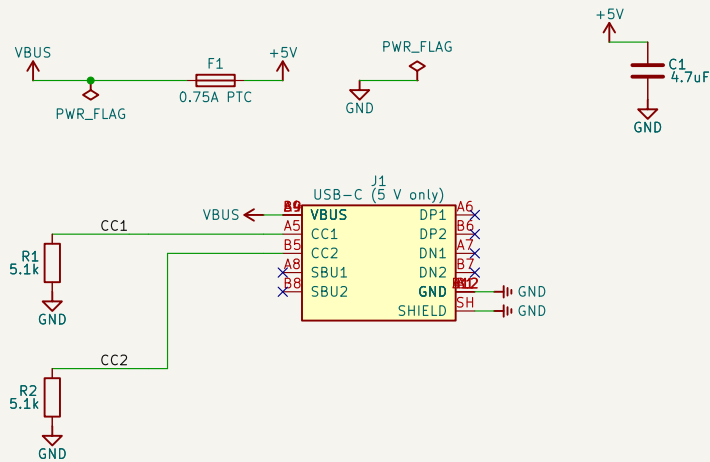


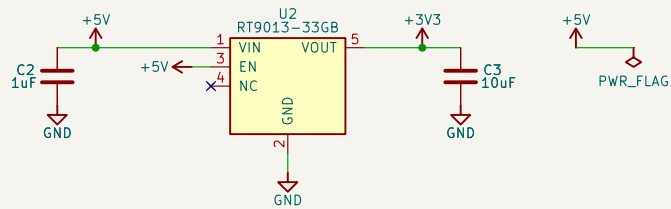
USB-C power in

Power only – the USB data lines are not used. 5.1 kOhm on CC1 / CC2 ask any USB-C port for 5 V.



3.3 V regulator

Makes the 3.3 V supply for the microcontroller, the IMU and the LEDs from the USB 5 V.



Sheets

STM32F411 microcontroller and more

GPS module header and more

Generated from the netlist (run/state/circuit_graph.json) – do not edit by hand
Sheet: USB-C power in and 3.3 V regulator

faezor PCB

Sheet: /
File: board.kicad_sch

Title: sim-pilot: STM32F411 autopilot board for the World

Size: A4 Date: 2026-10-13

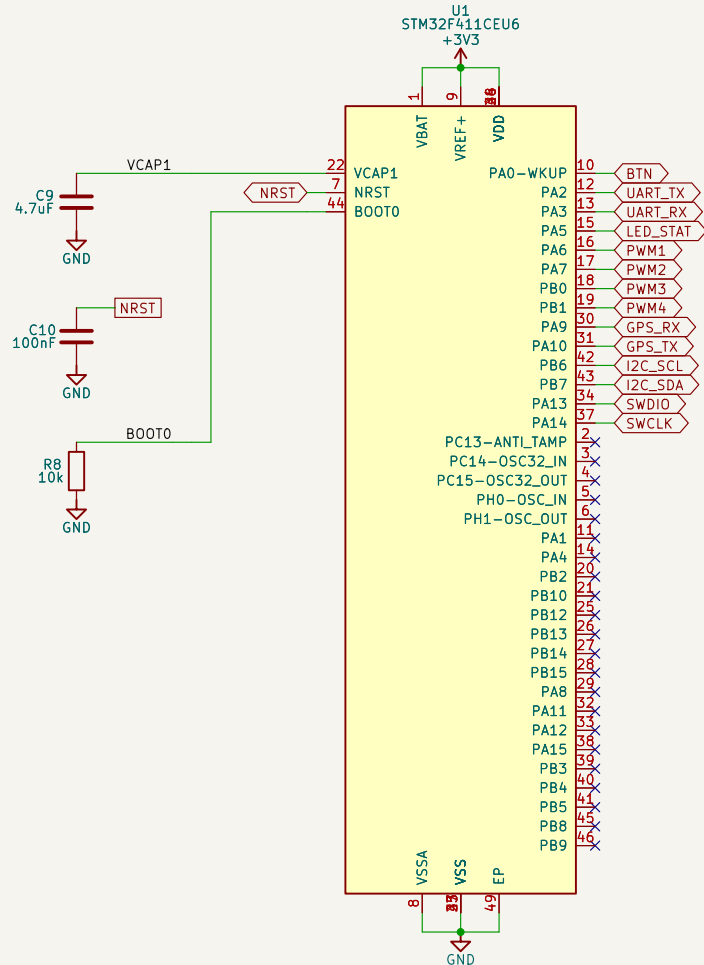
Rev: 1

KiCad E.D.A. 10.0.7

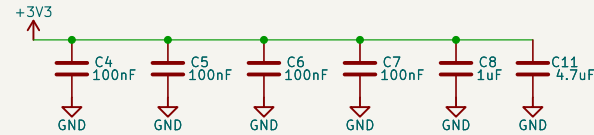
Id: 1/3

STM32F411 microcontroller

The chip that runs the autopilot firmware – a 100 MHz Arm Cortex–M4. On pcb.faezor.ai it runs in the simulator, in the World.
100 nF at each VDD pin, 4.7 uF on VDD and 4.7 uF on VCAP1 (the chip's internal regulator), 1 uF + 100 nF on VDDA.
BOOT0 is pulled low (R8, 10 kOhm); the chip boots the firmware in its flash.
No crystal – the firmware runs on the internal 16 MHz oscillator.

