

# **Zao SDK Quick Start Guide**

**Soliton Systems**

2023/05/02

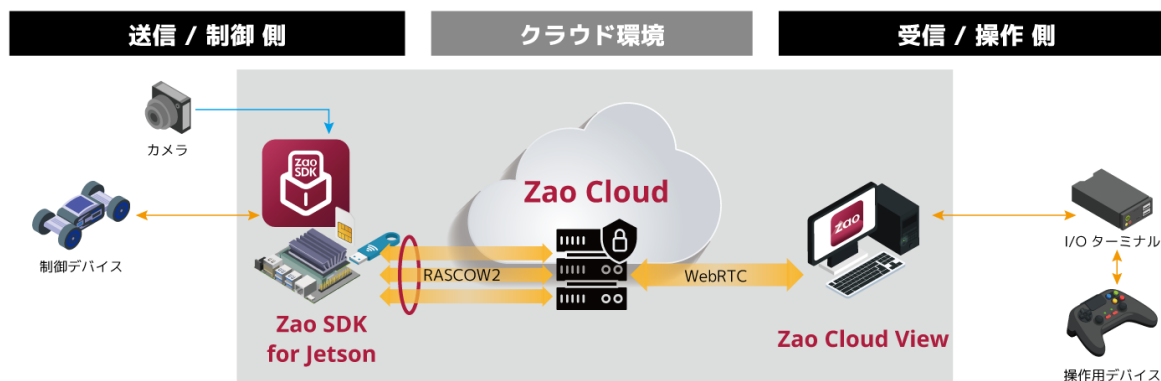
## Table of Contents

<b>1 Introduction</b> .....	<b>3</b>
<b>2 Setting up Zao SDK for Jetson</b> .....	<b>5</b>
2.1 JetPack Setup .....	5
2.2 Zao SDK for Jetson Setup.....	10
<b>3 Zao Cloud View Setup</b> .....	<b>12</b>
3.1 Installing Zao Cloud View .....	12
3.2 Login to Zao Cloud .....	12
<b>4 Live Streaming Setup</b> .....	<b>15</b>
4.1 Obtaining a pairing number .....	15
4.2 pairing.....	16
4.3 live reception (e.g. radio).....	18
4.4 Jetson Power Off .....	19
4.5 Exit Zao Cloud View .....	19
<b>5 Serial Tunnel Setup</b> .....	<b>20</b>
5.1 Preparation of PC for operation check .....	20
◀ 5.2 USB to Serial Adapter Connection.....	21
5.3 Start of serial communication.....	22
<b>6 Receiving PC Operating Environment</b> .....	<b>23</b>
<b>7 Update History</b> .....	<b>24</b>

- This document covers Zao SDK for Jetson 1.0.x.x.
- In the command execution example, blue letters indicate the part of the command to be input.

## 1 Introduction.

Zao SDK is a system for stable transmission of video, audio, and control signals using Zao SDK for Jetson and Zao Cloud (Fig. 1-1 Figure 11). This document describes how to set up Zao SDK for Jetson and Zao Cloud View to start video transmission and serial tunneling.



**Fig. 1-1 Zao SDK Overall Configuration**

This document assumes Jetson Nano Developer Kit (rev. B01) and wired LAN connection. Zao SDK for Jetson also supports other Jetsons and Internet connections. For details, please refer to the FAQ and User's Guide on [zao-sdk.org](http://zao-sdk.org). For information on supported devices, including webcams, USB serial adapters, etc., please refer to the FAQ on [zao-sdk.org](http://zao-sdk.org).

Please prepare the following equipment

### Jetson side

- Jetson Nano Developer Kit (rev. B01)  
Internet access required (wired, DHCP)
- microUSB AC adapter (5V output, capable of supplying 2A or more)
- microSD card (32GB or more, UHS-I or higher)
- HDMI Monitor
- USB keyboard, USB mouse
- Webcam
- USB to Serial Adapter

### receiving entity

- Receiving PC  
See appendix for required specifications  
Internet access is required

- USB to Serial Adapter

### For serial tunnel operation check

- PCs tested (Windows)
- USB to serial adapter x 2
- RS232 cross cable x 2

### Other

- Cloud View subscription information (PDF file sent after trial application)
- USB memory stick
- microSD card reader/writer

Setup flow. Figure 12 shows the setup flow.



**Fig. 1-2 Setup Flow**

## 2 Setting up Zao SDK for Jetson

This chapter describes the procedure for setting up Zao SDK for Jetson.

