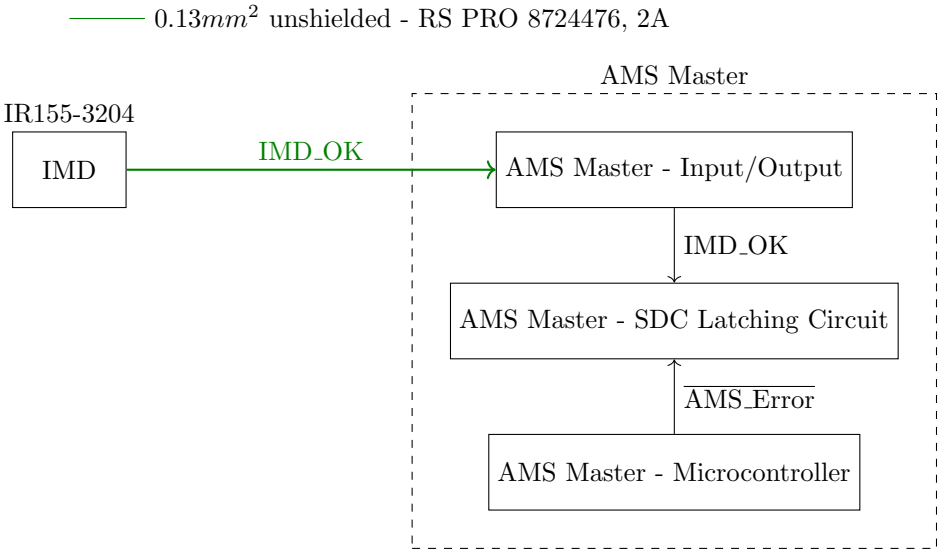
1 AMS und IMD Error Latching



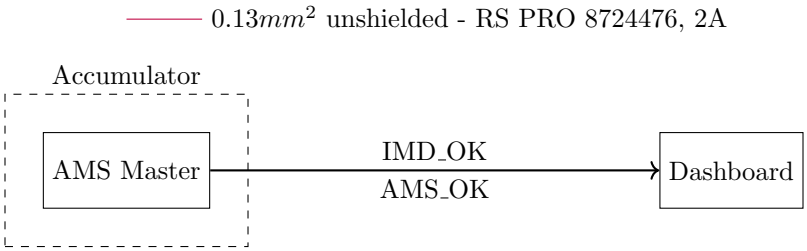
1.1 IMD Latching

- The `IMD_OK` signal is pulled high approximately 1.5 seconds after startup for the IR155-3204 IMD.
- Therefore the Power-on Reset (PoR) lasts approximately 2 seconds.

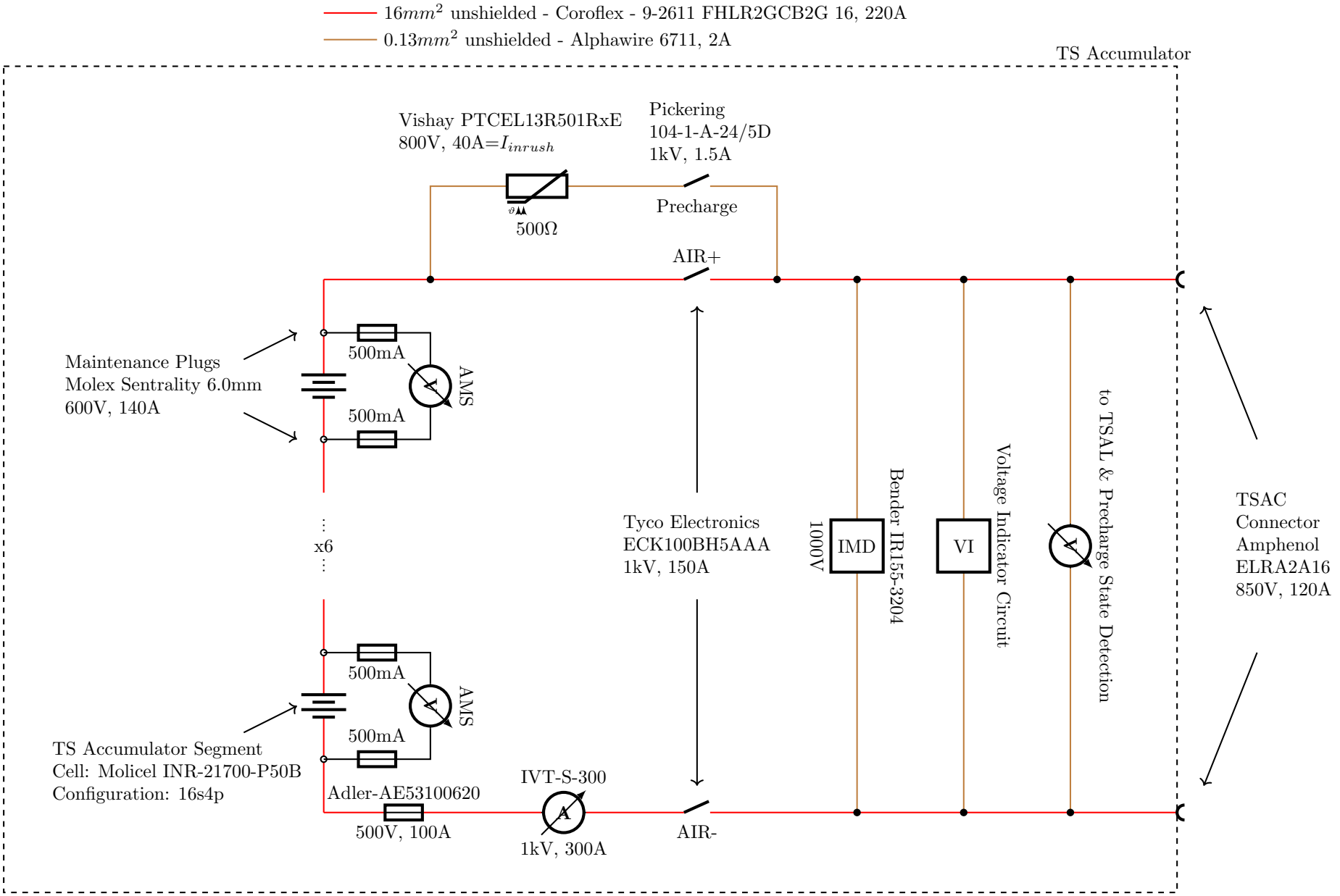
1.2 AMS Latching

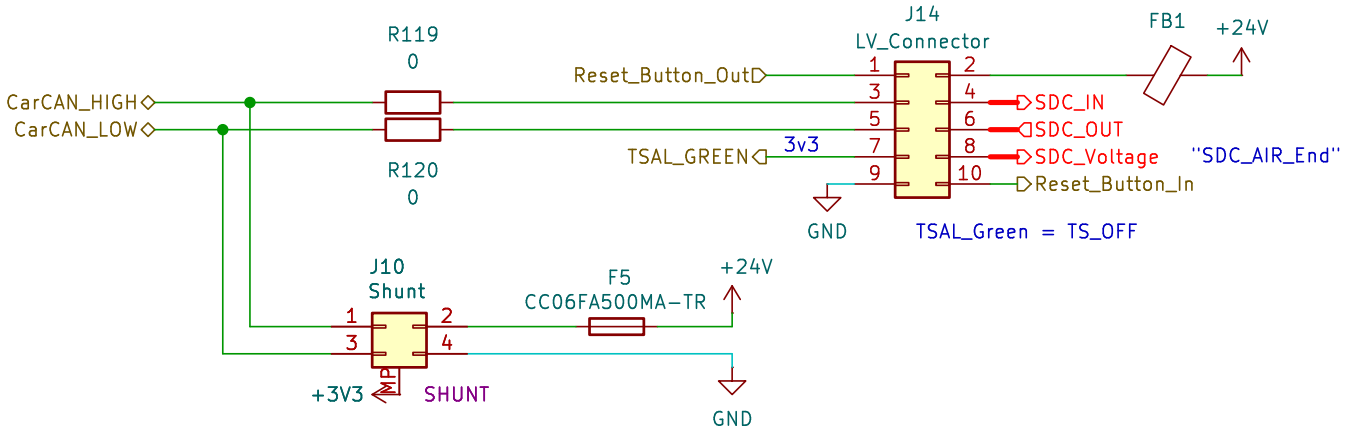
- The `AMS_OK` signal is pulled low until the following conditions are met:
  - The AMS Master communicates with all six AMS Slaves, each providing valid voltage and temperature measurements.
  - The AMS Master mommunicates with the shunt sensor (IVT-S-300-U3-I-CAN2-12/24)

2 SCS signal implementation



Both signals are transmitted every 50 ms over the CAN bus. If the Dashboard does not receive a CAN message from the AMS Master within 150 ms, it will trigger a fault condition. In response to this fault, the following LEDs will be activated: the `AMS Error` LED will be turned on, the `IMD Error` LED will be turned on, and the `TS Off` LED will remain off.


