

Al Development Carrier Board Y-C1 Datasheet



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Website

WeChat Channel

Beijing Plink-AI Technology Co., LTD

Web: http://www.plink-ai.com/

Add: Room 1106/1108, Jinyu Jiahua Building, Shangdi 3rd Street, Haidian District, Beijing

Tel: +86-010-62962285/400-127-3302

Document History

Version	Date	Description of Change	Hardware Version
V 1.0	2019-12-21	Preliminary Release	V 1.0
V 1.1	2020-02-20	 Added Y-C1 order type description. Added LED indicator color description. 	V 1.0
V 2.0	2023-11-16	 Modify the datasheet template. Added the description of interface function test. 	V 1.0
V 2.1	2024-01-06	Modify font	V 1.0

Hardware Update History

Version	Date	Description of Change
V 1.0	2019-12-21	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	Introduction6
2	Specifications7
3	External I/O Ports9
4	All-Round Display12
5	Connector Description13
6	Ordering Information19
7	Recovery Mode19
8	Method of Application20
9	GPIO Test21
1 () CAN Test22
11	Serial Port Test23
12	2 Special Instructions24



1 Introduction



Y-C1 is a low-cost, compact carrier board with NVIDIA® Jetson[™] TX1/TX2/TX2-4GB/TX2i series core modules for compact deployment needs. For industrial deployment applications, the main interfaces are designed for electrostatic safety protection, and a high-reliability power supply application scheme is adopted. The input power supply has overvoltage and reverse polarity protection functions, and has a variety of external interfaces, All components on the board adopt wide-temperature models.

Y-C1 has a 150-pin high-speed signal expansion connector, which can generate SATA / PCIe / MIPI CSI / I2C / I2S / SPI / DP and other signals. It can be used directly on the company's expansion carrier board Y-C1-E1.



	Feature	
Y-C1	Carrier Board	
Module	NVIDIA Jetson TX1/TX2 Series Modules	
Temperatur e	-40 ~ +85°C	
Dimensions (L×W×H)	87mm * 60mm * 16mm (Including I/O ports and mounting holes)	
Weight	51g	

Power

Power Supply	Spec
Input Type	DC
Input Voltage	+7V ~ +19V

I/O Ports

Interface	Quantity	Interface	Quantity		
USB3.0 Type-A	2	Micro USB	1		
RJ45	1	HDMI	1		
Recovery Button	1	LED	1		
RTC Battery Holder	1	DC power Jack	1		
30pin Connector	1(4*UART\4*GPIO\1*I2C\2*CAN)				
150pin Connector	1(DP\PCle\MIPI	1(DP\PCIe\MIPI CSI\SATA\I2C\I2S\SPI)			
Note: The CAN bus interface function is not available when used with the Jetson TX1 module.					



NVIDIA Jetson Series Modules Technical Specifications

Module	TX2 4GB	TX2 8GB	TX2 Industrial
Al Performance	1.33 T	1.26 TFLOPS	
GPU	256-core NVIDIA Pascal™ architecture GPU		
CPU	Dual-core quad-core	e NVIDIA Denver™ 2 64-bi Arm [®] Cortex [®] -A57 MPCore	t CPU and e processor
Memory	4GB 128-bit LPDDR4 51.2GB/s 8GB 128-bit LPDDR4 59.7GB/s		8GB 128-bit LPDDR4 (ECC Support) 51.2GB/s
Storage	16GB eMMC 5.1 32GB eMMC 5.1		
Video Encode	1x 4K60 (H.265) 3x 4K30 (H.265) 4x 1080p60 (H.265)		
Video Decode			
CSI Camera)	
Power	7.5W - 15W 10W - 20		
Mechanical	Inte	Plate	



3 External I/O Ports



High-Speed signal expansion connector

Y-C1 Front Ports

Sign	Function	Sign	Function	
P1	Туре А НДМІ	P3	USB 3.0 Type A	
P4	Micro USB	P7	150pin multifunctional high-speed signal extension connector	
P8	Power In(+7V ~ +19V)	P9	RJ45 Jack (10/100/1000Mbps Ethernet)	
P10	Multi-function pin(30 pin)	BT1	621 RTC Battery Socket(3.3V)	
S2	RECOVERY Button, used to set the core module to recovery mode			