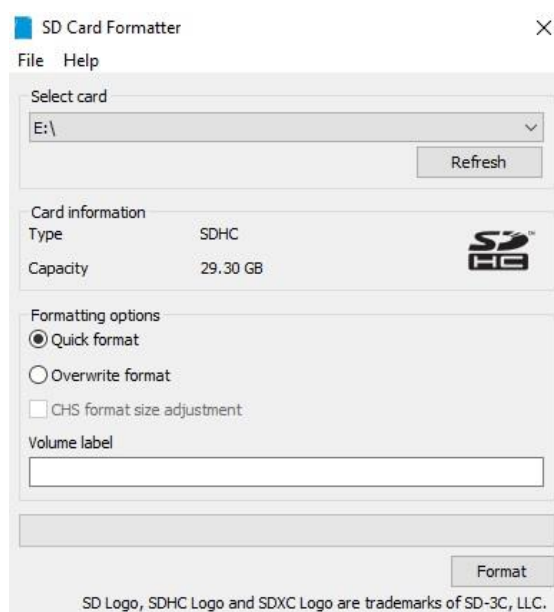
### 2.1 JetPack Setup

Setup the "JetPack" OS environment for Jetson on the Jetson Nano Developer Kit.

After writing the JetPack 4.6.1 image to a microSD card on a PC, perform the initial setup with the Jetson Nano Developer Kit. (Reference: NVIDIA "[Get Started With Jetson Nano Developer Kit](#)" NVIDIA "Get Started With Jetson Nano Developer Kit")

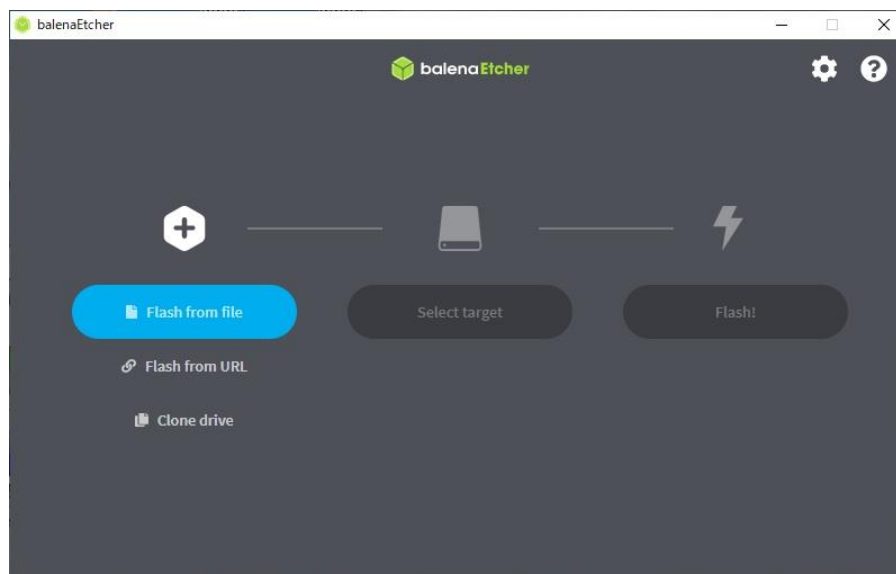
Using the receiving PC, prepare a microSD card according to the following procedure.

1. Download the [Jetson Nano Developer Kit SD Card Image](#) from the link
2. Download [SD Memory Card Formatter for Windows](#) from the link, install and launch it.
3. Set the drive for the SD card, Figure Click on the "Format" button to format with the settings in



**Figure 2-3 SD Card Formatter Settings Dialog**

4. Download, install and start [Etcher](#)



**Figure 2-4 Etcher startup screen**

5. Click on "Flash from file" and select the zip file downloaded in step 1.
6. Insert microSD card if not already inserted.
7. Click on "Select target" and select the drive for the microSD card.  
At this time, Figure 2-5 If the dialog box shown in Figure 23 appears, click the Cancel button in the dialog box.



**Figure 2-5 Format Confirmation Dialog**

8. Figure 2-4 Click on "Flash!" on the Etcher screen in Figure 23 to start writing the image. It will take several minutes.
9. After writing is complete, remove the microSD card and exit Etcher

Next, set up the Jetson Nano Developer Kit.

The microSD card slot on the underside of the Jetson Nano Developer Kit (Figure 2-6 ), insert the microSD card to which the system image was written in the previous step.



