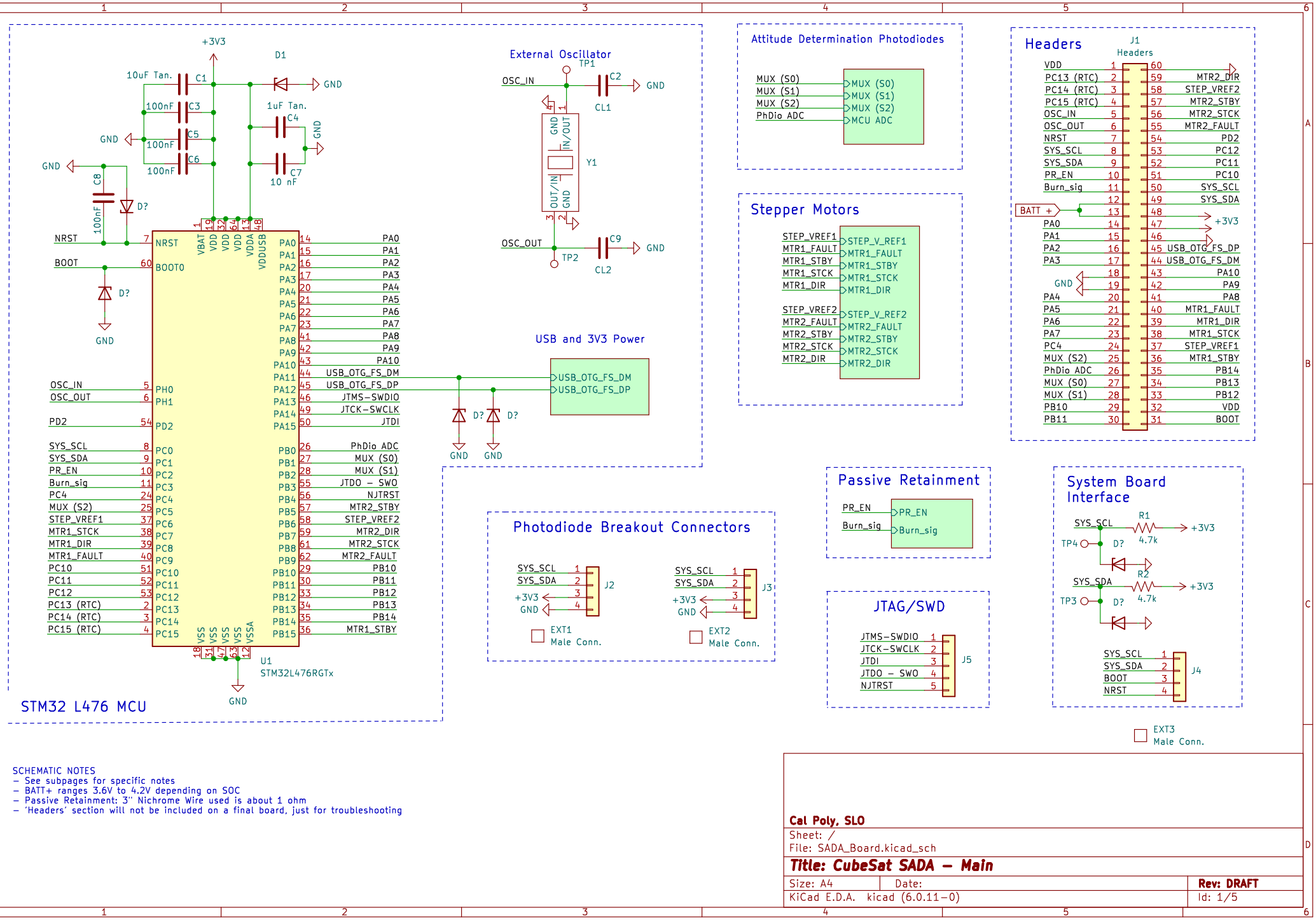
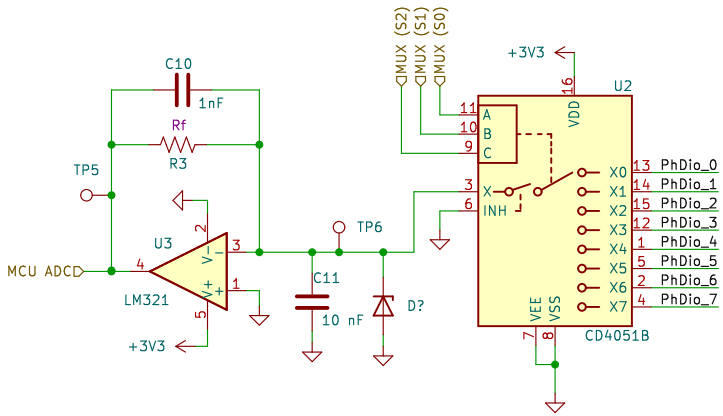
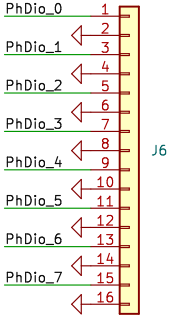

