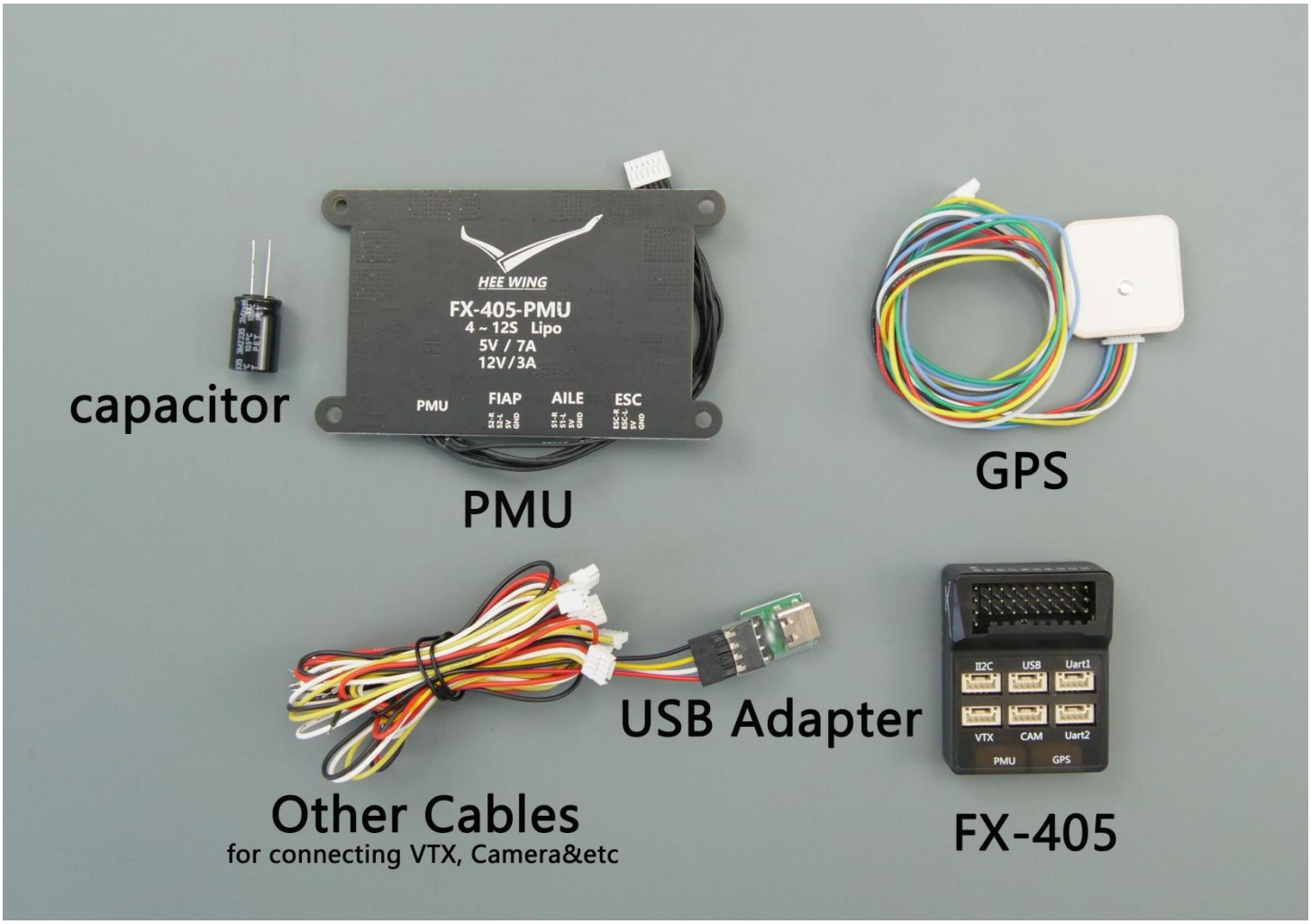
T2 FX-405 Stabilizer Instruction Manual

Heewing FX-405 Stabilizer is a F405 based Stabilizer that is small but powerful and capable of VTOL flying configuration.

