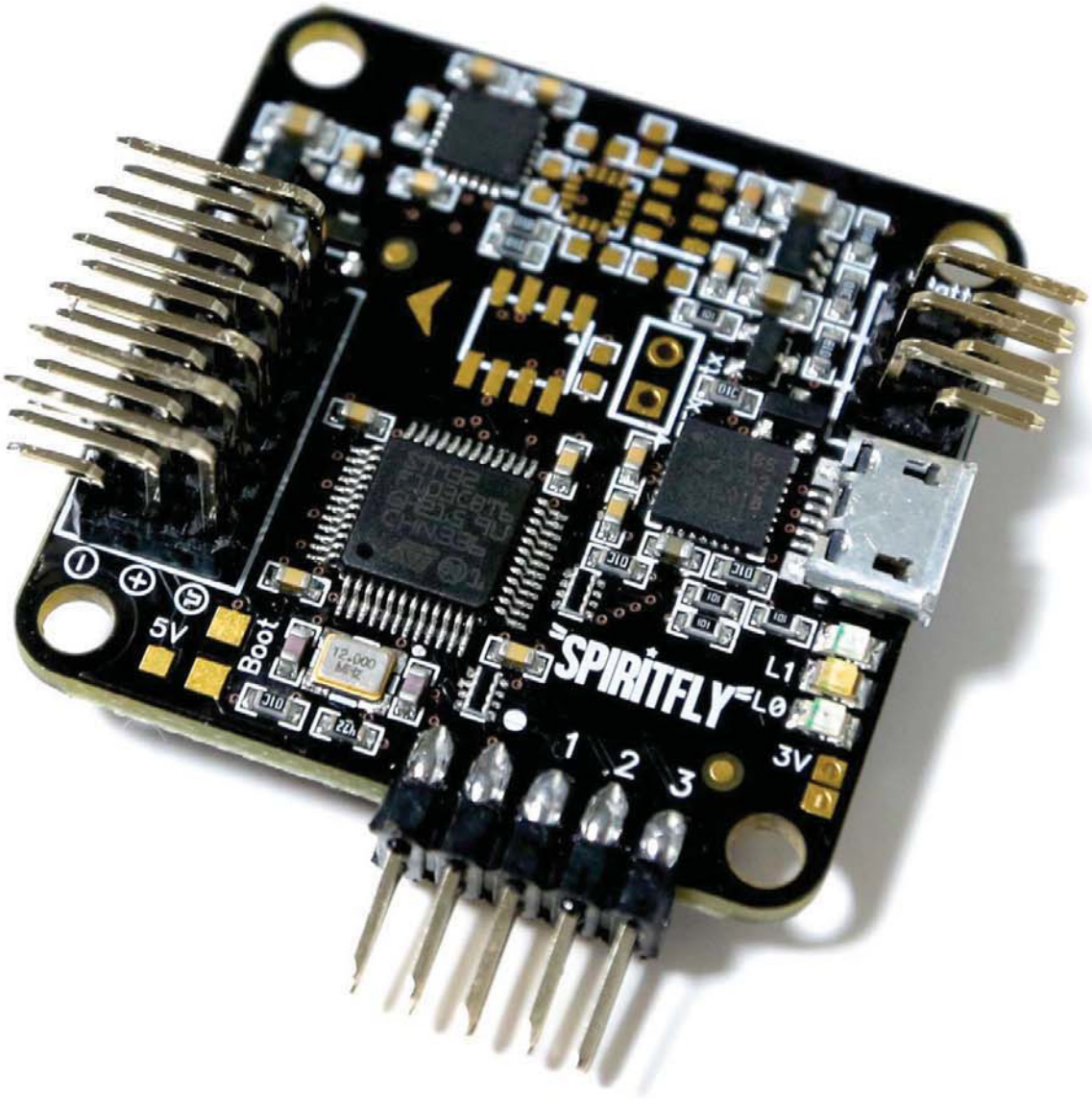
MADE 2 FLY

GET THE SHOT

QUALITY MULTICOPTER GEAR



SPIRITFLY PRO
SETUP GUIDE

WARNING

Multirotors are not toys and they can cause serious injury and permanent damage. Always perform pre-flight checks and always exercise situational awareness.

The operation of multirotors are governed over certain countries. Please check the rules, regulations and laws pertaining to the operation of multirotors.

Made2Fly will not be held responsible for any damage, loss or injury as a result of the operators actions.

Have fun and stay safe!

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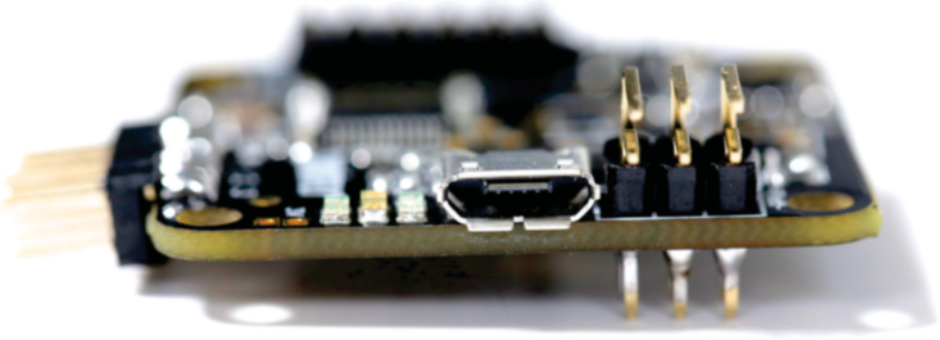
STAY LOCKED IN.



SPECIFICATIONS

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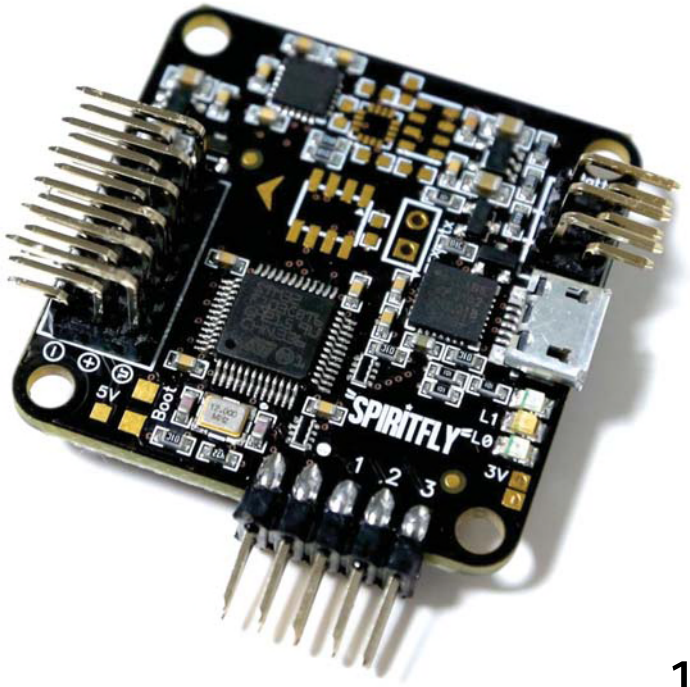
STAY LOCKED IN

You're going to love the SpiritFly, it has all the good bits of the latest technology packed inside a itty bitty sexy looking board. It can perform accurate flips, feels like its on rails during forward flight, level mode, acro mode, altitude hold, 2-axis gimbal controller and more!

FEATURES:

- 36mm x 36mm
- 6 grams (8 grams with headers)
- Pre soldered with header pins
- Preloaded with latest SF MultiWii code
- Modern 32-bit ARM processor running at 3.3v/72MHz
- MEMs gyro, accelerometer, compass and pressure sensor
- Quad, Tri, hex, Octo, various coaxial onfigurations as well as fully customizable motor mixer for any airframe!
- Flexible RC input, Standard (PWM), CPPM or Spektrum satellite
- Battery voltage monitoring and low voltage alarm
- FrSky telemetry transmission support
- Onboard USB for setup and configuration
  * Micro or Mini USB
- Easy to use MultiWii-based configuration GUI
- Flying wing, Airplane Mixer *
- GPS Position Hold / Return to Home *

(*) Work in Progress



MODES:

- Acrobatic
- Auto-Level
- MAG - Heading Hold *
- Altitude Hold *
- Horizon Mode
- GPS Position Hold * (GPS Module Required)
- Return To Home * (GPS Module Required)

*SpiritFly Pro version only

FLIGHT MODES

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ACCESSING THE MODES

Listed below are the available Flight Modes for the SpiritFly (SF Controller).
To access these modes, users must assign a switch / switches on their TX and interface with the SF Controller via the AUX channels. Please refer to your TX and RX manual for instructions.

Before trying these modes, users must first complete the initial setup that is outlined in this manual.

We do not recommend the use of a switch to Arm motors, instead, use the stick commands to save an export channel.

For more information on these flight modes, please refer to:
http://www.multiwii.com/wiki/index.php?title=Flightmodes

ACRO

Our favourite mode. This mode only uses gyros. You can perform acrobatic moves like FLIPS and get a "real accurate" feel for the multirotor. When you master this mode, you will have a skill that will see you through to other multirotors easily. Pilots who fly other "modes" like GPS or Level Modes may have limited progress with their flying skills.

ANGLE

This is LEVEL mode and activates the Accelerometers. It's a great beginner mode to learn how to hover and get to know your multirotor characteristics. Releasing the sticks after front, back, left or right inputs will cause the multirotor to auto-level. As best practice, periodically calibrate the accelerometers.

HORIZON

This mode is the best of both worlds: Acro and Angle. How it works -When the stick is near the centre, Angle mode (Auto-level) is activated. However, when you want to fly fast forward or perform Acrobatic maneuvers, pushing the sticks further to the edges causes Acro mode to kick in. Try it!

BARO

This mode is only available for SpiritFly Pro. This is Altitude Hold, meaning, it will hold its height in the air with an error of a 1 mere box. This is NOT Position Hold. (PH). PH requires GPS.

The barometer sensor that is installed in the SpiritFly Pro is a very sensitive chip. Even the slightest change of light and/or temperature can affect in the way your multirotor holds its altitude.

We recommend the use of this mode when you've lost orientation or to just fly around with the same height without throttle input. This mode is not common mode to fly around for fun.

MAG

This mode is only available for SpiritFly Pro. This is heading lock - meaning ONLY really good for when you want to film moving the multirotor up and down and to keep the heading LOCKED in until Rudder/Yaw input is provided by the user.

HEADFREE

This mode is only available for SpiritFly Pro. This mode is also called orientation-lock. The SF FC will hold the orientation of the multorotor and will always move in the same 2D direction e.g.. Forward is always forward, back is back, left is left and right is right.

MOTOR MIXER

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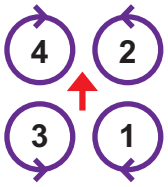
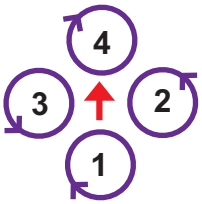
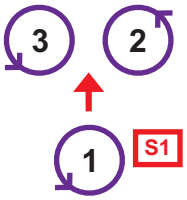
Images below show motor numbering and preopeller rotation for various supported multirotors.



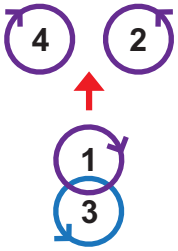
Quadcopter-X
(default)



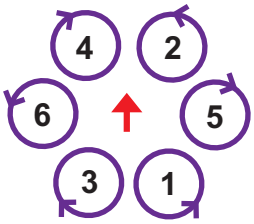
Quadcopter-Plus



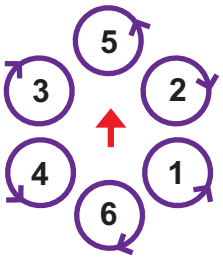
Tricopter



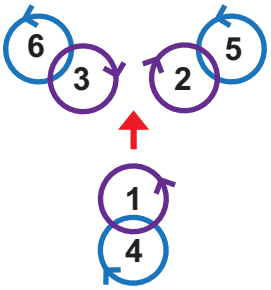
Y4



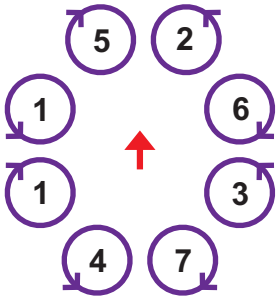
Hexa-X



Hexa-Plus



Y6



Octo-X

Changing the Mixer Type in CLI:

Quadcopter - X (quadx) is the default setting.
CLI syntax: mixer [quadx/ quadp / tri / hexa / octo etc]

ADVANCED USERS **Configurations with more than 6 motors require a CPPM receiver.**

In all cases, the "front" arrow on flight control sholud point in the same direction as the red arrow in these illustrations.

For Y4 and Y6 mixes, purple motors are top, blue is bottom. In servo mode (Tri-/Bi-/Camera Stabilization), motor numbers change according to the diagrams below. When CPPM receiver additional 4 outputs are available for Hexa- with gimbal or Octo- configuration.

In Tricopter mode, tail tilt servo connects to S1, and motors M1..M3 shown in Fig 3. Motor connections on the previous page. When camera stabilization is enabled, gimbal pitch/roll servos connect to S1/S2, and motor connectors shift as well.

It's also possible to program a completely custom mix of up to 10 motors.

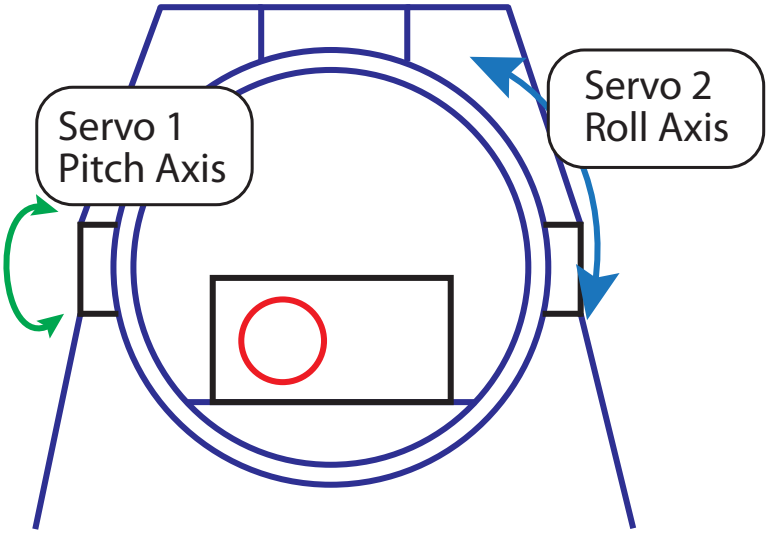
SERVO GIMBAL MODE

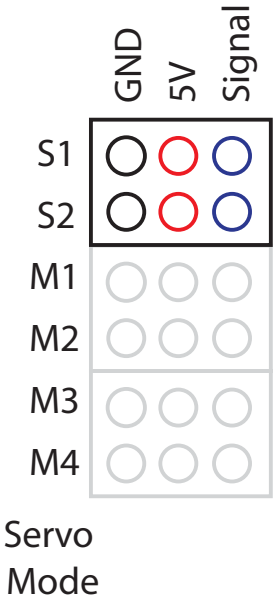
By setting multirotor type to "Standalone Gimbal Stabilization" in CLI (refer to CLI mode) - servo outputs 1 and 2 can drive camera gimbal servos.
Both analog (50Hz refresh) and digital (200Hz+ refresh) servos are supported.
Servo gain (amount of servo travel for given angle of tilt) is configurable for both pitch and roll axis.

