

RTSS-X306

Product Manual

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Revision History

Revision	Date	Reason for change	Applicable hardware version	Modified by
V1.0	2023-06-25	Initial release	V1.0	RT0086



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Electronic components and circuits are very sensitive to electrostatic discharge. Although our company designs anti-static protection for the main interfaces on the card when designing circuit board products, it is difficult to achieve anti-static safety protection for all components and circuits. Therefore, it is recommended to observe anti-static safety precautions when handling any circuit board component (including RTSS-X306). Anti-static safety protection measures include, but are not limited to the following:

- a) The smart box should be placed in an anti-static bag during transportation and storage, and then the board should not be taken out during installation and deployment.
- b) Before touching the smart box, discharge the static electricity stored in the body: wear a discharge grounding wrist strap.
- c) Operate the smart box only within the safe area of the electrostatic discharge point.
- d) Avoid moving smart boxes in carpeted areas.

Precautions and after-sales maintenance

matters needing attention

Before using the product, please read this manual carefully and keep it for future reference;

- Please pay attention to and follow all warning and guidance information marked on the product;
- Please use matching power adapter to ensure the stability of voltage and current;
- Please use this product in a cool, dry and clean place;
- Do not use this product in cold and hot alternate environment to avoid condensation damage components;
- Do not splash any liquid on the product. Do not use organic solvent or corrosive liquid to clean the product;
- Do not use the product in dusty and messy environment. If it is not used for a long time, please pack the product;
- Do not use in the environment with excessive vibration, any dropping or knocking may damage the circuit and components;
- Do not plug and unplug the core board and peripheral modules when power is on;
- Please do not repair or disassemble the product by yourself. In case of any fault, please contact our company in time for maintenance;
- Do not modify or use unauthorized accessories by yourself, and the damage caused will not be



warranted;

After sales maintenance

1) Warranty period

- Base plate, core plate : 3 year (non-human damage)
- Other peripherals sold by the company: 1 year (non-human damage)

2) Warranty description

- Within 7 days: the product (base plate, core module) is not damaged by human, our company will replace / repair it free of charge, and bear the return freight; (because the core module needs NVIDIA to confirm that it can meet the requirements of repair, it will take a long time, we will coordinate as soon as possible, please forgive for the inconvenience)
- From 7 days to 36 months: the product (base plate, core module) is not damaged by human, our company will repair it free of charge, and bear the return freight; (because the core module needs NVIDIA to confirm that it can meet the requirements of repair, it will take a long time, we will coordinate as soon as possible, please forgive for the inconvenience)
- Artificial damage in more than 3 year or 3 year: the product (carrier plate) shall be tested after it is sent to the customer, and the customer shall be informed of whether it can be repaired and the maintenance cost in detail. After reaching an agreement, the product shall be repaired and returned to the customer, and the company shall bear the return freight;
- Starting time: the core module is subject to the original factory delivery time, and the loading plate is subject to the express delivery receipt date;

3) Contact information

Official website: www.realtimesai.com

Taobao website: <https://shop340963258.taobao.com/>

Address: 11, block B, Heping Xiyuan, Heping West Street, Chaoyang District, Beijing

Attention: RMA

Tel: **400-100-8358**

Mailing notice: contact with the company's sales department in advance, arrange technical support personnel to check and eliminate errors caused by misoperation as soon as possible, fill in the product after-sale return to factory maintenance form after verification, and send it to rma@realtimes.cn Mail box, please attach the list of items to facilitate verification, so as to avoid loss and loss in the process of express delivery. The company does not receive any delivery

Technical support and development customization

1. Scope of technical support

- 1) The company releases the electrical characteristics and use of industrial carrier boards and modules;
- 2) Physical dimension of hardware, relevant structure diagram and line sequence definition of specific interface;
- 3) Burn in verification of all BSP support packages provided by the company;
- 4) The company released burn environment construction, entry-level use. ;
- 5) Various peripheral module drivers released by the company;
- 6) The company's product fault diagnosis and after-sales maintenance services;

2. Scope of technical discussion

Due to the wide range of embedded system knowledge and various types of involvement, we can not



guarantee that all kinds of questions can be answered one by one. The following content is not available for technical support, only suggestions can be provided.

- 1) Knowledge beyond the course published by our company;
- 2) Specific software program design;
- 3) Technical support for industrial carrier not issued by the company;
- 4) All kinds of driving support for industrial carrier board not issued by the company;
- 5) Hardware principle and drive design of peripheral module not issued by our company;

3. Technical support mode

- 1) Official website or email questions (recommended):
<https://www.realtimesai.com/cn/download.html> techsupport@realtimes.cn
- 2) Official Taobao through Alibaba Wangwang consultation: <https://shop340963258.taobao.com/>
- 3) Wechat group consultation (wechat Group No. consults Taobao customer service or sales, and Taobao purchase order No. needs to be provided for verification);
- 4) Technical support email: techsupport@realtimes.cn
- 5) Tel: **400-100-8358**

4. Technical support time

Monday to Friday; 8:30-12:00 am; 1:00-17:30 PM;

The company arranges the rest according to the national legal holidays, during which it may not be able to provide technical support, please send the problem to the technical support email. We will reply to you as soon as possible on weekdays.

