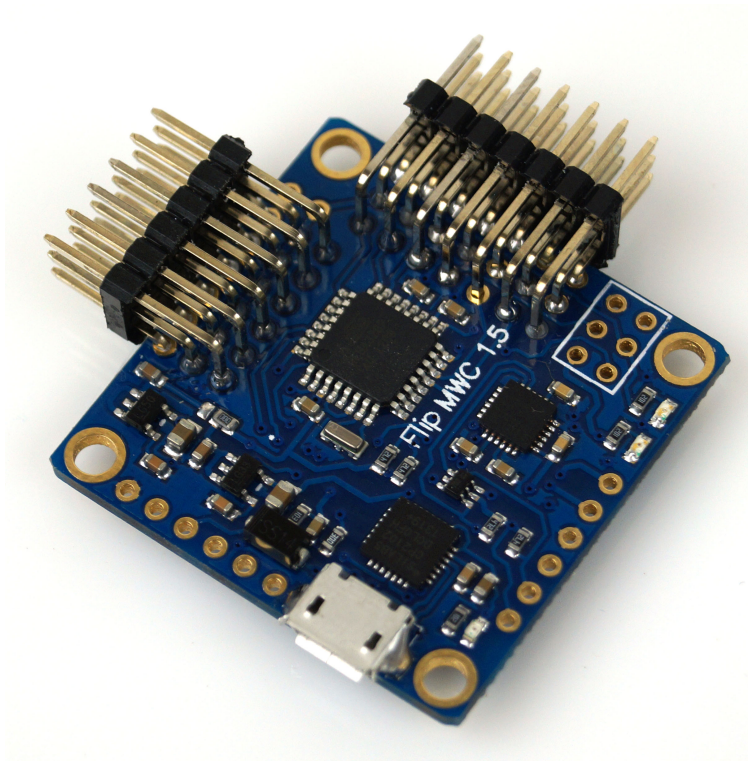




Software Configuration

FLIP (MultiWii compatible flight controller)



Revision 1.0 Feb 17, 2014 - BETA

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Introduction

The FLIP MultiWii compatible flight controller is one of the least expensive multi-rotor flight controllers on the market. Alexandre Dubus started the MultiWii project many years ago, originally using an Arduino microcontroller linked to a Nintendo Wii gyroscope (already present in the remote) to control multi-rotor aircraft, which is where the name “MultiWii” came from. It quickly became more and more popular and his software was adapted to work with a wide variety of sensors. Today the “MultiWii” project is a very powerful open source software that keeps getting better with each revision release and is compatible with a variety of off the shelf flight controllers and sensors. This document is intended to help you get started using the FLIP (MultiWii compatible) flight controller as part of Lynxmotion multi-rotor UAV kits.

STEP 1: Preparation

A: MultiWii Board Drivers (For FLIP Flight Controller)

<http://www.silabs.com/products/mcu/pages/usbtouartbridgevcpdrivers.aspx>

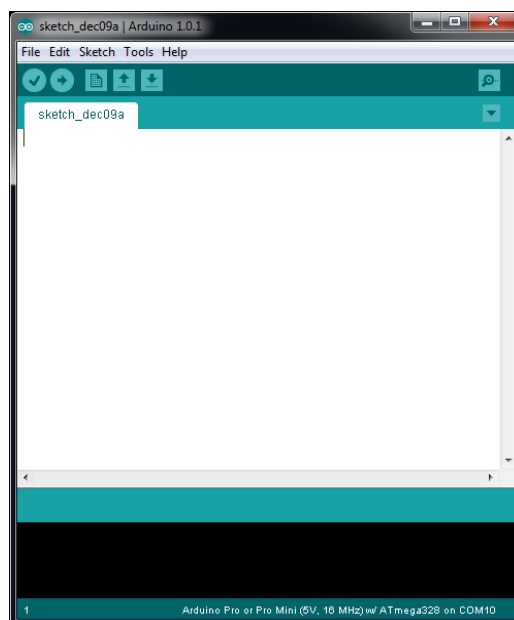
In order to communicate with the MultiWii board, you must download and install the correct USB to serial drivers (VCP = Virtual Com Port). This allows your computer to recognize and communicate with the FLIP when it's connected to the computer. Visit the site above and choose the download which corresponds to your operating system ("Download for ..."). After extracting the ZIP file, install it on your system using the .exe file.

B: Download / Install Arduino IDE Software

<http://arduino.cc/en/main/software>

The MultiWii program was created using the Arduino software. We suggest that you have the latest version installed on your system. Go to www.Arduino.cc and click the "Download" tab at the top of the page. Scroll down and you will see a section "Arduino IDE" and "Download". Choose the link which corresponds to whichever operating system you are running on your computer (Windows, Mac, Linux etc) and download the software to a known location on your computer.

We suggest extracting the main "Arduino" folder to a new folder under c: drive. We tend to put it under "Program Files". Once extracted, you can go to that folder on your computer and see an icon marked "Arduino.exe". This starts the Arduino program (you may want to create a shortcut on your desktop too). You can double click this to see that it works, then close it.



Arduino software interface

C: Download / Install JAVA

<https://www.java.com/en/>

If you do not already have the latest version of Java, go to www.java.com and click the “Free Download”. It should automatically detect your system and provide the correct download file. Follow the instructions for the installation. JAVA is used for the MultiWii General User Interface (GUI).

Note: If the GUI interface is not opening correctly, refer back to the [JAVA installation](#) in step 1.

D: MultiWii Files

Download the pre-configured MultiWii file your Lynxmotion UAV / Drone platform below. These files have been configured specifically for the FLIP flight controller and copter type.

