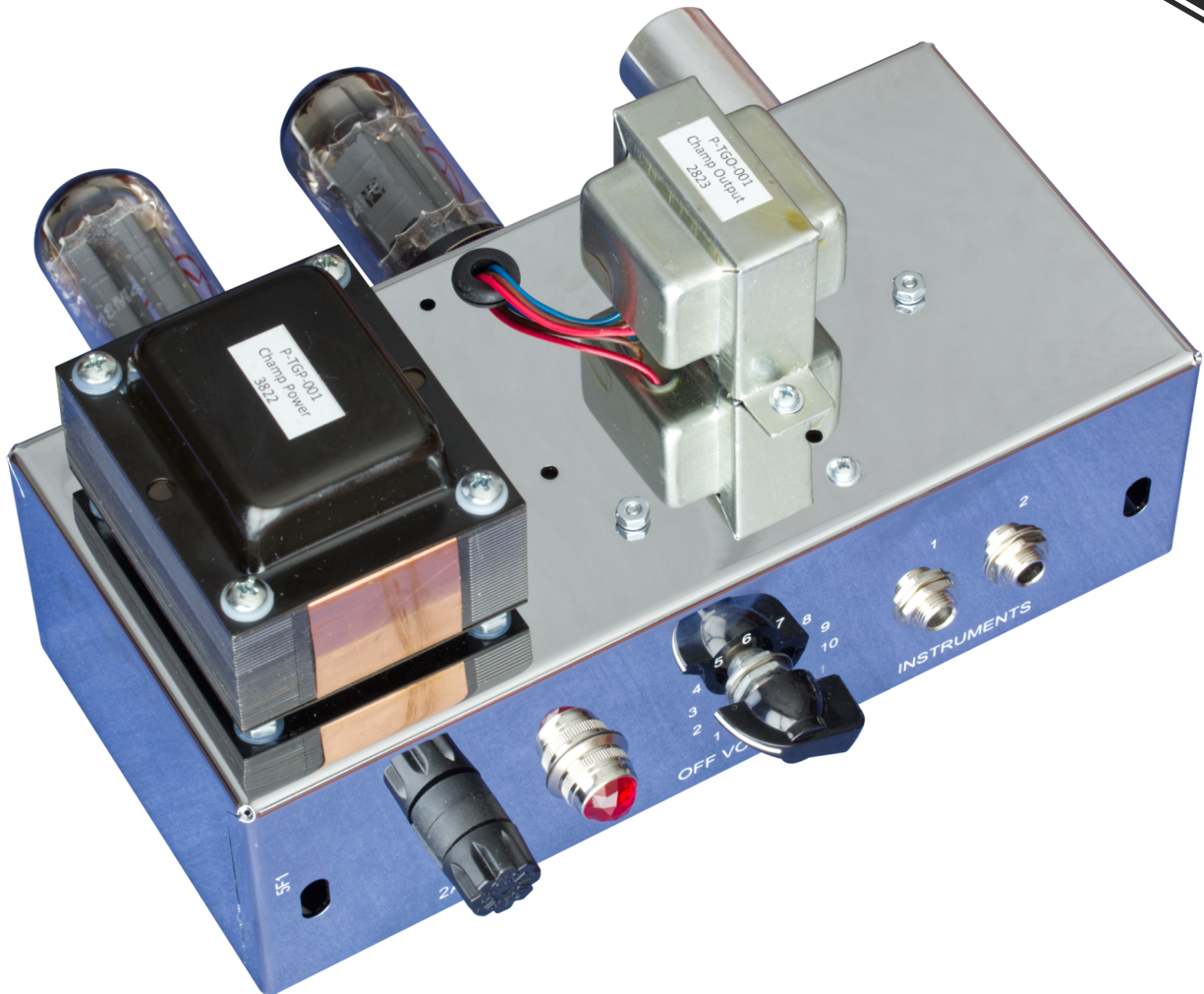


5F1 Chassis Kit

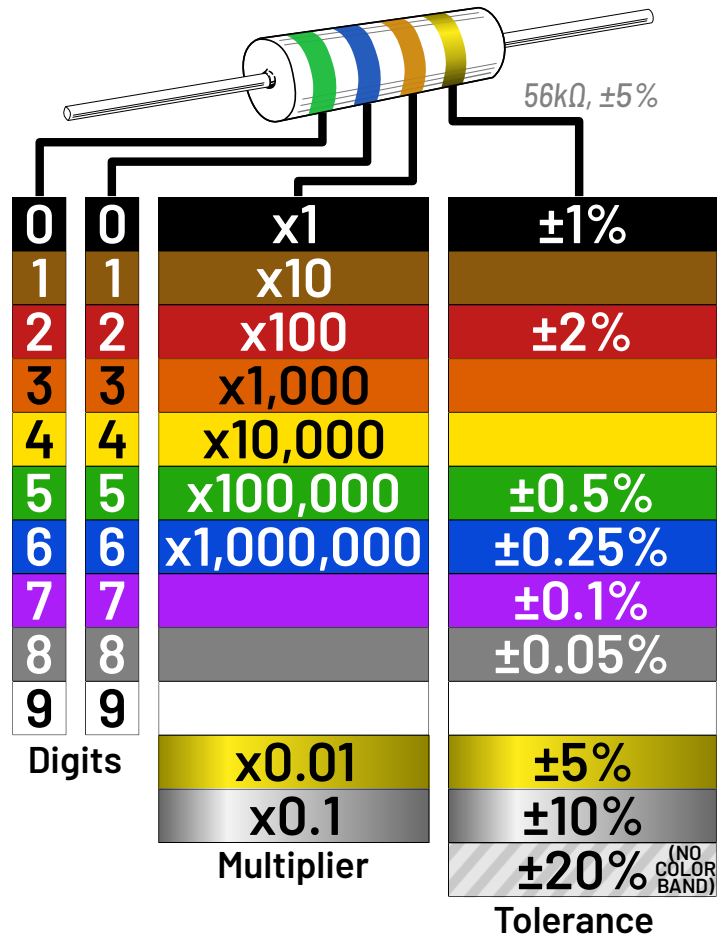


This kit provides all the chassis components to recreate one of the most beloved amps in history, known for its warm, rich tones and straightforward design. The project offers a rewarding and educational experience for both experienced DIYers and newcomers to the world of tube amplifiers. The step-by-step guide is designed to help builders through the entire assembly process, providing everything required to successfully complete the 5F1 amp chassis kit.

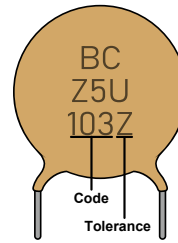
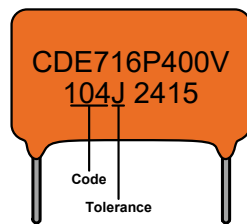
The 5F1 chassis kit is crafted to match the original specifications of the classic circuit, featuring high quality parts that best replicate the vintage units. This ensures that the finished amp not only looks authentic but also delivers the classic vintage sound. With clear instructions, detailed diagrams, and helpful tips, the building process is both engaging and enjoyable.



4-BAND RESISTOR COLOR CODE CHART



CAPACITOR CODE CHART



Picofarad pF	Nanofarad nF	Microfarad uF	Code	Picofarad pF	Nanofarad nF	Microfarad uF	Code	Tolerance
10	0.01	0.00001	100	2200	2.2	0.0022	222	E: 0.5%
12	0.012	0.000012	120	3300	3.3	0.0033	332	F: ±1%
15	0.015	0.000015	150	4700	4.7	0.0047	472	G: ±2%
22	0.022	0.000022	220	5600	5.6	0.0056	562	J: ±5%
33	0.033	0.000033	330	6800	6.8	0.0068	682	K: ±10%
47	0.047	0.000047	470	10000	10	0.01	103	M: ±20%
56	0.056	0.000056	560	15000	15	0.015	153	P: +100%, -0%
68	0.068	0.000068	680	22000	22	0.022	223	Z: +80%, -20%
82	0.082	0.000082	820	33000	33	0.033	333	
100	0.1	0.0001	101	47000	47	0.047	473	
120	0.12	0.00012	121	56000	56	0.056	563	
150	0.15	0.00015	151	68000	68	0.068	683	
220	0.22	0.00022	221	100000	100	0.1	104	
330	0.33	0.00033	331	150000	150	0.15	154	
470	0.47	0.00047	471	220000	220	0.22	224	
560	0.56	0.00056	561	330000	330	0.33	334	
680	0.68	0.00068	681	470000	470	0.47	474	
820	0.82	0.00082	821	560000	560	0.56	564	
1000	1	0.001	102	680000	680	0.68	684	
1500	1.5	0.0015	152	1000000	1000	1	105	

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Required Tools

Adjustable Wrench
Cutters
Needlenose Pliers
Phillips Head Screwdrivers
Ruler
Solder (No Clean Type)
Soldering Iron (70W+)
Multimeter with Standard Probes & Alligator Clip Leads
Wire Stripper
Xacto Knife or Similar Cutting Tool
4Ω Speaker with Speaker Cable
Electric Guitar with Instrument Cable
Heat Gun

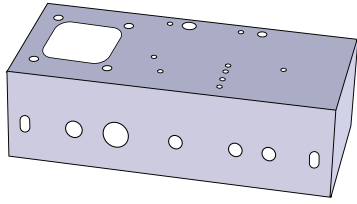
Optional Recommended Tools

Self-adjusting Wire Stripper
Strain Relief Pliers
Socket Drivers
Desoldering Braid
Desoldering Pump
Helping Hands
Non Slip Bench Mat
Speaker Cable Extension

Parts List

	R-PR02-1D5K	Qty 2	1.5kΩ 2W Metal Film Resistor
	R-PR02-22K	Qty 2	22kΩ 2W Metal Film Resistor
	R-PR02-68K	Qty 2	68kΩ 2W Metal Film Resistor
	R-PR02-100K	Qty 2	100kΩ 2W Metal Film Resistor
	R-PR02-220K	Qty 1	220kΩ 2W Metal Film Resistor
	R-PR02-1M	Qty 1	1MΩ 2W Metal Film Resistor
	R-PR03-470	Qty 1	470Ω 3W Metal Film Resistor
	R-PR03-10K	Qty 1	10kΩ 3W Metal Film Resistor
	C-ET25-50-MOD	Qty 2	25uF 50V Electrolytic Capacitor
	C-ET8-475-MOD	Qty 2	8uF 475V Electrolytic Capacitor
	C-ET16-475-MOD	Qty 1	16uF 475V Electrolytic Capacitor
	C-RD022-600	Qty 2	0.022uF 600V Film Capacitor (223J)

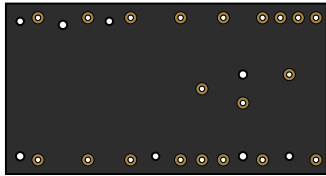
Parts List



P-HCH05-B

Qty 1

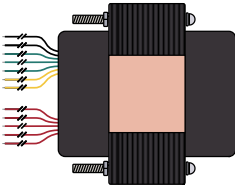
5F1 Chassis



P-HEYE-1

Qty 1

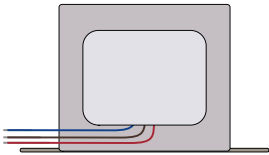
5F1 Eyelet Board with Bottom



P-TGP-001

Qty 1

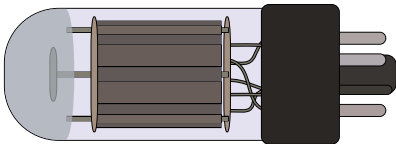
5F1 Power Transformer



P-TGO-001

Qty 1

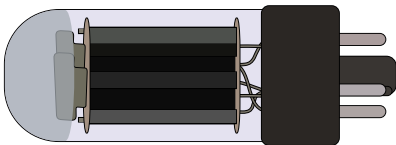
5F1 Output Transformer



T-6V6-S-JJ

Qty 1

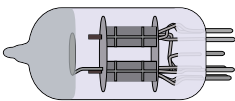
6V6S (6V6GT) Power Tube



T-5Y3-S-JJ

Qty 1

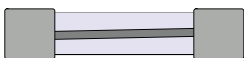
5Y3S (5Y3GT) Rectifier Tube



T-12AX7-S-JJ

Qty 1

ECC83S (12AX7) Preamp Tube



F-Z3AG-S2

Qty 1

2A 3AG Slow Blow Fuse



S-H210

Qty 1

Fuse Holder

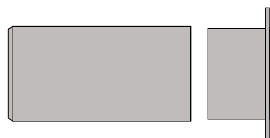
Parts List



P-ST9-700

Qty 1

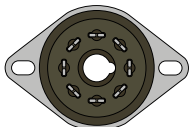
Noval Socket



P-SS9-400

Qty 1

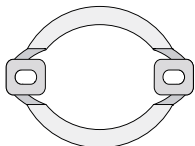
Noval Socket Shield & Base



P-ST8-209MIP

Qty 2

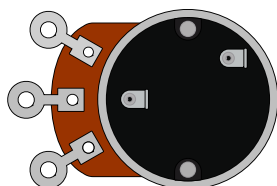
Octal Socket



S-H142

Qty 2

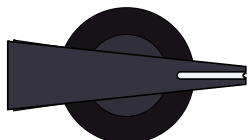
Octal Socket Tube Retainer



R-VS-1MA-SS

Qty 1

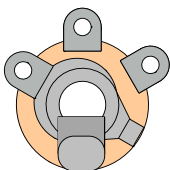
Switched A1MΩ Potentiometer



P-K300

Qty 1

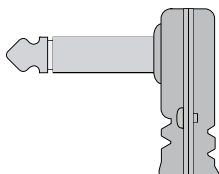
Chickenhead Knob



W-SC-12A

Qty 3

Switched 1/4" Jack

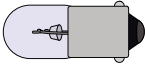
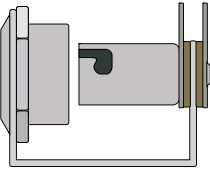


W-SC-228

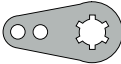
Qty 1

Right Angle 1/4" Plug

Parts List

	P-L115	Qty 1	Red Jewel
	P-47	Qty 1	47 Bulb
	P-L124-P	Qty 1	Pilot Light Socket
	P-GROM-18	Qty 1	1/8" Inner Diameter Rubber Grommet
	P-GROM-14-S	Qty 1	1/4" Inner Diameter Rubber Grommet
	P-H1350	Qty 1	Power Cord Strain Relief
	S-W133	Qty 1	3 Conductor Power Cord
	S-W902Y	6 ft	22AWG Yellow Wire
	S-W902R	1 ft	22AWG Red Wire
	S-W903G	4 ft	18AWG Green Wire
	S-W903W	1 ft	18AWG White Wire
	S-W903B	1 ft	18AWG Black Wire
	S-W3817	1 ft	20AWG Bus Wire
	S-S-MHS-116	1 ft	1/16" Heat Shrink Tubing
	S-MHS-332	1 ft	3/32" Heat Shrink Tubing

Parts List

	S-HS440-14	Qty 9	4-40 x 1/4" Pan Head Screw
	S-HS440-12	Qty 2	4-40 x 1/2" Pan Head Screw
	S-HHN440	Qty 13	4-40 Nut
	S-HHN832	Qty 4	8-32 Nut
	S-H113	Qty 4	#8 Solder Lug
	S-HW4	Qty 6	#4 Flat Washer
	S-HLW4	Qty 10	#4 Lock Washer
	S-HLW8	Qty 1	#8 Lock Washer

Notes on Wired Connections

This section covers stripping and dressing the various wires used throughout this kit.

Instructions Terminology

Throughout these instructions, you will be guided to make various wire connections. Typically, these steps will instruct you to 'connect a wire from one point to another.' Occasionally, a specific length will be specified. It's important to follow these measurements precisely.

In other steps, you will be instructed to 'trim and connect' a wire that is already installed to components, like the transformers or wires previously connected to the eyelet board or elsewhere. For these steps, first line up the wire to gauge the required length. Ensure the wire is not pulled taut, allowing for some slack.

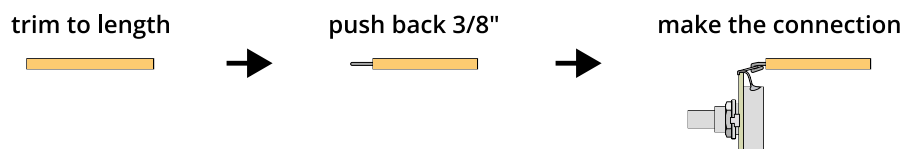
You will sometimes want to route wires away from or around other components. This keeps the build tidy and prevents wires from blocking access to solder lugs and other connections. In the drawings, the individual wires are laid out to avoid overlapping for clarity, but their basic routings are good examples to follow. It is perfectly fine if the wires in your build overlap one another as long as metal contacts don't touch.

Once you are satisfied with the length and routing, cut the wire. Prepare the wire appropriately for its type and then make the connection as instructed.

Preparing Cloth-Covered Wires

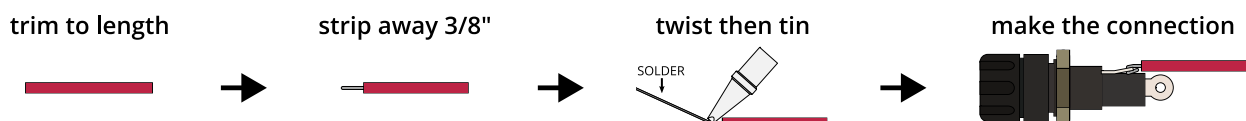
The majority of the wire used throughout this kit is cloth-covered wire. The type included is stranded wire, which allows flexibility, but it includes a top coat of solder to help it hold shape. Additionally, no tinning is required which makes building with this type of wire a breeze.

Cloth-covered wire like this is commonly referred to as "push back" wire. This is because you can simply trim the wire to length and then push back the cloth insulation rather than stripping it with wire strippers. First, make a clean cut with a sharp pair of cutters. Then, carefully push the cloth cover back to expose $\sim 3/8"$ of the bare wire. Try to avoid fraying the cloth when pushing it back. As mentioned, no additional tinning is required so you can now make the connection.



Preparing PVC-Insulated Wires

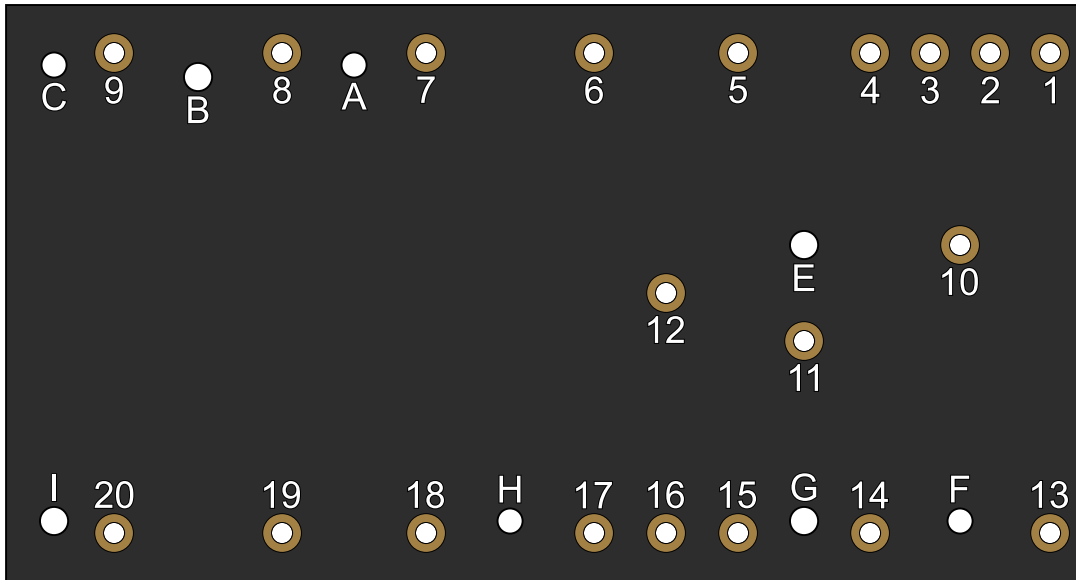
Some wires, like the power cord and transformer wires, are PVC-insulated. To prepare these wires you will need to strip and tin them before making the connection. Once trimmed to length, use wire strippers to remove $\sim 3/8"$ of the insulation. Twist the bare end of the wire and then tin it with a soldering iron. You can now make the connection.