Specification,

- STM32F405 Microcontroller
- ICM42688 IMU
- SLP06 barometer
- Dataflash (V2 board only)
- MAX7456 OSD
- 4 UARTs
- 9 PWM outputs
- Stabilizer Input Voltage : 5V
- PMU Input Voltage : 14.8V to44.4V
- PMU Rated Current: 0~100A
- Stabilizer Dimension : 44.3mm (L) x 34.4mm (W) x 13.7mm (H)
- Stabilizer Weight : 14.2gram (without PMU & wires)



1. Connecting Receiver
i. connect your preferred receiver to the RC-In Port on the Stabilizer

ii. Supported Receiver Types

a. SBUS, IBUS, PPM Receiver

- please set the parameter to the values below, “write params” to the Stabilizer then reboot.
BRD_ALT_Config = 0
SERIAL6_PROTOCOL = -1

b. ELRS & CRSF Receiver
- factory parameter is already pre-configured for this type of receiver and the Stabilizer will auto recognise the type of signal.
BRD_ALT_Config = 1
SERIAL6_PROTOCOL = 23

For SBUS Receiver



For ELRS/CRSF Receiver



2. Setting Failsafe
i. it is important to set your receiver failsafe setting accordingly. Please refer to your receiver manual and verify that the intended failsafe setting is correct before flight ie Stabilizer going into RTL mode when the radio is off/signal lost.
*have propeller removed when testing this

ii. in the case of VTOL enabled Stabilizer, the plane will go into fixed wing mode and transition into VTOL mode during landing at the home position.

3. Starting the Motors

i. the Stabilizer is set to disarmed the motors during every reboot. Please hold full rudder Right for about 4 seconds to disarm/unlock the motors.

ii. as ARMING_CHECK=0 is set to zero, there are no arming conditions checked by the Stabilizer before the motors are disarmed so please ensure that you have GPS Home locked and sensors are all ready.

To disarm or stop the motors spinning
i. hold full rudder left for about 4 seconds

Note :
- motors will go into idle mode/spinning slowly when it's disarmed so please takeoff the propellers when testing this for the first time.

4. Serial Interface
i. Serial interface 1 : default Mavlink 1
ii. Serial interface 2 : default Mavlink 2

5. IIC
Default : ASP5033

6. Setting Up for Digital FPV

i. For new Avatar / SharkByte / DJI O3/ O4 (MSP Display Port)

Method 1 - using UART1 or UART2
a. Set the below parameters,
- OSD_TYPE = 3
- SERIAL2_PROTOCOL = 33 (or SERIAL1_PROTOCOL = 33)
- MSP_OPTIONS = 0 (or you may use 4 or 5 if there's font incompatibility)

b. connect your Air Unit RX & TX to the TX & RX on the UART1 or UART2
c. power your Air Unit from the 9V from the VTX or CAM port on the Stabilizer

To enable Auto Recording after arming the motors
Go to your DJI Goggle Settings > Recording Settings > Takeoff REC, set to ON

ii. If the above parameter does not work with your Walksnail or DJI O3/O4, please visit the link and try the parameters.
https://www.heewing.com/pages/connecting-digital-fpv-to-fx-405-Stabilizer

7. MSP OSD Protocol
for the old DJI Google V1 & V2

i. Use UART1 or UART2
Set the below parameters,
- OSD_TYPE = 3
- SERIAL2_PROTOCOL = 33 (or SERIAL1...)
- MSP_OPTIONS = 0

ii. Have RX & TX connected to either UART1 or UART2 and power it from the 9V of VTX or CAM port on the Stabilizer

iii. DJI OSD must be enabled on your goggles. Go to Settings > Display > Custom OSD

Optional : You may set OSD_TYPE to 1 to output both analog OSD and MSP OSD.

