

FORTINI F4

Flight Controller

USER MANUAL VERSION 1.0



Please contact us if you need further assistance: Tech support: <u>tech@furiousfpv.com</u> Sales support: <u>sales@furiousfpv.com</u> Website: <u>http://furiousfpv.com/</u>





Contents

Introduction	2
Features	2
Connections	4
Connect with Receiver	4
 Using SPD15 Receiver 	4
 Using LR1000D Receiver 	5
Using XSR FrSky Receiver	6
 Using Spektrum Satellite Receiver 	6
Connect with Video Transmitter	7
 Using Tramp HV 	7
 Using TBS Unify Pro 	9
 Using FX FX799T 	11
Connect with stack Mnova and Runcam	13
Connect with other devices	14
Connect with ESC 4 in 1	15
 Using Aikon SEFM 30A 	15
 Using Cicada 35x4 35A 	16
Using T-Motor F 35A 4IN1-4S	17
Basic setup	18
Tips	20
How to configure your Spektrum RX with your Flight Controller	20
How to open Piggy OSD menu by Transmitter	21



Introduction

After a full year of study & experience with the Radiance & KOMBINI Flight Controllers, we've gathered every aspect of customer feedback in an ultimate effort to produce the single most cutting edge Flight Controller the FPV market has ever seen. Hold on - you don't want to miss this.

Enter the all new Fortini F4 - the culmination of years of research and application as we push forward into the outer limits of FPV. With a new high performance, low noise 32kHz Invensense 20602 gyro that features ultra-high sensitivity, this FC is designed for outright performance, offering ultracrisp flight characteristics that will be felt in every move you make. Want more? Don't worry - just look below.

With a massive array of (5) UARTS, the Fortini F4 allows simultaneous connection of SBUS, S.PORT, OSD, USB and either a TBS Smart Audio System or Immersion RC Tramp. Furthering this, the Fortini F4 is the very first Flight Controller that offers built in input & output Inrush Voltage Protection to protect the BEC and other electronic components in the case of extreme voltage spikes.

Soft mounted for the ultimate in vibration protection, the Fortini F4 features 16MB of integrated flash memory, allowing BlackBox functionality to review all data after your flight. The Fortini F4 is also the very first FC to allow S.PORT direct connection with the receiver without any aspect of receiver modification.

The Fortini F4 is the full up package, breaking new ground in true FC brilliance. Toss compromise out the window and open your FPV world to the most functional and feature packed FC you have ever seen before.

Features

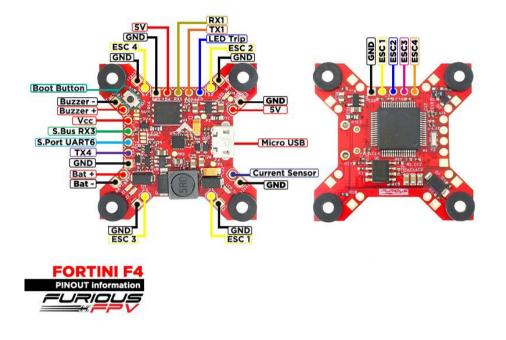
- Invensense 20602 gyro for high speed 32khz, lowest noise floor and highest sensitivity
- Gyro located as close as possible to the center
- Integrated vibration dampening dummies
- Separate power supply for gyro with LDO low noise and high accuracy
- Built in driver inverter for S-bus
- Built in driver inverter for Smartport connection directly to FC
- MCU: STM32F405
- Voltage and current ADC pins, for full voltage and current monitoring



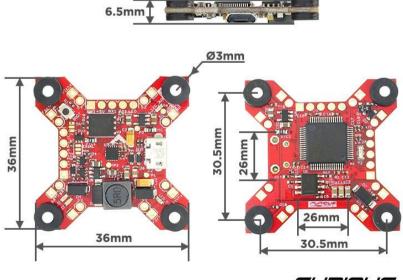
- 16MB of flash memory Blackbox
- 5x Serial UARTs for USB, OSD, SMART AUDIO or TRAMP, SPORT, SBUS
- RX powered via USB
- Selectable 3.3V or 5V for RX



- LED Driver for WS2812b programmable LED
- Integrated buzzer driver
- Built-in BEC 5V-2A supports direct 2-6S Lipo connection
- Inrush Voltage Protection Input and Output by Transient Voltage SuppressorBoard Layout
- Weight: 5.5gr



Dimensions





Connections

Connect with Receiver:

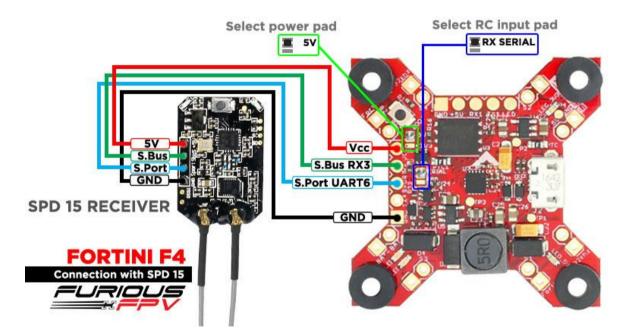
***WARNING:** Fortini F4 can support up to 6s Lipo battery but make sure other devices also support it.

