VALVE FACTORY 18

18W AMPLIFIER KIT INSTRUCTIONS

Customize this amp for your very own tone

stewmac
making guitars better

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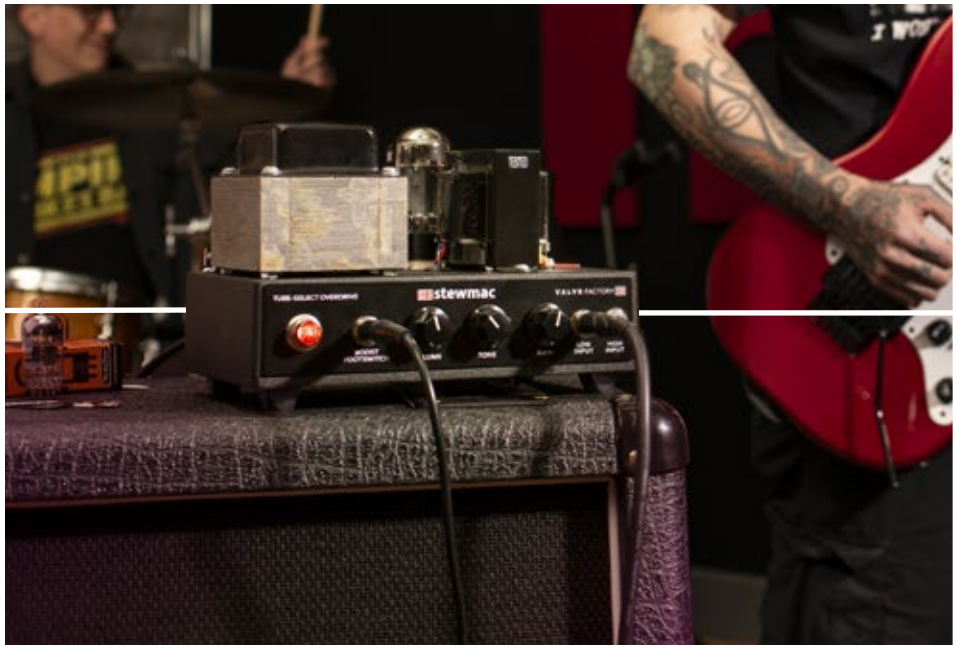


An original amp for original tone chasers

Congratulations on starting your journey with the Valve Factory 18. This isn't just about building an amplifier—it's a journey of self-expression. Every guitarist knows that iconic amps have their unique voices: Fender amps sound unmistakably Fender, Marshall amps roar with Marshall's signature grit, and Orange amps deliver their signature punch. But the VF18 is different. It puts YOU in control, allowing you to dial in a sound that's uniquely your own.

At the heart of this original circuit design is a commitment to giving you the more tone flexibility than you get in other commercial amps. Whether it's a clean rich, mids-centric tone perfect for jazz to the raw overdriven, riding right on the edge, perfect for hard rock, this amp allows you to dial in exactly what you are chasing. Plus, the VF18 is flexible—as your tone evolves, this amp evolves with you.

To kickstart your tone-chasing journey, the VF18 includes two carefully selected tube options. But that's just the beginning. There's a whole universe of tube possibilities waiting for you to explore, offering (almost) endless ways to refine and personalize your sound.

Adding even more versatility, the VF18 features a tone stack bypass switch. This lets your guitar's signal shine through with added body and volume, perfect for cutting through the mix during solos or creating a "lead channel" when you need it most.

Compact yet incredibly powerful, the Valve Factory 18 is a perfect companion for both the studio and the stage. Its size belies its performance, and its tone-shaping flexibility ensures it's always up to the task, no matter the setting. We're confident that the thrill of playing through this amp will only be matched by the satisfaction of building it yourself.

Build it with StewMac

Our immersive instructions will guide you through every step of assembling your StewMac Valve Factory 18. While building an amp might seem intimidating, we've made it easy. Each step is clearly illustrated, with helpful tips and educational insights along the way. If you ever get stuck, our expert team of luthiers and amp builders is here to help.

Welcome to the StewMac community. Let's build something extraordinary.

When you see this icon throughout this instruction manual, take a little time to read through the helpful tips and tricks.

Parts

Know your parts. Taking a minute to become familiar with and organize your parts well before you jump into building your amp will save you a ton of time in the long run.

Identifiying numbers, letters and color bands on parts isn't always easy. To make the process more efficient, we've sorted the smaller parts into a couple of tackle boxes. However, we recommend always having both a magnifiying device and a mulitmeter on hand.

Resistors

Gray Red Black Black Brown

☐ (1) 820Ω 1/2W metal film

Gray Red Black Brown Brown

☐ (2) 8.2K 1/2W metal film

Blue Gray Black Red Brown

☐ (2) 68K 1/2W metal film

Gray Red Black Red Brown

☐ (1) 82K 1/2W metal film

Brown Black Black Orange Brown

☐ (2) 100K 1/2W metal film

Brown Red Black Orange Brown

☐ (1) 120K 1/2W metal film

Red Red Black Orange Brown

☐ (1) 220K 1/2W metal film

Red Violet Black Orange Brown

☐ (1) 270K 1/2W metal film

Yellow Violet Black Orange Brown

☐ (4) 470K 1/2W metal film

Brown Black Black Yellow Brown

☐ (1) 1M 1/2W metal film

Brown Green Black Orange Brown

☐ (1) 150K 1/2W metal film

Orange Orange Black Red Brown

☐ (1) 33K 1/2W metal film

Brown Gray Black Brown Brown

☐ (1) 1.8K 1/2W metal film

Red Red Black Brown Brown

☐ (1) 2.2K 1/2W metal film

Brown Black Brown Gold

☐ (2) 100Ω 2W metal oxide

Red Violet Red Gold

☐ (1) 2.7K 2W metal oxide

Gray Red Red Gold

☐ (1) 8.2K 2W metal oxide

Red Red Yellow Gold

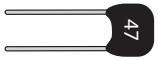
☐ (1) 220K 2W metal oxide

☐ (1) 250Ω 2W wire wound

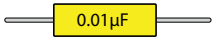
Diode

☐ (2) 1N5408 diode

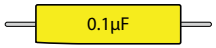
Capacitors



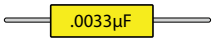
☐ (1) 47pF 500V silver mica



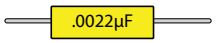
☐ (3) .01µF 630V film capacitor



☐ (1) 0.1µF 630V film capacitor



☐ (1) .0033µF 630V film capacitor



☐ (1) .0022µF 630V film capacitor

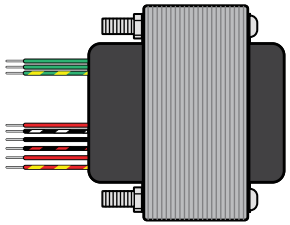
☐ (2) .022µF 630V film capacitor

☐ (1) JJ electrolytic capacitor 40/20/20/20uF, 500V

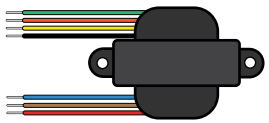
☐ (1) 47µF 63V axial leaded electrolytic capacitor

☐ (2) 22µF 25V axial leaded electrolytic capacitor

Transformers

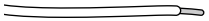


☐ (1) Pacific Trans 120/240 V power transformer



☐ (1) Pacific Trans 18 W output transformer

Wire



☐ 18 AWG, 6", white pushback wire

☐ 20 AWG, 24", white pushback wire

☐ 20 AWG, 46", black pushback wire

☐ 18 AWG, 6", black pushback wire

☐ 20 AWG, 12", shielded circuit wire

☐ 20 AWG, 12", yellow pushback wire

☐ 18 AWG, 12", green pushback wire

☐ 20 AWG, 32", blue pushback wire

☐ 20 AWG, 20", red pushback wire

☐ 20 AWG, 34", orange pushback wire

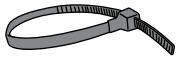
Heat-shrink tubing

☐ (1) 1/8" diameter (12" length)

☐ (1) 3/8" diameter (12" length)

☐ (1) 1/16" diameter (6" length)

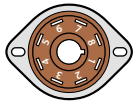
Zip ties



☐ (2) 4" zip tie

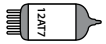
Tubes, lamp, fuses, and sockets

☐ (2) Nine-pin tube socket

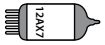


☐ (2) Eight-pin tube socket

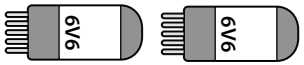
☐ (1) 12AT7/ECC81 preamp tube (phase inverter tube)



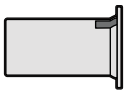
☐ (1) 12AY7 preamp tube



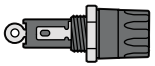
☐ (1) 12AX7/ECC83 preamp tube



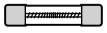
☐ (1) 6V6GTCZ matched pair power tubes



☐ (2) Tube shield

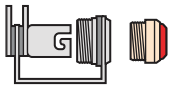


☐ (1) Fuseholder



☐ (1) Fuse (1 amp)

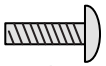
☐ (1) Pilot lamp bulb



☐ (1) Pilot lamp assembly

☐ (1) Jewel lens (red)

Hardware



☐ (2) 8-32 machine screw, 3/8"

☐ (2) 6-32 machine screw, 1/4"

☐ (10) 4-40 machine screw, 1/4"

☐ (4) 6-32 machine screw, 3/8"

☐ (4) 4-40 machine screw, 3/8"

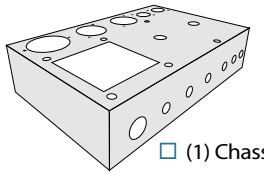
☐ (6) 8-32 locknut with external tooth

☐ (14) 4-40 locknut with external tooth

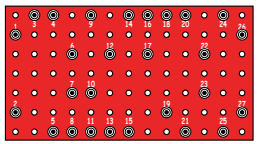
☐ (2) Rubber grommet

☐ (4) Lock washer

☐ (4) Aluminum washer for turret board



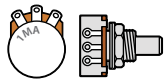
☐ (1) Chassis



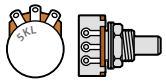
☐ (1) Turret board with turrets

☐ (1) Top plate

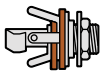
Control pots, input Jacks and more



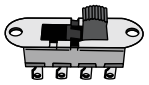
☐ (2) 1M control pot (A-audio taper)



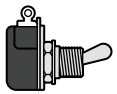
☐ (1) 250K control pot (L-linear taper)



☐ (4) Switchcraft 3-lug shunting jack (long bushing)



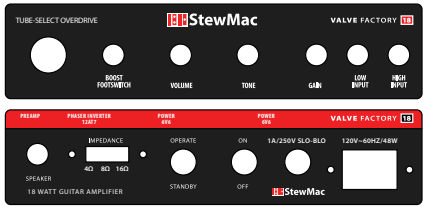
☐ (1) CW Industries DP3T slider switch



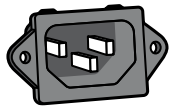
☐ (2) SPST switch

☐ (2) Washers for SPST switches

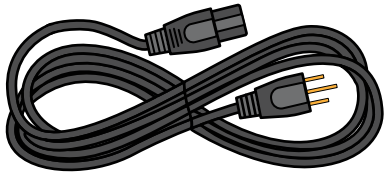
☐ (4) Rubber feet



☐ (1) Faceplate/backplate

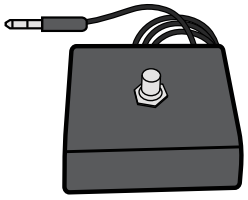


☐ (1) Power inlet

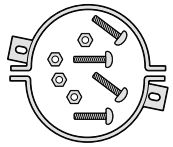


☐ (1) Quail Electronics power cord

☐ (3) MXR-style knob



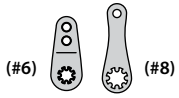
☐ (1) Footswitch



☐ (1) Filter cap mounting clamp

☐ (1) Three-lug terminal strip

☐ (1) Two-lug terminal strip



☐ (2) Solder lug

Tools and supplies

Required

Phillips screwdrivers, #1 and #2
Item #3000 Guitar Tech Screwdriver Set

Needle nose pliers
Item #1610 Long Nose Pliers

Round nose bending pliers
#1609

Wire cutter
Item #1607 Wire Cutter

Wire stripper
Item #1606 Wire Stripper

Soldering iron (preferably 40W)
Item #0501 Solomon SL-30 Soldering Station

Delta Solder 60/40
Item #103460 60/40
Item #103461 Lead Free

Solder sucker
Item #0503 Solomon Solder Sucker

Rule
Item #4905 StewMac Shop Rule

Peakmeter PM19C
Item #3620

Snuffer stick (bleed resistor)
Item #1552 Snuffer Stick

Alligator Clip Heat Sinks
Item # 0532-CU

Wooden chopsticks

Butane BBQ lighter
For heating heat-shrink tubing

White grease pencil

Helpful to have tools

StewMac Solder Monster
Item # 0531

StewMac Guitar Parts Tray
Item # 10394

Amp voltages are seriously dangerous! Even when unplugged.

When you turn on an amp, the capacitors are designed to take on a charge and hold it. That stored voltage is enough to injure you seriously, or even kill you.

These components aren't a threat until the first time you plug the amp in. The stored electricity can be safely discharged to ground with a snuffer stick. See how to use it in the photo on the right.

Once your amp has been turned on, don't touch the wiring with your bare hands—even after turning it off. If you need to press on a contact, use a chopstick or Sharpie marker, which are both non-conductive. Don't use a pencil, because graphite is conductive.

Follow these important tips, they will help you complete your build safely.

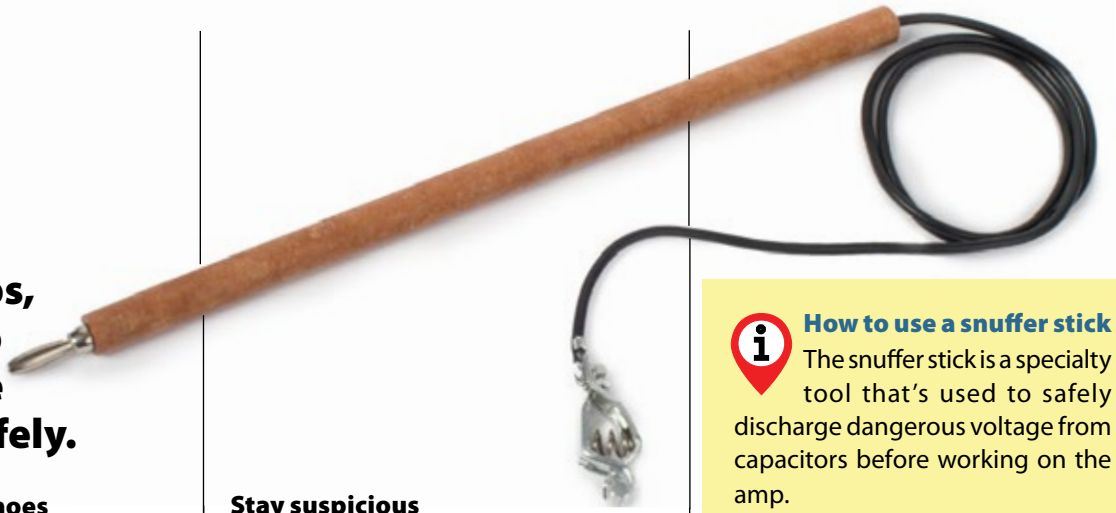
Wear rubber-soled shoes
Rubber soles increase the insulation between yourself and the ground.

Take off your ring
A metal ring on your finger can bridge a hot connection to ground.

Wear safety glasses
Rosin-core solder sometimes bubbles up, and it can spew molten specks into the air. You don't want molten solder in your eyes.

It's better not to work alone
Electrical shocks can incapacitate you, and having someone available to call 911 can be a lifesaver.

Take breaks and stop when you're tired
Fatigue leads to mistakes, and no one can afford mistakes when working with electricity.



Stay suspicious
Whether it's the first time you've been inside a live amplifier or the 100th time, don't become complacent. If you discharge the caps and walk away for a few minutes, check again for residual voltage when you return. Capacitors can self-charge through a phenomenon known as dielectric memory.

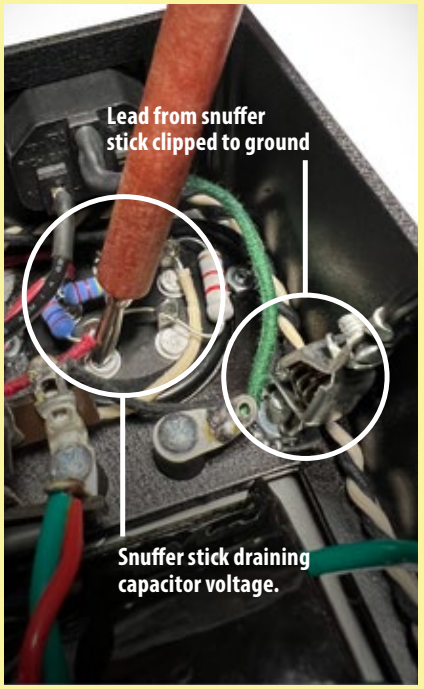
Check before powering on
It's easy to forget that you left a stray tool or wire in the chassis. It's also easy to forget to re-attach the speaker wire, and that can fry an output transformer in seconds. Constant vigilance is your friend when working on amps.

Always unplug your amp
Unplug the amp whenever you don't need it plugged in. Some points are always hot when the amp's plugged in, even if the power switch is off. These points include the lugs on the fuse socket, power switch, and standby switch.

How to use a snuffer stick

The snuffer stick is a specialty tool that's used to safely discharge dangerous voltage from capacitors before working on the amp.

To discharge a capacitor, clip the snuffer stick lead to ground—preferably a mounting bolt on the power transformer. Hold the tip of the stick to the cap's positive lead and use your multimeter to watch the voltage drain to less than 18V.

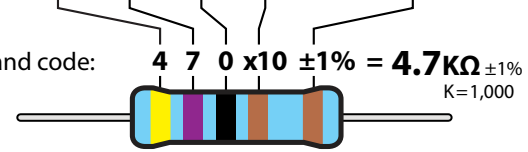


How to read resistor values

A resistor's value—the amount of resistance it creates—is rated in ohms (Ω). Larger ohm values mean more resistance. For example, a 100Ω resistor creates ten times as much resistance as a 10Ω resistor.

The resistors used in amplifiers are too small to have value numbers printed on them. Instead, a system of colored bands tells their values. The key to reading these bands is located to the right.

	Band 1	Band 2	Band 3	Multiplier	Tolerance
BLACK	0	0	0	1	
BROWN	1	1	1	10	+/- 1%
RED	2	2	2	100	+/- 2%
ORANGE	3	3	3	1,000	
YELLOW	4	4	4	10,000	
GREEN	5	5	5	100,000	+/- 0.5%
BLUE	6	6	6	1,000,000	+/- 0.25%
VIOLET	7	7	7	10,000,000	+/- 0.10%
GRAY	8	8	8	100,000,000	+/- 0.05%
WHITE	9	9	9	1,000,000,000	
GOLD				0.1	+/- 5%
SILVER				0.01	+/- 10%



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

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. This indicates the tolerance allowed during manufacturing

Can't read the colors?

You can always use a multimeter to test a resistor's value. Set your meter to ohms and connect the test leads on each side of the resistor. Additionally, there are great apps and websites like DigiKey.com out there to help you identify parts accurately. Beyond color identification, it's a great practice to test every resistor with your multimeter, just to be certain the resistor is not faulty.

Capacitor values

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

Think of a capacitor as a container that can hold electricity. Capacitance, measured in farads, refers to how much electricity this container can hold—its capacity. One farad (1F) would be much too large for use in an amplifier. Caps for amps are rated in millionths of a farad, called microfarads (µF), or trillionths of a farad: picofarads (pF). The voltage spec for a cap refers to how much DC voltage it can handle at any given time.

A unique property of capacitors is that they don't allow DC current to flow past them, only AC current. This is important in parts of an amplifier circuit, such as the path between a preamp stage and a power amp stage. Here, a "coupling capacitor" will block DC voltage, allowing only the AC guitar signal to pass.

Filter caps

Capacitors also filter out 60Hz hum, or "ripple," after the AC current from the wall is converted to DC. These capacitors are called filter caps, because they filter out the ripple from a power supply. The filter cap in this amp is a 40µf + 20µf + 20µf + 20µf electrolytic can capacitor. This can capacitor actually has four capacitors inside. They each have their own positive lug and they share a common negative lug.

