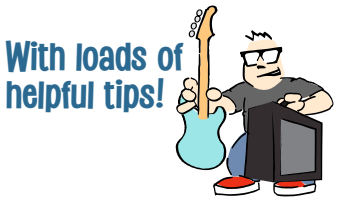
’64 REVERB UNIT KIT

ORIGINAL 6G15 CIRCUIT

ASSEMBLY INSTRUCTIONS



StewMac® ICON KITS

Contents

’64 REVERB UNIT KIT

ORIGINAL 6G15 CIRCUIT

Reverb you can't get from a pedal.

Be excited!

This is the unit that put the waves in surf music! Looks like an amp, sounds like a beach party.

This tube-driven reverb tank relies on good ol’ physics for a perfect effect. Your guitar signal travels along two large suspended springs to produce the reverb that launched the iconic surf sound.

This reverb unit is an ICON

The greats of surf rock used this king of spring to get their submerged, tubluar tones. Controls for dwell, mix, and tone take you from dark, atmospheric decay to bright and snappy splash.

StewMac® ICON KITS

StewMac ICON KITS bring classics that are no longer made, or are simply unaffordable, within reach. And the best part is you get to build them with your own hands.

We give painstaking attention to parts selection, authentic materials, and instantly recognizable details—everything that makes the originals so sought after.

Build it with StewMac

These immersive instructions walk you through every step of creating this tone machine. And you’ll learn a lot, gaining a deep knowledge of your reverb unit’s inner workings.

Follow our steps closely for safety, too: we’ve carefully laid out a path that even newcomers can follow in handling electrical components.

Building an electronics kit can seem daunting, but nobody makes it easier than StewMac. Watch for helpful tips along the way, too—we’re here to help!

Let's get building!

Here's how to build this kit!

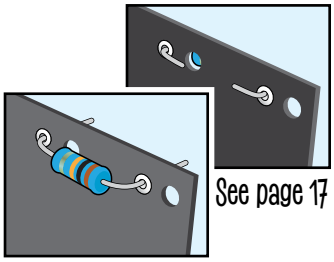
Quick look:

Sort your components by type, using the **parts list**.

Get the **cabinet** ready, starting at **Step 1** on page 9.

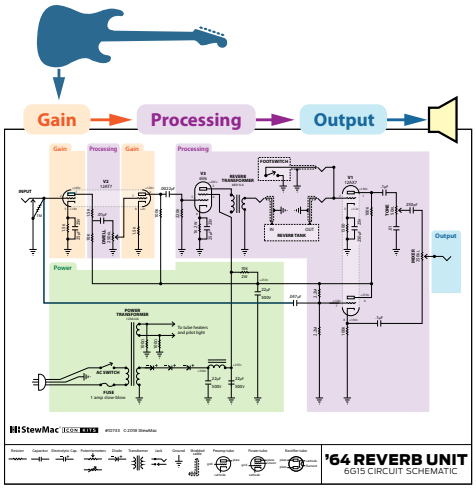
You'll prep the metal **chassis** and the **eyelet board** too.

Wiring comes later:



See page 17

1. First, you'll **wrap** the leads, connecting them without solder.
2. Then **double-check** all the connections. Don't rush!
3. When everything checks out, it's time to **solder**. The numbered steps tell you when.



Learn more:
You don't need to read the **schematic**, but it's fun.
See how your guitar's signal gets processed into sound.
This is on page 35.

Parts list

Resistors

☐ (2) 100Ω .5W carbon composite

☐ (3) 1.5K .5W carbon composite

☐ (1) 10K .5W carbon composite

☐ (4) 100K .5W carbon composite

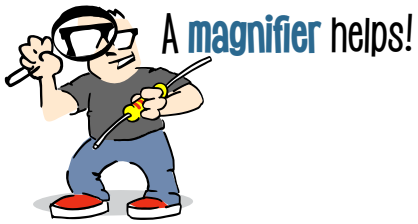
☐ (1) 220K .5W carbon composite

☐ (1) 1M .5W carbon composite

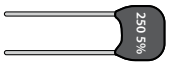
☐ (2) 2.2M .5W carbon composite

☐ (1) 1K 2W metal oxide

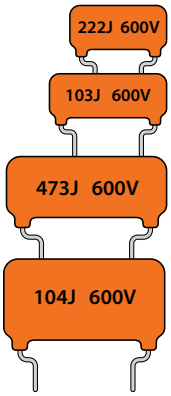
☐ (1) 10K 2W metal oxide



Capacitors



☐ (1) 250pF 500V silver mica

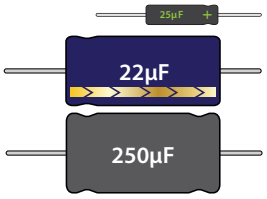


☐ (1) .0022µF 600V Orange Drop

☐ (2) .01µF 600V Orange Drop

☐ (1) .047µF 600V Orange Drop

☐ (2) .1uF 600V Orange Drop

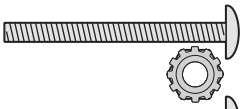


☐ (2) 25µF 50V electrolytic

☐ (3) 22µF 500V electrolytic

☐ (1) 250µF 25V bipolar electrolytic

Hardware



☐ (2) 10-32 machine screw, 1-1/2"
☐ (2) 10-32 locknut

☐ (6) 8-32 machine screw, 3/8"
☐ (6) 8-32 locknut

☐ (3) 6-32 machine screw, 1/2"
☐ (3) 6-32 locknut

☐ (2) 4-40 machine screw, 3/8"
☐ (4) 4-40 machine screw, 1/4"
☐ (6) 4-40 locknut

☐ (4) Self-tapping screw

☐ (1) Black wood screw

☐ (1) Power cord clamp

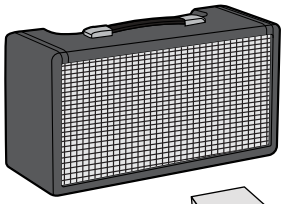
☐ (1) Strain relief for power cord

☐ (6) Rubber grommet

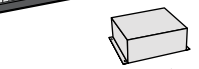
Diode

☐ (3) 1N4007 1000V rectifier diode

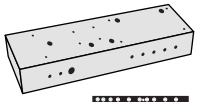
Cabinet and Chassis



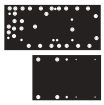
☐ (1) Cabinet



☐ (1) Capacitor pan



☐ (1) Chassis



☐ (2) Eyelet boards

☐ (2) Insulator boards

Parts list

Tubes, lamps, fuses, and sockets

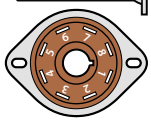

☐ (3) RCA-style jack

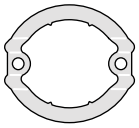

☐ (1) Two-lug jack


☐ (1) Three-lug jack


☐ (2) Nine-pin tube socket


☐ (2) Shield for nine-pin tube socket

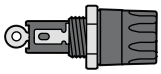

☐ (1) Eight-pin tube socket

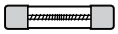

☐ (1) Tension clip for eight-pin tube socket

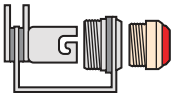
☐ (1) 12AX7 preamp tube (also called ECC83S)

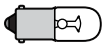
☐ (1) 12AT7 preamp tube (also called ECC81)

☐ (1) 6V6S power tube

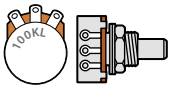

☐ (1) Fuse socket


☐ (1) Fuse (1 amp, slow blow)

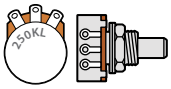

☐ (1) Pilot lamp socket with lens


☐ (1) Pilot lamp bulb (#47)

Terminals, knobs, and cords

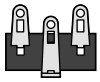


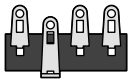
☐ (1) 100K control pot (L-linear taper)



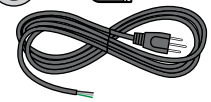
☐ (2) 250K control pot (L-linear taper)


☐ (3) Knob

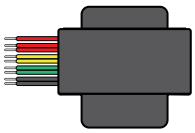

☐ (1) Three-lug terminal

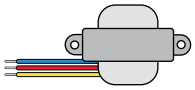

☐ (1) Four-lug terminal

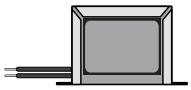

☐ (1) Power switch


☐ (1) Power cord

Transformers


☐ (1) Power transformer


☐ (1) Output transformer


☐ (1) Filter choke

Wire


☐ (1) White wire

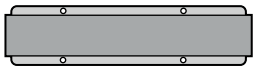

☐ (1) Green wire

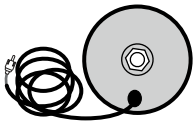

☐ (1) Blue wire

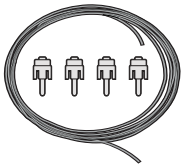

☐ (1) Red wire


Vintage-style **push-back wire** lets you push the insulation back instead of cutting it away. **BUT:** Trimming the insulation still works better.

Reverb tank & footswitch


☐ (1) Reverb tank


☐ (1) Footswitch


☐ (1) Reverb wiring kit
(shielded wire and 4 RCA plugs)

Tools and supplies

Required

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

Needle nose pliers
Item #1610 Long Nose Pliers

Wire cutter
Item #1607 Wire Cutter

Wire stripper
Item #1606 Wire Stripper

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

Solder (at least one Pocket-Pak)
Item #0505 Kester Pocket-Pak Solder

Solder sucker
Item #0503 Solomon Solder Sucker

Drill with a 5/32" bit
5/32" for mounting eyelet board to chassis

Ruler
Item #4905 StewMac Shop Rule

Digital multimeter
Item #3618 Fieldpiece Pocket Multimeter

Snuffer stick (bleed resistor)
Item #1552 Snuffer Stick

Pencil

Wooden chopsticks

Glue
Wood glue, white glue, or contact cement for gluing a paper label inside the cabinet

Butane lighter or matches
For heating heat-shrink tubing

Helpful

Round nose bending pliers
Item #1609 Round Nose Bending Pliers

Solder wick
Item #0504 Solder Wick, 5-foot roll

Soldering aids
Item #0521 StewMac Soldering Aids

Soldering stand
Item #0506 Solomon Soldering Stand

Printed circuit board vise

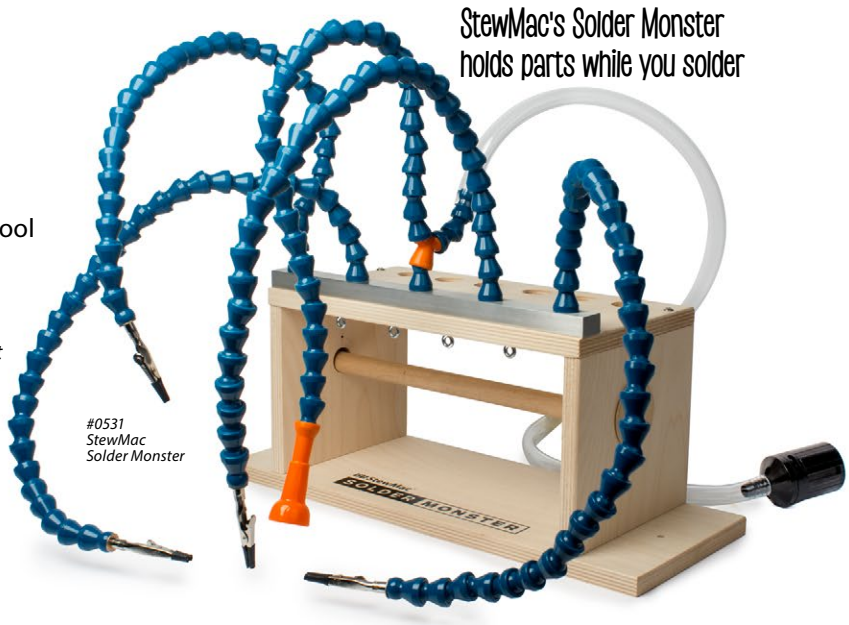
Chassis stand
Item #10750 Chassis Stand

Solder Monster, or helping hand tool
Item #0531 StewMac Solder Monster

Fine tip permanent marker

Scratch awl or center punch
Item #3000 Guitar Tech Screwdriver Set

Tray for loose parts



Amp voltages are seriously dangerous!

High voltage, even when unplugged

When you turn on an amp, or in this case a reverb unit, 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 unit in. The stored electricity can be safely discharged to ground with a snuffer stick. See how to use it below.

Once your unit has been turned on, don't touch the wiring with your bare hands—even after turning the unit 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.

It's important that you understand the dangers so you're working safely. Here's how to do it right.

Professionals who work on amps take these safety habits very seriously

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 live electronics 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 up

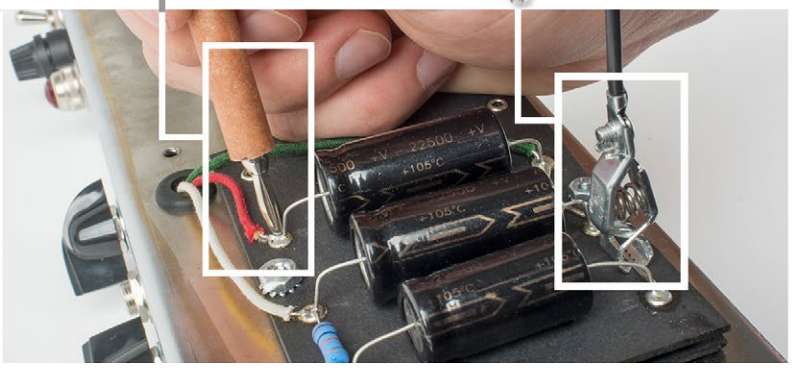
It's easy to forget that you a left a stray tool or wire in the chassis. It's also easy to forget to re-attach the speaker wire, and that can fry an output transformer in seconds. Constant vigilance is your friend when working on electronics.

Always unplug it

Unplug the unit whenever you don't specifically need it plugged in. Some points are always hot when the unit'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

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 this unit 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 provided below. However, an easier way to decode these bands is to download one of the many smartphone apps for this purpose.

One band will be the nearest to an end of the resistor. That band tells the first value. Combine it with the value of band 2 to get a two-digit number (68 in our example below). Multiply that number by band 3 (68 x 1,000 = 68,000). Thousands are represented by the letter K, so this resistor is 68K (kilo-ohms, or KΩ).

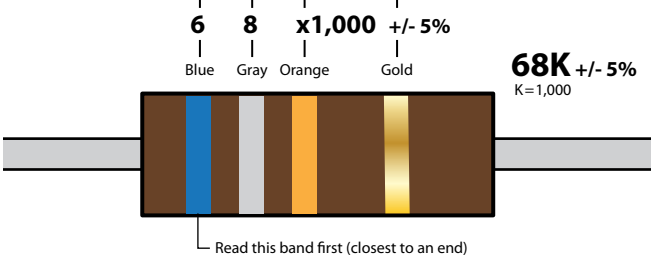
If there is a fourth band, it will be either silver or gold. This indicates the tolerance allowed during manufacturing. The resistors used in this kit have a +/- 5% tolerance, represented by a gold band 4.

A magnifying glass helps a lot. The bands on a 470Ω resistor are yellow/violet/brown, and the bands on a 47K resistor are yellow/violet/orange. They're easily confused!

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.

	Band 1 1st Digit	Band 2 2nd Digit	Band 3 Multiplier	Band 4 Tolerance
BLACK	0	0	1	None +/- 20%
BROWN	1	1	10	
RED	2	2	100	
ORANGE	3	3	1,000	
YELLOW	4	4	10,000	
GREEN	5	5	100,000	
BLUE	6	6	1,000,000	
VIOLET	7	7		
GRAY	8	8	0.01	+/- 10% SILVER
WHITE	9	9	0.1	+/- 5% GOLD



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 here. Caps for this unit 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.

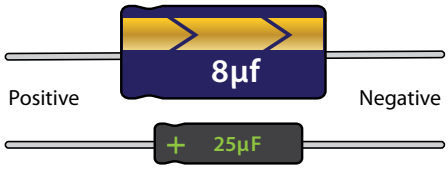
A unique property of capacitors is that they don't allow DC current to flow past them, only AC current. This is important in some parts of audio circuits, such as the path between a preamp stage and a power amp stage. Here, a "coupling capacitor" will block DC voltage, allowing only the AC guitar signal 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 caps in this unit are the 22µF electrolytic capacitors.