In addition to standalone stabilization, camera outputs can also be enabled when used as a standard multirotor controller. In case of a standard receiver, this limits to a Quad mixer.

In case of CPPM receiver, up to Octo can be supported while still allowing for camera control. Channels AUX3/AUX4 can be assigned to tilt/roll the camera mount in addition to stabilization. See "Seial Console" chapter for more details.

NOTE: Make sure the aircraft is level when powering up in standalone gimbal \stabilization mode.





WARNING:
If using high-current draw servos for camera stabilization, consider powering them from a separate BEC. Only connect Signal and GND wire to board and 5V wire from servos to BEC power source

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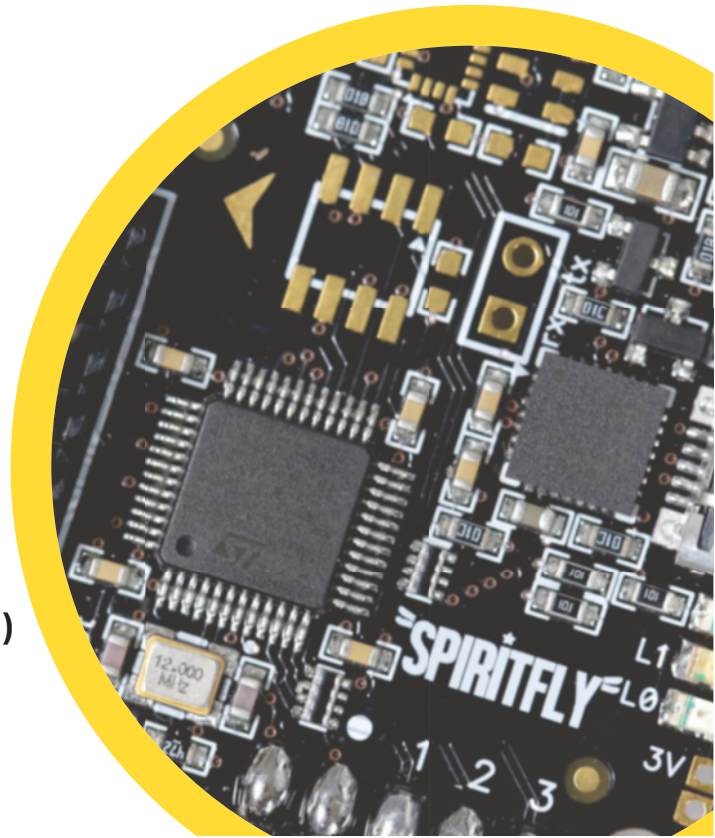
SETUP/TUNING OVERVIEW

PROPS OFF UNTIL MAIDEN FLIGHT STAGE!

1. INSTALL ELECTRONICS/WIRING
2. BIND TX/RX
3. PERFORM ESC CALIBRATION
4. CONNECT TO PC
5. SENSOR CALIBRATION
6. SET RADIO ENDPOINTS
7. SET FLIGHT MODES
8. MAIDEN FLIGHT
9. PID TUNING
10. SETUP GPS (Optional)
11. FRSKY TELEMETRY (Optional)



WIRING DIAGRAM

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WARNING: DO NOT INSTALL PROPELLERS UNTIL MAIDEN FLIGHT STAGE!

1

INSTALL ELECTRONICS/WIRING

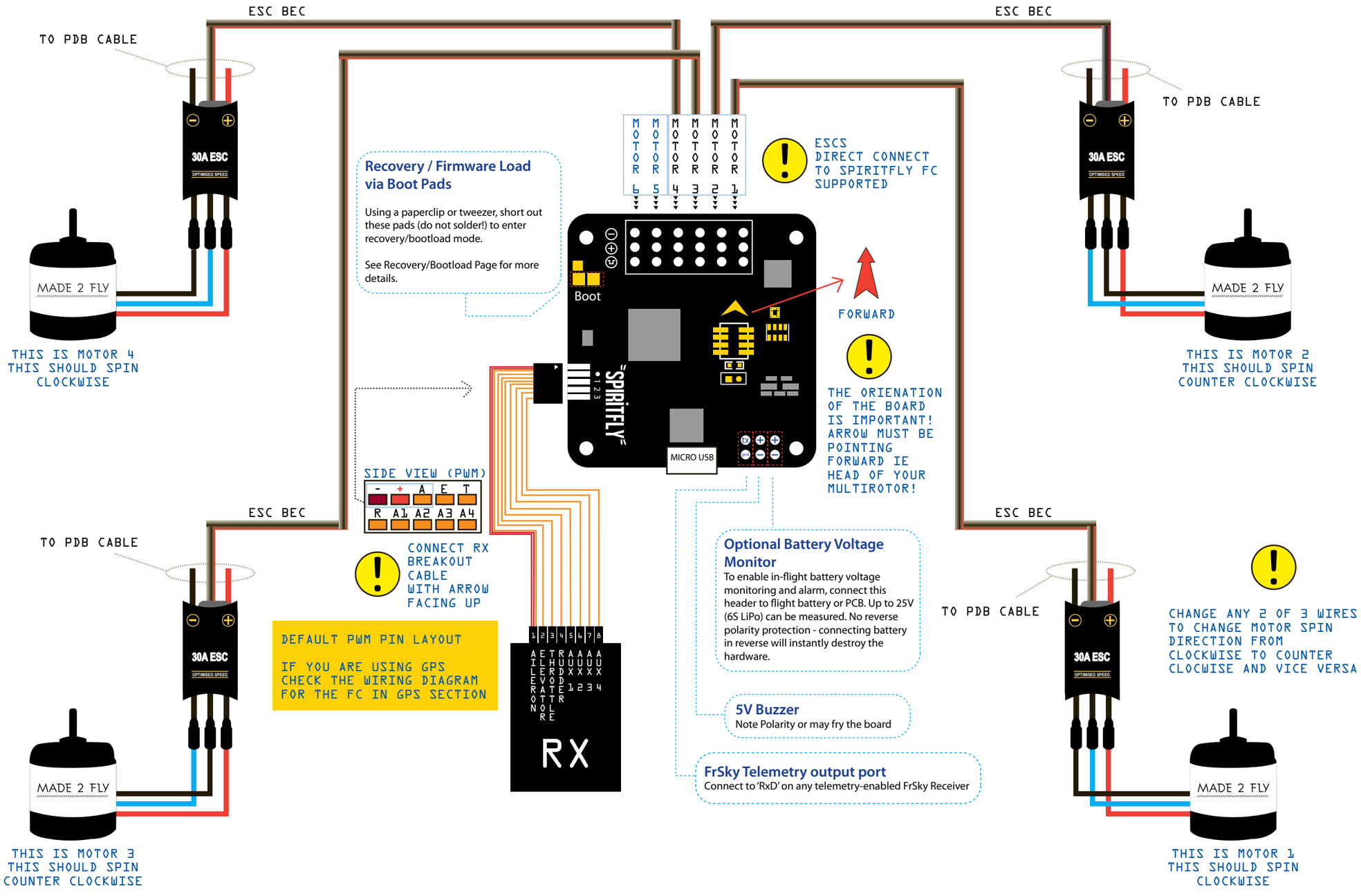
INCORRECT INSTALLATION OF THE PINS/WIRES CAN INSTANTANEOUSLY DESTROY THE FC.

If using PPM load the SPIRITFLY PPM Profile using Coolterm.

If using PWM load the SPIRITFLY PWM Profile using CoolTerm

LOADING THE WRONG PROFILE WILL CAUSE YOUR BOARD NOT TO FUNCTION

You can also switch between PPM / PWM via CLI. Watch the How-To Video on our website.



INITIAL SETUP

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SOFTWARE AND HARDWARE REQUIREMENTS

To perform Initial Setup, you will need to install following drivers and software:

- VCP Driver
- Silabs Driver
- MultiWiiGui
- CoolTerm - for loading configuration profiles

Drivers and Software are available at: http://madetofly.com.au/downloads

For hardware you will need:

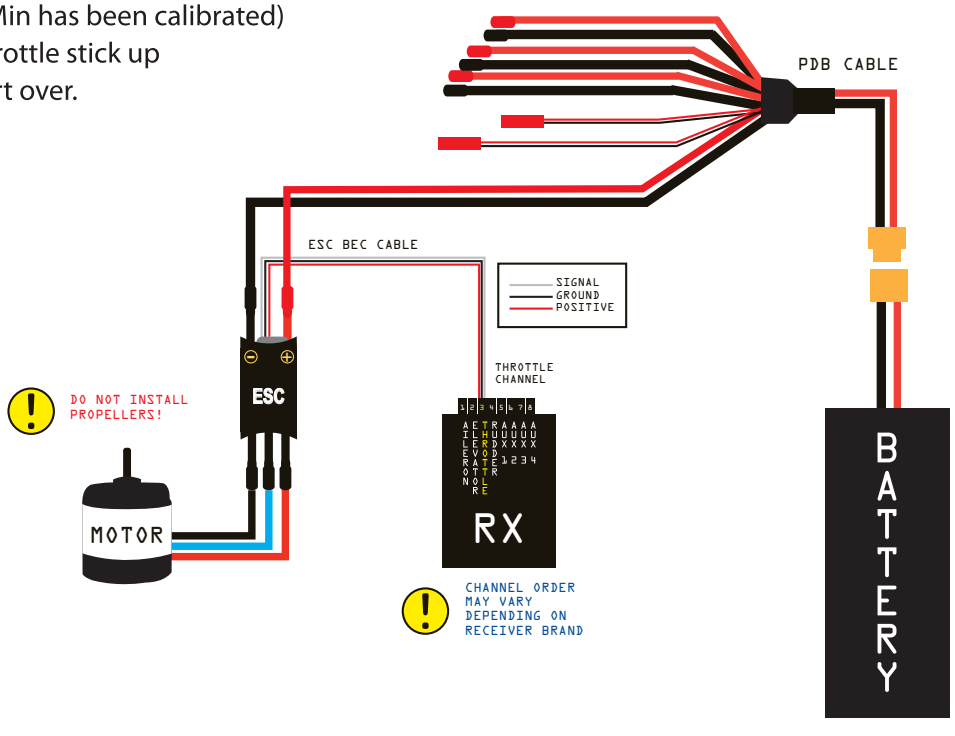
- Windows/Mac machine
- Micro USB cable
- Assembled Multirotor frame with SpiritFly Installed including all necessary electronics
- Your own programmable Transmitter (8 Channel recommended) and a compatible Receiver (at least 5 Channels)

2 BIND TX/RX

3 PERFORM ESC CALIBRATION

This is a crucial step. Not doing this will cause your multirotor to malfunction
PROCEDURE:

1) Bind your Transmitter (TX) with the Receiver (RX). Refer to the manufacturer's manual for instructions.
2) Push Throttle stick to 100%, Power up TX
3) ENSURE PROPS ARE NOT INSTALLED ON THE MOTOR
4) Select one ESC and connect per the diagram below
5) ESC will power up and Beep Twice (Throttle Max has been calibrated)
6) Move Throttle stick to 0%
7) ESC will beep once (Throttle Min has been calibrated)
8) Test by slightly pushing the throttle stick up
9) If the motor does not spin, start over.
*** Repeat for remaining ESCs



MADE 2 FLY
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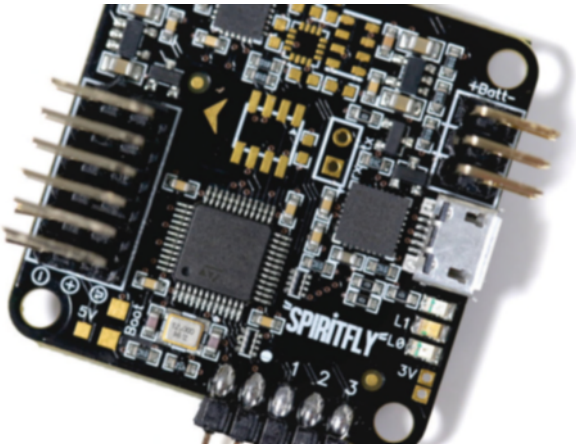
4 CONNECTING YOUR SPIRITFLY TO A COMPUTER

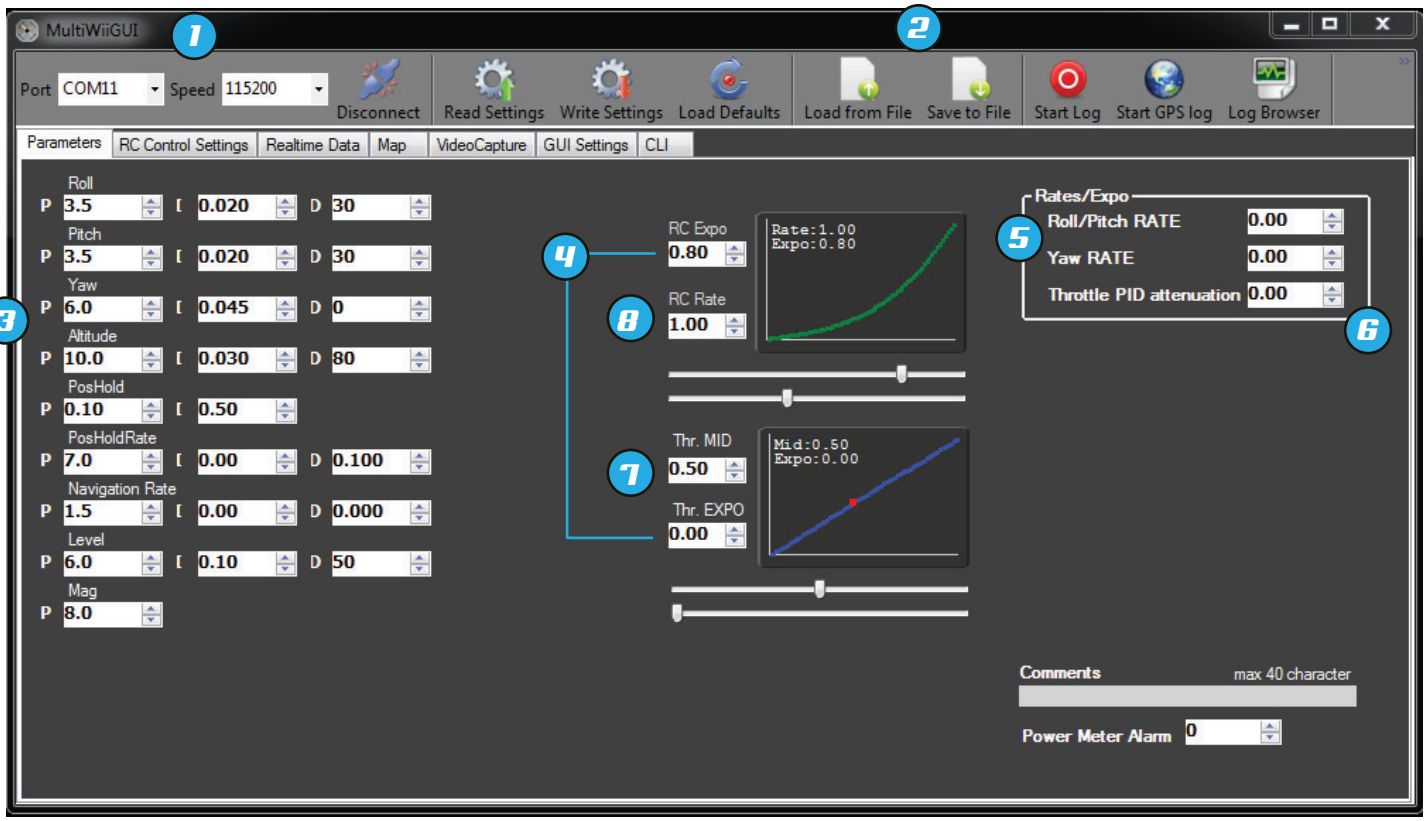


- Ensure all drivers and software are installed
- Open the BaseflightGUI Software
- Connect a micro USB cable to the Spiritfly USB port
- The software will automatically detect the COM and the BAUD rate is set by default.
- Click Connect and wait for a few seconds...

