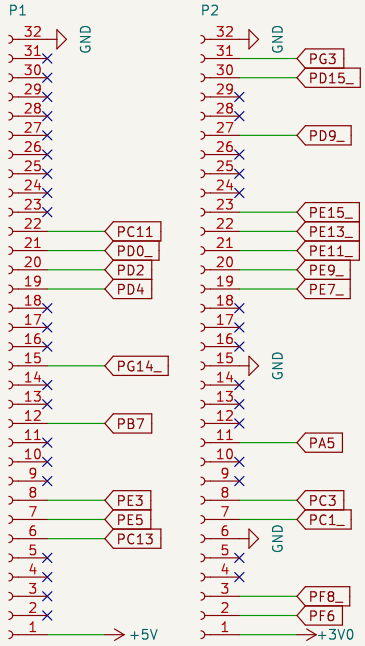
# Cable–Monitor
## A Project by A.Horvat and T.Wey
## for PM3 Module ZHAW



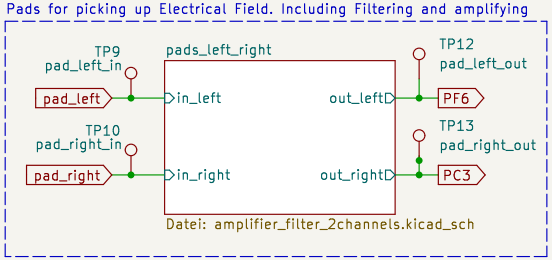

GPIOs with names ending by a _ might be used for board peripherals. Check their availability.

The outline of the extension connectors of the microcontroller board with a list of the available functions and peripherals on each pin is in Microcontroller_STM32F429/Datasheets/Extension_Connectors.xlsx

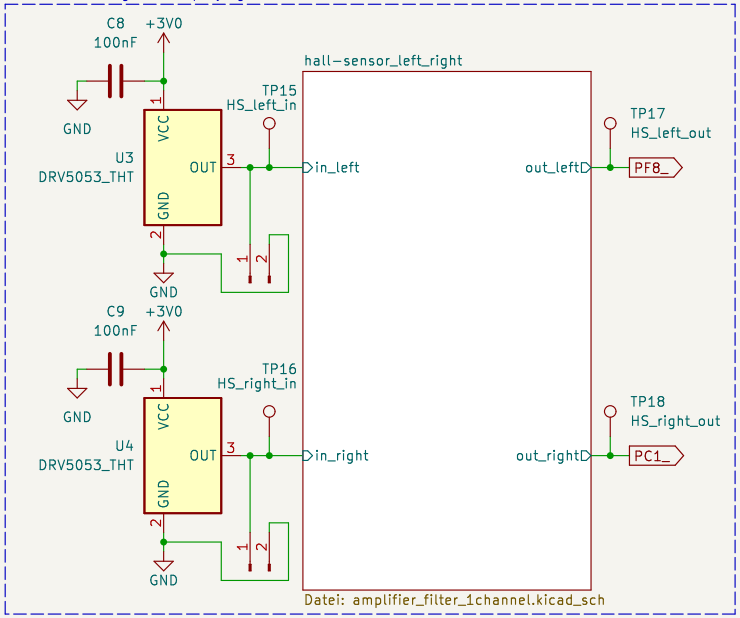
Recommended use of ADC inputs for ET.PM3:
PF6 = ADC3_IN4 = PAD_LEFT
PC3 = ADC123_IN13 = PAD_RIGHT
PF8 = ADC3_IN6 = COIL_LEFT
PC1 = ADC123_IN11 = COIL_RIGHT
PA5 = ADC12_IN5 (= DAC_OUT2) if additional PAD or COIL

DAC output controls VCO input for ET.PM4
PA5 = ADC12_IN5 = DAC_OUT2

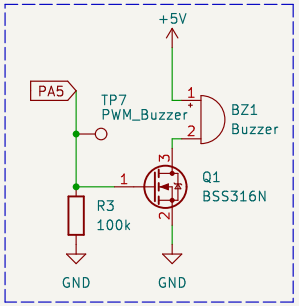
### Pads for picking up Electrical Field. Including Filtering and amplifying