Electrolytic caps

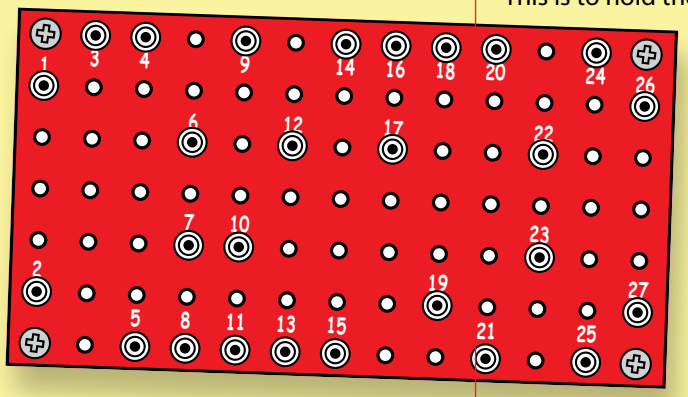
Electrolytic capacitors contain electrolyte: a liquid or gel that gives them a large storage capacity. Electrolytic caps are typically polarized.

Polarized caps

Some capacitors have polarity and some don't. It's extremely important to install polarized caps correctly in a circuit. The positive lead of an electrolytic cap will be indicated by an indented ring around one edge of the capacitor. The negative lead will often be indicated by a band of arrows pointing to the negative lead.

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

Best practices to keep in mind



Number and solder turrets

Steps to adding parts to the turret board are referred to by turret number. However the turret board does not come numbered. You will find a numbered diagram in this guide to help you but it's very helpful to number each turret on the turret board with a fine-point marker.

When it's time to solder, flow the solder all the way through the turret to ensure a good connection for the component leads and flow solder all the way around the turret to ensure a good connection for the jumper wires.

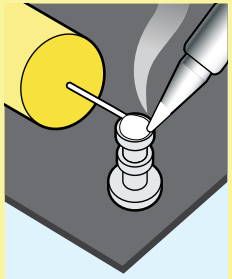
Soldering lead wire and components to the turret board

Solder the lead wires onto the turret board first. Cut each lead to its specified length. Strip 3/8" off one end of each lead and 1/8" off the other.

Double check your work! Make sure you have the correct lead connected to the correct turret before soldering.

Wrap the 3/8" end of each lead around its designated turret, position it, and tack it with a small amount of solder. This is to hold these leads in place when loading the electronic components onto the turret board. They will be fully soldered in place with the capacitors and resistors once the board is fully loaded.

Component leads are inserted through the turrets. Measure the distance between the turrets a component will be spanning and trim the leads 1/4" longer on each end. Bend the leads to fit into the holes in the tops of the turrets. Leave the leads unsoldered while you add other components. This way, you can check your work and make corrections without having to redo a solder joint. It also helps protect heat sensitive parts from damage. Ideally you solder components only once, which is the best way to get clean, trouble-free connections.



Once confirming (and re-confirming) that all components are in their proper locations, solder them into place. While the turret is hot, hit the lead wires with more solder to make sure they are secure, and their joints are solid.

To get good clean solder joints, follow these tips

✔ **Wrap the leads tightly**

Good electrical contact starts with good mechanical contact before you add the solder. Don't use solder to "glue" loose joints.

✔ **Keep the iron clean**

Wipe the tip of the iron often on a damp sponge.

✔ **Keep the iron tinned**

Melt a small amount of solder onto the tip of the hot iron. This is called "tinning" the iron. Also tin component leads like multi-strand wires to help the solder flow.

✔ **Don't feed the solder to the iron**

Hold the tinned tip against the joint for a few seconds until the connection reaches soldering temperature, then feed the solder to the joint. Keep the iron on the connection for a second longer to allow the flux to cook out of the joint.

✔ **Don't blow on hot solder**

Don't blow on the joint to cool it, or touch anything until the joint has completely cooled. A good solder joint is shiny—a sign that it was left to cool undisturbed.

✔ **Trim excess leads**

Cut away the ends of wires after the joint has cooled.

✔ **Think twice, solder once**

Plan ahead so each joint is only soldered once. Resoldered joints are messy and more likely to fail.

✔ **Position the parts**

Orient the parts so their specs face out so you can read them later. Many builders also align resistor bands to read in the same direction.

✔ **Strip the insulation**

How much insulation to strip? With plastic insulation, strip 3/8" from the wire ends. Push-back wire works best when you strip away about 1/4" of the cloth.

Minimize hum by routing the heater wires carefully

AC voltage is 60Hz, which can be picked up as an unwanted hum, so it's very important to use these two techniques when you route these wires.

Twist the wires

Wire twisting isn't about keeping things tidy, it's about hum-canceling. These intertwined wires reduce noise that can occur with straight wires.

Keep them away from the signal

The heater wires are kept at the outermost edge of the enclosure, and at the opposite corner from the input jacks and control pots. Make right-angle bends to connect at the tube sockets, to stay away from other wires as much you can.

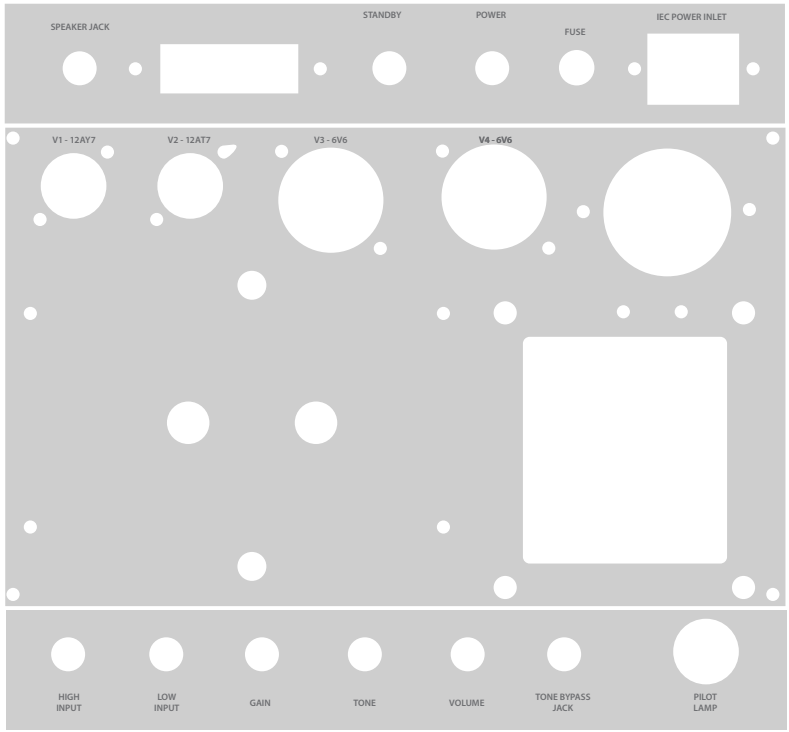
When two leads cross each other, bend them to 90° rather than running them side-by-side. Keep lead wires short to minimize interference. These are good dressing habits for all leads.

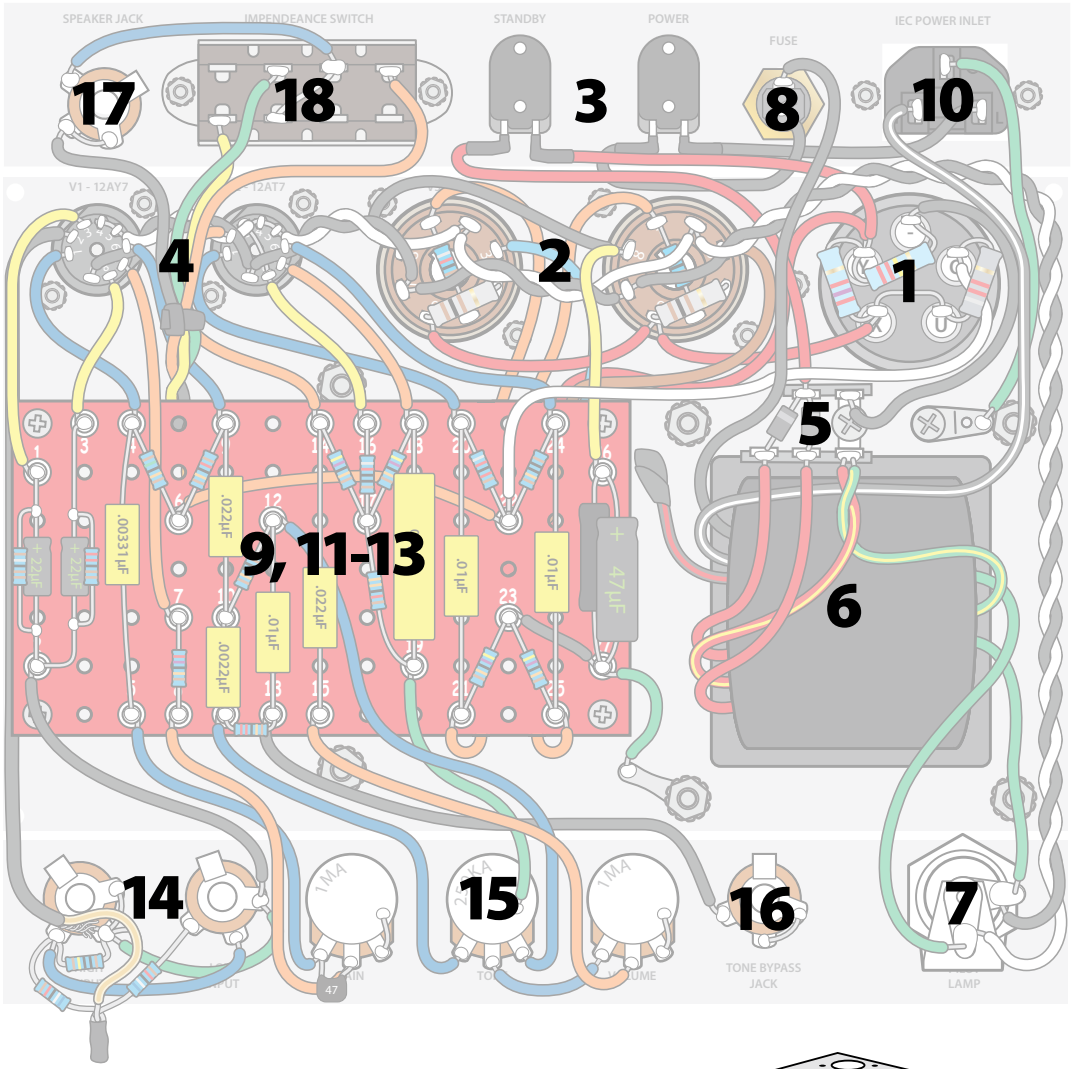
Order of build

We will build this amp in the same direction that power flows through it. With the back of the chassis facing away from you, we'll start by adding parts somewhat counterclockwise or left to right. Initially we'll be installing parts that connect on the underside of the top of the amps chassis. From there we'll work our way to the front and back panels. There, we'll connect the parts we installed earlier on the inside top to the jacks, switches and other parts on the front and back panels. Mid build, we'll do a quick test to check our work and make sure we're ready to move on to the next steps. We'll retest everything at the very end of the build to be confident everything is correct.

Understanding the illustrations in this guide.

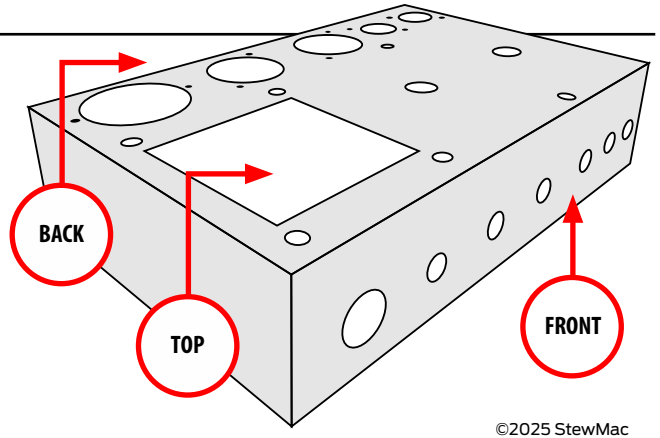
The majority of the illustrations in this guide are shown as an overhead view. For example, in reality the chassis is a metal box, but shown as flat panels in this guide.





Understanding the chassis direction.

In order to be sure it's always clear where you should be installing parts during your build, we will use the verbiage of the different areas as noted in this diagram.



STEP BY STEP

FOLLOW THESE STEPS AND SOON YOU'LL HAVE AN AMAZING AMP THAT YOU BUILT BY YOURSELF

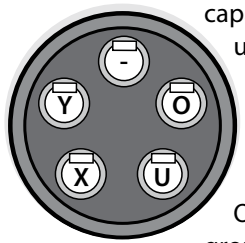
IMPORTANT! Read before getting started!

Many of the connection points in this kit are very small and have numerous wires connected to them. This includes, but is not limited to, tube sockets, turret board, pots, and jacks.

Pay close attention to the drawings before soldering. When you see more than one lead going to the same connection point, don't automatically flood the joint with solder as it could make it difficult to attach the other leads. We suggest no solder on these joints until all wires are in place. If you feel the need to use solder, use just enough to tack the joint in place without filling the eyelet completely.

Prepping the filter capacitor

We're going to start the building of the Valve Factory 18 by doing a few "sub-builds" of parts that will eventually install into our amp. This will save time and effort down the road. The filter capacitor is made up of 4 separate sections. The solder lugs for each section are labeled Y, U, X and O, the common ground connection is labeled with a minus sign (-).



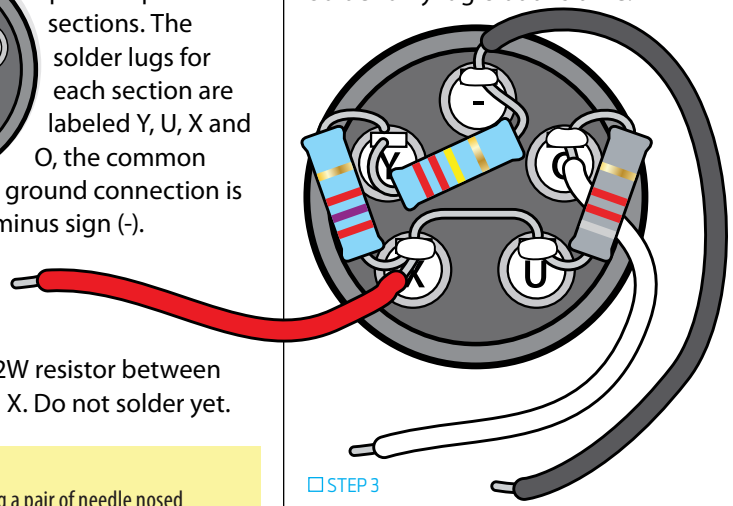
☐ STEP 1

Insert the 2.7K 2W resistor between terminals Y and X. Do not solder yet.

TIP: Using a pair of needle nosed pliers, bend a small fish hook shape in the leads coming out of each terminal. These hooks will help to keep the lead in place while soldering. Use this method throughout this build whenever possible.

☐ STEP 2

Next, slip one end of the long leads of the 8.2K 2W resistor through the U and X terminals. This will create a jumper between the U and X terminals. Slip the other end of the lead through the O terminal and make a fish hook bend. Solder only lug U at this time.



☐ STEP 3

The 220K 2W resistor goes between lug Y and the negative (-) lug (ground). The 220K 2W resistor is used to bleed off the high voltage on this capacitor once the unit is turned off.

There ends up being four leads connected to lug Y. This is a tight fit; it is a good idea to leave this lug free of solder until all leads are attached.

☐ STEP 4

Cut a 5" piece of 20-gauge black wire and strip the ends. Solder one end to the negative (-) lug, along with the other end of the 220K 2W resistor.

TIP! USING PUSH BACK WIRE The term "push-back" comes from the fact that it is easy to push back the cloth insulation to expose the core of the wire. Many amp and pedal builders use this technique. Some however like the wire to be stripped to expose clean ends without the insulation coming in contact with the connection point or hot solder. There are a couple ways to go about this. One is to use our #1606 Fine-gauge wire strippers. These are very sharp and can be used to cleanly cut away the insulation. Another technique is to push back the amount of insulation off one end of the wire and trim off the excess insulation. For example, if you need a wire with 1/8" of the core exposed on both ends, push back enough insulation to expose 1/4" of the wire core on one end. Work the 1/4" of excess insulation down towards the opposite end of the piece so it's hanging off with no wire in it. Then simply cut off the empty 1/4" of insulation with your wire cutters or scissors.

☐ STEP 5

Cut a 3-1/2" piece of red wire. Push back the cloth insulation to expose 1/4" of the wire core and attach it to the X lug and solder in place along with the unsoldered resistor leads.

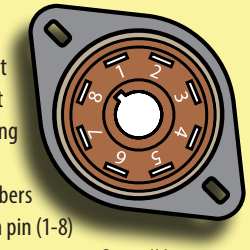
☐ STEP 6

Cut a 6" piece of 20-gauge white wire and solder it to the O lug, along with the other end of the 8.2K 2W resistor. Set the capacitor to the side for now.

Prepping and connecting the V3 and V4 tube sockets

Next, we will be doing sub builds of the V3 and V4 output tube sockets. These are the larger 8-pin sockets. Note that each pin has two holes in them for attaching multiple components.

NOTE: You will notice that the sockets come in two different sizes. The larger sockets are for the output tubes. You will want to assign one socket as V3 and the other V4 and ensure these are kept separate for the next steps, before installing in the chassis. They have a series of numbers associated with each pin (1-8) which are hard to see, so a magnifier will be very helpful here. You'll notice that there is a squared off notch within the beige part of the socket. This notch lines up between pins 1 and 8.



☐ STEP 7

Solder a 5-1/2" orange lead to the bottom holes on pin 1 on both sockets. Do not to flow solder in the top holes.

☐ STEP 8

Run the two 8.2K resistors through the top holes between pins 1 and 5 of both sockets and solder them in place.

☐ STEP 9

Solder the two 100-ohm 2W resistors into the bottom holes on pins 4 and 6 on both sockets, again using care not to flow solder into the top holes.

☐ STEP 10

Cut a 3" piece of red wire and solder one end to pin 6 on V3 socket as shown.

☐ STEP 11

Next, cut one 4" piece of 18-gauge white and one 4" piece of 18-gauge black wire. Twist these two wires together tightly as shown in the illustration on the next page.

Solder one end of the white wire to pin 2 of V3 socket and one end of the black wire to pin 7 of V3 socket. For now, leave the opposite two ends of this twisted pair not attached to anything.

In addition, cut a 3-1/2" piece of black 20 gauge wire and solder it to pin 8 on V3 socket.

☐ STEP 12

Now, from the outside of the chassis, insert the V3 socket into the third hole from the left in the chassis. Orient the socket so that the number 6 pin is in the 7:00 position. Then, using two 4-40 x 1/4" machine screws and locknuts, lightly secure the sockets in place with the locking nuts inside the chassis. It is crucial that the tube socket be held in place just enough to keep it on the chassis. We will need this play to make installation of the power and standby switches possible later.

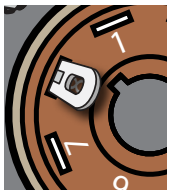
☐ STEP 13

Now, insert the V4 socket in place using the same procedure. Again, only tighten the screws enough to hold the socket loosely in place.

☐ STEP 14

Guide the two orange leads from V3 and V4 side by side between the two sockets. The ends of the leads will rest where the turret board will eventually attach.

☐ STEP 15



CAREFULLY bend pin #8 forward towards the center of the V4 socket (this will make installation easier due to space constraints). Be gentle so you don't weaken the pin as it might need to bend out later.

☐ STEP 16

Next, solder the free end of the red wire from pin 6 of V3 to pin 6 of V4, along with the red lead from Lug X of the filter cap.

☐ STEP 17

Attach the two free ends of the twisted pair of white and black wires coming from V3 to pins 2 and 7 of V4 socket. White to pin 2, and black to pin 7. Again, additional leads will be soldered to these same lugs. Use little to no solder to hold these in place and it will make connecting the remaining wires easier.

☐ STEP 18

Attach the black wire from pin 8 of V3 socket to pin 8 of V4 socket.

Standby and power switch preparation and installation

Prepare the power and standby switches. Both switches are identical, use either one.

