Apollo
SE 25 Amplifier

Assembly Manual
for
Apollo IIX Monoblocks

Designed by:

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Words of Caution

Always keep in mind that you are the manufacturer of this amplifier. The final appearance of this amp and its sound quality will largerly depend upon the care taken during the assembly of this kit. We recommend that your work surface be padded, clean of debris and kept clean during assembly. This will prevent the top plate and wooden base from becoming accidentally scratched. Keep finger prints to a minimum (wear white cotton gloves when handling the chassis plate, covers, etc.). Once the transformers are mounted to the chassis plate, the unit becomes very heavy and much harder to handle. So be careful and don't drop it on your dining room table! Don't create antennas out of the hookup wire by making big loops and arches. Keep all wiring neat, lead lengths short and routed close to the chassis plate. Believe us when we say "neat wiring sounds mo better".

Always remember the nature of the equipment that you are working on. It contains high voltages and can cause serious personal injury. Always make sure that capacitors are completely discharged before handling or soldering the internal components. Never disconnect the power cord, or remove tubes while the unit is powered on.

Tools Required for Assembly

Soldering Iron
Solder
Solder Wick™ or Solder-Removing Device
Pliers
Wire Strippers
Hex Drivers
Screw Drivers
Volt/Ohm Meter
Cotton Gloves

Amplifier Chassis Parts List

	Wood Boxes	Qty = 2	
	Top Aluminum Plate	Qty = 2	
	Transformer Housings	Qty = 4	
	Covers for Transformer Housings	Qty = 4	
	Rear Panels for IEC and Fuse Holder	Qty = 2	
	Bottom Cover	Qty = 2	
	Feet	Qty = 8	
Chassis H/W	Hardware for mounting Top Plate	Qty = 20	L-Brackets
		Qty = 20	4-40 x 1/4 Machine Screws
		Qty = 20	#6 Wood Screws
BP H/W	Bottom Panel Hardware	Qty = 8	10-32 x 3/8 Button Head Socket Screws
Tran H/W	For mounting Transformer Housings	Qty = 16	6-32 x 5/8 Stainless Button Head Screws
Cover H/W	For Transformer Housing Covers	Qty = 16	6-32 x 3/8 Stainless Socket Head Screws
T1 H/W	For Power Transformer	Qty = 8	8-32 x 3.5" slotted head screws
		Qty = 8	6-32 plastic shoulder washer
		Qty = 8	8-32 locking nut
T2 H/W	For Output Transformer	Qty = 8	10-24 x 3/4" phillips head screw
		Qty = 8	10-24 locking nut
Rear H/W	Hardware for Rear Panel	Qty = 8	4-40 x 1 1/8 Stainless button head screw
		Qty = 4	4-40 x 1/2 Stainless button head screw
		Qty = 8	4-40 Stainless hex nut
M1 H/W	Hardware for Meter	Qty = 8	4-40 x 1 1/8 Button head screw (8) nuts
IT H/W	Hardware for Interstage Transformer	Qty = 8	#6 Wood screws (8) washers

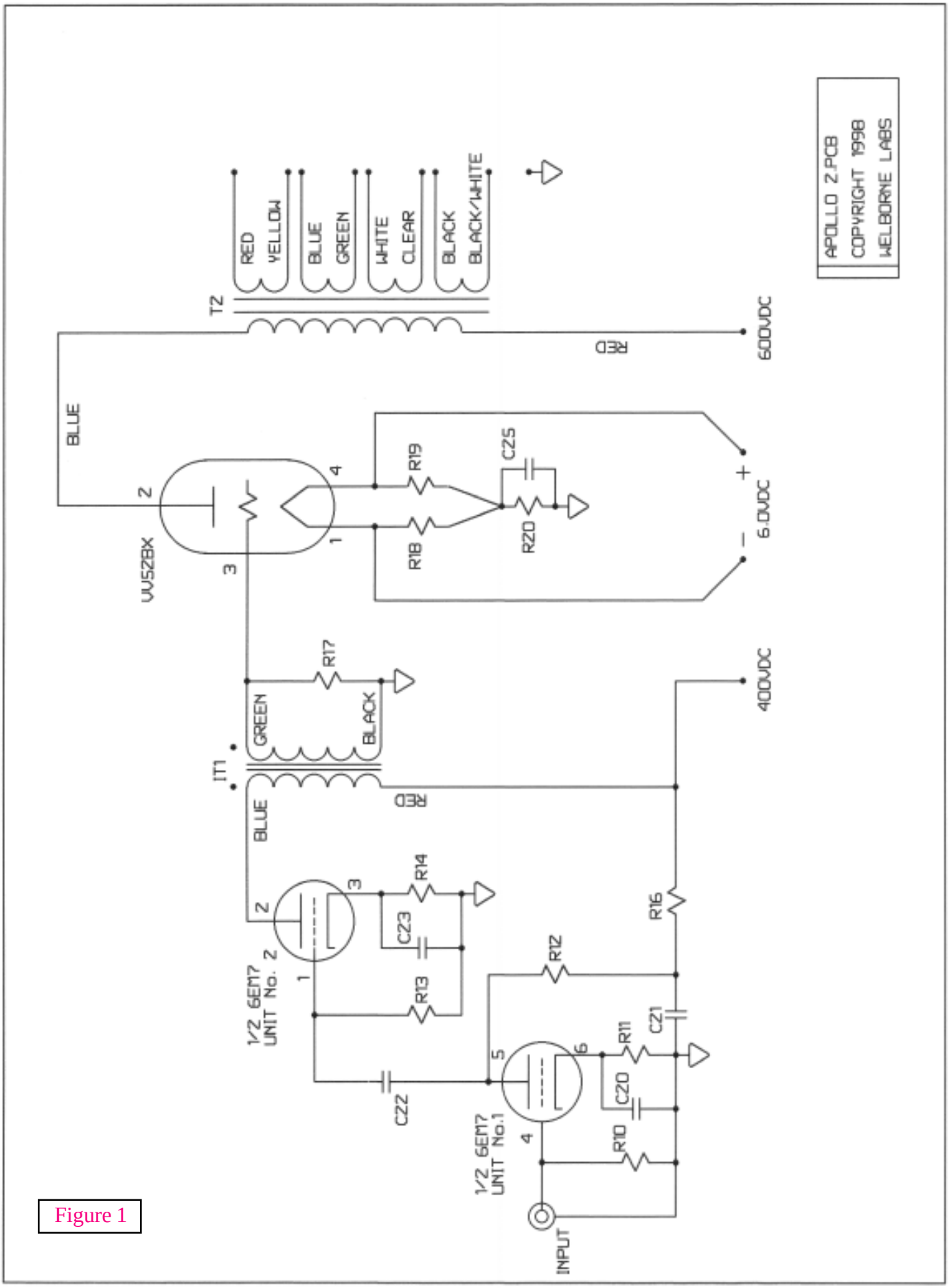

APOLLO 2.PCB
COPYRIGHT 1998
WELBORNE LABS
T2
RED
YELLOW
BLUE
GREEN
WHITE
CLEAR
BLACK
BLACK/WHITE
600VDC
RED
BLUE
UU5ZBX
R19
C25
R18
R20
6.0VDC
R17
GREEN
BLACK
T1
400VDC
RED
BLUE
R14
C23
R13
1/2 6EM7
UNIT No. 2
R16
R12
C21
R11
C22
C20
R10
1/2 6EM7
UNIT No.1
INPUT

Figure 1

Apollo II Amplifier Circuit (one channel)

Resistors

R10	100K	1/2 W	Caddock Foil Resistor
R11	1.0K	1/2W	Caddock Foil Resistor
R12	35.7K	1/2W	Caddock Foil Resistor
R13,R17	330K	1/2W	Caddock Foil Resistor
R14	2.2K	12W	Non-Inductive Wirewound
R16	150K	2W	AB Carbon Composition
R18,R19	24	3W	Non-Inductive Wirewound
R20	3.6K x 5 in parallel	5W	Non-Inductive Wirewound
R21	10	2W	Metal Oxide

Capacitors

C20	100uF/35V	ELNA Cerafine Electrolytic
C21	10uF/400V	Solen Polypropylene Film
C22	.22uF/600V	Jensen Copper Foil
C23	100uf/100V	ELNA Cerafine Electrolytic
C25	47uf/250V	Solen Fast Cap Film

Vacuum Tubes

V1	6EM7	NOS
V2	VV52BX	KR Enterprise

Miscellaneous

IT1	Interstage Transformer	Electra-Print
T2	Output Transformer	Electra-Print
S1	Octal Chassis Mount Socket	Miscellaneous manufacturer
S2	4 Pin Chassis Mount Socket	Miscellaneous manufacturer
RCA	RCA Chassis Mount Jack	Cardas
BIND	Binding Post	Cardas
M1	Meter	Amp Meter
Wire	Input Wire	Coax (white)
Wire	Signal Path	18awg Solid Core OFC (white/yellow/black)
Wire	Signal Path	15awg Stranded OFC (white/black)
Wire	Ground	Bare 18awg Silver Wire
Tube		Teflon Tubing

