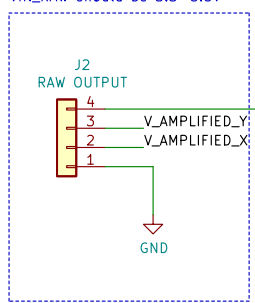
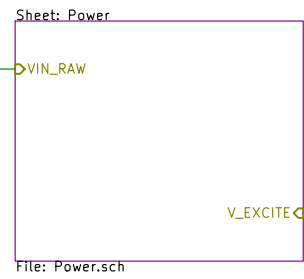


Connection to use amp with external microcontroller. (U3 will still need to set reference voltages)
VIN_RAW should be 3.3–5.5V

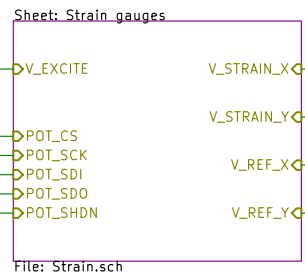


Do not connect VIN_RAW here and USB at the same time

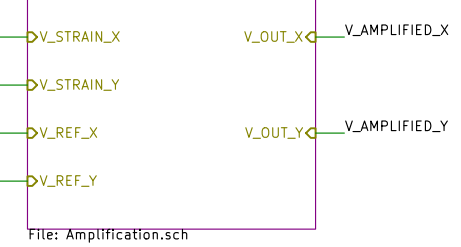
Reservoir capacitors and generation of V_EXCITE (2.5V)