Electrolytic caps

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

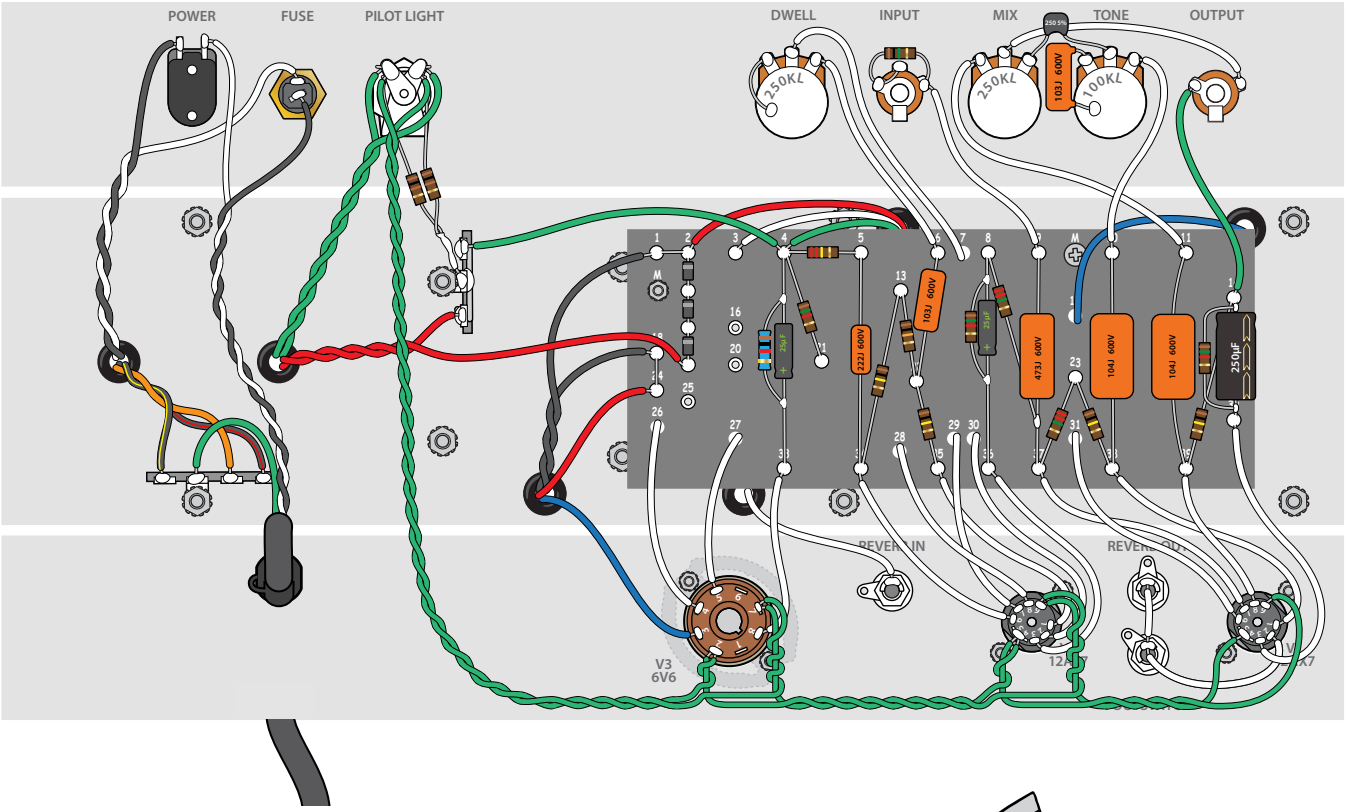


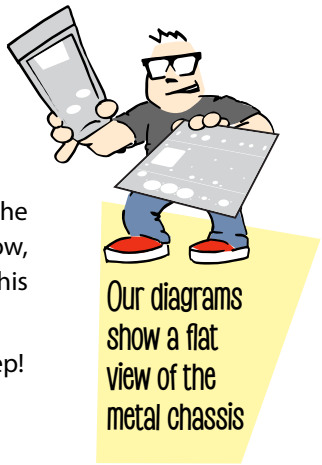
Polarized caps

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.

Complete wiring diagram





Our diagrams show a flat view of the metal chassis

Here's the complete 6G15 wiring

When you've finished the kit, you'll have connected all the parts shown in this wiring diagram. If it looks complex now, don't worry; we'll start at the very beginning and do this one step at a time.

Your circuit-building skills will get stronger with each step!

Start by prepping the cabinet

Prepare the cabinet for mounting the chassis by first removing the back panel.

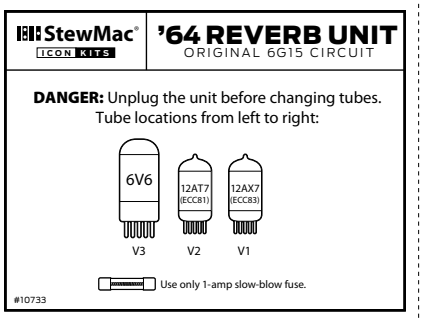
☐ STEP 1

Mount the power cord clamp

Drill a 5/64" pilot hole to mount the power cord clamp. Locate the clamp inside the left wall of the cabinet, 1-1/2" from the back panel ledge, 2" from the bottom.

Don't drill through the cabinet! Use a piece of masking tape on your drill bit to mark the depth, or use a StewMac Depth-stop Drill Bit (item #1712).

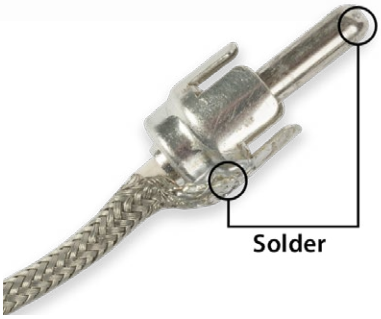
Use the black wood screw to mount the cable clamp. You'll secure the power cord with this clamp later, after the testing.



☐ STEP 2

Glue the tube placement chart

Cut out the tube placement chart on page 39. Put a thin coat of glue or contact cement on the back and glue it to the inside wall of the cabinet.



☐ STEP 3

Solder two reverb cables

Cut the shielded wire in the reverb wiring kit to two 2' lengths. At the ends of each piece, pull 3/4" of the wire mesh shielding away to one side and strip away 3/8" of the internal cloth shielding. Insert the exposed wire into an RCA plug so that it reaches the tip of the center post.

Solder this lead in place at the tip of the plug. Don't leave solder on the outside of the plug tip, which would keep it from fitting into the jack. See "Tips for great soldering" on page 17.

After the plug tip cools and the inside solder joint is set, solder the braided wire shielding onto the outside of the plug. Solder the four plugs this way, one on each end of the two cables.

These two cables will connect the reverb tank to the chassis later on.

Test for continuity between the tips of the plugs on each cable, then test for continuity between the shields of the plugs in the same way.

Also test to make sure you don't have continuity between the tip and the shield of each plug, which would indicate a short in the cable. If your multimeter finds unwanted continuity, the likely culprit is the inside (tip) wire shorting to the outer shield. If that happens, de-solder the tip connection and redo that solder joint.

☐ STEP 4

Mount the reverb tank

Remove the nuts from the four reverb tank mounting screws and remove your reverb tank from its box. Install the reverb tank with the RCA jacks facing up.

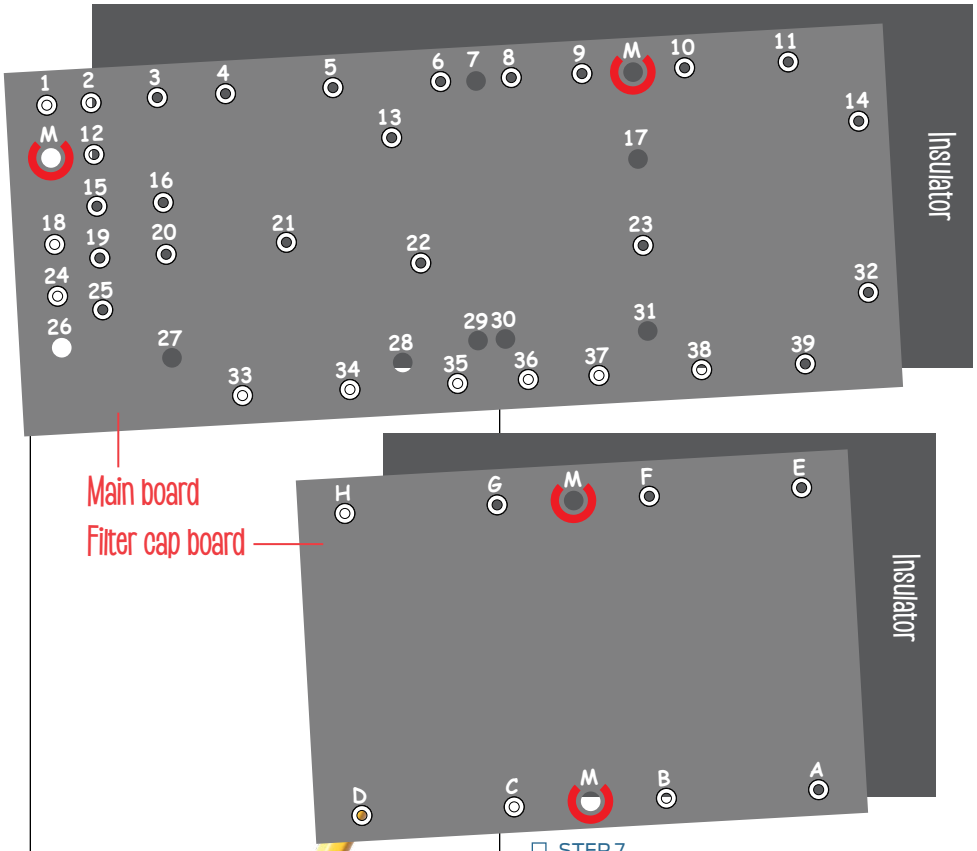
Reinstall the four reverb tank mounting nuts, tightening each until they are sufficiently tight.

Prepping the eyelet boards

This circuit is built on two eyelet boards. Signal processing happens on the main board, and a smaller board holds the filter capacitors.

For each eyelet board there's a blank board of the same size. These blanks serve as insulators to keep the eyelet board circuits from contacting the metal chassis.

The pairs of boards mount to the chassis with machine screws. Mounting holes are already in the eyelet boards, but you'll need to drill matching holes in the insulator boards.



☐ STEP 5

Tape the boards together

Noting the eyelet holes, align each eyelet board with its insulator and tape the paired boards together.

☐ STEP 6

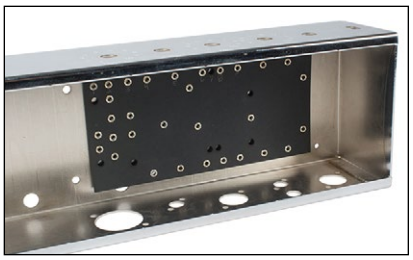
Drill the insulator boards

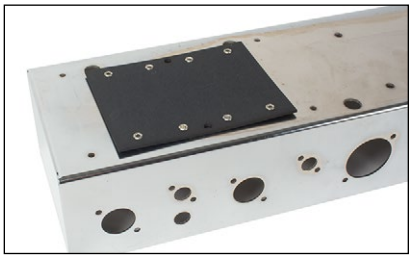
The mounting holes are pre-drilled in the eyelet boards. Through them, you can see the undrilled insulator board taped behind. Using the holes marked "M" on the drawing above as a guide, drill through the insulator boards with a 5/32" drill bit. Set the insulator boards aside for later.

☐ STEP 7

Number the eyelets and holes

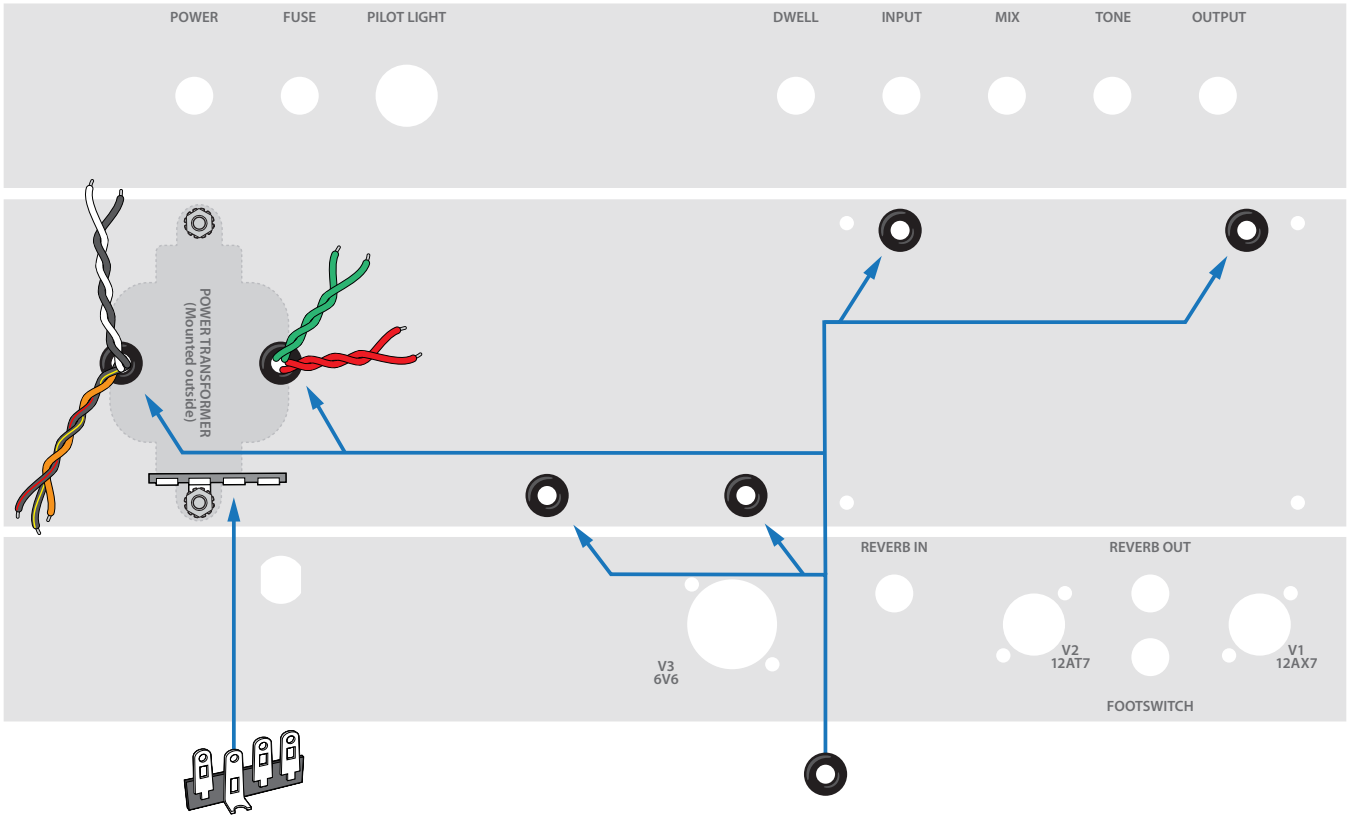
These instructions will refer to the eyelets and holes on the main eyelet board by number and on the filter cap board by letter. Use a pencil to mark these numbers and letters onto the boards as illustrated above.





The main board will be mounted inside the chassis, and the filter cap board will be mounted on the outside. In the photo above, we've positioned the empty boards just to show their eventual mounting locations.

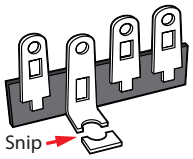
Installing the chassis-mounted components



☐ STEP 8

Install six rubber grommets

Squeeze these into the six holes for strain relief for the wires that will pass through the metal chassis.



☐ STEP 9

Prep one terminal strip

With a wire cutter, snip the mounting hole on the four-lug terminal strip as pictured. You'll mount this terminal strip as part of the next step.

☐ STEP 10

Mount the power transformer

The power transformer has nine leads, including two pairs with matching colors, plus five wires with different colors. Twist the same-color pairs together.

