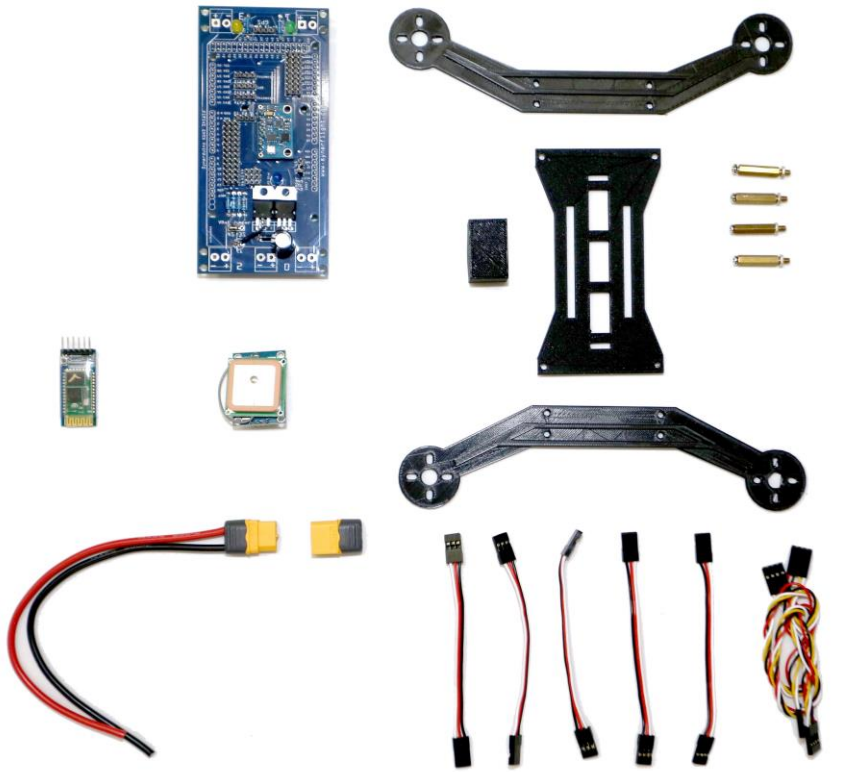
Synerduino Shield , Mini Kwad , FlywiiGUI

QUICK START GUIDE



Synerduino Kwad Shield

ESC is Solder on Top side only

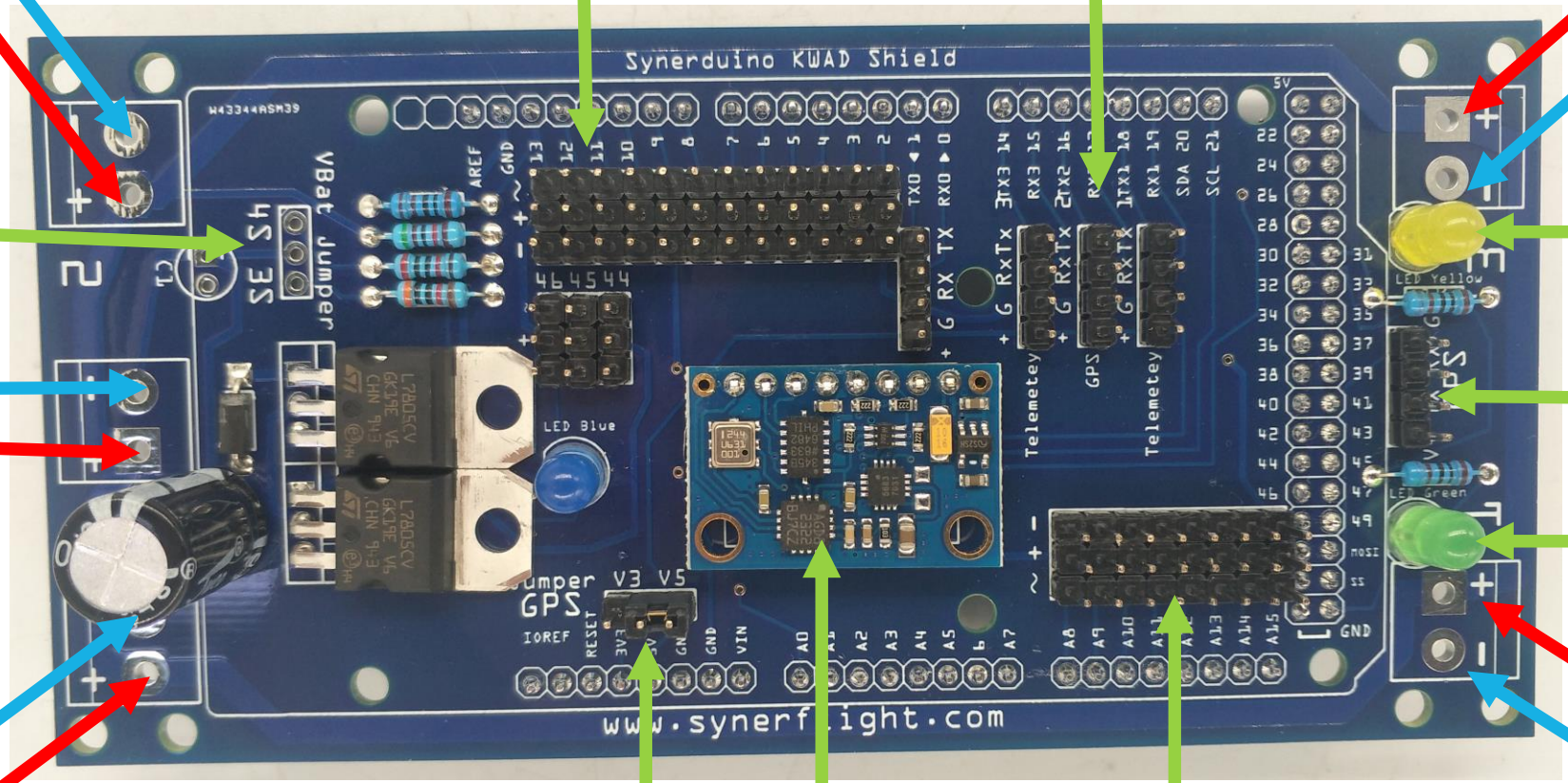
Note : surface mount your solder ESC wire make sure it doesn't penetrate to the bottom of the board

ESC / Servo PWM Out

Serial Pins

ESC is Solder on Top side only

Set jumper to the Battery Cell count (Soldred)



GPS LED

Power input 3s 11.1V

GPS Serial Pins

Status LED

ESC is Solder on Top side only

GPS Voltage Jumper

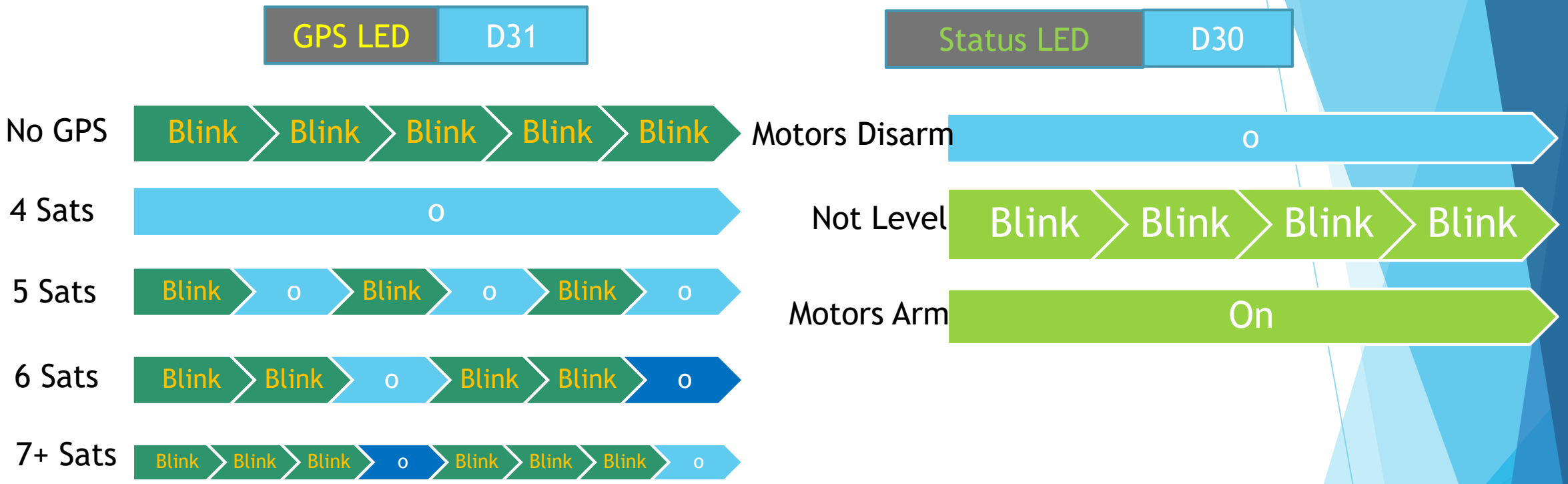
RC PWM in

ESC is Solder on Top side only

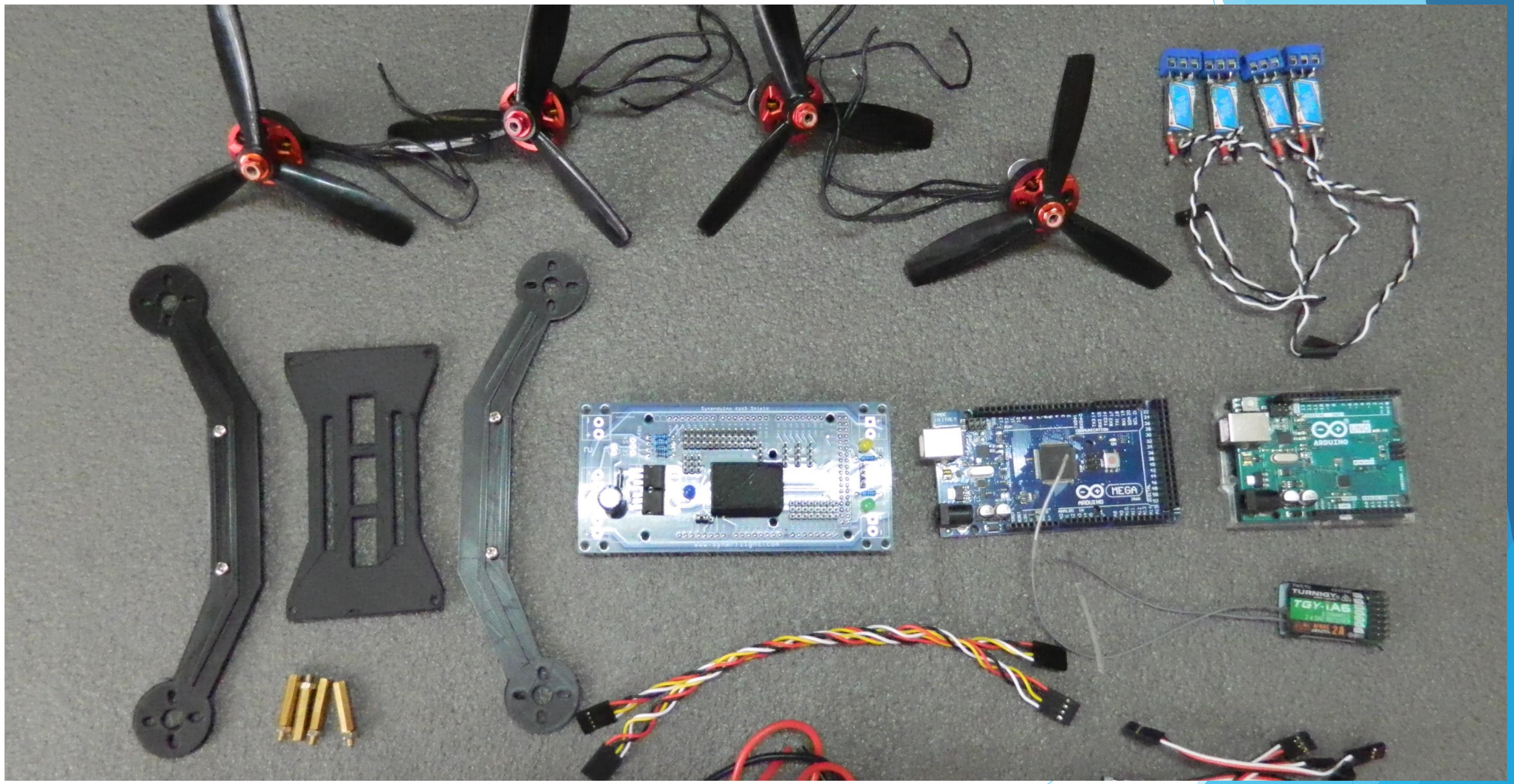
For improve performance IMU must be protected from the Environment

IMU : L3G4200D Gyro / ADXL345 Accelerometer / BMP180 – 85 Baro / MMC5883 Mag

LED Indicator

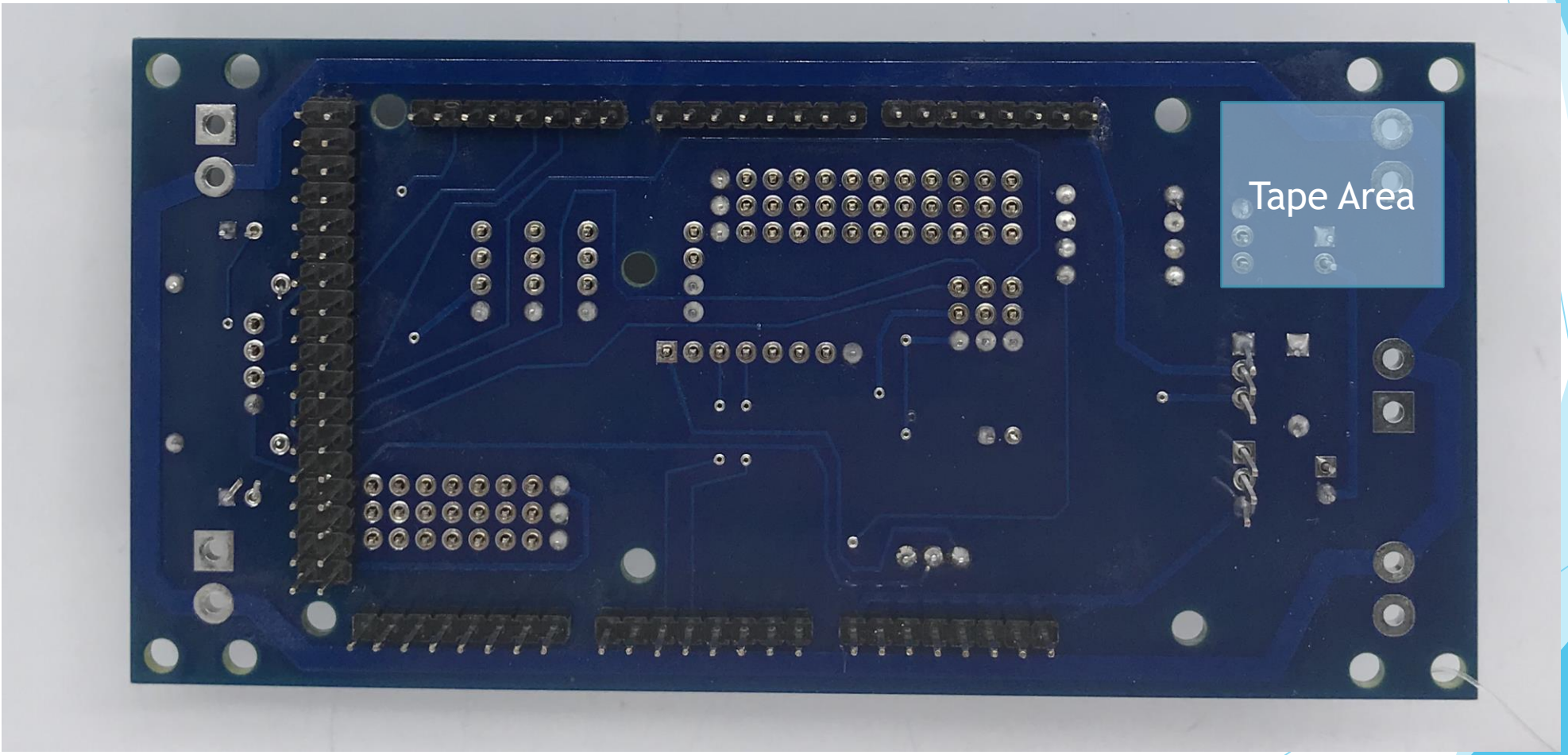


indicate a valid GPS fix by flashing the LED
- led work as sat number indicator
- No GPS FIX -> LED blinks constant speed
- Fix and sat no. below 5 -> LED off
- Fix and sat no. >= 5 -> LED blinks, one blink for 5 sat, two blinks for 6 sat, three for 7 +


