



# NANOMIND 110

## USER MANUAL

### Highlights

- **MindRacer in nano size frame, running MindPX & PX4 flight stack**
- **heavy lifter, maximum take-off weight up to 80 g**
- **5~7 minutes flight time**
- **full modularized, stackable, soldering-free assemble**
- **stackable style WEP expansion interface**
- **DroneCode compliant sockets**

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**Note** This manual can be used with NanoMind 110 BNF/RTF Kit series, and NanoMind 110 Tiny-whoop BNF/RTF series.



### **Important**

Coreless DC motors have lifetime of about 10 hours of total flights. To avoid fast retardation it is suggested to take 5~8 minutes break between flights.



## Physical

|                                     |                            |
|-------------------------------------|----------------------------|
|                                     | NanoMind 110               |
| WheelBase                           | 110mm diagonal             |
| Weight                              | 35g (w/o battery)          |
| Propellers                          | 55mm                       |
| Flight controller / Processor       | MindRacer v1.2 / STM32F427 |
| IMU / Redundancy                    | 10DOF / N                  |
| Motor                               | Coreless DC motor          |
| ESC                                 | N/A                        |
| Video transmitter (tiny-whoop only) | 5.8GHz 40CH                |
| Camera (tiny-whoop only)            | 600TVL PAL/NTSC            |
| GPS support (optional)              | Y                          |
| Optical Flow support (optional)     | Y                          |
| Lidar support (optional)            | N                          |
| Battery                             | 650mah                     |

## Quick Installation

NanoMind 110mm nano-size quad comes within bind-n-fly package. All components you need to install before flying simply are:

1. propellers
2. FPV camera (NanoMind tiny-whoop only)
3. battery



Fig. 1 Quick installation

- Install the propellers

The propellers need to be installed in specified order as in Fig. 2. It is important to notice that installing into wrong position will make the copter overturned and may cause serious harm.

Find the head of direction mark ('Front') on the frame, and align with the direction of head shows in Fig.2. The 2 pull propellers (marked with 'B') should be installed on motor 1 & 2 (clockwise - cw), while the 2 push propellers (marked with 'A') should be installed on motor 3 & 4 (counter clockwise - ccw).

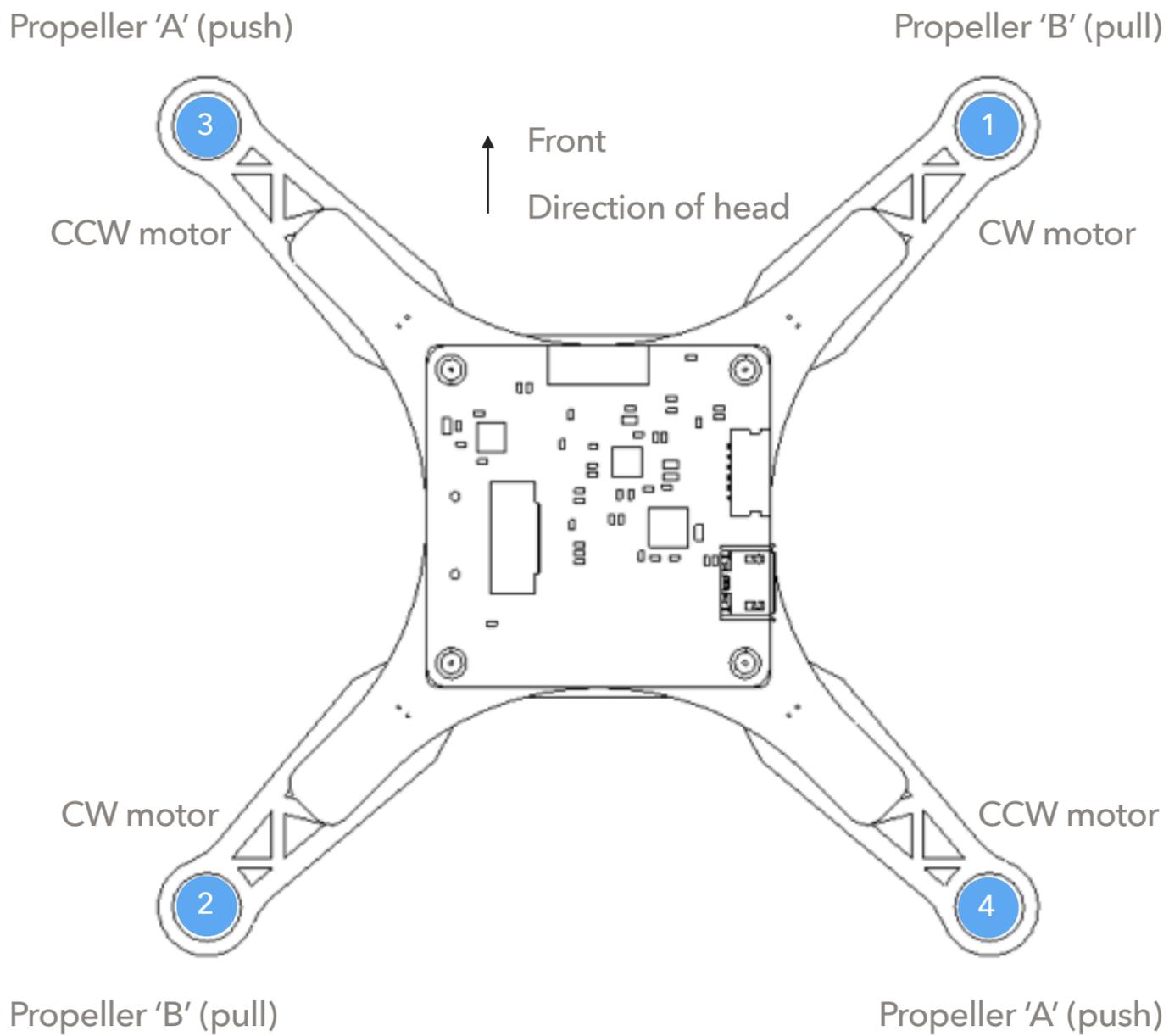


Fig. 2 Install propellers

- Install FPV camera (for tiny-whoop model only)

Other models can skip this step.

