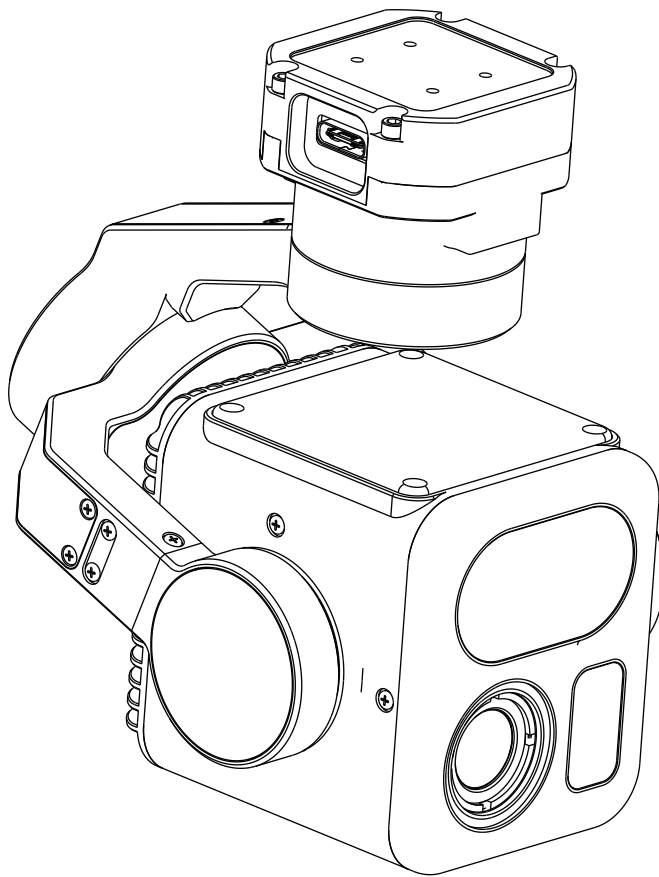




K40T-MINI-B Quad-Sensor Gimbal Camera User Manual

V1.0 202603



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1、Product Introduction

The K40T-MINI-B gimbal camera is an integrated drone payload that combines multiple sensors with high performance, specifically designed to meet the needs of drone inspection. This gimbal camera integrates a variety of sensors, including a 48MP wide-angle lens, a 48MP telephoto lens, an infrared sensor, and a laser rangefinder. Whether tracking moving targets or identifying heat sources, the K40T-MINI-B handles them with ease. Its unique dual-light super-resolution fusion algorithm deeply integrates visible light and thermal imaging with only 640×512 resolution, outputting fused images at 1080p resolution. It effortlessly captures details both day and night. Particularly outstanding when following and collecting data on targets from high altitudes, it provides robust support for fields such as public security, firefighting, power, water conservancy, forestry, and maritime affairs.

2、Product Function Parameter

Weight	267 g±5 g
Operating Voltage	12 V-18 V
Number of Axes	3-Axis Mechanical Gimbal
Software Limit Angle	Pitch:-90° to +30° Yaw:-120° to +120°
Mechanical Range	Pitch:-135° to +45° Roll:-45° to +45° Yaw:-135° to +135°
Max Control Speed	180°/S
Angular Vibration Range	±0.005°
Interface	Network Interface/TTL/sbus
Gimbal Mode	Recognition, Auto-Tracking
Operating Temperature	-40°C~+65°C
Communication Protocol	HEQ Proprietary Protocol/mavlink
IP Rating	IP54
Power Consumption	12W
Hybrid Zoom	100x
Visual Resolution	48MP (Wide、Tele)
TF Card Photo Format	JPG
TF Card Video Format	MP4
Video Resolution	4K@30fps
Encoding Format	H.264, H.265
AI Recognition & Tracking	Support

Wide-Angle Camera Parameter List

Sensor Size	1/2" CMOS
Focal Length (Wide)	4.49mm
Effective Pixels	48MP
Aperture (Wide)	F2.8
FOV	H:71° V:56° D:84°±1°