MEGA
ARDUINO
UNO
TURNIGY
TGY-IA6

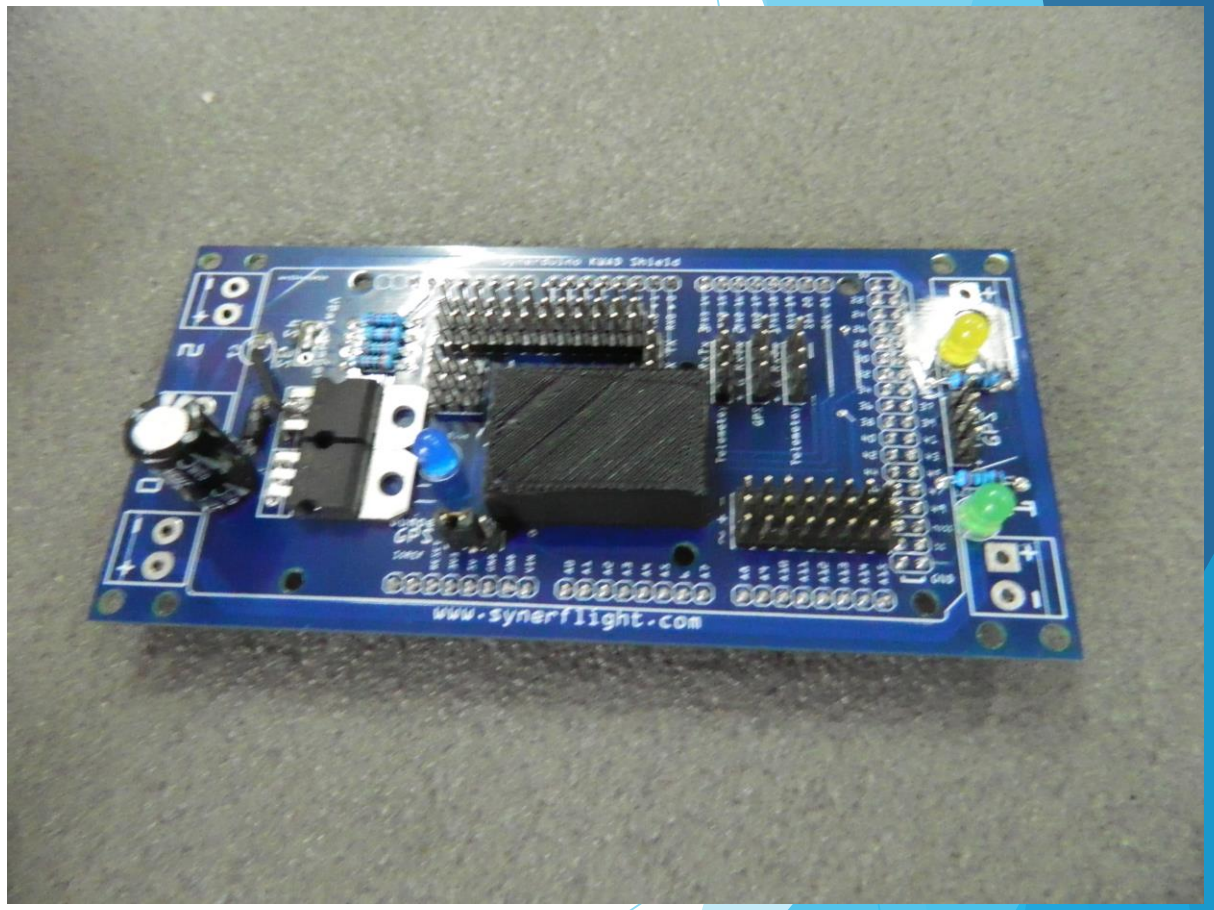
Synerduino Kwad Shield Preparation

Ensure insulation from the Arduino board add tape on these areas



Synerduino Kwad Shield Preparation

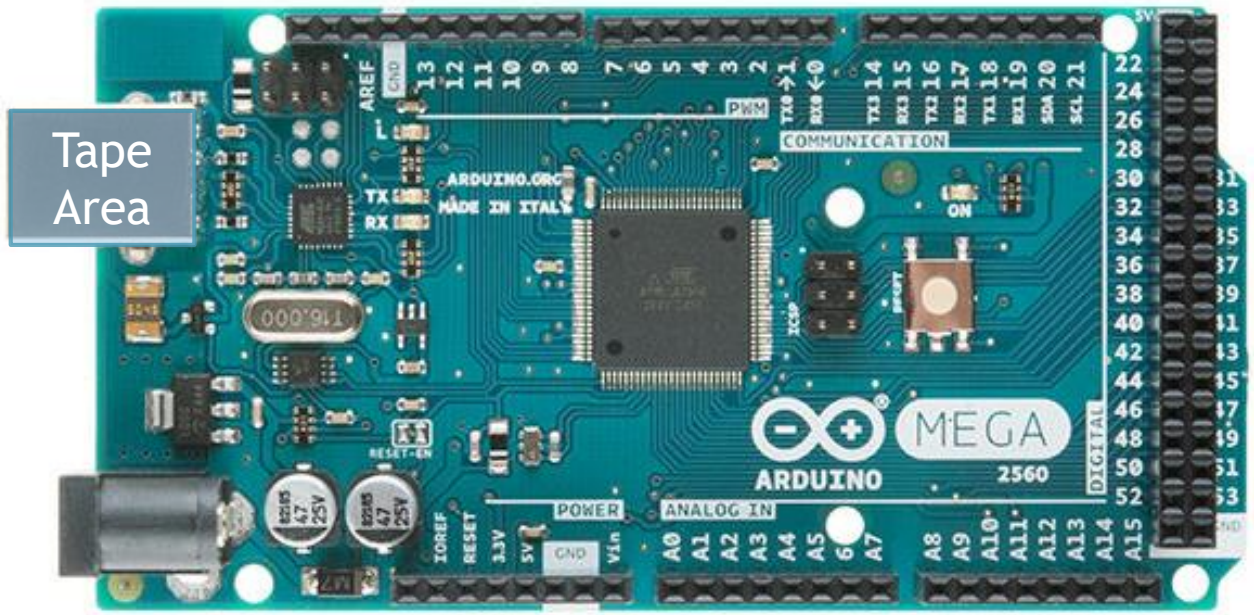
Seal the cover on to the sensor using PVA glue and let it dry



Same time Use small amount of PVA white Glue to Thread Lock the bolt in place Preventing it from going loose

Arduino Board Preparation

Ensure insulation from the Arduino board add tape on these areas

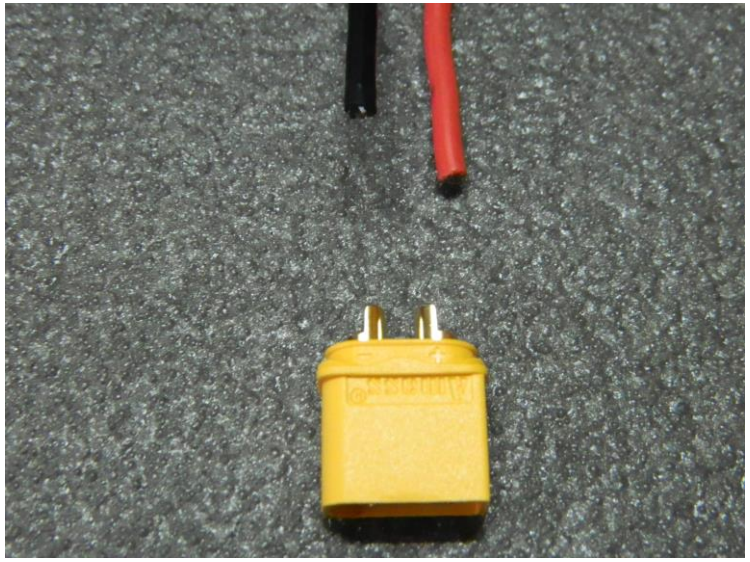


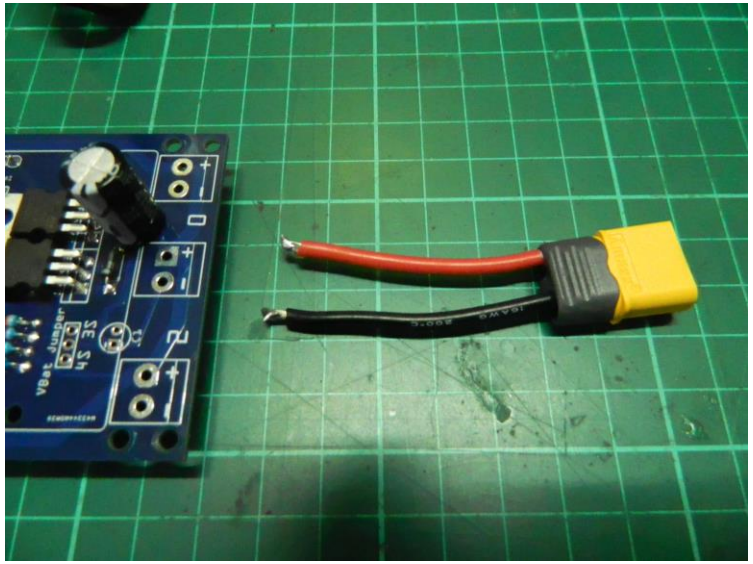
2560 MEGA

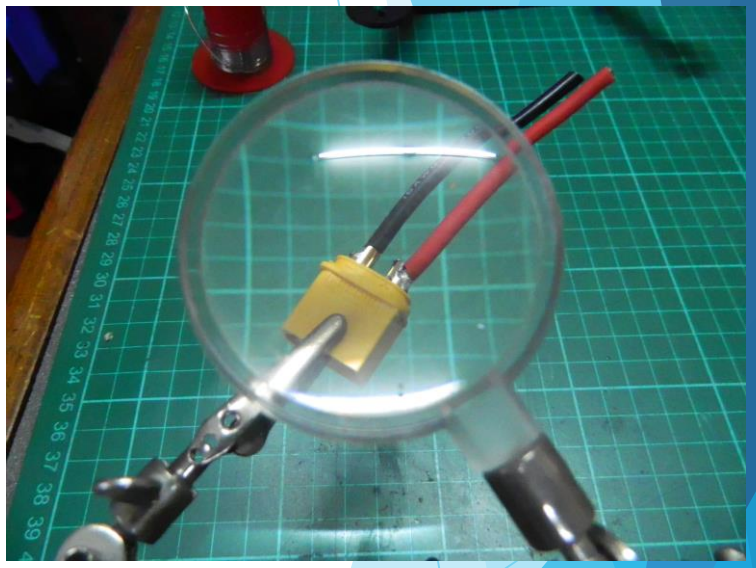
UNO 328

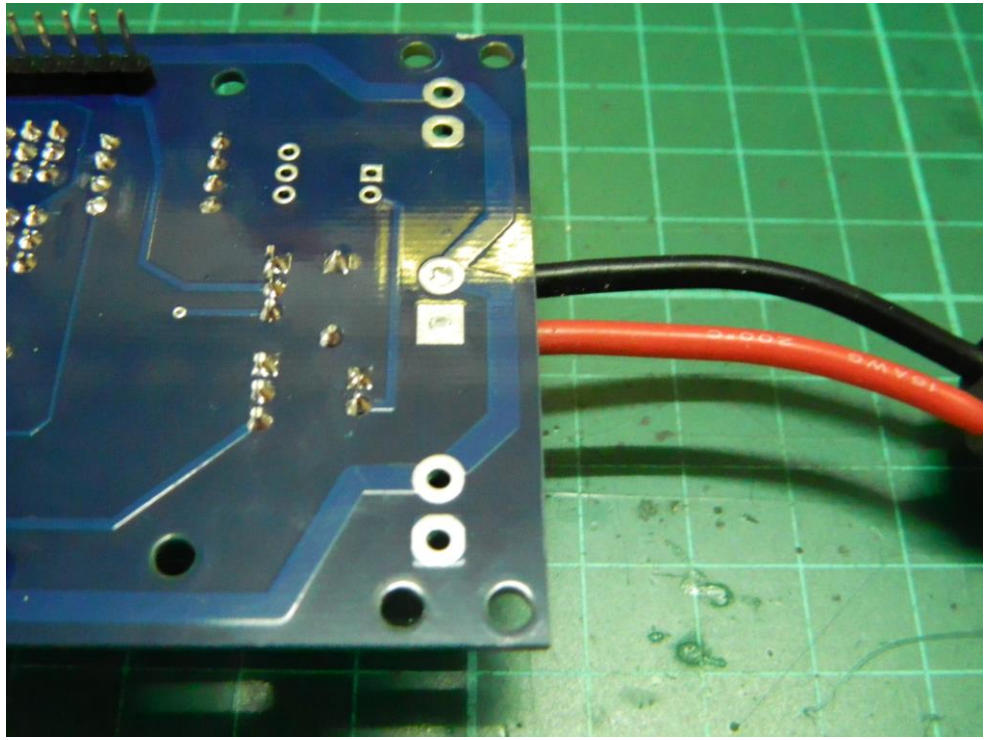
2560 MEGA

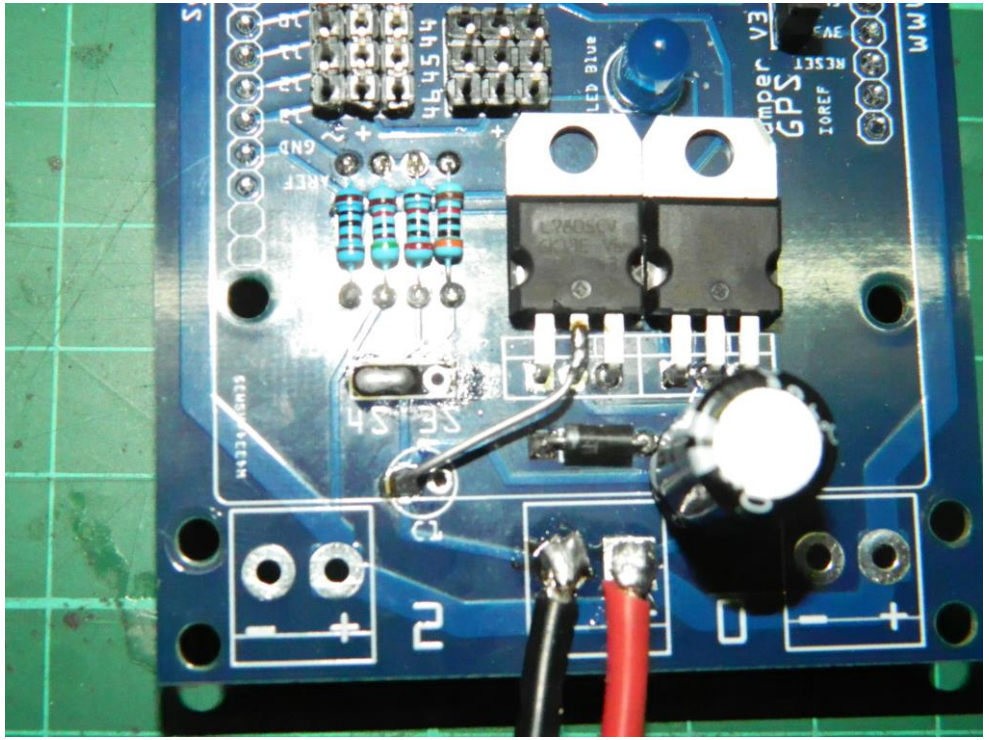
UNO 328





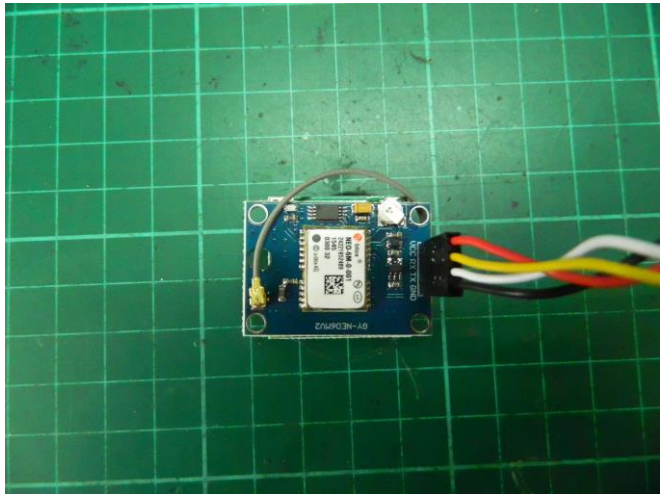




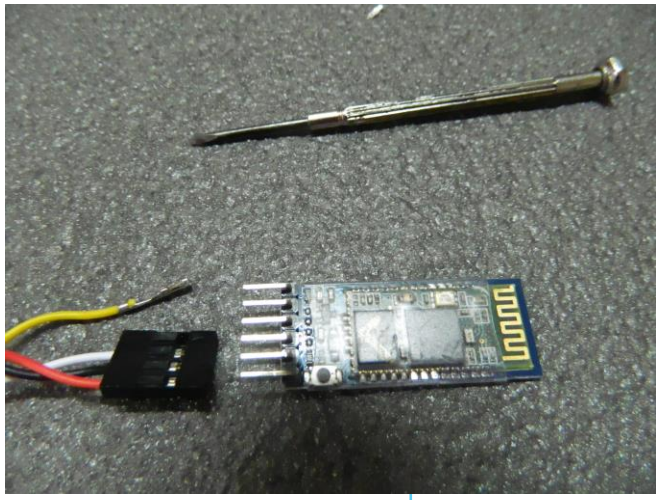


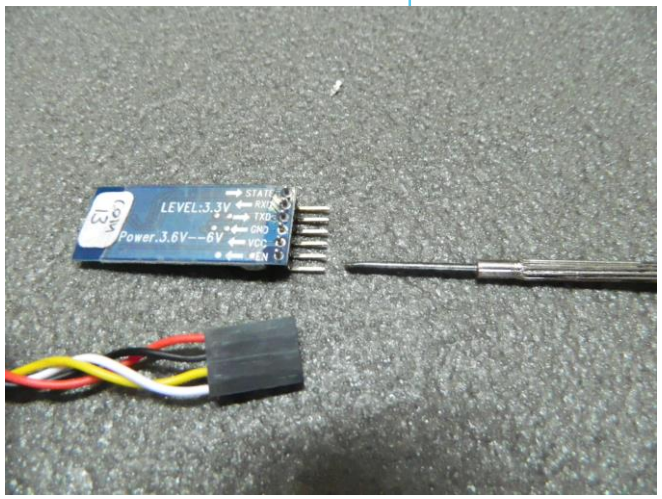
ONLY SURFACE MOUNT THE SOLDER WIRE
MUST NOT PROTRUDE THE HOLE

GPS (GPS)TX2 RX2



BLUETOOTH (TELEMETRY) TX1 RX1





ATTENTION:

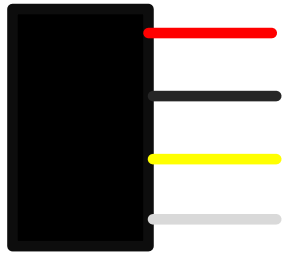
YOU MAY NEED TO REARRANGE THE HEADERS TO CONNECT THE BLUETOOTH AND GPS MODULE TO THE SHIELD BOARD ACCORDINGLY

VCC >> +

GND >> G

TX >> RX

RX >>TX

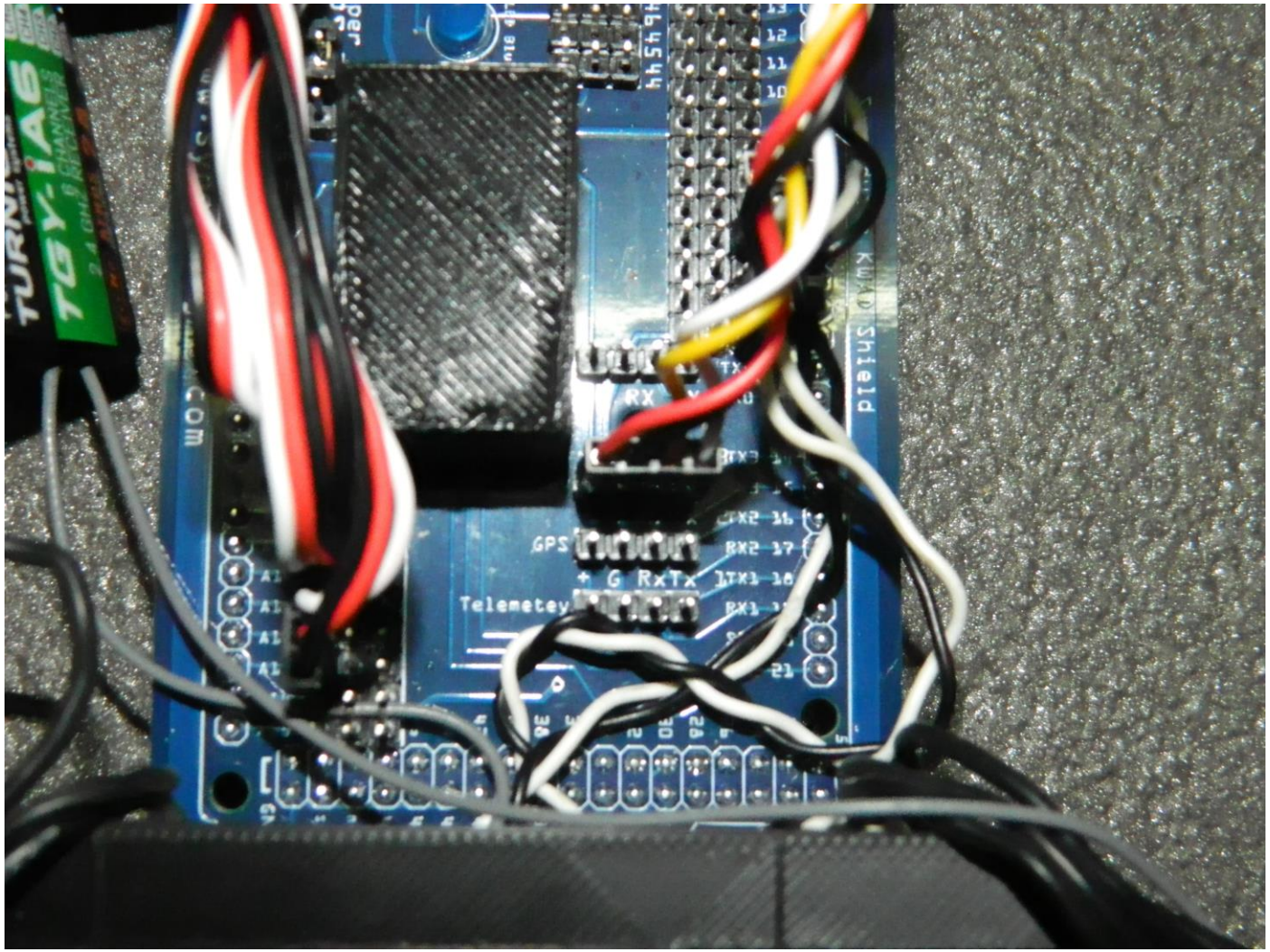


SEE TO IT THE WIRES COLOR CODE MATCHES THE MARKINGS

IMPROPER INSTALLATION MAY CAUSE DAMAGE TO THE ARDUINO BOARD AND SHIELD DUE TO REVERSE POLARITY

NOTE: WE PRESET THE BLUETOOTH AND GPS FOR YOUR CONVENIENCE

SHOULD YOU WISH TO CHANGE THE SETTING ON YOUR DIGRESSION SEE: SYNERDUINO BASIC



ATTENTION:

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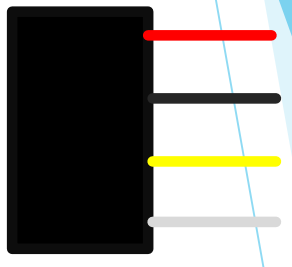
VCC >> +

GND >> G

TX >> RX

RX >>TX



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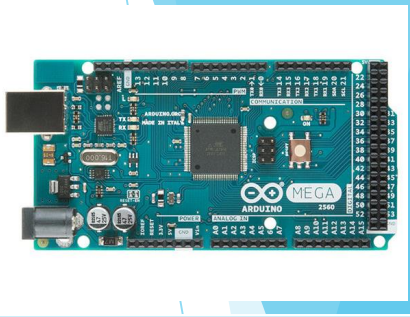
SHOULD YOU WISH TO CHANGE THE SETTING ON YOUR DIGRESSION SEE: SYNERDUINO BASIC

BLUETOOTH ON THE TELEMETRY PIN SERIAL1

GPS IN THE GPS PIN SERIAL2

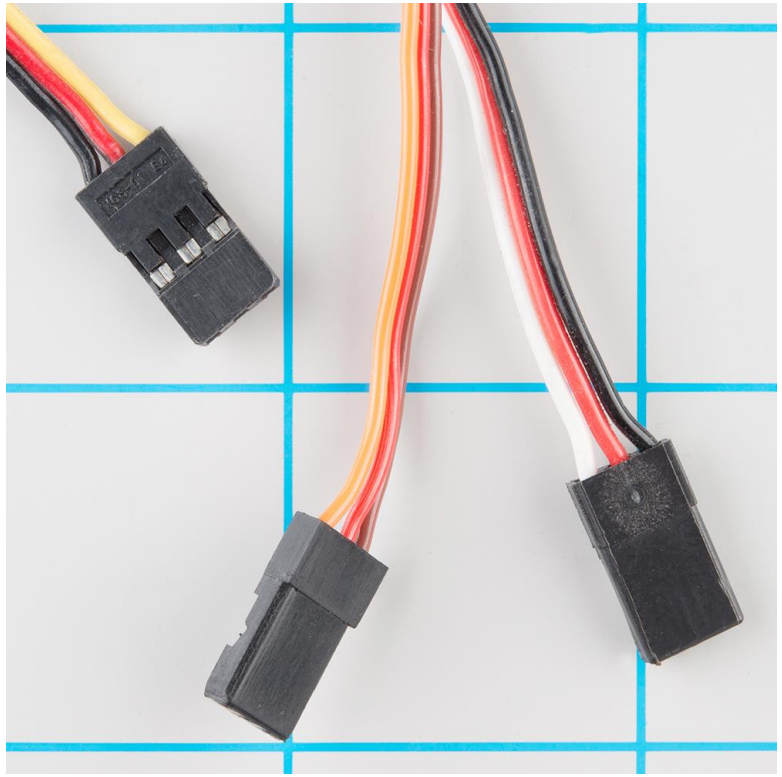
PWM INPUT Assignment

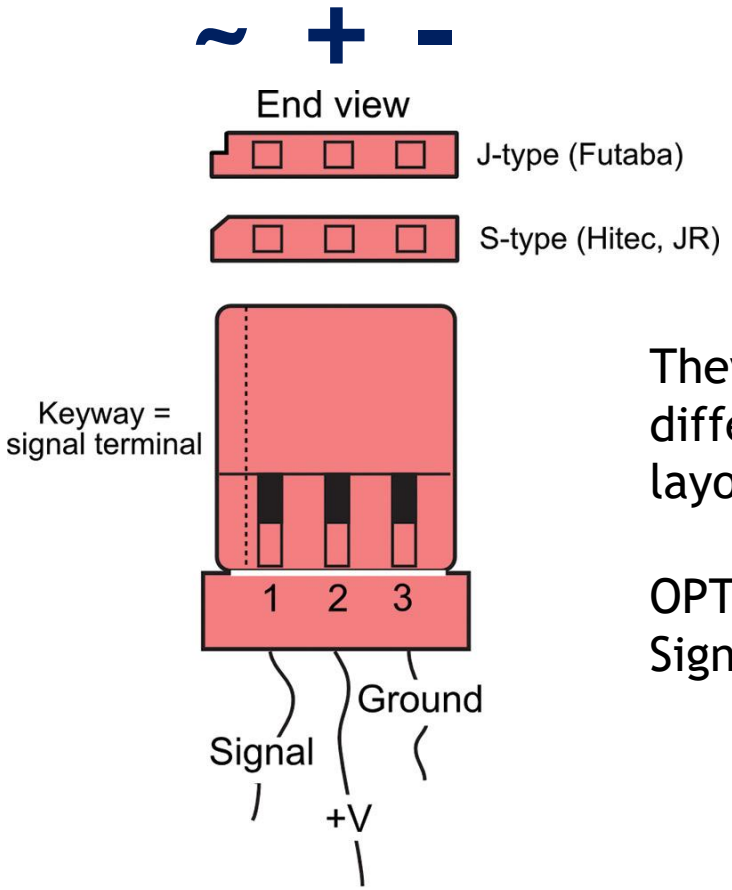
Pls Check the output pin from your Radio Rx manual



RX > Arduino / PWM in	Futaba Format	JR Format	Walkera Format	UNO 328 Input	Mega 2560 Input
Throttle	Ch3	Ch1	Ch3	D2	A8
Aileron	Ch1	Ch2	Ch2	D4	A9
Elevator	Ch2	Ch3	Ch1	D5	A10
Rudder	Ch4	Ch4	Ch4	D6	A11
Aux1	Ch5	Ch5	Ch5	D7	A12
Aux2	Ch6	Ch6	Ch6	D8	A13
Aux3	Ch7	Ch7	Ch7	N/A	A14
Aux4	Ch8	Ch8	Ch8	N/A	A15

SERVO HEADER





They may come with different coded wire but layout are always same

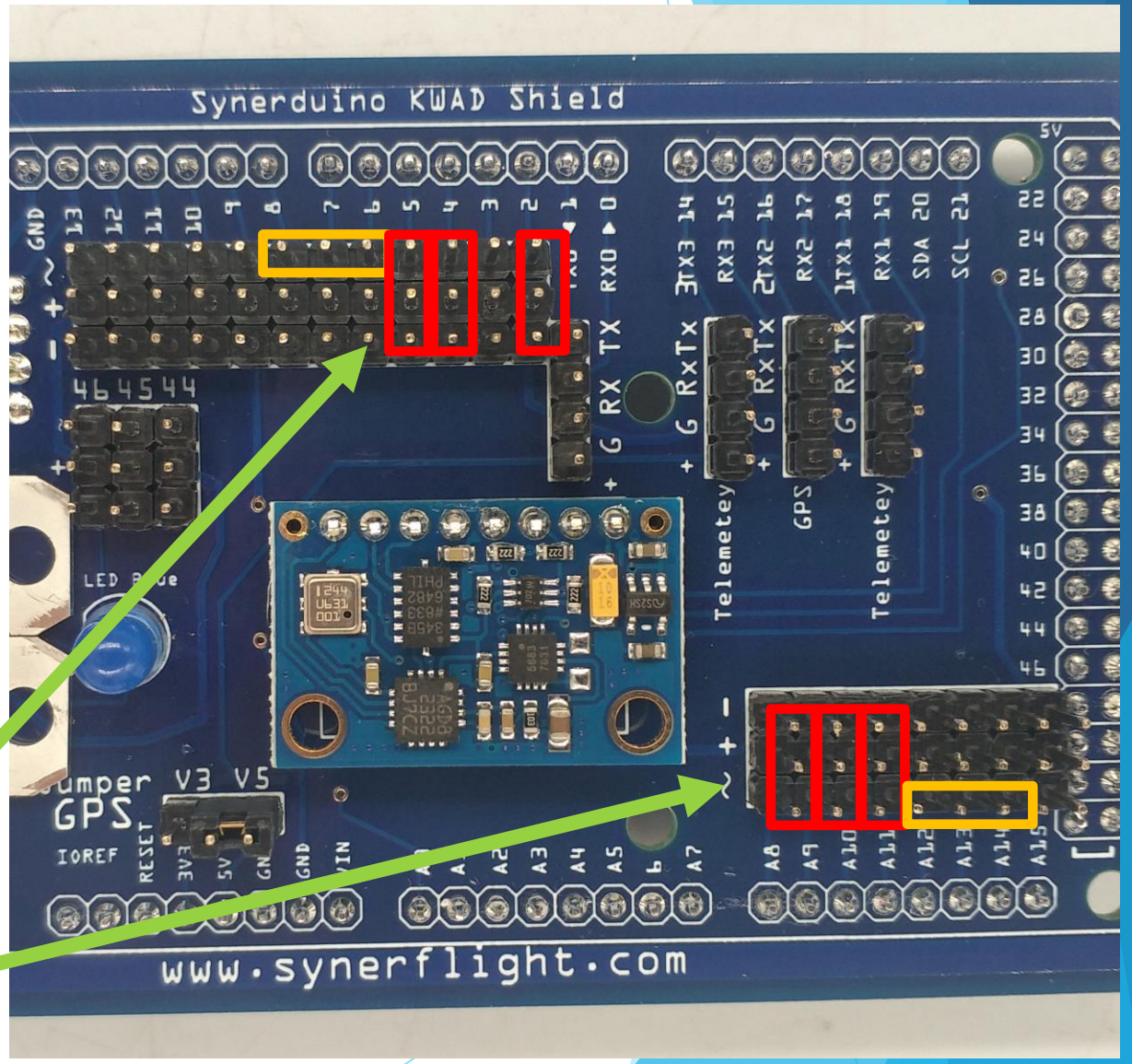
OPTO Wires may only have Signal and Negative Wires o

INCASE YOU'D ASK WHY THE SERVO CONNECTORS WERE DONE THIS WAY , ITS SIMPLY YOU DON'T NEED TO PLUG ALL THE PWM POWER RAILS ON ALL CHANNELS YOU JUST NEED THE PWM SIGNAL PIN ALONE