8. First Flight Preparation

Step 1 - Create new model in your Radio, set up a 3 position switch on your channel 6 for flight modes

Step 2 : Connect your Stabilizer to Mission Planner, perform Accelerometer Calibration and Radio Calibration

Step 3 : Before your first flight, ensure there is GPS HOME lock and control surfaces are moving at the correct directions

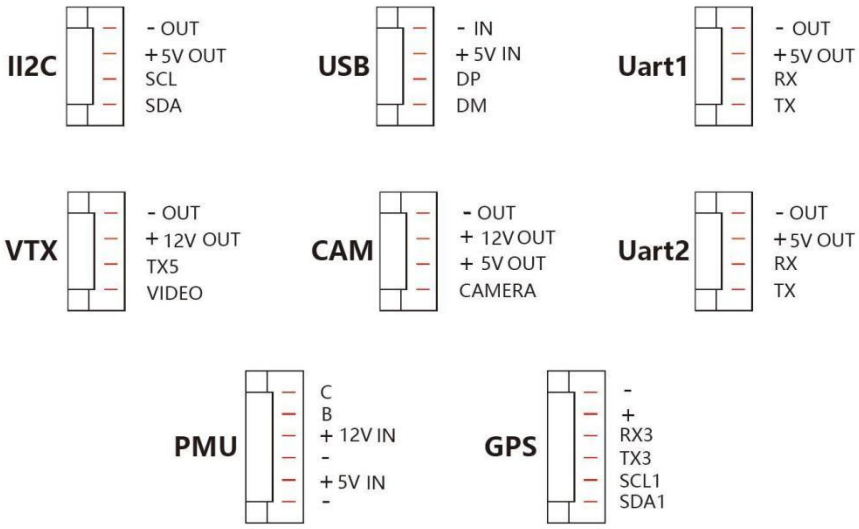