The other five wires allow you to wire the unit for different voltages, depending on the electrical system where you live. The black wire is used in all cases, and it's twisted together with another wire depending on your country's voltage:

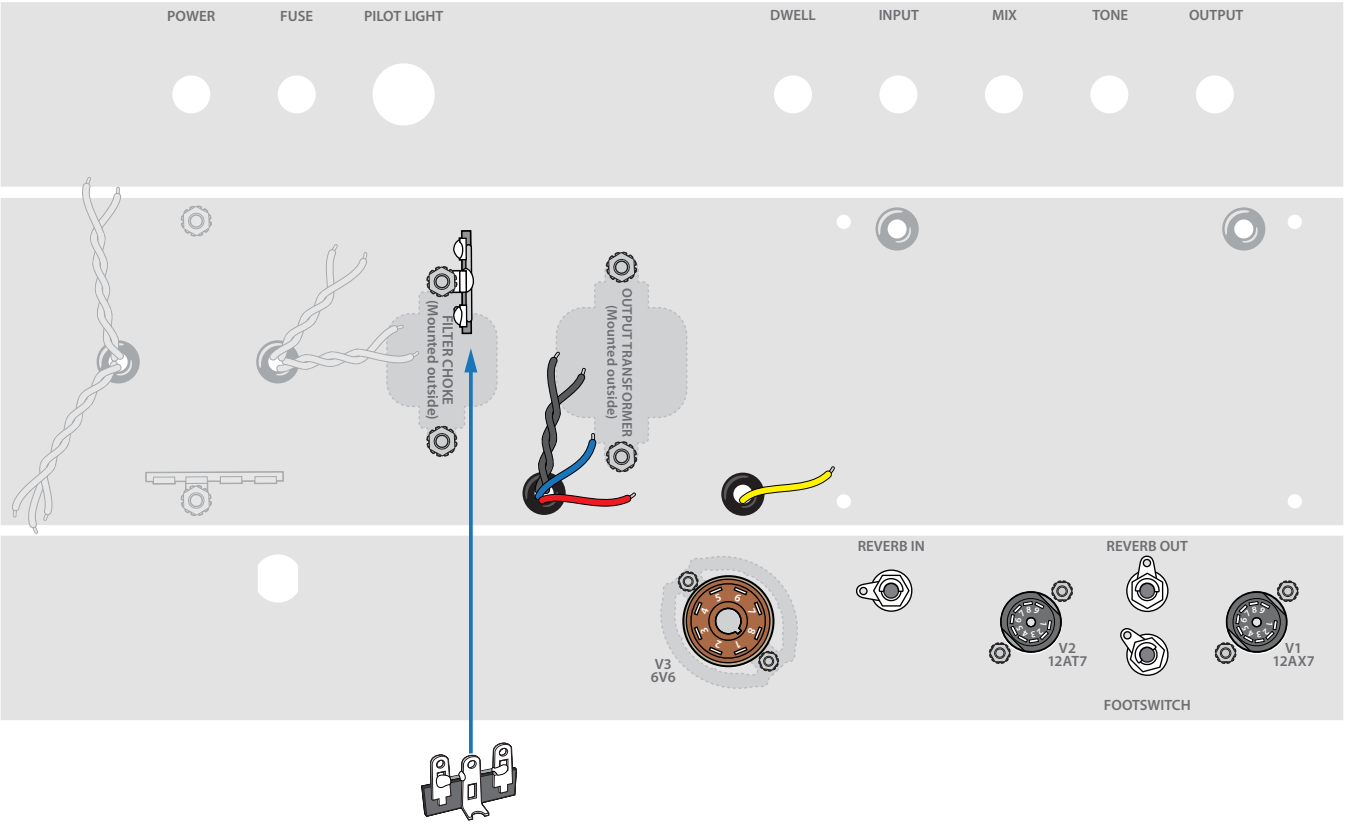
- 100V: orange
- 120V: white
- 220V: black/yellow striped
- 240V: black/red striped

In North America for example, you would twist the white wire together with the black wire for 120V.

Twist the three unused transformer wires together. You'll terminate them independently in a few steps. Pass the red and green twisted pairs through the grommeted hole under the fuse socket. Pass the rest of the wires through the grommeted hole closest to the outside wall of the chassis.

Mount the transformer on the outside of the chassis using 8-32 machine screws. Secure the screws inside the chassis with 8-32 locknuts. Mount the four-lug terminal strip under the rear locknut as shown.

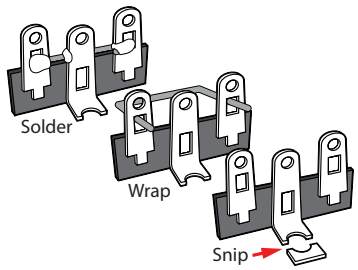
Pull these wires tight once the power transformer is mounted, but make sure the grommets do not pull out of their holes.



☐ STEP 11

Prep one grounding strip

With a wire cutter, snip the mounting hole on the three-lug terminal strip as pictured. Cut a 1" piece of green wire and remove the insulation. Wrap and solder the wire across the terminals, electrically connecting all three lugs. This will be used as a grounding strip.



☐ STEP 12

Mount the output transformer

The output transformer has red, blue, and yellow leads. Thread the red and blue leads through one rubber grommet as shown, and the yellow lead through the other grommet.

Using two 8-32 machine screws and locknuts, mount the output transformer to the outside of the chassis.

☐ STEP 13

Mount the filter choke

The filter choke has two black leads. Twist these leads together and thread them through the grommet with the red and blue output transformer leads as shown.

Using two 8-32 machine screws, mount the filter choke to the outside of the chassis. Mount the modified three-lug grounding strip under the front locknut.

☐ STEP 14

Mount socket V3 + tension clip

Orient socket V3 so pin 1 is nearest the opening of the chassis. Use two 4-40 x 3/8" machine screws to mount the socket outside of the chassis. As you install this socket, add the tension clip to support the tube. This clip is held by the same machine screws that mount the socket.

☐ STEP 15

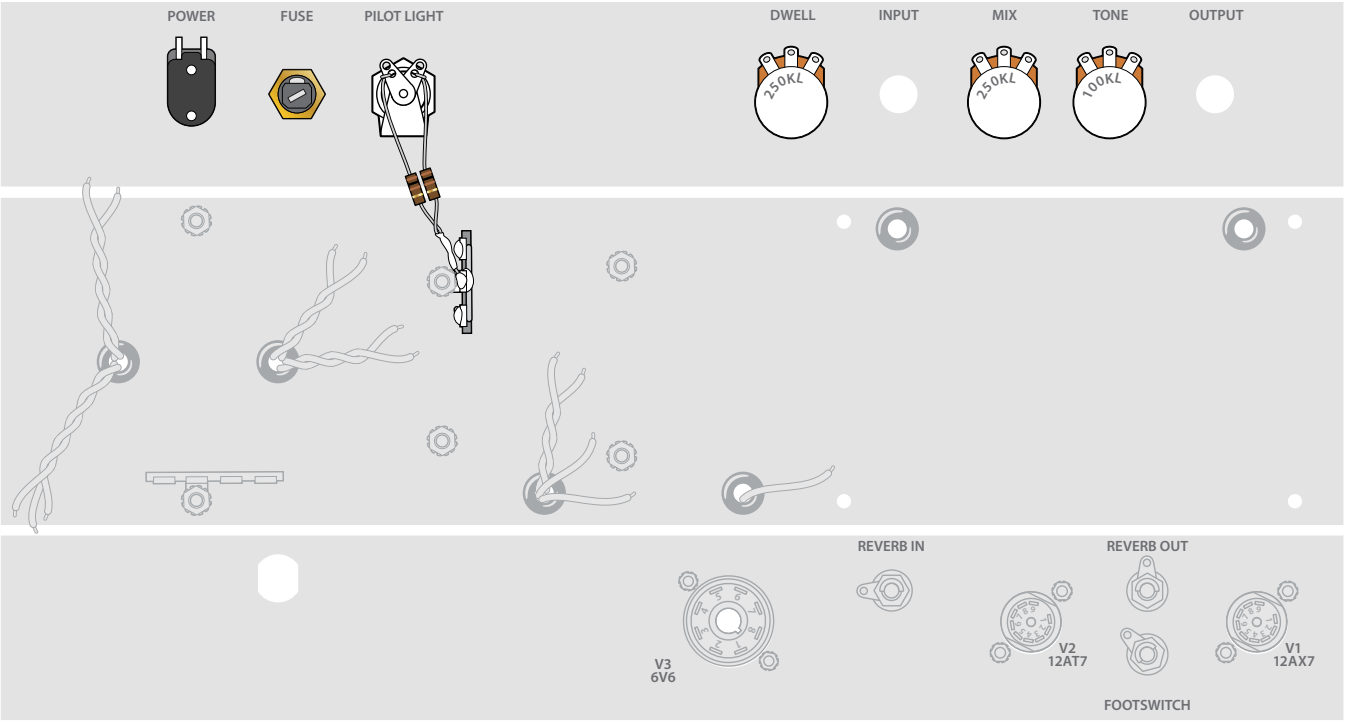
Mount sockets V2 & V1

Use two 4-40 x 1/4" machine screws to mount each nine-pin socket. Position the sockets so pin 3 is on the side toward the opening of the chassis.

☐ STEP 16

Install the RCA jacks

Mount the three RCA jacks in their respective holes. These jacks are for the reverb in, reverb out, and the footswitch.



☐ STEP 17

Install the power switch

Mount the power switch with its two lugs facing up for soldering later.

☐ STEP 18

Install the fuse socket

Mount the fuse socket so its side lug is facing up, toward the open side of the chassis. This makes it easier to solder later.

☐ STEP 19

Install the pilot lamp socket

Mount the pilot lamp socket by screwing the lens from the outside into the socket assembly. Position the socket so the tabs are facing up for soldering.

☐ STEP 20

Connect two 100Ω resistors to the lamp socket

Twist one lead from each of two 100Ω resistors together to join them. Wrap the other leads of these resistors to the lugs of the pilot lamp socket. Don't solder the pilot lamp lugs yet, but solder the twisted resistor leads to each other and then solder the twisted leads to the middle lug of the three-lug terminal strip under the pilot lamp assembly.

☐ STEP 21

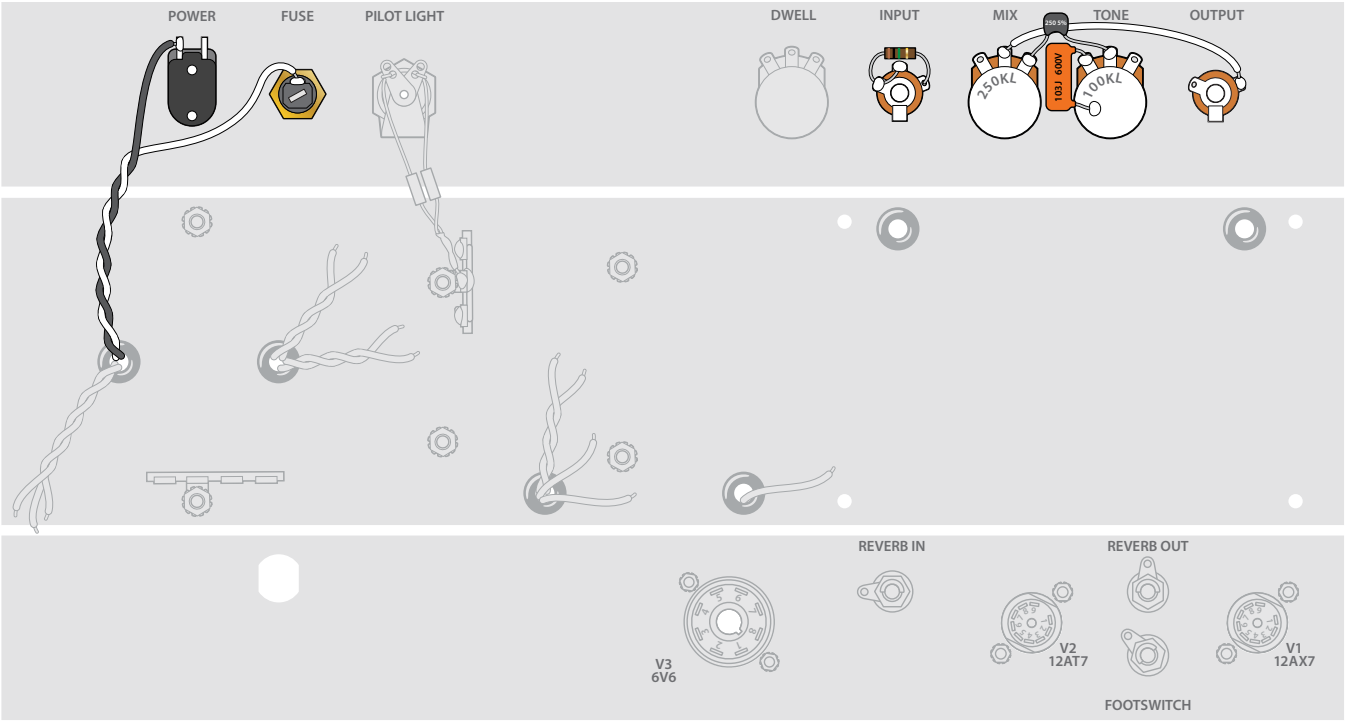
Install the control pots

Mount the pots so their lugs are facing up. When we refer to these lugs as left or right, it's assuming you're looking at the pot from the same point of view as the wiring diagram. Mount them left to right, as follows:

Dwell: 250KL

Mix: 250KL

Tone: 100KL



☐ STEP 22

Install two jacks

Mount the three-lug jack in the input hole and the two-lug jack in the output hole. Turn the jacks as pictured, with the lugs of both jacks facing up.

Run the leads of a 1M resistor through the right and left lugs of the input jack, positioning it out of the way of a guitar cable plug. It doesn't matter which direction the resistor is attached, because resistors aren't polarized. Wrap the lead going through the left lug through the middle lug.

Solder the left lug and middle lug connections, but not the right lug connection yet.

☐ STEP 23

Install one capacitor

Wrap and solder one lead of a .01µF Orange Drop cap to the left lug of the tone pot. Solder the other lead of this cap to the back of the tone pot.

Always set pots to zero before soldering to their housing. This way, if the inside components do get a little too hot it won't leave an imprint in a position you might need to use later.

☐ STEP 24

Install the silver mica capacitor

Wrap one lead of a 250pF silver mica cap through the right lug of the mix pot. Wrap the other lead of this cap through the middle lug of the tone pot. Solder both leads in place.

☐ STEP 25

Add one jumper

Cut one 4-1/4" white wire.

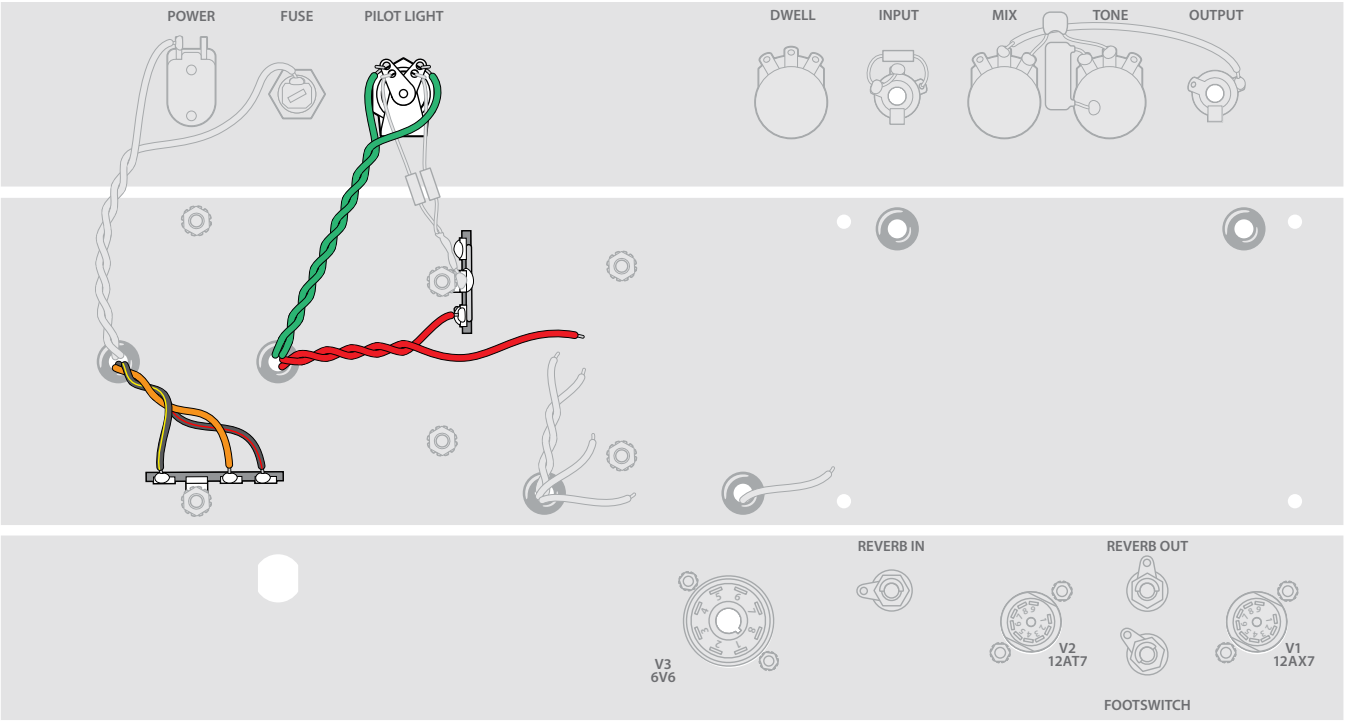
Wrap one end through the right lug of the output jack and wrap the other end through the middle lug of the mix pot. A connecting wire like this is called a jumper.

Solder both ends of this jumper in place.

☐ STEP 26

Install power transformer leads

Run the white lead from the power transformer to the side lug of the fuse socket. Trim it to fit and solder it. Trim and solder the black lead to the left lug on the power switch.



☐ STEP 27

Power transformer green leads

Run the two green wires from the power transformer to the lugs on the pilot lamp socket (either wire can go to either lug). Trim these wires to length and wrap them onto the lugs. Don't solder these connections yet.

Despite being green, these leads are not ground wires. They supply power to the pilot lamp, and after jumper wires are connected later they will also power the tube heater filaments.

☐ STEP 28

Power transformer red leads

Trim one of the power transformer's red leads to an appropriate length and wrap one lead through one of the lugs of the three-lug grounding strip under the pilot lamp assembly.

