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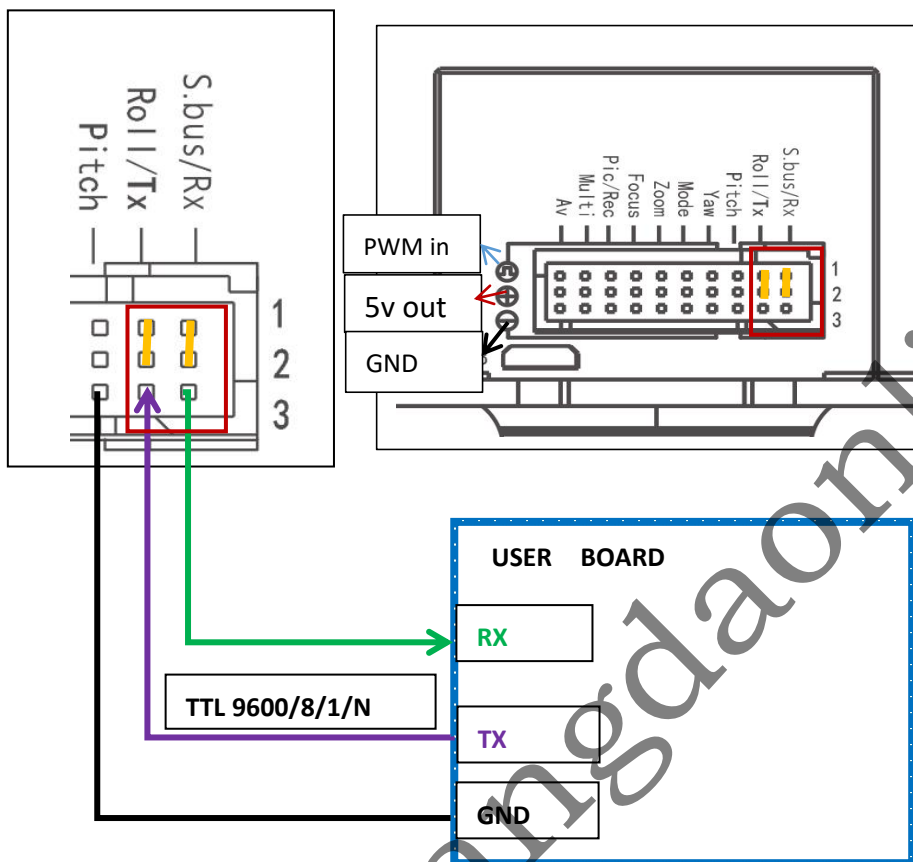
YANGDA gimbal protocol V1.9

