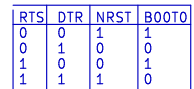


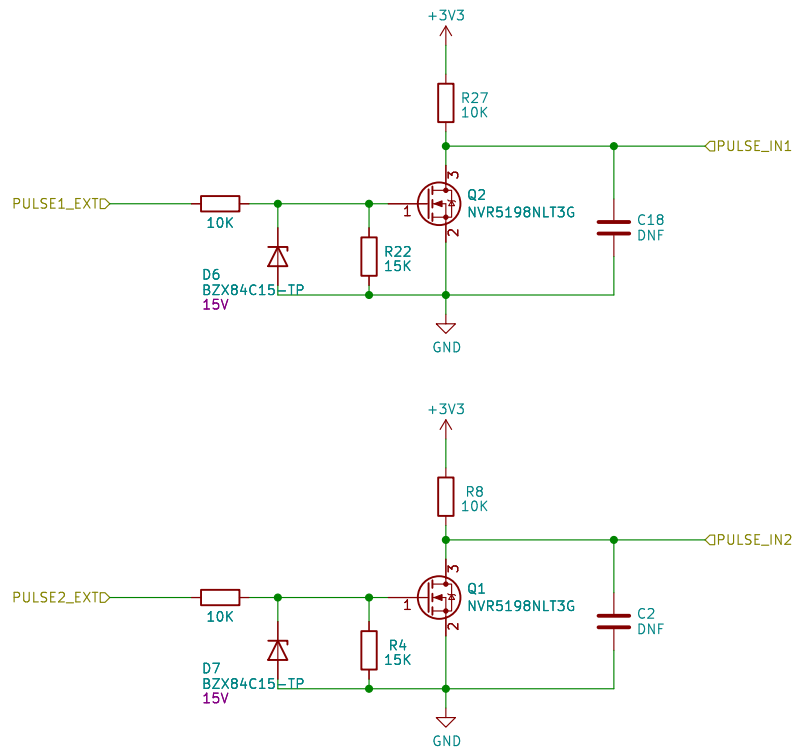
Please note:

- usb may not be available on all packages
- For confirmation of pin functions refer to datasheet. Symbol may not be correct
- The I/Os with wakeup from Standby/Shutdown capability are: PA0, PC13, PE6, PA2, PC5
- I/Os can be configured with internal pull-up, pull-down or floating in Shutdown mode but the configuration is lost when exiting the Shutdown mode.
- After reset, these pins are configured as JTAG/SW debug alternate functions, and the internal pull-up on PA15 (GPIO10), PA13, PB4 (GPIO8) pins and the internal pull-down on PA14 pin are activated.
- Or (r7, r95) fitted as pins appear as io on i451 chip