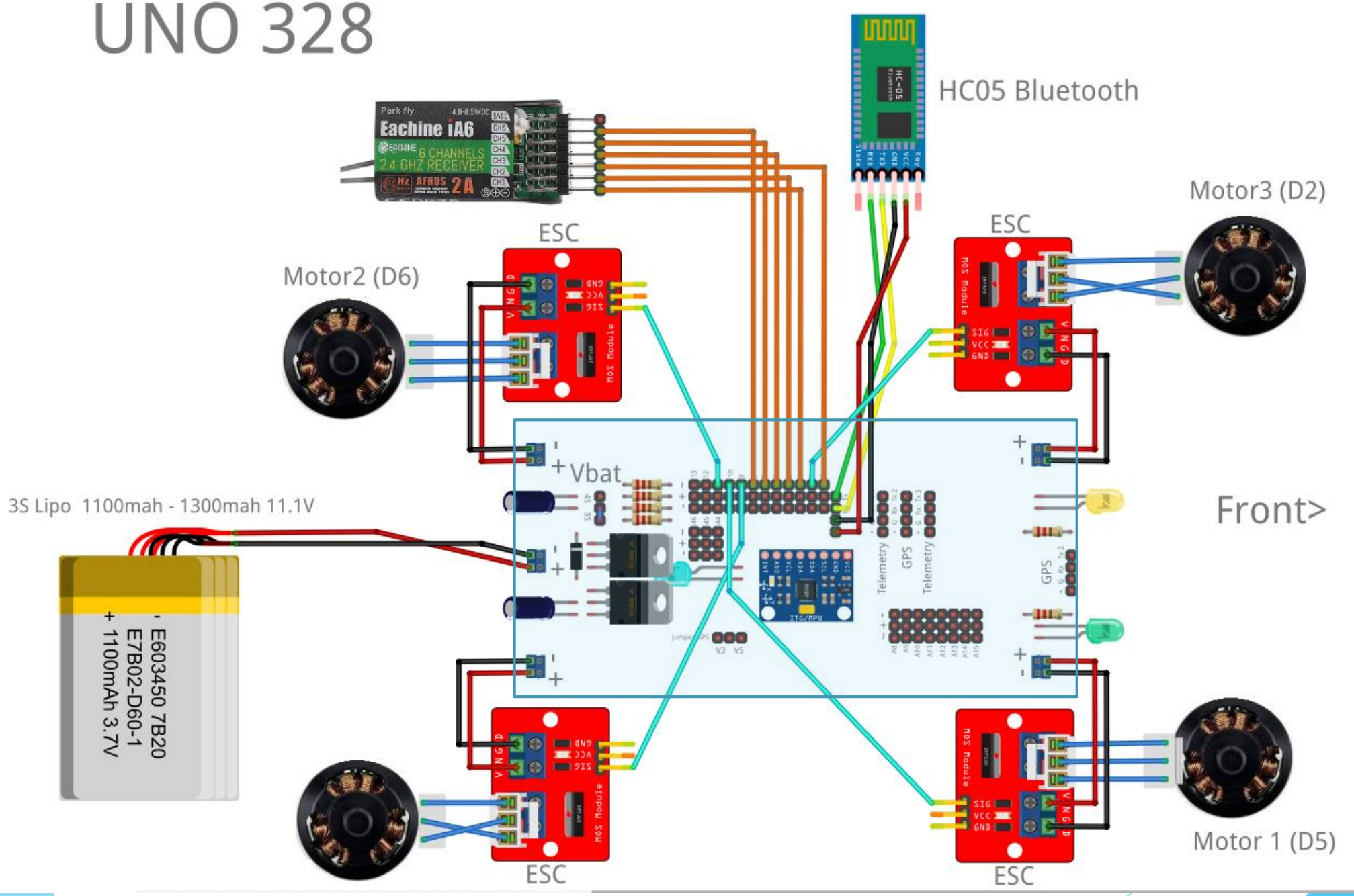
MOSTLY RUDDER AUX1 AND AUX2

UNO PWM IN

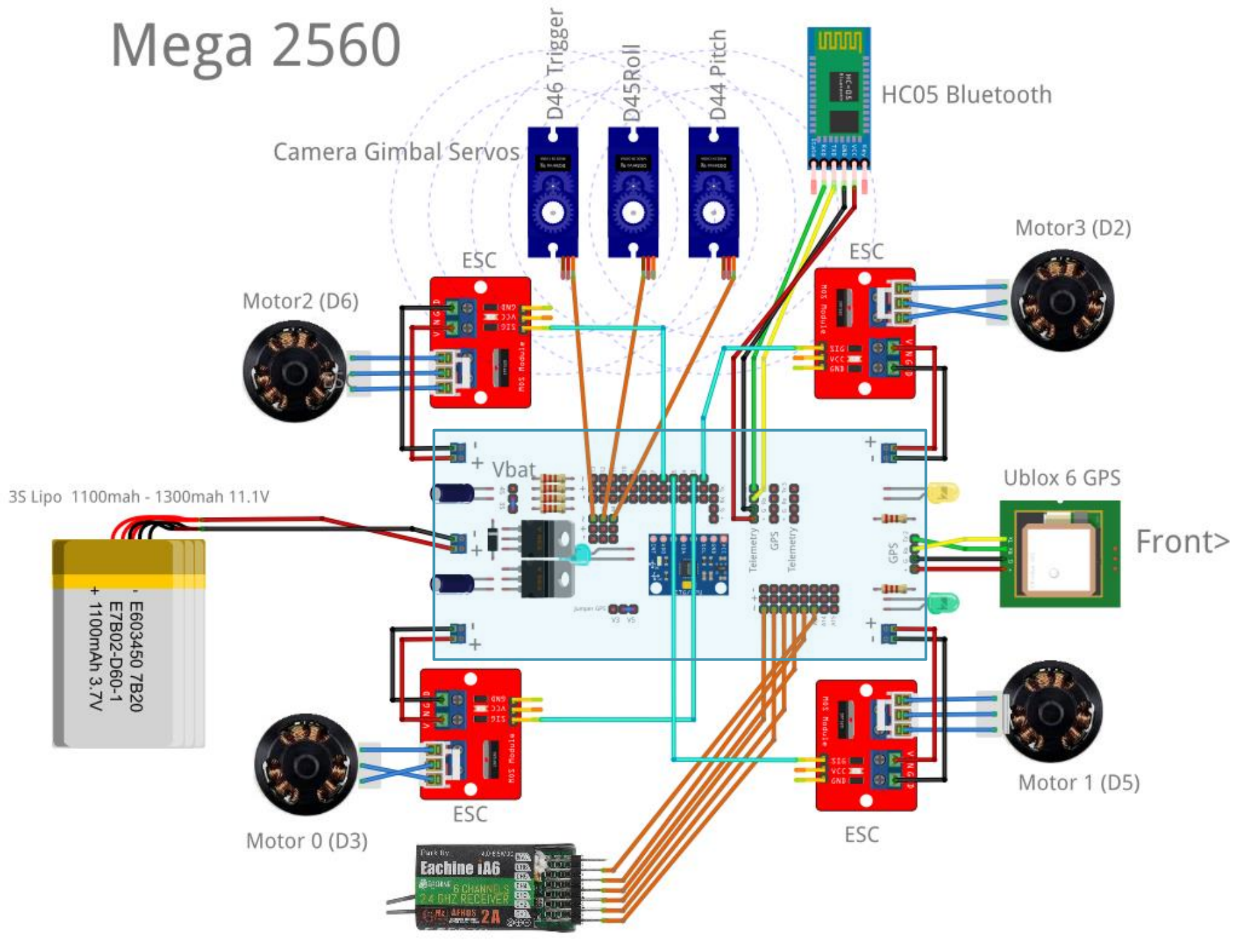
MEGA PWM IN



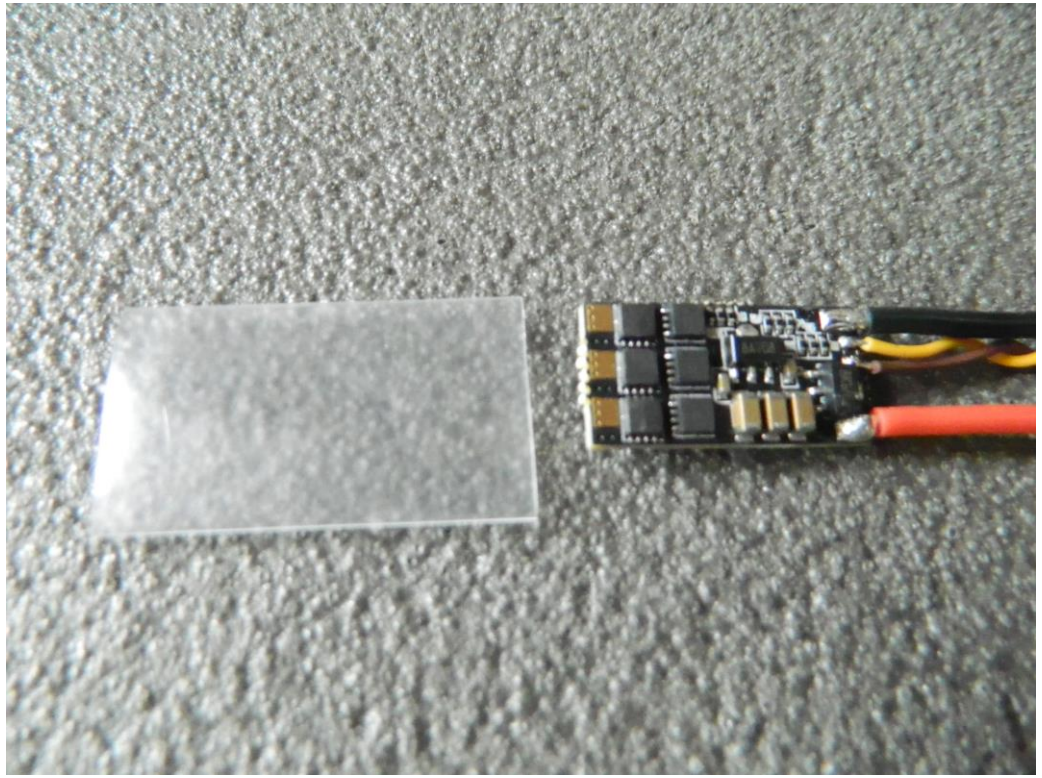
UNO 328

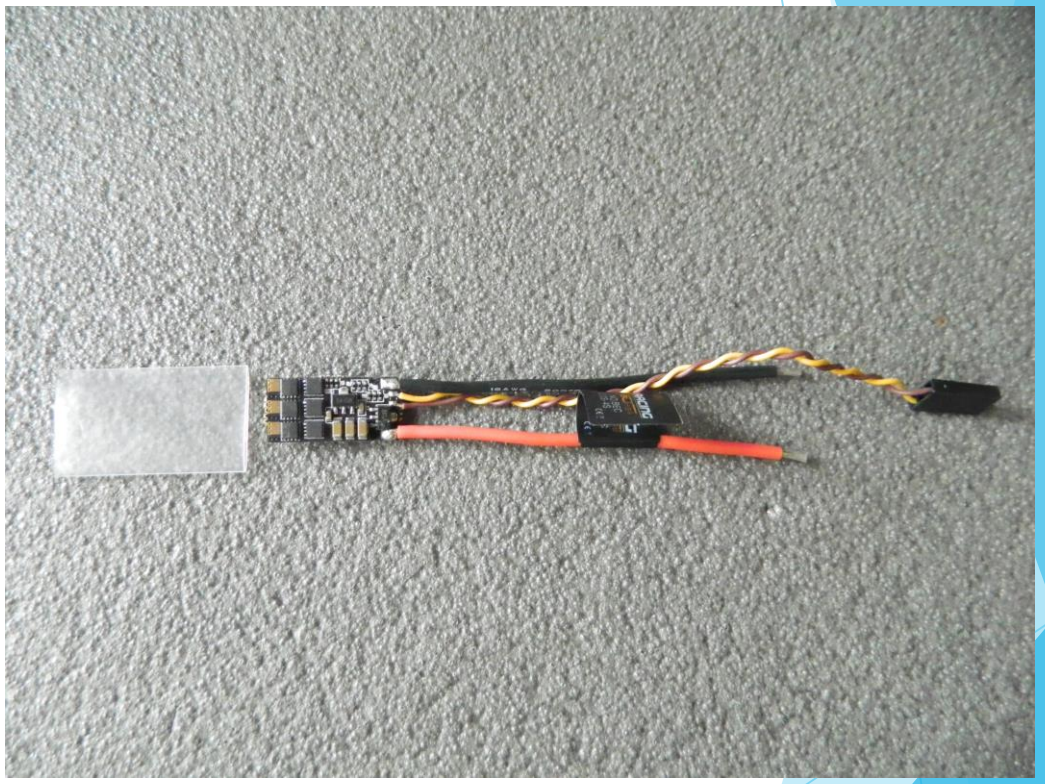

HC05 Bluetooth
Eachine iA6
6 CHANNELS
2.4 GHZ RECEIVER
ESC
Motor2 (D6)
Motor3 (D2)
ESC
ESC
ESC
Vbat
3S Lipo 1100mah - 1300mah 11.1V
E603450 7B20
E7B02-D60-1
1100mAh 3.7V
Front>
Motor 1 (D5)
Telemetry
GPS
Telemetry
GPS
MOS Module
SIG
VCC
GND

Mega 2560


D46 Trigger
D45Roll
D44 Pitch
HC05 Bluetooth
Camera Gimbal Servos
ESC
Motor2 (D6)
ESC
Motor3 (D2)
Vbat
3S Lipo 1100mah - 1300mah 11.1V
E603450 7B20
E7B02-D60-1
1100mAh 3.7V
Ublox 6 GPS
Front>
ESC
Motor 0 (D3)
ESC
Motor 1 (D5)
Eachine iA6
6 CHANNEL
2.4 GHZ RECEIVER

Electronic Speed Controller

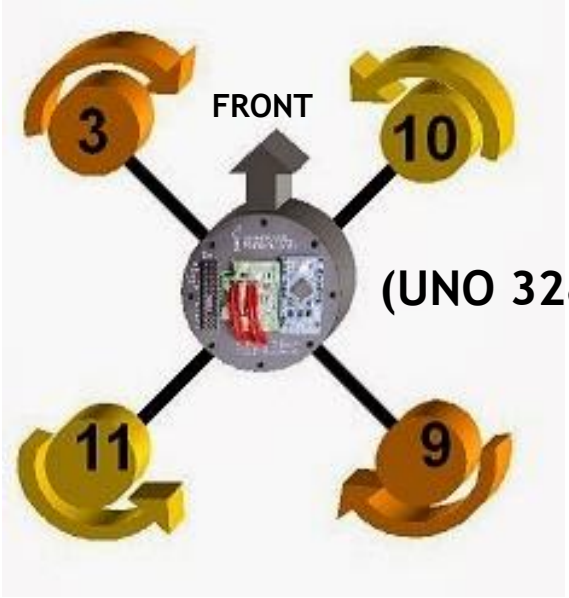




Note : Some ESCs require to solder the motor in first before applying the shrink tube motor must be in pairs of CCW and CW

Electronic Speed Controller

Motor [3]

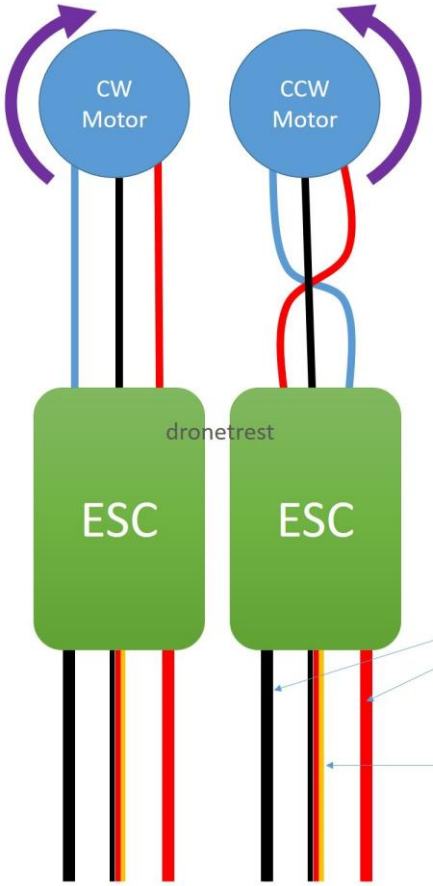


(UNO 328)

Motor [2]

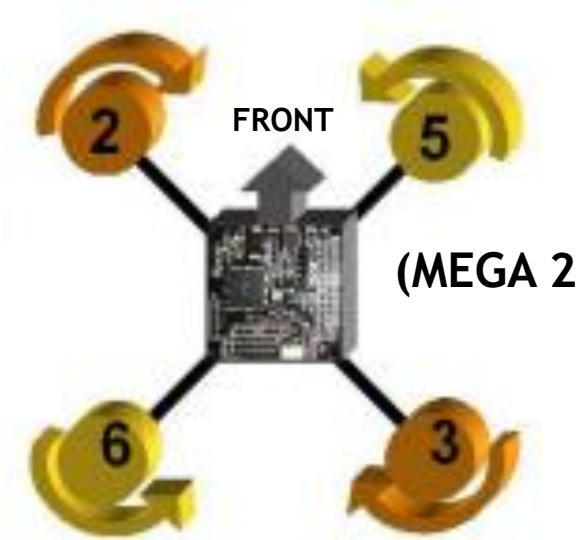
Motor [1]

Motor [0]



Note : you can pre solder the motor to the board and check for rotation before installing the propeller to insure all motor rotations are correct

Motor [3]

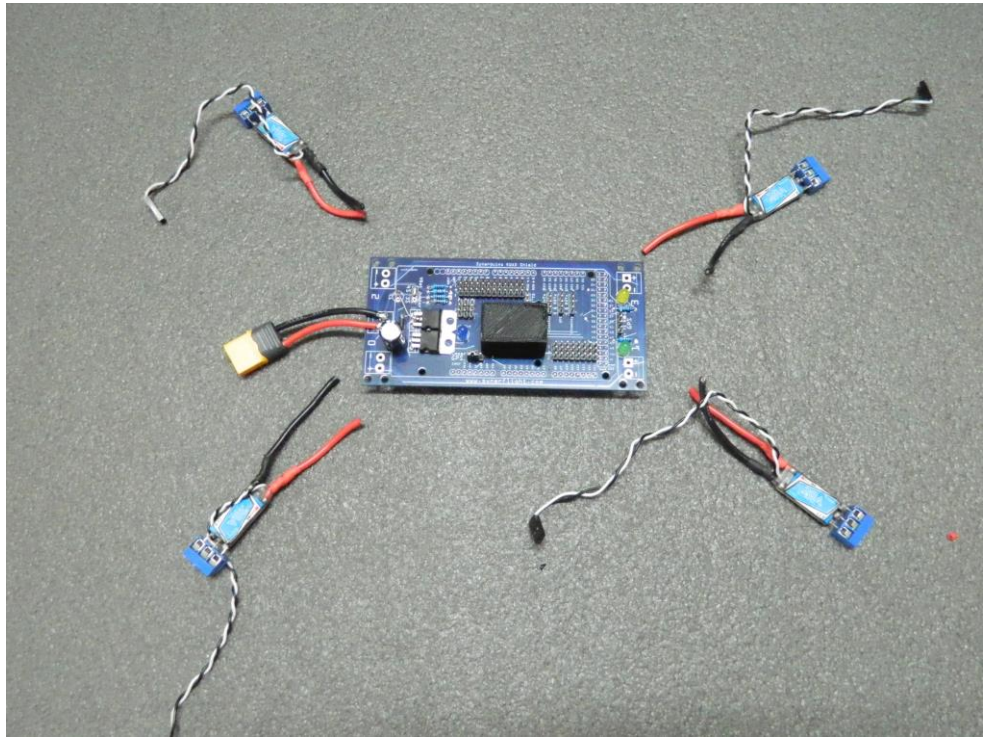


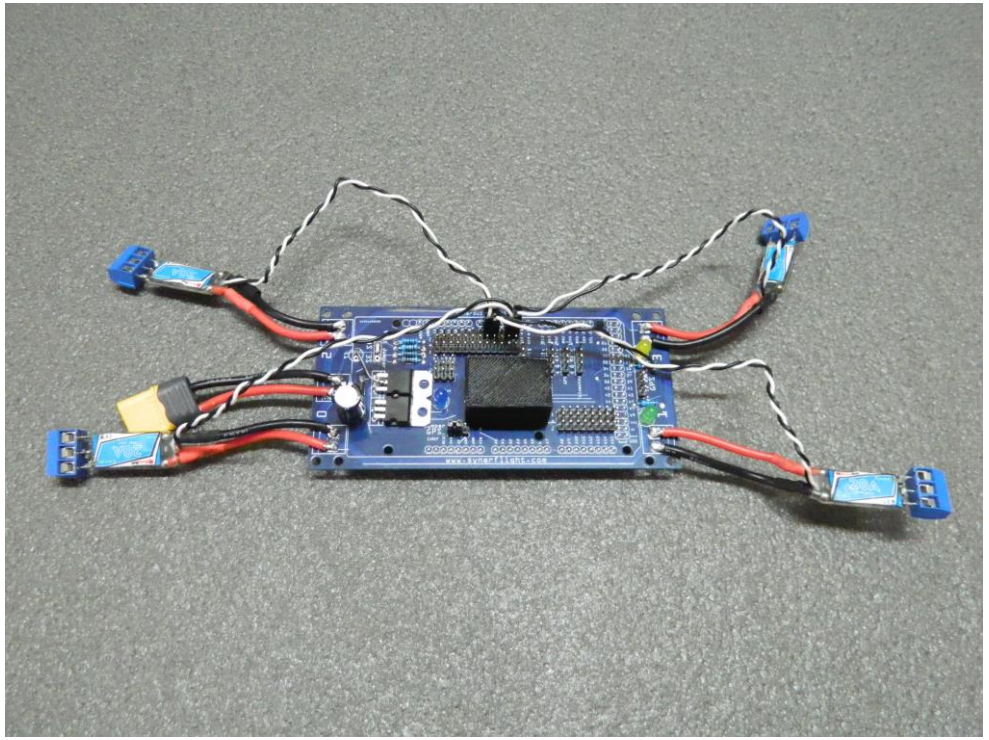
(MEGA 2560)

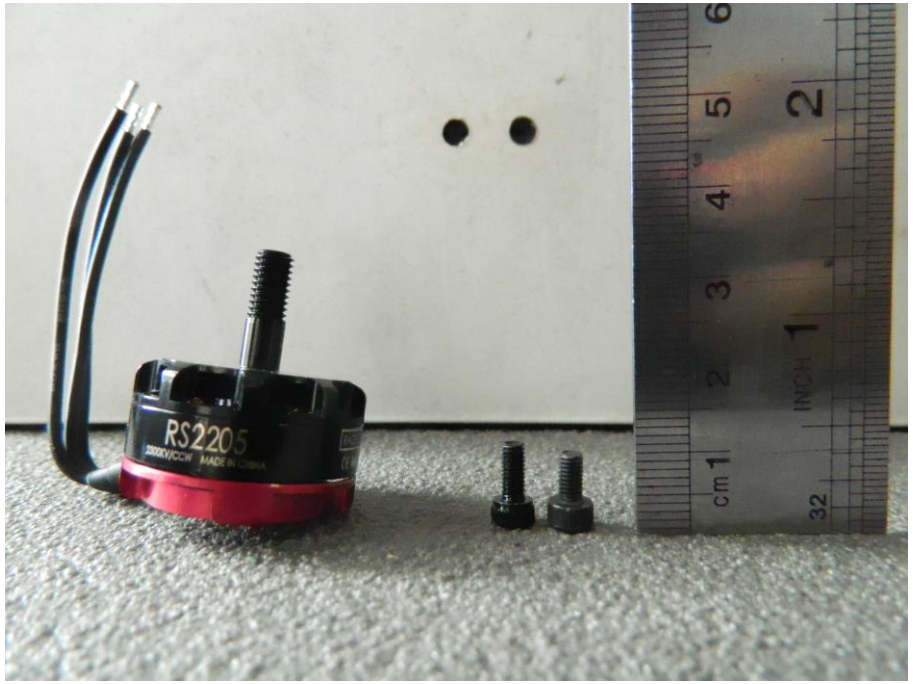
Motor [2]

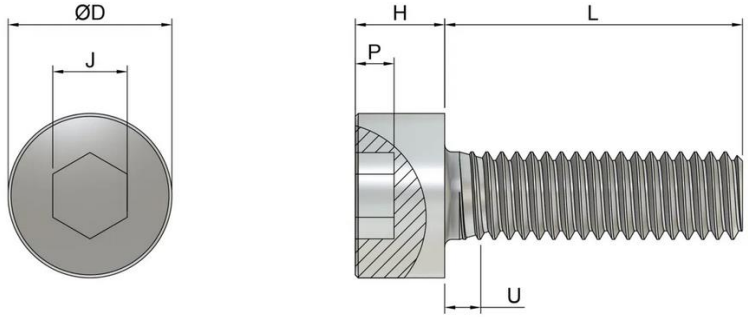
Motor [1]

Motor [0]