5. Complaints and suggestions

If you are not satisfied with us or have suggestions, you can send an email to [yu.qin @ realtimes.cn](mailto:yu.qin@realtimes.cn) For feedback, please call **400-100-8358** for further improvement.

6. Customized development services

The company provides the embedded operating system driver based on NVIDIA Jetson series and the paid customized development service of hardware carrier board to shorten your product development cycle.

Please email the request to info@realtimes.cn

Data acquisition and subsequent update

1. Access to information

Download on our website

The company's website contains supporting information of its products, including product Product Manual, NVIDIA Jetson series module data manual, BSP driver support package for carrier board, supporting peripheral driver files, interface test verification method, FAQ, system burning guide, etc. get into www.realtimesai.com , select "data download" in the navigation bar, find the data you need, and click download.

2. Subsequent updates

Updates of subsequent documents, BSP, driver files and other official account will be updated in time. We will pay close attention to our developments in order to ensure that your information is up to date. We will push through WeChat public.



Product presentation

1 Product introduction

RTSS-X306 Feiyun Smart Box is the UAV industry solution for Orin NX and Orin Nano core modules. It adopts the active cooling design of aluminum alloy shell, which can adapt to the more harsh working environment. It adopts the stable snap-on terminal block to ensure the stability of the interface during the flight of the UAV. Rich interface to ensure the diversity of sensor access, OSDK interface can meet the needs of customers to access industry-level UAVs, built-in chip type WIFI6 module to ensure more stable data exchange, longer distance signal transmission, is the ideal solution for the UAV industry.

1.1 Feature

PN	RTSS-X306-8G/ (5G)	RTSS-X306/ (5G)	RTSS-X306-ORIN NANO4/ (5G)	RTSS-X306-ORIN NANO8/ (5G)
AI Core	Orin NX 8GB	Orin NX 16GB	Orin Nano 4GB	Orin Nano 8GB
CPU	6-core Arm® Cortex®-A78AE v8.2 64-bit CPU 1.5MB L2 + 4MB L3	8-core Arm® Cortex®-A78AE v8.2 64-bit CPU 2MB L2 + 4MB L3	6-core Arm® Cortex®-A78AE v8.2 64-bit CPU 1.5MB L2 + 4MB L3	
GPU	1,024-core NVIDIA Ampere architecture GPU with 32 Tensor Cores		512-core NVIDIA Ampere architecture GPU with 16 Tensor Cores	1,024-core NVIDIA Ampere architecture GPU with 32 Tensor Cores
Memory	8GB 128-bit LPDDR5 102.4GB/s	16GB 128-bit LPDDR5 102.4GB/s	4GB 64-bit LPDDR5 34 GB/s	8GB 128-bit LPDDR5 68 GB/s
Storage	128GB SSD comes standard			
Computing Power	70 TOPS	100 TOPS	20 TOPS	40 TOPS



PN Interface	RTSS-X306-8G	RTSS-X306	RTSS-X306-ORIN NANO4	RTSS-X306-ORIN NANO8
AI Core	Jetson Orin NX 8GB	Jetson Orin NX 16GB	Jetson Orin Nano 4GB	Jetson Orin Nano 8GB
System	Ubuntu 20.04			
USB	2 x USB 3.0 Type C ports, support usb2.0, usb3.0 signals; 1 x USB2.0 interface (can be extended up to 2 USB2.0), only support usb2.0 signals; 1 x Micro USB Debug;			
Display	1 x Micro HDMI interface			
Ethernet	1 x GbE (10/100/1000Mbps adaptive; Half-duplex/full-duplex adaptive)			
Serial port	1 x UART			
CAN	1 x CAN			
OSDK	1 x OSDK			
WIFI	Chip WIFI6 (built-in)			
M.2	1 x M.2 key M port, 128GB SSD as standard; (Built-in interface)			
FAN	1 x FAN interface (built-in interface)			
RTC	Support RTC function (built-in RTC battery)			
Heat-dissipating method	Fan heat dissipation			
Dimensions	100mm*71mm*40mm			
Power	DC +9~+36V Or OSDK +24V			
Temperature	-25~+50°C			