<http://www.lynxmotion.com/s-4-electronics-guides.aspx#UAV>

Extract these files to a known location on your computer. We suggest placing them under the “examples” folder you created in step C. This way the MultiWii project will be available under the “Examples” tab within the IDE software. EX: C:\Program Files\Arduino\examples\

Advanced users can also download the latest stable version of MultiWii. Do not download a “dev” version which is intended for developers or advanced users and are often in BETA state. Note that there are many tabs, many of which need to be modified slightly for a specific setup (ex. choosing a controller type, copter type etc.).

<https://code.google.com/p/multiwii/downloads/list>

STEP 2: MultiWii Code

Connect the MultiWii board to the computer using the appropriate USB cable. Your computer should detect and identify the board since you already installed the drivers.

- A. If you unzipped the file to the Arduino examples folder.
 1. Start the Arduino program by double-clicking "Arduino.exe"
 2. At the top left of the screen, go to "File -> Examples -> MultiWii_X_X -> MultiWii"
 3. Within the Arduino software, you should see several tabs appear on top, the first of which is called "MultiWii"

- B. If you unzipped the file to another location.
 1. Open the file location for Arduino created in step B.
 2. Start the Arduino program by double-clicking "Arduino.exe"
 3. At the top left of the screen, go to "File -> Open"
 4. Browse to the MultiWii file folder on your computer
 5. Within that folder you will find a file "MultiWii.ino"
 6. Select that file and click "open"
 7. Within the Arduino software, you should see several tabs appear on top, the first of which is called "MultiWii"



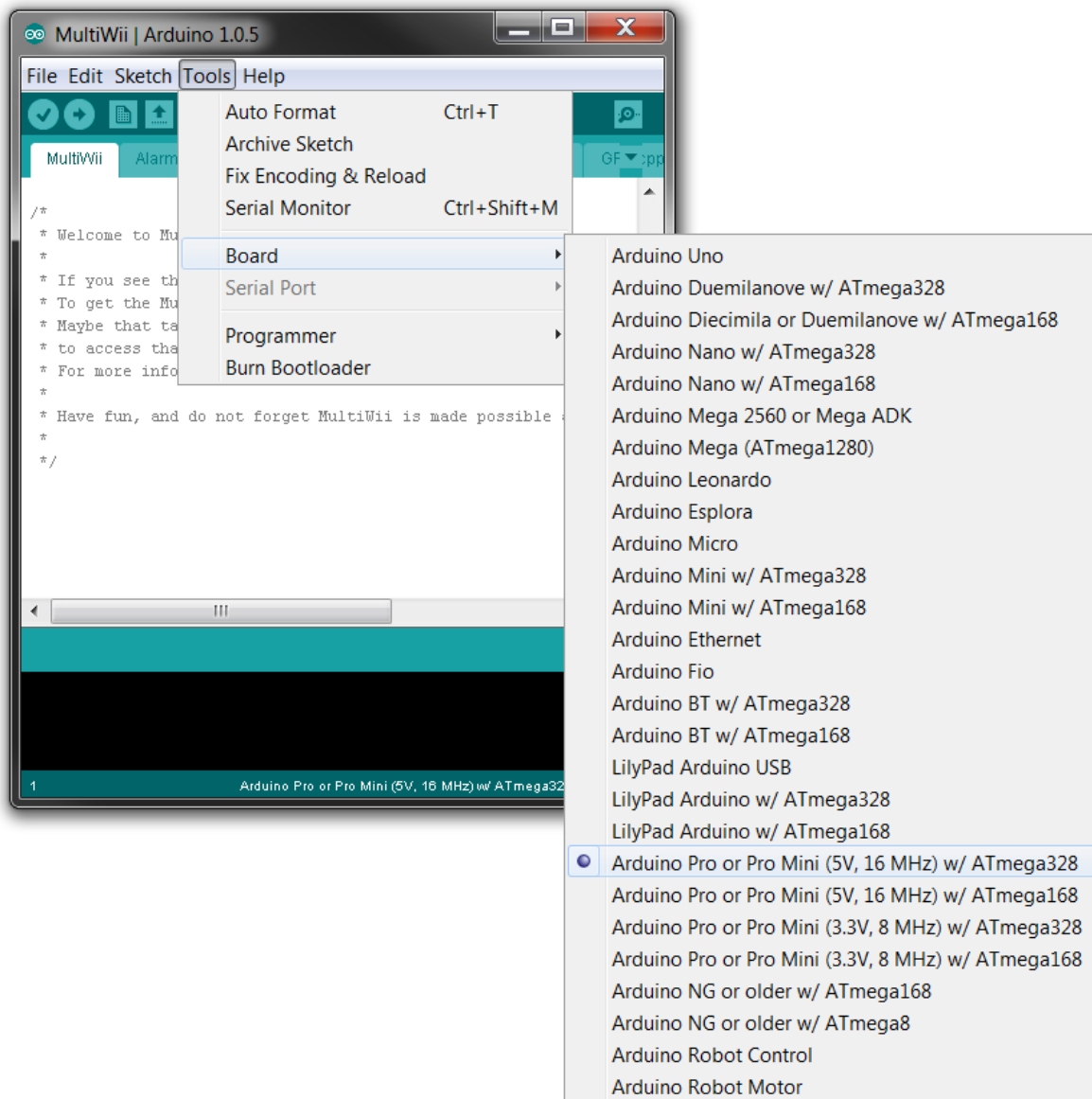
MultiWii Program in Arduino Software

STEP 3: Arduino Board Setup

The next step is to select your MultiWii board and COM port so the Arduino software will know which board it is communicating with and via which COM port so you can upload the file.