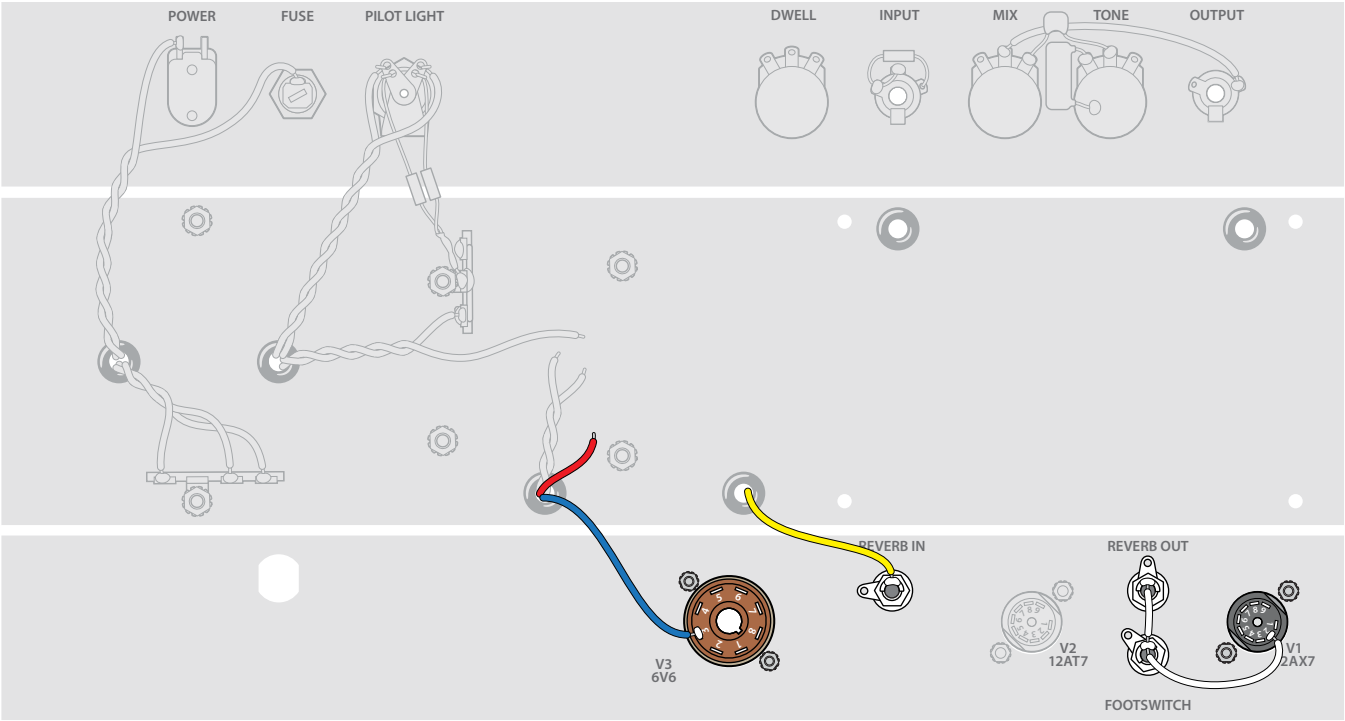
You can twist the other red lead in with itself to keep it out of the way. This lead will be connected to the eyelet board once the eyelet board is installed.

☐ STEP 29

Terminate the power transformer's unused leads

The three unused leads from the power transformer will carry hundreds of volts, so they need to be safely terminated and not hanging loose in the chassis.

Cut these wires to length and solder them to the three ungrounded lugs of the four-lug terminal strip as shown. These three lugs are not grounded or connected to any components, which makes them a safe place to anchor these unused live wires. The remaining lug on this strip is grounded to the chassis, and will be used later to ground the power cord.



☐ STEP 30

Connect output transformer's blue and yellow leads

Trim the blue wire from the output transformer to an appropriate length and solder it to pin 3 of socket V3.

Trim the yellow wire from the output transformer to an appropriate length and solder it to the center lug of the reverb in jack.

Leave the red output transformer lead free for now; you will install it to the eyelet board later on.

☐ STEP 31

Add two jumpers

Add a 2" white jumper between pin 2 of socket V1 and the center lug of the footswitch jack. Solder this jumper in to pin 2 of socket V1.

Add a 3/4" white jumper between the center lug of the reverb out jack and the center lug of the footswitch jack.

Solder the connection to the center lug of the reverb out jack.

Solder the connection to the center lug of the footswitch jack along with the jumper from socket V1.

☐ STEP 32

Inspect and double-check

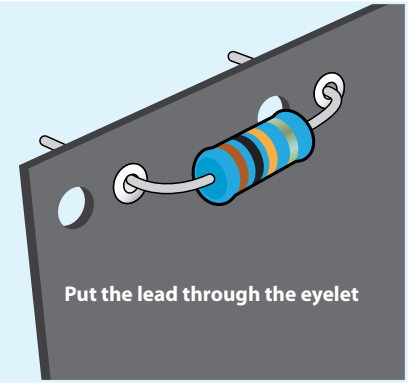
This is a good time to step away from the project for a few minutes and take a break.

When you're ready to go at it again, carefully review every connection you've made so far.

When everything checks out, you're ready to move on to the eyelet board.

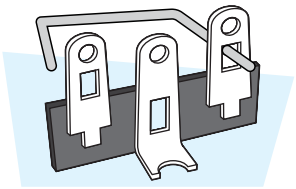
Be suspicious!
Assume there's a mistake and you're the one who'll find it.

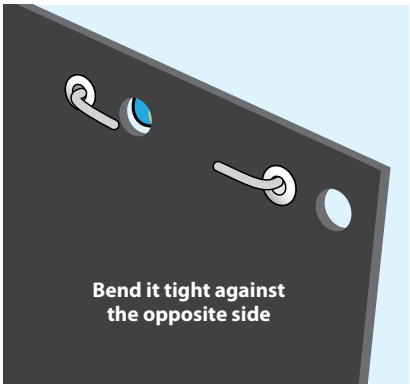
How to wrap and solder the eyelet board



Wrap

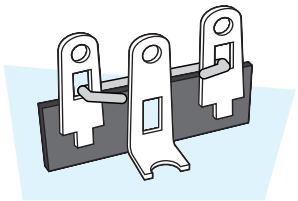
Don't solder the components as they go onto the eyelet board. Instead wrap all the parts onto the board, bending their leads tightly so the parts stay in place without solder.

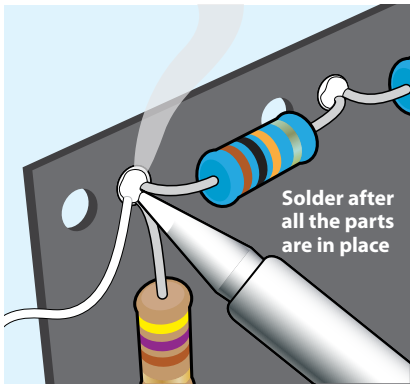




Inspect

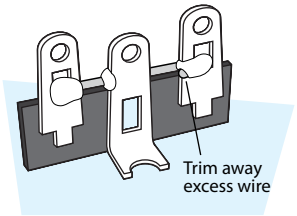
When all the parts are in place, stop and inspect. Go back over every step. Careful inspection is the best way to make sure your unit works the first time you turn it on.

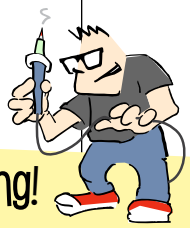




Solder

Solder each connection point only once. Reheating to add another part makes a messy, faulty solder joint. Use the soldering tips below to get professional results.



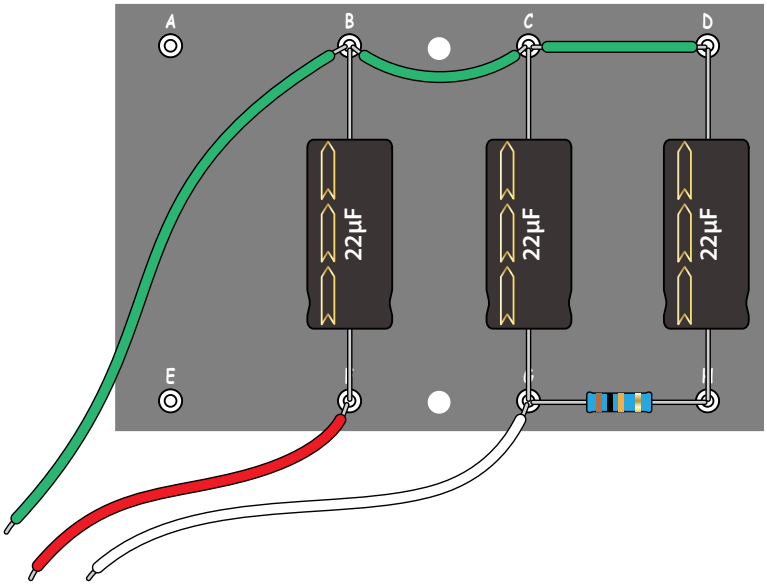


Tips for great soldering!

- Don't think of solder as glue. Good mechanical connections make good electrical connections. Solder's job is to finalize an already good joint, not to hold the parts on the board. So wrap the leads tightly for good electrical contact before soldering.
- Melt a small amount of solder onto the tip of the iron ("tinning" the iron). Hold the tip against the joint for a few seconds, until the connection reaches soldering temperature.

  Also tin component leads like multi-strand wires to help the solder flow.
- Keep your soldering tip clean by wiping it often on a damp sponge. Keep it tinned by occasionally melting a little solder onto it.
- Feed solder to the connection not to the iron. Keep the iron on the connection for a second longer to allow time for all of the flux to cook out of the joint.
- Don't ever blow on the hot solder or touch anything until the joint is completely cool. A good solder joint is shiny—a sign that it was left to cool undisturbed.
- Trim away the excess wires after the joint has cooled.
- Plan ahead so each joint is only soldered once. Resoldered joints are messy and more likely to fail.
- Position 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.
- 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 wrap.

Wrapping parts onto the filter cap board



☐ STEP 33

Add three capacitors

Use the small eyelet board for the three filter capacitors. **Note that these caps are polarized and must be installed in the correct orientation.**

Add a 22µF electrolytic capacitor with the positive lead wrapped through eyelet F and the negative lead through eyelet B.

Add another 22µF electrolytic cap with the positive lead through eyelet G and the negative through eyelet C.

Wrap a third 22µF electrolytic cap between eyelets H (positive lead) and D (negative).

☐ STEP 34

Add two jumpers

Wrap a 1-1/4" green jumper between eyelets B and C.

Add another 1-1/2" green jumper between eyelets C and D.

☐ STEP 35

Add one resistor

Add a 10K resistor between eyelets G and H.

☐ STEP 36

Add three more jumpers

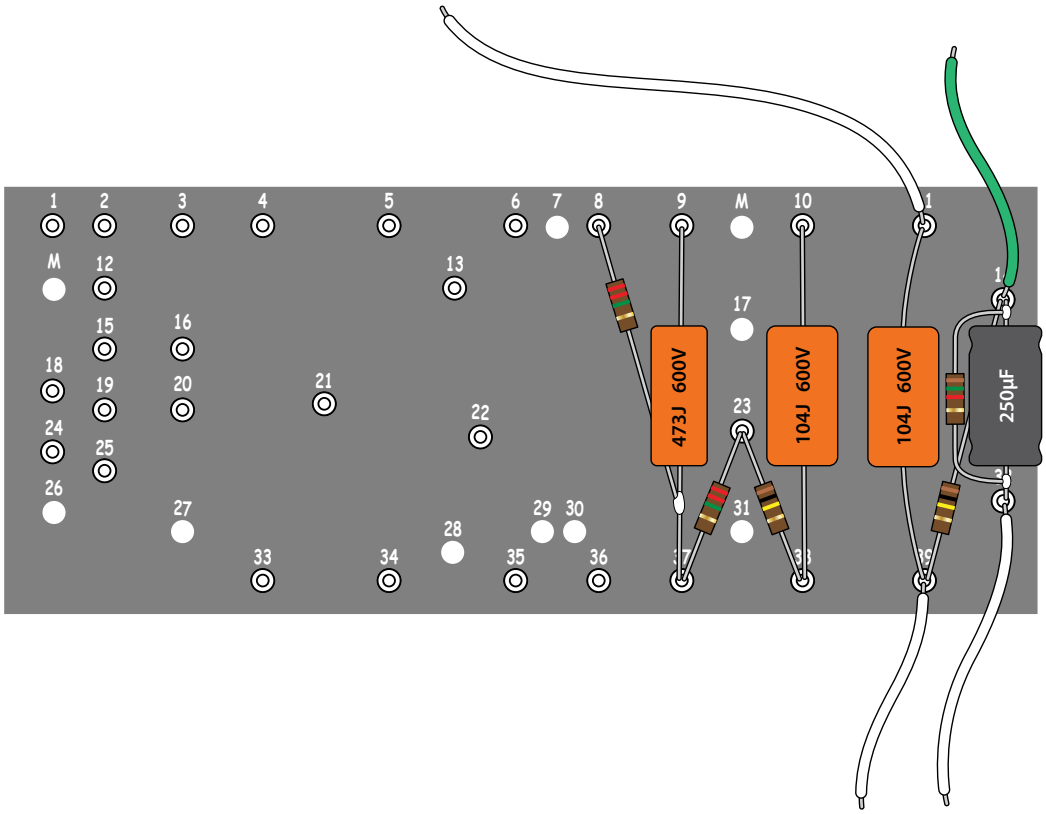
Add a 6" green jumper to eyelet B.

Add a 5-1/4" red jumper to eyelet F.

Add a 5-1/4" white jumper to eyelet G.

Set filter cap board aside for now, and let's get started on the main board!

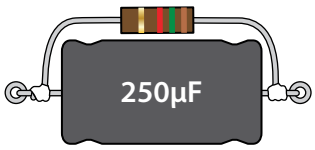
Wrapping parts onto the main eyelet board



☐ STEP 37

Install a cap + resistor

Wrap the leads from the 1.5K resistor around the leads on the 250µF 25V capacitor and solder them in place.



This capacitor is bipolar. This means that despite being an electrolytic capacitor, it can be installed in either direction.

Add this assembly between eyelets 14 and 32.

☐ STEP 38

Add two jumpers

Connect a 3-1/2" white jumper to eyelet 32.

Add a 3" green jumper to eyelet 14.

☐ STEP 39

Add another cap + resistor

Add a 100K resistor between eyelets 39 and 14.

Add a .1µF Orange Drop cap between eyelets 39 and 11. This and the following Orange Drop caps are not polarized, so you can install them in either direction. We recommend facing them all in the same direction to make their printed specs easy to read.

☐ STEP 40

Add two resistors + another cap

Add another 100K resistor between eyelets 23 and 38.

Add a 2.2M resistor between eyelets 23 and 37.

Wrap a .1µF Orange Drop cap between eyelets 10 and 38.

☐ STEP 41

Add two jumpers

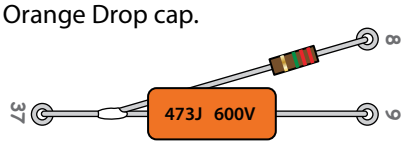
Wrap a 6-1/2" white jumper onto eyelet 11.

Wrap a 2-1/4" white jumper onto eyelet 39.

☐ STEP 42

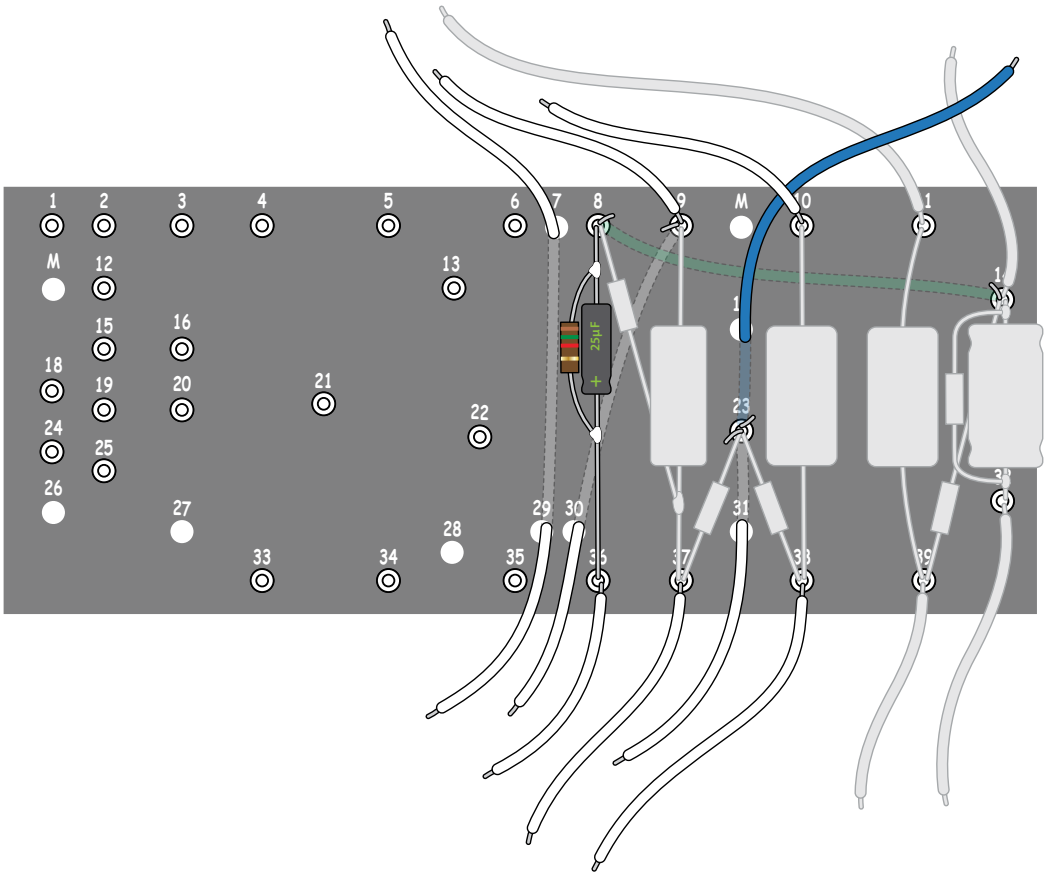
Add a resistor + cap pairing

Wrap and solder one lead of a 2.2M resistor to one lead of the .047µF Orange Drop cap.