16mm^2 unshielded - Coroflex - 9-2611 FHLR2GCB2G 16, 220A
0.13mm^2 unshielded - Alphawire 6711, 2A
TS Accumulator
Vishay PTCEL13R501RxE
800V, 40A=I_{inrush}
500Ω
Pickering
104-1-A-24/5D
1kV, 1.5A
Precharge
AIR+
Maintenance Plugs
Molex Sentrality 6.0mm
600V, 140A
500mA
500mA
AMS
x6
Tyco Electronics
ECK100BH5AAA
1kV, 150A
1000V
IMD
Bender IR155-3204
VI
Voltage Indicator Circuit
to TSAL & Precharge State Detection
TSAC
Connector
Amphenol
ELRA2A16
850V, 120A
500mA
500mA
AMS
TS Accumulator Segment
Cell: Molicel INR-21700-P50B
Configuration: 16s4p
Adler-AE53100620
500V, 100A
IVT-S-300
A
1kV, 300A
AIR-

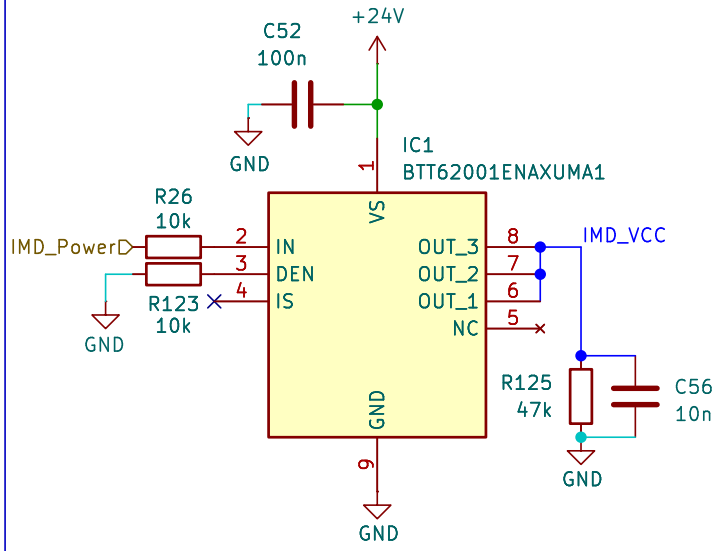


SHUNT:
IVT-S-300-U3-I-CAN1-12/24
max. 80mA

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

Main Connector

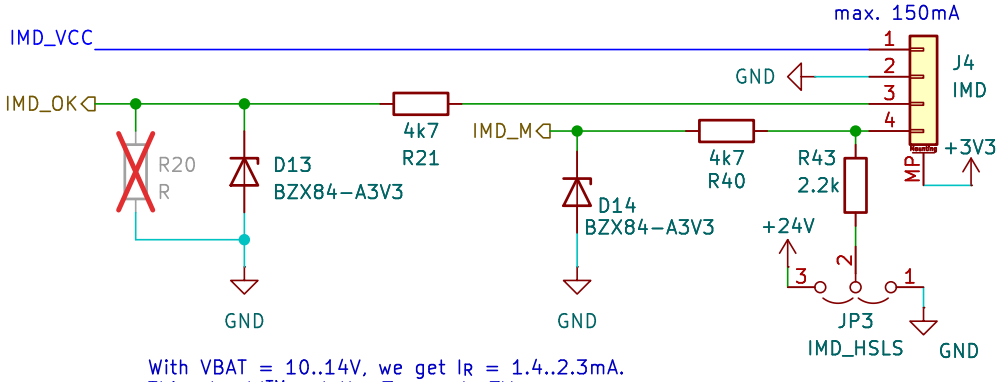
IMD Supply



IMD – Datasheet

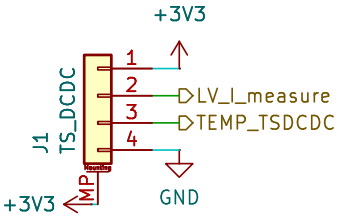
https://www.bender.de/fileadmin/content/Products/d/e/IR155-32xx-V004_D00115_D_XXEN.pdf

IMD Connector

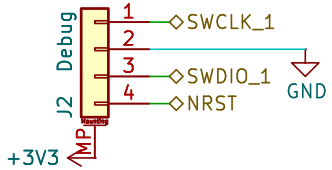


With VBAT = 10..14V, we get I_R = 1.4..2.3mA.
This should™ put the Zener at ~3V.

