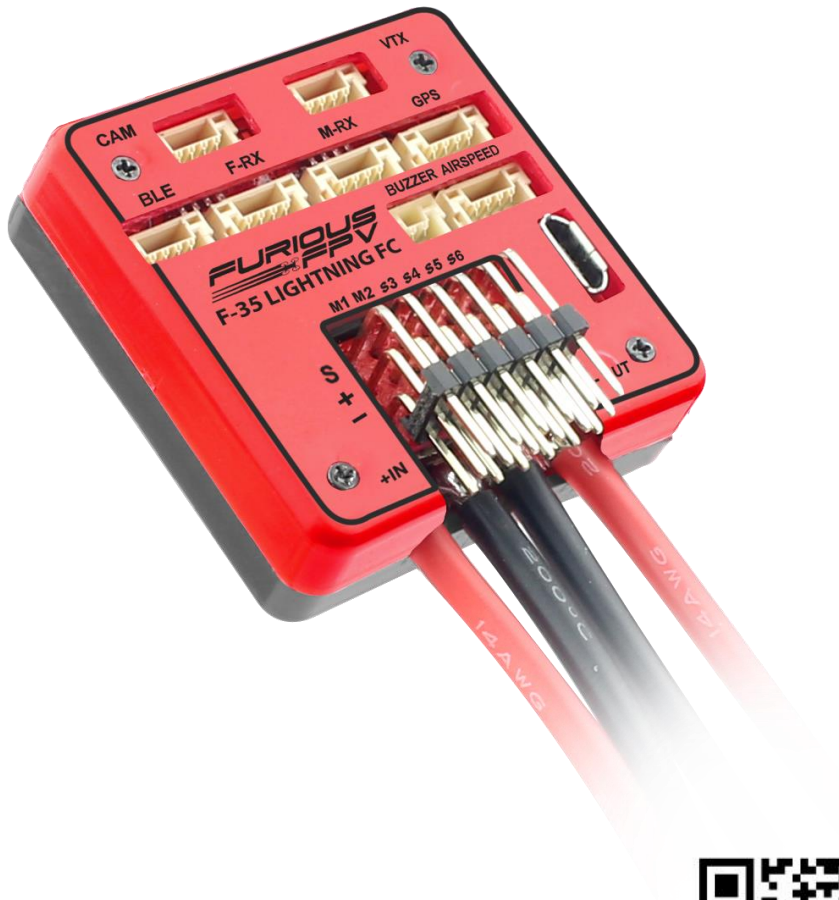
F-35 LIGHTNING

FLIGHT CONTROLLER

USER MANUAL VERSION 1.3



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Website: http://furiousfpv.com/

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Manual user log

V1.3:

- Update configure with DragonLink Receiver
- Change port connection Spektrum Receiver

*Please note: In this manual, BLUE Texts have hyperlinks to check out guideline.

Introduction

Furious FPV F-35 Lightning FC - Elevate Your Horizons.

Step into the all new F-35 Lightning FC - Furious FPV's 1st dedicated wing flight controller, ready and waiting to open all new worlds to winged FPV.

Encompassed by a robust aluminum case for maximum levels of protection and strength, the F-35 FC offers the ultimate levels of FPV capability that is dedicated & purpose built for the demands and capabilities of FPV winged flight.

Ultra easy to install with a massively powerful MCU STM F4 micro controller, the F-35 Lightning FC supports a full (6) UART's for GPS, VTX Control, S.PORT Telemetry, Crossfire RX, RX, Bluetooth functionality. With these systems in play, the F-35 offers worlds of capability & performance for maximum levels of FPV flight.

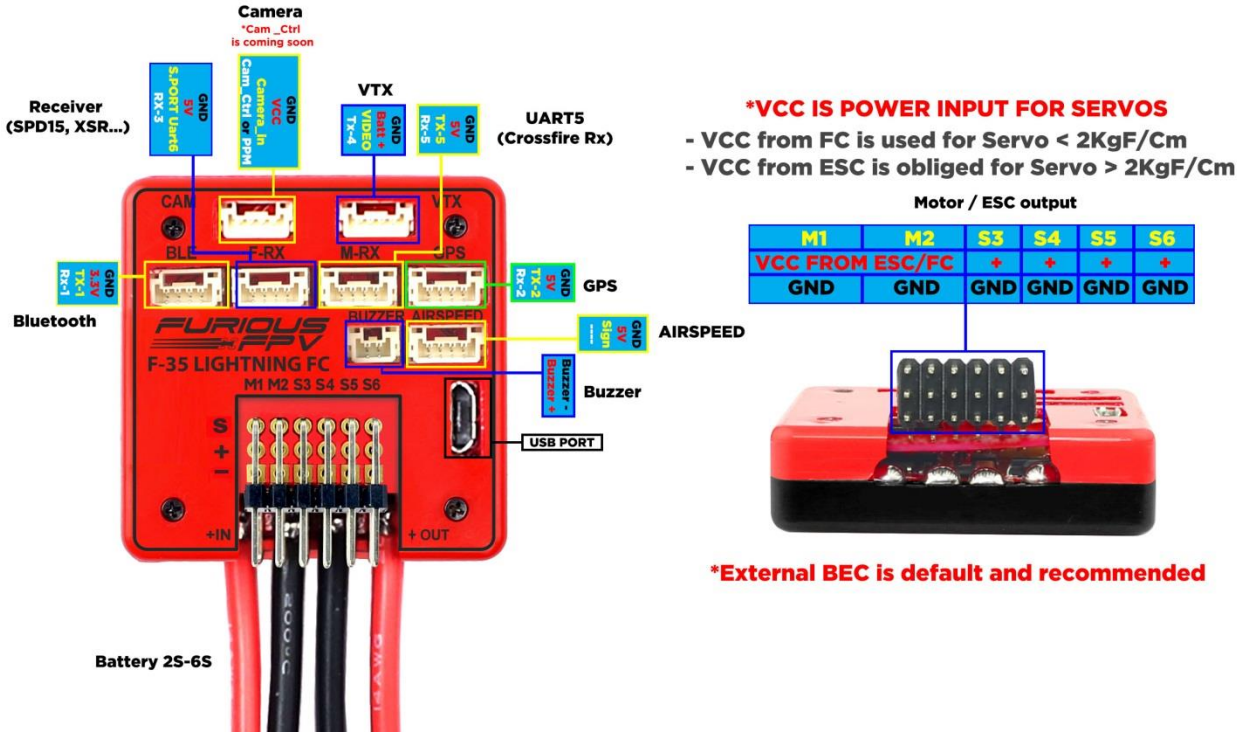
Integrating a built in 5V@3A BEC, buzzer port, anti vibration silicone dampeners and battery monitor with current sensor, the F-35 Lightning FC packs a massive punch in an ultra compact form. Pair this with a built in Barometer & OSD system, the F-35 FC is the game changing flight controller that is ready for anything and everything a pilot could possibly desire.

Take your winged FPV flight to new worlds and beyond with the Furious FPV F-35 Lightning FC - the ultimate winged FPV flight control system.

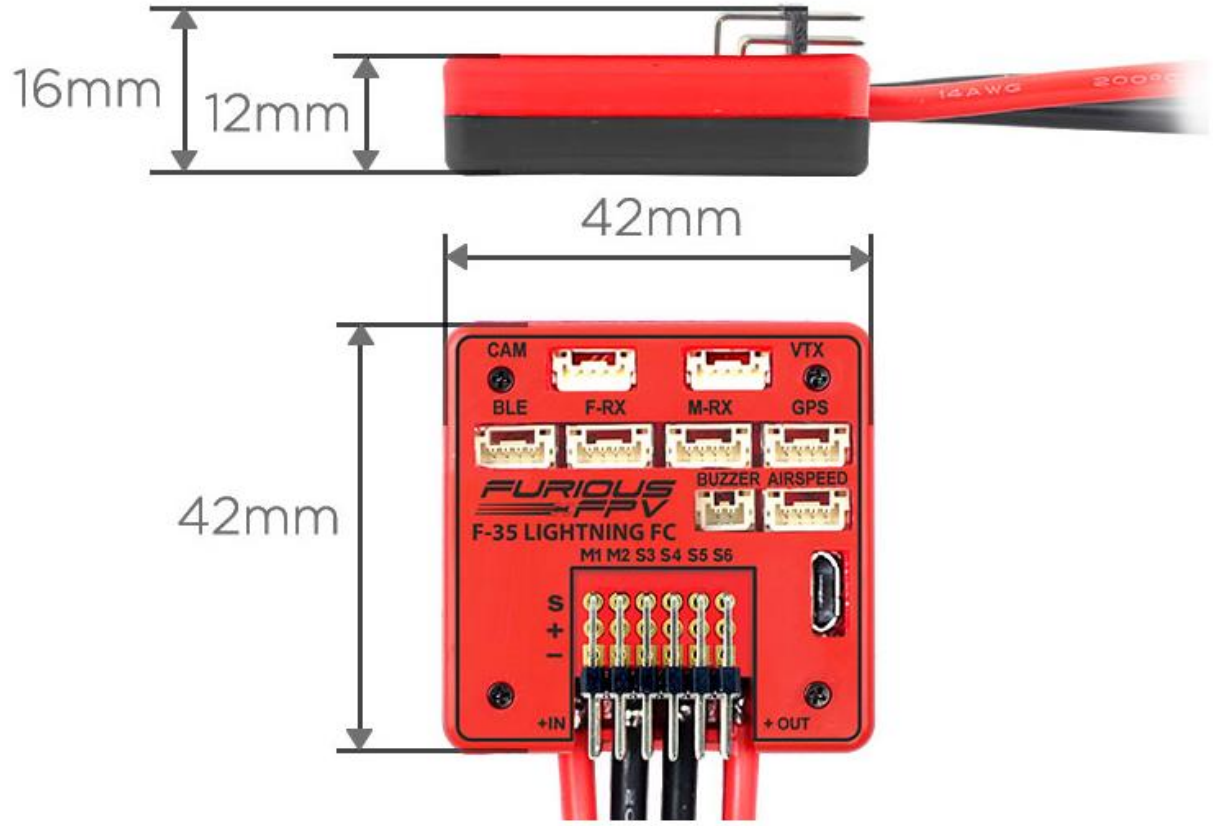
Features

- Flight Controller 6DOF + 3DOF MAG
- MCU STM F4 high performance
- Built-in OSD
- Support up to 6 UARTs (GPS, VTX Control, S.PORT Telemetry, Crossfire RX, RX, Bluetooth)
- Built-in Driver Inverter for SBUS and S.PORT connections
- Built-in Battery Voltage and Current monitor
- Camera and VTX port built-in Peripheral pass
- Built-in 5V@3A BEC for small Digital servos, can be easily changed to External BEC for bigger Servos
- Built-in Buzzer port
- High quality silicone wires with optimized lengths are included
- Support INAV firmware
- Vertical USB and ports => easy to install
- Pro version has GPS module, AirSpeed Sensor, Buzzer and Bluetooth Module
- Weight: 34g
- Voltage Range: 2S-6S LiPo

Pinouts

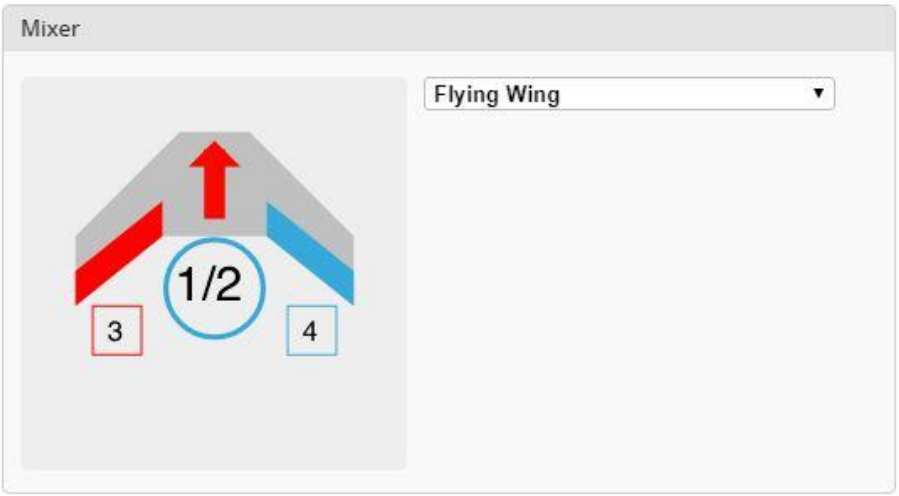


Dimensions



Connections
Connection With ESCs and Servos:

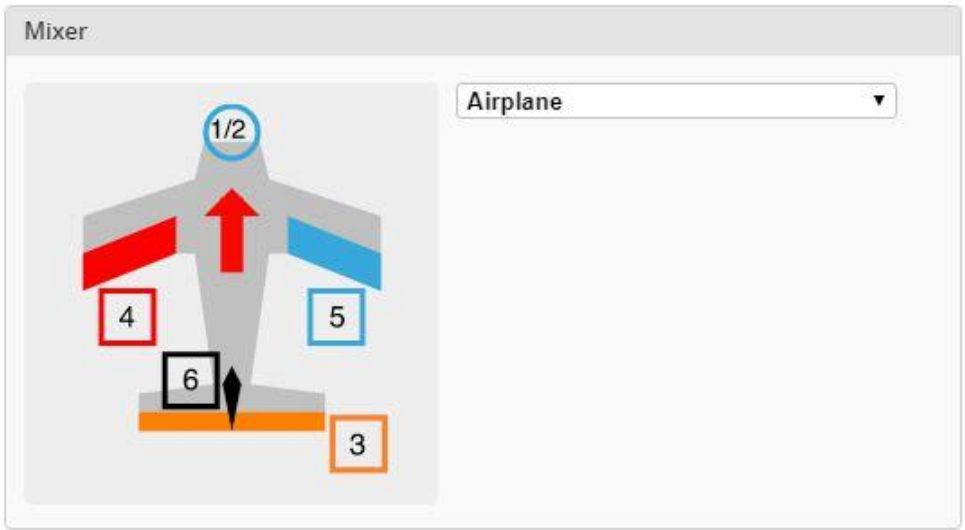
1. Flying Wing:



- **Location ESC: 1, 2**
- **Location Servos: 3, 4**

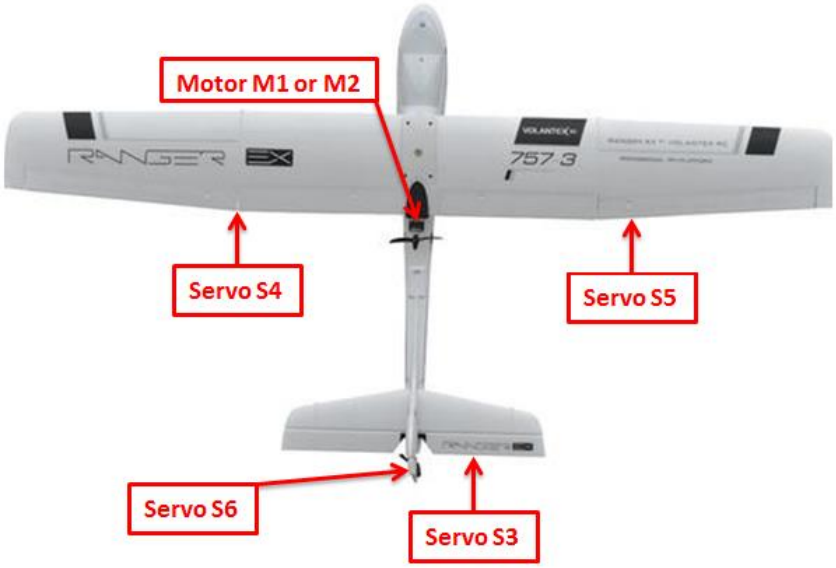
Ex: Reptile S800 Sky Shadow Flying Wing

2. Airplane:



- **Location ESC: 1, 2**
- **Location Servos: 3, 4, 5, 6**

Ex1: Volantex Ranger



Ex2: Twin Dream

Open **INAV Configurator** → Go to **CLI** tab and paste this strings as the picture above. Then, hit **Enter:**

 # mixer

mixer CUSTOMAIRPLANE

mmix reset

mmix 0 1.000 0.000 0.000 0.300 #Left motor

mmix 1 1.000 0.000 0.000 -0.300 #Right motor

 # servo mix

smix reset

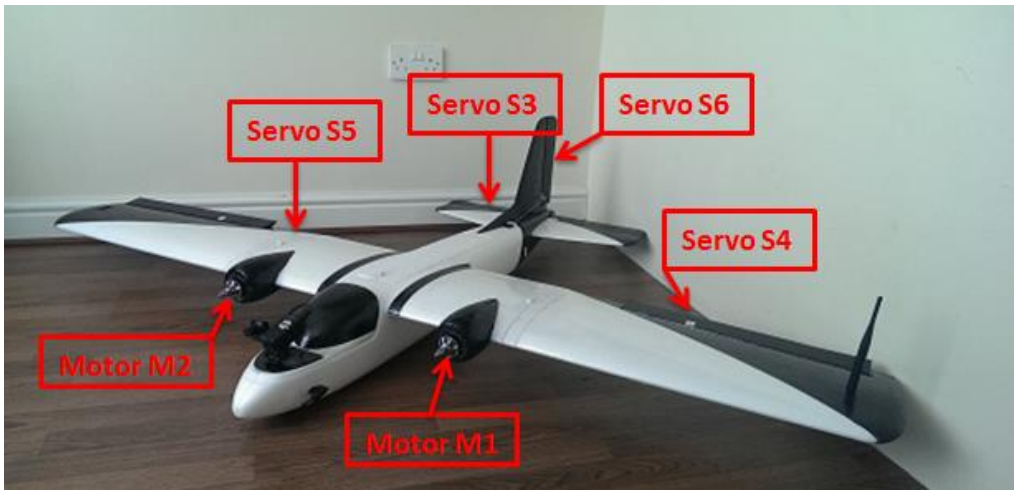
smix 0 3 0 100 0 #servo 3 takes Stabilised ROLL (PWM 4)

smix 1 4 0 100 0 #servo 4 takes Stabilised ROLL (PWM 5)

smix 2 5 2 100 0 #servo 5 takes Stabilised YAW (PWM 6)

smix 3 2 1 100 0 #servo 2 takes Stabilised PITCH (PWM 3)

save



Ex 3: V-Tail

Open **INAV Configurator** → Go to **CLI** tab and paste this strings. Then, hit **Enter:**

