VIEWPRO

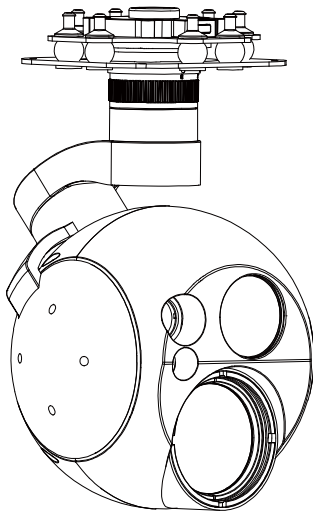## A30TR-50M
AI 30x EO + IR Dual-Sensor Laser Rangefinder Object Tracking Gimbal Camera

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, as which may cause the camera does not 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 no limited to, those set forth in the manual.

Legends

Warning   Important Note

Precautions

1. Please keep the camera in a dry environment to avoid fogging of the lens due to excessive humidity. If the lens is foggy, turn it on for a while and wait for the fog to dissipate.

2. The camera uses an infrared thermal imaging lens, please do not aim 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 the camera will be burned and irreversible damage will be caused.

3. When cleaning the camera lens, be sure to use a soft and dry cleaning cloth to wipe the lens surface.

4. Do not touch the coating on the surface of the infrared lens directly with your hands or with hard objects, otherwise the coating will be damaged and the image will be blurred.

5. Do not plug or unplug the TF card when power on; after plugging and unplugging the TF card, please make sure that the TF rubber plug is tightly covered to prevent the power-on self-check from failing.

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

7. The pin insertion interface of control box cannot be connected with power supply in case the control board will be burned.
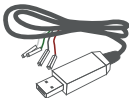
1. Product Introduction
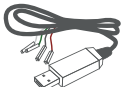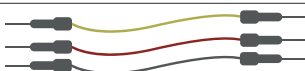
1.1 Introduction

A30TR-50M is a 3-axis triple-sensor AI gimbal camera for long range inspection and surveillance. It's powered by 30x optical zoom SONY RGB camera, 50mm 640*512 12 μm IR thermal sensor and 5km IR laser rangefinder(LRF).

A30TR-50M integrates powerful AI function, supports car and human auto detection and stable tracking. The simultaneous detection quantity of objects is more than 10. The RGB camera will perform auto-zoom to the ideal focal length for stable tracking while tracking a moving target continuously.

The precise LRF supports to measure the distance of targets within 5km (depends on environment and target size). Input real-time GPS data, the camera can calculate the target GPS coordinates and fulfill Geo-tagging function which will imbed the GPS coordinates and time of photographing location in the pictures.

1.2 In the Box

A. Standard Version			
Gimbal Camera X 1 pc		USB to TTL Cable x1pc	
Aluminum Cylinder x 4 pcs		M3 Screw x 8 pcs	
Power Cable x 1 pc			
B. Viewport Version			
Gimbal Camera X 1 pc		USB to TTL Cable x1pc	
Aluminum 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			

2.Installation Instruction

2.1 Overview

[1]
[2]
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[7]
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[10]
[11]

[15]

Viewport

[12]
[13]
[14]

GND
3V OUT
S.BUS IN/UART2_RX
UART2_RX
GND
UART1_RX
UART1_TX

POWER
UART
ETHERNET

R X +
R X -
T X +
T X -

SW
CVBS
GND
5VOUT
MULTI
PIC/REC
FOCUS/PPM
ZOOM
MODE
YAW
PITCH

PWM

Z-8D

HDMI
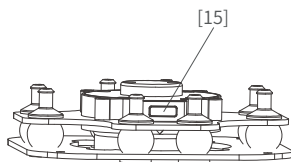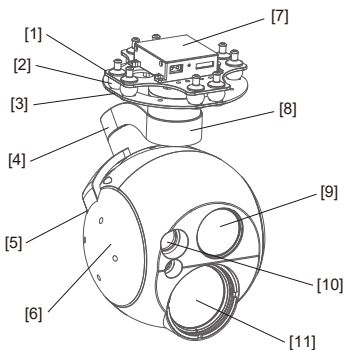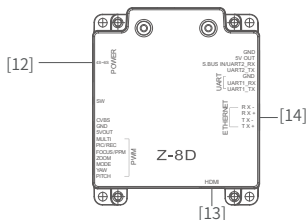
Control Box

