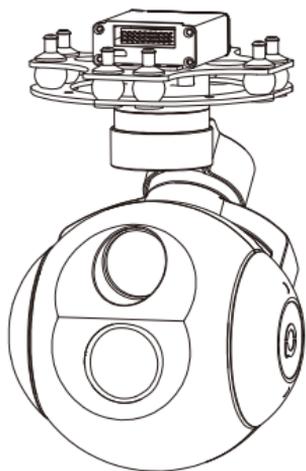# Viewpro

Q20KTIR 20x 4K EO + IR Dual-Sensor Object Tracking Gimbal Camera
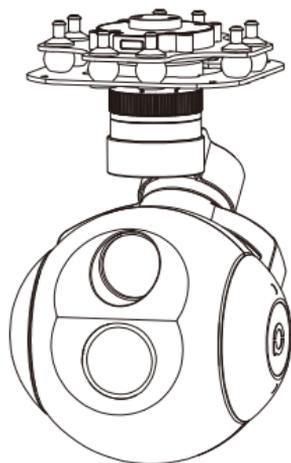## User Manual

User Manual | 使用说明

Standard Version
标准版

Viewport Version
快拆版

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   🚫   ⚠️
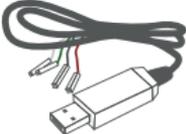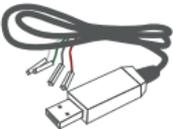   Warning   Important Note
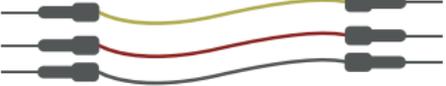
1.Product Introduction

1.1 Introduction

Q20KTIR is a 3-axis high-precision gimbal with 20x optical zoom SONY RGB camera, it integrated with 20x optical zoom EO sensor which provides not only 4K IP output but also 4K 8.51 picture& video storage and with a 25mm lens 640*480 IR thermal sensor. It supports IR thermal and visible PIP switch, IR color palette switch, photographing and video, target tracking, thermal digital zoom. 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.

Q20KTIR is widely used in UAV industries of public security, electric power, fire fighting, zoom aerial photography and other industrial applications.

1.

1.2 In the Box

A. Standard Version		
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			
B. Viewport Version		
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	

2. Installation Instruction

2.1 Overview

[1]
[2]
[3]
[6]
[7]
[5]
[8]
[9]
[4]
[10]

[14]

Viewport

[11]

[13]
[12]
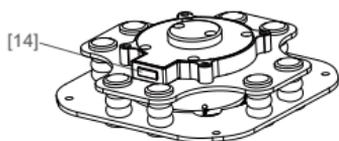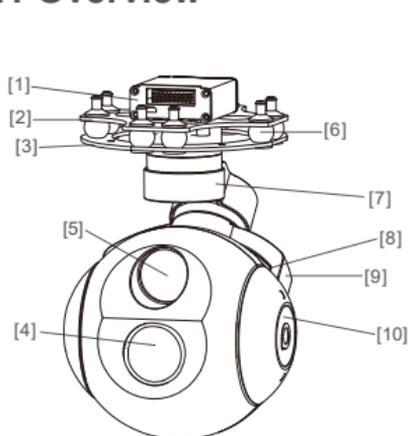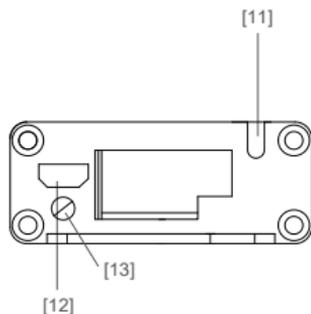
Control Box Back Side
(Standard Version)

[11]

POWER
CAN
UART 2 & BUS
PWM
ETHERNET

Viewpro

[13]
[12]

(Viewport Version)

