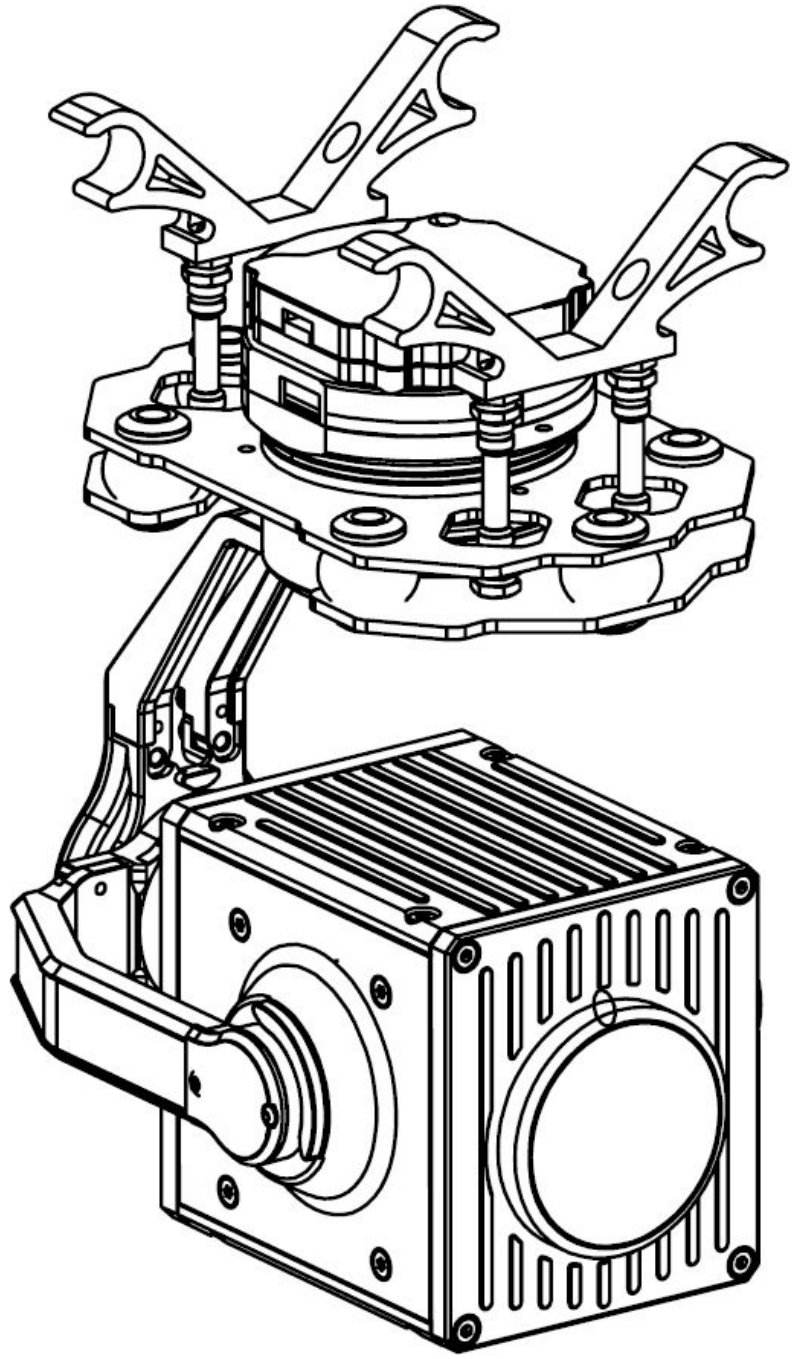
# TAROT T10X

10X Optical Zoom Camera Gimbal (4K ETH Output) User's Manual



**2023.11.06 Revised V1.1.1**

# Catalogue

# Warning and Disclaimer

Congratulations on purchasing your new TAROT product. The information in this document affects your safety and your legal rights and responsibilities. Read this entire document carefully to ensure proper configuration before use. Failure to read and follow instructions and warnings in this document may result in serious to yourself or others, or damage to your TAROT product or damage to other objects in the vicinity. This document and all other collateral documents are subject to change at the sole discretion of TAROT. For update product information, visit http://www.tarotrc.com and click on the product page for this product.

The T10X-Plus has been calibrated before leaving the factory. No physical or mechanical modification or adjustment of the gimbal is required or recommended. Do not add any other component or device to the camera. The T10X-Plus is a delicate instrument. Please do not disassemble or assemble the T10X-Plus yourself, otherwise it will cause the gimbal and camera to work abnormally.

To ensure the safety of flight control system after powering up, we recommend you remove all the propellers and use non-power-supply for the gimbal. Keep the entire components far from children and flammable & combustible materials!

Because TAROT cannot control the specific use, installation, modification, and improper use of users, TAROT will not be liable for the corresponding loss and compensation caused by following conditions:

1. Damage caused by failure to read this user manual carefully.
2. Damage caused by failure to operate in accordance with the relevant laws and regulations.
3. Damage caused by the operator continuing to operate the product in a poor physical or mental condition.
4. Damage caused by improper use or subjective intent.
5. Damage caused by the use of products or accessories not manufactured by our company.
6. Any damages relating to moral damage caused by the occurrence of an accident.
7. Damage caused by products out of warranty or improper maintenance resulting in poor operation of the product.
8. Damage caused by operation in bad weather such as heavy rain, snow, wind or hail.
9. Damage caused by flying in areas unsuitable for manoeuvring such as difficult observation areas, magnetic interference areas, radio interference areas, no-fly zones, etc.
10. Damage to the pod caused by homemade wire or incorrect soldering wire sequences.

# Ⅰ. Product Introduction

Tarot T10X-Plus is a 3-axis zoom camera Gimbal developed for industry applications, supporting 10x optical zoom with a 1/2.8 CMOS sensor with 8.29 million effective pixels, which can bring scenes hundreds of meters away into clear focus. The pod adopts professional three-axis mechanical stabilization technology. It can be used in fire fighting, forest public security, public security monitoring, search and rescue, environmental protection law enforcement and other industries.

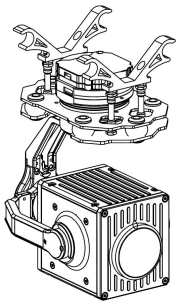
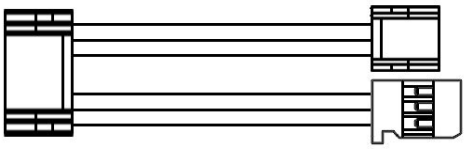
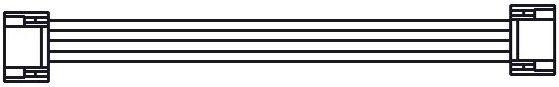
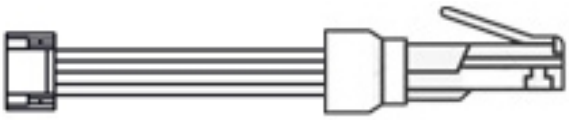
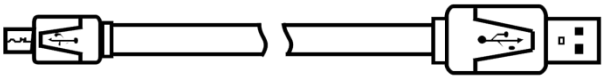
**Main Features**

- Weight 435g;
- Optical zoom camera supports 10x optical zoom with 8.29 million effective pixels;
- Field of view range 60.2° to 6.6°, optical zoom range f:4.8 to 48mm;
- Video resolution 4K@30fps; Photo resolution 3840*2160;
- Color minimum illumination 0.01Lux/f1.5; B/W minimum illumination 0.001Lux/f1.5;
- Highly optimized vector control algorithms for servo motors;
- Mechanical 3-axis image stabilization, ±0.01° image stabilization accuracy;
- Aluminum alloy structure design, lightweight and sturdy, good heat dissipation performance;
- One-click execution of a one-click 90-degree downward-facing Operation;
- Supports SBUS, serial protocol;
- Supports automatic/manual screen focus;

**Cautions:**

To ensure the stability of the gimbal after running, Tarot T10X gimbal needs 4-6S static time to complete the calibration self-test of the sensor after power on, during this period, please ensure that the gimbal is still hanging on the mounting platform, do not shake, touch or hold the gimbal, through the static self-test can greatly improve the gimbal's attitude solution and gimbal heading stability.

## Ⅱ. Product List

| | |
|---|---|
| T10X-Plus Gimbal ×1 |  |
| S.Bus Receiver and Serial Debugging Connection Cable/6P ×1 |  |
| ETH cable/4P-5P ×1 |  |
| ETH output and debugging cable /4P-RJ45 ×1 |  |
| Micro-SD memory card ×1 (Not included, self-provided) |  |
| Type-C Data Connection Cable ×1 (Not included, self-provided) |  |

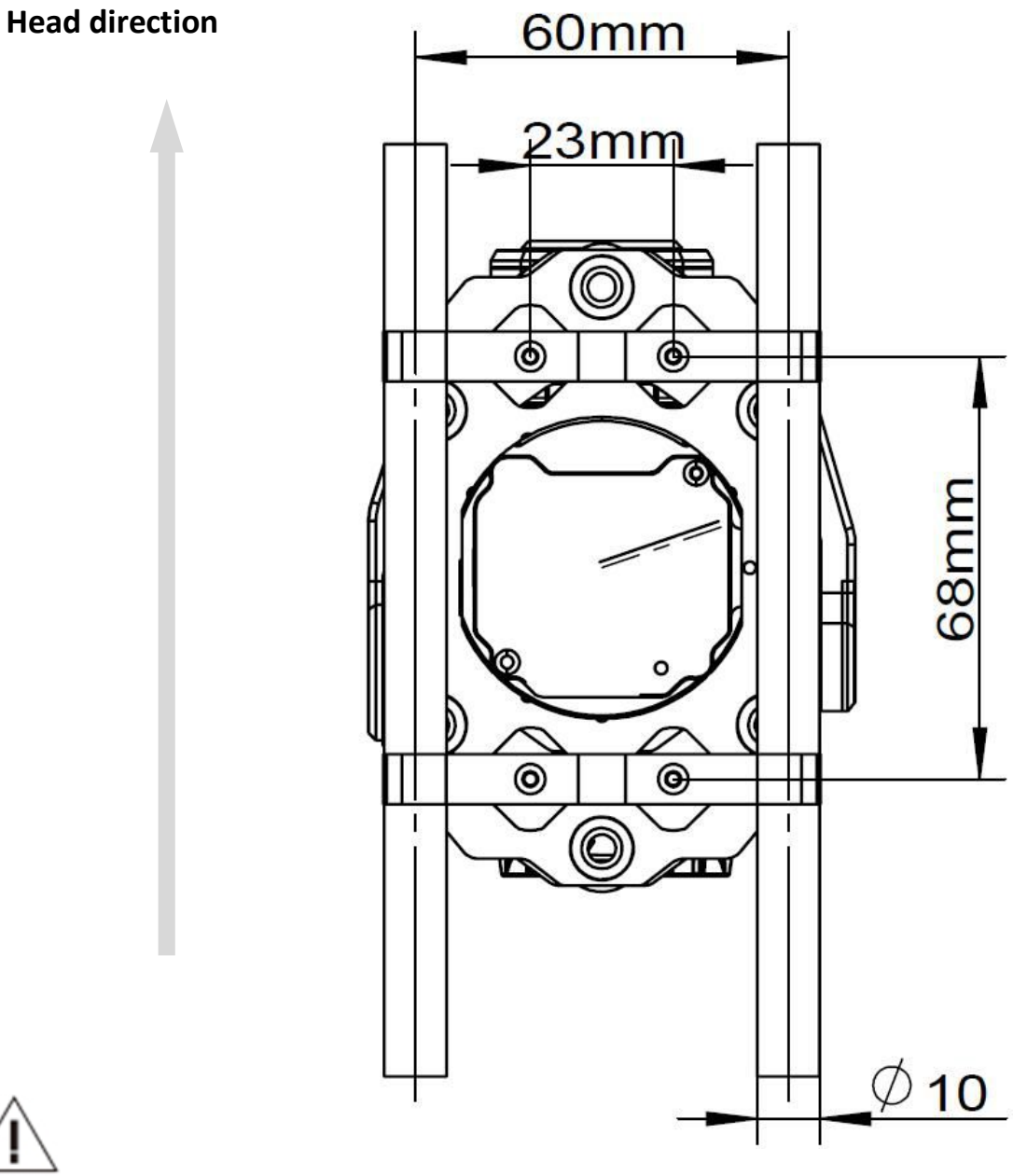
# Ⅲ. Mounting & Configuration

## 3.1 Gimbal Body Mount

According to the hole size in the figure below ,

1:Prepare Φ10 tube diameter with 60mm pitch for direct mounting with Gimbal mounting tubes.;

2:Or add 4 mounting holes (23mm*68mm) on the aircraft or mounting plate, use M3 screws to connect the aluminum post connection.




**Cautions:**

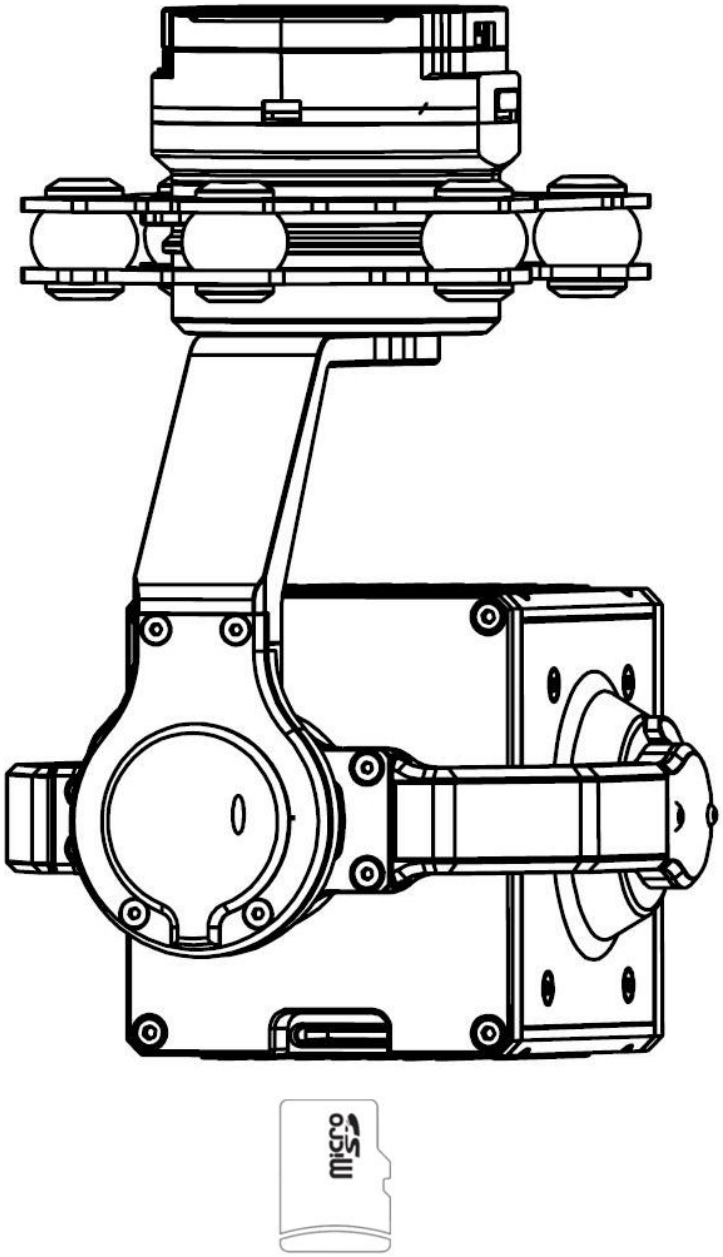
1.Make sure there is enough space on the craft to ensure that the Gimbal camera does not touch the ground when it is going down vertically;

2.Please make sure that the Gimbal camera is mounted in a level and firm position without loosening, to avoid abnormal vibration affecting the stabilization effect of the Gimbal;

3.Make sure that there are no foreign objects around the Gimbal camera body to ensure that it does not touch other objects while working.

## 3.2 Memory Card Installation

As shown in the picture below, the micro SD card slot is built into the upper end of the Gimbal body, and the memory card can be installed by inserting a micro SD card. To remove the SD card just press inward once to automatically eject the memory card.