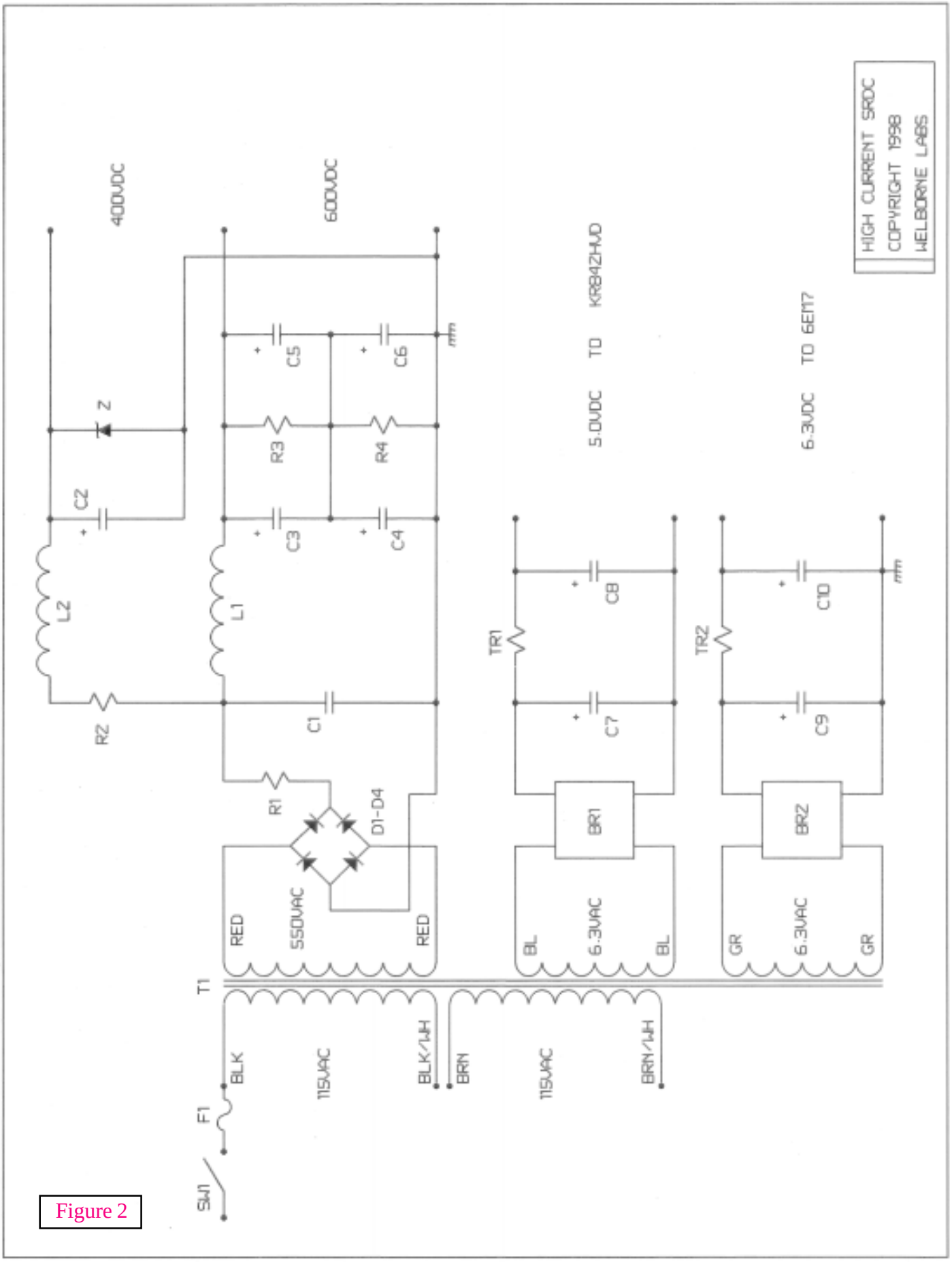

HIGH CURRENT SRDC
COPYRIGHT 1998
WELBORNE LABS
400VDC
600VDC
5.0VDC TO KR842HJD
6.3VDC TO 6EM7
SW1
F1
BLK
115VAC
BLK/WH
BRN
115VAC
BRN/WH
T1
RED
550VAC
RED
BL
6.3VAC
BL
GR
6.3VAC
GR
D1-D4
R1
R2
R3
R4
Z
C1
C2
C3
C4
C5
C6
C7
C8
C9
C10
L1
L2
TR1
TR2
BR1
BR2

Figure 2

Apollo II SRDC Power Supply (one channel)

Resistors

R1	5	Jumper Wire
R2	10K	12W Non-Inductive Wirewound
R3,R4	300K	2W Carbon

Thermistors

TR1,TR2	0.5	Thermistor

Capacitors

C1	10uF/630V	Solen Fast Cap Film
C2	47 x 47uf/500V	Blackgate Electrolytic
C3,C4,C5,C6	220 x 220uf/350V	Blackgate Electrolytic
C7,C8,C9,C10	10kuF/16V	Electrolytic

Miscellaneous

D1,D2,D3,D4	HCT1200	High Speed Soft Recovery Diodes
Z	Zener String	Overvoltage Clamp
BR1,BR2	100V/4A	Bridge Rectifier
L1	20H/150mA	Hammond Choke
L2	10H/60mA	Hammond Choke
T1	275-0-275-6.3	Custom Power Transformer
SRDC PCB		Circuit Board
IEC		IEC Connector and H/W
F1	2A/SLO-BLO	Fuse and Fuse Holder
Power Cord		IEC Power Cord
SW		Power Switch
TB6		Terminal Board and Hardware
Solder		Silver Solder
Rings	For Earth Grounds	Qty = 2, 8-32 Solder Rings
Diode H/W	For D1-D4 Diodes	Qty = 4, 4-40 x 1/2 Screws and Nuts
Clamp	For C2-C6	Qty = 5, Capacitor Clamps and (4) 4-40 x 1/4 Screws, (6) #6 woodscrews
SRDC H/W	For SRDC PCB	Qty = 2, L-Brackets and 6-32 x 1/4 Button Head Screws
L1/L2 H/W	For mounting L1/L2	Qty = 4, #6 Woodscrews

Apollo II Amplifier Assembly

It is assumed that the person(s) assembling this amplifier kit are somewhat knowledgeable in electronics, can read schematic diagrams, and have built kits and/or other equipment in a previous life. If you do not have experience building circuits it is recommended that you find someone that can help that is knowledgeable (GET HELP!). These instructions and diagrams are intended as a guide only. You are welcome to assemble the amp and position components as you like. However, we recommend that you follow this assembly sequence. Refer to the included figures as you follow the instructions. Assembly time will vary based upon your experience level and the attention given to doing a neat and tidy job, so you can expect anywhere from 12 to 20 hours to get it done right. If you have questions during assembly, please feel free to call.

The terminal boards have been installed to facilitate an easy and neat assembly. Solder components between terminals when possible (either vertically or horizontally) and use hookup wire from terminal-to-terminal and terminal-to-socket lug connections.

Teflon tubing has been provided to dress the bare component (resistors, caps, etc.) leads to prevent shorting.

1) To begin, remove the large chassis plates from their wooden bases and lay the plates upside down, on a padded surface, with the terminal boards facing up. Mount the tube sockets using the supplied hardware and in the direction shown in figure 3.

   The lugs of the terminal boards TB1, TB2, TB3, TB4 and TB5 have been numbered (refer to figure 3) to facilitate assembly. In subsequent steps a specific terminal board solder lug will be referenced by the terminal board number followed by the lug number. For example: “solder a black wire from TB3-4 to TB1-2”, refers to lug #4 of terminal board TB3 and lug #2 of terminal board TB1.

   In a similar manner, the tube socket pins will be referenced first by the tube number followed by the pin number. For example V1-3 refers to pin #3 of the V1 tube.

   Take a few minutes to familiarize yourself with the layout of the chassis plates. You can assemble both amplifiers, side-by-side, at the same time or....assemble and test one amplifier at a time. The choice is yours.

   CAUTION: The edges of the metal chassis pieces can have sharp edges...use care so as not to cut your fingers.

2) Refer to figure 4 for the following steps.

   Mount the output transformer T2 first using the supplied hardware (10-32 x 3/4” button head screws and locking nuts). CAUTION: Be very careful not to scratch the chassis plate. Get help if you need more than two hands. There is an arrow drawn on one surface of the transformer indicating the correct orientation for mounting. The transformer should be mounted such that the arrow is towards the front of the amplifier and pointing towards the chassis plate. Secure the screws and nuts.

   Mount the power transformer T1 using the supplied hardware (8-32 x 3.5” slotted screws, plastic shoulder washers and locking nuts). CAUTION: Be very careful not to scratch the chassis plate. There is an arrow drawn on one surface of the transformer indicating the correct orientation for mounting. The transformer should be mounted such that the arrow is towards the front of the amplifier pointing towards the chassis plate. Slide the 3.5 inch screws through the four holes in the transformer. On the bottom of the transformer slide one shoulder washer over each screw pushing the neck of the washer up into the transformer. Mount the transformer onto the chassis plate such that the shoulder washers are sandwiched between the transformer and chassis plate. Secure tightly with the locking nuts.

   Mount the power switch as shown in figure 4 and secure tightly with the provided hardware.

   There are two, tubular, aluminum transformer housings per channel. Each housing also includes a cover which bolts to its top. One of the housings is slightly taller than the other. The taller housing mounts over transformer T1 and the smaller one over T2. Mount these housings over their respective transformers and secure from the bottom using the supplied hardware (6-32 x 5/8” button head screws). Do not install the transformer covers at this time. CAUTION: Be very careful not to scratch the chassis plate.

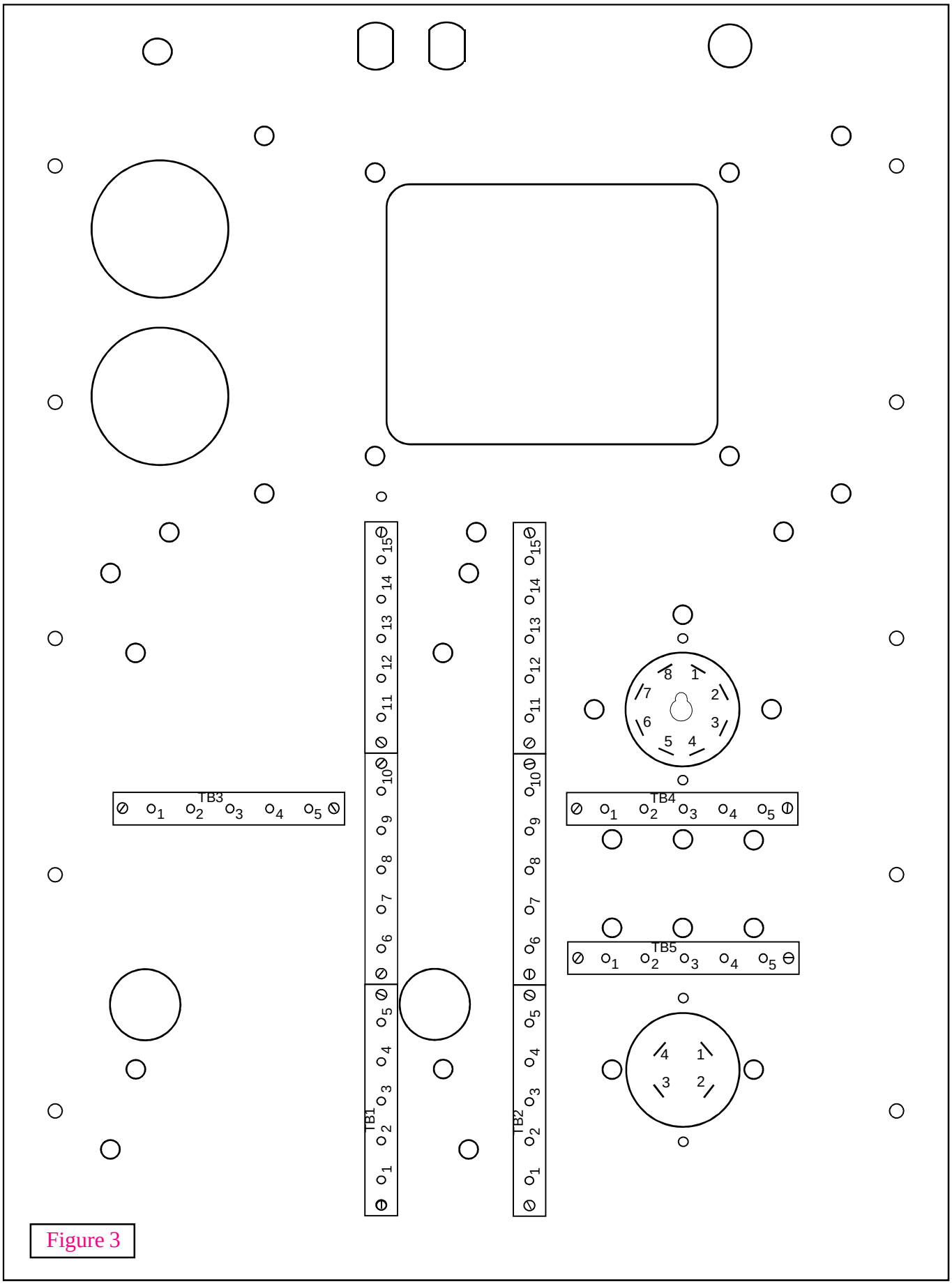


Figure 3

3. Refer to figure 5 for the following steps.

For this step you need to decide which tap of the output transformer you will be using (2, 4, 8, or 16 ohms). This decision is best made based upon the impedance of the speakers you will be using. If your speaker impedance falls in-between two choices (for example: 6 ohms), it is usually best to drop down to the next lowest tap, which in this instance would be 4 ohms.

