NewBeeDrone
BeeBrain Manual - v.1

The world's first FrSky*/DSMX* compatible, Betaflight ready, born for acro flight controller for the Tiny Whoop/Inductrix style quad. We have made two versions:
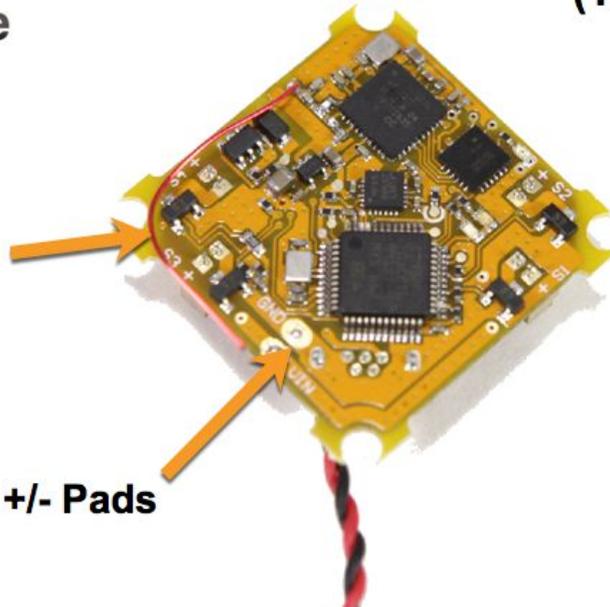
V1.d which is the DSMX* Compatible version, to be controlled by Spectrum* radios, and the Blade* RTF stock radio

BeeBrain V1.d
DSMX Compatible
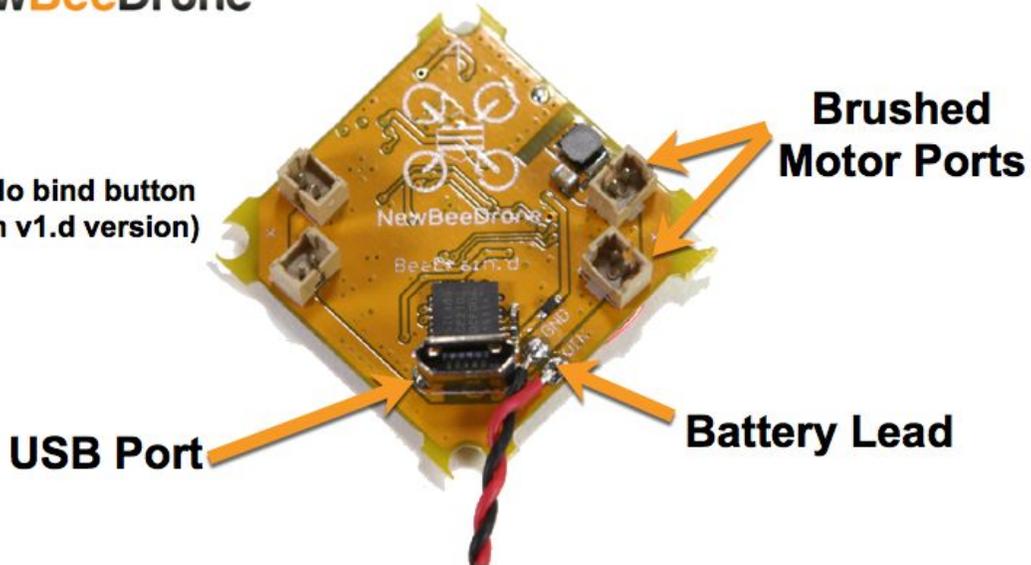**(Top of Board)**

Front

Antenna

Camera +/- Pads

NewBeeDrone

Front

BeeBrain V1.d
DSMX Compatible
(Bottom of Board)

Brushed
Motor Ports

(No bind button
on v1.d version)