**Figure 2-6** microSD card slot

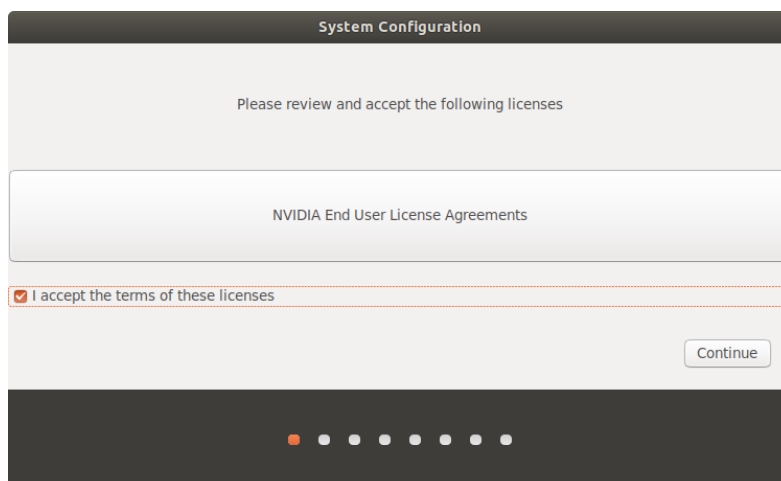
After connecting the HDMI monitor, keyboard, mouse, and LAN respectively, and the Micro-USB power cable, the Jetson Nano Developer Kit will power on and boot automatically. Once startup begins, the green LED next to the Micro-USB connector (Figure 2-7 ) will light up immediately.



**Figure 2-7** Power LED

When starting up for the first time, follow the procedure described below to perform the initial setup.

1. At startup Figure 2-8 Check the EULA for the NVIDIA Jetson software, click the checkbox, and then click "Continue" to proceed to the next step.



**Figure 2-8 EULA Confirmation Screen**

2. Please select "English" for language.  
To prevent problems with some applications other than Zao SDK for Jetson, we have chosen "English" instead of "Japanese".
3. Select your keyboard layout and proceed.
4. Please select time zone and proceed.
5. Please proceed as follows for user name, host name, etc.
  - Your name ..... User1
  - Your computer's name ..... nano1
  - Pick a username ..... user1
  - Choose a password ..... (optional)
  - Confirm your password ..... (same as above)
  - Select "Log in automatically"
6. APP partition size should be left as default
7. For Nvpmodel Mode, select "MAXN" and proceed
8. The initial setup process proceeds, Figure 2-9 Setup is complete when you see a screen like the one shown in Figure 27.



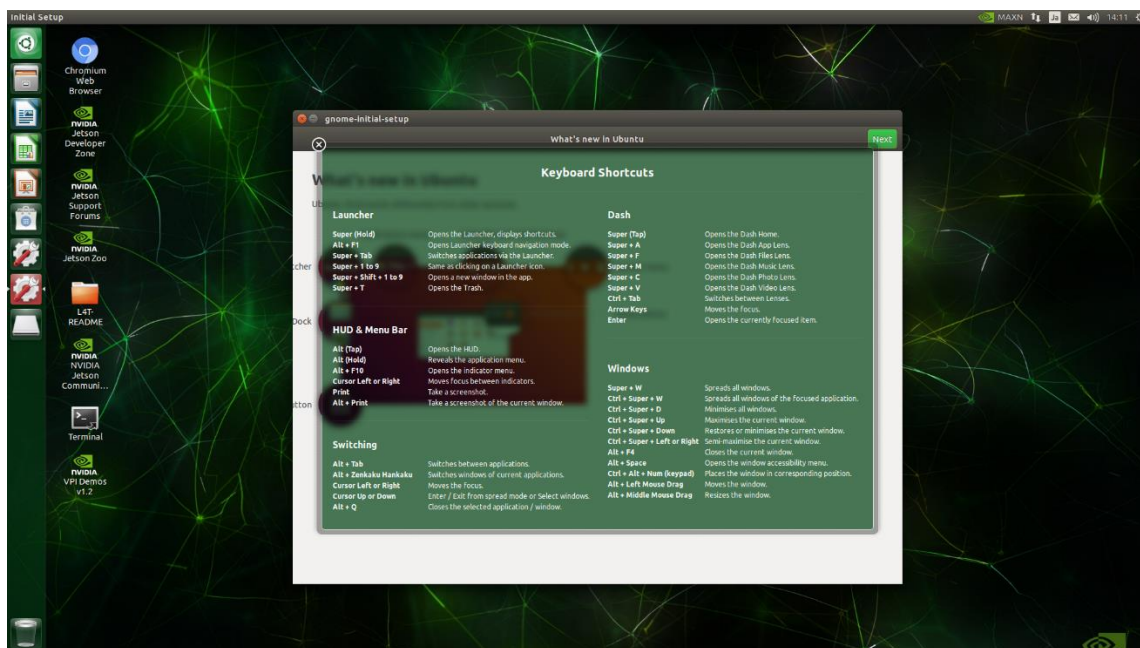


Figure 2-9 Startup screen after setup is complete.

## 2.2 Zao SDK for Jetson Setup

Following the JetPack setup, set up the Zao SDK for Jetson.

You will need the Zao SDK for Jetson package (zao\_sdk\_jetson\_1.0.x.x.tar.xz; please rename the file accordingly) downloaded from zao-sdk.org. Copy the file to your home directory on Jetson using a USB stick, etc.