Telephoto (Fixed-Focus) Camera Parameter List

Lens Size	1/2" CMOS
Pixel	48MP
Focal Length	25mm±5%
Aperture	F2.4
FOV	DFOV 18.8°

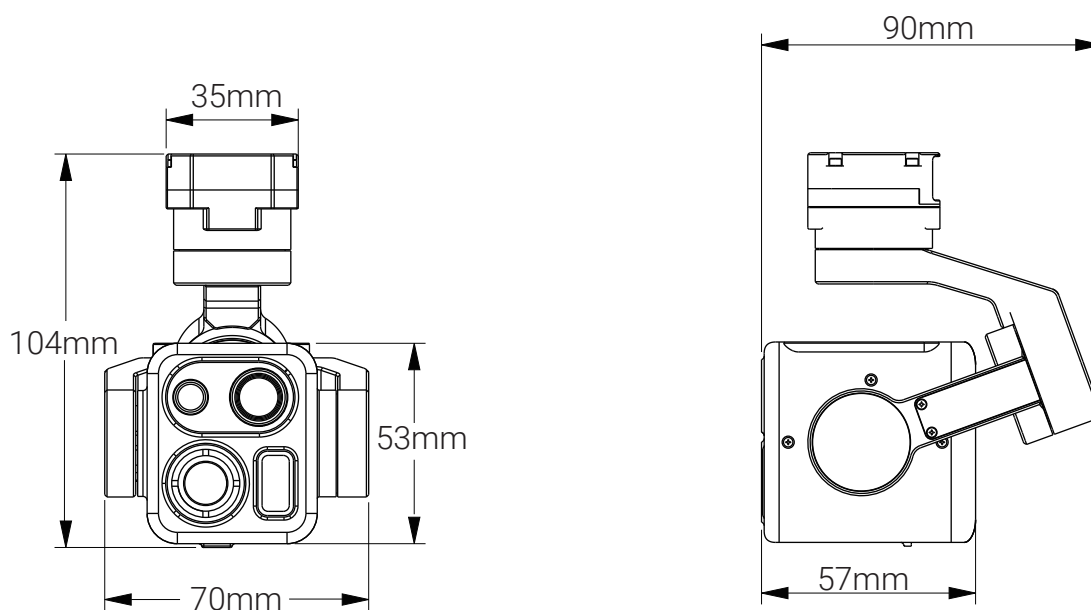
Thermal Camera Parameter List

Sensor Type	Vanadium Oxide (VOx) Microbolometer
Max. Image Size	640 x 512
Frame Rate	30 Hz
Pixel Pitch	12 μm
Spectral Range	8 ~ 14 μm
NETD	≤ 30 mK (@25°C, F#1.0)
Thermal Lens Focal Length	9.1 mm
Aperture	F1.0
FOV	48.3°(H)x38.6°(V),62.4°(D)

Laser Rangefinder Parameter List

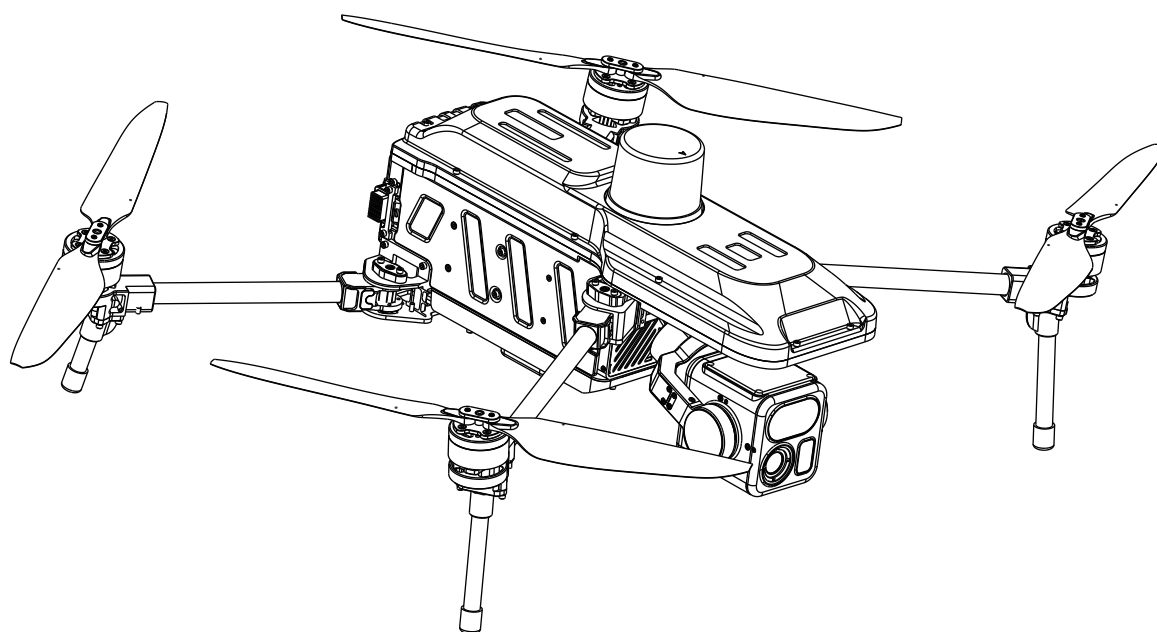
Measuring Range	3-1200m
Ranging Accuracy	±1m
Distance Resolution	0.1 m
Beam Divergence	3.2 mrad
Laser Type	905nm
Measurement Frequency	1-10Hz

3、 Gimbal Appearance Dimensions



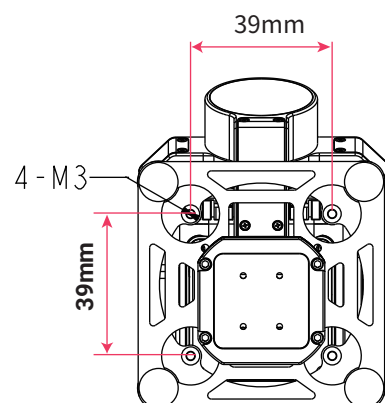
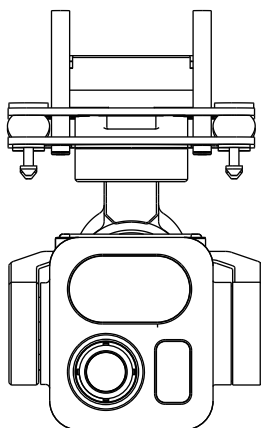
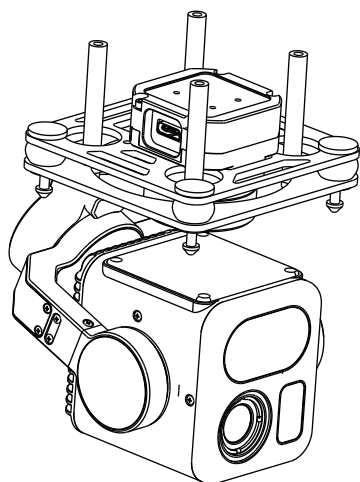
4、 Product Installation

