GCU

User Manual

FOXTECH

Using this Manual – Legend

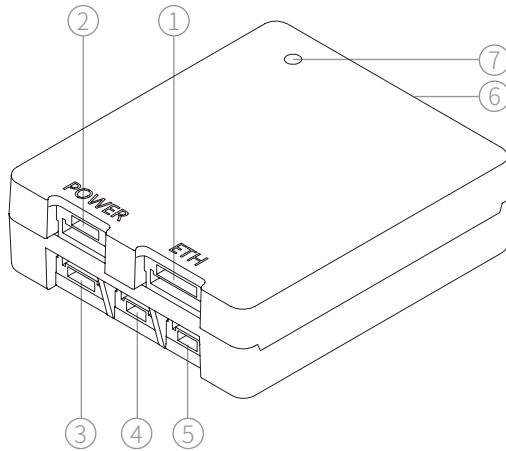⚠ Important   🔍 Tips   ❓ Explanation

Catalog

Introduction

Synopsis

With the GCU and the Dragonfly software, user can watch the image from the camera and control the gimbal real-timely on a computer.

The GCU has a tiny size and multiple extend ports. It supports Network, UART and S.BUS control. The GCU support both private protocol and MAVlink protocol.

Overview
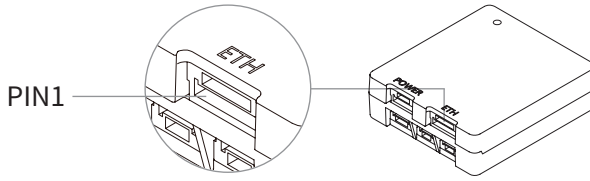

1.Network Port   2.Power Supply Port

3.UART2 Port   4.UART1 Port

5.S.BUS Port   6.Gimbal Control Port

7.Status LED

Status LED Description

Blue flashing	Working normally
Solid blue	GNSS not positioning
Solid purple	No GNSS data
Red flashing	Error

Port Definition

PIN1 —

Port	Pin	Definition	Description
POWER	1	GND	Operating Voltage: 20~52V DC
	2	GND	
	3	NC	
	4	Vin	
	5	Vin	
ETH	1	5V	GCU configuring; Private protocol control; HD image Output
	2	GND	
	3	T+	
	4	T-	
	5	R+	
	6	R-	
S.BUS	1	GND	Support S.BUS1 standard such as FASST and SFHSS and S.BUS2 standard such as FASSTest
	2	5V	
	3	S.BUS	
UART	1	GND	GCU configuring; Private protocol control
	2	UART_Rx	
	3	UART_Tx	
UART2	1	UART2_Tx	MAVlink protocol control
	2	GND	
	3	5V	
	4	UART2_Rx	

🔍 The total output power of 5 V on the GCU is 1.5 W. Do not supply power to any equipment over 1.5 W through the GCU. Otherwise may cause the device working unproperly.

Configuring & Updating Firmware

⚠ Ensure the gimbal and the GCU have both been updated to the latest firmware before use. Otherwise, usage may be affected.

⚠ Ensure the diver of the config module is installed on the computer before configuring or updating the firmware.

⚠ Before configuring, the computer should be set to a static IP address, which is in the same network segment with the GCU and the camera (without IP address conflicts). The default IP address of the GCU and the camera are 192.168.1.121 and 192.168.1.108.

⚠ Do not power off the device while updating the firmware. Restart the device once firmware update is complete.

Configuring the GCU

1. Connect the computer and the network port of the GCU with the network conversion module, or connect the computer and the UART1 port of the GCU with the config module.
2. Connect the gimbal and the GCU with the gimbal control cable. Power on the device. Open the GCU_Config software and choose UDP port or the COM port corresponding to the config module. Click"Start Config", the, software will display current configuration of the GCU.
3. Configure the GCU in the software.

🔍 The new parameter filled in textbox will not be saved until clicking "Enter"on the keyboard. It is unnecessary to click "Enter" after editing other settings.

