Assembly and Operation of the



AC POWER SUPPLY

MODEL HP-1144



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HEATH COMPANY
BENTON HARBOR, MICHIGAN 49022



INTRODUCTION

The Heathkit Model HP-1144 AC Power Supply provides well-regulated, low voltage, DC power from an AC power source. You can wire it to operate from either a 120-volt AC or 240-volt AC 50/60 Hz power line and maintain regulation within 2%.

This AC Power Supply was primarily designed to provide +13.8 VDC for the Heathkit, Model SB-104 SSB Transceiver. A cable and socket provide output power and a series connection for the remote on-off switch on the Transceiver. The attractive, rugged construction and reliable performance of this Power Supply will provide many years of dependable service.

Refer to the "Kit Builders Guide" for complete information on unpacking, parts identification, tools, wiring, soldering, and step-by-step assembly procedures.

PARTS LIST

Check each part against the following list. The parts may vary slightly from the illustration. Keep any part that is individually packaged with a part number on it in its package after you identify it until you actually use it. Some parts are marked with a "171-" packaging number. These numbers are used for packaging only and do not appear in the Manual "Parts List." Save all packaging material until you locate all the parts.

Each circuit part in this kit has its own circuit component number (R2, C4, etc.). Use these numbers when you want to positively identify the same part in the various sections of the Manual. These numbers, which are especially useful when a part has to be replaced, appear:

- In the Parts List,
- At the beginning of each step where a component is installed,
- In some illustrations,
- In the Schematic,
- In the sections at the rear of the Manual.

To order a replacement part use the Parts Order Form furnished with this kit. If a Parts Order Form is not available, refer to "Replacement Parts" inside the rear cover of this Manual. NOTE: Never use a "171-" packaging number if you must order replacement parts; use only the part numbers listed in the following list.



	QTY.	DESCRIPTION	PART No.	CIRCUIT Component No.	PRICE Each	
RESI	STORS					
()	1	22 Ω (red-red- black), 1/2-watt	1-49	R1	.15	
()	1	820 Ω (gray-red- brown), 1/2-watt	1-8	R7	.15	
()	1	2200 Ω (red-red-red), 1/2-watt	1-44	R5	.15	
()	1	270 Ω (red-violet-brown), 2-watt	1-30-2	Ŕ4	.20	
()	8	.33 Ω, 5-watt	3-11-5	R2, R3 (4 each)	.50	
CONT	rol					
()	1	500 Ω	10-381	R6	1.00	
NOTE ways.	EXAMPL	S capacitors can be man .Ε: .1, .1k, or .1 μF. Ho instructions will always	owever, the			
()	2 1	.1 μF Mylar* 500 μF electrolytic	27-47 25-199	C4, C6 C5	.30	
()	1 2	2500 μF electrolytic 10,000 μF electrolytic	25-154 25-263	C3 C1, C2	5.25	
DIODI	ES-TRA	NSISTORS				
()	1	MDA990-2 bridge	57-88	BR1	7.80	

^{*}DuPont Registered Trademark

rectifier

1N4002 diode

57-65

D5



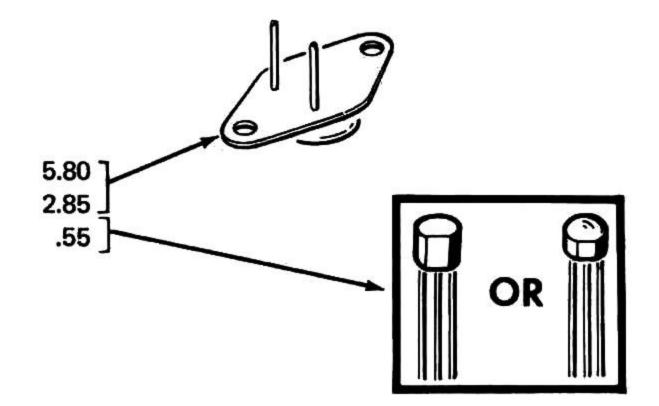
QTY. DESCRIPTION PART CIRCUIT PRICE No. Component No. Each

Diodes-Transistors (cont'd.)

NOTE: Transistors are marked for identification in one of the following four ways. (The term "type number" refers only to the numbers in a transistor or integrated circuit description. It does not refer to the letters, which could change.)

- 1. Part number.
- 2. Transistor or integrated circuit type number.
- 3. Part number and type number.
- Part number with a type other than the one listed.

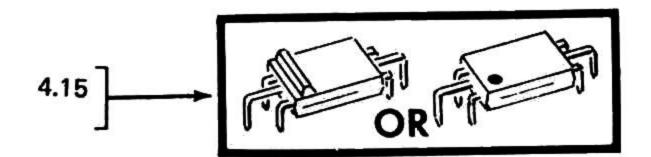
()	2	40411 transistor	417-139	Q3, Q4
()	1	2N3055 transistor	417-215	Q2
()	1	2N3643 transistor	417-233	Q1



INTEGRATED CIRCUIT

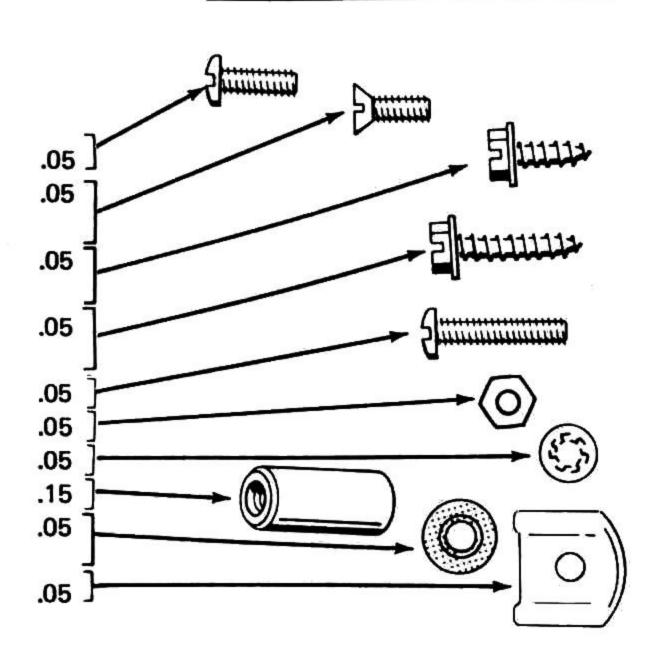
NOTE: If either the "Part Number" or the "Description" number is on the integrated circuit, you have the correct part. Do not be concerned about any other numbers. (The Description number may have additional letters and numbers other than those given.)

() 1 MFC 6030 integrated 442-48 IC1 circuit



HARDWARE

	#6 Hardware						
()	16	6-32 x 3/8" screw	250-89			
()	2	6-32 x 3/8" flat	250-434			
			head screw				
()	12	#6 x 3/8" sheet	250-475			
			metal screw				
()	4	#6 x 5/8" sheet	250-1199			
			metal screw				
()	7	6-32 x 11/16" screw	250-206			
()	13	6-32 nut	252-3			
1)	22	#6 lockwasher	254-1			
()	4	6-32 x 11/16" spacer	255-83			
()	6	#6 fiber shoulder	253-2			
			washer				
()	1	#6 D washer	253-89			





	QTY.	DESCRIPTION	PART No.	CIRCUIT Component No.	PRICE Each	***************************************
Har	dware (co	ont'd.)				
	1/4" Ha	rdware				
()	8	1/4"-20 x 7/8" screw	250-253		.05	
()	13	1/4" nut	252-57		.05	
()	9	1/4" flat washer	253-31		.05]	
()	14	1/4" lockwasher	254-14		.05	(224)
()	1	Large solder lug	259-23		.15	(3-5)
ME	TAL PAR	RTS				
1 1		Cover	00 1100 1			
1 1	-1 1	Cover	90-1108-1		5.00	
()	2	Chassis Clamp	200-678-1 207-2		5.50	
()	1	Connector pin	259-20		.60	
()	1	Heat sink	215-76	8	.05 J 18.00	
18 18	•		2.070		18.00	
)	
WIF	RE-SLEEV	/E			H	
()	1	Large sleeving	346-4		.10/ft 🥨	
()	1	Line cord	89-23		1.23	
()	1	Brown wire #18	344-31		.05/ft	
()	1	Small sleeving	346-7		.05/ft	
()	1	Cable (9 wire)	347-40		.45/ft	all did a
()	1	Bare wire	340-1		.05/ft	
MIS	CELLANI	EOUS				
()	1	Transformer	54-848	T1	41.25	
()	1	Grommet	73-23		.20 🚽	
()	2	Mica insulator	75-44		.15	
()	1	Strain relief	75-71		.15	
()	1	Printed circuit board	85-1392-1		1.50	
1)	4	Thermal grease	352-31 261-34		.60	
()	1	Plastic foot Cable clamp	207-34		.10 1	
()	1			EO	.15	
()	1	20-amp fuse, 3AG, SFI 7-amp fuse, 3AG,	421-16	F2 F1	.15	
, ,		MDX7 slow-blow	421-9	E-1	.55	
()	2	Fuseholder	423-1		.95 🔨	
()	1	Nut starter	490-5		.15	
				11		1
					ell-tim	ME BOOK MY DOWN
					Effellow	



QTY. DESCRIPTION PART CIRCUIT PRICE No. Component No. Each Miscellaneous (cont'd.) .45 Terminal board 431-67 Terminal strip .15 431-42 Transistor socket .25 434-189 11-pin socket .50 434-118 .65 Socket cap 440-8 Solder (Additional 3' rolls of solder can be ordered under part number 331-6 for \$.25 each.) **PRINTED MATERIAL** Blue and white label 391-34 Parts Order Form 597-260 Kit Builders Guide 597-308 Assembly Manual (See front cover for part

The above prices apply only on purchases from the Heath Company where shipment is to a U.S.A. destination. Add 10% (minimum 25 cents) to the price when ordering from a Heathkit Electronic Center to cover local sales tax, postage, and handling. Outside the U.S.A., parts and service are available from your local Heathkit source and will reflect additional transportation, taxes, duties, and rates of exchange.

ASSEMBLY NOTES

Before you start to assemble this kit, be sure you have read the wiring, soldering, and step-by-step assembly information in the "Kit Builders Guide."

number.)

Install components on the circuit board by following the steps in Pictorials 1 and 2. Resistors are designated by resistance values (in $k\Omega$) and color bands. Capacitors are designated by capacitance value (in μF) and type (Mylar or

electrolytic). Read the entire step before you perform the operation; then follow the instructions carefully. Position all parts as shown in the Pictorials.

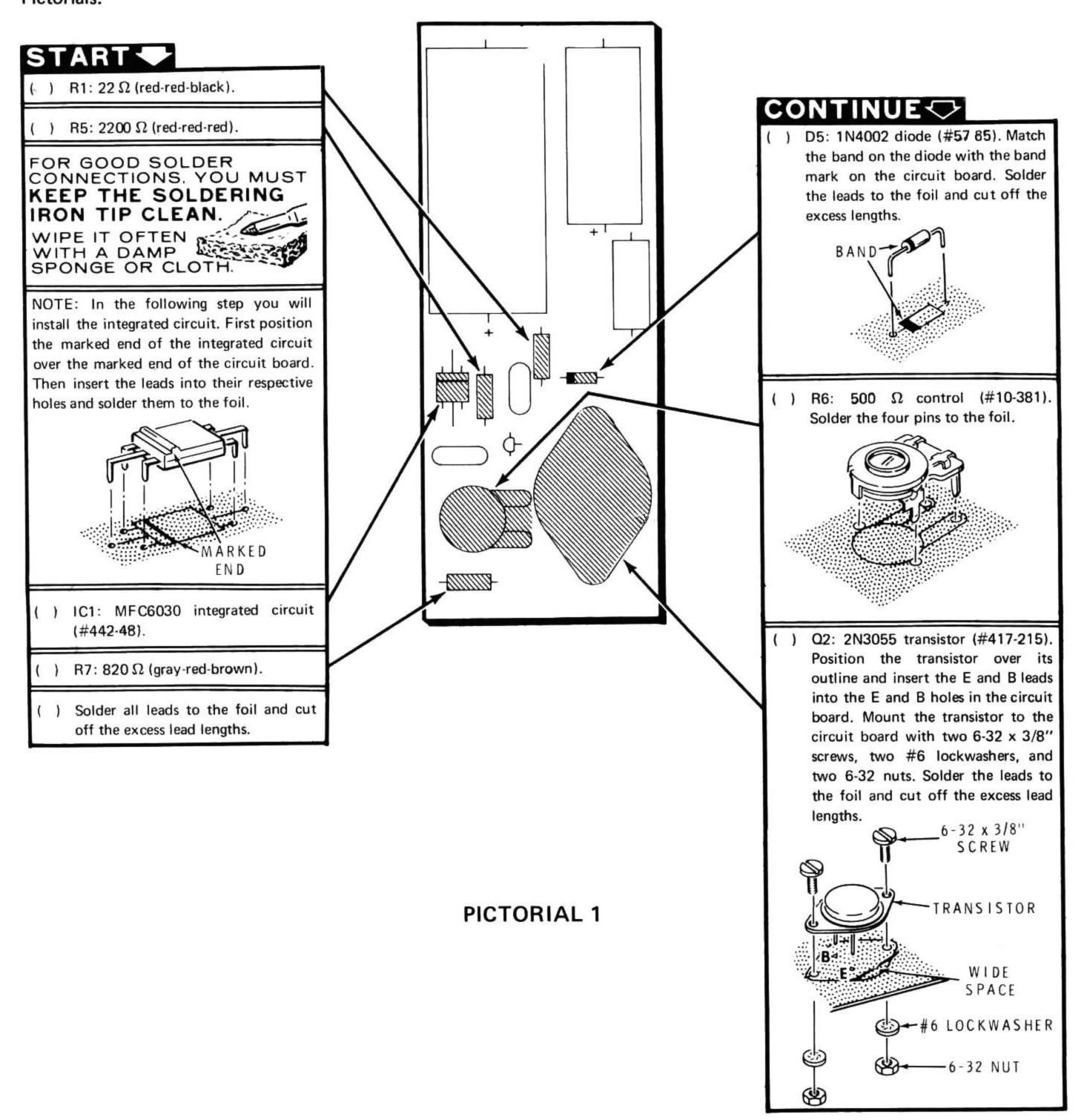
SAFETY WARNING: Avoid eye injury when you clip off excess leads. We suggest you wear glasses or at least clip the leads so the ends will not fly toward your eyes.