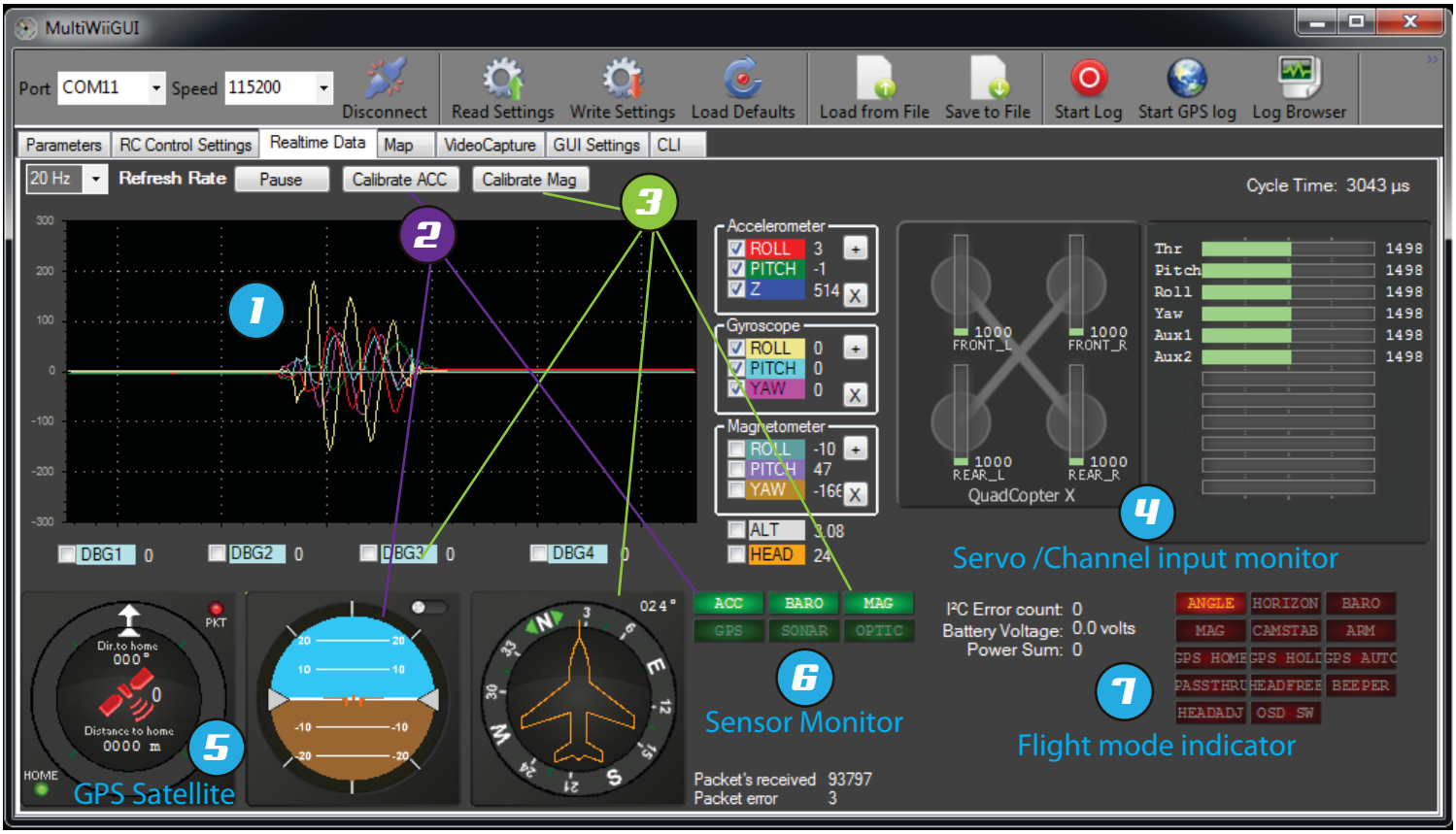
NOTE that your SpiritFly board has been preconfigured to allow you to fly out of the box.

Only change the settings in the software if you know what you're doing!

MULTIWIIGUI SOFTWARE - PARAMETER TAB - OVERVIEW



1) COM Port and Speed settings. Click Connect / Disconnect to start/end PC communication to your SpiritFly
2) Save and Load your settings (different from profiles loaded via Coolterm)
3) PID Tuning
4) Expo Settings - Adjusts the sensitivity of the sticks
5) Rate Settings - Adjusts the angle/degree of freedom of the multirotor
6) Throttle PID Attenuation - If the multirotor oscilates on Throttle UP, increase TPA
7) Thr. MID - If your quad loses altitude at throttle midpoint, increase this number (not in BARO Mode)
8) RC Rate - Usually left at default but increasing this number gives your multirotor a snappier reaction to inputs



BEFORE YOU START, PROPS OFF!!!

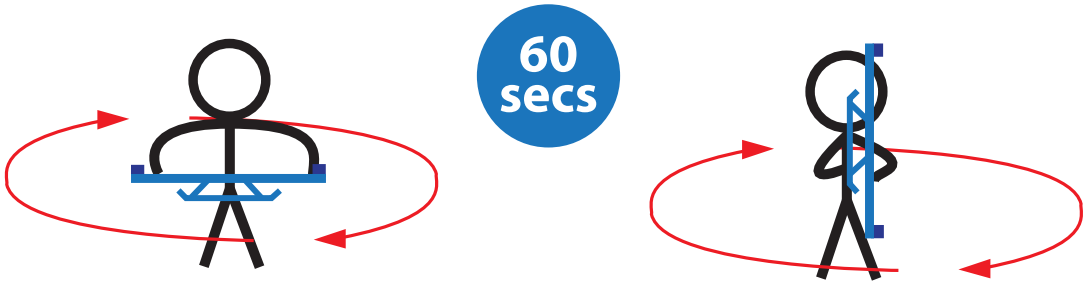
5 SENSOR CALIBRATION

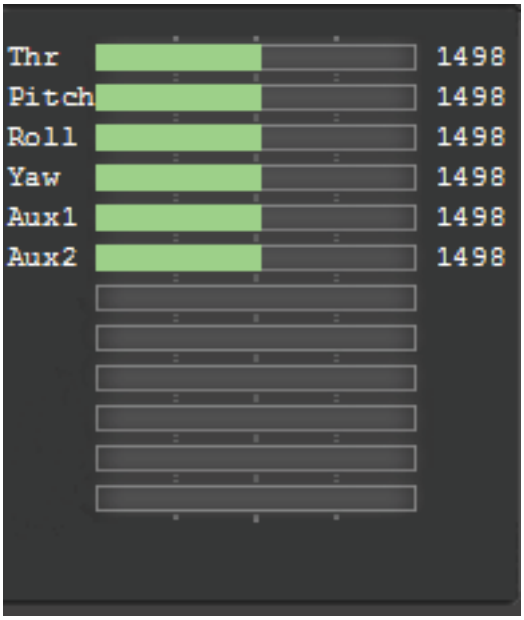
1 - In the graph, the software reads live data from the board. Go ahead and move your copter around - you should see the sensors pick up the movement and report it in 'waves'. If you can see movement in the graph this is good and you can continue with the procedure.

2 - Ensure your multirotor is on a flat and even surface. Click on Calibrate ACC - This calibrates the accelermeter.

3 - Click on Calibrate MAG - This calibrates the magnetometer. You need to spin the multirotor around all 3 axis shown below. Ensure you do this outdoors and not near any magnetic fields, including cars.

Notice the LED on the Spiritfly board flashes quickly. Turn the copter around on all axis for a 60 second period. Calibration is complete once the LED stops blinking.





PROPS OFF.
PLUG IN YOUR BATTERY.

SET THE POINTS IN THIS ORDER:

MID = 1500
LOW = 1095
HIGH = 1905

6 RADIO CALIBRATION / SET ENDPOINTS

Skipping this step will cause your board not to properly respond to your transmitter's inputs.

**Performing this step can cause your motors to spin anytime -
it is very important that you remove the propellers for your own safety!**

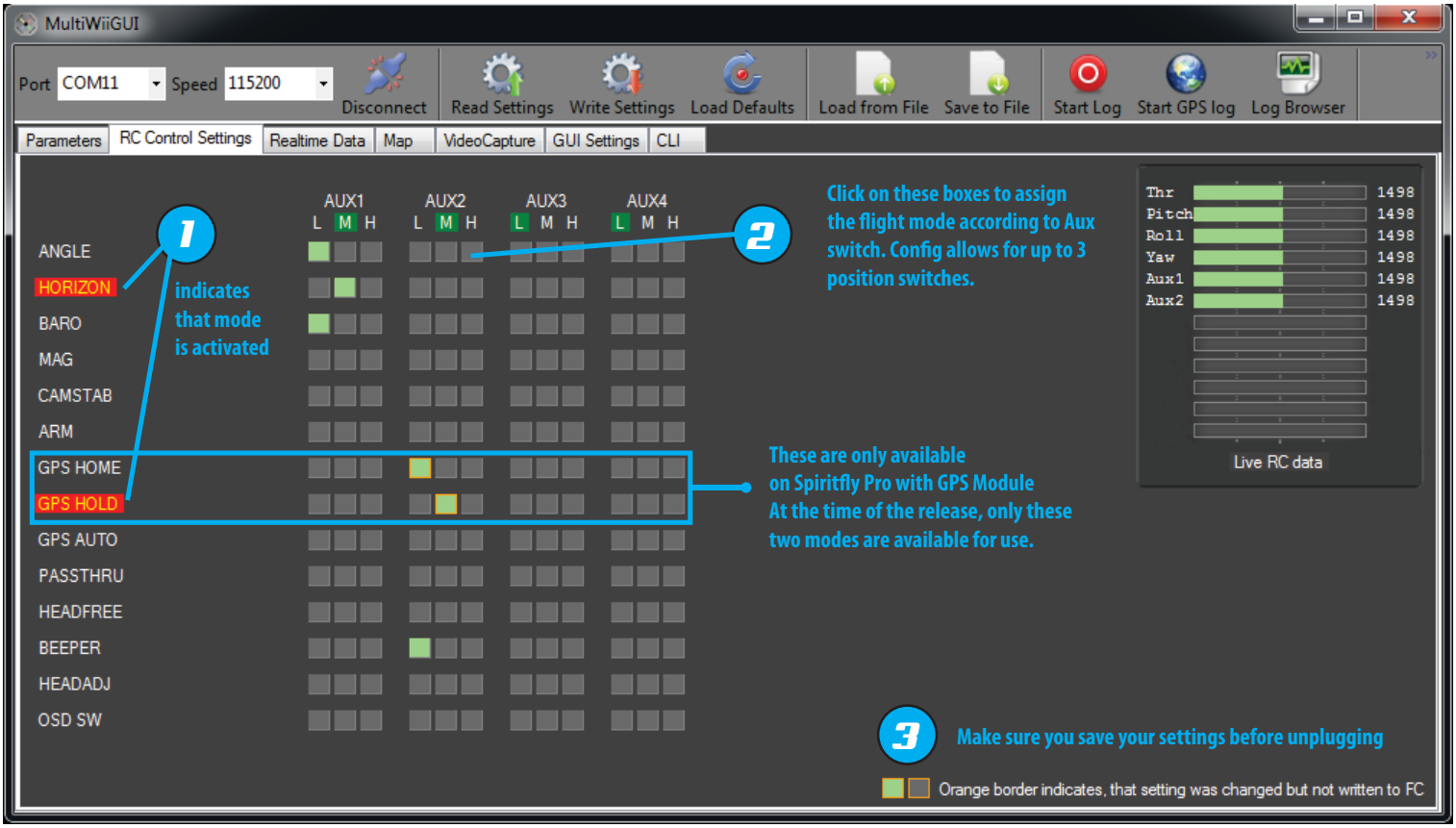
Refer to your Radio Controller's manual to understand how to setup trims and endpoints on your transmitter/radio controller.

This is the RX Panel. You should see numbers in each grey box. Move the sticks on your controller. You should see the sliders move left and right. If it doesn't work, please check the wiring from your receiver and Spiritfly board.

Go into your TRAVEL ADJUST or SUBTRIM MENU or END POINTS on your controller and the points to the values below. Look at you computer screen while adjusting on your controller. The bars will move as you dial in on your controller. 1500 is the MOST important value - aim to get as close as possible to this number.

Set 1500 for all channels: Throttle, Pitch, Roll, Yaw and AUX channels. Not doing so will result in your board not responding to your stick commands.

If the direction of the slider does not correspond with your stick direction then REVERSE that channel in your controller. eg If you move the throtte stick up - the throttle grey bar should move to the right and all 4 green bars should go up.



7 SET FLIGHT MODES

Before you do this you need to set a switch on your radio controller/transmitter to use an AUX Channel. If you don't know how to do this, please refer to your transmitter's instruction manual.

To set a mode on a switch simply click on the small boxes in the RC Control tab as shown above.
You can use a 3 position switch to have access to 3 modes in 1 switch or 2 modes with a 2 position switch.
Recommended settings are the following for a 3 position switch:

L = HORIZON
M = ANGLE+BARO
H = ACRO (No tickboxes)

WARNING: Selecting ANGLE and HORIZON Modes on the same switch eg. Horizon and Angle Mode selected on the same column can cause your multirotor to malfunction.
Ensure you only select one of these two.

GPS modes are only available when you purchase and install a GPS unit on your Spiritfly Pro.

Once you have selected your desired modes, click "**Write Settings**" and then "**Disconnect**".
Unplug USB and Unplug Battery.

8 MAIDEN FLIGHT

Perform this step outdoors, clear of any obstacles, cars and people.
Check that your motors are spinning in the correct direction.
Ensure that you installed the correct props on their respective motors.
In the case of a quadcopter you will have 2 x Clockwise props (usually marked with an R) and 2 counter clockwise. Check the Motor Setup page.

8.1 - Install the battery on your multirotor in such a way that when you hold the quad with both of your index fingers at the centre and lift it it balances. If the quad tilts forward, move the battery back. If the quad tilts backwards, move the battery forward. Ensuring CoG (centre of gravity) is achieved will affect flight characteristics of your multirotor.

8.2 -Power up your radio controller then power up your quad by plugging the battery.
DO NOT MOVE THE QUAD whilte it boots up.