Refer to the table below for the output transformer coding. The output impedances are selected by connecting the eight color coded secondary leads as shown below. Terminal Strip 3 (TB3) has been set up to facilitate the configuration of the output transformer wiring. Figure 5 depicts the connection for 8 ohms, however the terminals of TB3 can be used for connecting any of the configurations below. If you decide to shorten the output leads of the output transformer, the red enamel coating on the wires must be removed before soldering to the terminals. This can be easily done by applying a small amount of solder to the enamel coating which will melt it away. Connect the transformer leads to TB3 by stripping approximately 1/2 inch of the enamel coating from each end, bending the end into a small loop around the terminal lugs of TB3, and soldering.

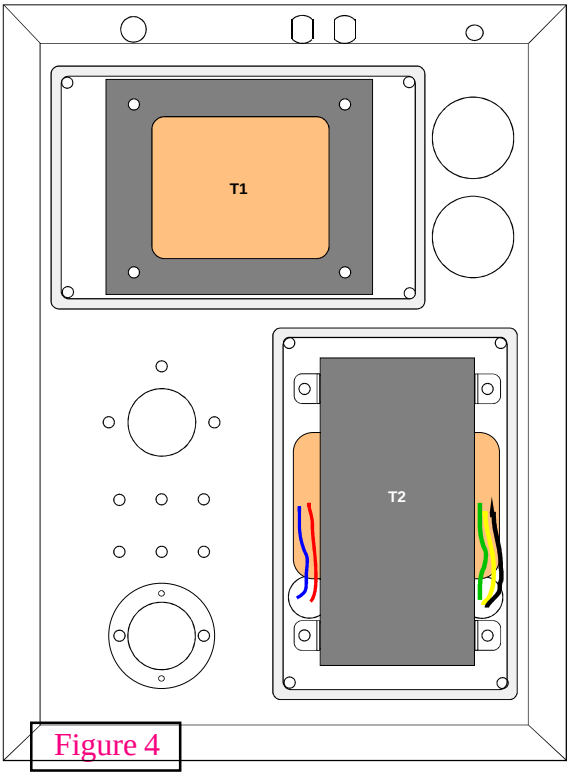


Figure 4

Cut a piece of the white 15awg hookup wire approximately 18 inches in length and solder this wire to one of the Cardas binding posts.

Cut a piece of the black 15awg hookup wire approximately 18 inches in length and solder this wire to the other Cardas binding post.

16 OHMS	8 OHMS	4 OHMS	2 OHMS
R - Output	R - Output	Join BK, R - Output	Join BK, WH, BL, R - Output
Join BK, CL	Join BK, CL, GR	Join WH, BL, BW, Y	Join BW, CL, GR, Y - Ground
Join WH, GR	Join WH, BL, Y	Join CL, GR - Ground	
Join BL, Y	BW - Ground		
BW - Ground			

Join the leads by soldering them to the terminals of TB3.

Secondary wire color code:

BW - Black w/White Letters	GR - Green
BK - Black	BL - Blue
CL - Clear	Y - Yellow
WH - White	R - Red

Mount the binding post, with the white wire, to the chassis plate using one of the red washers. This post will be the positive (+) connection. Secure tightly with the teflon washer and brass nut. Mount the binding post, with the black wire, to the chassis plate using one of the black washers. This post will be the negative (-) connection. Secure tightly with the teflon washer and brass nut. Note: It is very important to get these posts secured very tightly now, because if they should become loose later, they will be difficult to re-tighten.

Route the white wire from the positive binding post, as shown in figure 5, and solder to TB3-1. Route the black wire, from the negative bing post, and solder to TB3-4 (for 8 ohm connection).

Using the white coax cable, cut a length approximately 12 inches long. Strip off approximately 1 inch of the outer jacket so the silver braid is exposed. Using a pin, or some other small pointed device, slowly tease the braid starting at the cut end until it is completely unbraided. Pull the unbraided wire to one side of the cable and twist. Strip off approximately 1/8 inch of the center wire's insulation and solder this wire to the center lug of the Cardas rca jack. Solder the twisted coax shield to the rca ground plate. Solder a separate 18awg black ground wire approximately 12 inches in length to the rca ground plate as well.

Mount the Cardas rca jack to the chassis plate and secure tightly. Note: It is very important to get the rca jacks secured very tightly now, because if they should become loose later, they will be difficult to re-tighten.

Route the coax wire from the rca jack, as shown in figure 5, and solder to TB2-12. Route the black rca jack ground wire, as shown in figure 5, and solder to TB1-13.

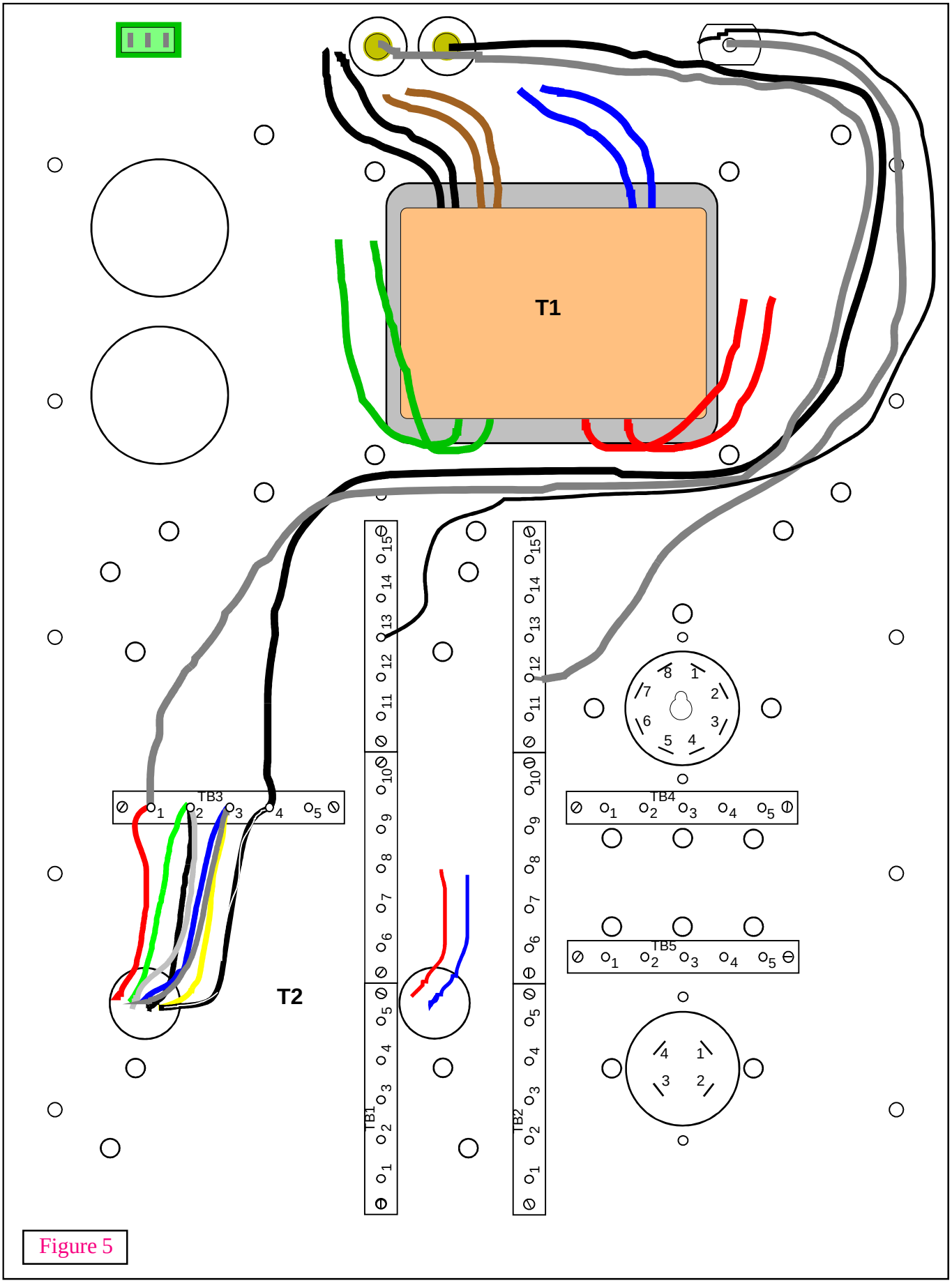


Figure 5

4) Refer to figure 6 for the following steps. The following diagrams will depict a somewhat messy wiring layout. This is intentional, and is done so in order to make the instructions easier to follow. Your wiring job should be much neater than this. Keep lead lengths and wires as short as possible. Route all wires close to the chassis plate. Don't make big loops across the chassis. These loops make great antennas which pickup noise, radio stations and generate hum.

   Cut a piece of the bare silver wire. Starting at TB1-9, wrap it such that it makes contact with lugs TB1-9 through TB1-15 twice. Or in other words, extend the wire up and around TB1-15 and back down to TB1-9. Solder the wire to each of the solder lugs.

   Cut a piece of black hookup wire to length and solder between TB1-1 and TB1-9. Refer to figure 6.

   Cut a piece of the bare silver wire and solder it such that it makes contact with terminals TB4-1 through TB4-5.

   Cut a piece of the bare silver wire and solder it such that it makes contact with terminals TB5-1 through TB5-5.

   Cut a piece of black hookup wire to length and solder between TB1-5 and TB1-11.

   Cut a piece of black hookup wire to length and solder between TB2-15 and TB4-3.

   Cut a piece of black hookup wire to length and solder between TB1-12 and TB3-4.

   Cut a piece of black hookup wire to length and solder between TB1-13 and V1-7.

   Cut a short piece of black hookup wire approximately 3 inches in length and solder one end to TB1-14. Solder one of the terminal rings to the other end of this wire. Refering to figure 6, remove the screw, closest to TB1-14, which holds the trans former housing for T1. Insert the terminal ring and re-install and tighten this screw.

   Locate the red teflon coated wire originating from T2, trim to length and solder to TB3-5. Locate the blue teflon coated wire originating from T2, trim to length and solder to V2-2.

   Cut a piece of white hookup wire to length and solder between TB1-6 and TB2-7.

   Cut a piece of white hookup wire to length and solder between TB1-7 and TB2-10.

   Cut a piece of white hookup wire to length and solder between TB2-1 and V2-3.

   Cut a piece of white hookup wire to length and solder between TB2-3 and V1-2.

   Cut a piece of the bare silver wire and solder such that it makes contact with lugs TB2-4, TB2-5 and TB2-6.

   Cut a piece of white hookup wire to length and solder between TB2-7 and V1-5.

   Cut a piece of white hookup wire to length and solder between TB2-9 and V1-3.

   Cut a piece of white hookup wire to length and solder between TB2-10 and V1-1.

   Cut a piece of white hookup wire to length and solder between TB2-11 and V1-6.

