FOXTECH Seeker-40 TIR Dual-Sensor AI Tracking Camera User Manual

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User Manual
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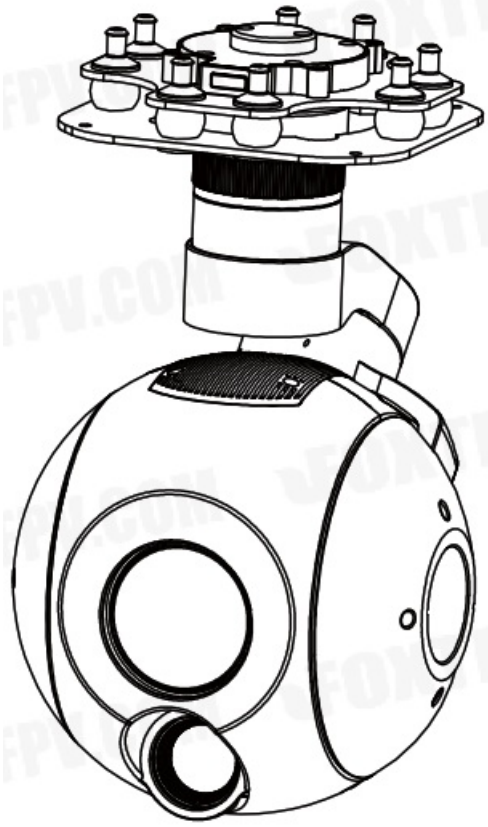


Description

Disclaimer

Thank you for purchasing this product. you can log in to the website for the latest product information, technical support and user manual. It is recommended that you download and use the latest version of the user manual. This manual is subject to change without notice.

You can also get product usage information or technical support through official customer service. Due to different production batches, the appearance or function parameters are slightly different and will not affect the normal use of the product.

Please read this statement carefully before using. Once used, it is deemed to be an endorsement and acceptance of the entire contents of this statement. Please read the instruction manual carefully and strictly follow the instructions in this manual to use this product. Foxtech will not be liable for any result or loss caused by improper use, installation, assembly or modification of users.

Intellectual Property

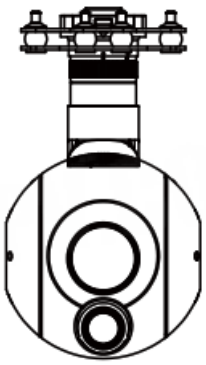
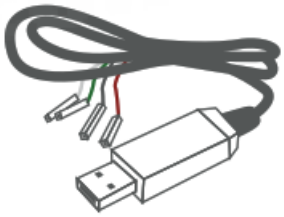
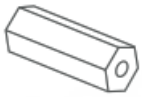
Contents

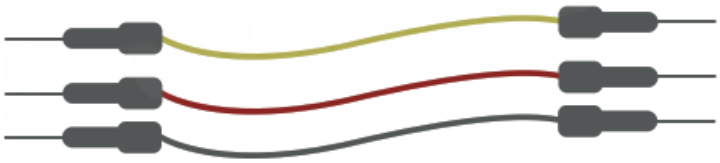
Product Introduction

1.1 Introduction

Seeker-40 is a 3-axis high-precision gimbal with 40x optical zoom SONY RGB camera, it integrated with 40x optical zoom EO sensor and with a 19mm lens 640*512 IR thermal sensor. It supports IR thermal and EO PIP switch, IR color palette switch, photographing and video, target tracking, thermal digital zoom and AI detect vehicles and people. When the external GPS and time input, GPS coordinate and shooting time can be saved in image file, OSD can display GPS and real-time as well. It features aluminum alloy housing and anti-interference. The 3 axis gimbal can achieve stabilization in yaw, roll and pitch. The integrated design of damping system and gimbal can greatly reduce mechanical vibration. Seeker-40 is widely used in UAV industries of public security, electric power, fire fighting, zoom aerial photography and other industrial applications.

