



# FLIGHT CONTROLLER LUX-F7

## BASIC MANUAL

MCU: 216MHz STM32F722RET6  
IMU: MPU6000 & ICM20602, Dual Gyros built-in  
Baro: BMP280  
OSD: AT7456E  
Blackbox: MicroSD card slot  
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)

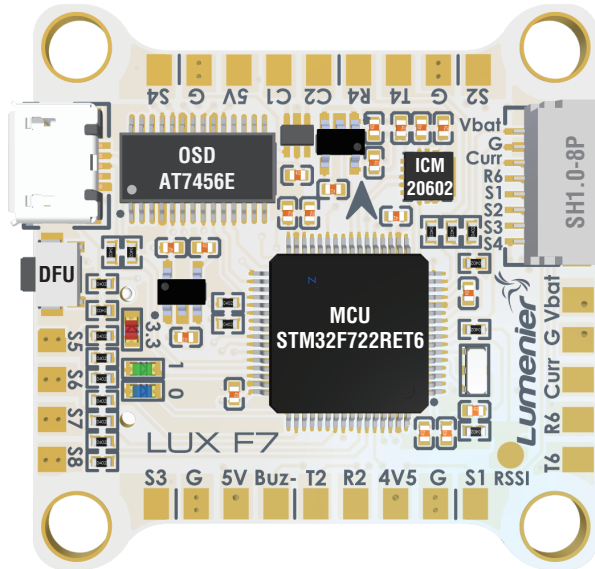
Camera control  
Smartaudio & Tramp VTX protocol  
WS2812 Led Strip  
Beeper  
RSSI  
INAV analog airspeed

Input: 6~36V (2~8S LiPo)  
BEC: 5V 2A cont. (Max.3A)  
LDO 3.3V: Max.200mA  
Current Sensor: No  
Battery Voltage Sensor: 1:10

# LAYOUT

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

R4: UART4\_RX  
 T4: UART4\_TX  
 \*\*\* R4 has 200ohm built-in, can be remapped to PWM camera control  
 (CLI resource camera\_control 1 A01)



S5/S6/S7/S8: ESC signal  
 LED 3.3: Red, 3.3V Status  
 LED 0: Blue, FC Status  
 LED 1: Green, FC Status

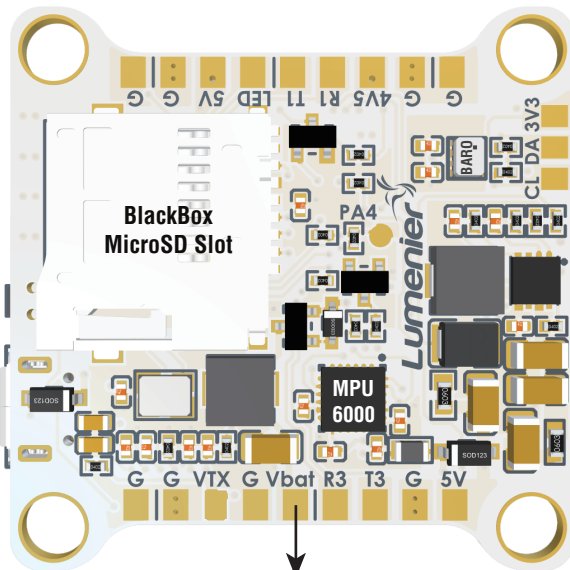
Vbat: Battery voltage  
 6~36V DC IN  
 G: Ground  
 Curr: current sensor signal IN  
 R6: UART6\_RX  
 S1/S2/S3/S4: ESC signal  
 T6: UART6\_TX  
 Rssi: Analog RSSI IN (0~3.3V)

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 MCU has inner inverter, SBUS can be connected to any unused UART\_RX.  
 \*\*\* Frsky FPort, SmartPort, Tramp & SmartAudio can be connected to any unused UART\_TX

