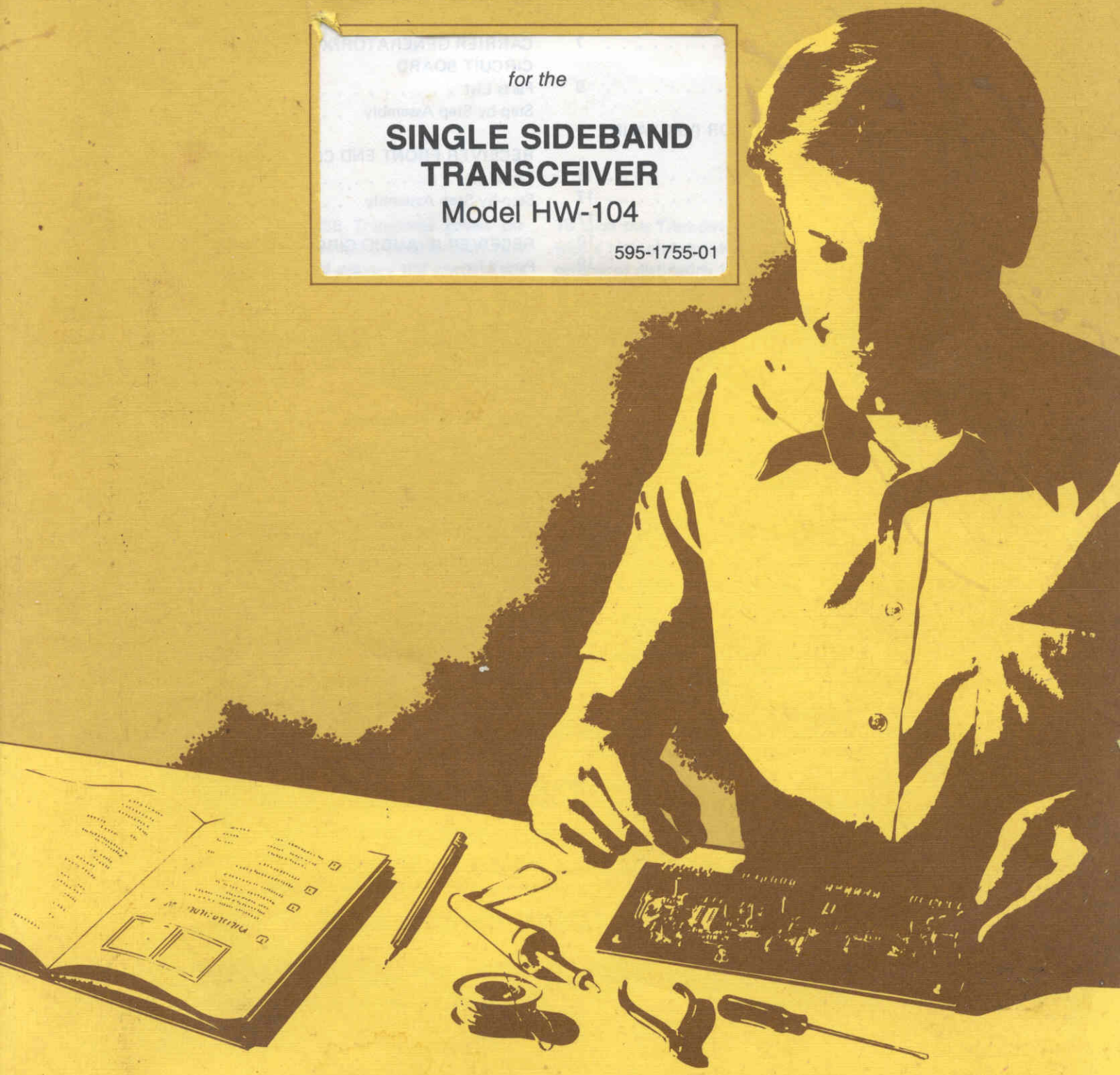
HEATHKIT® MANUAL

for the

SINGLE SIDEBAND TRANSCEIVER

Model HW-104

595-1755-01



HEATH COMPANY • BENTON HARBOR, MICHIGAN

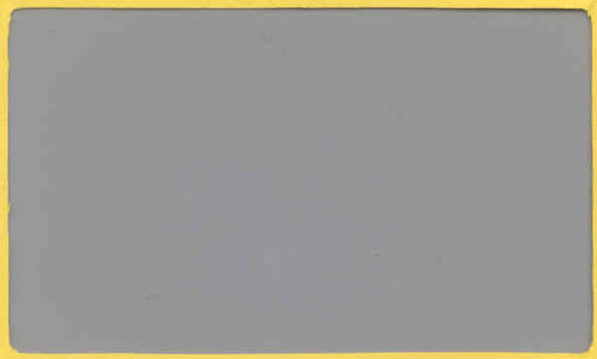
HEATH COMPANY PHONE DIRECTORY

The following telephone numbers are direct lines to the departments listed:

Kit orders and delivery information	(616) 982-3411
Credit	(616) 982-3561
Replacement Parts	(616) 982-3571

Technical Assistance Phone Numbers
8:00 A.M. to 12 P.M. and 1:00 P.M. to 4:30 P.M., EST, Weekdays Only

R/C, Audio, and Electronic Organs	(616) 982-3310
Amateur Radio	(616) 982-3296
Test Equipment, Weather Instruments and Home Clocks	(616) 982-3315
Television	(616) 982-3307
Aircraft, Marine, Security, Scanners, Automotive, Appliances and General Products	(616) 982-3496
Computers — Hardware	(616) 982-3309
Computers — Software:	
Operating Systems, Languages, Utilities	(616) 982-3860
Application Programs	(616) 982-3884
Heath Craft Wood Works	(616) 982-3423



YOUR HEATHKIT 90-DAY LIMITED WARRANTY

Consumer Protection Plan for Heathkit Consumer Products

Welcome to the Heath family. We believe you will enjoy assembling your kit and will be pleased with its performance. Please read this Consumer Protection Plan carefully. It is a "LIMITED WARRANTY" as defined in the U.S. Consumer Product Warranty and Federal Trade Commission Improvement Act. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Heath's Responsibility

PARTS — Replacements for factory defective parts will be supplied free for 90 days from date of purchase. Replacement parts are warranted for the remaining portion of the original warranty period. You can obtain warranty parts direct from Heath Company by writing or telephoning us at (616) 982-3571. And we will pay shipping charges to get those parts to you . . . anywhere in the world.

SERVICE LABOR — For a period of 90 days from the date of purchase, any malfunction caused by defective parts or error in design will be corrected at no charge to you. You must deliver the unit at your expense to the Heath factory, any Heathkit Electronic Center (units of Veritechnology Electronics Corporation), or any of our authorized overseas distributors.

TECHNICAL CONSULTATION — You will receive free consultation on any problem you might encounter in the assembly or use of your Heathkit product. Just drop us a line or give us a call. Sorry, we cannot accept collect calls.

NOT COVERED — The correction of assembly errors, adjustments, calibration, and damage due to misuse, abuse, or negligence are not covered by the warranty. Use of corrosive solder and/or the unauthorized modification of the product or of any furnished componen, will void this warranty in its entirety. This warranty does not include reimbursement for inconvenience, loss of use, customer assembly, set-up time, or unauthorized service.

This warranty covers only Heath products and is not extended to other equipment or components that a customer uses in conjunction with our products.

SUCH REPAIR AND REPLACEMENT SHALL BE THE SOLE REMEDY OF THE CUSTOMER AND THERE SHALL BE NO LIABILITY ON THE PART OF HEATH FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES, INCLUDING BUT NOT LIMITED TO ANY LOSS OF BUSINESS OR PROFITS, WHETHER OR NOT FORSEEABLE.

Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

Owner's Responsibility

EFFECTIVE WARRANTY DATE — Warranty begins on the date of first consumer purchase. You must supply a copy of your proof of purchase when you request warranty service or parts.

ASSEMBLY — Before seeking warranty service, you should complete the assembly by carefully following the manual instructions. Heathkit service agencies cannot complete assembly and adjustments that are customer's responsibility.

ACCESSORY EQUIPMENT — Performance malfunctions involving other non-Heath accessory equipment, (antennas, audio components, computer peripherals and software, etc.) are not covered by this warranty and are the owner's responsibility.

SHIPPING UNITS — Follow the packing instructions published in the assembly manuals. Damage due to inadequate packing cannot be repaired under warranty.

If you are not satisfied with our service (warranty or otherwise) or our products, write directly to our Director of Customer Service, Heath Company, Benton Harbor MI 49022. He will make certain your problems receive immediate, personal attention.

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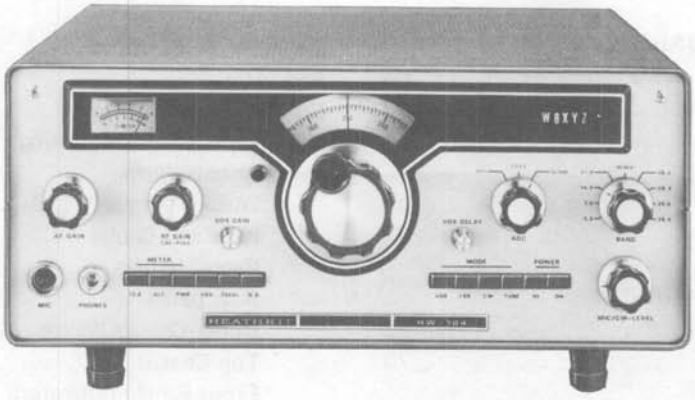


HEATH COMPANY
BENTON HARBOR, MICHIGAN 49022

TABLE OF CONTENTS

INTRODUCTION

The Heathkit Model HW-104 SSB Transceiver covers the high frequency amateur bands from 3.5 MHz through 29.0 MHz. It is entirely solid state and delivers 100 watts ±1 dB to the antenna. However, it can be instantly switched to QRP operation, in which case a minimum of one watt is delivered to tha antenna. Broadbanding eliminates the necessity to "peak" circuits within a band. All that is necessary is to turn the Band switch and select the frequency you desire.

A red window, which provides subdued lighting and high visibility, covers the frequency dial, the panel meter, and a space for your station call letters.

The Vox Gain and Vox Delay controls are conveniently located on the front panel to facilitate adjustments for operators who work both CW and SSB. Vox or PTT is pushbutton-selected, and the AGC action can be switched to fast, slow, or off. Provision is made for ALC input from an amplifier, and relay contacts are available for switching an amplifier between transmit and receive.

The Transceiver operates from a 13.8 VDC power input, which can be furnished by a power supply or from a battery. The panel meter can be switched to read the supply voltage or relative power output; in the receive mode, when it is switched to ALC, it acts as an S meter. The power amplifier circuit board carries a special 1-year warranty – see "Circuit Board Service Policy" on Page 57 in the Operation Manual for complete details.

To align this Transceiver, you should have a volt-ohmmeter with a high ohms-per-volt rating and a 50 ohm dummy load capable of dissipating 100 watts of power.

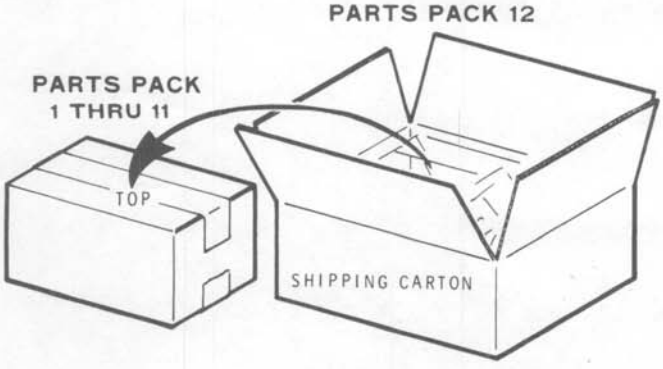
The following accessories are also available for use with this Transceiver:

- An accessory noise blanker that you can install to reduce impulse type noise. A front panel switch is included for this accessory.
- A narrow filter for CW operation. Space is provided for it on one of the circuit boards.
- A 10 Meter accessory that extends the frequency coverage to 29.7 MHz.
- An AC-operated power supply.
- A speaker in a matching cabinet.
- A mobile mount to hold the Transceiver when it is installed in a vehicle. A relay to control the power input is included with this accessory.

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

PARTS PACKAGING

The Transceiver shipping carton contains a box marked "Packs 1-11 TOP." After you remove this box, the remaining parts in the shipping carton form Parts Pack #12, which are items too large to fit into the other parts packs, parts used for several circuit boards, and those items which you will use in the chassis assembly sections.



Open the "TOP" side of the box marked Packs 1-11. Under the cover you will find a "Pack Index Sheet" lying on top of the contents. This sheet shows you the location of each parts pack in the box. DO NOT disturb any of these packs yet.

Each assembly section of the Manual contains its own "Parts List" and "Step-by-Step Assembly" instructions. At the beginning of each "Parts List" you will be told which parts pack to remove from the box and open. You may also be directed to remove certain required parts from pack #12.

To avoid intermixing parts, do not remove or open any of the parts packs until directed to do so at the beginning of one of the "Parts Lists." Return any part that is packed in an individual envelope with a part number on it back in its envelope after you identify it until that part is called for in a step. Some envelopes have one side transparent so the parts inside can be identified without opening the envelope.

In the shipping carton is a flattened cardboard carton marked with red. Save this carton. Its use is described in "Circuit Board Service Policy."

ASSEMBLY NOTES

The assembly of your Transceiver is divided into two principal sections – the circuit boards and the chassis. The circuit boards and certain subassemblies will be built first, and then laid aside, so each one will be available when it is required for the chassis assembly.

A soldering iron rated at 15 to 25 watts is preferred. A 1/16" or 1/8" pyramidal or chisel tip is best. This type of soldering iron will make the kit easier to assemble and there will be less chance of solder bridges occuring between foils on the circuit board (when solder connects two foils unintentionally, it is called a solder "bridge"). Be sure to apply enough heat so the solder flows easily and has a shiny surface when it cools; however, an excessive amount of heat can sometimes cause the foil to separate from the circuit board, so be careful.

Use only the amount of solder required to make a good connection, as shown in the "Kit Builders Guide." The use of an excessive amount of solder does not improve the electrical connection, and you may run out of solder before you complete the assembly of your Transceiver. If you do run out of solder, be sure you buy only rosin core solder; the use of acid core solder will void your warranty.

Notice the soldering abbreviations used in the 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 the "S" tells how many wires are at the connection. (Where a wire passes through a connection and goes on to another point, it counts as two wires.)

Resistors are designated by their color bands and their resistance in Ω (ohms), kΩ (kilohms), or MΩ (megohms). The resistor color code is explained in the "Kit Builders Guide." Capacitors are designated by their capacitance value and type.

Each circuit part in this kit has its own component number (R402, C404, 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 if 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.

A specific group of numbers is assigned to each individual circuit board, such as 401 to 499 for the HFO circuit board. Thus, the first resistor on this board is numbered R401, the sixth capacitor is numbered C406, etc. Refer to the Schematic Notes for a list of the number groups.

Always tighten hardware when you install it unless you are instructed to leave it loose.

Some illustrations are too large for this Manual and will be found in the "Illustration Booklet." You will be directed to this Booklet when necessary. The illustrations are arranged in the order in which you will use them.

CIRCUIT BOARD ASSEMBLY

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

Unless you are otherwise instructed, parts will be installed on the top of each circuit board (the side with the component outlines), and the leads will be soldered to the foil (other) side. Solder the leads only to the foil side of the circuit board unless you are specifically instructed otherwise. Before you clip off the excess length of each lead (as illustrated in the "Kit Builders Guide"), look at the junction of the lead and the foil to make sure the lead has been soldered.

Take your time while assembling each circuit board – accuracy is far more important than speed. Position each component over its outline on the circuit board and solder each connection carefully, as improper soldering causes more difficulty than anything else. Be careful not to cover unused holes with solder or to form a solder "bridge" between two foils.

Most circuit boards are identified by their part number. These are listed in each "Parts List" and printed on the component side of each circuit board. When you have finished mounting the parts on a circuit board, set the board aside until it is called for later in the assembly instructions.

Use 1/2 watt 10% tolerance (fourth band silver) resistors unless directed otherwise in a step. The fourth band is gold for 5% tolerance resistors.

When you install a transistor on a circuit board, leave about 1/4" between the transistor body and the circuit board. The instructions will point out any exceptions.

Transistors are marked for identification in one of the following four ways:

1. Part number.
2. Type number.
3. Part number and type number.
4. Part number with a type number other than the one listed.

NOTES:

- Some parts, such as resistors and small electrolytic capacitors, may be mounted vertically. Some of the mounting details show the bodies of these devices elevated above the circuit board to clarify the routing of the leads.

- Before you solder, push each part (except transistors) down against the circuit board.

- Solder a part, or a group of parts, only when instructed to do so. Follow the instructions carefully and read the entire assembly step before you perform each operation.

VARIABLE FREQUENCY OSCILLATOR (VFO) AND EXTENDER BOARD

PARTS LIST

Remove the parts from Pack #1 and check each part against the following list. Make a check (✓) in the space provided as you identify each part. Return any part that is packed in an individual envelope with the part number on it back in the envelope after you identify it until it is called for in a step. Do not throw away any packing materials until all parts are accounted for.

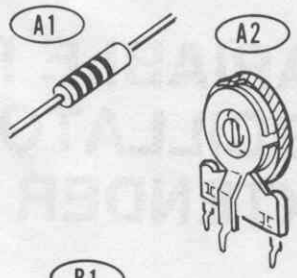
KEY No.	QTY.	DESCRIPTION	PART No.	CIRCUIT Component No.

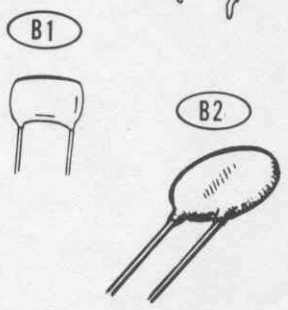
RESISTORS, 1/2-Watt

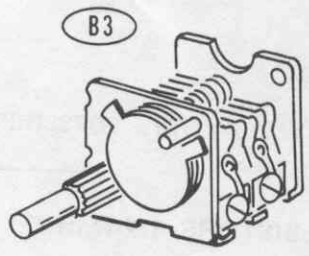
NOTE: The following resistors have a 10% tolerance unless otherwise noted. 10% is indicated by a fourth color band of silver; 5% is indicated by a fourth color band of gold.

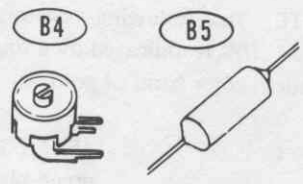
A1 ( )	1	15 Ω, 5% (brown-green-black)	1-54	R1237
A1 ( )	1	47 Ω (yellow-violet-black)	1-1	R1205
A1 ( )	2	100 Ω (brown-black-brown)	1-3	R1226, R1228
A1 ( )	1	150 Ω (brown-green-brown)	1-66	R1206
A1 ( )	3	470 Ω (yellow-violet-brown)	1-6	R1203, R1233 R1236
A1 ( )	1	1200 Ω (brown-red-red)	1-10	R1201
A1 ( )	1	1500 Ω (brown-green-red)	1-11	R1231
A1 ( )	1	3300 Ω (orange-orange-red)	1-14	R1234
A1 ( )	1	3900 Ω (orange-white-red)	1-46	R1227

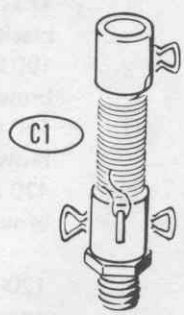
KEY No.	QTY.	DESCRIPTION	PART No.	CIRCUIT Component No.
Resistors (cont'd.)				
A1( )	2	22 kΩ (red-red-orange)	1-22	R1229, R1235
A1( )	1	220 kΩ (red-red-yellow)	1-29	R1225
A1( )	1	1 MΩ (brown-black-green)	1-35	R1204
A2( )	1	1000 Ω control	10-936	R1232
CAPACITORS				
Mica				
B1 ( )	1	12 pF	20-130	C1209
B1 ( )	1	200 pF	20-108	C1231
B1 ( )	1	330 pF	20-139	C1233
B1 ( )	1	390 pF	20-106	C1229
B1 ( )	1	680 pF	20-107	C1234
Disc				
B2 ( )	2	10 pF	21-3	C1202, C1214
B2 ( )	2	50 pF, N150	21-190	C1203, C1204
B2 ( )	3	510 pF, N1500	21-191	C1205, C1206, C1207
B2 ( )	1	.001 μF	21-140	C1225
B2 ( )	1	.005 μF	21-27	C1208
B2 ( )	6	.01 μF	21-176	C1213, C1215, C1226, C1227, C1228, C1232
Other Capacitors				
B3 ( )	1	Tuning capacitor	26-153	C1201
B4 ( )	1	15-60 pF trimmer	31-63	C1211
B5 ( )	1	4.7 pF ceramic	21-29	C1212
INDUCTORS				
C1 ( )	1	Variable inductor	40-1720	L1201
C2 ( )	2	3.7 μH toroid coil	40-1684	L1202, L1203
C3 ( )	2	350 μH RF choke	45-82	RFC1201, RFC1204

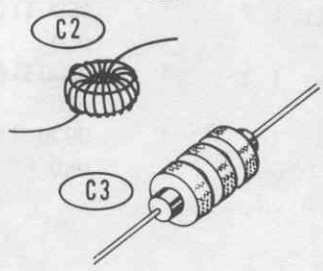






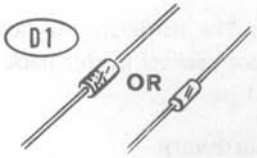






KEY No.	QTY.	DESCRIPTION	PART No.	CIRCUIT Component No.

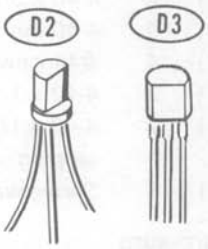
DIODES-TRANSISTORS



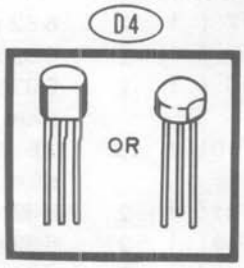
D1 ( )	1	1N458 diode	56-24	D1201
D1 ( )	2	1N4149 diode	56-56	D1202, D1203
D1 ( )	1	VR7.5 zener diode	56-97	ZD 1201

NOTE: Transistors may be marked in any of the following four ways:

1. Part number.
2. Type number.
3. Part number and type number.
4. Part number and a type number other than the one listed.

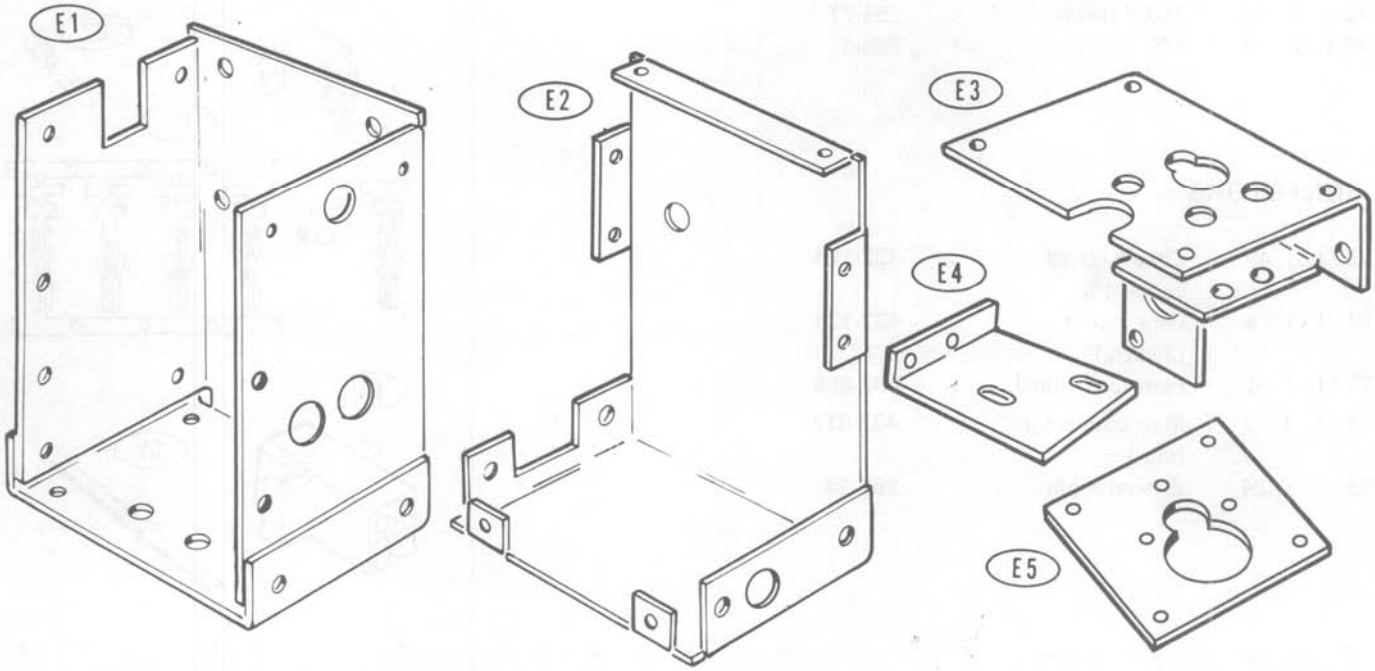


D2 ( )	1	2N3393 transistor	417-118	Q1204
D3 ( )	2	MPF105 transistor	417-169	Q1202, Q1203
D4 ( )	1	2N3638A transistor	417-234	Q1205



METAL PARTS

E1 ( )	1	VFO chassis	206-1170
E2 ( )	1	VFO shield	206-1168
E3 ( )	1	VFO bracket	204-2086
E4 ( )	1	Capacitor mounting bracket	204-2088
E5 ( )	1	Dial drive plate	205-761



KEY No.	QTY.	DESCRIPTION	PART No.	CIRCUIT Component No.

HARDWARE

NOTE: The hardware may be in more than one packet. Open all of the hardware packets in this pack before you check the hardware against the "Parts List."

#4 Hardware

F1 ( )	8	4-40 x 5/8" screw	250-323
F2 ( )	4	4-40 nut	252-15
F3 ( )	4	#4 lockwasher	254-9
F4 ( )	3	4-40 x 1/4" screw	250-285
F5 ( )	7	4-40 x 1/2" self-tapping screw	250-248
F6 ( )	3	Spring washer	253-59

#6 Hardware

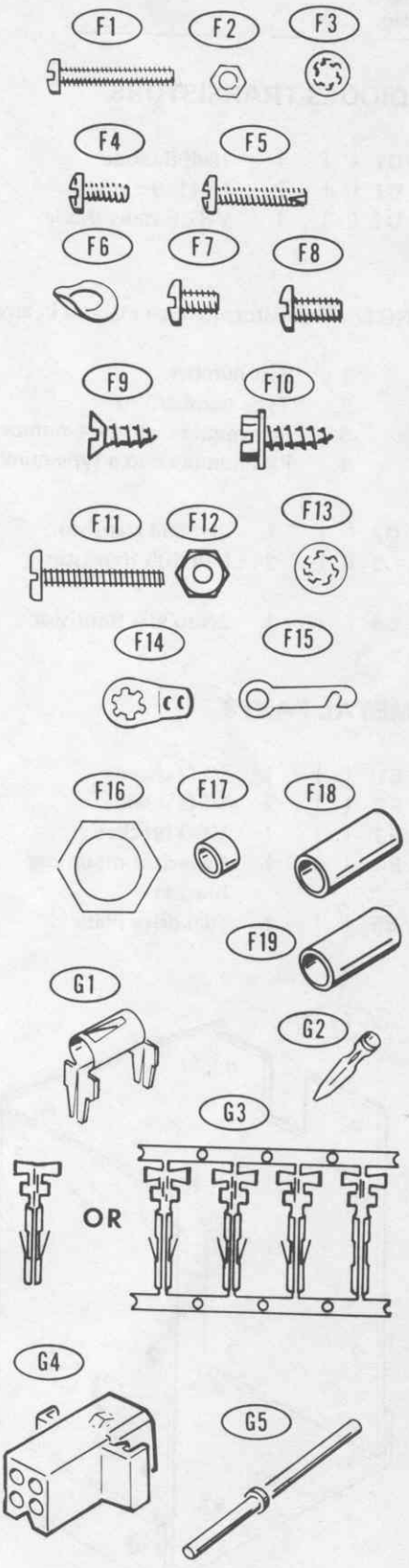
F7 ( )	4	6-32 x 3/16" screw	250-138
F8 ( )	2	6-32 x 1/4" screw	250-56
F9 ( )	2	6-32 x 3/8" flat head sheet metal screw	250-441
F10 ( )	15	#6 x 3/8" hex head sheet metal screw	250-475
F11 ( )	2	6-32 x 11/16" screw	250-206
F12 ( )	2	6-32 nut	252-3
F13 ( )	7	#6 lockwasher	254-1
F14 ( )	2	#6 solder lug	259-1
F15 ( )	1	#6 plain solder lug	259-6

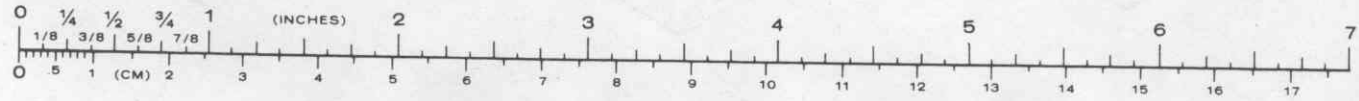
Other Hardware

F16 ( )	1	Control nut	252-7
F17 ( )	10	1/8" spacer	255-1
F18 ( )	2	7/16" spacer	255-77
F19 ( )	4	3/8" spacer	255-3

CONNECTORS

G1 ( )	48	Circuit board connector	432-124
G2 ( )	4	Wire socket (2 extra)	432-134
G3 ( )	4	Female terminal	432-855
G4 ( )	1	Male connector housing	432-817
G5 ( )	24	Extender pin	262-24





KEY No.	QTY.	DESCRIPTION	PART No.	CIRCUIT Component No.

MISCELLANEOUS

H1	( )	1	Vernier drive	100-1041
H2	( )	1	Clutch	266-200
H3	( )	2	Fish paper (2-3/4" x 2-3/4")	75-90
	( )	1	Fish paper (2" x 1-3/4")	75-108
H4	( )	1	Heat sink	215-63
	( )	1	Cement (tube)	350-12
H5	( )	2	Board puller	207-80
H6	( )	4	Extender block	255-108

PARTS FROM PACK #12 (parts in the shipping carton)

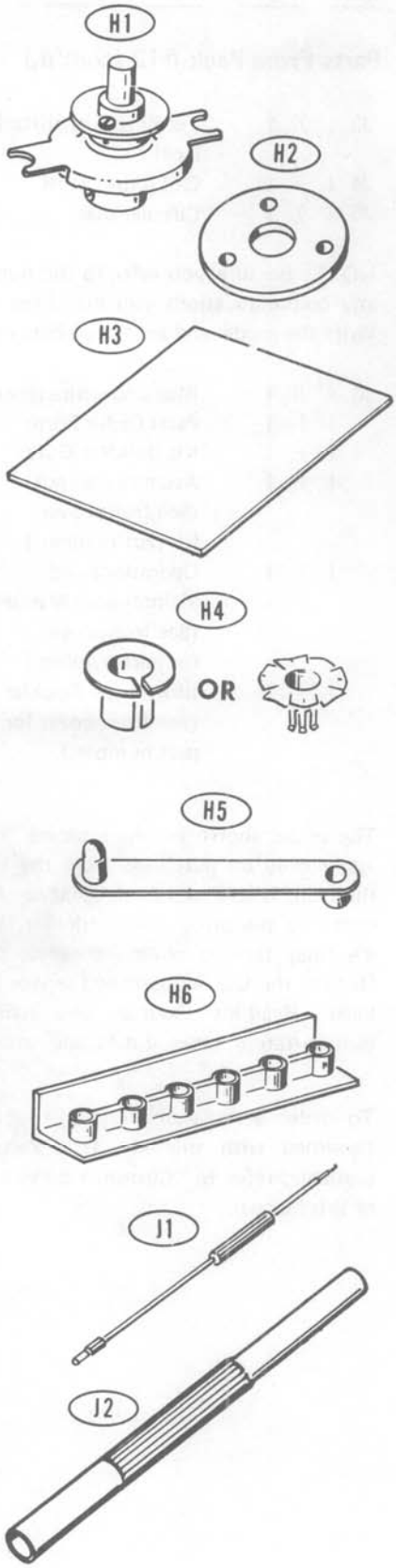
	( )	1	Oscillator circuit board	85-1624-2
	( )	1	Buffer circuit board	85-1625-1
	( )	1	Extender board	85-1465
J1	( )	1	Coil alignment tool	490-1
J2	( )	1	Nut starter	490-5

NOTE: Remove the wire bundle. Cut off lengths when you are directed to do so by the assembly steps in the various sections of the Manual. Use solid wire in steps unless otherwise specified.

Wire bundle consisting of:

( )	*7'*	*Small bare wire*	*340-2*
( )	*1'*	*Large bare wire*	*340-3*
( )	*15'*	*Shielded cable*	*343-15*
( )	*2'*	*Large orange wire*	*344-30*
( )	*9'*	*Red wire*	*344-52*
( )	*5'*	*Small orange wire*	*344-53*
( )	*25'*	*Gray wire*	*344-58*
( )	*8'*	*Stranded white wire*	*344-109*
( )	*3-1/2'*	*RG-58A/U coaxial cable*	*343-2*
( )	*1-1/2"*	*Small sleeving*	*346-1*
( )	*1'*	*Large sleeving (heat shrinkable)*	*346-20*

( ) Solder



KEY No.	QTY.	DESCRIPTION	PART No.	CIRCUIT Component No.

Parts From Pack #12 (cont'd.)

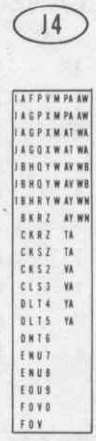
J3 ( )	1	Terminal identification label	390-1045
J4 ( )	1	Call letters label	390-1087
J5 ( )	1	Circular dial	464-73

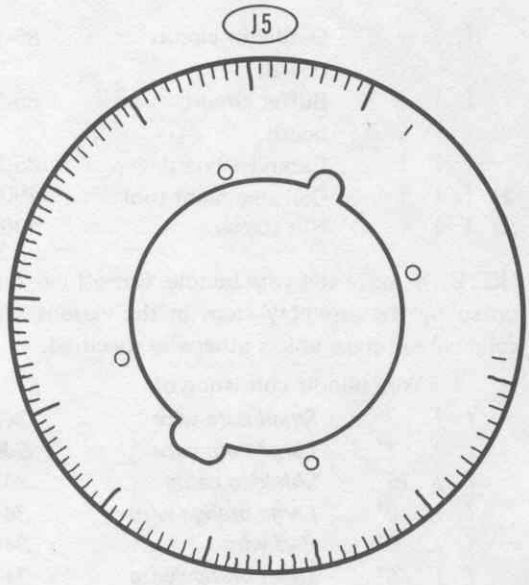
NOTE: Be sure you refer to the numbers on the blue and white label in any communications you may have about this kit with Heath Company. Write the model and series numbers in this sample for future reference.

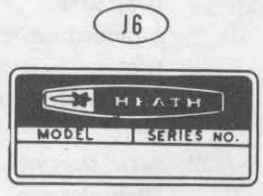
J6 ( )	1	Blue and white label	391-34
( )	1	Parts Order Form	597-260
( )	1	Kit Builders Guide	597-308
( )	1	Assembly Manual (See front cover for part number.)	
( )	1	Operations and Maintenance Manual (See front cover for part number.)	
( )	1	Illustration Booklet (See front cover for part number.)	

The prices shown on the separate "Heath Parts Price List" 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 (Michigan residents add 4% sales tax) to cover insurance, 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.

To order a replacement part, use the Parts Order Form furnished with this kit. If a Parts Order Form is not available, refer to "Customer Service" inside the rear cover of this Manual.







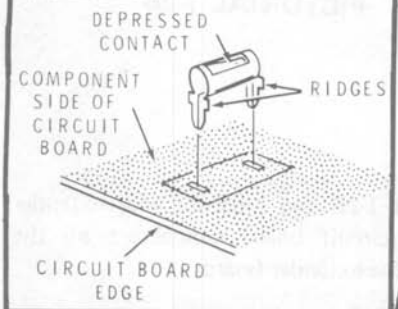
STEP-BY-STEP ASSEMBLY

EXTENDER CIRCUIT BOARD

START

Place the extender board foil side down.

Install circuit board connectors in the following manner. Note that inside each connector the spring contact is depressed on one end. This depressed end of the connector should face away from the edge of the circuit board. Insert the mounting tabs through the circuit board until the ridges of the connector are firmly against the circuit board. Look at the row of connectors to make sure the depressed end of the contact of each connector is toward the center of the circuit board. Solder the tabs to the foil.



( ) Six circuit board connectors.

( ) Six circuit board connectors.

( ) Six circuit board connectors.

( ) Six circuit board connectors.

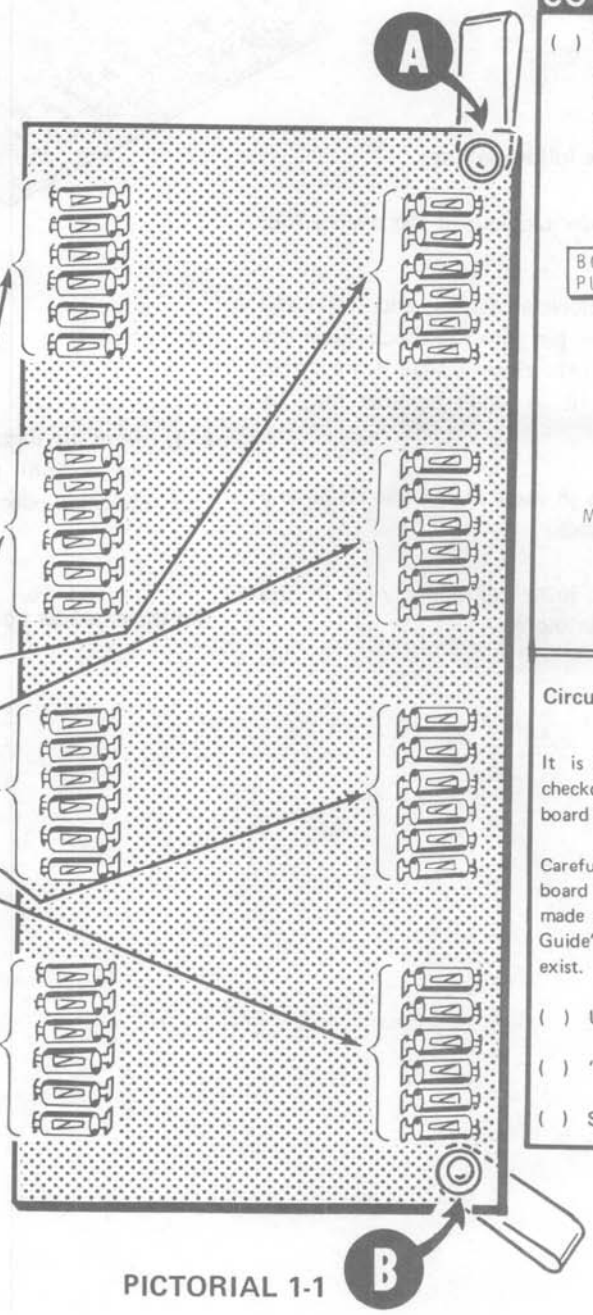
( ) Six circuit board connectors.

( ) Six circuit board connectors.

( ) Six circuit board connectors.

( ) Six circuit board connectors.

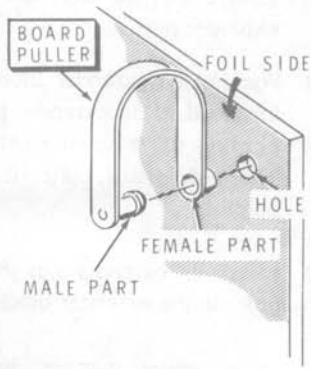
( ) Look at the connector row to be sure the depressed end of the contact of each connector is toward the center of the circuit board.



PICTORIAL 1-1

CONTINUE

( ) Mount board pullers on the foil side of the circuit board at holes A and B. Position the female part in the circuit board hole; then push the male part through the female part.



Circuit Board Checkout

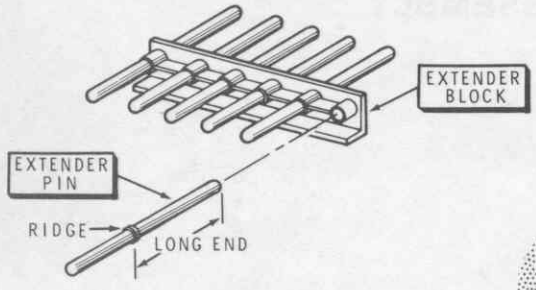
It is important that you perform the checkout procedure after each circuit board is completed.

Carefully inspect the foil of the circuit board for the following most commonly made errors. Consult your "Kit Builders Guide" to remedy these problems if any exist.

( ) Unsoldered connections.

( ) "Cold" solder connections.

( ) Solder bridges between foil patterns.



PICTORIAL 1-2A

EXTENDER BLOCK

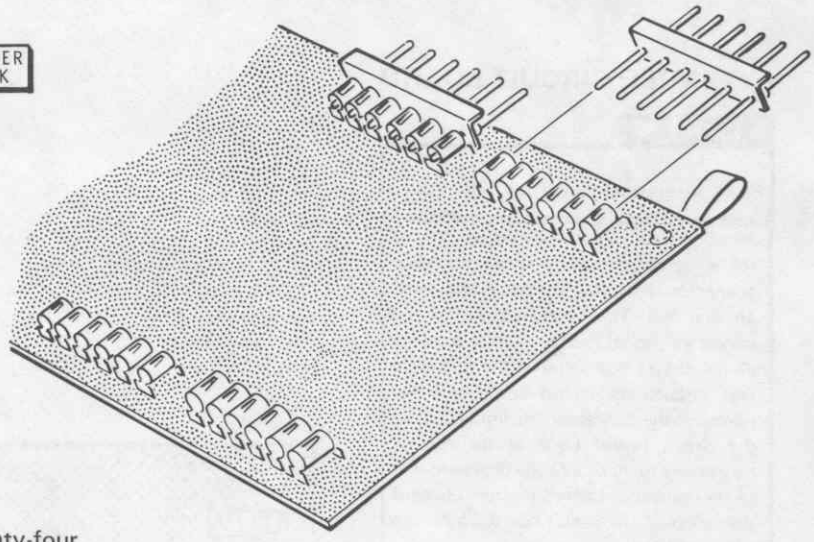
Refer to Pictorial 1-2A for the following steps.

( ) Locate the four extender blocks and the twenty-four extender pins.

( ) Position an extender block as shown, and insert the long end of an extender pin into the block. Push the pin into the block until the ridge is against the block. The pins are a tight fit. A small hammer may be helpful.

( ) Install an extender pin in each of the five remaining holes in the extender block.

( ) In a similar manner, install extender pins in the remaining three extender blocks.



PICTORIAL 1-2B

( ) Refer to Pictorial 1-2B and plug the four extender blocks into the circuit board connectors on the indicated edge of the extender board.

Set the extender board aside until it is called for in a step.

OSCILLATOR CIRCUIT BOARD

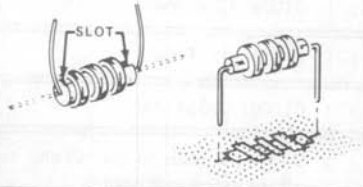
START

Position the oscillator circuit board as shown. Then complete each step in the order listed.

( ) R1206: 150 Ω (brown-green-brown).

( ) R1205: 47 Ω (yellow-violet-black).

( ) RFC1204: 350 µH RF choke (#45-82). Bend the leads toward the slot in the choke body to avoid placing any strain on the leads of the choke winding. Then install the choke as shown.



( ) C1212: 4.7 pF tubular. (May be marked 4.7 MMF.)

( ) R1201: 1200 Ω (brown-red-red).

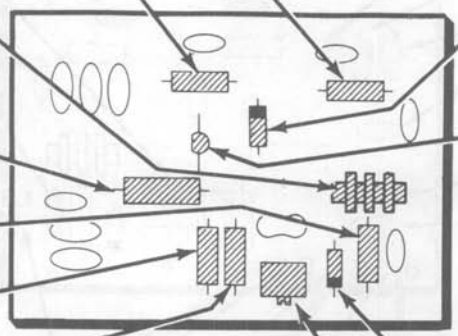
( ) R1204: 1 MΩ (brown-black-green).

( ) R1203: 470 Ω (yellow-violet-brown).

FOR GOOD SOLDER CONNECTIONS, YOU MUST **KEEP THE SOLDERING IRON TIP CLEAN.** WIPE IT OFTEN WITH A DAMP SPONGE OR CLOTH.

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

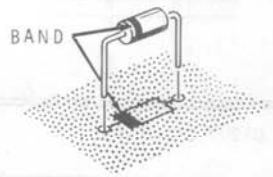
( ) Solder the leads to the foil and cut off the excess lead lengths.



PICTORIAL 1-3

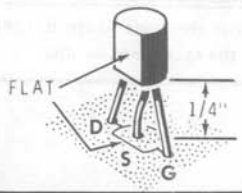
CONTINUE

NOTE: When you install a diode, always match the band on the diode with the band mark on the circuit board.



( ) ZD1201: VR 7.5 zener diode (#56-97).

( ) Q1202: MPF105 transistor (#417-169). Line up the flat of the transistor with the outline of the flat on the circuit board. Then insert the leads into their correct D, S, and G holes. Solder the leads to the foil and cut off the excess lead lengths.



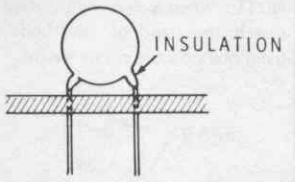
( ) D1201: 1N458 diode (#56-24).

( ) C1211: 15-60 pF trimmer.

( ) Solder the leads to the foil and cut off the excess lead lengths.

START

NOTE: When you install disc capacitors, do not push the insulated portion of the leads into the circuit board holes. This could make it difficult to solder the leads to the foil.



( ) C1207: 510 pF disc.

( ) C1206: 510 pF disc.

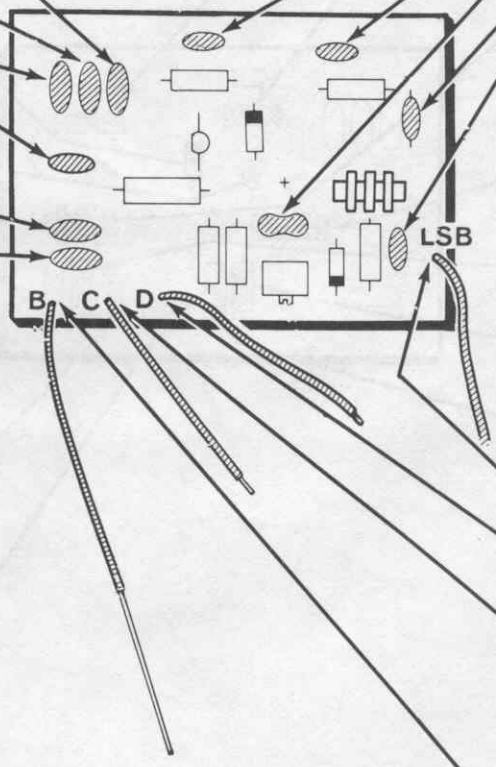
( ) C1205: 510 pF disc.

( ) C1202: 10 pF disc.

( ) C1203: 50 pF disc.

( ) C1204: 50 pF disc.

( ) Solder the leads to the foil and cut off the excess lead lengths.



CONTINUE

( ) C1214: 10 pF disc.

( ) C1213: .01 μF disc.

( ) C1209: 12 pF mica.

( ) C1215: .01 μF disc.

( ) C1208: .005 μF disc.

( ) Solder the leads to the foil and cut off the excess lead lengths.

NOTES:

1. Cut the following wires to the proper lengths and remove 1/4" of insulation from each end unless directed otherwise in a step. Then solder each wire as it is connected and cut off the excess lead length.

2. Only one end of each wire will be connected at this time.

( ) Connect a 6" small orange wire to hole LSB.

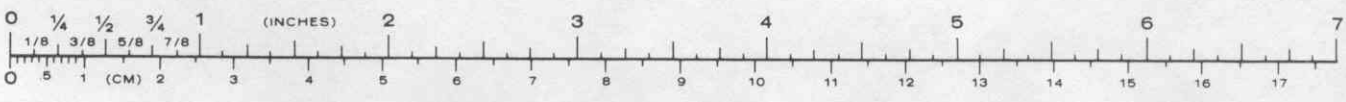
( ) Connect a 2" small orange wire to hole D.

( ) Connect a 2-1/2" gray wire to hole C.

( ) Cut a 3-3/8" red wire. Then remove 1/4" of insulation from one end and 1-1/8" of insulation from the other end.

( ) Connect the 1/4" bare end of the red wire to hole B.

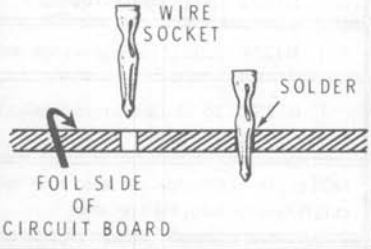
PICTORIAL 1-4



START

( ) Position the circuit board foil-side-up as shown.

( ) Install wire sockets (#432-134) at the two indicated locations as shown in the following detail. Use a minimum amount of heat and solder so the wire socket does not fill with solder, but be sure you have a good connection.



NOTE : There may be several unused holes in this circuit board.

CIRCUIT BOARD CHECKOUT

Carefully inspect the circuit board for the following conditions.

( ) Unsoldered connections.

( ) "Cold" solder connections.

( ) Solder bridges between foil patterns.

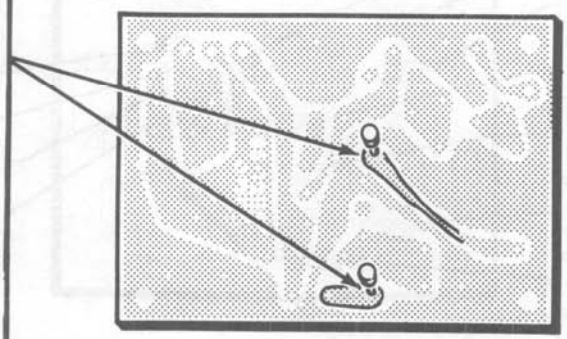
( ) Protruding leads. No component lead should be longer than 1/8".

( ) Transistor for the proper type and installation.

( ) Diodes for the correct position of the banded end.

Set the circuit board aside until it is called for in a step.

FINISH



PICTORIAL 1-5

BUFFER CIRCUIT BOARD

START

Position the buffer circuit board as shown.

( ) R1231: 1500 Ω (brown-green-red).

( ) R1227: 3900 Ω (orange-white-red).

( ) R1229: 22 kΩ (red-red-orange).

( ) R1226: 100 Ω (brown-black-brown).

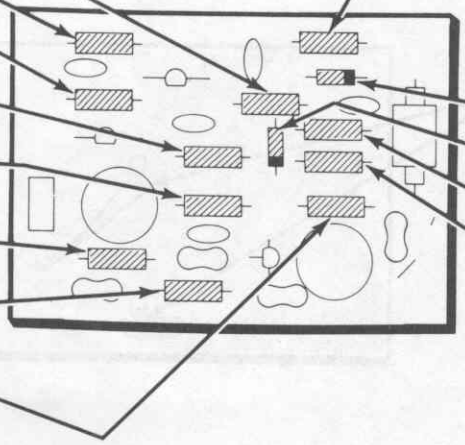
( ) R1228: 100 Ω (brown-black-brown).

( ) R1233: 470 Ω (yellow-violet-brown).

( ) R1235: 22 kΩ (red-red-orange).

( ) R1236: 470 Ω (yellow-violet-brown).

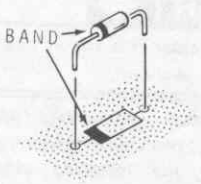
( ) Solder all leads to the foil and cut off the excess lead lengths.



CONTINUE

( ) R1225: 220 kΩ (red-red-yellow).

NOTE: When you install a diode, always match the band on the diode with the band mark on the circuit board.



( ) D1202: 1N4149 diode (#56-56).

( ) D1203: 1N4149 diode (#56-56).

( ) R1234: 3300 Ω (orange-orange-red).

( ) R1237: 15 Ω (brown-green-black).

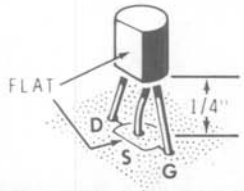
NOTE: In the following step, save two cutoff resistor leads for use later.

( ) Solder all leads to the foil and cut off the excess lead lengths.

PICTORIAL 1-6

START

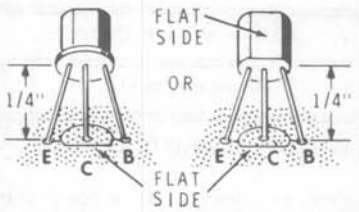
( ) Q1203: MPF105 transistor (#417-169). Line up the flat of the transistor with the outline of the flat on the circuit board. Then insert the leads into their correct D, S, and G holes. Solder the leads to the foil and cut off the excess lead lengths.



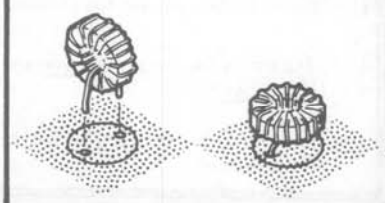
( ) C1226: .01 μF disc.

( ) C1227: .01 μF disc.

( ) Q1204: 2N3393 transistor (#417-118). The transistor may be one of the two types shown below. Insert the transistor leads into the corresponding E, C, and B holes in the circuit board as shown. Solder the leads to the foil and cut off the excess lead lengths.



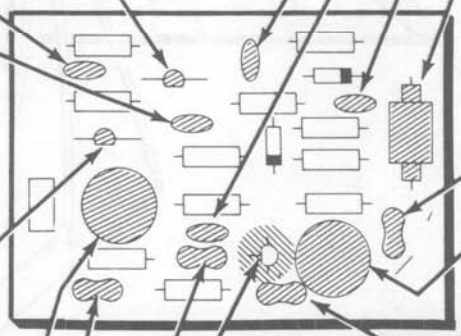
( ) L1202: 3.7 μH toroid coil (#40-1684). Insert the leads in the holes and then bend the coil over as shown. Solder the leads to the foil and cut off the excess lead lengths.



( ) C1231: 200 pF mica.

( ) C1229: 390 pF mica.

( ) Solder the leads to the foil and cut off the excess lead lengths.



PICTORIAL 1-7

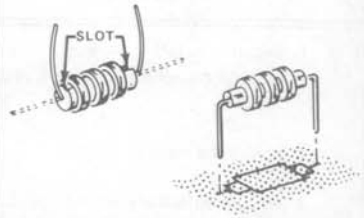
CONTINUE

( ) C1225: .001 μF disc.

( ) C1228: .01 μF disc.

( ) C1232: .01 μF disc.

( ) RFC1201: 350 μH RF choke (#45-82). Bend the leads toward the slot in the choke body to avoid placing any strain on the leads of the choke winding. Then install the choke as shown.



( ) C1234: 680 pF mica.

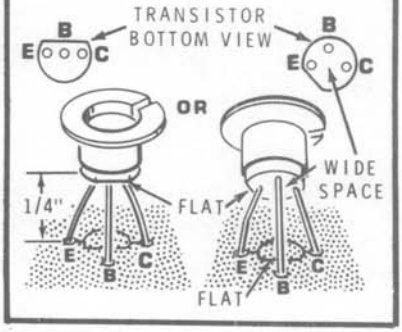
( ) L1203: 3.7 μH toroid coil (#40-1684).

( ) C1233: 330 pF mica.

( ) Solder the leads to the foil and cut off the excess lead lengths.

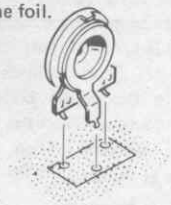
( ) Push a heat sink onto a 2N3638A transistor (#417-234). The bottom of the heat sink must not project below the transistor body or its leads might be shorted.

( ) Q1205: 2N3638A transistor (#417-234). Identify the leads from one of the drawings below. Then insert the leads into the indicated circuit board holes as shown. Solder the leads to the foil and cut off the excess lead lengths.



START

( ) R1232: 1000 Ω control. Push the control down firmly against the circuit board. Then solder the lugs to the foil.

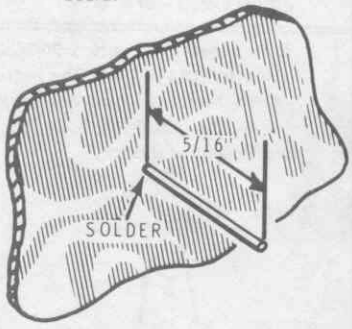


( ) 1. Install cutoff resistor leads through circuit board holes E and INPUT.

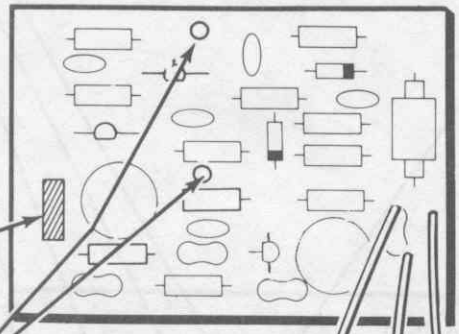
2. Solder the leads to the foil.

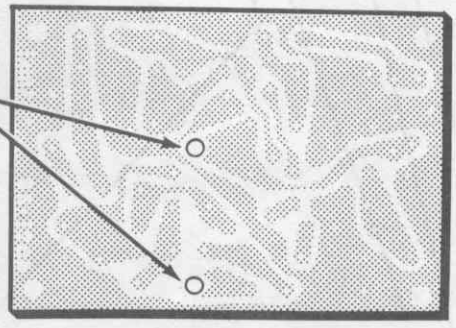
3. Be sure both leads extend straight out from the foil side of the board. Then cut the leads to 5/16" as shown.

4. After the leads have been soldered to the foil, the lead ends on the component side of the circuit board should be flush with the surface of the board.



COMPONENT SIDE





FOIL SIDE

PICTORIAL 1-8

CONTINUE

( ) 1-1/2" small bare wire to GND.

NOTES:
1. Cut the following wires to the proper lengths and remove 1/4" of insulation from each end. Solder each wire as it is connected and cut off the excess lead lengths.
2. Only one end of each wire will be connected at this time.

( ) 1-3/4" gray wire to OUTPUT.

( ) 1-3/4" red wire to +11.

CIRCUIT BOARD CHECKOUT

Carefully inspect the circuit board for the following conditions.

( ) Unsoldered connections.

( ) "Cold" solder connections.

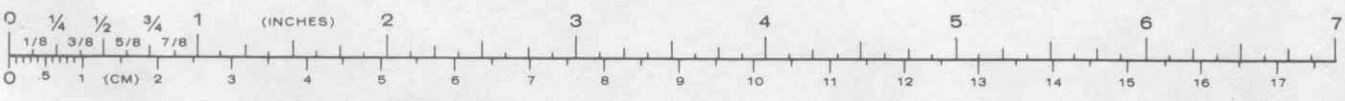
( ) Solder bridges between foil patterns.

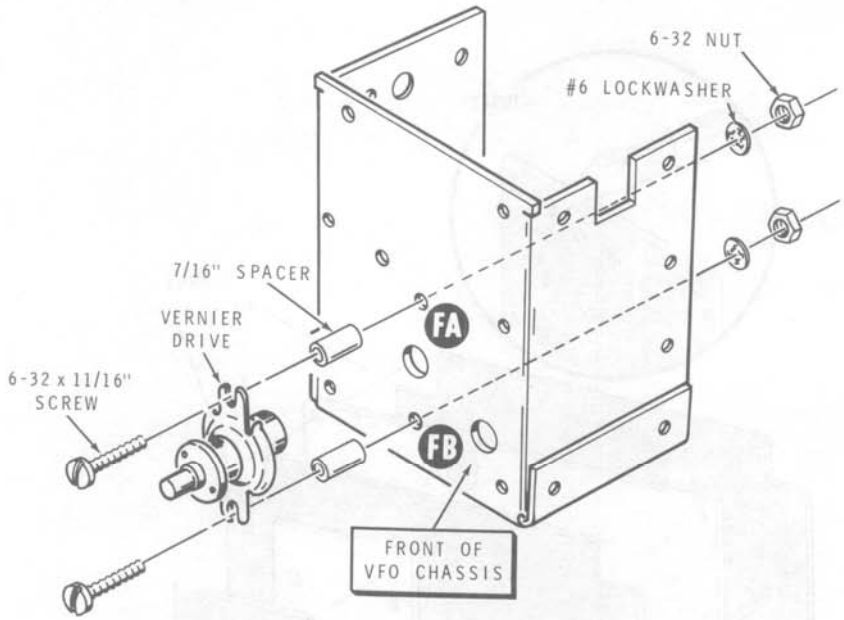
( ) Transistors for the proper type and installation.