Open a terminal and execute the following commands in order. The first time you execute sudo, you will be asked for a password.

```
$ sudo apt-get update
$ sudo apt-get -y install libqmi-utils socat dkms libcrypto++6 nano ca-certificates
$ tar xf zao_sdk_jetson_1.0.x.x.tar.xz
```

Then execute the following command in the terminal. You will be presented with a choice, enter 2. You will then be asked to enter the hostname of the ZAO\_CLOUD\_URL to connect to Jetson. Enter the hostname of the ZAO\_CLOUD\_URL as listed in the "Cloud View Subscription Information.pdf" file (Figure 2-10 ). The process will then take a few minutes to complete.

```
$ sudo zao_sdk_jetson_1.0.x.x/setup_zao_sdk_jetson.sh
-----
Preset: Jetson AGX Xavier Developer Kit
Preset: Jetson Nano Developer Kit
Preset: Jetson Xavier NX Developer Kit
Preset: Aetina AX810
0. Custom

Select a setup type > 2

Input hostname of ZAO_CLOUD_URL > cvp-00000000-00v
(Please enter the value from the Cloud View subscription information.pdf file. (Figure 2-10
underlined))

Wait a minute ...
Done.
$
```

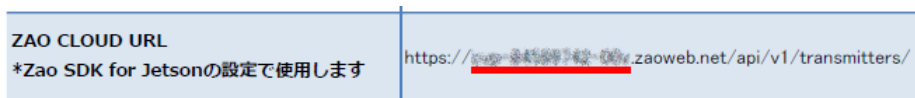
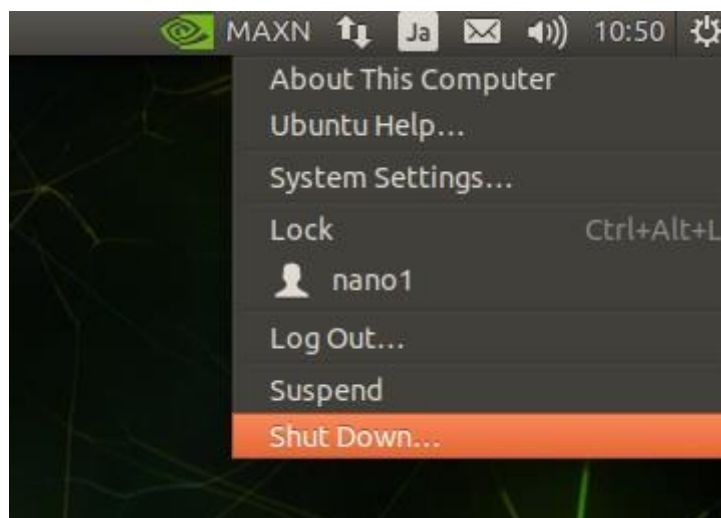


Figure 2-10 ZAO\_CLOUD\_URL information in Cloud View subscription information

This completes the Jetson setup procedure.

Figure 2-11 Select "Shut Down..." from the menu in the upper right corner of the screen as shown in from the menu in the upper right corner of the screen as shown in Figure 29 to shut down Jetson.



**Figure 2-11 Shut Down Menu**

The green LED next to the Micro-USB connector on the Jetson Nano Developer Kit (Figure 2-7 ) next to the Micro-USB connector on the Jetson Nano Developer Kit should be off before disconnecting the power cable.

### 3 Zao Cloud View Setup

This chapter describes how to install Zao Cloud View on a receiving PC and how to log in to Zao Cloud.

**\*Even if you are using an older version of Zao Cloud View, please overwrite the Zao Cloud View downloaded from zao-sdk.org.**

#### 3.1 Installing Zao Cloud View

The installer exe file is included in the zip file downloaded from zao-sdk.org. After unzipping the file, please run it. The setup wizard will start up.

