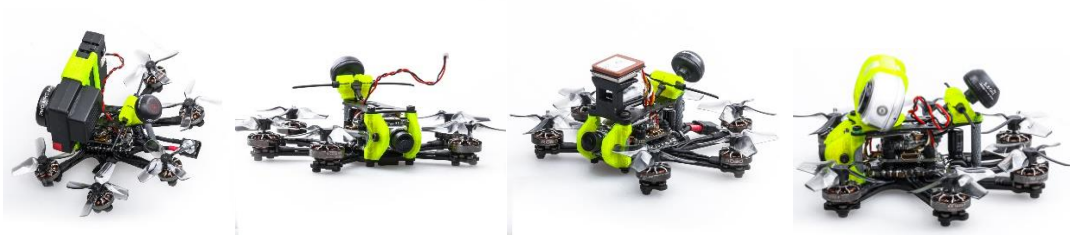


Flywoo

Firefly hex nano Manual

Analog INAV Version



1/ drone introduction

Firefly Hex nano inav hexacopter , the world's first hex smallest inav platform developed by FLYWOO .

If you expect to have a smart drone? If you are looking forward to trying a new operating system (INAV) but don't know how to start? Then Firefly hex nano inav will be your best experience platform.

The Firefly using inav can do some smart action such as altitude hold , position hold , and return to home. As our slogn says “ Use your imagination and have fun with your first 1.6inch Hexacopter.

The Hex nao is equipped with GOKU HEX 13A STACK and 6pcs ROBO 1202.5 5500KV motors, to bring the Firefly a quiet, stable, flexible and long flight time characteristics. Perfect for the indoor and outdoor recording every beautiful flying moment!



Battery recommend

Flight time:

About 6 min flight with Explorer 450mAh 4S battery

About 4 min flight with Explorer 300mAh 4S battery



2/ Configuration and wiring diagram description

Specifications

Item: Firefly hex nano hexacopter

Weight: 57.9g (without battery)

Wheelbase: 90mm

FC & ESC : GOKU HEX F4 16*16 STACK - (FC+13A ESC)

Frame: Firefly hex nano Frame

Motors: Robo 1202.5 5500KV

Props: HQ 40mm 4-Blades Props

Receiver Option: Frsky XM+ / TBS Crossfire

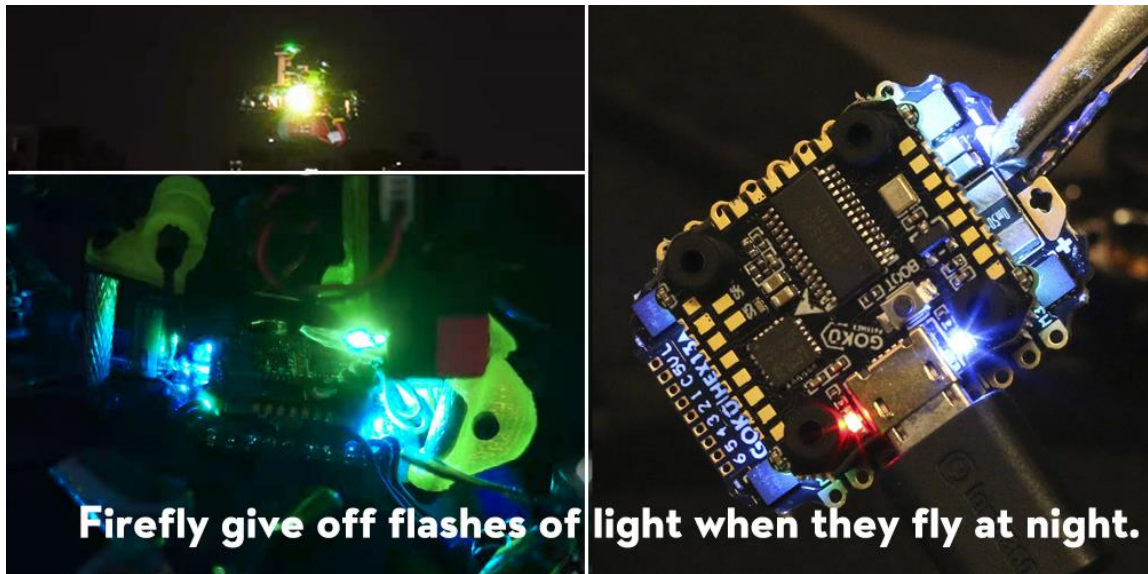
Camera Degree: 15° -90°

VTX: Goku VTX625 450mw

Antenna: Atomic 5.8GHz Antenna Length 30mm (RHCP)

Battery: 4S 450mAh / 4S 300mAh battery (Not including)

GOKU HEX F411 16X16 STACK, support 4s battery. Use powerful STM32F411 chip,5V/2A BEC, black box, WS2812LED, support 2 complete uarts, 1 soft serial port, 1 I2C port and other functions are all open! Enough to meet all FPV needs.