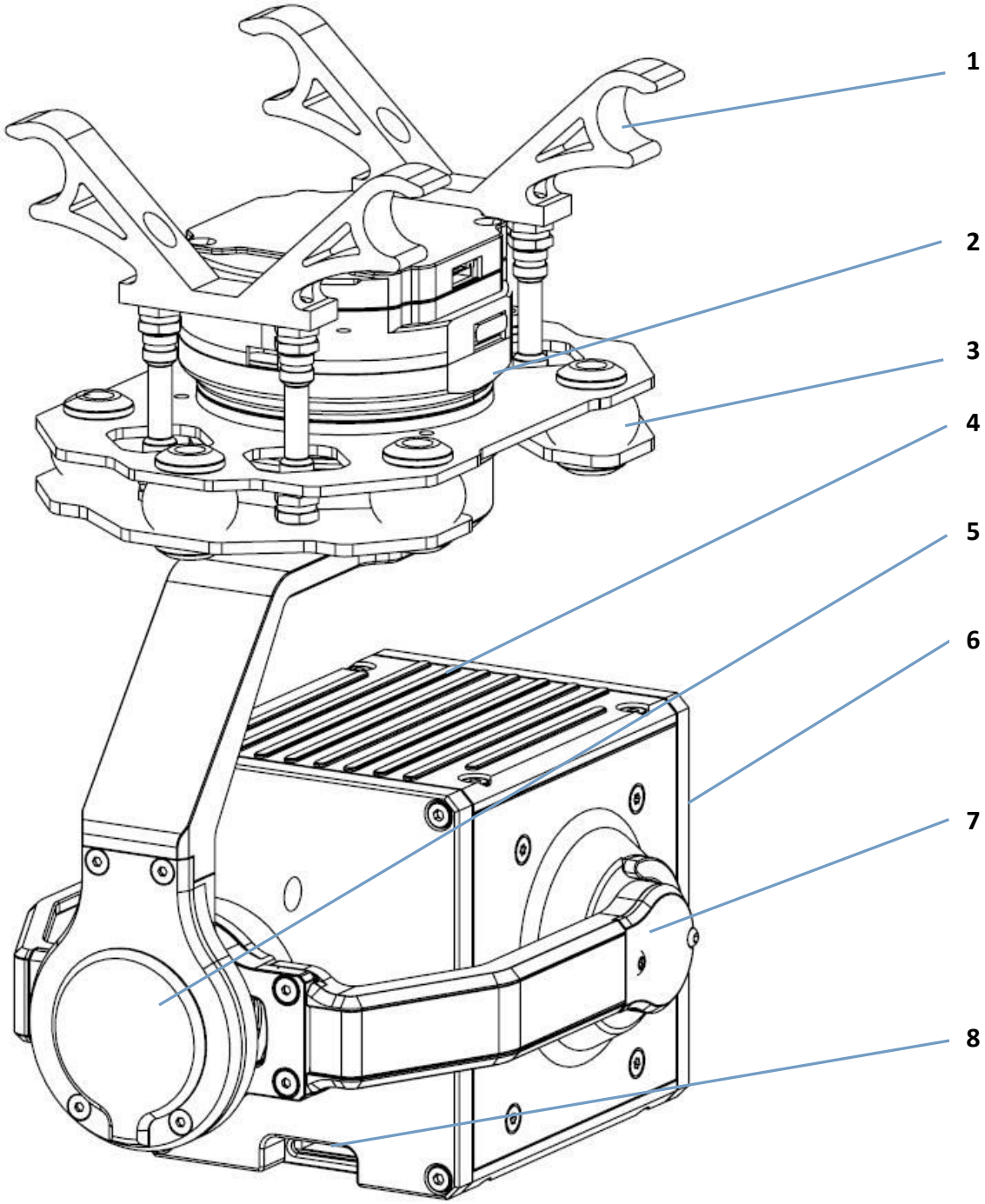

**Cautions:**

1.Please make sure that the Micro SD card is inserted in the correct orientation to avoid damaging the Gimbal camera;

2.The Gimbal camera supports Micro SD cards up to 128GB. Since the Gimbal camera requires fast reading and writing of 1080p video data, please use a Class 10 or UHS-1 or above Micro SD card for proper video recording. Do not pull out the Micro SD card during the photo or video recording process, otherwise the images obtained during the shooting process may be lost.

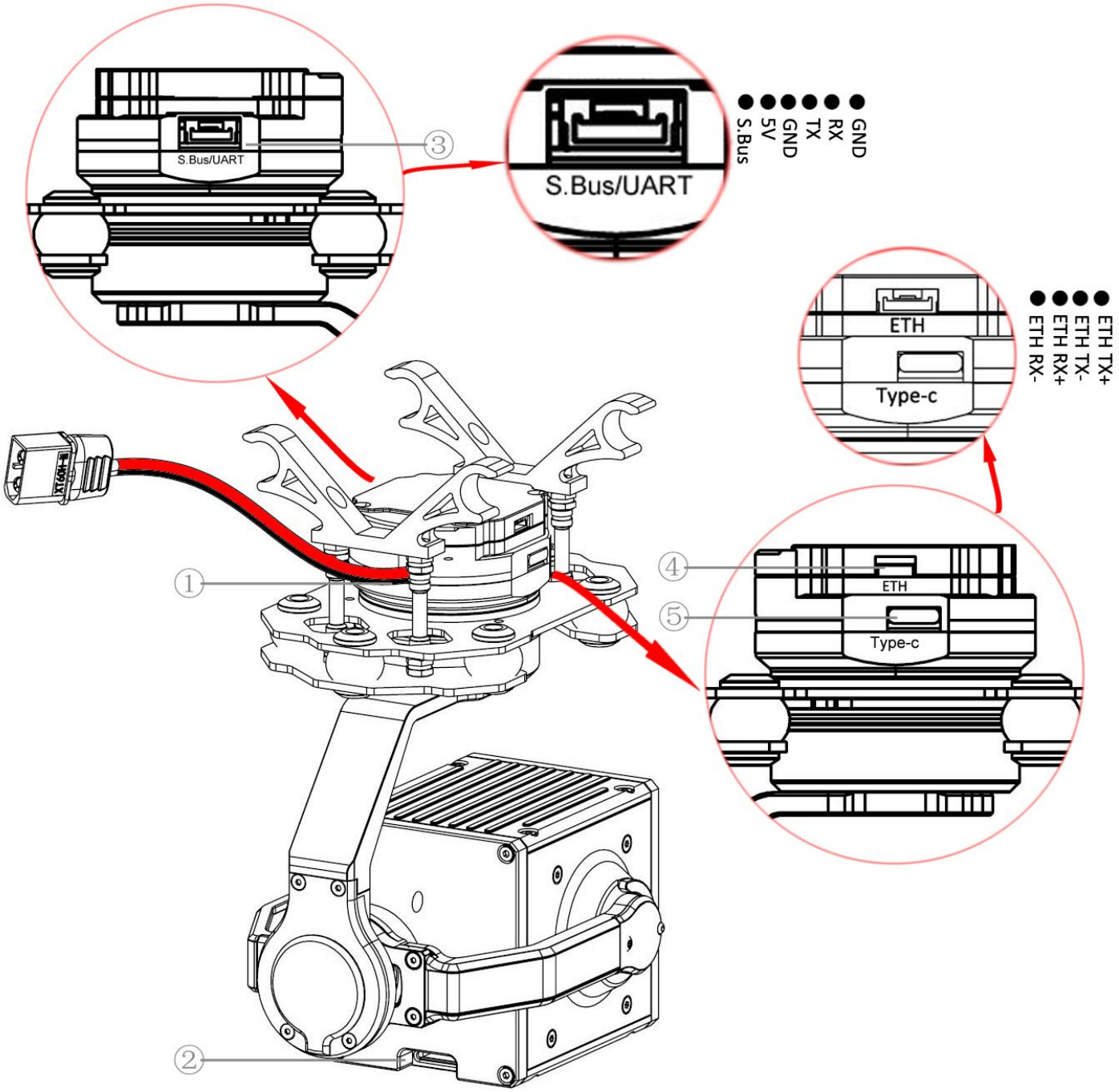
## 3.3Gimbal Parts Introduction

### 3.3.1 Gimbal Overall Introduction




| | | | | | |
|---|---|---|---|---|---|
| 1 | Gimbal Suspension | 4 | Movement protection frame | 7 | Gimbal Tilt axis |
| 2 | Gimbal Point axis | 5 | Gimbal Roll axis | 8 | Camera TF card slot |
| 3 | Gimbal damping ball | 6 | Movement lenses | 9 | |

### 3.3.2 Gimbal Interface Definition




| | | | |
|---|---|---|---|
| ① | Power connector | ④ | Net Video Output Interface |
| ② | Micro SD card slot | ⑤ | Gimbal Debugging Interface /Type-C |
| ③ | S.Bus and UART serial interface | | |

| | |
|---|---|
| **①.DC IN** | Power supply interface/XT30: DC 12V-27V (3S-6S Lipo, supports high voltage lithium)<br>Too low or too high a voltage can cause damage to the Gimbal , If the same battery is used to power both the Gimbal camera and the aircraft, make sure that the battery voltage meets the specifications of the Gimbal camera and the aircraft. |
| **②.Micro SD** | Micro SD memory card interface<br>The Gimbal camera can support Micro SD cards with a maximum capacity of 128GB. Since the Gimbal camera requires fast reading and writing of 4K video data, please use a Class 10 or UHS-1 and above Micro SD card to ensure proper video recording.<br>Note: Please do not pull out the Micro SD card or power off directly during the recording process, otherwise it will cause the loss of video files. |
| **③.S.Bus/UART** | S.Bus receiver interface and UART serial interface<br>1:S.Bus receiver connector for connecting an S.Bus receiver via [S.Bus receiver connection cable].<br>2:UART serial interface, you can use the serial protocol to control the Gimbal by connecting to this interface, the interface line sequence from left to right: S.Bus signal, 5V, GND, serial port TX, RX, GND |
| **④.ETH** | ETH video transmission/network port debugging interface<br>Interface wire sequence from left to right: RX-, RX+, TX-, TX+<br>1:You can connect [4P-RJ45 ETH output and debugging cable] to a computer for screen output or movement settings;<br>2:Can be connected to third-party network port mapper, such as YUNZHUO H16 remote control, or other data link products with the same wire sequence and connector by connecting [4P-5P ETH port cable]. |
| **⑤.Type-C** | Gimbal sets up Type-C connector<br>Connection to Tarot Gimbal debugging software Tarot Gimbal Assistant<br>S.Bus channel setting, communication protocol setting, Gimbal Firmware Upgrade, Gimbal pid debugging can be realized. |

# Ⅳ. Tarot T10X-Plus Gimbal Tuning Software

## 4.1 Tuning Software Installation and Setup

①Please go to the official website to download Tarot T10X-Plus tuning software. URL: http://www.tarotrc.com/;

②Run the driver installation software in the "USB Driver" folder (for Win7 installation, Win10 and above driver-free self-recognition), and complete the driver installation according to the prompts;

③Connect the "Type-C Gimbal Debugging Port" to the computer via [Type-C] cable to complete the final installation of the device driver;

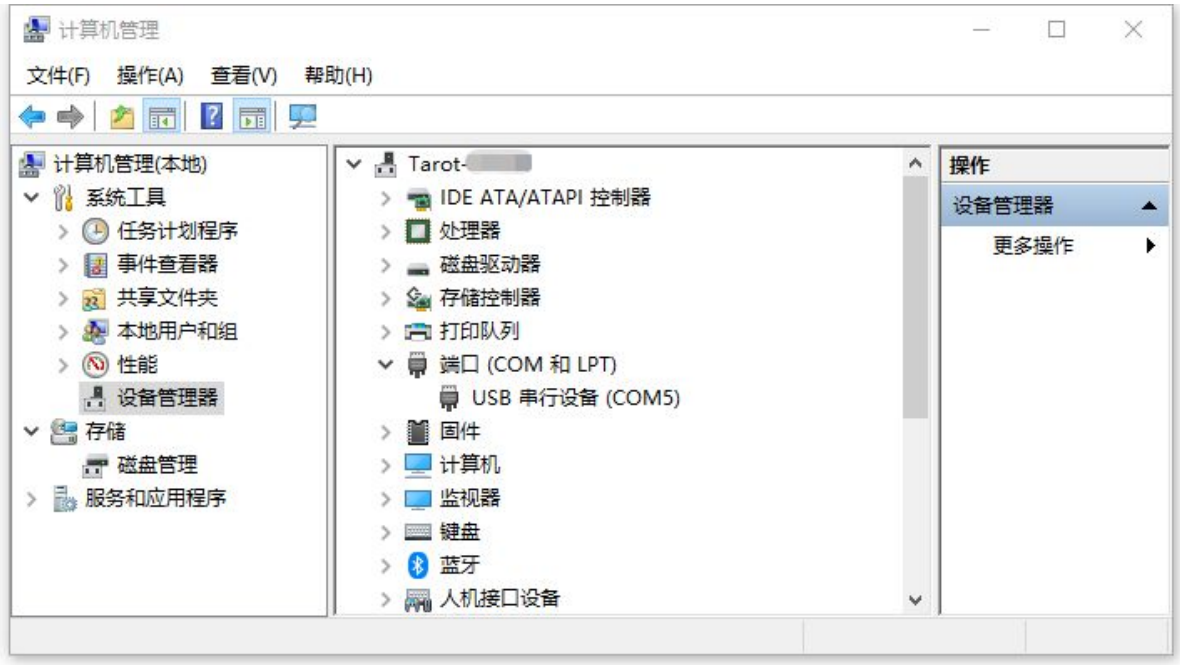
④Run Tarot Gimbal Assistant Gimbal Adjustment Software "TGA.exe" for Gimbal Adjustment and Operation Upgrade.

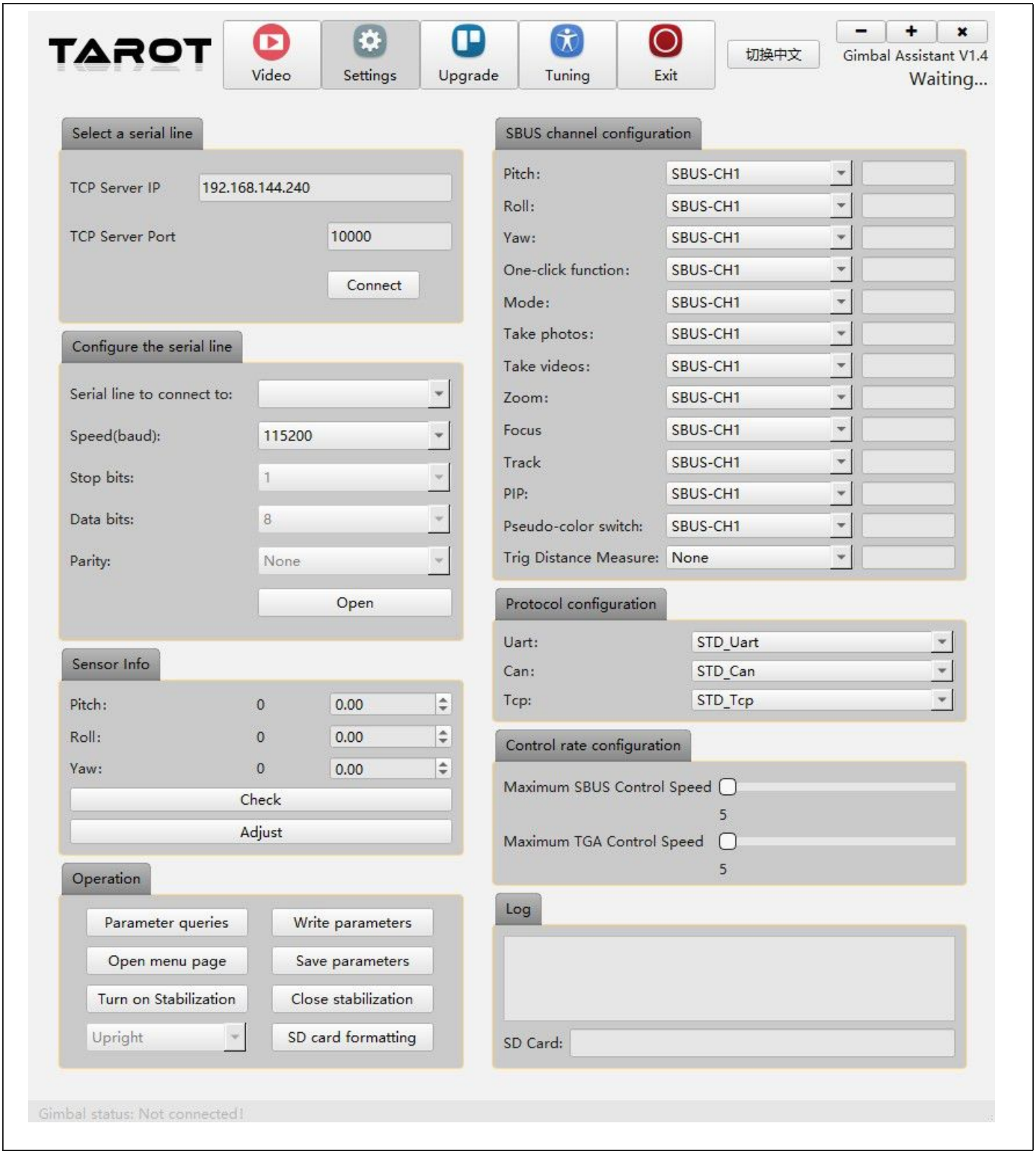
## 4.2 Introduction of Tarot Gimbal Assistant software

Tarot T10X-Plus 3-axis Gimbal that stabilizes Roll, Pitch, and Point angles in three directions in flight.