1.2 In the Box

Gimbal Camera x 1 pc		USB to TTL Cable x 1 pc	
Copper Cylinder x 4 pcs		M3 Screw x 8 pcs	
Power Cable x 1 pc			
PWM Control Cable x 1 pc			
TTL / S.BUS Control Cable x 1 pc			

TTL Connect Cable x 3 pcs	
Ethernet Cable x 1 pc	

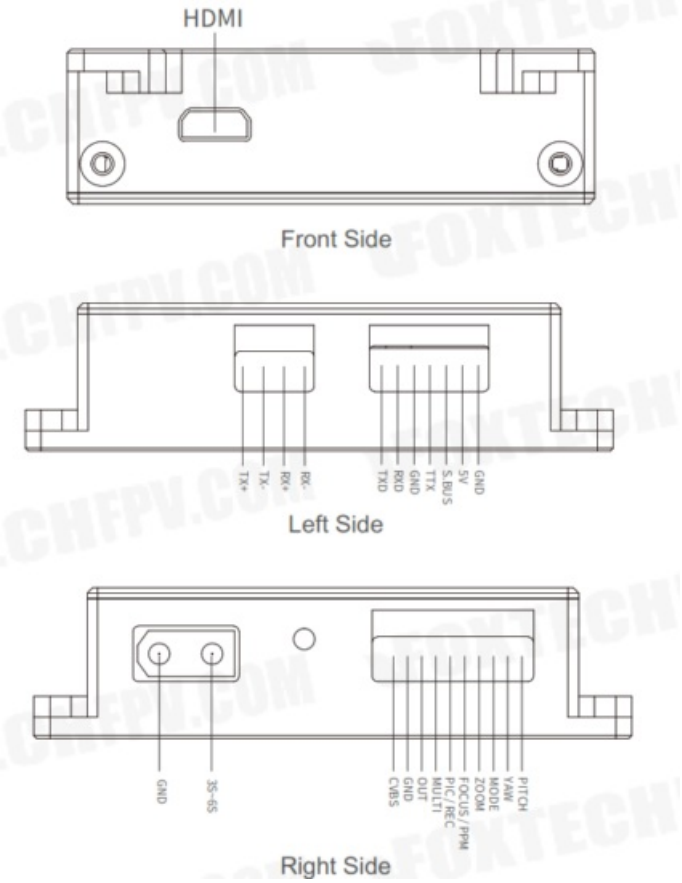
Installation Instruction

2.1 Overview

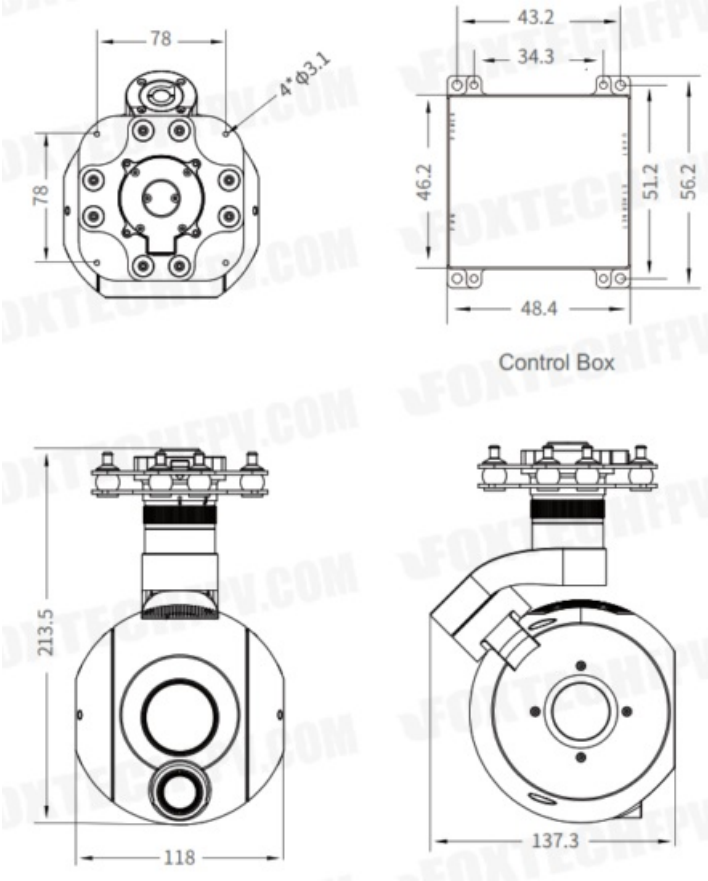
1 Quick-mount unlock button 2 Upper damping board 3 Lower damping board 4 Damping ball 5 Yaw axis motor 6 TF card slot 7 Roll axis motor	8 FHD zoom camera 9 Pitch axis motor 10 Infrared thermal camera 11 3-6S power interface 12 Micro HDMI interface 13 Ethernet interface