Mount the FPV camera on the front 2 hexagon studs as shown in Fig. 3. Connect FPV camera power cable to the 5V output socket on the bottom frame.

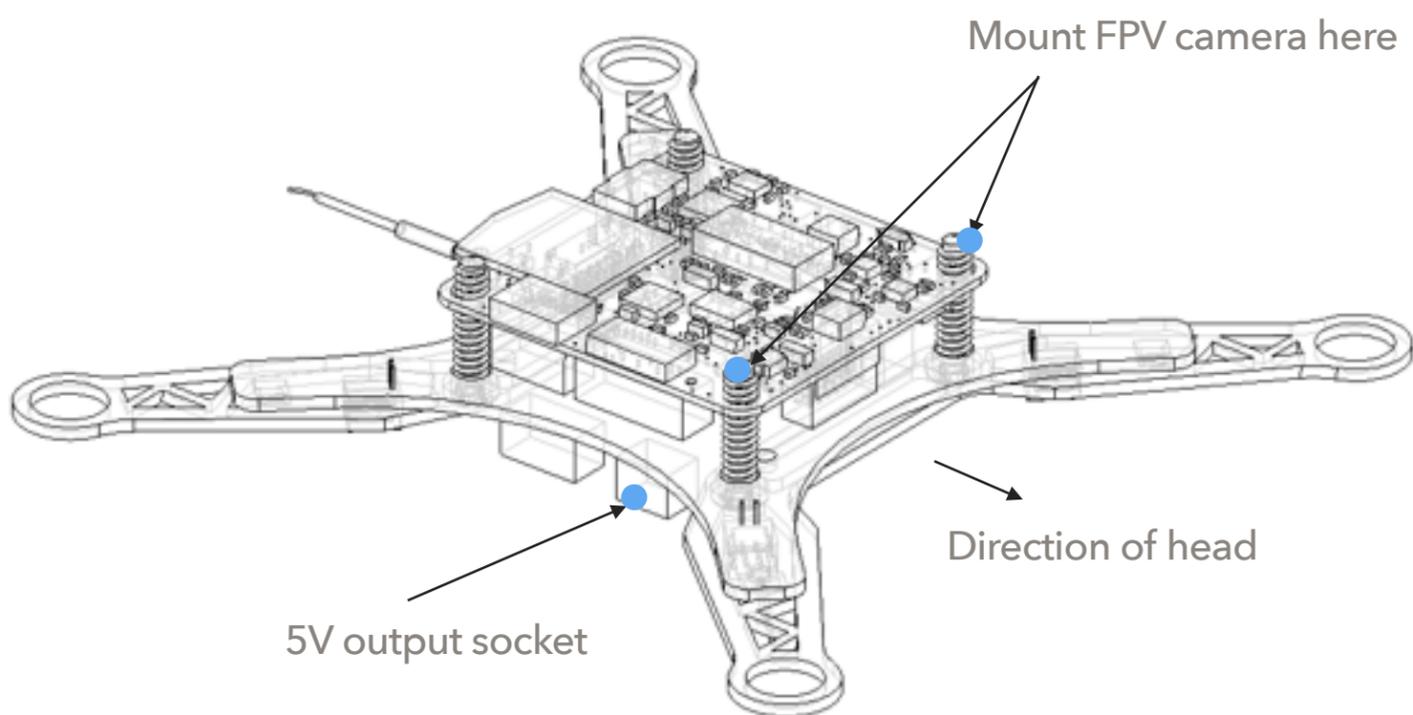


Fig. 3 Install FPV camera

- Install the battery

The battery should be mounted on the bottom of drone. The bottom surface of battery and the top surface of drone are all attached with nylon fastener tape by default. Place the battery on the position of the nylon fastener tape, and give light push on the battery to make sure it is fastened solidly.

After mounted plug the battery connect to the power head on the tail of drone.

## Power On/Off

Once the battery is connected to the power head of drone, all parts will be powered on. The main LED on flight controller will turn to breathing blue and the drone is now ready for command.

Disconnect the battery when you finished a flight.

## Charging battery

Battery can be charged using external battery charger. Please check in package accessories for USB charger cable.

## RC Pairing

The remote controller needs to be paired with the drone before it can control the drone to fly. For RTF option, the remote controller comes together with the drone is already been paired with copter by default so you can skip this step.



Fig. 4 RC pairing

However with BNF option or for other cases you may need to pair/re-pair and do some setting with the remote controller. To do that,

- 1) remove the MindRacer flight controller on the top and let the bottom frame exposed.
- 2) Find the 'bind' button on bottom frame (take FrSky receiver option as an example as in Fig. 4) and use this button to pair with your remote controller.

Note that some receiver does not need a bind button to do pairing so you can skip this step. Refer to below's list of pairing instructions for details.

Please follow the instructions from remote controller vendor to complete the pairing procedure. You can find detailed information about the pairing procedure in following list of compatible remote controller models that may come with NanoMind.

[ErSky Taranis X9D/PLUS \(S.Bus\) pairing and setting instructions](#)

[RadioLink AT9/S \(S.BUS\) pairing and setting instructions](#)

[Spectrum DX series \(DSM\) pairing instructions](#)

[ElySky AFHDS2A series \(PPM\) pairing instructions](#)

## Arm/Disarm

Warning: before arm, please make sure no obstacle can be occluded with drone's spinning propeller.

Note: by default MR210 uses mode 2 (throttle on left) remote controller. All guides below will be based on left throttle pattern.

After the remote controller is powered on and paired, lower the throttle stick to the low-right corner for a few seconds. The propeller will start to spin at a minimum speed. The drone is then in armed state and ready to take off.