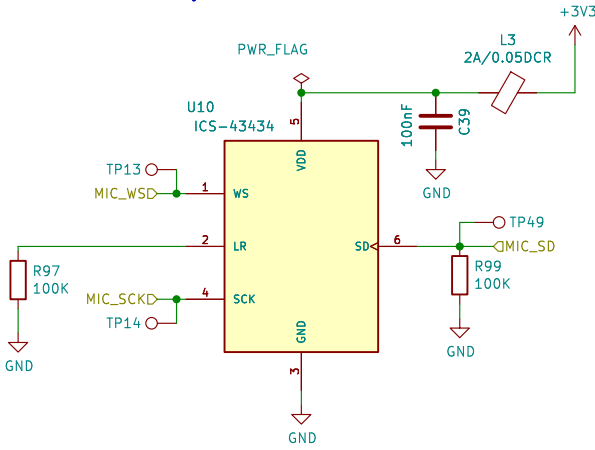


Id: 3/9

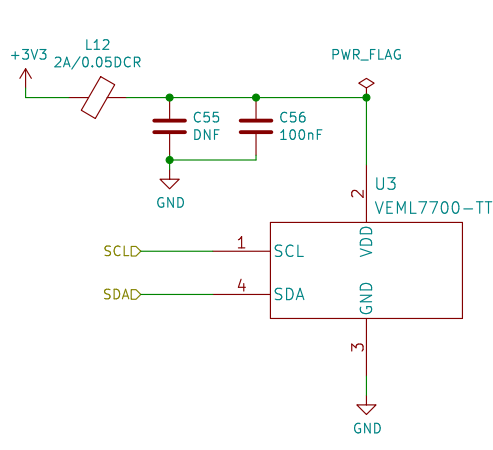
Pulse Inputs



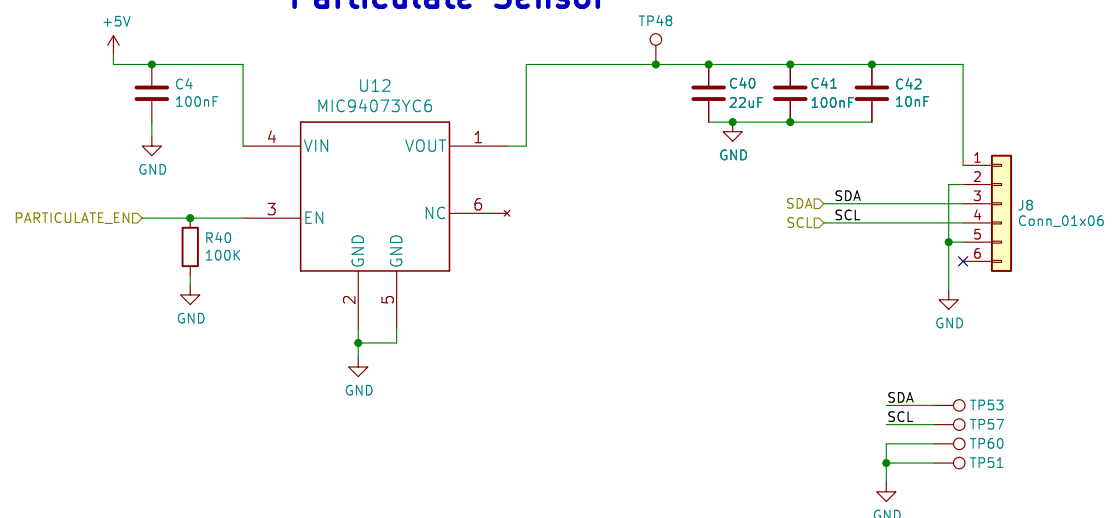
Microphone module



Light Sensor



Particulate Sensor



The sensor is equipped with a serial communication interface. The interface connector is located at the side of the sensor adjacent to the air outlet. The used connector is ACES 51451-0060N-001 on the sensor's side, while the corresponding plug is ACES 51452-0060H0N-001. At the time of writing JST GHR-06V-S is compatible and can be used as well. In a description of the pin layout is given.

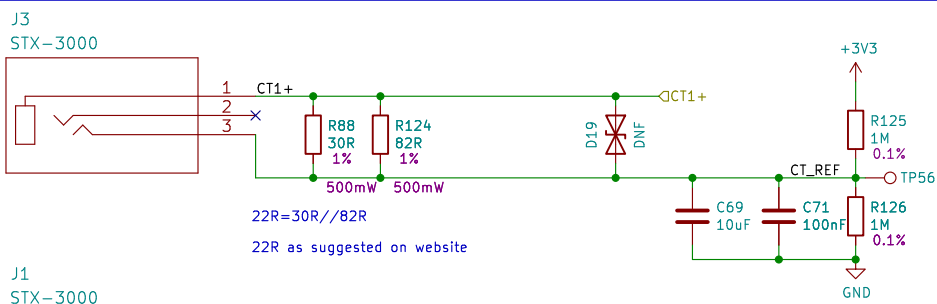
Pin	Name	Description	Comments
1	VDD	Supply voltage	5V ± 10%
2	GND	Ground	
3	SDA	Serial data input / output	LVTTTL 3.3V compatible
4	SCL	Serial clock input	LVTTTL 3.3V compatible
5	SEL	Interface select	Connect to GND
6	NC	Do not connect	

Table 10: SEN5x pin assignment.

