



# BOXER-RK3568

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Fanless Embedded Box PC

User's Manual 1<sup>st</sup> Ed

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## Packing List

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

Item	Quantity
● BOXER-RK3568	1
● 12V / 60W Power Adapter	1

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

## About this Document

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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 on [AAEON.com](http://AAEON.com) for the latest version of this document.

## Safety Precautions

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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.*

## ISED RSS Warning

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This product meets the applicable Industry Canada technical specifications.

Le présent matériel est conforme aux spécifications techniques applicables d'Industrie Canada.

## 产品中有毒有害物质或元素名称及含量

AAEON System

QO4-381 Rev.A2

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。

环保使用期限(EFUP (Environmental Friendly Use Period))：10 年

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)

## Name and content of hazardous substances in product

AAEON System

QO4-381 Rev.A2

Part Name	Hazardous Substances					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
PCB Assemblies	×	○	○	○	○	○
Connector and Cable	×	○	○	○	○	○
Chassis	○	○	○	○	○	○
CPU and Memory	×	○	○	○	○	○
Hard Disk	×	○	○	○	○	○
LCD Modules	×	○	○	○	○	○
CD-ROM/DVD-ROM	×	○	○	○	○	○
Touch Modules	×	○	○	○	○	○
Power	×	○	○	○	○	○
Battery	×	○	○	○	○	○

The table is prepared in accordance with the provisions of SJ/T 11364.

○ : Indicates that said hazardous substance contained in all of the homogenous materials for this product is below the limit requirement of GB/T 26572.

× : Indicates that said hazardous substance contained in at least one of the homogenous materials used for this part is above the limit requirement of GB/T 26572. But this product still be compliance with 2011/65/EU Directive (allowed with 2011/65/EU Annex III of RoHS exemption with number 6(c),7(a),7(c)-1).

EFUP (Environment Friendly Use Period) value: 10 years.

Notes:

1. This product defined period of use is under normal condition.
2. In above part, CPU/Memory/ Hard Disk/CD-ROM/DVD-ROM/ Power are optional.
3. In above part, LCD Modules/ Touch Modules are for all-in-one product model.

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# Chapter 1

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Product Specifications

## 1.1 Specifications

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### System

CPU	Rockchip RK3568 Quad-core Arm® Cortex®-A55 Processor
GPU	Arm® Mali™-G52
Chipset	NPU: 0.8 TOPS
Graphics	Video Encode: H.264 / H.265 up to 1080p @60fps Video Decode: H.264 / H.265 / AV1 / AVS2 / VP9 up to 4K @60fps MPEG-1 / VP8 up to 1080p @60fps
System Memory	LPDDR4 2GB/4GB/8GB (Optional)
Display Interface	HDMI 2.0
Storage/SSD	16GB (Default)/32GB eMMC and Micro SD card
I/O	Micro SD Card Slot x 1 HDMI 2.0 x 1 Antenna Connector for WiFi 802.11 b/g/n, BT V5.0 Antenna Connector for LTE (Optional) GbE, RJ-45 x 1 USB 3.2 Gen 1 (Type-C OTG) x 1, USB 3.2 Gen 1 (Type-A) x 1 USB 2.0 x 1 RS-232/422/485 x 1 RS-232 x 1 (Optional) SIM Card Slot x 1
Expansion	mPCIe Slot x 1 (mSATA / USB) for LTE Module
Indicator	Power LED x 1

## System

OS Support	Android™ 12 Debian® 10 (Optional)
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## Mechanical

Mounting	VESA Mount: 75mm x 75mm
Dimension (W x D x H)	4.2" x 3.37" x 1.97" (106.5mm x 85.6mm x 50mm)
Gross Weight	1.1 lb (0.5 kg)
Net Weight	0.66 lb (0.3 kg)