 # mixer

mixer CUSTOMAIRPLANE

mmix reset

mmix 0 1.0 0.0 0.0 0.0 # motor

smix reset

smix 0 2 0 -100 0 # servo 2 takes Stabilised ROLL

smix 1 3 0 -100 0 # servo 3 takes Stabilised ROLL

smix 2 4 1 100 0 # servo 4 takes Stabilised PITCH

smix 3 5 1 -100 0 # servo 5 takes Stabilised -PITCH

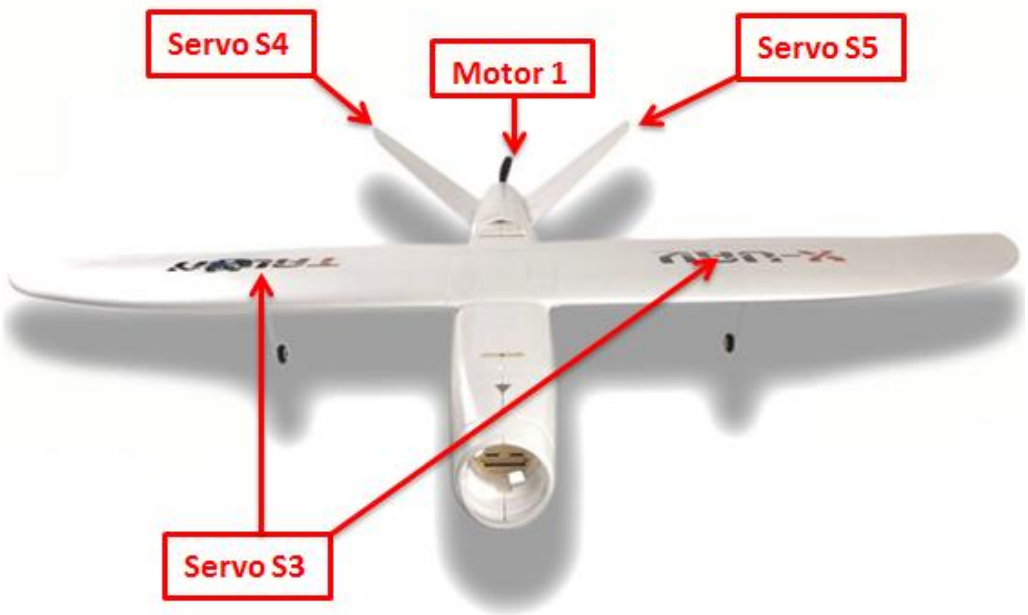
smix 4 4 2 -100 0 # servo 4 takes Stabilised YAW

smix 5 5 2 -100 0 # servo 5 takes Stabilised YAW

smix 6 6 8 -100 0 # servo 6 takes RC AUX 1 (camera yaw)

smix 7 7 9 -100 0 # servo 7 takes RC AUX 2 (drop bomb)

save



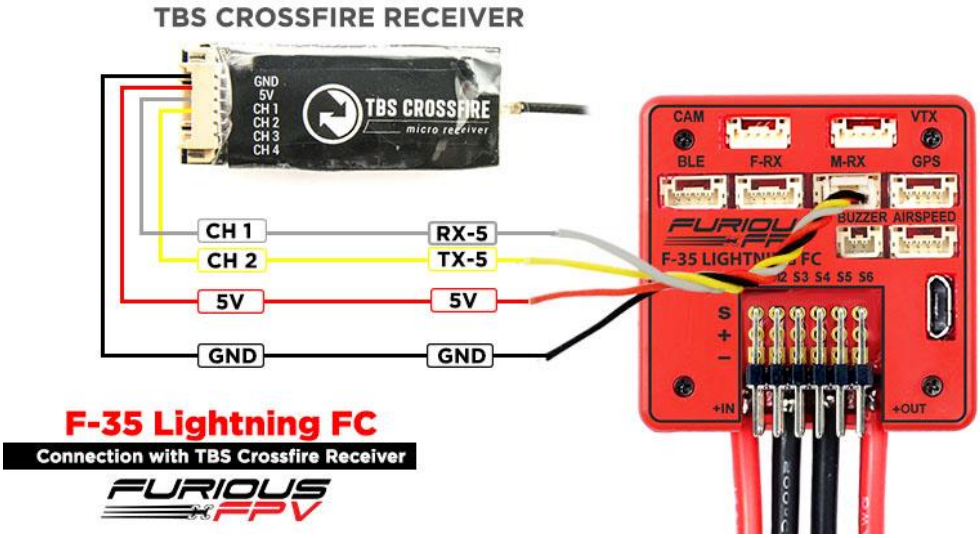
Connection With Receivers:

***Warning: Only support power is 5V for receiver**

I. TBS Receiver

1. TBS Crossfire Micro Rx V2 (Plug and play with Micro Rx Cable)

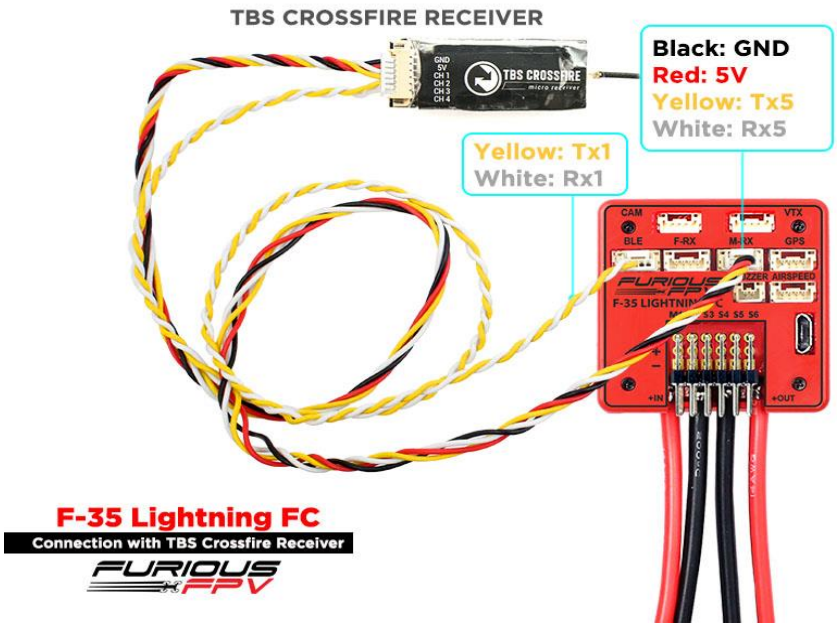
Identifier	Data	Telemetry	RX	Sensors	Peripherals
USB VCP	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART1	MSP 57600	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART2	MSP 115200	Disabled AUTO	Serial RX	GPS 57600	Disabled 115200
UART3	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART4	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	IRC Tramp 115200
UART5	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART6	MSP 115200	SmartPort AUTO	Serial RX	Disabled 38400	Disabled 115200



2. TBS Crossfire Micro Rx V2 (Plug and Play with Micro Rx and TBS-Ext Cable for Wireless Connection)

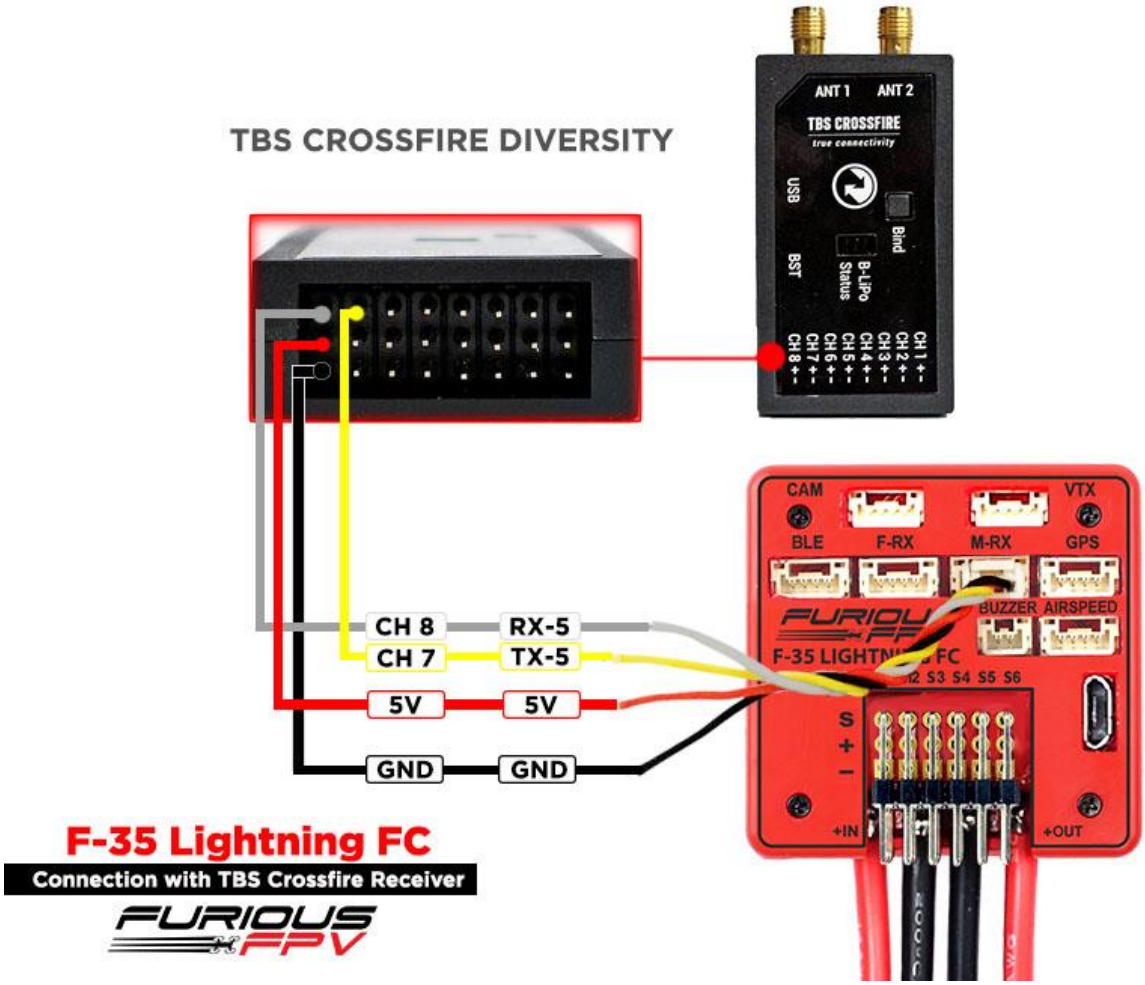
Video: [Wireless connection to INAV via TBS Crossfire Tx + TBS Micro Rx V2]

Identifier	Data	Telemetry	RX	Sensors	Peripherals
USB VCP	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART1	MSP 57600	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART2	MSP 115200	Disabled AUTO	Serial RX	GPS 57600	Disabled 115200
UART3	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART4	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	IRC Tramp 115200
UART5	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART6	MSP 115200	SmartPort AUTO	Serial RX	Disabled 38400	Disabled 115200



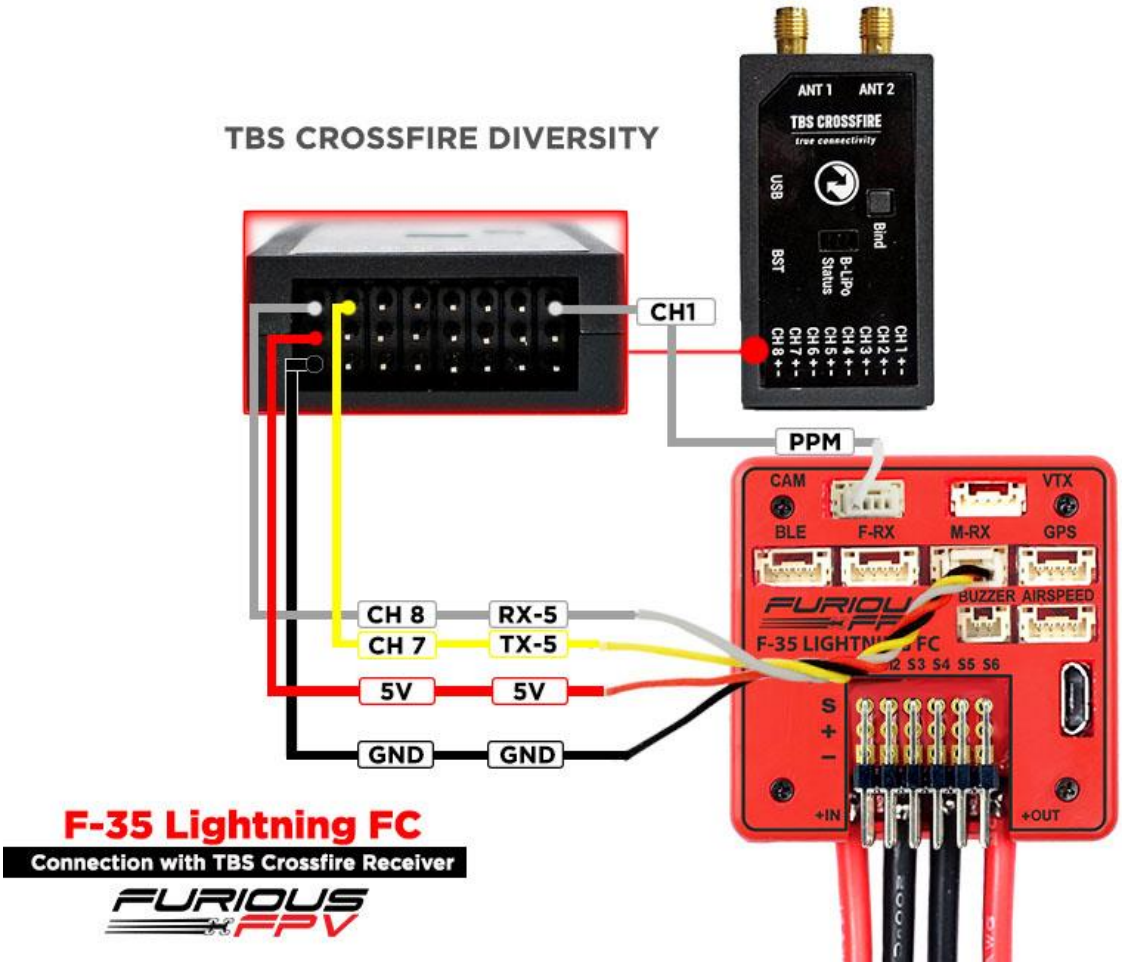
3. TBS Crossfire Diversity Rx Only Use CRSF Protocol

Identifier	Data	Telemetry	RX	Sensors	Peripherals
USB VCP	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART1	MSP 57600	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART2	MSP 115200	Disabled AUTO	Serial RX	GPS 57600	Disabled 115200
UART3	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART4	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	IRC Tramp 115200
UART5	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART6	MSP 115200	SmartPort AUTO	Serial RX	Disabled 38400	Disabled 115200

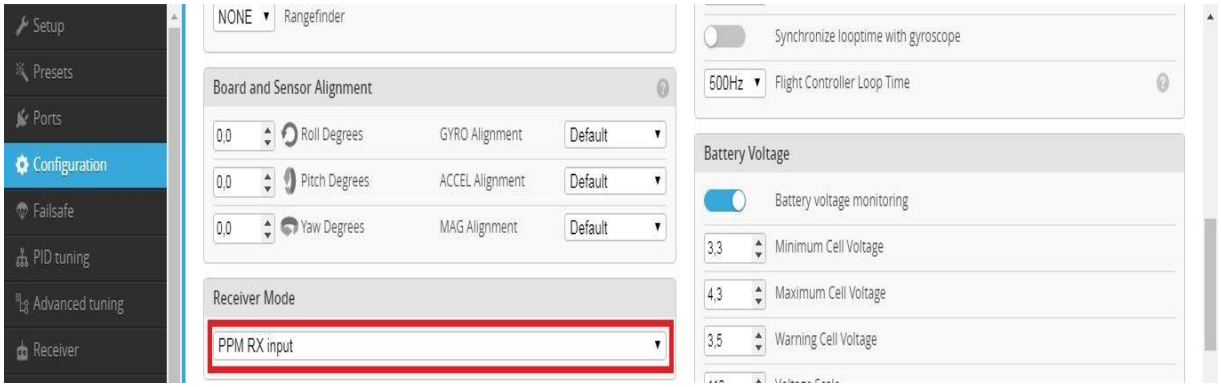


4. TBS Crossfire Diversity Rx Use PPM + Serial TX-RX

Identifier	Data	Telemetry	RX	Sensors	Peripherals
USB VCP	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART1	MSP 57600	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART2	MSP 115200	Disabled AUTO	Serial RX	GPS 57600	Disabled 115200
UART3	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART4	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	IRC Tramp 115200
UART5	MSP 57600	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART6	MSP 115200	SmartPort AUTO	Serial RX	Disabled 38400	Disabled 115200