3.
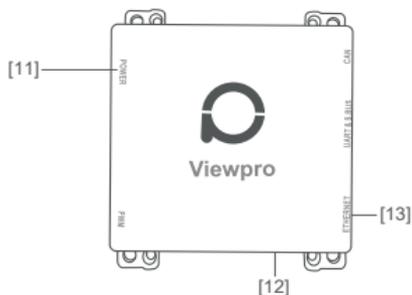
[1] Control box	[8] TF card slot
[2] Upper damping board	[9] Roll axis motor
[3] Lower damping board	[10] Pitch axis motor
[4] FHD zoom camera	[11] 3-6S power interface
[5] Infrared thermal camera	[12] Micro HDMI interface
[6] Damping ball	[13] Ethernet interface
[7] Yaw axis motor	[14] Viewport unlock 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 put the infrared thermal camera towards the sun in case any burn to the camera

2.2.1 Control Box Printing (Standard Version)

■ 5V output
■ GND

AV MULTI PIC/REC FOCUS ZOOM MODE YAW PITCH

Yellow Jumper Cap

1 2 3

GND RX TX

USB
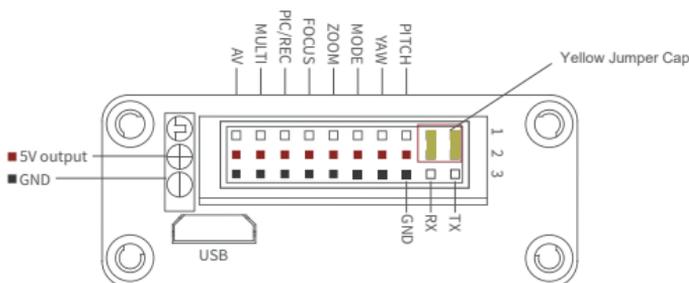
🚫
- The input voltage cannot be higher than 6S.
- The pin insertion interface cannot be connected with power supply.
- The yellow jumper cap cannot be removed

2.2.2 Control Box Printing (Viewport Version)

HDMI

Front Side

3S-6S
GND

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

POWER   SW   PWM

Left Side

TX-
TX+
RX-
RX+

TXD
RXD
GND
TTX
S.BUS
5V
GND

DC5V
CANH
CANL
GND

ETHERNET   UART & S.BUS   CAN

Right Side

5.
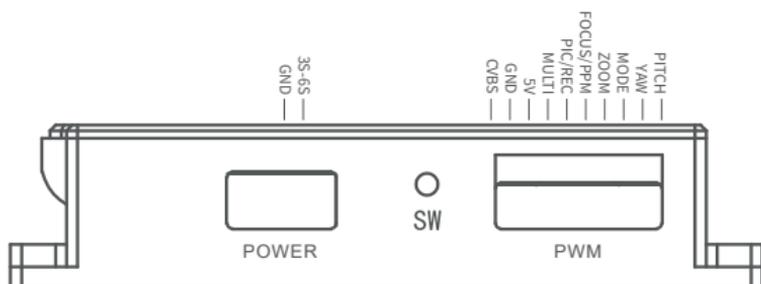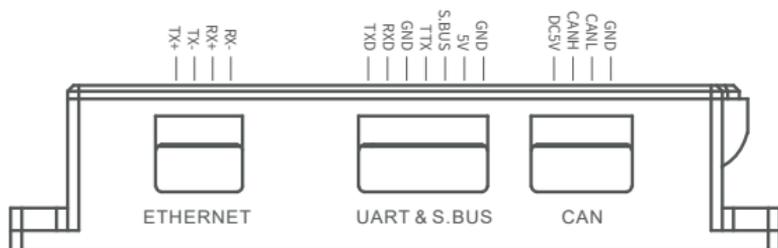
2.3 Device Dimensions (Standard Version)