Please go to the official website "Download Center" to download the product 3D model: <https://www.hequavtech.com/>

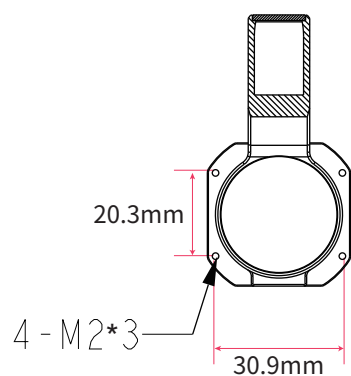


Installation Example 1

Installation Example 2

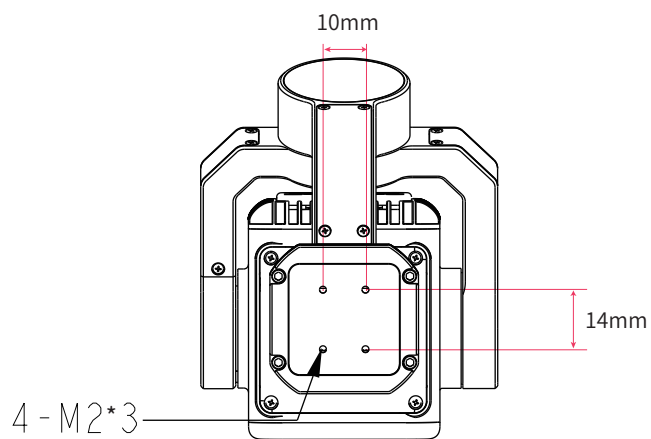


Installation Method 1



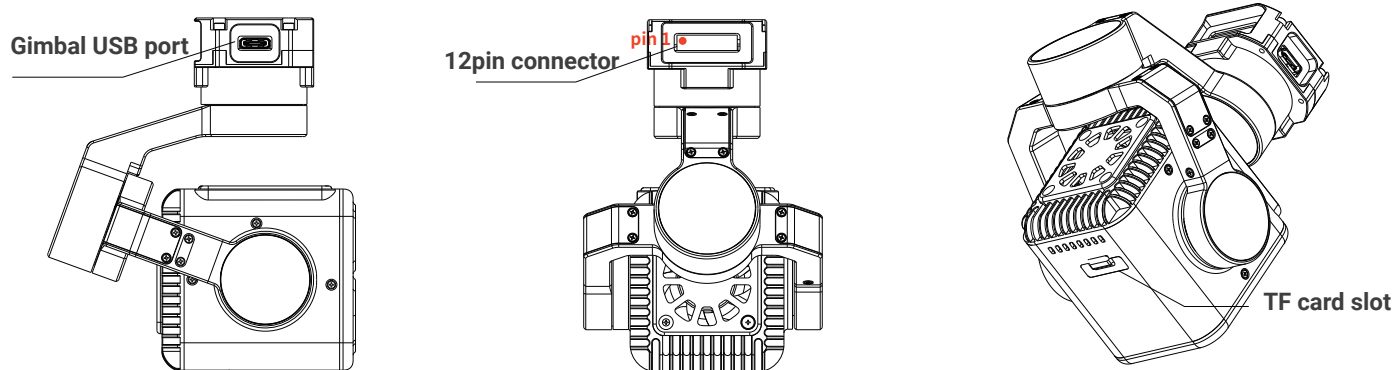
The upper bracket installation holes, 4 M2*3mm screws, the hole spacing is 20.3mm and 30.9mm respectively.

Installation Method 2



The upper bracket installation holes, 4 M2*3mm screws, the hole spacing is 10mm and 14mm respectively.

5、Product Hardware Interface



Model	Interface Type	Function
Gimbal USB	USB Port	Gimbal upgrade and debugging
Memory card interface	TF card interface	Store photos and videos/upgrade camera and gimbal firmware

No.	Model	Interface Type	Interface Definition	Function
1	12PIN(GH1.25mm) Connector	Power Interface	GND	GND
2		Power Interface	GND	GND
3		Power Interface	12V-18V	Power Input
4		Power Interface	12V-18V	Power Input
5		Communication Interface	T+	Network Interface
6		Communication Interface	T-	Network Interface
7		Communication Interface	R+	Network Interface
8		Communication Interface	R-	Network Interface
9		Communication Interface	SBUS	
10		Communication Interface	GND	
11		Communication Interface	TX	TTL Serial Port
12		Communication Interface	RX	TTL Serial Port

