

F-35 LIGHTNING

FLIGHT CONTROLLER

USER MANUAL VERSION 1.5



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Manual user log

V1.5:

- Update configure with DJI OcuSync Air Unit

*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

🚖 Servos	
🚴 GPS	
🛓 Motors	$(S_{2}(2) N A \setminus A A$
🖾 OSD	$\Box O \Box \Box I I \land I \land \land \land \land$
🖣 LED Strip	Paste at here
+ Sensors	
Tethered Logging	
: Blackbox	Write your command here

Open **INAV Configurator** \rightarrow 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 T 38400 T	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 V AUTO V	Serial RX	Disabled V 38400 V	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		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	IRC Tramp • 115200 •
UART5	MSP 115200 •	Disabled • AUTO •	Serial RX	Disabled T 38400 T	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 V 38400 V	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 \rightarrow Go to Configuration tab and drag to Receiver Mode. Then, select PPM RX input as the picture below

🖌 Setup	NONE Rangefinder	Synchronize looptime with gyroscope
🔌 Presets	Board and Sensor Alignment	500Hz Flight Controller Loop Time
🖌 Ports	0,0 CRON Degrees GYRO Alignment Default •	Restore Welson
Configuration	0,0 CEL Alignment Default	Battery voltage
👽 Failsafe	0.0 Caw Degrees MAG Alignment Default V	Battery voltage monitoring
, and tuning		3,3 🗘 Minimum Cell Voltage
ြီး Advanced tuning	Receiver Mode	4,3 🗘 Maximum Cell Voltage
📩 Receiver	PPM RX input	3,5 🗘 Warning Cell Voltage
		Taxa Al Malaca Barta



II. FrSky Receiver

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

Identifier	Data	Telemetry	RX	Sensors	Peripherals
USB VCP	MSP 115200 T	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. R-XSR

Identifier	Data	Telemetry	RX	Sensors	Peripherals
USB VCP	MSP 115200 •	Disabled • AUTO •	Serial RX	Disabled V 38400 V	Disabled • 115200 •
UART1	MSP 19200 •	Disabled • AUTO •	Serial RX	Disabled V 38400 V	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 V 38400 V	Disabled • 115200 •
UART5	MSP 115200 •	Disabled • AUTO •	Serial RX	Disabled • 38400 •	Disabled • 115200 •
UART6	MSP 115200 •	SmartPort V AUTO V	Serial RX	Disabled • 38400 •	Disabled • 115200 •





3. R9

Identifier	Data	Telemetry		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. R9 Slim

Identifier	Data	Telemetry	RX	Sensors	Peripherals
USB VCP	MSP 115200 •	Disabled • AUTO •	Serial RX	Disabled V 38400 V	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 •
UARTS	MSP 115200 •	Disabled • AUTO •	Serial RX	Disabled • 38400 •	Disabled • 115200 •
UART6	MSP 115200 •	SmartPort + AUTO +	Serial RX	Disabled • 38400 •	Disabled • 115200 •





5. 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 V AUTO V	Serial RX	Disabled • 38400 •	Disabled • 115200 •



6. SPD15

Identifier	Data	Telemetry	RX	Sensors	Peripherals
USB VCP	MSP 115200 V	Disabled • AUTO •	Serial RX	Disabled • 38400 •	Disabled • 115200 •
UART1	MSP 57600 T	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 •





7. 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 •
UARTS	MSP 115200 •	Disabled • AUTO •	Serial RX	Disabled • 38400 •	Disabled • 115200 •
UART6	MSP 115200 *	SmartPort • AUTO •	Serial RX	Disabled • 38400 •	Disabled • 115200 •



III. 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 •





IV. DJI Ocussync Air Unit

Identifier	Data	Telemetry	RX	Sensors	Peripherals
USB VCP	MSP 115200 •	Disabled V AUTO V	Serial RX	Disabled • 38400 •	Disabled • 115200 •
UART1	MSP 57600 •	Disabled • AUTO •	Serial RX	Disabled V 38400 V	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 V 38400 V	IRC Tramp • 115200 •
UART5	MSP 115200 V	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 DJI Ocusync Air Unit



