品立科技
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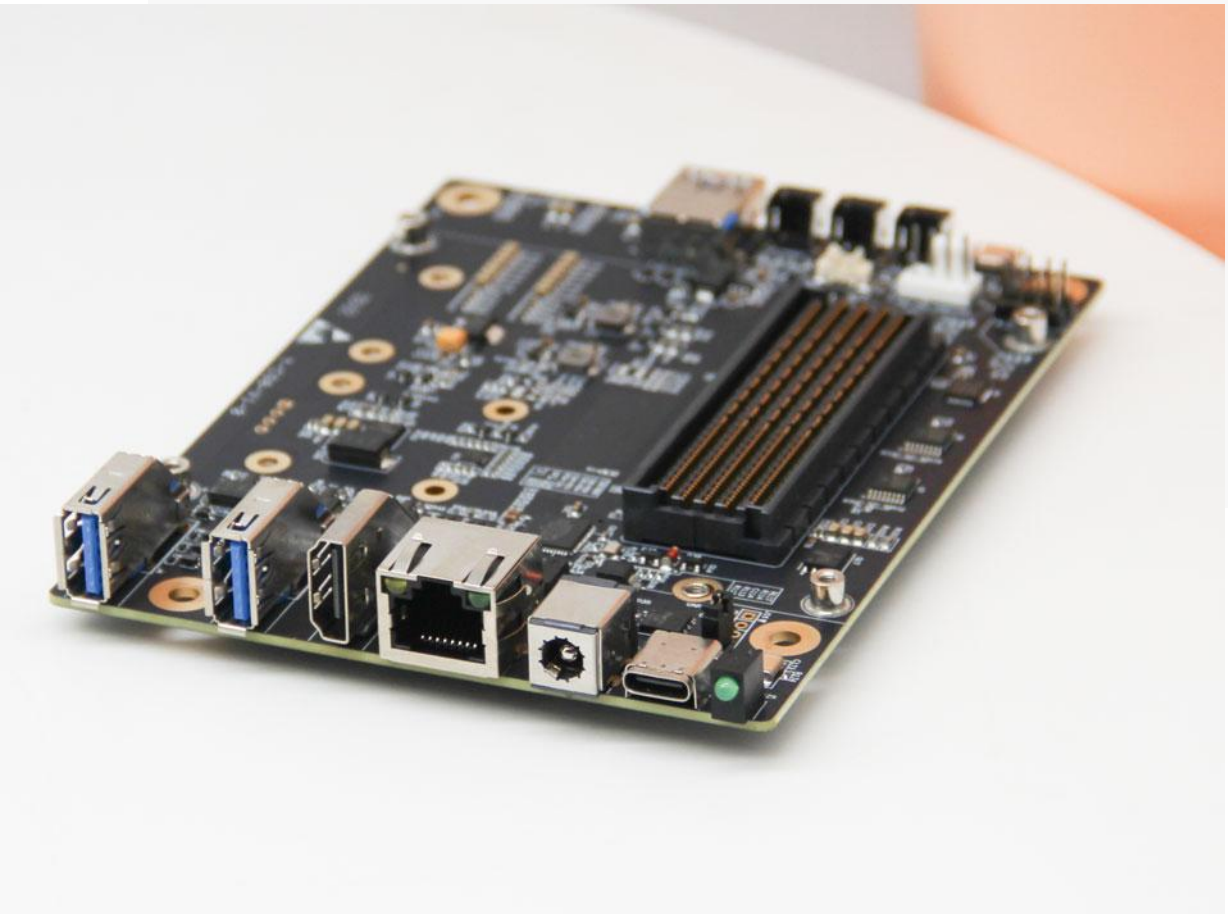
AI Development Carrier Board

Y-C9

Datasheet



Version V2.1

Date 2025-01-07

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Document History

Version	Date	Description of Change	Hardware Version
V 1.0	2022-3-16	Preliminary Release	V 1.0
V 1.0.1	2022-4-6	Update the document home page, header and footer; Updated the USB description in product features.	V 1.0
V 2.0	2024-1-8	Modify the product manual template; Added interface test description; Added Jetpack5.* version GPIO mapping number; Added the description of interface functions when the AGX ORIN module is installed.	V1.0
V 2.1	2025-1-7	Modify font	V 1.0

Hardware Update History

Version	Date	Description of Change
V 1.0	2022-2-10	Initial version

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-C9 is a compact carrier equipped 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.