☐ STEP 19

Standby switch: Cut and strip two 5" pieces of red wire and solder one end of each wire to each terminal of the standby switch. Cut a 1/2" piece of heat-shrink tubing and slide it over the soldered joints once the solder has cooled. Next, heat the tubing to shrink it. Set the standby switch aside.

☐ STEP 20

Power switch: Cut and strip two pieces of 5" pieces of 20-gauge black wire and solder one end of each wire to each terminal of the power switch. Once cooled, slide heat shrink tubing over the terminal joints and heat the tubing to shrink as previously done on the standby switch.

☐ STEP 21

Remove hex and dress nuts from both switches. Using the unattached rear panel control plate as reference. Install the standby switch into the first hole closest to the rectangular cutout for the impedance switch. The power switch installs into the hole immediately to the right of the standby switch.

IMPORTANT! Take your time and use care not to stress the contacts on the power tube sockets when installing the switches. It's a tight fit, carefully wiggle the switches into place.

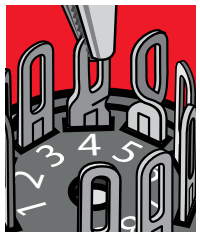
☐ STEP 22

Now that the power and standby switches are in place, add the rear panel control plate and secure it to the chassis using the finish washers and dress nuts. Tighten these down just snug with your fingers for now.

☐ STEP 23

Dress the red and black wires along the inside back wall of the chassis moving toward the filter capacitor.

Installing the V1 and V2 tube sockets



☐ STEP 24

Next, prepare the V1 and V2 tube sockets. The V1 and V2 sockets also have a series of numbers (1-9) associated with each pin. It is helpful to *carefully* twist pins 4 and 5 slightly with a pair of needle nose pliers so that they are facing each other as shown.

☐ STEP 25

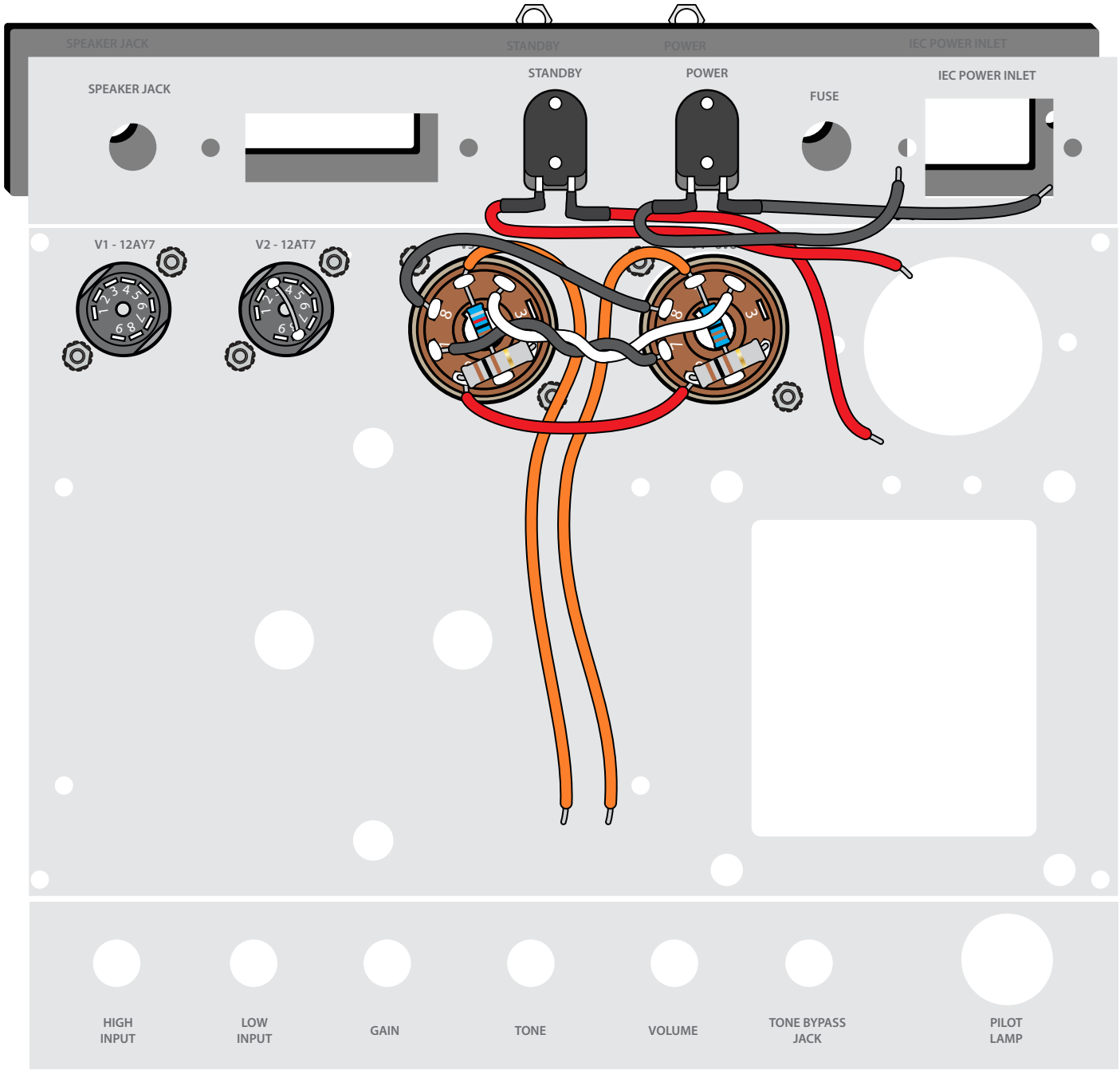
Install a jumper between pins 3 and 8 of V2. You can use an excess resistor lead clipping or pushback wire core for this.

☐ STEP 26

Place the V1 socket on the top plate that indicates gain stage by tube type and install it in the V1 hole in the chassis. Orient the socket so that pins 4 and 5 are closest to the rear mounting hole on the chassis. Secure it using two 4-40 x 3/8" machine screws and locknuts on the inside. Note that these screws are slightly longer than the others used to attach the rest of the tube sockets. This added length is to accommodate the extra thickness of the top tube gain info plate.

☐ STEP 27

Orient V2 (you installed a cathode jumper to it) the same way as V1 and secure it with two 4-40 x 1/4" machines and locknuts.



Connecting the V1 & V2 Sockets

NOTE: About heater wire installation
These tubes require a 6.3V AC current to power their filaments, which are also called "heaters" in the amp world. This current is provided by the power transformer through twisted black and white leads. With the limited space provided by the chassis, the best way to run the heater wires is to tuck them into the bottom back corner of the chassis. Keeping the wires tucked into the back corner of the chassis, away from the signal carrying wires, prevents the AC current in these heater wires from bleeding 60hz hum into your signal.

☐ STEP 28

Cut 3" pieces each of white and black 20-gauge wire and twist them together.

☐ STEP 29

Expose 1/8" of the core on one end of the black wire and solder it to pin 9 on the V1 socket.

☐ STEP 30

Expose 1/8" of the core on the same end of the white wire and run it through pins 4 and 5 on the V1 socket and solder in place.

☐ STEP 31

Expose 1/8" of the core on the opposite end of the black wire and connect it to pin 9 on the V2 socket.

TIP! The pins on V2 will have additional leads attached in a future step. We suggest leaving these pins free of solder for the time being as it makes it easier to attach the additional leads when there is no solder in the pins.

☐ STEP 32

Expose 1/4" of the core of the white wire on the same end and run it through pins 4 and 5 on the V2 socket.

☐ STEP 33

Dress the wiring by pressing it down and to the back of the chassis as shown. This is important, as these two tube locations make up the preamp section. By dressing the wiring down against the back of the chassis, potential noise pickup is reduced.

Connecting the V2 & V3 sockets

☐ STEP 34

Cut 3" pieces each of white and black 20-gauge wire and twist them together tightly.

☐ STEP 35

Expose 1/8" of the core on one end of the white wire and run it through pins 4 and 5 on the V2 socket and solder in place.

☐ STEP 36

Expose 1/8" of the core on the same end of the black wire and solder it to pin 9 on the V2 socket.

☐ STEP 37

Connect the opposite end of the white wire running from V2, expose 1/8" of the core and solder it to pin 2 on V3.

☐ STEP 38

Expose 1/8" of the core of the same end of the black wire and solder it to pin 7 on V3.

Connecting the V4 socket to lamp

☐ STEP 39

Cut two 10-1/2" pieces each of 20-gauge white and black wire and twist them together tightly.

☐ STEP 40

Expose 1/8" of the core on the white wire and solder it to pin 2 on V4.

☐ STEP 41

Expose 1/8" of the core on the black wire and solder it to pin 7 on V4.

Install the filter capacitor and clamp

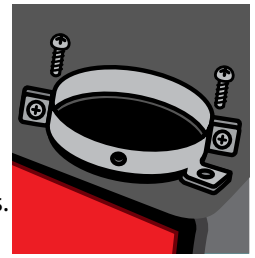
☐ STEP 42

Attach the filter capacitor clamp to the outside of the chassis and secure using two 4-40 x 1/4" machine screws and locking nuts.

TIP! Use care not to interfere with the resistors on the socket or bend the leads dramatically on the tube sockets. Dress this twisted pair by pressing it down to the rear of the chassis and following the corner around to the front. These long leads will eventually be soldered to the front panel jewel lamp assembly, so the path simply follows the chassis wall from the socket to the right front.

☐ STEP 43

Slide the prepped capacitor into its hole from inside the chassis and into the attached clamp. Push the capacitor into the clamp until about 1/8" of the capacitor is still inside the chassis. There's a rim and indent on the end of the capacitor which is a good reference for how deep it should hang inside the chassis.



This step is important, as we need to leave enough clearance to allow for the IEC power inlet to be installed without interference, and to permit dressing the associated wiring around and above the large can capacitor.

☐ STEP 44

Rotate the capacitor so that the U lug is in the 6:00 position and tighten the clamp just enough to hold the capacitor in place, but not tight.

Adding the terminal strips

☐ STEP 45

Align the 2-terminal and 3-terminal strips so they face each other and the screw holes on each strip line up. Insert a 6-32 x 1/4" machine screw into the threaded hole in the chassis and tighten. Make sure to orient the two-terminal strip so that it is facing towards the back of the chassis and closer to the capacitor than the 3-terminal strip.

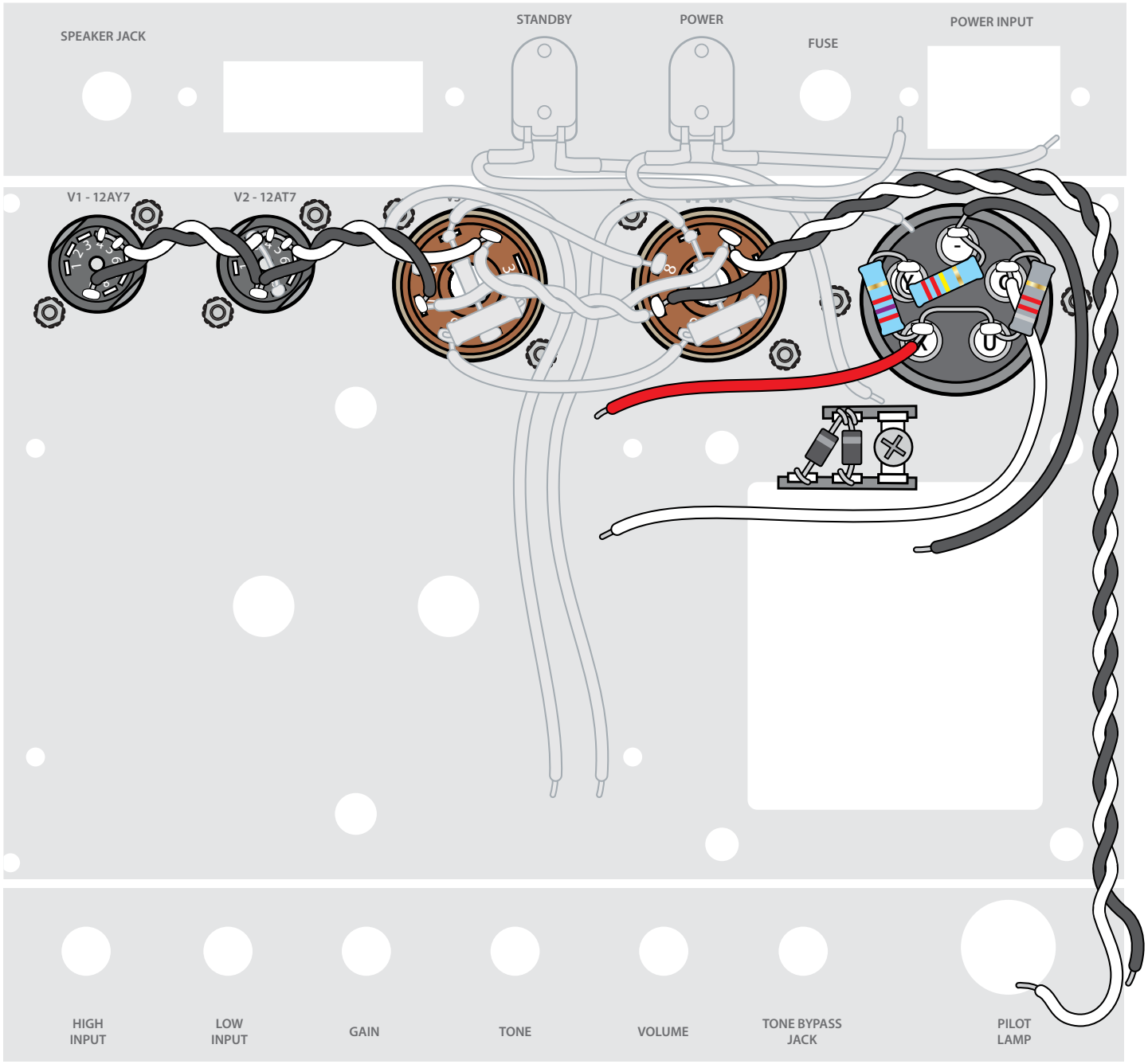
☐ STEP 46

Next, trim the leads to fit and connect the two 1N5408 rectifier diodes to the terminal strips.

Thread both leads of the cathode end of the diodes (the ends with the stripe) through the first lug on the two-terminal strip working left to right.

☐ STEP 47

Thread the other two ends of the diode leads through the first and second lugs on the 3-terminal strip. Don't fully solder the diodes in place yet as more wires will be attached to the terminals, just tack them in using as little solder as possible.



Installing the power transformer

Needless to say, the power transformer is heavy and a tight fit with all of the other components, which is the reason we are installing it later in this build instead of earlier like we do in our other kits.

☐ STEP 48

Thread the wires coming from the transformer from the outside of the chassis, through the large square opening. Make sure to orient the wires so the red wires are on the left and the green wires are closest to the right side of the chassis.

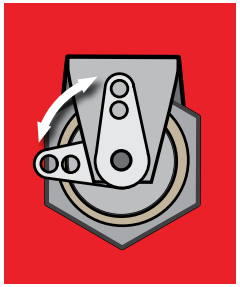
☐ STEP 49

Align the bolts that are attached to the transformer with the holes provided in the chassis and then attach the 8/32" locknuts on the inside of the chassis EXCEPT for the locking nut on the bottom left-hand side. Before attaching the final nut, place the #8 solder lug over the end of the bolt, add the locking nut, and tighten securely. A 2" long 11/32" socket is recommended to clear the chassis walls.

Installing the pilot light

☐ STEP 50

Unscrew the large nut holding the pilot light assembly together and set lamp parts aside.



On the pilot light assembly, you will find two lugs, both with upper and lower soldering holes. These lugs can rotate slightly to make soldering leads to them a bit easier. Rotate the outer lug so that it's in the 12:00 position, and rotate the inner lug so that it is in the 9:00 position.

☐ STEP 51

Take the front control plate for the amp and place it in the appropriate position over the holes in the chassis.

☐ STEP 52

Insert the threaded shaft of the mounting sleeve for the lamp through the faceplate side of the hole for the lamp.

☐ STEP 53

Slip the lamp assembly bracket on to the threaded shaft from the inside and reattach the large nut to secure it. Turn the bracket so that the flat metal side is facing you (or facing the bottom of the chassis when turned right side up). Tighten nut further with a large pair of needle nosed pliers. The #1344 ESP Spanner Wrench also works well for this job.

☐ STEP 54

Do not add the bulb at this stage, but do attach the jewel lens.

TIP! Temporarily installing the high input jack can help keep the front control plate in position without flopping around while you complete the next steps.

Installing the fuse holder

☐ STEP 55

Remove the large nut that is attached to the fuse holder.

☐ STEP 56

Slide the rubber grommet up the threaded shaft of the fuse holder to its base so that it will be on the outside of the chassis when installed.

☐ STEP 57

Slip the threaded shaft through the appropriate hole in the faceplate and reattach the large nut on the inside of the chassis. Use care to not cross thread the nut on the plastic shaft while threading it on.

☐ STEP 58

Before tightening the nut in place, make sure the lug that runs the length of the shaft is facing up or toward the bottom of the chassis when the amp is right side up.

☐ STEP 59

Use heavy needle nose pliers or the ESP Spanner Wrench to tighten the retaining nut in place.

☐ STEP 60

Don't add the fuse at this stage.

TIP! At this stage, examine your work to make sure it reflects the illustration on the right. We suggest going back over your work frequently through this build to spot any potential mistakes and correct them while it is still easy to get to the parts.

Install the output transformer

☐ STEP 61

Flip the amp over so that it's in the upright position. Next, install the two 1/2" rubber grommets into the holes where the output transformer wires will slip into the chassis.

☐ STEP 62

Rotate the amp so that the front faceplate faces you. Now, orient the transformer so that the red, blue, and brown wires can easily thread through the grommet on the left and the yellow, black, orange, and green wires can slide into the hole on the right.

☐ STEP 63

Guide the wires through the grommeted holes and align the holes of the mounting bracket of the transformer with the holes on the top of the chassis.

☐ STEP 64

Insert an 8-32 x 3/8" machine screw from the outside of the chassis through the mounting bracket and chassis. While holding the screw and output transformer in place, carefully flip the amp over so that you can attach a locking nut on the screw from the inside.

☐ STEP 65

Repeat this step for the other mounting screw and locking nut. Tighten both screws securely.

Wire up the filter capacitor

☐ STEP 66

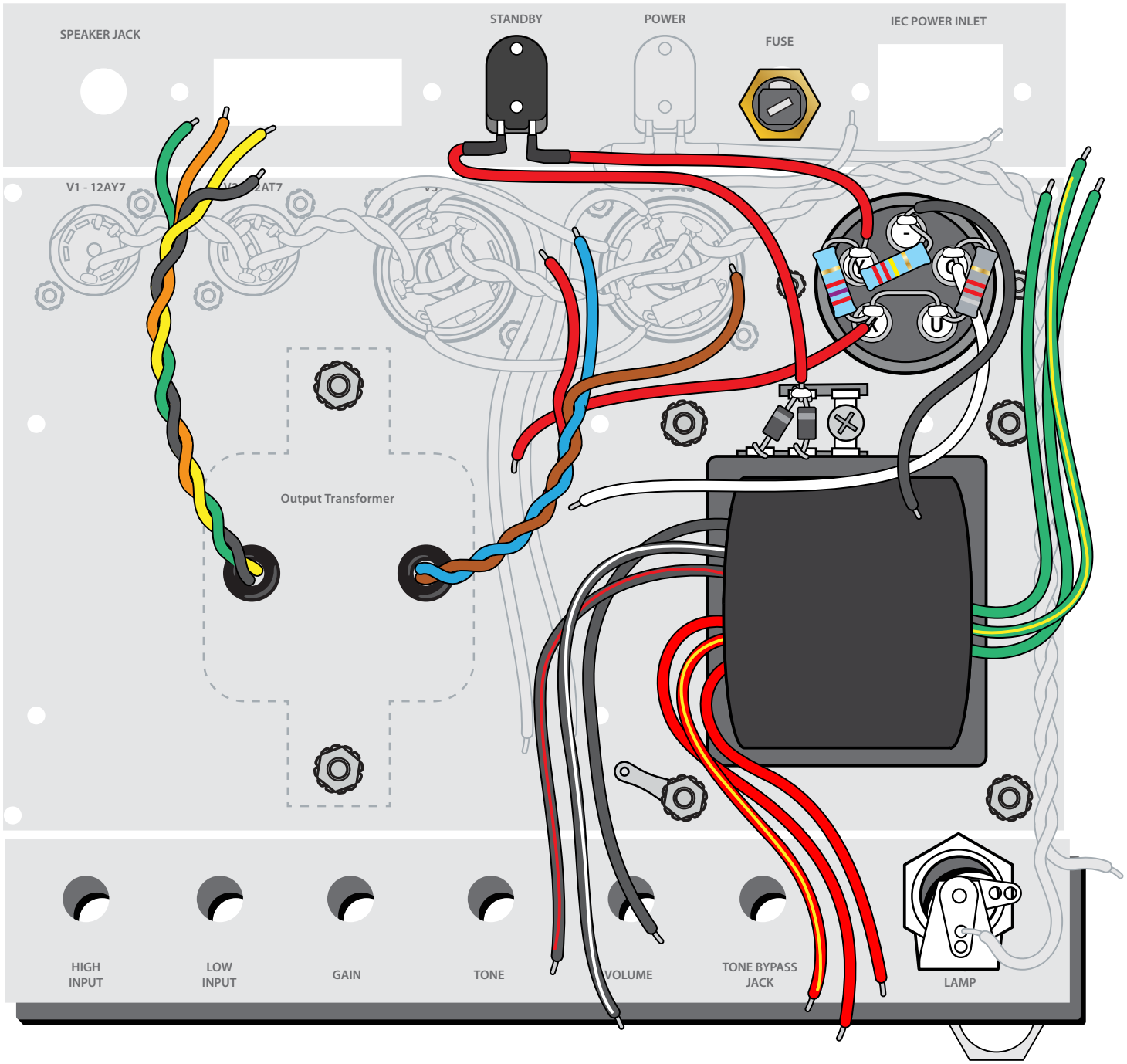
Find the end of the red wire coming from the right-hand lug of the standby switch.