( ) Diodes for the correct position of the banded end.

Set the circuit board aside until it is called for in a step.

FINISH





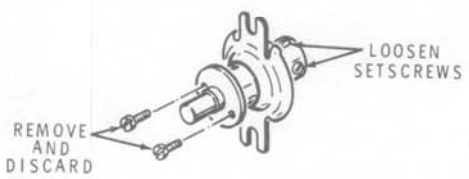
PICTORIAL 1-9

VFO ENCLOSURE

Refer to Pictorial 1-9 for the following steps.

( ) Refer to Detail 1-9A and remove and discard the two brass screws in the collar of the vernier drive.

( ) Use a knife blade or fine sandpaper to remove any burrs that may be around the two holes on both sides of the collar of the vernier drive.

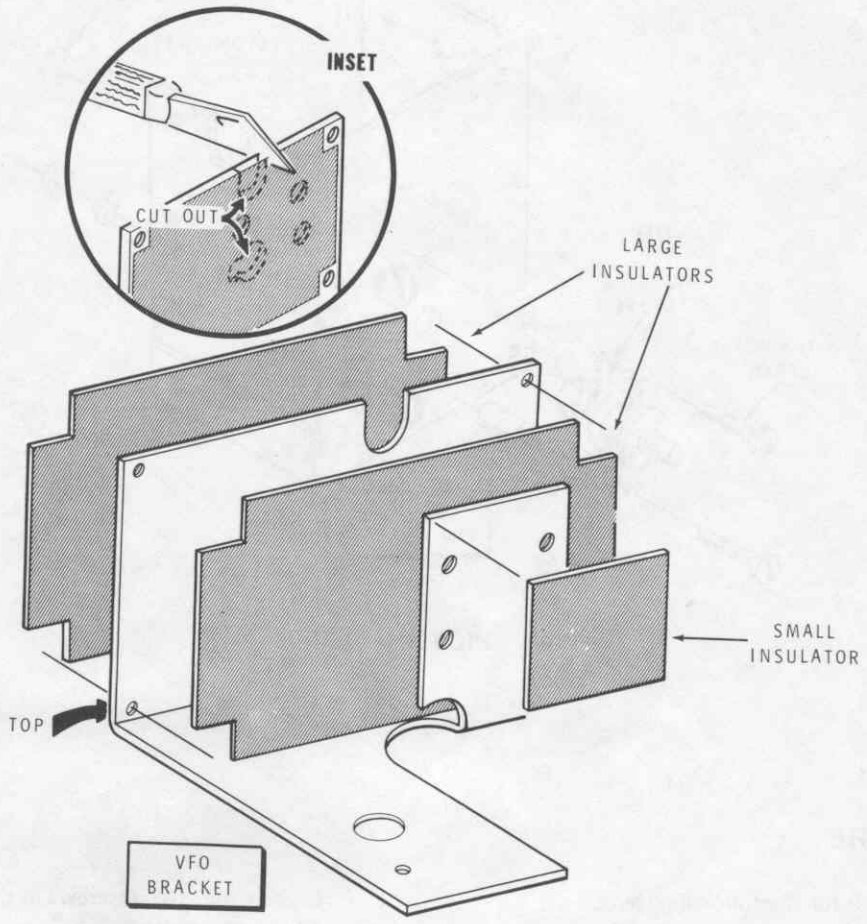


Detail 1-9A

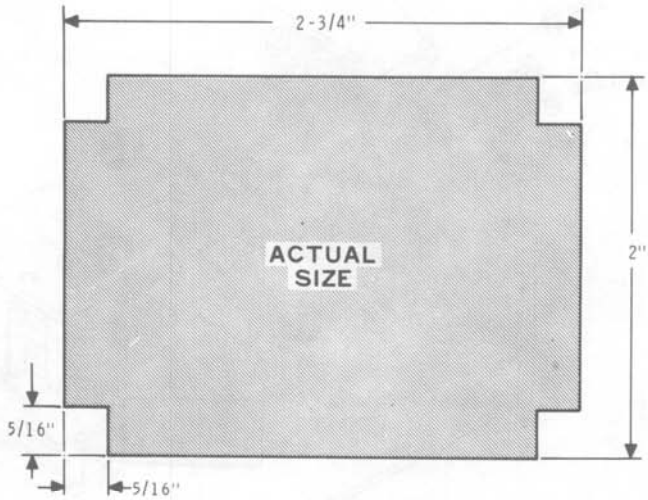
( ) Loosen the two setscrews in the bushing of the vernier drive just enough to allow a 1/4" shaft to be inserted into the bushing.

NOTE: A plastic nut starter has been included with this kit. Use the nut starter to hold and start 4-40 and 6-32 nuts onto screws.

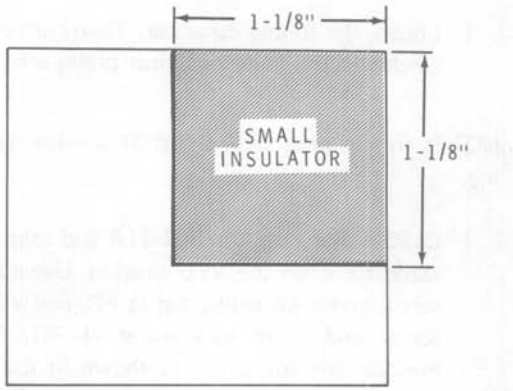
( ) Refer to Pictorial 1-9 and mount the vernier drive onto the front of the VFO chassis at FA and FB. Use two 6-32 x 11/16" screws, two 7/16" spacers, two #6 lockwashers, and two 6-32 nuts. Tighten the hardware only finger tight at this time.



PICTORIAL 1-10



Detail 1-10A



Detail 1-10B

Refer to Pictorial 1-10 for the following steps.

( ) Refer to Detail 1-10A and prepare two large insulators from two 2-3/4" x 2-3/4" pieces of fish paper. Save the leftover pieces for use later.

( ) Remove the backing paper from one of the prepared insulators. Then press the insulator onto the top surface of the VFO bracket.

( ) Refer to the inset drawing of Pictorial 1-10 and use a small, sharp, cutting tool to cut out the insulator from the five openings in the bracket.

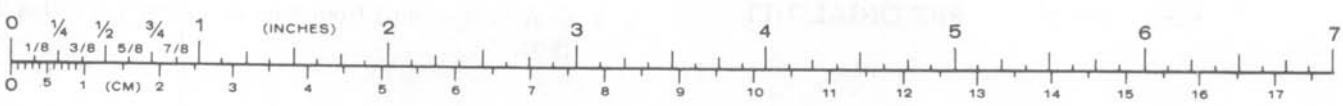
( ) Remove the backing paper from the other prepared insulator. Then press the insulator onto the bottom surface of the VFO bracket.

( ) Cut out the insulator from the five openings in the bracket.

( ) Refer to Detail 1-10B and prepare a small insulator from the 2" x 1-3/4" piece of fish paper. Save the leftover piece for use later.

( ) Remove the backing paper from the prepared insulator. Then press the insulator onto the VFO bracket.

( ) Cut out the insulator from the four openings in the bracket.



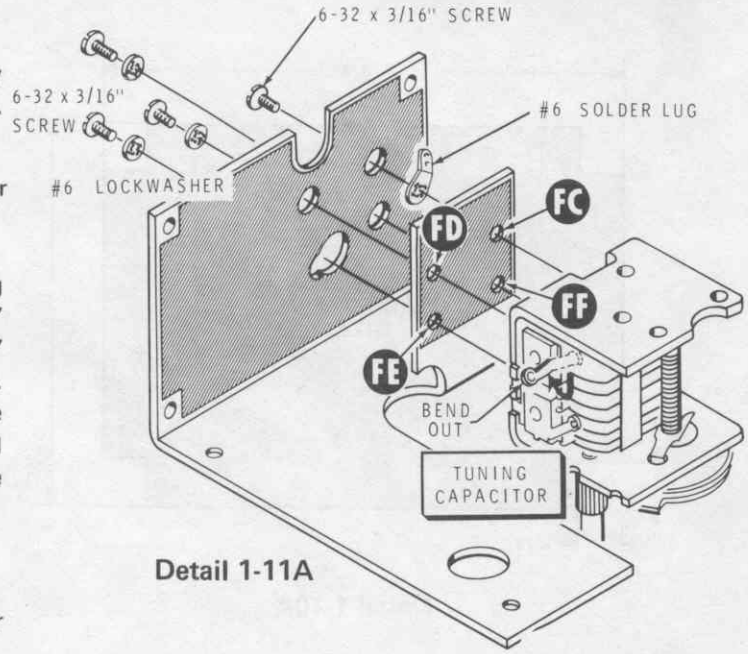
Refer to Pictorial 1-11 for the following steps.

( ) Locate the tuning capacitor. Then turn the shaft fully clockwise until the capacitor plates are fully meshed.

NOTE: In the next step, DO NOT use the #6 plain solder lug.

( ) C1201: Refer to Detail 1-11A and mount the tuning capacitor onto the VFO bracket. Use a 6-32 x 3/16" screw and a #6 solder lug at FC, and a 6-32 x 3/16" screw and a #6 lockwasher at FD, FE, and FF. Position the solder lug as shown in the Pictorial. Be sure the rear surface of the tuning capacitor is parallel with the edge of the bracket before you tighten the hardware.

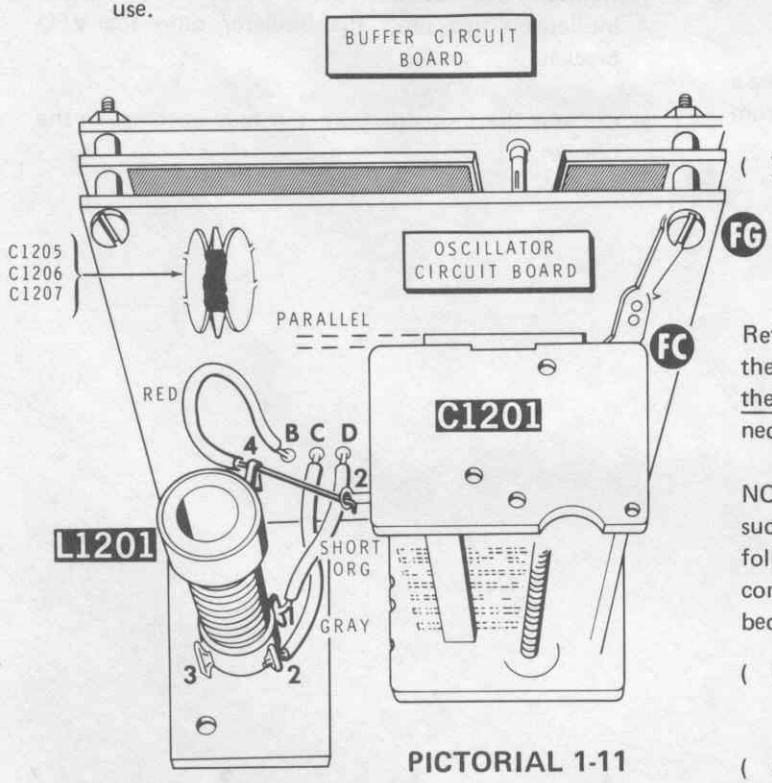
( ) Refer to the Detail and bend one lug of the capacitor as shown.



Detail 1-11A

NOTES:

1. When a step calls for hardware, only the screw size will be given. For example, if "6-32 x 3/8" hardware" is called for, it means that you should use a 6-32 x 3/8" screw, one or more #6 lockwashers, and a 6-32 nut at each mounting hole. The Detail referred to in the step will show you the proper number of lockwashers to use.



PICTORIAL 1-11

2. You must position the circuit boards, in the next step, so the two bare wires on the foil side of the buffer circuit board pass through the two openings in the VFO bracket and enter the two wire sockets on the foil side of the oscillator circuit board and do not touch any other metal parts.

( ) Refer to Detail 1-11B and mount the oscillator circuit board and the buffer circuit board onto the VFO bracket. Use 4-40 x 5/8" hardware and two 1/8" spacers at each corner, with a #6 plain solder lug (#259-6) under the head of the screw at hole FG. Form and position the solder lug as shown in the Pictorial.

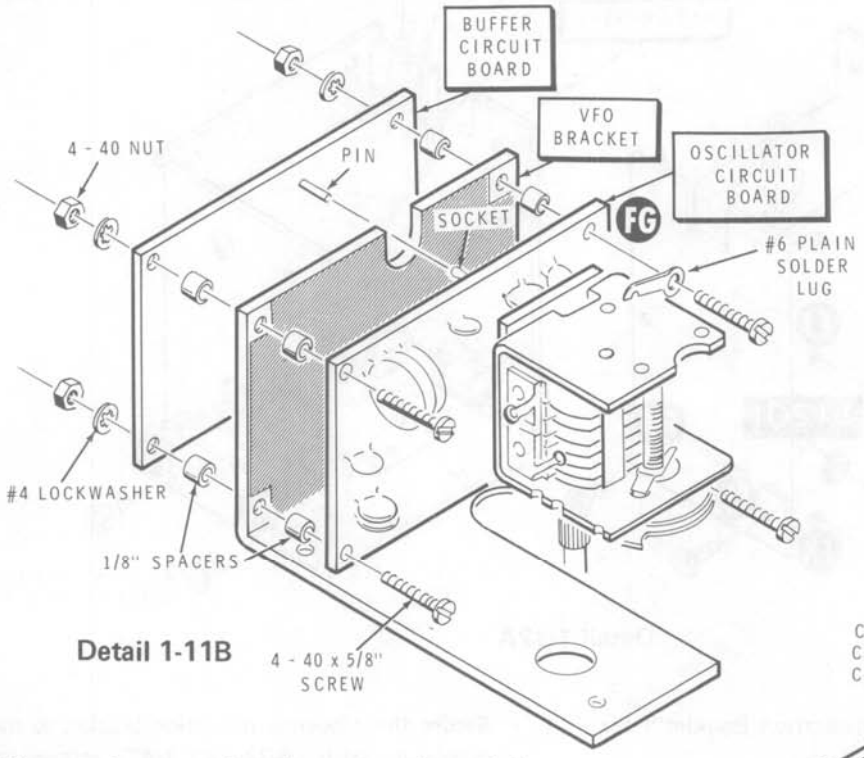
( ) L1201: Refer to Detail 1-11C and temporarily mount the variable inductor in hole L1201 in the VFO bracket. Use a control nut. Position the coil as shown in the Pictorial.

Refer to Pictorial 1-11 and connect the wires coming from the oscillator circuit board as follows. Remove all slack from the wires but do not strain the connections. NOTE: If necessary, remove additional insulation from the wires.

NOTE: In the following steps, the letter "S" with a number such as (S-1) means to solder the connections. The number following the "S" tells you how many wires are at the connection. If (NS) is used in a step, it means not to solder because you will add other wires later.

( ) Short orange wire coming from hole D, to coil L1201 lug 1 (S-1).

( ) Gray wire coming from hole C, to coil L1201 lug 2 (S-1).

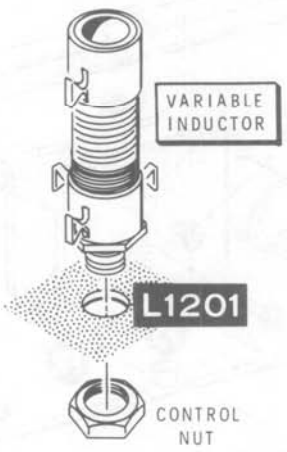


Detail 1-11B

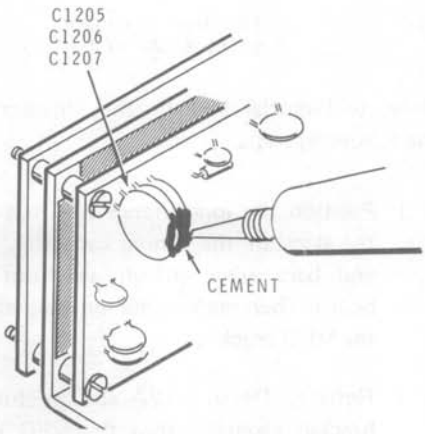
NOTE: When a wire passes through a connection and then goes to another point, as in the next step, the solder instructions will call for two wires (S-2), one entering and one leaving the connection. Be especially careful when you solder these connections that you apply enough solder and heat to properly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

( ) Red wire coming from hole B, through coil L1201 lug 4 (S-2) to capacitor C1201 lug 2 (S-1).

NOTE: There is no connection to lug 3. The long orange wire will be connected later.



Detail 1-11C



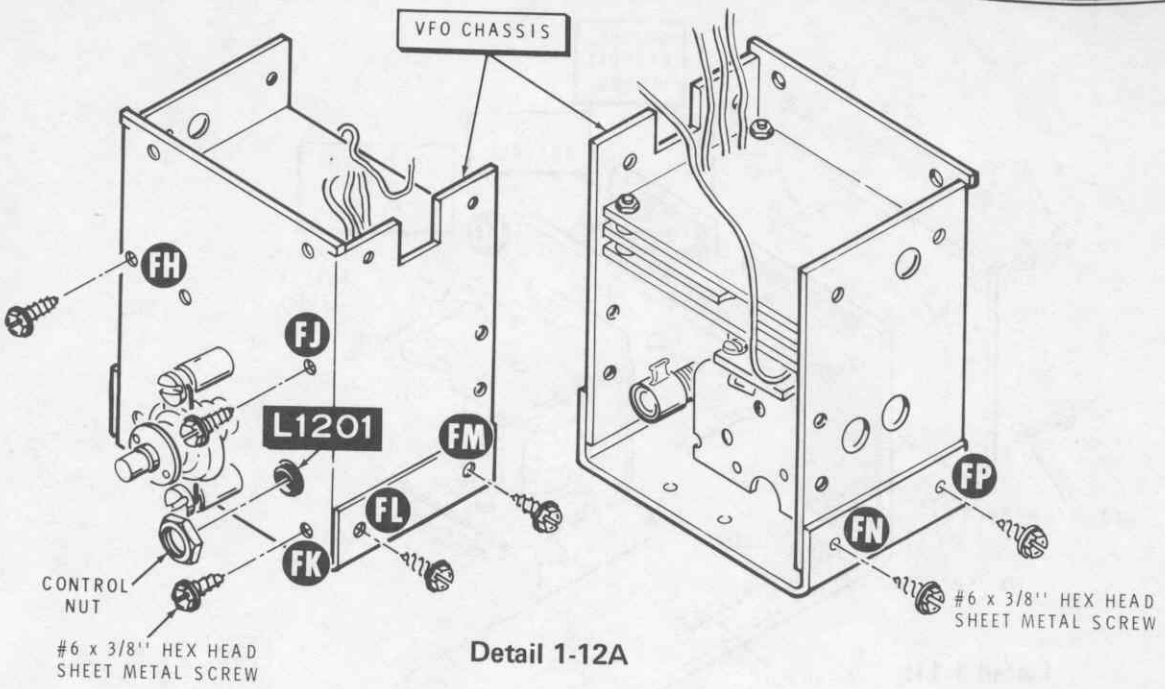
Detail 1-11D

( ) Refer to Detail 1-11D and press the top edges of disc capacitors C1205, C1206, and C1207 together.

( ) Remove the cap from the tube of cement (#350-12). Then use a suitable small pointed tool to punch a hole in the end of the tube nozzle. CAUTION: This cement is very soft and sticky; handle it with care.

( ) Squeeze a sufficient amount of cement on the top edges of the group of disc capacitors to cement them together. Take care not to move these capacitors during the following steps, as it will require several hours for the cement to set.

( ) Squeeze a few drops of cement into the centers of the two toroid coils on the buffer circuit board so the coils will be fixed in position on the board. NOTE: Save the remaining cement for use later.



Detail 1-12A

Refer to Pictorial 1-12 (in the "Illustration Booklet") for the following steps.

( ) Position the long orange wire out of the way toward the back of the tuning capacitor, and the red, gray, and bare wires straight up from the buffer circuit board. Then remove the nut that secures coil L1201 to the VFO bracket.

( ) Refer to Detail 1-12A and carefully install the VFO bracket assembly into the VFO chassis. The tuning capacitor shaft should pass through hole C1201 in the shield and into the bushing of the vernier drive. The threaded coil bushing should pass through hole L1201.

( ) Refer again to Detail 1-12A and, from the front of the shield, start #6 x 3/8" hex head sheet metal screws into holes FH, FJ, FK, FL, FM, FN, and FP. Do not tighten the screws yet. NOTE: Do not install a screw in the lower left front of the shield.

( ) Locate the capacitor mounting bracket. Then use one of the #6 x 3/8" hex head sheet metal screws to thread the two small holes in the bracket. A 1/4" nut driver may be helpful. Save the screw for use in a later step.

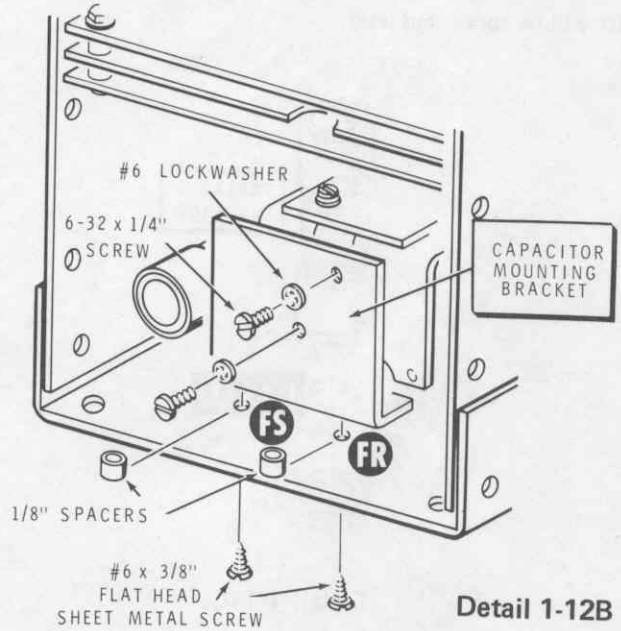
( ) Refer to Detail 1-12B and mount the capacitor mounting bracket to the bottom of the VFO chassis at FR and FS. Use a 6-32 x 3/8" flat head sheet metal screw and one 1/8" spacer at each hole.

( ) Secure the capacitor mounting bracket to the tuning capacitor with 6-32 x 1/4" screws and #6 lockwashers.

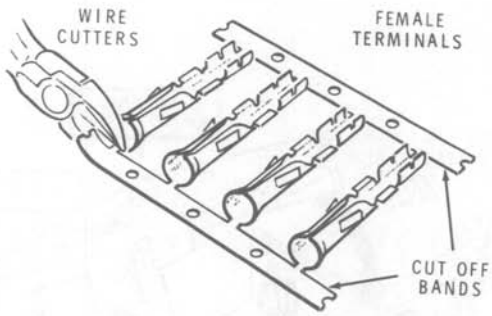
( ) Tighten the seven previously started #6 x 3/8" hex head sheet metal screws.

( ) Tighten the vernier drive setscrews onto the tuning capacitor shaft.

( ) Rotate the shaft of the vernier drive a few turns either way. Then tighten the screws that hold the vernier drive onto the VFO chassis.



Detail 1-12B

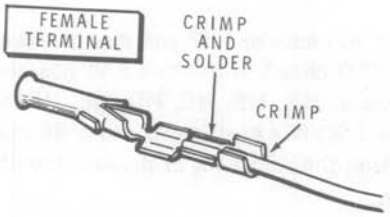


Detail 1-12C

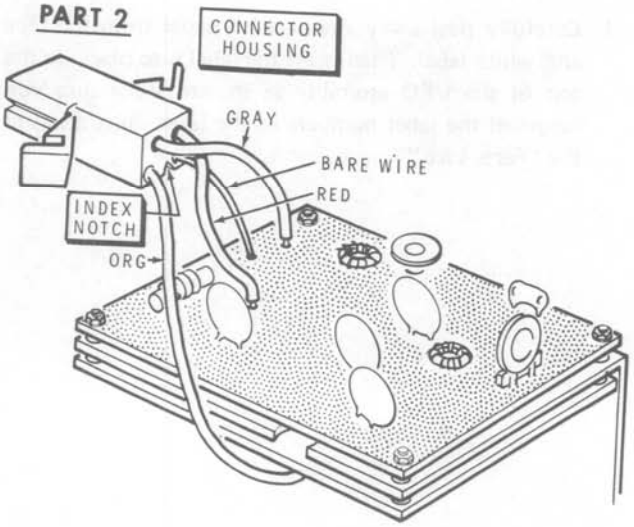
( ) Secure the bushing of coil L1201 on the front of the VFO chassis with the nut you removed earlier.

( ) Refer to Detail 1-12C and cut the two supporting bands from the strip of four female terminals, if this has not already been done.

PART 1



PART 2



Detail 1-12D

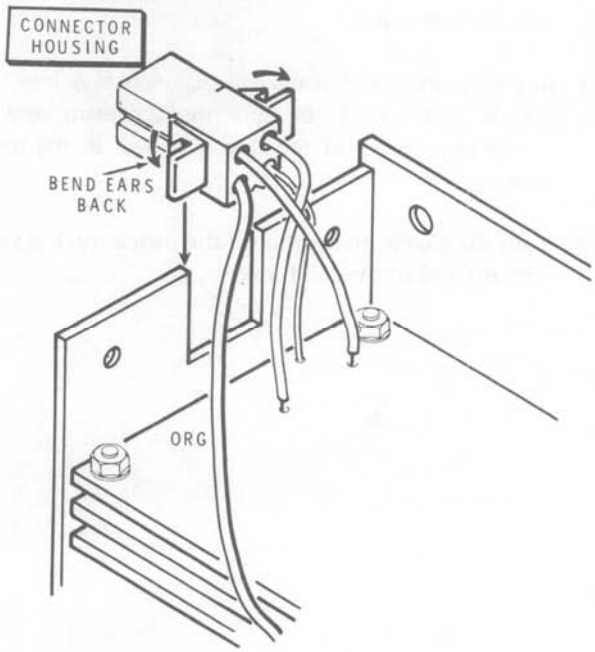
Refer to Detail 1-12D for the next two steps.

( ) Refer to part 1 of Detail 1-12D and install female terminals on the free end of the bare wire and on the free ends of the orange, gray, and red wires coming from the VFO assembly.

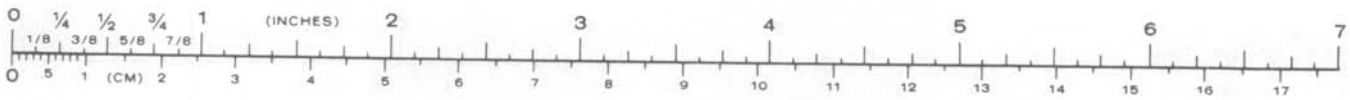
( ) Position the male connector housing with the ears and index notch as shown; then refer to Part 2 of Detail 1-12D and insert the female terminals into the holes in the connector housing. Push each terminal into the housing until it snaps into place. Select the hole for each wire according to its position relative to the index notch. Be sure to use the correct hole, as the terminals cannot be removed after they are inserted. Tug gently on each wire to make sure the terminals have locked into place.

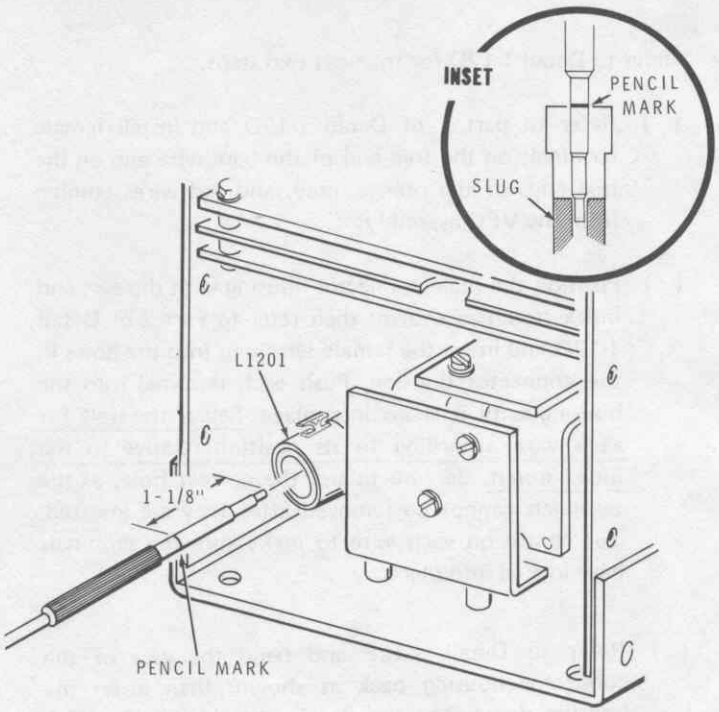
( ) Refer to Detail 1-12E and bend the ears of the connector housing back as shown; then insert the housing down into the slot in the side of the VFO chassis.

( ) Bend together the ends of the two solder lugs at FG and FC. Then solder them together. (See Pictorial 1-12.)

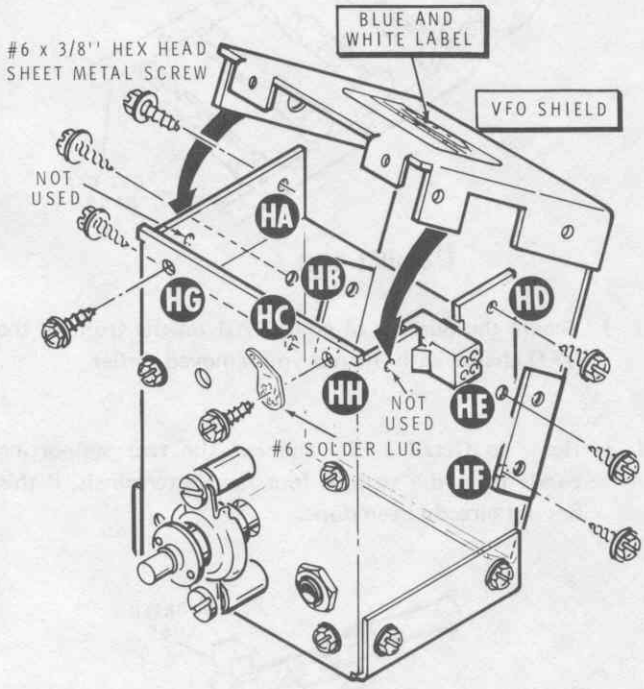


Detail 1-12E





Detail 1-12F



PICTORIAL 1-13

Refer to Detail 1-12F for the next three steps.

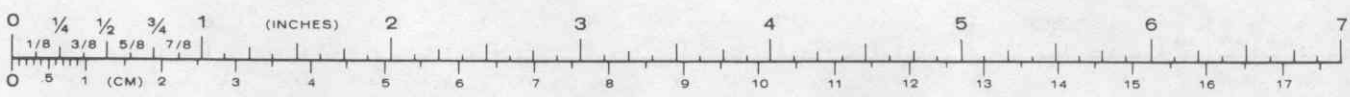
( ) Put a pencil mark 1-1/8" from the short end of the coil alignment tool.

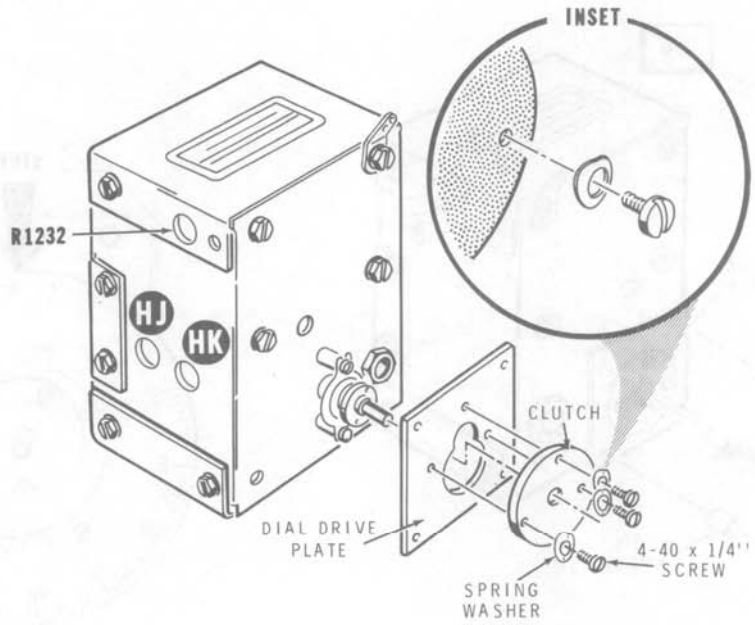
( ) Insert the short end of the coil alignment tool into the slug in coil L1201. Be sure the alignment tool is completely seated in the slug as shown in the inset drawing.

( ) Turn the slug in the coil until the pencil mark is even with the end of the coil form.

( ) Refer to Pictorial 1-13 and mount the VFO shield on the VFO chassis with #6 x 3/8" hex head sheet metal screws at HA, HB, HC, HD, HE, HF, and HG. Use a #6 x 3/8" hex head screw and a #6 solder lug at HH. Position the solder lug as shown. Note the two unused holes.

( ) Carefully peel away the backing paper from the blue and white label. Then press the label into place on the top of the VFO assembly as shown. Make sure you recorded the label numbers in the label illustration in the "Parts List."





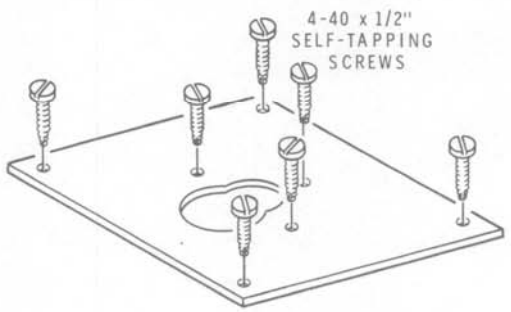
PICTORIAL 1-14

VFO DIAL ASSEMBLY

Refer to Pictorial 1-14 for the following steps.

( ) Refer to Detail 1-14A and turn a 4-40 x 1/2" self-tapping screw into each of the seven holes in the dial drive plate. Insert the screws until about one-third of the length extends from the back side of the plate.

( ) Remove and discard the seven screws in the dial drive plate.



Detail 1-14A

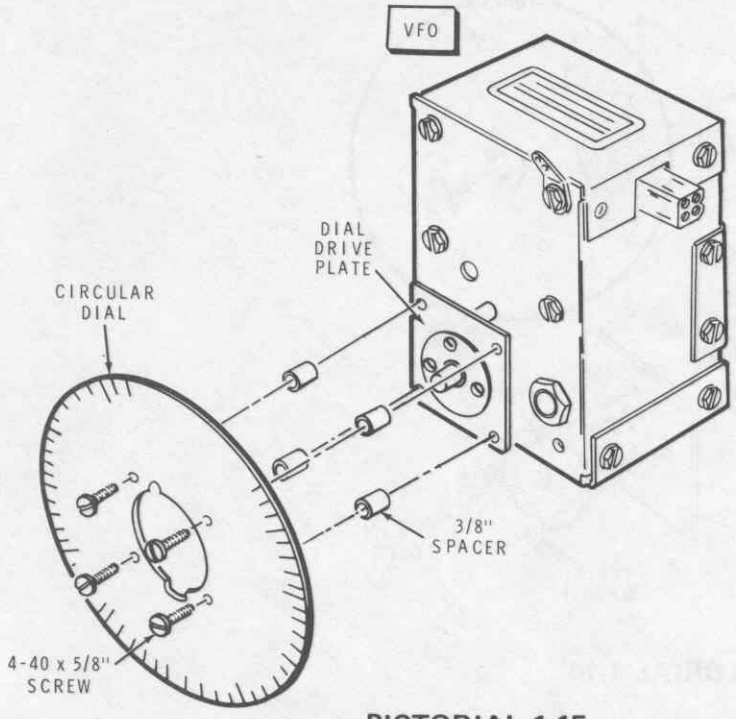
( ) Place the larger portion of the opening in the dial drive plate over the collar of the vernier drive and slide the plate down behind the collar.

( ) Place the clutch onto the vernier drive and secure it to the dial drive plate with three 4-40 x 1/4" screws and three spring washers. Do not tighten these screws. Refer to the inset drawing and position the washers as shown.

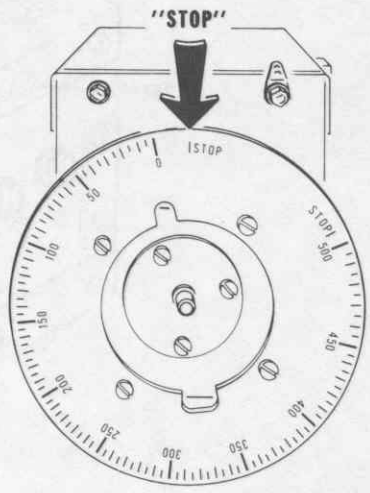
( ) Adjust each of the three 4-40 screws until its end is flush with the inner surface of the dial drive plate. Then turn each screw one turn counterclockwise. The clutch should then be parallel with the dial drive plate.

( ) Insert the end of a screwdriver through hole R1232 in the side of the VFO assembly. Then turn the control to the center of its rotation.

( ) Insert the end of a screwdriver through holes HJ and HK in the side of the VFO assembly. Tighten the two trimmer screws until snug; then turn each one 1/2 turn counterclockwise.



PICTORIAL 1-15



Detail 1-15A

Refer to Pictorial 1-15 for the following steps.

( ) Remove the paper backing from the circular dial; then mount the circular dial onto the dial drive plate. Use four 4-40 x 5/8" screws and four 3/8" spacers.

( ) Turn the vernier shaft to its full counterclockwise position. Then slip the circular dial with one hand until the STOP at the "0" end of the scale is at the 12 o'clock position as shown in Detail 1-15A.

This completes the assembly of the VFO. Set it aside until it is called for in a step.

TRANSMITTER AUDIO/REG CIRCUIT BOARD

PARTS LIST

Remove the parts from Pack #2 and check each part against the following list. Make a check (✓) in the space provided as you identify each part. Return any part that is packed in an individual envelope with the part number on it back in the envelope after you identify it until it is called for in a step. Do not throw away any packing materials until all parts are accounted for.

KEY No.	QTY.	DESCRIPTION	PART No.	CIRCUIT Component No.

RESISTORS, 1/2-Watt

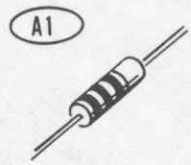
NOTES:

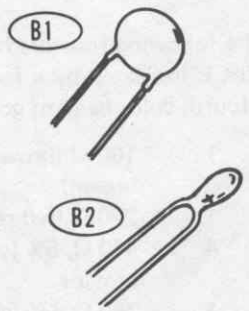
1. The resistors may be packed in more than one envelope. Open all of the resistor envelopes in this pack before you check them against the Parts List.

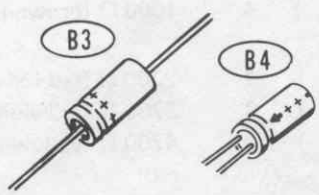
2. The following resistors have a 10% tolerance unless otherwise noted. 10% is indicated by a fourth color band of silver; 5% is indicated by a fourth color band of gold.

A1 ( )	1	100 Ω (brown-black-brown)	1-3	R226
A1 ( )	1	220 Ω (red-red-brown)	1-45	R228
A1 ( )	4	470 Ω, 5% (yellow-violet-brown)	1-157	R216, R236, R239, R255
A1 ( )	1	750 Ω, 5% (violet-green-brown)	1-96	R254
A1 ( )	4	1000 Ω (brown-black-red)	1-9	R219, R229, R231, R242,
A1 ( )	1	2200 Ω (red-red-red)	1-44	R238
A1 ( )	1	2700 Ω (red-violet-red)	1-13	R249
A1 ( )	3	4700 Ω (yellow-violet-red)	1-16	R217, R221, R233
A1 ( )	1	6800 Ω (blue-gray-red)	1-19	R243

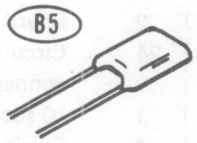
KEY No.	QTY.	DESCRIPTION	PART No.	CIRCUIT Component No.
Resistors (cont'd.)				
A1 ( )	4	10 kΩ (brown-black-orange)	1-20	R205, R232, R235, R237
A1 ( )	1	15 kΩ (brown-green-orange)	1-21	R241
A1 ( )	3	22 kΩ (red-red-orange)	1-22	R201, R203, R215
A1 ( )	2	33 kΩ (orange-orange-orange)	1-24	R214, R244
A1 ( )	2	47 kΩ (yellow-violet-orange)	1-25	R234, R251
A1 ( )	1	100 kΩ (brown-black-yellow)	1-26	R227
A1 ( )	6	120 kΩ (brown-red-yellow)	1-121	R202, R204, R208, R209, R222, R224
A1 ( )	1	220 kΩ (red-red-yellow)	1-29	R213
A1 ( )	1	330 kΩ (orange-orange-yellow)	1-31	R212
A1 ( )	2	470 kΩ (yellow-violet-yellow)	1-33	R248, R211
A1 ( )	1	680 kΩ (blue-gray-yellow)	1-34	R223
A1 ( )	1	1.5 MΩ (brown-green-green)	1-36	R207
A1 ( )	2	2.2 MΩ (red-red-green)	1-37	R206, R225
A1 ( )	1	3.3 MΩ (orange-orange-green)	1-38	R245
A1 ( )	1	4.7 MΩ (yellow-violet-green)	1-71	R218
A1 ( )	2	10 MΩ (brown-black-blue)	1-40	R246, R247
CAPACITORS				
Disc				
B1 ( )	1	.001 μF	21-163	C211
B1 ( )	12	.1 μF	21-199	C201, C202, C203, C206, C207, C213, C217, C218, C219, C221, C225, C228
				C204
B1 ( )	1	.01 μF	21-176	C204
Electrolytic				
B2 ( )	1	.68 μF (tantalum)	25-200	C215
B2 ( )	1	47 μF (tantalum)	25-223	C227
B3 ( )	1	2 μF	25-123	C212
B3 ( )	3	50 μF	25-98	C205, C209, C226
B4 ( )	1	10 μF	25-115	C214





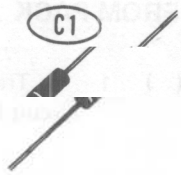


KEY No.	QTY.	DESCRIPTION	PART No.	CIRCUIT Component No.
Other				
B5 ( )	1	.022 μF Mylar*	27-63	C216
B5 ( )	2	.1 μF Mylar	27-47	C208, C222



DIODES

C1 ( )	2	Zener, 5.1 volt	56-16	ZD201, ZD203
C1 ( )	1	Zener, 9.1 volt	56-19	ZD202
C1 ( )	5	1N4149	56-56	D201, D202, D203, D204, D205
C1 ( )	1	1N4002	57-65	D207

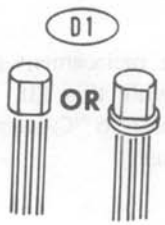


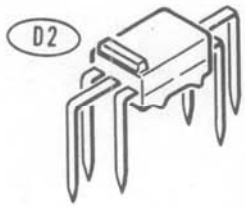
TRANSISTORS-INTEGRATED CIRCUITS

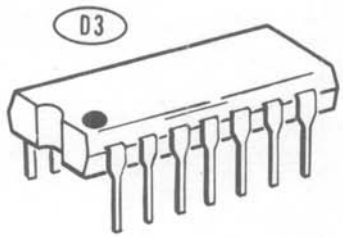
NOTE: Transistors and integrated circuits are marked for identification in one of the following four ways:

1. Part number.
2. Type number. (On integrated circuits this refers only to the numbers; the letters may be different or missing.)
3. Part number and type number.
4. Part number with a type number other than the one listed.

D1 ( )	4	X29A829 transistor	417-201	Q202, Q204, Q207, Q208
D1 ( )	6	MPSA20 transistor	417-801	Q201, Q203, Q205, Q206, Q209, Q210
D2 ( )	1	MFC6030 integrated circuit	442-48	IC203
D3 ( )	1	LM3900 integrated circuit.	442-71	IC201





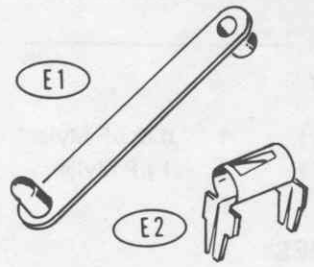


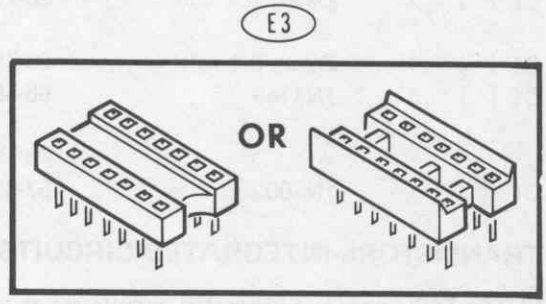
*DuPont Registered Trademark.

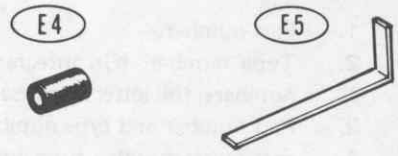
KEY No.	QTY.	DESCRIPTION	PART No.	CIRCUIT Component No.

MISCELLANEOUS

E1 ( )	2	Board puller	207-80
E2 ( )	24	Circuit board connector	432-124
E3 ( )	1	IC socket	434-298
E4 ( )	4	Ferrite bead	475-10
E5 ( )	1	IC lifter	490-111







PART FROM PACK #12

( )	1	Transmitter audio/reg circuit board	85-1634-2

The prices shown on the separate "Heath Parts Price List" 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 (Michigan residents add 4% sales tax) to cover insurance, 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.

To order a replacement part, use the Parts Order Form furnished with this kit. If a Parts Order Form is not available, refer to "Customer Service" inside the rear cover of this Manual.

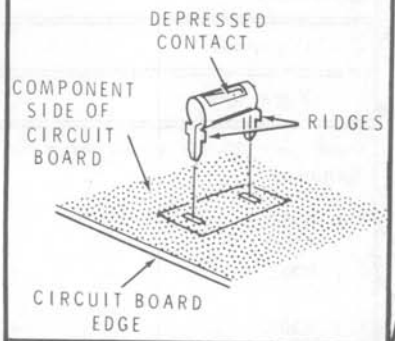
STEP-BY-STEP ASSEMBLY

START

Position the transmitter audio/reg circuit board as shown. Then complete each step in Pictorial 2-1 through 2-6.

FOR GOOD SOLDER CONNECTIONS, YOU MUST **KEEP THE SOLDERING IRON TIP CLEAN.** WIPE IT OFTEN WITH A DAMP SPONGE OR CLOTH.

Install circuit board connectors in the following manner. Note that inside each connector the spring contact is depressed on one end. This depressed end of the connector should face away from the edge of the circuit board. Insert the mounting tabs through the circuit board until the ridges of the connector are firmly against the circuit board. Look at the row of connectors to make sure the depressed end of the contact of each connector is toward the center of the circuit board. Solder the tabs to the foil.

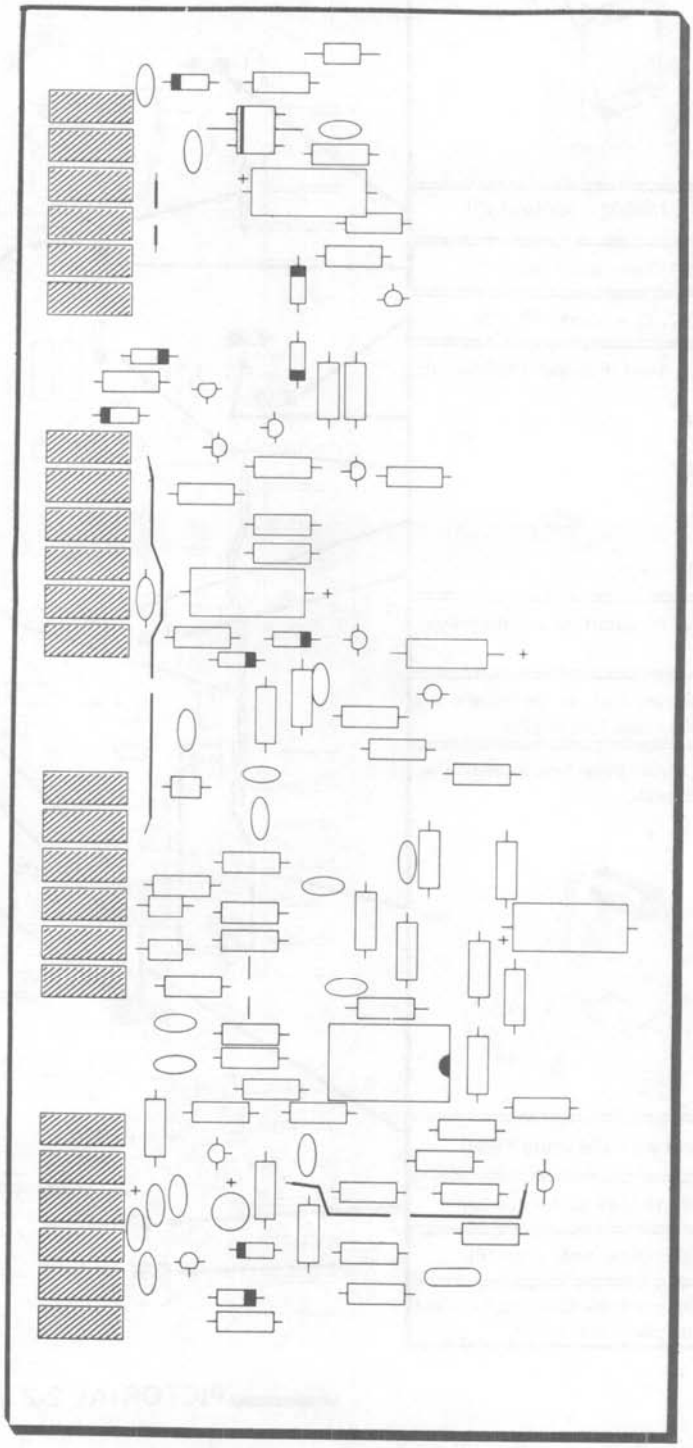


( ) Six circuit board connectors.

( ) Six circuit board connectors.

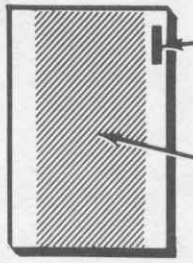
( ) Six circuit board connectors.

( ) Six circuit board connectors.



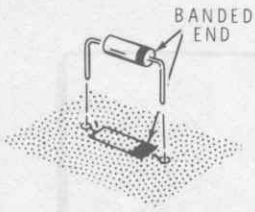
PICTORIAL 2-1

IDENTIFICATION DRAWING



START

NOTE: When you install a diode, always match the banded end of the diode with the band mark on the circuit board.



( ) D207: 1N4002 diode (#57-65).

( ) ZD201: Zener diode (#56-16).

( ) ZD202: Zener diode (#56-19).

Install four 1N4149 diodes (#56-56) at:

( ) D204. . . . . .

( ) D203. . . . . .

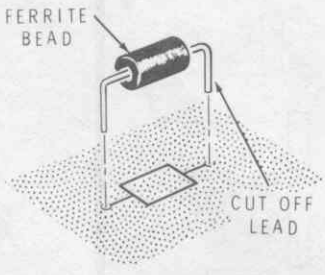
( ) D201. . . . . .

( ) D202. . . . . .

NOTE: Save the cutoff leads in the following step.

( ) Solder the leads to the foil and cut off the excess lead lengths.

( ) FB: Install three ferrite beads. Use cutoff leads.



( ) Jumper wire. Use a cutoff lead.

( ) D205: 1N4149 diode (#56-56).

( ) ZD203: Zener diode (#56-16).

( ) Solder the leads to the foil and cut off the excess lead lengths.

CONTINUE

( ) FB: Ferrite bead. Use a cutoff lead.

NOTE: When you install a jumper wire, cut it to the indicated length and remove 1/4" of insulation from each end. After the wire has been installed, use a small screwdriver to press it down against the circuit board.

( ) 1" gray wire.

( ) 3" gray wire.

Install six 120 kΩ (brown-red-yellow) resistors at:

( ) R204.

( ) R202.

( ) R209.

( ) R222.

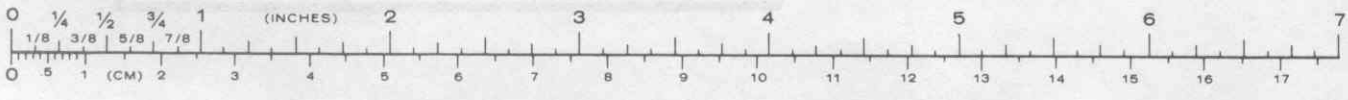
( ) R208.

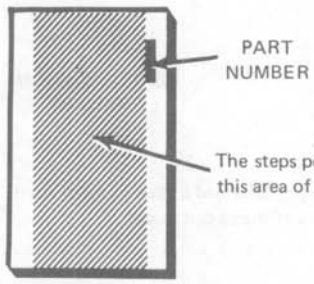
( ) R224.

( ) 2-3/8" gray wire.

( ) Solder the leads to the foil and cut off the excess lead lengths.

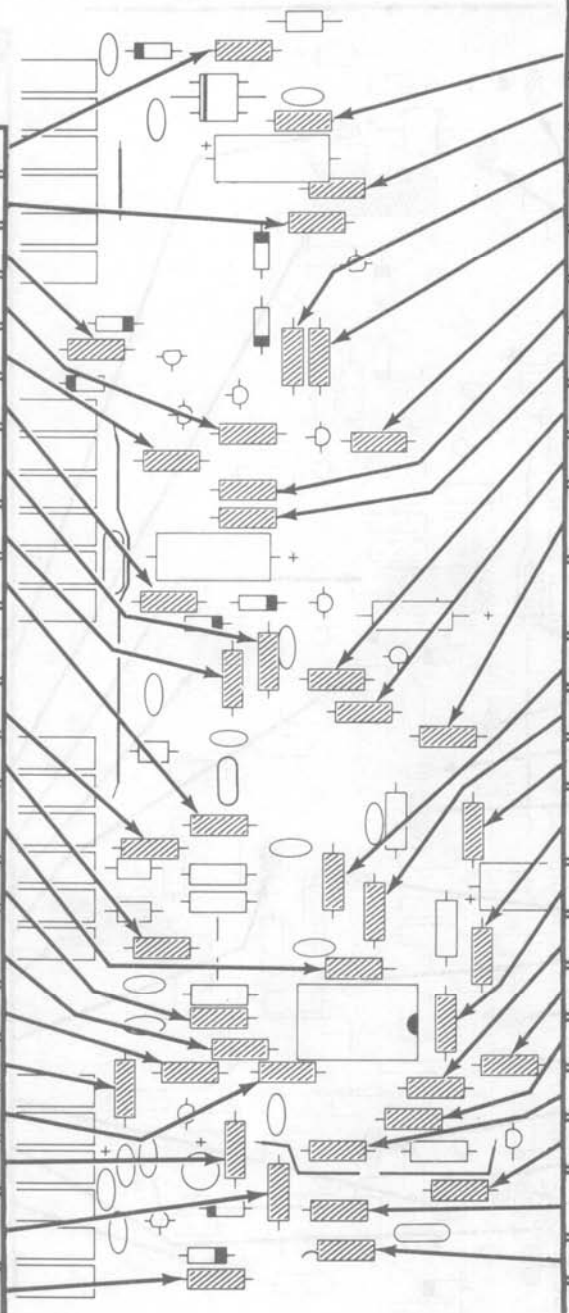
PICTORIAL 2-2





START

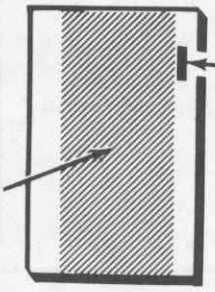
- ( ) R254: 750 Ω (violet-green-brown).
- ( ) R231: 1000 Ω (brown-black-red).
- ( ) R217: 4700 Ω (yellow-violet-red).
- ( ) R237: 10 kΩ (brown-black-orange).
- ( ) R235: 10 kΩ (brown-black-orange).
- ( ) R229: 1000 Ω (brown-black-red).
- ( ) R227: 100 kΩ (brown-black-yellow).
- ( ) R226: 100 Ω (brown-black-brown).
- ( ) R205: 10 kΩ (brown-black-orange).
- ( ) Solder the leads to the foil and cut off the excess lead lengths.
- ( ) R203: 22 kΩ (red-red-orange).
- ( ) R201: 22 kΩ (red-red-orange).
- ( ) R212: 330 kΩ (orange-orange-yellow).
- ( ) R223: 680 kΩ (blue-gray-yellow).
- ( ) R248: 470 kΩ (yellow-violet-yellow).
- ( ) R249: 2700 Ω (red-violet-red).
- ( ) R251: 47 kΩ (yellow-violet-orange).
- ( ) R225: 2.2 MΩ (red-red-green).
- ( ) R243: 6800 Ω (blue-gray-red).
- ( ) R244: 33 kΩ (orange-orange-orange).
- ( ) R241: 15 kΩ (brown-green-orange).
- ( ) Solder the leads to the foil and cut off the excess lead lengths.



CONTINUE

- ( ) R255: 470 Ω (yellow-violet-brown).
- ( ) R232: 10 kΩ (brown-black-orange).
- ( ) R234: 47 kΩ (yellow-violet-orange).
- ( ) R233: 4700 Ω (yellow-violet-red).
- ( ) R238: 2200 Ω (red-red-red).
- ( ) R236: 470 Ω (yellow-violet-brown).
- ( ) R239: 470 Ω (yellow-violet-brown).
- ( ) R216: 470 Ω (yellow-violet-brown).
- ( ) R215: 22 kΩ (red-red-orange).
- ( ) R214: 33 kΩ (orange-orange-orange).
- ( ) Solder the leads to the foil and cut off the excess lead lengths.
- ( ) R206: 2.2 MΩ (red-red-green).
- ( ) R213: 220 kΩ (red-red-yellow).
- ( ) R228: 220 Ω (red-red-brown).
- ( ) R211: 470 kΩ (yellow-violet-yellow).
- ( ) R207: 1.5 MΩ (brown-green-green).
- ( ) R218: 4.7 MΩ (yellow-violet-green).
- ( ) R219: 1000 Ω (brown-black-red).
- ( ) R246: 10 MΩ (brown-black-blue).
- ( ) R247: 10 MΩ (brown-black-blue).
- ( ) R221: 4700 Ω (yellow-violet-red).
- ( ) R245: 3.3 MΩ (orange-orange-green).
- ( ) R242: 1000 Ω (brown-black-red).
- ( ) Solder the leads to the foil and cut off the excess lead lengths.

PICTORIAL 2-3



START

Install .1 μF disc capacitors at:

( ) C228.

( ) C225.

FOR GOOD SOLDER CONNECTIONS, YOU MUST **KEEP THE SOLDERING IRON TIP CLEAN.** WIPE IT OFTEN WITH A DAMP SPONGE OR CLOTH.

( ) Solder the leads to the foil and cut off the excess lead lengths.

( ) C222: .1 μF Mylar.

( ) C217: .1 μF disc.

( ) C203: .1 μF disc.

( ) C208: .1 μF Mylar.

Install eight .1 μF disc capacitors at:

( ) C202.

( ) C201.

( ) C206.

( ) C207.

( ) C218.

( ) C219.

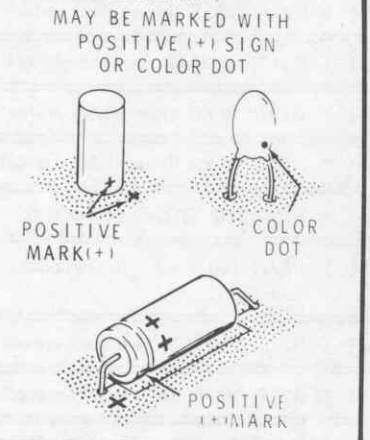
( ) C221.

( ) C213.

( ) Solder 24 leads to the foil and cut off the excess lead lengths.

CONTINUE

NOTE: When you install electrolytic and tantalum capacitors, be sure to match the positive (+) mark or color dot on the capacitor with the positive (+) mark on the circuit board as shown.



( ) C227: 47 μF tantalum.

Install two 50 μF electrolytic capacitors at:

( ) C226.

( ) C205.

( ) C212: 2 μF electrolytic.

( ) C211: .001 μF disc.

( ) C209: 50 μF electrolytic.

( ) C204: .01 μF disc.

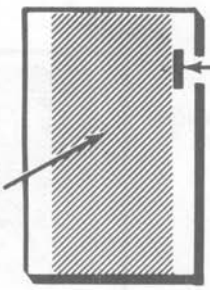
( ) C214: 10 μF electrolytic.