NewBeeDrone

USB Port

Battery Lead

V1.f which is the FrSky* Compatible version, to be controlled by Taranis* radios

NewBeeDrone

BeeBrain V1.f
FrSky Compatible
(Top of Board)
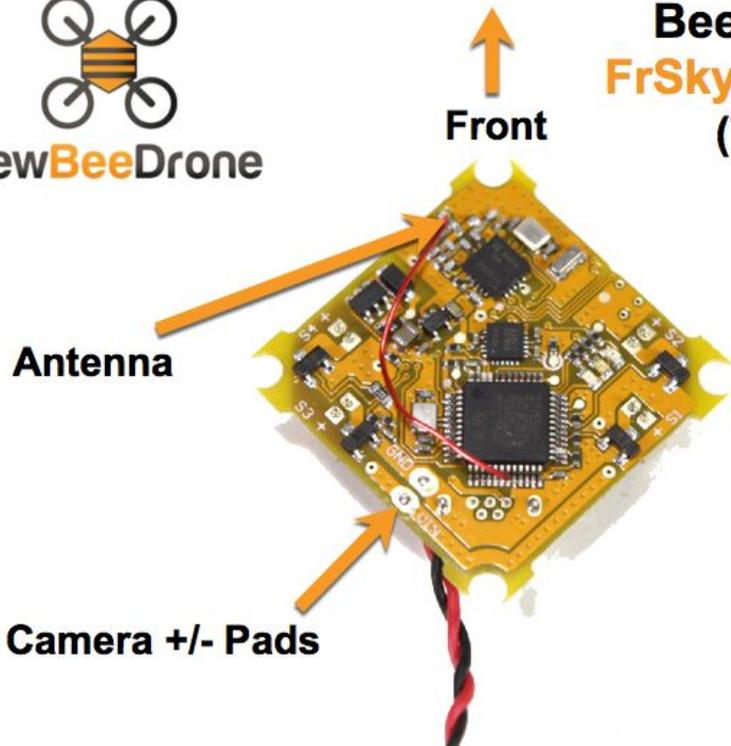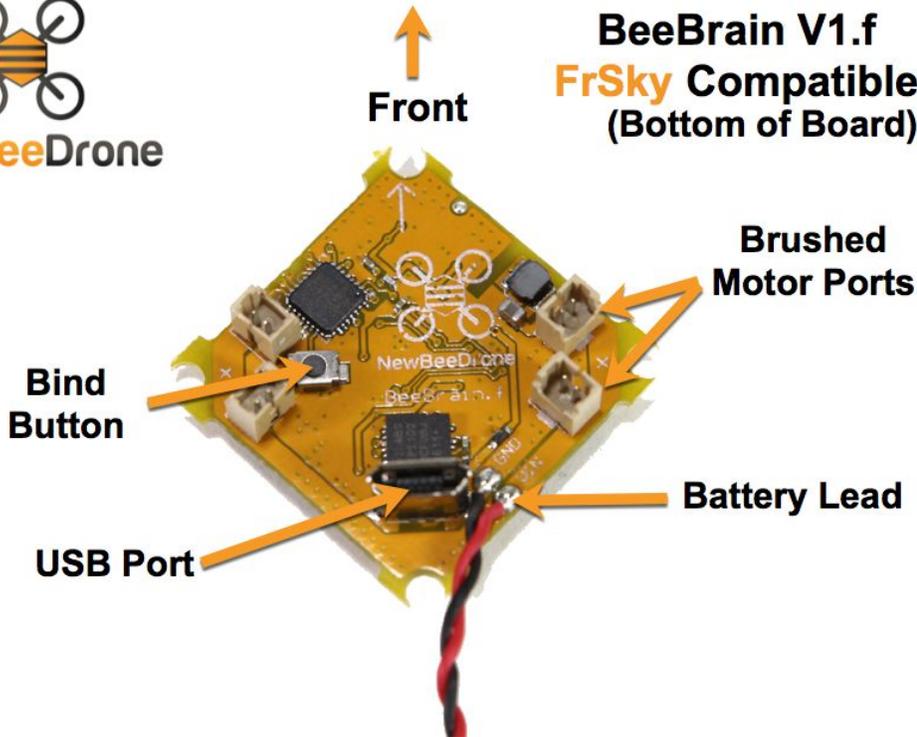
Front

Antenna

Camera +/- Pads

NewBeeDrone

BeeBrain V1.f
FrSky Compatible
(Bottom of Board)

Front

Brushed
Motor Ports

Bind
Button

Battery Lead

USB Port

Table of Contents

Common questions asked

1. Why can't I connect to Betaflight configurator?
    a. **Make sure all the correct drivers are installed, and try a different USB cable, USB port, restart the computer, or try a different OS**
2. Why can't I bind to my BeeBrain?
    a. **Make sure you have the correct receiver settings set in Betaflight**
3. Why wont my BeeBrain arm?
    a. **Make sure the quad is on a level surface, and the ARM mode is set**
4. Why does my BeeBrain spin in circles when I throttle up?
    a. **Make sure your motors are in the correct positions and correct rotation**
5. Why do the propellers spin up when I plug in the battery?
    a. **Make sure your ESC/Motor protocol is set properly**
6. Why do the motors barely spin when I give full throttle?
    a. **The Betaflight firmware may have been corrupted. Re-flash the firmware and try a different version.**
7. How do I safely flash the BeeBrain?
    a. **Please pay close attention to the steps outlined in the guide**

PLEASE READ FIRST (before flashing the board or changing any settings on it)

All BeeBrains **come fully tuned and configured with Betaflight 2.9.1 out of the box**. There is no need to flash a firmware onto it unless you would like to use a newer version of Betaflight (such as 3.0). **We recommend** that you start with the default Betaflight 2.9.1 settings on the board. Simply install the BeeBrain on your frame (check out our build video), bind to your controller, setup your flight modes, and you are ready to fly!

This Backup file (right click and use save as) contains our recommended settings for Betaflight 2.9.1. If you are having trouble binding to your BeeBrain or have changed some settings and are experiencing issues, please use this file to restore your BeeBrain to our current recommended settings.
To use this file, download it, Connect to Betaflight, and then use the **Restore** function found on the Setup tab to load these settings into your BeeBrain:
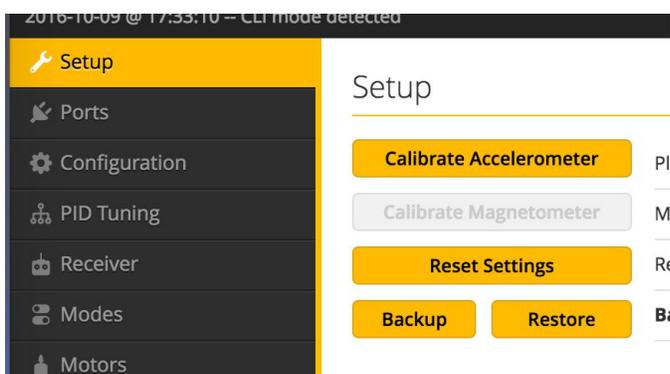
Please join our popular BeeBrain Facebook group where you can find lots of members of the community sharing their settings and helping out by answering some of the common questions that new users have been asking.

The Official TinyWhoop Facebook Group is another great place to discuss the BeeBrain and everything TinyWhoop related. Check them out, its an amazing and fast growing community!

Please also check out our RCGroups BeeBrain Thread where some users have been experimenting with some advanced settings and sharing out their tips and tricks.