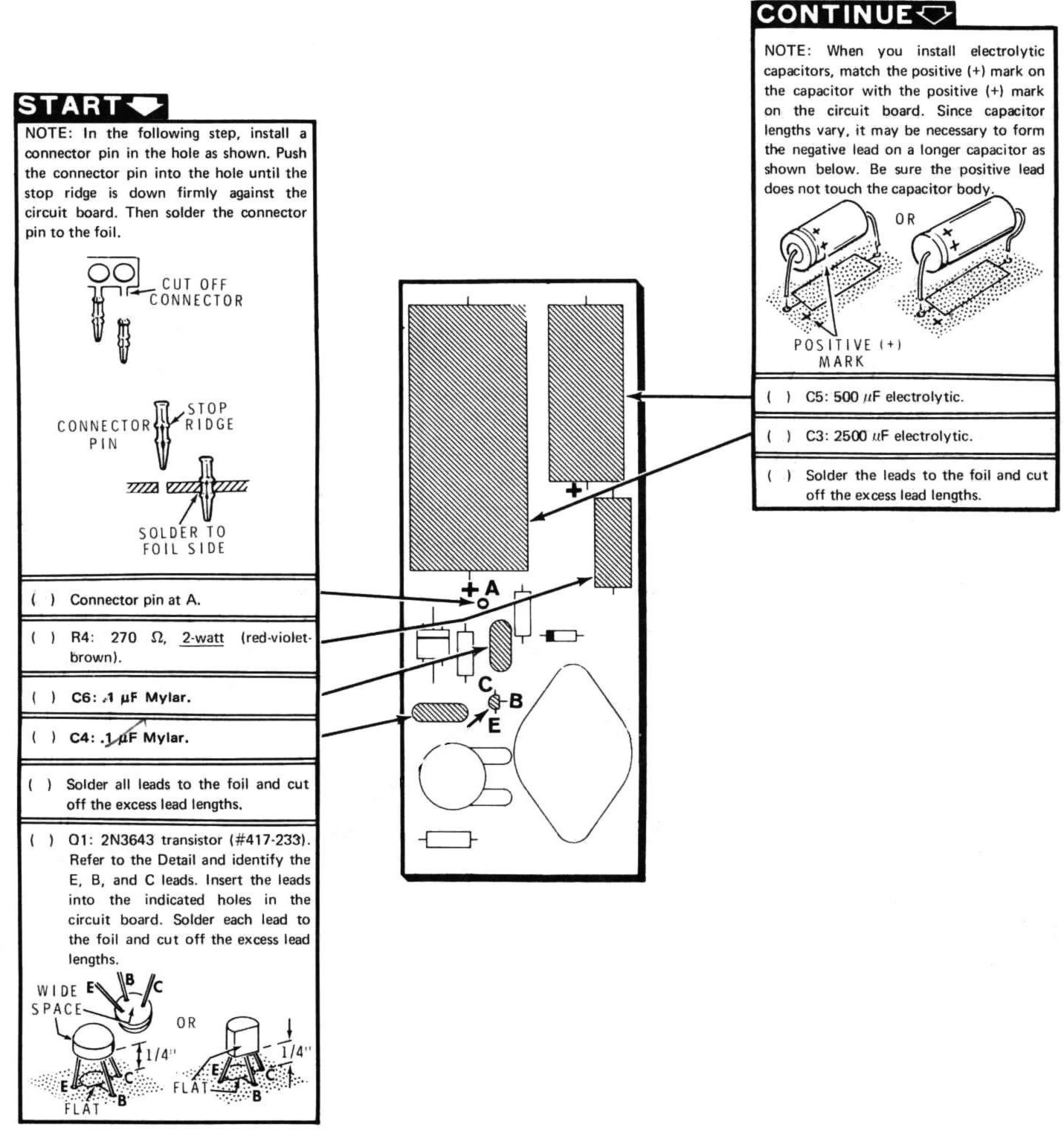
STEP-BY-STEP ASSEMBLY

CIRCUIT BOARD ASSEMBLY

Locate the circuit board and position it lettered side up as shown in Pictorial 1. Then complete each step in the Pictorials.

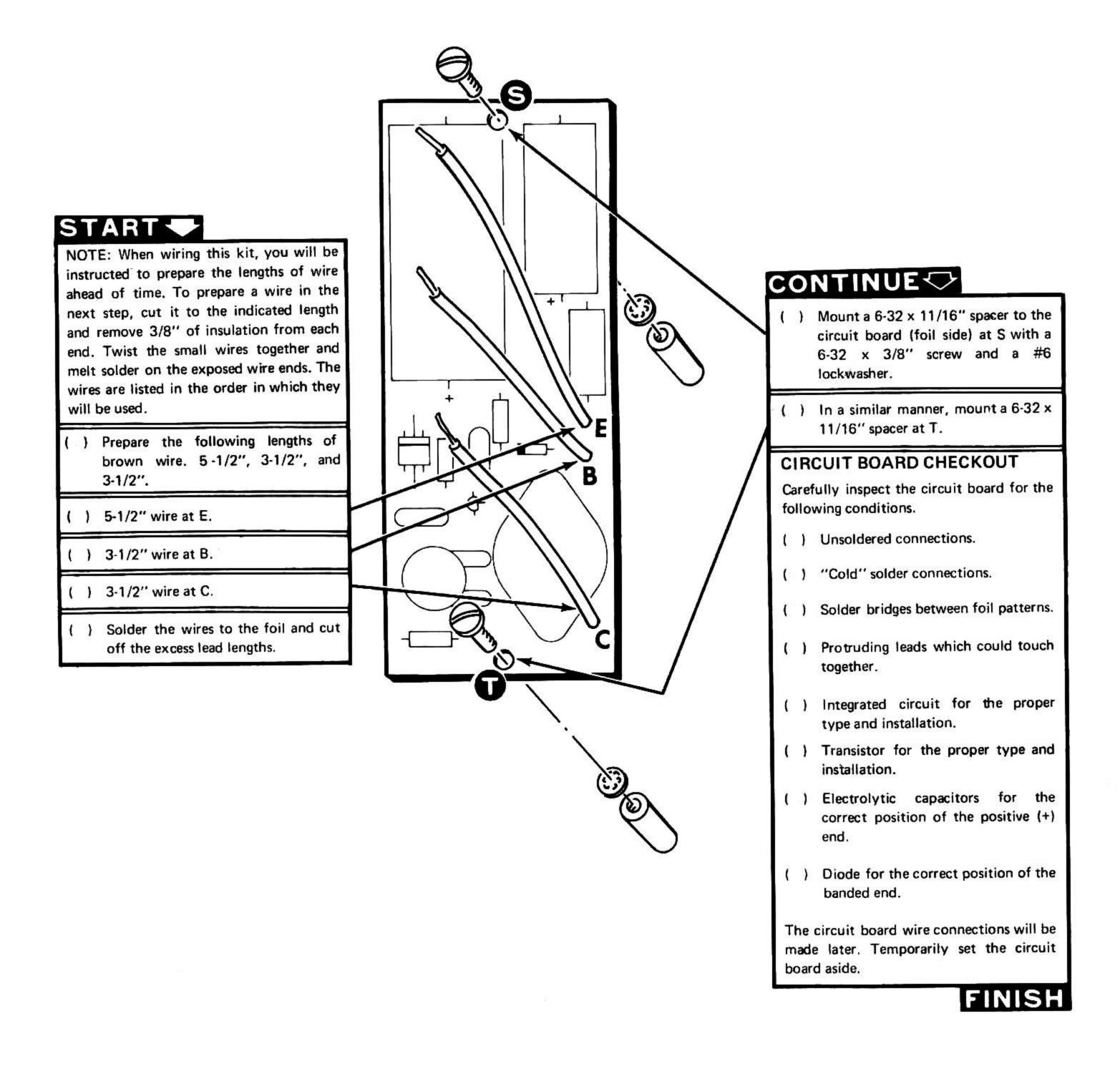






PICTORIAL 2





PICTORIAL 3

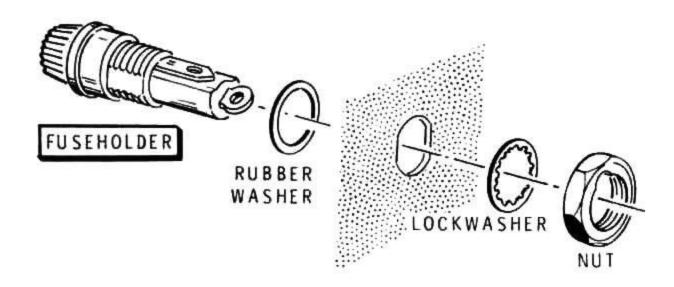
3/4 1/4 0 1" 2" 3" 4" 5" 6"



CHASSIS ASSEMBLY

Refer to Pictorial 4 (fold-out from Page 11) for the following steps.

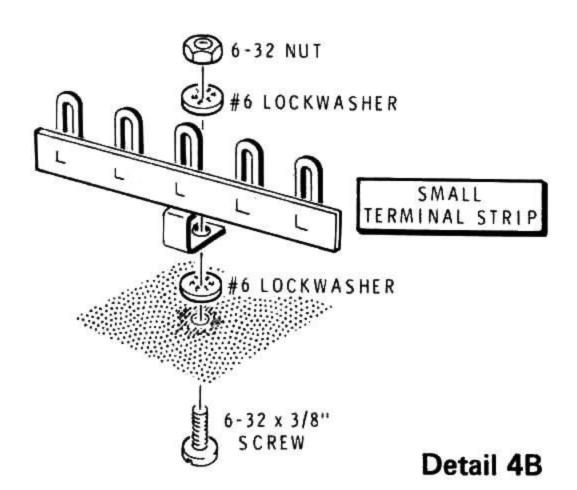
- () Carefully peel the protective paper from the plastic feet and press a foot onto the chassis bottom at each corner. Do not cover the holes.
- () Install a grommet at hole A.



Detail 4A

- () Refer to Detail 4A and mount a fuseholder at F1 with the hardware supplied with the fuseholder. Be sure to position the lug as shown.
- () In a similar manner, mount a fuseholder at F2.

NOTE: When hardware is used, the steps will give the size and type only. For example, "Use 6-32 x 3/8" hardware" means to use a 6-32 x 3/8" screw, one or more #6 lockwashers, and a 6-32 nut. Refer to the Detail for the proper installation of the hardware.



Refer to Detail 4B and install a terminal strip at B with 6-32 x 3/8" hardware.

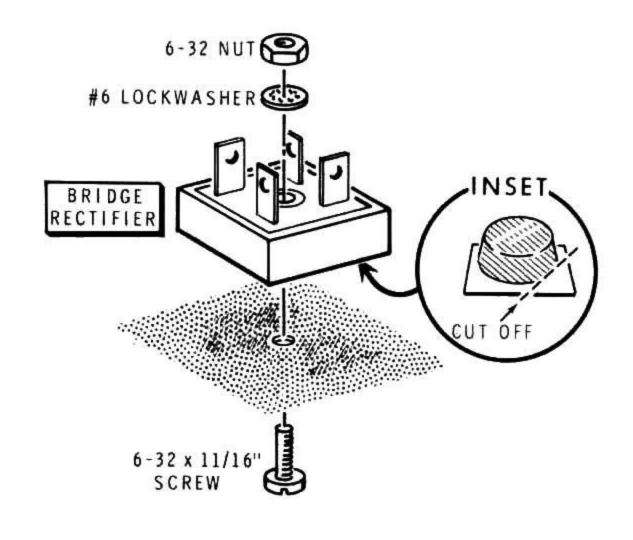
WARNING:

The thermal compound used in the following step (and later) can be injurious to both your eyes and your clothes. Handle it with utmost care.

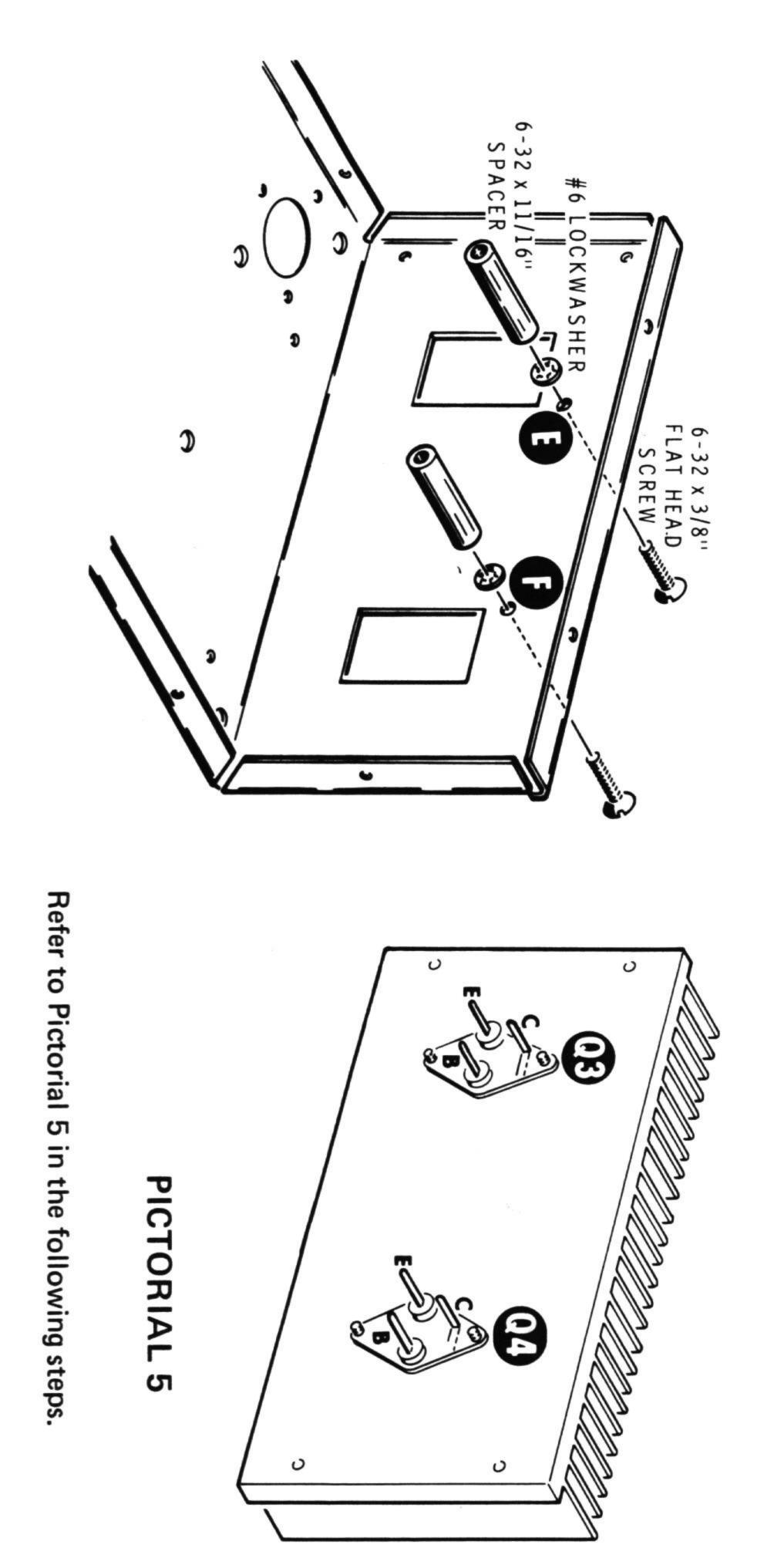
KEEP THE COMPOUND AWAY FROM YOUR EYES. Wash your hands immediately after you use the compound. Should you get any in your eyes, wash your eyes with water at once and see a doctor as soon as possible.

KEEP THE COMPOUND OFF YOUR CLOTHES. If you get the compound on your clothes it may leave a permanent white stain.

- BR1: Refer to the inset drawing in Detail 4C and open the thermal grease pod. Spread a thin layer of the thermal grease on the large flat side of the MDA990-2 bridge rectifier (#57-88). Save the remaining thermal grease for use later.
-) Refer to Detail 4C and install the bridge rectifier at BR1 with 6-32 x 11/16" hardware. Position the positive (+) and negative (-) lugs as shown in Pictorial 4.



Detail 4C



Page 11



socket.

Ве

sure the

transistor

mounting holes

when you tighten the screws.

the

transistor,

mica

insulator,

or, heat sink, and transistor socket ridges seat properly in

transistors, line up the wide space on

NOTE: As you mount

- lockwasher. to Detail 4D 6-32 flat a 6-32 head screw 11/16"
- similar manner, mount a 6-32 11/16" spacer at
- and H Refer ö with 6-32 Detail 4E and hardware. mount the circuit board at G
- and mount spacer
- Q4: (#17-139) at Q4. similar manner, mount a 40411 transistor

the mica insulator.

