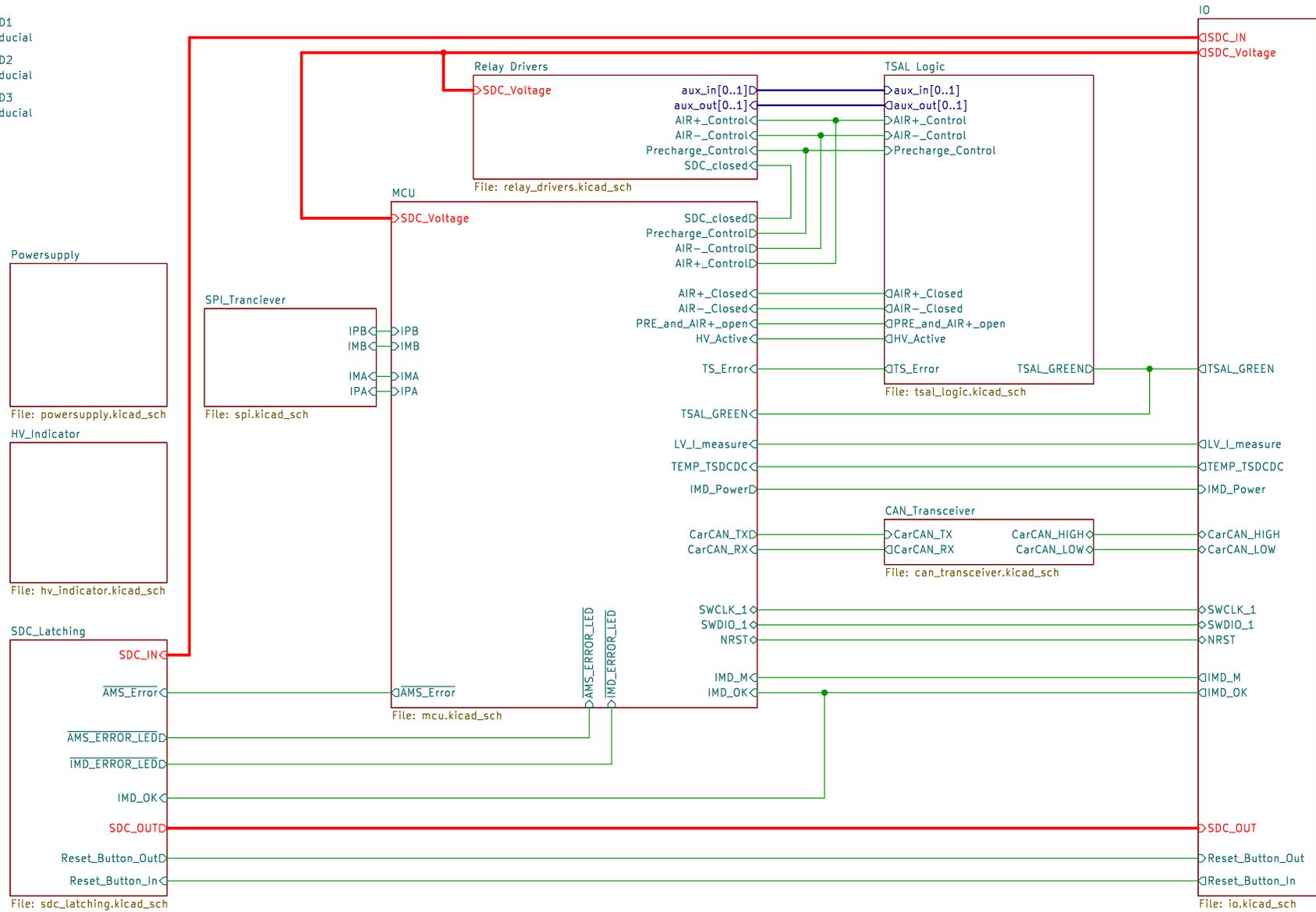


-  H1 MountingHole
-  H3 MountingHole
-  H4 MountingHole
-  H5 MountingHole

-  FID1 Fiducial
-  FID2 Fiducial
-  FID3 Fiducial

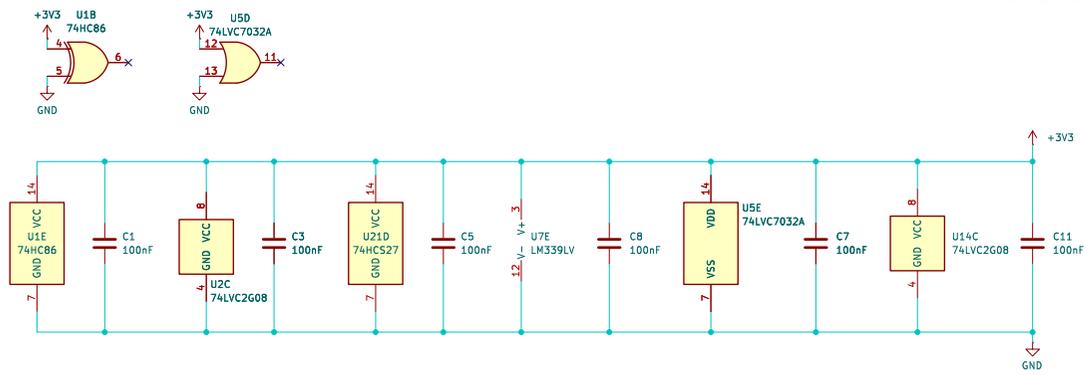
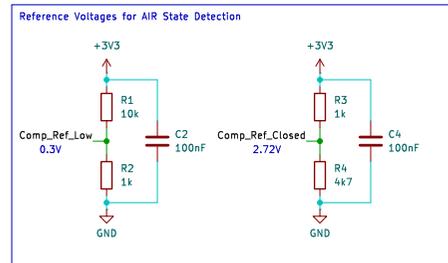
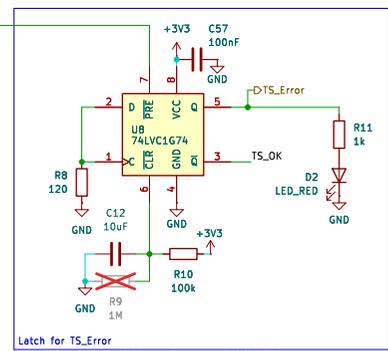