A: Board Selection

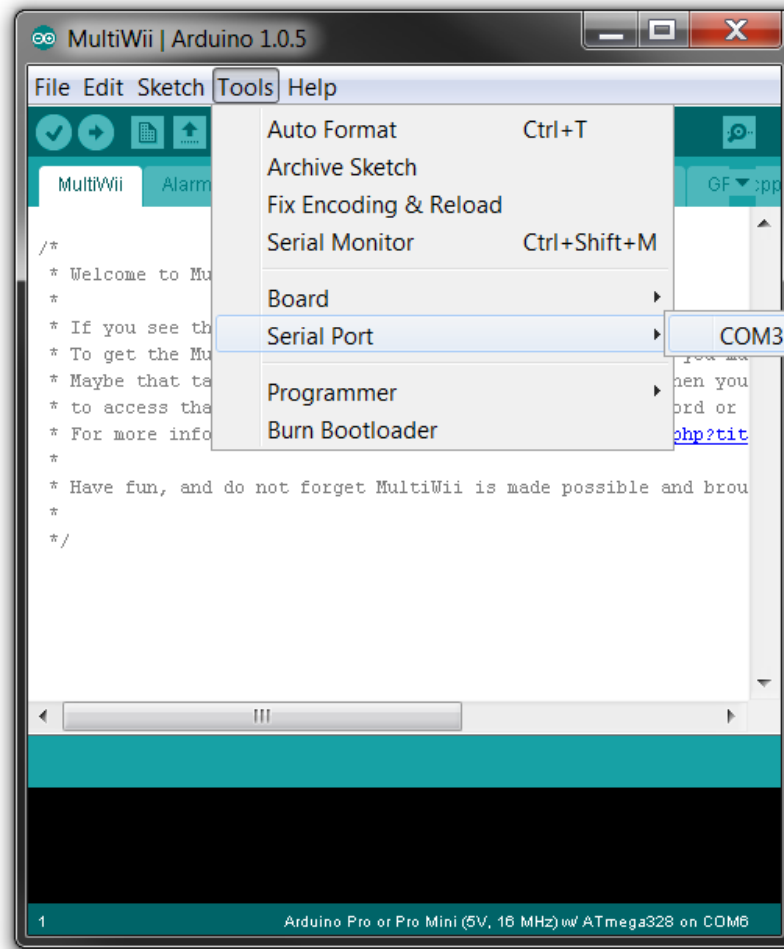
Tell the Arduino software which board you're using. Under "Tools -> Board" and select the right board. For the Flip MultiWii Flight Controller, select the "Arduino Pro / Pro Mini (5V, 16Mhz) w/ATmega328".



Arduino Software Board Selection

B: Serial Port Selection

Under “Tools -> Serial Port”, select the right Serial Port -> COM XX (The number is different for each computer). If you don't know which COM port is connected to the board, unplug the board, look at the selection of COM ports available, then plug the board back in; a new COM port should appear and this is the one you need to select.



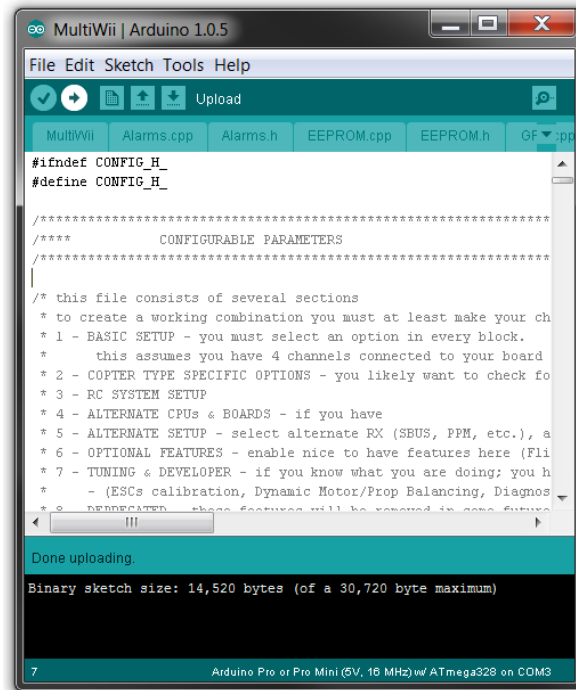
Arduino Software COM port selection

-- WARNING --

Be sure to have the main battery removed when you upload code as there is a risk that the motors may start spinning by accident.

