

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: fydpcad.kicad_sch

Title:

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

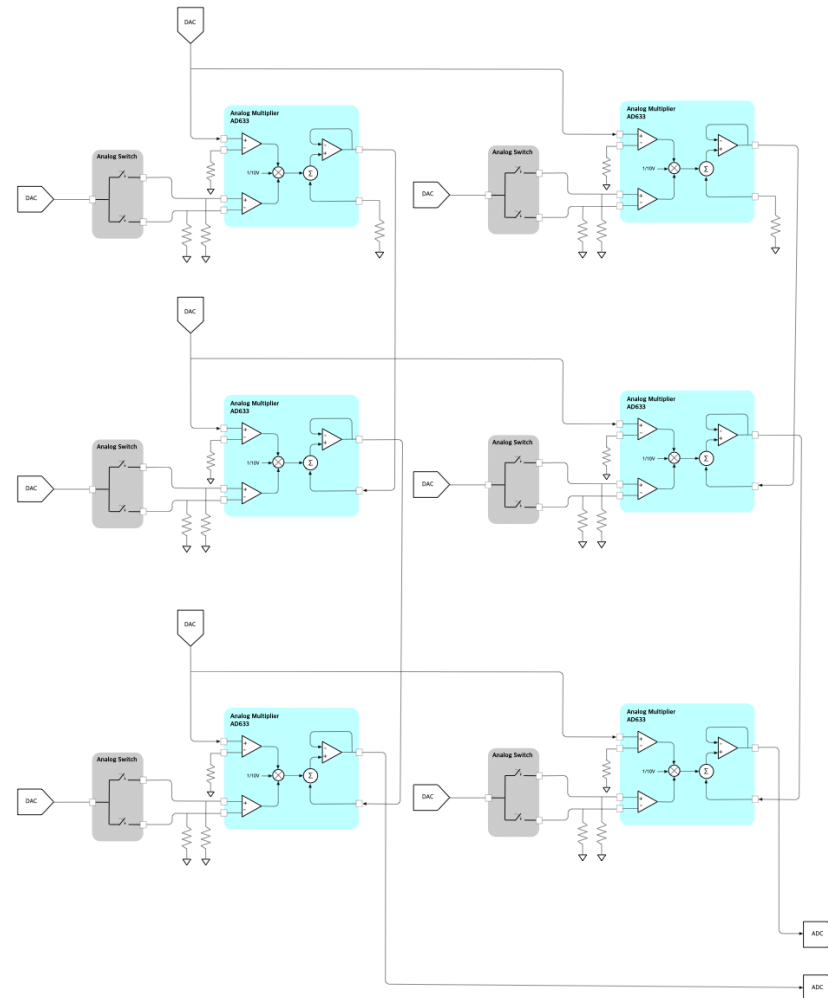
Date:

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 4X2 CASE.



Sheet: /BLOCK DIAGRAM/
File: Block_Diagram.kicad_sch

Title:

Size: A4

Date:

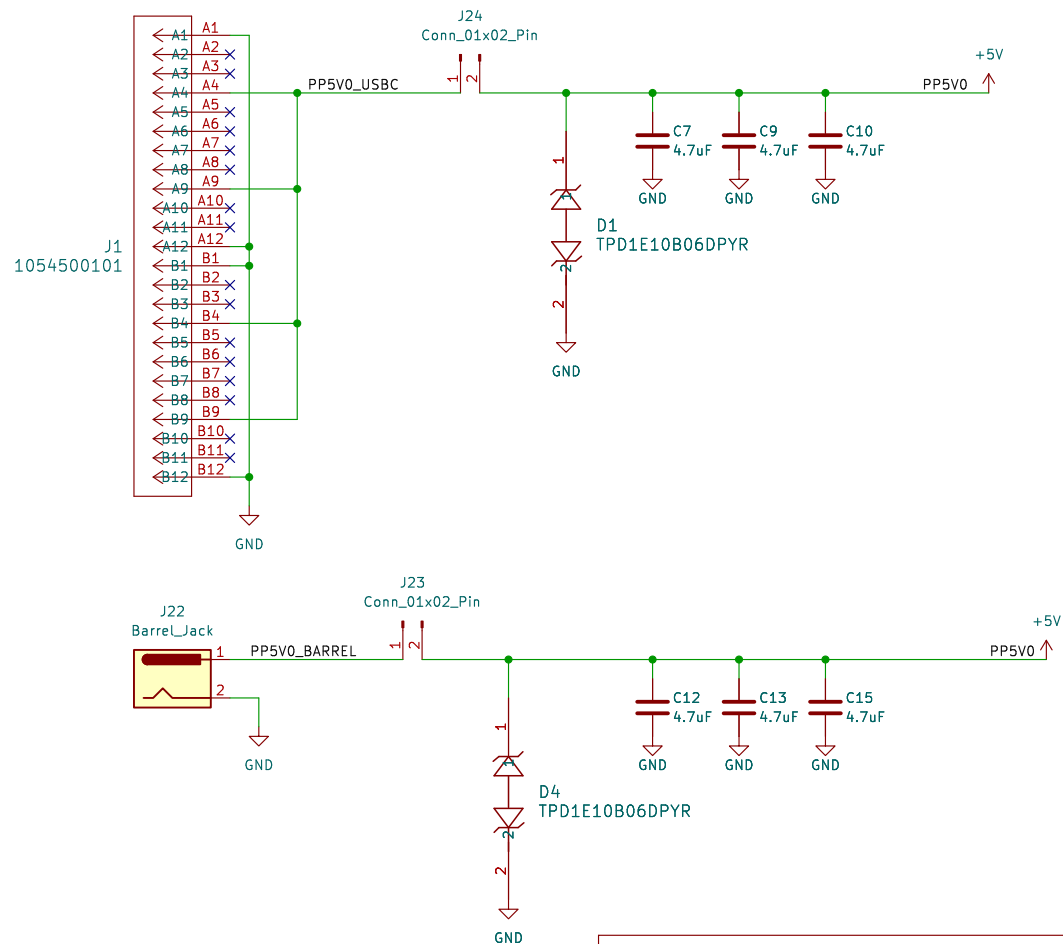
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Rev:

Id: 2/12

USB C Receptacle

USB C Receptacle



Sheet: /USBC RECEPTACLE/
File: USBC_Receptacle.kicad_sch

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Size: A4

Date:

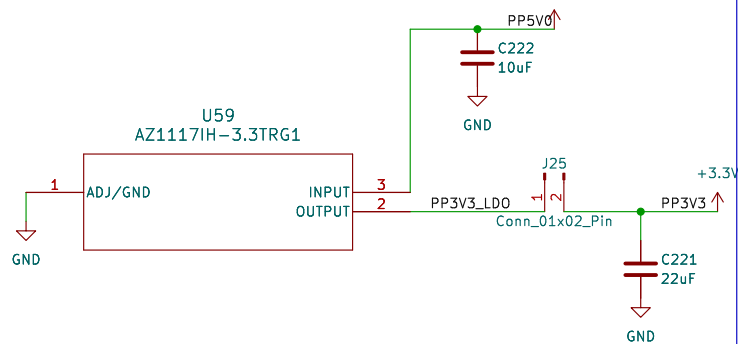
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Rev:

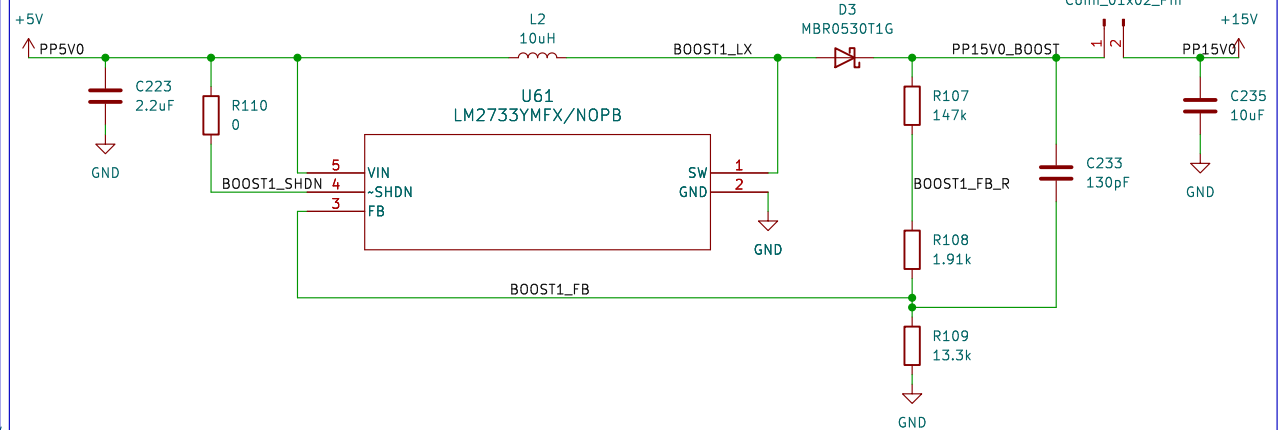
Id: 3/12

POWER

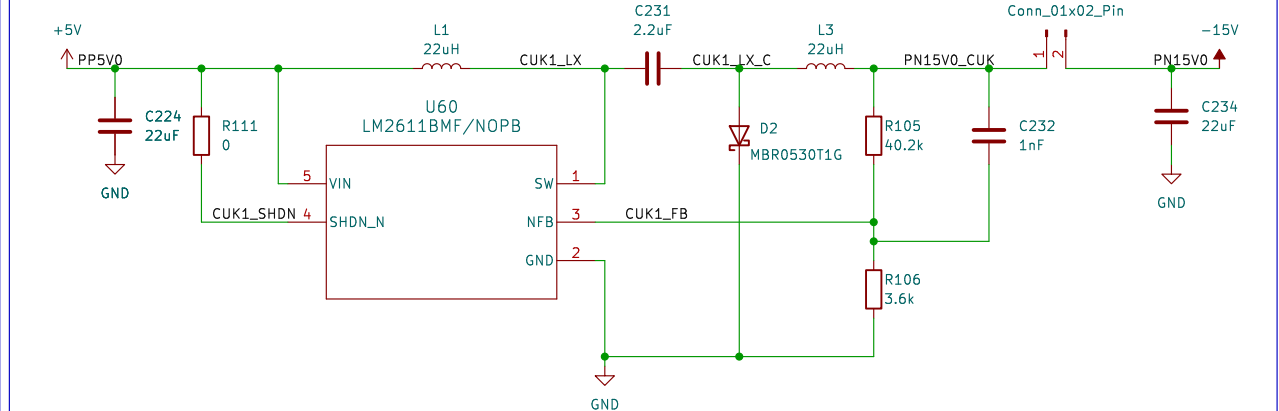
5V --> 3.3V LDO



5V --> 15V Boost Converter



5V --> -15V Cuk Converter



Sheet: /POWER/
File: power.kicad_sch

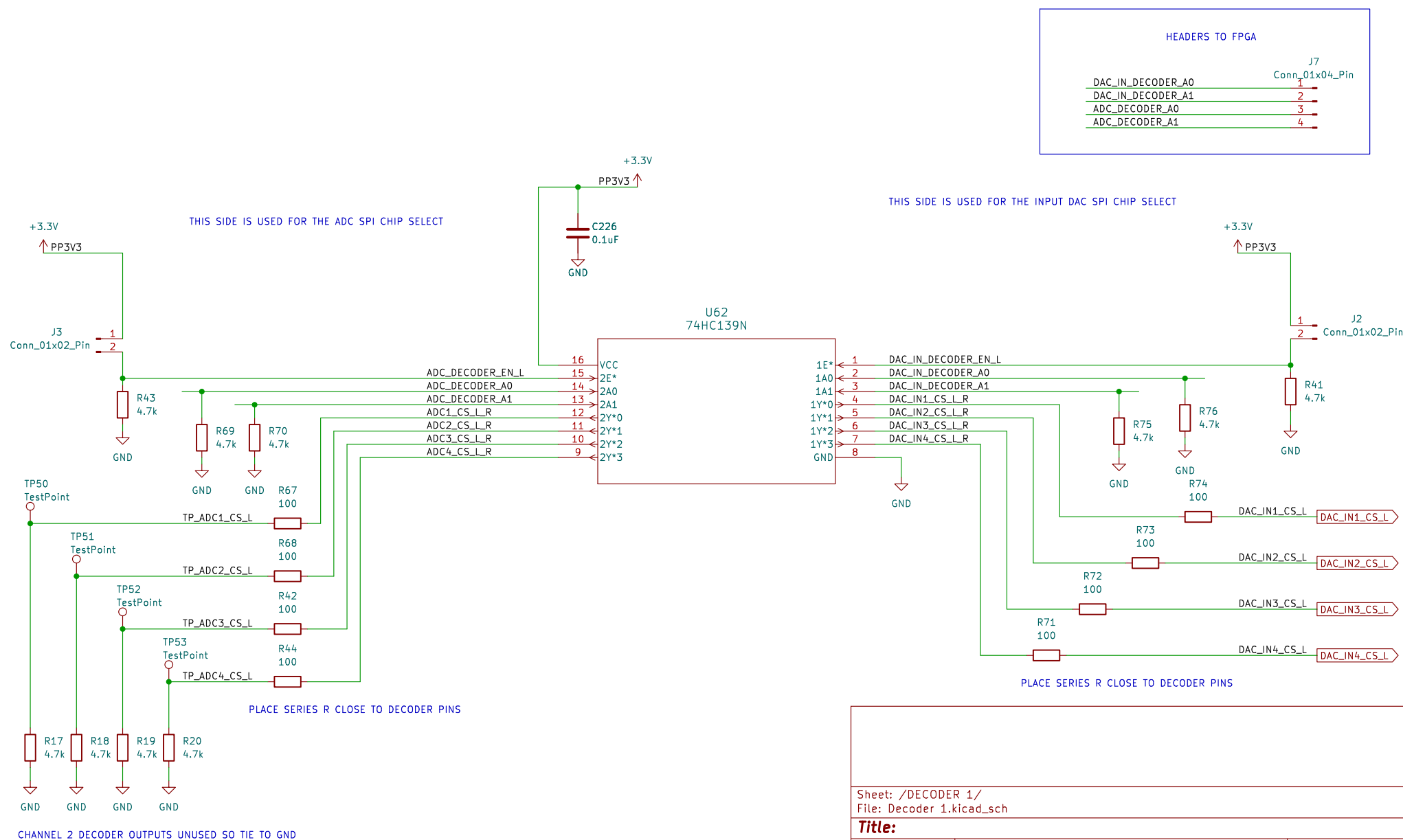
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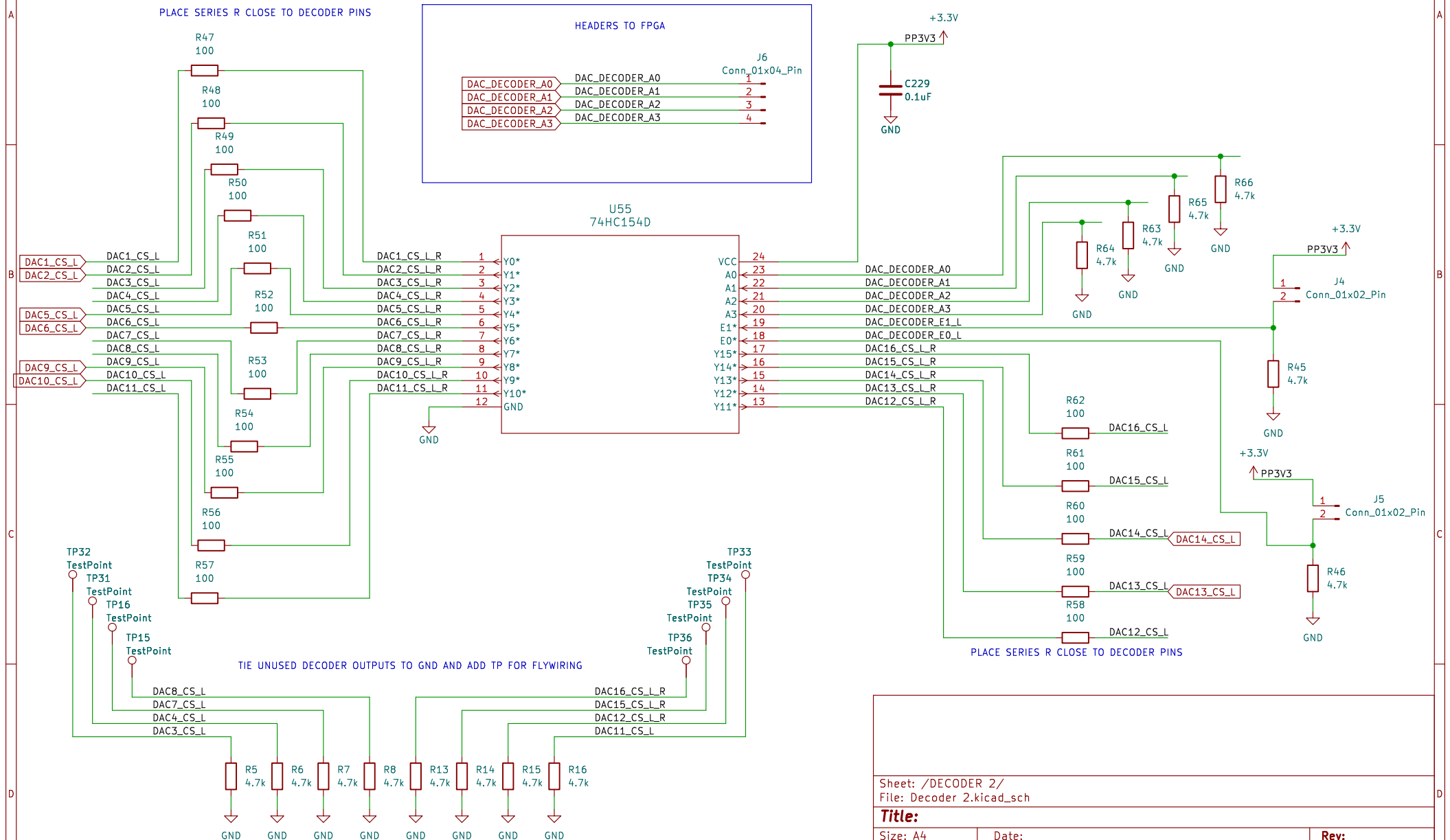
Date:

Rev:
Id: 4/12

DAC INPUTS DECODER & ADC OUTPUT DECODER (UNUSED)



DAC WEIGHTS DECODER



Sheet: /DECODER 2/
File: Decoder 2.kicad_sch

Title:

Size: A4

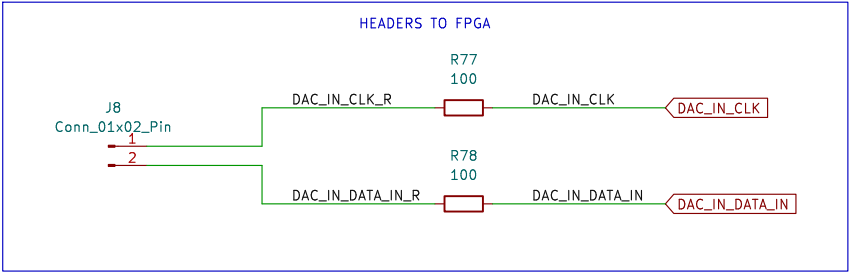
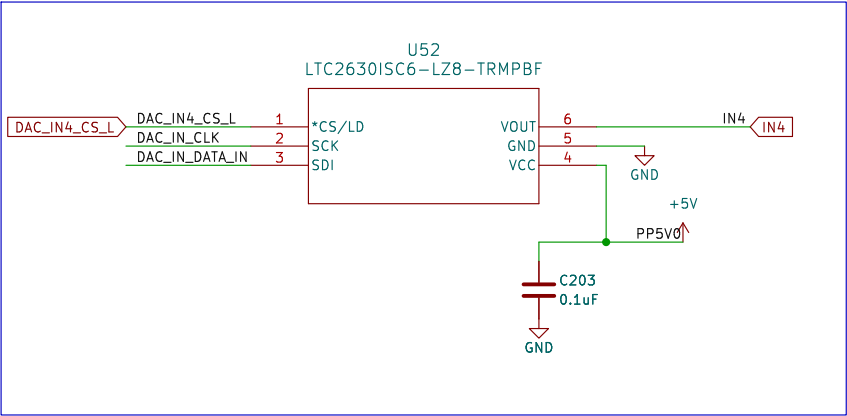
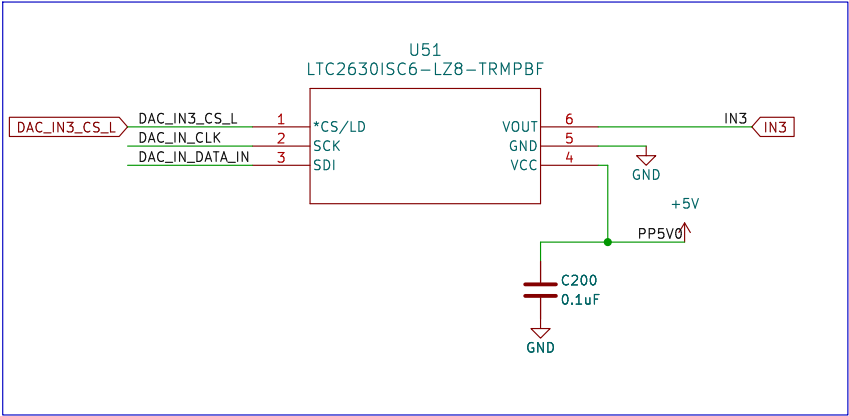
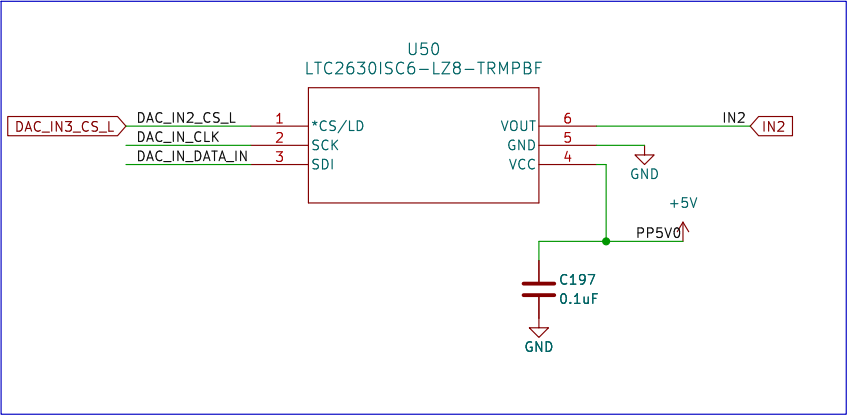
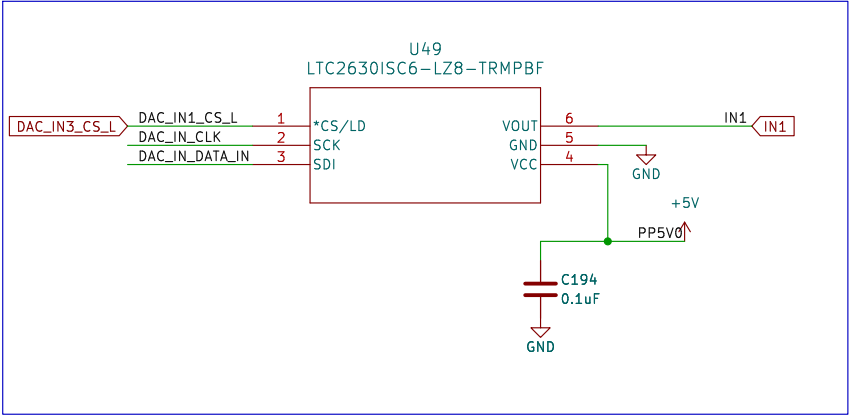
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KiCad E.D.A. kicad 7.0.7

Rev:

Id: 6/12

DAC INPUTS



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

Title:

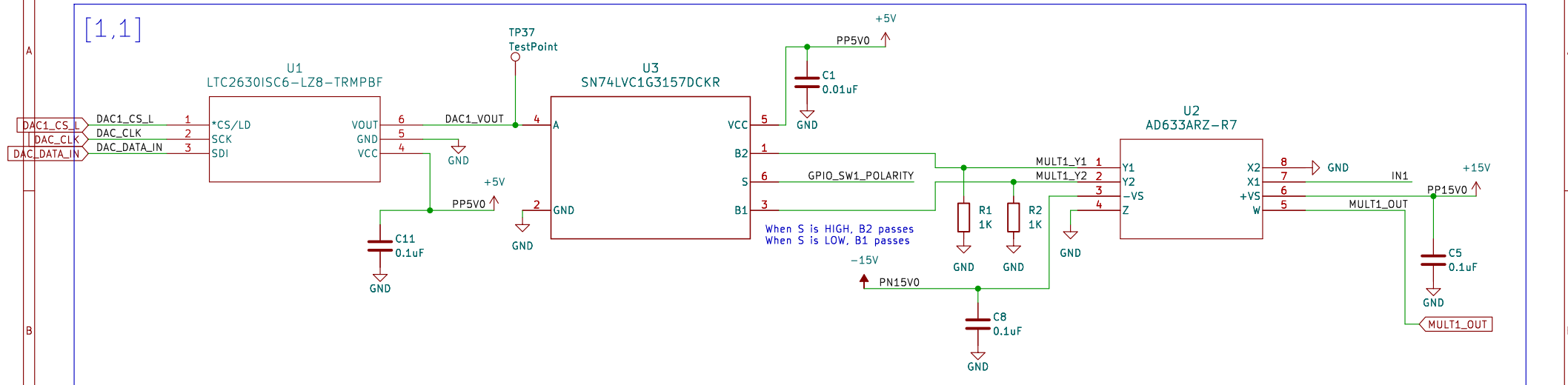
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Date:

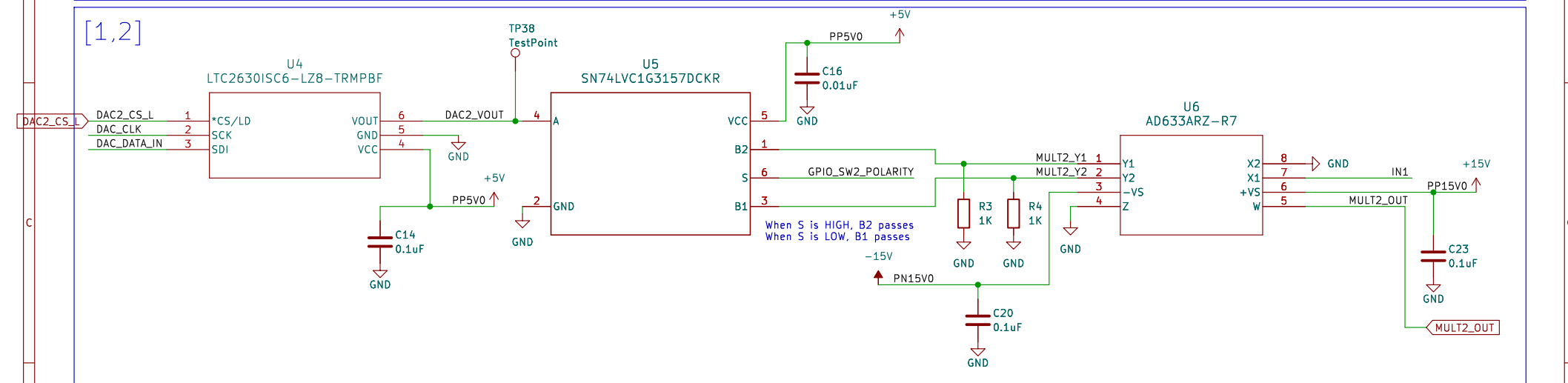
Rev:
Id: 7/12

ANALOG MULTIPLIER ([1,1] & [1,2])

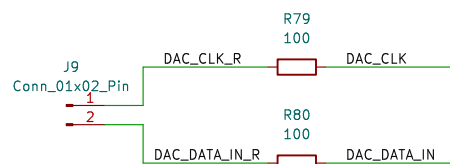
[1,1]



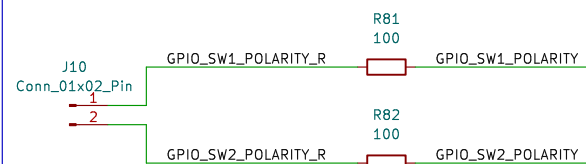
[1,2]



HEADERS TO FPGA



ANALOG SWITCH SELECT GPIO TO FPGA
THESE ARE 5V GPIOs



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

Title:

Size: A4

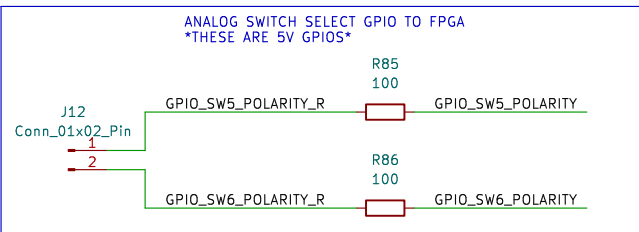
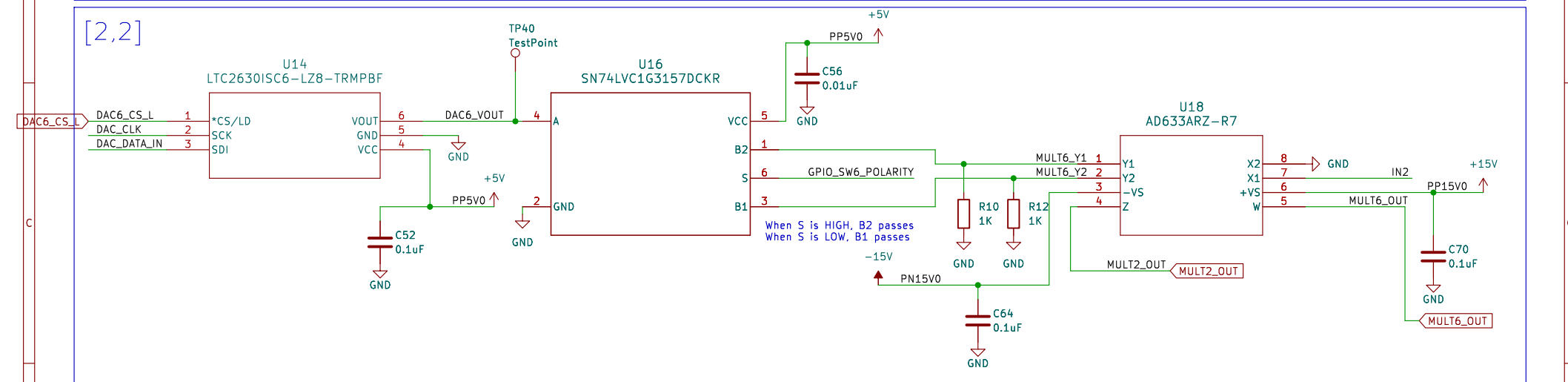
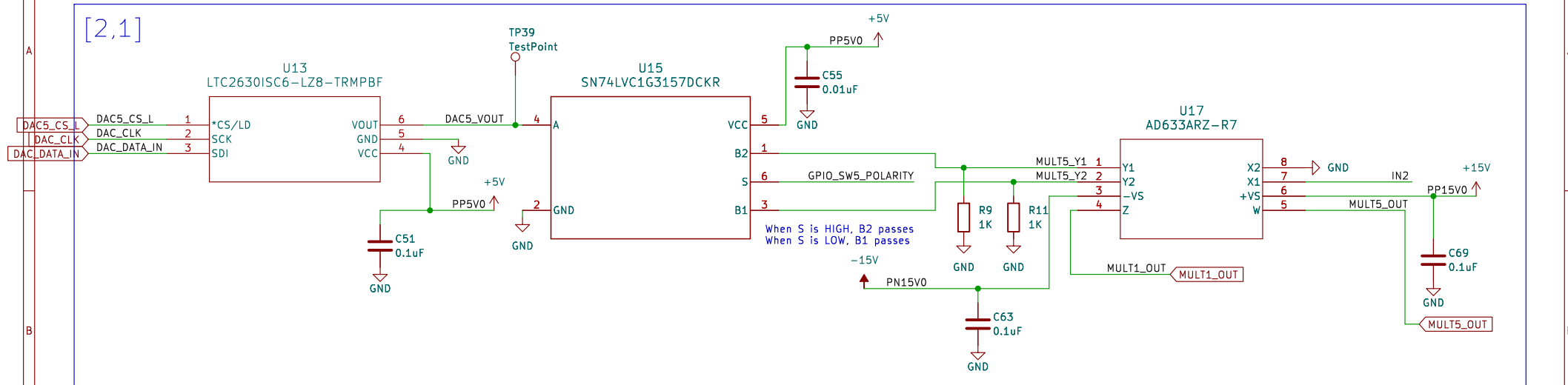
Date:

KiCad E.D.A. kicad 7.0.7

Rev:

Id: 8/12

ANALOG MULTIPLIER (([2,1] & [2,2]))



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

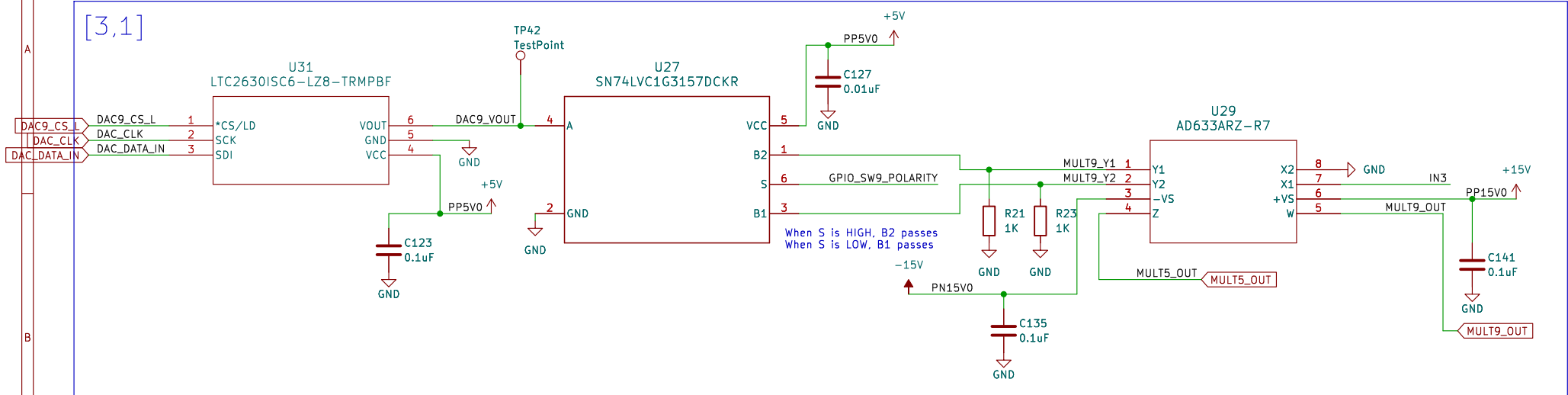
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Size: A4	Date:
KiCad E.D.A. kicad 7.0.7	

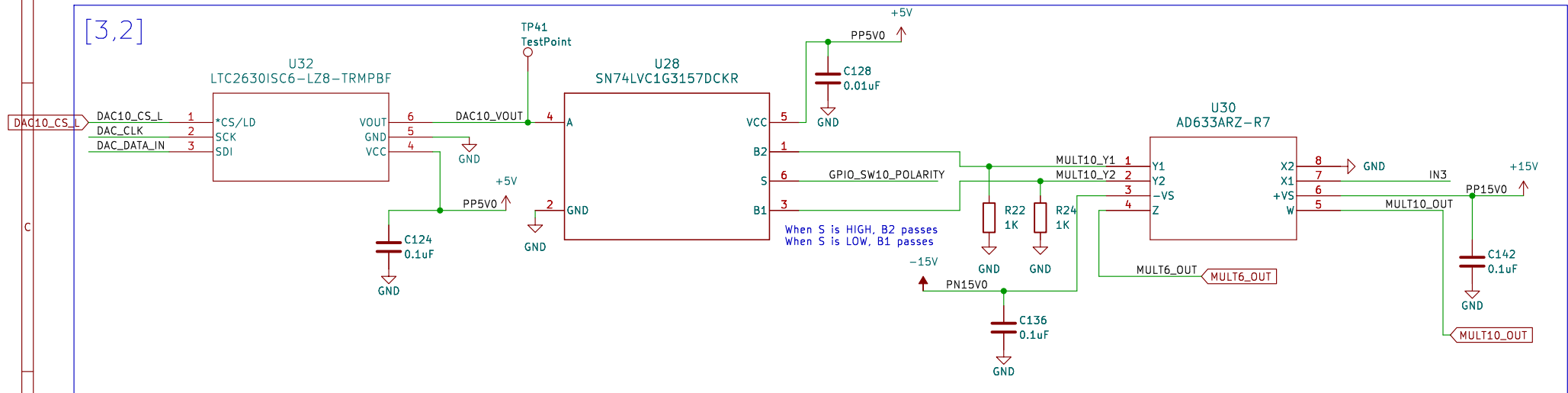
Rev:
Id: 9/12

ANALOG MULTIPLIER (([3,1] & [3,2]))

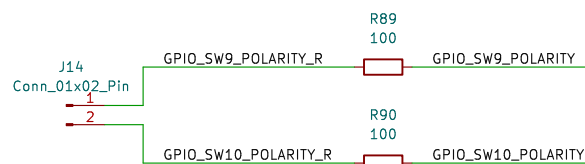
[3,1]



[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

Date:

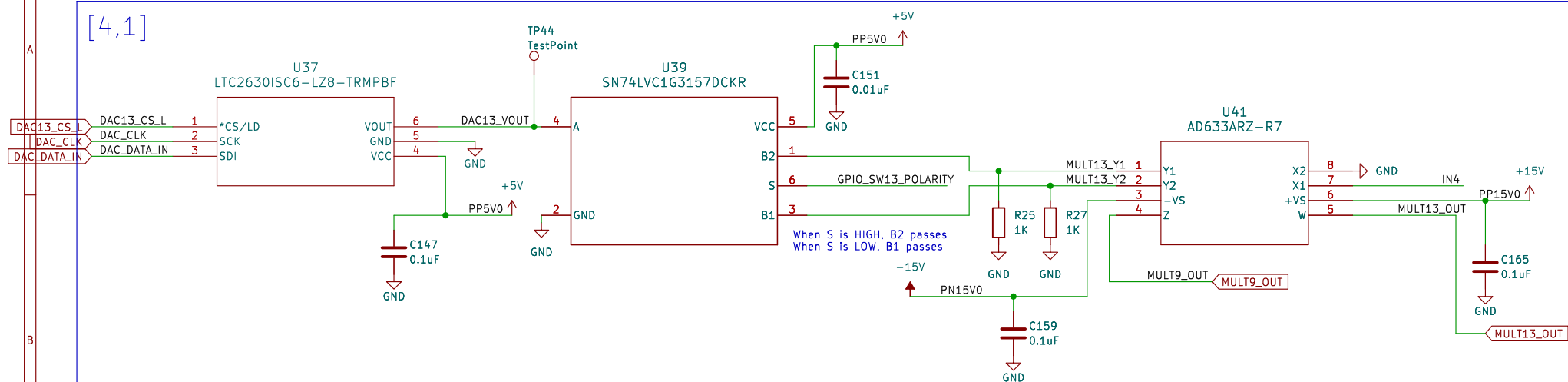
KiCad E.D.A. kicad 7.0.7

Rev:

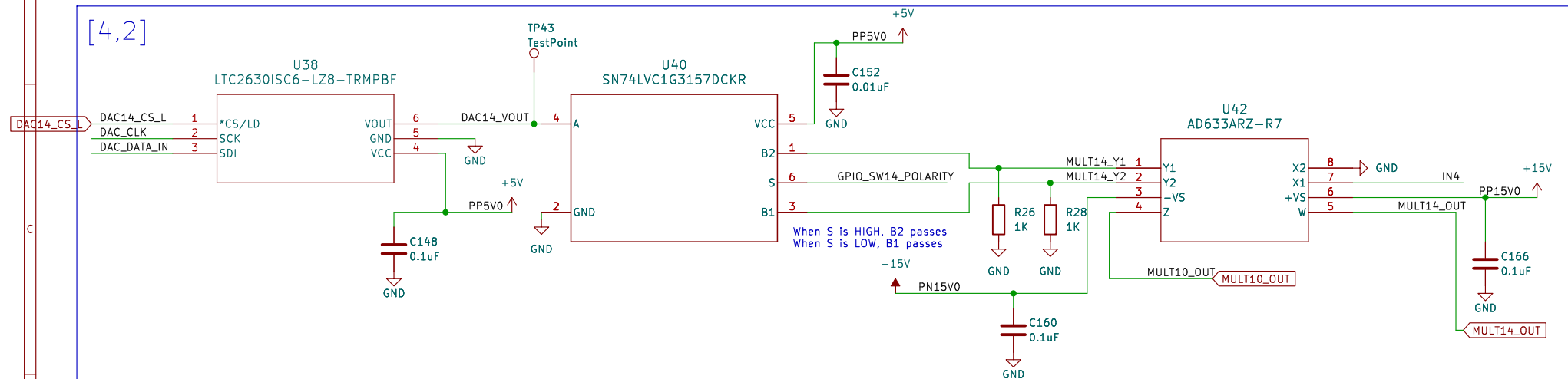
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ANALOG MULTIPLIER (([4,1] & [4,2]))

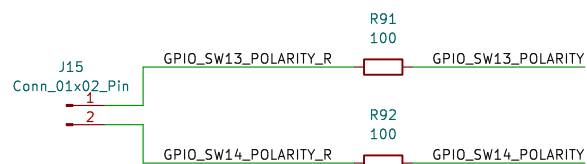
[4,1]



[4,2]



ANALOG SWITCH SELECT GPIO TO FPGA
THESE ARE 5V GPIOs



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

Title:

Size: A4

Date:

KiCad E.D.A. kicad 7.0.7

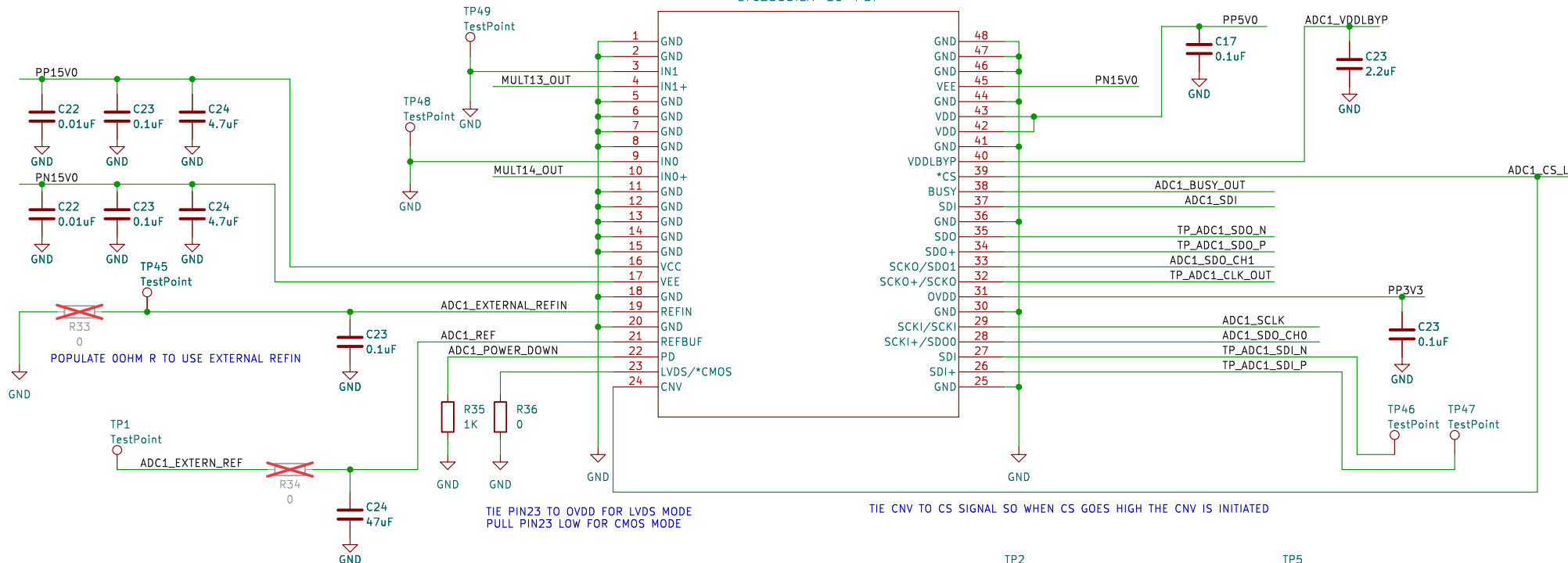
Rev:

Id: 11/12

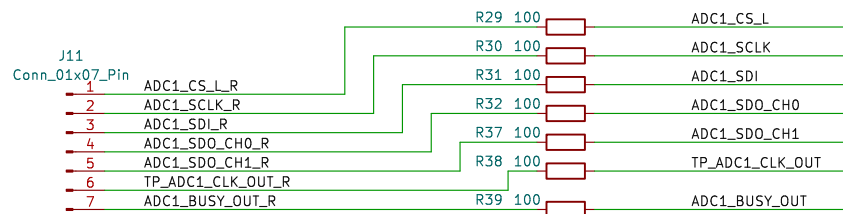
ADC – 16-BIT DUAL CHANNEL DIFFERENTIAL

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