Firefly inav device

Equipped with GOKU GM8 MIN GPS V2.0 and Flywoo BQNANO V1.0 to meet the needs of INAV. BQNANO V.10 is the latest module developed by Flywoo, with a built-in compass and barometer, and weighs only 0.6g, which is perfect for Ultralight INAV drones.



Includes

- 1 x Prebuilt and tested Firefly hex nano hexacopter
- 2 x HQ 40mm 4-Blades Props
- 2 x Lipo Strap
- 1x Goku mini gps v2.0
- 1x Flywoo BQNANO V1.0

Feature:

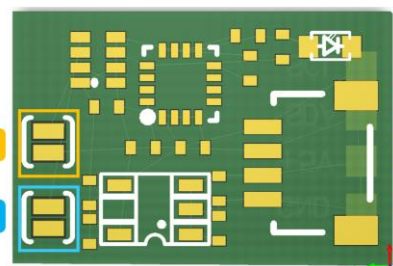
Model: FLYWOO BQNANO V1
 Baro: BMP280
 Compass QMC5883L
 Power supply: 3.3V-5V
 Communication: I2C protocol
 Pin: SH1.0-4
 Weight: 0.6g
 Module size: 11mm*15.5mm



If your FC board has a barometer, you need to disconnect the Baro SDA / SCL pad.

Baro/SDA

Baro/SCL

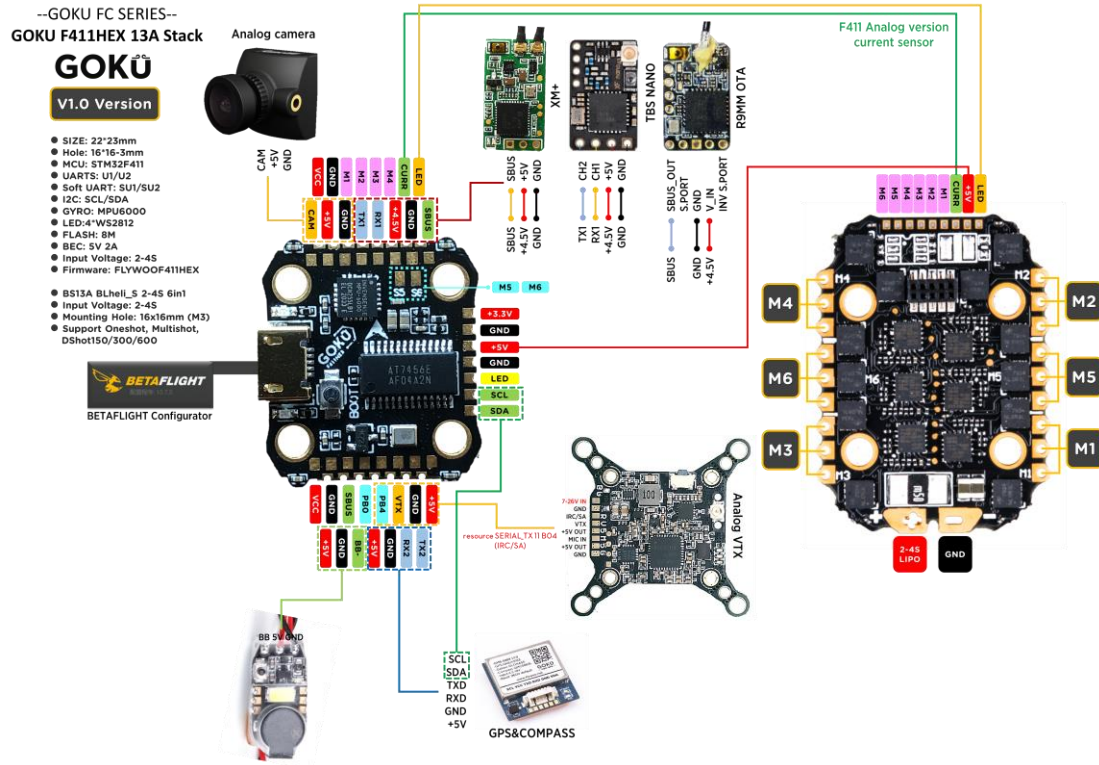


SCL

SDA

3.3V-5V

GND



Target firmware: FLYWOOF411HEX INAV 3.0.0

Identifier	Data	Telemetry	RX	Sensors	Peripherals
USB VCP	<input checked="" type="checkbox"/> MSP 115200	Disabled AUTO	<input type="checkbox"/> Serial RX	Disabled 115200	Disabled 115200
UART1	<input type="checkbox"/> MSP 115200	Disabled AUTO	<input checked="" type="checkbox"/> Serial RX	Disabled 115200	Disabled 115200
UART2	<input type="checkbox"/> MSP 115200	Disabled AUTO	<input type="checkbox"/> Serial RX	GPS 9600	Disabled 115200
SOFTSERIAL1	<input type="checkbox"/> MSP 115200	Disabled AUTO	<input type="checkbox"/> Serial RX	Disabled 115200	IRC Tramp 115200

