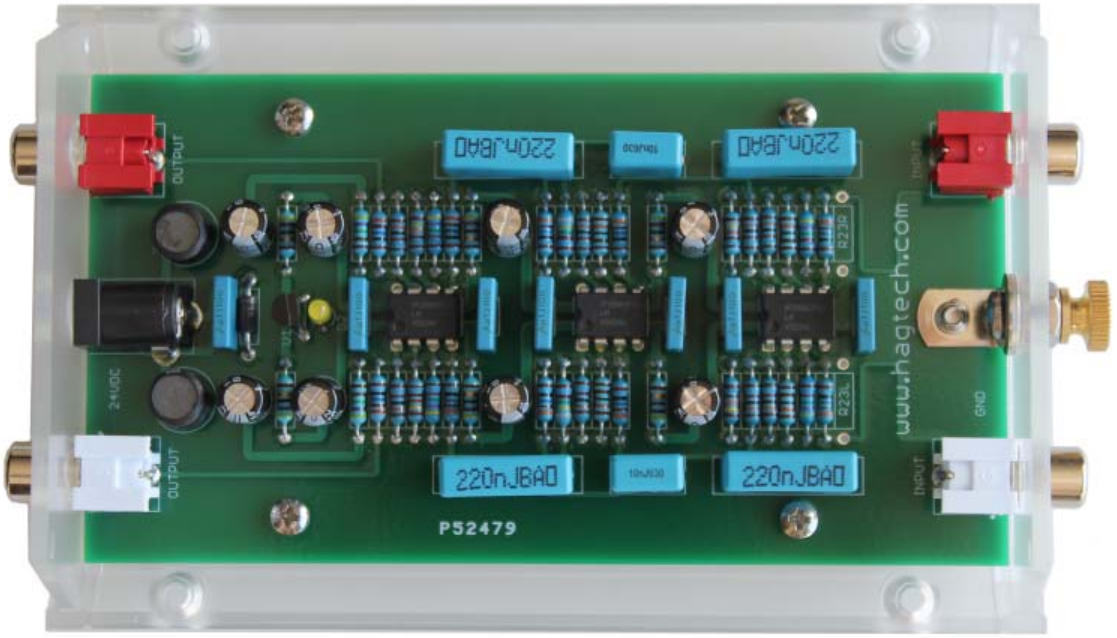
BUGLE2

MM / MC Phonostage



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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).

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 have been included in 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.

Item	Quantity
Resistor	52
100nF	7
220nF	4
10nF	2
100uF	8
Diode	1
LED	1
Inductor	2
Opamp	3
Rail Splitter	1
DC Jack	1
RCA	4
Bracket	1
Feet	4
Nylon standoff	4
#4 x 3/16	4
#4 x ½	4
#6 x ¼	1
#6 x ½	1
#6 nut	1
#6 Thumbnut	1
PCB	1
Enclosure	1
Power Supply	1
Sockets	3

Assembly

Sort resistors using the chart provided. Not all values will be used! The extras are for different gain and loading options. Assembly is best done in the following order. Check box after each step is completed.

- ❑ Sort resistors

Mount the four 1" tall nylon posts to the bottom of circuit board using the #4 screws. This is to provide a convenient fixture for installing and soldering components.

- ❑ Install nylon posts

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	332	332	100
R3, R8	1k30	681	392

- ❑ Install resistors

Add the diode. Solder, and cut.

- ❑ Install diode

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

- ❑ Install sockets

Add the 100nF decoupling capacitors. Solder and cut.

- ❑ Install 100nF caps

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

- ❑ Install film caps

Add the inductors. Solder in place and cut.

- ❑ Install inductors

Insert the 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 the 220uF electrolytic capacitors. The long lead goes into the square hole.

- ❑ Install electrolytic capacitors

Install the 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

Remove the nylon posts (save screws). 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

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

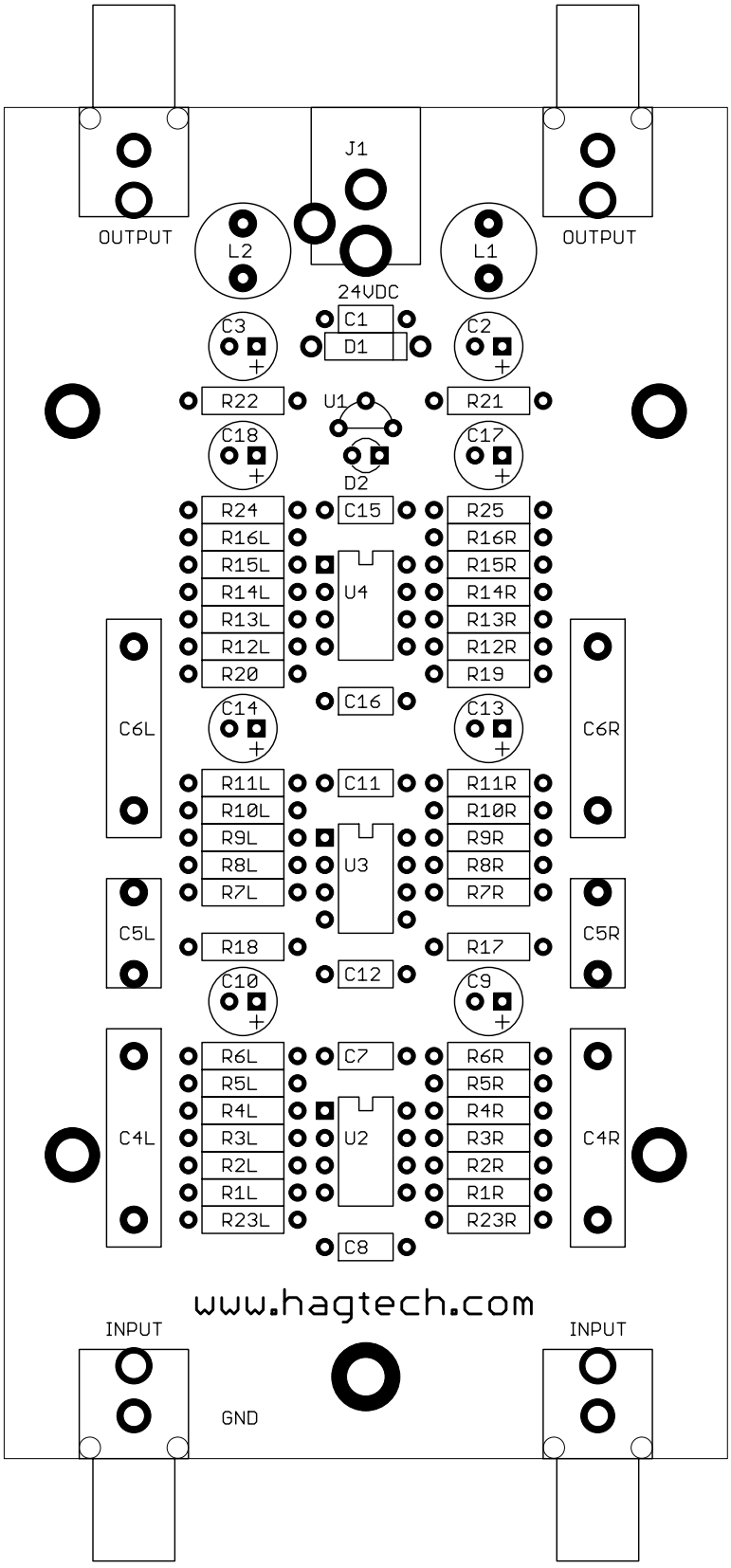
Connect a cable between output jacks and your audio system. Attach the turntable ground wire to the grounding post and connect the turntable RCA output plugs into the Bugle2 input jacks. Plug in the power supply. Enjoy!

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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C2
R22
U1
R21
C18
C17
D2
R24
C15
R25
R16L
R16R
R15L
U4
R15R
R14L
R14R
R13L
R13R
R12L
R12R
R20
R19
C16
C6L
C14
C13
C6R
R11L
C11
R11R
R10L
R10R
R9L
U3
R9R
R8L
R8R
R7L
R7R
C5L
R18
R17
C5R
C12
C10
C9
R6L
C7
R6R
R5L
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R4L
R4R
C4L
R3L
U2
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R2R
R1L
R1R
R23L
R23R
C8
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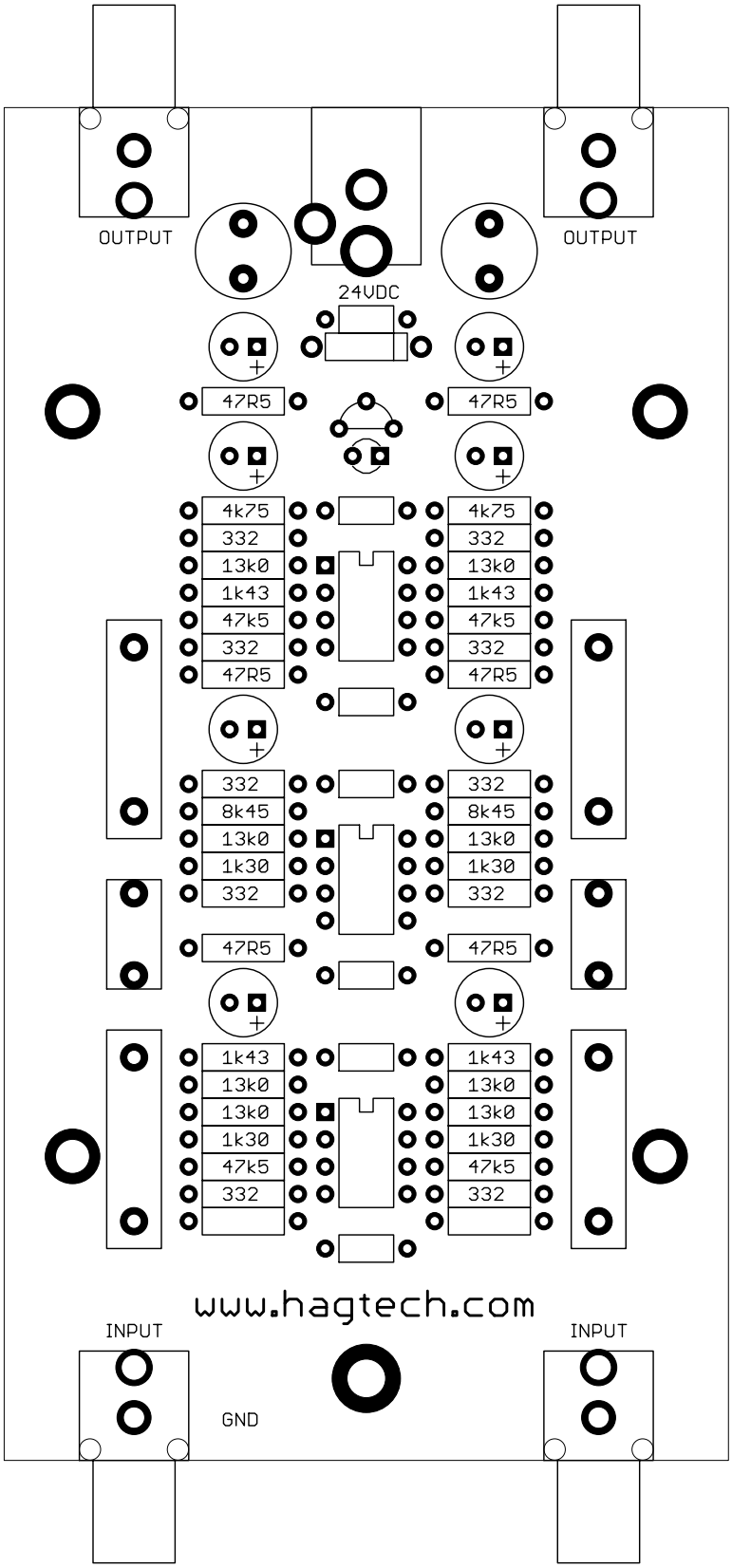
INPUT
INPUT
GND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332
47R5
332
8k45
13k0
1k30
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INPUT
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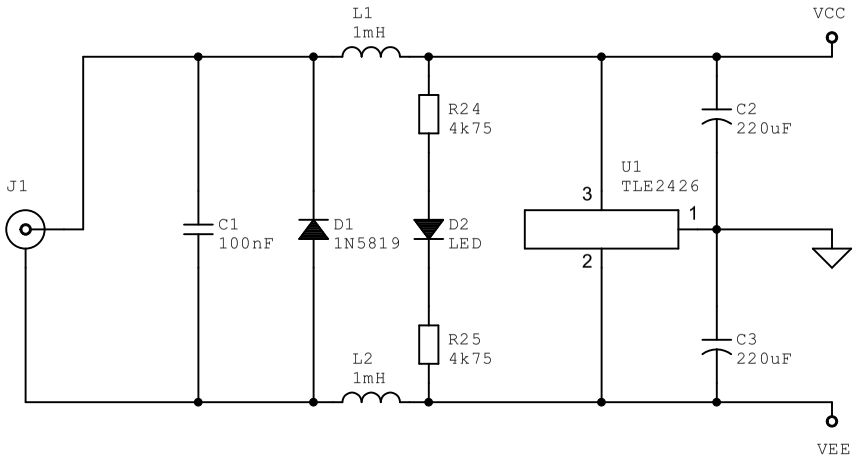

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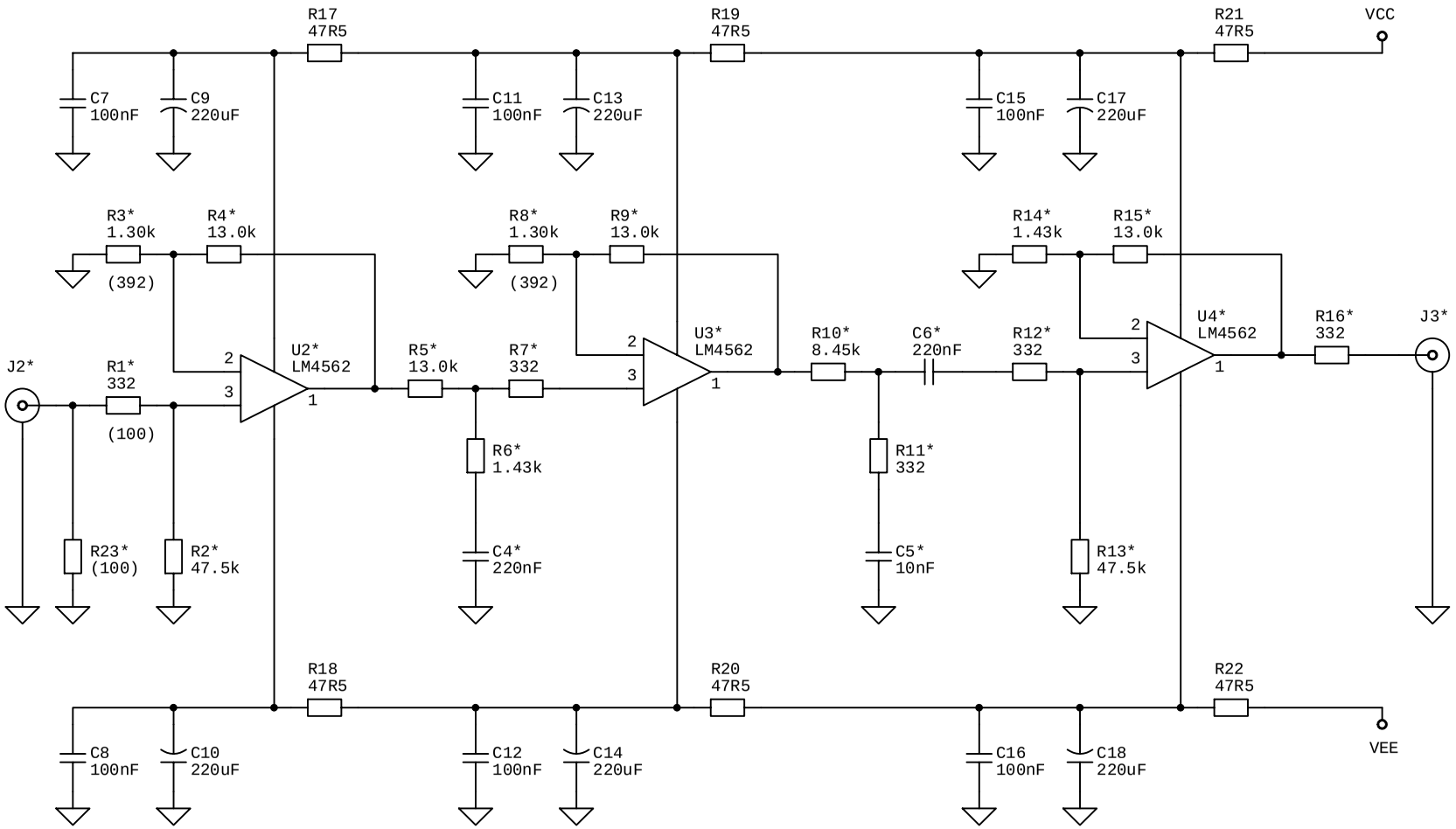

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