Unit: mm

2.3 Device Dimensions (Viewport Version)

Unit: mm

99.9

99.9

78.0

78.0

φ3.5

68.4

63.4

Control Box

100.0

118.7

100.0

200.8

132.3

7.
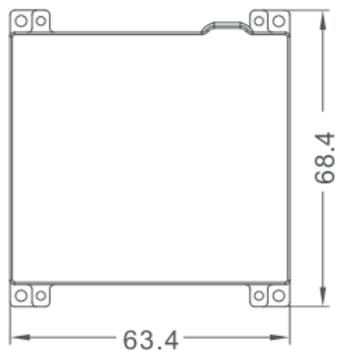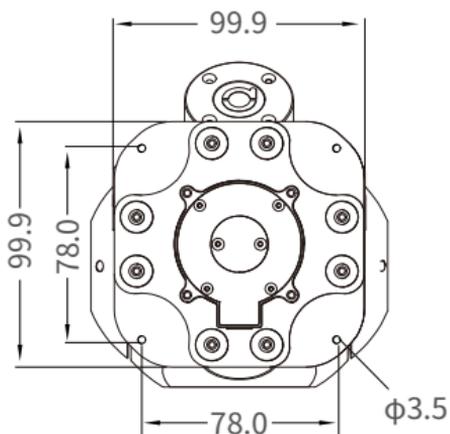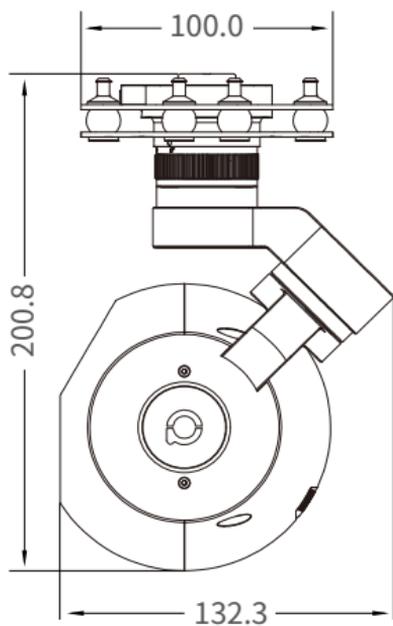
2.4 Install Mounting Part

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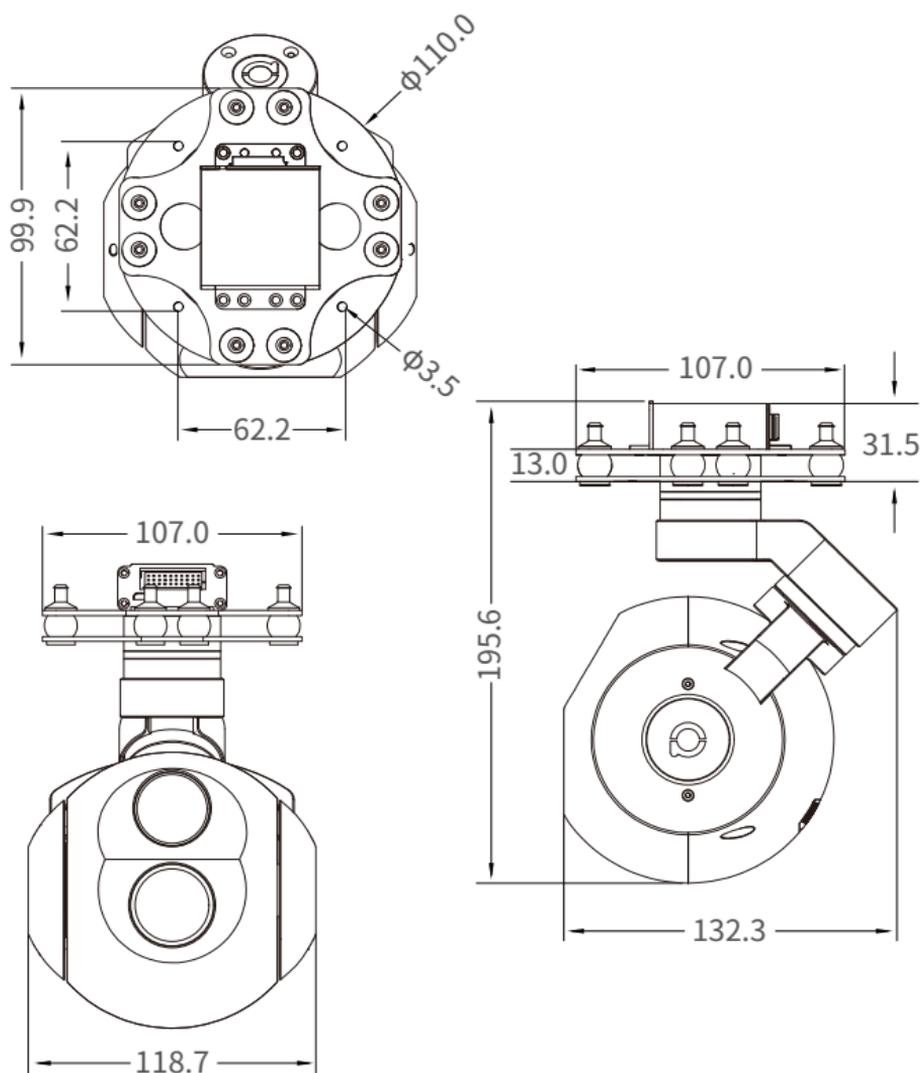
(2) Fix one end of the copper cylinder on the screw hole of lower damping board, and use M3 screw to fasten it.