Binding Your BeeBrain:

V1.f - FrSky* Compatible version:
1. Hold down the Bind Button on the BeeBrain and power up the BeeBrain via USB or 1 cell Lipo battery
2. Power on the Taranis
3. Select the model you want to bind it to (press MENU)
4. Go to the edit menu of select model (press PAGE)
5. Select the mode (D8) and the number of channels you want to use
6. Set your Taranis* into bind mode
7. Place the rx and tx approximately 1m (3 feet) apart
8. You will see a solid red LED when the board has been successfully bound

V1.d - DSMX* Compatible version:
1. Power on the BeeBrain via USB or 1 cell Lipo battery
2. The LED's will flash steadily first, then will start to flash rapidly
3. Power on the DSMX controller while holding down the bind button on the controller
4. You will see a solid red LED when the board has been successfully bound

If using the stock* Inductrix Blade MLP4DSM controller:
1. Push down and hold the left stick, and power on the controller. Once the controller is powered on, let go of left stick to allow the controller to enter bind mode
2. The LEDs will finish flashing and give a solid red light to indicate successful bind
3. You will need to change many settings on this controller to control the quad (refer to our step by step video)

REQUIRED CLI Commands for stock controller:
Go to the CLI tab in Betaflight, Type in:
       "rxrange 0 1180 1860"
       "rxrange 1 1180 1860"
       "rxrange 2 1180 1860"
       "rxrange 3 1180 1860"

       Hit Enter. Type "Save", hit Enter.

```
Entering CLI Mode, type 'exit' to return, or 'help'

# rxrange 0 1180 1860

# rxrange 1 1180 1860

# rxrange 2 1180 1860

# rxrange 3 1180 1860

# save
Saving
Rebooting
```

Check out our video for a complete guide on how to bind the stock Blade MLP4DSM controller to the BeeBrain.

PLEASE NOTE - while the stock controller that comes with all RTF Inductrix kits can be bound to the BeeBrain, due to its limited control resolution, we highly recommend using a fully featured radio such as the Taranis* or Spectrum* to get the most out of our flight controller.

Betaflight Setup

The BeeBrain uses the NAZE32 firmware file of Betaflight/Cleanflight, and it follows all the same processes of connecting, flashing, and configuring as any other Naze board. We at NewBeeDrone prefer Betaflight, and so the instructions are specific to using Betaflight firmware and the newly released Betaflight Configurator.

How to install Betaflight Configurator (if you already have the betaflight configurator, please skip to the next *IMPORTANT* section about having the correct drivers installed)

1. Download and install [BetaFlight Chrome Configurator](#) via Google Chrome extension.
2. On your browser, click menu.
3. Select More tools > Extensions.
4. On the extension you want to add, click add from Chrome. If you are having trouble finding this area use this link: chrome://extensions
5. Scroll down to the bottom of your extensions page and click 'Get more extensions"

6. Go to the search bar on the right and type in "Betaflight"

7. Click "ADD TO CHROME" on the top Betaflight- Configurator App

8. Click on "LAUNCH APP" (top green button)

IMPORTANT NOTE - If you are new to Betalfight and the Configurator, please make sure you install all the necessary and upto date drivers (*CP210x, STM USB VCP*) that the Configurator requires. These drivers can be obtained on this section highlighted below.

