

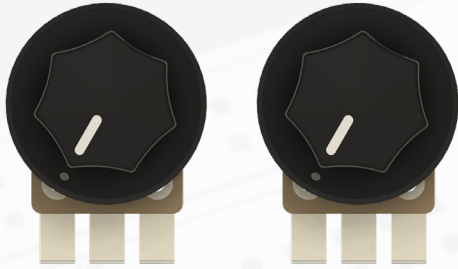
CIR-KIT™
BREADBOARD BUNDLE

3-BAND EQ

BUILD GUIDE

INCLUDED COMPONENTS

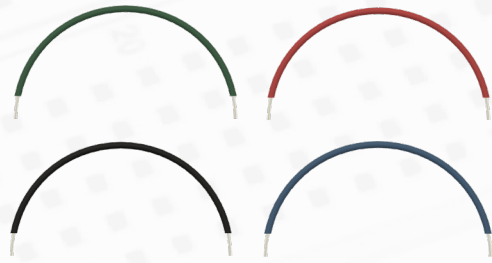
Potentiometers



B100K
x3

A100K
x1

Precut Wire



1.5" Red, Black, Green, Blue
x40

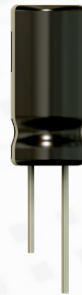
Transistors & Capacitors



Transistor
2n3904
x1



Film Caps
(various)
x6

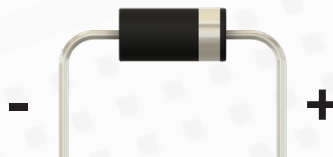


Electrolytic Cap
(various)
x5

Resistors & Diodes



Resistors
(various)
x14



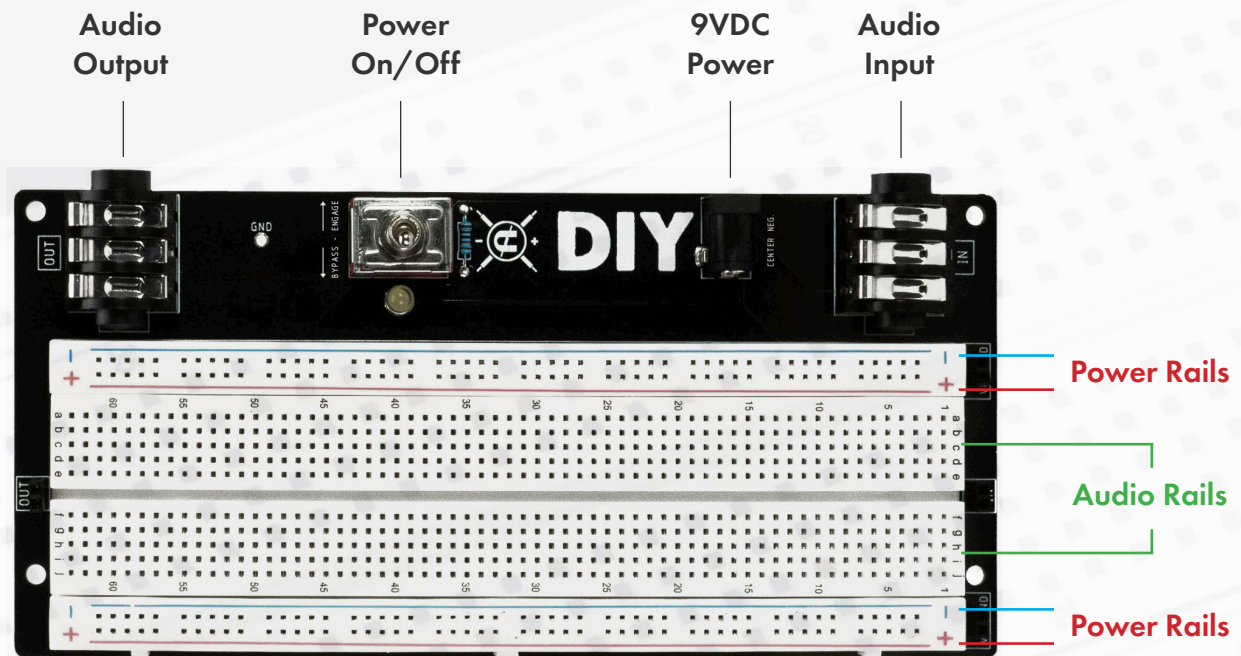
Diode
1n4001
x1

IC's & DIPS



IC
TL072
x1

BREADBOARD FLOW

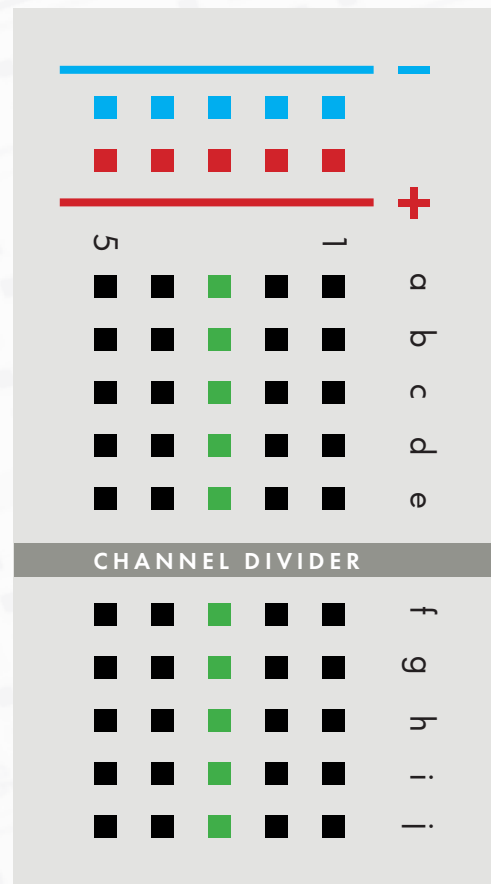


Power rails flow horizontally.

The **negative** rail will connect to the pin header marked **GND**, and the **positive** rail will connect to the pin header marked **VCC**.

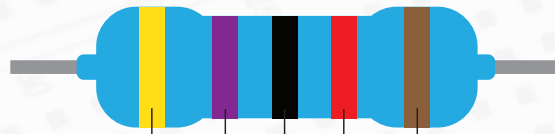
Audio rails flow vertically.

Channels **a-e** are connected, and channels **f-j** are connected.



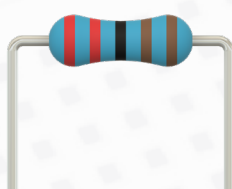
READING RESISTORS

Reading resistors may seem intimidating, but it's a very important aspect of breadboarding and is actually very easy! To determine the resistor value, follow the table and colors below. To ensure you are reading the correct value, keep in mind that the tolerance band is always found on the far right.



COLOR	1ST BAND	2ND BAND	3RD BAND	DECIMAL MULTIPLIER		TOLERANCE	
BLACK	0	0	0	1	1		
BROWN	1	1	1	10	10	±	1%
RED	2	2	2	100	100	±	2%
ORANGE	3	3	3	1K	1,000		
YELLOW	4	4	4	10K	10,000		
GREEN	5	5	5	100K	100,000		
BLUE	6	6	6	1M	1,000,000		
VIOLET	7	7	7	10M	10,000,000		
GRAY	8	8	8		100,000,000		
WHITE	9	9	9		1,000,000,000		
GOLD					0.1	±	5%

Shown below are the resistors and values that we'll be using in this build.



2.2K



3.3K



10K



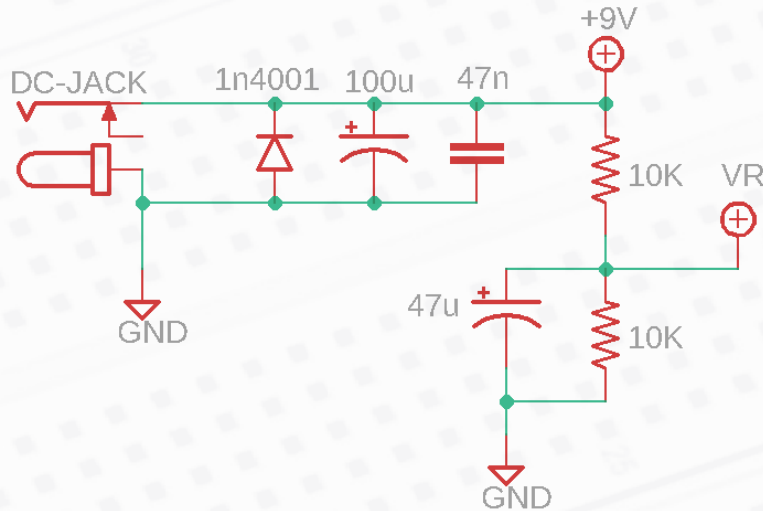
1M



2.2M

STEP ONE | POWER FILTERING

Power filtering helps to filter unwanted noise from power supplies, while preventing incorrect polarity from damaging the circuit. Ensure that polarized components (diode + electrolytic capacitor) are inserted correctly. In the schematic below, power is shown as 9V, whereas the breadboard shows VCC. Please note that for the majority of pedal circuits, these terms are interchangeable. The two 10K resistors form a divider network, forming reference voltage, or "VR" at 4.5 volts.



1.5" Red
x2

1.5" Black
x2



1n4001
x1



47n
x1



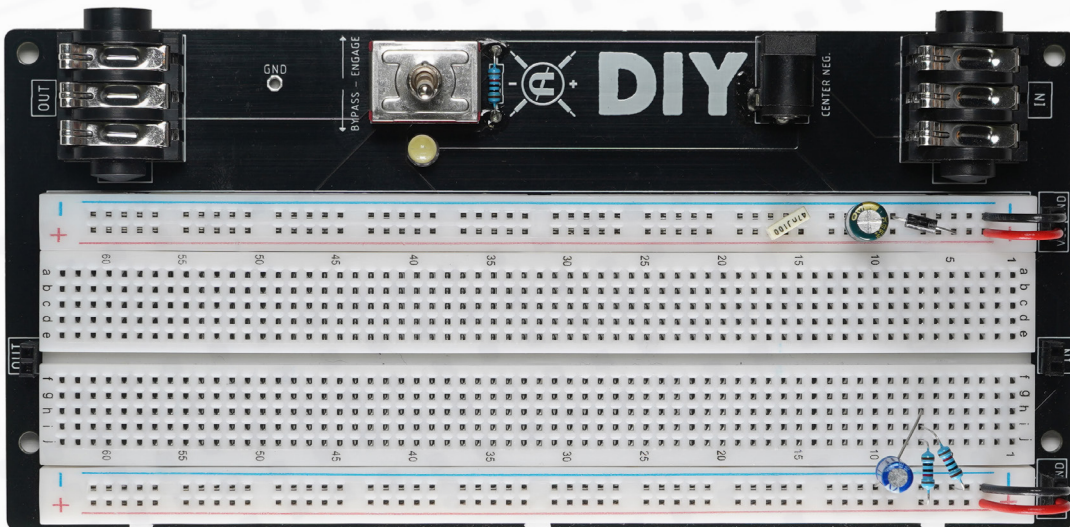
10K
x2



100u
x1

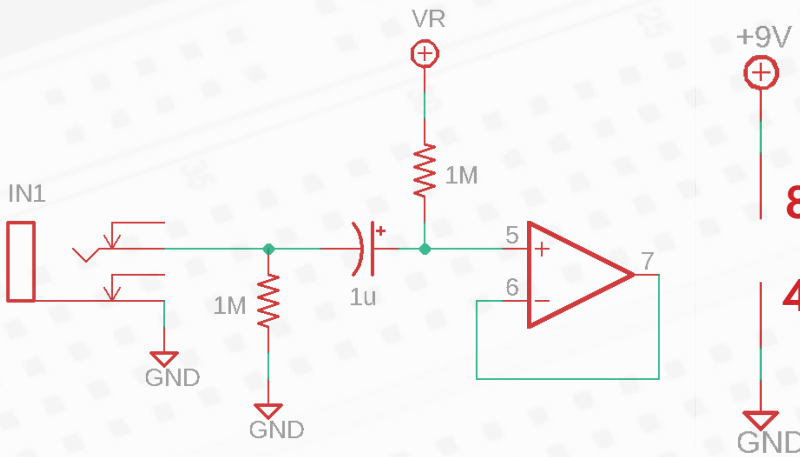


47u
x1

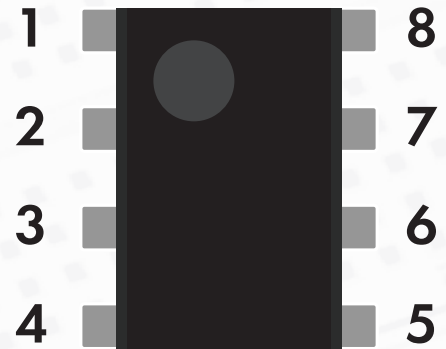


STEP TWO | INPUT

The input capacitor blocks AC signal, while setting the amount of low frequency audio allowed into the circuit. The pull down resistor prevents popping from the switch, and the 1M resistor to VR establishes reference voltage for the circuit. The first op amp stage serves as a buffer.



OP AMP PINOUT



1.5" Green
x3



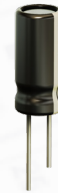
1.5" Red
x2



1.5" Black
x3



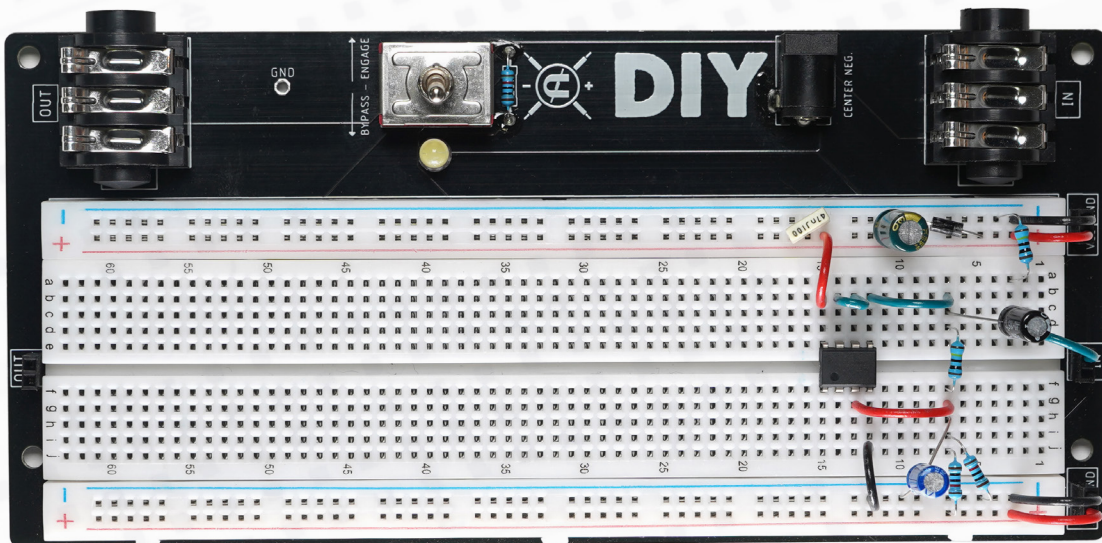
1M
x2



1u
x1

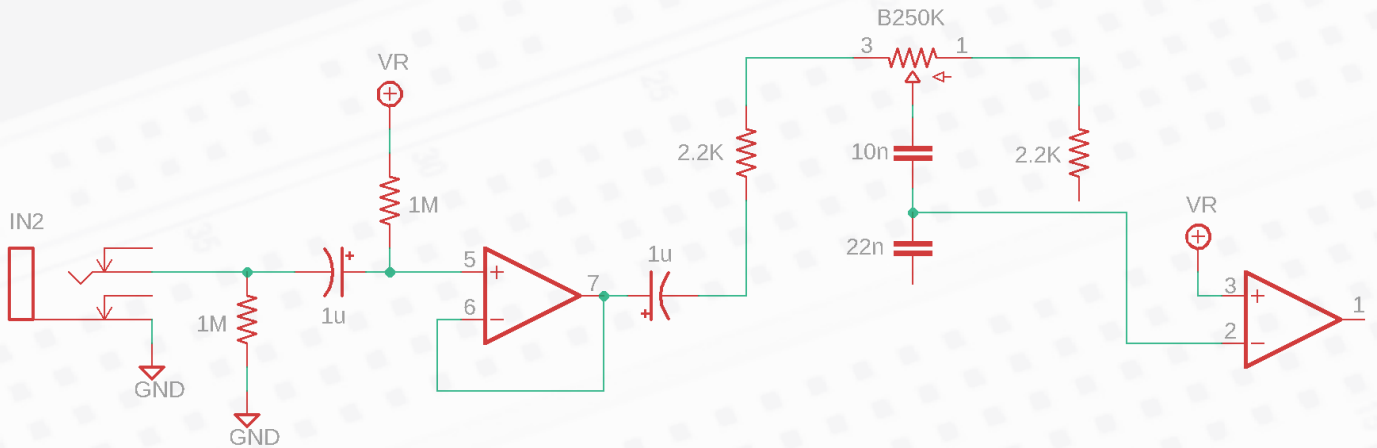


TLO72
x1



STEP THREE | TREBLE

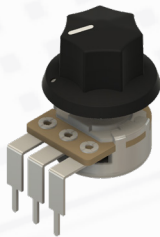
The combination and placement of the potentiometer, resistors, and capacitors in this stage allow for control over the treble frequencies.



1u
x1



1.5" Green
x2



B250K
x1



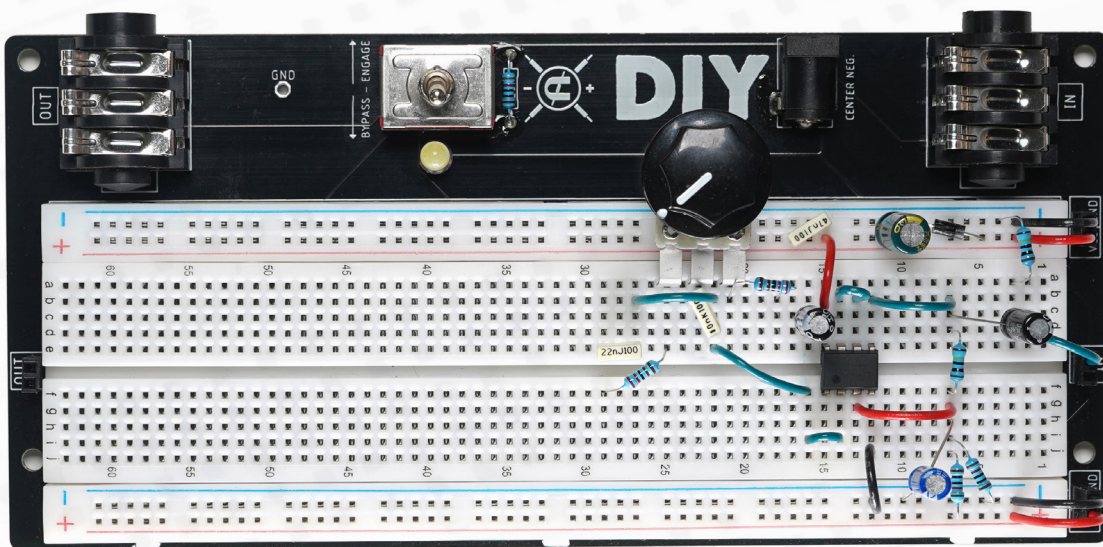
2.2K
x2



22n
x1

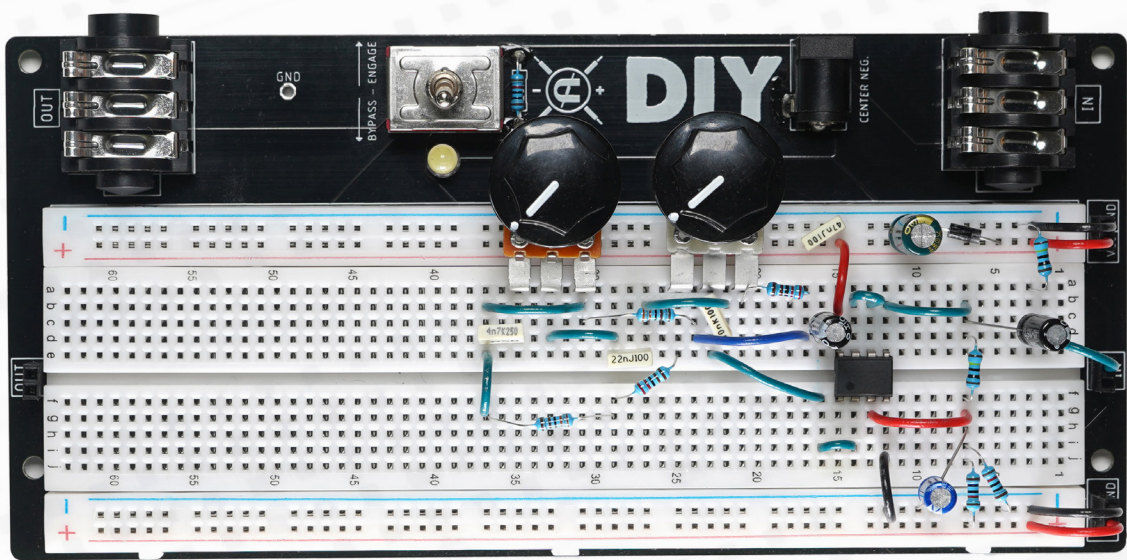
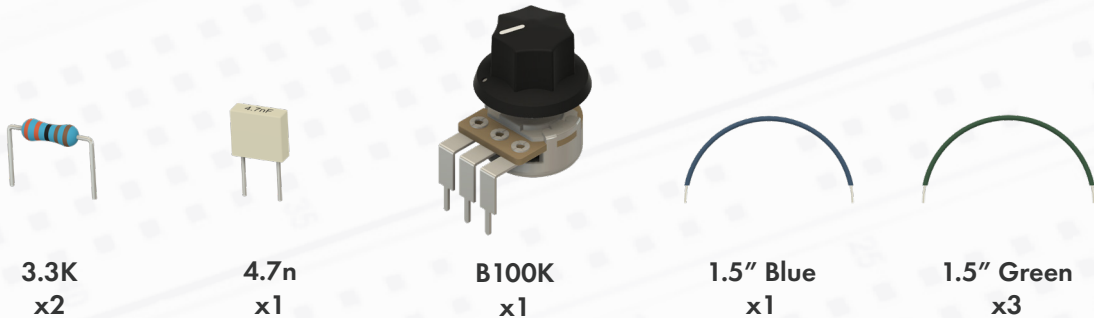
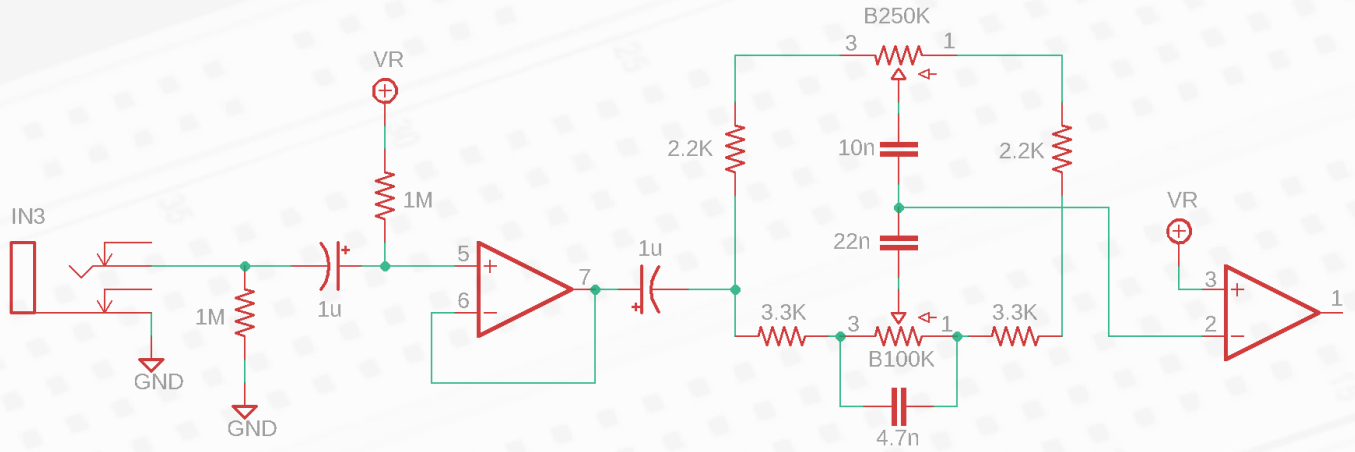


10n
x1



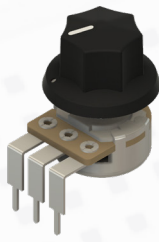
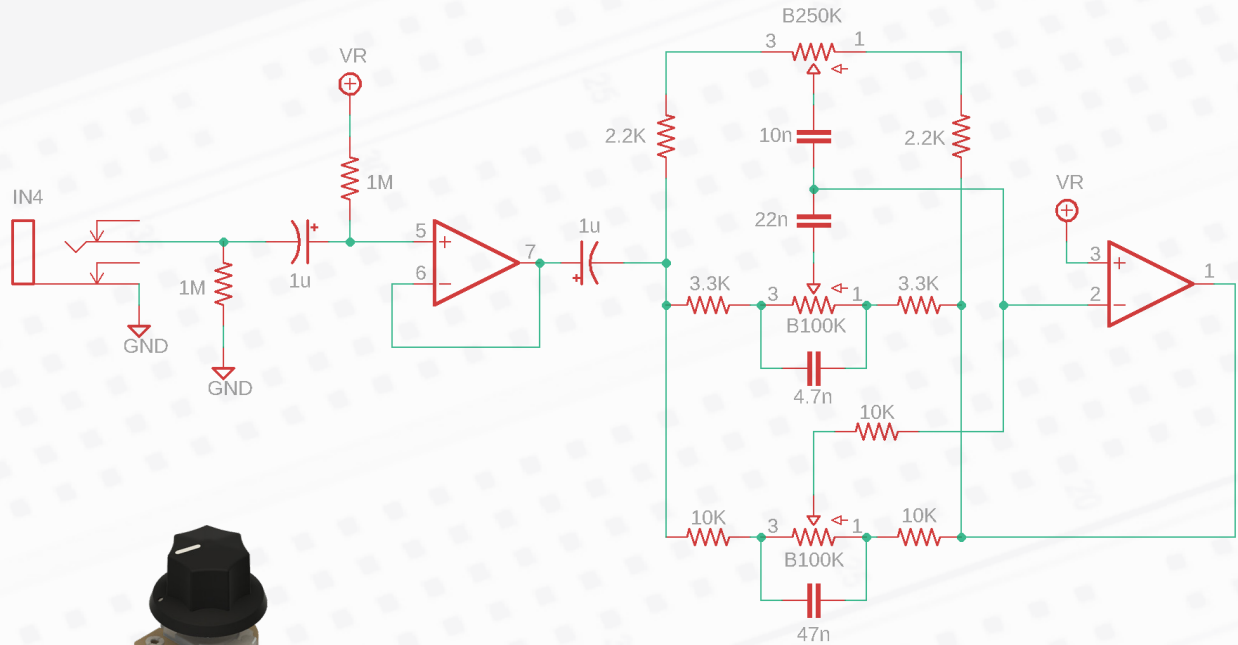
STEP FOUR | MID

The combination and placement of the potentiometer, resistors, and capacitors in this stage allow for control over the mid frequencies.



STEP FIVE | BASS

The combination and placement of the potentiometer, resistors, and capacitors in this stage allow for control over the treble frequencies. The final connection of the three potentiometers to the op amp stage allow for amplification of the EQ bands.



**B100K
x1**



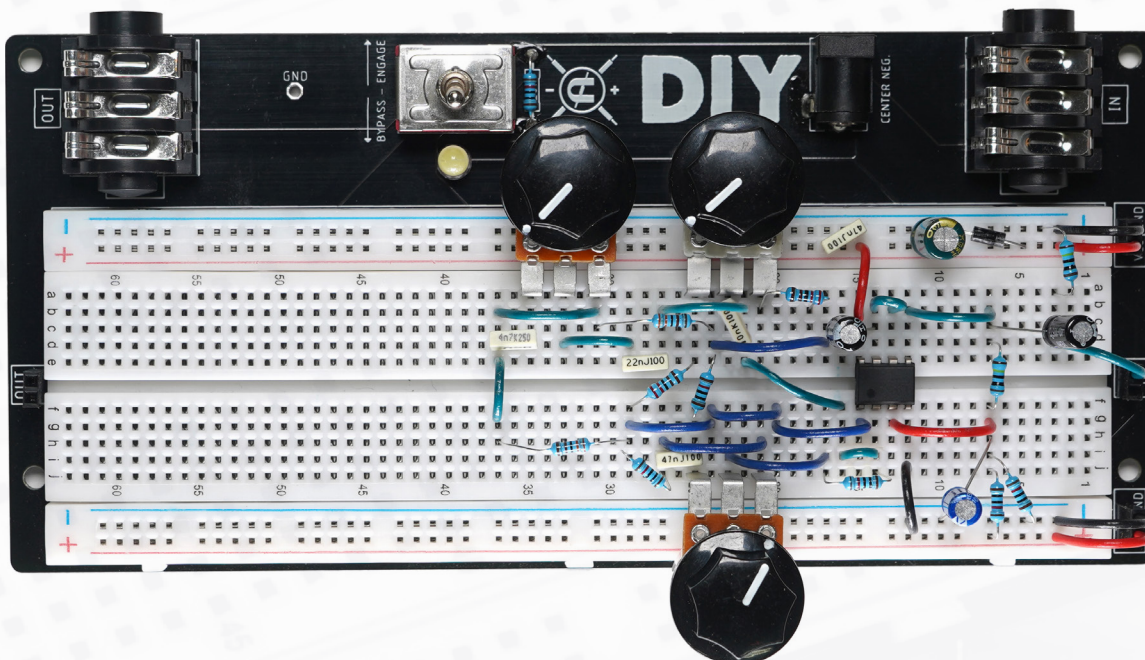
**47n
x1**



**10K
x3**

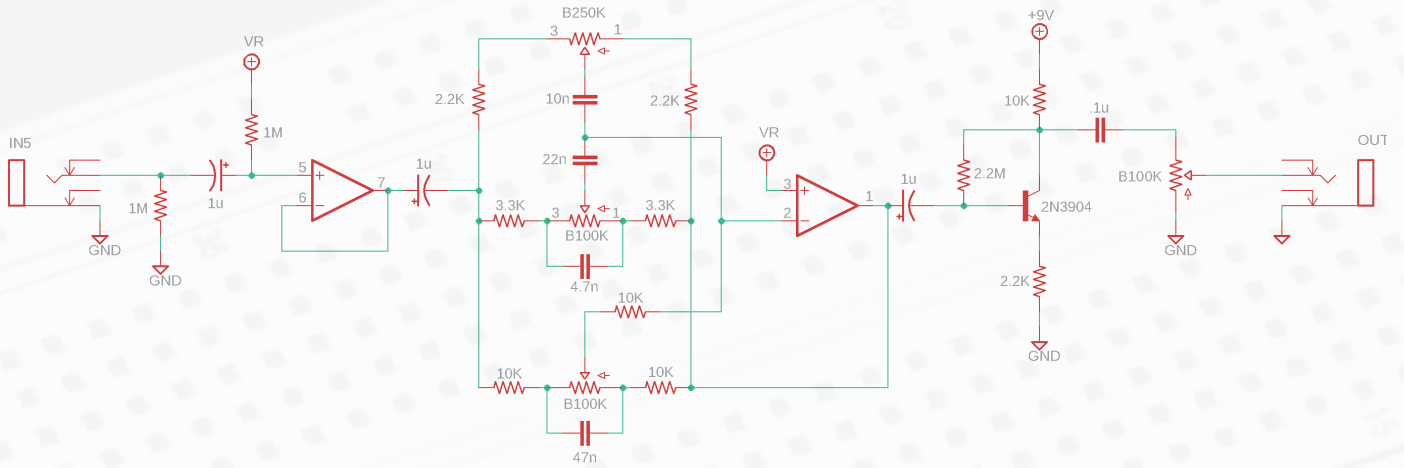







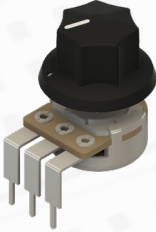




**1.5" Blue
x5**

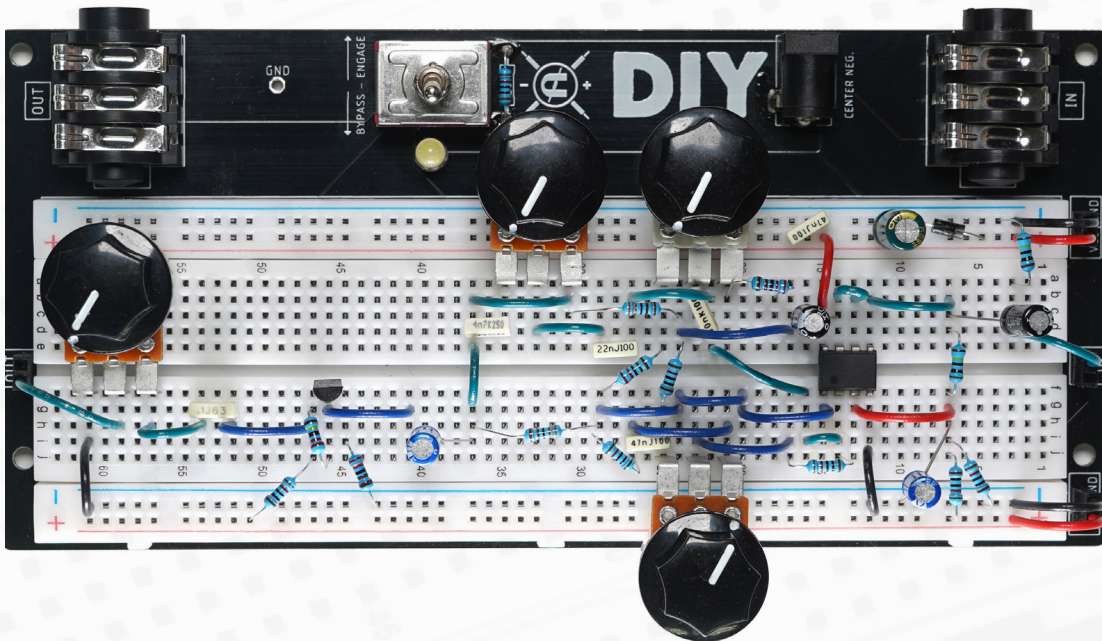


STEP SIX | OUTPUT

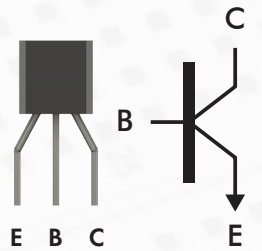
The transistor network amplifies the output signal, with the volume knob acting as an attenuator, setting the output volume of the circuit.



- 
2.2M
x1
- 
10K
x1
- 
2.2K
x1
- 
2N3904
x1
- 
1u
x1
- 
B100K
x1
- 
.1u
x1
- 
1.5" Green
x2
- 
1.5" Black
x1
- 
1.5" Blue
x2



TRANSISTOR PINOUT



TROUBLESHOOTING

Not getting power to the Power Rails/LED is not turning on when the toggle switch is set to the 'Engage' position.

Check that the proper connections are being made from the "VCC" & "GND" pin headers to the Power Rails. Pay attention to the orientation of Polarized components (Diodes and Electrolytic Capacitors).

Check the polarity of your power supply. Breadboards require "Center negative" polarity (as is with the power supply shipped with the bundle).

Not getting any effect when the toggle switch is set to the Engage position.

Most common issues will pertain to the proper connections being made. This could be as simple as a component being 1 slot away from the correct Audio Rail.

Check that transistor/op amps are in the correct orientation, and not flipped around 180 degrees.

Getting effect when toggle switch is set to Engage, but it doesn't sound as expected.

Check that the transistor/op amps is in the correct orientation and not flipped around 180 degrees. Check that the resistors are in the correct place and didn't get swapped with a different value. Pay attention to the orientation of Polarized components (Diodes and Electrolytic Capacitors).

Still stuck? Please reach out to us with any questions you have! We're here to help. Please email us at: diy@coppersoundpedals.com

