INTERNATIONAL HOUSE OF OVERDRIVE

CLASSIC KIWI TRANSPARENT BOOST/OVERDRIVE

INSTRUCTION GUIDE

THE PEDAL FROM THE 1970'S THAT'S STILL PIPING HOT

Based on the Crowther Hot Cake, an overdrive which first became available around 1976. It was one of the earliest hand-made boutique effects pedals available. The circuit was designed to be what is now referred to as a "transparent" overdrive. An effect that enhances the players sound while keeping the original tone intact. This circuit has gone through many changes since its inception, and we have further expanded on the design by returning to an earlier version most revered by players, and removing the buffer, which resulted in a reworked circuit that is true bypass but still retains the charm of the design. We also include the original LM741 IC chip found in the originals, as well as the TL071 that is found in later versions so you can experiment with which IC best suits your playing style.

Because the Hot Cake is made one-by-one by Paul Crowther, they fetch premium prices.

FIRST TIME BUILDING A PEDAL? Kick back and watch our 4-part series where we show you the basics of pedal building. Even if you're a complete beginner, don't worry! We go over everything from unboxing, to choosing the right soldering iron, to making every connection. We also give tips on painting your pedal.

Visit: stewmac.com/pedal-build

TOOLS AND SUPPLIES
(REQUIRED OR RECOMMENDED)

Not pictured: #1Phillips screwdriver, supplies to paint your pedal, clear silicone adhesive, spray finish.

Power: Model #12260 requires a standard 9V DC center-negative power supply (not included) and consumes less than 100mA.

Soldering Iron #0502
Delta Solder #103460
Delta Solder #103461
Solder Wick #0504

PC Board Holder #0500

Guitar Tech
Wrench Set #3691
or nut drivers/sockets

Wire Cutter #1607

Long-Nose Pliers #1610

Fine-Gauge Wire
Stripper #1606

TOOLS AND SUPPLIES
(HELPFUL)

Magnifying Glass or
OptiVISOR #1685

Multimeter PM8225C
#103556

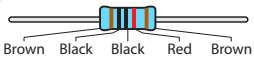
Soldering Aids #0521

Our Pedal Building Tool Set #2318 is the perfect companion for new pedal builders who do not already have a lot of tools and supplies.

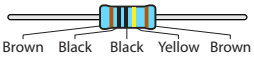
Note: While electrical properties remain the same, the appearance of parts may vary based on availability. If you are ever unsure, please contact us via the information on the back of this manual.

We know you are excited to get started building. That said, one of the keys to a successful build is taking the time to get to know all of your parts. Sort all of your pedal's parts and check them off according to the parts lists. If you are not familiar with what they do, the next section will give you a little primer.

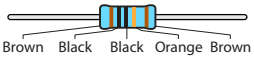
PARTS LIST



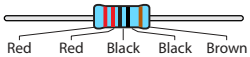
10K resistor (3) #7362



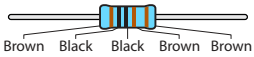
1M resistor (2) #7367



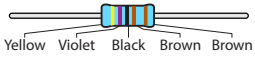
100K resistor (3) #7365



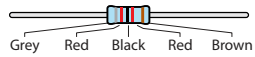
220Ω resistor (2) #7353



1K resistor (1) #7357



4.7K resistor (1) #7359



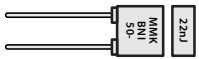
82K resistor (1) #7410

10µF electrolytic capacitor (2) #7310

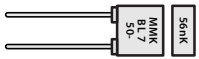
100µF electrolytic capacitor (1) #7339

.082µF capacitor (1) #7525

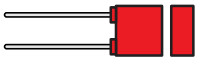
470pF capacitor (1) #103164



.022µF capacitor (1) #7317



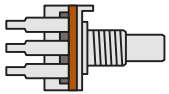
.056µF capacitor (1) #103165



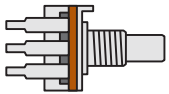
.01µF capacitor (1) #7331

PARTS LIST (CONT)

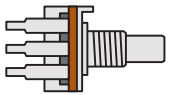
8.2V Zener diode (1)



A50K audio taper pot (1)

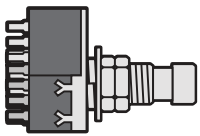


C50K reverse audio taper pot (1)



B25K linear taper pot (1)

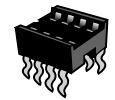
Adhesive foam tape squares (1)



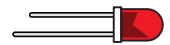
3PDT latching footswitch (1)

LM741 Integrated circuit (1)

TL071 Integrated circuit (1)



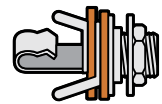
Integrated circuit socket (1)



Red LED (1)

5mm LED mounting bezel (1)

2.1mm DC power connector (1)

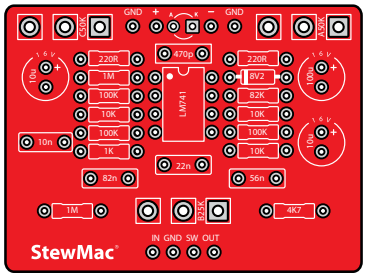


1/4" Mono jack (2)

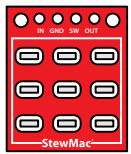
PARTS LIST (CONT)

24" of lead wire (1)

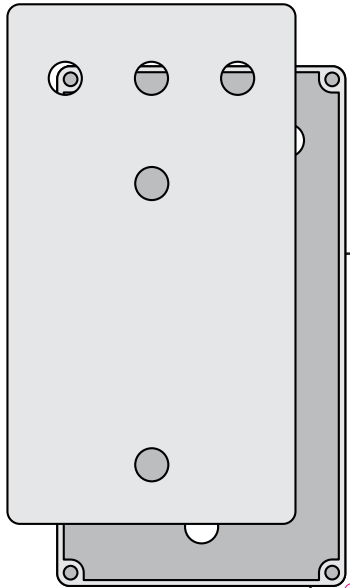
Control knobs (3)



Circuit board [PCB] (1)

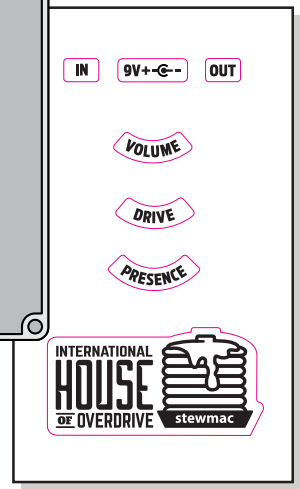


Breakout board (1)



Pre-drilled enclosure (1)

Sticker sheet (1)



1 PAINTING YOUR PEDAL HOUSING

Give your pedal a custom paint job by painting and adding the stickers provided in this kit (or custom decals that you can create on your own). Doing this pre-build is not only fun, but it's much easier than disassembling the pedal to paint it once you put it together. Don't forget to order quality primer and lacquers from stewmac.com.

1. To minimize redoing steps, make sure you have a solid idea of the look and feel you're going for.

2. Lightly sand housing with a P240 grit sandpaper and wipe clean any debris.

3. Cover the holes from the inside with masking tape.

4. On a large piece of cardboard, elevate the housing top and bottom on a couple of small blocks of wood.

5. With long, slow strokes, spray one light coat of primer or primer/paint on top and bottom. Allow 45 minutes of drying time between next two to three coats.

6. If you're using primer followed by paint method, paint 3 coats with 45 minutes between coats.

7. Now, add your IHOO sticker and any other desired decoration (paint pens, acrylic paint, Sharpie etc.). Allow drying time.

8. Add 3 coats of clear coat glaze with 45 minutes between coats. Wait at least 2 hours before adding parts.

UNDERSTANDING ELECTRONIC COMPONENTS

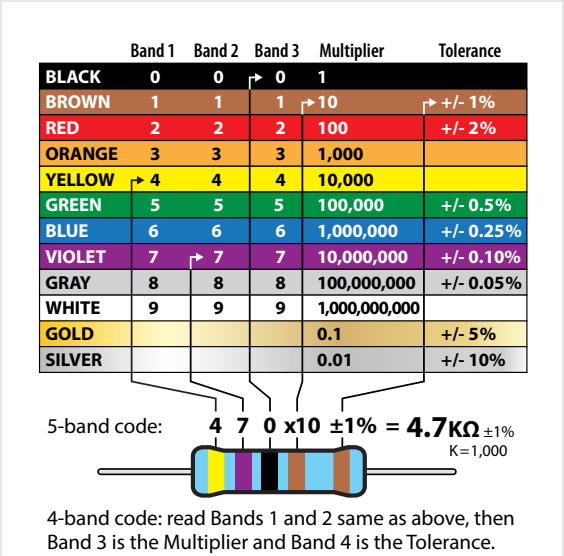
A number of different components are used to make an effects pedal. Here's an overview of what they do.

RESISTORS

A resistor is used in an electrical circuit to present an opposition to current flow. It resists the amount of current that can pass through it.

A resistor's value—the amount of resistance it creates – is rated in ohms (Ω). The higher the ohmic value, the greater the resistance to this flow of current. For example, a 100Ω resistor creates ten times as much resistance as a 10Ω resistor.

Resistor values are indicated by colored bands, read from left to right. The first color in the code is usually the one painted closest to a lead. When a gold or silver band is present, it's always one of the last colors in the code.



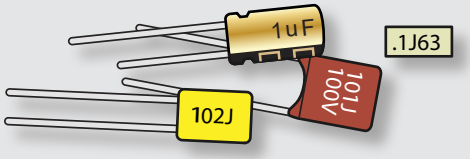
4-band code: read Bands 1 and 2 same as above, then Band 3 is the Multiplier and Band 4 is the Tolerance.

If you're having trouble reading the color bands, there are apps that make easy work of identifying them. Or, try using a multimeter to read a resistor's value. Just set your multimeter to ohms and connect the test leads on each side of the resistor.

CAPACITORS

The two main uses of capacitors are to store electricity and to block the flow of DC current.

Capacitor values are typically printed on the component. The key values with caps are their voltage and capacitance.



The voltage spec for a cap refers to how much DC voltage it can handle at any given time. If this rating is exceeded, the capacitor will fail.

Capacitance, measured in farads, refers to how much electricity a capacitor can hold. One farad (1F) would be much too large for use in a pedal. Caps for pedals are rated between millionths of a farad, called microfarads (µF), billionths of a farad, called nanofarads (nF), or trillionths of a farad: picofarads (pF). **.001µF = 1nF = 1,000pF**.

Resistors and capacitors may also be referred to with shorthand notation on the printed circuit board when there is a decimal in the value. For example, the place on the board for the 4.7K resistor will read 4K7, and the spot for a 2.2nF capacitor will read 2n2. This is done to save space on the board and make the labels as clear as possible.

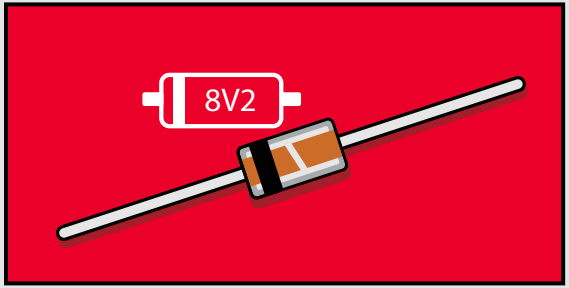
Some capacitors have polarity and some don't. It's extremely important to install polarized caps correctly in a circuit. The negative lead will often be indicated by a band of arrows pointing to the negative lead and will be shorter than the positive lead. The positive lead of an electrolytic cap will be longer and won't have any arrows pointing to it.

The hole in the PCB for the positive lead is square and marked with a "+".

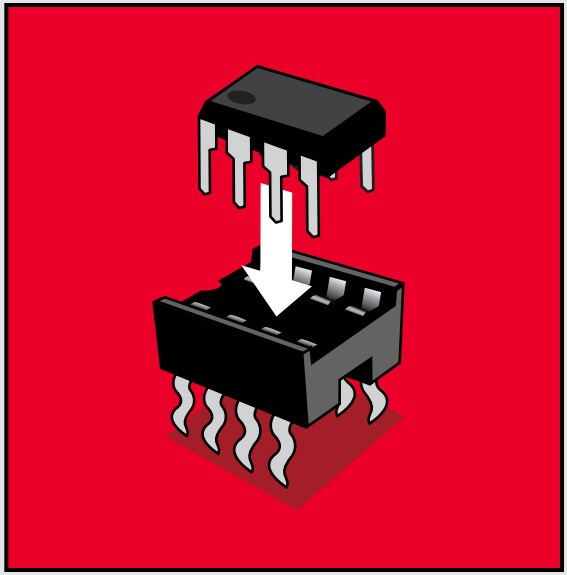
Installing capacitors with the polarity backwards will make the circuit malfunction and quickly destroy the capacitor— even causing it to explode.

DIODES

Diodes are used where you want electricity to flow in only one direction, such as power rectification, and also to limit how much current can flow, to create "clipping" distortion.



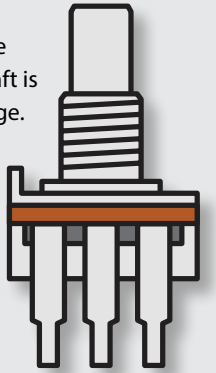
Diodes are also polarized, so they need to be installed in the correct orientation. The stripe around one end marks the negative (-) lead of the diode. On the circuit board, the printed outline of the diode also shows this stripe. Install the diode so that the stripe matches the direction shown on the circuit board.



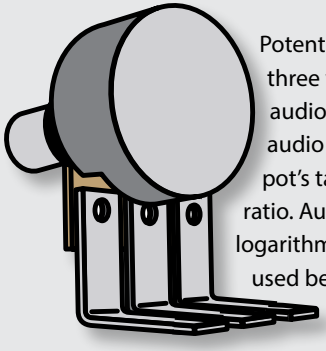
INTEGRATED CIRCUITS

Integrated circuits are complex, tiny, self-contained collections of components that contain a complete circuit. Op-amps, audio processors, and linear voltage regulators are three kinds of integrated circuits.

POTENTIOMETER

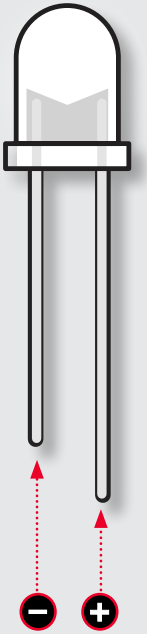


A potentiometer, or pot, is a variable resistor. This means, as the knob shaft is rotated, the DC resistance will change. There are three lugs or soldering terminals on a conventional potentiometer. The outside two are the ends of the resistive strip, and the center lug is connected to the "sweeper." The sweeper allows you to vary the DC resistance relative to its position along the resistive strip, or relative to the outer two lugs.



Potentiometers come in three varieties: linear taper, audio taper, and reverse audio taper. The linear taper pot's taper works at a 1:1 ratio. Audio taper has a special logarithmic ratio. Audio taper is used because our ears don't hear changes in volume in a linear fashion as you might expect. As the volume increases, a greater change in signal or sound pressure is required to perceive a smooth transition. Reverse audio tapers are the same as audio pots, but reversed.

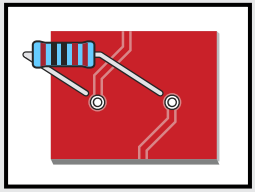
LED

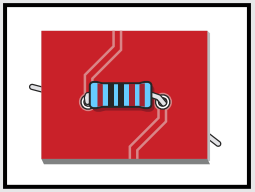


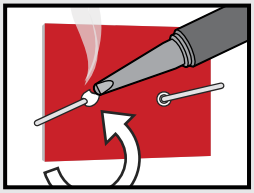
LED stands for Light Emitting Diode, and functionally LEDs are very similar to regular diodes. LEDs are most often used as indicator lights in pedals. They are polarized just like diodes and electrolytic capacitors and must be installed in the correct orientation to work. The positive (anode) lead of the LED will be longer and the anode side of the LED housing will be round. The negative (cathode) lead of the LED will be shorter and the cathode side of the LED housing will be flat. LEDs are mounted inside of a bezel, which protects the LED and insulates the leads from shorting against the enclosure or any internal components.

SOLDERING

The solder joints you'll make on the circuit board are very small, and too much heat can damage the board. The idea is to make joints quickly, without scorching the holes.

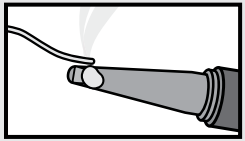






1. Hold components in place for soldering by threading the leads through the board and bending them apart on the reverse side. You will be making your solder joints on the reverse side of the board.

2. Tin the iron by melting a small amount of solder onto the tip of the iron.



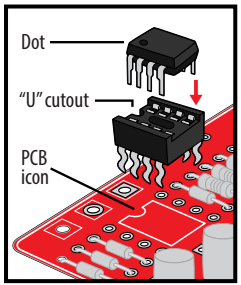
3. Insert the tip into the hole and let it heat for 4-5 seconds before touching it with solder. This heats the contact enough for the solder to flow nicely without damage. Feed the solder to the hole, not the iron, and you don't need much solder, just enough to fill the hole. Keep the iron on the connection for a second longer; this pause gives time for all of the flux to cook out of the joint. After the joint has cooled, trim away the excess lead wire.

Here's a few more soldering tips that might be helpful:

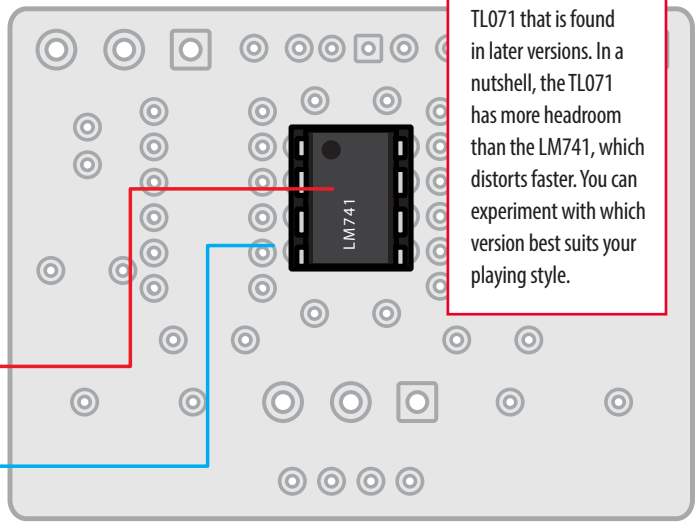
- Keep your soldering tip clean by wiping it often on a damp sponge.
- Also keep it tinned by occasionally melting a little solder onto it.
- Don't blow on the hot solder or touch anything until the joint has cooled completely. A good solder joint is shiny – a sign that it was left to cool undisturbed.
- Plan ahead so each joint is only soldered once. Resoldered joints are messy and more likely to fail.

2 INSTALL THE INTEGRATED CIRCUIT (IC) SOCKET AND CHIP

Next, carefully snap the integrated circuit (IC) socket onto the circuit board. Make sure the u-shaped cutout matches the one on the circuit board and that ALL of the legs have penetrated the circuit board, and none have folded under the part. Flip over the circuit board and solder all 8 legs of the socket. Once cool, install the piggybacking IC chip by snapping it into the socket.



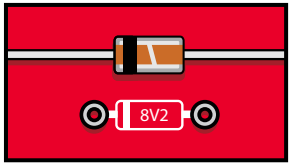
Orienting this chip is also critical. The small dot in the upper left corner is installed on the same end as the u-shaped cutout on the IC socket for proper orientation.



LM741 op-amp (1)
(or alt TL071 op-amp)

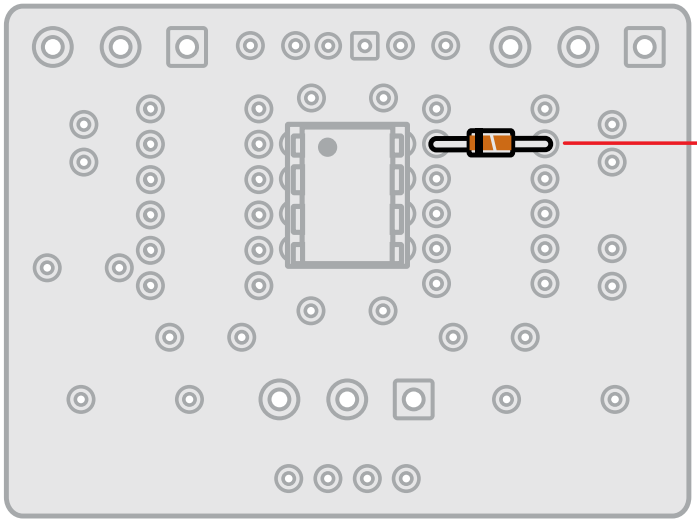
Integrated circuit socket (1)

We include the LM741 IC chip found in the originals, as well as the TL071 that is found in later versions. In a nutshell, the TL071 has more headroom than the LM741, which distorts faster. You can experiment with which version best suits your playing style.



Like the op-amp, orientation of this diode is critical. Note that there is a black band around the diode, and on the location of the diode on the circuit board there is a white band printed on the left-hand side. Install the diode so the band matches the band on the circuit board.

3
INSTALL 1 DIODE

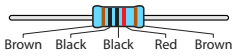


8.2V Zener diode (1)

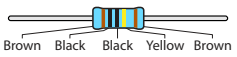
Note the stripe around one end of the diode. This marks the negative (-) lead. On the PCB, the printed outline of the diode also shows this stripe. Install the diode to match the direction shown. Place the diode with the wires pointing down, through the component side.

4 INSTALL 13 RESISTORS

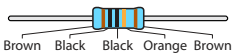
Next, we're going to add some resistors to our circuit board. Like in the previous step, you'll find an outline of each resistor and its value printed in the proper location on the circuit board. Resistors are not polarized, so it doesn't matter which direction the leads are oriented. Match resistors to the values on the circuit board, a few at a time, and solder in place. Clip the leads close to the board, but not touching the board so you don't damage the solder pads.



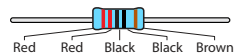
10K resistor (3)



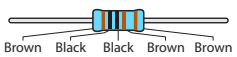
1M resistor (2)



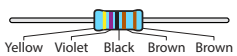
100K resistor (3)



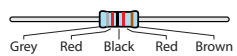
220Ω resistor (2)



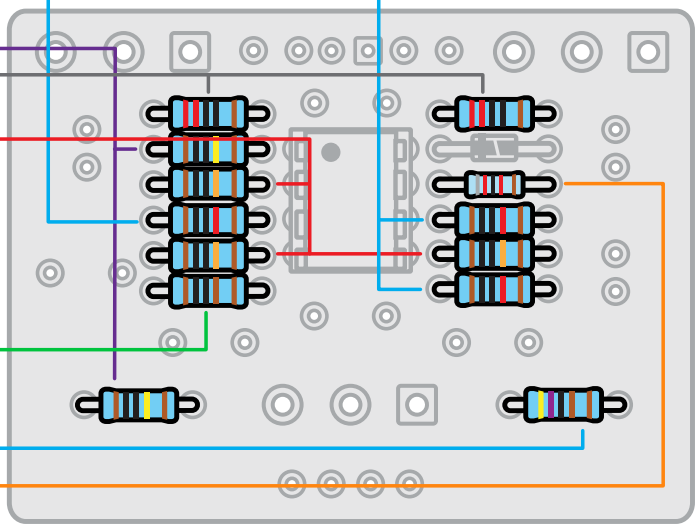
1K resistor (1)



4.7K resistor (1)

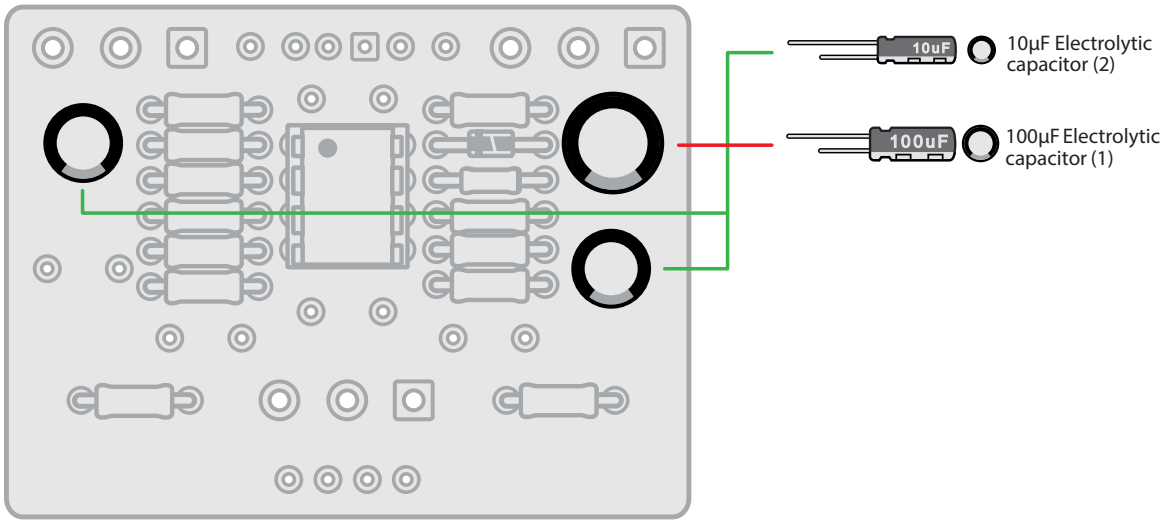


82K resistor (1)



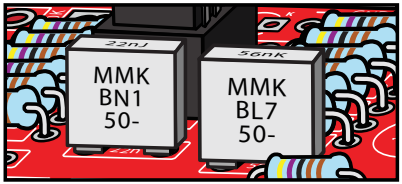
The types of capacitors shown below are polarized and must be installed in the correct orientation. Note the stripe running the length of each cap; this identifies the negative (-) lead. On the circuit board, the circle for this cap's location has a round through hole on one side, and a square through hole on the other, this is where the "+" lead goes. Insert the capacitors with their stripes facing the round hole side. (Another way to identify the negative lead on polarized caps; it is the shorter of the two leads).

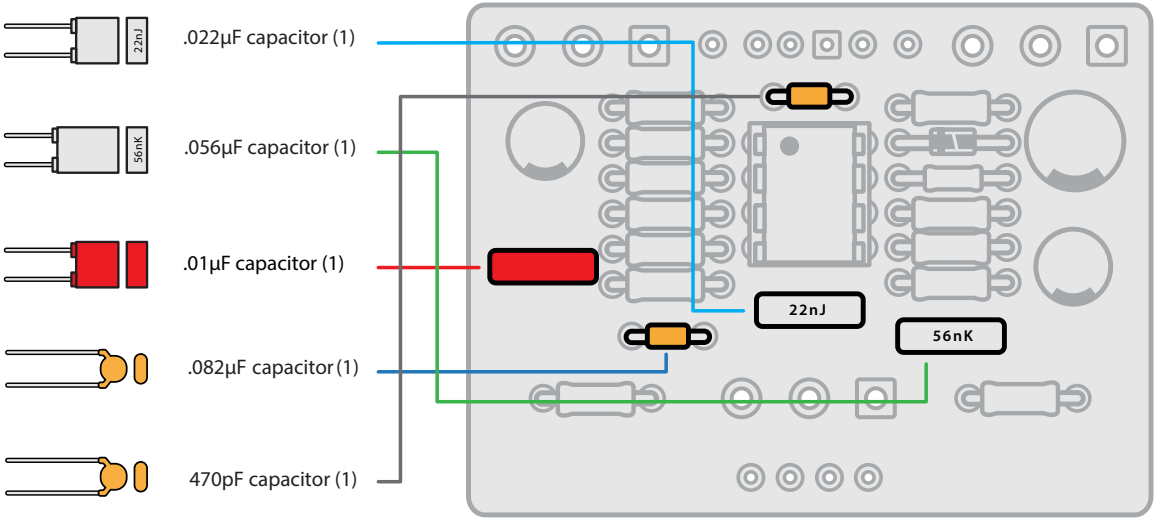
5 INSTALL 3 ELECTROLYTIC CAPACITORS

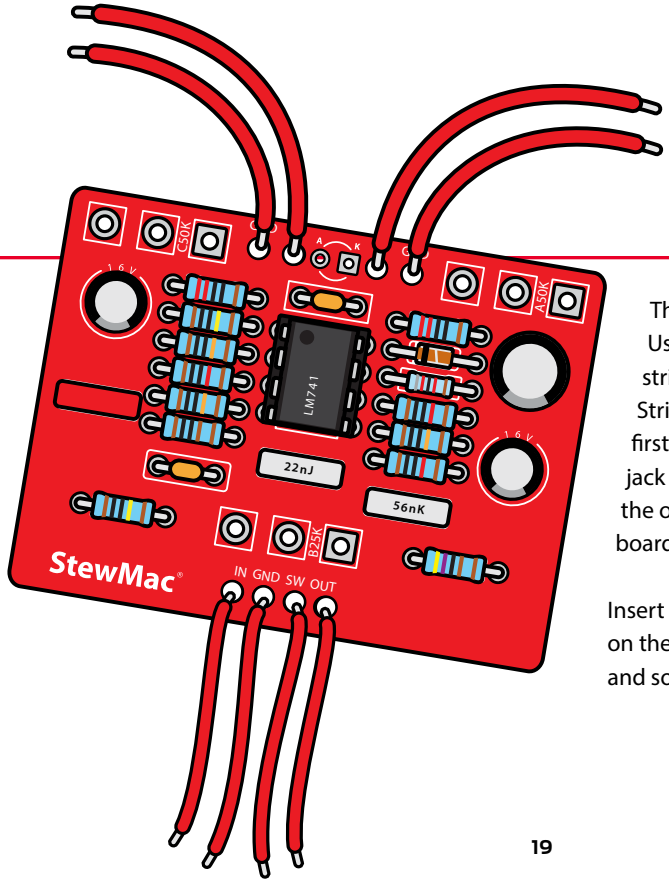


6 INSTALL 5 CAPACITORS

The remaining capacitors below are not polarized. However, the best practice is to solder them in place with text facing the bottom of the circuit board.





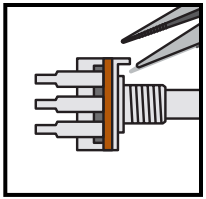


7 INSTALL 8 LEAD WIRES

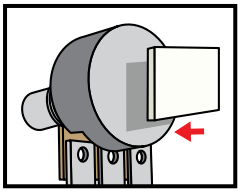
This kit comes with 24" of 22-gauge lead wire. Using the correct 22AWG slot on your wire stripper, cut the wire into eight 1-1/2" sections. Strip around 3/32" off both ends of all wires. The first four sections will attach the DC inlet and jack grounds at the top of the circuit board and the other four sections will attach the breakout board to the bottom center of the PCB.

Insert the stripped ends of the wires into the holes on the front/component side of the circuit board and solder them on the back side.

8 PREPPING POTS FOR INSTALLATION



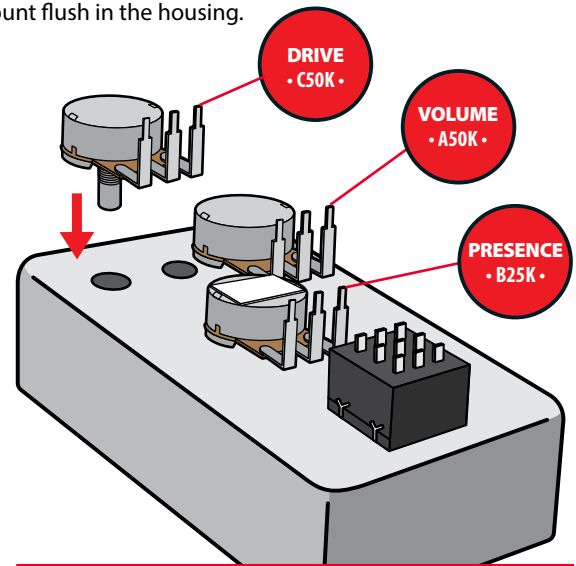
Locate the three pots. If any pot has an index tab protruding from it, break it off with a pair of needle nose pliers. This will allow the pot to mount flush in the housing.



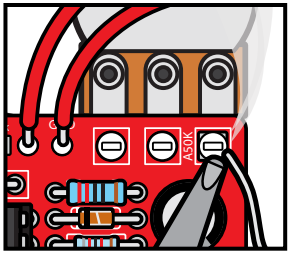
Before mounting the B25K presence pot to the circuit board, place one section of the included double foam adhesive tape squares on the back of the pot to insulate it from the mounted electronic components.

Remove the nuts and washers from the three pots and the footswitch.

Insert the threaded shaft of each part through the appropriate holes on the OUTSIDE of the enclosure and reattach the nut and washers on the inside. Attaching the pots and footswitch to the outside of the enclosure is a temporary step which will provide a mini work station to hold the parts in place while soldering them.

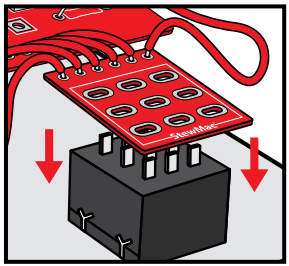


Protect your painted housing by laying down a piece of paper/light cardboard with holes for the pots and footswitch on the housing before temporarily attaching the components.



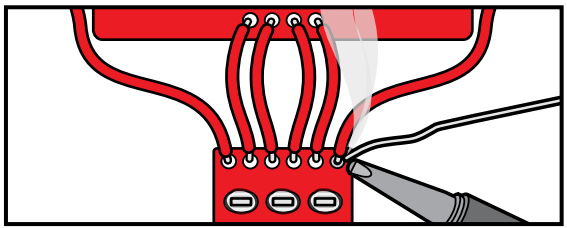
With the component side of the circuit board facing up, maneuver the lugs of the pots and circuit board until the lugs slip into their appropriate holes in the circuit board. Once all the lugs have popped through the board, solder them in place.

9 CONNECTING THE POTS AND FOOTSWITCH TO THE CIRCUIT BOARD



Orient the breakout board on the footswitch so that the six open holes for the lead wires are closest to the circuit board. Once the lugs on the footswitch pop through, solder them in place.

The four leads coming off the bottom of the circuit board are individually marked (left to right) IN, GND, SW, OUT. Attach these to the corresponding holes on the breakout board and solder them in place.



Cut two 4-1/2" leads and strip 3/32" off the ends. Attach these to the outer holes of the breakout board and solder them in place.

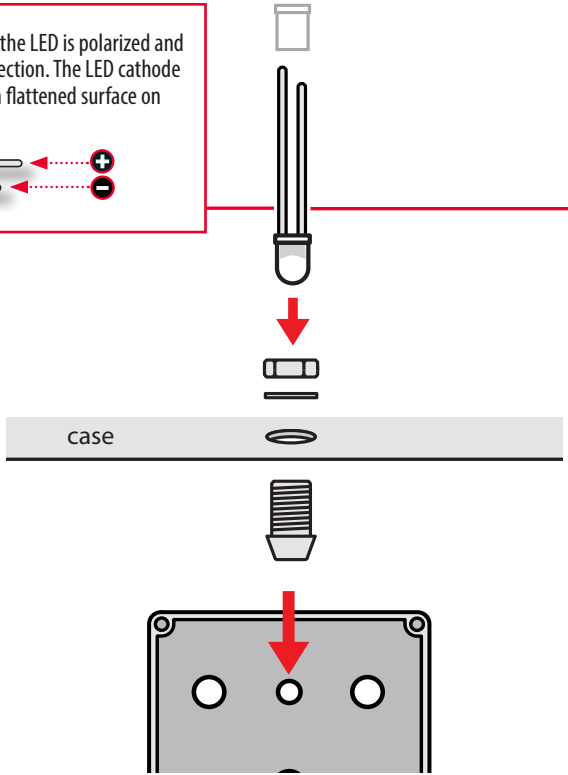
Remove all nuts and washers from the inside of the enclosure so you can remove circuit boards with the newly installed hardware.

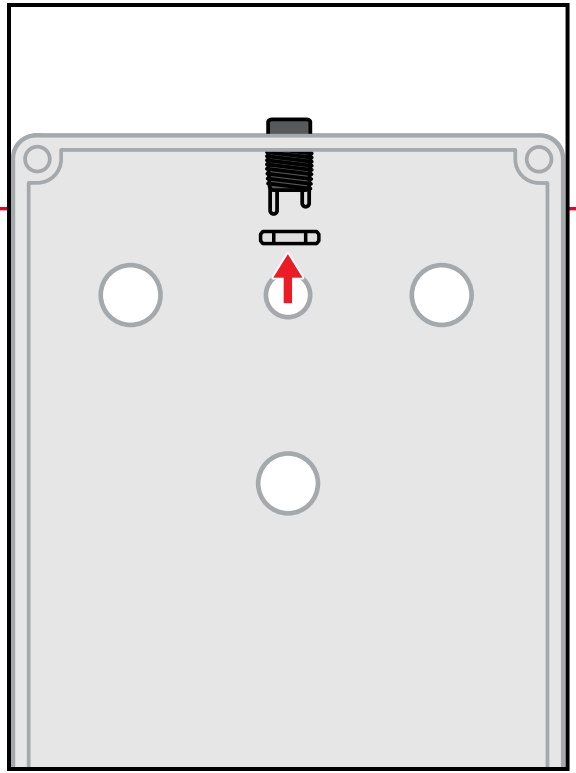
10 INSTALL THE LED INDICATOR LIGHT

Like some of the caps and diodes, the LED is polarized and has to be installed in a specific direction. The LED cathode is indicated by a shorter lead, as well as a flattened surface on the glass housing of the component.

The LED mounting bezel consists of two main parts: A ring that the LED fits into, and a plastic plug that goes over the LED from the back side to keep it in place.

Install the mounting bezel through the front of the enclosure. From the inside, slip a lock washer and nut on and tighten it up using a 3/8" wrench. Insert the LED into the bezel so that the two leads are parallel with the top and bottom of the housing and the shorter lead is closest to the right side of the enclosure. Feed the leads through the plastic plug and press the plug down until it's tight in the bezel. The LED will be held in place when you solder the leads to the circuit board. For a more secure mount, you can run a bead of clear silicone adhesive around the plastic plug.



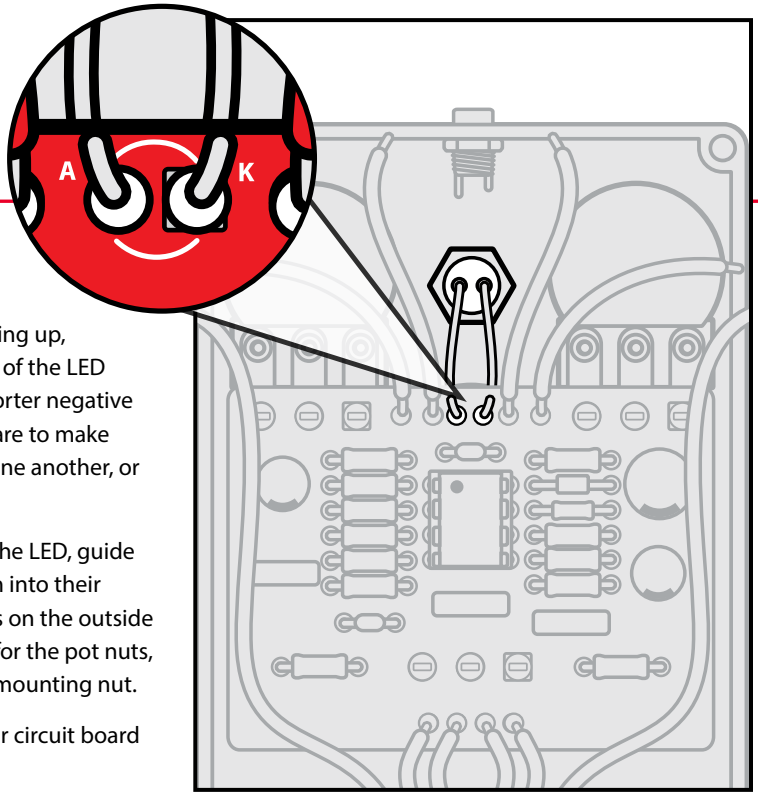


11 INSTALL THE DC JACK

Insert the DC jack into the top of the housing, making sure the longer of the two lugs is on the left.

Using a 7/16" wrench or needle nose pliers, tighten the nut. Be careful not to overtighten so you don't strip the plastic threads of the DC jack.

12 INSTALL THE CIRCUIT BOARD AND CONNECT THE LED

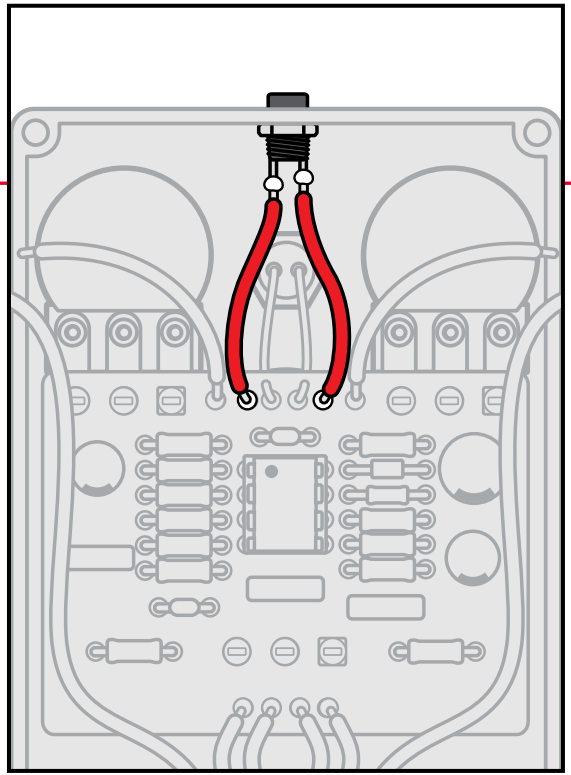


Lay the pedal housing face down.

With the component side of the PCB facing up, carefully thread the longer positive lead of the LED through the hole marked "A" and the shorter negative lead through the hole marked "K". Use care to make sure these bare leads are not touching one another, or the LED will malfunction.

As you lower the PCB onto the leads of the LED, guide the shafts of the pots and the footswitch into their holes and reattach the washers and nuts on the outside of the enclosure using a 10mm wrench for the pot nuts, and a 14mm wrench for the footswitch mounting nut.

Lastly, solder the leads of the LED in their circuit board holes. Trim the excess lead wire.



13 SOLDER DC JACK AND LED IN PLACE

Solder the left lead coming from "+" on the circuit board to the longer lug of the DC jack.

Next, solder the right lead marked "-" to the shorter lug of the DC jack.

Now solder both leads of the LED coming through the circuit board.

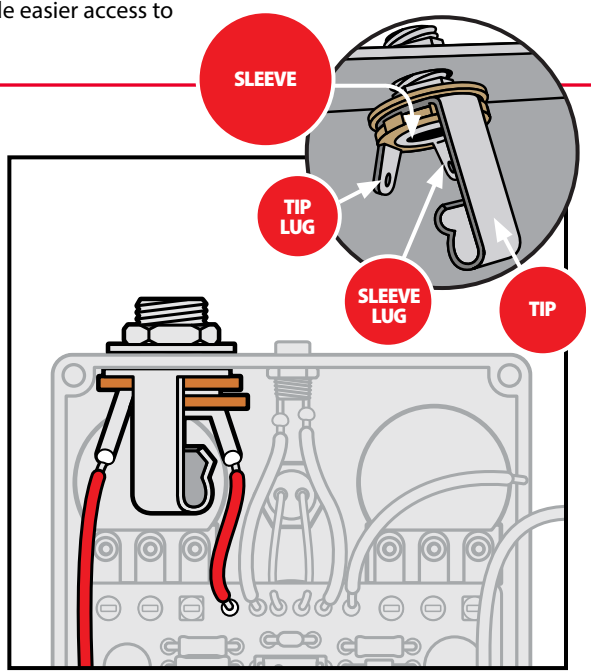
14 INSTALL THE INPUT JACK

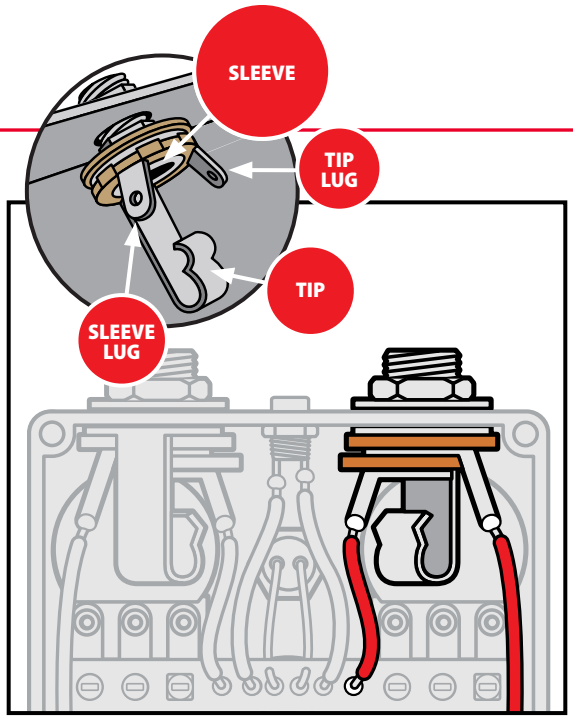
This kit contains two mono jacks. One will be your input jack and the other is your output jack. Insert one jack into the left side of the housing with the tip connection facing up. Add the washer and thread the nut onto the shaft enough so that the jack can rotate freely. You may need to rotate the jack to provide easier access to setting the solder joints.

Working left to right, solder the 4-1/2" lead coming off the left-hand side of the breakout board to the "tip" lug of the input jack.

Solder the lead marked "GND" on the top of the PCB to the input jack lug that corresponds with the sleeve connection. The sleeve lug should be the one closest to the DC jack.

Once the solder has cooled, orient the jack as shown in the diagram. Make sure none of the connections on the jack are shorting to the enclosure or any other components. Tighten the nut on the jack using a 1/2" wrench.





15 INSTALLING THE OUTPUT JACK

Insert the output jack into the right side of the housing with the tip facing down. Add the washer and thread the nut on to the shaft enough so that the jack can rotate freely.

Solder the lead marked "GND" at the top of the board to the output jack lug that corresponds with the sleeve. The sleeve lug should be the one closest to the DC jack.

Solder the 4-1/2" lead coming off the right-hand side of the breakout board to the "tip" lug of the output jack. Once the solder has cooled, orient the jack as shown in the diagram. Make sure none of the connections on the jack are shorting to the enclosure or any other components. Tighten the nut on the jack using a 1/2" wrench.

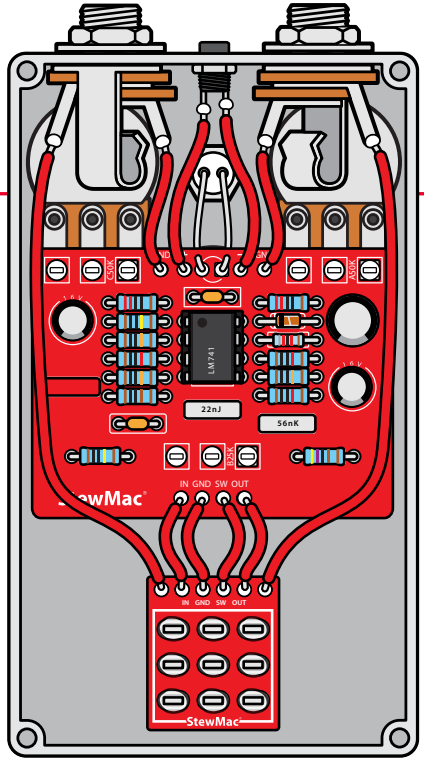
16 COMPLETED VIEW

With the output jack secured, this is what your pedal should look like.

Attach the back cover using a #2 Phillips screwdriver.

Attach the knobs using a 3mm slotted screwdriver.

Congrats on a job well done!



HERE'S HOW THE CONTROLS WORK

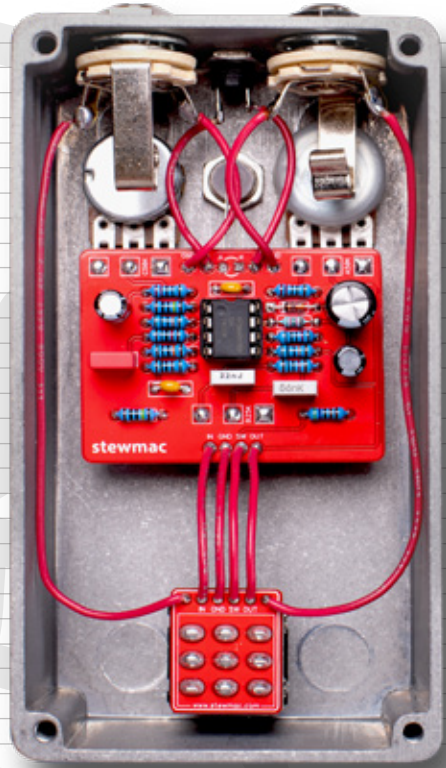
POWER Use a standard 9 volt DC power supply with a 2.1mm negative-center barrel (not included). We always recommend pedal-specific, transformer-isolated, wall-wart power supplies or supplies with separate isolated outputs. Some switching supplies, as well as some linear (non-switching) pedal power supplies can be noisy. Switching-type power supplies, daisychains, and non-pedal specific power supplies do not filter dirty power as well and let through unwanted noise. Do not run at higher than 9V DC voltages!

DRIVE This controls the amount of dirt in the signal.

PRESENCE Boosts the upper midrange and treble frequencies in a way that makes a guitar's tone sound notably livelier, raspier, more pronounced and present.

VOLUME This controls the output of the pedal.

NOTES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