## DWARF II API V1.0 (english version)

### 1. API Introduction

The DWARF II API can be divided into the following types of interfaces according to protocol types and functions:

- 1. Bluetooth connection API, providing Bluetooth network-related interfaces
- 2. Basic function API, providing camera preview, photo, video, auto focus, ISP parameter adjustment, system Settings and other interfaces
- 3. Advanced functional API, providing astronomical related interface, automatic tracking interface, panoramic stitching interface
- 4. Motion control API, providing interfaces to control the movement of DWARF II rotation axis and pitch axis
- 5. File preview and download API, providing interfaces for previewing and accessing images and videos taken by DWARF II
- 6. System function API, providing system-related interfaces

## 2. Bluetooth connection API

Bluetooth connections communicate using BLE, using the following services and features:

type	UUID	explain	
Service	0000180A-0000-1000-8000-00805F9B34FB	Service UUID	
Characteristic	00009999-0000-1000-8000-00805F9B34FB	Characteristic UUID	

The Bluetooth request sends byte data (not enough bytes for zero) and returns a json string.

### 2.1 Configuring AP Hotspots

Bluetooth request

Message h	eader (1 byte)	Password (3	32 bytes)	Command (12 bytes)	Country code
5 th 0 (8)					20.00

### 0x02

#### return

	field		type	29.00	explain	
	cmd		string	- 85.000	wifiap	
CW 4627	ssid		string		wifi name	
	psd		string	58 48A	wifi password	
2.00 a (8.7)	ip		string		IP Address	
	code		int	58991	Error code	

## 2.2 Configuring STA Mode (Connecting to Router)

### request

Message header (1 byte)	Password (32 bytes)	Command (12 bytes)	ssid(32 bytes)
0x01	default: "DWARF_12345678"	wifista	Router name

#### return

field		type	- 40 (12)	ex	olain
cmd		string		wi	fista
ssid		string	58 482	Route	er name
psd		string		Router	password
ip		string	28 48A	IP A	ddress
code		int 🕬 🌃		Erro	r code

## 2.3 Get WIFI configuration

Message header (1 byte)	Password (32 bytes)	Command (12 bytes)	Message ta
0x05	default: "DWARF_12345678"	getconfig	0x0

	field		type		explain
	cmd		string	93	getconfig
	state		int	2 N 10 <sup>1</sup>	0: Not configured 1: in configuration 2: Configuration complete
	mode	58 str.	int	2 th 4 (8)	0:NONE 1:AP 2:STA
ps 101	ssid		string	g\strace{\pi}	wifi name
	psd	20 407	string	2th 467	Wifi password
W 0.027	ip		string	g).	IP Address
	code	38 90	int	39.10	Error code

## 2.4 Example Change the name and password of Bluetooth wifi

### request

Message header (1 byte)	Password (32 bytes)	Mode (1 byte)	Command (12 by
		$\Xi m A_{\rm RZY}$	210 Athy
profit profit	2000	2000	200 (18)
0x06	default: "DWARF_1234	0: Bluetooth name	setBleWifi
2.0 apr.	5678"	1: Bluetooth password	211 211
$\Xi W \pm ig_{f}$ $\Xi W \pm ig_{f}$	200 0.007	2: wifi name	2 th 4 th 7
200 0.007	$\mathbb{E}_{2g,3(g_f)} = \mathbb{E}_{2g,3(g_f)}$	3: wifi password	EW 4/87

field	type	explain
cmd	string	setBleWifi
100 mg 1	40.00,	- 10 mg 1

code	int	Error code
mode	int	mode
value	string	Modified value

### 2.5 Reset Bluetooth WIFI

request

Message header (1 byte)		Command (12 bytes)	Message tail (1 byte)	
58 187	0x07	reset	0x04	
		th say	200 1007	

#### return

	field		type	explain
	cmd		string	reset
5 20 5 60 7	state		int	1: Waiting for reset 2: Reset complete
5 th 2 th 2	code	5 M 4 M/2	int 🕬 🌁	Error code

## 3. Basic function API

Unless otherwise specified, the communication interface is ws://192.168.88.1:/ 9900, the communication protocol is websocket, and the communication data type is json.

Note: Make sure the camera is turned on before using the basic function API.

