

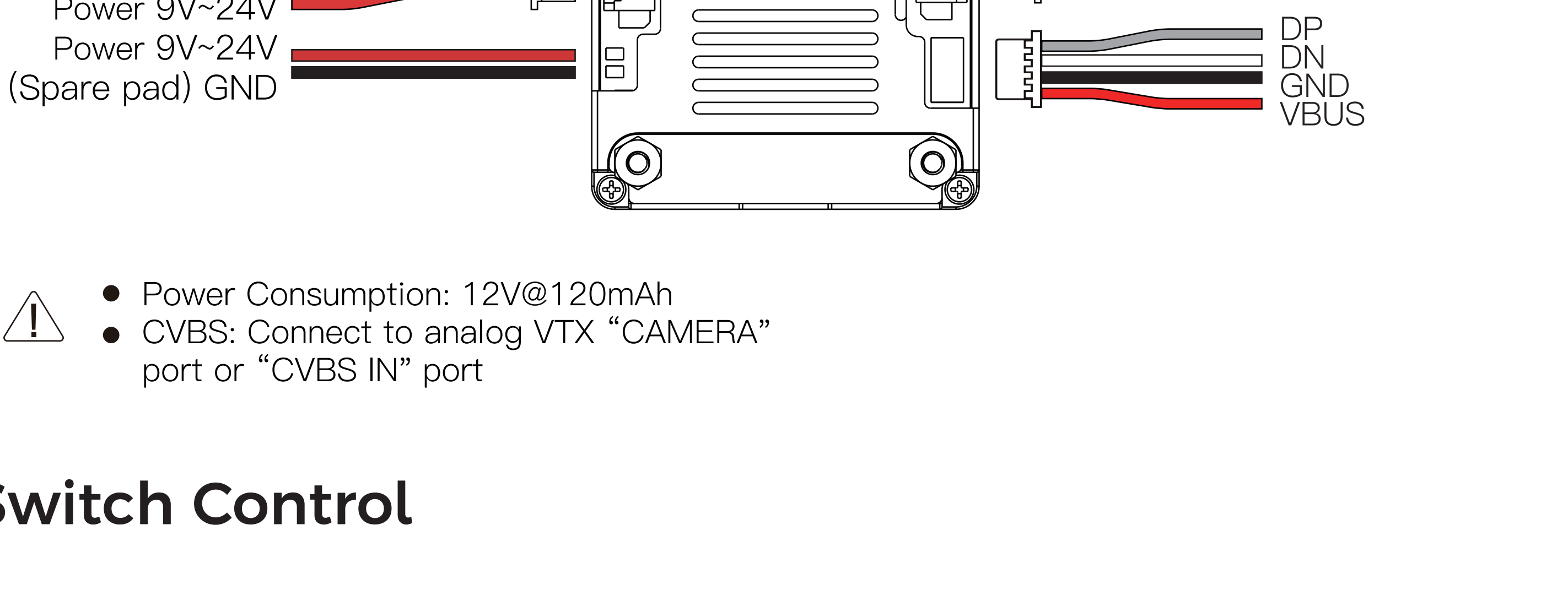
ECLIPSE 004 Dual

Quick Start Guide

V1.0

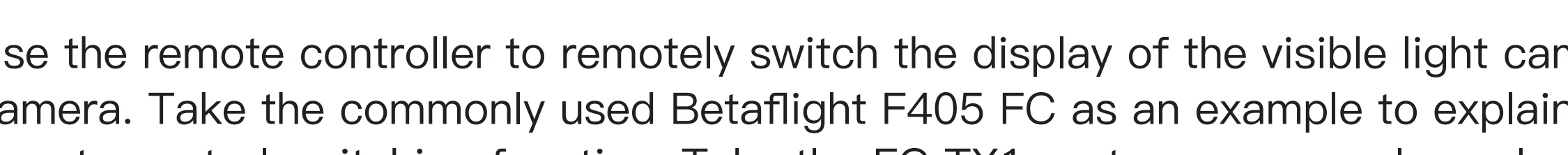


Connection



- Power Consumption: 12V@120mAh
- CVBS: Connect to analog VTX "CAMERA" port or "CVBS IN" port

