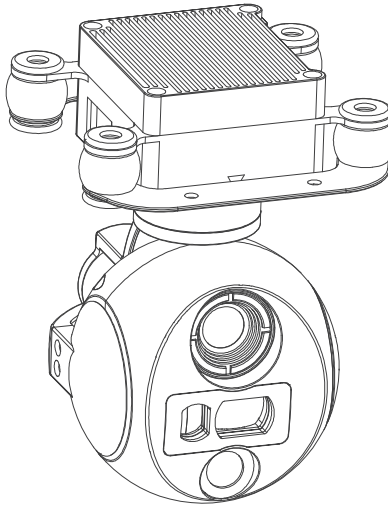
A609R EO+IR+LRF Triple-sensor AI Object Tracking Gimbal Camera

User Manual



For more details please scan the QR code or visit our website:
www.viewprotech.com

Disclaimer and Warning

Congratulations on purchasing your new Viewpro product. Please read this entire document carefully. Failure to read or follow instructions and warnings in this document may result in damage to your Viewpro product. Disassemble the gimbal camera by user is not permitted, which may cause the camera not to work normally.

Viewpro accepts no liability for damage, injury or any legal responsibility incurred directly or indirectly from the use of this project. The user shall observe safe and lawful practices including, but not limited to, those set forth in the manual.

Legends



Warning



Important Note

Precautions

1. After using the camera, please store the device in a dry environment to avoid fogging the lens due to excessive ambient humidity. If the lens fogs up, turn on the camera for a while and wait for the fog to dissipate.
2. The camera uses an infrared thermal imaging lens. Do not point it at strong energy sources, such as the sun, laser beams, lava, etc. The temperature of the object observed by the lens must be less than 800°C, otherwise it will burn the camera and cause irreversible damage to it.
3. When cleaning the camera lens, be sure to wipe the lens with a soft and dry cleaning cloth.
4. Do not directly touch or scratch the coating on the surface of the infrared lens with your hands or hard objects, otherwise the coating will be damaged and the image will be blurred.
5. Do not insert or remove the TF card while the power is on; after inserting or removing the TF card, please make sure that the TF rubber plug is tightly covered to prevent the power-on self-test from failing.
6. Never look directly into the laser rangefinder!

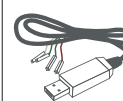
1.Product Introduction

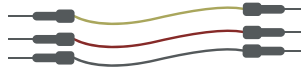
1.1 Introduction

A609R is a high-precision 3-axis stabilization payload equipped with a 2MP fixed lens EO camera, a 9.1 mm uncooled VOx lens, a 640x512 resolution thermal imager and a 1200m rangefinder. It supports PTZ control, digital zoom, photo and video recording, target tracking and AI human and car detection.

The camera can achieve stabilization in three directions: pan, roll and pitch. It is designed for hoisting by default. It adopts an integrated design of shock absorption and gimbal, which can greatly reduce mechanical vibration. It can be widely used in public security, electric power, firefighting, and zoom aerial photography and other industries.

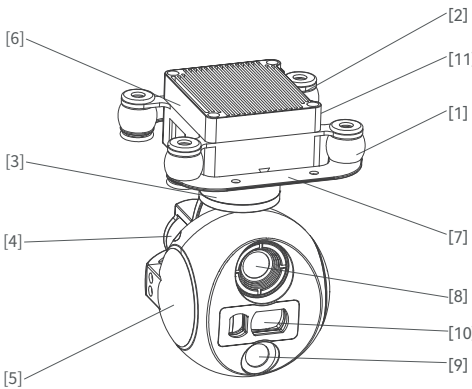
1.2 In the Box

Gimbal camera*1pc		USB to TTL cable *1pc	
Aluminum Cylinder *4pcs			
M3 screw *8pcs			

Power cable*1pc	
TTL connect cable *1pc	
Ethernet cable *1pc	
Multi-function cable*1pc	

2. Installation Instruction

2.1 Overview



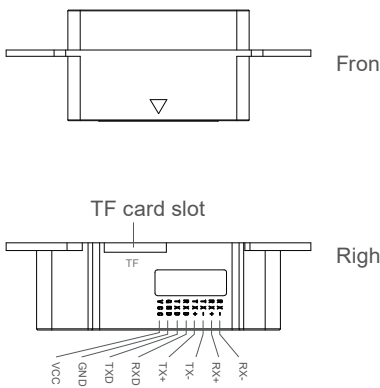
[1] Damping ball
[2] Gimbal interfaces
[3] Yaw axis motor
[4] Roll axis motor
[5] Pitch axis motor
[6] AI Control box
[7] Damping board
[8] Infrared thermal camera
[9] FHD EO camera
[10] Laser ranger
[11] TF card slot

Please ensure that there isn't any obstacle while the motor rotating.