Connect to GND for -3204
Connect to +24V for -3203



TSDCDC Connector

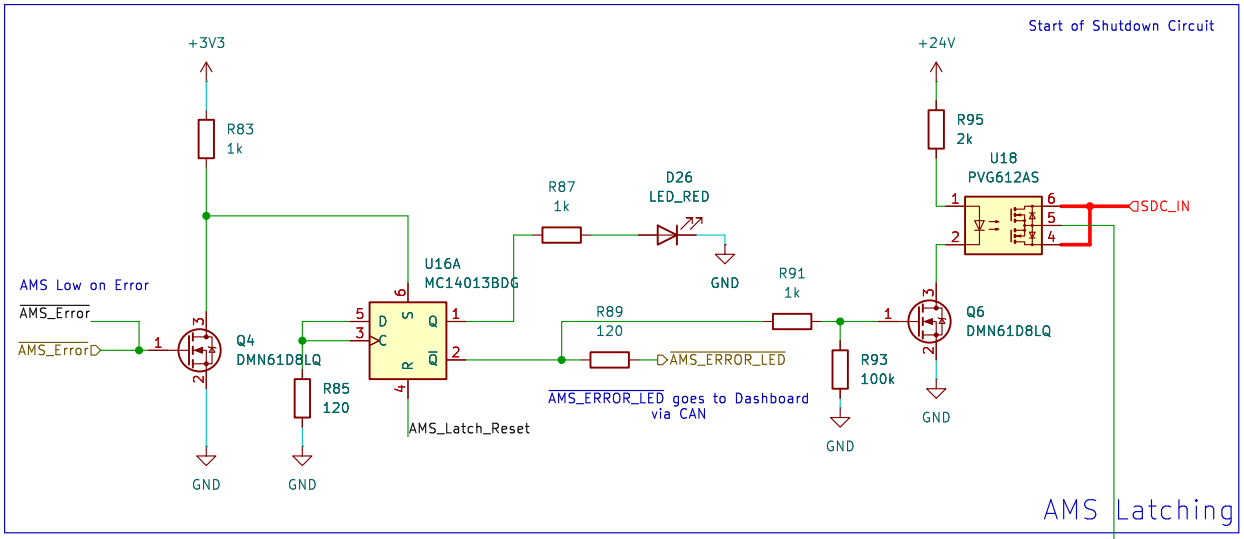


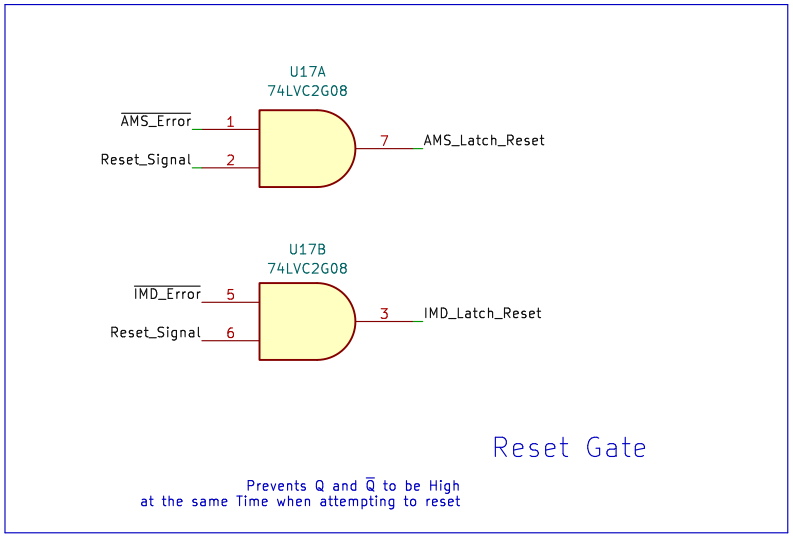
Debug Connector

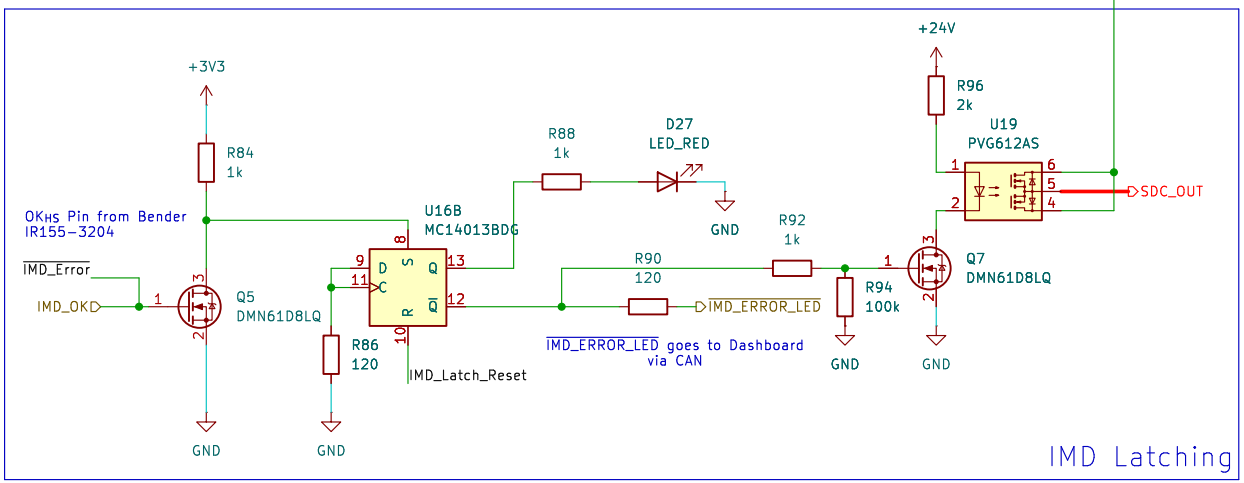
FASTTUBE

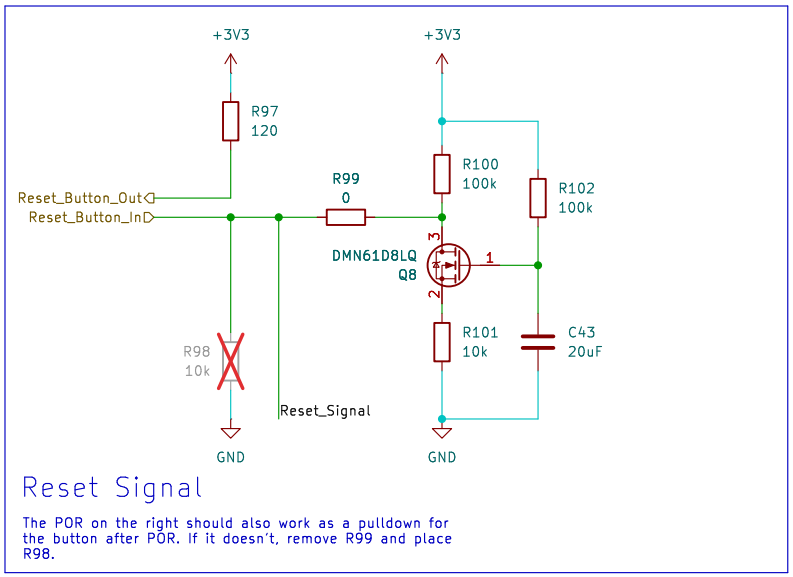
Title: Input/Output

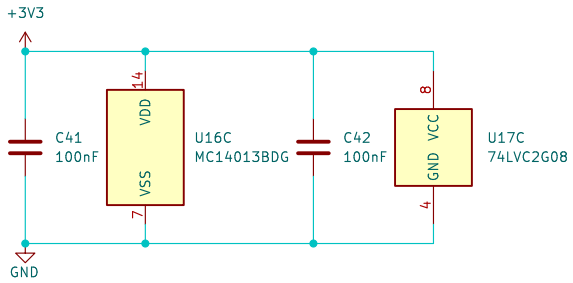
Project: Master_FT25	Rev: V1
Author: Lene Marquardt	Date: 2025-03-09
	Exp. Date: 2025-04-27
	Size: A5 | Page: 13/15