We have found that some users have been experiencing issues such as not being able to connect to the board or failing when flashing the board due to these missing drivers
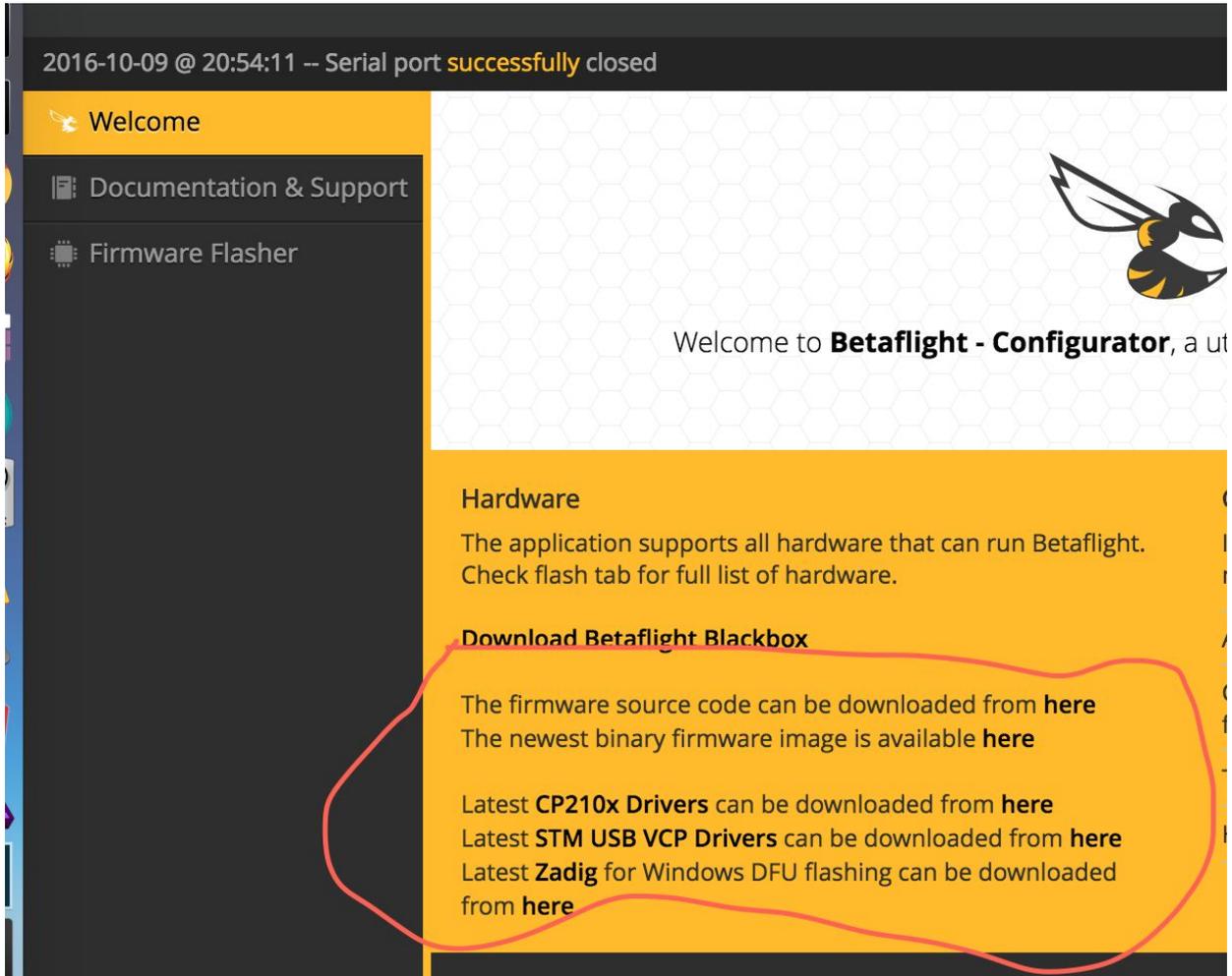
9. Connect micro USB cable to the micro USB port on your BeeBrain
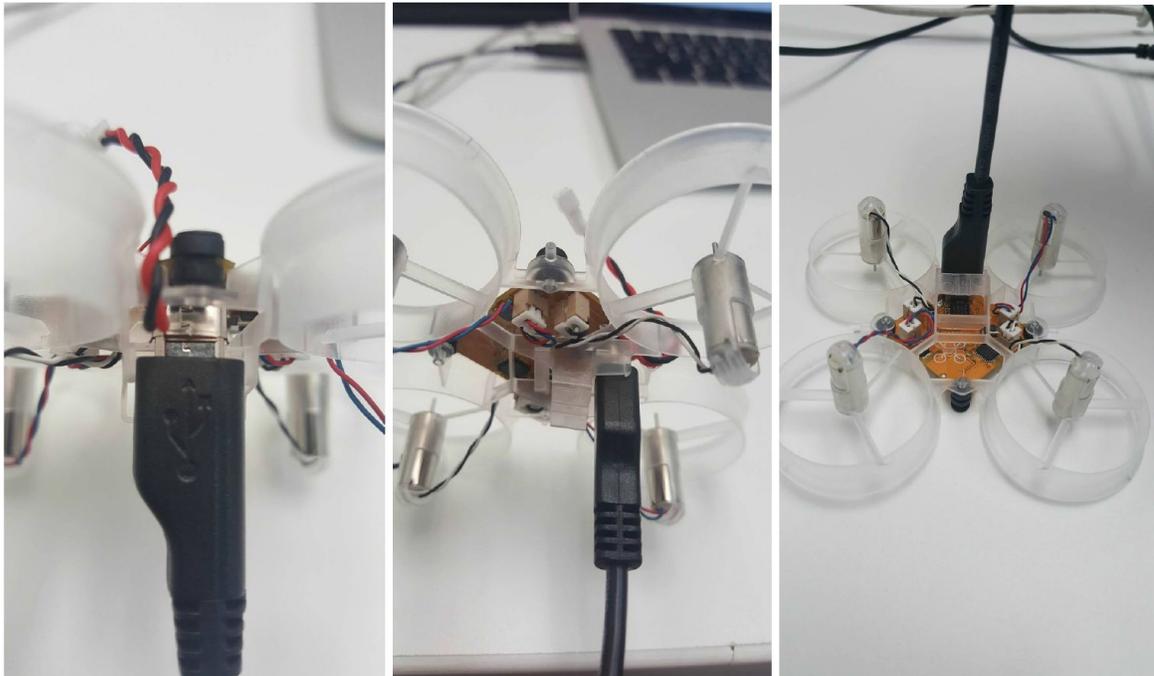
10. Connect the BeeBrain to your computer via USB cable
11. Click "Connect" in top right corner (yellow button)
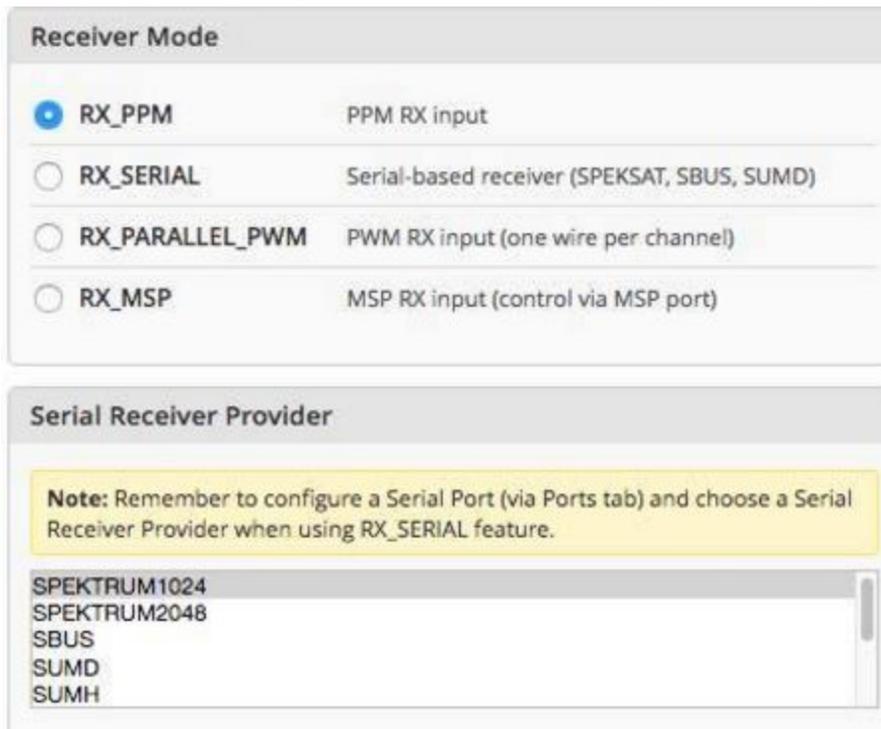12. You are now connected to Betaflight.