( ) C215: .68 μF tantalum.

( ) C216: .022 μF Mylar.

( ) Solder the leads to the foil and cut off the excess lead lengths.

PICTORIAL 2-4

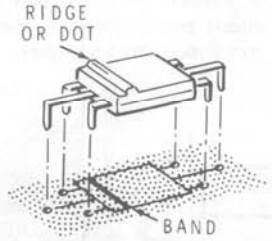


The steps performed in this Pictorial are in this area of the circuit board.

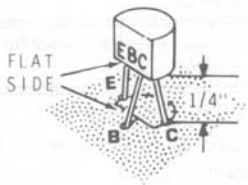
START

( ) IC203: MFC 6030 (#442-48).

Position the ridge or dot of the IC over the band screened on the circuit board. Then insert the IC leads into their corresponding holes, press the IC down tight against the circuit board and solder each lead to the foil.



NOTE: Install the following transistors in the manner shown. First line up the flat of the transistor with the outline of the flat on the circuit board. Insert the transistor leads into their correct holes, indicated by E, B, and C. Solder each lead to the foil and cut off the excess lead lengths.



Install six MPSA20 transistors (#417-801) at:

( ) Q205.

( ) Q206.

( ) Q203.

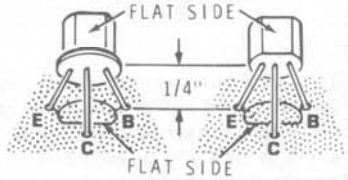
( ) Q201.

( ) Q210.

( ) Q209.

CONTINUE

NOTE: Install the following transistors in the manner shown. First line up the flat of the transistor with the outline of the flat on the circuit board. Bend the "C" lead forward or backward if required, and insert the transistor leads into their correct holes, indicated by E, C, and B. Solder each lead to the foil and cut off the excess lead length.



Install four X29A829 transistors (#417-201) at:

( ) Q204.

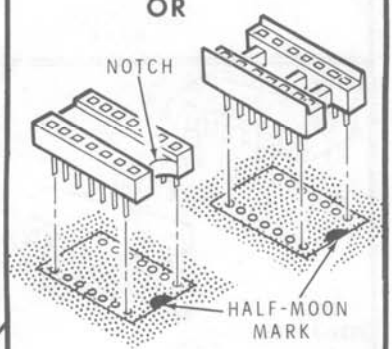
( ) Q207.

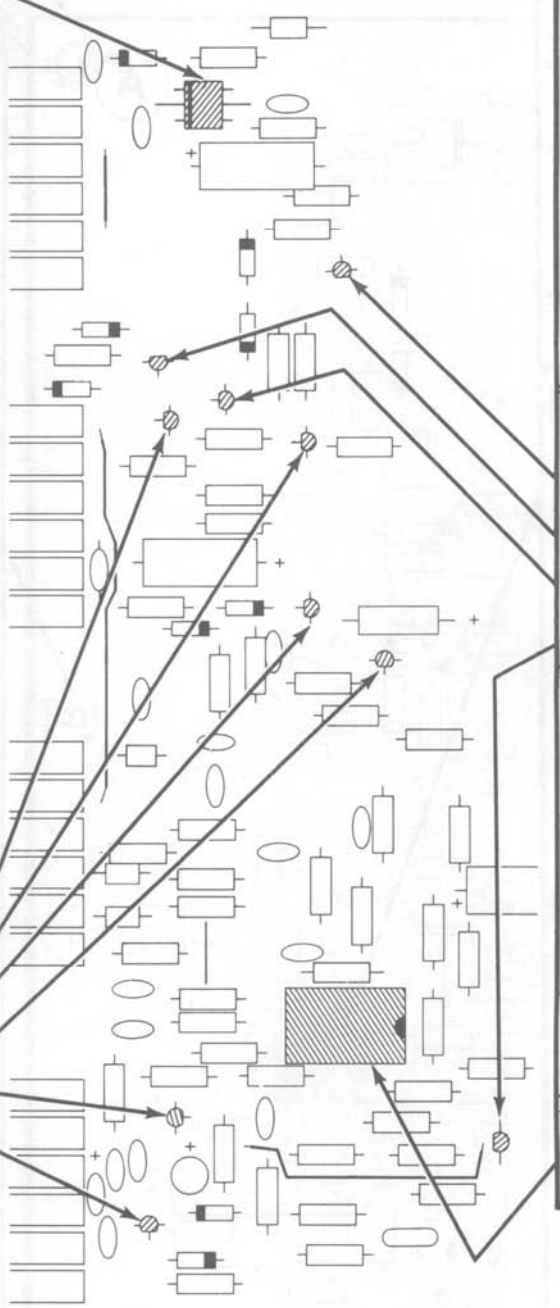
( ) Q208.

( ) Q202.

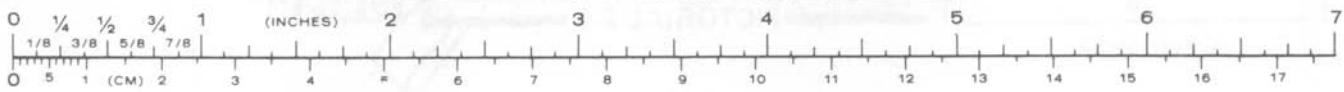
( ) 14-pin integrated circuit socket. Insert the socket pins into the holes. The half-moon mark on the circuit board should still be visible after it is installed. Solder the pins to the foil.

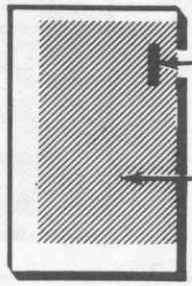
OR





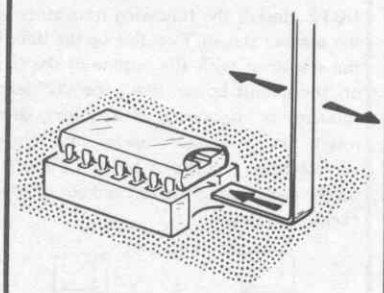
PICTORIAL 2-5





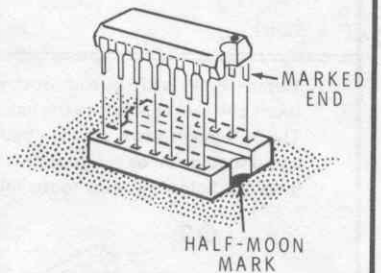
START

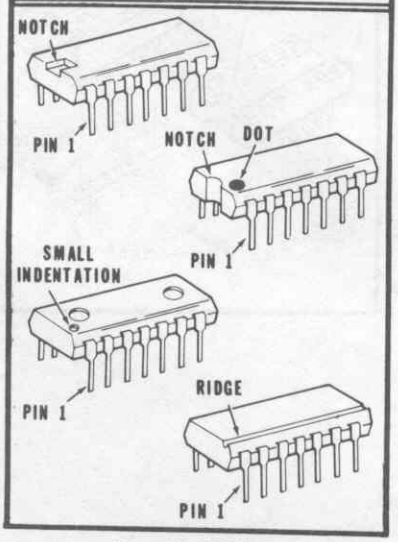
NOTE: An IC lifter has been furnished to remove an IC from its socket, if necessary.



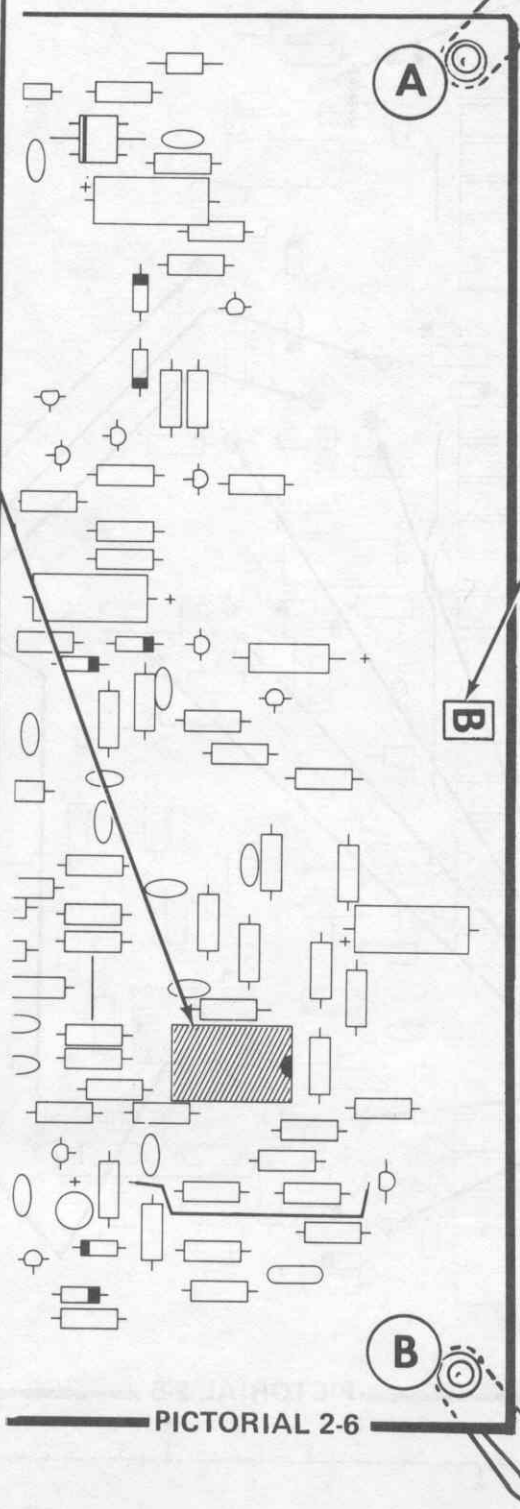
To use the lifter, push the shorter end in between the IC and the socket and rock the longer portion back and forth. Be careful as the IC pins are easily bent.

( ) IC201: Refer to Detail 2-6A and identify the pin 1 end of an LM3900N integrated circuit (#442-71). Position the pin 1 end of this integrated circuit toward the half-moon mark on the circuit board. Then carefully install the integrated circuit. Make sure all the pins are in their respective holes.





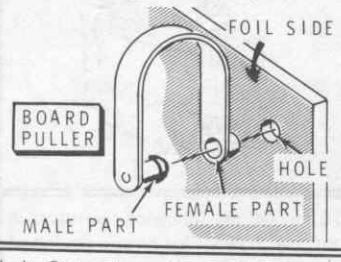
Detail 2-6A



PICTORIAL 2-6

CONTINUE

( ) Mount board pullers on the foil side of the circuit board at holes A and B. Position the female part in the circuit board; then push the male part through the female part.



( ) Cut a large letter "B" from the terminal identification label (#390-1045) and remove the adhesive backing. Press the letter onto the circuit board at the location shown.

NOTE: There may be several unused holes in this circuit board.

CIRCUIT BOARD CHECKOUT

Carefully inspect the circuit board for the following conditions.

( ) Unsoldered connections.

( ) "Cold" solder connections.

( ) Solder bridges between foils.

( ) Protruding leads. No lead should be longer than 1/8"

( ) Transistors for the proper type and installation.

( ) Integrated circuits for the proper type and installation.

( ) Electrolytic capacitors for the correct position of the positive (+) mark.

( ) Diodes for the correct position of the banded end.

Set the circuit board aside until it is called for in a step.

FINISH

HFO/PREMIXER CIRCUIT BOARD

PARTS LIST

Remove the parts from Pack #3 and check each part against the following list. Make a check (✓) in the space provided as you identify each part. Return any part that is packed in an individual envelope with the part number on it back in the envelope after you identify it until it is called for in a step. Do not throw away any packing materials until all parts are accounted for.

KEY No.	QTY.	DESCRIPTION	PART No.	CIRCUIT Component No.

RESISTORS, 1/2-Watt

NOTES:

1. The resistors may be packed in more than one envelope. Open all of the resistor envelopes in this pack before you check them against the Parts List.

2. The following resistors have a 10% tolerance unless otherwise noted. 10% is indicated by a fourth color band of silver; 5% is indicated by a fourth color band of gold.

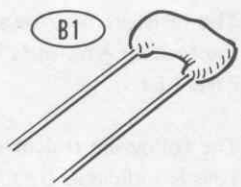
A1 ( )	3	22 Ω (red-red-black)	1-49	R439, R445, R449
A1 ( )	1	39 Ω, 5% (orange-white-black)	1-156	R455
A1 ( )	1	100 Ω (brown-black-brown)	1-3	R444
A1 ( )	1	220 Ω (red-red-brown)	1-45	R446
A1 ( )	4	470 Ω (yellow-violet-brown)	1-6	R405, R417, R426, R441
A1 ( )	18	1000 Ω (brown-black-red)	1-9	R401, R406, R409, R413, R418, R422, R427, R454, R456, R457, R458, R459, R462, R463, R464, R465, R466, R467

KEY No.	QTY.	DESCRIPTION	PART No.	CIRCUIT Component No.
Resistors (cont'd.)				
A1 ( )	3	2200 Ω (red-red-red)	1-44	R451, R452, R471
A1 ( )	3	3300 Ω (orange-orange-red)	1-14	R404, R416, R425
A1 ( )	1	3900 Ω (orange-white-red)	1-46	R453
A1 ( )	5	4700 Ω (yellow-violet-red)	1-16	R419, R424, R428, R461, R472
A1 ( )	1	8200 Ω (gray-red-red)	1-73	R407
A1 ( )	3	15 kΩ (brown-green-orange)	1-21	R403, R411, R414
A1 ( )	3	22 kΩ (red-red-orange)	1-22	R443, R447, R448
A1 ( )	1	47 kΩ (yellow-violet-orange)	1-25	R442
A1 ( )	7	100 kΩ (brown-black-yellow)	1-26	R402, R408, R412, R415, R421, R423, R429

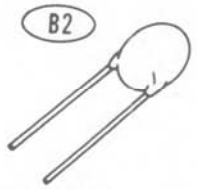
CAPACITORS

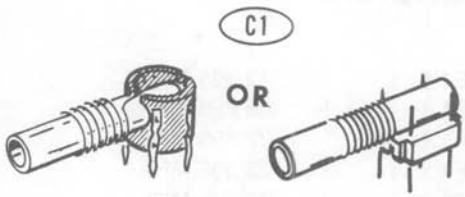
Mica

B1 ( )	4	12 pF	20-130	C461, C463, C465, C467
B1 ( )	2	30 pF	20-100	C456, C458
B1 ( )	1	33 pF	20-160	C471
B1 ( )	2	47 pF	20-101	C409, C412
B1 ( )	4	75 pF	20-110	C452, C454, C462, C466
B1 ( )	2	100 pF	20-148	C401, C405
B1 ( )	1	300 pF	20-115	C457
B1 ( )	1	470 pF	20-128	C453



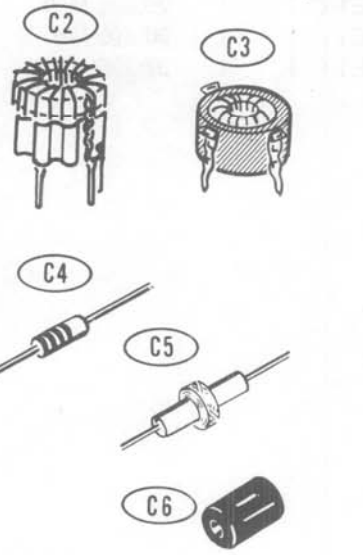
KEY No.	QTY.	DESCRIPTION	PART No.	CIRCUIT Component No.
Capacitors (cont'd.)				
Disc				
B2 ( )	1	2.7 pF	21-149	C444
B2 ( )	1	3.3 pF	21-33	C407
B2 ( )	3	5 pF	21-78	C403, C413, C421
B2 ( )	2	6 pF	21-169	C469, C472
B2 ( )	2	7.7 pF	21-181	C418, C425
B2 ( )	4	10 pF	21-3	C404, C416, C422, C423
B2 ( )	1	18 pF	21-60	C414
B2 ( )	1	24 pF	21-84	C417
B2 ( )	3	100 pF	21-9	C437, C439, C441
B2 ( )	1	270 pF	21-17	C447
B2 ( )	2	.001 μF	21-140	C443, C446
B2 ( )	19	.01 μF	21-176	C402, C406, C408, C411, C415, C419, C424, C434, C435, C436, C438, C442, C445, C448, C451, C455, C459, C464, C468
B2 ( )	1	.1 μF	21-95	C449



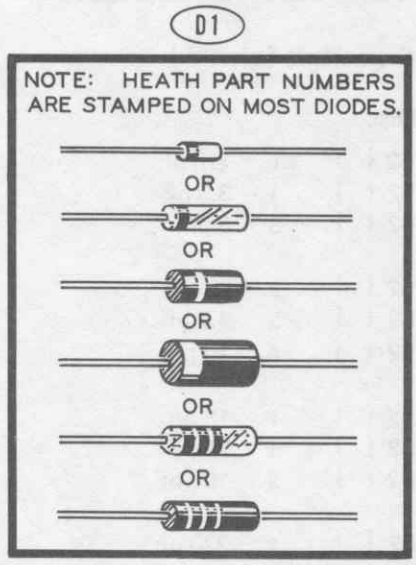


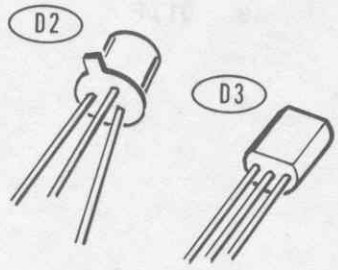
INDUCTORS

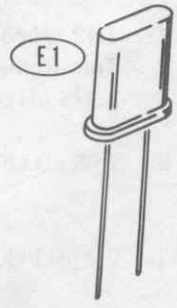
C1 ( )	6	0.5 μH coil	40-687	L402, L403, L404, L405, L406, L407
C1 ( )	1	1.42 μH coil	40-1047	L401
C2 ( )	2	Transformer	40-1050	L422, L423
C3 ( )	4	3.975 μH coil (red dot)	40-1879	L416, L417, L418, L419
C3 ( )	6	7.95 μH coil	40-1672	L410, L411, L412, L413, L414, L415,
C4 ( )	2	2.2 μH inductor	45-73	RFC401, RFC402
C5 ( )	1	30 μH inductor	45-27	RFC403
C6 ( )	7	Ferrite bead	475-10	



KEY No.	QTY.	DESCRIPTION	PART No.	CIRCUIT Component No.
DIODES-TRANSISTORS				
D1 ( )	10	1N458 diode	56-24	D431, D432, R433, R434, R435, D436, D437, D438, D439, D440
D1 ( )	1	1N191 diode (brown-white-brown)	56-26	D426
D1 ( )	16	1N4149 diode	56-56	D401, D402, D403, D404, D405, D406, D407, D408, D409, D410, D411, D412, D413, D414, D421, D422
D1 ( )	4	FH1100 diode	56-87	D427, D428 D429, D430
D2 ( )	2	2N2369 transistor	417-154	Q405, Q406
D3 ( )	3	MPS6521 transistor	417-172	Q401, Q402, Q403
D4 ( )	1	2N3866 transistor	417-205	Q407
CRYSTALS				
E1 ( )	1	12.395 MHz	404-415	Y401
E1 ( )	1	15.895 MHz	404-416	Y402
E1 ( )	1	22.895 MHz	404-417	Y403
E1 ( )	1	23.895 MHz	404-543	Y404
E1 ( )	1	29.895 MHz	404-418	Y405
E1 ( )	1	36.895 MHz	404-419	Y406
E1 ( )	1	37.395 MHz	404-420	Y407



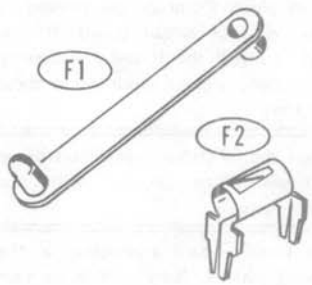




KEY No.	QTY.	DESCRIPTION	PART No.	CIRCUIT Component No.

MISCELLANEOUS

F1 ( )	2	Board puller	207-80	
F2 ( )	18	Circuit board connector	432-124	



PART FROM PACK #12

( )	1	HFO/Premixer circuit board	85-1626-2	

The prices shown on the separate "Heath Parts Price List" 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 (Michigan residents add 4% sales tax) to cover insurance, 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.

To order a replacement part, use the Parts Order Form furnished with this kit. If a Parts Order Form is not available, refer to "Customer Service" inside the rear cover of this Manual.

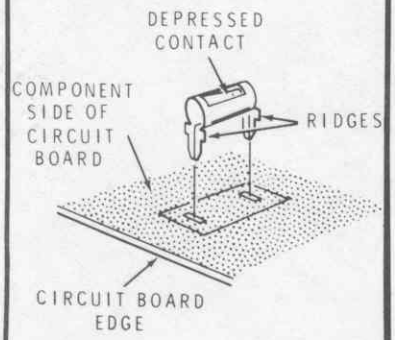
STEP-BY-STEP ASSEMBLY

START

NOTE: The components shown in dashed lines in these Pictorials are printed in yellow on your circuit board. If you intend to install the 10-meter Accessory kit, the parts will be mounted in these spaces later.

Position the HFO/Premixer circuit board as shown. Then proceed with the following steps.

Install circuit board connectors in the following manner. Note that inside each connector the spring contact is depressed on one end. This depressed end of the connector should face away from the edge of the circuit board. Insert the mounting tabs through the circuit board until the ridges of the connector are firmly against the circuit board. Look at the row of connectors to make sure the depressed end of the contact of each connector is toward the center of the circuit board. Solder the tabs to the foil.

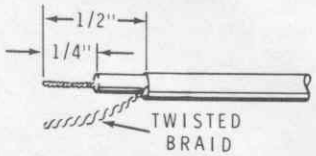


( ) Six circuit board connectors.

( ) Six circuit board connectors.

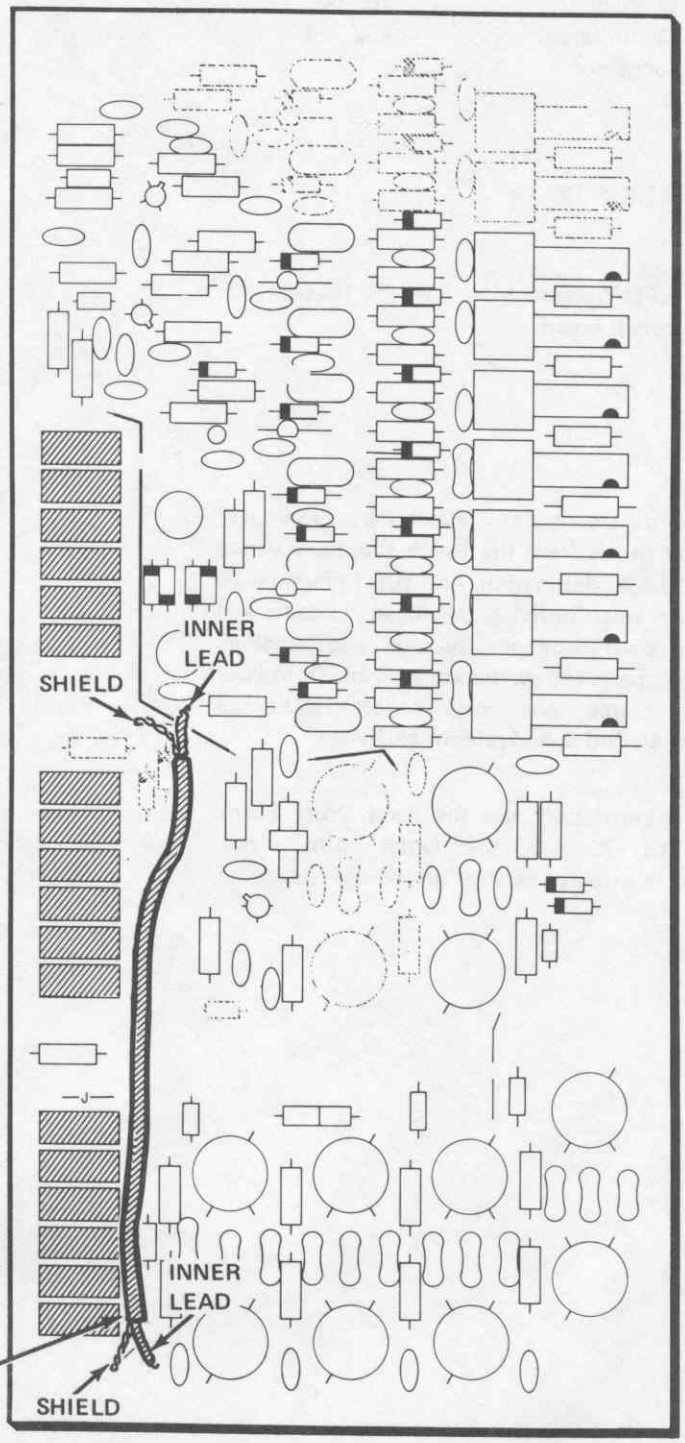
( ) Six circuit board connectors.

( ) Prepare both ends of a 5" shielded cable as follows. DO NOT use the RG-58A/U coaxial cable.

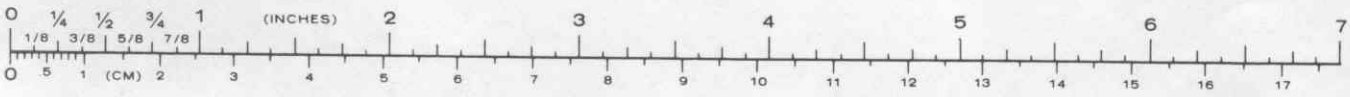


Remove 1/2" of the outer insulation. Then remove 1/4" of insulation from the inner lead.

( ) Install the shielded cable as shown. Form the cable to the outline on the board. Be sure the shield leads and the inner leads are installed as indicated. Solder the leads to the foil and cut off the excess lead lengths.

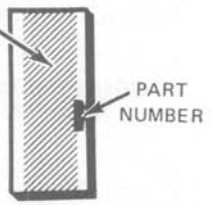


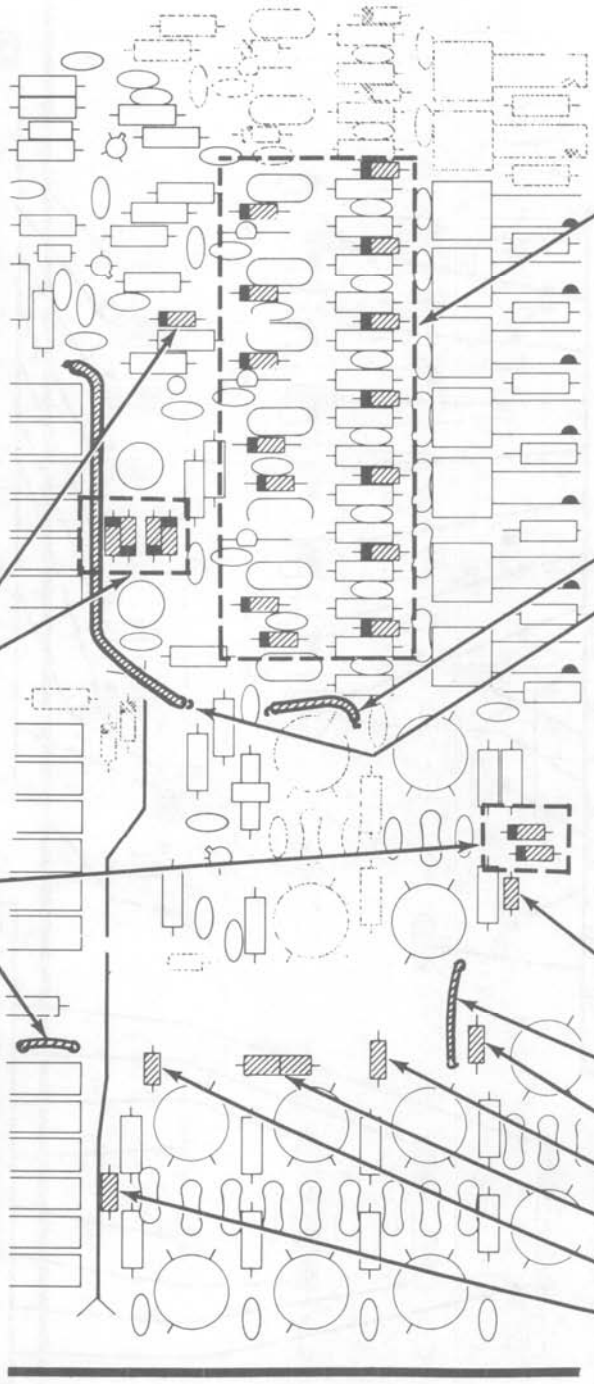
PICTORIAL 3-1



The steps performed in this Pictorial are in this area of the circuit board.

IDENTIFICATION DRAWING





START

( ) Set aside the ten 1N458 diodes (#56-24). These will be installed later.

NOTE: When you install a diode, always match the banded end on the diode with the band mark on the circuit board.

( ) D426: 1N191 diode (#56-26, brown-white-brown).

( ) D427-D430: Four FH1100 diodes (#56-87).

( ) D421, D422: Two 1N4149 diodes (#56-56).

( ) 1" bare wire (cutoff lead) at J.

FOR GOOD SOLDER CONNECTIONS, YOU MUST **KEEP THE SOLDERING IRON TIP CLEAN.** WIPE IT OFTEN WITH A DAMP SPONGE OR CLOTH.

( ) Solder the leads to the foil and cut off the excess lead lengths.

CONTINUE

( ) D401-D414: Fourteen 1N4149 diodes (#56-56).

NOTE: In the following step, save the cutoff leads for use later.

( ) Solder the 28 leads to the foil and cut off the excess lead lengths.

( ) Prepare a 1-1/8" and a 3-1/4" gray wire. As you install each wire, solder it to the foil and cut off the excess wire lengths.

( ) 1-1/8" gray wire at J.

( ) 3-1/4" gray wire at J.

NOTE: When you install a ferrite bead, use a cutoff lead to mount the bead to the circuit board.

( ) Ferrite bead.

( ) 1" bare wire (cutoff lead) at J.

( ) Ferrite bead.

( ) Ferrite bead.

( ) Two ferrite beads.

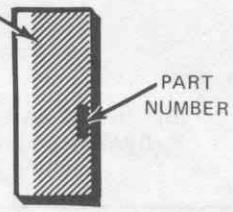
( ) Ferrite bead.

( ) Ferrite bead.

( ) Solder the leads to the foil and cut off the excess lead lengths. Discard any unused leads.

PICTORIAL 3-2

The steps performed in this Pictorial are in this area of the circuit board.



START

Install seven 100 kΩ (brown-black-yellow) resistors at:

( ) R429.
( ) R423.
( ) R421.
( ) R415.
( ) R412.
( ) R408.
( ) R402.

( ) Solder the leads to the foil and cut off the excess lead lengths.

( ) R452: 2200 Ω (red-red-red).

( ) R454: 1000 Ω (brown-black-red).

( ) R453: 3900 Ω (orange-white-red).

( ) R455: 39 Ω (orange-white-black).

( ) R471: 2200 Ω (red-red-red).

( ) Solder the leads to the foil and cut off the excess lead lengths.

CONTINUE

Install seven 1000 Ω (brown-black-red) resistors at:

( ) R427.
( ) R422.
( ) R418.
( ) R413.
( ) R409.
( ) R406.
( ) R401.

( ) Solder the leads to the foil and cut off the excess lead lengths.

( ) R472: 4700 Ω (yellow-violet-red).

Install two 1000 Ω (brown-black-red) resistors at:

( ) R466.
( ) R467.

Install eight 1000 Ω (brown-black-red) resistors at:

( ) R457.
( ) R459.
( ) R463.
( ) R465.
( ) R464.
( ) R462.
( ) R458.
( ) R456.

( ) Solder the leads to the foil and cut off the excess lead lengths.

PICTORIAL 3-3

The steps performed in this Pictorial are in this area of the circuit board.

IDENTIFICATION DRAWING

PART NUMBER

START

( ) R439: 22 Ω (red-red-black).

( ) R441: 470 Ω (yellow-violet-brown).

( ) R442: 47 kΩ (yellow-violet-orange).

( ) R425: 3300 Ω (orange-orange-red).

( ) R426: 470 Ω (yellow-violet-brown).

( ) R447: 22 kΩ (red-red-orange).

( ) R448: 22 kΩ (red-red-orange).

( ) R446: 220 Ω (red-red-brown).

( ) Solder the leads to the foil and cut off the excess lead lengths.

( ) R445: 22 Ω (red-red-black).

( ) R449: 22 Ω (red-red-black).

( ) R416: 3300 Ω (orange-orange-red).

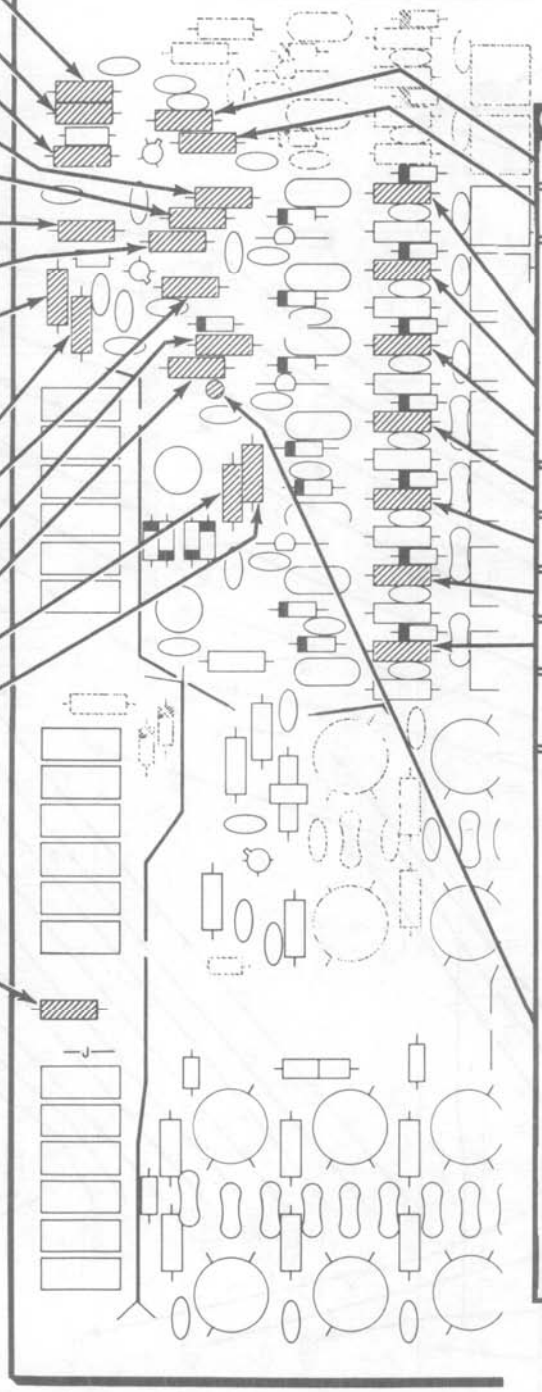
( ) R417: 470 Ω (yellow-violet-brown).

( ) R405: 470 Ω (yellow-violet-brown).

( ) R404: 3300 Ω (orange-orange-red).

( ) R461: 4700 Ω (yellow-violet-red).

( ) Solder the leads to the foil and cut off the excess lead lengths.



CONTINUE

( ) R444: 100 Ω (brown-black-brown).

( ) R443: 22 kΩ (red-red-orange).

Install three 4700 Ω (yellow-violet-red) resistors at:

( ) R428.

( ) R424.

( ) R419.

( ) R414: 15 kΩ (brown-green-orange).

( ) R411: 15 kΩ (brown-green-orange).

( ) R407: 8200 Ω (gray-red-red).

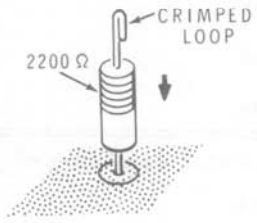
( ) R403: 15 kΩ (brown-green-orange).

( ) Solder the leads to the foil and cut off the excess lead lengths.

( ) R451: 2200 Ω (red-red-red).

1. Cut one lead of this resistor to 3/8". Form this lead into a loop; then crimp the loop tightly as shown.

2. Install the long lead of this resistor at "2200 TP." Solder the lead to the foil and cut off the excess lead.



NOTE: The loop on this resistor is TP (test point).

PICTORIAL 3-4

The steps performed in this Pictorial are in this area of the circuit board.

IDENTIFICATION DRAWING

PART NUMBER

START

Install five .01 µF disc capacitors at:

( ) C435. . . . . .

( ) C436. . . . . .

( ) C438. . . . . .

( ) C442. . . . . .

( ) C434. . . . . .

Install seven .01 µF disc capacitors at:

( ) C424. . . . . .

( ) C419. . . . . .

( ) C415. . . . . .

( ) C411. . . . . .

( ) C408. . . . . .

( ) C406. . . . . .

( ) C402. . . . . .

( ) Solder the leads to the foil and cut off the excess lead lengths.

Install three .01 µF disc capacitors at:

( ) C445. . . . . .

( ) C468. . . . . .

( ) C448. . . . . .

Install four .01 µF disc capacitors at:

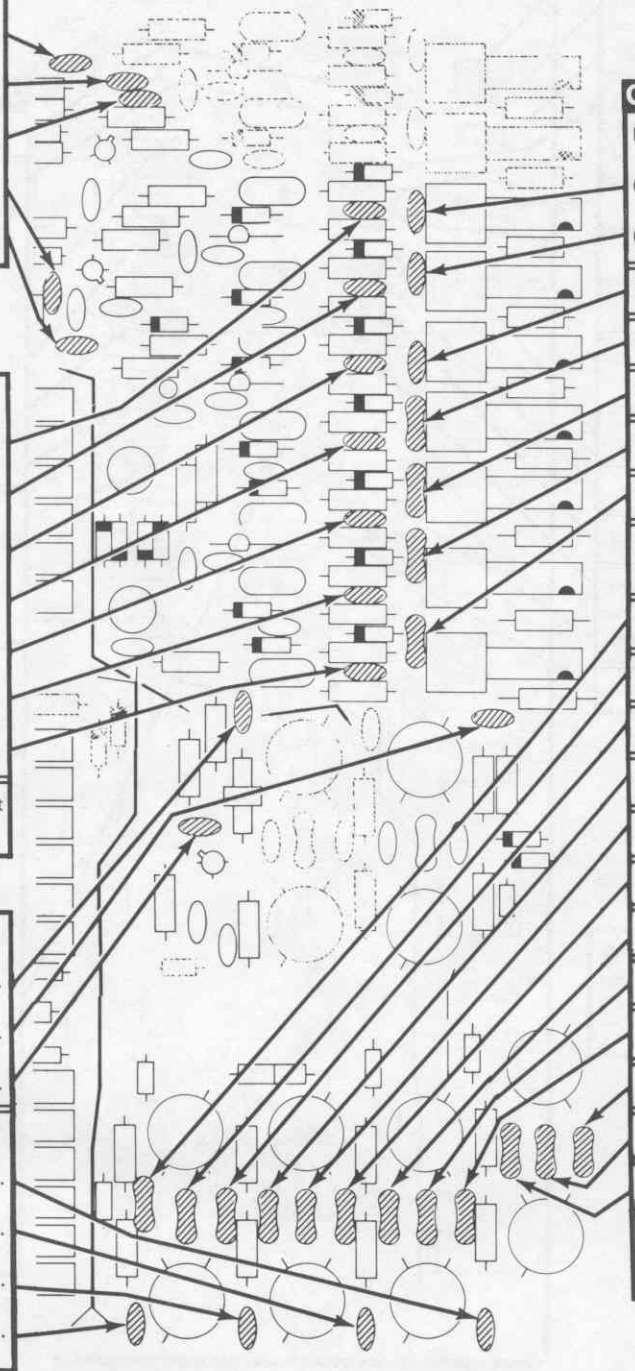
( ) C464. . . . . .

( ) C459. . . . . .

( ) C455. . . . . .

( ) C451. . . . . .

( ) Solder the leads to the foil and cut off the excess lead lengths.



CONTINUE

Install two 7.7 µF disc capacitors at:

( ) C425.

( ) C418.

( ) C417: 24 pF disc.

( ) C412: 47 pF mica.

( ) C409: 47 pF mica.

( ) C405: 100 pF mica.

( ) C401: 100 pF mica.

( ) Solder the leads to the foil and cut off the excess lead lengths.

( ) C452: 75 pF mica.

( ) C453: 470 pF mica.

( ) C454: 75 pF mica.

( ) C456: 30 pF mica.

( ) C457: 300 pF mica.

( ) C458: 30 pF mica.

( ) C461: 12 pF mica.

( ) C462: 75 pF mica.

( ) C463: 12 pF mica.

( ) C465: 12 pF mica.

( ) C466: 75 pF mica.

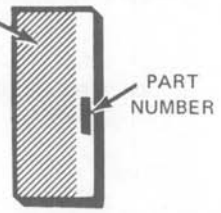
( ) C467: 12 pF mica.

( ) Solder the leads to the foil and cut off the excess lead lengths.

PICTORIAL 3-5

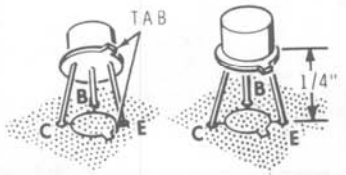
The steps performed in this Pictorial are in this area of the circuit board.

IDENTIFICATION DRAWING



START

NOTE: When you install the following transistors, line up the tab on each transistor with the outline of the tab on the circuit board. Then insert the leads into their correct C, B, and E holes. Solder the leads to the foil and cut off the excess lead lengths.

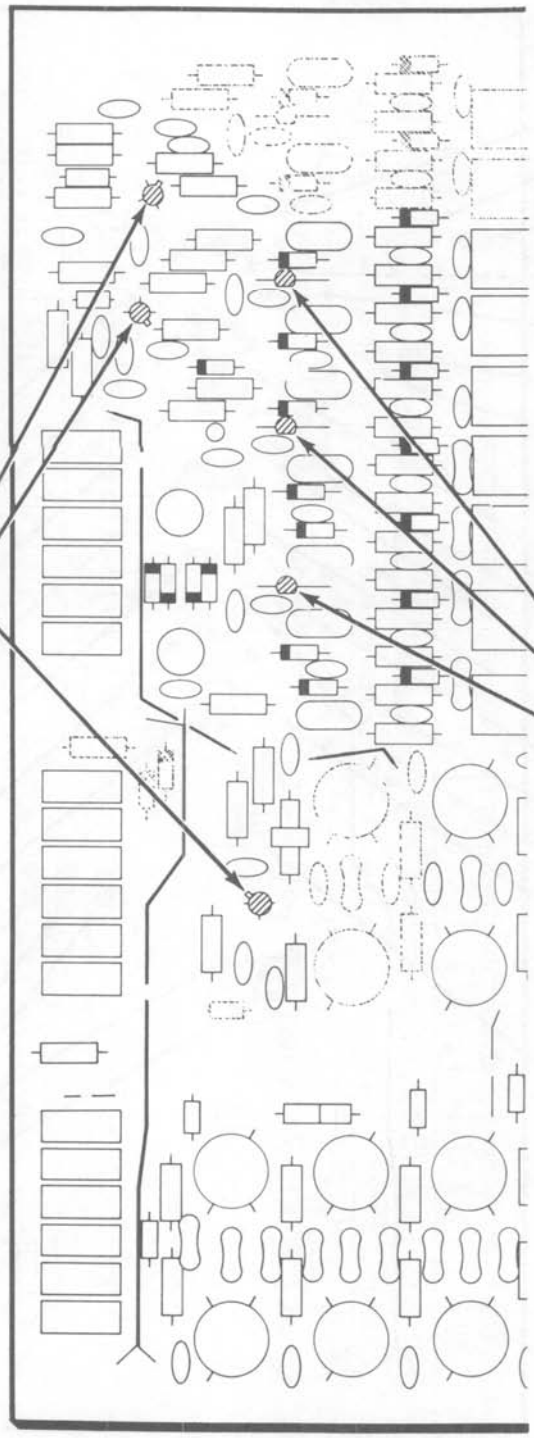


Two 2N2369 transistors (#417-154) at:

( ) Q405. . . . . .

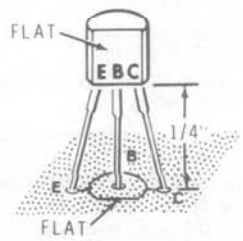
( ) Q406. . . . . .

( ) Q407: 2N3866 transistor (#417-205). This transistor fits down against the circuit board.



CONTINUE

NOTE: Install the following transistors in the manner shown. First line up the flat of the transistor with the outline of the flat on the circuit board. Insert the transistor leads into their correct holes indicated by E, B, and C. Solder each lead to the foil and cut off the excess lead length.



Three MPS 6521 transistors (#417-172) at:

( ) Q403.

( ) Q402.

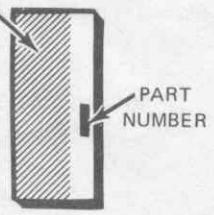
( ) Q401.

PICTORIAL 3-6

The steps performed in this Pictorial are in this area of the circuit board.

IDENTIFICATION DRAWING

PART NUMBER



START

( ) C437: 100 pF disc.

( ) C439: 100 pF disc.

( ) C441: 100 pF disc.

( ) C421: 5 pF disc.

( ) C422: 10 pF disc.

( ) C443: .001 µF disc.

( ) C444: 2.7 pF disc.

( ) Solder the leads to the foil and cut off the excess lead lengths.

( ) C423: 10 pF disc.

( ) C414: 18 pF disc.

( ) C413: 5 pF disc.

( ) C416: 10 pF disc.

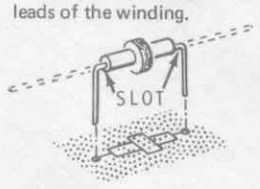
( ) C404: 10 pF disc.

( ) C446: .001 µF disc.

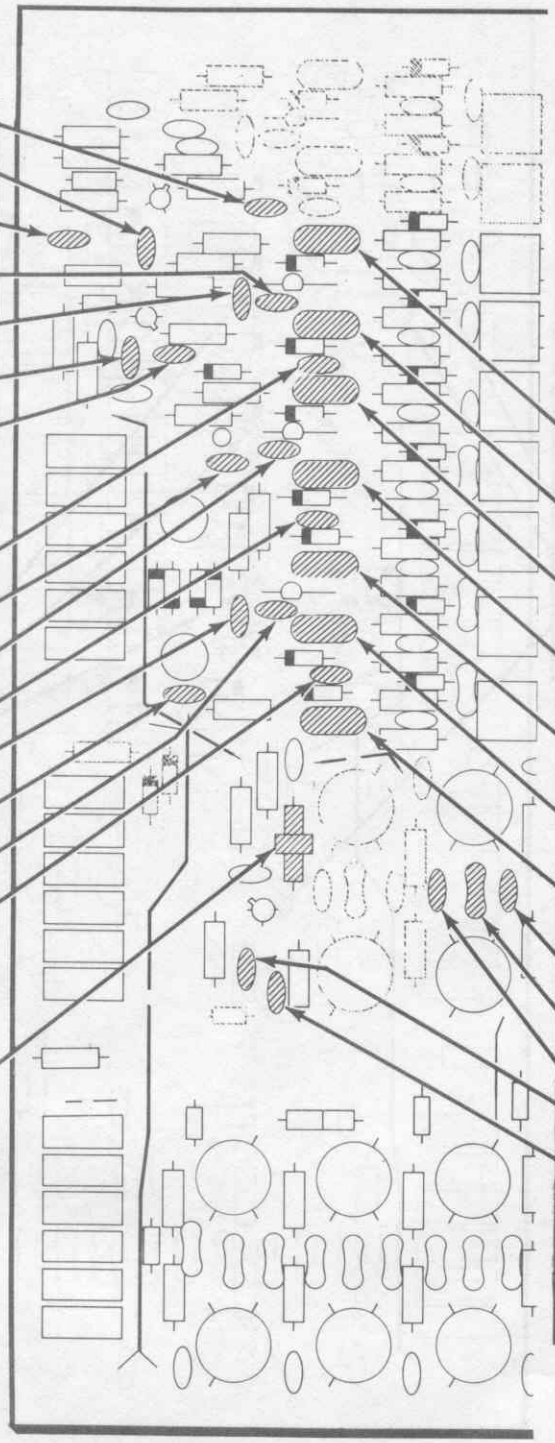
( ) C403: 5 pF disc.

( ) C407: 3.3 pF disc.

( ) RFC 403: 30 µH inductor (#45-27). Bend the leads toward the slot in the coil form to prevent damage to the leads of the winding.

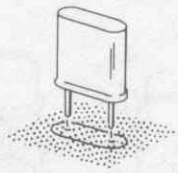


( ) Solder the leads to the foil and cut off the excess lead lengths.



CONTINUE

NOTE: Each crystal frequency is screened on the circuit board. The component numbers are also screened except for Y403, Y405, and Y407. Be sure you mount each crystal in its correct location. Use a minimum amount of heat and solder the leads to the foil.



( ) Y407: 37.395 MHz crystal (#404-420).

( ) Y406: 36.895 MHz crystal (#404-419).

( ) Y405: 29.895 MHz crystal (#404-418).

( ) Y404: 23.895 MHz crystal (#404-543).

( ) Y403: 22.895 MHz crystal (#404-417).

( ) Y402: 15.895 MHz crystal (#404-416).

( ) Y401: 12.395 MHz crystal (#404-415).

( ) C469: 6 pF disc.

( ) C471: 33 pF mica.

( ) C472: 6 pF disc.

( ) C449: .1 µF disc.

( ) C447: 270 pF disc.

( ) Solder the leads to the foil and cut off the excess lead lengths. Save four cutoff leads for use during the assembly of the calibrator circuit board.

PICTORIAL 3-7

The steps performed in this Pictorial are in this area of the circuit board.

IDENTIFICATION DRAWING

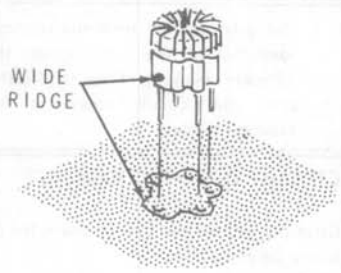
PART NUMBER

START

NOTE: As you install the components in this Pictorial, solder the leads and cut off the excess lead lengths.

( ) RFC 402: 2.2 μH inductor (#45-73).

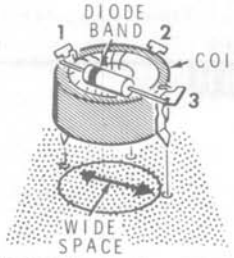
( ) RFC 401: 2.2 μH inductor (#45-73).



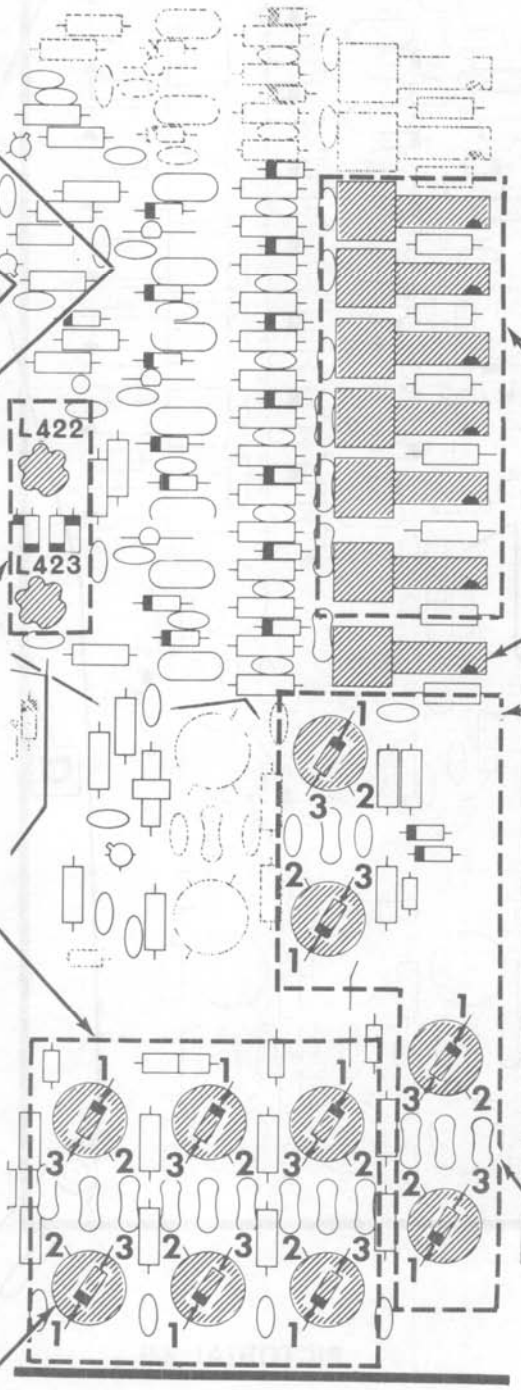
( ) L422, L423: Two transformers (#40-1050). Match the wide ridge on the coil form to the wide space between the holes on the circuit board outline.

( ) L410-L415: Six 7.95 μH coils (#40-1672).

After you install the coils, connect a diode between lugs 1 and 3 of each coil. Be sure you position the banded end of the diode as shown in the Pictorial (toward lug 1 of the coil). Bend each diode lead against a coil terminal and solder it in place. Then cut off the excess lead lengths.

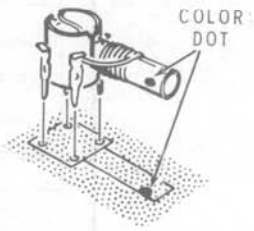


( ) D431-D436: Six 1N458 diodes (#56-24). Connect them to coils L410-L415 respectively.



CONTINUE

Position each coil over its outline and insert all four pins through their holes. Make sure no terminals of adjacent coils touch each other. Then solder the coil pins to the foil.

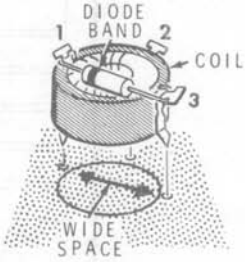


( ) L402-L407: Six coils (#40-687 green dot).

( ) L401: 1.42 μH coil (#40-1047 gray dot).

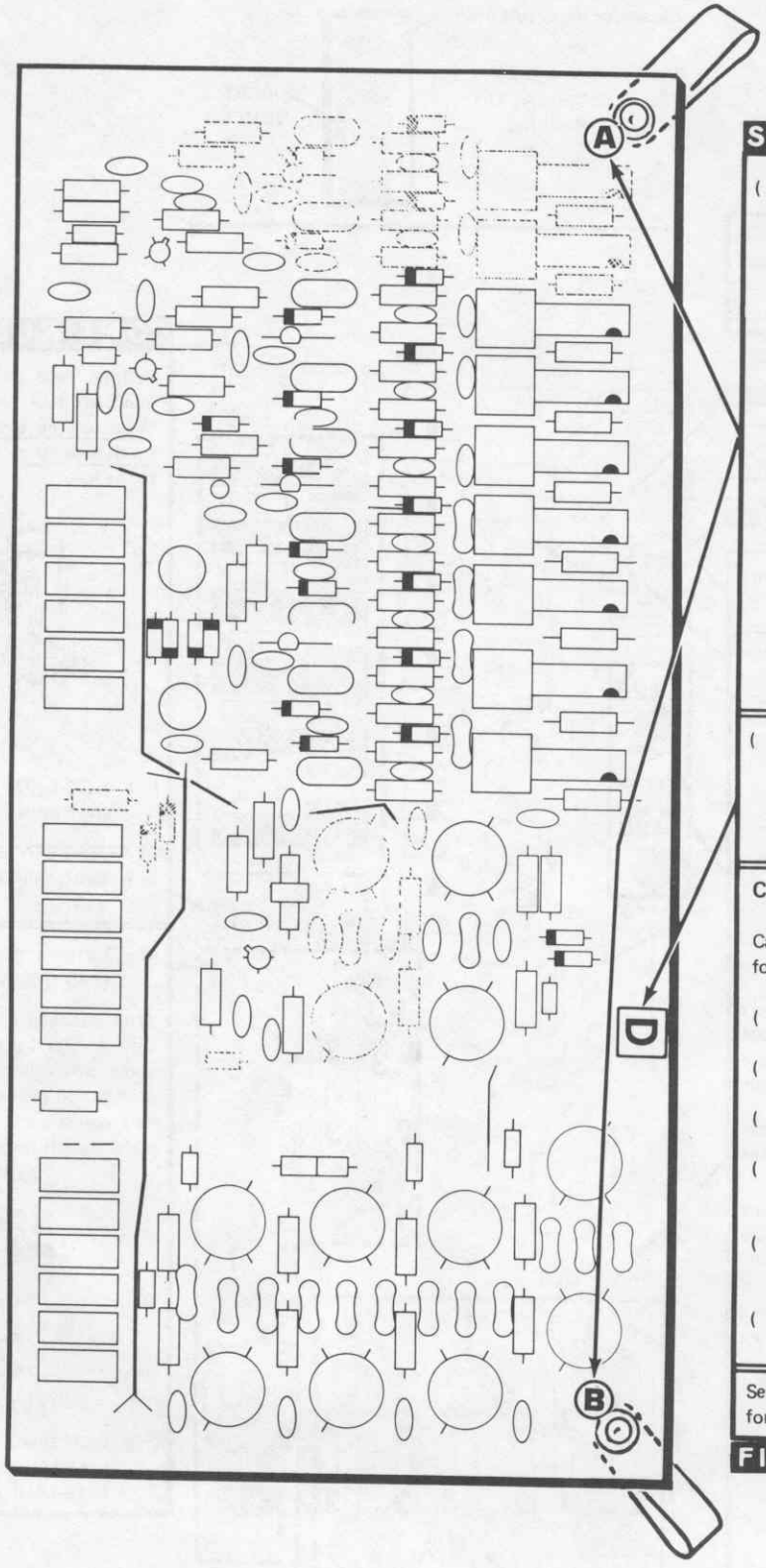
( ) L416-L419: Four 3.975 μH coils (#40-1879 red dot).

After installing the coils, connect a diode between lugs 1 and 3 of each coil. Be sure you position the banded end of the diode as shown in the Pictorial. Bend each diode lead against a coil terminal and solder it in place. Cut off the excess lead lengths.



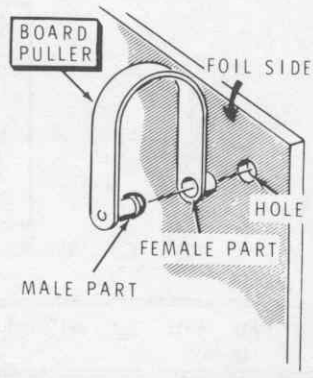
( ) D437-D440: Four 1N458 diodes (#56-24). Connect them to coils L416-L419 respectively.

PICTORIAL 3-8



START

( ) Mount board pullers on the foil side of the circuit board at holes A and B. Position the female part in the circuit board; then push the male part through the female part.



( ) Cut a letter "D" from the terminal identification sheet and remove the adhesive backing. Press the letter onto the circuit board at the location shown.

CIRCUIT BOARD CHECKOUT

Carefully inspect the circuit board for the following conditions.

( ) Unsoldered connections.

( ) "Cold" solder connections.

( ) Solder bridges between foil patterns.

( ) Protruding leads which could touch together.

( ) Transistors for the proper type and installation.

( ) Diodes for the correct position of the banded end.

Set the circuit board aside until it is called for in a step.

FINISH

PICTORIAL 3-9

CALIBRATOR CIRCUIT BOARD

PARTS LIST

Remove the parts from Pack #4 and check each part against the following list. Make a check (✓) in the space provided as you identify each part. Return any part that is packed in an individual envelope with the part number on it back in the envelope after you identify it until it is called for in a step. Do not throw away any packing materials until all parts are accounted for.

KEY No.	QTY.	DESCRIPTION	PART No.	CIRCUIT Component No.
RESISTORS, 1/2-Watt				
NOTE: The following resistors have a 10% tolerance unless otherwise noted. 10% is indicated by a fourth color band of silver; 5% is indicated by a fourth color band of gold.				
A1 ( )	1	150 Ω (brown-green-brown)	1-66	R106
A1 ( )	3	1000 Ω (brown-black-red)	1-9	R102, R104, R105
A1 ( )	1	47 kΩ (yellow-violet-orange)	1-25	R103
A1 ( )	1	220 kΩ (red-red-yellow)	1-29	R101
CAPACITORS				
B1 ( )	4	10 pF disc	21-3	C102, C104, C105, C106
B1 ( )	2	.1 μF disc	21-95	C103, C107
B2 ( )	1	8-60 pF trimmer	31-52	C101

KEY No.	QTY.	DESCRIPTION	PART No.	CIRCUIT Component No.