## Environmental

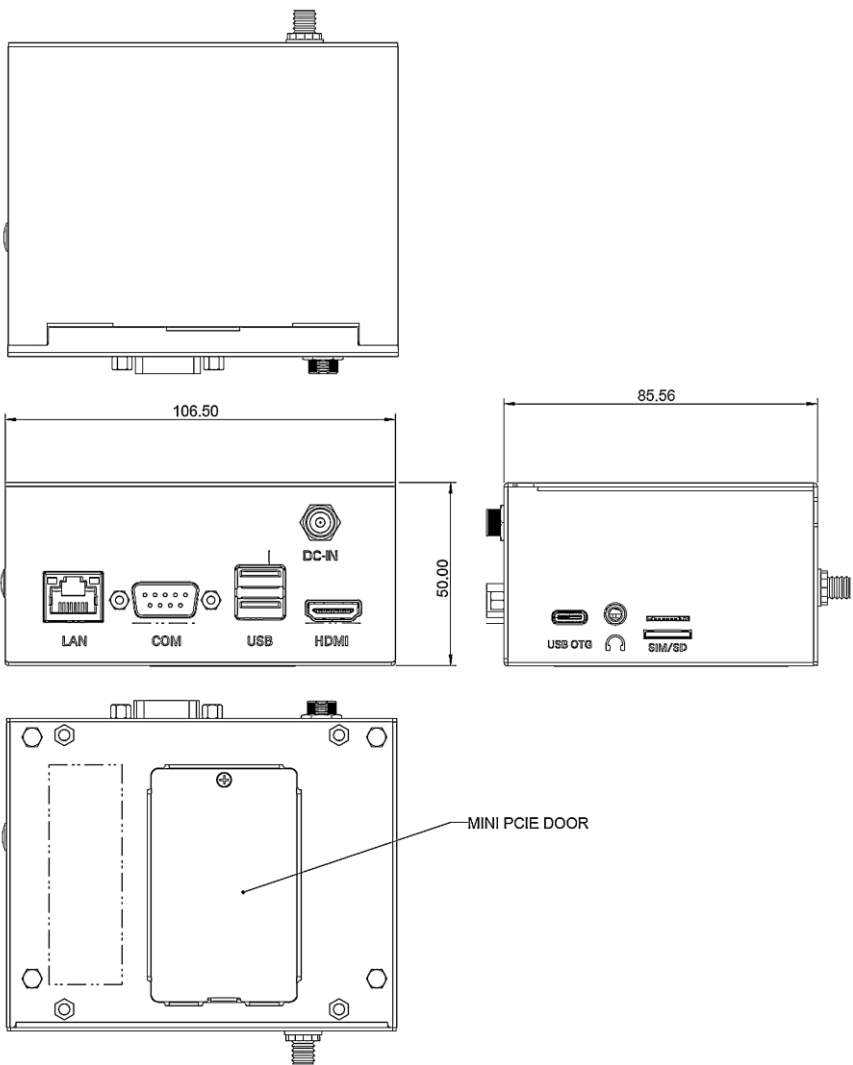
Operating Temperature	32°F ~ 122°F (0°C ~ 50°C)
Storage Temperature	-40°F ~ 176°F (-40°C ~ 80°C)
Storage Humidity	0% ~ 90% relative humidity, non-condensing
Shock	Onboard eMMC 20G, IEC 60068-2-27, half sine, 11 ms duration
Vibration	Random, 2.0 Grms, 5-500Hz Onboard eMMC
Anti-Vibration	N/A
Certification	CE / FCC

# Chapter 2

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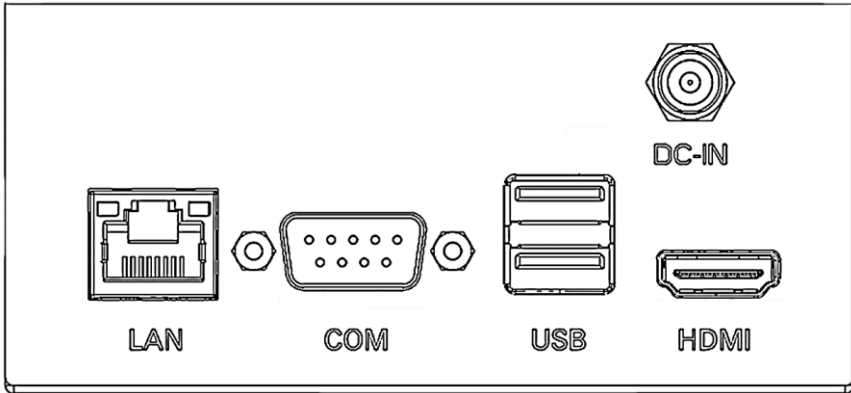
Hardware Information