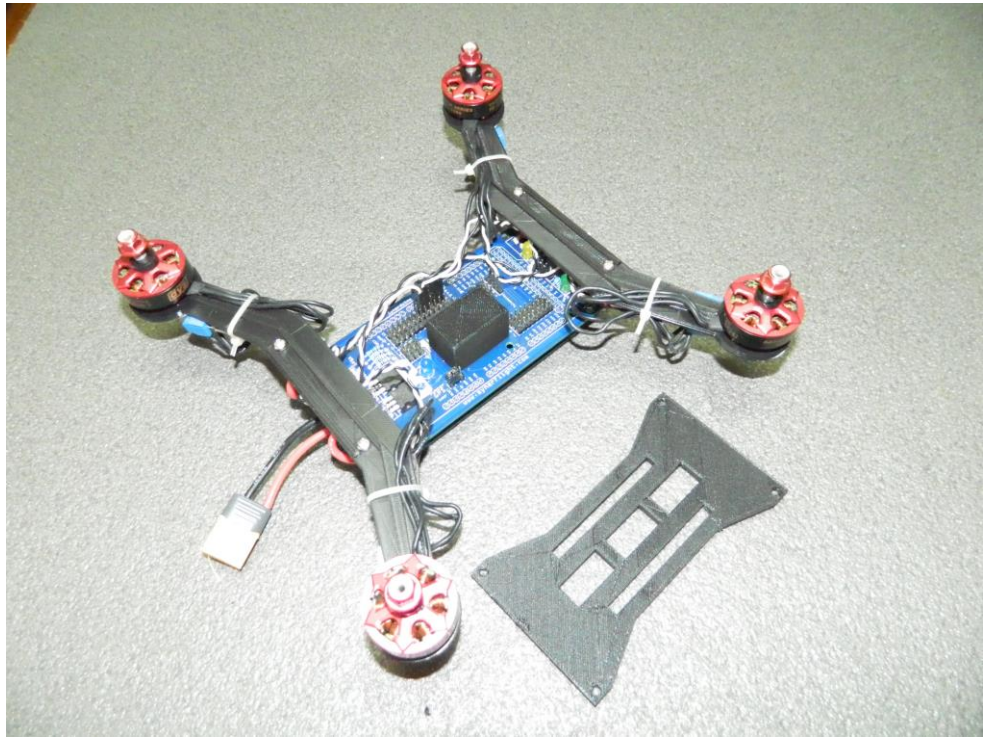


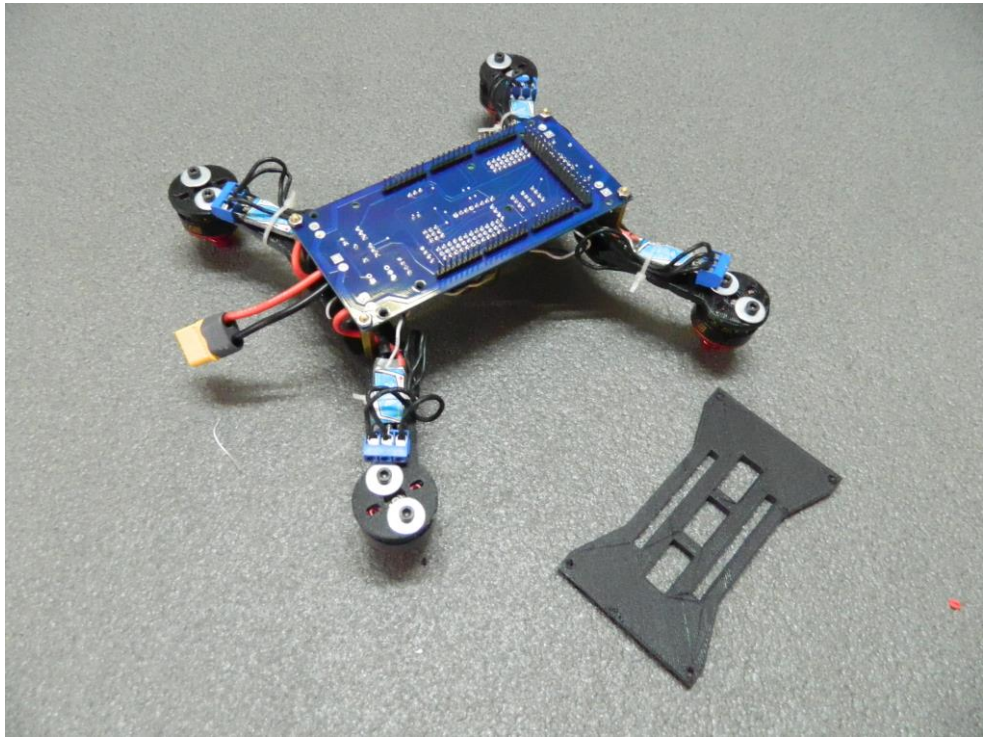


Note : this frame is design to use M3 bolts with thread length of 6mm with washer as fittings included in the set (use the shortest bolt that came with the motor set)

Ensure that the bolt thread does not touch the inner wire coils of the motor

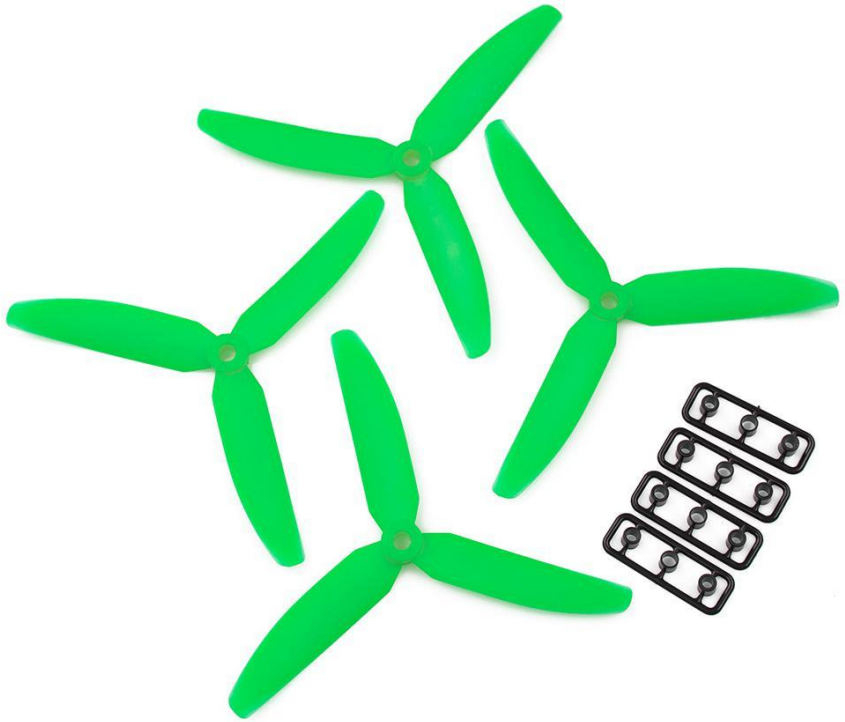
Use small amount of PVA white Glue to Thread Lock the bolt in place Preventing it from going loose





Note:
Use small amount of PVA White Glue to Thread Lock the the M3 bolts in place Preventing it from going loose and parts flying off

Two pair counter rotating Propellers



Note: ensure the props are well balance
With no blade damage if you want to ensure a good Stability in GPS and Altitude hold modes.

Vibration in the frame can cause the sensors to register noise making flights unstable and tuning difficult

Other

- Software
- Configuration
- FlyWii GUI
- MultiWii
- APK Essentials

Configuration

Created On October 19, 2020 Last Updated On October 26, 2020 by Kevin C

You are here: Main > Other > Configuration

< All Topics

Preset Parameters for the Synerduino Mini Kwad frame

Firmware Loader Download

Miniquad Firmware Hex File Download

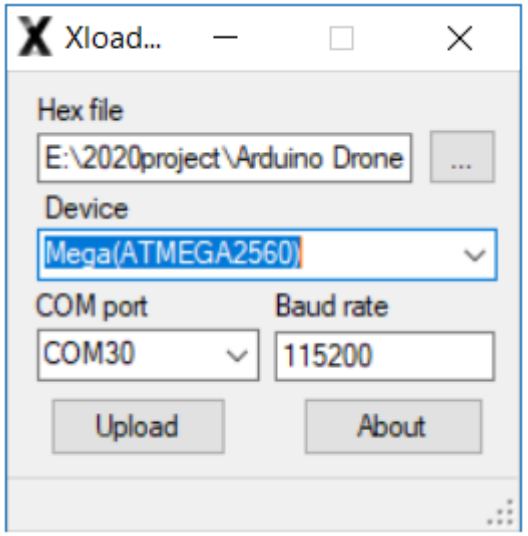
PID Presets Tuning for the Synerduino Mini Kwad Frame load this to the flywiiGUI Load from File

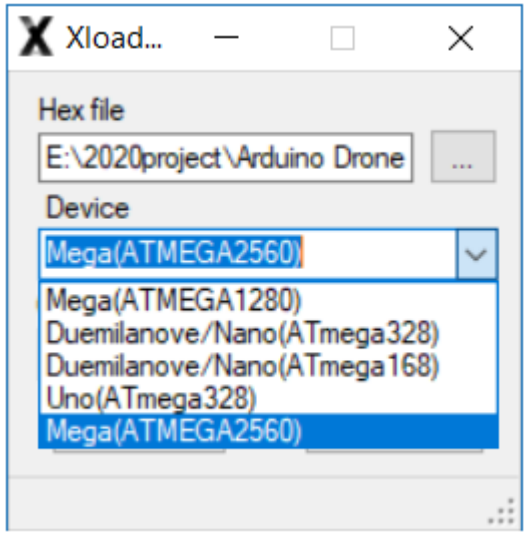
PID and Parameters PID09 Download

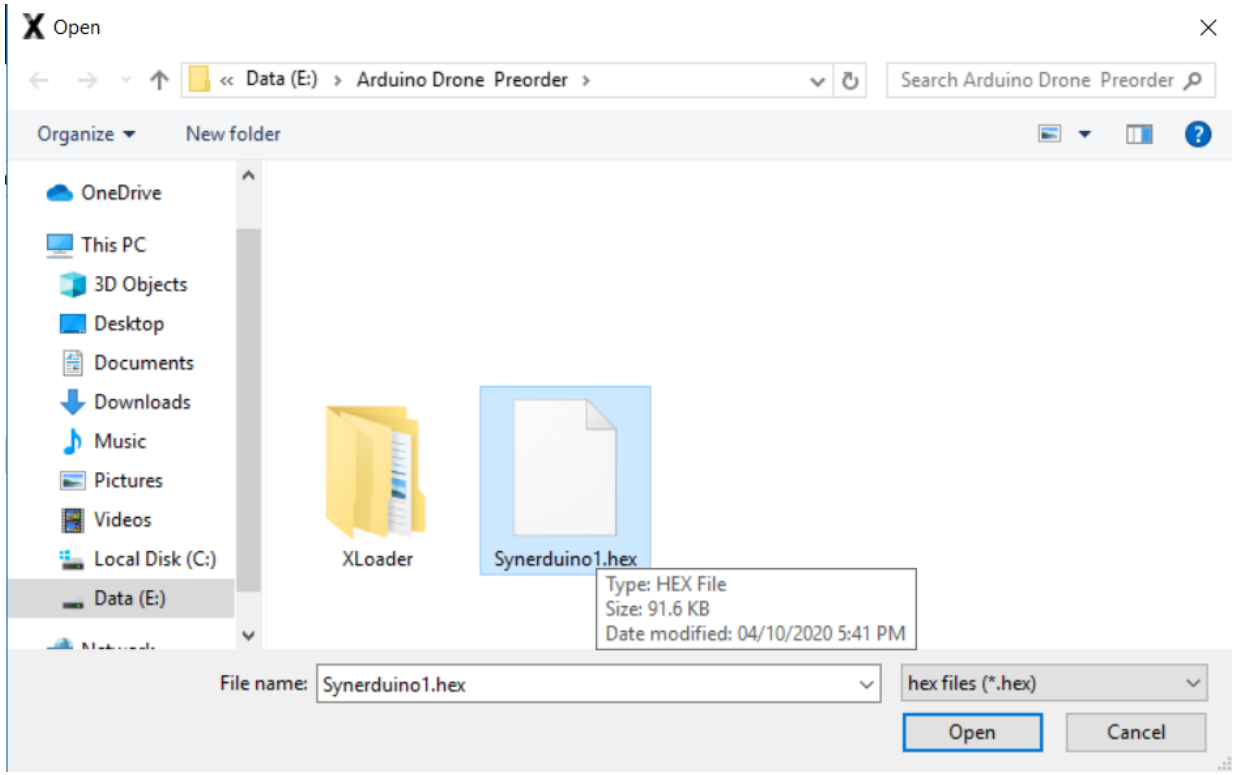
PID and Parameters PID10 Download

Firmware Loader Download

Miniquad Firmware Hex File Download





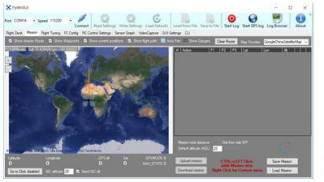


Other

- Software
- Configuration
- FlyWii GUI
- MultiWii
- APK Essentials

The FlyWii GUI is a free updated version of the MultiWii WinGUI. It serves as the ground control station for the MultiWii 2.4 controller software.

FlyWii GUI is currently only supported for Windows 7/8/10



Download

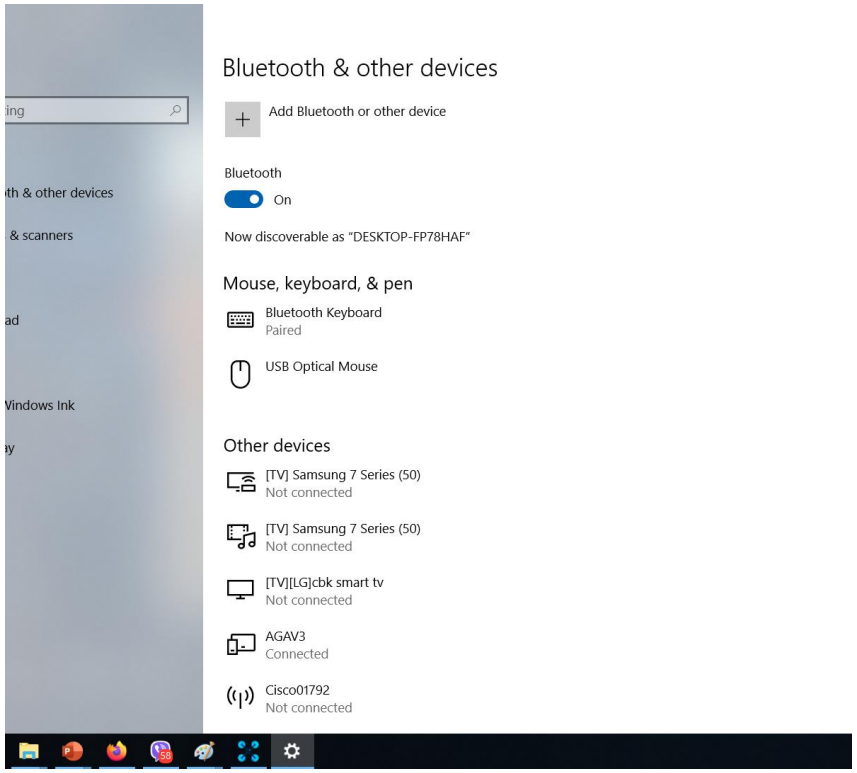
Latest Release

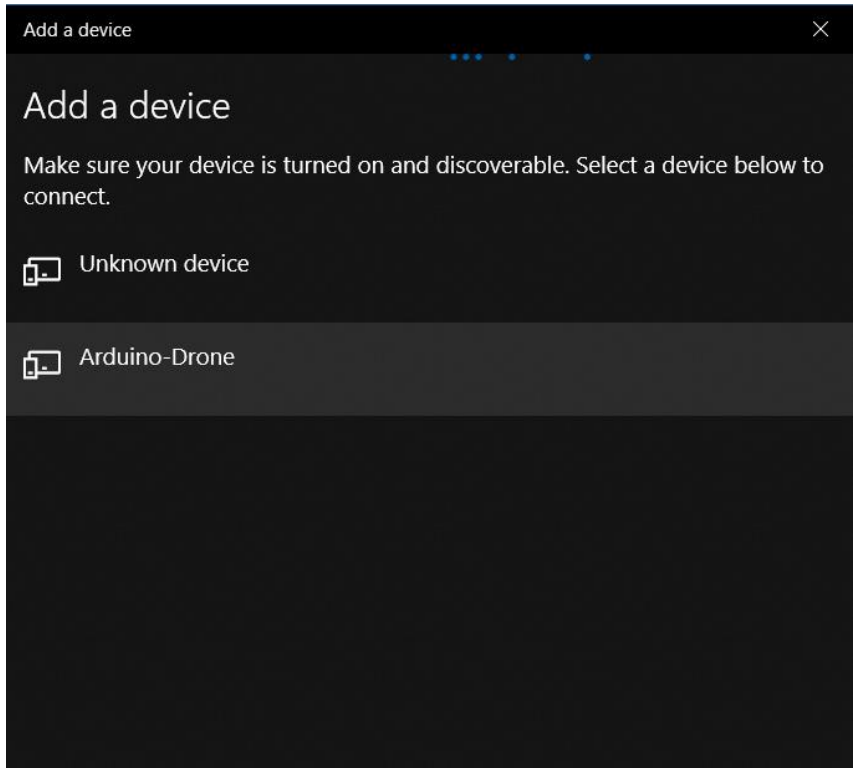
FlyWii GUI v3.1 Download

FlyWii GUI – Lite Download

Previous
Configuration

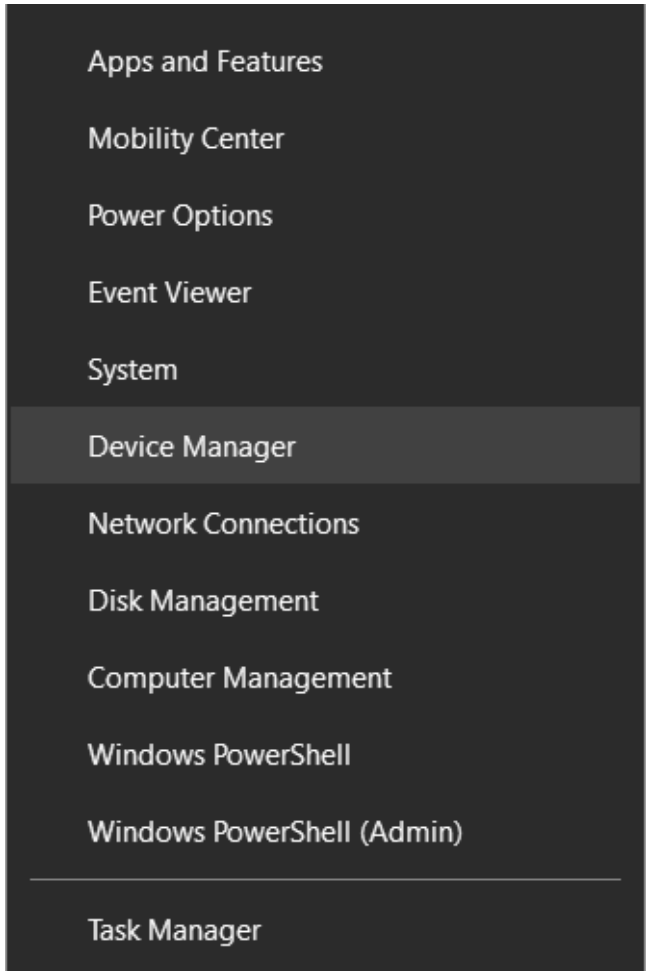
Next
MultiWii

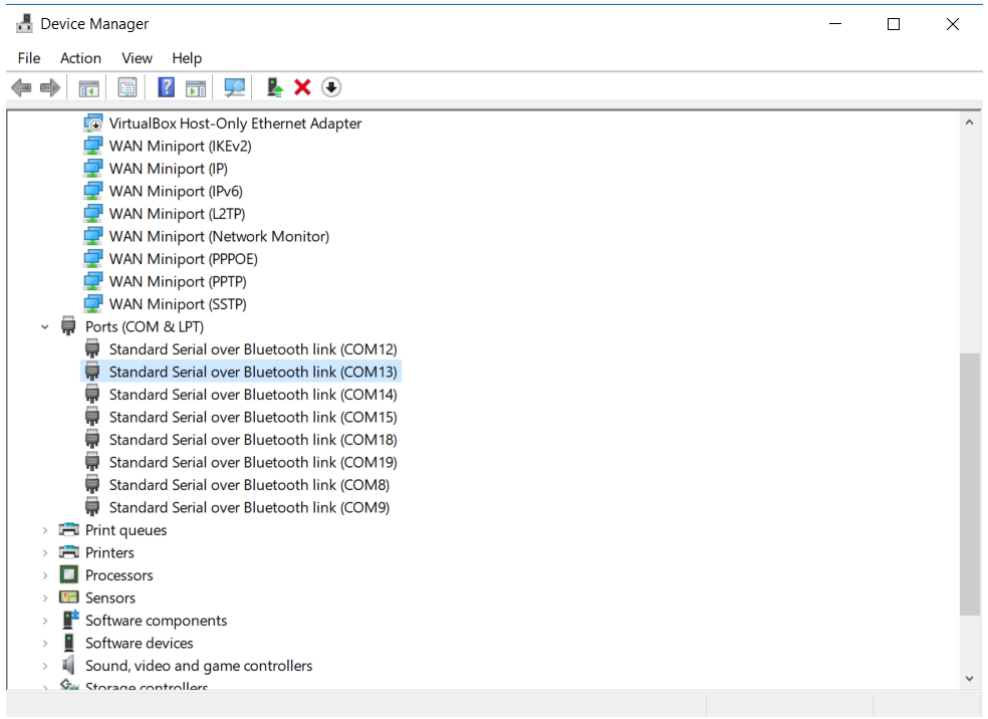




Adding Bluetooth on Windows Device Manager look for Arduino-Drone BT device

Take note on which Serial Com port its added to in Device Manager





in Device Manager Located in COM & LPT

For our Arduino Drone we provide the FlywiiGUI just for this http://synerflight.com/flywiigui/