   Cut a piece of white hookup wire to length and solder between TB2-12 and V1-4.

   Cut a piece of white hookup wire to length and solder between TB2-13 and TB5-2.

Now is a good time to inspect all connections and clean up any solder flux that may have splashed onto the terminal boards, chassis plate, etc. As the amplifier is populated with more components it becomes more difficult to position the soldering iron without touching already placed parts. It is very important that you be aware of these parts when soldering and not accidentally burn the insulation off an adjacent component or wire.

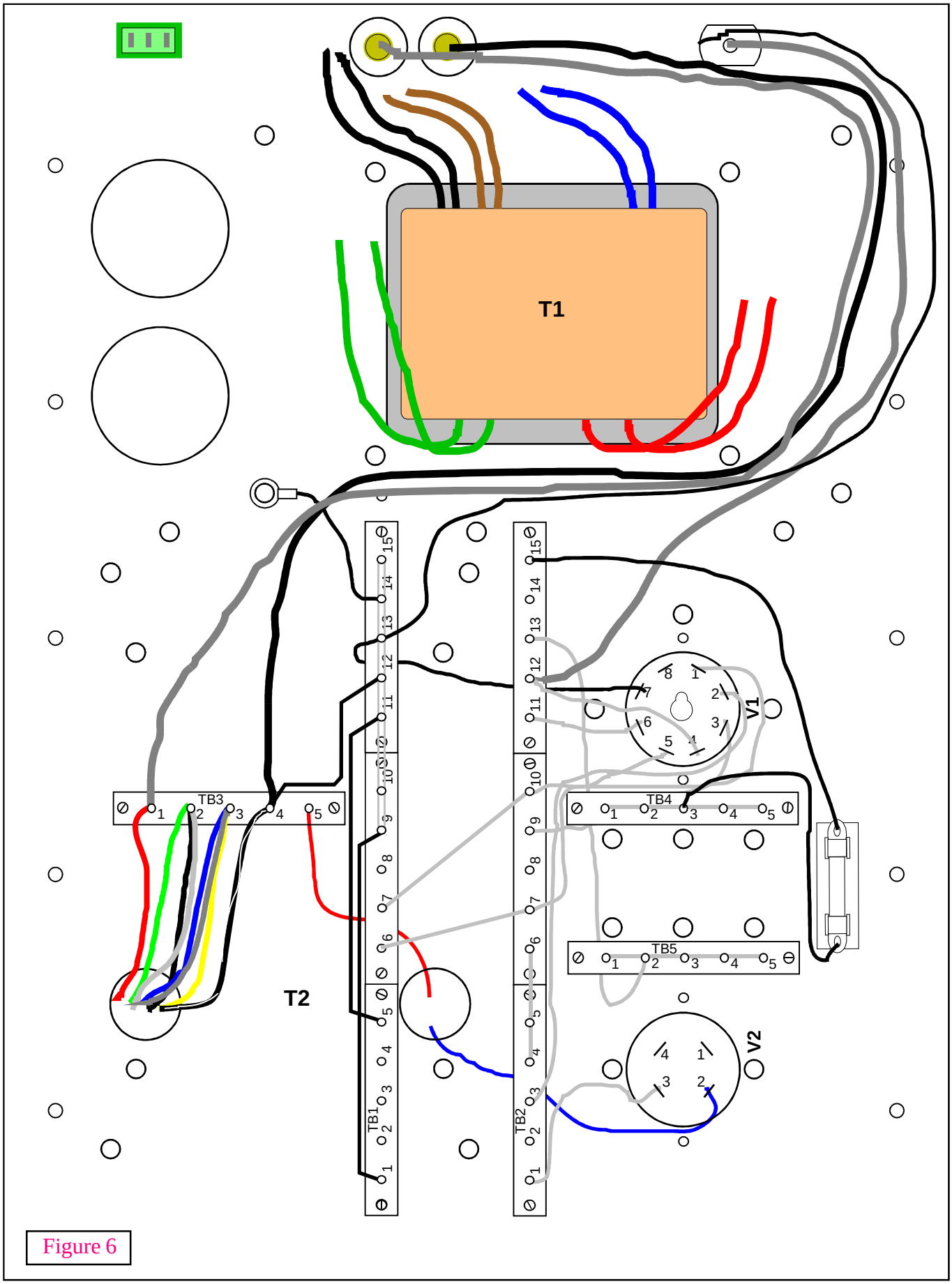


Figure 6

5) Refer to figure 7 for the following steps.

Mount the Blackgate WZK capacitors C3 and C4 to the chassis plate using the supplied hardware. This is step is most easily done by first attaching the clamp to the capacitor and tightening the screw and nut securely. Once again, it is important to get these tight now because it will be very difficult to tighten them later, should they become loose. The terminal end of the capacitor should protrude just above the clamp, refer to figure 7.

Once the clamps are in place, mount them to the chassis plate, from the bottom side, using the 4-40 machine screws. Tighten these screws securely, but don't over-tighten as you can very easily strip the threads of the tapped holes. Once the capacitors are mounted, carefully bend their solder terminals back to an angle of approximately 45°.

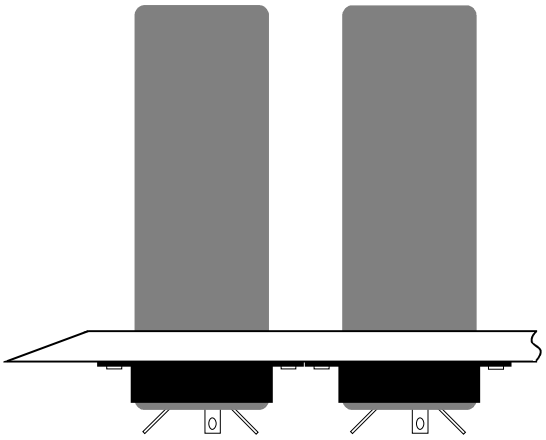


Figure 7

6) Refer to figure 8 for the following steps.

Cut two pieces of the bare silver wire approximately one inch in length each. Insert one between the capacitor lugs C3-1 and C3-2 and solder. Insert the other between the capacitor lugs C4-1 and C4-2 and solder. Trim any access wire.

Cut a piece of the white 18awg hookup wire to length, route and solder between TB3-5 and C3-2.

Cut a piece of the white 18awg hookup wire 7 inches in length and solder one end to TB1-3. Leave the other end unterminated.

Cut a piece of the black 18awg hookup wire 6 inches in length, route as shown in figure 8 and solder one end to TB1-14. Leave the other end unterminated.

Position R10 as shown in figure 8 and solder one lead to TB1-12 and the other lead to TB2-12.

Position R11 as shown in figure 8 and solder one lead to TB1-11 and the other lead to TB2-11.

Position R12 as shown in figure 8 and solder one lead to TB1-6 and the other lead to TB2-6.

Position R13 as shown in figure 8 and solder one lead to TB1-10 and the other lead to TB2-10.

Position R14 as shown in figure 8 and solder one lead to TB1-9 and the other lead to TB2-9.

Position R16 as shown in figure 8 and solder one lead to both TB1-3 and TB1-4 and the other lead to TB2-4.

Position R17 as shown in figure 8 and solder one lead to TB1-1 and the other lead to TB2-1.

Position R18 as shown in figure 8 and solder one lead to TB5-1 and the other lead to V2-4.

Position R19 as shown in figure 8 and solder one lead to TB5-5 and the other lead to V2-1.

R20 consists of five resistors connected in parallel. Locate the five 3.6K resistors and solder them as shown in figure 8. There should be one resistor soldered between TB4-1 and TB5-1, TB4-2 and TB5-2, TB4-3 and TB5-3, TB4-4 and TB5-4, and TB4-5 and TB5-5.

Position R21 as shown in figure 8 and solder one lead to TB1-15 and the other lead to TB2-15.

Cut a piece of yellow wire 8 inches in length and solder one end to TB4-3. Route as shown in figure 8 and leave the other end unterminated.Cut a piece of black wire 10 inches in length and solder one end to TB1-10. Route as shown in figure 8 and leave the other end unterminated.

Position Z as shown in figure 8 and solder the lead with the red band to TB1-3 and the other lead to TB1-1.

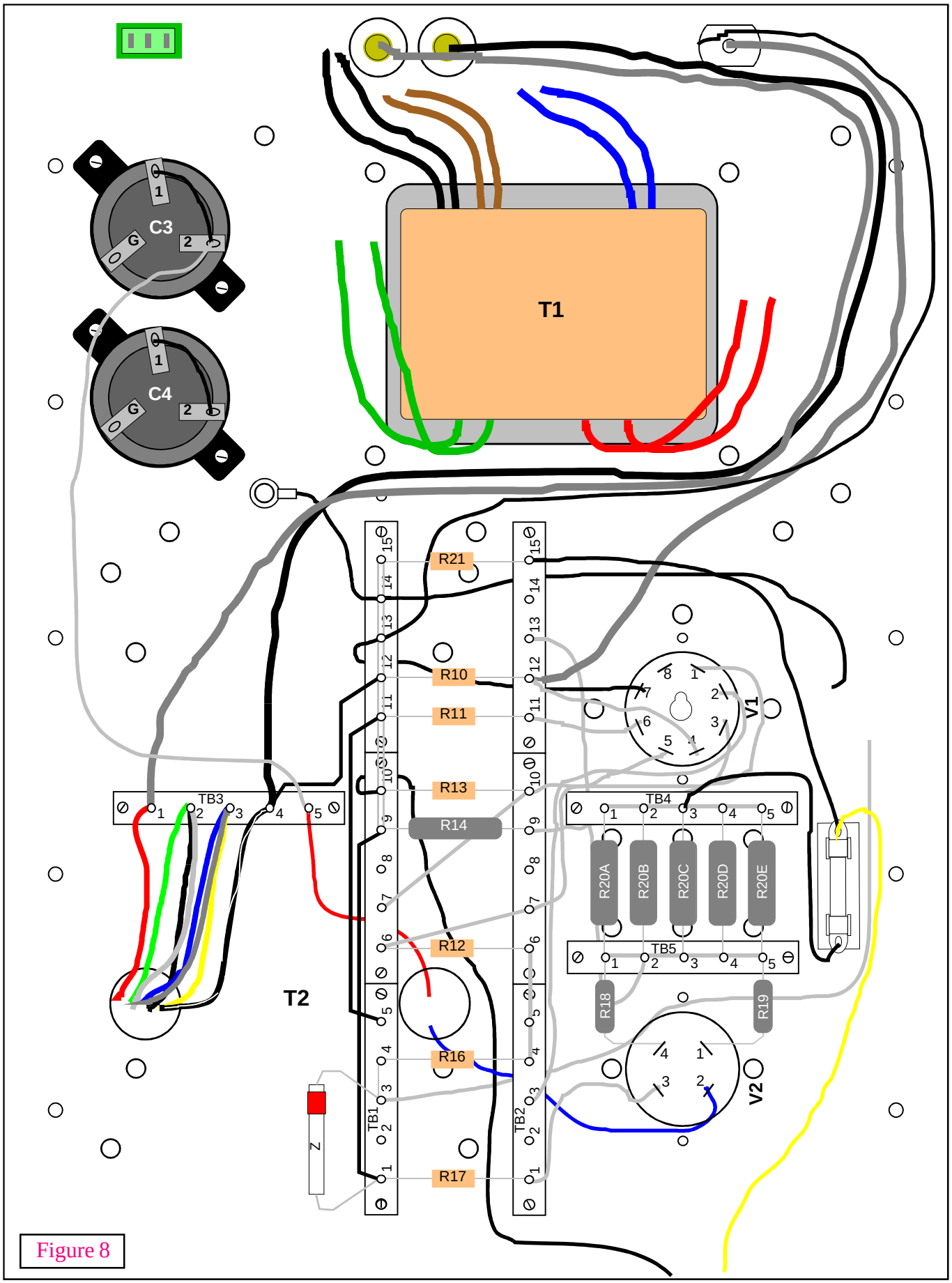

C3
C4
T1
T2
R21
R10
R11
R13
R14
R12
R16
R17
TB1
TB2
TB3
TB4
TB5
V1
V2
R20A
R20B
R20C
R20D
R20E
R18
R19

Figure 8

7) Refer to figure 9 for the following: In the next steps you will stuff and solder the power supply components onto the SRDC circuit board. The circuit board stuffing diagram is silkscreened on the board indicating the proper position and orientation of the components.