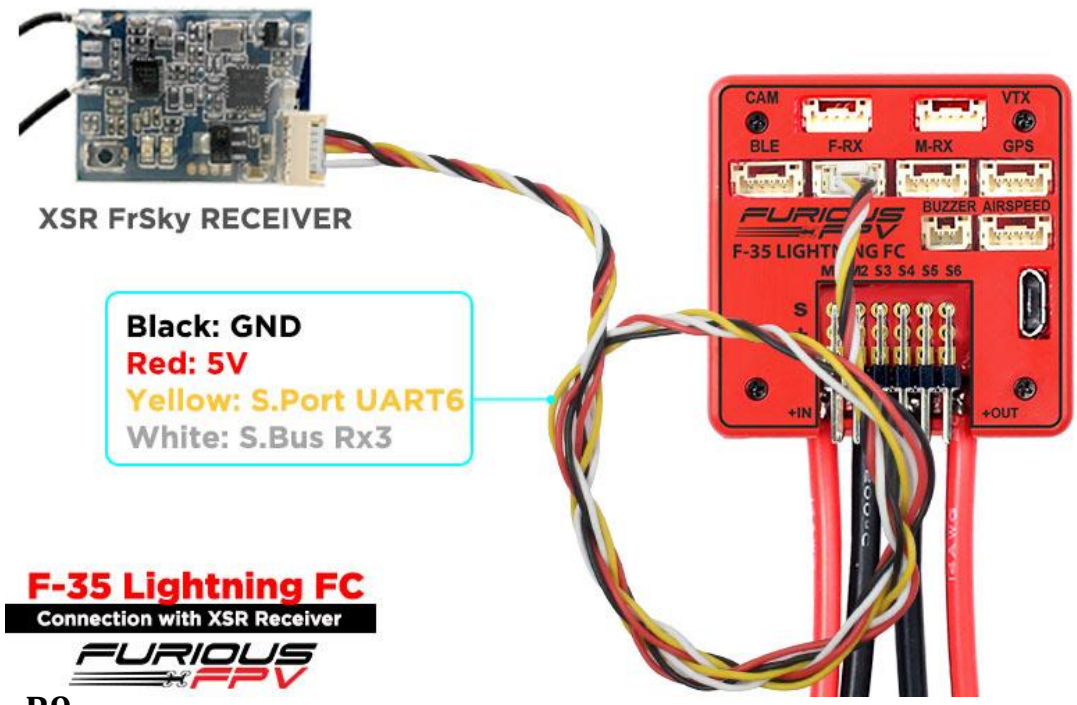
***Note:** To using PPM, you need to open **INAV Configurator** → Go to **Configuration** tab and drag to **Receiver Mode**. Then, select **PPM RX input** as the picture below



II. FrSky Receiver

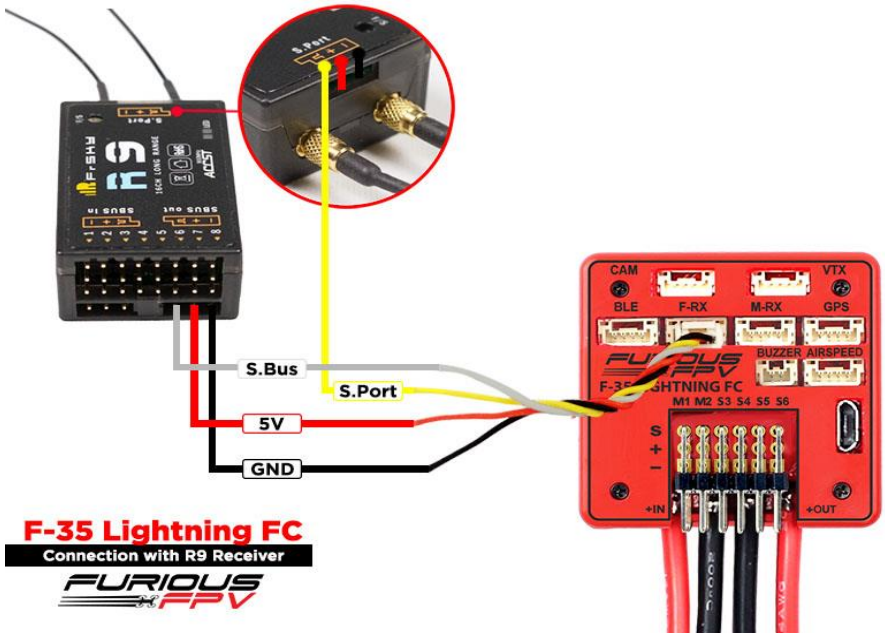
1. XSR (Plug and Play with F-RX Cable)

Identifier	Data	Telemetry	RX	Sensors	Peripherals
USB VCP	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART1	MSP 57600	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART2	MSP 115200	Disabled AUTO	Serial RX	GPS 57600	Disabled 115200
UART3	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART4	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	IRC Tramp 115200
UART5	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART6	MSP 115200	SmartPort AUTO	Serial RX	Disabled 38400	Disabled 115200



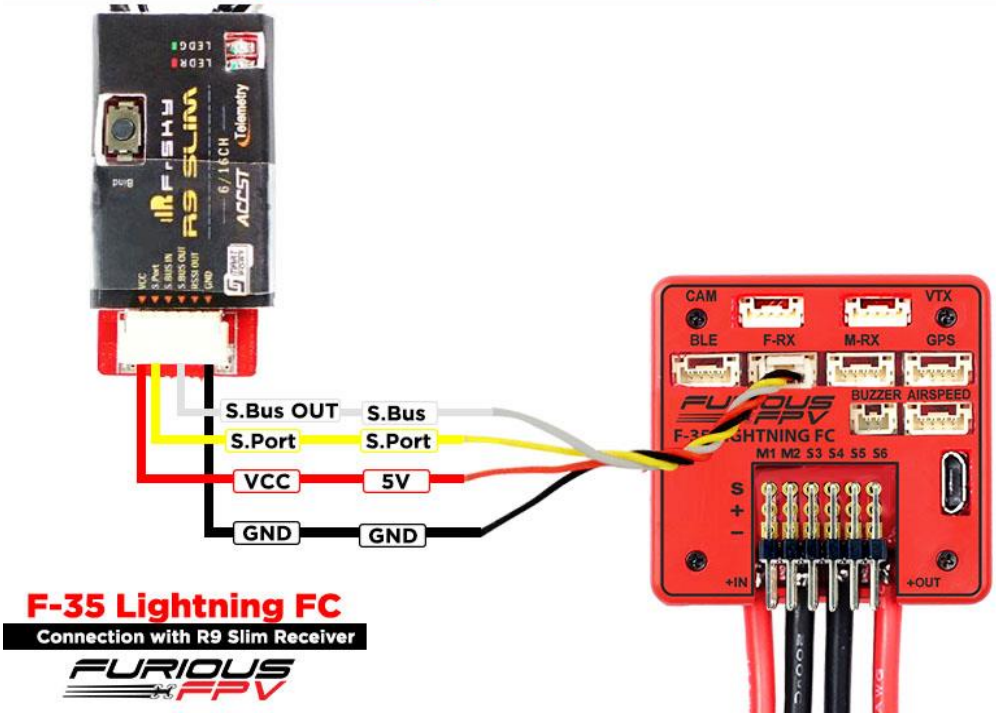
2. R9

Identifier	Data	Telemetry	RX	Sensors	Peripherals
USB VCP	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART1	MSP 57600	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART2	MSP 115200	Disabled AUTO	Serial RX	GPS 57600	Disabled 115200
UART3	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART4	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	IRC Tramp 115200
UART5	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART6	MSP 115200	SmartPort AUTO	Serial RX	Disabled 38400	Disabled 115200



3. R9 Slim

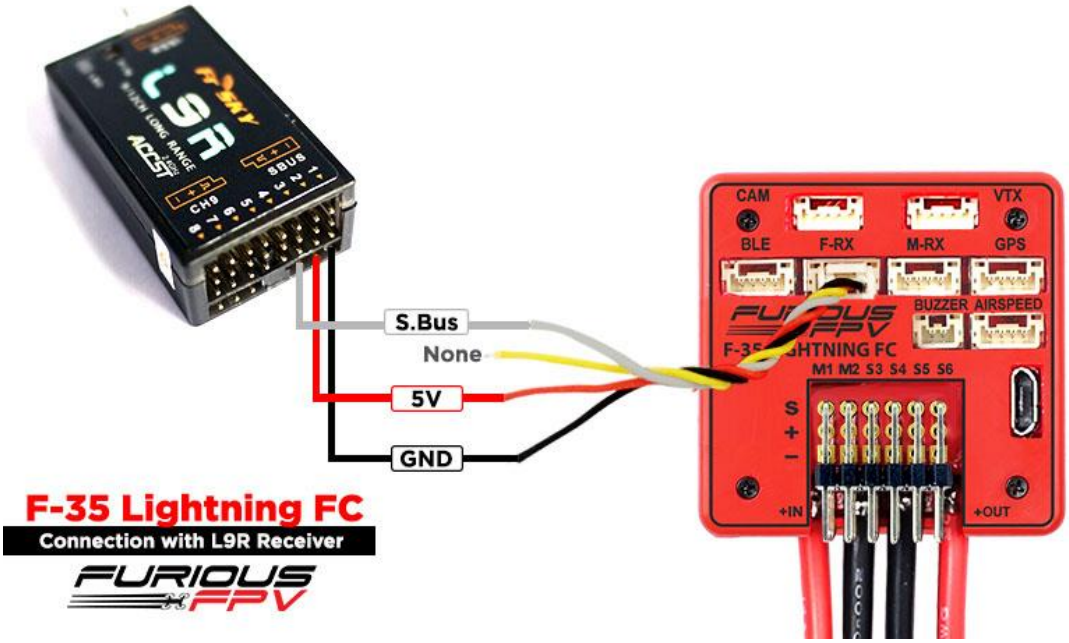
Identifier	Data	Telemetry	RX	Sensors	Peripherals
USB VCP	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART1	MSP 57600	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART2	MSP 115200	Disabled AUTO	Serial RX	GPS 57600	Disabled 115200
UART3	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART4	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	IRC Tramp 115200
UART5	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART6	MSP 115200	SmartPort AUTO	Serial RX	Disabled 38400	Disabled 115200



F-35 Lightning FC
Connection with R9 Slim Receiver

4. L9R

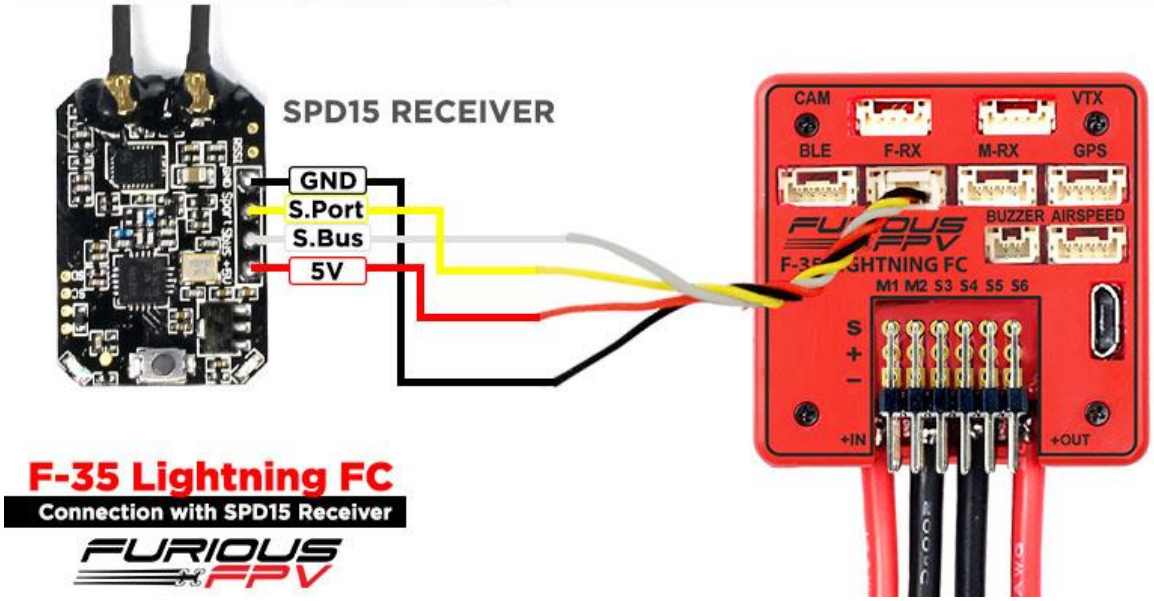
Identifier	Data	Telemetry	RX	Sensors	Peripherals
USB VCP	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART1	MSP 57600	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART2	MSP 115200	Disabled AUTO	Serial RX	GPS 57600	Disabled 115200
UART3	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART4	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	IRC Tramp 115200
UART5	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART6	MSP 115200	SmartPort AUTO	Serial RX	Disabled 38400	Disabled 115200



F-35 Lightning FC
Connection with L9R Receiver

5. SPD15

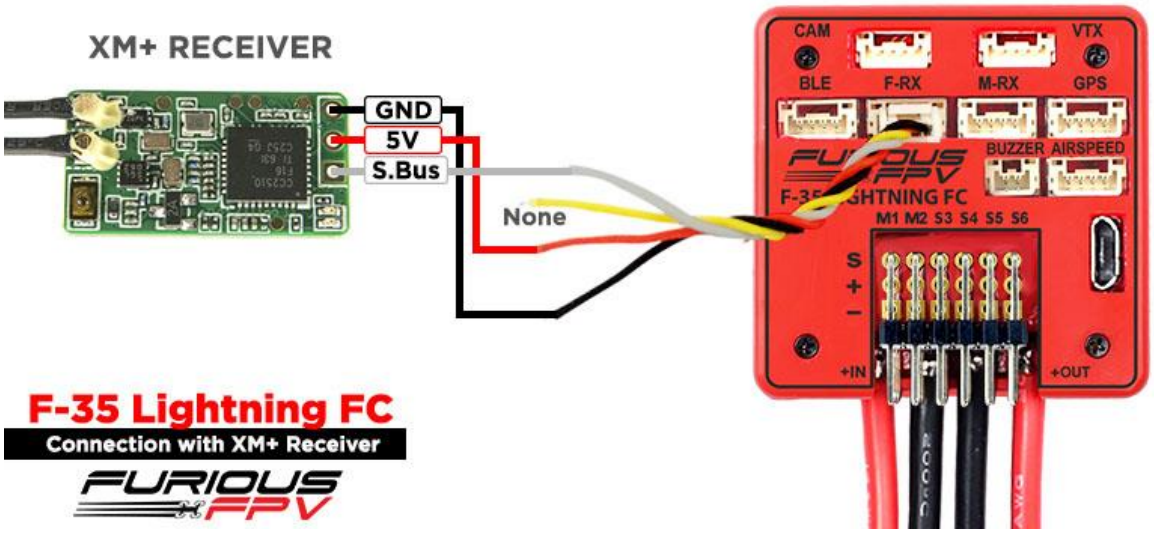
Identifier	Data	Telemetry	RX	Sensors	Peripherals
USB VCP	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART1	MSP 57600	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART2	MSP 115200	Disabled AUTO	Serial RX	GPS 57600	Disabled 115200
UART3	MSP 115200	Disabled AUTO	**Serial RX**	Disabled 38400	Disabled 115200
UART4	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	IRC Tramp 115200
UART5	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART6	MSP 115200	**SmartPort AUTO**	Serial RX	Disabled 38400	Disabled 115200