[1] Upper damping board
[2] Damping ball
[3] Lower damping board
[4] Roll axis motor
[5] TF card slot
[6] Pitch axis motor
[7] Control box
[8] Yaw axis motor

[9] FHD zoom camera
[10] Laser rangefinder
[11] Infrared thermal camera
[12] 4S-6S power interface
[13] Micro HDMI interface
[14] Ethernet interface
[15] Viewport unlock button

- 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 use laser ranging against glass within 5meters.

- Don't put the infrared thermal camera towards the sun, magma, laser, etc. in case any burn to the camera.

2.2 Control Box Printing (Standard Version)

Front Side

HDMI

Left Side

SW

4S 6S

C V B S
G N D
5 V
M U L T I
PIC / REC
FOCUS/PWM
Z O O M
M O D E
Y A W
PITCH

Right Side

T X +
T X -
R X +
R X -

T X D
R X D
G N D
T T X
S.BUS
5 V
G N D
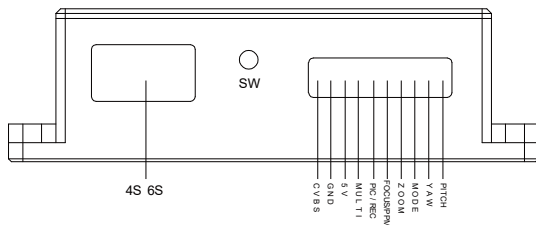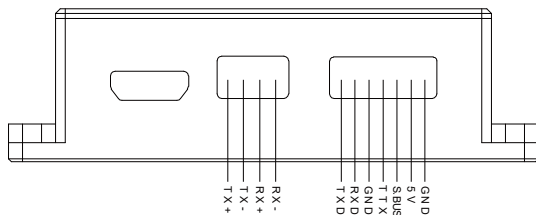
- The input voltage cannot be higher than 6S.
- The pin insertion interface cannot be connected with power supply.
- The yellow jumper cap cannot be removed

2.2.2 Control Box Printing (Viewport Version)

Front Side

HDMI

Left Side

4S~6S

PITCH
YAW
MODE
ZOOM
FOCUS/PPM
PIC/REC
MULTI
5V OUT
GND
CVBS

SW

Right Side

T X +
R X +
T X -
R X -

UART1-TX
UART1-RX
GND
UART2-TX
S.BUS IN/UART2-RX
5V OUT
GND
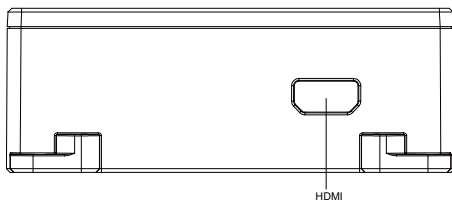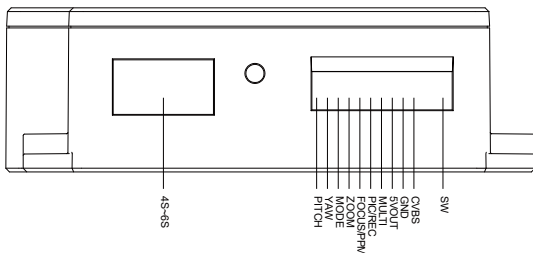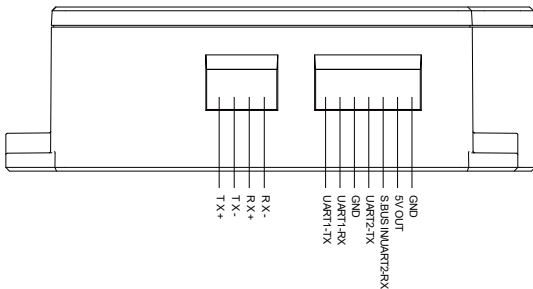
2.3 Device Dimensions (Standard Version)