☐ STEP 67

Expose 1/8" of the core, connect it to the Y lug on the filter capacitor, and solder it in place.

☐ STEP 68

Now, take the red wire coming from the left-hand side of the standby switch, expose 1/8" of the core, and solder it to the first lug on the 2-terminal strip. Note that the lug you will be soldering to will also have the two rectifier diodes connected to it.



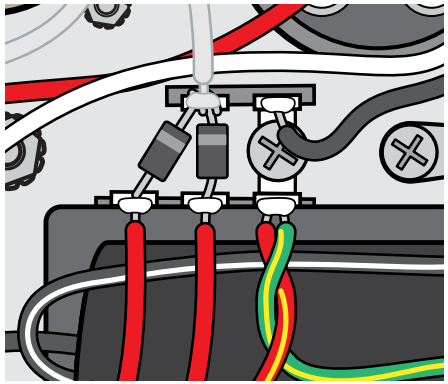
Wire up the terminal strips

☐ STEP 69

Now, we're going to add a few more wires to our terminal strips. Find the green/yellow wire coming from the right side of the power transformer and the red/yellow wire coming from the left side of the transformer. You'll notice these wires are significantly longer than they need to be for this amp. They'll need to be shortened before attaching to the terminal strips to keep things tidy inside the chassis. The distance between where the wires exit the transformer and where they'll attach to the terminal strip is only a few inches. Use care not to cut these too short.

☐ STEP 70

Once you have shortened the red/yellow and green/yellow leads to the appropriate length, strip 1/8" of insulation from the end of each wire, twist the leads together, and install them both to the ground lug of the 3-terminal strip. Note that the ground lug of this terminal strip is the lug without the diodes, farthest to the right.



☐ STEP 71

Take the remaining red wires from the power transformer and measure, cut, strip them and solder them to the first and second lugs on the 3-terminal strip. Either wire will work on either lug. For reference, the two diodes are attached to the same lugs in the terminal strips as where the red power transformer wires will attach.

☐ STEP 72

Find the black wire attached to the negative (-) lug on the filter capacitor, measure the distance to the right-hand side lug on the 2-terminal strip. Once measured, cut and expose 1/8" of the core and solder it to the right most lug on the 2-terminal strip.

Wire up the pilot light

☐ STEP 73

The end of the long white and black twisted pair of wires that runs along the right inside of the chassis should be right underneath the lamp assembly. Shorten the black wire as needed to reach the bottom hole of the inner lug on the lamp assembly. Expose 1/8" of the core and solder it to the bottom hole of the inner lug on the lamp assembly.

☐ STEP 74

Take either of the remaining green wires coming from the power transformer and measure, shorten and strip as you did in the previous step and solder to the upper hole of the same inner lug of the lamp assembly next to the black wire.

☐ STEP 75

Trim the white wire of the twisted pair as needed to reach the lower hole of the outer lug of the lamp assembly, expose 1/8" of the core and solder into place.

Take the remaining green wire from the power transformer, measure, shorten, and strip as necessary and solder to the upper hole of the outer lug next to the previous white wire.

Prepping the IEC power inlet

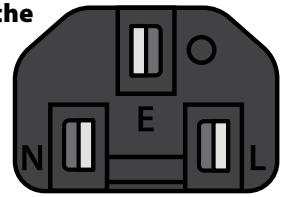
☐ STEP 76

Prep the IEC power inlet by cutting a 3-1/2" green wire and push back the cloth insulation to expose 1/4" of the core wire. Solder one end of this green wire to the center lug of the IEC. Once the solder has cooled, slide a 1/2" piece of heat shrink tubing over the terminal joint and shrink with heat.

☐ STEP 77

Solder the #6 solder lug to the opposite end of the green wire.

Wiring up the IEC inlet



☐ STEP 78

Orient the IEC power inlet so that the ground wire is toward the bottom of the chassis when the amp is upright and is finally assembled. Slide the IEC into the chassis and secure with two 4-40 x 3/8" machine screws and locking nuts.

☐ STEP 79

Run the green ground lead through the hole in the chassis with the green ground lug facing the bottom of the chassis. Attach the lug on the end of the ground wire to the chassis using a 6-32 x 1/4" machine screw.

☐ STEP 80

Find the black/white wire coming from the left side of the power transformer. Measure the length needed to reach the terminal (marked "N") on the left-hand side of the IEC, plus a comfortable amount of excess, and cut and strip 1/8" off the end of the wire.

☐ STEP 81

Slide a 1/4" piece of heat shrink tubing onto the black/white wire and move it to the middle of the wire, out of the way of the heat.

☐ STEP 82

Thread this wire through the hole of the IEC and solder in place.

☐ STEP 83

Once the solder joint has cooled, slide the heat-shrink tubing over the joint and heat to shrink the tubing.

☐ STEP 84

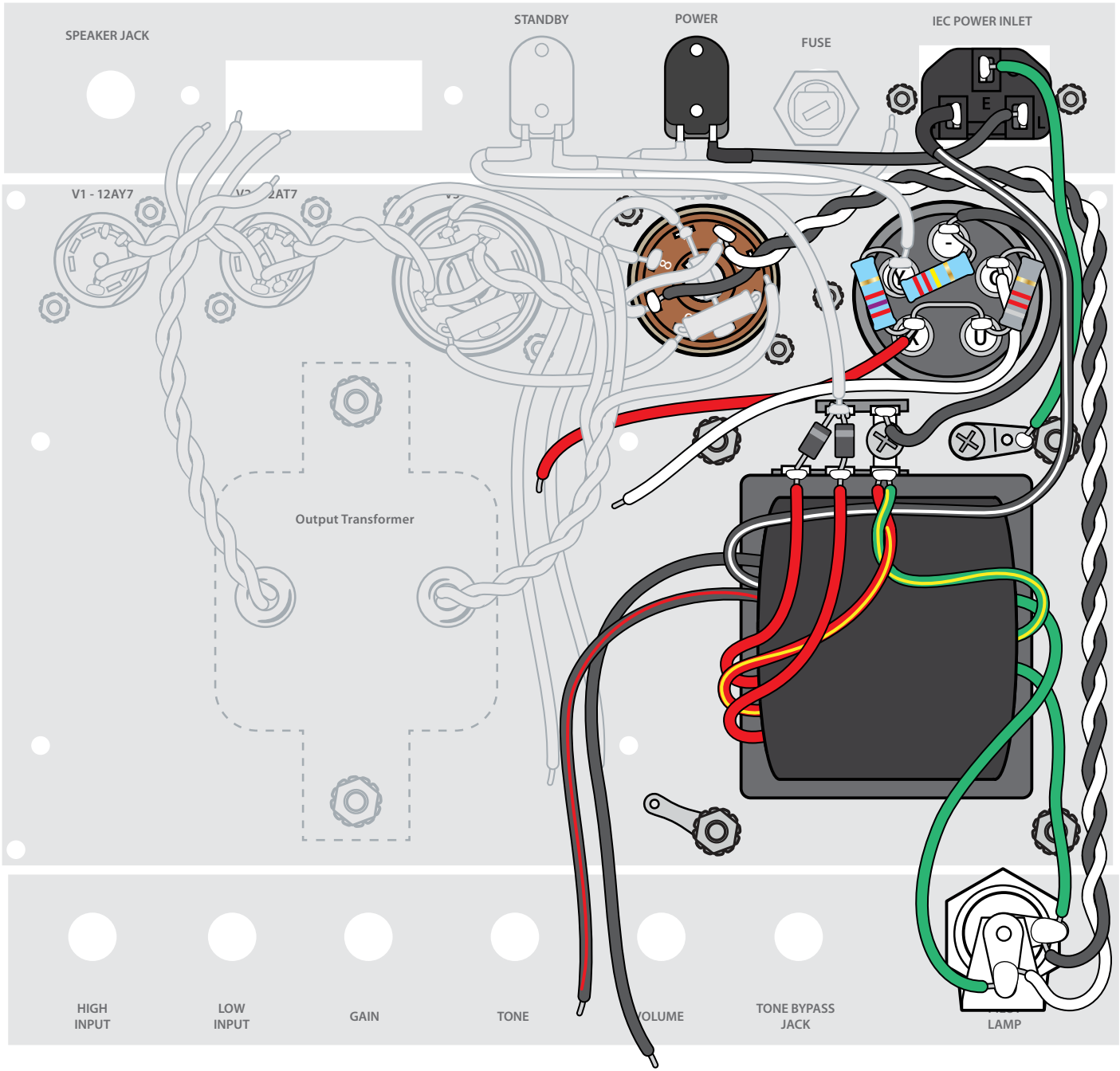
Locate the black wire coming from the right-hand lug of the power switch. Measure the distance to the right-hand (marked “L”) lug of the IEC inlet. Figure in a little excess slack and slide a 1/4” piece of heat shrink tubing over the end of the wire, moving it out of the way for now.

☐ STEP 85

Solder the black wire from the power switch to the right-hand lug of the IEC inlet.

☐ STEP 86

Once the solder joint has cooled, slide the heat-shrink tubing over the joint and heat to shrink the tubing.



Wire up the fuse holder

☐ STEP 87

Find the remaining black wire coming from the left-hand lug of the power switch and measure the distance to the eyelet shaped lug at the end of the fuse holder with the wire. Give your wire a little slack and trim it to length. Slide a 1/2" piece of 3/8" heat shrink tubing over the end of the wire and move it out of the way temporarily.

☐ STEP 88

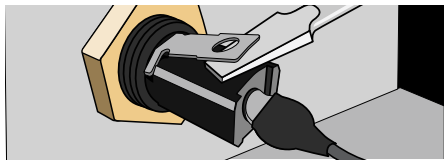
Expose 1/4" of the core of the black wire and solder it to the eyelet shaped lug at the end of the fuse holder. Slide the 1/2" piece of heat shrink tubing over the joint and heat to shrink.

☐ STEP 89

Locate the black wire coming from the left-hand side of the power transformer. Measure the distance to the lug that runs the length of the shaft on the fuse holder, trim to length, strip 1/8" off the end of the trimmed wire and slide a 1/2" piece of heat shrink tubing onto the lead and move it out of the way until the wire is soldered in place.

☐ STEP 90

Using the tip of a small screwdriver, *carefully* bend the lug that runs the length of the fuse holder shaft upward around 45 degrees.



☐ STEP 91

Thread the stripped end of the black lead from the power transformer through the lug and solder in place.

☐ STEP 92

Once the solder has cooled, slide the heat shrink tubing over the lug and wire joint and shrink the tubing.

Add fuse, bulb and cap wire

☐ STEP 93

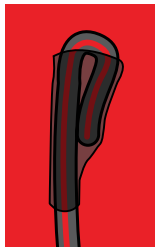
Unscrew the cap end of the fuse holder, insert the fuse and lock cap in place.

☐ STEP 94

Unscrew the jewel lens from the pilot light assembly, lock the bulb in place and reattach the lens.

☐ STEP 95

You'll find one stray black/red wire coming from the power transformer. This wire is from the primary of the power transformer and is not needed for operation from 120 VAC (Domestic) wall outlets, so we're basically going to cap this wire. Start by trimming the length of this wire down to about 2". Slip a small piece of heat shrink tubing over the end of the lead and slide it to the middle of the wire. Then bend the end of the wire over onto itself and slide the heat shrink tube over the end of the wire and its loop. Heat to shrink the tubing, sealing off any potential connection.



IMPORTANT! Use extreme caution while conducting the power up and voltage check. Clip the common (black) probe of your multimeter to the solder lug attached to the chassis that connects the green wire to the IEC inlet. Use one hand to hold the red probe while testing voltages and put your other hand in your pocket to minimize the potential for a serious electrical shock.

Testing AC voltage

☐ STEP 96

Tighten up the filter capacitor securely at this stage.

☐ STEP 97

Make sure the fuse is in the holder, the bulb is installed in the light housing, and the power and standby switches are off (bat handle in the up position). There will be no tubes in the amp at this stage.

☐ STEP 98

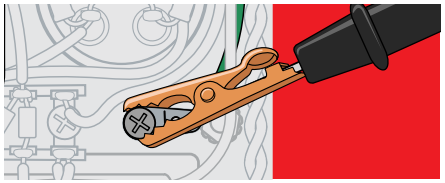
Plug the power cord into the IEC inlet and then into an outlet.

☐ STEP 99

Flip the power switch to the on position. The pilot light should be glowing brightly and the fuse should not pop. Wait a minute or two. If everything seems to be working and nothing is smoking, your amp is in a good place.

☐ STEP 100

Attach one of your heat sinks to the negative probe (black). Clip the probe to the same ground as the IEC ground (the lug with the green wire that's attached to the chassis).



☐ STEP 101

Turn on your multimeter and set it to 600 volts AC.

☐ STEP 102

Take the red lead coming from the multimeter and maneuver its point to make contact with the light assembly and check the multimeter reading. You should find ~3.25VAC.

☐ STEP 103

Now connect to the fuse holder and check its voltage. You should read ~120VAC.

☐ STEP 104

Additionally, we need to check pins 4/5 and 9 on both V1 and V2, as well as pins 2 and 7 on V3 and V4. These are all heater wire connections and should all read the same: ~3.25VAC.

Testing DC voltage

☐ STEP 105

Flip the standby switch to the down position, releasing the DC voltage into the filter capacitor. Set your digital multimeter to 600VDC for the following readings:

☐ STEP 106

With the red probe from the multimeter, you should get voltage readings in these base ranges when connected to the associated terminals on the can capacitor: Note they will likely read a little higher than the listed voltages because the amp does not yet have tubes in it. (These voltages are taken using 120VAC wall voltage).

Point "Y" on filter capacitor: 383.1 VDC.

Point "X" on filter capacitor: 357.2 VDC.

Point "O" on filter capacitor: 317.7 VDC.

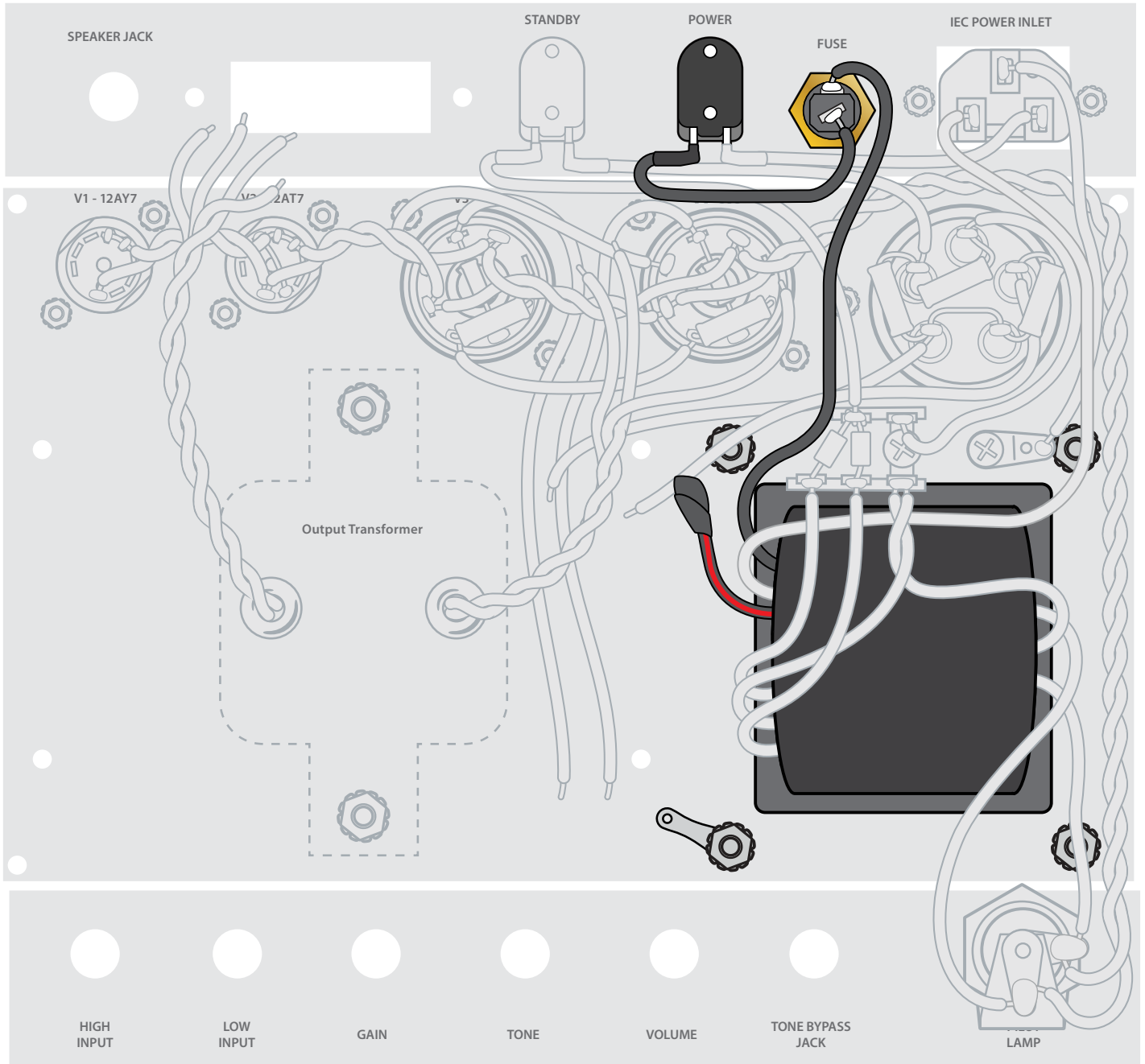
☐ STEP 107

Turn off amp and unplug it from the wall outlet.

☐ STEP 108

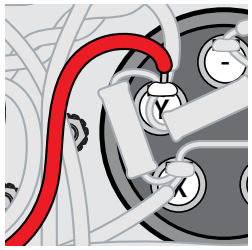
If the voltages you get are considerably higher than those listed, double check your work to make sure all connections and resistors are correct.

CAUTION! After the DC tests are done, the filter capacitor will be charged. You MUST drain this capacitor with a snuffer stick (see page 9) before moving on to the next steps.