8.3 - Move back about 2 meters, Arm the motors by using the following stick command for the **THROTTLE**: **DOWN THEN RIGHT AND HOLD FOR 2 SECONDS.** The motors should either spool/spin up or the RED LED on the board will stop flashing. The LED will go SOLID GREEN to indicate it is ARMED.

DO NOT APPROACH / PICK UP YOUR MULTIROTOR WHILE THE BOARD IS ARMED!
TO **DISARM**, MOVE THE **THROTTLE STICK DOWN AND THEN LEFT AND HOLD FOR 2 SECONDS**.

8.4 - If the LED is SOLID RED this means it is either in LEVEL or ALTITUDE HOLD modes.
NO RED LED and just the GREEN LED means it is in MANUAL/ACRO Mode.

8.5 - Now VERY gently move the THROTTLE stick up. This will cause the motors to spin faster to generate lift. Keep moving the THROTTLE stick up until you see your multirotor lifting slightly off the ground. AT THIS POINT, IF YOUR MULTIROTOR HAS FLIPPED, IT IS A CLEAR INDICATION THAT SOMETHING IS NOT CONFIGURED/INSTALLED CORRECTLY.

CHECK FOR THE FOLLOWING:

1. You may have the signal cables from the ESC to the Motor pins in the wrong position
2. You may have the signal cables in the wrong plug going to the receiver
3. You have the motors spinning in the wrong direction.

PROPS OFF BEFORE YOU DO THIS! Check your bullet connections going to the ESC switch any two wires to reverse the spin direction.

4. You may have the wrong props installed on the wrong motor.

MAIDEN FLIGHT continued...

8.6 - If all OK, continue to hover in the air and give very gently stick inputs to keep try and keep the multirotor in a 1 metre box. IF you find your quad drifting unusually to one side, you may need to check your COG and check if your frame arms or motor mounts are slightly angled or bent.

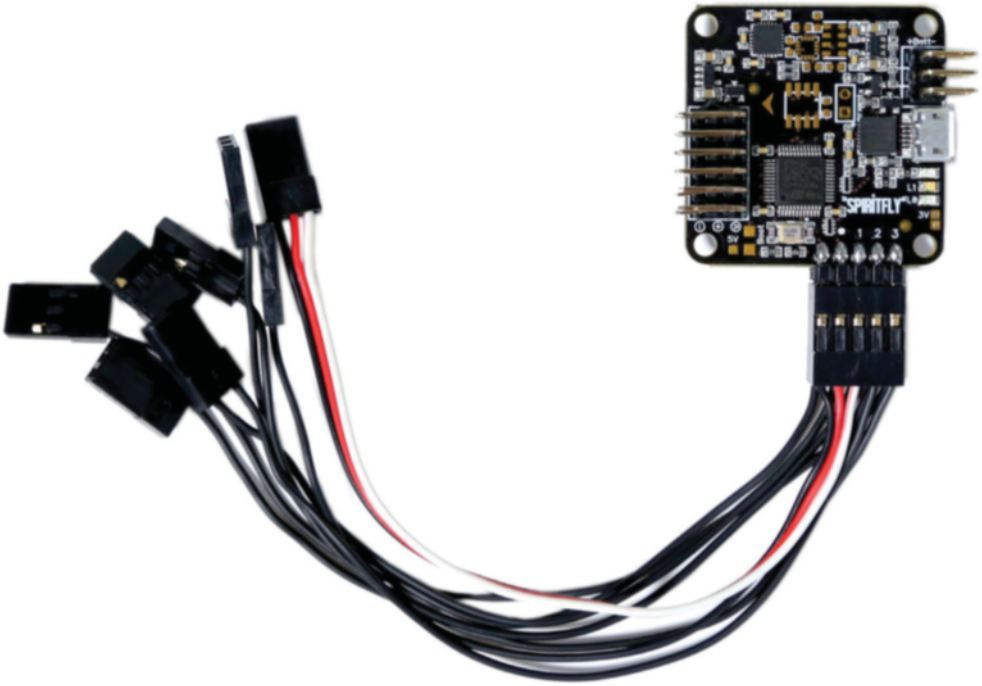
The Spiritfly does not magic, so if your frame is not symmetrical and straight on all motors/arms then it will not function as expected/correctly.

8.7 - Continue to practice and try switching to the other modes to learn how they work.

8.8 - Land your multirotor and disarm the motors usig the **DISARM** stick input. The LED on the Spiritfly will start to FLASH RED.

BEFORE APPROACHING YOUR MULTIROTOR
Carefully "Pulse" the Throttle stick to ensure that the motors are disarmed. If they spin, then that means the motors are ARMED and therefore unsafe to approach

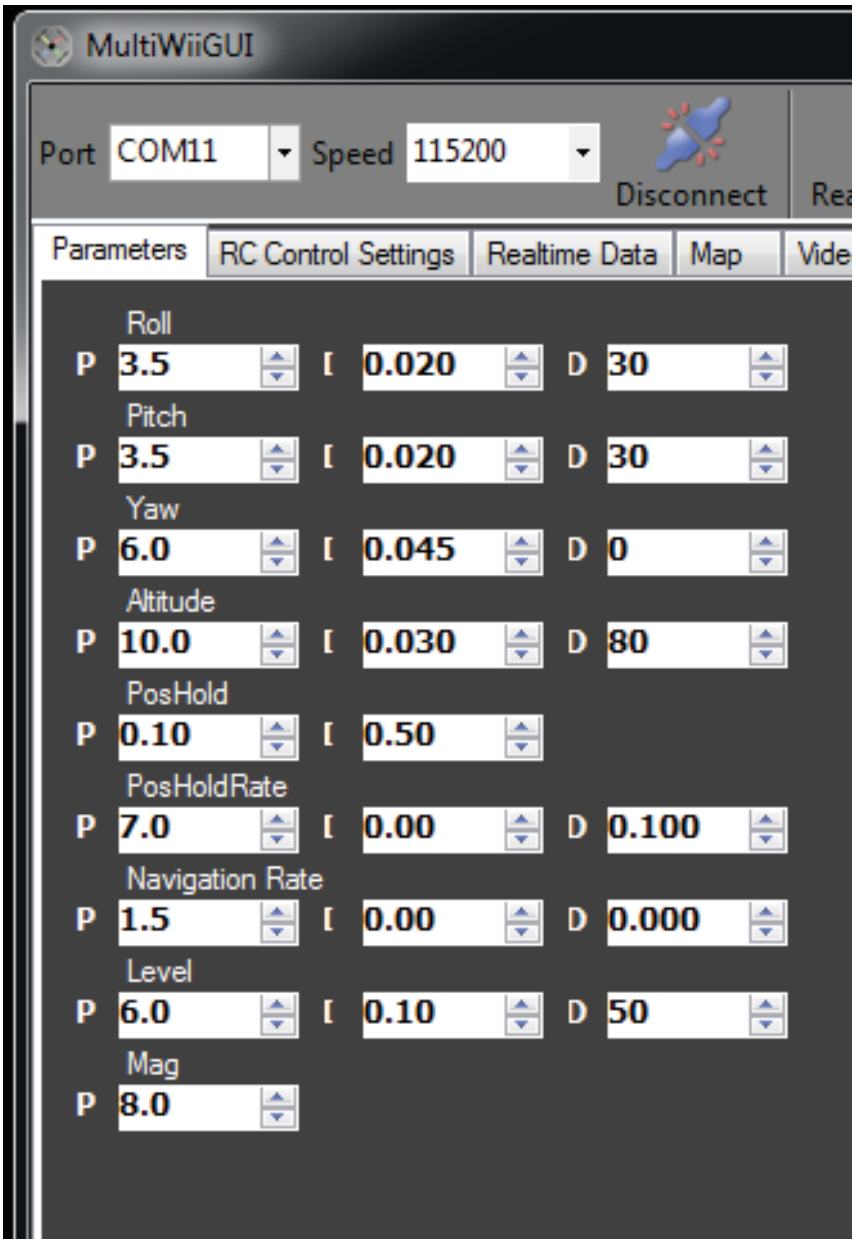
BEFORE APPROACHING YOUR MULTIROTOR
DO NOT SWITCH OFF YOUR RADIO CONTROLLER/TRANSMITTER WITHOUT DISARMING THE MOTORS. This can produce unexpected results and may cause injury or damage.



9 PID TUNING

PID tuning is an art but once you figure it out, you will realise the potential power of it. Your Spiritfly board will fly OK with default settings but if you notice your multirotor is oscillating or sluggish that means you have to tune it.

Roll = Left and Right movement
Pitch = Forward and Backwards Movement
YAW = Turning (Rudder)



P Value

9.1 If you observe oscillation (wobbles on hover) then decrease P value on both the ROLL and PITCH

9.2 If it is not oscillating but feels very sluggish, increase the P value on both the ROLL and PITCH

9.3 Normally you do not have to adjust YAW, though if you find your multirotor turning on its own, you may need to increase YAW P value to 10.0 or so. This will give the multirotor a 'snappier' feel.

I Value

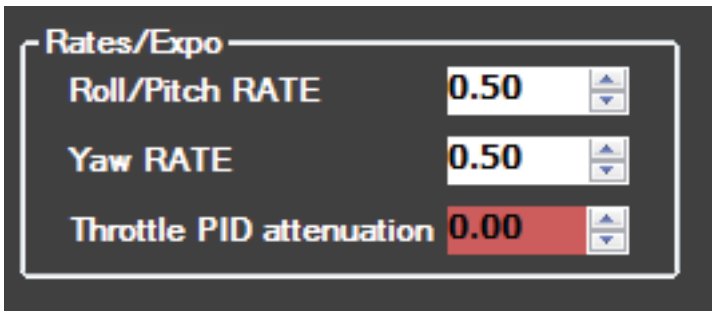
9.4 If you find your multirotor 'losing control' then increase the I value

D Value

9.5 This is normally left untouched. Advanced users can find more information about this, however, having dialled in GOOD P and I values is more than sufficient for a good locked-in feeling.

PID TUNING (ADVANCED)

If your require finer control of your multirotor, you can tweak the following



RED BOX:
Indicates unsaved change.
Click Write Settings to commit.

TPA = Throttle PID Attenuation

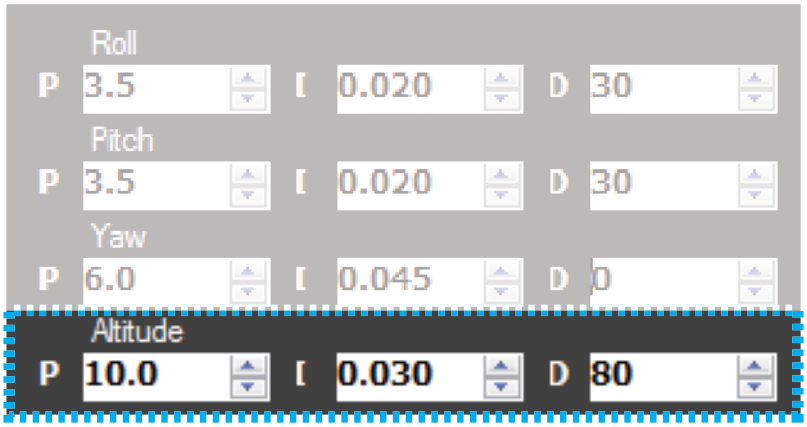
This controls the throttle burst. If your multirotor wobbles on full throttle or bursts, then you can apply a higher TPA value to kill off any unwanted wobbles.

ROLL/PITCH Rate

If you require more angle for your multirotor, increase ROLL/PITCH value. This is often adjusted and helps if you want to do acrobatic flips. Normally, 0-.0.30 is the recommended value for smooth aerial video. Any value higher than this gives finer and more agile angle control.

YAW Rate

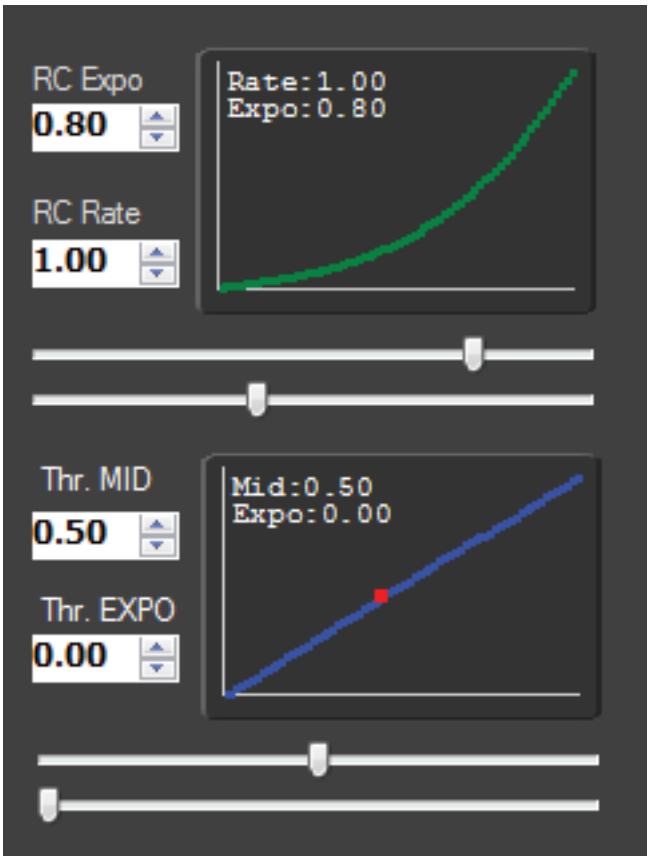
If you require a snappier Yaw authority, increase this value. Normally 0.00 is the best fo smooth aerial video work



Altitude

Altitude is to adjust your barometer (altitude hold) sensitivity. Increase the P value until the multirotor stops dropping. You may also need to increase the I value as this acts like the "brakes". Imagine P as the accelerator and I as the brakes. You need to find the right balance. Value D is for forward motion and to keep the altitude hold. So, if you are moving forward and the quad drops then increase the D value

PID TUNING (ADVANCED)



MID THROTTLE

This controls the midpoint for the throttle. This is not for altitude hold, if the copter drops, incease the MID point value until it stays in hover. Your multirotor should hover at 50% throttle.

EXPO THROTTLE

This controls the responsiveness or sensitivity of the throttle stick. If you would like to have a softer lift and throttle response, then DECREASE this value.

However, if you want a snappier response, INCREASE this value. Otherwise, there is no need to change this value.

RC EXPO

This gives an EXPO curve in relation the Pitch and Roll sticks. The higher the value the more 'damp' is the stick sensitivity towards the centre. The sensitivity/response is increased the further away the stick is from its centre.

