

Sheet: /dac_gp1/howland_ipump/
File: howland_ipump.sch

Title:

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Date:

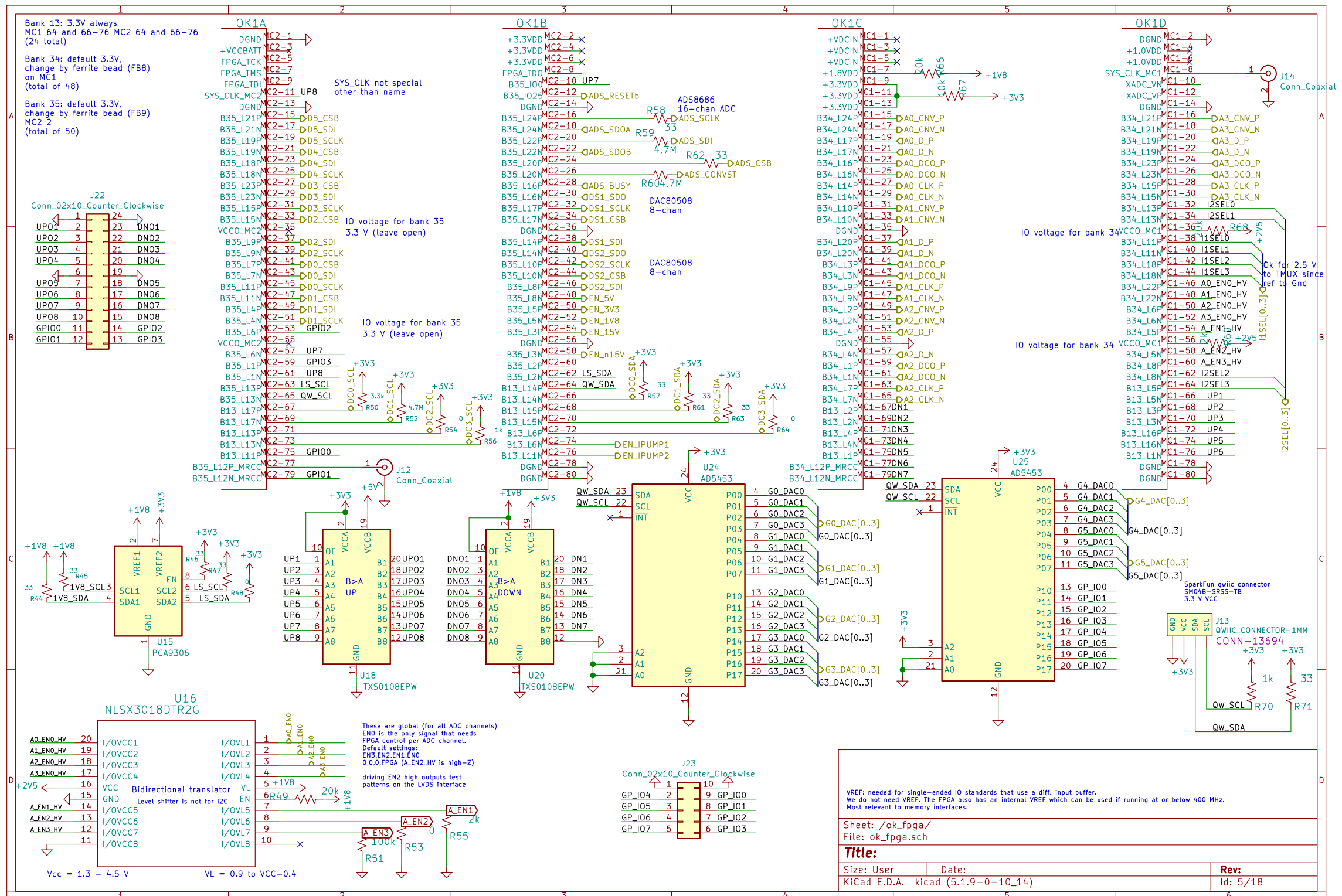
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What is VCCBATT?

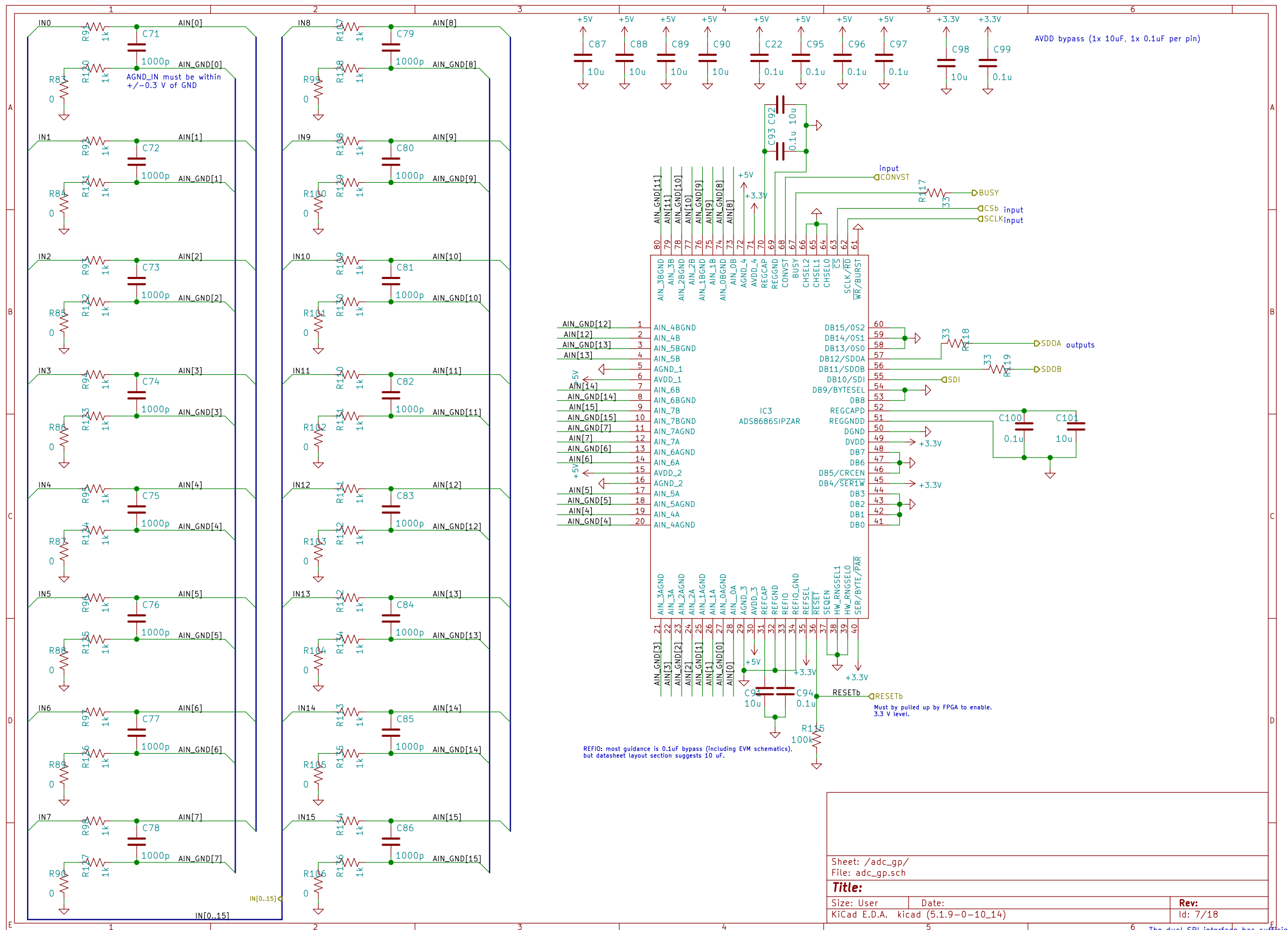
Do a check of skew matching between DCO and D for high-speed ADC