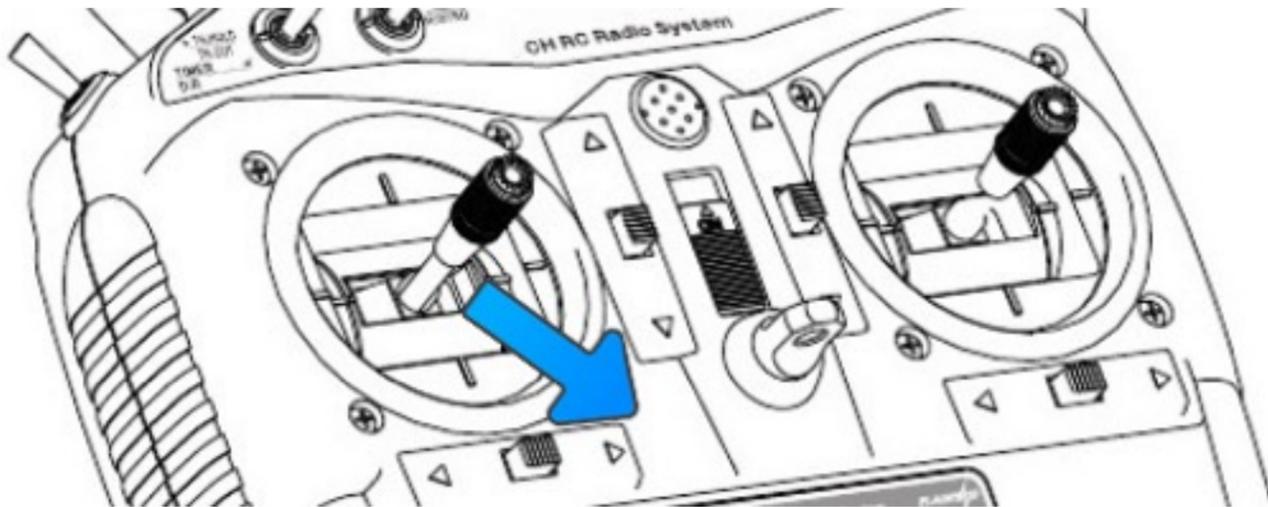


Fig. 5 Arming

To disarm, lower the throttle stick to the low-left corner for a few seconds, the propellers will stop spinning.

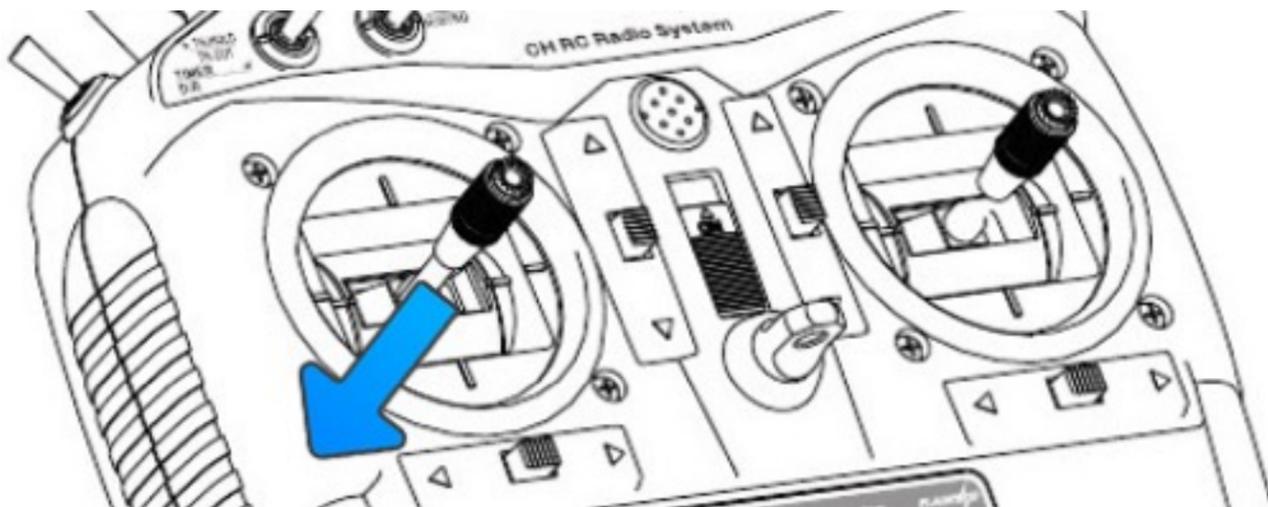


Fig. 6 Disarming

## Select Flight Mode

Flight modes is pre-set on remote controller as in Fig.7. By default 4 flight modes are configurable through remote controller: manual, assist/altitude control, assist/position control, and acro mode.

The modes can be chosen by switches in the remote controller (use WFLY/7 remote controller as an example) as in Fig. 7.

