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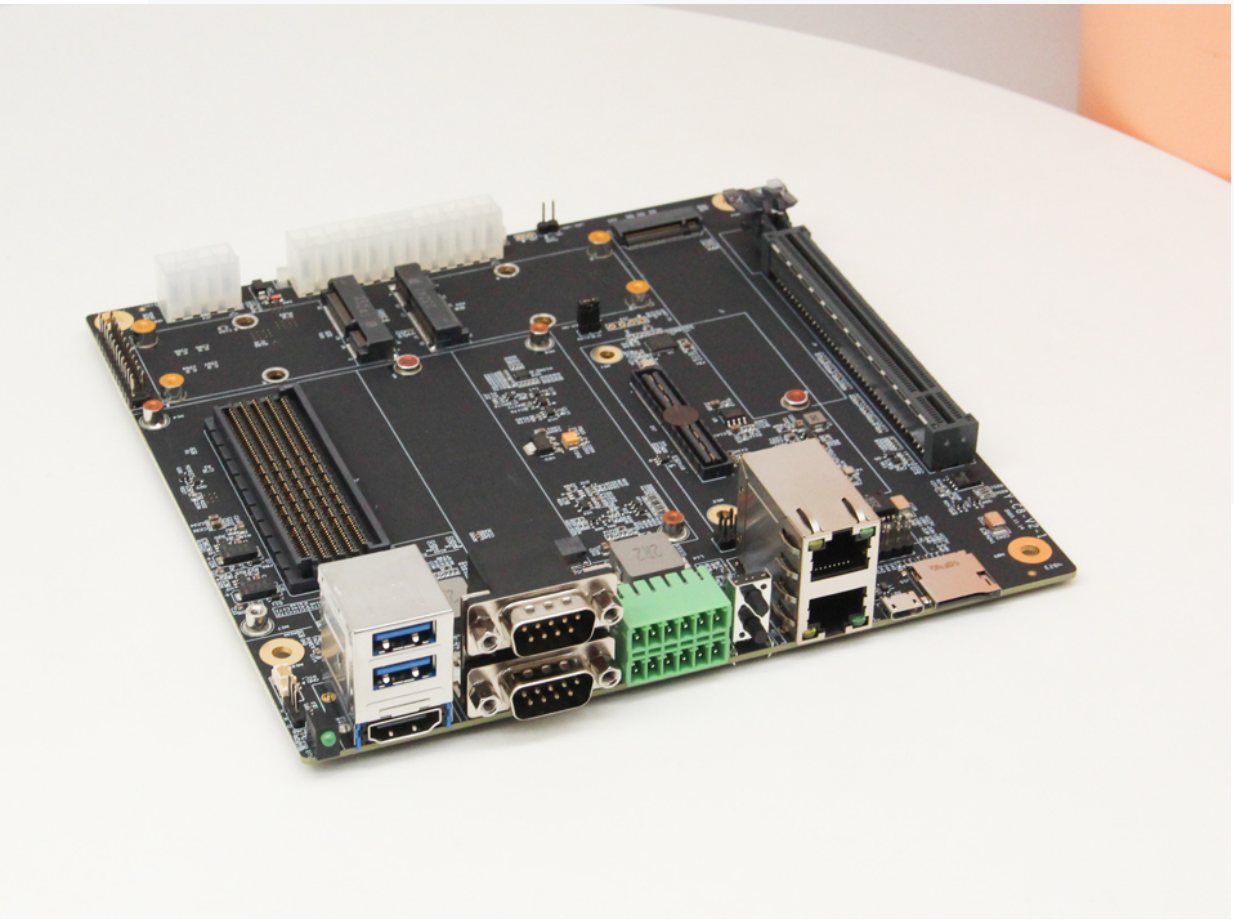
AI Development Carrier Board

Y-C8

Datasheet



Version V2.2

Date 2024-03-21

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Document History

Version	Date	Description of Change	Hardware Version
V 1.0	2022-2-10	Preliminary Release	V 1.0
V 1.0	2022-3-23	Update the camera module pin definition.	V 1.0
V 1.0.1	2022-4-6	Update the document home page, header and footer; Update the description of PCIe signals; Update the product feature description.	V 1.0
V 1.1	2022-7-4	Update 4.20 System power control connector signal definition; Change button to power on; Updated the description of the Recovery mode in section 3.3Release SW1 button after more than 3 seconds; Add parameters when the loading board is equipped with the AGX ORIN module.	V 1.0
V 2.0	2023-3-13	Added support for V2.0 hardware.	V1.0/V2.0
V 2.1	2024-1-4	Modify the product manual template; Added interface test description; Added Jetpack5.* version GPIO mapping number;	V1.0/V2.0
V 2.2	2024-3-21	Add Jetpack6.* version, RS232 serial port device name description.	V1.0/V2.0

Hardware Update History

Version	Date	Description of Change
V 1.0	2022-2-10	Initial version
V2.0	2023-3-13	1. Add PCIe X16 connector (J9) Soft shutdown and power-off function. 2. Added the AGX Xavier module and AGX ORIN module RTC Power supply selection function (J46); 3. replace the J25 connector model: XH2.54-4P -> 2.54 single-row pins with 4-pin spacing;

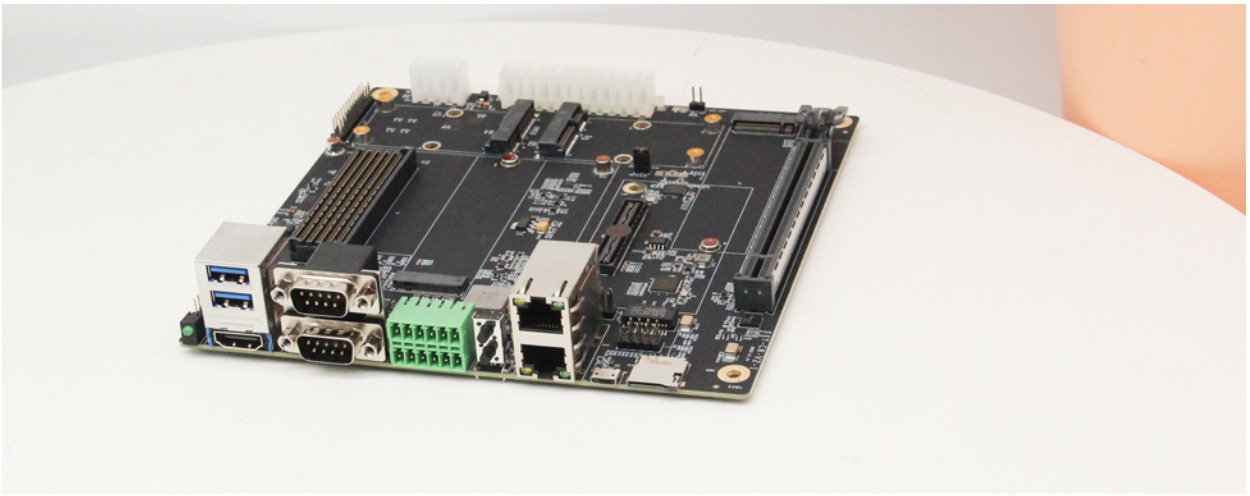
Electronic components and circuits are very sensitive to electrostatic discharge, although the company will design the main interface on the board card to do anti-static protection design, but it is difficult to do anti-static safety protection for all components and circuits. Therefore, it is recommended that you take ESD safety measures when handling any circuit board component.

ESD safety measures include but are not limited to the following:

1. Put the card in an ESD bag during transportation or storage. Do not take out the card until installation and deployment.
2. Before touching the board, release the static electricity stored in the body: Wear a grounding wrist strap.
3. Operate circuit boards only in electrostatic discharge safe areas.
4. Avoid moving circuit boards in carpeted areas.
5. Avoid direct contact with electronic components on the board through edge contact.