(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).
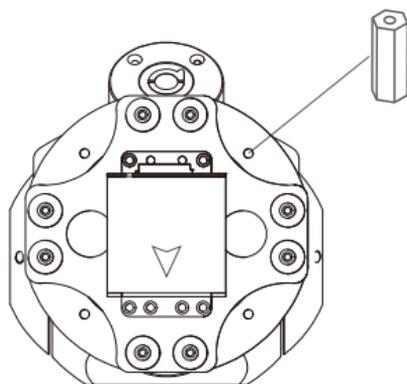
Front

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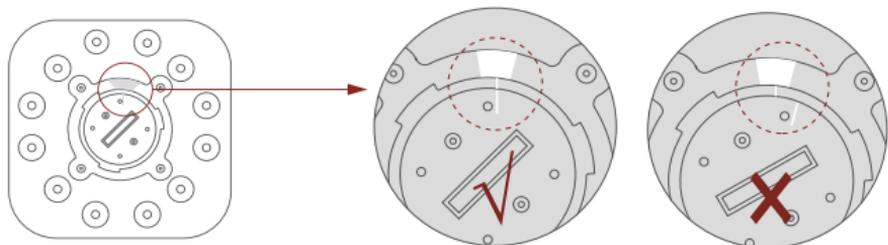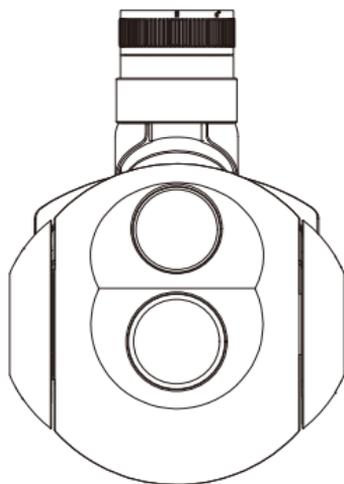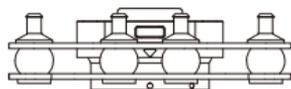
1. Make sure the two white stripes indicated in above picture are aligned with each other. (If the stripes are not aligned to each other, please pinch the connector part and turn it to left manually)
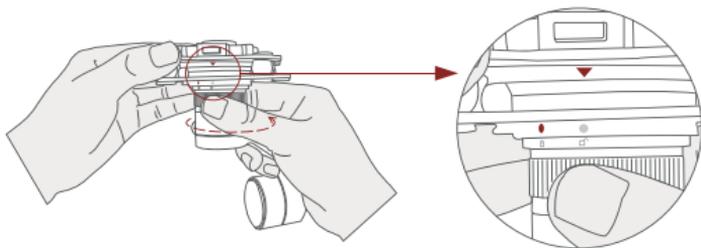
2. Align the white dot (unlock icon) to the red triangle (below unlock button), push the gimbal into the Viewport completely and then rotate the gimbal camera anticlockwise.
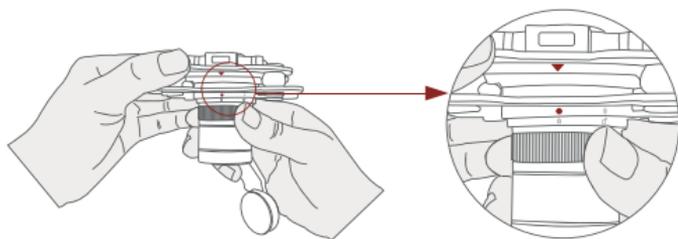
3. When you hear "click" sound (when red dot is aligned to the red triangle) means the gimbal camera and Viewport has been locked.
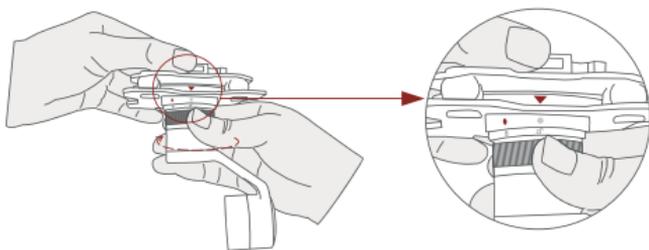
4. To unlock the Viewport, you need to press on unlock button and rotate the gimbal camera clockwise till the white dot align to the red triangle. Then pull the gimbal out from the Viewport.