Using SPD15 Receiver:

* **NOTE:** If you are using S.Port with firmware 3.1.7, please enter CLI mode and type the following commands:

set_sport_halfduplex = OFF save

Port Identifier	Configuration	Serial Rx	Telemetry Output	Sensor Input
USB VCP	MSP 115200 🔻	Serial RX	Disabled T AUTO T	Disabled • AUTO •
UART1	MSP 115200 •	Serial RX	Disabled • AUTO •	Disabled • AUTO •
UART3	MSP 115200 •	Serial RX	Disabled • AUTO •	Disabled • AUTO •
UART4	MSP 115200 V	Serial RX	Disabled • AUTO •	Disabled • AUTO •
UART6	MSP 115200 T	Serial RX	SmartPort V AUTO V	Disabled • AUTO •



You can buy SPD15 Receiver right here: <u>https://goo.gl/FTnrpR</u>

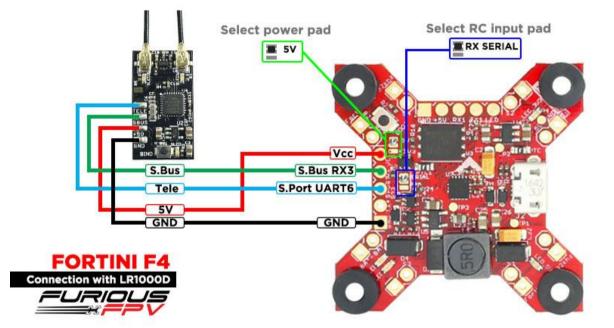


Using LR1000D Receiver:

* **NOTE:** If you are using S.Port with firmware 3.1.7, please enter CLI mode and type the following commands:

set	sport_	_halfduplex	<mark>= OFF</mark>
save	2		

Port Identifier	Configuration	Serial Rx	Telemetry Output	Sensor Input
USB VCP	MSP 115200 V	Serial RX	Disabled • AUTO •	Disabled • AUTO •
UART1	MSP 115200 V	Serial RX	Disabled • AUTO •	Disabled • AUTO •
UART3	MSP 115200 V	Serial RX	Disabled • AUTO •	Disabled • AUTO •
UART4	MSP 115200 V	Serial RX	Disabled • AUTO •	Disabled • AUTO •
UART6	MSP 115200 Y	Serial RX	SmartPort VAUTO V	Disabled • AUTO •



You can buy LR1000D Receiver right here: <u>https://goo.gl/4Cr0Hl</u>

* NOTE: If you use LR1000D Receiver please go to CLI and type the following

commands:

<mark>set sbus_inversion = OFF</mark>

<mark>save</mark>

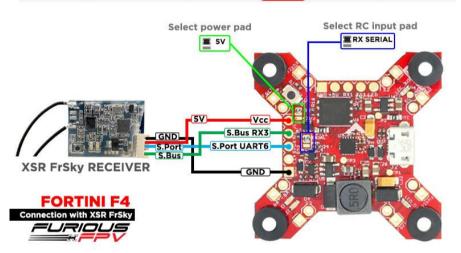


Using XSR FrSky Receiver:

* **NOTE:** If you are using S.Port with firmware 3.1.7, please enter CLI mode and type the following commands:

set	sport_	_halfduplex	<mark>= OFF</mark>
save	2		

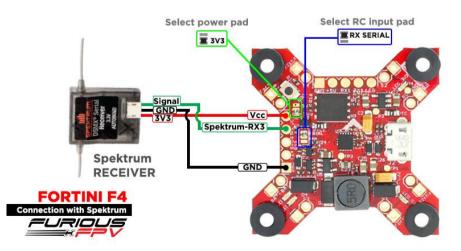
Port Identifier	Configuration	Serial Rx	Telemetry Output	Sensor Input
USB VCP	── MSP 115200 ▼	Serial RX	Disabled • AUTO •	Disabled • AUTO •
UART1	MSP 115200 V	Serial RX	Disabled • AUTO •	Disabled • AUTO •
UART3	MSP 115200 V	Serial RX	Disabled • AUTO •	Disabled • AUTO •
UART4	MSP 115200 V	Serial RX	Disabled • AUTO •	Disabled • AUTO •
UART6	MSP 115200 V	Serial RX	SmartPort . AUTO .	Disabled • AUTO •



Using Spektrum Satellite Receiver:

Port Identifier	Configuration				
USB VCP	MSP 115200 •	Serial RX	Disabled • AUTO •	Disabled • AUTO •	Disabled • AUTO •
JART1	MSP 115200 V	Serial RX	Disabled • AUTO •	Disabled • AUTO •	Disabled • AUTO •
UART3	MSP 115200 •	Serial RX	Disabled • AUTO •	Disabled • AUTO •	Disabled • AUTO •
UART4	MSP 115200 •	Serial RX	Disabled • AUTO •	Disabled • AUTO •	Disabled • AUTO •
UART6	MSP 115200 *	Serial RX	Disabled • AUTO •	Disabled • AUTO •	Disabled • AUTO •

NOTE: When use Spektrum Satellite for Fortini F4, you must use battery for FC's power





Connect with Video Transmitter:

Using Tramp HV:

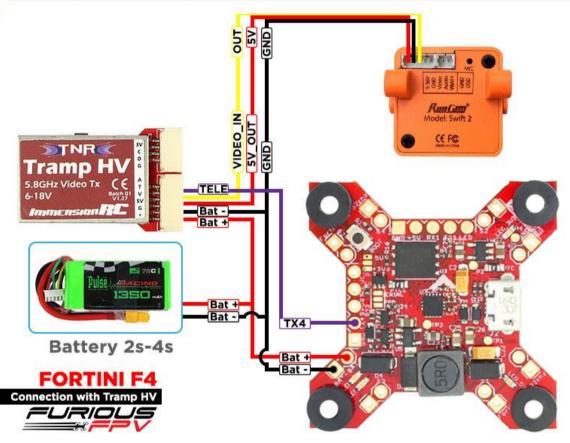
• With Piggy V2 OSD

A CONTRACTOR OF A DESCRIPTION OF A DESCR	Configuration	Serial Rx	Telemetry Output	Sensor Input	Peripherals
ISB VCP	MSP 115200 •	Serial RX	Disabled • AUTO •	Disabled • AUTO •	Disabled • AUTO
ART1	MSP 115200 •	Serial RX	Disabled • AUTO •	Disabled • AUTO •	Disabled • AUTO
NRT3	MSP 115200 •	Serial RX	Disabled • AUTO •	Disabled • AUTO •	Disabled • AUTO
ART4	MSP 115200 •	Serial RX	Disabled • AUTO •	Disabled • AUTO •	IRC Tramp • AUTO
RT6	MSP 115200 •	Serial RX	Disabled • AUTO •	Disabled • AUTO •	Disabled • AUTO
		VIDEO_IN	5V_OUT	GND TX RX	



• With Only Camera

Port Identifier	Configuration	Serial Rx	Telemetry Output	Sensor Input	Peripherals
USB VCP	MSP 115200 V	Serial RX	Disabled • AUTO •	Disabled • AUTO •	Disabled • AUTO
UARTI	MSP 115200 •	Serial RX	Disabled • AUTO •	Disabled • AUTO •	Disabled • AUTO
UART3	MSP 115200 ¥	Serial RX	Disabled • AUTO •	Disabled • AUTO •	Disabled • AUTO
UART4	MSP 115200 ·	Serial RX	Disabled • AUTO •	Disabled • AUTO •	IRC Tramp · AUTO
UART6	MSP 115200 •	Serial RX	Disabled • AUTO •	Disabled • AUTO •	Disabled • AUTO

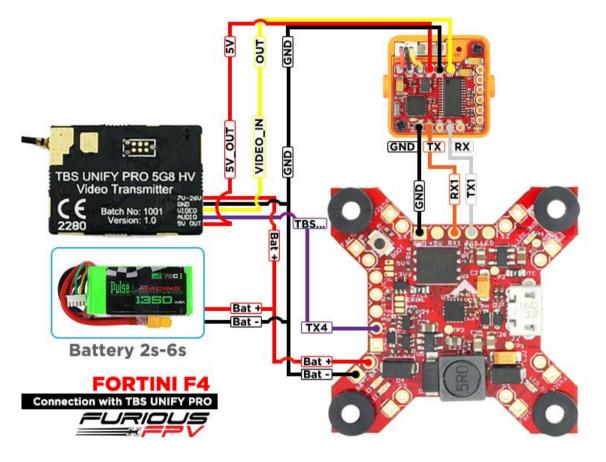




Using TBS Unify Pro:

• With Piggy V2 OSD

Port Identifier	Configuration	Serial Rx	Telemetry Output	Sensor Input	Peripherals
USB VCP	MSP 115200 •	Serial RX	Disabled • AUTO •	Disabled • AUTO •	Disabled • AUTO •
UART1	MSP 115200 •	Serial RX	Disabled • AUTO •	Disabled • AUTO •	Disabled • AUTO •
UART3	MSP 115200 •	Serial RX	Disabled • AUTO •	Disabled • AUTO •	Disabled • AUTO •
UART4	MSP 115200 •	Serial RX	Disabled • AUTO •	Disabled • AUTO •	TBS SmartAudio • AUTO •
UART6	MSP 115200 *	Serial RX	Disabled · AUTO ·	Disabled · AUTO ·	Disabled • AUTO •