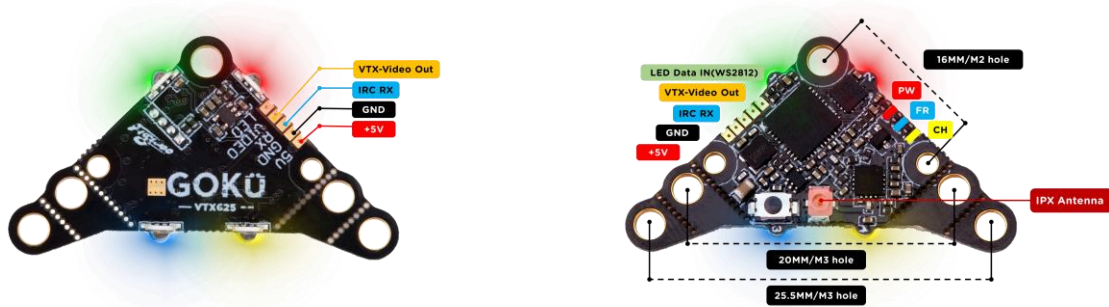
SOFTSERIAL1 TX is mapped to PIN B04

CLI: RESOURCE SERIAL_TX 11 B04

UART1: TBS/R9M/XM+/DSMX/SBUS receiver

UART2: GPS module, the default baud rate is 9600

SOFTSERIAL1: VTX IRC/SA Control



Frequency table :

FR/CH	CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8
A	5865	5845	5825	5805	5785	5765	5745	5725
b	5733	5752	5771	5790	5809	5828	5847	5866
E	5705	5685	5665	5645	5885	5905	5925	5945
F	5740	5760	5780	5800	5820	5840	5860	5880
r	5658	5695	5732	5769	5806	5843	5880	5917

- The selections in **xxxx** requires HAM license to operate .legally. **xxxx** Selections are only available on special request.
- **Button function**
- FR (blue light), short press the button, the blue light flashing times represent CH1-CH8
- CH (yellow light), long press the button 2S until the yellow light flashes, and then press the button shortly, the number of flashes of the yellow light represents A-r
- PW (power), long press the button 6S until the red light flashes, and then press the button shortly, the number of flashes of the red light represents 5 levels of power
- **Long press 10S to unlock 40 channels. (three color led flashes)**

3/ Receiver binding

TBS NANO 915:

When the USB is connected, the green light of the receiver flashes, and then bind according to the picture operation.

https://www.youtube.com/watch?v=-iNkVcOLITM&ab_channel=Danimal3D



R9MM FCC ACCESS OTA:

Make sure your remote control supports ACCESS protocol, then follow the link to register and bind

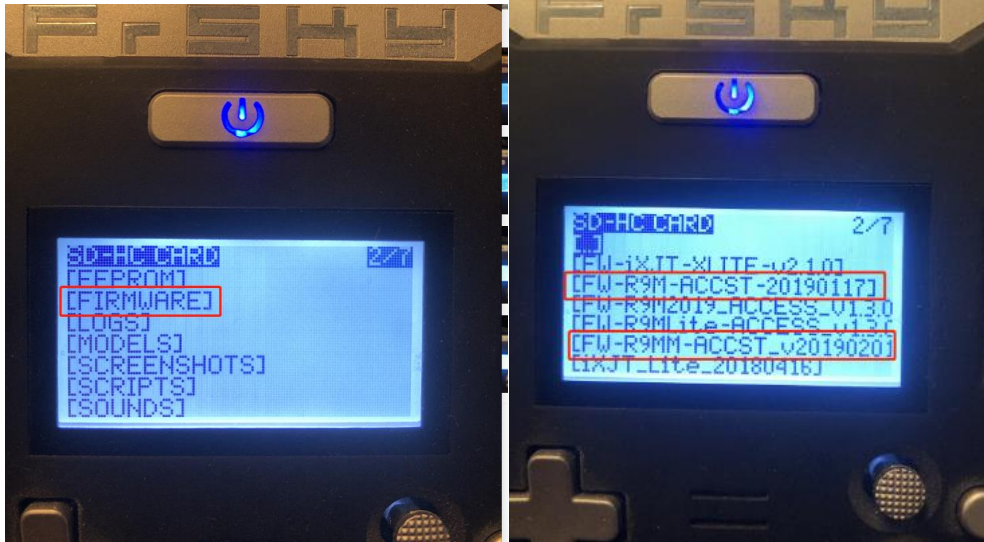
https://www.youtube.com/watch?v=az5hDdNBcjg&t=9s&ab_channel=FrSkyRC

If the remote control is ACCST protocol, please bind as follows:

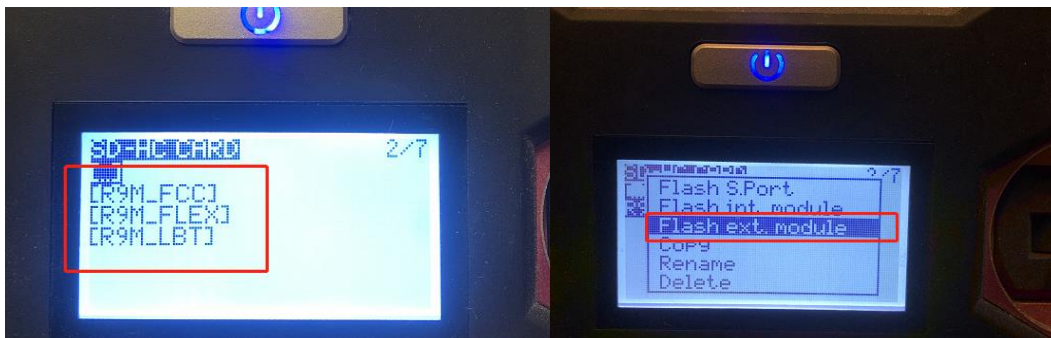
1/ Put these two files into the firmware directory of the SD card of the remote control.

R9MM firmware: FW-R9MM-ACCST_v20190201

R9M TX module: FW-R9M-ACCST-20190117



2/ Insert the R9M TX module and write the firmware you need



3/ To write the firmware of the R9MM receiver, you need to remove the R9MM receiver, and then write the firmware by connecting to the S.PORT port.

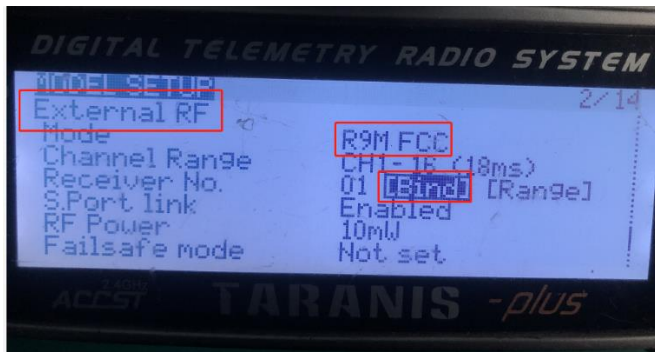


4/ After both R9M TX and R9MM RX are written into the ACCST firmware.

Binding method:

- 1/ Press and hold the button of RX, power on, the red and green lights are always on.
- 2/ Then after R9MM selects binding, RX red light flashes, and then exit
- 3/ RX is powered on again, and only a green light is displayed, indicating that the binding is

successful.



XM+ receiver:

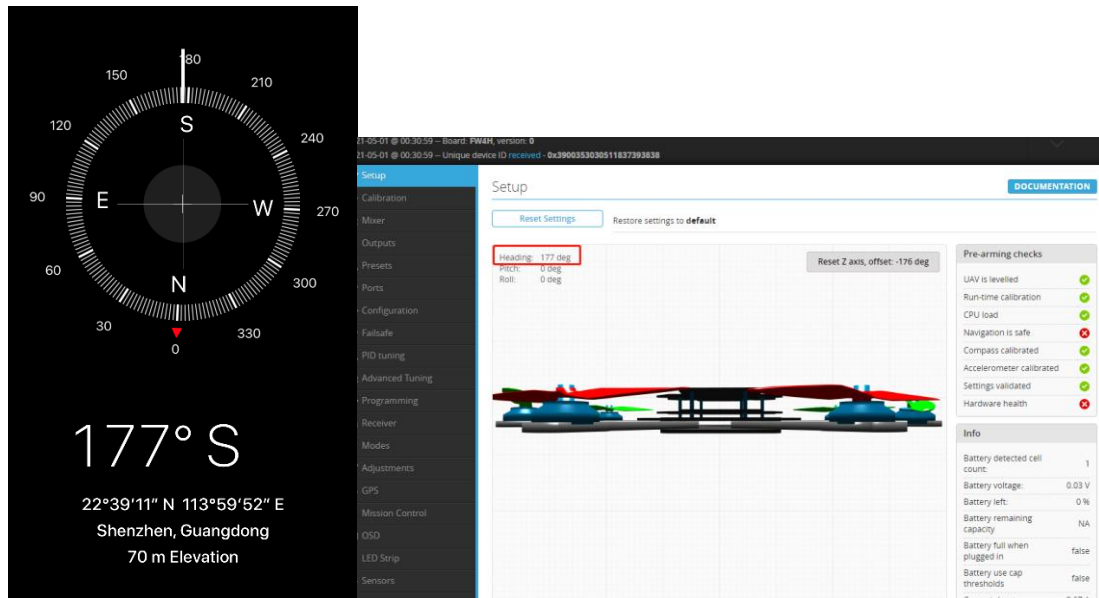
- 1/ Press the XM+ receiver button, USB power supply, the red and green lights are always on
- 2/ The remote control turns on the binding mode, the green light flashes to indicate successful binding, turn off and restart



- 3-1/ Then set the corresponding serial port and receiver protocol to ensure the normal output of each channel of the receiver.