Table of Contents

1 Introduction



Y-C8 is a standard Mini-ITX carrier with NVIDIA Jetson AGX Orin/AGX Xavier series core modules. Suitable for compact deployment requirements. The main interface is designed for electrostatic safety protection, and the power supply application scheme with high reliability is adopted. The input power supply has the functions of overvoltage and reverse polarity protection, and has a rich external interface. All the devices on the board adopt wide temperature models. In order to facilitate the design of the shell structure, the important interfaces of the Y-C8 carrier board are designed in one side.

The Y-C8 carrier board can carry hundreds of functional modules through one PCIe x16 connector (supporting only PCIe x8 signals) and two miniPCIe connectors (including USB2.0 and PCIe X1 signals) to achieve further expansion of system functions. Can be expanded to 4 full speed USB3.0 signals, 4 gigabit network signals, 2 full speed SATA signals, can also be equipped with up to 256G Mini PCIe storage, various formats of video capture/output card, AD capture card, multi-serial card, sound capture/output card, multi-function I/O card...

2 Specifications

	Specific
Carrier Board	Y-C8
Module	NVIDIA Jetson AGX Xavier / AGX ORIN Series Modules
Temperature	-40 ~ +85℃
Dimensions (L×W×H)	170mm * 170mm * 34mm (Including I/O ports and mounting holes)
Weight	260g

Power Supply	Spec
Input Type	DC
Input Voltage	+12V

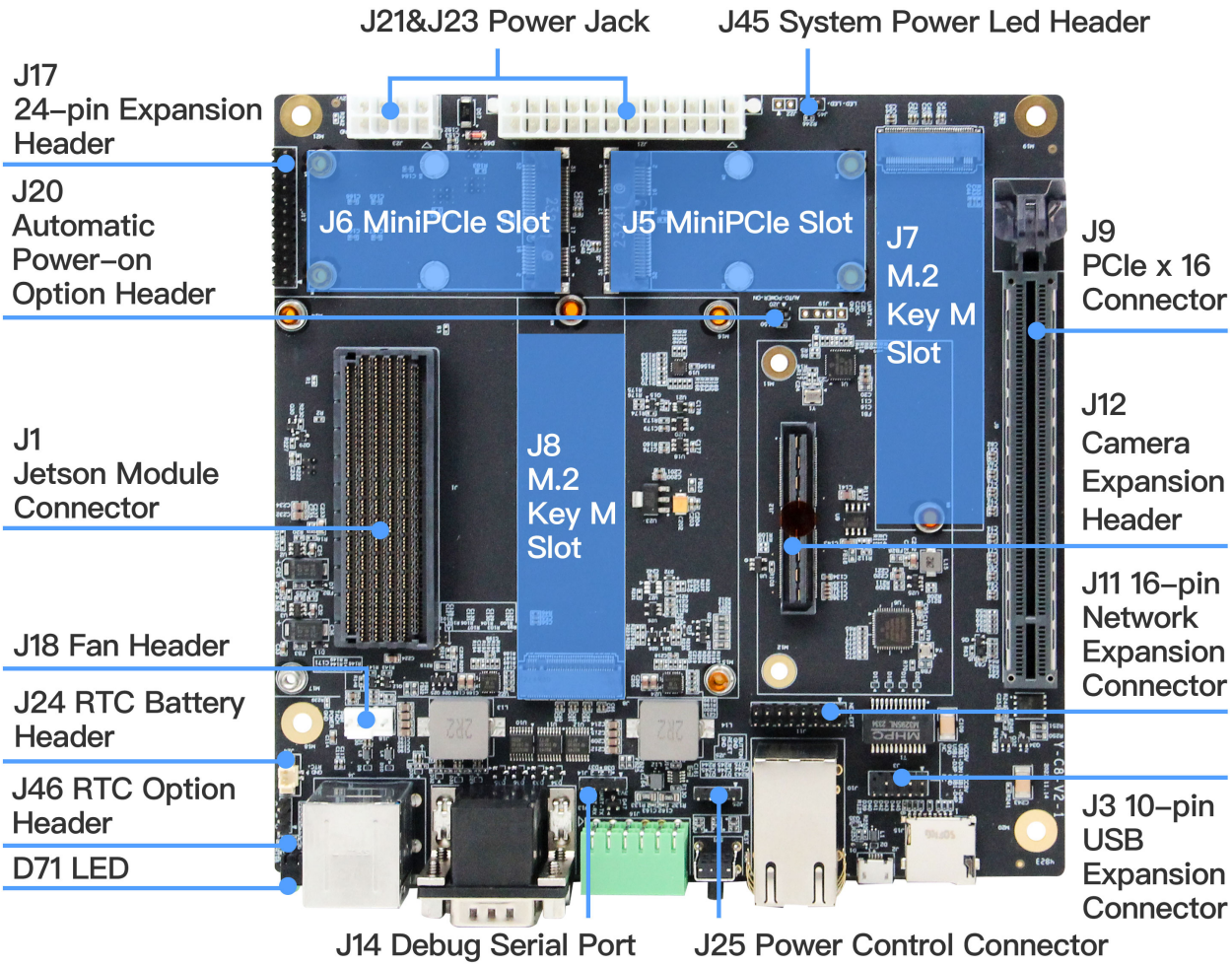
I/O Ports

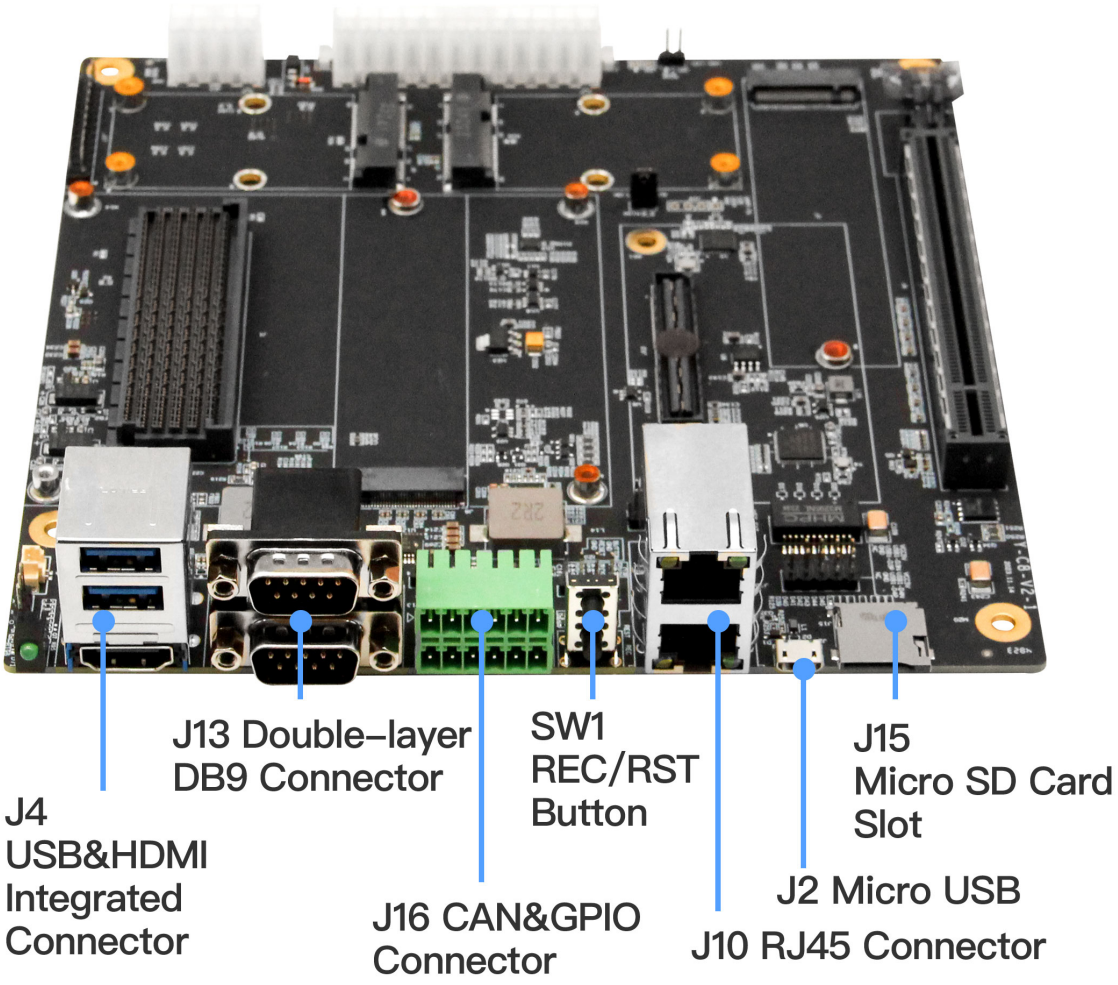
Interface	Quantity	Interface	Quantity
USB3.0 Type-A	2	Micro USB	1
miniPCIe Slot	2	HDMI	1
M.2 Key M Slot (2280)	2	CAN (include transceiver)	2
RTC Battery Connector	1	RJ45	2
RS232 serial port	2	Micro SD Card Slot	1
Camera Connector	1	PCIe x16	1
Fan Header	1	Power Jack	1
GPIO	4	USB2.0 (10pin Header)	1(2xUSB2.0)
24pin Expansion Header		1(SPI / I2S / I2C / PWM / GPIO)	
Note： When used with the Jetson AGX Xavier module, only one USB Type A supports full speed 3.0, the other USB Type 2.0, and one miniPCIe and one M.2 Key M port are unavailable。			

