



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)

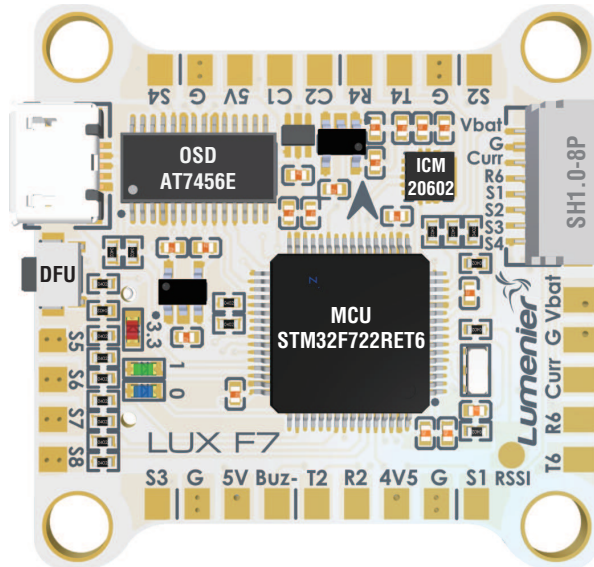
C2: Camera-2 video

*** 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)



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)

S5/S6/S7/S8: ESC signal

LED 3.3: Red, 3.3V Status

LED 0: Blue, FC Status

LED 1: Green, FC Status

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)

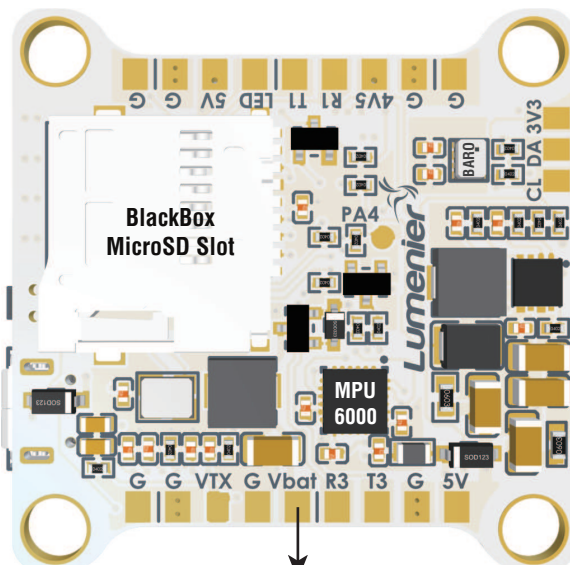
*** F722 MCU has inner inverter, SBUS can be connected to any unused UART_RX.

