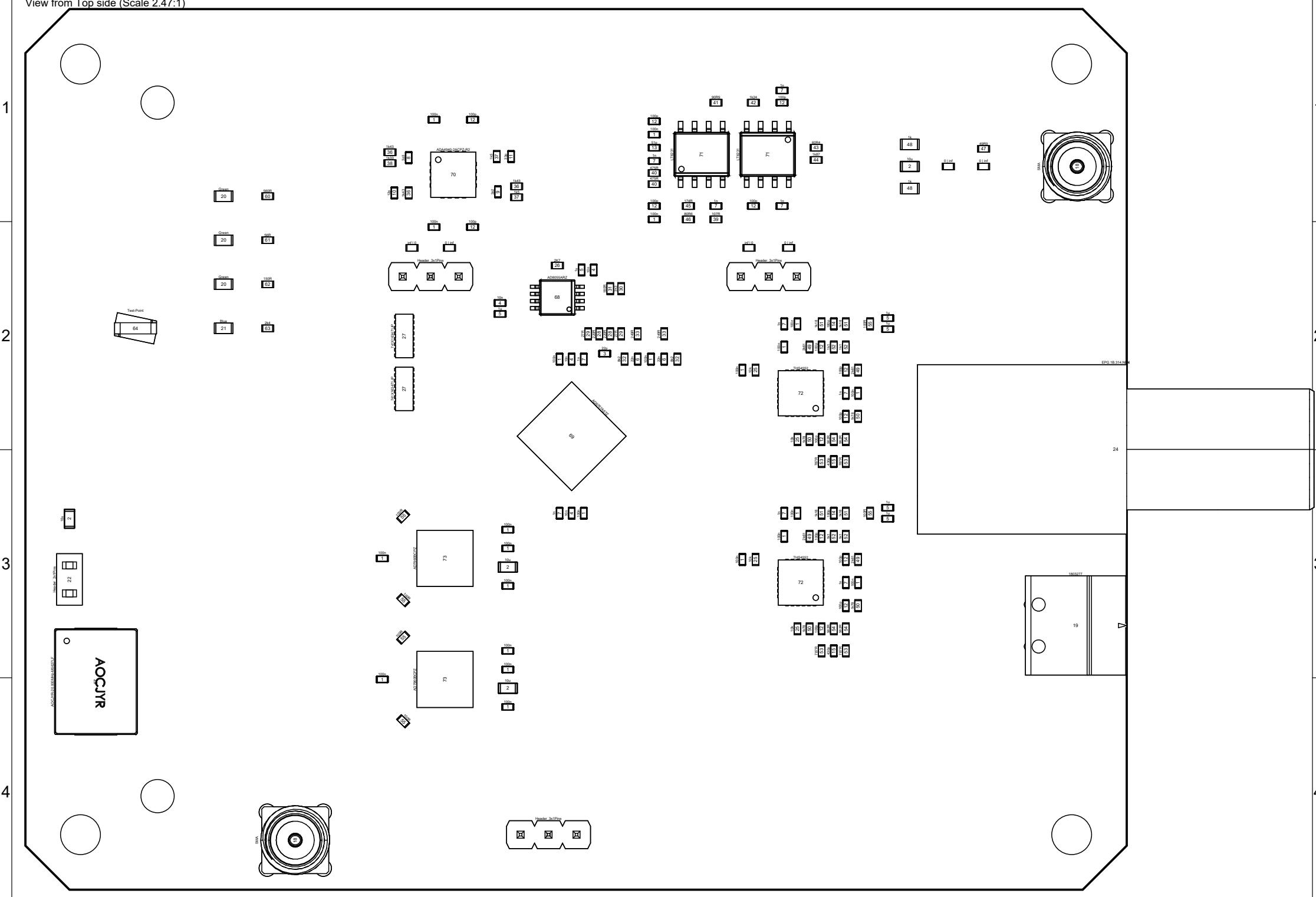


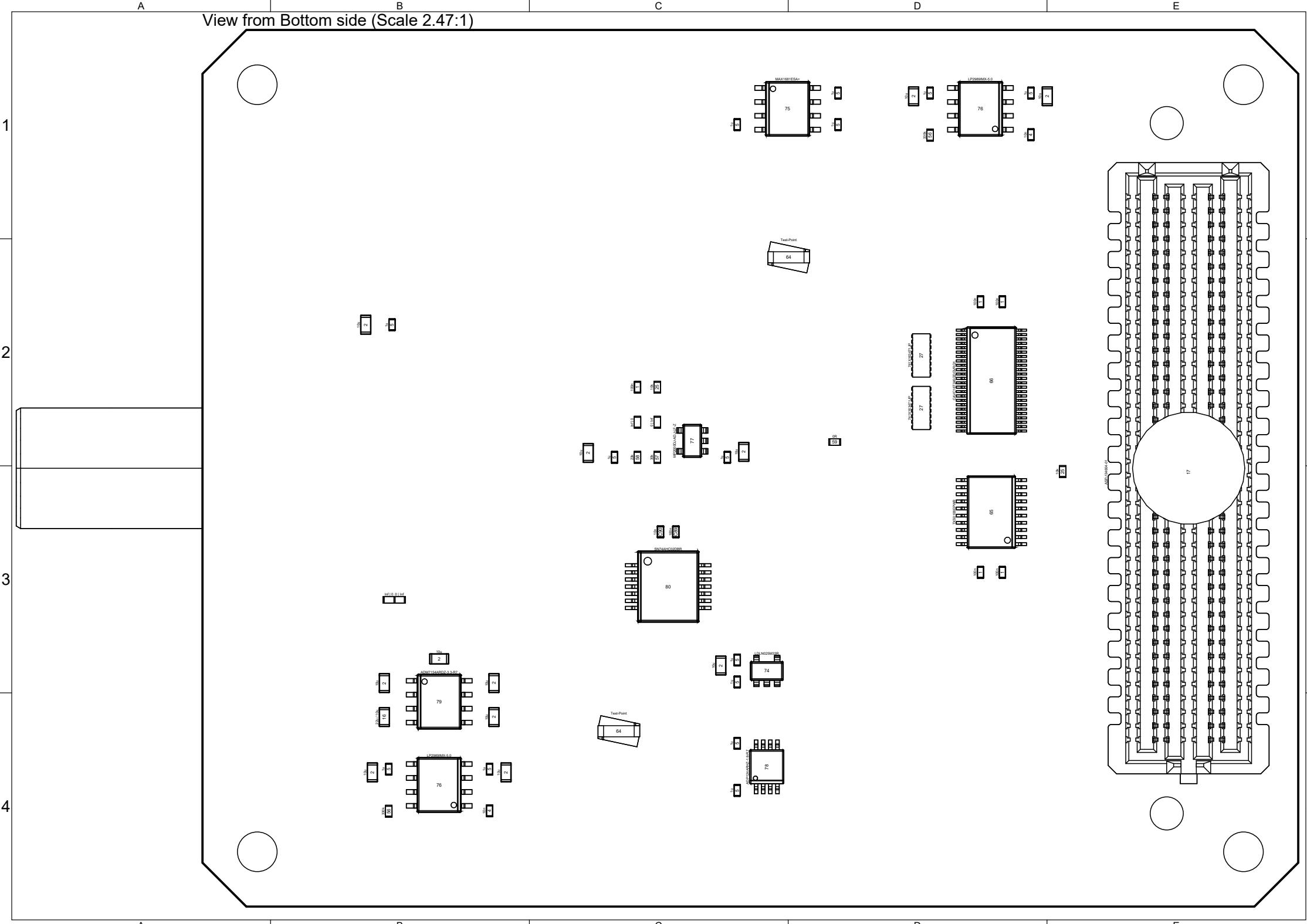


View from Top side (Scale 2.47:1)

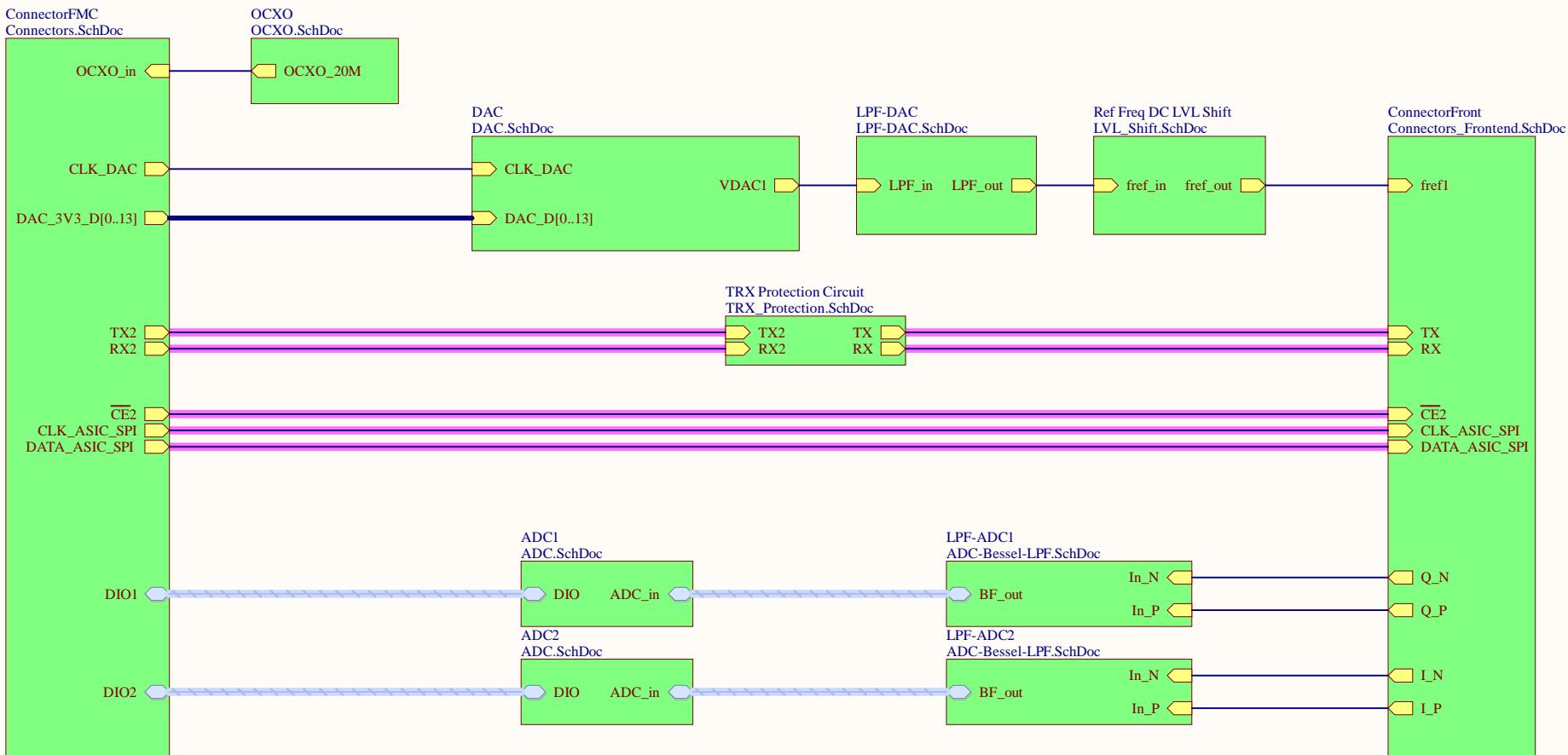
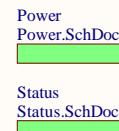
A



View from Bottom side (Scale 2.47:1)

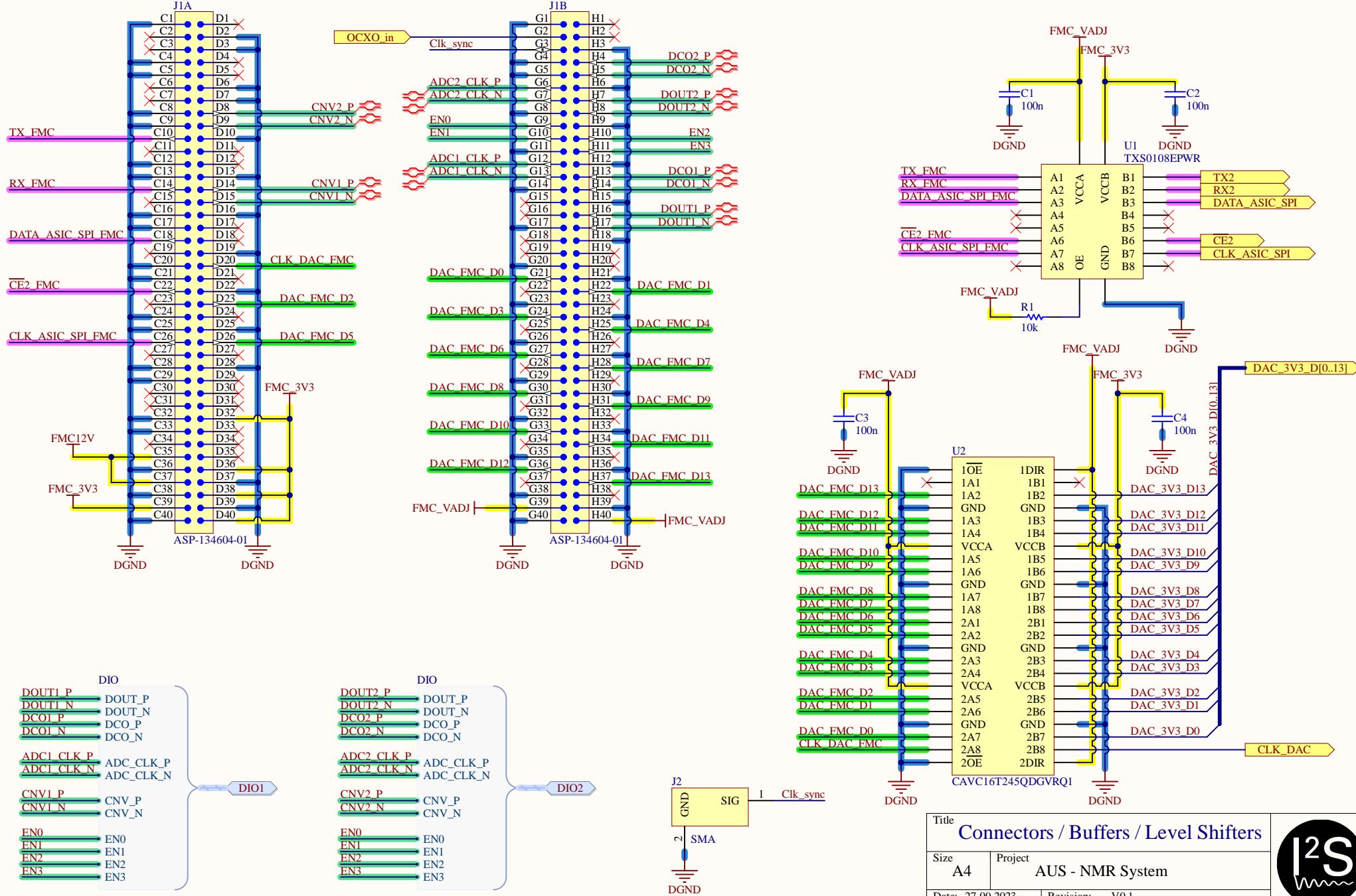


A	B	C	D	E
Bill Of Materials	Bill Of Materials	Bill Of Materials		
Line #	Designator	Name	Quantity	Line #
1 1	C1, C2, C3, C4, C13, C14, C17, C24, C26, C35, C37, C51_LPF-ADC1, C51_LPF-ADC2, C53_LPF-ADC1, C53_LPF-ADC2, C54_LPF-ADC1, C54_LPF-ADC2, C55_LPF-ADC1, C55_LPF-ADC2, C56_ADC1, C56_ADC2, C58_ADC1, C58_ADC2, C59_ADC1, C59_ADC2, C60_ADC1, C60_ADC2, C74, C93	100n	29	Line #
2 2	C5, C40, C41, C57_ADC1, C57_ADC2, C63, C67, C70, C72, C76, C77, C80, C84, C86, C87, C88	10u	16	Designator
3	C6	22p	1	Name
4	C7, C9, C15, C18, C71, C81, C94	10n	7	Quantity
5 3	C8, C10, C39, C42_LPF-ADC1, C42_LPF-ADC2, C47_LPF-ADC1, C47_LPF-ADC2, C61, C62, C64, C65, C66, C68, C69, C73, C75, C78, C79, C82, C83	1u	20	Line #
6	C11, C12	22n	2	Designator
7 3	C16, C19, C28, C29, C30, C31, C50_LPF-ADC1, C50_LPF-ADC2, C52_LPF-ADC1, C52_LPF-ADC2	1n	10	Name
8	C20	3p3	1	Quantity
9	C21	2p2	1	Line #
10	C22	12p	1	Designator
11	C23	33p	1	Name
12 4	C25, C27, C33, C34, C36, C38, C43_LPF-ADC1, C43_LPF-ADC2, C44_LPF-ADC1, C44_LPF-ADC2, C48_LPF-ADC1, C48_LPF-ADC2, C49_LPF-ADC1, C49_LPF-ADC2	100p	14	Quantity
13	C32	51p	1	Line #
14	C45_LPF-ADC1, C45_LPF-ADC2	180p	2	Designator
				Name
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				Line #
				Designator



Title	
<b>FMC interface to FPGA - Top Level</b>	
Size	Project
A4	AUS - NMR System
Date: 27.09.2023	Revision: V0.1
Sheet 1 of 14	Drawn By: M.Sc. Tobias Wirth





A

A

B

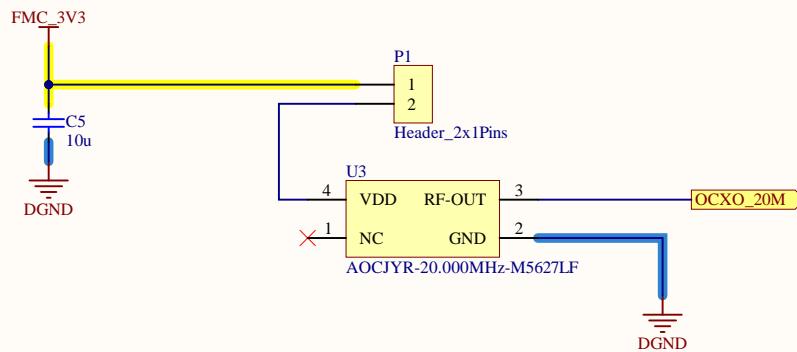
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C

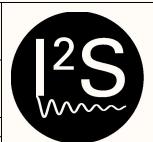
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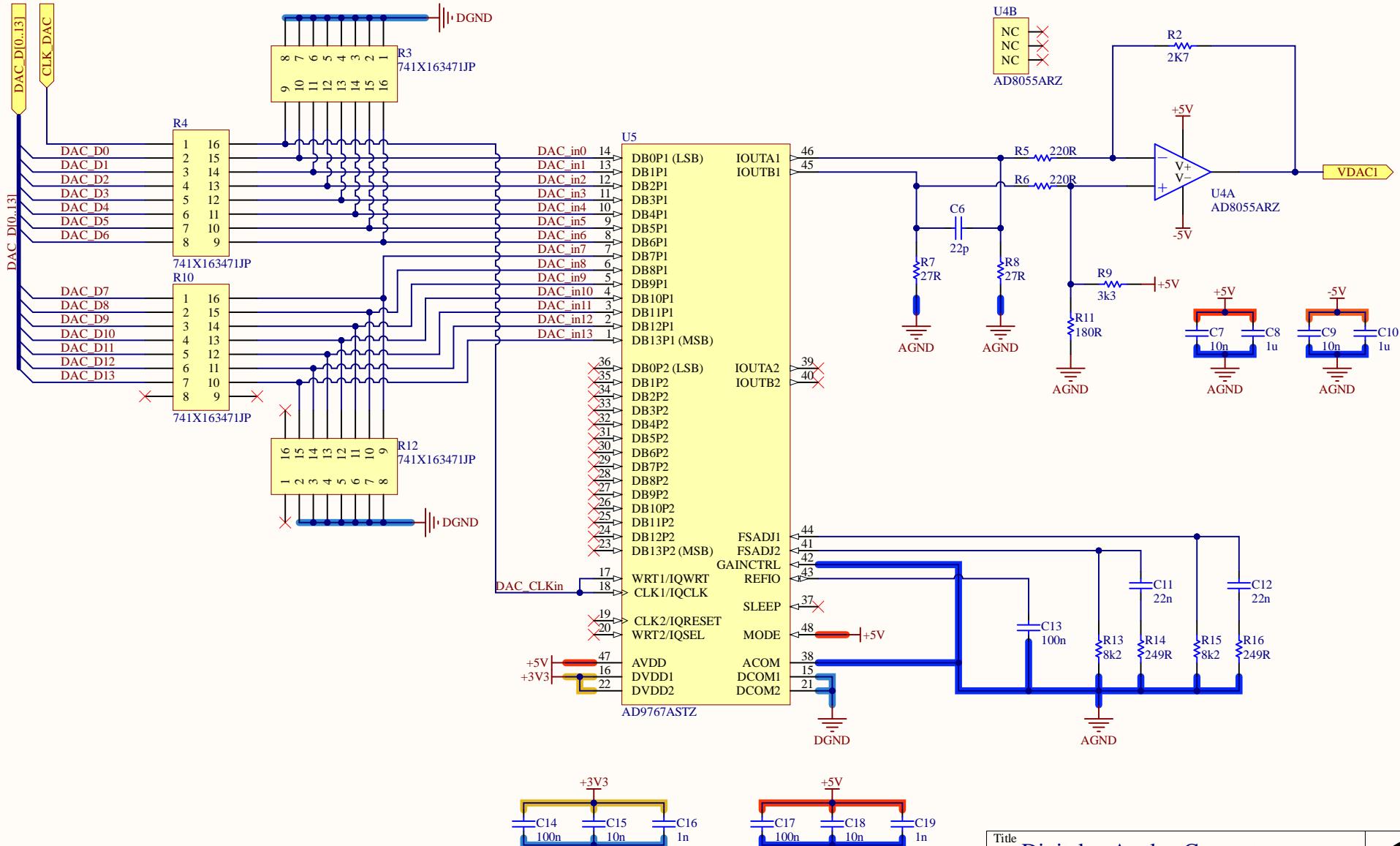
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D

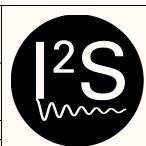


Title	
<b>Oven Controlled Crystal Oscillator</b>	
Size A4	Project AUS - NMR System
Date: 27.09.2023	Revision: V0.1
Sheet 3 of 14	Drawn By: M.Sc. Tobias Wirth





Title		Digital to Analog Converter	
Size	Project	AUS - NMR System	
A4			
Date: 27.09.2023	Revision:	V0.1	
Sheet 4 of 14	Drawn By:	M.Sc. Tobias Wirth	



A

A

B

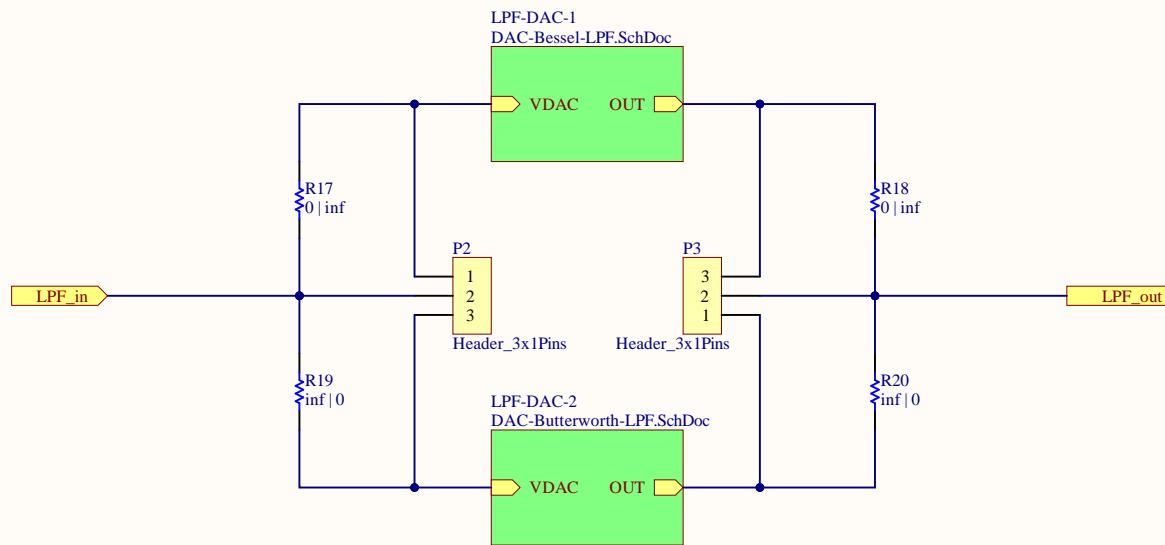
B

C

C

D

D



Title  
**Low Pass Filters**

Size A4	Project AUS - NMR System
------------	-----------------------------

Date: 27.09.2023	Revision: V0.1
Sheet 5 of 14	Drawn By: M.Sc. Tobias Wirth



A

A

B

B

C

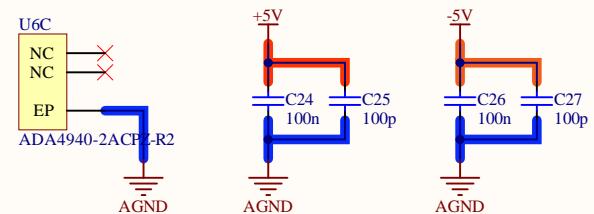
C

D

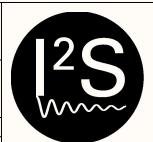
D



Active Butterworth Low Pass Filter  
Corner frequency 12MHz  
Gain 0dB



Title	
Butterworth LPF (12MHz / 0dB)	
Size	Project
A4	AUS - NMR System
Date: 27.09.2023	Revision: V0.1
Sheet 6 of 14	Drawn By: M.Sc. Tobias Wirth



A

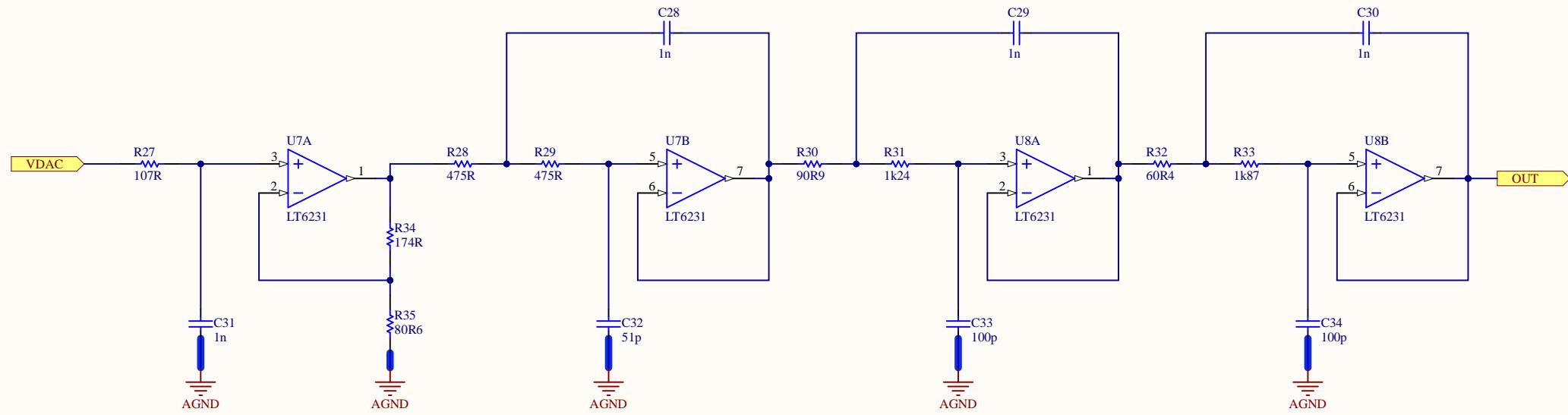
A

**U7A**  
1st Order  
Low Pass Buffered RC

**U7B**  
2nd Order  
Low Pass Sallen Key

**U8A**  
3rd Order  
Low Pass Sallen Key

**U8B**  
4th Order  
Low Pass Sallen Key



#### 4th Order Active Bessel Low Pass Filter

Corner frequency 1.5MHz

Variable Gain via **R34** and **R35**: Currently 10dB  
(Min. Gain = 05dB)

#### Gain Values:

**R34** = 111R & **R35** = 143R -- 05dB  
**R34** = 174R & **R35** = 80R6 -- 10dB  
**R34** = 230R & **R35** = 25R5 -- 20dB

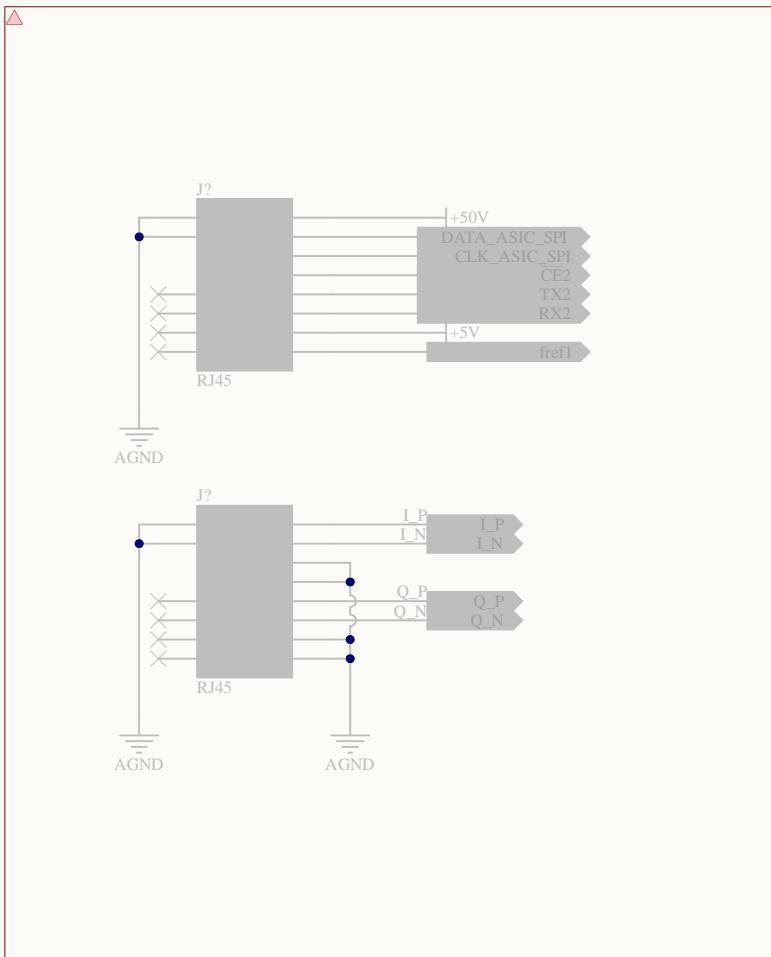
Title: **Bessel LPF (1.5MHz / 10dB)**

Size: **A4** Project: **AUS - NMR System**

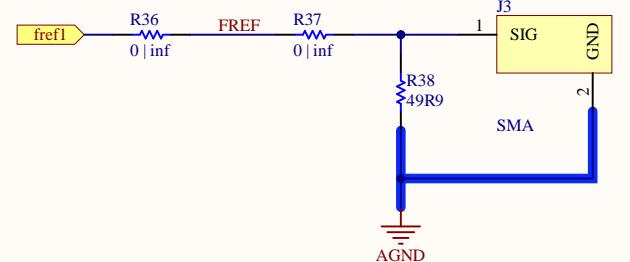
Date: 27.09.2023 Revision: V0.1  
Sheet 7 of 14 Drawn By: M.Sc. Tobias Wirth



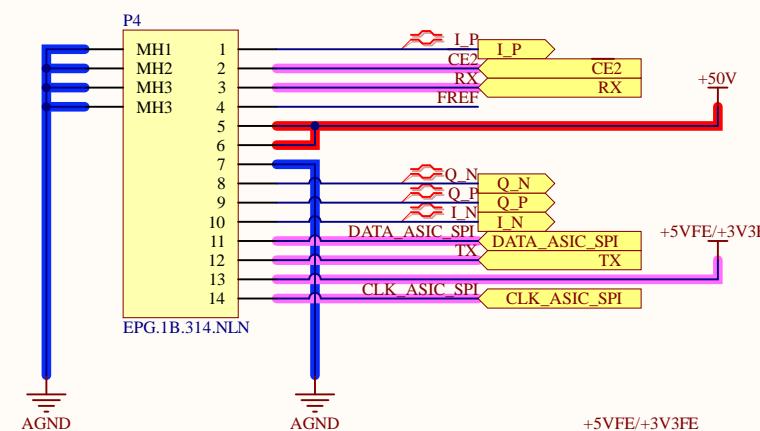
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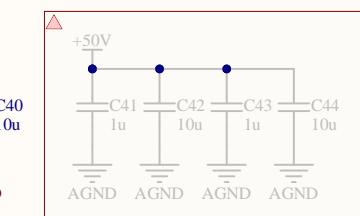
B



C



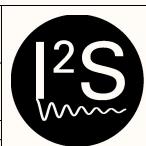
D



## Title Connectors - Frontend

Size A4 Project AUS - NMR System

Date: 28.09.2023 Revision: V0.1  
Sheet 8 of 14 Drawn By: M.Sc. Tobias Wirth



A

A

B

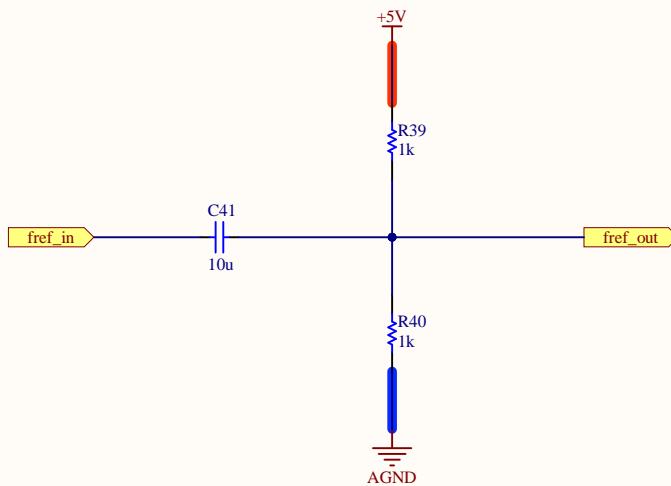
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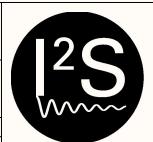
C

D

D



Title	
Reference Frequency DC Level Shift	
Size	Project
A4	AUS - NMR System
Date: 05.10.2023	Revision: V0.1
Sheet 9 of 14	Drawn By: M.Sc. Tobias Wirth



A

A

B

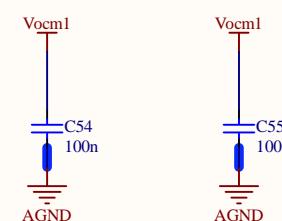
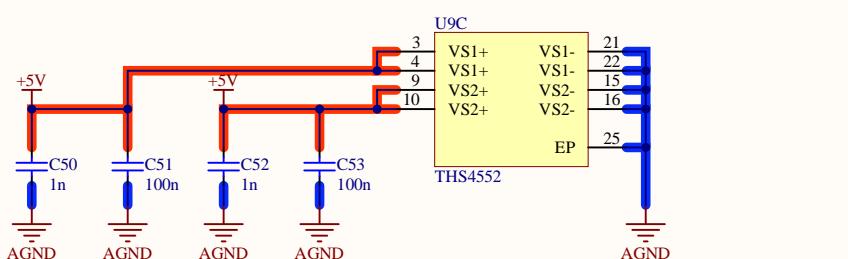
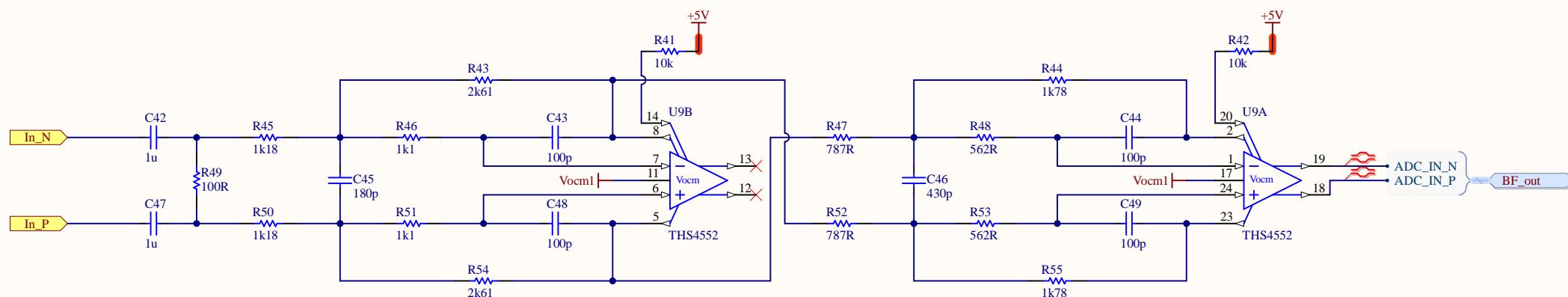
B

C

C

D

D



Title	
Bessel LPF / AAF (350kHz / 14dB)	
Size	Project
A4	AUS -NMR System
Date: 06.10.2023	Revision: V0.1
Sheet 10 of 14	Drawn By: M.Sc. Tobias Wirth



A

A

B

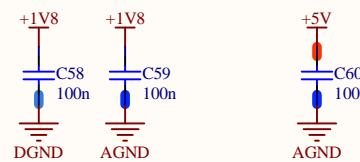
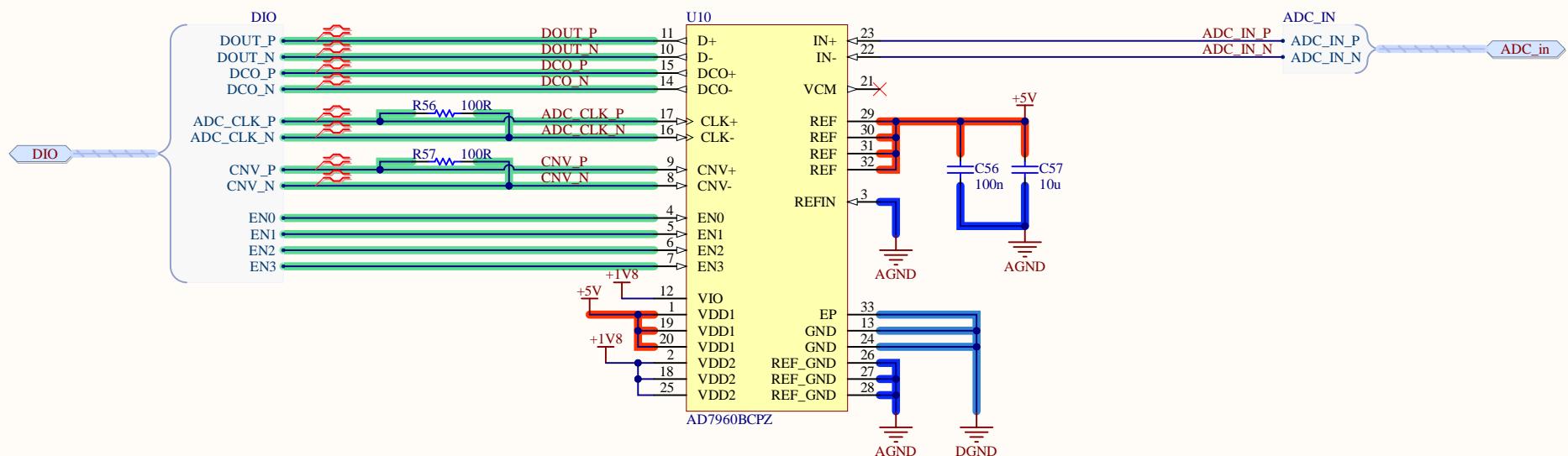
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C

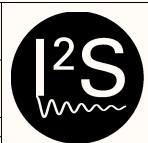
C

D

D

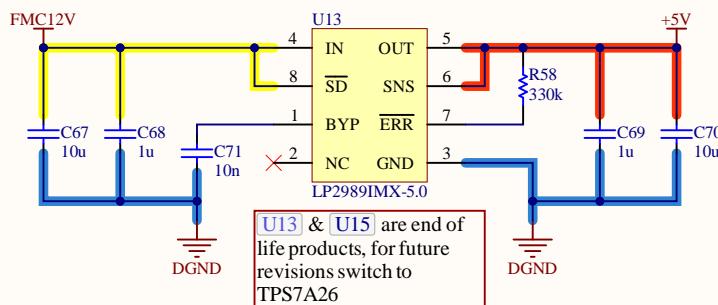
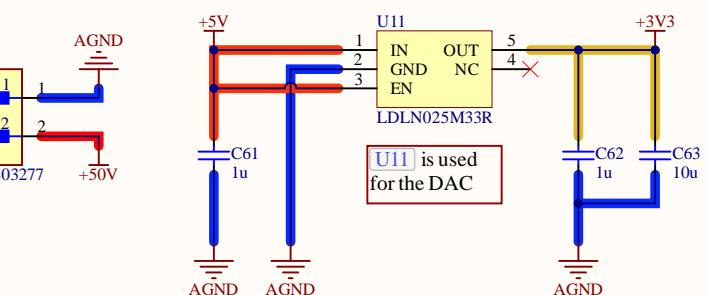


Title	
<b>Analog to Digital Converter</b>	
Size A4	Project AUS - NMR System
Date: 06.10.2023	Revision: V0.1
Sheet 11 of 14	Drawn By: M.Sc. Tobias Wirth

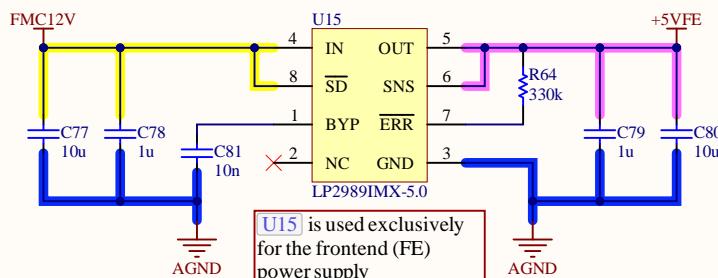


**[C67], [C68], [C69], [C70],  
[C77], [C78], [C79], and [C80]**  
MUST be ceramic capacitors!

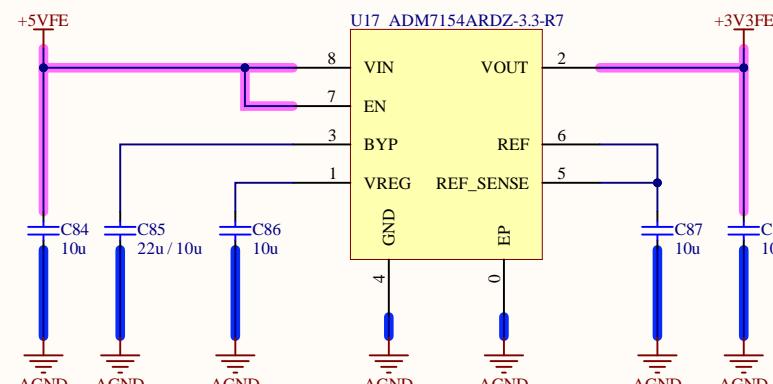
All other capacitors do not  
have to be ceramic, but it is  
recommended that they are.



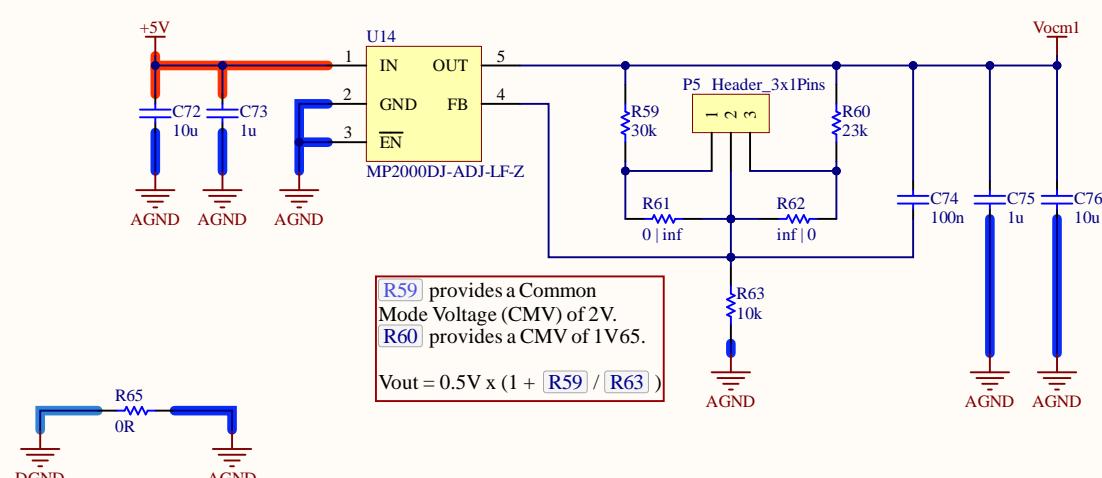
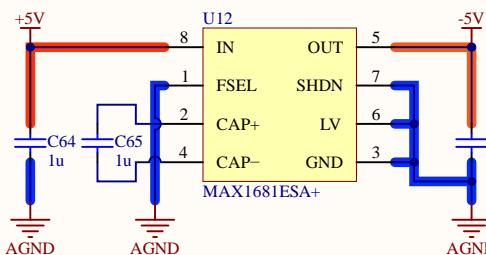
**U13** & **U15** are end of life products, for future revisions switch to TPS7A26



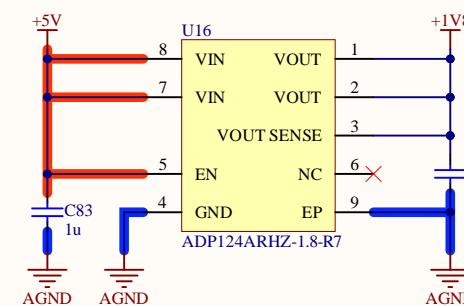
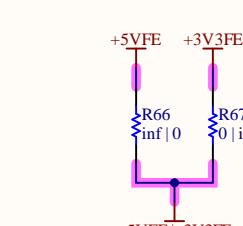
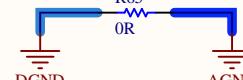
**U15** is used exclusively  
for the frontend (FE)  
power supply



**U17** is used placed on backend if  
temperatures exceed 125°C otherwise DNP.  
Also choose **R66** & **R67** accordingly.



**R59** provides a Common  
Mode Voltage (CMV) of 2V.  
**R60** provides a CMV of 1V65.  
Vout = 0.5V x (1 + **R59** / **R63**)



Title	
Size	Project
A4	AUS - NMR System
Date: 06.10.2023	Revision: V0.1
Sheet 12 of 14	Drawn By: M.Sc. Tobias Wirth



A

B

C

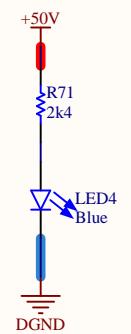
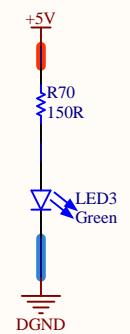
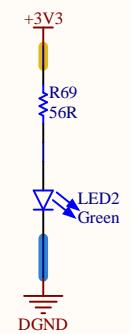
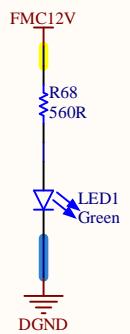
D

A

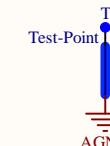
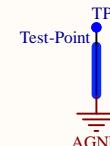
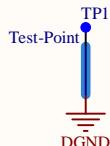
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C

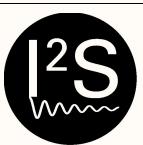
D



LED4 is used to indicate a live +50V



Title		Status LEDs	
Size	Project	AUS - NMR System	
A4			
Date: 06.10.2023	Revision:	V0.1	
Sheet 13 of 14	Drawn By:	M.Sc. Tobias Wirth	



A

A

B

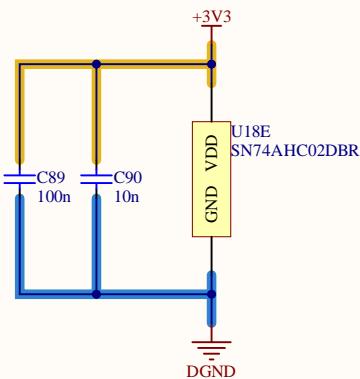
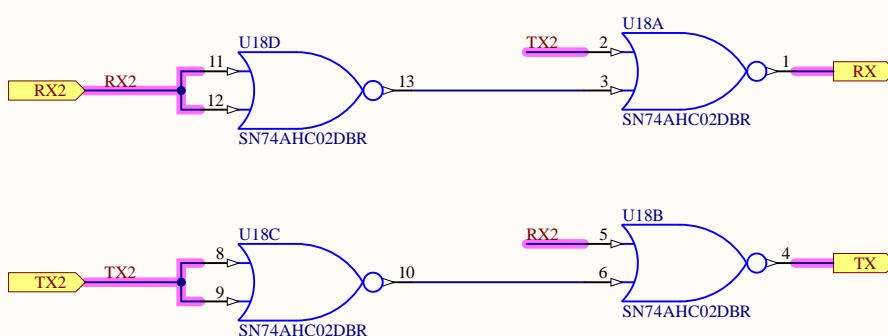
B

C

C

D

D



Title <b>TRX Protection Circuit</b>	
Size A4	Project AUS - NMR System
Date: 07.10.2023	Revision: V0.1
Sheet 14 of 14	Drawn By: M.Sc. Tobias Wirth