## 2.1 Dimensions



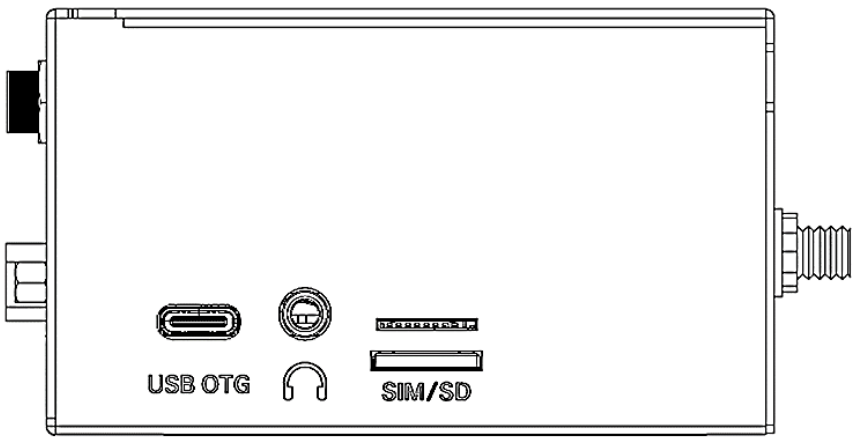
## 2.2 List of Ports

### Front Side View



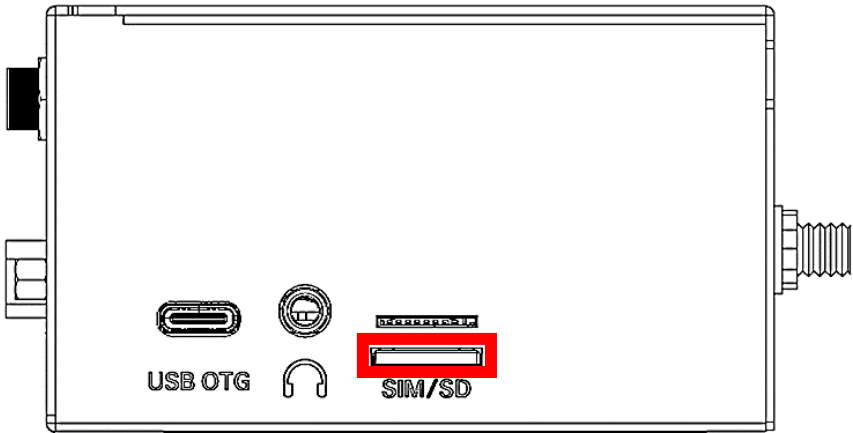
Label	Description
LAN	GbE LAN Port
COM	DB-9 for RS-232/422/485
USB	USB 2.0/USB 3.2 Gen 1 Type-A Ports
HDMI	HDMI Port
DC IN	DC 12V Power Input

Right Hand Side View



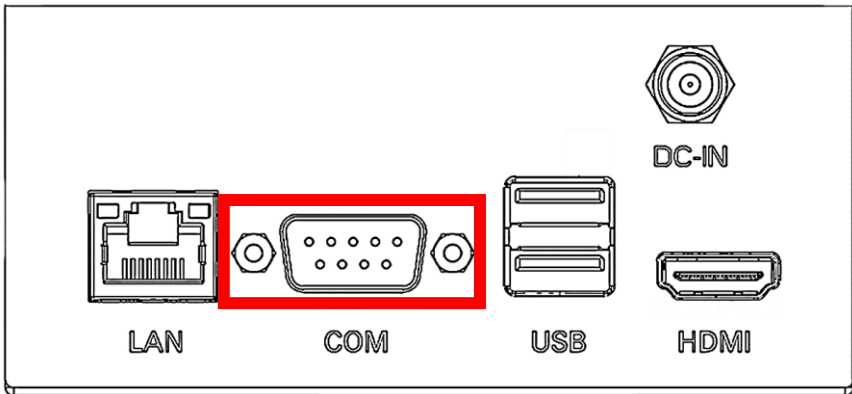
Label	Description
USB OTG	USB 3.2 Gen 1 OTG Type-C Port
Audio	4-pole Audio Jack for Microphone/Earphone
SD	MicroSD Card Socket, Push-Push Type
Nano SIM	Nano SIM Card Socket with Tray, Push-Push Type

## 2.2.1 MicroSD Card



Standard specifications.