Calibration Acc – Drone must be on level surface

Write settings after changes made in any of the parameters

Calibration Mag/Compass

Serial Com

Refresh rate

Altitude

Heading

Flight Log

RC PWM

Frame type / Motor PWM

Attitude

GPS

Serial Data

Vertical Speed

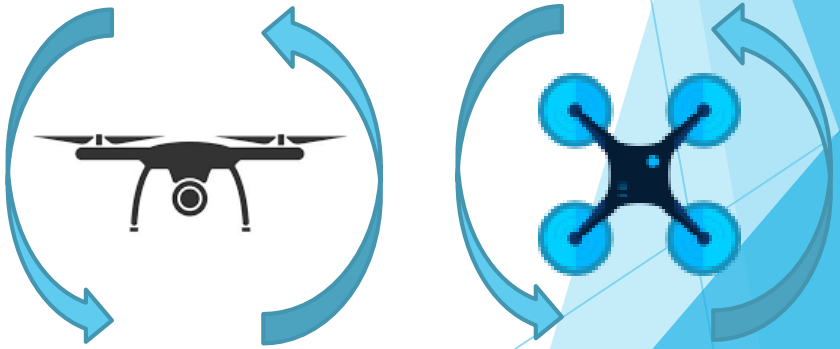
Analog sensor / Battery

Sensor Status

Refresh Rate . Telemetry update speed

Acc Calibration . Set the drone down on a level surface . Away from any metal objects for 30 secs.

Mag Calibration . Move the drone 360 degrees in all axis within 1 min. while the blue Led flashes



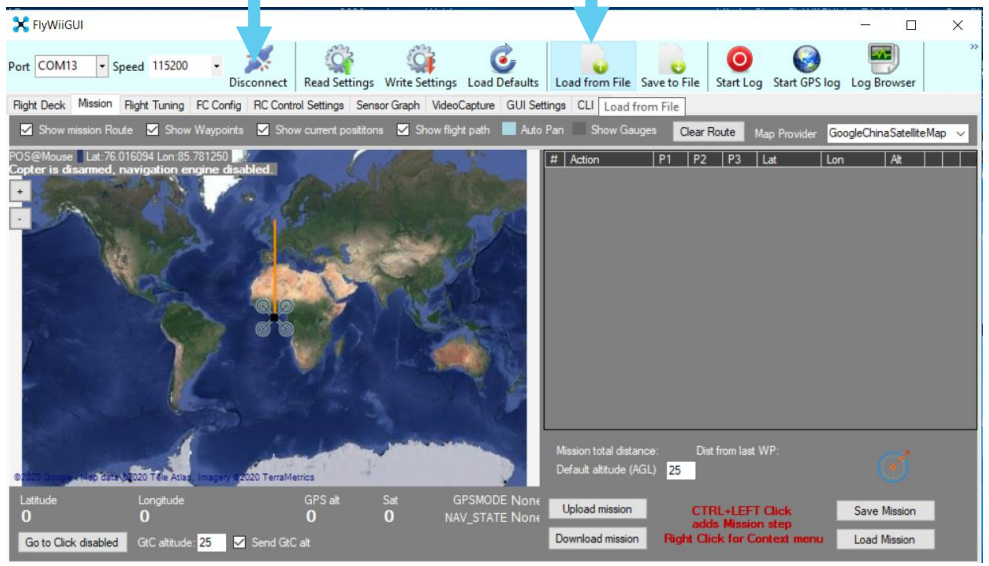
These Calibration must be perform after Parameter updates after Flashing the firmware

Graphs and Data Logging

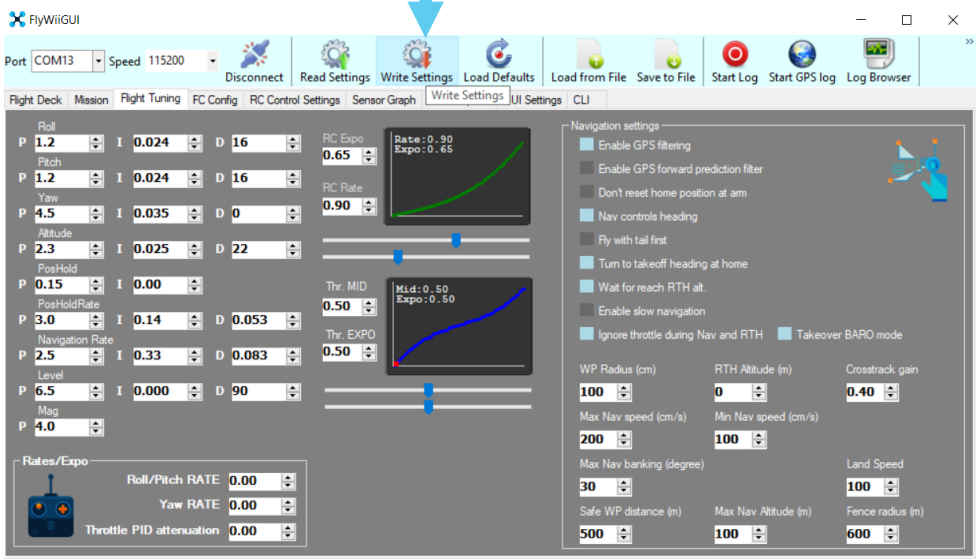
Check the Graphs to ensure each sensors are correctly oriented properly

Connect to the Com Device

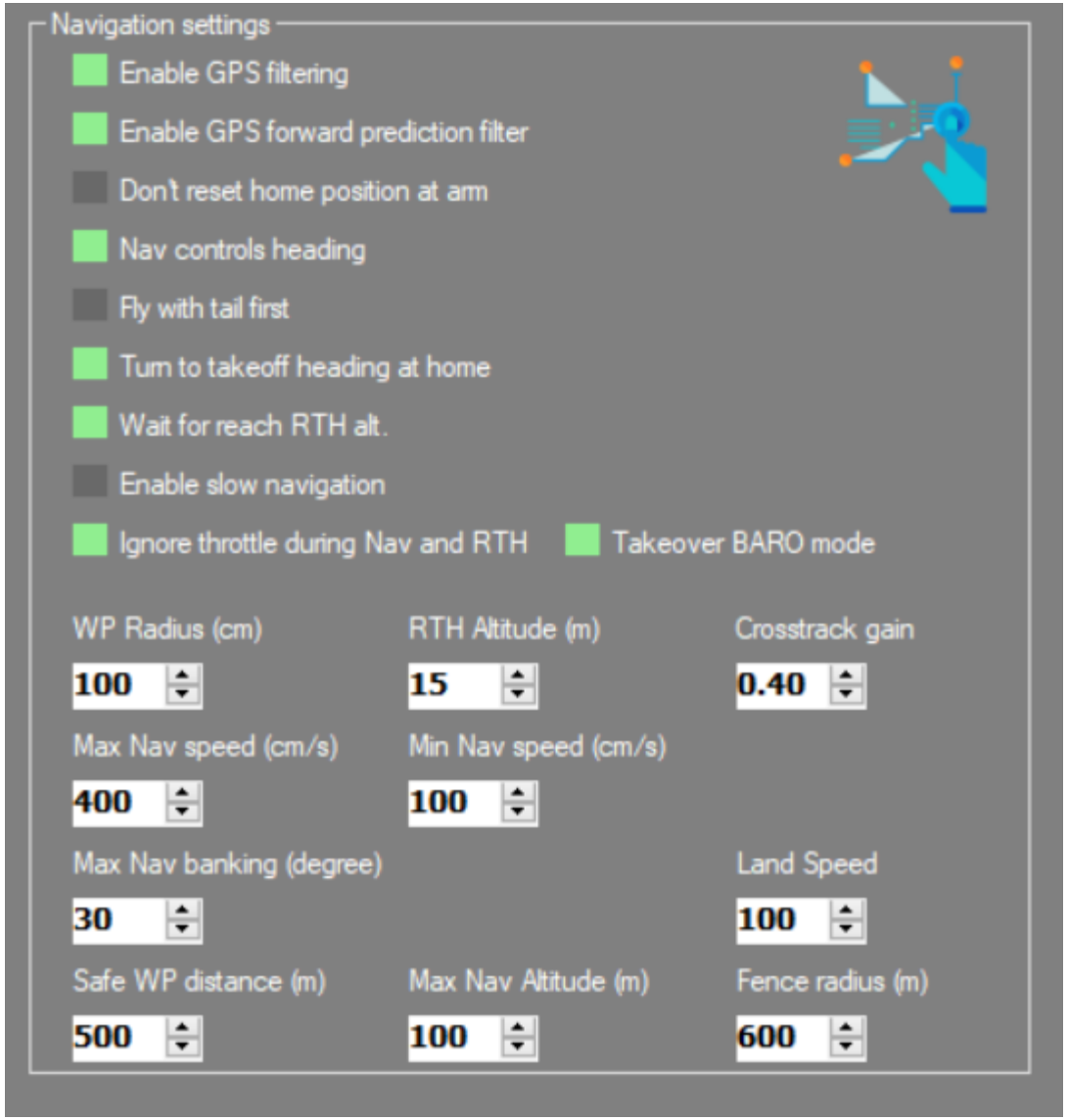
Load the PID file



Write PID Parameter to drone



Other Navigation Functions



WP Radius - the radius of the area the Pos PID with trigger it has reach the waypoint

Max Nav Speed - Maximum speed the drone travel between waypoints (too fast and you likely over shoot your target) ***for first mission flight test Nav speed of 100cm/s with ("Enable Slow Navigation "Active)***

Min Nav Speed - the speed the drone travel when with in the WP Radius

RTH Altitude - Altitude the drone will climb to when its below the altitude in relation to its home point when the RTH is trigger set this to 0 to RTH at current altitude

Max Nav Banking - the max allowable pitch and roll the drone will be set too while traveling between waypoints (tune this along with Max Nav Speed to take account with Environment conditions)

Max Nav Altitude - Max altitude the drone is cap to fly at

Land Speed - speed of descending for Landing cm/s

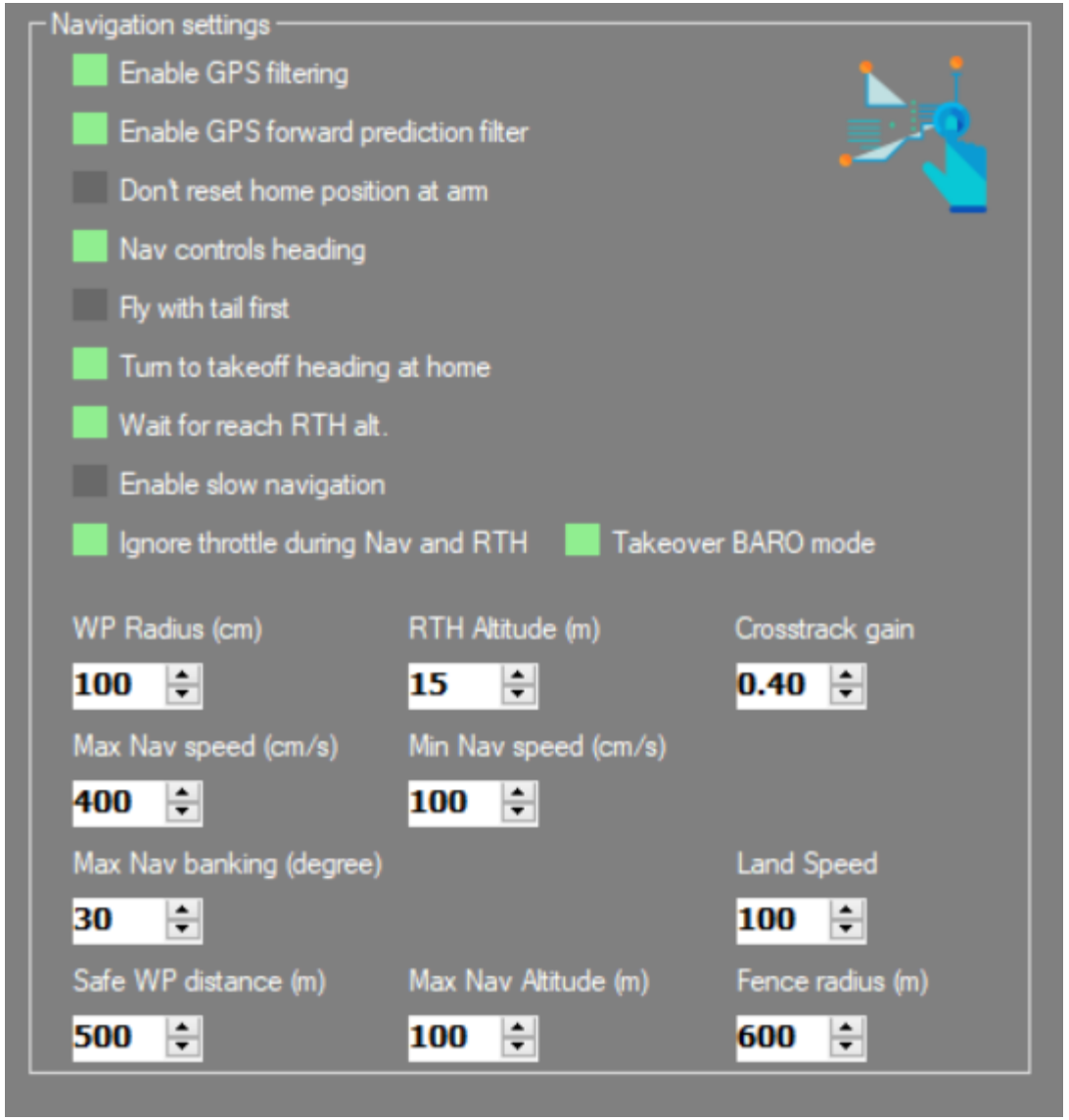
Safe WP Distance - max distance between waypoint before its null out

Fence Radius - Geo Fence to keep the drone with in the perimeter in relation to home position

CrossTrack gain - this tune the GPS and Nav sensitivity

GPS Filtering - use to enhance GPS accuracy

GPS Forward Prediction Filter - predicting the drones location and to compensate for lag . (optional) - not necessary for most application



Don't Reset Home position at Arm - this retains the home position where you first plug power on your drone

Nav Controls Heading – this points the drone to its next waypoint

Fly tail first - makes the drone fly reverse (don't use unless it's a camera pull out shot)

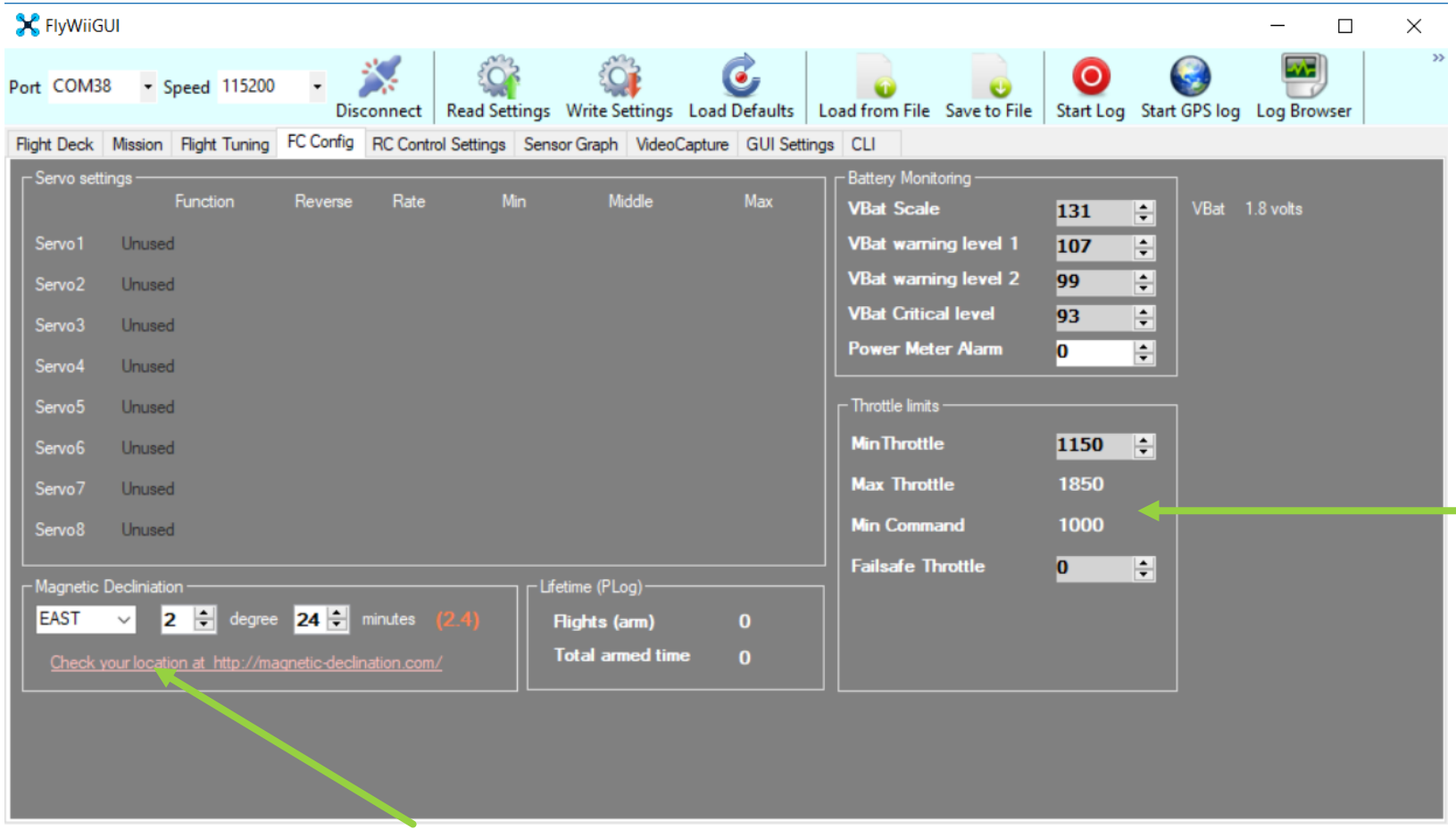
Turn take off heading at Home – when drone arrives at home position it orientates to its heading right after arming