*** 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

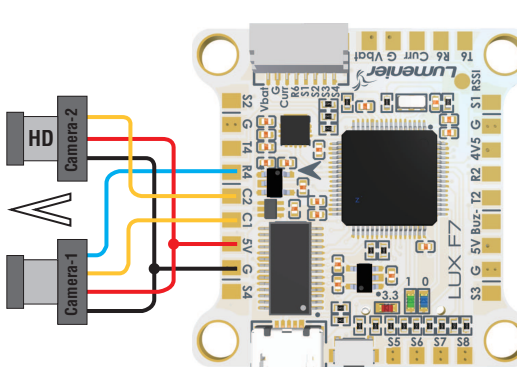
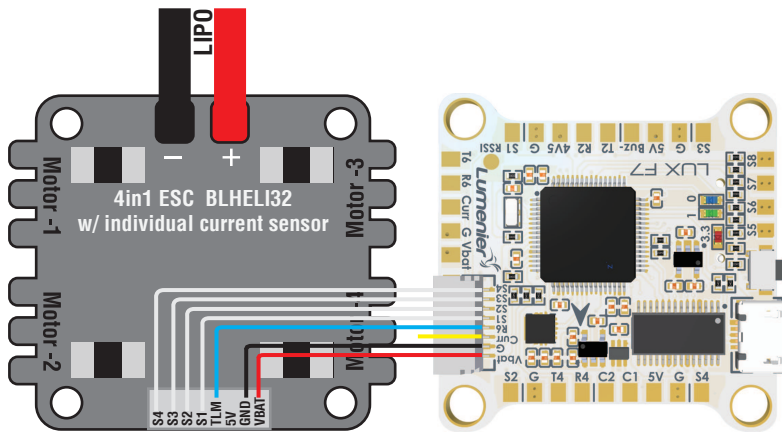
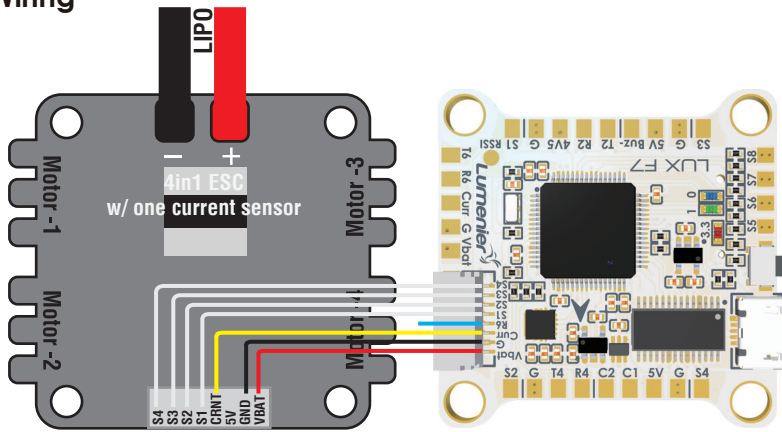
CLI set gyro_to_use = 1
set acc_hardware = MPU6500
save

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

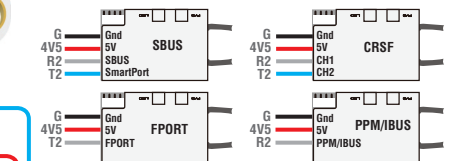
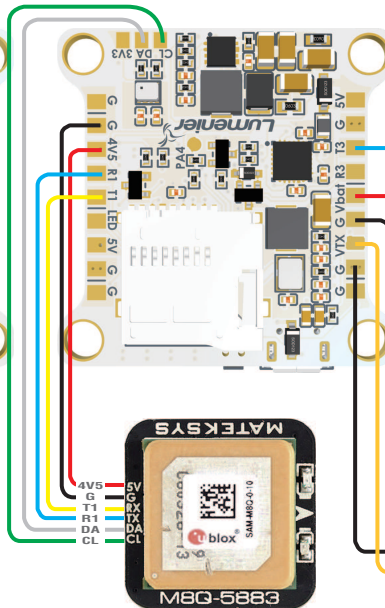
VTX Power / Camera switcher (BetaFlight / INAV)

USER1	No USER1 definition Vbat(for VTX) ON by default	G VTX G Vbat
Add Range		
USER2	No USER2 definition C1 (Camera-1) ON by default	C2 C1 5V G
Add Range		
USER1	AUX 2	Vbat OFF Vbat ON
Add Range	Min: 900 Max: 1200	900 1000 1200 1400 1500 1600 1800 2000 2100
USER2	AUX 3	C1 ON & C2 OFF C2 ON & C1 OFF
Add Range	Min: 1750 Max: 2100	900 1000 1200 1400 1500 1600 1800 2000 2100