Unit: mm
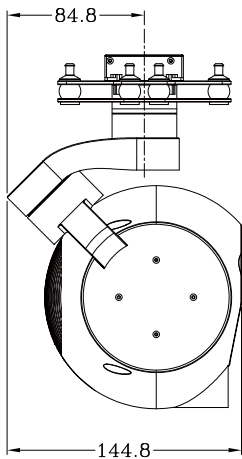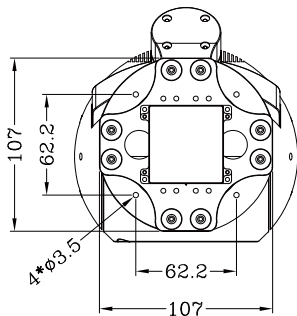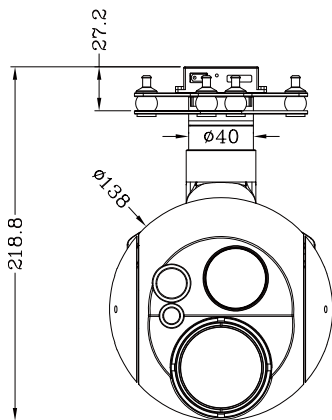
2.3 Device Dimensions (Viewport Version)

Unit: mm

Control Box
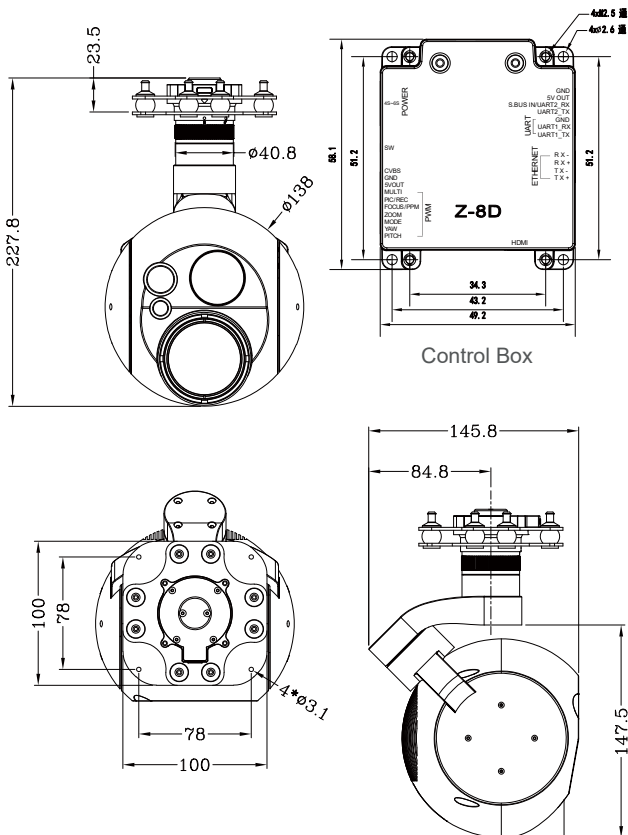
2.4 Install Mounting Part

(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 (Viewport version is the same).
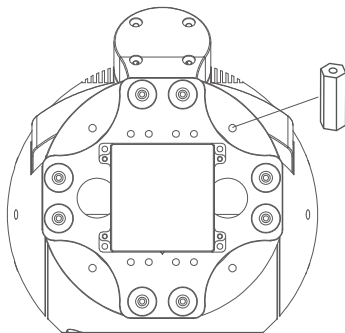
Front