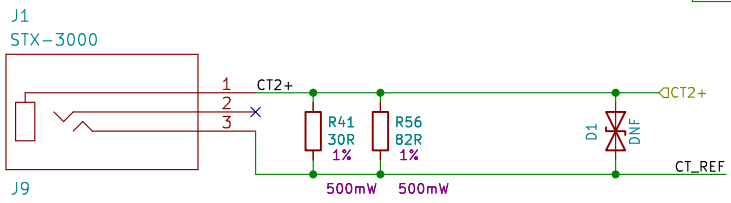
SEN54-SDN-T particulate sensor to be used here

Note, that there is an internal electrical connection between GND pin (2) and metal shielding. Keep this metal shielding electrically floating to avoid any unintended currents through this internal connection. If this is not an option, proper external potential equalization between GND pin and any potential connected to the shielding is mandatory. Any current through the connection between GND and metal shielding may damage the product and poses a safety risk through overheating

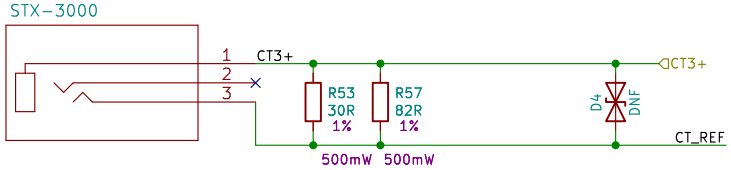
CT Clamp 1



CT Clamp 2



CT Clamp 3

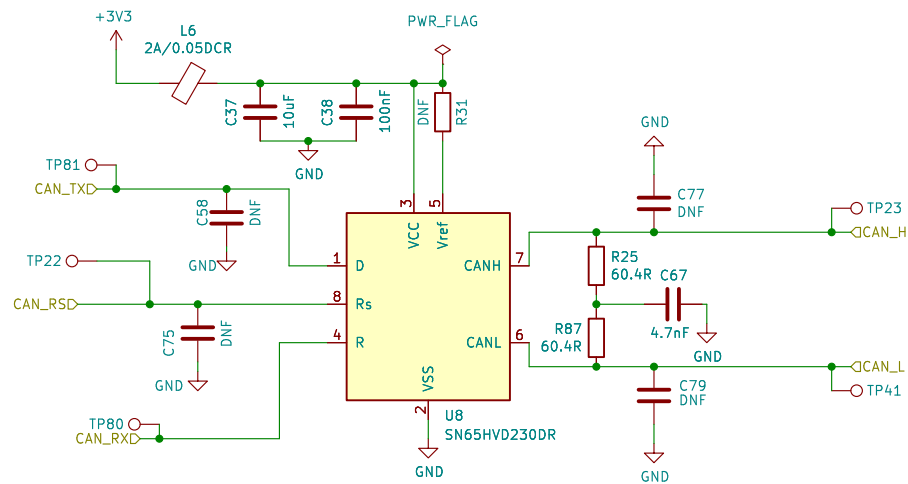


CT clamp reference
bypass capacitor few hundred ohms
<https://learn.openenergymonitor.org/electricity-monitoring/ct-sensors/interface-with-arduino>

Many ct cmlaps available on market:
-mA output, default on this design 100A:50mA. calcs are 0a= 0x22=0v and 141.4mA*22=3.11v=100a
-0-1v output
- 333mv voltage output (unsure if buden resistor needed)
-4-20mA
- some ct clamps can provide very high voltage outputs e.g 5v and above
-may need to fit tvs for current output types, yhdc internally built in
-some ct clamps may need an external supply e.g 24v

For design simplicity we assume by default use 100mA:50mA ct clamp by yhdc or use voltage output version where ct clamps are scaled from 0-1v.