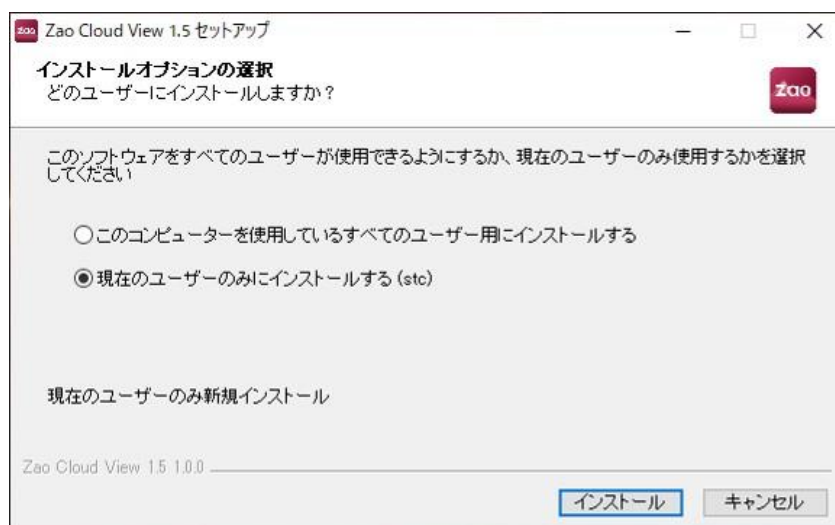


Figure 3. 3-12 Setup Wizard Screen

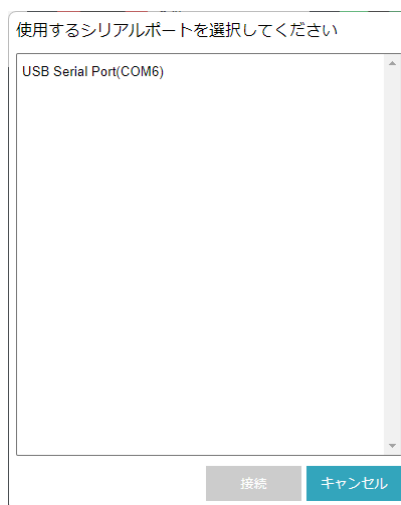
#### 3.2 Login to Zao Cloud

Please make sure that the receiving PC has Internet access, launch "Zao Cloud View", and log in by entering the "ServiceID", "Username", and "Password" information respectively as indicated in the "Cloud View Subscription Information.pdf" (Figure 3. 3-13 Figure 32). Check "Remember Me" to keep your login information (90 days).



Figure 3. 3-13 Enter login information

After logging in, a serial port selection dialog may appear (Figure 3. 3-14 ). Since we will first check the operation without using the serial port, please select "Cancel" to proceed.



**Figure 3. 3-14 Serial Port Selection Dialog**

## 4 Live Streaming Setup

This chapter describes the steps to start live distribution. This procedure must be performed only once the first time.

### 4.1 Obtaining a pairing number

Make sure the following are connected to Jetson to start

- HDMI Monitor
  - keyboard
  - Web camera
  - LAN connection to the built-in Ethernet
- See User's Guide for instructions on using USB-NIC, Wi-Fi, and Soliton MLU

After setup, Jetson will start in text mode. The control application will start automatically, Figure 4-15 The control app will automatically launch and display Not Paired as shown in Figure 41 (the upper left portion of the control app screen is shown in Figure 42).Figure 4-16 If the Network failed message is displayed as shown in Figure 42, the ZAO\_CLOUD\_URL setting is incorrect or there is an error in the network connection. Please refer to the FAQ on zao-sdk.org for the solution.

```
System(S)          Connect(C)
2023-03-10 17:06:53 +0900, SUID:
Control
[ Not Paired ]
```

Figure 4-15 Control Application Initial Screen

```
System(S)          Connect(C)
2023-04-19 11:29:19 +0900, SUID:
Control
[ Network failed ]
```

Figure 4-16 Control application screen (when Network failed)

Press the c key on the keyboard to display the "Connect(C)" menu. Figure 4-17 If you select "Pairing" as shown in Figure 4-18 The pairing number will be displayed as shown in Figure 44. During the validity period of the pairing number (15 minutes), perform the process described in "4.2 Pairing" below. If the expiration date has passed, select "Pairing" from the "Connect(C)" menu again to obtain a new pairing number.

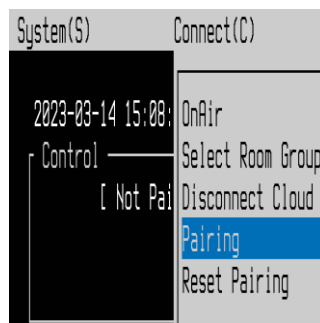


Figure 4-17 Select Pairing from the Connect menu

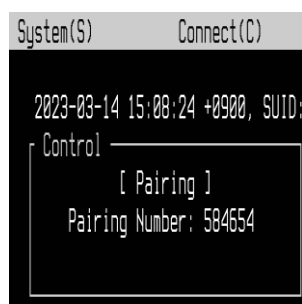


Figure 4-18 Pairing number display

## 4.2 pairing

Next, perform the pairing operation on the receiver PC; sign in to Zao Cloud, and then click on the "Pairing" button on the receiver PC, Figure 4-19 Select "External Camera Management" from the left side menu, as shown in Figure 45. Click the "Not Paired" button on the External Camera Management screen that appears, Figure 4-20 Figure 46: Pairing Number Entry Dialog Box Figure 4-18 Enter the pairing number displayed in the Jetson control application as shown in Figure 45.