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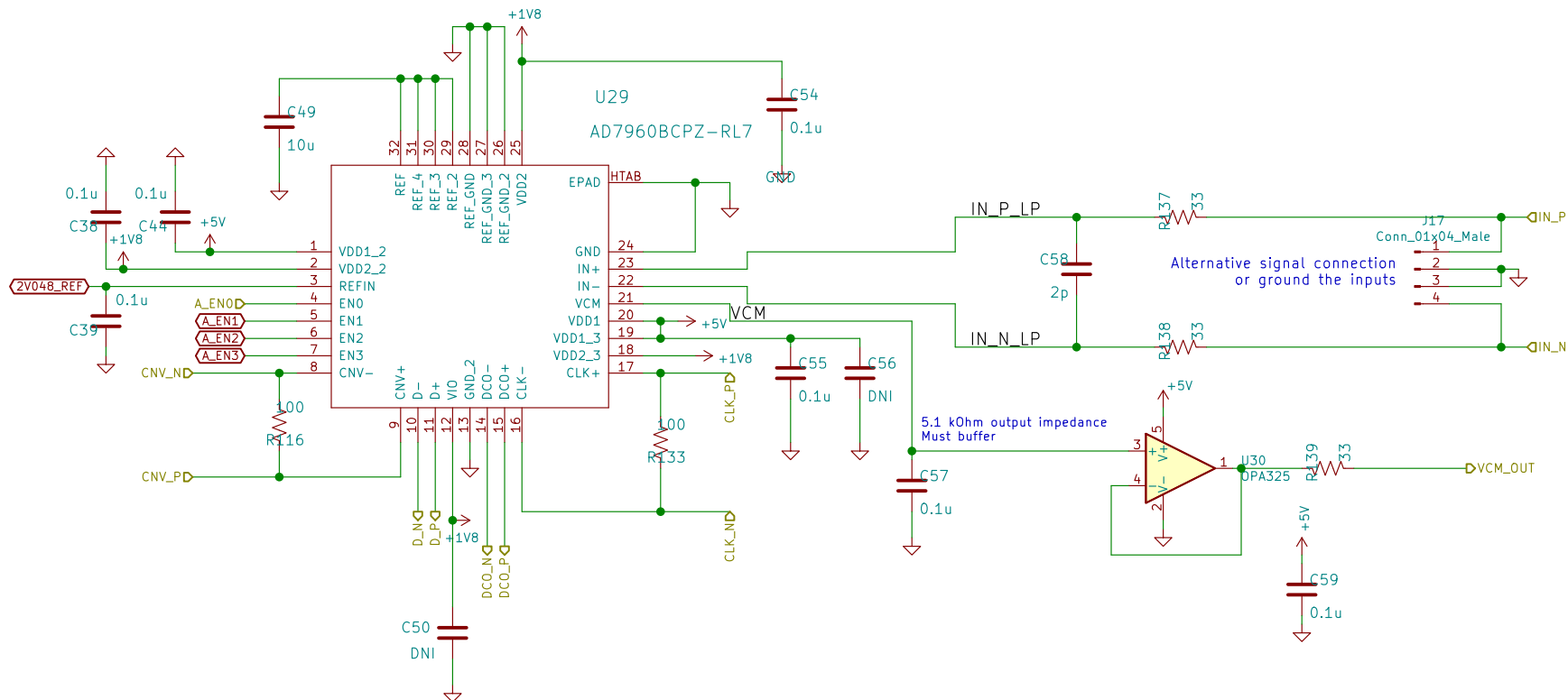
AIN_GND[12]	1	AIN_4BGND
AIN[12]	2	AIN_4B
AIN_GND[13]	3	AIN_5BGND
AIN[13]	4	AIN_5B
AIN[14]	5	AGND_1
AIN_GND[14]	6	AVDD_1
AIN[15]	7	AIN_6B
AIN_GND[15]	8	AIN_6BGND
AIN[15]	9	AIN_7B
AIN_GND[15]	10	AIN_7BGND
AIN_GND[7]	11	AIN_7AGND
AIN[7]	12	AIN_7A
AIN_GND[6]	13	AIN_6AGND
AIN[6]	14	AIN_6A
AIN[5]	15	AVDD_2
AIN_GND[5]	16	AGND_2
AIN[4]	17	AIN_5A
AIN_GND[4]	18	AIN_5AGND
AIN[4]	19	AIN_4A
AIN_GND[4]	20	AIN_4AGND

REFIO: most guidance is 0.1uF bypass (including EVM schematics), but datasheet layout section suggests 10 uF.

