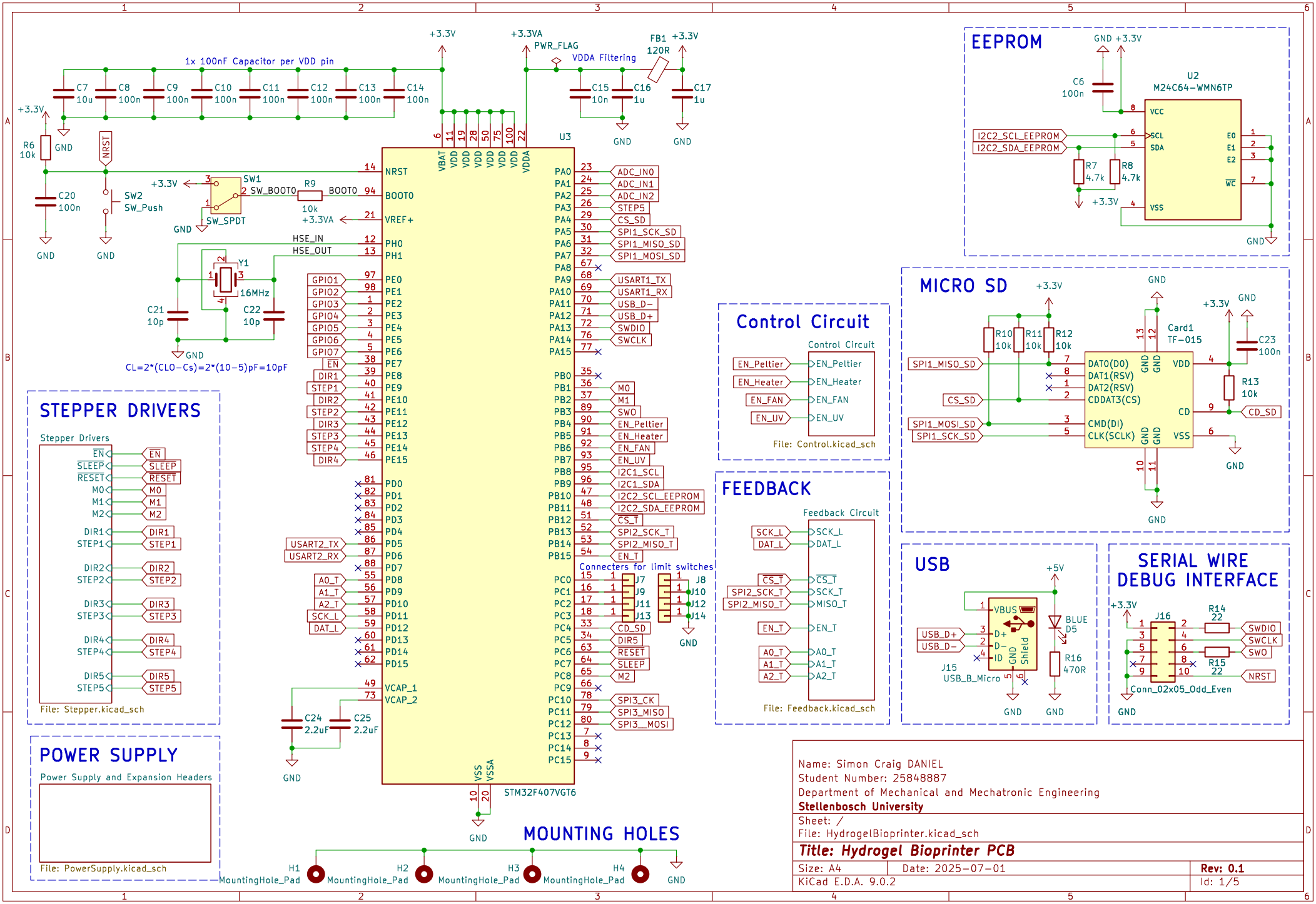
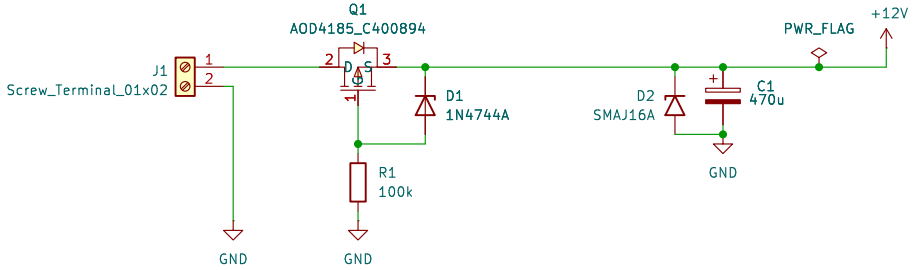
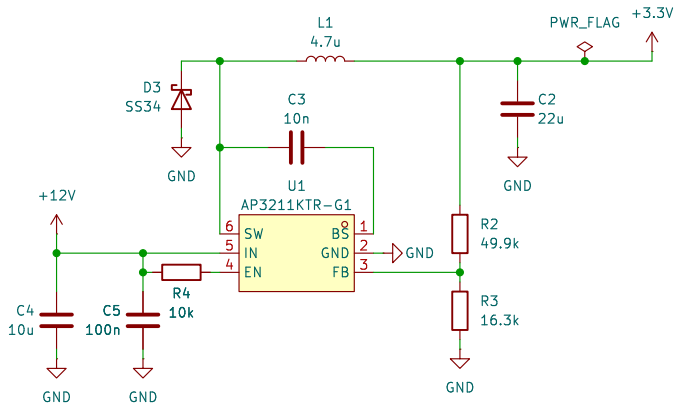
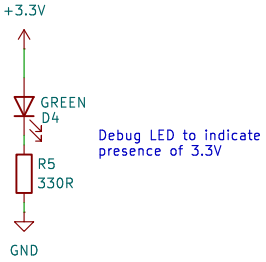