- 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 Printing



2.3 Device Dimensions
Unit: mm

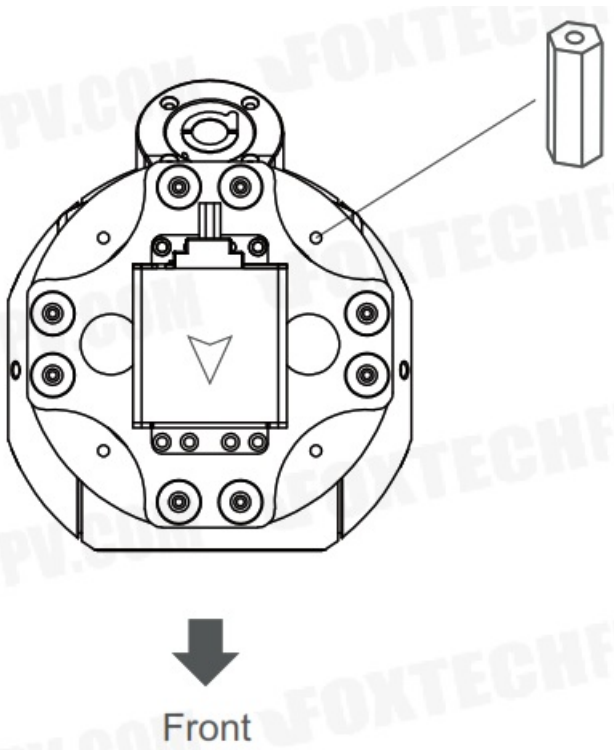


2.4 Install Mounting Part

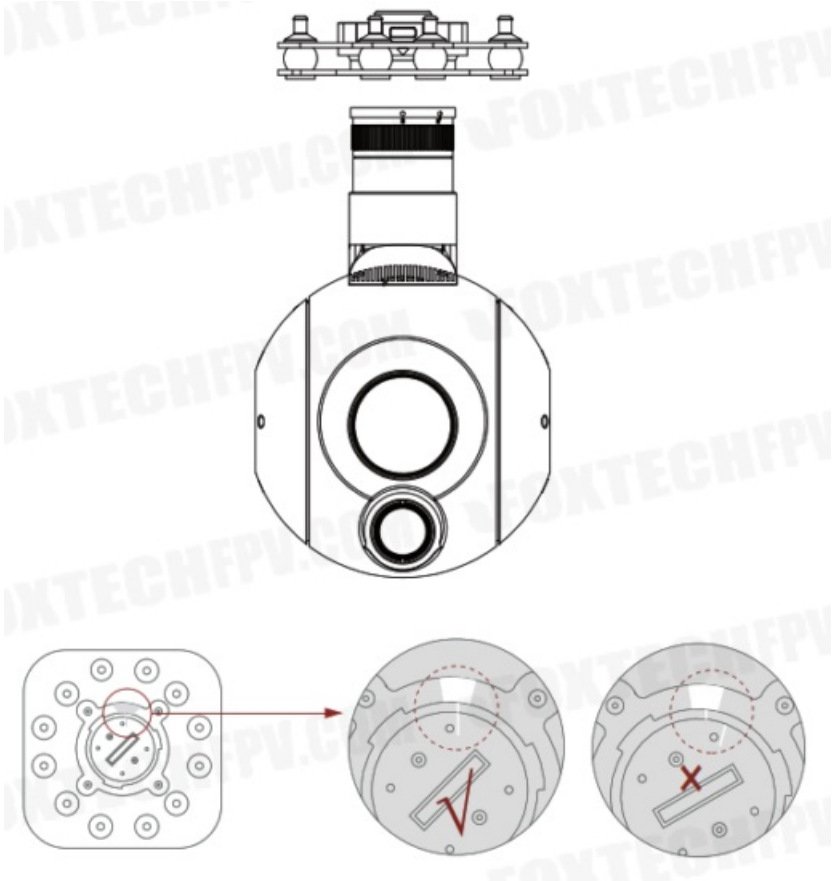
1. Find out the arrow on the gimbal which indicating the yaw heading of the payload (i.e. the lens direction when

the camera power on), and synchronize with the direction specified by the UAV.

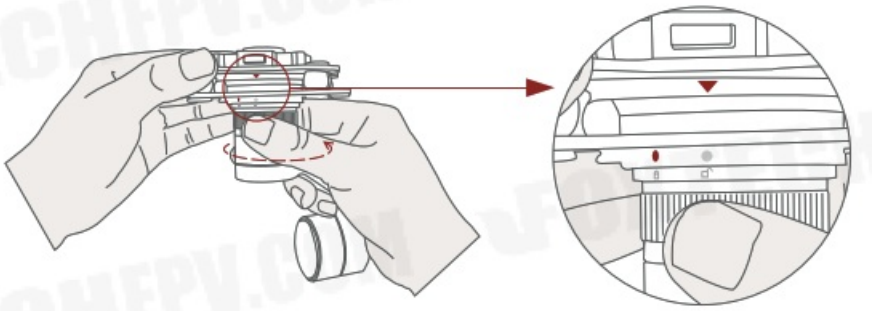
2. Fix one end of the copper cylinder on the screw hole of lower damping board, and use M3 screw to fasten it.
3. According to the provided screw hole dimension you can make suitable mounting holes on the UAV mounting board, and fixes the other end of the copper cylinder on the mounting board of the UAV.