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The dual SPI interface has sufficient BW to clock the data out at the 1 MSPS (just need 16 MHz clock rate)

Use internal buffer (x2) with 2.048V ref.
 "External reference of 2.048 V applied to the REFIN pin
 (high impedance input). The on-chip buffer gains this by 2
 and drives the REF pin with 4.096 V"
 EN3=X, EN2=0, EN1=0, EN0=1 (28 MHz BW)
 EN3=X, EN2=1, EN1=0, EN0=1 (9 MHz BW, use this BW only when the throughput is 2 MSPS or lower)
 VDD2 and VIO can come from the same supply.
 But route and decouple separately.



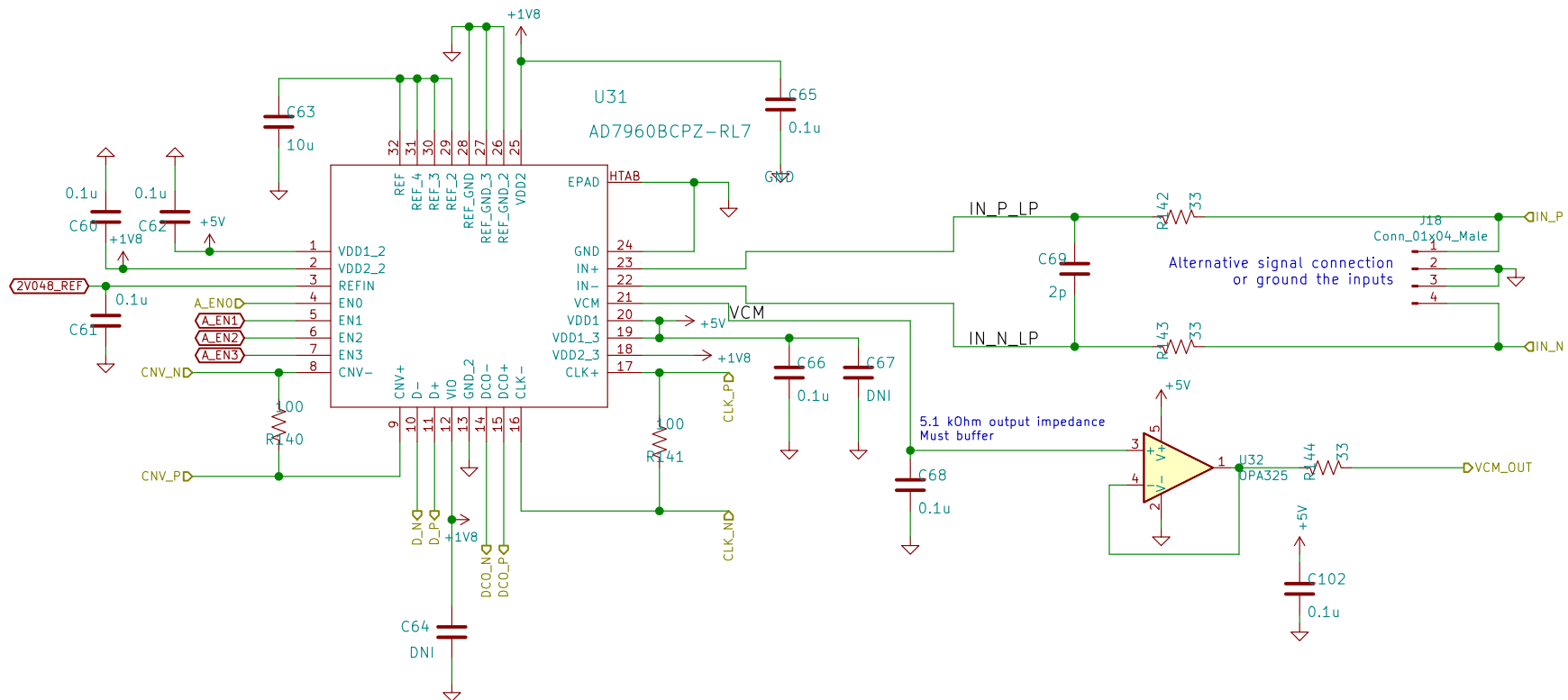
Sheet: /adc0/
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 KiCad E.D.A. kicad (5.1.9-0-10_14)

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Use internal buffer (x2) with 2.048V ref.
 "External reference of 2.048 V applied to the REFIN pin
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 EN3=X, EN2=1, EN1=0, EN0=1 (9 MHz BW, use this BW only when the throughput is 2 MSPS or lower)
 VDD2 and VIO can come from the same supply.
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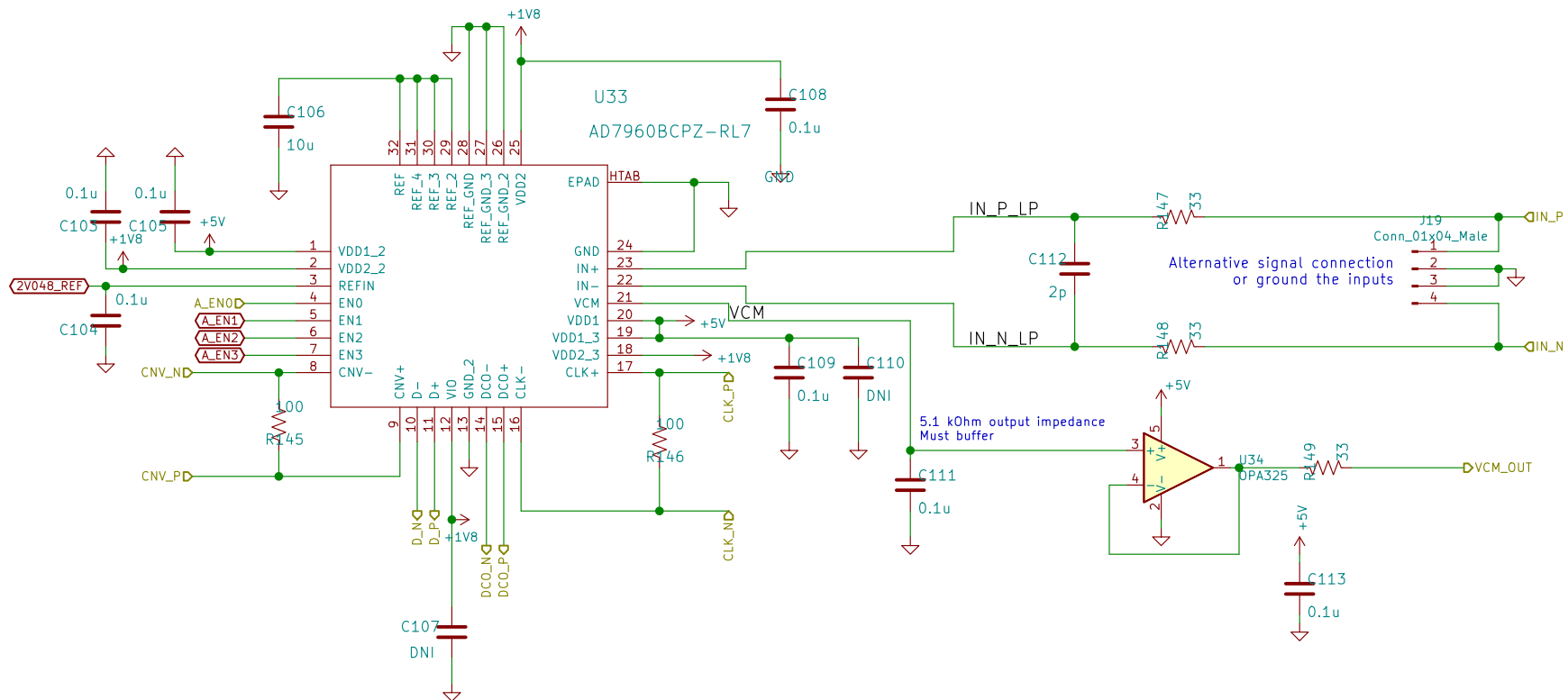
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Use internal buffer (x2) with 2.048V ref.
 "External reference of 2.048 V applied to the REFIN pin
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 and drives the REF pin with 4.096 V"
 EN3=X, EN2=0, EN1=0, EN0=1 (28 MHz BW)
 EN3=X, EN2=1, EN1=0, EN0=1 (9 MHz BW, use this BW only when the throughput is 2 MSPS or lower)
 VDD2 and VIO can come from the same supply.
 But route and decouple separately.