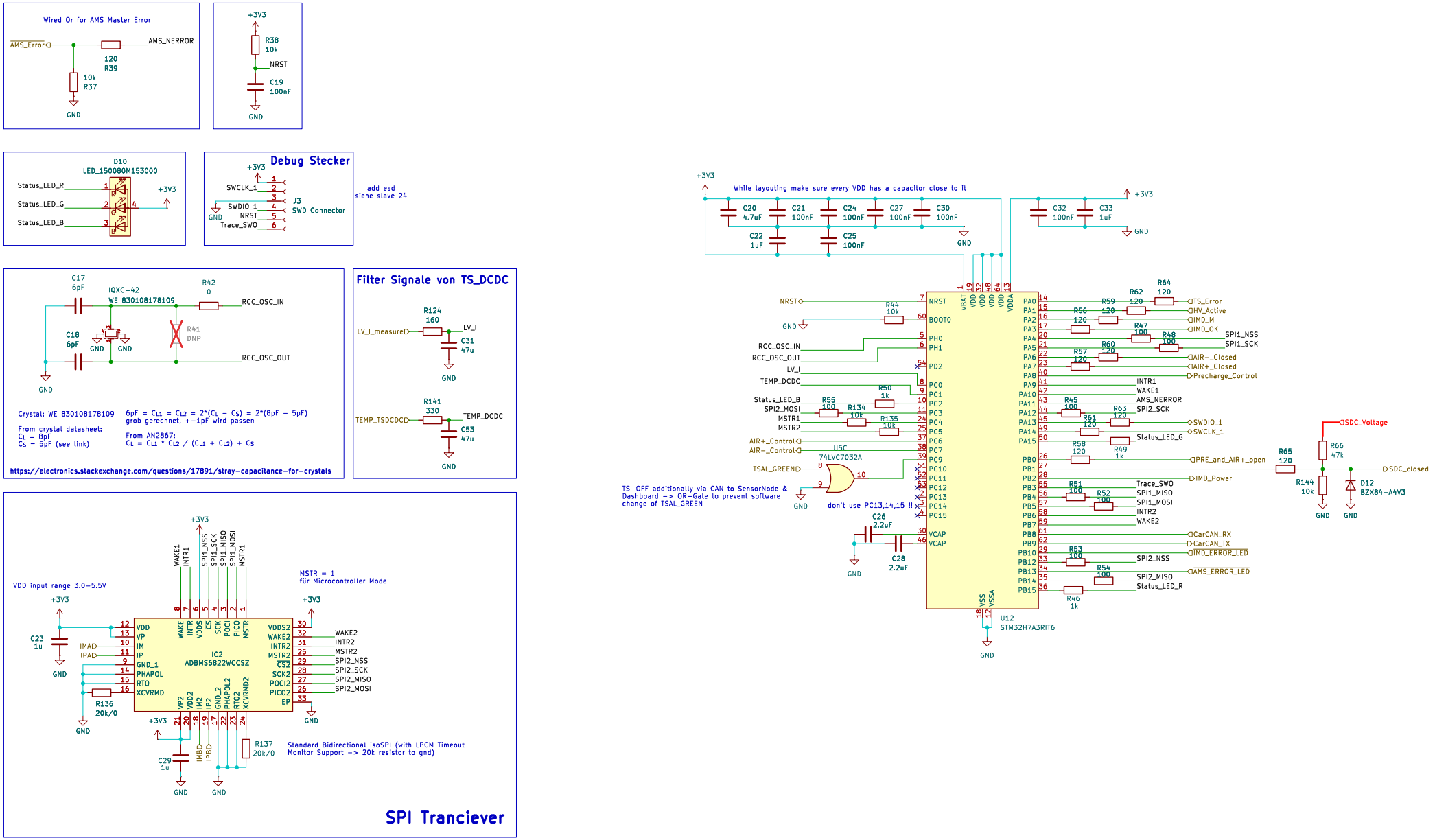




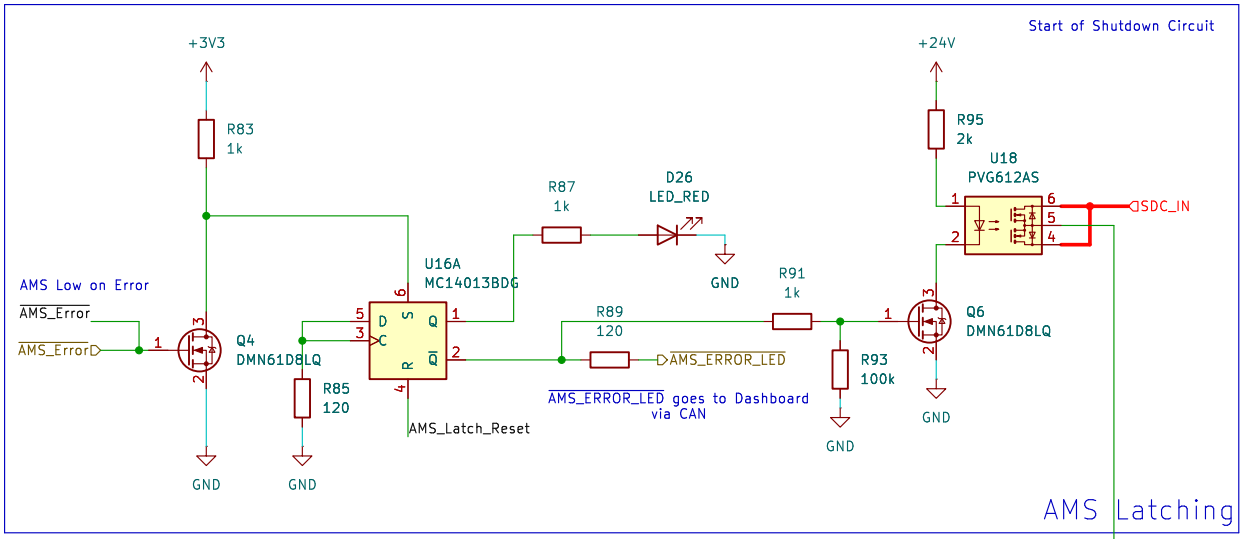


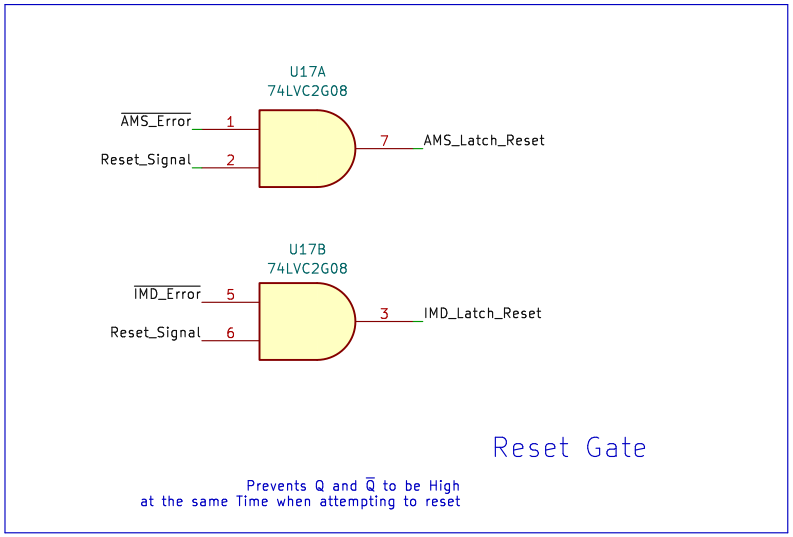
FASTTUBE

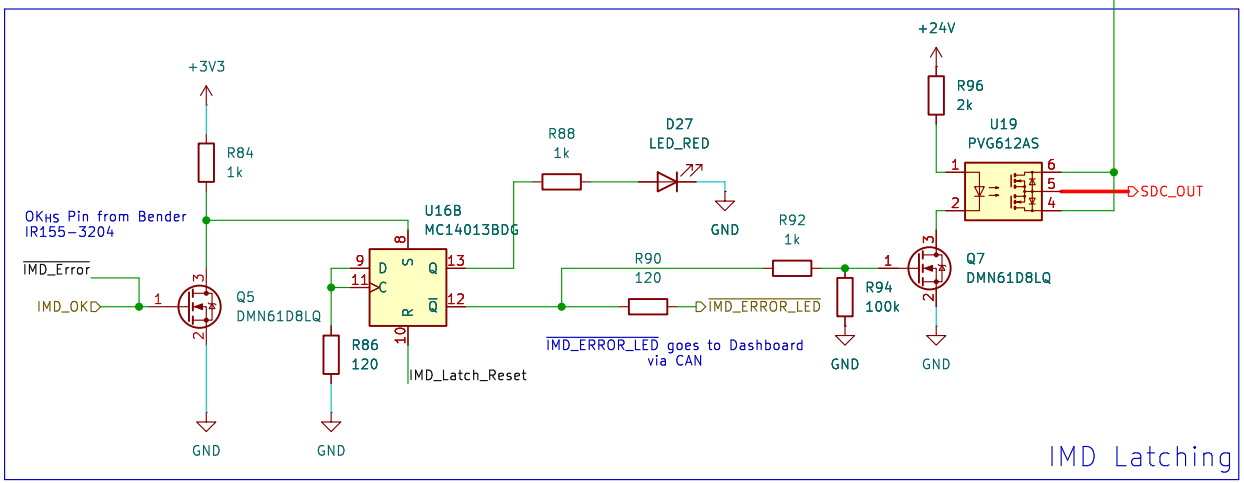
Title: SDC Latching Circuit	**Rev: V1**
	Date: 2025-03-09
Project: Master_FT25	Exp. Date: 2025-04-27
Author: Lene Marquardt	Size: A4 | Page: 12/15

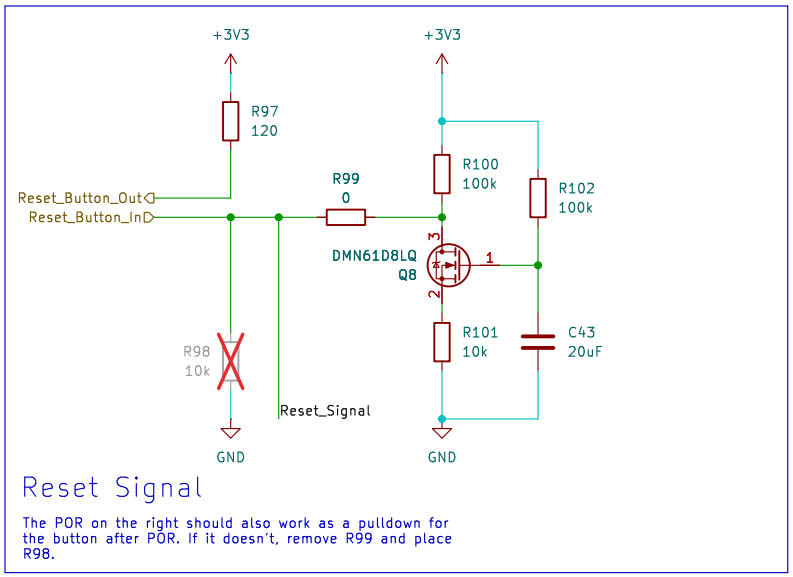


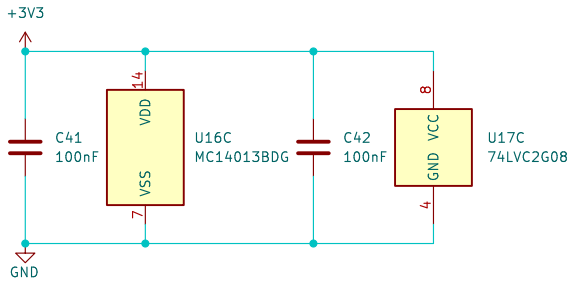
FASTTUBE	
Title: Microcontroller	Rev: V1
	Date: 2025-03-09
Project: Master_FT25	Exp. Date: 2025-04-27
Author: Lene Marquardt	Size: A3 | Page: 7/15