Step 4 : Switch flight mode to QLoiter, full Right Rudder for about 4 seconds to Arm the motors, the motors will start to spin slowly, increase the throttle gradually to take off

Step 5 : Push your sticks to confirm Pitch, Roll and Rudder are reacting to the correct direction

Step 6 : Now you may raise your altitude and switch to FBWA mode for forward flying

9. Stabilizer Pin-out





II2C : Blank
VTX : Analog VTX

USB : to PC
CAM : to Analog Camera

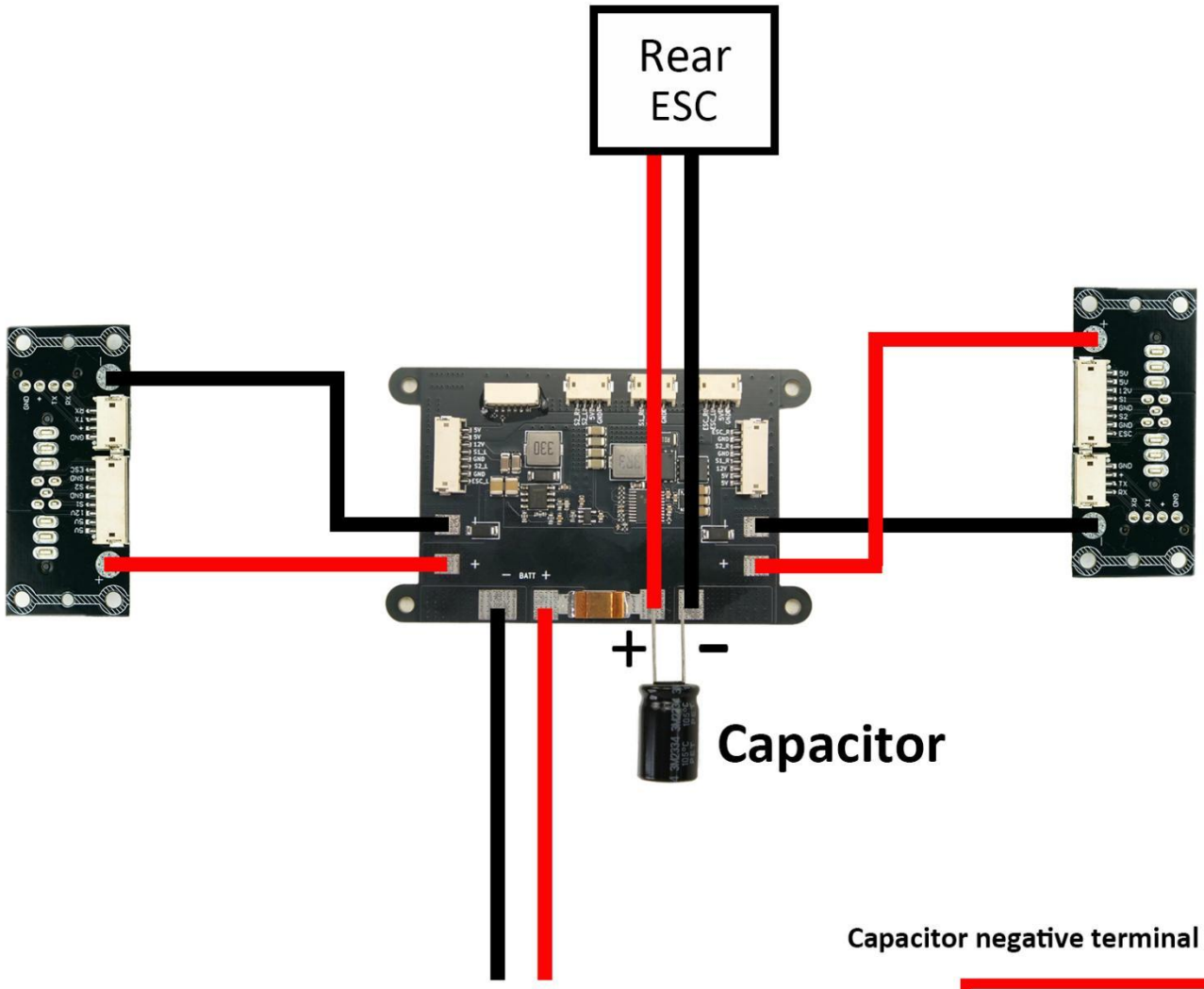
UART 1 : Digital VTX
UART 2 : Digital VTX