Notes on Fiberboard Construction

This section covers basic fiberboard construction.

Board Layout

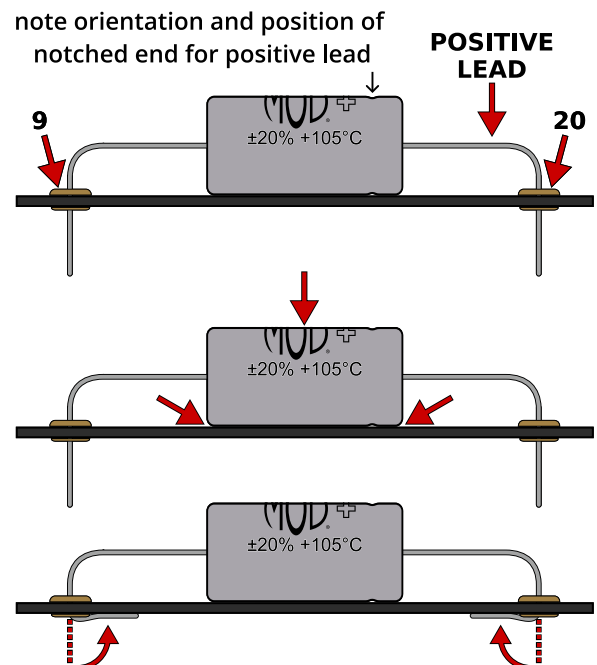


Orient the fiberboard as shown above. The eyelets will be referenced by the numbers shown on this drawing throughout the instructions. Similarly, the empty holes will be referenced by the letters shown here. These numbered and lettered holes will be used when mounting the various parts. For example, you might be instructed to connect an electrolytic capacitor from eyelet 9 to 20 with the positive lead at 20. For the empty holes, you will be instructed to pass a wire through them. These wires may connect to an eyelet through the back of the board. Alternatively, the wire may pass back through another hole to be routed to an eyelet on the top of the board or elsewhere in the amp.

Mounting and Soldering Parts

When instructed to mount a part to the board, line the part up with the two holes and then bend the leads so each lead can pass through the eyelets. Make sure that the label is facing upwards so you can clearly read the capacitance or other pertinent info for the type of part being mounted. Make sure that the body of the part sits flush to the board.

Once the part is oriented correctly and flush to the board, bend the leads on the underside of the board to secure the component to the board. Do this by pushing each lead inwards and completely flat to the board. The part should now be held tightly to the board.



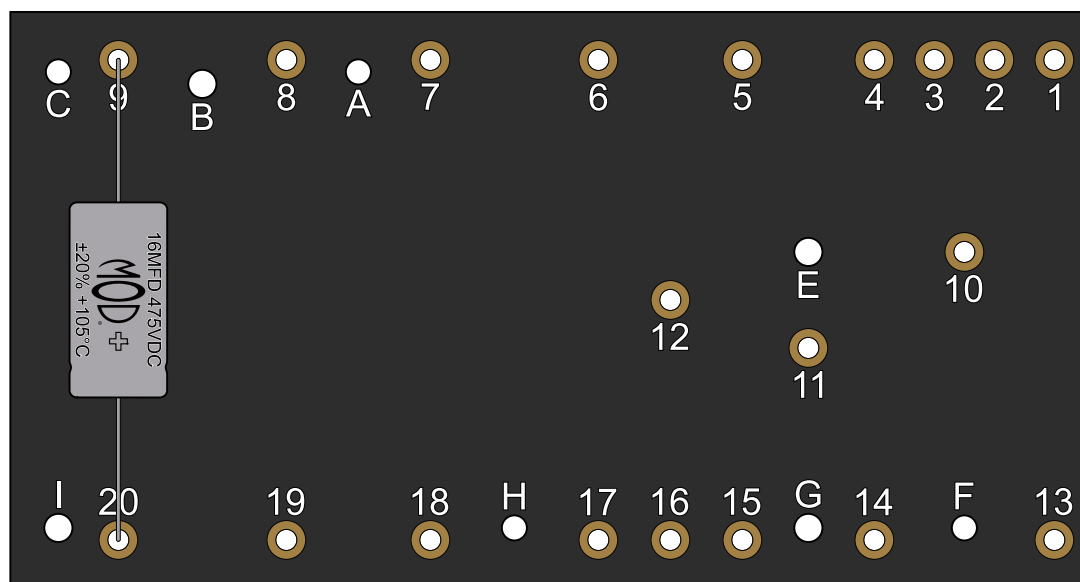
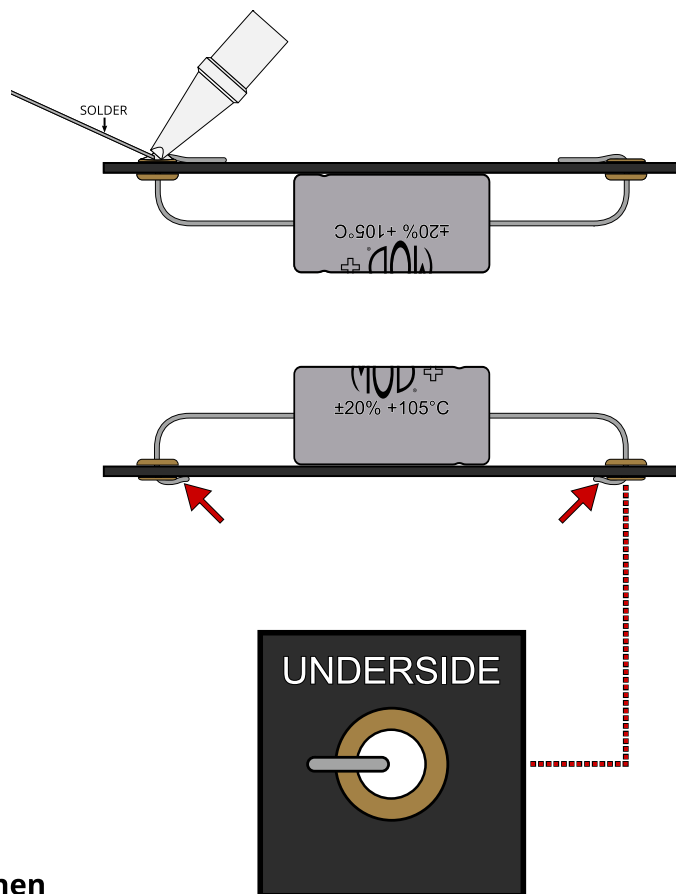
Notes on Fiberboard Construction

Mounting and Soldering Parts (cont.)

At this point you may be instructed to solder one or both of the eyelets. If so, make sure your soldering iron is fully warmed up before soldering. Position the tip of the iron so that it is touching both the metal eyelet and the lead or leads of the mounted components. Slowly feed solder onto the eyelet. The solder should flow evenly across the eyelet and completely fill the hole. You may need to move the end of the solder strand around the eyelet to ensure that the eyelet is fully filled with solder and that it is also bonding to the lead of the component. Once fully flowed, remove both the solder strand and iron from the eyelet and components.

With the component soldered to the board, use a pair of cutters to trim the excess leads on the underside of the board.

Be sure to carefully follow the various connections listed in the instructions. **Only solder an eyelet when instructed.** Some eyelets will connect multiple parts or offboard wire connections that appear later in the instructions.



5F1 Eyelet Board Construction

Please fully review the safety information on page 37 before beginning. Locate the 5F1 Eyelet Board. The following steps will cover the placement and soldering of all parts that are mounted on this board. Use the Parts List as a reference.

5F1 Eyelet Board: Part 1

A1-1: Locate a 1.5K Ω resistor. Its color bands are brown, green, red, gold. Next, locate a 25 μ F 50V capacitor. Bend the leads of the resistor to each cross perpendicularly with the leads of the capacitor. Wrap the resistor's leads around the capacitor's leads and solder the wrapped areas to bond the resistor to the capacitor. Connect the negative lead to eyelet 1 and the positive lead to eyelet 13.

A1-2: Connect a 5" piece of yellow wire to eyelet 1. Solder eyelet 1 now.

A1-3: Connect a 4" piece of yellow wire to eyelet 13. Solder eyelet 13 now.

A1-4: Locate a 68K Ω resistor. Its color bands are blue, gray, orange, gold. Connect this resistor from eyelet 2 to 10.

A1-5: Connect a 3" piece of yellow wire to eyelet 2. Solder eyelet 2 now.

A1-6: Locate the other 68K Ω resistor. Connect this resistor from eyelet 3 to 10.

A1-7: Connect a 3" piece of yellow wire to eyelet 3. Solder eyelet 3 now.

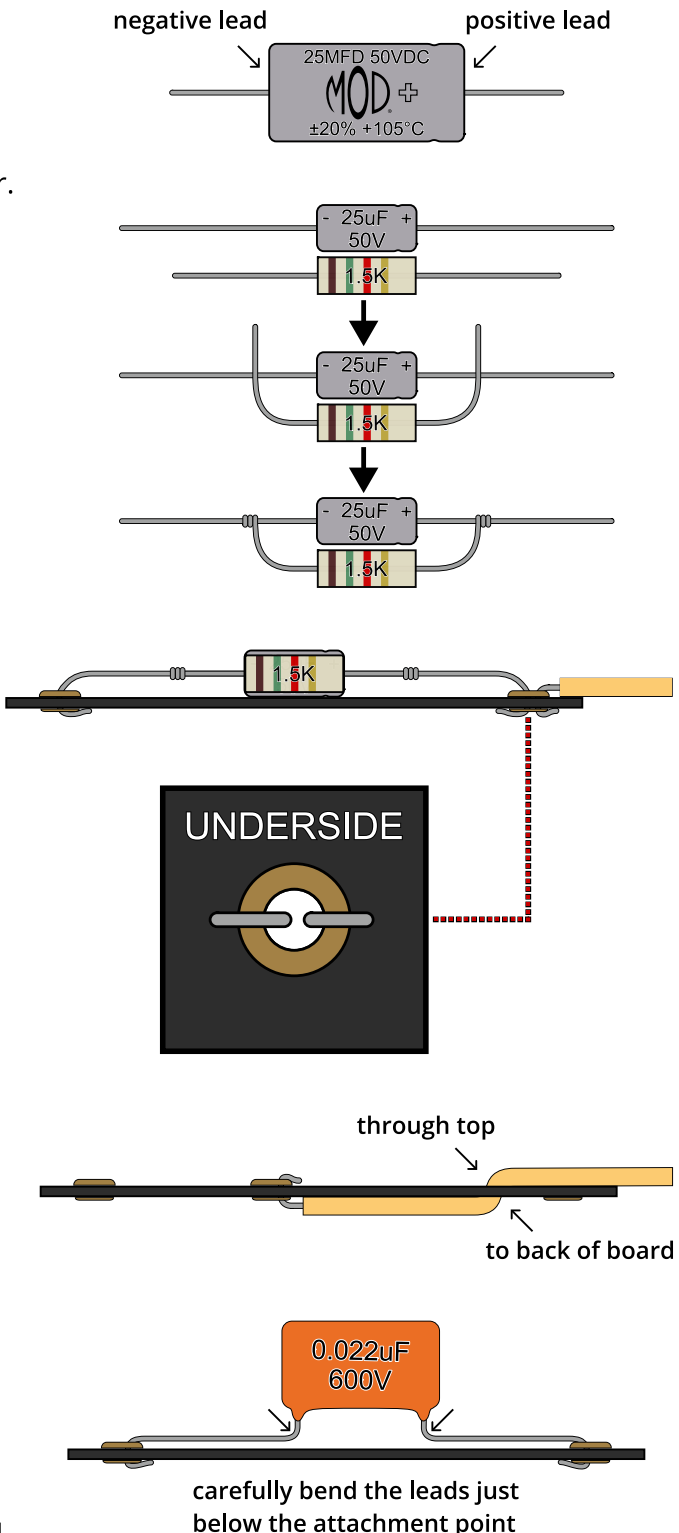
A1-8: Thread a 6" piece of yellow wire through hole F and connect it to eyelet 10 through the back of the board. Solder eyelet 10 now.

A1-9: Locate a 0.022 μ F (223J) 600V capacitor. Connect it from eyelet 4 to 14.

A1-10: Connect a 6" piece of yellow wire to eyelet 4. Solder eyelet 4 now.

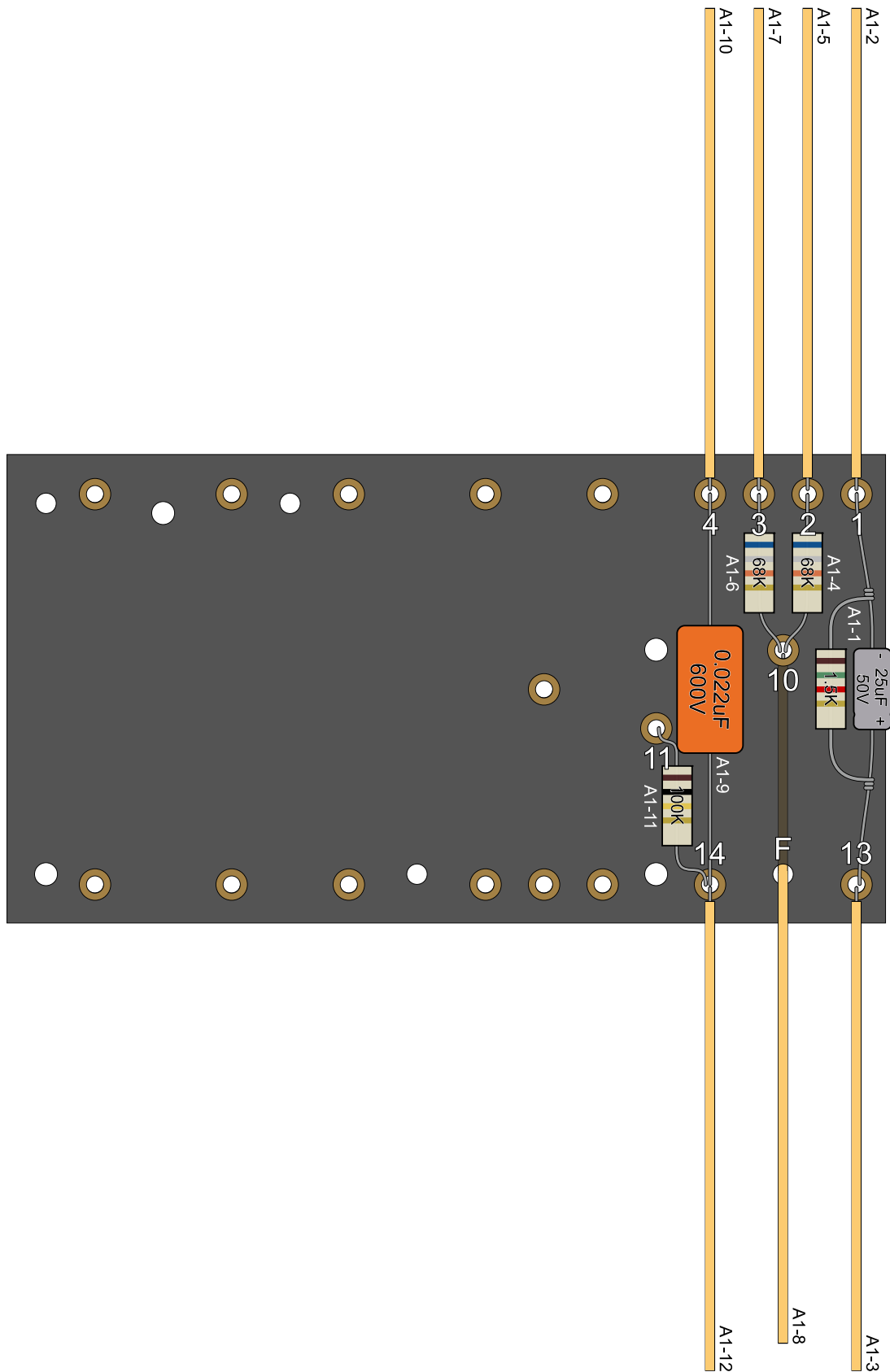
A1-11: Locate a 100K Ω resistor. Its color bands are brown, black, yellow, gold. Connect this resistor from eyelet 11 to 14.

A1-12: Connect a 4" piece of yellow wire to eyelet 14. Solder eyelet 14 now.



5F1 Eyelet Board Construction

5F1 Eyelet Board: Part 1 Drawing



5F1 Eyelet Board Construction

5F1 Eyelet Board: Part 2

A2-1: Locate the other 100K Ω resistor. Connect this resistor from eyelet 11 to 15.

A2-2: Locate the other 0.022 μ F (223J) 600V capacitor. Connect it from eyelet 5 to 15.

A2-3: Connect a 4" piece of yellow wire to eyelet 15. Solder eyelet 15 now.

A2-4: Locate a 220K Ω resistor. Its color bands are red, red, yellow, gold. Connect this resistor from eyelet 6 to 5.

A2-5: Thread a 6" piece of yellow wire through hole H and connect it to eyelet 5 through the back of the board. Solder eyelet 5 now.

A2-6: Locate a 1.5K Ω resistor. Its color bands are brown, green, red, gold. Connect this resistor from eyelet 6 to 12.

A2-7: Locate a 22K Ω resistor. Its color bands are red, red, orange, gold. Connect this resistor from eyelet 12 to 16.

A2-8: Thread a 6" piece of yellow wire through hole G and connect it to eyelet 12 through the back of the board. Solder eyelet 12 now.

A2-9: Connect a 3" piece of yellow wire to eyelet 16. Solder eyelet 16 now.

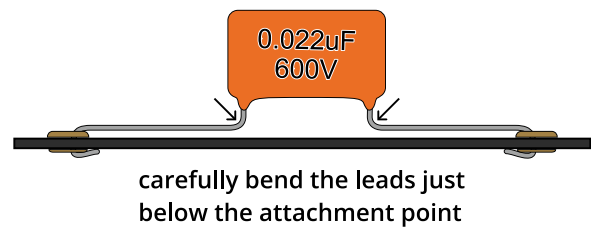
A2-10: Locate a 25 μ F 50V capacitor. Connect the negative lead to eyelet 6 and the positive to 17.

A2-11: Locate the 3W 470 Ω resistor. Its color bands are yellow, violet, brown, gold. Connect this resistor from eyelet 6 to 17.

A2-12: Connect a 4" piece of yellow wire to eyelet 17. Solder eyelet 17 now.

A2-13: Locate a 8 μ F 475V capacitor. Connect the negative lead to eyelet 7 and the positive to 18.

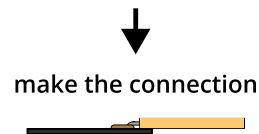
A2-14: Connect a 1.25" piece of yellow wire from the back of eyelet 6 to the back of 7. Solder eyelet 6 now.



trim to length



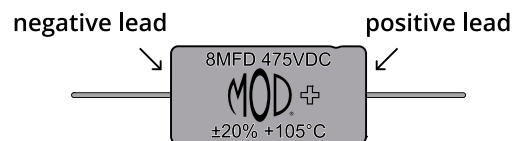
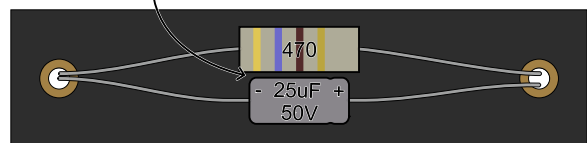
push back 3/8"



make the connection



space the parts for a small air gap to keep the heat from the resistor away from the capacitor

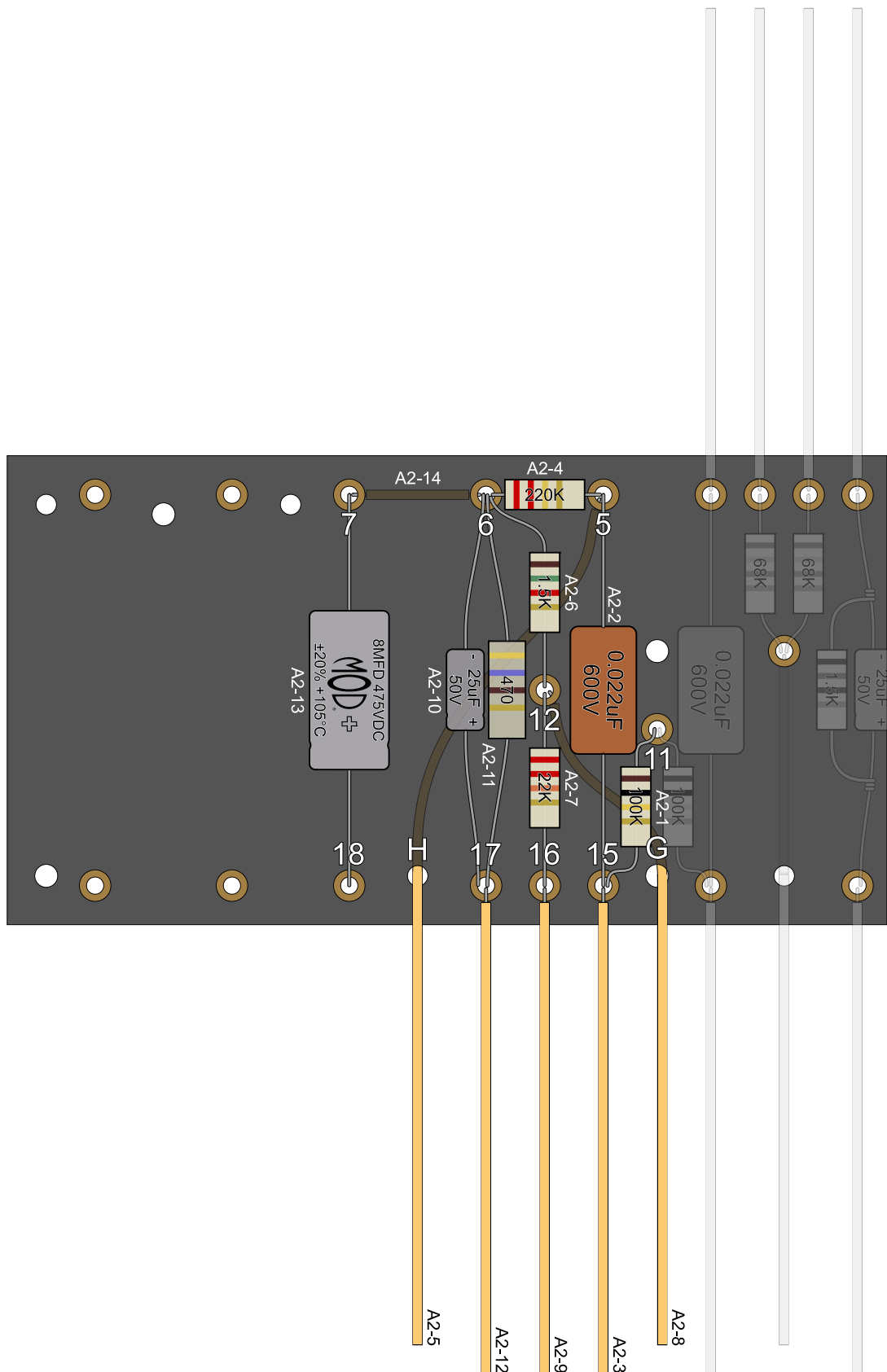


back of eyelet
to
back of eyelet



5F1 Eyelet Board Construction

5F1 Eyelet Board: Part 2 Drawing



5F1 Eyelet Board Construction

5F1 Eyelet Board: Part 3

A3-1: Connect a 2" piece of bus wire to the back of eyelet 7. Solder eyelet 7 now.

A3-2: Locate a 22K Ω resistor. Its color bands are red, red, orange, gold. Connect this resistor from eyelet 19 to 18.

A3-3: Connect a 3" piece of yellow wire from the back of eyelet 11 to the back of 18. Solder eyelets 11 and 18 now.

A3-4: Locate a 8 μ F 475V capacitor. Connect the negative lead to eyelet 8 and the positive to 19.

A3-5: Connect a 1.25" piece of yellow wire from the back of eyelet 8 to the back of 9. Solder eyelet 8 now.

A3-6: Locate the 3W 10K Ω resistor. Its color bands are brown, black, orange, gold. Connect this resistor from eyelet 20 to 19.

A3-7: Connect a 3" piece of yellow wire to eyelet 19. Solder eyelet 19 now.

A3-8: Locate the 16 μ F 475V capacitor. Connect the negative lead to eyelet 9 and the positive to 20.

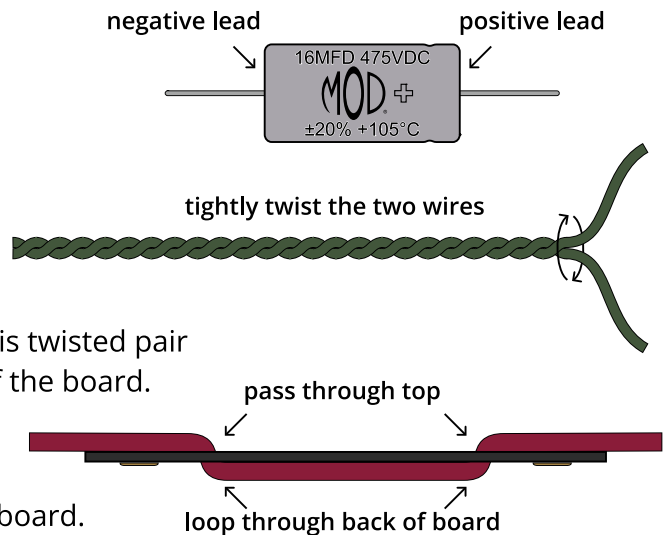
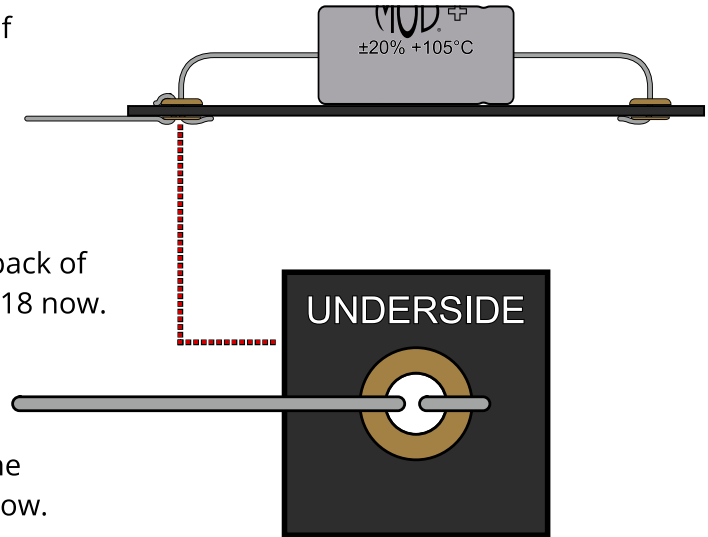
A3-9: Connect a 2" piece of bus wire to the back of eyelet 9. Solder eyelet 9 now.

A3-10: Twist two 12" pieces of green wire. Thread this twisted pair from C to I with the loop passing through the back of the board. Center it so ~3" exits hole C and ~5.5" exits hole I.

A3-11: Thread a 5" piece of yellow wire through hole I and connect it to eyelet 20 through the back of the board.

A3-12: Thread a 12" piece of red wire from A to G with the loop passing through the back of the board. Ensure the ends exiting holes A and G are roughly equal in length.

A3-13: Trim the excess leads from the 16 μ F capacitor and the 10K Ω resistor on the back of the board at hole 20. Leave just enough to hold these parts in place but do not solder this connection.

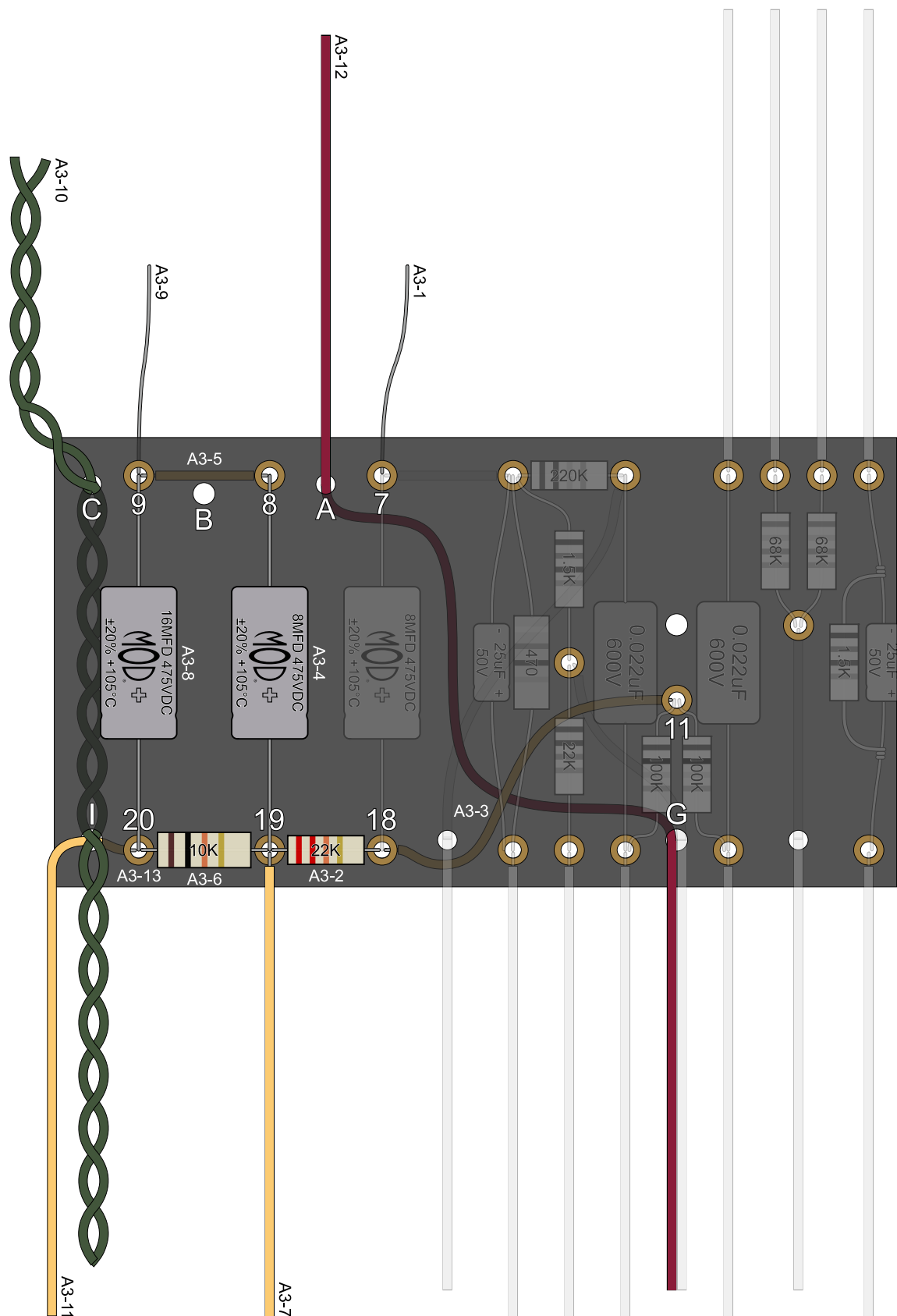


Completed Fiberboard: Inspection

The main fiberboard of the 5F1 is now completed. Please take some time to thoroughly check the connections, parts placement, and solder joints. Ensure all components are in their correct positions according to the wiring diagram, with electrolytic capacitors oriented correctly for polarity. Verify that all solder joints are smooth and shiny, and free of cold joints, which can appear dull or cracked. Note that all eyelets except for eyelet 20 should be soldered at this point. Verify the connections at eyelet 20 are properly placed but not soldered yet.

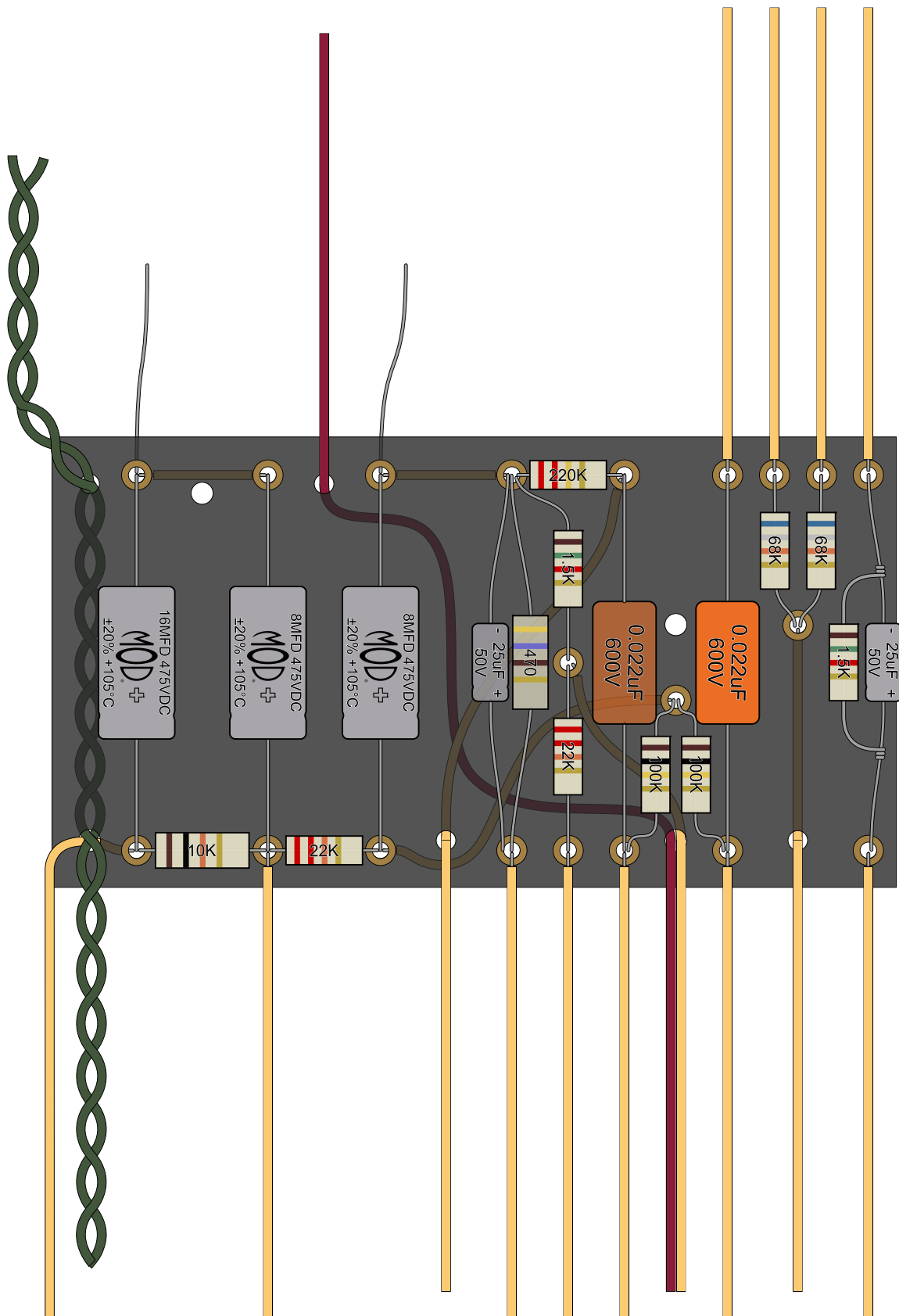
5F1 Eyelet Board Construction

5F1 Eyelet Board: Part 3 Drawing



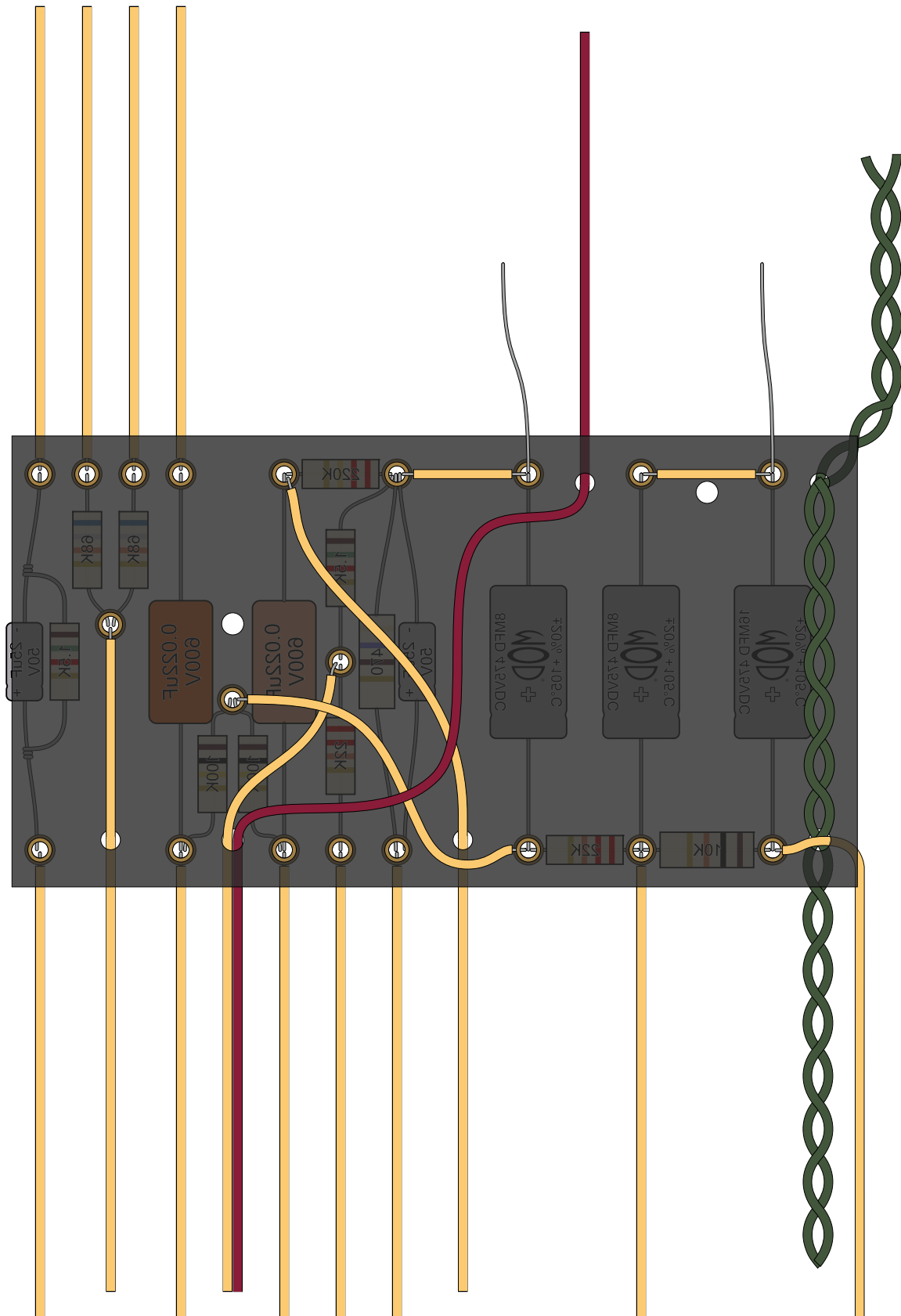
5F1 Eyelet Board Construction

Completed Fiberboard

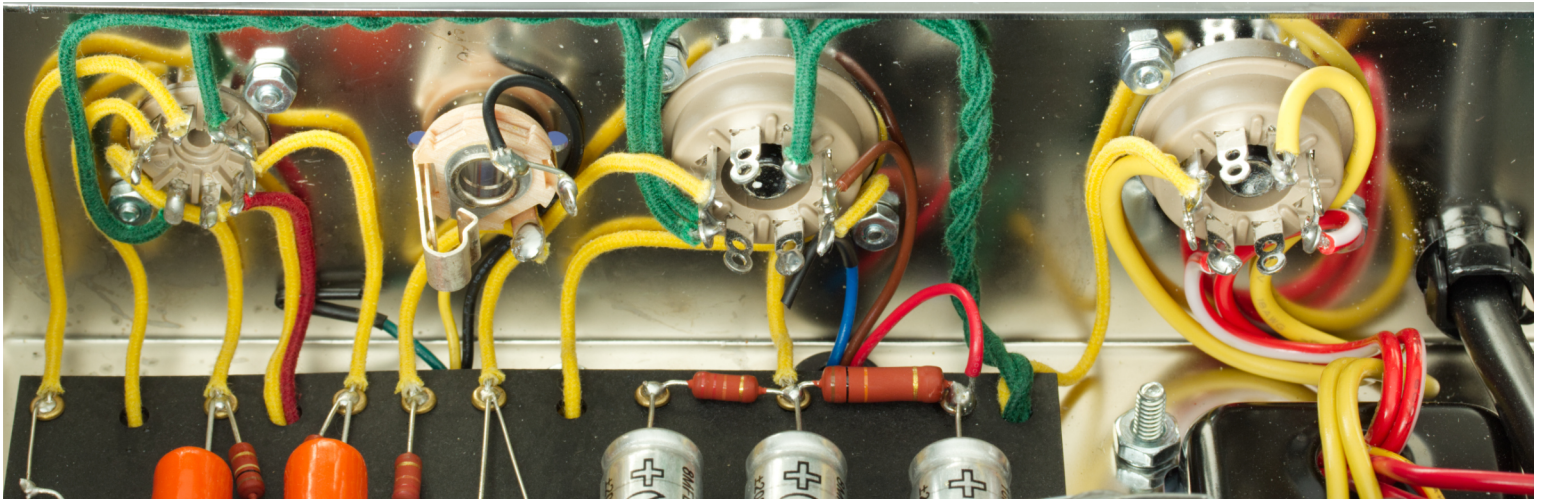
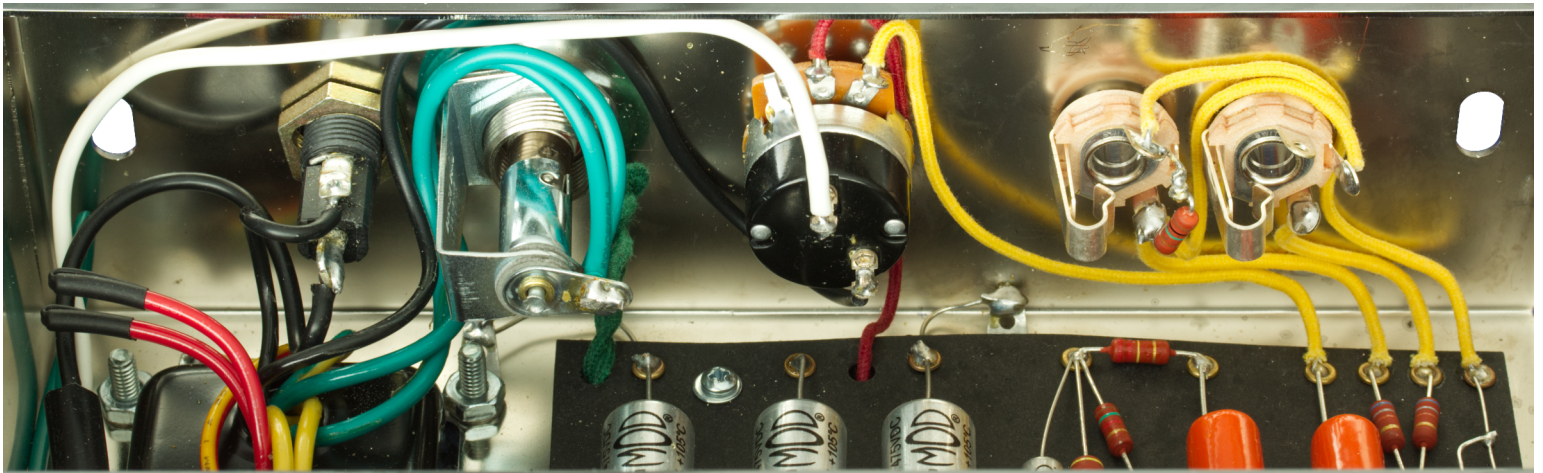
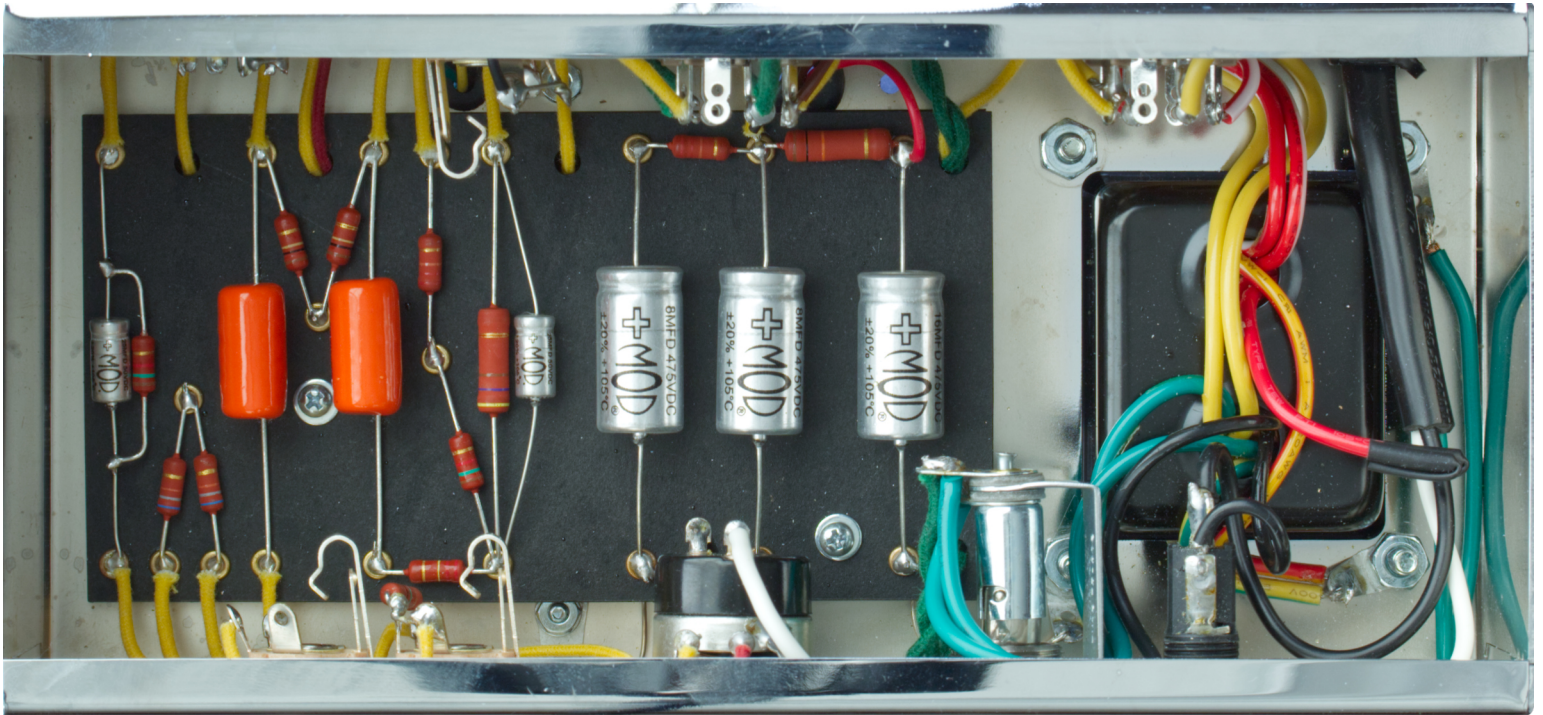


5F1 Eyelet Board Construction

Completed Fiberboard (back)



5F1 Reference Photos

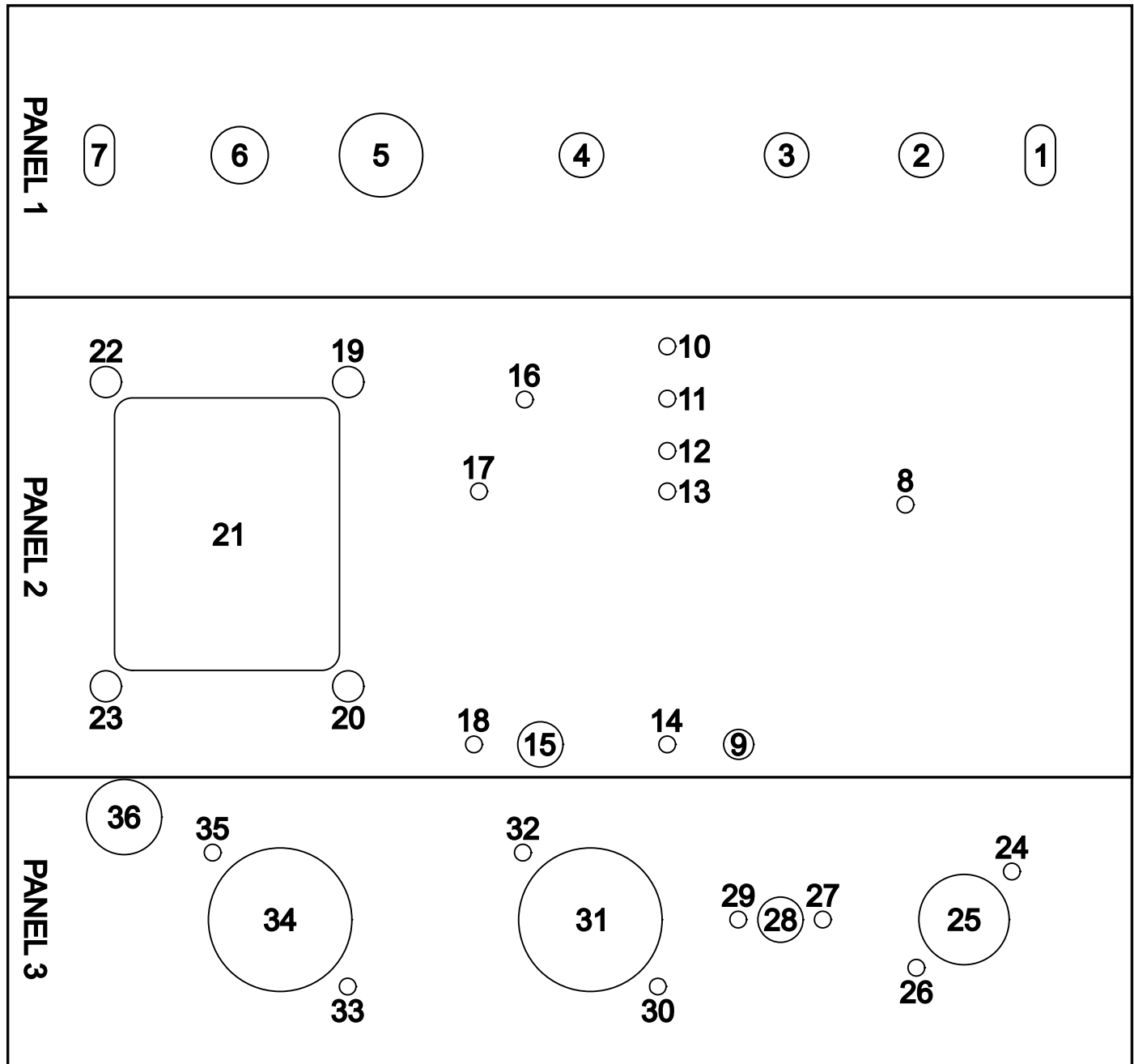


Notes on Chassis Construction

This section covers the chassis construction and diagrams used throughout these instructions

Chassis Layout

The chassis drawings show a flattened view of the chassis, looking into the open side, with the control side at the top and the tube side at the bottom. The top panel with the inputs and controls is referred to as Panel 1. The middle panel with the transformers and fiberboard is Panel 2. The bottom panel where the tube sockets mount is Panel 3. The holes referenced throughout the instructions will correspond to the numbers shown on this drawing.



Chassis-Mounted Components

If you would prefer to wire this amp with the power switch disconnecting the live conductor (modern wiring) instead of the neutral conductor (vintage accurate), see page 35 before continuing.

Locate the chassis. The following steps will cover the placement and mounting of components such as potentiometers, transformers, and sockets onto the chassis. Use the Parts List as a reference.

Part 1: Transformers

B1-1: Locate the power transformer. It has two solid red wires. Cut these to ~2" each. Be sure to only cut the solid red wires and not the striped red wires.

B1-2: Locate the 3/32" heat shrink tubing and cut two 1" pieces. Slide each piece 1/2" onto the ends of the cut red wires and shrink with a heat gun.

B1-3: Mount the power transformer in hole 21 of panel 2 with the red wire cluster facing panel 3. Leave the four preinstalled transformer nuts in place.

B1-4: Locate three #8 solder lugs. Slide these onto the mounting screws of the power transformer at holes 19, 22, and 23.

B1-5: Locate a #8 lock washer. Slide it onto the mounting screw of the power transformer at hole 20.

B1-6: Locate four #8 nuts. Thread these onto each mounting screw of the transformer. Use a nut driver to completely tighten each down.

B1-7: Locate the 1/8" rubber grommet. Attach it to hole 9 on panel 2.

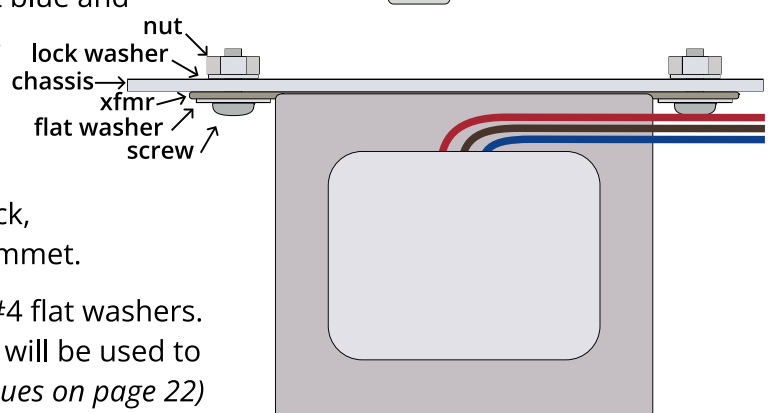
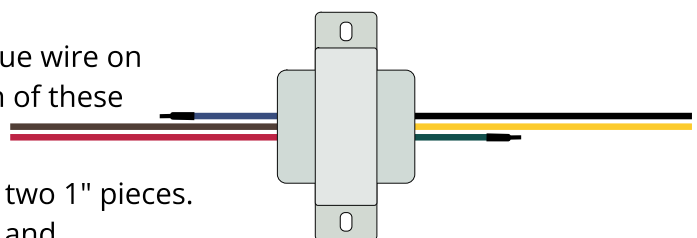
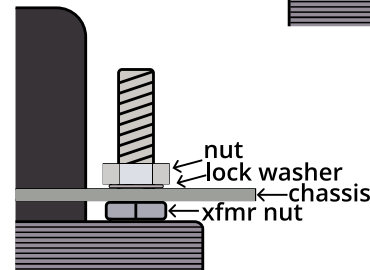
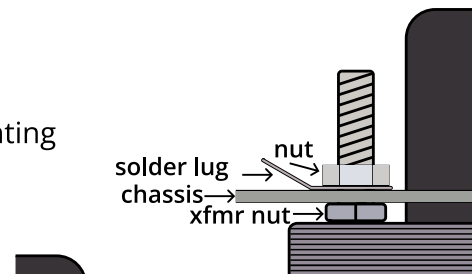
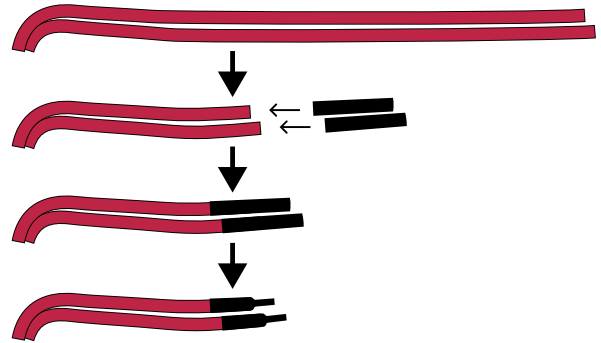
B1-8: Locate the 1/4" rubber grommet. Attach it to hole 15 on panel 2.

B1-9: Locate the output transformer. Locate the blue wire on one side and the green wire on the other. Cut each of these to ~3" each. Be sure to only cut those two wires.

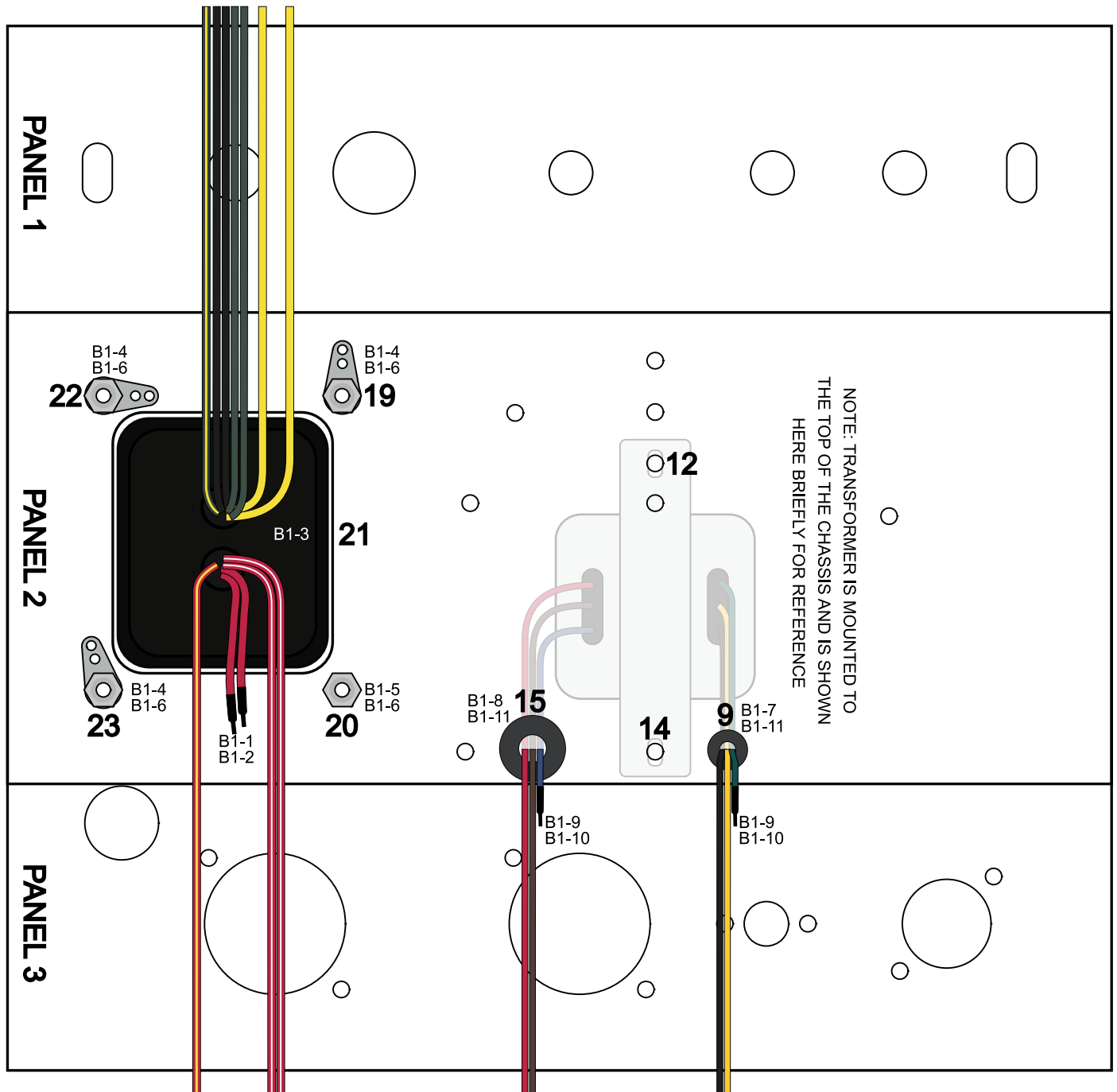
B1-10: Locate the 1/16" heat shrink tubing and cut two 1" pieces. Slide each Piece 1/2" onto the ends of the cut blue and green wires and shrink them with a heat gun.

B1-11: Mount the output transformer with the blue wire's cluster oriented towards the 1/4" grommet. Pull the blue, brown, and red wires through the 1/4" grommet. Pull the black, yellow, and green wires through the 1/8" grommet.

B1-12: Locate two 1/4" 4-40 screws and two #4 flat washers. Slide the flat washers onto the screws. These will be used to secure the transformer to the chassis. *(continues on page 22)*



Chassis-Mounted Components



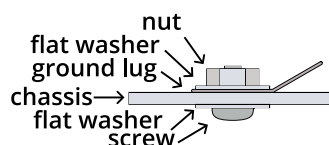
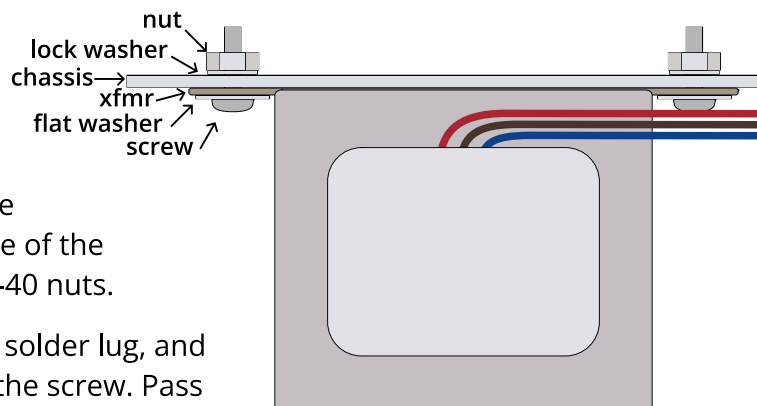
Chassis-Mounted Components

Part 1: Transformers (cont.)

B1-13: These two screws will mount through the transformer and then through holes 14 and 12 on the outside of panel 2.

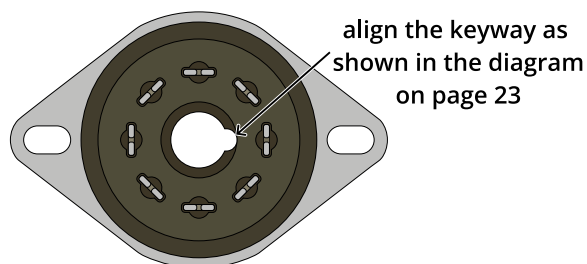
B1-14: Locate two #4 lock washers and two 4-40 nuts. First slide the lock washers over the threading of the two 4-40 screws on the inside of the chassis. Then secure both screws using the 4-40 nuts.

B1-15: Locate a 1/4" 4-40 screw, a 4-40 nut, a solder lug, and two #4 flat washers. Slide a flat washer onto the screw. Pass the screw through hole 10 on the outside of the chassis. Secure the solder lug to the inside of the chassis using the flat washer and nut. The lug should point towards panel 1.



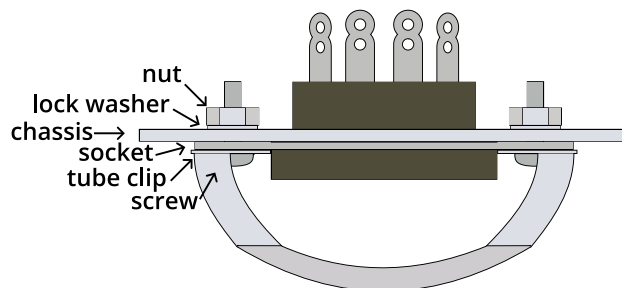
Part 2: Tube Sockets

B2-1: Locate the two octal sockets and tube clips. These will mount to holes 31 and 34 on panel 3 of the chassis. Hole 34 is the rectifier socket and hole 31 output socket. Be sure to orient the sockets as shown in the drawing.

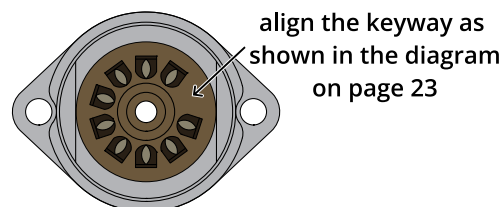


B2-2: Locate four 1/4" 4-40 screws, 4-40 nuts, and #4 lock washers. Pass the screws through the tube clip and then the mounting bracket of the octal socket.

B2-3: Mount these through the outside of the chassis then use the lock washers and nuts to secure the sockets to the chassis at holes 30, 32, 33, and 35.



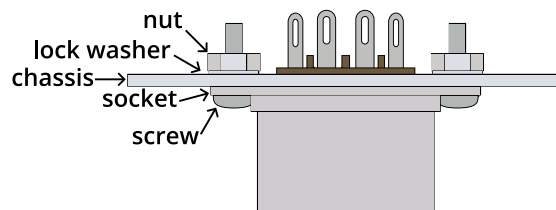
B2-4: Locate the noval socket. This will mount to hole 25 on panel 3 of the chassis. This is the preamp socket. Be sure to orient the socket as shown in the drawing.



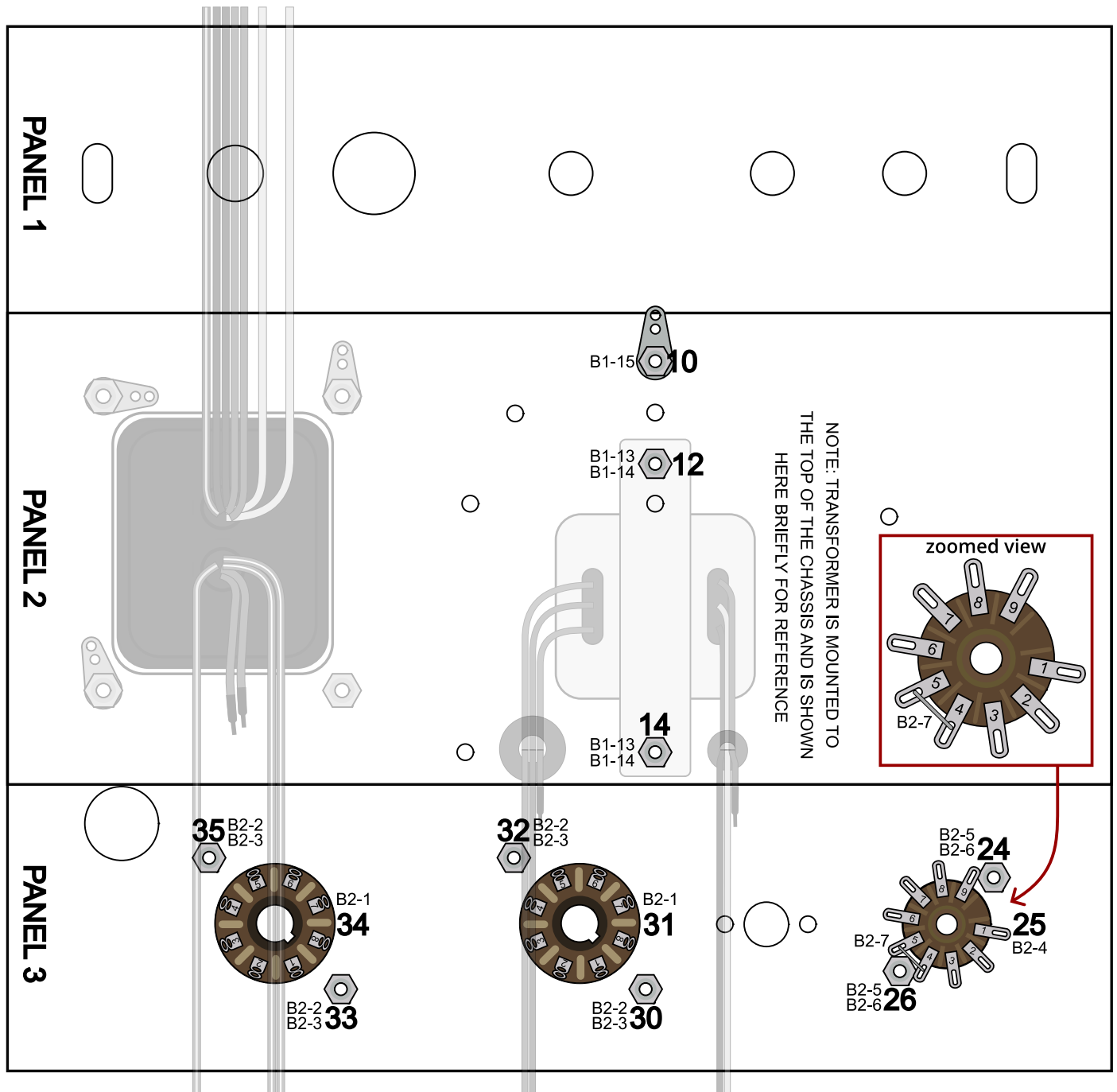
B2-5: Locate two 1/4" 4-40 screws, 4-40 nuts, and #4 lock washers. Pass the screws through the mounting bracket of the noval socket at holes 24 and 26.

B2-6: These mount through the outside of the chassis. Use the lock washers and nuts to secure the sockets to the chassis.

B2-7: Cut a 1/2" piece of bus wire. Use this to connect the lug 4 to 5 on the noval socket. Solder lug 5 now.



Chassis-Mounted Components



Chassis-Mounted Components

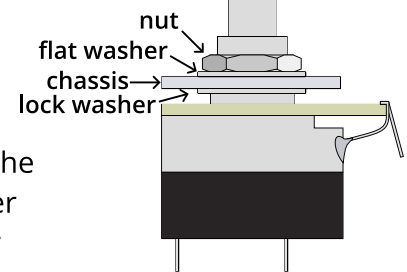
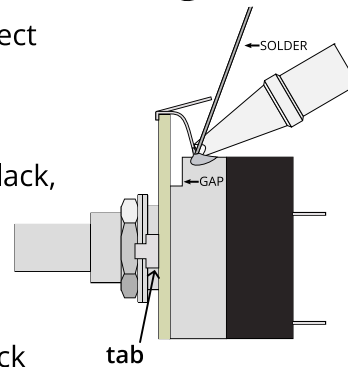
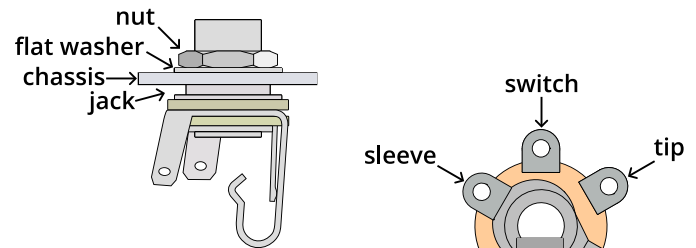
Part 3: Jacks

B3-1: Locate the three switched 1/4" jacks. Mount these to holes 2, 3 and 28. 2 and 3 are the input jacks and 28 is the output jack. The included flat washers mount beneath the nut on the outside of the chassis. Once mounted, bend the switch lug of the jack in hole 3 so it is perpendicular to panel 1.

B3-2: Cut two 3/4" pieces of bus wire. Use these to connect the switch lug to the sleeve lug on the jacks at hole 3 and 28. Solder the switch lug of the hole 28 jack now.

B3-3: Locate a 1M resistor. Its color bands are brown, black, green, gold. Connect it from the tip lug to the switch lug on the jack at hole 3. Solder the switch lug now.

B3-4: Cut a 3" piece of yellow wire. Use this to connect the switch lug of the jack at hole 2 to the tip lug of the jack at hole 3. Solder the switch lug of the jack at hole 2 now.

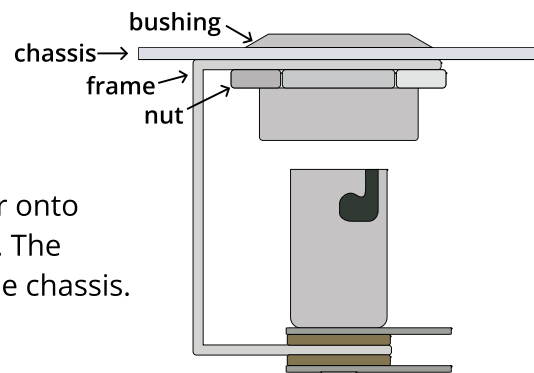


Part 4: Potentiometer

B4-1: Locate the switched A1MΩ potentiometer. Bend the leftmost lug of the potentiometer down until it makes contact with the metal potentiometer body. Solder the lug to the frame now. Be careful not to melt any solder into the gap.

B4-2: Once the pot cools after soldering, grip the small metal tab near the bushing with a pair of pliers and gently rock the tab until it snaps off.

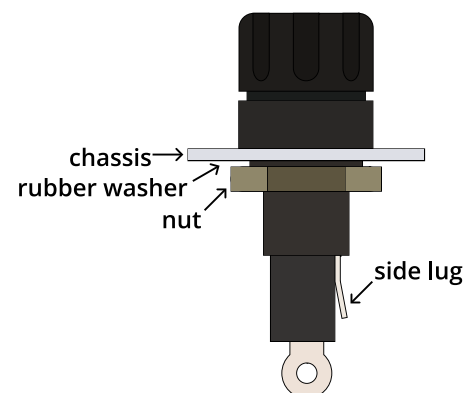
B4-3: Mount this pot to hole 4. First slide the lock washer onto the pot's bushing. Mount the pot with the lugs facing up. The flat washer mounts beneath the nut on the outside of the chassis.



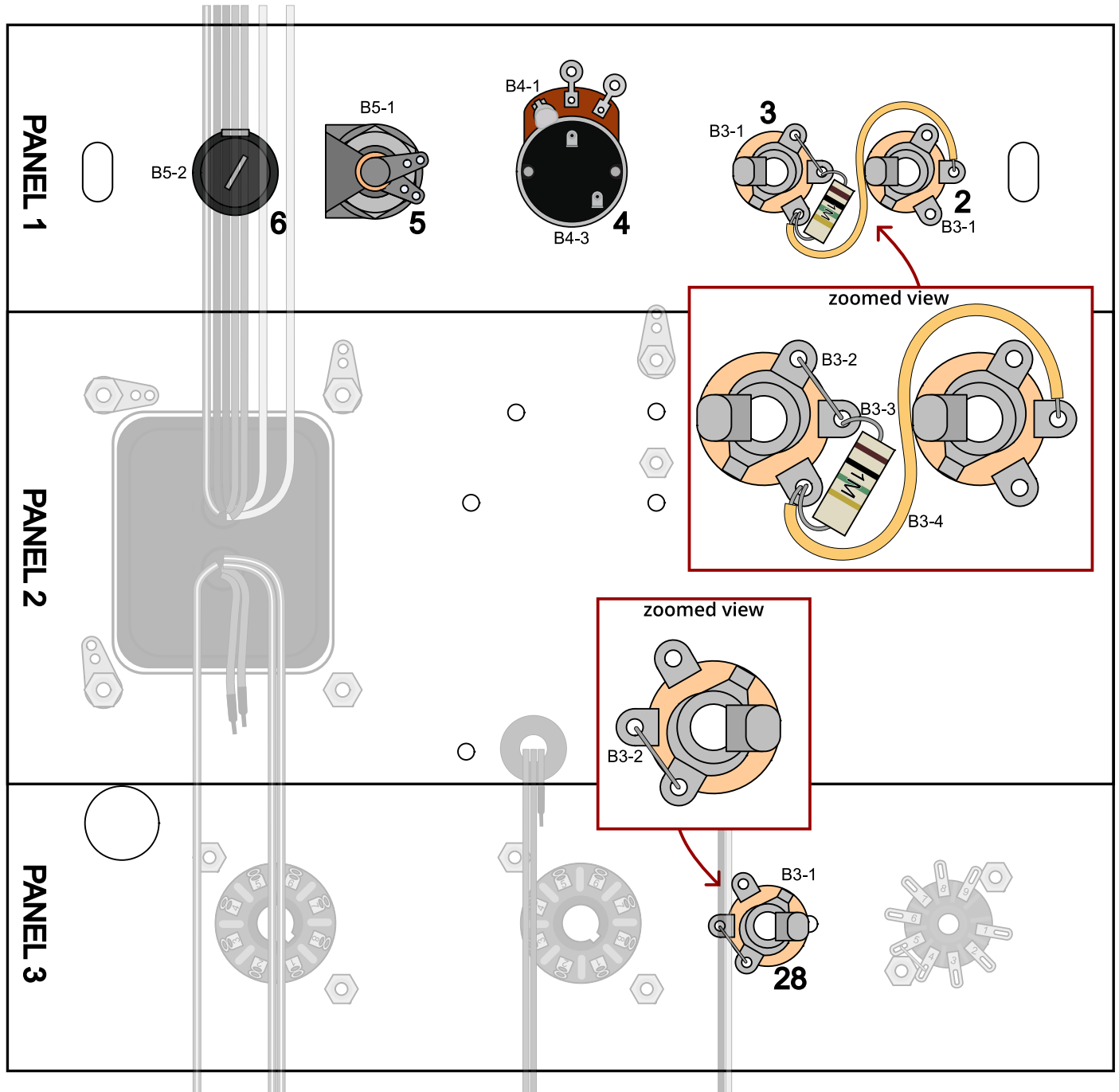
Part 5: Remaining Hardware

B5-1: Locate the pilot light socket. This will mount in hole 5. The bushing mounts to the outside of the chassis. The frame is then secured with the nut on the inside of the chassis. Make sure that the frame is oriented to the left.

B5-2: Locate the fuse holder. This will mount to hole 6. The holder is inserted through the outside of the chassis. Slide the rubber washer over the bushing inside the chassis and then secure the fuse holder with the nut. Make sure that the side lug is oriented upward.



Chassis-Mounted Components



Chassis-Mounted Components

Part 6: Transformer Wires

B6-1: Locate the two white-striped red wires on the power transformer. Trim these to connect to pins 4 and 6 of the octal socket at hole 34. Solder both pins now.

B6-2: Locate the two yellow wires on the power transformer. Trim these to connect to pins 2 and 8 of the octal socket at hole 34. Solder pin 2 now.

B6-3: Locate the yellow-striped red wire and yellow-striped green wire on the power transformer. Trim these to connect to the ground lug at hole 22. Solder this lug now.

B6-4: Locate one of the black wires on the power transformer. Gently lift the side lug of the fuse holder up a few millimeters away from its body then trim the wire to connect to the side lug on the fuse holder. Solder the side lug now.

B6-5: Locate the other black wire on the power transformer. Trim it to connect to the lower switch lug on the potentiometer. Be sure to provide enough slack, roughly an 8" length, to run it along the inside of panel 1. This will keep it out of the way of the board area. Solder the lower switch lug now.

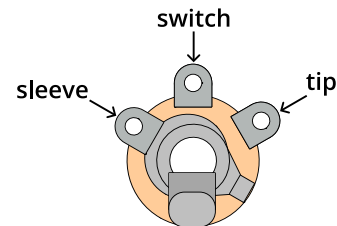
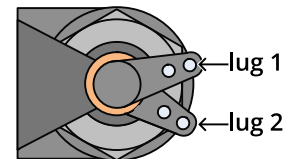
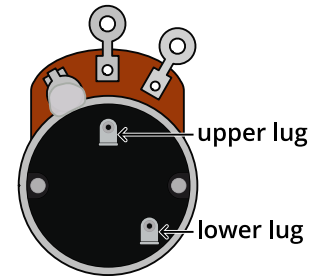
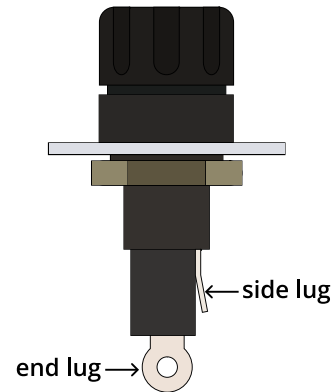
B6-6: Locate the two green wires on the power transformer. Trim these to connect one to lug 1 and the other to lug 2 of the pilot light holder. Be sure to provide enough slack to run them along the inside of panel 1 and out of the way of the board area.

B6-7: Locate the brown wire on the output transformer. Trim this to connect to pin 3 of the octal socket at hole 31. Solder this connection now.

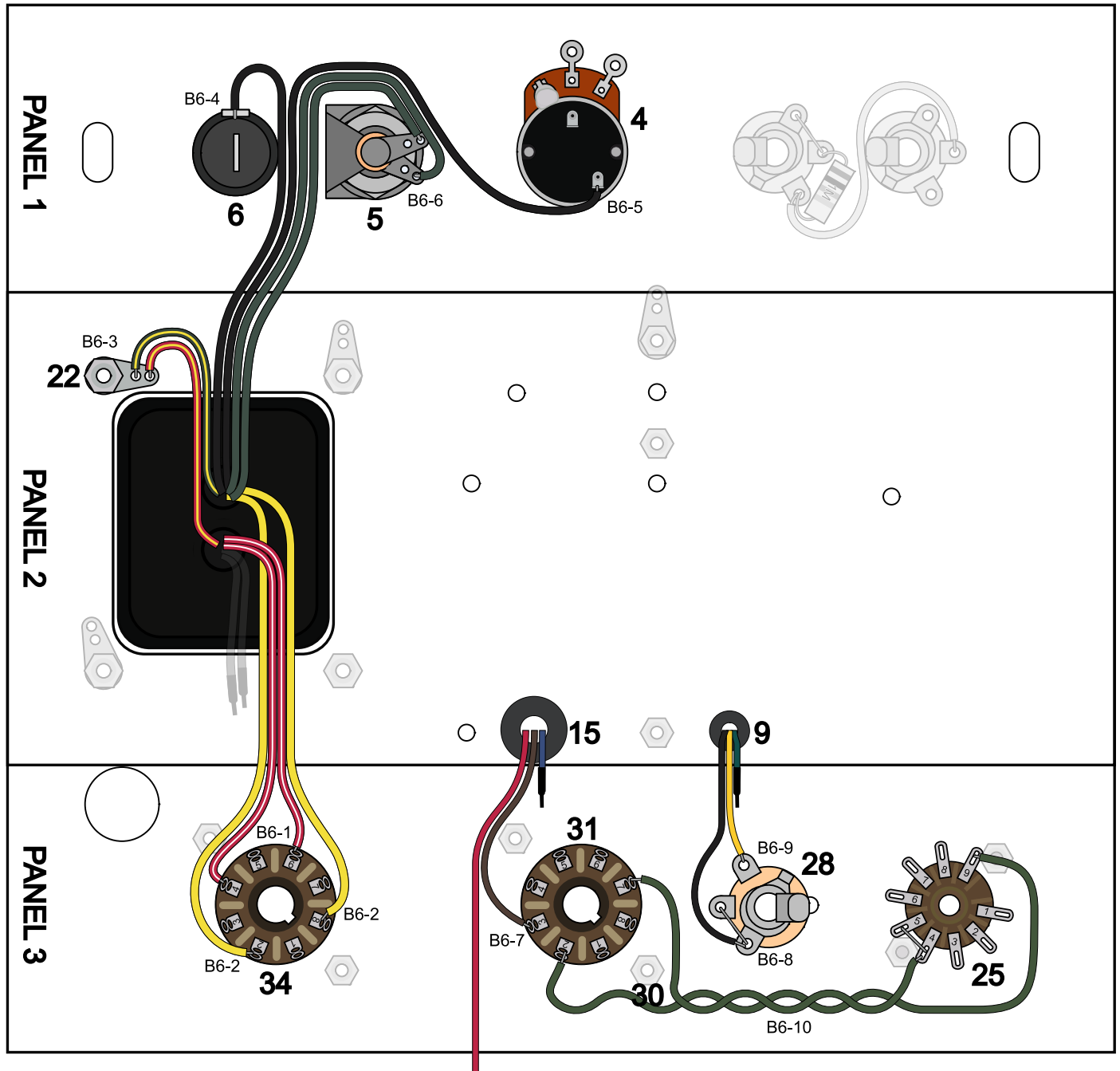
B6-8: Locate the black wire on the output transformer. Trim this to connect to the sleeve lug of the output jack. Solder this connection now.

B6-9: Locate the yellow wire on the output transformer. Trim this to connect to the tip lug of the output jack.

B6-10: Starting at the middle of two 8" pieces of green wire, twist a 2.5" segment. Leave the two ends untwisted. Position the twisted section against the outside lip of the chassis between the noval socket and octal socket at hole 31. Trim the four untwisted ends to connect pins 9 and 4 of the noval socket to 7 and 2 of the octal socket at hole 31. Polarity does not matter with these wires. Solder pins 9 and 4 of the noval socket now.



Chassis-Mounted Components



Chassis-Mounted Components

Part 7: Power Cord

B7-1: Locate the three prong power cord. Trim back 7 inches of the black outer insulation from the bare end. Self-adjusting wire strippers are the best tool for this but careful use of cutters can work.

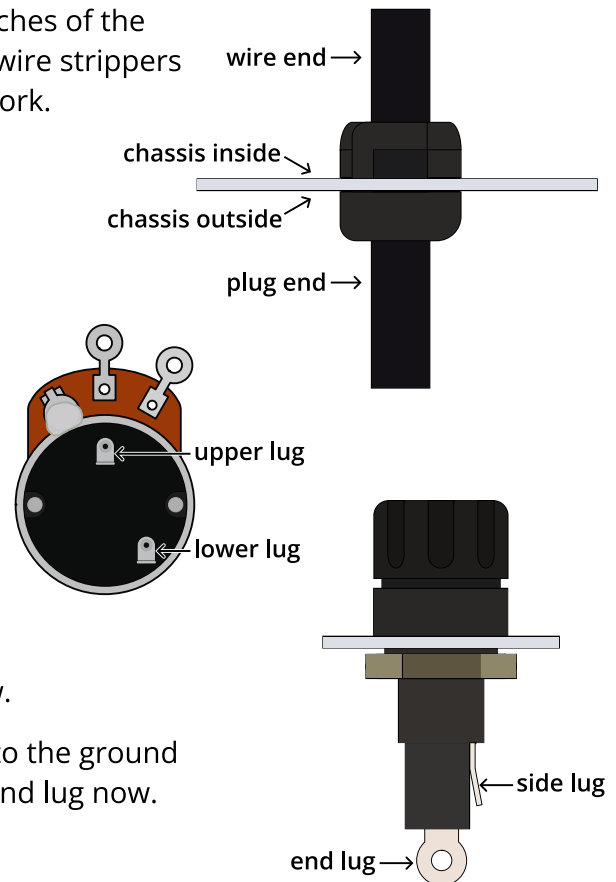
B7-2: From the outside of the chassis, thread this cord through hole 36 on panel 3 of the chassis until roughly 2.5" of the black outer insulation is inside the chassis.

B7-3: Locate the strain relief. Attach it to the power cord at the outside of the chassis. Strain relief pliers are the ideal tool to compress the cord in the strain relief but careful use of standard pliers can accomplish this. Feed the strain relief into hole 36 until it snaps into place.

B7-4: Run the white wire of the power cord across the inside of panel 1 to connect it to the upper lug of the potentiometer's switch. Solder the upper lug now.

B7-5: Trim the black wire of the power cord to connect to the end lug of the fuse holder. Solder the end lug now.

B7-6: Trim the green wire of the power cord to connect to the ground lug at hole 23 of the power transformer. Solder the ground lug now.

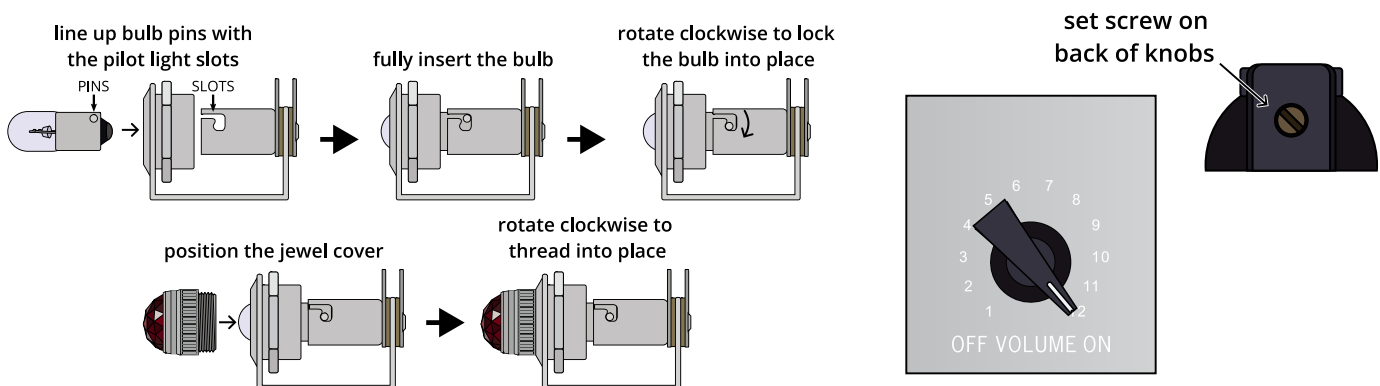


Completed Chassis Hardware: Inspection

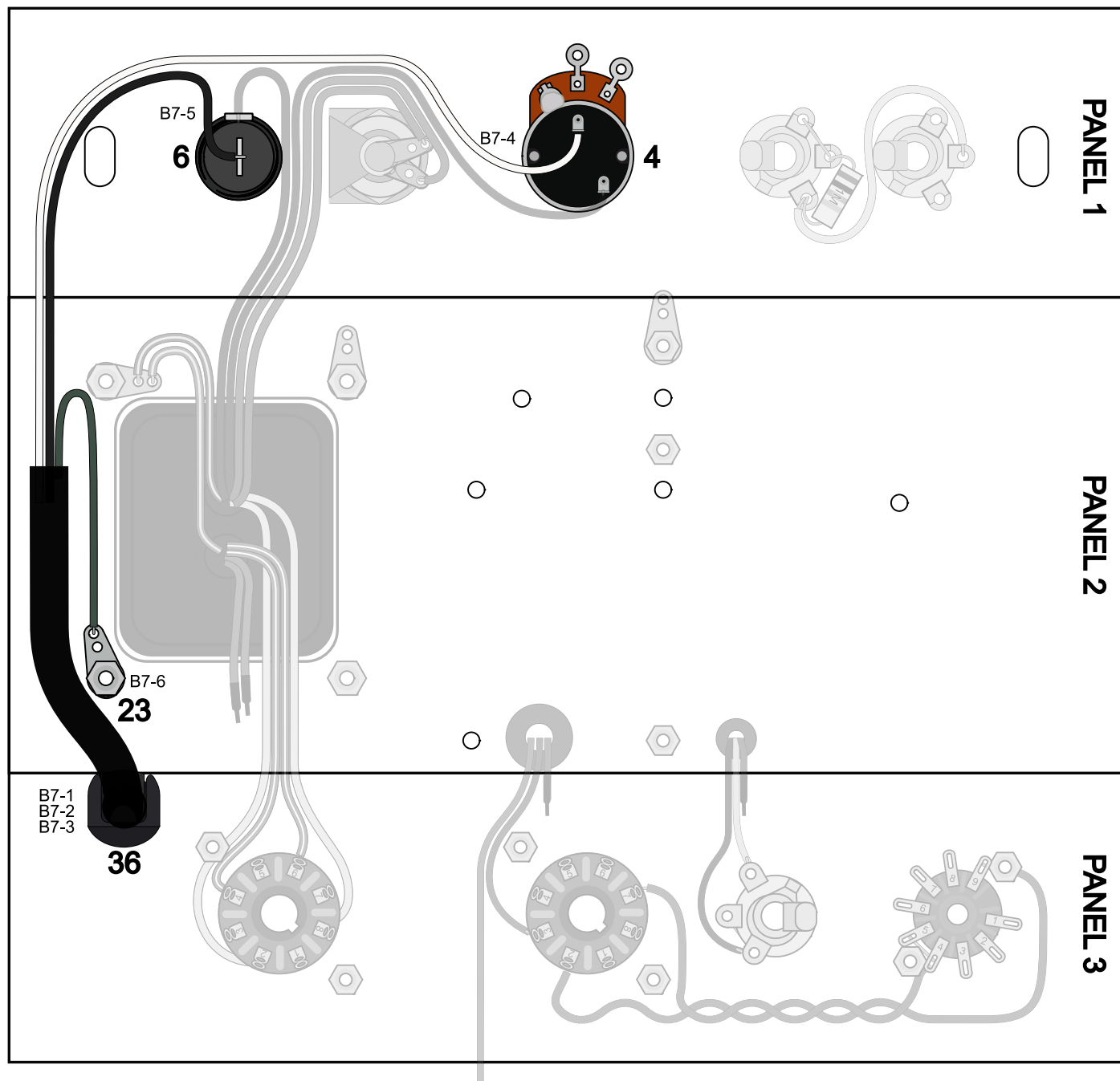
The hardware mounting and wiring of this section is now completed. Please take some time to thoroughly check the connections, parts placement, and solder joints. Ensure all components are in their correct positions according to the wiring diagram. Verify that all solder joints are smooth and shiny, and free of cold joints, which can appear dull or cracked.

Front Panel Finishing Hardware

Insert the bulb into the pilot light socket, ensuring it is securely in place. Position the jewel cover over the bulb and screw it on gently until it is firmly attached. Next, attach the knob to the potentiometer. Turn the pot shaft fully clockwise, then align the knob to point at 12. Tighten the set screw. Rotate the knob to ensure that it is fully attached and is not slipping.



Chassis-Mounted Components

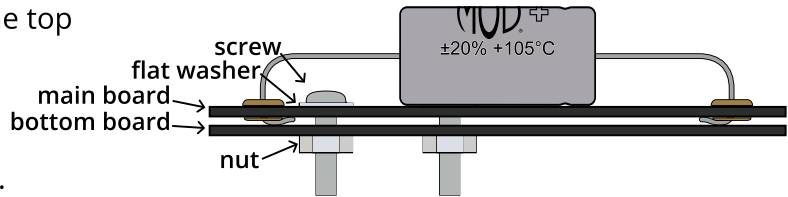


Final Assembly

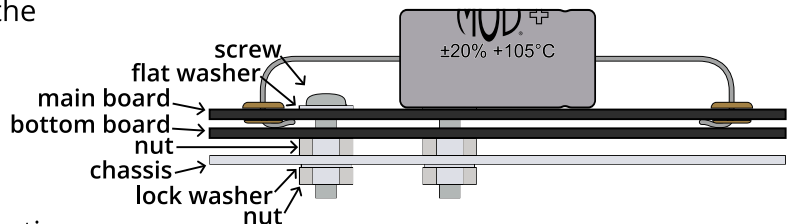
Locate the completed fiberboard. The following steps will guide you through mounting the fiberboard into the chassis and wiring all of the connections.

Part 1: Mounting the Fiberboard

C1-1: Line up the bottom fiberboard with the top fiberboard. Make sure the two empty holes match the same position on both boards. Be careful not to disturb any of the unsoldered connections on the main board.



C1-2: Locate two 1/2" 4-40 screws, two flat washers, and two 4-40 nuts. Slide the flat washers onto the screws and then insert the screws through the top of the main fiberboard at holes B and E. On the bottom side of the bottom board, thread the nuts onto the screws. These only need to be finger tight.



C1-3: Carefully lower the fiberboard assembly into the chassis so that the ends of the 1/2" screws pass through holes 16 and 8 of the chassis. Temporarily unmounting the pilot light holder can make this process and a few of the steps that follow a little easier to access.

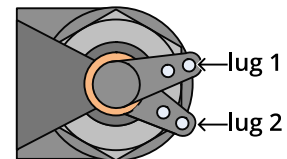
C1-4: Locate two 4-40 nuts and #4 lock washers. On the outside of the chassis, slide the lock washers onto the 1/2" screws and then secure them using the nuts.

Part 2: Wired Connections

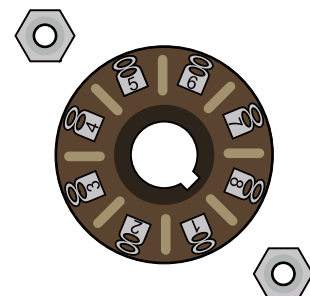
C2-1: Connect the bus wire at eyelet 7 to the ground lug at hole 10 of the chassis. Solder the ground lug now.

C2-2: Connect the bus wire at eyelet 9 to the ground lug at hole 19 of the chassis. Solder the ground lug now.

C2-3: Locate the two twisted green wires coming from hole C of the fiberboard. Trim these to connect one to lug 1 and the other to lug 2 of the pilot light holder. Polarity does not matter. Solder both holes on both lugs now.

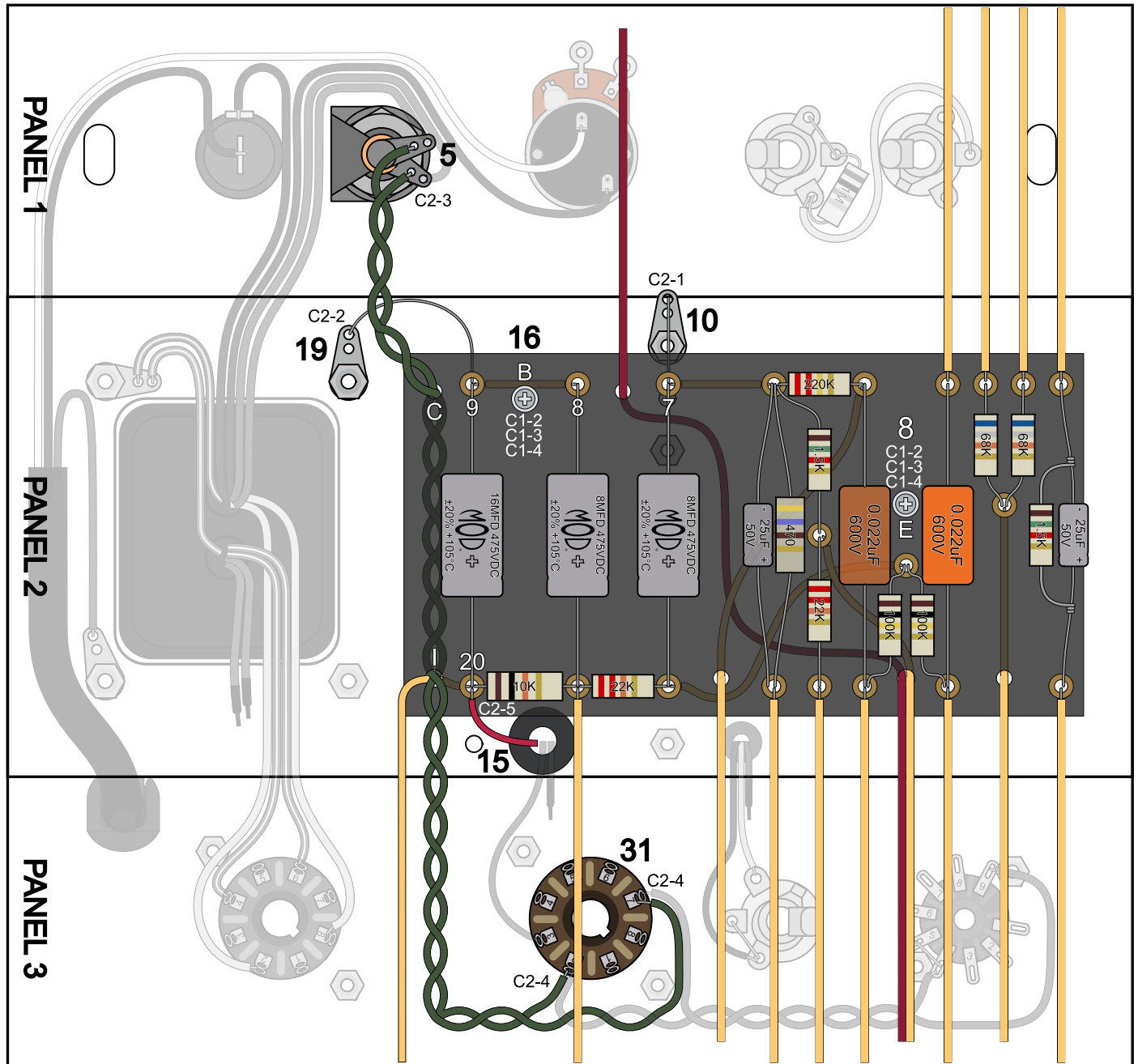


C2-4: Locate the other end of these two wires coming from hole I of the fiberboard. Trim and connect these to lugs 2 and 7 of the octal socket at hole 31. Polarity does not matter. Solder lugs 2 and 7 now.



C2-5: Locate the red wire of the output transformer coming from hole 15 of the chassis. Trim and connect it to eyelet 20. Make sure that the yellow wire coming from hole I is still connected to eyelet 20. Solder eyelet 20 now.

Final Assembly



Final Assembly

Part 2: Wired Connections (cont.)

C2-6: Locate the yellow wire at hole I on the fiberboard. Trim and connect it to lug 8 of the octal socket at hole 34. Solder lug 8 now.

C2-7: Locate the yellow wire at eyelet 19. Trim and connect it to lug 4 of the octal socket at hole 31. Solder lug 4 now.

C2-8: Locate the red wire at hole A of the fiberboard. Trim and connect it to the middle lug of the potentiometer. Solder the middle lug now.

C2-9: Locate the yellow wire at hole H of the fiberboard. Trim and connect it to lug 5 of the octal socket at hole 31. Solder lug 5 now.

C2-10: Locate the yellow wire at eyelet 17. Trim and connect it to lug 8 of the octal socket at hole 31. Solder lug 8 now.

C2-11: Locate the yellow wire at eyelet 16. Trim and connect it to the tip lug of the output jack at hole 28. Solder the tip lug now.

C2-12: Locate the yellow wire at eyelet 15. Trim and connect it to lug 6 of the noval socket at hole 25. Solder lug 6 now.

C2-13: Locate the red wire at hole G of the fiberboard. Trim and connect it to lug 7 of the noval socket at hole 25. Solder lug 7 now.

C2-14: Locate the yellow wire at hole G of the fiberboard. Trim and connect it to lug 8 of the noval socket at hole 25. Solder lug 8 now.

C2-15: Locate the yellow wire at eyelet 14. Trim and connect it to lug 1 of the noval socket at hole 25. Solder lug 1 now.

C2-16: Locate the yellow wire at hole F of the fiberboard. Trim and connect it to lug 2 of the noval socket at hole 25. Solder lug 2 now.

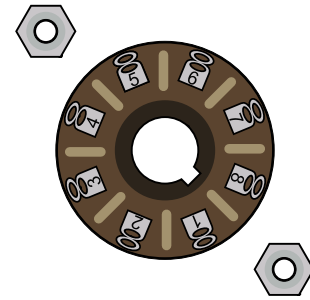
C2-17: Locate the yellow wire at eyelet 13. Trim and connect it to lug 3 of the noval socket at hole 25. Solder lug 3 now.

C2-18: Locate the yellow wire at eyelet 4. Trim and connect it to the right lug of the potentiometer. Solder the right lug now.

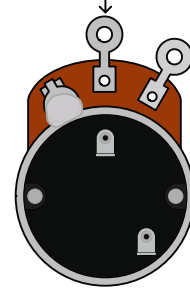
C2-19: Locate the yellow wire at eyelet 3. Trim and connect it to the tip lug of the input jack at hole 3. Solder the tip lug now.

C2-20: Locate the yellow wire at eyelet 2. Trim and connect it to the tip lug of the input jack at hole 2. Solder the tip lug now.

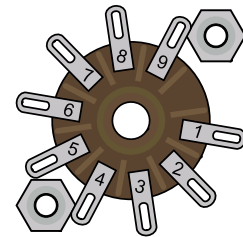
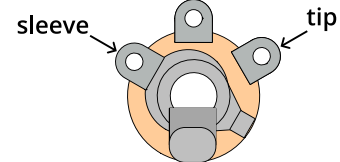
C2-21: Locate the yellow wire at eyelet 1. Trim and connect it to the sleeve lug of the input jack at hole 3. Solder the sleeve lug now.



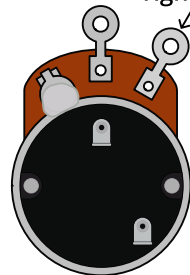
middle lug



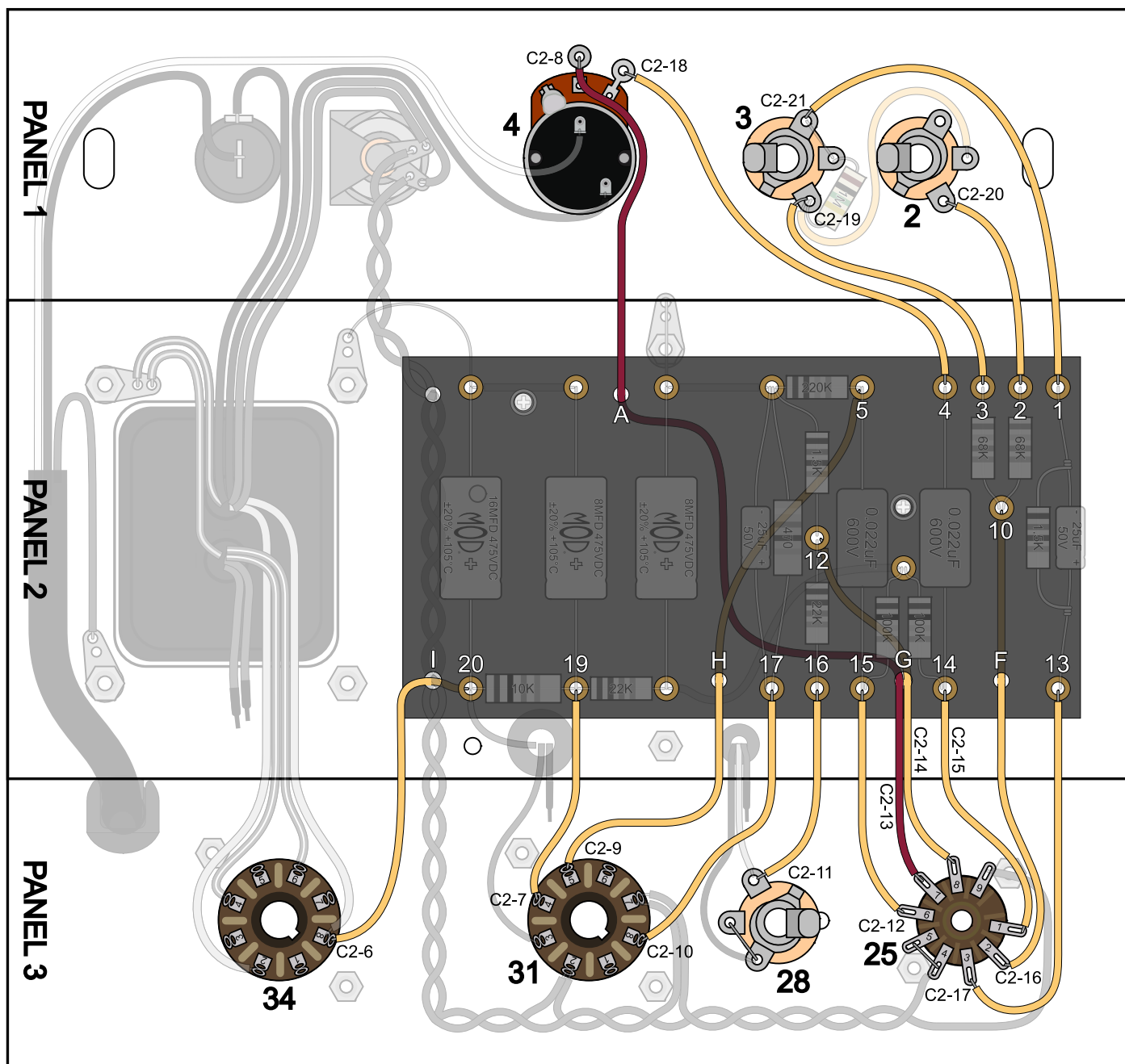
switch



right lug

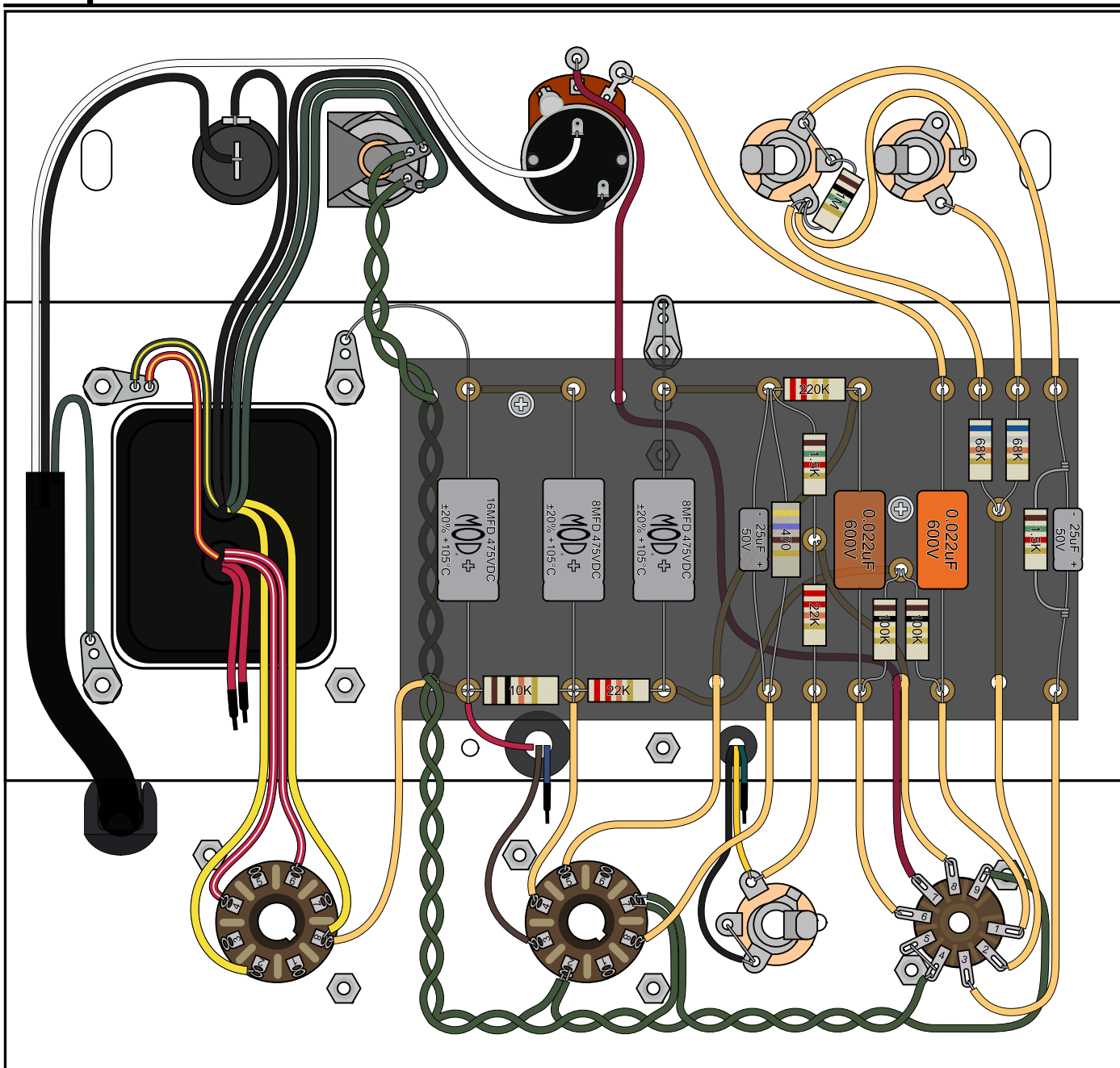


Final Assembly



The chassis of the 5F1 is now completed. Please take some time to thoroughly check all of the connections, parts placement, and solder joints. Ensure all components are in their correct positions according to the wiring diagram, with electrolytic capacitors oriented correctly for polarity. Verify that all solder joints are smooth and shiny, and free of cold joints, which can appear dull or cracked.

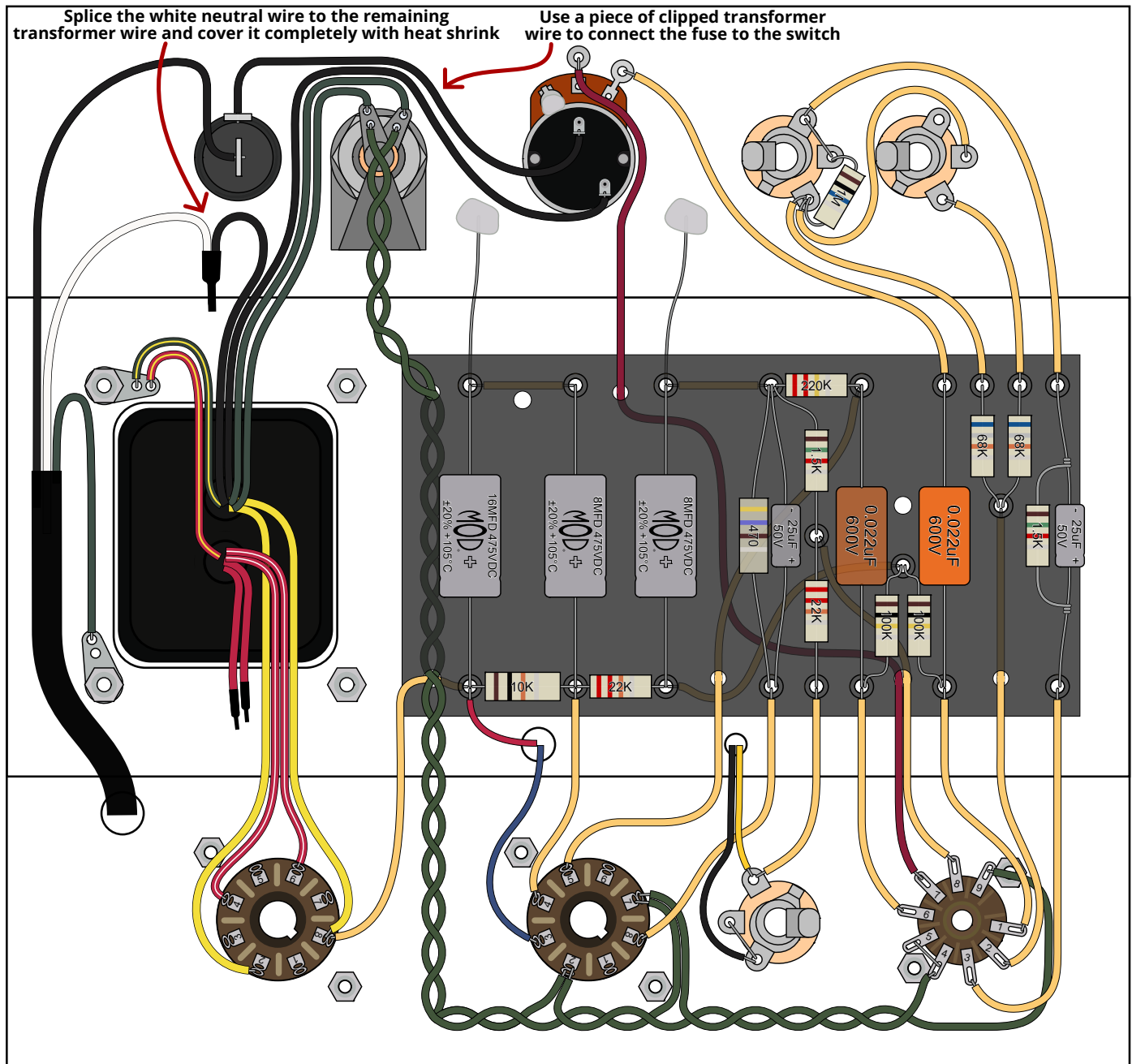
Completed 5F1 Chassis



Use this page to record any notes on the chassis construction.

Completed 5F1 Chassis (Modern Power Switching)

This kit is intended to be a faithful recreation of the original layout, and includes the original power switching scheme where the neutral power conductor is disconnected when the amp is switched off. A modern design following best electrical practices would switch the power by disconnecting the live conductor. The below drawing shows how to make that adjustment if preferred.



Speaker Wiring (optional)

This optional section provides instructions for wiring the stock speaker when using the stock cabinet with the amplifier. If a different speaker or cabinet will be used, this section can be skipped.

Part 1: Preparing the Speaker Wire

D1-1: Locate the black and white 18AWG wires. Push back the cloth sleeving to expose 3/8" of bare wire on each.