PN Interface	RTSS-X306-8G(5G)	RTSS-X306(5G)	RTSS-X306-ORIN NANO4(5G)	RTSS-X306-ORIN NANO8(5G)
AI Core	Jetson Orin NX 8GB	Jetson Orin NX 16GB	Jetson Orin Nano 4GB	Jetson Orin Nano 8GB
System	Ubuntu 20.04			
USB	2 x USB 3.0 Type C ports, support usb2.0, usb3.0 signals; 1 x USB2.0 interface (can be extended up to 2 USB2.0), only support usb2.0 signals; 1 x Micro USB Debug;			
Display	1 x Micro HDMI interface			
Ethernet	1 x GbE (10/100/1000Mbps adaptive; Half-duplex/full-duplex adaptive)			
Serial port	1 x UART			
CAN	1 x CAN			
OSDK	1 x OSDK			
WIFI	Chip WIFI6 (built-in)			
M.2	1 x M.2 key M port, 128GB SSD as standard; (Built-in interface)			
FAN	1 x FAN interface (built-in interface)			
RTC	Support RTC function (built-in RTC battery)			
SIM	1 x Nano SIM(Built-in expansion interface)			
Heat-dissipating method	Fan heat dissipation			
Dimensions	100mm*71mm*53mm			



Power	DC +9~+36V Or OSDK +24V
Temperature	-25~+50°C
Weight	About 394g

1.2 Ordering Information

Model Options	Functional Description
RTSS-X306	Orin NX Feiyun Smart Box air-cooled version, built-in ORIN NX 16GB module,2 x USB3.0, 2 x USB2.0,1 x Micro HDMI,1 x GbE,1 x M.2Key M,1 x UART,1 x DEBUG,1 x OSDK,1 x CAN,WIFI6 module,1 x FAN,1 x RTC,-25°C~+50°C;128GSSD,wiring package (including XT30 power conversion cable and interface wiring),provides Realtimes RTS Linux4Tegra software support package, through 3C and CE certification
RTSS-X306(5G)	Orin NX Feiyun Smart Box air-cooled version, built-in ORIN NX 16GB module,2 x USB3.0, 2 x USB2.0,1 x Micro HDMI,1 x GbE,1 x M.2Key M,1 x M.2Key B,1 x Nano SIM,1 x UART,1 x DEBUG,1 x OSDK,1 x CAN,WIFI6 module,1 x FAN, 1 x RTC, -25°C~+50°C ; 128GSSD,5G module,wiring package (including XT30 power conversion cable and interface wiring),provides Realtimes RTS Linux4Tegra software support package, through 3C and CE certification
RTSS-X306-8G	Orin NX Feiyun Smart Box air-cooled version, built-in ORIN NX 8GB module,2 x USB3.0, 2 x USB2.0,1 x Micro HDMI,1 x GbE,1 x M.2Key M,1 x UART,1 x DEBUG,1 x OSDK,1 x CAN,WIFI6 module,1 x FAN,1 x RTC,-25°C~+50°C;128GSSD,wiring package (including XT30 power conversion cable and interface wiring),provides Realtimes RTS Linux4Tegra software support package, through 3C and CE certification
RTSS-X306-8G(5G)	Orin NX Feiyun Smart Box air-cooled version, built-in ORIN NX 8GB module,2 x USB3.0, 2 x USB2.0,1 x Micro HDMI,1 x GbE,1 x M.2Key M,1 x M.2Key B,1 x Nano SIM,1 x UART,1 x DEBUG,1 x OSDK,1 x CAN,WIFI6 module,1 x FAN, 1 x RTC, -25°C~+50°C ; 128GSSD,5G module,wiring package (including XT30 power conversion cable and interface wiring),provides Realtimes RTS Linux4Tegra software support package, through 3C and CE certification
RTSS-X306-OrinNano8	Orin Nano Feiyun Smart Box air-cooled version, built-in ORIN Nano 8GB module,2 x USB3.0, 2 x USB2.0,1 x Micro HDMI,1 x GbE,1 x M.2Key M,1 x UART,1 x DEBUG,1 x OSDK,1 x CAN,WIFI6 module,1 x FAN,1 x RTC,-25°C~+50°C;128GSSD,wiring package (including XT30 power conversion cable and interface wiring),provides Realtimes RTS Linux4Tegra software support package, through 3C and CE certification
RTSS-X306-OrinNano8(5G)	Orin Nano Feiyun Smart Box air-cooled version, built-in ORIN Nano 8GB module,2 x USB3.0, 2 x USB2.0,1 x Micro HDMI,1 x GbE,1 x M.2Key M,1 x M.2Key B,1 x Nano SIM,1 x UART,1 x DEBUG,1 x OSDK,1 x CAN,WIFI6 module,1 x FAN, 1 x RTC, -25°C~+50°C ; 128GSSD,5G module,wiring package (including XT30 power conversion cable and