F-35 Lightning FC
Connection with SPD15 Receiver

6. XM+

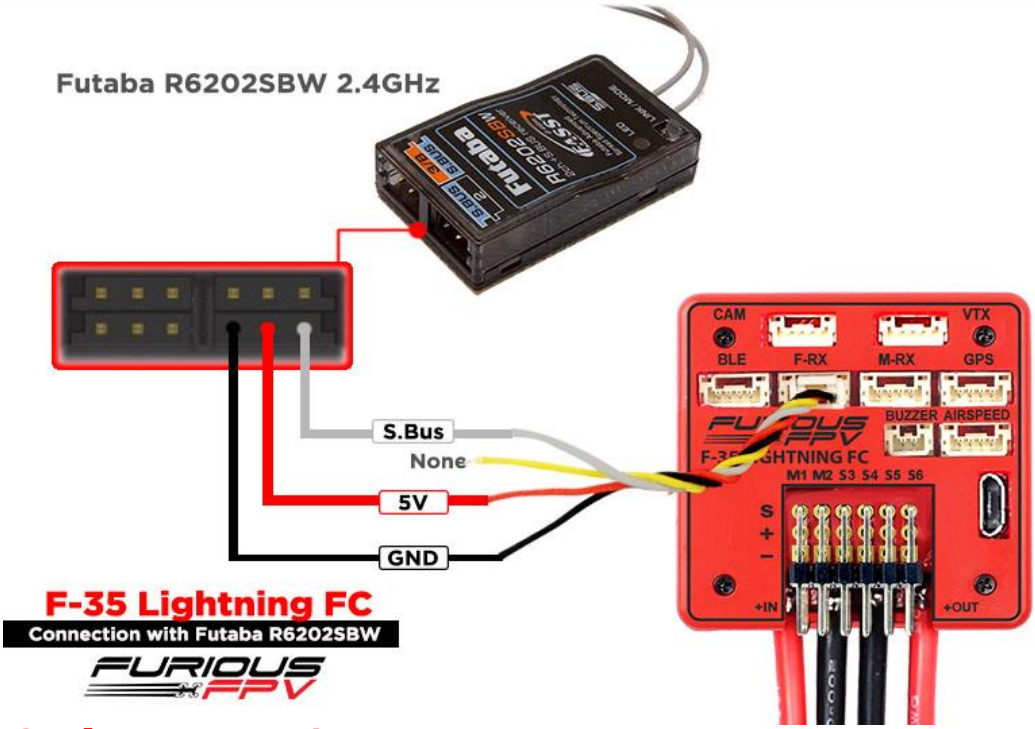
Identifier	Data	Telemetry	RX	Sensors	Peripherals
USB VCP	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART1	MSP 57600	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART2	MSP 115200	Disabled AUTO	Serial RX	GPS 57600	Disabled 115200
UART3	MSP 115200	Disabled AUTO	**Serial RX**	Disabled 38400	Disabled 115200
UART4	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	IRC Tramp 115200
UART5	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART6	MSP 115200	SmartPort AUTO	Serial RX	Disabled 38400	Disabled 115200



F-35 Lightning FC
Connection with XM+ Receiver

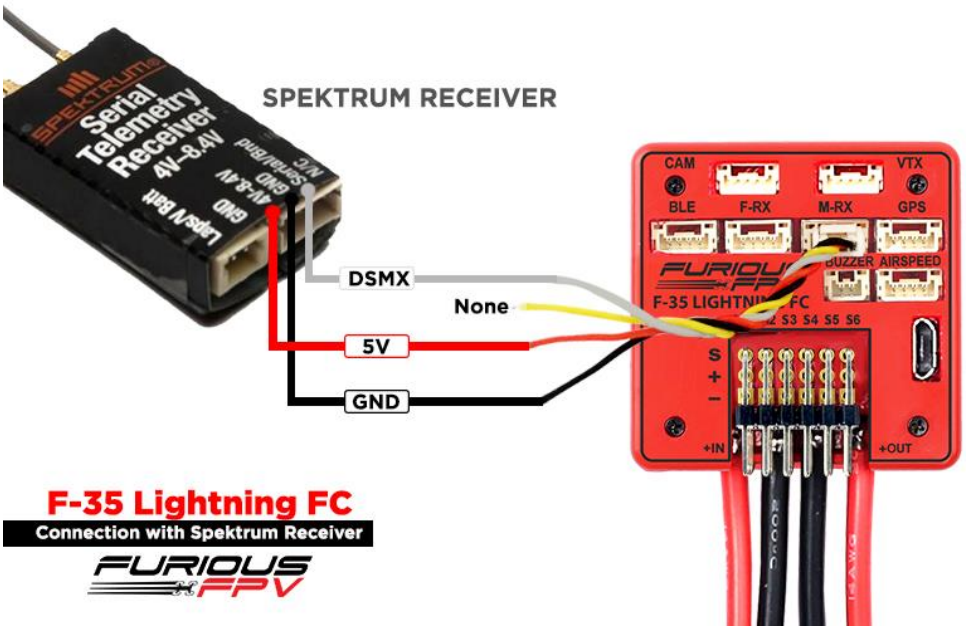
II. Futaba Receiver

Identifier	Data	Telemetry	RX	Sensors	Peripherals
USB VCP	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART1	MSP 57600	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART2	MSP 115200	Disabled AUTO	Serial RX	GPS 57600	Disabled 115200
UART3	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART4	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	IRC Tramp 115200
UART5	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART6	MSP 115200	SmartPort AUTO	Serial RX	Disabled 38400	Disabled 115200



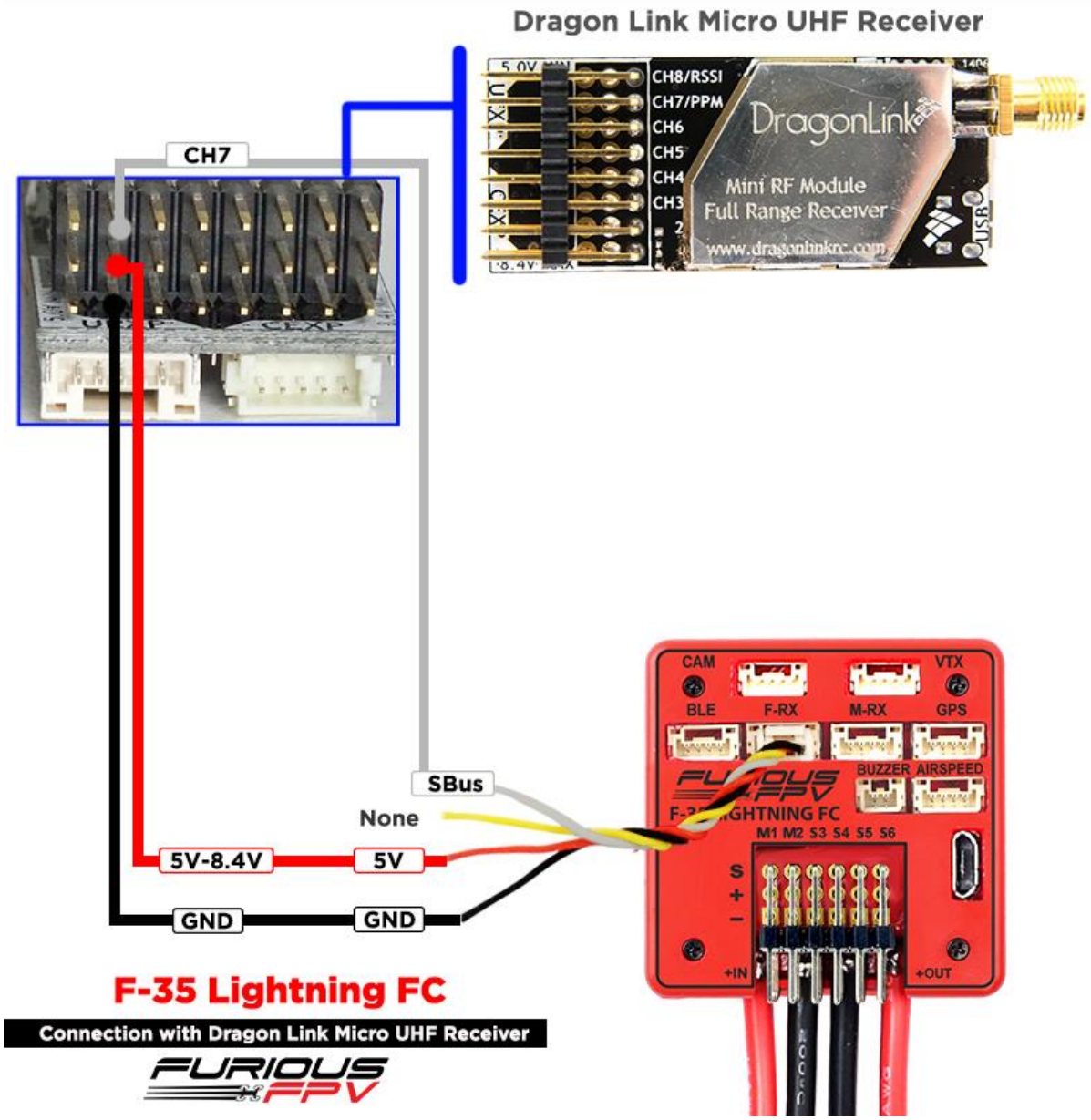
III. Spektrum Receiver

Identifier	Data	Telemetry	RX	Sensors	Peripherals
USB VCP	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART1	MSP 19200	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART2	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART3	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART4	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART5	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART6	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200

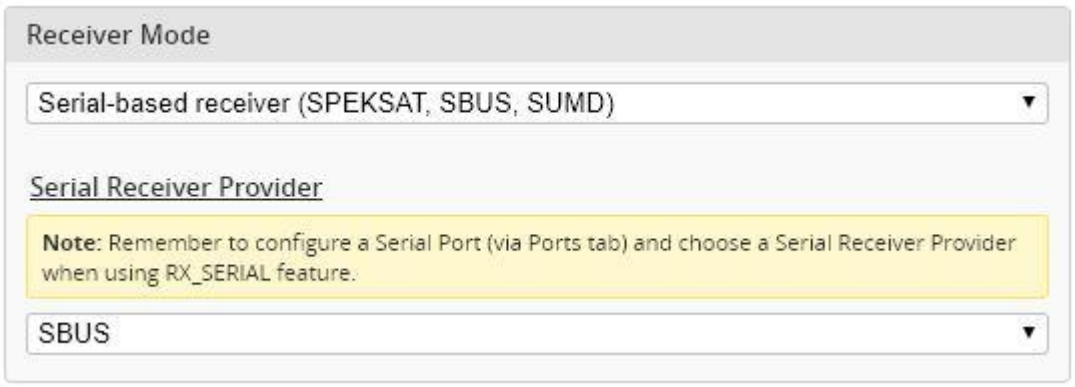


IV. Dragon Link Micro UHF Receiver

Identifier	Data	Telemetry	RX	Sensors	Peripherals
USB VCP	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART1	MSP 57600	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART2	MSP 115200	Disabled AUTO	Serial RX	GPS 57600	Disabled 115200
UART3	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART4	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	IRC Tramp 115200
UART5	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART6	MSP 115200	SmartPort AUTO	Serial RX	Disabled 38400	Disabled 115200

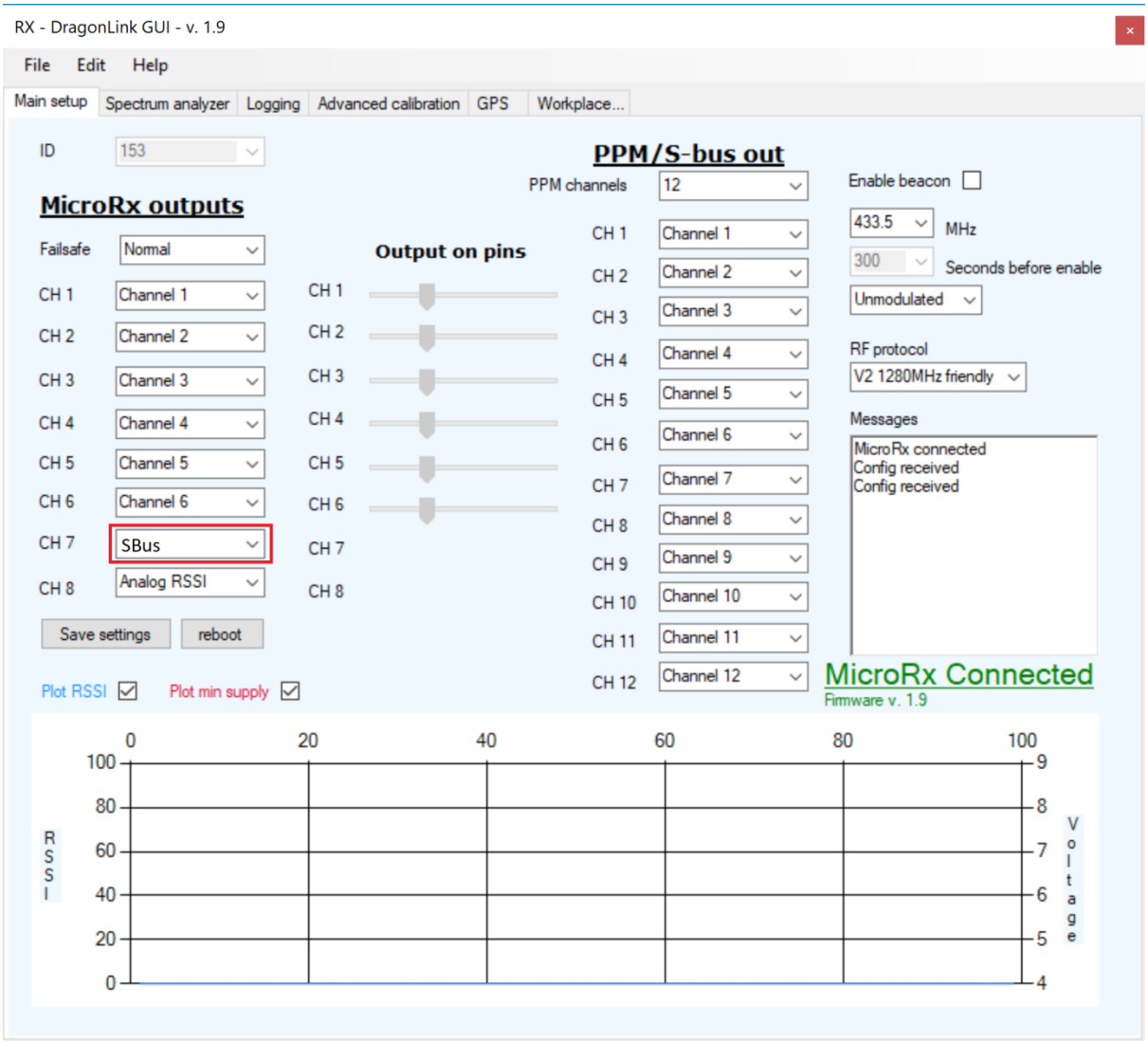


Open **INAV Configurator** → Go to **Configuration** tab and drag to **Receiver Mode**. Then, select like as the picture below



***Note:** With Dragon Link V2 Rx, please use the **Dragon Link GUI** software to configure **CH7** port from PPM (default) to **SBUS**

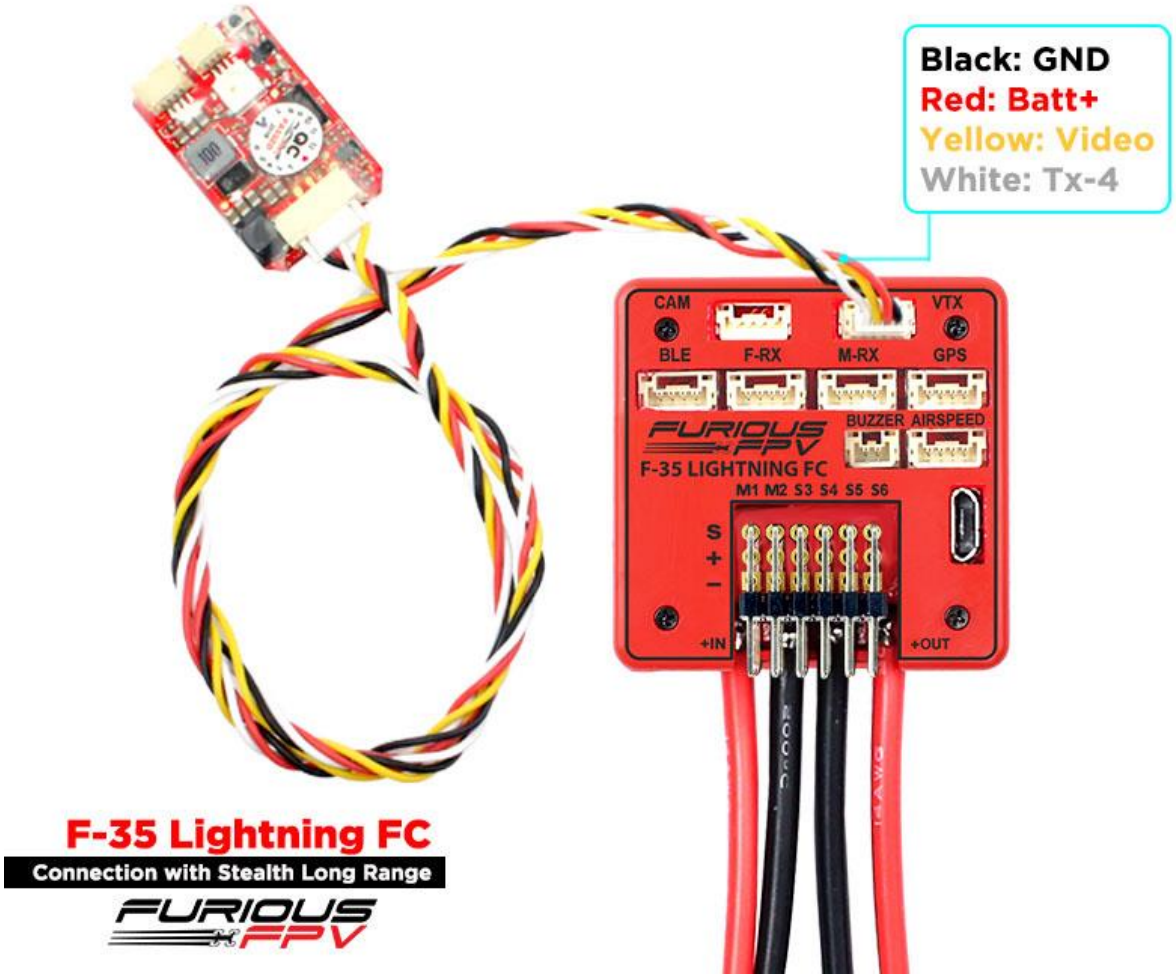
Download software: [DragonLink GUI]