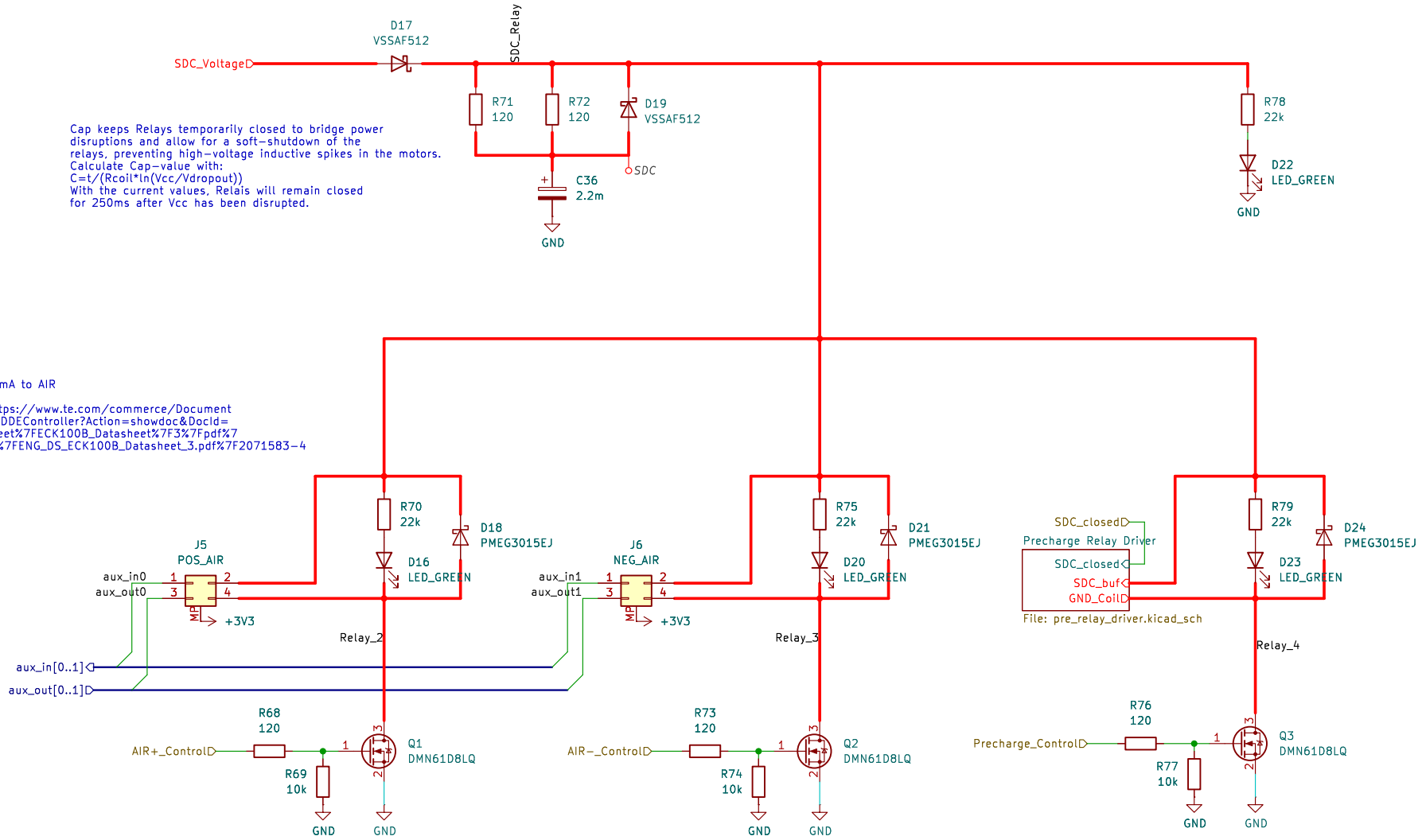






FASTTUBE

Title: SDC Latching Circuit	**Rev: V1**
	Date: 2025-03-09
Project: Master_FT25	Exp. Date: 2025-04-27
Author: Lene Marquardt	Size: A4 | Page: 12/15



FASTTUBE

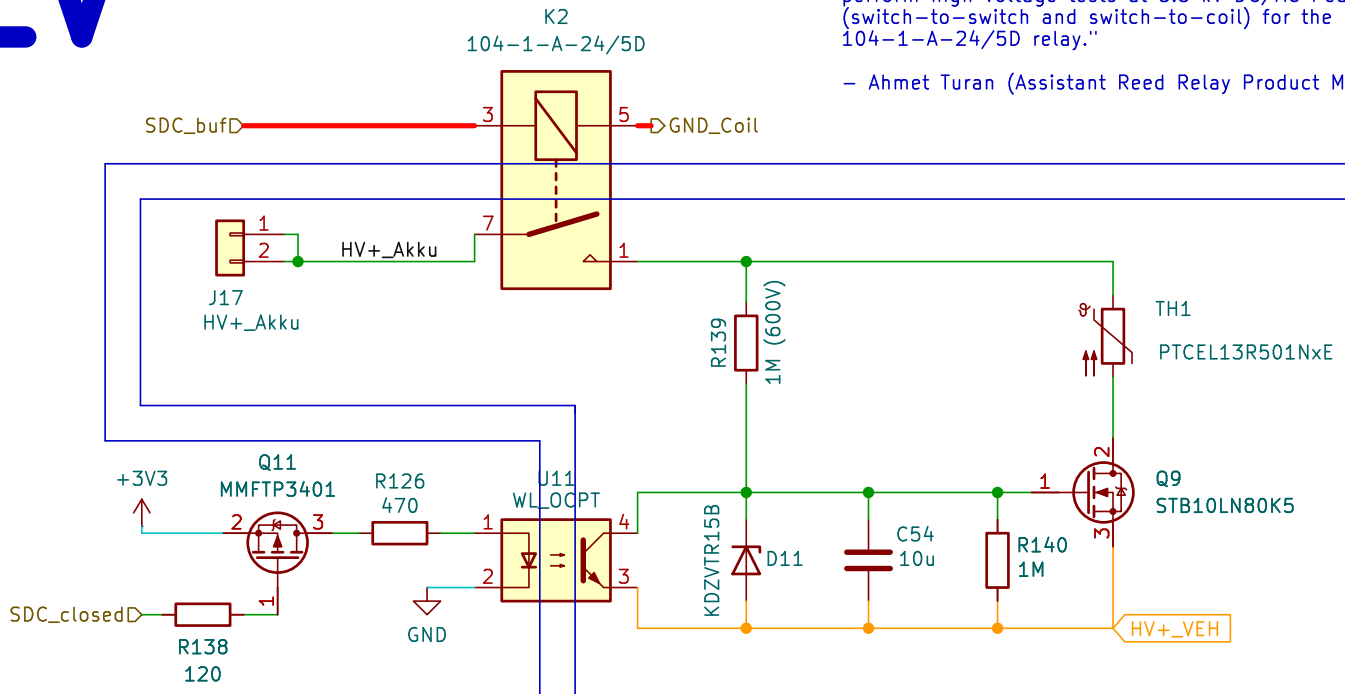
Title: Relay Drivers	**Rev: V1**
	Date: 2025-03-09
Project: Master_FT25	Exp. Date: 2025-04-27
Author: Lene Marquardt	Size: A4 | Page: 9/15

LV

TS–LV isolation via relay pn distance (10.16mm)

"Regarding your questions about our testing process, we perform high voltage tests at 5.5 kV DC/AC Peak (switch–to–switch and switch–to–coil) for the 104–1–A–24/5D relay."

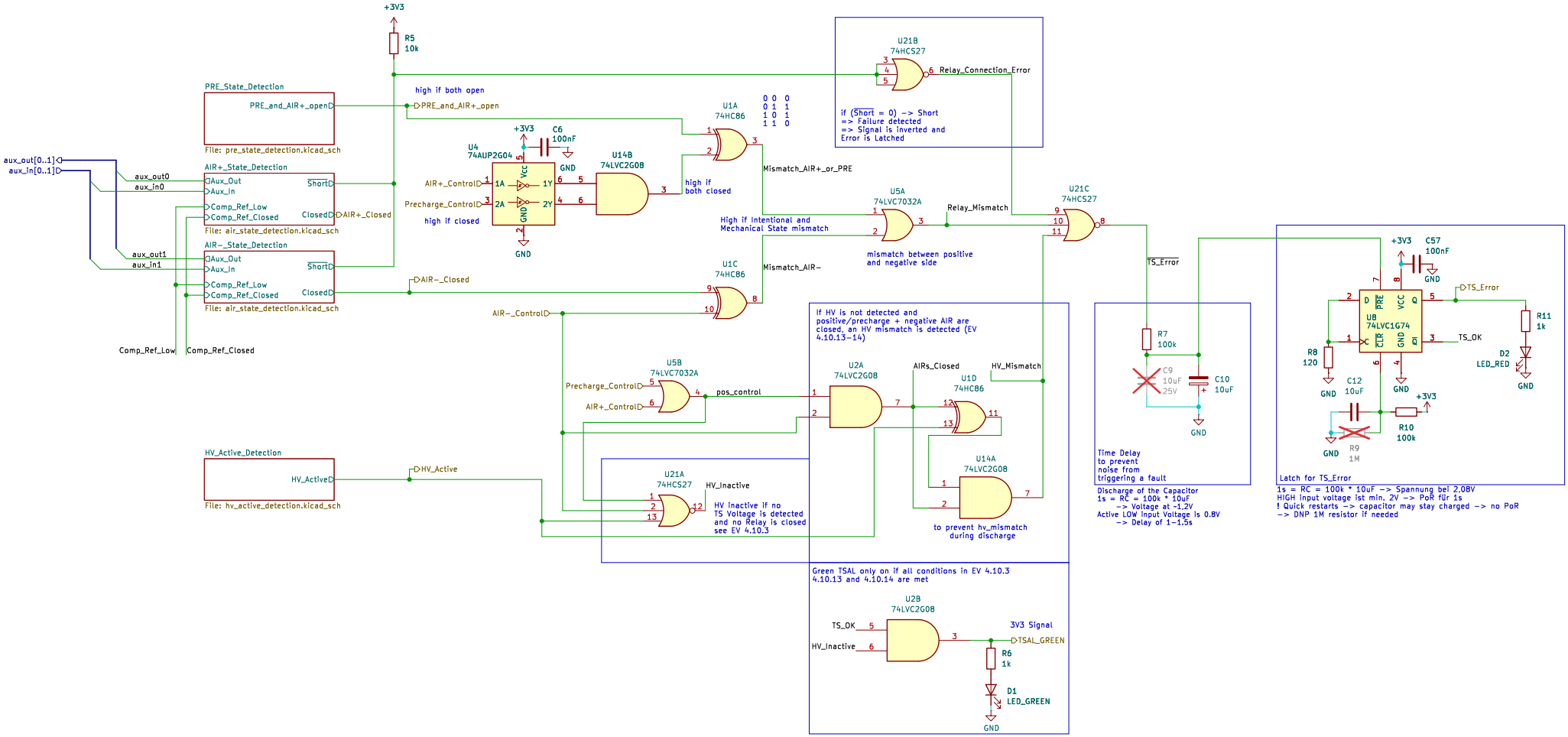
– Ahmet Turan (Assistant Reed Relay Product Manager)