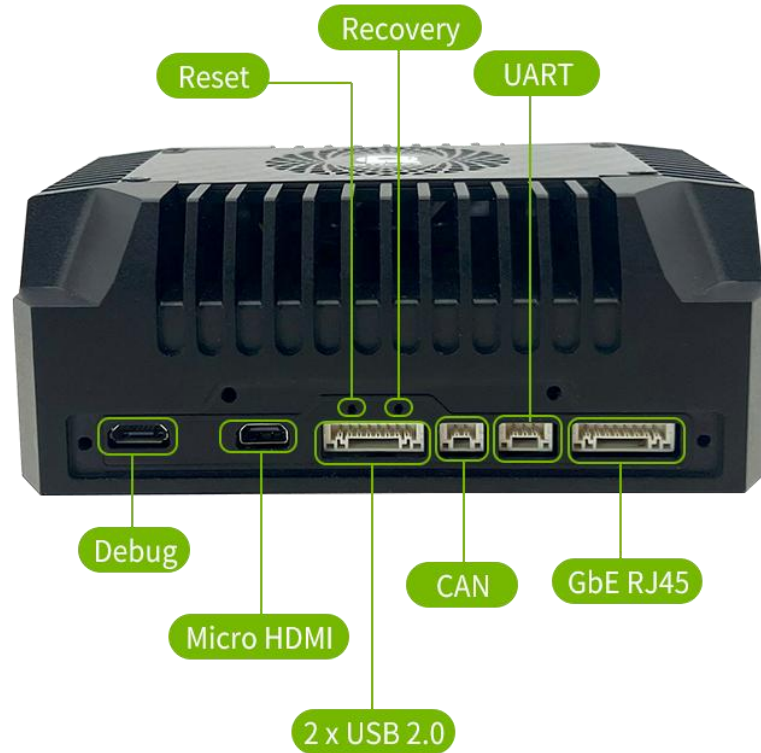


	interface wiring),provides Realtimes RTS Linux4Tegra software support package, through 3C and CE certification
RTSS-X306-OrinNano4	Orin Nano Feiyun Smart Box air-cooled version, built-in ORIN Nano 4GB module,2 x USB3.0, 2 x USB2.0,1 x Micro HDMI,1 x GbE,1 x M.2Key M,1 x UART,1 x DEBUG,1 x OSDK,1 x CAN,WIFI6 module,1 x FAN,1 x RTC,-25°C~+50°C;128GSSD,wiring package (including XT30 power conversion cable and interface wiring),provides Realtimes RTS Linux4Tegra software support package, through 3C and CE certification
RTSS-X306-OrinNano4(5 G)	Orin Nano Feiyun Smart Box air-cooled version, built-in ORIN Nano 4GB module,2 x USB3.0, 2 x USB2.0,1 x Micro HDMI,1 x GbE,1 x M.2Key M,1 x M.2Key B,1 x Nano SIM,1 x UART,1 x DEBUG,1 x OSDK,1 x CAN,WIFI6 module,1 x FAN, 1 x RTC, -25°C~+50°C ; 128GSSD,5G module,wiring package (including XT30 power conversion cable and interface wiring),provides Realtimes RTS Linux4Tegra software support package, through 3C and CE certification

Order online:Taobao Store : <https://shop340963258.taobao.com>Tmall Store : <https://feiyunzhihe.tmall.com/>Jingdong Store : <https://mall.jd.com/index-824786.html>

Product specifications

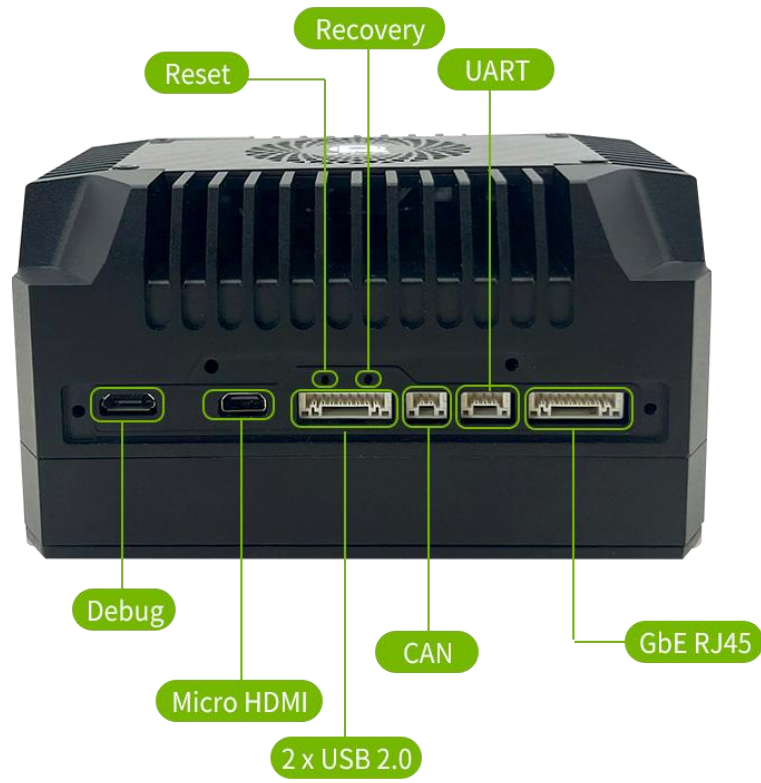
1 External interface function and location