简体中文

Network Setting

GCU IP		Gateway IP	
Subnet Mask		Remote IP	
Camera IP			

Stream1
Stream2
Stream3
Stream4

Gimbal Data

| Roll | | Pitch | | Yaw | |

Carrier Data

GNSS
| Roll | | Pitch | | Yaw | |
| Acc_N | | Acc_E | | Acc_U | |

S.BUS Setting

Rev

	None ▾	☐		Follow	Lock	Mavlink		UDP ▾
Mode	None ▾	☐		Ortho	Lock	Gaze		Start Config
	None ▾	☐		None		Neutral		
Track	None ▾	☐		Exit		Track		GCU Firmware
Pitch	None ▾	☐						
Yaw	None ▾	☐						Gimbal Model
Zoom	None ▾	☐		Wide	Stop	Tele		Gimbal Firmware
Pic&Rec	None ▾	☐		Record	None	Shutter		
VideoSwitch	None ▾	☐		Palette	None	Pic-in-Pic		
IRCUT	None ▾	☐		Off		On		Reset
Lamp	None ▾	☐		Off		On		Calibration
Ranging	None ▾	☐		Off		On		

1.Network setting

- GCU IP / Gateway IP / Subnet mask / Remote IP
  Configure the network parameters of the GCU. Ensure the parameters will not cause network linkage abnormal.
- Camera IP
  Fill in the IP address of current camera, Video stream addresses will be generated automatically by the GCU. It will not change the IP address of the camera.

2.Gimbal Data

Display the altitude data of the gimbal

3.Carrier Data

Display the INS positing statue, altitude angle and northward / eastward / upward accuracy of the carrier.

4.S.BUS Setting

Set S.BUS channels corresponding to gimbal functions and their renversements. The pitch and yaw are liner channel, and others are switch channels.

For switch channels, pulse width entering [1000μs , 1300μs] triggers lower function once; entering [1300μs , 1700μs] triggers middle function once; entering [1700μs , 2000μs] triggers higher function once. Pulse width varying in the same interval does not repeat the trigger.

- Mode
  Follow: Head follow mode. Yaw angle of the gimbal rotates with the carrier and is uncontrollable.
  Lock: Head lock mode. Yaw angle and pitch angle of the gimbal are controllable and keep current angle while no rotating command is received.
  MAVlink: The gimbal can be controlled by MAVlink protocol. Other S.BUS channels controlling is unavailable in the mode.
  Ortho: Orthoview mode. In this mode, the gimbal rotates to vertical downward. The yaw angle follows the carrier and is uncontrollable. Otherwise the yaw angle remains unchanged and is controllable.
  Gaze: Gaze mode. Gimbal constantly aims current position in the center of the view. To gimbals equipped with laser ranger finder, turning on ranging before entering gaze mode will improve the accuracy of locking. The gaze mode is available only when the gimbal receiving valid GNSS data.
  Neutral: Gimbal returns its neutral position
- Track
  The gimbal will automatically keep tracking the target in the center of the screen.
- Pitch / Yaw
  Control value corresponds the angular velocity of pitch / yaw of the gimbal.
- Zoom
  The zoom rate constantly varies while the channel value is in Tele / Wide interval, until the channel value enters stop interval or the camera is at max / min zoom rate.
- Pic & Rec
  The Pic command triggers camera shoot one photo. The Rec command starts or stops recording. It is able to shoot photos while recording without ending record. The pictures and the video are saved in the MicroSD card of the gimbal.

- Video Switch
  Palette: To gimbals equipped with thermal camera, this command switches options of palette.
  Pic-in-pic: To gimbals equipped with multiple cameras, this command switches different view of the cameras.
- IRCUT
  Turn on IRCUT, the camera will switch to night scene to achieve a better image quality in low-light environment.
- Lamp
  To gimbals equipped with laser lighting module, choose this function to turn on laser lighting and IRCUT at the same time.

⚠ Several models of gimbal equipped with laser lighting module, which is a Class 3B invisible laser. DO NOT exposure eyes to the beam within 12 meters or observe the beam by any optical instrument. DO NOT place any inflammable within 20 centimeters in front of the lighting module.

- Ranging
  To gimbals equipped with laser range finder, this command turns on / off ranging. The gimbal is able to calculate out the longitude, latitude and elevation of the target while receiving GNSS data.

5.Reset
  Click to reset all the parameters of the GCU.
6.Calibration
  Click to calibrate the gimbal. Please keep the gimbal static while calibrating.

🔍 After calibration, it is normal that the yaw shaft of the gimbal drifts about 15 degrees per hour when not receiving valid carrier INS data. To make sure the gimbal attitude corrects, it is necessary to transmit valid carrier INS data, usually the GNSS should be positioning.