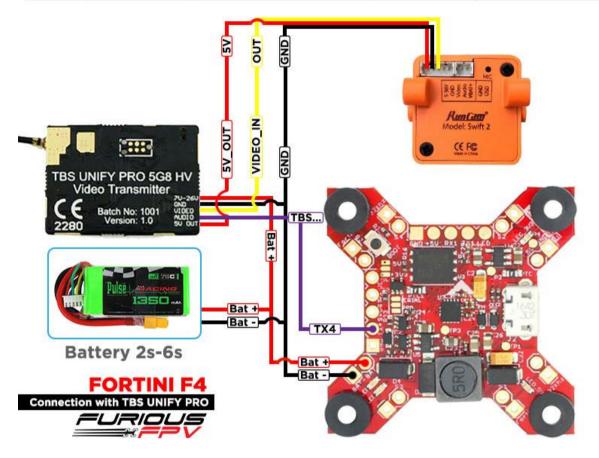




• With Only Camera

Note: not all combinations are valid. When the flight controller firmware detects this the senal port configuration will be reset. Note: Do NDT disable MSP on the first senal port unless you know what you are doing. You may have to reflash and erase your configuration if you do.

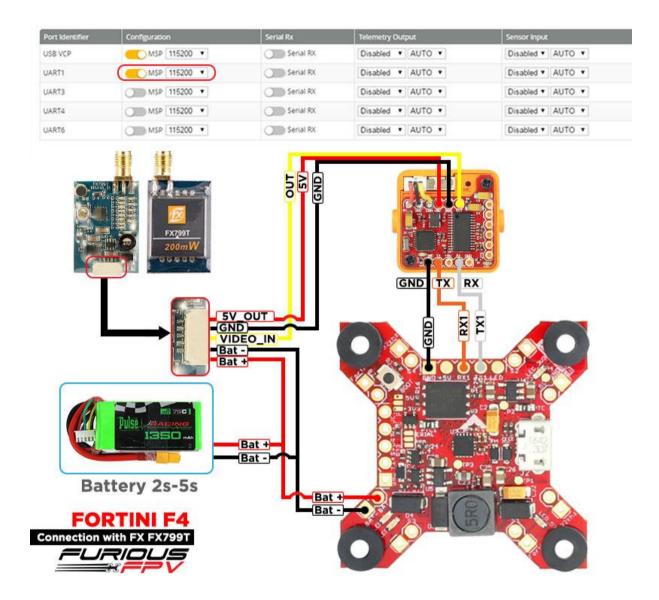
Port Identifier	Configuration	Serial Rx	Telemetry Output	Sensor Input	Peripherals
USB VCP	MSP 115200 •	Serial RX	Disabled • AUTO •	Disabled • AUTO •	Disabled • AUTO •
UART1	MSP 115200 •	Serial RX	Disabled • AUTO •	Disabled • AUTO •	Disabled • AUTO •
UART3	MSP 115200 •	Serial RX	Disabled • AUTO •	Disabled • AUTO •	Disabled • AUTO •
UART4	MSP 115200 •	Serial RX	Disabled • AUTO •	Disabled • AUTO •	TBS SmartAudio • AUTO •
UART6	MSP 115200 *	Serial RX	Disabled V AUTO V	Disabled • AUTO •	Disabled • AUTO •





Using FX FX799T:

• With Piggy V2 OSD

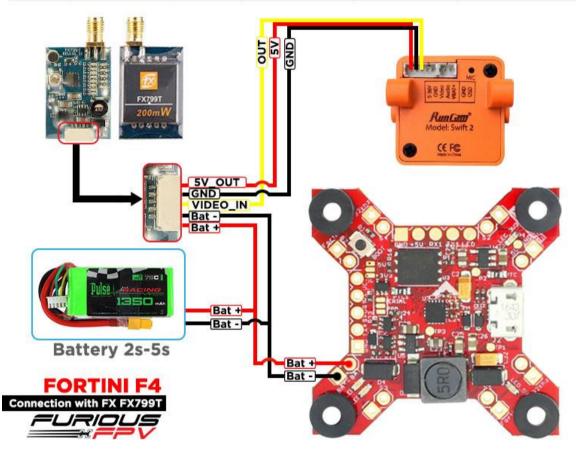




• With Only Camera

Note: not all combinations are valid. When the flight controller firmware detects this the serial port configuration will be reset. Note: Do NOT disable MSP on the first serial port unless you know what you are doing. You may have to reflash and erase your configuration if you do.