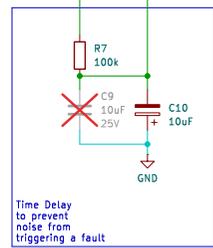
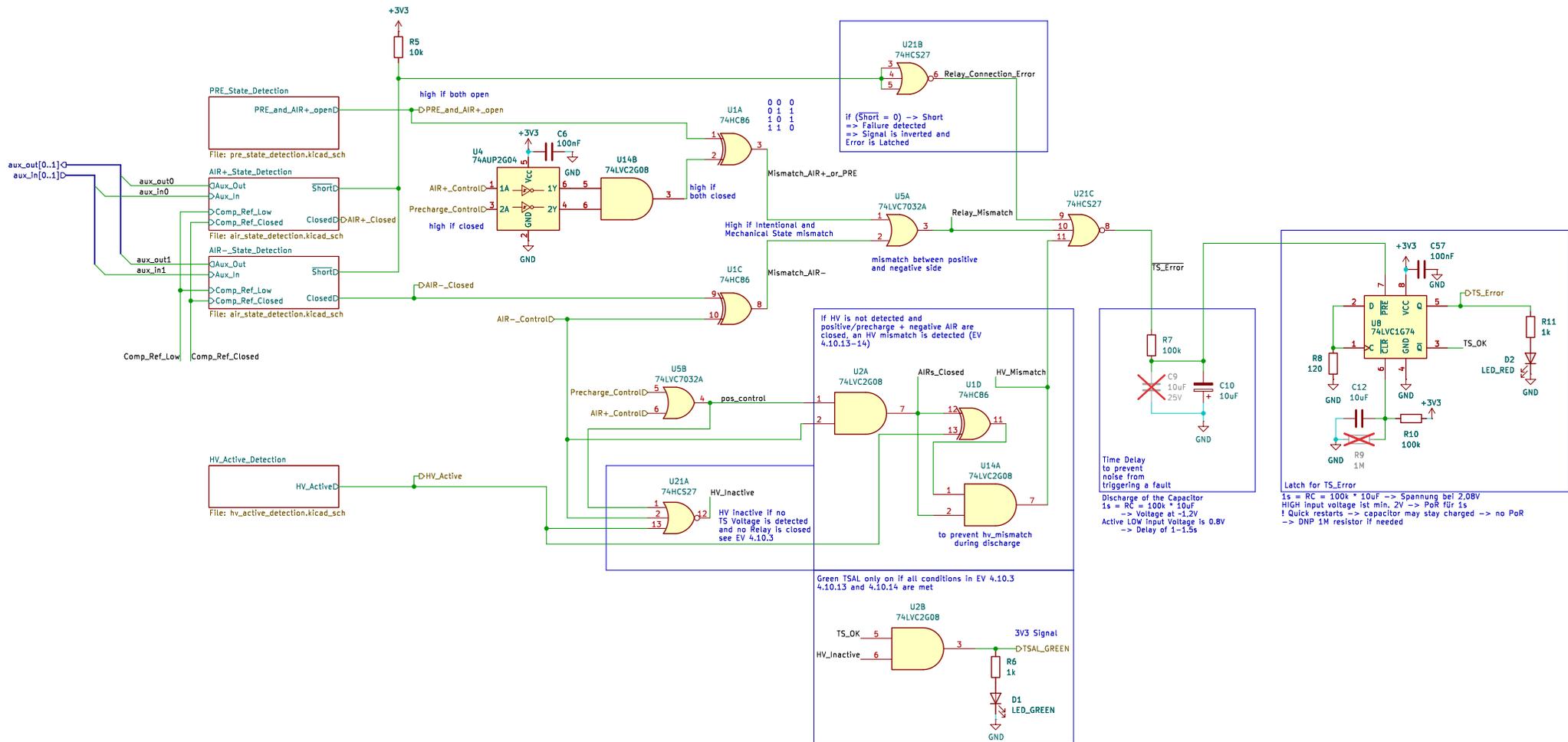


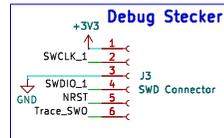
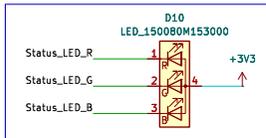
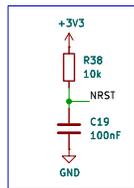
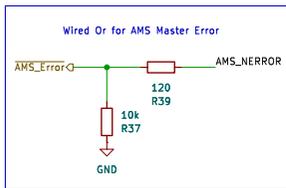
FT25 V2 or FT26:

TSAL Sheet:

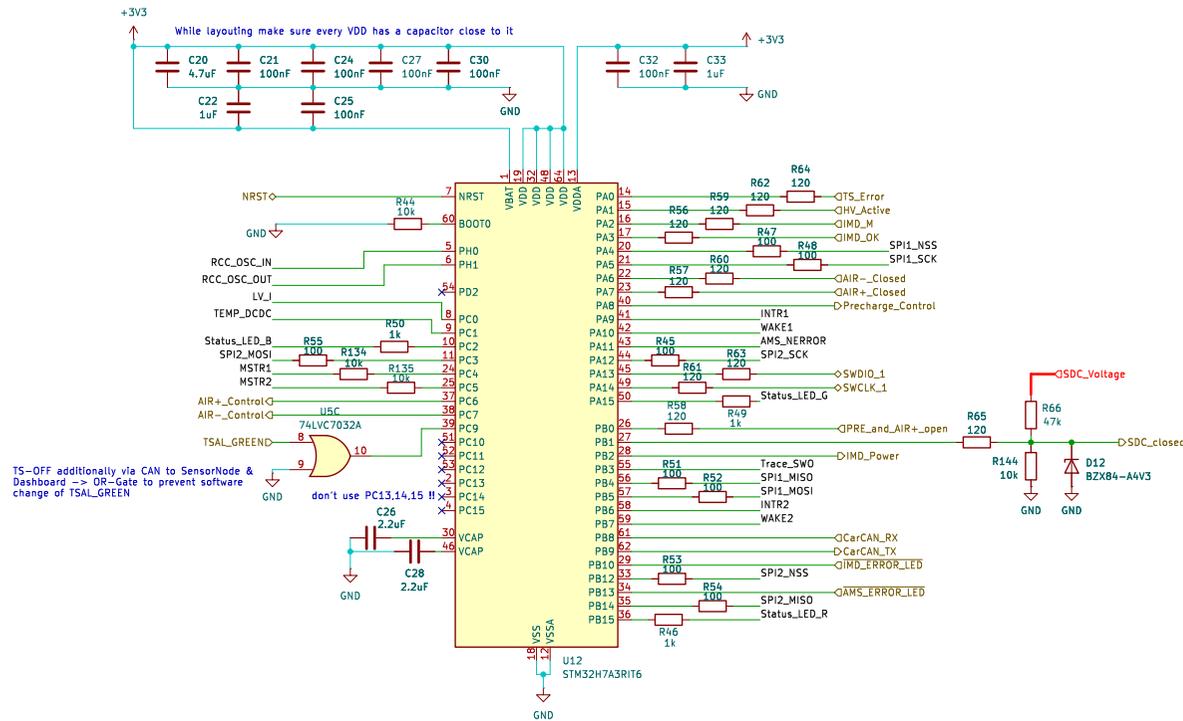
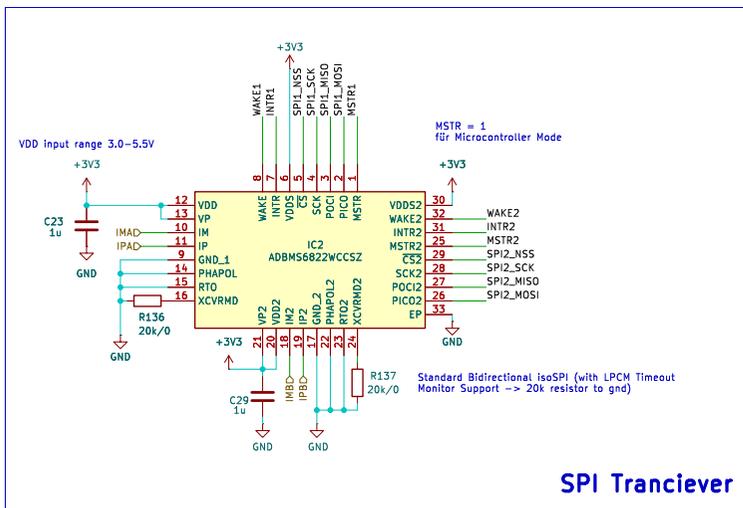
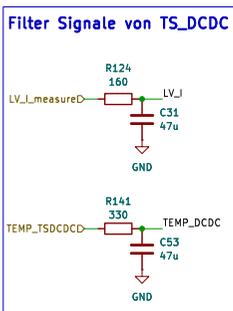
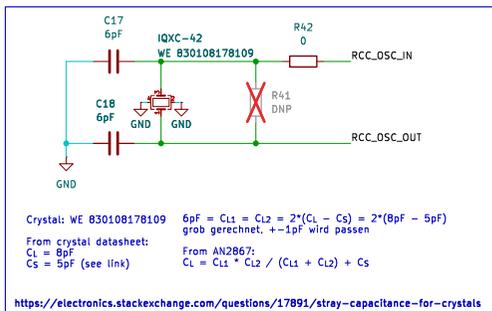
- schaltung im Dischargefall (U14A) vereinfachen
- "Bei U5B hast du ja schon PC\_ctl OR AIR+\_ctl, das müsste man nur noch invertieren. Zum invertieren könnte man auch einfach das übrige U1B benutzen ( XOR(a,1) == NOT(a) ). Aber besser natürlich den Pull umdrehen und einfach zwei "closed" Signale vergleichen. " - Oskar

<b>FASTTUBE</b>	
<b>Title: AMS Master Rootsheet</b>	
Rev: V1	
Date: 2025-03-09	
Project: Master_FT25	Exp. Date: 2025-04-27
Author: Lene Marquardt	Size: A4   Page: 1/15



