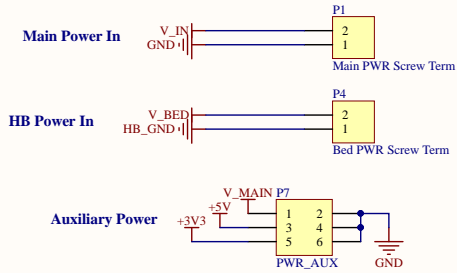
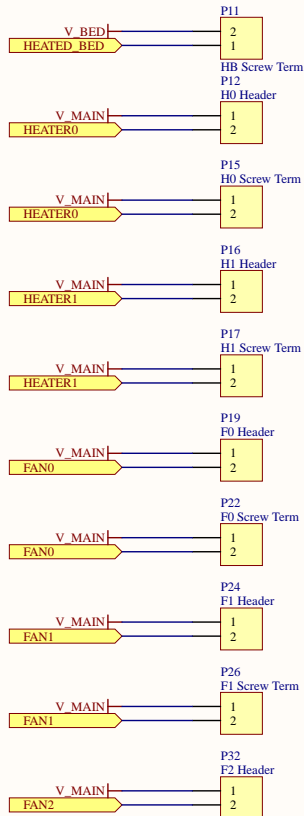


Main Power



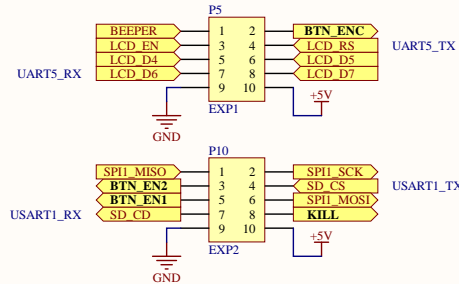
MOSFETs



Expansion

EXP1 and EXP2 suit displays / control panels
-buttons on interrupts
-buzzer on timer's PWM output (TIM8 CH4)
-SPI for SD access
-match existing RAMPS/RUMBA style character+graphic LCDs

EXP1 and EXP2 both have U(S)ARTs (1 & 5) on matching pins
-either could be used individually for a serial-based external display
-note EXP2 USART1 is shared with EXP4 (peripheral, not pins)



EXP2 P10 is "KILL" on some boards and control panel schematics
"KILL" is supposed to cause the printer to freeze or reset.

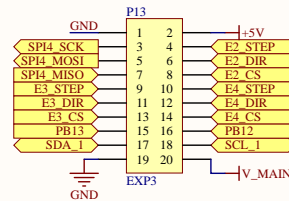
However:
-P10 is often not connected on the display board (as per RRD Character / Graphic Schematics) (most displays use RESET / P8 instead)
-EXP2 has no power pin, limiting its functionality
Therefore "KILL" has been moved to P8, replacing RESET
And P10 is now a 5V power pin

If an existing control panel does connect P10, it will likely be a button shorting it to ground
-Which will cause the 5V regulator's short-circuit protection to cut off power, resetting the micro
or it will be a button connecting it to 5V (less likely):
-Which will do nothing at all

EXP3 can be used for an expansion board

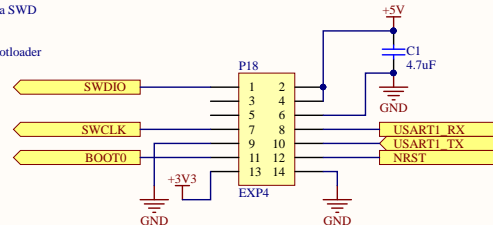
-Three sets of STEP/DIR/EN pins
-SPI4 for stepper driver control
-PB12/13 as GPIO or CAN
-SDA/SCL for I2C

This allows three additional TMC2130 stepper drivers
Plus either two MOSFETs directly (PB12/13)
Or a more extensive expansion via I2C or CAN



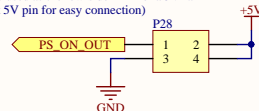
EXP4 is combination programming and Raspberry Pi / host header

-UART for control by Pi or other host board
-NRST and BOOT0 allow programming via UART
-SWDIO, SWCLK, NRST allow programming via SWD
-SWDIO as pull-down input can detect Pi's 3.3V
-SWCLK can be used as GPIO if needed
-BOOT0 and adj. 3V can be jumpered for HW bootloader