The Tarot-Gimbal-Assistant software (hereinafter referred to as TGA software) allows you to change the S.Bus channel settings, Gimbal function settings, and camera parameter settings for the Gimbal.

First, power on your Gimbal, then connect the Gimbal [⑤.Type-C Gimbal debugging connector] to your computer via [Type-C cable], and then "right-click" on [My Computer]-[Manage]-[Device Manager]-[Ports (COM and LPT)] to see Gimbal's real port number **(If can not sure of the real port number, please re-plug the corresponding USB cable, the port number will be refreshed in real time ) ,**Run the parameterization software "TGA.exe", select the correct communication port in "Select Connection Port" and click "Open Serial Port".





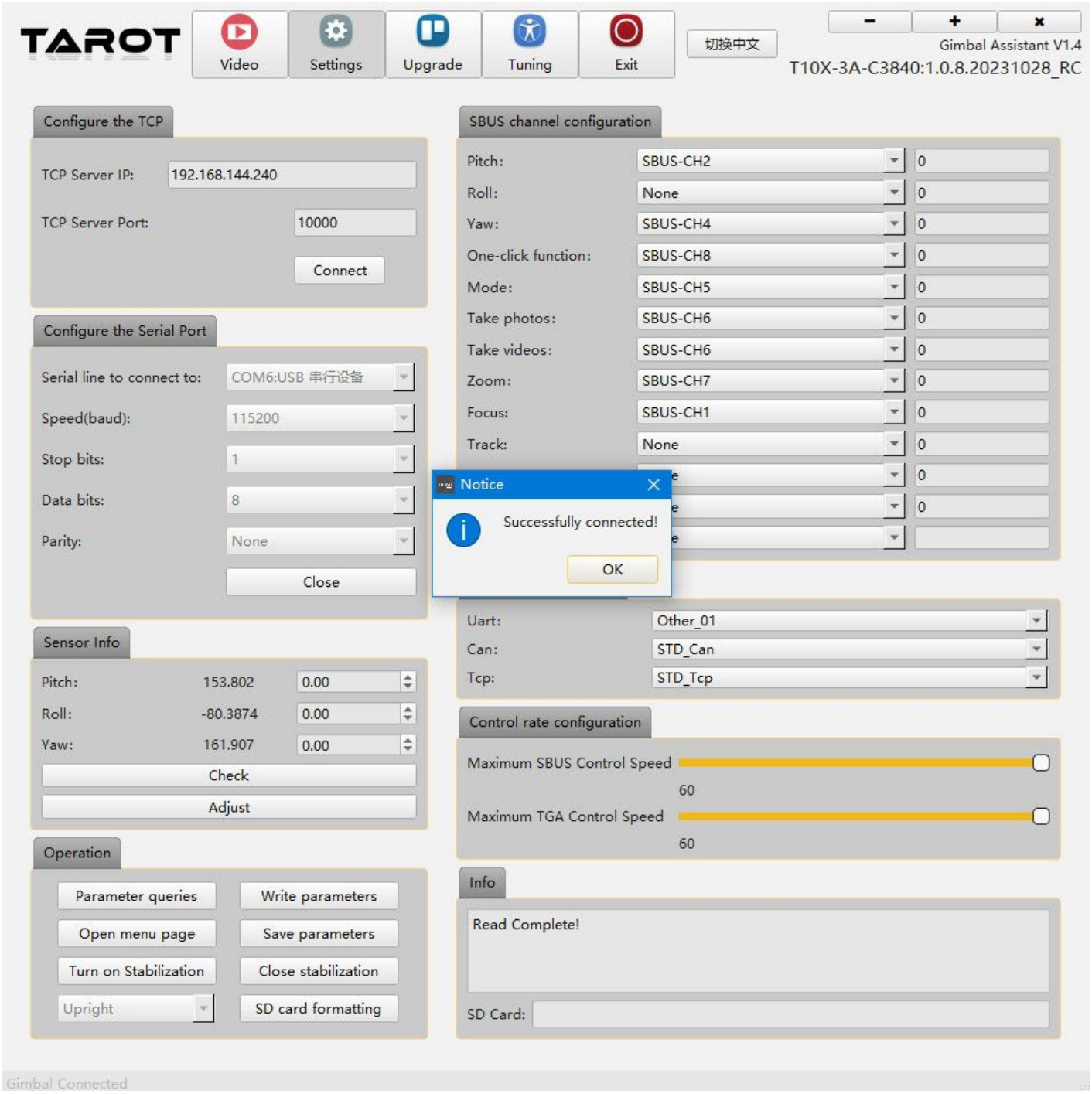

## Caution on connecting Gimbal to TGA software:

1.If you only need to set the parameters of the Gimbal, you only need to plug in the Type-C cable to connect the debugging, and there is no need to power up the Gimbal;

2.If the Type-C cable has been successfully connected to the TGA software for the process of parameter adjustment, the Gimbal power, there is a probability that the initial angle of the Gimbal operation shifted, does not affect the use, continue to debugging, debugging is complete, unplugging the Type-C cable to re-power the Gimbal can be restored;

3.If the software crashes during the Gimbal connection and the connection is unsuccessful, please re-plug the Type-C cable and reconnect it.

After selecting the correct port number and clicking the button "Open", a pop-up window "Successfully connected" will appear and the latest Parameters and Gimbal data will be automatically refreshed with the current presets.

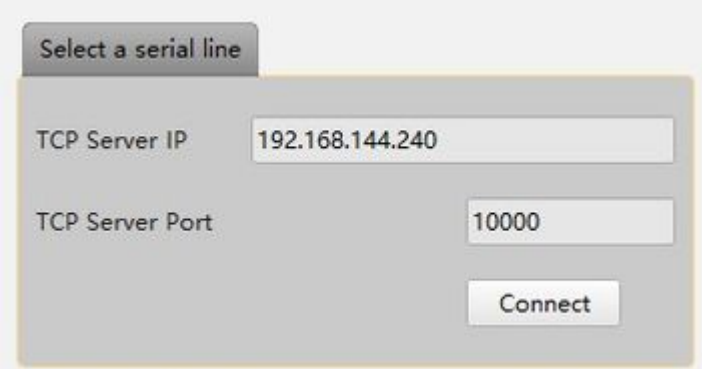



After you have finished setting the Gimbal parameters, please click the [Write parameters]-[Save parameters]" buttons in the lower left corner in order to ensure that the parameters are written to the Gimbal, and when the Gimbal is powered up next time, it will run with the parameters saved to the flash memory.

To verify that the parameters were written successfully, click on "Parameter queries" again to get the actual data.

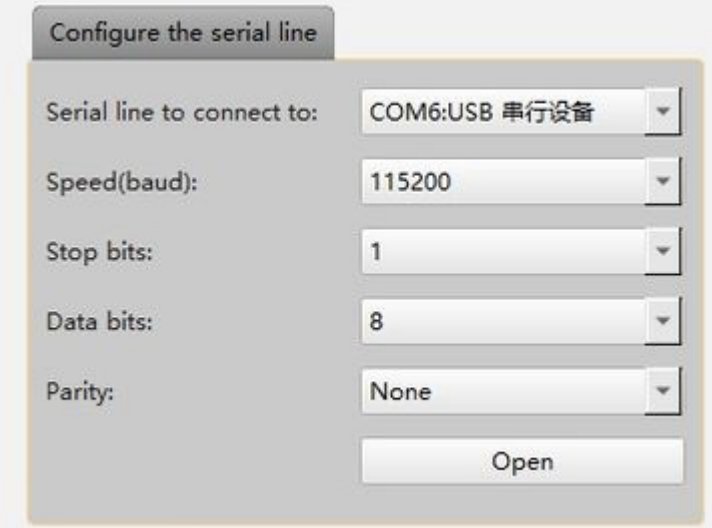
## 4.3 Operating Instructions for TGA Software Functions

### 4.3.1 Select a serial line




Tarot reserved function setting items, this parameter does not need to be set for the time being.

### 4.3.2 Configure the serial line




Serial line to connect to:Port number displayed after driver installation (Windows 10+ drive-free)

Speed(baud)、Stop bits、Data bits、Parity，Values are kept as default

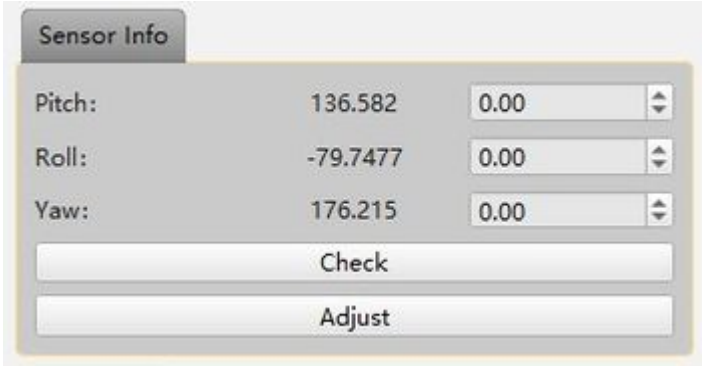
1.Speed(baud):115200

2.Stop bits:1

3.Data bits:8

4.Parity:None

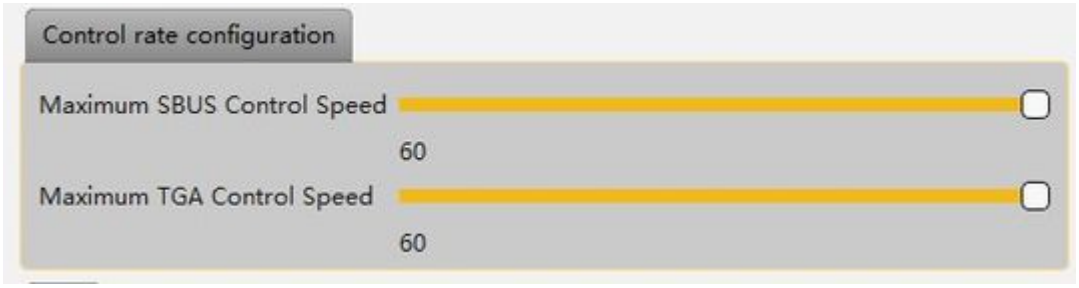
### 4.3.3 Sensor Info




Sensor Info displays real-time angle information for several of the Gimbal's current motor axes.

Sensor fine-tuning settings: Use this function when you have specific fine-tuning needs for the Gimbal angle.
Gimbal sensors are fully calibrated at the Gimbal factory, do not operate without this requirement.
Query fine-tuning parameters: Click "Check" to query the current fine-tuning settings;
Write fine-tuning parameters: After fine-tuning the desired angle, click "Adjust" to keep the current angle value.

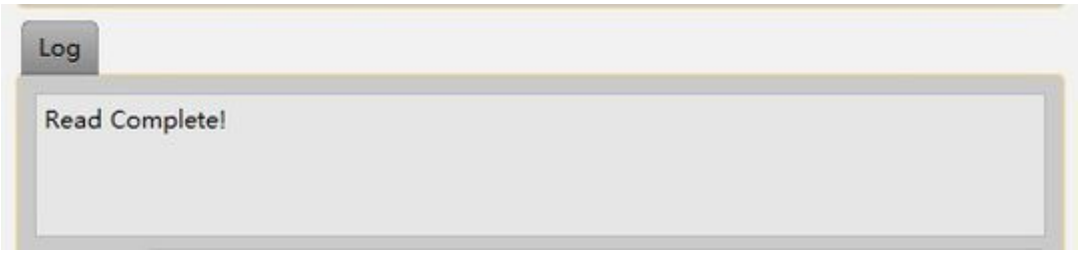
### 4.3.4 Control Rate Configuration




.

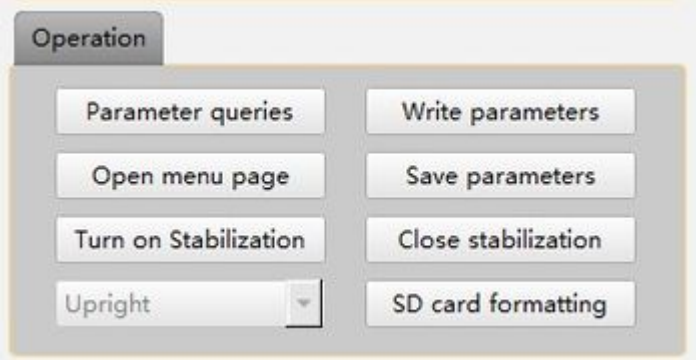
In order to satisfy different users, users can adjust the maximum control rate of Gimbal according to their own Operation habits.
After modifying the control rate, click "Write parameters" and "Save parameters" to adjust the control rate to 5-60 degrees/second.

### 4.3.5 Log




Log displays real-time feedback on Gimbal's Operations.

### 4.3.6 Operation




The Operation section provides some control over Gimbal's Operation

1.Parameter queries:Click to refresh the currently set Gimbal parameters in real time;

2.Write parameters/Save parameters:After setting the operation of Gimbal, you need to click "Write parameters" to write the settings to the flash memory of Gimbal; then click "Write parameters". Then click "Write parameters" and then click "Save parameters" to save the parameters successfully, the next time you reconnect, you can display the new parameters after saving;

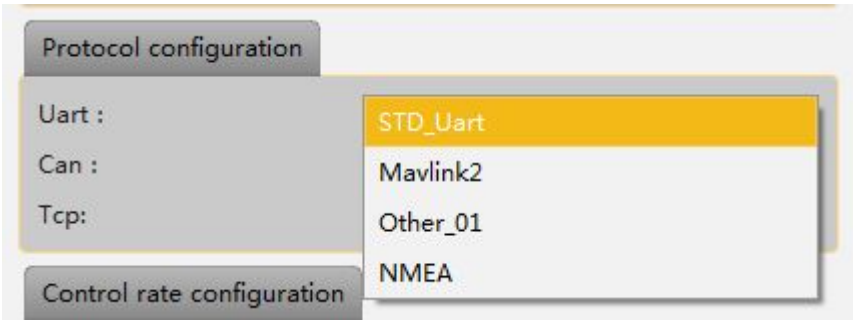
4.Close stabilization/Turn on Stabilization:Gimbal motor stops running / Gimbal motor starts running, for specific requirements such as Gimbal Firmware Upgrade before the Gimbal operation of Close stabilization is required;

5.Upright/Inverted:Functionality in beta, not open yet

6.SD card formatting:This T10X-Plus does not support, you need to insert the SD card into the card reader to format Operation;

7.Open menu page:T10X-2A/T10X-Pro models Gimbal function setup item, this T10X-Plus does not support.