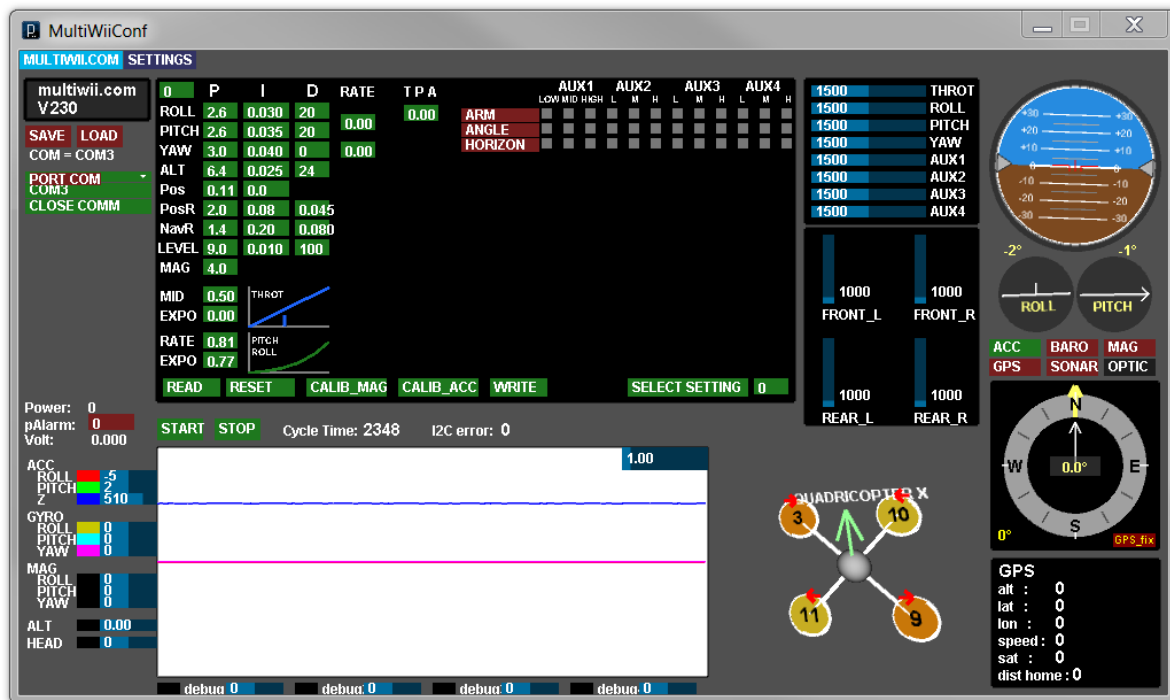
C: Upload to the Board

Once this is done, save the program and upload it to the board by pressing the “upload” icon (circle with an arrow pointing to the right)



Arduino - Upload icon in white

STEP 4: MultiWii Configuration Tool



MultiWii Configuration Interface (GUI)

Ensure you have uploaded the modified Arduino code to the board without errors. Save the file and close the Arduino program.

1. Open the MultiWiiConf folder (previously suggested it be place it in the Arduino folder)
2. Locate "\MultiWiiConf\application.windows32\MultiWiiConf.exe" (you may want to create a desktop shortcut)
3. Run the application; a new window will appear "MultiWii Conf Interface"
4. On the left side of the new window, you will see "PORT COM". Click on the COM port (or select the right COM port if there is a list). The COM should turn green when it has successfully connected.
5. Click "Start" located above top left above the graph. The red background will turn green when the board is connected.
6. Your MultiWii board should be connected to the computer and the values at the bottom should change when moving your board.
7. The first time you use your board, you will need to calibrate the accelerometer sensor: lay the flight controller board perfectly flat and level (with respect to gravity). Ideally this should be done when it's in place in the copter frame. If it is not mounted in the frame, remember to follow this step again once it has been mounted.
8. Click "CLIB_ACC" and wait 5 seconds before proceeding.

STEP 5: End Point Calibration

-- WARNING --

The following setup should be done without the propellers installed on your copter. Moving the joysticks around could cause it to become "Armed" causing the motors to spin.

In order to work correctly, the FLIP flight controller needs you to configure your transmitter's "End Points". End Points are the maximum and minimum signal values which your transmitter sends when the joystick(s) reach their mechanical limits. Unfortunately the min/max values on most controllers are not high enough to be used by the FLIP controller and need to be set higher than the default settings. Note that not all flight controllers have the option to increase or decrease End Points; if you have chosen a remote control which does not allow these settings to be modified, you will need to refer to the MultiWii online guide. For flight controllers which allow the End Points to be reconfigured, follow the procedure below:

1. Power your handheld transmitter and turn it on
2. Connect your main battery (Should power up the Flight Controller and Receiver)
3. Connect your Flight Controller to the PC with the USB cable
4. Open the MultiWiiConf.exe application
5. Make sure your sub-trims are all centered and show values of 1500. If not, you can move them until you reach that number.
6. For each of your channels you have to set up the End Point so it shows 1000 as the minimum value and 2000 at maximum (usually 120% on the transmitter)

STEP 6: Load Configuration File

PID settings need to be changed for your copter to react right. This is done mostly by trial and error of the settings. We have some Pre-Configured files for our platform that are included in the MultiWii zip you downloaded earlier. If you want to do it yourself, please refer to [MultiWii PID Wiki](#)

1. In the MultiwiiConf GUI interface, click on the "LOAD" button and browse to the desired file. It should have an .mwi extension. Once selected click "Open".
2. You will see a message box saying "Configuration loaded: example.mwi". Click "OK"
3. Parameters should be loaded to the GUI, Click "WRITE" to send it to the board.

Note: This does not save the AUX settings.

[You can now proceed with the electronics guide.](#)

Appendix 1: Configure MultiWii (Advanced users)

Important Note: If you want to better understand the configuration needed in order to get the “general” MultiWii code configured for your specific copter type, a few of the major changes are outlined below. However, if you chose one of the pre-configured programs in step 1d, then you can skip to step 4c.

A) Configuration Tab

If you’re not using one of our already “setup” MultiWii files, open the tab “config.h”. All the major parameters that need modifications are within this tab. Since there are many tabs, there may be an arrow at the far right of the tabs; click this arrow to see the other “hidden” tabs. All the user configuration are within this file, don’t try to modify others unless you’re an advance user.



MultiWii Config.h File Location

B) Changing Parameters

If you're not using one of our pre-configured MultiWii files, you might have to change some parameters which are specific to your board, copter and/or hardware.

A. Copter Type

To tell the software which copter type you will be using the board for. Find (****The Type of multicopter****) and under that uncomment the type of copter you have. ex: Quad, HEX6 or any others. To uncomment, remove the two forward slashes at the start of the line, the line will turn from gray to black telling you it's defined.