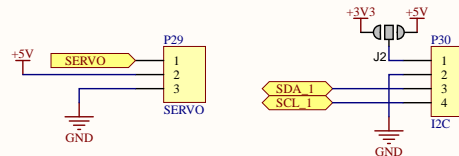


PS_ON can be used to pull PSU enable low

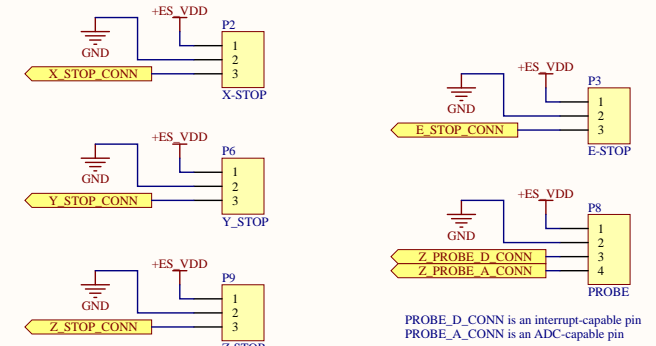
OR
PS_ON can be used as the low-side FET for a 5V fan (with adjacent 5V pin for easy connection)



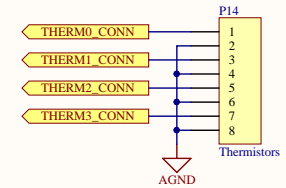
5V can be supplied via either of the 5V pins
Bypassing the board's switching regulator



Endstops / Z-Probe

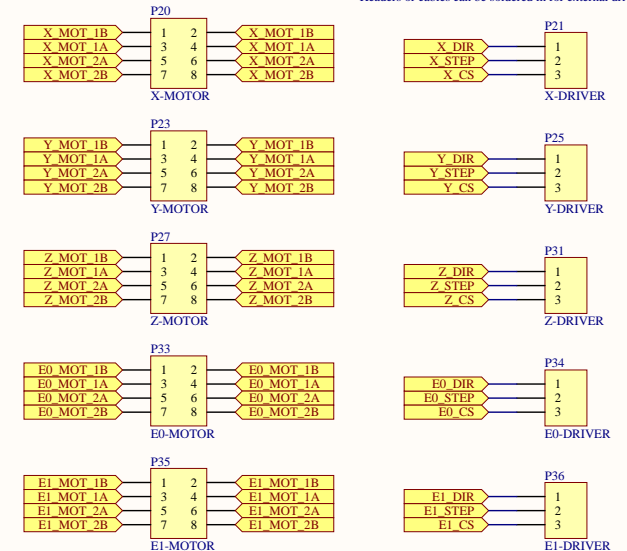


Thermistors



Stepper Motors

Driver STEP/DIR/EN headers are not populated
Headers or cables can be soldered in for external drivers