V. Spektrum Receiver

Identifier	Data	Telemetry	RX	Sensors	Peripherals
USB VCP	MSP 115200 T	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 •





VI. Dragon Link Micro UHF Receiver

Connection with Dragon Link Micro UHF Receiver

Identifier	Data	Telemetry	RX	Sensors	Peripherals
USB VCP	MSP 115200 •	Disabled V AUTO V	Serial RX	Disabled V 38400 V	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 \rightarrow 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

RX - Dra	gonLink (GUI - v. 1.9							×
File	Edit H	elp							
Main setu	P Spect	rum analyzer	Logging	Advanc	ced calibration GPS	Workplace			
ID	153		~			PPM PPM channels	/S-bus out	Enable beaco	n 🔲
<u>Mic</u>	roRx	output	5			CH 1	Channel 1 V	433.5 🗸	MHz
Failsa	fe Nor	mal	~	CH 1	Output on pins	S CH 2	Channel 2 🗸 🗸	300 🗸	Seconds before enable
011	Cria			CH 2		CH 3	Channel 3 🗸 🗸	Unmodulated	~
CH 2	Cha	innel 2	~	CH Z		CH 4	Channel 4 🗸 🗸	RF protocol	
CH 3	Cha	nnel 3	~	CH 3		CH 5	Channel 5 \checkmark	V2 1280MHz	triendly ~
CH 4	Cha	nnel 4	~	CH 4		CH 6	Channel 6 🗸 🗸	Messages MicroRx conr	nected
CH 5	Cha	nnel 5	~	CH 5		CH 7	Channel 7 🗸 🗸	Config receive Config receive	ed ed
CH 6	Cha	nnel 6	~	CH 6		CH 8	Channel 8 🗸		
CH 7	SB	us	~	CH 7		CH 9	Channel 9 🗸		
CH 8	Ana	log RSSI	\sim	CH 8		CH 10	Channel 10 🗸 🗸		
Sa	ve setting:	s reboo	t			CH 11	Channel 11 🗸 🗸		
Plot F	RSSI 🗹	Plot min s	upply 🗹			CH 12	Channel 12 🗸	MicroRx Firmware v. 1.9	Connected
	0 100 +			20	40		60	80	100
	80								
R	60								7 °
S	40			<u> </u>					
	20								g
	~								4
	0-								



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 V	Disabled • AUTO •	Serial RX	Disabled • 38400 •	Disabled • 115200 •
UART1	MSP 57600 •	Disabled • AUTO •	Serial RX	Disabled • 38400 •	Disabled • 115200 •
UART2	MSP 115200 ¥	Disabled V AUTO V	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 •
JART5	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 pin outs 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 •







4. Using with TBS Unify 2G4:

Identifier	Data	Telemetry	RX	Sensors	Peripherals
USB VCP	MSP 115200 •	Disabled V AUTO V	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 V	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 V 38400 V	Disabled • 115200 •
UART1	MSP 57600 •	Disabled • AUTO •	Serial RX	Disabled V 38400 V	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 V 38400 V	IRC Tramp • 115200 •
UART5	MSP 115200 •	Disabled • AUTO •	Serial RX	Disabled V 38400 V	Disabled • 115200 •
UART6	MSP 115200 •	SmartPort • AUTO •	Serial RX	Disabled • 38400 •	Disabled • 115200 •



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

🖌 Setup	GPS	
🔍 Presets	Note: Remember to configure a Serial Port (via Ports tab) when using GPS feature.	
🖌 Ports	GPS for navigation and telemetry	0
Configuration	UBLOX Protocol	
💎 Failsafe	Disable Ground Assistance Type	
ដង PID tuning	0 Agnetometer Declination [deg]	
B Advanced tuning		