DIODE-TRANSISTORS-INTEGRATED CIRCUIT

C1 ( )	1	Zener diode, 5.1 volt	56-16	ZD101

NOTE: Transistors and integrated circuits are marked for identification in one of the following four ways:

1. Part number.
2. Type number. (On integrated circuits this refers only to the numbers; the letters may be different or missing.)
3. Part number and type number.
4. Part number with a type number other than the one listed.

C2 ( )	2	MPSA20 transistor	417-801	Q101, Q102
C3 ( )	1	SN7473N integrated circuit	443-5	IC101

MISCELLANEOUS

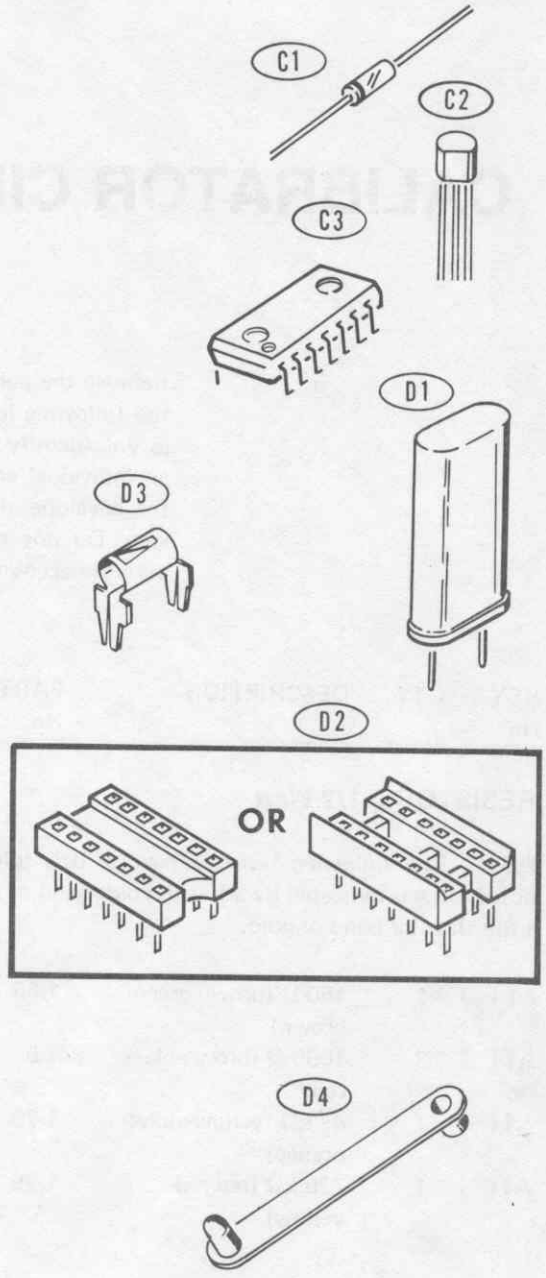
D1 ( )	1	100 kHz crystal	404-43	Y101
D2 ( )	1	IC socket	434-225	
D3 ( )	6	Circuit board connector	432-124	
D4 ( )	1	Board puller	207-80	

PART FROM PACK #12 (parts in the shipping carton)

( )	1	Calibrator circuit board	85-1636-1

The prices shown on the separate "Heath Parts Price List" 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 (Michigan residents add 4% sales tax) to cover insurance, 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.

To order a replacement part, use the Parts Order Form furnished with this kit. If a Parts Order Form is not available, refer to "Customer Service" inside the rear cover of this Manual.



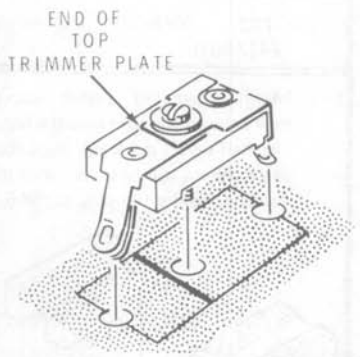
STEP-BY-STEP ASSEMBLY

START

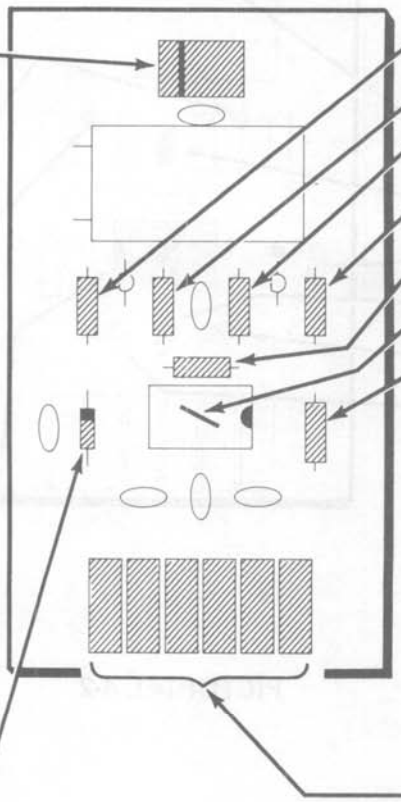
Position the calibrator circuit board as shown. Then complete each step in the following Pictorials.

( ) C101: Install the 8-60 pF trimmer capacitor as follows:

1. Refer to the illustration below and identify the end of the top trimmer plate.
2. Insert the trimmer lugs into the circuit board so the end of the top plate is toward the left as shown.
3. Push the trimmer down against the circuit board. Then bend the lugs over flat against the other side of the circuit board.
4. Solder the lugs to the foil.



( ) ZD101: Zener diode (#56-16). Be sure you match the banded end of the diode with the band mark on the circuit board. Solder the leads to the foil and cut off the excess lead lengths.



PICTORIAL 4-1

CONTINUE

( ) R102: 1000 Ω (brown-black-red).

( ) R101: 220 kΩ (red-red-yellow).

( ) R103: 47 kΩ (yellow-violet-orange).

( ) R104: 1000 Ω (brown-black-red).

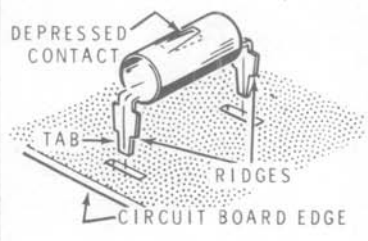
( ) R105: 1000 Ω (brown-black-red).

( ) Jumper wire. Use a cutoff lead. Position this wire down tight against the circuit board.

( ) R106: 150 Ω (brown-green-brown).

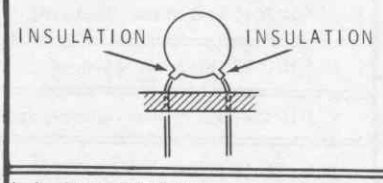
( ) Solder the leads to the foil and cut off the excess lead lengths.

( ) Install six circuit board connectors in the following manner. Note that inside each connector the spring contact is depressed on one end. This depressed end of the connector should face away from the edge of the circuit board. Insert the mounting tabs through the circuit board until the ridges of the connector are firmly against the circuit board. Look at the row of connectors to make sure the depressed end of the contact of each connector is toward the center of the circuit board. Solder the tabs to the foil.



START

NOTE: When you install disc capacitors, do not push the insulated portion of the leads into the circuit board holes. This could make it difficult to solder the leads to the foil.



( ) C102: 10 pF disc.

( ) C103: .1 μF disc.

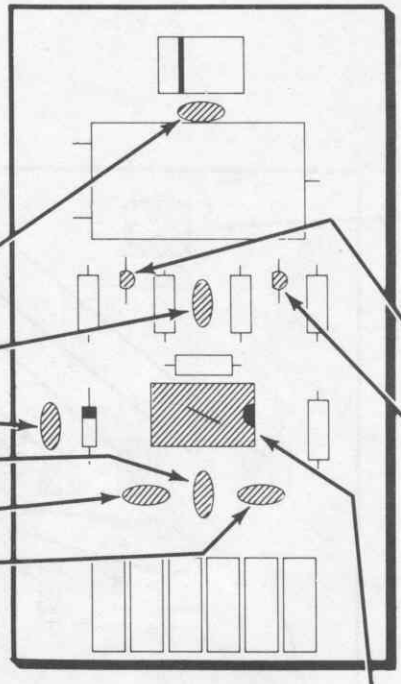
( ) C107: .1 μF disc.

( ) C105: 10 pF disc.

( ) C106: 10 pF disc.

( ) C104: 10 pF disc.

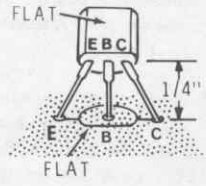
( ) Solder the leads to the foil and cut off the excess lead lengths.



PICTORIAL 4-2

CONTINUE

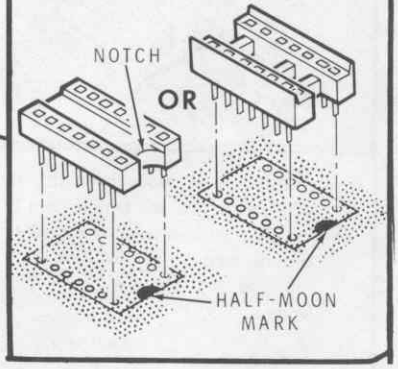
NOTE: Install the following transistors in the manner shown. First line up the flat on the transistor with the outline of the flat on the circuit board. Insert the transistor leads into their correct holes indicated by E, B, and C. Solder each lead to the foil and cut off the excess lead lengths.



( ) Q101: MPSA20 transistor (#417-801).

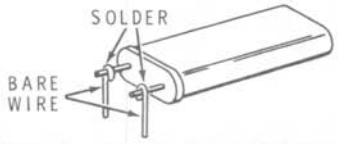
( ) Q102: MPSA20 transistor (#417-801).

( ) 14-pin integrated circuit socket. Insert the socket pins into the holes. The half-moon mark on the circuit board should still be visible after it is installed. Solder the pins to the foil.



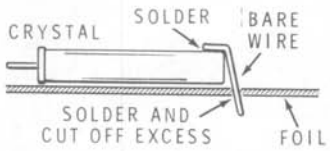
START

( ) Bend and solder a cutoff lead to each pin of the 100 kHz crystal (#404-43).

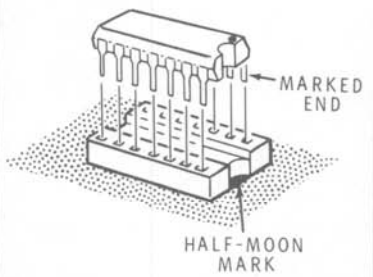


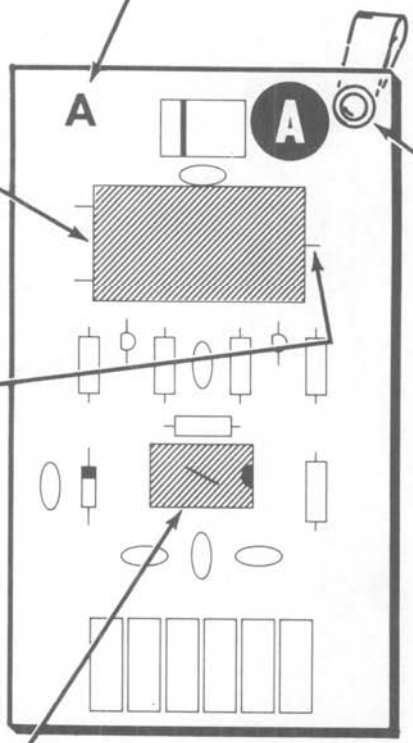
( ) Y101: Install the crystal on the circuit board by inserting the bare wire leads through their circuit board holes. Solder the leads to the foil and cut off any excess wire lengths.

( ) Bend a cutoff lead and insert it through the circuit board hole at the opposite end of the cyrstal as shown. Solder the wire to the crystal and to the circuit board foil. Cut off any excess wire lengths.



( ) IC101: SN7473N integrated circuit (#443-5). Refer to Detail 4-3A; then position the pin 1 end of the integrated circuit toward the half-moon mark on the circuit board. Then carefully install the integrated circuit. Make sure all the pins are in their respective holes.



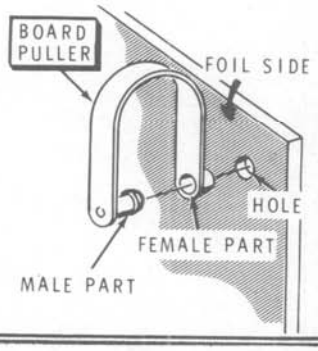


PICTORIAL 4-3

CONTINUE

( ) Cut a large letter "A" from the terminal identification label (#390-1045) and remove the adhesive backing. Press the letter onto the circuit board at the location shown.

( ) Mount a board puller on the foil side of the circuit board at hole A. Position the female part in the circuit board; then push the male part through the female part.



CIRCUIT BOARD CHECKOUT

Carefully inspect the circuit board for the following conditions.

( ) Unsoldered connections.

( ) "Cold" solder connections.

( ) Solder bridges between foils.

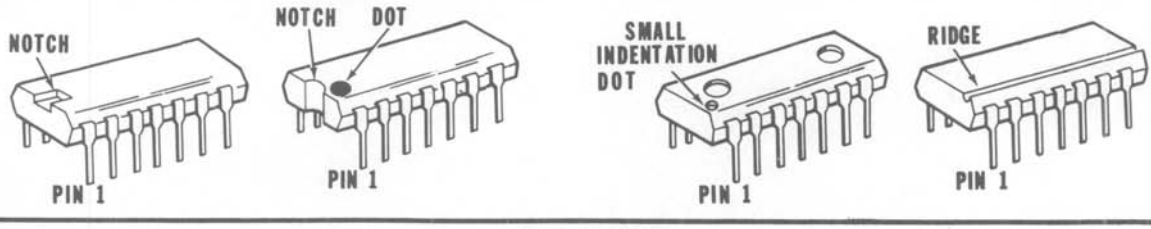
( ) Protruding leads. No lead should be longer than 1/8".

( ) Transistors for the proper type and installation.

( ) Integrated circuit for the proper type and installation.

( ) Diode for the correct position of the banded end.

Set the circuit board aside until it is called for.



Detail 4-3A

TRANSMITTER IF CIRCUIT BOARD

PARTS LIST

Remove the parts from Pack #5 and check each part against the following list. Make a check (✓) in the space provided as you identify each part. Return any part that is packed in an individual envelope with the part number on it back in the envelope after you identify it until it is called for in a step. Do not throw away any packing materials until all parts are accounted for.

KEY No.	QTY.	DESCRIPTION	PART No.	CIRCUIT Component No.

RESISTORS

NOTES:

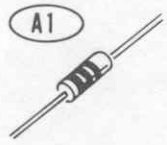
1. The resistors may be packed in more than one envelope. Open all of the resistor envelopes in this pack before you check them against the Parts List.

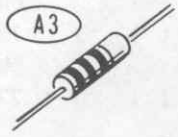
2. The following resistors have a 10% tolerance unless otherwise noted. 10% is indicated by a fourth color band of silver; 5% is indicated by a fourth color band of gold.

1/4-Watt

A1 ( )	1	10 Ω, 5% (brown-black-black)	1-55-12	R325
A1 ( )	2	15 Ω, 5% (brown-green-black)	1-56-12	R302, R308
A1 ( )	3	22 Ω (red-red-black)	1-42-12	R303, R305, R306
A1 ( )	6	100 Ω (brown-black-brown)	1-1-12	R311, R315, R316, R324, R343, R345
A1 ( )	1	150 Ω (brown-green-brown)	1-37-12	R317
A1 ( )	1	220 Ω (red-red-brown)	1-17-12	R326
A1 ( )	1	390 Ω (orange-white-brown)	1-23-12	R314
A1 ( )	1	470 Ω, 5% (yellow-violet-brown)	1-65-12	R331

KEY No.	QTY.	DESCRIPTION	PART No.	CIRCUIT Component No.
Resistors (cont'd.)				
A1 ( )	1	560 Ω (green-blue-brown)	1-13-12	R301
A1 ( )	24	1000 Ω (brown-black-red)	1-2-12	R307, R334, R335, R336, R337, R338, R339, R341, R342, R344, R346, R347, R348, R349, R351, R352, R353, R354, R355, R356, R357, R358, R359, R361
A1 ( )	1	1800 Ω, 5% (brown-gray-red)	1-99-12	R318
A1 ( )	1	3300 Ω, 5% (orange-orange-red)	1-74-12	R327
A1 ( )	1	3900 Ω (orange-white-red)	1-7-12	R323
A1 ( )	2	6800 Ω (blue-gray-red)	1-27-12	R321, R322
A1 ( )	1	10 kΩ (brown-black-orange)	1-9-12	R333
A1 ( )	2	12 kΩ (brown-red-orange)	1-14-12	R319, R329
A1 ( )	2	22 kΩ (red-red-orange)	1-45-12	R312, R313
Other Resistors				
A2 ( )	1	1210 Ω, 1%, 1/8-watt	2-68-11	R332
A2 ( )	1	5760 Ω, 1%, 1/8-watt (may be marked as 5.76K)	2-17-11	R328
A3 ( )	1	1.5 Ω, 1/2-watt (brown-(green-gold)	1-140	R304
A3 ( )	1	6.8 Ω, 5%, 1/2-watt (blue-gray-gold)	1-135	R309



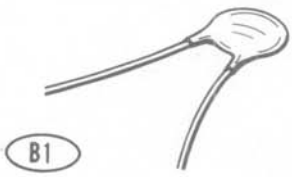


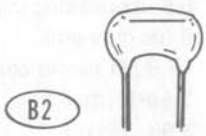
KEY No.	QTY.	DESCRIPTION	PART No.	CIRCUIT Component No.

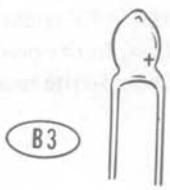
CAPACITORS

Disc

B1 ( )	4	6 pF	21-169	C329, C333, C354, C356
B1 ( )	4	18 pF	21-160	C334, C337, C358, C361
B1 ( )	1	39 pF	21-167	C320
B1 ( )	2	.001 µF	21-140	C306, C308
B1 ( )	28	.01 µF	21-176	C301, C302, C303, C304, C305, C307, C311, C312, C313, C314, C316, C317, C318, C321, C323, C324, C326, C331, C335, C339, C344, C347, C353, C357, C362, C366, C371, C372,

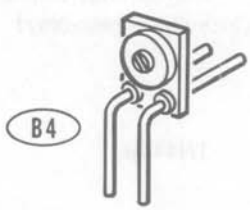






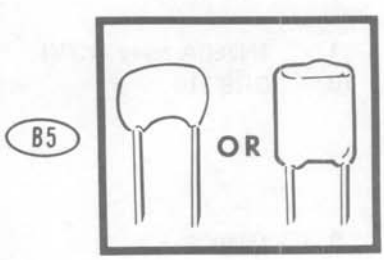
Mica

B2 ( )	4	7.5 pF	20-52	C325, C328, C350, C352
B2 ( )	2	50 pF	20-97	C332, C355
B2 ( )	3	62 pF	20-109	C327, C342, C351
B2 ( )	3	75 pF	20-110	C338, C363, C365
B2 ( )	2	130 pF	20-104	C336, C359
B2 ( )	4	390 pF	20-106	C343, C346, C367, C369
B2 ( )	1	150 pF	20-149	C348
B2 ( )	2	680 pF	20-134	C341, C364
B2 ( )	2	820 pF	20-171	C345, C368

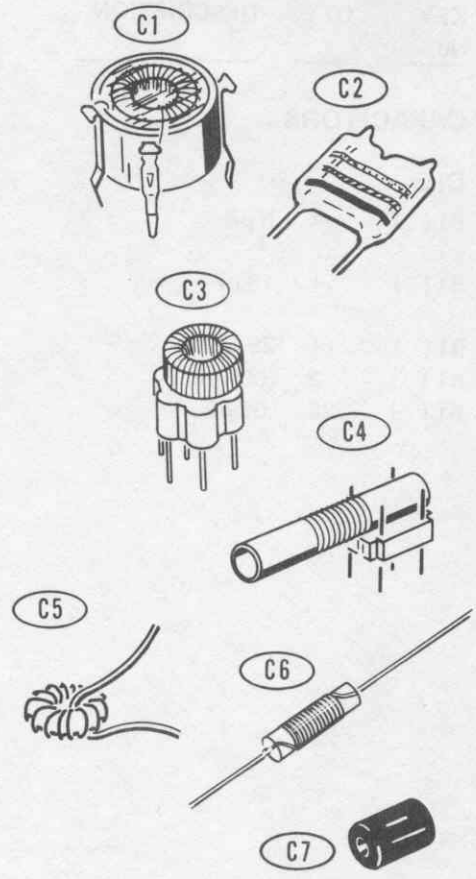


Other Capacitors

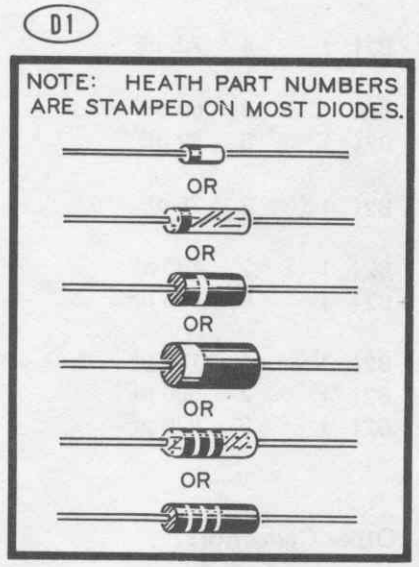
B3 ( )	1	47 µF tantalum	25-223	C315
B4 ( )	1	8-40 pF trimmer	31-76	C349
B5 ( )	2	.1 µF Mylar	27-47	C309, C319



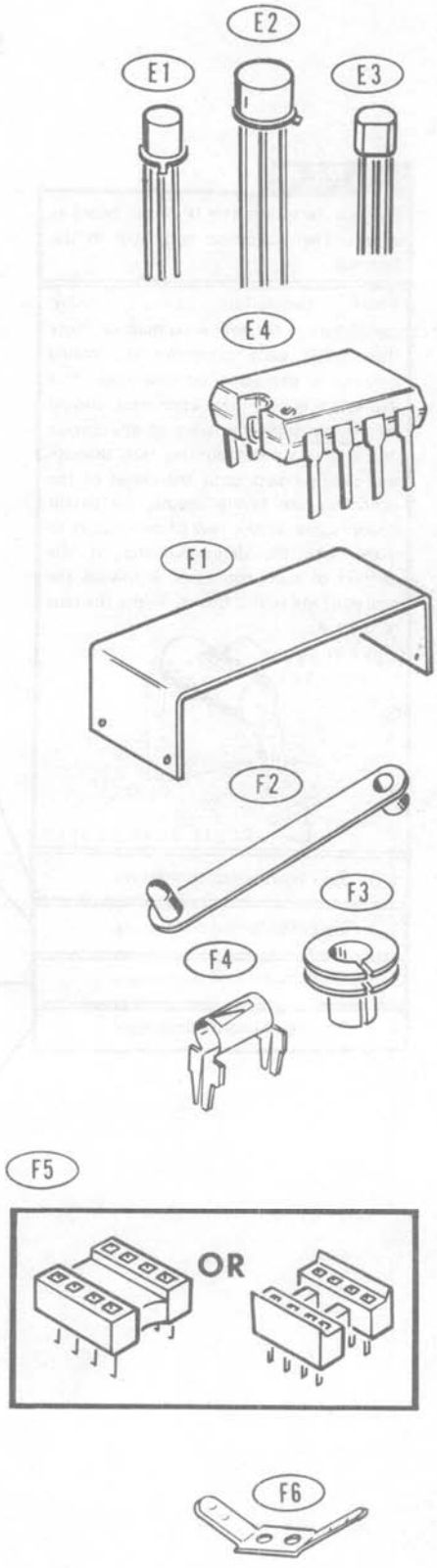
KEY No.	QTY.	DESCRIPTION	PART No.	CIRCUIT Component No.
INDUCTORS				
C1 ( )	16	7.95 μH coil	40-1672	L301, L302, L303, L304, L305, L306, L307, L308, L311, L312, L313, L314, L315, L316, L317, L318
C2 ( )	1	180 μH peaking coil (brown-gray-brown)	40-488	L322
C2 ( )	1	6.8 μH peaking coil (blue-gray-gold)	40-1653	L323
C3 ( )	1	10.9 μH toroid coil	40-1049	L324
C3 ( )	2	Transformer	40-1050	T301, T302
C4 ( )	4	3.95 μH coil	40-1673	L309, L310, L319, L320, L321
C5 ( )	1	13.2 μH toroid coil	40-1877	
C6 ( )	1	15 μH RF choke	45-51	RFC301
C7 ( )	10	Long ferrite bead	475-10	
C7 ( )	1	Short ferrite bead	475-16	



KEY No.	QTY.	DESCRIPTION	PART No.	CIRCUIT Component No.
DIODES				
D1 ( )	10	1N458 (may be marked yellow-green-gray)	56-24	D313, D314, D321, D322, D325, D326, D329, D330, D333, D334,
D1 ( )	9	1N4149	56-56	D301, D302, D303, D304, D305, D317, D318, D319, D320
D1 ( )	4	FH1100	56-87	D306, D307, D308, D309
D1 ( )	1	1N750A zener (4.7V)	56-59	ZD301
D1 ( )	10	DRS-110	57-64	D315, D316, D323, D324, D327, D328, D331, D332, D335, D336
D1 ( )	3	1N4002	57-65	D310, D311, D312



KEY No.	QTY.	DESCRIPTION	PART No.	CIRCUIT Component No.
TRANSISTORS-INTEGRATED CIRCUIT				
E1 ( )	1	2N2369 transistor	417-154	Q301
E2 ( )	2	2N3866 transistor	417-205	Q304, Q305
E3 ( )	2	MPSA20 transistor	417-801	Q302, Q303
E4 ( )	1	MC1350P integrated circuit	442-18	IC301
MISCELLANEOUS				
F1 ( )	1	Shield	206-1107	
F2 ( )	2	Board puller	207-80	
F3 ( )	2	Heat sink	215-31	
F4 ( )	24	Circuit board connector	432-124	
F5 ( )	1	IC socket	434-230	
F6 ( )	1	Spring clip	258-95	
PART FROM PACK #12				
( )	1	Transmitter IF circuit board	85-1627-4	



The prices shown on the separate "Heath Parts Price List" 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 (Michigan residents add 4% sales tax) to cover insurance, 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.

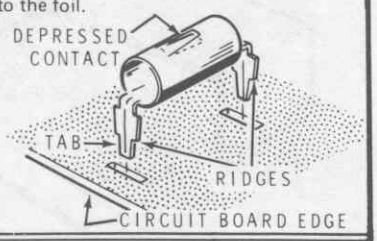
To order a replacement part, use the Parts Order Form furnished with this kit. If a Parts Order Form is not available, refer to "Customer Service" inside the rear cover of this Manual.

STEP-BY-STEP ASSEMBLY

START

Position the transmitter IF circuit board as shown. Then complete each step in the Pictorial.

Install twenty-four circuit board connectors in the following manner. Note that inside each connector the spring contact is depressed on one end. This depressed end of the connector should face away from the edge of the circuit board. Insert the mounting tabs through the circuit board until the ridges of the connector are firmly against the circuit board. Look at the row of connectors to make sure the depressed end of the contact of each connector is toward the center of the circuit board. Solder the tabs to the foil.

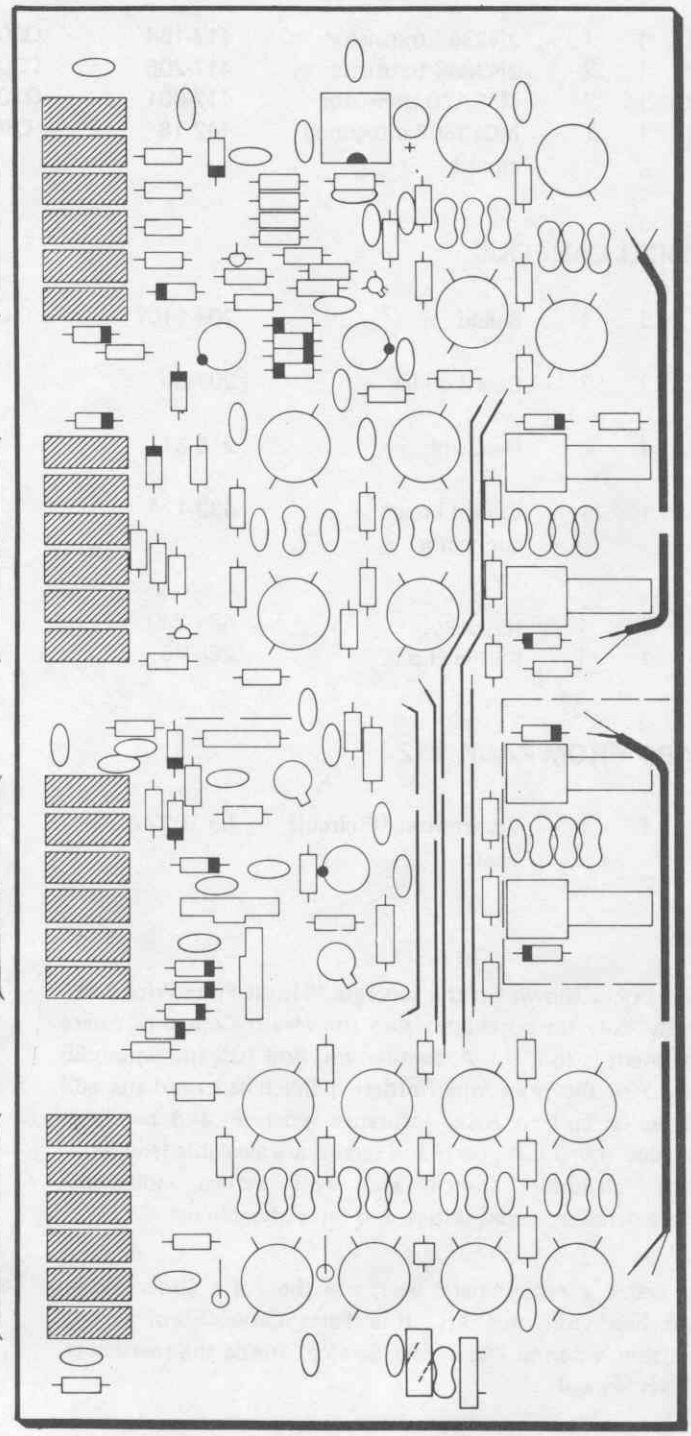


( ) Six circuit board connectors.

( ) Six circuit board connectors.

( ) Six circuit board connectors.

( ) Six circuit board connectors.



PICTORIAL 5-1

IDENTIFICATION DRAWING

The steps performed in this Pictorial are in this area of the circuit board.

PART NUMBER

START

( ) R327: 3300 Ω (orange-orange-red).

( ) R317: 150 Ω (brown-green-brown).

( ) R318: 1800 Ω (brown-gray-red).

( ) R334: 1000 Ω (brown-black-red).

( ) R333: 10 kΩ (brown-black-orange).

( ) R328: 5760 Ω, 1%.

( ) R329: 12 kΩ (brown-red-orange).

( ) Solder the leads to the foil and cut off the excess lead lengths.

( ) R325: 10 Ω (brown-black-black).

( ) R326: 220 Ω (red-red-brown).

( ) R321: 6800 Ω (blue-gray-red).

( ) R322: 6800 Ω (blue-gray-red).

( ) R319: 12 kΩ (brown-red-orange).

NOTE: Save the cutoff resistor leads in the next step; some of these will be used later.

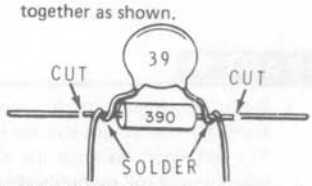
( ) Solder the leads to the foil and cut off the excess lead lengths.

CONTINUE

( ) R315: 100 Ω (brown-black-brown).

( ) R316: 100 Ω (brown-black-brown).

( ) Form the leads of a 390 Ω (orange-white-brown) resistor as shown. Then cut each lead of a 39 pF disc capacitor to 1/2" and wrap the capacitor leads around the resistor leads. Solder the leads together as shown.



( ) R314/C320: Resistor-capacitor combination.

( ) R323: 3900 Ω (orange-white-red).

( ) R332: 1210 Ω, 1%.

( ) R331: 470 Ω (yellow-violet-brown).

( ) R312: 22 kΩ (red-red-orange).

( ) R311: 100 Ω (brown-black-brown).

( ) Solder the leads to the foil and cut off the excess lead lengths.

Install four 1000 Ω (brown-black-red) resistors at:

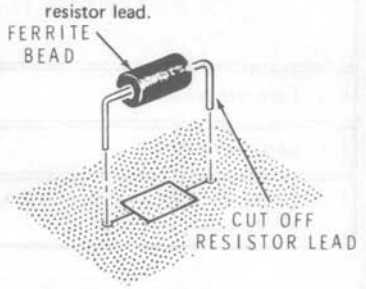
( ) R352.

( ) R354.

( ) R353.

( ) R355.

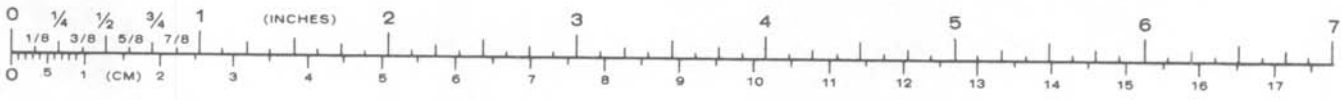
( ) Long ferrite bead. Use a cutoff resistor lead.



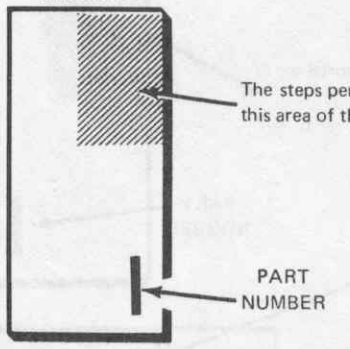
( ) Long ferrite bead.

( ) Solder the leads to the foil and cut off the excess lead lengths.

PICTORIAL 5-2

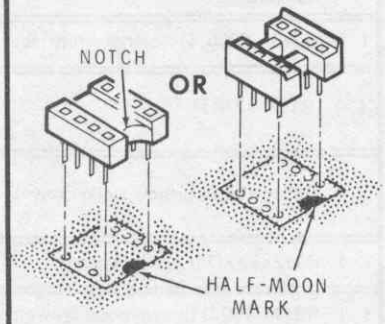


IDENTIFICATION DRAWING



START

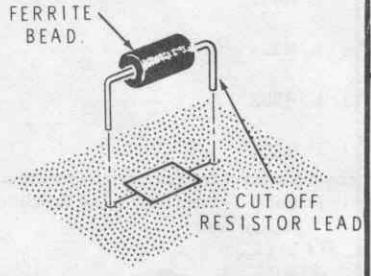
( ) 8-pin integrated circuit socket. Insert the socket pins into the holes. The half-moon mark on the circuit board should still be visible after it is installed. Solder the pins to the foil.



( ) R313: 22 kΩ (red-red-orange).

( ) R324: 100 Ω (brown-black-brown).

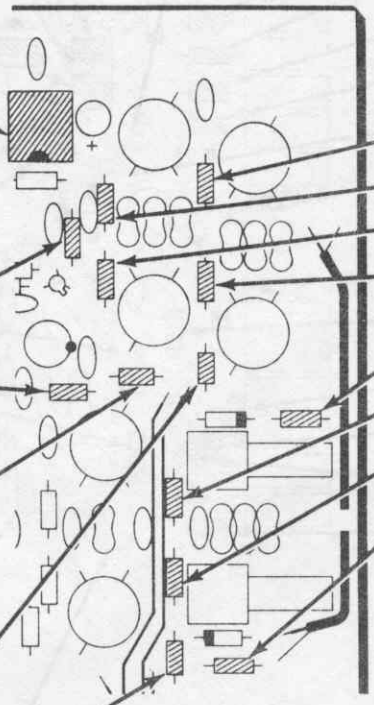
( ) Long ferrite bead. Use a cutoff resistor lead.



( ) Long ferrite bead.

( ) Long ferrite bead.

( ) Solder the leads to the foil and cut off the excess lead lengths.



CONTINUE

Install eight 1000 Ω (brown-black-red) resistors at:

( ) R357.

( ) R359.

( ) R358.

( ) R356.

( ) R347.

( ) R348.

( ) R351.

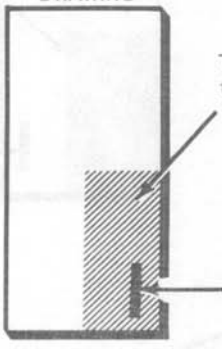
( ) R361.

NOTE: Save the cutoff resistor leads in the next step; some of these will be used later.

( ) Solder the leads to the foil and cut off the excess lead lengths.

PICTORIAL 5-3

IDENTIFICATION DRAWING

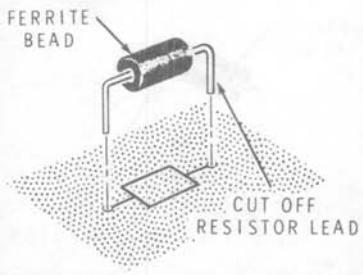


START

( ) R304: 1.5 Ω, 1/2-watt (brown-green-gold).

( ) R309: 6.8 Ω, 1/2-watt (blue-gray-gold).

( ) Long ferrite bead. Use a cutoff resistor lead.

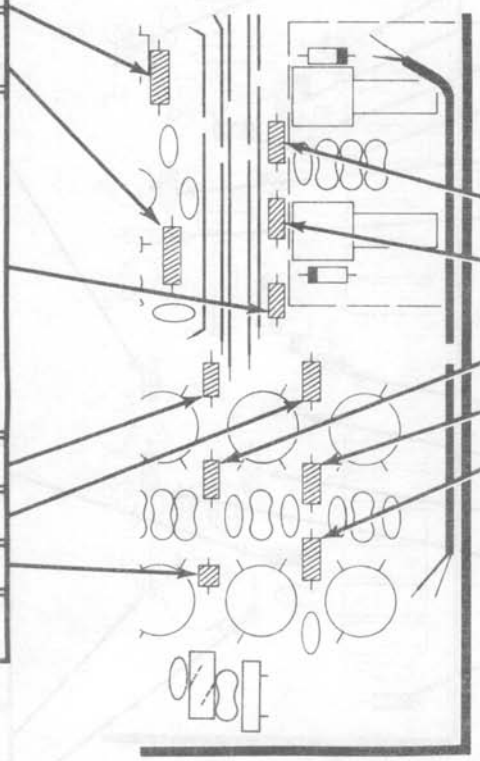


( ) Long ferrite bead.

( ) Long ferrite bead.

( ) Short ferrite bead.

( ) Solder the leads to the foil and cut off the excess lead lengths.



CONTINUE

Install five 1000 Ω (brown-black-red) resistors at:

( ) R337.

( ) R336.

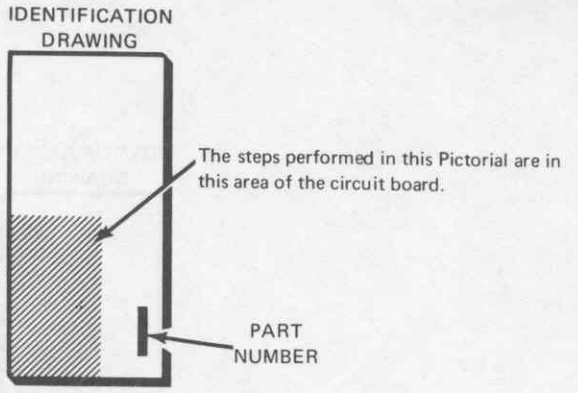
( ) R341.

( ) R338.

( ) R339.

( ) Solder the leads to the foil and cut off the excess lead lengths.

PICTORIAL 5-4



START

( ) R306: 22 Ω (red-red-black).

( ) R307: 1000 Ω (brown-black-red).

( ) R303: 22 Ω (red-red-black).

( ) R305: 22 Ω (red-red-black).

( ) R301: 560 Ω (green-blue-brown).

( ) R302: 15 Ω (brown-green-black).

( ) R308: 15 Ω (brown-green-black).

( ) Solder the leads to the foil and cut off the excess lead lengths.

Install five 1000 Ω (brown-black-red) resistors at:

( ) R349. . . . . .

( ) R335. . . . . .

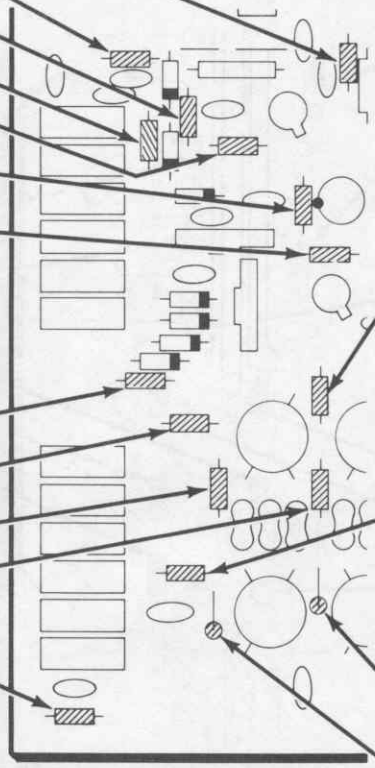
( ) R344. . . . . .

( ) R342. . . . . .

( ) R346. . . . . .

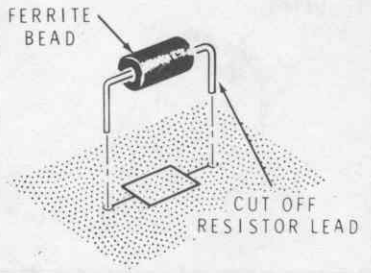
NOTE: Save the cutoff resistor leads in the next step; some of these will be used later.

( ) Solder the leads to the foil and cut off the excess lead lengths.



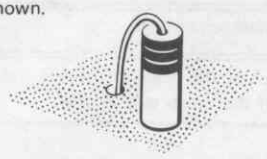
CONTINUE

( ) Long ferrite bead. Use a cutoff resistor lead.



( ) Long ferrite bead.

NOTE: Mount the following two resistors as shown.



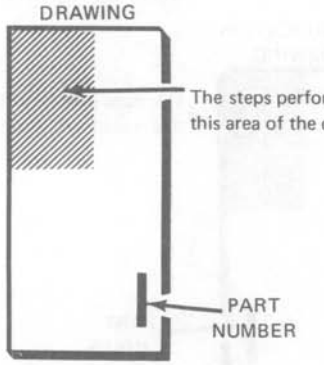
( ) R343: 100 Ω (brown-black-brown) at 1000.

( ) R345: 100 Ω (brown-black-brown) at 1000.

( ) Solder the leads to the foil and cut off the excess lead lengths.

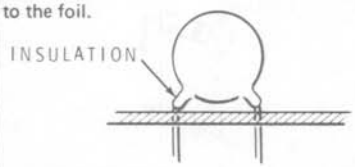
PICTORIAL 5-5

IDENTIFICATION DRAWING



START

NOTE: When you install disc capacitors, do not push the insulated portion of the leads into the circuit board holes. This could make it difficult to solder the leads to the foil.



Install four .01 μF disc capacitors at:

( ) C317. . . . . .

( ) C321. . . . . .

( ) C323. . . . . .

( ) C316. . . . . .

( ) Solder the leads to the foil and cut off the excess lead lengths.

NOTE: When you install a diode, always match the band on the diode with the band mark on the circuit board.

Install four 1N4149 diodes (#56-56) at:

( ) D303. . . . . .

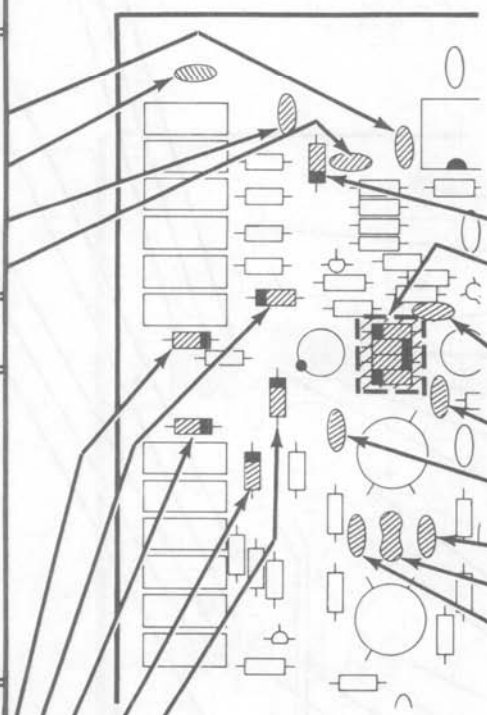
( ) D305. . . . . .

( ) D302. . . . . .

( ) D301. . . . . .

( ) ZD301: 1N750A zener (#56-59).

( ) Solder the leads to the foil and cut off the excess lead lengths.



CONTINUE

( ) D304: 1N4149 diode (#56-56).

( ) D306-D309: four FH1100 diodes (#56-87).

Install three .01 μF disc capacitors at:

( ) C312.

( ) C324.

( ) C357.

( ) C354: 6 pF disc.

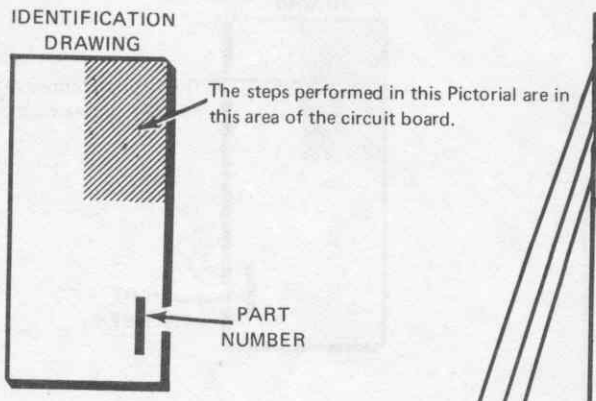
( ) C355: 50 pF mica.

( ) C356: 6 pF disc.

NOTE: Some of the components just installed are very close together. Be very careful, in the next step, that you do not form a solder bridge with any nearby foil pads.

( ) Solder all leads to the foil and cut off the excess lead lengths.

PICTORIAL 5-6



START

Install four .01 μF disc capacitors at:

( ) C318. . . . . .

( ) C366. . . . . .

( ) C371. . . . . .

( ) C313. . . . . .

( ) C367: 390 pF mica.

( ) C368: 820 pF mica.

( ) C369: 390 pF mica at 820.

( ) Solder all leads to the foil and cut off the excess lead lengths.

( ) C314: .01 μF disc.

( ) C362: .01 μF disc.

( ) C361: 18 pF disc.

( ) C359: 130 pF mica.

( ) C358: 18 pF disc.

( ) C353: .01 μF disc.

( ) Solder the leads to the foil and cut off the excess lead lengths.

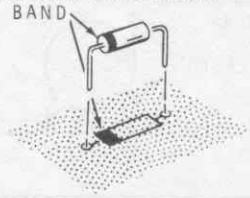
CONTINUE

( ) C363: 75 pF mica.

( ) C364: 680 pF mica.

( ) C365: 75 pF mica.

NOTE: When you install a diode, always match the band on the diode with the band mark on the circuit board.



( ) D313: 1N458 diode (#56-24).

( ) C352: 7.5 pF mica.

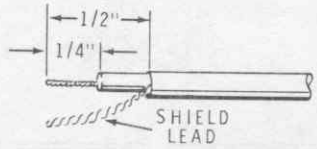
( ) C351: 62 pF mica.

( ) C350: 7.5 pF mica.

( ) D314: 1N458 (#56-24).

( ) Solder the leads to the foil and cut off the excess lead lengths.

( ) Prepare both ends of a 3-1/2" shielded cable..



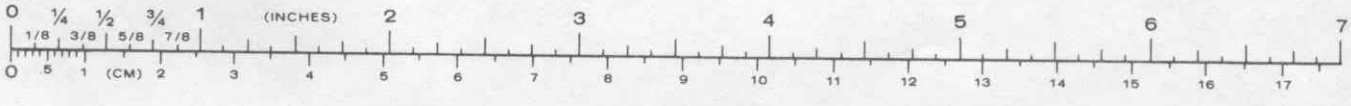
If it is not already done, remove the foil wrap completely. Then twist the fine wire strands of the inner leads and shield leads. Apply only enough solder to these leads to hold the small strands in place.

( ) 3-1/2" shielded cable. As you install the cable, solder the leads to the foil.

ONE END:
Inner lead to hole A
Shield lead to hole B

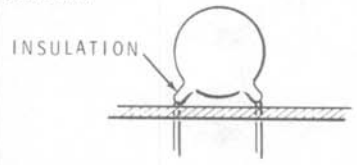
OTHER END:
Inner lead to hole C
Shield lead to hole D.

PICTORIAL 5-7



START

NOTE: When you install disc capacitors, do not push the insulated portion of the leads into the circuit board holes. This could make it difficult to solder the leads to the foil.



( ) C302: .01 μF disc.

( ) C304: .01 μF disc.

( ) C319: .1 μF Mylar.

NOTE: When you install a diode, always match the band on the diode with the band mark on the circuit board.

( ) D310-D312: Three 1N4002 diodes (#57-65).

( ) Solder the leads to the foil and cut off the excess lead lengths.

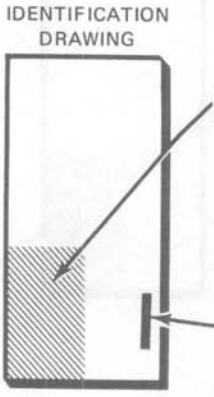
( ) D317-D320: Four 1N4149 diodes (#56-56).

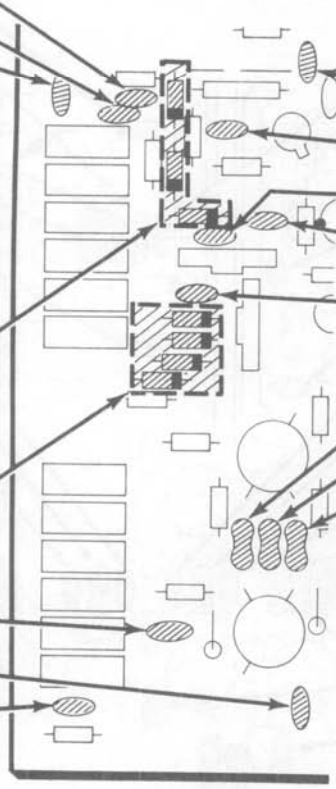
( ) C344: .01 μF disc.

( ) C339: .01 μF disc.

( ) C347: .01 μF disc.

( ) Solder all leads to the foil and cut off the excess lead lengths.





CONTINUE

Install four .01 μF disc capacitors at:

( ) C372.

( ) C301.

( ) C303.

( ) C305.

( ) C309: .1 μF Mylar.

( ) C346: 390 pF mica.

( ) C345: 820 pF mica.

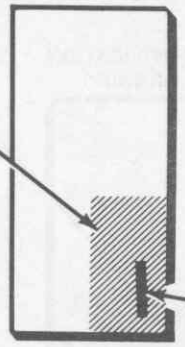
( ) C343: 390 pF mica.

( ) Solder all leads to the foil and cut off the excess lead lengths.

PICTORIAL 5-8

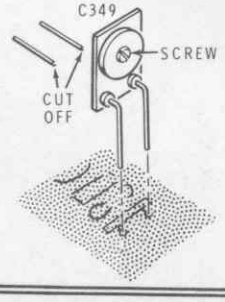
IDENTIFICATION DRAWING

The steps performed in this Pictorial are in this area of the circuit board.



START

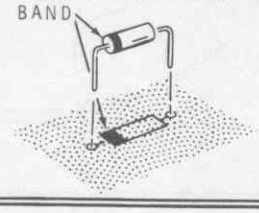
- ( ) C326: .01 µF disc.
- ( ) C306: .001 µF disc.
- ( ) C307: .01 µF disc.
- ( ) C308: .001 µF disc.
- ( ) C311: .01 µF disc.
- ( ) C334: 18 pF disc.
- ( ) C336: 130 pF mica.
- ( ) Solder the leads to the foil and cut off the excess lead lengths.
- ( ) C337: 18 pF disc.
- ( ) C338: 75 pF mica.
- ( ) C342: 62 pF mica at 75.
- ( ) C341: 680 pF mica.
- ( ) C331: .01 µF disc.
- ( ) C335: .01 µF disc.
- ( ) C348: 150 pF mica.
- ( ) C349: 8-40 pF trimmer (#31-76). Be sure to position the adjustment screw as shown.



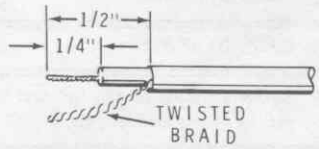
- ( ) Solder the leads to the foil and cut off the excess lead lengths.

CONTINUE

NOTE: When you install a diode, always match the band on the diode with the band mark on the circuit board.



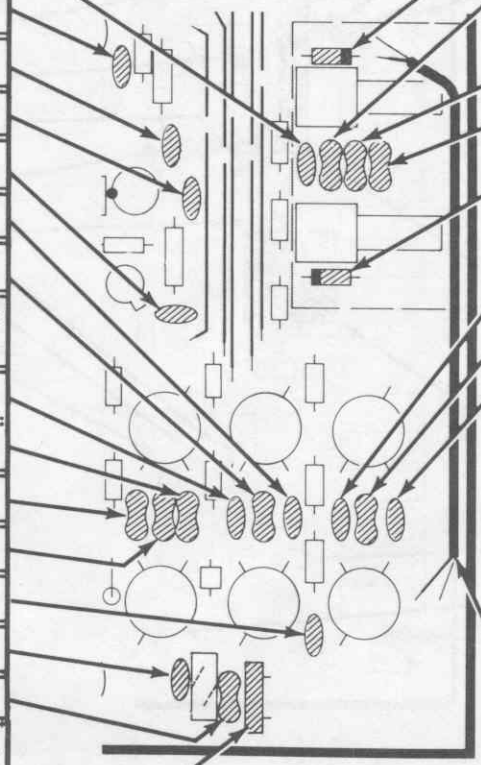
- ( ) D316: DRS-110 (#57-64).
- ( ) C325: 7.5 pF mica.
- ( ) C327: 62 pF mica.
- ( ) C328: 7.5 pF mica.
- ( ) D315: DRS-110 (#57-64).
- ( ) C333: 6 pF disc.
- ( ) C332: 50 pF mica.
- ( ) C329: 6 pF disc.
- ( ) Solder the leads to the foil and cut off the excess lead lengths.
- ( ) Prepare both ends of a 4-1/2" shielded cable. If not already done, twist the fine wire strands of the inner leads and shield leads. Then apply only enough solder to these leads to hold the small strands in place.



- ( ) 4-1/2" shielded cable. As you install the cable, solder the leads to the foil.

  ONE END:
  Inner lead to hole F
  Shield lead to hole E

  OTHER END:
  Inner lead to hole G
  Shield lead to hole H.



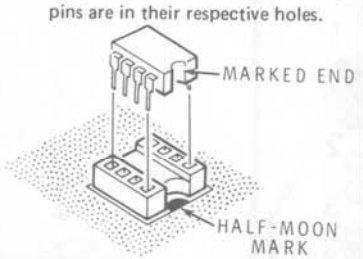
PICTORIAL 5-9

IDENTIFICATION DRAWING

The steps performed in this Pictorial are in this area of the circuit board.

START

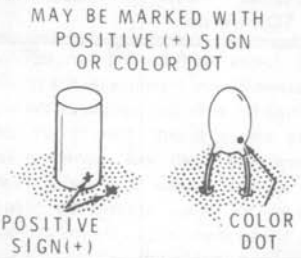
( ) IC301: MC1350P integrated circuit (#442-18). Refer to Detail 5-10A; then position the pin 1 end of this integrated circuit toward the half-moon mark on the circuit board. Then carefully install the integrated circuit. Make sure all the pins are in their respective holes.



NOTE: When you install the next transistor, line up the tab on the transistor with the outline of the tab on the circuit board. Then insert the leads into their correct C, B, and E holes. Solder the leads to the foil and cut off the excess lead lengths.

( ) Q301: 2N2369 (#417-154).

NOTE: When you install electrolytic and tantalum capacitors, be sure to match the positive (+) mark or color dot on the capacitor with the positive (+) mark on the circuit board as shown.



( ) T302: Coil (#40-1050).

( ) T301: Coil (#40-1050).

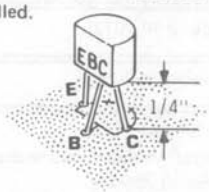
( ) Solder the leads to the foil and cut off the excess lead lengths.

CONTINUE

( ) C315: 47 μF tantalum.

( ) Solder the leads to the foil and cut off the excess lead lengths.

NOTE: When you install each of the following transistors, position the E, B, and C leads (bend the "B" lead forward or backward as required) of the transistor into the corresponding E, B, and C holes of the circuit board. Position the transistor 1/4" above the circuit board. Solder all leads to the foil and cut off the excess lead lengths of each transistor after it is installed.

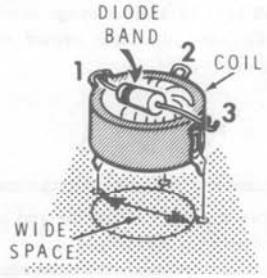


( ) Q303: MPSA20 (#417-801).

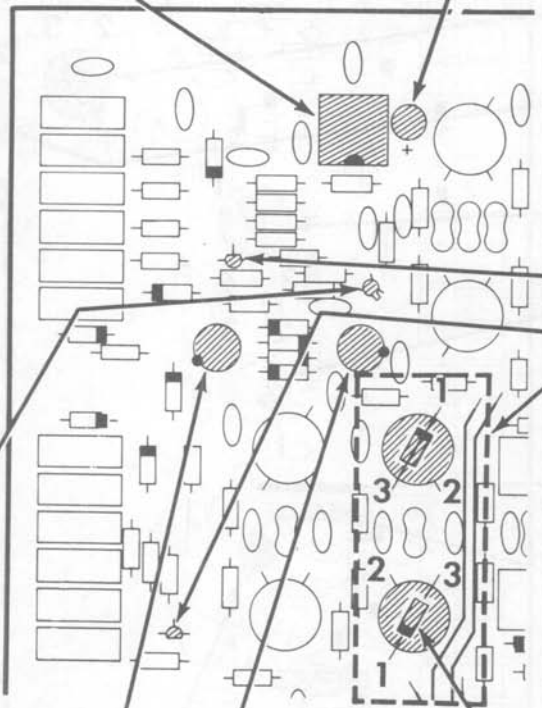
( ) Q302: MPSA20 (#417-801).

( ) L305, L306: Two 7.95 μH coils (#40-1672).

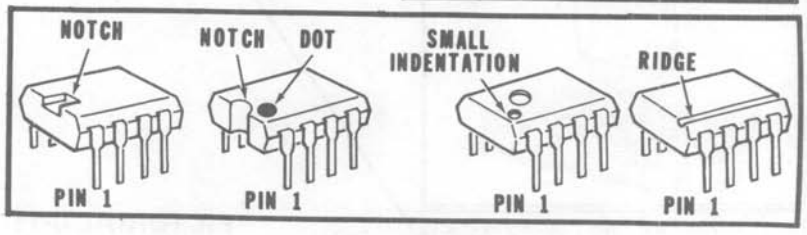
After installing the coils, connect a diode between lugs 1 and 3 of each coil. Be sure you position the banded end of the diode as shown in the Pictorial.



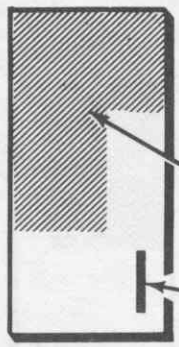
( ) D325, D326: Two 1N458 diodes (#56-24). Connect them to coils L305 and L306 respectively.



PICTORIAL 5-10



Detail 5-10A



START

As you install the coils in the following steps, mount each coil as shown. Solder the lugs to the foil. Then connect a diode (#56-24) between lugs 1 and 3 of each coil. Be sure to position the banded end of each diode as indicated. Solder the two connections and cut off excess lead lengths.

( ) L302: Coil (#40-1672).

( ) D334: Diode (#56-24).

( ) L304: Coil (#40-1672).

( ) D330: Diode (#56-24).

( ) L301: Coil (#40-1672).

( ) D333: Diode (#56-24).

( ) L303: Coil (#40-1672).

( ) D329: Diode (#56-24).

( ) L307: Coil (#40-1672).

( ) D321: Diode (#56-24).

( ) L308: Coil (#40-1672).

( ) D322: Diode (#56-24).

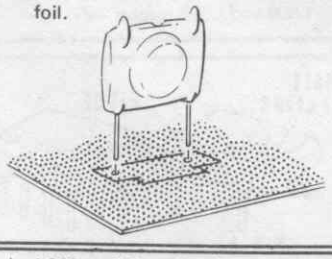
NOTE: When a jumper wire is called for, use gray wire cut to the specified length. Remove 1/4" of insulation from each end.

