Filter for the ADC/DAC

Caps for STM32 supply

SWD connector

I2C SSD1306 Display

UART CONNECTOR

CAN HEADER

Static discharge USB protection

Rotary encoder/switch
with a debouncing circuit

Resonator

Debug LED indicators

TIM2 ENC MODE

TIM3 ENC MODE

TIM4 ENC MODE

Motor driver 0

Motor driver 1

Motor driver 2

Power to the
on-board computer

Addressable LEDs around the PCB

External devices

Power Management

DC-DC 3V3 for Power Management

DC-DC for EXT, MCU, and LEDs

DC-DC 12V for Motors

Motor wiring:
Pin | Color | Function
1 Red: Motor power
2 Black: Motor power
3 Green: Encoder ground
4 Blue: Encoder Vcc (3.5 V to 20 V)
5 Yellow: Encoder A output
6 White: Encoder B output

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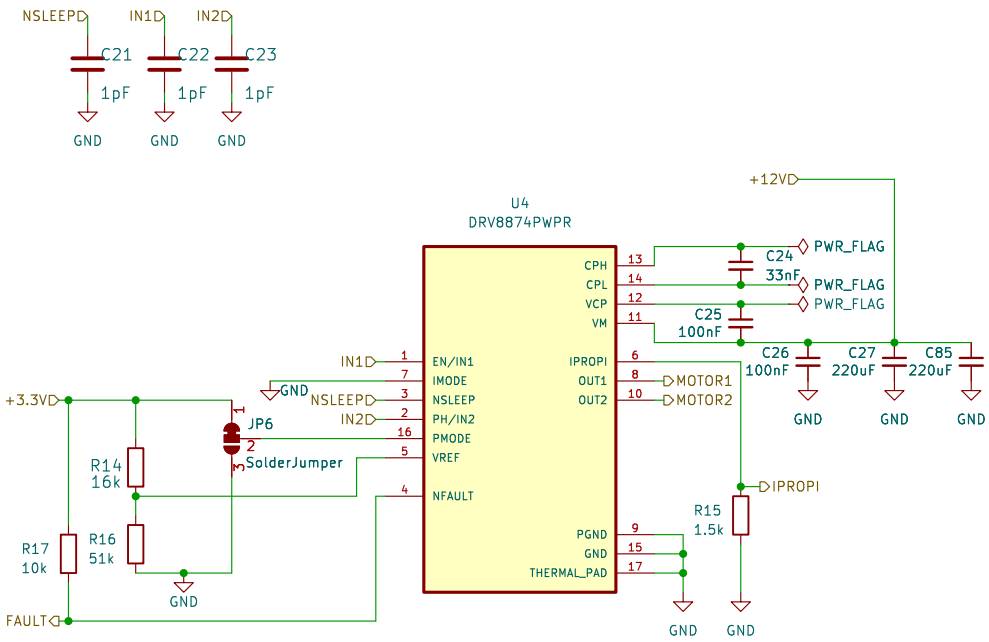
Sheet: /

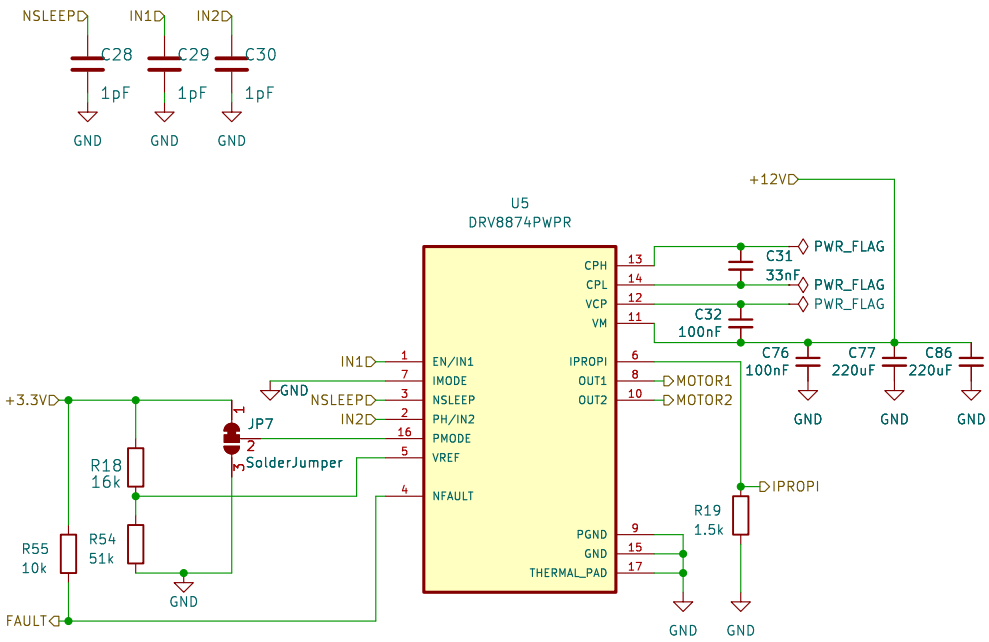
File: mainboard.kicad_sch

Title: Robotont mainboard

Size: A3	Date: 2023-21-11	Rev: 0.2.0
KiCad E.D.A. kicad 7.0.9-7.0.9~ubuntu20.04.1		Id: 1/16