Spread a

thin layer of

thermal grease

on both sides of

(#17-139),

mica

insulator,

and

socket on

transistor

nd transistor 6-32 x 11/1

11/16"

screws.

sink

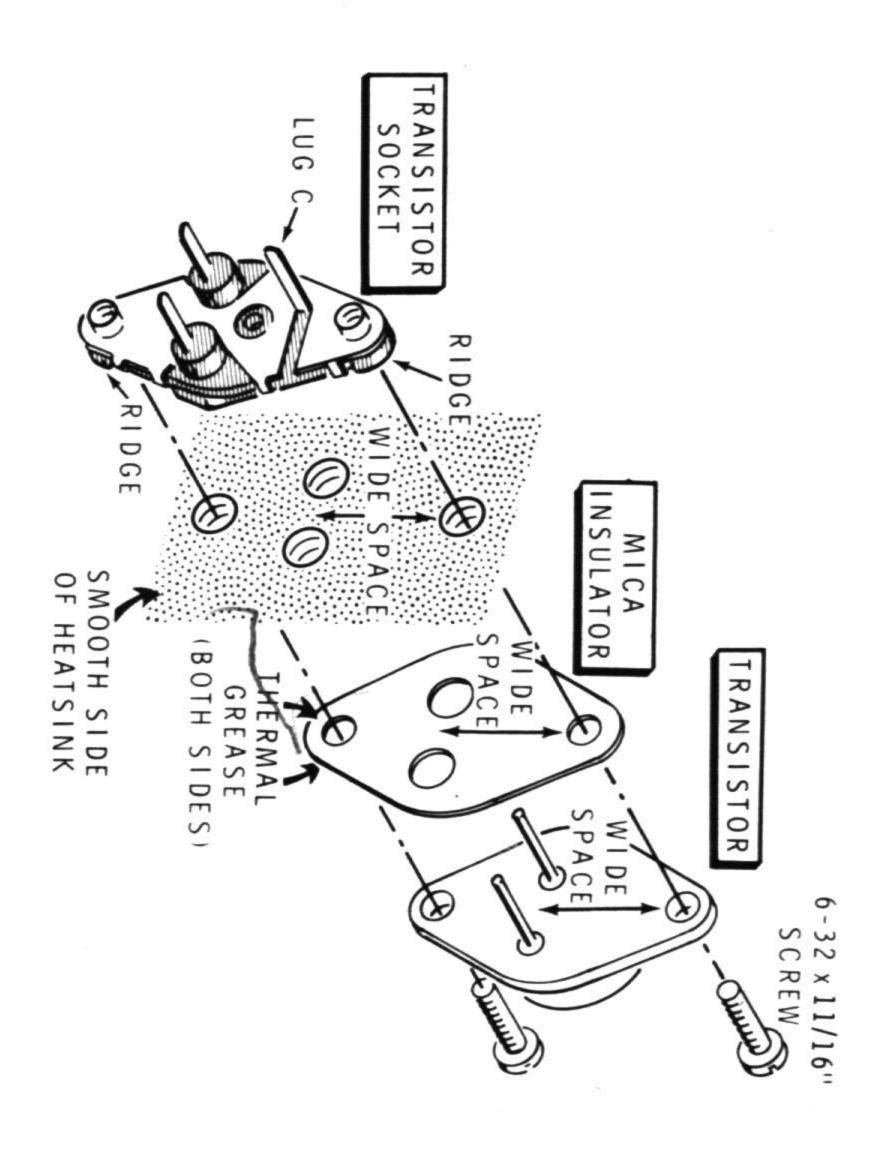
at

03

with

two

Refer to Detail 5A and install a 40411



#6

LOCKWASHER (15)

CIRC

0

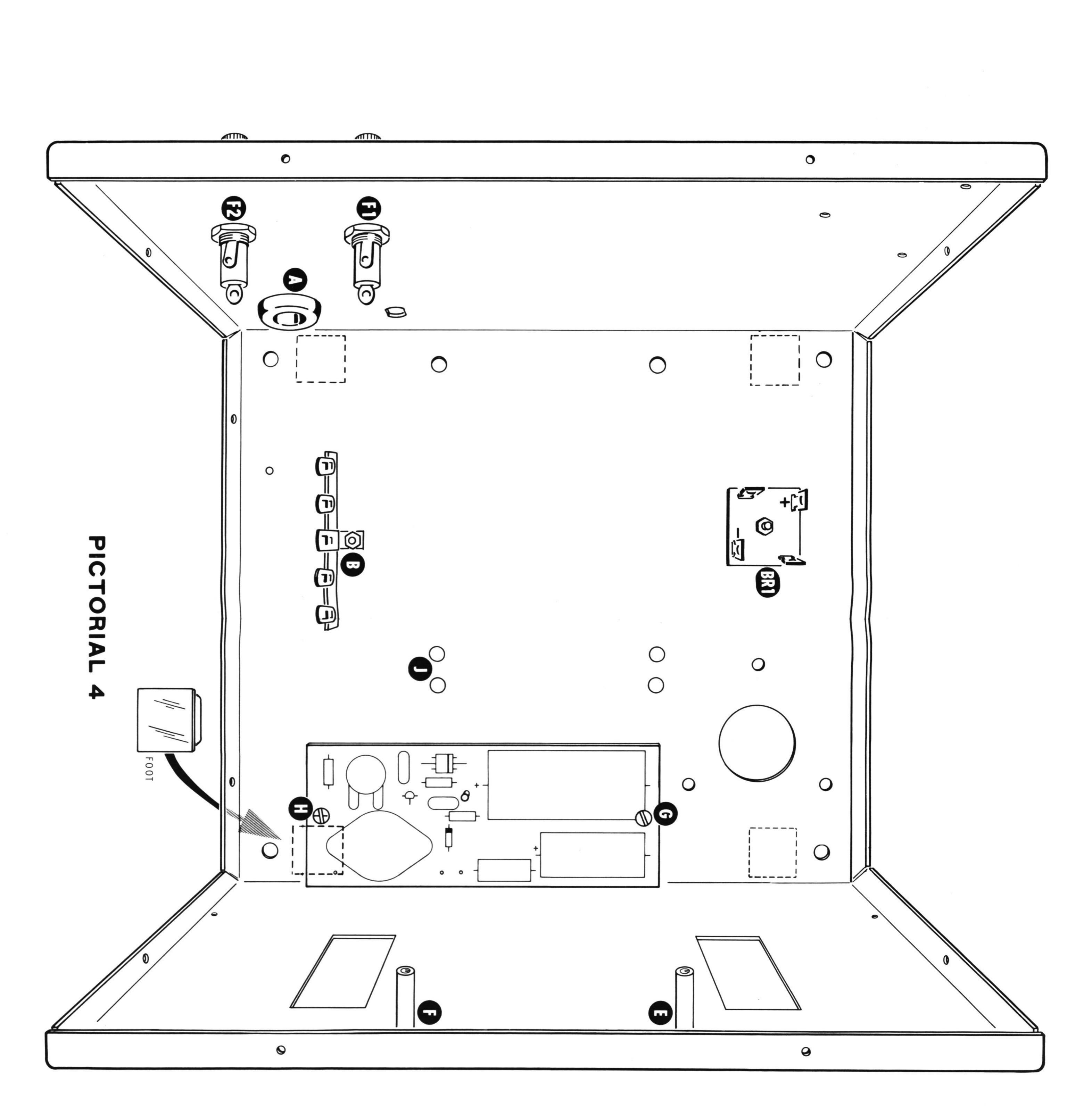
G

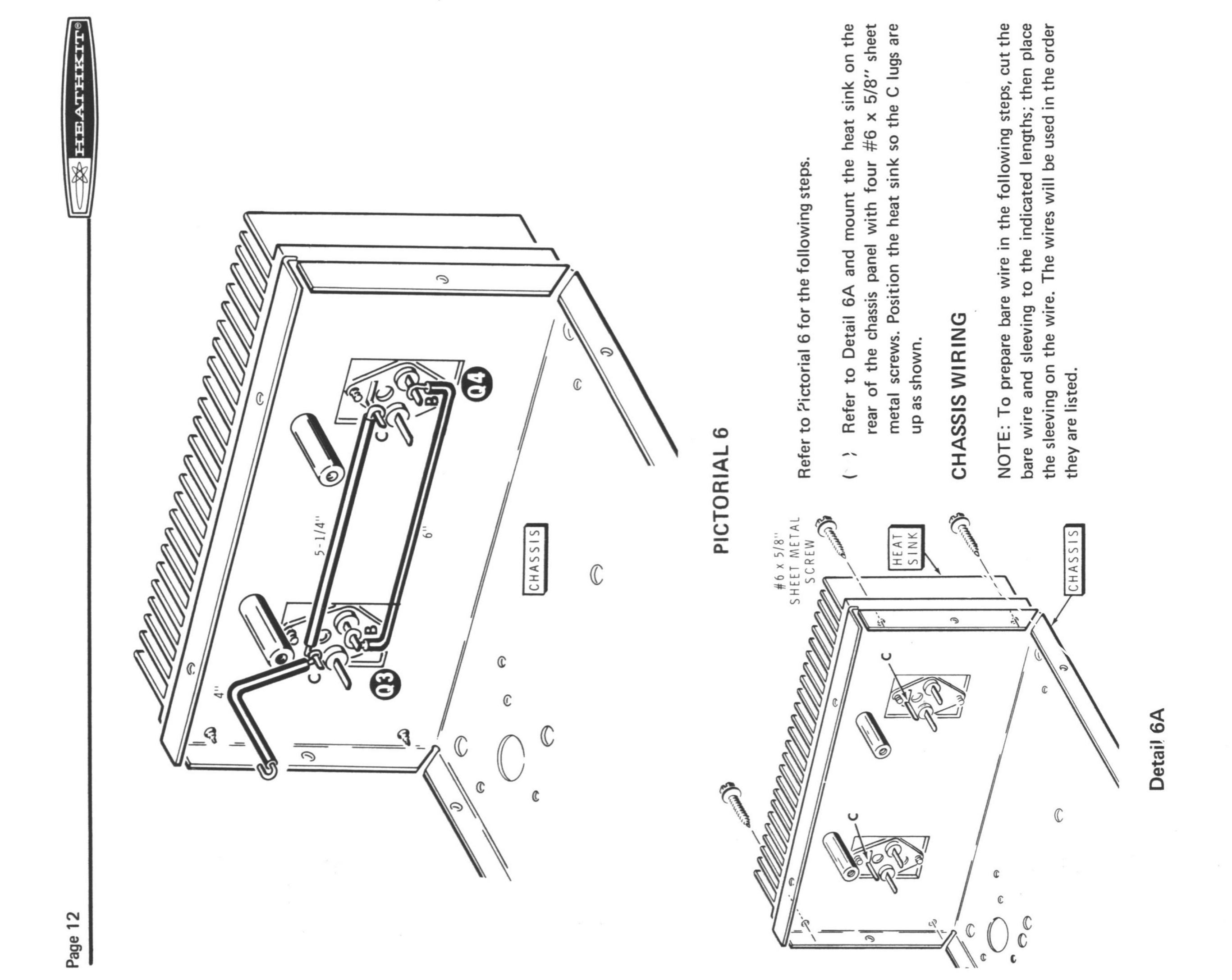
6-32 x 3/8"

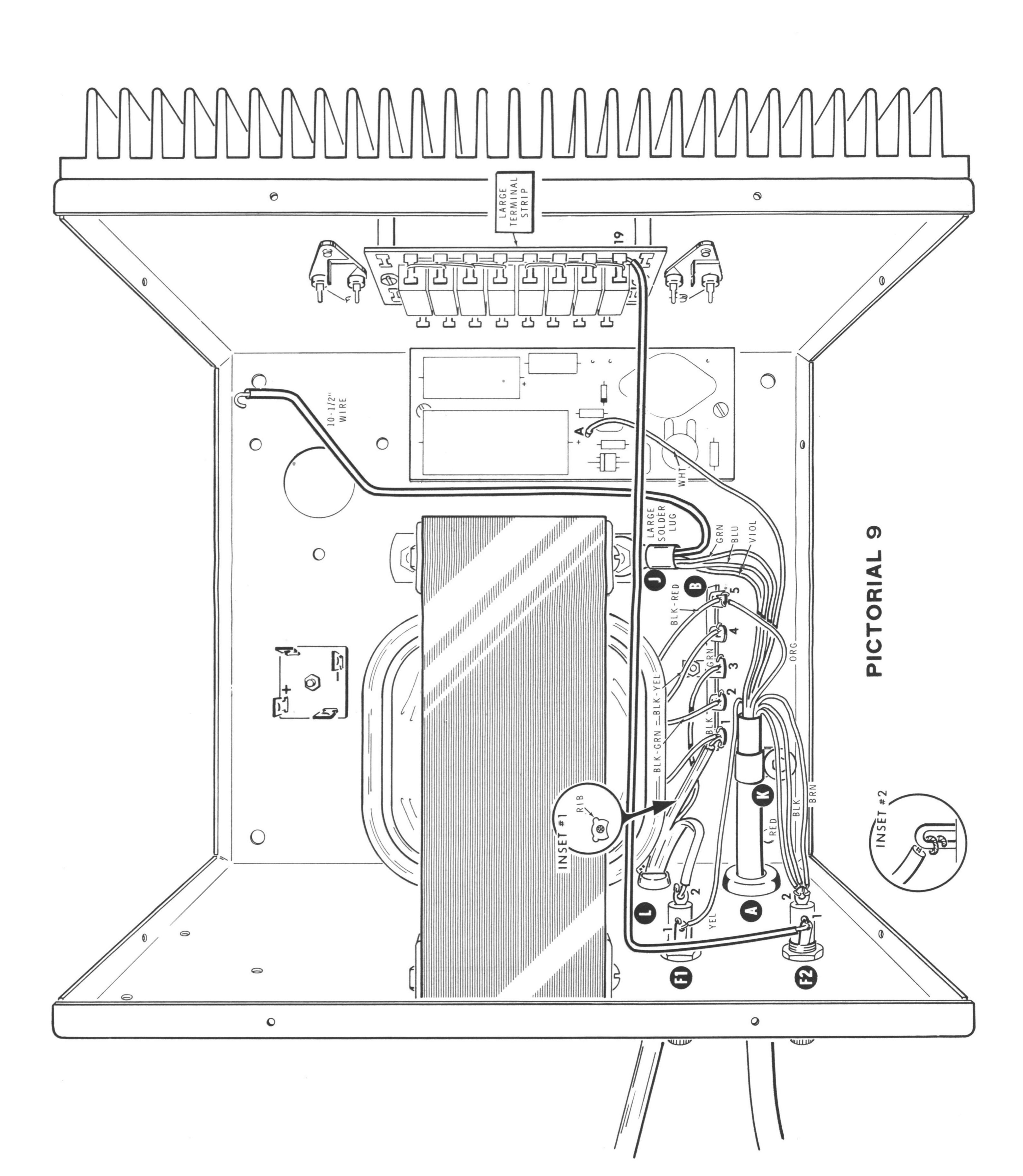
6-32 x 3/8" SCREW

Detail 4E

Detail 5A









Prepare the following lengths of wire and sleeving.