4/Compass check and calibration :

Make sure that the direction of the compass is consistent with the direction of the compass app on the phone. If it is not the same, click the calibration compass again and rotate it for 30 seconds. (The accuracy of the compass determines whether the NAV POSHOLD/NAV RTH mode works normally)



Calibration

[DOCUMENTATION](#)

Accelerometer Calibration

Note: If the flightcontroller is mounted in another angle or upside down, do the calibration steps with the flightcontroller pointing as shown in the pictures, not the quad (otherwise calibration won't work).

Step 1

Step 2

Step 3

Step 4

Step 5

Step 6

Accelerometer Values				
Acc Zero	X	<input type="text" value="21"/>	Y <input type="text" value="13"/>	Z <input type="text" value="-143"/>
Acc Gain	X	<input type="text" value="4118"/>	Y <input type="text" value="4089"/>	Z <input type="text" value="4071"/>

Compass Calibration

After pressing the button you have 30 seconds to hold the copter in the air and rotate it so that each side (front, back, left, right, top and bottom) points down towards the earth.

Zero X	<input type="text" value="226"/>
Zero Y	<input type="text" value="121"/>
Zero Z	<input type="text" value="269"/>
Gain X	<input type="text" value="1537"/>
Gain Y	<input type="text" value="1805"/>
Gain Z	<input type="text" value="1443"/>

Optic Flow Calibration

After pressing the button you have 30 seconds to hold the copter in the air and tilt it to sides without moving it horizontally. Note that optic flow sensor needs to observe the surface at all times.

Scale	<input type="text" value="10.5"/>
-------	-----------------------------------

5/ Mode setting:

Set the ARM switch and flight mode switch, AUX* corresponds to the remote control switch, and the yellow area mark is turned on.

Modes DOCUMENTATION

Use ranges to define the switches on your transmitter and corresponding mode assignments. A receiver channel that gives a reading between a range min/max will activate the mode. Remember to save your settings using the Save button.

Mode	Channel	Min	Max
ARM	CH 6	1300	2100
ANGLE			
HORIZON	CH 6	1700	2100
NAV RTH	CH 8	1700	2100
NAV POSHOLD	CH 7	1700	2100
NAV ALTHOLD	CH 7	1350	1725
HEADING HOLD			

Save

ARM mode:

When GPS satellites search for more than 6 satellites, drone can be unlocked.

HORIZON mode: The flight control will remain in the horizontal mode, and it can also perform rolling flight maneuvers.

NAV ALTHOLD mode:

The current altitude is detected by the air pressure sensor and the flying altitude is maintained.

NAV POSHOLD mode:

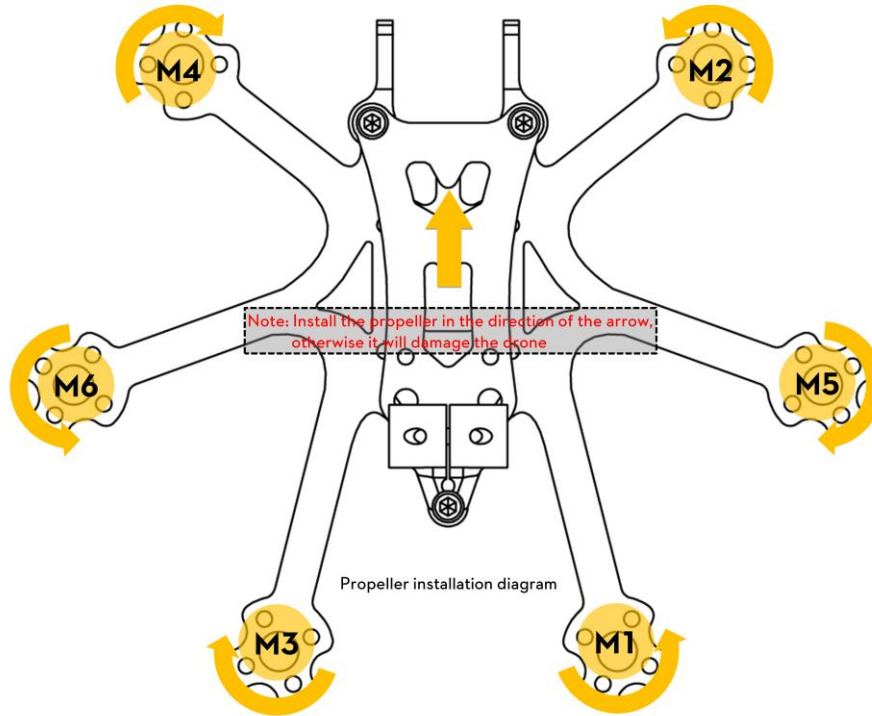
When the compass/barometer/GPS is working normally, the current flight position can be kept unchanged, suitable for beginners. (Be careful to stay away from the magnetic interference environment to prevent interference with the compass direction)

NAV RTH mode:

also known as return to home. When the mode is activated, the drone will rise, then reverse direction, fly toward the unlocked position, and then automatically land vertically. (Be careful to stay away from the magnetic interference environment to prevent interference with the compass direction)

6/ Motor test:

Unload the propeller, test the rotation direction of the motor, turn on the safety switch, and test the rotation of the motors one by one.