University of Tartu		
Sheet: /Motor driver 0/ File: motor_driver.kicad_sch		
Title: Motor driver		
Size: A4	Date: 2023-21-11	**Rev: 0.2.0**
KiCad E.D.A. kicad 7.0.9-7.0.9~ubuntu20.04.1		Id: 2/16



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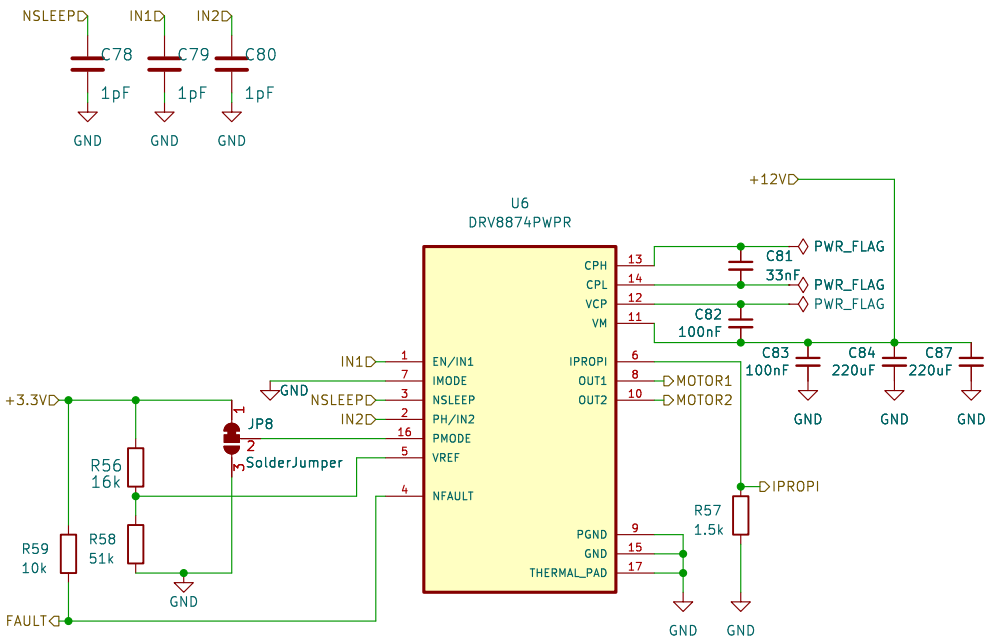
Sheet: /Motor driver 1/
File: motor_driver.kicad_sch

Title: Motor driver

Size: A4	Date: 2023-21-11	**Rev: 0.2.0**
KiCad E.D.A. kicad 7.0.9-7.0.9~ubuntu20.04.1		Id: 3/16