NVIDIA Jetson Series Modules Technical Specifications

Module	Jetson AGX Xavier 32GB	Jetson AGX Xavier 64GB	Jetson AGX Orin 32GB	Jetson AGX Orin 64GB
AI Performance	32 TOPS		200 TOPS	275 TOPS
GPU	512-core NVIDIA Volta architecture GPU with 64 Tensor Cores		1792-core NVIDIA Ampere architecture GPU with 56 Tensor Cores	2048-core NVIDIA Ampere architecture GPU with 64 Tensor Cores
CPU	8-core NVIDIA Carmel Arm® v8.2 64-bit CPU 8MB L2 + 4MB L3		8-core Arm® Cortex®-A78AE v8.2 64-bit CPU 2MB L2 + 4MB L3	12-core Arm® Cortex®-A78AE v8.2 64-bit CPU 3MB L2 + 6MB L3
Memory	32GB 256-bit LPDDR4x 136.5GB/s	64GB 256-bit LPDDR4x 136.5GB/s	32GB 256-bit LPDDR5 204.8 GB/s	64GB 256-bit LPDDR5 204.8 GB/s
Storage	32GB eMMC 5.1		64GB eMMC 5.1	
Video Encode	4x 4K60 (H.265) 8x 4K30 (H.265) 16x 1080p60 (H.265) 32x 1080p30 (H.265)		1x 4K60 (H.265) 3x 4K30 (H.265) 6x 1080p60 (H.265) 12x 1080p30 (H.265)	2x 4K60 (H.265) 4x 4K30 (H.265) 8x 1080p60 (H.265) 16x 1080p30 (H.265)
Video Decode	2x 8K30 (H.265) 6x 4K60 (H.265) 12x 4K30 (H.265) 26x 1080p60 (H.265) 52x 1080p30 (H.265)		1x 8K30 (H.265) 2x 4K60 (H.265) 4x 4K30 (H.265) 9x 1080p60 (H.265) 18x 1080p30 (H.265)	1x 8K30 (H.265) 3x 4K60 (H.265) 7x 4K30 (H.265) 11x 1080p60 (H.265) 22x 1080p30 (H.265)
Power	10W - 30W		15W - 40W	15W - 60W

3 External I/O Ports



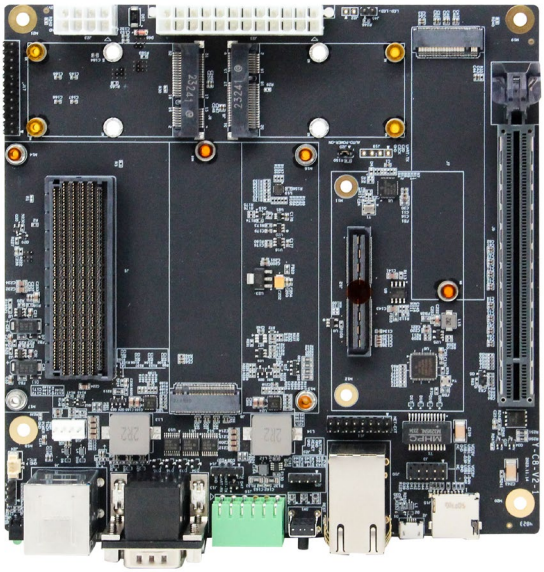

J4
USB&HDMI
Integrated
Connector
J13 Double-layer
DB9 Connector
J16 CAN&GPIO
Connector
SW1
REC/RST
Button
J10 RJ45 Connector
J2 Micro USB
J15
Micro SD Card
Slot

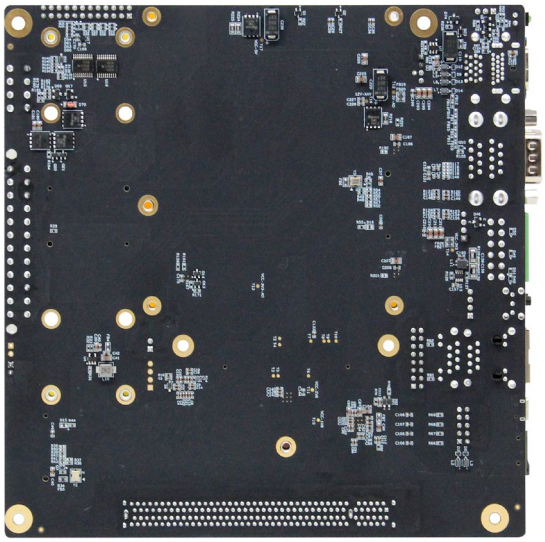
Sign	Function	Sign	Function
J1	Jetson Module Connector	J2	Micro USB Connector
J3	10pin USB Expansion Connector	J4	USB&HDMI Integrated Connector
J5/J6	miniPCIe Slot	J7/J8	M.2 Key M Slot(support 2280 size)
J9	PCIe x16 Connector(Only support PCIe x8 signal)	J10	Double-layer RJ45 Connector
J11	16pin Network Expansion Header	J12	Camera Expansion Header
J13	Double-layer DB9 Connector (RS232)	J14	Debug Serial Port Header
J15	Micro SD Card Slot	J16	CAN & GPIO Connector
J17	24pin Expansion Header	J18	FAN Header
J20	Automatic Power-on Option Header	J21/J23	Power Jack(Concurrent usage is not supported)
J24	RTC Battery Header	J25	Power Control Connector
D71	Power LED	J46	RTC Option Header
SW1	Recovery Button	Reset	Reset Button
J45	System Power Led Header（Switch key indicator light）		