Port Identifier	Configuration	Serial Rx	Telemetry Output	Sensor Input	Peripherals
USB VCP	MSP 115200 •	Serial RX	Disabled • AUTO •	Disabled V AUTO V	Disabled • AUTO •
UART1	MSP 115200 •	Serial RX	Disabled • AUTO •	Disabled • AUTO •	Disabled • AUTO •
UART3	MSP 115200 •	Serial RX	Disabled • AUTO •	Disabled • AUTO •	Disabled • AUTO •
UART4	MSP 115200 ·	Serial RX	Disabled • AUTO •	Disabled * AUTO *	Disabled • AUTO •
WART6	MSP 115200 *	Serial RX	Disabled * AUTO *	Disabled + AUTO +	Disabled * AUTO *

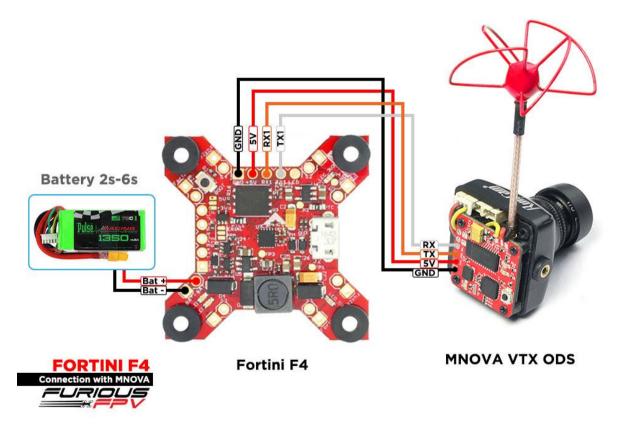




Connect with stack Mnova and Runcam :

	ations are valid. When the flight controller e MSP on the first serial port unless you kr
ort Identifier	Configuration
ISB VCP	──── MSP 115200 ▼
JART1	<u> </u>
JART3	MSP 115200 V
IART4	MSP 115200 V
JART6	MSP 115200 T

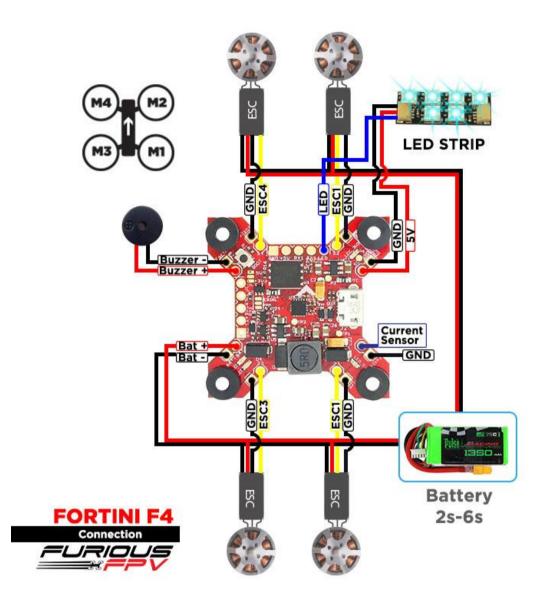
* WARNING: Mnova is only compatible with 5V. Please solder only to 5V pad if using Mnova



You can buy Mnova right here: <u>https://goo.gl/JyQnds</u>



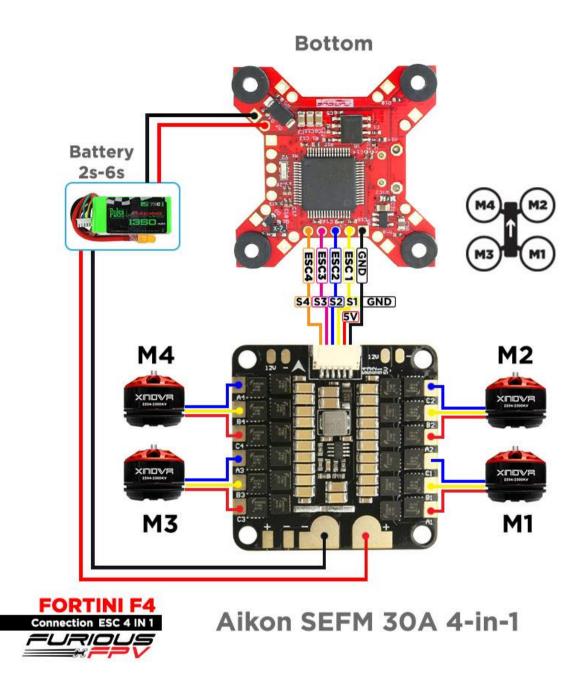
Connect with other devices:



You can buy LED STRIP right here: <u>https://goo.gl/TXwSwl</u>

Connect with ESC 4 in 1:

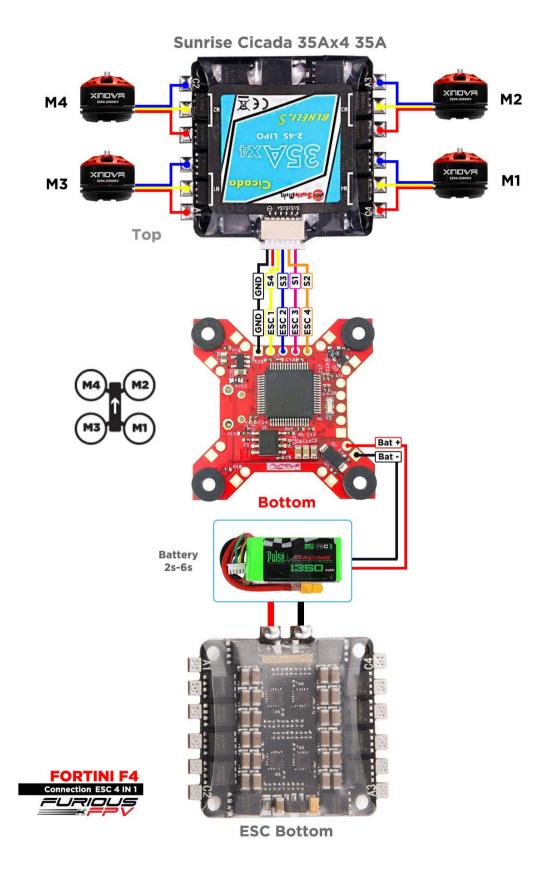
Using Aikon SEFM 30A:



You can buy ESC Aikon SEFM 30 4 in 1 right here: <u>https://goo.gl/IOYBEr</u>



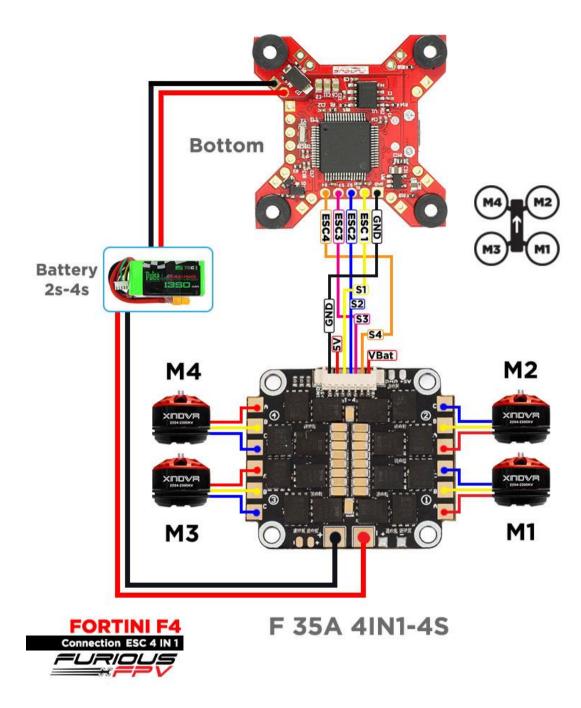
Using Cicada 35x4 35A:



You can buy ESC Sunrise Cicada 35x4 35A right here: <u>https://goo.gl/s080al</u>



Using T-Motor F 35A 4IN1-4S:



You can buy ESC F 35A 4in1-4S right hexre: <u>https://goo.gl/QyM3eh</u>



Basic setup

Please, follow carefully these next steps, and always **remove** your propellers when you're configuring your quad

STEP 1: Connect Fortini F4 with computer via USB cable and then open BetaFlight

STEP 2: Configure Ports.

- (1) Turn on MSP of UART 1 to use OSD.
- (2) Turn on Serial Rx of UART 3 to use Receiver Mode
- (3) Select SmartPort of UART 6 to use S.Port UART 6

	ations are valid. When the flight controller fin le MSP on the first serial port unless you kno		t configuration will be reset. ave to reflash and erase your configuration if you do.		
Port Identifier	Configuration	Serial Rx	Telemetry Output	Sensor Input	Peripherals
USB VCP	MSP 115200 •	Serial RX	Disabled V AUTO V	Disabled • AUTO •	Disabled • AUTO •
UART1	● MSP 115200 ▼	Serial RX	Disabled V AUTO V	Disabled V AUTO V	Disabled • AUTO •
UART3	MSP 115200 •	Serial RX	Disabled V AUTO V	Disabled • AUTO •	Disabled • AUTO •
UART4	MSP 115200 •	Serial RX	Disabled 🔻 AUTO 🔹 🍝	Disabled • AUTO •	Disabled • AUTO •
UART6	MSP 115200 T	Serial RX	SmartPort V AUTO V	Disabled V AUTO V	Disabled • AUTO •

