



MATEKSYS

FLIGHT CONTROLLER F722-mini

QUICK START GUIDE

MCU: 216MHz STM32F722RET6

IMU: MPU6000 & ICM20602, Dual Gyros built-in

OSD: AT7456E

Blackbox: 32M-byte Flash memory

5x Uarts (1,2,3,4,6) with built-in inversion

1x Softserial supported

8x Dshot/Proshot/oneshot outputs

1x I2C

1x SH1.0_8pin connector (Vbat/G/Curr/R6/S1/S2/S3/S4)

Vbat filtered output power for VTX, switchable via AUX (modes tab-user1)

Dual Camera image switchable via AUX (modes tab-user2)

Camera control

Smartaudio & Tramp VTX protocol

WS2812 Led Strip

Beeper

RSSI

INAV Analog airspeed

Input: 6~36V (2~8S LiPo)

BEC: 5V 2A cont. (Max.3A)

LDO 3.3V: Max.200mA

Battery Voltage Sensor: 1:10 (Scale 110)

Current Sensor: No

Convertible 20mm to 30.5mm mounting

LAYOUT

C1: Camera-1 video IN (Default)
 C2: Camera-2 video IN
 *** C1/C2 can be switched via PINIO2 (Modes Tab/USER2)

G/Gnd: Ground
 R3 & T3: UART3_RX & TX
 R4 & T4: UART4_RX & TX

Vtx: Video OUT for Video Transmitter
 *** RX4 has 200ohm built-in, can be remapped to PWM camera control
 (CLI resource camera_control 1 A01)

Vbt: Battery voltage filtered, Max.1A load on this pad. (Default ON)
 *** ON/OFF can be switched via PINIO1 (Modes Tab/USER1)

LED 3.3: Red, 3.3V Status
 LED 0: Blue, FC Status
 LED 1: Green, FC Status

S5/S6/S7/S8: ESC signal

T6: UART6_TX

PA4: for Analog Airspeed sensor in INAV
 No function in BF

SH1.0-8P Sequence
 --Vbt: Battery voltage, 6~36V DC IN
 --G: Ground
 --Curr: current sensor signal IN
 --R6: UART6_RX, for BLHei32 ESC Telemetry
 --S1/S2/S3/S4: ESC signal

3V3: LDO3.3V Max.200mA
 Rssi: Analog RSSI IN (0~3.3V)

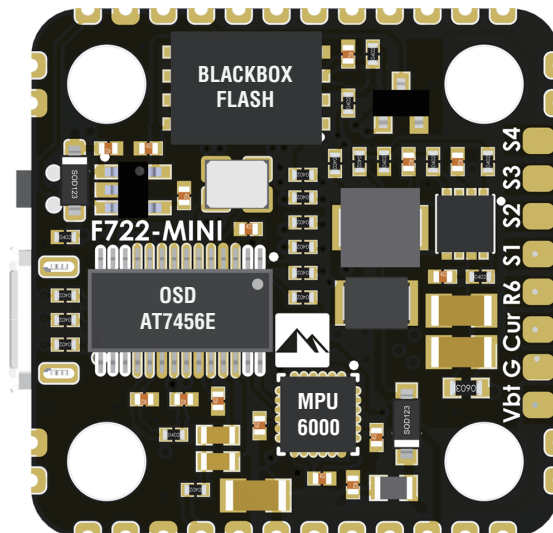
SCL: I2C1_SCL
 SDA: I2C1_SDA

R1 & T1: UART1_RX & TX

5V: onboard BEC 5V 2A cont. Max.3A
 4V5: 4.4~4.8V, Max.500mA, the voltage is also supplied when connecting via USB
 G: Ground

R2: UART2_RX for Serial RX by default, PPM share R2 pad
 T2: UART2_TX
 *** T2 can be remapped to softserial_tx1 to get one more Uart for Frsky SmartPort
 (CLI resource SERIAL_TX 11 A02)
 *** F722 UART ports have built-in inversion, SBUS can be connected to any unused UART_RX.
 *** Frsky FPort, SmartPort, Tramp & SmartAudio can be connected to any unused UART_TX
 *** GPS can be connected to any unused UART_TX & RX