X306 FRONT



X306 BACK




X306(5G)FRONT




2 Connectors Description


2.1 Display interface

Function	HDMI output	
Type	Micro HDMI	


2.2 Micro USB DEBUG interface

Function	DEBUG	
Type	Micro USB	


2.3 USB3.0 TYPE C interface

Function	USB3.0	
Type	Standard TYPE C USB 3.0	

2.4 USB 2.0 interface

Function	USB 2.0																								
Type	GH 1.25mm_8P/ A1257WR-S-8P																								
Pin define	<table border="1"> <thead> <tr> <th>Pin</th> <th>Signal</th> <th>Pin</th> <th>Signal</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>VBUS1</td> <td>2</td> <td>USB2.0_1N</td> </tr> <tr> <td>3</td> <td>USB2.0_1P</td> <td>4</td> <td>GND</td> </tr> <tr> <td>5</td> <td>VBUS2</td> <td>6</td> <td>USB2.0_2N</td> </tr> <tr> <td>7</td> <td>USB2.0_2P</td> <td>8</td> <td>GND</td> </tr> </tbody> </table>					Pin	Signal	Pin	Signal	1	VBUS1	2	USB2.0_1N	3	USB2.0_1P	4	GND	5	VBUS2	6	USB2.0_2N	7	USB2.0_2P	8	GND
Pin	Signal	Pin	Signal																						
1	VBUS1	2	USB2.0_1N																						
3	USB2.0_1P	4	GND																						
5	VBUS2	6	USB2.0_2N																						
7	USB2.0_2P	8	GND																						


2.5 OSDK interface

Function	OSDK																																
Type	TYPE C																																
Pin define	<table border="1"> <thead> <tr> <th>Pin</th> <th>Signal</th> <th>Pin</th> <th>Signal</th> </tr> </thead> <tbody> <tr> <td>A4,A 9,B4, B9</td> <td>24V</td> <td>A1,A 12,B1 ,B12</td> <td>GND</td> </tr> <tr> <td>A2</td> <td>NC</td> <td>B2</td> <td>NC</td> </tr> <tr> <td>A3</td> <td>NC</td> <td>B3</td> <td>NC</td> </tr> <tr> <td>A5</td> <td>UART_RX (3.3V)</td> <td>B5</td> <td>SYNC_PPS (3.3V)</td> </tr> <tr> <td>A6</td> <td>USB2.0_P</td> <td>B6</td> <td>USB_ID</td> </tr> <tr> <td>A7</td> <td>USB2.0_N</td> <td>B7</td> <td>VBUS</td> </tr> </tbody> </table>					Pin	Signal	Pin	Signal	A4,A 9,B4, B9	24V	A1,A 12,B1 ,B12	GND	A2	NC	B2	NC	A3	NC	B3	NC	A5	UART_RX (3.3V)	B5	SYNC_PPS (3.3V)	A6	USB2.0_P	B6	USB_ID	A7	USB2.0_N	B7	VBUS
Pin	Signal	Pin	Signal																														
A4,A 9,B4, B9	24V	A1,A 12,B1 ,B12	GND																														
A2	NC	B2	NC																														
A3	NC	B3	NC																														
A5	UART_RX (3.3V)	B5	SYNC_PPS (3.3V)																														
A6	USB2.0_P	B6	USB_ID																														
A7	USB2.0_N	B7	VBUS																														


	A8	UART_TX (3.3V)	B8	GND
	A10	NC	B10	NC
	A11	NC	B11	NC

Note: Interface functions include 24V power supply, system burning, USB2.0, PPS_IN, UART


2.6 CAN interface

Function	CAN											
Type	GH 1.25mm_2P/ A1257WR-S-2P											
Pin define	<table border="1"> <thead> <tr> <th>Pin</th> <th>Signal</th> <th>Pin</th> <th>Signal</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>CAN_H</td> <td>2</td> <td>CAN_L</td> </tr> </tbody> </table>					Pin	Signal	Pin	Signal	1	CAN_H	2
Pin	Signal	Pin	Signal									
1	CAN_H	2	CAN_L									


2.7 UART interface

Function	UART															
Type	GH 1.25mm_3P/ A1257WR-S-3P															
Pin define	<table border="1"> <thead> <tr> <th>Pin</th> <th>Signal</th> <th>Pin</th> <th>Signal</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>UART_TX</td> <td>2</td> <td>UART_RX</td> </tr> <tr> <td>3</td> <td>GND</td> <td></td> <td></td> </tr> </tbody> </table>					Pin	Signal	Pin	Signal	1	UART_TX	2	UART_RX	3	GND	
Pin	Signal	Pin	Signal													
1	UART_TX	2	UART_RX													
3	GND															