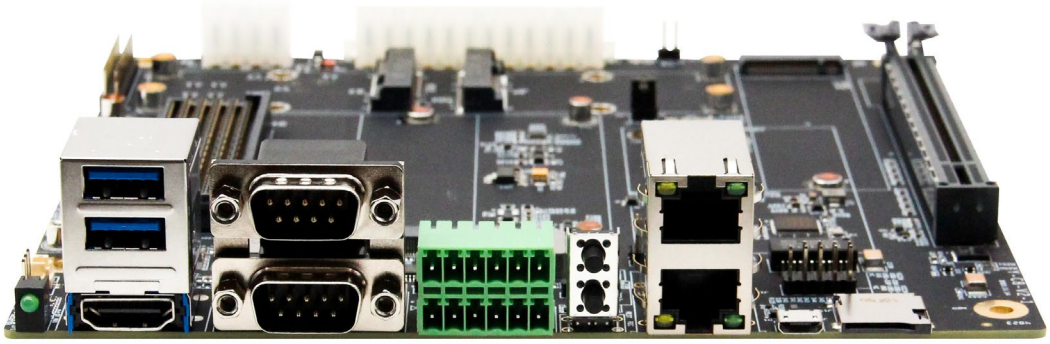
Notes：

- J6 & J8 connectors are not available with the Jetson AGX Xavier module.
- The RJ45 connector near the PCB of the J10 connector can be used directly. The other connector needs to be added to the single-network port NIC through miniPCIe, and the NIC signal can be connected to the J11.
- The J9 PCIe x16 connector supports only PCIe x8 signals and does not support soft shutdown and power-off when V1.0 hardware is used. V2.0 hardware supports soft shutdown and power-off.
- Only one J21 and J23 power supply port needs to be connected during use.
- J24 RTC battery socket, using V1.0 hardware, RTC function cannot be used with AGX ORIN module. V2.0 hardware needs to be used with J46.
- Only V2.0 hardware has the J46 RTC function switch pin.
- The key near the PCB is the Recovery button, and the other key is the Reset button.

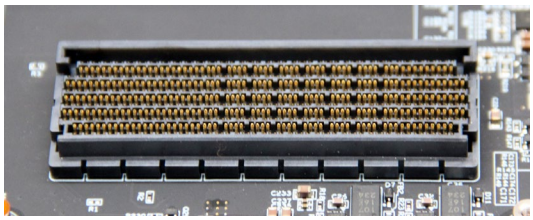
4 All-Round Display

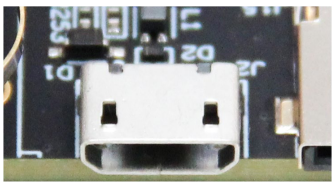






5 Connector Description

Jetson Module Connector（J1）		
Function	Connect NVIDIA Jetson AGX Orin / AGX Xavier Series Modules	
Sign	J1	
Type/Model	699pin SO-DIMM	
Explain	For pin definitions of this connector, refer to the pin definition instructions in the NVIDIA Jetson AGX ORIN / AGX Xavier series module datasheet.	

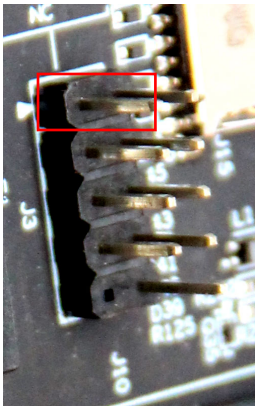
Micro USB 2.0（J2）		
Function	USB 2.0 OTG connector	
Sign	J2	
Type/Model	Type-B standard Micro USB 2.0 connector (Use to flash system)	
Pin definition	<table><tr><th>Pin</th><th>Signal</th><th>Pin</th><th>Signal</th></tr><tr><td>1</td><td>VBUS</td><td>2</td><td>USB 2.0 D-</td></tr><tr><td>3</td><td>USB 2.0 D+</td><td>4</td><td>NC</td></tr><tr><td>5</td><td>GND</td><td></td><td></td></tr></table>	

USB2.0 Signal Expansion Header（J3）

Function	USB2.0 Signal Expansion Header
Sign	J3
Type/Model	10-pin(2*5), 2.0mm pitch
Pin definition	See table below

Pin	Signal	Pin	Signal
1	VCC_3V3	2	VCC_3V3
3	USB1_D3_N	4	USB1_D4_N
5	USB1_D3_P	6	USB1_D4_P
7	GND	8	GND
9	NC	10	NC

Pin 1 position: right picture identification.

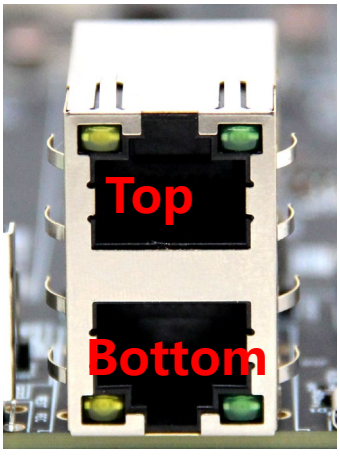


Ethernet Jack（J10）

Function	10/100/1000Mbps Ethernet
Sign	J10
Type/Model	RJ45 ethernet socket(x2 stacked)
Pin definition	See table below

Pin	Signal	Pin	Signal
1	TP0+	2	TP0-
3	TP1+	4	TP2+
5	TP2-	6	TP1-
7	TP3+	8	TP3-

The top RJ45 network port needs to be expanded to use the miniPCIe port to connect the expanded network port to the J11 pin.

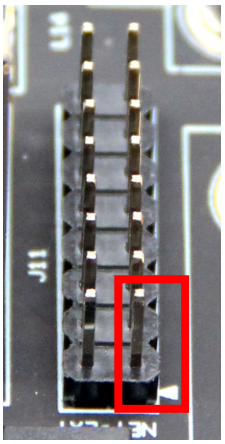


Network Expansion Header（J11）

Function	Network expansion header
Sign	J11
Type/Model	16-pin(2*8), 2.0mm pitch
Pin definition	See table below

Pin	Signal	Pin	Signal
1	GND	2	VCC_3V3
3	VCC_3V3	4	VCC_3V3
5	ETH_ACT	6	ETH_LINK
7	NC	8	NC
9	ETH_N_0	10	ETH_P_0
11	ETH_N_1	12	ETH_P_1
13	ETH_N_2	14	ETH_P_2
15	ETH_N_3	16	ETH_P_3

Pin 1 position: right picture identification. The single-network NIC is expanded through the miniPCIe port, which corresponds to the upper network port of the double-layer RJ45 network port.

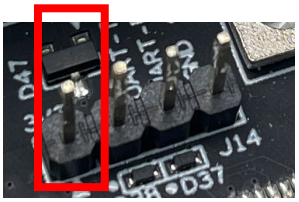


Debug Serial Port（J14）

Function	DEBUG Serial Port
Sign	J14
Type/Model	4-pin, 2.0mm pitch
Pin definition	See table below

Pin	Signal	Pin	Signal
1	3.3V	2	UART3_TX
3	UART3_RX	4	GND

The default serial port setting: 115200,8N1.
Pin 1 position: right picture identification.



USB3.0 & HDMI Connector（J4）

Function	USB3.0 & HDMI Connector
Sign	J4
Type/Model	Type A standard USB3.0 & HDMI Connector

Pin definition

HDMI pin definition as following：

Pin	Signal	Pin	Signal
1	D2+	2	D2_SHIELD
3	D2-	4	D1+
5	D1_SHIELD	6	D1-
7	D0+	8	D0_SHIELD
9	D0-	10	CK+
11	CK_SHIELD	12	CK-
13	CEC	14	RESERVED
15	SCL	16	SDA
17	DDC/CEC_GND	18	+5V
19	HP_DETS		

USB3.0 pin definition as following：

When the Jetson AGX Xavier module is installed, the lower USB only USB2.0 signal is available.