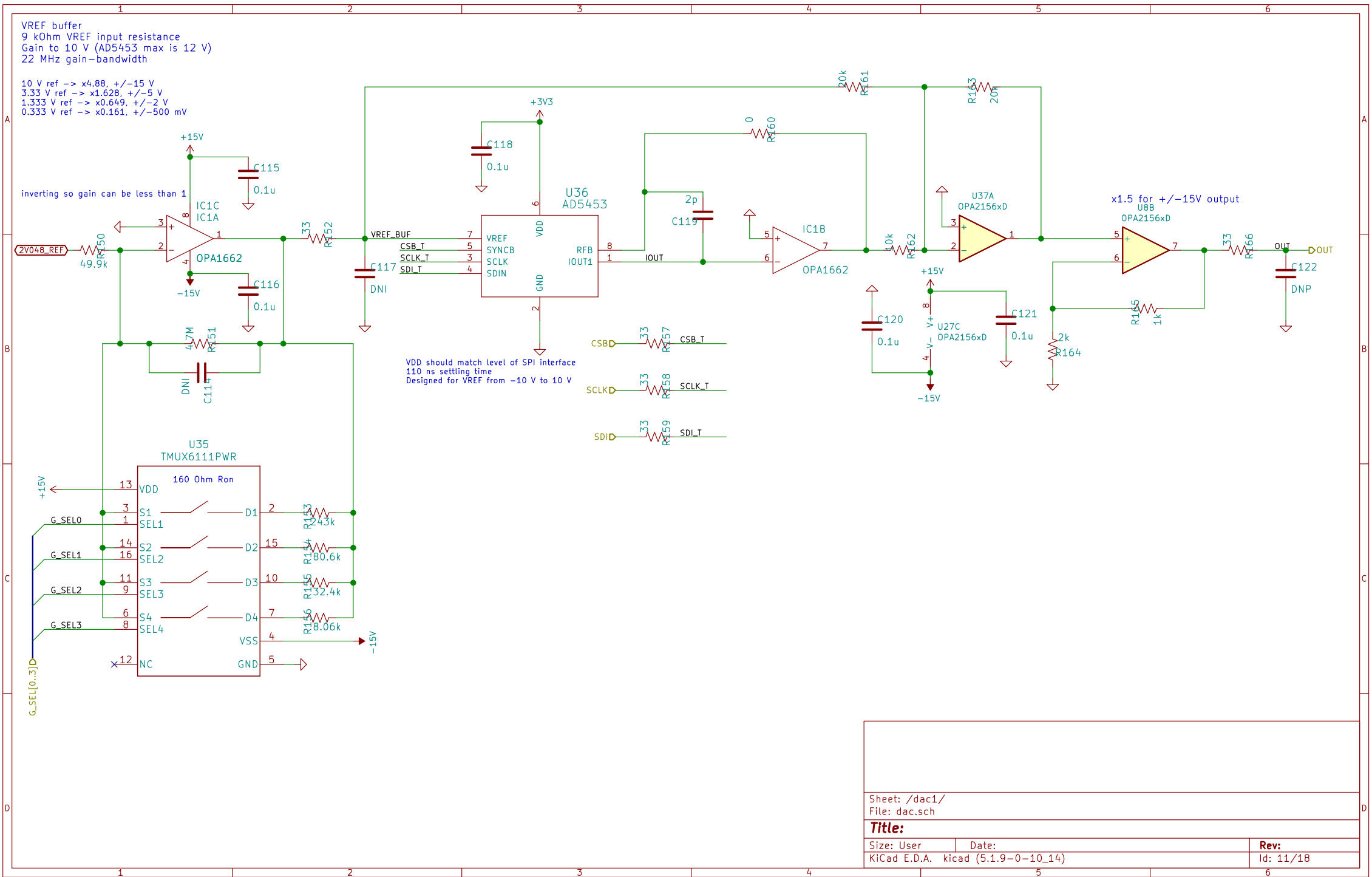


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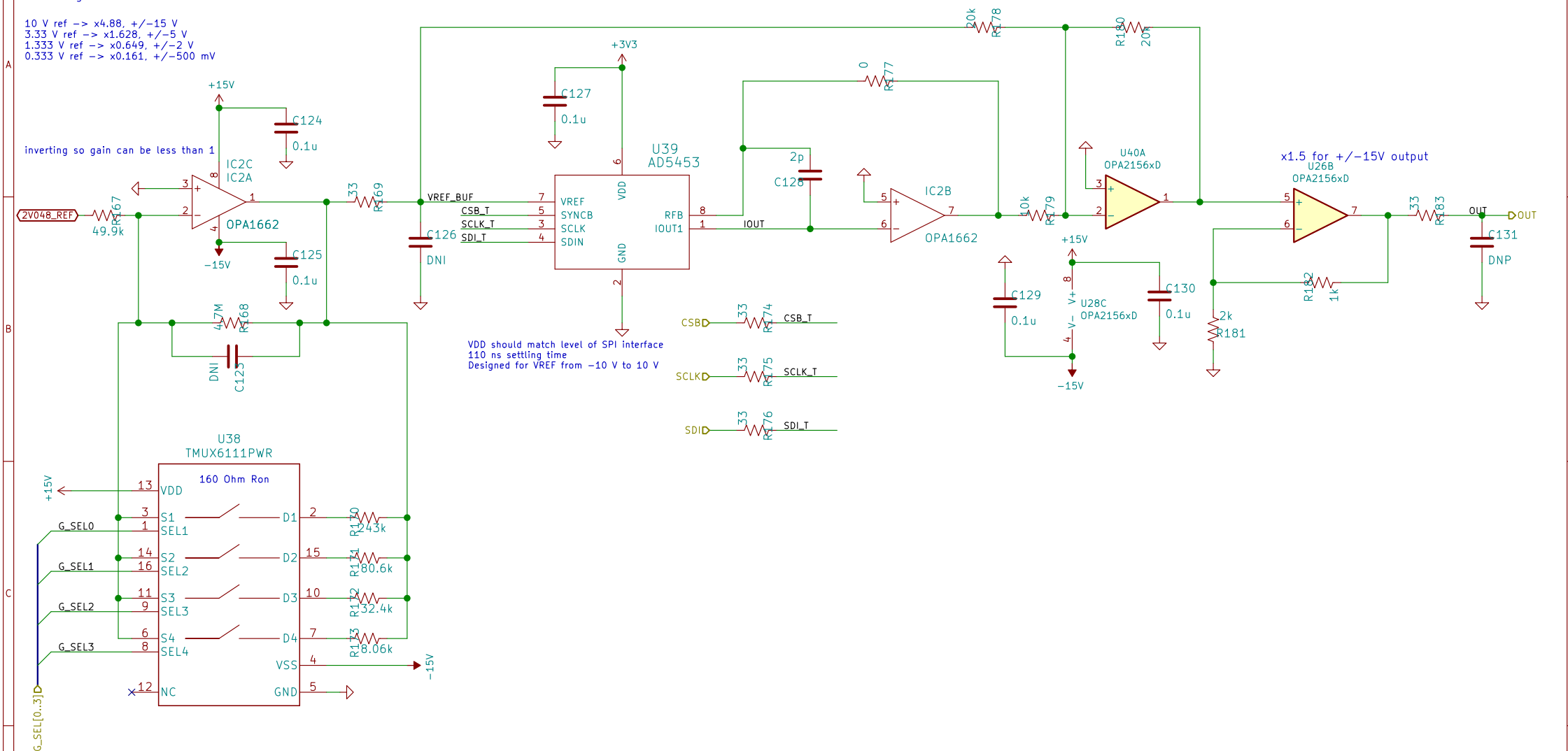
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10 V ref -> x4.88, +/-15 V
3.33 V ref -> x1.628, +/-5 V
