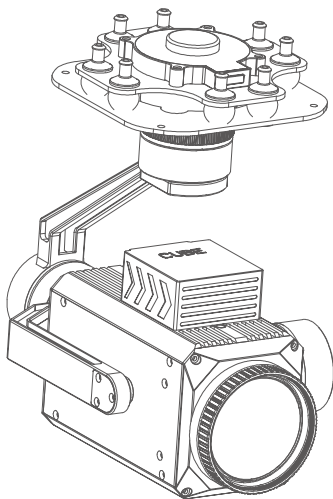




Z36T Cube 36x Starlight Level Night Vision Optical Zoom Object Tracking Gimbal Camera User Manual

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, 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

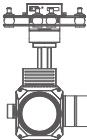
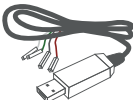



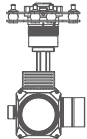
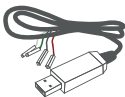




1.Product Introduction


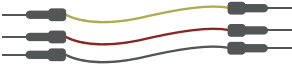

1.1 Introduction

Z36T Cube is a high-precision 3-axis gimbal integrated with a 36x optical zoom Starlight Level Night Vision SONY camera. It supports visible optical zoom, photographing and video, target tracking. When the external GPS and time input, the OSD can display angle, zoom times, GPS and real-time and tracking frame, also can select to turn off the OSD. It features fast focus, compact structure and lighter weight design. 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.

Z36T Cube is widely used in UAV industries of public security, electric power, fire fighting, zoom aerial photography and other industrial applications.

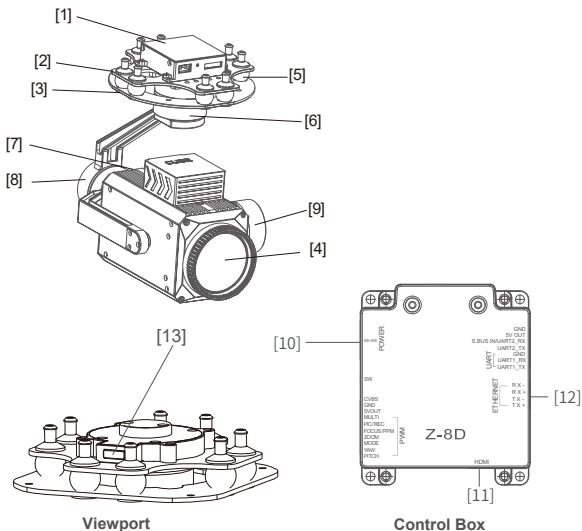
1.2 In the Box

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] Control box | [8] Roll axis motor |
| [2] Upper damping board | [9] Pitch axis motor |
| [4] FHD zoom camera | [10] 4-6S power interface |
| [5] Damping ball | [11] Micro HDMI interface |
| [6] Yaw axis motor | [12] Ethernet interface |
| [7] TF card slot | [13] Viewport unlock button |



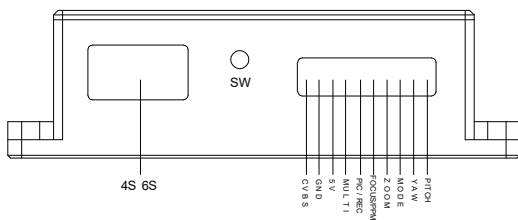
- Please ensure that there isn't any obstacle while the motor rotating.
 - Please remove the obstacle immediately if gimbal camera is blocked during rotation.
-

2.2.1 Control Box Printing (Standard Version)

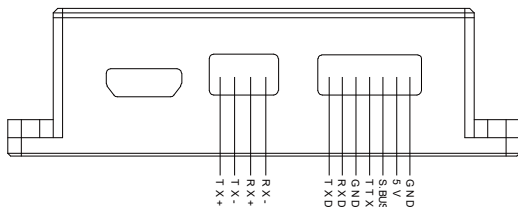
Front Side



Left Side



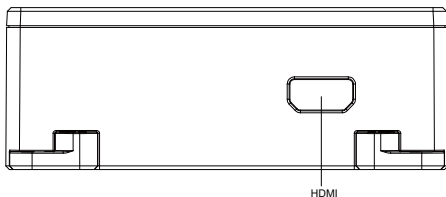
Right Side



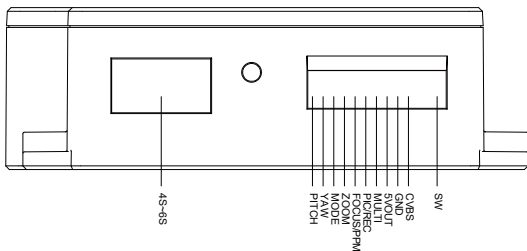
- The input voltage cannot be higher than 6S.
- The pin insertion interface cannot be connected with power supply.
- The yellow jumper cap cannot be removed