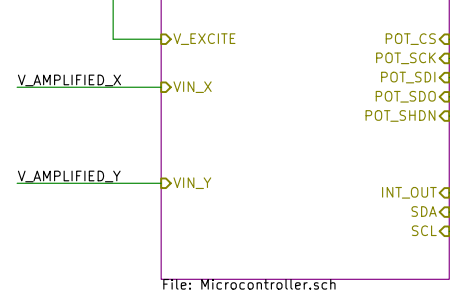
X and Y axes and reference voltages



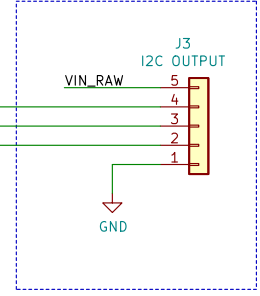
Sheet: Amplification



Sheet: Microcontroller

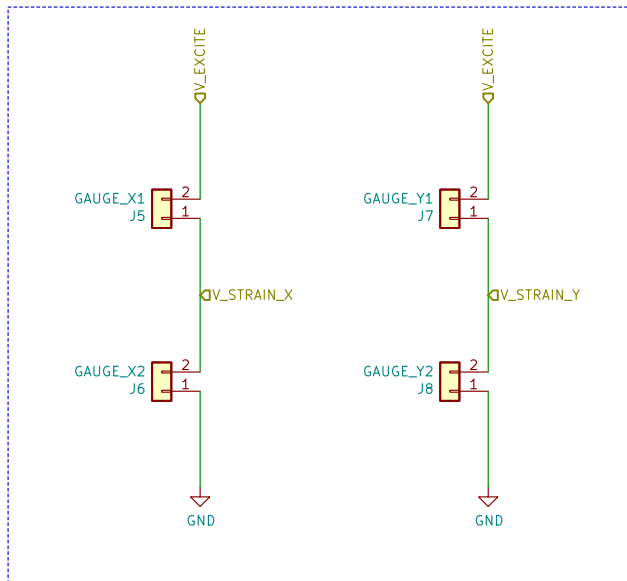


Connector to use as i2c peripheral to external microcontroller

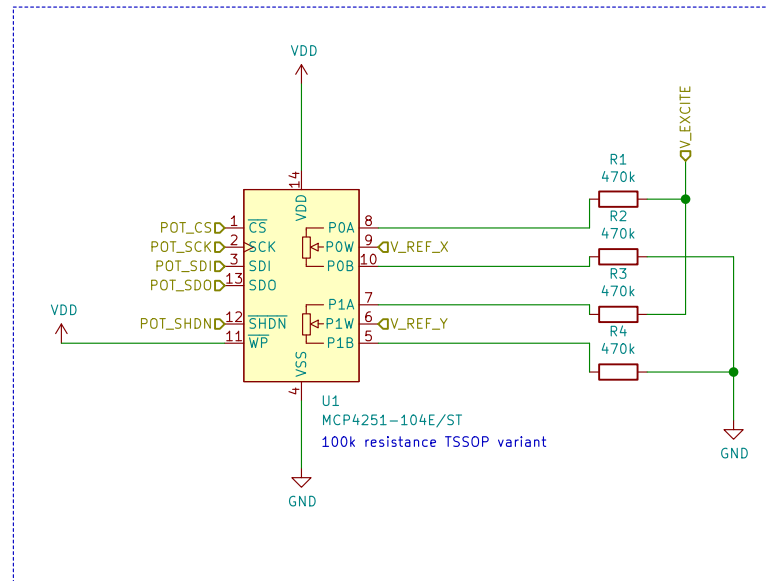


Sheet: /		Date:	
File: pointing-stick.sch		Rev:	
Size: A4	KiCad E.D.A. kicad 5.1.9	Id: 1/5	

Strain gauge voltage dividers for X and Y axes
 When GAUGE_X1's resistance increases, GAUGE_X2's decreases
 This doubles the V_STRAIN_X change compared to using just one gauge



Use digital potentiometer to generate reference voltages for strain gauges
 Channel 0 is X axis, channel 1 is Y axis
 With these resistors, V_REF_(X|Y) is between 1.128 and 1.368 V



Sheet: /Strain gauges/
 File: Strain.sch

Title:

Size: A4

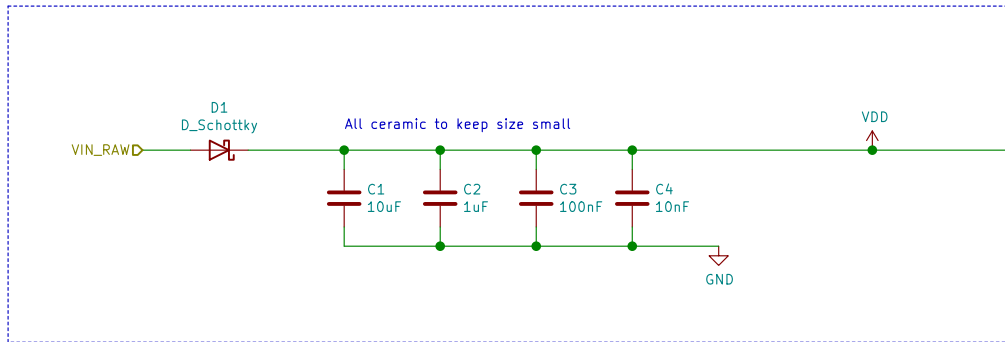
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KiCad E.D.A. kicad 5.1.9

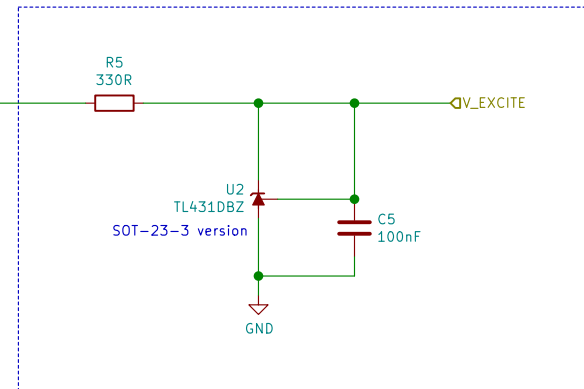
Rev:

Id: 2/5

Smoothing capacitors for power input
VIN_RAW should be 5V
3.3 might work but gain may need adjustment