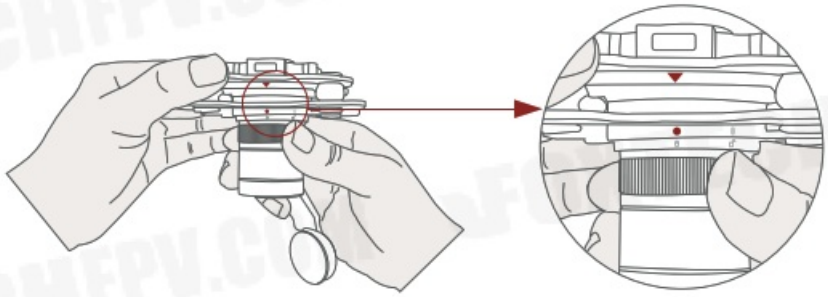
2.5 Release Instruction



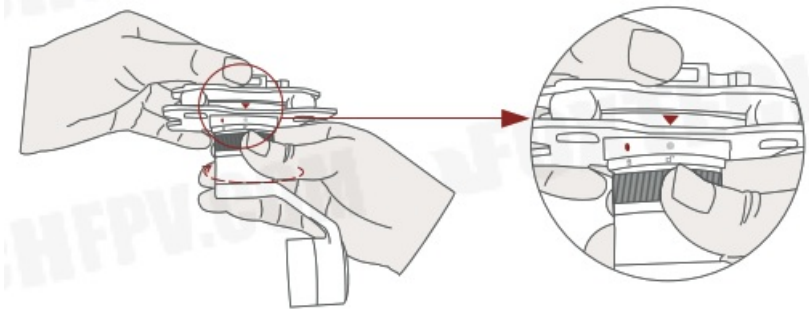
1. Make sure the two white stripes indicated in above picture are aligned with each other. (If the stripes are not aligned to each other, please pinch the connector part and turn it to left manually)|



2. Align the white dot (unlock icon) to the red triangle (below unloc button), push the gimbal into the plate completely and then rotate the gimbal camera anticlockwise.



3. When you hear “click” sound (when red dot is aligned to the red triangle) means the gimbal camera and the plate has been locked.



4. To unlock the Viewport, you need to press on unlock button and rotate the gimbal camera clockwise till the white dot align to the red triangle. Then pull the gimbal out from the Viewport.

2.6 Install TF Card

TF (Micro SD card): Install the TF card to the card slot (Re. 2.1 Overview). Support max 128GB. Request Class 10 (10m/s) transmission speed or higher and FAT32 or ex FAT format.

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

2.7 Image Output Interface

HDMI: Micro HDMI output, HD 1080P 60/30fps, 1080P 60fps as default.
(Optional)
Ethernet: Ethernet/IP output interface, support RTSP/RTMP/UD-P/ONVIF video streaming. Default: RTSP output, IP address: RTSP: //192.168.2.119:554, output resolution: 1080P, frame rate: 30fps, bit rate: 4M. (Optional) SDI: SMA outer screw inner hole interface, 1080P 30fps output. (Optional)
AV: no AV output

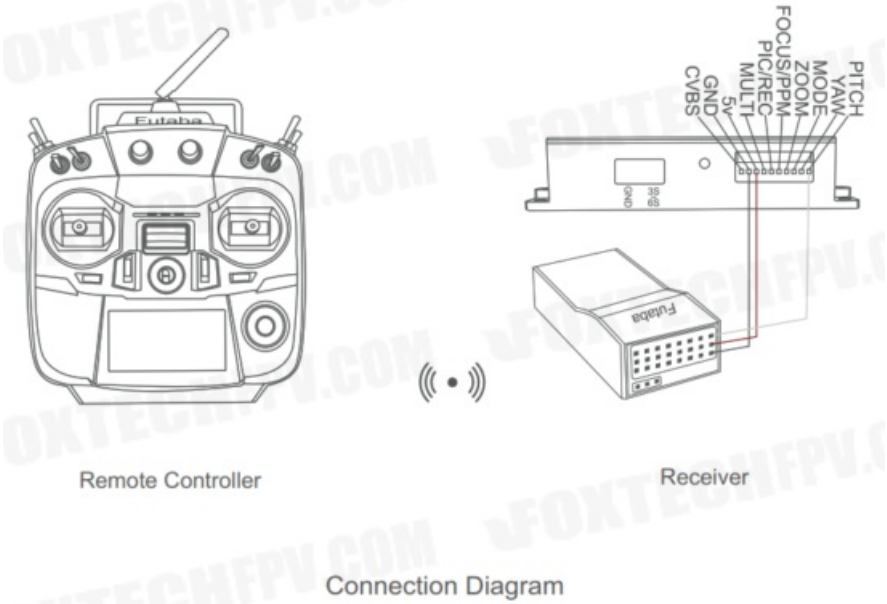
- Above output mode is optional. Please subject to your actual product.
- When using user interface software Viewlink for network connection, the network of external device (computer) should be the IP address: 192.168.2.2 (choose the last byte among 2~254, can not be 119 same as the gimbal), subnet mask: 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.