Part No: 304-010
Devtank LTD
Sheet: /Sensors_AND_IO/
File: Sensors_AND_IO.kicad_sch
Title: Open Smart Monitor
Size: A3 Date: 2023-12-19 Rev: D
KiCad E.D.A. kicad 7.0.9-7.0.9-ubuntu23.10.1 Id: 4/9



Note: C58 and 75 are filtering caps

Part No: 304-010

Devtank LTD

Sheet: /CanTransciever/

File: CanTransciever.kicad_sch

Title: Open Smart Monitor

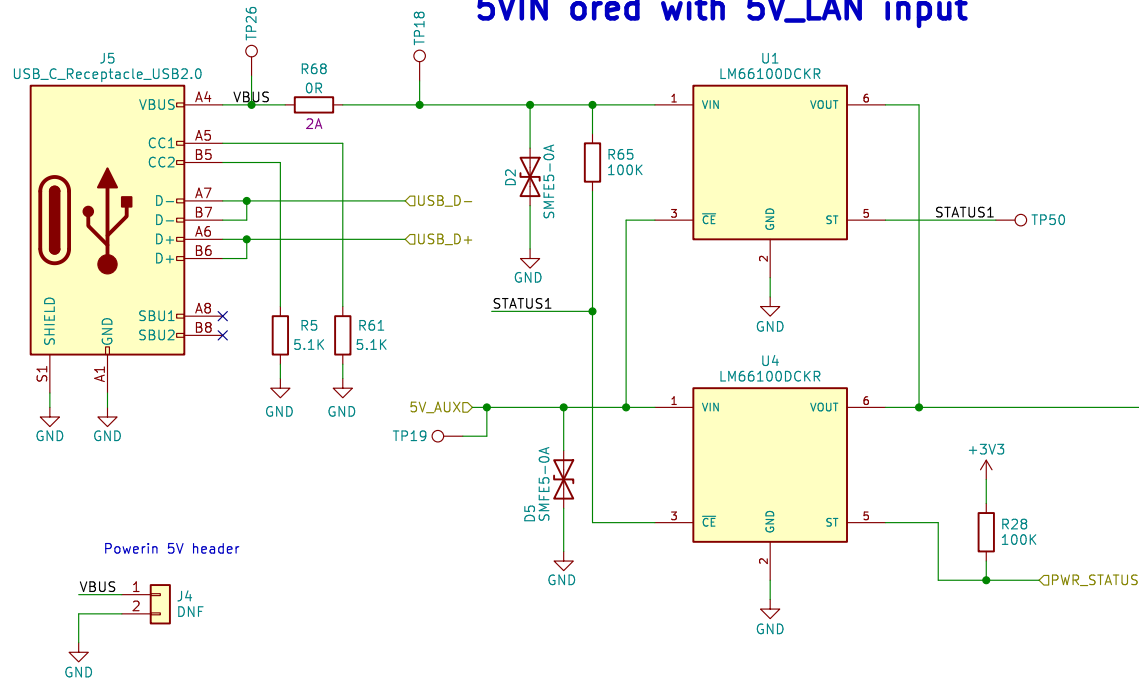
Size: A4 Date: 2023-12-19

KiCad E.D.A. kicad 7.0.9-7.0.9-ubuntu23.10.1

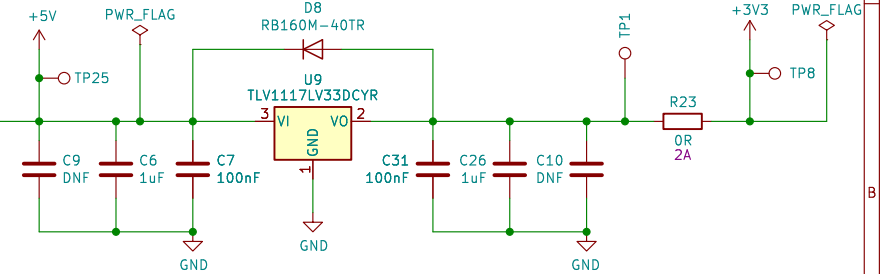
Rev: D

Id: 6/9

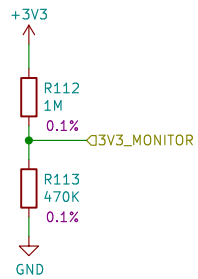
5VIN ored with 5V_LAN input



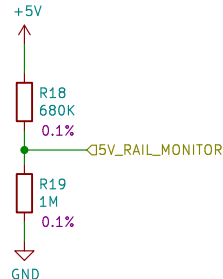
3V3 Regulator



3V3 Monitor



5Vin Monitor



The above configuration supports 2 inputs voltages where VBUS will have priority over 5V_AUX

Typical loss for 5V supply based on rdson 0.79mohm (based on 200mA datasheet spec)

Typical current of sensor 0.1A
 $0.1 \times 0.79 \text{mohm} = 79 \mu\text{Vloss}$ $5\text{V} - 79 \mu\text{V} = 4.99\text{V}$

Max current of sensor 0.5A
 $0.5 \times 0.79 \text{mohm} = 19.75 \text{mVloss}$ $5\text{V} - 19.75 \text{mV} = 4.98\text{V}$

divider ratio = $47 / 147 = 31.97$
 $5 / 1024 = 1 \text{adc} = 4.88 \text{mm}$
 $(4.2 / 4.88 \text{mm}) \times 0.3197 = 275.15 \text{adc} = \text{fully charged and above}$