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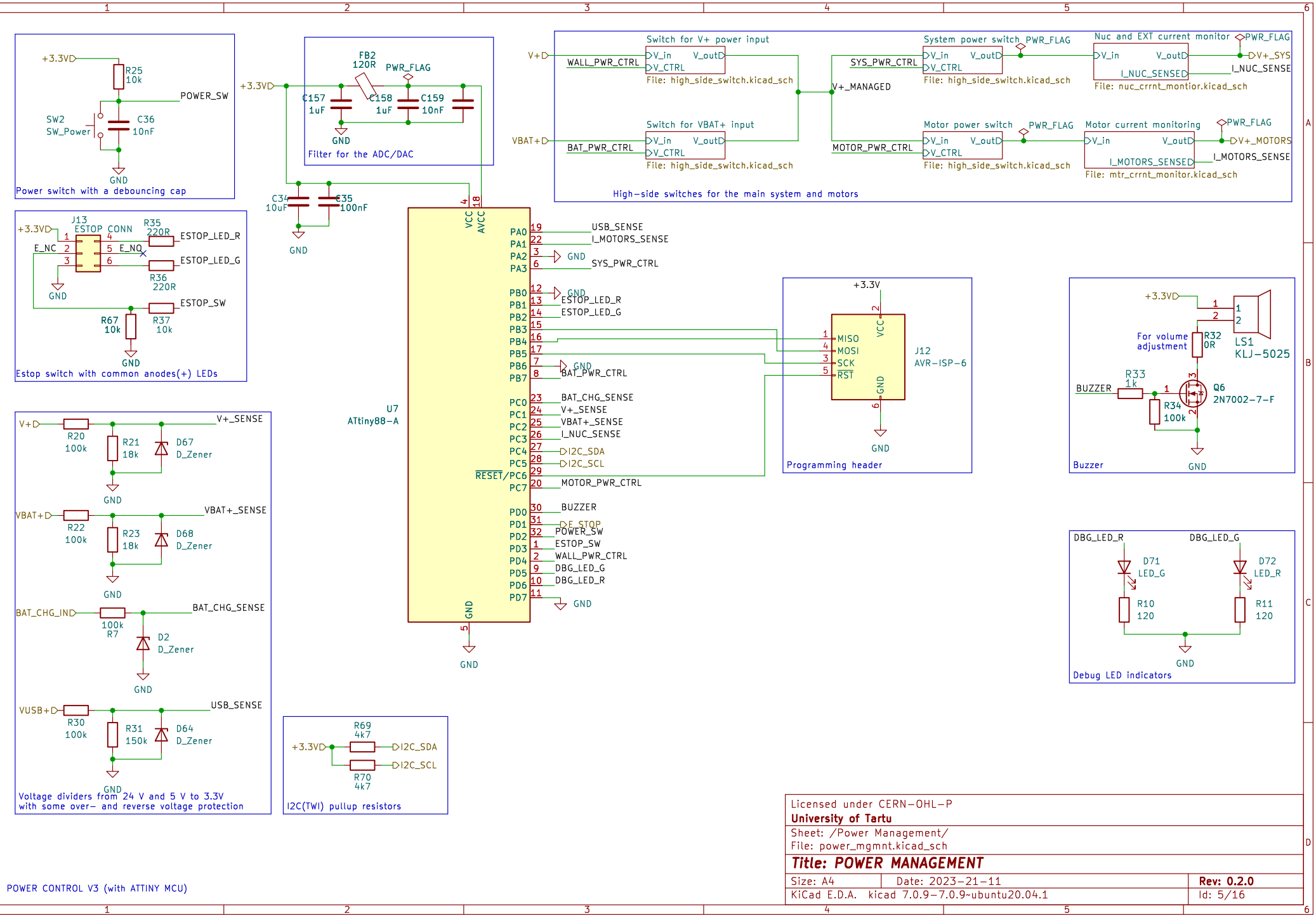
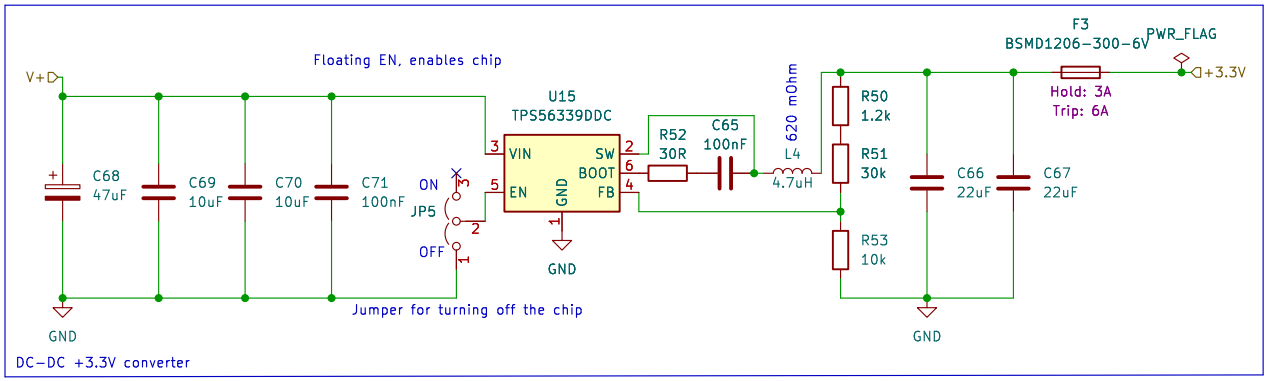
Sheet: /Motor driver 2/
File: motor_driver.kicad_sch

Title: Motor driver

Size: A4	Date: 2023-21-11	**Rev: 0.2.0**
KiCad E.D.A. kicad 7.0.9-7.0.9~ubuntu20.04.1		Id: 4/16