## 3.1 image transmission

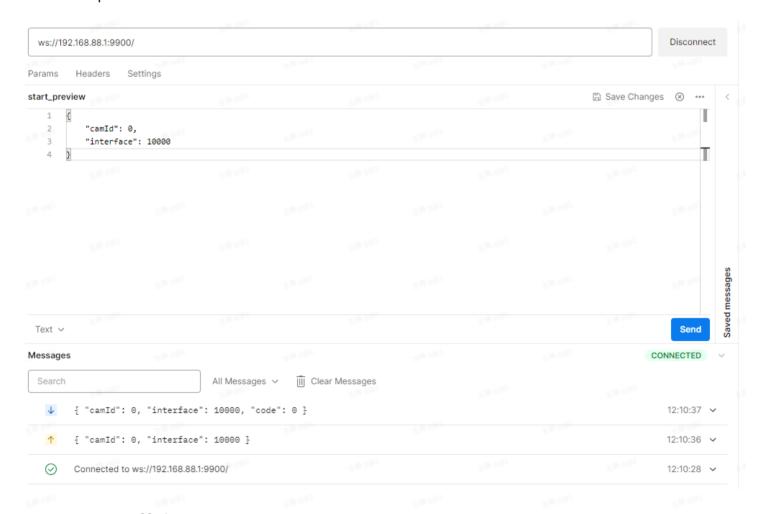
### 3.1.1 Turn on the camera

field		type	20.40	explain
	5 10 000	39.99	3999	500.000

interface	int seed	value:10000
camId(camera id)	int	0:Long focal camera 1:Wide-an

field	type	explain
interface	int	value:10000
camId(camera id)	int	0:Long focal camera 1:Wide-angle camera
code	int	Error code

### Use example



### 3.1.2 Turn off the camera

	field		type	3	explain
500 000		500 0007		20.007	

Esp Aspy	interface	int	value:10017
can	nId(camera id)	int	0:Long focal camera 1:Wide-anք

field	type	explain
interface	int	value:10017
camId(camera id)	int	0:Long focal camera 1:Wide-angle camera
code	int	Error code

## 3.1.3 Camera preview

The camera preview interface is jpeg video stream, requiring the receiver to parse the jpeg video stream and display. You can use the browser to test the interface.

1. Long lens preview

http://192.168.88.1:8092/mainstream

2. Wide-angle preview

http://192.168.88.1:8092/thirdstream

## 3.2 Photograph and video

### 3.2.1 Photograph

	field		type		explain
	interface		int		value:10006
2 B 4 G/	camId(camera id)	28 487	int	58 103	0:Long focal camera 1:Wide-angle
18 18 <sup>1</sup>	mode(Photo mode)	20 sq./	int		0:Single shot 1:Continuous Capture
es 1923	count(number)	100 mm	int		default:1

field	type	explain
interface	int	value:10006
camId(camera id)	int	0
code	int	Error code

## 3.2.2 Start recording

### request

field	type	explain
interface	int	value:10007
camId(camera id)	int	0:Long focal camera
name(File name without suffix)	string	Name it with a phone timestamp

#### return

	field	type	explain
	interface	int	value:10007
2 th 1822	camId(camera id)	int seed	0:Long focal camera
	code	int	Error code

## 3.2.3 Stop recording

field	type	explain
interface	int	value:10009
camld(camera id)	int	0:Long focal camera

field	type	explain
interface	int	value:10009
camId(camera id)	int	0:Long focal camera
code	int	Error code

## 3.2.4 Start time lapse photography

### request

field	type	explain
interface	int	value:10018
camId(camera id)	int	0:Long focal camera
interval(Interval time)	int	1s-60s
outTime(Output duration)	int	1s-
name(File name without suffix)	string	Name it with a phone timestamp

### return

field	type	explain
interface	int	value:10018
camId(camera id)	int	0:Long focal camera
code	int	Error code

## 3.2.5 Stop time-lapse photography

field	type	explain	
interface	int	value:10019	

camId(camera id)	int	0:Long focal camera
------------------	-----	---------------------

	field	type		explain
	interface	int	5 M 4 M 7	value:10019
2 to 4 to 7	camId(camera id)	int		0:Long focal camera
	code	int		Error code

## 3.3 Adjust ISP parameters

## 3.3.1 brightness

## request

	field		ty	pe	explain
2 th 4 th 7	interface		ir	nt	value:10204
10 m (187)	camId(camera id)	28 etc.)	ir	nt ga est	0:Long focal camera 1:Wide-angle camera
	value		ir	nt	Long focal range:0-255 default: 128
2.30 a.027					Wide-angle range: -64-64 default: 0