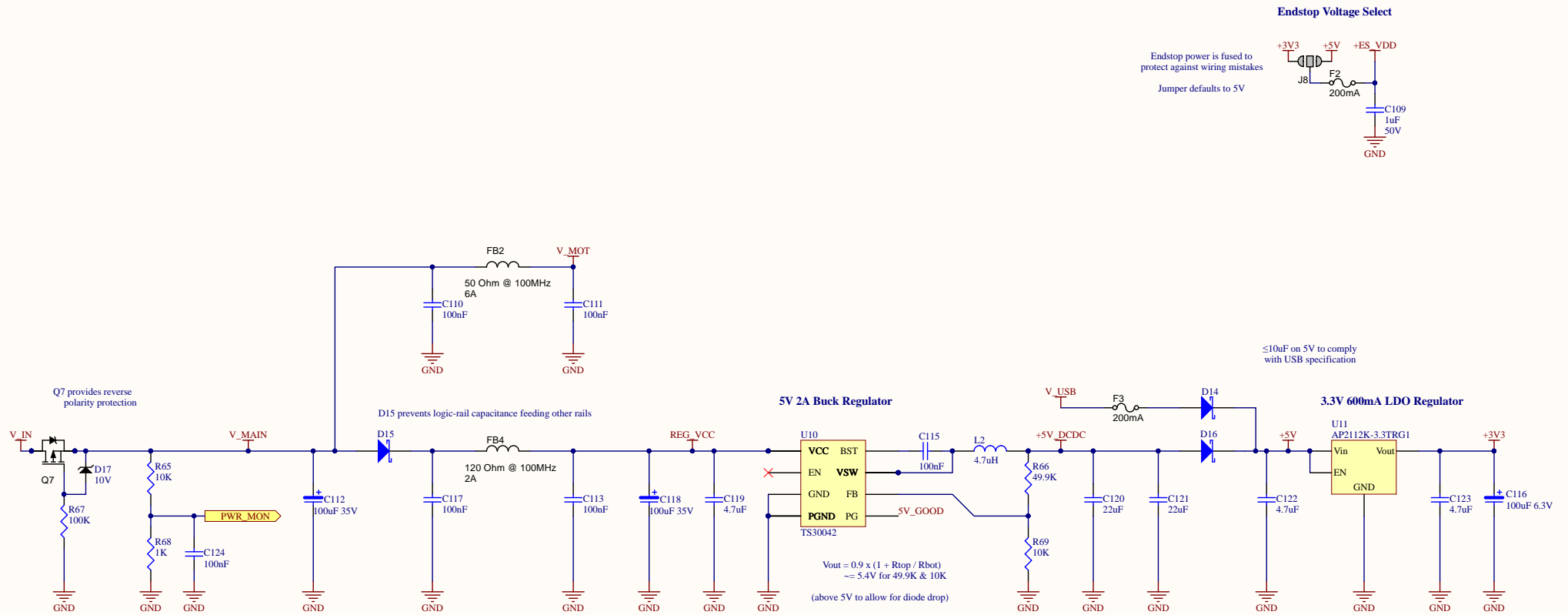


Aus3D

GPLv3
github.com/Aus3D/PicoPrint
www.aus3d.com/picoprint

Revision: 0.3A
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Drawn: Chris Barr
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Power

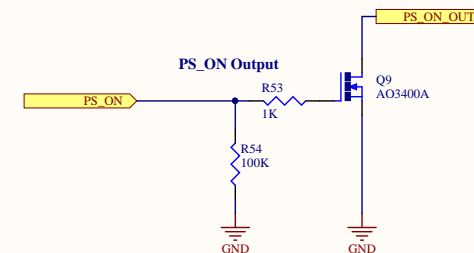
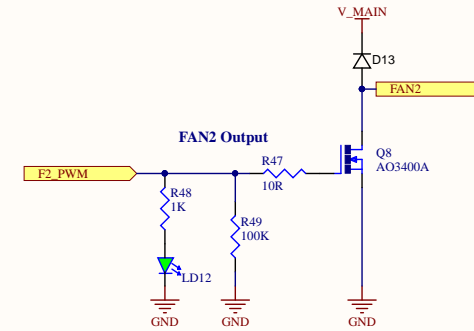
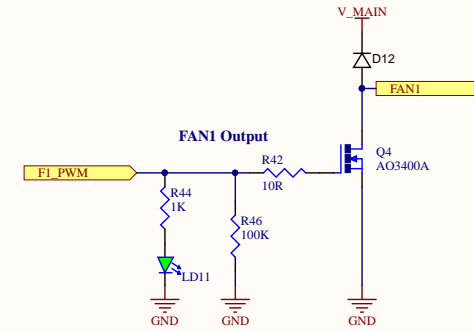
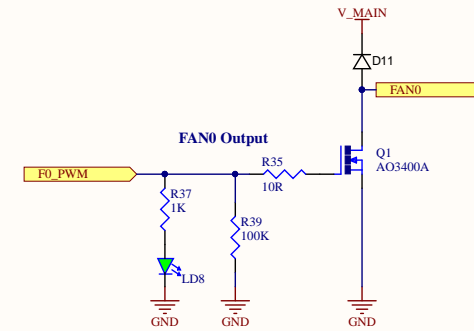
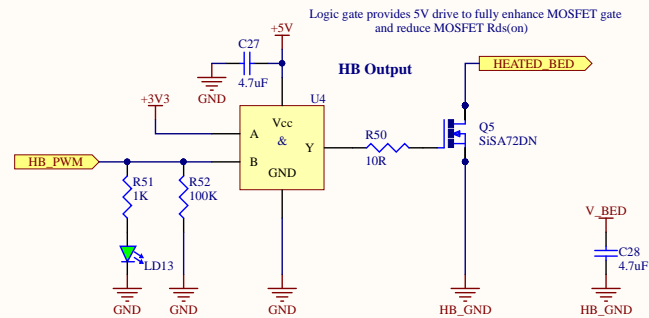
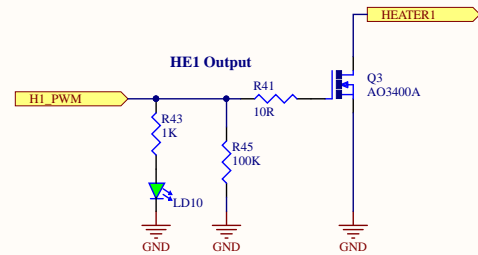
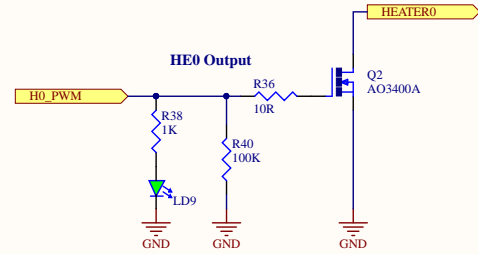