( ) 1-1/4" jumper wire.

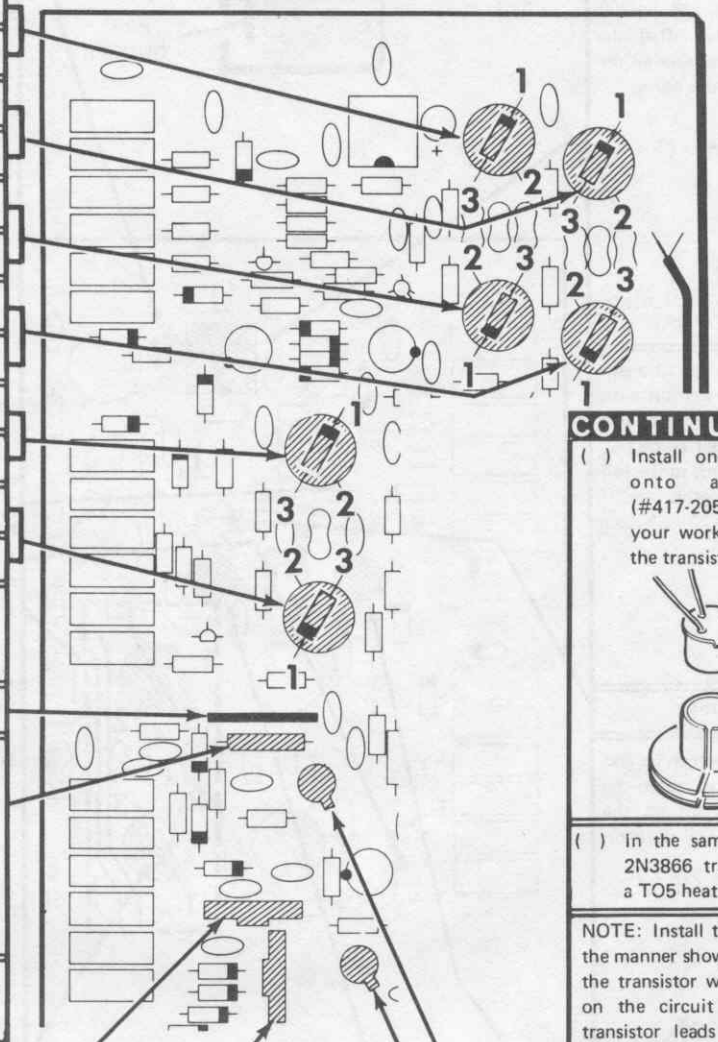
( ) RFC301: 15 µH RF choke (#45-51). To avoid damage to the choke, bend the leads toward the slots in the coil form.

( ) Solder the leads to the foil and cut off the excess lead lengths.

( ) L322: 180 µH (brown-gray-brown) peaking coil. Solder the lugs to the foil.



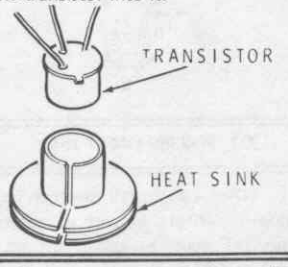
( ) L323: 6.8 µH (blue-gray-gold) peaking coil. Solder the lugs to the foil.



PICTORIAL 5-11

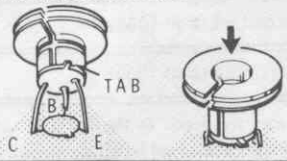
CONTINUE

( ) Install one of the TO5 heat sinks onto a 2N3866 transistor (#417-205). Place the heat sink on your work area as shown, and press the transistor into it.



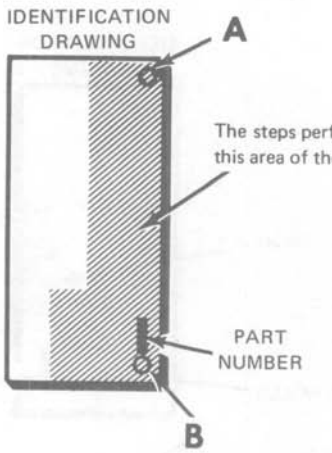
( ) In the same manner press another 2N3866 transistor (#417-205) into a TO5 heat sink.

NOTE: Install the following transistors in the manner shown. First line up the tab on the transistor with the outline of the tab on the circuit board. Then insert the transistor leads into their correct holes which are indicated by C, B, and E. Push the transistor down against the circuit board. Solder each lead to the foil and cut off the excess lead length.



( ) Q304: 2N3866 transistor (#417-205).

( ) Q305: 2N3866 transistor (#417-205).



START

NOTE: When a jumper wire is called for, use gray wire cut to the specified length. Remove 1/4" of insulation from each end.

( ) 4-7/8" jumper wire.

( ) 4-7/8" jumper wire.

( ) 2-3/4" jumper wire.

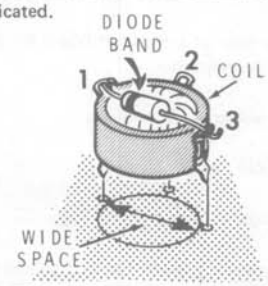
( ) 2-3/4" jumper wire.

( ) 2-1/2" jumper wire.

( ) L324: Coil (#40-1049).

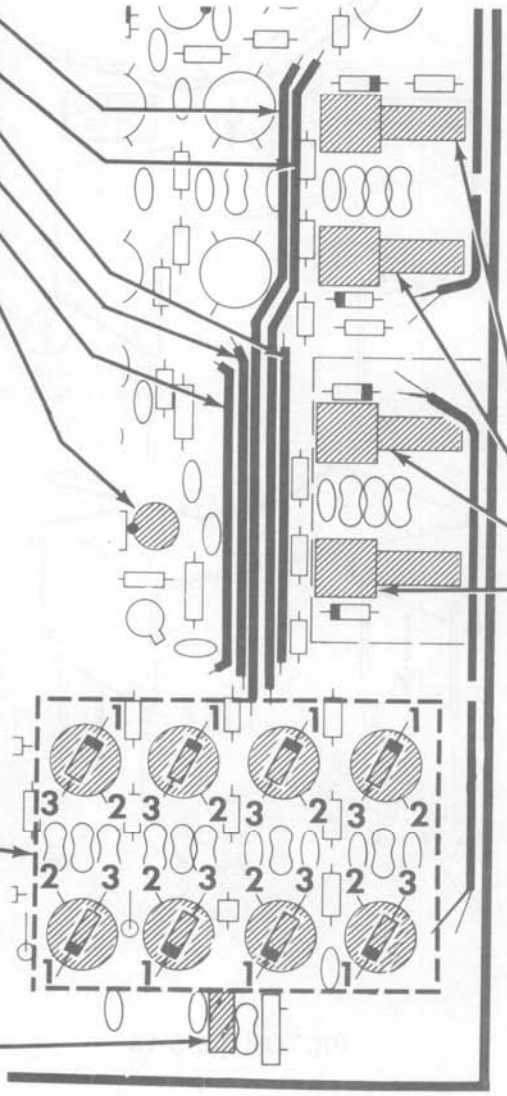
( ) Solder all leads to the foil and cut off the excess lead lengths.

Each time you install a coil in the following step, solder the lugs to the foil. Then connect and solder a diode (#57-64) between lugs 1 and 3 of each coil. Be sure to position the banded end of the diode as indicated.



( ) Install a coil (#40-1672) at each of the following eight locations: L311, L312, L313, L314, L315, L316, L317 and L318.

( ) L321: 13.2 μH toroid coil (#40-1877). Solder the leads to the foil and cut off the excess lead lengths.



CONTINUE

NOTE: The coils have been pretuned at the factory. Do not attempt to adjust the coils until instructed to do so.

When you install coils on the board, position the coil over its outline making sure all four coil pins are inserted through the board holes. Then solder each pin.

Install four 3.95 μH coils (#40-1673) at:

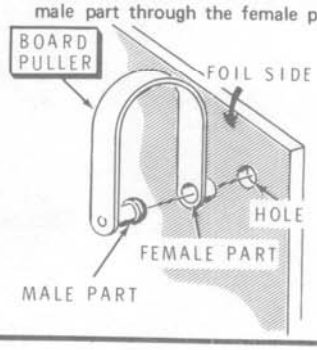
( ) L309.

( ) L310.

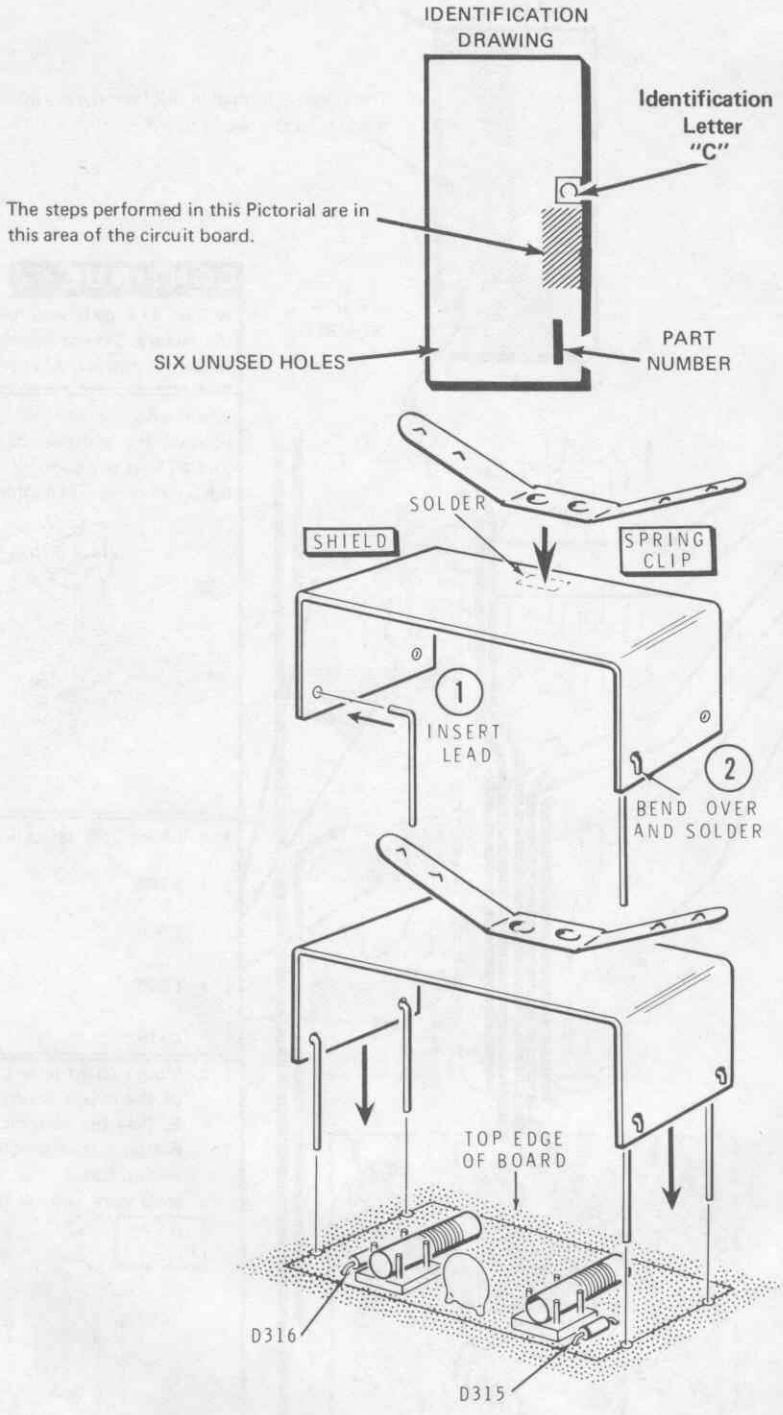
( ) L320.

( ) L319.

( ) Mount board pullers on the foil side of the circuit board at holes A and B. (See the identification drawing.) Position the female part in the circuit board hole. Then push the male part through the female part.



PICTORIAL 5-12



PICTORIAL 5-13

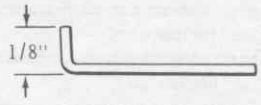
START

( ) Cut a letter "C" from the terminal identification label sheet and remove the adhesive backing. Press this letter onto the circuit board in a clear spot near the location shown in the identification drawing.

( ) Solder the spring clip to the shield in the area shown (this clip will ground the shield directly to the compartment shield when the circuit board is installed later).

Use four cutoff resistor leads in the following steps.

( ) Form each of the four leads:



( ) Insert the short end of each lead into a shield hole, bend it over on the outside of the shield, and solder it. Use plenty of heat.

( ) Insert the four leads in the holes in the circuit board outline, push the shield against the board, and solder the four leads to the foil. Cut off the excess lead lengths.

CIRCUIT BOARD CHECKOUT

Carefully inspect the circuit board for the following conditions.

( ) Unsoldered connections.

( ) "Cold" solder connections.

( ) Solder bridges between foils.

( ) Protruding leads. No lead should be longer than 1/8".

( ) Transistors for the proper type and installation.

( ) Integrated circuit for the proper type and installation.

( ) Electrolytic capacitors for the correct position of the positive (+) mark.

( ) Diodes for the correct position of the banded end.

( ) Set the circuit board aside until it is called for in a step.

FINISH

VFO FILTER AND DRIVER CIRCUIT BOARDS

PARTS LIST

Remove the parts from Pack #6 and check each part against the following list. Make a check (✓) in the space provided as you identify each part. Return any part that is packed in an individual envelope with the part number on it back in the envelope after you identify it until it is called for in a step. Do not throw away any packing materials until all parts are accounted for.

KEY No.	QTY.	DESCRIPTION	PART No.	CIRCUIT Component No.

RESISTORS

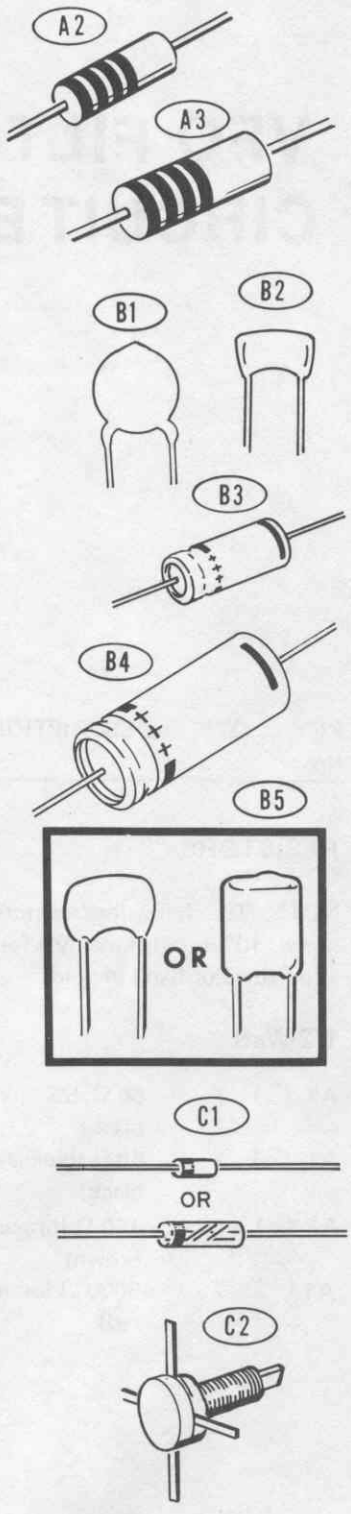
NOTE: The following resistors have a 10% tolerance unless otherwise noted. 10% is indicated by a fourth color band of silver; 5% is indicated by a fourth color band of gold.

1/2-Watt

A1 ( )	1	56 Ω, 5% (green-blue-black)	1-83	R901
A1 ( )	2	68 Ω (blue-gray-black)	1-2	R1254, R1266
A1 ( )	2	150 Ω (brown-green-brown)	1-66	R907, R1255
A1 ( )	2	3900 Ω (orange-white-red)	1-46	R905, R906

KEY No.	QTY.	DESCRIPTION	PART No.	CIRCUIT Component No.
Other Resistors				
A2 ( )	1	1000 Ω, 1-watt (brown-black-red)	1-2-1	R904
A2 ( )	1	.33 Ω, 5%, 2-watt (orange-orange-silver)	3-2-2	R902
A3 ( )	1	220 Ω, 2-watt (red-red-brown)	1-13-2	R903
CAPACITORS				
Disc				
B1 ( )	1	470 pF	21-56	C901
B1 ( )	1	820 pF	21-150	C903
B1 ( )	10	.01 μF	21-176	C904, C907, C909, C911, C912, C913, C914, C915, C916, C1253
Other Capacitors				
B2 ( )	2	105 pF mica	20-162	C1254, C1256
B2 ( )	1	230 pF mica	20-111	C902
B2 ( )	1	620 pF mica	20-167	C1255
B3 ( )	1	10 μF electrolytic	25-54	C908
B4 ( )	1	250 μF electrolytic	25-262	C905
B5 ( )	1	.1 μF Mylar	27-47	C906
DIODES-TRANSISTORS				
C1 ( )	2	1N191 diode (brown-white-brown)	56-26	D905, D906
C1 ( )	2	DRS-110 silicon diode	57-64	D903, D904
C1 ( )	2	1N4002 silicon diode	57-65	D901, D902
C2 ( )	2*	PT6619 transistor	417-830	Q901, Q902

*If ordering transistors, don't forget to order thermal compound, #352-31.



KEY No.	QTY.	DESCRIPTION	PART No.	CIRCUIT Component No.

INDUCTORS

D1 ( )	2	14.5 μH coil	40-1052	L901, L902
D2 ( )	2	10.1 μH coil	40-1732	L1251, L1252
D3 ( )	1	2.2 μH choke	45-73	RFC901
D4 ( )	2	350 μH choke	45-82	RFC902, RFC903

HARDWARE

NOTE: The hardware may be in more than one packet. Open all of the hardware packets in this pack before you check the hardware against the Parts List.

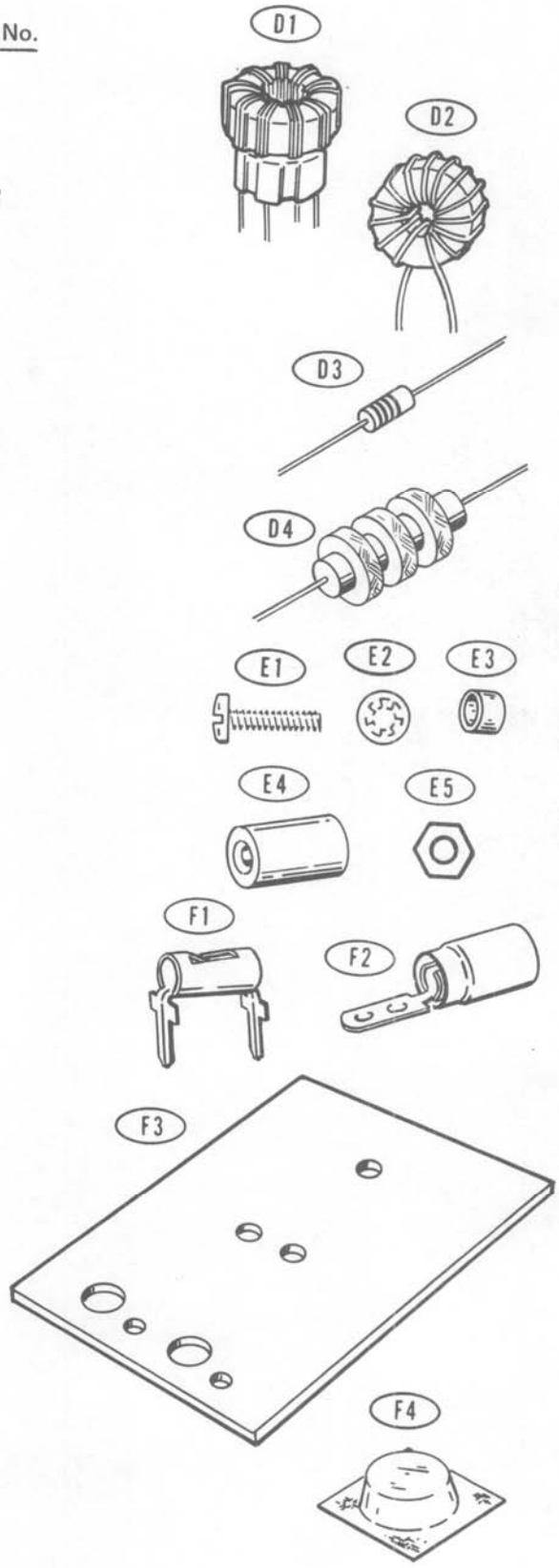
E1 ( )	3	6-32 x 1/2" screw	250-162
E2 ( )	3	#6 lockwasher	254-1
E3 ( )	3	1/8" spacer	255-1
E4 ( )	3	15/32" tapped spacer	255-23
E5 ( )	2	8-32 nut	252-4

MISCELLANEOUS

F1 ( )	6	Circuit board connector	432-124
F2 ( )	2	Phono socket	434-186
F3 ( )	1	Heat sink	215-80
F4 ( )	1	Thermal compound*	352-31

PARTS FROM PACK #12

( )	1	Driver circuit board	85-1628-1
( )	1	VFO filter circuit board	85-1633-2



The prices shown on the separate "Heath Parts Price List" 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 (Michigan residents add 4% sales tax) to cover insurance, 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.

To order a replacement part, use the Parts Order Form furnished with this kit. If a Parts Order Form is not available, refer to "Customer Service" inside the rear cover of this Manual.

*Dow Corning thermal heat sink compound contains Zinc Oxides, SiO_2, and slight traces of CO_2.

STEP-BY-STEP ASSEMBLY

VFO FILTER CIRCUIT BOARD

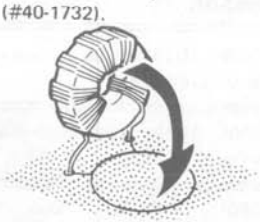
START

Position the VFO Filter circuit board as shown and complete the following steps.

( ) C1254: 105 pF mica.

( ) C1256: 105 pF mica.

( ) L1251: 10.1 µH toroid coil (#40-1732).



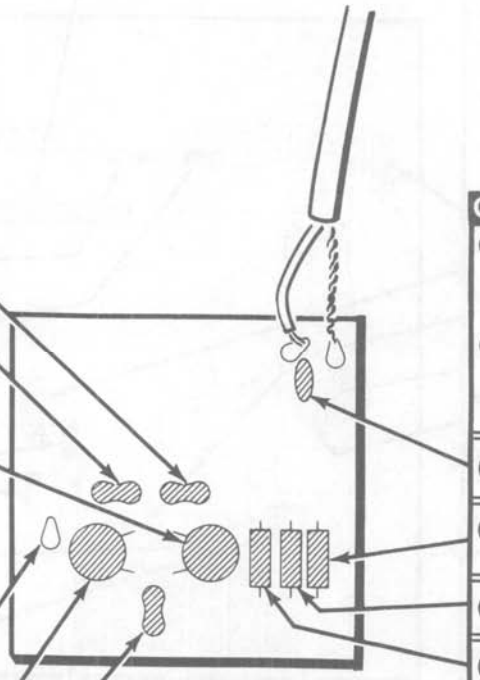
NOTE: To prepare a length of wire, cut it to the indicated length and remove 1/4" of insulation from each end.

( ) Prepare a 1-3/4" gray wire. Insert one end into hole H and solder the wire to the foil. The free end will be connected later.

( ) L1252: 10.1 µH toroid coil (#40-1732).

( ) C1255: 620 pF mica.

( ) Solder the leads to the foil and cut off the excess lead lengths.



CONTINUE

( ) Refer to Detail 6-1A and prepare a 4-3/8" length of shielded cable. NOTE: DO NOT use RG-58A/U.

( ) Connect the center conductor to B (S-1) and the shield to A (S-1). The free end will be connected later.

( ) C1253: .01 µF disc.

( ) R1255: 150 Ω (brown-green-brown).

( ) R1254: 68 Ω (blue-gray-black).

( ) R1266: 68 Ω (blue-gray-black).

( ) Solder the leads to the foil and cut off the excess lead lengths.

NOTE: Disregard any unused holes.

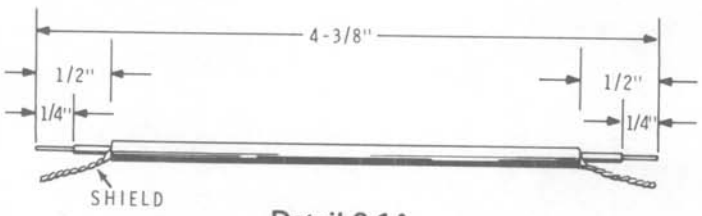
( ) Squeeze a little of the cement (saved from the VFO steps) into the centers of the two toroid coils to affix them to the circuit board.

( ) Check the circuit board for unsoldered connections.

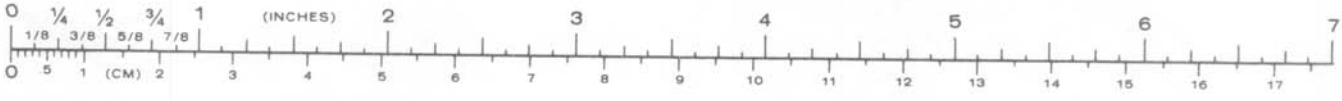
Set the circuit board aside until it is called for in a step.

PICTORIAL 6-1

CUT THE CABLE ACCORDING TO THE DIMENSIONS BELOW. PREPARE EACH END AS SHOWN.



Detail 6-1A



DRIVER CIRCUIT BOARD

START

Position the Driver circuit board as shown. Then proceed with the following steps.

NOTE: The circuit board will be mounted close to a metal plate. To avoid short circuits, use a minimum amount of solder that will still produce good solder connections. Then cut the excess lead lengths as short as possible.

( ) R907: 150 Ω (brown-green-brown).

( ) R905: 3900 Ω (orange-white-red).

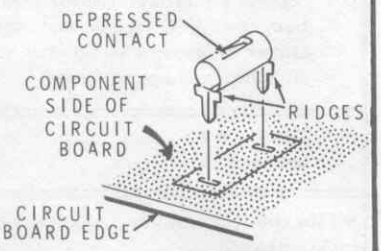
( ) R906: 3900 Ω (orange-white-red).

( ) R901: 56 Ω (green-blue-black).

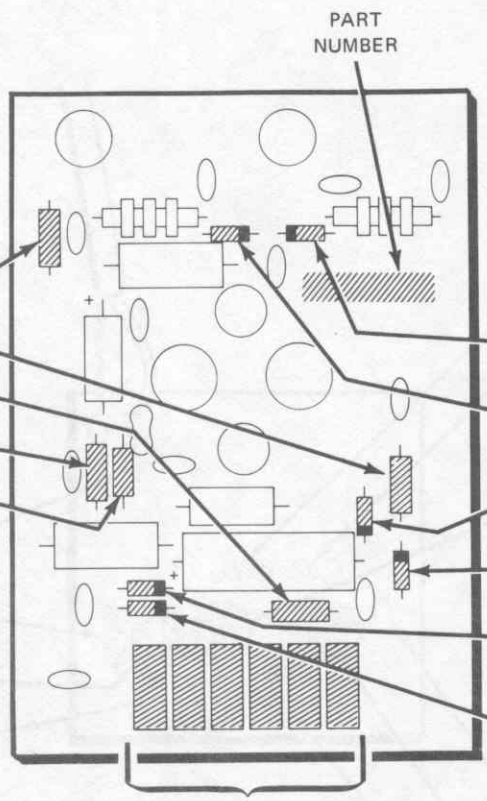
( ) RFC901: 2.2 μH choke (#45-73).

( ) Solder the leads to the foil and cut off the excess lead lengths.

Install circuit board connectors in the follow manner. Note that inside each connector the spring contact is depressed on one end. This depressed end of the connector should face away from the edge of the circuit board. Insert the mounting tabs through the circuit board until the ridges of the connector are firmly against the circuit board. Look at the row of connectors to make sure the depressed end of the contact of each connector is toward the center of the circuit board. Solder the tabs to the foil.

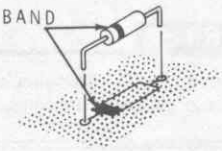


( ) Six circuit board connectors.



CONTINUE

NOTE: When you install a diode, always match the banded end of the diode with the band mark on the circuit board.



( ) D903: DRS-110 silicon diode (#57-64). Do not confuse this diode with the #57-65 diode.

( ) D904: DRS-110 silicon diode (#57-64).

( ) D906: 1N191 diode (brown-white-brown) (#56-26).

( ) D905: 1N191 diode (brown-white-brown) (#56-26).

( ) D901: 1N4002 silicon diode (#57-65).

( ) D902: 1N4002 silicon diode (#57-65).

FOR GOOD SOLDER CONNECTIONS, YOU MUST **KEEP THE SOLDERING IRON TIP CLEAN.** WIPE IT OFTEN WITH A DAMP SPONGE OR CLOTH.

( ) Solder the leads to the foil and cut off the excess lead lengths.

PICTORIAL 6-2

START

Install six .01 μF disc capacitors at:

( ) C911. . . . . .

( ) C915. . . . . .

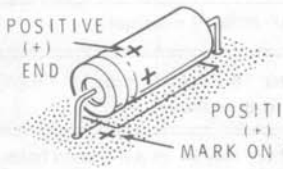
( ) C907. . . . . .

( ) C916. . . . . .

( ) C914. . . . . .

( ) C909. . . . . .

Position the positive (+) end of the electrolytic capacitors as shown.



( ) C908: 10 μF electrolytic.

( ) C902: 230 pF mica.

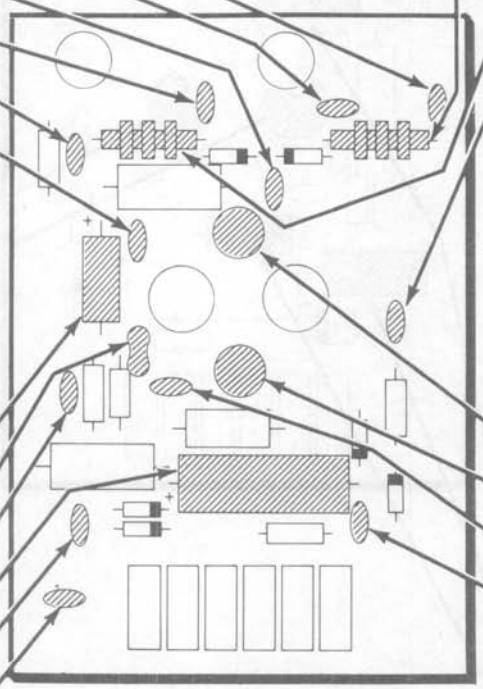
( ) C903: 820 pF disc.

( ) C905: 250 μF electrolytic.

( ) C901: 470 pF disc.

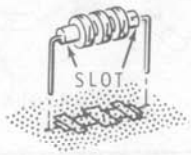
( ) C906: .1 μF Mylar.

( ) Solder the leads to the foil and cut off the excess lead lengths.



CONTINUE

( ) RFC902: 350 μH choke (#45-82). Bend the leads toward the slot in the coil form to prevent damage to the leads of the winding.



( ) RFC903: 350 μH choke (#45-82).

( ) C912: .01 μF disc.

NOTE: Install the following coils by inserting the pins into the correct holes in the circuit board. Solder the leads to the foil and cut off the excess lead lengths.

( ) L902: 14.5 μH coil (#40-1052).

( ) L901: 14.5 μH coil (#40-1052).

( ) C904: .01 μF disc.

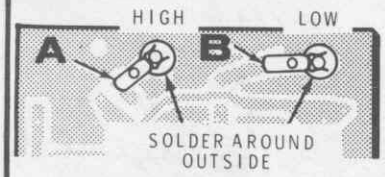
( ) C913: .01 μF disc.

( ) Solder the leads to the foil and cut off the excess lead lengths.

PICTORIAL 6-3

START

NOTE: When you mount a phono socket, first seat the socket in its hole on the top of the circuit board. Then turn the circuit board over and support the socket with the corner of a book to hold the socket up against the board. Position each socket so its lug can be bent over to touch the appropriate foil shown by arrows A and B. Then solder the socket to the foil by moving a soldering iron around the socket and foil while you apply solder.



( ) Phono socket at LOW.

( ) Phono socket at HIGH.

( ) Bend each phono socket lug over so its end touches foil A or B. Be sure no part of this lug touches the socket body. However, the clearance between this lug and the socket body must be as small as possible. Solder each lug to the foil.

( ) Use an ohmmeter to make sure there is an open circuit between each phone socket center conductor and the ground foil.

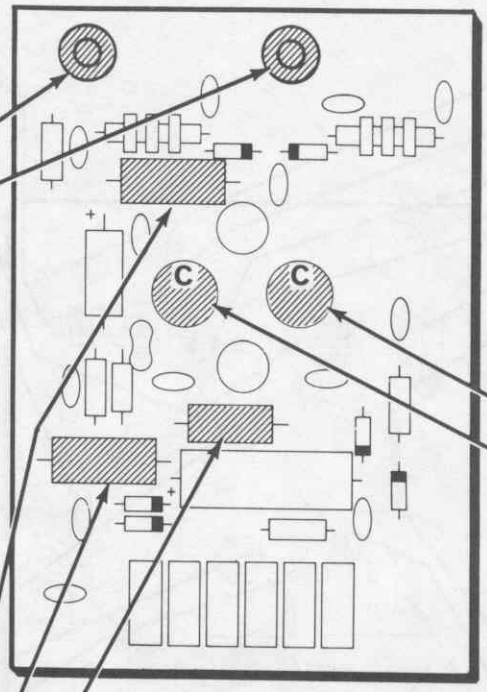
Turn the circuit board foil-side-down to perform the next three steps.

( ) R904: 1000 Ω, 1-watt (brown-black-red).

( ) R903: 220 Ω, 2-watt (red-red-brown).

( ) R902: .33 Ω, 2-watt (orange-orange-silver).

( ) Solder the leads to the foil and cut off the excess lead lengths.



PICTORIAL 6-4

CONTINUE

Cut the four leads of each of the PT6619 transistors (#417-830) to 3/16". Mount the transistor with its threaded stud and leads from the foil side of the circuit board. The collector lead is identified by letter "C" on the top of the transistor.

1. Be SURE the letter C matches the letter C on the circuit board.
2. Be SURE the transistor studs are perpendicular to the circuit board before you solder.
3. Check a second time that the letters C match each other.

( ) Q902: PT6619 transistor.

( ) Q901: PT6619 transistor.

( ) Solder the four leads of each transistor to the foil.

NOTE: There may be several unused holes in this circuit board.

Circuit Board Checkout

Carefully inspect the circuit board for the following conditions.

( ) Unsoldered connections.

( ) "Cold" solder connections.

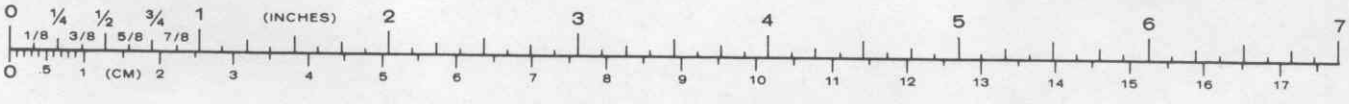
( ) Solder bridges between foil patterns.

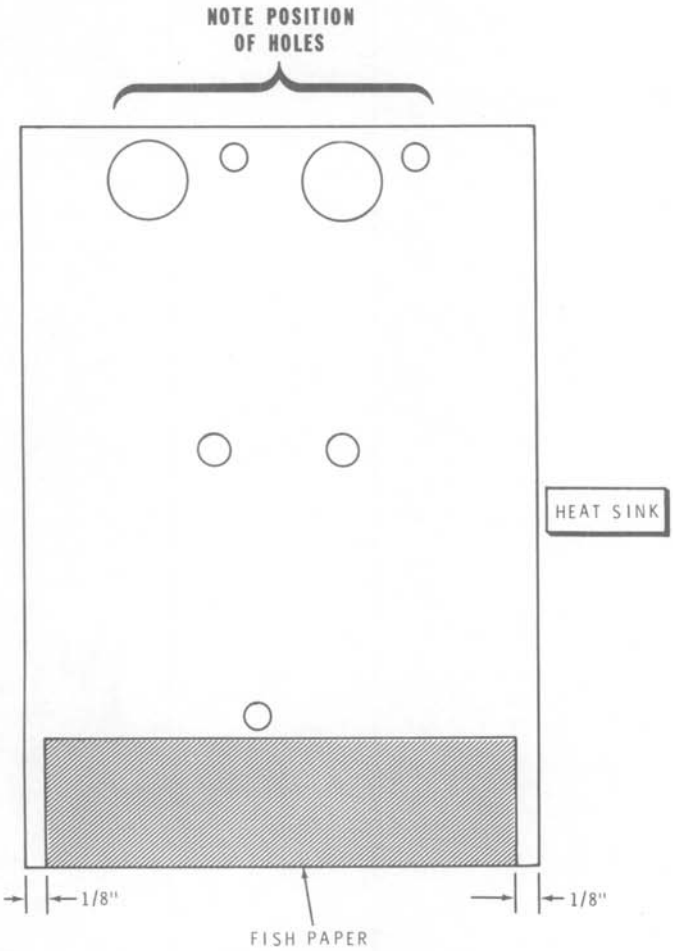
( ) Protruding leads. No lead should be longer than 1/8".

( ) Transistors for the proper type and installation.

( ) Electrolytic capacitors for the correct position of the positive (+) mark.

( ) Diodes for the correct type and position of the banded end.





Detail 6-5A

Heat Sink Assembly

Refer to Pictorial 6-5 (in the "Illustration Booklet") for the following steps.

( ) Refer to Detail 6-5A, remove the paper backing from a 2-3/4" x 3/4" piece of fish paper (left over from previous steps), and mount the paper in the position shown.

( ) Remove and discard any nuts that may be threaded on the transistor studs.

WARNING: You will be using Dow Corning 340 thermal heat sink compound in the next step and in several other steps in the Manual. Although the compound is not caustic, it may cause temporary discomfort if it gets into your eyes. Should this happen, rinse your eyes with warm water. If the compound gets into your clothing, the clothing may require professional cleaning. The compound contains Zinc Oxides, SiO_2, and slight traces of CO_2.

( ) Refer to inset drawing #1 on the Pictorial. Cut open the thermal compound and squeeze out a small amount of it. Use an applicator to liberally coat the transistor studs at D and E.

( ) Wash the thermal compound from your hands.

NOTE: Save the remaining compound for use later.

( ) Place a 6-32 x 1/2" screw through hole A from the component side of the circuit board. Hold the screw in place with your finger and turn the circuit board foil-side-up. Place a 1/8" spacer over the end of the screw. Then lower the heat sink onto the screw, with the fish paper toward the foil side of the circuit board, so the transistor studs fit through holes D and E in the heat sink. Place a #6 lockwasher onto the 1/2" screw; then turn a 15/32" tapped spacer onto the screw (only finger tight).

( ) In the same manner, secure the circuit board to the heat sink at B and C. Use a 6-32 x 1/2" screw, a 1/8" spacer, a #6 lockwasher, and a 15/32" tapped spacer at each location.

( ) Tighten the three screws and spacers at A, B, and C.

( ) Carefully check the space between the underside of the circuit board and the heat sink to be sure none of the component leads or solder connections touch the heat sink. Be sure to carefully check the center conductors of the phono sockets.

NOTE: To avoid damage to the power transistors, it is important that you follow exactly the instructions for tightening the nuts in the following steps.

( ) Start an 8-32 nut onto each transistor stud at D and E.

( ) Use your fingers ONLY and tighten the two nuts as much as possible.

( ) Hold the flats on the end of the transistor stud with pliers to keep the transistor stud from turning as shown in inset #2 of the Pictorial. Then tighten each transistor mounting nut 1/8 turn more.

This completes the assembly of your driver circuit board. Set it aside until it is called for in a step.

ALC/OUTPUT FILTER CIRCUIT BOARD

PARTS LIST

Remove the parts from Pack #7 and check each part against the following list. Make a check (✓) in the space provided as you identify each part. Return any part that is packed in an individual envelope with the part number on it back in the envelope after you identify it until it is called for in a step. Do not throw away any packing materials until all parts are accounted for.

KEY No.	QTY.	DESCRIPTION	PART No.	CIRCUIT Component No.

RESISTORS

NOTE: The following resistors have a 10% tolerance unless otherwise noted. 10% is indicated by a fourth color band of silver; 5% is indicated by a fourth color band of gold.

1/2-Watt

A1( )	1	220 Ω (red-red-brown)	1-45	R804
A1( )	1	1000 Ω (brown-black-red)	1-9	R808
A1( )	3	3300 Ω (orange-orange-red)	1-14	R801, R805, R806
A1( )	1	4700 Ω (yellow-violet-red)	1-16	R809
A1( )	1	6200 Ω, 5% (blue-red-red)	1-116	R803
A1( )	1	10 kΩ (brown-black-orange)	1-20	R807

Other Resistors

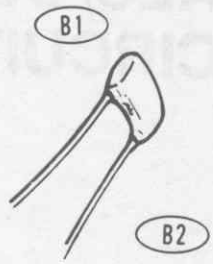
A2( )	1	150 Ω, 1-watt (brown-green-brown)	1-18-1	R802

KEY No.	QTY.	DESCRIPTION	PART No.	CIRCUIT Component No.

CAPACITORS

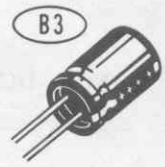
Mica

B1 ( )	2	100 pF	20-102	C801, C804
B1 ( )	3	150 pF	20-103	C802, C803, C806
B1 ( )	1	180 pF	20-105	C805
B1 ( )	1	255 pF	20-126	C809
B1 ( )	1	290 pF	20-121	C812
B1 ( )	1	300 pF	20-115	C824
B1 ( )	1	330 pF	20-139	C811
B1 ( )	2	470 pF	20-113	C807, C815
B1 ( )	3	620 pF	20-167	C808, C817, C819
B1 ( )	2	680 pF	20-107	C813, C816
B1 ( )	1	820 pF	20-171	C814
B1 ( )	1	1000 pF	20-122	C822
B1 ( )	2	1800 pF	20-137	C818, C821



Other Capacitors

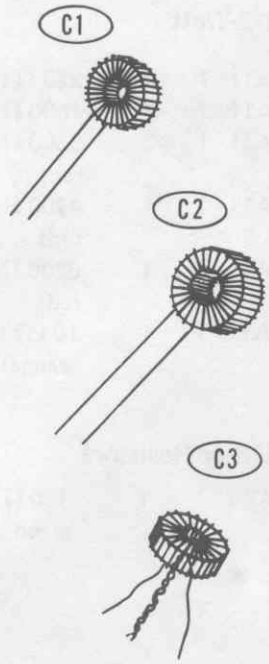
B2 ( )	1	10 pF disc	21-3	C823
B2 ( )	4	.001 μF disc	21-140	C825, C826, C828, C829
B3 ( )	1	5 μF electrolytic	25-149	C827



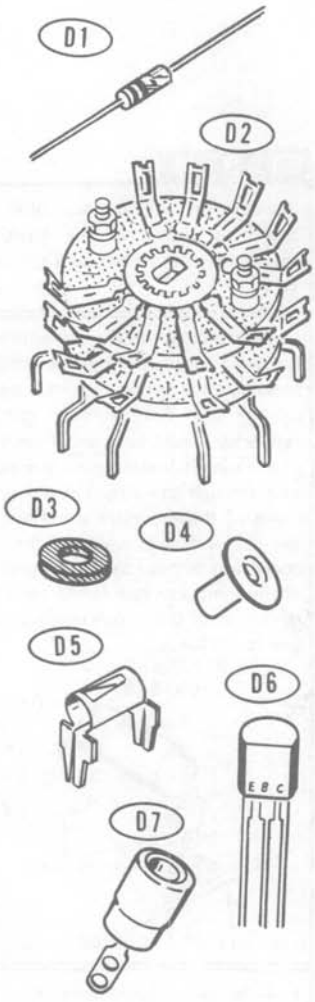
INDUCTORS

NOTE: The following inductors are toroid type coils unless otherwise noted. Leave these inductors in their envelopes until they are called for in a step.

C1( )	2	.13 μH (white and red dots)	40-1861	L801, L803
C1( )	1	.255 μH (blue dot)	40-1862	L804
C1( )	1	.37 μH (red and yellow dots)	40-1863	L805
C1( )	1	.42 μH (yellow dot)	40-1864	L806
C1( )	1	.44 μH (white and green dots)	40-1865	L802
C1( )	1	.48 μH	40-1610	L807
C1( )	1	.76 μH (orange dot)	40-1866	L808
C1( )	1	.88 μH (white dot)	40-1868	L809
C2( )	1	.825 μH (white and yellow dots)	40-1867	L810
C2( )	1	1.31 μH (green dot)	40-1869	L811
C2( )	1	1.59 μH (red dot)	40-1870	L812
C3( )	1	30 μH	40-1011	L813



KEY No.	QTY.	DESCRIPTION	PART No.	CIRCUIT Component No.
MISCELLANEOUS				
D1 ( )	3	1N295 diode (red-white-green)	56-20	D801, D802, D803
D2 ( )	1	Rotary switch	63-723	SW1C, SW1D
D3 ( )	1	#6 flat fiber washer	253-1	
D4 ( )	1	Eyelet	257-12	
D5 ( )	6	Circuit board connector	432-124	
D6 ( )	2	MPSA20 transistor	417-801	Q801, Q802
D7 ( )	2	Phono socket	434-186	
PART FROM PACK #12				
( )	1	ALC/output filter circuit board	85-1630-2	

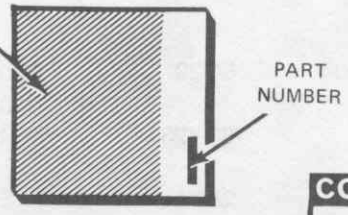


The prices shown on the separate "Heath Parts Price List" apply only on purchases from the Heath Company where shipment is to a U.S.A. destination. Add 10% (minimum 25 cents) to the price when ordering (Michigan residents add 4% sales tax) to cover insurance, postage, and handling. Outside the U.S.A., parts and service are available from your local Heathkit source and will reflect additional transportation, taxes, duties, and rates of exchange.

To order a replacement part, use the Parts Order Form furnished with this kit. If a Parts Order Form is not available, refer to "Customer Service" inside the rear cover of this Manual.

STEP-BY-STEP ASSEMBLY

The steps performed in this Pictorial are in this area of the circuit board.

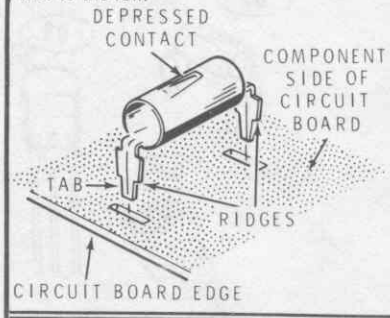


IDENTIFICATION DRAWING

START

Position the ALC/output filter circuit board as shown in the identification drawing. Then proceed with the following steps.

Install six circuit board connectors in the following manner. Note that inside each connector the spring contact is depressed on one end. This depressed end of the connector should face away from the edge of the circuit board. Insert the mounting tabs through the circuit board until the ridges of the connector are firmly against the circuit board. Look at the row of connectors to make sure the depressed end of the contact of each connector is toward the center of the circuit board. Solder the tabs to the foil.



( ) Six circuit board connectors.

( ) R806: 3300 Ω (orange-orange-red).

( ) R805: 3300 Ω (orange-orange-red).

( ) R809: 4700 Ω (yellow-violet-red).

( ) R804: 220 Ω (red-red-brown).

( ) R801: 3300 Ω (orange-orange-red).

( ) R803: 6200 Ω (blue-red-red).

( ) R802: 150 Ω, 1-watt (brown-green-brown).

( ) R808: 1000 Ω (brown-black-red).

( ) R807: 10 kΩ (brown-black-orange).

( ) Solder the leads to the foil and cut off the excess lead lengths.

CONTINUE

( ) C802: 150 pF mica.

( ) C801: 100 pF mica.

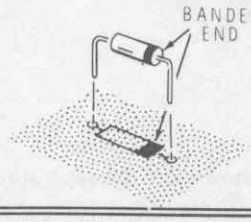
( ) C803: 150 pF mica.

( ) C804: 100 pF mica.

( ) C823: 10 pF disc.

( ) Solder the leads to the foil and cut off the excess lead lengths.

NOTE: When you install a diode, always match the banded end of the diode with the band mark on the circuit board.



Install three IN295 diodes (#56-20) at:

( ) D802.

( ) D801.

( ) D803.

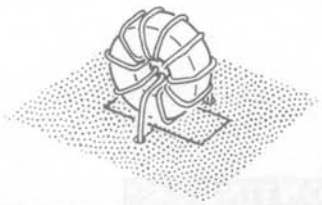
FOR GOOD SOLDER CONNECTIONS, YOU MUST **KEEP THE SOLDERING IRON TIP CLEAN.** WIPE IT OFTEN WITH A DAMP SPONGE OR CLOTH.

( ) Solder the leads to the foil and cut off the excess lead lengths.

PICTORIAL 7-1

START

NOTE: When you install toroid coils in the following steps, do not remove a coil from its envelope until you are ready to mount it. Then start the leads through their holes in the top of the board. Grasp the lead ends from the foil side of the board and pull the coil down onto the board. Solder the leads as you install each coil. Then cut off the excess lead lengths.



( ) L804: .255 µH coil (#40-1862, blue dot).

( ) L805: .37 µH coil (#40-1863, red and yellow dots).

( ) L807: .48 µH coil (#40-1610).

( ) L806: .42 µH coil (#40-1864, yellow dot).

( ) L809: .88 µH coil (#40-1868, white dot).

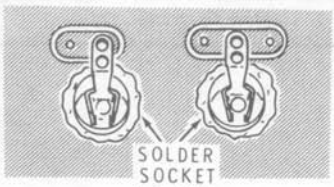
( ) L812: 1.59 µH coil (#40-1870, red dot).

( ) L810: .825 µH coil (#40-1867, white and yellow dots).

( ) L808: .76 µH coil (#40-1866, orange dot).

( ) L811: 1.31 µH coil (#40-1869, green dot).

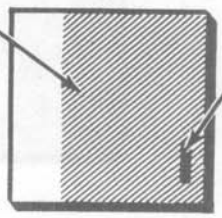
NOTE: To mount a circuit board socket, seat the socket in its hole on the top of the circuit board. Turn the circuit board over and support the socket with the corner of a book to hold the socket up against the board. Position the lug over the foil pad as shown. Then solder the socket to the foil by moving a soldering iron around the socket and foil while you apply solder. The lug will be soldered later.



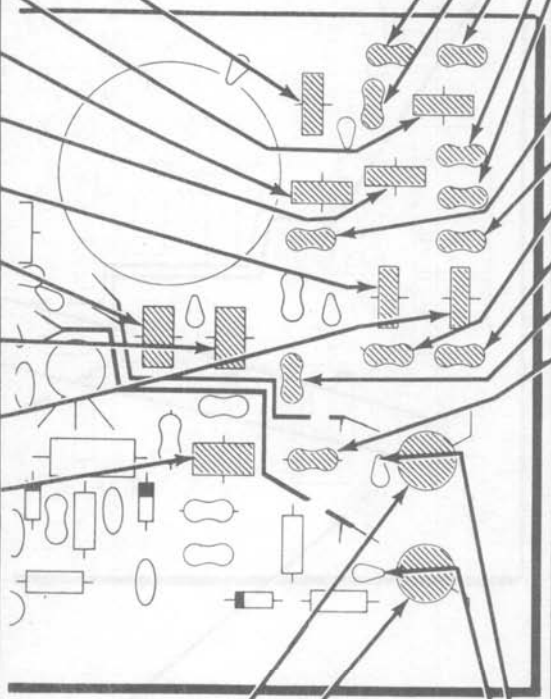
( ) Phono socket at IN.

( ) Phono socket at OUT.

The steps performed in this Pictorial are in this area of the circuit board.



IDENTIFICATION DRAWING



CONTINUE

( ) C805: 180 pF mica.

( ) C806: 150 pF mica.

( ) C807: 470 pF mica.

( ) C808: 620 pF mica.

( ) C809: 255 pF mica.

( ) Solder the leads to the foil and cut off the excess lead lengths.

( ) C812: 290 pF mica.

( ) C813: 680 pF mica.

( ) C815: 470 pF mica.

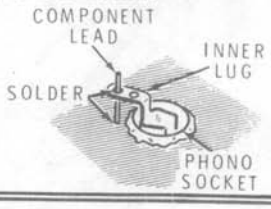
( ) C814: 820 pF mica.

( ) C816: 680 pF mica.

( ) C818: 1800 pF mica.

( ) Solder the leads to the foil and cut off the excess lead lengths. Save two cutoff leads for use in the following steps.

NOTE: In each of the next two steps, bend the inner lug of the phono socket as shown. Then push a cut-off component lead through the lug and into the circuit board hole. Solder the lead to both the lug and the foil and cut off the excess lead lengths. Be careful not to short the lug to the phono socket shell.

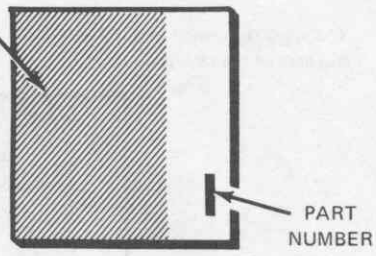


( ) Cutoff lead at F.

( ) Cutoff lead at G.

PICTORIAL 7-2

The steps performed in this Pictorial are in this area of the circuit board.

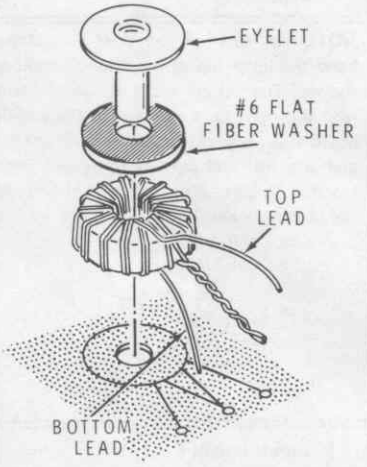


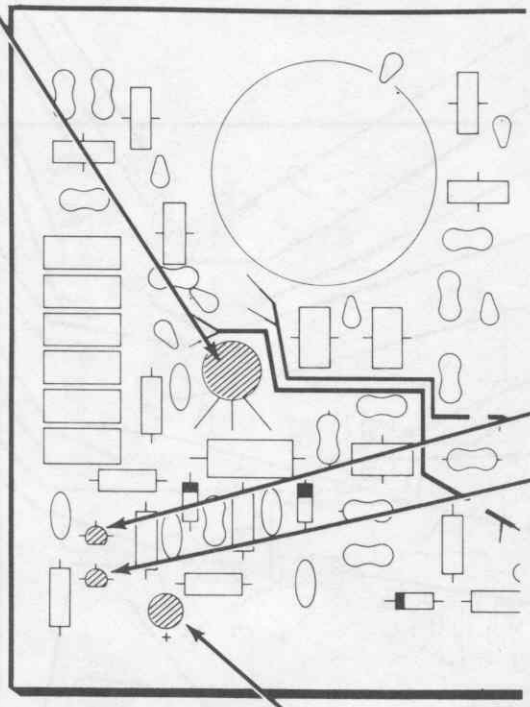
IDENTIFICATION DRAWING

START

( ) L813: Install a 30 μH coil (#40-1011) as follows:

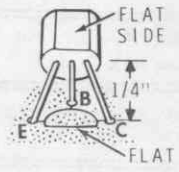
1. Refer to the drawing below and push the #6 flat fiber washer onto the eyelet. (It is a tight fit.)
2. Push the eyelet through the center of the coil as shown, either side up. Then push the eyelet through the circuit board. Position the leads as shown and solder the eyelet to the foil. Be careful that you do not fill the eyelet with solder.
3. Push the leads through the circuit board. IMPORTANT: Be sure the twisted pair goes into the center hole. The lead coming from the bottom of the coil must go to the hole nearest the 10 pF disc capacitor. The lead from the top must go to the hole nearest the location for the 1000 pF mica capacitor.
4. Solder the three leads to the foil and remove any excess lead lengths.





CONTINUE

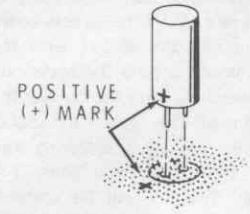
NOTE: In each of the following steps where a transistor is installed, line up the flat on the transistor with the flat on the circuit board. Then insert the transistor leads into the corresponding E, B, and C holes in the circuit board. Solder the leads to the foil and cut off the excess lead lengths.



( ) Q801: MPSA20 transistor (#417-801).

( ) Q802: MPSA20 transistor (#417-801).

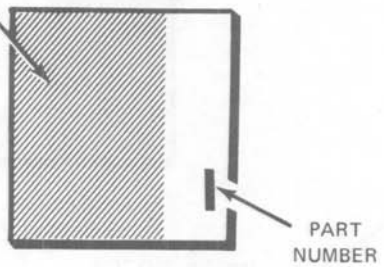
NOTE: When you install the electrolytic capacitor, match the positive (+) marking on the capacitor with the positive (+) marking on the circuit board. Solder the leads to the foil and cut off the excess lead lengths.



( ) C827: 5 μF electrolytic.

PICTORIAL 7-3

The steps performed in this Pictorial are in this area of the circuit board.



IDENTIFICATION
DRAWING

START

( ) L801: .13 μH coil (#40-1861, white and red dots).

( ) L802: .44 μH coil (#40-1865, white and green dots).

( ) L803: .13 μH coil (#40-1861, white and red dots).

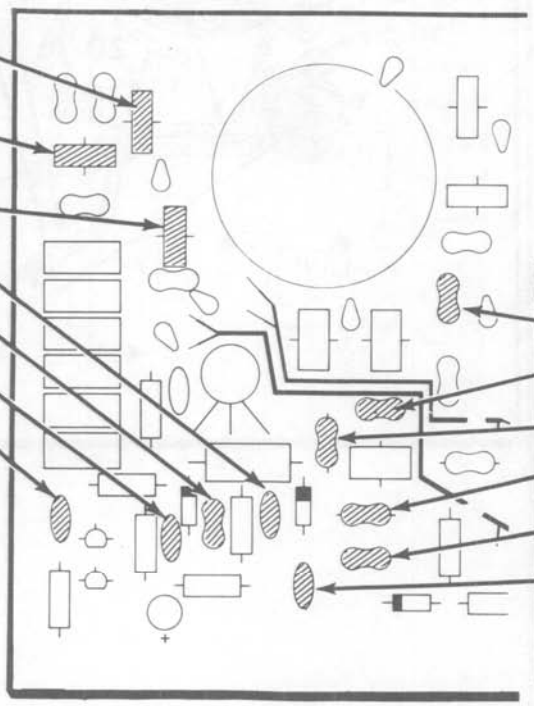
( ) C825: .001 μF disc.

( ) C824: 300 pF mica.

( ) C826: .001 μF disc.

( ) C829: .001 μF disc.

( ) Solder the leads to the foil and cut off the excess lead lengths.



CONTINUE

( ) C811: 330 pF mica.

( ) C817: 620 pF mica.

( ) C822: 1000 pF mica.

( ) C821: 1800 pF mica.

( ) C819: 620 pF mica.

( ) C828: .001 μF disc.

( ) Solder the leads to the foil and cut off the excess lead lengths.

PICTORIAL 7-4

START

( ) Orient the ten rotary switch lugs with the circuit board holes. Then carefully turn the rotors in both switch wafers so the index notches are in the position shown. You may want to use one of the switch shafts from Pack #12 to turn the rotors.

( ) SW1C-SW1D: Rotary switch (#63-723). Push the switch firmly down onto the circuit board. Then solder the ten lugs to the circuit board foil. In further steps, only the top wafer lugs will be connected.

( ) Form a 2" length of small bare wire so it curves around, and touches, switch lugs 5 through 14. Then bend the ends of the wire so they enter switch lugs 5 and 14. Solder the wire to all the lugs except lug 12.

( ) Prepare the following lengths of gray wire:

1-1/2" 1-1/4" 1-1/4" 1-1/2" 1-1/4"

As you install the wires in the following steps, solder both ends of the wire and cut off any excess wire lengths.

( ) 1-1/2" wire from A to switch lug 3.

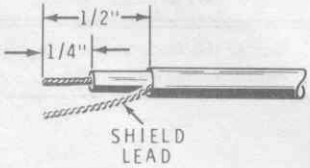
( ) 1-1/4" wire from X to switch lug 12 (also solder the bare wire).

( ) 1-1/4" wire from B to switch lug 16.

( ) 1-1/2" wire from C to switch lug 18.