Y-C9 carrier board can be equipped with hundreds of functional modules through 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-C9
Module	NVIDIA Jetson AGX Xavier / AGX ORIN Series Modules
Temperature	-40 ~ +85°C
Dimensions (L×W×H)	136mm * 100mm * 20mm (Including I/O ports and mounting holes)
Weight	112g

Power Supply	Spec
Input Type	DC
Input Voltage	+12V

I/O Ports

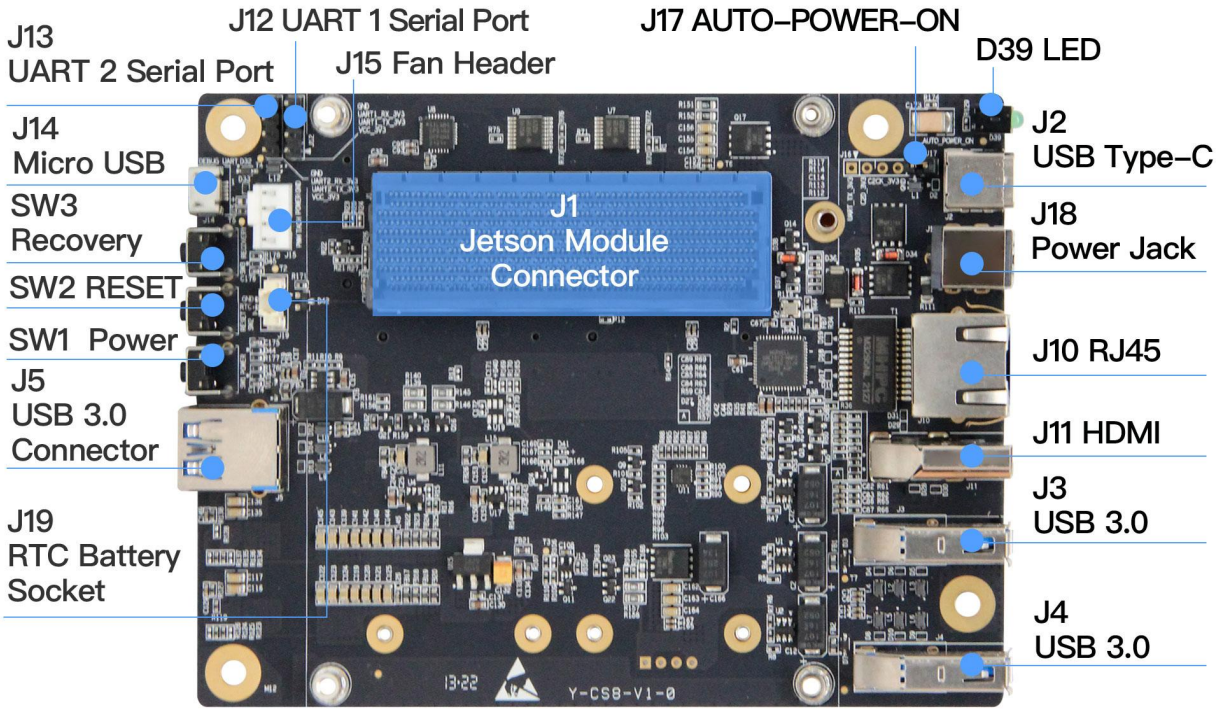
Interface	Quantity	Interface	Quantity
USB3.0 Type-A	3	Micro USB (Debug)	1
USB Type-C (OTG)	1	HDMI	1
miniPCIe Slot	2	M.2 Key M Slot (2280)	1
RTC Battery Connector	1	RJ45	1
3.3V TTL serial port	2	Power Jack	1
Fan Header	1		

Note：
When used with the Jetson AGX ORIN module, only one USB Type A supports full speed 3.0, the rest is USB2.0, and one miniPCIe is unavailable, and the RTC function is unavailable.