## 3.3.2 contrast

	field		type		explain
	interface	28 487	int		value:10205
5.80 VIII.	camId(camera id)	200 107	int	2 th 4 th 1	0:Long focal camera 1:Wide-angle camera
0.101	value		int	2 th 4/8/7	Long focal range:0-255 default:

Wide-angle range: 0-95 default:

0

## 3.3.3 saturation

### request

	field			type		explain
2 th 4 th 7	interface		550 4007	int	in car	value: 10206
5 th 4 th 1	camId(camera id)	5 th e(t)	58 ral	int	2B 7E	0:Long focal camera 1:Wide-angle camera
CB 952	value	59 981	18 18 <sup>1</sup>	int	10 toy	Long focal range:0-255 default:
		2 88 4 (B.)				Wide-angle range: 0-100 default: 80

## 3.3.4 hue

### request

	field		type	explain
	interface	2.0	int	value:10207
230 attr	camId(camera id)	590 1001	int	0:Long focal camera 1:Wide-angle camera
Say alley	value	24 × 67	int	Long focal range:0-255 default: 128
18 18 1		58.487		Wide-angle range: -2000-2000 default: 0

## 3.3.5 sharpness

	field	type	explain
	interface	string	value:10208
50007	29x 16t)	28.001	200.000

E 20 4 16 7	camId(camera id)	int int	0:Long focal camera 1:Wide-angle
			camera
2 th 4 th 7	value	int	Long focal range:0-100 default: 50
			Wide-angle range: 1-7 default: 2

## 3.3.6 Set exposure mode

request

field		type	explain
interface	1001	int	value:10001
camId(camera id)	220 VIII.	int	0:Long focal camera 1:Wide-ang camera
mode	200 200	int	Long focal camera: 0:auto 1:mar Wide-angle camera: 3:auto 1:ma

## 3.3.7 Set exposure value

request

field	ty	pe	explain
interface	s <sup>p est</sup> ir	nt 🥬 🤲	value:10003
camId(camera id)	s <sup>m om</sup> ir	nt small	0:Long focal camera 1:Wide-angle camera
value	dou	uble	Long focal camera: 0.0000-15.0000 Wide-angle camera: 0.0003-1.0

## 3.3.8 Set gain mode

field	type	explain
interface	int	value:10004
2 to 1 to	20.007	2 th c ty

camId(camera id)	int seed	0:Long focal camera 1:Wide-angle		
		camera		
mode	int	0:auto 1:manual		

## 3.3.9 Set gain value

request

	field		type		explain
	interface		int	28 4/27	value:10005
1 to 1 to 1	camId(camera id)	58 103	int	58 10 <sup>1</sup>	0:Long focal camera 1:Wide-angle camera
5 th 1 th 1	value		int		Long focal camera:0-240
					Wide-angle camera:64-8000

## 3.3.10 Start autofocus

### request

	field			type		20.40		explain	
interface			int			value:10211			
10 4 th h	camId(camera id)		5 M 4 M A	int	2 M 4 W L		0:Lo	ong focal ca	imera
	mode			int		20.407	0: Globa	al focus 1:	Area focus
150 oth 1	centerX			int				0-1920	
	centerY			int		20 407		0-1080	

field	type	explain
interface	int	value:10211
camId(camera id)	int	0:Long focal camera
code	int	Error code

### 3.3.11 Set the white balance mode

request

	field	type	explain
5 th + 12 l	interface	int	value:10212
5 th 4 th 1	camId(camera id)	int	0:Long focal camera 1:Wide-angle camera
	mode	int	0: auto 1: manual

### 3.3.12 Set the white balance scene

request

	20 407	field			type	e	210 4107	explain	
5 th 018 /	int	erface		200 0007	int	2000/		value:10213	
camId(camera id)			int			29 (0)	0:Long focal camera	3	
510 100	n	node		59140	int	3849,		0: Incandescent lamp	
							230 4107	1: Fluorescent lamp	
5 th 9 th 1				210 Alg.7				2: Warm fluorescent lamp	
							230 ata <sub>7</sub>	3: sunlight	
				2.00 etc.)				4: overcast sky	
							210 ata7	<ul><li>5: evening twilight</li><li>6: shadow</li></ul>	
- 10 miles	58 (0)		28 to)	520 000			58 105	3.00	

## 3.3.13 Set the white balance color temperature parameter

	field	type	explain
	interface	int	value:10214
Esp Assy	camId(camera id)	int	0:Long focal camera 1:Wide-angle camera
Zan origi	value	int	Long focal camera: 2800-7500