2.5 Viewport Release Instruction
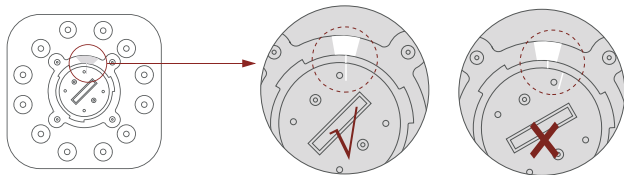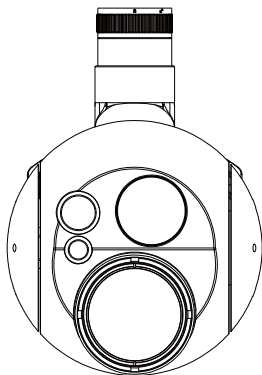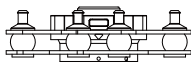
1. Make sure the two white stripes indicated in above picture are aligned with each other. (If the stripes are not aligned to each other, please pinch the connector part and turn it to left manually)
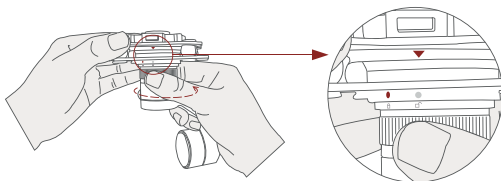
2. Align the white dot (unlock icon) to the red triangle (below unlock button), push the gimbal into the Viewport completely and then rotate the gimbal camera anticlockwise.
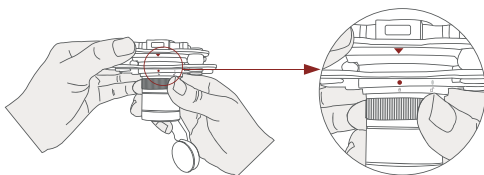
3. When you hear "click" sound (when red dot is aligned to the red triangle) means the gimbal camera and Viewport has been locked.
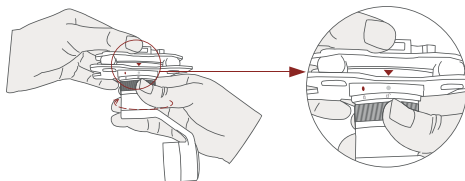
4. To unlock the Viewport, you need to press on unlock button and rotate the gimbal camera clockwise till the white dot align to the red triangle. Then pull the gimbal out from the Viewport.

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 exFAT format.

⚠ ● Make sure 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/UDP/ONVIF video streaming. Default: RTSP output, IP address: RTSP: //192.168.2.119:554, output resolution: 1080P, frame rate: 30fps, bit rate: 4M. (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.

3. 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 an example)

Remote Controller   Receiver
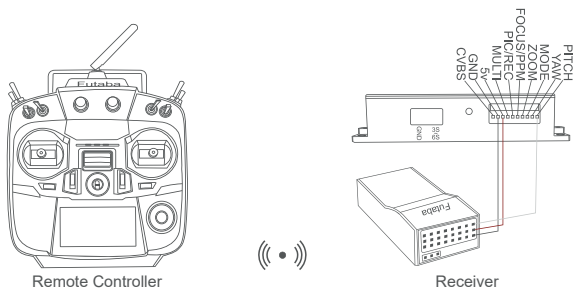
Connection Diagram

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.)

Position 1
Low Gear
Pitch Up

Position 2
Middle Gear
Pitch Stop

Position 3
High Gear
Pitch Down

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

Position 1	**Position 2**	**Position 3**
Low Gear	Middle Gear	High Gear
Yaw Left	Yaw Stop	Yaw Right

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** | **Position 2** | **Position 3** |
| Low Gear | Middle Gear | 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)

4) Function of continuous switching:

4-1) Operate 1 time continuously and quickly, from position 2 - 3, to Home position.

4-2) Operate 2 times continuously and quickly, from position 2 - 3 - 2 - 3, the camera lens looks vertically down.

4-3) 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)

4-4) 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 3-gear switch on remote control are optional. 3-gear switch as example.)