Connection With VTX:

1. Using with Stealth Long Range VTX (Plug and Play with VTX Cable)

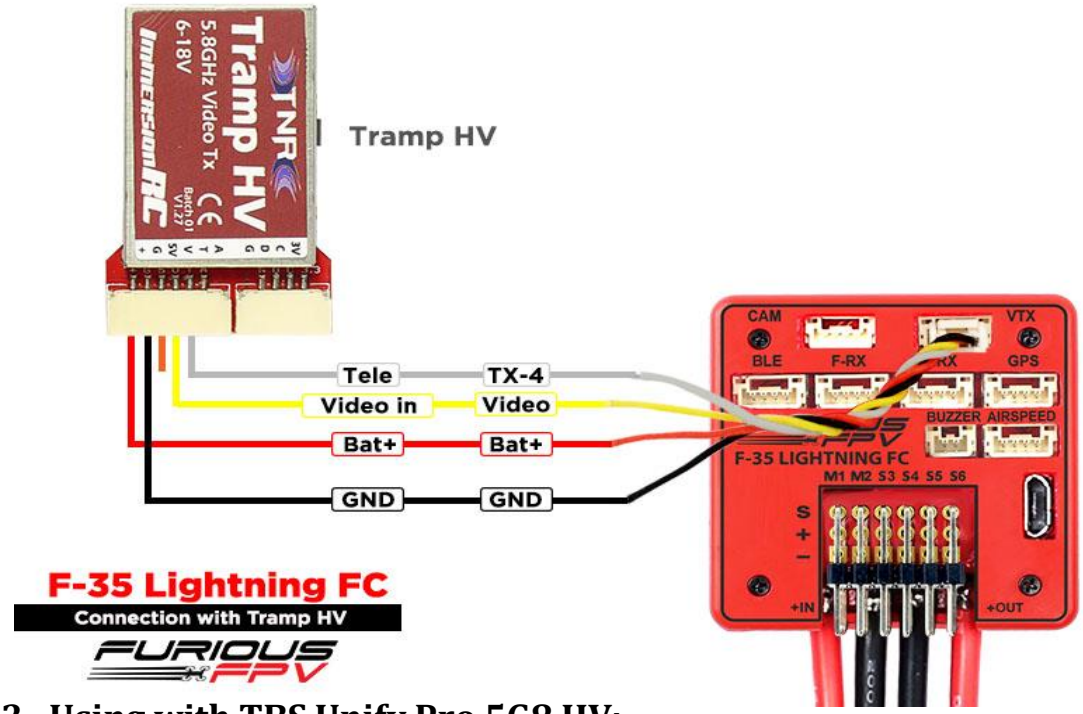
Identifier	Data	Telemetry	RX	Sensors	Peripherals
USB VCP	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART1	MSP 57600	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART2	MSP 115200	Disabled AUTO	Serial RX	GPS 57600	Disabled 115200
UART3	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART4	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	IRC Tramp 115200
UART5	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART6	MSP 115200	SmartPort AUTO	Serial RX	Disabled 38400	Disabled 115200



2. Using with Tramp HV

***Note:** If using our VTX Cable, please swap wires the same as pinouts of this VTX

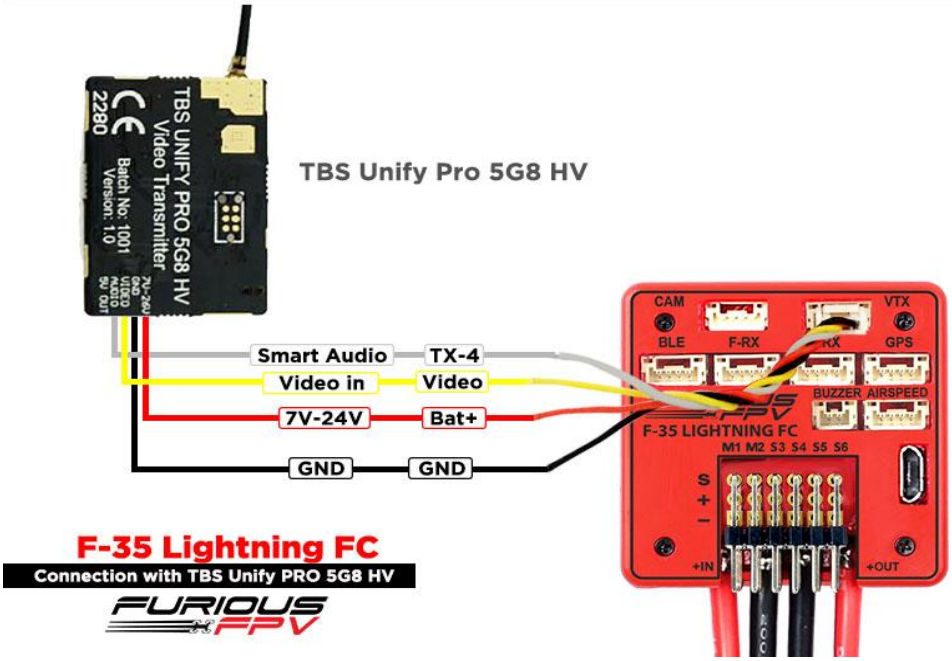
Identifier	Data	Telemetry	RX	Sensors	Peripherals
USB VCP	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART1	MSP 57600	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART2	MSP 115200	Disabled AUTO	Serial RX	GPS 57600	Disabled 115200
UART3	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART4	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	IRC Tramp 115200
UART5	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART6	MSP 115200	SmartPort AUTO	Serial RX	Disabled 38400	Disabled 115200



F-35 Lightning FC
Connection with Tramp HV

3. Using with TBS Unify Pro 5G8 HV:

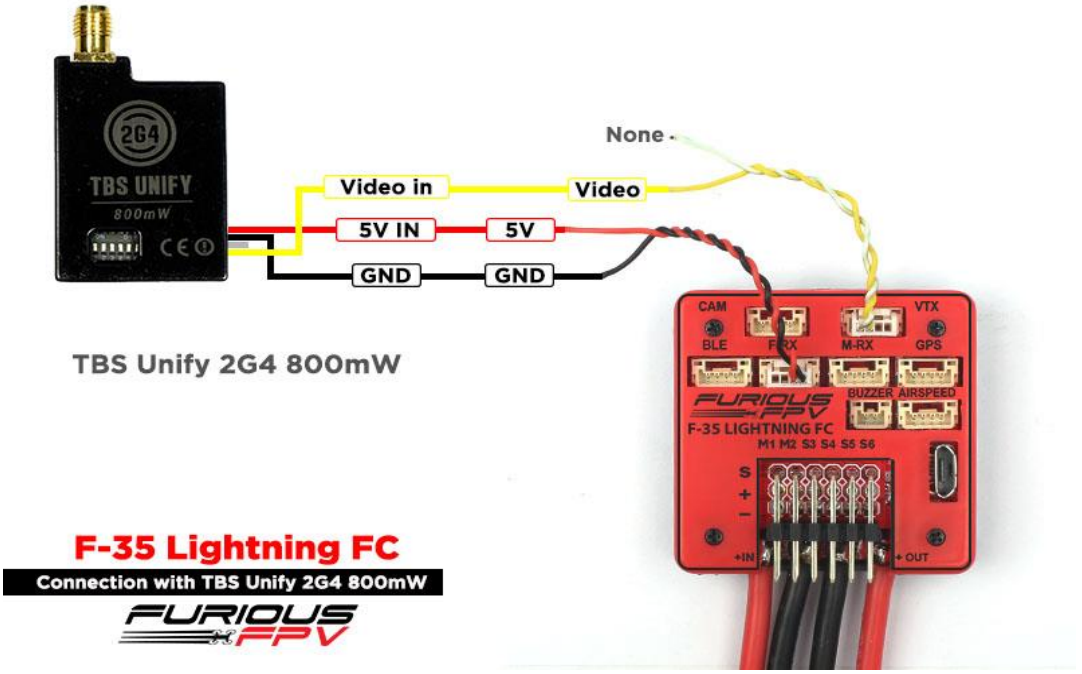
Identifier	Data	Telemetry	RX	Sensors	Peripherals
USB VCP	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART1	MSP 57600	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART2	MSP 115200	Disabled AUTO	Serial RX	GPS 57600	Disabled 115200
UART3	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART4	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	TBS SmartAudio 115200
UART5	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART6	MSP 115200	SmartPort AUTO	Serial RX	Disabled 38400	Disabled 115200



F-35 Lightning FC
Connection with TBS Unify PRO 5G8 HV

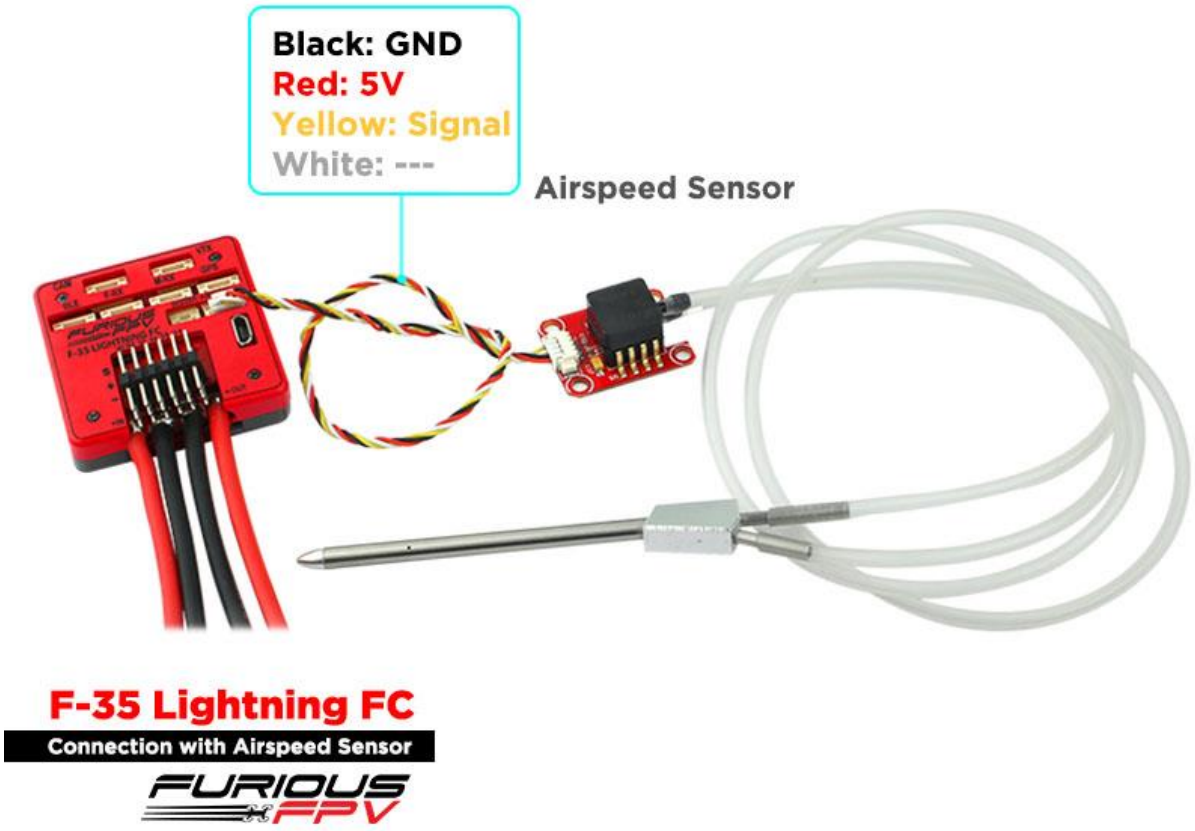
4. Using with TBS Unify 2G4:

Identifier	Data	Telemetry	RX	Sensors	Peripherals
USB VCP	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART1	MSP 57600	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART2	MSP 115200	Disabled AUTO	Serial RX	GPS 57600	Disabled 115200
UART3	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART4	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART5	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART6	MSP 115200	SmartPort AUTO	Serial RX	Disabled 38400	Disabled 115200



Connection With Furious AirSpeed Sensor

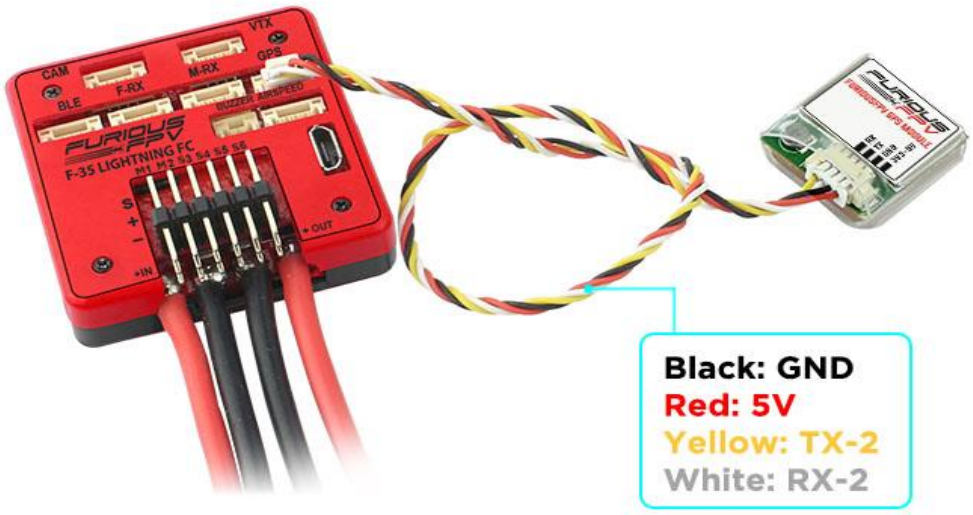
Check out [How to assembly silicone tube for Airspeed sensor]



Connection With Furious FPV GPS Module (Plug and Play with GPS Cable)

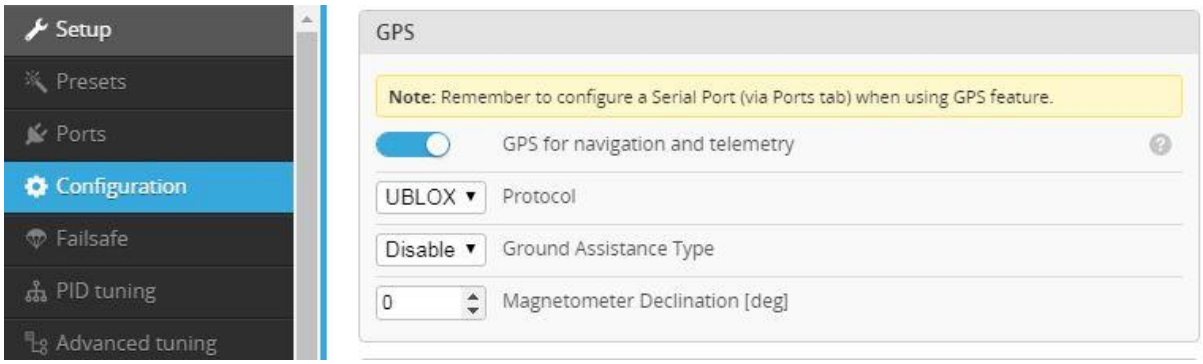
***Warning:** For the first time set up and whenever you change your location. You need to leave the Wing or Airplane on the field for approximately 5 minutes so that the GPS is updated

Identifier	Data	Telemetry	RX	Sensors	Peripherals
USB VCP	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART1	MSP 57600	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART2	MSP 115200	Disabled AUTO	Serial RX	GPS 57600	Disabled 115200
UART3	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART4	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	IRC Tramp 115200
UART5	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART6	MSP 115200	SmartPort AUTO	Serial RX	Disabled 38400	Disabled 115200