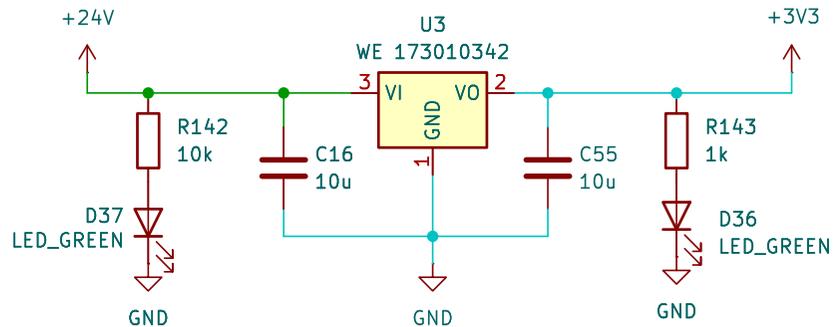


add esd siehe slide 24





Power supply from PDU  
always on signal



# FASTTUBE

**Title: Powersupply**

**Rev: V1**

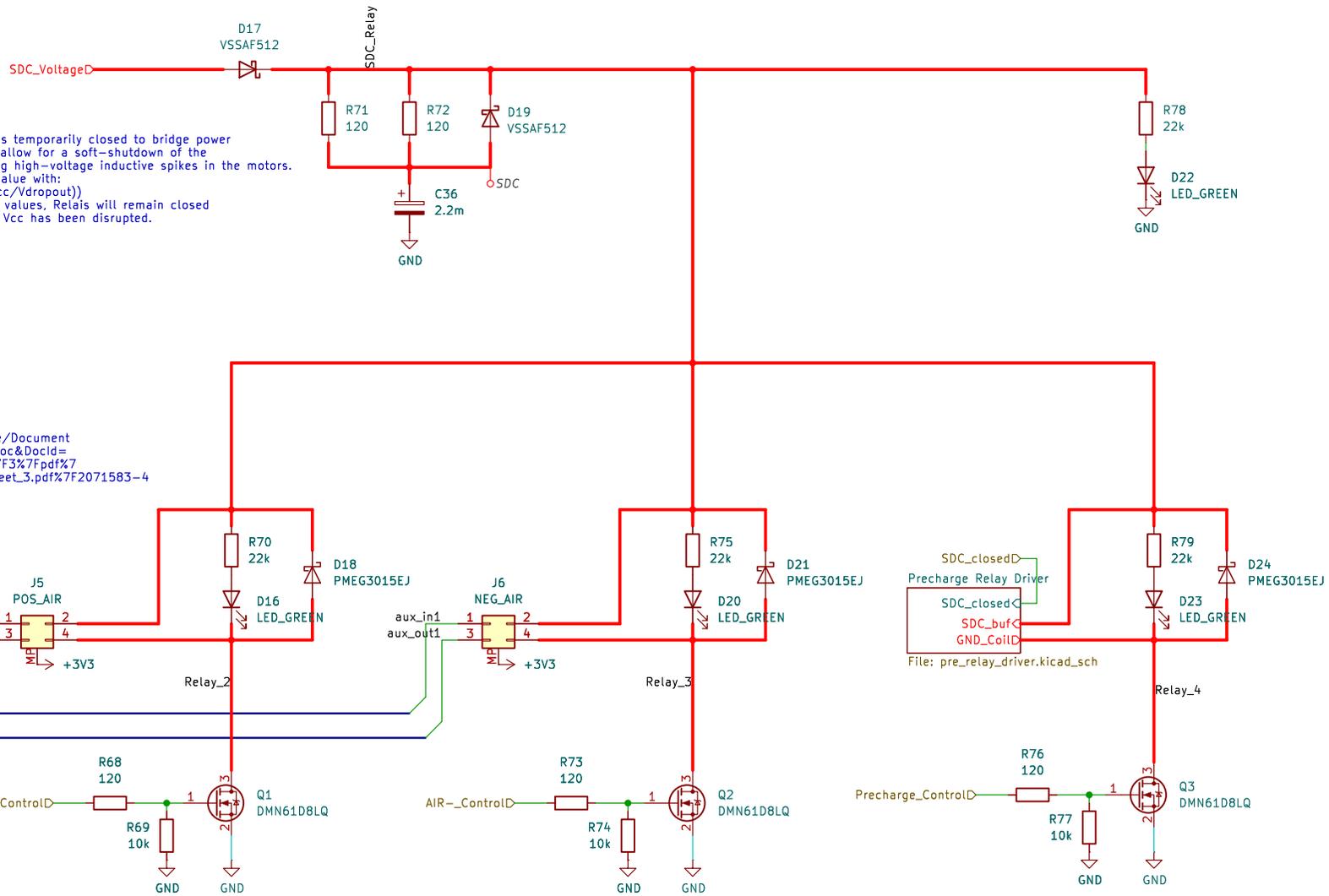
**Date: 2025-03-09**

**Project: Master\_FT25**

**Exp. Date: 2025-04-27**

**Author: Lene Marquardt**

**Size: A5 | Page: 8/15**



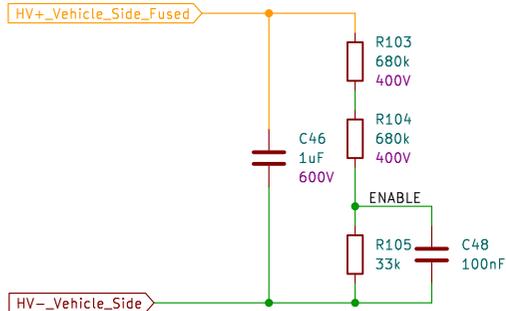
Cap keeps Relays temporarily closed to bridge power disruptions and allow for a soft-shutdown of the relays, preventing high-voltage inductive spikes in the motors.  
 Calculate Cap-value with:  
 $C = t / (R_{coil} \cdot \ln(V_{cc} / V_{dropout}))$   
 With the current values, Relays will remain closed for 250ms after Vcc has been disrupted.

max 500mA to AIR

siehe: [https://www.te.com/commerce/DocumentDelivery/DDEController?Action=showdoc&DocId=Data+Sheet%7FECK100B\\_Datasheet%7F3%7Fpdf%7FEnglish%7FENG\\_DS\\_ECK100B\\_Datasheet\\_3.pdf%7F2071583-4](https://www.te.com/commerce/DocumentDelivery/DDEController?Action=showdoc&DocId=Data+Sheet%7FECK100B_Datasheet%7F3%7Fpdf%7FEnglish%7FENG_DS_ECK100B_Datasheet_3.pdf%7F2071583-4)

The MOSFETs act as a low-side switch for the Power-relays used. The diodes protect the MOSFETs from inductive voltage spikes caused by the Relays-coils when powered off.

