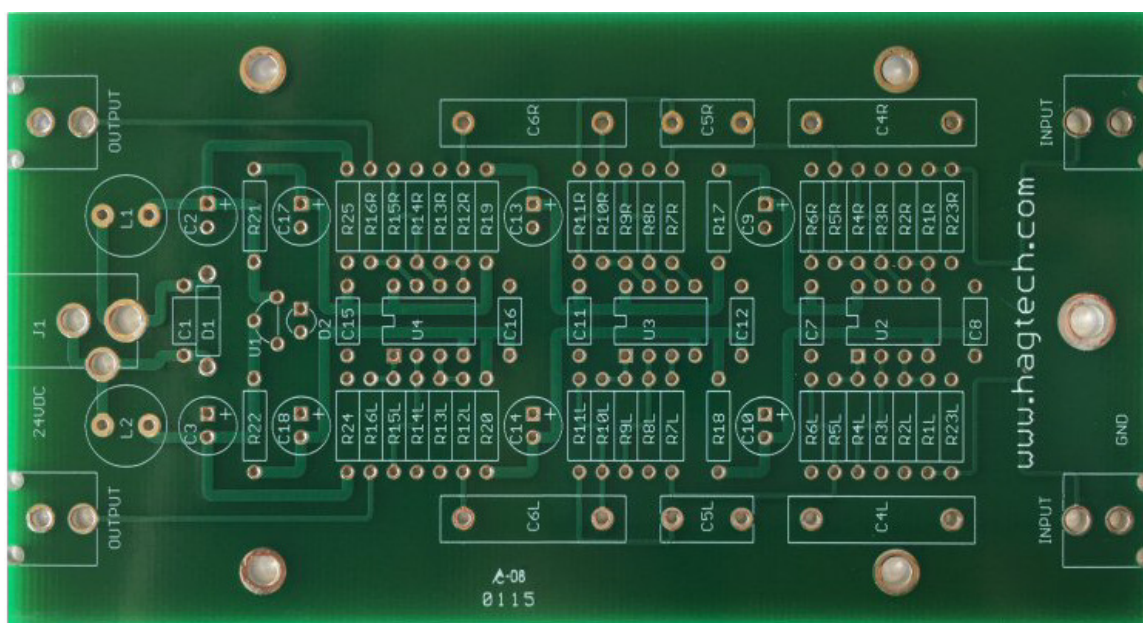




BUGLE2

MM / MC Phonostage PCB



Made in USA

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Description

Congratulations, you have just purchased one of the highest performance-per-dollar audiophile products available! The Bugle2 was designed to be a simple yet flexible phonostage capable of achieving very good sound quality comparable to far more costly units. It is a second-generation circuit topology that uses low noise audio opamps implementing passive split equalization filters and to provide a low output impedance. Gain can be set for either 40dB or 60dB (suitable for MC cartridges).

Available as a PCB-only kit, you will have to purchase all of the components to complete assembly.

Specifications

| Item | Specification |
|------------------|--------------------------------|
| Gain | 40dB (MM) or 60dB (MC) |
| Input Impedance | 47k (MM) or 100 ohm (MC) |
| Output Impedance | 300 ohm |
| Bandwidth | 10Hz to 1000kHz |
| Distortion | <0.01% @1kHz |
| Noise | 64dB ref 0.5mV A-weighted (MC) |
| Size | 3" x 5" x 1" |
| Power | 120Vac / 240Vac 1W |

Parts

The following parts need to be purchased to complete your kit. If you want to make substitutions, it is recommended to build as stock first to make sure it works properly. Then modify to your liking. For resistor details, see chart in back of this manual. For EU version of power supply, use the 709-GS06E-6P1J.

| Item | Mouser | Qty | Reference |
|--------------|----------------------|-----|-------------------------|
| Box | 635-A-27-B | 1 | |
| RCA (red) | 490-RCJ-042 | 2 | J2,J3 |
| RCA (white) | 490-RCJ-043 | 2 | J2,J3 |
| Opamp | 926-LM4562NA/NOPB | 3 | U2,U3,U4 |
| Splitter | 595-TLE2426ILP | 1 | U1 |
| Diode | 511-1N5819 | 1 | D1 |
| LED | 696-SSL-LX3044LYD | 1 | D2 |
| 1mH | RL622-102K-RC | 2 | L1,L2 |
| 100nF | 80-MMK7.104K100K00L4 | 7 | C1 |
| 10nF | 80-PHE426MK5100JR05 | 2 | C5 |
| 220nF | 80-PHE426HB6220JR06 | 4 | C4,C6 |
| 220uF | 647-UVZ1C221MED | 8 | C2,C3 |
| Bracket | 534-4332 | 1 | |
| DC Jack | 163-179PH-EX | 1 | J1 |
| Socket | 535-08-3518-10 | 3 | |
| 47R5 | 271-47.5-RC | 10 | R17,R18,R19,R20,R21,R22 |
| 332 | 271-332-RC | 10 | R1,R7,R11,R12,R16 |
| 1.30k | 271-1.3K-RC | 10 | R3,R8 |
| 1.43k | 271-1.43K-RC | 10 | R6,R14 |
| 4.75k | 271-4.75K-RC | 10 | R24,R25 |
| 8.45k | 271-8.45K-RC | 10 | R10 |
| 13.0k | 271-13K-RC | 10 | R4,R5,R9,R15 |
| 47.5k | 271-47.5K-RC | 10 | R2,R13 |
| Feet | 517-SJ-5003BK | 4 | |
| Power Supply | 709-GS06U-6P1J | 1 | |

| Item | McMaster Carr | Qty | Reference |
|-----------|---------------|-----|-----------|
| #4 x 3/16 | 91772A105 | 4 | |
| #6 x 1/4 | 91772A144 | 1 | |
| #6 x 5/8 | 91772A150 | 1 | |
| #6 nut | 96278A007 | 1 | |
| #6 knurl | 92741A110 | 1 | |

Assembly

Using the stuffing guide, install all of the resistors. Solder in place and cut leads. The guide shows values for 40dB. Gain and loading options are listed in the following chart.

| Resistor | 40dB | 50dB | 60dB |
|----------|------|------|------|
| R23 | | 681 | 100 |
| R1 | 316 | 316 | 100 |
| R3, R8 | 1k30 | 681 | 392 |

- ❑ Install resistors

Add diode. Solder, and cut.

- ❑ Install diode

Insert sockets for the operation amplifiers. Make sure of orientation! Solder in place.

- ❑ Install sockets

Add 100nF decoupling capacitors. Solder and cut.

- ❑ Install 100nF caps

Add DC jack, TLE2426 rail-splitter (TO-92 package), and LED. The long lead of LED goes into square hole. Solder in place and cut leads.

- ❑ Install DC jack, rail-splitter, LED

Install film capacitors, 220nF first, then 10nF. Solder in place and cut leads.

- ❑ Install film caps

Add inductors. Solder in place and cut.

- ❑ Install inductors

Insert RCA jacks. Use red for right channel, white for left. Make sure they are pressed all the way down to circuit board. Solder.

- ❑ Install RCA jacks

Install 220uF electrolytic capacitors. Long lead goes into square hole.

- ❑ Install electrolytic capacitors

Install opamps into sockets. The dot in the plastic indicates pin1, which is the hole with the square pad.

- ❑ Install opamps

The assembly is now ready for initial testing. Connect the power supply to the DC jack. Plug the supply into the wall, and the LED should turn on. Some of the power supplies have a few seconds of delay so don't panic. Disconnect.

- ❑ Electrical test

Add the grounding bracket using the #6 x 1/4" screw. Make sure the flat surface faces rearward and is aligned with the edge of circuit board.

- ❑ Install ground bracket

Modify end panels by drilling 3 holes in each (for RCA jacks, ground, and power).

- ❑ Modify end panels

Insert circuit board assembly into the bottom section of the plastic enclosure. Do this by placing end panels (textured surface outwards) onto the RCA jacks and then dropping into position. Secure in place using the #4 x 3/8" screws.

- ❑ Insert board into enclosure

Add the #6 x 1/2" ground screw through the bracket and secure using #6 nut. Add #6 thumbscrew (not too tight).

- ❑ Install ground post

Turn unit over and add rubber feet. And finally, apply top cover and secure in place using the four remaining screws.

- ❑ Add feet and top cover

Installation

Congratulations! Your Bugle2 is now complete and ready for installation.

Testing

If you have a DVM you can perform additional electrical testing prior to installation. With power applied, the DC voltage on the outputs should read 0V (or less than 20mV). The voltages (relative to the grounding post) on pin 8 of the opamps should be a positive voltage of roughly +10V. Each opamp will have a different reading, as the extensive filtering is lossy, so the input opamps have the lowest voltage. The voltages on pin 4 of the opamps will be negative, roughly -10V.

If you want to measure bandwidth or frequency response, you will need an iRIAA filter, a sinewave oscillator, and either an oscilloscope or AC voltmeter. A quick check for equalization accuracy is to apply a 500Hz square wave. The output waveform should be identical in shape. If there are droops, sags, overshoots, or spikes, the EQ is in error. If you have built the unit per these instructions such testing is not necessary.

Operation

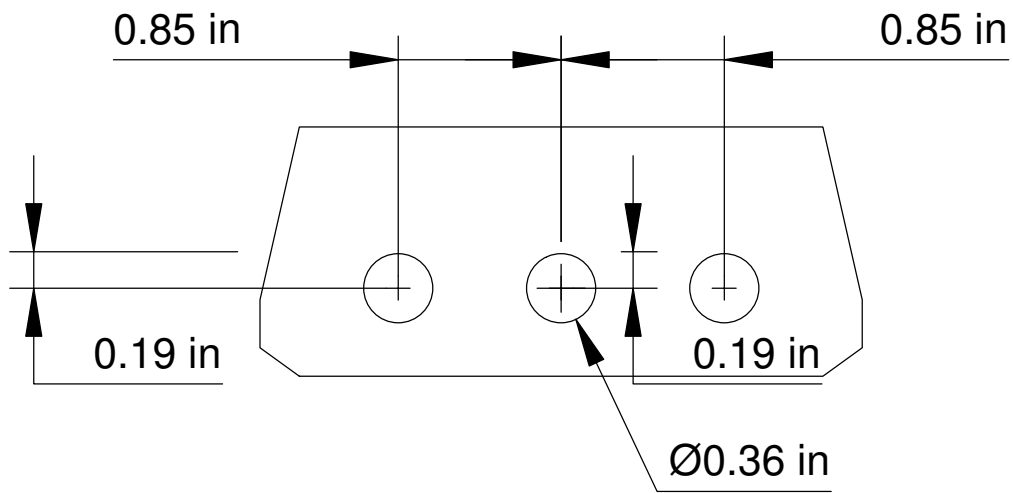
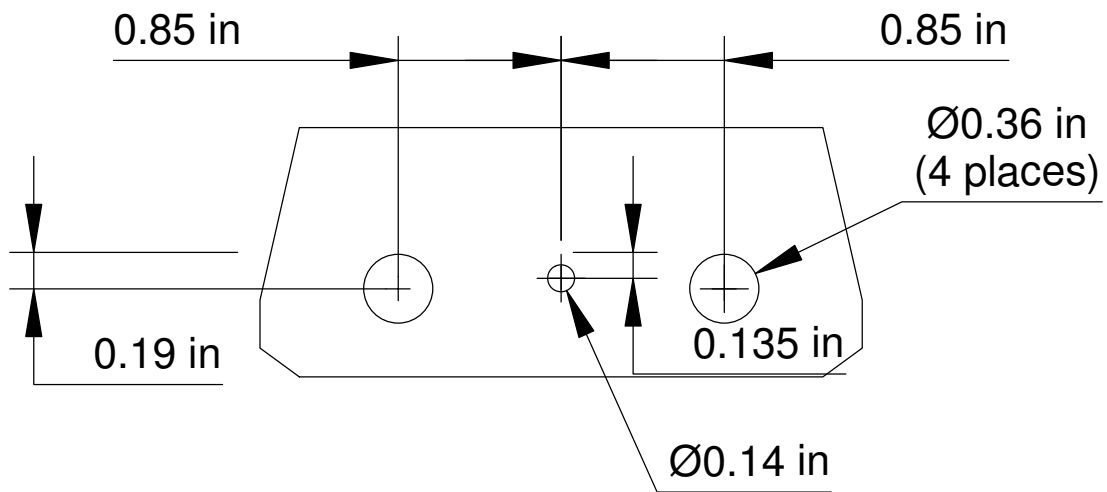
Connect a cable between output jacks and your audio system. Attach the turntable ground wire to the grounding post and connect the turntable RCA output plugs into the Bugle2 input jacks. Plug in the power supply. Enjoy!

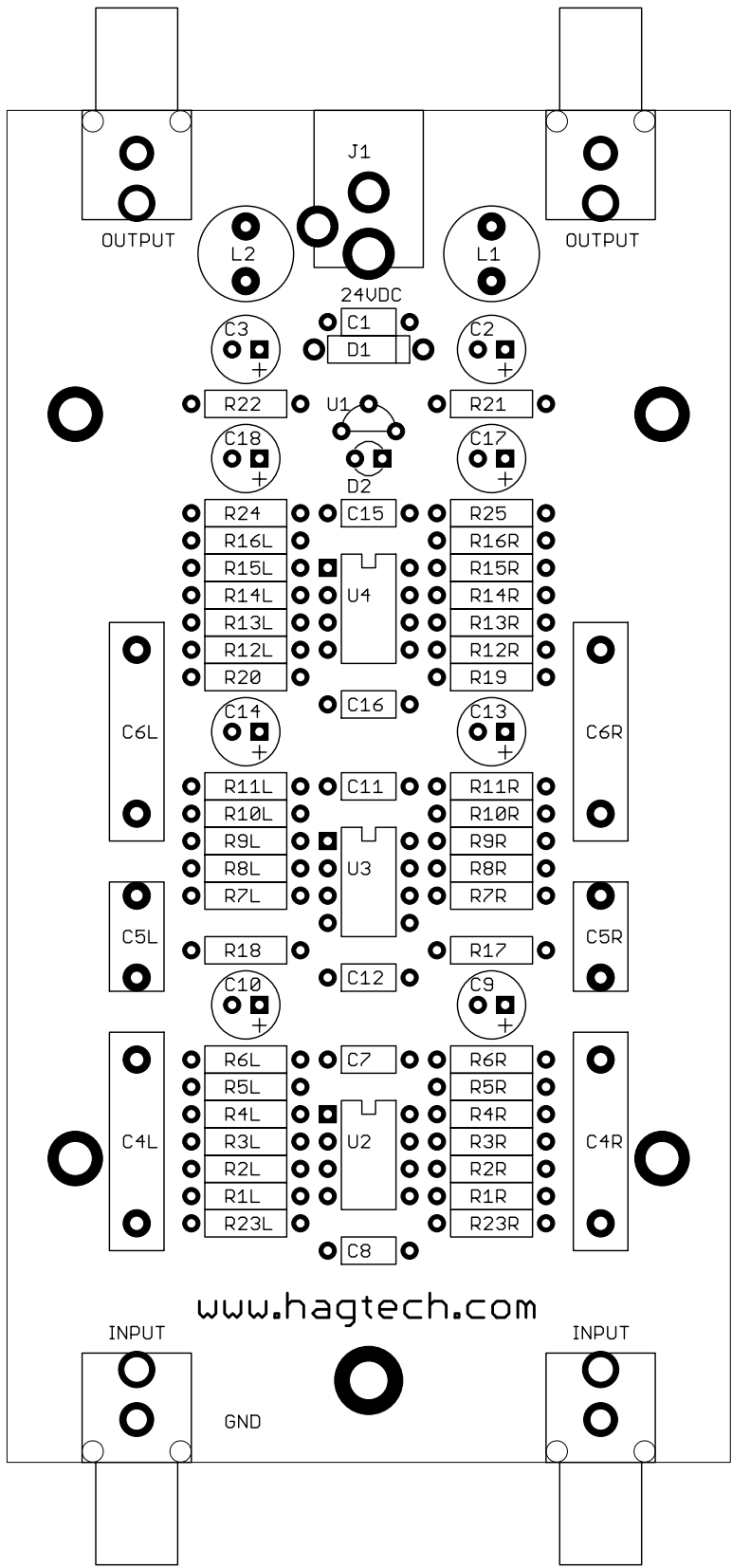
The Bugle2 must get an Earth ground from the linestage or receiver via the connecting cables; otherwise there will be hum. If the inputs to the linestage are floating, then add an extra ground wire to the Bugle2.

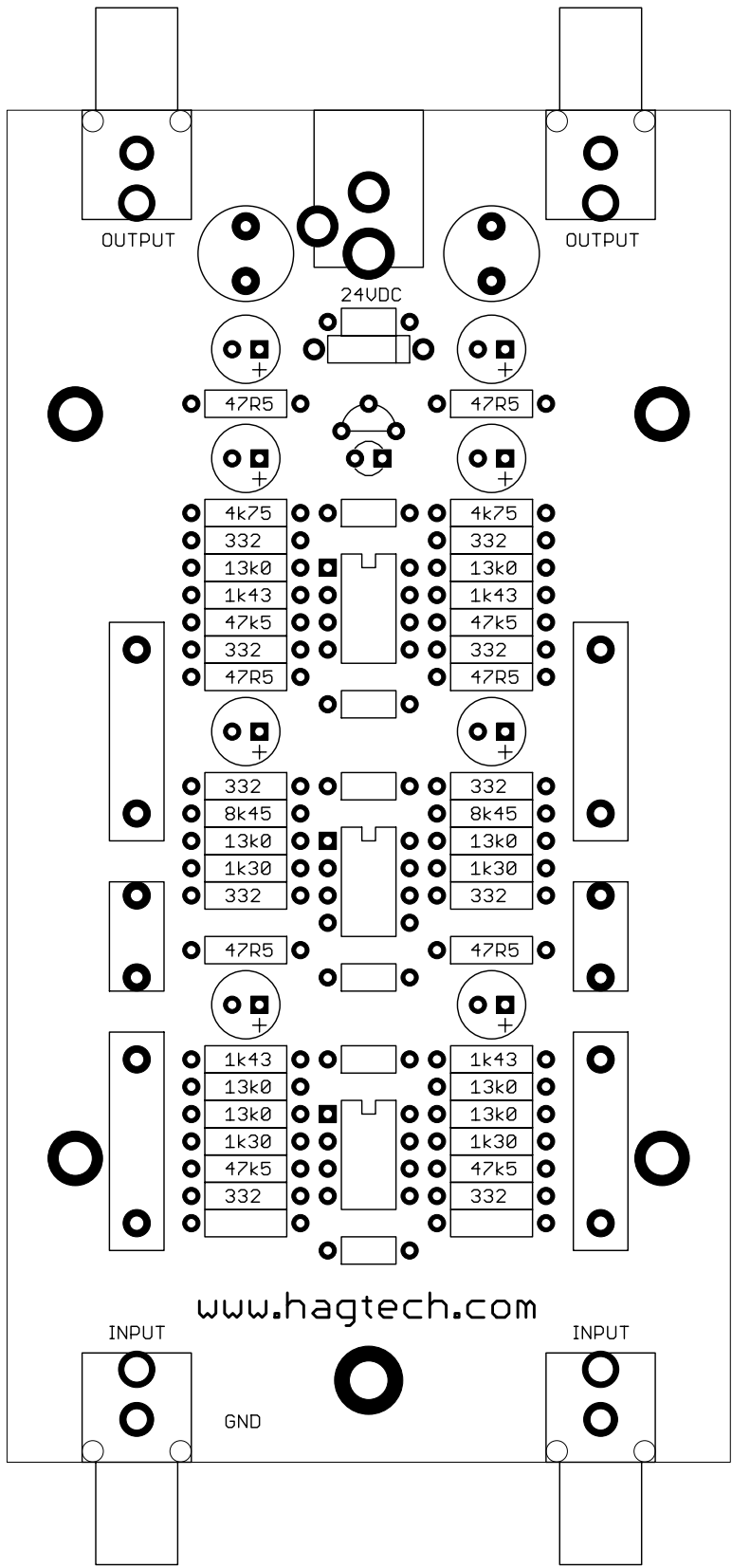
Troubleshooting

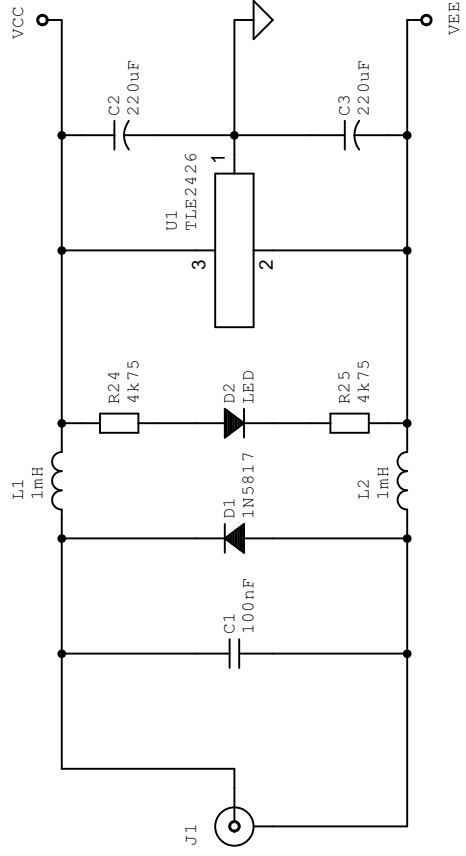
If the sound is not good, double-check all resistor values to make sure they were installed into their correct locations.

If a channel has a scratchy sound to it (not a nice clean, quiet hiss) then it is likely the input opamp has been damaged and should be replaced. These devices are very sensitive to ESD and precautions must be taken. Hum, buzz, and other noise sources (WiFi) can be induced into the Bugle2 and/or input cables via close proximity. Place as far from other equipment as possible.









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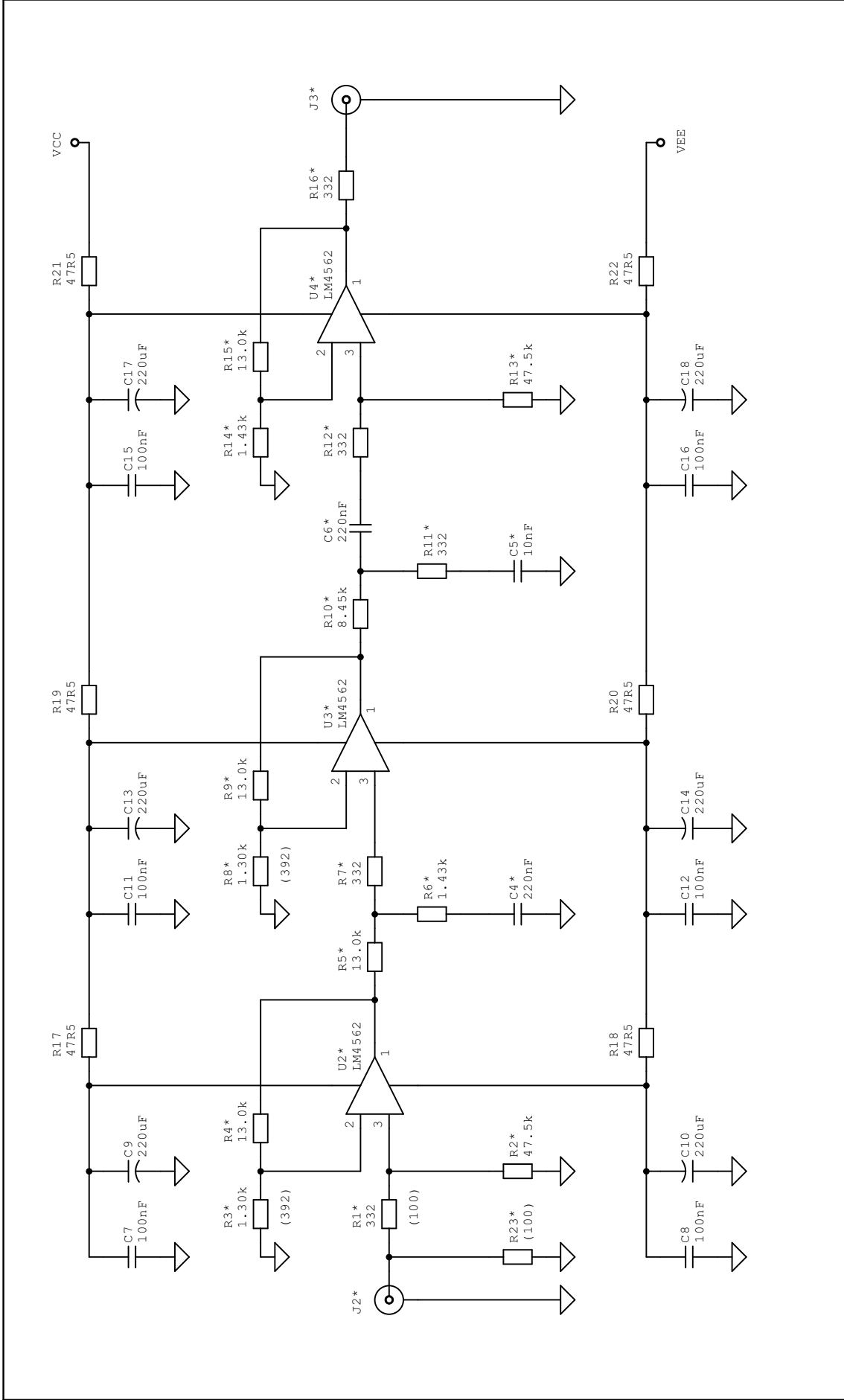
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