1.333 V ref -> x0.649, +/-2 V
0.333 V ref -> x0.161, +/-500 mV

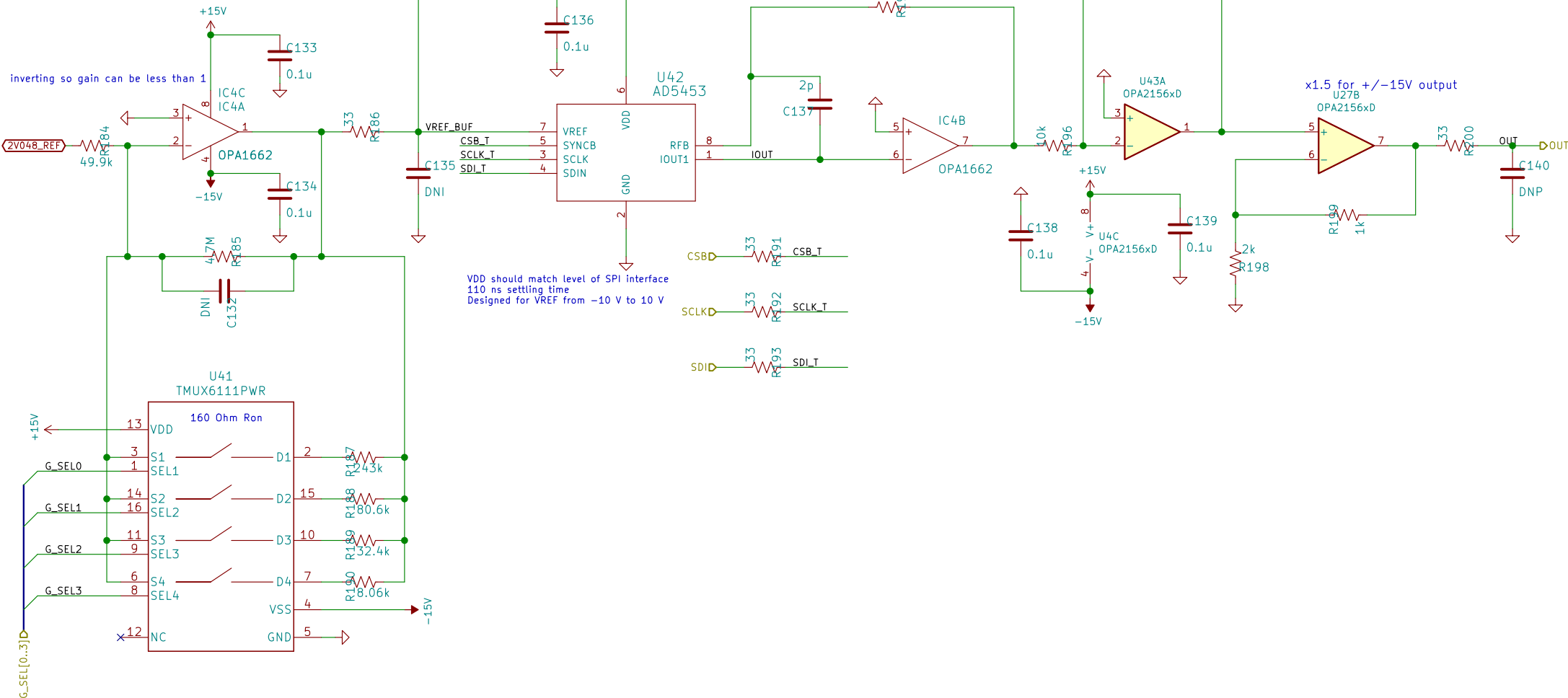
10 V ref -> x4.88, +/-15 V
3.33 V ref -> x1.628, +/-5 V
1.333 V ref -> x0.649, +/-2 V
0.333 V ref -> x0.161, +/-500 mV