### 4.3.7 Protocol configuration




In the TGA Protocol configuration interface, communication connection, T10X-Plus Gimbal can choose "STD_Uart" or "Other_01" protocol control, in order to Click "Write parameters" and "Save parameters", and then restart the T10XGimbal after power off to take effect.

Gimbal Factory Default Other_01 Protocols

**Cautions:**

1. T10X-Plus Gimbal does not support Mavlink2 protocol with NMEA temporarily, no need to select it;
2.T10X-Plus Gimbal does not support CAN protocol temporarily, no need to select it;
3.T10X-Plus Gimbal does not need to set up Tcp settings;

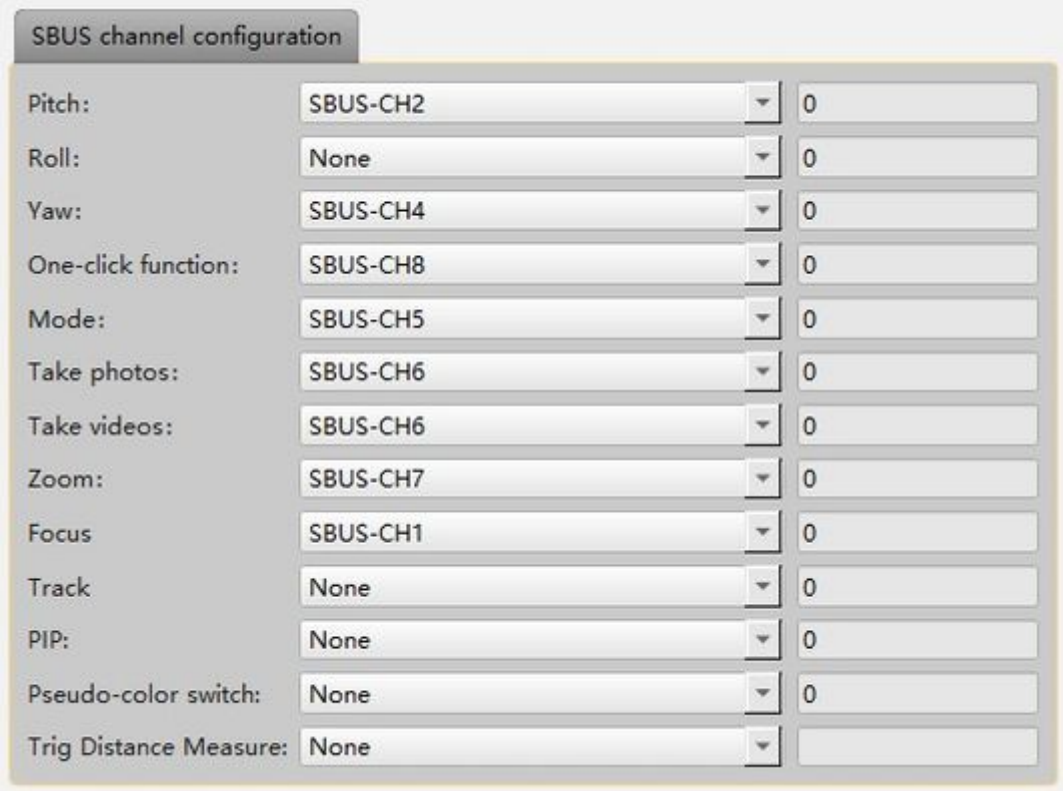
### 4.3.8 S.Bus Channel Configuration

Connect the Gimbal to the Tarot Gimbal debugging tool TGA.exe by means of [4.2 Introduction of Tarot Gimbal Assistant software] Operation, after successful connection, you can adjust the value of the S.bus channel according to your needs.

Tarot T10X Plus Gimbal factory preset channel values Gimbal [Pitch CH2], [Yaw CH4], [One-click function CH8], [Mode CH5], [Take photos, Take videos CH6], [Zoom CH7], [Focus CH1]. CH1], please use the parameterization software to modify the parameters, click "Write parameters" and "Save parameters" at the bottom left corner after modification;

[Roll]:None，Not supported temporarily, but will be supported by subsequent firmware updates;

[Track]、[PIP]、[Pseudo-color switch]、[Trig Distance Measure]: None，This model does not support




**Cautions:**

1.After you have finished setting the Gimbal parameters, please click the [Write parameters]-[Save parameters]" buttons in order to make sure that the parameters are written to the Gimbal, and when the Gimbal is powered up next time, it will run with the parameters saved to the flash memory;

2.To verify that the parameters were written successfully, click on "Parameter queries" again to get the actual data;

3.The T10X-Plus Gimbal is supplied with a 5V power supply for the S.Bus receiver. If your receiver already has a separate power supply, disconnect the 5V output from the S.Bus/UART interface.

## ①Gimbal Tilt Settings

**Select a rotary pushbutton switch or joystick for Tilt axis control**:

**Rocker as an example - preset CH2:**

Rocker up, Gimbal corresponds to Tilt axis up;

No Operation in the center;

Rocker down, Gimbal corresponds to Tilt axis down.

## ②Gimbal Yaw Settings

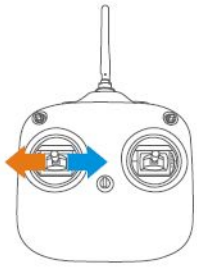
**Select a rotary pushbutton switch or joystick for Yaw axis control.**:

**Rocker as an example - preset CH4:**

Rocker to the left, Gimbal corresponds to the Yaw axis to the left;

No Operation in the center;

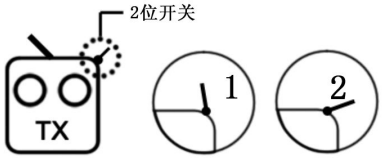
Rocker to the right, Gimbal corresponds to Yaw axis to the right.



## ③Gimbal One-click function Settings

Selection of a two- or three-position switch for mode control:

Example of a two-position switch - preset CH8**:**




A1:Position 1 to Position 2: The current position immediately performs a one-button face down, looking down 90°;

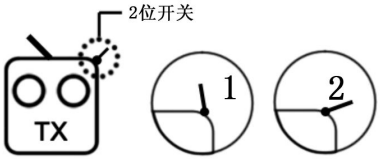
A2:Position 2 to Position 1: Gimbal back to center, back to the initial energized state of the Gimbal.

**Position 1 and Position 2 settings can be reversed.**

## ④Gimbal Mode Settings

Selection of a two- or three-position switch for mode control:

**Example of a two-position switch - preset CH5:**




Position 1: Follow, Point to follow mode, Point to follow vehicle heading change;

Position 2: Locked, pointing in locked mode, Gimbal Point in locked orientation and not moving;

**Position 1 and Position 2 settings can be reversed.**

**Immediate effect after mode change (Gimbal's current position does not change)**

## ⑤Camera Take photos and Take videos Settings

Description:Can be configured with two independent channels to control photo/video recording separately; can also be configured with one channel for unified control of photo/video recording.

Illustrated with one-channel statistical control:

Choose a rotary push-button switch or a three-position switch for unified control of Take photos and Take videos:

**Three-position switch as an example - preset CH6:**

**Position 1 is set to Take photos, center position 2 has no action, position 3 is set to Take videos.**

A1:Position 2 to Position 1: Take a picture once

A2:Position 1 to position 2 (back to center): no action

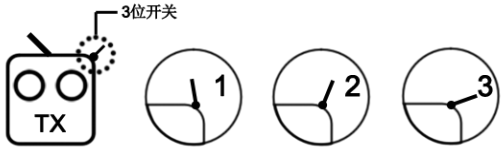
A3:Position 2 to Position 1: Take photos again

B1:Position 2 to Position 3:Start Take videos

B2:Position 3 to position 2 (back to center): no action

B3:Position 2 to Position 3: Stop Take videos

**Position 1 and position 3 settings can be reversed.**




## ⑥Camera Zoom Settings

Select a rotary pushbutton switch or a three-position switch as the camera Zoom control:

**Three-position switch as an example - preset CH7:**

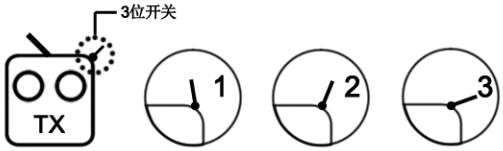
A1:Position 2 to Position 1: Zoom out

A2:Position 1 to Position 2 (back to center):Zoom pause

B1:Position 2 to Position 3: Zoom in

B2:Position 3 to Position 2 (back to center): Zoom Pause

**Position 1 and position 3 settings can be reversed.**




## ⑦Camera Focus Settings

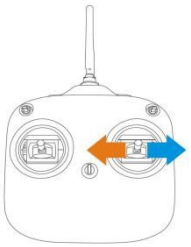
Select a rotary pushbutton switch or joystick for Point axis control.:

**Take the joystick as an example - preset CH1:**

Joystick left. Camera Focus+

Centered: no Operation

Joystick right. Camera Focus-



**Cautions:**

1.The Gimbal function can be changed to control forward and reverse by setting the channel forward and reverse rudders in the Futaba remote control;

2.The effective travel of each channel control can be changed by setting the channel travel in the Futaba remote control.

# Ⅴ. Firmware Upgrade

## Upgrade Steps

1.You can check the latest version at the official website (http://www.tarotrc.com).

2.Ensure that Gimbal is Successfully connected to the software and that all information is successfully read.

3.Unzip the downloadable firmware package and click on the "Close stabilization" button in the lower right corner of the TGA software to make sure that the Gimbal 3-axis motors are not running at the moment;

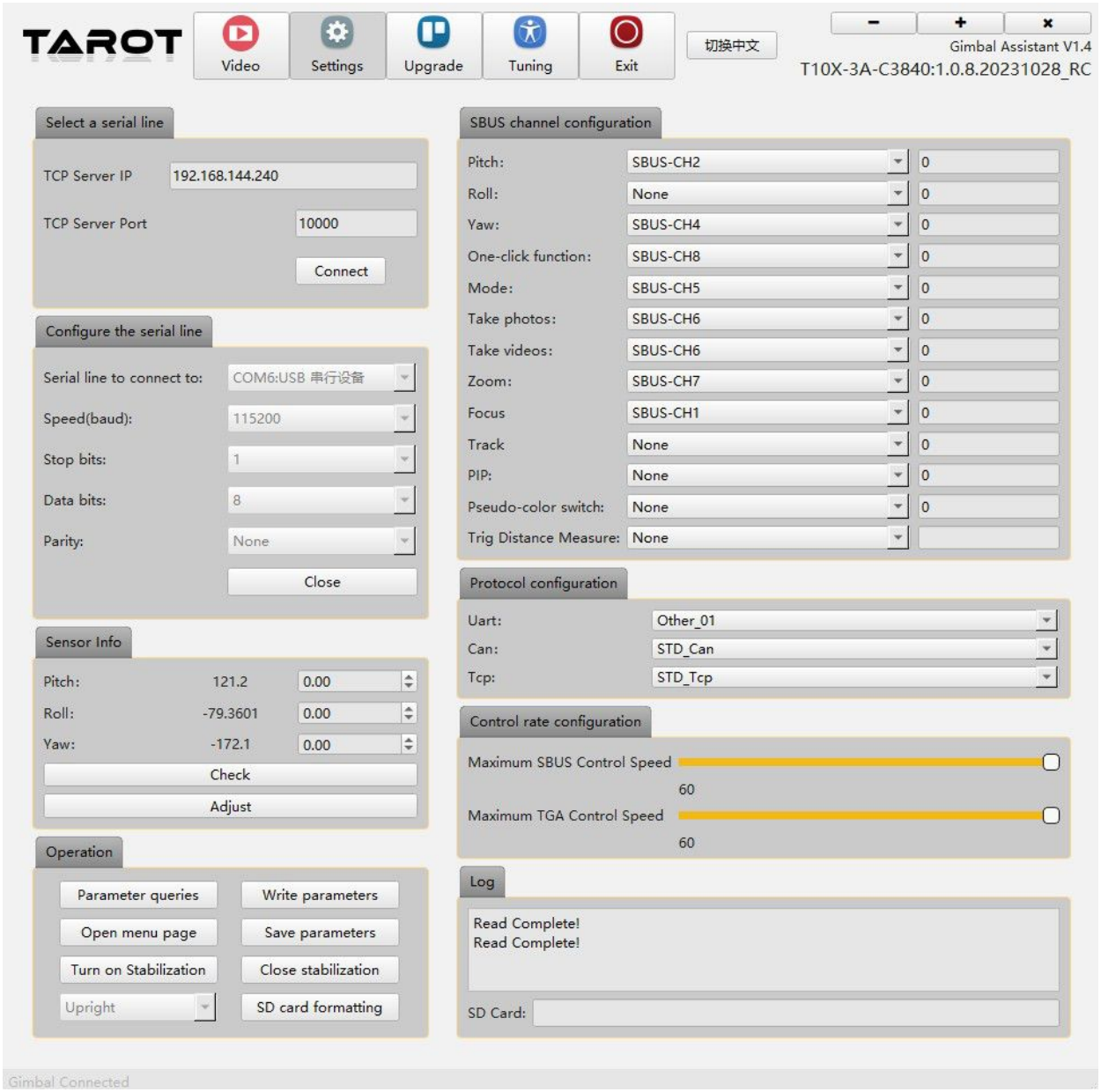
4.Click the "Upgrade" button to enter the upgrade interface of TGA software, and then click the "Enter upgrade mode" button at the bottom right corner of the interface;

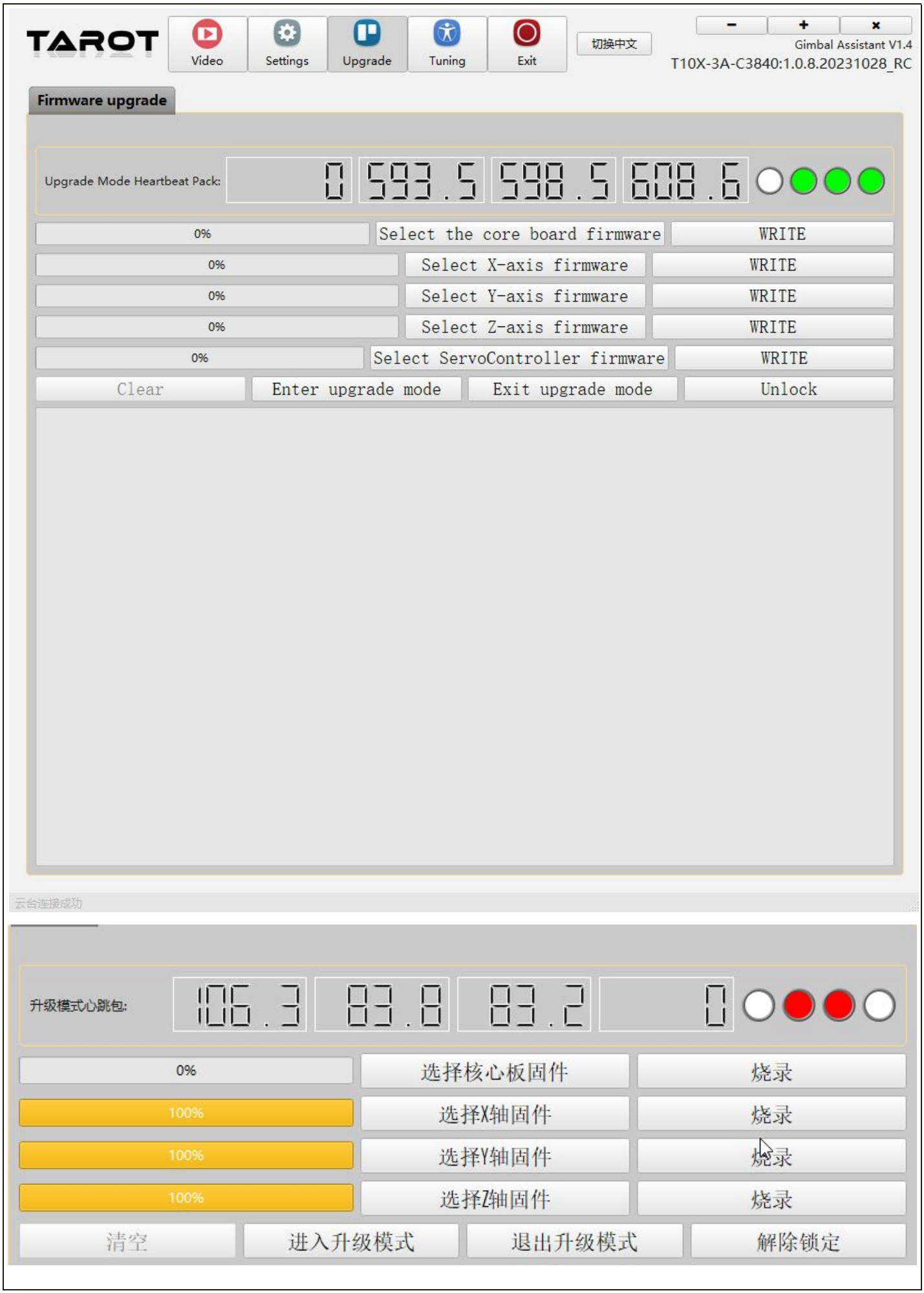
5.Click "Enter upgrade mode" button to enter the upgrade program, click "Select the core board firmware" again to select the file in the firmware package. "Cube.bin", click the "WRITE" button, the progress bar reaches 100%, the upper left corner of the prompt upgrade is complete that is successful;

6.X-axis/Y-axis/Z-axis is similar to Operation, click in turn, select the corresponding firmware file, and click WRITE;

7.Click "Exit upgrade mode" after all upgrades are completed;

8.Power down and reboot the Gimbal.