Model	Descriptions	video	TF card max	Protocol support functions
Sky Eye-I 1080P	10x 1080p gimbal	HDMI 1080P60/AV	32G	CMD control YAW/ROLL/PITCH and get angles ,control camera zoom.....
Sky Eye-18HZ 1080P	18x 1080p gimbal	HDMI 1080P60/AV	32G	CMD control YAW/ROLL/PITCH and get angles ,control camera zoom.....
Sky Eye-18HZ 1080P Ball	18x 1080p pod	HDMI 1080P60/AV	32G	CMD control YAW/ROLL/PITCH and get angles ,control camera zoom.....
Sky Eye-30HZ	30x 1080p gimbal	HDMI 1080P60/ AV	32G	CMD control YAW/ROLL/PITCH and get angles ,control camera zoom.....
Sky Eye-30HZ Ball	30x 1080p pod	HDMI 1080P60/AV	32G	CMD control YAW/ROLL/PITCH and get angles ,control camera zoom.....
Sky Eye-30HZ-S Ball	30x 1080p tracking pod	HDMI 1080P60	128G	CMD control YAW/ROLL/PITCH and get angles ,control camera zoom,OSD for , tracking, GPS, pod status
Eagle Eye-10IE	10x EO+19mm 640 IR tracking gimbal	HDMI 1080P60 or RJ45 onvif	128G	CMD control YAW/ROLL/PITCH and get angles ,control camera zoom,OSD for , tracking, GPS, pod status,IR camera control
Eagle Eye-20IE	20x EO+25mm 640 IR tracking gimbal	HDMI 1080P60 or RJ45 onvif	128G	CMD control YAW/ROLL/PITCH and get angles ,control camera zoom,OSD for , tracking, GPS, pod status,IR camera control
Eagle Eye-30IE	30X EO+25mm 640 IR tracking pod	HDMI 1080P60 or RJ45 onvif	128G	CMD control YAW/ROLL/PITCH and get angles ,control camera zoom,OSD for , tracking, GPS, pod status,IR camera control
Eagle Eye-30IE-50	30X +50mm 640 IR tracking	HDMI 1080P60 or RJ45 onvif	128G	CMD control YAW/ROLL/PITCH and get angles ,control camera zoom,OSD for , tracking, GPS, pod status,IR camera control
Sky Eye-12NL	12X + 800M laser tracking gimbal	HDMI 1080P60	128G	CMD control YAW/ROLL/PITCH and get angles ,control camera zoom,OSD for , tracking, GPS, pod status
Sky Eye-36SZ	36x 1080p tracking gimbal	HDMI 1080P60	128G	CMD control YAW/ROLL/PITCH and get angles ,control camera zoom,OSD for , tracking, GPS, pod status
Sky Eye-36SZ-IP	36x 1080p gimbal	RJ45 ONVIF 1080P25 P30	128G	CMD control YAW/ROLL/PITCH and get angles ,control camera zoom, have app for PC, phone.
Sky Eye-Z6K	SONY a6000/a7RII gimbal	HDMI 1080p	a6000 /a7RII	CMD control YAW/ROLL/PITCH and get angles ,control sony a6000 /a7RII camera zoom,picture, record
Sky Eye-Duo Pro	FLIR duo PRO gimbal	HDMI	Two TF card	CMD control YAW/ROLL/PITCH and get angles ,control camera



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TTL 3.3v UART baud : 115200/9600(some version), 8, 1, none, HEX



We have connect RX1 and RX2 with yellow stubs, and connect TX1 and TX2 with stubs. DO NOT remove the stubs!

Please connect your RX to RX3, your TX connect to TX3.

PAY attention:

1) the signals inside red frame are all TTL signal, do not connect them to power or ground, if do ,may damage our device!

2) The other signals is for PWM input signals to control the gimbal,

PWM in: connect to your PWM reciever signal (not include AV, AV is output for CVBS video signal)

5V out: for your PWM reciever power supply;

GND: connect to your PWM reciever GND;



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1) combine_long_cmd_control: FF 01 0F 10 RM PM YM RSL RSH RAL RAH PSL PSH PAL PAH YSL YSH YAL YAH CS

FF 01 0F 10 : header

RM roll control mode, 00=mode_no_control, 01=mode_speed, 42 = mode_angle 45=mode_angle_rel_frame

RSL RSH roll speed (2 byte signed little-endian order), units: 0.122degree/sec;

RAL RAH roll angle (2 byte signed little-endian order), units: 0.02197degree

PM PSL PSH PAL PAH :Pitch control, same as roll control formats

YM YSL YSH YAL YAH: Yaw control, same as roll control formats

SL = Speed Low byte , SH = speed high byte, AL = angle low byte , AH= angle high byte ;

CS = body checksum, checksum is calculated as a sum of all bytes (from 'RM' to 'YAH') modulo 256;

example1: ROLL no control, PITCH speed mode 1.2degree/sec, YAW angle mode to 20 degree。

FF 01 0F 10 00 01 05 00 00 00 00 0A 00 00 00 00 00 E8 03 FB

Example2: ROLL no control, PITCH angle mode to 40 degree, YAW angle mode 20 degree。

FF 01 0F 10 00 05 05 00 00 00 00 00 00 D0 07 00 00 E8 03 CC

Example3: speed stop pitch and yaw:

FF 01 0F 10 00 01 01 00 00 00 00 00 00 00 00 00 00 00 02



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2) visca_angle_mode_control

Angle mode	up	81 01 0A 01 VV WW 03 01 FF	VV:speed 0X00 (0) -0X32 (50) WW angle 0X01 (0) -0X96 (150)	VV = 0 , gimbal use default speed
	down	81 01 0A 01 VV WW 03 02 FF		
	left	81 01 0A 01 VV WW 01 03 FF		
	right	81 01 0A 01 VV WW 02 03 FF		
	home	81 01 0A 01 VV WW 03 03 FF		

For example:

81 01 0A 01 00 32 03 01 FF pitch up 50 degree

81 01 0A 01 00 32 03 02 FF pitch down 50 degree

81 01 0A 01 00 00 03 03 FF home position

3) visca_speed_mode

up-----81 01 06 01 00 10 03 01 FF

down-----81 01 06 01 00 10 03 02 FF

left-----81 01 06 01 10 00 01 03 FF

right-----81 01 06 01 10 00 02 03 FF

stop-----81 01 06 01 00 00 03 03 FF

UpLeft-----81 01 06 01 05 05 01 01 FF

UpRight-----81 01 06 01 05 05 02 01 FF

DownLeft-----81 01 06 01 05 05 01 02 FF

DownRight-----81 01 06 01 05 05 02 02 FF



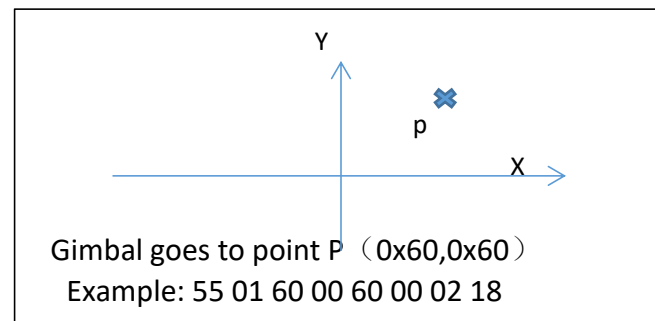
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4) pelco-d speed mode

Speed_mode _separate	up	FF 01 00 08 00 SP CS	SP: SPEED, 00~3F CS : checksum calculated from byte2 to byte6 , modulo 256
	down	FF 01 00 10 00 SP CS	
	left	FF 01 00 04 SP 00 CS	
	right	FF 01 00 02 SP 00 CS	
	stop	FF 01 00 00 00 00 01	
Speed_mode_ combine	X, y	55 01 XL XH YL YH 02 CS CS: checksum from 55 to 02, modulo 256	0xXHXL: 0~500: XL yaw low byte, XH: yaw high byte, 2 byte signed little-endian 0xYHYL: 0~500: YL pitch low byte, YH: pitch high byte, 2 byte signed little-endian

example:

- FF 01 00 08 00 0a 13 pitch up, speed 10
- FF 01 00 10 00 0a 1b pitch down, speed 10
- FF 01 00 04 0a 00 0f yaw left speed 10
- FF 01 00 02 0a 00 0d yaw right speed 10
- FF 01 00 00 00 00 01 stop





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6) camera_control_cmd:

6.1) Sky Eye-I 1080P,Sky Eye-18HZ,Sky Eye-30HZ,Sky Eye-18HZ (Ball),Sky Eye-30HZ(ball) HDMI output version:

FF 01 00 40 00 00 41 zoom out
FF 01 00 20 00 00 21 zoom in
FF 01 00 00 00 00 01 stop zoom
FF 01 01 00 00 00 02 focus in
FF 01 00 80 00 00 81 focus out
FF 01 00 00 00 00 01 stop focus
FF 01 00 07 00 65 6d start rec, camera feedback 3A 77 52 65 63 31 0D 00
FF 01 00 07 00 64 6c stop rec, camera feedback 3A 77 52 65 63 30 0D 00
FF 01 00 07 00 67 6F mode_change (picture mode/record mode switch) no feedback
FF 01 00 07 00 55 5D record start/stop@record_mode camera feedback 3A 77 52 65 63 31 0D 00 when start rec
camera feedback 3A 77 52 65 63 30 0D 00 when stop rec

FF 01 00 07 00 55 5D take a picture@picture_mode
81 09 04 47 ff query_zoom_position
Zoom_position_feedback: 90 50 0p 0q 0r 0s FF pqrs: zoom_position_value
81 01 04 01 03 ff day mode
81 01 04 01 02 ff night mode
81 01 04 51 02 ff auto mode