Wide-angle camera: 2800-6000

## 3.3.14 IR\_CUT

### request

field			type	explain
interface		on real	int	value:10203
camId	58 103		int	0
value			int	0: Red light filter 3:Unfiltered red light

## 3.4 Gets DWARF running status and parameters

## 3.4.1 Get telephoto ISP parameters

### request

field	type	explain
camld	int	0
interface	int	value:10215

	field			type		explain	
	camld			int	5 th 4 th 1	0	
Zigo Aldey	interface		20.407	int 🕬 🌃		value:10215	
	expMode	20 467		int	28 aug.	Exposure mode	
5 th 9 th 1	exp		2.00 4.07	float		Exposure value	
	gainMode	5 th 1022		int	58 100	Gain mode	
10 700	gain		20.10	int		Gain value	
	awbMode	29000		int	200	White balance model	

24 497	awbCT		240 A187	int			White balance color temperature
	irState	28 407		int		29 487	0: Red light filter 3:Unfiltered red
2 th 4 th y			59 107				light
	quality			int			Preview picture quality: 30-85
5th 463	brightness		20000	int			brightness
	contrast			int			contrast
58 587	hue		28 467	int			hue
	saturation	28 487		int		28 407	saturation
5 th 9 th 1	sharpness		5 10 1/21	int	38 487		sharpness
	_ 0.022						-0.00

## 3.4.2 Get telephoto IRCUT state (when shooting raw)

### request

	field	type	explain
5 to 9 to 1	camld	int	0
	interface	int	value:10216

#### return

field	type	explain
interface	int	value:10216
value	int	0: Red light filter 3:Unfiltered red light

## 3.4.3 Returns to the telephoto working state

	field	type	explain
	interface	int	value:10022
2 to all 7	camld	int	0:Long focal camera

field	d		type			explain
cam	Id		int	- 0.783		0:Long focal camera
interfa	ace		int		-9.103	value:10022
camState(Car	nera state)	20.000	int	20 407		0: closed 1: opened
photoState(Sho	ooting state)	59 125	int	5 M 1021	2 (0 e/d).	<ul><li>0: idle1: Ordinary photograph</li><li>2: Panoramic photograph 3:</li><li>RAW photograph 4: Dark field photograph</li></ul>
recordState(Vi	deo status)	58 487	int	28 487		0: idle 1: On video 2: Time- lapse photography
trackState(Tra	cking state)	250.000	int	20 101	20 (0)	<ul><li>0: uninitialized 1: be initializing</li><li>2: Initialization complete 3: In track 4: Tracking stop</li></ul>
astroState(Astroi	nomical state)	58 103	int	210 stg./	2 th 4 th 7	<ul><li>0: Under correction 1: tracking</li><li>2: stopping 3: idle 4:</li><li>Calculating</li></ul>

## 3.4.4 Returns the wide-angle ISP parameter

### request

field	type	explain
camld	int	1:Wide-angle camera
interface	int see	value:10217

field	type	explain
interface	int	value:10217
camld	int	1
100 ogs.	20.00	28.00

Esp Agy	expMode		int		Exposure mode
	ехр	29 487	float	59 98%	Exposure value
58 587	gain		int	20 407	Gain value
	awbMode	5.80 rm	int	20 10.0	White balance model
200 200	awbCT		int	28.00	White balance color temperature
- 0. TO 1	brightness		int	- 0.00	brightness
	contrast		int		contrast
E10 4/87	saturation		int		saturation
	hue		int		hue
E19 4/07	sharpness		int		sharpness
	gamma		int		gamma

## 4. Advanced function API

## 4.1 Astronomical function

Before using the astronomy function, you must set the UTC+0 time

### 4.1.1 UTC+0 time

HTTP request: http://192.168.88.1:8092/date?date=yyyy-mm-dd hh:mm:ss

return

field	type	explain
result	int	0:ok,-1:failed

### 4.1.2 correction

	field	type	explain
	interface	int seeds	value:11205
	camId	int	0:Long focal camera
200 0007	2 it 1/2/	20.00	2 to

lon	2 to 4 to 7	double	longitude
lat	5 10 10 10 1	double	latitude
date	20 407	string	timestamp:yyyy-MM-dd HH:mm:ss
path	20.107	string	DWARF_GOTO_timestamp

	field	type	explain
5B 187	interface	int	value:11205
	code	int	Error code & State Code