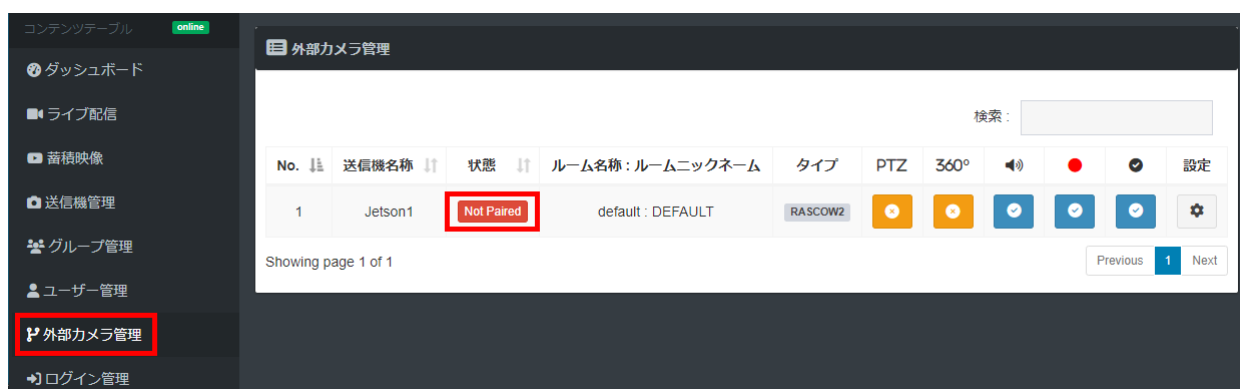


Figure 4-19 External Camera Management Screen





**Figure 4-20 Pairing Number Entry Dialog**

If pairing is successful Figure 4-19 the status button on the external camera management screen will switch to the "Paired" display. In addition, the control application on Jetson will also change to Figure 4-18 The "Pairing" display shown in Figure 45 will change to "Connected" and video transmission will begin.

## 4.3 live reception (e.g. radio)

When you select "Live Streaming" in Zao Cloud View, "Windows Security Important Warning" will appear. Please check all items and click "Allow access". The **firewall access permission will be displayed only when you use it for the first time.**

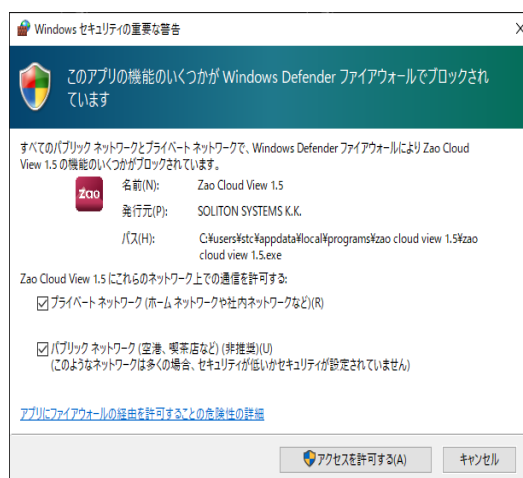


Figure 4-21 Firewall Access Permissions

Selecting Live Streaming will display the video transmitted from Jetson (Figure 4-22 ).