# Ⅵ. Gimbal PID Tuning

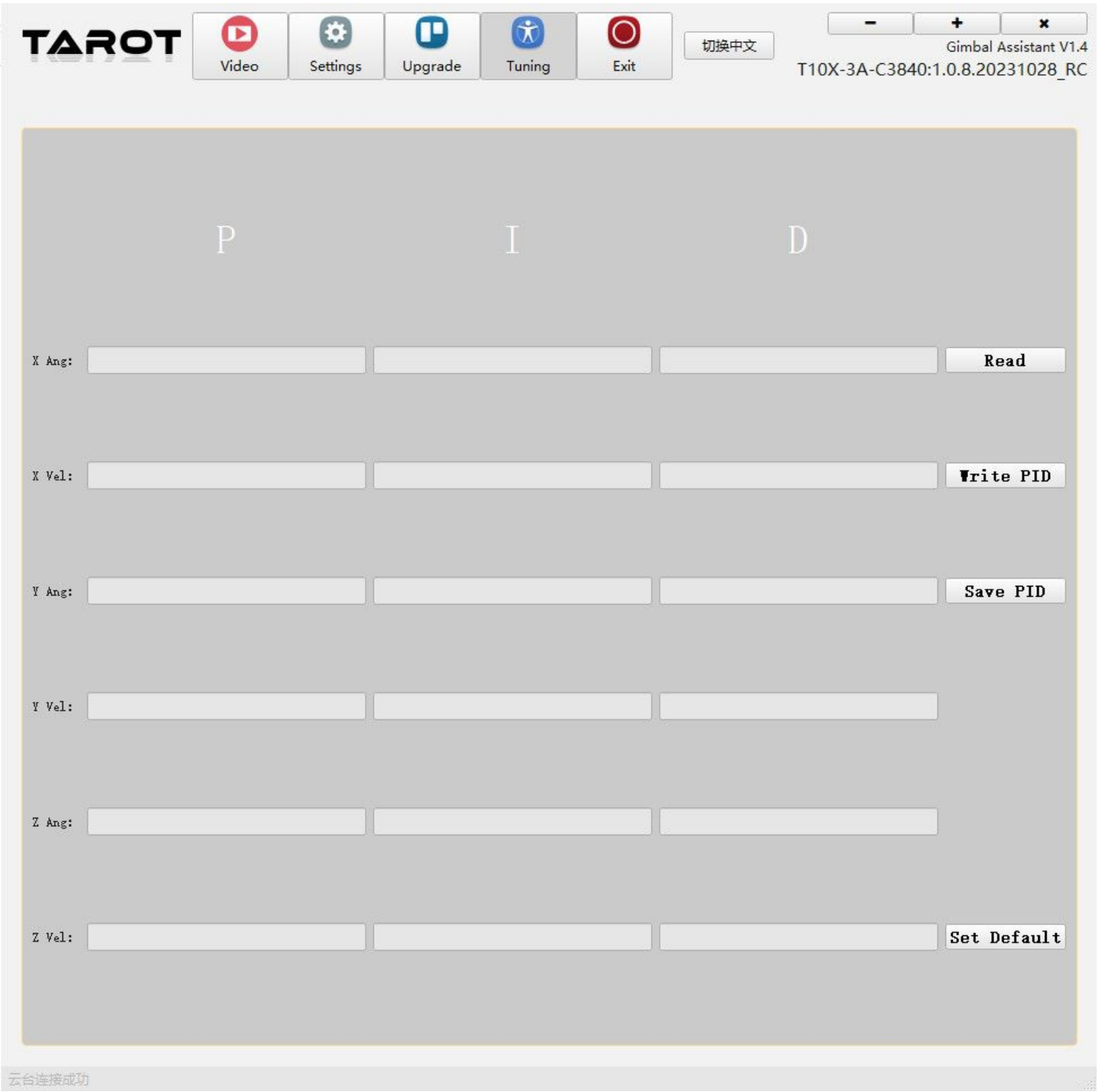
TGA Gimbal tuning software supports you to customize the PID parameters of Gimbal

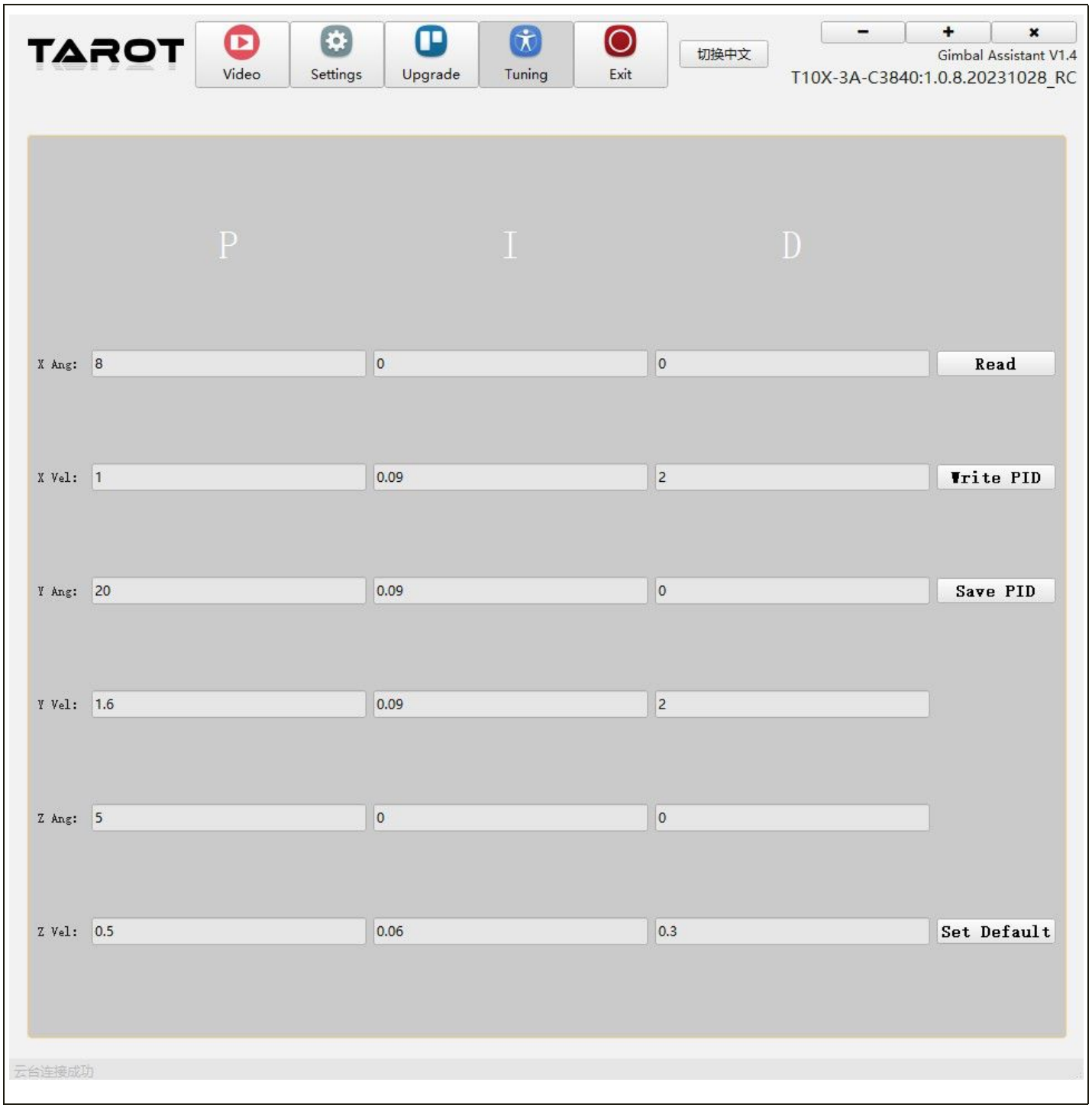
Note: The Gimbal has been pre-tuned to the optimal pid value before shipment, which is compatible with most flight situations. If the compatibility between the Gimbal and your flight platform is not perfect, you can fine-tune the Gimbal PID value in the following ways.

1.Enter the "Tuning" interface of TGA software, click "Read" to read out the preset PID value of the current Gimbal;

2.Fine-tune the pid value until Gimbal is to your satisfaction;

3.If the adjustment process is confusing, you can click "Set Default" to restore the factory PID value.




TAROT
Video
Settings
Upgrade
Tuning
Exit
切换中文
Gimbal Assistant V1.4
T10X-3A-C3840:1.0.8.20231028_RC
P
I
D
X Ang: 8 0 0 Read
X Vel: 1 0.09 2 Write PID
Y Ang: 20 0.09 0 Save PID
Y Vel: 1.6 0.09 2
Z Ang: 5 0 0
Z Vel: 0.5 0.06 0.3 Set Default
云台连接成功

# Ⅶ. ETH Video Output Settings

## 7.1 Default Video Streaming

Video streaming default address:

T10X-Plus Gimbal default camera IP address is: 192.168.144.68

The default address for the T10X-Plus Gimbal camera rtsp video stream is:

main stream:rtsp://admin:admin@192.168.144.68

complementary stream:rtsp://admin:admin@192.168.144.68/live2

Please fill in the video streaming address correctly according to the requirements to the corresponding location of the required software.

When you use the transmission control link SiYi MK15, Skydroid H16, H30, HEX herelink 2, Sprintlink, Chinowing, it can be used directly without modifying the camera ETH segment.

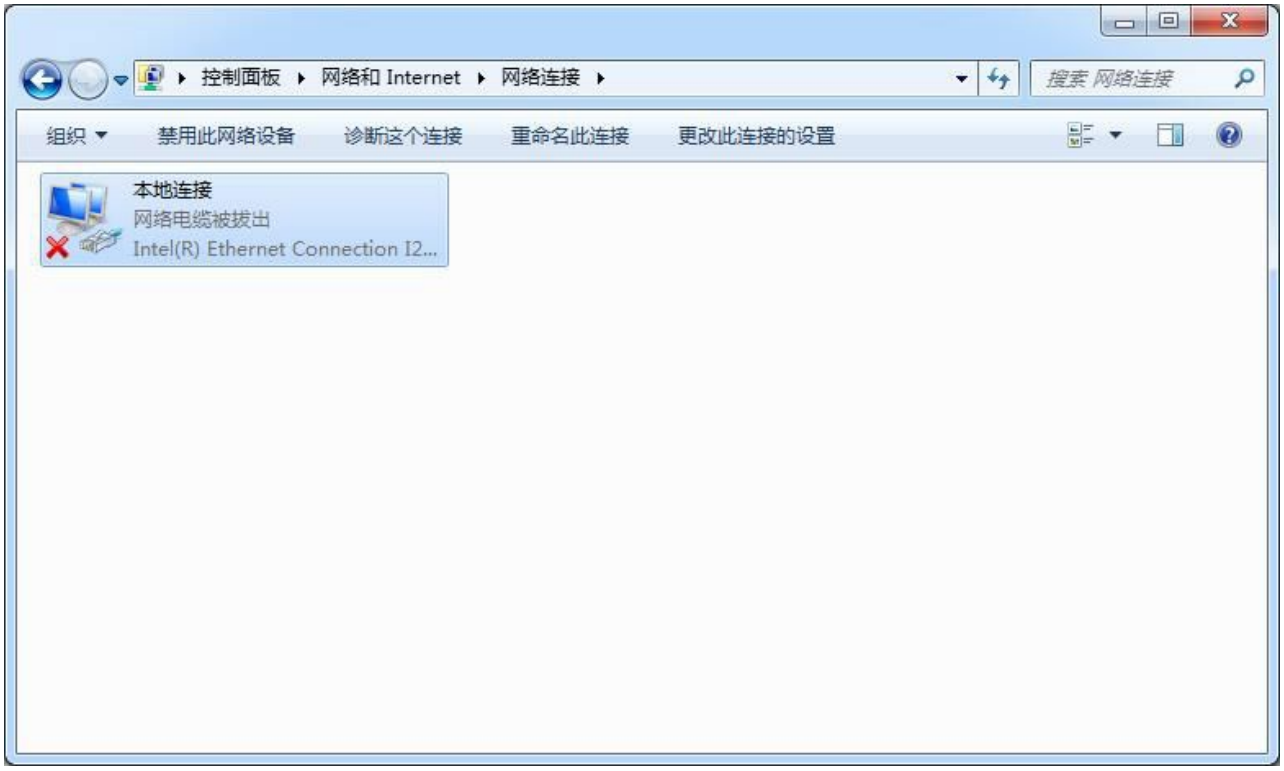
## 7.2 Default Network Segment Settings

Tarot T10X-Plus Gimbal Network Edition supports ETH video signal output, by connecting the [ETH] video output port to a computer, or network mapping device, you can get the Gimbal real-time video output.

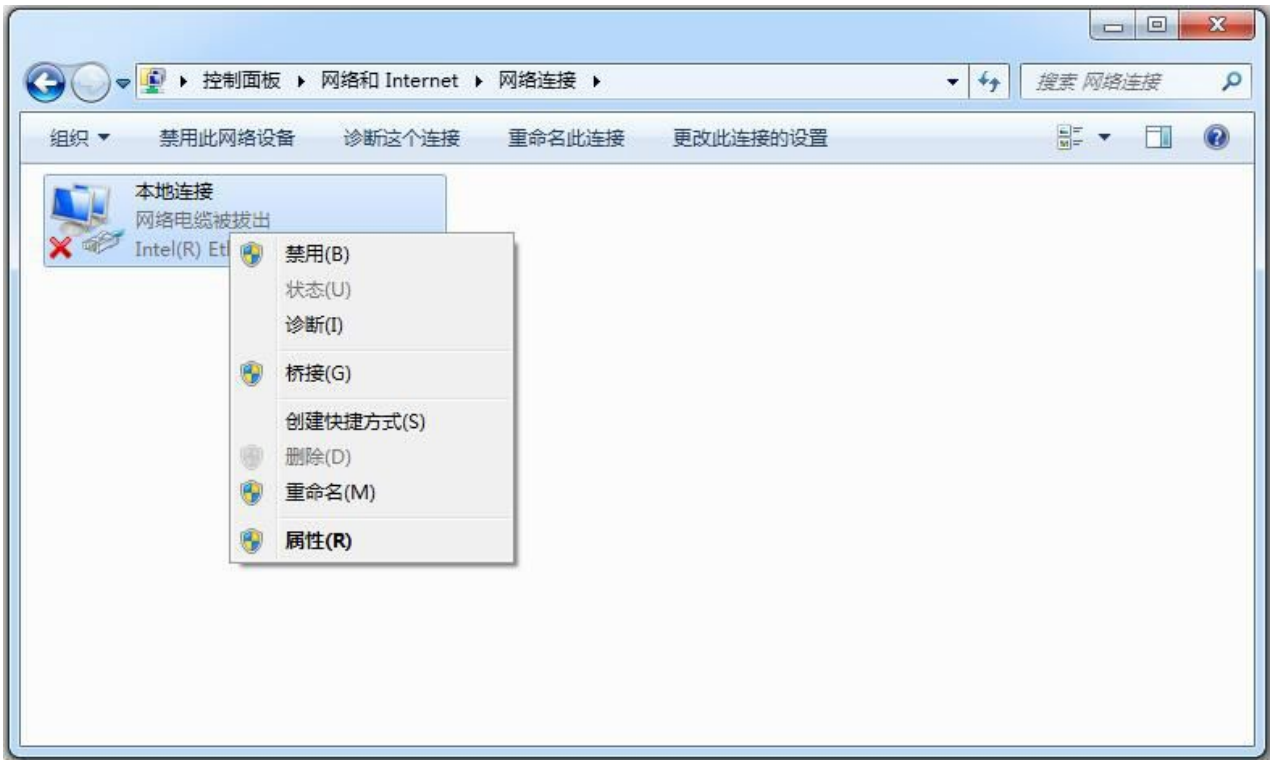
Use the matching [4P-RJ45 network output and debugging cable] to connect the Gimbal camera ETH interface to the computer, you can quickly view the Gimbal camera video output and set up the Gimbal internal movement of some of the basic parameters, as follows to connect to the computer as an example, to illustrate the process of viewing the video and Operation of the Gimbal camera.