# HV Indicator nicht verändert, wie FT24

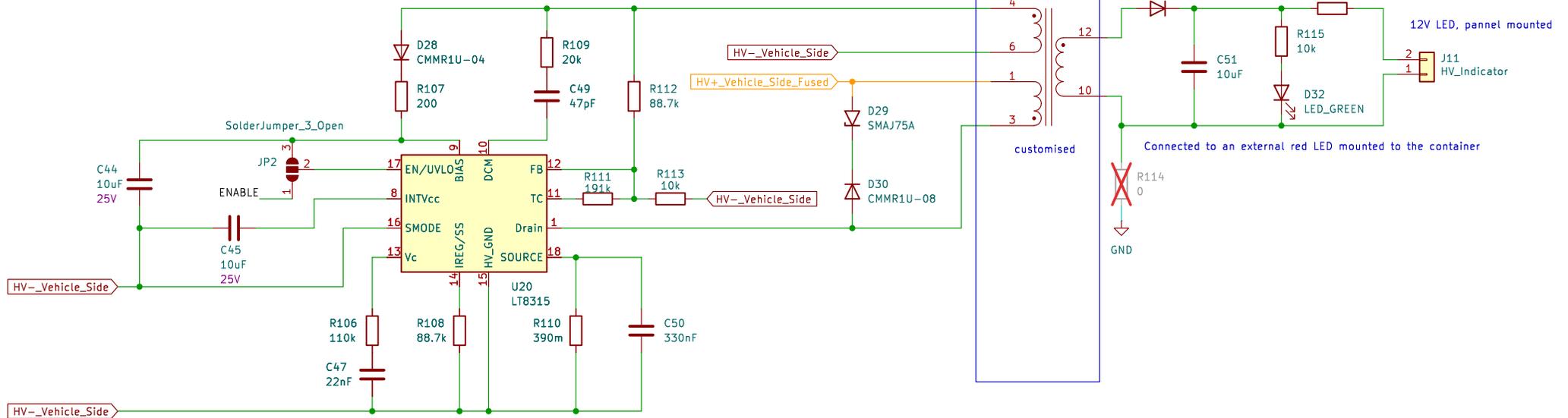


The Enable threshold of the LT8315 is 1.22V with the given resistor divider the following threshold voltage can be calculated:  
 $1.22V \cdot (1360k\Omega + 33k\Omega) / 33k\Omega = 51.5V$   
 Considering the hysteresis of 65mV mentioned in the datasheet, the following are the maximum turn-on/off levels:  
 turn-on: 54.2V  
 turn-off: 48.7V

The connections go directly to the vehicle side contacts of the AIR+ and AIR-

TS

LV



Circuit according to LT8315 datasheet example for 500Vin flyback converter with isolated 12V output.