6.2) Sky Eye-12NL,Sky Eye-20NL RJ45 onvif IP camera output version:

zoom_out_visca 81 01 04 07 37 FF //wide
zoom_in_visca 81 01 04 07 27 FF //tele



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focus_out_visca 81 01 04 08 37 FF //near
focus_in_visca 81 01 04 08 27 FF} //far
stop_zoom_visca 81 01 04 07 00 FF
stop_focus_visca 81 01 04 08 00 FF
start_picture 55 02 07 aa
start_record 55 02 05 aa
stop_record 55 02 06 aa
Zoom_direct_pos 81 01 04 47 0p 0q 0r 0s FF
Camera feedback :get cmd: 90 41 ff finished cmd: 90 51 ff
query_zoom_position 81 09 04 47 ff
Zoom_position_feedback: 90 50 0p 0q 0r 0s FF 0xpqrs: zoom_position_value

6.3) Sky Eye-12NL laser light cmd

zoom_in_laser {FF 01 01 04 00 1a 20} zoom_out_laser {FF 01 01 04 01 1a 21}
laser_on {FF 01 01 01 01 00 04} laser_off {FF 01 01 01 00 00 03}

6.4) Z6K cmd for sony a6000/a7Rii

poweron_a6000 FF 01 00 50 00 00 51 zoom_wide_a6000 FF 01 00 40 00 00 41
zoom_tele_a6000 FF 01 00 20 00 00 21 stop_zoom_a6000 FF 01 00 00 00 00 01
picture_a6000 ff 01 00 07 00 66 6E record_a6000 FF 01 00 07 00 55 5D

6.5) Sky Eye-30HZ-S, Sky Eye-36SZ, Eagle Eye-10IE, Eagle Eye-20IE, Eagle Eye-30IE tracking



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zoom_out_visca 81 01 04 07 37 FF //wide
zoom_in_visca 81 01 04 07 27 FF //tele
focus_out_visca 81 01 04 08 37 FF //near
focus_in_visca 81 01 04 08 27 FF} //far
stop_zoom_visca 81 01 04 07 00 FF
stop_focus_visca 81 01 04 08 00 FF
query_zoom_position 81 09 04 47 ff
Zoom_position_feedback: 90 50 0p 0q 0r 0s FF p q r s: zoom_position_value
rec_start_tracker 7e 7e 44 00 00 7c 01 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 bd
rec_stop_tracker 7e 7e 44 00 00 7c 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 bc
picture_tracker 7e 7e 44 00 00 7c 02 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 be





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cmd_data[8]= 0xXH ; X HIGT BYTE cmd_date[13] = track size

cmd_data[9]= 0xYL ; Y LOW BYTE

cmd_data[10]= 0xYH ; Y HIGH BYTE

Track the target at position : (769, 769)

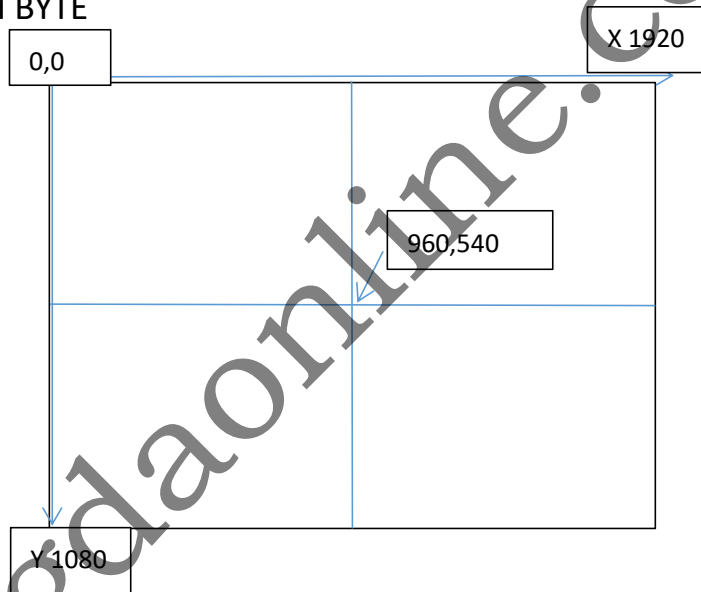
7e 7e 44 00 00 86 00 01 03 01 03 01 00 3c 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 0b

Track the target at position : (1025, 769)

7e 7e 44 00 00 86 00 01 04 01 03 01 00 3c 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 0c

Track the target at position : (257, 257)

7e 7e 44 00 00 86 00 01 01 01 01 01 00 3c 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 07



4. Tracking of target - refer question 3

5. Lock target - refer question 3