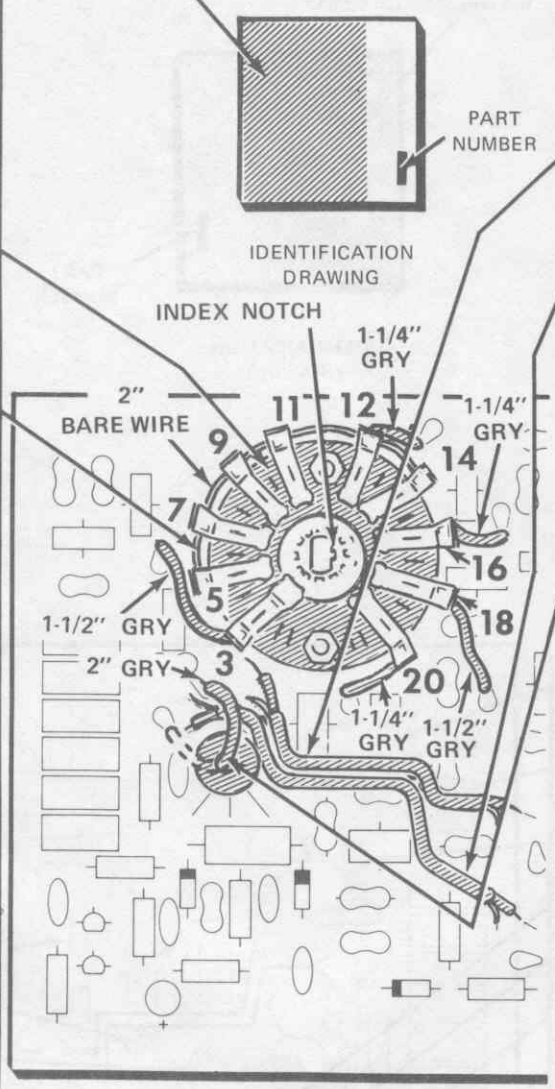
( ) 1-1/4" wire from D to switch lug 20.

( ) Prepare two lengths of shielded cable (one 3" length and one 3-3/4" length). Prepare both ends of each cable as follows:



Remove 1/2" of the outer insulation; then remove 1/4" of insulation from the inner conductor. Melt a small amount of solder on the wires at both ends.

The steps performed in this Pictorial are in this area of the circuit board.



PICTORIAL 7-5

CONTINUE

( ) At one end of the 3" cable, connect the shield lead to J (S-1) and the inner lead to H (S-1). Form the lead across the board as shown. Then connect the inner lead to N (S-1) and the shield lead to P (S-1).

( ) In the same manner, at one end of the 3-3/4" cable, connect the shield lead to L (S-1) and the inner lead to K (S-1). Form the lead across the board as shown. Then connect the inner lead to S (S-1) and the shield lead to R (S-1).

( ) Prepare a 2" gray wire.

( ) Place a 1-1/2" length of small sleeving over the 2" gray wire.

( ) Connect one end of the 2" gray wire to T (S-1). Pass the free end of this wire down through the eyelet of L813. Connect this end of the wire to hole E on the foil side of the board (S-1). NOTE: This wire must be as short as possible.

( ) Cut any excess lead lengths from the foil side of the board.

CIRCUIT BOARD CHECKOUT

Carefully inspect the circuit board for the following conditions.

( ) Unsoldered connections.

( ) "Cold" solder connections.

( ) Solder bridges between foils.

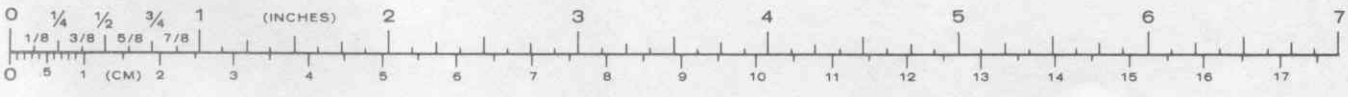
( ) Protruding leads. No lead should be longer than 1/8".

( ) Transistors for the proper type and installation.

( ) Electrolytic capacitor for the correct position of the positive (+) mark.

( ) Diodes for the correct position of the banded end.

Set the circuit board aside until it is called for in a step.



CARRIER GENERATOR/XTAL FILTER CIRCUIT BOARD

PARTS LIST

Remove the parts from Pack #8 and check each part against the following list. Make a check (✓) in the space provided as you identify each part. Return any part that is packed in an individual envelope with the part number on it back in the envelope after you identify it until it is called for in a step. Do not throw away any packing materials until all parts are accounted for.

KEY No.	QTY.	DESCRIPTION	PART No.	CIRCUIT Component No.

RESISTORS, 1/4-Watt

NOTES:

1. The resistors may be packed in more than one envelope. Open all of the resistor envelopes in this pack before you check them against the Parts List.

2. The following resistors have a 10% tolerance unless otherwise noted. 10% is indicated by a fourth color band of silver; 5% is indicated by a fourth color band of gold.

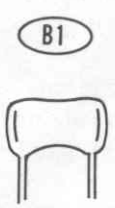
A1 ( )	1	22 Ω (red-red-black)	1-42-12	R605
A1 ( )	1	47 Ω (yellow-violet-black)	1-51-12	R634
A1 ( )	12	100 Ω (brown-black-brown)	1-1-12	R601, R607, R618, R619, R621, R622, R626, R627, R633, R636, R645, R655
A1 ( )	2	270 Ω (red-violet-brown)	1-21-12	R665, R667
A1 ( )	3	330 Ω, 5% (orange-orange-brown)	1-92-12	R639, R648, R658

KEY No.	QTY.	DESCRIPTION	PART No.	CIRCUIT Component No.
Resistors, 1/4-Watt (cont'd.)				
A1 ( )	5	680 Ω (blue-gray-brown)	1-40-12	R606, R629, R638, R647, R657
A1 ( )	2	1000 Ω (brown-black-red)	1-2-12	R609,R663
A1 ( )	2	1200 Ω (brown-red-red)	1-3-12	R604,R624
A1 ( )	4	1500 Ω (brown-green-red)	1-36-12	R603,R637, R646,R656
A1 ( )	1	2200 Ω (red-red-red)	1-4-12	R632
A1 ( )	1	2700 Ω (red-violet-red)	1-5-12	R635
A1 ( )	6	3300 Ω (orange-orange-red)	1-6-12	R641, R643, R649, R652, R659, R662
A1 ( )	4	4700 Ω (yellow-violet-red)	1-8-12	R644, R654, R664, R668
A1 ( )	4	6800 Ω (blue-gray-red)	1-27-12	R602, R614, R623, R631
A1 ( )	8	10 kΩ (brown-black-(orange)	1-9-12	R611, R615, R617, R640, R642, R651, R653, R661
A1 ( )	2	22 kΩ (red-red-orange)	1-45-12	R625, R628
A1 ( )	3	27 kΩ (red-violet-orange)	1-46-12	R608, R612, R616

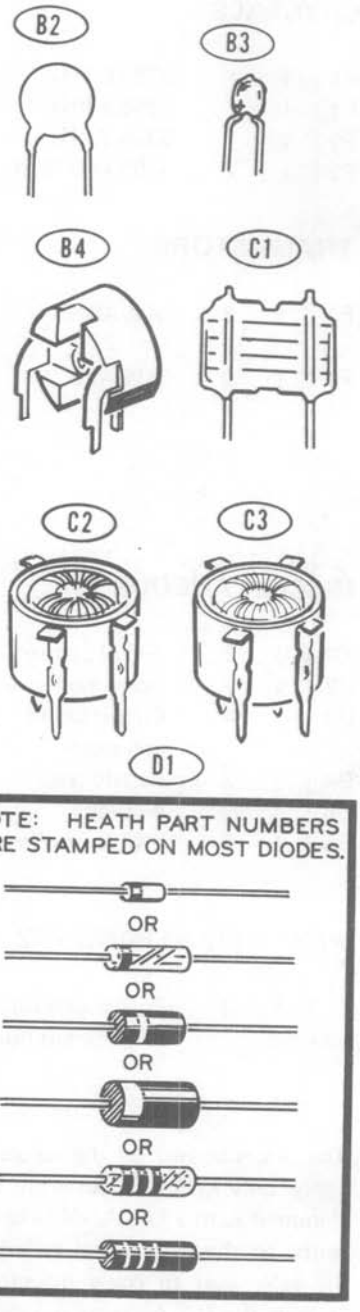
CAPACITORS

Mica

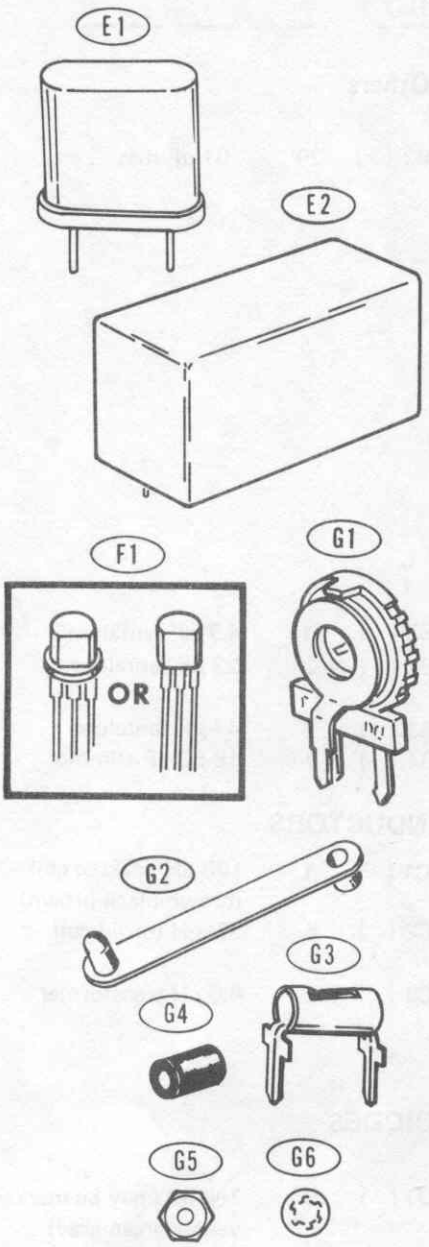
B1 ( )	1	33 pF	20-160	C645
B1 ( )	4	56 pF	20-78	C618, C633, C637, C642
B1 ( )	1	75 pF	20-110	C609
B1 ( )	4	82 pF	20-141	C613, C634, C638, C643
B1 ( )	1	94 pF	20-176	C611
B1 ( )	1	105 pF	20-162	C612
B1 ( )	1	115 pF	20-124	C625



KEY No.	QTY.	DESCRIPTION	PART No.	CIRCUIT Component No.
Others				
B2 ( )	29	.01 μF disc	21-176	C601, C602, C603, C604, C605, C606, C607, C614, C615, C616, C617, C619, C621, C623, C624, C626, C627, C628, C629, C631, C632, C636, C639, C641, C647, C648, C651, C652, C653
B3 ( )	1	4.7 μF tantalum	25-276	C646
B3 ( )	3	22 μF tantalum	25-212	C622, C635, C644
B3 ( )	1	47 μF tantalum	25-223	C608
B4 ( )	1	15-60 pF trimmer	31-63	C649
INDUCTORS				
C1 ( )	1	100 μH peaking coil (brown-black-brown)	40-486	L605
C2 ( )	4	37 mH toroid coil	40-1685	L601, L602, L603, L604
C3 ( )	1	6.5 μH transformer	40-1696	T601
DIODES				
D1 ( )	8	1N458 (may be marked yellow-green-gray)	56-24	D601, D602, D603, D604, D605, D606, D612, D613
D1 ( )	4	FH1100	56-87	D607, D608, D609, D611
D1 ( )	1	GD510	56-89	D614
D1 ( )	1	1N191 (brown-white-brown)	56-26	D615



KEY No.	QTY.	DESCRIPTION	PART No.	CIRCUIT Component No.
CRYSTALS				
E1 ( )	1	3393.6 kHz	404-205	Y601
E1 ( )	1	3396.4 kHz	404-206	Y603
E1 ( )	1	3395.7 kHz	404-549	Y602
E2 ( )	1	3395 kHz filter	404-328	FL-601
TRANSISTORS				
F1 ( )	3	X29A829	417-201	Q605, Q609, Q612
F1 ( )	9	MPSA20	417-801	Q601, Q602, Q603, Q604, Q606, Q607, Q608, Q611, Q613
MISCELLANEOUS				
G1 ( )	1	100 Ω control	10-314	R666
G2 ( )	2	Board puller	208-80	
G3 ( )	24	Circuit board connector	432-124	
G4 ( )	3	Ferrite bead	475-10	
G5 ( )	2	4-40 nut	252-2	
G6 ( )	2	#4 lockwasher	254-9	
PARTS FROM PACK #12				
( )	1	Carrier generator/Xtal filter circuit board	85-1635-3	



The prices shown on the separate "Heath Parts Price List" 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 (Michigan residents add 4% sales tax) to cover insurance, 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.

To order a replacement part, use the Parts Order Form furnished with this kit. If a Parts Order Form is not available, refer to "Customer Service" inside the rear cover of this Manual.

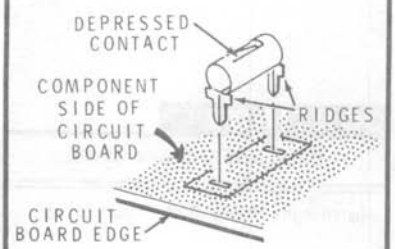
STEP-BY-STEP ASSEMBLY

START

NOTE: The components shown in dashed lines in these Pictorials are printed in yellow on your circuit board. If you intend to install the CW Filter Accessory kit, the parts will be mounted in these spaces.

Position the carrier generator/crystal filter circuit board as shown. Then proceed with the following steps.

Install twenty-four circuit board connectors in the following manner. Note that inside each connector the spring contact is depressed on one end. This depressed end of the connector should face away from the edge of the circuit board. Insert the mounting tabs through the circuit board until the ridges of the connector are firmly against the circuit board. Look at the row of connectors to make sure the depressed end of the contact of each connector is toward the center of the circuit board. Solder the tabs to the foil.



( ) Six circuit board connectors.

( ) Six circuit board connectors.

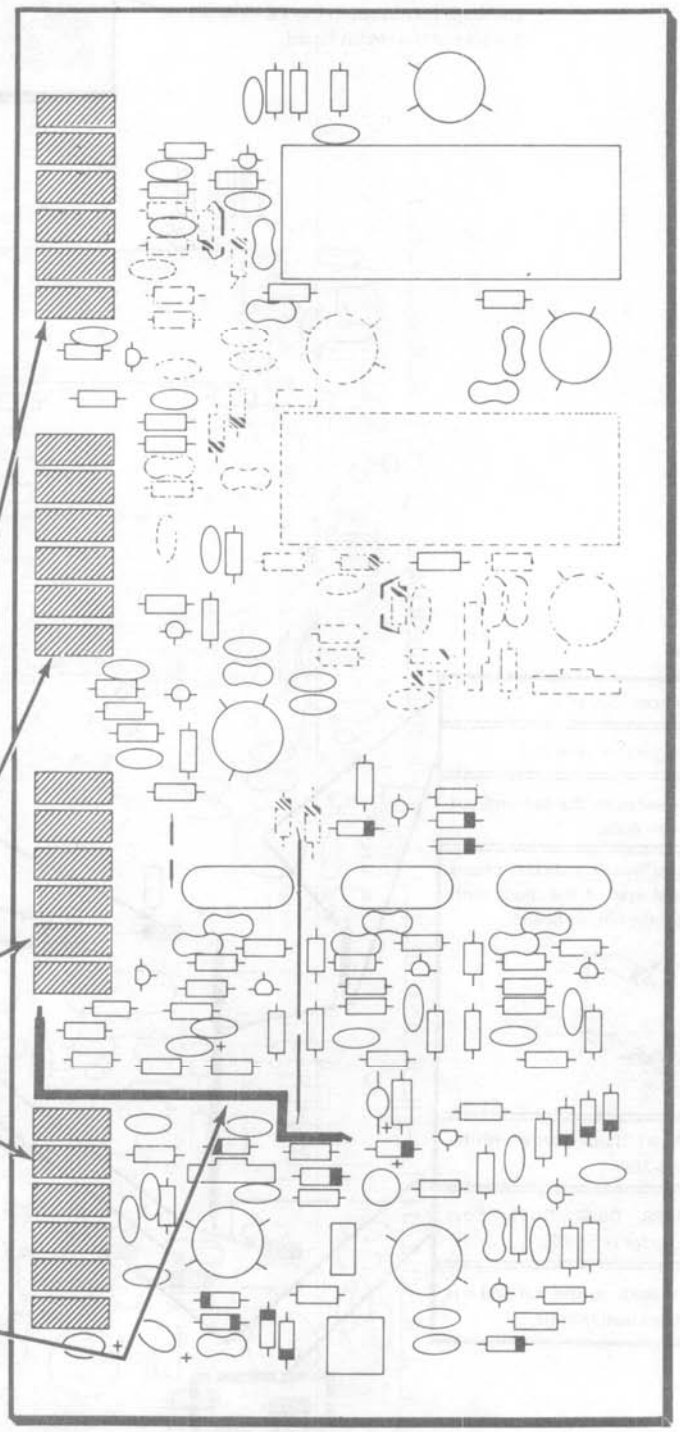
( ) Six circuit board connectors.

( ) Six circuit board connectors.

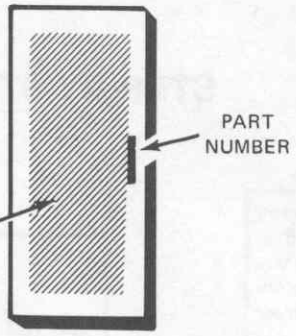
NOTE: To prepare a wire, cut it to the indicated length and remove 1/4" of insulation from each end.

( ) Prepare a 3-1/4" gray wire.

( ) Connect the wire at J, solder the ends to the foil, and cut off the excess ends.



PICTORIAL 8-1



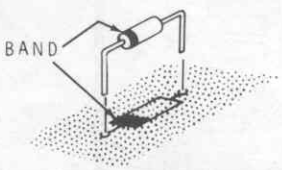
START

( ) 1" gray jumper wire at J.

( ) 2-3/8" gray jumper wire at J.

( ) Solder the wires to the foil and cut off the excess ends.

NOTE: When you install a diode, always match the banded end of the diode with the band mark on the circuit board.



( ) D615: 1N191 diode (brown-white-brown, #56-26).

( ) D607, D608, D609, D611: Four FH1100 diodes (#56-87).

( ) Solder the leads to the foil and cut off the excess lead lengths.

CONTINUE

( ) D614: GD510 diode (#56-89).

Install eight 1N458 diodes (#56-24) at:

( ) D605.

( ) D604.

( ) D612.

( ) D613.

( ) D603.

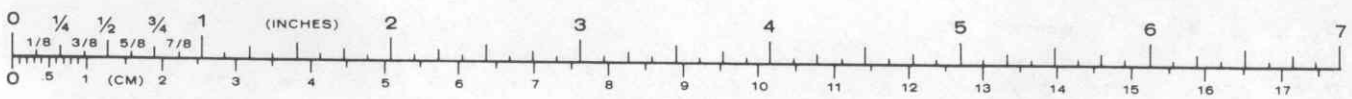
( ) D602.

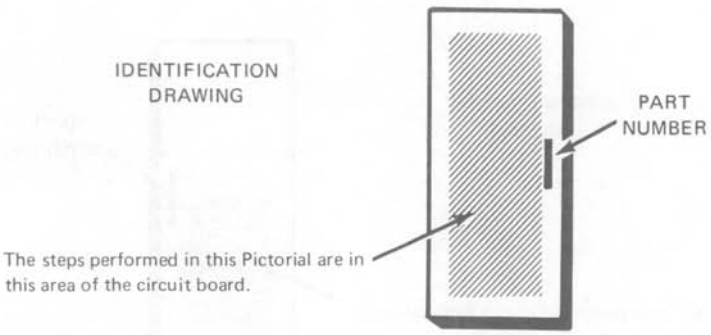
( ) D606.

( ) D601.

( ) Solder the leads to the foil and cut off the excess lead lengths.

PICTORIAL 8-2





START

( ) R602: 6800 Ω (blue-gray-red).

( ) R603: 1500 Ω (brown-green-red).

( ) R601: 100 Ω (brown-black-brown).

( ) R612: 27 kΩ (red-violet-orange).

( ) R609: 1000 Ω (brown-black-red).

( ) R611: 10 kΩ (brown-black-orange).

( ) R608: 27 kΩ (red-violet-orange).

( ) R607: 100 Ω (brown-black-brown).

( ) R618: 100 Ω (brown-black-brown).

( ) R616: 27 kΩ (red-violet-orange).

( ) R619: 100 Ω (brown-black-brown).

( ) Solder the leads to the foil and cut off the excess lead lengths.

( ) R621: 100 Ω (brown-black-brown).

( ) R624: 1200 Ω (brown-red-red).

( ) R623: 6800 Ω (blue-gray-red).

( ) R622: 100 Ω (brown-black-brown).

( ) R640: 10 kΩ (brown-black-orange).

( ) R644: 4700 Ω (yellow-violet-red).

( ) R645: 100 Ω (brown-black-brown).

( ) R646: 1500 Ω (brown-green-red).

( ) R633: 100 Ω (brown-black-brown).

( ) R664: 4700 Ω (yellow-violet-red).

( ) R668: 4700 Ω (yellow-violet-red).

( ) R663: 1000 Ω (brown-black-red).

( ) Solder the leads to the foil and cut off the excess lead lengths.

CONTINUE

( ) R605: 22 Ω (red-red-black).

( ) R606: 680 Ω (blue-gray-brown).

( ) R604: 1200 Ω (brown-red-red).

( ) R614: 6800 Ω (blue-gray-red).

Install six 10 kΩ (brown-black-orange) resistors at:

( ) R617.

( ) R615.

( ) R653.

( ) R651.

( ) R642.

( ) R661.

( ) Solder the leads to the foil and cut off the excess lead lengths.

Install four 100 Ω (brown-black-brown) resistors at:

( ) R655.

( ) R636.

( ) R626.

( ) R627.

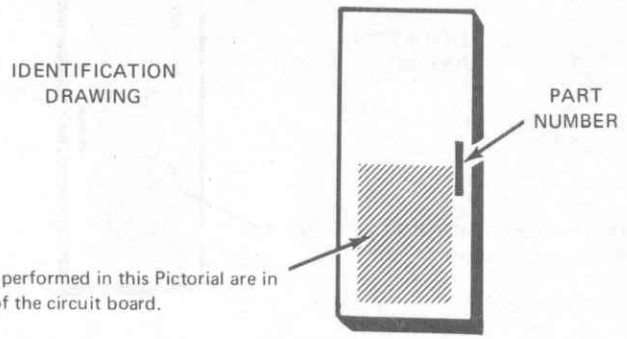
( ) R628: 22 kΩ (red-red-orange).

( ) R632: 2200 Ω (red-red-red).

( ) R634: 47 Ω (yellow-violet-black).

( ) Solder the leads to the foil and cut off the excess lead lengths.

PICTORIAL 8-3



START

Install six 3300 Ω (orange-orange-red) resistors at:

( ) R662. . . . . .

( ) R659. . . . . .

( ) R643. . . . . .

( ) R641. . . . . .

( ) R652. . . . . .

( ) R649. . . . . .

( ) R648: 330 Ω (orange-orange-brown).

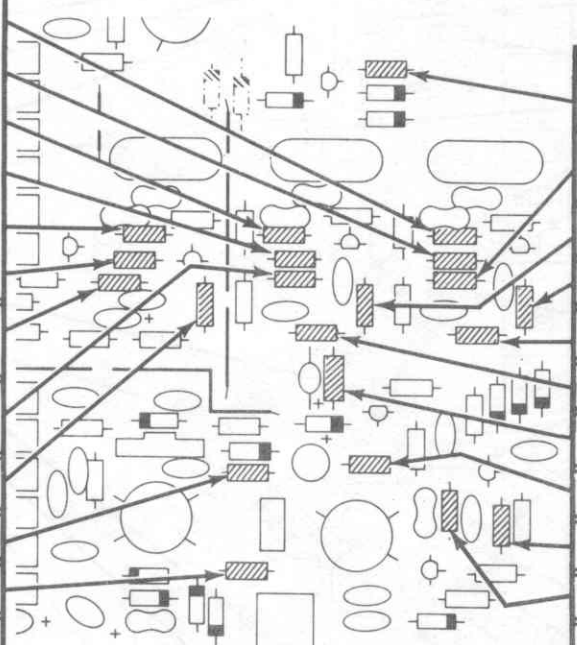
( ) R639: 330 Ω (orange-orange-brown).

( ) R647: 680 Ω (blue-gray-brown).

( ) R667: 270 Ω (red-violet-brown).

( ) R665: 270 Ω (red-violet-brown).

( ) Solder the leads to the foil and cut off the excess lead lengths.



CONTINUE

( ) R654: 4700 Ω (yellow-violet-red).

( ) R658: 330 Ω (orange-orange-brown).

( ) R638: 680 Ω (blue-gray-brown).

( ) R657: 680 Ω (blue-gray-brown).

( ) R656: 1500 Ω (brown-green-red).

( ) R637: 1500 Ω (brown-green-red).

( ) R625: 22 kΩ (red-red-orange).

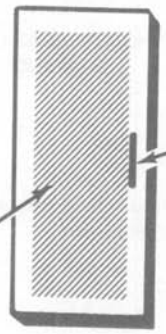
( ) R635: 2700 Ω (red-violet-red).

( ) R629: 680 Ω (blue-gray-brown).

( ) R631: 6800 Ω (blue-gray-red).

( ) Solder the leads to the foil and cut off the excess lead lengths.

PICTORIAL 8-4



The steps performed in this Pictorial are in this area of the circuit board.

KEEP YOUR SOLDERING IRON TIP CLEAN

START

Install seven .01 µF disc capacitors at:

( ) C602.
( ) C603.
( ) C601.
( ) C604.
( ) C605.
( ) C606.
( ) C607.

( ) Solder the leads to the foil and cut off the excess lead lengths.

Install six .01 µF disc capacitors at:

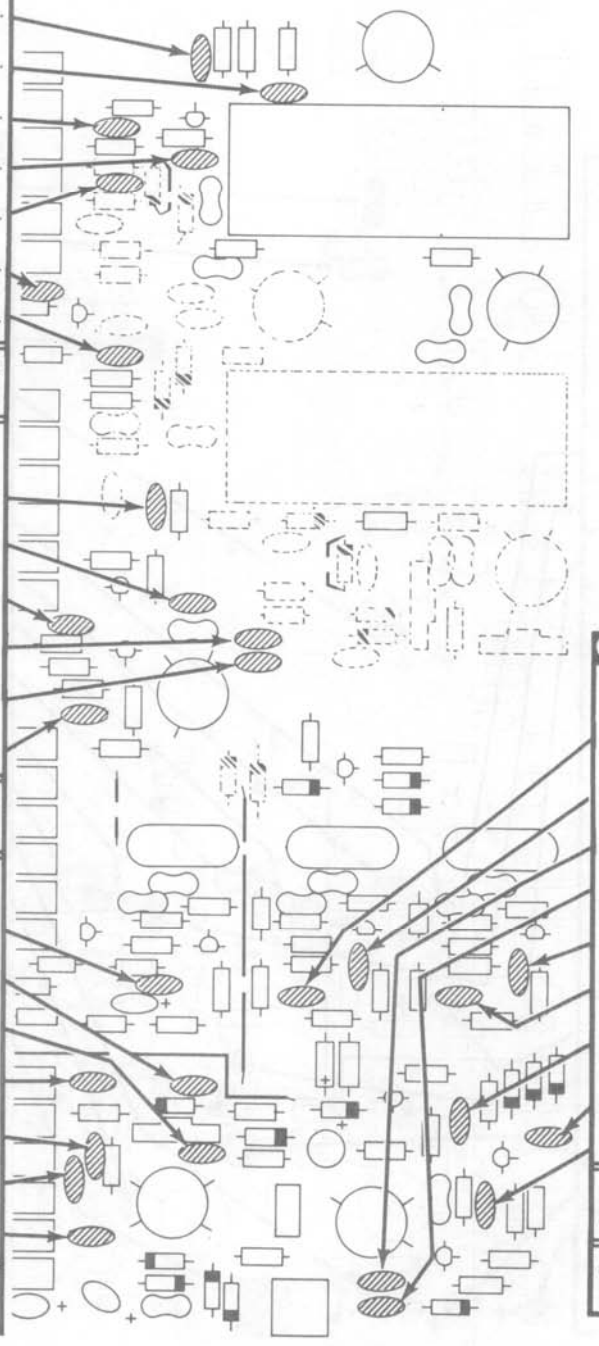
( ) C616.
( ) C615.
( ) C617.
( ) C614.
( ) C619.
( ) C621.

( ) Solder the leads to the foil and cut off the excess lead lengths.

Install seven .01 µF disc capacitors at:

( ) C636.
( ) C652.
( ) C648.
( ) C628.
( ) C651.
( ) C647.
( ) C653.

( ) Solder the leads to the foil and cut off the excess lead lengths.



CONTINUE

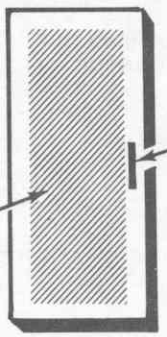
Install nine .01 µF disc capacitors at:

( ) C631.
( ) C632.
( ) C627.
( ) C629.
( ) C641.
( ) C639.
( ) C626.
( ) C623.
( ) C624.

NOTE: In the following step, save three cutoff leads for use later.

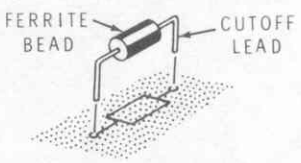
( ) Solder the leads to the foil and cut off the excess lead lengths.

PICTORIAL 8-5



START

NOTE: When you install a ferrite bead, use a cutoff lead to mount the bead to the circuit board.

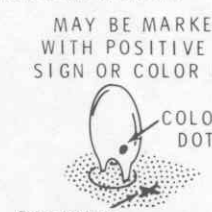


( ) Ferrite bead.

( ) Ferrite bead.

( ) Ferrite bead.

NOTE: When you install electrolytic and tantalum capacitors, be sure to match the positive (+) mark or color dot on the capacitor with the positive (+) mark on the circuit board as shown.



( ) C635: 22 µF tantalum.

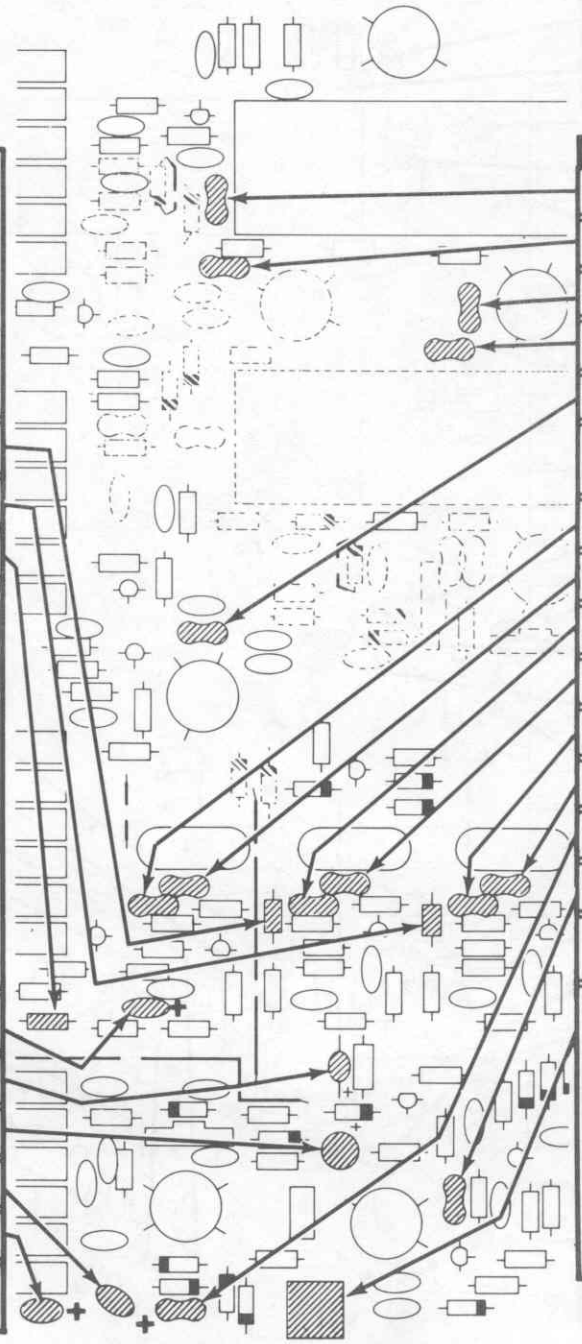
( ) C622: 22 µF tantalum.

( ) C608: 47 µF tantalum.

( ) C644: 22 µF tantalum.

( ) C646: 4.7 µF tantalum.

( ) Solder the leads to the foil and cut off the excess lead lengths.



CONTINUE

( ) C611: 94 pF mica.

( ) C609: 75 pF mica.

( ) C612: 105 pF mica.

( ) C613: 82 pF mica.

( ) C618: 56 pF mica.

( ) Solder the leads to the foil and cut off the excess lead lengths.

( ) C637: 56 pF mica.

( ) C638: 82 pF mica.

( ) C633: 56 pF mica.

( ) C634: 82 pF mica.

( ) C642: 56 pF mica.

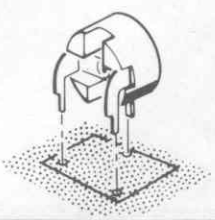
( ) C643: 82 pF mica.

( ) C645: 33 pF mica.

( ) C625: 115 pF mica.

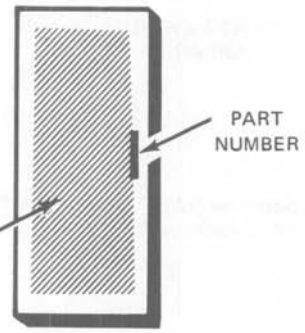
( ) Solder the leads to the foil and cut off the excess lead lengths.

( ) C649: 15-60 pF trimmer. Solder the leads to the foil.



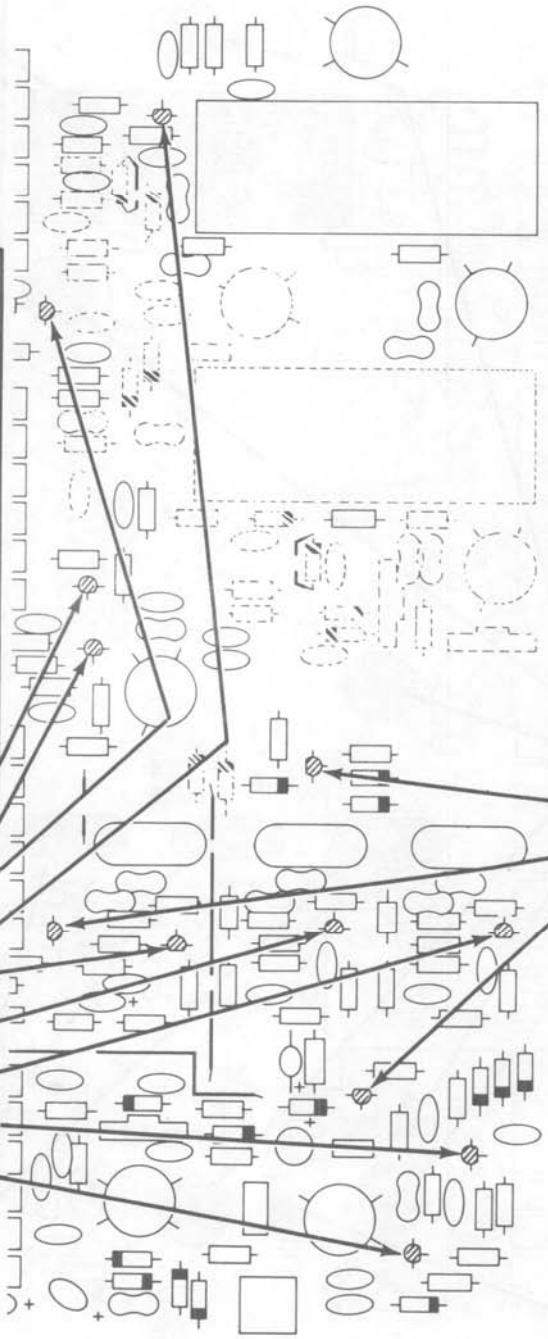
PICTORIAL 8-6

IDENTIFICATION DRAWING



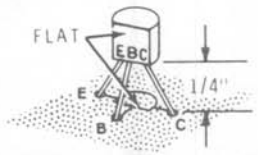
PART NUMBER

The steps performed in this Pictorial are in this area of the circuit board.



START

NOTE: When you install a transistor, position the E, B, and C leads (bend the "B" lead forward or backward as required) of the transistor into the corresponding E, B, and C holes of the circuit board. Position each transistor 1/4" above the circuit board. Solder all leads to the foil and cut off the excess lead lengths of each transistor after it is installed.



Install nine MPSA20 transistors (#417-801) at:

( ) Q603. . . . . .

( ) Q604. . . . . .

( ) Q602. . . . . .

( ) Q601. . . . . .

( ) Q611. . . . . .

( ) Q608. . . . . .

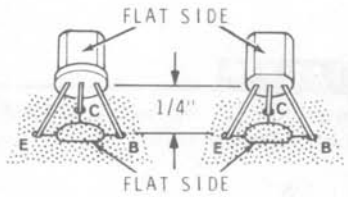
( ) Q613. . . . . .

( ) Q606. . . . . .

( ) Q607. . . . . .

CONTINUE

NOTE: Install the following transistors in the manner shown. First line up the flat of the transistor with the outline of the flat on the circuit board. Bend the center lead back away from the flat. Insert the transistor leads into their correct holes indicated by E, C, and B. Solder each lead to the foil and cut off the excess lead lengths.



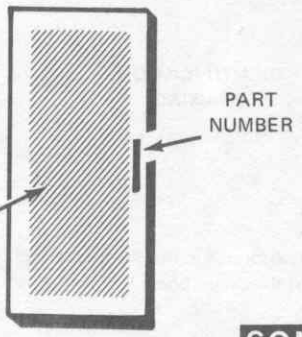
Install three X29A829 transistors (#417-201) at:

( ) Q612.

( ) Q609.

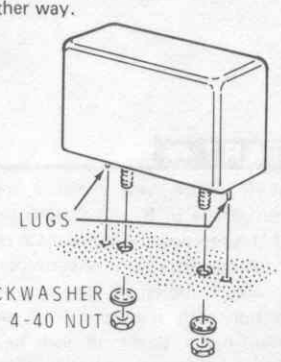
( ) Q605.

PICTORIAL 8-7



CONTINUE

( ) Mount the 2.1 kHz SSB crystal filter (#404-328) with #4 lockwashers and 4-40 nuts. Then solder the lugs to the foil. The filter can be installed either way.



START

Install four 37 mH coils (#40-1685). Solder the leads to the foil.

( ) L601. . . . . .

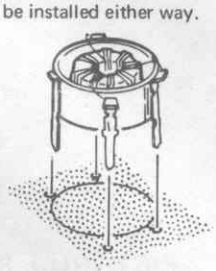
( ) L602. . . . . .

( ) L603. . . . . .

( ) L604. . . . . .

( ) L605: 100 μH peaking coil (brown-black-brown). Solder the leads to the foil.

( ) T601: Transformer (#40-1696). Solder the leads to the foil. This coil can be installed either way.



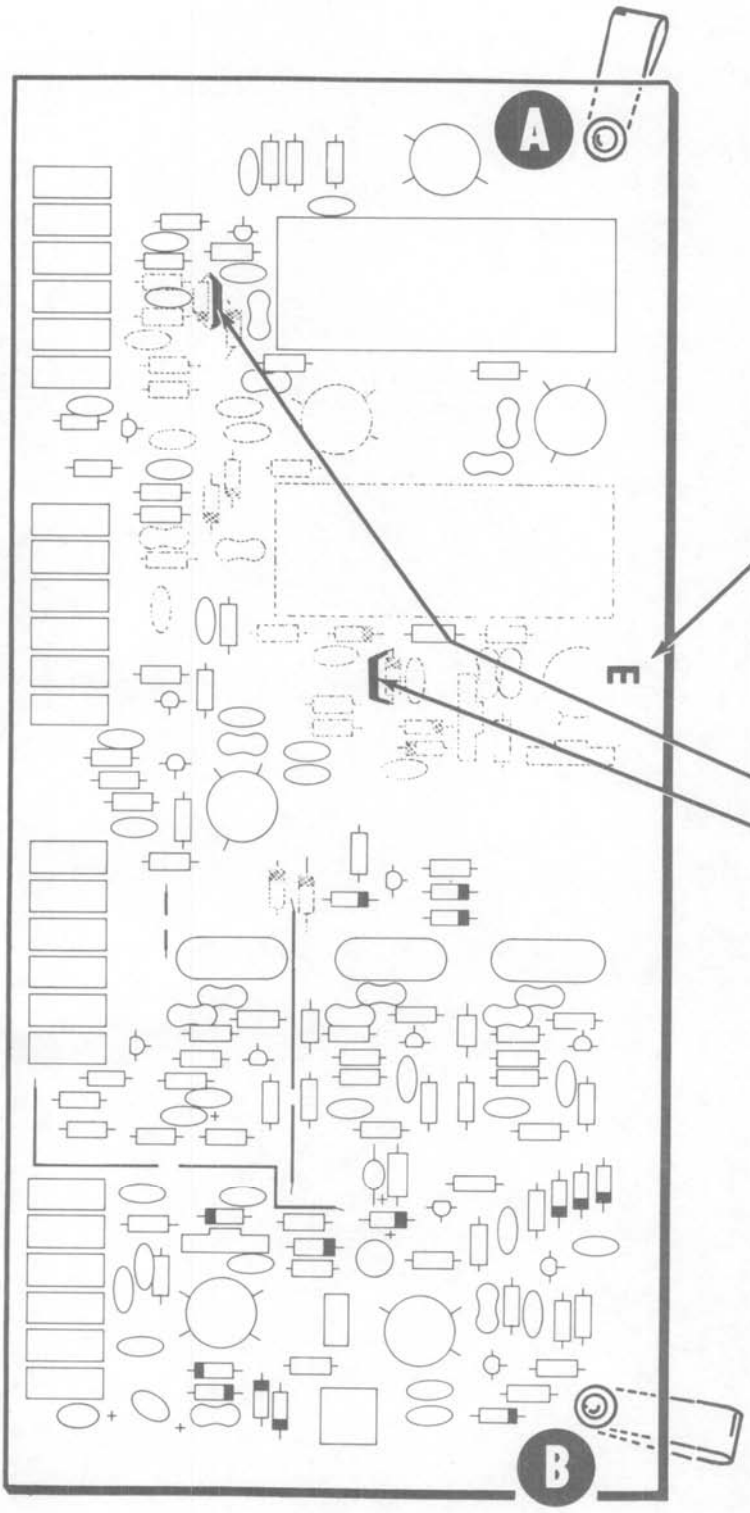
( ) R666: 100 Ω control (#10-314). Solder the leads to the foil and cut off the excess lead lengths.

( ) Y603: 3396.4 kHz crystal (#404-206).

( ) Y601: 3393.6 kHz crystal (#404-205).

( ) Y602: 3395.7 kHz crystal (#404-549).

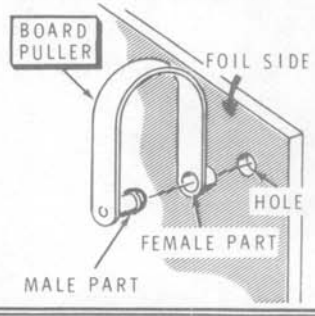
PICTORIAL 8-8



PICTORIAL 8-9

START

( ) Mount board pullers on the foil side of the circuit board at holes A and B. Position the female part in the circuit board; then push the male part through the female part.



( ) Cut a letter "E" from the terminal identification sheet and remove the adhesive backing. Press the letter onto the circuit board at the location shown.

NOTE: If you have purchased the CW Filter Accessory kit, it should be installed on this circuit board now and the three following steps should be disregarded. IMPORTANT: If you are not installing the CW Filter Accessory kit now, it is ESSENTIAL that you install the two jumper wires in the following steps:

( ) Prepare two 3/4" gray wires.

( ) 3/4" gray jumper wire.

( ) 3/4" gray jumper wire.

CIRCUIT BOARD CHECKOUT

Carefully inspect the circuit board for the following conditions.

( ) Unsoldered connections.

( ) "Cold" solder connections.

( ) Solder bridges between foils.

( ) Protruding leads. No lead should be longer than 1/8".

( ) Transistors for the proper type and installation.

( ) Tantalum capacitors for the correct position of the positive (+) mark.

( ) Diodes for the correct position of the banded end.

( ) Set the circuit board aside until it is called for in a step.

FINISH

RECEIVER FRONT END CIRCUIT BOARD

PARTS LIST

Remove the parts from Pack #9 and check each part against the following list. Make a check (✓) in the space provided as you identify each part. Return any part that is packed in an individual envelope with the part number on it back in the envelope after you identify it until it is called for in a step. Do not throw away any packing materials until all parts are accounted for.

KEY No.	QTY.	DESCRIPTION	PART No.	CIRCUIT Component No.

RESISTORS, 1/4-Watt

NOTES:

1. The resistors may be packed in more than one envelope. Open all of the resistor envelopes in this pack before you check them against the Parts List.

2. The following resistors have a 10% tolerance unless otherwise noted. 10% is indicated by a fourth color band of silver; 5% is indicated by a fourth color band of gold.

A1 ( )	4	100 Ω (brown-black-brown)	1-1-12	R718, R726, R728, R734
A1 ( )	3	220 Ω (red-red-brown)	1-17-12	R717, R727, R729
A1 ( )	1	330 Ω, 5% (orange-orange-brown)	1-92-12	R731
A1 ( )	9	1000 Ω (brown-black-red)	1-2-12	R702, R703, R704, R705, R706, R707, R708, R709, R722
A1 ( )	1	2200 Ω (red-red-red)	1-4-12	R701
A1 ( )	2	3300 Ω (orange-orange-red)	1-6-12	R712, R713

KEY No.	QTY.	DESCRIPTION	PART No.	CIRCUIT Component No.
Resistors (cont'd.)				
A1 ( )	1	5600 Ω (green-blue-red)	1-26-12	R721
A1 ( )	3	4700 Ω (yellow-violet-red)	1-8-12	R708A, R711, R737
A1 ( )	1	8200 Ω (gray-red-red)	1-28-12	R724
A1 ( )	1	15 kΩ (brown-green-orange)	1-10-12	R716
A1 ( )	1	22 kΩ (red-red-orange)	1-45-12	R733
A1 ( )	1	33 kΩ, 5% (orange-orange- orange)	1-82-12	R735
A1 ( )	3	47 kΩ (yellow-violet-orange)	1-11-12	R715, R725, R732
A1 ( )	1	82 kΩ (gray-red-orange)	1-12-12	R736
A1 ( )	2	150 kΩ (brown-green-yellow)	1-47-12	R714, R723

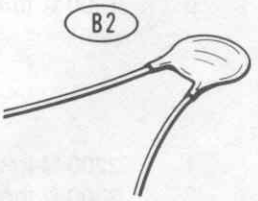
CAPACITORS

Mica

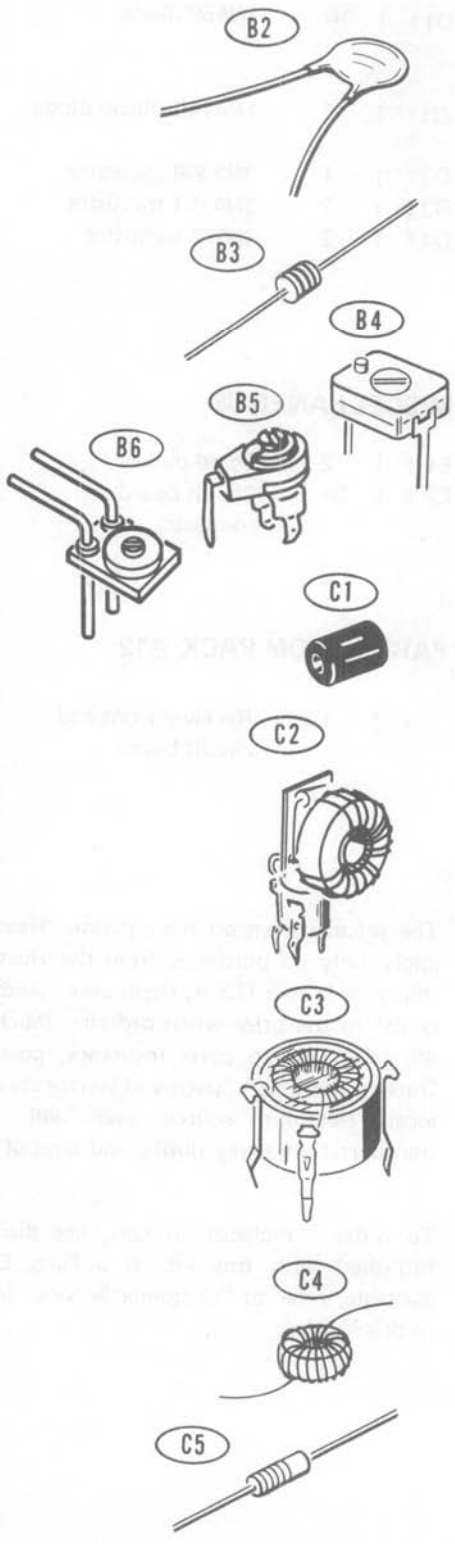
B1 ( )	4	7.5 pF	20-52	C731,C767, C772,C776
B1 ( )	1	15 pF	20-118	C726
B1 ( )	1	20 pF	20-173	C735
B1 ( )	2	30 pF	20-100	C715,C719
B1 ( )	1	36 pF	20-96	C785
B1 ( )	1	50 pF	20-97	C792
B1 ( )	1	62 pF	20-109	C724
B1 ( )	1	68 pF	20-76	C777
B1 ( )	2	75 pF	20-147	C784, C788
B1 ( )	2	105 pF	20-162	C703, C707
B1 ( )	1	120 pF	20-183	C712
B1 ( )	3	130 pF	20-104	C766, C771, C774
B1 ( )	2	150 pF	20-149	C739, C749
B1 ( )	1	200 pF	20-165	C728
B1 ( )	1	240 pF	20-125	C786
B1 ( )	1	400 pF	20-116	C717
B1 ( )	1	680 pF	20-134	C705
B1 ( )	2	820 pF	20-171	C779, C781

Disc

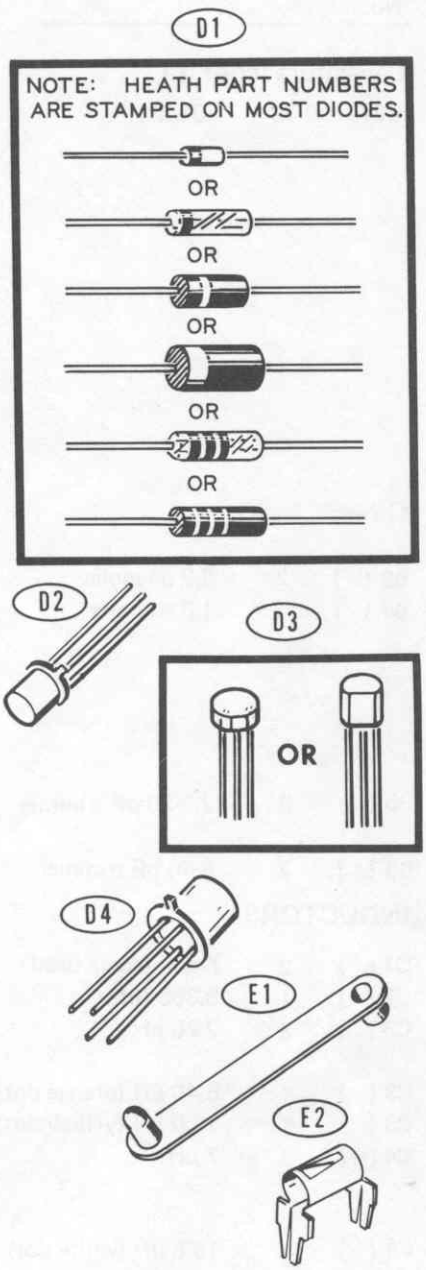
B2 ( )	2	3.9 pF	21-158	C737, C742
B2 ( )	2	10 pF	21-3	C746, C773
B2 ( )	2	270 pF	21-17	C762, C783



KEY No.	QTY.	DESCRIPTION	PART No.	CIRCUIT Component No.
Capacitors (cont'd.)				
B2( )	19	.01 μF	21-176	C701, C704, C708, C713, C716, C721, C727, C732, C738, C743, C748, C752, C761, C765, C768, C775, C782, C791, C793
Other				
B3 ( )	2	2.2 phenolic	28-1	C778, C789
B4 ( )	12	1-8 trimmer	31-68	C714, C718, C723, C725, C729, C734, C736, C741, C745, C747, C751, C753,
B5 ( )	3	2.7-20 pF trimmer	31-57	C702, C706, C711
B6 ( )	2	8-40 pF trimmer	31-76	C764, C769
INDUCTORS				
C1 ( )	2	Small ferrite bead	475-10	FB
C2 ( )	1	3.395 filter	100-1666	L704
C3 ( )	3	2.25 μH	40-1805	L725, L726, L727
C3 ( )	1	5.45 μH (orange dot)	40-1880	L729
C3 ( )	1	13.9 μH (yellow dot)	40-1881	L728
C4 ( )	5	7 μH	40-1726	L707, L708, L709, L712, L713
C4 ( )	4	15.5 μH (white dot)	40-1882	L701, L702, L705, L706
C4 ( )	1	26.1 μH (brown dot)	40-1878	L731
C4 ( )	1	3.82 μH (blue dot)	40-1874	L732
C4 ( )	3	4.5 μH (red dot)	40-1875	L716, L717, L734
C4 ( )	2	1.7 μH (white and green dots)	40-1871	L718, L719
C4 ( )	1	2.3 μH (green dot)	40-1872	L714
C4 ( )	1	3.4 μH (red and yellow dots)	40-1873	L711
C4 ( )	1	13.25 μH (white and yellow dots)	40-1877	L703
C5 ( )	1	2.2 μH inductor	45-73	RFC701



KEY No.	QTY.	DESCRIPTION	PART No.	CIRCUIT Component No.
DIODES-TRANSISTORS				
D1 ( )	10	1N458 diode	56-24	D701-D706, D709, D710, D713, D714
D1 ( )	4	1N4149 silicon diode	56-56	D707, D708, D711, D712
D2 ( )	1	2N2369 transistor	417-154	Q703
D3 ( )	2	2N4121 transistor	417-235	Q702, Q705
D4 ( )	2	40673 transistor	417-274	Q701, Q704
MISCELLANEOUS				
E1 ( )	2	Board puller	207-80	
E2 ( )	24	Circuit board connector	432-124	
PARTS FROM PACK #12				
( )	1	Receiver front end circuit board	85-1788-3	



The prices shown on the separate "Heath Parts Price List" 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 (Michigan residents add 4% sales tax) to cover insurance, 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.

To order a replacement part, use the Parts Order Form furnished with this kit. If a Parts Order Form is not available, refer to "Customer Service" inside the rear cover of this Manual.

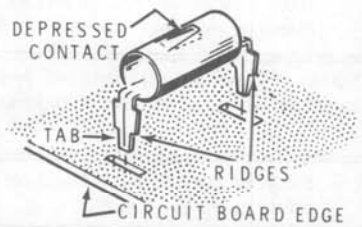
STEP-BY-STEP ASSEMBLY

START

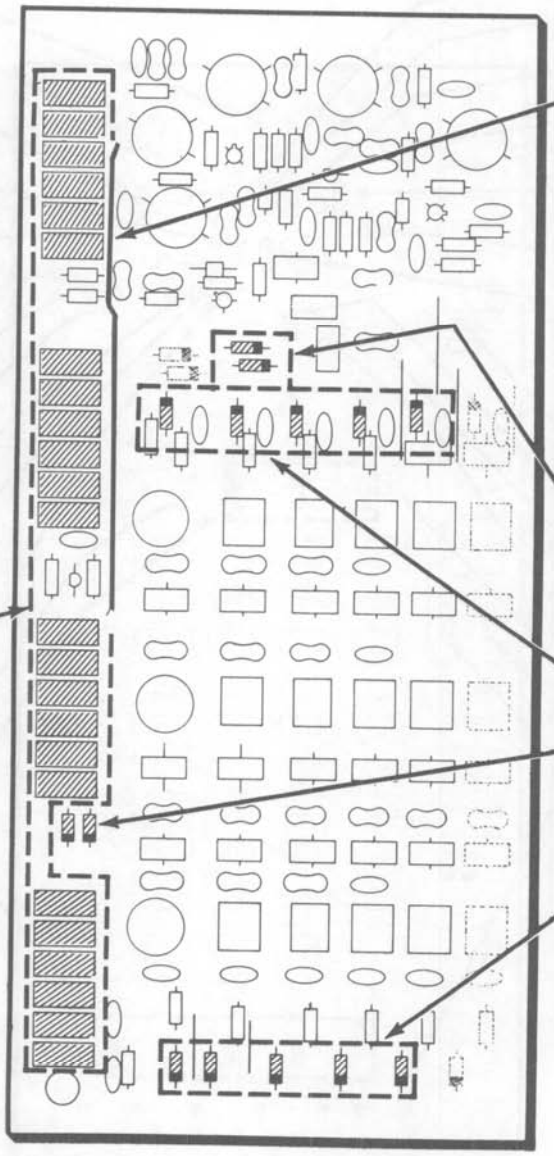
NOTE: The components shown in dashed lines in these Pictorials are printed in yellow on your circuit board. If you intend to install the 10-Meter Accessory kit, the parts will be mounted in these spaces.

Position the receiver front end circuit board as shown.

( ) Install twenty-four circuit board connectors in the following manner. Note that inside each connector the spring contact is depressed on one end. This depressed end of the connector should face away from the edge of the circuit board. Insert the mounting tabs through the circuit board until the ridges of the connector are firmly against the circuit board. Look at the row of connectors to make sure the depressed end of the contact of each connector is toward the center of the circuit board. Solder the tabs to the foil.



FOR GOOD SOLDER CONNECTIONS, YOU MUST **KEEP THE SOLDERING IRON TIP CLEAN.**
WIPE IT OFTEN WITH A DAMP SPONGE OR CLOTH.

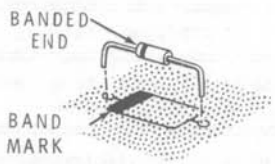


CONTINUE

NOTE: To prepare a gray wire, remove 1/4" of insulation from each end of the wire.

( ) 4-1/2" gray wire.

NOTE: When you install a diode, always match the banded end of the diode with the band mark on the circuit board.



( ) Two 1N4149 diodes (#56-56) at D711 and D712.

( ) Solder all leads to the foil and cut off the excess lead lengths.

( ) Five 1N458 diodes (#56-24) at D702, D704, D706, D710 and D714.

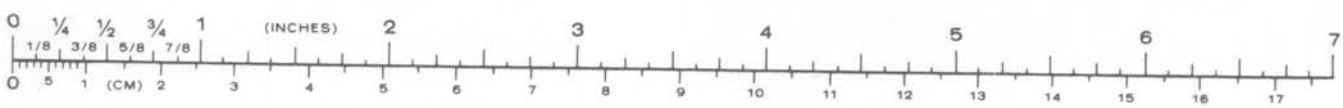
( ) Two 1N4149 diodes (#56-56) at D707 and D708.

( ) Solder the leads to the foil and cut off the excess lead lengths.

( ) Five 1N458 diodes (#56-24) at D701, D703, D705, D709 and D713.

( ) Solder all leads to the foil and cut off the excess lead lengths.

PICTORIAL 9-1



START

( ) R725: 47 kΩ (yellow-violet-orange).

( ) R726: 100 Ω (brown-black-brown).

( ) R724: 8200 Ω (gray-red-red).

( ) R728: 100 Ω (brown-black-brown).

( ) R723: 150 kΩ (brown-green-yellow).

( ) R722: 1000 Ω (brown-black-red).

( ) R727: 220 Ω (red-red-brown).

( ) Solder all leads to the foil and cut off the excess lead lengths.

( ) R733: 22 kΩ (red-red-orange).

( ) R729: 220 Ω (red-red-brown).

( ) R731: 330 Ω (orange-orange-brown).

( ) R732: 47 kΩ (yellow-violet-orange).

