Requirements:
- Handle 200g peak acceleration for 10 seconds
- record GPS, IMU, altituide, pressure, humidity, temperature
- LiPo powered
- grab data via USB
- LiPo charging via USB
- integrated antenna on GPS

Microcontroller

H1 MountingHole
H3 MountingHole
H2 MountingHole
H4 MountingHole

Microcontroller
USB_D_P
USB_D_N
SCL
SDA
GPS_TIMEPULSE
GPS_RESET
UART_TX
UART_RX
File: stm32f042k6ux.kicad_sch

GPS

GPS Antenna Module
GPS_RESET
GPS_TIMEPULSE
UART_TX
UART_RX
RESET_GPS
TIMEPULSE
UART_MCU_TX
UART_MCU_RX
File: gps_antenna_module_dual_band.kicad_sch

IMU Module

Inertial Measurement Unit
SCL
SDA
File: imu.kicad_sch

Power Regulation

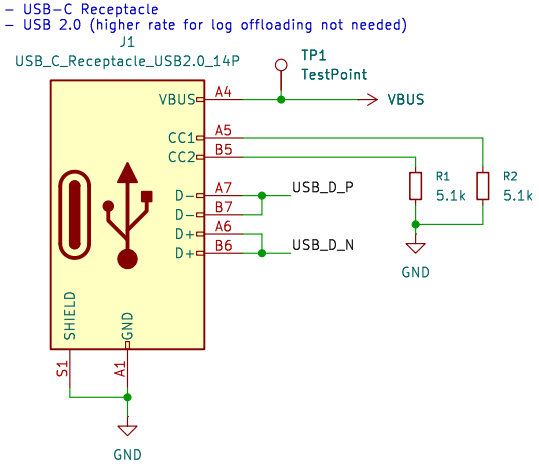
3.3V Buck-Boost Regulator
File: buck_boost_3v3_output_5V_input.kicad_sch

Enviornmental Sensors

Enviornmental Sensors
SCL
SDA
SCL_3.3V
SDA_3.3V
File: aux_sensors.kicad_sch

Power Supply

- USB-C Receptacle
- USB 2.0 (higher rate for log offloading not needed)



USB-C LiPo Charging
File: usb-c_lipo_charing.kicad_sch

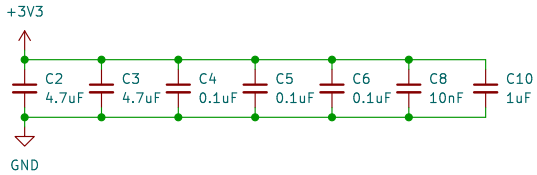
Brian Glen
Sheet: /
File: rocket_datalogger.kicad_sch

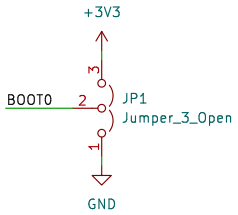
Title: Rocket Datalogger

Size: A4	Date: 2025-08-18	**Rev: 1**
KiCad E.D.A. 9.0.1		Id: 1/7

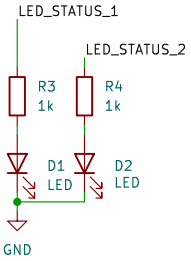
Microcontroller

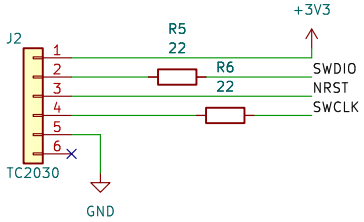
- power supply de-coupling
- TC2030 programing
- boot select switch
- 16 Mhz HSE oscillator
- status LEDs

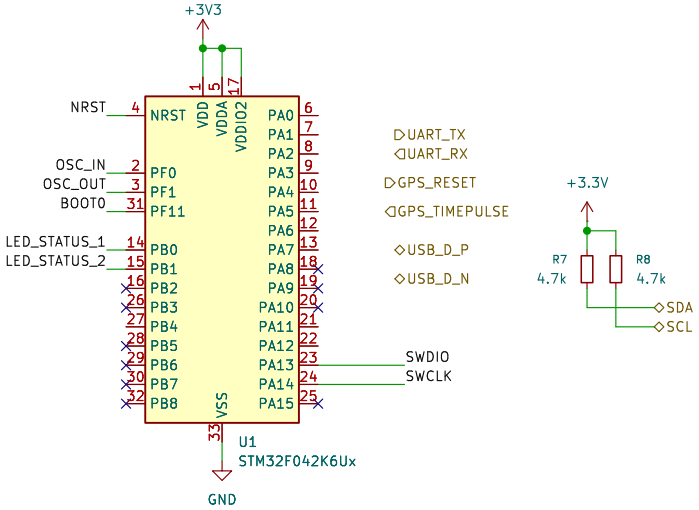


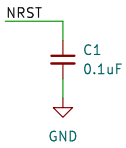


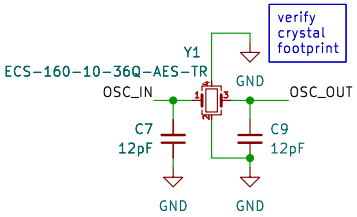
BOOT0 to 3V3: Boot to system memory
BOOT0 to GND: Boot to flash memory