- (4) In Peripherals of UART 4:
 - Select IRC Tramp for Tramp HV VTX

Note: Do Nor disabi	le MSP on the first serial port unless you kno	ow what you are doing. You may h	ave to reflash and erase your configuration if yo	ou do.	
Port Identifier	Configuration	Serial Rx	Telemetry Output	Sensor Input	Peripherals
USB VCP	MSP 115200 V	Serial RX	Disabled v AUTO v	Disabled • AUTO •	Disabled • AUTO •
UART1	MSP 115200 V	Serial RX	Disabled V AUTO V	Disabled • AUTO •	Disabled • AUTO •
UART3	MSP 115200 V	Serial RX	Disabled • AUTO •	Disabled • AUTO •	Disabled • AUTO •
UART4	MSP 115200 V	Serial RX	Disabled v AUTO v	Disabled V AUTO V	IRC Tramp V AUTO V
UART6	MSP 115200 V	Serial RX	SmartPort • AUTO •	Disabled V AUTO V	Disabled V AUTO V

• Select TBS Smartaudio for TBS Unify Pro VTX

Note: not all combin	ations are valid. When the flight controller f	irmware detects this the serial por	t configuration will be reset.		
			ave to reflash and erase your configuration if yo	ou do.	
Port Identifier	Configuration	Serial Rx	Telemetry Output	Sensor Input	Peripherals
USB VCP	─── MSP 115200 ▼	Serial RX	Disabled • AUTO •	Disabled • AUTO •	Disabled AUTO
UART1	MSP 115200 •	Serial RX	Disabled • AUTO •	Disabled V AUTO V	Disabled • AUTO •
UART3	MSP 115200 •	Serial RX	Disabled • AUTO •	Disabled V AUTO V	Disabled • AUTO •
UART4	MSP 115200 T	Serial RX	Disabled 🔻 AUTO 🔻	Disabled V AUTO V	TBS SmartAudio V AUTO V
UART6	MSP 115200 •	Serial RX	SmartPort V AUTO V	Disabled V AUTO V	Disabled V AUTO V

* **NOTE:** Please make sure that all the connections are correct.



STEP 3: Go to Configuration tab and choose ESC/Motor protocol in ESC/Motor Featur

ster. Not all combinations of features are valid. When the fight controller firmware detects invalid feature combinat tee: Configure serial ports before enabling the features that will use the ports.	ons contricting teacures will be disabled.	
lixer	ESC/Motor Features	
Qued X •	DSHOT600 ESCIM for protocol PNM ONESHOT125 ONESHOT22 ONESHOT22 ONESHOT22 NULTISHOT NUL	0
	BRUSHED DSH07150 DSH07300 DSH07600	6

STEP 4: Select Serial- based receiver in Receiver Mode

🕼 Ports	Board and Sensor Alignment			0	Accelerometer Trim	
Configuration	0 C Roll Degrees	GYRO Alignment	Default	•	0 CAccelerometer Roll	
	0 C Pitch Degrees	ACCEL Alignment	Default	•	0 2 Accelerometer Pitch	
	0 🗘 🗇 Yaw Degrees	MAG Alignment	Default	•		
B Receiver				_		
🖁 Modes	Receiver				Battery Voltage	
	Serial-based receiver (SPEKSAT, S *	Receiver Mode			VBAT Battery voltag	
	Note: Remember to configure a Serial Port (via	Note: Remember to configure a Serial Port (via Ports tab) and choose a Serial Receiver Provider when using RX_SERIAL				
	feature.				3,3 C Minimum Cell Volta	
	SBUS	Serial Receiver Provider			4,3 🖨 Maximum Cell Volta	
Tethered Logging	RSSI (Signal Strength)			0	3,5 🗘 Warning Cell Voltage	
				0	110 🗘 Voltage Scale	
	RSSI_ADC Analog RSSI input				0.0 Battery Voltage	

If you are using SBus, iBus or a Spektrum Satellite, you will need to pick your Serial Receiver Provider. Follow below table:

RX Туре	Serial Receiver Provider
DSM2 1024bit/22ms	SPEKTRUM1024
DSM2 2048bit/11ms	SPEKTRUM2048
DSMX 1024bit/22ms	SPEKTRUM1024
DSMX 2048bit/11ms	SPEKTRUM2048
FrSky RX	SBUS
Futaba RX	SBUS
FlySky RX	IBUS
Turnigy RX	IBUS

Click "Save and Reboot".