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VREF buffer
9 kOhm VREF input resistance
Gain to 10 V (AD5453 max is 12 V)
22 MHz gain-bandwidth

10 V ref -> x4.88, +/-15 V
3.33 V ref -> x1.628, +/-5 V
1.333 V ref -> x0.649, +/-2 V
0.333 V ref -> x0.161, +/-500 mV

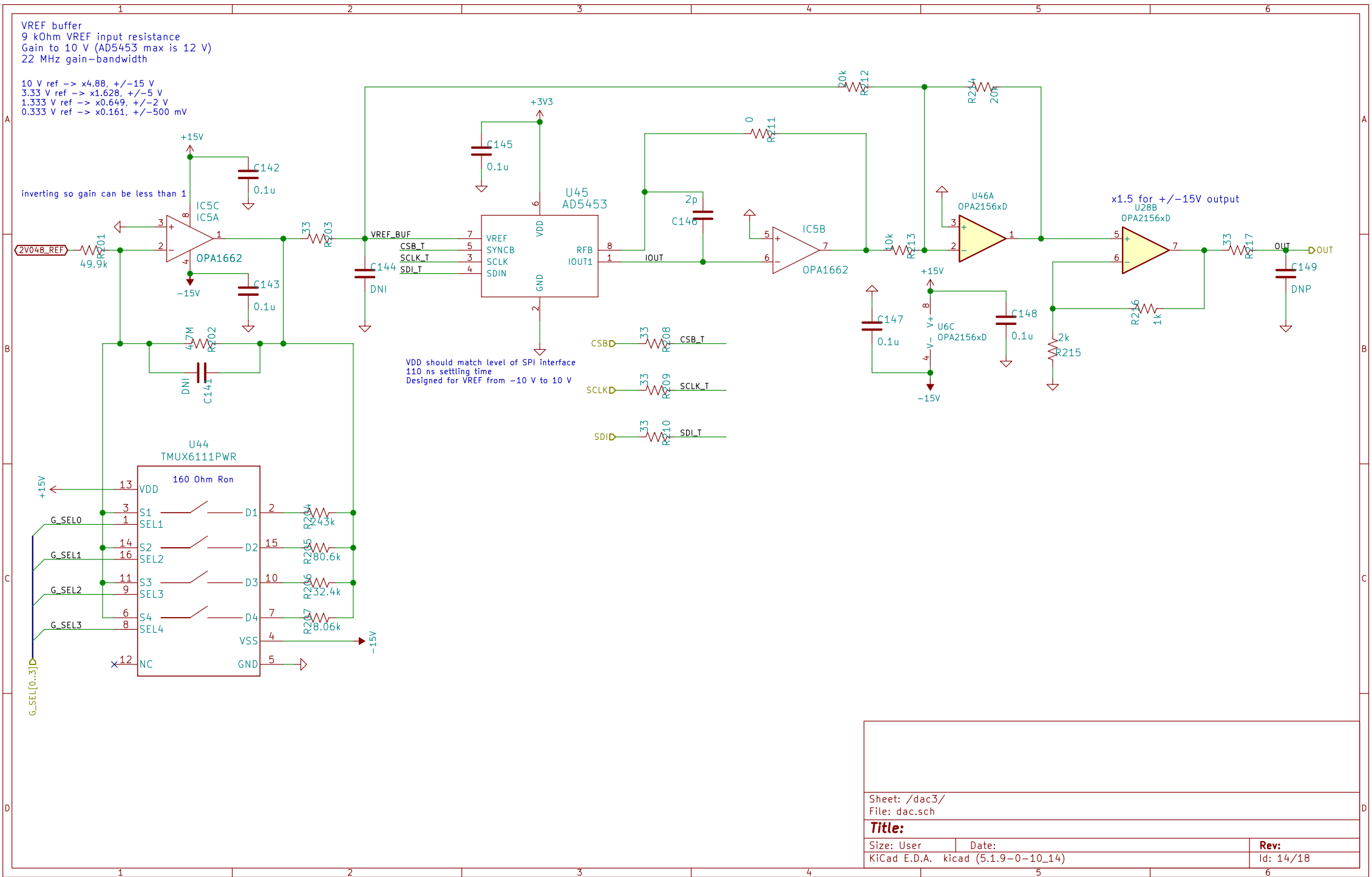


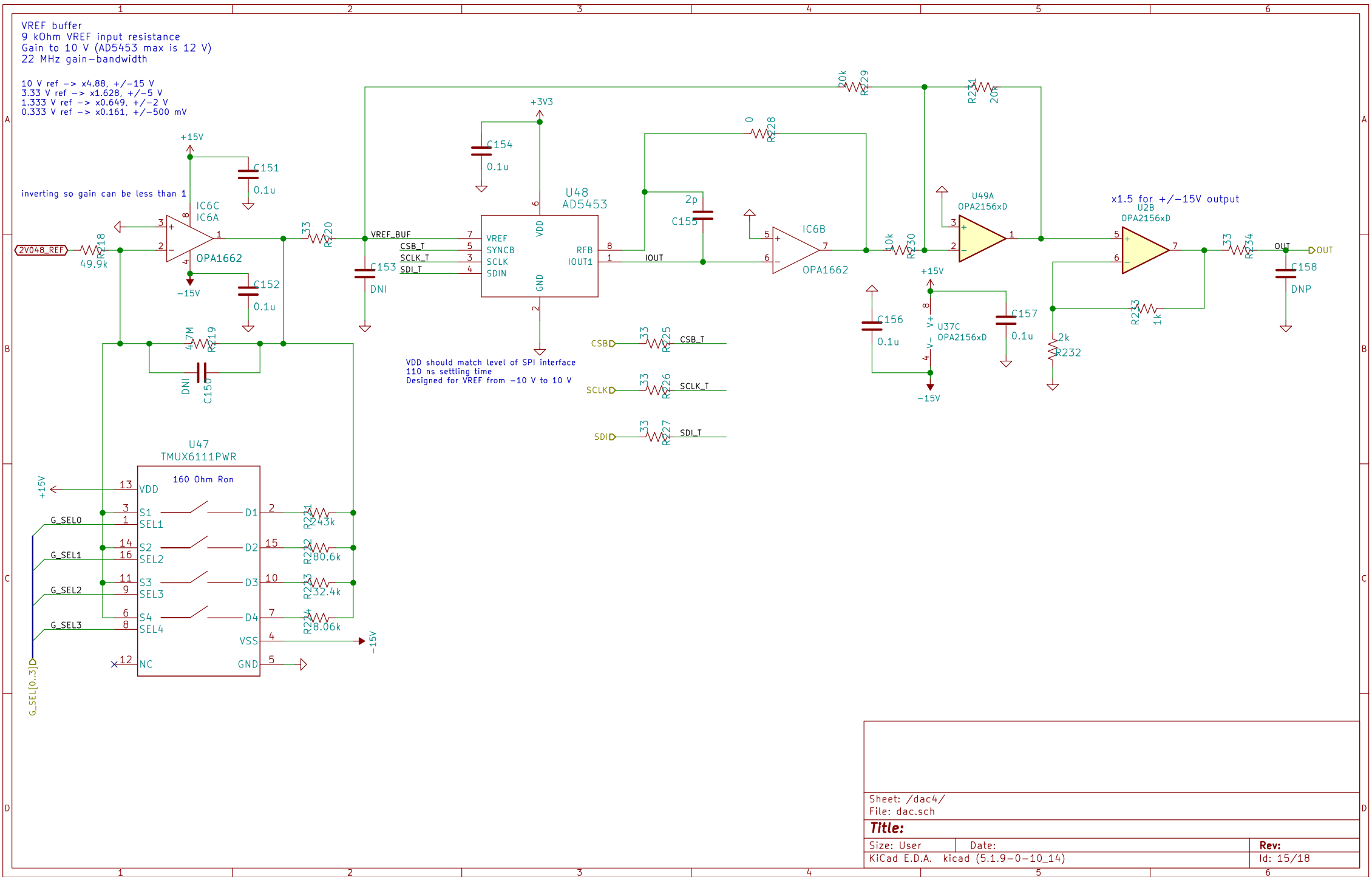
Sheet: /dac2/
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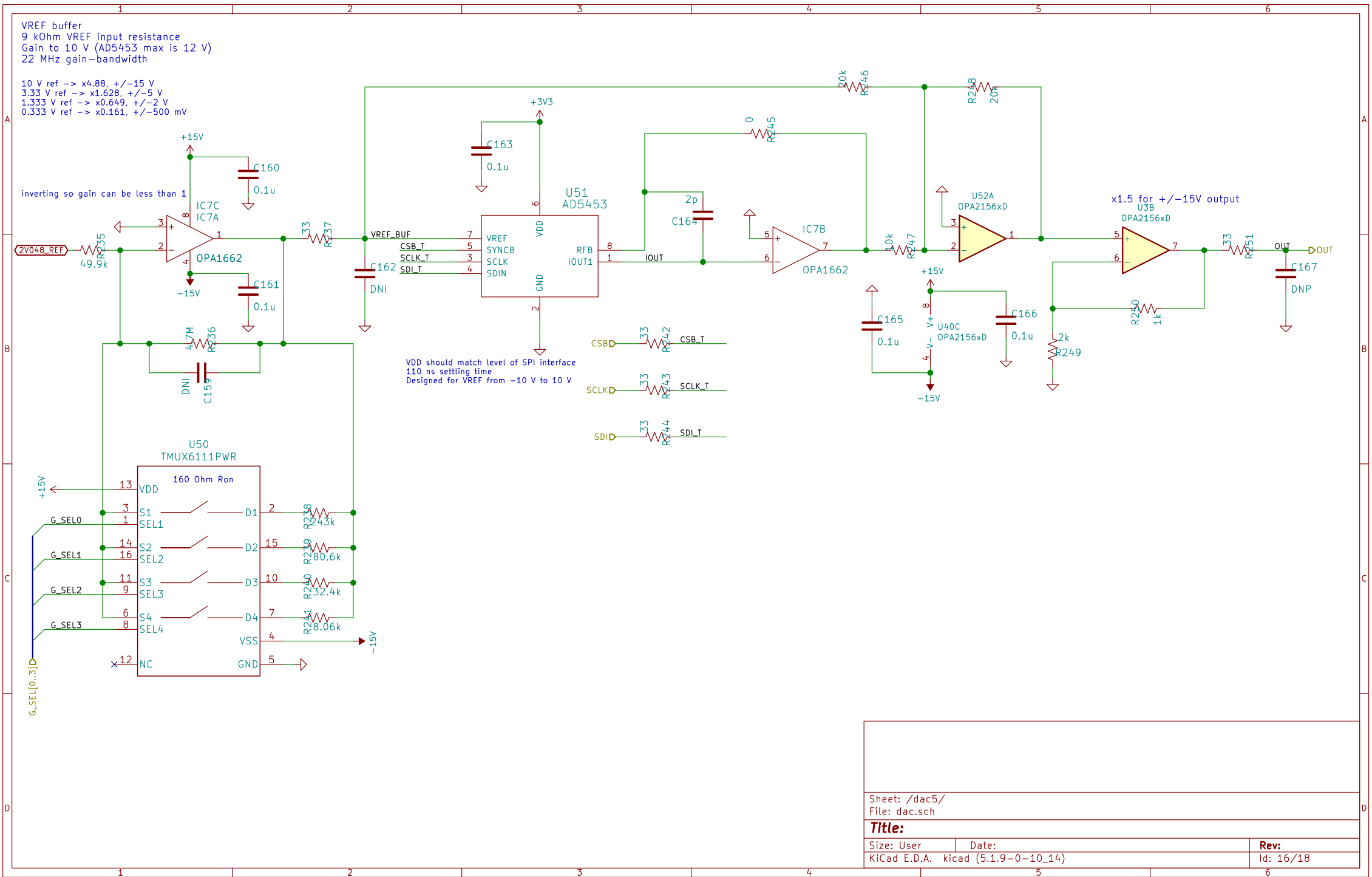