1. Use [4P-RJ45 ETH output and debugging cable] to connect to Gimbal ETH interface;

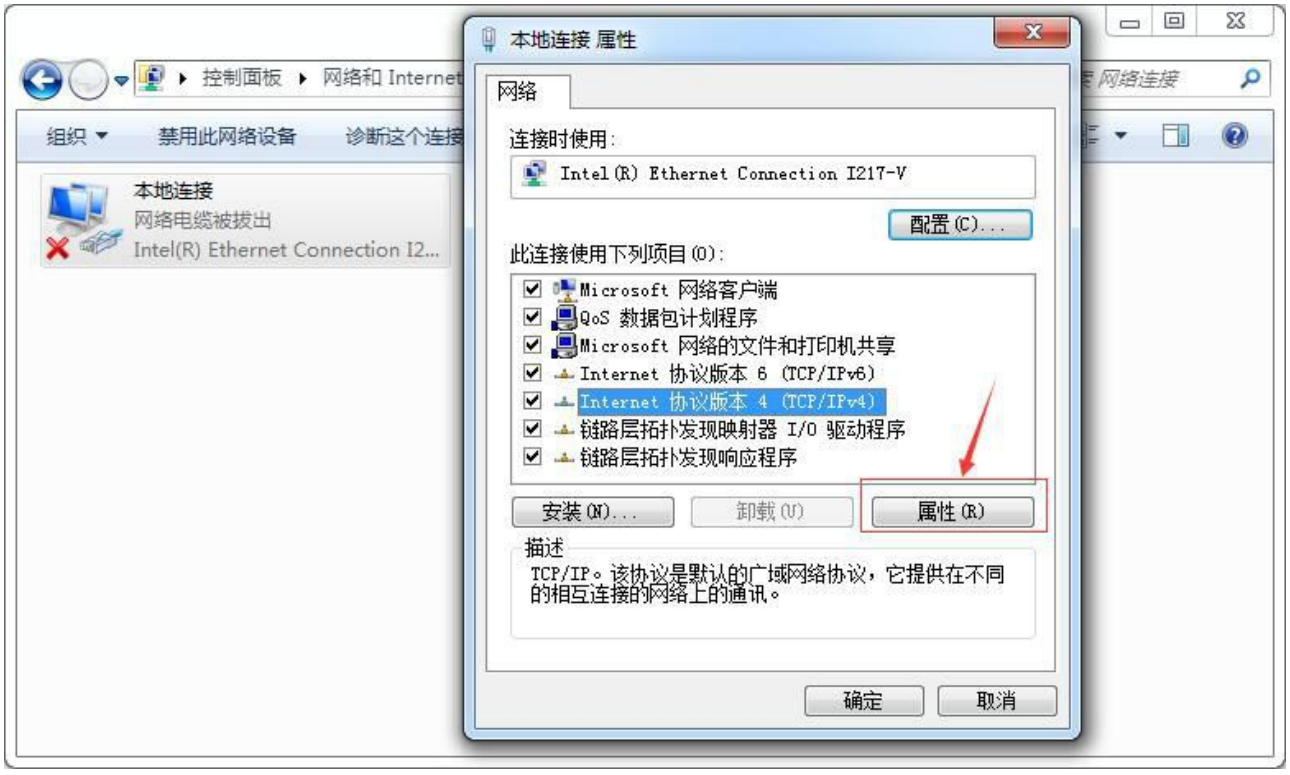
2. After the connection is complete, click the computer's [Control Panel] - [Network and Internet] - [View Network Status and Tasks] - [Change Adapter Settings], enter the network connection, showing the [Local Connection], as follows



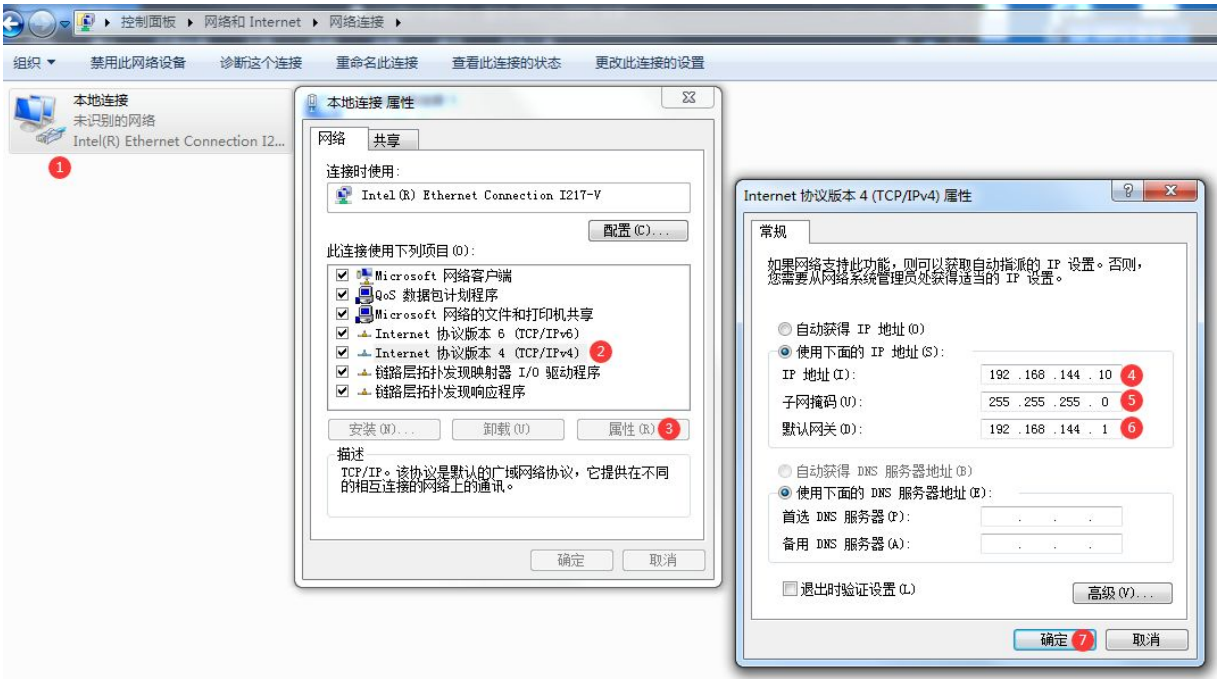
3.Right-click [Local Connection] - [Properties], as follows




4.After opening the properties of the local connection, click [Internet Protocol Version 4 (TCP/IPV4)] - [Properties], as follows

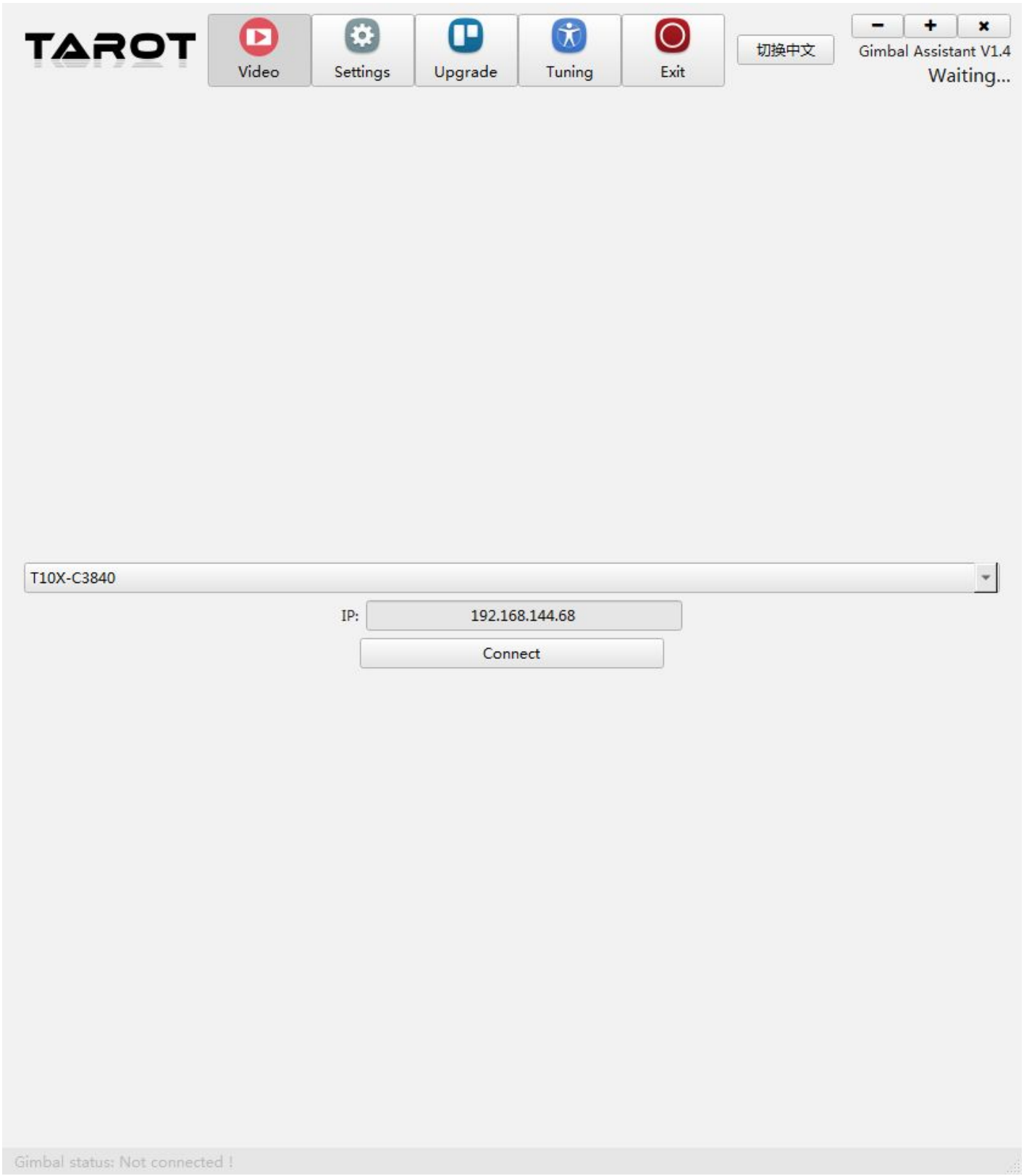


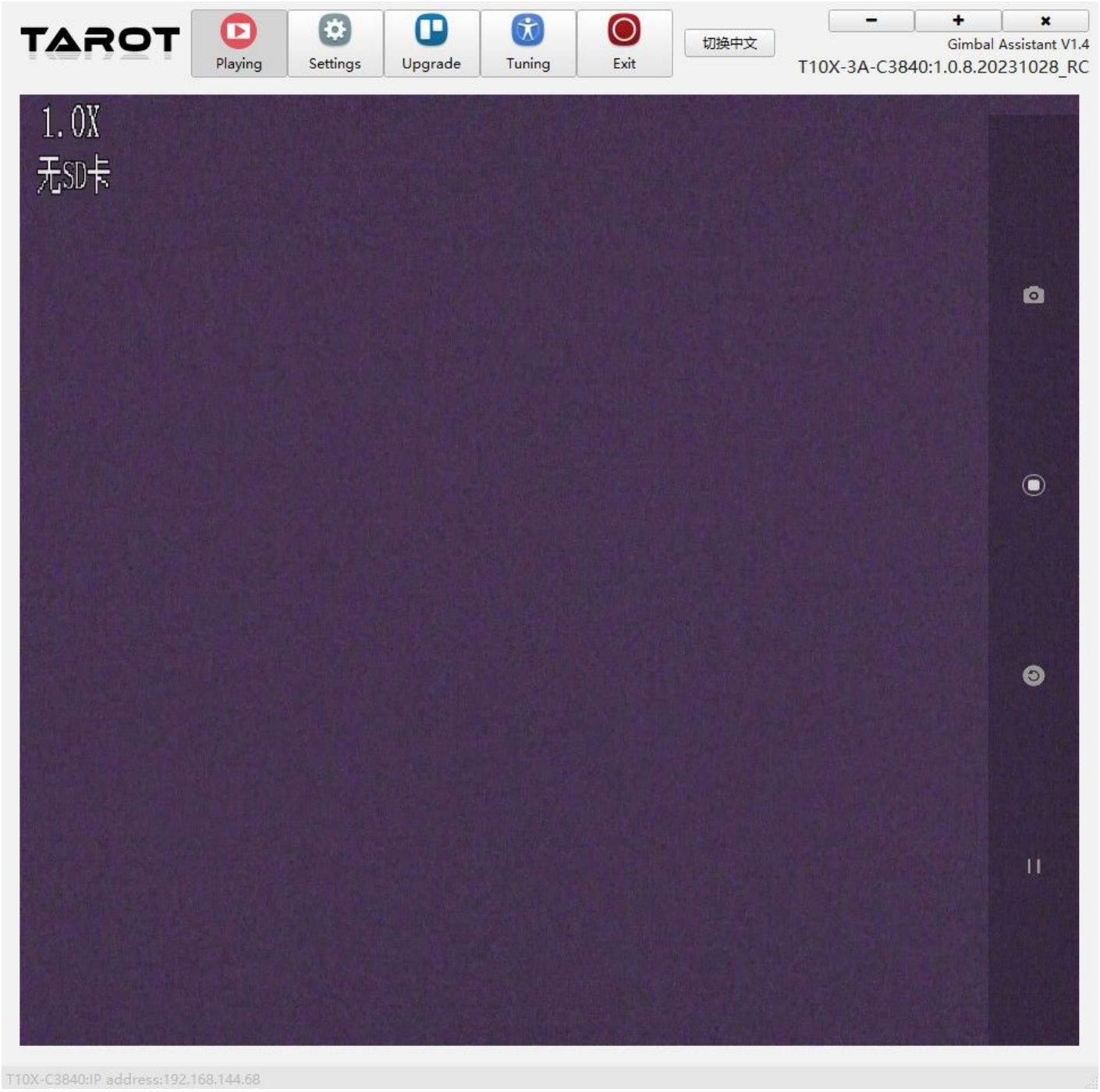
5.After opening the TCP/IPv4 properties, change the [Obtain an IP address automatically] option to the following figure



## 7.3 Video Screen Output

Open the TGA software, switch to T10X-C3840, enter 192.168.144.68 (default) in the IP address field, and click the button "Connect".