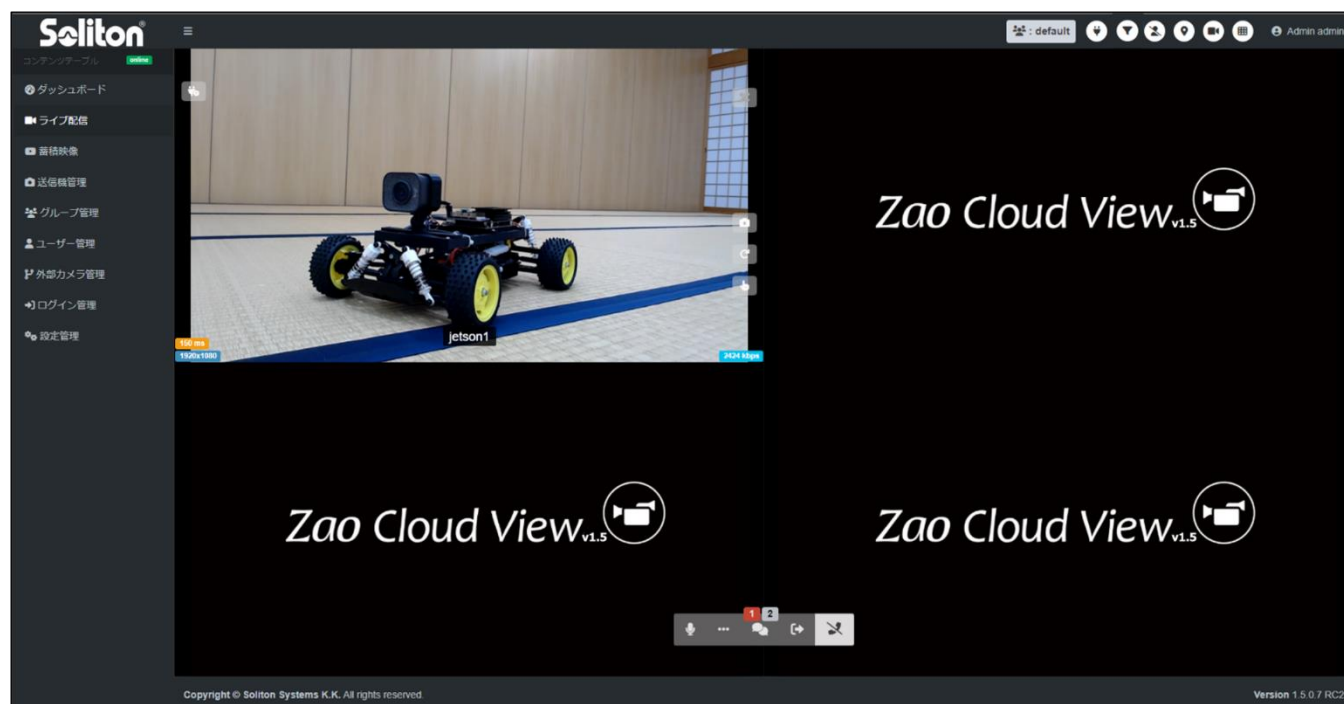


Figure 4-22 Live Streaming Screen

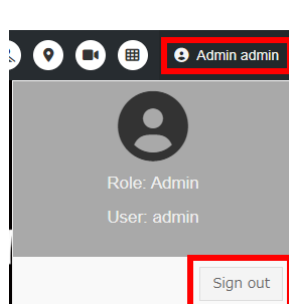
The second and subsequent startups do not require pairing operations or firewall settings, and live streaming is possible.

#### 4.4 Jetson Power Off

To power off Jetson, press the s key on the keyboard to bring up the "System(S)" menu of the control application and select "Shutdown System" on the menu. After a few moments, the green LED next to the Micro-USB connector on the Jetson Nano Developer Kit (Figure 2-7) After confirming that the LED is off, unplug the power cable.

#### 4.5 Exit Zao Cloud View

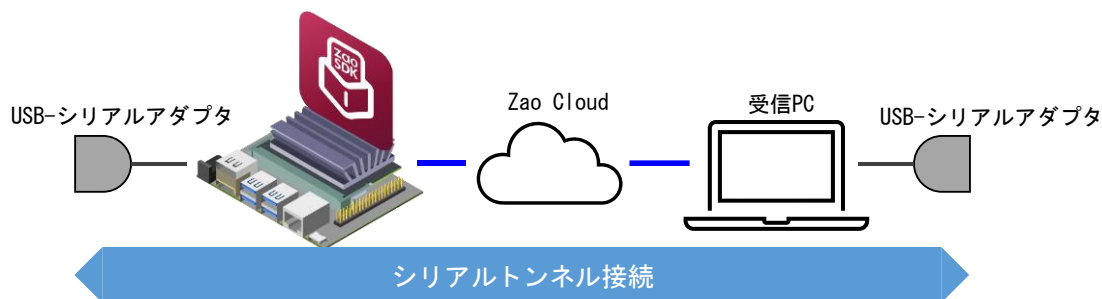
Before exiting Zao Cloud View, please log out from the top right corner of the screen (Figure 4-23 ). If you exit without logging out, you may not be able to log in if you start Zao Cloud View without timeout. In this case, please wait for about one minute and log in again.



**Figure 4-23 Logout Operation**

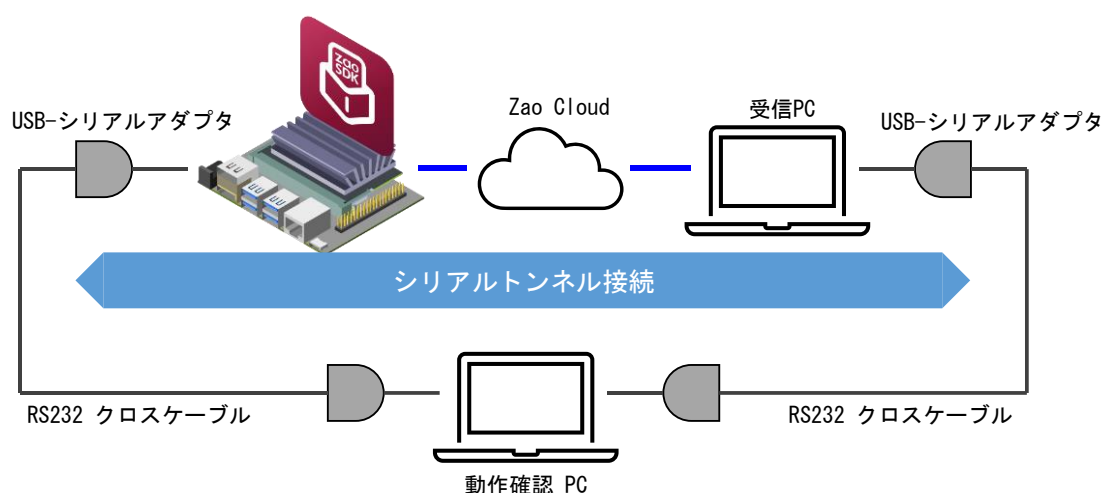
## 5 Serial Tunnel Setup

This chapter describes the procedure for using serial tunnels (Figure 51). Figure 5-24 Start with Jetson Power Off and Zao Cloud View closed.