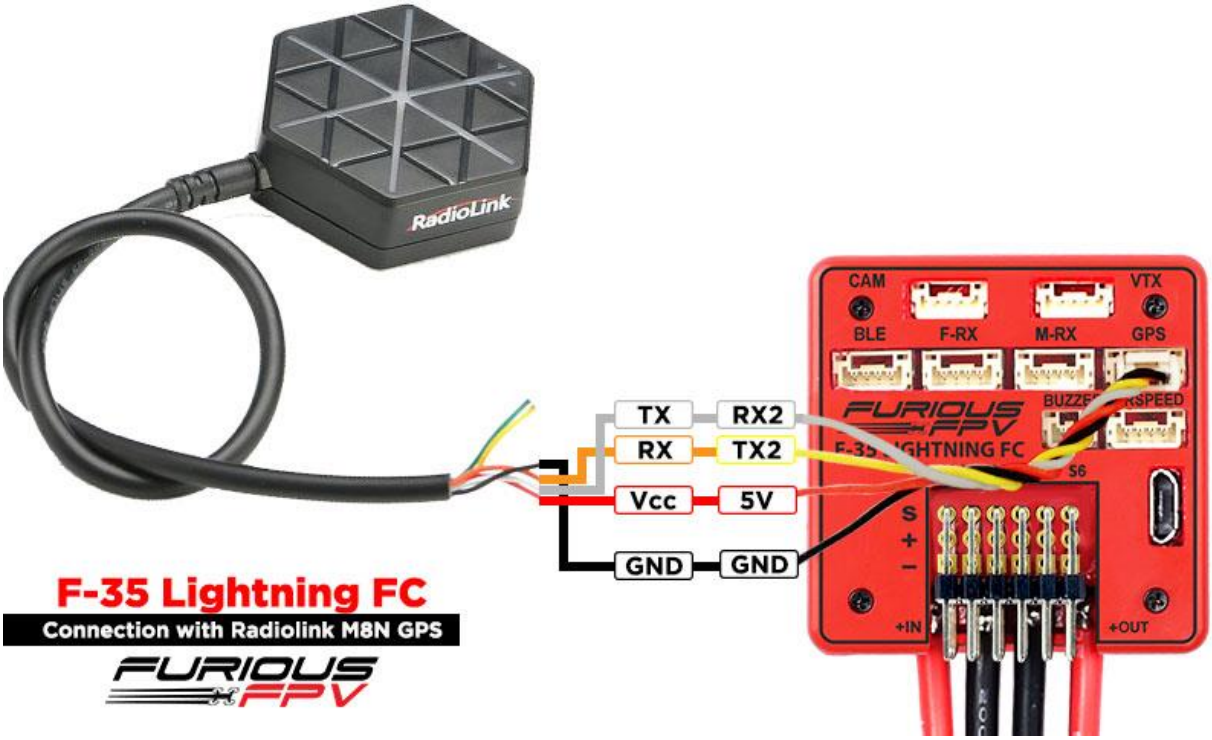
F-35 Lightning FC
Connection with GPS Module

Open **INAV Configurator** → Click **Configuration** tab → Drag to **GPS** and configure as the picture below:

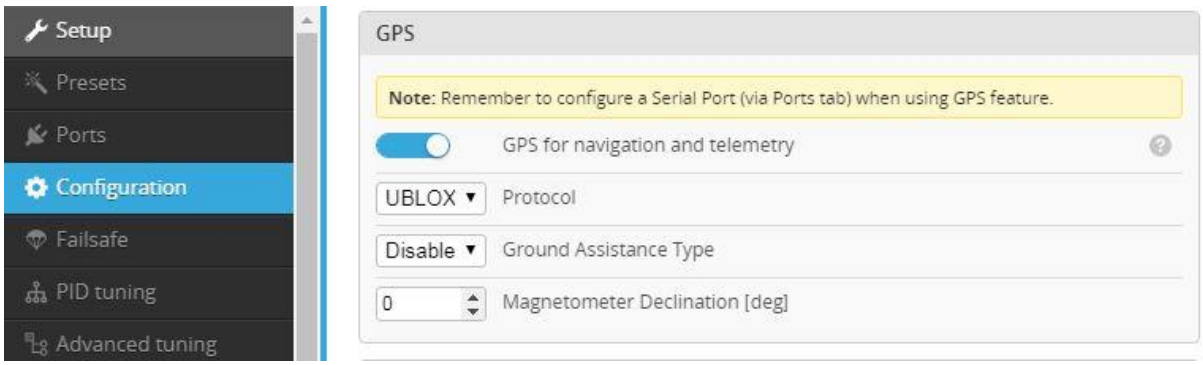


Connection With RadioLink M8N GPS

Identifier	Data	Telemetry	RX	Sensors	Peripherals
USB VCP	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART1	MSP 57600	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART2	MSP 115200	Disabled AUTO	Serial RX	GPS 57600	Disabled 115200
UART3	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART4	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	IRC Tramp 115200
UART5	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART6	MSP 115200	SmartPort AUTO	Serial RX	Disabled 38400	Disabled 115200

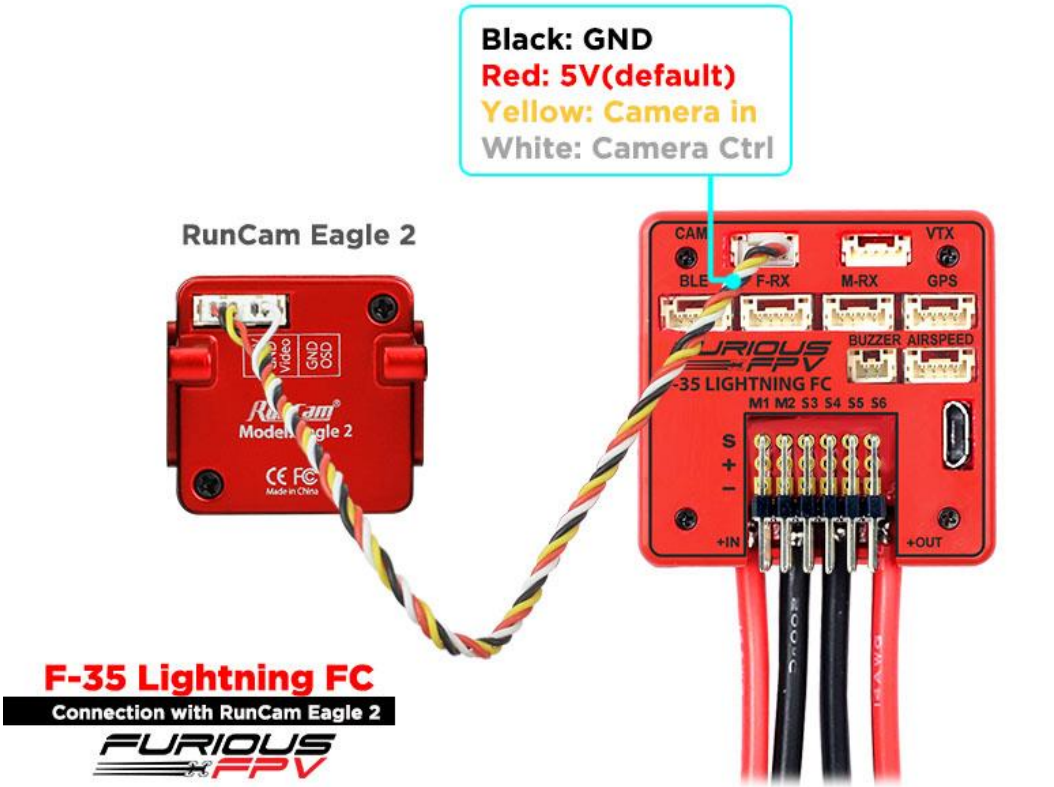


Open **INAV Configurator** → Click **Configuration** tab → Drag to **GPS** and configure as the picture below:

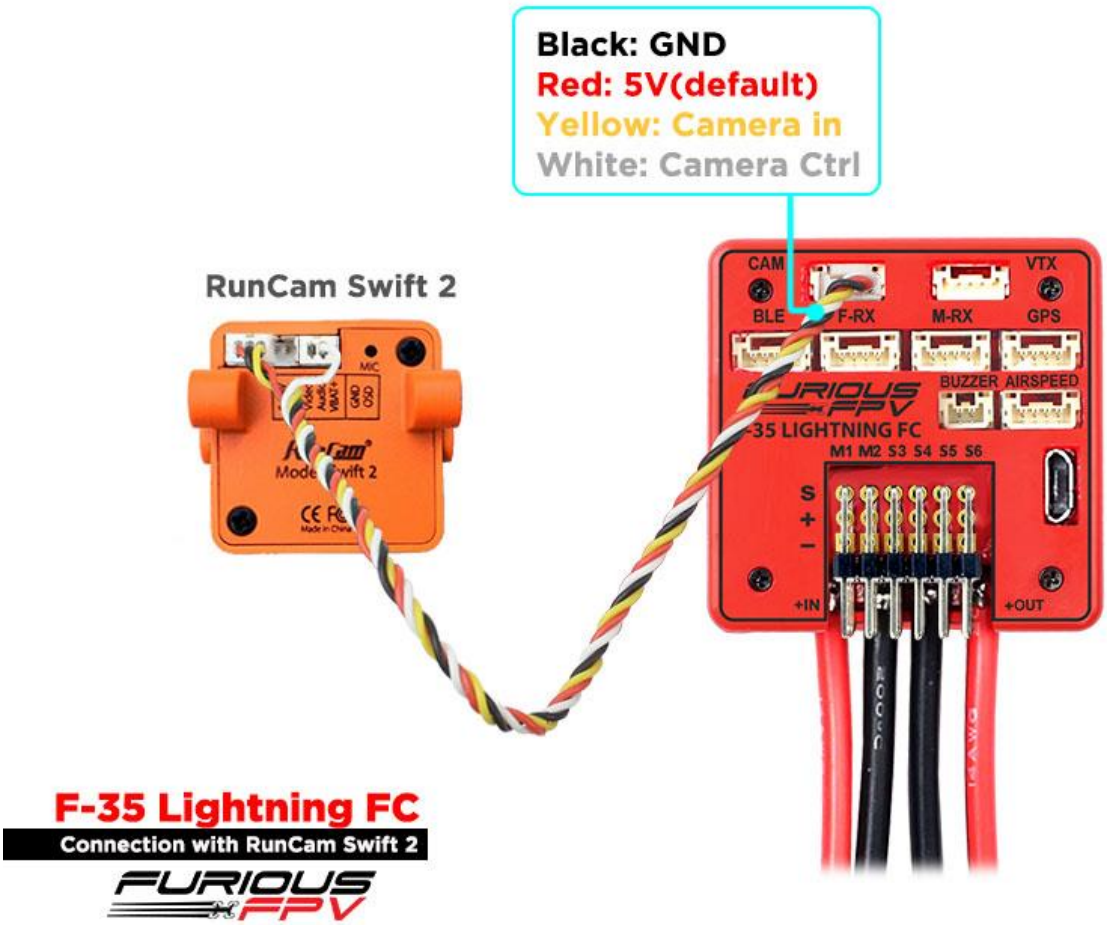


Connection With Camera (Plug and Play with CAM Cable)

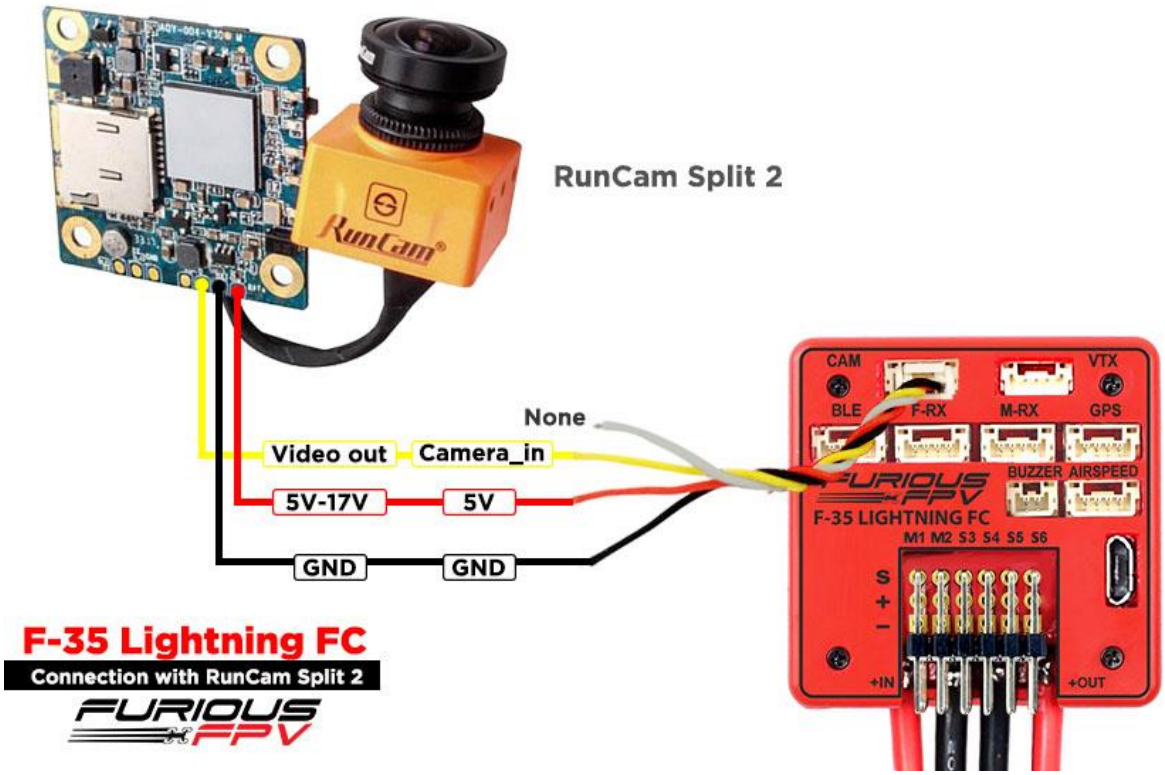
1. **RunCam Eagle 2**



2. **RunCam Swift 2**

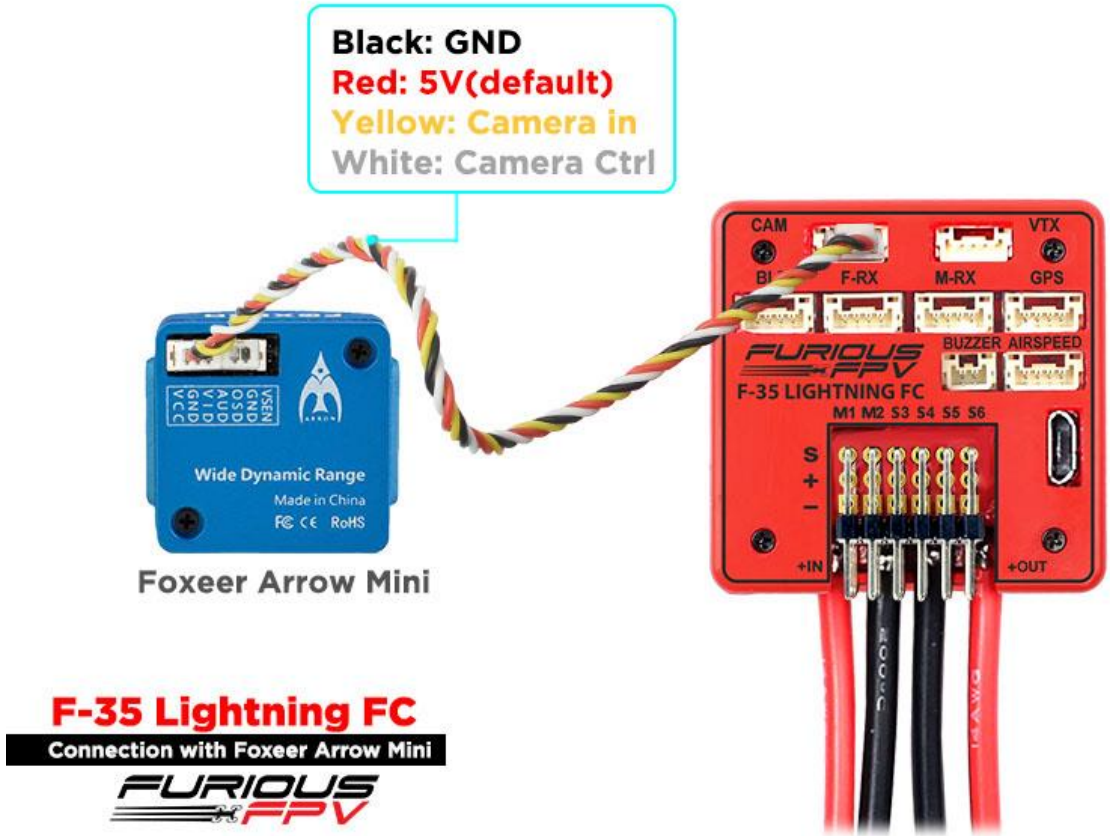


3. RunCam Split 2



F-35 Lightning FC
Connection with RunCam Split 2

4. Foxeer Arrow Mini



F-35 Lightning FC
Connection with Foxeer Arrow Mini

How To Set Up Wing With INAV Configurator

Step1: Calibrate **Sensor** (Click double to go to **How to calibrate Sensor** page)

INAV requires you to follow the accelerometer calibration steps. These steps are different to Cleanflight & Betaflight. So don't skip reading this section, **it's vitally important. But we have wireless so you should do this in the final step.**