STM32 L476 MCU
U1
STM32L476RGTx
External Oscillator
Y1
Attitude Determination Photodiodes
MUX (S0)
MUX (S1)
MUX (S2)
PhDio ADC
MCU ADC
Stepper Motors
STEP_V_REF1
STEP_V_REF2
Headers
J1
Headers
USB and 3V3 Power
USB_OTG_FS_DM
USB_OTG_FS_DP
Photodiode Breakout Connectors
J2
J3
EXT1
Male Conn.
EXT2
Male Conn.
Passive Retainment
PR_EN
Burn_sig
JTAG/SWD
JTMS–SWDIO
JTCK–SWCLK
JTDI
JTDO – SWO
NJTRST
J5
System Board Interface
J4
EXT3
Male Conn.
SCHEMATIC NOTES
– See subpages for specific notes
– BATT+ ranges 3.6V to 4.2V depending on SOC
– Passive Retainment: 3" Nichrome Wire used is about 1 ohm
– 'Headers' section will not be included on a final board, just for troubleshooting
Cal Poly, SLO
Sheet: /
File: SADA_Board.kicad_sch
Title: CubeSat SADA – Main
Size: A4
Date:
Rev: DRAFT
KiCad E.D.A. kicad (6.0.11–0)
Id: 1/5



Headers to external photodiodes



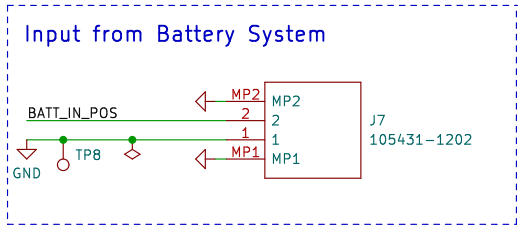
EXT4
Male Connector

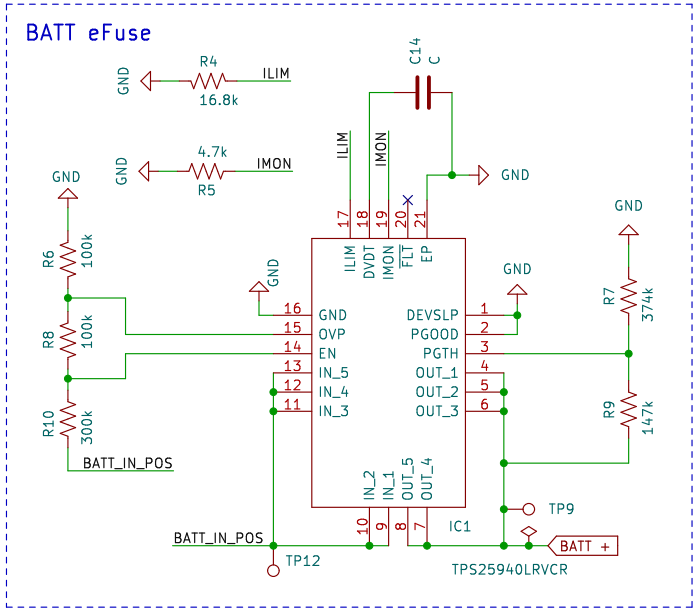
EXT5
Photodiodes (8)