1x 100nF Capacitor per VDD pin
VDDA Filtering
PWR_FLAG
STM32F407VGT6
U3
NRST
BOOT0
VREF+
HSE_IN
HSE_OUT
16MHz
CL=2*(CLO-Cs)=2*(10-5)pF=10pF
SW_SPDT
SW_Push
SW_BOOT0
Connecters for limit switches
EEPROM
M24C64-WMN6TP
I2C2_SCL_EEPROM
I2C2_SDA_EEPROM
Control Circuit
EN_Peltier
EN_Heater
EN_FAN
EN_UV
File: Control.kicad_sch
MICRO SD
Card1
TF-015
SPI1_MISO_SD
SPI1_MOSI_SD
SPI1_SCK_SD
CS_SD
CD_SD
FEEDBACK
Feedback Circuit
SCK_L
DAT_L
CS_T
SCK_T
MISO_T
EN_T
A0_T
A1_T
A2_T
File: Feedback.kicad_sch
USB
USB_B_Micro
USB_D+
USB_D-
SERIAL WIRE DEBUG INTERFACE
Conn_02x05_Odd_Even
SWDIO
SWCLK
SWO
NRST
STEPPER DRIVERS
Stepper Drivers
File: Stepper.kicad_sch
POWER SUPPLY
Power Supply and Expansion Headers
File: PowerSupply.kicad_sch
MOUNTING HOLES
MountingHole_Pad
Name: Simon Craig DANIEL
Student Number: 25848887
Department of Mechanical and Mechatronic Engineering
Stellenbosch University
Sheet: /
File: HydrogelBioprinter.kicad_sch
Title: Hydrogel Bioprinter PCB
Size: A4
Date: 2025-07-01
Rev: 0.1
KiCad E.D.A. 9.0.2
Id: 1/5