Buz- & 5V: General active 5V buzzer
 Buz- /5V/G: Matek DBUZ5V
 LED: 2812 LED signal Out



Size & Weight: 28x28mm /5g
 Holes: Φ4mm, 20mm x 20mm

Packing
 1x F722-mini
 1x 20mm to 30.5mm conversion plate
 1x SH1.0_8pin cable 5cm
 2x SH1.0_8pin connector
 6x M3 Silicon Grommets
 6x M2 Brass Grommets

Target

BetaFlight / INAV: MATEKF722SE

*** CLI defaults after reflashing

Check and swap the Gyros (BetaFlight)

CLI status

```
# status
System Uptime: 6 seconds
Current Time: 0000-01-01T00:00:00.000+00:00
Voltage: 0 * 0.1V (OS battery - NOT PRESENT)
CPU Clock=216MHz, Vref=3.32V, Core temp=47degC, GYRO=MPU6000, ACC=MPU6000
SD card: Startup failed
```

CLI get gyro_to_use
FIRST = MPU6000 by default
SECOND = ICM20602
BOTH is not supported on this FC

```
# get gyro_to_use
gyro_to_use = FIRST
Allowed values: FIRST, SECOND, BOTH
```

Select ICM20602

CLI set gyro_to_use = second
save

```
# set gyro_to_use = second
gyro_to_use set to SECOND
```

*** ICM20602 provides fast response, but it is sensitive. Be sure vibration and ESC noise are good filtered.

Check and swap the Gyros (INAV)

CLI status

```
# status
System Uptime: 52 seconds
Current Time: 2041-06-28T01:04:00.000+00:00
Voltage: 0.39V (IS battery - NOT PRESENT)
CPU Clock=216MHz, GYRO=MPU6000, ACC=MPU6000, BARO=BMP280, PITOT=ADC
```

CLI get gyro_to_use
0 = MPU6000 by default
1 = ICM20602

```
# get gyro_to_use
gyro_to_use = 0
Allowed range: 0 - 1
```

CLI get acc_hardware

```
acc_hardware = MPU6000
Allowed values: NONE, AUTO, ADXL345, MPU6050, MMA845x, BMA280, LSM303DLHC, MPU6000, MPU6500,
```

Select ICM20602

CLI set gyro_to_use = 1
set acc_hardware = MPU6500
save

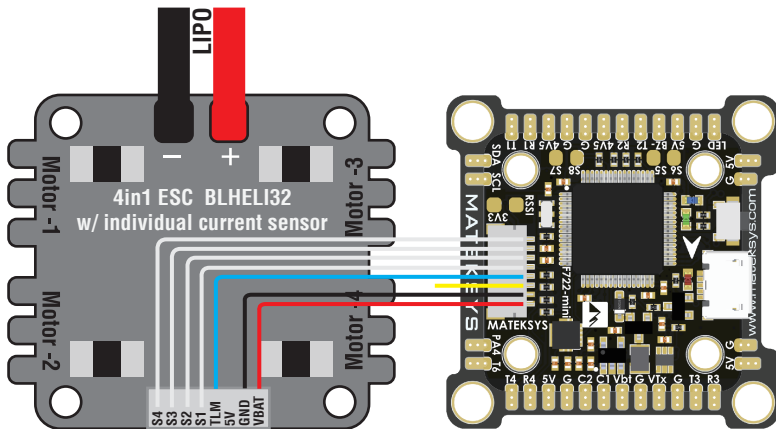
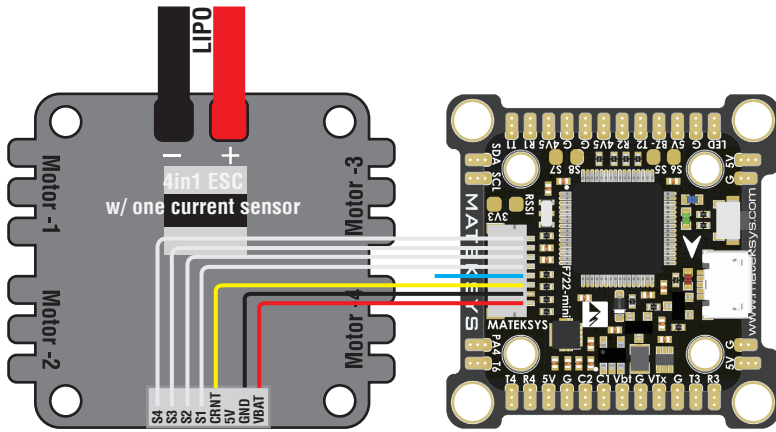
```
# set gyro_to_use = 1
gyro_to_use set to 1
# set acc_hardware = MPU6500
acc_hardware set to MPU6500
```

