

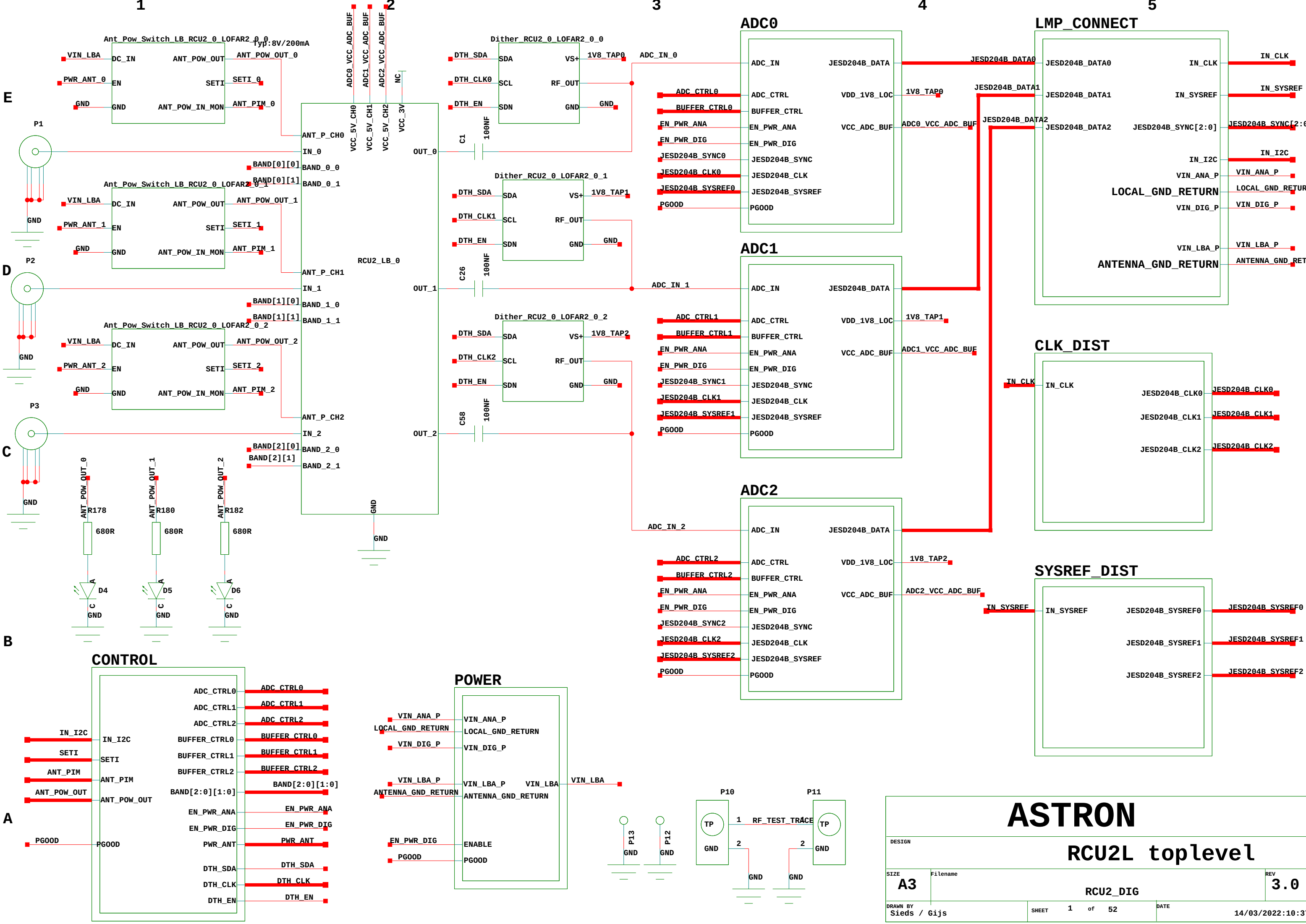
E

D

C

B

A



ASTRON

RCU2L top level

DESIGN		RCU2_DIG		REV
SIZE		A3		3.0
Filename		RCU2_DIG		14/03/2022:10:37
DRAWN BY		Sieds / Gijs		DATE
SHEET		1 of 52		REV

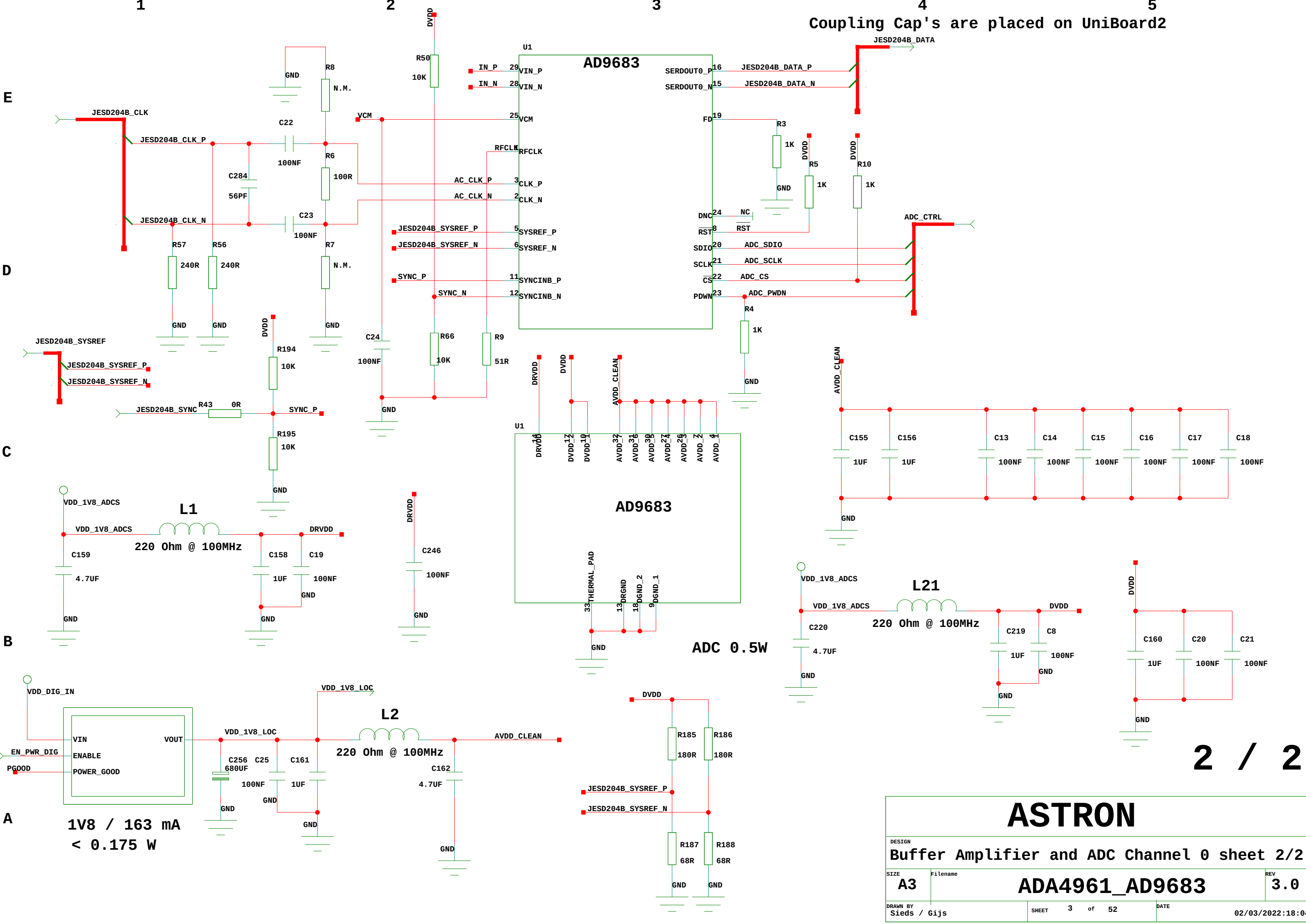
E

D

C

B

A



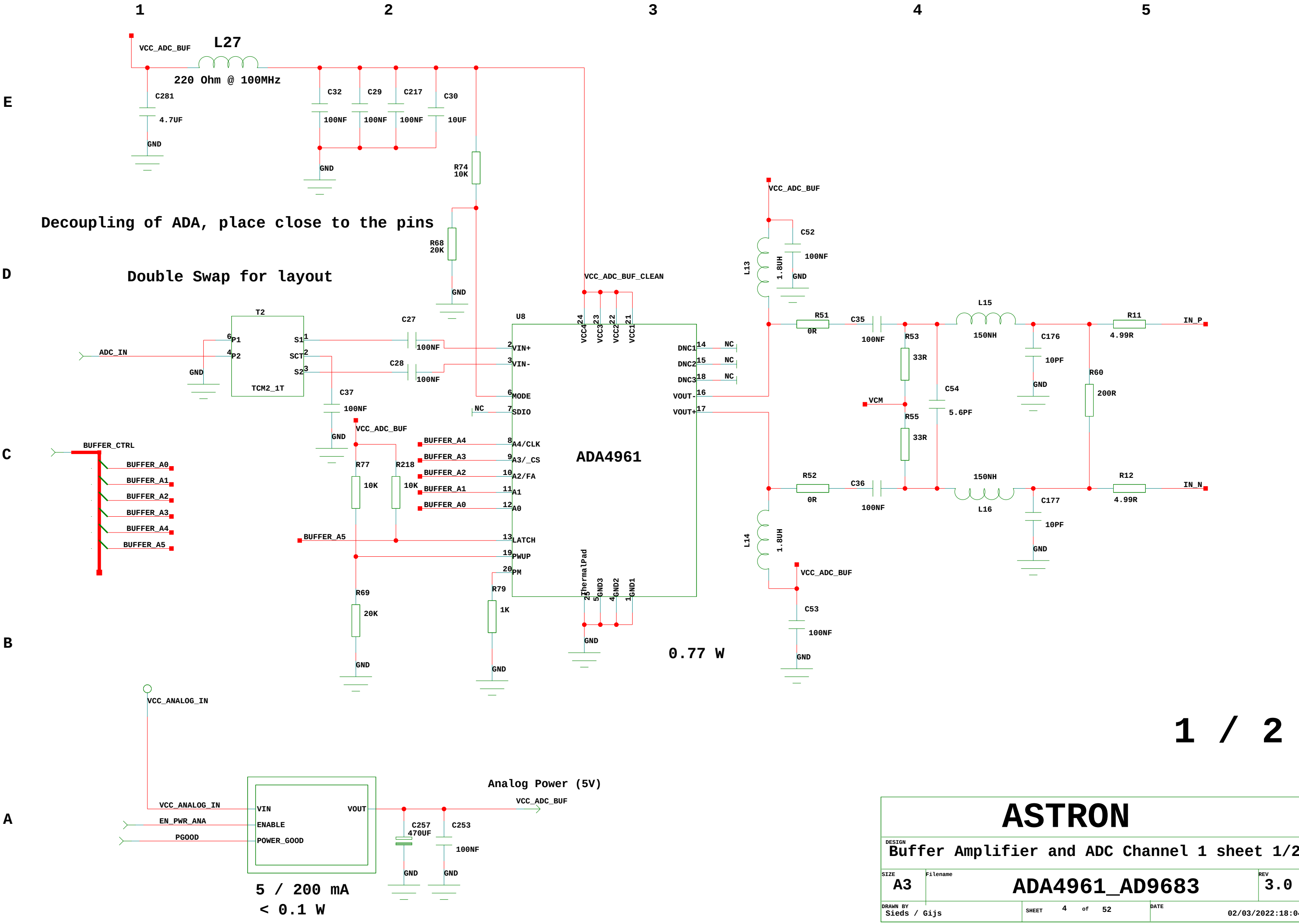
E

D

C

B

A



Decoupling of ADA, place close to the pins

Double Swap for layout

ADA4961

0.77 W

1 / 2

ASTRON

DESIGN Buffer Amplifier and ADC Channel 1 sheet 1/2

SIZE A3	Filename	ADA4961_AD9683	REV 3.0
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DRAWN BY Sieds / Gijs	SHEET 4 of 52	DATE 02/03/2022 18:04
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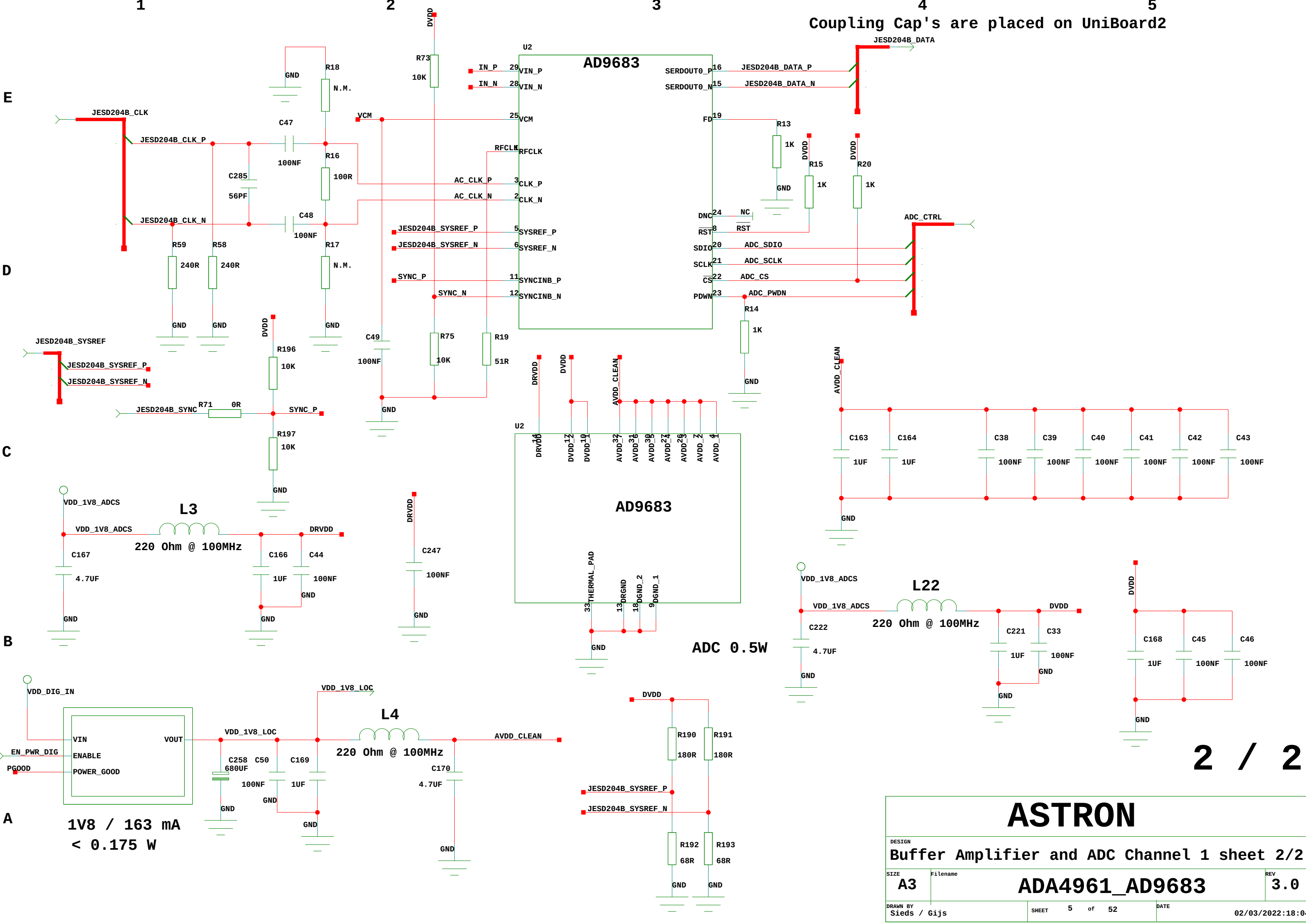
E

D

C

B

A



2 / 2

ASTRON

DESIGN			Buffer Amplifier and ADC Channel 1 sheet 2/2		
SIZE	Filename	ADA4961_AD9683			REV
A3					3.0
DRAWN BY		Sieds / Gijs		SHEET	5 of 52
				DATE	02/03/2022:18:04

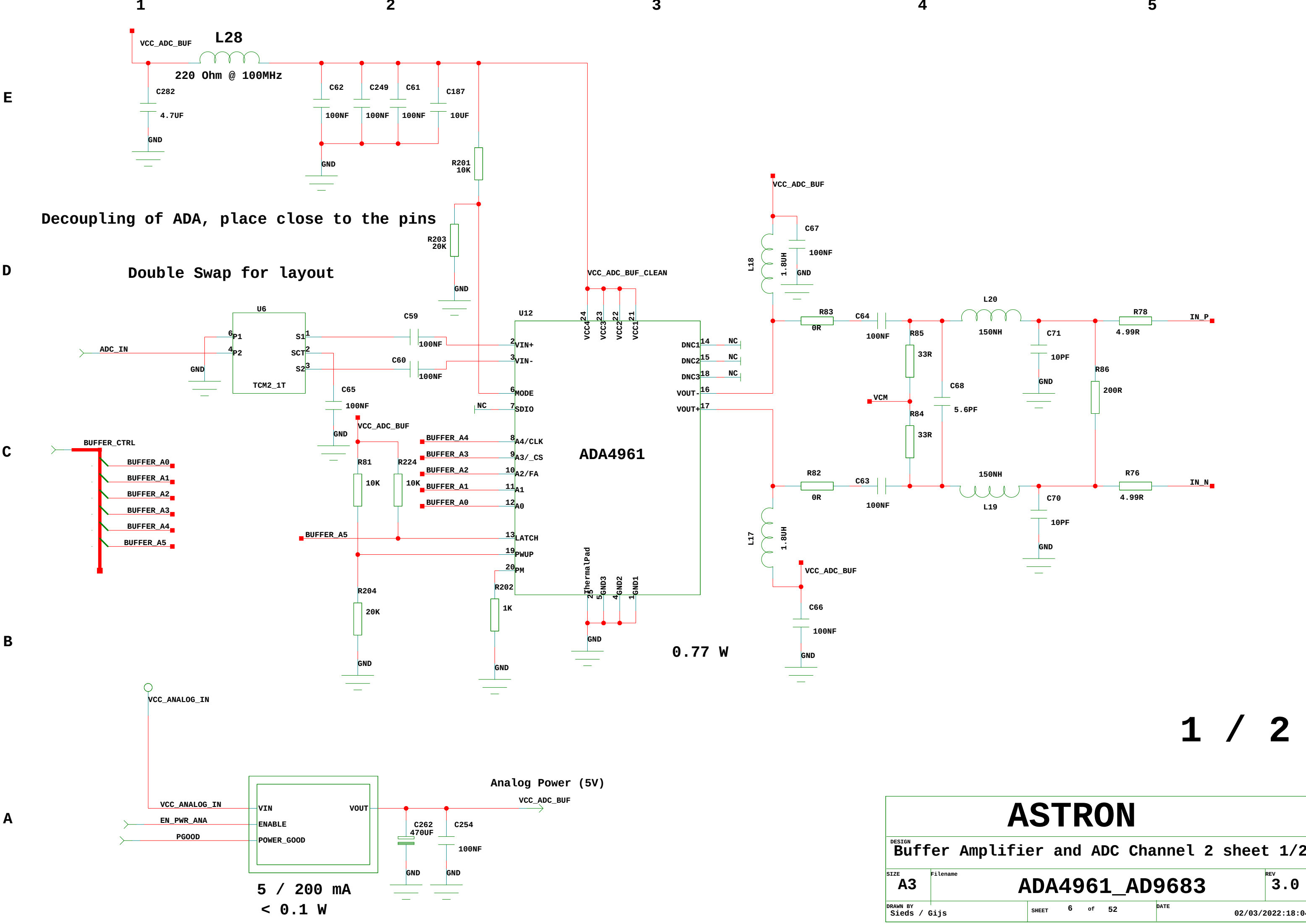
E

D

C

B

A



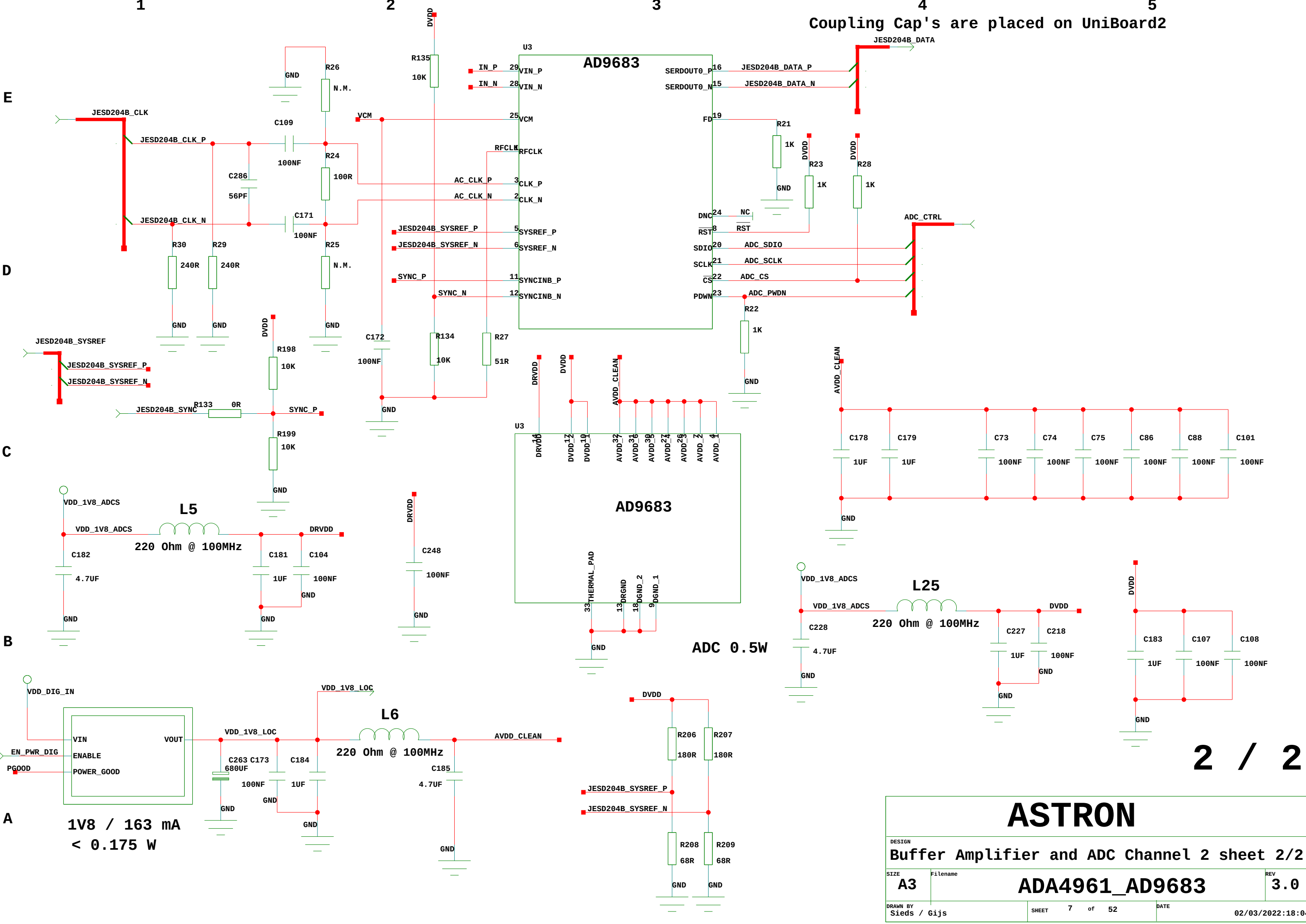
E

D

C

B

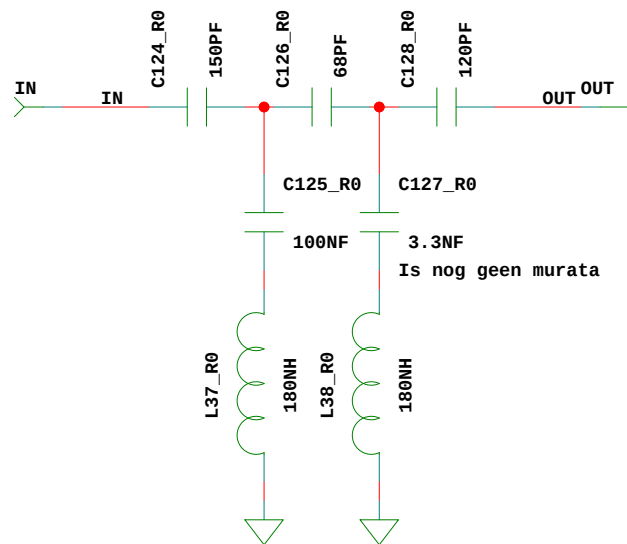
A



2 / 2

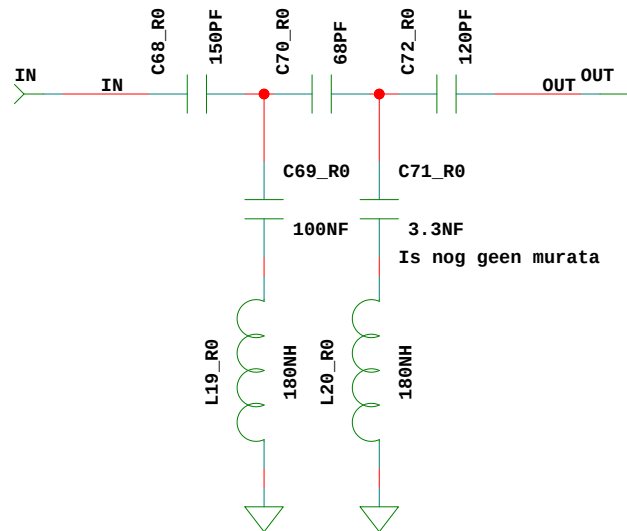
ASTRON

DESIGN		
Buffer Amplifier and ADC Channel 2 sheet 2/2		
SIZE	Filename	REV
A3	ADA4961_AD9683	3.0
DRAWN BY		DATE
Sieds / Gijs		02/03/2022:18:04
SHEET	7 of 52	



INAF ~~ASTRON~~

DESIGN				HP_30_MHz CH0	
SIZE	Filename	HP_30_MHz			REV
A1					1
DRAWN BY		SHEET		DATE	
Federico Perini & Sieds Damstra		8 of 20		02/03/2022:19:45	



INAF ~~ASTRON~~

DESIGN

HP_30_MHz CH1

SIZE

A1

Filename

HP_30_MHz

REV

1

DRAWN BY

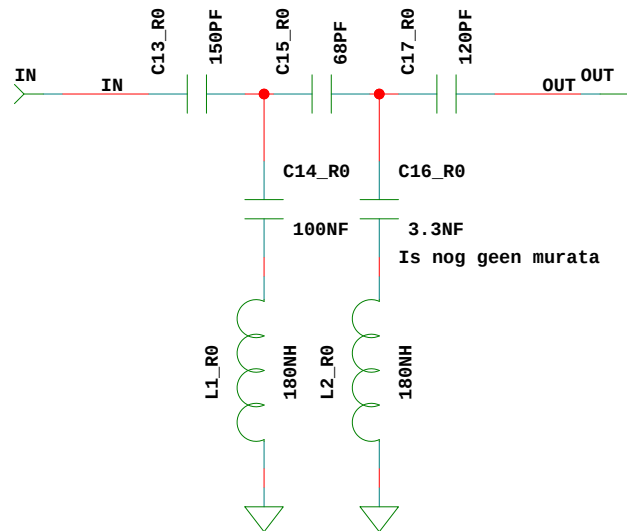
Federico Perini & Sieds Damstra

SHEET

9 of 20

DATE

02/03/2022:19:45



INAF ~~ASTRON~~

DESIGN

HP_30_MHz CH2

SIZE

A1

Filename

HP_30_MHz

REV

1

DRAWN BY

Federico Perini & Sieds Damstra

SHEET

10 of 20

DATE

02/03/2022:19:45

E

D

C

B

A

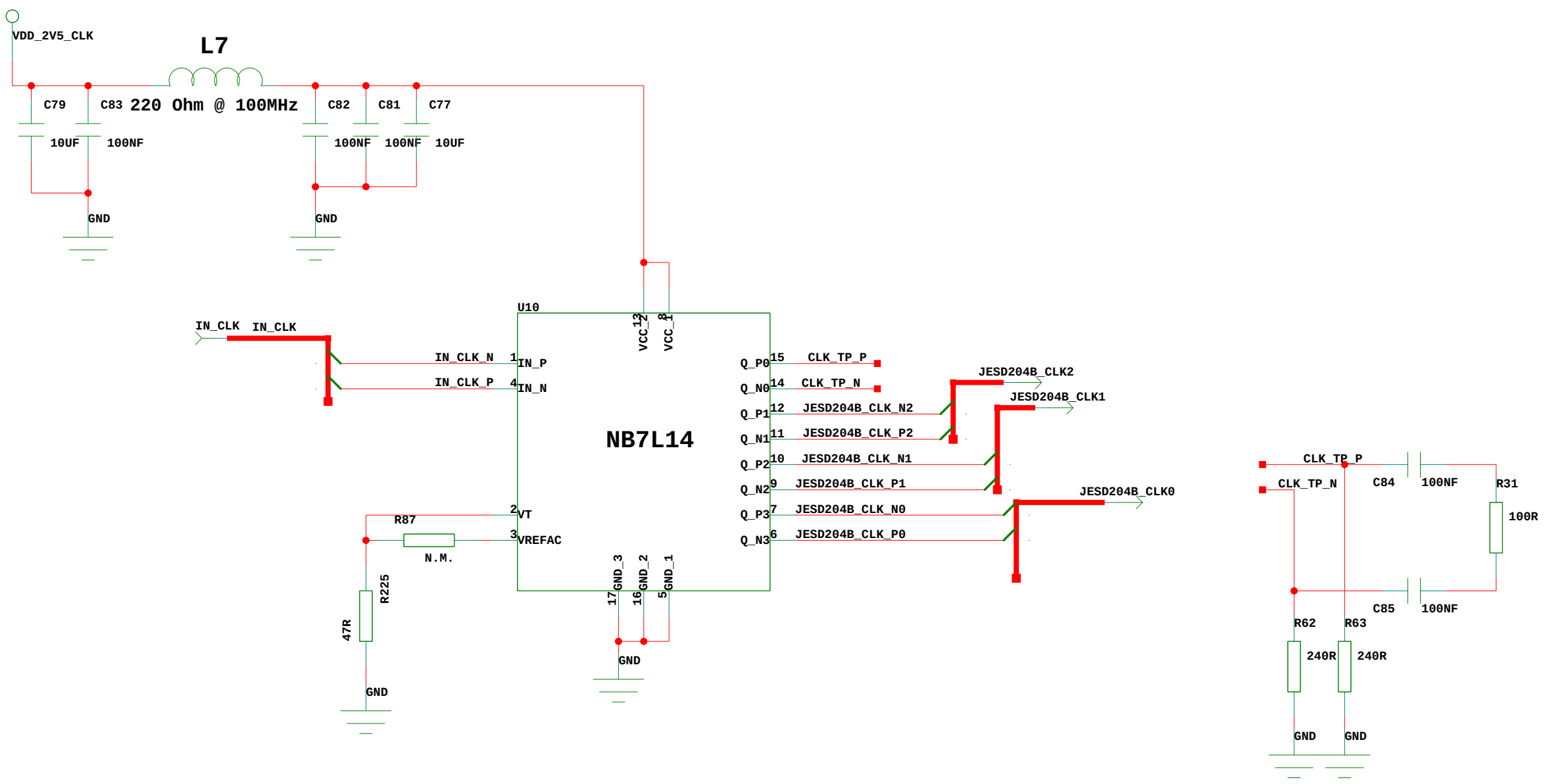
1

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5



ASTRON

DESIGN		Clock Distribution Buffer	
SIZE	Filename	CLK_DIST	REV
A3			3.0
DRAWN BY Sieds / Gijs		SHEET 11 of 52	DATE 24/02/2022:10:39

E

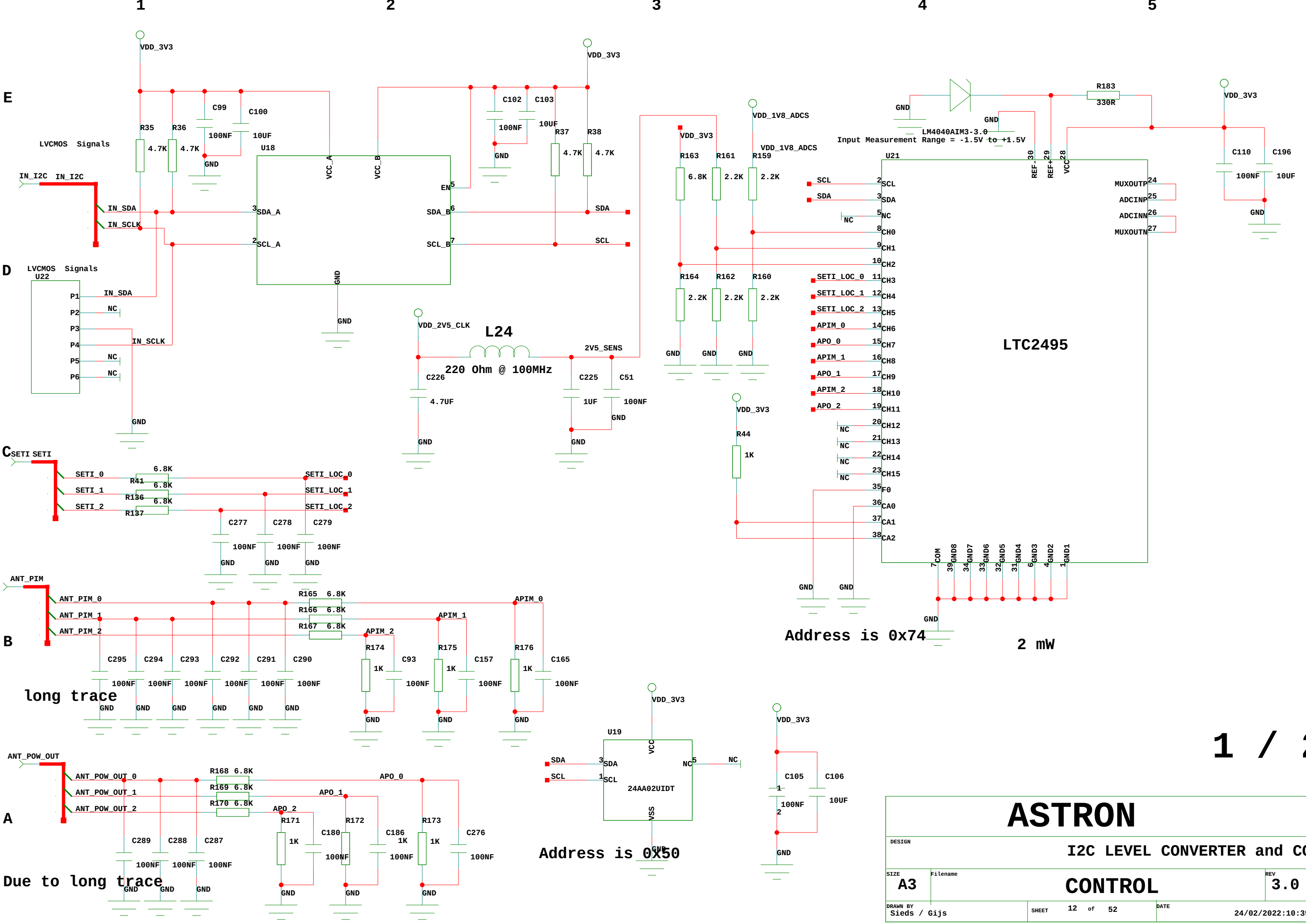
D

C

B

A

Due to long trace



ASTRON			
DESIGN I2C LEVEL CONVERTER and CONTROL			
SIZE A3	Filename	CONTROL	
DRAWN BY Sieds / Gijs		SHEET 12 of 52	DATE 24/02/2022:10:39
		REV 3.0	

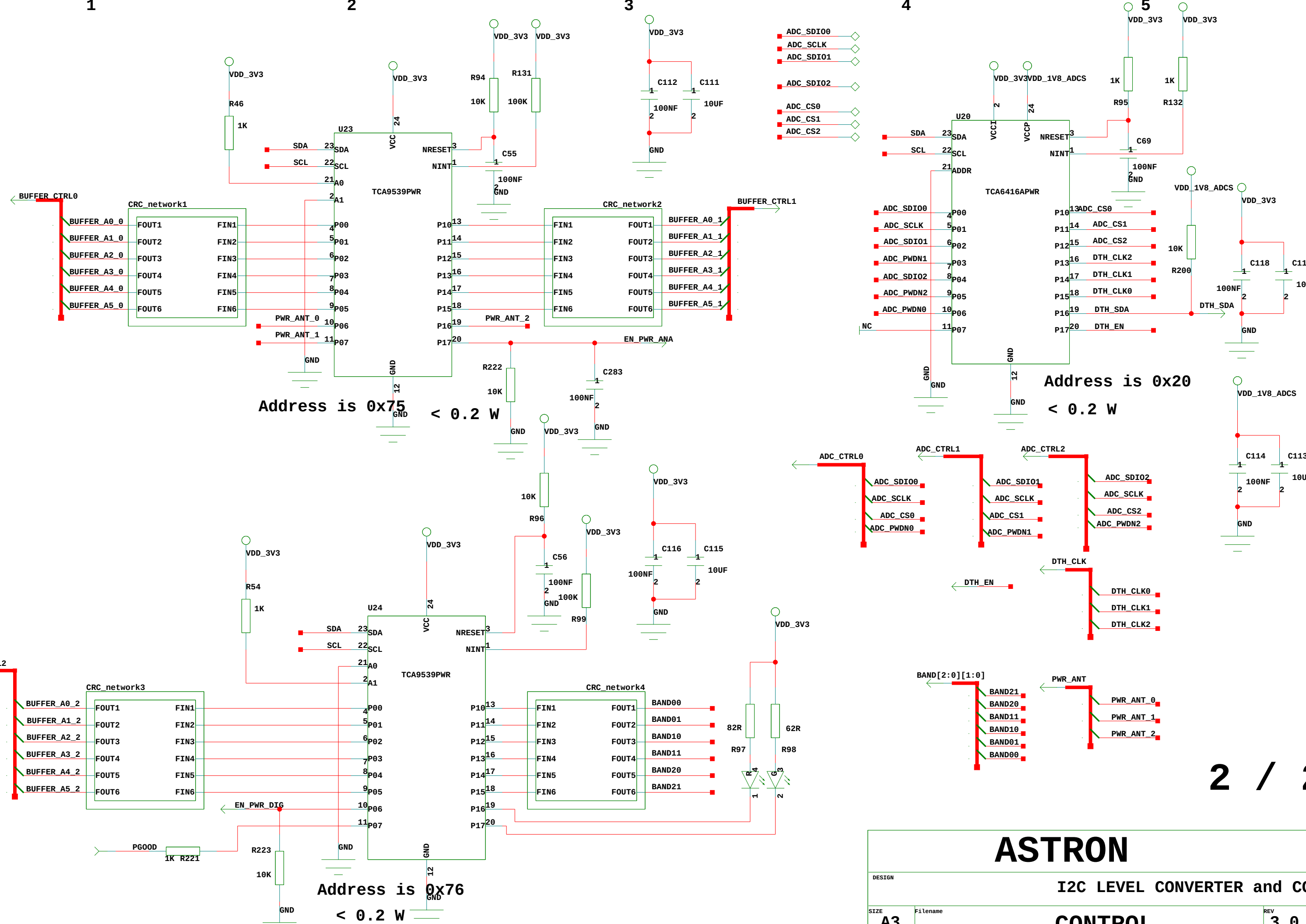
E

D

C

B

A



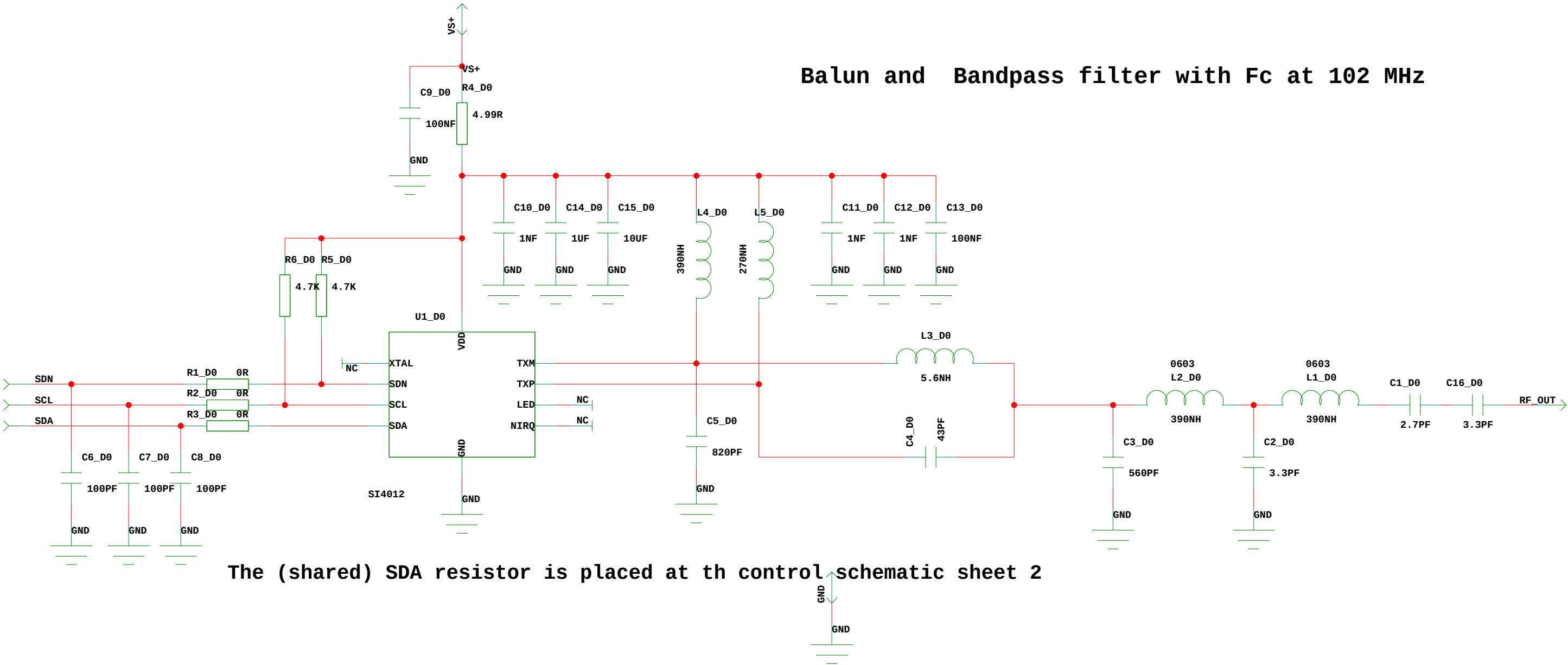
ASTRON

I2C LEVEL CONVERTER and CONTROL

CONTROL

3.0

Balun and Bandpass filter with Fc at 102 MHz



ASTRON
POSTBUS 2
DWINGELOO

DOC.NR.

Title
Dither RCU2.0 LOFAR 2.0

Drawn: S.Damstra

Size
A

Filename
Dither_RCU2_0_LOFAR2_0

Project

LOFAR 2.0

REV
1.0

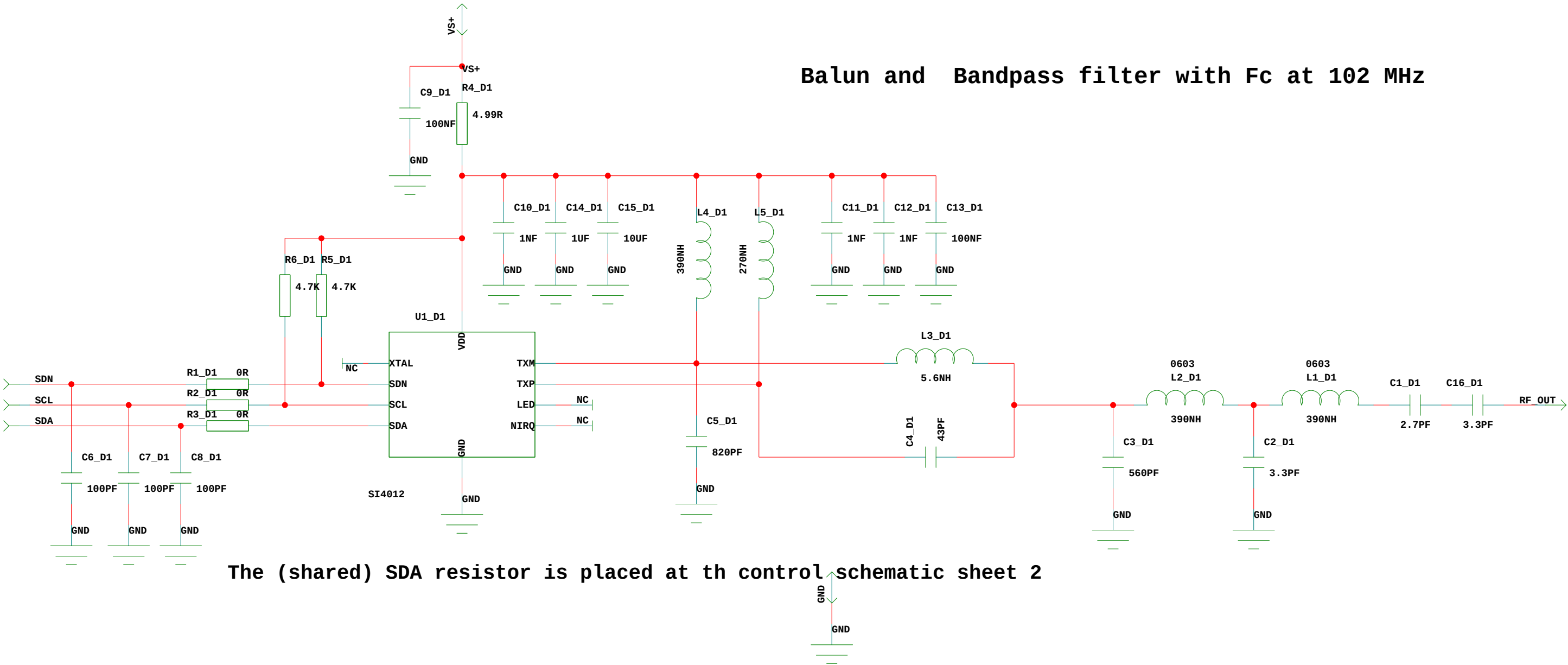
Chk.: G.W.Schoonderbeek / P.Kruger

Date: 24/02/2022:10:39

Sheet

of 52

Balun and Bandpass filter with Fc at 102 MHz



ASTRON
POSTBUS 2
DWINGELOO

DOC.NR.

Title
Dither RCU2.0 LOFAR 2.0

Drawn: S.Damstra

Size
A

Filename
Dither_RCU2_0_LOFAR2_0

Project

LOFAR 2.0

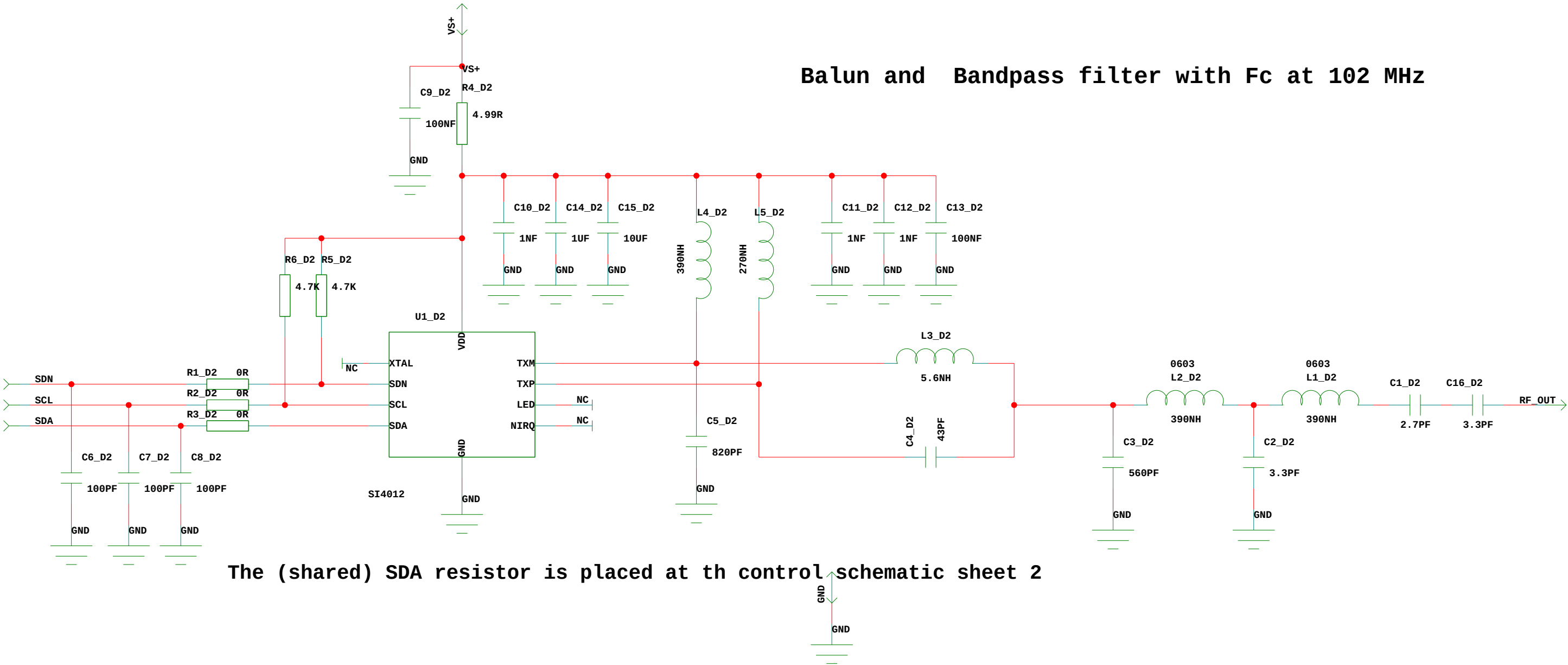
REV
1.0

Chk.: G.W.Schoonderbeek / P.Kruger

Date: 24/02/2022:10:39

Sheet of 52

Balun and Bandpass filter with Fc at 102 MHz



ASTRON
POSTBUS 2
DWINGELOO

DOC.NR.

Title **Dither RCU2.0 LOFAR 2.0**

Drawn: S.Damstra

Size
A

Filename
Dither_RCU2_0_LOFAR2_0

Project

LOFAR 2.0

REV
1.0

Chk.: G.W.Schoonderbeek / P.Kruger

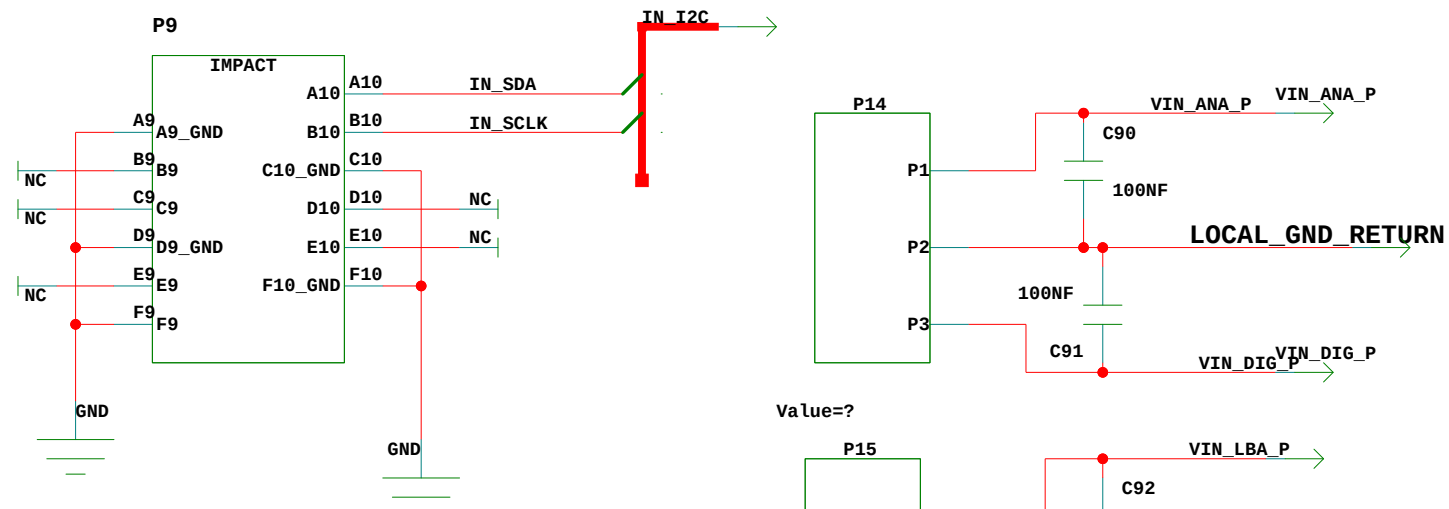
Date: 24/02/2022:10:39

Sheet

of 52

5

A


$$8 \text{ V} / 0.2 \text{ A}$$

DESIGN		Midplane connectors	
SIZE	Filename	REV	
A3	LMP_CONNECT	3.0	
DRAWN BY Sieds / Gijss		SHEET 17 of 52	DATE 24/02/2022:10:39

E

D

C

B

A

1

2

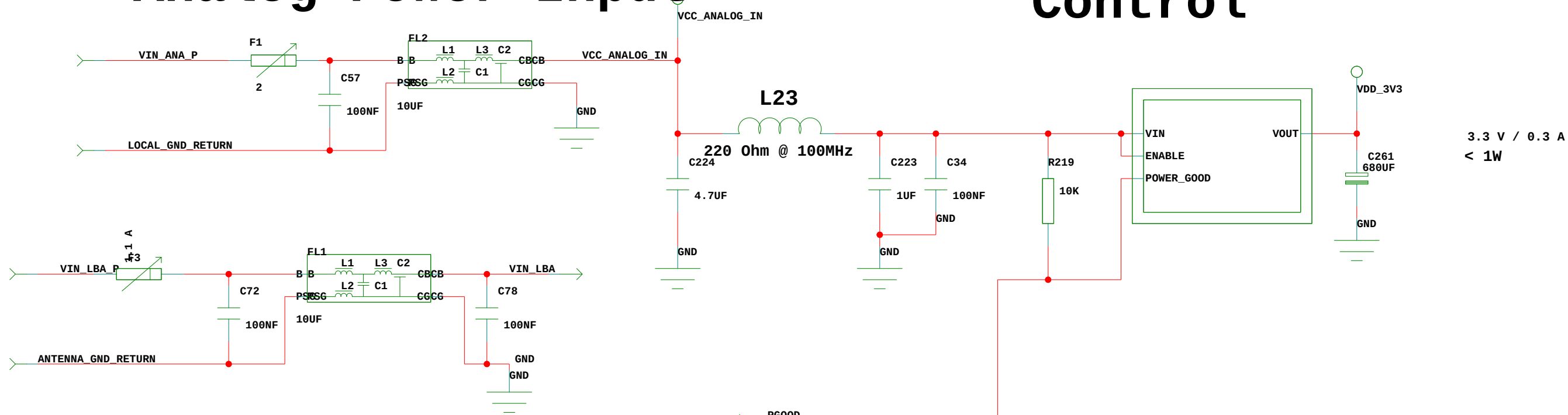
3

4

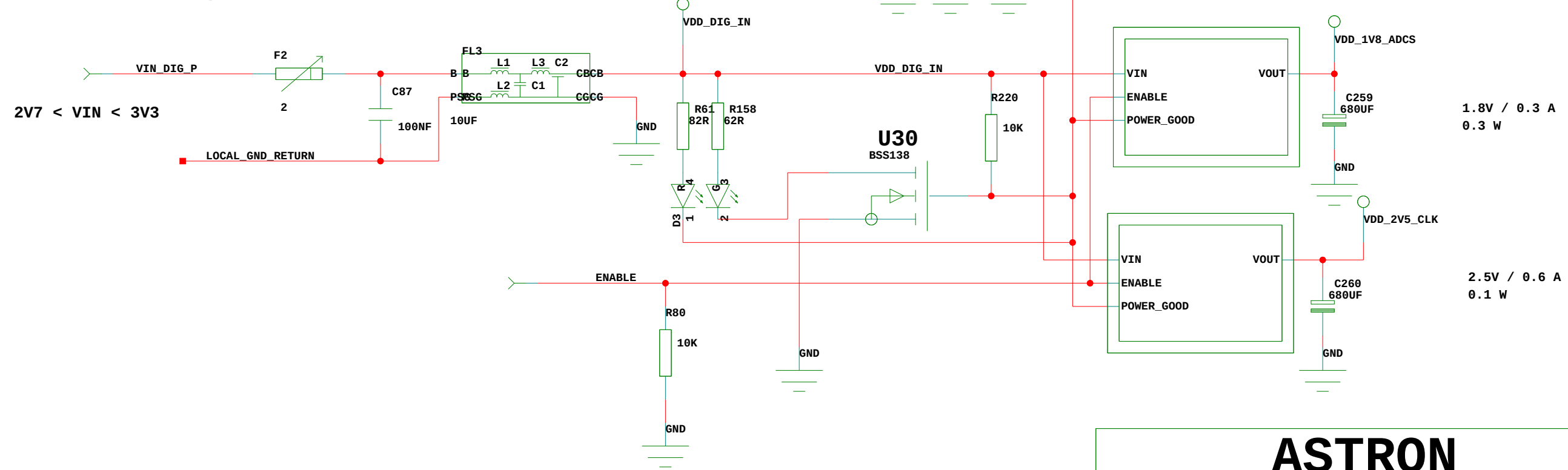
5

Analog Power Input

Control



Digital Power Supplies



ASTRON

ASTRON			
DESIGN			
Digital Power Supplies			
SIZE	Filename	REV	
A3		POWER	
DRAWN BY		SHEET	DATE
Sieds / Gijs		18 of 52	24/02/2022:10:39

E

D

C

B

A

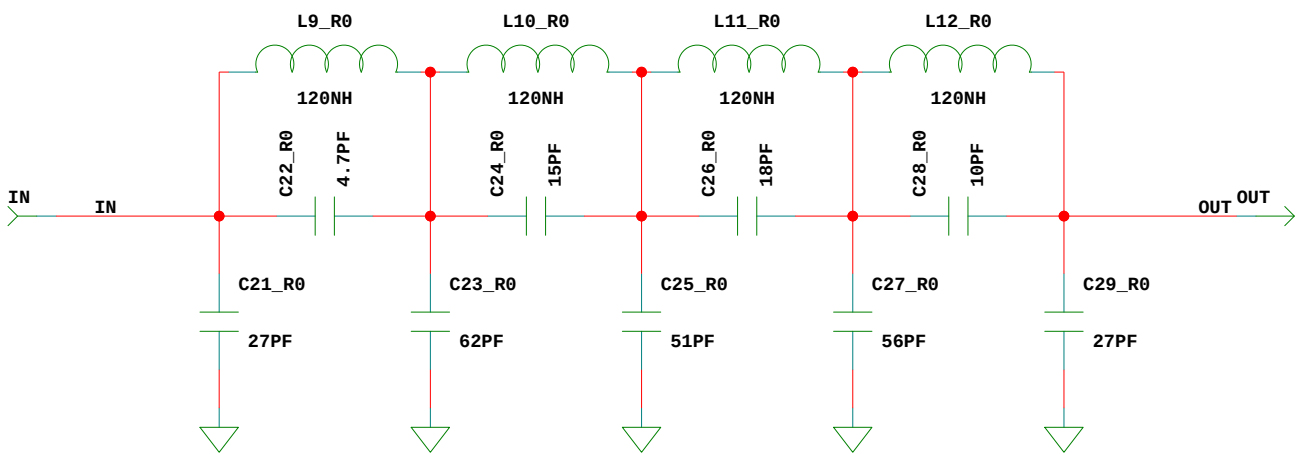
1

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INAF ASTRON				
DESIGN LP_80_MHz CH2				
SIZE A3	Filename LP_80_MHz			REV 1
DRAWN BY Federico Perini & Sieds Damstra		SHEET19 of 20	DATE 02/03/2022:19:45	

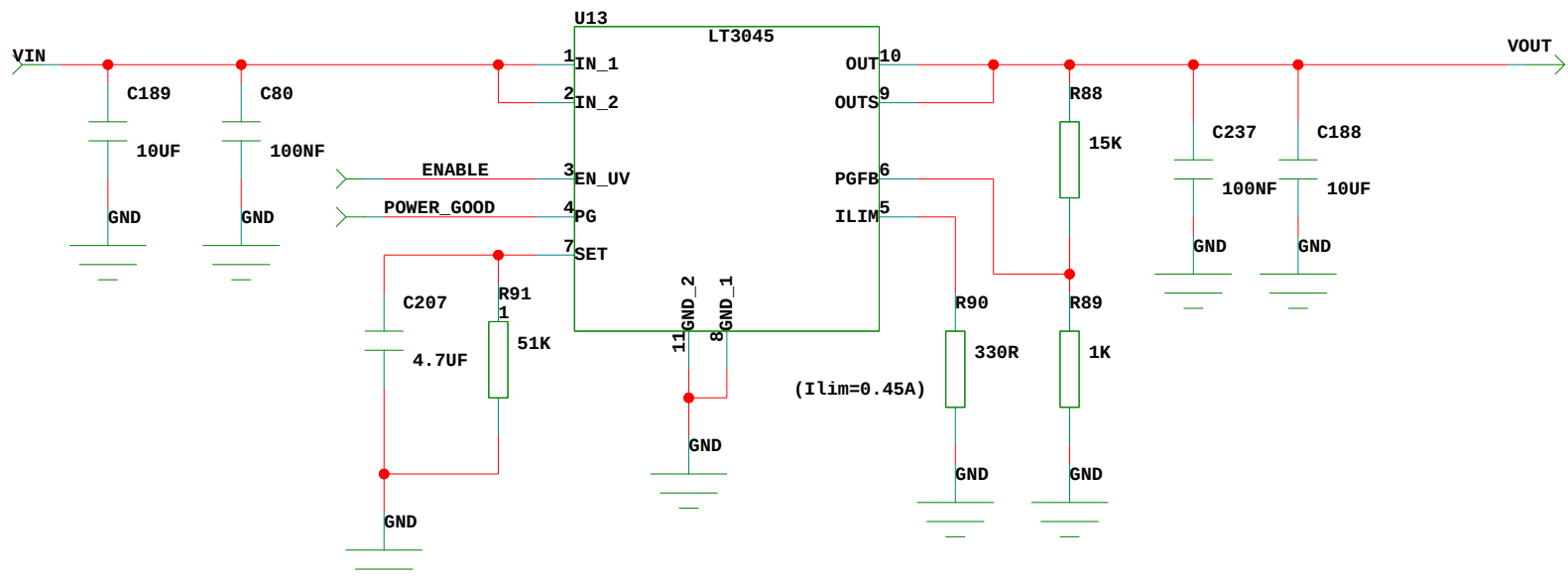
REVISIONS RCU2_LB

03/06/2020
FIRST EMISSION

ASTRON			
DESIGN <TITLE>			
SIZE A1	Filename 1	RCU2_LB	
DRAWN BY Federico Perini & Sieds Damstra		SHEET 20 of 20	DATE 02/03/2022:19:45



DRAWN BY Sieds / Gijs	SHEET 21 of 52	DATE 24/02/2022:10:39
---------------------------------	------------------------------	---------------------------------



$$V_{good} = 0.3 \left(1 + \frac{R_{high}}{R_{low}} \right)$$

$$V_{out} = 100\mu A \cdot R_{set}$$

$$I_{lim} = 150mA \cdot 1e3 / R_{lim}$$

Vout	Rset	ASTRON nr	Vgood	Rhigh	ASTRON nr
5V0	51K	AST02179	4V8	15K	AST01540
3V3	33K2	AST02177	2V8	8K2	AST01333
2V5	25K5	AST02176	2V3	6K8	AST02163
1V8	18K	AST02178	1V7	4K7	AST01979

ASTRON

DESIGN

VCC Analog Buffer Channel 0

SIZE
A1

Filename

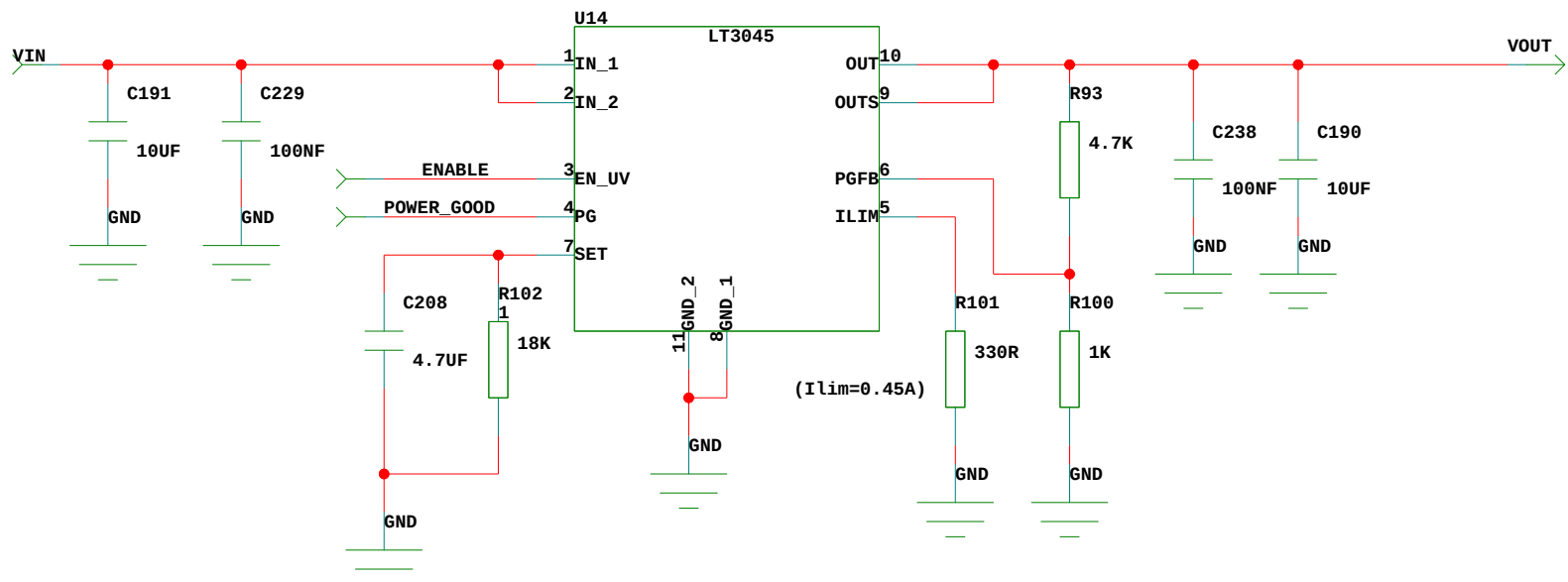
LDO_POWERSUPPLY

REV
3.0

DRAWN BY
Sieds / Gijs

SHEET 22 of 52

DATE
02/03/2022:19:49



$$V_{good} = 0.3 \left(1 + \frac{R_{high}}{R_{low}} \right)$$

$$V_{out} = 100\mu A \cdot R_{set}$$

$$I_{lim} = 150mA \cdot 1e3 / R_{lim}$$

Vout	Rset	ASTRON nr	Vgood	Rhigh	ASTRON nr
5V0	51K	AST02179	4V8	15K	AST01540
3V3	33K2	AST02177	2V8	8K2	AST01333
2V5	25K5	AST02176	2V3	6K8	AST02163
1V8	18K	AST02178	1V7	4K7	AST01979

ASTRON

DESIGN

VCC Analog Buffer Channel 0

SIZE
A1

Filename

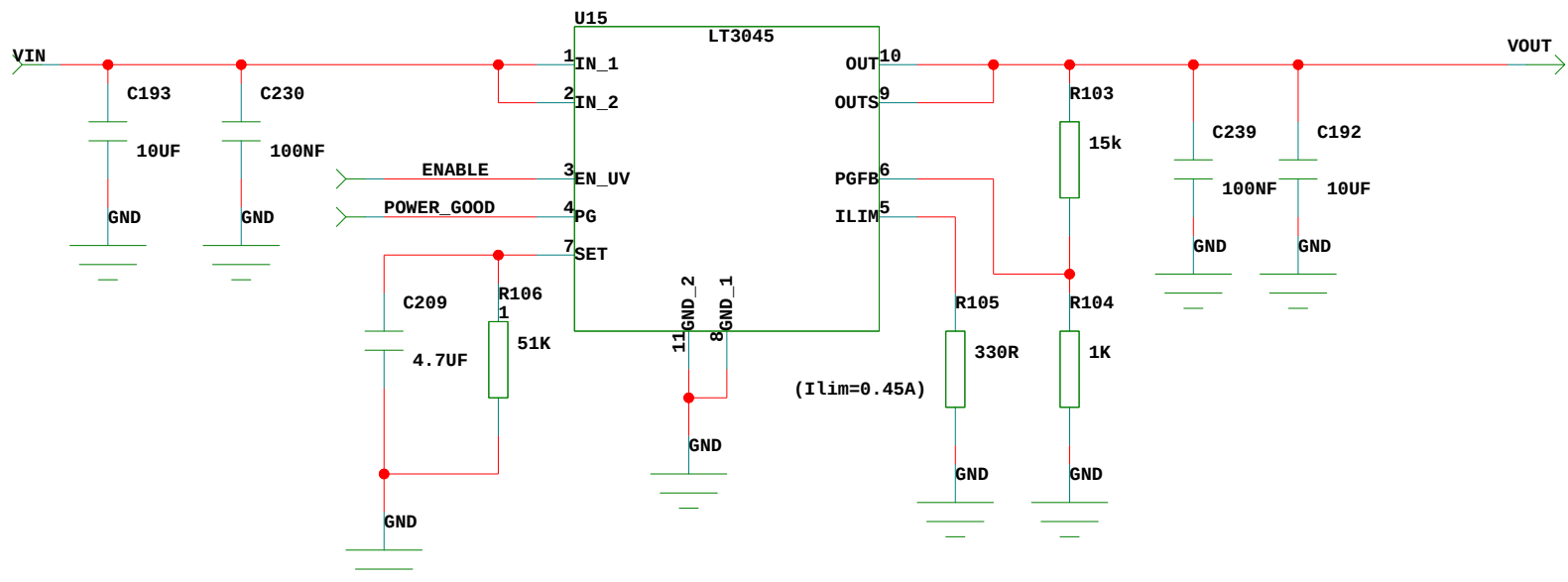
LDO_POWERSUPPLY

REV
3.0

DRAWN BY
Sieds / Gijs

SHEET 23 of 52

DATE
02/03/2022:19:49



$$V_{good} = 0.3 \left(1 + \frac{R_{high}}{R_{low}} \right)$$

$$V_{out} = 100\mu A \cdot R_{set}$$

$$I_{lim} = 150mA \cdot 1e3 / R_{lim}$$

Vout	Rset	ASTRON nr	Vgood	Rhigh	ASTRON nr
5V0	51K	AST02179	4V8	15K	AST01540
3V3	33K2	AST02177	2V8	8K2	AST01333
2V5	25K5	AST02176	2V3	6K8	AST02163
1V8	18K	AST02178	1V7	4K7	AST01979

ASTRON

DESIGN

VCC Analog Buffer Channel 1

SIZE
A1

Filename

LDO_POWERSUPPLY

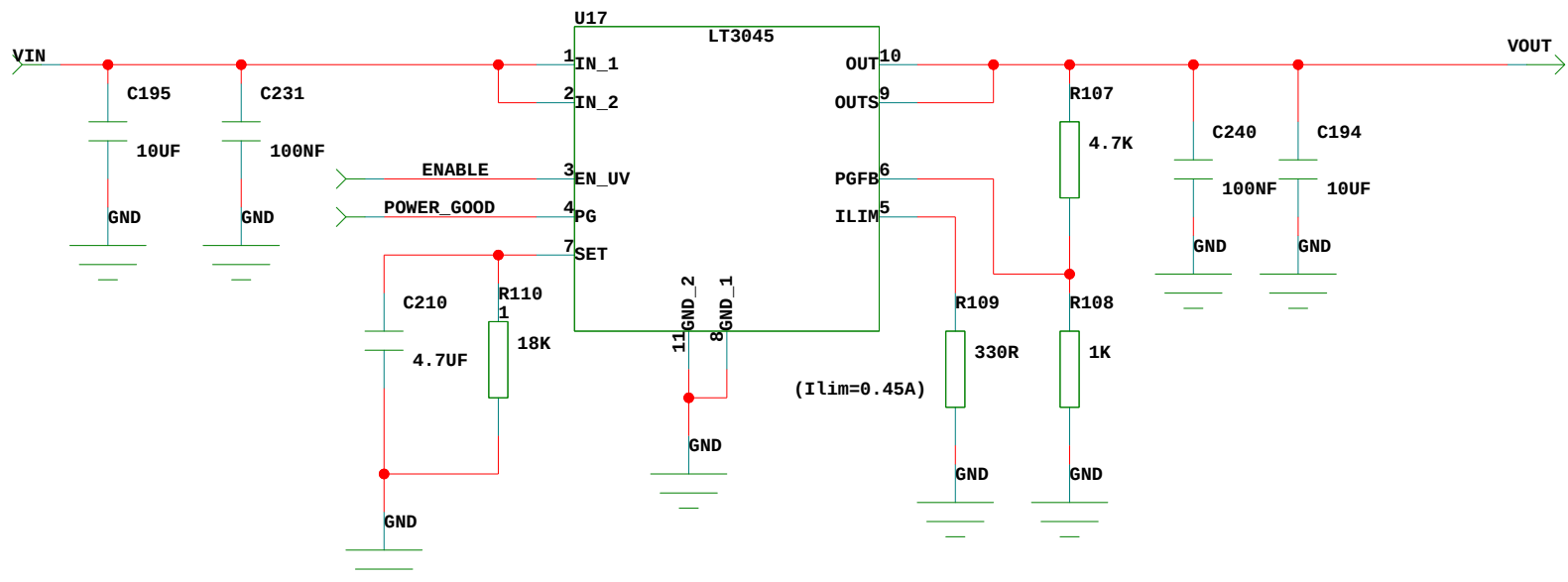
REV
3.0

DRAWN BY
Sieds / Gijs

SHEET 24 of 52

DATE

02/03/2022:19:49



$$V_{good} = 0.3 \left(1 + \frac{R_{high}}{R_{low}} \right)$$

$$V_{out} = 100\mu A \cdot R_{set}$$

$$I_{lim} = 150mA \cdot 1e3 / R_{lim}$$

Vout	Rset	ASTRON nr	Vgood	Rhigh	ASTRON nr
5V0	51K	AST02179	4V8	15K	AST01540
3V3	33K2	AST02177	2V8	8K2	AST01333
2V5	25K5	AST02176	2V3	6K8	AST02163
1V8	18K	AST02178	1V7	4K7	AST01979

ASTRON

DESIGN

VCC Analog Buffer Channel 1

SIZE
A1

Filename

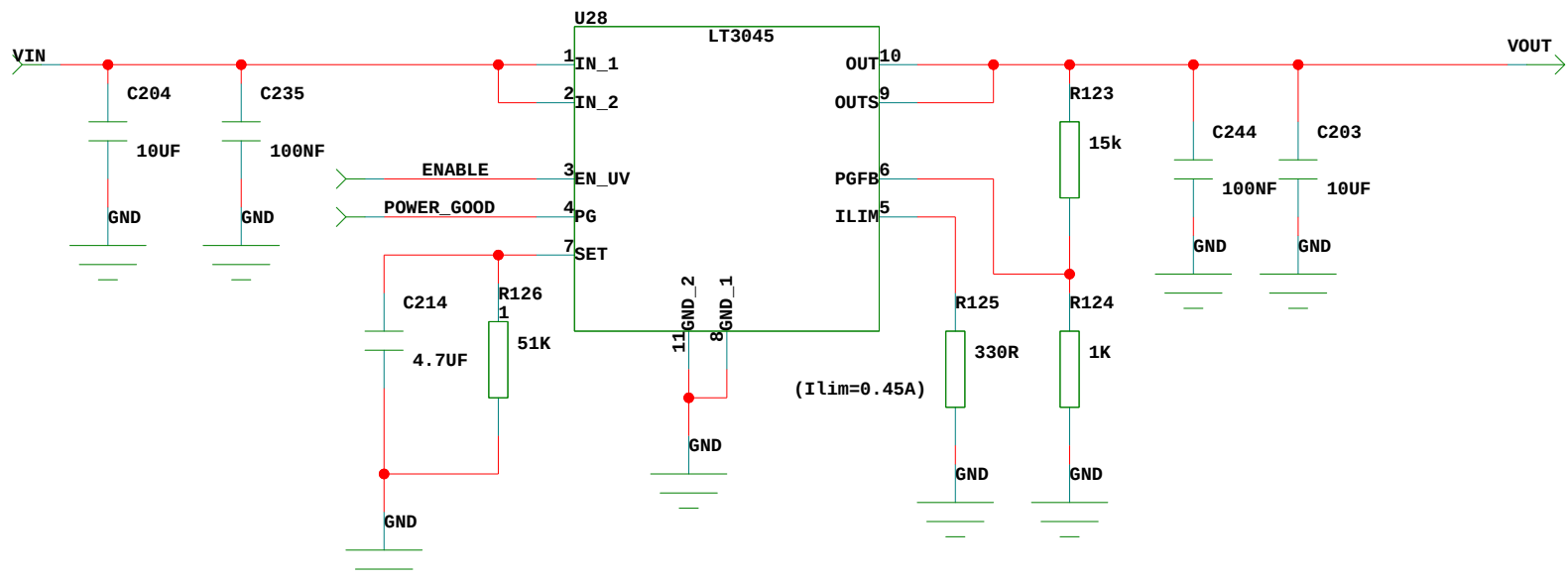
LDO_POWERSUPPLY

REV
3.0

DRAWN BY
Sieds / Gijs

SHEET 25 of 52

DATE
02/03/2022:19:49



$$V_{good} = 0.3 \left(1 + \frac{R_{high}}{R_{low}} \right)$$

$$V_{out} = 100\mu A \cdot R_{set}$$

$$I_{lim} = 150mA \cdot 1e3 / R_{lim}$$

Vout	Rset	ASTRON nr	Vgood	Rhigh	ASTRON nr
5V0	51K	AST02179	4V8	15K	AST01540
3V3	33K2	AST02177	2V8	8K2	AST01333
2V5	25K5	AST02176	2V3	6K8	AST02163
1V8	18K	AST02178	1V7	4K7	AST01979

ASTRON

DESIGN

VCC Analog Buffer Channel 2

SIZE
A1

Filename

LDO_POWERSUPPLY

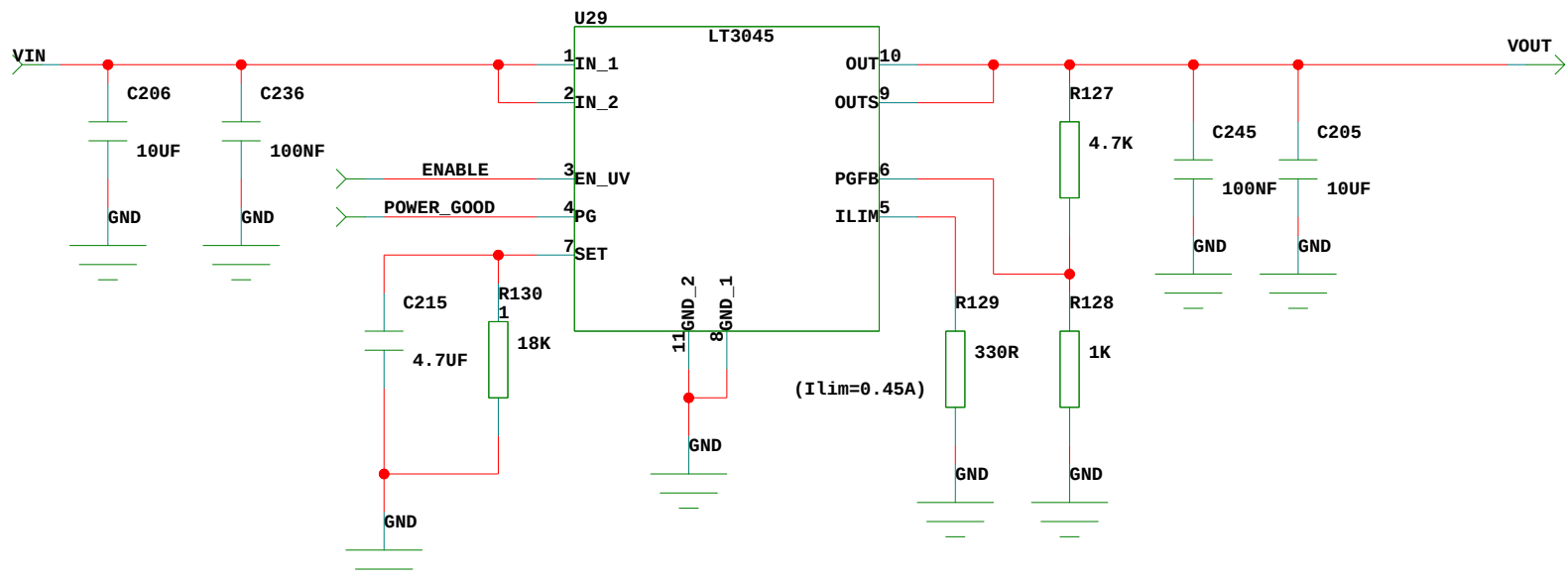
REV
3.0

DRAWN BY
Sieds / Gijs

SHEET 26 of 52

DATE

02/03/2022:19:49



$$V_{good} = 0.3 \left(1 + \frac{R_{high}}{R_{low}} \right)$$

$$V_{out} = 100\mu A \cdot R_{set}$$

$$I_{lim} = 150mA \cdot 1e3 / R_{lim}$$

Vout	Rset	ASTRON nr	Vgood	Rhigh	ASTRON nr
5V0	51K	AST02179	4V8	15K	AST01540
3V3	33K2	AST02177	2V8	8K2	AST01333
2V5	25K5	AST02176	2V3	6K8	AST02163
1V8	18K	AST02178	1V7	4K7	AST01979

ASTRON

DESIGN

VCC Analog Buffer Channel 2

SIZE
A1

Filename

LDO_POWERSUPPLY

REV
3.0

DRAWN BY
Sieds / Gijs

SHEET 27 of 52

DATE
02/03/2022:19:49

E

D

C

B

A

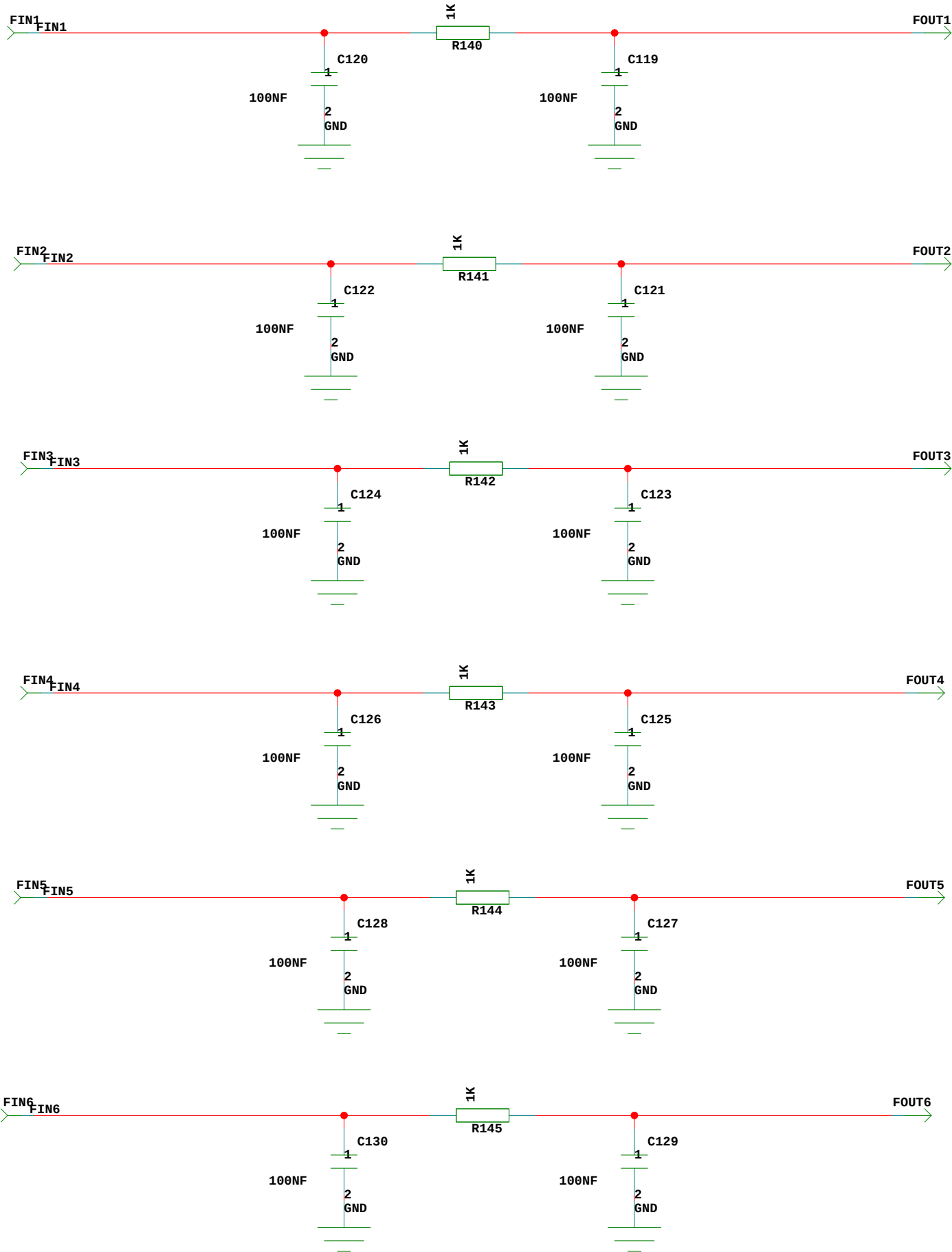
1

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ASTRON

DESIGN				Filter Datalines ADC Buffer			
SIZE	Filename	CRC_NETWORK				REV	3.0
DRAWN BY Sieds / Gijs		SHEET	28	of	52	DATE	24/02/2022:10:39

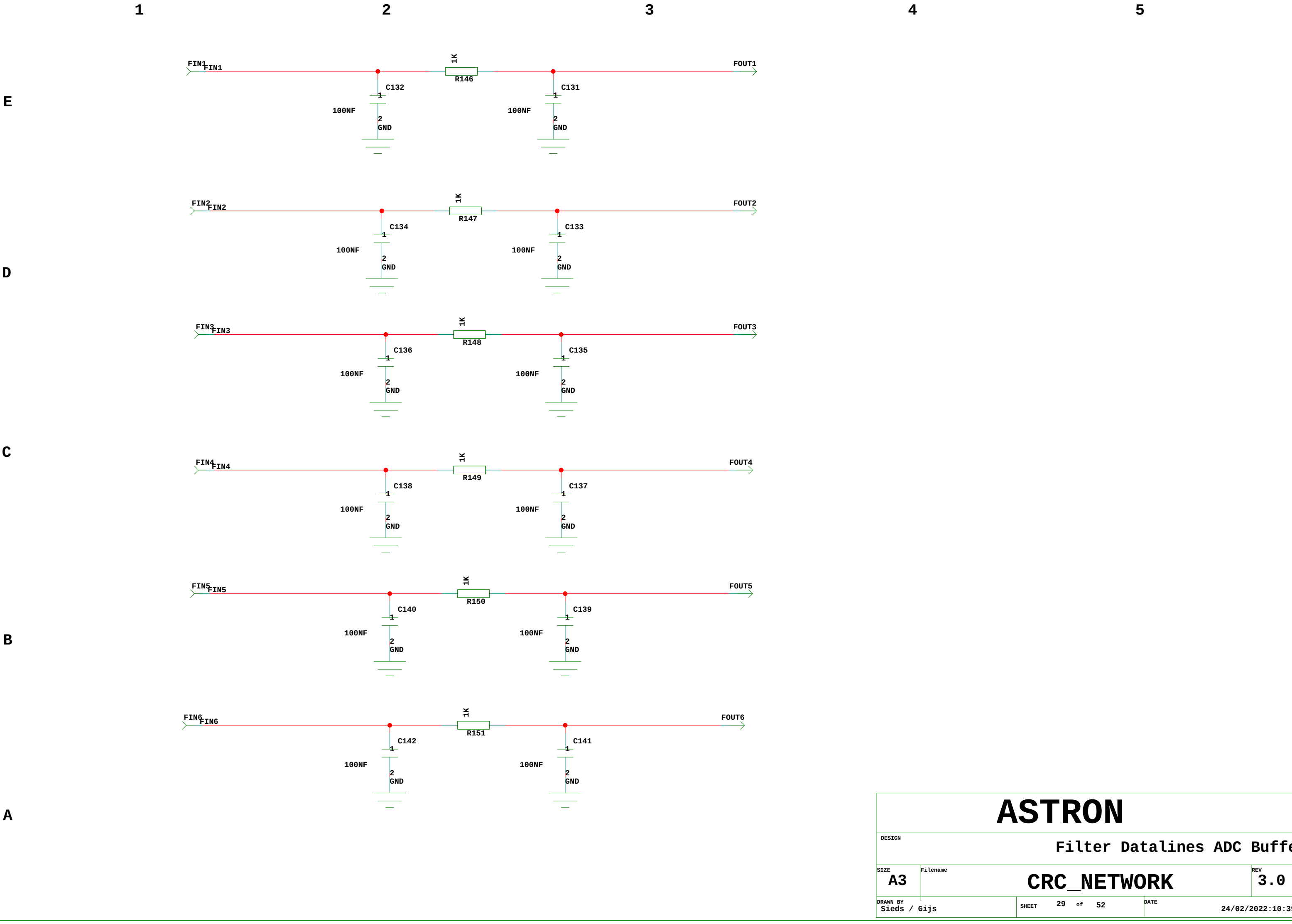
E

D

C

B

A



ASTRON

Filter Datalines ADC Buffer

DESIGN			
SIZE	Filename	CRC_NETWORK	
A3			REV 3.0
DRAWN BY Sieds / Gijs	SHEET 29 of 52	DATE 24/02/2022:10:39	

E

D

C

B

A

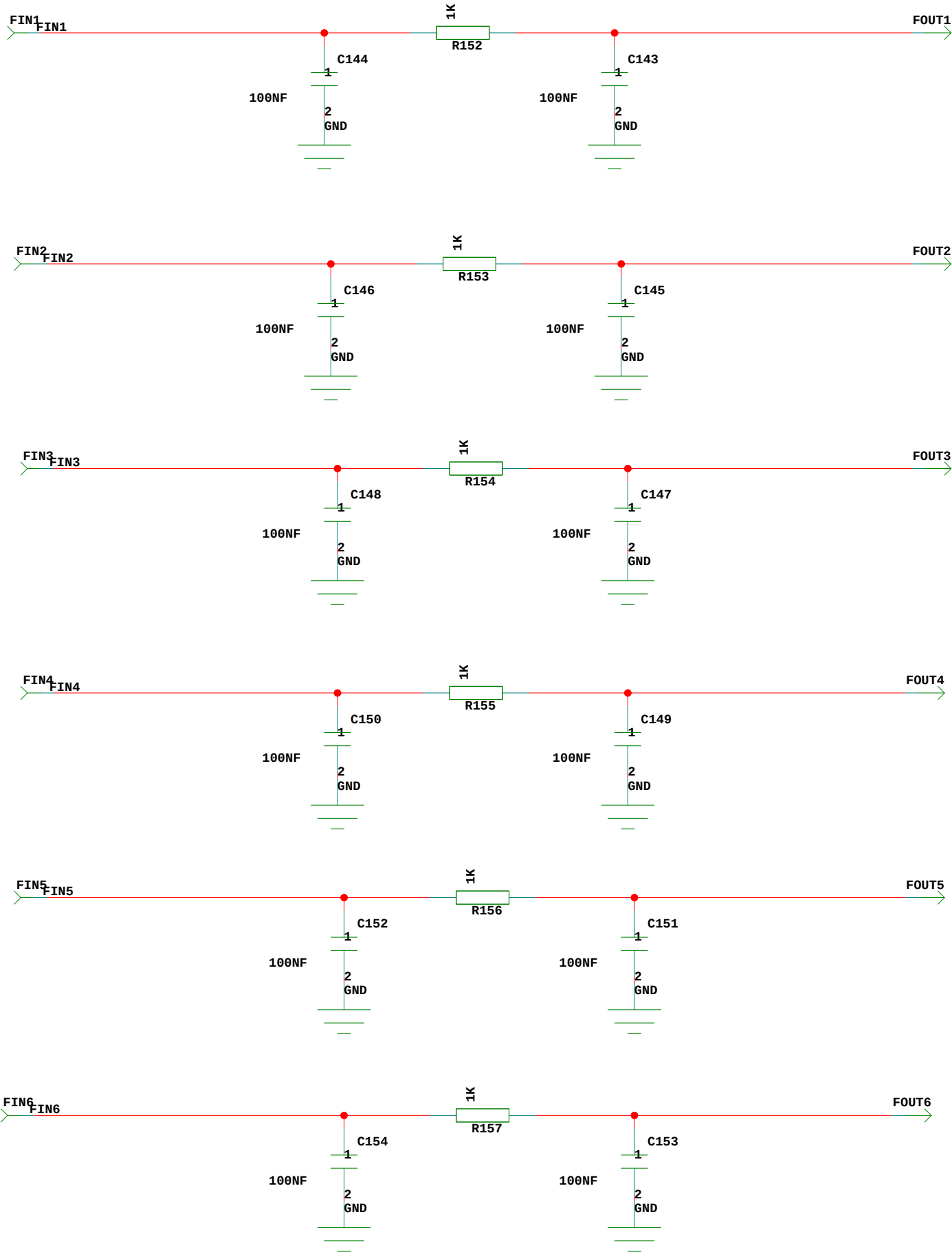
1

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ASTRON

DESIGN				Filter Datalines ADC Buffer			
SIZE	Filename	CRC_NETWORK				REV	3.0
DRAWN BY		SHEET		DATE			
Sieds / Gijs		30 of 52		24/02/2022:10:39			

E

D

C

B

A

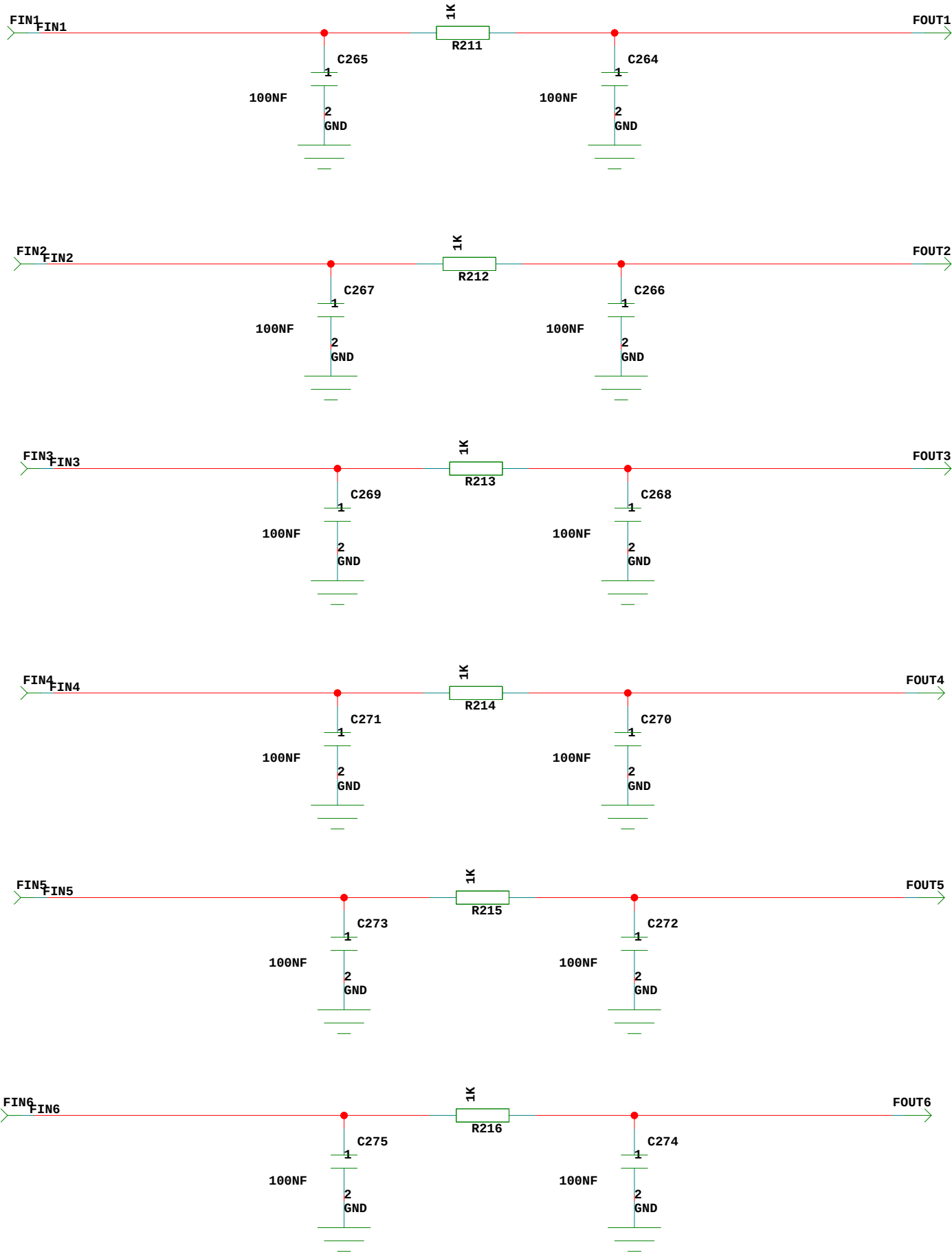
1

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5

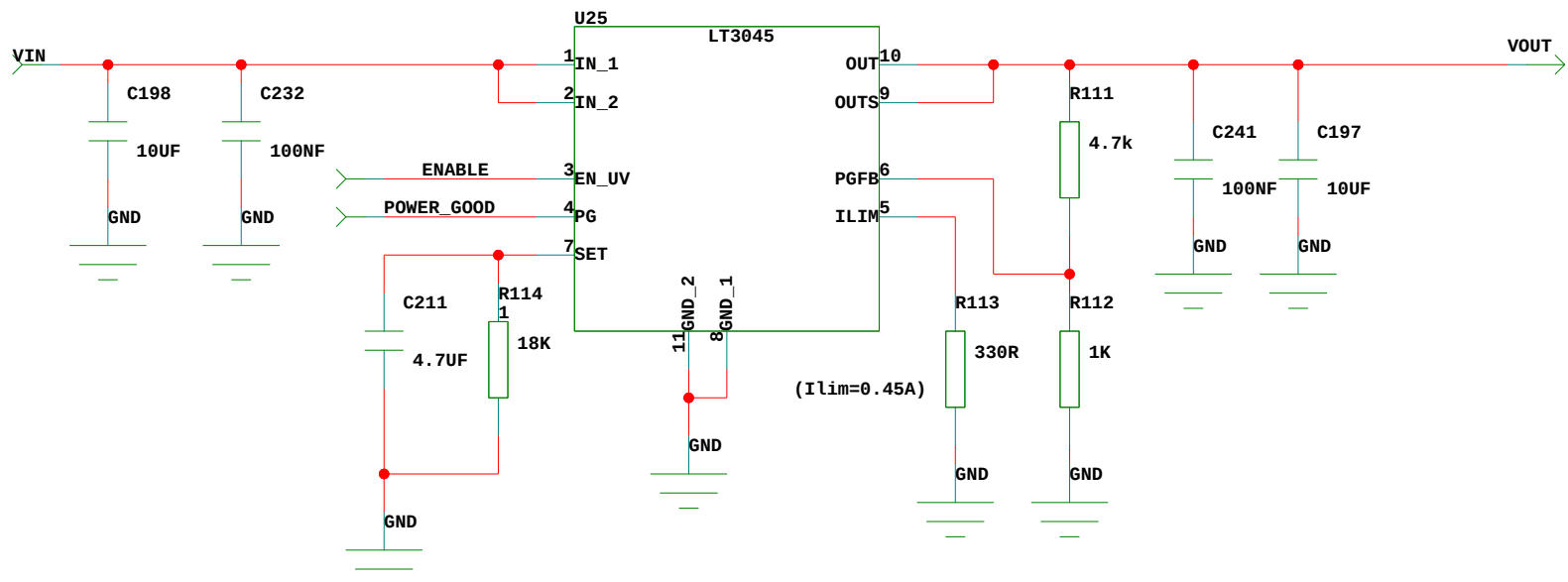


ASTRON

DESIGN Filter Datalines ADC Buffer

SIZE A3	Filename	REV 3.0
------------	----------	------------

DRAWN BY Sieds / Gijs	SHEET 31 of 52	DATE 24/02/2022:10:39
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$$V_{good} = 0.3 \left(1 + \frac{R_{high}}{R_{low}} \right)$$

$$V_{out} = 100\mu A \cdot R_{set}$$

$$I_{lim} = 150mA \cdot 1e3 / R_{lim}$$

Vout	Rset	ASTRON nr	Vgood	Rhigh	ASTRON nr
5V0	51K	AST02179	4V8	15K	AST01540
3V3	33K2	AST02177	2V8	8K2	AST01333
2V5	25K5	AST02176	2V3	6K8	AST02163
1V8	18K	AST02178	1V7	4K7	AST01979

ASTRON

DESIGN

Central Power ADC Power

SIZE
A1

Filename

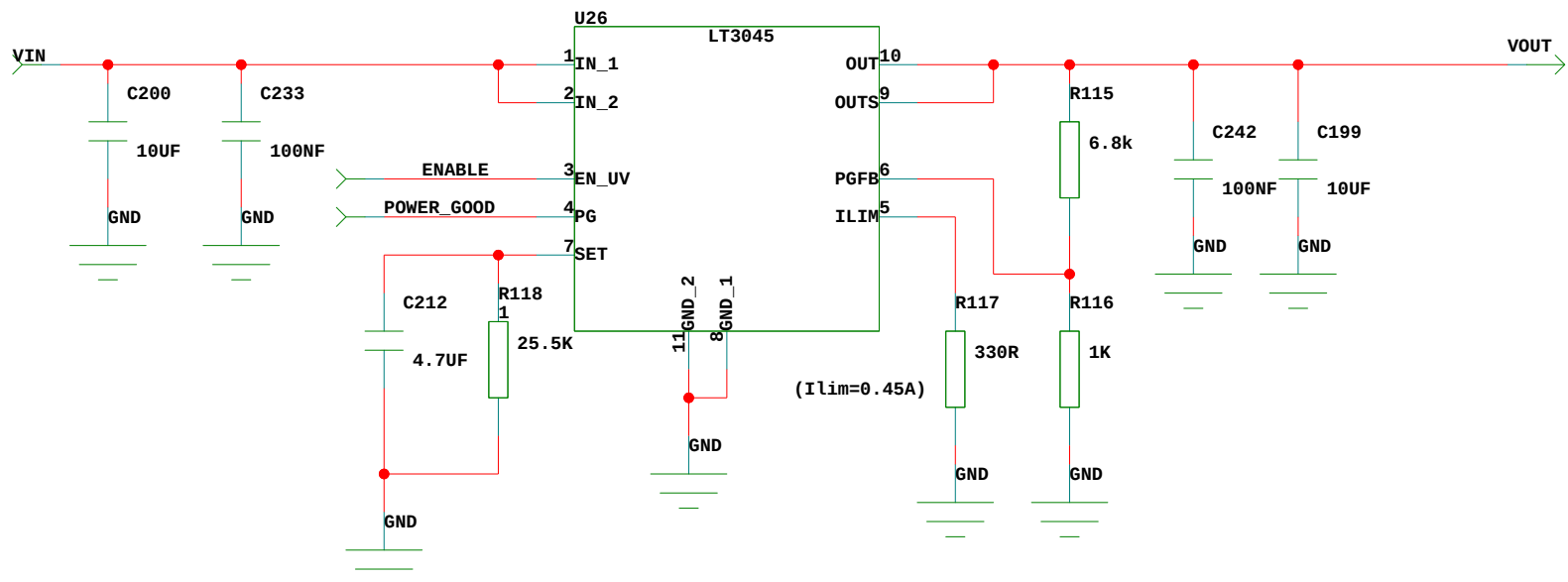
LDO_POWER SUPPLY

REV
3.0

DRAWN BY
Sieds / Gijs

SHEET 32 of 52

DATE
02/03/2022:19:49



$$V_{good} = 0.3 \left(1 + \frac{R_{high}}{R_{low}} \right)$$

$$V_{out} = 100\mu A \cdot R_{set}$$

$$I_{lim} = 150mA \cdot 1e3 / R_{lim}$$

Vout	Rset	ASTRON nr	Vgood	Rhigh	ASTRON nr
5V0	51K	AST02179	4V8	15K	AST01540
3V3	33K2	AST02177	2V8	8K2	AST01333
2V5	25K5	AST02176	2V3	6K8	AST02163
1V8	18K	AST02178	1V7	4K7	AST01979

ASTRON

DESIGN

Central Power supply for CLock

SIZE
A1

Filename

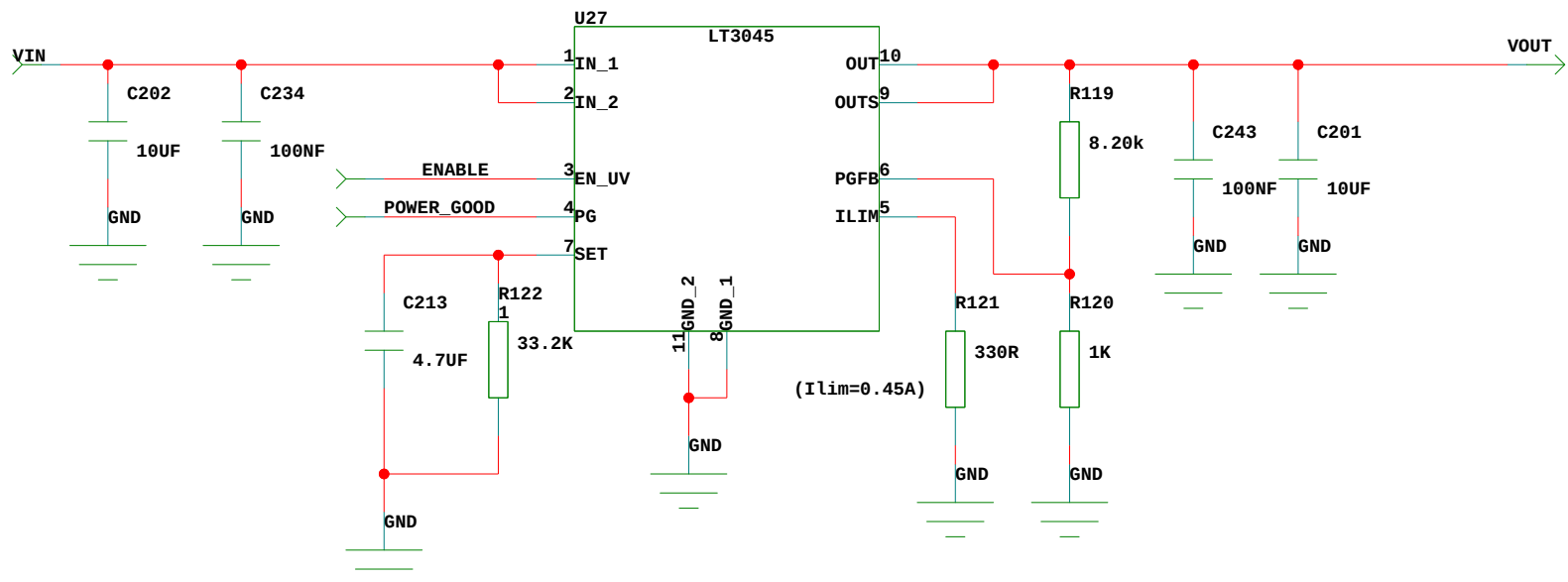
LDO_POWERSUPPLY

REV
3.0

DRAWN BY
Sieds / Gijs

SHEET 33 of 52

DATE
02/03/2022:19:49



$$V_{good} = 0.3 \left(1 + \frac{R_{high}}{R_{low}} \right)$$

$$V_{out} = 100\mu A \cdot R_{set}$$

$$I_{lim} = 150mA \cdot 1e3 / R_{lim}$$

Vout	Rset	ASTRON nr	Vgood	Rhigh	ASTRON nr
5V0	51K	AST02179	4V8	15K	AST01540
3V3	33K2	AST02177	2V8	8K2	AST01333
2V5	25K5	AST02176	2V3	6K8	AST02163
1V8	18K	AST02178	1V7	4K7	AST01979

ASTRON

DESIGN

Central Power for Control (3V3)

SIZE
A1

Filename

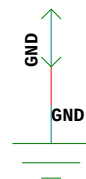
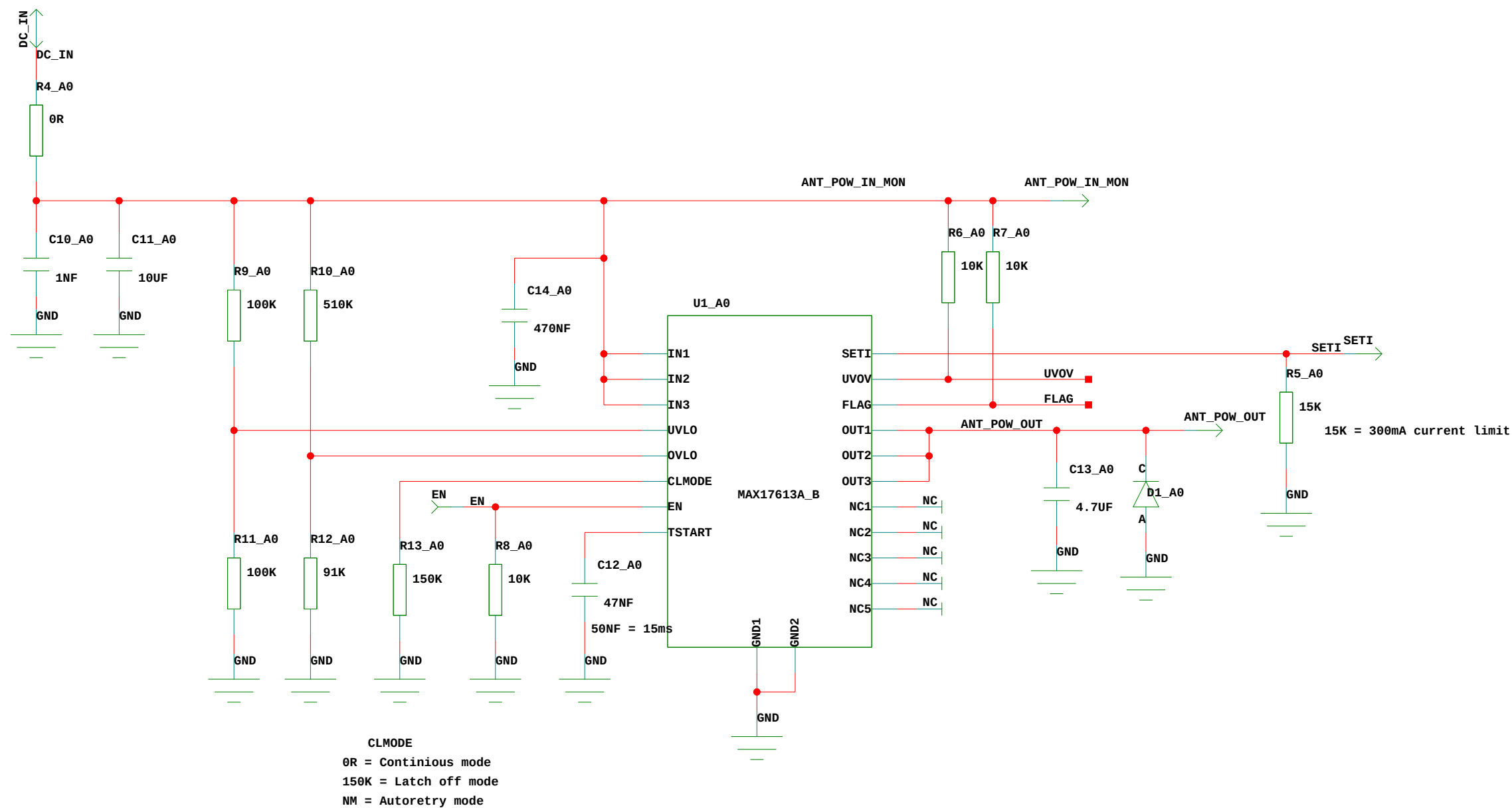
LDO_POWER SUPPLY

REV
3.0

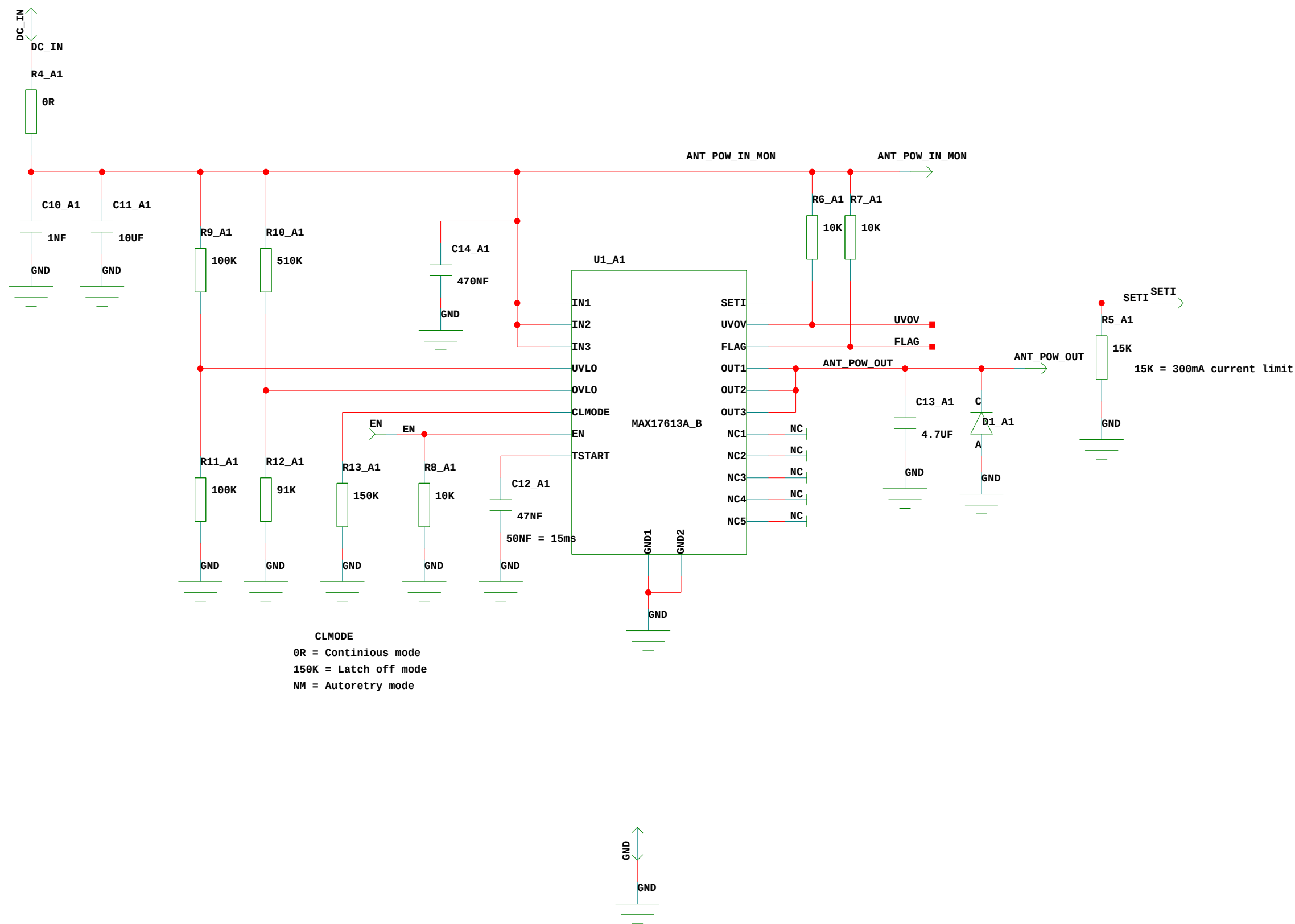
DRAWN BY
Sieds / Gijs

SHEET 34 of 52

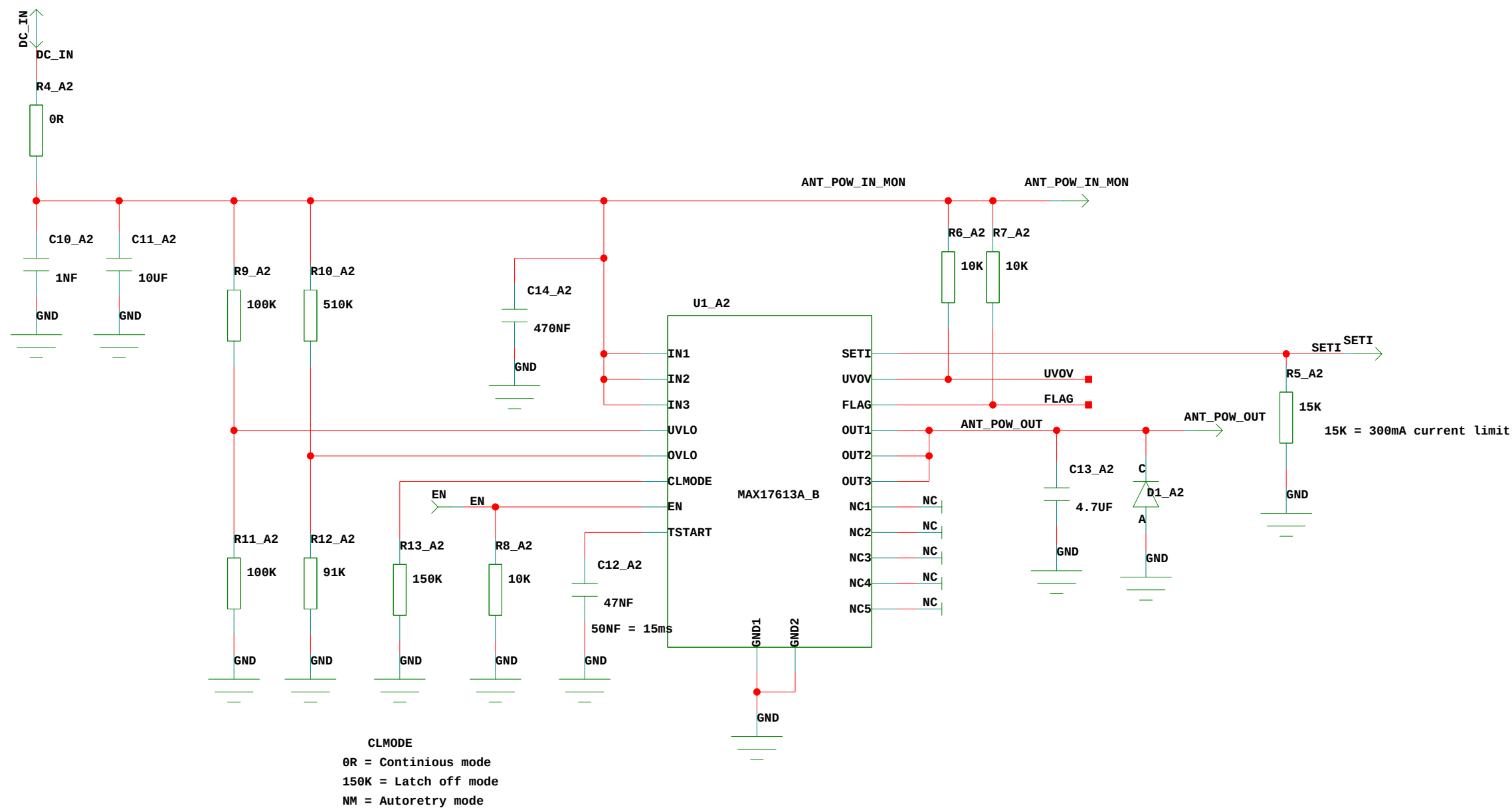
DATE
02/03/2022:19:49



 ASTRON POSTBUS 2 DWINGELOO	DOC. NR.			
	Title ANTENNA POWER SWITCH LOW BAND RCU2.0 LOFAR 2.0			
Drawn: S.Damstra	Size A	Filename Ant_Pow_Switch_LB_RCU2_0_LOFAR2_0	Project LOFAR 2.0	REV 1.0
Chk.: G.W.Schoonderbeek / P. Kruger	Date: 03/03/2022:17:42	Sheet of 2		

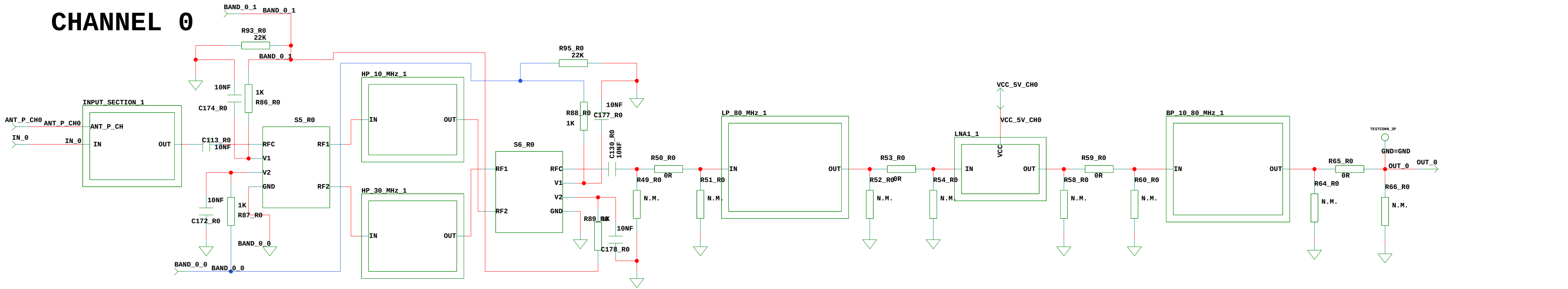


 ASTRON POSTBUS 2 DWINGELOO	DOC. NR.			
	Title ANTENNA POWER SWITCH LOW BAND RCU2.0 LOFAR2.0			
Drawn: S.Damstra	Size A	Filename Ant_Pow_Switch_LB_RCU2_0_LOFAR2_0	Project LOFAR 2.0	REV 1.0
Chk.: G.W.Schoonderbeek / P.Kruger	Date: 03/03/2022:17:42	Sheet of 2		

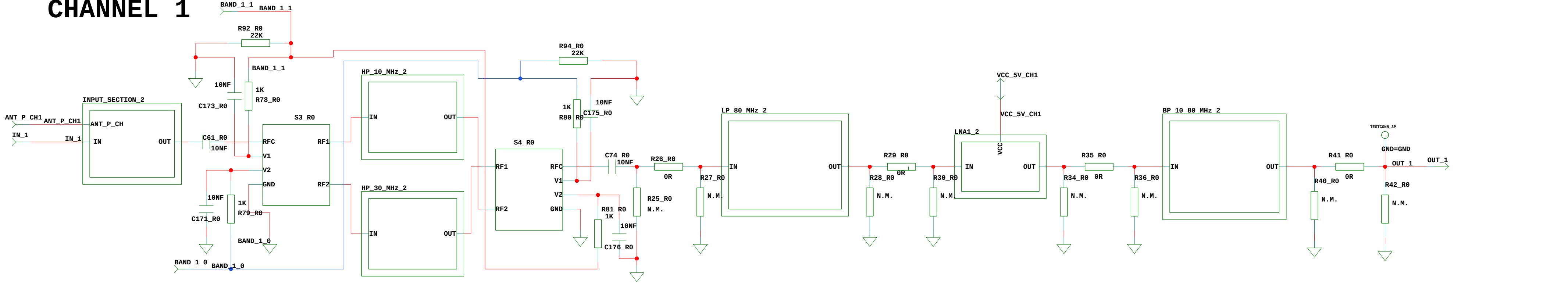


 ASTRON POSTBUS 2 DWINGELOO	DOC. NR.			
	Title ANTENNA POWER SWITCH LOW BAND RCU2.0 LOFAR 2.0			
Drawn: S.Damstra	Size A	Filename Ant_Pow_Switch_LB_RCU2_0_LOFAR2_0	Project LOFAR 2.0	REV 1.0
Chk.: G.W.Schoonderbeek / P. Kruger	Date: 03/03/2022:17:42	Sheet of 2		

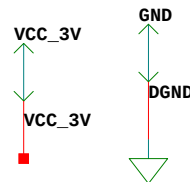
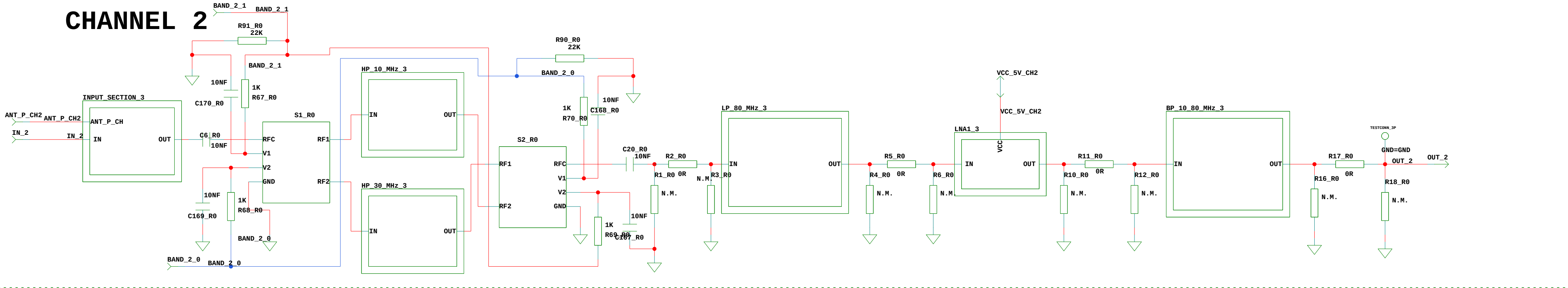
CHANNEL 0



CHANNEL 1



CHANNEL 2



INAF ASTRON

DESIGN RCU2_LB RF signal processing.

SIZE	Filename	2	REV	1
A1				

1

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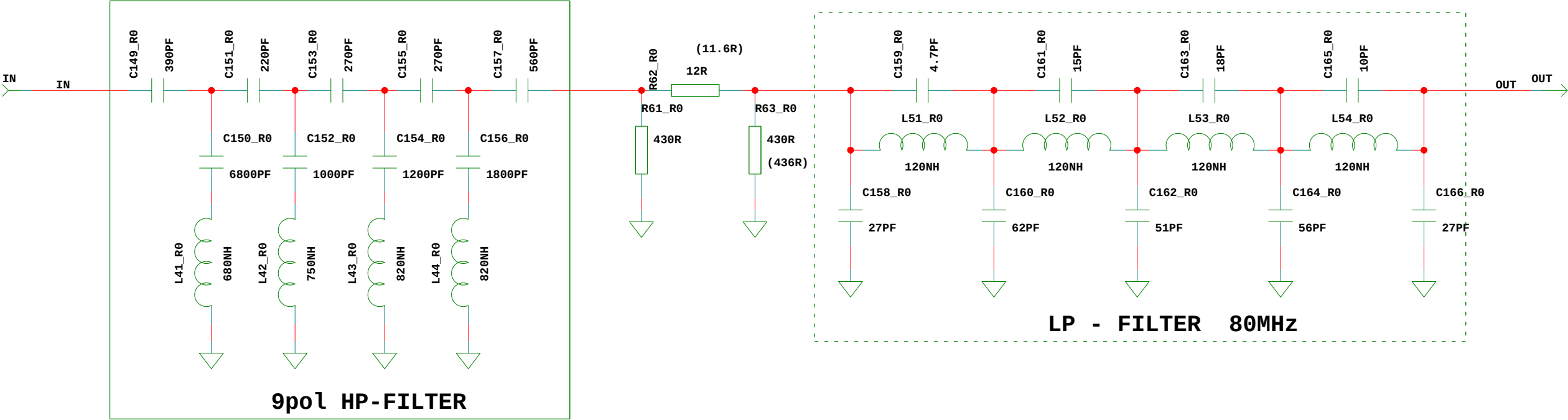
E

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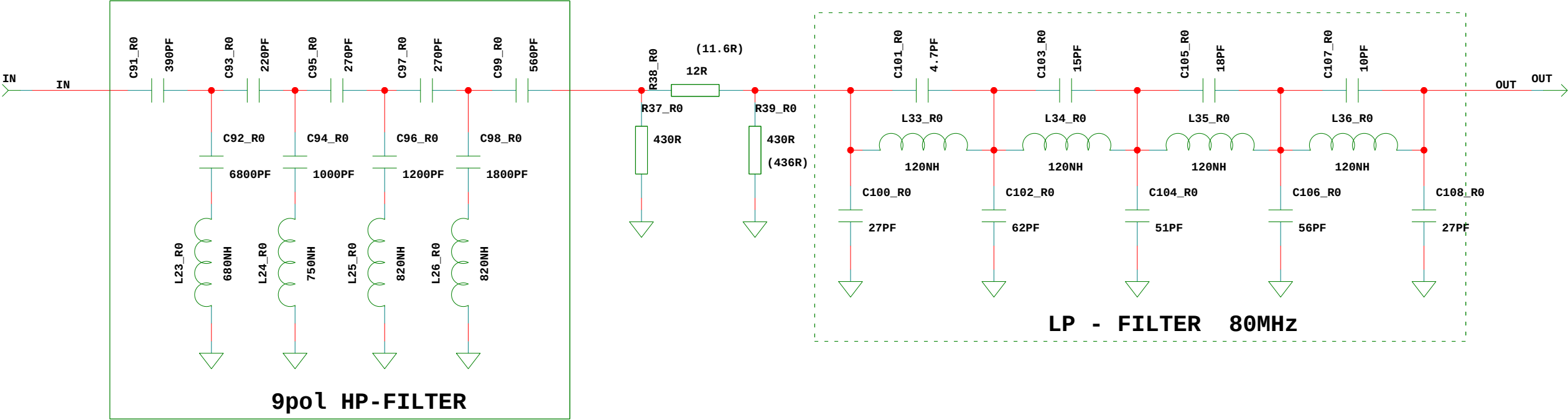
E

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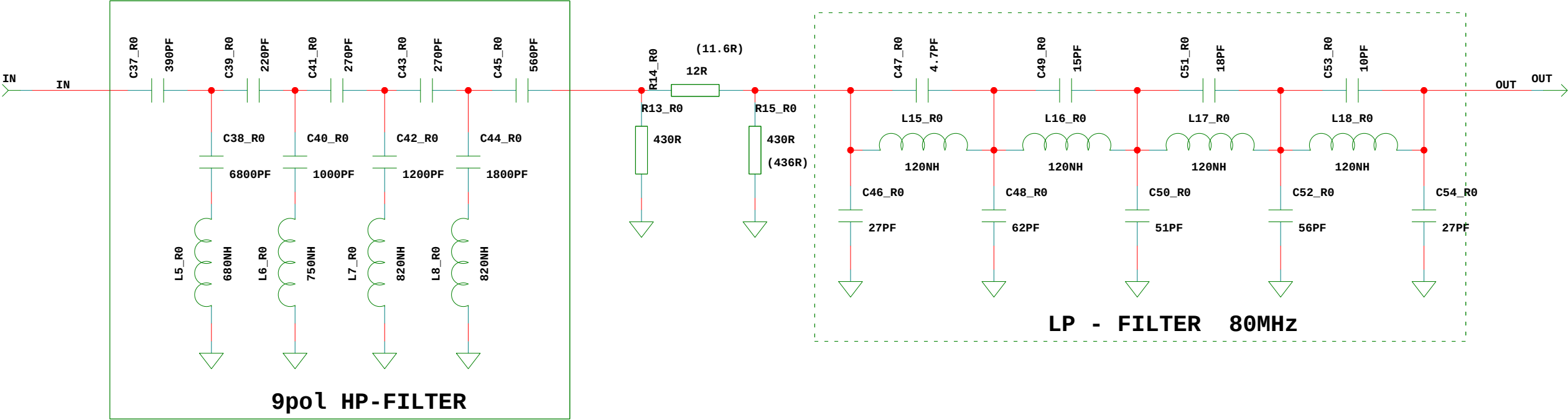
E

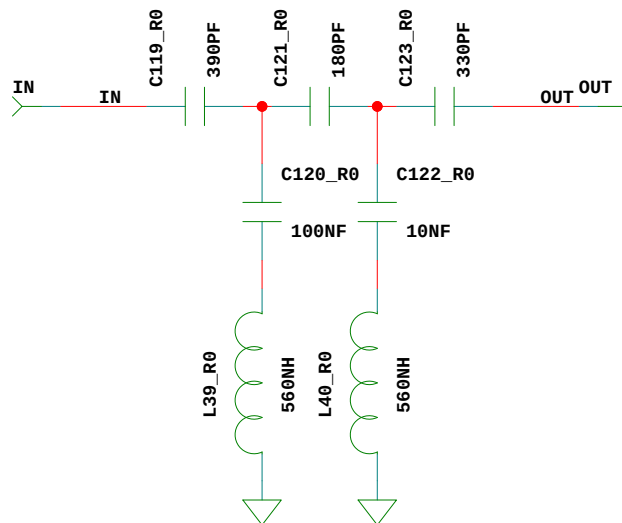
D

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INAF ASTRON

DESIGN

HP_10_MHz CH0

SIZE
A1

Filename

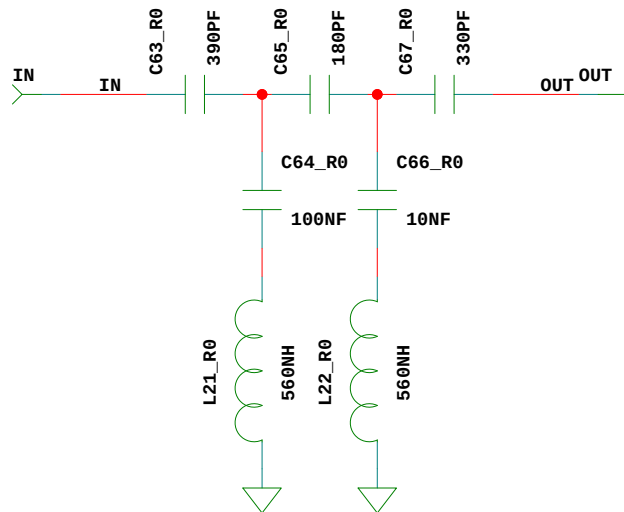
HP_10_MHz

REV
1

DRAWN BY
Federico Perini & Sieds Damstra

SHEET **5** of **20**

DATE
02/03/2022:19:45



INAF ASTRON

DESIGN

HP_10_MHz CH1

SIZE
A1

Filename

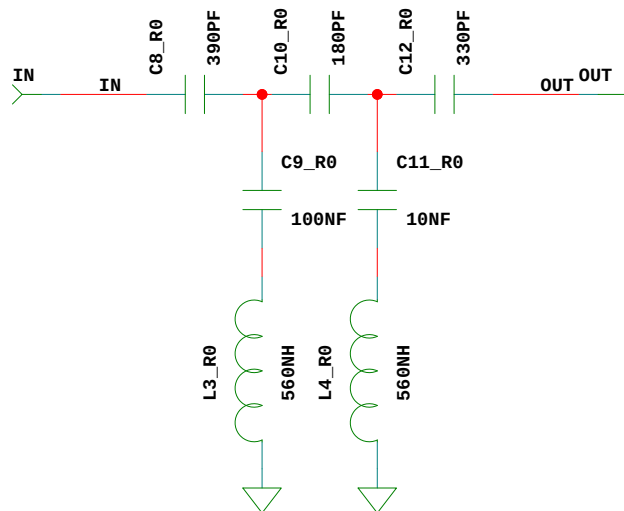
HP_10_MHz

REV
1

DRAWN BY
Federico Perini & Sieds Damstra

SHEET **6** of **20**

DATE
02/03/2022:19:45



INAF ASTRON

DESIGN

HP_10_MHz CH2

SIZE
A1

Filename

HP_10_MHz

REV
1

DRAWN BY

Federico Perini & Sieds Damstra

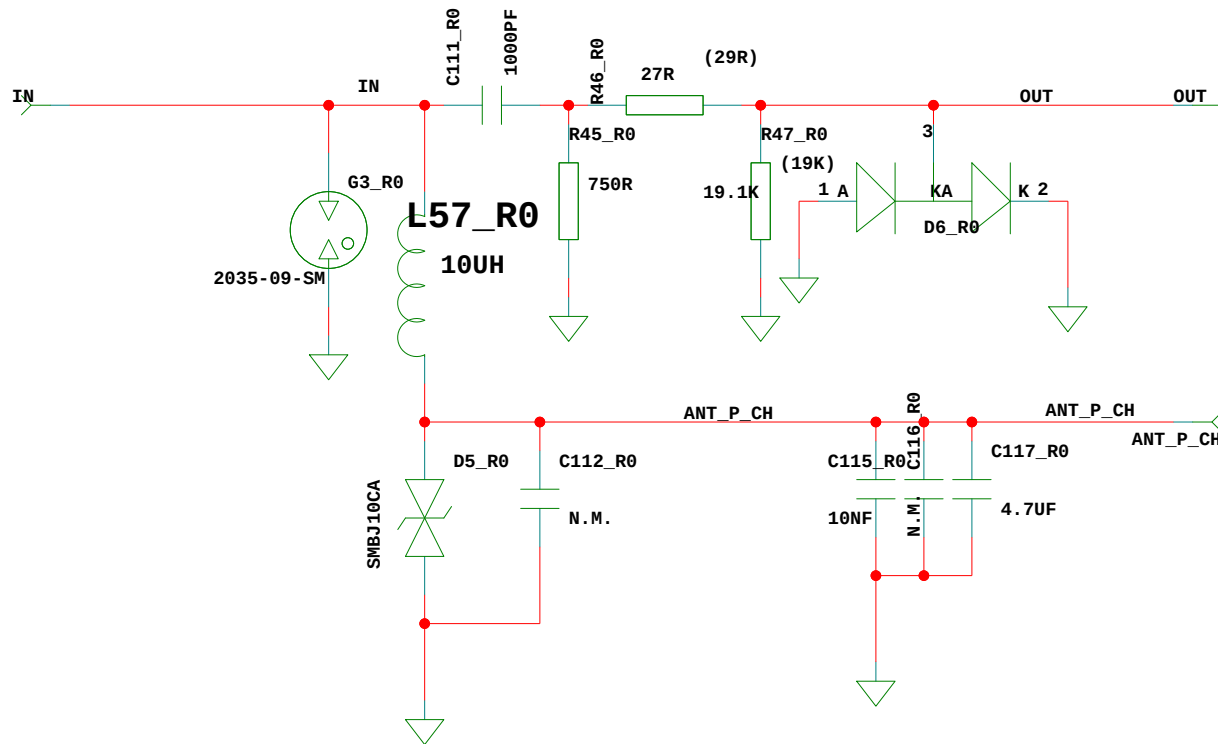
SHEET

7 of 20

DATE

02/03/2022:19:45

4 dB Pad



INAF ASTRON

DESIGN

Input section LBA CH0

SIZE
A1

Filename	
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INPUT_SECTION

REV 1

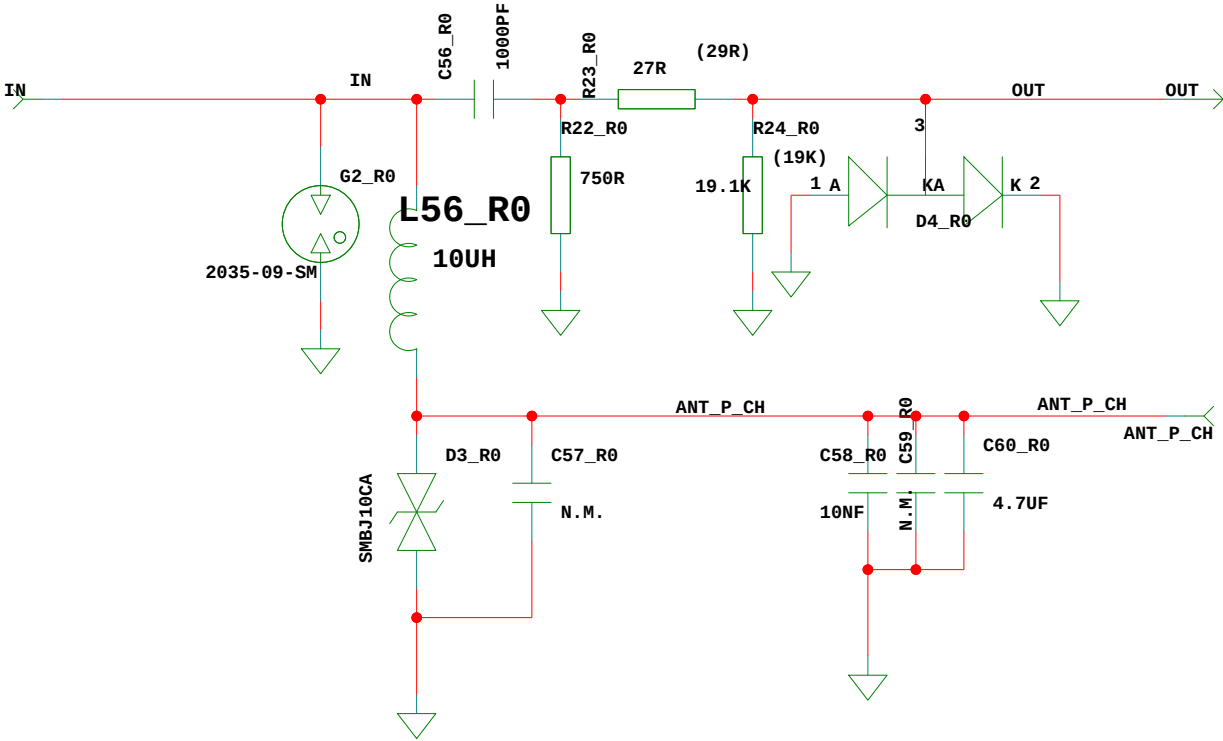
DRAWN BY
Federico Perini & Sieds Damstra

SHEET 11 of 20

DATE

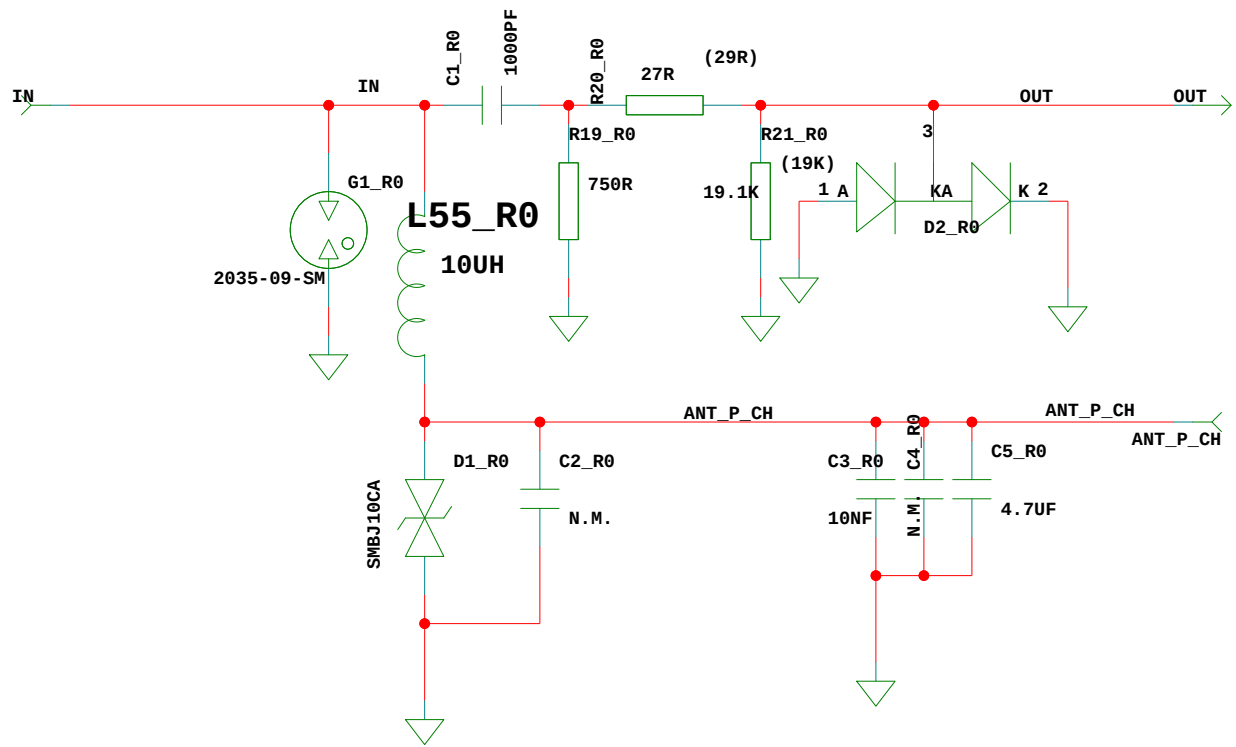
02/03/2022:19:45

4 dB Pad



INAF ASTRON			
DESIGN			
Input section LBA CH1			
SIZE	Filename	INPUT_SECTION	
A1		1	
DRAWN BY		SHEET	DATE
Federico Perini & Sieds Damstra		12 of 20	02/03/2022:19:45

4 dB Pad



INAF ASTRON			
DESIGN			
Input section LBA CH2			
SIZE	Filename	INPUT_SECTION	
A1			REV 1
DRAWN BY		SHEET	DATE
Federico Perini & Sieds Damstra		13 of 20	02/03/2022:19:45

E
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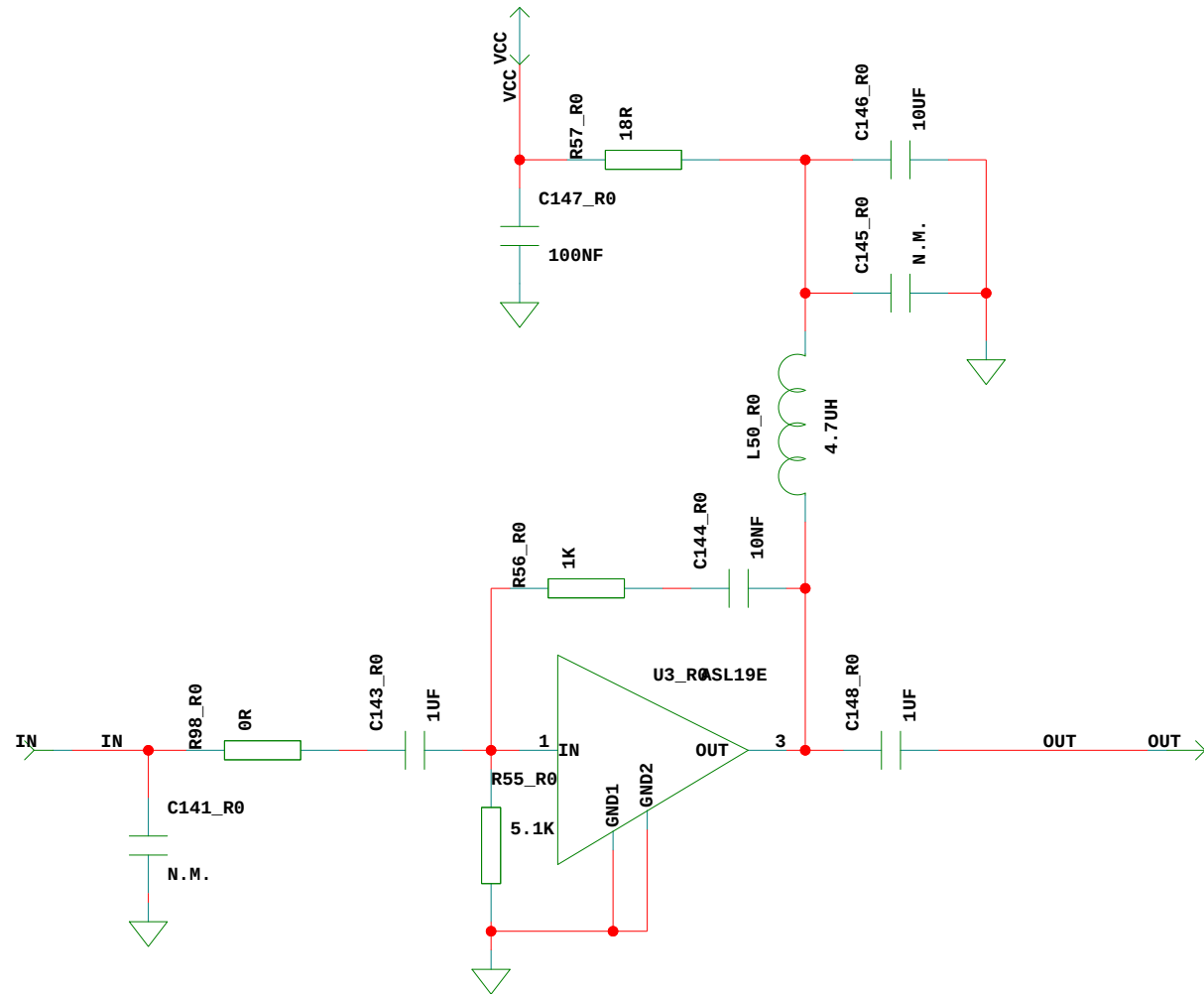
1

2

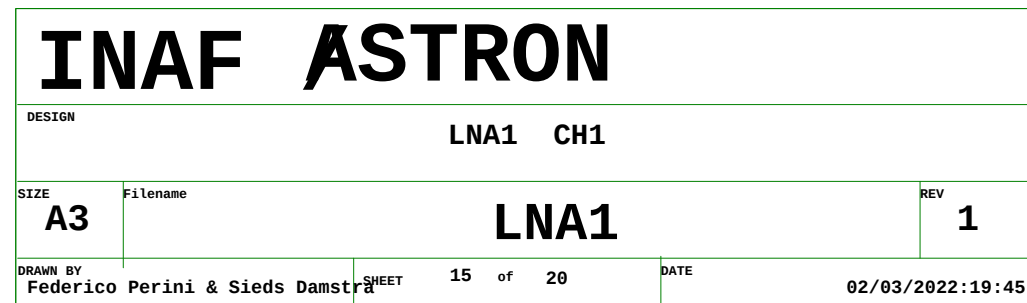
3

4

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INAF ASTRON				
DESIGN LNA1 CH0				
SIZE A3	Filename LNA1			REV 1
DRAWN BY Federico Perini & Sieds Damstra	SHEET 14 of 20	DATE 02/03/2022:19:45		



E
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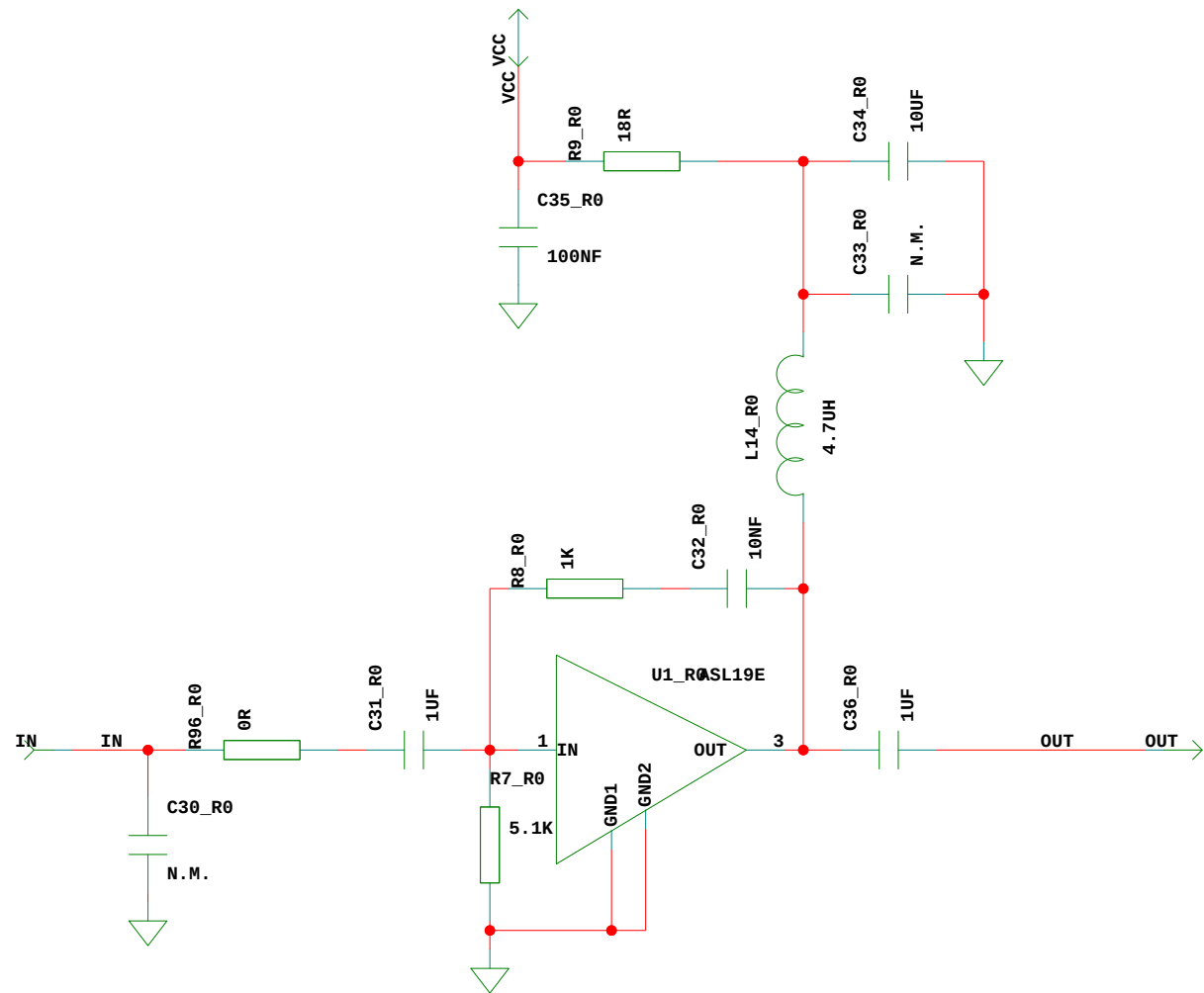
1

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3

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INAF ASTRON			
DESIGN		LNA1 CH2	
SIZE	Filename	REV	
A3	LNA1	1	
DRAWN BY		SHEET	DATE
Federico Perini & Sieds Damstra		16 of 20	02/03/2022:19:45

E

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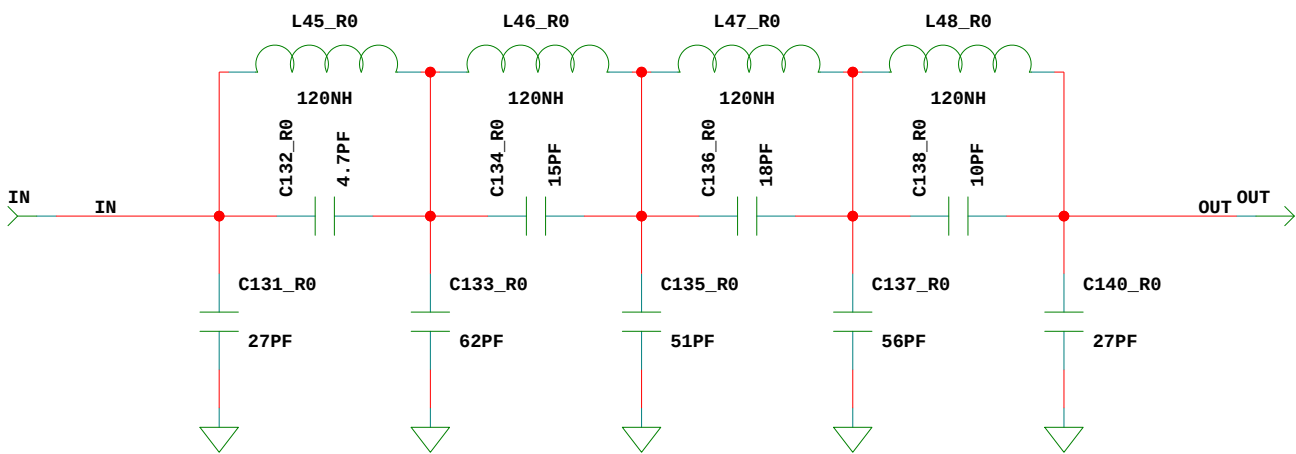
1

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INAF ASTRON

DESIGN LP_80_MHz CH0

SIZE A3

Filename LP_80_MHz

REV 1

DRAWN BY Federico Perini & Sieds Damstra

SHEET 17 of 20

DATE 02/03/2022:19:45

E

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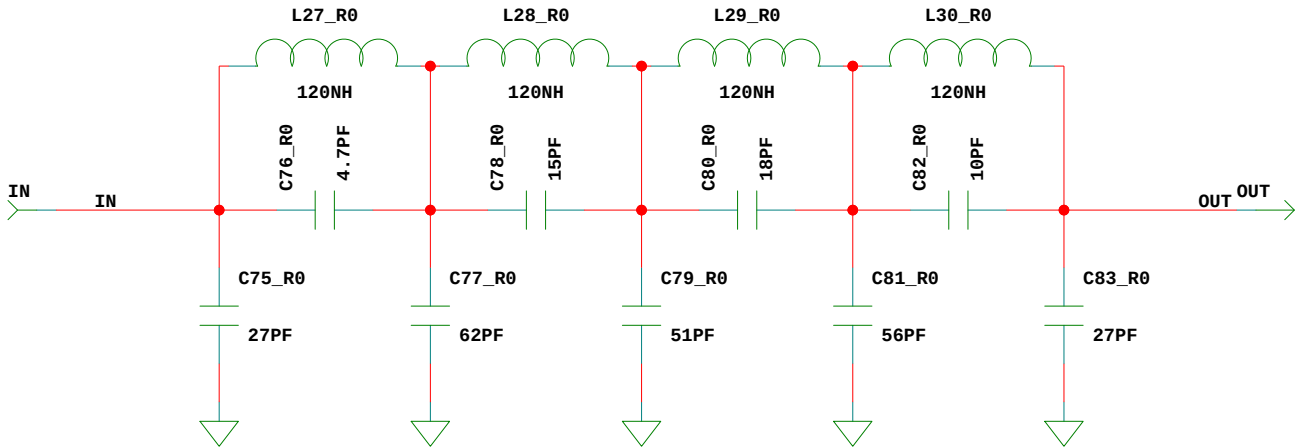
1

2

3

4

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INAF ASTRON

DESIGN LP_80_MHz CH1

SIZE	Filename	REV
A3	LP_80_MHz	1