FT24: 270 (possibly) figure out how bright LED has to be

12V LED, panel mounted

J11 HV\_Indicator

customised

Connected to an external red LED mounted to the container

**FASTTUBE**

Title: HV Indicator Driver

Rev: V1

Date: 2025-03-09

Project: Master\_FT25

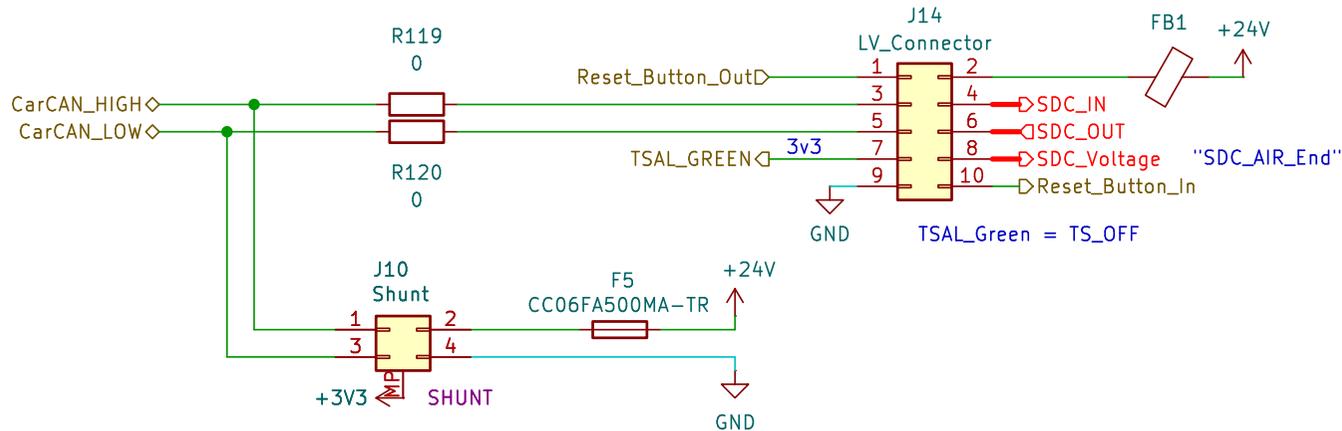
Exp. Date: 2025-04-27

Author: Lene Marquardt

Size: A4 | Page: 11/15





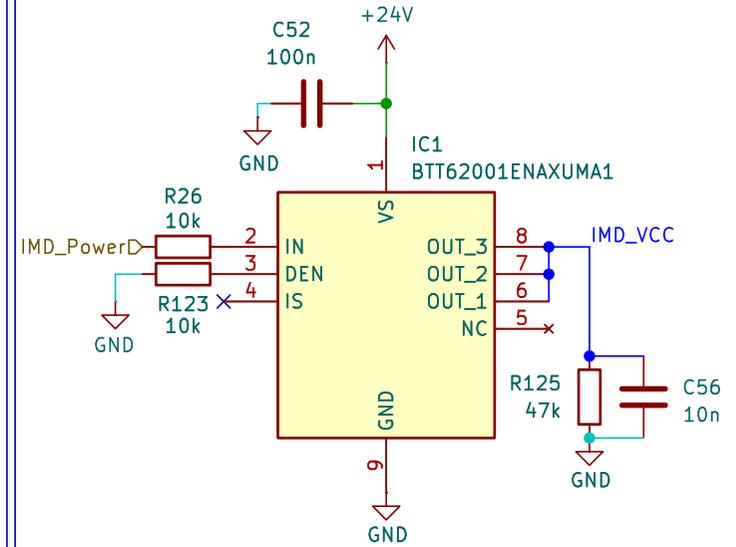


SHUNT:  
IVT-S-300-U3-I-CAN1-12/24  
max. 80mA

Datasheet  
<https://www.isabellenhuetteusa.com/wp-content/uploads/2022/07/Datasheet-IVT-S-V1.03.pdf>

## Main Connector

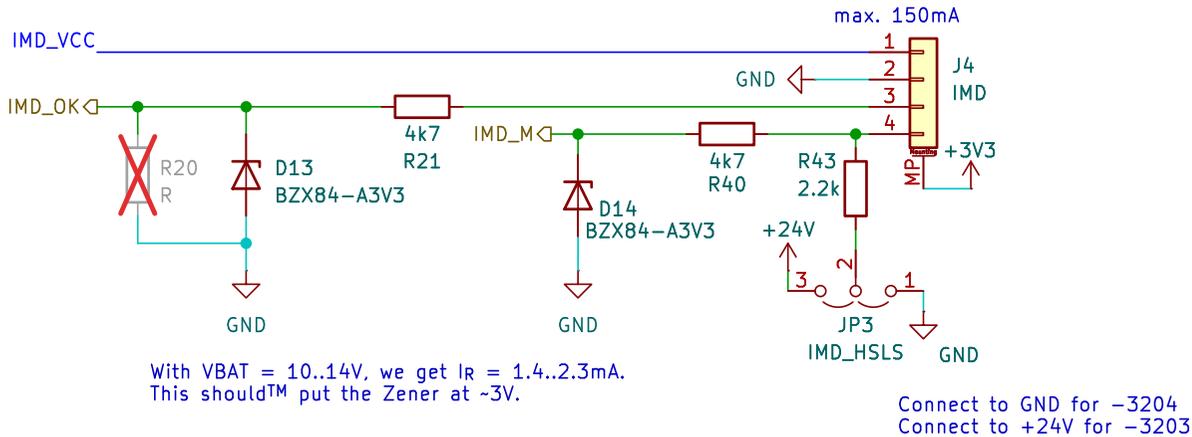
## IMD Supply



## IMD Connector

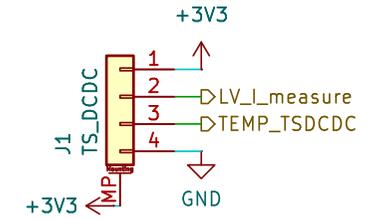
IMD - Datasheet

[https://www.bender.de/fileadmin/content/Products/d/e/IR155-32xx-V004\\_D00115\\_D\\_XXEN.pdf](https://www.bender.de/fileadmin/content/Products/d/e/IR155-32xx-V004_D00115_D_XXEN.pdf)

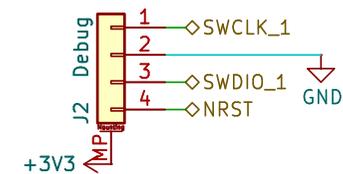


With VBAT = 10..14V, we get I<sub>R</sub> = 1.4..2.3mA.  
This should™ put the Zener at ~3V.