## 4.1.3 Start goto

Please ensure that the correction is successful before starting the goto request

<b>field</b> interface			type int			explain	
						value:11203	
5 M 200	camld		5.00 100	int	a atti	0:Long focal camera	
	planet		5 M 4 M 1	int		Mercury = 0,  Venus = 1,	
					200 4007	Mars = 2,	
THE SELECT			20.107			Jupiter = 3,	
					20 407	Saturn = 4,	
			50.107			Uranus = 5,	
					20 etc.)	Neptune = 6, Moon = 7	
			20.407		2 th 1/23	GO planet with this field and use right ascension and declination without it	
	ra	- 10 T (C)	2,00	double	2 th 4 th 7	Right ascension	
-m vill )	dec		200 4007	double		declination	

lon	double	longitude
lat	double	latitude
date	string	timestamp:yyyy-MM-dd HH:mm:ss
path	string	DWARF_GOTO_timestamp

	field		type	explain
	interface	5 th 4 th 1	int	value:11205
	code		int	Error code & State Code

## 4.1.4 Take raw pictures

field	type		explain
interface	int	-91.952	value:10011
camld	int		0:Long focal came
target	string	589.1007	Shot target, default NULL, obtain
RA	string		The right ascension coordinate st
DEC	string	58 167	The declination coordinate stri
exp	double		Exposure value
gain	int	59 107	Gain value
binning	int		0:no binning mod
	20 to;	59 107	1:binning mode
count	int		Number of shots, defa
name(File name without suffix)	string	59.107	Name it with a phone tin
overlayCount(The number of stack pictures)	int	590 1007	Must set to 1
format(RAW data format)	int		0:FITS

field	type	explain
interface	int	value:10011
camld	int	0
code	int	Error code

## 4.1.5 Returns the number of raw images

No request is required; dwarf actively returns.

#### return

	field	type	explain
	interface	int	value:10014
2 th 4 th y	code	int	State code
	camld	int	0
	totalCount	int	Total number of RAW images shot
	currentCount	int	Number of RAW images taken

## 4.1.6 Returns the number of superimposed astronomical RAW images

No request is required; dwarf actively returns.

	field			type		explain
	interface		20 407	int 🕬 🤲		value: 10023
	code	20 107		int	29.467	State code
5 fb 9 fb 1	camId		2 th 4 th )	int		0
	stackedCount	38 101		int	29 105	Number of RAW images stacked

### 4.1.7 Stop taking RAW images

request

field	type	explain
interface	int	10015

### 4.1.8 RAW image preview

RAW image preview interface for jpeg video stream, need the receiver to parse the jpeg video stream and display, you can use a browser to test the interface.

RAW image preview:

http://192.168.88.1:8092/rawstream

## 4.1.9 Switch the RAW preview source

request

field	type	explain
interface	int	value:10020
camld	int	0
source(RAW preview source)	int	0:Continuous superposition graph 1:Single 15s exposure graph
		2:Single sheet according to exposure time (more than 15s) composite image

## 4.1.10 Taking dark field

	field			type	p).		explair	59 107	
	interface			int	20 407		value:100	26	
5 th 9 th 1	camId		20 toy	int 🕬	gă.	20 107	0	58 407	
	count	28 107		int	20.107		default:4	10	31
20.467	28 187		200 4007	50.15	j.h	20.107		28 187	

ne(File name withou	e name without suffix)		string			DWARF_DARK prefix,Name it	
					5/9 10/2	with a phone timestamp	
binning			int			0:no binning mode	
					58 407	1:binning mode	
darkGain			int			There are 25 gain stops, each of which corresponds to a bit of int.	
					200 4007	If shooting a dark field with 0 and	
						10 gain, send 3.	
darkExp			int		58 say	Exposure gear, starting at zero, last 15 seconds	
	binning darkGain	darkGain	binning  darkGain	binning int  darkGain int	binning int  darkGain int	binning int  darkGain int	

## 4.1.11 Query the shot field

## request

	field	type	explain
	interface	int	value:10027
5 to 5 to 7	camId	int sheet	0
	binning	int	0:binning1*1
		2 to 4 to 7	1:binning2*2

	field		type		explai	n
	interface		int	5 M 4 G/Y	value:10	027
	value		int		There are 25 gain s which corresponds If shooting a dark fi	to a bit of int.
				3,000	10 gain, se	
	code		int	5 th 10 h	State co	ode
	camld		int		0	
	binning		int	590 100	0:binning	g1*1
5 th + 12 l					1:binning	g2*2