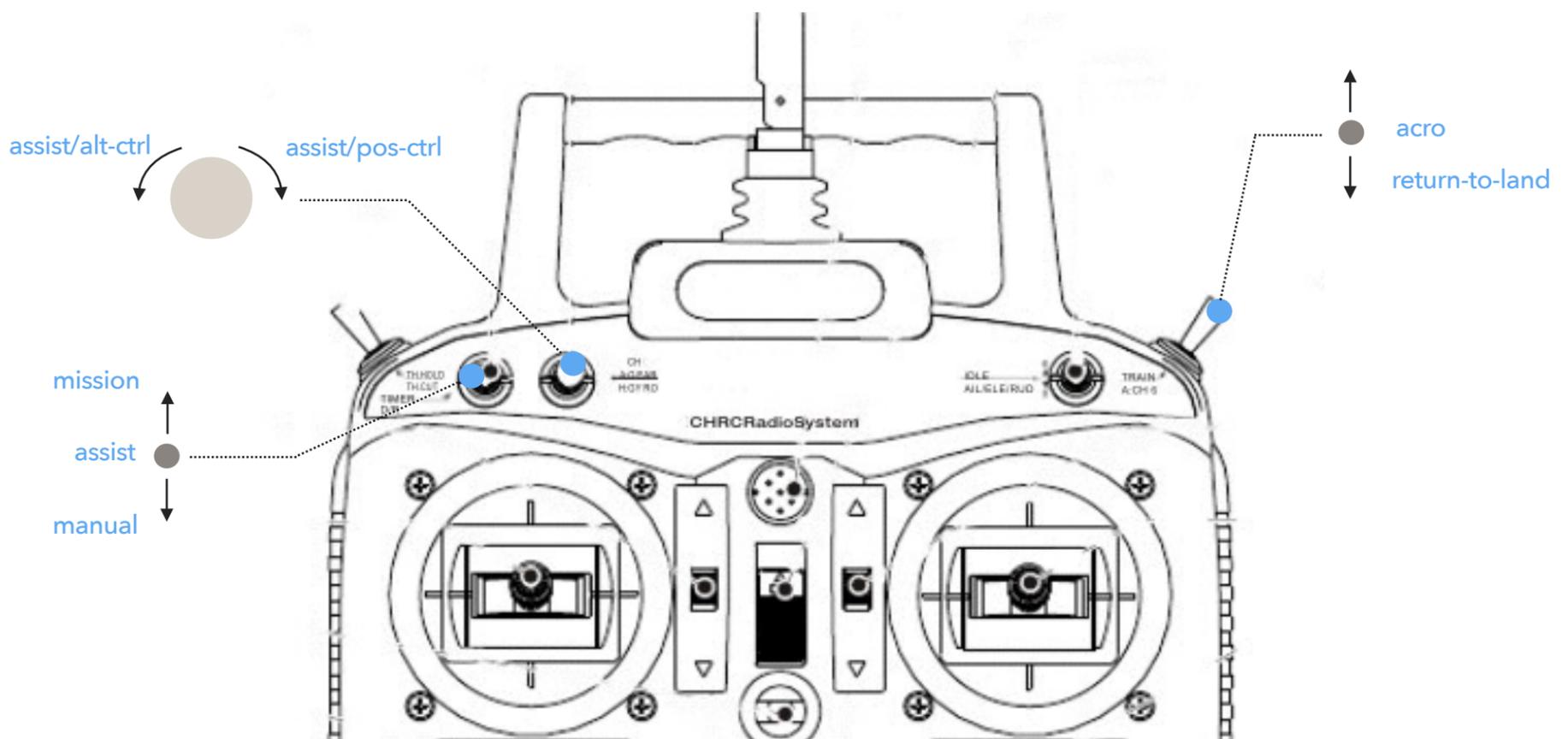


Fig. 7 select flight modes

For beginners, manual mode is a good start point, as the drone will auto stabilize its attitude during the flight which makes it easier for pilots to control. When pilots eventually get more and more experienced then can switch to acro mode for a real racing.

Switch layout on different remote controllers are usually different. You can change the layout of mode switches or define more flight modes through QGroundControl. Please refer to MindRacer User Guide document for details.

### Install an External Compass Module

In case an external compass is needed to provide precise heading data, attach the Nano-Compass module onto the drone as shown in Fig. 8. Follow [this link](#) for more informations.

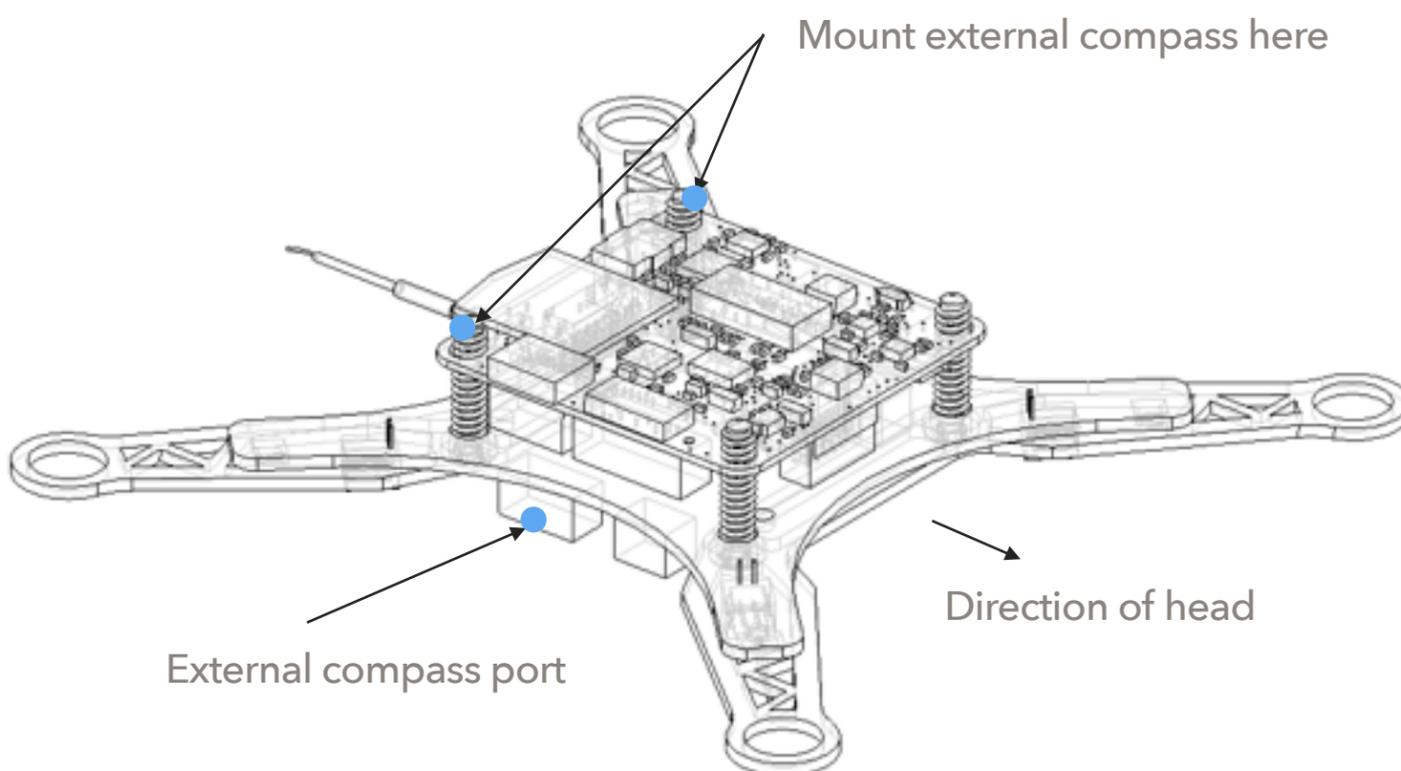


Fig. 8 select flight modes

## Flight Black Box - Using a SD Card

MindRacer has a micro SD (TF) card slot. MindRacer will record flight data into the SD card. It is important for reproducing flight course either for training or maintenance purpose. So it is strongly recommended that user inserting a SD card before take off.