Create V_EXCITE (2.5V) from VDD
Using TL431 in fixed zener mode



Making VDD and V_EXCITE from input voltage

George Bryant

Sheet: /Power/

File: Power.sch

Title: Power

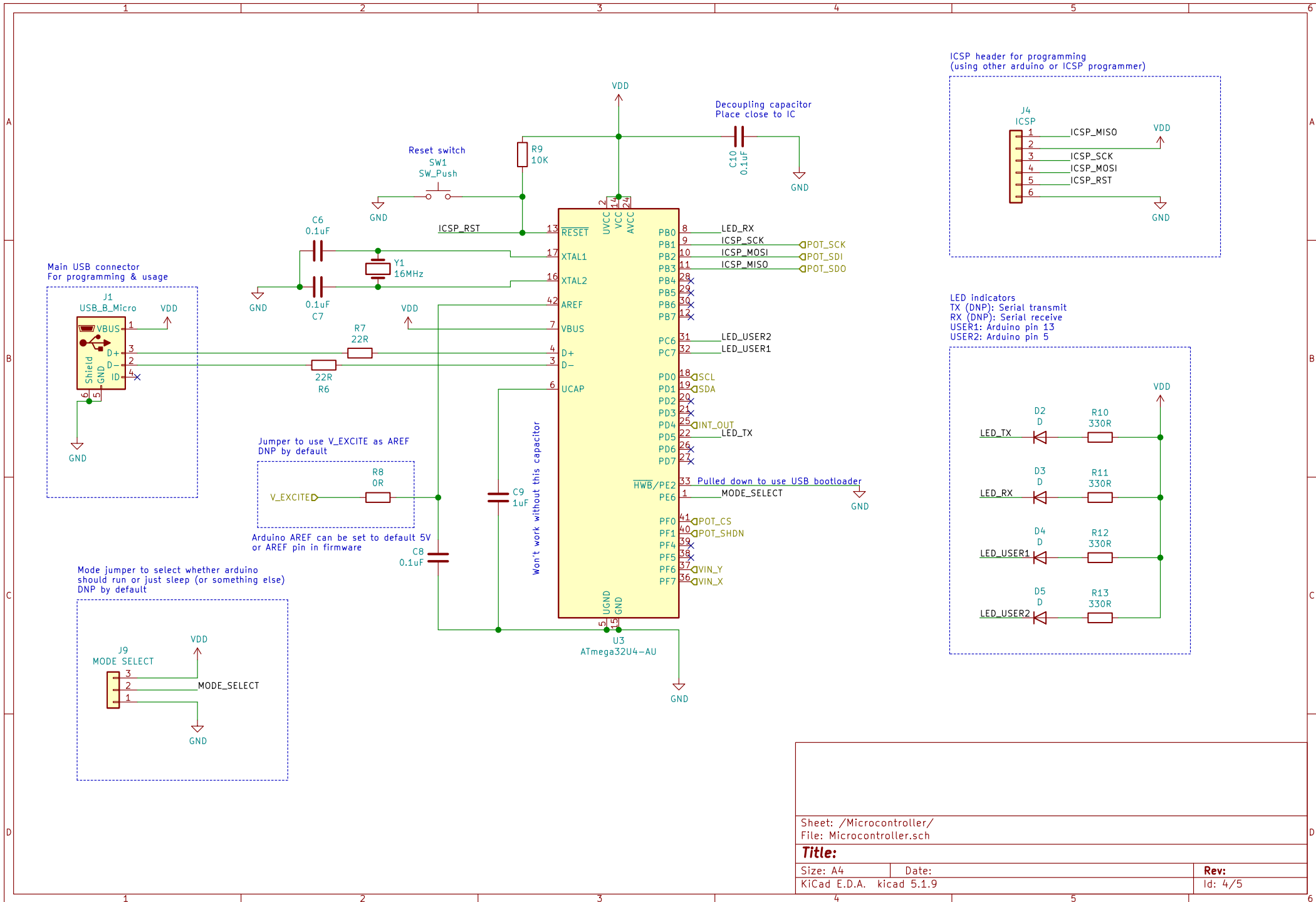
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KiCad E.D.A. kicad 5.1.9