Outputs

[DOCUMENTATION](#)

Configuration

- Enable motor and servo output ?
- DSHOT150 ESC protocol ?
- 50Hz Servo refresh rate ?
- Stop motors on low throttle
- 5.00 Motors IDLE power [%]
- 14 Number of motor poles (number of magnets)
- Reversible motors mode (for use with reversible ESCs)

Motors

1	2	3	4	5	6
0%	0%	0%	0%	0%	0%

0%

0%

0%

0%

0%

0%

Master

Acc. noise 0.0015
RMS
Current [A] 8.58
Voltage [V] 0.03

Motor Test Mode Notice:
 Moving the sliders will cause the motors to **spin up**.
 In order to prevent injury **remove ALL propellers** before using this feature.

I understand the risks, propellers are removed - Enable motor control

Servo

7/ Flight firmware upgrade and write default CLI

1/ Activate DFU mode, make sure the INAV configurator is the latest version 3.0.0

Download link: <https://flywoo.net/pages/manual>

INAV Firmware

INAV 2.5.2 Firmware

INAV 3.0.0 Firmware

INAV Configurator 3.0.0 download

Usage

- Download the required Zip file, either as below (32 and 64 bit) or from the official site.
 - o INAV-Configurator_linux32_3.0.0.tar.gz
 - o INAV-Configurator_linux64_3.0.0.tar.gz
 - o INAV-Configurator_macOS_3.0.0.zip (untested, unsigned)
 - o INAV-Configurator_win32_3.0.0.zip (untested, unsigned)
 - o INAV-Configurator_win64_3.0.0.zip (untested, unsigned)

2/ INAV Configurator will display to enter DFU mode. If it does not enter DFU mode, it may be that the driver is not installed. The driver can be installed using IMPULSE RC software

The image shows two windows side-by-side. The left window is the INAV Firmware Flasher application. It displays a 'DFU' status at the top right. The main interface includes sections for 'Choose a Board', 'Choose a Firmware version', and various flashing options like 'No reboot sequence', 'Flash on connect', 'Full chip erase', and 'Manual baud rate' (set to 256000). A 'Warning' section at the bottom contains important instructions and notes. The right window is the 'ImpulseRC Driver Fixer' utility, which features a drone icon with red eyes and a progress bar. The progress bar is partially filled with green, and the text below it reads 'Installing DFU driver'.

Driver software:

https://impulserc.blob.core.windows.net/utilities/ImpulseRC_Driver_Fixer.exe

3/ Then load the local HEX firmware and wait for the flashing to complete. A green progress bar is displayed to indicate completion, and DFU will become a COM port

Windows Explorer window showing the file selection process:

名称	修改日期	类型	大小
inav_3.0.0_FLYWOOF7DUAL.hex	2021/4/15 20:56	HEX 文件	1,164 KB
inav_3.0.0_FLYWOOF405HD.hex	2021/4/15 20:42	HEX 文件	1,297 KB
inav_3.0.0_FLYWOOF411.hex	2021/4/15 20:39	HEX 文件	1,290 KB
inav_3.0.0_FLYWOOF411EVO_HD.hex	2021/4/15 21:08	HEX 文件	1,290 KB
inav_3.0.0_FLYWOOF411HEX.hex	2021/4/15 21:00	HEX 文件	1,290 KB
inav_3.0.0_FLYWOOF411V2.hex	2021/4/15 22:48	HEX 文件	1,290 KB
inav_3.0.0_FLYWOOF745.hex	2021/4/15 21:13	HEX 文件	1,331 KB
inav_3.0.0_FLYWOOF745HD.hex	2021/4/15 21:20	HEX 文件	1,320 KB
inav_3.0.0_FLYWOOF745NANO.hex	2021/4/15 21:50	HEX 文件	1,331 KB

Main interface buttons: Flash Firmware, Load Firmware [Online], **Load Firmware [Local]**

Warning section:

Please do **not** try to flash **non-INAV** hardware with this firmware flasher.
Do **not disconnect** the board or **turn off** your computer while flashing.

Note: STM32 bootloader is stored in ROM, it cannot be bricked.
Note: **Auto-Connect** is always disabled while you are inside firmware flasher.
Note: Make sure you have a backup; some upgrades/downgrades will wipe your configuration.
Note: If you have problems flashing try disconnecting all cables from your FC first, try rebooting, upgrade chrome, upgrade drivers.
Note: When flashing boards that have directly connected USB sockets (SPRacingF3Mini, Sparky, ColibriRace, etc) ensure you have read the USB Flashing section of the INAV manual and have the correct software and drivers installed

IMPORTANT: Ensure you flash a file appropriate for your target. Flashing a binary for the wrong target can cause **bad** things to happen.