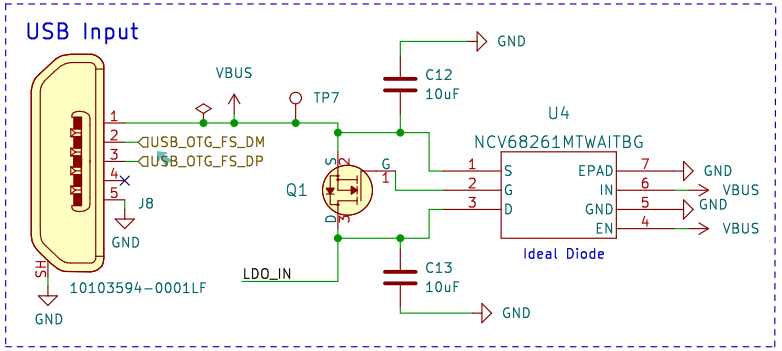
Image reflects a negative V_out, though in
circuit photodiode polarity should be reversed

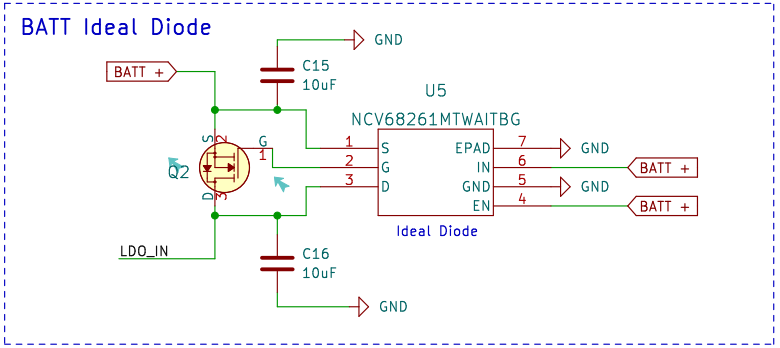
Schematic Notes
- DNS = Do Not Solder. These photodiodes are not implemented at this time, though functionality is implemented to the board for future uses
- Example attitude determination photodiodes are SFH 203 P, and supporting circuitry designed around those. Please adjust R_F and buffer capacitor accordingly

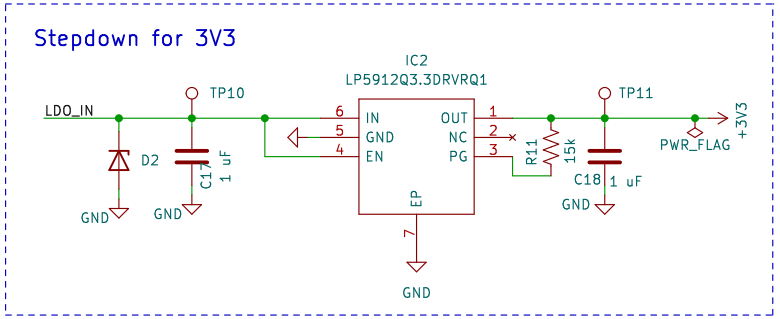
Sheet: /CRNR PHOTODIODES/	
File: Photodiode_circuit.kicad_sch	
Title:	
Size: A4	Date:
KiCad E.D.A. kicad (6.0.11-0)	Id: 2/5
	Rev:











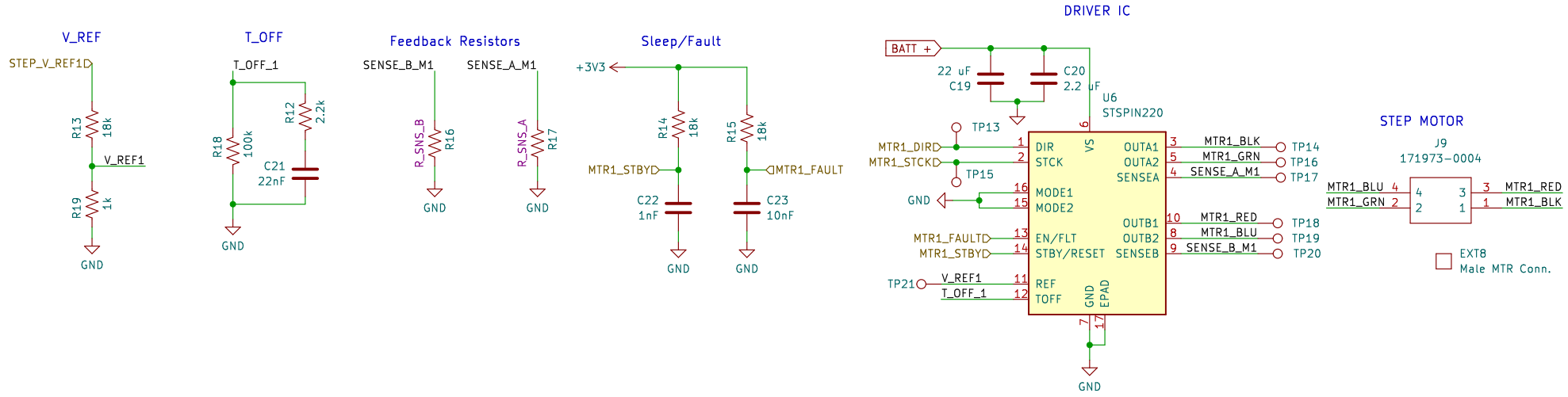
EXT6
PWR Banana Plugs

EXT7
Power Male Connector

Schematic Notes
- NCV68261 is an ideal diode used to prevent current injection into USB or battery source
  - Mimics common two source voltage input selection circuit of having a series diode on each line w/o voltage drop
- BATT+ ranges 3.6V to 4.2V depending on SOC
- Most of the health/current information of the eFuse has been neglected since there is no supervisor MCU
- EFuse designed to have overvoltage lockout at 4.95V and undervoltage lockout at 2.5V, though UVLO unecessary
- The ideal diode circuit for the battery input could perhaps be deleted since the eFuse accomplishes the same purpose, but it was left so that battery outputs such as stepper motors and passvie retainment cannot be attempted with only USB power

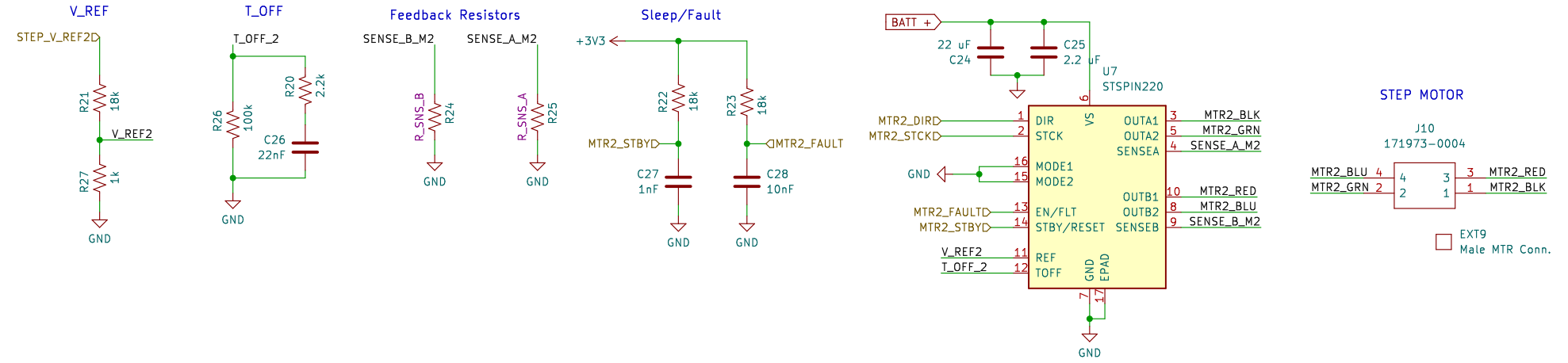
Sheet: /USB and MCU LDO/		
File: usb_MCU_LDO.kicad_sch		
Title:		
Size: A4	Date:	**Rev:**
KiCad E.D.A. kicad (6.0.11-0)		Id: 4/5

MOTOR 1



Identical Frequency– Necessary to ensure identical movement?