Please remove the obstacle immediately if gimbal camera is blocked during rotation.

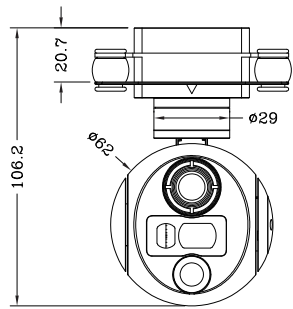
Don't put the infrared thermal camera towards the sun in case any burn to the camera.

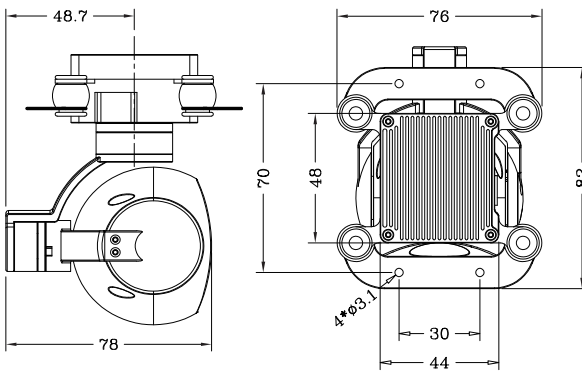
2.2 Control box silk screen



2.3 Device Dimensions

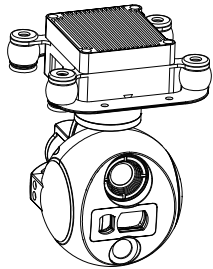
Units: mm





2.4.1 Install Damping Ball and Plates

1)Pay attention to the direction of damping plates before installation, refer to below figure.



2.4.2 Install Mounting Part

(1) Find out the arrow or A609R silk print on the gimbal which indicates the yaw heading of the payload

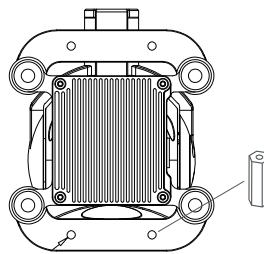
(i.e. the lens direction when the camera power on), and synchronize with the direction specified by the UxS.

(2) Fix one end of the Aluminum Cylinder on the screw hole of lower damping board, and use M3 screw to fasten it.

(3) According to the provided screw hole dimension you can make suitable mounting holes on the UxS mounting board, and fixes the other end of the Aluminum Cylinder on the mounting board of the UxS.



Straight ahead



2.5 Install TF Card

TF (Micro SD card):

Install the TF card to the card slot (Re. 2.1 Overview). Support max 256GB. Requires Class 10 (10m/s) transmission speed or higher and FAT32



Make sure device is power off when inserting the TF card, hot plugging is not supported.

2.6 Image output interface

Network output: Standard RJ45 port, supports RTSP/UDP/RTMP.
Default: RTSP, stream at rtsp://192.168.2.119:554, 720P@30fps, 2Mbps bitrate .
All parameters user-adjustable.

Analog output: not supported.



When using Viewlink for network connection, the network of external device (computer) should be the IP address: 192.168.2.2 (choose the last byte among 2~254, can not be 119 same as the gimbal), subnet mask: 255.255.255.0, Default gateway: 192.168.2.1, and all firewalls of the computer must be closed. Then enter the IP address of the gimbal camera, Open Video, the video stream can be outputted.

3. Signal Control

3.1 Serial Port / TTL Control

TTL communication requirements: TTL signal is 3.3V, baud rate: 115200, data bit 8, stop bit 1, no parity, HEX send and receive.