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 60/50/30/25fps, 1080P 60fps as default. (Optional)

Network: Ethernet/IP output interface, support RTSP/RTMP/UDP/ONVIF video streaming. Default: RTSP output, IP address: RTSP://192.168.2.119:554, output resolution: 720P (record in 1080p), frame rate: 25fps, bit rate: 2M. (Optional)

SDI: SMA outer screw inner hole interface, 1080P 30fps output. (Optional)

AV: no AV output

- Above output mode is optional, HDMI and SDI output cannot coexist at the same time. 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 example)
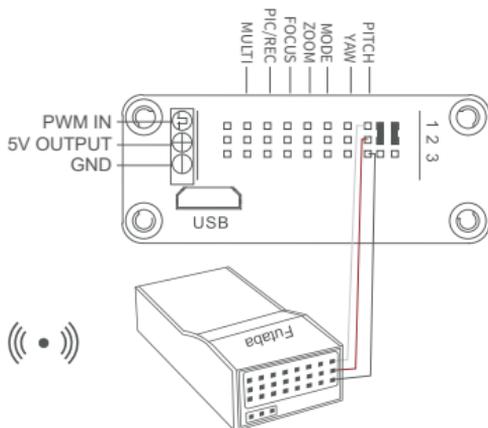
MULTI
PIC/REC
FOCUS
ZOOM
MODE
PITCH
YAW

PWM IN
5V OUTPUT
GND

1 2 3

USB

Remote Controller

Receiver

Connection Diagram
(Standard Version)

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

GND 3S 6S
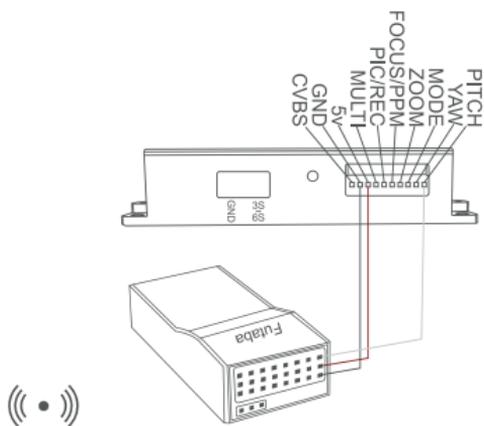
Remote Controller

Receiver

Connection Diagram
(Viewport Version)

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.)
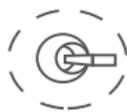
Position 1	Position 2	Position 3
Low Gear	Middle Gear	High Gear
Pitch Up	Pitch Stop	Pitch Down

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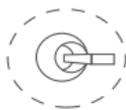
Position 1	Position 2	Position 3
Low Gear	Middle Gear	High Gear
Yaw Left	Yaw Stop	Yaw Right

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)

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)

4) 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

5) 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 Gear	High Gear
PIP switch	No control	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.

6) 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.)

16.

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.

7) Multi: IR digital zoom / tracking control

Position 1   Position 2   Position 3

Low Gear   Middle Gear   High Gear

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):

Gimbal Camera		Cable
TX	⟷	RX (White)
RX	⟷	TX (Green)
GND	⟷	GND (Black)