Wrap the capacitor lead with the resistor soldered to it onto eyelet 37.

Wrap the capacitor's other lead to eyelet 9. Wrap the resistor's other lead onto eyelet 8.



☐ STEP 43

Add four jumpers

Wrap a 5-3/4" white jumper onto eyelet 38.

Wrap a 3-3/4" white jumper onto eyelet 10.

Wrap a 4-1/2" white jumper onto eyelet 37.

Wrap a 3-1/2" white jumper onto eyelet 9.

☐ STEP 44

Add four back-of-board jumpers

Flip the board over and add a 4-3/4" white jumper to the back of eyelet 23. Thread this jumper up through hole 31 and pull it tight to keep it in place.

Flip the board over and add a 6" white jumper to the back of eyelet 9. Thread this jumper up through hole 30 and pull it tight to keep it in place.

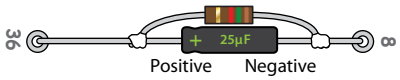
Flip the board over and thread a 9" white jumper through hole 7 and thread the other end through hole 29.

Flip the board over and add a 5" blue jumper to the back of eyelet 23. Thread this jumper up through hole 17 and pull it tight to keep it in place.

☐ STEP 45

Add a cap + resistor pairing

Wrap the leads from the 1.5K resistor around the leads on the 25µF 50V capacitor and solder them in place.



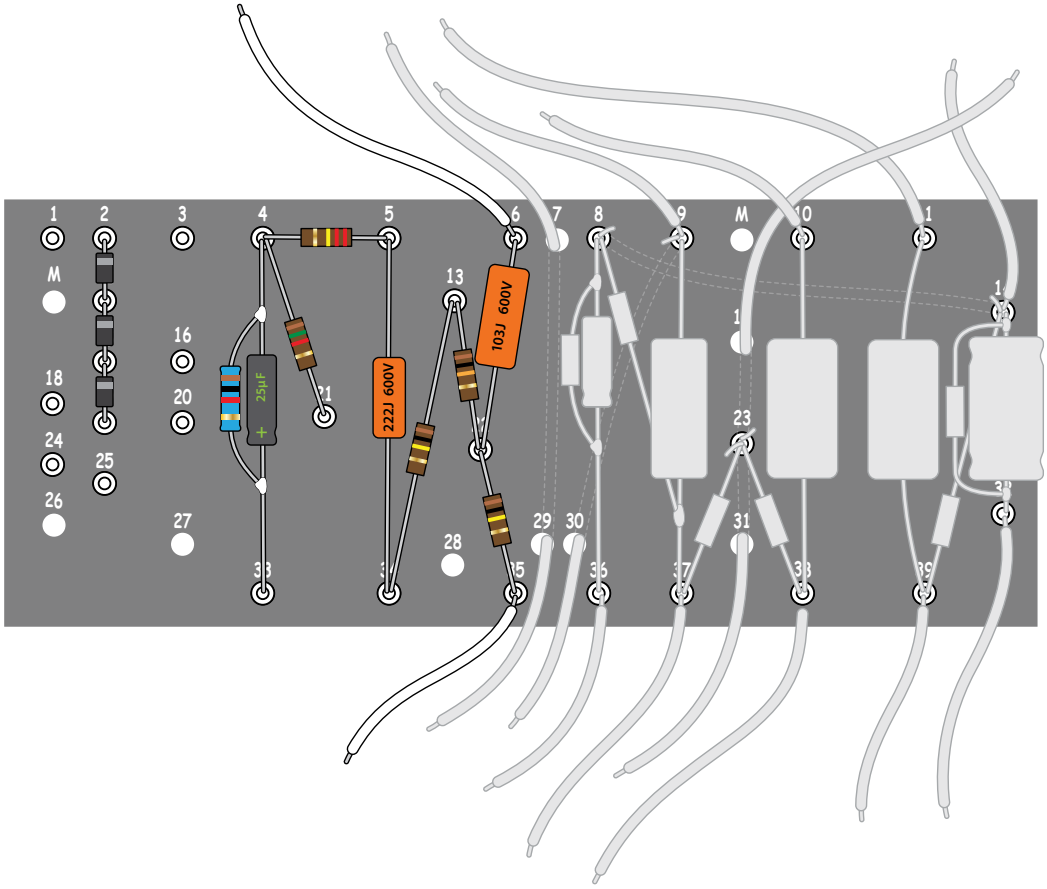
Note the polarity of the capacitor. Install this resistor/capacitor assembly between eyelets 8 and 36, making sure the capacitor's negative lead goes to eyelet 8.

☐ STEP 46

Add two jumpers

Add a 2-3/4" white jumper to eyelet 36.

Flip the board over and add a 2-3/4" green jumper between the back of eyelet 8 and the back of eyelet 14.



☐ STEP 47

Add two resistors + one cap

Add a 100K resistor between eyelets 22 and 35.

Add a 10K resistor between eyelets 13 and 22.

Add a .01µF Orange Drop cap between eyelets 6 and 22.

☐ STEP 48

Install two jumpers

Add a 5-1/2" white jumper to eyelet 6.

Add a 3" white jumper to eyelet 35.

☐ STEP 49

Add two more resistors + a cap

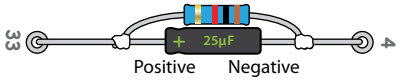
Add a 100K resistor between eyelets 13 and 34.

Add a .0022µF Orange Drop cap between eyelets 5 and 34.

☐ STEP 50

Add a cap + resistor pairing

Wrap the leads from the 1K resistor around the leads on the 25µF capacitor and solder them into place.



Note the polarity of the capacitor. Install this resistor/capacitor assembly between eyelets 4 and 33, making sure the capacitor's negative lead goes to eyelet 4.

☐ STEP 51

Add two resistors

Add a 220K resistor between eyelets 4 and 5.

Add a 1.5K resistor between eyelets 4 and 21.

☐ STEP 52

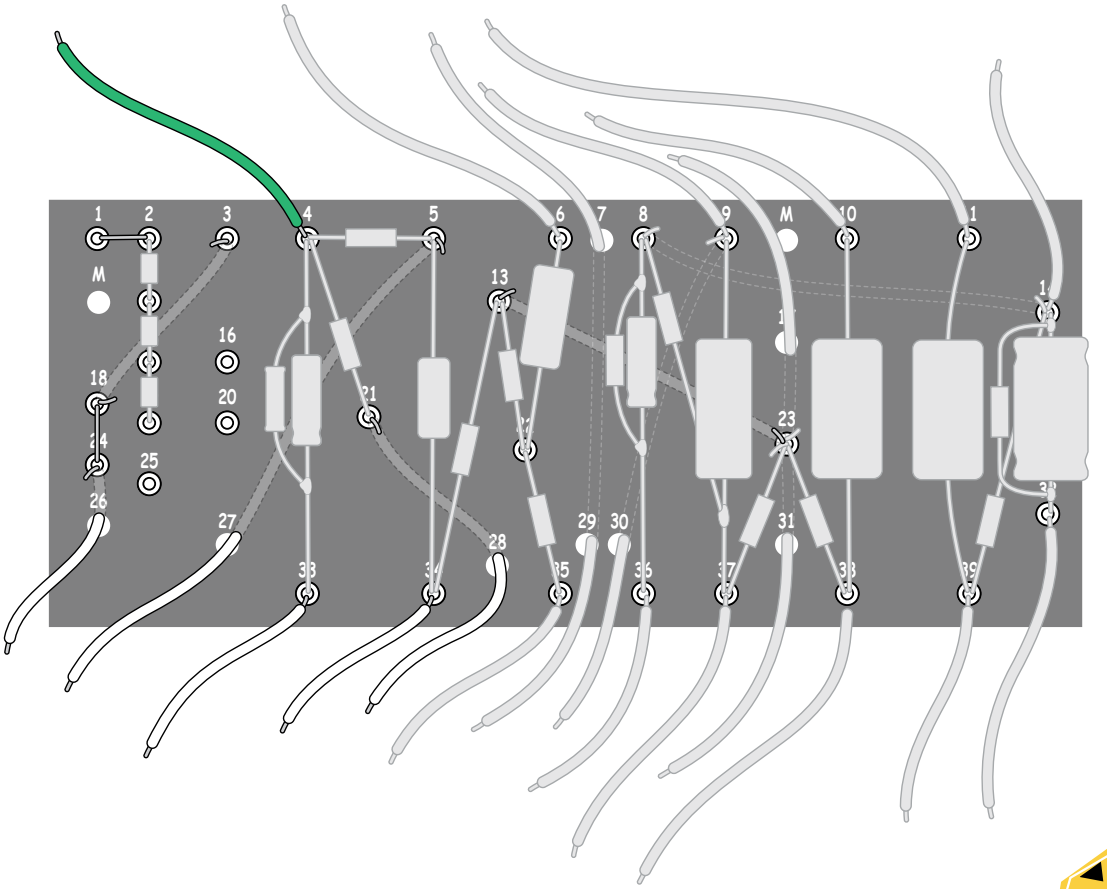
Add three rectifier diodes

Note the polarity of the diodes: the positive lead is indicated by a stripe at that end. The end with no stripe is negative.

Add the first diode between eyelets 2 and 12, connecting the positive lead to eyelet 2.

Add the second diode between eyelets 12 and 15, connecting the positive lead to eyelet 12.

Add the third diode between eyelets 15 and 19, connecting the positive lead to eyelet 15.



☐ STEP 53

Add four back-of-board jumpers

Flip the board over and add a 2-1/2" white jumper between eyelets 13 and 23.

Add a 1-3/4" white jumper between the back of eyelet 3 and the back of eyelet 18.

Add a 4-1/2" white jumper to the back of eyelet 5, then thread the other end through the bottom of hole 27 and pull it tight to keep it in place.

Add a 3-3/4" white jumper to the back of eyelet 21, then thread the other end through the bottom of hole 28 and pull it tight to keep it in place.

☐ STEP 54

Add six jumpers

Add a 2-1/2" white jumper to eyelet 34.

Add a 2-3/4" white jumper to eyelet 33.

Add a 3" white jumper to the bottom of eyelet 24, then thread the other end up through hole 26 and pull tight to keep in place.

Add a 5" green jumper to eyelet 4.

Cut two 3/4" white jumpers and remove their insulation. Add one between eyelets 1 and 2. Add the second between eyelets 18 and 24.

☐ STEP 55

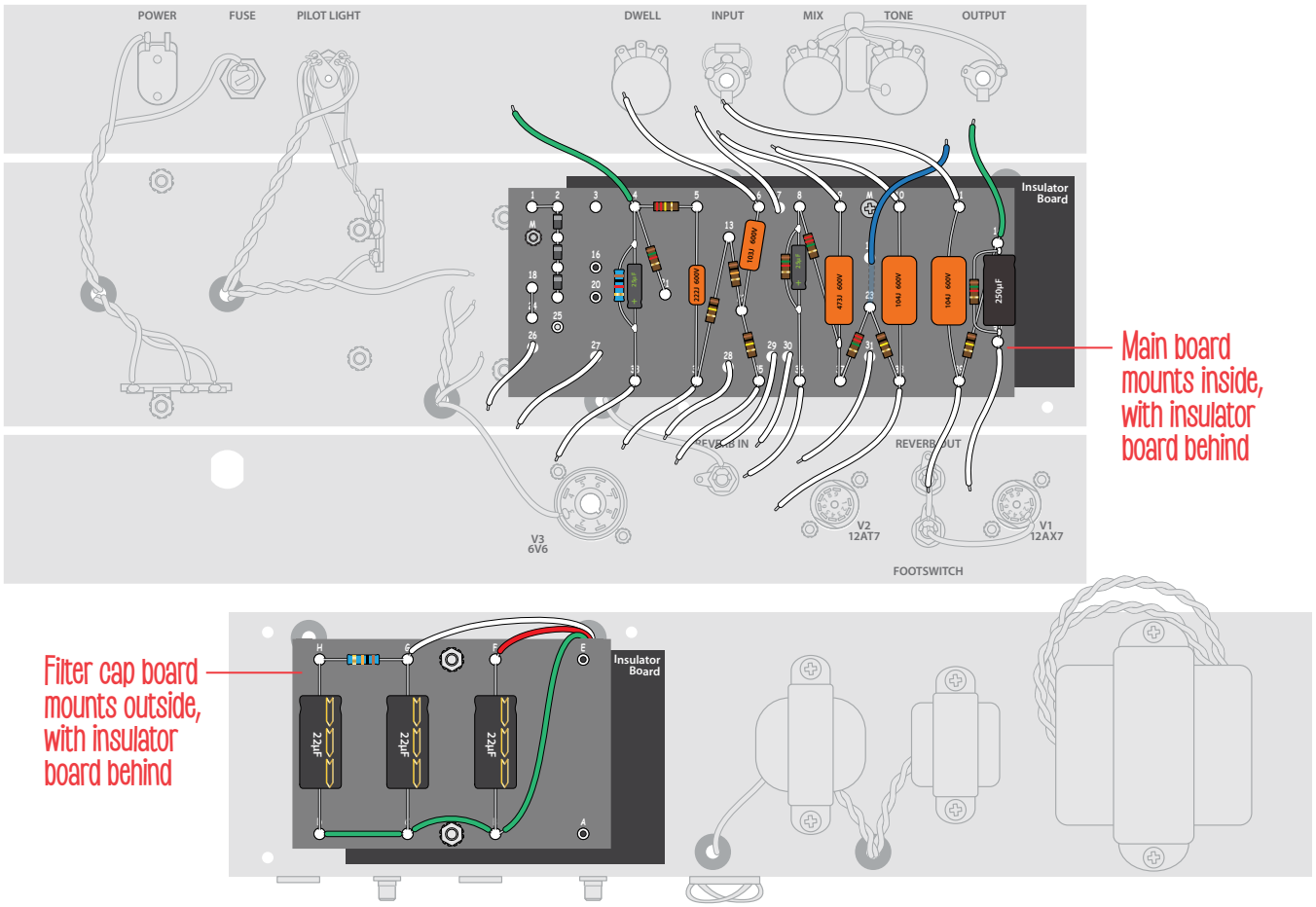
Review your work

All the components and wires are now on the eyelet boards. Take a break to rest your eyes. It's time to inspect your work so far, and it's a mistake to do that in a rush.

Review everything to make sure you've correctly followed each step. To find no mistakes at this stage is pretty unusual, and it's much easier to correct them now than after you're done soldering!

As you check your work, make sure every connection is tight!

Soldering and installing the eyelet boards



☐ STEP 56

Solder the eyelet boards

When all the parts and wires are in the right place and tightly wrapped, it's time to set the connections with solder.

Review the tips for great soldering on page 17, then solder each connection on the eyelet boards.

After soldering all the joints, clip the excess leads on the back and the front of the board. This is important to avoid a short in your circuit.

Check all your solder joints to make sure they're shiny.

☐ STEP 57

Install the four boards

Make sure you have enough length on the unsoldered jumpers coming through holes 7 and 29 to reach their components. To do this, lay the main eyelet board on the floor of the chassis where it will be mounted and adjust these jumpers.

Install the filter cap board and its insulation board first, on the exterior of the chassis. Run a 6-32 x 1/2" machine screw through the inside of the chassis and then lay down the insulation board, then the filter cap board. Secure it with a locknut on the outside of the chassis.

Feed the green, red, and white jumpers from the filter cap board through the grommeted hole under the input jack.