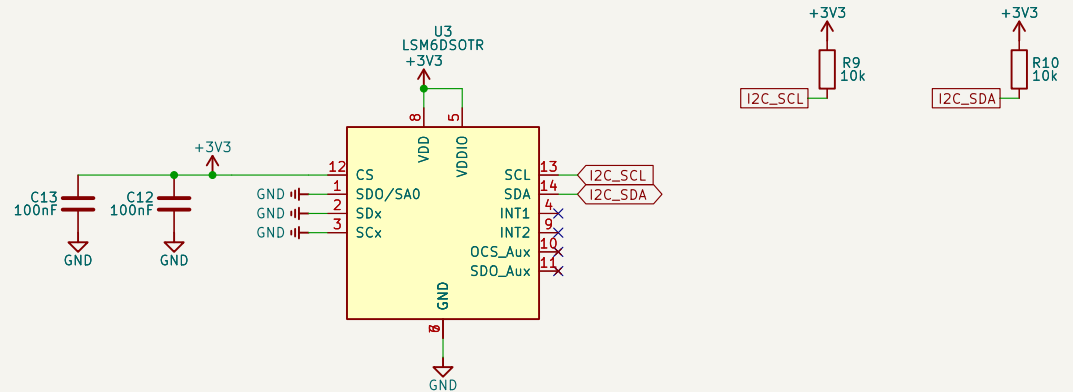


STM32F411 microcontroller: decoupling



LSM6DSO IMU

Accelerometer + gyroscope on I2C1 (PB6 SCL, PB7 SDA) at address 0x6A. In the World it feels the vehicle's motion at this very spot.
SDO/SA0 to GND: I2C address 0x6A; CS to 3.3 V: I2C mode.
10 kOhm pull-ups on SCL and SDA (the datasheet's example), 100 nF at VDD and at VDDIO.
Its axes: x to the right, y towards the top edge of the board, z out of the top.



Generated from the netlist (run/state/circuit_graph.json) – do not edit by hand
Sheet: STM32F411 microcontroller and more

faezor PCB

Sheet: /STM32F411 microcontroller and more/

File: board-stm32f411-microcontroller-and-more.kicad_sch

Title: sim-pilot: STM32F411 autopilot board for the World

Size: A4

Date: 2026-10-13

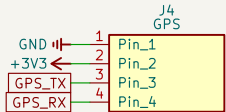
Rev: 1

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Id: 2/3

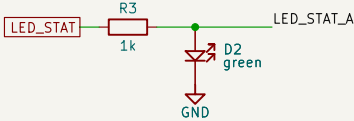
GPS module header

A GPS module plugs in here: pin 1 GND, 2 3.3 V, 3 the module's TX (to PA10, USART1 RX), 4 its RX (from PA9). 9600 baud NMEA.



Status LED

A green LED on PA5 – blinking while the autopilot waits, on while it is armed.



Servo / ESC outputs

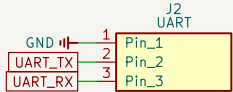
Four RC outputs: GND, +5 V, signal – TIM3 channels 1–4 on PA6, PA7, PB0, PB1 at 50 Hz, 1000–2000 us pulses. Car: PWM1 steering, PWM2 throttle. Drone: motors 1–4.

+5 V comes from USB here: a real airframe feeds the servos from its battery's BEC instead.



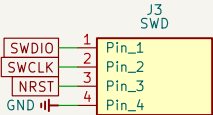
UART header

The console (USART2, 115200 baud): pin 1 GND, 2 TX (PA2), 3 RX (PA3). The firmware prints the IMU, the attitude and the GPS fix; type car, drone, go or stop.



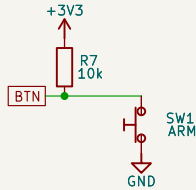
SWD debug header

Programming and debugging: 1 SWDIO (PA13), 2 SWCLK (PA14), 3 NRST, 4 GND – for an ST-Link or a J-Link.



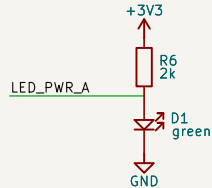
Arm button

Pulls PA0 low while pressed (R7 holds it high otherwise); the firmware arms or disarms the autopilot.



Power light

A green LED on 3.3 V through 2 kOhm, lit whenever the board has power.



Generated from the netlist (run/state/circuit_graph.json) – do not edit by hand
Sheet: GPS module header and more

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Sheet: /GPS module header and more/
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Title: sim-pilot: STM32F411 autopilot board for the World

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Rev: 1

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