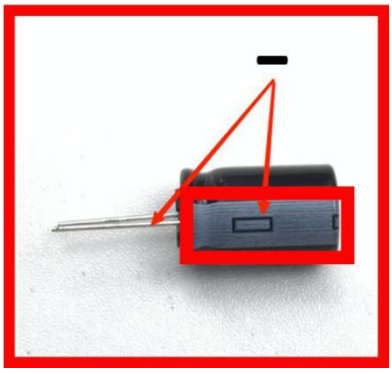
S1 Aileron (Y cable)
S2 Elevator servo
S3 Blank
S4 Rudder servo
S5 Left tilt servo
S6 Right tilt servo
S7 Left motor
S8 Right motor
S9 Rear motor
RC-IN Recevier

*Above connection is for T2 Cruza. You may change it based on your own configuration on other planes

10. PMU Connection

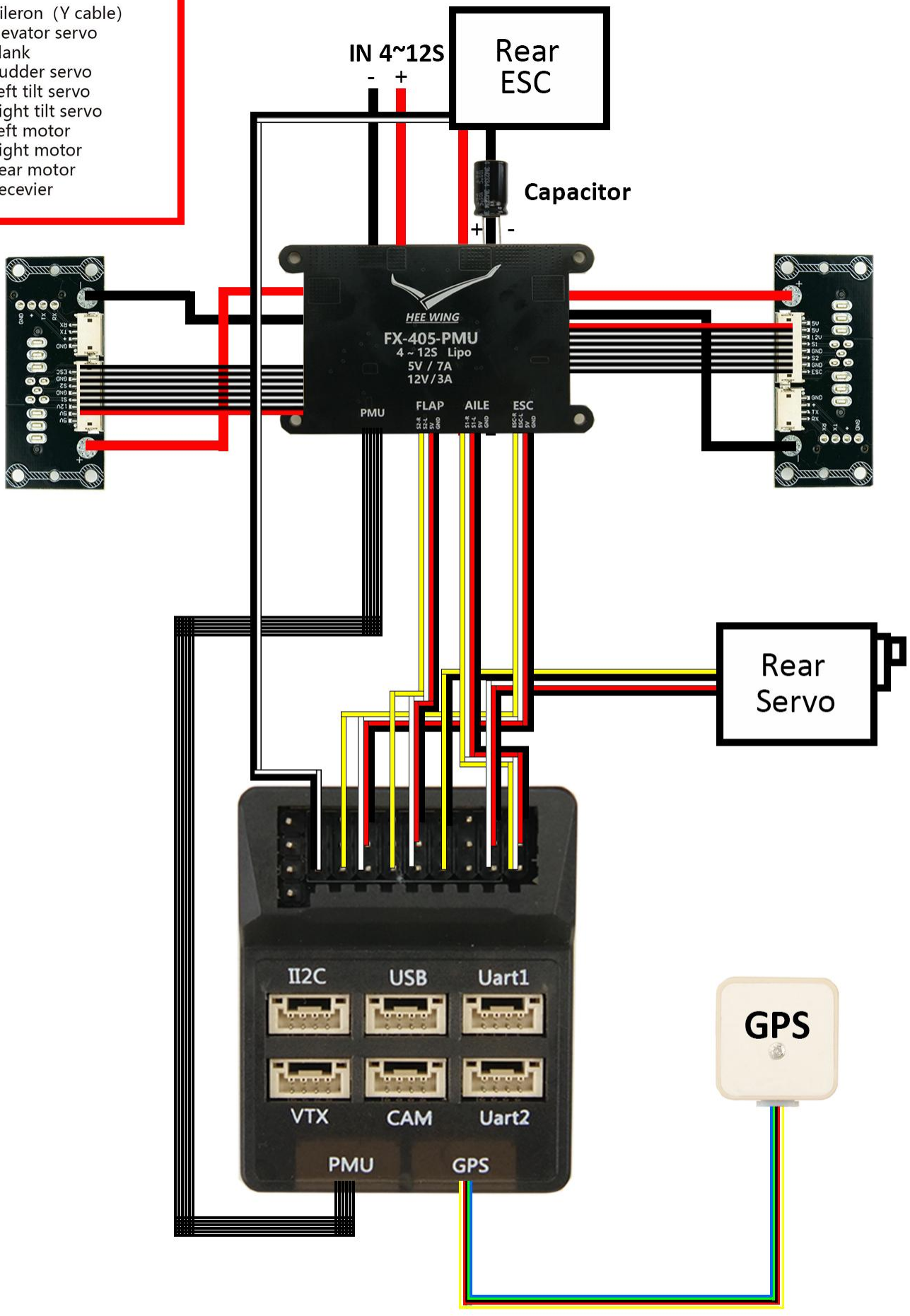


Capacitor negative terminal diagram



11. Master Wiring

S1	Aileron（Y cable)
S2	Elevator servo
S3	Blank
S4	Rudder servo
S5	Left tilt servo
S6	Right tilt servo
S7	Left motor
S8	Right motor
S9	Rear motor
RC-IN	Recevier