VTX Power / Camera switcher (BetaFlight / INAV)

The screenshot displays the INAV configuration interface for VTX and camera settings. It is organized into three main sections:

- USER1:** Shows "No USER1 definition" and "Vbt(for VTX) ON by default". Below this is a slider for "Vbt OFF" to "Vbt ON" with a range from 900 to 2100. A dropdown menu is set to "AUX 2".
- USER2:** Shows "No USER2 definition" and "C1 (Camera-1) ON by default". Below this is a slider for "C1 ON & C2 OFF" to "C2 ON & C1 OFF" with a range from 900 to 2100. A dropdown menu is set to "AUX 2".
- Legend:** A horizontal bar at the top right identifies the pins: 5V, G, C2, C1, Vbt, G, VTx.

Wiring (4in1 ESC)



Battery

Onboard ADC Voltage Meter Source

Onboard ADC Current Meter Source

3.3 Minimum Cell Voltage

4.3 Maximum Cell Voltage

3.5 Warning Cell Voltage

0 Capacity (mAh)

Voltage Meter

Battery scale 110 110 Scale

Battery 0 V 10 Divider Value

1 Multiplier Value

Amperage Meter

Use the current sensor scale of 4in1

Battery 0.00 A 179 Scale [1/10th mV/A]

0 Offset [mA]

Battery

ESC Sensor Voltage Meter Source

ESC Sensor Current Meter Source

3.3 Minimum Cell Voltage

4.3 Maximum Cell Voltage

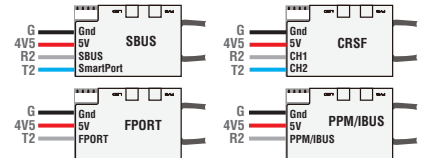
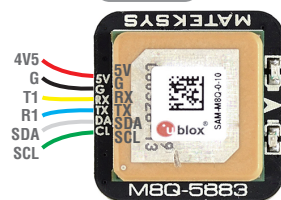
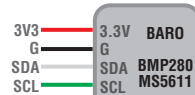
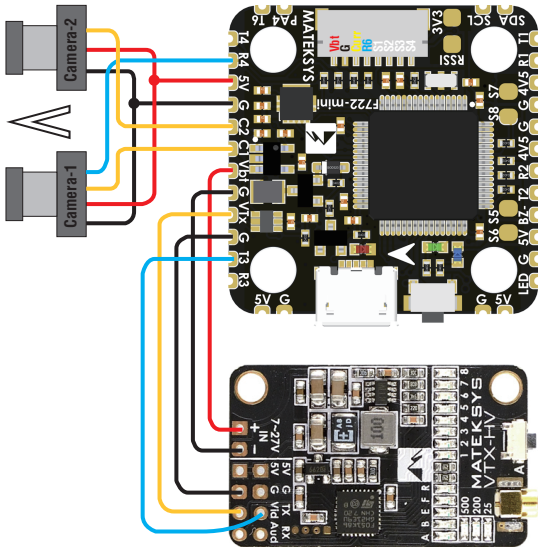
3.5 Warning Cell Voltage

