Y-C7
Carrier Board
Datasheet

Document History

Version	Data	Description of Change	Applicable Hardware Version
V1.0	August 20th, 2021	Create a Document	V1.0
V1.1	September 8th, 2022	Modify the pin signal definition of the gigabit wired network connector The modification content is: 8pin definition: MX2+ is changed to MX1+	V1.0
V1.2	September 18th, 2022	Added product feature description Added content: On-board 64GB industrial grade EMMC storage particle	V1.0
V1.3	May 22th, 2023	Add Jetpack5.* version GPIO mapping number and serial port device name	V1.0

Electronic components and circuits are very sensitive to electrostatic discharge, although the company will do anti-static protection design on the main interface of the board when designing circuit board products, but it is difficult to do anti-static safety protection for all components and circuits. Therefore, it is recommended to follow esd safety precautions when handling any circuit board component. Esd protection measures include but are not limited to the following:

- During transportation or storage, place the card in an ESD bag and do not take it out until installation.
- Release the static electricity before touching the board. Wear a discharge grounding wrist strap.
- Operate the circuit board only in electrostatic discharge safety area.
- Avoid moving circuit boards in carpeted areas.
- Avoid direct contact with electronic components on the board by edge contact.

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Chapter 1. Introduction

The Y-C7 is a product that matches NVIDIA ® Jetson ™ Xavier NX, TX2 NX and Nano series core modules are low-cost, small volume and industrial grade carrier boards. For the intelligent computing application of UAV industry, the electrostatic safety protection design is carried out for the main interface, and the power application scheme with high reliability and 70W load capacity is adopted. The input power supply has over-voltage and reverse polarity protection functions, and has rich external interfaces. The whole board devices adopt wide temperature models. According to the seismic requirements of UAV, all interfaces adopt the flexible wire outgoing design, so as to improve the seismic performance of the connection with peripherals through flexible wire unloading. For high speed usb3.1 signal adopts the design of type-C connector with fixed structure, and the type-C peripheral or adapter can be locked by screws.

Through the 2 lane MIPI CSI interface on y-c7, you can access a variety of camera modules, as well as CVBS (PAL / NTSC), SDI, HDMI and other video signals. A 64GB industrial grade EMMC storage particle is welded on the surface of y-c7 carrier plate. Through the storage expansion software provided by us, the expanded storage space can be configured with one key conveniently, quickly and efficiently.

The y-c7 carrier board can carry hundreds of functional modules through one MiniPCIe connector and one M.2 E Key connector to further expand the system functions. It can be expanded to 4 full speed usb3. 0 signal, 2 gigabit network signals and 2 full speed SATA signals. It can also be equipped with 4G/WiFi communication module, various formats of video acquisition / output card, AD acquisition card, multi serial port card, sound acquisition / output card and multi-functional IO card

1.1 Product Specifications

- On-board 64GB industrial grade EMMC storage particle
- 1 Full-speed USB3.1 Type C connector for shock resistance
- 1 Micro USB connector
- 1 Gigabit Ethernet (10 / 100 / 1000 BASE-T) connector
- 1 HDMI 2.0 interface
- 1 USB2.0 connector
- 1 M.2 E Key connector
- 1 Full-length MiniPCIe connector
- 1 Fan control interface
- 1 RS-232 level serial port,
- 1 3.3V TTL level UART port
- One 2 Lane MIPI camera port FPC connector
- 1 group of I2C signals with 3.3V level
- 1 CAN bus interface with on-board transceiver
- Three 3.3V bit programmable GPIO, one 3.3V strong driving ability of the bit programmable GPO
- One RTC clock holds the power supply port
- 5V, 3.3V power output ports
- 1 working indicator light
- Power on automatically
- Board size: 80mm * 60mm * 16.8 mm
- Power supply requirements: DC + 9V~ + 24V
- Operating temperature: -40~ + 85℃
- Weight: 40g

*When used with Jetson nano module, the CAN bus interface function is unavailable and the m.2 connector is unavailable.