Pin	Signal	Pin	Signal
1	VBUS	2	USB 2.0 D-
3	USB 2.0 D+	4	GND
5	SSRX-	6	SSRX+
7	GND	8	SSTX-
9	SSTX+		

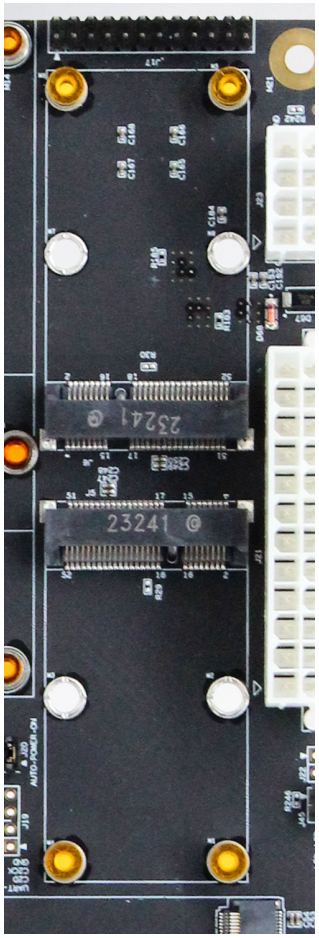
miniPCIe Slot（J5 & J6）

Function	miniPCIe slot
Sign	J5 & J6
Type/Model	5.6mm high, support full-length and half-length expansion cards

Pin definition

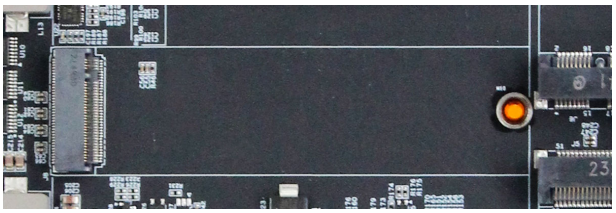
Pin	Signal	Pin	Signal
1	PEX_WAKE_N	2	VCC_3V3_PCIE
3	NC	4	GND
5	NC	6	VCC_1V5_PCIE
7	PEX_CLKREQ	8	NC
9	GND	10	NC
11	UPHY_REFCLK_N	12	NC
13	UPHY_REFCLK_P	14	NC
15	GND	16	NC
17	NC	18	GND
19	NC	20	NC
21	GND	22	PEX_RST_N
23	UPHY_RX_N	24	VCC_3V3_PCIE
25	UPHY_RX_P	26	GND
27	GND	28	VCC_1V5_PCIE
29	GND	30	NC
31	UPHY_TX_N	32	NC
33	UPHY_TX_P	34	GND
35	GND	36	USB1_D_N
37	GND	38	USB1_D_P
39	VCC_3V3_PCIE	40	GND
41	VCC_3V3_PCIE	42	NC
43	GND	44	NC
45	NC	46	NC
47	NC	48	VCC_1V5_PCIE
49	NC	50	GND
51	NC	52	VCC_3V3_PCIE

When the AGX Xavier module is installed, PCIE signals at the J6 position are unavailable.



M.2 Key M Slot（J7 & J8）

Function	M.2 Key M Slot
Sign	J7 & J8
Type/Model	Key M , 2280 Size



Pin definition

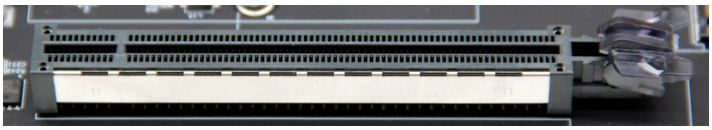
Standard M.2 Key M slot

When the Jetson AGX Xavier module is used, the M.2 slot on the J8 is unavailable.

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	GND	2	VCC_3V3	3	GND	4	VCC_3V3
5	UPHY_RX5_N	6	NC	7	UPHY_RX5_P	8	NC
9	GND	10	LED	11	UPHY_TX5_N	12	VCC_3V3
13	UPHY_TX5_P	14	VCC_3V3	15	GND	16	VCC_3V3
17	UPHY_RX4_N	18	VCC_3V3	19	UPHY_RX4_P	20	NC
21	GND	22	NC	23	UPHY_TX4_N	24	NC
25	UPHY_TX4_P	26	NC	27	GND	28	NC
29	UPHY_RX3_N	30	NC	31	UPHY_RX3_P	32	NC
33	GND	34	NC	35	UPHY_TX3_N	36	NC
37	UPHY_TX3_P	38	NC	39	GND	40	I2C_CLK
41	UPHY_RX2_N	42	I2C_DAT	43	UPHY_RX2_P	44	ALERT_N
45	GND	46	NC	47	UPHY_TX2_N	48	NC
49	UPHY_TX2_P	50	PEX_RST_N	51	GND	52	PEX_CLKREQ
53	UPHY_REFCLK_N	54	PEWAKE_N	55	UPHY_REFCLK_P	56	NC
57	GND	58	NC	59	NC	60	NC
61	NC	62	NC	63	NC	64	NC
65	NC	66	NC	67	NC	68	SUSCLK(32Khz)
69	NC	70	VCC_3V3	71	GND	72	VCC_3V3
73	GND	74	VCC_3V3	75	GND		

PCIE Connector（J9）

Function	PCIE Connector
Sign	J9
Type/Model	11mm high，PCIe x16



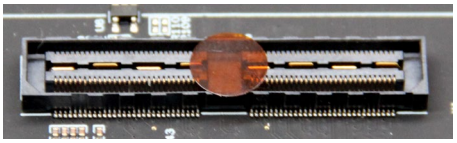
Pin definition

This port supports only PCIe x8 signals but not PCIe x16 signals. If V1.0 hardware is used, this port does not support soft shutdown and power-off. If V2.0 hardware is used, this port supports soft shutdown and power-off.

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
A1	GND	B1	VCC_12V	A26	UPHY_RX14_N	B26	GND
A2	VCC_12V	B2	VCC_12V	A27	GND	B27	UPHY_TX15_P
A3	VCC_12V	B3	VCC_12V	A28	GND	B28	UPHY_TX15_N
A4	GND	B4	GND	A29	UPHY_RX15_P	B29	GND
A5	SPI2_SCK	B5	I2C3_CLK	A30	UPHY_RX15_N	B30	NC
A6	SPI2_MISO	B6	I2C3_DAT	A31	GND	B31	PEX_PRSNT
A7	SPI2_MOSI	B7	GND	A32	NC	B32	GND
A8	SPI2_CS0	B8	VCC_3V3	A33	NC	B33	UPHY_TX16_P
A9	VCC_3V3	B9	SLVS_XCLR	A34	GND	B34	UPHY_TX16_N
A10	VCC_3V3	B10	VCC_3V3	A35	UPHY_RX16_P	B35	GND
A11	PEX_RST	B11	PEX_WAKE	A36	UPHY_RX16_N	B36	GND
A12	GND	B12	PEX_CLKREQ	A37	GND	B37	UPHY_TX17_P
A13	UPHY_REFCLK_P	B13	GND	A38	GND	B38	UPHY_TX17_N
A14	UPHY_REFCLK_N	B14	UPHY_TX12_P	A39	UPHY_RX17_P	B39	GND
A15	GND	B15	UPHY_TX12_N	A40	UPHY_RX17_N	B40	GND
A16	UPHY_RX12_P	B16	GND	A41	GND	B41	UPHY_TX18_P
A17	UPHY_RX12_N	B17	PEX_PRSNT	A42	GND	B42	UPHY_TX18_N
A18	GND	B18	GND	A43	UPHY_RX18_P	B43	GND
A19	NC	B19	UPHY_TX13_P	A44	UPHY_RX18_N	B44	GND
A20	GND	B20	UPHY_TX13_N	A45	GND	B45	UPHY_TX19_P
A21	UPHY_RX13_P	B21	GND	A46	GND	B46	UPHY_TX19_N
A22	UPHY_RX13_N	B22	GND	A47	UPHY_RX19_P	B47	GND
A23	GND	B23	UPHY_TX14_P	A48	UPHY_RX19_N	B48	PEX_PRSNT
A24	GND	B24	UPHY_TX14_N	A49	GND	B49	GND
A25	UPHY_RX14_P	B25	GND				