RC RATE

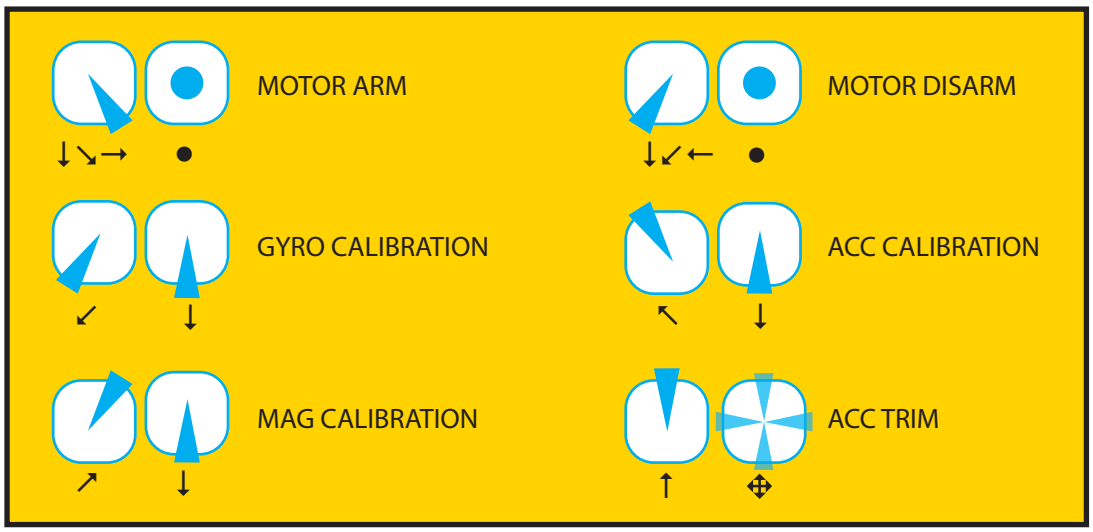
This controls the sensitivity of the Pitch and Roll sticks. If you want touchy response, then INREASE this value.

MIX AND MATCH

Read up on RC Expos and how these affect your ability to control your multirotor. RC Rates can be tamed with Expos.

STICK ACTIONS

THE FOLLOWING DIAGRAMS ARE COMMON RADIO CONTROL STICK ACTIONS USING A MODE 2 RADIO CONTROLLER.



Motor Arm

This will start up your motors. Be careful! The motors should spin when you issue the ARM command. If this doesn't occur try setting your minthrottle to 1180 by entering "set minthrottle 1180" and also "feature -MOTOR_STOP" and then "save" in CLI.

Motor Disarm

This will disengage your motors. The multirotor is now safe to hold.

Gyro Calibration

If your multirotor is behaving unusual, this is recommended to do. Once input is done, the gyro's will reset for up to 2 seconds. It will be OK to fly again after this period.

Acc. Calibration

This sets the LEVEL of your multirotor. If your multirotor is behaving unusually, this is also recommended. Place multirotor on a flat and even surface and perform the stick command. The gyro's will reset for up to 2 seconds then it will be OK to flry again after this period.

Mag. Calibration

This will set all axis points of your multirotor. Input the stick command, then the GREEN LED will flash very fast for 60 seconds. Now turn your multirotor around all axis, 360 degrees slowly. Once done place your multirotor back on the ground and wait for the LED to stop blinkng. Once this is done, then Mag Calibration is complete.

Acc. Trim

This is used if your multirotor is wanting to move to one side on its own. That meas you must trim it. So, take note of which side it is drifting, then land. DISARM the motors , then input: left stick UP and move the right stick to the direction you would like to offset. If the the multirotor moves left, then enter 1 right command. Repeat this action until the copter flies straight and smooth.

ALTITUDE HOLD

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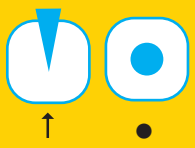
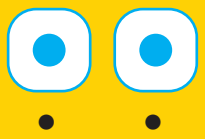
QUALITY MULTICOPTER GEAR

THIS MODE IS ONLY AVAILABLE ON THE SPIRITFLY PRO VERSION.

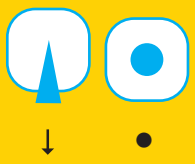
YOU MUST SWITCH YOUR FLIGHT MODE TO BARO MODE



RAISES THE MULTIROTOR



SET ALTITUDE POSITION



LOWERS THE MULTIROTOR AND IF THROTTLE STICK IS PULLED TO 0%, AUTOLAND WILL BE ACTIVATED - CAUSING THE MULTIROTOR TO SLOWLY DESCEND, LAND AND SHUT OFF THE MOTORS

1. Arm motors in **BARO (Altitude Hold)** Mode

2. The motors will start up

3. Apply throttle to raise the multirotor up to about 1 metre high then place the throttle stick in the midpoint (centre). Spiritfly will register this as the altitude hold point

4. To raise the multirotor again, push the throttle stick **UP**, and it will slowly gain altitude.

5. To set the **NEW** altitude hold point, bring the throttle stick back to the midpoint/centre position. This is now registered as the **NEW** altitude position.

6. To lower the multirotor, pull the throttle stick **DOWN** below the midpoint/centre. It will descend.

Completely, pulling the throttle down to 0% activates **AUTOLAND**

This will cause the multirotor to begin a slow descend and automatically shut-off the motors once it has landed.

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QUALITY MULTICOPTER GEAR

10 GPS SETUP

PROCEDURE:

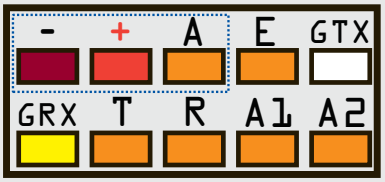
10.1 INSTALL GPS USING HARNESS
10.2 LOAD SPIRITFLY GPS PROFILE (PWM OR PPM)
10.3 VERIFY GPS CONNECTIVITY/VALIDATION
10.4 GPS FLIGHT MODES AND MAGNETIC DECLINATION

HARNESS INSTALLATION OPTIONS:

1) Using the RX cable, lift the tabs and insert the yellow and white wires into the FC RX breakout cable. This is the option for PWM.

2) For PPM connections, insert the provided single servo lead connector into the yellow/white wire and plug into pin 3 or 4 on the appropriate RX FC pins

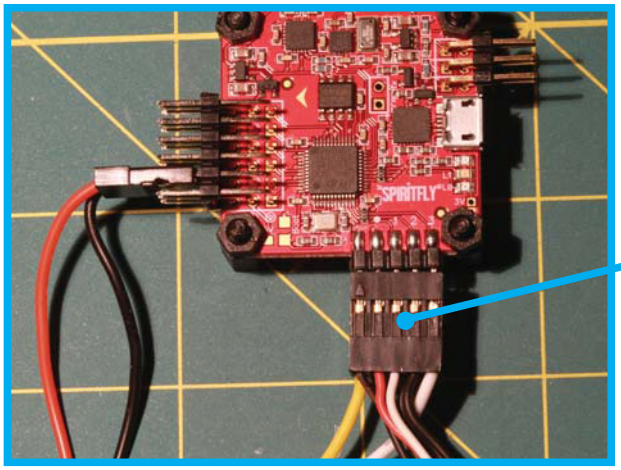
SPIRITFLY RX PIN LAYOUT WITH GPS FEATURE ON

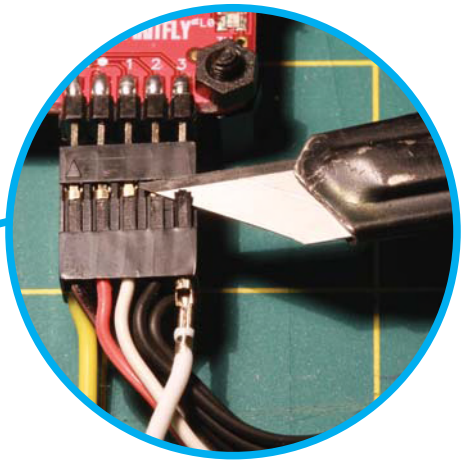


IN CLI, TYPE "FEATURE GPS" TO ENABLE THE GPS FEATURE

GPS HARNESS WIRES:

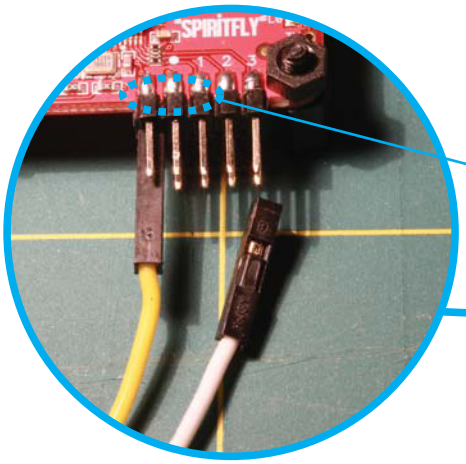
TXD PLUGS INTO RX PIN 4
RXD PLUGS INTO RX PIN 3
VCC PLUGS INTO + 5V POWER SOURCE
GND PLUGS INTO -

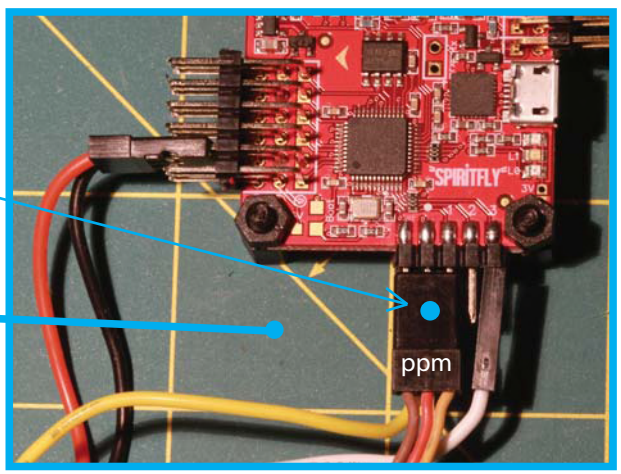




OPTION 1 FOR PWM

OPTION 2 FOR PPM





GPS WIRING

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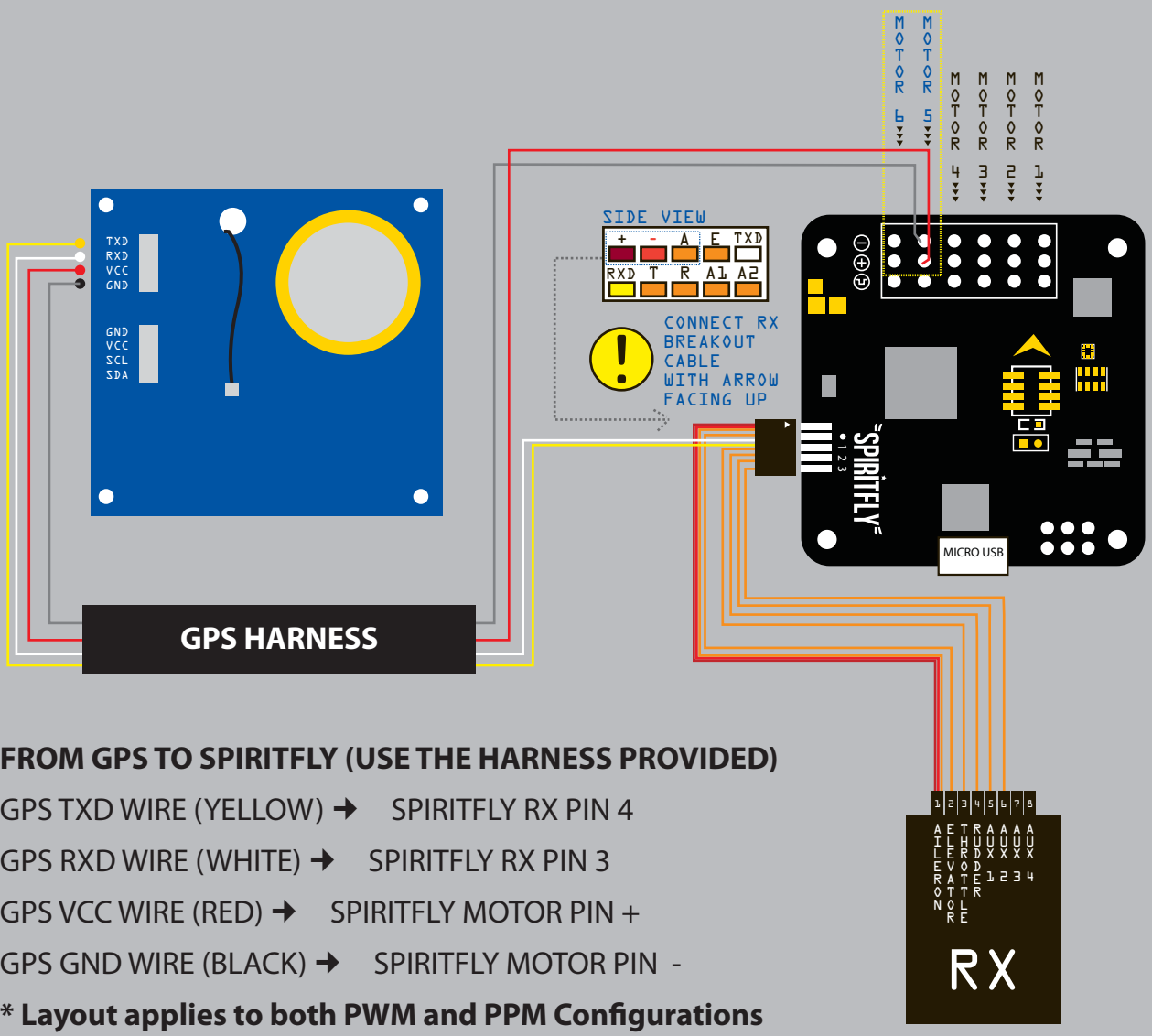
10. 1 INSTALL GPS BASED ON DIAGRAM



FROM GPS TO SPIRITFLY (USE THE HARNESS PROVIDED)

GPS TXD WIRE (YELLOW) ➜ SPIRITFLY RX PIN 4

GPS RXD WIRE (WHITE) ➜ SPIRITFLY RX PIN 3

GPS VCC WIRE (RED) ➜ SPIRITFLY MOTOR PIN +

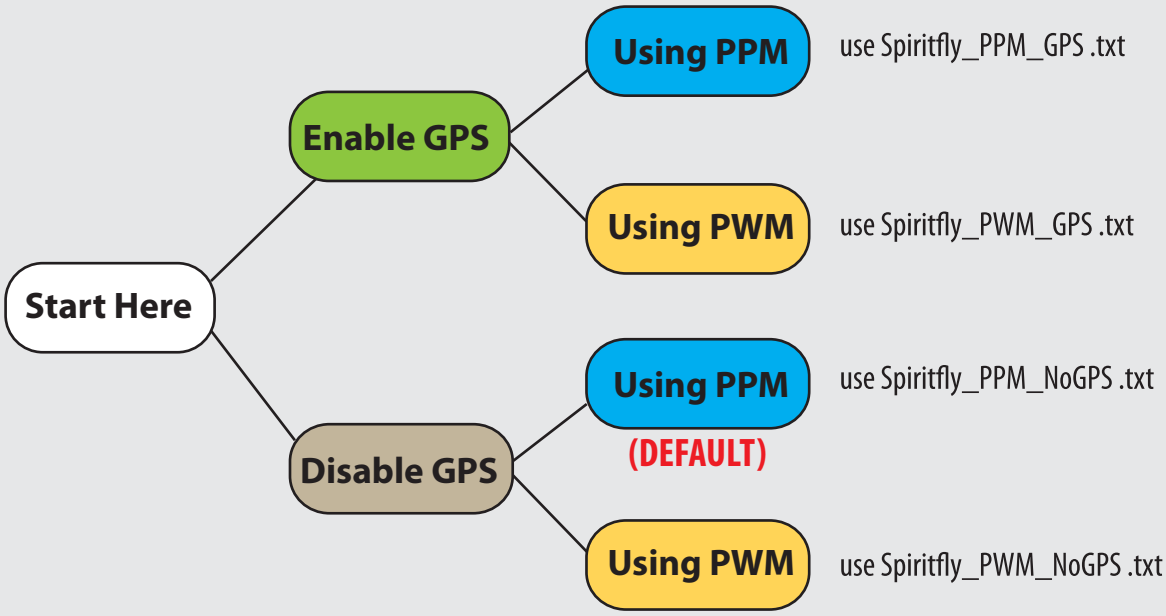
GPS GND WIRE (BLACK) ➜ SPIRITFLY MOTOR PIN -