Connection Diagram (PC - USB to TTL Cable- Gimbal Camera as example):

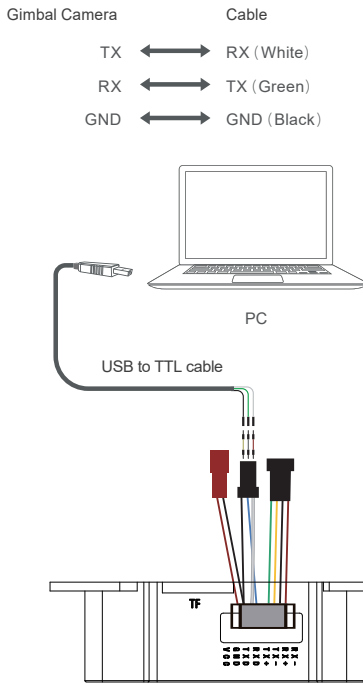


Diagram of USB to TTL Cable:

Connect the camera to the upper computer by USB to TTL cable (Adopt connection method of TX to RX, RX to TX, GNG to GND at Dupont ends of the provided USB to TTL cable, connect to the specified TTL of the gimbal, and the USB end of the cable connect to computer).

Install Viewlink control software to test the functions directly. Users may choose to develop their own software, please contact technical support for TTL control protocol file.

ViewLink is a user interface developed by Viewpro for Viewpro gimbal cameras, you can download it from Viewpro website (www.viewprotech.com) or ask distributors for installation package.



Connect serial port of gimbal to pins, DO NOT connect with power supply.

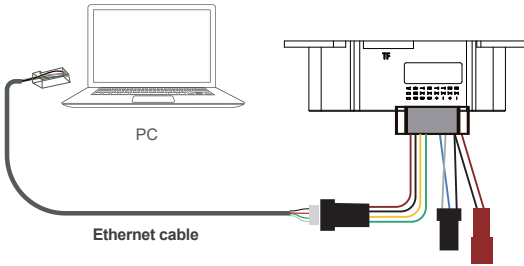


The default baud rate of serial port is 115200, which can be changed according to the docking equipment.

3.2 TCP Control

For Viewpro gimbal cameras with Ethernet output, the default IP address is: 192.168.2.119, control port: 2000. You can send the corresponding protocol to realize TCP control after connecting.

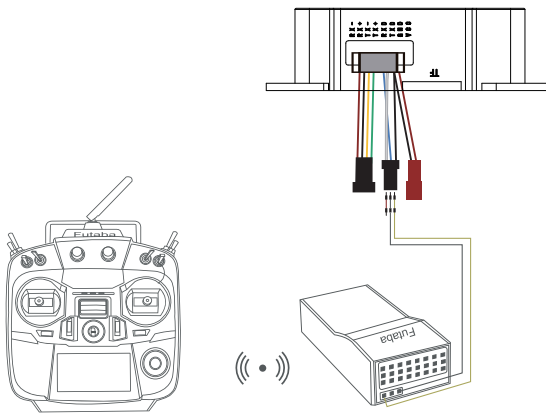
The TCP control protocol is [Frame header: EB + command ID: 90 + data body (serial port protocol) + Checksum (CS = body checksum, checksum is calculated as a sum of all bytes of data body modulo 256)]. Or directly use UI Viewlink to control after TCP connection.



3.3 S.bus Control

Using a combination of signals of the Sbus serial bus protocol to control the payload. Wiring requires connecting the external S.bus signal cable to the S.bus silk screen position of the payload, and connecting the external S.bus signal GND to the GND interface.

For example, when using the S.bus control of the Futaba RC, the pod is connected to the S.bus interface of the receiver. Connect the power supply of the remote control from other interface.Use the following wiring diagram:



Remote Controller Receiver

S.bus control mode: Sbus factory default 7-13 channel signal controls the pod function. The channel uses a three-speed switch, rocker or knob.