Power switch with a debouncing cap
+3.3VD
R25
10k
POWER_SW
SW2
SW_Power
C36
10nF
GND
Filter for the ADC/DAC
FB2
120R
PWR_FLAG
C157
1uF
C158
1uF
C159
10nF
C34
10uF
C35
100nF
High-side switches for the main system and motors
V+
WALL_PWR_CTRL
Switch for V+ power input
V_in
V_out
V_CTRL
File: high_side_switch.kicad_sch
VBAT+
BAT_PWR_CTRL
Switch for VBAT+ input
V+_MANAGED
SYS_PWR_CTRL
System power switch
MOTOR_PWR_CTRL
Motor power switch
Nuc and EXT current monitor
I_NUC_SENSED
File: nuc_crrnt_montior.kicad_sch
Motor current monitoring
I_MOTORS_SENSED
File: mtr_crrnt_monitor.kicad_sch
V+_SYS
I_NUC_SENSE
V+_MOTORS
I_MOTORS_SENSE
Estop switch with common anodes(+) LEDs
J13
ESTOP_CONN
E_NC
E_NO
R35
220R
R36
220R
ESTOP_LED_R
ESTOP_LED_G
ESTOP_SW
R67
10k
R37
10k
U7
ATtiny88-A
VCC
AVCC
PA0
PA1
PA2
PA3
PB0
PB1
PB2
PB3
PB4
PB5
PB6
PB7
PC0
PC1
PC2
PC3
PC4
PC5
RESET/PC6
PC7
PD0
PD1
PD2
PD3
PD4
PD5
PD6
PD7
USB_SENSE
I_MOTORS_SENSE
SYS_PWR_CTRL
BAT_CHG_SENSE
V+_SENSE
VBAT+_SENSE
I_NUC_SENSE
I2C_SDA
I2C_SCL
MOTOR_PWR_CTRL
BUZZER
E_STOP
POWER_SW
ESTOP_SW
WALL_PWR_CTRL
DBG_LED_G
DBG_LED_R
Programming header
J12
AVR-ISP-6
MISO
MOSI
SCK
RST
Buzzer
For volume adjustment
R32
0R
LS1
KLJ-5025
R33
1k
R34
100k
Q6
2N7002-7-F
Debug LED indicators
DBG_LED_R
DBG_LED_G
D71
LED_G
D72
LED_R
R10
120
R11
120
Voltage dividers from 24 V and 5 V to 3.3V
with some over- and reverse voltage protection
V+
VBAT+
BAT_CHG_IND
VUSB+
R20
100k
R21
18k
D67
D_Zener
V+_SENSE
R22
100k
R23
18k
D68
D_Zener
VBAT+_SENSE
100k
R7
D2
D_Zener
BAT_CHG_SENSE
R30
100k
R31
150k
D64
D_Zener
USB_SENSE
I2C(TWI) pullup resistors
R69
4k7
R70
4k7
Licensed under CERN-OHL-P
University of Tartu
Sheet: /Power Management/
File: power_mgmnt.kicad_sch
Title: POWER MANAGEMENT
Size: A4
Date: 2023-21-11
Rev: 0.2.0
KiCad E.D.A. kicad 7.0.9-7.0.9~ubuntu20.04.1
Id: 5/16
POWER CONTROL V3 (with ATTINY MCU)

Required current max ~200mA
TODO: look for more efficient solution



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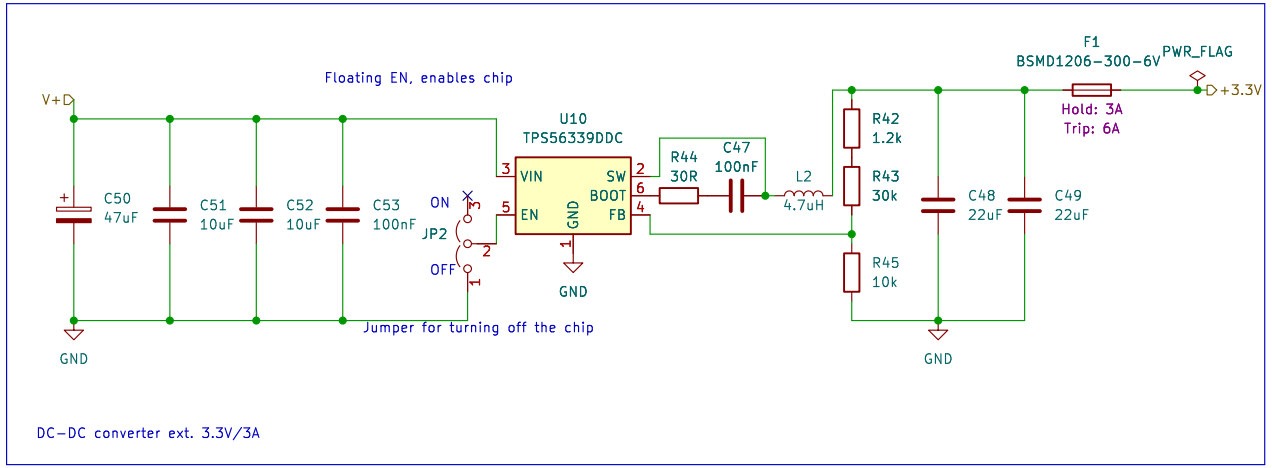
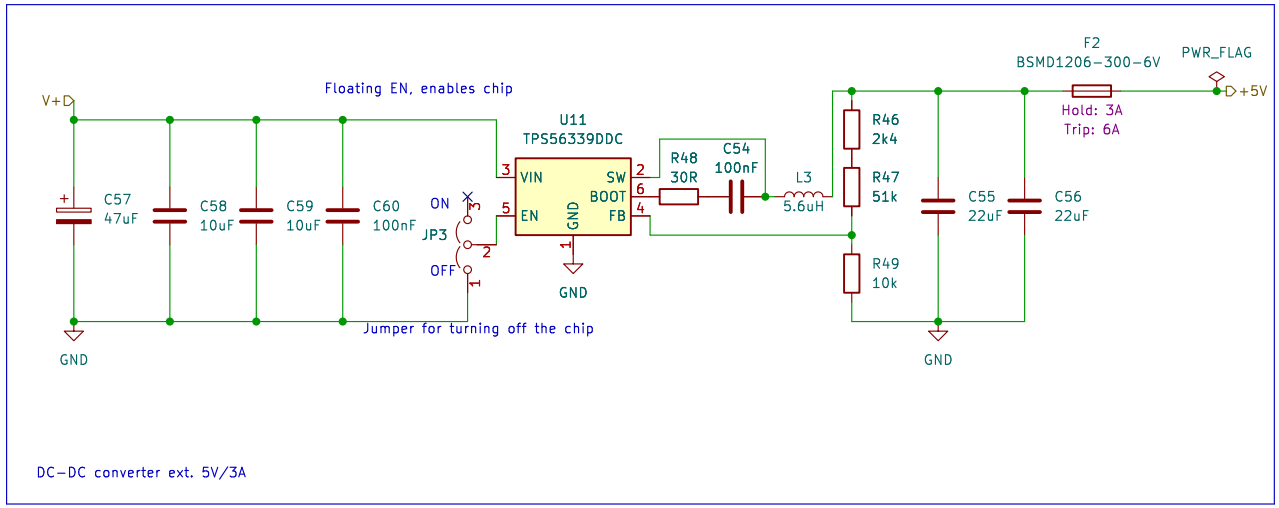
Sheet: /DC-DC 3V3 for Power Management/
File: dc_dc_3V3_pm.kicad_sch