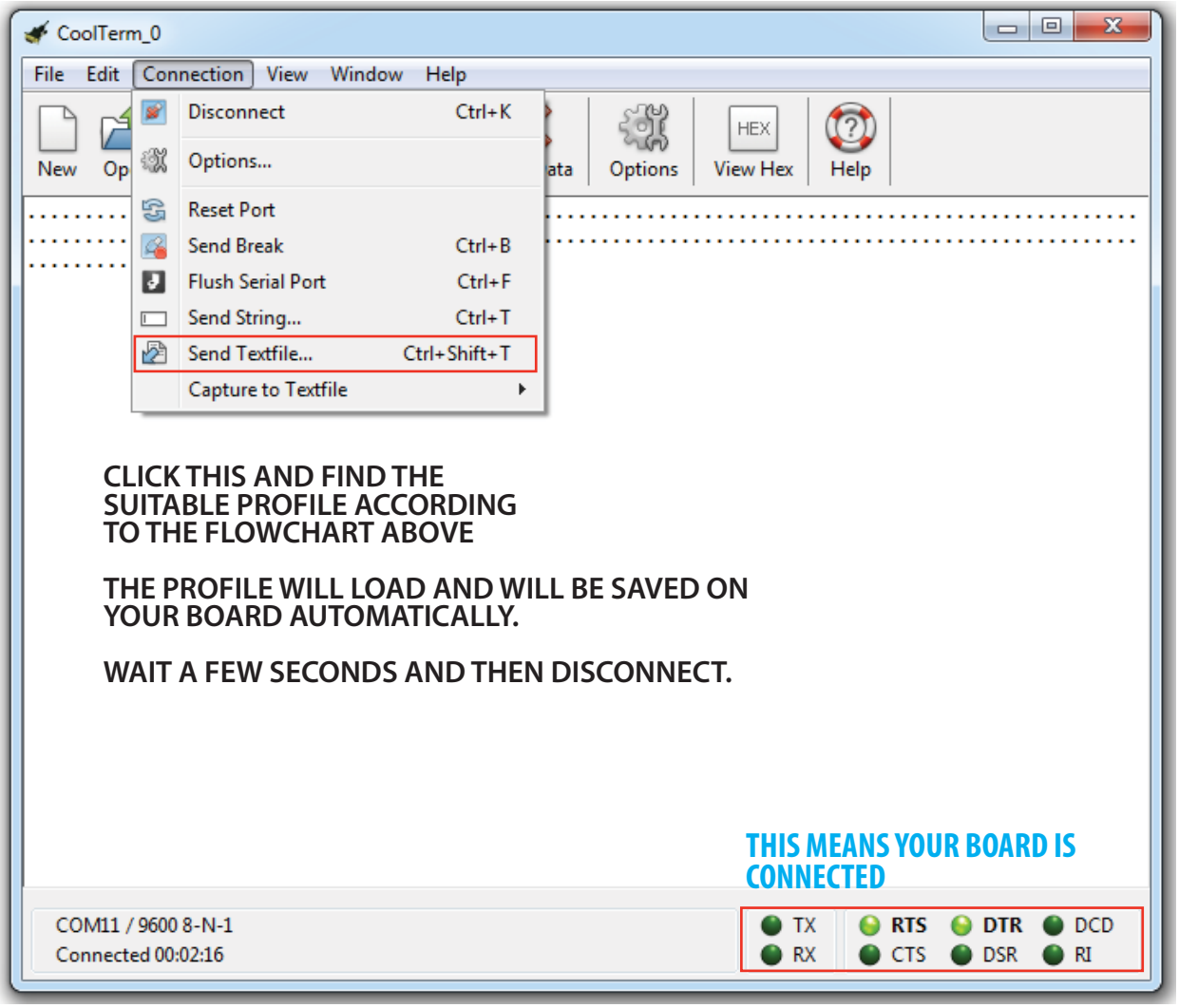
*** Layout applies to both PWM and PPM Configurations**

FAST TIPS and WARNINGS:

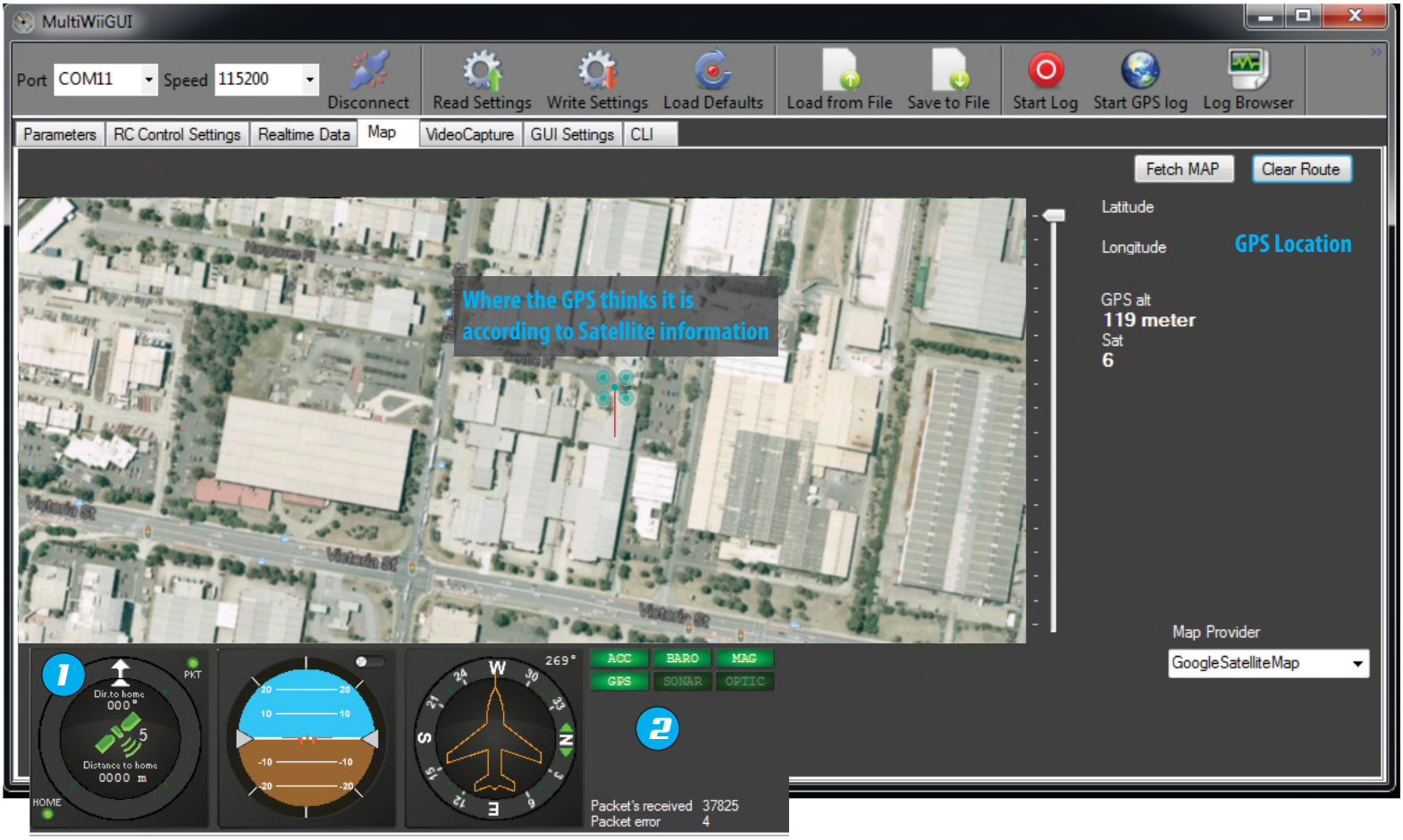
- The GPS unit can be powered up from any 5V power source
- You need to plug in your battery for this step
- Reversing the VCC/GND connections will destroy the GPS chip and potentially your Spirifly board
- **The GPS Unit LED will light up SOLID GREEN (and will flash BLUE and GREEN after GPS lock)**
- GPS Lock is expected to occur ~2-3 minutes after power up (COLD START)

10. 2 LOAD GPS PROFILE





10. 3 VERIFYING GPS CONNECTIVITY IN MULTIWII GUI



ENSURE THAT THE GPS UNIT'S LED IS FLASHING BLUE AND GREEN
THIS INDICATES THAT IT HAS ACHIEVED A LOCK WITH THE SATELLITES
DO NOT PROCEED UNTIL YOU ACHIEVE THIS

1. GPS Lock indicator #of Satellites (4 minimum):

If you don't get GPS lock and if the GPS green box is lit check/try:

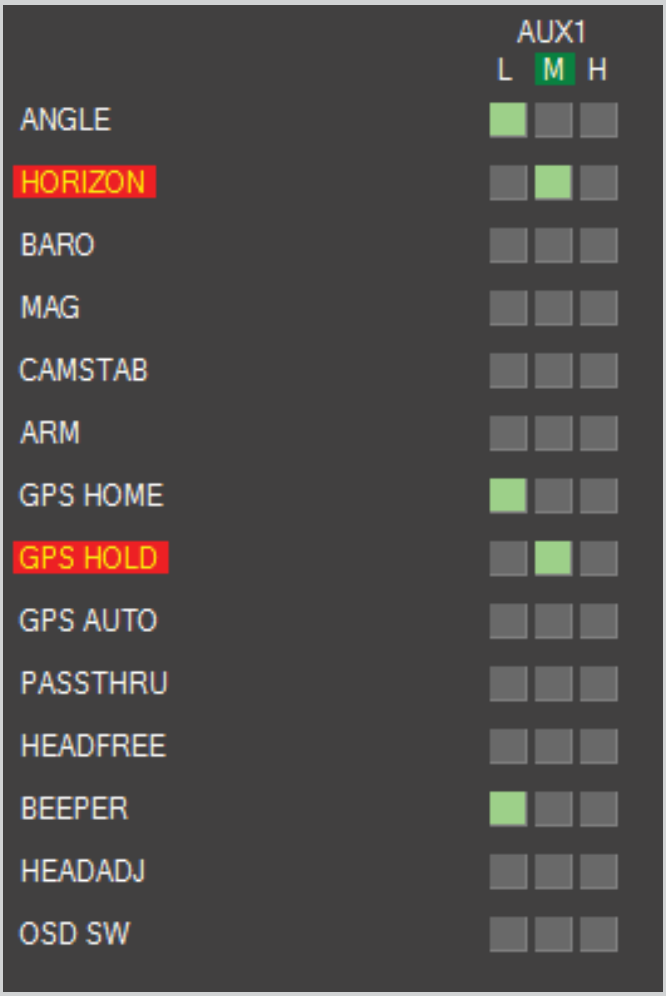
1) Is the GPS unit LED flashing Green and Blue?
2) Go outdoors and retry
2) Unplug battery, plug back in after 1 minute
3) If it is a cloudy day/overcast this will affect GPS lock. Retry on a clear/sunny day

2. GPS board detected by Spiritfly board

If this GPS box doesn't light up check:

1) Is the GPS board connected?
2) Is there light on the GPS board?
3) Did you follow the GPS wiring diagram?
4) Go to CLI, type '###' then
   type 'feature' - Does it say GPS is an enabled feature?
   type 'dump', check gps_baudrate = 38400
5) Swap the yellow and white wires, unplug the battery and plug back in

10. 4 SETTING GPS MODES AND MAGNETIC DECLINATION



GPS FLIGHT MODES

GPS HOLD = POSITION HOLD
GPS HOME = RETURN TO HOME + AUTOLAND

GPS MODES CAN BE ENABLED IN ONE OF THE FOLLOWING FLIGHT MODES:

1) HORIZON OR;
2) ANGLE

***NEVER HAVE BOTH ANGLE AND HORIZON ENABLED**

Setting Magnetic Declination

SKIPPING THIS STEP WILL CAUSE YOUR GPS TO BE UNRELIABLE AND PRODUCE INCONSISTENT RESULTS

1) Connect to Spiritfly board via MultiWiiGUI
2) Go to CLI Tab
3) Type **"###"**
4) Set magnetic declination - type **"set mag_declination = [4 digit combination]"**
**Refer to http://magnetic-declination.com/ to obtain your xxxx combination (ie 12º-40' EAST = 1240)*
This is a very important step or your GPS will not function as expected
5) Save your settings - type **"save"**
6) Your Spiritfly will now reboot

10. 5 SETTING GPS MODES (continued)

MAKE SURE YOU TEST THESE MODES BEFORE COMPLETELY RELYING ON THEM
AVOID USING THESE MODES IN CLOUDY AREAS
DO NOT ATTEMPT THESE MODES WITHOUT ACHIEVING GPS LOCK
BE PREPARED TO SWITCH BACK TO MANUAL CONTROL VIA ACRO/HORIZON/ANGLE MODES AT ALL TIMES.

GPS-BASED FLIGHT MODES

GPS HOLD = POSITION HOLD

Activating this mode will cause your Multirotor to "Hold" its position and altitude within a 1 metre box. Note that you must tune your BARO/Altitude Hold and mode for this to work properly. This flight mode uses the Barometer but you don't need to enable BARO Mode.

To activate this mode, raise your multirotor to the desired altitude, allow it to level and settle and then enable the GPS HOLD mode. Ensure AGLE/HORIZON Mode is enabled in conjunction with GPS Hold in your GUI configuration.

GPS HOME = RETURN TO HOME + AUTOLAND

Activating this flight mode will cause your multirotor to "return home" within 5 meters of where you armed your multirotor and perform autoland and disarm the motors. This is often used as a last resort/failsafe mechanism for your multirotor when you've lost orientation or in the event of loss of signal between RX and TX.

This flight mode uses both the barometer and magnetometer however you do not need to enable MAG nor BARO in your GUI. Ensure that ANGLE/HORIZON is enabled in conjunction with GPS HOME in your GUI configuration.

To activate this mode, it is important that you first check that your **GPS UNIT HAS ACHIEVED SATELLITE LOCK BEFORE ARMING YOUR MOTORS**. This is indicated by the Green and Blue flashing LED on the GPS Unit. Failure to do this can cause your multirotor not to return to its original position and you can lose it! Once activated, the GPS will steer your multirotor back to its GPS positioned where it was armed, autolands and shuts off the motors or you can take back control by switching to another flight mode.