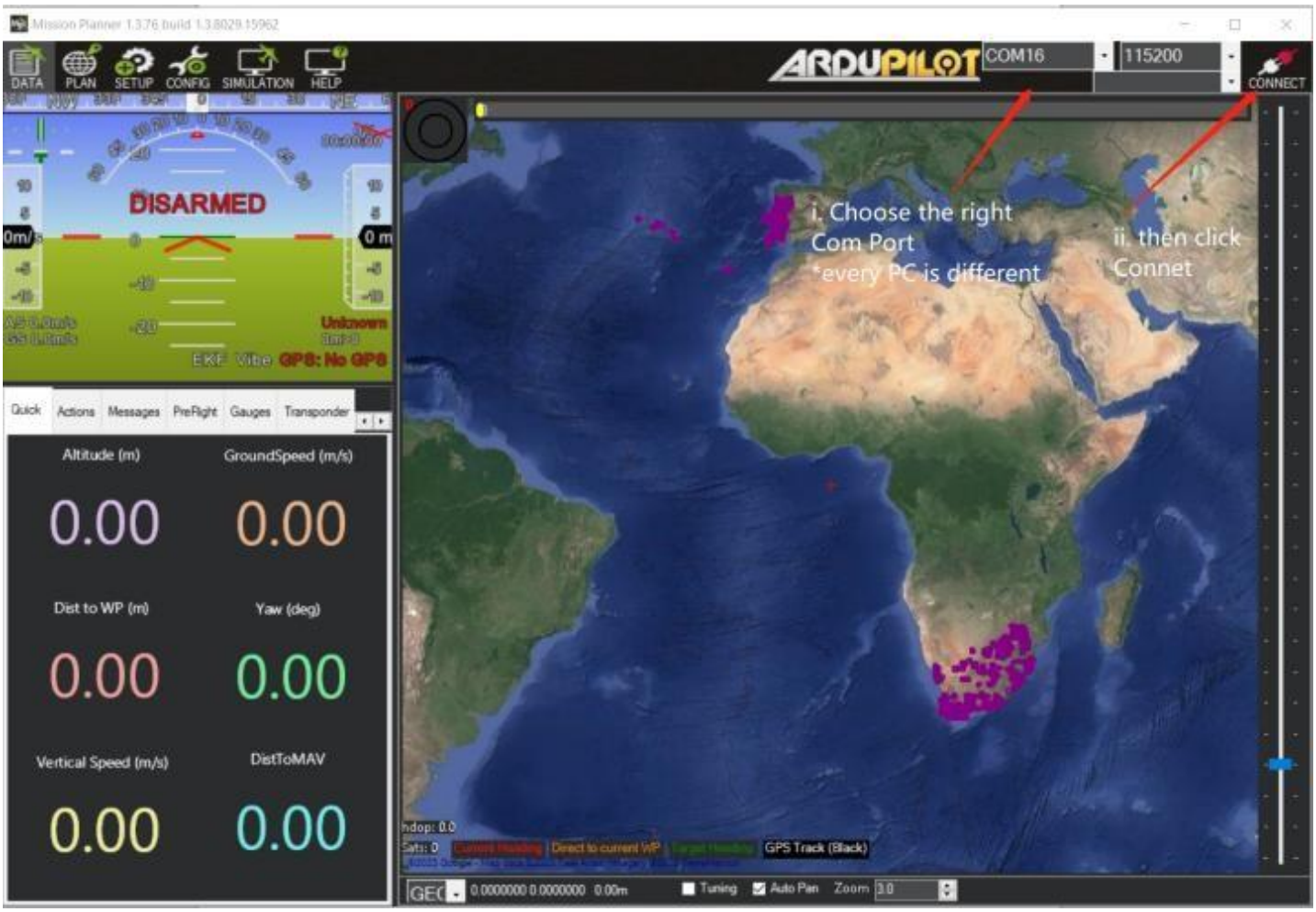
Mission Planner Configuration

i. Visit www.heewing.com for the latest instruction manual and build video.

ii. Download the latest Mission Planner from the link below.
https://ardupilot.org/planner/docs/mission-planner-installation.html

iii. Open Mission Planner after it has been installed. Connect your Stabilizer to your PC via the USB adapter provided and your own USB C cable.

Choose the correct Com Port from the drop down menu on the top left and click "Connect".



iv. If you are using ELRS or CRSF, your receiver signal is automatically recognised by the Stabilizer. No action is needed in this step.

If you are using SBUS, IBUS or PPM, go to CONFIG > Full Parameter List > please configure the following parameters,
BRDALT_Config = change the value to 0
SERIAL6_PROTOCOL = change the value -1



Then reboot your Stabilizer.