Title: DC-DC converter for the power management subsystem

Size: A4	Date: 2023-21-11	**Rev: 0.2.0**
KiCad E.D.A. kicad 7.0.9-7.0.9~ubuntu20.04.1		Id: 6/16



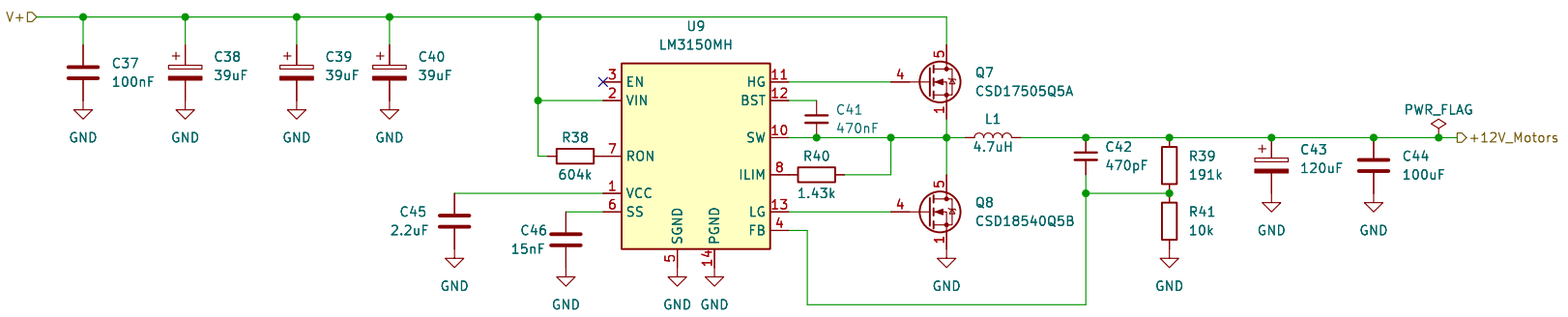


University of Tartu

Sheet: /DC-DC for EXT, MCU, and LEDs/
File: dc_dc_ext.kicad_sch

Title: DC-DC converter for the MCU, LEDs, and external devices

Size: A4	Date: 2023-21-11	**Rev: 0.2.0**
KiCad E.D.A. kicad 7.0.9-7.0.9~ubuntu20.04.1		Id: 7/16