Switch Control

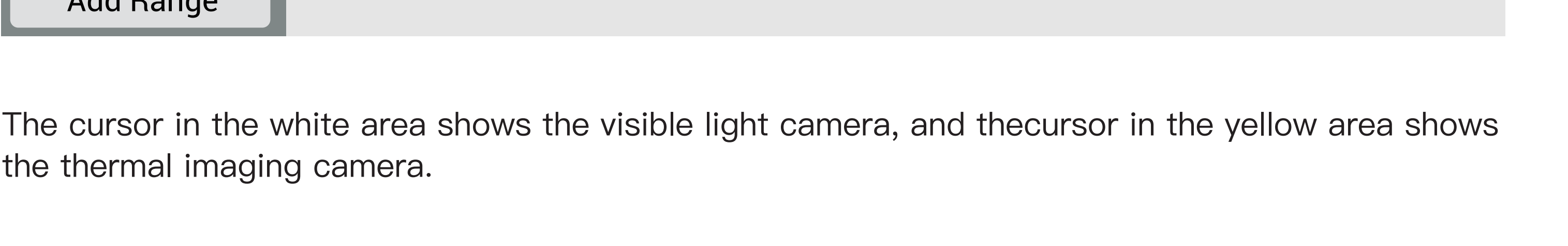


Use the remote controller to remotely switch the display of the visible light camera and the black&white camera. Take the commonly used Betaflight F405 FC as an example to explain how to configure the remote control switching function. Take the FC TX1 port as an example, make sure the UART1 function is not used, and solder the control line (Introduction 4)to the FC TX1 port.

Open Betaflight Configurator and enter [resource](#) in the CLI command line to query the TX1 pin definition. The TX1 of the demonstration FC is the A09 pin. Enter the following blue font to configure the PINIO function of the TX1 pin.

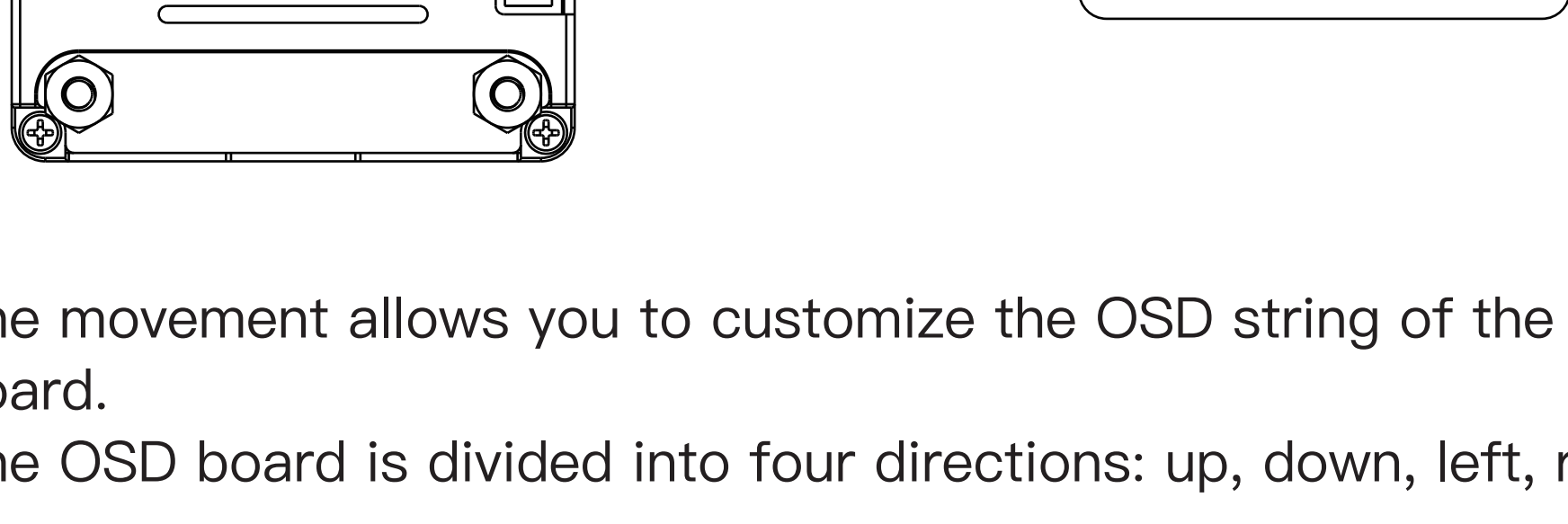
```
resource SERIAL TX 1 NONE //Disable the serial port function of the Tx1 pin
resource PINIO 1 A09 //Configure the TX1 pin (The example is A09 pin, different FC pins are different, please fill in according to the actual) as PINIO function No. 1
set pinio_box=40,255,255,255 //Set the PINIO function range
save //save configuration
```