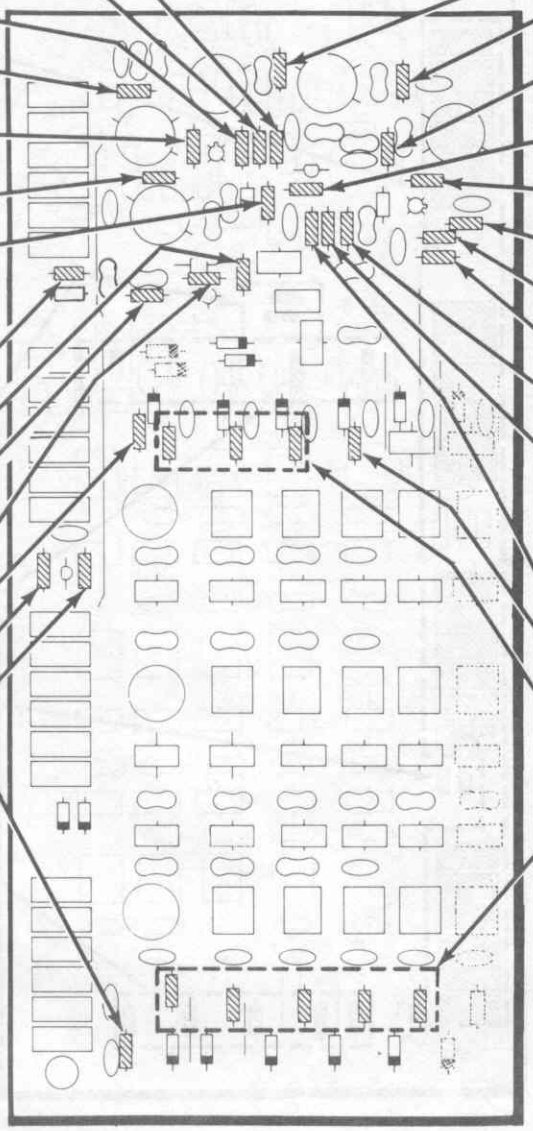
( ) R711: 4700 Ω (yellow-violet-red).

( ) R713: 3300 Ω (orange--orange-red).

( ) R712: 3300 Ω (orange-orange-red).

( ) R701: 2200 Ω (red-red-red).

( ) Solder all leads to the foil and cut off the excess lead lengths.



CONTINUE

( ) R721: 5600 Ω (green-blue-red).

( ) RFC701: 2.2 μH inductor (#45-73).

( ) R714: 150 kΩ (brown-green-yellow).

( ) R736: 82 kΩ (gray-red-orange).

( ) R716: 15 kΩ (brown-green-orange).

( ) R717: 220 Ω (red-red-brown).

( ) R718: 100 Ω (brown-black-brown).

( ) R715: 47 kΩ (yellow-violet-orange).

( ) R734: 100 Ω (brown-black-brown).

( ) R735: 33 kΩ (orange-orange-orange).

( ) Solder all leads to the foil and cut off the excess lead lengths.

( ) R737: 4700 Ω (yellow-violet-red).

( ) R708A: 4700 Ω (yellow-violet-red).

( ) R703, R705, and R707: Install three 1000 Ω (brown-black-red) resistors.

( ) R702, R704, R706, R708 and R709: Install five 1000 Ω (brown-black-red) resistors.

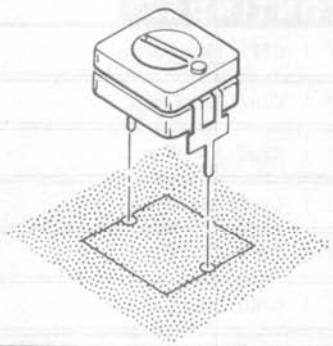
NOTE: In the following step, save two cutoff resistor leads for use in Pictorial 9-3.

( ) Solder all leads to the foil and cut off the excess lead lengths.

PICTORIAL 9-2

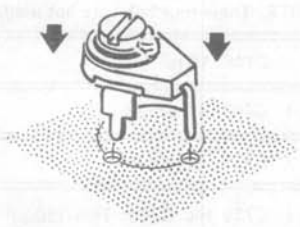
START

NOTE: The square 1-8 pF trimmer capacitors may be installed either way in the circuit board. Solder the lugs to the foils as you install the capacitors.



( ) C723, C734, C745 and C753: Four 1-8 pF trimmer capacitors.

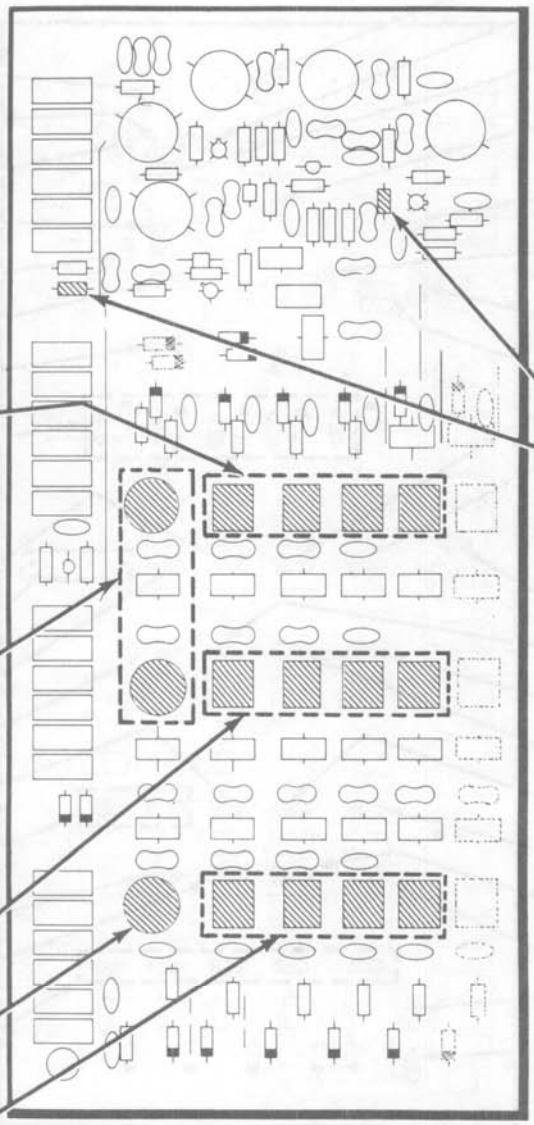
( ) C706, C711: 2.7-20 pF trimmers as shown. Solder the three lugs of each capacitor to the foil.



( ) C718, C729, C741 and C751: Four 1-8 pF trimmer capacitors.

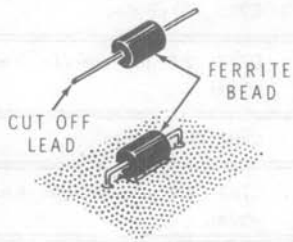
( ) C702: 2.7-20 pF trimmer. Solder the lugs to the foil.

( ) C714, C725, C736 and C747: Four 1-8 pF trimmer capacitors. Solder the lugs to the foil.



CONTINUE

NOTE: To install a ferrite bead, push a cutoff lead through the bead and bend down the wire ends as shown.



Install two small ferrite beads at:

( ) FB.

( ) FB.

( ) Solder all leads to the foil and cut off the excess lead lengths.

PICTORIAL 9-3

START

NOTE: In the following steps, take care not to confuse 30 pF and 130 pF mica capacitors.

( ) C774: 130 pF mica.

( ) C772: 7.5 pF mica.

( ) C783: 270 pF disc.

( ) C778: 2.2 pF phenolic (red-red-white).

( ) C793: .01 μF disc.

( ) C789: 2.2 pF phenolic (red-red-white).

( ) C792: 50 pF mica.

( ) C788: 75 pF mica.

( ) C724: 62 pF mica.

( ) C712: 120 pF mica.

( ) Solder all leads to the foil and cut off the excess lead lengths.

( ) C761: .01 μF disc.

( ) C731: 7.5 pF mica.

( ) C707: 105 pF mica.

( ) C719: 30 pF mica.

( ) C717: 400 pF mica.

( ) C705: 680 pF mica.

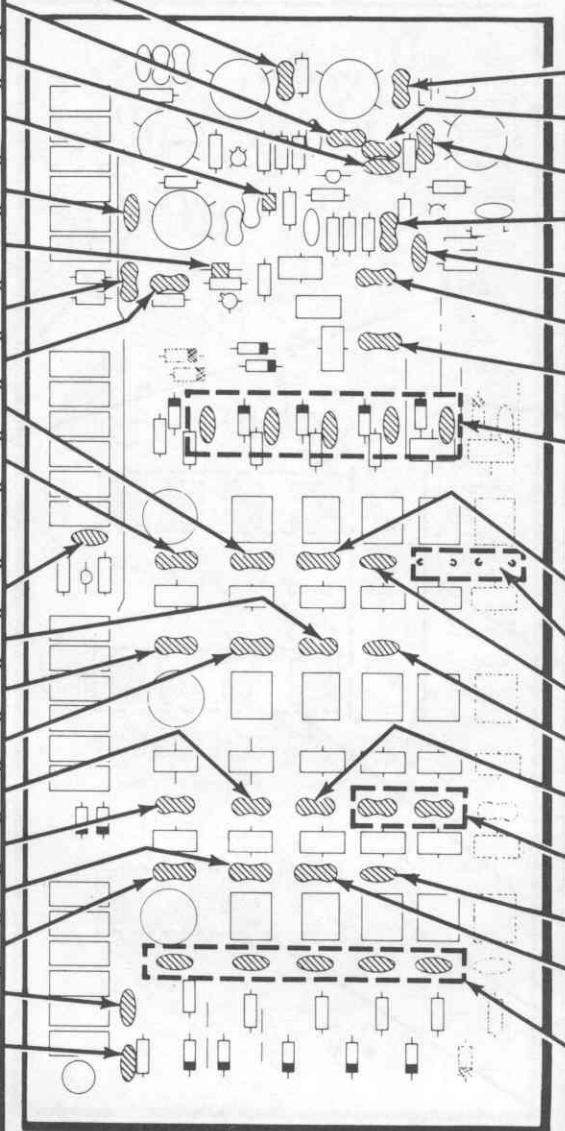
( ) C715: 30 pF mica.

( ) C703: 105 pF mica.

( ) C701: .01 μF disc.

( ) C713: .01 μF disc.

( ) Solder all leads to the foil and cut off the excess lead lengths.



CONTINUE

( ) C771: 130 pF mica.

( ) C767: 7.5 pF mica.

( ) C766: 130 pF mica.

( ) C784: 75 pF mica.

( ) C762: 270 pF disc.

( ) C786: 240 pF mica.

( ) C785: 36 pF mica.

( ) C708, C721, C732, C743 and C752: Five .01 μF disc capacitors.

( ) Solder all leads to the foil and cut off the excess lead lengths.

( ) C735: 20 pF mica.

NOTE: These four holes are not used.

( ) C746: 10 pF disc.

( ) C742: 3.9 pF disc.

( ) C728: 200 pF mica.

( ) C739 and C749: Two 150 pF mica capacitors.

( ) C737: 3.9 pF disc.

( ) C726: 15 pF mica.

( ) C704, C716, C727, C738 and C748: Five .01 μF disc capacitors.

( ) Solder all leads to the foil and cut off the excess lead lengths.

PICTORIAL 9-4

START

( ) C768: .01 μF disc.

( ) C779: 820 pF mica.

( ) C782: .01 μF disc.

( ) C781: 820 pF mica.

( ) C775: .01 μF disc.

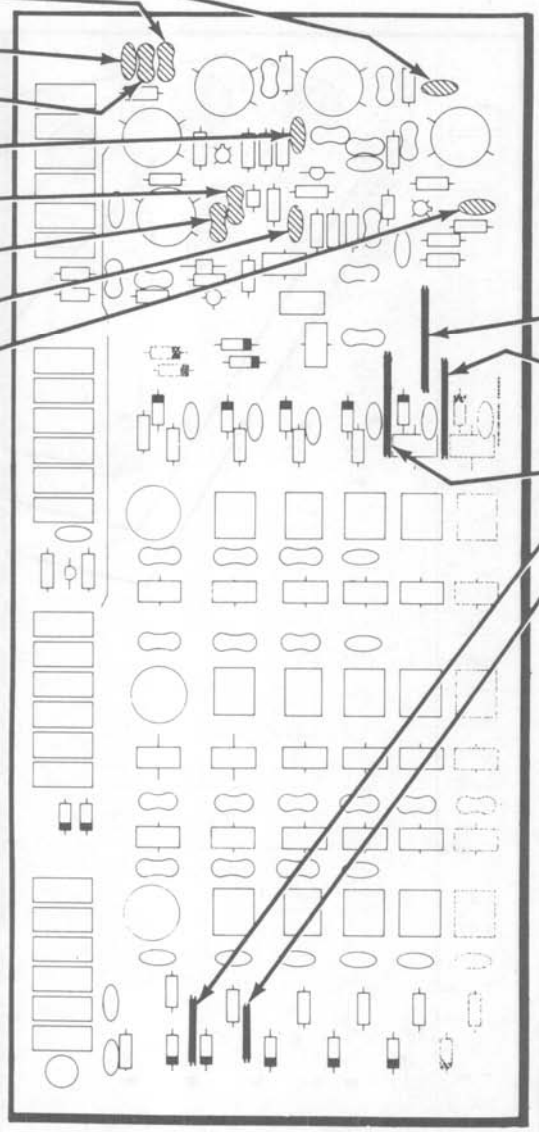
( ) C777: 68 pF mica.

( ) C776: 7.5 pF mica.

( ) C791: .01 μF disc.

( ) C765: .01 μF disc.

( ) Solder all leads to the foil and cut off the excess lead lengths.



CONTINUE

NOTE: To prepare a gray wire, remove 1/4" of insulation from each end of the wire.

( ) 1-1/4" gray wire.

( ) 1-1/4" gray wire.

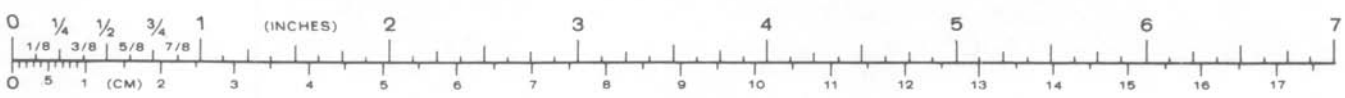
( ) 1-3/8" gray wire.

( ) 1" gray wire.

( ) 7/8" gray wire.

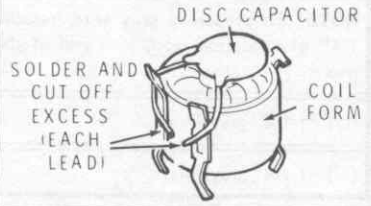
( ) Solder the wires to the foil and cut off the excess lead lengths.

PICTORIAL 9-5

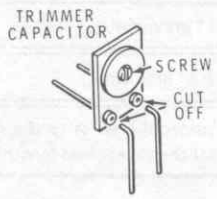


START

( ) C773: Install a 10 pF disc capacitor on a 2.25 µH coil (#40-1805). Position the capacitor leads across the two coil form terminals, solder the leads to the terminals, and cut off the excess lead lengths. Use the two coil form terminals which are closest together. The other terminal is not connected to the coil.

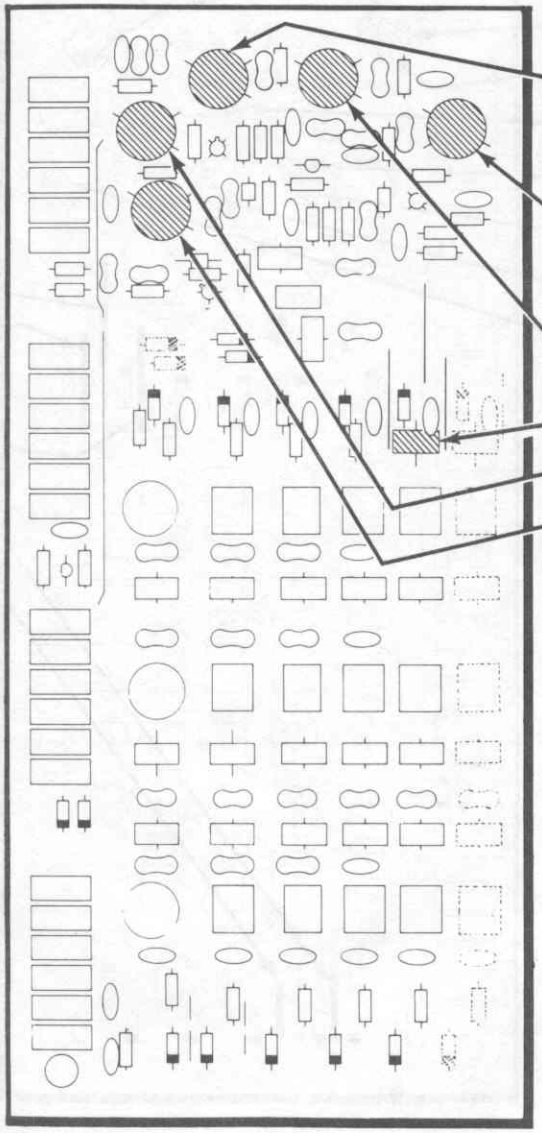


( ) Locate an 8-40 pF trimmer capacitor and cut off the indicated leads as shown.



( ) C764: Install this prepared trimmer capacitor on a 2.25 µH coil (#40-1805). Position the trimmer leads across the two coil form terminals, solder the leads to the terminals, and cut off the excess lead lengths. Use the two coil form terminals which are closest together.

( ) C769: Install an 8-40 pF trimmer capacitor on a 2.25 µH coil (#40-1805). Solder the leads as before.



PICTORIAL 9-6

CONTINUE

( ) L727 (and C773): Install the #40-1805 coil with the 10 pF disc capacitor. Solder the leads to the foil.

( ) L725 (and C764): Install one of the #40-1805 coils with the trimmer capacitor. Solder the coil leads to the foil.

( ) L726 (and C769): Install the remaining coil with the trimmer capacitor. Solder the leads to the foil.

( ) L719: #40-1871 coil (white and green dots).

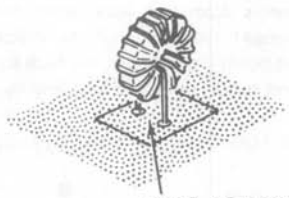
( ) L729: #40-1880 coil (orange dot).

( ) L728: #40-1881 coil (yellow dot).

( ) Inspect the three terminals of each of the five coils to be sure they are well soldered.

START

NOTE: In the following steps, mount the toroid coils as shown. Put one drop of cement (from the tube of cement) on the bottom of each coil, press the coil against the circuit board, solder the leads to the foil, and cut off the excess lead lengths.



( ) L711: #40-1873 coil (red and yellow dots).

( ) L707: #40-1726 coil.

( ) L703: #40-1877 coil (white and yellow dots).

( ) L709: #40-1726 coil.

( ) L706: #40-1882 coil (white dot).

( ) L702: #40-1882 coil (white dot).

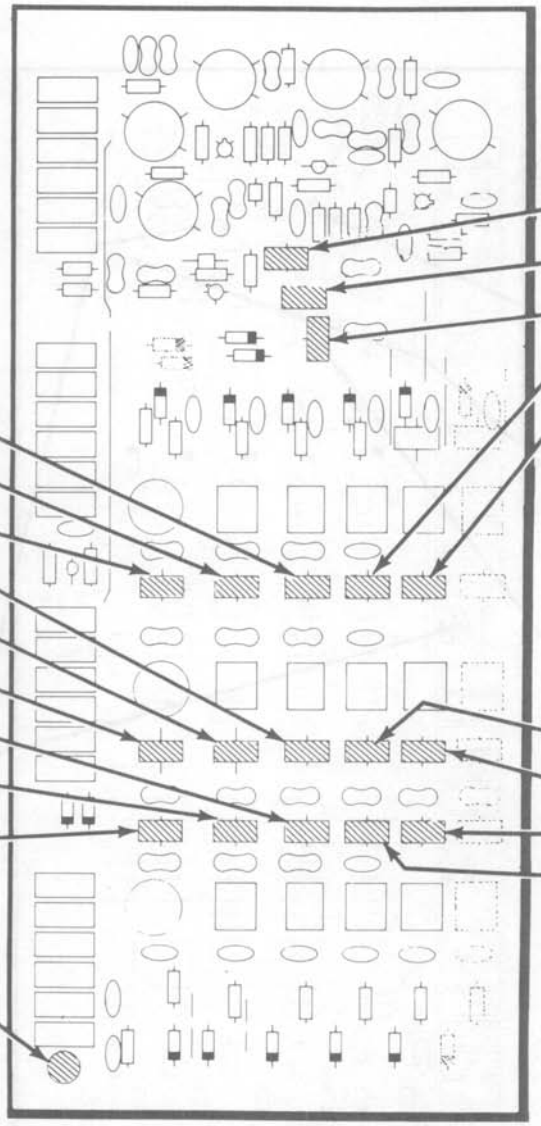
( ) L708: #40-1726 coil.

( ) L705: #40-1882 coil (white dot).

( ) L701: #40-1882 coil (white dot).

NOTE: When you install the next part, be careful that you do not break the wax bond.

( ) L704: 3.395 filter (#100-1666). Solder the leads to the foil.



CONTINUE

( ) L734: #40-1875 coil (red dot).

( ) L732: #40-1874 coil (blue dot).

( ) L731: #40-1878 coil (brown dot).

( ) L714: #40-1872 coil (green dot).

( ) L718: #40-1871 coil (white and green dot).

( ) L713: #40-1726 coil.

( ) L717: #40-1875 coil (red dot).

( ) L716: #40-1875 coil (red dot).

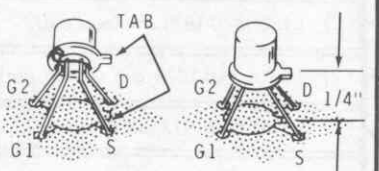
( ) L712: #40-1726 coil.

PICTORIAL 9-7

START

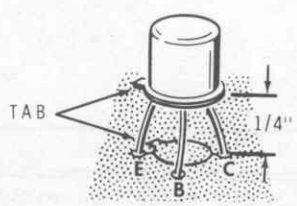
NOTE: Install the following transistors in the manner shown. First, line up the tab with the tab outline on the circuit board. Insert the transistor leads (identified in the detail) into the correct holes on the circuit board. Solder each lead to the foil and cut off the excess lead lengths. Then remove the shorting wire from the transistor leads.

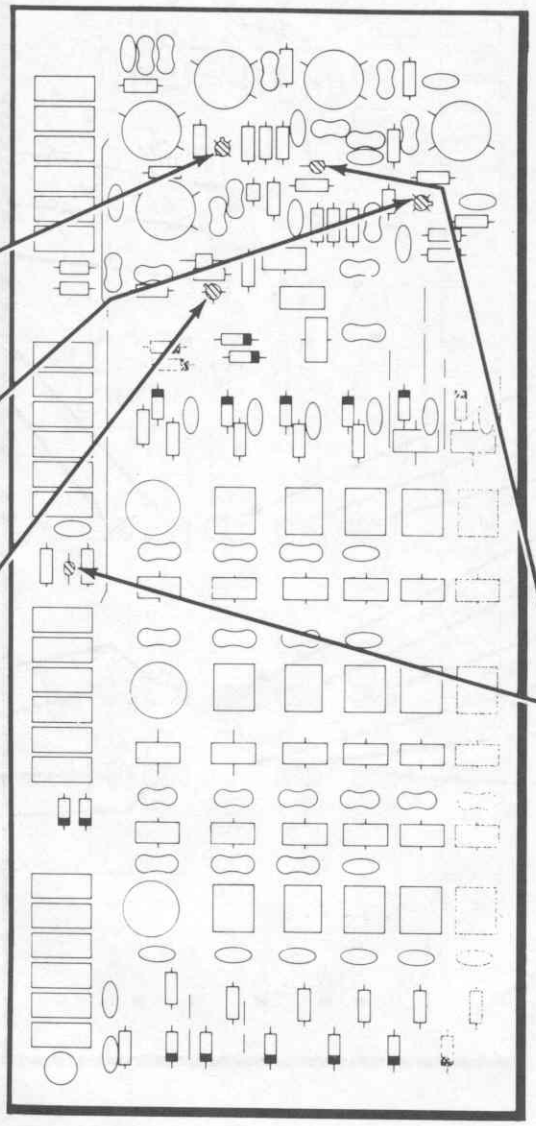
( ) Q704: 40673 transistor (#417-274).



( ) Q701: 40673 transistor (#417-274).

( ) Q703: 2N2369 transistor (#417-154).

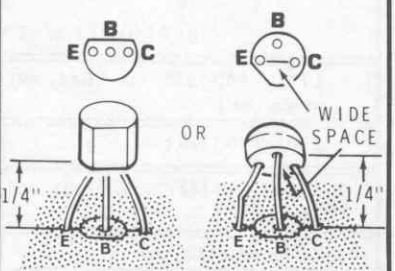




CONTINUE

NOTE: Identify the leads of the following transistors from the appropriate detail; then insert the leads into the indicated circuit board holes. Solder the leads to the foil and cut off the excess lead lengths.

BOTTOM VIEW OF TRANSISTOR



( ) Q702: 2N4121 transistor (#417-235).

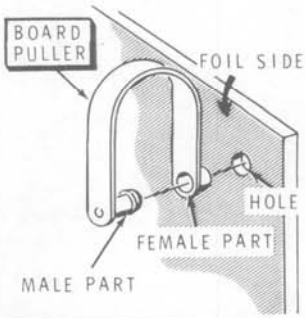
( ) Q705: 2N4121 transistor (#417-235).

PICTORIAL 9-8

START

( ) Cut a letter "G" from the label sheet. Carefully remove the protective backing paper and press this letter on the circuit board as shown.

( ) Mount board pullers on the foil side of the circuit board at holes A and B. Position the female part in the circuit board hole. Then push the male part through the female part.



CIRCUIT BOARD CHECKOUT

Carefully inspect the circuit board for the following conditions.

( ) Unsoldered connections.

( ) "Cold" solder connections.

( ) Solder bridges between foil patterns.

( ) Protruding leads. No lead should be longer than 1/8".

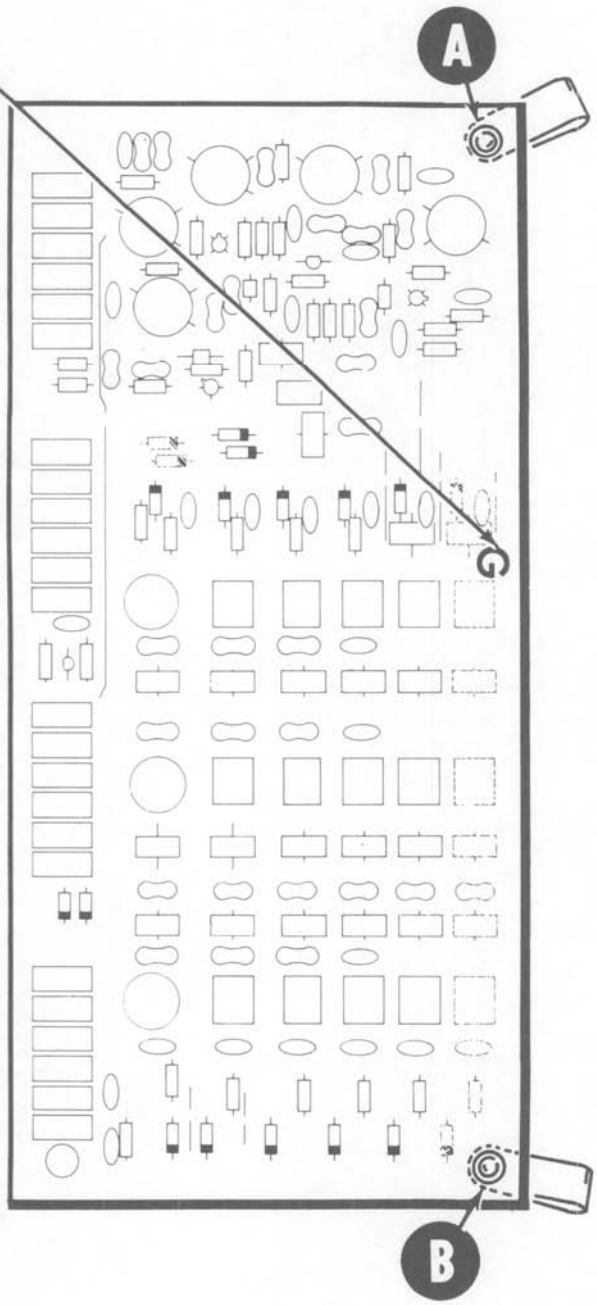
( ) Transistors for the proper type and installation.

( ) Diodes for the correct position of the banded end.

Set the circuit board aside until it is called for in a step.

NOTE: Save the tube of cement. It will be needed in the future if you purchase the HWA-104-1 Accessory.

FINISH



PICTORIAL 9-9

RECEIVER IF/AUDIO CIRCUIT BOARD

PARTS LIST

Remove the parts from Pack #10 and check each part against the following list. Make a check (✓) in the space provided as you identify each part. Return any part that is packed in an individual envelope with the part number on it back in the envelope after you identify it until it is called for in a step. Do not throw away any packing materials until all parts are accounted for.

KEY No.	QTY.	DESCRIPTION	PART No.	CIRCUIT Component No.

RESISTORS

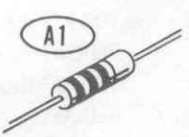
NOTES:

1. The resistors may be packed in more than one envelope. Open all of the resistor envelopes in this pack before you check them against the Parts List.

2. The following resistors have a 10% tolerance unless otherwise noted. 10% is indicated by a fourth color band of silver; 5% is indicated by a fourth color band of gold.

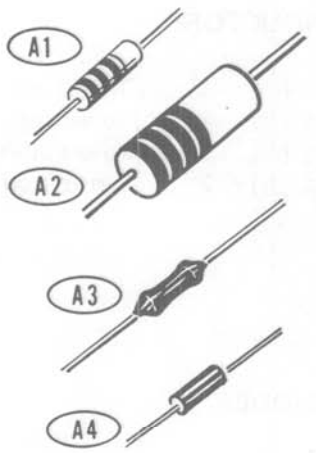
1/2-Watt

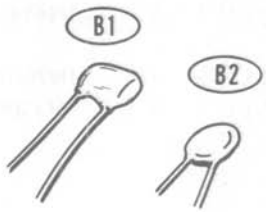
A1 ( )	1	47 Ω (yellow-violet-black)	1-1	R504
A1 ( )	14	100 Ω (brown-black-brown)	1-3	R501, R506, R508, R509, R515, R522, R528, R536, R543, R544, R551, R553, R559, R563
A1 ( )	1	150 Ω (brown-green-brown)	1-66	R558

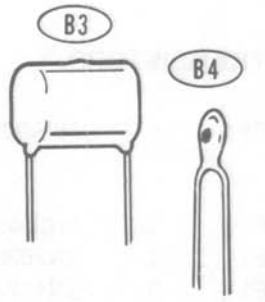


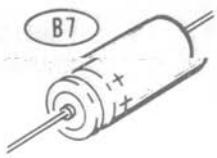
KEY No.	QTY.	DESCRIPTION	PART No.	CIRCUIT Component No.
RESISTORS (cont'd.)				
A1( )	1	270 Ω (red-violet-brown)	1-42	R505
A1( )	1	330 Ω (orange-orange-brown)	1-4	R578
A1( )	2	470 Ω (yellow-violet-brown)	1-6	R519, R531
A1( )	3	620 Ω, 5% (blue-red-brown)	1-131	R514, R525, R579
A1( )	2	820 Ω (gray-red-brown)	1-8	R502, R529
A1( )	4	1000 Ω (brown-black-red)	1-9	R521, R552, R555, R556
A1( )	3	1500 Ω (brown-green-red)	1-11	R503, R541, R557
A1( )	1	1800 Ω (brown-gray-red)	1-93	R582
A1( )	2	2400 Ω, 5% (red-yellow-red)	1-89	R513, R523
A1( )	3	2700 Ω (red-violet-red)	1-13	R517, R524, R542
A1( )	1	3300 Ω (orange-orange-red)	1-14	R538
A1( )	1	3900 Ω (orange-white-red)	1-46	R537
A1( )	4	4700 Ω (yellow-violet-red)	1-16	R507, R512, R533, R572
A1( )	1	6800 Ω (blue-gray-red)	1-19	R549
A1( )	1	8200 Ω (gray-red-red)	1-73	R526
A1( )	1	10 kΩ (brown-black-orange)	1-20	R518
A1( )	2	15 kΩ (brown-green-orange)	1-21	R511, R554
A1( )	1	22 kΩ (red-red-orange)	1-22	R574
A1( )	2	27 kΩ (red-violet-orange)	1-23	R566, R567
A1( )	2	33 kΩ (orange-orange-orange)	1-24	R547, R548
A1( )	1	39 kΩ (orange-white-orange)	1-67	R516
A1( )	1	62 kΩ, 5% (blue-red orange)	1-128	R568
A1( )	1	91 kΩ, 5% (white-brown-orange)	1-127	R571
A1( )	3	100 kΩ (brown-black-yellow)	1-26	R539, R565, R581
A1( )	1	120 kΩ (brown-red-yellow)	1-121	R527
A1( )	1	150 kΩ (brown-green-yellow)	1-27	R573
A1( )	1	330 kΩ (orange-orange-yellow)	1-31	R564

KEY No.	QTY.	DESCRIPTION	PART No.	CIRCUIT Component No.
Resistors (cont'd.)				
A1 ( )	1	390 kΩ (orange-white-yellow)	1-32	R575
A1 ( )	1	820 kΩ (gray-red-yellow)	1-68	R545
A1 ( )	1	1.5 MΩ (brown-green-green)	1-36	R576
A1 ( )	1	3.3 MΩ (orange-orange-green)	1-38	R577
A1 ( )	1	5.6 MΩ (green-blue-green)	1-86	R546
Other Resistors				
A2 ( )	1	.82 Ω, 5%, 2-watt (gray-red-silver)	3-1-2	R532
A3 ( )	1	1755 Ω, 1%, .12-watt	2-5-11	R562
A4 ( )	1	20 kΩ, 1%, 1/4-watt	2-68-12	R561
CAPACITORS				
Mica				
B1 ( )	1	130 pF	20-104	C509
B1 ( )	1	160 pF	20-178	C505
B1 ( )	2	270 pF	20-114	C543, C544
Disc				
B2 ( )	5	.001 μF	21-140	C523, C524, C546, C547, C551
B2 ( )	24	.01 μF	21-176	C501-C504, C506-C508, C511-C517, C519, C521, C522, C532-C534, C536-C539
B2 ( )	2	.05 μF	21-143	C528, C552
B2 ( )	1	.1 μF	21-95	C545
Mylar				
B3 ( )	1	.68 μF Mylar	27-62	C542
Electrolytic				
B4 ( )	1	.68 μF tantalum	25-200	C548
B4 ( )	1	2.2 μF tantalum	25-221	C535
B5 ( )	2	10 μF, 15V	25-115	C518, C549
B6 ( )	5	100 μF	25-248	C525, C526, C527, C529, C541
B7 ( )	1	500 μF	25-157	C531

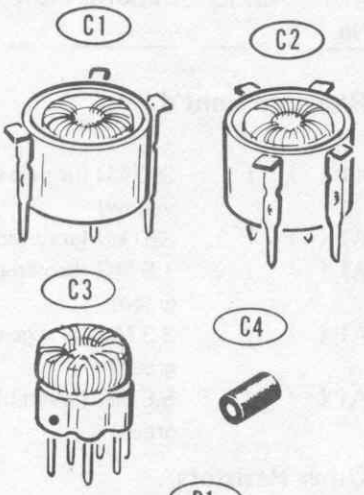


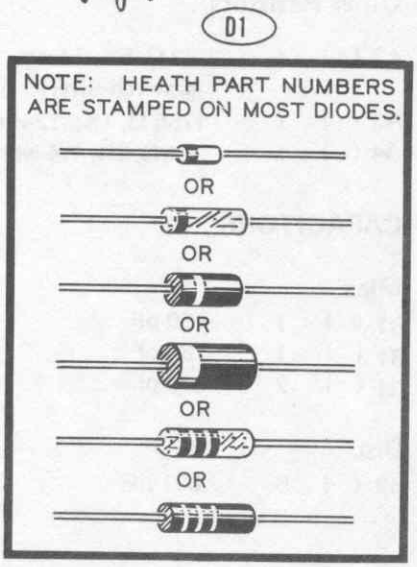


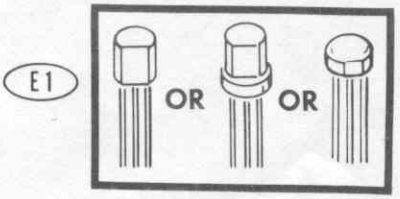


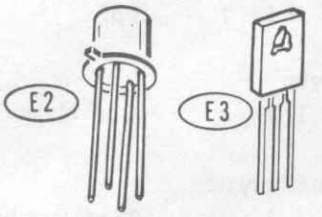


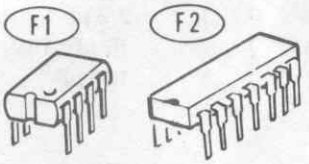
KEY No.	QTY.	DESCRIPTION	PART No.	CIRCUIT Component No.
INDUCTORS				
C1 ( )	1	Toroid coil	40-1686	L501
C2 ( )	1	Toroid coil	40-1687	T501
C3 ( )	1	Toroid bifilar coil	40-1688	T502
C4 ( )	2	Ferrite bead	475-10	FB
DIODES				
D1 ( )	1	1N710 zener	56-6	ZD501
D1 ( )	9	1N4149	56-56	D501-D505, D511-D514
D1 ( )	1	1N750A	56-59	ZD502
D1 ( )	4	FH1100	56-87	D506-D509
TRANSISTORS				
E1 ( )	9	MPSA20	417-801	Q502-Q505, Q507-Q509, Q512, Q514
E1 ( )	1	2N3643	417-233	Q515
E1 ( )	1	2N3638A	417-234	Q517
E1 ( )	3	2N4121	417-235	Q506, Q511, Q513
E2 ( )	1	40673	417-240	Q501
E3 ( )	1	SJE607	417-263	Q516
E3 ( )	1	SJE608	417-264	Q518
INTEGRATED CIRCUITS				
F1 ( )	1	MC1350P	442-18	IC501
F2 ( )	1	LM3900	442-71	IC502



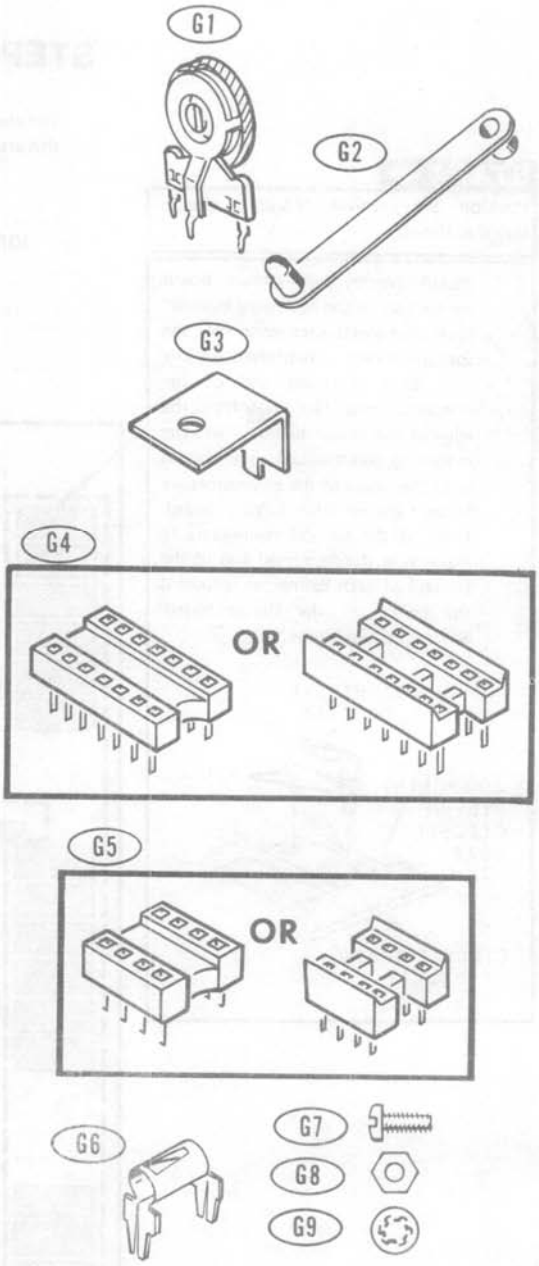








KEY No.	QTY.	DESCRIPTION	PART No.	CIRCUIT Component No.
MISCELLANEOUS				
G1 ( )	1	5000 Ω control	10-311	R534
G2 ( )	2	Board puller	207-80	
G3 ( )	2	Heat sink	215-53	
G4 ( )	1	14-pin socket	434-225	
G5 ( )	1	8-pin socket	434-230	
G6 ( )	24	Circuit board connector	432-124	
G7 ( )	2	4-40 x 1/4" screw	250-52	
G8 ( )	2	4-40 nut	252-2	
G9 ( )	2	#4 lockwasher	254-9	
PART FROM PACK #12				
( )	1	Receiver IF/audio circuit board	85-1631-4	



The prices shown on the separate "Heath Parts Price List" 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 (Michigan residents add 4% sales tax) to cover insurance, 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.

To order a replacement part, use the Parts Order Form furnished with this kit. If a Parts Order Form is not available, refer to "Customer Service" inside the rear cover of this Manual.

STEP-BY-STEP ASSEMBLY

The steps performed in this Pictorial are in this area of the circuit board.

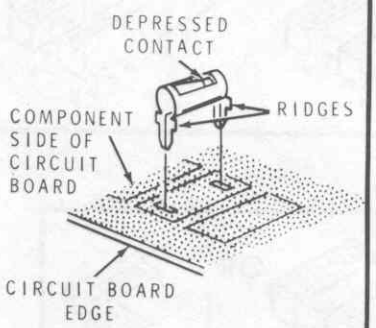
IDENTIFICATION DRAWING

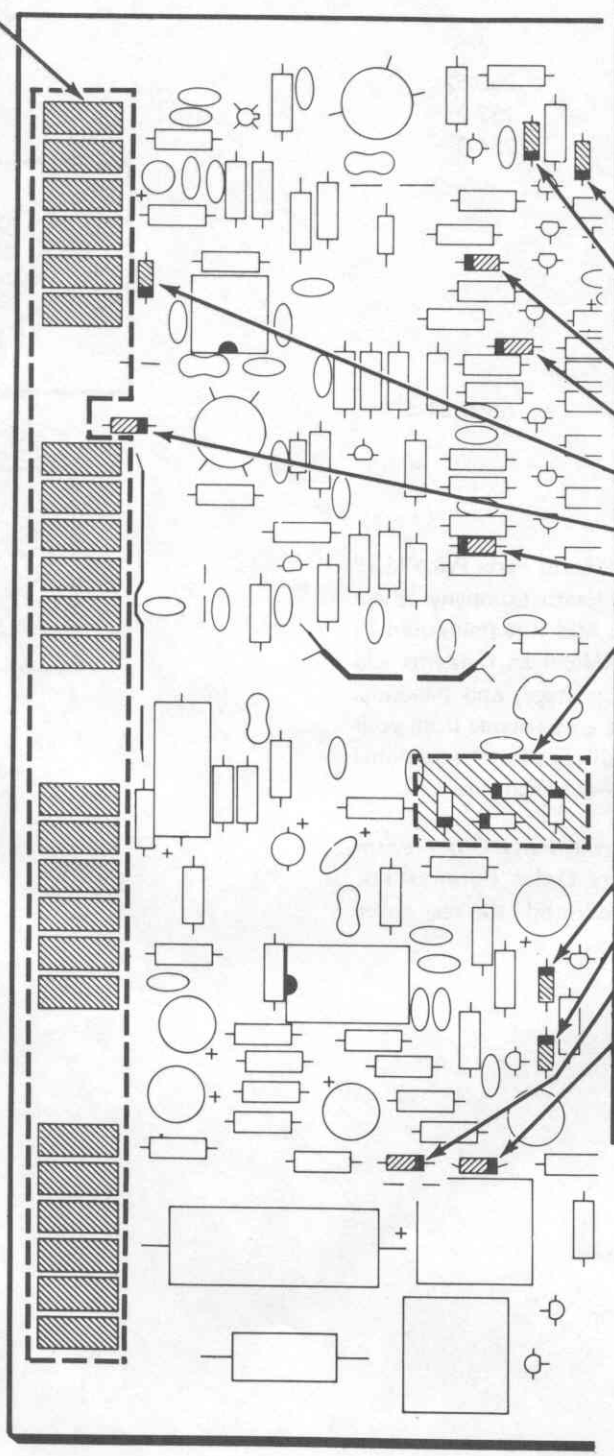
PART NUMBER

START

Position the receiver IF/audio circuit board as shown.

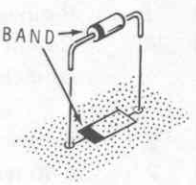
( ) Install twenty-four circuit board connectors in the following manner. Note that inside each connector the spring contact is depressed on one end. This depressed end of the connector must face away from the edge of the circuit board. Insert the mounting tabs through circuit board until the ridges of the connectors are firmly against the circuit board. Look at the row of connectors to make sure the depressed end of the contact of each connector is toward the center of the circuit board. Solder the tabs to the foil.





CONTINUE

NOTE: When you install a diode, always match the banded end of the diode with the band mark on the circuit board.



( ) ZD502: 1N750A (#56-59).

( ) ZD501: 1N710 (#56-6) diode.

Install five 1N4149 (#56-56) diodes at:

( ) D504.

( ) D501.

( ) D505.

( ) D503.

( ) D502.

( ) D506-D509: Four FH1100 (#56-87) diodes.

( ) Solder all leads to the foil and cut off the excess lead lengths.

Install four 1N4149 (#56-56) diodes at:

( ) D514.

( ) D513.

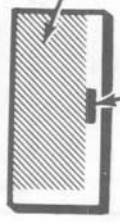
( ) D511.

( ) D512.

( ) Solder all leads to the foil and cut off the excess lead lengths.

PICTORIAL 10-1

The steps performed in this Pictorial are in this area of the circuit board.



START

( ) R505: 270 Ω (red-violet-brown).

( ) R504: 47 Ω (yellow-violet-black).

( ) R502: 820 Ω (gray-red-brown).

( ) R503: 1500 Ω (brown-green-red).

( ) R501: 100 Ω (brown-black-brown).

( ) R507: 4700 Ω (yellow-violet-red).

( ) R513: 2400 Ω (red-yellow-red).

( ) R514: 620 Ω (blue-red-brown).

( ) R517: 2700 Ω (red-violet-red).

( ) R519: 470 Ω (yellow-violet-brown).

( ) Solder the leads to the foil and cut off the excess lead lengths.

( ) R566: 27 kΩ (red-violet-orange).

( ) R568: 62 kΩ (blue-red-orange).

( ) R567: 27 kΩ (red-violet-orange).

( ) R564: 330 kΩ (orange-orange-yellow).

( ) R565: 100 kΩ (brown-black-yellow).

( ) R563: 100 Ω (brown-black-brown).

( ) R581: 100 kΩ (brown-black-yellow).

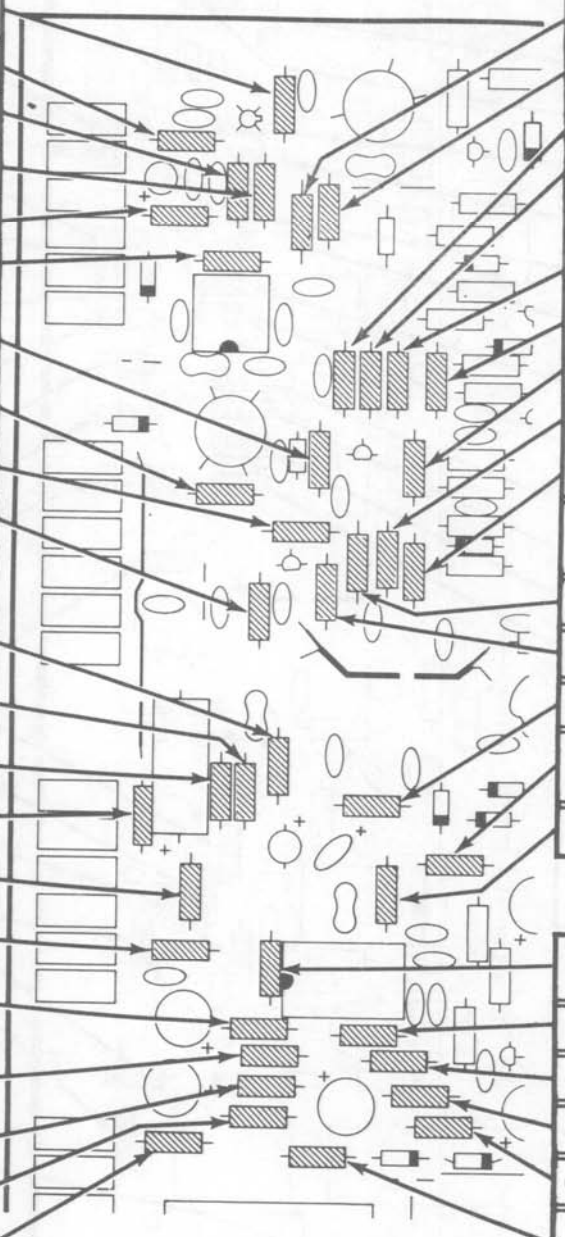
( ) R573: 150 kΩ (brown-green-yellow).

( ) R571: 91 kΩ (white-brown-orange).

( ) R525: 620 Ω (blue-red-brown).

( ) R528: 100 Ω (brown-black-brown).

( ) Solder all leads to the foil and cut off the excess lead lengths.



PICTORIAL 10-2

CONTINUE

( ) R506: 100 Ω (brown-black-brown).

( ) R508: 100 Ω (brown-black-brown).

( ) R511: 15 kΩ (brown-green-orange).

( ) R512: 4700 Ω (yellow-violet-red).

Five 100 Ω (brown-black-brown) at:

( ) R509.

( ) R551.

( ) R553.

( ) R515.

( ) R559.

( ) Solder the leads to the foil and cut off the excess lead lengths.

( ) R516: 39 kΩ (orange-white-orange).

( ) R518: 10 kΩ (brown-black-orange).

( ) R522: 100 Ω (brown-black-brown).

( ) R575: 390 kΩ (orange-white-yellow).

( ) R576: 1.5 MΩ (brown-green-green).

( ) R577: 3.3 MΩ (orange-orange-green).

( ) R572: 4700 Ω (yellow-violet-red).

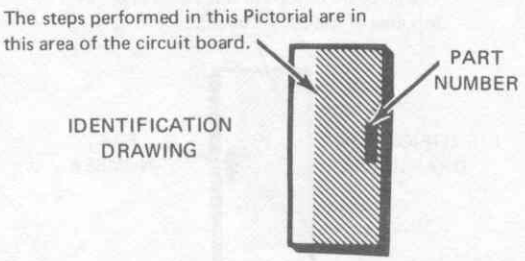
( ) R574: 22 kΩ (red-red-orange).

( ) R527: 120 kΩ (brown-red-yellow).

( ) R526: 8200 Ω (gray-red-red).

( ) R523: 2400 Ω (red-yellow-red).

( ) Solder all leads to the foil and cut off the excess lead lengths.



START

( ) R533: 4700 Ω (yellow-violet-red).

( ) R541: 1500 Ω (brown-green-red).

( ) R537: 3900 Ω (orange-white-red).

( ) R536: 100 Ω (brown-black-brown).

( ) R543: 100 Ω (brown-black-brown).

( ) R545: 820 kΩ (gray-red-yellow).

( ) R547: 33 kΩ (orange-orange-orange).

( ) R552: 1000 Ω (brown-black-red).

( ) R554: 15 kΩ (brown-green-orange).

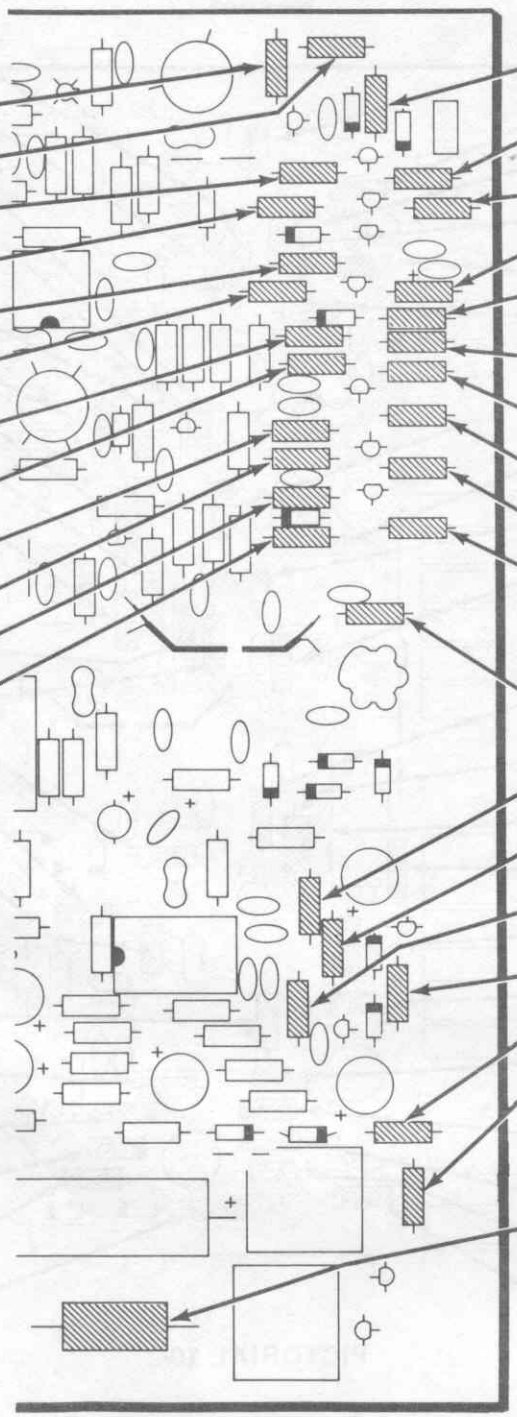
( ) R555: 1000 Ω (brown-black-red).

( ) R556: 1000 Ω (brown-black-red).

( ) R561: 20 kΩ, 1%.

KEEP YOUR SOLDERING IRON TIP CLEAN

( ) Solder all leads to the foil and cut off the excess lead lengths.



CONTINUE

( ) R538: 3300 Ω (orange-orange-red).

( ) R539: 100 kΩ (brown-black-yellow).

( ) R542: 2700 Ω (red-violet-red).

( ) R544: 100 Ω (brown-black-brown).

( ) R546: 5.6 MΩ (green-blue-green).

( ) R548: 33 kΩ (orange-orange-orange).

( ) R549: 6800 Ω (blue-gray-red).

( ) R557: 1500 Ω (brown-green-red).

( ) R558: 150 Ω (brown-green-brown).

( ) R562: 1755 Ω, 1%.

( ) Solder all leads to the foil and cut off the excess lead lengths.

( ) R521: 1000 Ω (brown-black-red).

( ) R578: 330 Ω (orange-orange-brown).

( ) R582: 1800 Ω (brown-gray-red).

( ) R579: 620 Ω (blue-red-brown).

( ) R531: 470 Ω (yellow-violet-brown).

( ) R524: 2700 Ω (red-violet-red).

( ) R529: 820 Ω (gray-red-brown).

NOTE: The 2-watt resistor, in the following step, is the same physical size as a 1-watt resistor.

( ) R532: .82 Ω, 2-watt (gray-red-silver).

( ) Solder the leads to the foil and cut off the excess lead lengths. Save six cutoff leads for use in the next Pictorial.

PICTORIAL 10-3

The steps performed in this Pictorial are in this area of the circuit board.

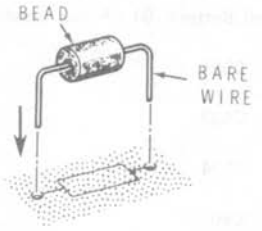
IDENTIFICATION DRAWING

PART NUMBER

START

( ) Bare wire. Use a cutoff lead.

( ) Ferrite bead.



( ) Ferrite bead.

( ) 1" bare wire. Use a cutoff lead.

( ) 1" bare wire. Use a cutoff lead.

( ) 2-1/2" gray wire. Remove 1/4" insulation from each end.

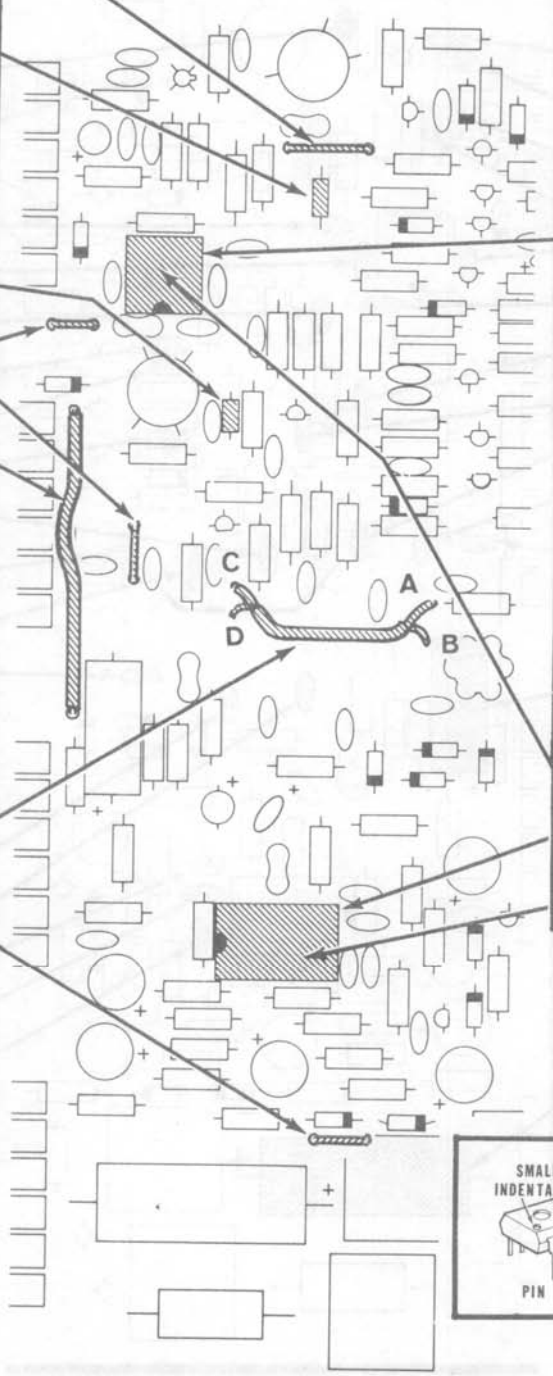
( ) Prepare both ends of a 2" length of shielded cable as shown. Melt a small amount of solder on the wires at each end.

( ) Prepared shielded cable. Connect the center conductor at one end to hole A and the shield wires to B. At the other end, connect the center conductor to C and the shield wires to D. Solder the cable as it is installed.

( ) 1" bare wire. Use a cutoff lead.

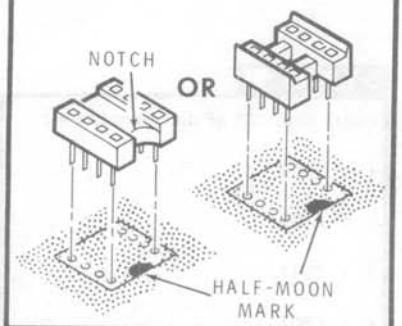
FOR GOOD SOLDER CONNECTIONS, YOU MUST **KEEP THE SOLDERING IRON TIP CLEAN.** WIPE IT OFTEN WITH A DAMP SPONGE OR CLOTH.

( ) Solder all leads to the foil and cut off the excess lead lengths.



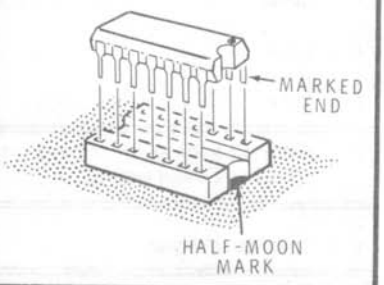
START

NOTE: When you install the following integrated circuit sockets, first insert the socket pins into the holes. The half-moon mark on the circuit board should still be visible after the socket is installed. Then solder the pins to the foil.



( ) 8-pin IC socket at IC501.

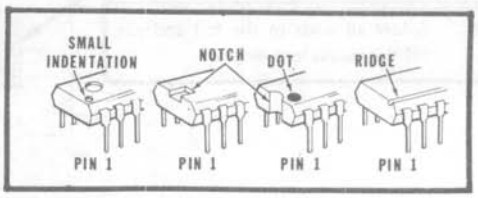
NOTE: When you install the following integrated circuits, first refer to Detail 10-4A, then position the pin 1 end of the integrated circuit toward the half-moon mark on the circuit board. Then carefully install the integrated circuit. Make sure all the pins are in their respective holes.



( ) IC501: MC1350P IC (#442-18).