B. MultiWii Board/Sensors


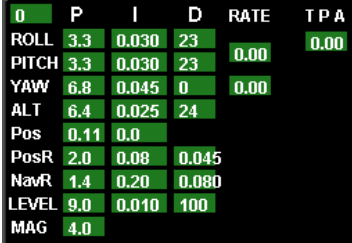
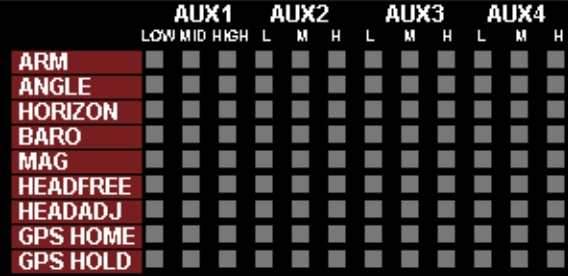
Because MultiWii support many different board, you need to tell the software board you will be using. Find (****Combined IMU Boards****) and uncomment your board. If you're using the FLIP MultiWii board the define will be #define FLYDUINO_MPU (towards the bottom of the list)

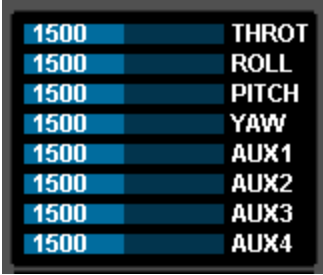
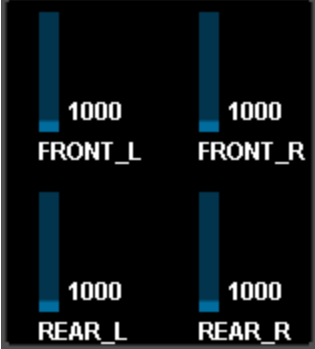
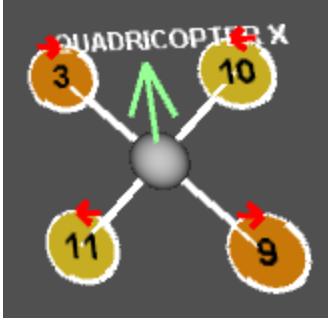
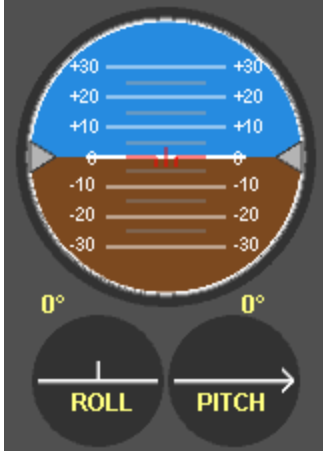
C. Throttle when Armed

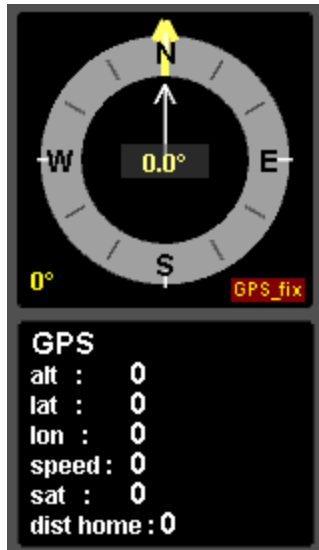
Not all ESC's react the same so you might have to play with this value to get the motors to spin at a slow rate when you arm the board. Find (****Motor minthrottle****) and define your ESC and if he is not in the list, only change the number. This is a try and test procedure until you have it where you want.

Appendix 2: Using the MultiWii GUI (Optional)

At this point, you can proceed to the electrical wiring. If you want to learn more about MultiWii you can continue with the rest of this guide.

	<p>Software version This give you which version is uploaded to your MultiWii flight controller.</p> <p>Save / Load configuration Enable you to save your PID and Setup settings to a file to be able to load it again later. Useful if you use your Flight Controller on multiple platform.</p> <p>COM Port Selection Here you will have to select the COM port of your Flight Controller before being able to start a communication.</p>																																																																																																																																														
 <table border="1"> <thead> <tr> <th></th> <th>P</th> <th>I</th> <th>D</th> <th>RATE</th> <th>T P A</th> </tr> </thead> <tbody> <tr> <td>ROLL</td> <td>3.3</td> <td>0.030</td> <td>23</td> <td></td> <td>0.00</td> </tr> <tr> <td>PITCH</td> <td>3.3</td> <td>0.030</td> <td>23</td> <td>0.00</td> <td></td> </tr> <tr> <td>YAW</td> <td>6.8</td> <td>0.045</td> <td>0</td> <td>0.00</td> <td></td> </tr> <tr> <td>ALT</td> <td>6.4</td> <td>0.025</td> <td>24</td> <td></td> <td></td> </tr> <tr> <td>Pos</td> <td>0.11</td> <td>0.0</td> <td></td> <td></td> <td></td> </tr> <tr> <td>PosR</td> <td>2.0</td> <td>0.08</td> <td>0.045</td> <td></td> <td></td> </tr> <tr> <td>NavR</td> <td>1.4</td> <td>0.20</td> <td>0.080</td> <td></td> <td></td> </tr> <tr> <td>LEVEL</td> <td>9.0</td> <td>0.010</td> <td>100</td> <td></td> <td></td> </tr> <tr> <td>MAG</td> <td>4.0</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		P	I	D	RATE	T P A	ROLL	3.3	0.030	23		0.00	PITCH	3.3	0.030	23	0.00		YAW	6.8	0.045	0	0.00		ALT	6.4	0.025	24			Pos	0.11	0.0				PosR	2.0	0.08	0.045			NavR	1.4	0.20	0.080			LEVEL	9.0	0.010	100			MAG	4.0					<p>PID Settings These settings will determine how much of a compensation the flight controller will produce. To change them you have to maintain the click in the green square and move your mouse left or right to change the value. Once set, click on WRITE to send it to the Controller. MultiWii PID</p>																																																																																		
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	<p>RC Transmitter Values</p> <p>Here you can see the value of each channel connected to your MultiWii board in real time. It's useful to setup your transmitter to output all signals between 1000-2000.</p>
	<p>ESC Values</p> <p>These are the output values sent to each ESC/Motors of your copter. Once armed, these values should go up to to the ****Motor minthrottle**** value as found in Confi.h when you throttle up.</p>
	<p>Model 3D Display</p> <p>This provides a visual (3D) representation of the quadcopter's orientation. Note that the default orientation is at a slight angle.</p> <p>Included in this diagram are which motors to connect to which pins on the MultiWii board. The red arrows show you the orientation / direction of the propellers.</p>
	<p>Horizon</p> <p>Just as in a regular aircraft, a horizon shows you if the aircraft is pitched forward or backward or is rolling left or right. The blue represents "sky" and brown represents "ground". If you think your board is horizontal and the horizon is not level, your sensors need to be recalibrated.</p>