3.3.1 Yaw (Yaw, Joystick, rotary knob or 3-gear switch on remote control are optional. 3-gear switch as example.)



Position 1

Low Gear
Yaw Left



Position 2

Middle Gear
Yaw Stop



Position 3

High Gear
Yaw Right

3.3.2 Pitch (Pitch, Joystick, rotary knob or 3-gear switch on remote control are optional. 3-gear switch as example.)



Position 1

Low Gear
Pitch Up



Position 2

Middle Gear
Pitch Stop



Position 3

High Gear
Pitch Down

3.3.3 Mode (PWM Mode channel in to adjust speed control/one key to Home position etc functions. Rotary knob or 3-gear switch on remote control are optional. 3-gear switch as example.)



Position 1

Low Gear



Position 2

Middle Gear



Position 3

High Gear

Position 1: Low speed mode, control pitch / yaw with this mode at lowest speed
Position 2: Middle speed mode, control pitch / yaw with this mode at middle speed
Position 3: High speed mode, control pitch / yaw with this mode at highest speed
(If it is controlled by rotary knob, the speed will change according to switch position)

Function of continuous switching:

1. Operate 1 time continuously and quickly, from position 2 - 3, to Home position.

2. Operate 2 times continuously and quickly, from position 2 - 3 - 2 - 3, the camera lens looks vertically down.

3. Operate 3 times continuously and quickly, from position 2 - 3 - 2 - 3 - 2 - 3, to disable Follow Yaw Mode (gimbal yaw not follows by frame)

4. Operate 4 times continuously and quickly, from position 2 - 3 - 2 - 3 - 2 - 3 - 2 - 3, to enable Follow Yaw Mode (gimbal yaw follows by frame)

3.3.4 Zoom (zoom , rotary knob and 3-gear switch on remote control. Take 3-gear switch as an example.)



Position 1

Low Gear
PIP switch



Position 2

Middle Gear
Gear



Position 3

High Gear
IR color palette switch

3.3.5 Focus (Focus channel is to control PIP, IR color palette switch, 3-gear switch as example.)



Position 1
Low Gear



Position 2
Middle Gear



Position 3
High Gear

Switch from Position 2 to 1: turn to Picture in Picture mode and four display mode (IR、IR+EO、EO、EO+IR) switch cyclically.
Switch from Position 2 to 3: Three types of IR color (black hot, white hot, pseudo color)switch cyclically.

3.3.6 Pic/Rec (IR digital zoom / tracking control, rotary knob or 3-gear switch on remote control are optional. 3-gear switch as example)



Position 1
Low Gear



Position 2
Middle Gear



Position 3
High Gear

Switch from Position 2 to 1 to take a picture.
OSD display “IMG PHOTOING” at the left top corner and the picture is stored in TF card.

Switch from Position 2 to 3 to start “ Record ” , and repeat the operation to stop recording.
During recording, OSD display information of “REC 00 00 00”, as current recording time, and the remaining capacity of TF card. It will show the “TFXXXMB” when stop recording. When the storage capacity of TF card is full , “TF FULL” is shown on screen. If no TF card is inserted, “ NO TF” is shown on screen. Please insert the TF card before using.

3.3.7 Multi (Connect Multi Backup channel to control digital zoom and tracking by 3-gear switch on the remote control. Take 3-gear switch as an example)



Position 1

Low Gear



Position 2

Middle Gear



Position 3

High Gear

Switch from Position 2 to 1: Thermal imager digital zoom, 1X,2X, 3X, 4X.
Switch from Position 2 to 3: Display the tracking box at the center of screen, start tracking.
Switch from Position 3 to 2: Cancel tracking.



- User can set the channels by setting serial command according to the actual requirement. The S.Bus channel position can be arranged in any sequence within channel 7-13 to connect with the flight controller or remote control.

- TTL control and S.bus control cannot coexist at the same time for standard version. The defualt control is TTL if no requirement. The user can set to S.bus control if needed (please contact with our technical support for the setting instruction.)

3.4 Laser Rangefinder

A609R build-in infrared (IR) laser rangefinder (LRF). The target is the object in the center point of the screen.



1. The LRF of A609R is default turned off to prolong life-span, can open It and choose ranging frequency in Viewlink main interface -LRF section manually.

2.If you don't use Viewlink, you can send below serial port commands to set the laser rangefinder working methods:

- Single Use: 55 AA DC 05 1C 20 00 39
- Continuous ranging: 55 AA DC 05 1C 40 00 59
- Turn off again: 55 AA DC 05 1C A0 00 B9

3. Some cases might cause the distance show 0:

A. The distance is out of range

B. Target is too small to be ranged within the valid distance

C. The IR laser rangefinder can't get distance information from reflective objects (glass, water, rain) or over-inclined objects.