0 Capacity (mAh)

ESC_SENSOR Use KISS/BLHeli_32 ESC telemetry as sensor

UART6 115200 Disabled

*** R4 pad has 200ohm built-in, can be remapped to PWM camera control (BF CLI resource camera_control | A01)



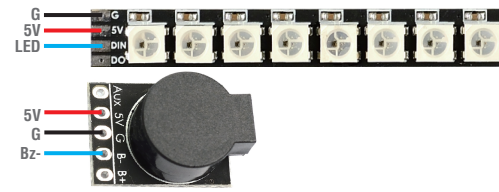
*** BF CLI resource serial_tx1 on T2 pad for SmartPort

*** SBus/IBUS/DSM can be connected to any unused UART_RX

*** FPort, SmartPort can be connected to any unused UART_TX

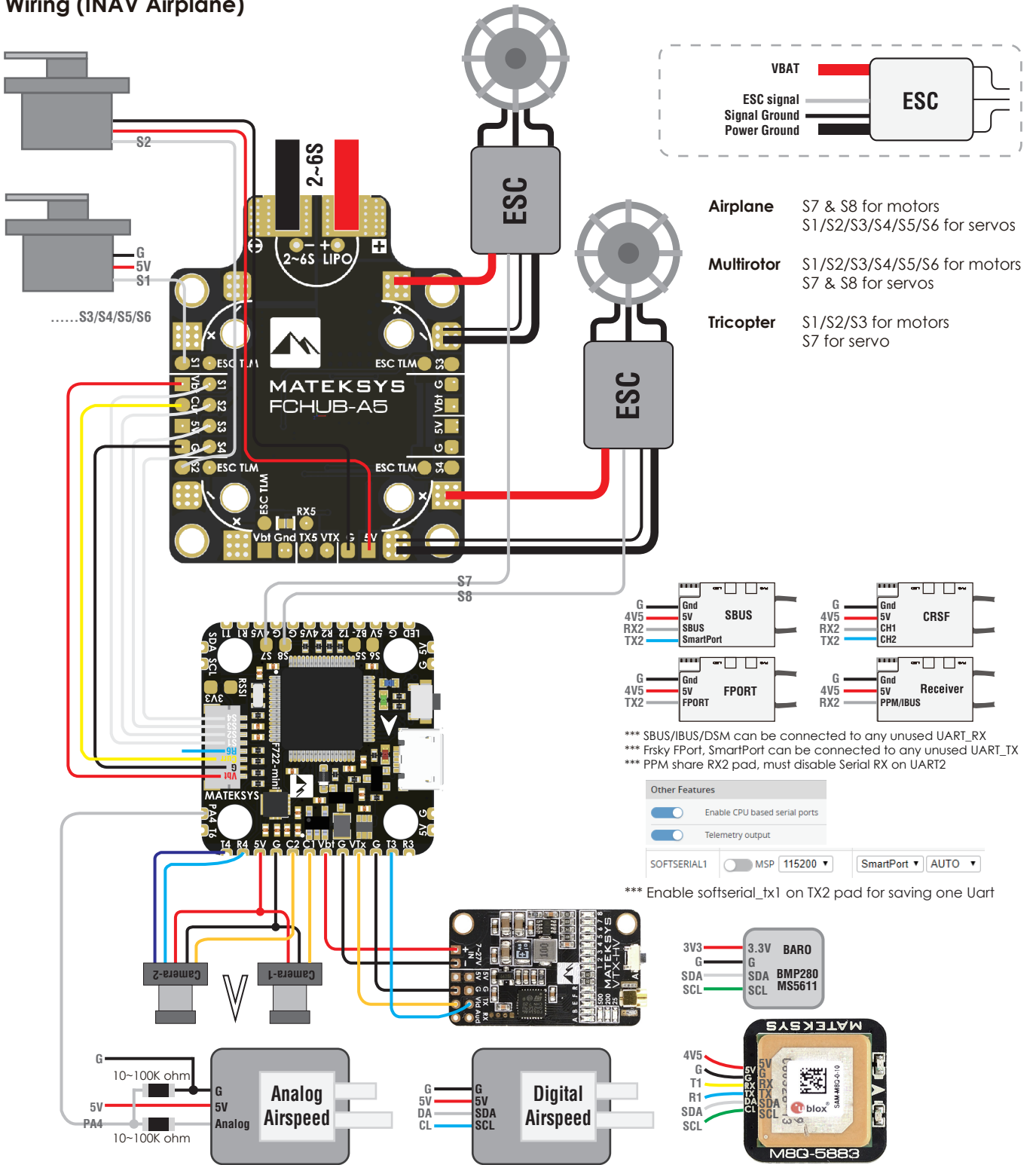
*** PPM share R2 pad, must disable Serial RX on UART2