1.2 Order Information

Model	Function
Y-C7	Interface expansion board with NVIDIA® Jetson™ Xavier NX, TX2 NX, Nano series core modules

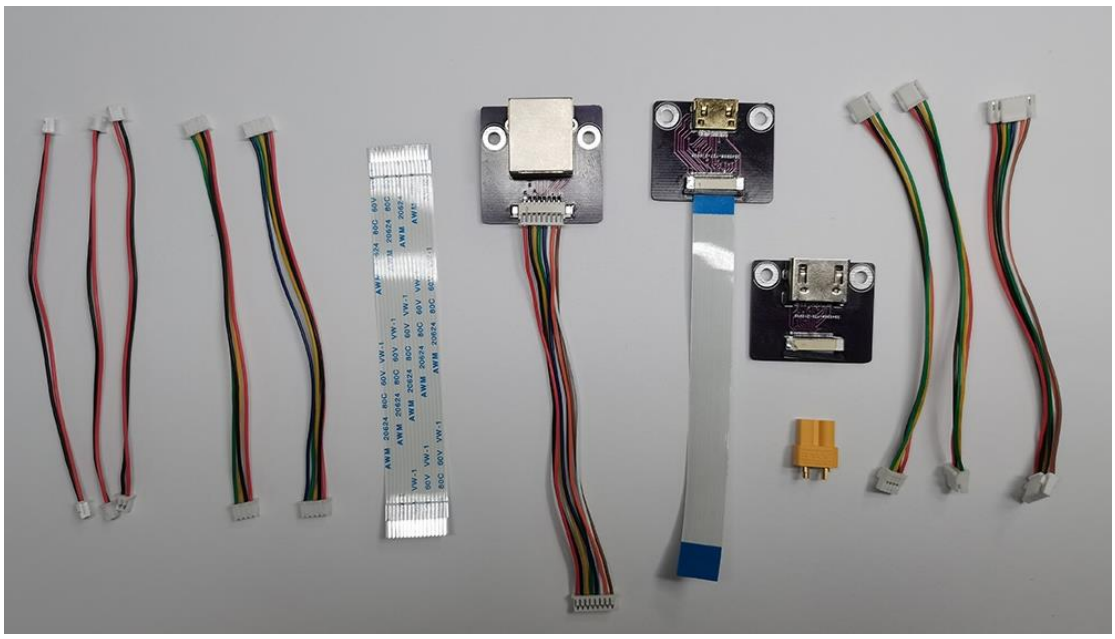
Taobao Store Address: https://shop333807435.taobao.com/

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

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

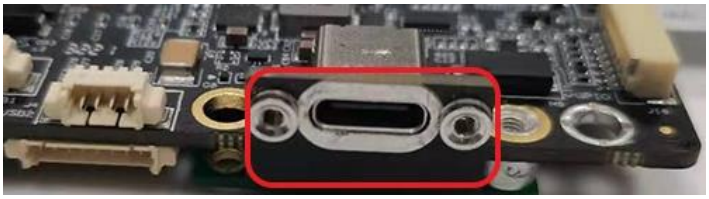
1.3 Parts

a.The wiring of the carrier board is as follows:

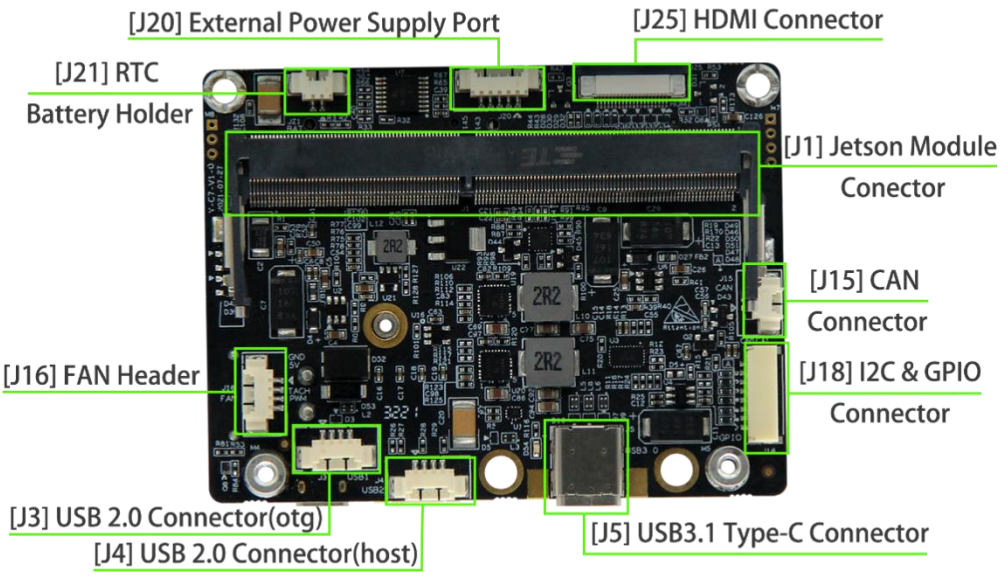


b. along with a Set of screws

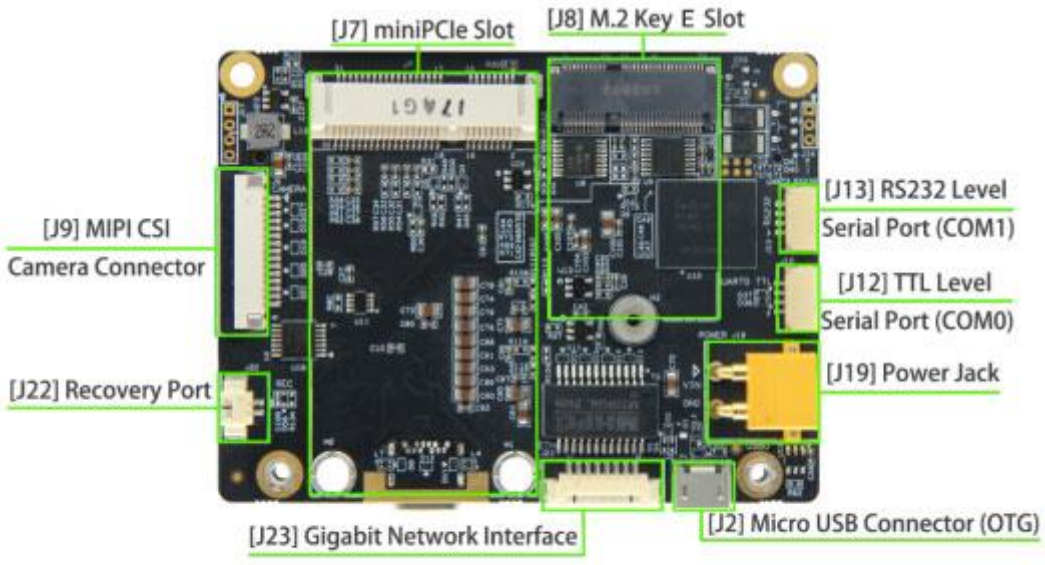
c. Type-C reinforced locking accessories can be selected from the factory (not installed by default)



Chapter 2. Interface Function Description



Y-C7 Front Interface Description



Y-C7 Back Interface Description

2.1 Functional Connector

Connector	Description
J1	High-speed connector for connecting the Jetson series of core modules
J2	Type-B micro USB interface connector is used for system burning and OTG function output
J3	USB 2.0 (device) OTG Connector
J4	USB 2.0 (host) Connector
J5	USB 3.1 Type-C Connector
J7	miniPCIe Slot (52-pin)
J8	M.2 E Key Slot
J9	2 Lane MIPI CSI Connector
J12	3.3V TTL Level Serial Port COM0
J13	RS232 Level Serial Port COM1
J14	RS232 Debug Serial Port COM2
J15	CAN Connector
J16	PWM FAN interface Connector
J17	Carrier firmware upgrade signal connector
J18	I2C & GPIO Connector
J19	Carrier power input connector
J20	High current 3.3V and 5V power output connectors for peripherals
J21	RTC Clock hold Power Connector
J22	Recovery Signal Connector
J23	10/100/1000 BASE-T wired network signal connector
J25	HDMI Connector

2.2 LED Indicators

LED	Description

D54	Core module working status indicator

Chapter 3. Installation and Use

3.1 Installation effect drawing

3.2 Method of use

1) Ensure that the voltage for all external systems is turned off

2) Install the Jetson core module on the J1 high-speed connector. Note the alignment between the connectors. Install the core module retaining screws after the module is installed in place.