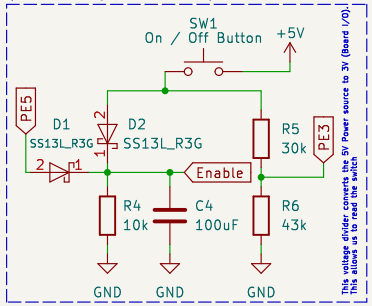

### Hall–Sensor to detect Magnetic Fields (and allow us to calculate Current)
### includes filtering and amplifying



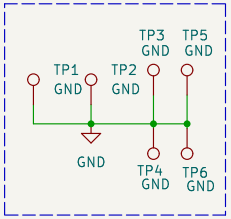

### PWM controlled Buzzer



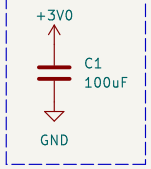

### Logic for On/Off Switch
### (soft latching power circuit)



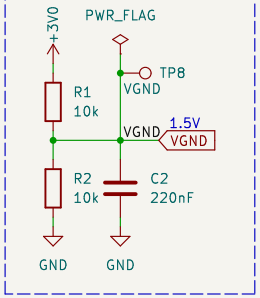

### Ground Pads



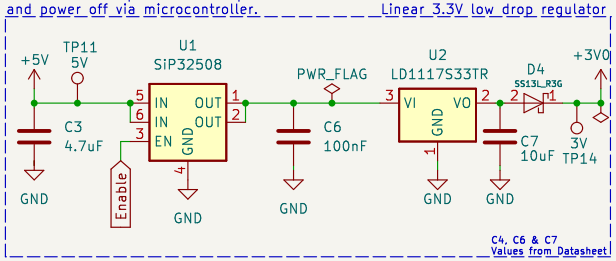

### Coupling Capacitor




### Virtual Ground

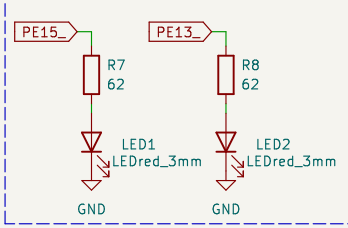



### Load switch
### Can be used to power on with pushbutton and power off via microcontroller.

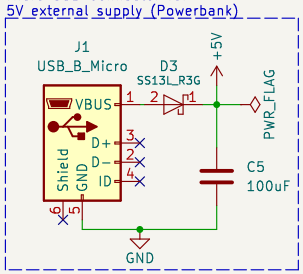



### Linear 3.3V low drop regulator

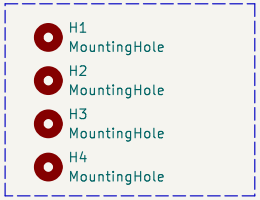
### Left and Right LED's to show direction of Fields