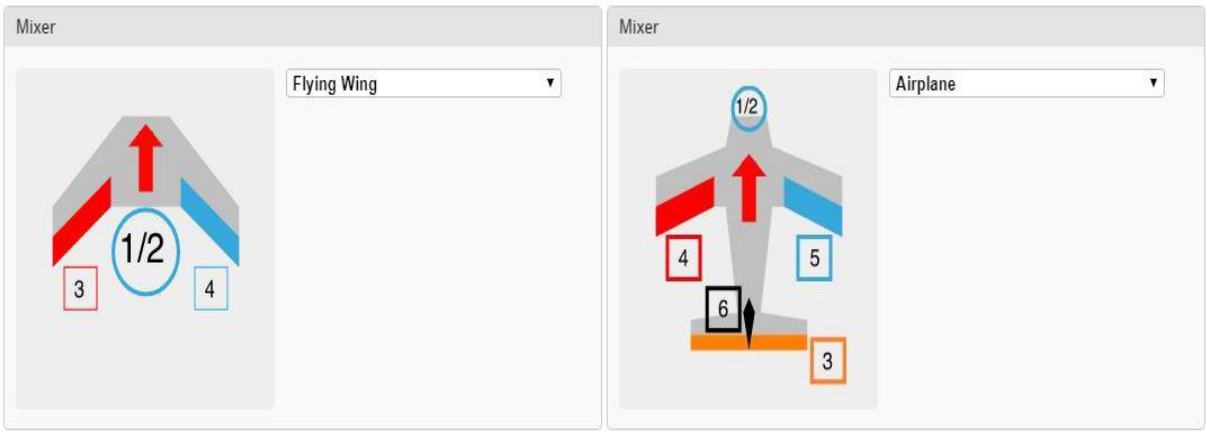
Video: Calibrate sensor with wireless connection Via Bluetooth module

Step2: Set up "**Ports"** tab

- If use **TBS Crossfire Micro receiver**, you don't need to change anything. Because we have ready configured
- If use **XSR receiver**, Please turn on **Serial Rx** of UART3 to use **Receiver Mode**

Step3: Set up "**Configuratios"** tab

- If use **TBS Crossfire Micro receiver,** you don't need to change anything. Because we have ready configured
- If use **XSR receiver**, drag to **Receiver Mode** and select **SBUS** in the **Serial Receiver Provider**
- Change model: There are two models that you can choose: Airplane and Flying Wing



Step4: Configure "**Receiver"** tab

- Check range and value: Your transmitter should use **NO mixing at all** (so separate channels for Thr, Ail, Rud, Ele).Check that when moving the sticks, the right channels moves in the receiver window. Also, everything should be centered at 1500us, and full stick movement should be 1000-2000us. Use sub trim and travel range on your TX to set this up.
- Check Channel Map: Please set correctly channel map with the channel on your transmitter

Step5: Set up "**Servos"** tab

- If reverse Servo, change "Direction and rate" from +100 to -100
- If Servo exceed maximum wanted deflection reduce min/max
- If control surfaces is not perfectly centered adjust servo midpoint. (This is after setting them up as close as possible mechanically)

***Note:** In the Servos tab servos are counted from 0-7 while in the Motors tab they run from 1-8.

Step6: Set up Mode (click MODE to check mode's description table)

1. Select **Mode** tab
2. Drag to mode that you want to use. Then, click **Add Range** and select **CH** channel for switch that you want to use this mode

Step7: Set Failsafe

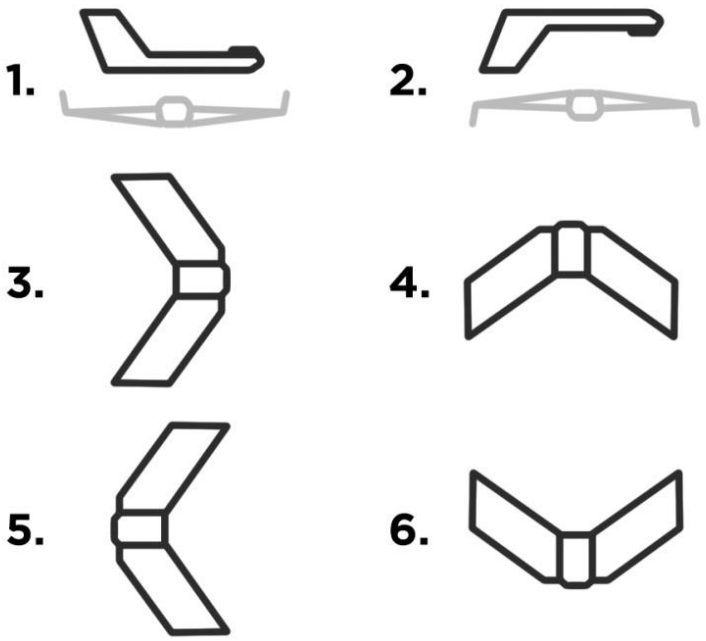
How To Calibrate Sensor

After building new an Airplane, you must calibrate Magnetometer and Accelerometer sensor. With F-35 Lightning FC, we don't need to plug USB cable that can use wireless connection with FuriousFPV Bluetooth Module or TBS Crossfire TX.

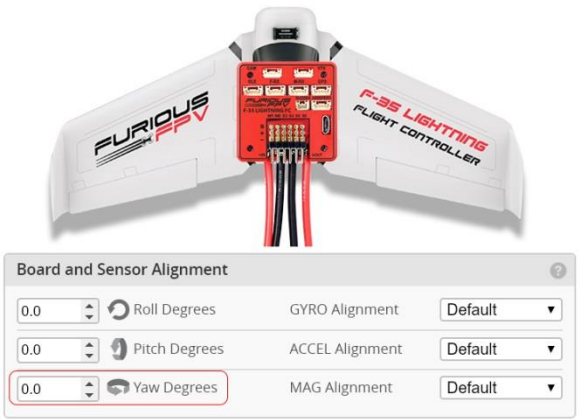
Step 1: Connect F-35 Lightning FC with INAV configurator

Step 2: At **Setup** tab

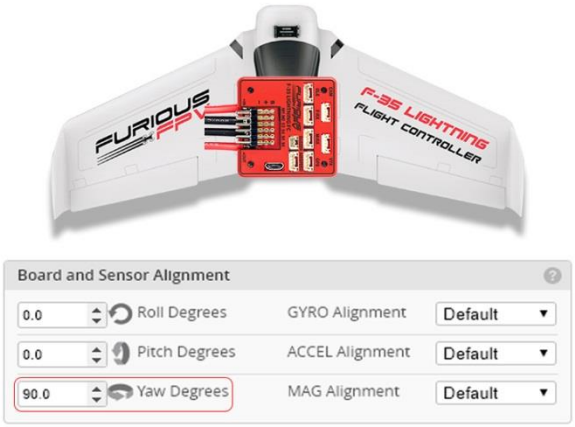
1. **Calibrate Accelerometer:** Please click **Calibrate Accelerometer** to calibrate 6 points Accelerometer sensor like the below pictures:



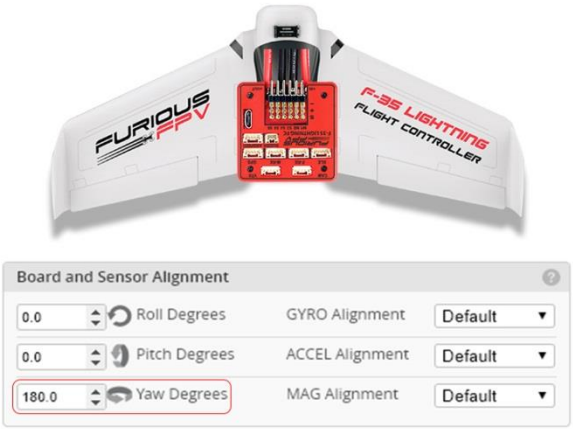
2. **Compass Calibrate:** Please click **Calibrate Magnetometer** then You have 30 seconds to hold the copter in the air and rotate it so that each side (front, back, left, right, top and bottom) points down towards the earth.
3. **Board Orientation:** If you have your board rotated in any way, change board alignment to match- please check the below pictures:



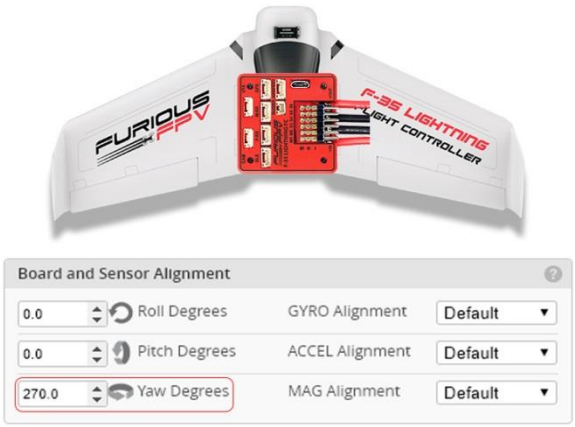
(1)



(2)



(3)



(4)

How To Connect INAV Wireless To F-35 Via TBS Crossfire TX

The Device:

- TBS Micro RX V2 + TBS Crossfire TX
- **Micro RX** cable for F-35 + **TBS-External** Cable for F-35 (Include in the package)
- App: **INAV Configurator** on PC, **EZ-Gui** on Android.
- Video: Wireless connection to INAV via TBS Crossfire Tx + TBS Micro Rx V2

Step 1: Using **TBS-Ext cable** plug to **Micro RX cable** like bellow picture:

Step 2: Mapping Output channels for TBS Micro RX.

- Output 1: CRSF TX
- Output 2: CRSF RX
- Output 3: Serial RX
- Output 4: Serial TX

Step 3: Configure your TBS Crossfire Module.
Please select Bluetooth protocol of TBS TX module is **BRIDGE.**

***Note:** Verify that you **turn on** Telemetry on Receiver

Step 4: Connect your device to use Configurator app.

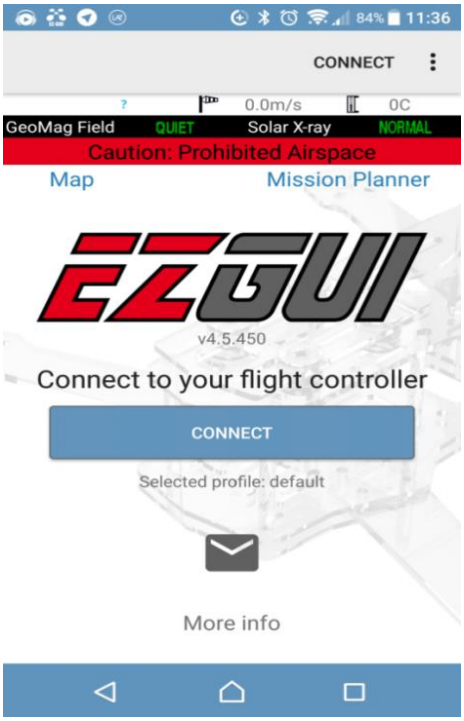
❖ **Option1: Connect with PC:**

1. Use Bluetooth on PC search and add your TBS Module Bluetooth. Normally TBS have name is Crossfire#### (# is number).
2. Open INAV Configurator on PC, then check new Port.Com number using to connect TBS Crossfire TX and select it. (You can check it in **Device Manager**). And select **Baud rate is 57600**.
3. Turn on **WIRELESS mode** of INAV at the Right-Top interface of app. Then, click Connect button to connect.

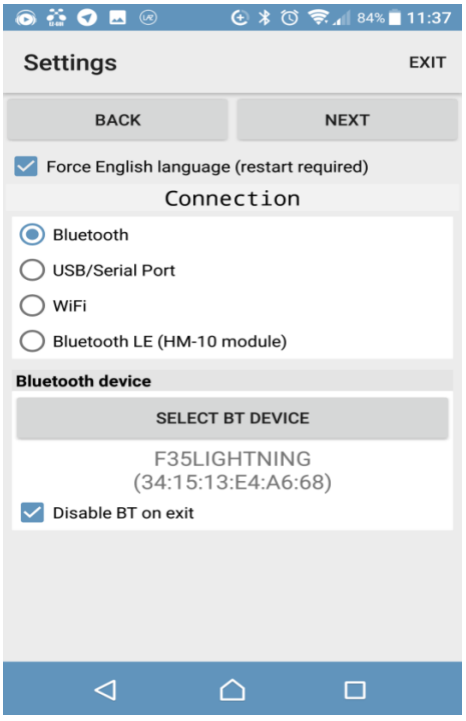
- Now you can do anything with a wireless connection same when you connect with USB cable.

❖ **Option2: Connect with EZ-Gui on Android app:**

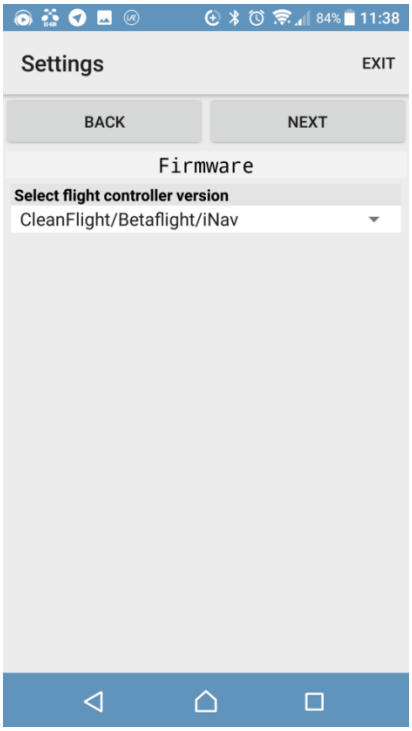
1. Download and install app at here: **DOWNLOAD**
2. Turn On Bluetooth on your mobile
3. Open EZ Gui:



– Click icon 3 Vertical dots the Top-Right screen and click **Settings** to go to page setting and configure for Connections. At here, we will select connection is **Bluetooth** then click **SELECT BT DEVICE** to search you TBS Crossfire module and select it when detected your module.



– Click next icon and select Firmware is **Cleanflight/Betaflight/INAV**.



– Click next and select option same as units or another options. After app will come back home screen.

4. At Home Screen, please click CONNECT to connect your app to FC.

How To Connect Smartphone To F-35 Lightning FC Via FuriousFPV Bluetooth Module

The Device:

– FuriousFPV Bluetooth Module
– App: **INAV Configurator** on PC, **EZ-Gui** on Android.
– Video: [Calibrate sensor with wireless connection Via Bluetooth module]

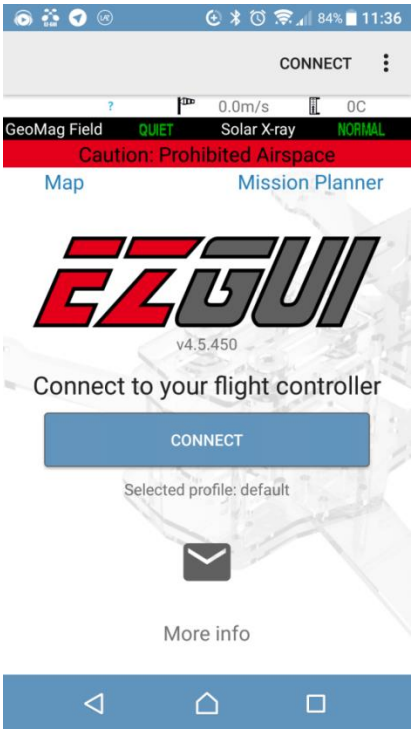
Step 1: Plug FuriousFPV module into F-35 Lightning FC. Then, go into **Ports** tab on the **INAV Configurator** and configure as the pictures below:

Identifier	Data	Telemetry	RX	Sensors	Peripherals
USB VCP	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART1	MSP 57600	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART2	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART3	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART4	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART5	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200
UART6	MSP 115200	Disabled AUTO	Serial RX	Disabled 38400	Disabled 115200

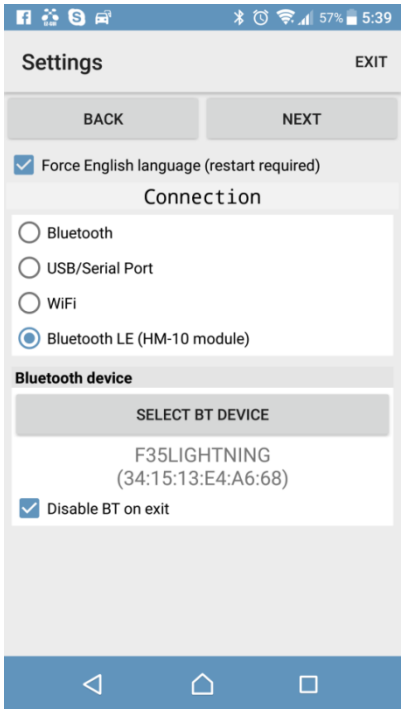
Step 2: Connect with EZ-Gui on Android app

1. Download and install app at here: **DOWNLOAD**
2. Turn On Bluetooth on your mobile

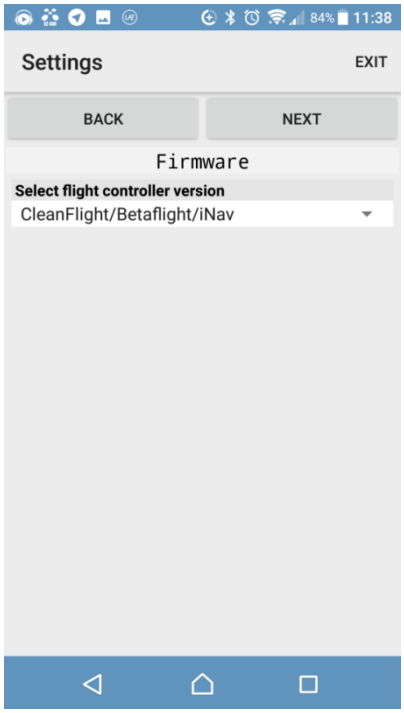
3. Open EZ Gui:



– Click icon 3 Vertical dots the Top-Right screen and click **Settings** to go to page setting and configure for Connections. At here, we will select connection is **Bluetooth** then click **SELECT BT DEVICE** to search you TBS Crossfire module and select it when detected your module.