3) Install the necessary external cables. (E.g.: display line connected to HDMI display, power input line used to power the system, USB line linking keyboard and mouse, camera, miniPCIe function extension module...)

4) Connect the power cord to the power supply.(See 4.4 for the power cable connection step. Please ensure that the heat dissipation device on the core module is installed before power on.)

5) Y-C7 is powered on automatically by default. Turn on the power and the system starts to work

6) For systems without a protective housing, avoid moving the hardware system after electrification. Avoid using direct body contact with the circuit board and any electronic components.

3.3 Installation and Removal of Core Module

To install the Jetson Xavier NX module correctly, follow the sequence and mounting hardware instructions. Here are some suggested assembly guidelines:

1. Assemble any required thermal solution on the module.

2. Install the module

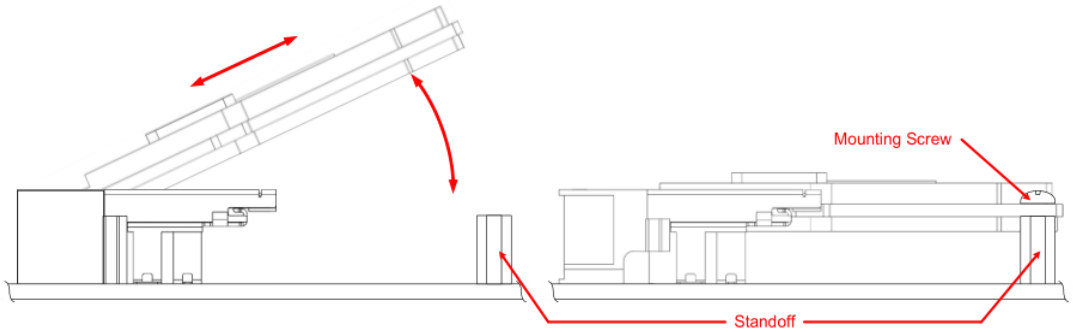
a) Start with baseboard that has suitable standoff to match SODIMM connector height.

b) Insert module fully at an angle of 25-35 degree into the SODIMM connector.

c) Arc down the module board until the SODIMM connector latch engages.

d) Secure the module to the baseboard with screws into the standoff/spacer. The carrier board (shown in Figure 3-1) uses a standoff and screws to secure the module to the system/base- board.

Figure 3-1. Module to Connector Assembly Diagram



To remove the module correctly, follow the reverse of the installation sequence.

3.4 Recovery mode

The Jetson core module works in normal mode and Recovery mode. In Recovery mode, it can update file system, kernel, Boot loader, BCT and other operations.

The steps to enter the Recovery mode are as follows:

1) Turn off the system power supply.

2) Use the Micro-USB cable to connect the Micro-USB port (J2) of the Y-C7 to the Jetson development host USB port.

3) Short circuit the two pins of J22 connector without loosening, supply power to the system, keep J22 short circuit for more than 3 seconds after power supply, and then release.

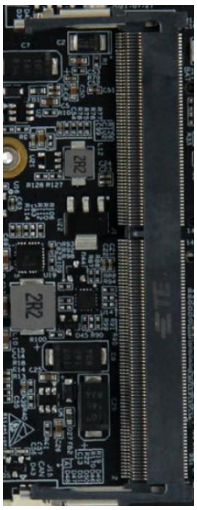
4) The system enters the Recovery mode, where subsequent operations can be performed.

For system burning and application library software installation, please refer to the documents "Jetson System Burning Environment Building" and "Using SDKmanager to burn System" on the company's website, or contact the technical support staff of the company.

Chapter 4. Board card interface definition description

4.1 Core module interface [J1]

Function	Connect the NVIDIA Jetson Series Xavier NX / TX2 NX / Nano core module
Identification	J1
Type / Model	High-quality gold-plated high-speed connector
Pound definition	For the pin definitions of this connector, see the pin definition description in the NVIDIA Jetson Series Xavier NX / TX2 NX / Nano Core Module Data Manual.