Position 1	**Position 2**	**Position 3**
Low Gear	Middle Gear	High Gear
Zoom Out	Stop Zoom	Zoom In

6) Focus (not functional for this channel)

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

Position 1	**Position 2**	**Position 3**
Low Gear	Middle	High Gear
PIP switch	Gear	IR color palette switch

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 picture and record. Joystick, rotary knob or 3-gear switch on remote control are optional. 3-gear switch as example.)

| **Position 1** | **Position 2** | **Position 3** |
| Low Gear | Middle Gear | High Gear |

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: tracking control

| **Position 1** | **Position 2** | **Position 3** |
| Low Gear | Middle Gear | High Gear |

Switch from Position 2 to 1: (Reserved)

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):

Gimbal Camera   **Cable**

TX ⟷ RX (White)

RX ⟷ TX (Green)

GND ⟷ GND (Black)

Control Box

USB to TTL Cable

PC

Connection Diagram
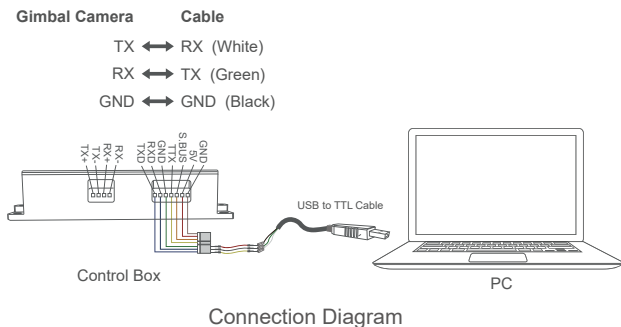
Diagram of USB to TTL Cable:

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.

3.3 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):

Remote Control

Receiver
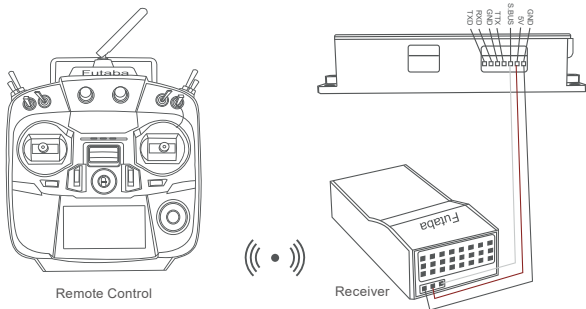
Wiring Diagram

S.Bus control mode: default S.Bus signal channel 7-13 to control gimbal camera functions (the function of channel is consistent with the corresponding channel in PWM function description)

Channel 7: Yaw Control
Channel 8: Pitch Control
Channel 9: Mode Control
Channel 10: Zoom Control
Channel 11: Focus Control
Channel 12: Pic/Rec Control
Channel 13: Multi Backup

⚠

● 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 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 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.

PC
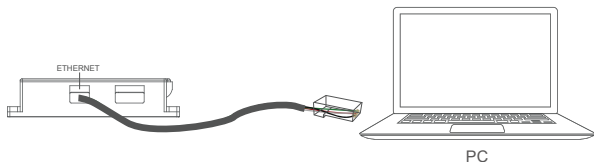
Ethernet wiring diagram

3.5 Laser Rangefinder

A30TR-50M build-in infrared (IR) laser rangefinder (LRF), can calculate the target distance and resolve the GPS coordinate of the object automatically after GPS signal is synced from the UAV. The target is the object in the center point of the screen. The measuring capacity is up to 5km for buildings in high visible weather and good weather.

1. The LRF of A30TR-50M 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:

- Continuous ranging: AA 55 0D 01 FF
- Single Use: 55 AA DC 05 1C 20 00 39
- Turn off again: AA 55 0D 00 FF

3. Some cases might cause the distance show 0:

A. The distance is out of range (5 to 5000 meters)

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.

