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PLink-AI

AI Computing Platform

SYS-2006

Datasheet

Version V2.1

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Document History

Version	Date	Description of Change	Hardware Version
V 1.0	2021-06-03	Preliminary Release	V 1.0
V 1.1	2023-05-22	Add Jetpack5.* version GPIO map number, serial device name.	V 1.0
V 2.0	2024-02-29	Modify the product manual template; Add interface test description.	V 1.0
V 2.1	2025-01-09	Modify font	V 1.0

Hardware Update History

Version	Date	Description of Change
V 1.0	2021-4-25	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.

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1 Introduction

SYS-2006 is a compact AI industrial computer that can be used with NVIDIA® Jetson™ Xavier NX, TX2 NX, and Nano series core modules. For industrial deployment applications, the main interface is designed for electrostatic safety protection, and a highly reliable power application scheme is adopted. The input power supply has overvoltage and reverse polarity protection functions, and there are abundant external interfaces, and the internal interface carrier board devices are wide temperature models.

SYS-2006 standard model can support 1/3/5 full-speed Gigabit Ethernet (with Jetson Nano module, only 3 full-speed Gigabit Ethernet can be supported). If you need to expand SSD memory card, 4G communication module, various video capture/output cards, AD capture cards, multi-function IO cards, etc., please contact our sales staff.

2 Specifications

	Specific
Carrier Board	Y-C6
Module	NVIDIA Jetson Xavier NX / TX2 NX / Jetson NANO Series Modules
Temperature	-20 ~ +65°C
Dimensions (L×W×H)	160mm * 130mm * 65mm (Including I/O ports and mounting holes)
Weight	1078g

Power Supply	Spec
Input Type	DC
Input Voltage	+9V ~ +24V

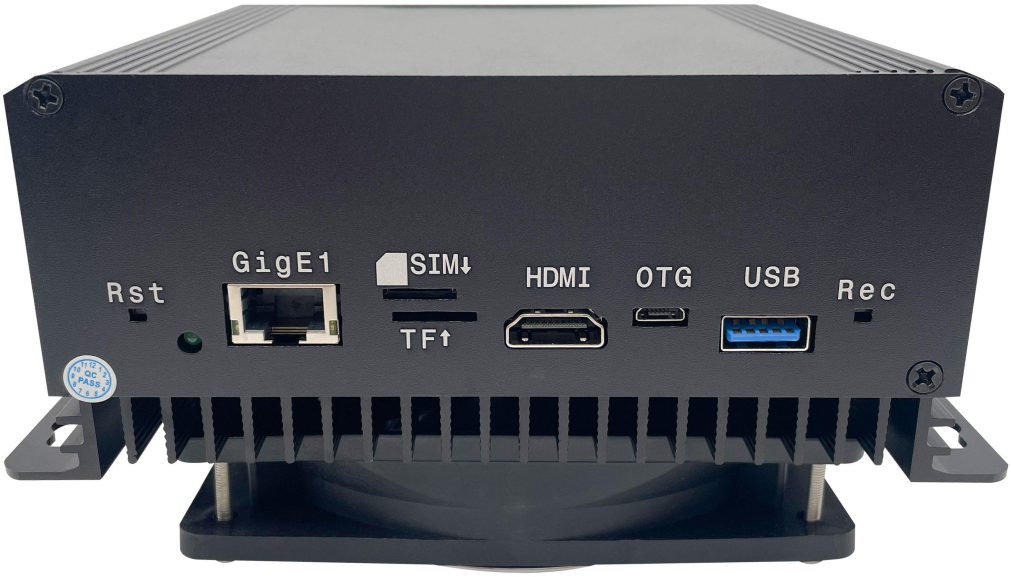
I/O Ports

Interface	Quantity	Interface	Quantity
USB3.0 Type A	1	Micro USB	1
RJ45	1	HDMI	1
DB9（2*RS232/1*Multi）	3	LED	1
Micro SD Card Slot	1	DC power Jack	1
USB2.0 Type A	2	Nano SIM Card Slot	1
Note: When used with the Jetson NANO module, the CAN bus interface function is not available and a miniPCIe interface is not available.			