Gimbal and UAV System Connection Diagram

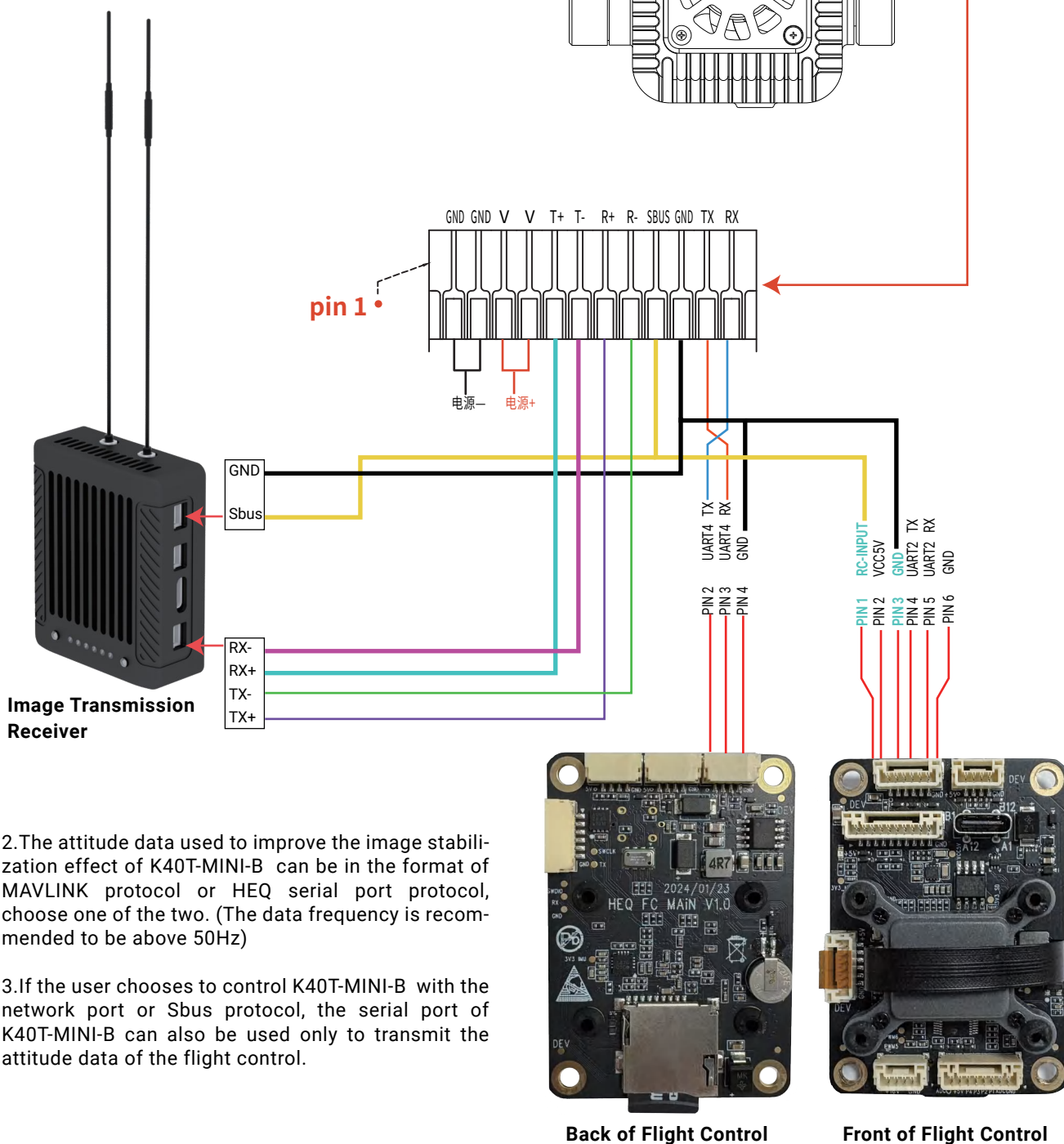
Important Notes:

1. The serial port of K40T-MINI-B can be used to receive control commands of the gimbal camera, and can also receive attitude data of the flight control to improve the accuracy and effect of image stabilization.

Verification Method for Successful Interfacing:

Approximately two minutes after the device is powered on, disconnect the serial cable. If the gimbal locks up and stabilization ceases, reconnect the serial cable. If stabilization resumes upon reconnection, it indicates successful interfacing with the flight controller data.

Conversely, if stabilization persists after the serial cable is disconnected, the interfacing is incorrect. In this case, check whether the flight controller output settings are correct or if the serial hardware connection is reversed.



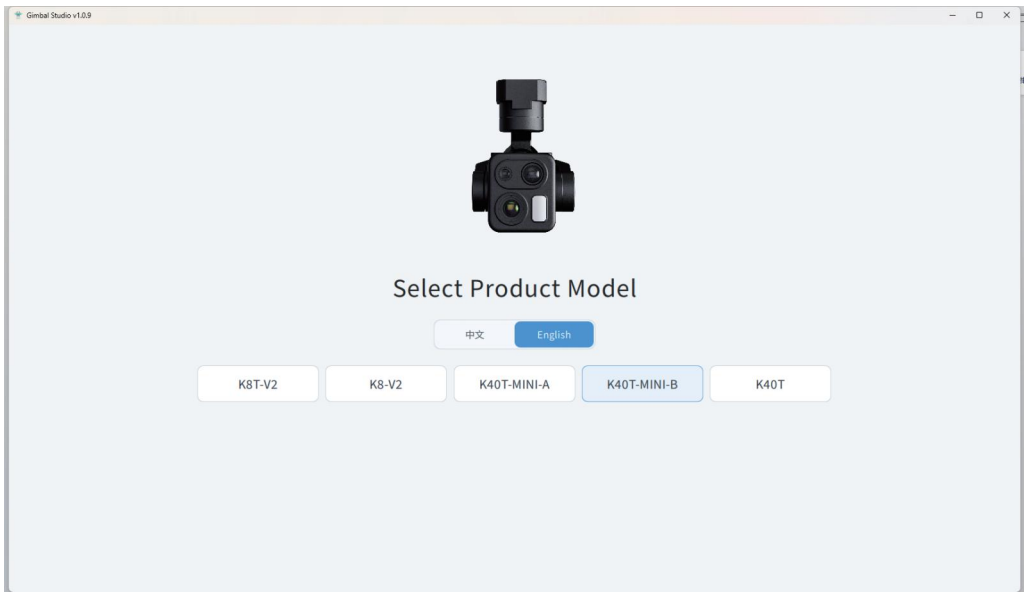
6、Product Control Interface and Protocol