2.8 Network interface

Function	Gigabit network interface																								
Type	GH 1.25mm_8P/ A1257WR-S-8P																								
Pin define	<table border="1"> <thead> <tr> <th>Pin</th> <th>Signal</th> <th>Pin</th> <th>Signal</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>MDI0_P</td> <td>2</td> <td>MDI0_N</td> </tr> <tr> <td>3</td> <td>MDI1_P</td> <td>4</td> <td>MDI1_N</td> </tr> <tr> <td>5</td> <td>MDI2_P</td> <td>6</td> <td>MDI2_N</td> </tr> <tr> <td>7</td> <td>MDI3_P</td> <td>8</td> <td>MDI3_N</td> </tr> </tbody> </table>					Pin	Signal	Pin	Signal	1	MDI0_P	2	MDI0_N	3	MDI1_P	4	MDI1_N	5	MDI2_P	6	MDI2_N	7	MDI3_P	8	MDI3_N
Pin	Signal	Pin	Signal																						
1	MDI0_P	2	MDI0_N																						
3	MDI1_P	4	MDI1_N																						
5	MDI2_P	6	MDI2_N																						
7	MDI3_P	8	MDI3_N																						


2.9 Power interface

Function	Power input interface											
Type	XT30											
Pin define	<table border="1"> <thead> <tr> <th>Pin</th> <th>Signal</th> <th>Pin</th> <th>Signal</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>+</td> <td>2</td> <td>-</td> </tr> </tbody> </table>					Pin	Signal	Pin	Signal	1	+	2
Pin	Signal	Pin	Signal									
1	+	2	-									

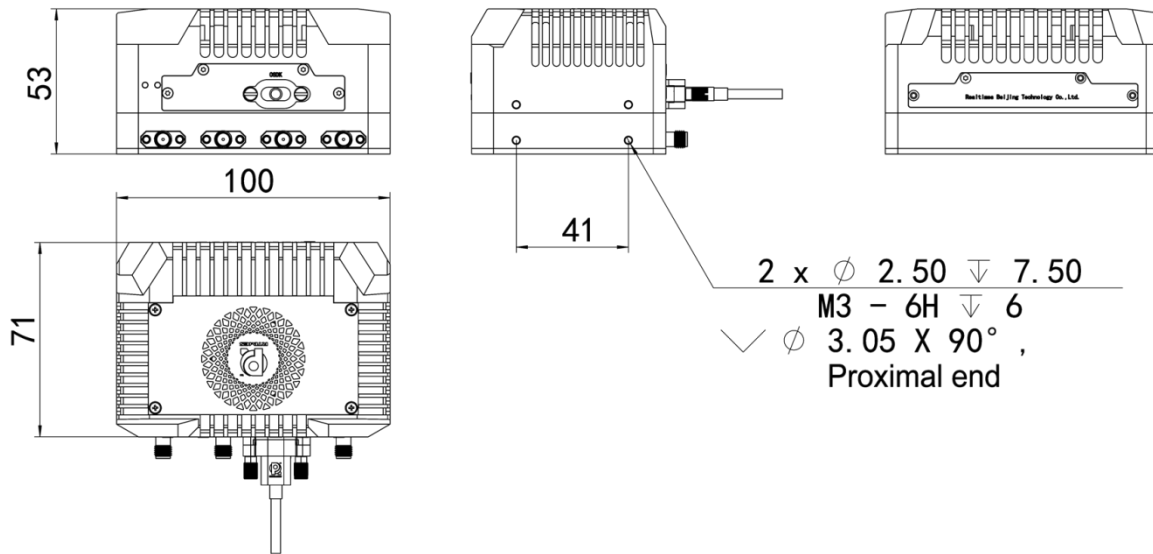


	Input voltage range: DC +9~+36V Do not connect cables with power on!	
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2.10 5G antenna

Function	5G antenna	
Type	IPX(IPEX, UFL) to SMA-KY female head (outer screw inner hole) 0.81/ Black line/fourth generation Note: RTSS-X306(5G) version is available	

3 Product size diagram



4 Hardware update history

RTSS-X306 hardware update history

Revision	Update description
V1.0	Initial release

Software version supporting instructions

The RTSS-X306 is a complete machine form product with Jetson Orin NX/Orin Nano module as the core, providing one-stop terminal equipment for developers to help developers develop applications.

RTSS-X306 Feiyun Smart Box supporting software includes:

- L4T (Linux for Tegra) : L4T provides the "OS" for your smart box, including the Linux kernel, boot loader, board level support package (BSP), and sample file system. (The pure system is installed for the device by default, Jetpack needs to install it itself)
- Jetpack: The Jetpack sdk is the most comprehensive solution for building AI applications. It includes software libraries and apis, samples, developer tools, and documentation for the latest and previous versions of Jetson products.

1 Use

1.1 Smart box power on and start

- a) Ensure that all external system voltages are turned off
- b) Install necessary external cables. (e.g., the display cable to the HDMI monitor, the power input cable to the system, the USB cable to the keyboard and mouse...)
- c) Connect the power cable to the power supply.
- d) RTSS-X306 adopts automatic power-on design. Turn on the power and the system starts to work.