Signal Control

3.1 PWM Control

Control the gimbal camera functions by the multiplex pulse width modulation signal outputted by PWM channel of the remote control receiver. The camera needs up to 6 control channels of PWM (to expand tracking function use up to 7 PWM channels). You can choose needed functions according to actual usage to reduce the required number of PWM channels.

3.1.1 PWM Connection Diagram (Connect pitch channel as example)



Connection Diagram

3.1.2 PWM Control Operation Instruction

1. Pitch (PWM Pitch channel in to control Pitch. Joystick, rotary knob or 3-gear switch on remote control are optional. 3-gear switch as example.)

2. Yaw (PWM Yaw channel in to control Yaw. Joystick, rotary knob or 3gear switch on remote control are optional. 3-gear switch example.)

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. 3gear switch as example.)

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:

3.1) Operate 1 time continuously and quickly, from position 2 – 3, to Home position.
3.2) Operate 2 times continuously and quickly, from position 2 – 3 – 2 – 3, the camera lens looks vertically down
3.3) 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)
3.4) 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)
5) Zoom (PWM Zoom channel in to control Zoom. Joystick, rotary knob or 3gear switch on remote control are optional. 3-gear switch as example.)

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

Switch from Position 2 to 1: Picture in Picture. EO+IR , IR+EO, EO only, IR only.

Switch from Position 2 to 3: IR color-switching: white-hot, black hot, pseudo color
7) Pic/Rec (PWM Pic/Rec channel in to control take pictures and record.
Joystick, rotary knob or 3-gear switch on the remote control are optional. 3-gear switch as example.)

Switch from Position 2 to 1: Take a picture

- OSD display ‘REC IMG’ a second.

Switch from Position 2 to 3: Start record / repeat operation to stop record

- Start record, the OSD display rec hh:mm:ss.
- Stop record, the OSD display STBY.

8) Multi: IR digital zoom / tracking control

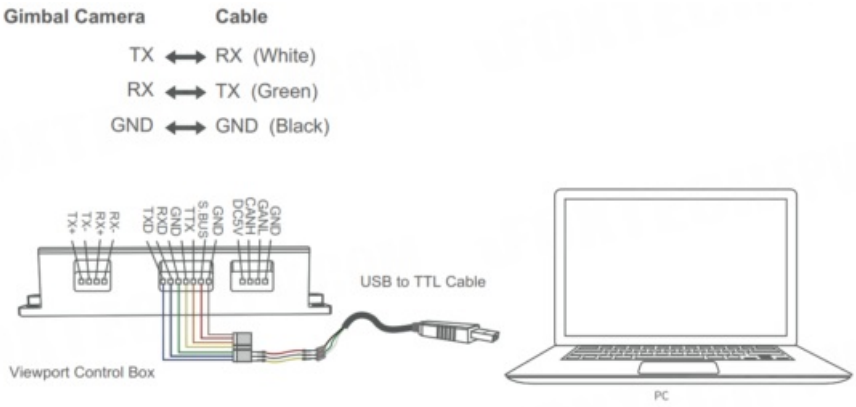
Switch from Position 2 to 1: IR digital zoom, 1x~4x Switch from Position 2 to 3:

- Exit the tracking, display the cross cursor. Adjust the cross cursor to lock target object and start tracking

Switch from Position 3 to 2:

- Cancel tracking

3.2 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):



Connection Diagram Viewport Version

Diagram of USB to TTL Cable:

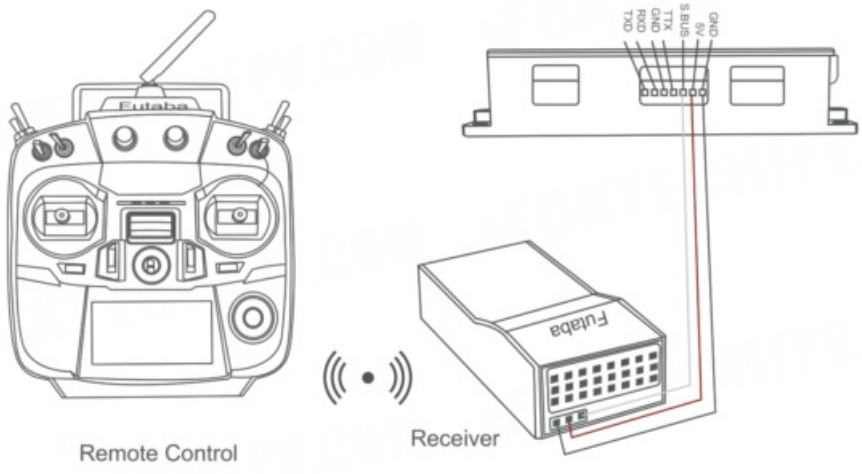
Connect the camera to the upper computer by USB to TTL cable (Adopt connection method of TX to RX, RX to TX, GNG to GND at Dupont ends of the provided USB to TTL cable, connect to the specified TTL of the gimbal, and the USB end of the cable connect to computer).

Install the Seeker-40 software to test the functions directly. Users may choose to develop their own software, please contact technical support for TTL control protocol file.

- 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.

3.3 S.BUS Control

Control the gimbal camera functions by one combining signals. Connect the external S.Bus to S.Bus port on the control box, and the external S.bus signal GND connect to the GND interface of the control box. Wiring Diagram (Take Futaba remote control for example):



Wiring Diagram

S.Bus control mode: default S.Bus signal channel 9-15 to control gimbal camera functions (the function of channel is consistent with corresponding channel in PWM function description)

Channel 9: Yaw Control

Channel 10: Pitch Control

Channel 11: Mode Control

Channel 12: Zoom Control

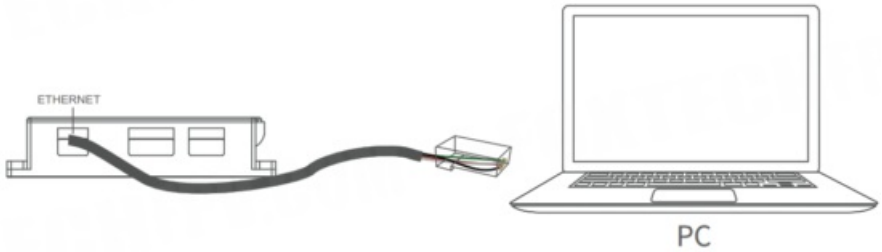
Channel 13: Focus Control

Channel 14: Pic/Rec Control
Channel 15: Multi Backup

- ⚠ User can set the channels by setting serial commands according to the actual requirement. The S.Bus channel position can be arranged in any sequence within channel 1-15 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 TCP control

For Seeker-40 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 Seeker-40 software to control with TCP connection.



Wiring Diagram

Specification

Hardware Parameter	
Working voltage	12V
Input voltage	3S – 6S
Output voltage	5V (connect with PWM)
Dynamic current	1350-1600mA @ 12V
Idle current	1350mA @ 12V

Working environment temp	-20 C – +60 C
Output	micro FIDMI(1080P 30/60fps) / IP (1080p/720p 30/60fps)
Local-storage	SD card (Up to 128G,class 10, FAT32 or ex FAT format)
Control method	PWM / TTL / S.BUS/ TCP(IP output version)
Gimbal Spec	
Mechanical Range	Pitch/Tilt: -55° – 130°, Roll: ±45°, Yawl Pan: ±300° / ±360°*N (IP / SDI output version)
Controllable Range	Pitch/Tilt: -45° – 90°, Yaw/Pan: ±290° / ±360°*N (IP / SDI output version)
Vibration Angle	Pitch/Roll: ±0.02°, Yaw: ±0.02°

One-key to center	√
Camera spec	
Imager Sensor	112.8′ Sony IMX462LOR CMOS Sensor
Picture quality	Full HD 1080 (1920’1080)
Effective pixel	2.13MP