Control Type	Interface	Protocol
Gimbal control	Network/serial port/Sbus	Please go to the official website: https://www.hequavtech.com/ "Download Center" to download the network/serial port protocol; Sbus protocol is a universal standard protocol for drone remote controllers. For specific setting methods, refer to 7. Product Assistant Software Usage Guide of this document for setting.
Video stream	Network	Default RTSP push stream, pull stream address : rtsp:// 192.168.144.64:558/live/single , Before starting the video, please make sure that the network segment of the device is consistent with that of the K40T-MINI-B gimbal camera. (The K40T-MINI-B Assistant Software supports IP address settings. For details, please refer to 7. Product Assistant Software Usage Guide)

7、Product Assistant Software Usage Guide

Please go to the official website "Download Center" to download the assistant software: <https://www.hequavtech.com/>

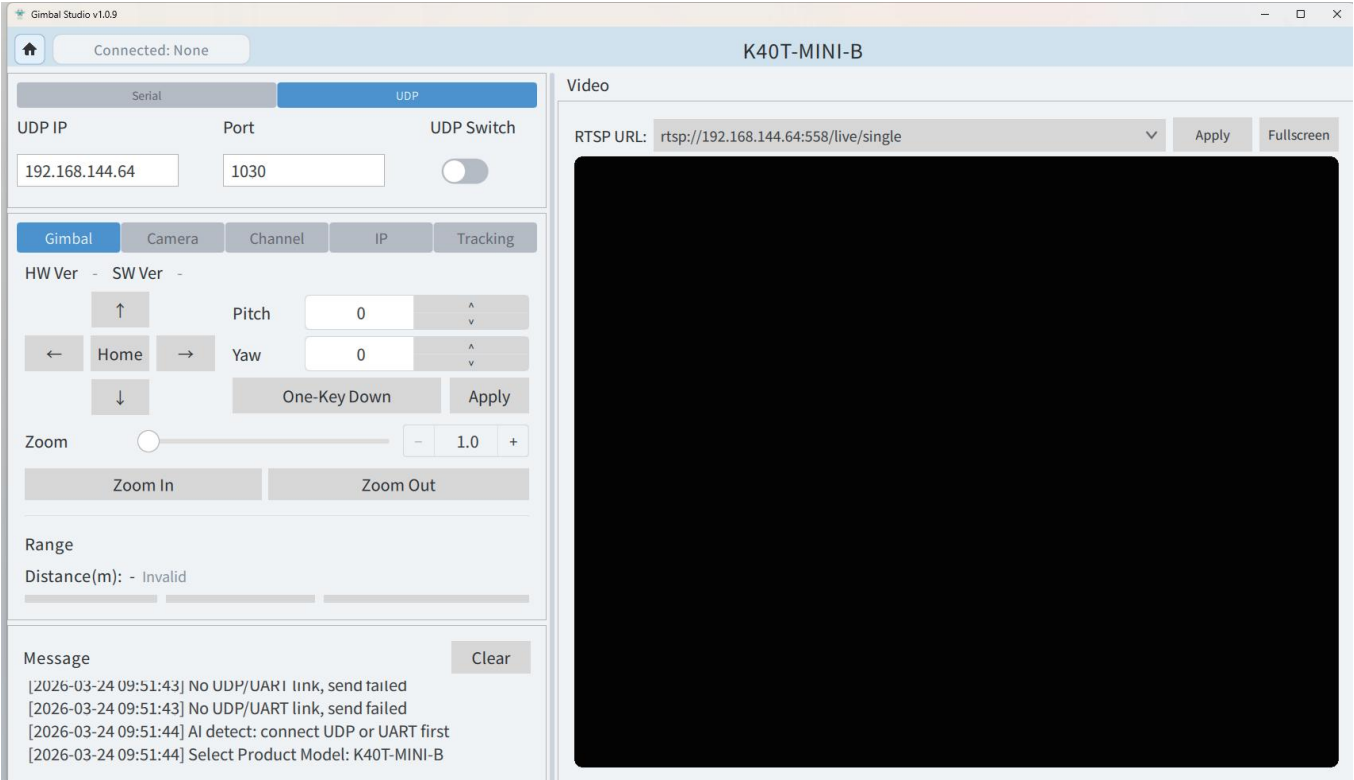
7.1 Assistant Software Interface



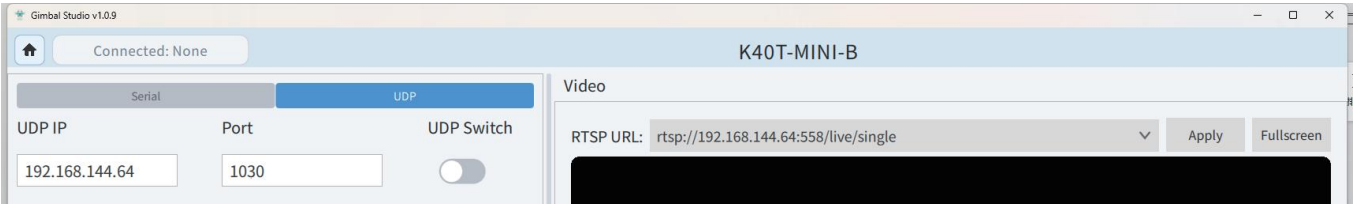
Enter the assistant software page and select the corresponding product model. If you need to switch the language version, please click the icon below to set it.