Start with resistors R3 and R4. Measure and bend the leads at right angles, insert the resistors into the circuit board holes until their bodies are flush with the board, and solder.

Next, measure and the bend the leads of diodes D1 through D4 such that the diodes will lay flat on the board. Insert the diodes into their respective holes and secure with the provided hardware (4-40 screws and nuts). Solder the diode leads to the circuit board. Careful not to apply too much heat.

Cut a short jumper wire and solder it into the location for R1 on the circuit board.

Solder resistor R2 onto the circuit board. This resistor should be mounted such that its body is raised approximately 1/8" from the surface of the circuit board.

Solder the bridge rectifiers BR1 and BR2 onto the circuit board noting the proper polarity as indicated by the "+" and "-" signs on both the board and rectifiers. These rectifiers should be mounted such that the bottom of their plastic bodies are raised approximately 1/4" from the surface of the circuit board.

Solder the capacitors C7 through C10 onto the circuit board noting the proper polarity as indicated by the "+" and "-" signs on both the board and capacitors.

Solder capacitor C1 onto the circuit board. Note that C1 has no polarity.

Solder thermistors TR1 and TR2 onto the circuit board. These thermistors should be mounted such that their bodies are raised approximately 1/4" from the surface of the circuit board. After soldering, bend the thermistors approximately 45^{o} out away from the adjacent capacitors.

Cut to length a piece of the white 18awg hookup wire, route and solder between the pads marked "A" and "B" on the SRDC circuit board. This wire can be soldered to either side of the board.

8) Refer to figure 9 and the SRDC circuit board stuffing diagram for the following steps.

Cut a piece of the white 18awg hookup wire 15 inches in length and solder to the circuit board pad identified as "5.0VDC".
Cut a piece of the black 18awg hookup wire 15 inches in length and solder to the circuit board pad identified as "GRND3".
Loosely twist this wire together with the white wire.

Cut a piece of the white 18awg hookup wire 10 inches in length and solder to the circuit board pad identified as"6.3VDC".
Cut a piece of the black 18awg hookup wire 10 inches in length and solder to the circuit board pad identified as "GRND1".
Loosely twist this wire together with the white wire.

Cut a piece of the black 18awg hookup wire 8 inches in length and solder to the circuit board pad identified as "GRND2".

Cut a piece of the white 18awg hookup wire 5 inches in length and solder to the circuit board pad identified as "L1".

Cut a piece of the white 18awg hookup wire 5 inches in length and solder to the circuit board pad identified as "L2".

Cut two pieces of the white 18awg hookup wire, one 5 inches and one 15 inches in length and solder to the circuit board pads identified as "+ C3/C5".

Cut two pieces of the yellow 18awg hookup wire, one 5 inches and one 15 inches in length and solder to the circuit board pads identified as "- C3/C5".

Cut three pieces of the black 18awg hookup wire, one 5 inches and two 10 inches in length and solder to the circuit board pads identified as "- C4/C6" and "GRND".

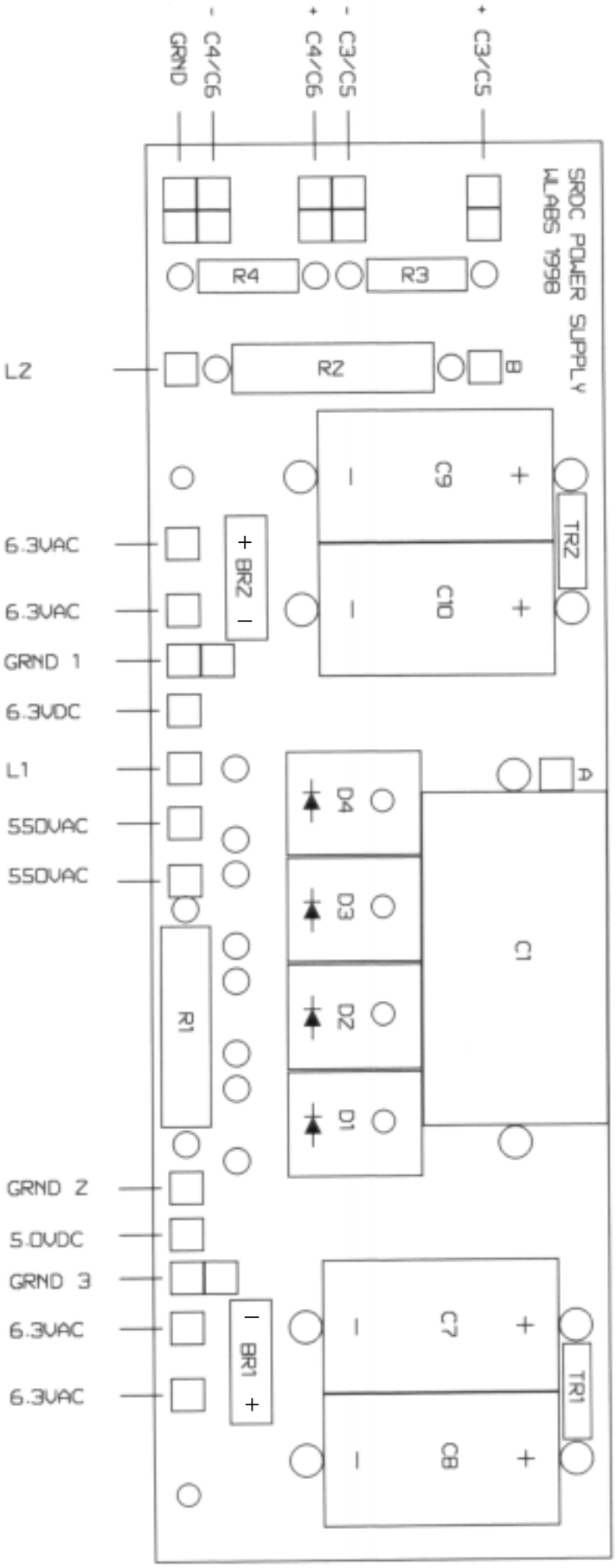

SRDC POWER SUPPLY
KLABS 1998
- C4/C6
GRND
+ C4/C6
- C3/C5
+ C3/C5
R4
R3
L2
R2
B
C9
C10
TR2
6.3VAC
6.3VAC
BR2
GRND 1
6.3VDC
L1
A
550VAC
550VAC
D4
D3
D2
D1
C1
R1
GRND 2
5.0VDC
GRND 3
6.3VAC
6.3VAC
BR1
C7
C8
TR1

Figure 9

9) Refer to figure 10 for the following steps.

Install terminal strip TB6 as shown in the drawing. TB6 mounts on top of the two mounting studs of T1. Secure with nuts.

Connect the T1 transformer primary leads based upon your ac voltage requirements. Refer to figure 10.

For 120Vac/60Hz operation hookup the T1 primary as follows:

Locate the brown, brown/white, black and black/white leads of transformer T1. Cut to length the brown and brown/white leads and solder to TB6-4. Cut to length the black and black/white leads, strip the ends and solder to TB6-3. Cut the orange wire to a length of approximately 1 inch and tape the end using electrical tape or cover with heat shrink tubing.

For 220Vac/50Hz operation hookup the T1 primary as follows:

Solder the black and brown/white leads together and tape their ends or cover with heat shrink tubing. Cut to length the black/ white lead wire and solder to TB6-4. Cut to length the orange lead wire and solder to TB6-3. Cut the brown wire to a length of approximately 1 inch and tape the end using electrical tape or cover with heat shrink tubing.

For 240Vac/50Hz operation hookup the T1 primary as follows:

Solder the black and brown/white leads together and tape their ends or cover with heat shrink tubing. Cut to length the black/ white lead wire and solder toTB6-4. Cut to length the Brown lead wire and solder to TB6-3. Cut the orange wire to a length of approximately 1 inch and tape the end using electrical tape or cover with heat shrink tubing.

For 100Vac/50Hz operation hookup the T1 primary as follows:

Solder the brown and brown/white leads together and tape their ends or cover with heat shrink tubing. Cut to length the black and black/white leads and solder them to TB6-4. Cut to length the orange lead wire and solder to TB6-3.

Cut to length a piece of the black hookup wire and solder between the outer lug of the power switch and TB6-5.

Cut to length a piece of the black hookup wire and solder between the center lug of the power switch and TB6-4.

Now is a good time to inspect all connections and clean up any solder flux that may have splashed onto the terminal boards, chassis plate, etc. Things are becoming more crowded now and, as mentioned before, it will become more difficult to position the soldering iron without touching already placed parts. It is very important that you be aware of these parts when soldering and not accidentally burn the insulation off an adjacent component or wire.

10) Mount the fuse holder and IEC connector to the small rear panel using the supplied hardware as shown in figure 11.

Cut a short length of wire and solder it between the outer IEC terminal and the side lug of the fuse holder.

Cut an 8 inch piece of black wire and solder it to the rear lug of the fuse holder.

Cut a piece of black hookup wire approximately 8 inches in length and solder one end to the other outer terminal of the IEC connector as depicted in figure 11.

Cut a piece of black hookup wire approximately 8 inches in length and solder one end to the center terminal of the IEC connector.

