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ASSEMBLY MANUAL

JTM45+ " " Styled 50W Tube Guitar Amp Kit

(with some great " " styled mods)

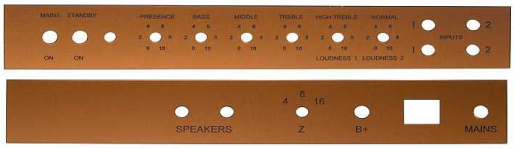

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Table of Contents

Preface

Marshall amplifiers have always been the forefront in the sound of rock n' roll. Since the early 1960's, Marshall has taken simple circuits and turned them into extraordinary, amplifiers that to this day, continue to define great tone.

In the early 60's, the JTM45 established Marshall as the new leader in guitar amplifiers. While all the other amplifier manufacturers were designing their amps to be cleaner, Marshall took a different path. With a simple circuit (from the Fender 1959 4x10 Bassman), Marshall “crunched” it full of harmonically rich tone and built an amplifier that set the standard for everyone to follow.

This British JTM45+ kit is our nod to the original JTM45 and MkII 50W amplifiers. With turret board, point-to-point construction, quality components, and just a touch of American upgrading, this kit is ready to become your sound.

Unlike previous assembly manuals, we have designed this manual for the more advanced builder in mind. This manual is lite on step-by-step instructions, but filled with detailed drawings and photos. We are leaving these drawings and photos to speak for themselves. If you have previous amp building experience, you will enjoy the challenge that this kit provides.

But before we get started, a safety review …

Robert Hull

Director of Technical Services
TubeDepot.com

Before continuing, PLEASE READ the following:

NOTE

We are continually making improvements to this assembly manual in an effort to provide the best instructions possible. Therefore, when the manual's instructions differ from the video, I recommend following this written manual as this will be more up-to-date and accurate.

1 Safety

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!!! Read these safety precautions before continuing !!!

ALL tube amplifiers contain **LETHAL VOLTAGES,** often several hundred volts which **WILL** leave burnt entrance and exit wounds in skin if accidentally touched. These voltages have the potential to cause **permanent physical damage and death**. These voltages are present when the amp is turned on and also for some time after the amp has been turned off. **You can still get shocked with a tube amp turned off and disconnected from AC power.**

The above statement is a bit scary, but we want to stress that every piece of electronic equipment must be treated with respect. When AC power is applied, there is always a chance for injury or death. With tube amps, even when the AC power is not applied there is still danger. Being shocked with high voltage is very painful and we do not want anyone finding out the hard way.

When building this kit, we want your experiences to be both enjoyable and safe. There are more kits to assemble and we want you to enjoy building and playing them all.

- DISCLAIMER -

TubeDepot.com, it's employees, officers, shareholders, investors and subsidiaries accept no liability for any damage(s), injury(s) or death incurred from or while building or using this kit.

Throughout this manual at key points in the construction, we have annotated important steps with the below alerts. For your safety and to improve construction quality, It is important that you become familiar with each of these alerts and adhere to any safety recommendations when they appear.

Explanation of Alerts

WARNING	*Used when identifying an action that may cause physical injury or death.*
CAUTION	*Used when identifying an action that may cause damage to components and/or equipment.*
NOTE	*Used when identifying general points of interest.*
MOD	*Used when identifying potential modification point(s)*

2 Tools and Supplies

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As with any construction project, there are certain recommended tools and supplies. The following are the tools and supplies NOT provided with the kit but are needed for completion. These are expected to be provided by the builder.

The following is our recommended list:	***TubeDepot.com part number***
Phillips screwdriver, #1 and #2	TL-VTSCRSET8
Slip joint pliers	
Needle nose pliers	TL-VT33
Wire cutters, diagonal	TL-VT33
Wire strippers, for 18 and 20 awg wire	TL-VT5021
Electric Drill (cordless recommended)	
Drill bit, 1/8” - AC receptacle installation; turret board wire routing	TL-DB-40125
Drill bit, 5/32” - turret board mounting	TL-DB-40156
Drill bit, 9/32” - Chassis mounting in cabinet	
Drill bit, 5/16” - inset nut installation into chassis	
Drill bit, 7/16” - impedance selector installation	
Drill bit, 1/4” - shock mounted tube socket mounting holes	
Countersink bit	
Masking tape, 2” or 3”	
Ruler or scale, 12” w/ 1/16” markings	
Permanent marker, fine tip	
Soldering iron, 25W – 40W (35W recommended)	TL-WP35
Solder, electronics safe (60/40 w/ rosin core recommended)	TS-24-6040-0027
Flux, electronic – liquid or paste (must be safe for electronic work)	TS-83-1000-0186
De-soldering pump / solder extractor	TS-384-1000
Solder wick or desoldering braid	TS-1817-10F
Sponge or soldering iron tip cleaner	TL-TIP-CLEANER

The following are tools that really nice to have on hand:

Soldering station w/ temperature control	TL-WTCPT
Multimeter w/ DC range of at least 500V	TL-DVM850BL
Variable AC supply (Variac® style)	
Current Limiting AC source (dim bulb tester) – self built	
Needle nose pliers – small size, for electronics work	TL-NN7776
Wire cutters, diagonal – small size, for electronics work	TL-170M
Center punch – an automatic center punch is great	
Nutdrivers - 5/16”, 11/32”, 7/16”, 1/2”	
Square, 9”	
Scratch Awl	
De-burring tool	TL-DB-1
Fingernail polish (for holding nuts and screws in place)	
Step drill bit (1/8” - 1/2”)	
Orange wood stick – for moving components and wires into place	TS-OWS

3 Parts Inventory

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Make sure the following items are included with your kit. Let us know if there are any missing items or if you have any questions regarding a particular part(s).

qty	*description*	*TD part number*
1	chassis, aluminum Marshall style JTM45	CH-MARJTM45
1	panel, front and back, Marshall style JTM45, plastic	CH-MARJTM45-FP
1	xfmr, power, 45W Marshall style w/ rectifier tap	TR-PW-05
1	xfmr, output, 50W Marshall style	TR-OT-07
1	choke, Marshall style 3 HY, 250mA	TR-CK-05
1	GZ34 JJ dual-diode rectifier	JJ-GZ34
1	EL34 beam power tetrode (sold in pairs)	JJ-EL34
3	12AX7 / ECC83 dual triode preamp tube	JJ-ECC83
7	knob, Marshall style w/ set screw	P-MAR-1-4-BRASS
1	knob, chicken head, vintage w/ set screw	P-VSCH
2	fuse holder, low profile screwdriver cap, 3AG	P-FH-LOWPRO
1	fuse, 3AG 500mA slow blow (HT fuse)	P-BK-MDL-.5A
1	fuse, 3AG 2A fast blow (Mains fuse)	P-BK-AGC-2A
1	Indicator lamp, 6.3V incandescent	P-PL-MARSHALL-1
1	push nut-flat round 5/16" stud (included w/ above lamp)	
6	jack, 1/4", Amphenol mono	P-ACJM-IHS
2	washer, chassis grounding for above jack	GW-CL1442
2	switch, toggle SPST; Carling	P-110-63
1	switch, toggle DPST, Carling	P-2BK62-73
2	washer, lock 1/2", internal tooth	LW-IT-1-2
2	switch, mini toggle, DPDT, (on-on)	P-108-MINI-2
1	switch, mini toggle, SPDT (on-off-on)	P-108-MINI-3
1	switch, 3 position rotary	P-ROTARY-SWITCH
1	plug, AC chassis mount, press fit	P-IEC-1
1	power cord, with IEC connector	P-12PWI
3	diode, 1N4007	D-1N4007
2	diode, GP02-30-E3/73	D-R3000
3	socket, tube, miniature 9 pin	SK-B-VT9-ST-C
3	shield, tube socket, miniature 9 pin	SK-PCP
3	socket, tube, octal chassis mount	SK-B-VT8-ST
3	grommets, rubber 1/2" chassis hole	P-GROMMET-1/2
4	bolt, metric, M6x30mm, stainless steel	MS-M6X30MM
4	flat washer, metric, M6, stainless steel	BP-M6-WASHER
4	captive nuts, M6	BP-M6-CAPTIVENUT

qty	*description*	*TD part number*
4	screw, zinc plated 6-32 x 1/4", phillips pan head	BP-632-1/4
18	screw, zinc plated 6-32 x 3/8", phillips pan head	BP-632-3/8
2	nuts, standard 6x32	BP-632
12	nuts, KEPS 6x32	BP-632-KEPS
4	standoff, aluminum hex, #6 threaded, 1/2" long	BP-ALSTDOFF-6-FF-1/2"
7	nuts, KEPS 8x32	BP-832-KEPS
3	nuts, 8-32 standard	BP-832-NUT
6	screw, zinc plated 8-32 x 3/8", phillips pan head	BP-832-3/8
4	solder lug, locking, #8 screw	P-TERMLOCK-8
4	solder lug, locking, #6 screw	P-TERMLOCK-6
10 ft.	wire, 20 AWG, stranded, hi-temp PVC - yellow	HTPVC-20-STR-YELLOW
10 ft.	wire, 20 AWG, stranded, hi-temp PVC - red	HTPVC-20-STR-RED
10 ft.	wire, 20 AWG, stranded, hi-temp PVC - black	HTPVC-20-STR-BLACK
10 ft.	wire, 20 AWG, stranded, hi-temp PVC - white	HTPVC-20-STR-WHITE
10 ft.	wire, 20 AWG, stranded, hi-temp PVC - blue	HTPVC-20-STR-BLUE
10 ft	wire, 20 AWG, stranded, hi-temp PVC - violet	HTPVC-20-STR-VIOLET
10 ft.	wire, 20 AWG, stranded, hi-temp PVC - orange	HTPVC-20-STR-ORANGE
10 ft.	wire, 18 AWG, stranded, hi-temp PVC - black	HTPVC-18-STR-BLACK
2 ft	wire, 20 AWG, solid bare buss wire, tinned copper	BW-20
2 ft	wire, 16 AWG, solid bare buss wire, tinned copper	BW-16
2 ft	shielded wire, interconnect	IW-2330
5 ft	aluminum tape, 2" width, self adhesive	P-TAPE-ALUM
1 ft	double stick tape, 1" wide (not listed in stock – applied to back of plexi back plate)	
1	heat shrink, 1/8" - BLACK, 6" piece	TS-HS-1-8
11 in.	G10 glass epoxy board (11”x 3-1/8”)	BP-125BOARD-RED
68	turret, hollow Keystone 1540-4	BP-TURRET
1	470 / 1/2W, 1% metal film	R-273-470
2	820 / 1/2W, 1% metal film	R-273-820
2	1.5K / 1/2W, 1% metal film	R-273-1.5K
1	2.7K / 1/2W, 1% metal film	R-273-2.7K
2	5.6K / 1/2W, 1% metal film	R-273-5.6K
1	22K / 1/2W, 1% metal film	R-273-22K
1	27K / 1/2W, 1% metal film	R-273-27K
2	33K / 1/2W, 1% metal film	R-273-33K
1	47K / 1/2W, 1% metal film	R-273-47K
1	51K / 1/2W, 1% metal film	R-273-51K
4	68K / 1/2W, 1% metal film	R-273-68K
1	82K / 1/2W, 1% metal film	R-273-82K
5	100K / 1/2W, 1% metal film	R-273-100K
2	220K / 1/2W, 1% metal film	R-273-220K

qty	*description*	*TD part number*
2	470K / 1/2W, 1% metal film	R-273-470K
4	1M / 1/2W, 1% metal film	R-273-1M
2	1.0 / 1W metal oxide	R-273-1
3	10K / 1W, metal oxide power resistor	R-273-10K
1	15K / 1W, metal oxide power resistor	R-273-15K
1	220K / 1W, metal oxide power resistor	R-273-220K
2	470 / 3W metal oxide	R-282-470
1	1K / 3W metal oxide	R-282-1K
2	10K / 3W metal oxide	R-282-10K
1	22K / 3W metal oxide	R-282-22K
1	47pfd / 500V; silver mica	CP-SM-47-500V
1	100 pF / 500V; silver mica	CP-SM-100-500V
1	250pfd / 500V; silver mica	CP-SM-250-500V
1	500pfd / 500V; silver mica	CP-SM-500-500V
1	.0022ufd / 630V; Mallory 150	CP-M150-0022-630V
7	.022ufd / 630V; Mallory 150	CP-M150-022-630V
2	.1ufd / 630V; Mallory 150	CP-M150-1-630V
2	.68 / 100V, Mallory 150	CP-M150-68-100V
2	50ufd / 50ufd @ 500V	CP-JJ-50X2-500V
2	capacitor clamp, small	CP-CLAMP1
1	16ufd / 475V	CP-FT-16-475V
1	47ufd / 500V	CP-FT-47-500V
1	330uF / 16V	CP-ST-330-16V
2	10uF / 160V	CP-ST-10-160V
1	5K linear	RV24A-10D2-15R1-B-5K
1	25K linear	RV24A-10D2-15R1-B-25K
1	250K linear	RV24A-10D2-15R1-B-250K
4	1M audio	RV24A-10D2-15R1-A-1M
1	50K trimmer pot	BP-BIASPOT-50K
1	Turret setter kit	DIY-PFT-KIT

The following additional parts are particular to your choice of head or combo kits:

head kit -

1	cabinet, small box black tolex Marshall style	CAB-MAR-SMBOX

combo kit -

1	cabinet, 1x12 combo Marshall style	CAB-MAR18
1	speaker, 12", 75W ceramic Weber Silver Bell	secret hidden stock
1	1/4" phone plug, Switchcraft P-280	P-280
1 ft.	techflex, yellow	TS-PTNO-1-4
2 ft.	wire, 18 AWG, stranded, hi-temp PVC - white	HTPVC-18-STR-WHITE

4 Cabinet Preparation

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This chapter deals with preparing the cabinet for installation of the completed chassis. But first, we need to take inventory of the parts that came installed with the cabinet.

4.1 Cabinet Inventory

Combo Cabinet

1. **Handle w/ mounting hardware** – There should be a single flat black handle with two gold end covers mounted to the top of the cabinet.
2. **Feet, rubber** – There should be four rubber feet attached with screws.
3. **Back panels, upper and lower with screws** – There should be two back panels. The top back panel should be secured with four panel screws, the bottom panel should be secured with five panel screws. All panel screws should have a finishing washer.
4. **Baffle screws** – There should be eight black oxide coated screws with matching black finishing washers holding the baffle in the cabinet.
5. **Speaker bolts** – There should be four black oxide coated bolts for securing the speaker to the baffle board.

Head Cabinet

1. **Handle w/ mounting hardware** – There should be a single flat black handle with two gold end covers mounted to the top of the cabinet.
2. **Feet, rubber** – There should be four rubber feet attached with screws.
3. **Back panel w/ screws** – The back panel should be secured with four panel screws.

With either cabinet, inspect all screws. I've found screws that weren't fully tightened during assembly. These loose screws will buzz when vibrated by the speaker or speaker cab.

4.2 Drilling the Four Chassis Mounting Bolts

CAUTION *The following steps call for drilling the mounting holes in the cabinet for the chassis. Make sure to review, reread and remeasure at each step to reduce potential drilling errors. Because (as the wise old amp builder's saying goes) what is drilled, cannot be undrilled.*

4.2.1 Combo Cabinet

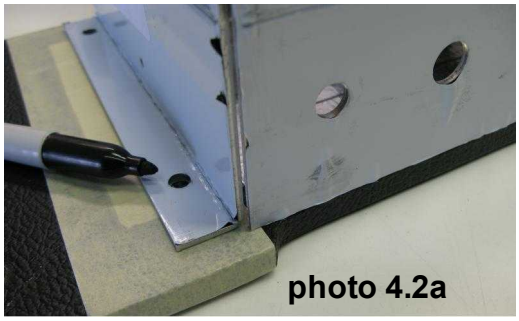
photo 4.2a

Step 1 – Remove the back panel and lay the panel on the work table with the vinyl covering facing down.
Step 2 – With the aluminum chassis, center the chassis on the back panel with the control panel side of the chassis flush against the back panel cutout (photo 4.2a).
Step 3 – Make a mark through each of the four mounting holes of the chassis onto the back panel (photo 4.2a).
Step 4 – Drill a small 1/8” pilot hole in the center of each of these marks.
Step 5 – Once the pilot holes have been drilled, drill the final 5/16” hole down the center of each of these holes.
Step 6 – With a hobby knife, clean the edges of the holes by cutting off any excess vinyl covering left from the drilling operation.

4.2.2 Head Cabinet

Step 1 – Place the cabinet upside down with handle against the bench and front of cabinet facing you.
Step 2 – Lay two strips of masking tape on each end just on the inside of the feet.
Step 3 – On both strips of masking tape, make marks 1-3/8", following the curve, from the outside edge of the cabinet (photo 4.2b).
Step 4 – Locate the front of the chassis (the front has the four input holes). Now, align the front of the chassis mounting lips on the 1-3/8" mark (photo 4.2b). Visually center the chassis over the front opening of the cabinet. (photo 4.2c).
Step 5 – Make a mark through the four chassis mounting holes onto the tape. Move the chassis to the side. (photo 4.2d)
Step 6 – Drill a 5/16" hole in each of the four marks. Remove the masking tape. (Increase this hole size to 3/8" if needed).
Step 7 – With a hobby knife, clear the holes of any remaining vinyl covering.

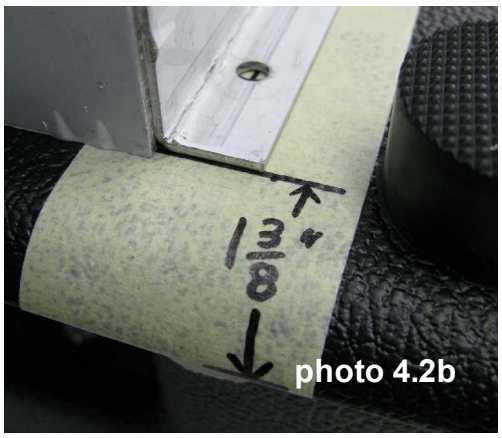

photo 4.2b

photo 4.2d

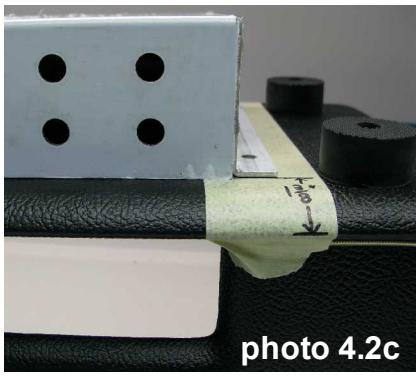
photo 4.2c

4.3 Installing the Shielding Tape

4.3.1 Combo Cabinet

Step 1 – Place the cabinet back panel with the vinyl side down toward the desk.
Step 2 – Cut three lengths of shielding tape, each 20" long.
Step 3 – Remove the backing from the first of these 20" shielding tape strips.

CAUTION *Once the backing is removed from the aluminum tape, the tape will have a tendency to curl. Be sure to keep the tape straight to avoid having the tape stick permanently to itself.*

Step 4 – Apply the aluminum tape to the back of the panel centered between the chassis mounting holes.
Step 5 – Apply the second strip of tape along the lower edge of the previous tape, overlapping about 1/8" the entire length (photo 4.3b).
Step 6 – Apply the final shielding tape strip along the upper edge of the first tape, overlapping about 1/8" (photo 4.3b).
Step 7 – With a hobby knife, Clear the mounting holes of shielding tape.


photo 4.3a

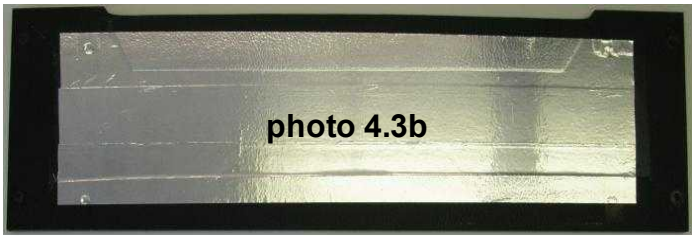
photo 4.3b

4.3.2 Head Cabinet

Step 1 – Place the cabinet with the back open toward you.
Step 2 – Cut three lengths of shielding tape, each 18” long.
Step 3 – Remove the backing from the first of the 18” shielding tape strips.

CAUTION *Once the backing is removed from the aluminum tape, the tape will have a tendency to curl. Be sure to keep the tape straight to avoid having the tape stick permanently to itself.*

Step 4 – Apply the first aluminum tape strip to the inside of the cabinet, centered down the middle between the chassis mounting holes (photo 4.3c).
Step 5 – Apply the second shielding strip to the cabinet along the lower edge of the previous tape, overlapping about 1/8” the entire length.

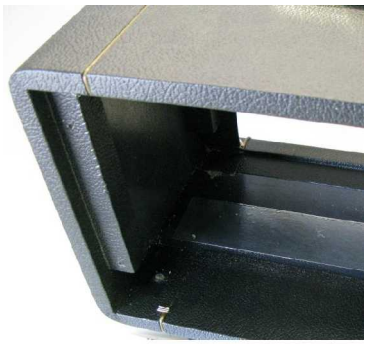
photo 4.3c


photo 4.3d

Step 6 – Apply the third strip along the upper edge of the first tape, overlapping about 1/8” along the entire length (photo 4.3d).
Step 7 – Clear the mounting holes of shielding tape with a hobby knife.

4.4 Wiring the Speaker Cable to the Speaker (Combo Cabinet)

NOTE *For hints on improved soldering skills, review Appendix B at the end of this manual. Additionally, see “How to Solder”, http://www.youtube.com/watch?v=cIDydYIVTqU*

Step 1 – Measure a 14” length of white 18AWG wire, and a 14” length of black 18AWG wire.
Step 2 – Twist these black and white wires tightly together the full length.

NOTE *To get an even, tight twist, use a handheld drill to twist the two wires together. Place the loose wire ends into the drill chuck and slowly turn the drill until the wires are tightly twisted..*

Step 3 – At one end of this twisted pair, strip the insulation back ½ ” from both wires and tin these two wires

NOTE *The ¼” phone plug was invented for use in telephone switchboards in 1878. And although it is no longer used for telephone switching, this great plug has become the standard connection type between musical instruments and outboard equipment.*

Step 4 – Unscrew the barrel of the ¼ ” phone plug and solder the two tinned wires to the plug; white to center and black to shield (photo 4.3a).
Step 5 – Slide the length of yellow Techflex over this twisted pair right up to the center conductor of the plug (photo 4.3b).
Step 6 – Slide the 3” length of 3/8” heat shrink up over the Techflex up to the center conductor of the plug (photo 4.3b).


photo 4.3a

Step 7 – Shrink the heat shrink in place with a heat gun (photo 4.3b)

CAUTION *Be careful when applying heat to the heatshrink, especially at the point where the techflex and heatshrink meet. The techflex will quickly melt if excess heat is applied.*

photo 4.3b

photo 4.3c

Step 8 – Install the remaining 3" heat shrink length over the tech flex at the opposite end of the twisted pair near the cut end.
Step 9 – Shrink the heat shrink in place with a heat gun.
Step 10 – At the opposite end of the twisted wire pair, strip back the insulation ¼" and tin these two wires.
Step 11 – Solder these wires to the terminals of the speaker; the white wire to the "+" terminal and the black wire to the "-" terminal (photo 4.3c).

4.4 Mounting the Speaker in the Cabinet (Combo Cabinet)

NOTE *A speaker does not come standard with the cabinet. Therefore, the choice of speaker is up to you. It is recommended that the power rating of the speaker is at least 35W.*

Step 1 – Remove the four speaker mounting screws from the speaker baffle board.
Step 2 – With speaker in hand, carefully align the speaker mounting holes to the baffle board mounting holes (I recommend installing the speaker with connecting terminals on top).
Step 3 – Install a single #8 flat washer on each of the four mounting screws prior to installation.
Step 4 – Install the four mounting screws through the speaker mounting holes into the baffle board. Firmly tighten down.

photo 4.4a

5 Chassis Preparation, Assembly, and Wiring

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NOTE *There are several great modifications that are possible on this amp. I recommend reviewing these mods prior to beginning the following assembly steps to see if there is something that interests you. It is easier to install most modifications during initial assembly than later.*

5.1 Installing the Captive Nuts into the Chassis

WARNING *During all drilling and cutting operations, it is important to wear proper eye protection and follow appropriate safety precautions.*

photo 5.1a

Step 1 – Locate the four mounting holes on the outwardly bent flange edges of the chassis, two on each edge.
Step 2 – Remove the protective white plastic on just these edges.
Step 3 – With a 5/16” drill bit, enlarge all four of these holes and remove any burrs.
Step 4 – Place the chassis, flange down, on a flat solid surface (concrete floor is good).
Step 5 – Place an inset nut on the flange directly over one of the newly drilled 5/16” holes (photo 5.1a).
Step 6 – With a few blows from a hammer to the top of the insert nut, seat the nut firmly into the hole and flush against the chassis flange. To assist in making sure the nut is firmly seated, you can also insert the chassis edge and nut into a vise and press together (photo 5.1b).

photo 5.1b

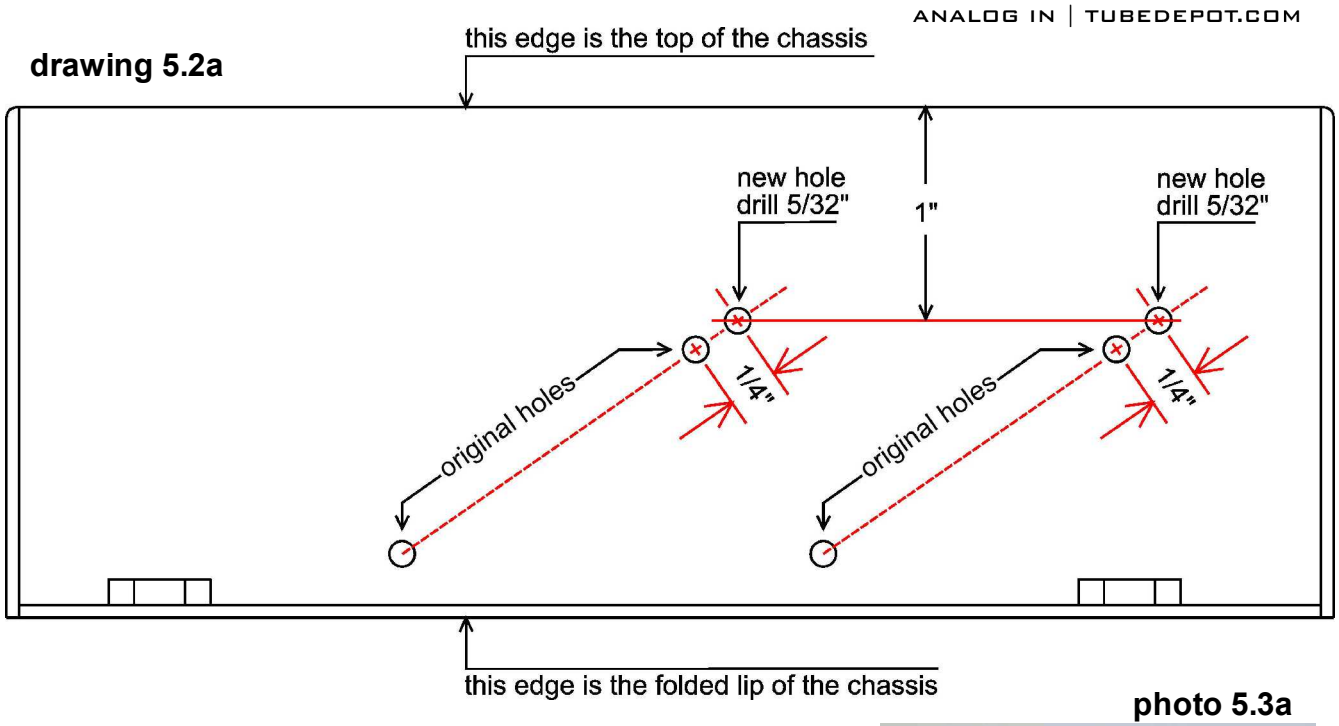
Step 7 – Inspect the nut to insure it is well seated (photo 5.1c). Repeat step 6 as needed.
Step 8 – Repeat above for the remaining three nuts.
Step 9 – Once all the nuts have been mounted, test fit in the cabinet and modify the hole size as needed.

photo 5.1c

5.2 Drilling New Holes for Mounting Can Capacitors

Step 1 – Measure and mark appropriate side of chassis with pen according to (drawing 5.2a).
Step 2 – Use a center punch to mark the point to be drilled.
Step 3 – Drill the 5/32” holes at each of these marks and debur the holes.
Step 4 – Remove all remaining protective plastic covering from chassis.

drawing 5.2a



5.3 Installing the Grommets

Step 1 – install 1/2” grommets in the appropriate holes on the top of chassis (photo 5.3a).

photo 5.3a

5.4 Installing the Tube Sockets

Step 1 – Modify the tube shield covers by flattening both ends of the base so that the mounting screws will properly lay flush against the chassis (photos 5.4a and 5.4b).
Step 2 - Install the three 9 pin tube sockets in the appropriate holes in the chassis. Note alignment of sockets and which #6 screws are used (drawing 5.4a).
Step 3 – Install the three octal tube sockets in the appropriate holes in the chassis. Make sure to include the #6 solder terminals on the power tube sockets. Note alignment of sockets and which #6 screws and nuts are used with each socket (drawing 5.4b).

photo 5.3a

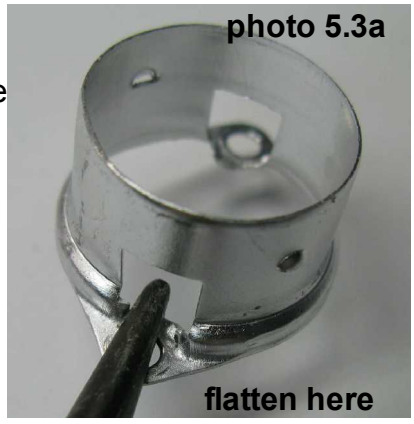
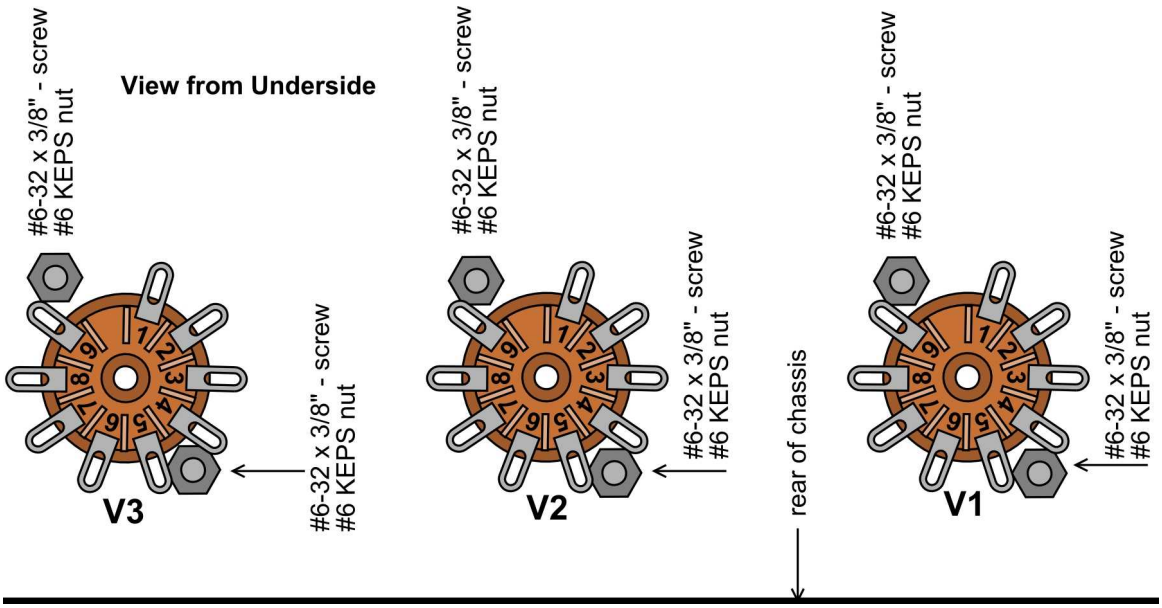
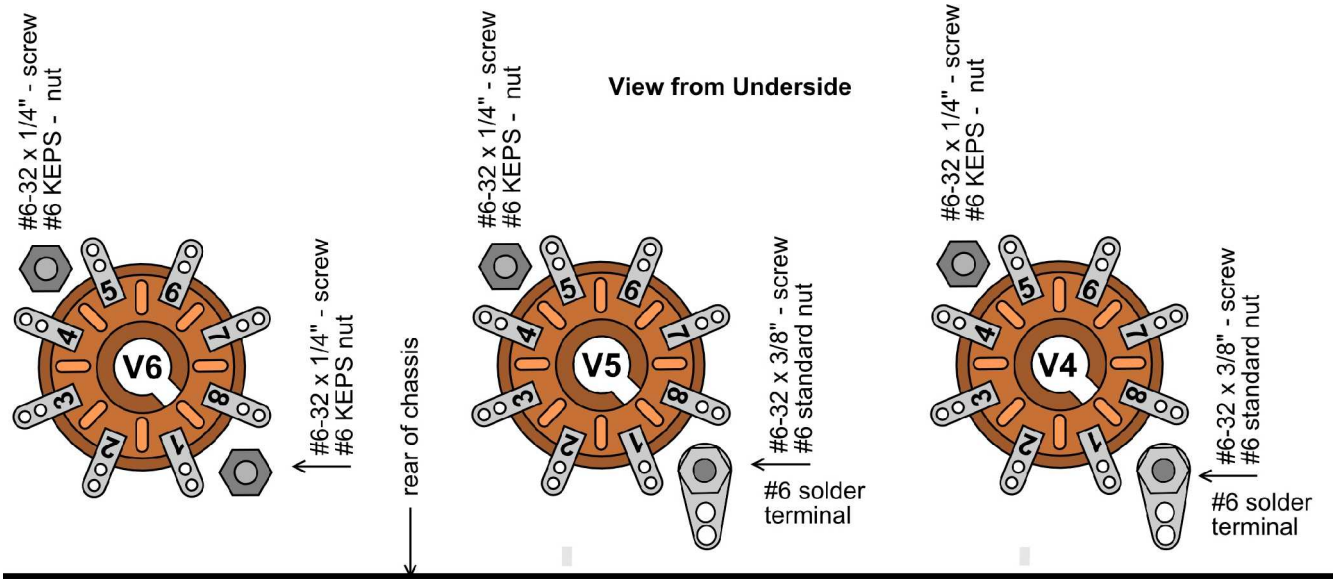


photo 5.3b



9 pin socket installation **Drawing 5.4a**

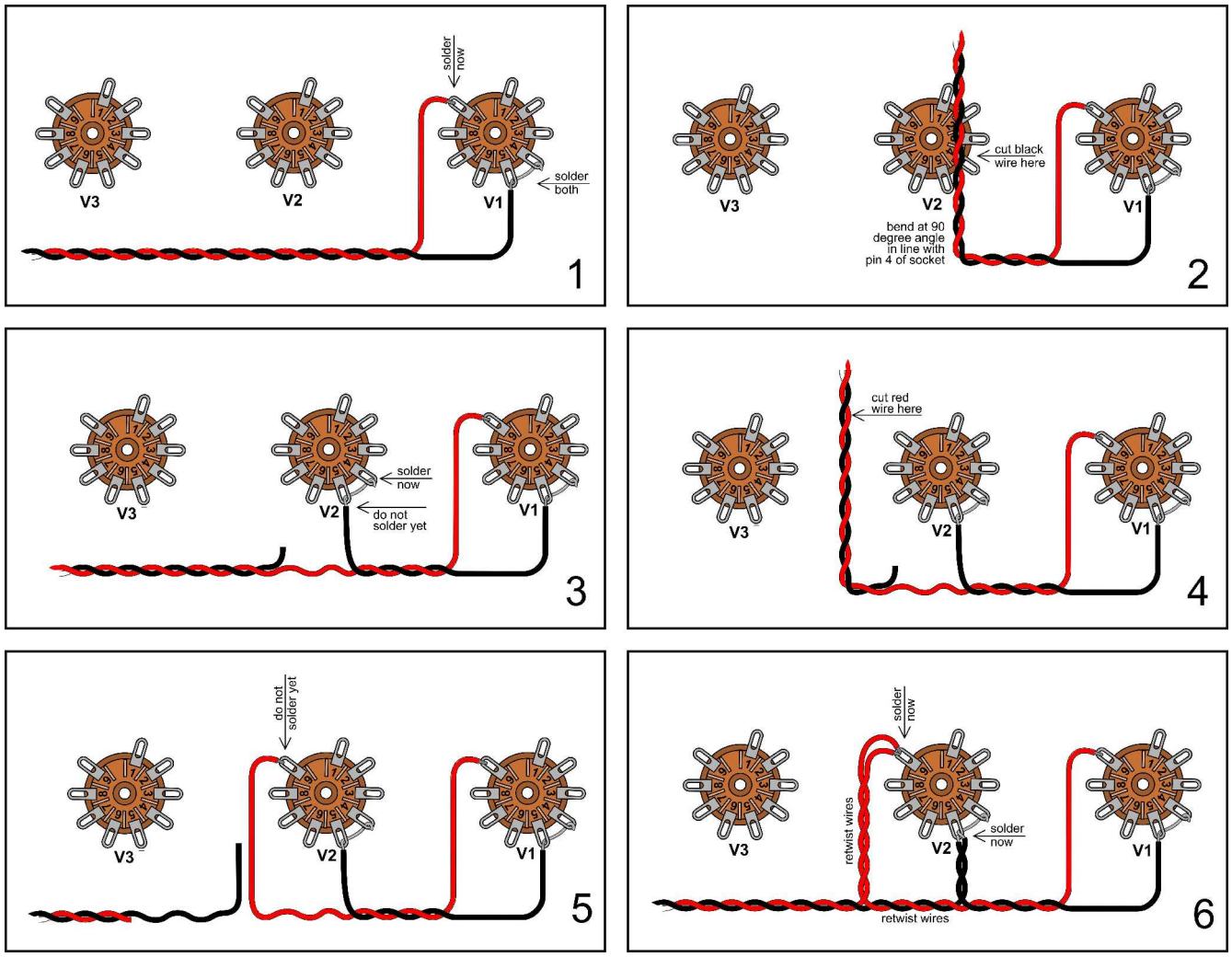


Octal socket installation **Drawing 5.4b**

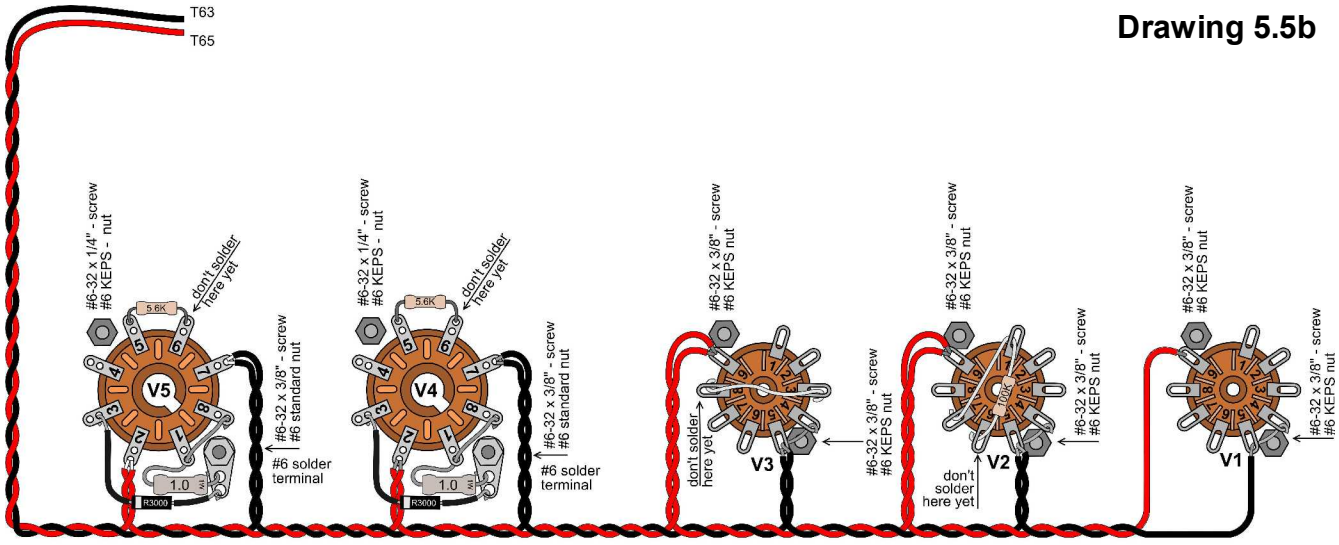
5.5 Wiring the Filaments

Step 1 – Use an electric drill to twist together 3-1/2 feet of 20AWG black and 20AWG red wires. The resultant dual twisted wire should be about 3 feet long.
Step 2 – Wire the filaments for the preamp and power tubes. Review the following drawings for method description (drawing 5.5a & 5.5b).

Drawing 5.5a



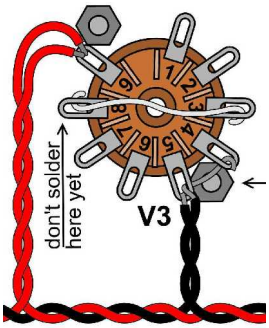
Drawing 5.5b



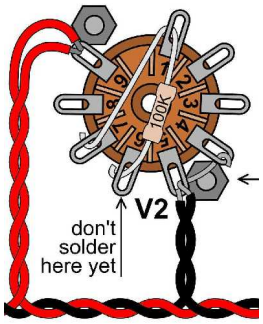
twist 3-1/2 feet of the red and black 20 AWG wire together for filament

5.6 Preliminary Wiring of Tube Sockets

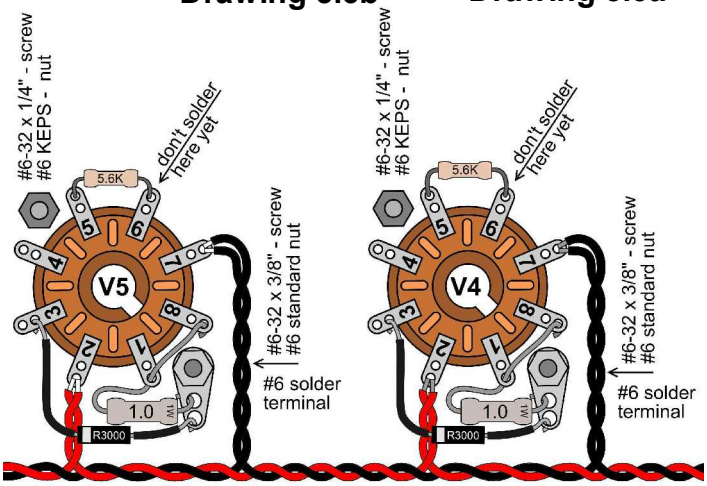
Step 1 – Wire a 100K / 1/2W resistor to the back of the V2 socket as shown (drawing 5.6a). Do not apply solder to pin 6 just yet.
Step 2 – Wire a jumper wire across the back of the V3 (pins 3 & 8) socket as shown (drawing 5.6b). Do not apply solder to pin 8 just yet.
Step 3 – Wire a 5.6K / 1/2W resistor to the back of V4 and V5 sockets as shown. Do not solder where indicated (drawing 5.6c).
Step 4 – Wire a 1.0 / 1W resistor to pins 1 & 8 of V4 and V5 sockets as shown (drawing 5.6C)
Step 5 – Cut four 3/4" pieces of recycled 20AWG plastic wire insulation and place over the leads of the R3000 diodes.
Step 6 – Wire the two R3000 diodes to the V4 and V5 sockets as shown (drawing 5.6C). Pay careful attention to polarity of diodes.



Drawing 5.6b



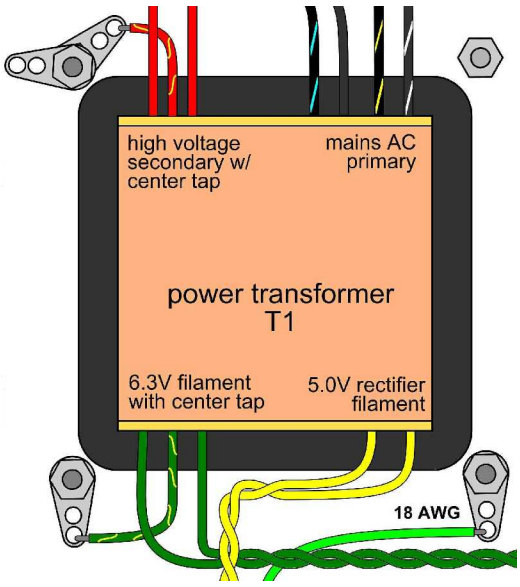
Drawing 5.6a



Drawing 5.6c

5.7 Installation of Hardware, Transformers and Faceplate

Step 1 – Install the power transformer with the green and yellow wires coming through the chassis cutout toward the rear of the chassis. Refer to drawing to determine the proper location of the four #8 solder terminals (drawing 5.7a). Use three #8 nuts and one KEPS #8 nut.
Step 2 – Install the four aluminum standoffs to the chassis with four #6-32 x 1/4" screws.
Step 3 – Install the output transformer with the red, blue and brown wires coming through the grommet nearest the front of the chassis and with the remaining orange, yellow, brown, black and green wires coming through the grommet nearest the back of the chassis. Use four #8x32-3/8" screws and four #8 KEPS nuts.
Step 4 – Install the choke with the black wire coming through the remaining grommet. Use two #8x32-3/8" screws and two #8 KEPS nuts.



Drawing 5.7a

Step 5 – Remove protective plastic from faceplate and rear plate.
Step 6 – Install faceplate along with input jacks, master volume, volume & tone controls, power and standby switches and indicator lamp (with rear lock washer). Refer to drawing for proper component alignments (drawing 5.15c).
Step 7 – Install IEC AC power entry connector into the square cut out on the back of chassis (before installing rear plate). Snap firmly into place.

Step 8 – Remove backing of double stick tape on back of rear plate and Install the rear plate along with the two fuse holders and the two speaker jacks. The impedance selector will be installed later. Refer to drawing for proper component alignments (drawing 5.15c).

5.8 Tube / Solid State Rectifier Select Switch Installation

Step 1 – Drill a 1/4" hole through the back panel and the chassis. This hole should be centered between the mains fuse and the IEC AC power entry connector (photo 5.8a).
Step 2 – Debur this 1/4" hole and install the mini DPDT switch.

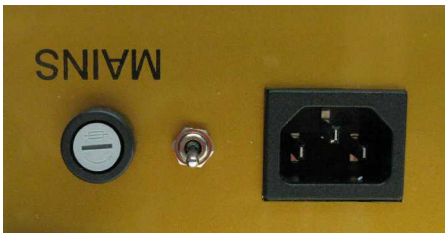


photo 5.8a

5.9 Feedback select Switch Installation

Step 1 – Drill a 1/4" hole through the back panel and the chassis. This hole should be centered between the impedance selector and the nearest speaker jack (photo 5.9a).
Step 2 – Debur this 1/4" hole and install the mini SPDT (center off) switch.

photo 5.9a

5.10 Impedance Selector Installation

Step 1 – Enlarge the impedance selector hole to 13/32" with either a 13/32" drill bit or hand reamer.
Step 2 – Debur this 13/32" hole and install the impedance selector switch. Align this switch with the switch limit pin closest to the chassis surface (photo 5.10a).

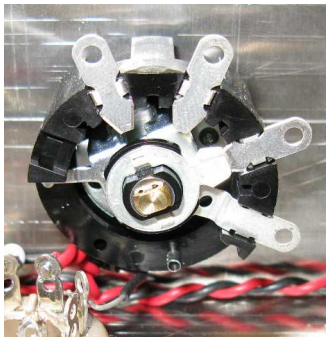


photo 5.10a

5.11 Power Transformer Wiring,

Step 1 – Wire the power transformer primary (black and brown wires) according to your local AC mains supply to the power switch and the AC IEC connector. (drawings 5.11a and 5.11b).
Step 2 – Wire the appropriate wire (18 AWG black or white) between the power switch and input fuse holder (drawing 5.11a or 5.11b).
Step 3 – Wire the appropriate wire (18 AWG black) between the AC fuse holder and the AC IEC connector (drawing 5.11a or 5.11b).
Step 4 – Wire the rectifier filament (yellow wires) to the rectifier tube (drawing 5.11a or 5.11b).
Step 5 – With the standby switch, insure the word "MEXICO" on the side of the switch is facing the lamp. Wire the HV (red wires) to the standby switch (drawing 5.11a or 5.11b).
Step 6 – Wire the filament center tap (green with yellow stripe) to the grounded solder terminal (drawing 5.11a or 5.11b). Save the remaining wire for future use.
Step 7 – wire the HV center tap (red with yellow stripe) to the grounded solder terminal (drawing 5.11a or 5.11b).
Step 8 – install a wire (recycled wire from filament center tap) between the AC IEC connector and the appropriate grounded solder terminal (drawing 5.11a or 5.11b).

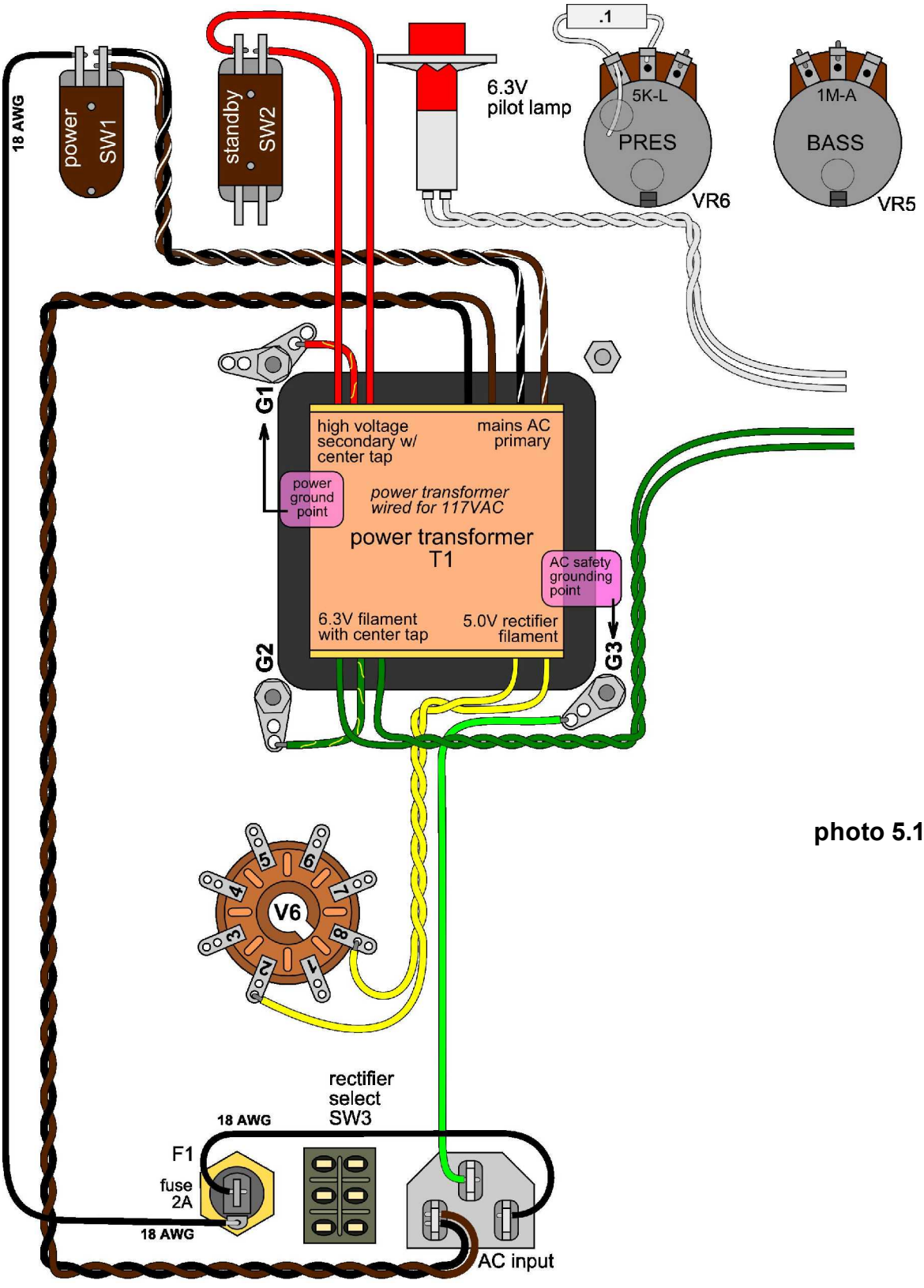


photo 5.11a

120V WIRING

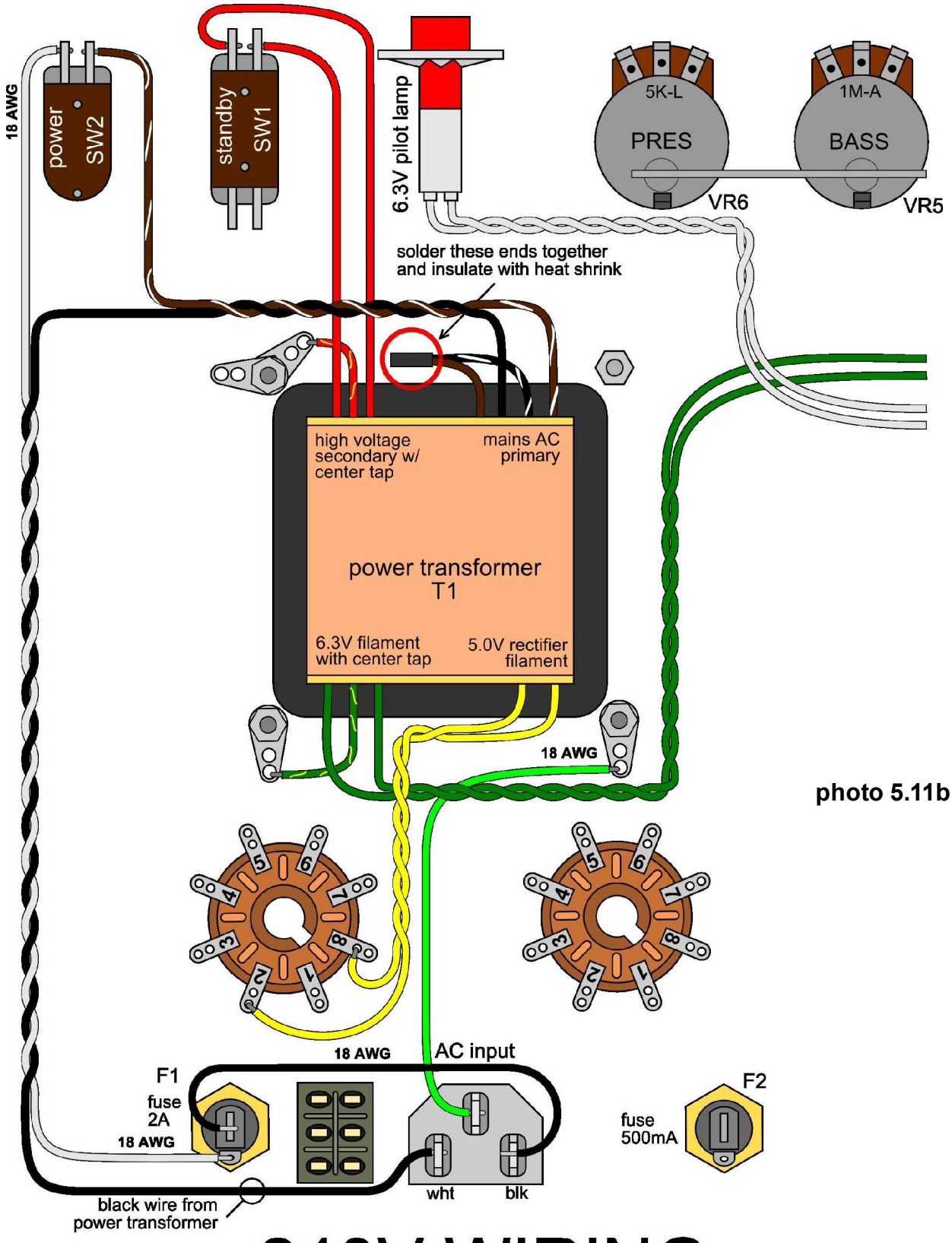


photo 5.11b

240V WIRING

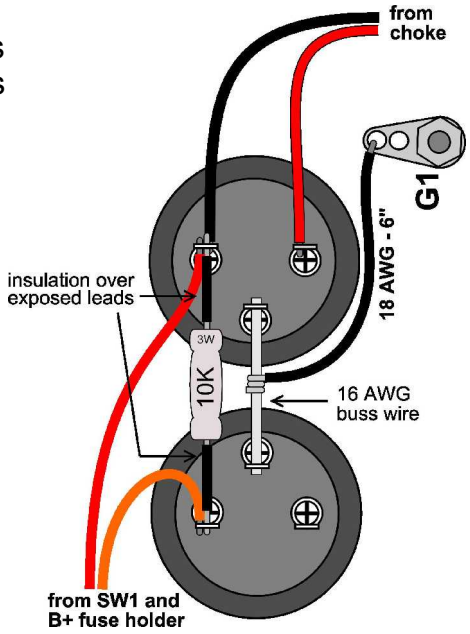
5.12 Wiring the High Voltage (B+) Power Supply

photo 5.12a

Step 1 – Wire the two diodes to the back of the rectifier tube socket (drawing 5.12b). Be sure the polarity of the diodes are installed as shown. Save space by mounting the diodes directly over the socket.
Step 2 – Twist together the saved wires from installing the standby switch and solder one end of these wires to the remaining standby switch terminals and the other end to the rectifier tube socket (drawing 5.12b).
Step 3 – Wire the rectifier select switch to the B+ fuse holder and tube rectifier socket as shown (drawing 5.12b).
Step 4 – Connect a red 20AWG wire between the tube rectifier and the B+ fuse holder (drawing 5.12b)
Step 5 – wire a black 16AWG wire, 15” long, on the G2 grounded solder lug and run it along the back of the chassis (drawing 5.12b). This will eventually be wired to the speaker jacks.
Step 6 – Wire a black 20AWG wire, 12” long on the G1 grounded solder lug (drawing 5.12a).
Step 7 – Wire a black 20AWG wire, 16” long on the G1 grounded solder lug (drawing 5.12b).
Step 8 – Wire a black 16AWG wire, 6” long on the G1 grounded solder lug (drawing 5.12a).
Step 9 – Loosely mount the two can caps in their respective holders as shown (photo 5.12a).

NOTE Before soldering the can cap, thoroughly scrape the three contacts with a hobby knife or equivalent to insure good solder connections.

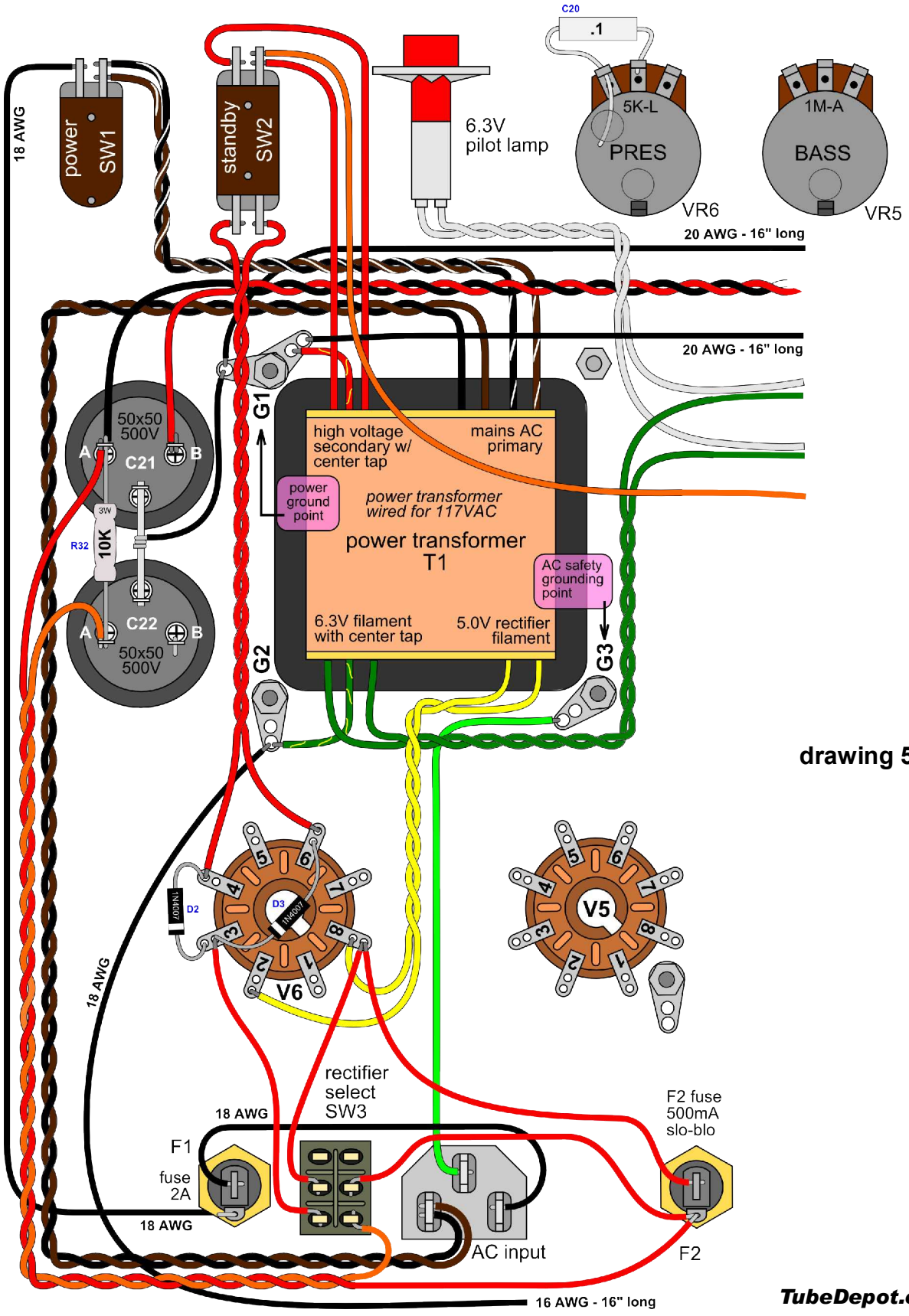
Step 10 – Temporarily mount the two can caps to the chassis with #6-32 x 1/4” screws and #6 KEPS nuts. Rotate the caps to where the ground tabs face each other (drawing 5.12a).
Step 11 – Remove the caps and holders from the chassis and tighten down the caps into their holders.
Step 12 – Reinstall the caps and holders into the chassis.
Step 13 – Install a short piece of 16AWG bare wire between the two ground lugs (drawing 5.12a).
Step 14 – Solder the end of the 6” length of 18AWG black wire from the grounded solder terminal, G1 to the middle of the buss wire between the can caps (drawing 5.12a).
Step 15 – cut two 3/4” lengths of recycled insulation and install on the leads of the 10K / 3W resistor.
Step 16 – Install the 10K / 3W resistor across the terminals of the two can caps (drawing 5.12a and 5.12a). Do not solder this resistor in place just yet.
Step 17 – Connect the leads from the choke to the terminals of the can cap (drawing 5.12a). Solder only the terminal with the single choke lead.



drawing 5.12a

Step 18 – Twist a red and an orange 20AWG wires together to form a 10” twisted pair cable.
Step 19 – Wire the orange wire of this cable to the rectifier switch and the red wire to the B+ fuse holder (drawing 5.12b).
Step 20 – Run these wires along the chassis to the can caps and solder the orange wire to the juncture of the choke wire and 10K resistor on the can cap (drawing 5.12a).

Step 21 – Solder the orange wire to the terminal at the opposite end of the 10K resistor.



drawing 5.12b

5.13 Wiring the Output Transformer, Feedback Switch, & Speaker jacks

Step 1 – Insure that you have the TR-OT-07 output transformer (if you have a different transformer, let us know). From the bundle of primary wires, solder the white wire to the side terminal of the B+ fuse holder (drawing 5.15c).
Step 2 – From this same wire bundle, solder the blue wire to pin 3 of V5.
Step 3 – From this same wire bundle, solder the red wire to pin 3 of V4. Keep this red wire long enough to reach V5, pin 3 just in case these two wires have to be exchanged.
Step 4 – Solder two lengths of 16AWG buss wire through the contacts of the output jacks as shown (drawing 5.13a).
Step 5 – Connect the bundle of secondary wires of the output transformer to the impedance selector as shown (drawing 5.13a).
Step 6 – Solder the black lead from the output transformer to the output jacks.
Step 7 – Solder the 18" - 18 AWG black wire from the grounded solder terminal G2 (at the power transformer) to the output jacks (drawing 5.13a).
Step 8 – Solder a 6" length of recycled wire (from the power transformer wiring) between the common terminal of the impedance selector and output jacks (drawing 5.13a).
Step 9 – Install the two resistors on the rear of the feedback switch (drawing 5.13a).
Step 10 – Install a wire between the 4 ohm tap of the impedance selector switch and the feedback selector switch as shown (drawing 5.13a).

drawing 5.13a