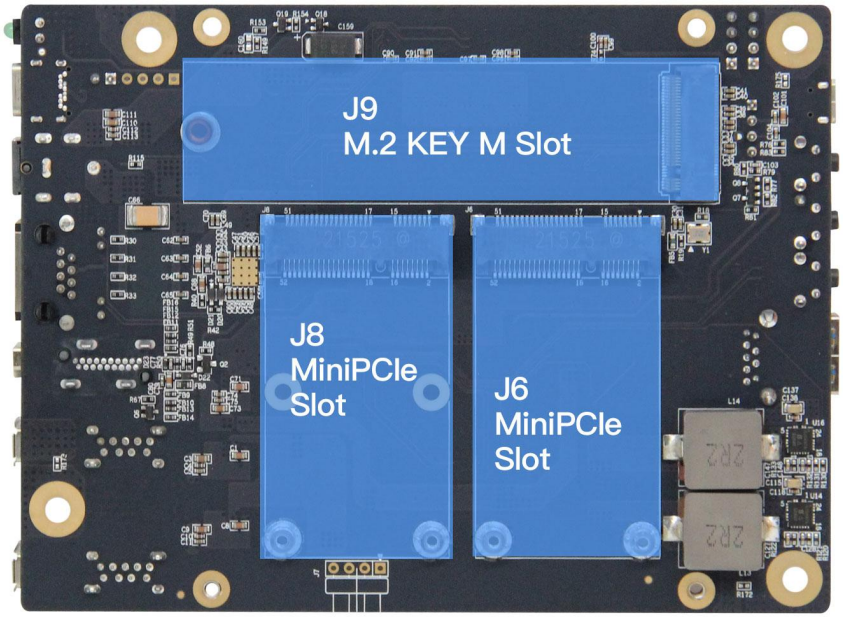
NVIDIA Jetson Series Modules Technical Specifications

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



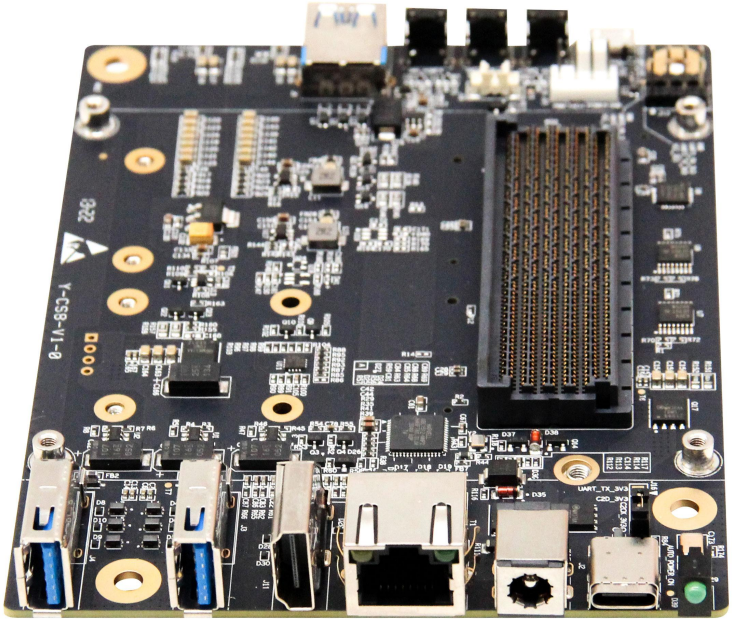
Sign	Function	Sign	Function
J1	Jetson Module Connector	J2	USB Type C (OTG)
J14	Micro USB（Debug）	J18	Power Jack
J10	RJ45 Jack(10/100/1000Mbps ethernet)	J15	Fan Header
J11	Type A HDMI Connector	SW1	Power Button
J12 & J13	3.3V TTL Serial Port	SW2	Reset Button
J19	RTC Battery Header(Only supply AGX Xavier module)	SW3	Recovery Button
J3&J4&J5	USB3.0 Type A Connector（With AGX ORIN, only the J3 supports USB 3.0）		