Buz- & 5V: General active 5V buzzer

LED: 2812 LED signal  
 R1 & T1: UART1



3V3: LDO3.3V Max.200mA  
 DA: I2C1\_SDA  
 CL: I2C1\_SCL  
 PA4: for analog Airspeed in INAV  
 No function in BF  
 Size & Weight: 36x36mm /7g  
 Holes: Φ4mm, 30.5mm mounting  
 Packing  
 1x LUX-F7  
 1x SH1.0\_8pin to 8pin cable  
 1x SH1.0\_6pin connector  
 6x M3 Silicon Grommets

Vbat: Battery voltage filtered, Max.1A load on this pad. (Default ON)  
 \*\*\* ON/OFF can be switched via PINIO1 (Modes Tab/USER1)  
 VTX: Video OUT to Video Transmitter

R3: UART3\_RX  
 T3: UART3\_TX

## 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

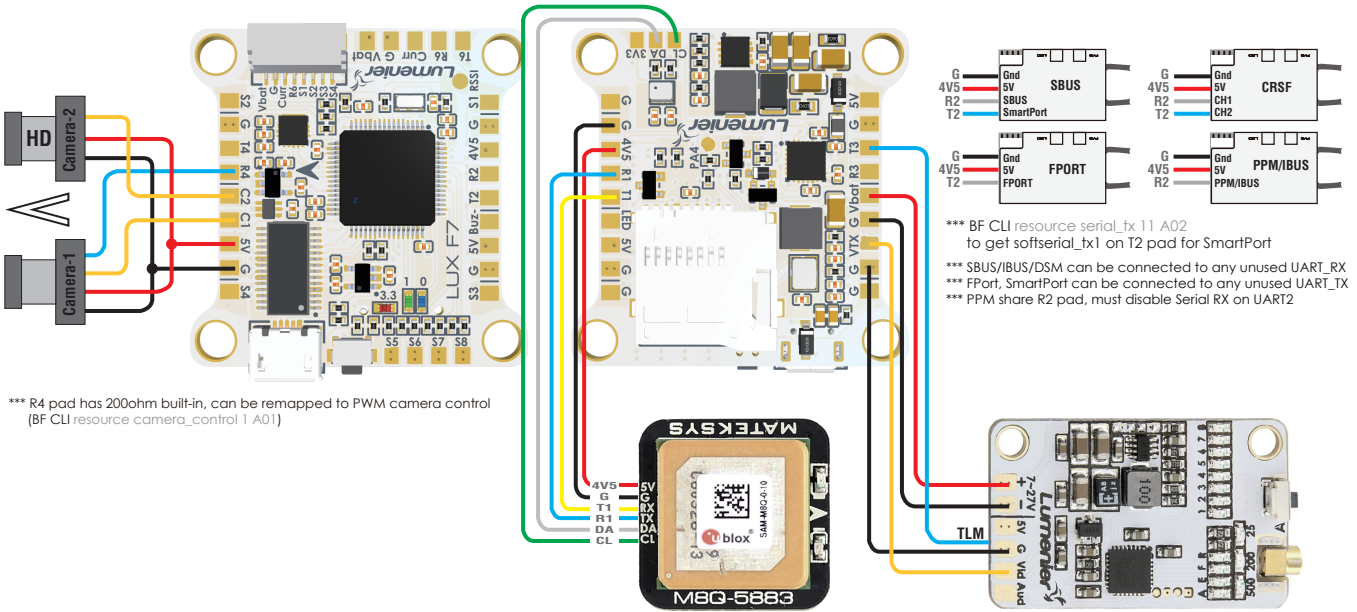
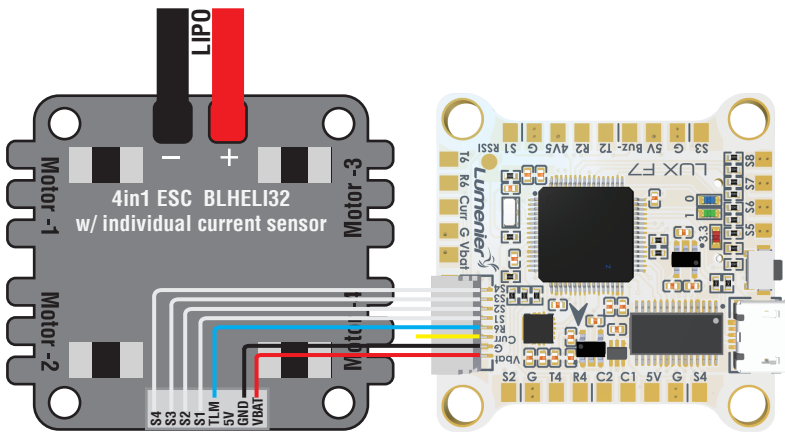
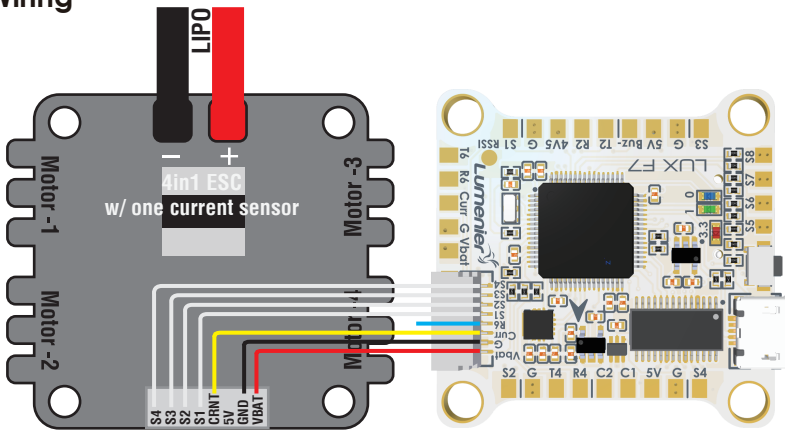
CLI set gyro\_to\_use = 1  
set acc\_hardware = MPU6500  
save

```