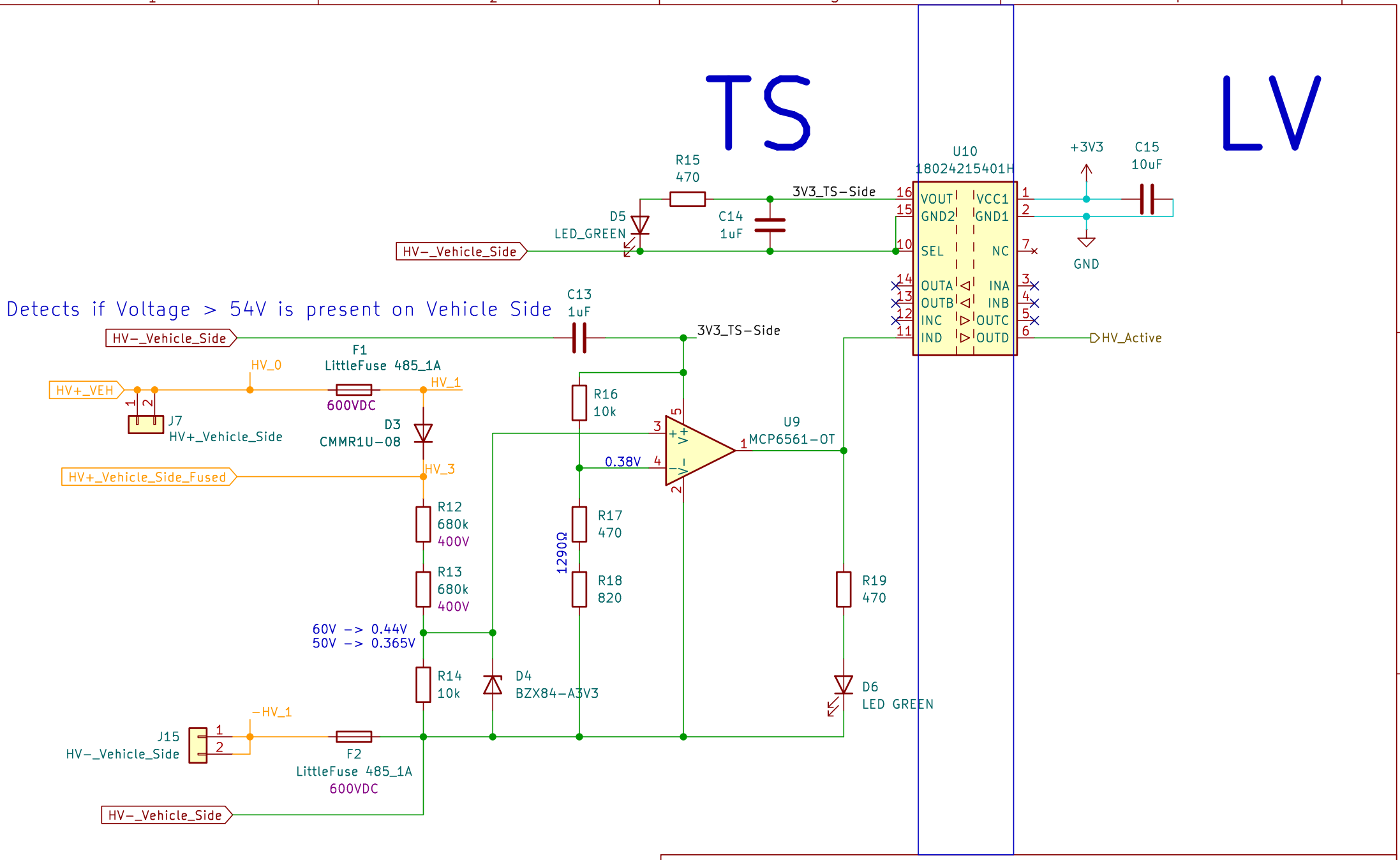
TS

FASTTUBE

Title: Precharge Relay Driver	**Rev: V1**
	Date: 2025–03–09
Project: Master_FT25	Exp. Date: 2025–04–27
Author: Lene Marquardt	Size: A5 | Page: 10/15



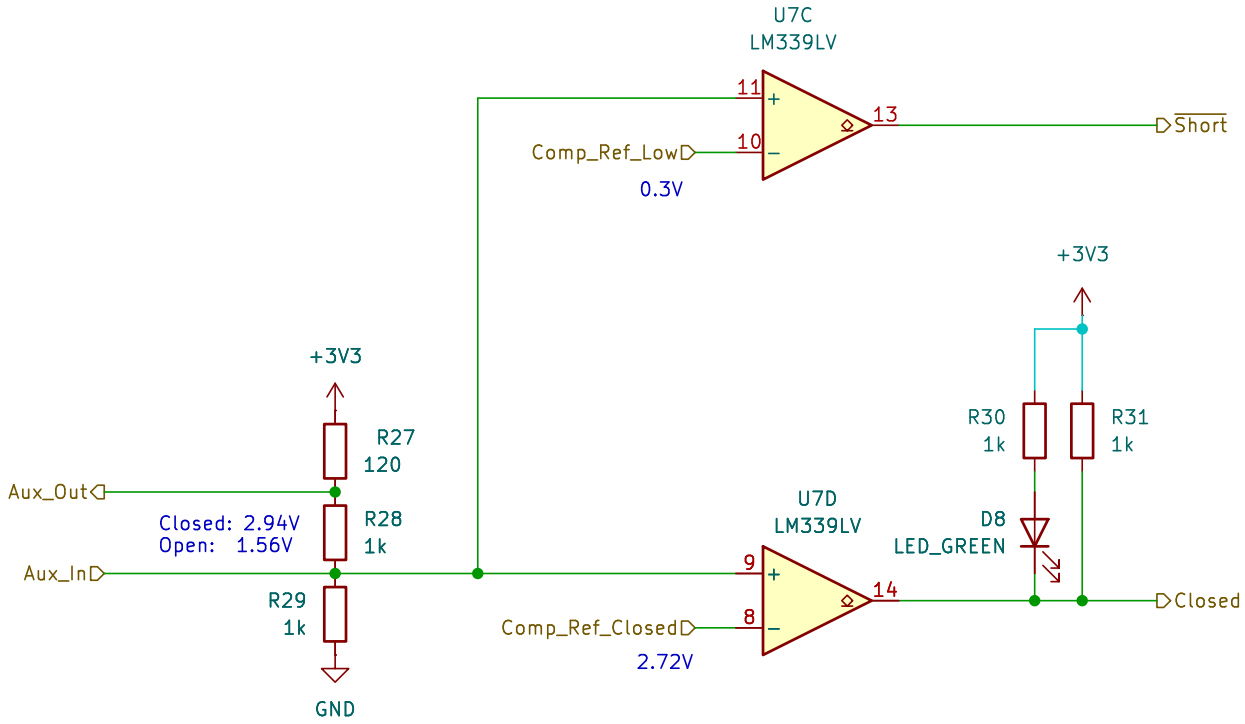
FASTTUBE	
Title: TSAL Logic	Rev: V1
	Date: 2025-03-09
Project: Master_FT25	Exp. Date: 2025-04-27
Author: Lene Marquardt	Size: A3 | Page: 2/15