1.2 Recovery Mode

Jetson Orin NX/Orin Nano core modules can work in normal mode and Recovery mode. In Recovery mode, you can perform file system update, kernel update, boot loader update, BCT update and other operations.

To enter Recovery mode:

- a) Turn off the power supply to the system.
- b) Use the OSDK interface system burning cable, plug the type C end into the OSDK interface of RTSS-X306, connect the type A end to the USB male-to-male extension cable, and connect the other end of the extension cable to the USB port of the PC development host.
- c) Press the Recovery button to supply power to the system. Keep the power supply running for more than 3 seconds, and then release the Recovery button.
- d) When the system enters the Recovery mode, you can perform subsequent operations.

2 Board level support Package (BSP)

L4T provides "OS" for your Feiyun Smart Box, including Linux kernel, boot loader, board support package (BSP) and sample file system.

The RTSS-X306 smart box works on a system burned using the official NVIDIA Linux For Tegra (L4T). HDMI, Gigabit Ethernet, USB2.0, serial port, GPIO, SD card, I2C bus can be supported. However, the Mini-PCIe, M.2, USB3.0, and fan ports do not work properly.



To support all RTSS-X306 smart box interfaces, you need to load the driver patch (BSP: board support package). Use flash mode for system burning. SDK Manager to install all other JetPack components except L4T to get your box up and running quickly.

For system flash documentation, please refer to [《Orin NX System flash Manual》](#). L4T and BSP can be downloaded from [Ruitai Cloud Space](#), and L4T can also be downloaded directly from the L4T main page on the Jetson developer site.

Note: Contact technical support to obtain the password of the Rui Tai cloud space account.

RTSS-X306 board-level patch support pack download jump link:

<https://www.realtimes.cn/cn/software.html>

3 Jetpack

Nvidia jetpack sdk is the most comprehensive solution for building AI applications. It includes software libraries and apis, examples, developer tools and documentation for the latest and previous versions of Jetson products.

3.1 Jetpack Component summary

This section briefly introduces each component of JetPack. For more detailed information about these components, please refer to JetPack's online documentation.

OS Image

JetPack includes a reference file system derived from Ubuntu. (Development kit system, no need to install)

Libraries and APIs

JetPack library and API include:

- TensorRT and cuDNN for high-performance deep learning applications
- CUDA for multi-domain GPU accelerated applications
- NVIDIA Container Runtime for containerized GPU accelerated applications
- Multimedia API package for camera application and sensor driver development
- VisionWorks, OpenCV and VPI for visual computing applications
- Sample application

3.2 How to install Jetpack

Overview of process steps

Installing JetPack to your Jetson device requires you to perform the following steps:

1. Download and install the NVIDIA SDK Manager on the Linux host.
2. Connect your jetson device to the Linux host (Type C (OSDK) or network (same network segment)).
3. Test your device can connect via ssh.
4. Use SDK Manager to select and install the required components.



Download and install the NVIDIA SDK Manager on the Linux host.

You must have a Linux host with internet access to run SDK Manager and refresh the developer kit. The supported host operating systems are:

Ubuntu Linux x64 Version 18.04 or 16.04

Download and install NVIDIA SDK Manager.

sdkmanager Installation package: **sdkmanager-[version].[build#].deb**

The current version is: **sdkmanager_1.2.0**

sdkmanager install

\$ sudo apt install ./sdkmanager-[version].[build#].deb

Connect your jetson device to the Linux host

Prepare your Jetson device for the following settings. (If the equipment system is not initialized, the system user needs to initialize after power-on)

- Connect the monitor, keyboard and mouse to the Jetson Feiyun smart box device (please refer to the interface description above).
- Use Type C (OSDK) cable to connect Linux host and Jetson Feiyun Smart Box (Type C (OSDK) or network (same network segment))
- During the setup process, SDK Manager will provide Internet connection for your jetson Feiyun Smart Box via Type C (OSDK) or network connection.
- Connect the supplied power adapter to the DC jack of the Feiyun Smart Box, and plug the AC interface into an AC power outlet.

Test that your device can connect via ssh.

If connected via Type C (OSDK), enter lsusb under the Linux host terminal to see the nvidia crop

The device can be accessed through ping or ssh commands

```
$ ping 192.168.55.1
```

or

```
$ ssh <jetson_user>@192.168.55.1
```

If connected via a network, check whether the device ip address is in the same network segment as the Linux host on the Feiyun Smart Box, and the Feiyun Smart Box device can be accessed through the ping or ssh command.

```
$ ping <jetson_ip>
```

or

```
$ ssh <jetson_user>@<jetson_device_ip>
```

Use SDK Manager to select and install the required components

NVIDIA SDK Manager supports installing software to Jetson core (Flying Cloud Smart Box). For complete instructions, please refer to Chapter 5 of "[Orin NX System Programming Manual](#)".

3.3 Sample application

JetPack includes several examples that demonstrate the use of JetPack components. They are stored in the reference file system and can be compiled in the developer toolkit.