The SD card must be formatted with FAT32.

## FPV Camera and Display (for tiny-whoop)

FPV camera video transmitter needs to be paired with receiver before flight. The channels of transmitter is set by a push button on the transmitter, with LED indicator showing the current selected channel and band. The default channel setting for transmitter is B8(5945MHz).

By default you do not need to adjust any of the setting as during manufacture the default display kit has been paired with the transmitter. In case you want to change the setting or use a different receiver than default display kit, you need to access the the switch group on the video transmitter board.

Note during a racing match, you need to make sure your video transmitter channel setting does not interfere with others.

The detailed frequency and channels settings are listed below (Fig. 9).

|         | CH1/5   | CH2/6   | CH3/7   | CH4/8   |
|---------|---------|---------|---------|---------|
| Group A | 5740MHz | 5760MHz | 5780MHz | 5800MHz |
|         | 5820MHz | 5840MHz | 5860MHz | 5880MHz |
| Group B | 5705MHz | 5685MHz | 5665MHz | 5645MHz |
|         | 5885MHz | 5905MHz | 5925MHz | 5945MHz |
| Group C | 5865MHz | 5845MHz | 5825MHz | 5805MHz |
|         | 5785MHz | 5765MHz | 5745MHz | 5725MHz |
| Group D | 5658MHz | 5695MHz | 5732MHz | 5769MHz |
|         | 5806MHz | 5843MHz | 5880MHz | 5917MHz |
| Group E | 5733MHz | 5752MHz | 5771MHz | 5790MHz |
|         | 5809MHz | 5828MHz | 5847MHz | 5866MHz |
| Group F | 5362MHz | 5399MHz | 5436MHz | 5473MHz |
|         | 5510MHz | 5547MHz | 5584MHz | 5621MHz |

Fig. 9 frequency and channel settings

Pilots use FPV goggles to receive video streams from drone's camera. The goggles needs to be correctly setup before it can receive video. Please check and follow goggles vendor's guide to set it up. By default the goggles needs to be tuned to the same frequency of nano drone's transmitter (5945MHz) to work properly.

### Change Frequency Group and channel

Use the 2 buttons on the top of camera to adjust group and channel.

Long press on the front button for 2 seconds switches between PAL/NTSC. Short click flip video images.

Long press on the back button for 2 seconds change groups. Short click change channels.

## Connect to Ground Station

As a professional flight controller, MindRacer has hundreds of parameters that user can tune. Using QGroundControl software from computer is the best way to carefully adjust these parameters.

QGroundControl is a free software that anyone can download and use it on the fly. It can be downloaded from <http://www.qgroundcontrol.org>. Currently it can support all major PC OS platforms including Windows, MacOS, Linux, etc. Select the right version for your OS.

To connect, launch QGroundControl on your PC (Fig. 10).



Fig. 10 Launch QGroundControl

Power OFF the drone first. Use a micro-USB cable to connect the 'USB' port of MindRacer to a PC USB port. The MindRacer flight controller should be powered on. Wait for a few seconds until the flight controllers main LED turns in to any stable color. The QGC will try to automatically connect to the flight controller. After connected, the ground station will update its UI with drone's status information.