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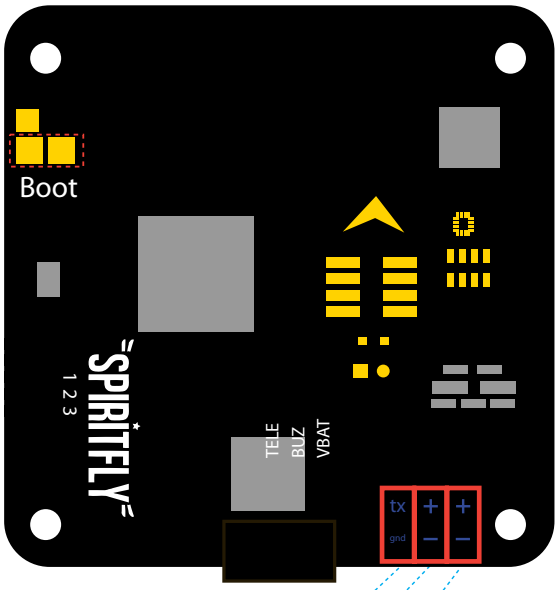
QUALITY MULTICOPTER GEAR

11 FRSKY TELEMETRY SETUP

PROCEDURE:

11.1 CONNECT SPIRITFLY TO FRSKY RECEIVER (MUST HAVE TELEMETRY SUPPORT, IE DR4-II)
11.2 CONNECT POWER SOURCE TO SPIRITFLY
11.3 ENABLE TELEMETRY AND OTHER FUNCTIONS IN CLI
11.4 CONFIGURE YOUR TRANSMITTER



11.2 Optional Battery Voltage Monitor

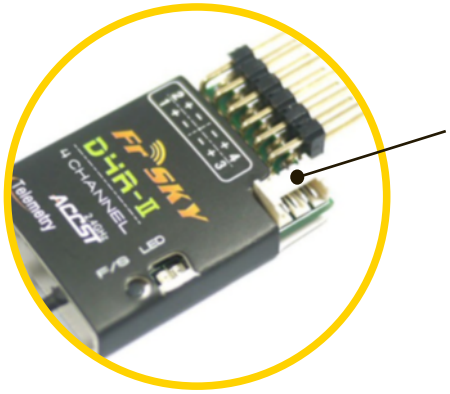
To enable in-flight battery voltage monitoring and alarm, connect this header to flight battery or PCB. Up to 25V (6S LiPo) can be measured. No reverse polarity protection - connecting battery in reverse will instantly destroy the hardware. Only connect the + wire

5V Buzzer

Connect optional buzzer here.

11.1 FrSky Telemetry output port

Connect to 'RxD' on any telemetry-enabled FrSky Receiver



GND, A2, TX, RX

connect the RX pin
to the Spiritfly TX pin

11.3 Enable Telemetry via CLI

1. Connect your Spiritfly to a PC, open MultiwiiGUI and go to CLI Tab
2. disable the softserial port to divert telemetry data to the UART port by typing:

```
feature -SOFTSERIAL
```

3. Enable telemetry function by typing:

```
feature TELEMETRY
```

4. Set the port on which Telemetry data will be sent by typing:

```
set telemetry_port=0
```

5. Set the Telemetry protocol to FrSky by typing:

```
set telemetry_provider=0
```

6. Save your changes by typing:

```
save
```

11.4 Configure your Transmitter

Please refer to your Transmitter manual for instructions on how to display telemetry data for the following:

Accelerometer data
Battery voltage
GPS Data (if GPS is installed)
Altitude (if barometer is installed)

You must ARM the board for the telemetry data to be transmitted. Propellers off for your own safety!

FIRMWARE UPDATE

MADE 2 FLY
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Spirifly is loaded with the latest firmware level at the time of shipping. This section is only for advanced users and it is not required to start using Spiritfly

Tools Required:

1) Hercules SETUP Utility

2) Flash Loader Demonstrator

3) Latest Spiritfly Firmware (available at Made2fly.com.au)

Note: Hardware should ONLY be connected by USB
DO NOT perform firwmare update while flight battery is connected!

1. Entering Bootloader Mode

1) Run Hercules SETUP and switch to "Serial" tab.

2) Choose COM11 or your USB-Serial port,
set baudrate to 115200, 8 bit and no parity

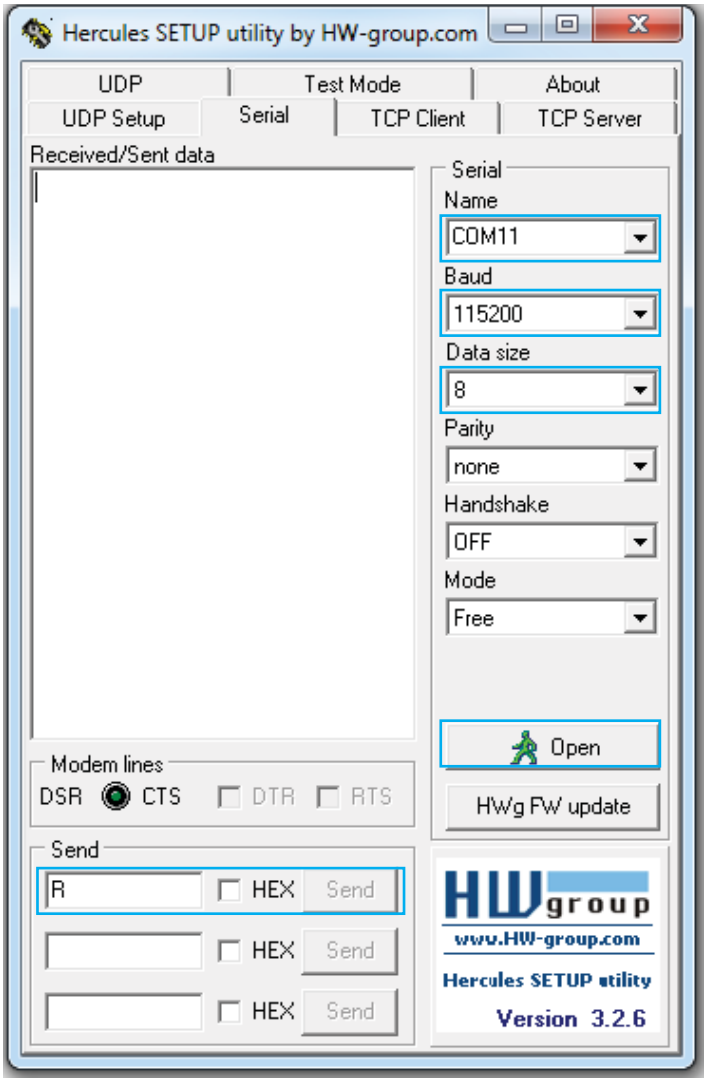
3) Click Open

4) In any of the 3 Send boxes, type "R"

5) Click Send

- All 3 LEDS will turn on -
- this indicates your hardware is in
- bootloader mode

6) Proceed to "Firmware Update" steps



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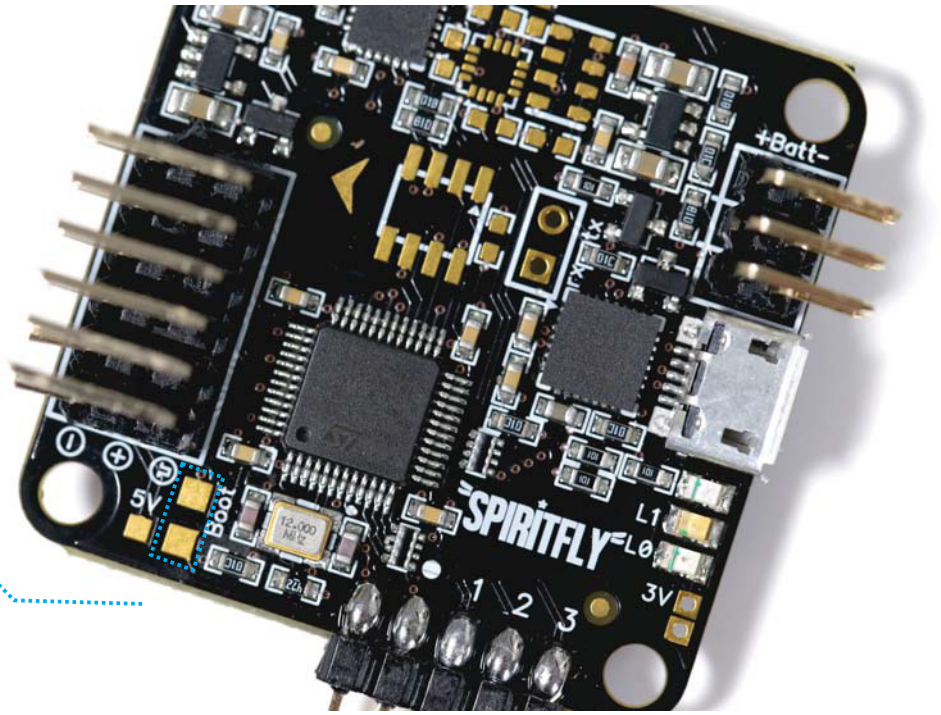
Rescuing your board / Alternate method to initiate firmware upgrade if 'R' input doesn't work...

BOOT PADS

These pads need to be shorted in order to initiate/enter recovery/bootloader mode.

Use an item that has conductor properties like tweezers or paperclip



If your firmware is too old or in case of a failed attempt to flash your board try these steps to enter rescue / bootloader mode:

1. Plug the micro USB cable into the SpiritFly usb port.

2. Short the bootloader pads using tweezers or paperclip (any item that has conductor properties). DO NOT SOLDER these pads.

3. While keeping the pads shorted, plug in the PC end of the micro USB cable.

At this point, only POWER LED will be on - 2 status lights are OFF.
ONLY power (blue) led will be on at this point, the other 2 must be OFF.
If they blink, unplug the USB cable and start over. This means the pads were not shorted correctly!

Otherwise, proceed with the next steps.

If it doesn't work, try again!
This method is guaranteed to initiate rescue/bootload mode

Once hardware is in bootloader mode (see previous page), Flash Loader Demonstrator can be used to flash the firmware

Firmware update:

1) Run Flash Loader Demonstrator

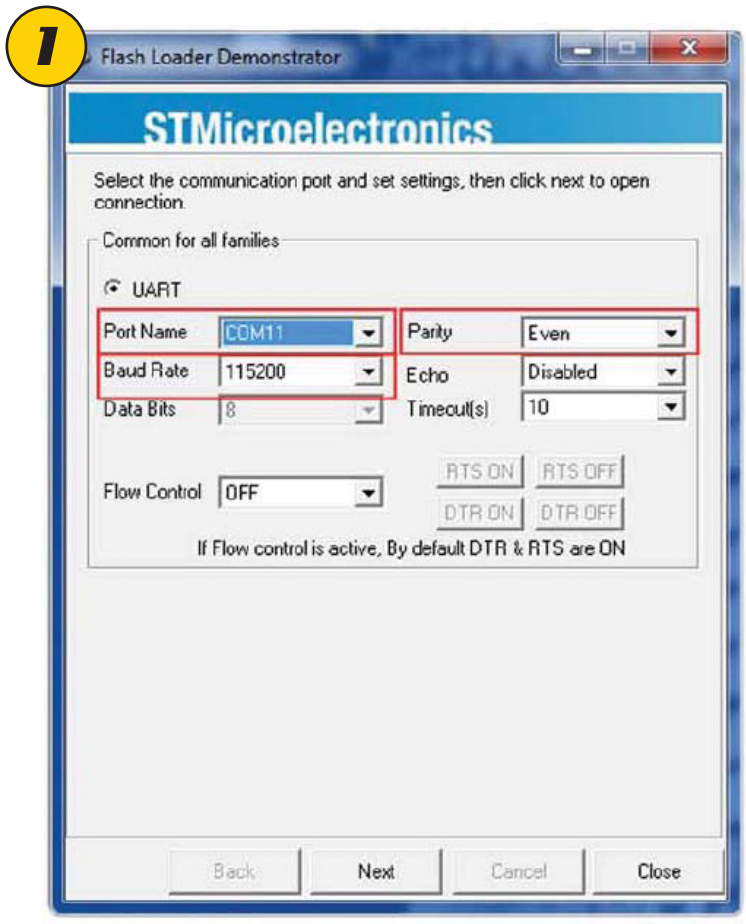
2) Choose COM11 or your USB-Serial port, baudrate to 115200, make sure parity is set to EVEN

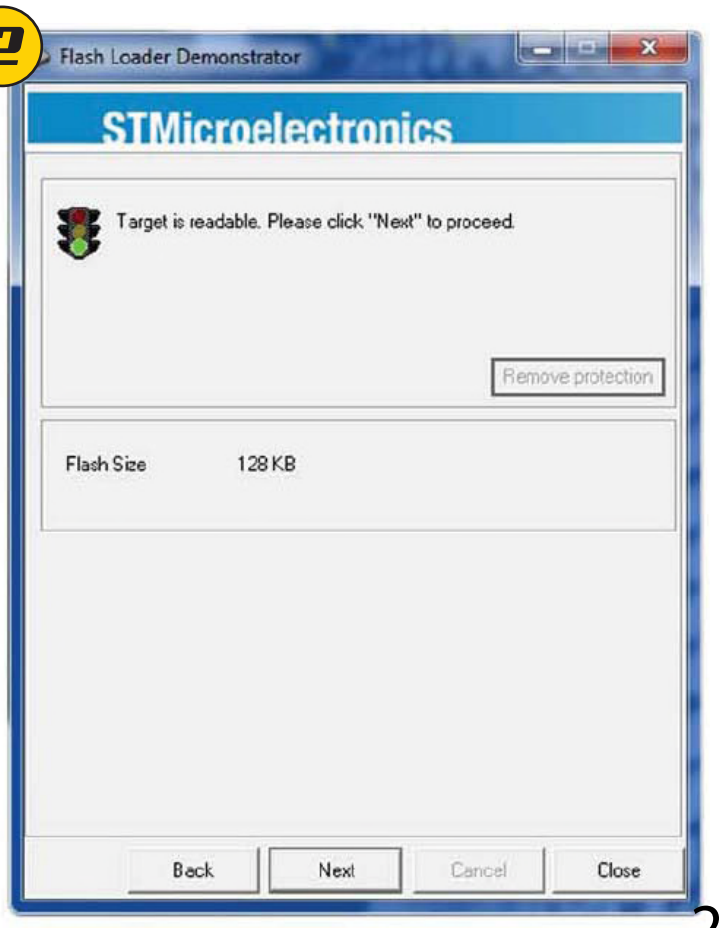
3) Click "Next" button several times. When asked to choose device size, ensure 128K is selected

4) On the last page see Flash Loader figure below), choose:

- Download to device
- Browse to the location of .hex file to update
- Choose "Erase necesasry pages" to keep settings (firmware may still clear them) or "Global Erase" to erase all settings and return to defaults
- Check "Jump to user program" checkbox
- Uncheck "Verify after download" checkbox
- Click the "Next" button

After successful update, the board will reboot, flashing status LEDs in the usual pattern. You can now unplug USB safely. This concludes the Firmware upgrade process.