## TSDCDC Connector



## Debug Connector



# FASTTUBE

Title: Input/Output

Project: Master\_FT25

Author: Lene Marquardt

Rev: V1

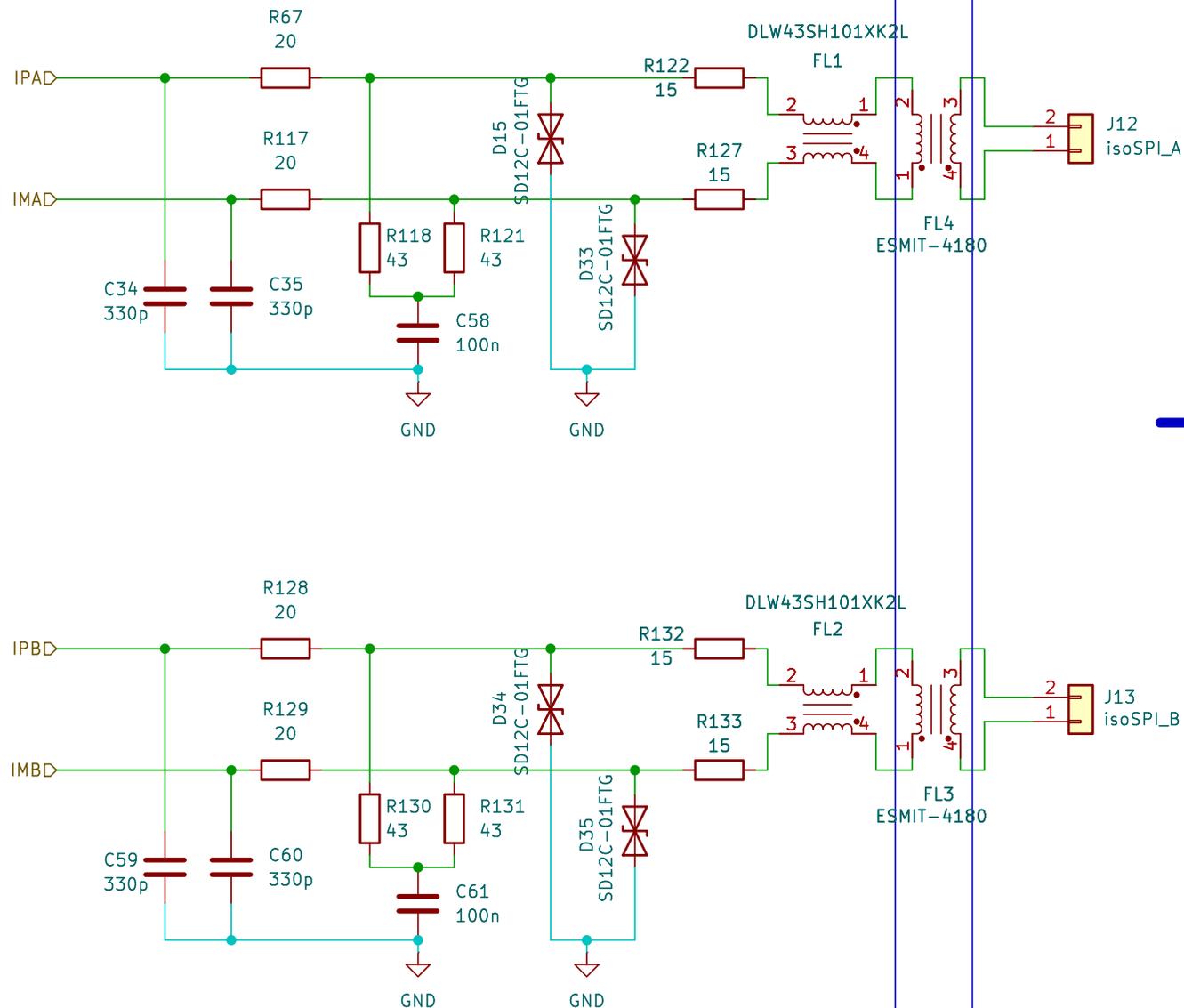
Date: 2025-03-09

Exp. Date: 2025-04-27

Size: A5 | Page: 13/15

LV

TS

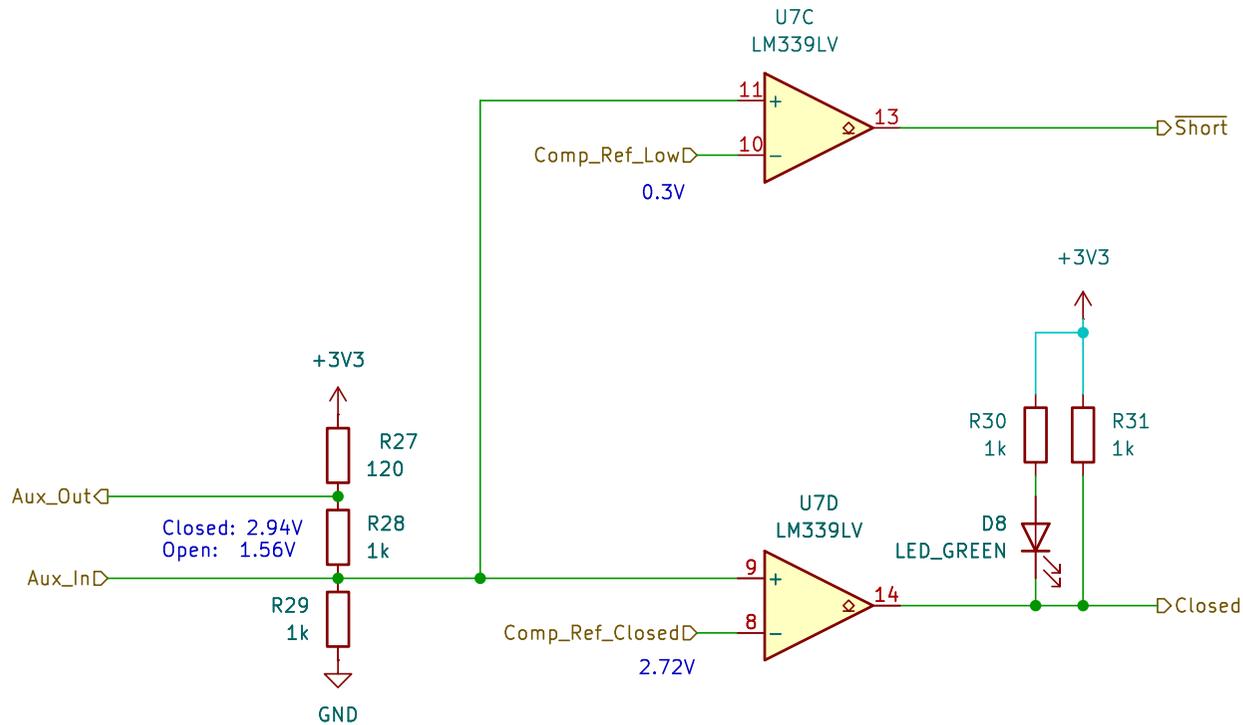


# FASTTUBE

<b>Title:</b> <i>Isolated SPI Transciever</i>	<b>Rev:</b> V1
<b>Project:</b> Master_FT25	<b>Date:</b> 2025-03-09
<b>Author:</b> Lene Marquardt	Exp. Date: 2025-04-27
	Size: A5   Page: 14/15