Wiring the output transformer

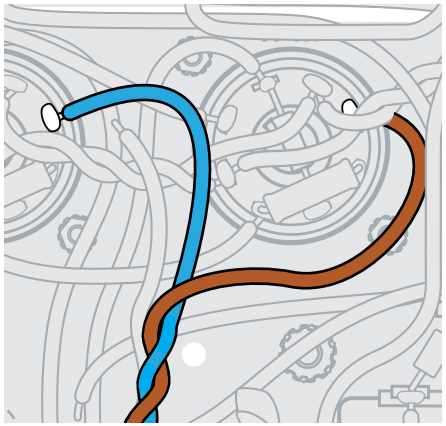
☐ STEP 109

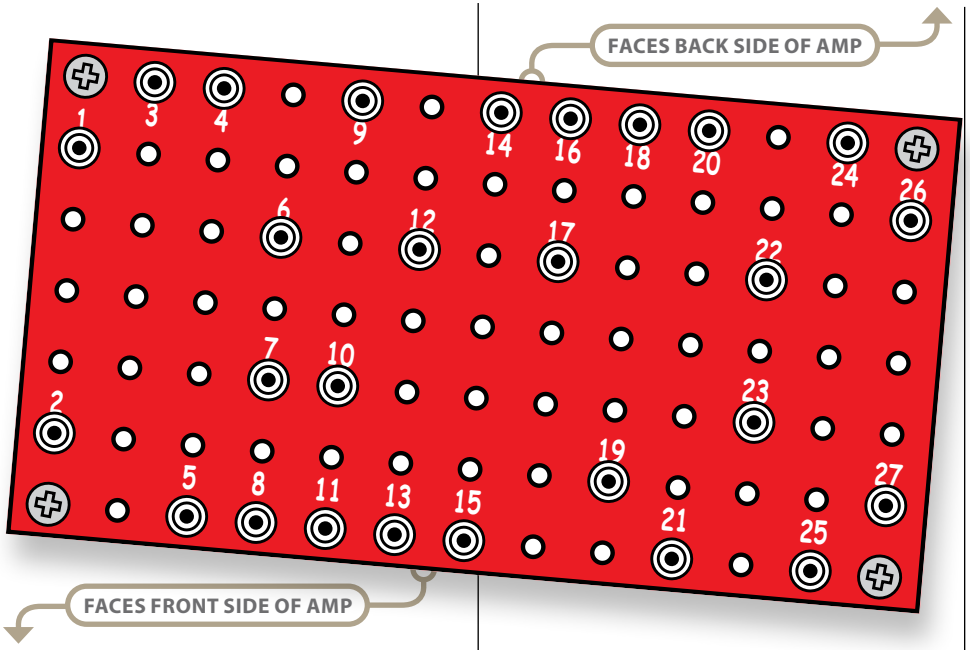


Next, solder the output transformer primary wires to the appropriate locations. First, measure the distance to the "Y" terminal on the filter capacitor from the red wire on the output transformer. Add in a little slack to the wire, trim and strip its end and then solder it to lug "Y" on the can capacitor. This will complete the connections to the can capacitor.

☐ STEP 110

Next, measure the distance between the blue wire from the transformer secondary to pin 3 of V3 socket and the brown wire to pin 3 of V4 and solder both into place. Use a piece of masking tape to hold these wires against the enclosure. This will prevent the wires from interfering with the turret board which mounts over the output transformer.





NOTE: You're ready to start installing leads and components onto the turret board. In these steps, you'll insert the leads into the turrets without soldering, and the solder will be added later. This allows you to check your work and make corrections without having to undo solder joints. Ideally, you solder each joint only once.

Populating the turret board

First let's get a good sense of the board itself. In all four corners of the turret board, you'll find holes larger than the holes for turrets. These holes will be where screws mount the turret board to the chassis.

Note that the board has 27 turrets as well as empty holes. We'll give each turret a number to make it easier to locate where to install jumper wires, resistors, and capacitors. It's a good idea to label your board's turrets to match with white pencil. Each column of turrets will be numbered top to bottom and continue to the next column. For your build, be sure to orient the board so that you see turrets in the top holes of column 2 and 3.

Install the jumper wires

We'll start by installing the jumper wires, working left to right. Expose 1/4" of the wire core and carefully wrap the core around the bottom ring of the turret and position it so it sits perpendicular to the turret board. Hit this connection point with a small amount of solder, just enough to hold it in position while you continue working. These jumper joints will be fully soldered in when the rest of the components are installed.

Soldering wires to turrets

☐ STEP 111

Trim appropriate colored wires to the following lengths and solder them to the designated turrets or destinations detailed below.

- 3" yellow wire to turret #1
- 3" black wire to turret #2
- 2" yellow wire to turret #3
- 4" blue wire to turret #4
- 3" blue wire to turret #5
- Run a 3.25" orange jumper between turrets #6 and #22
- 4" orange wire to turret #7
- 3" orange wire to turret #8
- 2" blue wire to turret #9
- 3" blue wire to turret #11
- 5.5" blue wire to turret #12
- 5" black wire to turret #13
- 4" orange wire to turret #14
- 4" orange wire to turret #15
- 2.5" yellow wire to turret #16
- 3.5" orange wire to turret #18
- 3" green wire to turret #19
- 3.5" blue wire to turret #20
- Run a 1.5" black jumper between turrets #23 and #27
- 4" blue wire to turret #24
- 3.5" yellow wire to turret #26
- 2" green wire to turret #27

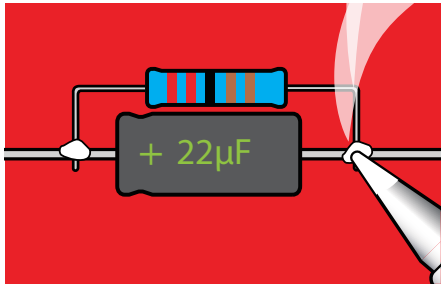
Prepare the resistor/capacitor combinations

These are the cathode biasing and bypass capacitors for the first two gain stages of the preamp section.

Note that there are two different values here, a 1.8K, and 2.2K. Working from the left we will start with the 1.8K resistor/22uF capacitor.

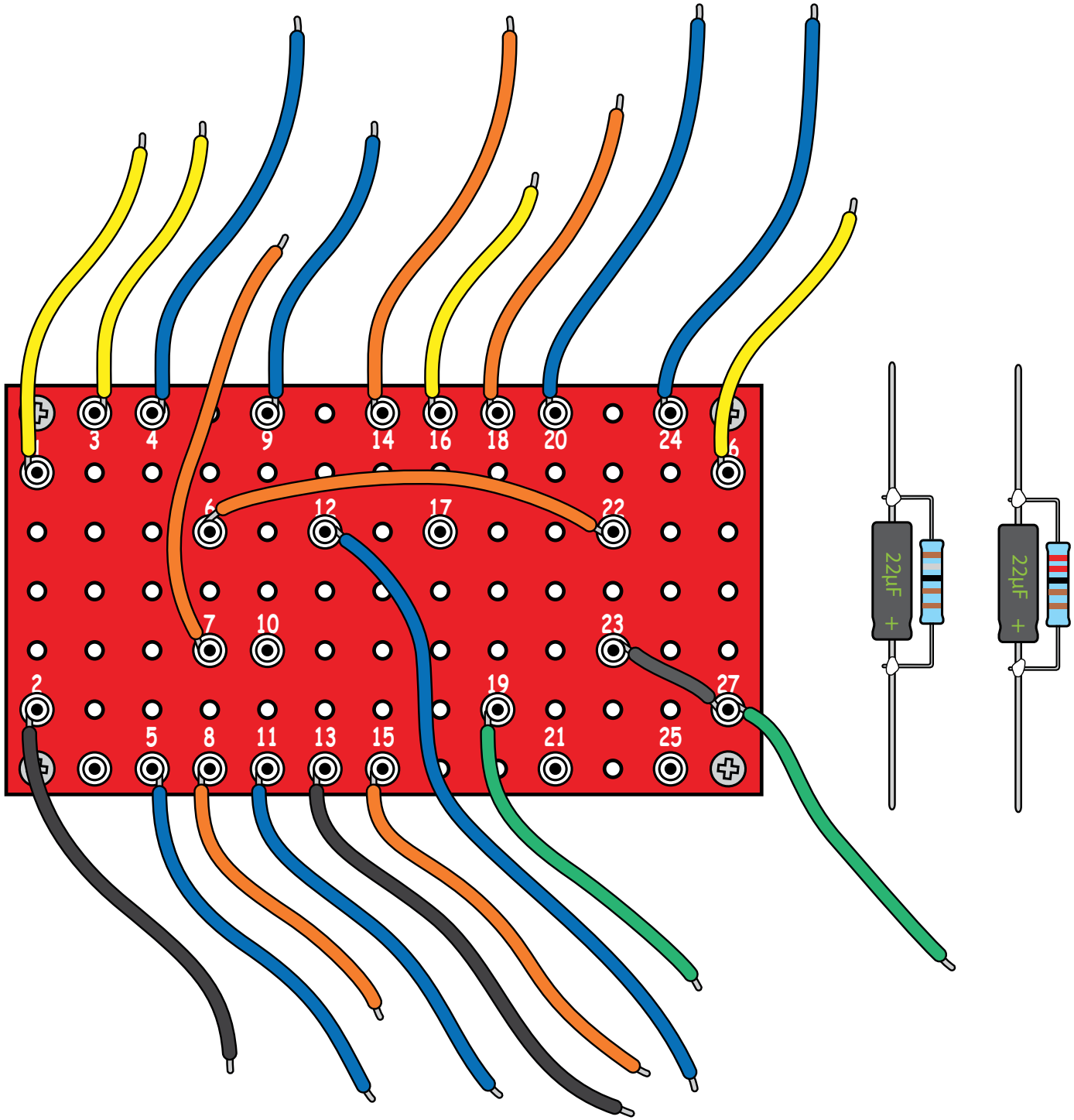
☐ STEP 112

Using a pair of needle nosed pliers, carefully bend the leads of the two resistors at a 90 degree angle, roughly 1/4" away from each end the resistor body.



Next, center the 1.8K resistor 1/8" away from one of the 22uF capacitors and wrap the resistor leads around the capacitor leads where they intersect. Solder the leads in place. The result should be the resistor "piggybacking" the capacitor.

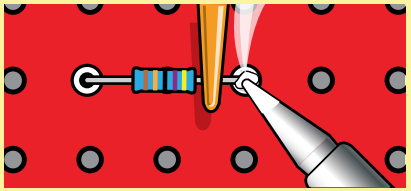
Repeat this process with the other 2.2K resistor and 22uF capacitor. Cut off the excess leads and set the capacitor/ resistor combinations aside.



Adding resistors and capacitors

You will now place all of your components on the turret board. Wait to do any soldering until all the components are in place. Take your time and check your diagram frequently.

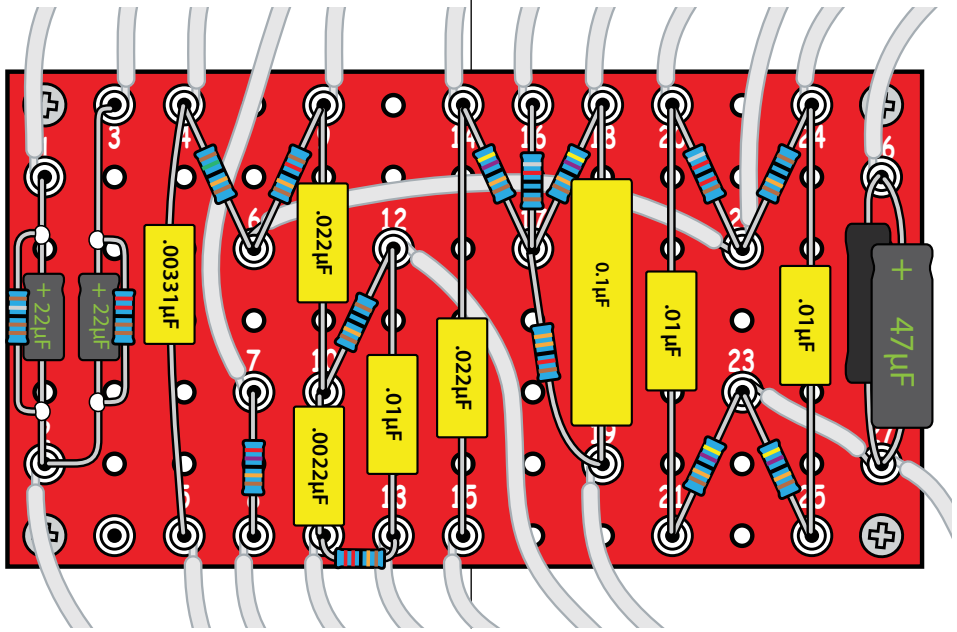
TIP! Use heat sinks with delicate components. Attach a heat sink or two between turrets and capacitors to absorb some of the potentially damaging heat when soldering.



Measuring and soldering leads. When installing the resistors and capacitors, span the connections you will be making and trim the leads an extra 1/4" longer on each end than they need to be. Precisely measure the distance and bend the leads to fit. Insert the bent ends into the holes on top of the turrets as shown.

☐ STEP 113

- Install the 22uF capacitor/1.8K resistor combo between turrets #1 and #2. Install so the positive lead coming off of the capacitor is pointing towards the rear of the chassis.
- Once again making sure the positive lead is properly oriented towards the rear of the chassis, install one end of the 22uF capacitor/2.2K resistor combo to turret #3. On the opposite end, bend a right angle in the lead and install it to turret #2.
- Install a 150K resistor between turrets #4 and #6.
- Install the .0033uF capacitor between turrets #4 and #5.
- Install the 120K resistor between turrets #6 and #9.
- Install the 270K resistor between turrets #7 and #8.
- Install a .022uF capacitor between turrets #9 and #10.
- Install a .0022uF capacitor between turrets #10 and #11.
- Install one 100K resistor between turrets #10 and #12.
- Install the 220K resistor between turrets #11 and #13.
- Install one .01uF capacitor between turrets #12 and #13.
- Install the remaining .022uF capacitor between turrets #14 and #15.
- Install a 470K resistor between turrets #14 and #17.
- Install a 820-ohm resistor between turrets #16 and #17.
- Install another 470K resistor between turrets #18 to #17.
- Install the 33K resistor between turrets #17 and #19.
- Install the 0.1uF capacitor between turrets #18 and #19.
- Install another .01uF capacitor between turrets #20 and #21.
- Install the 82K resistor between turrets #20 and #22.
- Install another 470K resistor between turrets #21 and #23.



- Install the remaining 100K resistor between turrets #24 and #22.
- Install the remaining 470K resistor between turrets #23 and #25.
- Install the remaining .01uF capacitor between turrets #24 and #25.
- Install the 250-ohm 5 watt resistor between turrets #26 and #27.
- Insert the leads of the final 47uF capacitor into the holes on top of turrets #26 and #27. Install so the positive lead is oriented toward the rear of the chassis.

Carefully check all components

☐ STEP 114

Your turret board is now loaded and you are almost ready to solder. Before soldering the components, it's critical to take some time to compare your work to the diagram to verify that all of your jumpers, resistors, and capacitors are in their correct locations. Step away for a few minutes and do it again, just to make sure. If everything looks correct, you are good to go with soldering!

Solder turret board components

☐ STEP 115

Turrets take a bit of heat before they are hot enough to flow solder. Once the solder begins to flow, make sure it flows completely over the solder joints and jumper wires for a nice solid connection of the components.

You want a nice, shiny, and smooth joint that is not dull in color or lumpy in appearance.

Use heat sinks on the capacitors!

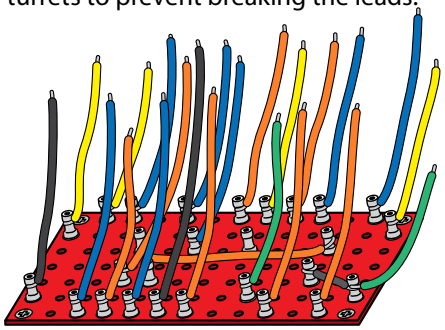
The yellow coupling capacitors in particular are highly susceptible to too much heat.

When soldering the capacitors to the turret board, also make sure not to let the tip of the iron contact the capacitor body. This can easily destroy the capacitor, alter its value, or shorten the life of the part. Turrets that have more than one component on them should be soldered after all the components are in place. Take your time and check your diagram frequently.

Install the turret board

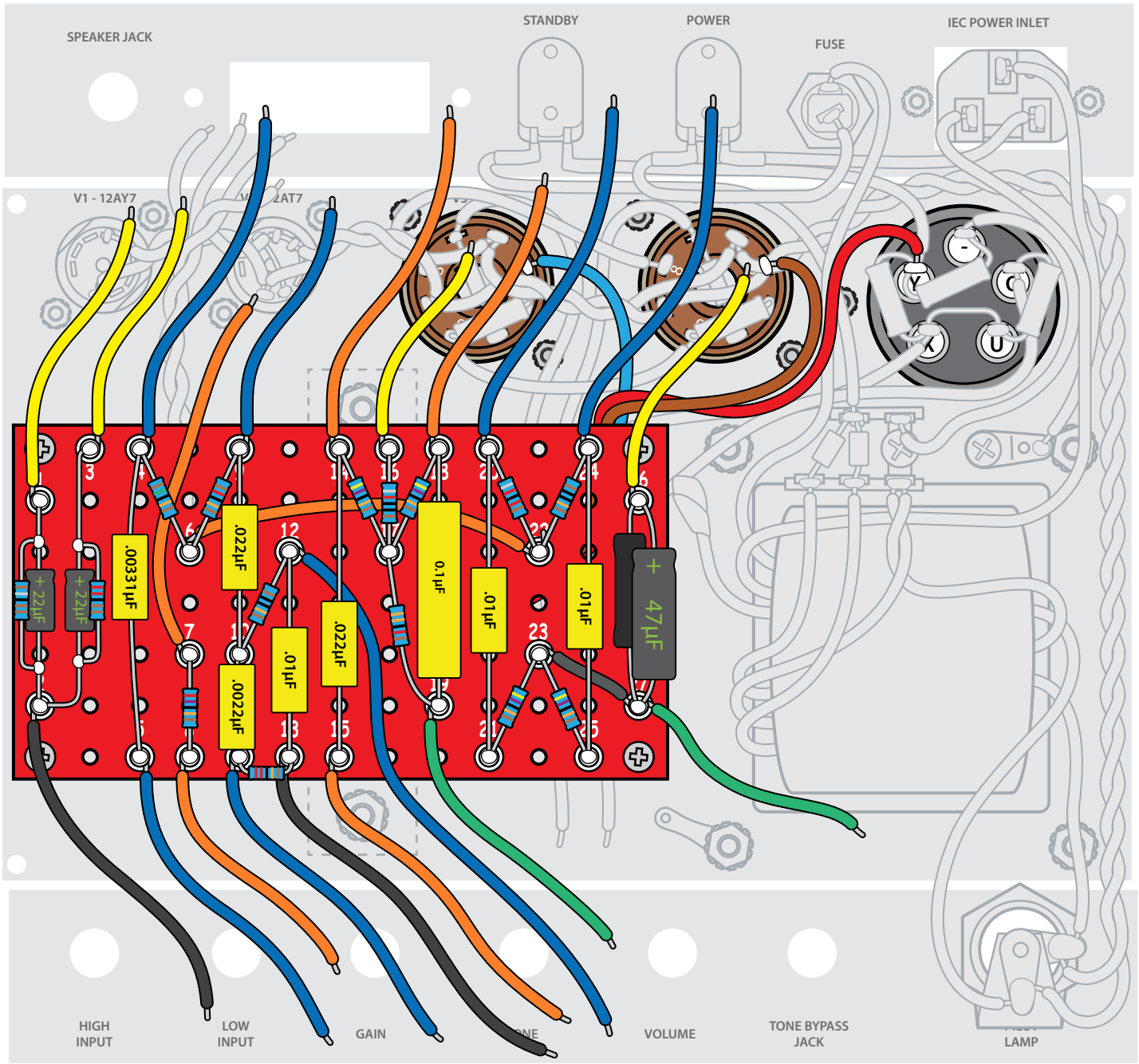
☐ STEP 116

Carefully bend all of the leads coming off of the turret board so they are pointing upwards. Use care not to twist or bend the wire too sharply at the turrets to prevent breaking the leads.



☐ STEP 117

With turret #1 facing V1, attach the turret board to the chassis using the provided 6-32 x 3/8" screws and washers. Secure the turret board to the chassis using a #2 Philips screwdriver.

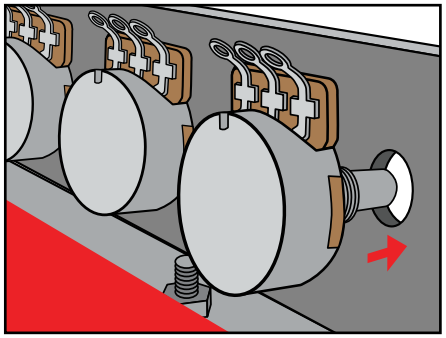


Install the input jacks

☐ STEP 118

Install the high and low input jacks. Position the long “tip” arms so they point to the left bottom corner of the chassis when looking into it, with the front panel facing your belly. Make sure the front control panel is square to the chassis and tighten the jacks securely with a 1/2” nut driver.