**Figure 5-24 Serial Tunnel Operation Image**

In this chapter Figure 5-25 This chapter describes the procedure for verifying that data sent to the left of the PC is received from the right through the serial tunnel and vice versa in the configuration shown in Figure 52.



**Figure 5-25 Serial Tunnel Operation Check Configuration**

The default is a serial tunnel connection with a baud rate of 115200 bps. Please refer to the user's guide to change the baud rate.

### 5.1 Preparation of PC for operation check

Connect the two USB-to-serial adapters and make sure they are recognized by the COM ports.

Install a terminal application such as Tera Term.

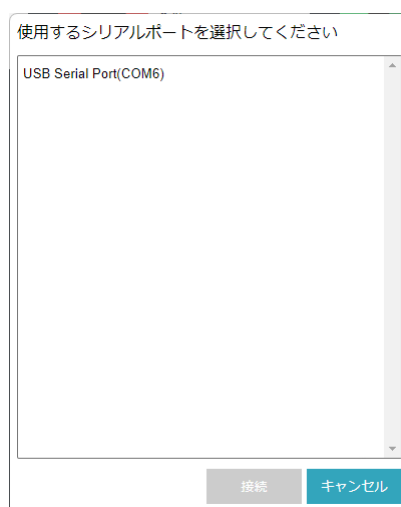
Run two Tera Term programs, open each COM port, and set the speed to 115200, data to 8bit, parity to

none, stop bit to 1bit, and flow control to none.

## 5.2 USB to Serial Adapter Connection

Connect the USB to serial adapter to the USB connector on Jetson.

Then, after connecting the USB-serial adapter to the receiving PC, launch Zao Cloud View and login. Select the COM port you wish to use and click "Connect" to proceed; note that some PCs may list COM ports other than that of the USB-serial adapter you connected. If you have previously selected and "connected" to a COM port, that port will be automatically selected and the dialog will not appear. How to change the port is described below.



**Figure 5-26 COM Port Selection**

The serial icon at the top of the screen appears red when connected to the COM port (Figure 5-27 ). This icon can be clicked to disconnect or connect the COM port.



**Figure 5-27 Serial icon (with COM port connected)**

If you have inadvertently selected a COM port that is not the intended one, or if you want to change the port, start over by operating Zao Cloud View as follows

1. Log out
2. Select "Cache clear" from the View menu
3. Restart Zao Cloud View

### 5.3 Start of serial communication

Figure 5-25 Connect the RS232 crossover cable as shown in Figure 52, then turn on the Jetson and start live transmission.

To start serial communication, click the Start Serial Communication button displayed in the upper left corner of the video on the live-streaming screen.



Figure 5-28 Start of serial communication

The button to start serial communication is displayed in orange. When serial communication starts, TX and RX blink according to the data flow.



Figure 5-29 Serial communication in progress

Confirm that when you input text on one side of Tera Term on the PC, it is displayed on the other side, and that the text is also displayed in the opposite direction.

## 6 Receiving PC Operating Environment

The minimum operating environment for the receiving PC is shown in Table 1 and the recommended environment is shown in table (e.g. Table 1) 2 The recommended minimum system requirements are shown in Table 1 and Table 2.

**Table 1 Minimum Operating Environment**

<b>OS</b>	Windows 10 / Windows 11
<b>CPU</b>	Intel architecture from the 8th generation onward
<b>RAM</b>	8GB or more
<b>GPU</b>	DirectX12 or higher graphics card
<b>Display resolution</b>	1280 x 720 or higher

**table (e.g. Table 1) 2 Recommended operating environment (required for 4K resolution)**

<b>OS</b>	Windows 10 / Windows 11
<b>CPU</b>	10th generation or later Corei7 8-core, 3 GHz or higher
<b>RAM</b>	16GB or more
<b>GPU</b>	NVIDIA RTX3000 series or higher
<b>Display resolution</b>	1920 x 1080 or higher 3860 x 2160 or higher for 4K

## 7 Update History

<b>Rev.</b>	<b>Date</b>	<b>Update details</b>
1.0-1	2023-04-27	first edition
1.0-2	2023-05-02	Fixed COM port selection dialog Other minor corrections