Updating Firmware

1. Connect the computer and the UART1 port of the GCU with the config module. Power on the devices.
2. Open FreeFlightIAP software. Choose the COM port corresponding to the config module.
3. Click "browse", choose the firmware file, click "download" and wait for the updating complete.
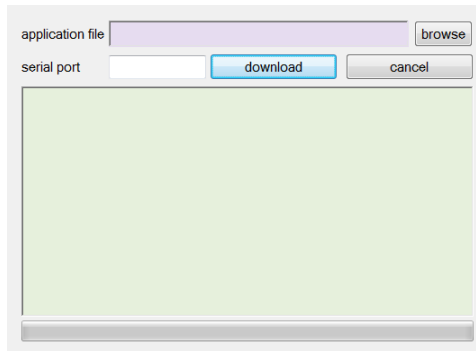
Appendix 1 Specifications

General	
Product Name	GCU
Dimensions	45.4*40*13.5 mm
Weight	18.6 g
Operating Voltage	14 ~ 53 VDC
Power	1.8 W
Environment	
Operating Temperature	-20°C～60°C
Storage Temperature	-20°C～60°C
Storage Humidity	≤ 85%RH（Non-condensing）

Appendix 2 Dimensions

45.4 13.5

40

26 4-M2▼3mm

30
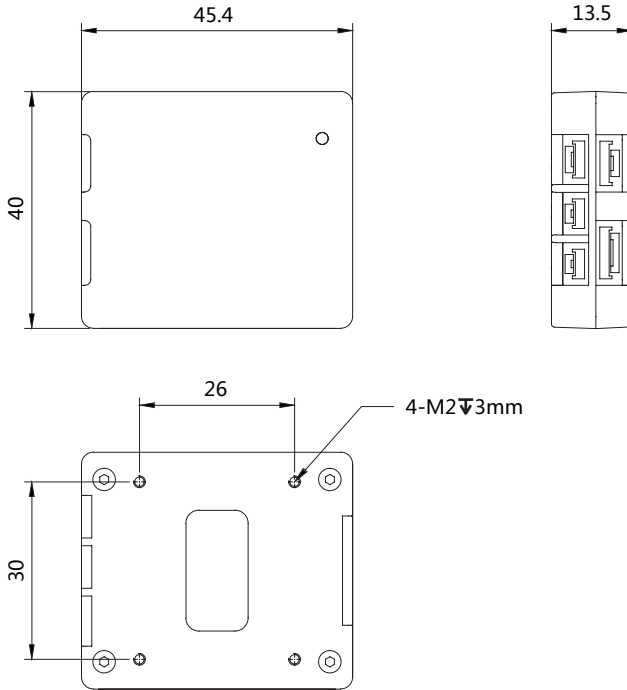
⚠ Use screws of proper length to fix the GCU. Too short screws short may cause the fixation unsecure, and too long screws may damage the device.

Appendix 3 MAVLink Configuration

ArduPilot

SERIAL1	
SERIAL1_BAUD	115
SERIAL1_OPTIONS	1024
SERIAL1_PROTOCOL	2
SR1	
SR1_ADSB	0 Hz
SR1_EXIT_STAT	0 Hz
SR1_EXTRA1	0 Hz
SR1_EXTRA2	0 Hz
SR1_EXTRA3	0 Hz
SR1_PARAMS	0 Hz
SR1_POSITION	0 Hz
SR1_RAW_CTRL	0 Hz
SR1_RAW_SENS	0 Hz
SR1_RC_CHAN	0 Hz
MNT1	
MNT1_TYPE	4 (Gremsy) / 6 (SToRM32 Mavlink)
RC1	
RC1_OPTOPN	213 (MOUNT1_PITCH)
RC2	
RC2_OPTOPN	214 (MOUNT1_YAW)
RC3	
RC3_OPTOPN	163 (MOUNT1_LOCK)
CAM	
CAM_TRIGG_TYPE	3 (Mount)

🔍 The MNT1_TYPE is recommended as 6. The MNT1_ROLL_MAX, MNT1_ROLL_MIN, MNT1_PITCH_MAX, MNT1_PITCH_MIN, MNT1_YAW_MAX and MNT1_YAW_MIN will be configured automatically depend on data from the GCU. The angle limit should be set manual while the MNT1_TYPE is 4.

🔍 The RC1~RC3 are just examples, which can be defined according to actual situation.

PX4

MAVLink	
MAV_1_CONFIG	TELEM2
MAV_1_MODE	Custom / Gimbal
MAV_1_RATE	115200 B/s
Serial	
SER_TEL2_BAUD	115200 8N1
Mount	
MNT_MAIN_PITCH	AUX1
MNT_MAIN_YAW	AUX2
MNT_MODE_IN	Auto (RC and Mavlink Gimbal)
MNT_MODE_OUT	MAVLink gimbal protocol v2
Camera Setup	
Trigger mode	Distance based, on command (Survey mode)
Trigger interface	MAVLink (forward via MAV_CMD_IMAGE_START_CAPTURE)

🔍 The MAV_1_MODE is recommended as Custom.

🔍 The AUX1 and AUX2 are just examples, which can be defined according to actual situation. It should be configured in RC Map for further application.

🔍 The trigger mode is just an example, which can be modified according to actual situation.