Aus3D

GPLv3
github.com/Aus3D/PicoPrint
www.aus3d.com/picoprint

Revision: 0.3A
Date: 1/05/2018
Drawn: Chris Barr
Page: 2 of 5

MOSFET Outputs

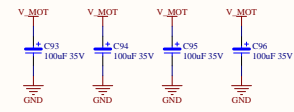
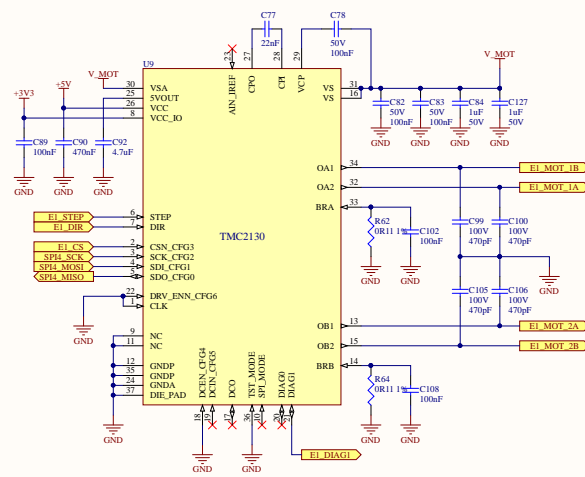
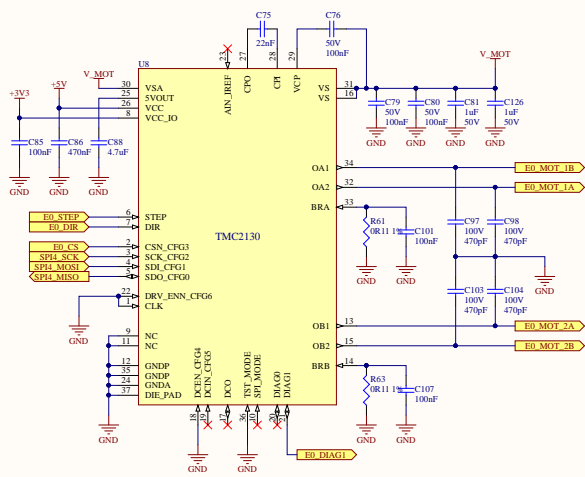
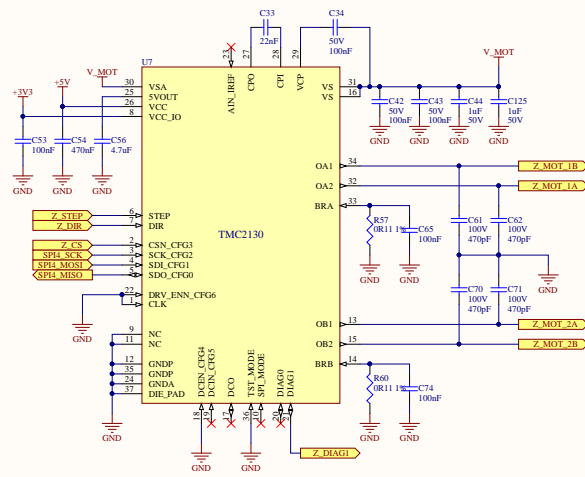
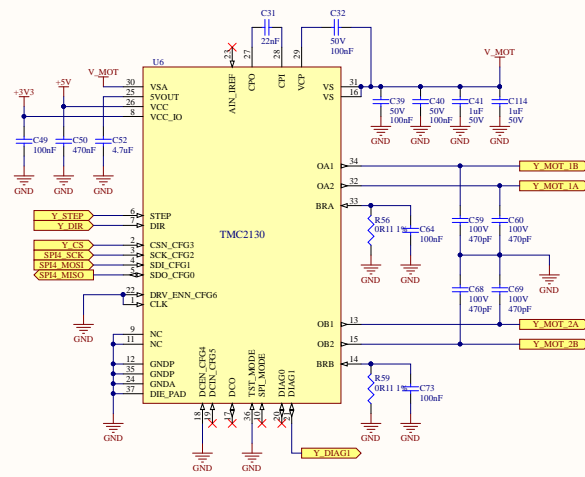
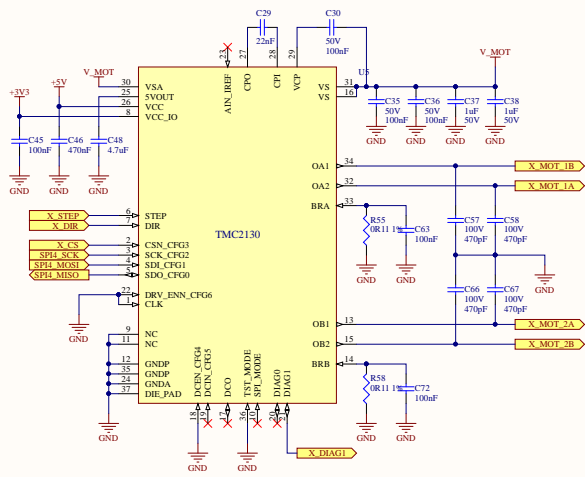