Compass / Additional Sensors

The FLIP / MultiWii board only contains an accelerometer and a gyroscope. You can add an external pressure sensor (altimeter), GPS and magnetic compass. Other compatible boards may have this functionality onboard. You would get the readings for each here.



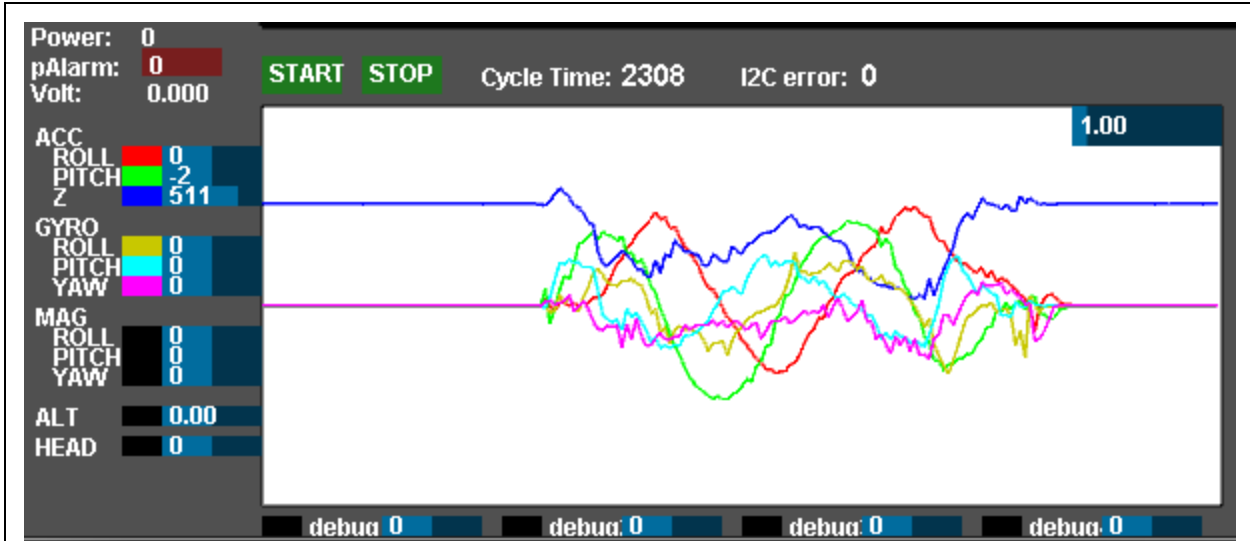
MultiWii Exponential & Rate

This section is mostly used by experienced UAV pilots. It gives the user curves of the Throttle and Pitch/Roll.

READ RESET CALIB_MAG CALIB_ACC WRITE SELECT SETTING 0

MultiWii Read/Write bar

- **READ:** Reads the settings that are already loaded on the board
- **RESET:** Clears all the change you might have done if you didn't click "WRITE"
- **CALIB_MAG:** Starts the Magnetometer calibration
- **CALIB_ACC:** Starts the Accelerometer calibration
- **WRITE:** Writes (uploads) the settings to the board
- **SELECT SETTING:** Experimental option (Don't use unless you know what it is)



MultiWii Sensors value and Graph

This is an important window; it's the graph which shows you in real time the raw value of the sensors you have on your board.

ACC (Accelerometer)		
ROLL	Accelerometer value for the Roll (~wing angle) axis	
PITCH	Accelerometer value for the Pitch (nose up/down) axis	
Z	Accelerometer value for the Z (vertical) axis	
GYRO (Gyroscope)		
ROLL	Gyroscope value for the Roll axis	
PITCH	Gyroscope value for the Pitch axis	
YAW	Gyroscope value for the Yaw axis	
MAG (Magnetometer)		
ROLL	Magnetometer value for the Roll axis	
PITCH	Magnetometer value for the Pitch axis	
YAW	Magnetometer value for the Yaw (direction) axis	
ALT (Altitude)	Altitude based on the Barometer	
HEAD (Heading)	Heading based on the Magnetometer	

Table of sensors value showed in the GUI (with colors)

Troubleshooting Using Sensor Values

This approach helps to troubleshoot if you have directional issue with your copter. It will show you if the board is mounted in the right orientation or if you have not selected the right board in the “config.h”

- TILT the MULTI to the RIGHT (left side up):
MAG_ROLL, ACC_ROLL and GYRO_ROLL goes up
MAG_Z and ACC_Z goes down
- TILT the MULTI forward (tail up):
MAG_PITCH, ACC_PITCH and GYRO_PITCH goes up
MAG_Z and ACC_Z goes down
- Rotating the copter clockwise (YAW):
GYRO_YAW goes up
- The copter stays level:
MAG_Z is positive ; ACC_Z is positive

Flight Modes

A number of flight modes are defined and can be assigned to transmitter AUX switches in the MultiWiiConf GUI. If you have a transmitter with five or more channels you can configure the software to allow you to change the flight mode via the 5th channel (aux switch). Each mode is defined below.