Wait to reach RTH - this works with RTH altitude command which the drone would climb to the said altitude before initiating the flight to home position

Enable slow navigation - this works with keeping the drone to its **Min Nav speed**

Ignore throttle and Take over Baro - as the name suggest disable throttle stick command from the controller when the drone is on mission mode

Other Navigation Functions



MOTOR THROTTLE RANGE PWM TO THE MOTOR

THIS ALSO CONTROLS THE MOTOR IDLE SPEED ON ARM

IMPORTANT TO KNOW THE MAGNETIC DECLINATION OF YOUR REGION

THIS AID ANY AUTONOMOUS FUNCTION THAT REQUIRES COMPASS

- HEADING HOLD
- GPS HOLD
- RTH
- MISSION

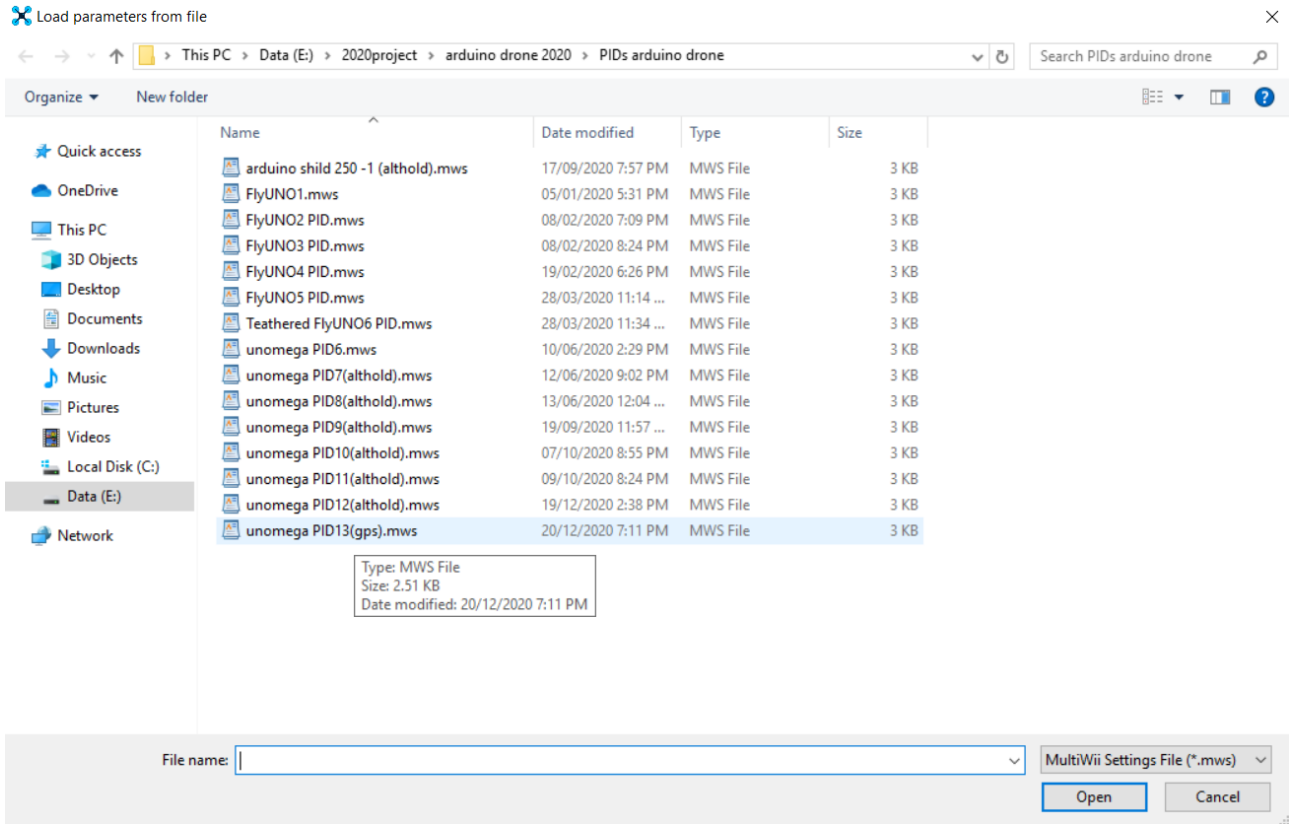
CALIBRATE COMPASS AT THE FLIGHT DECK TAB AFTER SETTING THIS UP

PID Presets Tuning for the Synerduino Mini Kwad Frame

In FlywiiGUI click **(Load from File Icon)** open the **PID.mws** file and Click on **(Write Settings)**

PID and Parameters PID12 Download

PID and Parameters PID10 Download



Download the Preset PIDs from

http://synerflight.com/kwad-documentation/3-software/

Presets for the synerduino Kwad Shield frame

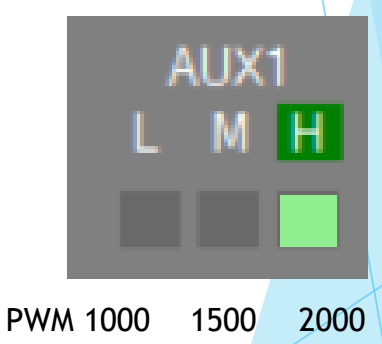
Write settings after changes made in any of the parameters

Aux Switches

Flight modes allows for additional access functions to your drone's capabilities

And can be setup using the Aux switch

ARM
Baro
Altitude
GPS Hold
Mag
GPS Home
Mission
Trigger
Land



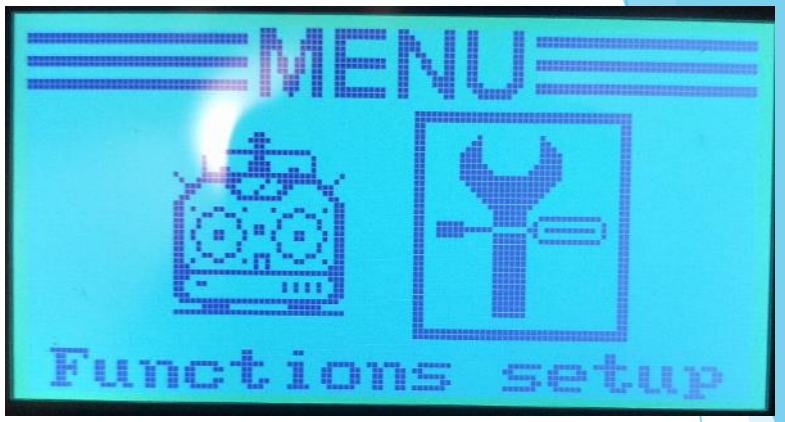
FS or TYG i6 remote example for Assigning Aux switch

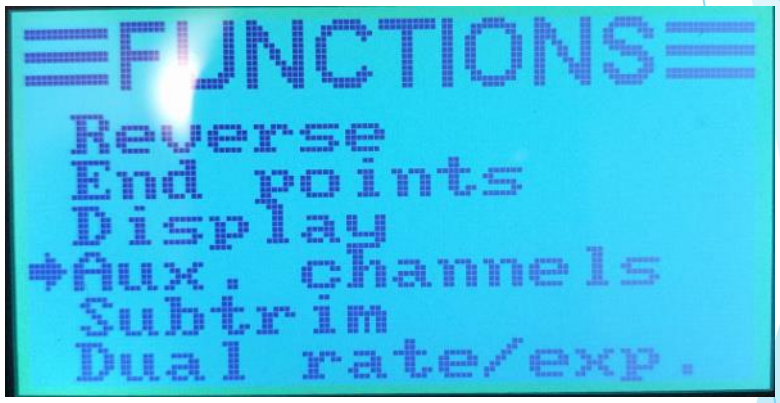
Press OK for 1 sec
Enter Function setup
Choose Aux Channels
Hit ok button
Choose Channel to switch assignment on the remote

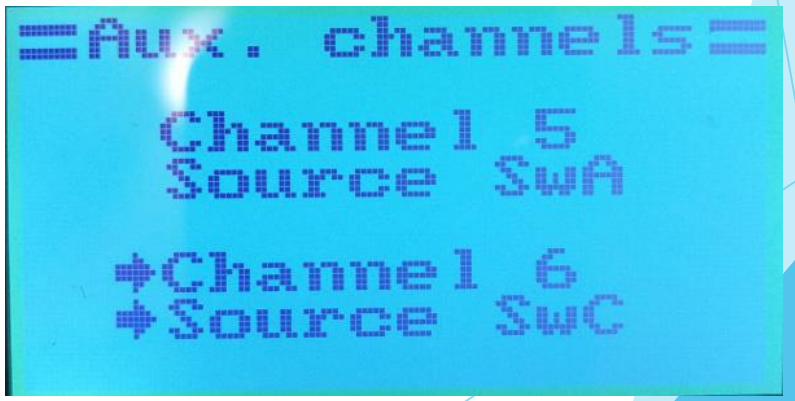
Up/down button to select assignment

Hold Cancel Button for 3sec to set when exiting the Aux Channel menu

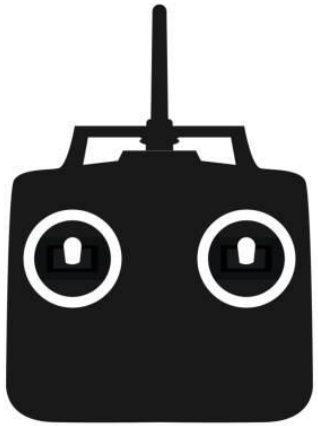
You may enter in again to see if its set properly







Fail Safe



Your Drone should enter this modes when it gets disconnected from the remote for whatever reason

it’s a safety function as important as getting it connected in the first place.

Two Option can be configured

- GPS Home – this sets the drone into return to home mode right to the Launch location only works when GPS is available

- Land - the simplest way is to quit all other flight modes and throttle down . Commonly use in none GPS Drones

This require setup both on Remote and FlyWiiGUI

FS or TYG i6 remote example for Fail safe

Press OK for 1 sec
Enter Systems
Choose RX Setup
Choose Failsafe
Choose Channel to set failsafe to
Move the stick or Aux switch to its fail safe position

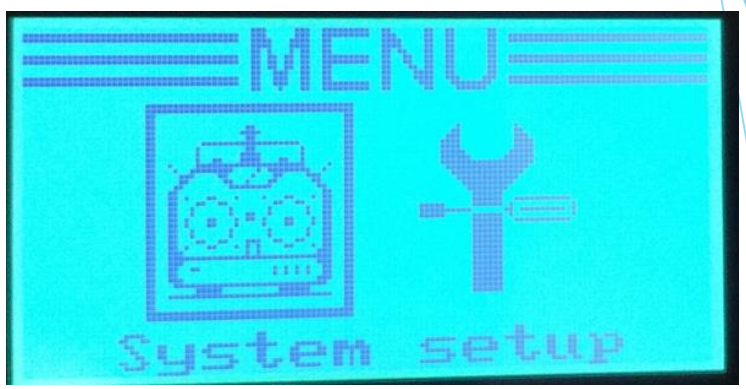
Eg. GPS Home Mode (Ch5 or Ch6 where ever you set that mode in) or throttle down Stick on Ch3
Hit ok button

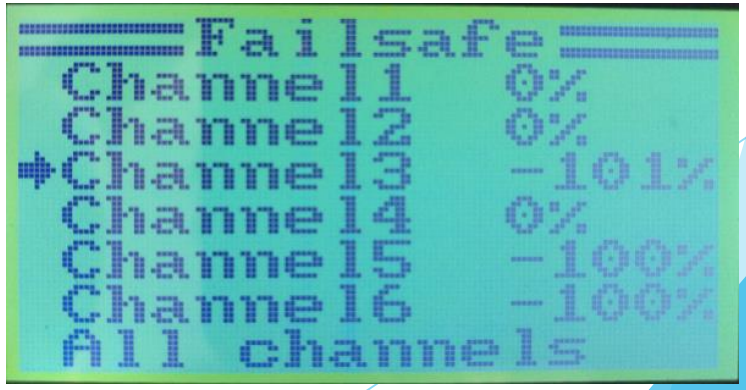
Hold Cancel Button for 3sec to set when exiting the failsafe menu

You may enter in again to see if its set properly

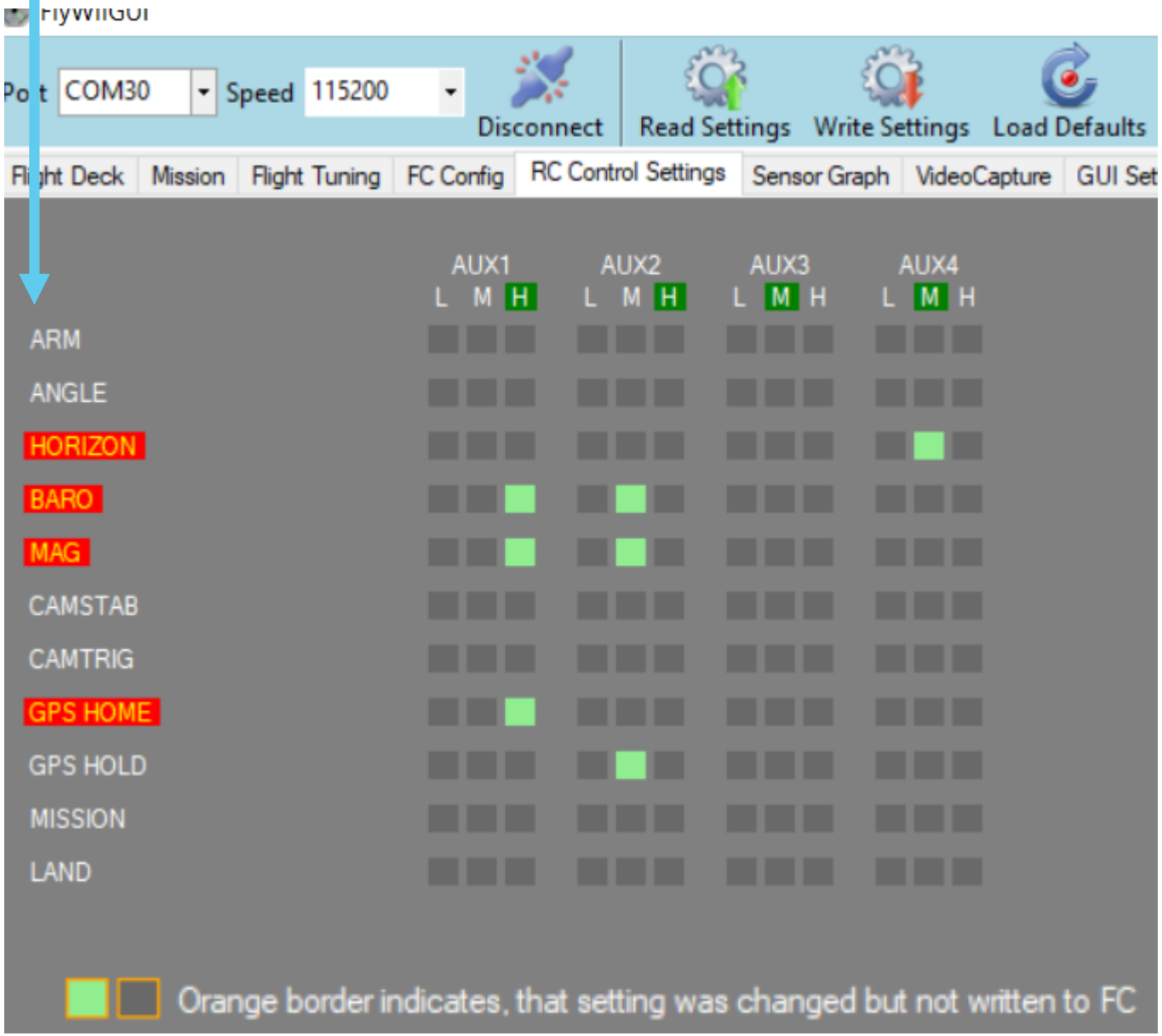
Attention:
The Receiver will enter this mode when radio link is lost from the Transmitter

Switch transmitter off to test this function
Make sure props are remove before doing so