Tips

How to configure your Spektrum RX with your Flight Controller

In Betaflight Configurator:

- Go to the Ports tab
- Enable "Serial RX" on the UART 3

Note: not all combin	ations are valid. When the flight controller fi	rmware detects this the serial por	t configuration will be reset.		
Note: Do NOT disab	e MSP on the first serial port unless you kno	w what you are doing. You may h	ave to reflash and erase your configuration if y	ou do.	
Port Identifier	Configuration	Serial Rx	Telemetry Output	Sensor Input	Peripherals
USB VCP	MSP 115200 V	Serial RX	Disabled • AUTO •	Disabled V AUTO V	Disabled • AUTO •
UART1	MSP 115200 •	Serial RX	Disabled v AUTO v	Disabled V AUTO V	Disabled • AUTO •
JART3	MSP 115200 •	Serial RX	Disabled • AUTO •	Disabled • AUTO •	Disabled • AUTO •
UART4	MSP 115200 V	Serial RX	Disabled V AUTO V	Disabled V AUTO V	Disabled • AUTO •
UART6	MSP 115200 •	Serial RX	Disabled V AUTO V	Disabled V AUTO V	Disabled • AUTO •

Click "Save".

Then go to the **Configuration** tab. Under the section labeled "**Receiver**", pick **Serial Receiver Provider** compare with your **RX Type**.

RX Туре	Serial Receiver Provider
DSM2 1024bit/22ms	SPEKTRUM1024
DSM2 2048bit/11ms	SPEKTRUM2048
DSMX 1024bit/22ms	SPEKTRUM1024
DSMX 2048bit/11ms	SPEKTRUM2048

	Board and Sensor Alignment			0
Configuration	0 C Roll Degrees	GYRO Alignment	Default	•
	0 🗘 🜖 Pitch Degrees	ACCEL Alignment	Default	٠
	0 🛟 🕽 Yaw Degrees	MAG Alignment	Default	•
2 Modes				
	Receiver			
	Serial-based receiver (SPEKSAT, S 🔻 R	eceiver Mode		
	Note: Remember to configure a Serial Port (via feature. SPEKTRUM2048	Ports tab) and choose a Serial Receive	r Provider when using RX_SERIA	4
	RSSI (Signal Strength)			0
	RSSI_ADC Analog RSSI input			



Click "Save".

Finally, go to the **Receiver** tab. Pull down the drop down that says "**Channel Map**" and select the "**JR / Spektrum / Graupner**" option.

Receiver				WIKE
to ~2000. Set midpoint (default 1500	locumentation. Configure serial port (if required), receiver mode), trim channels to 1500, configure stick deabband, verify behavi fe chapter of documentation and configure fallsafe.	(serial/ppm/pwm), provider (for serial receivers), bind receiver, set channel map, configu our when TX (s off or out of range.	ure channel endpoints/range on T	X so that all channels go from ~1000
Roll	1500	Channel Map		ISSI Channel
Pitch	1500	TAER 1234	T	Disabled •
Yaw	1500	Default		
Throttle	885	Futaba / Hitec		Yaw Deadband
AUX 1	1500	JR / Spektrum / Graupner		
AUX 2	1500	1600	•	0 \$
AUX 3	100		0 (0
AUX 4	1500			
AUX 5	1500	RC Interpolation		
AUX 6	1500	Auto RC Interpolation		0
AUX 7	1500	Auto · Reinterpolation		0
AUX 8	1500			
AUX 9	1500	Preview		
AUX 10	1500			

Once again, click "Save".

How to open Piggy OSD menu by Transmitter

To access the in-built OSD menu in MW-OSD, disarm your quadcopter first.

- THROTTLE MIDDLE
- YAW RIGHT
- PITCH FULL

To navigate through menu in the OSD:

- PITCH/ROLL sticks are used to navigate
- YAW stick is used to adjust / change values

OSD Menu Index:

- PID Config (Roll/Pitch/Yaw PID for many flight modes)
- RC Tuning (RC Rate, RC Expo, Pitch/Roll Rate, Yaw Rate, TPA (Throttle PID Att)
- Access all settings
- Voltage (Display voltage on/off, Adjust Voltage, Voltage alarm, Cells)
- RSSI (Display RSSI on/off etc)
- Current (Display Amp on/off, Adjust Amps)
- Advanced (Unit Metric or Imperial, Signal – Pal or NTSC, Mag Calibration)
- Display (On/Off switches for Horizon, Sidebars, Scrolling bars, Throttle, GPS Coordinates, Sensors, Gimbal, Map Mode)
- Advanced (Unit, VREF, etc.)
- Alarms (Distance, altitude, timer ...)
- Advance tuning (Profile, PID controller)
- Statistics (Fly time, Maximum Distance, Max Altitude, Max Speed, Flying time)



PID	CONFIG			
ROLL	4 4	4 0	20	
	5 B		22	
YAW			20	
ALT			0	
		0		
LEVEL			100	
MAG	4 0		0	
EXIT	SAUE+E)	(IT) (P	AGE>	





Thanks for using our product