Mode	Gyroscope	Accelerometer	Barometer	Compass (Mag)	GPS
ACRO / Gyro Only	- X -				
ANGLE (Stable/Level/Acc)	- X -	- X -			
HORIZON	- X -	- X -			
BARO (Altitude Hold)	- X -	- X -	- X -		
MAG (Heading Hold)	- X -	- X -		- X -	
HEADFREE (CareFree)	- X -	- X -		- X -	
GPS Return to Home	- X -	- X -		- X -	- X -
GPS Waypoint	- X -	- X -		- X -	- X -
GPS Position Hold	- X -	- X -		- X -	- X -
Failsafe	- X -				

Flight modes showing hardware required

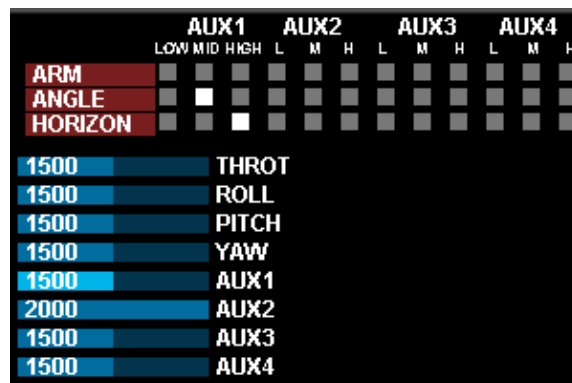
X = Required Hardware for the Mode

Setting Flight Mode

To set the flight mode, you need to check the box according to the High - Mid - Low state of your auxiliary switch that you want the Mode to be activated. (You have to click "WRITE" once you set them)

EX: Here you can see that the AUX1 is set for:

- ACRO - When the AUX1 is LOW (1000); when nothing is selected, the mode is ACRO
- ANGLE - When the AUX1 is in MID (1500)
- HORIZON - When the AUX1 is in HIGH (2000)



A: Motor Control

1. ARM
 - a. Lets you arm the motors, This can be use instead of the usual stick combination.
 - b. It's up to you which channel to use (for example, arming / disarming can be a switch or knob)

B: Flight Modes

Only one of the following flight modes can be active at any time

1. ACRO
 - a. This is the default mode when the HORIZON or ANGLE mode are not activated and is more "acrobatic" flight
 - b. Sensor: Gyroscope only
2. ANGLE
 - a. A stable mode (when the PID values are adjusted correctly and Gyro and ACC are calibrated and trimmed). It will try to keep the model level to the ground.
 - b. Sensors: Gyroscope and accelerometer.

Note: According to MultiWii developers, ANGLE MODE is virtually obsolete, HORIZON MODE is preferable in most cases.

3. HORIZON:
 - a. A mixture between ACRO and ANGLE modes. It combine the stable effect with slow RC commands and acrobatics with fast RC commands.
 - b. Will be in ANGLE MODE mode when PITCH/ROLL sticks are centered and in ACRO MODE mode when full PITCH or ROLL sticks are applied, allowing flips.

- c. Sensors: Gyroscope and Accelerometer.

Additional flight modes which can be activated in combination with the main flight modes and each other:

4. BARO
 - a. The barometer is used in order to keep a certain (fixed) height when no other commands from the RC transmitter are received.
 - b. If you activate BARO (ALT HOLD) and the GPS modes, they will use the same calculated altitude.
 - c. Sensors: Gyroscope, Accelerometer and Barometer (Accelerometer is needed to estimate the Z acceleration in this mode) You can activate BARO (ALT HOLD) and the GPS modes will use the same altitude.
5. MAG
 - a. Heading (compass direction) lock mode, it will try to keep its Yaw orientation. This can be activated in all flight stabilization modes. The UAV will keep pointing in the same direction until there is a yaw input from the transmitter. Without this mode, you will still have slight deviation (like a tail gyro in heli). Compared to no MAG, this mode offers a drift free tail, just like the difference between heading hold and conventional helicopter gyros.
 - b. Sensors: Gyroscope, Accelerometer and Magnetometer (Accelerometer is needed also because it is used in heading angle determination)
6. HEADFREE
 - a. Does not impact the flight mode (ANGLE/HORIZON/ACRO). It only holds the orientation (yaw) of the multi and will always move in the same 2D direction for the same ROLL/PITCH stick movement. Can be activated with MAG mode.
 - b. Holds the pilots 2D perspective as reference, MAG does not, both give a drift free tail.
7. HEADADJ
 - a. Sets a new yaw origin for HEADFREE mode.

C: GPS Modes

GPS modes can be activated in ANGLE or HORIZON flight modes. will be ignored if there is no GPS lock at time of arming. are generally used along with ALT HOLD, but this is not mandatory. the mag sensor is mandatory for GPS control, but MAG mode is not. Activation of MAG MODE has no effect in GPS MODE. GPS altitude is never used in a control loop (only for display).

1. GPS HOME
 - a. Uses compass and GPS for the purpose of returning home to the starting point. Stabilisation is done in accordance with the flight mode (ANGLE/HORIZON). The GPS altitude is not very accurate and therefore not usable for holding the height.
2. GPS HOLD
 - a. Hold current position using GPS and baro (if available).

VTail alternate Mixings

Many user don't like the way MultiWii is mixing the special tail configuration of the VTail. So they change those mixing to something more optimal. It is greatly suggested to do it but it require to change the code slightly prior to upload.