TAROT
Playing
Settings
Upgrade
Tuning
Exit
切换中文
Gimbal Assistant V1.4
T10X-3A-C3840:1.0.8.20231028_RC
1.0X
无SD卡
T10X-C3840:IP address:192.168.144.68

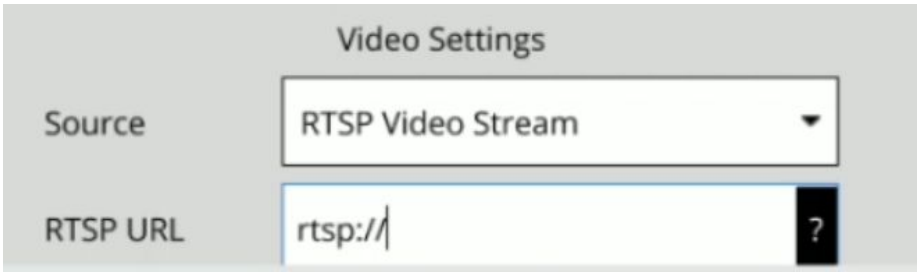
## 7.4 Screen Output Case Demonstration

1:QGC open source software

MAVlink Configure the serial line See communication serial port settings.

Open QGC software-Settings-Video Streaming Settings interface, enter the following video streaming address:

rtsp://admin:admin@192.168.144.68/live2




2:JIYI Ground Station

Wiring note: Gimbal Operation control uses the S.Bus, the ground station only serves as an image display.

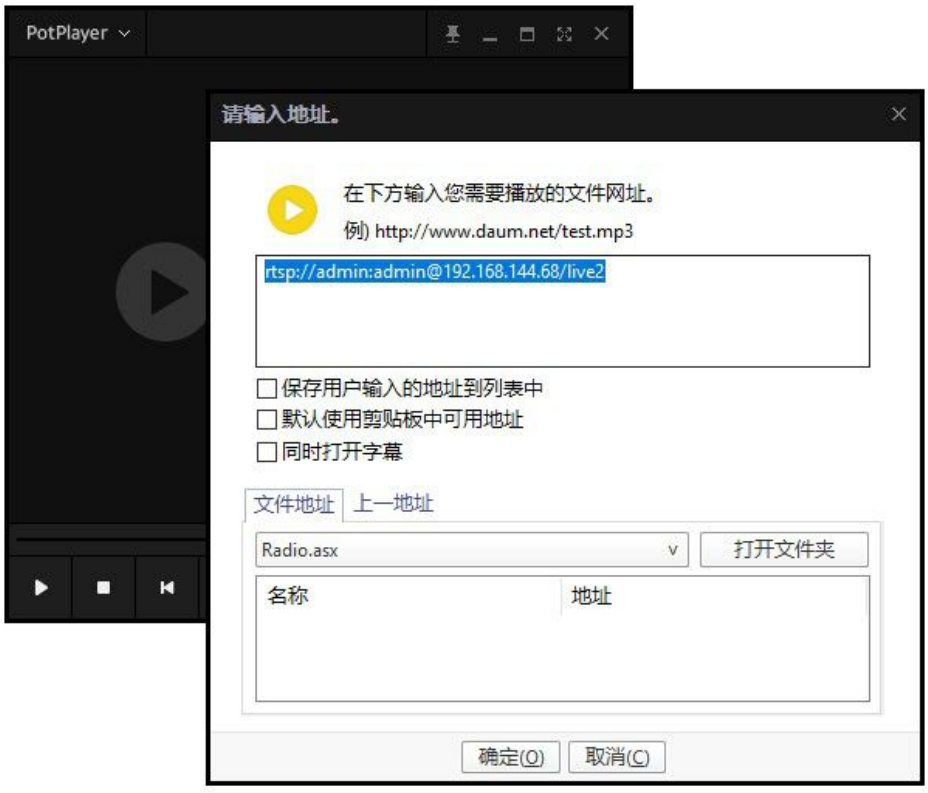
After registering your user information, go to the earth station, rtsp stream address screen and enter the following address:

rtsp://admin:admin@192.168.144.68/live2

3:Potplayer open source player

Click the button "Media" - "Open Web Streaming" - enter the address of the video stream in the "Please enter a web URL" field:

rtsp://admin:admin@192.168.144.68/live2

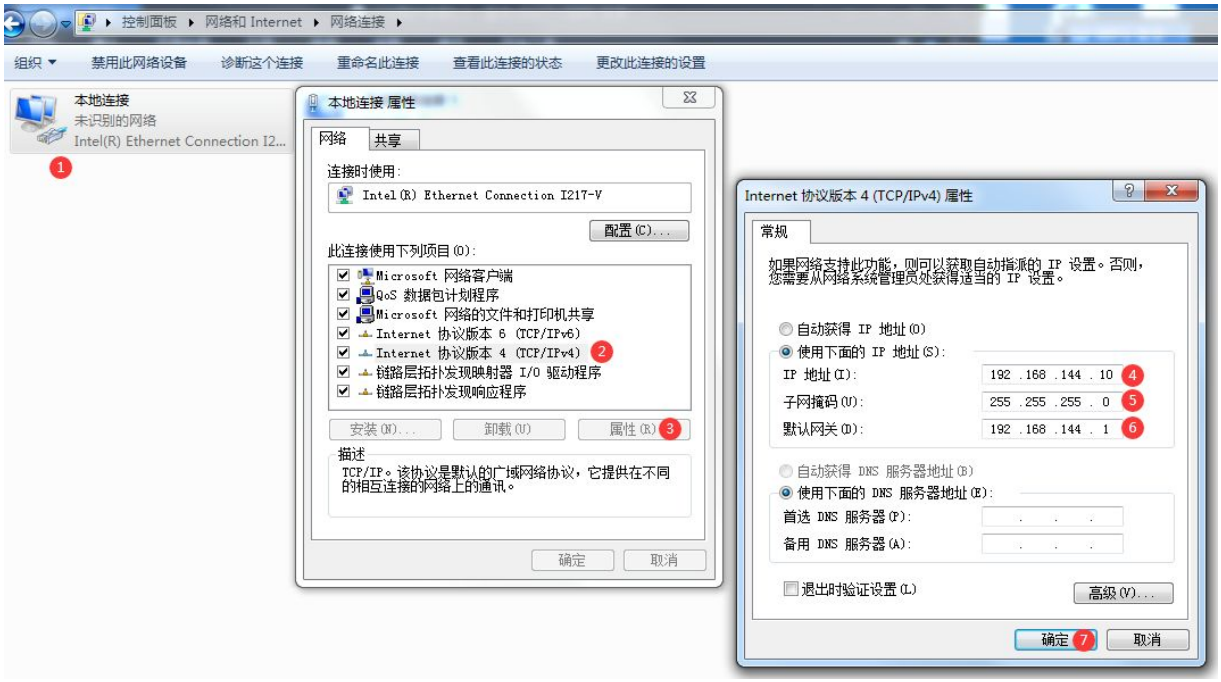



Note: If you modify the camera network segment, the network segment in the video stream address should be modified correspondingly to keep the network segment consistent!

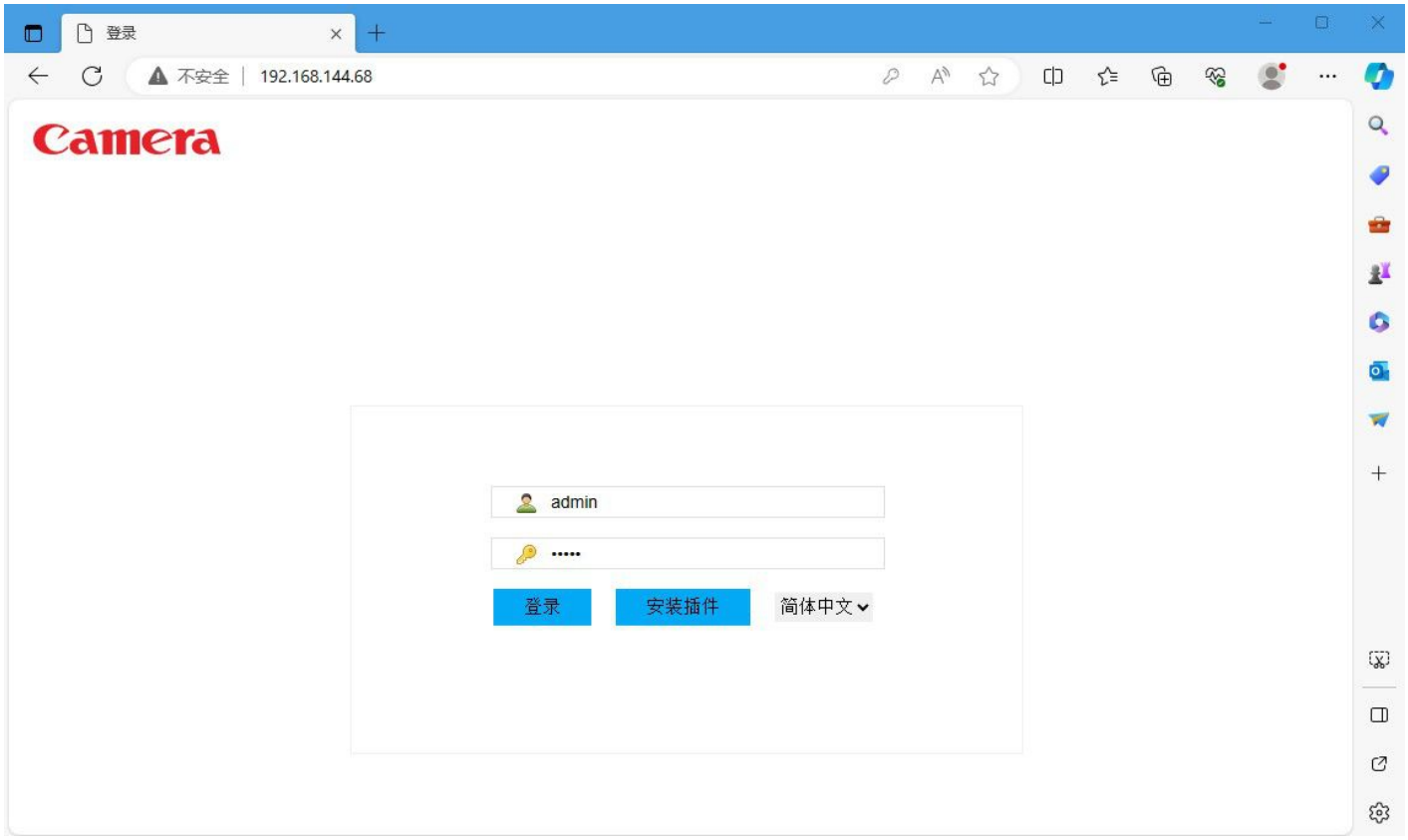
## 7.5 Camera ETH Segment Modification

If you are using a device with a ETH segment other than the default 144, you can follow the tutorial below to change it to the desired ETH segment.

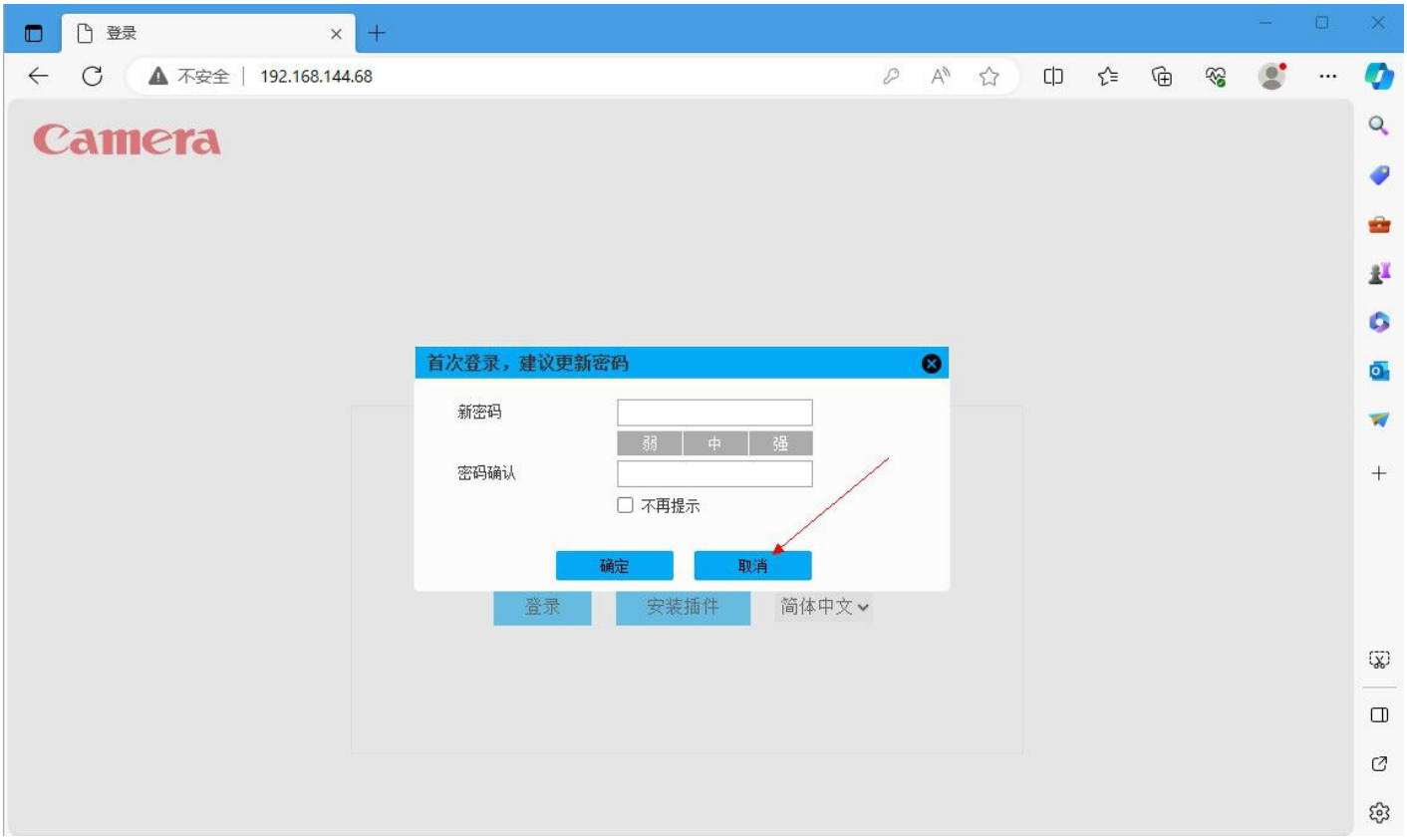
1:Connect the Gimbal to the computer's network port through the 4P-RJ45 ETH output and debugging cable, power up the Gimbal, and when the Gimbal finishes the self-test action, the computer will recognize the new wired network. Please set the TCP/IPv4 of this wired network correctly as shown in the following figure, and then Confirm to save the setting.



