

FYDP – ANALOG MATRIX MULTIPLIER

UNIVERSITY OF WATERLOO

BLOCK DIAGRAM

File: Block_Diagram.kicad_sch

USBC RECEPTACLE

File: USBC_Receptacle.kicad_sch

POWER

File: power.kicad_sch

DAC INPUTS

File: DAC_Inputs.kicad_sch

DECODER 1

File: Decoder 1.kicad_sch

DECODER 2

File: Decoder 2.kicad_sch

ANALOG MULTIPLIER 1

File: Analog_Multiplier 1.kicad_sch

ANALOG MULTIPLIER 2

File: Analog_Multiplier 3.kicad_sch

ANALOG MULTIPLIER 3

File: Analog_Multiplier 5.kicad_sch

ANALOG MULTIPLIER 4

File: Analog_Multiplier 7.kicad_sch

ADC

File: ADC.kicad_sch

Sheet: /
File: fydpc.kicad_sch

Title:

Size: A4
KiCad E.D.A. kicad 7.0.7

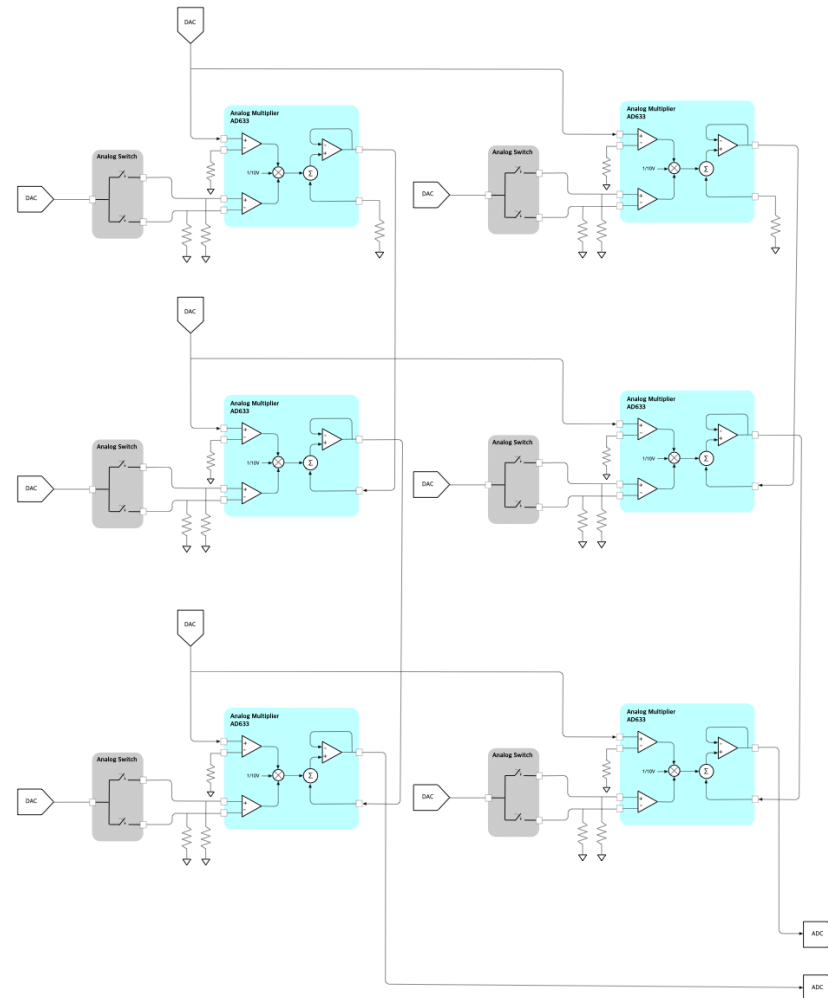
Date:

Rev:

Id: 1/12

BLOCK DIAGRAM

BASIC BLOCK DIAGRAM FOR A 3X2 MATRIX.
THIS PROJECT USES THE SAME IDEA AS THIS BLOCK DIAGRAM BUT EXPANDS IT TO A 4X4 CASE.



Sheet: /BLOCK DIAGRAM/
File: Block_Diagram.kicad_sch

Title:

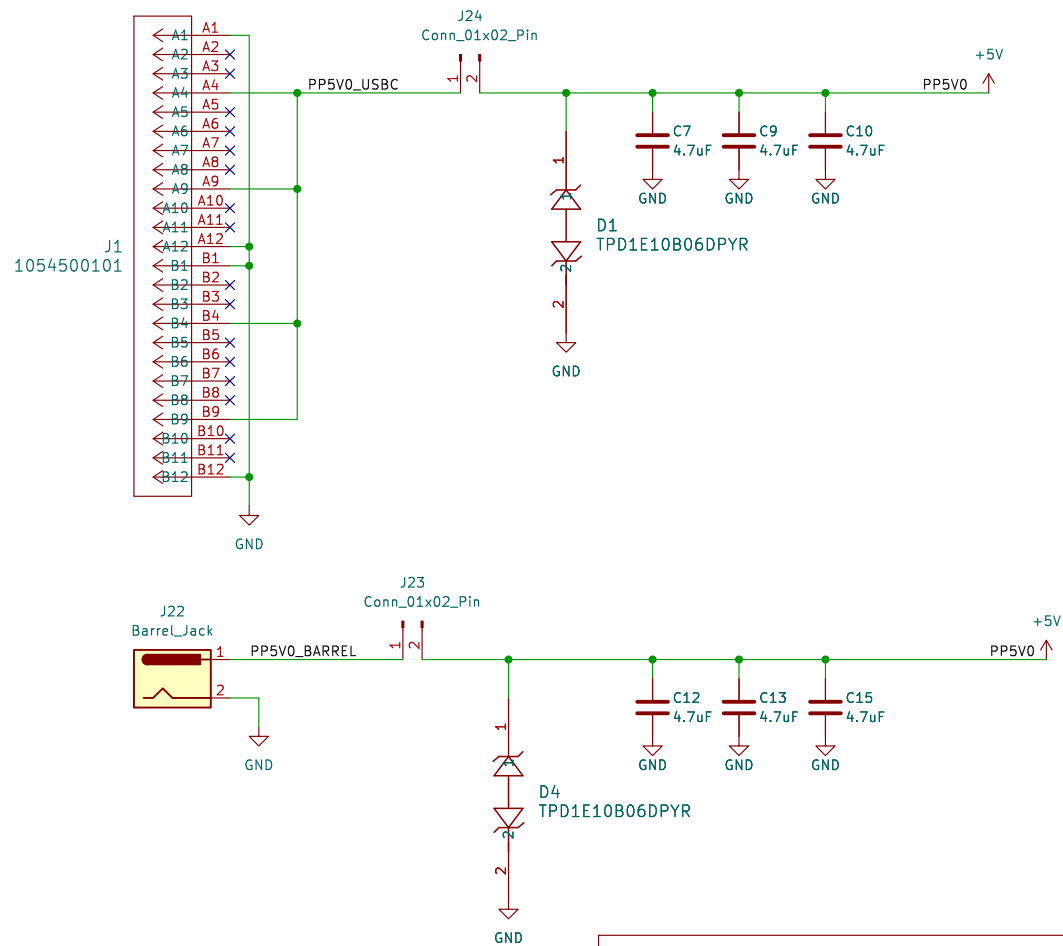
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Date:

Rev:
Id: 2/12

USB C Receptacle

USB C Receptacle



Sheet: /USBC RECEPTACLE/
File: USBC_Receptacle.kicad_sch

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Size: A4

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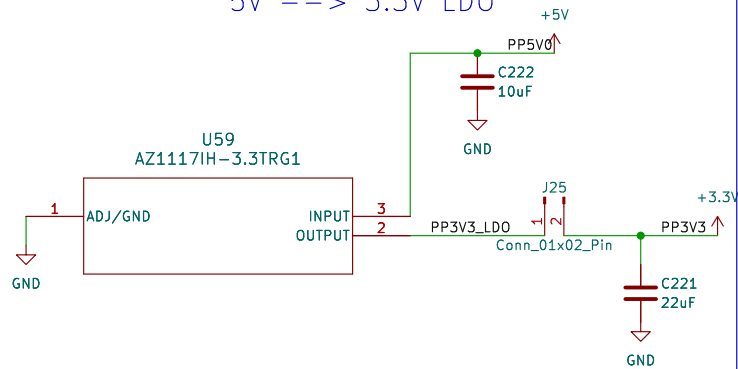
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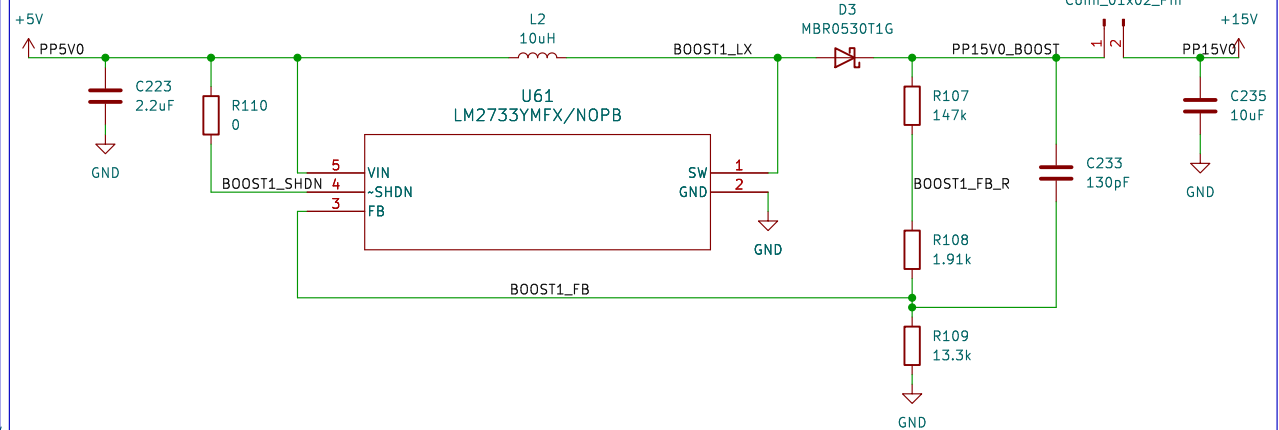
Id: 3/12

POWER

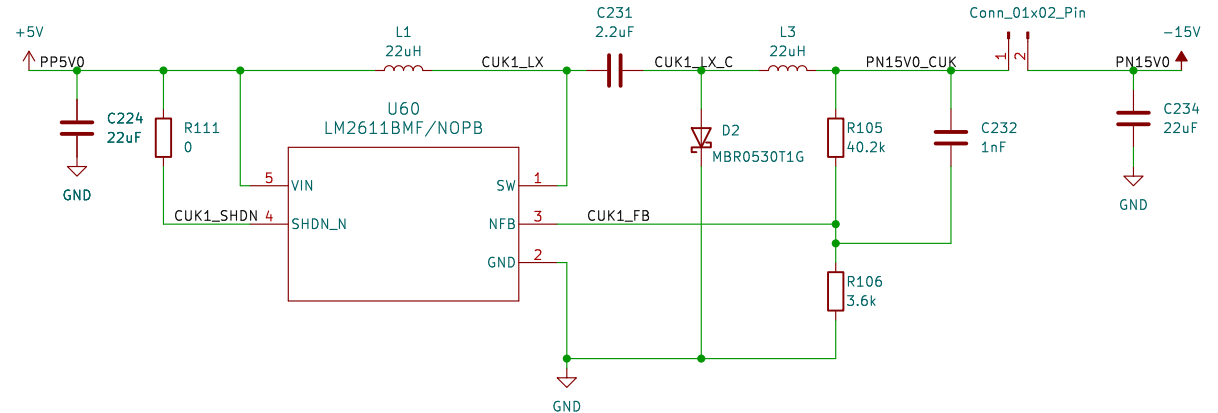
5V --> 3.3V LDO



5V --> 15V Boost Converter



5V --> -15V Cuk Converter



Sheet: /POWER/
File: power.kicad_sch

Title:

Size: A4

Date:

KiCad E.D.A. kicad 7.0.7

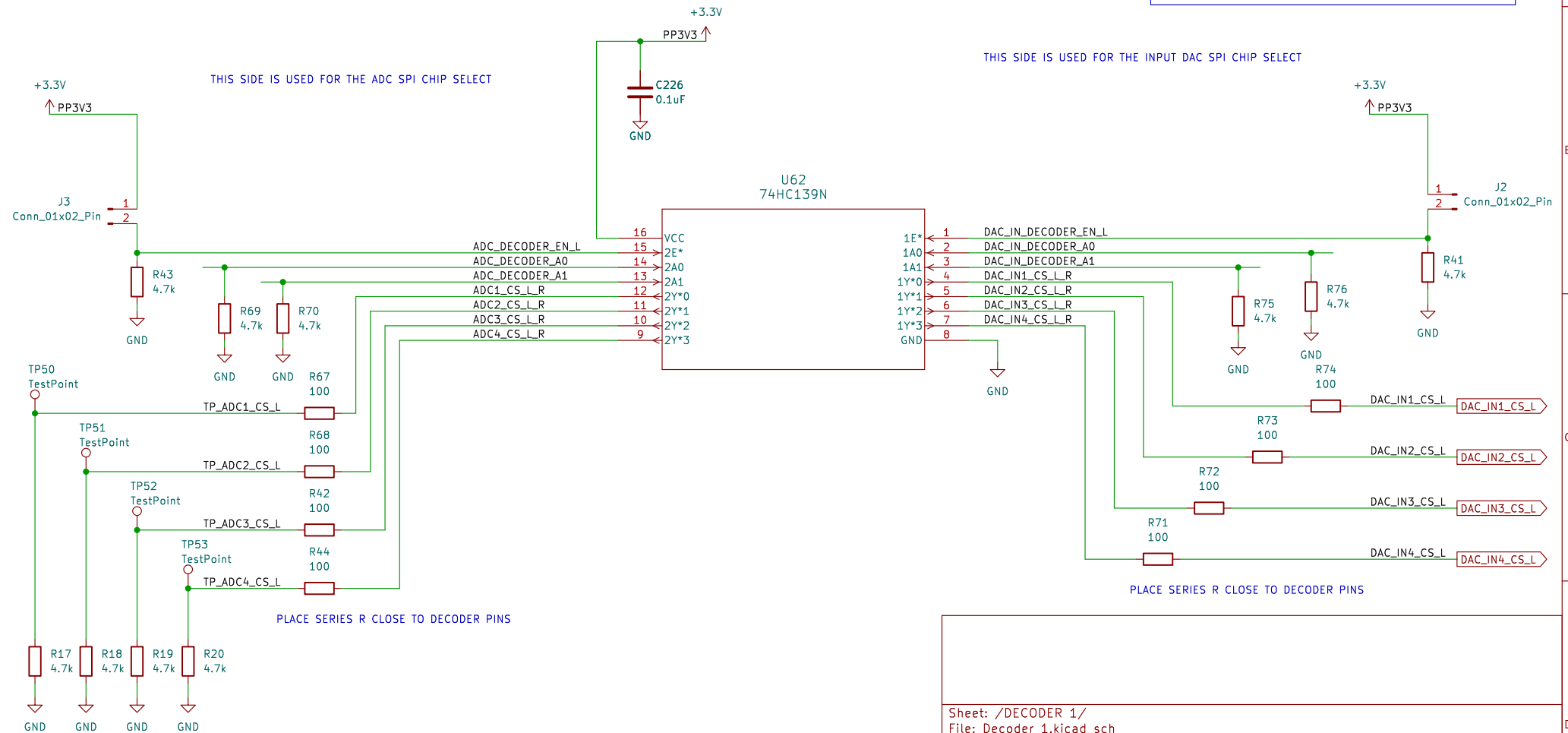
Rev:

Id: 4/12

DAC INPUTS DECODER & ADC OUTPUT DECODER

HEADERS TO FPGA

DAC_IN_DECODER_A0	J7 Conn_01x04_Pin 1
DAC_IN_DECODER_A1	2
ADC_DECODER_A0	3
ADC_DECODER_A1	4



Sheet: /DECODER 1/
File: Decoder 1.kicad_sch

Title:

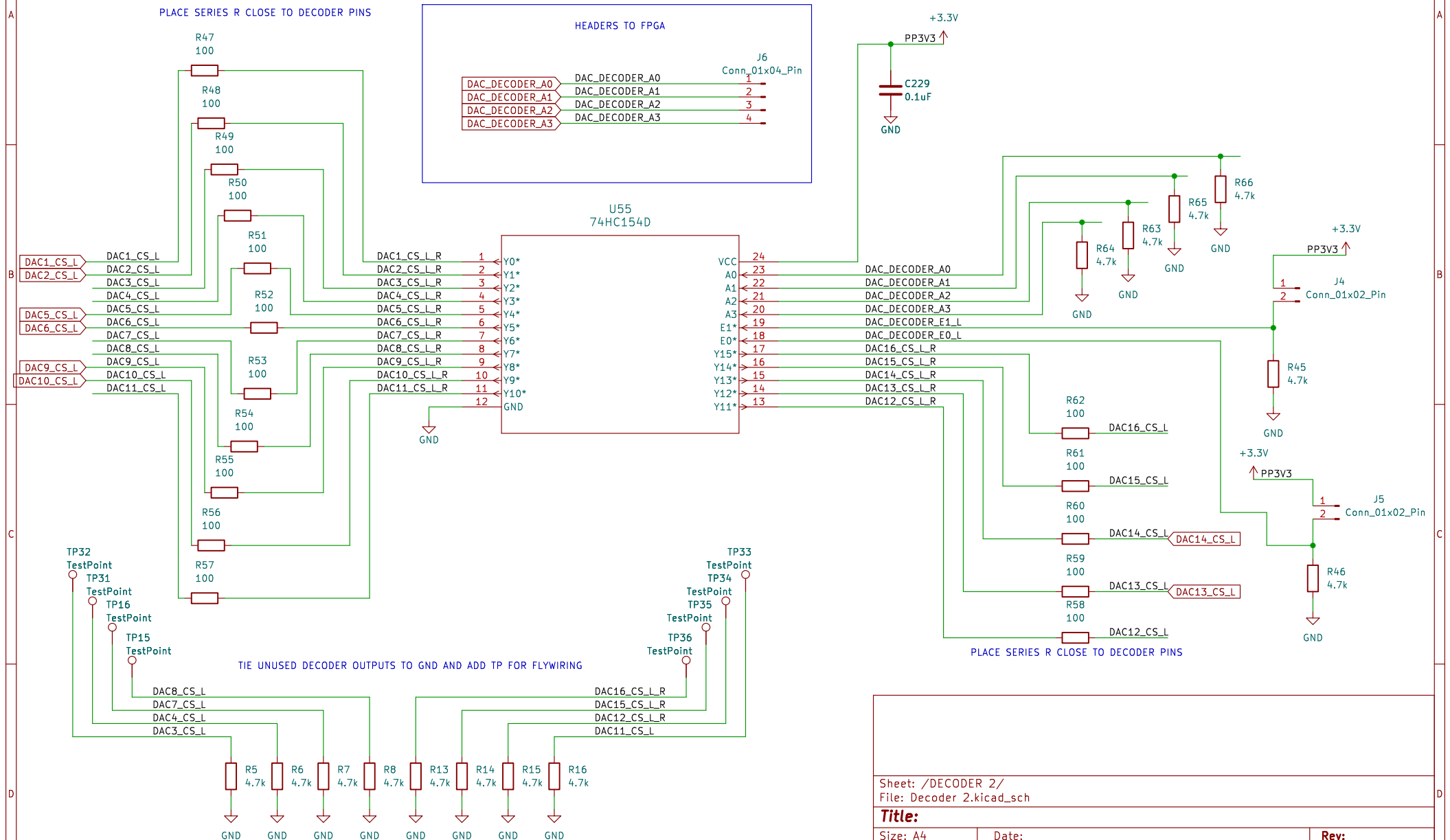
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KiCad E.D.A. kicad 7.0.7

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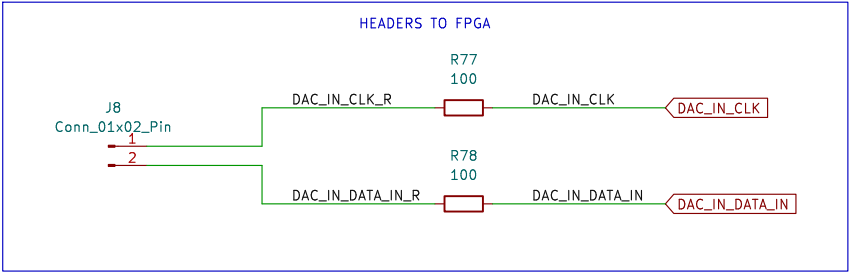
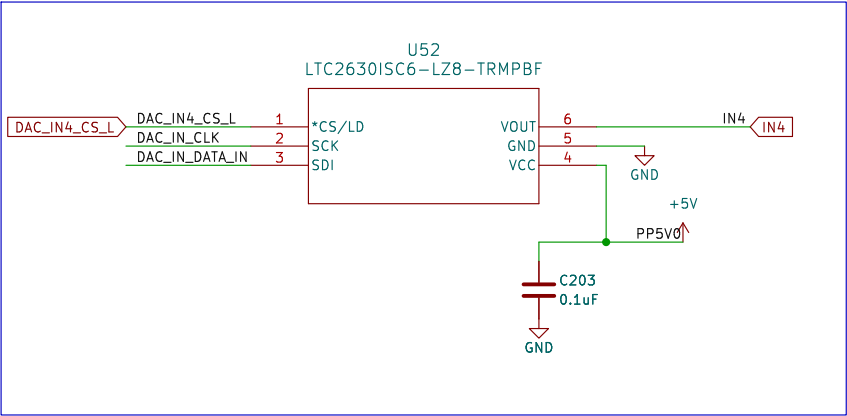
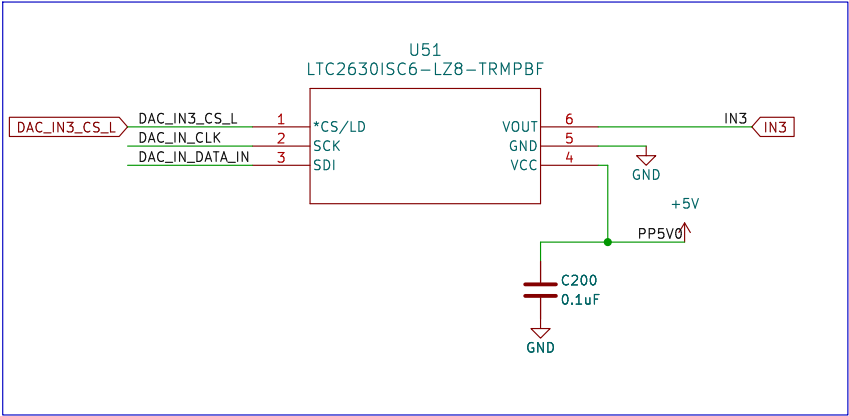
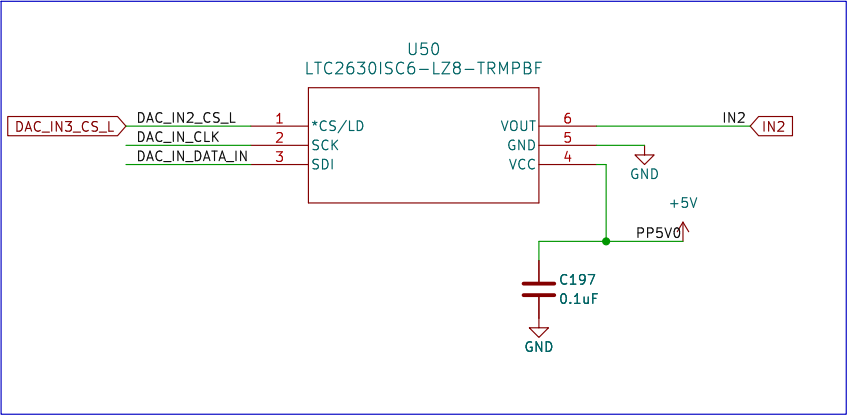
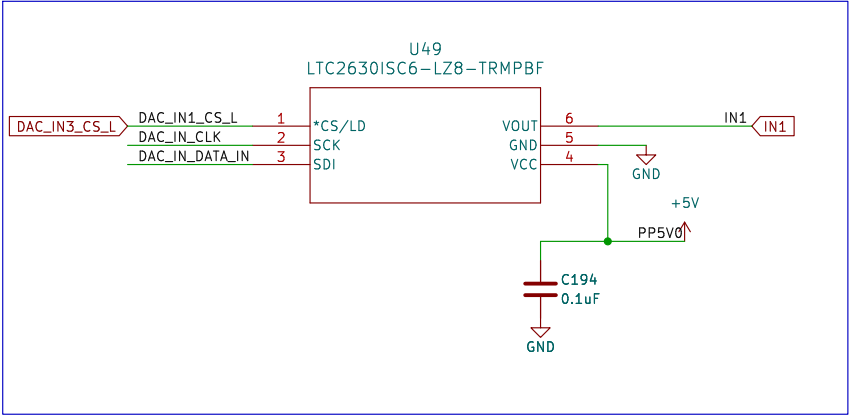
Rev:

Id: 5/12

DAC WEIGHTS DECODER



DAC INPUTS



Sheet: /DAC INPUTS/
File: DAC Inputs.kicad_sch

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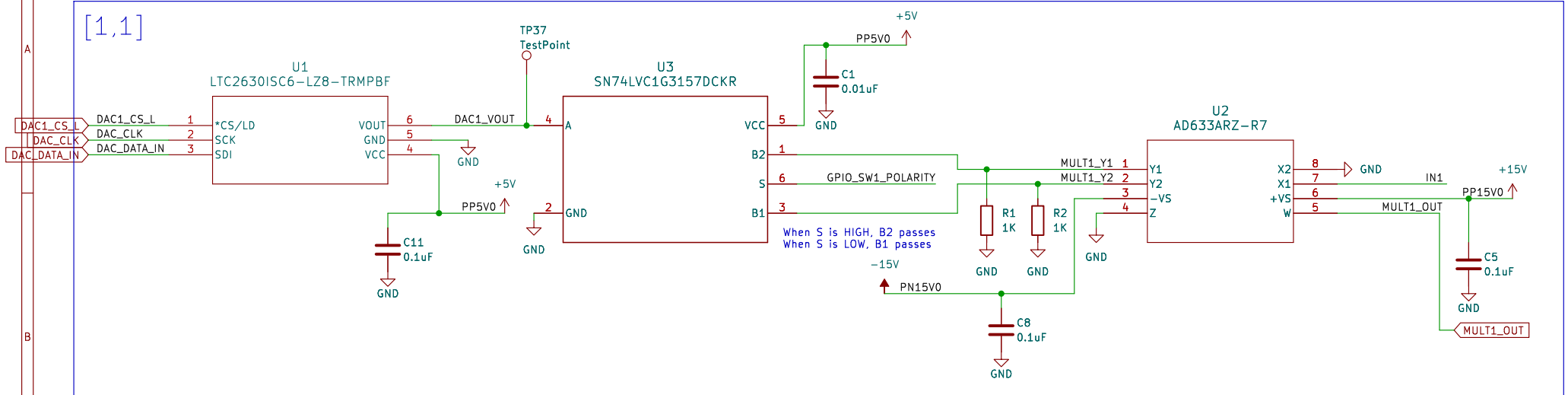
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KiCad E.D.A. kicad 7.0.7

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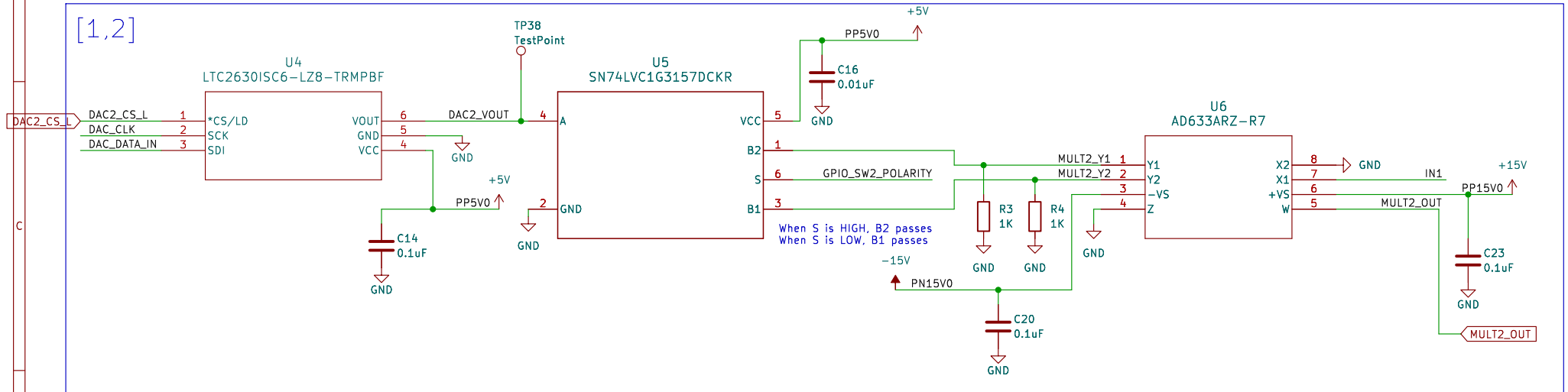
Rev:
Id: 7/12

ANALOG MULTIPLIER (1/8)

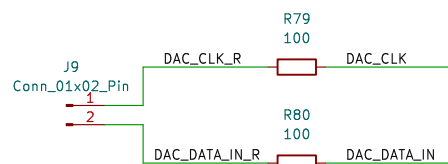
[1.1]



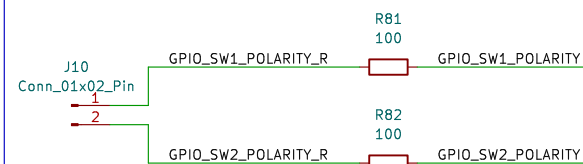
[1.2]



HEADERS TO FPGA



ANALOG SWITCH SELECT GPIO TO FPGA
THESE ARE 5V GPIOs



Sheet: /ANALOG MULTIPLIER 1/
File: Analog Multiplier 1.kicad_sch

Title:

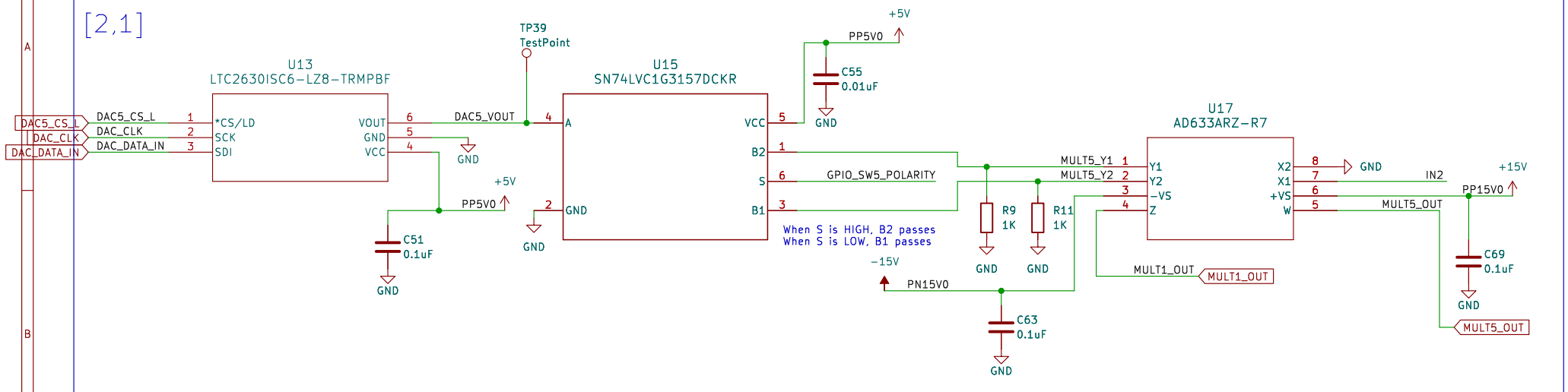
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KiCad E.D.A. kicad 7.0.7

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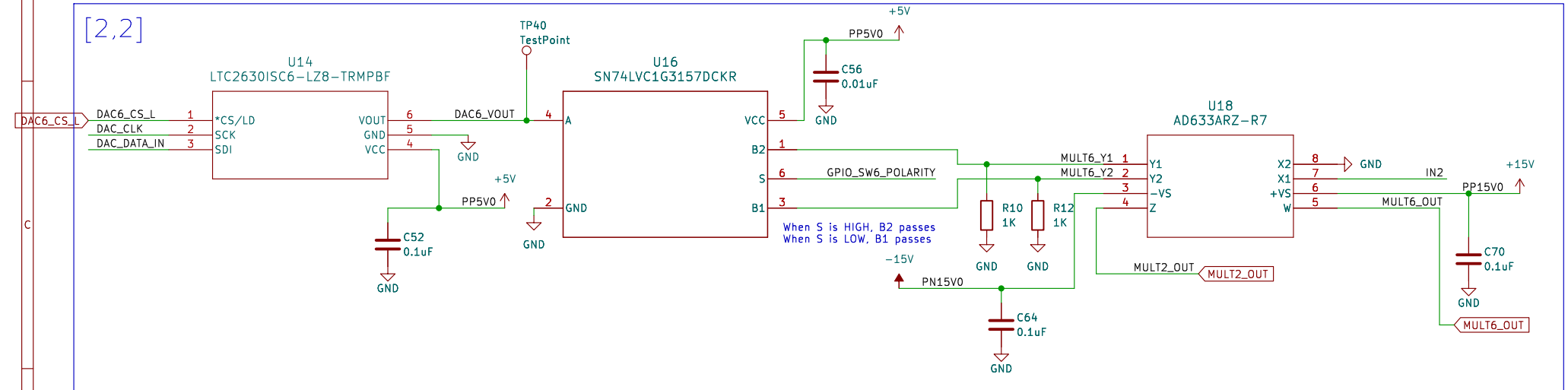
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Id: 8/12

ANALOG MULTIPLIER (3/8)

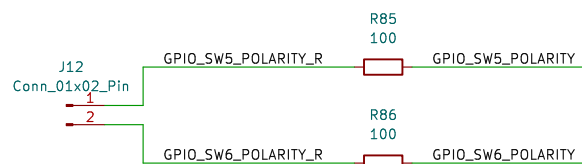
[2.1]



[2.2]



ANALOG SWITCH SELECT GPIO TO FPGA
THESE ARE 5V GPIOs



Sheet: /ANALOG MULTIPLIER 2/
File: Analog Multiplier 3.kicad_sch

Title:

Size: A4

Date:

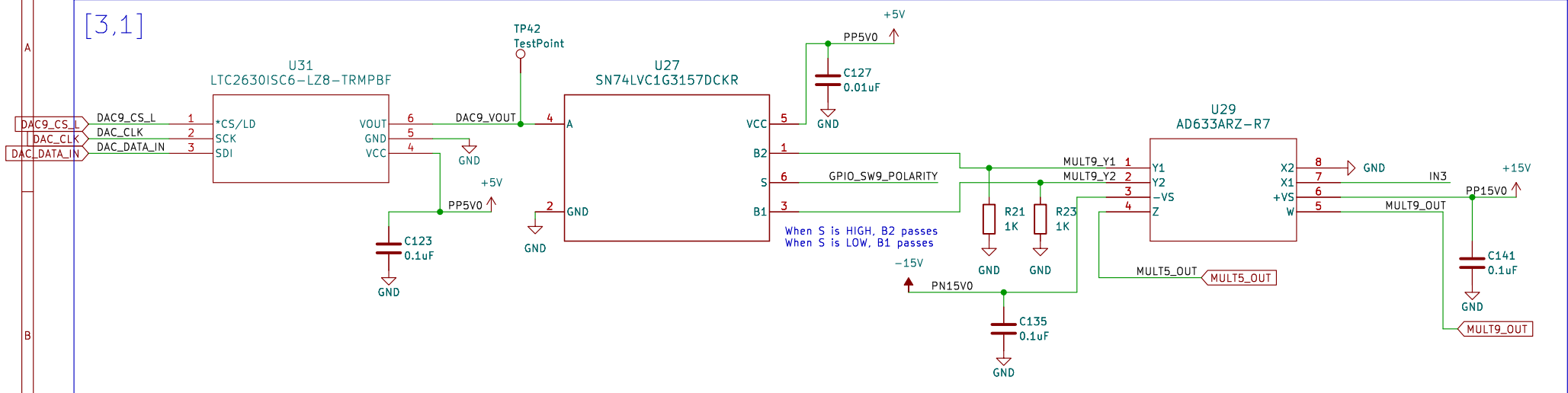
KiCad E.D.A. kicad 7.0.7

Rev:

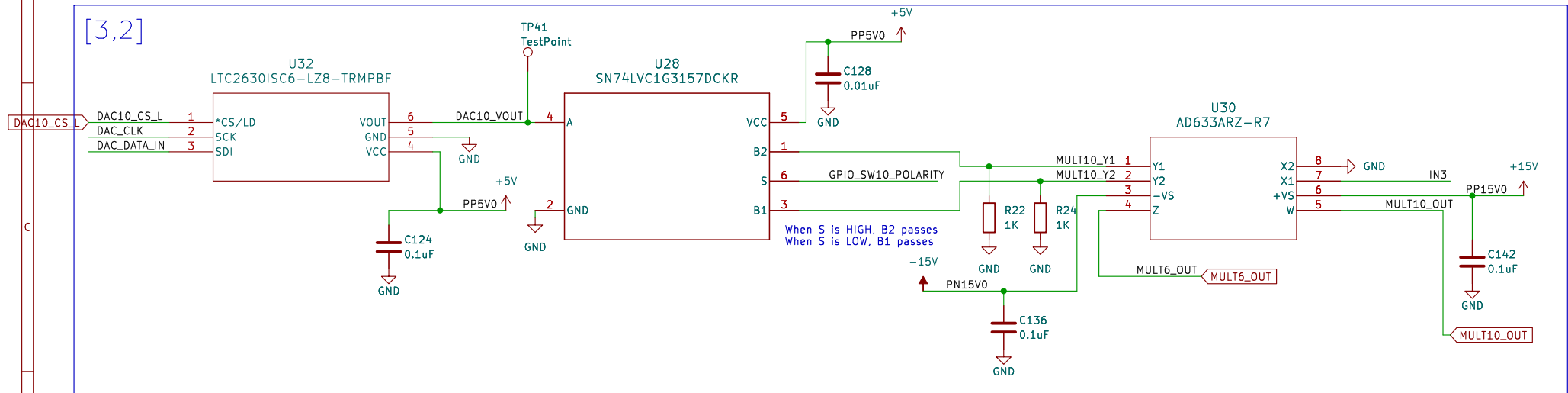
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ANALOG MULTIPLIER (5/8)

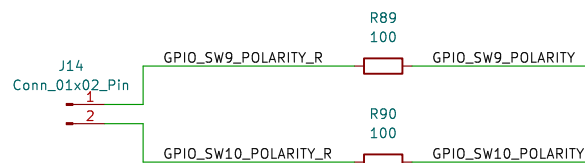
[3,1]



[3,2]



ANALOG SWITCH SELECT GPIO TO FPGA
THESE ARE 5V GPIOs



Sheet: /ANALOG MULTIPLIER 3/
File: Analog Multiplier 5.kicad_sch

Title:

Size: A4

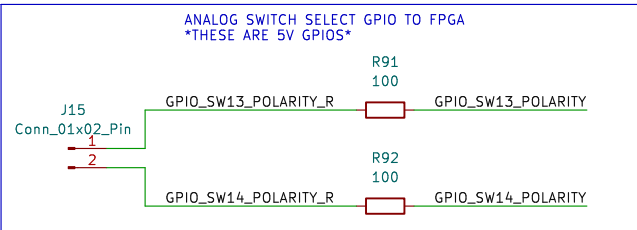
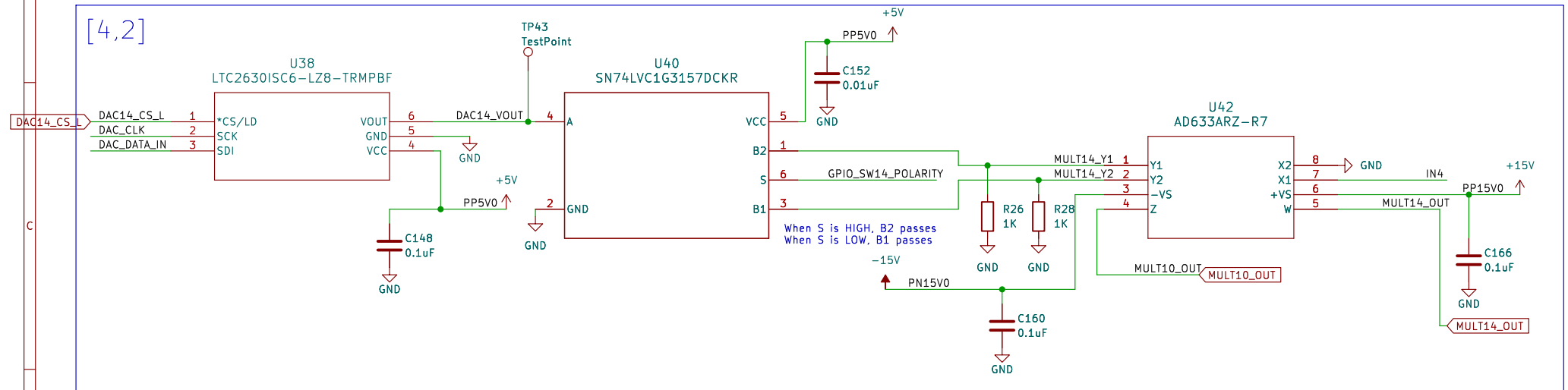
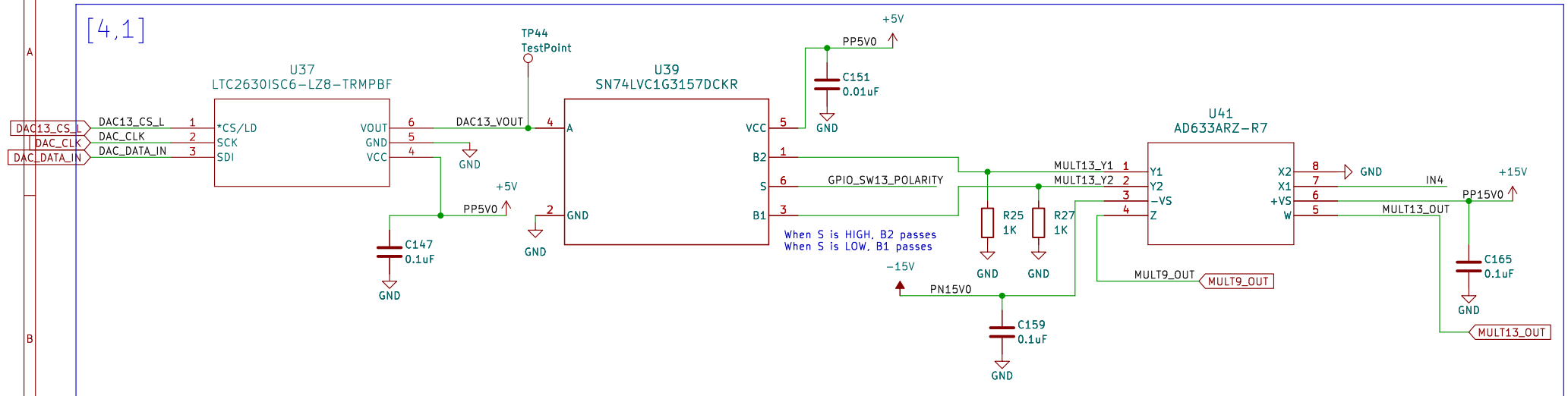
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KiCad E.D.A. kicad 7.0.7

Rev:

Id: 10/12

ANALOG MULTIPLIER (7/8)



Sheet: /ANALOG MULTIPLIER 4/
File: Analog Multiplier 7.kicad_sch

Title:

Size: A4	Date:
KiCad E.D.A. kicad 7.0.7	

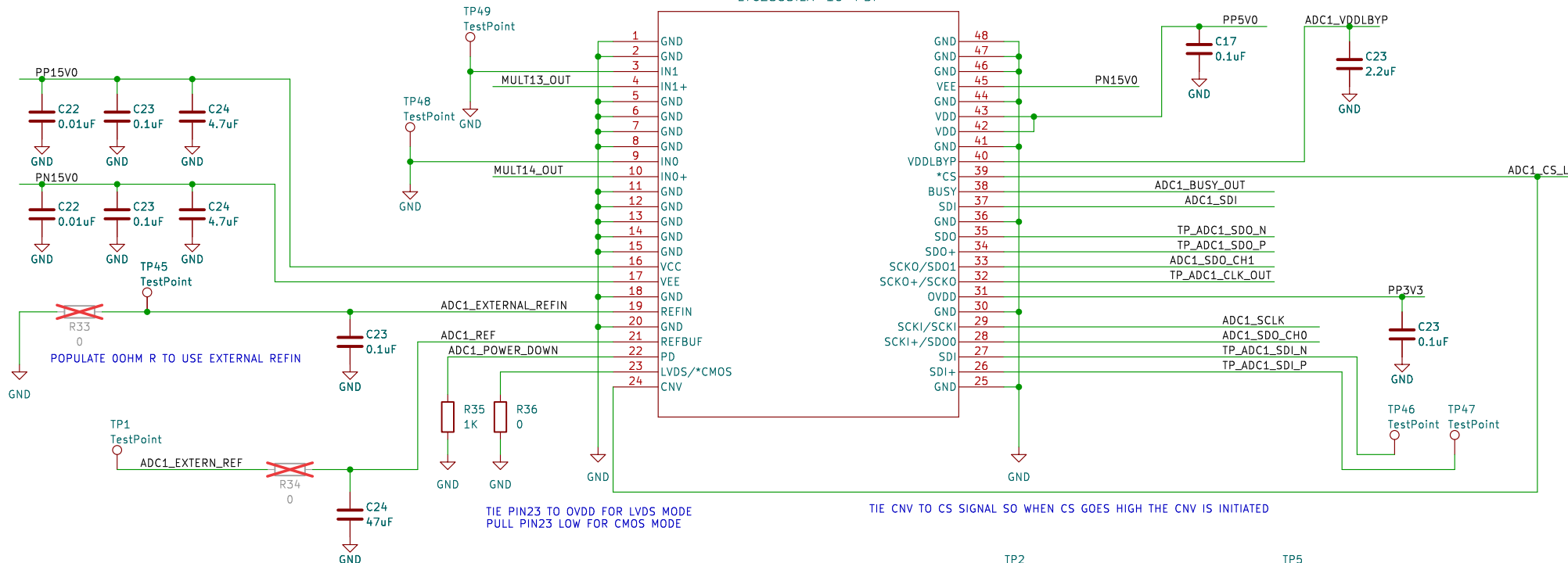
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Rev:
Id: 11/12

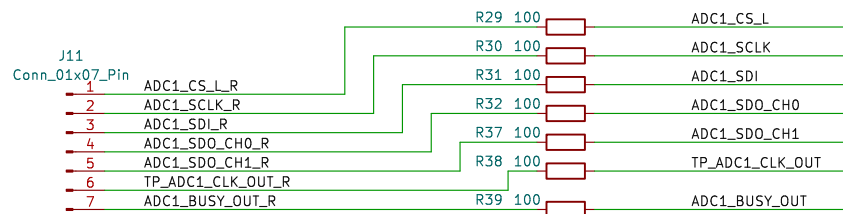
ADC – 16-BIT DUAL CHANNEL DIFFERENTIAL

ADC SAMPLES (VIN+ – VIN-)
INPUT RANGE: (VEE + 4V <= VCM <= VCC – 4V)

U53
LTC2353ILX-16-PBF



HEADERS TO FPGA



Sheet: /ADC/
File: ADC.kicad_sch

Title:

Size: A4
KiCad E.D.A. kicad 7.0.7

Date:

Rev:

Id: 12/12