2.2.2 Control Box Printing (Viewport Version)

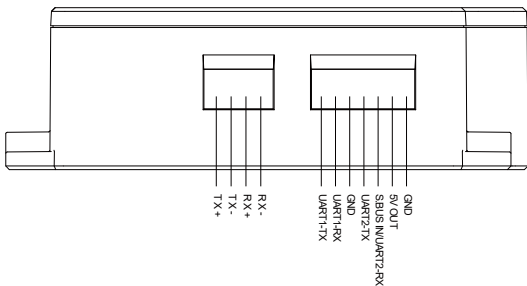
Front Side



Left Side

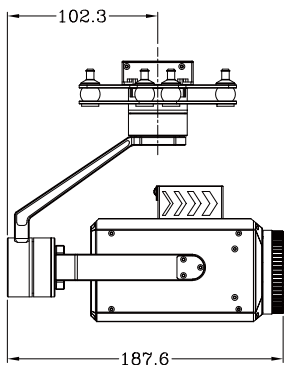
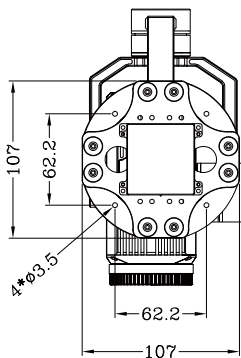
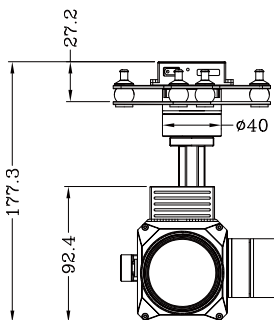


Right Side



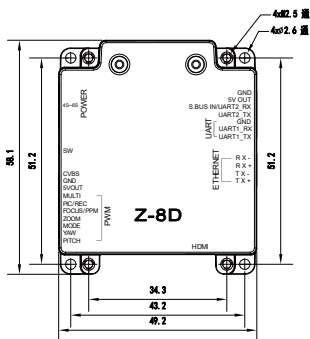
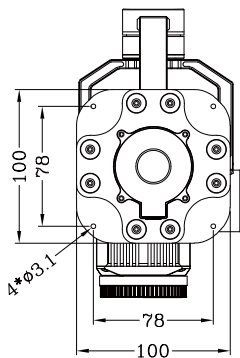
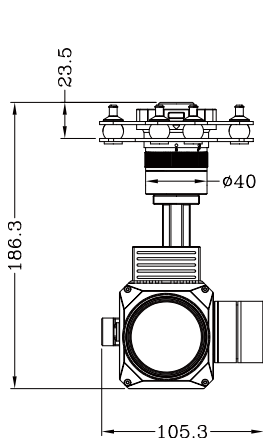
2.3.1 Device Dimensions (Standard Version)

Unit: mm

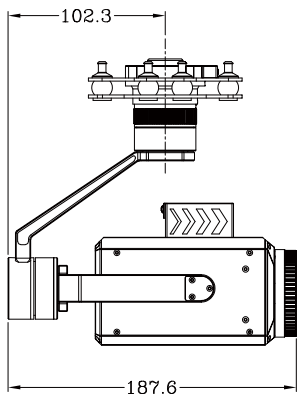


2.3.2 Device Dimensions (Viewport Version)

Unit: mm



Control Box

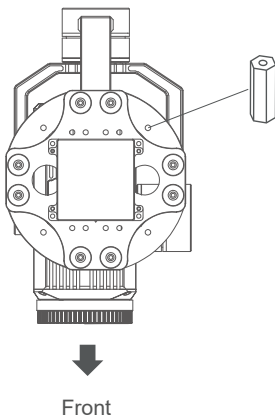


2.4 Install Mounting Part

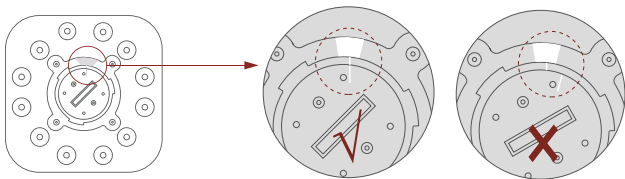
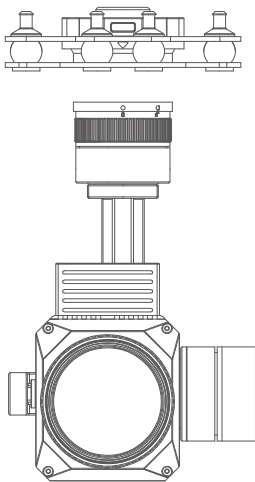
(1) Find out the arrow on the gimbal which indicating the yaw heading of the payload (i.e. the lens direction when the camera power on), and synchronize with the direction specified by the UAV.