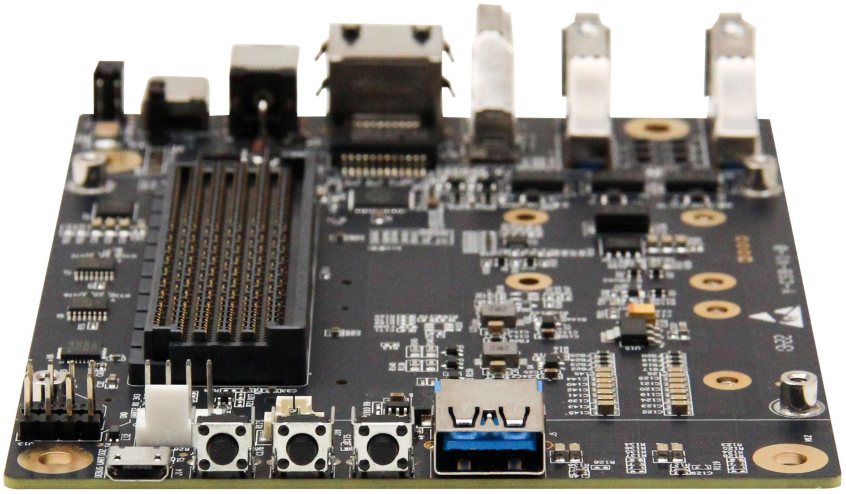


Sign	Function	Sign	Function
J6	miniPCIe Slot	J9	M.2 Key M Slot（2280）
J8	miniPCIe Slot（This interface is unavailable when AGX ORIN is installed）		

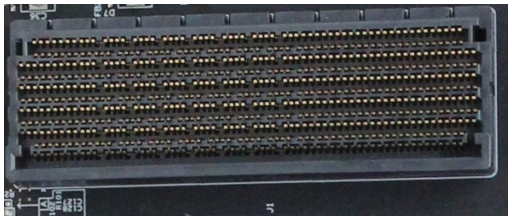
LED	
D39	System power-on indicator

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 Connector（J14）		
Function	Debug Serial Port	
Sign	J14	
Type/Model	Type-B standard Micro USB connector	
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>DN</td></tr><tr><td>3</td><td>DP</td><td>4</td><td>NC</td></tr><tr><td>5</td><td>GND</td><td></td><td></td></tr></table> Pin 1 position: right picture identification. This interface is used as a debugging serial port and cannot be used for system burning. The default serial port setting: 115200,8N1	

USB3.0 Connector（J3 & J4 & J5）

Function	USB3.0 Connector
Sign	J3 & J4 & J5
Type/Model	Type-A standard USB3.0 Connector
Pin definition	

Pin	Signal	Pin	Signal
1	VBUS	2	DP
3	DN	4	GND
5	RX_N	6	RX_P
7	GND	8	TX_N
9	TX_P		

Ethernet Jack（J10）

Function	10/100/1000Mbps Ethernet
Sign	J10
Type/Model	RJ45 ethernet socket
Pin definition	

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

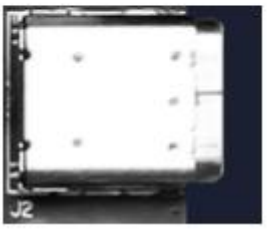
USB Type C Connector（J2）

Function	USB 2.0 OTG connector
Sign	J2
Type/Model	Type C standard USB Connector

Pin definition

Pin	Signal	Pin	Signal
A1	GND	B1	GND
A2	NC	B2	NC
A3	NC	B3	NC
A4	NC	B4	NC
A5	NC	B5	NC
A6	NC	B6	NC
A7	USB0_N	B7	USB0_N
A8	USB0_P	B8	USB0_P
A9	NC	B9	NC
A10	NC	B10	NC
A11	NC	B11	NC
A12	GND	B12	GND

Only use to flash system.



miniPCIe Slot（J6 & J8）

Function	miniPCIe Slot
Sign	J6 & J8
Type/Model	5.6mm high, support full-length and half-length expansion cards

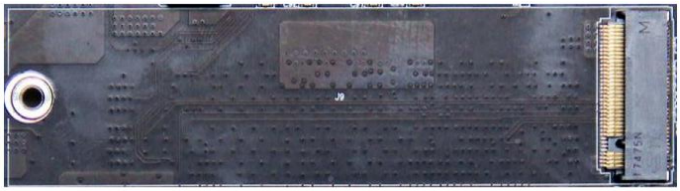
Pin definition

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	PEX_CLK_N	12	NC
13	PEX_CLK_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	NC
37	GND	38	NC
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 ORIN module is installed, the miniPCIe in the J8 position is unavailable.