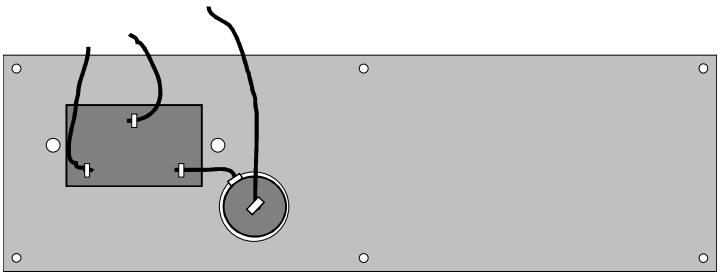


Figure 11

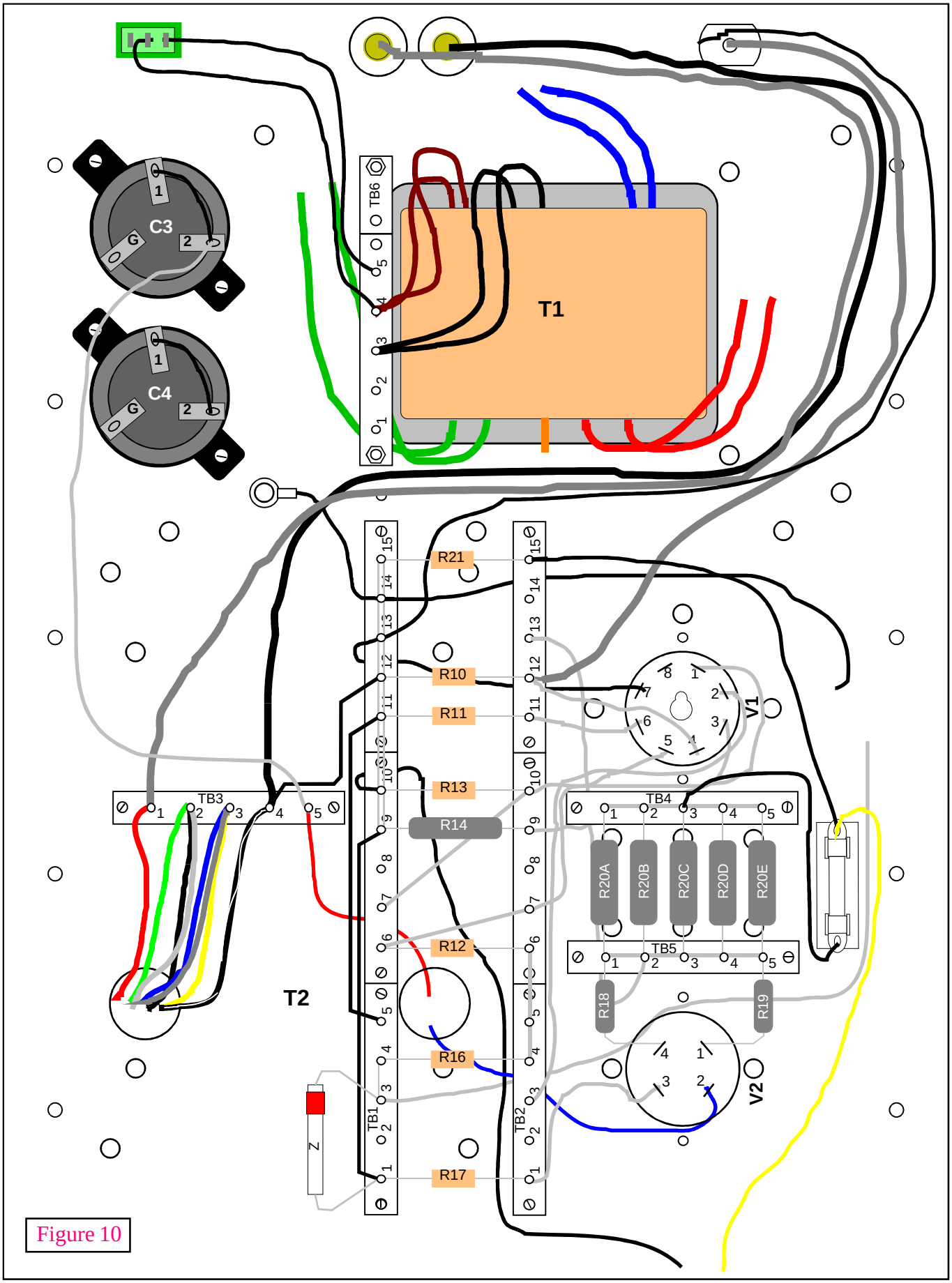

C3
C4
G
1
2
T1
TB6
T2
TB3
TB1
TB2
TB4
TB5
R21
R10
R11
R13
R14
R12
R16
R17
R18
R19
R20A
R20B
R20C
R20D
R20E
V1
V2
Z

Figure 10

11) OK...now for the fun part. Refer to figure 12 for the following steps. It is now time to install the SRDC circuit board.

Locate the bag marked “SRDC H/W”. Attach the two L-brackets to the circuit board using the supplied 6-32 screws. These screws go through the board and into the threaded holes on the brackets. The brackets should be mounted on the circuit board such that the “feet” are on the component side of the board.

Remove the two “rear” screws that hold the T1 housing to the chassis plate. The SRDC board brackets will be positioned over these screw holes and the board secured to the chassis by replacing the screws and tightening.

With all of the wires hanging off of the board installing it will be somewhat of a challenge. You will need to route the longer wires towards their destination as you position the circuit board into place. For instance, the black and white 5.0VDC/GRND3 filament voltage wires should be routed around T1 and in-between TB1 and TB2, threading these wires underneath the already positioned resistors. These two wires will connect to the V2 tube socket.

Once the board is installed, you can begin soldering the wires to it.

Begin by cutting the two blue transformer wires to length and soldering them to the pads located on the lower right side of the board and marked “6.3VAC”.

Next, cut to length and solder the two red transformer wires to the pads marked “550VAC”.

Cut to length the two green transformer wires and solder to the pads located on the lower left side of the board and marked “6.3VAC”.

Next, connect the 5.0VDC filament wire to the tube socket V2. Cut to length the white wire and solder to V2-4.

Connect the GRND3 filament wire to the tube socket V2. Cut to length the black wire and solder to V2-1.

Route, cut to length and solder the black GRND2 wire to TB1-15.

Route, cut to length and solder the white L1 wire to TB6-2.

Route, cut to length and solder the white L2 wire to TB6-1.

Route, cut to length and solder the white 6.3VDC wire to V1-8.

Route, cut to length and solder the black GRND1 wire to V1-7.

Cut to length a short piece of the yellow wire and solder between C3-G and C4-1.

Cut to length one of the white wires, previously soldered to the “+C3/C5” pad, route and solder to C3-1.

Route the other white wire, previously soldered to the “+C3/C5” pad, over to the right side of the chassis. This wire will be connected later.

Cut to length one of the yellow wires, previously soldered to the “-C3/C5” pad, route and solder to C4-1.

Route the other yellow wire, previously soldered to the “-C3/C5” pad, over to the right side of the chassis. This wire will be connected later.

Cut to length one of the black wires, previously soldered to the “-C4/C6” pad, route and solder to C4-G.

Route the second black wire, previously soldered to the “-C4/C6” pad, over to the right side of the chassis. This wire will be connected later.

Cut to length the third black wire, previously soldered to the “-C4/C6” pad, route and solder to TB1-15.

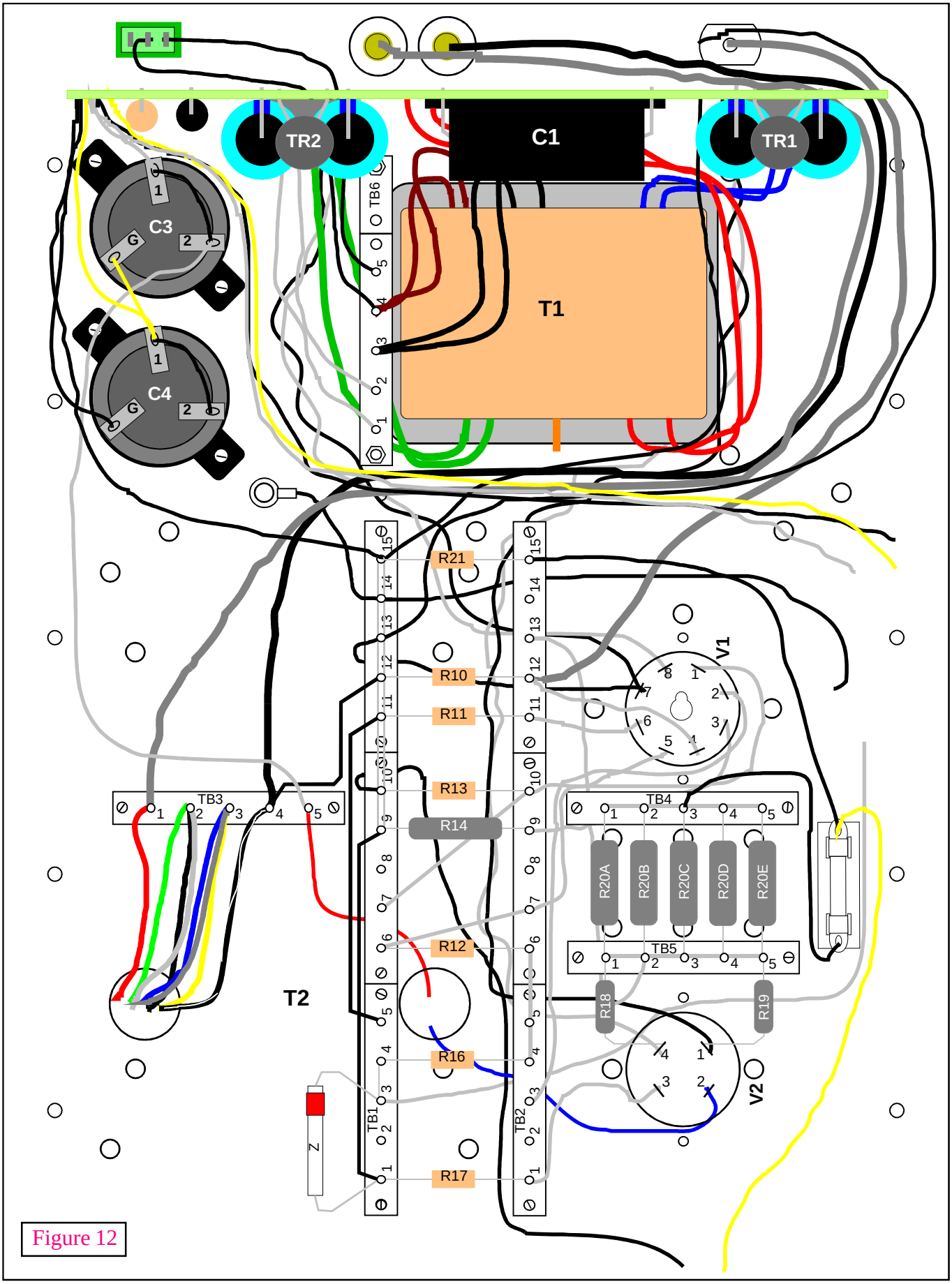

TR2
C1
TR1
C3
C4
T1
TB6
R21
R10
R11
R13
R14
R12
R16
R17
TB3
TB4
TB5
TB1
TB2
T2
V1
V2
R20A
R20B
R20C
R20D
R20E
R18
R19
Z

Figure 12

12) Refer to figure 13 for the following steps:

Position capacitor C20 as shown in the diagram and solder the negative lead to TB1-11 and the positive lead to TB2-11.

Position capacitor C23 as shown in the diagram and solder the negative lead to TB1-9 and the positive lead to TB2-9.

Position capacitor C22 as shown in the diagram and solder one lead to TB1-7 and the other lead to TB2-7. C22 has no polarity.

Position capacitor C21 as shown in the diagram and solder one lead to TB1-5 and the other lead to TB2-5. C21 has no polarity.

Position capacitor C25 as shown in the diagram and solder one lead to TB1-13 and the other lead to TB2-13. Note that C25 has no polarity.