POWER SUPPLY

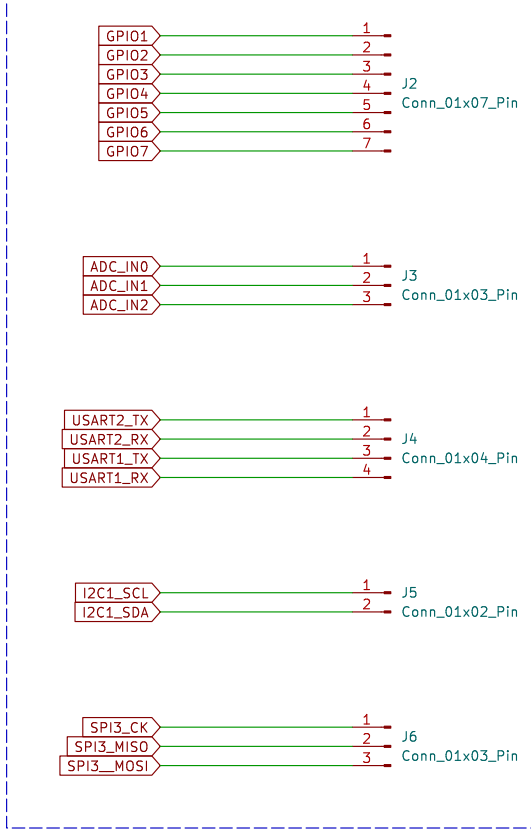






Debug LED to indicate presence of 3.3V

EXPANSION HEADERS



Name: Simon Craig DANIEL
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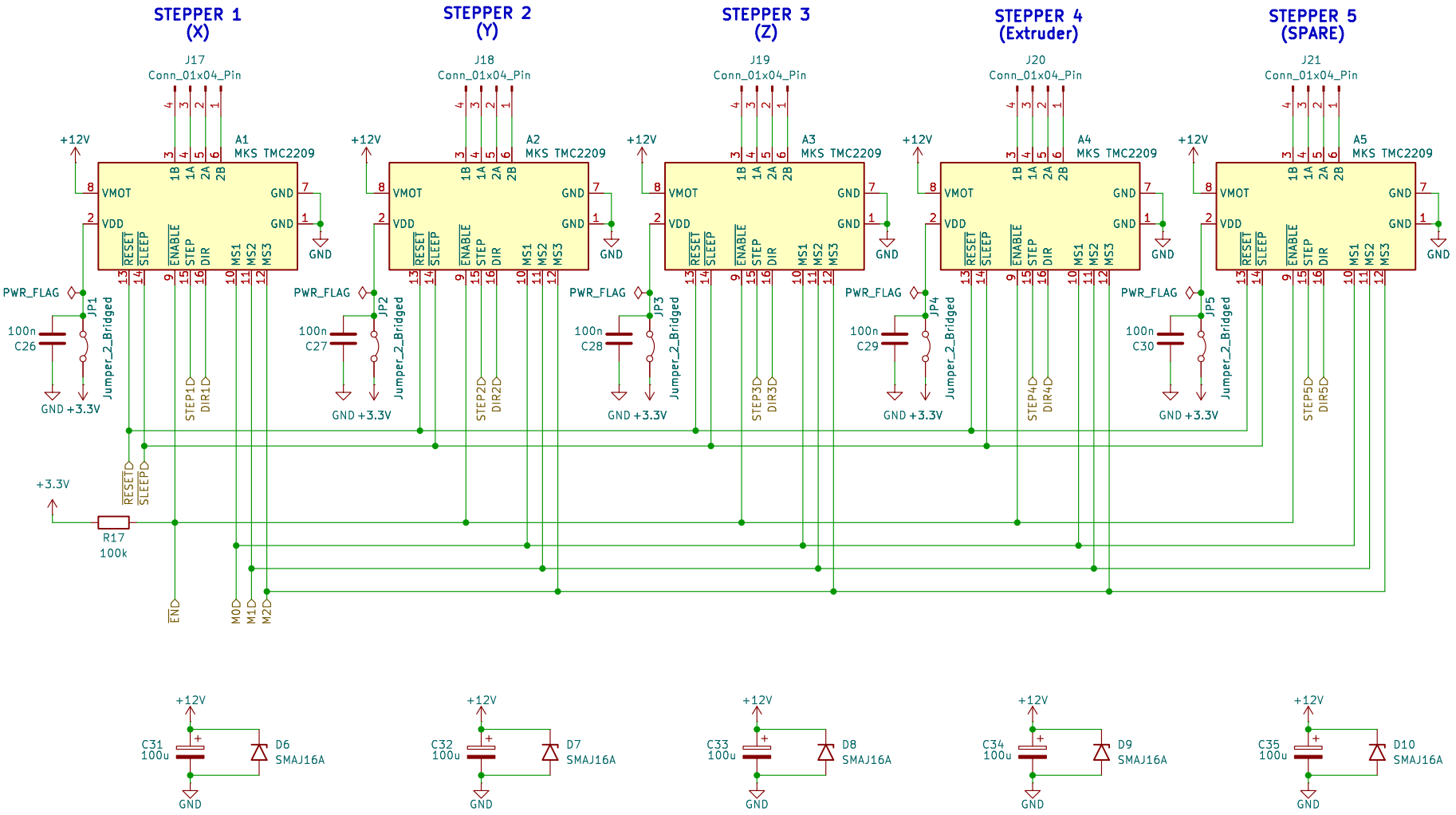
Sheet: /Power Supply and Expansion Headers/
File: PowerSupply.kicad_sch