- Click next icon and select Firmware is **Cleanflight/Betaflight/INAV**.



- Click next and select option same as units or another options. After app will come back home screen.

4. At Home Screen, please click CONNECT to connect your app to FC.

How To Setup Failsafe

Setting up Return Home for Failsafe to purpose: when Wing lost signal with Transmitter, Wing will auto return home afterward

Step 1: Configure **Receiver**

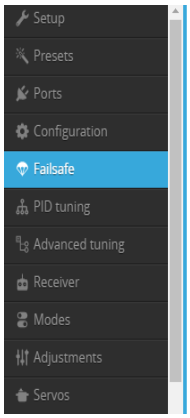
There are two options to configure:

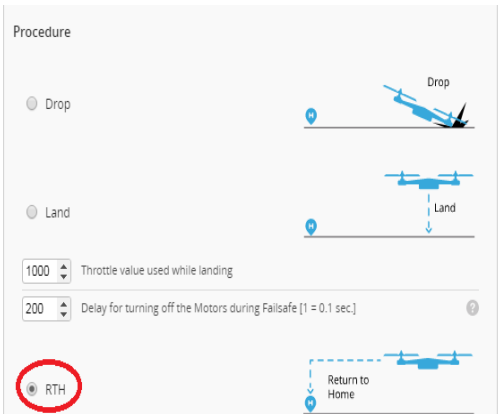
- ❖ Option 1: Cut off the channel
- ❖ Option 2: Set Position

1. Go into **Modes** tab and select a switch for Failsafe
2. Set Switches and Sticks on your transmitter to the following below
   - Throttle: 0% (No throttle)
   - Aileron: 50% (No input, Stick center)
   - Rudder: 50% (No input, Stick center)
   - Elevator: 50% (No input, Stick center)
   - Failsafe mode: activated
   - Arm switch: Disarmed (If you use stick arming you can skip this)

Step 2: Configure **INAV Configurator**

1. Open **INAV Configurator** and go into **Failsafe** tab
2. Enable **RTH** on the **setting** stage

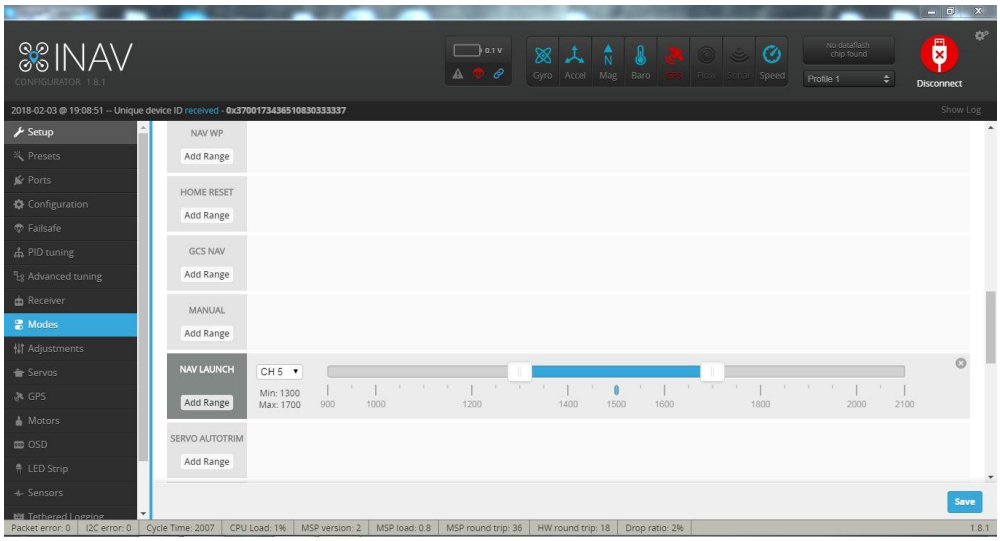




How To Use NAV LAUNCH (Auto Take Off) Function

Video: [How to use NAV LAUNCH (Auto Take off) with F-35 Lightning FC]

Step1: Open "**INAV Configurator"** → Select "**Mode"** tab → drag to **NAV LAUNCH** function, click **Add Range** and select **CH** channel for switch that you want to use this mode



Step2: Set switch to NAV LAUNCH mode prior to arming (note that it won't actually enable until arming)

Step3: ARM the plane. Motor should start spinning at min_throttle (if MOTOR_STOP is active, motor won't spin)

***Note:**

- NAV LAUNCH is automatically aborted after 5 seconds or by any pilot touch on PITCH/ROLL stick
- Verify that motor don't respond to throttle stick motion

Step4: Put throttle stick to desired throttle value to be set after launch is finished.

Step5: Throw the airplane.

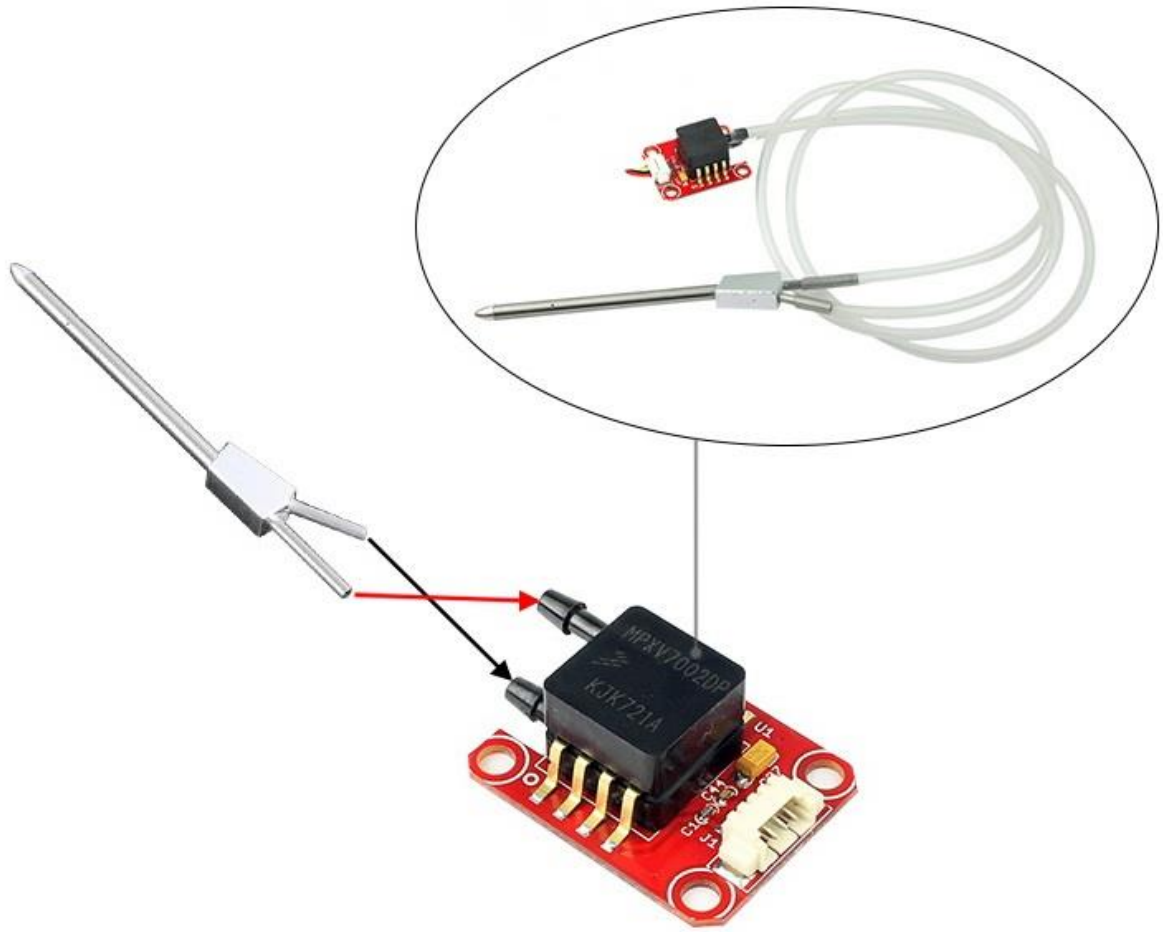
***Note:** It must be thrown leveled or thrown by slinging it by wingtip

Step6: Launch sequence will finish when pilot switch off the NAV LAUNCH mode or move the sticks

INAV MODE

No	Mode Name	Description
1	ANGLE	Stabilized mode with self leveling and restricted banking angles
2	HORIZON	Stabilized mode with self leveling but without restricted banking angles
3	NAV RTH	Used for Return-to-home. Does not need any other mode selected.
4	NAV WP	Used to fly WAYPOINT mission. Does not need any other mode selected.
5	PASSTHRU	Used with fixed-wings to control everything manually. (Direct servo control)
6	AIR MODE	Keeps PID controller active at zero throttle
7	HEADING HOLD	Holds current heading using yaw rotation (rudder). Can be used with and without compass.
8	ARM	Used to switch arm aircraft
9	BEEPER	Used to activate beeper
10	OSD SW	Turns on and off OSD overlay
11	TELEMETRY	Normally telemetry is always enabled, using this mode allows you to turn telemetry on and off at will
12	FAILSAFE	Used to manually initiate FAILSAFE
13	HOME RESET	Used to set a new home position at the current aircraft position.
14	GCS NAV	Used to allow ground station to control aircraft to do stuff
15	FLAPERON	Used to activate flaperons on fixed-wing aircraft.
16	NAV LAUNCH	Used to detect and automatic launch fixed-wing aircraft.
17	SERVO AUTOTRIM	Used to trim midpoint for servos to maintain straight flight
18	AUTO TURN	Automatically tune fixed-wing PIFF gains.

How to assembly silicone for airspeed sensor



Video Guide

Video 1: Wireless connection to INAV via TBS Crossfire Tx + TBS Micro Rx V2

Video 2: Calibrate sensor with wireless connection Via Bluetooth module

Video 3: How to use NAV LAUNCH (Auto Take off) with F-35 Lightning FC

Video 4: How to flash firmware and calibrate Acceloremeter

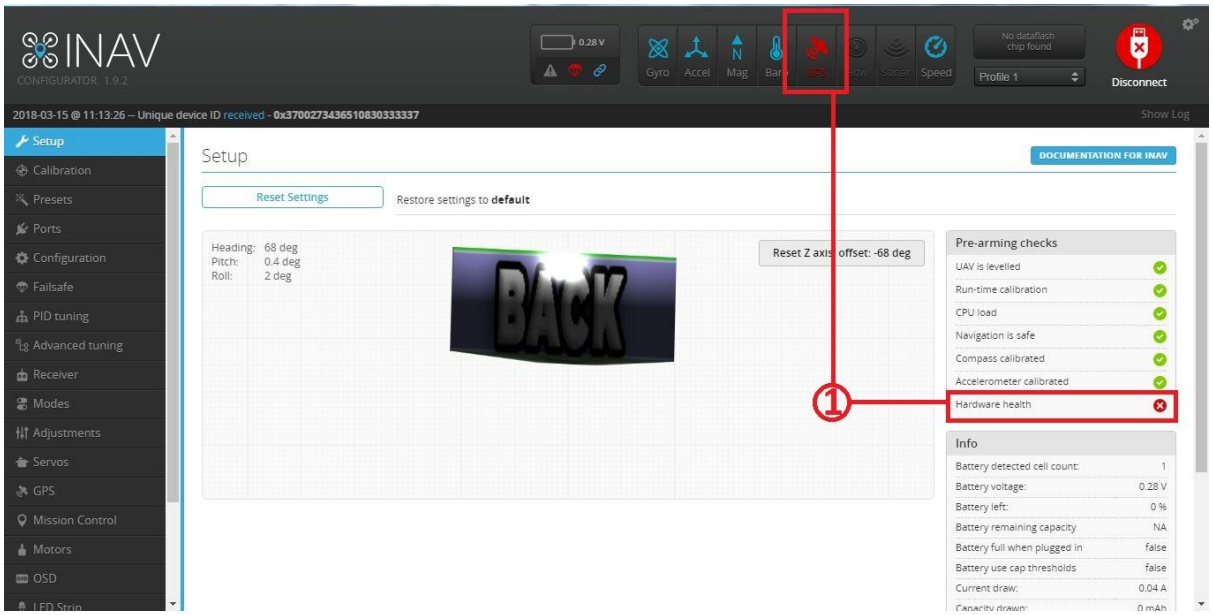
Video 5: Calibrations sensor and active Compass Calibrate button on INAV 1.9

Video 6: Setup TBS Nano RX and set RSSI to F-35 Lightning

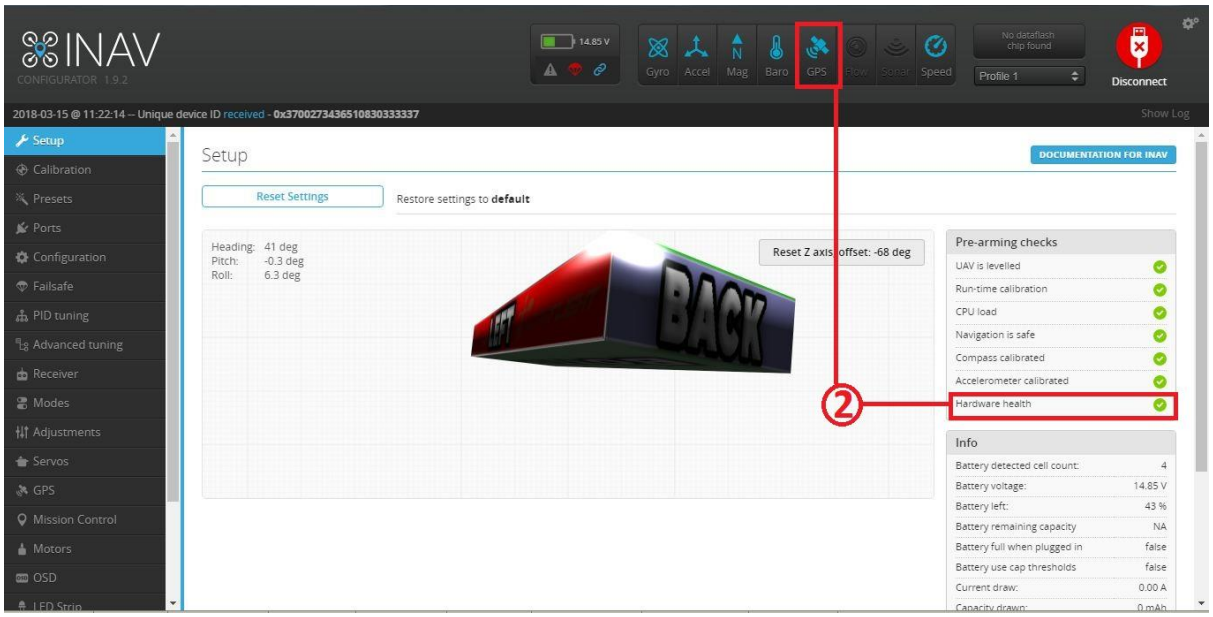
Frequently Asked Questions

Q: Why don’t the Hardware Health work?

A: In the (P1) picture, the Hardware Health is not working. The reason is that you don’t plug GPS module or don’t power on the FC. To solve this issue, you need to plug GPS module and verify that plugged battery for FC. Then, this function will work afterward as the (P2) picture.



(P1)



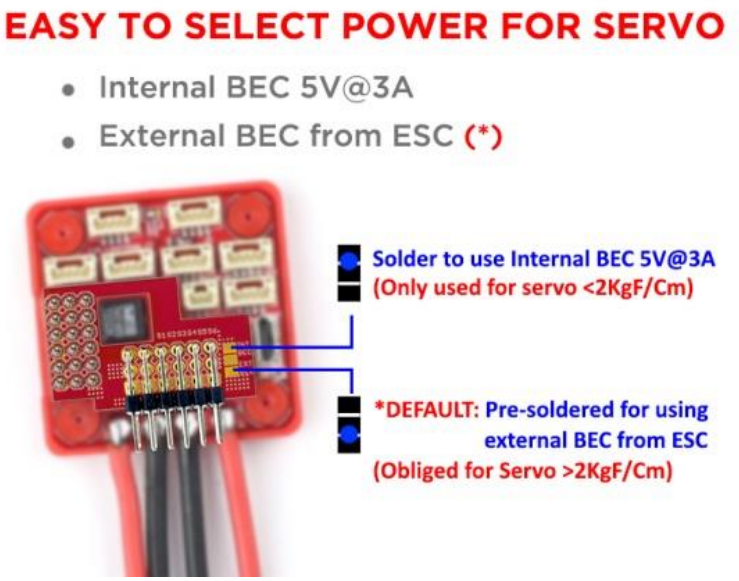
(P2)

Q: Cannot Calibrate Acceloremeter or the Pitch and Roll values are not correct

A: Please flash latest firmware and setup as the manual

Q: How can I switch from External BEC to Internal BEC?

A: Open your plastic case and refer the picture below



Q: Is there a way to directly connect and configure LED Strips on the F-35 Lightning?

A: F-35 Lightning don't support LED Strips

Thanks for using our product