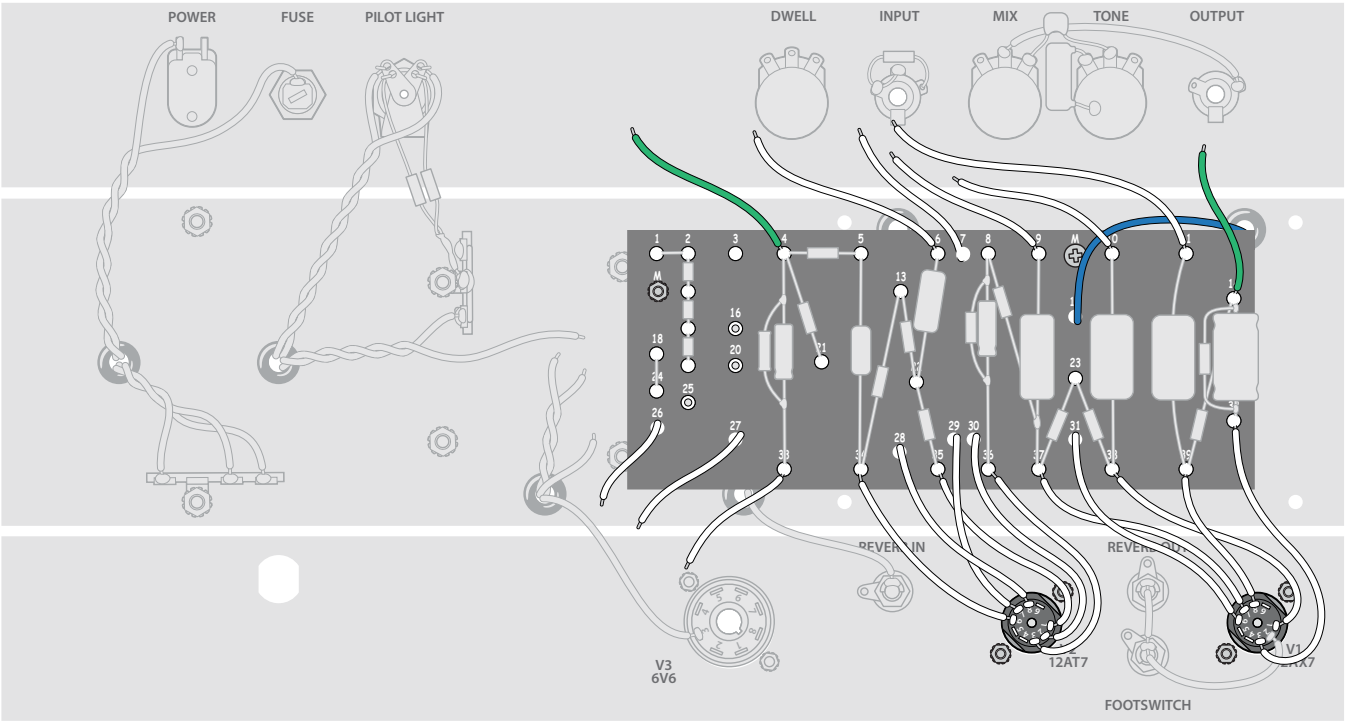
Inside the chassis, lay the insulation board down first and then the main eyelet board on top of it.

Line up the mounting holes and pass a 6-32 screw through the mounting hole in between eyelets 9 and 10. Pass this screw through the holes in the main eyelet board, main insulation board, chassis, filter cap insulation board, and filter cap eyelet board. Secure with a 6-32 locknut.

Feed the blue jumper coming from hole 17 through the grommeted hole under the output jack.

Pass a 4-40 screw through the other mounting hole on the main eyelet board and secure it on the other side of the chassis with a 4-40 locknut.

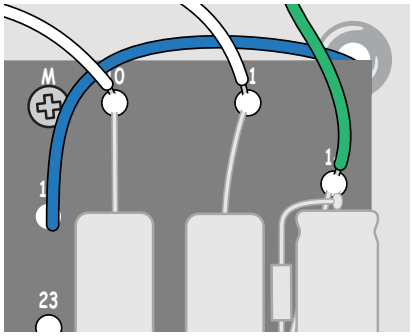
Connecting the eyelet board to the chassis components



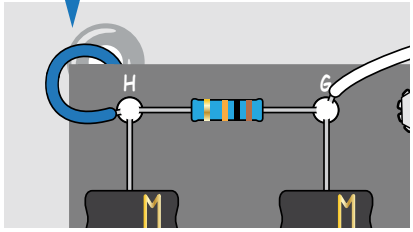
☐ STEP 58

Solder the blue jumper

Run the blue jumper coming from hole 17 through the grommet to the outside of the chassis and solder it to eyelet H of the filter cap board.



The blue jumper runs from inside to outside the chassis, where it connects to eyelet H on the filter cap board.



☐ STEP 59

Solder tube socket V1

Wrap the white jumper from eyelet 38 through pin 1 of socket V1 and solder in place.

Wrap the white jumper from hole 31 through pin 6 of socket V1 and solder in place.

Wrap the white jumper from eyelet 32 through pin 3 of socket V1 and solder in place.

Wrap the white jumper from eyelet 39 through pin 8 of socket V1 and solder in place.

Wrap the white jumper from eyelet 37 through pin 7 of socket V1 and solder in place.

Trim all excess wire ends and inspect your solder joints.

☐ STEP 60

Solder tube socket V2

Wrap the white jumper from eyelet 35 through pin 1 of socket V2 and solder in place.

Wrap the white jumper from eyelet 34 through pin 6 of socket V2 and solder in place.

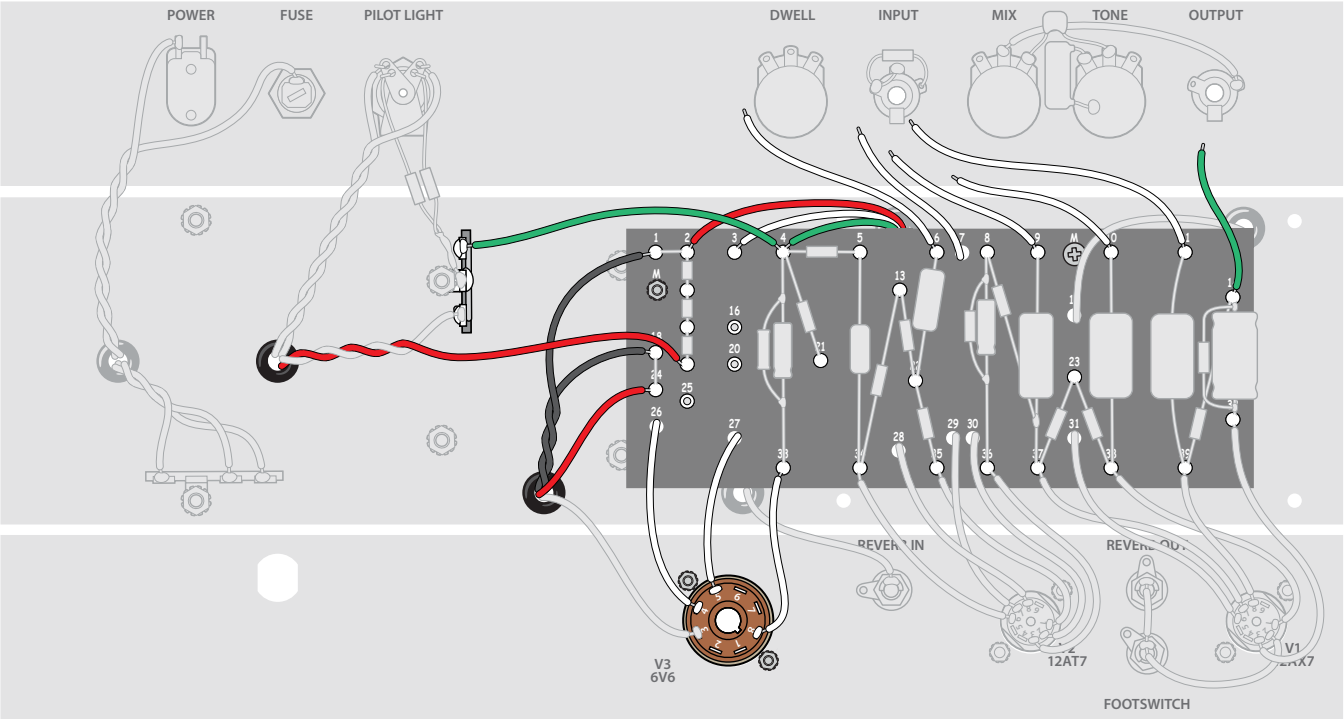
Wrap the white jumper from eyelet 36 through pin 3 of socket V2 and solder in place.

Wrap the white jumper from hole 28 through pin 8 of socket V2 and solder in place.

Wrap the white jumper from hole 29 through pin 7 of socket V2 and solder in place.

Wrap the white jumper from hole 30 through pin 2 of socket V2 and solder in place.

Trim all excess wire ends and inspect your solder joints.



☐ STEP 61

Solder tube socket V3

Wrap the white jumper from hole 26 through pin 4 of socket V3 and solder in place.

Wrap the white jumper from hole 27 through pin 5 of socket V3 and solder in place.

Wrap the white jumper from eyelet 33 through pin 8 of socket V3 and solder in place.

Trim all excess wire ends and inspect your solder joints.

☐ STEP 62

Connect the red wire from the output transformer

Coming through the grommeted hole near the back wall of the chassis will be the red output transformer wire. Solder this wire to eyelet 24.

☐ STEP 63

Connect the red wire from the power transformer

Solder the red power transformer lead to eyelet 19.

☐ STEP 64

Install the filter choke leads

Coming through the grommeted hole near the back wall of the chassis will be the black filter choke leads. Solder one of these leads to eyelet 1 and solder the other lead to eyelet 18.

☐ STEP 65

Solder the three leads from the filter cap board

Solder the white jumper coming from the filter cap board to eyelet 3.

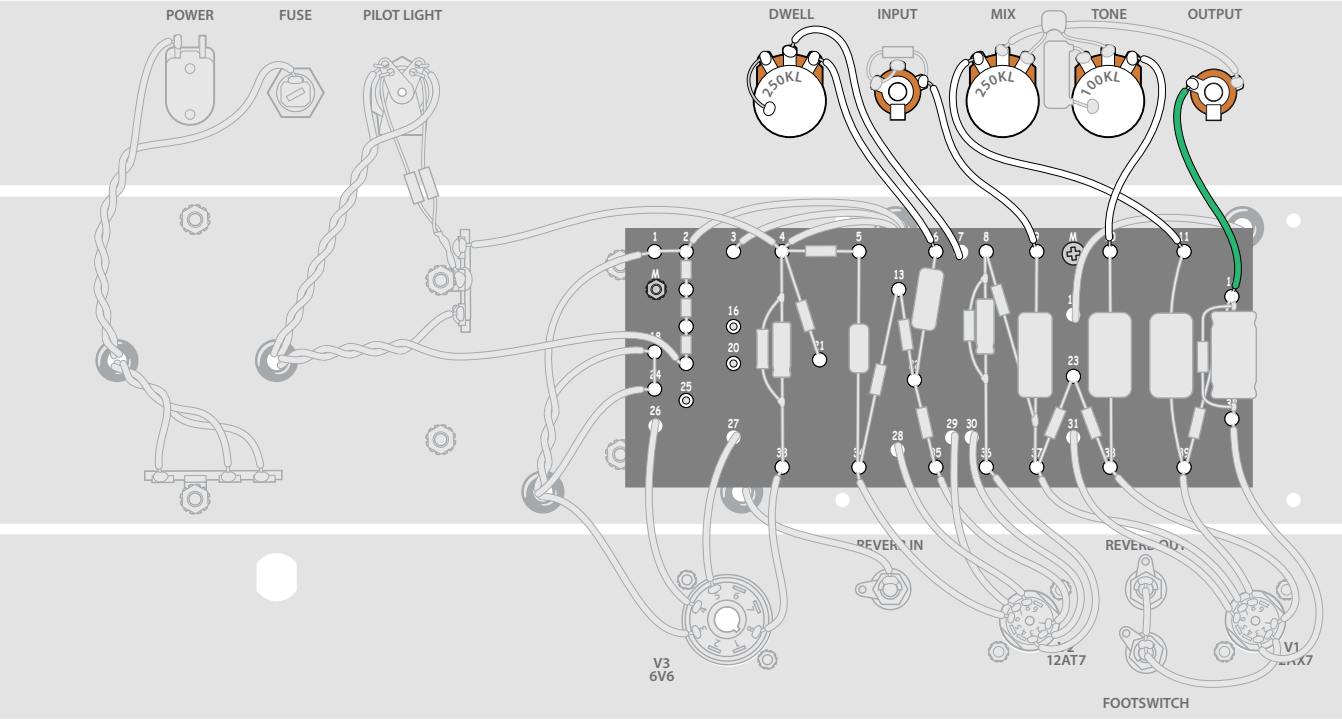
Solder the red jumper coming from the filter cap board to eyelet 2.

Solder the green jumper to eyelet 4.

☐ STEP 66

Solder a green jumper to ground

Solder the green jumper coming from eyelet 4 to the three-lug grounding strip under the pilot lamp.



☐ STEP 67

Solder the dwell pot

Cut a 1" green jumper and remove the insulation. Solder one end of this to the left lug of the dwell pot. Solder the other end to the back of the pot.

Solder the white jumper from hole 7 to the middle lug of the dwell pot.

Solder the white jumper from eyelet 6 to the right lug of the dwell pot.

☐ STEP 68

Solder the input jack

Solder the white jumper from eyelet 9 to the right lug of the input jack along with the resistor lead already in place.

Trim any excess leads and inspect all three solder joints on the jack.

☐ STEP 69

Solder the mix pot

Solder the white jumper from eyelet 11 to the left lug of the mix pot.

Trim the excess wires.

☐ STEP 70

Solder the tone pot

Solder the white jumper from eyelet 10 to the right lug of the tone pot.

Trim the excess wires.

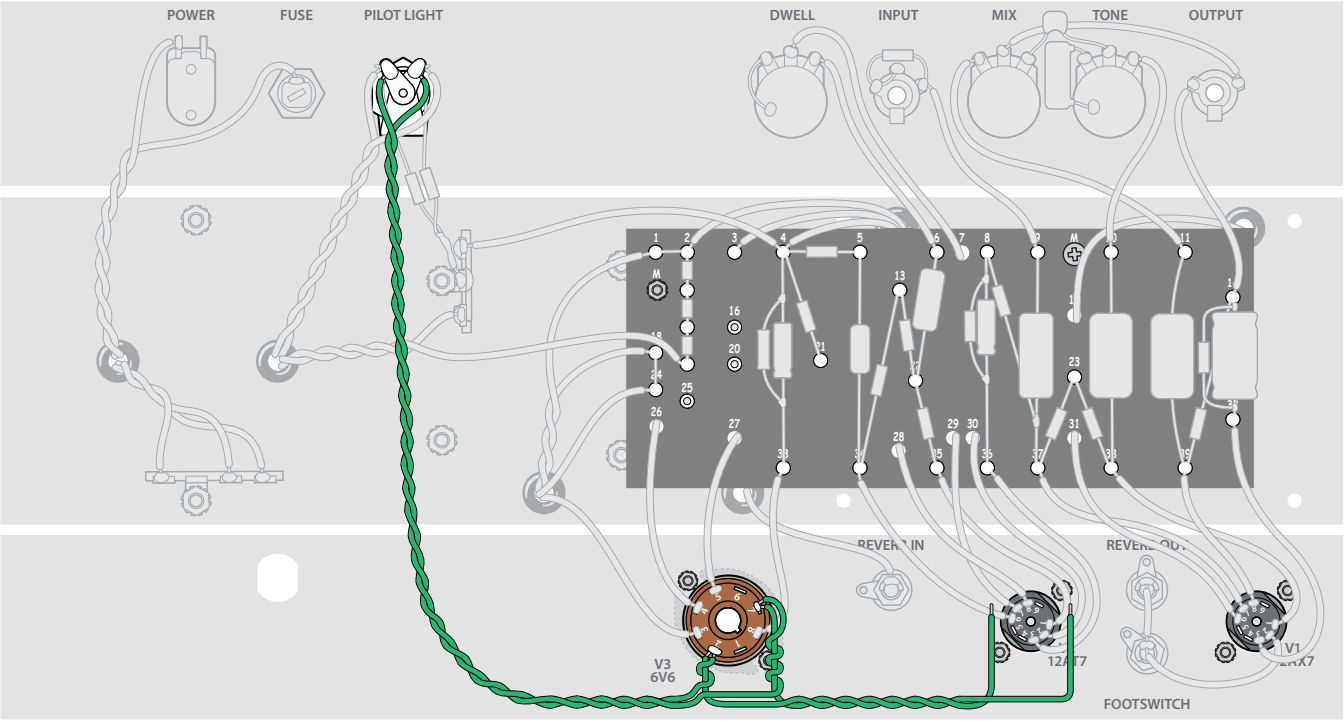
☐ STEP 71

Solder the output jack

Solder the green jumper from eyelet 14 to the left lug of the output jack.

Next you'll install the wires that power the heating elements in the tubes. That part's a little tricky, so review the following page carefully before you start on it.

Installing the heater wires



☐ STEP 72

Connect to the pilot lamp

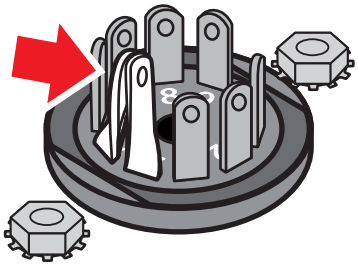
Cut two 8-1/2" green jumpers and twist them together, leaving one inch of untwisted wire on each side. Wrap the two wires from one side of this twisted pair through the two lugs of the pilot lamp assembly. Solder these leads into place with the two 100Ω resistors and the green power transformer leads.