Part No: 304-010

Devtank LTD

Sheet: /PowerSupply/

File: PowerSupply.kicad_sch

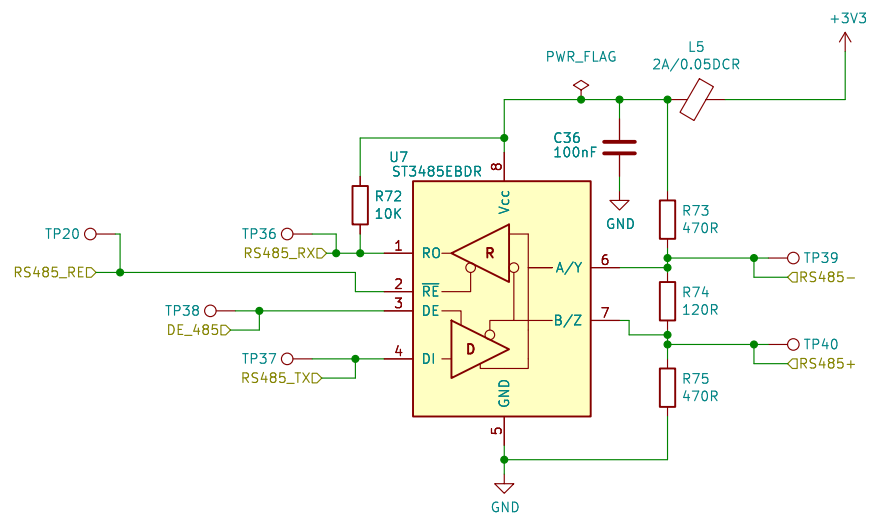
Title: Open Smart Monitor

Size: A4 Date: 2023-12-19

KiCad E.D.A. kicad 7.0.9-7.0.9-ubuntu23.10.1

Rev: D

Id: 7/9



Part No: 304-010

Devtank LTD

Sheet: /RS485_Comms/

File: RS485_Comms.kicad_sch

Title: Open Smart Monitor

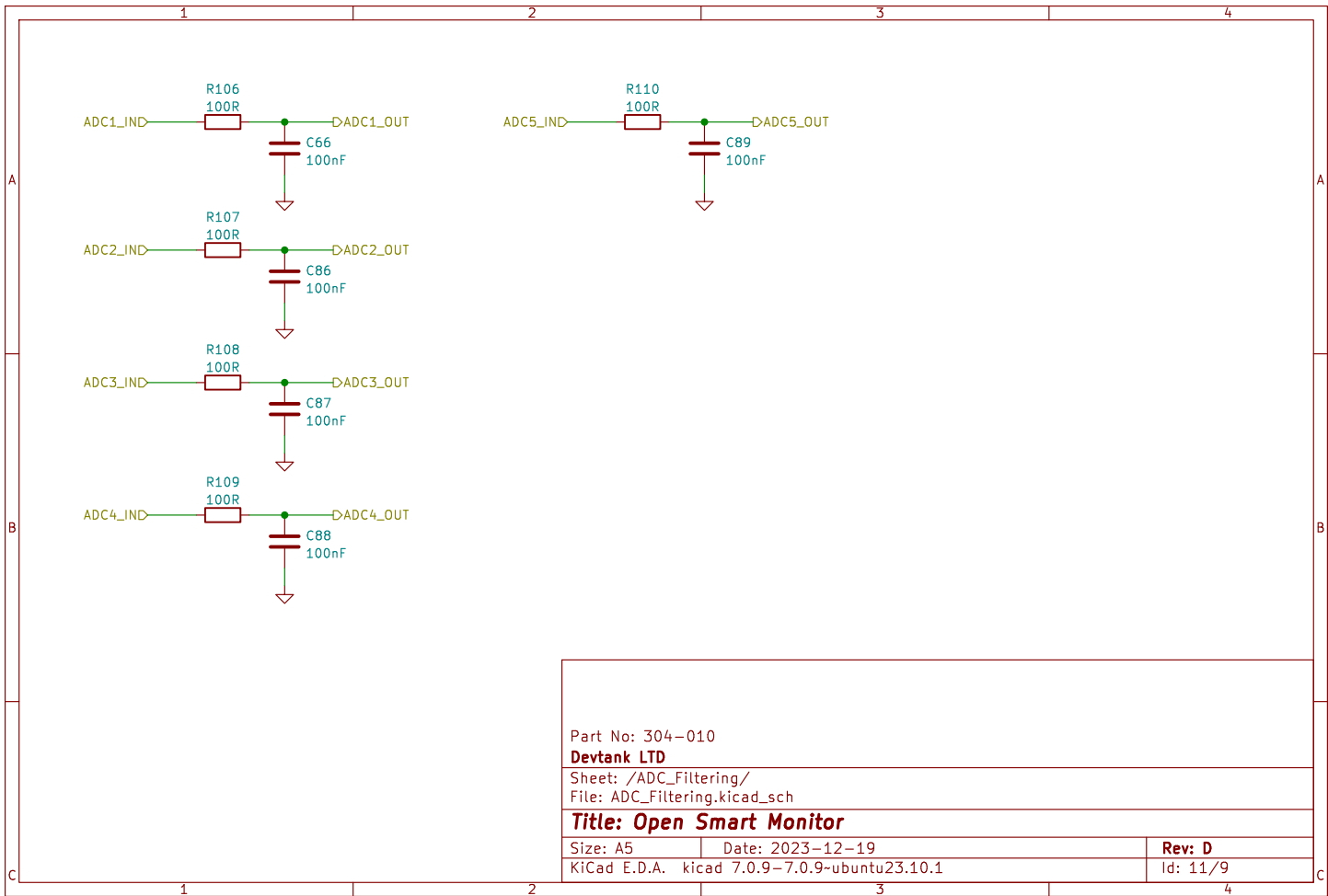
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Date: 2023-12-19

Rev: D

KiCad E.D.A. kicad 7.0.9-ubuntu23.10.1

Id: 8/9



Id: 12/9