

PSU
qrp03r0_psu.SchDoc

Power Supply
Input voltage
2 x 24 VAC for the power amp
2 x 24 VAC for the anode voltage
1 x 9-12 VAC for the filament and the delay circuit.
For the power amp
+35 V, -35 V, GND
For the tube
+60V, -60V, GND
For the tube filament
6.3V and filament ground with lifted potential referred to ground
Power on delay
Eliminates pop and thumps in the speaker.

Delay_Collector_R
Delay_Emitter_R
Delay_Collector_L
Delay_Emitter_L

DELAY_EMITTER_R
DELAY_EMITTER_R
DELAY_COLLECTOR_L
DELAY_EMITTER_L

TUBE BUFFER
qrp03r0_buffer.SchDoc

Tube input buffer
The input is buffered with a E88CC double triode, one half for each channel.
As an option two tubes can be used where each tube consists of a cathode follower and a current generator.
There is an option for an opamp buffer.

Buffered_Signal_R
Buffered_Signal_L

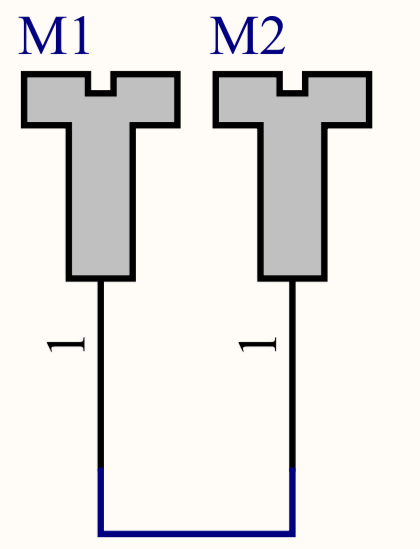
BUFFERED SIGNAL_R
BUFFERED SIGNAL_L

L
qrp03r0_amp.SchDoc

Delay_Collector
Delay_Emitter
Buffered_Signal
The power amp
The power amp consists of two LM3886.

R
qrp03r0_amp.SchDoc

Delay_Collector
Delay_Emitter
Buffered_Signal
The power amp
The power amp consists of two LM3886.



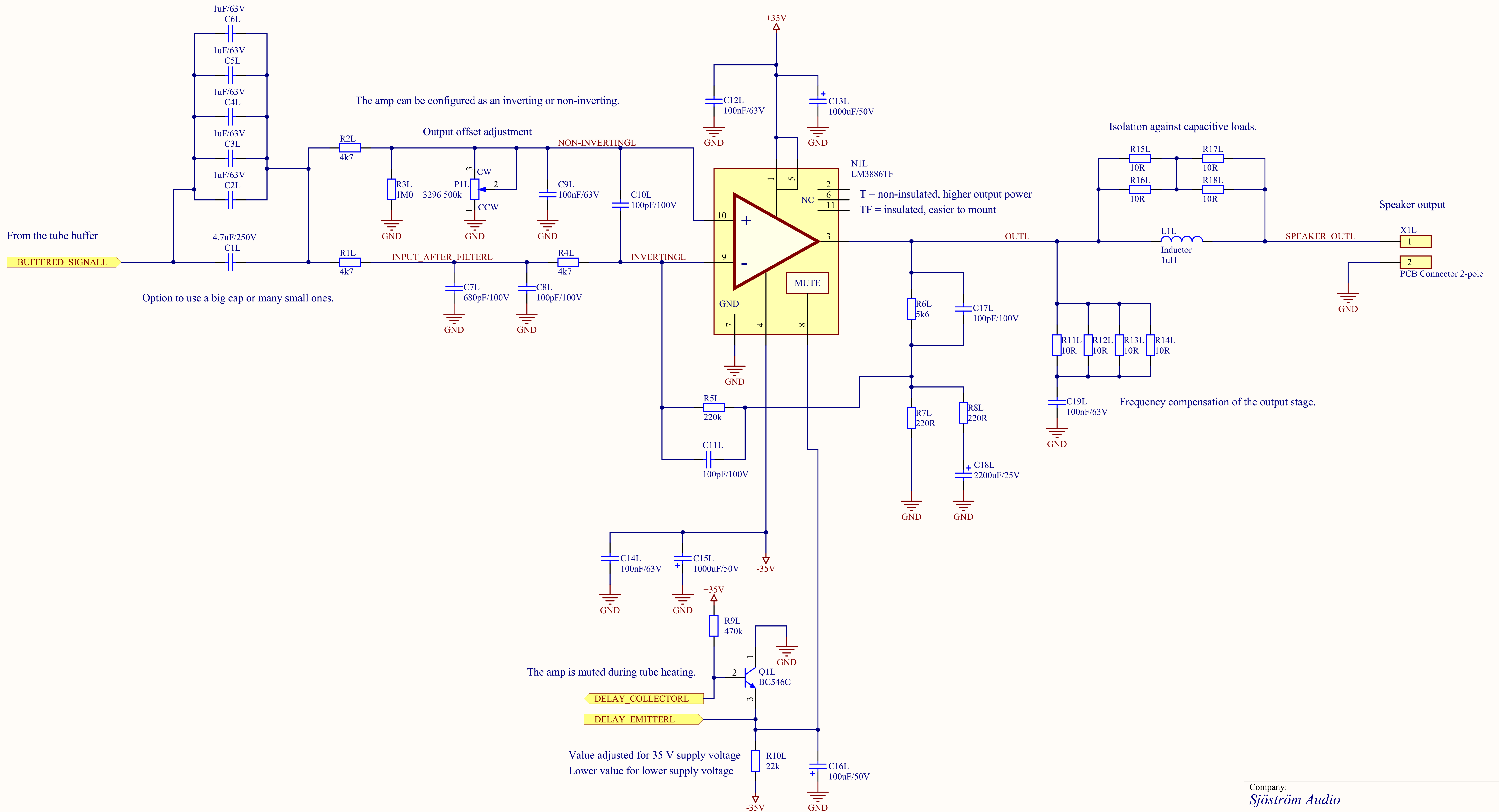
Hole for screw M3

The project goal is to take the original "Tube Buffered Gainclone" to the next level.

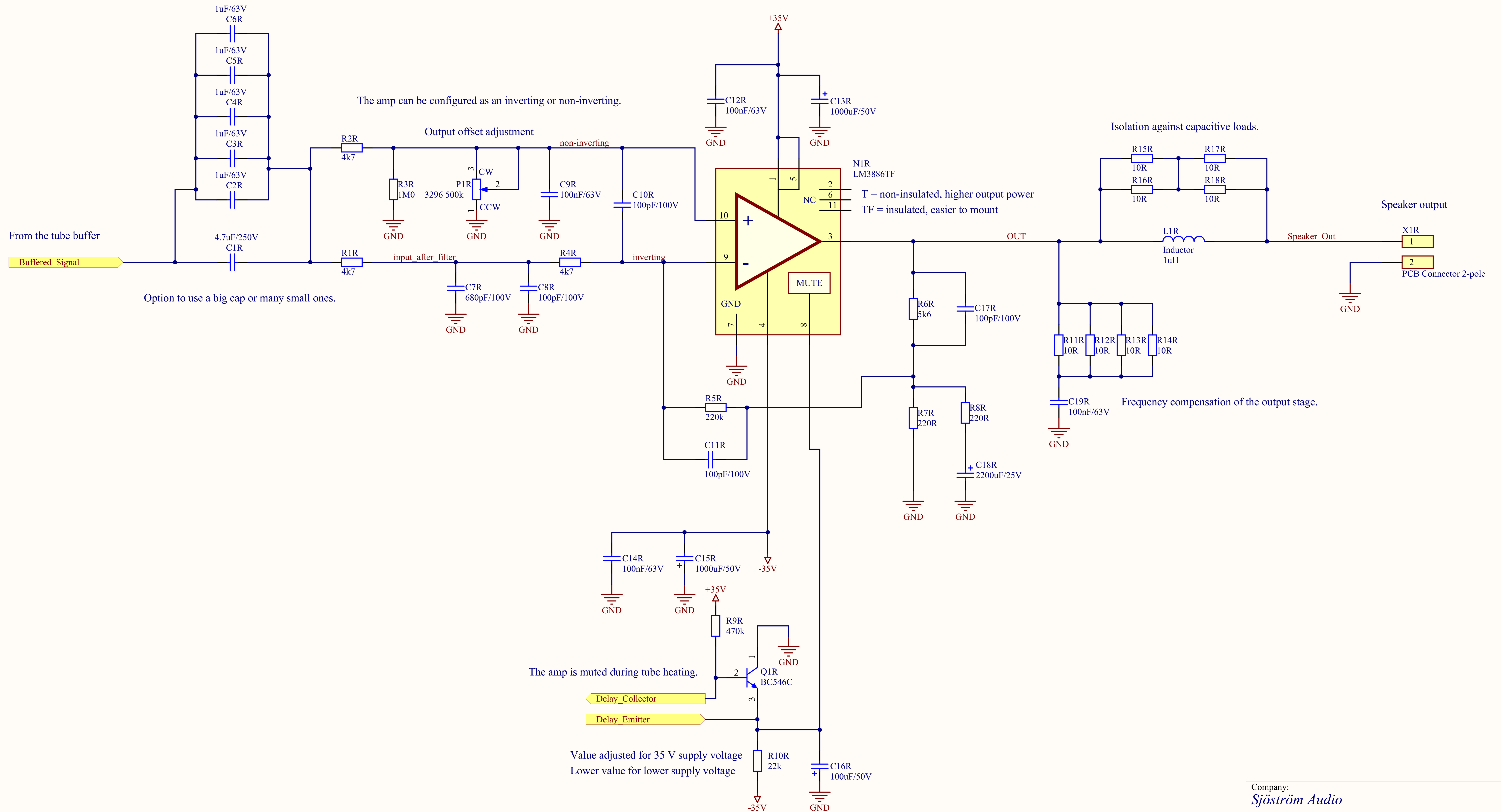
Easy available parts are chosen with room for special ones if space is available. The new parts in the design is made by Per-Anders Sjöström with Joe Rasmussen as a mentor and speaking partner.

The new idea is to have one tube for both channels or using two tubes forming a White Cathode Follower creating an exceptional performance.

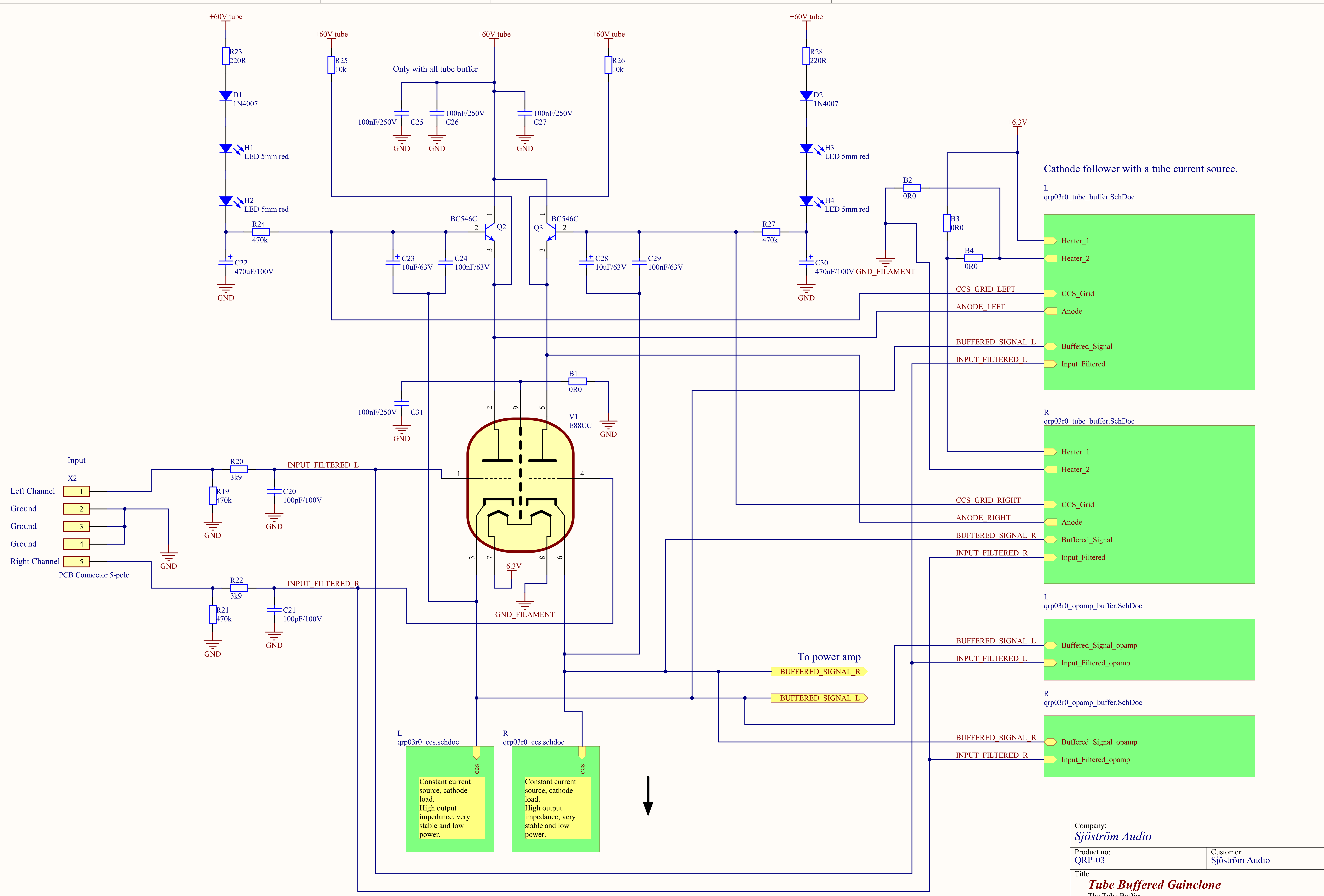
Company: <i>Sjöström Audio</i>		
Product no: QRP-03	Customer: Sjöström Audio	
Title Tube Buffered Gainclone Block Diagram [No Variations]		
Design: P-A/JR	Drawing: P-A	Approved: P-A
Size: A3	Revision: 0	Created: 2012-10-20
Sheet 1 of 12	Changed: 2013-03-16	Printed: 2013-03-16
File: qrp03r0.SchDoc		



Company: <i>Sjöström Audio</i>		
Product no: SST-03	Customer: Sjöström Audio	
Title Tube Buffered Gainclone The LM3886 amplifier [No Variations]		
Design: P-A/JR	Drawing: P-A	Approved: P-A
Size: A3	Revision: 0	Created: 2012-10-20
Sheet 2.1 of 12	Changed: 2012-11-04	Printed: 2013-03-16
File: qrp03r0_amp.SchDoc		



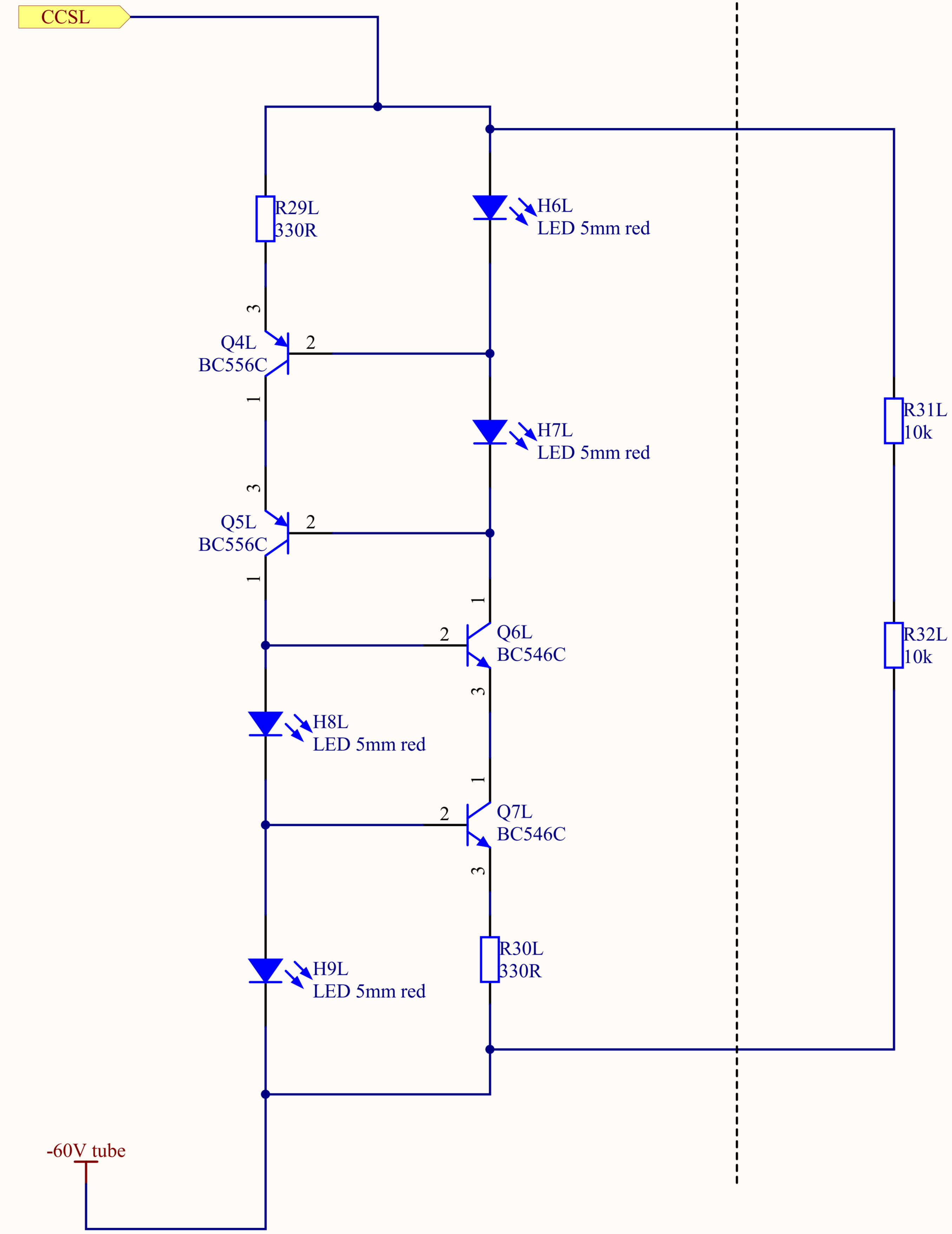
Company: Sjöström Audio		
Product no: SST-03	Customer: Sjöström Audio	
Title Tube Buffered Gainclone The LM3886 amplifier [No Variations]		
Design: P-A/JR	Drawing: P-A	Approved: P-A
Size: A3	Revision: 0	Created: 2012-10-20
Sheet 2 of 8	Changed: 2012-11-04	Printed: 2013-03-16
File: qrp03r0_amp.SchDoc		



Variant name
[No Variations]

Company: <i>Sjöström Audio</i>		
Product no: QRP-03	Customer: Sjöström Audio	
Title Tube Buffered Gainclone The Tube Buffer [No Variations]		
Design: P-A/JR	Drawing: P-A	Approved: P-A
Size: A3	Revision: 0	Created: 2012-10-20
Sheet 3 of 12	Changed: 2013-03-16	
File: qrp03r0_buffer.SchDoc	Printed: 2013-03-16	

Advanced current source Simple current source



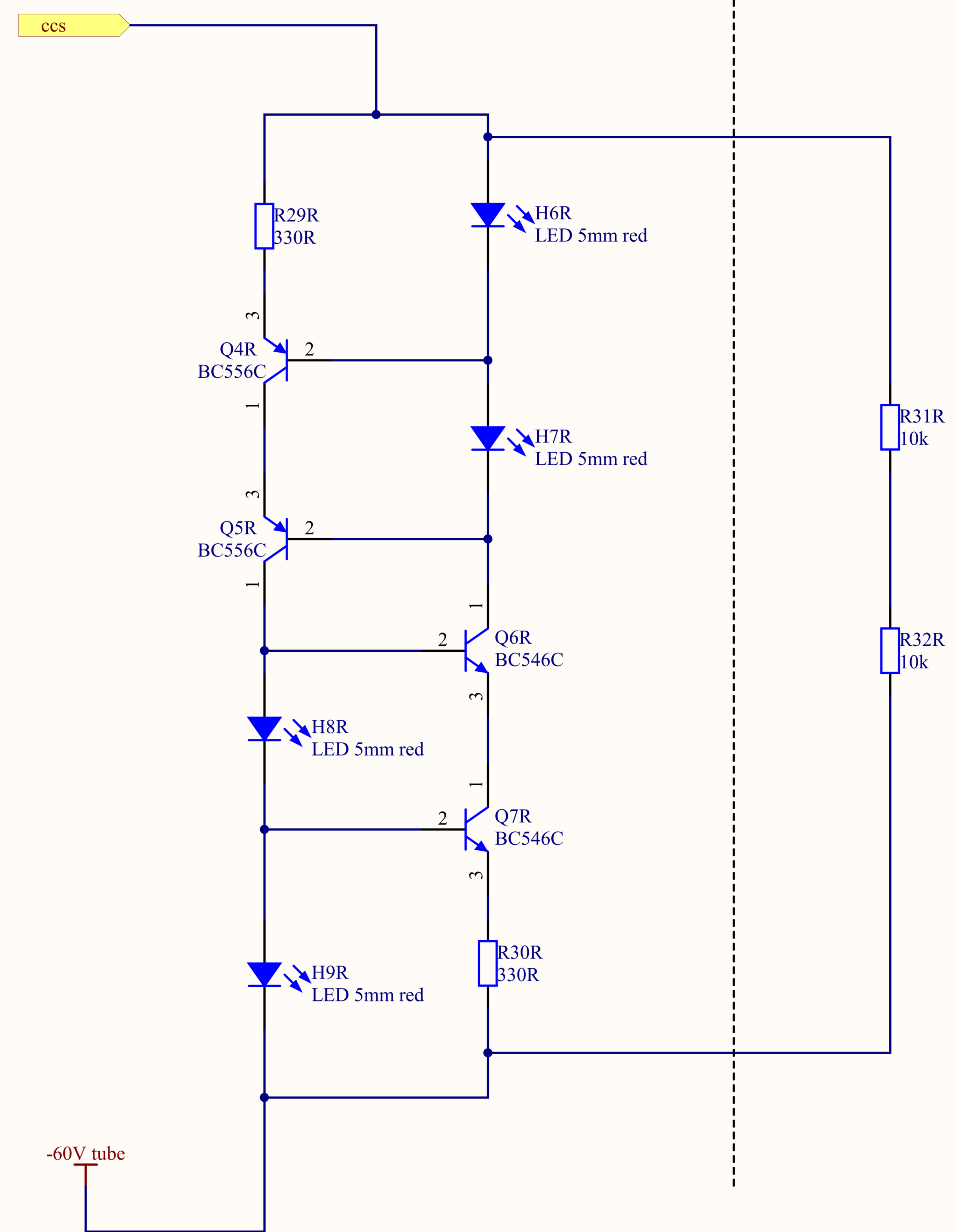
Decoupling on the all tube buffer schematics

Company: <i>Sjöström Audio</i>		
Product no: QRP-03	Customer: Sjöström Audio	
Title Tube Buffered Gainclone Ultra High Performance Current Source [No Variations]		
Design: P-A/JR	Drawing: P-A	Approved: P-A
Size: A3	Revision: 0	Created: 2012-10-20
Sheet 4.1 of 12	Changed: 2013-03-16	
File: qrp03r0_ccs.SchDoc	Printed: 2013-03-16	

A

A

Advanced current source Simple current source



Decoupling on the all tube buffer schematics

B

B

C

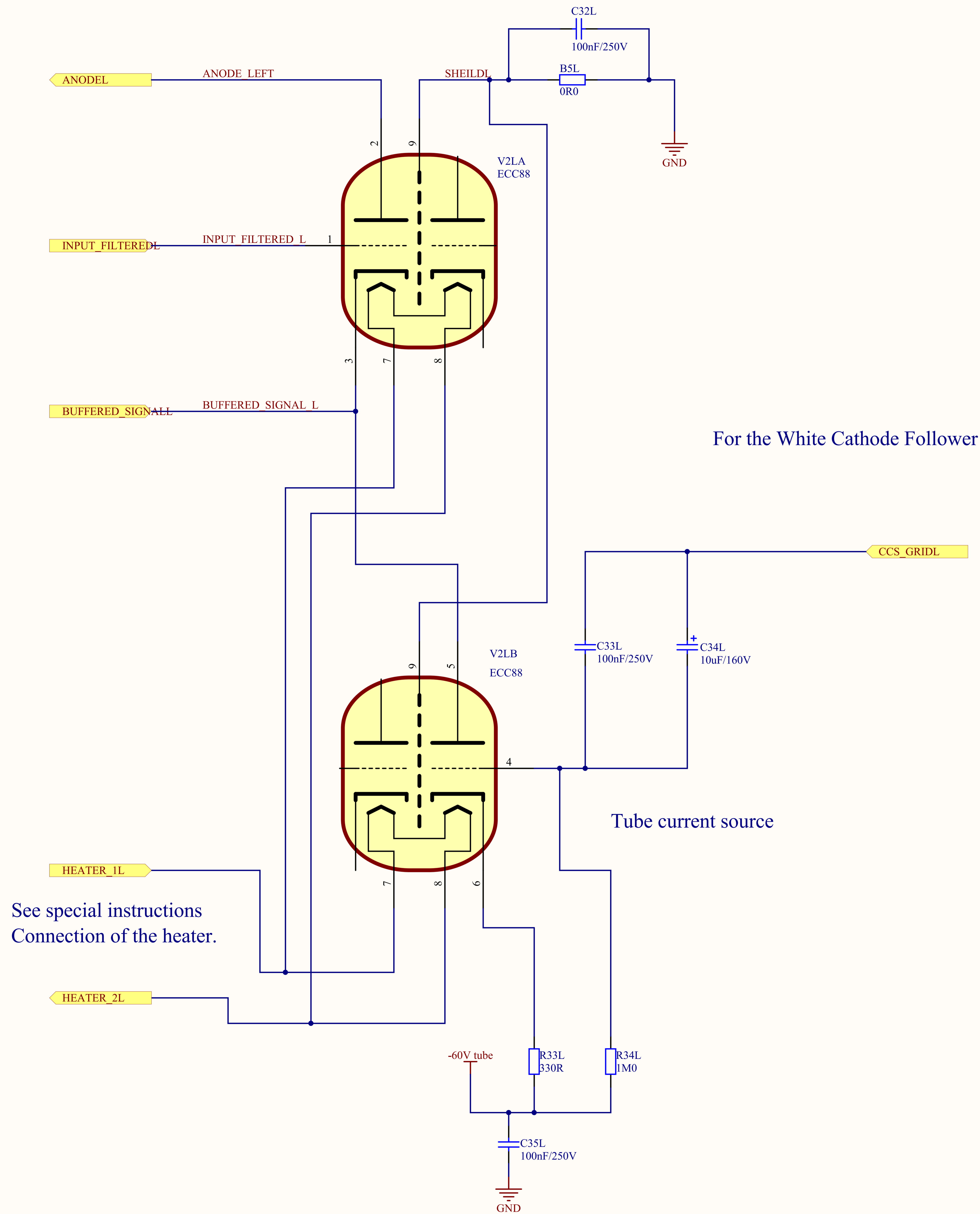
C

D

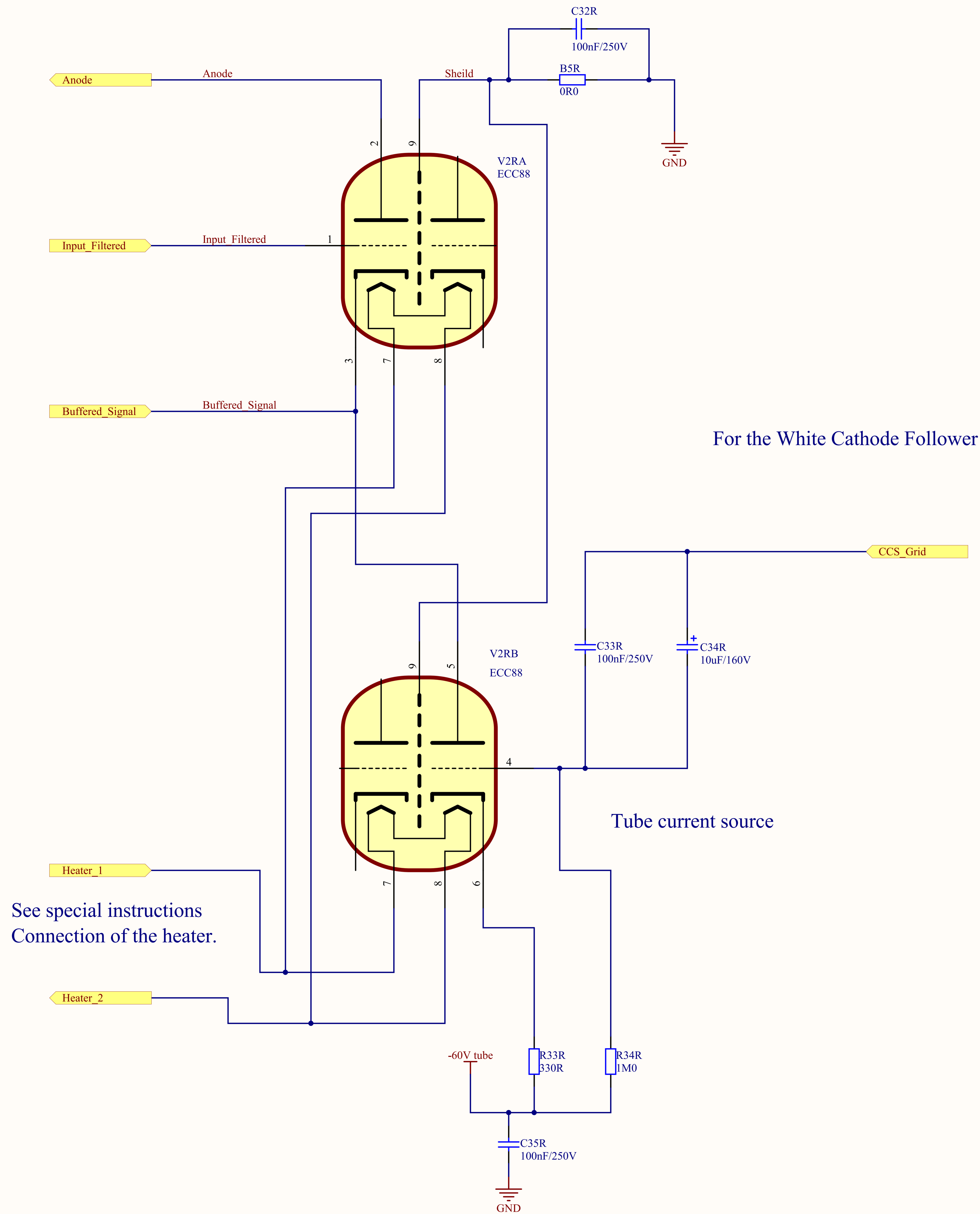
D

Variant name
[No Variations]

Company: <i>Sjöström Audio</i>		
Product no: QRP-03	Customer: Sjöström Audio	
Title Tube Buffered Gainclone Ultra High Performance Current Source [No Variations]		
Design: P-A/JR	Drawing: P-A	Approved: P-A
Size: A3	Revision: 0	Created: 2012-10-20
Sheet 4 of 8	Changed: 2013-03-16	
File: qrp03r0_ccs.SchDoc	Printed: 2013-03-16	



Company: <i>Sjöström Audio</i>		
Product no: QRP-03	Customer: Sjöström Audio	
Title Tube Buffered Gainclone All tube buffer [No Variations]		
Design: P-A/JR	Drawing: P-A	Approved: P-A
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Sheet 5.1 of 12	Changed: 2013-03-16	
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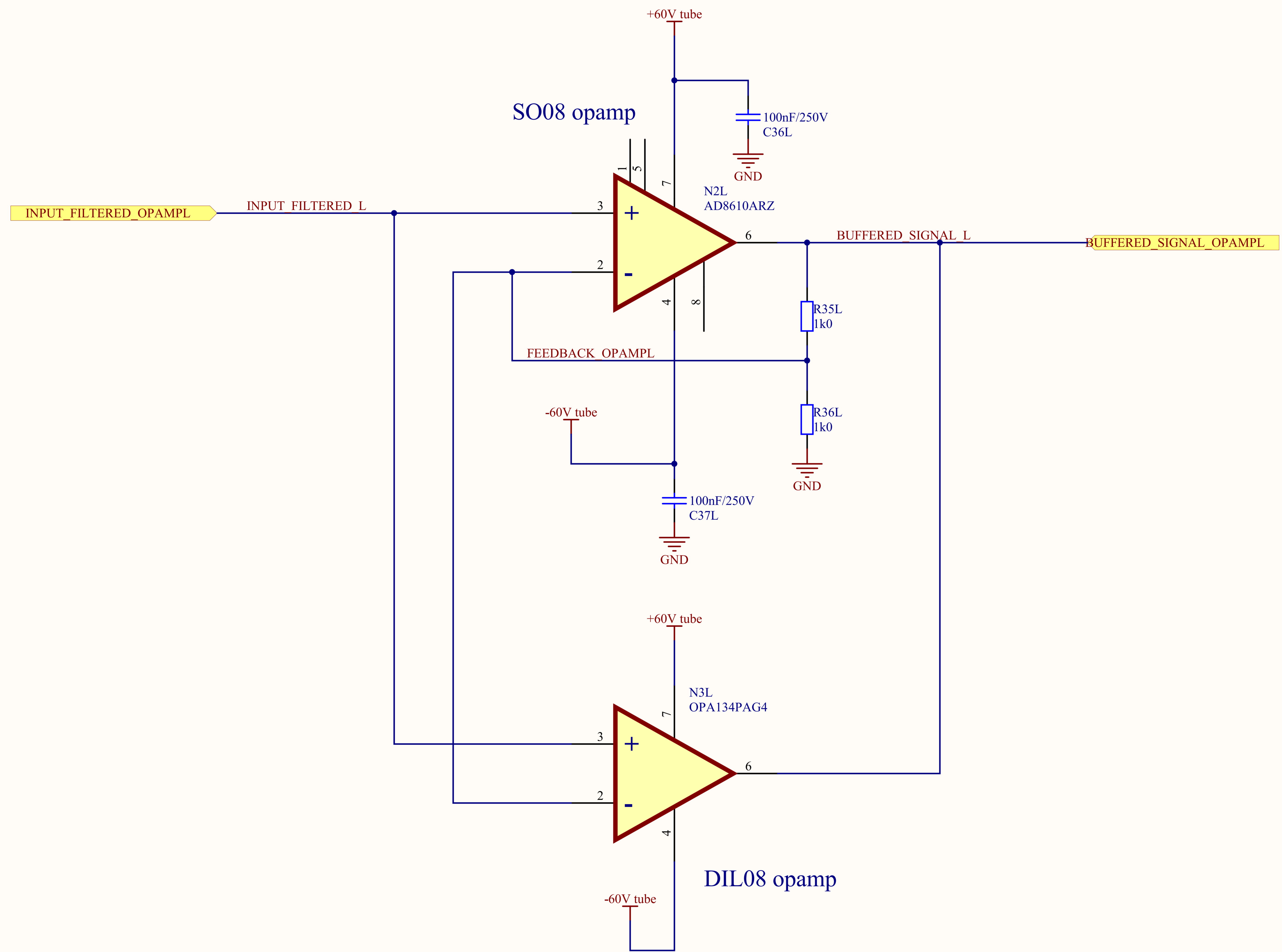


For the White Cathode Follower

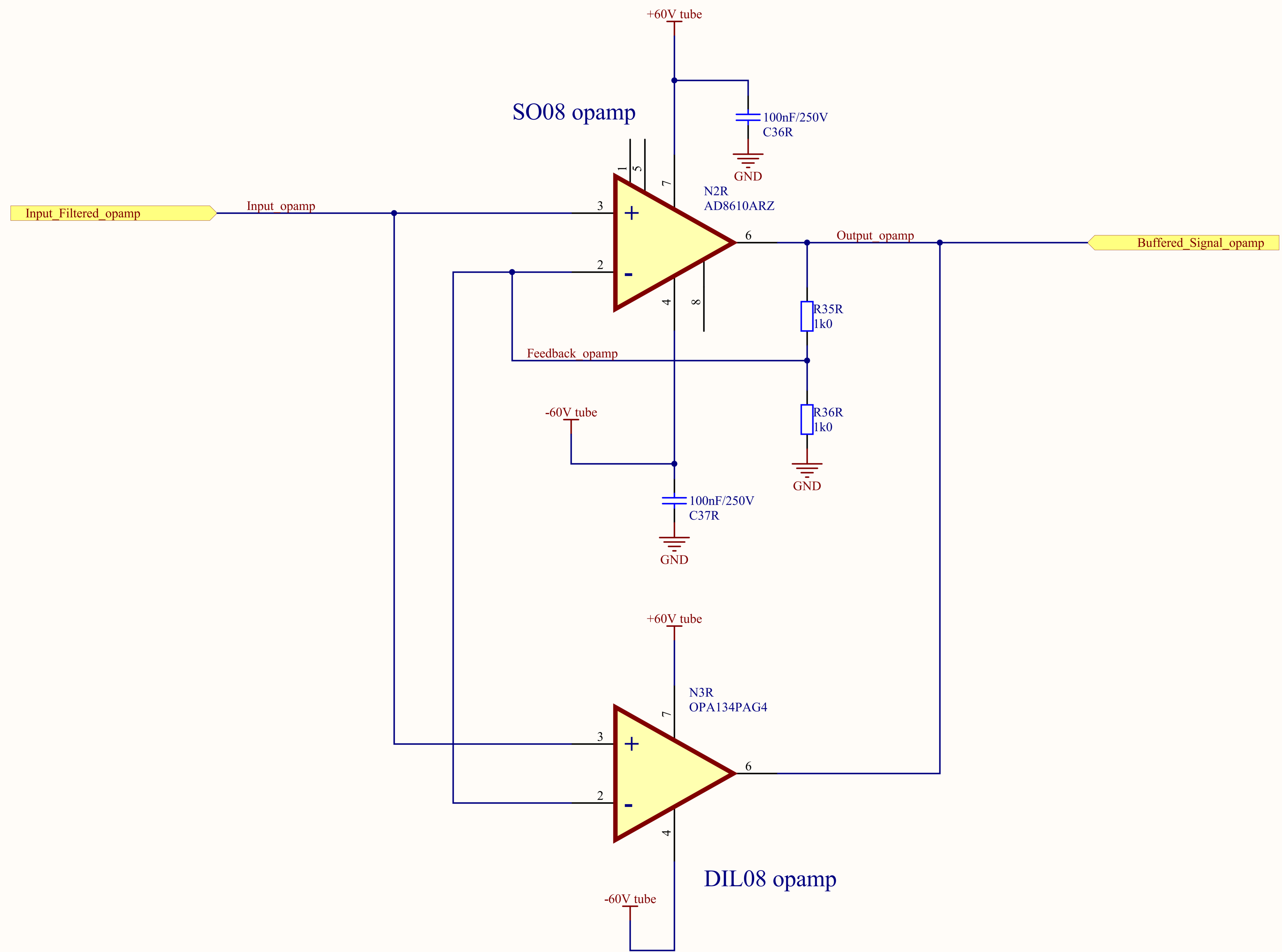
Tube current source

See special instructions
Connection of the heater.

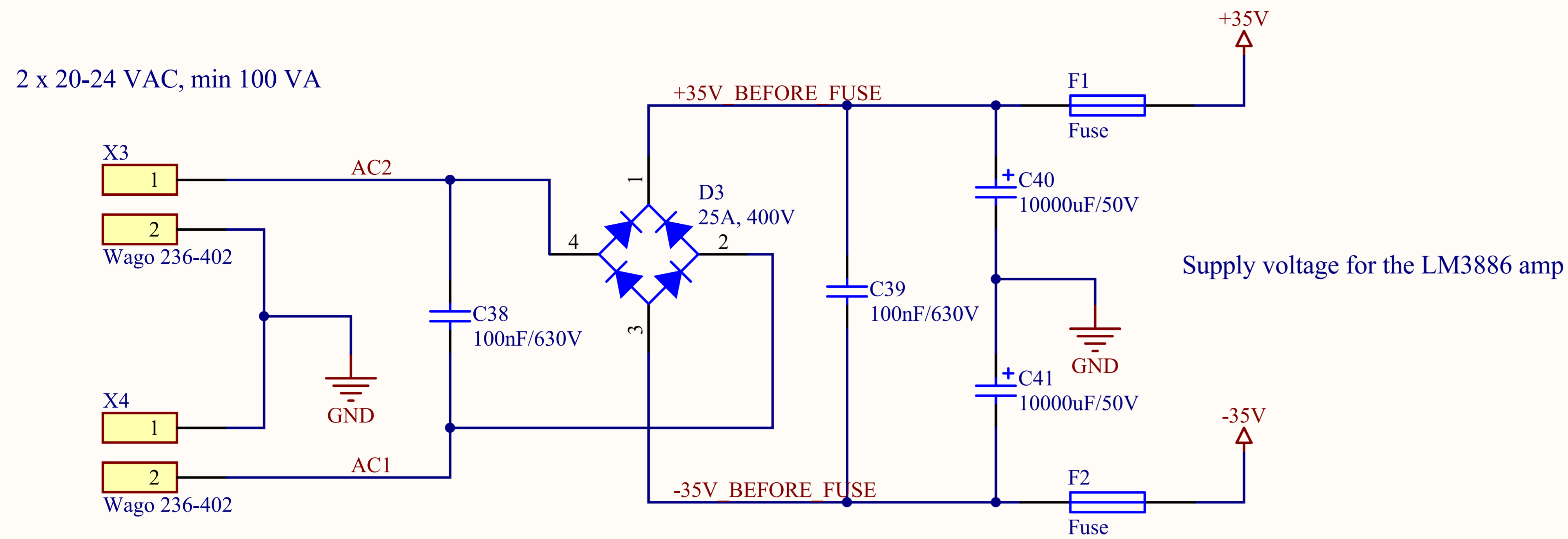
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Product no: QRP-03	Customer: Sjöström Audio	
Title <i>Tube Buffered Gainclone</i> All tube buffer [No Variations]		
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Sheet 5 of 8	Changed: 2013-03-16	
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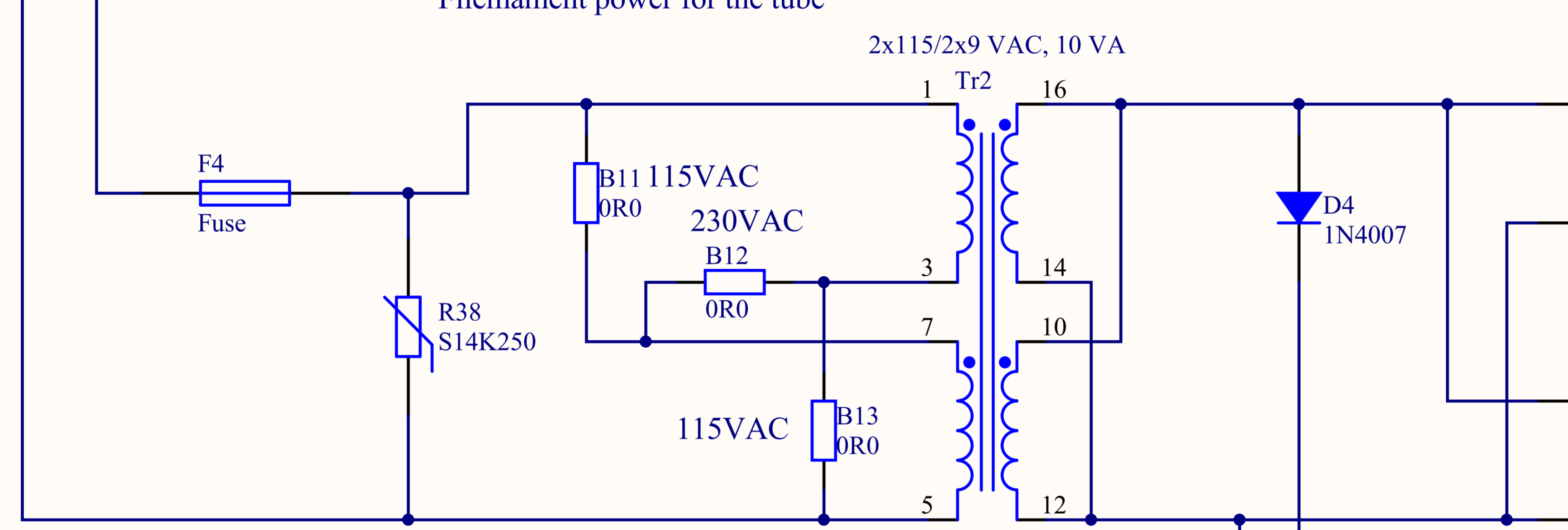
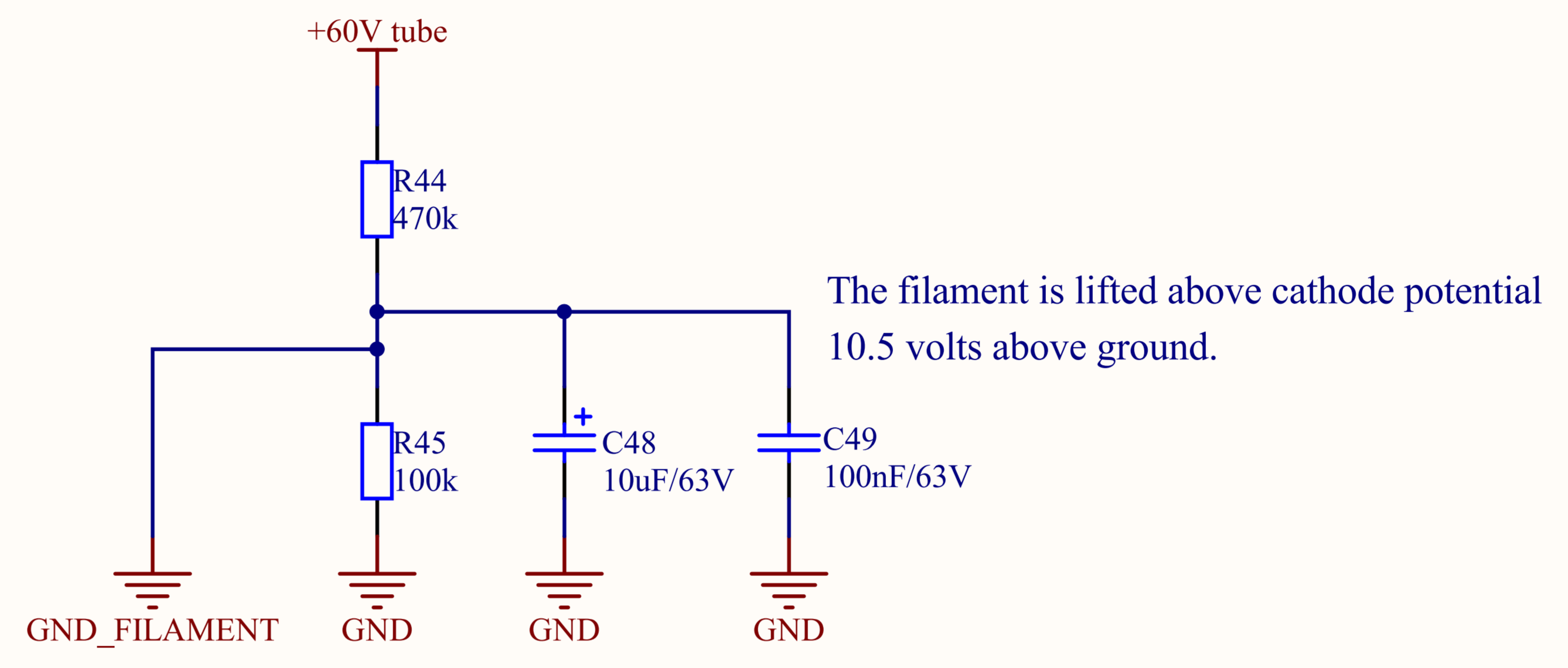
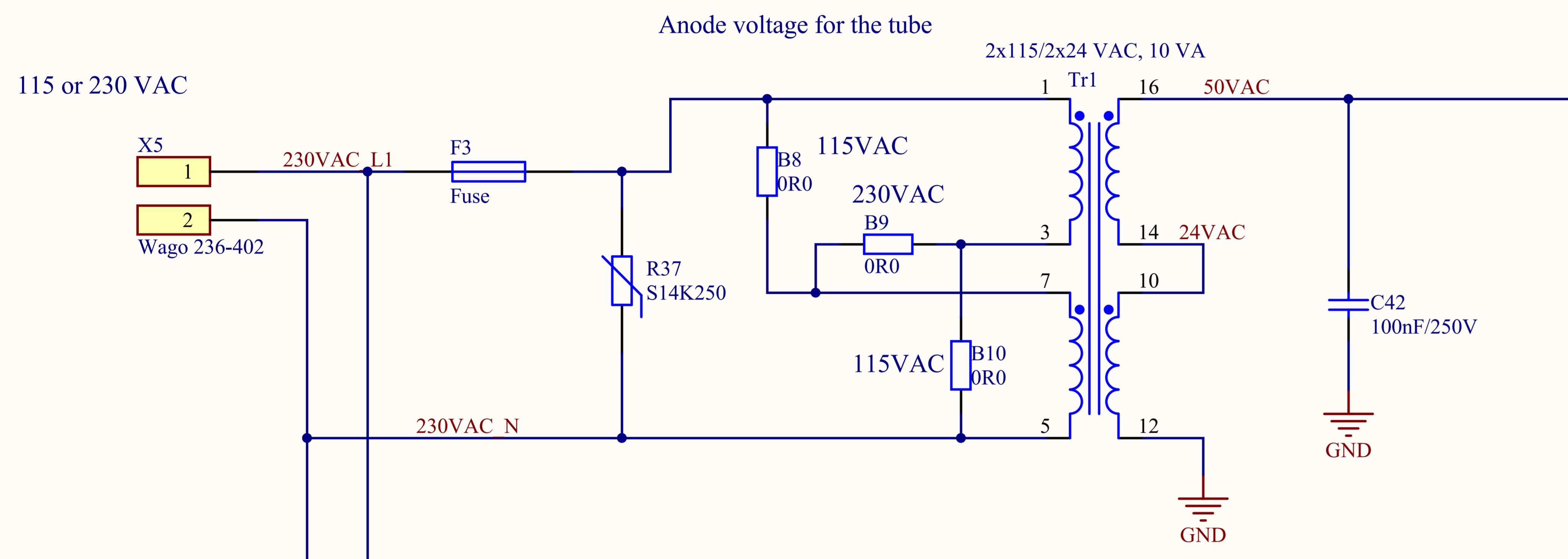
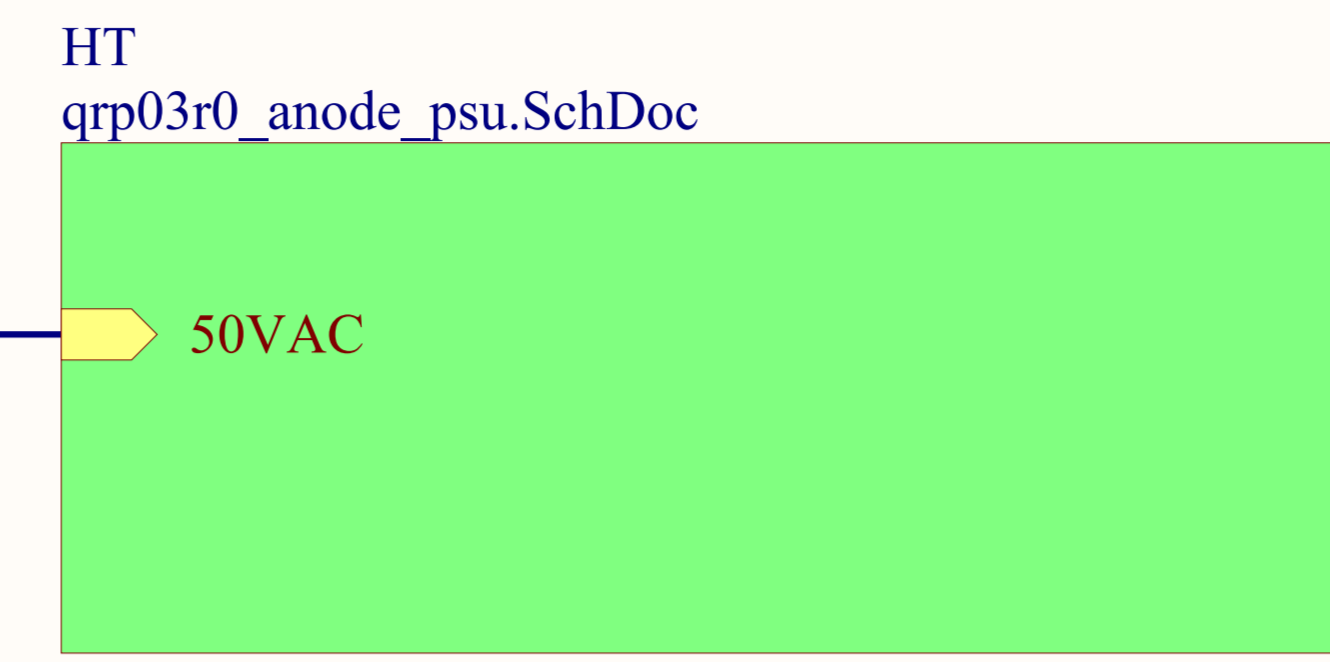
Company: <i>Sjöström Audio</i>		
Product no: QRP-03	Customer: Sjöström Audio	
Title <i>Tube Buffered Gainclone</i> High performance opamp buffer [No Variations]		
Design: P-A/JR	Drawing: P-A	Approved: P-A
Size: A3	Revision: 0	Created: 2012-10-20
Sheet 6.1 of 12	Changed: 2013-03-16	
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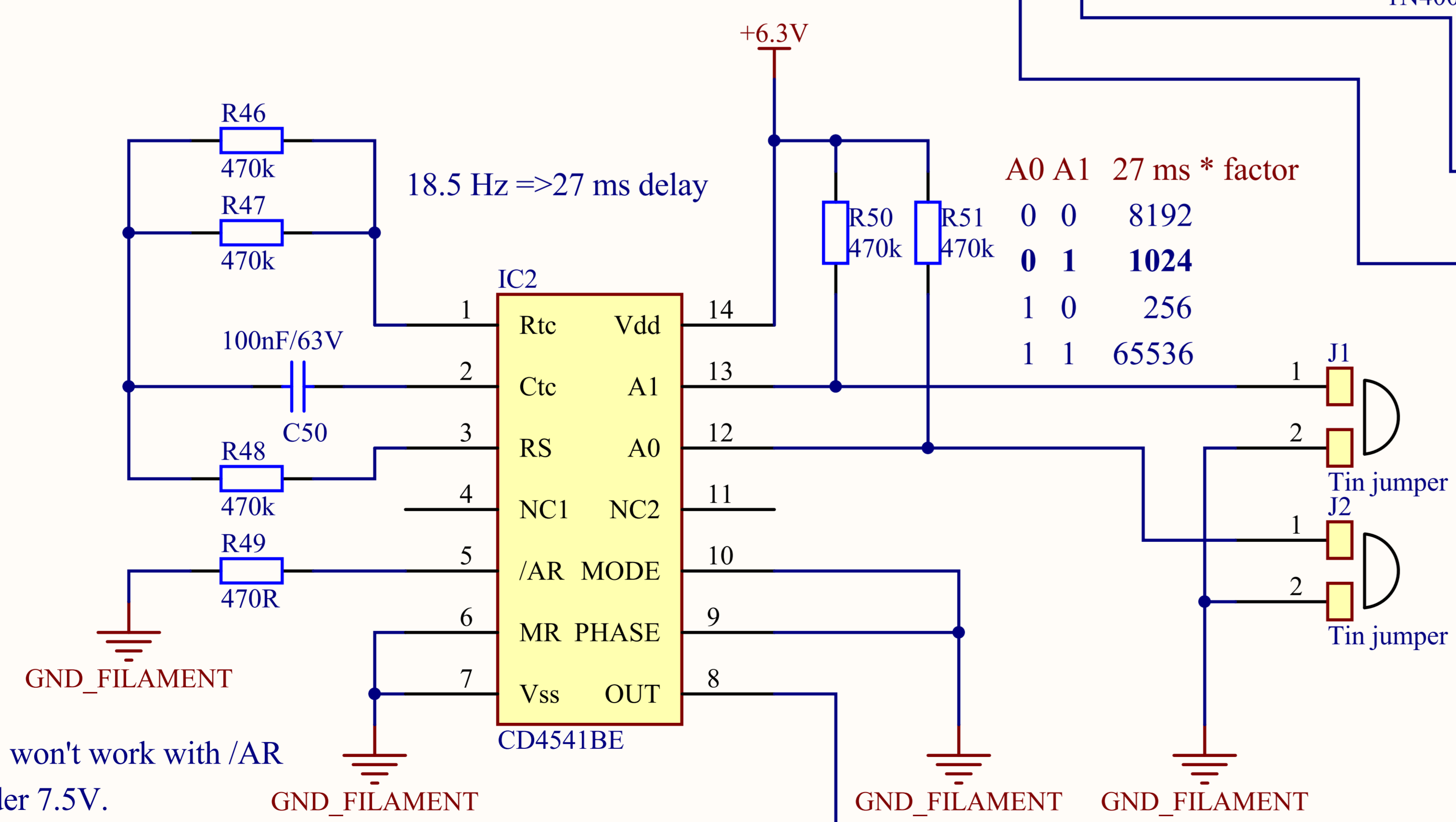
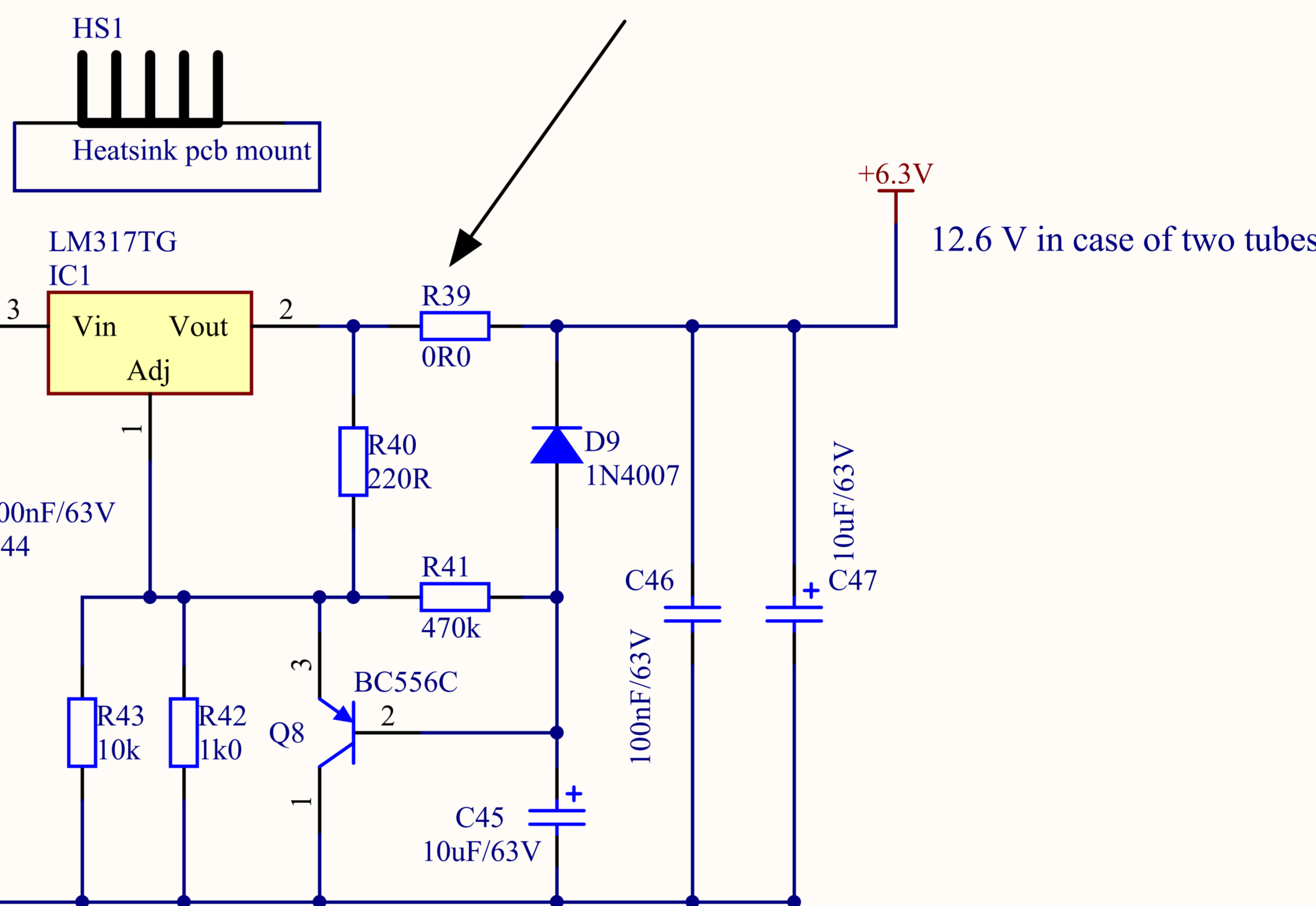
Company: <i>Sjöström Audio</i>		
Product no: QRP-03	Customer: Sjöström Audio	
Title <i>Tube Buffered Gainclone</i> High performance opamp buffer [No Variations]		
Design: P-A/JR	Drawing: P-A	Approved: P-A
Size: A3	Revision: 0	Created: 2012-10-20
Sheet 6 of 8	Changed: 2013-03-16	Printed: 2013-03-16
File: qrp03r0_opamp_buffer.SchDoc		



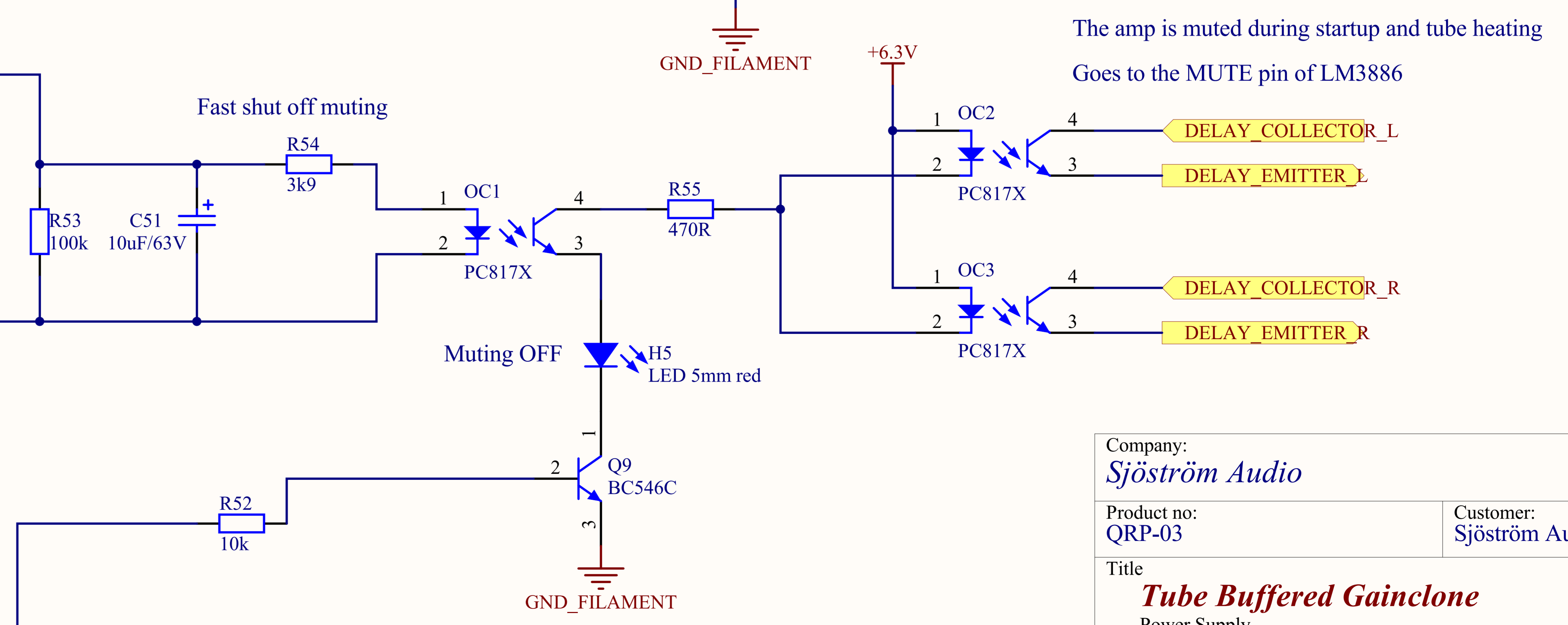
Anode voltage, ± 60 V or ± 15 V for opamps



Constant current from LM317



Notice that NXP HEF4541 won't work with /AR if the supply voltage is under 7.5V.



The amp is muted during startup and tube heating
Goes to the MUTE pin of LM3886

Variant name
[No Variations]

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Title Tube Buffered Gainclone		
Power Supply [No Variations]		
Design: P-A/JR	Drawing: P-A	Approved: P-A
Size: A3	Revision: 0	Created: 2012-10-20
Sheet 7 of 12	Changed: 2013-03-16	
File: qrp03r0_psu.SchDoc	Printed: 2013-03-16	