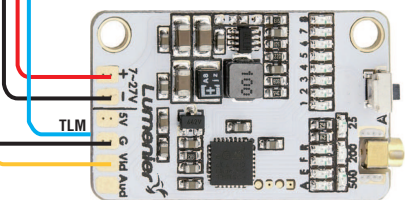
Wiring



*** 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



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 0 V

110 Scale

10 Divider Value

1 Multiplier Value

Amperage Meter

Use the current sensor scale of 4in1A

Battery 0.00 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

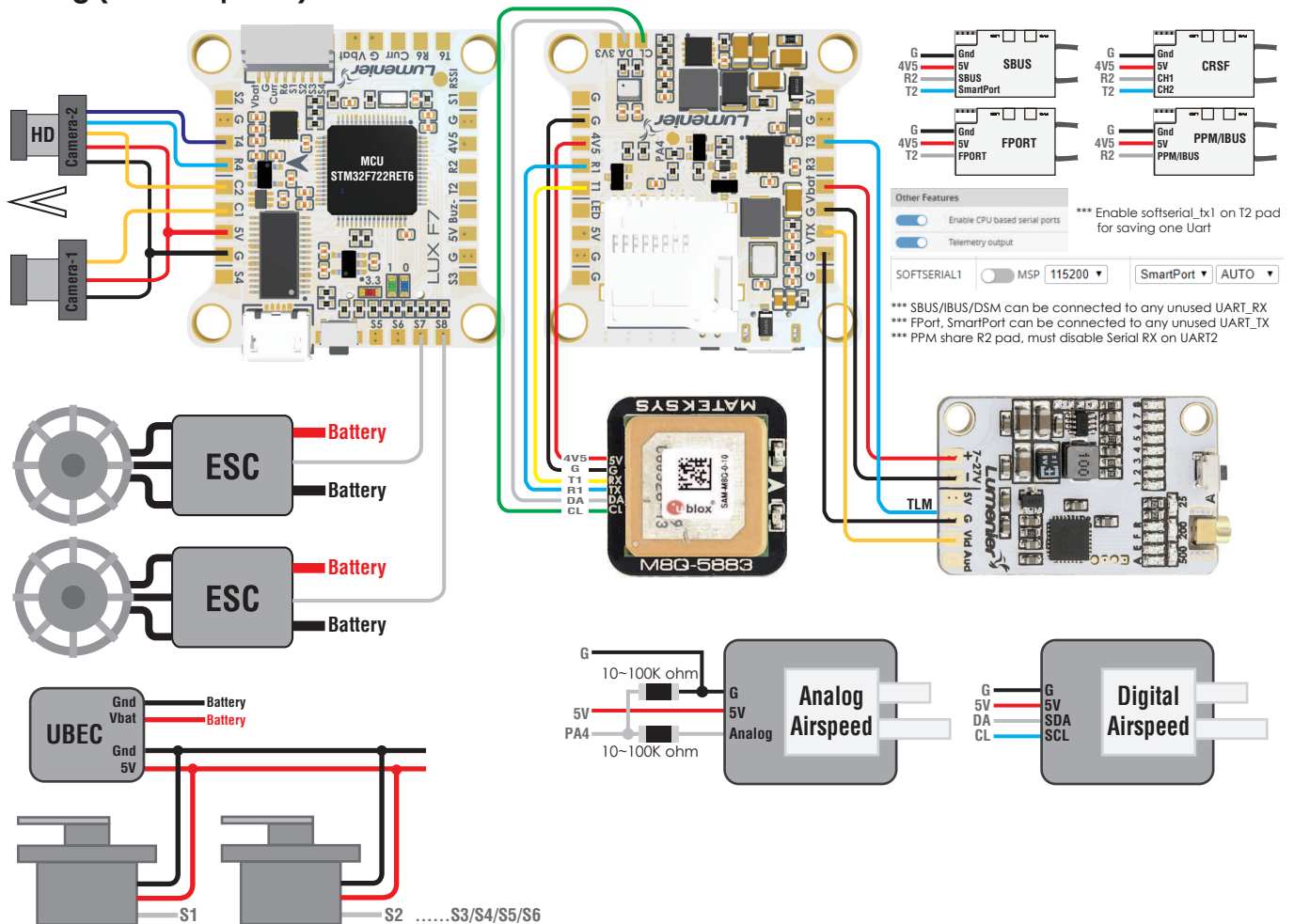
0 Capacity (mAh)