## 2.2.2 COM Port



RS-232			
Pin	Pin Name	Signal Type	Signal Level
1	DCD	IN	
2	RX	IN	
3	TX	OUT	+10V
4	DTR	OUT	+10V
5	GND	GND	GND

## RS-232

Pin	Pin Name	Signal Type	Signal Level
6	DSR	IN	
7	RTS	OUT	+10V
8	CTS	IN	
9	RI/+5V/+12V	IN/ PWR	+5V/+12V

## RS-485

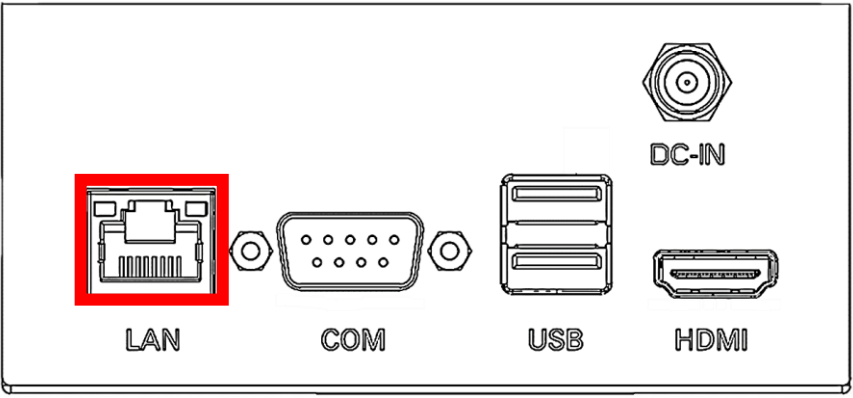
Pin	Pin Name	Signal Type	Signal Level
5	GND	GND	GND
1	RS485_D-	I/O	+5V
2	RS485_D+	I/O	+5V

## RS-422

Pin	Pin Name	Signal Type	Signal Level
5	GND	GND	GND
1	RS422_TX-	OUT	±5V
2	RS422_TX+	OUT	±5V
3	RS422_RX+	IN	
4	RS422_RX-	IN	

**Note:** COM RS-232/422/485 mode can be set by APP settings. Default is RS-232.

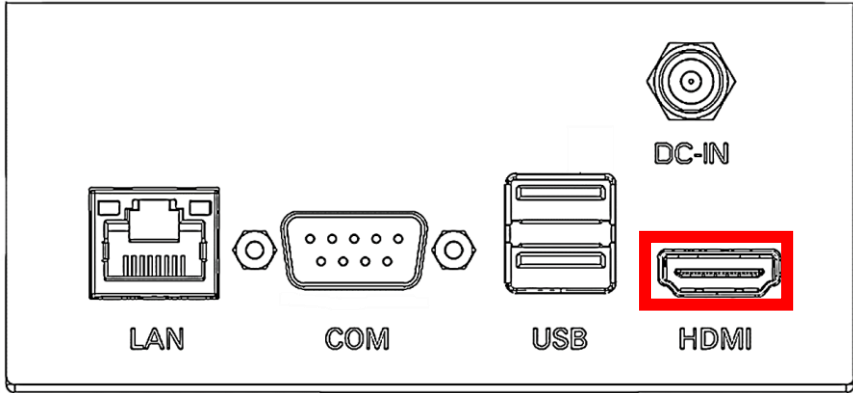
## 2.2.3 RJ-45 LAN Port 1



Pin	Pin Name	Signal Type	Signal Level
J1	LAN1_MDI0_P	DIFF	
J2	LAN1_MDI0_N	DIFF	
J3	LAN1_MDI1_P	DIFF	
J4	LAN1_MDI1_N	DIFF	
J5	LAN1_MDI2_P	DIFF	
J6	LAN1_MDI2_N	DIFF	
J7	LAN1_MDI3_P	DIFF	
J8	LAN1_MDI3_N	DIFF	