PWM FAN Header

Y-C11 Back Ports

Sign	Function	Sign	Function	
P2	Micro SD Slot	P6	PWM FAN	
P12	400-pin connector for Jetson TX1/TX2/TX2-4GB/TX2i modules			

LED Description

Sign	Function			
D9	1.8V power status lamp			
	Three-color multi-function sta	tus indicator		
	Lamp status	Statements		
	Green light shining	The core module is powered on properly		
	Green light on	The input voltage is smaller than the required startup voltage		
D8	Blue light shining	Wait to press the power button to turn it on		
	Cyan lights(blue + green) shining	The carrier board is working, core module is not working		
	Purple light(bule + red) shining	Operating system shutdown		
	Red light shining	Entered maintenance mode		



All-Round Display









Connector Description

Jetson module Connector (P12)				
Function	Connect NVIDIA Jetson TX1/TX2 Series Modules			
Sign	P12	[]		
Type/Model	Samtec: SEAM-50-03.5-S- 08-2-A-K			
Explain	See the L4T Development Guide for details about software support for those modules.			

Micro USB 2.0 (P4)						
Function	USB 2.0 Connector					
Sign	P4					
Type/Model	Type-B standard Micro USB 2.0 connector					
Pin definition	Pin 1 3 5 When U pin mus When U ID pin n	Signal VBUS USB 2.0 D+ GND JSB-OTG is in st float。 JSB-OTG is in nust be GND	Pin 2 4 host m device	Signal USB 2.0 D- USB ID node, the US e mode, the U	B ID JSB	

HDMI Connector (P1)							
Function	HDMI I	Display Connector					
Sign	P1]		
Type/Model	Туре-А	Standard HDMI C	onnect	ors			
	Pin	Signal	Pin	Signal			
	1	TMDS Data2+	2	TMDS Data2 GND			
	3	TMDS Data2-	4	TMDS Data1+			
	5	TMDS Data1 GND	6	TMDS Data1-			
	7	TMDS Data0+	8	TMDS Data0 GND			
Pin definition	9	TMDS Data0-	10	TMDS Clock+			
definition	11	TMDS Clock GND	12	TMDS Clock-			
	13	CEC	14	NC			
	15	DDC clock	16	DDC data			
	17	DDC GND	18	+5V			
	19	Hot Plug Detect					

Fan Heade	r (P6)				
Function	4-pin fa	an header fo			
Sign	P6				
Type/Model	Molex I	PicoBlade He			
Pin definition	Pin	Signal	Pin	Signal	94 (
	1	GND	2	+5V	
	3	TACH	4	PWM	
	Pin 1 Position: right picture identification.				

USB 3.0 Connector (P3)									
Function	USB 3.0	USB 3.0 Connector							
Sign	Р3	P3							
Type/Model	USB3.0	USB3.0 Type-A (x2 Stacked)							
Pin definition	Pin 1 3 5 7 9	Signal VBUS USB 2.0 D+ SSRX- GND SSTX+	Pin 2 4 6 8	Signal USB 2.0 D- GND SSRX+ SSTX -					

Micro SD Card Slot (P2)								
Function	Micro S	Micro SD(TF)Card Slot						
Sign	P2							
Type/Model	Micro SD (TF)							
Pin definition	Pin 1 3 5 7 9	Signal SDIO_DATA2 SDIO_CMD SDIO_CLK SDIO_DATA0 GND	Pin 2 4 6 8 10	Signal SDIO_DATA3 SDIO_VCC GND SDIO_DATA1 SDIO_CD				

Power Jack	(P8)				
Function	Power s	upply input termi	inal (Fer	nale head)	
Sign	P8		and the second second		
Type/Model	The 3.5mm power supply terminals				
Pin definition	Pin 1 Input vo	Signal VCC(+) Itage range: +7V	Pin 2 ~ +19V.	Signal GND(-)	

Power cable connection step:

- 1. Loosen the power cable locking screw of the power terminal(male head) in the accessory bag;
- 2. Insert the cable into the cable fixing hole on the wiring terminal(male head);
- 3. Tighten the power cable locking screw of the power terminal(male)(pay attention to the polarity of the power cable);
- 4. Insert the male power terminal into the female power terminal on the board card;
- 5. Tighten the fastening screws on the power terminal connector.