☐ STEP 73

Connect to tube socket V3

Cut two 6" green jumpers. Twist them together very tightly and leave about 1" of untwisted jumpers on both sides. Take 1" of the new jumper and twist it in with 1" of the jumper coming from the pilot lamp assembly. Twist the other ends of 1" untwisted jumpers together. Solder one twisted pair into pin 7 of socket V3 and the other twisted pair into pin 2 of socket V3. Run these twisted pairs up an inch from the tube socket and turn them at a 90° angle toward the V2 socket.

On the remaining V1 and V2 sockets (both 9-pin tube sockets), twist pin 4 and pin 5 toward each other so that their eyelets line up. Be very careful while doing this as these pins are delicate.

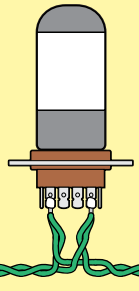


How to REDUCE THE HUM caused by AC voltage

These heater wires carry AC voltage that will cause hum if they get too close to wires that carry the signal. These tips minimize that hum.

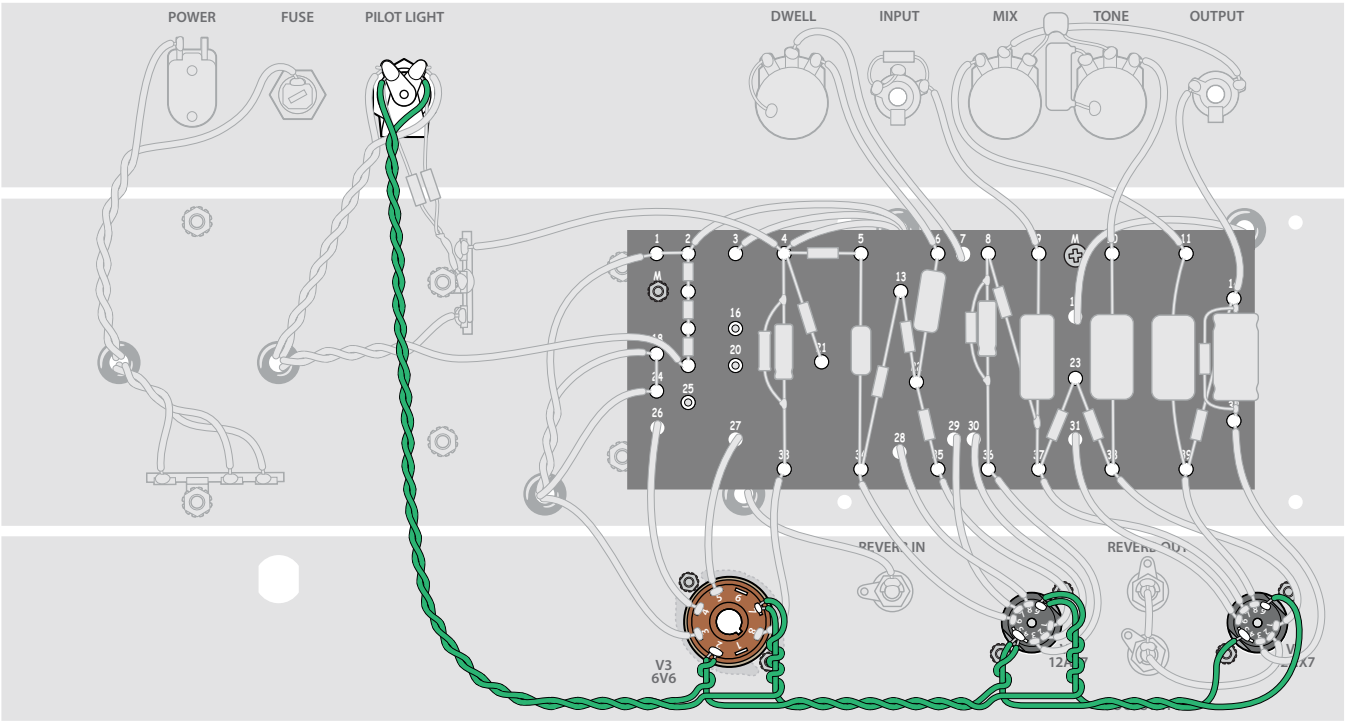
Twist the wires tightly

This reduces hum, the way opposite-wound coils do in a humbucking pickup. Twisted wires are easier to route away from signal wires.



Route them out and away

Let these wires stick out about an inch from the socket before bending them. This keeps the heater wires from mingling with the signal wires.



☐ STEP 74

Connect to tube socket V2

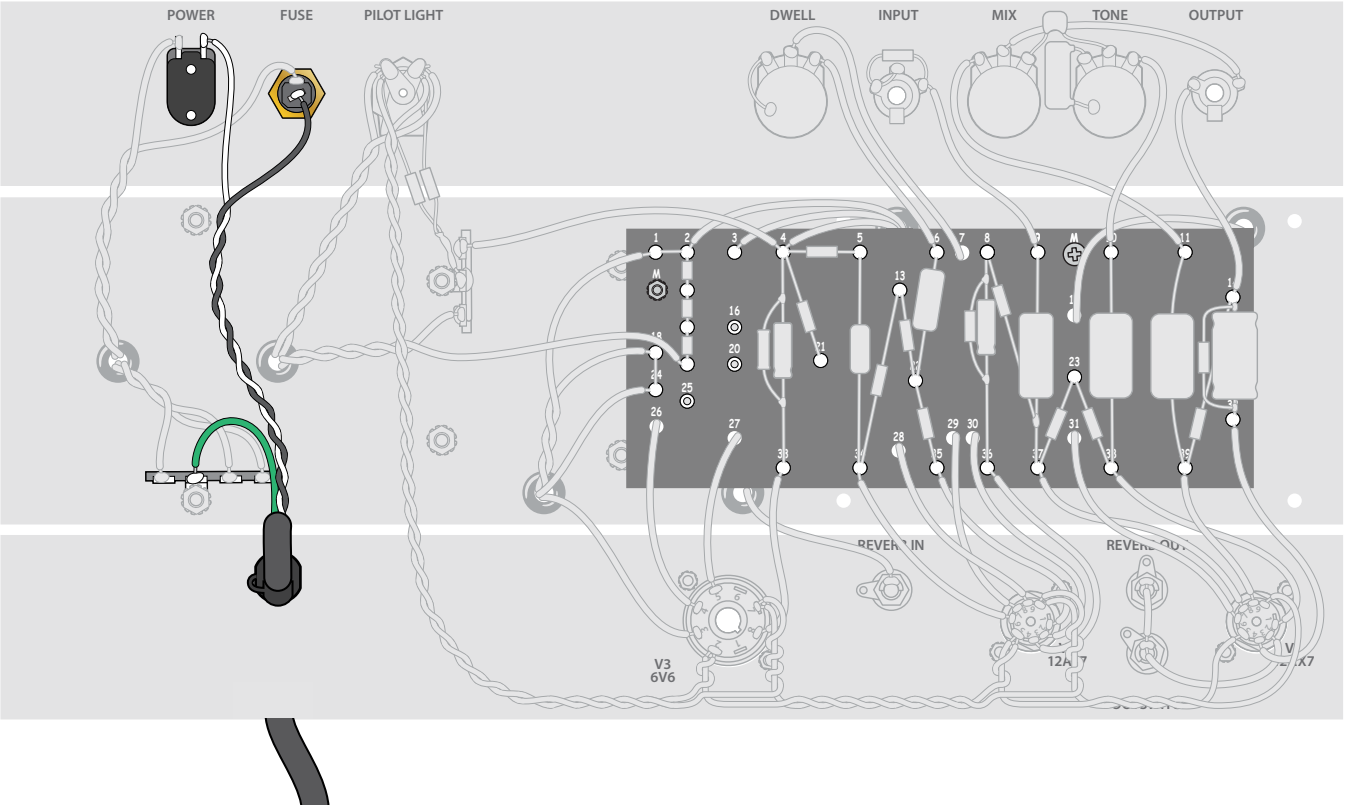
Cut two more 6" green jumpers. Twist them together very tightly and leave about 1" of untwisted jumpers on both sides. Take 1" of the new jumper and twist it in with 1" of the jumper coming from the pilot lamp assembly. Twist the other ends of 1" untwisted jumpers together.

Solder one pair of twisted wires into pin 4+5 of socket V2 and solder the other pair of twisted wires into pin 9 of socket V2. Run these twisted pairs up an inch from the tube socket and turn them at a 90° angle toward socket V1. Trim the excess wire.

☐ STEP 75

Connect to tube socket V1

Solder one wire from this last heater run into pin 4+5 of socket V1 and solder the other wire into pin 9 of socket V1.



☐ STEP 76

Add the power cord

Strip the power cord's outer insulation until the black and white leads can reach the power switch and fuse. Twist the black and white leads together.

Cut the green lead from the power cord to reach the grounded lug on the four-lug terminal strip as shown in the diagram. Tin this lead (see page 17) and wrap it onto the lug.

Pull the power cord leads through the hole in the chassis and secure with the black strain relief.

The strain relief is a tight fit. Use pliers to squeeze it onto the power cord outside the chassis, and keep squeezing to fit it into the mounting hole.

☐ STEP 77

Connect the power cord leads

Solder the power cord's white wire to the right lug on the power switch.

Solder the power cord's black wire to the center/back lug of the fuse socket.

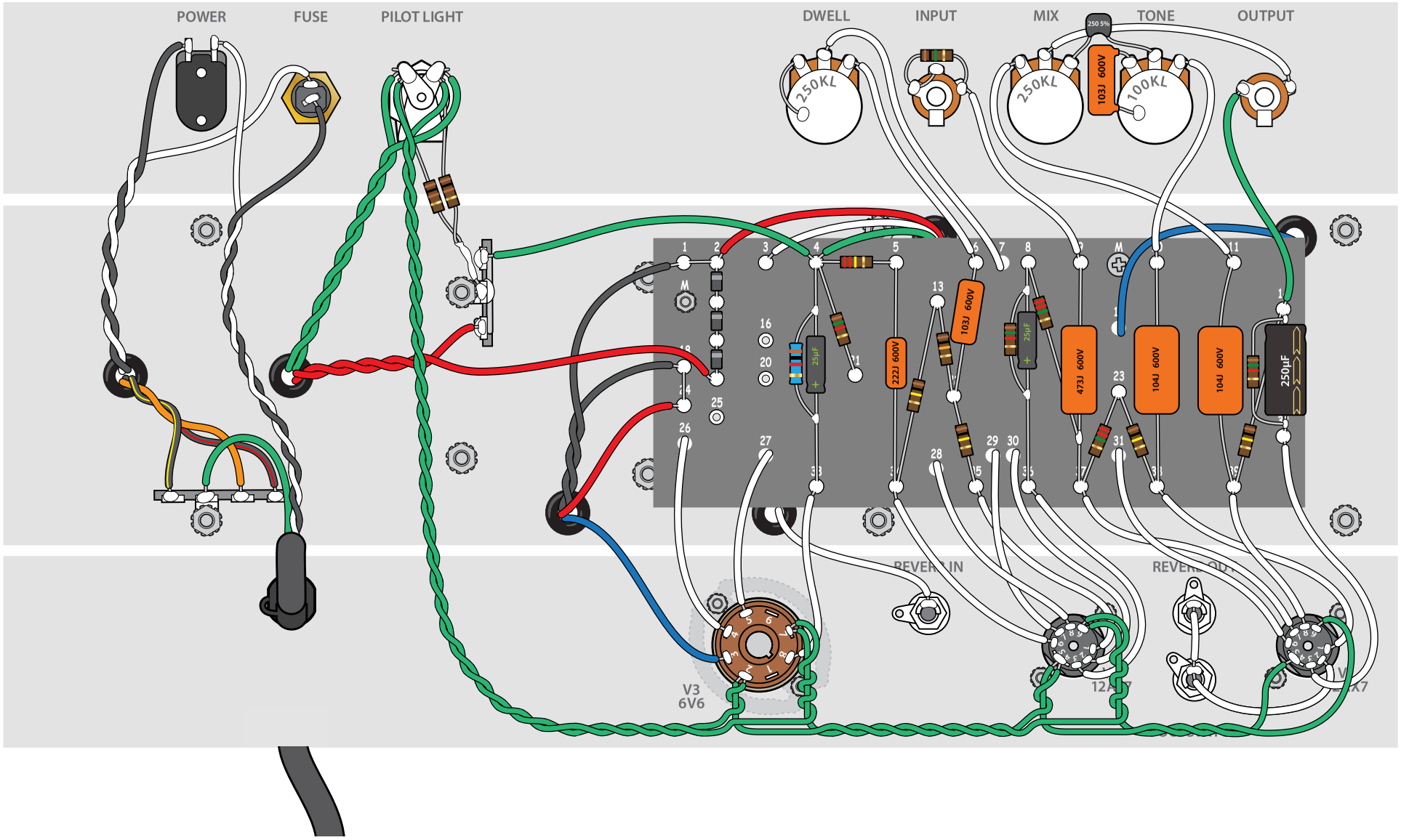
Danger: Soldering this lead to the side lug of the fuse socket will create a shock hazard.

Solder the power cord's green ground wire to the grounded lug of the terminal strip.

Take a break and review your work

You've soldered all the components and wires, and now it's time to take a break. Rest your eyes and review your work later, carefully searching out any errors before you move on.

Completed 6G15 wiring

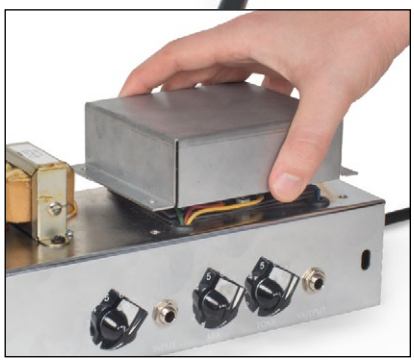


’64 REVERB UNIT

6G15 CIRCUIT SCHEMATIC

StewMac® ICON KITS

Final assembly



☐ STEP 78

Install the capacitor pan

Use the self-tapping screws to mount the capacitor pan on the chassis, covering the filter cap board.

☐ STEP 79

Install the fuse

Insert the 1-amp fuse into the fuse socket from the front of the chassis. Make sure the socket cap is secure. Never use a fuse rated above 1 amp in this unit.

☐ STEP 80

Install the pilot lamp bulb

Insert the pilot lamp bulb into its socket from the front of the chassis and twist until it locks in place. Screw the red jewel lens over the socket.

☐ STEP 81

Install the three control knobs

Turn the shaft of each pot to zero and install the knob so that the indicator line points to number 1.

☐ STEP 82

Connect the shielded cables to the reverb tank

Connect the two shielded cables you assembled in Step 3 to the in and out jacks on the reverb tank.

☐ STEP 83

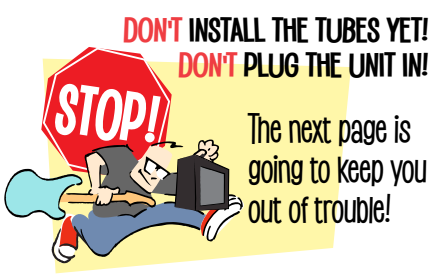
Install the chassis

Place the chassis in the cabinet. Run two 10-32 machine screws through the top of the cabinet into the chassis and fasten loosely with locknuts.

Hold the upper back panel in place and position the chassis flush against the panel. Tighten the locknuts.

Connect the shielded cable from the reverb tank's in jack to the reverb out jack on the chassis.

Connect the reverb tank's out cable to the reverb in jack on the chassis. You'll install the back panels later.



Any **multimeter** will work fine for the two types of tests we're about to do: checking **continuity** and reading **voltages**. The instructions that came with your meter will be helpful.

Continuity testing is simply making sure current flows between two points successfully. Touch the meter's red lead to one end of the section being tested, and the black lead to the other end. If the continuity is good, your meter will beep or register this on the display.

Voltage testing is where you need to be careful. Some steps require the unit to be plugged in and turned on. This becomes dangerous if you're not cautious. Respect the voltages and follow the directions, and these tests are safe and easy.

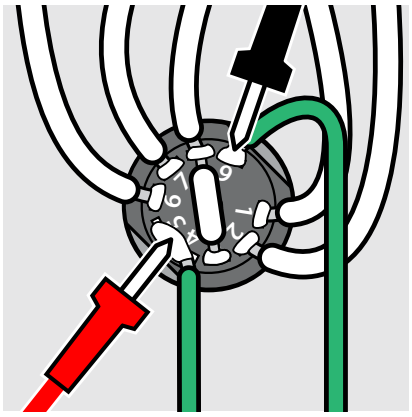
☐ STEP 84

Perform a safe power-up

At this point, there should be no tubes installed.

Before plugging the unit in, turn the power switch to ON. Switching the unit on before the first power-up protects you from shock if a mistake in your wiring has created a short to the chassis. If this short exists, an indication would be that the pilot light will not turn on, since the AC current is going directly to ground.

Plug the power cord in. The pilot lamp should light.



At this point, dangerous voltage is forming in the filter caps. Always discharge them before working on the circuit, even if the unit is unplugged. See how to use a snuffer stick on page 6.

For a few minutes, watch for smoke or unusual smells. If anything seems unusual, disconnect the power immediately and carefully review all your connections.