ESC_SENSOR Use KISS/BLHeli_32 ESC telemetry as sensor

UART6 115200 Disabled AUTO ESC AUTO

Identifier	Configuration/MSP	Serial Rx	Telemetry Output	Sensor Input	Peripherals
USB VCP	☒ 115200 v	☐	Disabled v AUTO v	Disabled v AUTO v	Disabled v AUTO v
UART1	☐ 115200 v	☐	Disabled v AUTO v	GPS v 57600	Disabled v AUTO v
UART2	☐ 115200 v	☒	Disabled v AUTO v	Disabled v AUTO v	Disabled v AUTO v
UART3	☐ 115200 v	☐	Disabled v AUTO v	Disabled v AUTO v	IRC Tramp v AUTO v
UART4	☐ 115200 v	☐	Disabled v AUTO v	Disabled v AUTO v	Disabled v AUTO v
UART6	☐ 115200 v	☐	Disabled v AUTO v	ESC v AUTO v	Disabled v AUTO v
SOFTSERIAL1	☐ 115200 v	☐	SmartPort v AUTO v	Disabled v AUTO v	Disabled v AUTO v

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	☒ MSP 115200	Disabled AUTO	☐ Serial RX	Disabled 115200	Disabled 115200
UART1	☐ MSP 115200	Disabled AUTO	☐ Serial RX	GPS 57600	Disabled 115200
UART2	☐ MSP 115200	Disabled AUTO	☒ Serial RX	Disabled 115200	Disabled 115200
UART3	☐ MSP 115200	Disabled AUTO	☐ Serial RX	Disabled 115200	IRC Tramp 115200
UART4	☐ MSP 115200	Disabled AUTO	☐ Serial RX	Disabled 115200	RunCam Device 115200
UART6	☐ MSP 115200	Disabled AUTO	☐ Serial RX	Disabled 115200	Disabled 115200
SOFTSERIAL1	☐ MSP 115200	SmartPort AUTO	☐ Serial RX	Disabled 115200	Disabled 115200

Pins Definitions (BF & INAV)

Pad Hole	Pin name	Function	BetaFlight Octo	BetaFlight Quad	INav Tricopter	INav Quad X	INav Hex X	INav Flying Wing	INav Airplane
S1	PB4	TIIM3_CH1	motor-1	motor-1	motor-1	motor-1	motor-1	servo	servo
S2	PB5	TIIM3_CH2	motor-2	motor-2	motor-2	motor-2	motor-2	servo	servo
S3	PB0	TIIM3_CH3	motor-3	motor-3	motor-3	motor-3	motor-3	servo	servo
S4	PB1	TIIM3_CH4	motor-4	motor-4	motor-4	motor-4	motor-4	servo	servo
S5	PA15	TIIM2_CH1	motor-5				motor-5		servo
S6	PB3	TIIM2_CH2	motor-6				motor-6		servo
S7	PB6	TIIM4_CH1	motor-7		servo	servo	servo	motor-1	motor-1
S8	PB7	TIIM4_CH2	motor-8			servo	servo	motor-2	motor-2
LED	PA8	TIIM1_CH1	2812LED	2812LED	2812LED	2812LED	2812LED	2812LED	2812LED
R2	PA3	TIIM9_CH2	R2/ppm	R2/ppm	R2/ppm	R2/ppm	R2/ppm	R2/ppm	R2/ppm
T2	PA2	TIIM9_CH1	T2/pwm1	T2/pwm1					
R4	PA1	TIIM5_CH2	R2/pwm2	R2/pwm2					
T4	PA0	TIIM5_CH1	Cam_Ctrl	Cam_Ctrl					
PA4	PA4	ADC	/	/				AirSpeed	AirSpeed