Aus3D

GPLv3
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www.aus3d.com/picoprint

Revision: 0.3A
 Date: 1/05/2018
 Drawn: Chris Barr
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Stepper Drivers



Notes

Digital 5V is provided by board's 5V rail, not TMC2130's internal regulator, in order to minimise power dissipation. Internal analog domain is still powered from internal regulator.

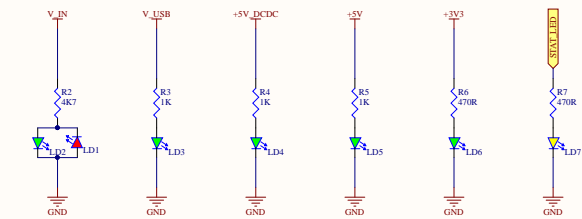
SPI_MODE has internal pull-up, defaults to SPI mode enabled.

DRV_ENN_CFG6 is tied to GND so drivers are always enabled. Can be disabled via SPI command if required.

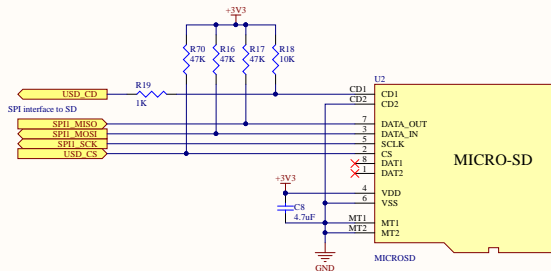
CLK is tied to GND to enable internal clock.

DIAG1 can be used for sensorless-homing if SPI readout is not supported by firmware. Defaults to open-drain output, and will be left floating unless otherwise configured.