MOTOR 2



SCHEMATIC NOTES
- Designed for use with Polalu S20STH30-0604A
- Chosen to use EN pullup instead of MCU enable control
- MODE1 and MODE2 grounded since only full stepping is used
- Vref/RSNS chosen for max current of 0.6A/phase, though this is likely more current than necessary. R_SNS and V_ref can be changed if only significantly lower current is used
- Vref set at constant 0.19 volts since no microstepping takes place
- Motor current is set by PWM through V_REF pin. 100% Duty cycle represents I_max motor can handle (0.6A)
- MCU_STBY is the stepper sleep toggle used to reduce power when motors stationary

Sheet: /Steppers /
File: Bipolar_Steppers.kicad_sch

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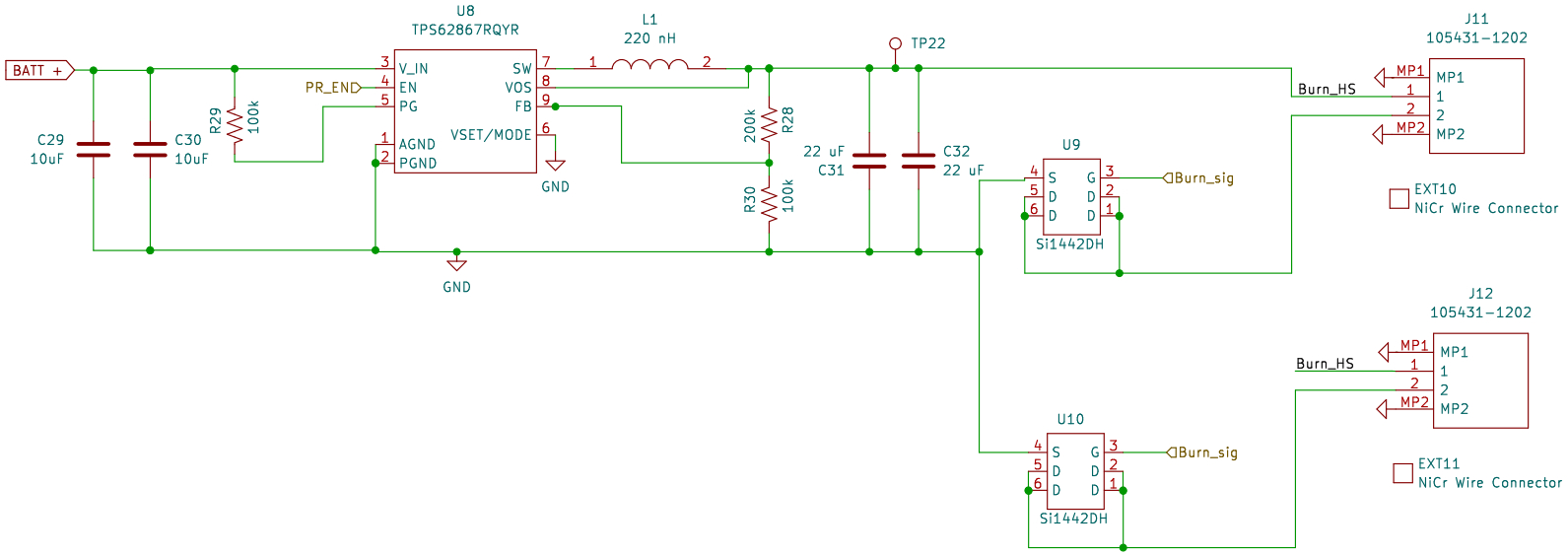
Size: A4 | Date: | **Rev:**
KiCad E.D.A. kicad (6.0.11-0) | Id: 5/5

Passive Retainment NiChrome Burner



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Title:		
Size: A4	Date:	**Rev:**
KiCad E.D.A. kicad (6.0.11-0)		Id: 5/5