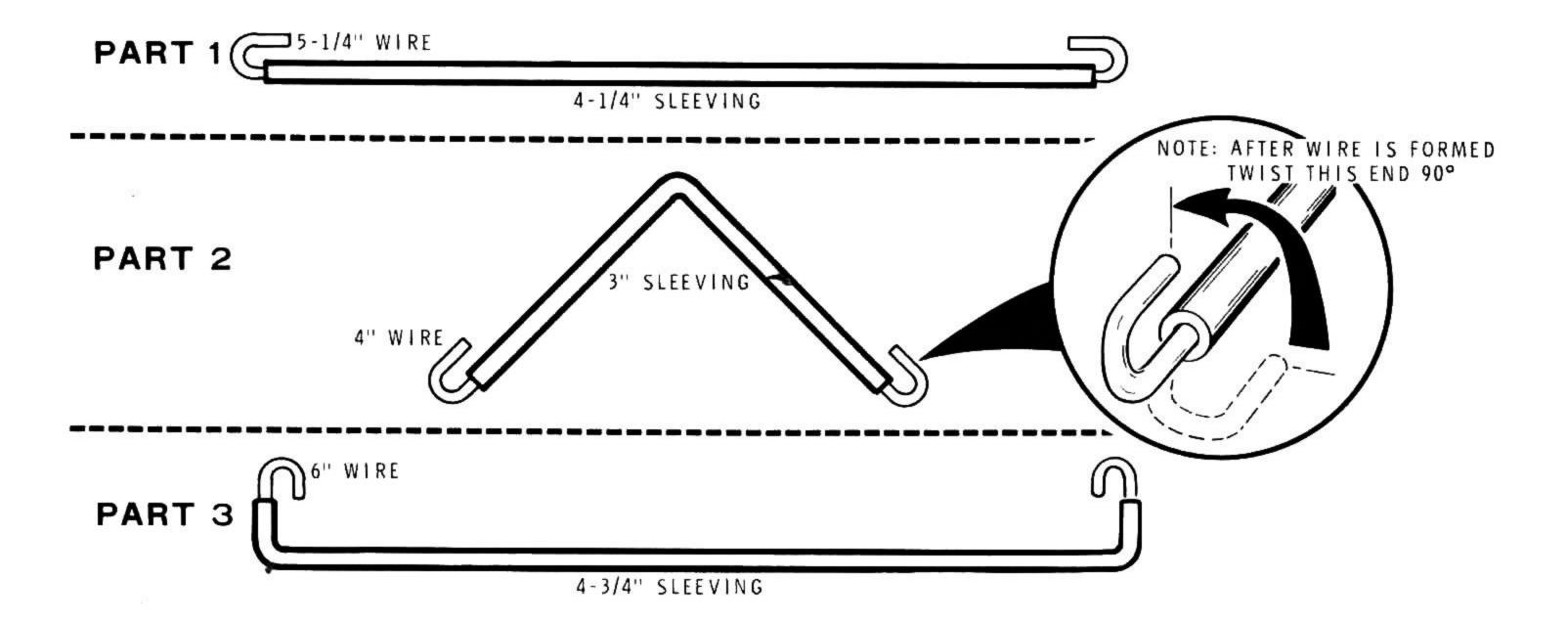
		WIRE	SLEEVING
()	5-1/4"	4-1/4"
()	4"	3"
()	6"	4-3/4"
()	13"	9-1/2"
()	3"	1"
()	3-1/4"	1-1/4"

NOTE: As you install each wire, form the wire to the respective outline given in Detail 6B. Be careful not to damage the connecting lugs.

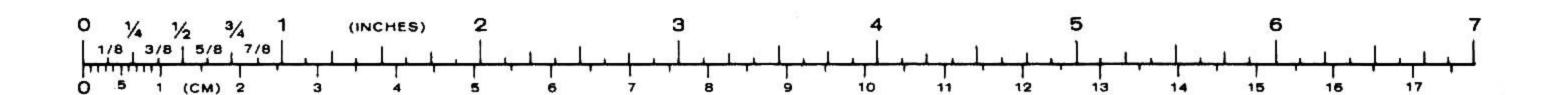
() Refer to part 1 and form the 5-1/4" wire as shown.

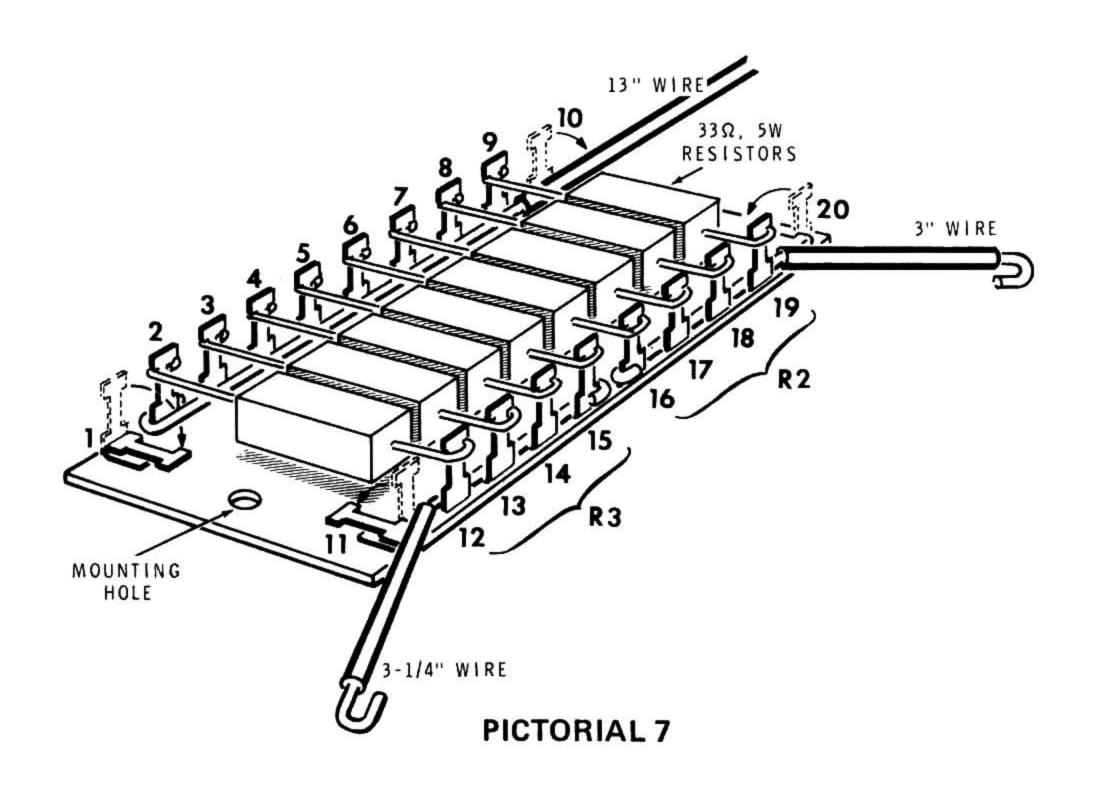
NOTE: In the following steps, (NS) means not to solder because other wires will be added later. "S—" with a number, such as (S-3), means to solder the connection. The number following "S" tells how many wires are at the connection. Use special care when you solder these connections. Apply enough heat and solder so that each wire is properly soldered.

- () Connect this 5-1/4" wire between Q3 lug C (NS) and Q4 lug C (NS).
- () Refer to part 2 and form the 4" wire as shown.
- () Connect this wire to Q3 lug C (S-2).
- () Refer to part 3 and form the 6" wire as shown.
- () Connect this wire between Q3 lug B (S-1) and Q4 lug B (NS). Be careful you do not solder the transistor pins to the socket lugs.



Detail 6B





Refer to Pictorial 7 in the following steps.

() Locate the terminal board and bend over the lug at each corner (lugs 1, 10, 11, and 20).

Form the following wires as shown in Detail 7A.

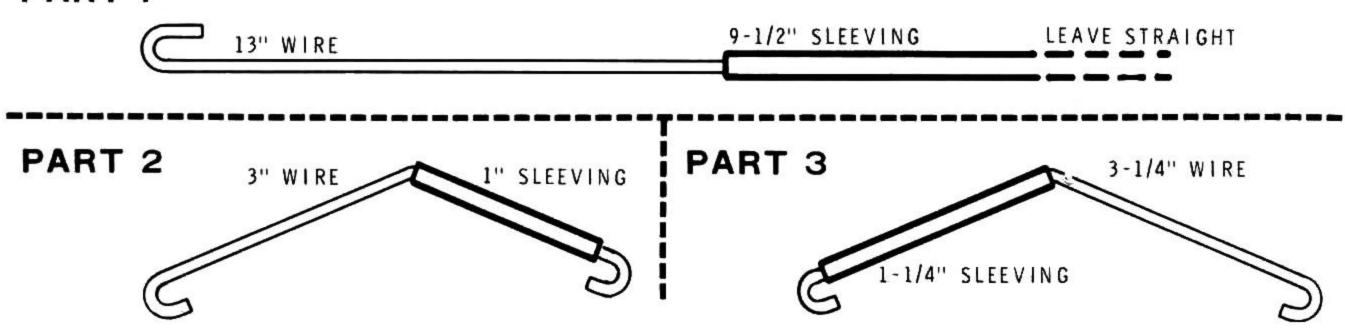
- () Refer to part 1 and form a 13" length of wires as shown.
- () Connect the 13" wire to one row of lugs (2 through 9) on the terminal board; solder the wire to each lug.
- () Refer to part 2 and form the 3" wire as shown.

-) Connect this wire to lugs 16, 17, 18, and 19 on the terminal board; solder the bare wire to each lug.
-) Refer to part 3 and form the 3-1/4" wire as shown.
- Connect this wire to lugs 12, 13, 14, and 15 on the terminal board; solder the bare wire to each lug.

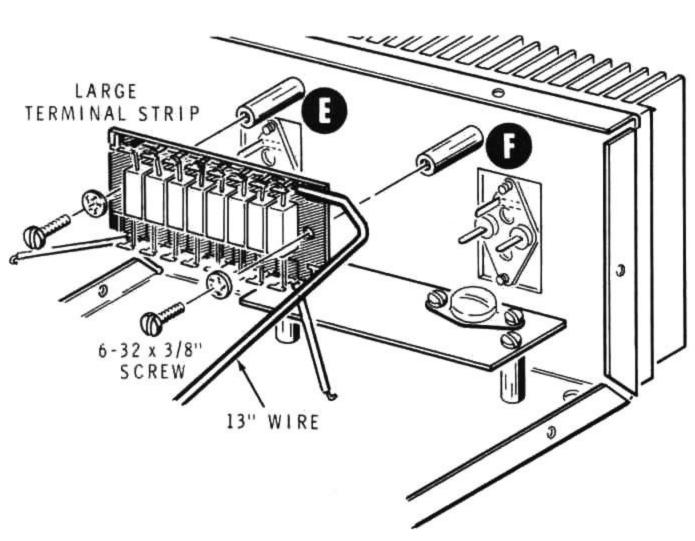
NOTE: Resistors R2 and R3 are made up four resistors each.

 R2, R3: Connect a .33 Ω, 5-watt resistor between lugs 2 and 12 as shown. In a similar manner, connect seven .33 Ω, 5-watt resistors as shown. Position the resistors up off of the terminal board and the end resistors away from the mounting holes. Solder the resistors as you install them.

PART 1



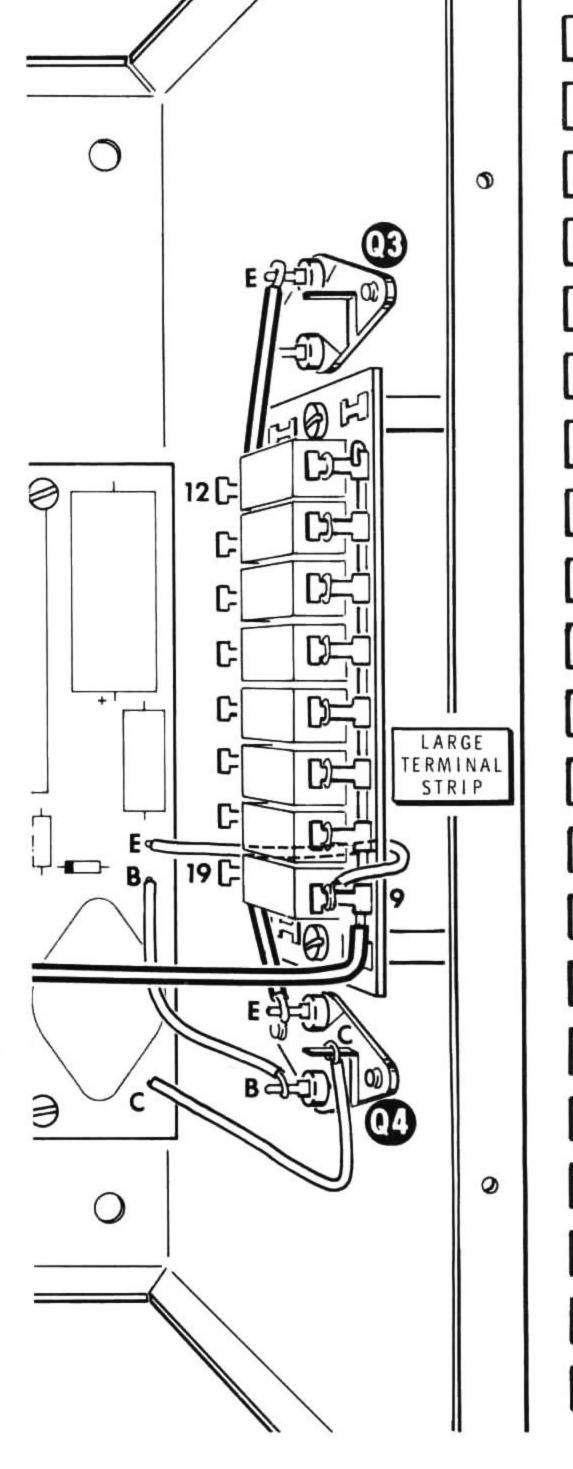
Detail 7A



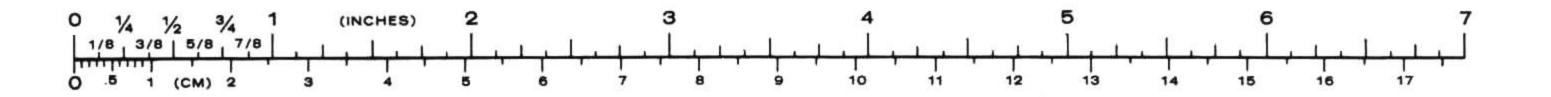
Detail 8A

Refer to Pictorial 8 for the following steps.

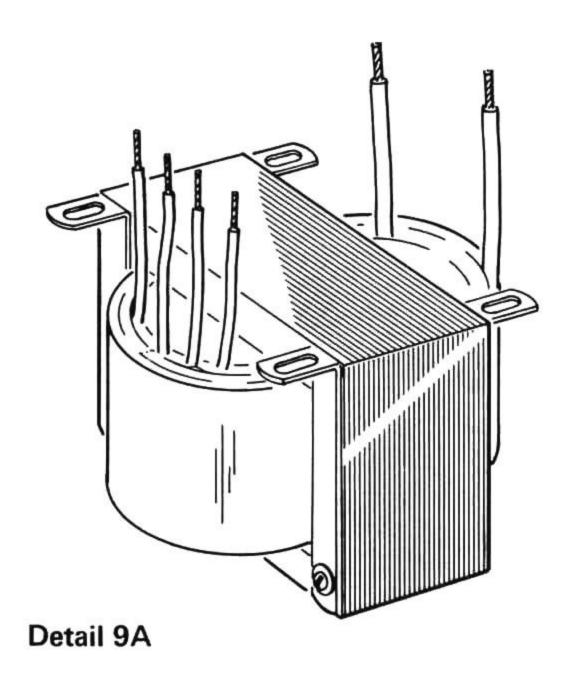
- () Position the terminal board on the spacers at E and F. Form the short wires from the terminal board so the wire ends fit over Q3 lug E, and Q4 lug E.
- () Refer to Detail 8A and mount the terminal board to spacers E and F with 6-32 x 3/8" screws and #6 lockwashers. Form the 13" wire as shown.
- Connect the wire coming from large terminal strip lug 12 to Q3 lug E (S-1).
- () Connect the wire coming from the large terminal strip lug 19 to Q4 lug E (S-1).
- () Connect the wire coming from circuit board hole C to Q4 lug C (S-2).
- () Connect the wire coming from circuit board hole B to Q4 lug B (S-2).
- Connect the wire coming from circuit board hole E to terminal board lug 9 (S-1). Note, other wires have already been soldered to this lug.