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

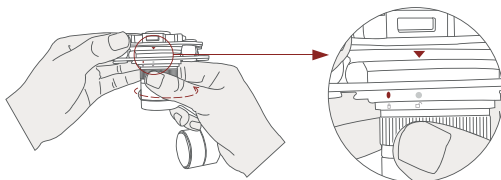
(3) According to the provided screw hole dimension you can make suitable mounting holes on the UAV mounting board, and fixes the other end of the copper cylinder on the mounting board of the UAV (Viewport version is the same).



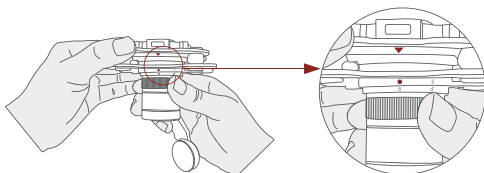
2.5 Viewport Release Instruction



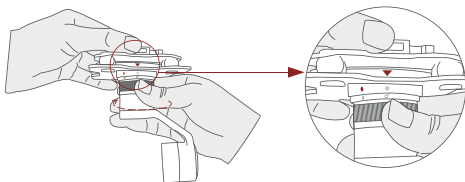
1. Make sure the two white stripes indicated in above picture are aligned with each other.
(If the stripes are not aligned to each other, please pinch the connector part and turn it to left manually)



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 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 36fps 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.

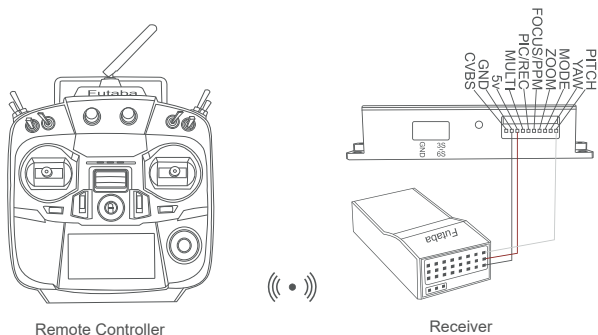
- When using user interface software Viewlink for network connection, the network of external device (computer) should be the IP address: 192.168.2.2 (choose the last byte among 2~254, can not be 119 same as the gimbal), subnet mask: 255.255.255.0, Default gateway: 192.168.2.1, and all firewalls of the 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)



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

Low Gear
Yaw Left



Position 2

Middle Gear
Yaw Stop



Position 3

High Gear
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

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:

- 3.1)** Operate 1 time continuously and quickly, from position 2 - 3 - 2, to Home position.
- 3.2)** Operate 2 times continuously and quickly, from position 2 - 3 - 2 - 3 - 2, the camera lens looks vertically down.
- 3.3)** Operate 3 times continuously and quickly, from position 2 - 3 - 2 - 3 - 2 - 3 - 2, 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 - 2, 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

Low Gear
IR digital zoom



Position 2

Middle Gear
No control



Position 3

High Gear
IR color palette switch

5) Focus (not functional for this channel)

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.)



Position 1

Low Gear



Position 2

Middle Gear



Position 3

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: Tracking control



Position 1

Low Gear



Position 2

Middle Gear



Position 3

High Gear

Switch from Position 2 to 1: Cancel tracking

Switch from Position 2 to 3:

- Exit the tracking, display the lock frame in the center of the screen, start tracking

Switch from Position 3 to 2:

- "+" appears in the center of the screen, adjust the cross cursor UDLR with yaw and pitch control to lock target object

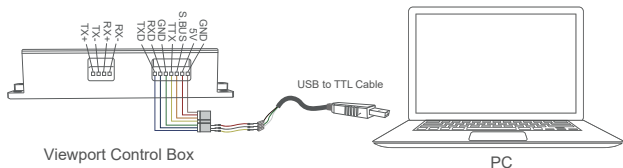
Switch from Position 2 to 3 again: Choose another target for second tracking

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)



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.