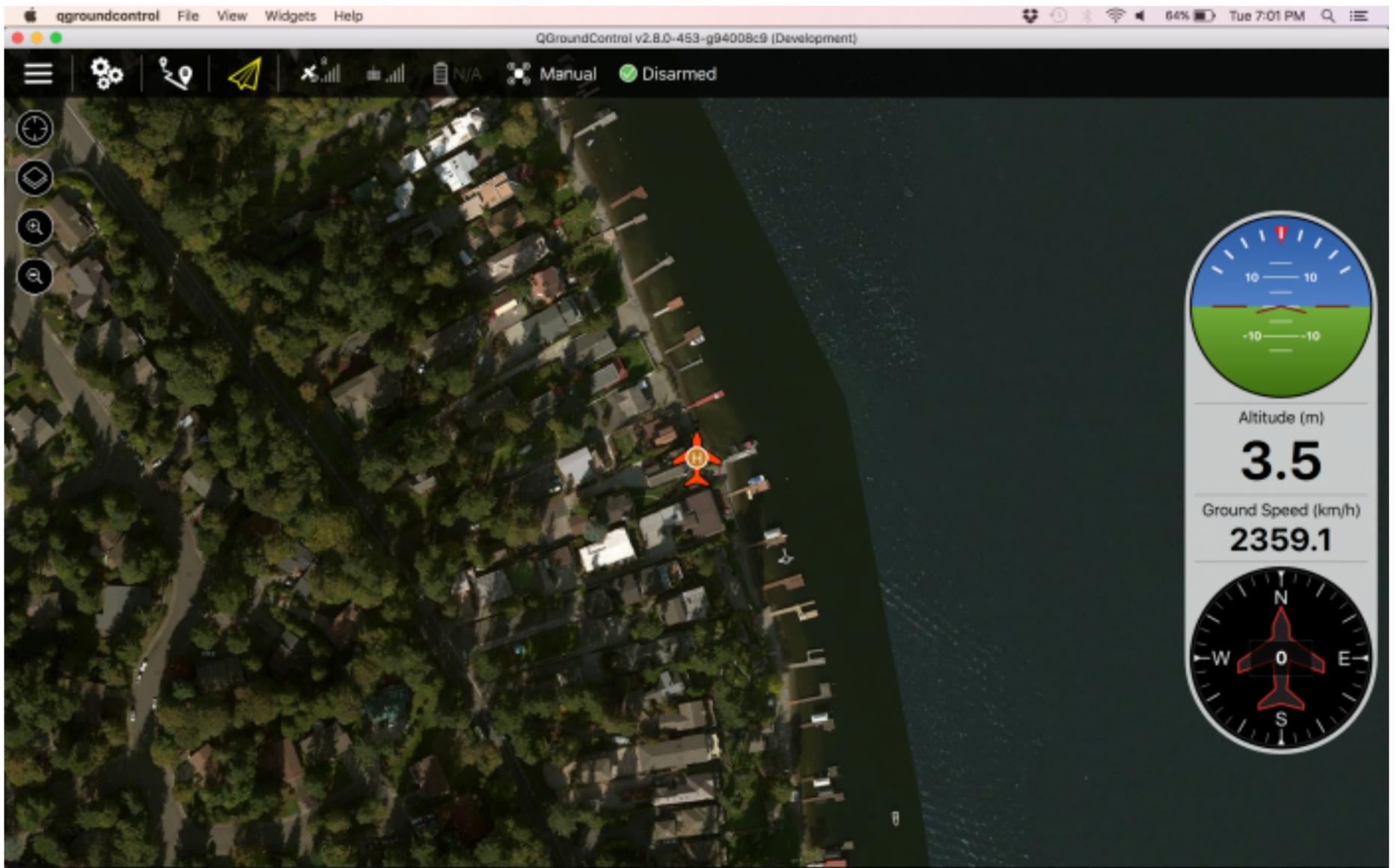


Fig. 9 drone status information

## Calibrate New Remote Controller in QGC

In case you need to re-calibrate your remote controller, and configure the flight modes as in Fig. 5, you can do this in QGC as depicted in Fig. 11.

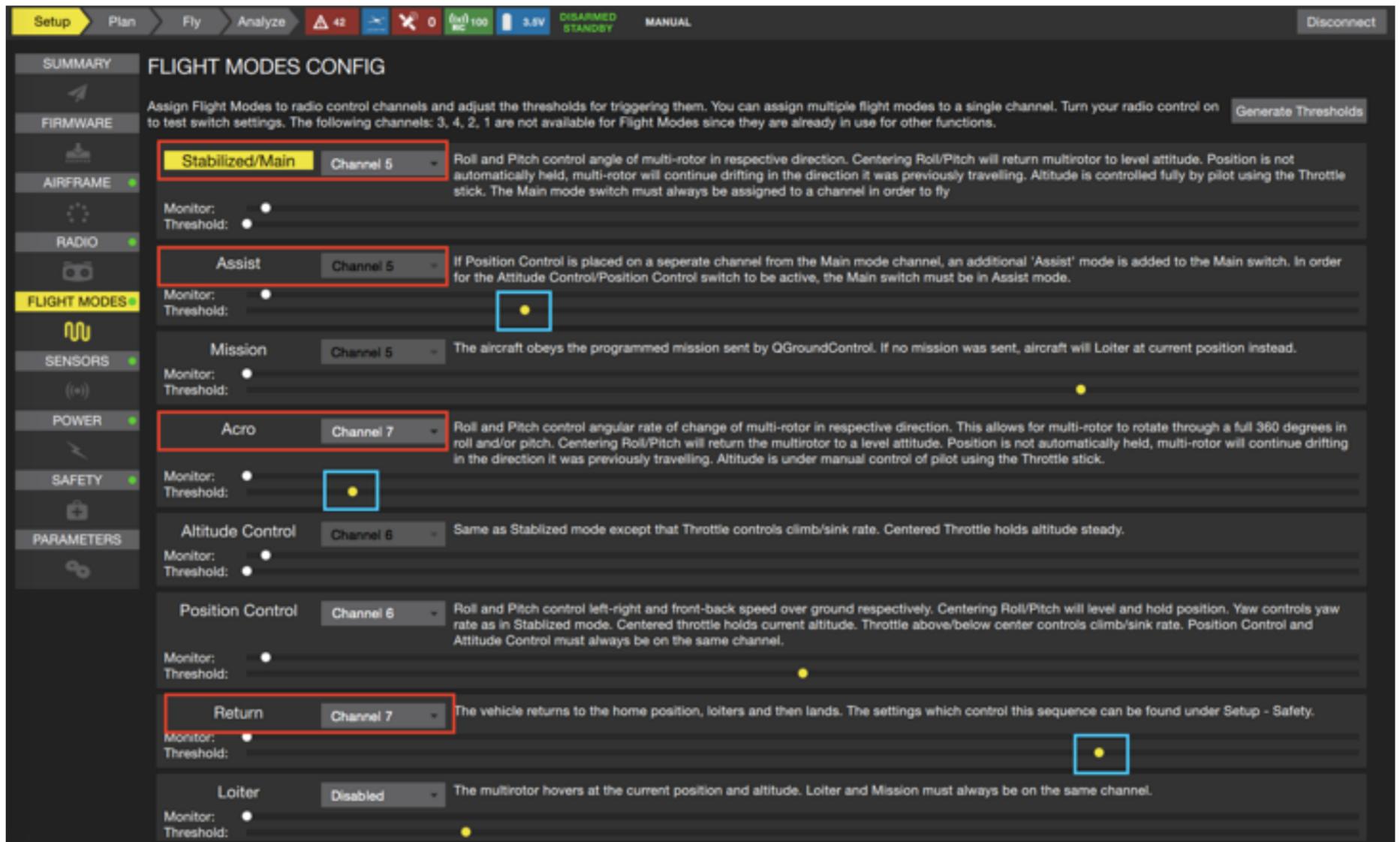


Fig. 11 Re-calibrate remote controller and configure flight modes

## Install a Wifi Telemetry Module

A Wifi telemetry module can be installed on NanoMind drone to provide telemetry data between the drone and a ground station. The module can be installed and connected to the drone as shown in Fig. 12.

The data port of Wifi module can be connected to either 'telemetry 1 port' on the bottom deck, or the 'telemetry 2 port' (the OSD port) on the flight controller, works the same. The default baud rate is 57,600 by default.