Title: Power Supply and Expansion Headers

Size: A4	Date: 2025-07-01	**Rev: 0.1**
KiCad E.D.A. 9.0.2		Id: 2/5

DRIVERS



Note: In the event that the MKS TMC2209 are unable to be procured, cheap available alternatives such as the A4988 and DRV8825 drivers can be used. If these alternatives are used, then $\overline{\text{RST}}$ and $\overline{\text{SLP}}$ pins will need to be pulled high using a spare GPIO or with the 3.3V source and the M2 pin will need to be connected to a spare GPIO pin for microstep setting selection. Solder connection points must therefore be included for these pins on the PCB to accomodate this potential need.

Name: Simon Craig DANIEL
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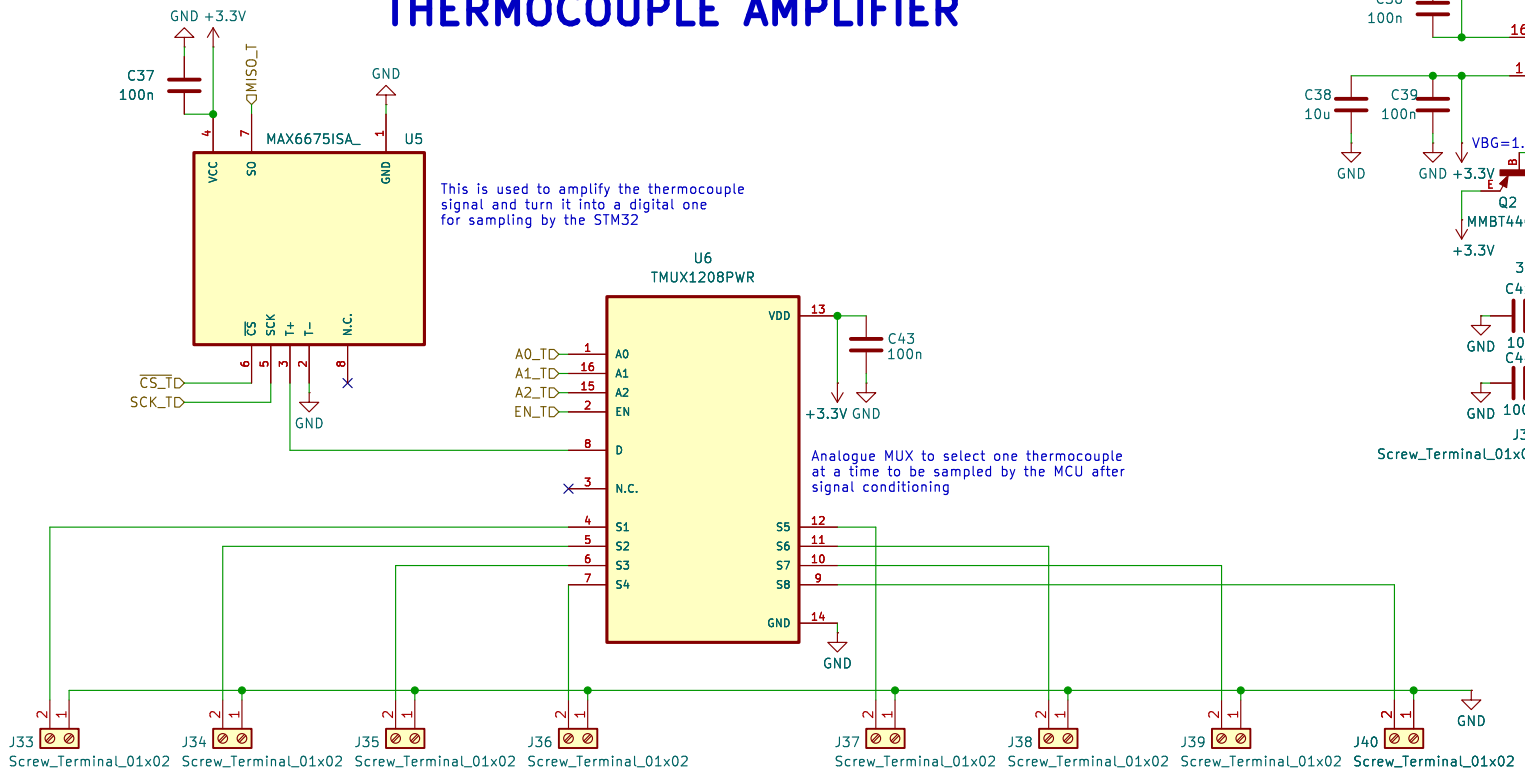
Sheet: /Stepper Drivers/
File: Stepper.kicad_sch