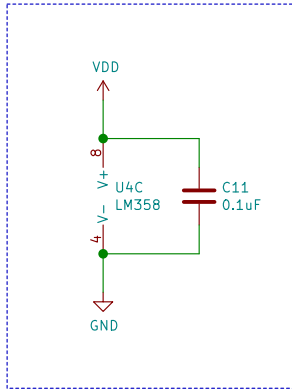
Rev:

Id: 3/5

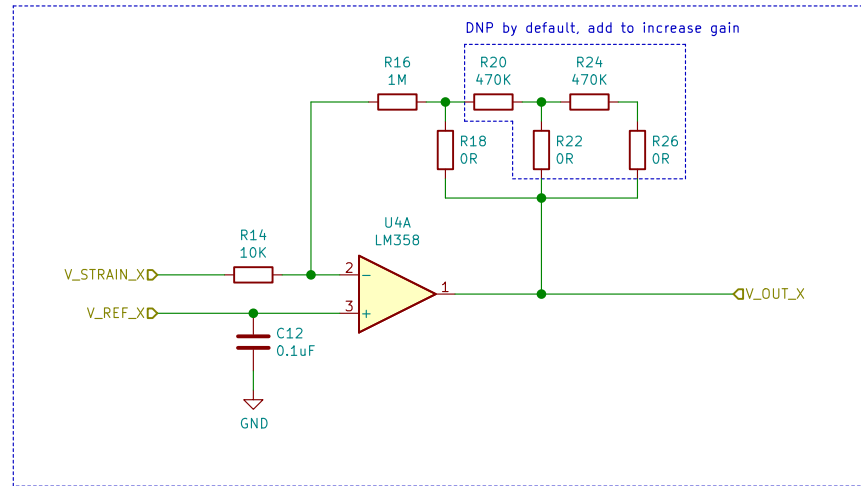


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Size: A4	Date:
KiCad E.D.A. kicad 5.1.9	Rev: 4/5

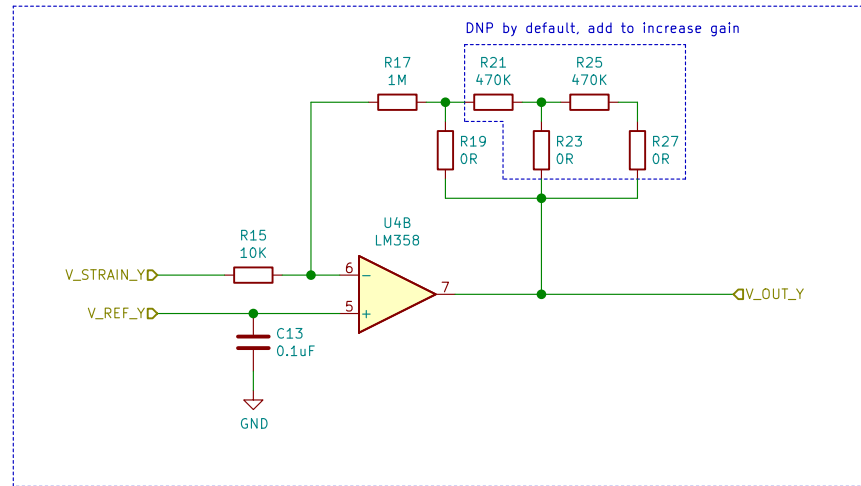
Power + decoupling
for LM358 dual op-amp



X-axis amplification
100-200x gain depending on where 0R jumper is
Amplifies difference between strain gauge and reference



Y-axis amplification
100-200x gain depending on where 0R jumper is
Amplifies difference between strain gauge and reference



Sheet: /Amplification/
File: Amplification.sch

Title:

Size: A4
KiCad E.D.A. kicad 5.1.9

Date:

Rev:
Id: 5/5