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4. Specifications

Overall Specifications	
N.W.	232g
Product meas.	78*62*106.2mm
Input voltage	14.8V~25.2V
Dynamic current	530~1000mA @ 16V
Power consumption	Average 8.5W, Max 16W
Working environment temp.	-20℃ ~ +50℃
IP rate	IP4X
Output	IP (RTSP/UDP 720p/1080p 30fps H264/H265)
Storage	TF card (Up to 256G,class 10, FAT32)
Picture in TF Card	JPG(1920*1080)
Video in TF Card	MP4(1080P@30fps)
Control method	TTL or S.BUS (choose one of them, and TTL by default), and TCP/UDP
Gimbal Spec	
Mechanical Range	Pitch/Tilt: -45°(Up)～130°(Down), Roll: ±60°, Yaw/Pan: ±150°
Controllable Range	Pitch/Tilt: -40°～125°, Yaw/Pan: ±145°
Vibration angle	Pitch/Roll/Yaw: ±0.02°
One-key to center	√
EO Camera Spec	
Imager Sensor	1/2.9" CMOS Sensor
Image pixel	2MP
Picture quality	Full HD 1080 (1920*1080)
Focus Length	6mm
Digital zoom	1x~12x

Field of View (D,H,V)	FOV：D 60° H 50° V 28°
IR Thermal Imager Spec	
Focus Length	9.1mm
Horizontal FOV	48.3°
Vertical FOV	38.6°
Diagonal FOV	62.4°
Detective Distance (Man: 1.8x0.5m)	379 meters
Recognize Distance (Man: 1.8x0.5m)	95 meters
Identification Distance (Man: 1.8x0.5m)	47 meters
Detective Distance (Car: 4.2x1.8m)	1163 meters
Recognize Distance (Car: 4.2x1.8m)	291 meters
Identification Distance (Car: 4.2x1.8m)	145 meters
Working mode	Uncooled VOxlong wave (8μm~14μm) thermal imager
Detector pixel	640*512
Pixel size	12μm
Digital zoom	1x~8x
Focusing method	Athermal prime lens
NETD	≤40mK (@25℃,@F1.0)
Color palette	White hot,black hot,Iron red
Radiometric function(Optional)	Support full-screen temperature data output
	Optional range（-20℃~+150℃, +100℃~+550℃）±2℃ or ± 2% of the reading (whichever is greater).

Camera Object Tracking	
Update rate of deviation pixel	30Hz
Output delay of deviation pixel	<30ms
Minimum object contrast	5%
SNR	4
Minimum object size	16*16 pixel
Maximum object size	256*256 pixel
Tracking speed	±48 pixel/frame
Object memory time	100 frames
Camera AI Performance	
Targets type	Car and human
Simultaneous detection quantity	≥ 10 targets
Min contrast ratio	5%
Min target size	5×5 pixel
Car detection rate	≥85%
False alarm rate	≤10%
Laser Rangefinder	
Range	5~1200 meters
Accuracy	1m
Light Beam	905nm pulse laser
Divergent Angle	~6 mrad
Laser pulse frequency	1~4Hz
Rangefinder	Measure the distance between the object at the center of screen and the laser rangefinder

5. FAQ

Q1. Does A609R support taking photos during video recording?

A: Yes

Q2.How many types of video output does A609R support?

A: Ethernet output only

Q3.Does A609R support 360 degrees limitless rotation?

A: It doesn't support, controllable angle ±140°

Q4. Forgot the camera IP after changing it?

To restore the default IP (192.168.2.119):

1) Format a TF card to FAT32. (If it is already FAT32, formatting is not necessary.)

2) Copy the file ip_bak.txt to the root directory of the TF card.

3) Power on the gimbal and wait for 3 minutes, the IP address will automatically reset to 192.168.2.119.

4) Power off the gimbal.

5) Confirm that the file ip_bak.txt is disappeared from the card — this means the reset was successful.

6) Insert the card back and power on. The IP should now be restored to 192.168.2.119.