4.Specification

Hardware Parameter	
Working voltage	16V
Input voltage	4S ~ 6S (14.8V~25.2V)
Output voltage	5V (connect with PWM)
Dynamic current	660~1250mA @ 16V
Power consumption	Average 10.6W, Max 20W
Working environment temp.	-20℃ ~ +50℃
Output	Micro HDMI(1080P 30fps/60fps) / IP (RTSP/UDP 720p/1080p 30fps H264/H265)
Local-storage	TF card (Up to 256G, class 10, FAT32 format)
Photo storage format	JPG(1920*1080)

Video storage format	MP4(1080P 30fps)
Control method	PWM / TTL / S.BUS / TCP / UDP

Gimbal Spec	
Mechanical Range	Pitch/Tilt: -55°～125°, Roll: ±45°, Yaw/Pan: ±300° / ±360°*N (IP output version)
Controllable Range	Pitch/Tilt: -45°～120°, Yaw/Pan: ±290° / ±360°*N (IP output version)
Vibration angle	Pitch/Roll/Yaw: ±0.02°
One-key to center	√

Camera spec	
Imager Sensor	1/2.8 Type STARVIS2 CMOS Sensor
Picture quality	Full HD 1080 (1920*1080)
Effective pixel	2.13MP
Lens optical zoom	30x, F=4.3~129mm
Digital zoom	12x (360x with optical zoom)
Min object distance	10mm(wide end) to 1200mm(tele end)
Horizontal viewing angle	64.0°(wide end) ~ 2.4°(tele end)
S/N ratio	more than 50dB
Min illumination (50%)	High Sensitivity mode On Color 0.009 lux (1/30 sec, 50%) High Sensitivity mode Off Color 0.09 lux (1/30 sec, 50%)

Exposure control	Auto, Manual, Priority mode(shutter priority & iris priority), EV compensation, Slow AE
Gain	Auto/Manual 0dB to 50.0dB(0 to 28 steps) Max.Gain Limit 10.7 dB to 50.0dB (6 to 28 steps)"
White balance	Auto, ATW, Indoor, Outdoor, One Push WB, Manual WB, Outdoor Auto, Sodium Vapor Lamp (Fix/Auto/Outdoor Auto)
Shutter speed	1/1s to 1/10,000s, 22 steps
Back light compensation	On/Off
Noise reduction	On/Off
Image stabilization	On/Off
Defog	On/Off

IR Thermal Imager Spec	
Focus Length	50mm
Coating Film	DLC
Horizontal FOV	8.8°
Vertical FOV	7.0°
Diagonal FOV	11.2°
Detective Distance (Man: 1.8x0.5m)	2083 meters
Recognize Distance (Man: 1.8x0.5m)	521 meters
Verified Distance (Man: 1.8x0.5m)	260 meters

Detective Distance (Car: 4.2x1.8m)	6389 meters
Recognize Distance (Car: 4.2x1.8m)	1597 meters
Verified Distance (Car: 4.2x1.8m)	799 meters
Working mode	Uncooled VOx long wave (8µm~14µm) thermal imager
Detector pixel	640*512
Pixel pitch	12µm
Focusing method	Athermal prime lens
NETD	≤50mK@F1.0 @25℃
Color palette	White hot, black hot, pseudo color
Digital zoom	1x ~ 8x
EO / IR 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

IR Laser Rangefinder	
Measure ability	"≥5km for big target (eg. building) ≥3km for car（2.3m×2.3m） ≥1.5km for people（1.75m×0.75m） (Based on typical value: LOS visibiligy: ≥8km Diffuse reflection rate: ≥0.3 Humility: ≤80%)"
Accuracy (Typical value)	≤ ±1m (RMS)
Wave length	1535nm pulse laser
Divergent Angle	≤ 0.5mrad
Measurement frequency	1~10HZ
Location Resolving	Latitude and longitude of target
Ranefinder	Measure the distance between the object at the center of screen and the laser rangefinder

EO Camera AI Performance	
TOPS	1T
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%

Packing Information	
N.W.	1508g (Viewport version)
Product meas	145.8*138*222.1mm (Standard version) / 145.8*138*227.8mm (Viewport version)

5.FAQ

1. What outputs does HDMI have？
A: HDMI 1080P 60fps(default)/HDMI 1080P 30fps

2. Does A30TR-50M support taking photos during recording?
A: Yes

3. How to set the video storage format of A30TR-50M?
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 user manual is subject to update without notice. For details, please visit http://www.viewprotech.com/index.php to get the latest product information.

Technical support : support@viewprotech.com