Install the pots



☐ STEP 119

Install a 1M pot into the hole marked Gain.

☐ STEP 120

Install a 250K pot into the hole marked Tone.

☐ STEP 121

Install the remaining 1M pot into the hole marked Volume.

☐ STEP 122

Position the pots so the lugs are facing up, and tighten in place using a 1/2” nutdriver.

Wiring up the input jacks

☐ STEP 123

Attach the black lead coming off of turret #2 to the right-hand lug of the low input jack. Do not solder this in place yet as more wires will be attached to this lug.

☐ STEP 124

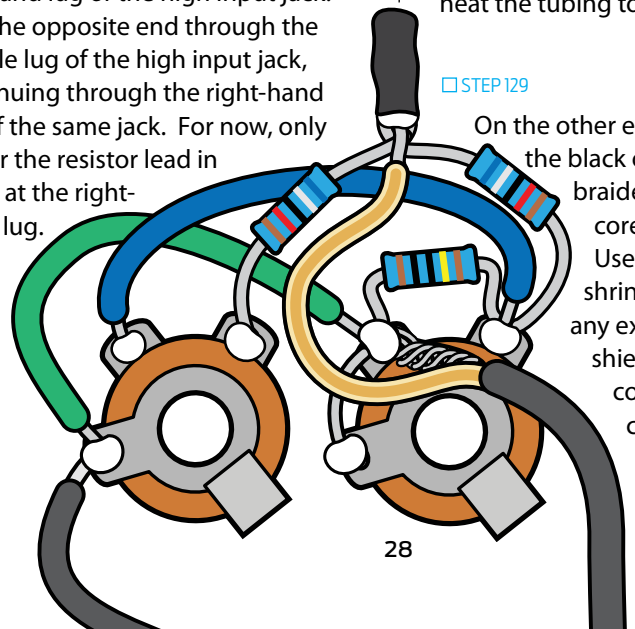
Cut a 1-3/4” piece of green wire and run it from the right-hand lug of the low input jack and solder in place. Run the opposite end of the wire to the middle lug of the high input jack. Do not solder in place just yet.

☐ STEP 125

Cut a 1-5/8” piece of blue wire and solder it to the middle lug of the low input. Run the opposite end of the wire to the left hand lug of the high input jack, still leaving the lug solder free.

☐ STEP 126

Run one end of a 1M resistor into the left-hand lug of the high input jack. Run the opposite end through the middle lug of the high input jack, continuing through the right-hand lug of the same jack. For now, only solder the resistor lead in place at the right-hand lug.



☐ STEP 127

Twist one end of two 68K resistors together. Insert one free end into the left-hand lug of the high input jack and solder in place. Thread the other free end of the resistor pair into the left-hand lug of the low input jack, and solder it in place.

☐ STEP 128

We are using shielded circuit wire running from the input jacks to V1 to help cut down on unwanted RF noise. The braided shield on this lead only needs to be grounded on the jack end. Cut a 6-1/2” piece of shielded circuit wire. Strip 3/4” of the black outer insulation from one end and carefully separate the braided shield from the insulated center core. Twist the separated shield and solder it in place at the middle lug of the high input jack. Next, strip 1/8” off of the end of the center core insulation and solder it to the twisted 68K resistor leads. Once the solder has cooled, slip a 1/4” piece of heat shrink tubing over the joint and heat the tubing to shrink to size.

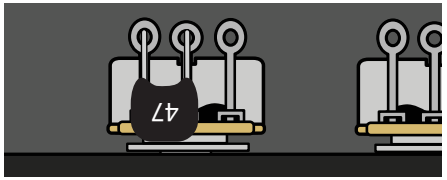
☐ STEP 129

On the other end, strip 3/4” of the black outer insulation, braided shield, and center core insulation away. Use a 1/8” piece of heat shrink tubing to insulate any exposed braided shield from coming in contact with other components and solder in place at pin 2 of V1.

Wiring the gain pot

☐ STEP 130

Install a 47pF capacitor between the left-hand and middle lug of the gain pot. Do not solder them in place yet.



☐ STEP 131

Attach the blue wire from turret #5 to the left-hand lug of the gain pot and solder it in place.

☐ STEP 132

Attach the orange wire from turret #8 to the middle lug of the gain pot and solder it in place.

☐ STEP 133

Run a ground jumper from the right-hand lug to the back of the housing of the gain pot.

Wiring the tone and volume pots

☐ STEP 134

Attach the blue wire running from turret #11 to the left-hand lug of the tone pot and solder it in place.

☐ STEP 135

Attach the blue wire running from lug #12 to the right-hand lug of the tone pot and solder it in place.

☐ STEP 136

Solder the green wire running from lug #19 to the back of the housing of the tone pot.

☐ STEP 137

Cut a 1-1/2″ piece of blue wire and expose 1/8″ of the core on both ends. Run the wire between the middle lug of the tone pot and the left-hand lug of the volume pot and solder it in place.

☐ STEP 138

Attach the orange wire running from turret #15 to the middle lug of the volume pot and solder it in place.

☐ STEP 139

Run a ground jumper from the right-hand lug to the back of the housing of the volume pot and solder it in place.

☐ STEP 140

Attach the green wire running from lug #27 to the nearby chassis ground lug and solder it in place.

Install the boost footswitch

☐ STEP 141

Orient boost footswitch jack with the lugs facing up and the long “tip” arm pointing towards the bottom of the chassis. Tighten with a 1/2″ nutdriver.

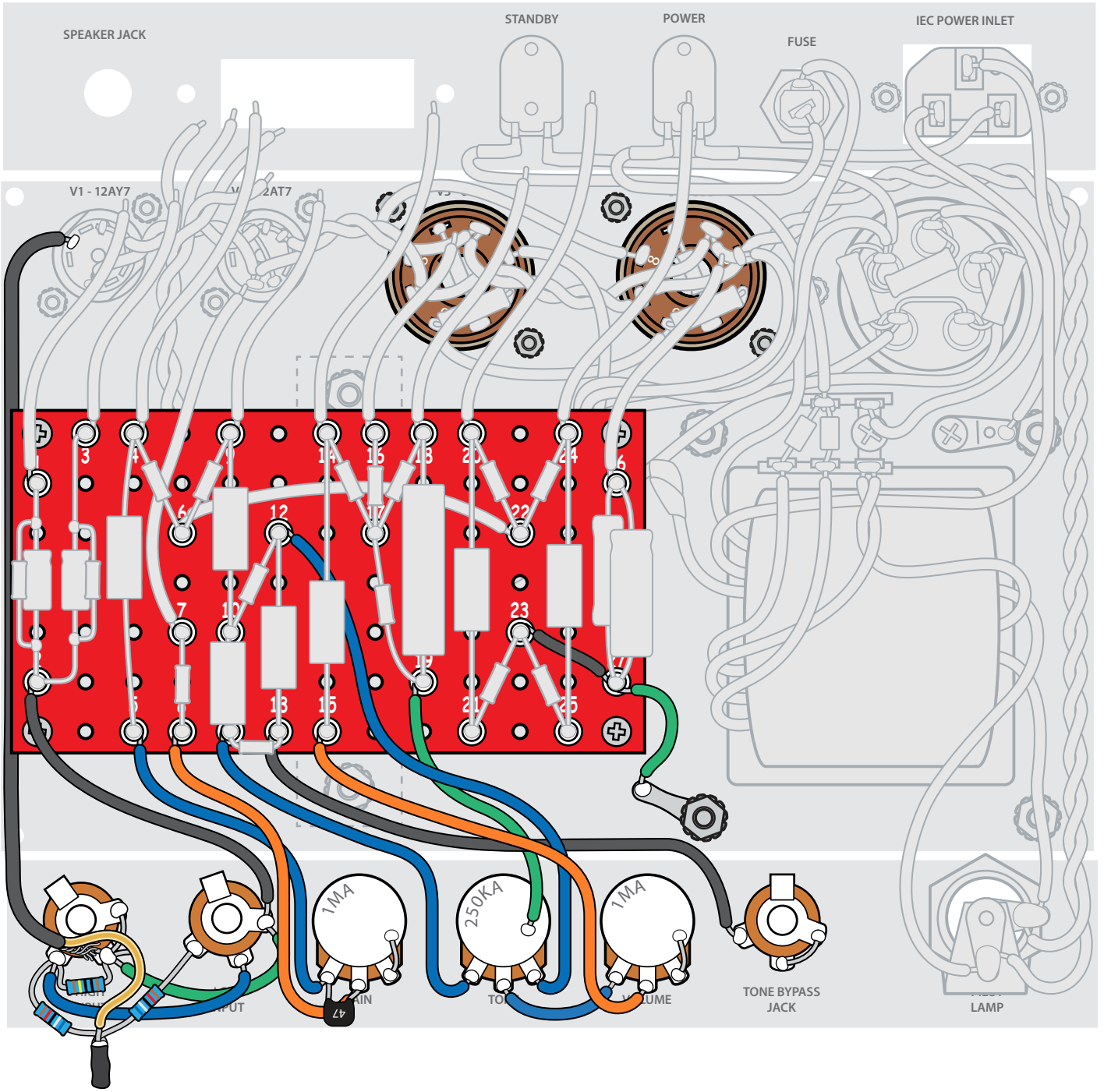
Wiring up the boost footswitch jack

☐ STEP 142

Run a jumper between the middle and right-hand lugs and solder it in place.

☐ STEP 143

Attach the black wire running from turret #13 to the left-hand lug of the jack for the boost footswitch and solder it in place.



Wiring up the tube sockets: V1

☐ STEP 144

Attach the yellow wire coming off of turret #1 to pin 3 on V1 and solder into place.

☐ STEP 145

Attach the blue wire coming off of turret #4 to pin 1 on V1 and solder into place.

☐ STEP 146

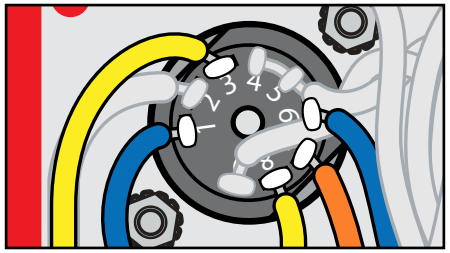
Solder the blue wire from turret #9 to pin 6 on V1.

☐ STEP 147

Solder the orange wire from turret #7 to pin 7 on V1.

☐ STEP 148

Attach the yellow wire coming off of turret #3 to pin 8 on V1 and solder into place.



V2

☐ STEP 149

Attach the orange wire coming off of turret #14 to pin 2 on V2 and solder into place.

☐ STEP 150

Attach the blue wire running off of turret #20 to pin 1 on V2 and solder into place.

☐ STEP 151

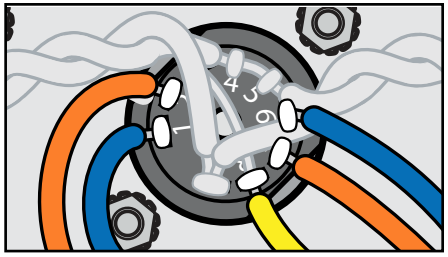
Attach the blue wire running from turret #24 to pin 6 on V2 and solder into place.

☐ STEP 152

Take the orange wire coming off of turret #18 and attach it to pin 7 on V2 and solder into place.

☐ STEP 153

Attach the yellow wire running off of turret #16 to pin 8 on V2 and solder into place.



V3

☐ STEP 154

Take the orange wire running under the board from pin #1 on V3 and solder it to turret #21.

V4

☐ STEP 155

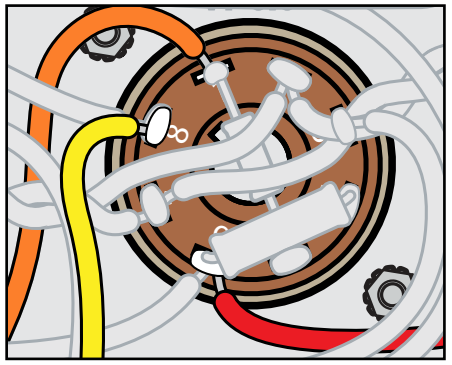
Take the orange wire running under the board from pin 1 on V4 and solder it to turret #25.

☐ STEP 156

Take the red wire coming off the can capacitor and attach it to pin 6 on V4.

☐ STEP 157

Attach the yellow wire coming off of turret #26 and attach it to pin 8 on V4.



Finish wiring the filter capacitor

☐ STEP 158

Attach the white wire coming from the filter capacitor and solder it to turret #22.

Install the speaker jack

☐ STEP 159

Install the jack and orient it so the long “tip” arm is facing the cutout for the impedance. Tighten down with a 1/2” nutdriver.

Installing the impedance switch

☐ STEP 160

The impedance switch is packaged with two oval head mounting screws. Discard those and mount the switch to the chassis using two of the provided 4-40 x 1/4” round head screws. It does not matter which side of the switch is up.

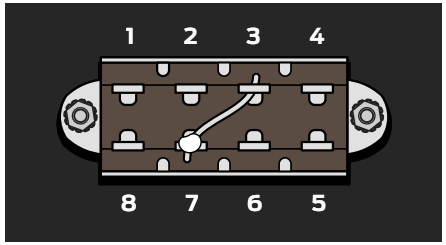
Wiring up the impedance switch and speaker jack

☐ STEP 161

Trim to length, strip off 3/4” of insulation, tin, and solder the black output transformer lead so that it spans the middle and right-hand lugs of the speaker jack.

☐ STEP 162

With the impedance switch installed, and looking directly at the lugs on the inside of the chassis, number the lugs 1-8 starting with the top-left lug and moving clockwise (diagram on right).



☐ STEP 163

Run a jumper from the top of lug 7 to the bottom of lug 3. A discarded resistor or lead works well for this. Only solder it in place at lug 7, you will be fitting a larger wire through the top of lug 3. This is easier done if it is free of solder.

☐ STEP 164

Trim, strip off 1/8" of the insulation, tin the end, and solder the orange wire coming off the output transformer to lug 4.

☐ STEP 165

Cut a 2-1/2" piece of blue wire and expose 1/8" of bare wire on both ends. Solder one end to lug 3. Solder the opposite end to the left-hand lug of the speaker jack.

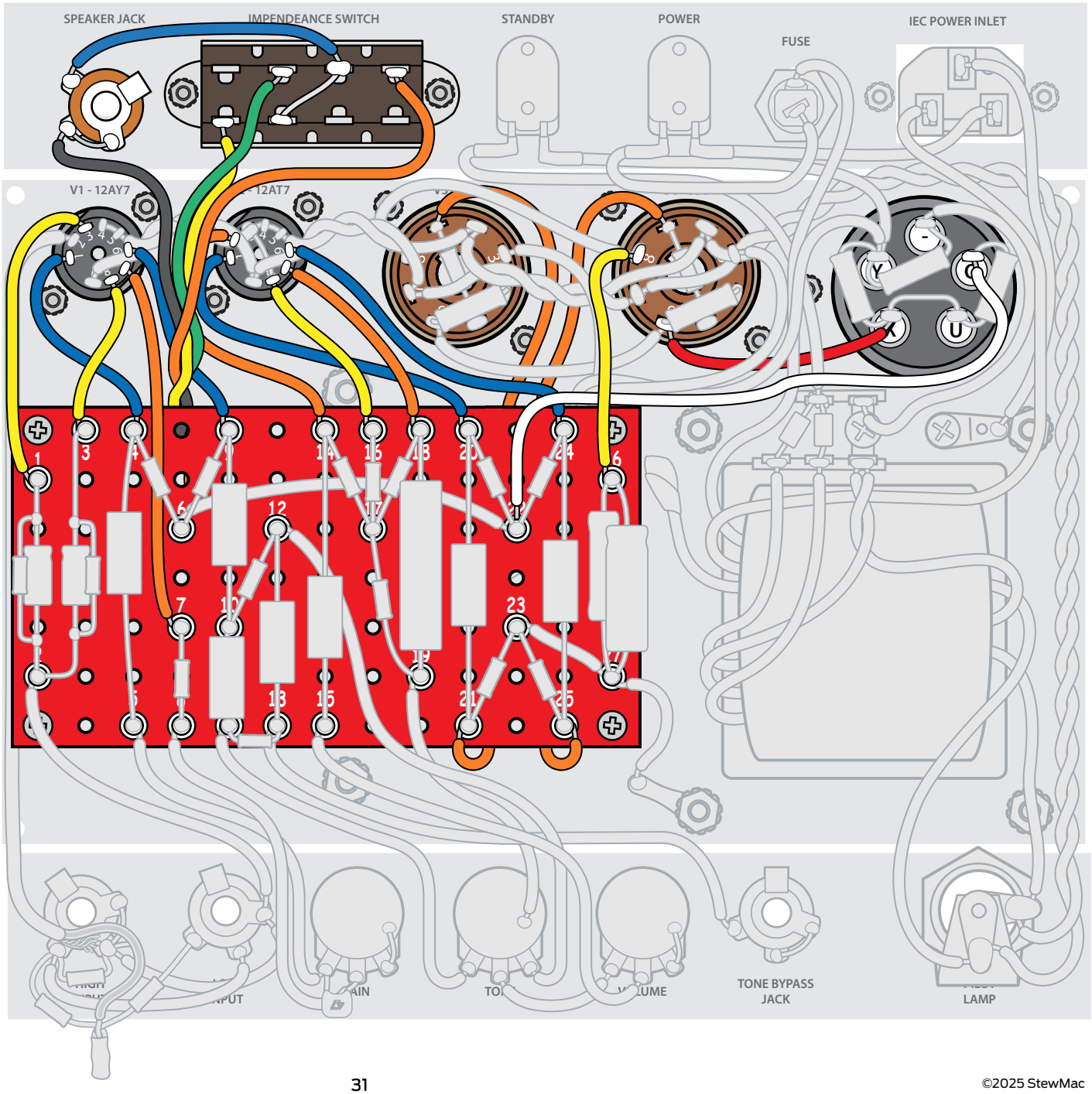
☐ STEP 166

Trim, strip off 1/8" of the insulation, tin the end, and solder the yellow wire from the output transformer to lug 8.

☐ STEP 167

Trim, strip off 1/8" of the insulation, tin the end, and solder the green wire from the output transformer to lug 2.

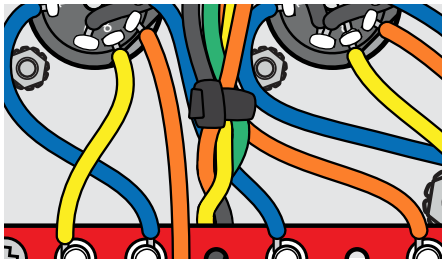
This concludes the soldering portion of the build, NICE WORK!!



Harness lead dress

☐ STEP 168

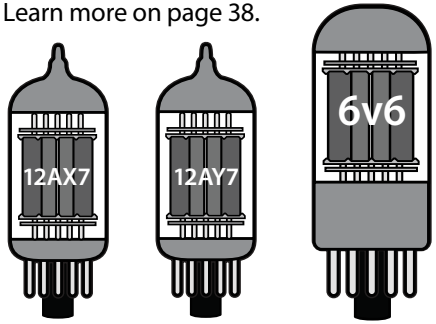
Dress the output transformer secondary wires by using the small tie wraps. This not only presents a cleaner appearance but helps in the overall noise level by keeping the output wiring away from the sensitive wiring connected to V1.



Install the tubes

This kit ships with both 12AX7 and 12AY7 tubes to allow you to experiment with the different gain properties of each type in the V1 position. The 12AX7 will produce the maximum gain, the 12AY7 will produce around half the amount, running considerably cleaner.

Learn more on page 38.



NOTE: These tubes get HOT! When you swapping tubes, make sure the tubes are cool, the amp is turned off, and unplugged from the wall.

TUBE-SWAPPING FOR TONE

While some preamp tubes add more crunch to your sound, others will sound smoother. This has to do with their gain factor. A 12AU7 tube has a factor of 20, meaning it amplifies the signal passing through it by twenty times. By contrast, a 12AX7 tube's gain factor is 100—five times stronger for creating overdrive.

PREAMP TUBE	OVERDRIVE GAIN FACTOR	
12AX7	100	DIRTY
5751	70	
12AT7	60	
12AY7	45	
12AU7	20	CLEAN

Experiment with your preamp tubes. The plate on top of the amp lists five preamp tube options, and we've provided two of them in the kit.