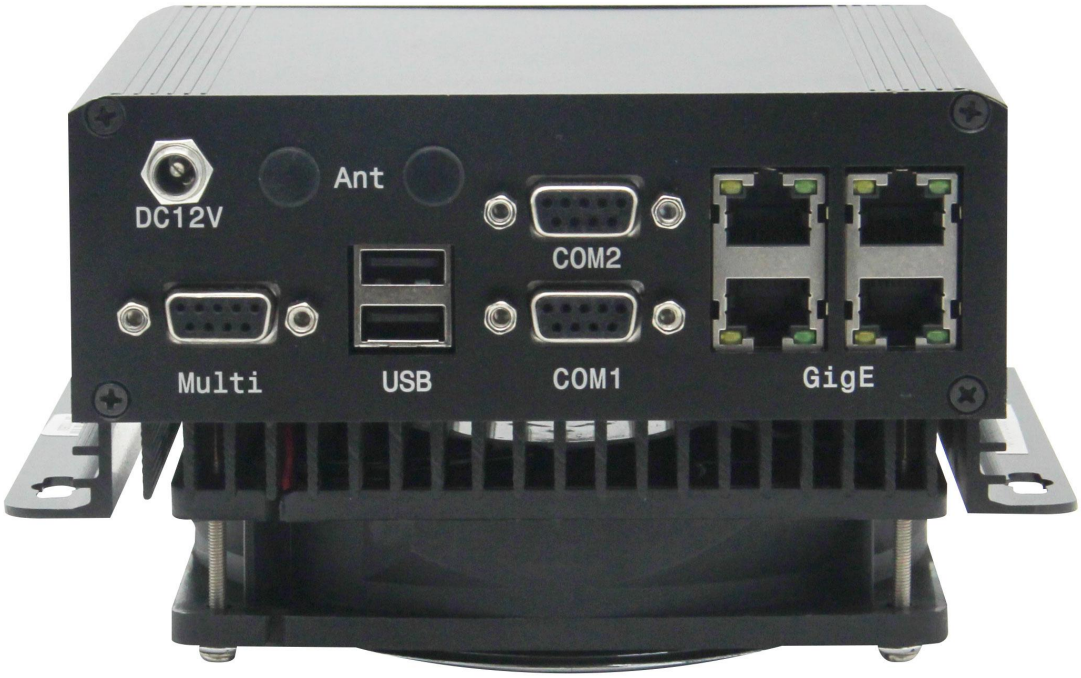
NVIDIA Jetson Series Modules Technical Specifications

Module	TX2 NX	Jetson Nano	Xavier NX 16/8GB
AI Performance	1.33 TFLOPS	0.5 TFLOPS	21TOPS
GPU	256-core NVIDIA Pascal™ architecture GPU	NVIDIA Maxwell™ architecture with 128 NVIDIA Cuda® cores	384-core NVIDIA Volta™ architecture GPU with 48 Tensor Cores
CPU	Dual-core NVIDIA Denver™ 2 64-bit CPU and quad-core Arm® Cortex®-A57 MPCore processor	Quad-core ARM® Coretx®-A57 MPCore processor	6-core NVIDIA Carmel Arm®v8.2 64-bit CPU 6MB L2 + 4MB L3
Memory	4GB 128-bit LPDDR4 51.2GB/s	4GB 64-bit LPDDR4 1600MHz-25.6GB/s	16 / 8GB 128-bit LPDDR4x 59.7GB/s
Storage	16GB eMMC 5.1	16GB eMMC 5.1 Flash	16GB eMMC 5.1
Video Encode	1x 4K60 (H.265) 3x 4K30 (H.265) 4x 1080p60 (H.265)	250 MP/sec 1x 4K@30(HEVC) 2x 1080p@60(HEVC) 4x 1080p@30(HEVC)	2x 4K60 (H.265) 4x 4K30 (H.265) 10x 1080p60 (H.265) 22x 1080p30 (H.265)
Video Decode	2x 4K60 (H.265) 7x 1080p60 (H.265) 14x 1080p30 (H.265)	500 MP/sec 1x 4K @ 60 (HEVC) 2x 4K @ 30 (HEVC) 4x 1080p @ 60 (HEVC) 8x 1080p @ 30 (HEVC)	2x 8K30 (H.265) 6x 4K60 (H.265) 12x 4K30 (H.265) 22x 1080p60 (H.265) 44x 1080p30 (H.265)
Power	7.5W - 15W	5W – 10W	10W – 20W
Mechanical	69.6mm x 45mm 260-pin SO-DIMM connector		

3 External I/O Ports



Sign	Function	Sign	Function
Rst	Reset Button	OTG	Type B Micro USB Connector
USB	USB 3.0 Type A Connector	GigE1	RJ45 Jack(10/100/1000Mbps Ethernet)
HDMI	Type A HDMI Connector	TF	Micro SD Card Slot
Rec	Recovery Button	SIM	Nano SIM Card Slot



Sign	Function	Sign	Function
USB	USB2.0 Type A Connector	COM1	RS232 Serial Port
DC12V	DC 12V Power Jack	COM2	RS232 Serial Port
Ant	Reserve SMA antenna holes	Multi	Multi-function IO（1*CAN/4*GPIO）
GigE	Reserve RJ45 Jack, if you need to use, please contact the sales staff		

4 All-Round Display

5 Connector Description

COM1 & COM2

Function	RS232 Serial Port
Sign	COM1 & COM2
Type/Model	DB9 Connector

Pin definition

Pin	Signal	Pin	Signal
1	NC	2	TX
3	RX	4	NC
5	GND	6	NC
7	NC	8	NC
9	NC		

The device filenames mapped by COM1 and COM2 on Linux systems are shown in the following table:

	COM1	COM2
Xavier NX	/dev/ttyTHS1	/dev/ttyTHS0
TX2 NX	/dev/ttyTHS1	/dev/ttyTHS2
Jetson Nano	/dev/ttyTHS2	/dev/ttyTHS1

Pin 1 position: right picture identification.

Multi

Function	Multi-function IO Connector
Sign	Multi
Type/Model	DB9 Connector

Pin definition

Pin	Signal	Pin	Signal
1	3.3V	2	CAN_L
3	CAN_H	4	GND
5	GND	6	GPO1
7	GPIO2	8	GPIO3
9	GPIO4		

The resulting GPIO mapping numbers are shown in the following table. GPIO high level voltage is 3.3V. Among them, GPO1 can only be used as an output, providing a current that can directly light the LED lamp bead.

	L4T version	GPO1	GPIO2	GPIO3	GPIO4
Xavier NX	<= L4T 32.*	436	422	268	393
	>L4T 32.*	453 (PS.04)	441 (PQ.06)	321 (PCC.04)	419 (PN.01)
TX2 NX		396	306	338	269
Jetson Nano		216	200	194	38
Orin NX		492 (PAC.06)	454 (PQ.06)	433 (PN.01)	391 (PH.00)
Orin Nano		492 (PAC.06)	454 (PQ.06)	433 (PN.01)	391 (PH.00)

Description:
Take the Xavier NX module, GPO1, as an example, if the system version is L4T 32.*, run this command:
$ echo 436 > /sys/class/gpio/export
After GPIO is enabled, the corresponding file name is generated: gpio436;

Then system version is later then L4T 32.*, run this command:
$ echo 453 > /sys/class/gpio/export
After GPIO is enabled the corresponding file name is generated: PS.04.
Note:
When Jetson Nano module is installed, CAN signal function is not available.

6 Ordering Information

Order Type	Function
SYS-2006	Compact AI industrial computer with NVIDIA® Jetson™ Xavier NX/TX2 NX/Jetson Nano core modules.

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 (OTG) of the SYS-2006 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 (REC) to power the system. Hold down the Recovery key (REC) for more than 3 seconds, and then release the Recovery key (REC).

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

8 Method of Application

- Make sure all external system voltages are off.
- 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

SYS-2006 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 Xavier NX 8GB module，L4T35.3.1，GPIO1 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

SYS-2006 with Jetson module comes standard with one CAN. 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. 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 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)

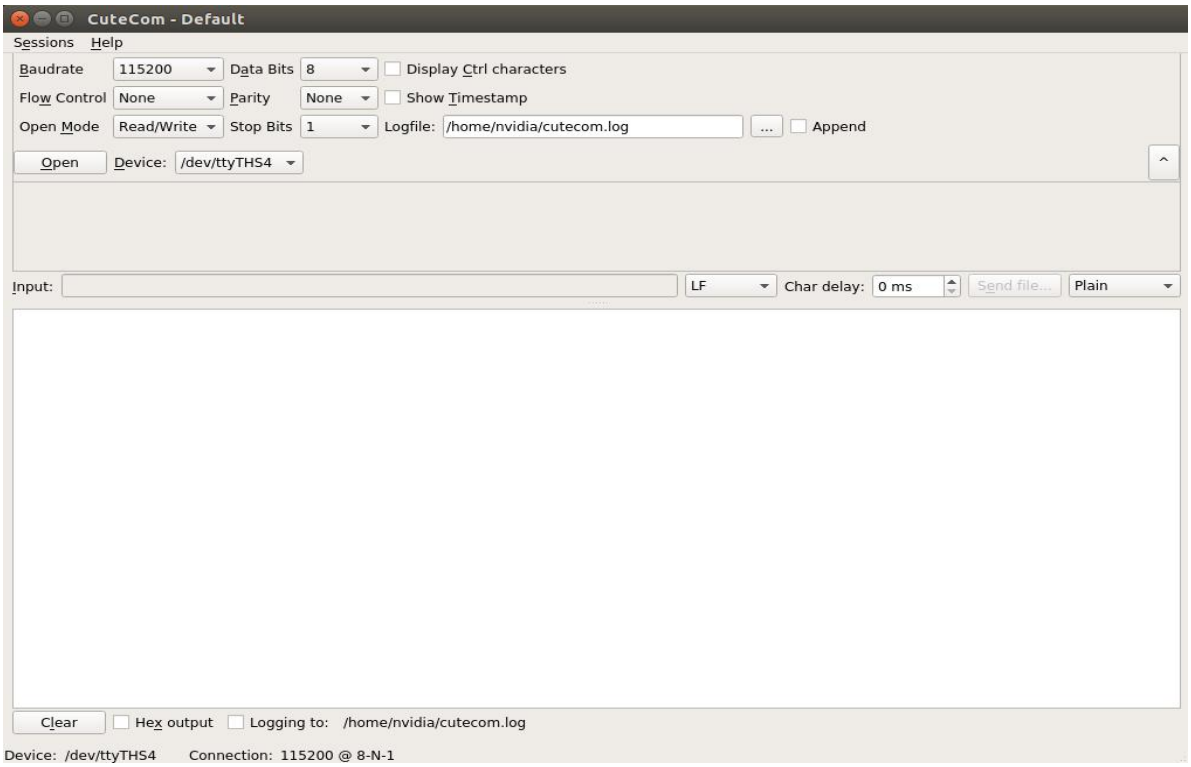
  Jetson NANO modules do not support CAN communication.

11 Serial Port Test

SYS-2006 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)