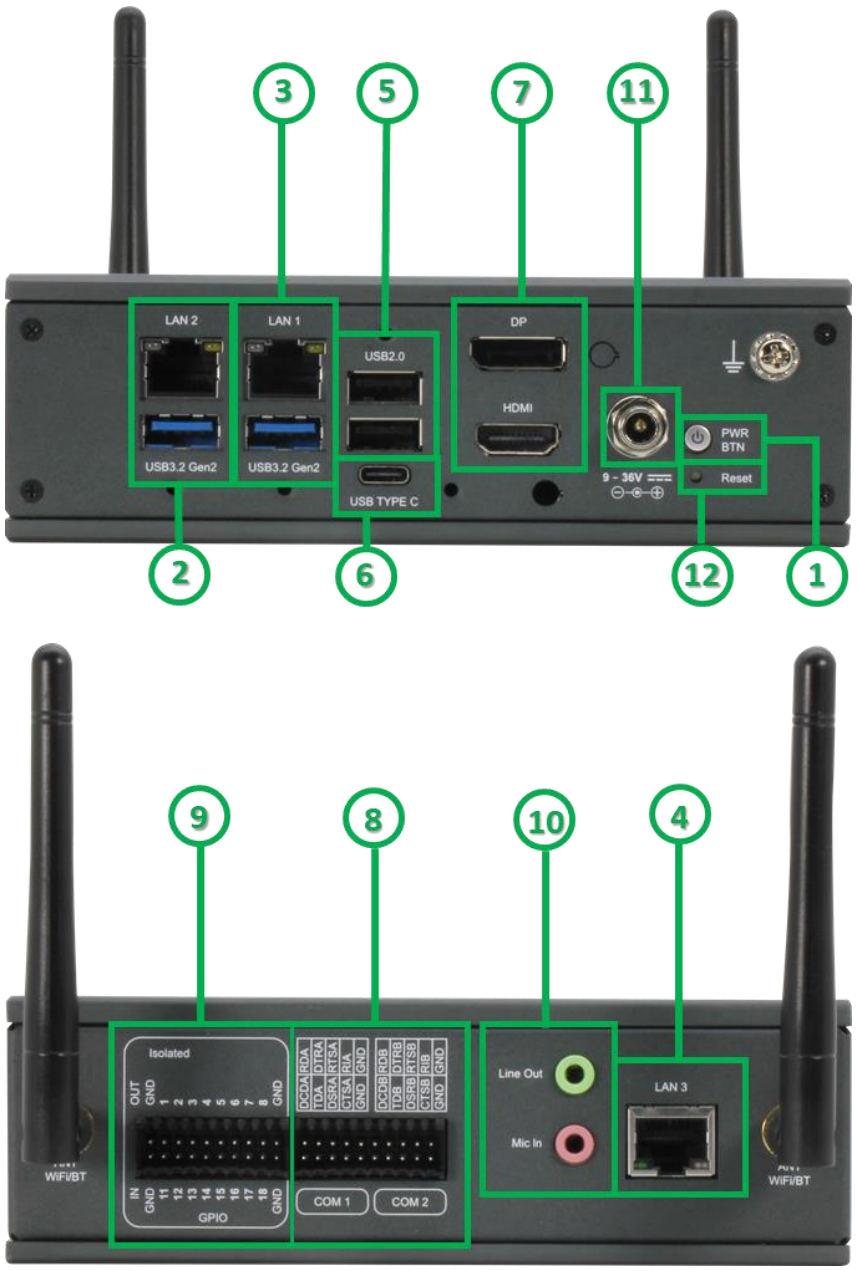
Chapter 2

Hardware Information

2.1 Dimensions



2.2 I/O Location



2.3 List of Connectors

Please refer to the table below for all of the board's connectors that you can configure for your application

Label	Function
1	Power Button
2	USB 3.2 Gen 2 & Ethernet Port (Intel® I225-IT)
3	USB 3.2 Gen 2 & Ethernet Port (Intel® I219-LM)
4	Ethernet Port (Realtek RTL8111H)
5	USB 2.0 (1/2)
6	USB 3.2 Gen 1 (Type-C)
7	DP 1.4 & HDMI 2.0
8	RS-232/422/485 (1/2)
9	GPIO
10	Mic In/Line Out
11	DC Jack
12	Reset Button

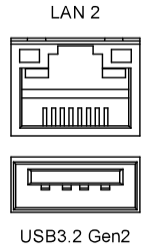
2.3.1 Power Button (1)

The controller provides power button to switch on/off system.