Component	Location
TensorRT	/usr/src/tensorrt/samples/
cuDNN	/usr/src/cudnn_samples_/
CUDA	/usr/local/cuda-/samples/
Multimedia API	/usr/src/tegra_multimedia_api/
VisionWorks	/usr/share/visionworks/sources/samples/ /usr/share/visionworks-tracking/sources/samples/ /usr/share/visionworks-sfm/sources/samples/
OpenCV	/usr/share/OpenCV/samples/
VPI	/opt/nvidia/vpi/vpi-/samples

3.4 Developer tools

JetPack includes the following development tools. Some are used directly on the Jetson system, and some run on a Linux host connected to the Jetson system.

•Application development and debugging tools

- [NSight Eclipse](#) version for GPU accelerated application development: runs on a Linux host. Support all Jetson products.

- [CUDA-GDB](#) for application debugging: Run on Jetson system or Linux host. Support all Jetson products.

- [CUDA-MEMCHECK](#) debug application memory error: run on Jetson system. Support all Jetson products.

•Application analysis and optimization tools

- [NSight Systems](#) for application multi-core CPU evaluation: run on a Linux host. Helps you improve application performance by identifying the slower parts of the code. Support all Jetson products.

- [NVIDIA@Nsight™ compute](#) Kernel Analyzer: An interactive analysis tool for CUDA applications. It provides detailed performance indicators and API debugging through user interface and command line tools.

- [NSight Graphics](#) for graphics application debugging and evaluation: a consolegrade tool for debugging and optimizing OpenGL and OpenGL ES programs. Run on the Linux host. Support all Jetson products.



3.5 Documentation

Documents related to developers using JetPack include:

- [JetPack Documentation](#)
- [VisionWorks Documentation](#)
- [Nsight Eclipse Edition Documentation](#)
- [CUDA-GDB Documentation](#)
- [CUDA-MEMCHECK Documentation](#)
- [TensorRT Documentation](#)
- [cuDNN Documentation](#)
- [CUDA Toolkit](#)
- [NVIDIA Container Runtime](#)
- [OpenCV Documentation](#)
- [Jetson Linux Multimedia API Reference](#)
- [Nsight Systems](#)
- [nvprof](#)
- [Visual Profiler](#)
- [Nsight Graphics](#)
- [Nsight Compute CLI](#)
- [VPI-Vision Programming Interface](#)



Terms of Warranty

Important note

Each embedded product provided by Realtimes Technology is free from any defects in material and process,fully in line with the specifications officially issued by the original factory.

Realtimes Technology warranty covers the original products,If the parts configured by the dealer are out of order, please consult with the dealer to solve the problem. All the baseplate and core modules provided by Ruitai New Era (Beijing) Technology Co., Ltd. are guaranteed for 3 years, while the other peripherals are guaranteed for 1 year (life-long maintenance service is provided if the warranty period is beyond the warranty period).The warranty period starts from the date of delivery, for the products repaired within the warranty period, the repair parts shall be extended for 12 months.Unless notified by Realtimes Technology, the date of your original invoice shall be the date of shipment.

How do I get warranty services

If the product does not work properly, Please contact Realtimes Technology or dealer for warranty service, please show invoice when product warranty(this is the proof for you getting warranty service).

Warranty solution

When you ask for warranty service, please follow Realtimes Technology warranty process,You will need to receive your first diagnosis from a technical engineer by phone or by email,at that time,we need you to cooperate with us to fill in all the questions on the RMA form provided by us. Once we accurately determine the cause of the fault and the location of the damage ,we will provide the charge list for the out of warranty products,which needs your confirmation.Realtimes Technology keep the right to repair or replace the products. If the product is replaced or repaired, the replaced faulty product or the repaired and replaced faulty parts will be returned to Realtimes Technology.

For products under warranty,the customer shall bear the freight when the product is returned to the manufacturer,Realtimes Technology will bear the ship cost of the products after maintenance.

The following conditions are not covered by the warranty terms

- a) Improper installation, improper use, misuse and abuse of products(Overloading, for example).
- b) Improper maintenance and storage (Such as fire, explosion, etc) or natural disasters (such as lightning stroke,earthquake,typhoon,etc)
- c) Personal unauthorized changing the product(such as changing circuit characteristics, mechanical characteristics, software characteristics,Conformal coating).
- d) Other failures which are clearly due to misuse(such as overvoltage,polarity reversal, the pin bent or broken,the wrong connection,drop damage,transportation damage,damage due to over operating temperature and so on).
- e) The logo and part number on the product have been deleted or removed.
- f) The product is out of warranty.



Special concerns

If the same fault multiple occurrence for the products,in order to find out the reason causing the problem,we will request the users to provide the specific documents or information of peripheral equipment,such as monitor,I/O boards,cables,power supply, diagram and structure of the system,etc.If such documents or information are not available,we have the right to refuse to perform the warranty, the repairments will be charged accordingly.

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