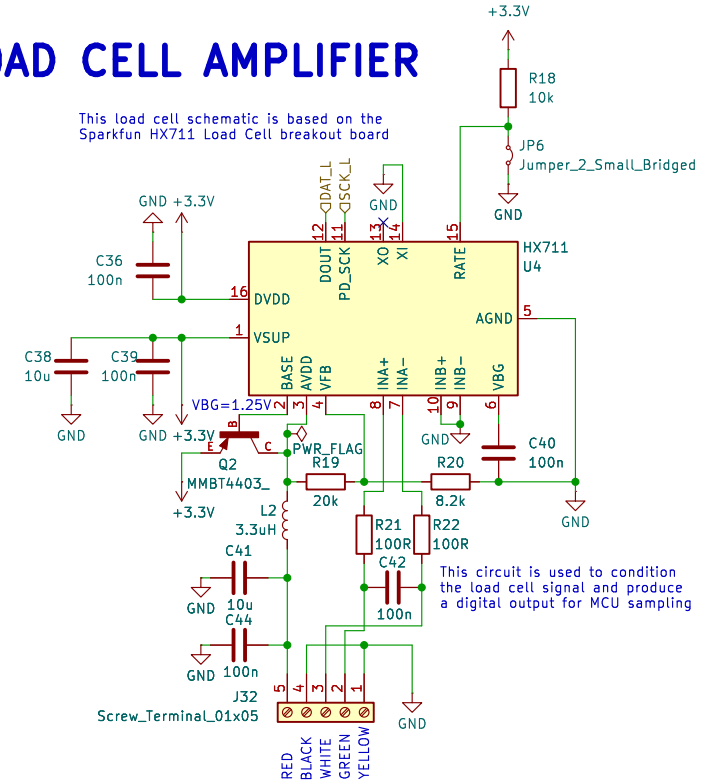
Title: Stepper Drivers

Size: A4	Date: 2025-07-01	**Rev: 0.1**
KiCad E.D.A. 9.0.2		Id: 3/5

THERMOCOUPLE AMPLIFIER



LOAD CELL AMPLIFIER



Name: Simon Craig DANIEL
Student Number: 25848887
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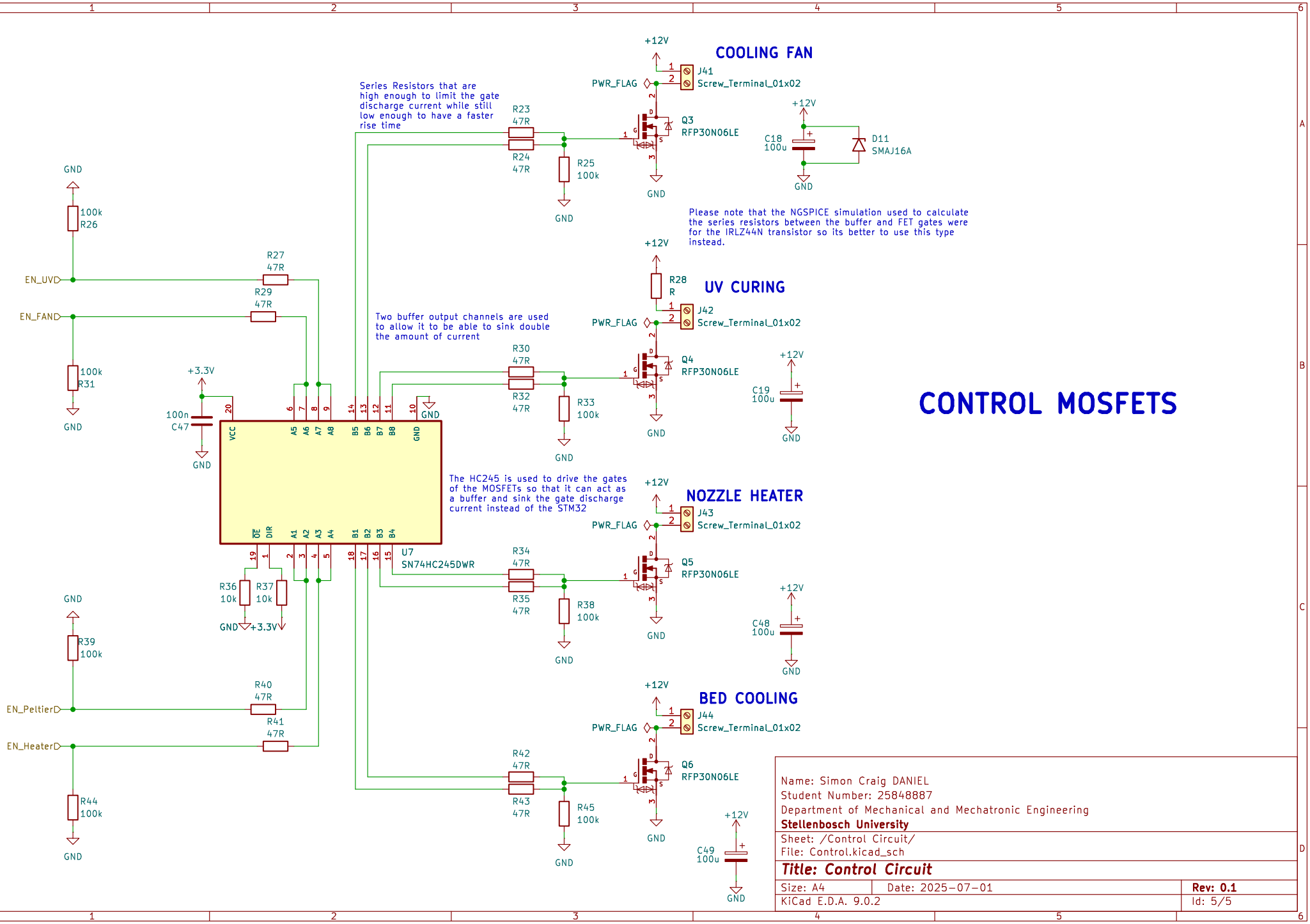
Sheet: /Feedback Circuit/
File: Feedback.kicad_sch

Title: Feedback Circuit

Size: A4	Date: 2025-07-01	**Rev: 0.1**
KiCad E.D.A. 9.0.2		Id: 4/5


CONTROL MOSFETS
COOLING FAN
UV CURING
NOZZLE HEATER
BED COOLING
Series Resistors that are high enough to limit the gate discharge current while still low enough to have a faster rise time
Please note that the NGSPICE simulation used to calculate the series resistors between the buffer and FET gates were for the IRLZ44N transistor so its better to use this type instead.
Two buffer output channels are used to allow it to be able to sink double the amount of current
The HC245 is used to drive the gates of the MOSFETs so that it can act as a buffer and sink the gate discharge current instead of the STM32
U7
SN74HC245DWR
Q3
RFP30N06LE
Q4
RFP30N06LE
Q5
RFP30N06LE
Q6
RFP30N06LE
J41
J42
J43
J44
Screw_Terminal_01x02
PWR_FLAG
D11
SMAJ16A
EN_UV
EN_FAN
EN_Peltier
EN_Heater
+12V
+3.3V
GND
Name: Simon Craig DANIEL
Student Number: 25848887
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Stellenbosch University
Sheet: /Control Circuit/
File: Control.kicad_sch
Title: Control Circuit
Size: A4
Date: 2025-07-01
Rev: 0.1
KiCad E.D.A. 9.0.2
Id: 5/5