After entering the page of the corresponding product model, the interface is as follows:



7.2 Connection Settings



Users can choose serial port or UDP connection mode according to actual conditions.
For specific parameter settings, refer to the table below:

Interface Type	Parameters/Settings	User Settings Supported Or Not
Serial port baud rate	Default: 115200	NO
UDP address	Default: 192.168.144.64	Yes (IP address)
Video playback address	Default : rtsp://192.168.144.64:558/live/single	Yes (IP address)

7.3 Gimbal Control

Gimbal Control interface showing tabs: Gimbal, Camera, Channel, IP, Tracking. The Gimbal tab is active, displaying fields for HW Ver and SW Ver. Below these are directional buttons (up, down, left, right) and a Home button. To the right are Pitch and Yaw controls, each with a numeric input (0) and up/down arrows. Further right are One-Key Down and Apply buttons. A Zoom section includes a slider, a numeric input (1.0), and minus/plus buttons. Below the zoom are Zoom In and Zoom Out buttons. At the bottom, a Range section shows Distance(m): - Invalid.

Users can click the gimbal control buttons to adjust the gimbal's speed and angle. The gimbal control speed has an adaptive relationship with the zoom ratio; for instance, a higher zoom ratio results in slower gimbal movement speed.

When the system outputs visible light video, the zoom display shows "Visible Light Zoom", supporting both hybrid zoom and continuous zoom.

When the system outputs infrared video, the zoom display shows "Infrared Zoom", also supporting both hybrid zoom and continuous zoom.

7.4 Video Stream Camera Type Settings

Video Stream Camera Type Settings interface showing tabs: Gimbal, Camera, Channel, IP, Tracking. The Camera tab is active, displaying Camera Ver 1.1.123. Below this are settings for Bitrate (8M), RTSP Resolution (1080P30fps selected), Codec (H265 selected), Output (Visible selected), Photo Res (8000 * 6000), and Record Res (4000 * 3000).

The assistant software allows selection of the camera stream type (visible light, thermal imaging, or split-screen). In thermal imaging mode, the color palette can be switched.

Users can click the camera restart button to reset the camera feed. It provides switching options for video bitrate, RTSP resolution, video encoding format, and photo/video recording resolution, which can be selected as needed.

7.5 Sbus Function Settings

Channel Mapping			
Stream	CH1	Gimbal Pitch	NONE
Zoom	NONE	Gimbal Yaw	NONE
Capture	NONE	Gimbal Home	NONE
Record	NONE	IR Palette	NONE

Read Write

If you are using Sbus to control the gimbal camera, you can enter the interface shown on the left to configure channel mapping. After setting up the corresponding channels, click "Write" to save the settings, or click "Read" to retrieve the current mapping status.

Yunzhuo Remote Control
Setting Range: 282-1722

Heqi Remote Control
Setting Range: 281-1721

Siyi Remote Control
Setting Range: 272-1712

7.6 Distance Measurement Function

Pitch 0

Yaw 0

Home

One-Key Down

Apply

Zoom 1.0

Zoom In Zoom Out

Range

Distance(m): 2.60

Single Continuous Stop Continuous

The assistant software provides buttons for Single Measurement, Continuous Measurement, and Stop Continuous Measurement, allowing users to perform functional testing based on their needs.

Note: The reference measurement range for the rangefinder on the K40T-MINI-B is 5m to 1200m. Actual test data may vary depending on environmental conditions.