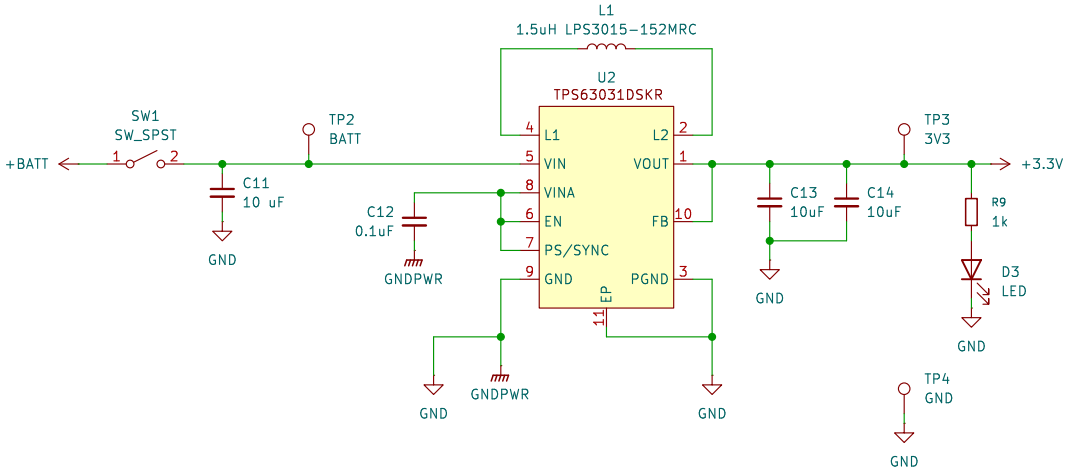


Sheet: /Microcontroller/
File: stm32f042k6ux.kicad_sch

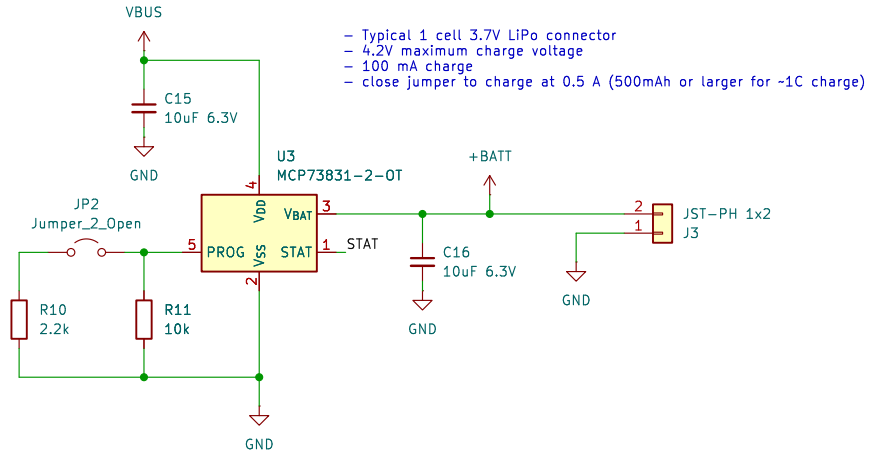
Title:

Size: A4	Date:	**Rev:**
KiCad E.D.A. 9.0.1		Id: 2/7

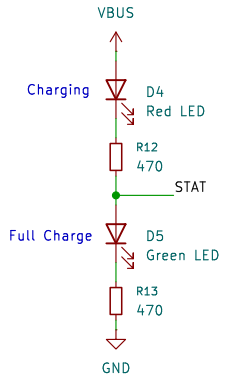
Note:
– The GNDPWR plane should only be connected to GND in one location.
– LiPo gnd and the regulated output gnd are the same. There is a seperate ground plane to handle ground–shift from high switching currents marked GNDPWR



Sheet: /3.3V Buck–Boost Regulator/		
File: buck_boost_3v3_output_5V_input.kicad_sch		
Title:		
Size: A4	Date:	**Rev:**
KiCad E.D.A. 9.0.1		Id: 4/7



- Typical 1 cell 3.7V LiPo connector
- 4.2V maximum charge voltage
- 100 mA charge
- close jumper to charge at 0.5 A (500mAh or larger for ~1C charge)