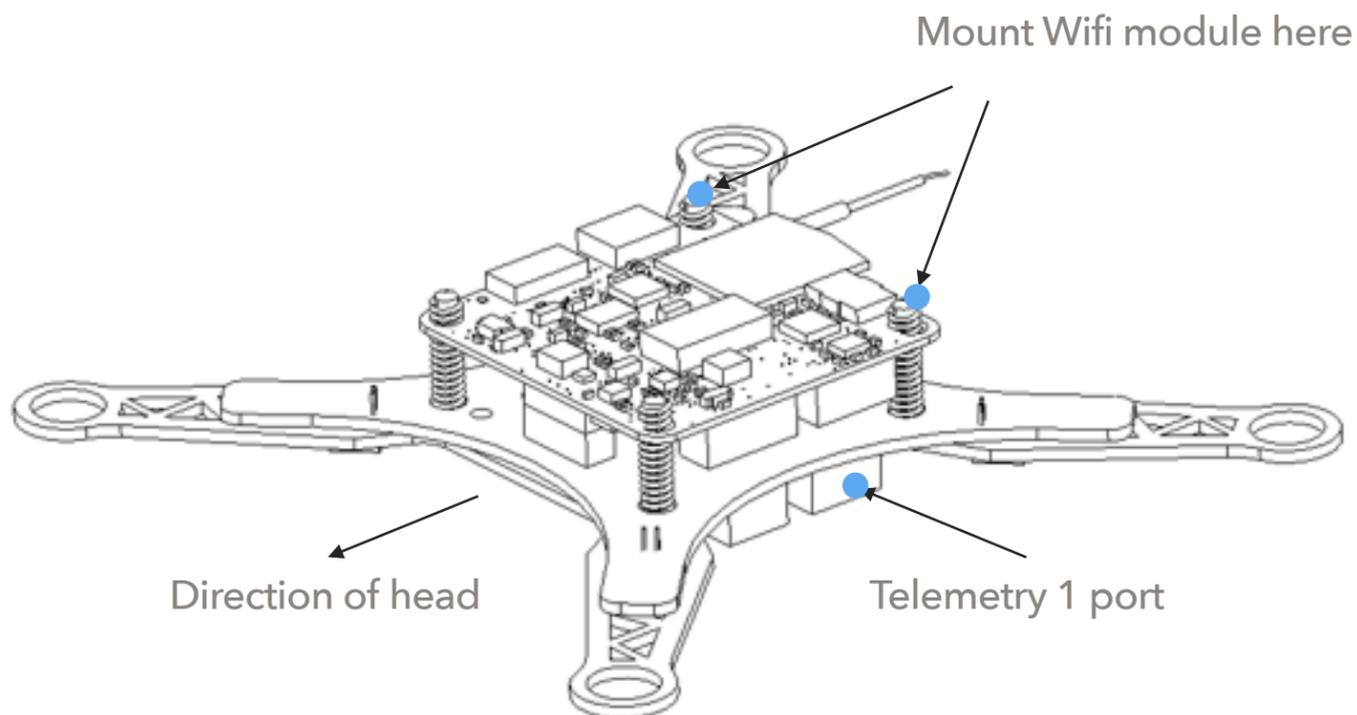


Fig. 12 Install a Wifi telemetry module onto NanoMind

To connect ground station to the wifi on nano drone, first turn on the wifi radio on ground station device, search for 'APM' and connect to it with password '12345678'. Once connected, launch the QGC on ground station device.

Tap on the 'Setup' icon on the upper-left corner, and select the 'comm links' tab, select 'TCP' type, and input Host address and port as in Fig. 13. Save the link, and connect. Wait till success.