Camera Expansion Header（J12）

Function	Camera Expansion Header
Sign	J12
Type/Model	0.5mm pitch，120pin QSH-060-01-H-D-A-K-TR connector

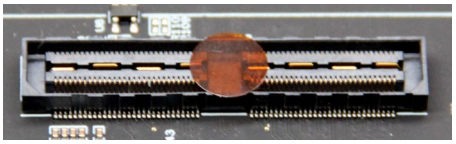


Pin definition

Pin	Signal	Pin	Signal	Pin	Signal
1	CSI0_D0_P	2	CSI1_D0_P	3	CSI0_D0_N
4	CSI1_D0_N	5	GND	6	GND
7	CSI0_CLK_P	8	CSI1_CLK_P	9	CSI0_CLK_N
10	CSI1_CLK_N	11	GND	12	GND
13	CSI0_D1_P	14	CSI1_D1_P	15	CSI0_D1_N
16	CSI1_D1_N	17	GND	18	GND
19	CSI2_D0_P	20	CSI3_D0_P	21	CSI2_D0_N
22	CSI3_D0_N	23	GND	24	GND
25	CSI2_CLK_P	26	CSI3_CLK_P	27	CSI2_CLK_N
28	CSI3_CLK_N	29	GND	30	GND
31	CSI2_D1_P	32	CSI3_D1_P	33	CSI2_D1_N
34	CSI3_D1_N	35	GND	36	GND
37	CSI4_D0_P	38	CSI6_D0_P	39	CSI4_D0_N
40	CSI6_D0_N	41	GND	42	GND
43	CSI4_CLK_P	44	CSI6_CLK_P	45	CSI_CLK_N
46	CSI6_CLK_N	47	GND	48	GND
49	CSI4_D1_P	50	CSI6_D1_P	51	CSI4_D1_N
52	CSI6_D1_N	53	GND	54	GND
55	TEST_T2	56	TEST_T3	57	TEST_T4
58	TEST_T5	59	CSI5_D0_P	60	CSI7_D0_P
61	CSI5_D0_N	62	CSI7_D0_N	63	GND
64	GND	65	CSI5_CLK_P	66	CSI7_CLK_P
67	CSI5_CLK_N	68	CSI7_CLK_N	69	GND

Camera Expansion Header（J12）

Function	Camera Expansion Header
Sign	J12
Type/Model	0.5mm pitch，120pin QSH-060-01-H-D-A-K-TR Connector

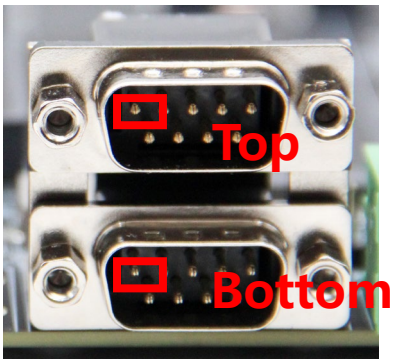


Pin definition

Pin	Signal	Pin	Signal	Pin	Signal
70	GND	71	CSI5_D1_P	72	CSI7_D1_P
73	CSI5_D1_N	74	CSI7_D1_N	75	I2C3_CLK_1V8
76	NC	77	I2C3_DAT_1V8	78	NC
79	GND	80	GND	81	VCC_2V8
82	VCC_2V8	83	VCC_2V8	84	TEST_T6
85	TEST_T7	86	NC	87	I2C2_CLK_1V8
88	CAM1_MCLK03_1V8	89	I2C2_DAT_1V8	90	CAM1_PWDN_1V8
91	CAM0_MCLK02_1V8	92	CAM1_RST_1V8	93	CAM0_PWDN_1V8
94	CAM2_MCLK04_1V8	95	CAM0_RST_BUF_1V8	96	NC
97	NC	98	NC	99	GND
100	GND	101	TEST_T8	102	VCC_1V8
103	NC	104	NC	105	I2C4_CLK_1V8
106	NC	107	I2C4_DAT_1V8	108	VCC_3V3
109	TEST_T9	110	VCC_3V3	111	NC
112	NC	113	NC	114	NC
115	GND	116	GND	117	TEST_T10
118	VCC_3V3	119	VDD_SYS_EN_1V8	120	VCC_3V3

DB9 Connector（J13）

Function	RS232 serial port
Sign	J13
Type/Model	DB9 Connector(x2 stacked)



Pin definition

Pin	Signal	Pin	Signal
1	NC	2	UART_RX_RS232
3	UART_TX_RS232	4	NC
5	GND	6	NC
7	NC	8	NC
9	NC		

Pin 1 position: right picture identification.
The device names in the system are as follows:

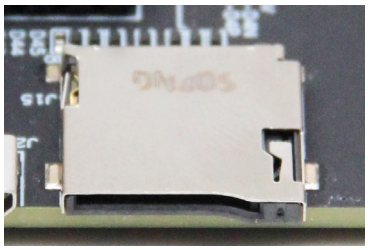
		Top Device Name	Bottom Device Name
AGX Xavier		/dev/ttyTHS1	/dev/ttyTHS0
AGX ORIN	Jetpack5.*	/dev/ttyTHS4	/dev/ttyTHS0
	Jetpack6.*	/dev/ttyTHS2	/dev/ttyTHS0

Micro SD Card Slot（J15）

Function	Micro SD Card Slot
Sign	J15
Type/Model	Micro SD （TF）

Pin definition

Pin	Signal	Pin	Signal
1	DATA2	2	DATA3
3	CMD	4	VCC(3.3V)
5	CLK	6	GND
7	DATA0	8	DATA1
9	CD	10	GND
11	GND	12	GND
13	GND		



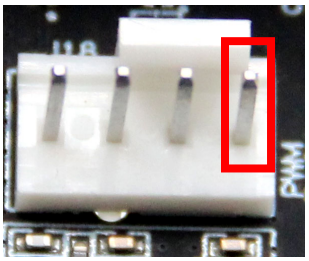
Fan Header（J18）

Function	4-pin fan header for 12V PWM fan
Sign	J18
Type/Model	47053-1000

Pin definition

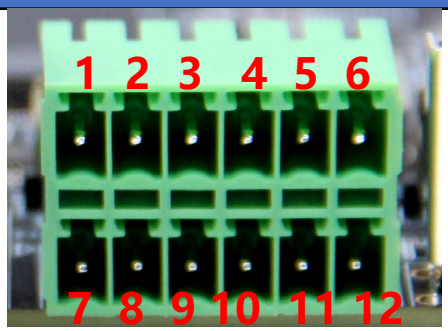
Pin	Signal	Pin	Signal
1	GND	2	POWER(12V)
3	TACH	4	PWM

Pin 1 position: right picture identification.



CAN & GPIO Connector（J16）

Function	CAN & GPIO signal connector
Sign	J16
Type/Model	2EDGKRH-3.5-2X6



Pin definition

The pin definition as follows：

Pin	Signal	Pin	Signal
1	CAN1_H	2	3.3V
3	CAN1_L	4	GND
5	GND	6	GPIO08
7	CAN0_H	8	GPIO09
9	CAN0_L	10	GPIO17
11	GND	12	GPIO27(PWM)

The resulting GPIO mapping numbers are shown in the following table, GPIO high level voltage is 3.3V.