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 V 38400 V	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 \rightarrow Click Configuration tab \rightarrow Drag to GPS and configure as the picture below:

🖌 Setup	GPS	
🕺 Presets	Note: Remember to configure a Serial Port (via Ports tab) when using GPS feature.	
🖌 Ports	GPS for navigation and telemetry	0
Configuration	UBLOX V Protocol	
💎 Failsafe	Disable ▼ Ground Assistance Type	
ដឹង PID tuning	0 \$ Magnetometer Declination [deg]	
ြန Advanced tuning		



Connection with Camera (Plug and Play with CAM Cable)

1. RunCam Eagle 2





3. RunCam Split 2



4. 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 are 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: <u>Set Failsafe</u>

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 <u>FuriousFPV Bluetooth Module</u> or <u>TBS Crossfire TX</u>.

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:

		SHTTING TROLLER	
			0
Board and Sensor Alignment			9
0.0 CRoll Degrees	GYRO Alignment	Default	,
0.0 🗘 🕽 Pitch Degrees	ACCEL Alignment	Default	•
0.0 🗘 🖘 Yaw Degrees	MAG Alignment	Default	•



Board	and Sensor Alignment		0
0.0	Coll Degrees	GYRO Alignment	Default 🔹
0.0	🗘 🜖 Pitch Degrees	ACCEL Alignment	Default 🔹
90.0	🗘 🕤 Yaw Degrees	MAG Alignment	Default •

(2)

(1)



0.0	CRoll Degrees	GYRO Alignment	Default	٠
0.0	Pitch Degrees	ACCEL Alignment	Default	٠
180.0	🗧 🧊 Yaw Degrees	MAG Alignment	Default	•

(3)

Board a	nd Sensor Alignment			0
0.0	Coll Degrees	GYRO Alignment	Default	•
0.0	Pitch Degrees	ACCEL Alignment	Default	•
270.0	💲 🧊 Yaw Degrees	MAG Alignment	Default	¥

(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).
- 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.

💿 🏭 💎 🖬 📧	⊕ ¥ ©	╤ ₄∥ 84%	11:37			
Settings			EXIT			
BACK		NEXT				
🔽 Force English language	(restart i	required)				
Conne	ction					
 Bluetooth 						
USB/Serial Port	USB/Serial Port					
O WiFi	🔿 WiFi					
Bluetooth LE (HM-10 m	nodule)					
Bluetooth device						
SELECT E	T DEVIC	E				
F35LIGI (34:15:13: ✓ Disable BT on exit	HTNIN E4:A6:	G 68)				
۵ ۵	2					



- 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 CONNECTS 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:

ldentifier	Data	Telemetry	RX	Sensors	Peripherals
USB VCP	MSP 115200 ▼	Disabled T AUTO T	Serial RX	Disabled	Disabled T 115200 T
UART1	MSP 57600 ▼	Disabled T AUTO T	Serial RX	Disabled	Disabled T15200 T
UART2	MSP 115200 V	Disabled • AUTO •	Serial RX	Disabled V 38400 V	Disabled T15200 T
UART3	MSP 115200 V	Disabled T AUTO T	Serial RX	Disabled V 38400 V	Disabled T 115200 T
UART4	MSP 115200 V	Disabled T AUTO T	Serial RX	Disabled V 38400 V	Disabled T115200 T
UART5	MSP 115200 V	Disabled T AUTO T	Serial RX	Disabled V 38400 V	Disabled T115200 T
UART6	MSP 115200 V	Disabled V AUTO V	Serial RX	Disabled V 38400 V	Disabled T 115200 T

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.