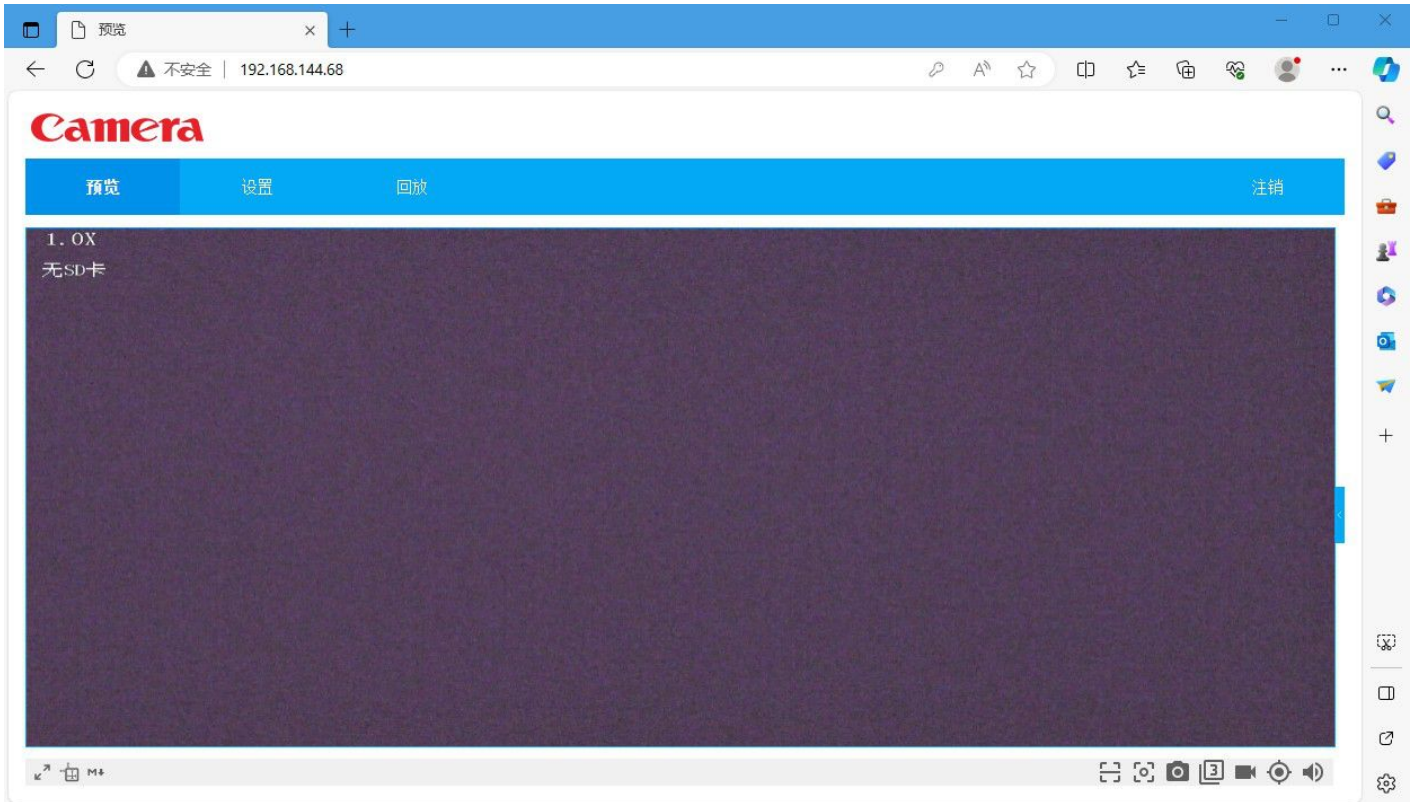

2. Settings modified to determine, open the IE kernel browser (do not use Chrome kernel browser), the address bar, enter [192.168.144.68], enter the account [admin], the password [admin], click to log in, as follows



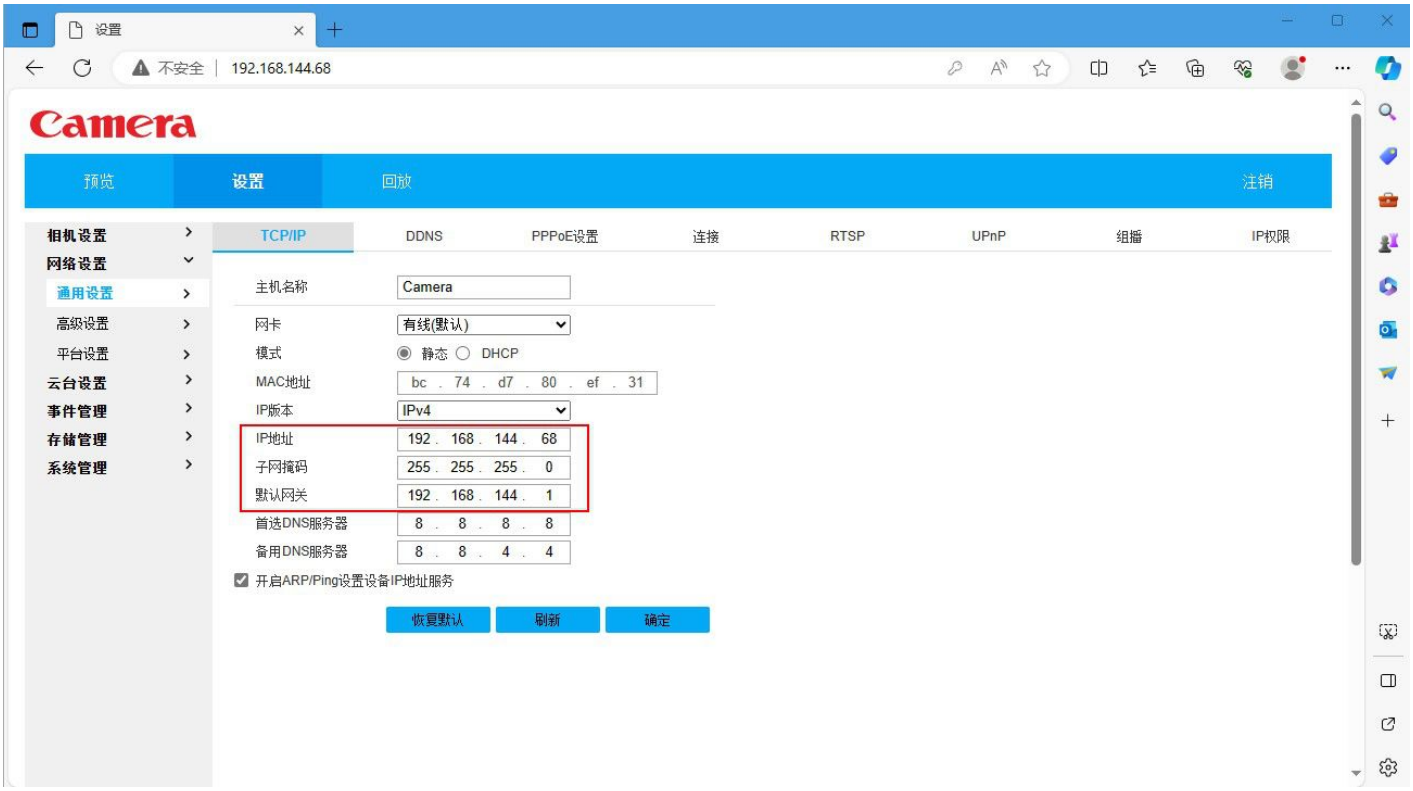
3.A pop-up box prompts to change the new password, remember to select [Cancel], you can not change the password, as follows




4.After the prompt [not installed video plug-ins, please click to download], click to download and install, after successful installation, refresh the site, you can view real-time images and modify the custom settings, as follows

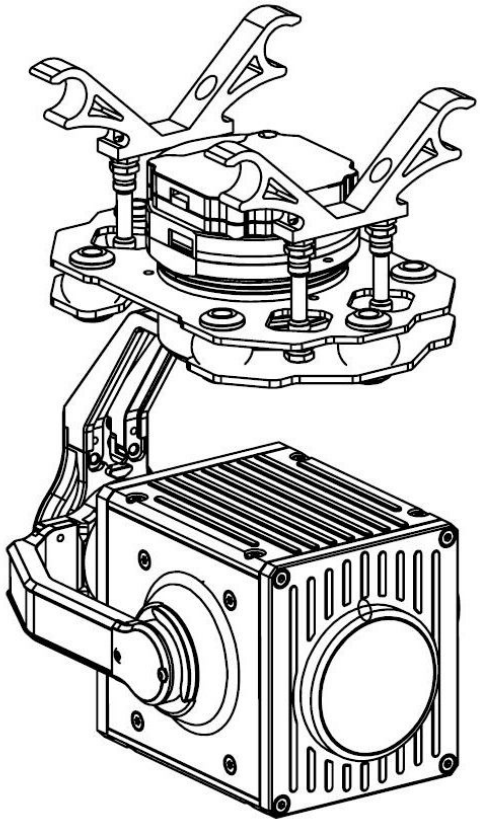


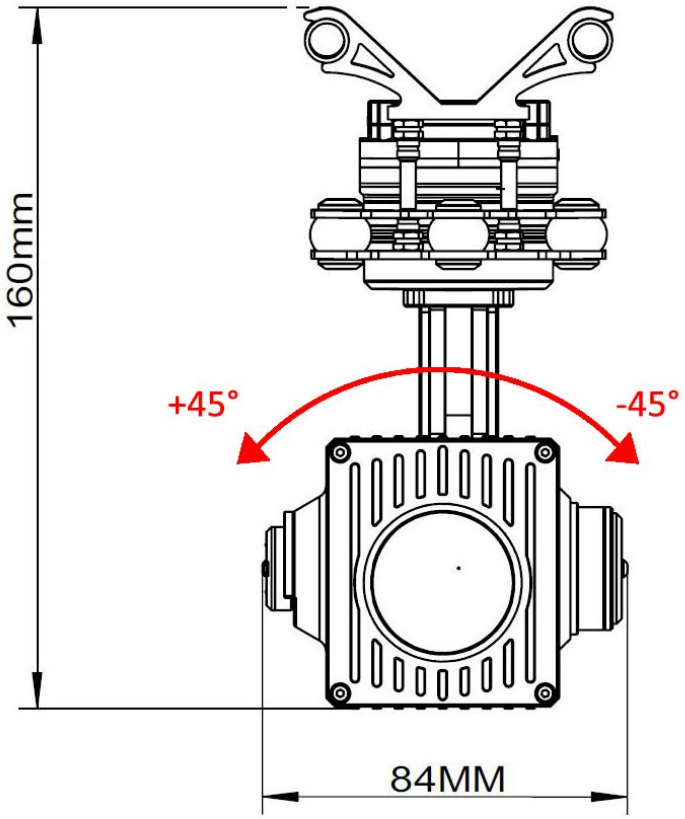
5.Click [Settings]-[Network Settings]-[General Settings]-[TCP/IP] to change the desired IP segment and address.

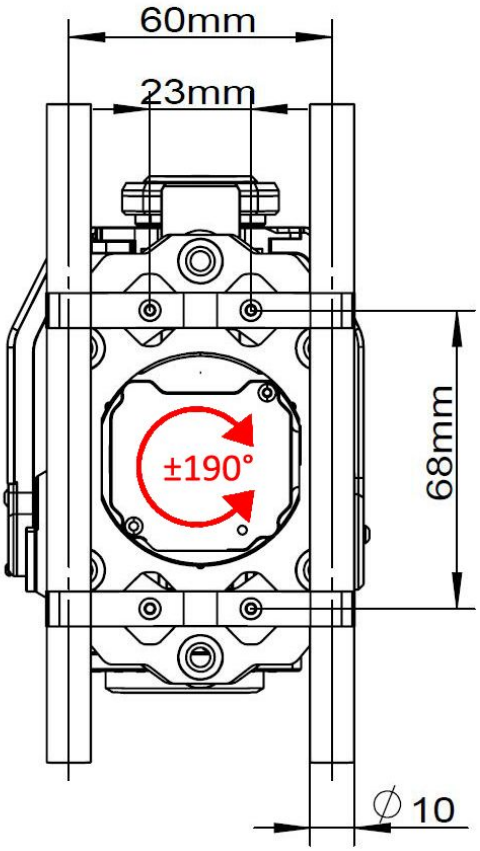


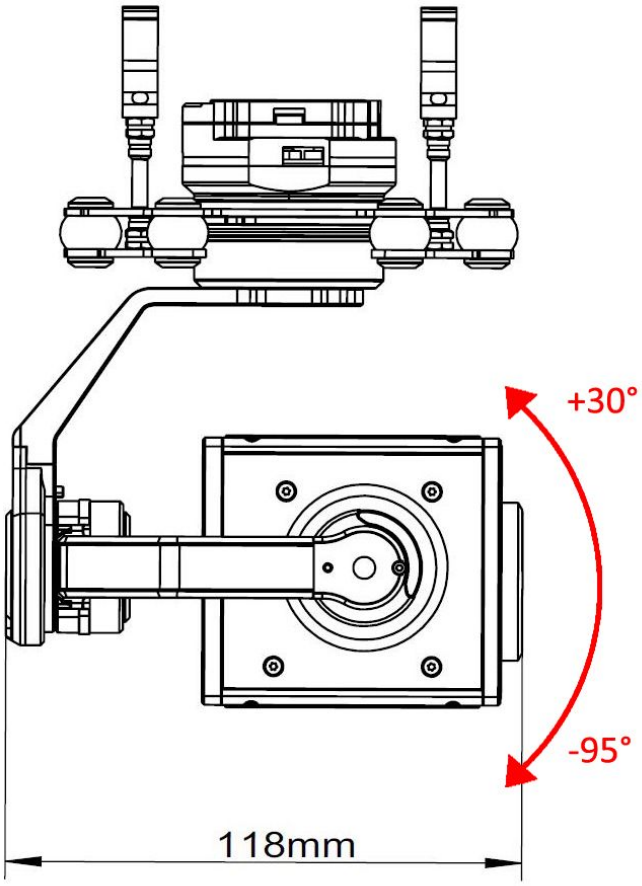
# Ⅷ. Specification Sheet

| Projects | | Parameters |
|---|---|---|
| **Function Indicators** | Video Outputs | ETH(4K@30fps) |
| | Supported Control Type | S.Bus、UART(TTL level) |
| | Advanced Features | One Click Down、Auto/Manual Focus |
| **Camera Technical Indicators** | Sensor Size | 1/2.8″ CMOS |
| | Effective Pixels | 8.29 Million |
| | Video Resolutions | MP4/4K@30fps |
| | Photo Resolutions | JPEG/3840*2160 |
| | Lens | 4.8～48mm |
| | Aperture | F1.7~f3.2 |
| | HFOV | 60.2°～6.6° |
| | VFOV | 36.1°～3.7° |
| | DFOV | 67.2°～7.6° |
| | Electronic shutter speed | 1~1/30000s |
| | Optical Zoom Rate | 10X |
| | Equivalent Digital Zoom Rate | 4X |
| | Minimum Illumination | IECUT off:0.01Lux/f1.5;IRUCT on:0.001Lux/1.5 |
| | Object Detection Distance | Person:1449m，Vehicle:1904m |
| | Object Identification Distance | Person:289.8m，Vehicle:308.9m |
| | Object Verification Distance | Person:144.9m，Vehicle:190.4m |
| | Stream Encode Format | H.264/H.264H/H.264B/H.265/MJPG |
| | Stream Network Protocol | ONVIF;GB/T28181;HTTP;RTSP;TCP;UDP,RTP |
| | Storage | Support a Speed Class 10 Micro SD card with a capacity of up to 128GB |
| | Minimum Focus Distance | 30cm |
| **Gimbal Technical Indicators** | Angular Vibration Range | ±0.01° |
| | Max Controllable Speed | PAN :5-60°/s |
| | | TILT :5-60°/s |
| | Controllable Range | PAN :±190° |
| | | TILT :Upright-95°～+30° |
| **Complete machine Technology Indicators** | Operating Temperature | -20～50℃ |
| | Dimensions (L x W x H) | 118×84×160mm |
| | Weights | 435g |
| | Operating Voltage | 12~27V |
| | Average power consumption | 5W |
| | Debugging Software Support | Windows 7, Windows 10 and above (driver free for win10 and above) |





# Ⅸ. Protocol of the Gimbal and Flight Control

The Gimbal camera supports the use of serial protocol control, through the protocol control, you can realize the control of the Gimbal and the camera, as well as the Gimbal status, attitude angle real-time feedback, easy to integrate with other modules and combinations, such as connected to the flight control, or the use of digital transmission control.

The content of the serial port protocol is not described here, you can dock according to the instructions.

Please contact our sales staff for Gimbal control protocols.

# X. Troubleshooting

| | |
|---|---|
| **Jelly phenomenon** | 1:Check the shock ball installation for offset<br>2:Gimbal camera installation fixed whether there is loose<br>3:Whether the shock ball is broken, please replace the shock ball regularly<br>4:Pid Parameters can be adjusted in the TGA software. |
| **Gimbal Point axis Offset** | Check Sensor Info through the debugging software to check if the Gimbal has a resting 4-6 seconds of self-test before powering up |
| **Video file cannot be opened** | Whether or not the Operation to turn off the video is fully executed during the Gimbal shooting process, if the Gimbal is directly powered off before the video is properly turned off, the video file will be lost. |
| **TCA and TGA software does not work properly** | 1:T10X-Plus has no power supply or the power supply voltage is lower than 12V, and it fails to start working normally.<br>2:Some lite systems lack the corresponding USB serial port driver, please install the driver in the package. |
| **The video screen doesn't come out** | Check that the network video segment is a 144 segment |