7.7 Camera IP Address Setting

IP 192 : 168 : 144 : 64

Mask 255 : 255 : 255 : 0

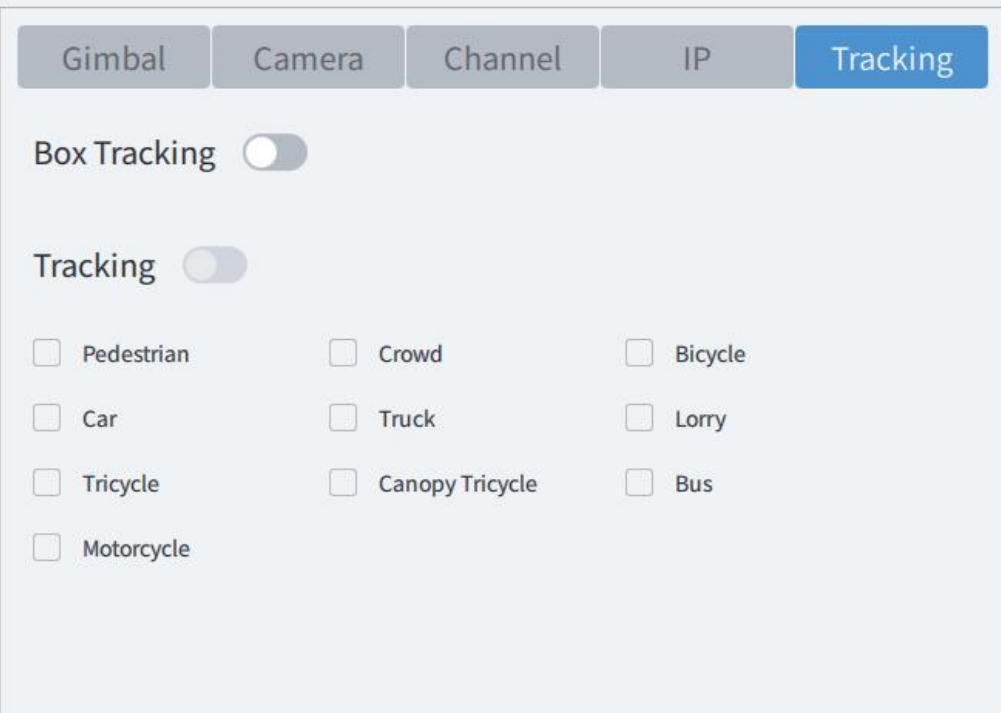
Gateway 192 : 168 : 144 : 1

Set Get

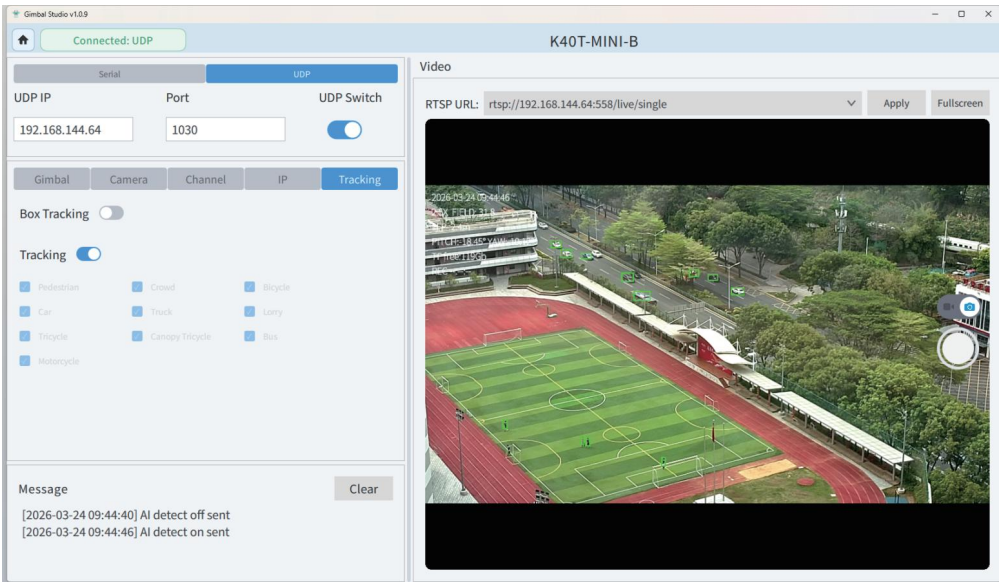
Users can set the IP address according to actual needs.

Note: Please keep a record after setting the IP address to avoid device connection failure. If you forget the IP address, please contact HEQ official for support.

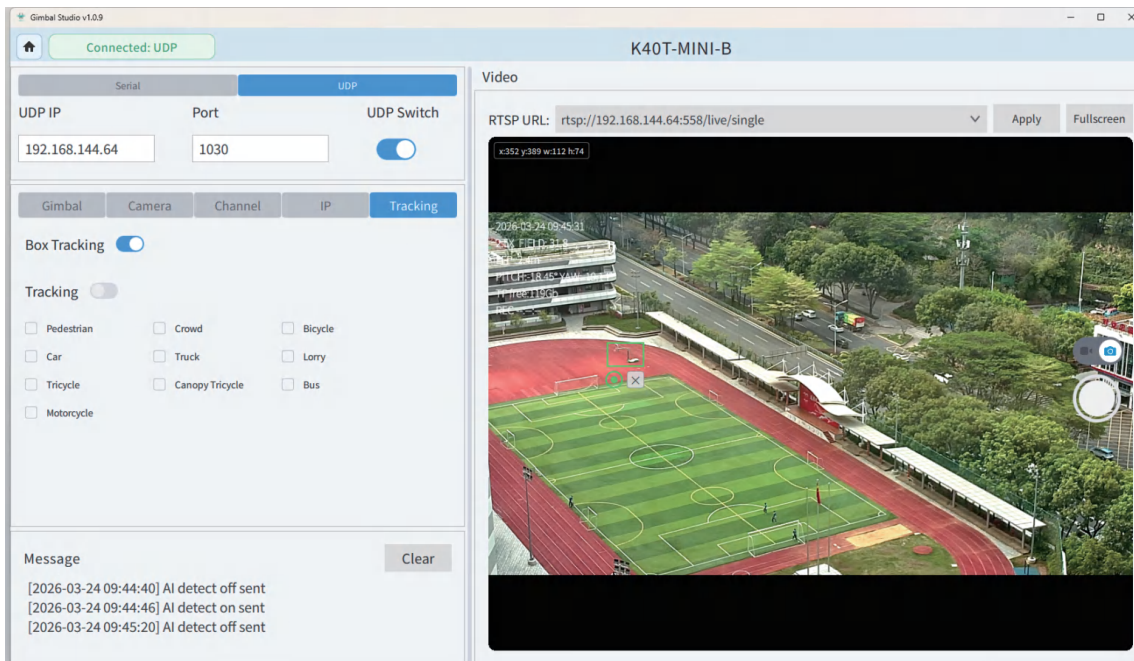
7.8 AI Recognition And Tracking Function