Betaflight Settings

There are certain settings specific to the BeeBrain that need to be setup in order for everything to work properly. **PLEASE NOTE** some settings are different based on the version of Betaflight that you are using, and we call those out in the sections below. If a Betalfight setting not mentioned in the following section then the default setting that comes with Betaflight works fine.

Receiver Settings

For both the DSMX* and FrSky* versions please make sure you set these settings on the Betalfight Configuration tab to the following:

1. Receiver Mode = **RX_PPM**
2. Serial Receiver provider = **SPECRUM1024** (same setting for both FrSky* and DSMX*)

Receiver Mode

●	RX_PPM	PPM RX input
○	RX_SERIAL	Serial-based receiver (SPEKSAT, SBUS, SUMD)
○	RX_PARALLEL_PWM	PWM RX input (one wire per channel)
○	RX_MSP	MSP RX input (control via MSP port)

Serial Receiver Provider

Note: Remember to configure a Serial Port (via Ports tab) and choose a Serial Receiver Provider when using RX_SERIAL feature.

SPEKTRUM1024
SPEKTRUM2048
SBUS
SUMD
SUMH

PLEASE NOTE if you cannot seem to bind your controller to the BeeBrain then make sure that these settings are set correctly.

ESC/Motor Settings

This is the main area where different settings have to be applied based on the version of Betaflight that you are using:

PLEASE NOTE - if you plug in your battery and your motors start to run at full speed automatically, it is due to the ESC/Motor protocol having the wrong setting for the version of Betaflight that you are using.
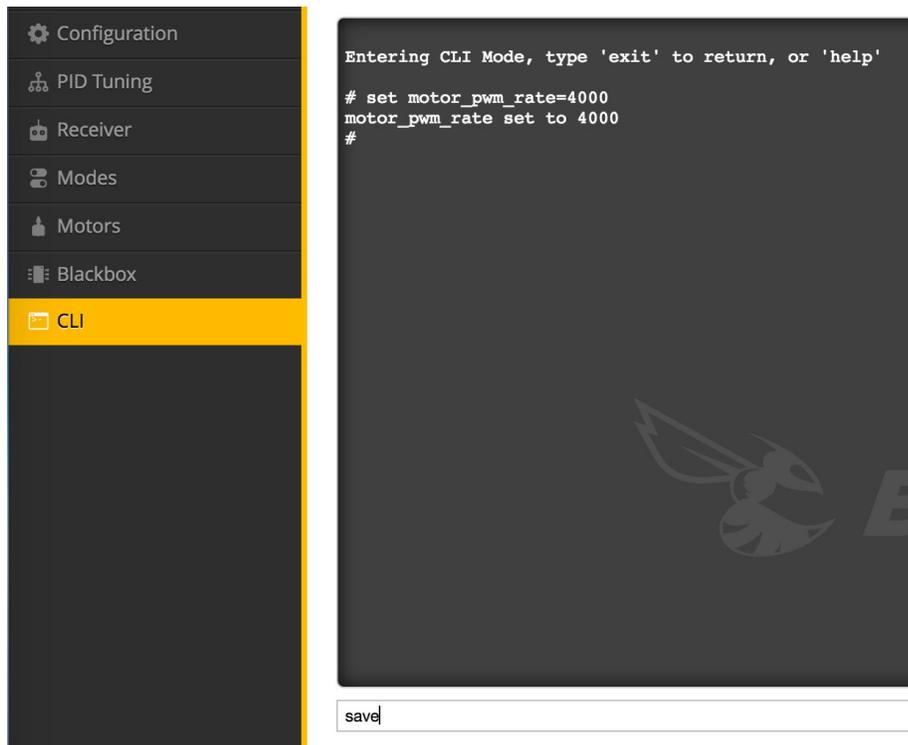
If the version of Betaflight you have is 2.9.1 then do the following:
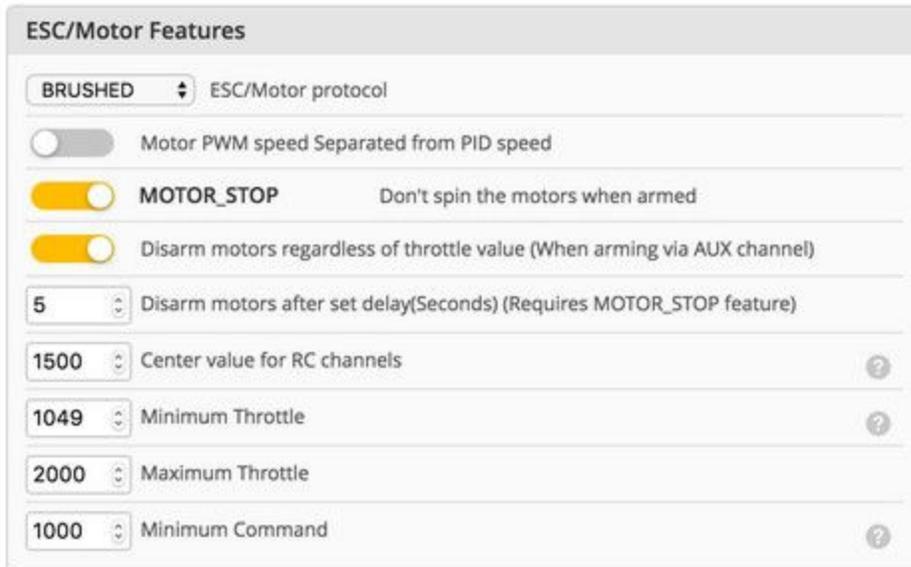
Set ESC/Motor protocol to **PWM** on the Configuration Tab
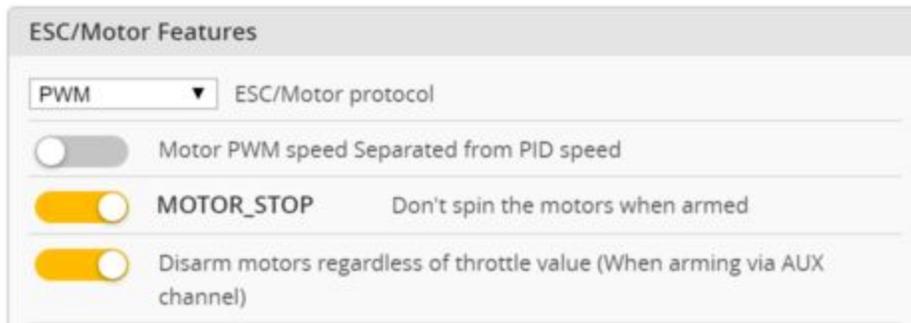
Go to the CLI Tab in the Configurator and type this in:
- *set motor_pwm_rate=4000*
- *save*