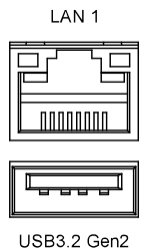
2.3.2 LAN 2 Ethernet Port (Intel® I225-IT) & USB 3.2 Gen 2 (2)

The controller provides Gigabit ethernet ports with 10/100/1000/2500 Base – Tx in combination with one USB 3.2 Gen 2.



2.3.3 LAN 1 Ethernet Port (Intel® I219-LM) & USB 3.2 Gen 2 (3)

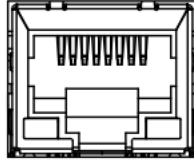
The controller provides Gigabit Ethernet ports with 10/100/1000 Base – Tx in combination with one USB 3.2 Gen 2.



2.3.4 LAN 3 Ethernet Port (Realtek RTL8111H) (4)

The controller provides one Gigabit ethernet ports and supports 10/100/1000Base-TX and LED indicator, see the details as below.

LAN 3



LAN Speed		Active LED	Link/Speed LED
1G	1G		
	100M		
	10M		

2.3.5 USB 2.0 (1/2) (5)

The controller provides two USB 2.0 slots, see the information as below.

USB2.0



2.3.6 USB Type-C 3.0 (6)

The controller provides one USB type C with support for Display port function, see the information as below.

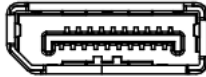


USB TYPE C

2.3.7 DP 1.4 & HDMI 2.0 (7)

The controller provides one DP 1.4 function and HDMI 2.0, see the information as below.

DP



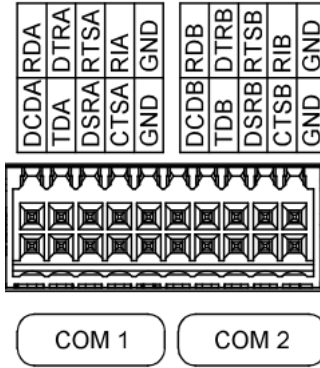
HDMI



2.3.8 COM 1/2 (Pin Header) (8)

The controller provides RS-232/422/485 via pin header interface, if you want to change the mode, please go to the BIOS setting page. Default is RS232.

See the hardware pin assignment and table as below.



COM 1	Function	Function
	DCDA/RS422TX-/RS485-	RDA/RS422TX+/RS485+
	TDA/RS422RX+	DTRA/RS422RX-
	DSRA	RTSA
	CTSA	RIA
	GND	GND

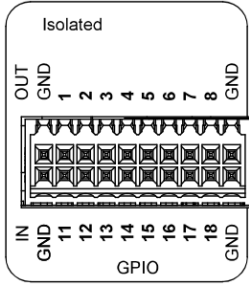
COM 2	Function	Function
	DCDB/RS422TX-/RS485-	RDB/RS422TX+/RS485+
	TDB/RS422RX+	DTRB/RS422RX-
	DSRB	RTSB
	CTSB	RIB
	GND	GND

2.3.9 GPIO (9)

The controller provides a GPIO pin header with 8 in and 8 out interfaces, see the hardware pin assignment and table as below.

Note: GPIO ports have digital isolators to protect the UP Element i12 Edge from damage as a result of high-voltage events. As such, GPIO 8 input/8 output is subject to the following three conditions:

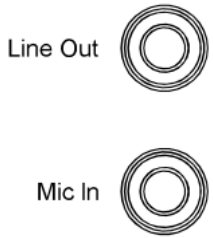
1. The maximum voltage on the GPIOs must not exceed 6V.
2. High-level input voltage (VIH): 3.5V minimum.
3. Low-level input voltage (VIL): 1.5V maximum.



Pin	Input	Pin	Output
-	GND	-	GND
11	GPIO11	1	GPIO1
12	GPIO12	2	GPIO2
13	GPIO13	3	GPIO3
14	GPIO14	4	GPIO4
15	GPIO15	5	GPIO5
16	GPIO16	6	GPIO6
17	GPIO17	7	GPIO7
18	GPIO18	8	GPIO8
-	GND	-	GND

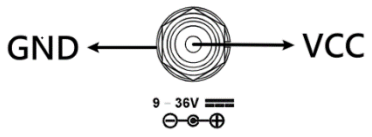
2.3.10 Mic-In/Line-Out (10)

The controller provides one Mic-in and one Line-out function, see the hardware pin assignment and table as below.



2.3.11 DC Jack (11)

The controller provides one jack interface for power range 9V ~ 36V DC in.



Pin	Input
VCC	9 – 36V DC_IN
GND	GND_SIGNAL

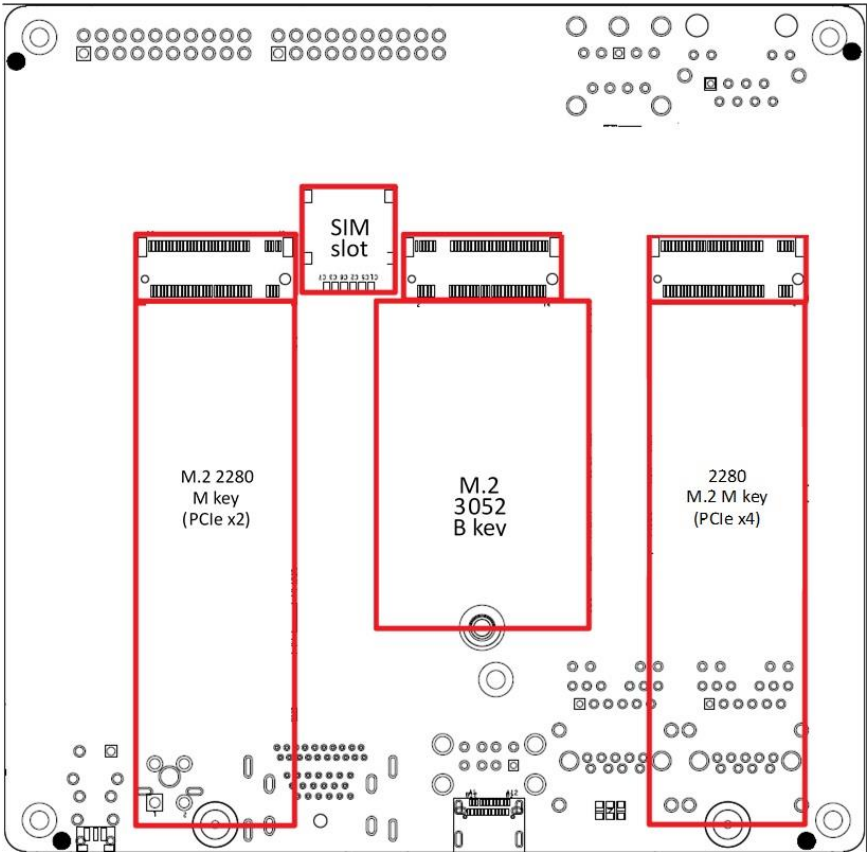
2.3.12 Reset Button (12)

The controller provides a button to reset the system.



2.4 List of Internal Slots

Slot	Function
Storage Slot	M.2 2280 M-Key 1 (PCIe [x4] interface)
Storage Slot	M.2 2280 M-Key 2 (PCIe [x2]/SATA interface)
LTE Module Slot	M.2 3052 B-Key (PCIe [x1])
SIM Slot	SIM Card



2.4.1. M.2 2280 M-Key

The controller provides one PCIe Gen 4 [x4] and one PCIe Gen 3 [x2]/SATA interface on M.2 M-Key slot for NVMe storage, SATA storage, and AI module.

2.4.2 M.2 3052 B-Key

The controller provides one M.2 3052 B-Key slot for an LTE module.

Chapter 3

Operating System and Certification

3.1. Operating System

3.1.1. OS Version Support

The Robot controller supports Windows10 Enterprise and Ubuntu 22.04.

3.1.2. Certification Specification

The controller hardware design meets CE/FCC Class A and RED certification requirements.

Note: Frame ground is required to be connected through M4 screw at front panel while operating the UP Element i12 Edge.

Appendix A

Cables and Connectors

A.1 Cables and Connectors

This table provides detailed information about the cables and connectors used by the UP Element i12 Edge. If you have any questions about the configuration of your board, please contact your AAEON sales representative.

Function Description	Mating Cable PN	Mating Cable Description
GPIO	16522X0048	Phoenix Connector.DIP.90D.10*2P.Pitch=2.54mm .H=12mm.FEMALE.PLUG IN Black.DINKLE.0156-1B20-BK
RS-232/422/485	16522X0048	Phoenix Connector.DIP.90D.10*2P.Pitch=2.54mm .H=12mm.FEMALE.PLUG IN Black.DINKLE.0156-1B20-BK

Appendix B

M.2 2280 Installation

B.1 M.2 2280 Device Installation

When installing an M.2 2280 device, please ensure the thermal pad is attached along with the device.

Note: As the below image illustrates, it is recommended that the M.2 2280 storage device is installed in the 1st Priority Location, while the 2nd Priority Location can be used if the former is occupied.

Note: For the 2nd Priority Location, there is the option to install a CANBus module (interface via PCIe [x2]).