Photo storage format	JPG(1920’1080 / 1280’720)
Video storage format	MP4 (1080P1720P 25fps/30fps)
Lens optical zoom	40x, F=4.25-170mm
Digital zoom	Off / MAX x2 – x32
Min object distance	0.1 / 1.5 / 3.0 / 5.0 / 10.0 m
Angle of View (D, H, V)	Wide: 73.80° / 6635° / 9.98°Tele: 2.16′ / 1.90° / 1.11°
AF Mode	Auto / One Push I Manual
Iris	Close – F1.6
Shutter speed	1/1 – 1130,000 sec
Sync system	Internal
S/N ratio	more than 50dB
Min illumination	Color(1/30s, 79.5dB) : 0.01 lux , BW(1130s. 79.5dB) : 0.002 lux Color DSS(1/1s. 79.5dB) : 0.001 lux , BW DSS(vis. 79.5dB) : 0.0002 lux

Exposure control	Auto / Iris. Priority / Shut. PiKAily / Manual

Gain Control(AGC)	0 – 10 steps
White balance	Auto / One Push / Manual / Indoor / Outdoor
Back Light	Off / BLC / HLC / WDR
Defog	Off / Manual / Auto
OSD	Yes
IR Thermal Imager Spec	
Lens size	19mm
Coating Film	DLC
Horizontal FOV	22.9°
Vertical FOV	18.4°
Diagonal FOV	29.0°
Recognize Distance (Man: 1.8 ×0.5m)	792 meters
Verified Distance (Man: 1.8×0.5m)	198 meters

Detective Distance (Car: 4.2×1.8m)	99 meters
Recognize Distance (Car: 4.2×1.8m)	2428 meters
Recognize Distance (Car: 4.2×1.8m)	607 meters
Verified Distance (Car: 4.2×1.8 m)	303 meters

Working mode	Uncooled long wave (8pm-14pm) thermal imager
Detector pixel	640’512
Pixel size	12pm
Focusing method	Athermal prime lens
NETD	≤560mK (@25 C)
Color palette	White. iron red, pseudo color
Digital zoom	lx – 8x
Sync correct time	Yes
EO /IR Camera Object Tracking 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	-32 pixel/frame
Object memory time	100 frames
EO Camera AI Recognition Performance	

Targets type	Car and human
Simultaneous detection quantity	z 10 targets
Min contrast ratio	5%
Min target size	5×5 pixel
Car detection rate	z85%
False alarm rate	s10%
Packing Information	
N.W.	1212g
Product meas.	118’137.3’213.5mm
Accessories	1pc gimbal camera device. screws, copper cylinders. damping balls, dam ping boards/ Hight quality plastic box with foam cushion
G.W.	2457g
Package meas.	360’300’250mm

FAQ

1. What outputs does HDMI have

   A: HDMI 1080P 60fps(default)/HDMI 1080P 30fps

2. Doe A40T support taking photos during recording?

   A: Yes

3. How to set the video storage format o A40T?

   A: When the IP output resolution is set to 1280*720, the storage resolution is 1920*1080; Storage resolution is 1920*1080 when the IP output resolution is set to 1920*1080; The video frame rate saved in the TF card is the same with the one set during IP output, 30fps and 60fps are optional.

This content is subject to change.
Download the latest version from
https://www.foxtechfpv.com/seeker-40-tir-dual-sensor-ai-tracking-camera.html
For everyday updates, please follow Foxtech facebook page"Foxtechhobby".

Documents / Resources

	FOXTECH Seeker-40 TIR Dual-Sensor AI Tracking Camera [pdf] User Manual Seeker-40, TIR Dual-Sensor AI Tracking Camera

References

- Seeker-40 TIR EO/IR Quick-mount 3-axis High-precision AI Tracking Gimgal Camera for Inspection and Survey