If you are using Betaflight 3.0 then do the following:

change ESC/Motor protocol to **BRUSHED** on the Configuration Tab

ESC/Motor Features

BRUSHED ⇕	ESC/Motor protocol

◯◯   Motor PWM speed Separated from PID speed

🟡◯   **MOTOR_STOP**   Don't spin the motors when armed

🟡◯   Disarm motors regardless of throttle value (When arming via AUX channel)

5 ⇕	Disarm motors after set delay(Seconds) (Requires MOTOR_STOP feature)
1500 ⇕	Center value for RC channels ❓
1049 ⇕	Minimum Throttle ❓
2000 ⇕	Maximum Throttle
1000 ⇕	Minimum Command ❓

Go to CLI and type this in:
set motor_pwm_rate=4000
save

⚙ Configuration

⛓ PID Tuning

📟 Receiver

⛃ Modes

🕯 Motors

▮▮ Blackbox

▭ CLI

```
Entering CLI Mode, type 'exit' to return, or 'help'

# set motor_pwm_rate=4000
motor_pwm_rate set to 4000
#
```

save
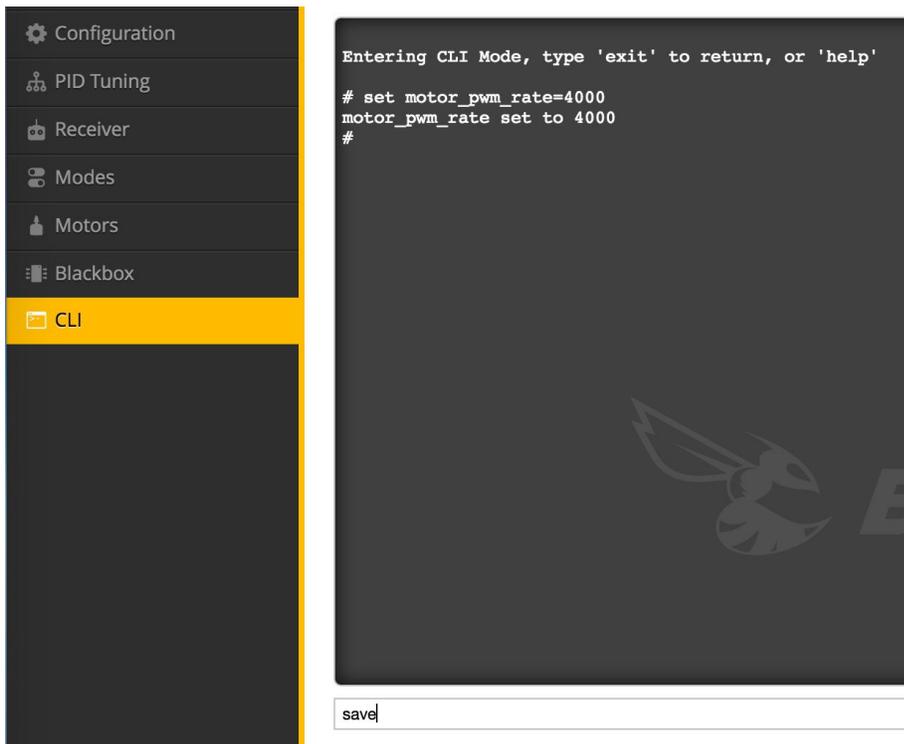
Other Configuration Section Settings

1. Turn on MOTOR_STOP
2. Set Minimum Throttle = 1020
3. Set Maximum Throttle = 2000
4. Set Center Value for RC Channels = 1500

5. 2KHz for gyro update frequency
6. 1KHz for PID Loop frequency
7. Feel free to turn off Barometer and Magnetometer if you'd like, as you do not need them.