*** GPS can be connected to any unused UART_TX & RX



Identifier	Configuration/MSP	Serial Rx	Telemetry Output	Sensor Input	Peripherals
USB VCP	<input checked="" type="checkbox"/> 115200	<input type="checkbox"/>	Disabled <input type="button" value="AUTO"/>	Disabled <input type="button" value="AUTO"/>	Disabled <input type="button" value="AUTO"/>
UART1	<input type="checkbox"/> 115200	<input type="checkbox"/>	Disabled <input type="button" value="AUTO"/>	<input checked="" type="button" value="GPS"/> 57600	Disabled <input type="button" value="AUTO"/>
UART2	<input type="checkbox"/> 115200	<input checked="" type="checkbox"/>	Disabled <input type="button" value="AUTO"/>	Disabled <input type="button" value="AUTO"/>	Disabled <input type="button" value="AUTO"/>
UART3	<input type="checkbox"/> 115200	<input type="checkbox"/>	Disabled <input type="button" value="AUTO"/>	Disabled <input type="button" value="AUTO"/>	<input checked="" type="button" value="IRC Tramp"/> <input type="button" value="AUTO"/>
UART4	<input type="checkbox"/> 115200	<input type="checkbox"/>	Disabled <input type="button" value="AUTO"/>	Disabled <input type="button" value="AUTO"/>	Disabled <input type="button" value="AUTO"/>
UART6	<input type="checkbox"/> 115200	<input type="checkbox"/>	Disabled <input type="button" value="AUTO"/>	<input checked="" type="button" value="ESC"/> <input type="button" value="AUTO"/>	Disabled <input type="button" value="AUTO"/>
SOFTSERIAL1	<input type="checkbox"/> 115200	<input type="checkbox"/>	<input checked="" type="button" value="SmartPort"/> <input type="button" value="AUTO"/>	Disabled <input type="button" value="AUTO"/>	Disabled <input type="button" value="AUTO"/>

Wiring (INAV Airplane)