🖪 🏠 🕄 🖻	* 🛈 🤶 📶 57% 🖥 5:39
Settings	EXIT
BACK	NEXT
Force English language	(restart required)
Conne	ction
O Bluetooth	
USB/Serial Port	
🔿 WiFi	
Bluetooth LE (HM-10 n	nodule)
Bluetooth device	
SELECT E	T DEVICE
F35LIGI (34:15:13)	HTNING E4:A6:68)
Disable BT on exit	



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

💿 🏠 🕑 🖬 ଉ	€ * ©	🛜 📶 84% 🗍	11:38
Settings			EXIT
BACK		NEXT	
Firm	nware		
Select flight controller ver	sion		
CleanFlight/Betaflight/	'iNav		Ψ.
۵ (

- 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

🖌 Setup	^	Procedure	
× Presets			
🖌 Ports		Drop	Drop
Configuration			0
💎 Failsafe			
႕ PID tuning		Land	Land
ြန Advanced tuning			V
📩 Receiver		1000 Throttle value used while landing	
🖀 Modes		200 Delay for turning off the Motors during Failsaf	e [1 = 0.1 sec.]
‡ ‡ Adjustments		\sim	
🖶 Servos		RTH	Return to Home

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**" \rightarrow Select "**Mode**" tab \rightarrow drag to **NAV LAUNCH** function, click **Add Range** and select **CH** channel for switch that you want to use this mode

			the second s			and the second se		
							No dataflash chip found Profile 1 \$	Disconnect
2018-02-03 @ 19:08:51 Unique device ID received - 0	(3700173436510830)	333337						
🖌 Setup								^
X Presets Add Range								
Nº Ports								
Configuration								
Tailsafe								
க் PID tuning GCS NAV								
1/28 Advanced tuning Add Range								
da Receiver								
Contract Add Bange								
tt Adjustments								
🚔 Servas NAV LAUNCH	CH 5 🔻		1	2				•
Add Range	Min: 1300 Max: 1700	900 1000	1200	1400	1500 1600	1800	2000 2	100
A Motors								
C OSD SERVO AUTOTR	M							
Add Range								
+- Sensors								Sava
Packet error 0 12C error 0 Curle Time 2007	Dilload 106 MSD	McDioad 0.9	MCD round trip, 26	WW round trip.	18 Dron ratio: 26			181

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		Stabilized mode with self leveling but without restricted				
Z	HUKIZUN	banking angles				
2		Used for Return-to-home. Does not need any other mode				
5	NAVRIII	selected.				
л		Used to fly WAYPOINT mission. Does not need any other mode				
4		selected.				
5	DASSTHRU	Used with fixed-wings to control everything manually. (Direct				
5	TASSTINO	servo control)				
6	AIR MODE	Keeps PID controller active at zero throttle				
7	HEADING	Holds current heading using yaw rotation (rudder). Can be used				
/	HOLD	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				
12		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	Used to trim midpoint for servos to maintain straight flight				
1/	AUTOTRIM					
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.

SINAV			Accel Mag. Bar Bar Subscription	No dataflash chip found	Disconnect
018-03-15 @ 11:13:26 Unique device ID	received - 0x370027343651	0830333337			
🌶 Setup	3) 			6	
Calibration	up			DOCUMENTA	ION FOR INAV
Presets	Reset Settings	Restore settings to default			
Ports					
Не	ading: 68 deg		Reset 7 axis offset: -68 deg	Pre-arming checks	
Configuration	ch: 0.4 deg		incontraining and	UAV is levelled	0
9 Failsafe	n. 200g			Run-time calibration	0
, PID tuning				CPU load	0
Advanced tuning		NUMB		Navigation is safe	0
, Auvanceu tuning				Compass calibrated	0
Receiver			4	Accelerometer calibrated	0
Modes			(1)	Hardware health	0
† Adjustments				Info	
r Servos				Battery detected cell count:	1
CDS				Battery voltage:	0.28 V
				Battery left:	0.96
Mission Control				Battery remaining capacity	NA
Motors				Battery full when plugged in	false
OSD				Battery use cap thresholds	false
				Current draw:	0.04 A
ED-Strio				Canacity drawn	0 mAh



(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

EASY TO SELECT POWER FOR SERVO

- Internal BEC 5V@3A
- External BEC from ESC (*)



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