13) Mount the rear panel containing the IEC connector and fuse holder to the wood base and secure it with the supplied hardware. Four of the 4-40 x 1 1/8 button head screws insert all of the way through the wood base and are secured wirh the 4-40 hex nuts. The other two 4-40 x 1/2 button head screws are simply screwed into the predrilled hole. These two holes are closest to the edge the wood base.

Next mount the 10 L-brackets to the inside wall of the wood base and secure with the #6 woodscrews as shown in figure 14. These screws go into the predrilled holes. At this timedo not tighten these screws all the way into the wood.

Mount inductor L1 as shown in fig. 14 using the predrilled holes & secure with the #6 woodscrews.

Mount inductor L2 as shown in fig. 14 using the predrilled holes & secure with the #6 woodscrews.

Mount capacitor C2 using the predrilled holes and secure with the #6 woodscrews.

Mount capacitors C5 and C6 as shown in figure 14 using the predrilled holes and secure with the #6 woodscrews.

Mount transformer IT as shown in figure 14 using the predrilled holes and secure with the #6 woodscrews.

Mount meter M1 as shown in figure 14 using the predrilled holes and secure with the 4-40 x 1 1/8 button head screws and hex nuts.

Carefully mount the top plate to the wood base. Secure it with the 4-40 x 1/4 machine screws. You might have to remove some the components previously attached to the wood base in order to access the 4-40 screws.

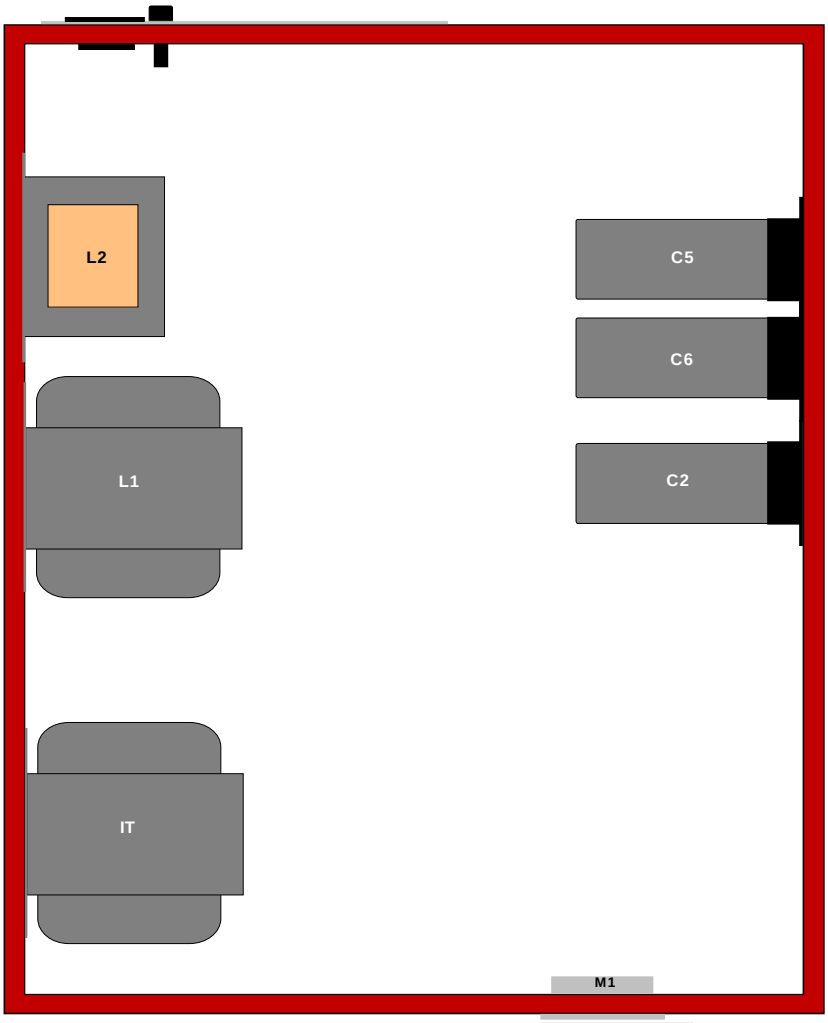


Figure 14

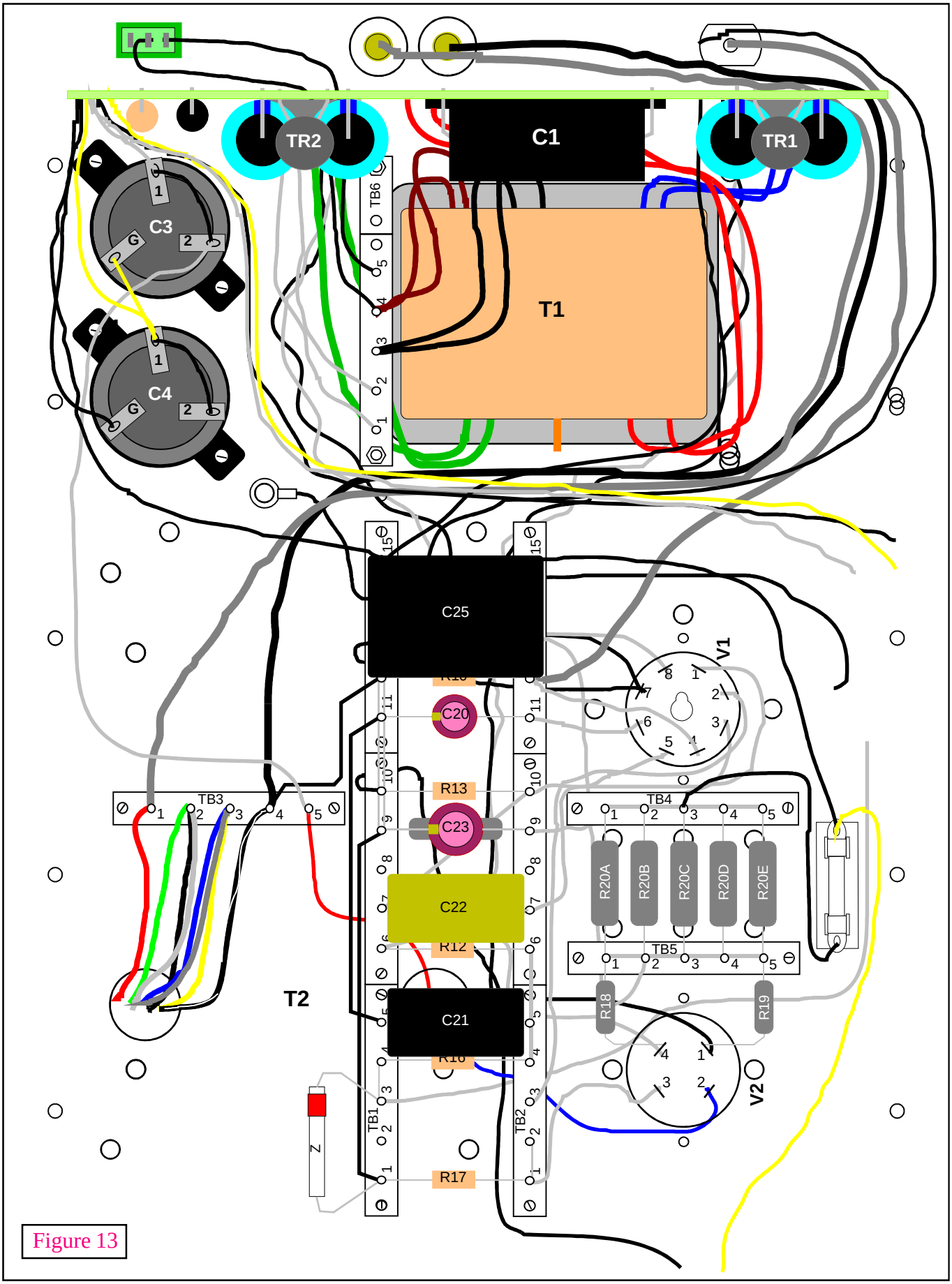

TR2
C1
TR1
C3
C4
T1
TB6
C25
C20
R13
C23
C22
R12
C21
R16
R17
T2
TB3
TB4
TB5
R20A
R20B
R20C
R20D
R20E
R18
R19
V1
V2
TB1
TB2

Figure 13

Solder a short jumper wire between the to positive terminals C2-1 and C2-2 of capacitor C2.

Solder the white wire previously attached to TB1-3 to C2-1.

Solder the black wire previously attached to TB1-14 to C2-GND.

Solder the black lead of inductor L2 to one of the positive terminals on capacitor , C2-1.

Solder the black lead of inductor L2 to TB6-1.

Solder the white lead of inductor L1 to one of the positive terminals on capacitor, C3-1.

Solder the black lead of inductor L1 to TB6-2.

Solder the black wire previously attached to the fuse holder to TB6-5.

Solder the black wire previously attached to the outer lug of the IEC connector to TB6-3.

Cut to length the black wire attached to the center lug of the IEC connector and solder one of the terminal rings to it. Secure the terminal ring to the same transformer housing stud that the other terminal ring was previously secured to.

Cut a short jumper wire and solder between C5-GND and C6-1.

Cut a short jumper wire and solder between C5-1 and C5-2.

Cut a short jumper wire and solder between C6-1 and C6-2.

Solder the white wire previously attached to SRDC “+C3/C5” pad to C5-1.

Solder the yellow wire previously attached to SRDC “-C3/C5” pad to C6-1.

Solder the black wire previously attached to SRDC “-C4/C6” pad to C6-GND.

Solder the yellow wire previously attached to TB4-3 to the positive terminal ring on meter M1. Remove the ring from the meter before soldering.

Solder the black wire previously attached to TB1-10 to the negative terminal ring on meter M1. Remove the ring from the meter before soldering.

Solder the blue lead of the interstage transformer IT1 to TB2-3.

Solder the red lead of the interstage transformer IT1 to TB1-3.