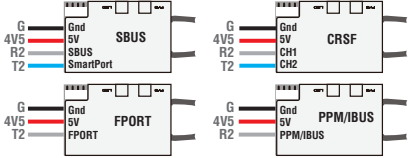
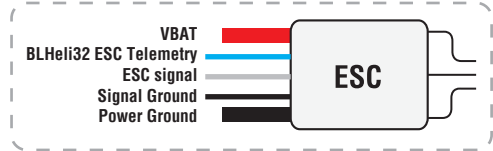
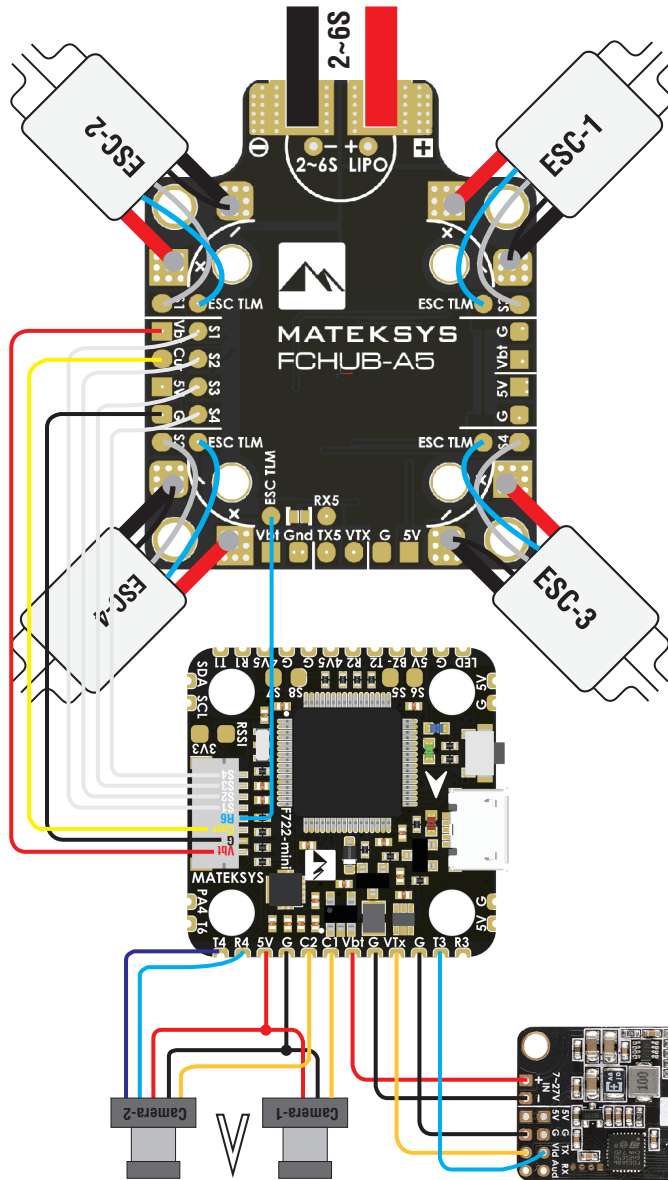
Ports

DOCUMENTATION FOR INAV

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.

Identifier	Data	Telemetry	RX	Sensors	Peripherals
USB VCP	<input checked="" type="checkbox"/> MSP 115200	Disabled AUTO	<input type="checkbox"/> Serial RX	Disabled 115200	Disabled 115200
UART1	<input type="checkbox"/> MSP 115200	Disabled AUTO	<input type="checkbox"/> Serial RX	GPS 57600	Disabled 115200
UART2	<input type="checkbox"/> MSP 115200	Disabled AUTO	<input checked="" type="checkbox"/> Serial RX	Disabled 115200	Disabled 115200
UART3	<input type="checkbox"/> MSP 115200	Disabled AUTO	<input type="checkbox"/> Serial RX	Disabled 115200	IRC Tramp 115200
UART4	<input type="checkbox"/> MSP 115200	Disabled AUTO	<input type="checkbox"/> Serial RX	Disabled 115200	RunCam Device 115200
UART6	<input type="checkbox"/> MSP 115200	Disabled AUTO	<input type="checkbox"/> Serial RX	Disabled 115200	Disabled 115200
SOFTSERIAL1	<input type="checkbox"/> MSP 115200	SmartPort AUTO	<input type="checkbox"/> Serial RX	Disabled 115200	Disabled 115200

Wiring (Quad with Individual ESC)



*** BF CLI resource serial_tx 11 A02
to get softserial_tx1 on T2 pad for SmartPort
*** SBUS/IBUS/DSM can be connected to any unused UART_RX
*** FPort, SmartPort can be connected to any unused UART_TX
*** PPM share R2 pad, must disable Serial RX on UART2