Controller Mapping

On the Receiver tab, please select the JR / Spektrum / Graupner as the Channel Map.
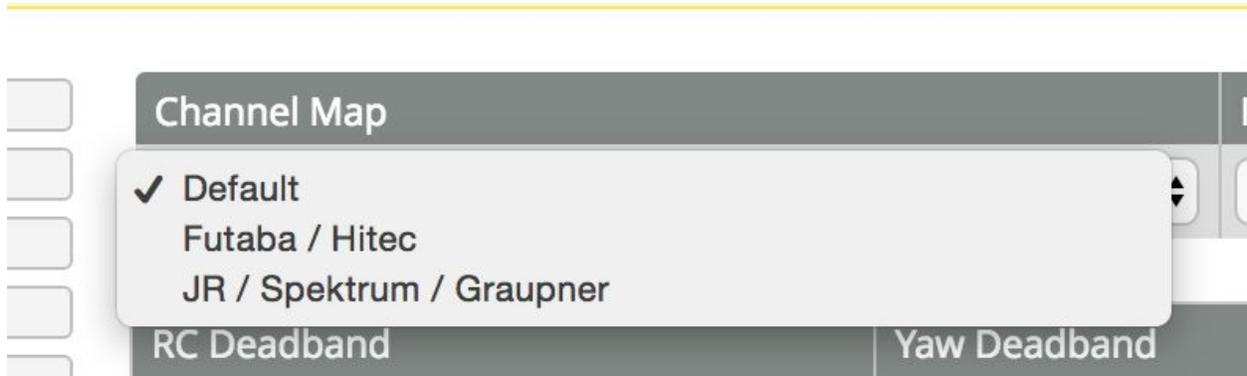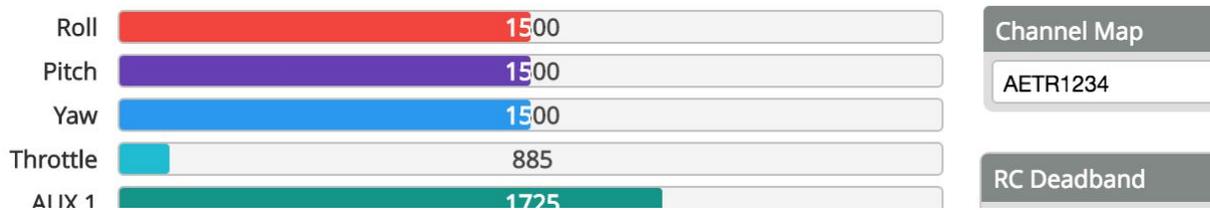

Move the sticks around to make sure that the correct stick on your controller moves the correct slider on the screen. So the Throttle stick would move the Throttle Slider and so forth.


For Spektrum radios please see this video for how to map the sticks accordingly.

Motor Direction

The BeeBrain uses Betaflight's motor direction, which spins the motors in the opposite direction compared to the Inductrix. You will need to swap the motor positions accordingly so that the motors spin the same direction noted in this diagram:

PLEASE NOTE - if your quad takes off and starts spinning rapidly, your motors are in the wrong position!
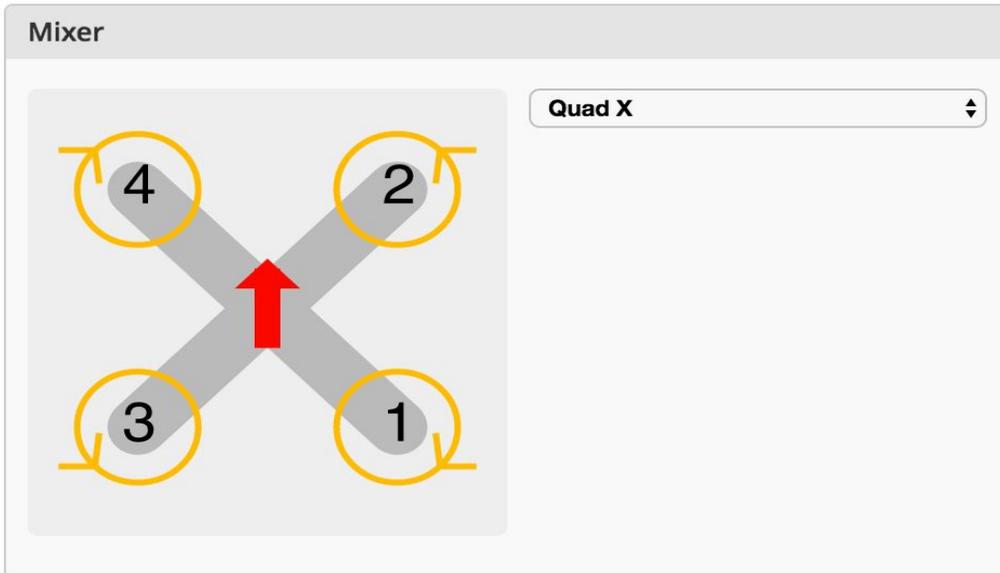
You will need to mount the ClockWise (CW) the props on motor 1 and 4, and mount the CounterClockWise (CCW) on motor 2 and 3. Here is the correct prop placement:
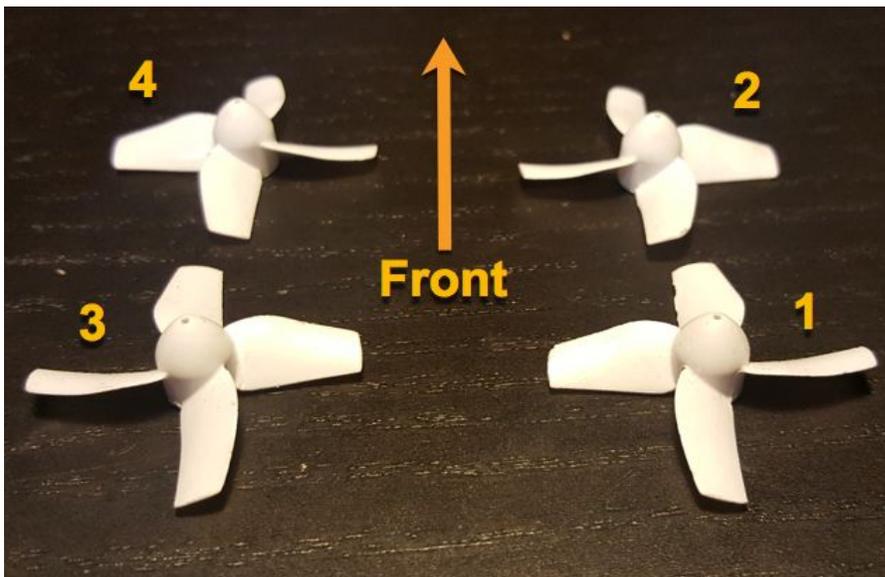
Flight Modes