Set your multimeter to 20V AC. Check the heater voltage across pin 9 and pins 4+5 on socket V1. This should read between 5-7V AC. If this reading is drastically different, disconnect power and check your connections.

If the unit seems normal, unplug the power cord while still leaving the power switch ON.

☐ STEP 85

Test the dangerous DC voltage

The dangerously high DC voltage that passes through the three diodes and the filter caps is referred to as "B+". The next step is to test this B+ voltage.

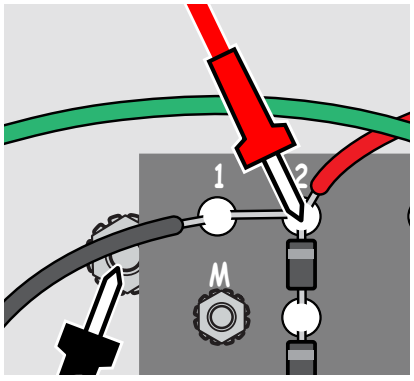
Plug the power cord back in.

Again, spend a few minutes watching for smoke or smells.

For safety, use only one hand to probe the unit during DC tests.

Keep your other hand behind your back when you need to probe a component. This way, you can't be a path between B+ voltage and ground—a mistake that would send a dangerous charge through your heart.

Seriously, keep one hand behind your back!



Set your multimeter to 500V DC and connect the negative lead to ground. Once the negative lead is secured to ground, measure the DC voltage at eyelet 2 for your B+ voltage. This should be roughly 420V DC.

Unplug the unit.

Danger: Remember to discharge the capacitors before working on the circuit. See how to use a snuffer stick on page 6.

☐ STEP 86

Test the preamp tubes

With the unit unplugged, you can install both of your preamp tubes. There are no indexing pins for the preamp sockets, but there is only one way to install these tubes in their sockets.

After these tubes are correctly installed, plug the unit back in. The pilot lamp should light up. Let the unit warm up for a few minutes. Again, if you get smoke or smells, unplug immediately.

Connect your multimeter's negative lead to ground.

Set the multimeter to 5V DC and check eyelet 32, which should read around 1.3V.

Set the multimeter to 200V DC and check eyelet 39, it should read around 130V.

If all of these voltages come within approximately 10% of their expected values, unplug the unit.

If the reading at eyelet 39 shows no voltage or low voltage, follow this test: Unplug the unit, drain the filter caps with the snuffer stick (instructions on page 6), set your meter to read continuity, and make sure you have properly installed the flying jumper from eyelet H of the filter cap board to eyelet 23 by testing for continuity between eyelet H of the filter cap board and eyelet 23.

If all of these voltages come within approximately 10% of their expected values, **unplug the unit.**

☐ STEP 87

Test the 6V6 power tube

With the unit unplugged, install the 6V6 power tube. Plug the footswitch into the back of the reverb unit.

Plug a guitar cable into the reverb unit's output jack. Plug the other end into your amp's input jack. Turn your amp on.

Perform these next tests with your amp turned away from you. If it starts to squeal, this helps protect your ears.

Plug the reverb unit in. After a few moments you should hear a low hum. If the hum becomes very loud, unplug the unit and your amp immediately and review your connections.

After the unit has warmed up for a few minutes attach your multimeter's negative lead to ground. Set your multimeter to read 5V DC and test for voltage at eyelet 36. This should read around 1.3V.

Set your multimeter to read 500V DC and test for voltage at pin 4 of socket V6. This should read around 285V.

If the readings are correct, plug in a guitar and play at low volume. If the reverb unit behaves as it should, keep increasing the dwell and mix and test the tone control. The reverb should saturate as you increase the dwell.

If the reverb isn't working, switch the cables in the reverb in and out jacks. If that doesn't remedy the issue, check your reverb cables again for a short.

If the unit squeals or seems unstable, use a wooden chopstick to probe for loose connections:

- from the input jacks to the board
- from the tube sockets to the board
- from the tube sockets to the front panel controls.

It usually takes just a minor wiring adjustment, perhaps resoldering a loose joint, to correct this sort of distortion.

☐ STEP 88

The last step

If the unit is stable and your tests match the voltages specified, feel free to let it rip!

If everything seems to be operating normally after playing for a few minutes, go ahead and turn the unit off. Install the cable clamp to mount the power cord on the side wall of the cabinet. Install the tube shields over the nine-pin tubes, and install the back panels.

Tube life

The life span of the power tubes is affected by how hard you drive the unit. If you are really driving the unit for hours every day, expect the power tube to have a shorter life span.

We encourage you to experiment with different tube brands and find the brand that is most favorable to your ears and your wallet.

For questions and support, StewMac is here to help!

For more than fifty years, StewMac has supplied instrument builders and repair shops. Our customer service team really knows how to help if you run into questions.

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Email: service@stewmac.com

Thanks for choosing this StewMac kit, and welcome to the world of amp building!

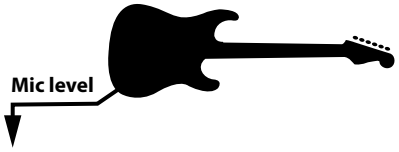
Learning more: secrets revealed in the schematic

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 unit creates the power needed to drive the spring reverb tank. 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.

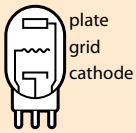
On the **wiring diagram** we build step-by-step in these pages, the parts are easier to recognize. But studying these color-coded stages will help you understand where each component fits into the creation of your sound.



Gain — Line level →

The gain circuit increases the signal strength to **line level** (about 1 volt), by passing it first through a 12AT7 preamp tube.

Inside the airless capsule of a tube, electrons flow from a heated **cathode** to be received by the anode **plate**. Between these two elements is a **grid** receiving the tiny voltage from the guitar. The guitar's varying musical signal controls the flow of electrons to the plate.



This three-part component is called a triode. The 12AT7 and 12AX7 tubes are dual-triode tubes; combining the elements of two tubes in one housing.

This circuit doesn't provide much gain to the signal from your guitar, because the focus of this reverb unit is signal processing.

Processing — Line level →

The processing stage shapes the **tone** of the signal. This begins with the **dwell pot**, which determines how long the reverb will linger in the sound.

The 6V6 tube receives the signal from the 12AT7 tube and drives the signal through the **reverb tank**. The 12AX7 tube then recovers the processed signal from the reverb tank and passes it to the **tone pot** for further processing. The tone pot determines the amount of highs or lows that are bled to ground. The tone pot then passes the processed signal to the **mix pot** where the processed signal is mixed back in with the "dry" signal. The dry signal is a part of the signal that was split from the input jack and sent to the mix pot unprocessed.

Output — Mic level → **Amp**

In a typical amp the signal is passed to the power tubes for final amplification and then sent to the output transformer to step down the voltage and step up the current to drive the speaker.

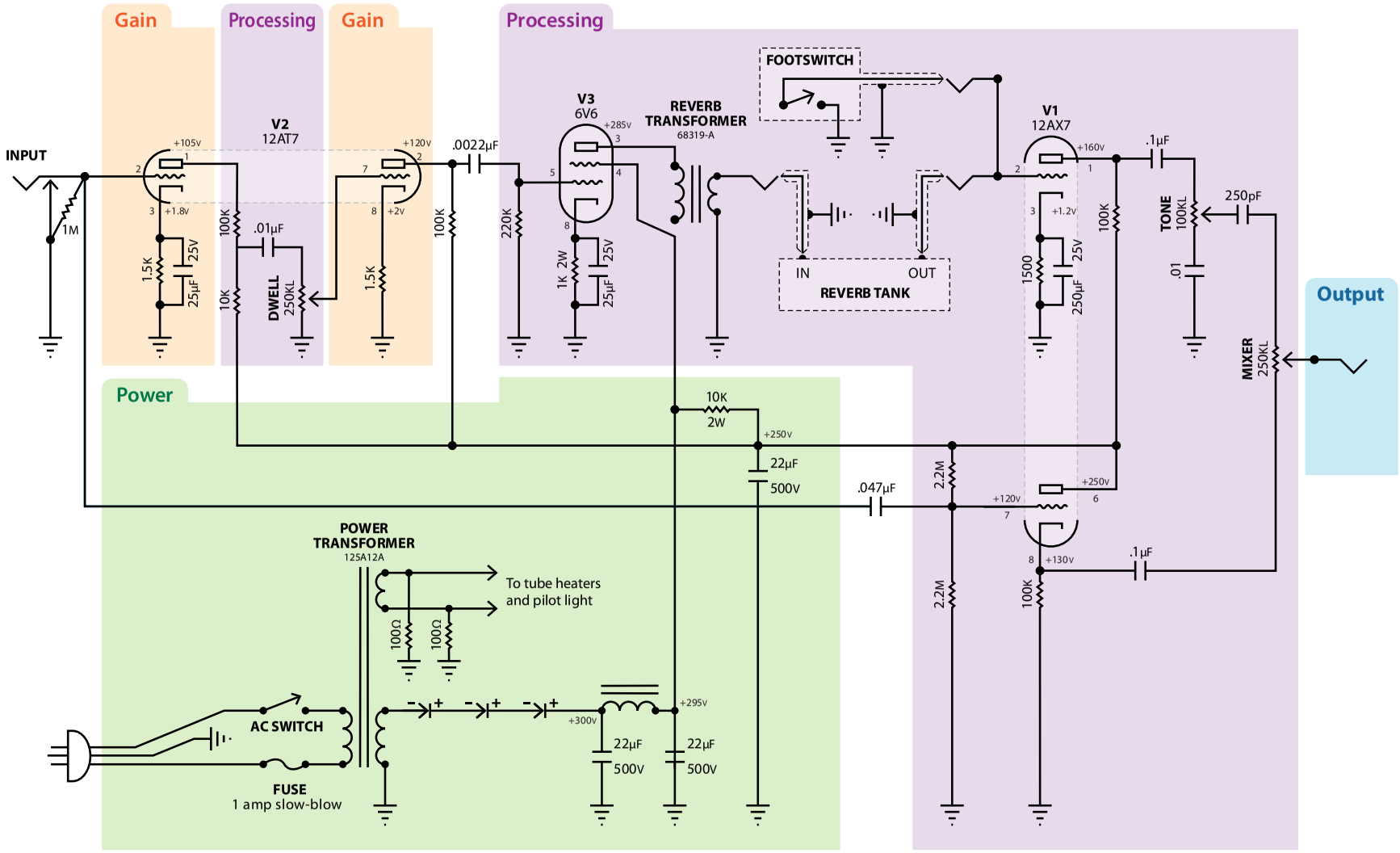
However, this is not a typical amp and doesn't have a typical output stage. This effects unit's output stage is simply the mixed signal that is sent from the mix pot to the output jack. This signal is a mic level signal, just like the one that comes out of your guitar.

Power

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

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 a series of three large electrolytic capacitors which filter out the pulsing to create a smooth current. As each cap smoothes a bit more, the current is also passing through resistors that lower the voltage.



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Resistor Capacitor Electrolytic Cap. Potentiometers Diode Transformer Jack Ground Shielded cable Preamp tube Power tube Rectifier tube

grid plate cathode

grid plate screen cathode

plate cathode plate filament

'64 REVERB UNIT

6G15 CIRCUIT SCHEMATIC

It's your amp. Your tone. You built it!

StewMac **ICON KITS** teach you the world of amp building, then turn you loose with amazing hand-built tone machines!

'57 MINI TWEED 5W AMP KIT

One-knob titan of tone.

A timeless studio darling whose tiny size hides tremendous punch and versatility.

The 5F1 circuit was meant to be a student amp but wasn't kid stuff for long; rock's finest guitarists hijacked it for some of the greatest songs ever recorded. Listen to Eric Clapton ("Layla") or Joe Walsh ("Rocky Mountain Way") while you build this amp!

Our simplest kit; the quickest way to get into amp building.

#10730 5 WATTS / 8" SPEAKER / ORIGINAL 5F1 CIRCUIT

DIFFICULTY
HOURS: **6**

'59 TWEED 15W AMP KIT

Dirty little devil that shaped guitar history.

With mysteriously fat saturated tone, this little monster makes it easy to achieve seismic distortion.

This amp's 5E3 circuit is an enigma: Why do the controls on the channel you're NOT using make your tone so great? The answer: Who cares? This is one of the greatest tone monsters ever created! Listen to Neil Young's *Rust Never Sleeps* while building this kit.

Our most popular amp kit and a great learning experience.

#10731 15 WATTS / 12" SPEAKER / ORIGINAL 5E3 CIRCUIT

DIFFICULTY
HOURS: **8**

'65 P-REVERB 15W AMP KIT

Sparkling bright, perfect for the surf.

Plug your single-coils straight in for that signature clean American tone, or go surfing with onboard effects.

The smallest member of the black-panel family to offer reverb and tremolo, this amp made its name as a jangly pop dream machine. Aficionados treasure its early low-end breakup powered by a pair of 6V6 tubes.

Listen to "Surfin' USA" and the great sounds of Ryan Adams.

#10734 15 WATTS / 10" SPEAKER / ORIGINAL AA1164 CIRCUIT

DIFFICULTY
HOURS: **12**

'66 D-REVERB 22W AMP KIT

Famously clean, with enough guts to gig.

Perfect for recording as well as performing, the D-Reverb produces stinging clarity that absolutely refuses to get lost in the mix.

One of the most popular designs ever, this amp lives in the happy middle between bright clarity and rich distortion. It excels in the studio and on the stage. While capable of crystal clear tones at good volume, you can push this one into beautifully saturated, play-sensitive distortion.

It's all here: clarity, distortion, and rectifier tube sag.

#10737 22 WATTS / 12" SPEAKER / ORIGINAL AB763 CIRCUIT

DIFFICULTY
HOURS: **16**

Beginner-tested. Pro quality.

StewMac **ICON KITS** are fun to build, with friendly instructions to guide you and loads of info to add to your knowledge.

'62 BRIT-PLEX 45W AMP KIT

The original British showstopper.

This amp started a revolution. It's been rocking the world for over 50 years, and we still can't get enough.

Favored by blues and rock players for exceptional sustain and rich creamy tone, the '62 Brit-Plex is chock-full of harmonic gain, yet it still stays articulate and even a little crispy. Put this head on a classic 4x10 cab and watch out!

While building, listen to Gary Moore's "Still Got The Blues."

#10736 45 WATTS / ORIGINAL 1962 CIRCUIT

DIFFICULTY
HOURS: **12**

'81 BRIT-800 50W AMP KIT

This hairy monster lives to shred.

The defining British circuit that dominated the '80s.

This 50W giant created your favorite heavy rock and metal albums. Used by Slayer and Pixies, and recorded on early Metallica albums, this circuit produces that screaming guitar tone that your mother despises. With solid-state rectification there's no sag, and the distortion created by this circuit is way more about treble than mids or bass.

Listen while building: Smashing Pumpkins' *Siamese Dream*.

#10735 50 WATTS / ORIGINAL 1981 CIRCUIT

DIFFICULTY
HOURS: **16**

'66 BRIT-74X 18W AMP KIT

Leave your half-stack at home.

Born in London, this little blues blaster earns its living every night, gigging in clubs across the USA.

Launched in 1966, this amp quickly became a low-wattage holy grail. This is a stripped down blues machine: two channels, one tone knob, no master volume. Buckle up and go where this gritty beast takes you! It comes with a footswitch to kick in the onboard tremolo.

Get the plexi tone without blowing the roof off the joint!

#10732 18 WATTS / 12" SPEAKER / ORIGINAL 1965 CIRCUIT

DIFFICULTY
HOURS: **12**

'64 REVERB UNIT KIT

Reverb you can't get from a pedal.

This is the unit that put the waves in surf music! Looks like an amp, sounds like a beach party.

This tube-driven reverb tank relies on good ol' physics for a perfect effect. Your guitar signal travels along two large suspended springs to produce the reverb that launched the iconic surf sound. This isn't a pocket-sized digital simulation; this is the real deal!

Listen to Dick Dale's "Misirlou" while doing this easy build.

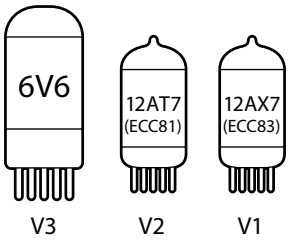
#10733 ORIGINAL 6G15 CIRCUIT

DIFFICULTY
HOURS: **8**

StewMac® ICON KITS

'64 REVERB UNIT
ORIGINAL 6G15 CIRCUIT

DANGER: Unplug the unit before changing tubes.
Tube locations from left to right:




Use only 1-amp slow-blow fuse.

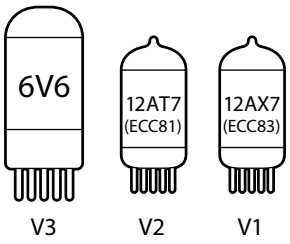
#10733

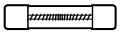
Cut this label on the dotted line with a razor knife and metal straightedge.
Fasten it to the bottom of the cabinet using thinned wood glue or contact cement.
The duplicate copy is included as a backup.

StewMac® ICON KITS

'64 REVERB UNIT
ORIGINAL 6G15 CIRCUIT

DANGER: Unplug the unit before changing tubes.
Tube locations from left to right:




Use only 1-amp slow-blow fuse.

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