PICTORIAL 8

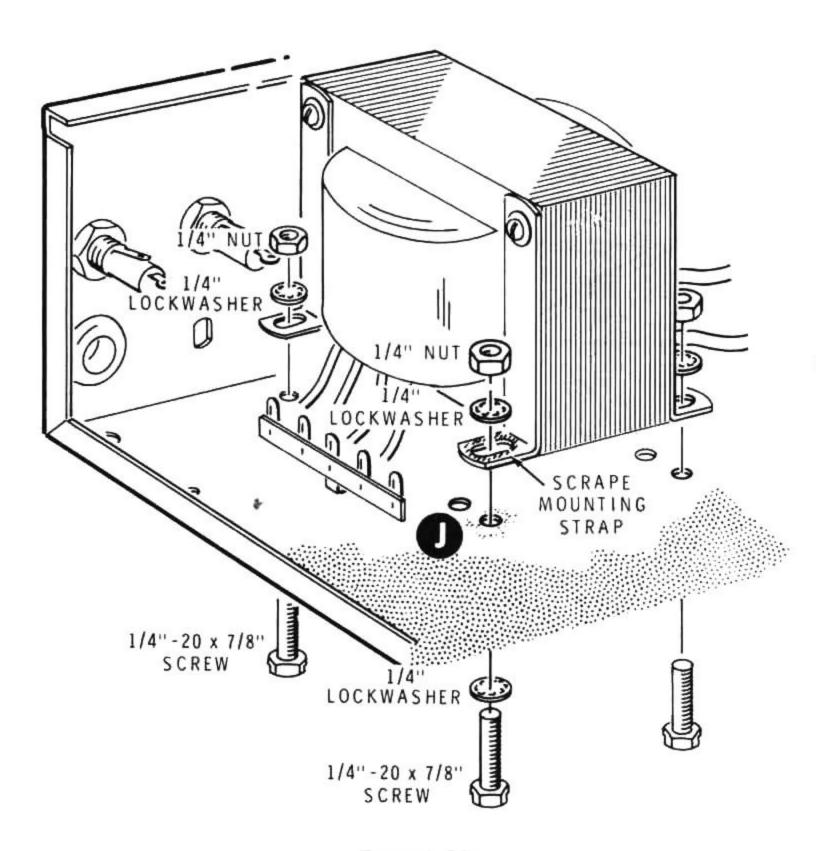






Refer to Pictorial 9 (fold-out from Page 12) for the following steps.

() Refer to Detail 9A and straighten the transformer leads as shown.

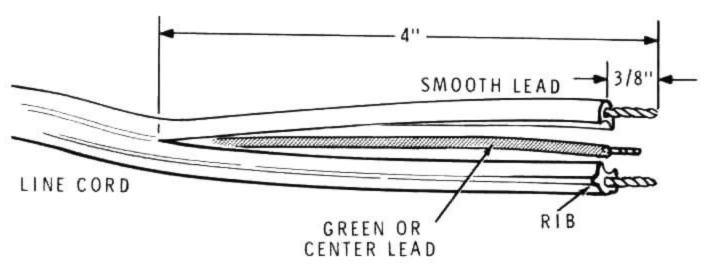


Detail 9B

- Refer to Detail 9B and scrape the top and bottom areas of the indicated transformer mounting strap.
- () Mount the transformer with 1/4" 20 x 7/8" hardware; position the transformer and leads as shown, and slide the transformer in from the side. Note the extra lockwasher at hole J and disregard the two unused holes.

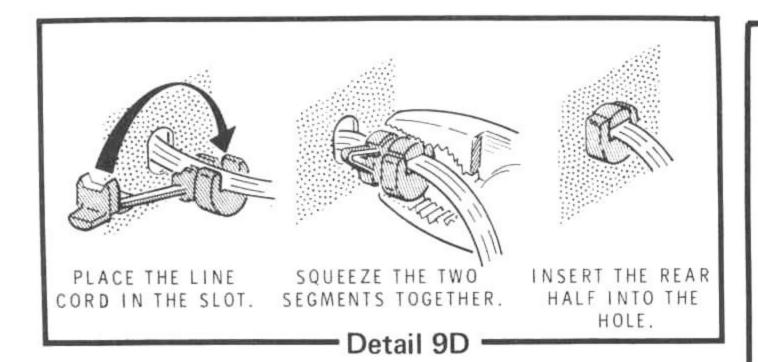
NOTE: Refer to inset drawing #2 and make mechanically secure connections as you wire the transformer and line cord in the following steps.

- () Connect the black-red transformer lead to lug 5 of terminal strip B (NS).
- () Connect the black-yellow transformer lead to lug 4 of terminal strip B (NS).
- Connect the black-green transformer lead to lug 2 of terminal strip B (NS).
- Connect the black transformer lead to lug 1 of terminal strip B (NS).

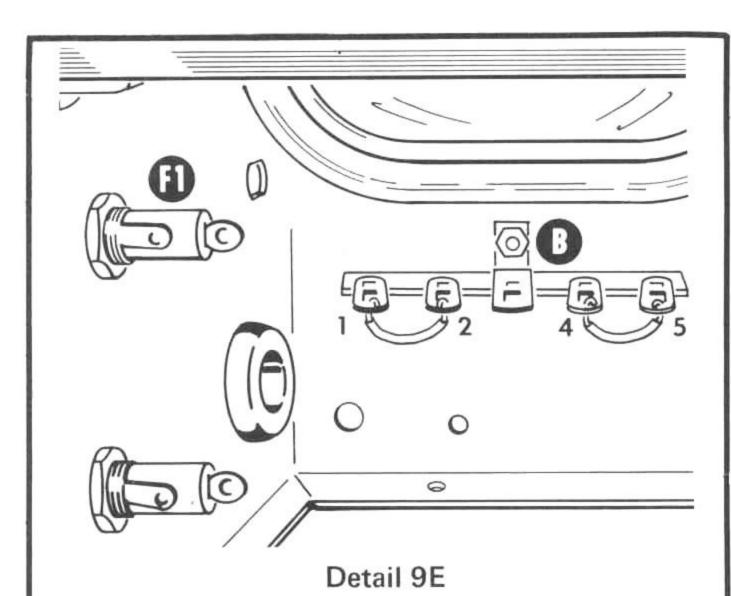


Detail 9C

- () Refer to Detail 9C and separate the wires at the free end of the line cord 4". Prepare the wire ends as shown. Note that there is a smooth lead and a ribbed lead as shown in inset drawing #1.
- Insert the prepared end of the line cord through hole L and connect the smooth lead to fuseholder F1 lug 2 (S-1). Make a mechanically secure connection.
- Securely connect the ribbed lead to terminal strip B lug 1 (NS).
- Securely connect the green or center lead to terminal strip B lug 3 (S-1).
- () Refer to Detail 9D and install a strain relief on the line cord at hole L.



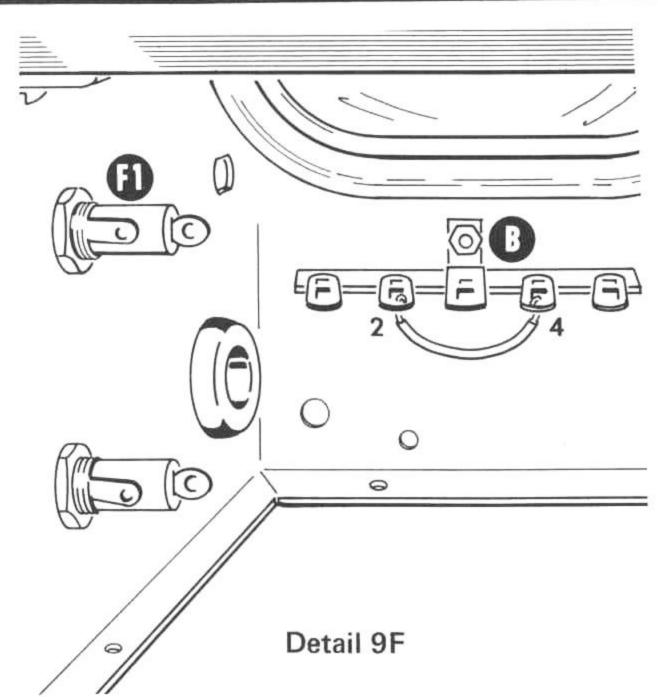
NOTE: Two different sets of wiring instructions are given in the following steps. One set of instructions is for 120-VAC line voltage (most often used in the United States), and the other is for 240-VAC line voltage. Use only the instructions that agree with the line voltage in your area. The 7-ampere fuse supplied with this kit is for 120-VAC use only.



For 120 VAC Only

Refer to Detail 9E for the following steps.

-) Prepare two 2" lengths of brown wire.
- () Connect a 2" wire between lugs 1 (S-3) and 2 (S-2) of terminal strip B.
- () Connect the other 2" wire between lugs 4 (S-2) and 5 (NS) of terminal strip B.
- F1: Turn the fuseholder cap counterclockwise and install a 7-ampere fuse.



For 240 VAC Only

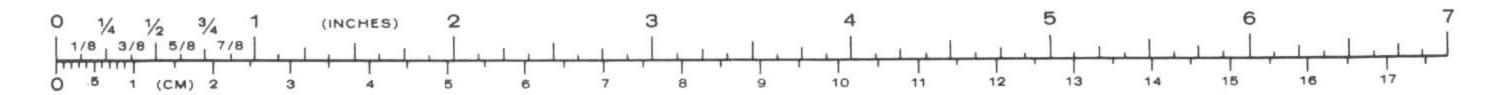
Refer to Detail 9F for the following steps.

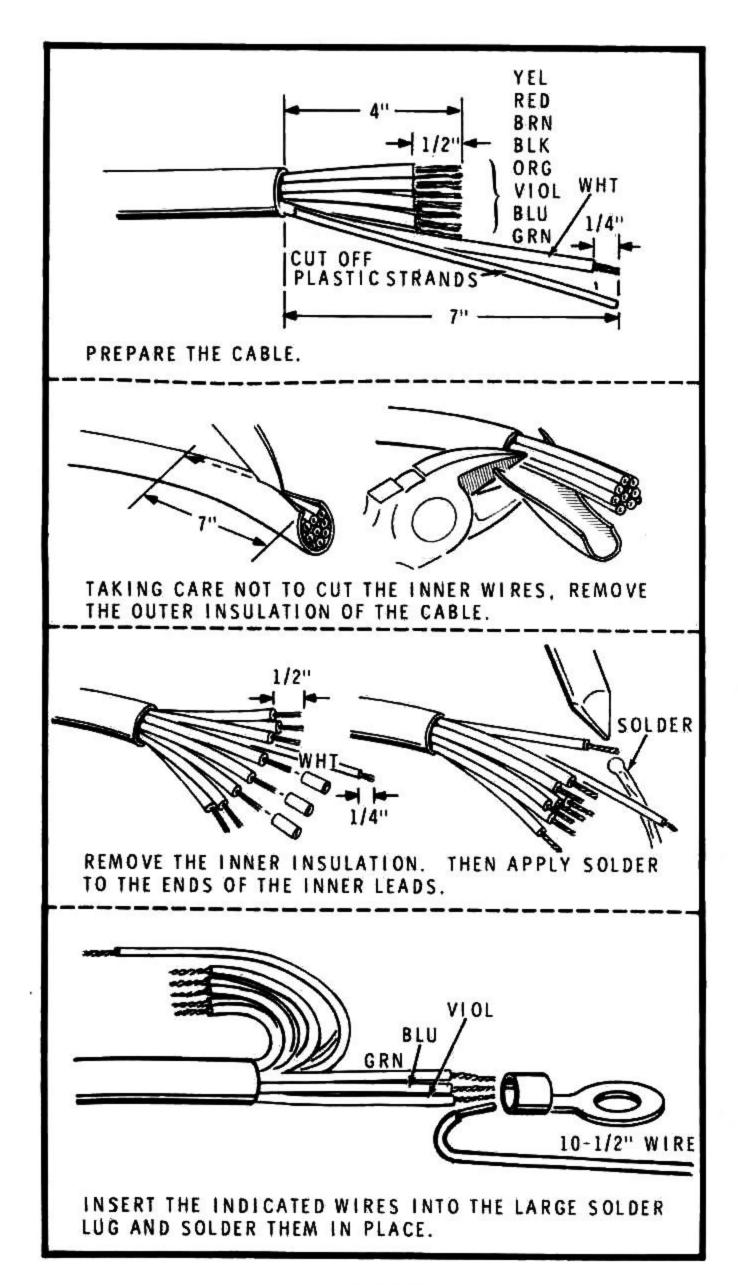
- Prepare a 2" length of brown wire and connect it between lugs 2 (S-2) and 4 (S-2) of terminal strip B.
- Solder the wires connected to lug 1 (S-2) of terminal strip B.
- F1: Turn the fuseholder cap counterclockwise and install a 4-ampere fuse (not supplied).

NOTE: The plug on the power cord in this kit is for standard 120 VAC outlets. For 240 VAC operation in the U.S.A., cut off the plug and replace it with a permanent plug that matches your 240 VAC receptacle. Be sure your power connection conforms with section 210-21 (b) of the National Electric Code, which reads in part:

"Receptacles connected to circuits having different voltages, frequencies, or types of current (AC or DC) on the same premises shall be of such design that attachment plugs used on such circuits are not interchangeable."

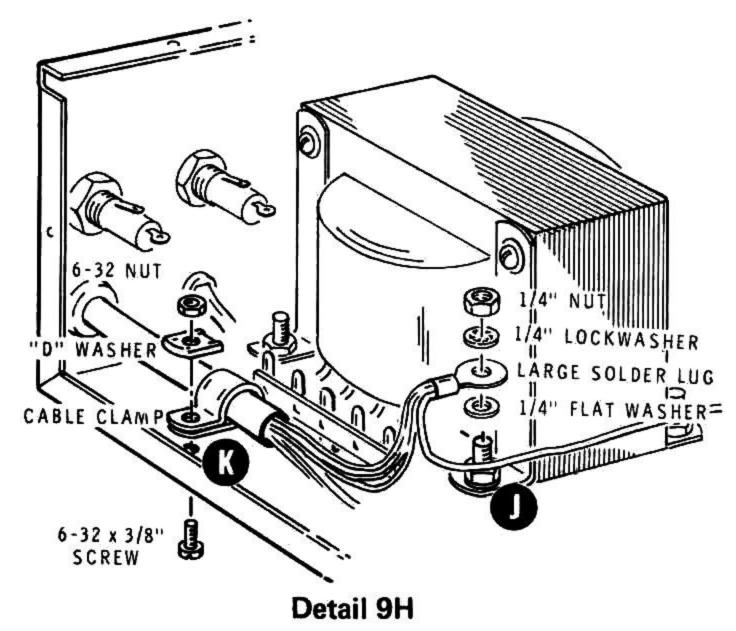
When you install a new plug, make sure you connect it according to your local electrical code. Keep in mind that the green, or center, line cord wire is connected to the power supply chassis.





Detail 9G

- () Insert one end of the cable through grommet A.
- () Refer to Detail 9G and prepare the cable as shown.
- () Cut a 10-1/2" length of bare wire. Place a 9-3/4" length of sleeving on this wire.
- () Refer to Pictorial 9 and form the wire as shown.
- () Connect the green, blue, violet cable wires and the prepared 10-1/2" wire into the large solder lug (S-4).



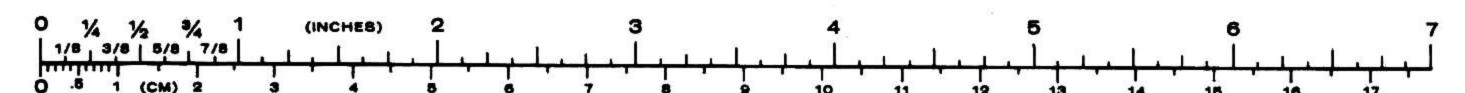
- () Refer to Detail 9H and mount the large solder lug at J with a 1/4" nut, 1/4" lockwasher, and 1/4" flat washer.
- () Mount a cable clamp at K on the cable with 6-32 x 3/8" hardware and a "D" washer as shown.