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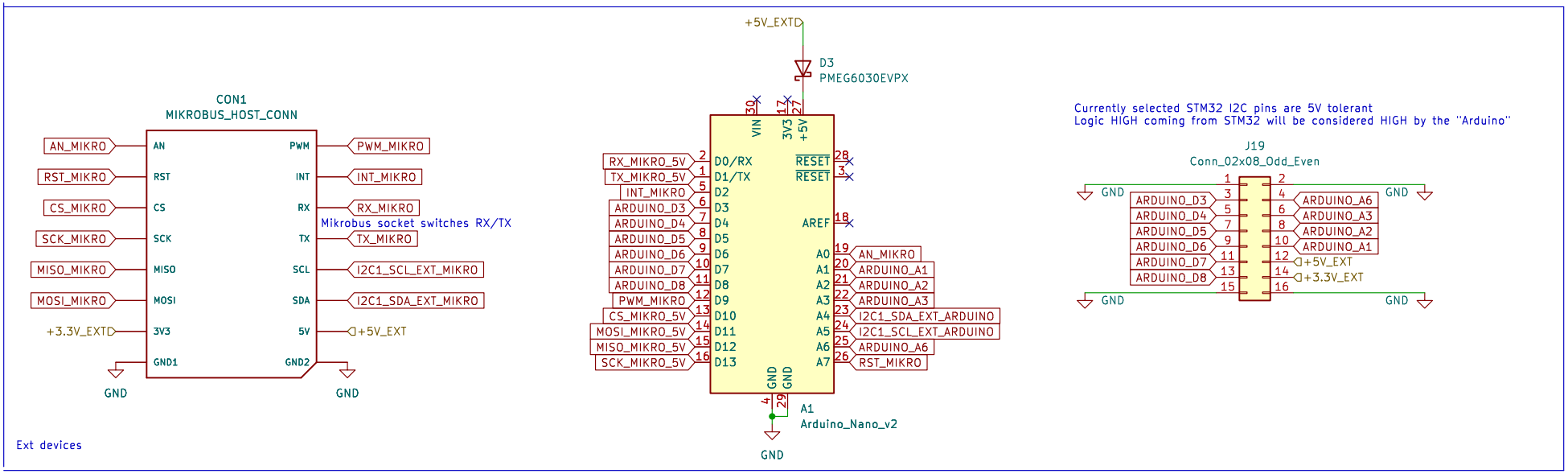
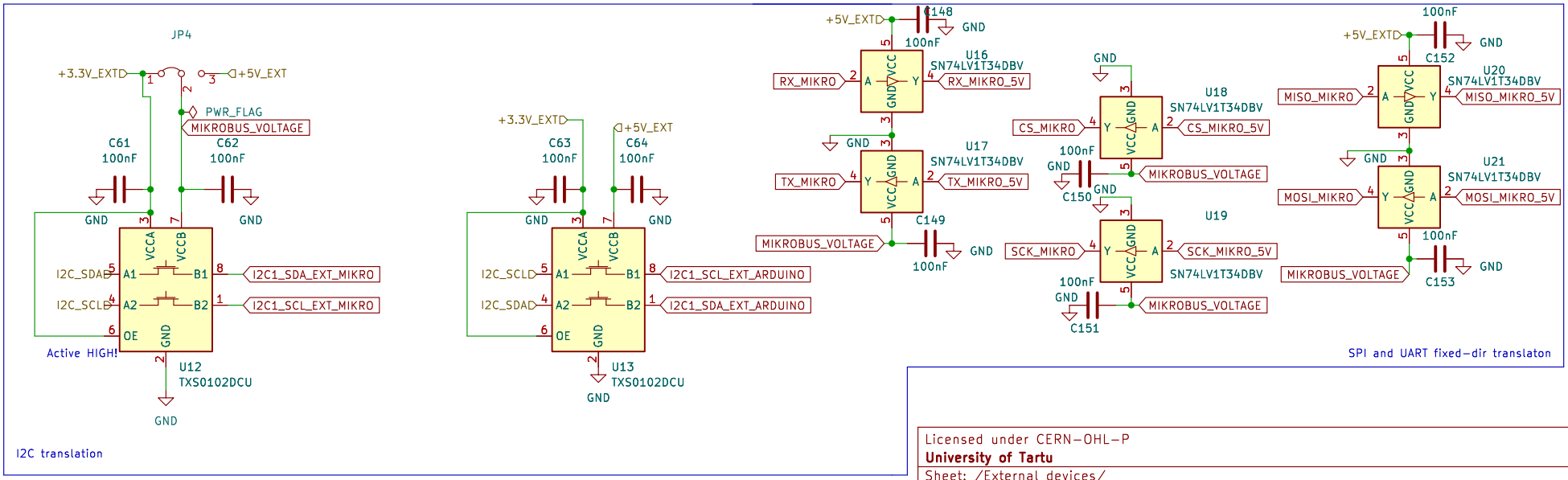
Sheet: /DC-DC 12V for Motors/
File: dc_dc_12v_motors.kicad_sch

Title: DC-DC converter 12V for motors

Size: A4	Date: 2023-21-11	**Rev: 0.2.0**
KiCad E.D.A. kicad 7.0.9-7.0.9~ubuntu20.04.1		Id: 8/16





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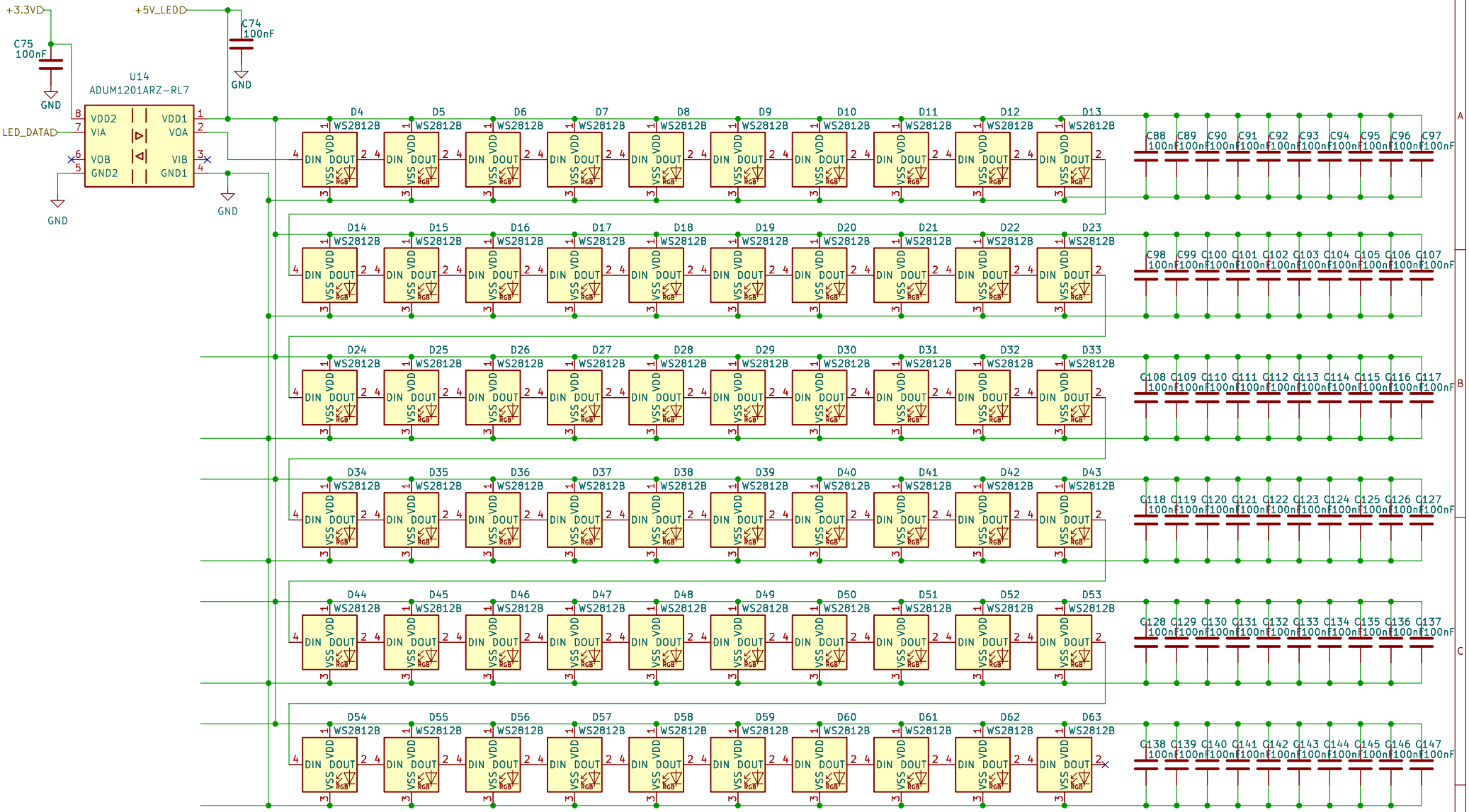
Sheet: /External devices/
File: ext_devices.kicad_sch

Title: External devices

Size: A4	Date: 2023-21-11	**Rev: 0.2.0**
KiCad E.D.A. kicad 7.0.9-7.0.9~ubuntu20.04.1		Id: 9/16



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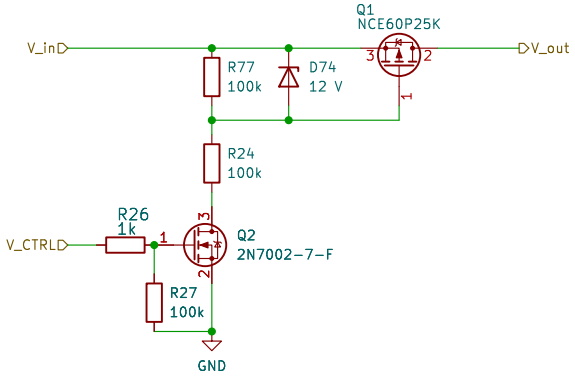
Sheet: /Addressable LEDs around the PCB/
File: leds.kicad_sch

Title: LEDs around the mainboard

Size: A4	Date: 2023-21-11	**Rev: 0.2.0**
KiCad E.D.A. kicad 7.0.9-7.0.9~ubuntu20.04.1		Id: 10/16



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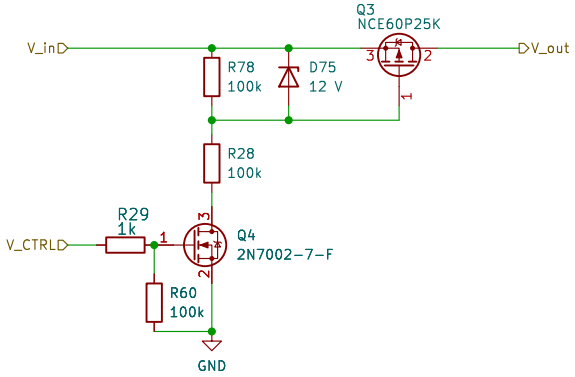
Sheet: /Power Management/Switch for V+ power input/
File: high_side_switch.kicad_sch

Title: High side switch

Size: A4	Date: 2023-21-11	**Rev: 0.2.0**
KiCad E.D.A. kicad 7.0.9-7.0.9~ubuntu20.04.1		Id: 12/16



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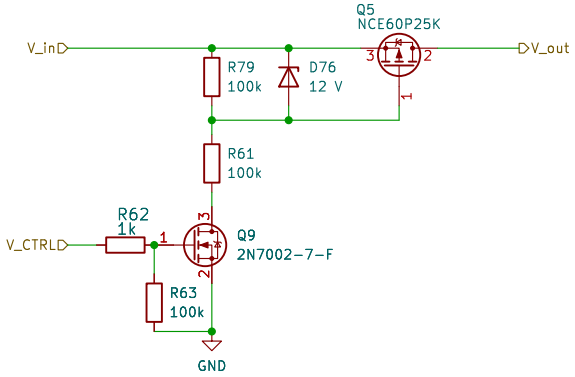
Sheet: /Power Management/Switch for VBAT+ input/
File: high_side_switch.kicad_sch

Title: High side switch

Size: A4	Date: 2023-21-11	**Rev: 0.2.0**
KiCad E.D.A. kicad 7.0.9-7.0.9~ubuntu20.04.1		Id: 13/16



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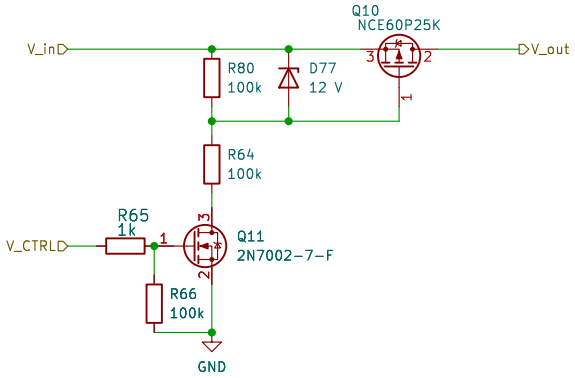
Sheet: /Power Management/System power switch/

File: high_side_switch.kicad_sch

Title: High side switch

Size: A4	Date: 2023-21-11	**Rev: 0.2.0**
KiCad E.D.A. kicad 7.0.9-7.0.9~ubuntu20.04.1		Id: 14/16



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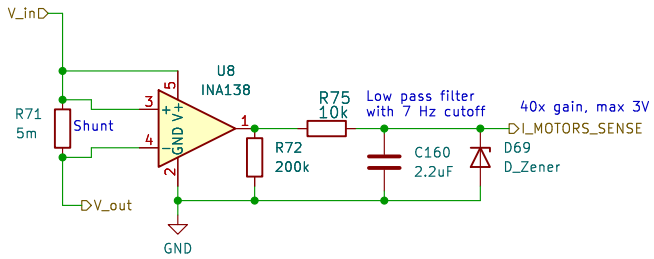
Sheet: /Power Management/Motor power switch/
File: high_side_switch.kicad_sch

Title: High side switch

Size: A4	Date: 2023-21-11	**Rev: 0.2.0**
KiCad E.D.A. kicad 7.0.9-7.0.9~ubuntu20.04.1		Id: 15/16



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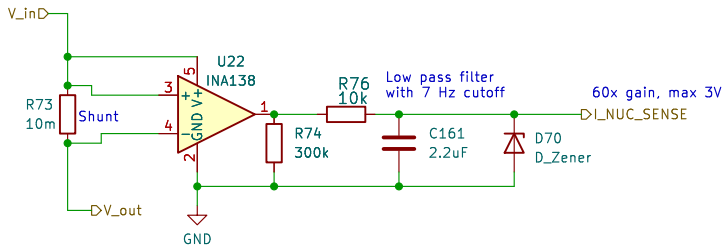
Sheet: /Power Management/Motor current monitoring/
File: mtr_crrnt_monitor.kicad_sch

Title: Motor current sensing circuit

Size: A4	Date: 2023-21-11	**Rev: 0.2.0**
KiCad E.D.A. kicad 7.0.9-7.0.9~ubuntu20.04.1		Id: 17/16



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Sheet: /Power Management/Nuc and EXT current monitor/
File: nuc_crrnt_montior.kicad_sch

Title: Onboard computer current sensing circuit

Size: A4	Date: 2023-21-11	**Rev: 0.2.0**
KiCad E.D.A. kicad 7.0.9-7.0.9~ubuntu20.04.1		Id: 17/16