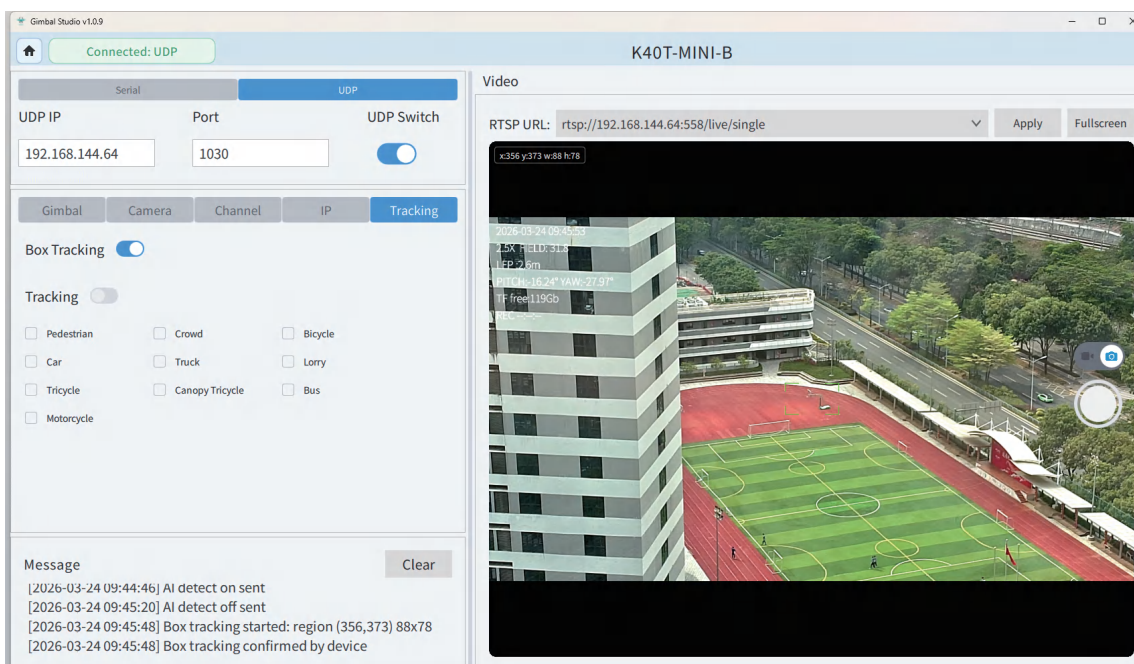
K40T-MINI-B has multiple common models built in and provides two tracking modes.



Recognition and Tracking: Before use, select the required model, then turn on the recognition and tracking. In recognition and tracking mode, targets that have been identified will be marked in green.



Selecting and Tracking



Selection and Tracking Successful

Target Selection and Tracking:

If you choose the target selection and tracking method, use the left mouse button to click and drag from the top-left corner to the bottom-right corner of the target or area of interest to complete the selection (a green dynamic bounding box will be displayed during the process). The device will automatically enter tracking mode (the tracking frame will turn green), and the tracked target will be automatically centered. Once selection tracking is enabled, PTZ movement cannot be manually controlled. If you switch the video output feed while selection tracking is active, the tracking status will be automatically disabled, and you will need to manually perform target selection and tracking again.

(This feature is continuously being iterated and optimized. New recognition models will also be added in the future. Users in need should visit the official website www.hequavtech.com and go to the download center to obtain the latest assistant software, device firmware, 3D drawings, and user manuals. We apologize for any inconvenience or trouble this may cause and appreciate your understanding!)

8、Product Firmware Upgrade

The upgrade of the K40T-MINI-B four-sensor AI gimbal camera is divided into two parts: camera firmware upgrade and gimbal firmware upgrade.

8.1 Camera Firmware Upgrade Method

After putting the file in the root directory of the SD card and powering on, there is no need to unzip the file, just wait for about 3 minutes.

 MAT-MINI-V1.0.39-Upgrade.tar	2026/3/9 11:48	360压缩	192,550 KB
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8.2 Gimbal Firmware Upgrade Method

Put the file in the root directory of the SD card and power on. During the upgrade process, the gimbal motor will stop. After the upgrade is successful, the gimbal will re-self check and stabilize.

 K40T-MINI-B_APP_V1.0.0.28_20260122.bin	2026/3/9 14:46	BIN 文件	102 KB
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9、Product Usage Precautions

9.1 Please store the gimbal camera in a dry and ventilated area at room temperature to avoid camera fogging due to high ambient humidity. If the camera fogs up, the water vapor will usually dissipate after the device is turned on for a while. The recommended storage environment is at a temperature of $20\pm5^{\circ}\text{C}$ and a relative humidity of less than 40%.

9.2 Do not expose the infrared camera camera to strong energy sources such as the sun, lava, or laser beams. The temperature of the observed target must not exceed 800°C , otherwise it will burn the camera and cause permanent damage.

9.3 Do not place the product in direct sunlight, in a poorly ventilated area, or near a heat source such as a heater. Do not turn the product on and off frequently. After turning it off, wait at least 30 seconds before turning it back on, otherwise it will affect the life of the product.

9.4 Under stable laboratory conditions, the K40T-MINI-B achieves the IP54 protection level of the IEC60529 standard. However, this protection level is not permanent and may degrade over time after long-term use.

9.5 Do not touch the surface of the camera lens and keep it away from hard objects, as this may cause the image to blur and affect the image quality. Use a soft, dry, clean cloth to clean the surface of the camera lens, and do not use alkaline detergent.

9.6 If there are other unclear points, please feel free to contact HEQ official, we will provide you with full technical support.

HEQ Official Website: www.hequavtech.com

HEQ Contact Email:

Email 1: sales@hequavtech.com

Email 2: support@hequavtech.com