Ethernet Jack (P9)									
Function	10/100/	10/100/1000 BASE-T Ethernet							
Sign	P9	Р9							
Type/Model	RJ45 Et	RJ45 Ethernet Connector							
Pin definition	Pin 1 3 5 7	Signal TP0+ TP1+ TP2- TP3+	Pin 2 4 6 8	Signal TPO- TP2+ TP1- TP3-					

High-speed Signal Expansion Connector (P7)						
Function	150pin high-speed signal expansion connector					
Sign	P7					
Type/Model	Pinlink-20202204150					
Pin definition	 Signals that can be drawn from this connector: 1. Second DP display signal; 2. PCle x2 + PCle x1 signal or PCle x1 + PCle x1 +USB3.0 x1 signal; 3. 6Lane MIPI CSI signal; 4. SATA signal; 5. Multiple I2C, I2S, SPI signals. Please contact sales for a detailed documentation of this interface! 					



	ELITE PARTNER	
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6 Ordering Information

Order Type	Description
Y-C1	NVIDIA® Jetson™ TX1/TXX2/TX2-4GB/TX2i core module is equipped with miniaturized carrier board.
Y-C1-L	Non-welded Multi-function high-speed Signal Expansion Connector (P7) version Y-C1 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/

7Recovery 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 (P7) of the Y-C1 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 (S2) to power the system. Hold down the Recovery key

(S2) for more than 3 seconds, and then release the Recovery key (S2).

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



${m 8}$ Method of Application

- Make sure all external system voltages are off.
- Install the Jetson core module onto the P12 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...)
- Follow the power input interface (P8) instructions, Connect the power cord 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



9GPIO Test

Y-C1 leads to the 4-way GPIO of the core module. Programmable output voltage 3.3V, please note that the input voltage does not exceed 3.3V.Take the TX2 8GB module, GPIO0 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 388 > /sys/class/gpio/export #Enable GPIO (Or initialize GPIO)
- echo out > /sys/class/gpio/gpio388/direction

#Set the GPIO input and output directions to out or in.

echo 1 > /sys/class/gpio/gpio388/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/gpio388/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

When Y-C1 is configured with TX2 modules, two CAN channels are standard. If you need to connect an external CAN device to 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. Two CAN buses can also be tested. During the test, connect the CAN0_H of the device to CAN1_H and the CAN0_L to CAN1_L. The test command is as follows :

- sudo apt-get install busybox can-utils
- # Writes the specified value to a register
- 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 recvive
- 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.



11 Serial Port Test

When the Y-C1 is configured with the TX2 module, it is equipped with three 3.3V TTL serial ports as standard, 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
- 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:

😣 🖨 🗊 Cu	teCom - Defa	ult			
Sessions <u>H</u> e	lp				
<u>B</u> audrate	115200 -	D <u>a</u> ta Bits	8	Display <u>C</u> trl characters	
Flo <u>w</u> Control	None 👻	<u>P</u> arity	None	Show Timestamp	
Open <u>M</u> ode	Read/Write 👻	Stop Bits	1	- Logfile: /home/nvidia/cutecom.log	
<u>O</u> pen	Device: /dev/t	tyTHS4 👻]		^
Input:				LF Char delay: 0 ms 1 Send file Plain	-
1.1P.act					
Clear	He <u>x</u> output	Loggin	g to: /h	me/nvidia/cutecom.log	

Device: /dev/ttyTHS4 Connection: 115200 @ 8-N-1

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 SDK manager software.
- For more information please refer to :Jetson wiki (plink-ai.com)