### Micro USB Connector for 5V external supply (Powerbank)




### M2 Mounting Holes



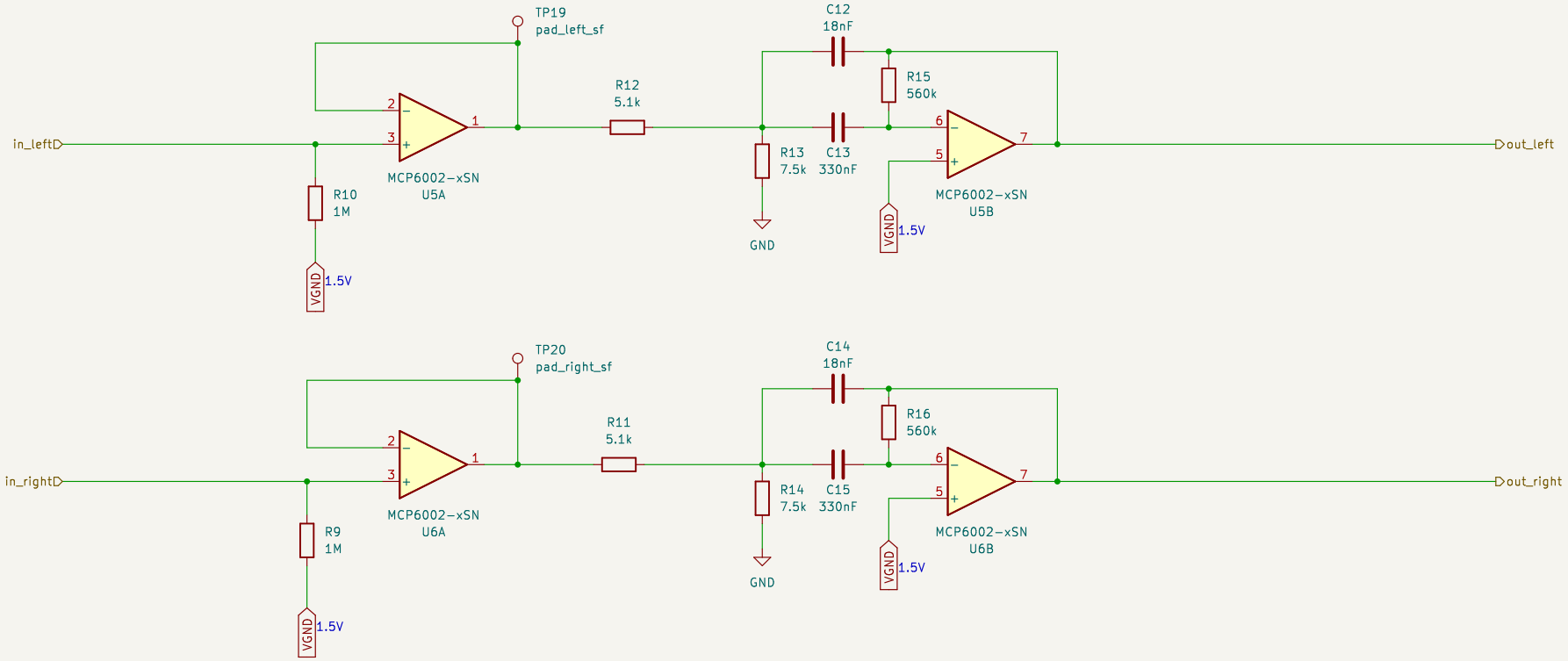

This is the Hardware Schematic of the Cable Monitor PCB which was designed for ET.PM3
Created by: horvaale & weytim01
**ZHAW**

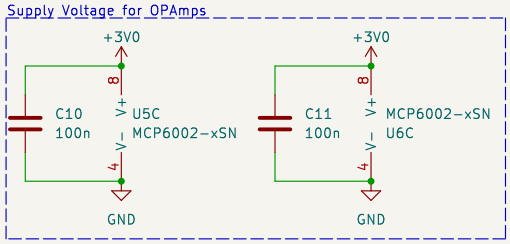
Sheet: /
File: Cable_Monitor.kicad_sch

***Title: Cable Monitor***

| Size: A4 | Date: 2023–09–29 | **Rev: V.1.0** |
|---|---|---|
| KiCad E.D.A. kicad 7.0.7 | | Id: 1/3 |

Filtering and Amplification to measure Electric Fields.
This will allow us to measure Fields generated by Cables and thus allow us to calculate the distance from an AC Voltage source.