*the receiver is not powered via USB, you need to connect your flight battery

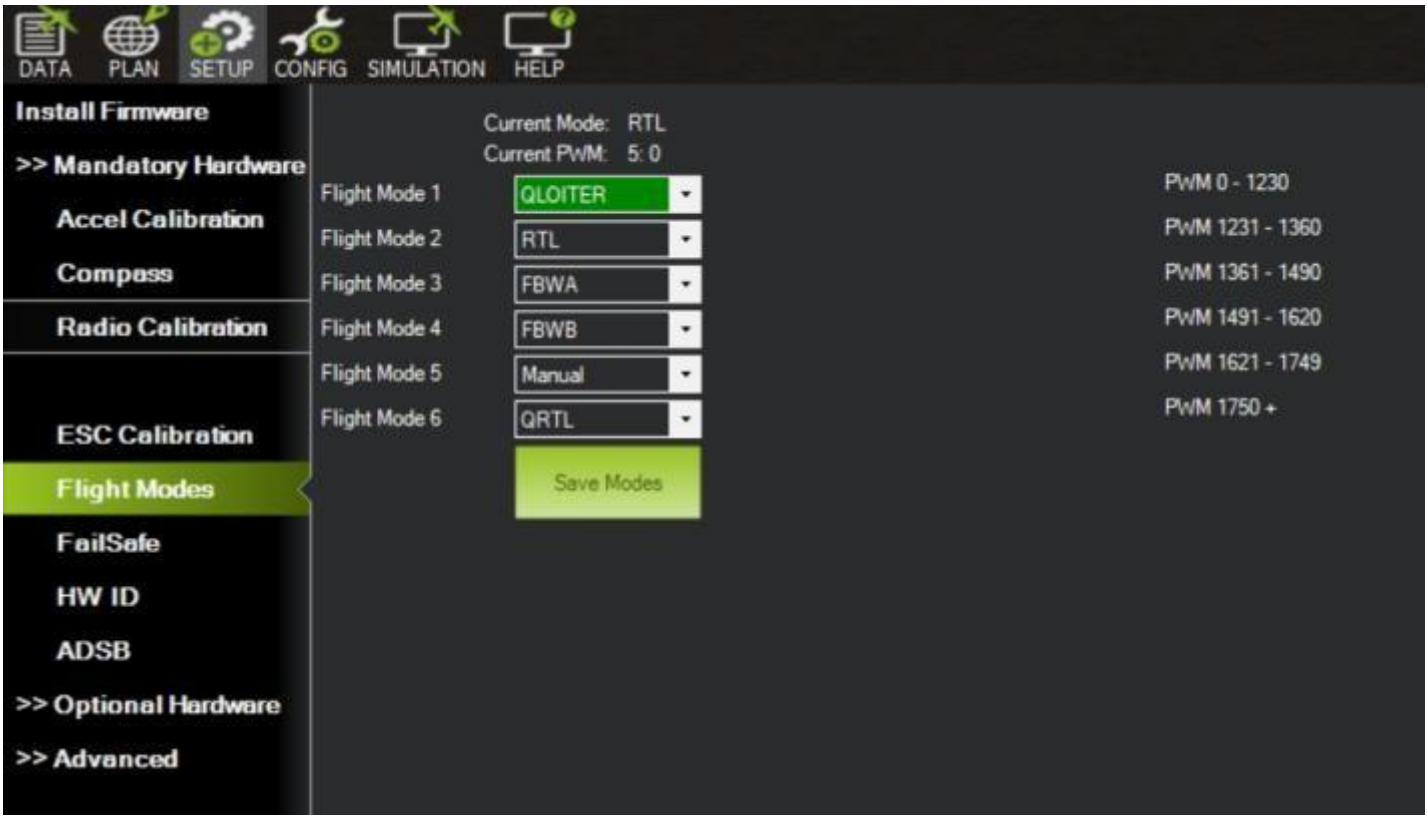
v. On your preferred Radio, set a 3 position switch to Channel 6.

vi. Go to Setup > Mandatory Hardware > Radio Calibration > Click Calibrate Radio and follow the step by step instructions shown on the screen



vii. Then go to Flight Modes

Toggle your 3 position switch we have set earlier. You should see the flight modes in the screenshot below changes between QLOITER(FM1), FBWA(FM4) & QRTL(FM6)



vii. With the propellers off the motors, you may now power up your VTOL plane and perform the preflight checks such as your control surface direction, VTOL controls, flight modes and etc.

WARNING

Although extensive testing and tuning has been done, the provided VTOL parameters are for your reference only. Heewing RC does not take responsibility for any issue arised from this. If you know what you are doing, you may adjust it accordingly to your flying enviroment or requirement.

Respect the rules of your local flying site or flying club. Choose an appropriate flying site, vast open space and far away from people and property.

Ensure that everything has been setup correctly before flying. There are many things that is out of our control and you do not hold Heewing RC for any liabilities when using our products.