# 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)

USER1	No USER1 definition Vbat(for VTX) ON by default	G VTX G Vbat
USER2	No USER2 definition C1 (Camera-1) ON by default	C2 C1 5V G
USER1	AUX 2	Vbat OFF   Vbat ON
USER2	AUX 3	C1 ON & C2 OFF   C2 ON & C1 OFF

# Wiring



**Battery**

Onboard ADC

Onboard ADC

3.3

4.3

3.5

0

**Voltage Meter**

Battery 0 V

Scale

Divider Value

Multiplier Value

**Amperage Meter**

**Use the current sensor scale of 4in1A**

Battery 0.00 A

Offset [mA]

**Battery**

ESC Sensor

ESC Sensor

3.3

4.3

3.5

0

ESC\_SENSOR Use KISS/BLHeli\_32 ESC telemetry as sensor

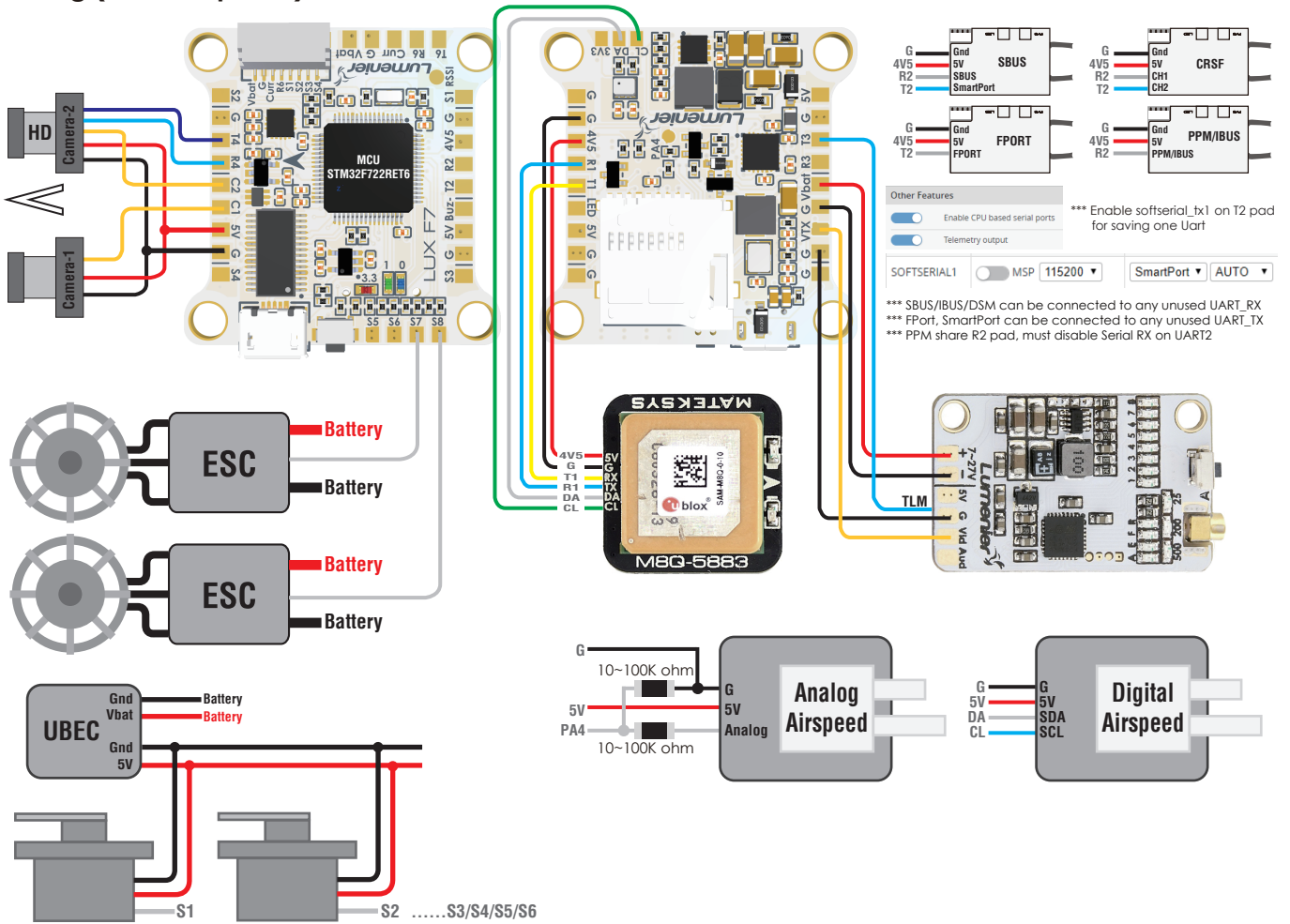
UART6  115200  Disabled

\*\*\* R4 pad has 200ohm built-in, can be remapped to PWM camera control (BF CLI resource camera\_control 1 A01)

- \*\*\* 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

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

# Pins Definitions (BF & INAV)

Pad Hole	Pin name	Function	BetaFlight		INav		INav		INav	
			Octo	Quad	Tricopter	Quad X	Hex X	Flying Wing	Airplane	
S1	PB4	TIM3_CH1	motor-1	motor-1	motor-1	motor-1	motor-1	servo	servo	
S2	PB5	TIM3_CH2	motor-2	motor-2	motor-2	motor-2	motor-2	servo	servo	
S3	PB0	TIM3_CH3	motor-3	motor-3	motor-3	motor-3	motor-3		servo	
S4	PB1	TIM3_CH4	motor-4	motor-4		motor-4	motor-4		servo	
S5	PA15	TIM2_CH1	motor-5				motor-5		servo	
S6	PB3	TIM2_CH2	motor-6				motor-6		servo	
S7	PB6	TIM4_CH1	motor-7		servo	servo	servo	motor-1	motor-1	
S8	PB7	TIM4_CH2	motor-8			servo	servo	motor-2	motor-2	
LED	PA8	TIM1_CH1	2812LED	2812LED	2812LED	2812LED	2812LED	2812LED	2812LED	
R2	PA3	TIM9_CH2	R2/ppm	R2/ppm	R2/ppm	R2/ppm	R2/ppm	R2/ppm	R2/ppm	
T2	PA2	TIM9_CH1	T2/pwm1	T2/pwm1						
R4	PA1	TIM5_CH2	R2/pwm2	R2/pwm2						
T4	PA0	TIM5_CH1	T4/pwm3	T4/pwm3						
PA4	PA4	ADC	/	/				AirSpeed	AirSpeed	