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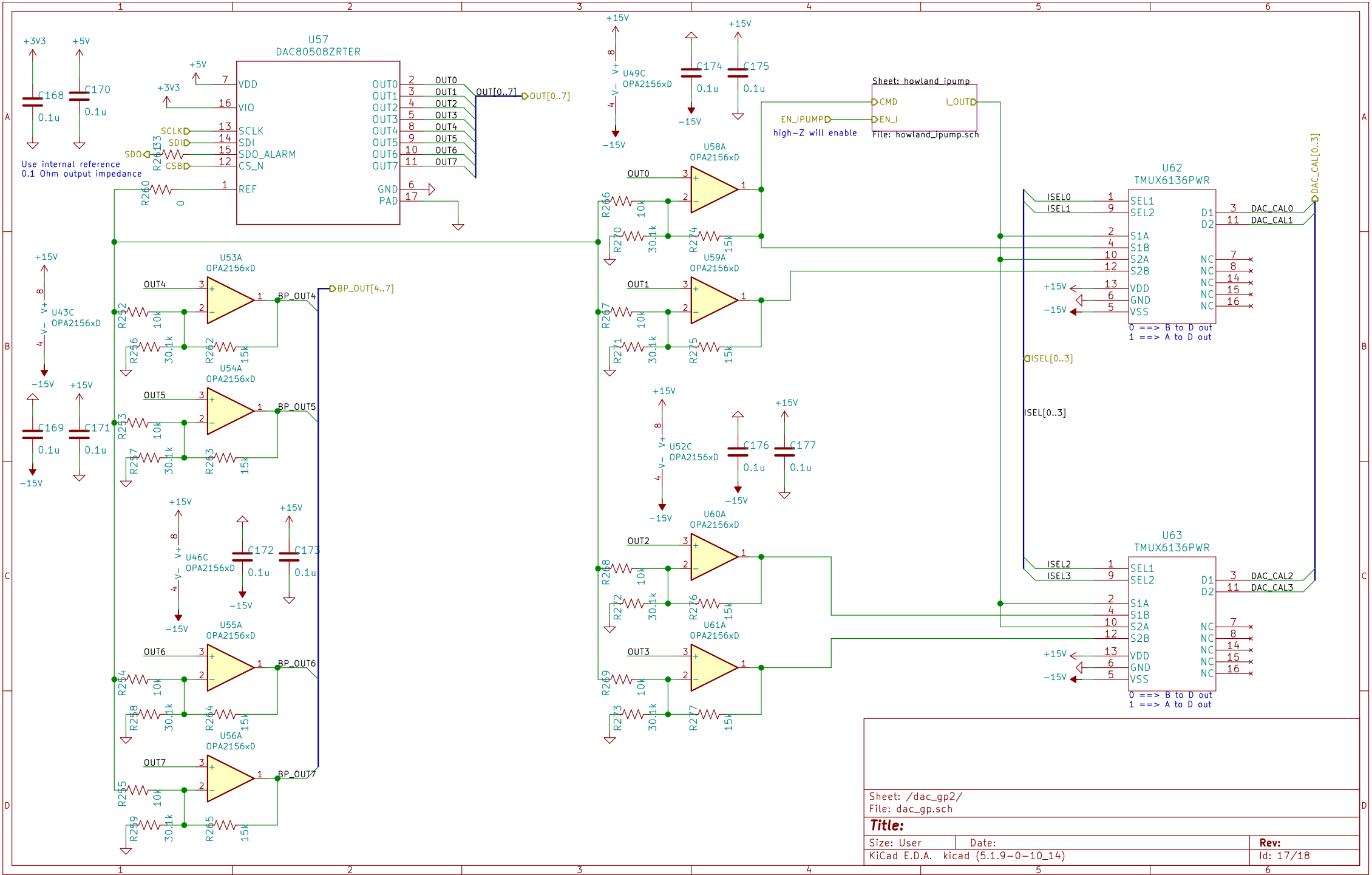
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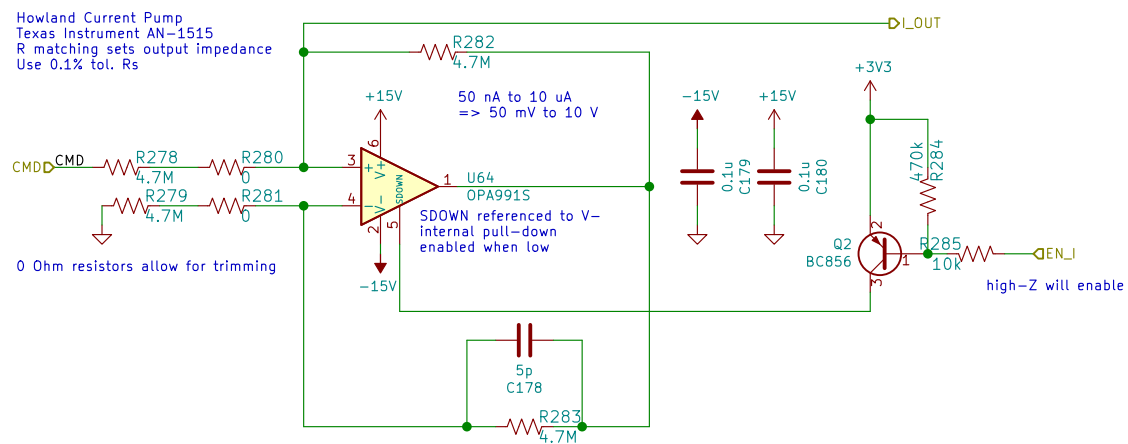








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