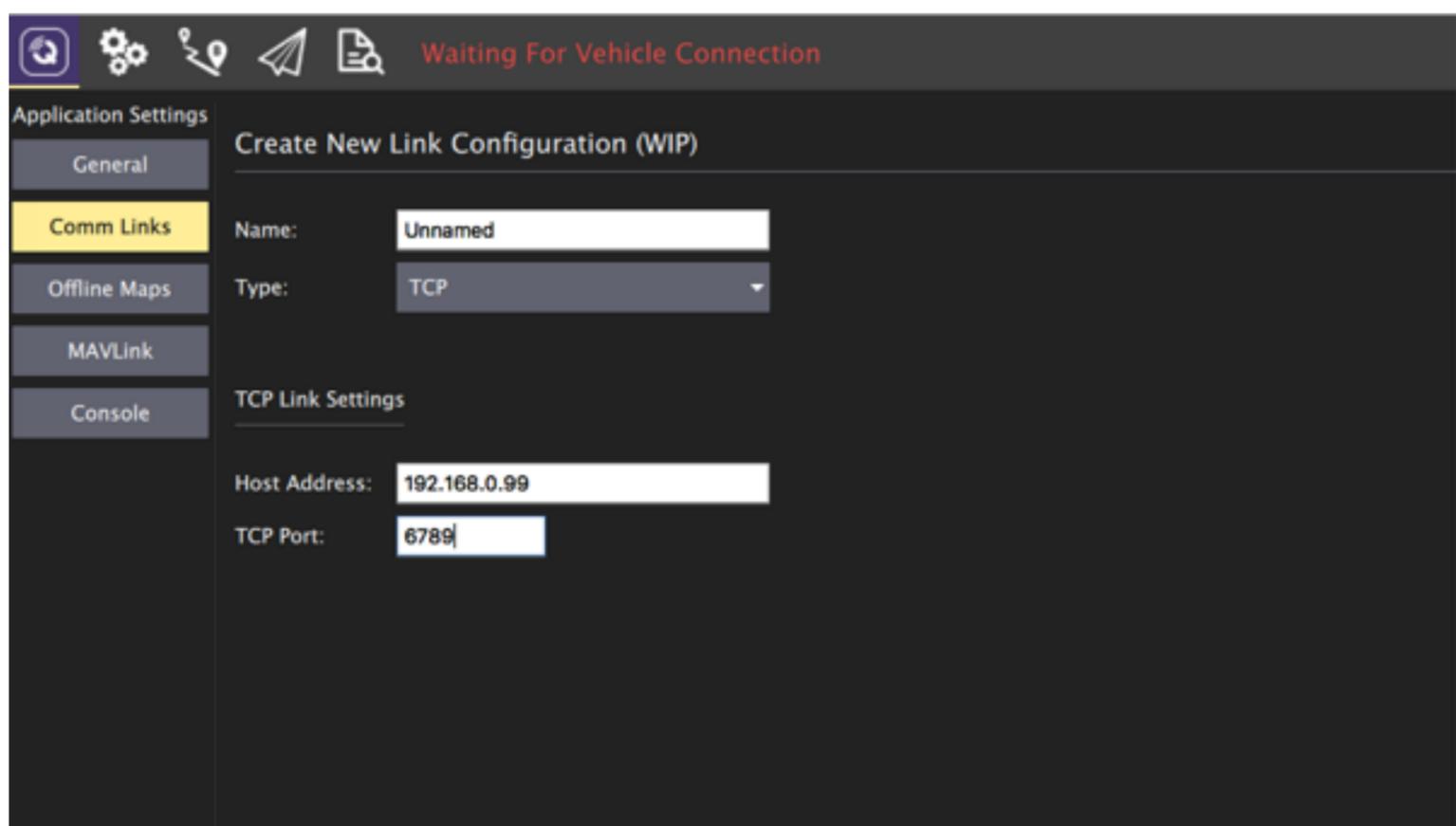


Fig. 13 Connect QGC to NanoMind through Wifi

## Stack a MindTag UWB Module

A MindTag (UWB tag) deck that following the WEP interface can be stacked onto NanoMind, mind the direction of mounting, as shown in Fig 14.

Once stacked, the MindTag is powered through WEP socket when battery is connected.

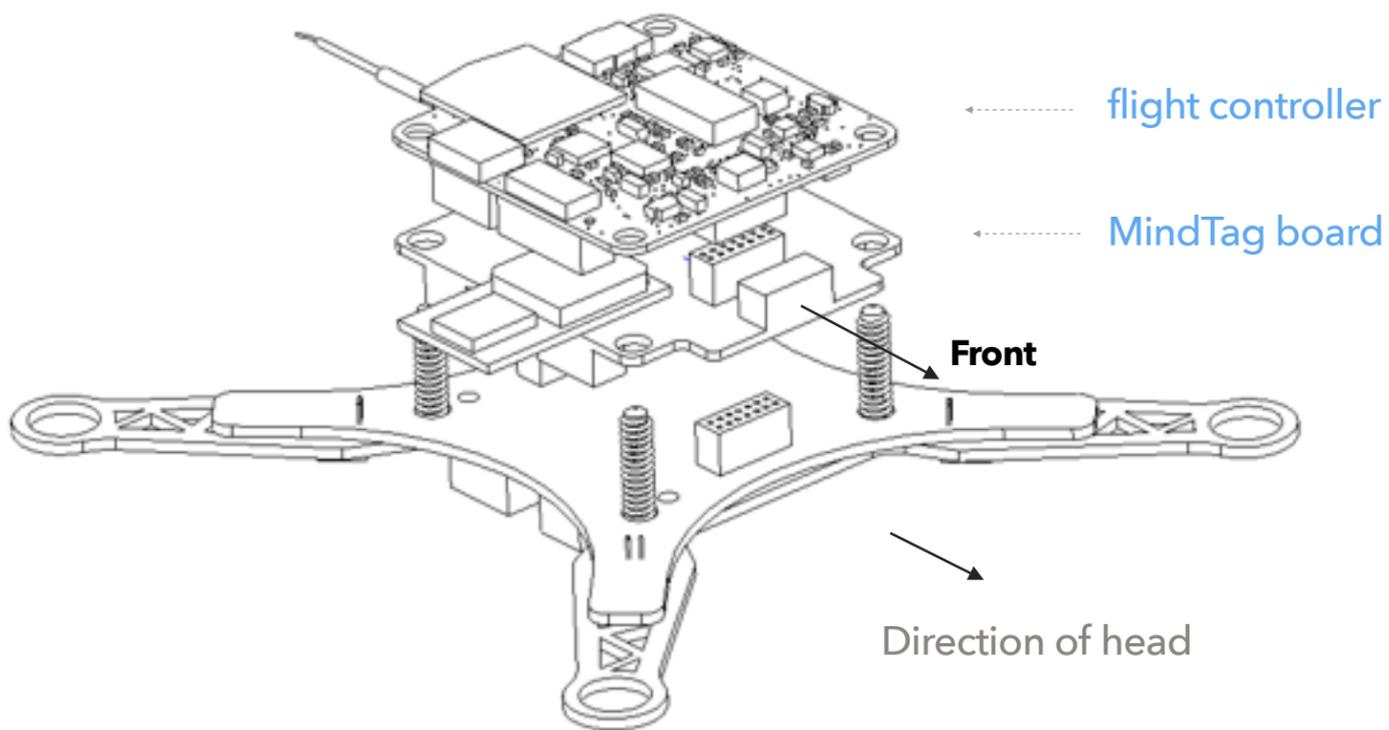


Fig. 14 Stack a MindTag deck onto NanoMind

## Color LED Indicator

The main LED indicator is a tricolor LED and can show different status information with the combination of different colors and blinks. The status information it indicates is listed below:

| LED color           | meaning (status)        | remark                |
|---------------------|-------------------------|-----------------------|
| Solid any color     | Armed                   |                       |
| Breathing any color | Standby                 |                       |
| Amber               | Low battery or Failsafe | (Return to home, etc) |
| Blue                | GPS not locked          |                       |
| Green               | GPS Locked              |                       |
| Fast Blink & Red    | Arming error            |                       |
| Blink & Red         | Other error             |                       |
| Transitional Green  | Mode switch success     |                       |

Fig. 15 LED indicator

## Support

Please visit [www.mindpx.org](http://www.mindpx.org) for more information. If you have any technical issues related to our products, please post on MindClub forum [club.mindpx.net](http://club.mindpx.net) to ask for help, Or you can send email to [support@mindpx.net](mailto:support@mindpx.net).

## Where to buy

You can buy NanoMind and all related accessories/spare parts at [AirMind Store](#) .