Next, configure the PINIO function mapping between the remote controller and FC. In Betaflight Configuration, map the No.1 PINO function (ie USER1 in the figure below) to the AUX channel of the remote control.



The cursor in the white area shows the visible light camera, and the cursor in the yellow area shows the thermal imaging camera.

OSD Functions

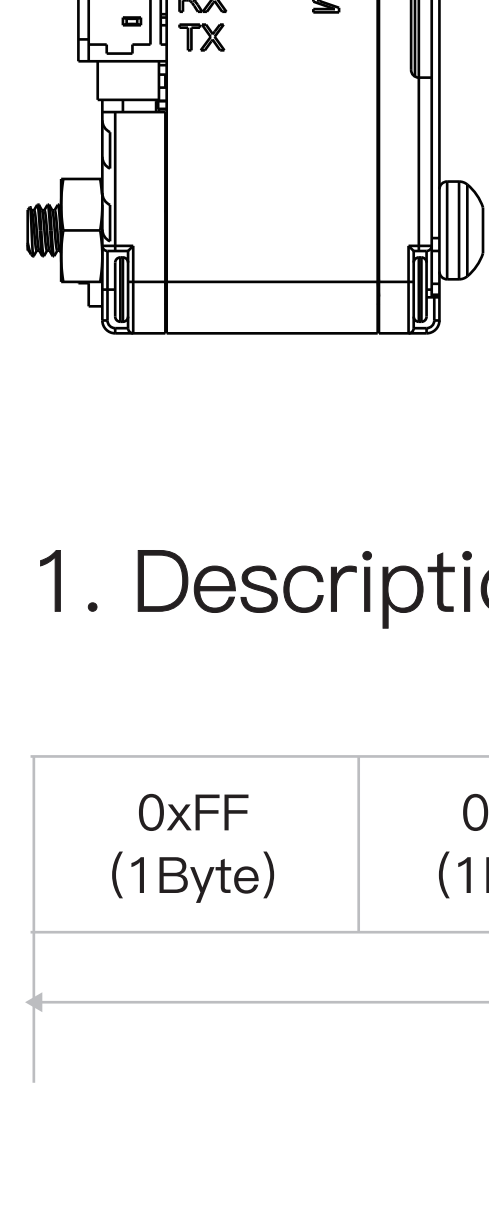


The movement allows you to customize the OSD string of the video display through an external menu board.

The OSD board is divided into four directions: up, down, left, right and center.

- Operating Instructions:**
- Connect the menu board to the movement
 - Wait for the movement to power on the picture
 - Press the center button, the operation interface will pop up, the operation interface is divided into four lines, the first line and the second line is to provide a choice of characters, the third line is to delete the option, the fourth line is the current character, the black background is the current cursor position
 - Press up, down, left or right to move the cursor in the character line, and press center to select the character to be inserted into the current string.
 - move the cursor to DEL, press the center, you can delete the last character in the string, all clear the current string will become [NA], this time that there is no character
 - Move the cursor to the fourth line of the current character line, press the center key to exit the operation. This is the string if not empty, the lower left corner will have the current settings string