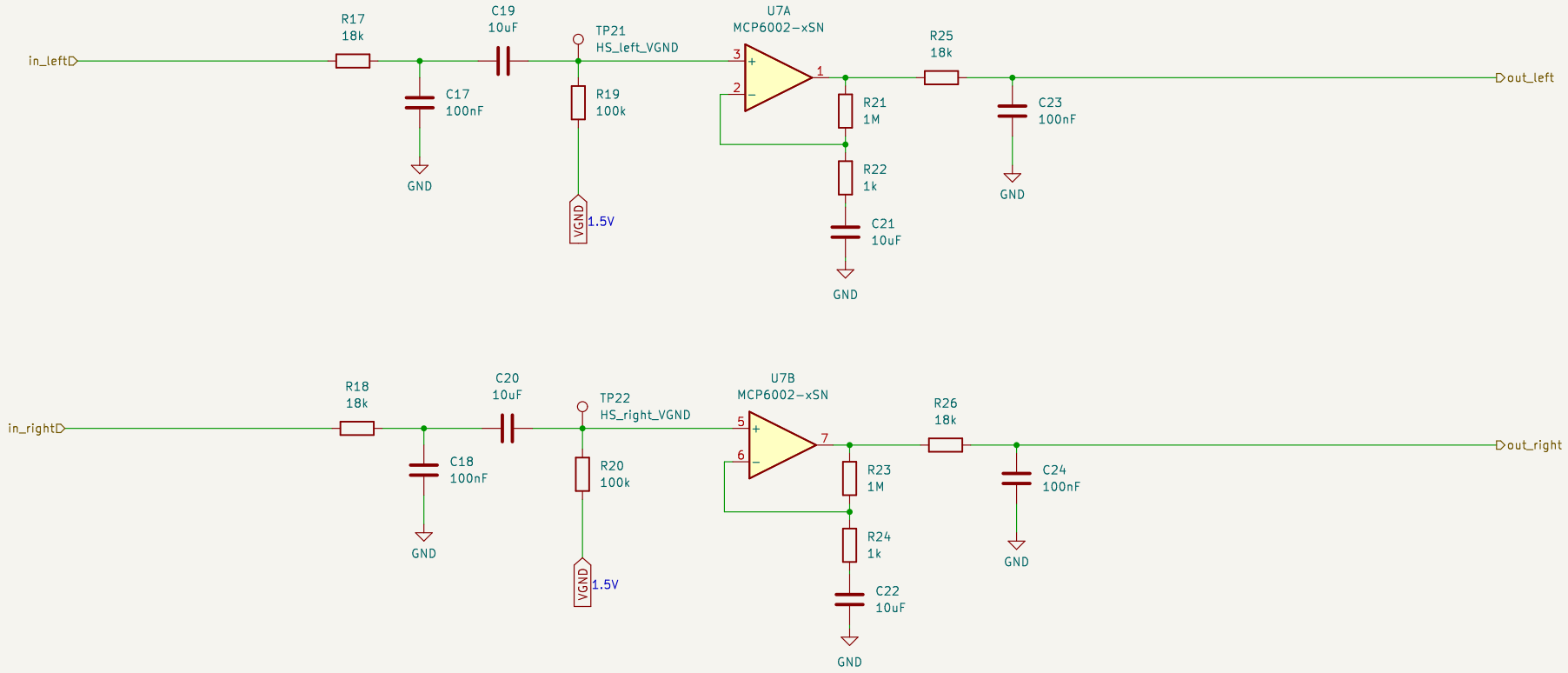

Pads for measuring electric fields (voltage)
Created by: horvaale & weytim01
**ZHAW**

Sheet: /pads_left_right/
File: amplifier_filter_2channels.kicad_sch

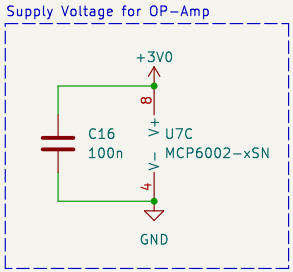
***Title: Amplifiers and Filters for Pads***

| Size: A4 | Date: 2022-12-22 | **Rev: V.1.0** |
|---|---|---|
| KiCad E.D.A. kicad 7.0.7 | | Id: 2/3 |

Filtering and Amplification used for Hall-Sensors.
The Hall-Sensors will be used to measure a magnetic Field and thus allow us to calculate a current.




Supply Voltage for OP-Amp




Hall-Sensor's used to measure magnetic Field (current)
Created by: horvaale & weytim01
**ZHAW**

Sheet: /hall-sensor_left_right/
File: amplifier_filter_1channel.kicad_sch

***Title: Amplifiers and Filters for Hall-Sensor***

| Size: A4 | Date: 2022-12-22 | **Rev: V.1.0** |
|---|---|---|
| KiCad E.D.A. kicad 7.0.7 | | Id: 3/3 |