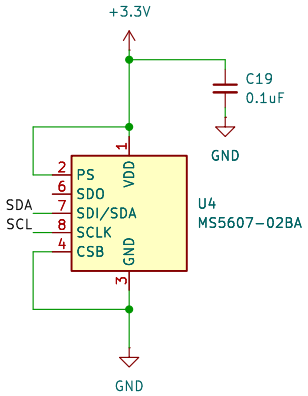


Sheet: /USB-C LiPo Charging/
File: usb-c_lipo_charing.kicad_sch

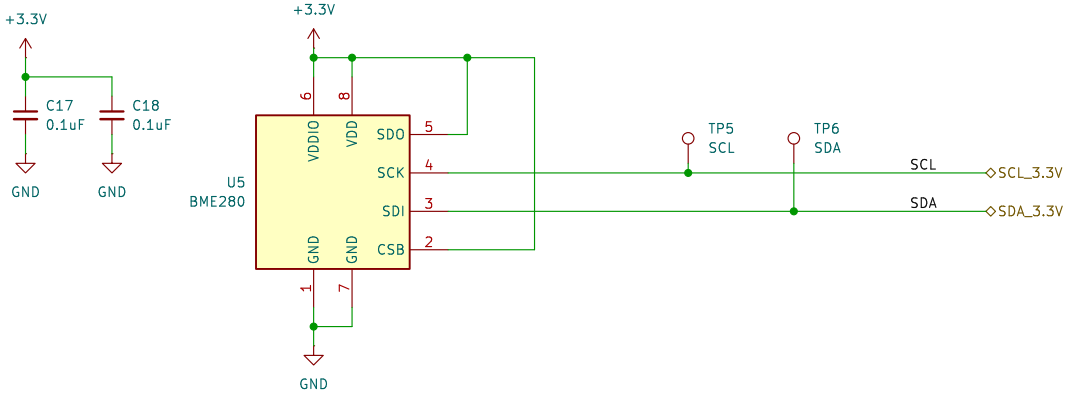
Title:

Size: A4	Date:	**Rev:**
KiCad E.D.A. 9.0.1		Id: 5/7

Primary High Precision Pressure Sensor for altituide estimation



Secondary Temp, Humidity, Pressure Sensor



Sheet: /Enviornmental Sensors/
File: aux_sensors.kicad_sch

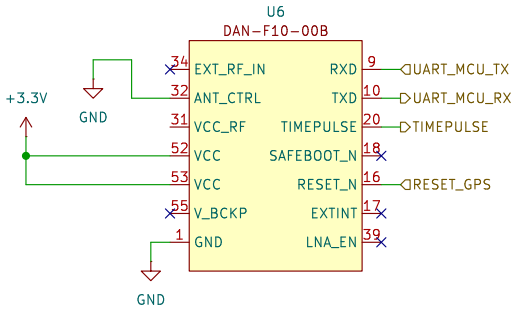
Title:

Size: A4 | Date: | **Rev:**

KiCad E.D.A. 9.0.1 | Id: 5/7

Note:
– PLace a 70 x 70 mm^2 ground plane around the module as part of the integrated antenna design. Module should be centered.
– ANT_CTL –> GND selects internal antenna
– GPS should be configured for Airborne <4G. This gives 80km max altituide, 20 km/s max vertical velocity, 500 m/s max horizontal velocity.
– Generally, use software reset over UART command. RESET_N triggers the RAM to clear and the firmware reloaded from flash

ANT_CTL –> GND selects internal antenna



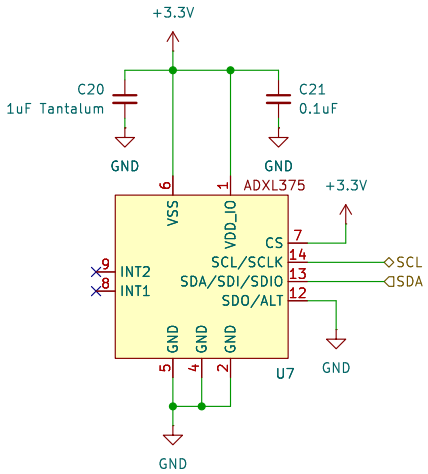
Sheet: /GPS Antenna Module/
File: gps_antenna_module_dual_band.kicad_sch

Title:

Size: A4	Date:	**Rev:**
KiCad E.D.A. 9.0.1		Id: 6/7

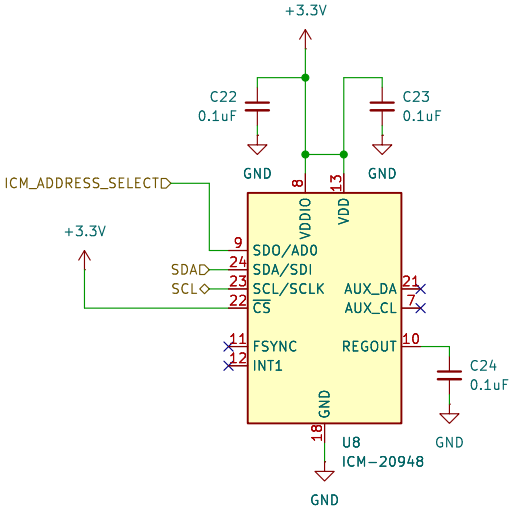
High G Accelerometer

- For peak acceleration measurement
- place near mounting hole



9-DOF IMU

- For rocket orientation
- Selectable I2C address with pin: b1101000 (pin low) and b1101001 (pin high)



Sheet: /Inertial Measurement Unit/		
File: imu.kicad_sch		
Title:		
Size: A4	Date:	**Rev:**
KiCad E.D.A. 9.0.1		Id: 7/7