## 4.2 Tracking function

Before using the trace function, initialize the trace

## 4.2.1 Trace initialization

### requst

field	type	explain
interface	int	value:11200

#### return

field	type	explain
camId	int	0
interface	int	value:11200
code	int	State code

## 4.2.2 Start tacking

### request

	field	type	explain
	interface	int	value:11201
270.051	camld	int	0
	X	int	0-1920
5 th 100°	У	int	0-1080
	W	int	0-1920
	h	int	0-1080

field	type	explain
	• • • • • • • • • • • • • • • • • • • •	•

interface	int	value:11201	
camId	int	0	
Х	int	Current tracking result x coordinate	
у	int	Current trace result y coordinate	
W	int	Current trace result width	
h	int	Current trace result height	
code	int	Error code	

## 4.2.3 Stop tracking

### request

field	type	explain
interface	int	value:11202
camld	int	0

#### return

field		type	explain
interface	2000	int	value:11202
camld		int	0
code		int 🕬	Error code

## 4.3 Panoramic function

## 4.3.1 Start panorama

field	type	explain
-------	------	---------

int			value	:10103
	int	28 48y	Numbe	r of rows
29.10	int		Number	of columns
	int	50.00	1248163	2 64 128 256
	int	c 80 c 80 h	1248163	2 64 128 256
2 th 4 th 7	int		0-1000	mStep1
	int	28 487	0-1000	mStep2
59.467	int		5 th 4 th 1	=2
	so of int	28 487	311>	=2
20.407	string		DWARF_PANOR	AMA+timestamp
	int	29.487	0-1	000
20000				
	int	5 80 V (8)	0-1	000
		int	int	int         Number of           int         12481633           int         12481633           int         0-1000*           int         0-1000*           int         >:           string         DWARF_PANOR           int         0-1

	field	type	explain
50 981	interface	int	value:10103
	code	int	State code

## 4.3.2 Stop panorama

### request

field	type	explain
interface	int	value:10106

## 5. Motion control API

## 5.1 Start

### request

	field			type			explain
	interface			int		5 M 183	value: 10100
	id(motor id)		58 487	int			1:spin 2:pitch
	mode			int		58 183	1:continuous mode 2:pulse mode
	mStep(subdivide)		20 agy	int			1 2 4 8 16 32 64 128 256
	speed		20.101	int		58 487	range:0-65536(1-50000&& <1000*mStep)
	direction			int		270 VIII.	0:anticlockwise 1:clockwise
	pulse		200 1007	int			range:>=2 (mStep<=32) >=5(mStep>32)
acc	celStep(Acceleration	steps)	- 10 × 10 h	int	×10.70 <sup>1</sup>	3,91	0-1000

### return

	field	type	explain
	interface	int seed	value:10100
	motorId	int	1:spin 2:pitch
100 mg/s	code	int	State code

### Touch limit return

field	type		explain
interface	int	28 101	value:10100
motorId	int		1:spin 2:pitch 3:focus
code	int	58 107	Error code:-22, RESULT_MOTOR_LIMIT

limit	int special	0:Limit 0
	Ellistay Ellistay	1:Limit 1

## 5.2 Stop

## request

field	type	explain
interface	int	value:10101
id	int	1:spin 2:pitch
decelStep(Deceleration steps)	int	0-1000

### return

field	type	explain
motorld	int	1:spin 2:pitch
interface	int	value:10101
runMode	int	0:pulse mode 1:continuous mode
numSteps	int	Running steps
code	int	Error code

## 5.3 Set speed

field	type	explain
id	int	1:spin 2:pitch
interface	int	value:10107
speed	int	0-50000
accelStep	int	0-1000
trend	int	0:decelerate 1:accelerate

field	type	explain
id	int	1:spin 2:pitch
interface	int	value:10107
code	int	Error code

## 5.4 Set direction

### request

field	type	explain
id	int	1:spin 2:pitch
interface	int	value:10108
direction	int	0:anticlockwise 1:clockwise

#### return

	field		type	explain
Ess esgy	motorId	50 101	int	1:spin 2:pitch
	interface		int	value:10108
5 th 10 th	direction	200 000	int	0:anticlockwise 1:clockwise

## 5.5 Set subdivide

	field	type	explain
5 th 4 th 1	id	int	1:spin 2:pitch
	interface	int	value:10109
5 th 1023	mStep	Int	1 2 4 8 16 32 64 128 256

## 6. File preview and download API

## 6.1 File preview

Preview using HTTP file server, interface: http://192.168.88.1:8090/file/ + file name, file called/sdcard directory below picture or video file.