Connect the cable wires as follows:

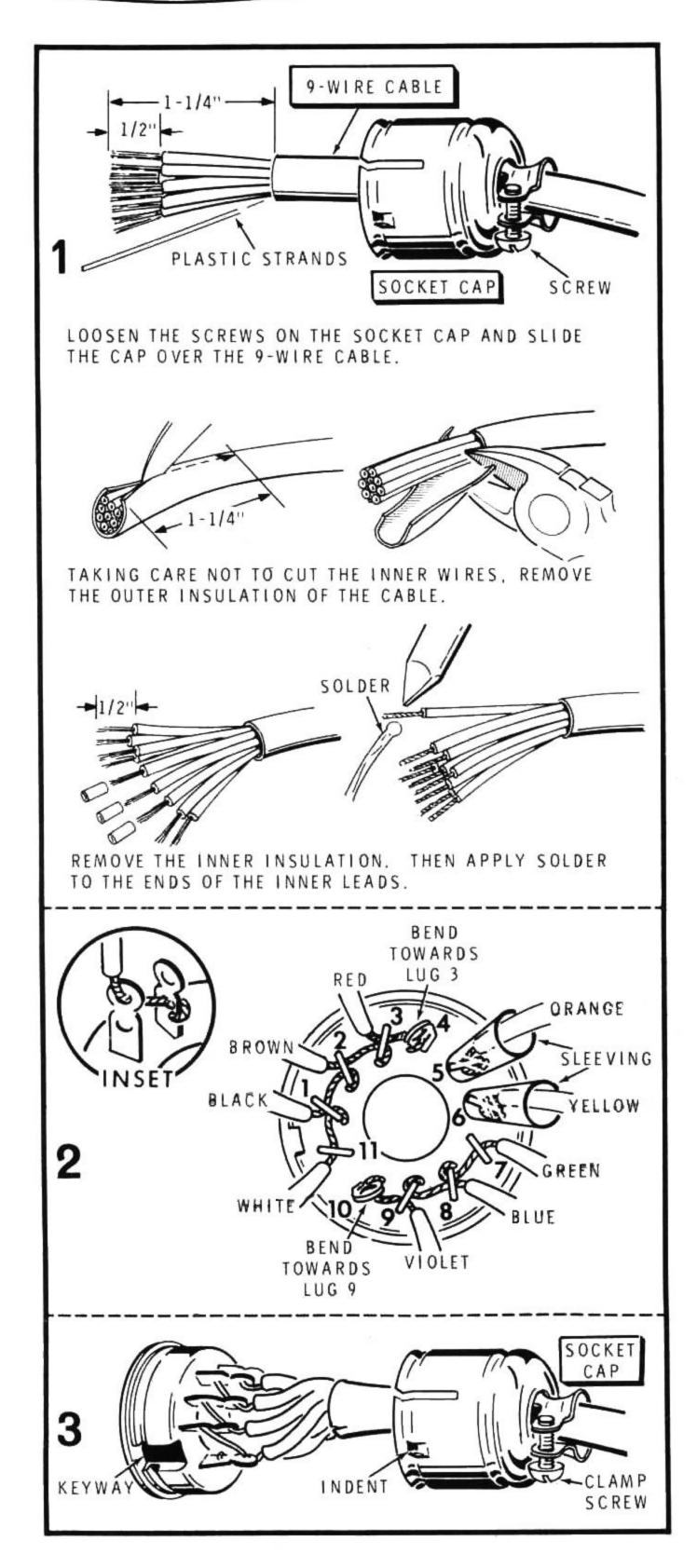
- () White to circuit board connector pin A (S-1).
- () Yellow to fuseholder F1 lug 1 (S-1).
- () Orange to terminal strip B lug 5 (S-3). (S-2 for 240 VAC.)
- () Red to fuseholder F2 lug 2 (NS).
- () Black to fuseholder F2 lug 2 (NS).
- () Brown to fuseholder F2 lug 2 (S-3).
- () Connect the 13" solid wire from the terminal board to fuseholder F2 lug 1 (S-1).

Refer to Pictorial 10 for the following steps.

- () Refer to part 1 and prepare the free end of the cable. Cut off the small black plastic strands.
- () Place the socket cap on the cable.







PICTORIAL 10

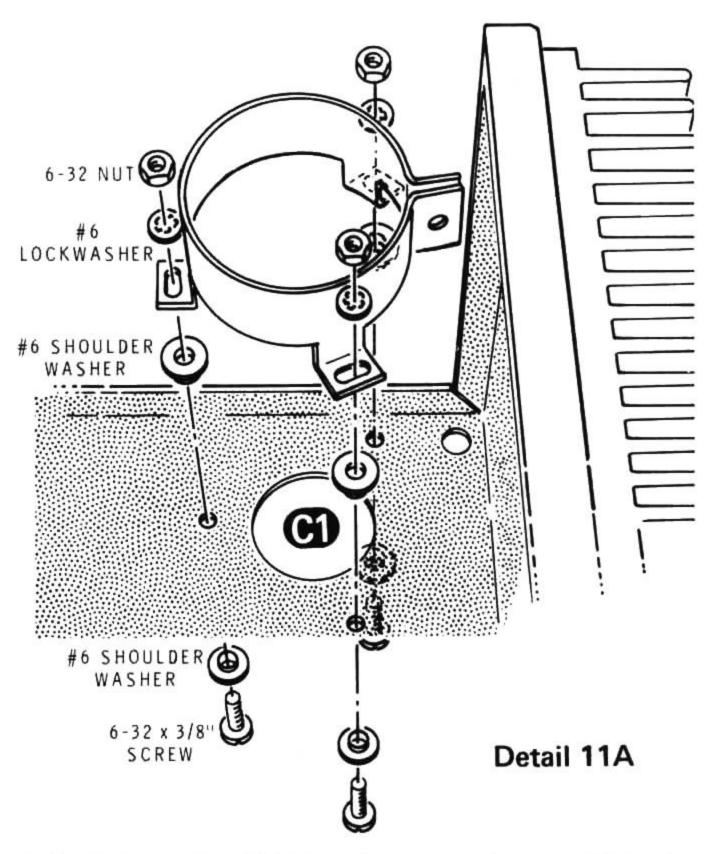
) Locate the clear sleeving and cut if in half. Place these lengths on the orange and yellow wires.

- () Refer to Part 2 of the Detail and the inset and connect the wires to the socket lugs as shown. Solder the wires at each lug.
- Slide the lengths of insulation down over the connections at lugs 5 and 6.
- () Refer to Part 3 of the Detail, line up the socket cap indent with the socket keyway, and press the cap onto the socket. Then tighten the clamp screws.

Refer to Pictorial 11 (fold-out from Page 23) for the following steps.

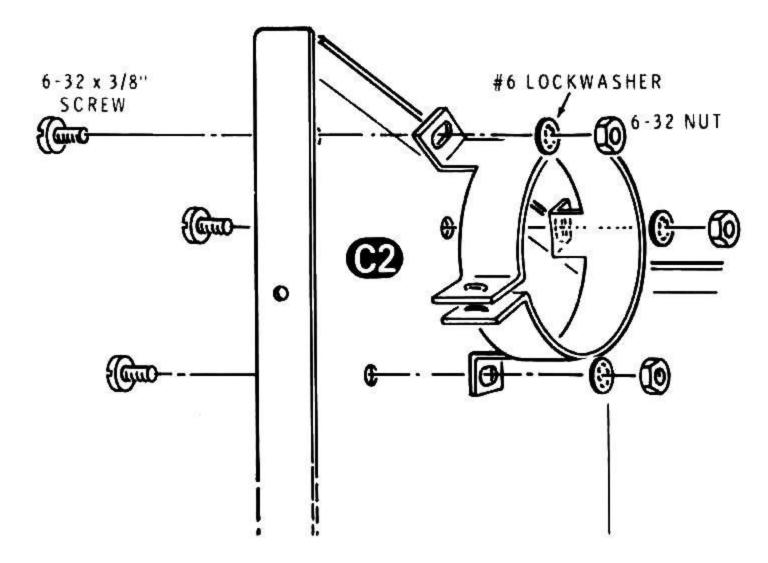
- () Position the chassis as shown.
- Connect one transformer white lead to bridge rectifier BR1 lug 2 (S-1). Wrap the lead on the lug.
- () Connect the other transformer white lead to bridge rectifier BR1 lug 4 (S-1). Wrap the lead on the lug.

NOTE: In the following steps, do not tighten the clamp hardware until the steps indicate.



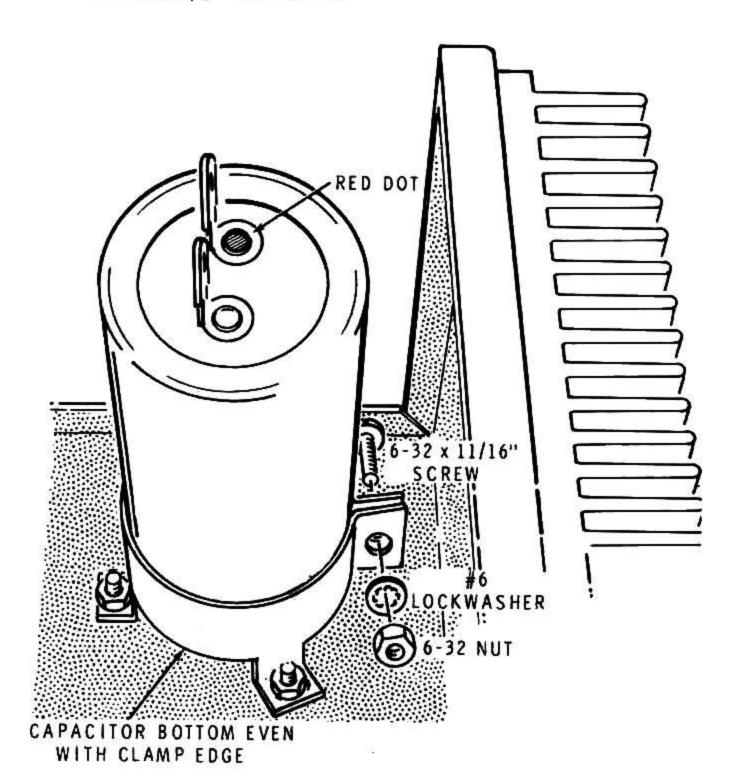
() Refer to Detail 11A and mount a clamp at C1 in the position shown. Use 6-32 x 3/8" hardware and six #6 fiber shoulder washers.





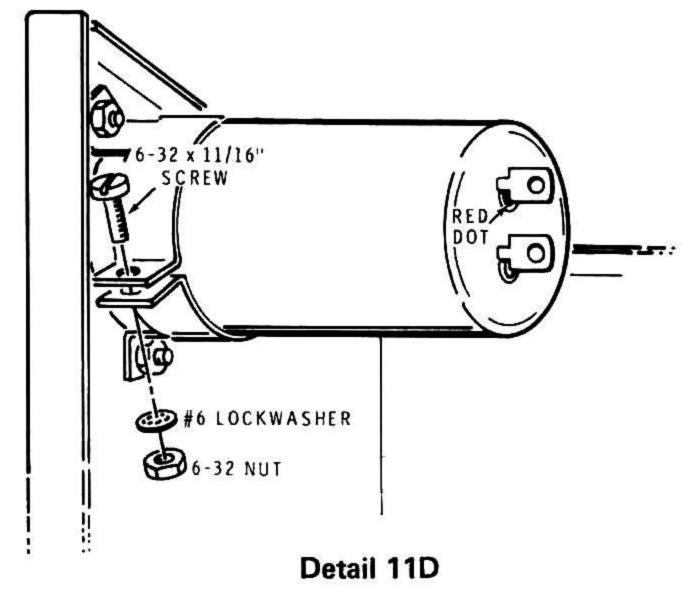
Detail 11B

- () Install 6-32x 11/16" hardware in each clamp.
- Refer to Detail 11B and mount a clamp at C2 with 6-32 x 3/8" hardware.



Detail 11C

- () C1: Refer to Detail 11C and install a 10,000 μF electrolytic capacitor in the clamp at C1. Position the capacitor bottom even with the clamp edge and the red dot to the chassis side edge as shown. Tighten the clamp screw; then tighten the clamp mounting screws.
- () C2: Refer to Detail 11D and install a 10,000 μF electrolytic capacitor in the clamp at C2. Position the red dot as shown and press the capacitor bottom tight against the chassis. Tighten the clamp screw; then tighten the clamp mounting screws.

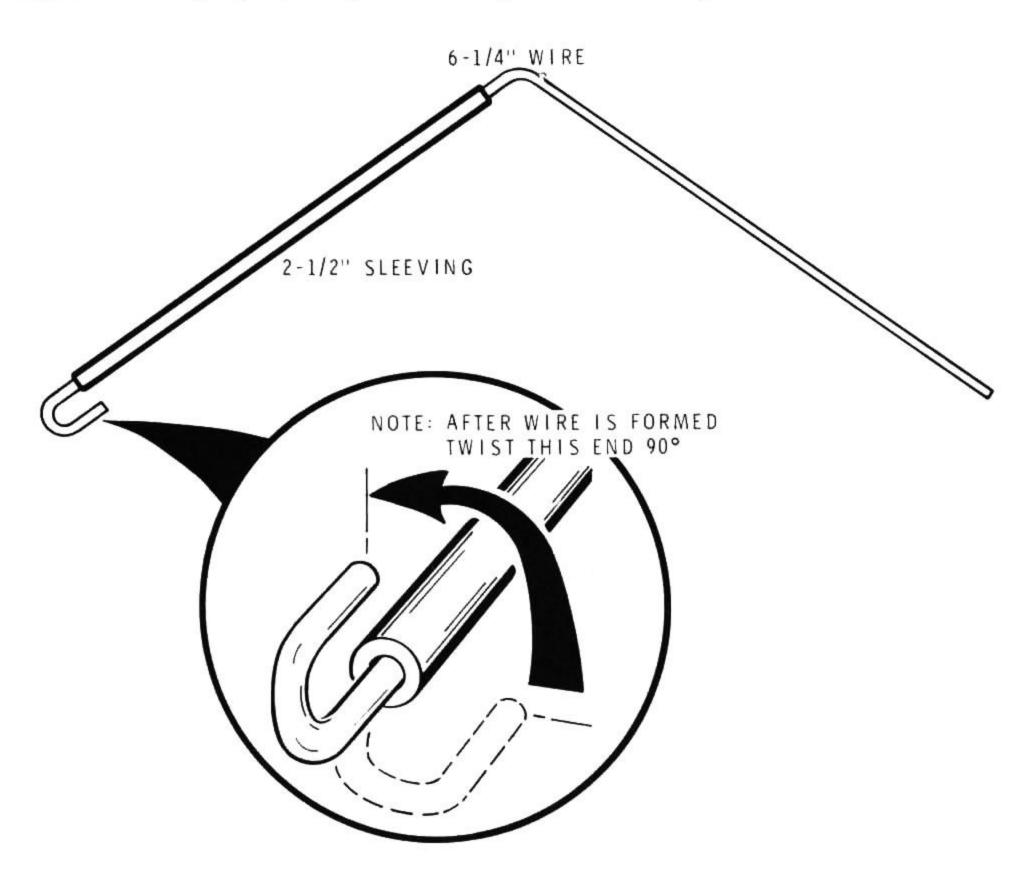


- () Cut two 6-1/4" bare wires. Place one 2-1/2" length of sleeving on each wire.
- () Refer to Detail 11E, and form these wires as shown.