Those will change the mixing output to the motors and should give a more natural behaviour for the copter. Our pre-setup files already have those changes done in the NewVTail.h file that is define in the config.h with this line (#define MY_PRIVATE_MIXING "NewVTail.h")

If you want to start from scratch, here is how to do it.
You need to find this line in the Output.ccp tab:

```
#elif defined( VTAIL4 )
motor[0] = PIDMIX(+0,+1, +1);           //REAR_R
motor[1] = PIDMIX(-1, -1, +0);         //FRONT_R
motor[2] = PIDMIX(+0,+1, -1);         //REAR_L
motor[3] = PIDMIX(+1, -1, -0);         //FRONT_L
```

And replace it with one of those tested mix.

```
#elif defined( VTAIL4 )
// ----- Kipkool VTail's mixing -----
motor[0] = PIDMIX(+0,+1, +1);           //REAR_R
motor[1] = PIDMIX(-1, -1, -0.64);     //FRONT_R
motor[2] = PIDMIX(+0,+1, -1);         //REAR_L
motor[3] = PIDMIX(+1, -1, +0.64);     //FRONT_L
```

```
#elif defined( VTAIL4 )
// ----- BrandXPD VTail 400/500 mixing -----
motor[0] = PIDMIX(-.50,+.93,+1)//REAR_R
motor[1] = PIDMIX(-.77,-.50,-.91);    //FRONT_R
motor[2] = PIDMIX(+.50,+.93,-1);      //REAR_L
motor[3] = PIDMIX(+.77,-.50,+.91);    //FRONT_L
```

```
#elif defined( VTAIL4 )
// ----- BrandXPD Mini-VTail mixing -----
motor[0] = PIDMIX(-.44,+ .84,+1)//REAR_R
motor[1] = PIDMIX(-.75,-.44,-.81);    //FRONT_R
motor[2] = PIDMIX(+.44,+ .84,-1)//REAR_L
motor[3] = PIDMIX(+.77,-.44,+ .81);   //FRONT_L
```

Note: You can also define custom mixing table for odd shape copters.

http://www.multiwii.com/wiki/index.php?title=Config.h#Individual_Mixing

MultiWii Stick Configuration (For Mode 2 Transmitter)

Stick Configuration - Multiwii 2.2













Left Stick

Yaw/Throttle

Right Stick

Pitch/Roll

 Airplane mode.
 Travel Must go >1900 To
 enter any calibration.

START-STOP	Arm Motors (start)			Motors will not start until you "unlock" them.
	Disarm Motors (stop)			
	Gyro Calibration Make sure Quad is Level. Do not touch			
AUTO-LEVEL WARNING: Make sure motors are disarmed	Angle/Horizon Calibration Make sure motors are turn are Disarmed This will clear out Trim			Do not use radio trims for Autolevel
	Angle/Horizon Trim Hold the Left stick in the OPPOSITE direction of drift. you might have to hold the stick for 5-10 second to see a change.			
Important: When Calibrating the Mag for GPS. 1. Set radio 4-5 Feet away from quad. 2. Remove all Keys/phones/metal from pockets 3. Enter calibration with stick commands. 4. walk over to Quad; turn it 360 on ALL 3 axes. (think of a sphere, and your motors MUST hit ALL the points) This can be tricky and might have to be tried 1-3 times to be successful!				Dx6,Dx7,Dx8 Aile = Rev. Elev = Normal Rudder = Rev.
GPS Very Important!	Mag Calibration WARNING: Make sure motors are disarmed			

Alternate ESC Calibration

There is a function in MultiWii to calibrate each ESC at the same time. This is done in config.h and need you to upload a -- Not Flyable -- version that will calibrate all your ESC's and then upload back the right version after. Be very careful with this procedure because it can cause the propeller to spin in some occasions.

-- WARNING --

Remove your propellers from the motors prior to do this.

1. Remove all propellers.
2. You have to upload a -- Non Flyable -- version of MultiWii to your board. Once done, the Flight Controller will itself do the calibration at power up. After calibration the real MultiWii version will need to be re-uploaded.
3. Go in the MultiWii "config.h" tab and find `//#define ESC_CALIB_CANNOT_FLY`. If you don't find it. Click on the "Edit" menu on top and then "Find...". Search for `//#define ESC_CALIB_CANNOT_FLY`.
4. Edit this line to remove the double dash before it like that `#define ESC_CALIB_CANNOT_FLY`.
5. Upload this to your board.
6. Power your copter, the board will run the calibration and you will hear the motors sound telling you it's doing the calibration also you will see the LED on the Flight Controller telling you it's finished (After about 10 seconds).
7. Re-Edit the line to add back the two dash `//#define ESC_CALIB_CANNOT_FLY` and Upload.
8. The calibration is done.

Note: If necessary, the low and high values for the ESCs can be tweaked by changing the values for the defines of `ESC_CALIB_LOW` and `ESC_CALIB_HIGH` 2000. Do this only if you know what you're doing.

Useful Links

Alternate GUI Interface

<http://code.google.com/p/mw-wingui/>

https://chrome.google.com/webstore/detail/baseflight-configurator/mppkgnedeapfejgfmkdoninnofogik?utm_source=gmail

<https://play.google.com/store/apps/details?id=com.ezio.mtwii>

<https://play.google.com/store/apps/details?id=net.xrotor.andmultiwiiconf>

Config.h Information

<http://www.mtwii.com/wiki/index.php?title=Config.h>

Config.h Online Configurator

For MultiWii 2.2 and before only

<http://panoramaic.se/configurator/>

PID Tuning

<http://www.mtwii.com/wiki/index.php?title=PID>

MultiWii Official Wiki

<http://www.mtwii.com/wiki>