Most pilots will prefer to fly in HORIZON mode as that allows for both stabilization and also flips and rolls. The other modes to use are:

1. ANGLE - full stabilization, no flips, ideal for first time pilots
2. Rate - if you do not have ANGLE or HORIZON turned on then the quad is in full rate mode, with no stabilization, giving the pilot full control of the quad at all times.
   We highly recommend to fly in rate mode with AIR MODE.
3. AIR MODE - spins the props at zero throttle, allowing the quad to maintain its attitude and angle at all times. This mode that allows for advanced aerial maneuvers.

PLEASE NOTE - If using the stock Inductrix Blade MLP4DSM controller, you do not need to set an ARM switch. Leave that blank and just move the left controller stick to down-right position and hold it for a few seconds and the quad will ARM.

[Check out our video for a complete guide on how to bind the stock Blade MLP4DSM controller to the BeeBrain.](#)

Recommended PID Settings

These are the settings we currently fly with (and come stock on the board), but these are subject to change as we and the FPV Tiny Whoop community at large continue to improve the tuning over time:

Flashing Latest Betaflight Firmware:

If you wish to flash a different firmware or update Betaflight to the newest version, please follow these steps to make sure you configure the BeeBrain properly.

1. Go into Firmware Flasher section, Select NAZE as the board, and pick the version of Betaflight you wish to flash (latest is 3.0.0 - NAZE)
2. Make sure that Manual Baud Rate is ON and set to 256000
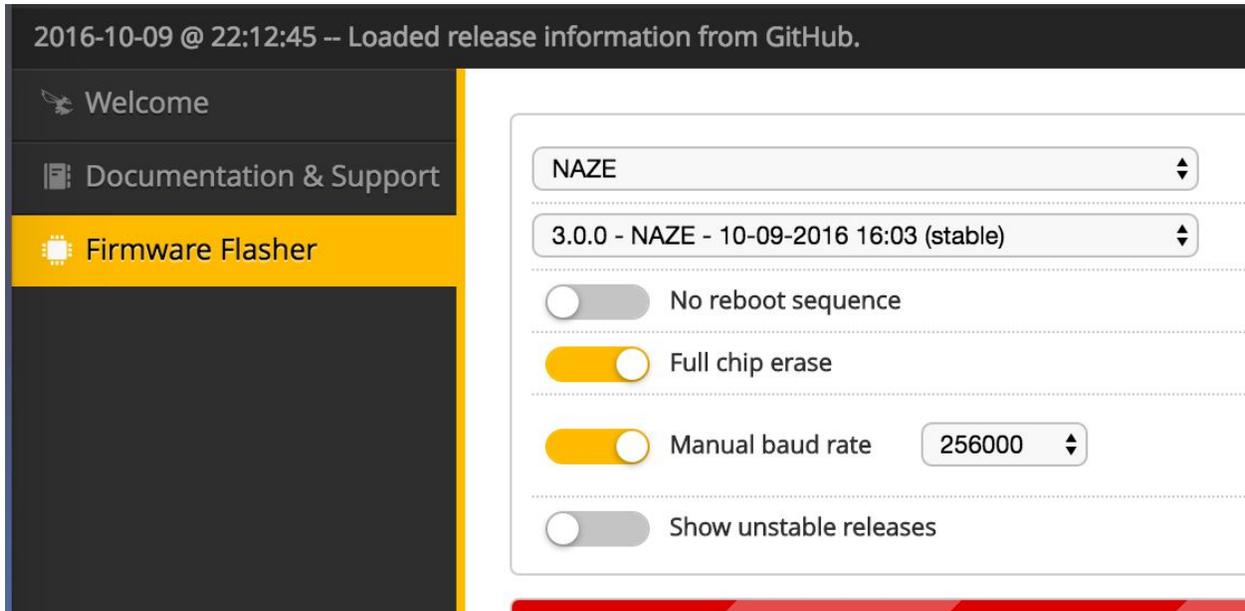
3. Click on Load Firmware [Online]. Once it loads, click on Flash Firmware
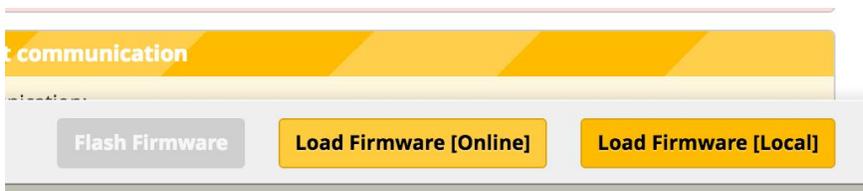
4. Once the firmware has finished flashing use the Connect button to connect to the BeeBrain

Please Note***:

1) The BeeBrain is not a Spektrum DSMX or DSM2 product, nor is it a copy of a Spektrum DSM2 or DSMX product. The Spektrum, Blade, DSMX and DSM2 brands are registered trademarks of Horizon Hobby, Inc.
2) The BeeBrain is not an FrSky Electronics product, nor is it a copy of an FrSky Electronics product. FrSky is a registered trademark of FrSky Electronics.
3) The BeeBrain has been tested to be compatible with Spektrum's DSMX and DSM2 product line, and FrSky PPM product line. (Spketrum, Blade, DSMX and DSM2 are the registered trademarks of Horizon Hobby, Inc. FrSky is a registered trademark of FrSky Electronics)

NewBeeDrone