### 6.2 File download

The file download protocol is ftp or sftp.

ftp login:

Account number: ftp

password: rockchip

sftp login:

Account number: root

password: rockchip

Note:

1.ftp only has download permission, no file transfer and delete permission, ftp can only access the sdcard directory

2.sftp can access all directories and has the permission to upload and delete files. Ensure that you select /sdcard as the directory to upload and delete files through sftp.

## 7. System function API

## 7.1 Returns other system states

request

field	type	explain
interface	int	value:11407

field	type	explain
	• •	-

interface	int	value:11407
chargeState(charging state)	int	0: uncharged 1: Slow charge 2: Quick charge
tfState(sd card status)	int	0: no microSD 1: have microSD
powerIndState(Power indicator status)	Int	0: close 1: open
ele(Electric quantity)	int int	Electric quantity
fwVersion	string	firmware version
cpuMode	int	0: normal mode 1: Performance Mode
mtpMode	int	0: close 1: open

## 7.2 Get microSD card information

request

field	type	explain
interface	int	value:11405

#### return

	field	type	explain
500 miles	interface	int seeds	value:11405
	size	int	G
520 B. B. B. B.	avail	int	G

## 7.3 check microSD

field	type	explain
interface	int	value:11409

	field	type	explain
1 th o (2)	interface	int	value:11409
	value	int	0: no microSD 1: have microSD
210 4th 7	code	int	Error code

## 7.4 Get the DWARF software version number

### request

field	type	explain
interface	int	value:11410

#### return

	field	type	explain
50 487	interface	int	value:11410
	version	string	example:1.5.2
Esp dery	code	int	Error code

## 7.5 Charging state (DWARF active sending)

#### return

field	type	explain
interface	int	value:11011
value	int	0: uncharged 1: Slow charge 2: Quick charge

## 7.6 MTP mode

field	type	explain
interface	int	value:11408

## 7.7 OTA upgrade (firmware version less than V1.3.19)

request

field	type	explain
interface	int	value:11400

## 7.8 OTA upgrade (firmware version V1.3.19 or greater)

request: http://192.168.88.1:9901/update?version=1.3.20

The value of version corresponds to the upgrade package version number

return

field	type	explain
result	int seed	OTA upgrade return value

### returned value specification

return code	value	20.00	explain	
UPDATE_SUCCESS	0	- 0.001	update successfully	
UPDATE_FAIL	-1	2 M 10 <sup>1</sup>	update failed	
UPDATE_FILE_NOT_EXIST	-2	210 att. 7	file does not exist	
UPDATE_FILE_PARSE_FAILED	-3	2 (0 a (0))	File parsing failure	
UPDATE_VERSION_ERROR	-4	5 th 40%	Version error	
UPDATE_REQUEST_ERROR	-5	2 th 4 th 7	Request failed	
UPDATE_UPDATING	-6	210 × 10.7	upgrading	

# 7.9 Obtain the firmware version (firmware version greater than or equal to V1.3.19).

request: http://192.168.88.1:9901/get\_version

return

field	type	explain
result	string	version

## 7.10 Power acquisition

request

field	type	explain
interface	int	value:11003

#### return

	field		type	explain
2 th 4 th 7	interface	2 th 1 th 1	int	value:11003
	value		int	0-100
5 M 4 M 7	code	20.487	int 🕬	Error code

### 7.11 Shut down

request

field	type	explain
interface	int	value:11004

### 7.12 RGB control

		58 103	

field	type		50 TO 1	explain
interface	int	20 407	val	ue:11000
mode	int		2 to 4 to 7	96-105
hue	int	59 100	3	0-255
saturation	int		58 100	0-255
value	int		-8181	0-255
background	int	- 10 × 10 Å		0-7
delayTime(delay time)	int			1-255
breatheDelay(Breathing delay)	int	510 4007		1-255
cycleNum(Number of cycles)	int int			0-255
cycleFlag(Loop flag)	int	58 925		oop other value: by degree