Control Box   PC

Connection Diagram Standard Version

Viewport Control Box

PC
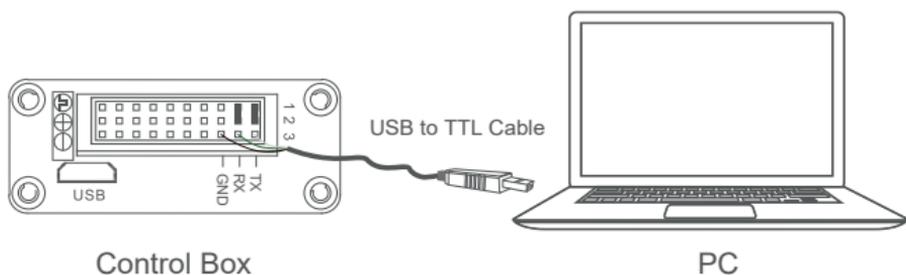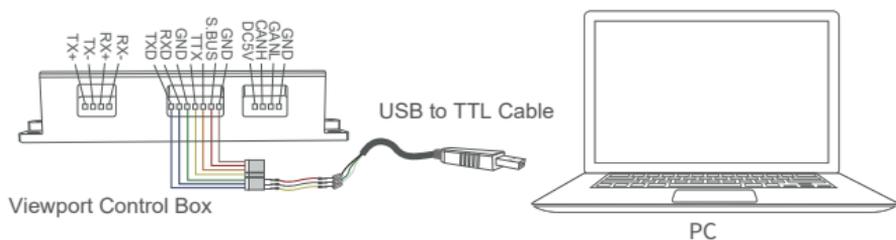
Connection Diagram Viewport Version

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 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.viewpro-tech.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):

S.BUS

5V OUTPUT
GND

1 2 3

USB

Futaba

S.bus

Remote Control   Receiver
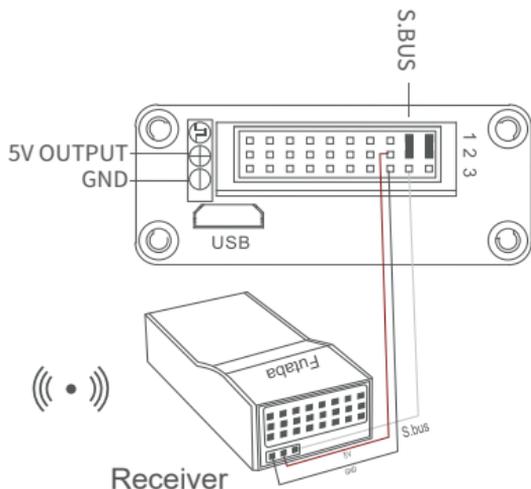
Wiring Diagram Standard Version

TXO
RXO
GND
TTX
S.BUS
5V
GND

Futaba

Remote Control

Receiver
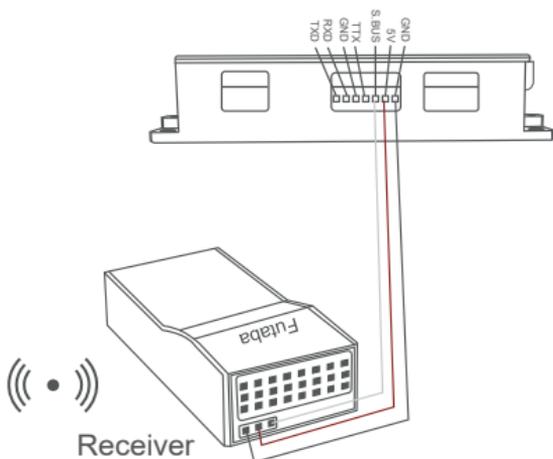
Wiring Diagram Viewport Version

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 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.)

---

4. Specification

Hardware Parameter	
Working voltage	12V
Input voltage	3S ~ 6S
Output voltage	5V (connect with PWM)
Dynamic current	950~1350mA @ 12V
Idle current	950mA @ 12V
Working environment temp	-20℃ ~ +60℃
Output	micro HDMI(1080P25/30fps)/IP (4K/1080p 25/30fps)
Local-storage	SD card (Up to 128G,class 10, FAT32 or ex FAT format)
Photo storage format	JPG (4K:3840*2160)
Video storage format	MP4 (1080P/4K 30fps)
Control method	PWM / SBUS / TTL
Gimbal Spec	
Mechanical Range	Pitch/Tilt: -36°～170°,Roll: ±42°, Yaw/Pan: ±300° / ±360°*N (IP output version)