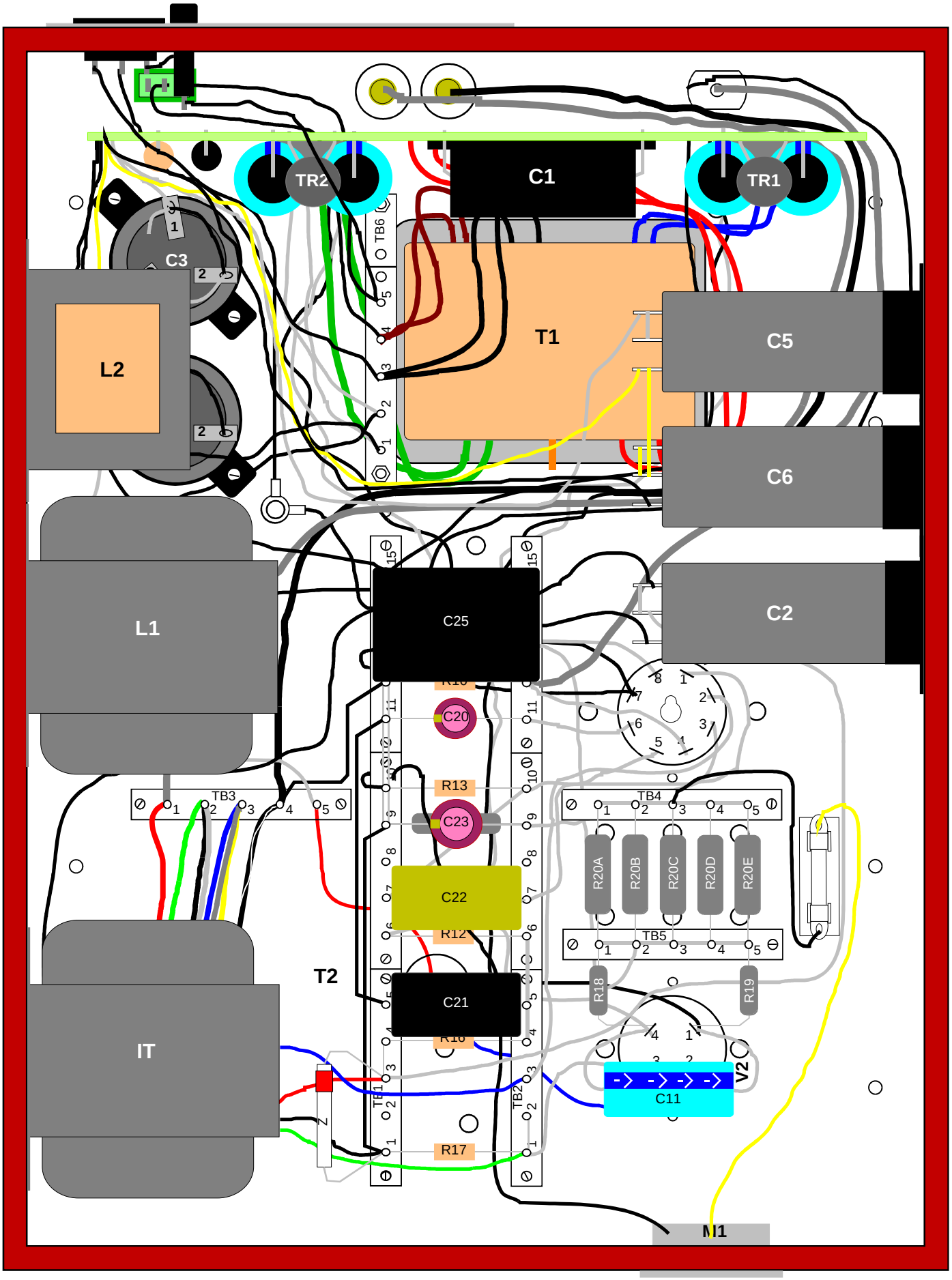
Solder the green lead of the interstage transformer IT1 to TB2-1.

Solder the black lead of the interstage transformer IT1 to TB1-1.

Install the 2 amp slow blow fuse in the fuseholder F1.

This completes the assembly phase of the Apollo II amplifier. Now is a good time to go back and check and double-check your work. This can be very tedious but it can also save time and money if you find your errors now instead of later. Of course applying power to the unit is usually the fastest way to find out your mistakes...just look for the smoke...but not the cheapest or best way!

Now on to the Power-up and Test.


TR2
C1
TR1
C3
T1
C5
L2
C6
L1
C25
C2
C20
R13
C23
C22
R12
T2
C21
IT
R17
TB3
TB4
TB5
TB6
TB1
TB2
R20A
R20B
R20C
R20D
R20E
R18
R19
V2
C11
M1

Power Up and Test Instructions

Power-up Sequence

1) It is recommended that you connect the amplifier to a dummy load or old set of speakers during the power-up procedure. The amplifier must have tubes installed to power-up and test operation.

2) Turn the amplifier on its side and install the tubes.

3) If you own or have access to a variable ac transformer, use it to slowly increase the ac voltage during power-up. Monitor the high voltage, using a dc voltmeter, as you increase the ac voltage. Refer to the table below for the proper voltages to be measured. If you do not have access to variable transformer, use the voltmeter to measure the high voltage as you power-up the amplifier. If the high voltage does not show signs of increasing after 2 or 3 seconds, immediately turn off the power.

   Using a voltage meter check the voltages as outlined below:

Test	(+) Meter Test Lead	(-) Meter Test Lead	Meter Range	Meter Reading
High Voltage	TB3-5	TB1-10	>600Vdc	600Vdc +/- 20V
Bias Voltage	TB5-3	TB4-3	>200Vdc	110Vdc +/- 10V
Output Filament	V2-4	V2-1	>10Vdc	5.0Vdc +/- 0.25V
Driver Filament	V1-8	V1-7	>10Vdc	6.0Vdc +/- 0.25V

4) If all the above voltages measure OK, and you are connected to a set of speakers, listen for excessive noise, oscillations or hum.

5) If there is no excessive noise, you are now ready to give the amps a listen.

Attach the bottom cover to the amplifier using the provided 10-32 button head screws.

Attach the feet to the bottom cover.

Turn the amplifier onto its feet and install the transformer housing covers. Be careful not to scratch the covers.

The amplifiers should now be ready to connect to your system and enjoy the music.

Troubleshooting

Problem:	Low or no High Voltage	Check the polarity of all electrolytic capacitors.
Problem:	No Sound	Are the tubes glowing? Are your speakers properly connected?
Problem:	Excessive Hum	Possible ground loop in circuit or chassis may not be grounded. Check all ground wiring. Check filament voltages and wiring. Check all tubes.
Problem:	Popping Noise	Possible cold or weak solder joint or loose connections. Check all solder connections.

If you have difficulty troubleshooting your equipment, give us a call. We will be glad to help you get your equipment running. We have a very high success rate at troubleshooting equipment problems over the telephone however phone calls can be expensive and they will be on your nickel, not ours. A letter or e-mail might be more appropriate, but in either case it will help if you have taken the time to write down as many symptoms as possible and also take and record some voltage measurements at key nodes in the circuit. If all else fails, you can send your amplifier to us, however this should be your last resort.

We have built an tested this amplifier and it works and therefore we have to assume that if your amplifier does not work, it is most likely something you did wrong during assembly. We charge a flat rate of $35 per hour for repairs.

Final Notes

Allow the amplifiers to warmup for several minutes prior to using them. This will guarantee the amps are operating under optimum conditions. One note: the Apollo amplifiers are designed to be “dead silent” with respect to ac hum. While I personally haven’t used the monoblocks with speakers in the 105dB sensitivity range, I have used them with speakers in the 94 to 100dB range and no hum should be audible with the ear positioned approximately 2 feet from the speaker. If you experience hum with your Apollo monoblocks, go back and revisit the ground wiring. Did you follow our wiring diagram exactly? 99.9% of the time, hum can be attributed to a ground problem, so this is the place to look first.

The Apollo amplifiers are designed to require a minimum amount of maintenance. There are no adjustments to make, you just plug in the tubes turn on the power and enjoy. You will need to oil the wooden boxes maybe once a year. Use a good quality furniture oil such as Formby’s, Watco, or a thinned linseed oil. Be careful not to get oil on the metal parts. The wood bases will retain their natural color longer if they are properly maintained and kept out of the direct sunlight.

A light application of a window cleaner, such as Windex, can be used to remove dust and dirt from the metal parts.

No doubt many of you will look at this amp with an eye on making component changes or circuit modifications. If you purchased this amplifier pre-assembled, this will void the warranty. If you have built the kit version, then go for it!

Have fun with your experimentation and listening. I hope you receive many years of enjoyment from your purchase.

Ron Welborne

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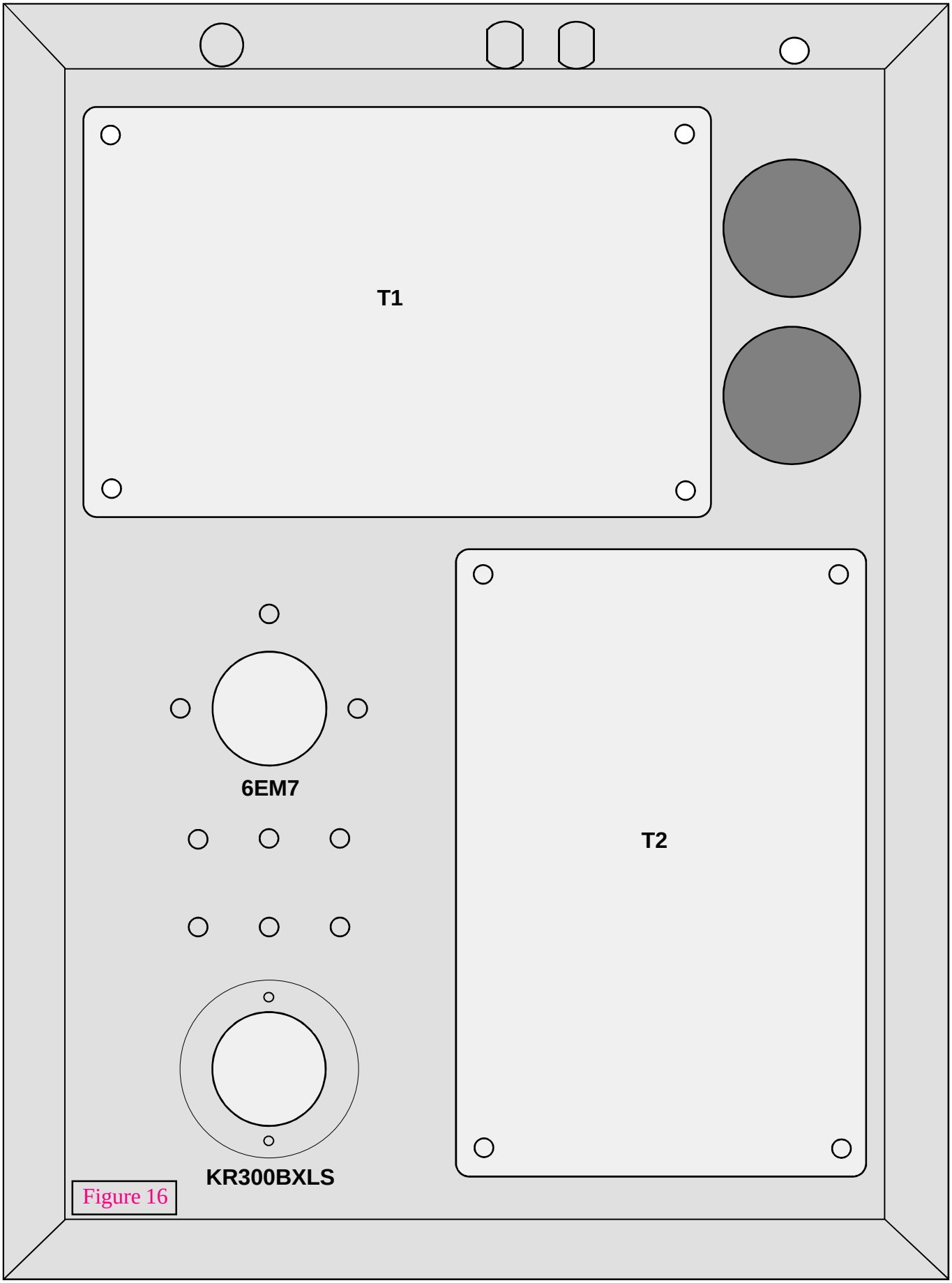

Figure 16