Recovery / Lost communication

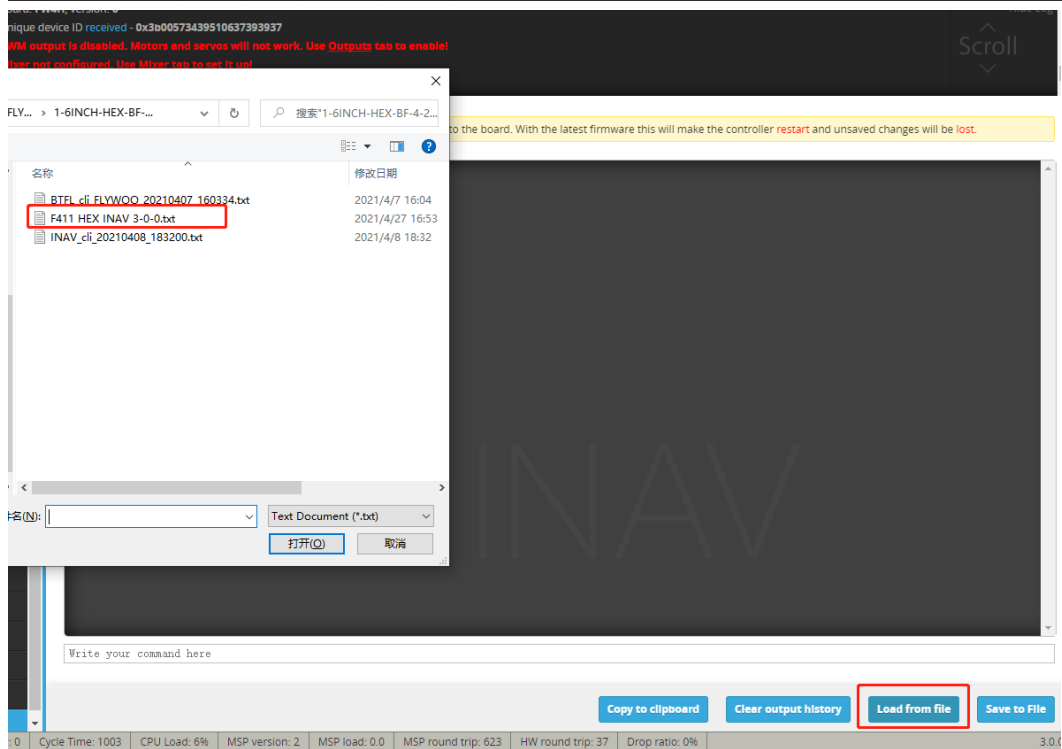
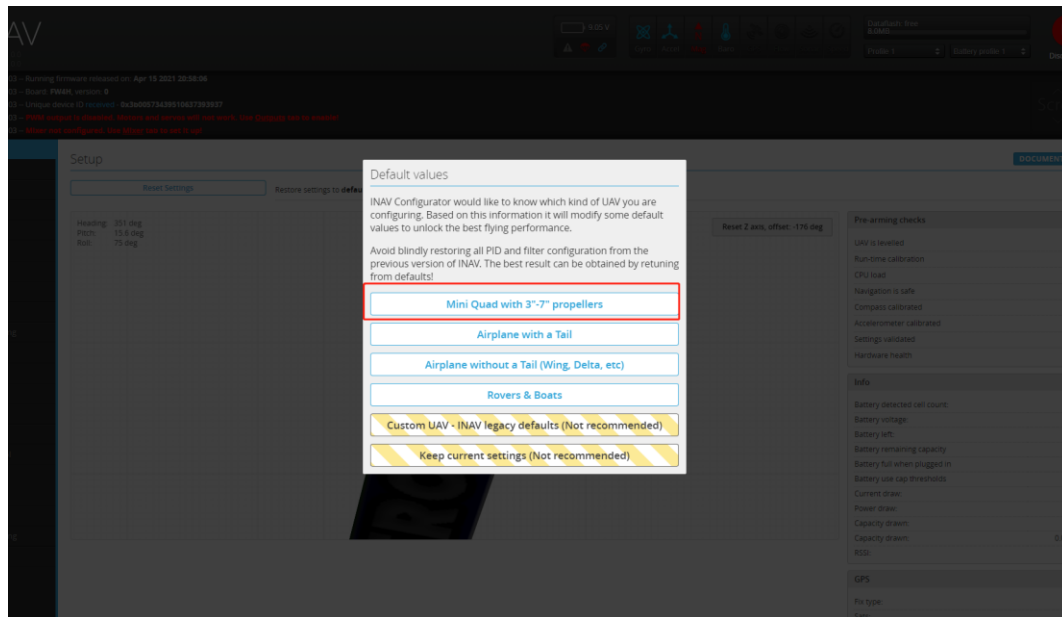
If you have lost communication with your board follow these steps to restore communication:

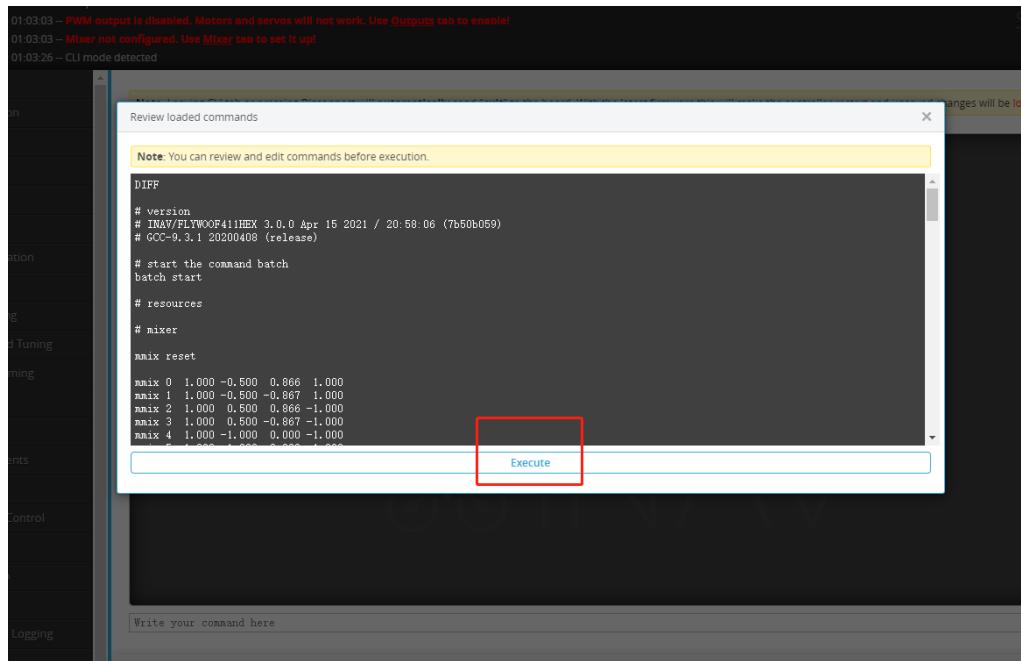
- Power off
- Enable 'No reboot sequence', enable 'Full chip erase'.
- Jumper the BOOT pins or hold BOOT button.
- Power on (activity LED will NOT flash if done correctly).
- Install all STM32 drivers and Zadig if required (see **USB Flashing** section of INAV manual).
- Close configurator, Close all running chrome instances, Close all Chrome apps, Restart Configurator.
- Release BOOT button if your FC has one.
- Flash with correct firmware (using manual baud rate if specified in your FC's manual).
- Power off.
- Remove BOOT jumper.
- Power on (activity LED should flash).
- Connect normally.

Programming: **SUCCESSFUL**

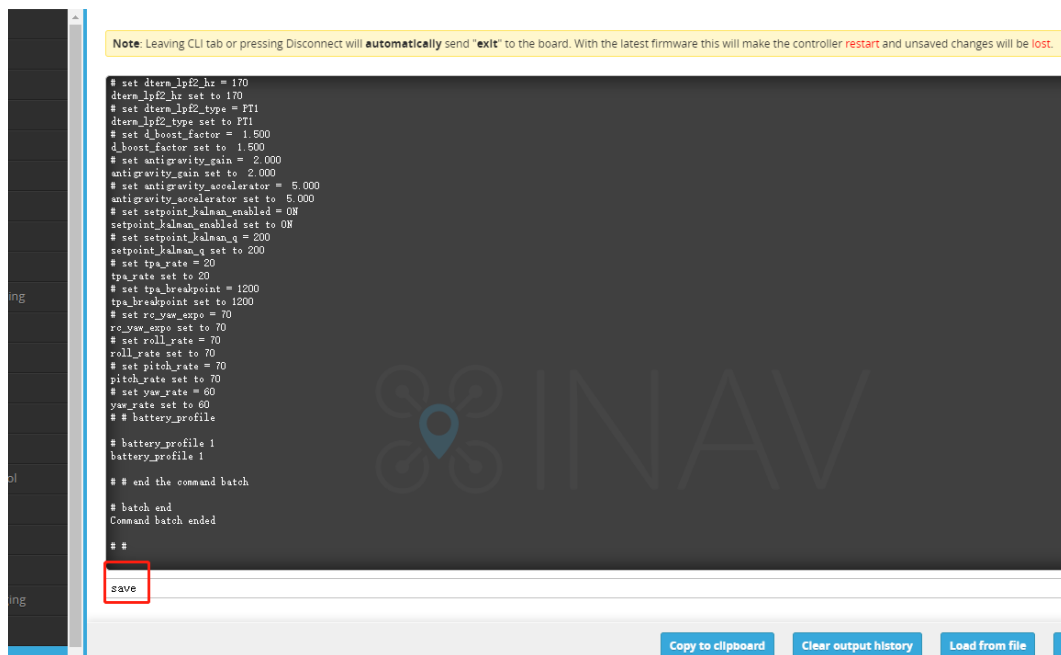
Main interface buttons: **Flash Firmware**, Load Firmware [Online], Load Firmware [Local]

4/ After the connection is entered, it is a blank interface, you need to write CLI commands, Factory CLI LINK: <https://flywoo.net/pages/manual>





5/ If the command is not restarted after writing the command, please write SAVE and press Enter to save, and the FC will restart



6/ Then all functions of FC return to normal.

Flywoo