Controllable Range	Pitch/Tilt: -35°～90°, Yaw/Pan: ±290° / ±360°*N (IP output version)
Vibration angle	Pitch/Roll: ±0.02°, Yaw: ±0.02°
One-key to center	√
EO Camera Spec	
Imager Sensor	SONY 1/2.5" "Exmor R" CMOS
Total pixel	8.51MP
Optical zoom	20x, F2.0 to F3.8,f = 4.4 mm (Wide), 88.4 mm (Tele)
Digital zoom	12x (240x with optical zoom)
Min. working distance	80 mm (Wide end), 800 mm (Tele end)
Angle of view (H)	70.2°(Wide end) ~ 4.1°(Tele end)
Sync system	Internal/External
S/N ratio	50dB
Recommended illumination	100 to 100000 lux
Min illumination	1.6 lux (1/30 sec, 50%, ICR off, High Sensitivity mode Off) 0.4 lux (1/30 sec, 50%, ICR Off, High Sensitivity mode On) 0.21 lux (50%, ICR off, Slow Shutter 1/4s, High sensitivity off) 0.06 lux (50%, ICR off, Slow shutter 1/4s, High sensitivity on)

Back light compensation	On/Off
Gain	Auto
White balance	Auto/Manual
Electronic shutter speed	1/1 to 1/10000 sec. (22 steps)
Noise reduction	On/Off (level 5 to 1/ Off, 6 steps)
Defog mode	On/Off (Low, Mid, High)
Focus	Auto/Manual/One-time automatic focus
Focus speed	2s
Lens initialization	Built-in
User presetting bit	20 sets
Image rotation	180°, Horizontal/Vertical mirror image
OSD	Yes
IR Thermal Imager Spec	
Lens size	25mm
Horizontal FOV	24.6°
Vertical FOV	18.5°
Diagonal FOV	30.4°
Detective Distance (Man: 1.8x0.5m)	735 meters

24.

Recognize Distance (Man: 1.8x0.5m)	184 meters
Verified Distance (Man: 1.8x0.5m)	92 meters
Detective Distance (Car: 4.2x1.8m)	2255 meters
Recognize Distance (Car: 4.2x1.8m)	564 meters
Verified Distance (Car: 4.2x1.8m)	282 meters
Working mode	Uncooled long wave (8μm~14μm) thermal imager
Detector pixel	640*480
Pixel size	17μm
Focusing method	Athermal prime lens
Emissivity correction	0.01~1
NETD	≤50mK (@25℃)
MRTD	≤650mK (@characteristic frequency)
Image enhancement	Auto adjust image brightness and contrast ratio
Color palette	White, iron red, pseudo color
Auto Non-uniform correction	Yes (no shutter)
Digital zoom	1x ~ 4x

Sync correct time	Yes
Thermometry type	Temperature bar (psudo color display) max temp, min temp, FOV center temp (Optional)
Temperature warning	0℃~120℃ (For thermometry version only)
IR / EO Camera Object Tracking	
Update rate of deviation pixel	50Hz
Output delay of deviation pixel	5ms
Minimum object contrast	5%
SNR	4
Minimum object size	32*32 pixel
Maximum object size	128*128 pixel
Tracking speed	32 pixel/frame
Object memory time	100 frames (4s)
The mean square root values of pulse noise in the object position	< 0.5 pixel
Packing Information	
N.W.	1043g(Viewport Version)
Product meas.	118.7*132.3*195.5mm（Standard Version） 118.7*132.3*200.8（Viewport Version）

Accessories	1pc gimbal camera device, screws, copper cylinders, damping balls, damping boards / box
G.W.	3225g
Package meas.	350*300*250mm

5. FAQ

1. How to deal with whitening visible image of Q20KTIR in foggy weather?
A: Enable defogging mode.

2. Does Q20KTIR support taking photos during recording?
A: Yes.

3. How to set the video storage format of Q20KTIR?
A: When the IP output resolution is set to 1920*1080, the storage resolution is 3840*2160; Storage resolution is 1920*1080 when the IP output resolution is set to 3840*2160; The video frame rate saved in the TF card is the same with the one set during IP output.

4. Does Q20KTIR (IP output version) support TCP control?
A: Not supported currently.

4. How to set Q20KTIR network encoding?
A: You can use "camera configure tool V12.13" to set the resolution, bit rate, net push mode,Encoder format, frame rate, packet format, record format.