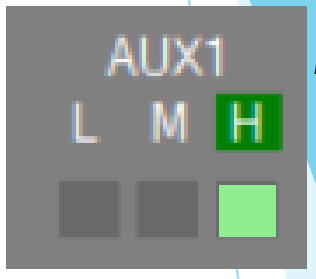




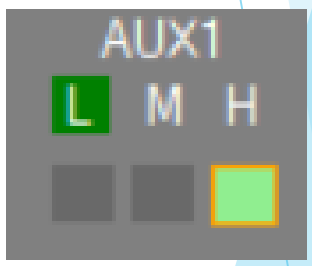
Flight mode Highlighted when Mode is on



Click on the Box to Highlight on position



Mode on



Mode off

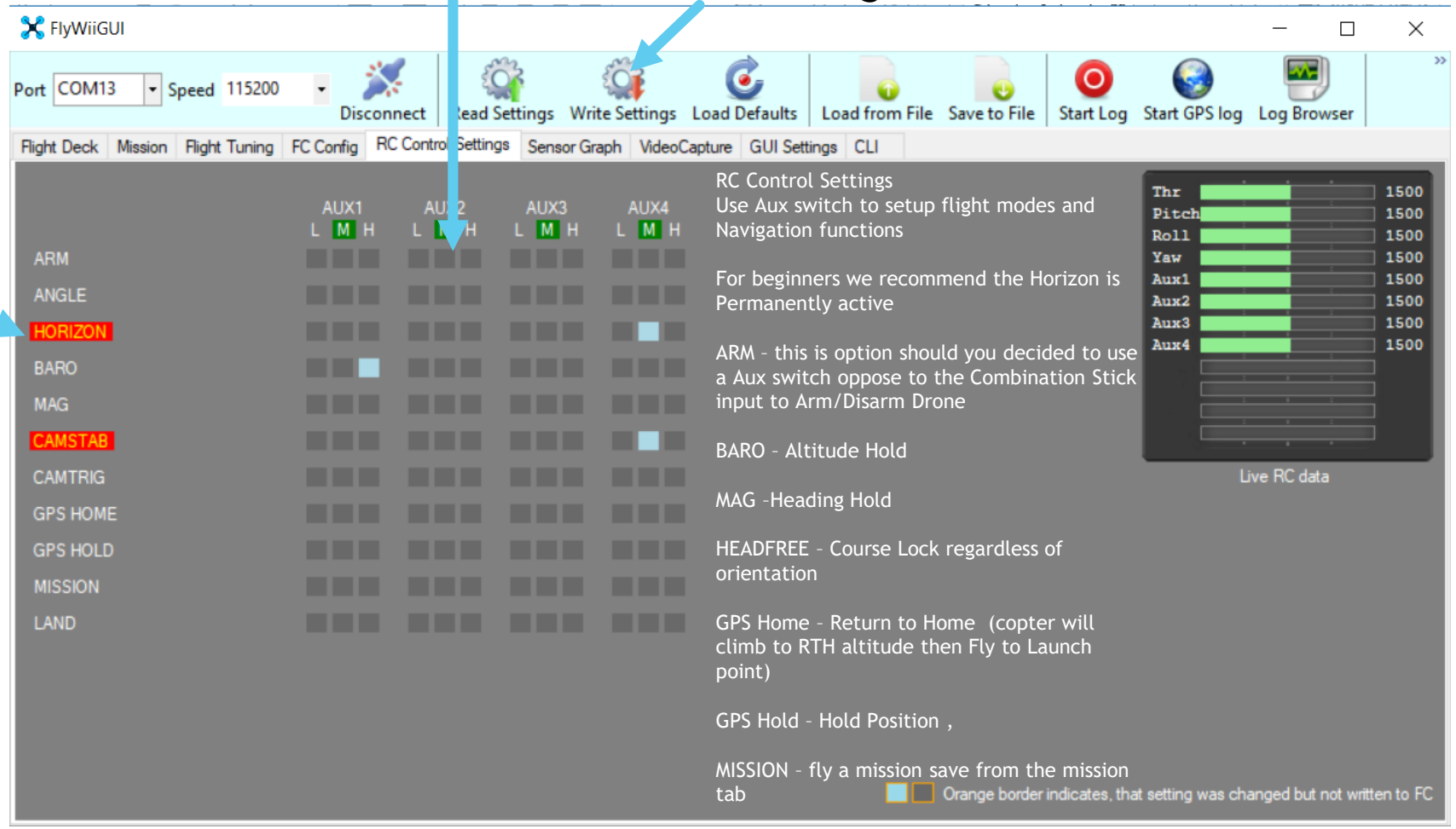
For Beginners

- Horizon mode is permanently active
- Other flight modes Place on switch & must be off when Arming or not in use

Set Flight Modes and Failsafe Modes using the Aux switch on your remote then hit the write setting icon

Write settings Parameter to drone

Flight mode Highlighted when Mode is on



For Beginners set Horizon Mode to permanently active

Missions

Note: Only functional for Mega 2560 Boards with GPS

Waypoint – the drone with travel between those points

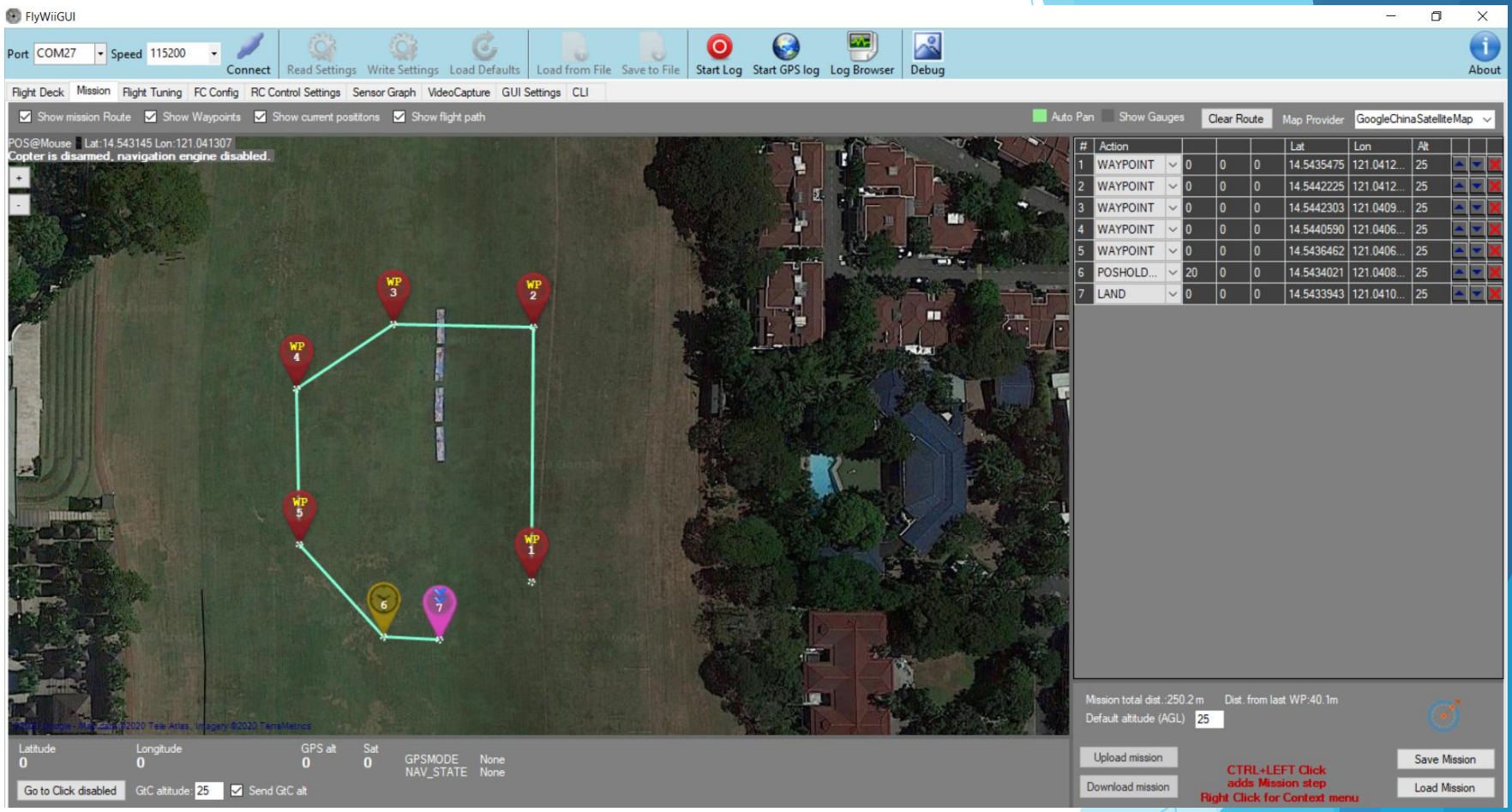
Time PosHold – Drone will wait X number of 00:00:00 then move to the next waypoint

Unlimited PosHold – once the drone reach this point it will hover and wait till you switch out of Mission mode

Land – the drone will land once it has reach this point (Must be place at the end of the mission)

RTH – the Drone will fly back to home position (Must be place at the end of the mission)

Default Alt – Altitude in meters (for first Mission test waypoint with altitude 2m-3m Above Ground Level) And set missions with 2m-3m altitude with Nav speed of 100cm/s .



RC Control Setting Tab – activate Baro , Mag , Mission

To start mission takeoff aircraft in stabilize mode up to 1-2meter altitude then switch the aux switch to mission mode .

Any time you can switch out of it on hold or stabilize mode

Missions

Prerequisite and process for a good mission , Points to test before performing a mission

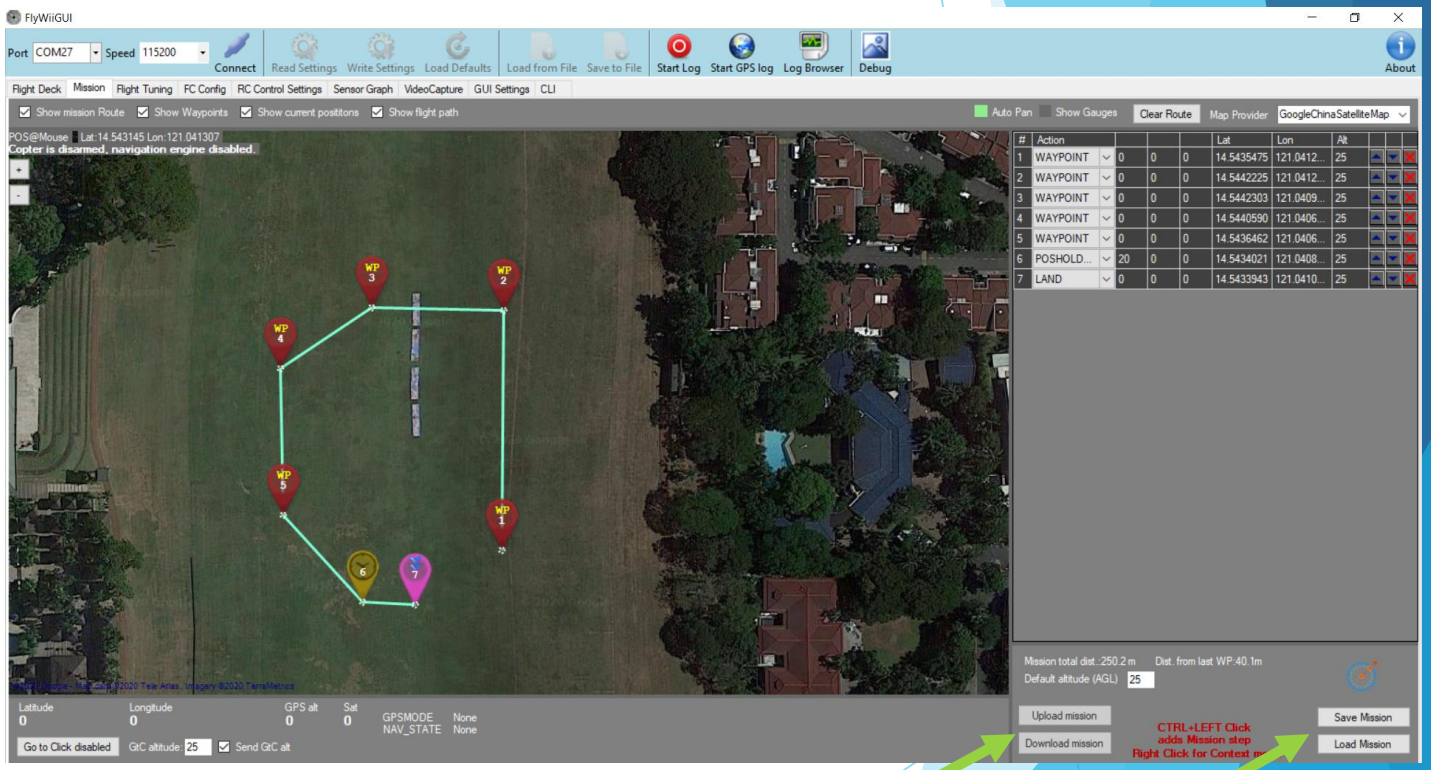
1. Drone is flying stable in horizon and Alt hold mode , holding altitude consistently less than 1m variation over 1 minute period . Tune PID and altitude PID when necessary. (Horizon ,Mag ,Baro)

2. Drone is flying stable and holding position in PosHold mode and Alt Mode not deviating with in a 1 x1 Meter Imaginary box , tune PosHold Rate PID when necessary (Horizon , Mag ,Baro ,GPS Hold)

3. RTH – set RTH Altitude to 0 , Max Nav speed to 100cm/s , set aux switch to RTH ,Baro , Mag and write settings ,Fly the drone 5 Meters away from the Launch site and activate the RTH Aux switch ,see if the drone returns back to home position and holds position when arrive . Tune Navigation Rate PID when necessary. (Horizon , Mag ,Baro ,GPS Home)

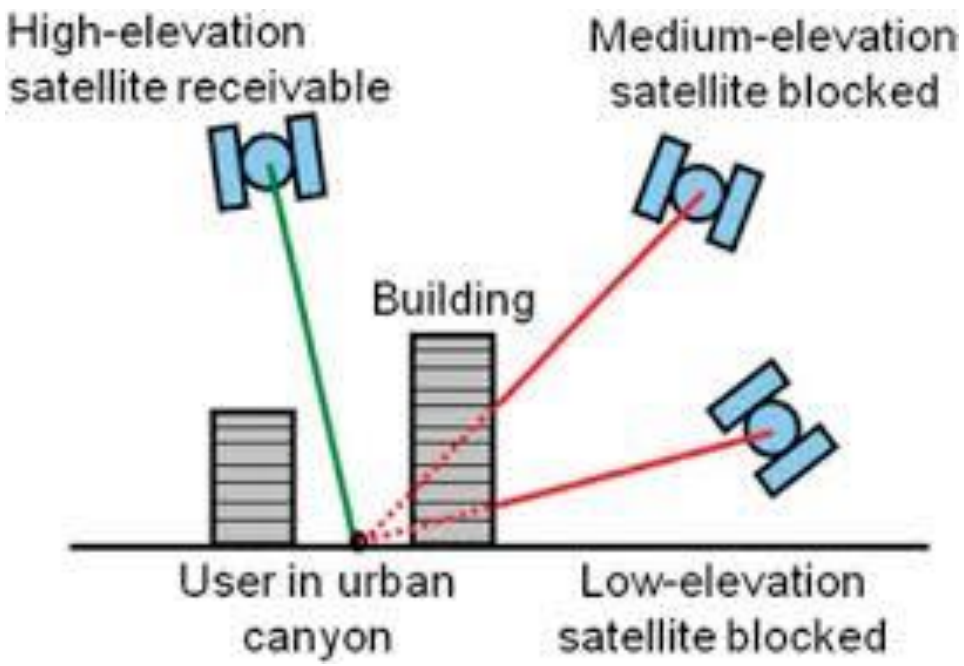
4. Your first Mission . Set Max Nav speed at 100cm/M in flight tuning and set altitude no higher than 3 meters and make a simple Box with a Land here marker . Test in a large area to perform mission stability checks . Revert to POS Rate and Nav Rate PID tuning when necessary (Horizon , Mag ,Baro ,Mission)

5. Ensure that all other Flight modes in Exception of Horizon Can Be switch off on demand while performing these tests.



Mission upload to /download from Drone

Mission Save to /Open from File



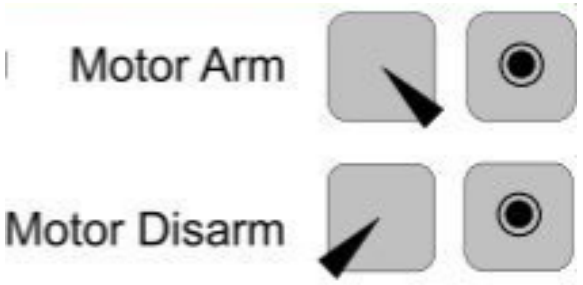
Note : GPS require a clear open area to get a proper fix and accuracy minimum 7 satellites but 10+ are Ideal

Flying next to a building can distort satellite signal deteriorating accuracy

Which in this case its better to not use GPS modes and fly Manual

And your much Done on your setup

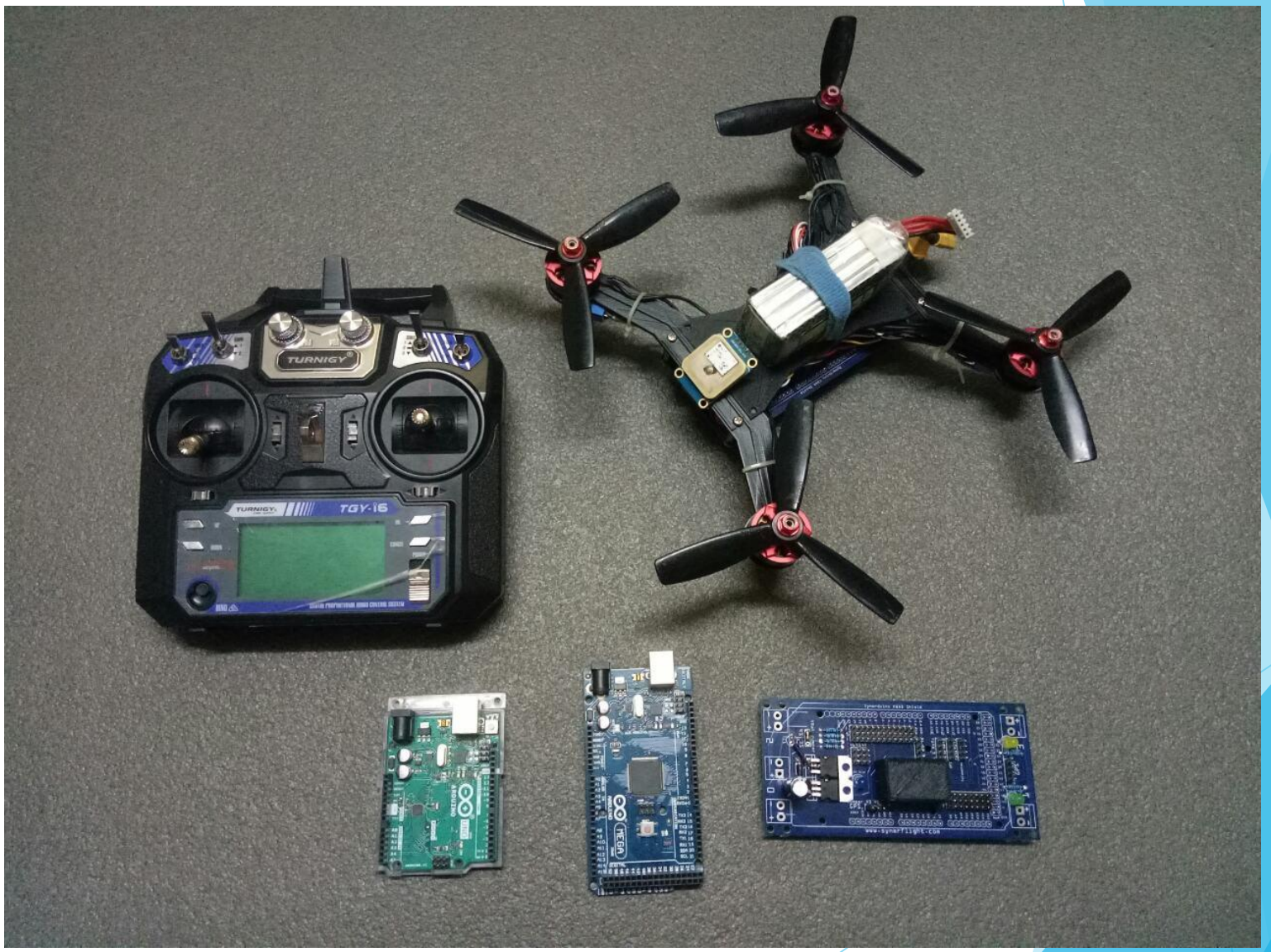
For Mode 2 Hold 2 seconds



Cannot Arm Motors

when on GPS Home , GPS Hold , Mission Flight modes & when USB is plugged in . (pls use Bluetooth telemetry)

Tests motors with Props off

Baro and Mag preferably switch off when Arming

Pls calibrate ACC and Mag in the Dashboard