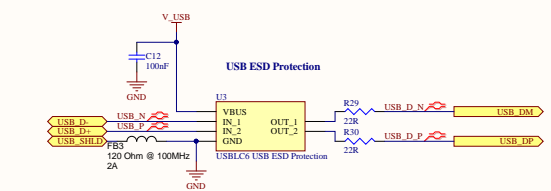
Indicator LEDs



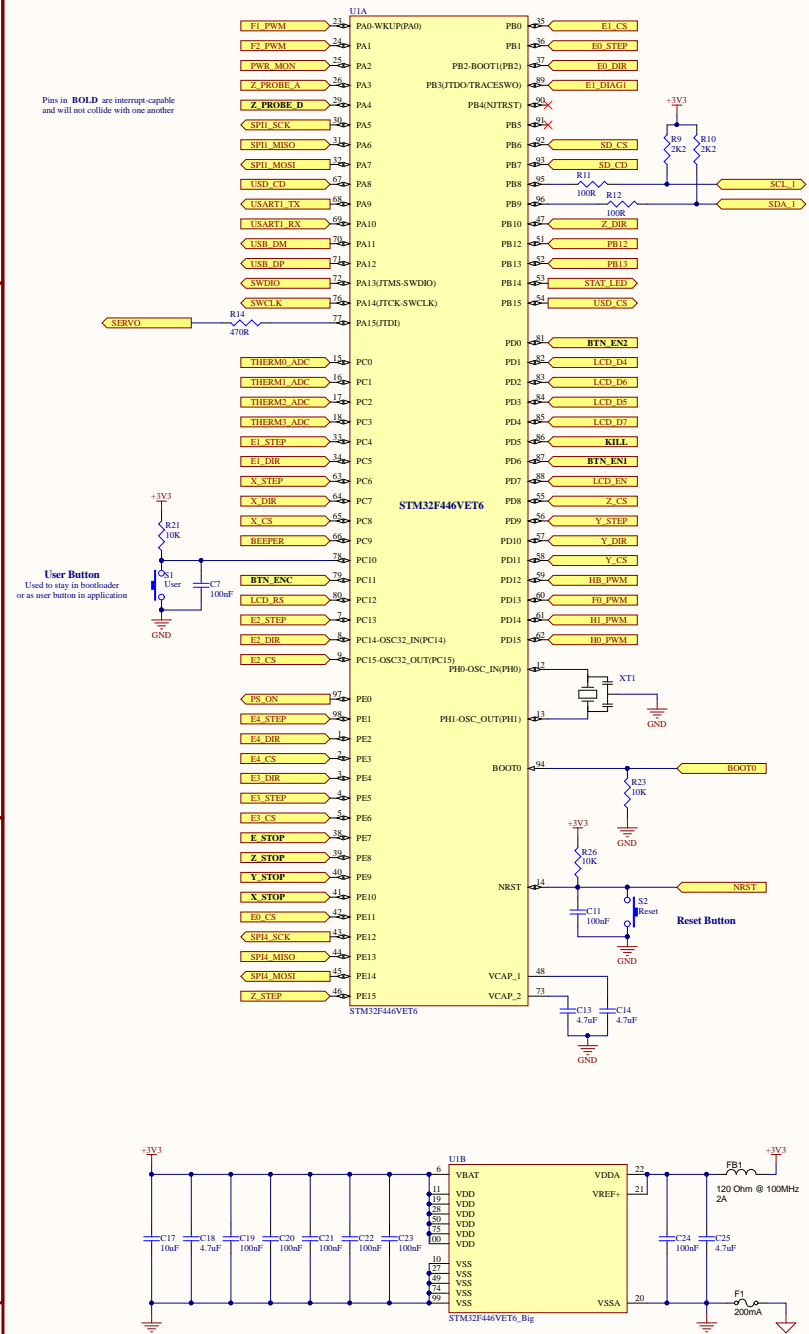
microSD



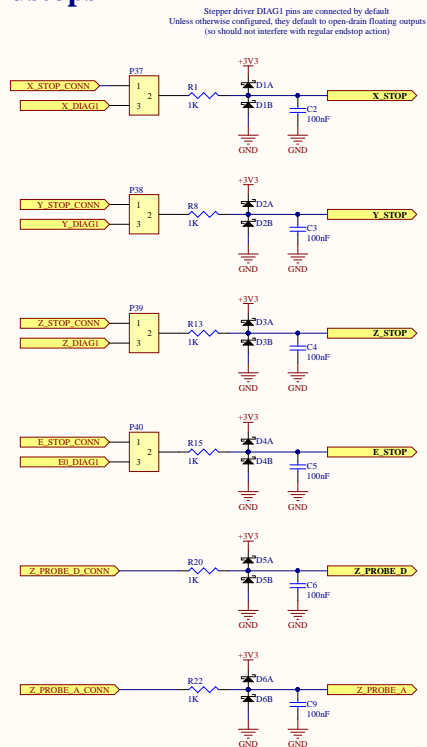
USB



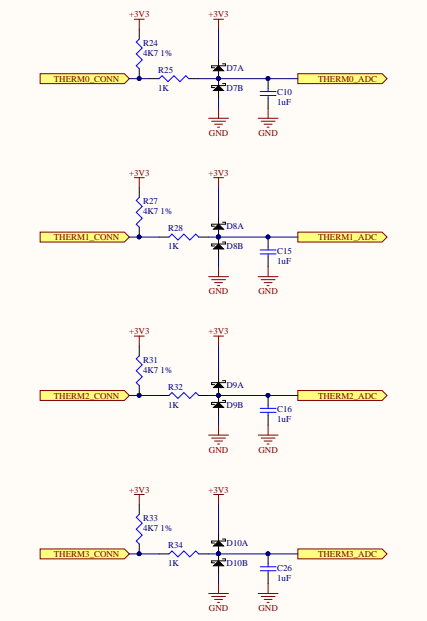
Microcontroller



Endstops



Thermistors



Fuse protects micro if thermistor ground is shorted to any other voltage accidentally