Serial Communication Description



TX	Master transmit, 3.3V level, baud rate default 115200bps
RX	Master receive, 3.3V level, baud rate default 115200bps
GND	Reference Ground
GPIO0	General Purpose IO, 3.3V level
GPIO1	General Purpose IO, 3.3V level
GPIO2	General Purpose IO, 3.3V level

1. Description of Agreement

0xFF (1Byte)	0x5A (1Byte)	version (1Byte)	cmd (2Byte)	sub_cmd (1Byte)	payload_len (4Byte)	payload	crc16 (2Byte)
header (10Byte)							

1.1 Field Description

0xFF: constant value
0x5A: constant value
version: Protocol version (initial version 0)
cmd: Command id
sub_cmd: subcommand
payload_len: Payload data length
payload: Data content
crc16: Checksum value with header and payload

1.2 Calibration Function

```
crc16_code
static uint16_t crc16_modbus(uint8_t *data, uint32_t length)
{
    uint8_t i;
    uint16_t crc = 0xffff; // Initial value
    while(length--)
    {
        crc ^= *data++; // crc ^= *data; data++;
        for (i = 0; i < 8; ++i)
        {
            if (crc & 1)
                crc = (crc >> 1) ^ 0xA001; // 0xA001 = reverse 0x8005
            else
                crc = (crc >> 1);
        }
    }
    return crc;
}
```

2. Command Definition

host→dev: The host computer sends to the device

dev→host: The device sends to the host computer

2.1 Getting the Version

Directional	cmd	sub_cmd	payload_len (Byte)	Instruction
host→dev	0	0	0	
dev→host	0	0	N	Returns the firmware version string

2.2 Image Adjustment

Directional	cmd	sub_cmd	payload_len (Byte)	Instruction
host→dev	1	0	1/0	1Byte brightness value (0~100), no payload without setting only return the actual brightness value
dev→host	1	0	1	Returns the current brightness value
host→dev	1	1	1/0	1Byte contrast value (0~100), no payload not set only return the actual contrast value
dev→host	1	1	1	Returns the current contrast value

2.3 Pseudo-Color

Directional	cmd	sub_cmd	payload_len (Byte)	Instruction
host→dev	2	0	1	Set the pseudo-color serial number, 0 is off pseudo-color

2.4 Shutter Control

Directional	cmd	sub_cmd	payload_len (Byte)	Instruction
host→dev	3	0	1	Manual shutter calibration image
host→dev	3	1	1	Disable automatic shutter calibration
host→dev	3	2	1	Enable automatic shutter calibration