M.2 Key M Slot（J9）

Function	M.2 Key M Slot
Sign	J9
Type/Model	Key M , 2280 Size



Pin definition

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		

HDMI Connector（J11）

Function	HDMI Connector
Sign	J11
Type/Model	Standard Type A HDMI Connector

Pin definition

Pin	Signal	Pin	Signal
1	DP2_TX2_P	2	GND
3	DP2_TX2_N	4	DP2_TX1_P
5	GND	6	DP2_TX1_N
7	DP2_TX0_P	8	GND
9	DP2_TX0_N	10	DP2_TXC_P
11	GND	12	DP2_TXC_N
13	HDMI_CEC	14	NC
15	DDC_SCL	16	DDC_SDA
17	GND	18	VCC_HDMI
19	HDMI_HPD		

Fan Header（J15）

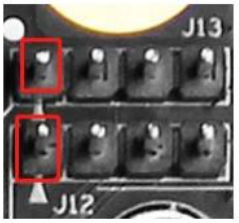
Function	4-pin fan header for 12V PWM fan
Sign	J15
Type/Model	47053-1000

Pin definition

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

Pin 1 position: right picture identification.

4-pin Header（J12 & J13）

Function	3.3V TTL serial port	
Sign	J12 & J13	
Type/Model	2.0mm pitch, 4pin header	

Pin definition

Pin	Signal	Pin	Signal
1	3.3V	2	UART_TX_3V3
3	UART_RX_3V3	4	GND

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

Modules	AGX Xavier	AGX ORIN
J12	/dev/ttyTHS0	/dev/ttyTHS0
J13	/dev/ttyTHS1	/dev/ttyTHS4

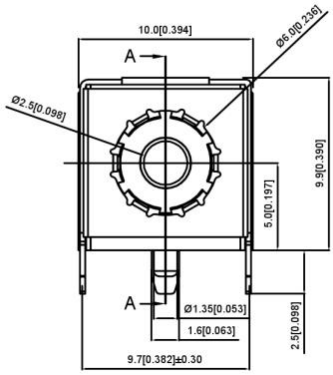
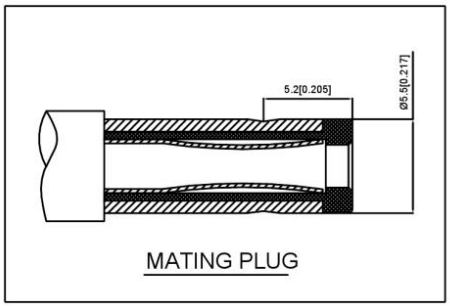
RTC Battery Socket（J19）

Function	Provides power support for the core board clock circuit	
Sign	J19	
Type/Model	2pin	

Pin definition

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

Pin 1 position: right picture identification.
The RTC function is not supported when the AGX ORIN module is used.

Power Jack（J18）		
Function	Power supply input terminal	
Sign	J18	
Type/Model	Inner pin diameter 2.5mm, outer hole diameter 5.5mm DC connector	
Pin definition	Supports a maximum of 12V 10A input  	

Auto Power ON（J17）	
Function	Auto-Power-On is enable when pin1 and pin2 are tied together
Sign	J17
Type/Model	2.0mm pitch，2pin
Pin definition	<table><tr><th>Pin</th><th>Signal</th><th>Signal</th><th>Signal</th></tr><tr><td>1</td><td>VCC (3.3V)</td><td>2</td><td>ACOK</td></tr></table> Pin 1 position: right picture identification. 

6 Ordering Information

Order Type	Function
Y-C9	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-C9 to the Jetson development host USB port.
- Press and hold down the Recovery button (SW3), and then power on the system. Hold the Recovery button for 3 to 4 seconds after power is powered on, and then release the Recovery button.
- If the system does not automatically start after power-on by default, hold down the Recovery key (SW3) and then press the Power key (SW1). Release the Recovery key after 3 to 4 seconds
- 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 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)

10 Serial Port Test

Y-C9 is equipped with two TTL 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: