



# ALL AMERICAN

## CLASSIC PEDAL KIT

### Assembly Instructions

The **ALL-AMERICAN** is one of the great stompboxes from JHS, makers of high-end effects pedals. Whenever JHS adds a new pedal to their line, they retire an existing design. This means great JHS pedals like the **ALL-AMERICAN** have become rare and sought-after. You can't buy one, but you can build yourself one—and it's fun!

Easy instructions!  
Clear pictures show where  
each part goes.



The **ALL-AMERICAN** is based on the original ProCo Rat, an early distortion pedal designed and built in Kalamazoo, Michigan in the 1970s. Vintage Rat pedals are one of the most sought after overdrive pedals out there. Favored by such greats as Joe Perry, Nels Cline, and David Gilmour The Rat is known for its unbelievable range of tones, spanning from clean/grit all the way to compressed sustaining fuzz.

JHS tweaked the Rat circuit for a more focused frequency range with tamed highs. The result is the **ALL-AMERICAN**. Its bass and mids melt perfectly into a combination that'll make a 1x12 combo sound like you have a stack of cabs backstage.

The addition of a sweep knob gives instant control over the feel of the gain structure as a whole. JHS also gave the **ALL-AMERICAN** a three-way gain switch, allowing LED/Silicon/Open clipping for one explosively versatile pedal!

## Tools and supplies

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- Required: Soldering iron with fine point tip  
Solder  
Wire cutter/stripper  
1/2" nut driver or socket  
10mm nut driver or socket  
14mm wrench  
#1 Phillips screwdriver
- Also helpful: Clear silicone adhesive  
Circuit card holder  
Magnifying glass or OptiVISOR  
StewMac Soldering Aids
- Power: This pedal requires a standard 9V DC center-negative power supply (not included) and consumes less than 100mA. There's no battery option.

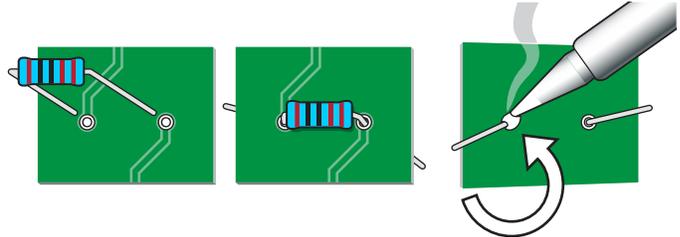
## Tips for soldering

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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 eyelets.



Hold components in place for soldering by threading the leads through the board and bending them apart on the reverse side.



Make your solder joints on the reverse side. Insert the tip into the eyelet 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. You don't need much solder, just enough to fill the eyelet. After soldering, trim away the excess lead wire.

## Give your pedal a custom paint job!

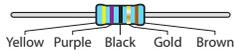
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Any paint sold for use on metal will work well on the kit case. Spray paints like Rustoleum® or Krylon® are a durable finish. You might want to paint the case before building the kit, so you won't need to take the parts back out for painting.

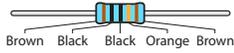
A way to add custom graphics is to print them from your computer onto waterslide decal paper. If you use decals, protect them from scratches by spraying clear topcoats over them.

## Parts list

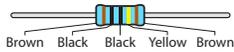
Resistor values are indicated by colored bands, read from left to right. The first color in the code is usually the one painted closest to a lead wire. When a gold or silver band is present, it's always one of the last colors in the code. A magnifier is a big help in reading these codes.



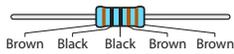
(1) **R1** Resistor (47 Ω)



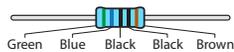
(2) **R2, R3** Resistors (100 kΩ)



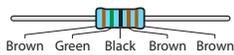
(3) **R4, R6, R14** Resistors (1.0 MΩ)



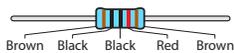
(4) **R5, R9, R11, R17** Resistors (1 kΩ)



(1) **R7** Resistor (560 Ω)



(1) **R13** Resistor (1.5 kΩ)



(1) **R15** Resistor (10 kΩ)



(1) **C1** Capacitor (100 μF)



(2) **C3, C15** Capacitors (1 μF)



(2) **C5, C12** Capacitors (4.7 μF)



(1) **C7** Capacitor (2.2 μF)



(4) **C2, C4, C9, C14** (.022 μF)



(1) **C6** Capacitor (.001 μF)



(1) **C8** Capacitor (100 pF)



(1) **C11** Capacitor (30 pF)



(1) **C13** Capacitor (.0033 μF)



(1) **D1** Diode (P6KE12A)



(2) **D6, D7** Rectifiers (1n4001)



(3) **D3, D4, D5** Red LEDs (5mm)



(1) **D8** White LED (5mm)



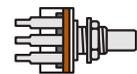
(1) **Q1** Transistor (2n5458)



(1) Ribbon cable



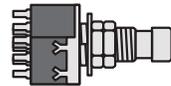
(1) On-Off-On mini toggle switch



(3) Pots **R10, R12, R16** (100 kΩ, audio taper)  
(1) Pot **R8** (1 kΩ, linear taper)



(4) Adhesive foam tape



(1) Footswitch (3PDT, latching)



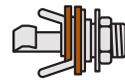
(1) **U1** Low noise op-amp (5534 500nA)  
(1) **U1.2** socket for op-amp



(1) Lead wires (12")



(1) DC power connector (21MM)



(2) Mono jacks, 1/4"



(1) LED mounting bezel (5mm)

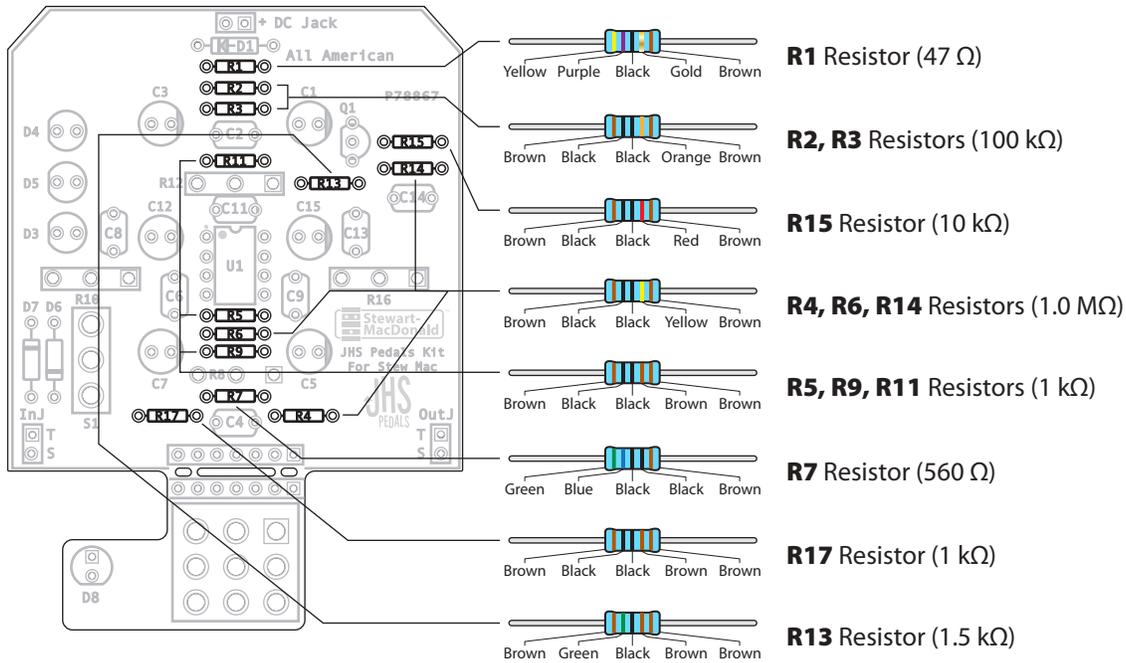


(4) Control knobs

(Not pictured) (1) Circuit board

(Not pictured) (1) Metal case with 4 screws

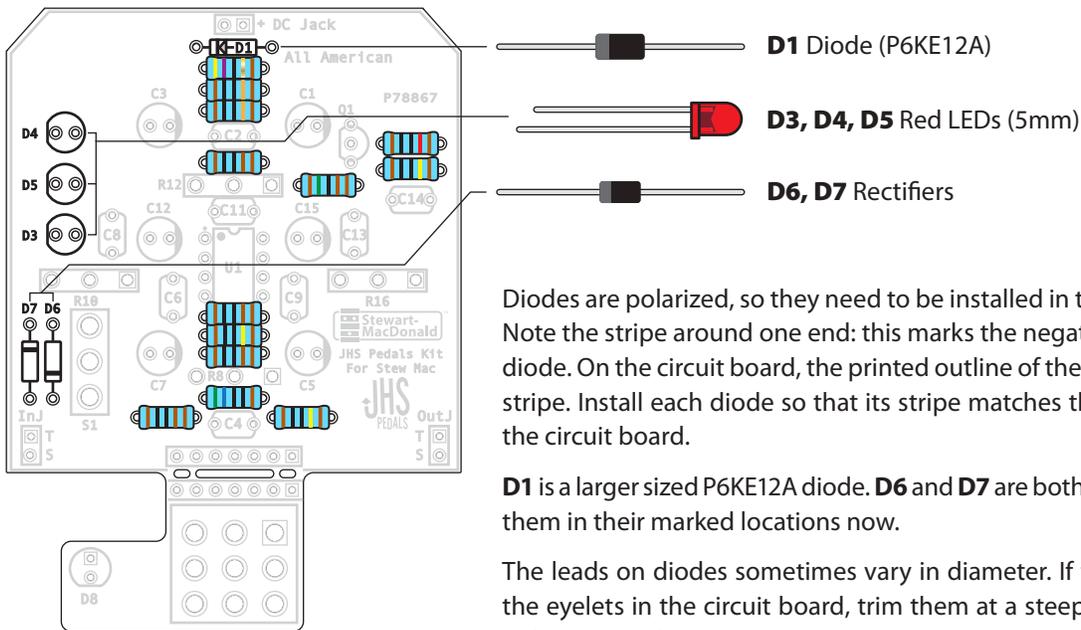
## Step 1: Install thirteen resistors



Resistors have a low profile, sitting closer to the board than taller components, so install them first. Their locations are marked with numbers on the board.

Resistors are not polarized, so it doesn't matter which lead goes in which eyelet. They can be installed in either direction.

## Step 2: Install the six diodes



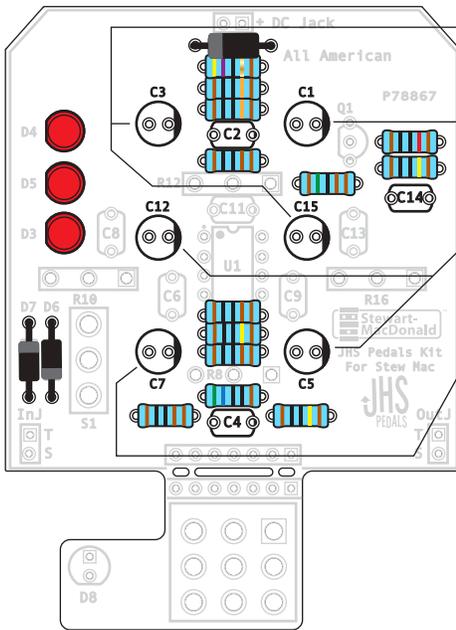
Diodes are polarized, so they need to be installed in the correct orientation. Note the stripe around one end: this marks the negative (minus) lead of the diode. On the circuit board, the printed outline of the diodes also shows this stripe. Install each diode so that its stripe matches the direction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

**D1** is a larger sized P6KE12A diode. **D6** and **D7** are both 1N4001 diodes. Solder them in their marked locations now.

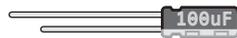
The leads on diodes sometimes vary in diameter. If the leads don't fit into the eyelets in the circuit board, trim them at a steep angle to create sharp points that fit into the holes.

Next install the three clipping diodes **D3**, **D4**, and **D5** on their location marks. These red LEDs (Light Emitting Diodes) are polarized and need to be installed in a the correct orientation. On the circuit board, their location marks indicate a flat on one side. This matches the slight flat on one side of the LED diode. Install them so the flat on the board matches the flat on the LED.

### Step 3: Install fourteen capacitors



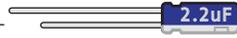
**C3, C15** Capacitors (1  $\mu$ F)



**C1** Capacitor (100  $\mu$ F)

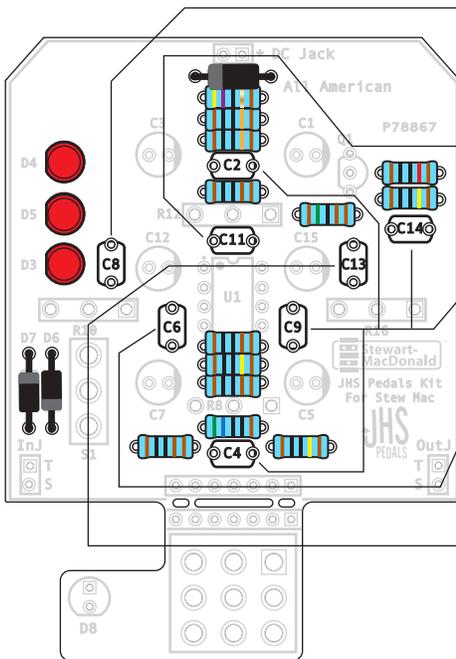


**C5, C12** Capacitors (4.7  $\mu$ F)

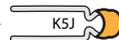


**C7** Capacitor (2.2  $\mu$ F)

The six capacitors shown above are polarized, and have to be installed in the correct orientation. Note the white stripe running the length of each cap; this identifies the negative (minus) lead. On the circuit board, the circle for this cap's location has a thicker line on one side: insert the capacitors with their stripe facing that side. (On polarized caps of this type, there's a second way to identify the minus lead: it is the shorter of the two leads.)



**C8** Capacitor (100 pF)



**C11** Capacitor (30 pF)



**C2, C4, C9, C14** Capacitors (.022  $\mu$ F)



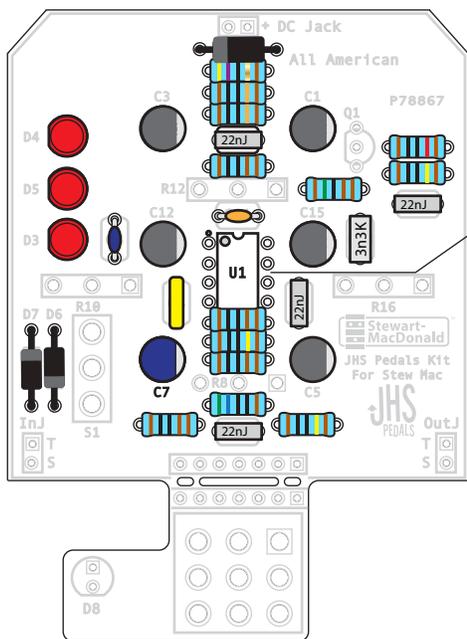
**C6** Capacitor (.001  $\mu$ F)



**C13** Capacitor (.0033  $\mu$ F)

The remaining capacitors are not polarized. Solder these caps in place facing either direction.

#### Step 4: Install the operational amplifier



**U1** Low noise op-amp (5534 500nA)

**U1.2** socket for op-amp

The operational amplifier consists of two parts: the op-amp itself (**U1**), and the socket it plugs into (**U1.2**).

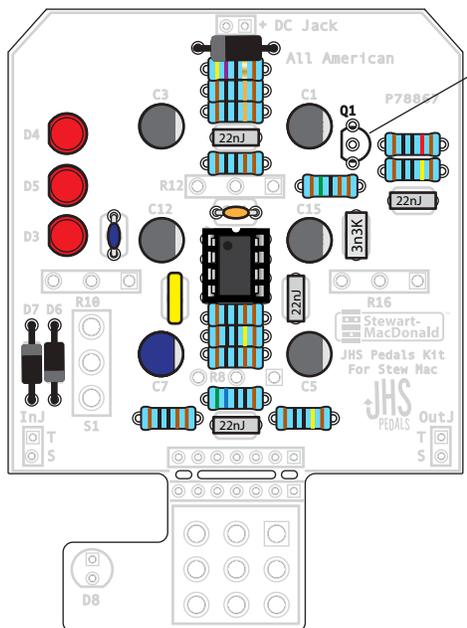
You'll solder the socket first, then install the op-amp in the socket.

The op-amp has to be oriented correctly in order to function properly. There are two indicators on the circuit board to guide you in positioning it:

1. The rectangular **U1** position marker has a small notch at one end. Align the similar notch in socket **U1.2** when installing the socket.
2. The **U1** position marker has a dot in one corner. There is a dot molded into the corner of op-amp **U1**. Align these corners when pressing the op-amp into place.

Solder socket **U1.2** to the board. The op-amp **U1** then snaps in without solder. This feature allows you to try different op-amps with no soldering.

#### Step 5: Install the transistor

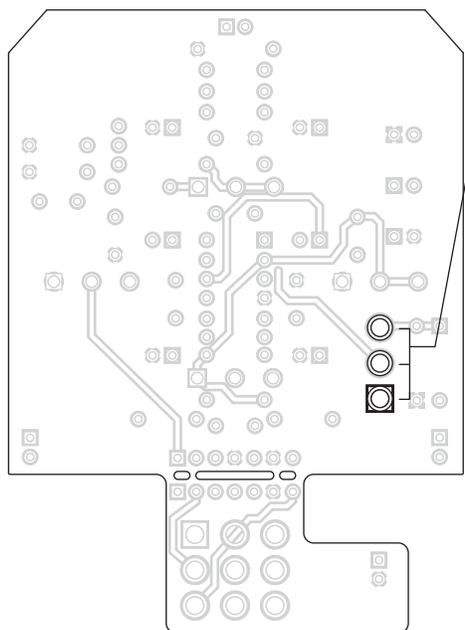


**Q1** Transistor (2n5458)

**Q1** is a 2n5458 JFET\* transistor. It is directional, and needs to be installed in a specific orientation. Note that it has a flat side. On the circuit board, its location outline also has a flat side. Install the transistor to match this outline.

\*JFET: Junction Gate Field-Effect Transistor

## Step 6: Install the mini toggle switch

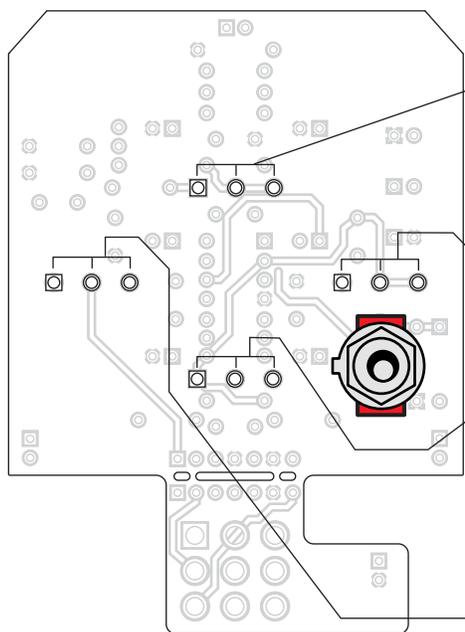


On-Off-On mini toggle switch

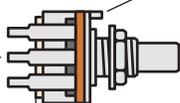
The three-position **mini toggle switch** installs on the back of the board, and there is no location marker printed. Solder the switch to the three large eyelets pictured, making sure it's flat and square to the circuit board.

The switch is not directional, so it works equally well turned in either direction.

## Step 7: Install the control pots



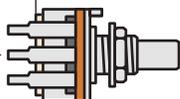
Break off this index pin on all 4 pots.



**R12** Tone pot (100 kΩ, audio taper)



Adhesive foam tape (Goes on back of the pots)



**R10** Drive pot (100 kΩ, audio taper)



**R8** Sweep pot (1 kΩ, linear taper)



Adhesive foam tape



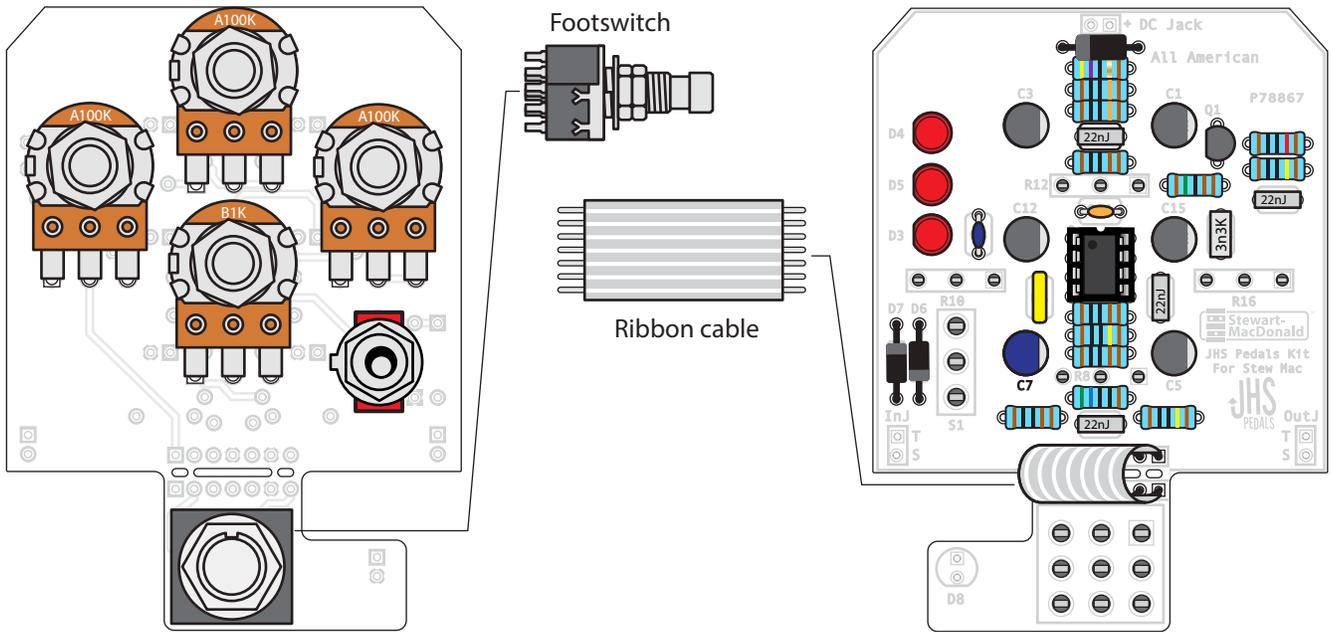
**R16** Volume pot (100 kΩ, audio taper)

The last components to go onto the circuit board are the four control pots. They install on the back of the board. Each pot has three connecting lugs; the illustration in **Step 8** shows the three pots in position on the board.

Each pot has an index pin protruding from the case. Break off this pin before installation, so the pot will mount flush against the pedal case. Needle nose pliers work well for removing the pins.

Use the adhesive foam tape to insulate the back of the pot from the soldered leads of the other parts. Solder the pot in place, making sure it sits flat on the back of the board.

## Step 8: Install the footswitch, then the ribbon cable

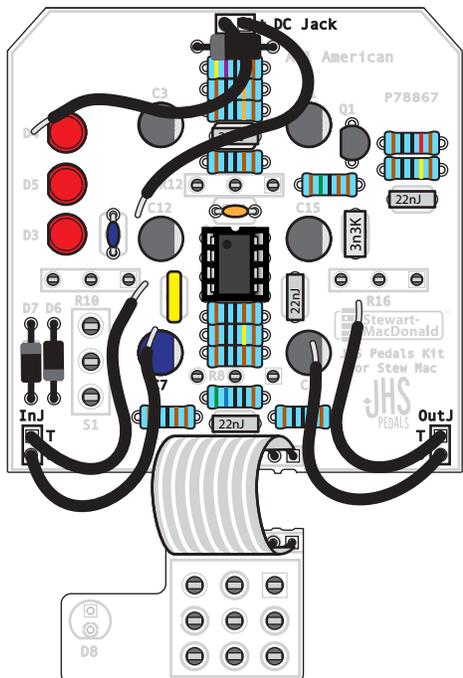


Install the **footswitch** on the back of the circuit board. The switch lugs will fit in only one of two directions; either orientation works fine. Insert the lugs through the nine eyelets so the switch sits flush, making contact all around.

Solder one lug and let it cool. This holds the switch in place while you solder the remaining lugs.

Next, install the **ribbon cable**. Insert the cable leads through the front of the board, and solder them in place on the back.

## Step 9: Install the lead wires, cut the board



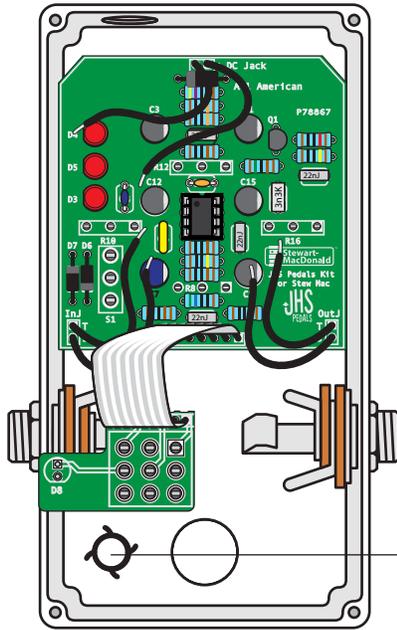
 Lead wire, cut into six 2" lengths

Cut the **lead wire** into six 2" lengths for the input, output, and power jacks. Strip the insulation on the ends and thread them through the front of the board. Solder them on the back of the board.

Now you can cut the switch portion of the board away from the main board. Small wire cutters make quick work of this, and a small saw also works.



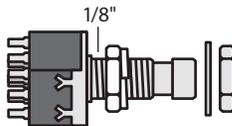
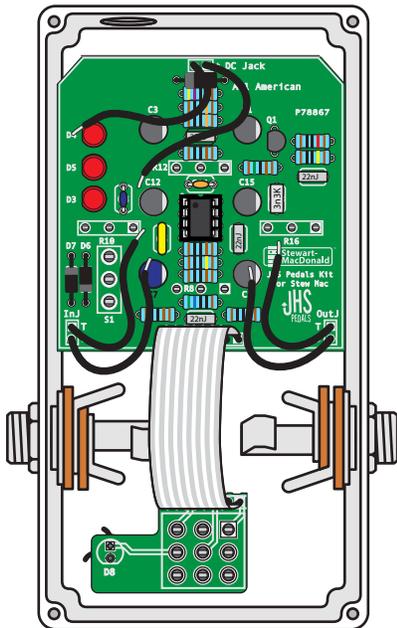
## Step 12: Install the LED in the mounting bezel



Like some of the caps and diodes, the **D8** LED is polarized and has to be installed in a specific direction. One side of the LED has a flat edge, indicating the negative lead. Another indication is that the negative lead is shorter than the positive. The circle marking the **D8** location on the switch circuit board has a corresponding flat to indicate the mounting orientation.

Insert the LED into the bezel. It will be held in place by soldering it to the switch circuit board in **Step 13**, but for a more secure mount you can run a bead of clear silicone adhesive around the LED and bezel.

## Step 13: Install the footswitch



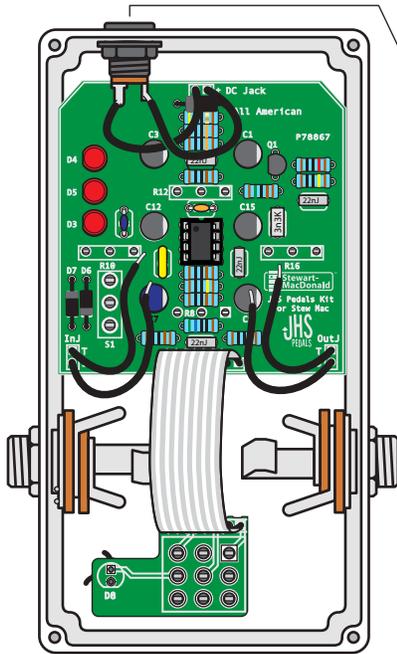
Thread one of the nuts onto the **footswitch**, leaving a 1/8" gap between it and the switch housing. Place the split lock washer on next.

Carefully install the switch so the legs of the diode feed through the **D8** holes on the switch circuit board.

Place the flat washer on the switch shaft on the top of the case. As you tighten the remaining nut on the switch, hold the switch circuit board inside the case so that it doesn't rotate.

Solder the **D8** LED and trim the leads.

## Step 14: Install the DC power connector



DC power connector



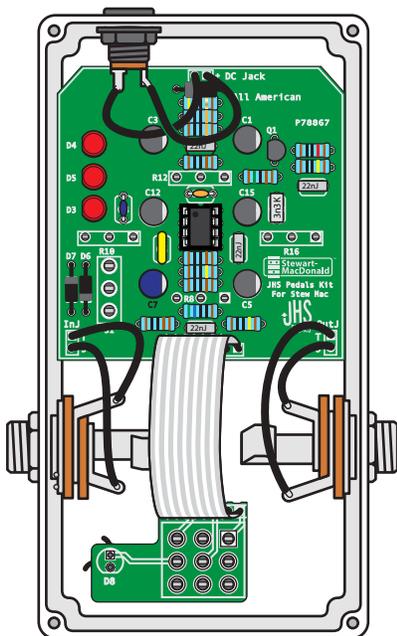
Negative Positive

Insert the **DC power connector** so the negative lug is facing up, and tighten it in place. The negative lug is the one with the largest metal tab.

Solder the installed leads from the circuit board to the jack. Where they attach to the board, the positive lead is on the the right and the negative is on the left.

This pedal requires a standard 9V DC center-negative power supply (not included) and consumes less than 100mA. There's no battery option.

## Step 15: Wire the input/output jacks



On the circuit board, the input and output jack leads are labeled **InJ** and **OutJ**. The leads are also labeled **T** for tip, and **S** for sleeve. Looking at a jack, you'll see that the sleeve lug is attached to the threaded shaft. The tip lug connects to the spring metal piece that contacts the tip of a guitar cord.

Solder these four leads as shown to finish the assembly.

Screw the bottom onto the case and add the control knobs.

Plug in and rock out!

Here's how to use the **ALL-AMERICAN**:

