

Rev	Description	Date
A	Initial Release	7/23/04
B	1. Changed R1 and R4 to 2.0k. Sets the gain of the input stage to 1. 2. Changed C11 and C13 to 500p to maintain the input stage pole at 150kHz. 3. Added JMP1 and JMP2 to bypass whitening stages.	10/20/04

Title <b>ICS130 Whitening Board</b>		
Size B	Number <b>D040425-B</b>	Revision <b>B</b>
Date: 12/23/2004	Sheet 1 of 2	
File: C:\User\d... \ICS130Whitening1.SchDoc	Drawn By: Daniel Sigg	

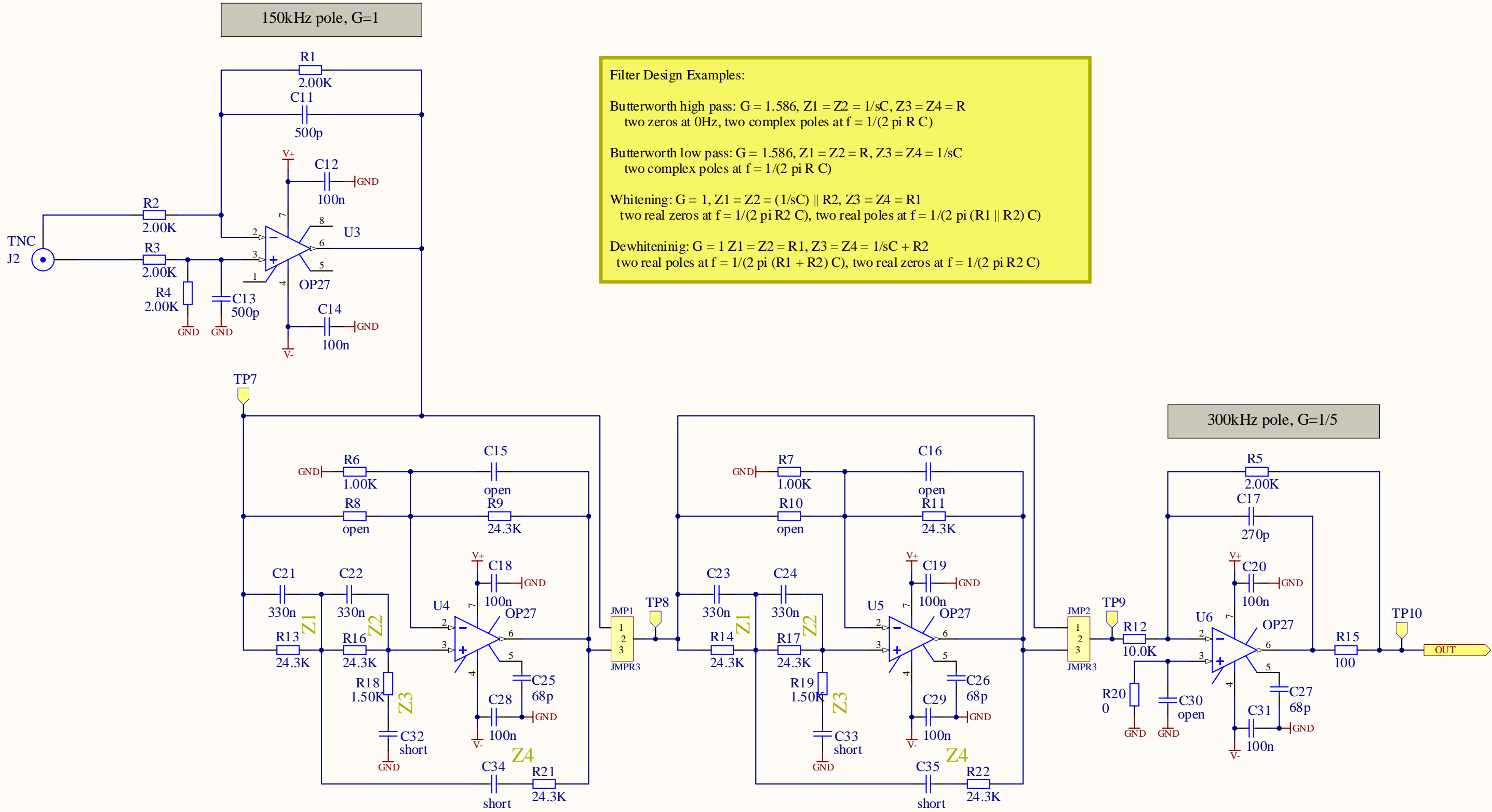
**Filter Design Examples:**

Butterworth high pass:  $G = 1.586$ ,  $Z1 = Z2 = 1/sC$ ,  $Z3 = Z4 = R$   
two zeros at 0Hz, two complex poles at  $f = 1/(2 \pi R C)$

Butterworth low pass:  $G = 1.586$ ,  $Z1 = Z2 = R$ ,  $Z3 = Z4 = 1/sC$   
two complex poles at  $f = 1/(2 \pi R C)$

Whitening:  $G = 1$ ,  $Z1 = Z2 = (1/sC) \parallel R2$ ,  $Z3 = Z4 = R1$   
two real zeros at  $f = 1/(2 \pi R2 C)$ , two real poles at  $f = 1/(2 \pi (R1 \parallel R2) C)$

Dewhitening:  $G = 1$ ,  $Z1 = Z2 = R1$ ,  $Z3 = Z4 = 1/sC + R2$   
two real poles at  $f = 1/(2 \pi (R1 + R2) C)$ , two real zeros at  $f = 1/(2 \pi R2 C)$



150kHz pole, G=1

300kHz pole, G=1/5

2 zero-pole pairs at 20Hz/100Hz

2 zero-pole pairs at 20Hz/100Hz

Title		
<b>ICS130 Whitening Board</b>		
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B	D040425-B	B
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