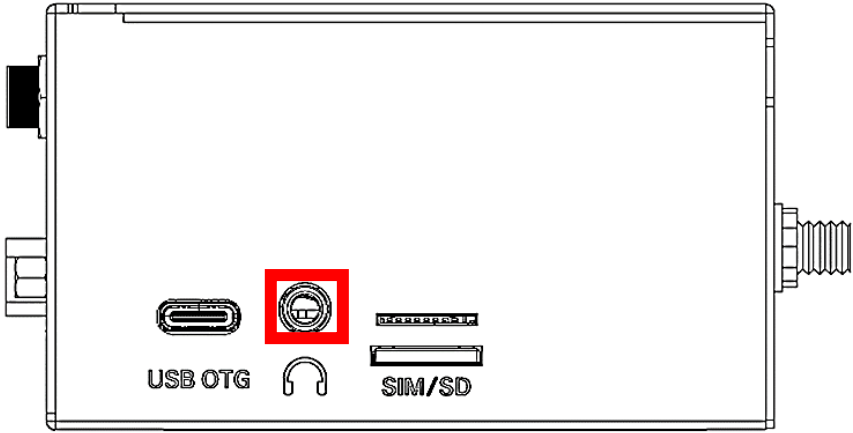
LED Color		Link Speed
<b>Left</b>	<b>Right</b>	-
OFF	Orange	10 Mbps
OFF	Green	100 Mbps
Yellow	OFF	1000 Mbps

## 2.2.4 HDMI Connector



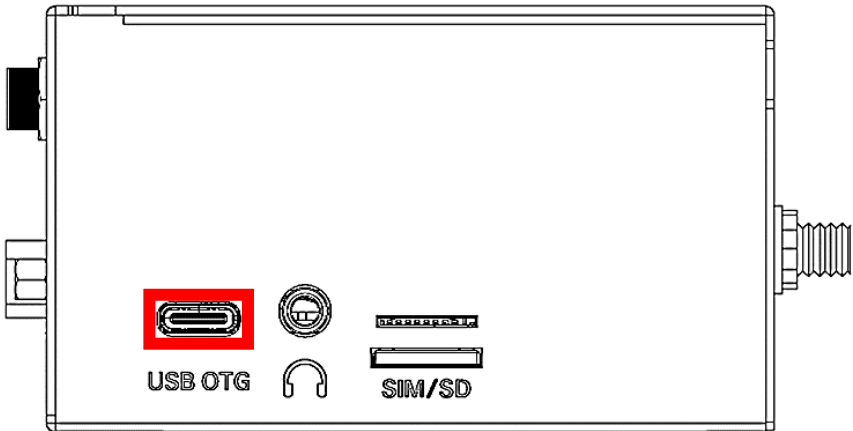
Pin	Pin Name	Signal Type	Signal Level
1	HDMI_TX2P_CONN	DIFF	
2	GND	GND	GND
3	HDMI_TX2N_CONN	DIFF	
4	HDMI_TX1P_CONN	DIFF	
5	GND	GND	GND
6	HDMI_TX1N_CONN	DIFF	
7	HDMI_TX0P_CONN	DIFF	
8	GND	GND	GND
9	HDMI_TX0N_CONN	DIFF	
10	HDMI_TXCP_CONN	DIFF	
11	GND	GND	GND
12	HDMI_TXCN_CONN	DIFF	
13	PORT_CEC	OUT	
14	N.C.	N/A	N/A
15	HDMI_SCL	I/O	
16	HDMI_SDA	I/O	
17	GND	GND	GND
18	VCC5V_HDMI	PWR	+5V
19	PORT_HPD	IN	

## 2.2.5 3.5mm Audio Jack w/ MIC Function



Pin	Pin Name	Signal Type	Signal Level
1	GND	GND	
2	HP_DET	IN	
3	HP_J_R	OUT	
4	N.C.	N/A	N/A
5	N.C.	N/A	N/A
6	HP_MIC1N	IN	
7	N.C.	N/A	N/A
8	HP_J_L	OUT	

## 2.2.6 USB 3.2 Gen 1 Type-C OTG

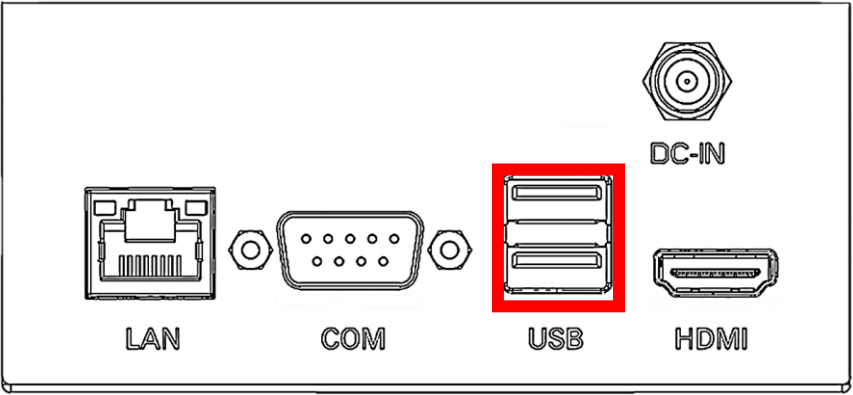


Pin	Pin Name	Signal Type	Signal Level
A1	GND	GND	GND
A2	TYPECO_TX1P_C	DIFF	
A3	TYPECO_TX1N_C	DIFF	
A4	VBUS_TYPEC	PWR	
A5	TYPECC1	I/O	
A6	TYPECO_DP_C	DIFF	
A7	TYPECO_DM_C	DIFF	
A8	N.C.	N/A	N/A
A9	VBUS_TYPEC	PWR	
A10	TYPECO_RX2N_C	DIFF	
A11	TYPECO_RX2P_C	DIFF	
A12	GND	GND	GND
B1	GND	GND	GND
B2	TYPECO_TX2P_C	DIFF	
B3	TYPECO_TX2N_C	DIFF	
B4	VBUS_TYPEC	PWR	
B5	TYPECC2	I/O	
B6	TYPECO_DP_C	DIFF	
B7	TYPECO_DM_C	DIFF	
B8	N.C.	N/A	N/A
B9	VBUS_TYPEC	PWR	
B10	TYPECO_RX1N_C	DIFF	
B11	TYPECO_RX1P_C	DIFF	

Pin	Pin Name	Signal Type	Signal Level
B12	GND	GND	GND

**Note:** The driving current of VBUS\_TYPEC supports up to 2A.

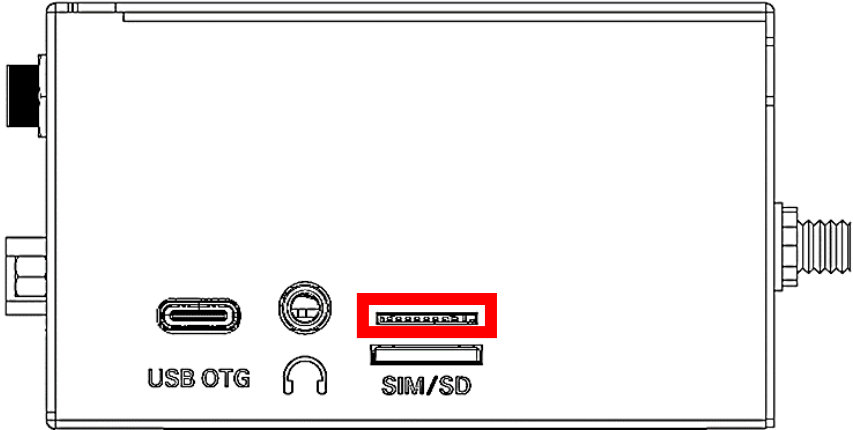
### 2.2.7 USB 3.2 Gen 1/USB 2.0 Port



Pin	Pin Name	Signal Type	Signal Level
1	5V_USB_C	PWR	+5V
2	USB3_DM_C	DIFF	
3	USB3_DP_C	DIFF	
4	GND	GND	GND
5	USB3_SSRXN_C	DIFF	
6	USB3_SSRXP_C	DIFF	
7	GND	GND	GND
8	USB3_SSTXN_C	DIFF	
9	USB3_SSTXP_C	DIFF	
10	5V_USB_C	PWR	+5V
11	USB2_N_C	DIFF	
12	USB2_P_C	DIFF	
13	GND	GND	GND

**Note:** The driving current of 5V\_USB\_C supports up to 2A.

## 2.2.8 Nano SIM Card



Pin	Pin Name	Signal Type	Signal Level
C3	USIM_CLK	IN	
C7	USIM_DATA	I/O	
C2	USIM_RESET	IN	
C1	USIM_PWR	PWR	
C6	N.C.	N/A	
CD	Card Detect	IN	
C5	GND	GND	GND

**Note:** CN22 must be used with the Nano SIM Card tray (P/N: P2M0410010).