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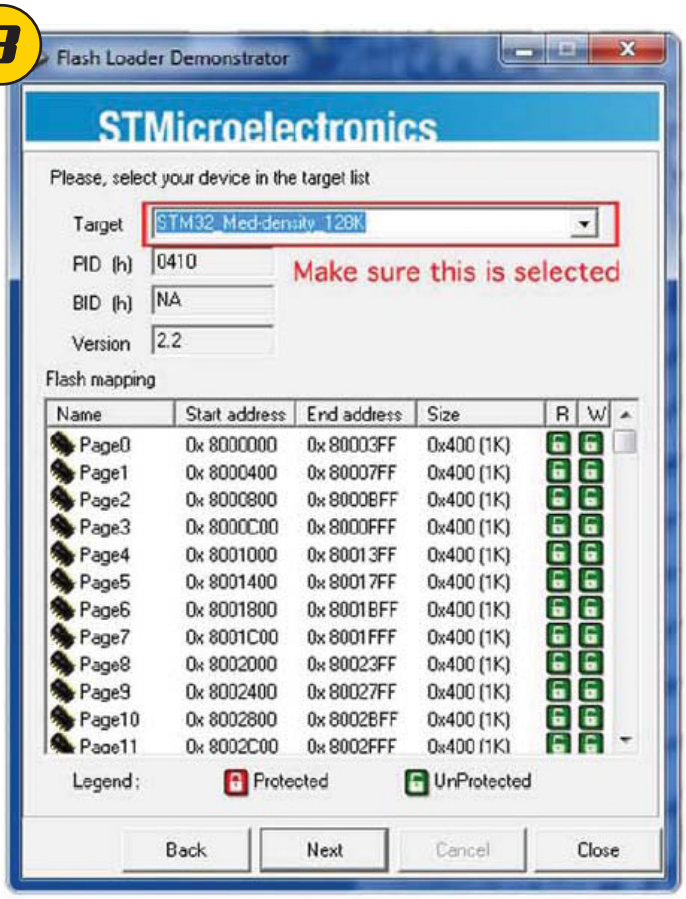

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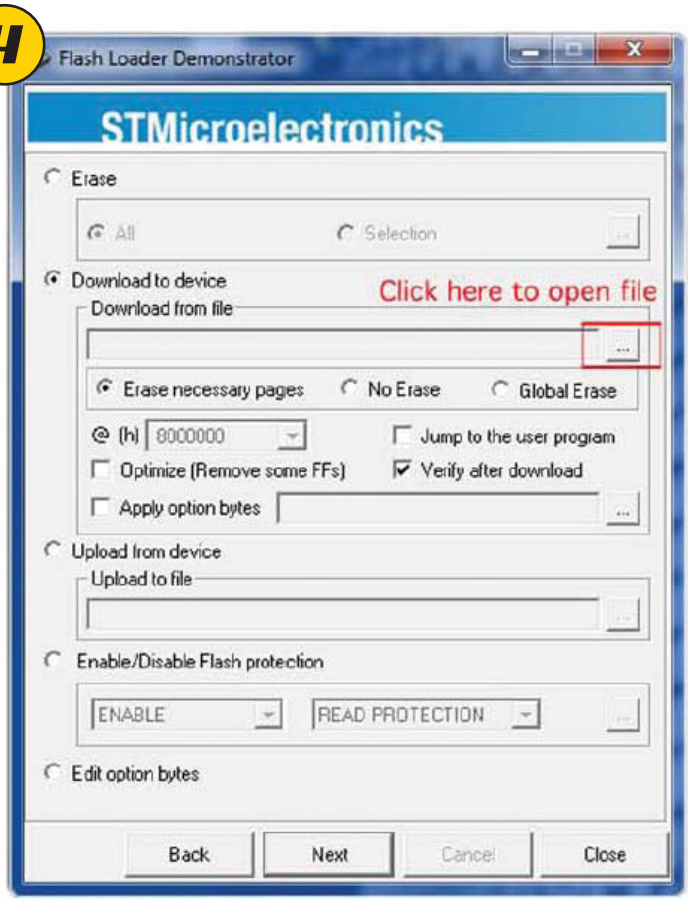

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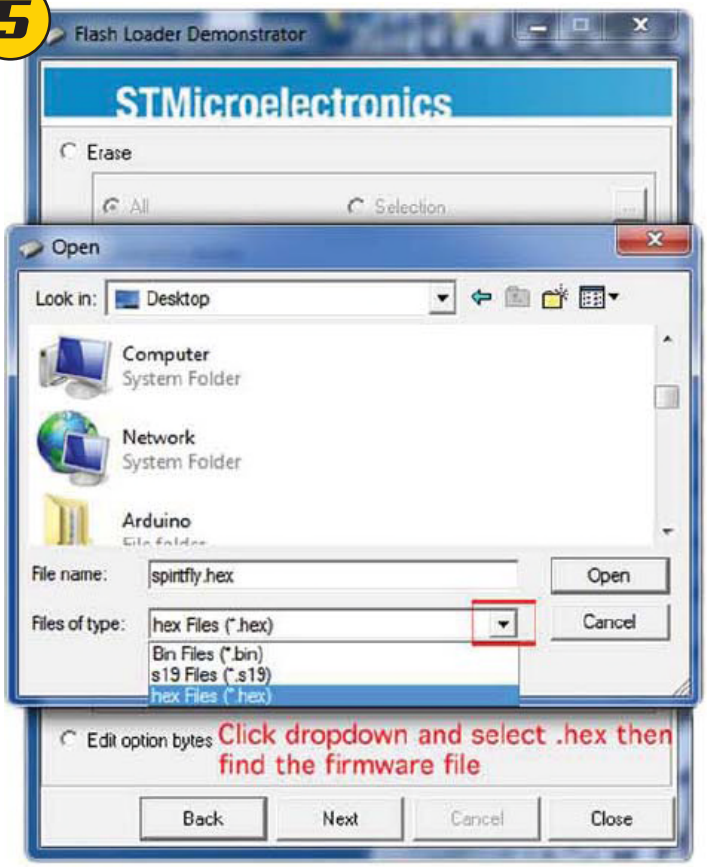

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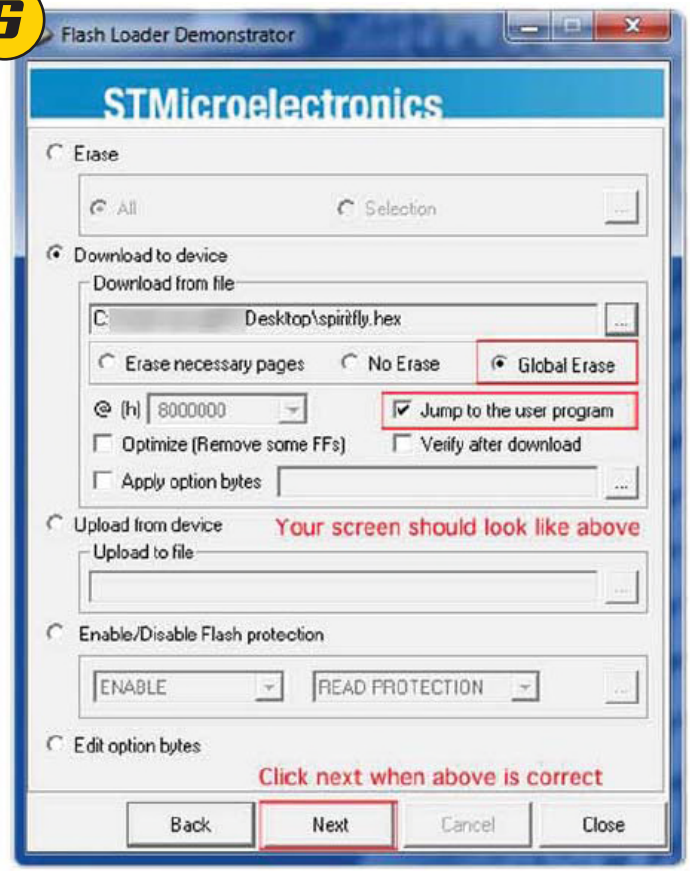

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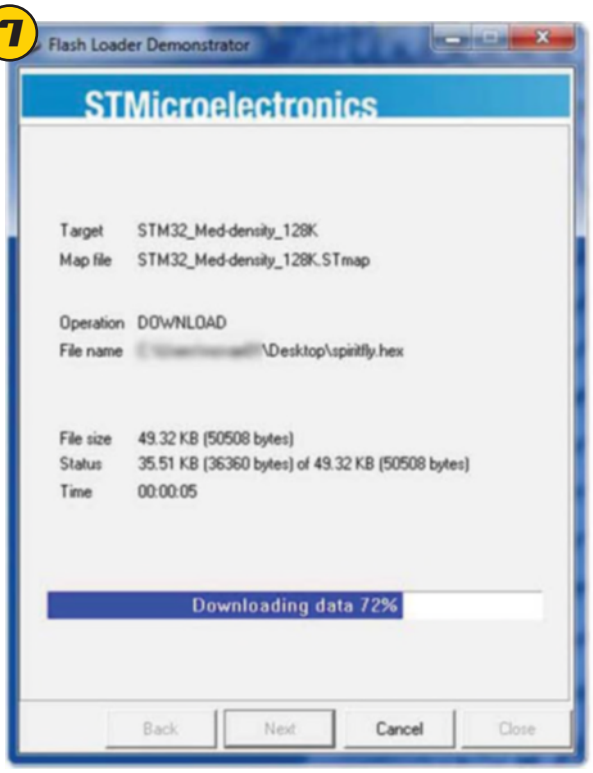

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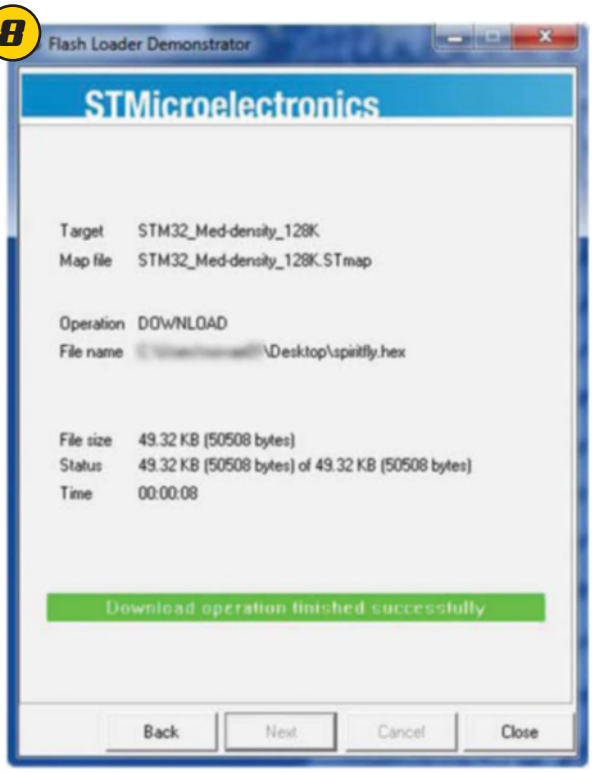
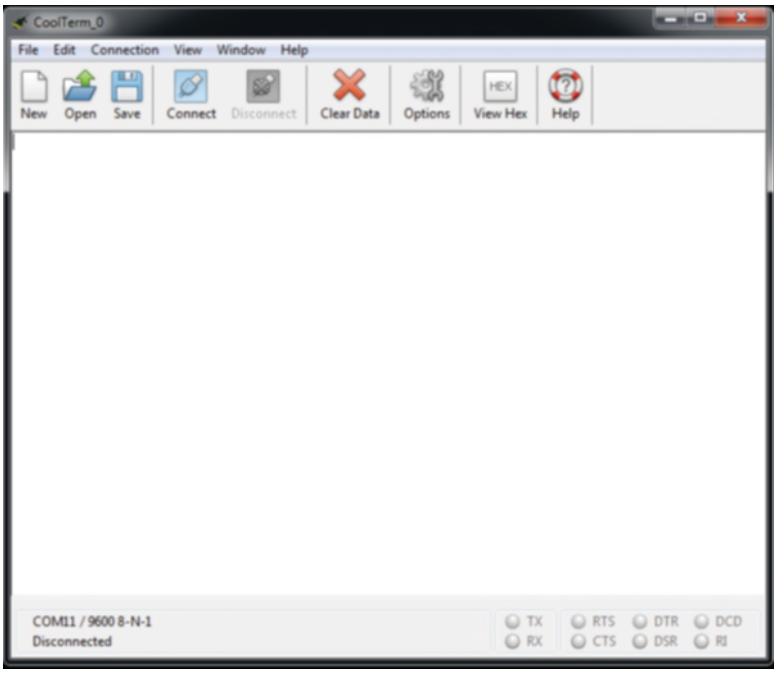


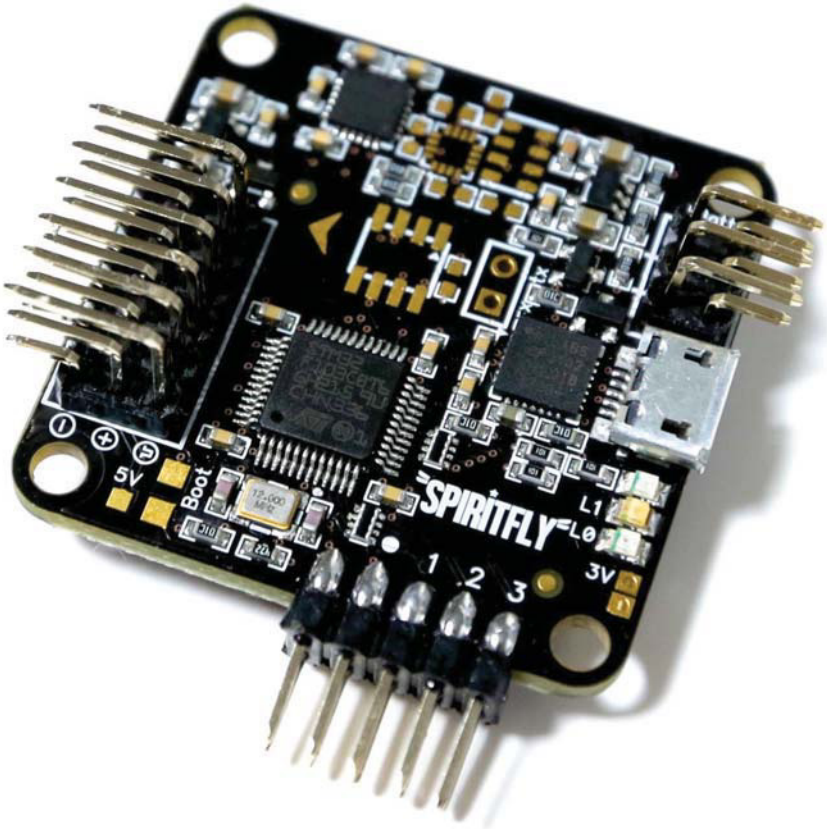
SUCCESS! You can close and unplug

FINAL STEP

At this point you MUST download COOL-TERM from our download page.
Open "Spiritfly Connection" file. Coolterm will open. Click connect, making sure your Spiritfly is plugged in via USB. Go to "Connection" in the menu.
Click "Send textfile". Find the supplied .txt file called "spiritfly settings.txt" and open it. Setings will appear in the command window. The settings will automatically load intothe board, just wait for a few moments until the LED lights on the board stop flashing. It is now safe to unplug.



YOUR SPIITFLY IS NOW UP TO DATE WITH THE LATEST FIRMWARE AND FACTORY SETTINGS. GO TO THE MULTIWII GUI TO START SETTING UP THE FLIGHT AND RADIO SETTINGS.



This concludes the Spiritfly Manual. For more information relating to your product purchased from Made2fly please contact us via our website.

FLY SAFE AND HAVE FUN!

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