## 7.13 Turn off RGB

request

field	type	explain
interface	int	value:11008

## 7.14 Turn on the power indicator

request

field	type	explain
interface	int	value:11009

## 7.15 Turn off the power indicator

field	type	explain
		-0.007

## 8. Error codes & status codes

## 8.1 Error codes

Error code	value		explai
RESULT_OK	0	30.10	operate succ
RESULT_CAM_OPENED	-1	- 00.0187	The camera
RESULT_CAM_CLOSED	-2		The camera
RESULT_CAM_RECORDING	-3	2.00 attr	On vide
RESULT_CAM_TAKING_PHOTO	-4		Being photog
RESULT_MOTOR_RUNNING	-5	20.487	Motor in m
RESULT_MOTOR_STOPED	-6		Motor stop
RESULT_MOTOR_SEND_FAILED	-7	59 107	Motor instruction fa
RESULT_PANORAMA_STARTED	-8		anorama scannin
RESULT_MOTOR_ERROR_RUNNING	-9	2 th 1/21	The motor stops first a which will cause the
RESULT_CAM_PAUSING_MUTILPHOTO	-10	28 48V	The beat is su
RESULT_CAM_AUTO_FOCUSING	-11		Autofoc
RESULT_TRACKER_UNINIT	-12	20.407	Tracing algorithm is
RESULT_TRACKER_INITING	-13		Tracing algorithm
RESULT_TRACKER_INITIED	-14	311 400	The tracing algorith
RESULT_TRACKER_TRACKING	-15		Under trac
RESULT_OTA_STARTING	-16		OTA upgr
RESULT_GOTO_JPGTOFITS_FAILED	-17	5 th 2 th 3	JPG failed to convert to
RESULT_GOTO_PLATE_SOLVING_FAILED	-18		Plate Solvin <sub>§</sub>
RESULT_GOTO_CALIBRATION_FAILED	-19	20.107	Level correctic

Bluetooth configu	29 107	-20	RESULT_BLE_WIFI_CONFIGING
The wifi has beer		-21	RESULT_BLE_WIFI_CONFIGED
Motor reach	500	-22	RESULT_MOTOR_LIMIT
The microSD is n	-0.981	-23	RESULT_TFCARD_NOT_EXIST
Motor not		-24	MOTOR_RESET_NOT_PERFORMED
OTA upgrad	59.487	-25	RESULT_OTA_ERR
Low electric		-26	RESULT_OTA_ELE_LOW
OTA versio	58 187	-27	RESULT_OTA_VERSION_ERR
plate sol		-28	RESULT_GOTO_PLATE_SOLVING
Be correc	200 4007	-29	RESULT_GOTO_CALIBRATING
Be track		-30	RESULT_GOTO_TRACKING
Stopping (	28 100	-31	RESULT_GOTO_STOPPING
Failed to open v		-32	RESULT_OPEN_UVC_CAMERA_FAILED
The UVC camera cann		-33	RESULT_UVC_CAMERA_CANNOT_FOUND
Tracking	28.703	-34	RESULT_TRACKER_STOP
Time lapse photogra		-35	RESULT_TL_RECORDING
In auto foo	200 att/2	-36	RESULT_AUTO_FOCUSING
Bluetooth pass		-37	RESULT_BLE_PASSWORD_ERROR
wifi passwo	2 to 4 to 7	-38	RESULT_WIFI_PASSWORD_ERROR
The Bluetooth wifi co		-39	RESULT_BLE_WIFI_CONFIG_ERROR
Procedi	20.407	2 th 4 th y	40y 20 40y
In panorar		-40	RESULT_PANORAMAING
No dark t	210 attr	-41	RESULT_NO_DARK_FRAME
Dark scene sh		-42	RESULT_DARK_FRAME_ERROR
RAW image shootin	20.407	-43	RESULT_CAPTURE_RAW_ELE_LOW
Stopping the telep		-44	RESULT_CLOSING_CAM_TELE

### 8.2 Status codes

explai	value		State code	
Start corre	1000	2 th 4 th 7	STATE_CALIBRATION_START	
Correcting Plat	1001	9	STATE_CALIBRATION_PLATE_SOLVING	STA
Correction	1002	20,407	STATE_CALIBRATION_FAILED	
Start GO	1003	51	STATE_GOTO_START	(B) 912.1
GOTO Plate (	1004	20 40.	STATE_GOTO_PLATE_SOLVING	
Start trac	1005	-0.081	STATE_GOTO_TRACKING	
GOTO fail	1006		STATE_GOTO_FAILED	
Stopping Astrono	1007	20.407	STATE_ASTRO_STOPPING	
End of astronom	1008		STATE_ASTRO_END	
Correct succe	1009	59 107	STATE_CALIBRATION_SUCCESS	