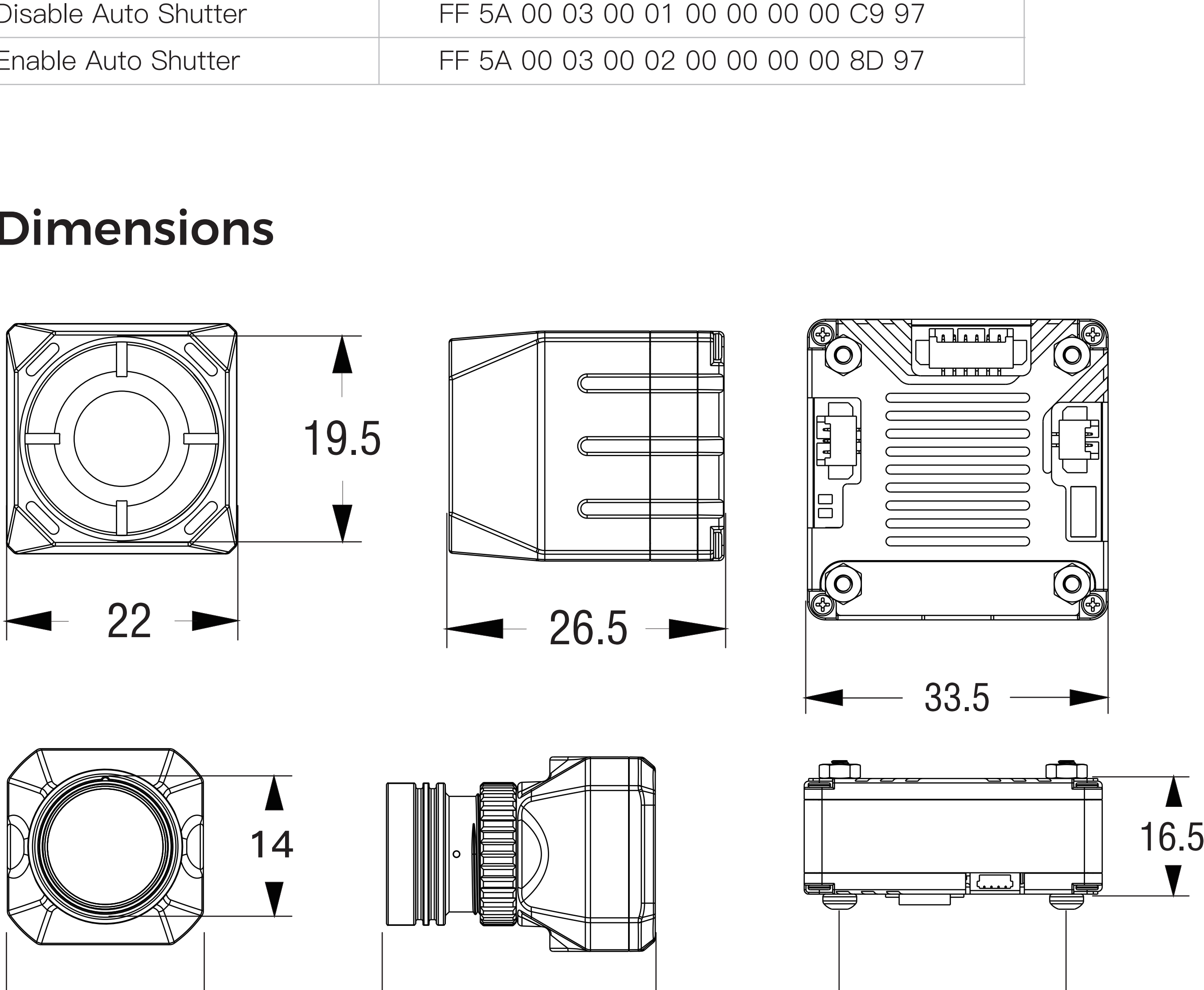
2.5 Hot Tracking

Directional	cmd	sub_cmd	payload_len (Byte)	Instruction
host→dev	4	0	1	Close Hot Tracking
host→dev	4	1	1	Open Hot Tracking

3. Example of Command

Command Description	Command Data
Get version	FF 5A 00 00 00 00 00 00 00 C7 57
Set the contrast to 80%	FF 5A 00 01 00 01 01 00 00 00 50 EB 73
Set the contrast to 50%	FF 5A 00 01 00 01 01 00 00 00 32 6A 9A
Set the brightness to 80%	FF 5A 00 01 00 00 01 00 00 00 50 EA A2
Set the brightness to 50%	FF 5A 00 01 00 00 01 00 00 00 32 6B 4B
Set pseudo color 5	FF 5A 00 02 00 00 01 00 00 00 05 6A 88
Set pseudo color 0	FF 5A 00 02 00 00 01 00 00 00 00 AA 8B
Shutter Calibration	FF 5A 00 03 00 00 00 00 00 00 F4 57
Disable Auto Shutter	FF 5A 00 03 00 01 00 00 00 00 C9 97
Enable Auto Shutter	FF 5A 00 03 00 02 00 00 00 00 8D 97

Dimensions



Unit: mm

Specifications

Model	Eclipse 004
Sensor	Uncooled vanadium oxide
Resolution	480x360
LENS	F1.0/9.1mm
FOV	48°(H)*34°(V)*59°(D)
Frame Rate	25/50fps
Power Consumption	<1.5w
Output	PAL
Supply Voltage	9V~24V
Temperature	-20°C~60°C
Interface	Analog Interface: CVBS
Latency	Average Latency 20ms
Image Quality	AllImage Enhancement

Model	Ratel Ultra AI
Image sensor	1/1.8 Inch Sensor
LENS	6mm
FOV	36.86° (H)*29.14° (V)