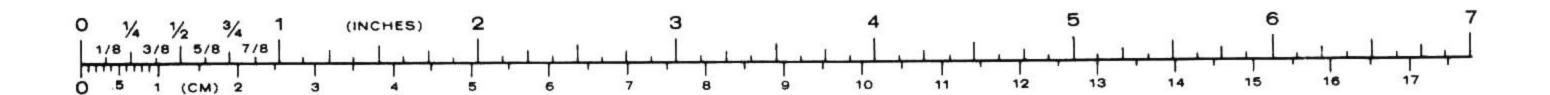
NOTE: Where a wire passes through a connection and then goes to another point, as in the next step, it will count as two wires in the solder instructions (S-2) one entering and one leaving the connection. Be especially careful, when soldering these connections, to apply enough solder and heat to solder these "through wires".

 Connect one wire from bridge rectifier BR1 lug 3 (S-1) through capacitor C2 lug 2 (S-2) to capacitor C1 lug 2

- (NS). Place a 2-1/4" length of sleeving on the portion of wire between the capacitors.
- Connect the 10-1/2" wire coming from the large solder lug as shown in Pictorial 11 to capacitor C1 lug 2 (S-2).
- () Connect the other 6-1/4" wire from bridge rectifier BR1 lug 1 (S-1) through capacitor C2 lug 1 (S-2) to capacitor C1 lug 1 (NS). Place a 2-1/4" length of sleeving on the portion of wire between the capacitors.
- Connect the wire coming from Q3 lug C to capacitor C1 lug 1 (S-2).



Detail 11E



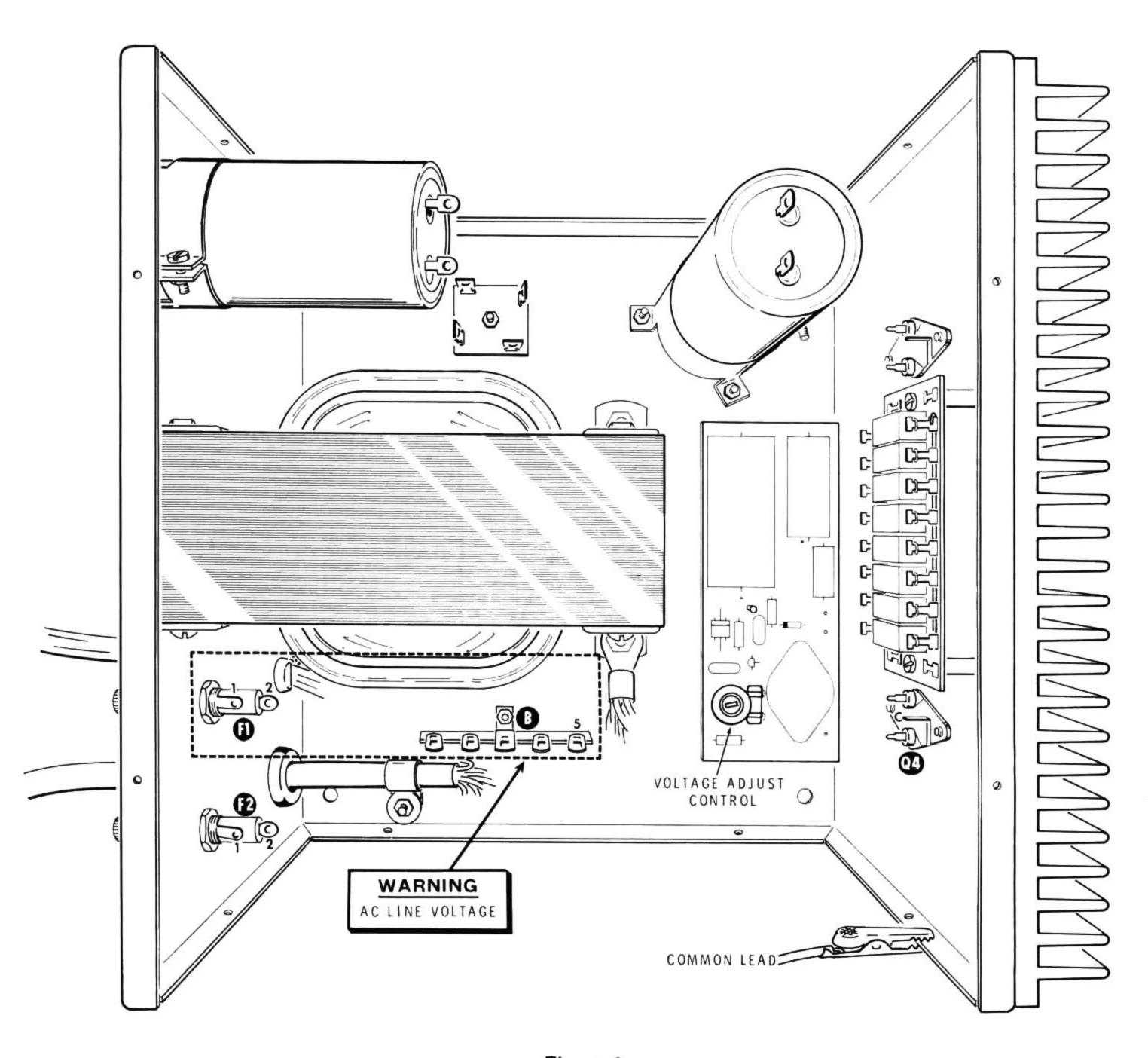


Figure 1



Page 23

EST AND ADJUSTMEN

In the following steps, if you do not obtain the desired results, refer to the "In Case of Difficulty" section and correct the problem before you proceed.

Resistance Checks

If you have a VOM (or VTVM) available, make the following resistance checks before you plug the line cord into an AC outlet.

- Connect the common or ground lead of your meter to the Power Supply chassis. Retain this connection for the following "Test and Adjustment" steps.
- Touch lug C of transistor Q4 with the other meter lead. Be sure a high resistance is indicated between lug C and the chassis.
-) Connect the other meter lead to fuseholder F2 lug 2. You should get a reading of approximately 3000 ohms on RX100 range. Retain this connection for the following step.
- F2: Install a 20-ampere fuse in fuseholder F2. Yo should get a reading of approximately 250 ohms.

Voltage Adjustment

Prepare a 5" brown wire.

(CM)

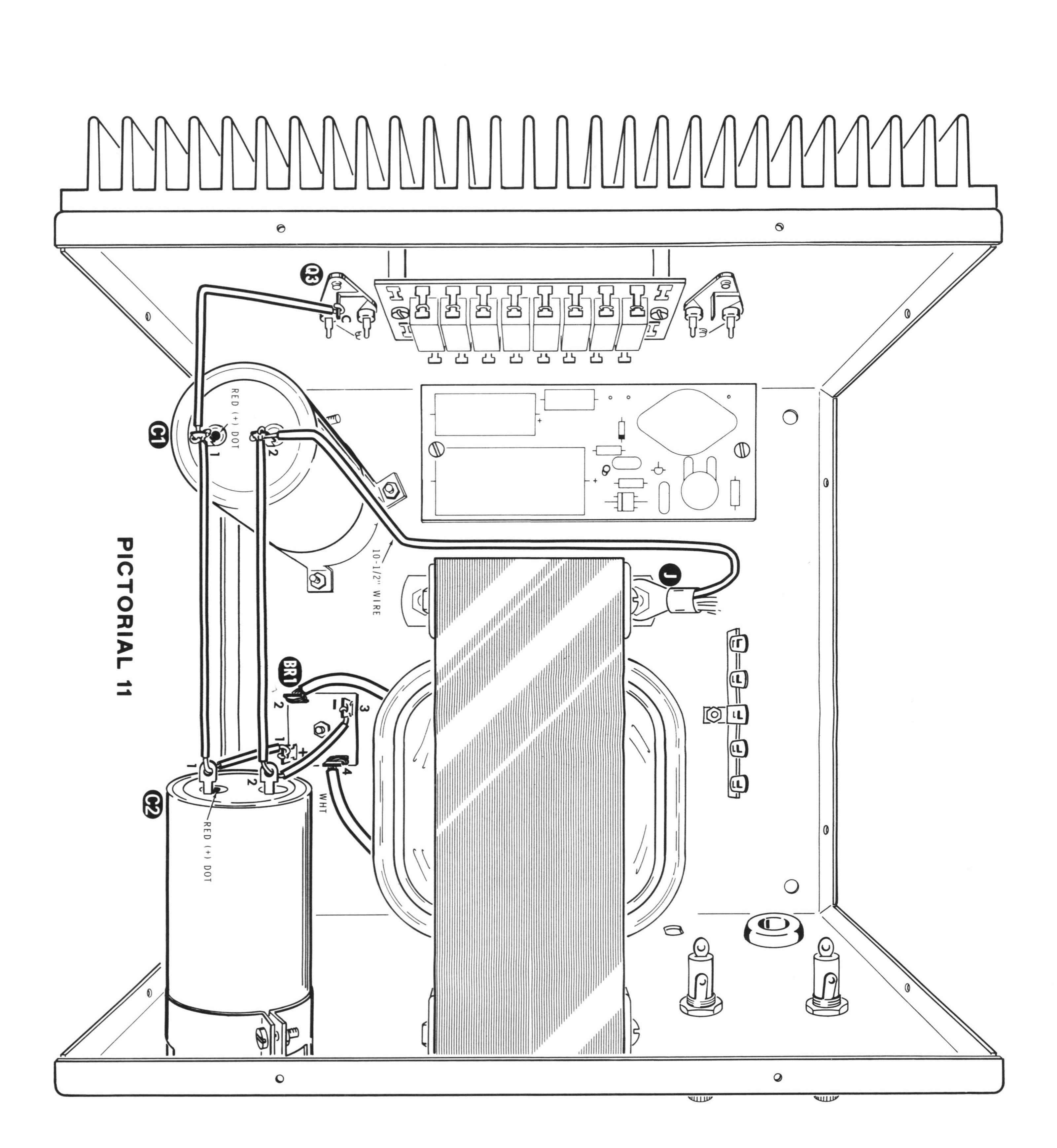
5-

- Temporarily solder this wire between fuseholder Flug 1 and terminal strip B lug 5.
- Adjust the VOM to measure DC voltages in the 15-volt range.
- Connect the positive lead of the VOM to fuseholder F2 lug 2.

CAUTION: When the line cord is connected to an AC outlet, AC voltage will be present at several places on the chassis, as shown in Figure 1. Be careful you do not contact this voltage because an electrical shock will result.

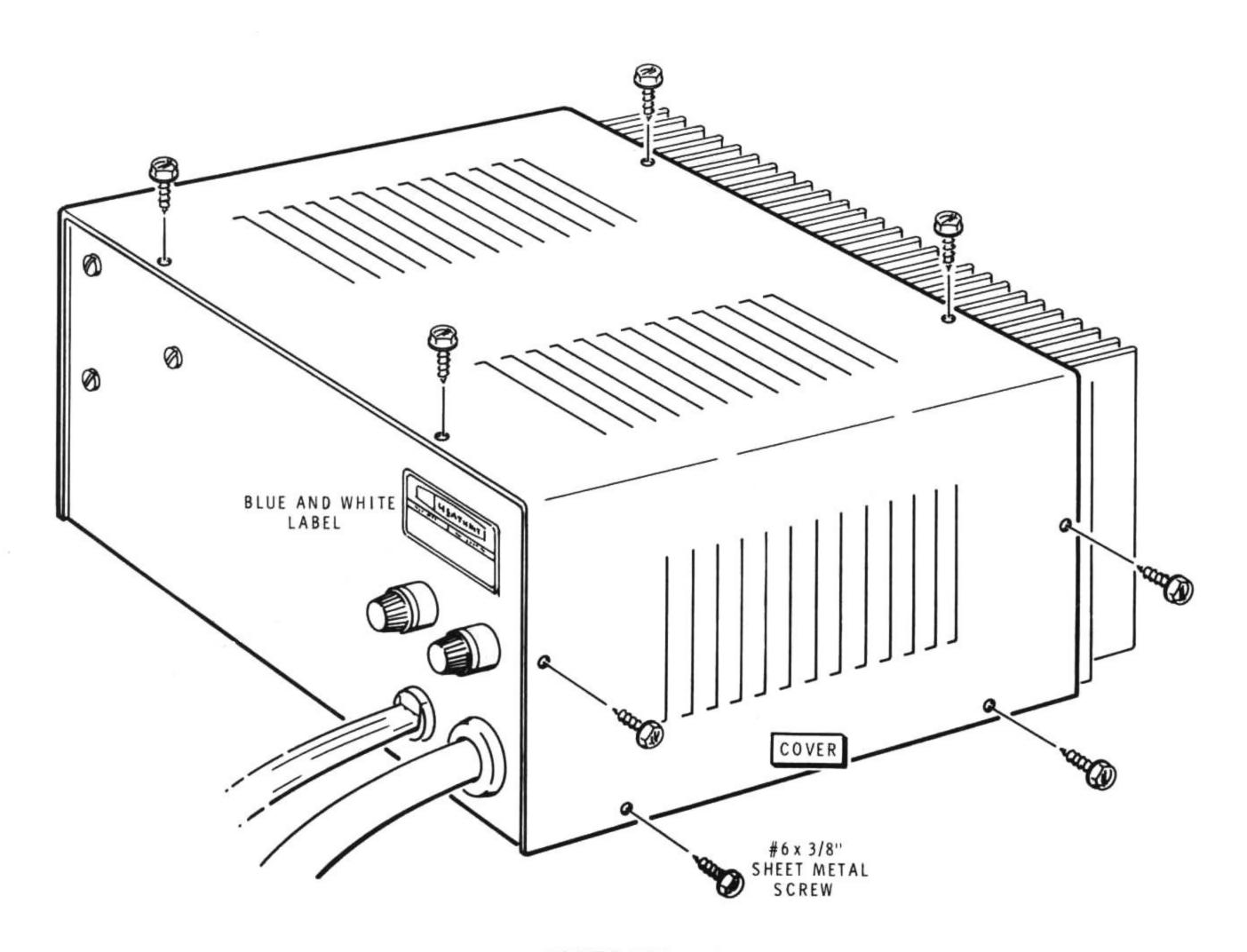
- Plug the line cord into a proper AC outlet. The output should measure between 11 and 15 VDC.
- Turn the Voltage Adjust control on the circuit board until the meter indicates +13.8 volts DC.
- () UNPLUG THE LINE CORD.
-) Remove the temporary wire from between fuseholder F1, lug 1 and terminal strip B lug 5.

This completes the "Test and Adjustment" section of Manual. Proceed to "Final Assembly."





FINAL ASSEMBLY



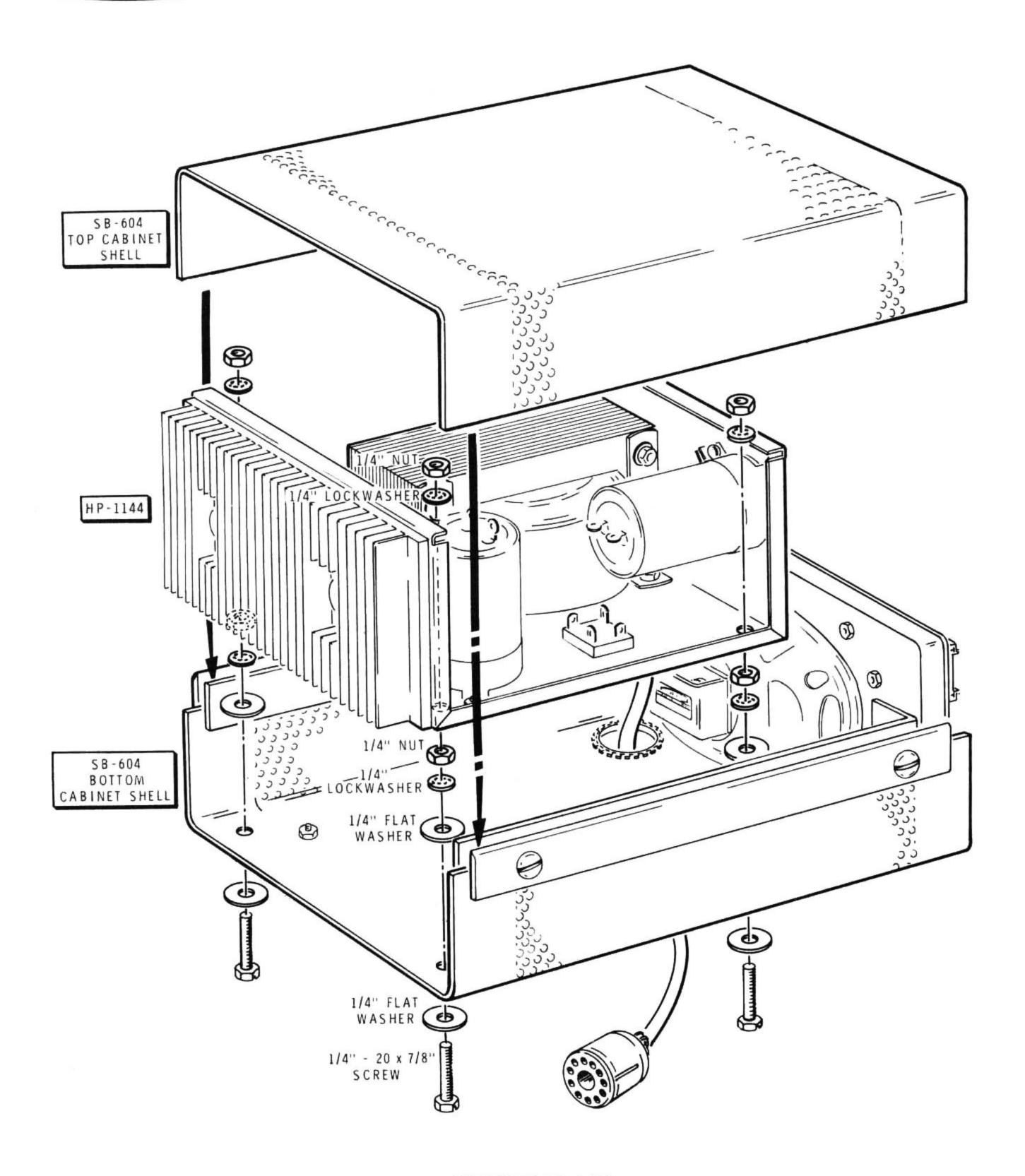
PICTORIAL 12A

This Power Supply is complete with its own cover, or it can be mounted in the SB-604 speaker cabinet. Since the Power Supply cover reduces air circulation, which results in less efficient cooling, we recommend you use only one of the next two steps.

- () Refer to Pictorial 12A and mount the Power Supply cover with twelve #6 x 3/8" sheet metal screws as shown.
- () Refer to Pictorial 12B and mount the Power Supply in the SB-604 speaker cabinet with four 1/4" -20 x 7/8" screws as shown.
- () Carefully peel away the backing paper from the blue and white identification label. Then press the label on the rear of the chassis. Be sure to refer to the numbers on this label in any communications you have with the Heath Company about this kit.

This completes the assembly of your AC Power Supply.





PICTORIAL 12B



OPERATION

The output voltage can be adjusted between approximately 11 and 16 volts DC, as noted in the "Specifications" section. The recommended value for use with the SB-104 Transceiver is 13.8 volts DC. The operation of the AC Power Supply

consists only of connecting the power cable to the SB-104 and the line cord to the proper AC line. The Power Supply will be switched remotely by the SB-104 switch.

IN CASE OF DIFFICULTY

CAUTION: When the line cord is connected to an AC outlet, AC voltage will be present at several places on the chassis. Be careful you do not contact this voltage or an electrical shock can result

- Recheck the wiring. Trace each lead in color pencil on the Pictorial as it is checked. It is frequently helpful to have a friend check your work. Someone who is not familiar with the unit may notice something you have consistently overlooked.
- 2. About 90% of the kits that are returned for repair do not function properly due to poor connections and soldering. Therefore, many troubles can be eliminated by a careful inspection of connections to make sure they are soldered as described in the "Soldering" section of the "Kit Builders Guide." Reheat any doubtful connections. Be sure all the wires are soldered at places where several wires are connected.

- 3. Be sure the transistors and the integrated circuit are in the proper locations (correct part number and type number). Be sure that each transistor lead is in the right hole and has a good solder connection. Check the integrated circuit for proper positioning and for good contact at each pin connection.
- 4. Check capacitor values carefully. Be sure the proper part is wired into the circuit at each capacitor location. Check each electrolytic capacitor to be sure the lead near the positive (+) marking is at the correct position.
- Check each resistor value carefully.
- Be sure the correct diode is installed and that the banded end is positioned correctly.
- Check all component leads connected to the circuit board.
- Make sure bare wires do not touch the chassis or other lugs and make sure all wires are properly soldered.



Troubleshooting Chart

PROBLEM	PROBABLE CAUSE
No output voltage.	1. F1. 2. F2.
Primary fuse F1 blows.	1. Bridge rectifier BR1 assembly. 2. Capacitor C1, C2.
Output fuse F2 blows.	 Excessive loading (keydown). Output shorted.
Unable to obtain +13.8 VDC with Voltage Adjust control.	 IC1. Voltage Adjust control R6. Resistors R5 or R7. D5.
Voltage drops significantly when transmitting.	1. IC1. 2. Q1, Q2, Q3, or Q4.

In an extreme case where you are unable to resolve a difficulty, refer to the "Customer Service" information inside the rear cover of the Manual. Your Warranty is located inside the front cover.



SPECIFICATIONS

Output Voltage	13.8 VDC regulated. (Adjustable from approximately 11 to 16 VDC.)
Maximum Output Current	20 amperes, intermittent, 8 amperes continuous.
Transistor Integrated Circuit and Diode Complement	2N3643 transistor. 2N3055 transistor. 40411 pass transistor (2). MFC6030 regulator IC. 1N4002 silicon diode. MDA990-2 bridge rectifier.
Power Requirements	110 to 130 VAC, 6 amperes; or 220 to 260 VAC, 3 amperes, 50/60 Hz maximum.
Dimensions	5-1/2" high x 9-1/4" wide x 10-1/4" deep.
Regulation	Less than 2% from no load to 20 amperes.
Ripple	Less than 1% at 20 amperes.
Fuses	7-amp, 3AG, slow-blow primary. 20-amp, 3AG, output.
Net Weight	23 lbs. (10.4Kg).

The Heath Company reserves the right to discontinue products and to change specifications at any time without incurring any obligation to incorporate new features in products previously sold.



CIRCUIT DESCRIPTION

Refer to the Schematic Diagram (fold-out from Page 31) as you read the following description.

The 120 VAC (or 240 VAC) line voltage is applied through primary fuse F1 and the power on-off switch (remote SB-104 switch) to the primary winding of power transformer T1. From the secondary winding, the voltage is applied to BR1 — a full wave bridge rectifier circuit. The rectified DC is then filtered by electrolytic capacitors C1 and C2, and applied to the regulator circuitry.

Transistors Q1 and Q2, with Q3 and Q4 form a triple Darlington circuit with exceptionally high gain for good regulation. Transistors Q3 and Q4 are paralleled in a series regulator circuit. The conduction of the Darlington circuit and the output voltage is controlled by the base bias provided by integrated circuit IC1. IC1 with its own zener reference diode, samples the output voltage, compares this to the internal reference voltage, and automatically adjusts the base bias of Q1 as needed to maintain a fixed output level. The output voltage is sampled at the load end of the

power cable, thereby compensating for the voltage drop across fuse F2 and the power cable. This allows almost no change in load voltage from no load to full load conditions.

The regulated output voltage level is adjusted by VOLTAGE ADJUST control R6.

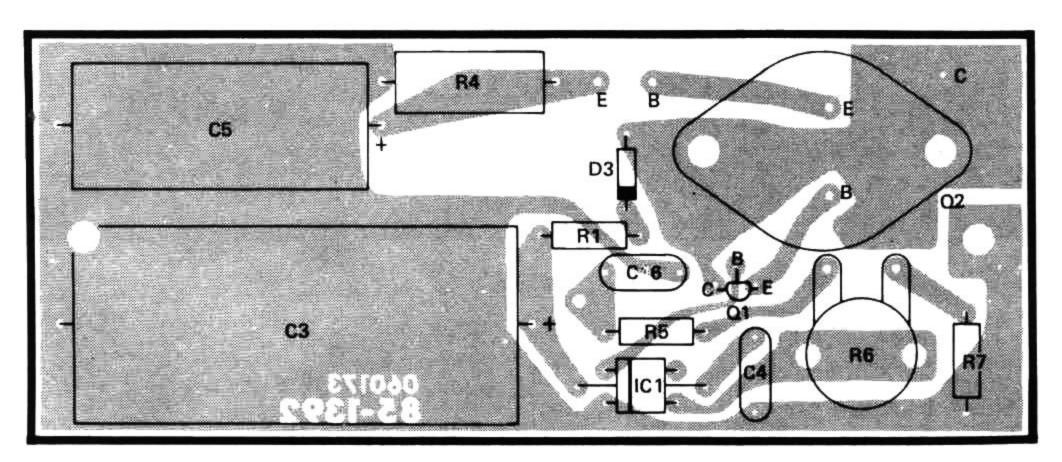
Capacitor C3 provides a nearly pure DC voltage for the integrated circuit regulator, IC1. Diode D5 allows C3 to charge from the power path but does not allow it to discharge back. In this way only the small load of IC1 is placed on C3. R1 prevents excessive current from flowing through D5 when the power supply is turned on.

Resistors R2 and R3 balance the current between the two regulator transistors, Q3 and Q4. Fuse F2 protects the regulators against an overload, and resistor R4 is a bleeder resistor and capacitor C5 provides transient protection for the supply.

CIRCUIT BOARD X-RAY VIEW

NOTE: To find the PART NUMBER of a component for the purpose of ordering a replacement part:

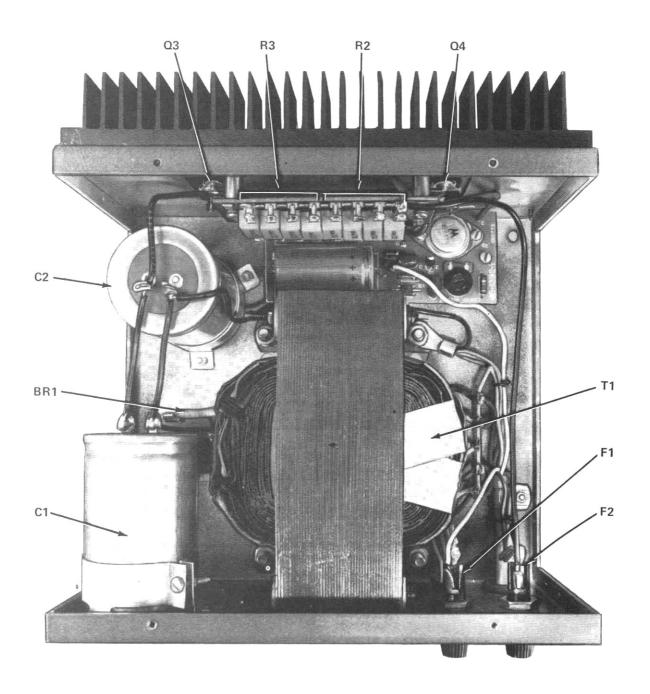
- A. Find the circuit component number (R5, C3, etc.) on the "X-Ray View" or "Chassis Photograph."
- B. Locate this same number in the "Circuit Component Number" column of the "Parts List."
- C. Adjacent to the circuit component number, you will find the PART NUMBER and DESCRIPTION which must be supplied when you order a replacement part.



(Viewed from component side)



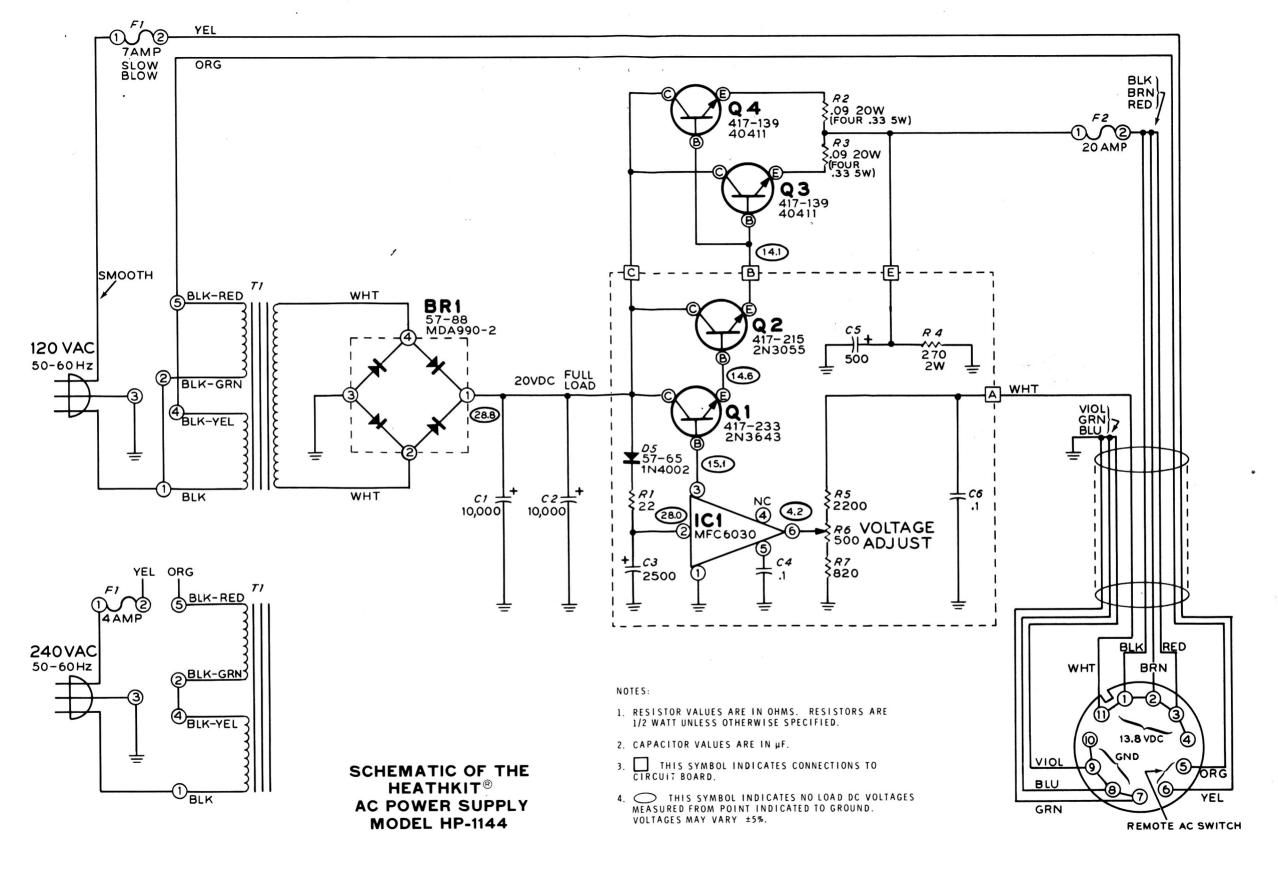
CHASSIS PHOTOGRAPH





SEMICONDUCTOR IDENTIFICATION CHART

COMPONENT NUMBER	HEATH PART NUMBER	REPLACED BY	DESCRIPTION
BR1	57-88	M D A 990 - 2	BRIDGE RECTIFIER
D 5	57-65	1N4002	DIODE
Q 1	417-233	2N3643	TRANSISTOR E BC E BC
Q 2	417-215	2N3055	TRANSISTOR
Q3	417-139	40411	TRANSISTOR
Q 4	417-139	40411	TRANSISTOR
I C 1	442-48	MFC6030	INTEGRATED CIRCUIT



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