# Accumulator TSAL – Relay state detection



# FASTTUBE

**Title: AIR Relay State Detection**

**Rev: V1**

**Date: 2025-03-09**

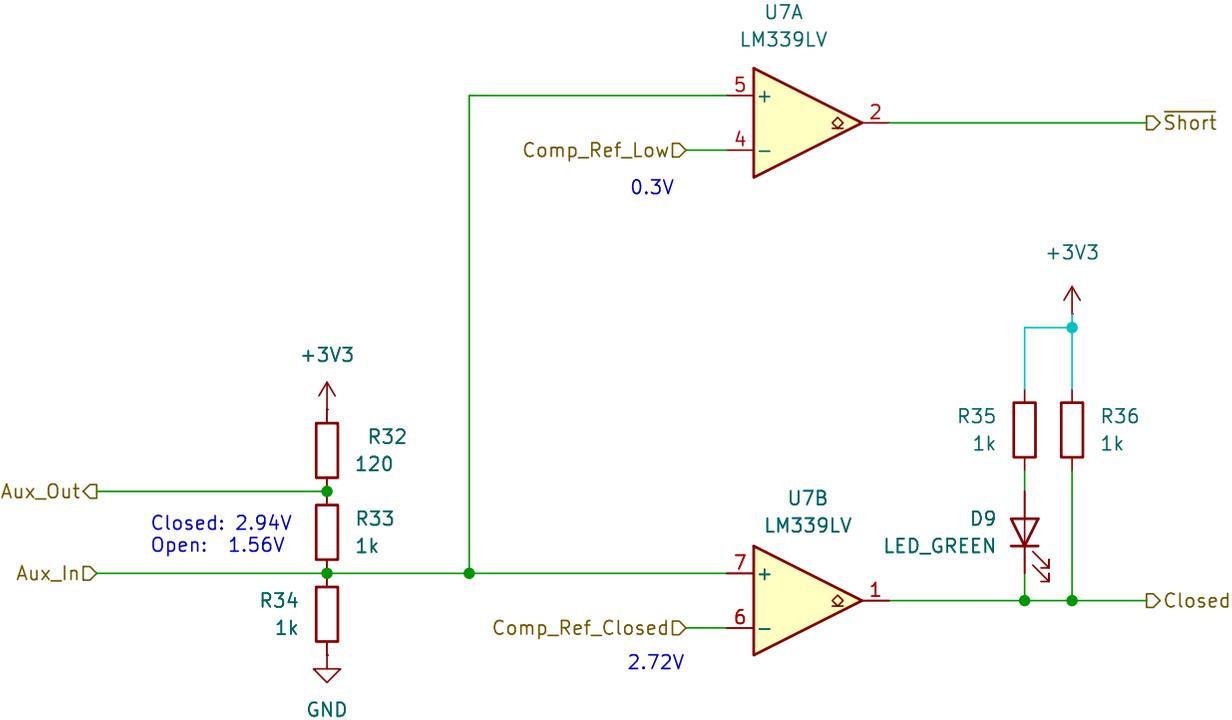
**Project: Master\_FT25**

**Exp. Date: 2025-04-27**

**Author: Lene Marquardt**

**Size: A5 | Page: 4/15**

# Accumulator TSAL – Relay state detection



**FASTTUBE**

**Title: AIR Relay State Detection**

**Rev: V1**

**Date: 2025-03-09**

**Project: Master\_FT25**

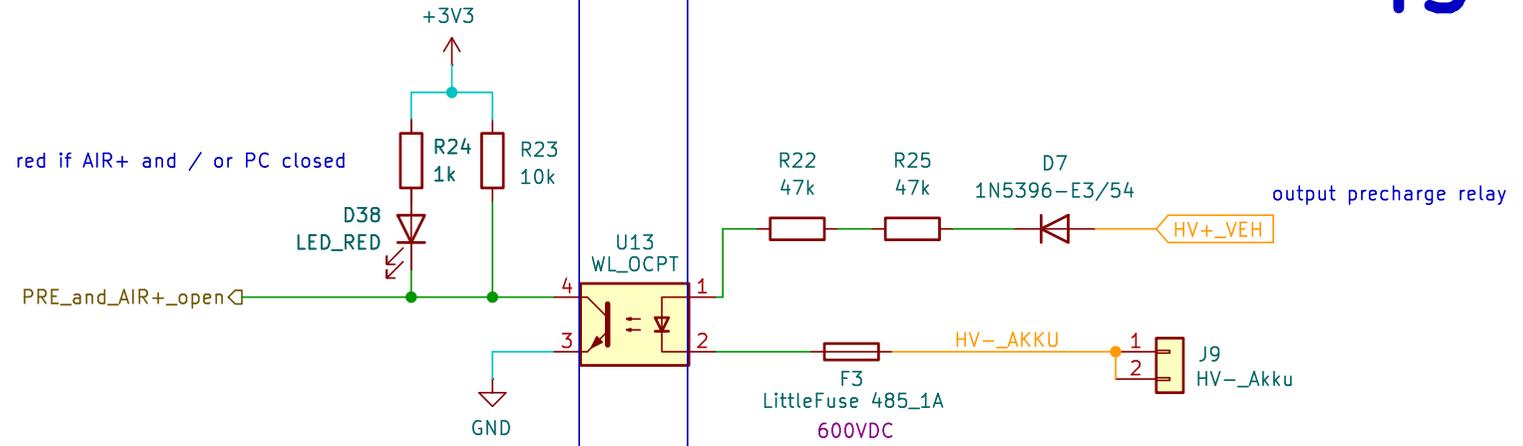
**Exp. Date: 2025-04-27**

**Author: Lene Marquardt**

**Size: A5 | Page: 5/15**

LV

TS



opto diode current:  
 @ maximum TS Voltage 403V = 4,27 mA  
 @ minimum TS Voltage 240V = 2,55 mA

red if AIR+ and / or PC closed

output precharge relay

Detects if Precharge or Positive AIR are closed:  
 PRE\_AIR+\_open = 3V3 if both Relays are Open  
 PRE\_AIR+\_open = 0V if one or both are Closed

# FASTTUBE

**Title: Precharge State Detection**

**Rev: V1**

**Date: 2025-03-09**

**Project: Master\_FT25**

**Exp. Date: 2025-04-27**

**Author: Lene Marquardt**

**Size: A5 | Page: 6/15**