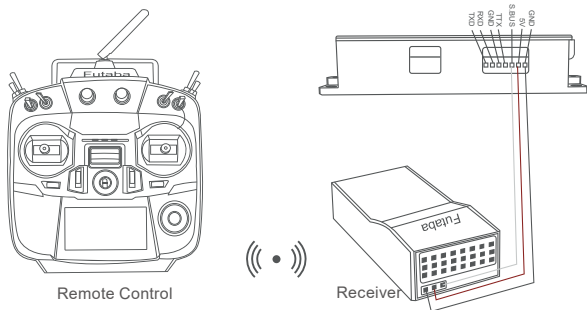
- The default baud rate of serial port is 115200, which can be changed according to the docking equipment.

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):

Wiring Diagram



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 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 default 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.

4. Specification

Hardware Parameter	
Working voltage	16V
Input voltage	4S ~ 6S
Output voltage	5V (connect with PWM)
Dynamic current	580~1150mA @ 16V
Power consumption	Average 9.3W, Max 18.4W
Working environment temp.	-20 C ~ +50 C
Output	Micro HDMI(1080P 60fps) / IP (RTSP/UDP 720p/1080p 25fps/30fps H264/H265) / SDI (1080P 30fps)
Local-storage	TF card (Up to 512G,class 10, FAT32 format)
Picture storage format in TF card	JPG(1920*1080)
Video storage format in TF card	MP4(1080P 30fps)
Control method	PWM / TTL / S.BUS / TCP / UDP
Gimbal Spec	
Mechanical Range	Pitch/Tilt: $\pm 120^{\circ}$, Roll: $\pm 70^{\circ}$, Yaw/Pan: $\pm 300^{\circ}$ / $\pm 360^{\circ}$ *N (IP / SDI output version)
Controllable Range	Pitch/Tilt: -45° (Up)~ 115° (Down), Yaw/Pan: $\pm 290^{\circ}$ / $\pm 360^{\circ}$ *N (IP / SDI output version)
Vibration angle	Pitch/Roll/Yaw: $\pm 0.02^{\circ}$
One-key to center	√

Camera Spec	
Imager Sensor	1/2" Sony IMX385LQR-C CMOS Sensor
Picture quality	Full HD 1080 (1920*1080)
Effective pixel	2.13M pixels
Lens optical zoom	36x, F= 6.0mm ~ 216.0mm
Digital zoom	Digital x32 Zoom
Angle of View (D, H, V)	Wide: 63.31° 56.5° 33.63° Tele: 2.44° 2.12° 1.19°
Sync system	Progressive scanning
S/N ratio	more than 50dB (AGC off)
Min. illumination (50%)	Color(1/30s, 77.7dB) : 0.01 lux , BW(1/30s, 77.7dB) : 0.002lux Color DSS(1/1s, 77.7dB) : 0.001 lux , BW DSS(1/1s, 77.7dB) : 0.0002 lux
Gain	Auto
White balance	Auto / One Push / Manual / Indoor / Outdoor / Auto-Ext
Shutter speed	1/30(25) ~ 1/60,000 sec
Brightness	0 ~ 20 steps
Aperture control	0 ~ 20 steps
Defog	Yes
OSD	Yes
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	±48 pixel/frame
Object memory time	100 frames (4s)
The mean square root values of pulse noise in the object position	< 0.5 pixel
Features	
OSD	Display the gimbal's yaw and pitch angle, magnification, card recording duration, aircraft GPS and altitude, date and time
Geotagging	Display time and GPS coordinate in picture exif
Card reading online	SMB read pictures or videos / HTTP read pictures or videos
KLV (UDP)	Card recording or Viewlink video playback
ArduPilot / PX4	Support(Mavlink protocol) Optional: Support Ardupilot Follow me feature
Dual video stream output	support

Packing Information

N.W.	930g / 992g (Viewport version with Viewport)
Product meas.	187.6*105.3*180.6mm /187.6*105.3*186.3mm (Viewport version with Viewport)

5. FAQ

1. How to deal with whitening visible image of Z36T Cube in foggy weather?

A: Enable defogging mode

2. Does Z36T Cube support taking photos during recording?

A: Yes

3. How to set the storage format of Z36T Cube?

A: When the IP output resolution is set to 1280*720, the storage resolution is 1920 * 1080; Storage resolution is 1280 * 720 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. The frame rate is 25fps or 36fps for optional.

4. Does Z36T Cube support simultaneous TCP control for multiple devices?

A: Yes.