PHASE INVERTER

Two power tubes deliver the audio power to the speaker. These tubes need to work together in a push-pull configuration, sending equal strength signals that are 180° out of phase with one another.

The phase inverter does the job of splitting the instrument signal in two and reversing the phase, inverting one of those two signals before passing them to the power tubes.

This complex sub-circuit, called a "long-tail pair phase inverter," uses both sides of a twin-triode 12AT7 tube.

The circuit sends a part of the split signal through one of the triodes in the 12AT7, where it's amplified just as it would be in any preamp tube. This is sent to one of the power tubes.

The circuit inverts the other part of the signal as it's passed through the other triode. This equal amplitude signal goes to the other power tube.

POWER TUBES

The VF18 uses a pair of pentode power tubes, which are much more complex than twin triode tubes. They're larger and built to handle far more voltage than the preamp tubes. The power tubes are responsible for delivering the 18W audio power to drive the speaker.

☐ STEP 169

Plug the speaker output on the back of the amp into a speaker cabinet, making sure the impedance selector on the amp is set to match the impedance of the speaker. We suggest using a speaker with an RMS rating of at least 50 watts for this step. It is important to use a speaker cable and not a guitar cable. Speaker cables are not shielded and use a heavier gauge wire to carry a more powerful signal from your amp to your speakers.

☐ STEP 170

Install the V1 tube of your choice and the 12AT7 phase inverter into the V2 socket. The larger 6V6 output tubes are installed into the V3 and V4 sockets.

Final voltage check and testing

NOTE: Output voltage measurements are measured at 120 VAC input line level.

☐ STEP 171

With all the tubes installed, carefully measure the DC voltages on the following test points.

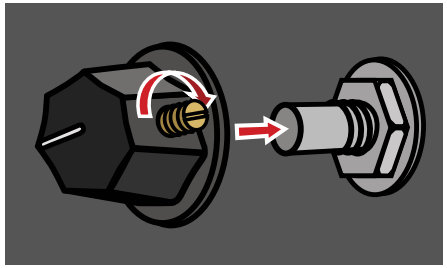
Attach the negative probe of your multimeter to the ground of the power jack and touch the positive probe on the following test points to check voltage numbers:

1. **"Y" on the filter capacitor:**
   DC Voltage: +383.1 VDC
2. **"U" on the filter capacitor:**
   DC Voltage: +357.2 VDC
3. **"O" on the filter capacitor:**
   DC Voltage: +317.7 VDC
4. **150K plate resistor on V1 (tube connection point):**
   DC Voltage: +133 VDC
5. **120K plate resistor on V1 (tube connection point):**
   DC Voltage: +163.8 VDC
6. **1.8K cathode resistor on V1:**
   DC Voltage: 2.20 VDC
7. **2.2K cathode resistor on V1:**
   DC Voltage:: +2.79 VDC
8. **82K plate resistor on V2 (tube connection point):**
   DC Voltage: +214.7 VDC
9. **100K plate resistor on V2 (tube connection point):**
   DC Voltage: +208.3 VDC
10. **820-ohm cathode tail resistor on V2:**
    DC Voltage: +79.2 VDC
11. **250-ohm common cathode resistor for V3 and V4:**
    DC Voltage: +22.97 VDC

Add knobs, feet, shields and chassis bottom cover

☐ STEP 172

Install the knobs as shown using a 3.0mm standard flat-head screwdriver.



☐ STEP 173

Attach the four pressure sensitive rubber feet to the bottom chassis cover.

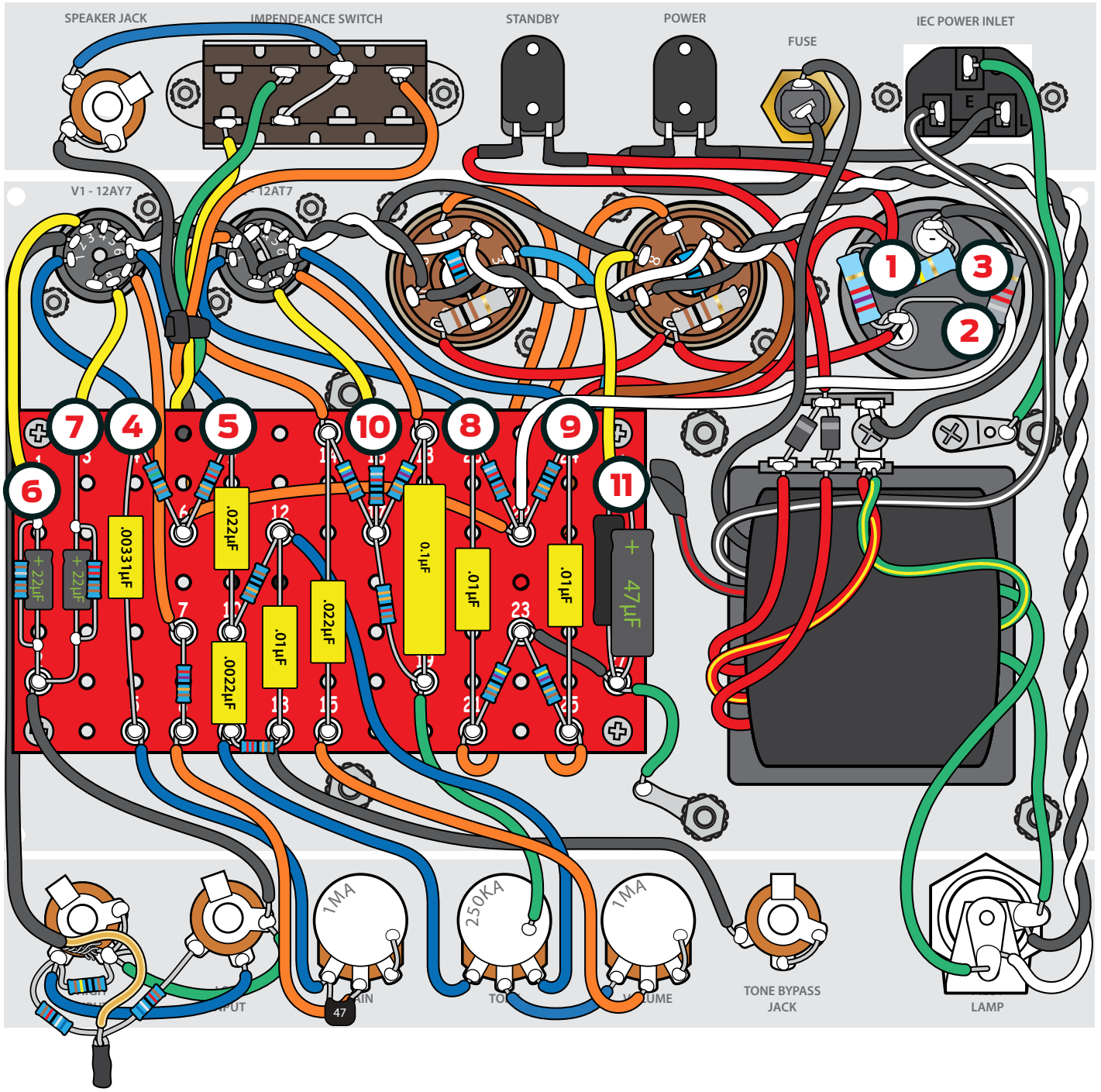
☐ STEP 174

Attach the chassis cover to the chassis using a #2 Phillips screwdriver.

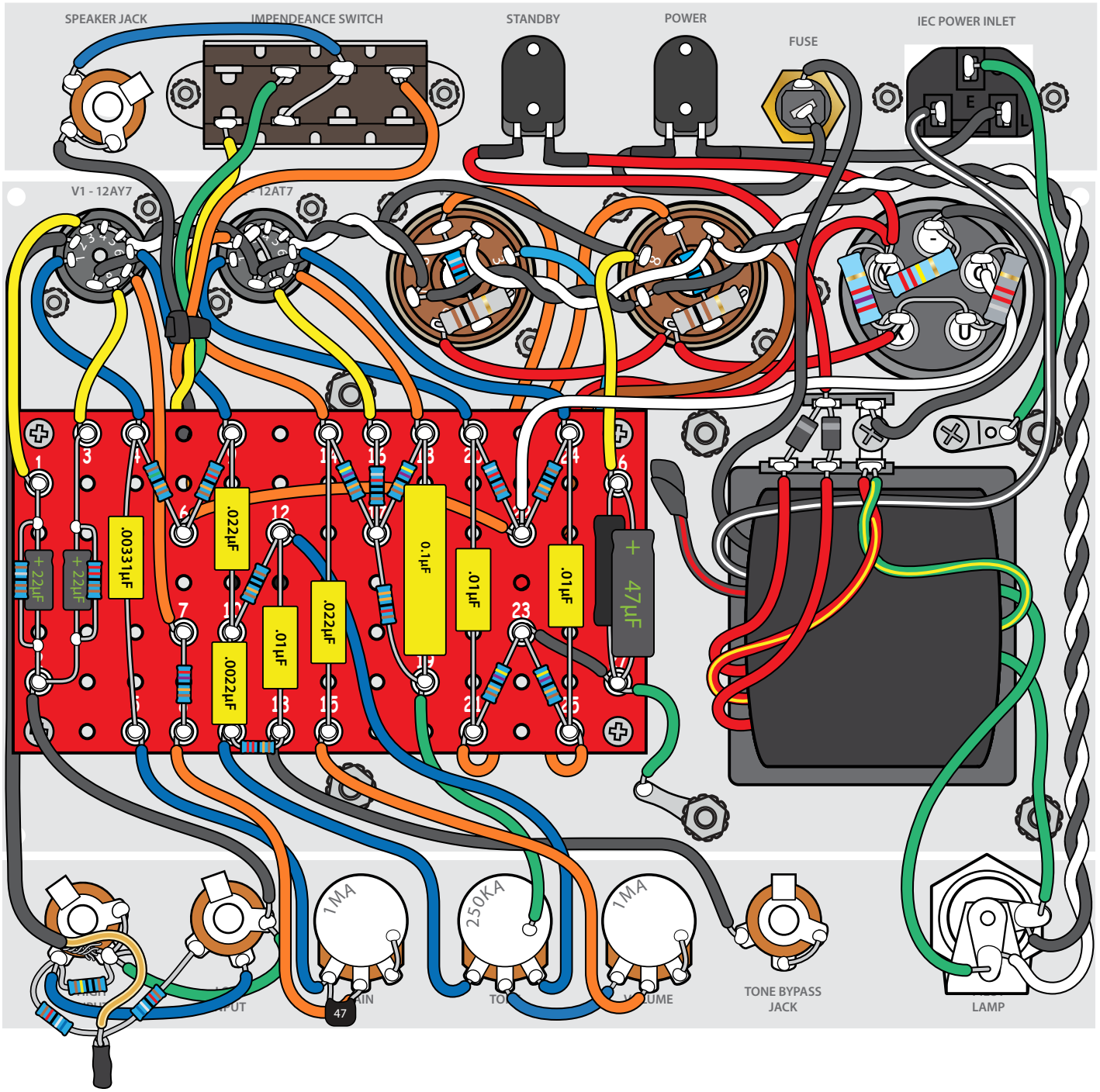
Install the tube shields

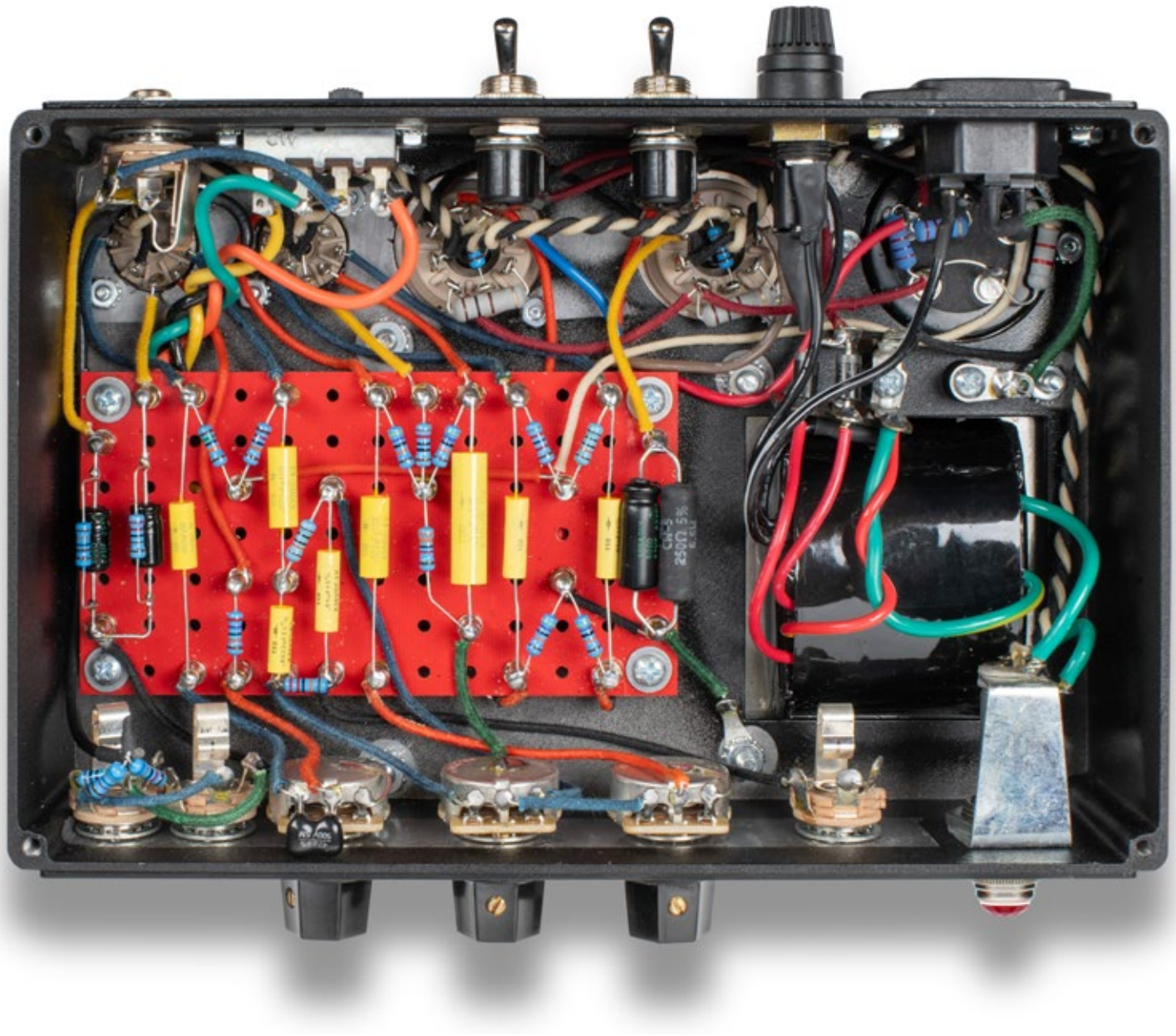
☐ STEP 175

With the chassis closed up and the amp connected to a speaker, turn the amp on. Inspect the tubes closely to make sure that all of them are glowing. Once you confirm that all tubes are glowing, plug in a guitar and turn the amp up and make sure you are getting a signal. Turn off the amp and let the tubes cool before carefully installing the tube shields on the preamp and phase inverter tubes. Simply place the shields over the tubes, then give them a twist to lock them into place.



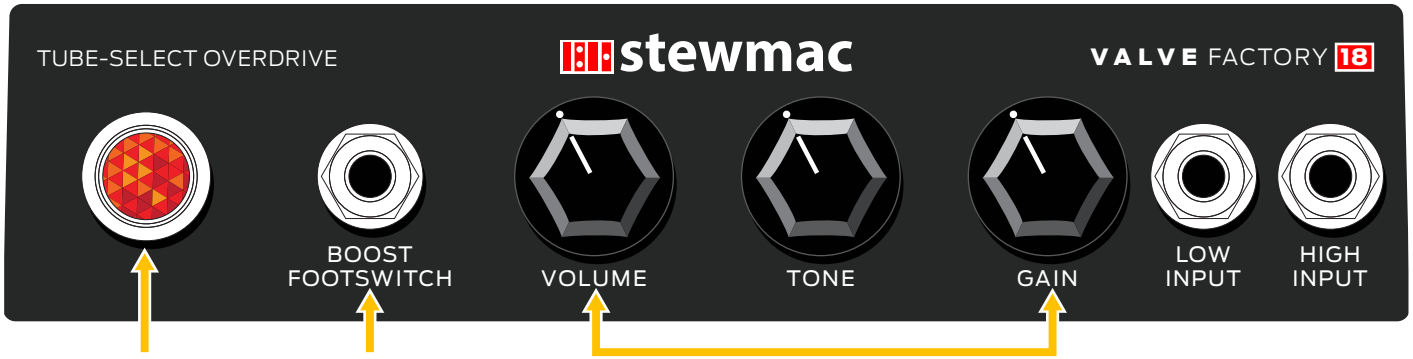
Completed Drawing





Understanding your VF18's features and controls

Knowing your amp's controls and how they work is the way to get the sounds you're after. Use this section to understand each item on the front and back panels of the VF18.



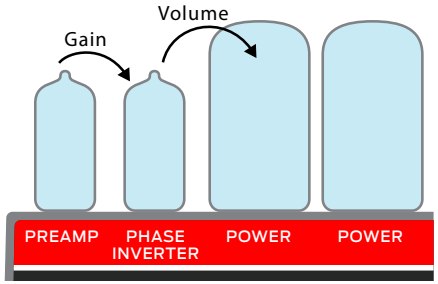
The boost footswitch bypasses the tone control

You might be familiar with the very popular Big Muff tone stack bypass mod. One of the many amazing features of the VF18, the boost footswitch, implements this same idea. You now have the ability to send your signal directly to the volume pot without any influence or loss from the tone circuitry. This happens by cutting the ground connection in the tone circuit, removing it entirely. As you probably have experienced, when you put guitar AC signal through passive components, you're going to lose some volume and tone with certain mixes of highs and lows. But when using the boost footswitch, you hear a volume boost with more mids (more of a full tone, you might say), but less precise control. You can use the boost as a constant "always on" setting, or as a "lead channel" to cut through the mix more during a solo.

Use gain to find your sound and volume to turn it up or down

The gain and volume controls are where the VF18 really shines. While they both contribute to loudness, their roles are very different. Working together, they create your tone.

The gain control sets the level at the amp's input stage. Cranking the gain sends a more powerful signal from the preamp tube to the phase inverter tube. Gain is more about tone than loudness; you'll hear some increase in volume as you dial in more overdrive and distortion.



The volume knob sets the level of signal from the final preamp stage to the power tubes. While keeping the tone you found with the gain knob, volume makes it louder or softer. Play with these two knobs to dial in a gritty tube crunch at lower volumes.

How the tone control works

The tone circuit contains a high-pass filter and a low-pass filter—and the control pot sweeps between them. You can get booming lows, crystalline highs, or any blend in between.

These two filters are each a different combination of a resistor and a capacitor wired in series.

The high-pass filter retains your high frequencies while reducing lows by sending them to ground. The low-pass filter does the opposite, allowing the lows to pass and routing the highs to ground.

The tone control pot splits the signal between these two filters. Turn the knob all the way counter-clockwise ("zero" if the knob had numbers), and you fully engage the low-pass filter and remove much of your highs.

Rotate the knob to the opposite end of its range, and your highs are sent through the amp while lows go to ground.

The tone control's rotation between these two extremes is a smooth blend that fades one up while fading the other down. The midpoint is an equal mix.

Which input to plug into, low or high?

Low input reduces your guitar's signal by 6dB. Plug into the low input jack when you're after a clean sound with minimal distortion.

High input sends your guitar's full signal to the preamp tube grid. This creates an overdriven sound by hitting that tube harder. This input also has greater impedance.

Think of input impedance as a threshold level that keeps your high frequencies from passing to ground instead of going into the preamp.

Lower impedance makes it easier for these high frequencies to escape while higher impedance retains more of the brightness of your sound.

Three speaker impedance options

The impedance switch lets you set the VF18 to match your 4-ohm, 8-ohm, or 16-ohm speaker cabinet. Sliding this switch engages different sets of leads from the output transformer's secondary coils. In all three settings, the output from the VF18 is 18 watts.