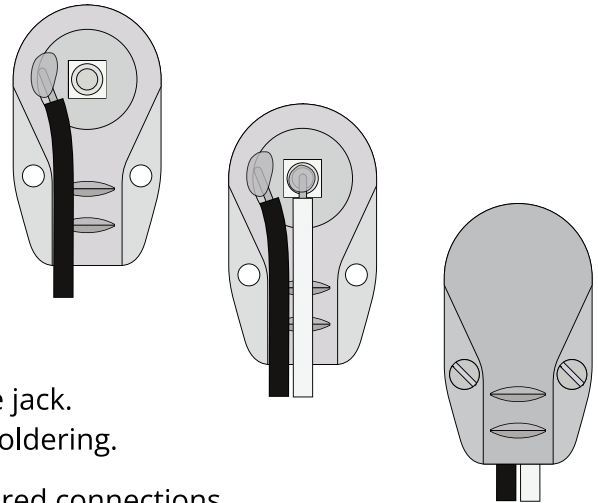
D1-2: Locate the right angle 1/4" plug. Remove the two screws to open the case. Secure the half with the plug using helping hands or a similar tool.

D1-3: Take the black wire and solder it directly to the inside of the jack's frame. Ensure that the wire is threaded through the opening before soldering.

D1-4: Solder the white wire to the center solder cup of the jack. Ensure the wire is threaded through the opening before soldering.

D1-5: Slide the sleeving back up the wire toward the soldered connections. Then, use the two screws to reattach the back cover of the jack.

D1-6: Grip the two wires at the base of the jack and twist them leaving only 1/2" of each wire untwisted



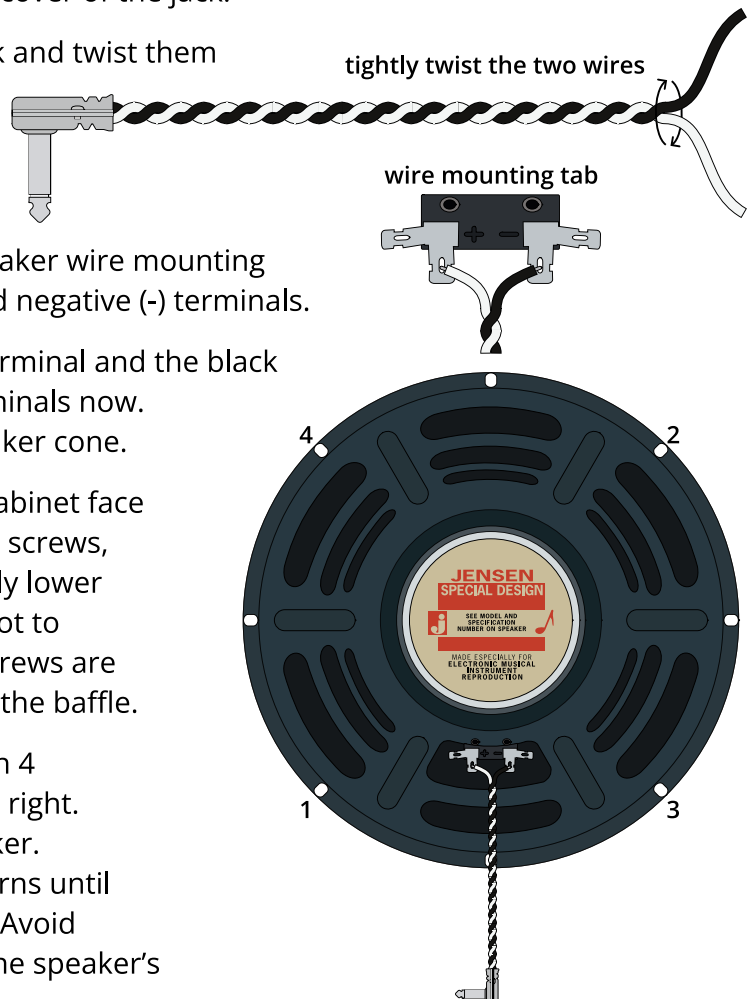
Part 2: Wiring the Speaker

D2-1: Locate the 8" 4Ω speaker used in the stock amp cabinet for the 5F1. Identify the speaker wire mounting tab. Note the orientation of the positive (+) and negative (-) terminals.

D2-2: Connect the white wire to the positive terminal and the black wire to the negative terminal. Solder both terminals now. Be careful not to drip any solder onto the speaker cone.

D2-3: Remove the back panels and place the cabinet face down. Align the speaker's holes with the baffle screws, ensuring the wire tab is at the bottom. Carefully lower the speaker onto the screws. Be very careful not to puncture the cone with the screws. Once all screws are through, lower the speaker until it's flush with the baffle.

D2-4: Attach the 6-32 Kep nuts in the 1 through 4 crisscross pattern shown on the graphic to the right. Tighten each nut until it just touches the speaker. Then go through the 1-4 sequence with half turns until the speaker is securely mounted to the baffle. Avoid over-tightening as this can negatively impact the speaker's performance.



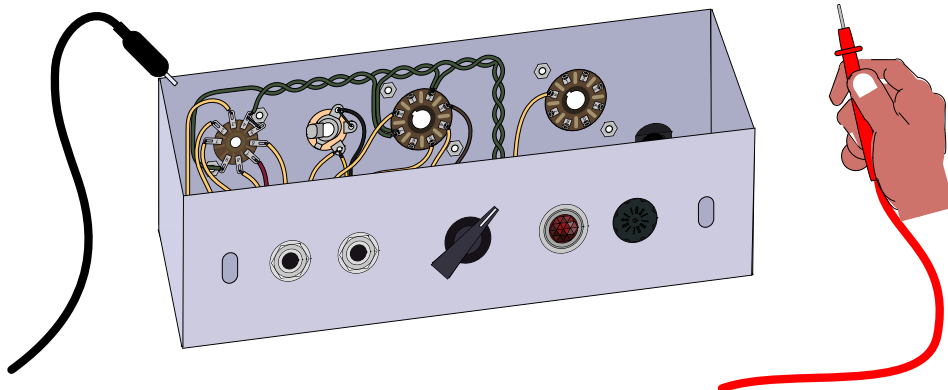
Safety

Tube amps operate at high voltages that have the potential to injure and kill. Please remember the following when working on this project.

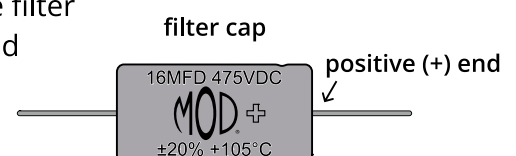
- Only work on tube amps when you are wide awake and sober
- Do not plug the amp in until you have gone through all of the instructions, checking and rechecking each step.
- Be aware that tubes become very hot when the amp is on and can take several minutes to cool down after power is turned off.
- Work in a ventilated area when soldering.
- Always follow the one hand rule when working with an amp that is connected to power or may have voltage present. (Any amp that has been plugged in at one time may have high voltage present)

One Hand Rule

The one hand rule is a safety precaution for working on an amp that is plugged in or could potentially have high voltages present. Use an alligator clip on the negative lead of your DMM and secure it to the chassis. With a standard 2mm probe on the positive lead, test the various points using one hand. This practice prevents a fatal shock by avoiding current passing through your heart. (Many people even put their other hand in their pocket or behind their back).



Always probe a tube amp for dangerous voltages present on the filter capacitors before working on it, even if it has been turned off and unplugged for months.



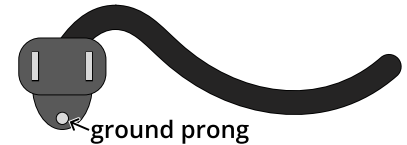
Preliminary Testing

At this stage, it's crucial to double-check and triple-check all connections, solder joints, and parts placement. It's highly recommended to review each step of the instructions to ensure all steps have been accurately completed. Incorrect wiring or misplaced components can permanently damage the amplifier. Once you are confident that the build is fully completed, you can begin preliminary testing.

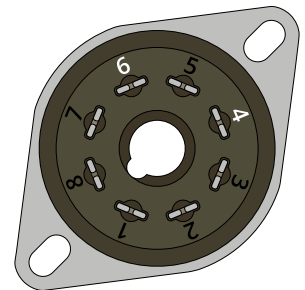
Power Transformer Verification

E1-1: If any of the test results differ from the provided information, immediately stop and unplug the amplifier. Review all connections to locate and fix the fault before proceeding further.

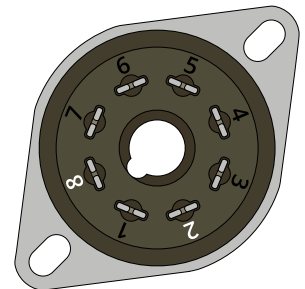
E1-2: Using the continuity test on a multimeter, check that the ground prong of the power cord has continuity with the chassis. Once verified, place the chassis in a clean work area with the open side facing down. A bench mat will help prevent slipping. The amp should be fully stable.



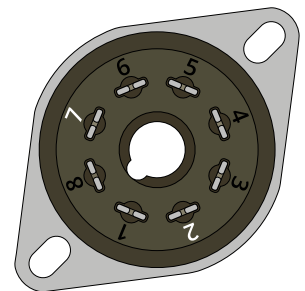
E1-3: Insert the 2A fuse into its holder. Set the multimeter to measure volts AC and attach standard 2mm pin test leads. Insert the probes into pins 4 and 6 of the rectifier's octal socket at hole 34. Make sure that the metal probes are not touching the tube clamp or one another. Turn the Volume knob counter-clockwise so the pot clicks into the off position.



E1-4: Plug the power cord into an outlet. The meter should read 0VAC but might show ~1-100mV. This is OK. Click the volume pot clockwise into the on position. The pilot light should be lit and the meter should now read ~599VAC. Click the volume pot counter-clockwise into the off position. Unplug the amp from the outlet.



E1-5: Remove the probes from pins 4 and 6 of the rectifier's octal socket and insert them into pins 2 and 8 of the same socket. Plug the power cord into the outlet. The meter should read 0VAC. Click the volume pot clockwise into the on position. The meter should now read ~5.4VAC. Click the volume pot counter-clockwise into the off position. Unplug the amp from the outlet.



E1-6: Remove the probes from pins 4 and 6 of the rectifier's octal socket and insert them into pins 2 and 7 of the output tube's octal socket at hole 31. Plug the power cord into the outlet. The meter should read 0VAC. Click the volume pot clockwise into the on position. The meter should now read ~6.8VAC. Click the volume pot counter-clockwise into the off position. Unplug the amp from the outlet.

E1-7: With these tests completed, you have successfully verified proper functionality of the power transformer in your amplifier. Measuring 599VAC confirms that the AC voltage, which will be rectified into the B+, is reaching the rectifier tube. The measurement of 5.4VAC ensures that the filament voltage is properly supplied to the rectifier tube. Similarly, the 6.8VAC measurement confirms that the 6.3V filament voltage is correctly distributed. Additionally, the functionality of the 6.3V filament is further validated by the pilot light, which is powered by the same 6.3V supply as the audio tubes.

DC Voltage Testing

Remember to follow the one-hand rule when working on an amp that is plugged in or may have high voltages present. Use an alligator clip on the negative lead of your DMM and secure it to the chassis. With a standard 2mm probe on the positive lead, test the various points using one hand. This practice prevents a fatal shock by avoiding current passing through your heart.

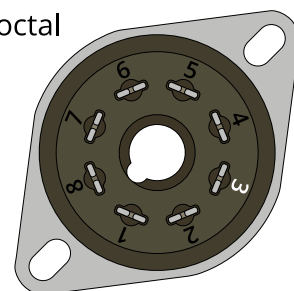
Rectifier Check

F1-1: If any of the test results differ from the provided information, immediately stop and unplug the amplifier. Review all connections to locate and fix the fault before proceeding further.

F1-2: Keep the chassis on the clean work area with the open side facing down. Switch your negative test lead to an alligator clip style lead. Secure the negative lead of the multimeter directly to the chassis. Hole 1 or 7 on panel 1 of the chassis works well for this.

F1-3: Insert the 5Y3 tube into the rectifier socket at hole 34. Make sure that the key on the tube aligns with the corresponding slot on the socket. Gently bend the clamp away from the tube and carefully insert it into place.

F1-4: Insert the positive probe of the multimeter into pin 3 of the power tube's octal socket at hole 31, ensuring the metal probe does not touch the tube clamp. Set the multimeter to measure DC volts. Plug the power cord into the outlet and then turn the volume pot clockwise to the on position. Observe the DC voltage as it rises. It should stabilize around 420VDC. This is the plate voltage for the 6V6 output tube. It will read high without the tube installed but will drop down to approximately 320VDC with the tubes installed.



F1-5: Click the volume pot counter-clockwise into the off position. Unplug the amp from the outlet. Leave the multimeter connected and observe the voltage. Notice how slowly it decreases; this is the charge held by the capacitors. Even though the amp is unplugged and off, dangerous voltages are still present. Be mindful of this and be sure to use the one-hand rule throughout these tests.

F1-6: Leave everything in place and allow the voltage to drop before continuing. This may take up to an hour. It should eventually settle around 5VDC.

F1-7: Carefully remove the positive probe from pin 3 of the output tube's socket. Be careful not to touch the metal retainer with the probe.

DC Voltage Test Measurements *(Diagram with examples voltage shown on pg. 41 for reference.)*

F2-1: Flip the amplifier so the open side is facing up. Insert the 12AX7 tube into the noval socket and the 6V6 into the octal socket at hole 31. Attach the noval socket shield cover to the socket at hole 25.

F2-2: Make sure the negative lead of the multimeter is still securely connected to the metal chassis. Connect a 4Ω speaker to the output jack. Set the multimeter to volts DC. Plug the power cord into the outlet and turn the volume pot clockwise to the on position. Keep it at the lowest volume setting while still staying on. The speaker might have a very faint 60hz hum but should otherwise be silent.

F2-3: Carefully measure the voltage at eyelet 20 using the positive lead of the multimeter. The meter should read approximately 336VDC.

DC Voltage Testing

DC Voltage Test Measurements (cont.)

F2-4: Carefully measure the voltage at eyelet 19 using the positive lead of the multimeter. The meter should read approximately 293VDC.

F2-5: Carefully measure the voltage at eyelet 18 using the positive lead of the multimeter. The meter should read approximately 250VDC.

F2-6: Carefully measure the voltage at eyelet 17 using the positive lead of the multimeter. The meter should read approximately 18VDC.

F2-7: Carefully measure the voltage at eyelet 12 using the positive lead of the multimeter. The meter should read approximately 1.1-1.4VDC.

F2-8: Carefully measure the voltage at eyelet 15 using the positive lead of the multimeter. Be prepared for the speaker to make a light popping sound when the probe makes contact with this eyelet. The meter should read approximately 155-170VDC.

F2-9: Carefully measure the voltage at eyelet 14 using the positive lead of the multimeter. The meter should read approximately 155-170VDC.

F2-10: Carefully measure the voltage at eyelet 13 using the positive lead of the multimeter. The meter should read approximately 1.1-1.4VDC.

F2-11: Click the volume pot counter-clockwise into the off position. Unplug the amp from the outlet.

Sound Test

F3-1: Remove the multimeter and flip the amplifier so the open side faces down. Ensure the amp is securely positioned and the speaker remains connected.

F3-2: Connect a guitar to an instrument cable and plug it into the Instrument 1 jack. Make sure that you have enough cable to play the guitar without pulling on the amp.

F3-3: Plug the power cord into the outlet and then turn the volume pot clockwise to the on position. Slowly increase the volume until the guitar can be heard clearly.

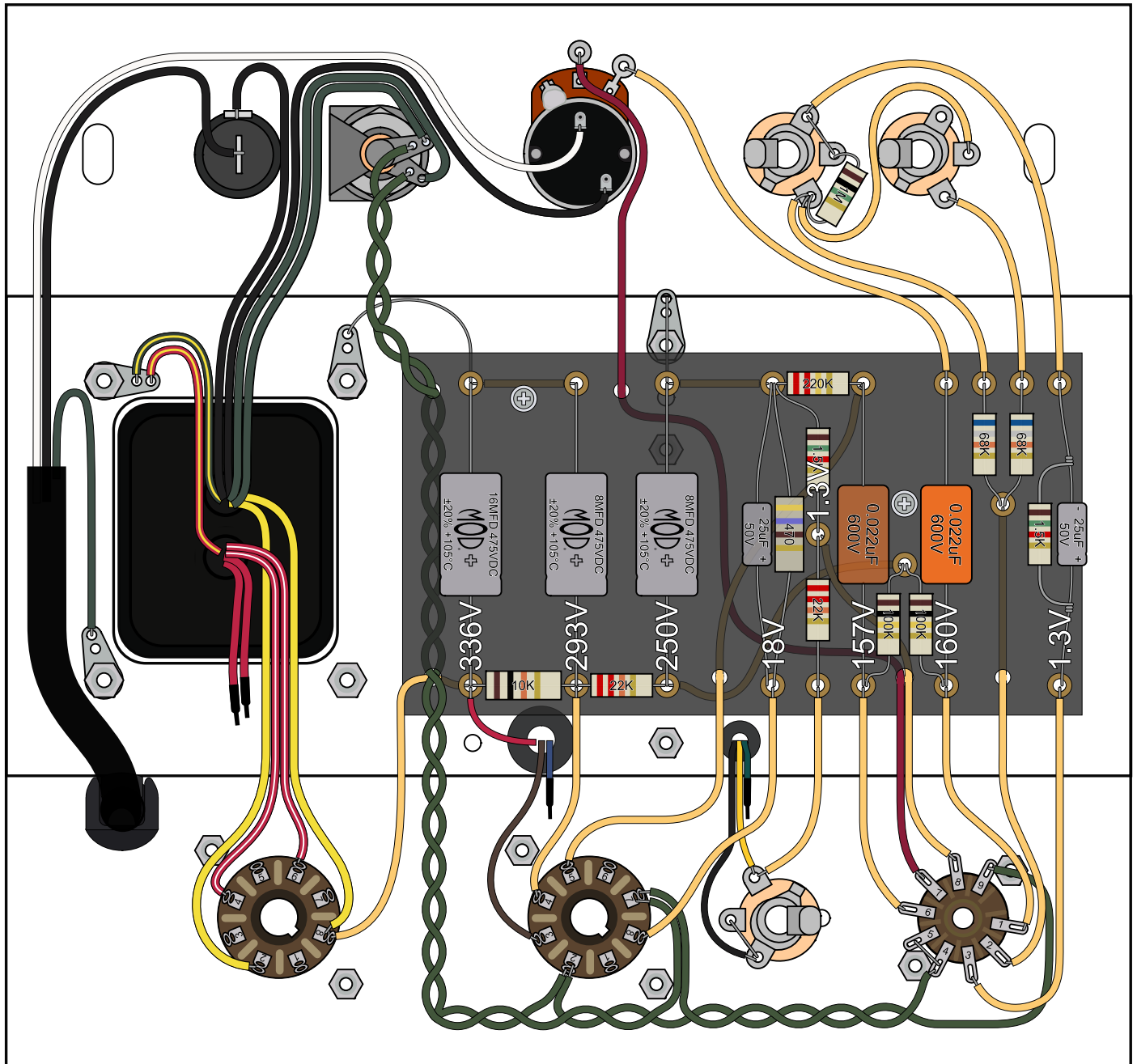
F3-4: Play around with the different levels. The amp should have fairly clean headroom at a high volume before the tube distortion kicks in.

F3-5: Rotate the pot to the off position. Carefully unplug the cable from the Instrument 1 jack and plug it into the 2 jack. Rotate the pot back to the on position. Play with the levels again. This should sound roughly the same as Instrument 1 input but quieter.

F3-6: Once you are satisfied that the amp is performing correctly click the volume pot counter-clockwise into the off position. Unplug the amp from the outlet.

F3-7: Once the tubes have cooled, you can now install the amplifier into its cabinet. It's a good idea to remove the tubes before mounting the chassis to avoid potential damage.

DC Voltage Testing (example voltages)



Thanks for selecting a Mod® Electronics amp kit. We hope you had as much fun building this amplifier as we had designing it for you. Mod® Electronics is a small business and your support means the world to us. Learn more about what else we do at modelectronics.com. Keep rocking.