FASTTUBE

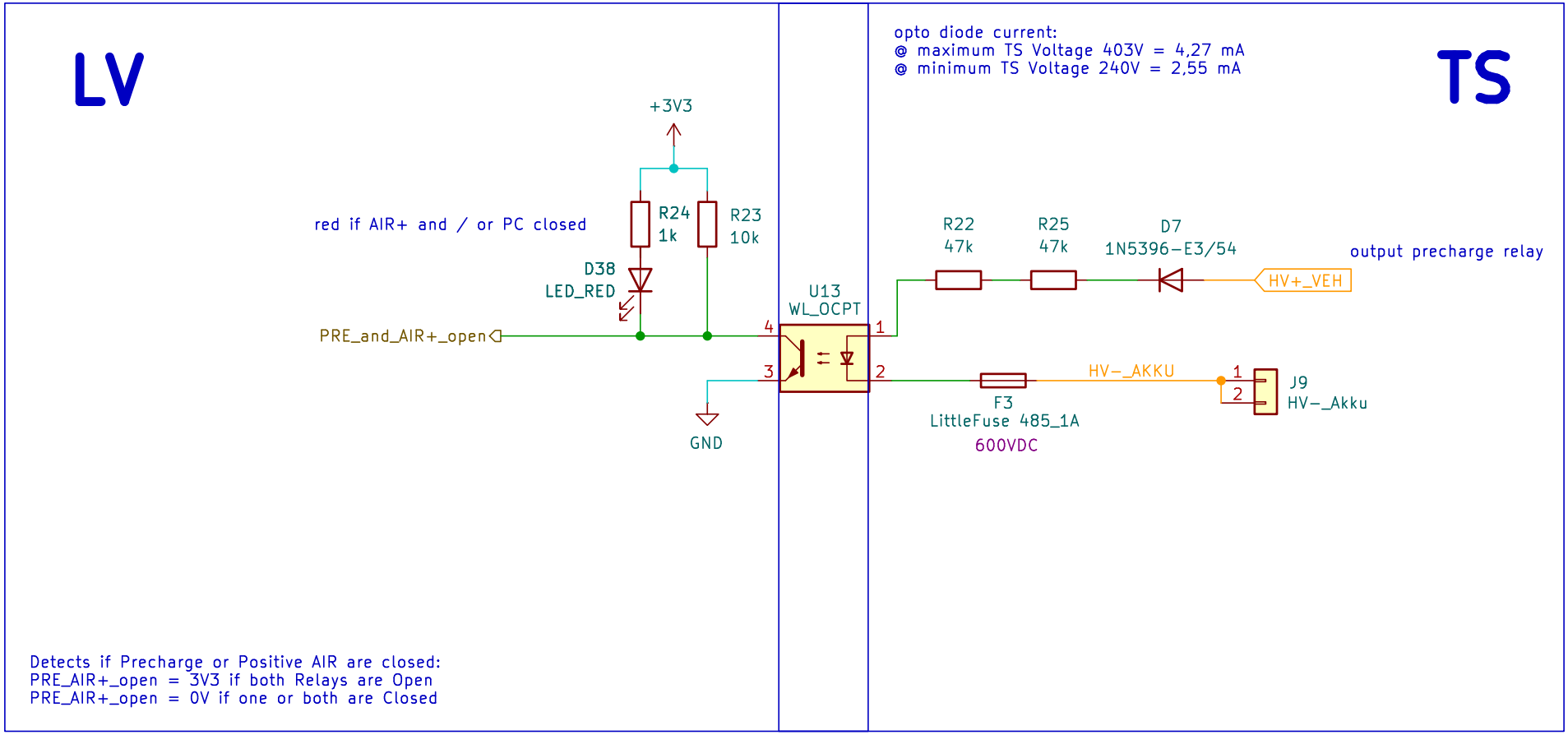
Title: TSAL HV Detection	**Rev: V1**
	Date: 2025-03-09
Project: Master_FT25	Exp. Date: 2025-04-27
Author: Lene Marquardt	Size: A5 | Page: 3/15

Accumulator TSAL – Relay state detection



FASTTUBE

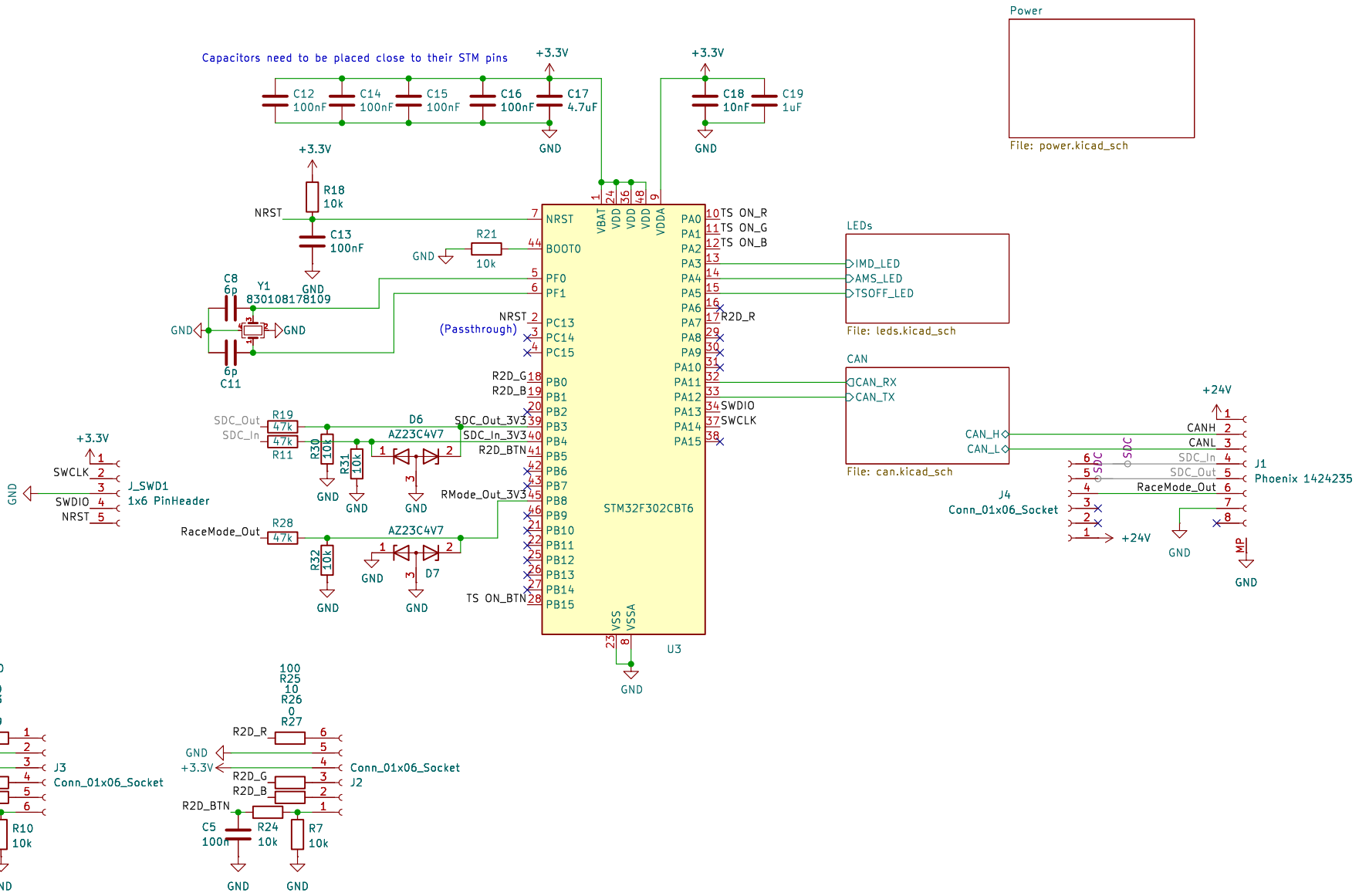
Title: AIR Relay State Detection	Rev: V1
	Date: 2025-03-09
Project: Master_FT25	Exp. Date: 2025-04-27
Author: Lene Marquardt	Size: A5 | Page: 4/15



FASTTUBE

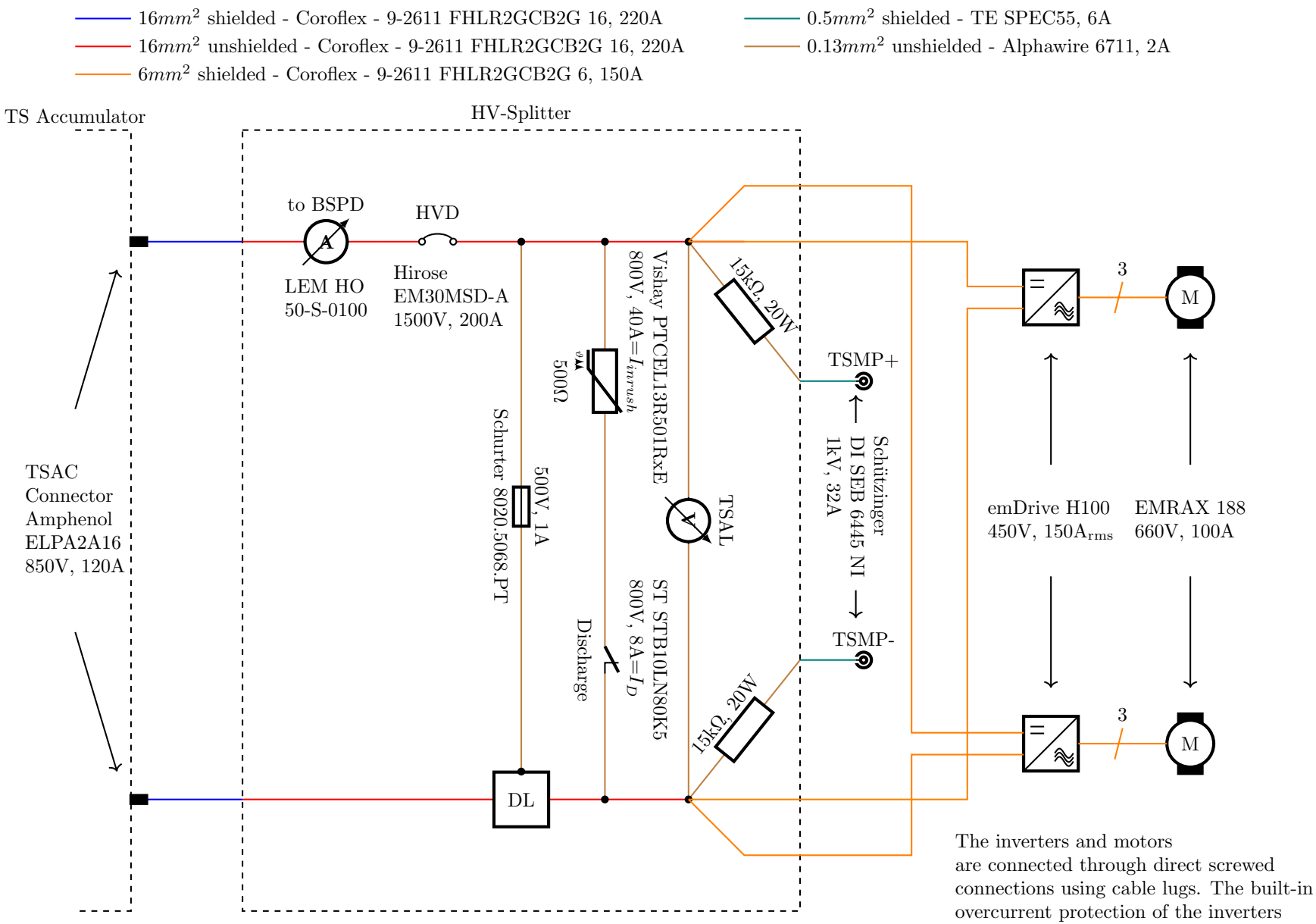
Title: Precharge State Detection	**Rev: V1**
	Date: 2025-03-09
Project: Master_FT25	Exp. Date: 2025-04-27
Author: Lene Marquardt	Size: A5 | Page: 6/15

Dashboard



FASTTUBE

Title: Dashboard Rootsheet	**Rev: V1**
	Date: 2025-03-26
Project: dashboard-FT25	Exp. Date: 2025-04-27
Author: Finley Troalic	Size: A4 | Page: 1/4

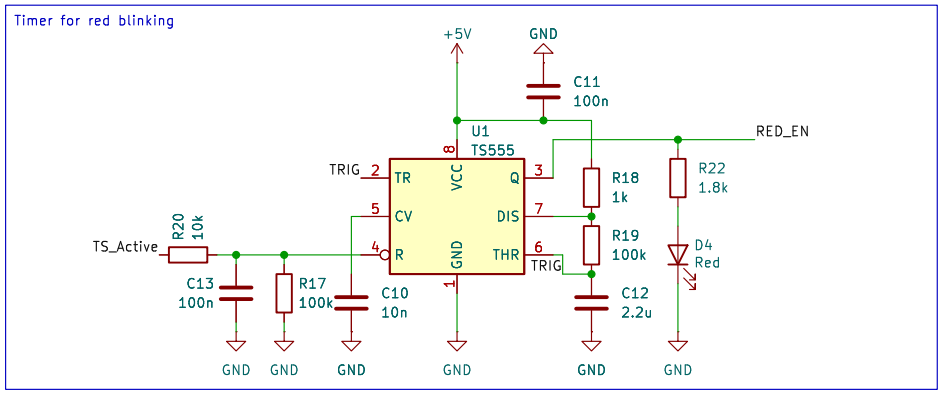


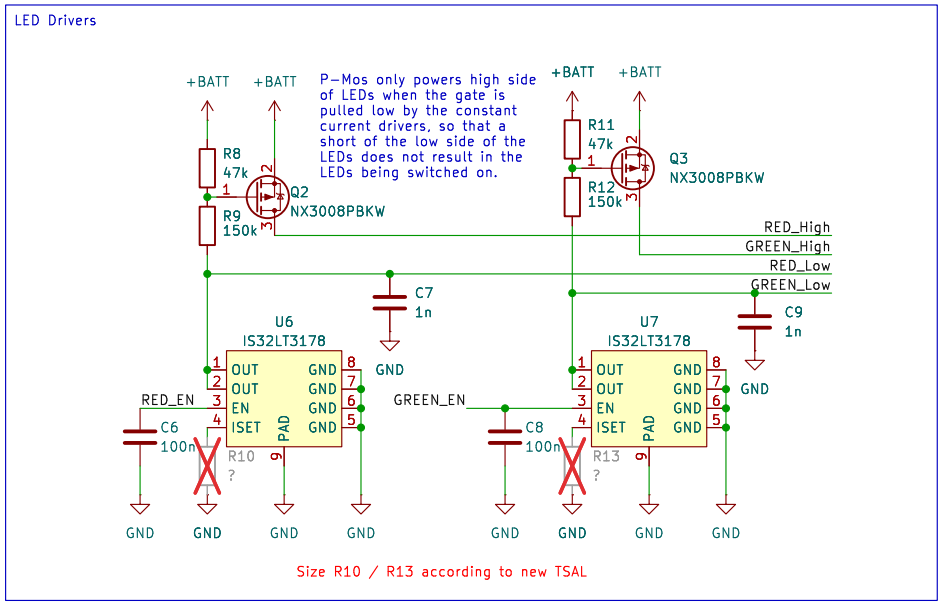
The cables are routed through cable glands if not specified

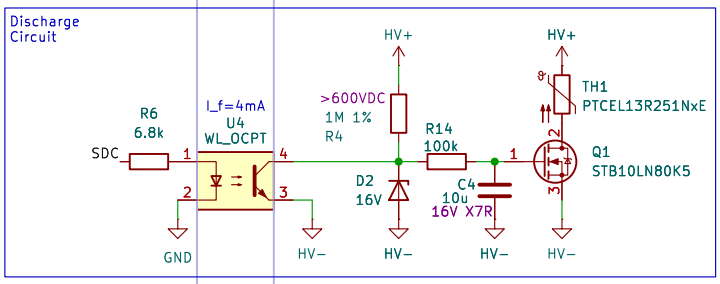
The inverters and motors are connected through direct screwed connections using cable lugs. The built-in overcurrent protection of the inverters (150A_{rms}) is used to protect the wires, which can handle a continuous current of 170A

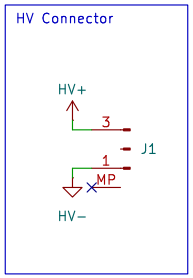
TSAL driver board and DC-link voltage detection

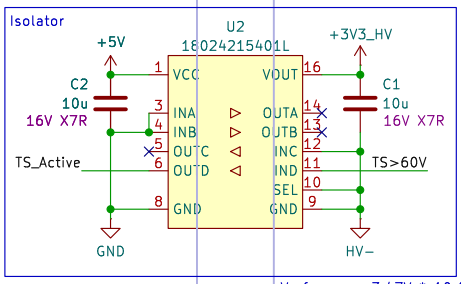
LV TS

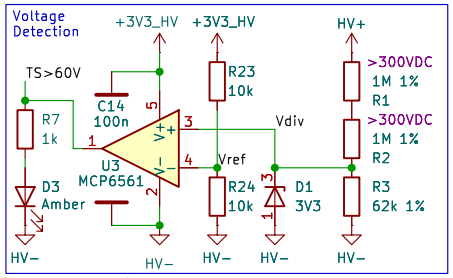




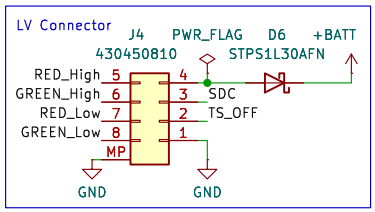


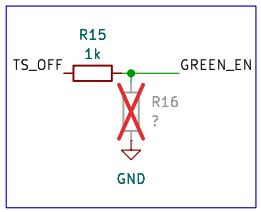


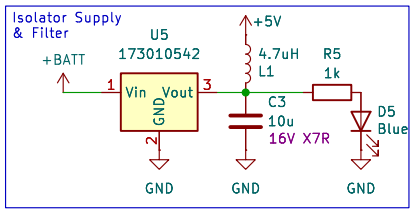




Vref_max = 3.47V * 10.1kΩ / (10.1kΩ + 9.9kΩ) = 1.76V
Vdiv@60V_min = 60V * 61.38Ω / (2*990kΩ + 61.38kΩ) = 1.8V
Vhyst_max@75deg = 6mV < 40mV (1.80V-1.76V)







FASTTUBE

Title: Discharge Circuit	**Rev: V1**
	Date: 2024-11-10
Project: DC	Exp. Date: 2025-04-27
Author: Karlsson Winkels	Size: A4 | Page: 1/1