4.2 Micro-USB2.0 [J2]

Function	USB 2.0 Connector
Identification	J2
Type/Model	Type-B standard Micro USB 2.0 interface (for burning operating system)

Pound definition

Pin	Signal	Pin	Signal
1	VBUS	2	USB2.0D -
3	USB2.0D+	4	USB ID
5	GND		

4.3 USB2.0 interface [J4]

Function	USB 2.0 signal
Identification	J4
Type/Model	Molex PicoBlade Header 53261-0471

Pound definition

Pin	Signal	Pin	Signal
1	VBUS	2	USB2.0 D-
3	USB2.0 D+	4	GND

Pin 1 position: marked in the red box on the right picture.

4.4 USB3.1 Connector [J5]

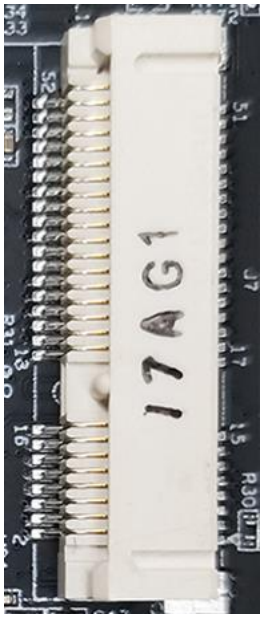
Function	The USB3.1 Connector
Identification	J5
Type/Model	Type-C Standard USB Interface, male
Pound definition	Support positive and negative insertion connection, DFP only Locking screw hole spacing 15mm

4.5 miniPCIe Extension interface（J7）

Function	miniPCIe Connector
Identification	J7
Type/Model	5.6mm high miniPCIe connector that supports full-length expansion cards

Pound definition

Pin	signal	Pin	signal
1	WAKE	2	3.3V
3	NC	4	GND
5	NC	6	1.5V
7	PEIC1_CLKREQ	8	NC
9	GND	10	NC
11	PEIC1_REFCLK_N	12	NC
13	PEIC1_REFCLK_P	14	NC
15	GND	16	NC
17	NC	18	GND
19	NC	20	WI_DISABLE
21	PEIC_CARD_SEL	22	PEIC1_REST
23	PERN	24	3.3V
25	PERP	26	GND
27	GND	28	1.5V
29	GND	30	SMB_CLK
31	PETN	32	SMB_DAT
33	PETP	34	GND
35	GND	36	NC
37	GND	38	NC
39	VCC_3V3_PCIE	40	GND
41	VCC_3V3_PCIE	42	NC
43	PEIC_SEL	44	NC



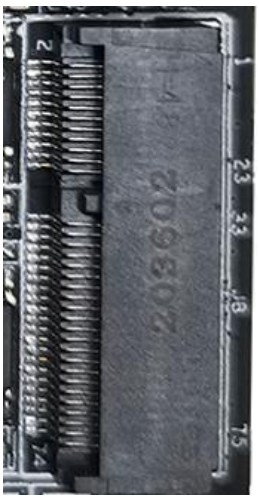
	45	NC	46	NC
	47	NC	48	1.5V
	49	NC	50	GND
	51	NC	52	3.3V

4.6 M.2 E Key Extension interface（J8）

Function	M.2 E Key connector
Identification	J8
Type/Model	4.8mm high 2230 Dimension M.2 E Key connector

Pound definition

Pin	Signal	Pin	Signal
1	GND	2	3V3
3	NC	4	3V3
5	NC	6	NC
7	NC	8	NC
9	NC	10	NC
11	NC	12	NC
13	NC	14	NC
15	NC	16	GND
17	NC	18	NC
19	NC	20	NC
21	NC	22	NC
23	NC	24	NC
25	NC	26	NC
27	NC	28	NC
29	NC	30	NC
31	NC	32	NC
33	GND	34	NC
35	PCIE_TX0_P	36	NC
37	PCIE_TX0_N	38	NC
39	GND	40	NC
41	PCIE_RX0_P	42	NC
43	PCIE_RX0_N	44	NC
45	GND	46	NC
47	PCIE_CLK_P	48	NC
49	PCIE_CLK_N	50	CLK_32M
51	GND	52	PCIE1_RST
53	PCIE_CLKREQ	54	NC
55	PCIE_WAKE	56	W_DISABLE1_CTRL
57	GND	58	NC
59	NC	60	NC