Modules	AGX Xavier		AGX ORIN
Jetpack Version	<Jetpack5.0	>=Jetpack5.0	
GPIO08	256	313(PBB.00)	325(PBB.01)
GPIO09	257	314(PBB.01)	324(PBB.00)
GPIO17	417	436(PQ.01)	444(PP.04)
GPIO27	393	419(PN.01)	433(PN.01)

Description:
Take the AGX Xavier module, GPIO08, as an example, if the system version earlier than Jetpack5.0, run this command:

```
$ echo  256 >  /sys/class/gpio/export
```

After GPIO is enabled, the corresponding file name is generated: gpio256;

Then system version is later then Jetpack5.0, run this command:

```
$ echo  313  >  /sys/class/gpio/export
```

After GPIO is enabled, the corresponding file name is generated: PBB.00.

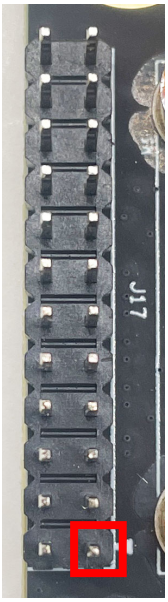
24-pin Extension Header（J17）

Function	Multi-function signal extension interface
Sign	J17
Type/Model	24-pin(2.0mm pitch, 2*12)

Pin definition

Pin	Signal	Pin	Signal
1	5V	2	3.3V
3	GND	4	GND
5	SPI1_MOSI_3V3	6	I2S2_CLK_3V3
7	SPI1_MISO_3V3	8	I2S2_DOUT_3V3
9	SPI1_SCK_3V3	10	I2S2_DIN_3V3
11	SPI1_CS0_3V3	12	I2S2_FS_3V3
13	SPI1_CS1_3V3	14	GND
15	GND	16	I2C5_CLK_3V3
17	PWM01_3V3	18	I2C5_DAT_3V3
19	GND	20	GND
21	GPIO35_PWM3_3V3	22	MCLK05_3V3
23	GND	24	GND

Pin 1 position: right picture identification.



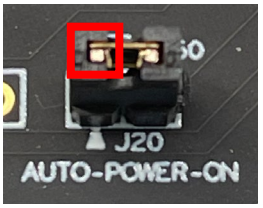
Auto Power On（J20）

Function	Auto-Power-On is enable when pin1 and pin2 are tied together
Sign	J20
Type/Model	2.0mm pitch, 2pin

Pin definition

Pin	Signal	Pin	Signal
1	3.3V	2	ACOK

Pin 1 position: right picture identification.



Power Jack （J21 & J23）

Function	Power supply input terminal
Sign	J21 & J23
Type/Model	44206-0001 & 39281083

Pin definition

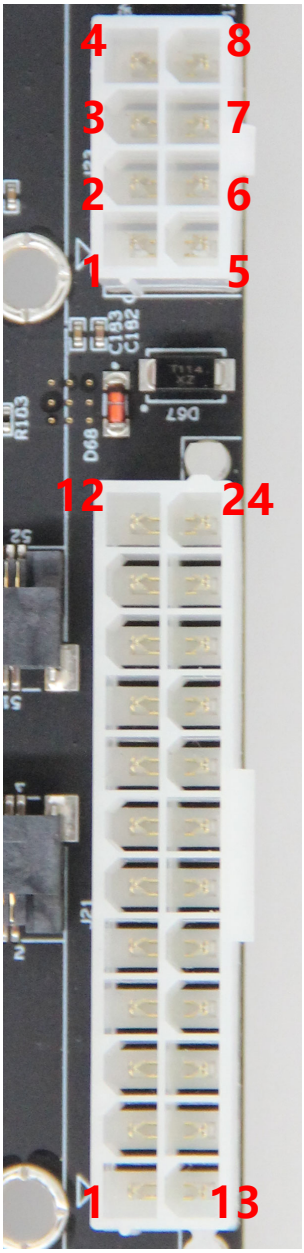
J21 power input port pins are defined as follows:

Pin	Signal	Pin	Signal
1	+3.3V	2	+3.3V
3	GND	4	+5V
5	GND	6	+5V
7	GND	8	NC
9	+5V	10	+12V
11	+12V	12	+3.3V
13	+3.3V	14	-12V
15	GND	16	PS_ON#
17	GND	18	GND
19	GND	20	NC
21	+5V	22	+5V
23	+5V	24	GND

J23 power input port pins are defined as follows:

Pin	Signal	Pin	Signal
1	GND	2	GND
3	GND	4	GND
5	+12V	6	+12V
7	+12V	8	+12V

During use, only one of the interfaces is required. The pin is shown on the right.

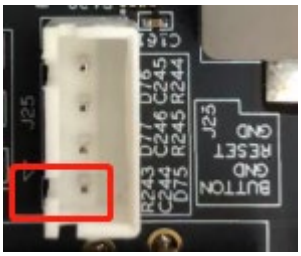


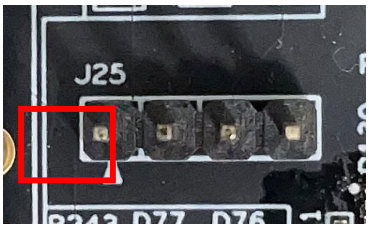
Power Supply Control Header（J25）

Function	Power supply control
Sign	J25
Type/Model	XH2.54-4P/ 2.54 pitch, 4pin
Pin definition	

Pin	Signal	Pin	Signal
1	POWER_ON	2	GND
3	RESET	4	GND

Connect this interface to the chassis switch and unshort-circuit J20 to set the system to press Key start.
The upper right image shows the V1.0 hardware diagram, and the lower right image shows the V2.0 hardware diagram.
Pin 1 Position: right picture identification.



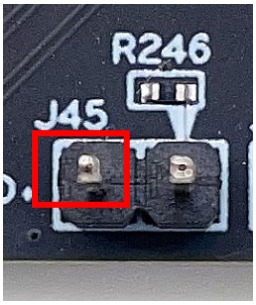


System Power LED（J45）

Function	System Power LED
Sign	J45
Type/Model	2.0mm pitch，2pin
Pin definition	

Pin	Signal	Pin	Signal
1	LED+	2	LED-

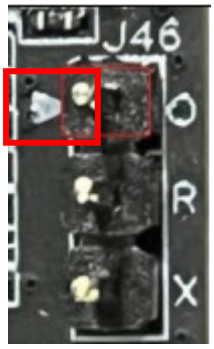
Pin 1 position: right picture identification.



RTC Power Supply Selection Header（J46）

Function	The RTC function switches when different modules are adapted
Sign	J46
Type/Model	2.54mm pitch，3pin
Pin definition	Pin 1 Position: right picture identification. With AGX ORIN module, if you need to use RTC function, please short pin1, pin2, If the AGX Xavier module needs to use the RTC function, short pin2 and pin3

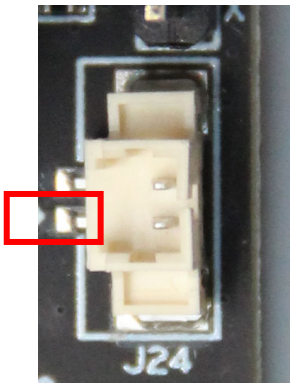
Pin	Signal	Pin	Signal	Pin	Signal
1	O	2	R	3	X



RTC Battery Socket（J24）

Function	Provides power support for the core board clock circuit
Sign	J24
Type/Model	2pin
Pin definition	Pin 1 position: right picture identification. When the V1.0 hardware is combined with the AGX ORIN module, the RTC function is not supported.

Pin	Signal	Pin	Signal
1	VCC (3.3V)	2	GND



6 Ordering Information

Order Type	Function
Y-C8	NVIDIA® Jetson™ AGX ORIN/AGX Xavier series module is equipped with miniaturized carrier board.

E-commerce Platform

Taobao Store Address：https://shop333807435.taobao.com/

Jingdong Store Address：https://mall.jd.com/index-11467104.html?from=pc

Ali International Station Address：https://plink-ai.en.alibaba.com/

7 Recovery Mode

Jetson core module can work in normal mode and Recovery mode. In Recovery mode, it can perform file system update, kernel update, Bootloader/UEFI update, BCT update and other operations.

To enter the Recovery mode, perform the following steps:

Power off the system.

Use a Micro-USB cable to connect the Micro-USB port (J2) of the Y-C8 to the Jetson development host USB port.

The Jetson development host should be Ubuntu18.04 or Ubuntu20.04 based on X86 architecture.

Press the Recovery key (SW1) to power the system. Hold down the Recovery key (SW1) for more than 3 seconds, and then release the Recovery key (SW1).

When the system enters Recovery mode, you can perform subsequent operations.

8 Method of Application

- Make sure all external system voltages are off.
- Install the Jetson core module onto the J1 high-speed connector. Ensure that the connectors are aligned with even force. After the module is installed in place, install the core module fixing screws.
- Install necessary external cables. (such as: the display line connected to the HDMI display, the power input line for the system power supply, the USB cable connecting the keyboard and mouse...)
- Connect the power cable to the power supply.(Make sure that the heat dissipation device on the core module is installed before power-on)
- For a system without a protective cover, do not move the hardware system after the system is powered on. Do not touch the circuit board or any electronic components on the circuit board with your body.

9 GPIO Test

Y-C8 leads to the 4-way CPIO of the Jetson core modules. Programmable output voltage 3.3V, please note that the input voltage does not exceed 3.3V.

Take the AGX ORIN module，L4T35.3.1，GPIO08 as an example:

The content after the '#' in the following command is a comment and does not need to be added when executing the command.

- sudo su
- echo 325 > /sys/class/gpio/export # Enable GPIO（Or initialize GPIO)
- echo out > /sys/class/gpio/PBB.01/direction
  #Set the GPIO input and output directions to out or in.
- echo 1 > /sys/class/gpio/PBB.01/value
  # Set the GPIO output high/low level to 1 for high and 0 for low.

#The preceding absolute path name is based on the actual path name generated after GPIO is enabled.

When set to the input state, you can only read values. When set to the output state, you can read and write values.

- cat /sys/class/gpio/PBB.01/value #Get GPIO value.

The output state can be measured using a multimeter to measure the voltage between the specific lead heel GND.

10 CAN Test

Y-C8 is equipped with two CAN signals when it is equipped with Jetson module. During test, connect the CAN_H of the device to the CAN_H of the device under test and the CAN_L to the CAN_L of the device under test.

The test command is as follows:

- sudo apt-get install busybox can-utils

#Writes the specified value to a register

Different modules need to write to the address of the register, and the value written is inconsistent. See the links at the end of this section for details.

- sudo busybox devmem 0x0c303020 w 0x458
- sudo busybox devmem 0x0c303018 w 0x400
- sudo busybox devmem 0x0c303010 w 0x458
- sudo busybox devmem 0x0c303008 w 0x400
- sudo modprobe can #Load the CAN bus subsystem support module
- sudo modprobe can_raw #Load the original CAN protocol module.
- sudo modprobe mttcan #Load CAN interface support
- sudo ip link set can0 type can bitrate 500000
  #Set CAN0 bit rate to 500k bps
- sudo ip link set can1 type can bitrate 500000
  #Set CAN1 bit rate to 500k bps
- sudo ip link set up can0 #Open CAN0
- sudo ip link set up can1 #Open CAN1
- candump can0 #Set CAN0 to receive
- cansend can1 1F223344#1122334455667788

  # # Open another terminal to send data through CAN1. After sending, there will be data echo at the receiving end of CAN0.

  See links for different module register values:

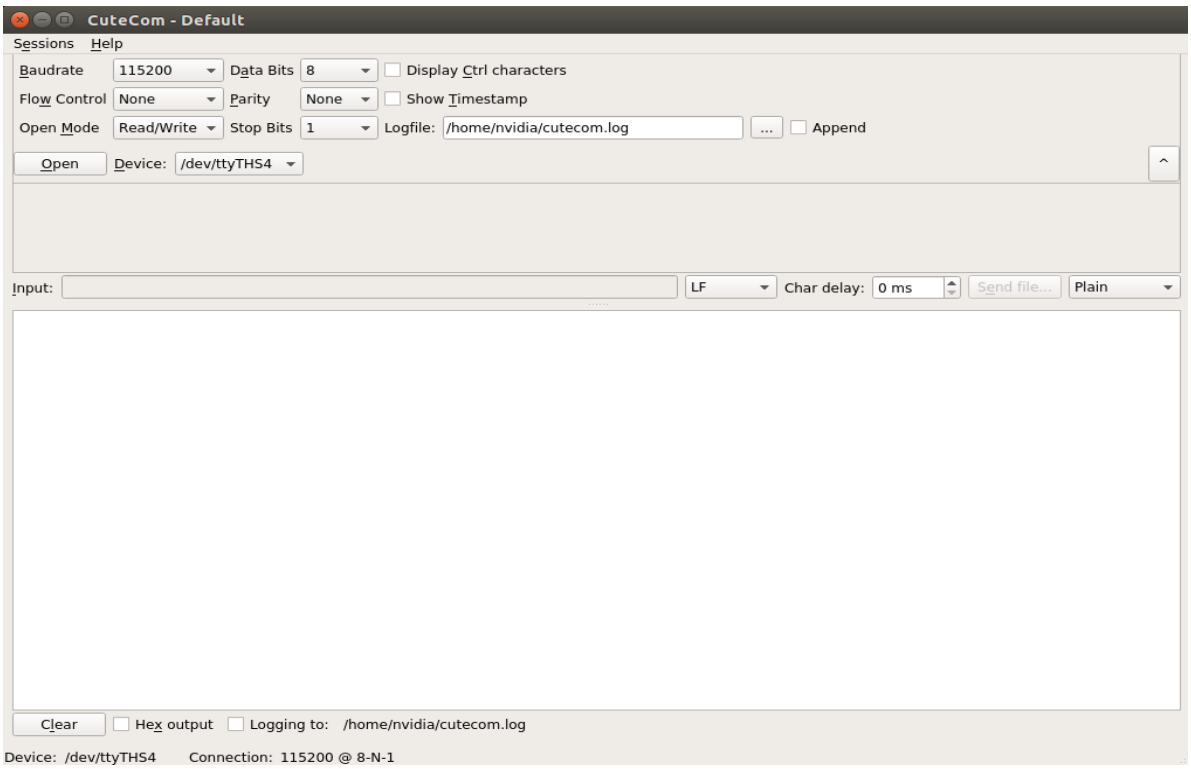
  Controller Area Network (CAN) — Jetson Linux Developer Guide documentation (nvidia.com)

11 Serial Port Test

Y-C8 is equipped with two RS232 serial ports as standard when it is paired with Jetson module, which can be used for self-collecting test of a single serial port and interconnection test of two serial ports. The command is as follows:

- sudo apt-get install cutecom #Install the serial port test tool
- sudo cutecom # For a single-serial port test, you only need to open one cutecom interface on each terminal. For a two-serial port connection test, use two terminals and open two cutecom interfaces.
- When testing a single serial port, connect the RX of a single serial port to the TX. When the two serial ports are connected, the RX of UART1 is connected to the TX of UART2, and the TX of UART1 is connected to the RX of UART2.

The interface of the serial port test tool cutecom is as follows:



12 Special Instructions

- Initial system username: **nvidia** , password: **nvidia**， no password su. If root permissions are required, use sudo to grant permissions, or use sudo su to access the root user.
- The pre-installed system is pure by default and does not contain Jetpack software. You can use the following command to install the software. Do not replace or modify the default software source before installation:
    - sudo apt-get update
    - sudo apt-get install nvidia-jetpack
- It can also be installed over the network using SDKmanager software.
- For more information please refer to :Jetson wiki (plink-ai.com)