Using the wrong setting can result in crackling, lower volume, or possibly damage to the amplifier. Using the correct setting gets the full range of tonality from the VF18.

How to use the standby switch

Contrary to popular belief, the standby switch isn't for keeping your amp warm but quiet between sets. Instead, it determines when high DC voltage is allowed to travel to the filter caps and tube plates. It's hard on the tubes to receive this voltage before the cathodes have time to be warmed by the heater wires.

Use this sequence to turn on your VF18:

1. **Power switch: On**

The tube plates and filter caps receive power to prepare for operation, but don't receive high DC voltage.

2. **Wait for one minute**

To allow the tubes to warm up.

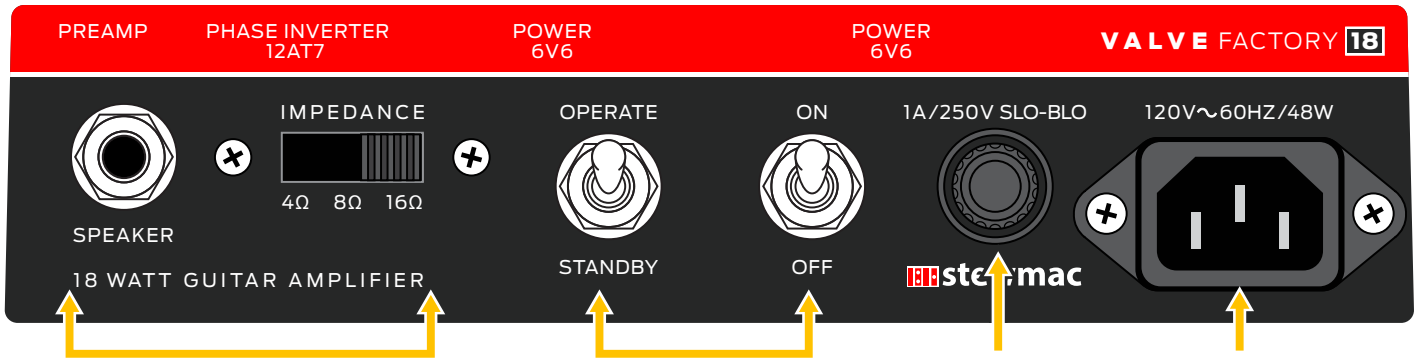
3. **Standby switch: Operate**

High DC voltage is applied to the tubes and the amp is ready to play.

To shut down your VF18:

1. **Standby switch: Standby**
2. **Power switch: Off**

Make this a habit and your amp will already be switched to standby mode the next time you flip the power on.



The fuse is critically important

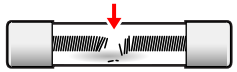
Every component has a specific voltage and wattage rating. If one tries to pull more voltage than it's rated for, there's a malfunction somewhere in the amp. When this occurs, the fuse disconnects the AC wall voltage to protect the amp.

If the current draw exceeds the rating of the fuse, the element in the fuse will heat up. If the higher current continues for a specified length of time, the element will melt, breaking the connection to the rest of the circuit.

Recognizing a blown fuse

A sure sign of a blown fuse is a break in the internal fuse element. If there's a gap in the wire, the fuse is blown and needs to be replaced. This isn't always easy to see, and there may or may not be a scorch mark inside the glass.

A melted fuse safely shuts off the power.



If you are having trouble discerning if your fuse is blown or not by looking at it, you can test continuity using your digital multimeter to know for certain.

If you are not able to find continuity by connecting your meter probes to both sides of the fuse, there is a break in the internal element and the fuse needs to be replaced.

A blown fuse can be serious

DANGER A component malfunction could cause the entire amp to heat up and eventually catch fire!

Troubleshooting a blown fuse

When trying to find the cause of a blown fuse, look for a short circuit where a connection is frayed or routed too close to another. Also look for weak solder joints, or strange smells or smoke that would indicate a component malfunction. If your amp still blows fuses, it's time to take it to a qualified amp repair shop.

Use only 1A 250V slow-blow fuses

It is critical to replace a fuse with one of identical voltage and current! Two fuses may look the same but have completely different ratings.

The VF18 uses a 1A 250V slow-blow fuse. Slow-blow fuses allow current above the rated value of the fuse to flow for a short period of time without blowing the fuse.

The power inlet

Standard wall voltage in the United States and some parts of the world is 120 Volts AC at 60 Hertz.

CAUTION! Your Valve Factory 18's tubes get very, very hot. Be sure to exercise caution while using and after using.

ALWAYS unplug your amp when it is not in use.

Tubes: Some insight on what goes on inside

Inside the glass structure that makes up a tube, you'll find several components, one being a filament. This is the part that glows when electric current flows through it. The heat that comes off of the filament causes the cathode inside the tube to release negatively charged electrons. Those negatively charged electrons are attracted to the positively charged anode called the plate. Between the cathode and plate is a grid. The grid carries the AC signal from a guitar's pickup and allows the flow of electrons from the cathode to plate inside the tube, amplifying the signal.

Preamp and power tubes

Preamp tubes start amplifying the signal coming from the guitar up to line level. The more gain you give the first preamp tube, the more preamp distortion you'll get. The second preamp tube is the phaser inverter. This tube splits your signal in two, inverts one of them, and sends them both to their respective power tubes. The power tubes work with the output transformer in a "push-pull" configuration to send the two halves of your signal coming from the phase inverter, now amplified to speaker level, through your speaker.

It's said that much of a tube amp's "feel" comes from the power tube. By cranking this section of the amp, you're adding more of that natural tube distortion – creating more harmonic overtones, more touch-responsiveness, and adding that warmth these amps are famous for.

Customize your tubes and your tone

Now that you have a better understanding of how preamp and power tubes work, let's talk about the sound they can create. In general, at low volumes, you can pretty much get tone out of any tube – but once you start cranking up the volume, you start to hear a difference. The beauty of the VF18 is you can select the perfect tubes to customize your amp, based on the type of music you play, and where you play it. The chart below is a great start to help you select the right tubes. From smooth jazz to hard rock and beyond, experimenting with preamp tubes can help you create a sound you never thought possible, and then claim as your own.

12AX7 [100 GAIN]
Included in kit

7025 [100 GAIN]

5751 [70 GAIN]

The 12AX7, 7025, and 5751 are the most commonly used high gain factor tubes. The 5751 and 7025 are said to be higher-rated for lower noise, but hearing a distinct difference isn't easy. These high gain tubes are all guts and glory. They have the least amount of headroom, which means they'll break up the fastest. If the AC/DC hard rock sound is what you're after, these are your tubes.

12AY7 [60 GAIN]
included in kit

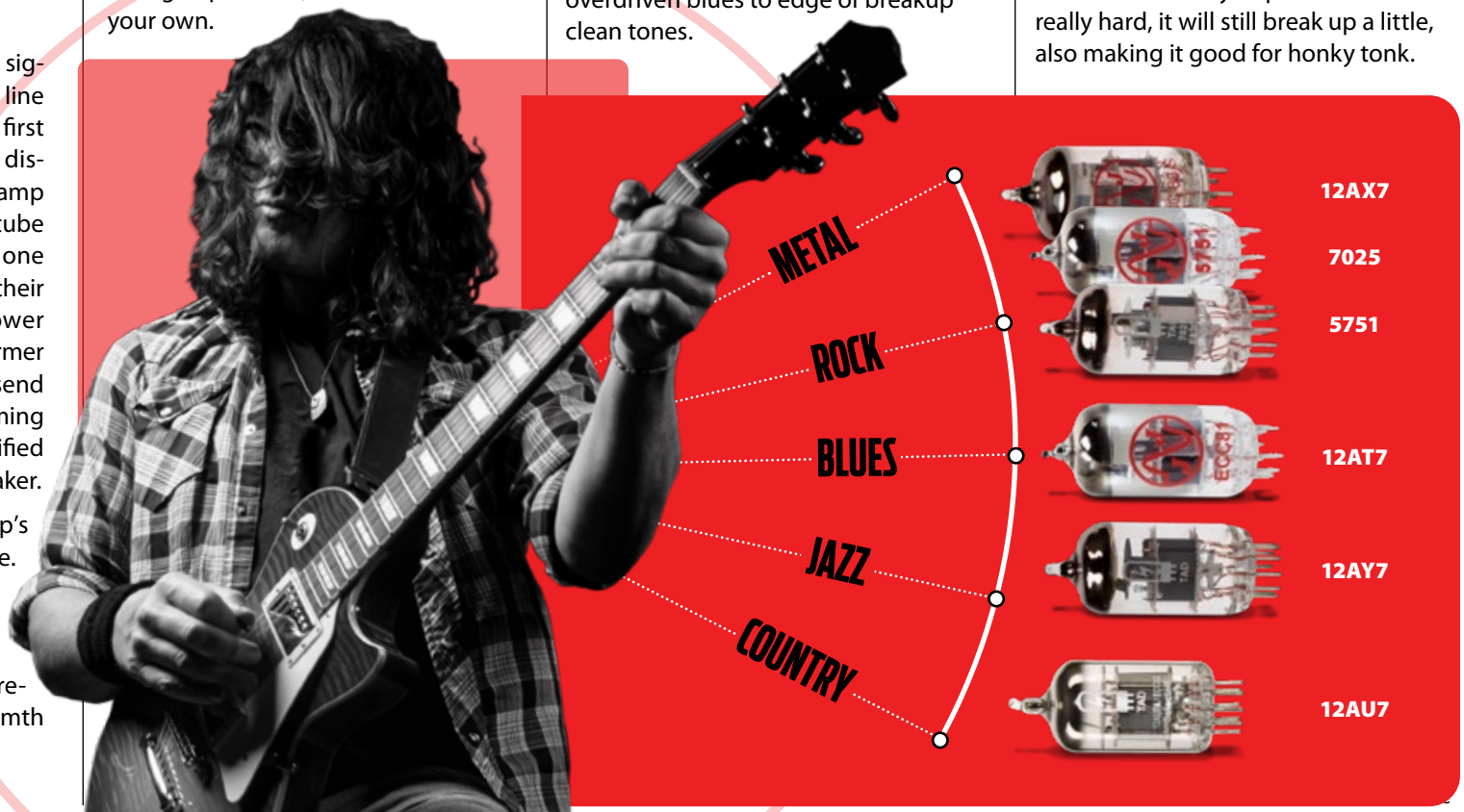
The 12AY7 is much like the 12AT7, but more headroom, so it's perfect for getting more into overdriven blues to edge of breakup clean tones.

12AT7 [60 GAIN]

The 12AT7 is probably the most versatile tube. It can do hard rock/distorted tones, but also has more headroom, so it can get louder without breaking up as much as the 12AX7-type tubes. This tube pulls off all the hard to classic rock, and overdriven blues very nicely.

12AU7 [20 GAIN]

The 12AU7 is our go-to jazz and country tube. This one has the most headroom, so it will get the loudest without breaking up. It's worth noting that the VF18 amp cannot reach gigging volume and stay clean with the other tubes. So, if you're a jazz player playing out, you'll pretty much need this tube. If you push this tube really hard, it will still break up a little, also making it good for honky tonk.



How often should I change my tubes

Tubes start to gradually fail due to the prolonged heat from the filaments that eventually lead to fewer electrons emitted off the cathode, a loss in vacuum seal, or a short between the elements that makes them less able to reflect the original signal.

As tubes start to go, you might notice your attack start to disappear, hissing, dips and jumps in volume, or a general staleness in the tone.

On average, preamp tubes can last up to 10,000 hours, while power tubes may need to be replaced after 1,000 to 2,000 hours of use. Rectifier tubes generally last between 5,000 and 10,000 hours.

These ballpark numbers can significantly vary depending on how your power tubes are biased, and how hard you push your amplifier when it is being used.

Whether you're a guitarist with an ear for an exact tone who plays every other night, or a player who only uses his/her tube amp from time to time, a good rule of thumb is to always have some back-up tubes on hand.

Diagnosing bad tubes

Preamp tubes

Preamp tubes last much longer than power tubes. That said, with time and use, they will eventually start wearing out. Preamp tubes usually cause problems through noise or microphonics. You might hear hissing or popping, like the sound of someone frying an egg. If you hear squeal, hum, or feedback, it's a good sign the tube is microphonic. Noise from microphonic tubes will typically increase with an increase in volume.

Power tubes

Your power tubes will be matched so that they are both drawing the same current and one tube is working equally as hard as the other. When these tubes start to give out, you will hear noise or little to no output. You can also visually identify a bad power tube if it is defective and drawing too much current. This will cause the tube to work too hard and you will see the plate components inside the glass case start to glow red. This is called red plating and is an immediate sign that tube is bad.

Tube Hum

Hum in an amplifier is typically due to poor lead dressing, or an issue with a ground connection. That said, tube hum can also come from a dirty or defective tube.

Tapping preamp tubes with a chopstick will create some sound that you'll hear through your speaker, but if you're hearing substantial noise or ringing, that's a good sign the tube is microphonic and needs to be replaced.

Power tubes should not make any noise when tapped. If you hear a crunching or whistling sound when tapped, you may have found the problem. If you think you have found a problematic tube, but are not sure, we recommend replacing it to confirm.

Staying on top of your tubes and making sure they are working optimally is a good way to increase the lifespan of your amp and keep it sounding great.

Looking to replace your amp tubes? StewMac has an inventory worth investigating.

SCAN ME

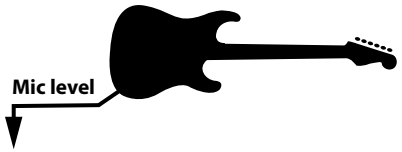
Learning more: secrets revealed in the schematic

You don't need to read a schematic to build this kit. But it's fun to see how the circuit works, and to see the different subcircuits that interact to shape your sound.

Working with the tiny signal from the guitar, the amp creates the power needed to drive the speaker. The signal is affected by the **gain, processing, output** and **power** stages as it passes through the circuit.

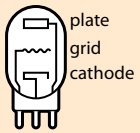
We've color-coded these stages on our schematic, to show how the parts work together. Symbols for components are in the key at the bottom of the frame.

On the **wiring diagram** we build step-by-step in these pages, the parts are easier to recognize. But studying these color-coded stages will help you understand where each component fits into the creation of your sound.



Gain — Line level →

The gain circuit increases the signal to **line level** (about 1 volt), by passing it through a 12AX7 preamp tube where electrons flow from a heated **cathode** to be received by the anode **plate**. The **grid** between these receives the tiny voltage from the guitar, whose varying musical signal controls the flow of electrons to the plate.



Processing — Line level →

The processing stage shapes the **tone**. This amp uses a single tone knob that blends between a high-pass and a low-pass filter to allow you to find your perfect tone.

The signal is then sent to the phase inverter which uses all of V2. The phase inverter then sends the signal to the output section.

Output — Speaker level →

The output stage increases the line level signal to **speaker level**, which is typically 8 volts or greater.

Two 6V6 tubes drive the output transformer. They receive the split signal, 180 degrees out of phase, amplify those signals, and send them to the output transformer to be recombined into one signal.

This transformer adjusts the impedance to 4, 8, or 16 ohms to drive an external speaker. This amp has an adjustable fixed bias, which means you need to check the bias and possibly make adjustments when you change power tubes.

Negative feedback

The negative feedback loop flattens and extends the amp's frequency response, reducing distortion generated in the output stage. This makes the amp's sound cleaner and more hi-fi. Some players disable this loop completely or add a potentiometer in place of the resistor to create a "grit control." We don't recommend this, because it places stress on the output transformer.

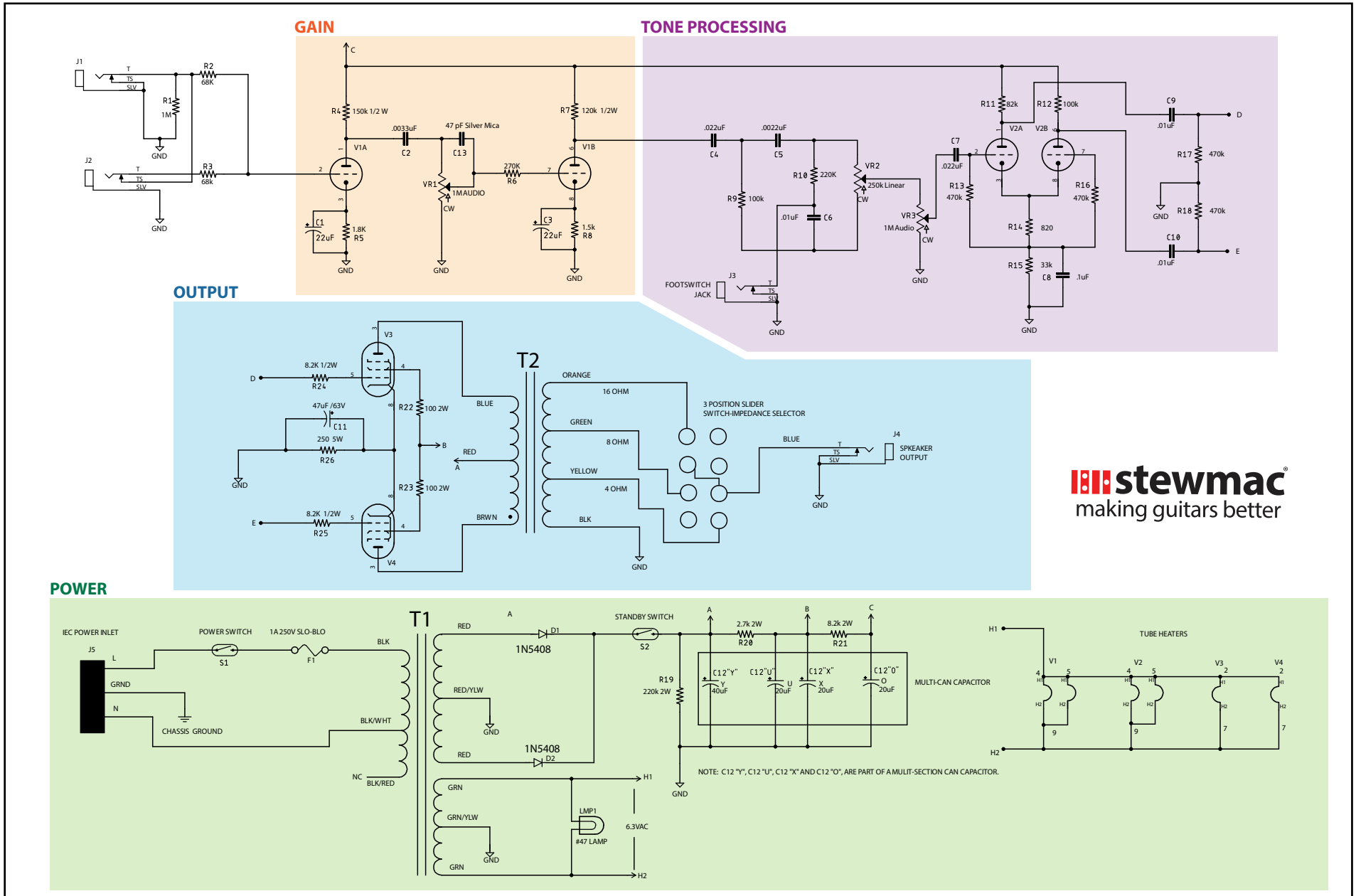
Power

The power supply stage provides power to the other circuit stages, as well as the tube heaters.

This circuit receives the **AC power** from your wall and passes it through the power transformer to create higher voltage. The electricity then goes to the rectifier, which converts it to a pulsing **DC current**.

This then passes through the filter capacitor. The filter capacitor filters out the pulsing to create a smooth current.

As the signal from the guitar becomes more amplified, the ripple of DC current becomes less evident and the fully filtered current is sent to the most sensitive part of the amplifier, the first pre-amp tube in the Gain stage.



WHEN THE STEWMAC TEAM WAS CONCEPTING WHAT TO CALL THIS AMP, we kept thinking that its exposed tubes and components look like a tiny factory. That's when The Valve Factory 18 was born. Ironically, being able to customize your tone with this powerful little amp makes it anything but a standard factory sound. We hope your building process has been challenging, rewarding and inspiring, just like the music we know you'll produce with it. Now that you have the tools and the knowledge to build like a pro, what's your next StewMac kit going to be? Another amp? A few pedals? Maybe even a guitar! If you need any help deciding, don't hesitate to contact us. Rock on!

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Notes

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21 N. Shafer St., Athens, OH 45701
800-848-2273 • stewmac.com

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