	61	NC	62	GPIO10_M2_ALERT
	63	GND	64	NC
	65	NC	66	NC
	67	NC	68	NC
	69	GND	70	NC
	71	NC	72	3V3
	73	NC	74	3V3
	75	GND	76	GND

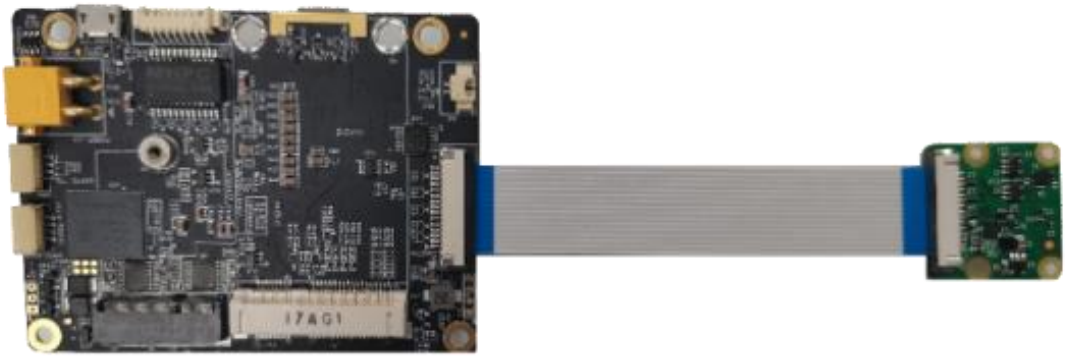
4.7 MIPI Camera connector(J9)

Function	2 Lane Mipi CSI Camera connector
Identification	J9
Type/Model	15pin, 1.0mm pitch, upper cover, lower contact FPC connector
Pound definition	

Pin	Signal	Pin	Signal
1	VCC_3V3	2	I2C_SDA
3	I2C_SCL	4	MCLK_1V8
5	PWDN_1V8	6	GND
7	CSI_CLK_P	8	CSI_CLK_N
9	GND	10	CSI_D1_P
11	CSI_D1_N	12	GND
13	CSI_D0_P	14	CSI_D0_N
15	GND		

Position of pin 1: marked in the red box of the picture on the right.

Connection diagram with Raspberry PI 2 with MIPI camera, note that it needs to be connected with the same plane cable.



4.8 TTL Serial Port COM0 [J12]

Function	3.3V TTL Serial Port COM0
Identification	J12
Type/Model	4-pin,1.25mm pitch connector GH-4PWT
Pound definition	

Pin	Signal	Pin	Signal
1	3.3V	2	TX
3	RX	4	GND

Pin1 position: at the red box mark in the picture on the right.

Module	Serial Port
Xavier NX	/dev/ttyTHS1
TX2 NX	/dev/ttyTHS1
Jetson NANO	/dev/ttyTHS2

4.9 RS232 Serial Port COM1 [J13]

Function	RS232 Serial Port COM1
Identification	J13
Type/Model	4Pin, 1.25mm pitch connector GH-4PWT
Pound definition	

Pin	Signal	Pin	Signal
1	NC	2	TX
3	RX	4	GND

Pin 1 position: at the red box mark in the picture on the right.

Module	Serial Port
Xavier NX	/dev/ttyTHS0
TX2 NX	/dev/ttyTHS2
Jetson NANO	/dev/ttyTHS1

4.10 CAN Connector [J15]

Function	CAN Connector
Identification	J15
Type/Model	Molex Pico Blade Header 53261-0271
Pound definition	

Pin	Signal	Pin	Signal
1	CAN_H	2	CAN_L

Pin 1 position: marked in the red box on the right picture.

4.11 RS232 Debug Serial Port COM2 [J14]

Function	RS232 Debug Serial Port COM2
Identification	J14
Type/Model	3pin, 2.00mm pitch, no welding connector
Pound definition	

Pin	Signal	Pin	Signal
1	TX	T2	RX
3	GND		

Pin 1 position: at the red box mark in the picture on the right.

COM2 is the serial port for kernel debugging, which is used to output c-boot, u-boot and Linux kernel information. After the Linux kernel is started, it is used as the serial port of display and control terminal. The default serial port setting is 115200bps, 8n1

4.12 FAN-Header [J16]

Function	FAN-Header
Identification	J16
Type/Model	Molex Pico Blade Header 53261-0471
Pound definition	

Pin	Signal	Pin	signal
1	GND	2	+5V
3	TACH	4	PWM

Pin 1 position: marked in the red box on the right picture.

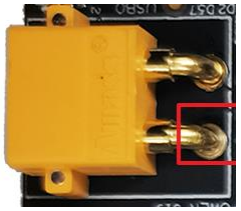
4.13 Power Jack [J19]

Function	SPI and I2C Signal Extension Connector
Identification	J19
Type/Model	XT30PW-M
Pound denition	

Pin	Signal	Pin	Signal
1	VCC (+)	2	GND (-)

Pin 1 position: at the red box mark in the picture on the right.

Input voltage range: +9V~+24V。



4.14 IO Connector Interface [J18]

Function	IIC and GPIO Signal Connector
Identification	J18
Type/Model	GH-8PWT
Pound definition	

Pin	Signal	Pin	Signal
1	3.3V	2	I2C0_SCL
3	I2C_SDA	4	GPO1
5	GPIO2	6	GPIO3
7	GPIO4	8	GND

Pin 1 position: marked in the red box on the right picture.

The following table shows the mapping number of GPIO in the system when different modules are configured.

Modules	**Xavier NX**		**TX2 NX**	**NANO**
Jetpack Version	<Jetpack 5.0	>=Jetpack 5.0	-	-
GPO1	436	453	396	216
GPIO2	422	441	306	200
GPIO3	268	321	338	194
GPIO4	393	419	269	38

4.15 Power Output Connector [J20]

Function	3.3V and 5V output, external power supply Connector
Identification	J20
Type/Model	Molex Pico Blade Header 53261-0571
Pound definition	

Pin	Signal	Pin	Signal
1	5V	2	GND
3	GND	4	GND
5	3.3V		

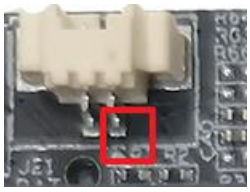
Pin 1 position: at the red box mark in the picture on the right.

This interface can provide up to 5V@2A And 3 3V@2A Power supply for peripherals.

4.16 RTC Battery Holder[J21]

Function	Provide power support for the core board clock circuit
Identification	J21
Type/Model	Molex Pico Blade Header 53261-0271
Pound definition	Pin 1 position: at the red box mark in the picture on the right.

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



4.17 Recovery Connector [J22]

Function	Recovery Connector
Identification	J22
Type/Model	Molex Pico Blade Header 53261-0271
Pound definition	Pin 1 position: at the red box mark in the picture on the right. When the system is powered on and started, if it is detected that the recovery is short circuited to GND, the core module enters the recovery mode and can perform system burning and other operations.

Pin	Signal	Pin	Signal
1	Recovery	2	GND

4.18Gigabit cable network connector[J23]

Function	Gigabit network connector
Identification	J23
Type/Model	Molex Pico Blade Header 53261-0871
Pound definition	Pin 1 position: at the red box mark in the picture on the right.

Pin	Signal	Pin	Signal
1	MX4-	2	MX4+
3	MX3-	4	MX3+
5	MX2-	6	MX2+
7	MX1-	8	MX1+

4.19 HDMI Connector [J25]

Function	HDMI Connector
Identification	J25
Type/Model	20pin 0.5mm pitch contact FPC connector

Pound definition

Pin	Signal	Pi	Signal
1	GND	2	TMDS Data2+
3	TMDS Data2-	4	GND
5	TMDS Data1+	6	TMDS Data1-
7	GND	8	TMDS Data0+
9	TMDS Data0-	10	
11	GND TMDS Clock+	12	TMDS Clock-
13	GND	14	GND
15	CEC	16	DDC clock
17	DDC data	18	Hot Plug Detect
19	NC	20	+5V Power

Pin 1 position: at the red box mark in the picture on the right.