( ) 14-pin IC socket at IC502.

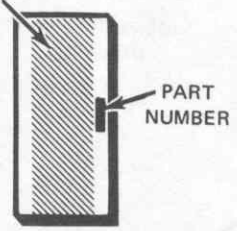
( ) IC502: LM3900 IC (#442-71).



Detail 10-4A

PICTORIAL 10-4

The steps performed in this Pictorial are in this area of the circuit board.



START

Install eleven .01 μF disc capacitors at:

( ) C503. . . . . .

( ) C502. . . . . .

( ) C517. . . . . .

( ) C501. . . . . .

( ) C508. . . . . .

( ) C512. . . . . .

( ) C511. . . . . .

( ) C514. . . . . .

( ) C515. . . . . .

( ) C533. . . . . .

( ) C519. . . . . .

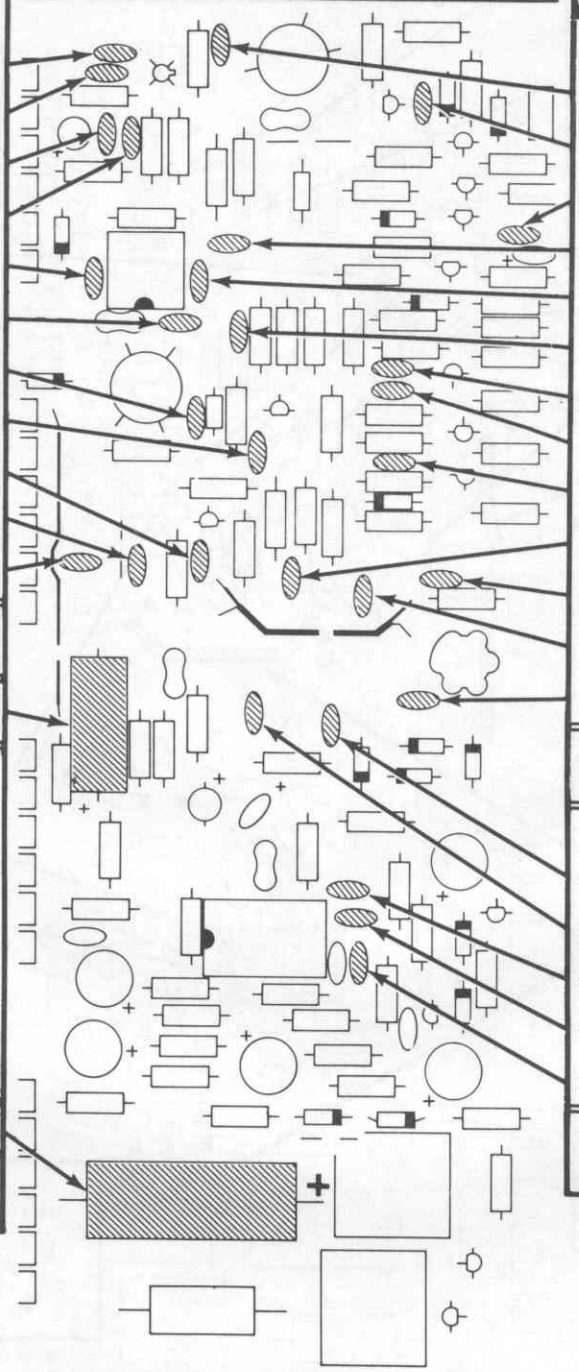
( ) Solder all leads to the foil and cut off the excess lead lengths.

( ) C542: .68 μF Mylar.

NOTE: When you mount the electrolytic capacitors in the following steps, always match the positive (+) mark on the capacitor with the positive (+) mark on the circuit board.

( ) C531: 500 μF electrolytic.

( ) Solder all leads to the foil and cut off the excess lead lengths.



CONTINUE

Install thirteen .01 μF disc capacitors at:

( ) C504.

( ) C532.

( ) C534.

( ) C507.

( ) C506.

( ) C513.

( ) C536.

( ) C538.

( ) C537.

( ) C516.

( ) C521.

( ) C539.

( ) C522.

( ) Solder all leads to the foil and cut off the excess lead lengths.

Install five .001 μF disc capacitors at:

( ) C523.

( ) C524.

( ) C551.

( ) C547.

( ) C546.

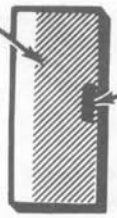
( ) Solder all leads to the foil and cut off the excess lead lengths.

PICTORIAL 10-5

The steps performed in this Pictorial are in this area of the circuit board.

IDENTIFICATION DRAWING

PART NUMBER



START

NOTE: To install transistors in the following steps, match the transistor flat or tab to the outline printed on the circuit board and insert the leads into the holes. Position the transistor body 1/4" above the circuit board. Solder each lead to the foil and cut off the excess lead lengths.

( ) Bend the center (B) lead of seven MPSA20 transistors (#417-801) away from the flat as shown.

Install the seven transistors at:

( ) Q512. . . . . .

( ) Q509. . . . . .

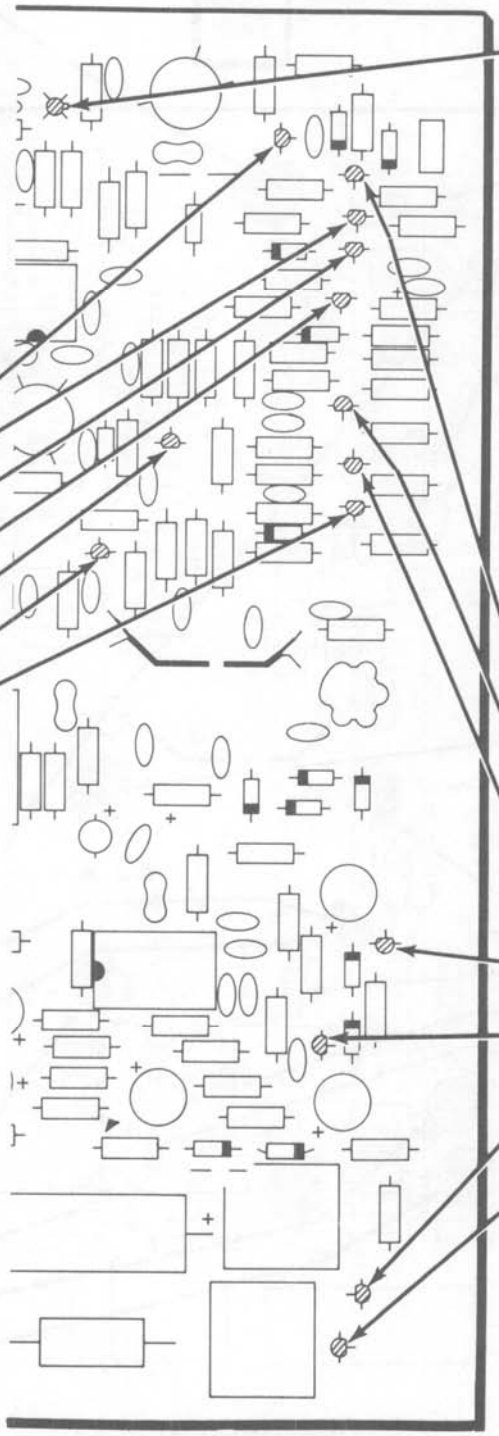
( ) Q508. . . . . .

( ) Q507. . . . . .

( ) Q502. . . . . .

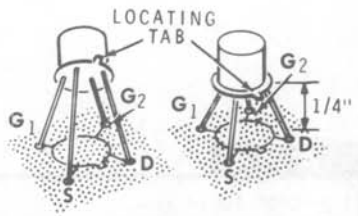
( ) Q503. . . . . .

( ) Q504. . . . . .



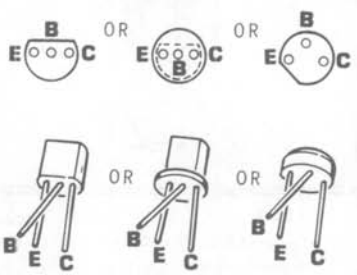
CONTINUE

( ) Q501: 40673 transistor (#417-240).



NOTE: Identify the leads of the following transistors from the appropriate detail. Then insert the leads into the indicated circuit board holes. Solder the leads to the foil and cut off the excess lead lengths.

BOTTOM VIEW OF TRANSISTOR



( ) Q511: 2N4121 transistor (#417-235).

( ) Q506: 2N4121 transistor (#417-235).

( ) Q505: MPSA20 transistor (#417-801).

( ) Q514: MPSA20 transistor (#417-801).

( ) Q513: 2N4121 transistor (#417-235).

( ) Q515: 2N3643 transistor (#417-233).

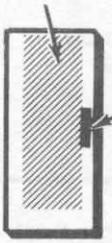
( ) Q517: 2N3638A transistor (#417-234).

PICTORIAL 10-6

The steps performed in this Pictorial are in this area of the circuit board.

IDENTIFICATION DRAWING

PART NUMBER

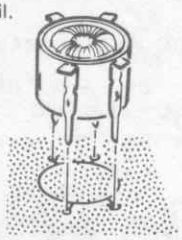


START

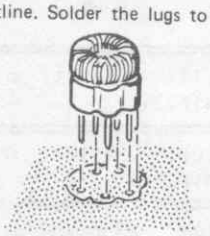
( ) C505: 160 pF mica.

( ) C509: 130 pF mica.

( ) T501: Toroid coil (#40-1687). Install this coil either way within the printed outline. Solder the lugs to the foil.



( ) T502: Toroid bifilar coil (#40-1688). Match the coil to the outline. Solder the lugs to the foil.



( ) C543: 270 pF mica.

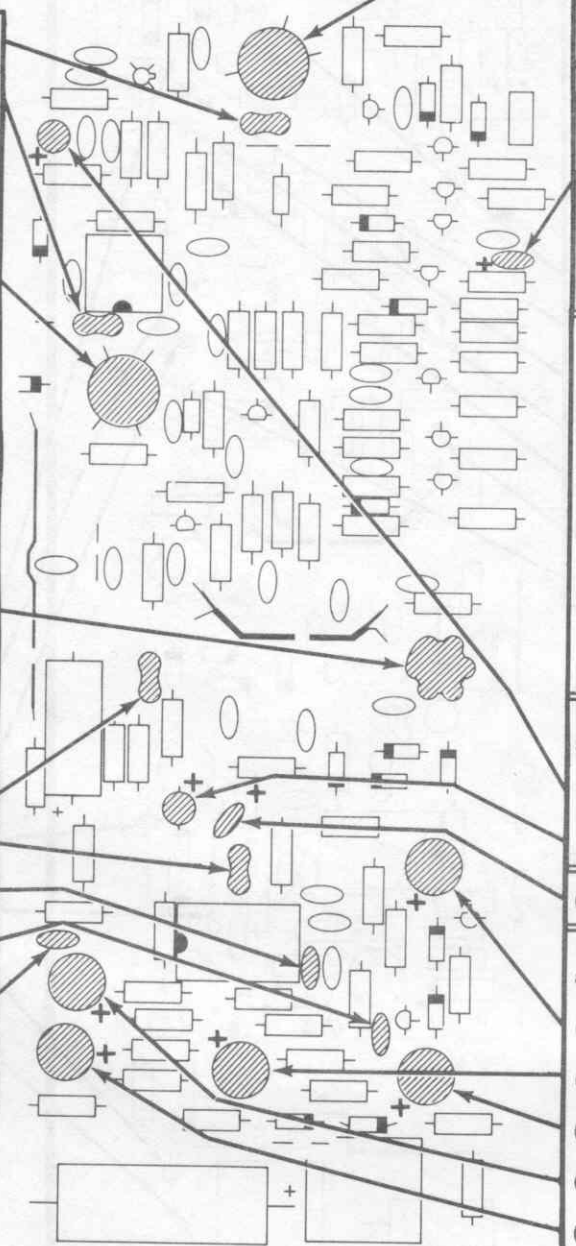
( ) C544: 270 pF mica.

( ) C545: .1 µF disc.

( ) C528: .05 µF disc.

( ) C552: .05 µF disc.

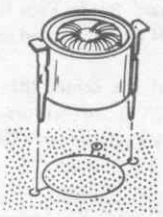
( ) Solder all leads to the foil and cut off the excess lead lengths.



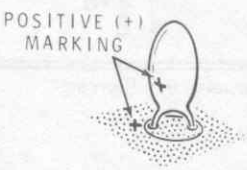
CONTINUE

NOTE: In the following step, do not be concerned if the coil has two lugs instead of three, as the coil can be installed either way.

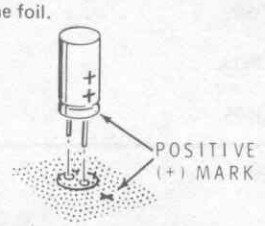
( ) L501: Toroid coil (#40-1686). Solder the lugs to the foil.



( ) C535: 2.2 µfd tantalum. Match the positive (+) markings.



NOTE: When you install the following electrolytic capacitors, mount the capacitors vertically and match the plus (+) mark on the capacitor to the plus (+) mark on the circuit board. Solder the lugs to the foil.



Install two 10 µF electrolytic capacitors at:

( ) C518.

( ) C549.

( ) C548: .68 µF tantalum.

Install five 100 µF electrolytic capacitors at:

( ) C529.

( ) C527.

( ) C526.

( ) C541.

( ) C525.

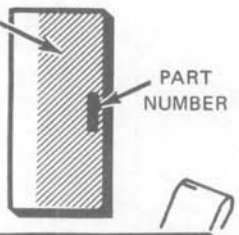
( ) Solder all leads to the foil and cut off the excess lead lengths.

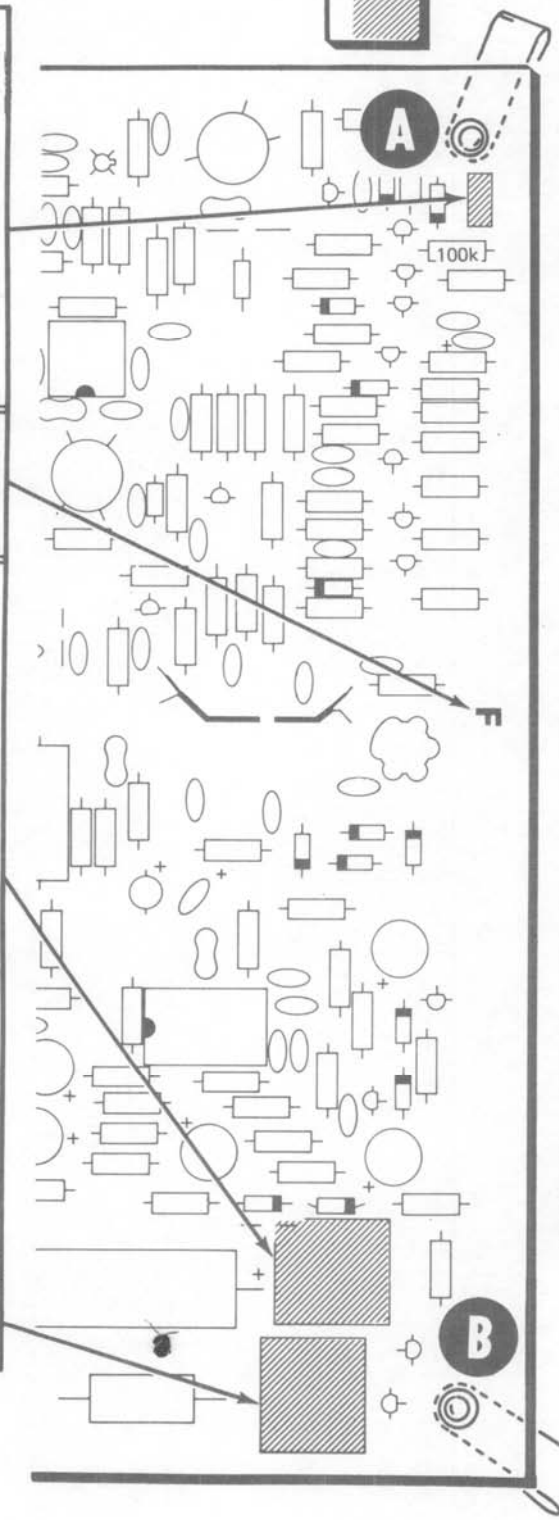
PICTORIAL 10-7

The steps performed in this Pictorial are in this area of the circuit board.

IDENTIFICATION DRAWING

PART NUMBER



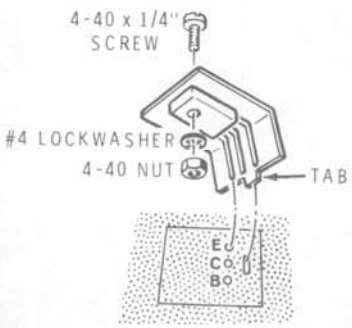


START

( ) R534: 5000 Ω control. (May be marked 5K). It may be necessary to move the 100 k Ω resistor slightly. Solder the lugs to the foil.

( ) Cut a letter "F" from the label sheet. Carefully remove the protective backing paper from the letter and press this letter on the circuit board as shown.

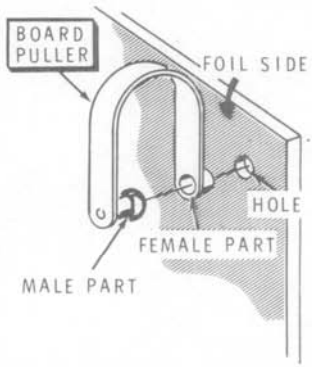
( ) Q516: SJE607 transistor (#417-263). Position the metal side of the transistor against the heat sink and bend the leads down to provide at least 1/16" clearance from the heat sink. When you bend the transistor leads, hold the lead with thin-nose pliers between the bending point and the transistor body. Mount the transistor with 4-40 x 1/4" hardware. Solder the transistor leads and the heat sink tab to the foil.



( ) Q518: SJE608 transistor (#417-264). Mount this transistor in a similar manner.

CONTINUE

( ) Mount board pullers on the foil side of the circuit board at holes A and B. Position the female part in the circuit board hole. Then push the male part through the female part.



CIRCUIT BOARD CHECKOUT

Carefully inspect the circuit board for the following conditions.

( ) Unsoldered connections.

( ) "Cold" solder connections.

( ) Solder bridges between foil patterns.

( ) Protruding leads. No lead should be longer than 1/8".

( ) Integrated circuits for the proper type and installation.

( ) Electrolytic capacitors for the correct position of the positive (+) mark.

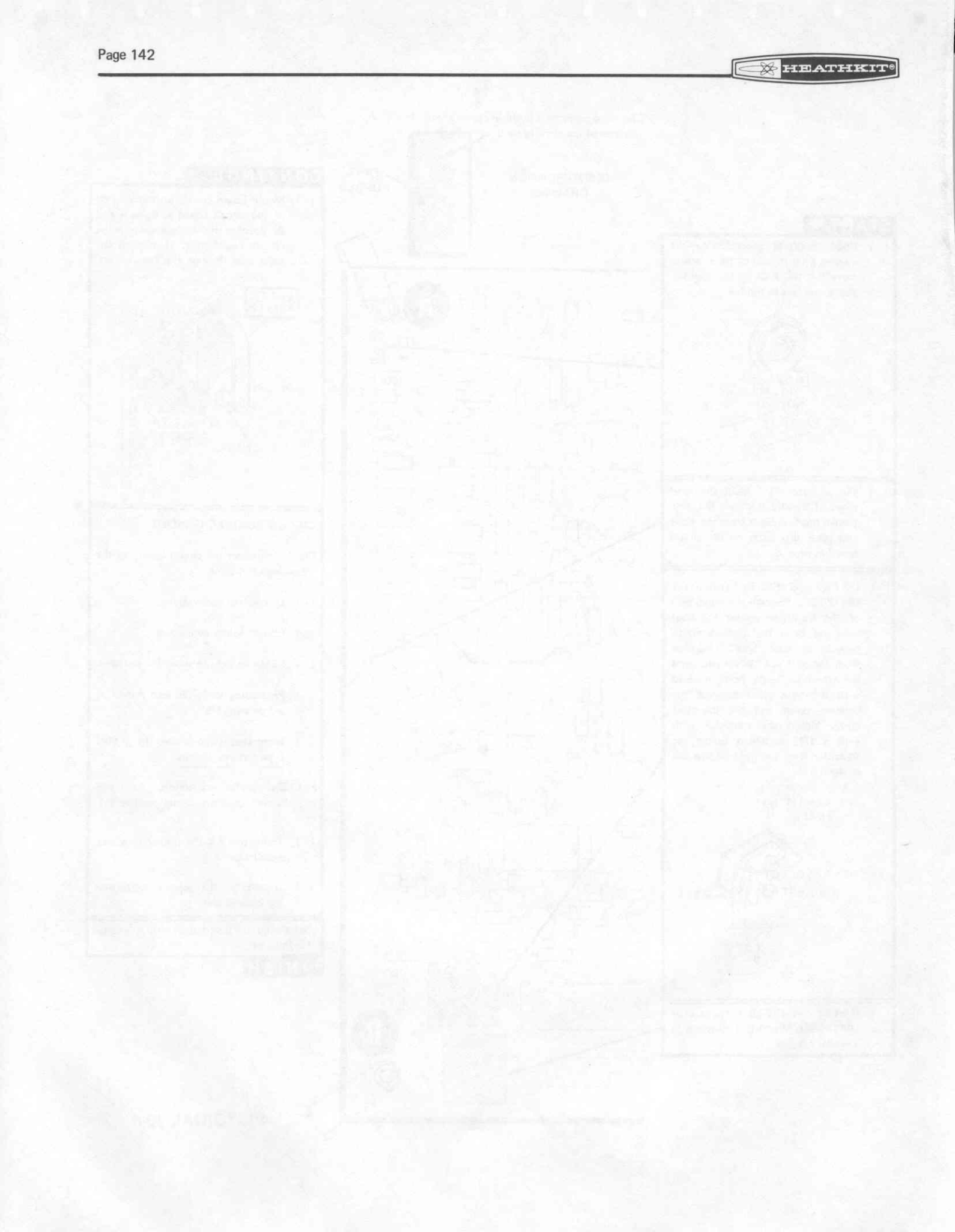
( ) Transistors for the proper type and installation.

( ) Diodes for the correct position at the banded end.

Set the circuit board aside until it is called for in a step.

FINISH

PICTORIAL 10-8

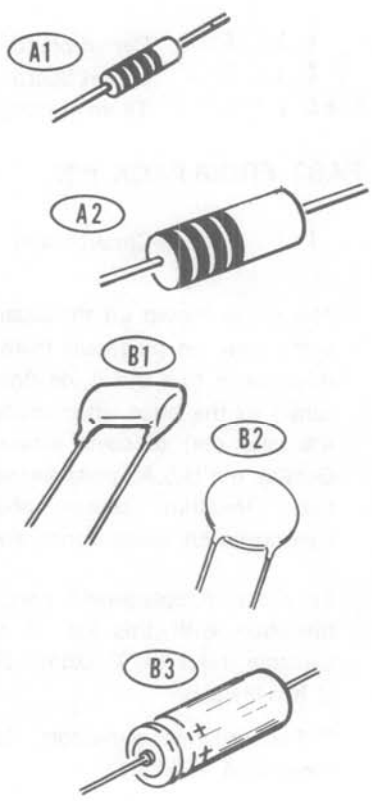


POWER AMPLIFIER CIRCUIT BOARD

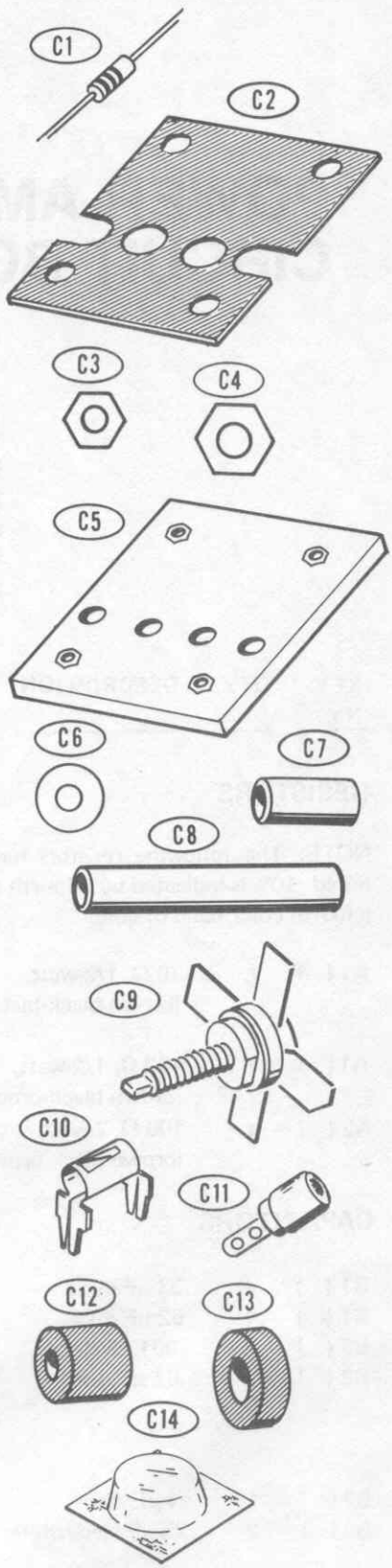
PARTS LIST

Remove the parts from Pack #11 and check each part against the following list. Make a check (✓) in the space provided as you identify each part. Return any part that is packed in an individual envelope with the part number on it back in the envelope after you identify it until it is called for in a step. Do not throw away any packing materials until all parts are accounted for.

KEY No.	QTY.	DESCRIPTION	PART No.	CIRCUIT Component No.
RESISTORS				
NOTE: The following resistors have a 10% tolerance unless otherwise noted. 10% is indicated by a fourth color band of silver; 5% is indicated by a fourth color band of gold.				
A1 ( )	5	10 Ω, 1/2-watt, (brown-black-black)	1-41	R951, R953, R955, R957, R958
A1 ( )	1	100 Ω, 1/2-watt, (brown-black-brown)	1-3	R952
A2 ( )	1	100 Ω, 2-watt, (brown-black-brown)	1-20-2	R959
CAPACITORS				
B1 ( )	1	33 pF mica	20-160	C965
B1 ( )	1	62 pF mica	20-109	C951
B2 ( )	2	.001 μF disc	21-140	C954, C959
B2 ( )	7	.01 μF disc	21-176	C953, C955, C956, C958, C961, C962, C964
B2 ( )	1	.1 μF disc	21-95	C952
B3 ( )	2	25 μF electrolytic	25-145	C957, C963



KEY No.	QTY.	DESCRIPTION	PART No.	CIRCUIT Component No.
MISCELLANEOUS				
C1 ( )	1	2.2 μH choke	45-73	RFC951
C2 ( )	1	Fish paper	75-705	
C3 ( )	4	8-32 nut	252-4	
C4 ( )	4	10-32 nut	252-5	
C5 ( )	1	Heat sink	205-1558	
C6 ( )	4	Flat washer	253-25	
C7 ( )	4	Short brass tube	266-827	
C8 ( )	4	Long brass tube	266-828	
( )	2	Clear tubing	346-26	
C9 ( )	1*	Package, consisting of	417-831-1	
	4	2N6456 or CD-2664A transistor		Q951, Q952, Q953, Q954
C10 ( )	6	Circuit board connector	432-124	
C11 ( )	1	Phono socket	434-186	
C12 ( )	5	5/16" ferrite bead	475-12	FB
C13 ( )	78	3/16" ferrite bead	475-17	L951, L952, L953, L954, L955, L956, L957, L958
( )	1	Circuit board	85-1640	
( )	1	Circuit board	85-1641	
C14 ( )	1	Thermal compound**	352-31	
PART FROM PACK #12				
( )	1	Circuit board	85-1629-2	



The prices shown on the separate "Heath Parts Price List" 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 (Michigan residents add 4% sales tax) to cover insurance, 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.

To order a replacement part, use the Parts Order Form furnished with this kit. If a Parts Order Form is not available, refer to "Customer Service" inside the rear cover of this Manual.

*When ordering transistors, don't forget to order thermal compound, #352-31.

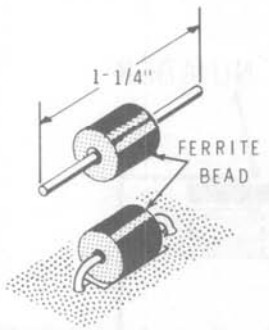
**Dow Corning thermal heat sink compound contains Zinc Oxides, SiO_2, and slight traces of CO_2.

STEP-BY-STEP ASSEMBLY

START

Position the power amplifier circuit board as shown. Then proceed with the following steps.

NOTE: When you install a ferrite bead in this Pictorial, the bead may move on the wire after it is installed. Use heavy bare wire.



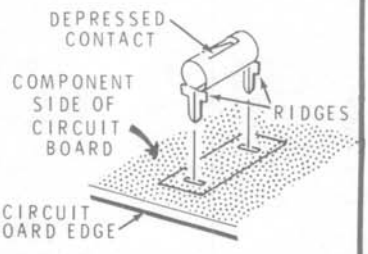
( ) 5/16" ferrite bead.

( ) 5/16" ferrite bead.

( ) 5/16" ferrite bead.

( ) Solder the leads to the foil and cut off the excess lead lengths.

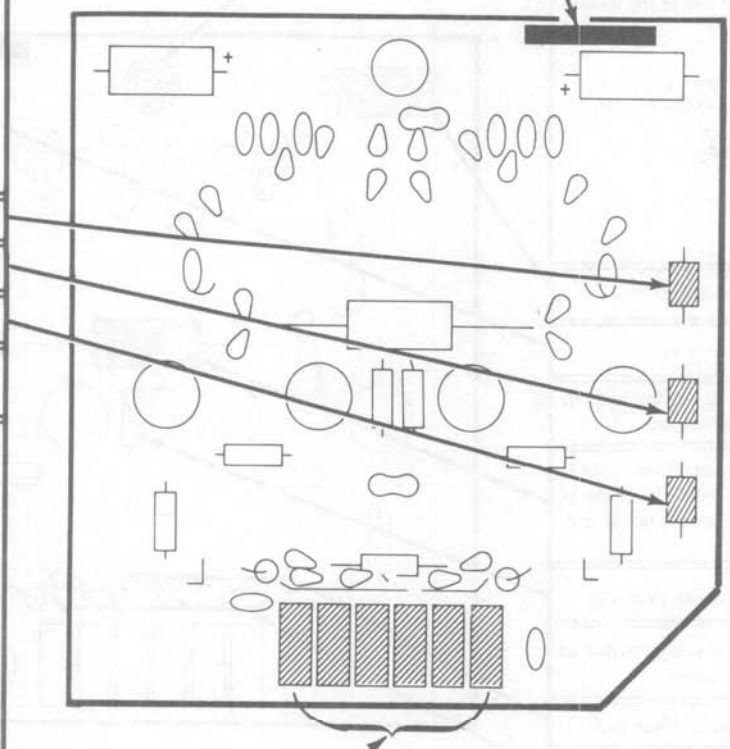
NOTE: Install the circuit board connectors in the following manner. Note that inside each connector the spring contact is depressed on one end. This depressed end of the connector must face away from the edge of the circuit board. Insert the mounting tabs through the circuit board until the ridges of the connector are firmly against the circuit board. Look at the row of connectors to make sure the depressed end of the contact of each connector is toward the center of the circuit board. Solder the tabs to the foil.



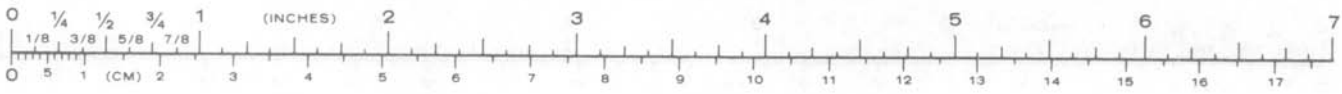
( ) Six circuit board connectors.

FOR GOOD SOLDER CONNECTIONS, YOU MUST **KEEP THE SOLDERING IRON TIP CLEAN.** WIPE IT OFTEN WITH A DAMP SPONGE OR CLOTH.

PART NUMBER

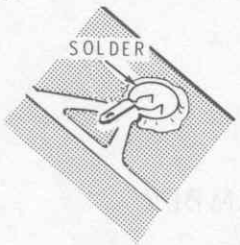


PICTORIAL 11-1

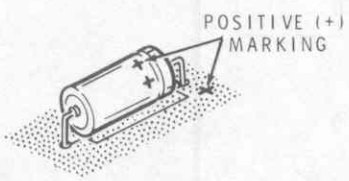


START

( ) Position the phono socket as shown, with the lug toward the foil pad shown in the following detail. Solder the outer shield to the circuit board foil. Then bend the inner lug over until its hole is aligned with the open hole in the foil. Be sure the inner lug does not touch the outer shield.



Position the positive (+) end of the following capacitors as shown.



( ) C963: 25 µF electrolytic.

( ) C957: 25 µF electrolytic.

( ) Solder the leads to the foil and cut off the excess lead lengths.

( ) R959: 100 Ω, 2-watt (brown-black-brown). NOTE: Bend the leads as shown to fit the circuit board outline.

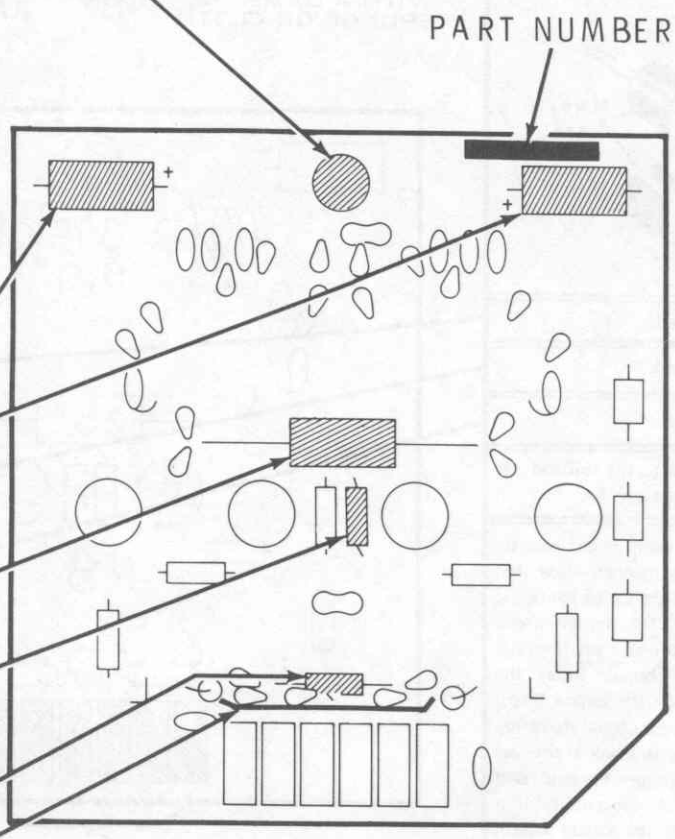
( ) RFC951: 2.2 µH choke (#45-73).

NOTE: Position the following resistor so holes R and S are not covered.

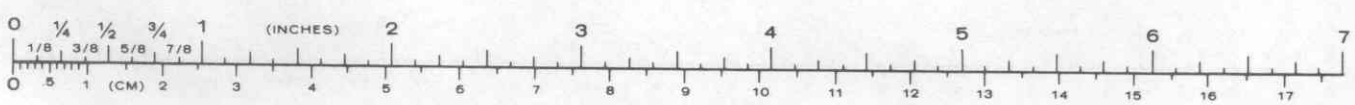
( ) R952: 100 Ω (brown-black-brown).

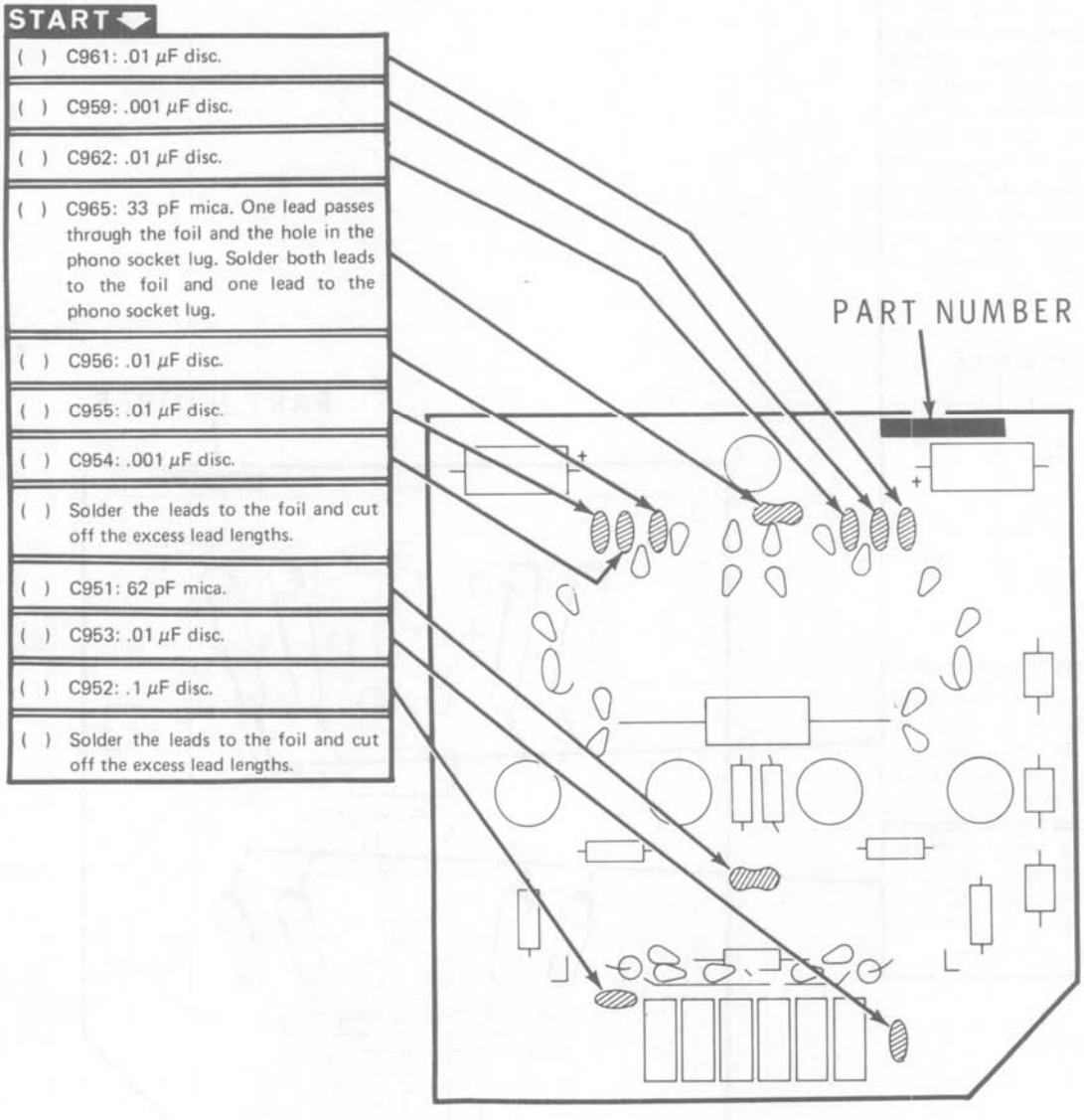
( ) 1-3/4" gray wire.

( ) Solder the leads to the foil and cut off the excess lead lengths.



PICTORIAL 11-2

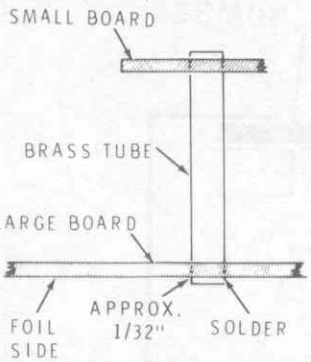




PICTORIAL 11-3

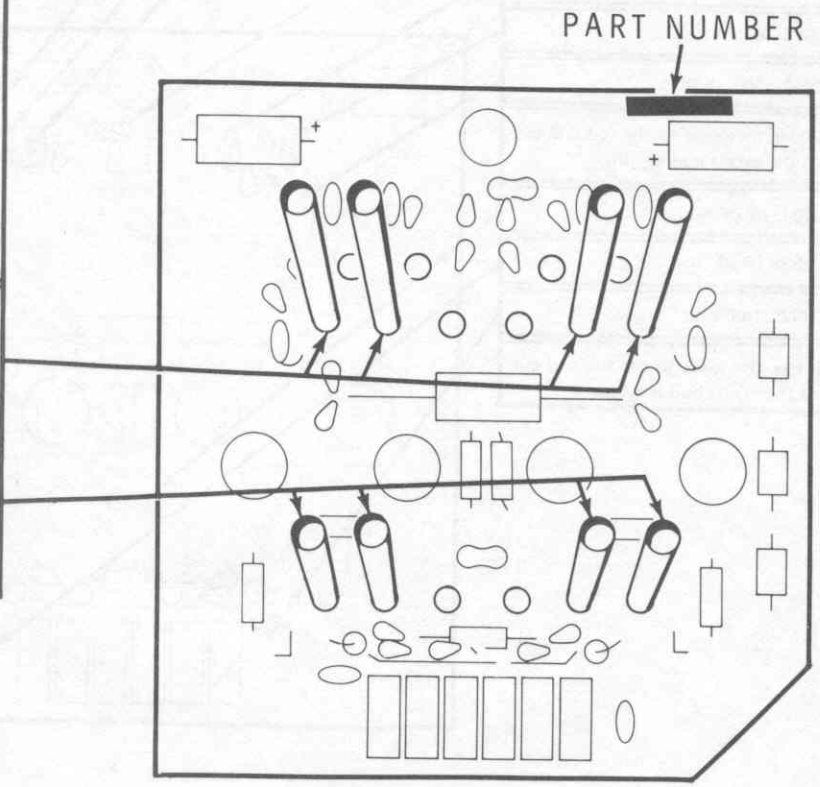
START

In the following steps, you will mount eight brass tubes on the circuit board. So they will take the solder easily, 1/4" of the end of each tube should be burnished with steel wool or fine sandpaper until it is bright. To mount the tubes, push them through the top of the board until they project approximately 1/32" through the foil side. Space the top of the tubes with the indicated small boards; then solder the tubes to the large circuit board foil. Solder around the circumference of each tube. Remove the small board from the top of the tubes temporarily.

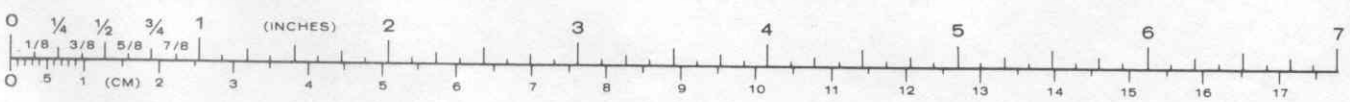


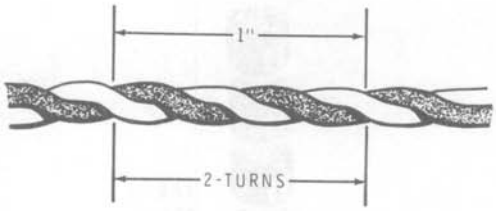
( ) Four long brass tubes. Use circuit board #85-1641 as a temporary spacer. Be sure the tubes are perpendicular to the circuit board. Solder the tubes to the foil.

( ) Four short brass tubes. Use circuit board #85-1640 as a temporary spacer. Be sure the tubes are perpendicular to the circuit board. Solder the tubes to the foil.



PICTORIAL 11-4





Detail 11-5A

TRANSFORMER ASSEMBLY

Refer to Pictorial 11-5 (in the "Illustration Booklet") for the following steps.

( ) Prepare a 20" red and a 20" gray wire. Twist these two wires together so there are approximately two complete turns for each inch of length as shown in Detail 11-5A. Cut this twisted pair into one 3", one 5-1/2", and two 4" lengths. Remove 1/4" of insulation from each wire end. Lay these pieces aside temporarily.

NOTE: When you cut pieces of clear tubing in the following steps, use a sharp knife or similar tool that will cut cleanly and cut the tubing squarely across. Try to cut each piece to exactly the specified length.

( ) Cut two 1/2" lengths of clear tubing.

( ) Cut six 1-1/8" lengths of clear tubing.

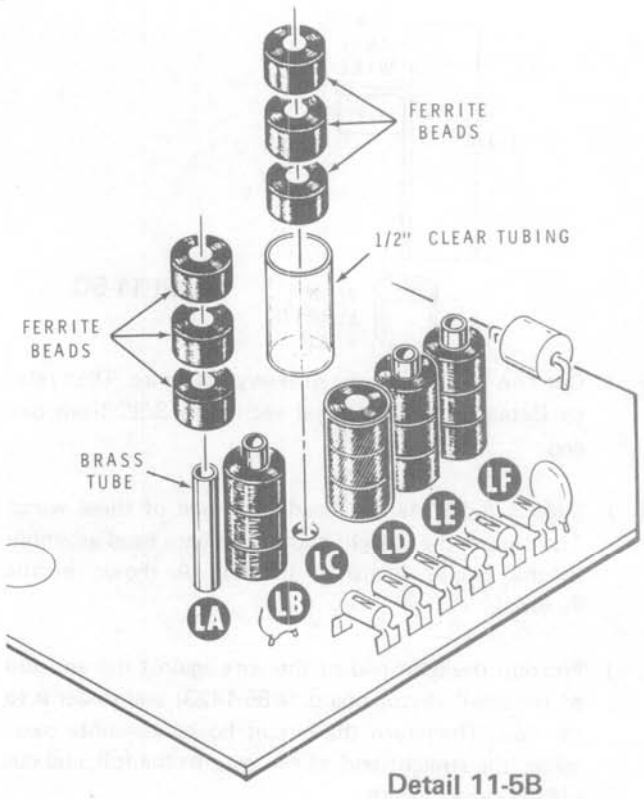
Refer to Detail 11-5B for the following four steps.

( ) L952: Place three 3/16" ferrite beads over short brass tube LA, and another three beads over brass tube LB on the top of the circuit board.

( ) L953: In the same manner, place three ferrite beads on tubes LE and LF.

( ) Place three ferrite beads inside a 1/2" length of large tubing. Set this tube and beads in place at LC on the circuit board.

( ) Place three more ferrite beads inside a 1/2" length of large tubing. Set this tube in place at LD on the circuit board. This step and the previous step complete the assembly of L951.



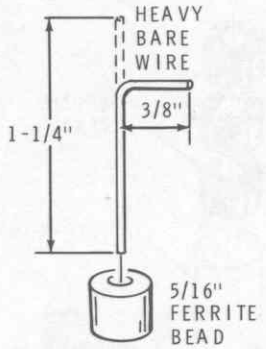
Detail 11-5B

NOTE: As there are ferrite beads loosely mounted on the four brass tubes, and as some of them are placed loosely within clear tubing, do not jostle the circuit board or turn it upside down until these beads are secured in place in the following steps.

( ) Position the small circuit board (#85-1640) foil-side-up so the four brass tubes are centered in the four end holes of the board (two holes at each end of the board). Carefully work the board down over the tube ends. Push the board down onto the tops of the beads. Make sure the two small holes are toward the connector edge of the power amplifier circuit board as shown in the Pictorial.

( ) Solder each of the four tube ends to the small circuit board foils. Solder completely around the circumference of each tube.

( ) Pick up the 3" length of twisted wires (laid aside earlier), bend it into a narrow "U" shape, and push the two ends down through the stacks of ferrite beads at LC and LD. On the foil side of the circuit board, spread the wires apart, as when you mount resistors and capacitors. These wires hold the ferrite beads in place when you handle the power amplifier circuit board.



Detail 11-5C

( ) Cut two 1-1/4" lengths of heavy bare wire. Then refer to Detail 11-5C and bend each wire 3/8" from one end.

( ) Slide a 5/16" ferrite bead over one of these wires. Then insert the straight end of this wire bead assembly in the circuit board at location A shown in the Pictorial.

( ) Position the bent end of the wire against the end foil of the small circuit board (#85-1423) and solder it to the foil. Then turn the circuit board assembly over, solder the straight end of the wire to the foil, and cut off the excess length.

( ) In the same way, install the remaining heavy bare wire and a 5/16" ferrite bead at location B shown on the Pictorial.

( ) L954: Refer to Detail 11-5D and place six ferrite beads on each brass tube, LG and LH.

( ) L955: Place six ferrite beads on each brass tube, LL and LM.

( ) Place six ferrite beads into each of the six 1-1/8" pieces of clear tubing to form six bead assemblies.

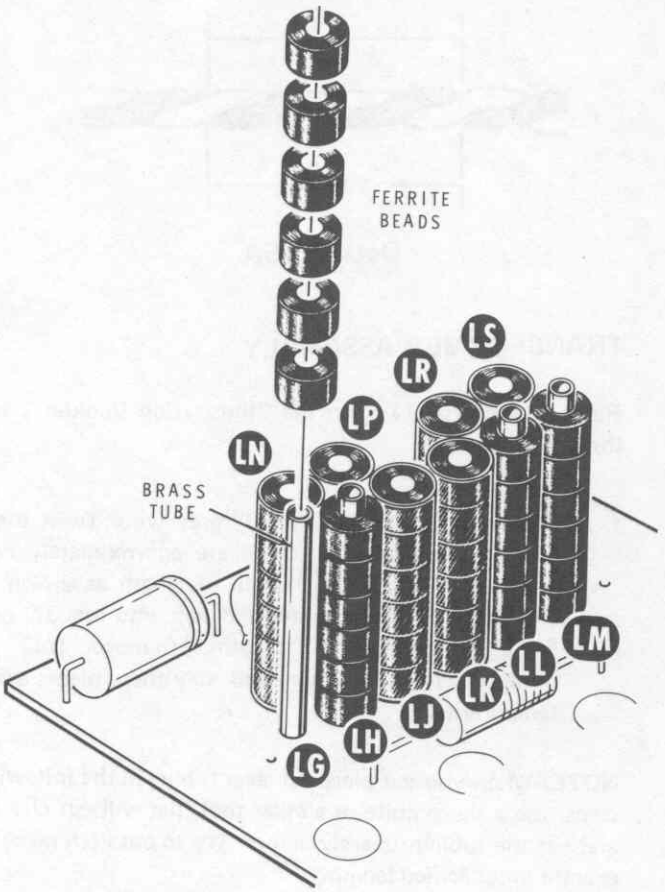
NOTE: Carefully position the bead assemblies on the top of the circuit board in the following steps. A piece of plastic tape might be helpful to hold them in place until they are wired in position later.

( ) L958: Place bead assemblies at LJ and LK.

( ) L956: Place bead assemblies at LN and LP.

( ) L957: Place bead assemblies at LR and LS.

( ) Position the small circuit board (#85-1641) foil-side-up. Then carefully work it down over the ends of the four brass tubes. Push the board down against the tops of the six bead assemblies.



Detail 11-5D

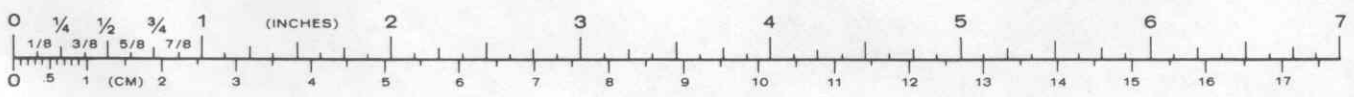
( ) Solder the four brass tubes to the circuit board foils. Solder completely around the circumference of each tube.

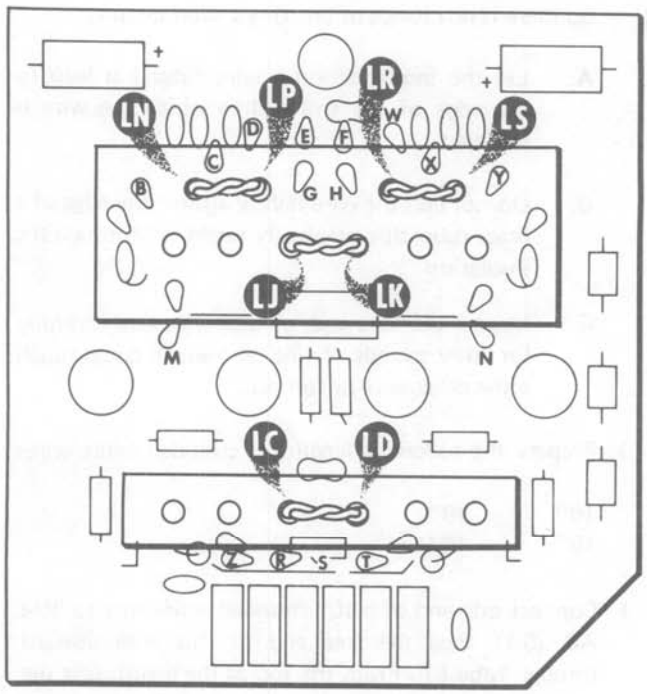
( ) Refer to Detail 11-5E, bend the 5-1/2" pair of twisted wires into a "U" shape, and push the ends down through the ferrite bead stacks at LJ and LK. Spread the wires apart on the foil side of the circuit board to hold the wires (and beads) in place.

( ) Similarly, use a 4" twisted pair of wires at LN and LP.

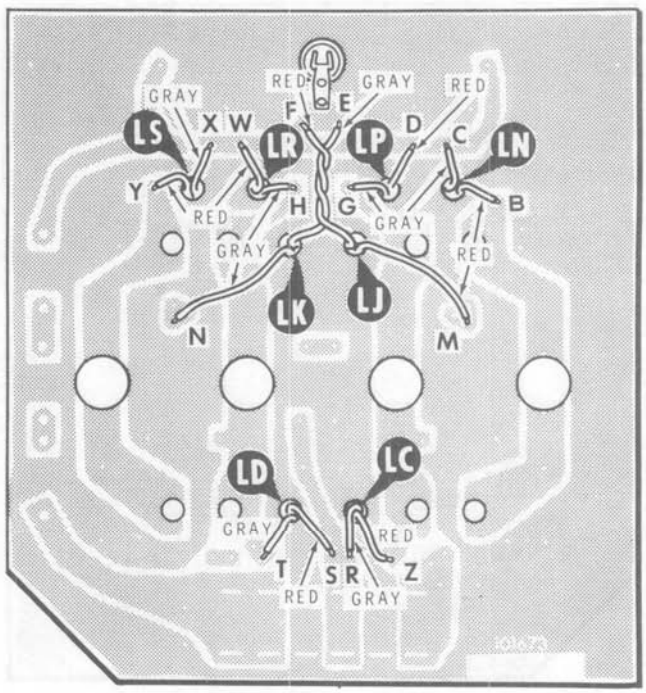
( ) Use a 4" twisted pair of wires at LR and LS.

( ) C958 and C964: Install two .01 μF disc capacitors between the large and small circuit boards as shown in the Pictorial. Solder the four leads to the circuit board foils and cut off the excess lead lengths.





Detail 11-5E



PICTORIAL 11-6

Refer to Pictorial 11-6 for the following steps.

NOTES:

1. In the following steps, circuit board holes are identified on the component side of the board. When you connect a wire in these steps, push the wire end into the hole from the foil side and solder the wire to the foil. Then cut any excess wire ends from the top of the board. Trim the wires to length, if necessary.

2. Each wire to be soldered in this Pictorial is bent over the sharp edge of a circuit board hole. Before you solder each lead, be sure there is a small amount of clearance between the wire insulation and the edge of the hole so the soldering heat will not soften the insulation and possibly cause a short circuit.

( ) Connect the red wire coming from LC to hole Z (S-1).

( ) Connect the gray wire coming from LC to hole R (S-1).

( ) Connect the red wire coming from LD to hole S (S-1).

( ) Connect the gray wire coming from LD to hole T (S-1).

( ) Connect the red wire coming from LJ to hole M (S-1).

( ) Connect the gray wire coming from LK to hole N (S-1).

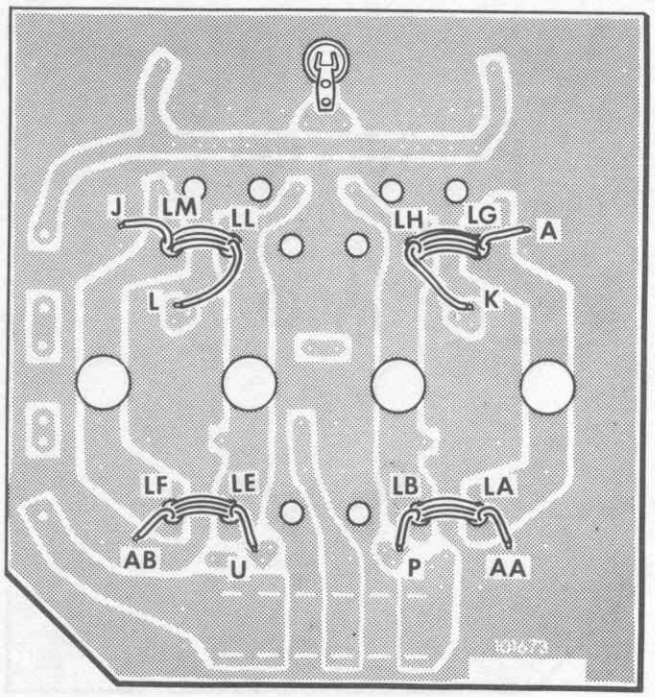
( ) Twist the remaining two wires coming from LK and LJ together. Connect the red wire to F (S-1) and the gray wire to E (S-1).

( ) Connect the gray wire coming from LN to hole C (S-1) and the red wire to hole B (S-1).

( ) Connect the gray wire coming from LP to hole G (S-1) and the red wire to hole D (S-1).

( ) Connect the gray wire coming from LR to hole H (S-1) and the red wire to hole W (S-1).

( ) Connect the gray wire coming from LS to hole X (S-1) and the red wire to hole Y (S-1).



PICTORIAL 11-7

Refer to Pictorial 11-7 for the following steps.

IMPORTANT: In the following steps you will be instructed to form coils with stranded white wire and to install four power transistors. This is a critical phase in the construction. Failure in this area can result in a Transceiver which does not operate and in costly replacement of the power transistors. The construction steps are not difficult but they must be followed carefully. (The Heath warranty does not cover incorrect assembly.)

NOTES:

1. You will "prepare" a wire by removing 1/4" of insulation from each end. The insulation used on this wire is very tough and you may find it difficult to remove. Use a very sharp knife but be careful not to nick the fine strands of wire underneath.

2. So there is no chance of creating a short circuit:

   A. Let the insulation on a wire extend at least to the edge of the foil pad to which the wire is soldered.

   B. Do not pull the wire tightly against the edge of a brass tube; this eventually might cut through the insulation.

   C. Inspect the bare ends of each wire very carefully for stray strands of fine wire which could touch some other wire or foil pad.

( ) Prepare the following lengths of stranded white wire:

10" 19"
10" 19"

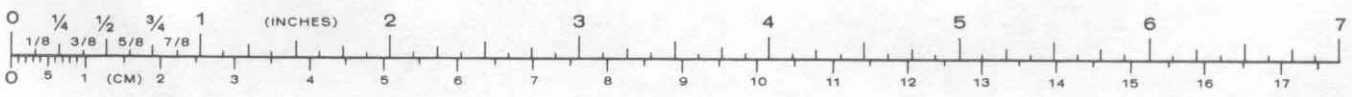
( ) Connect one end of a 10" stranded white wire to hole AB (S-1). Pass the free end of this wire upward through tube LF. From the top of the board, pass the end of the wire down through tube LE; then again upward through LF. Continue in this manner until there are four complete turns of wire across the top of transformer L952. Connect the end of the wire coming from tube LE to hole U (S-1). Adjust the wire turns to take up any excess wire length.

( ) Connect one end of a 10" stranded white wire to hole AA (S-1). In the same manner as in the last step, wrap four complete turns of wire through tubes LA and LB. Connect the end of the wire to hole P (S-1).

( ) Connect one end of a 19" stranded white wire to hole J (S-1). Wrap five complete turns of wire through tubes LM and LL. Connect the end of the wire to hole L (S-1).

( ) Connect one end of a 19" stranded white wire to hole A (S-1). Wrap five complete turns of wire through tubes LG and LH. Connect the end of the wires to hole K (S-1).

IMPORTANT: In the following steps you will install four power transistors on the circuit board. It is very important that the entire surface of each of the four leads is flat against the surface of the board. Use a screwdriver, for example, to hold the lead flat against the board until the solder cools.



TRANSISTOR INSTALLATION

START

IMPORTANT: If the power transistors furnished (#417-831) are type CTC CD-2664A, install them as shown in this Pictorial. If the transistors furnished are type 2N6456, proceed to Pictorial 11-9 and disregard this Pictorial.

Study the following steps carefully and have in mind just what is to be done and how you will do it. Only then should you perform the steps.

( ) Turn the circuit board foil-side-up so the board part number is in the position shown.

NOTES:

1. Handle power transistors with care, particularly the studs.

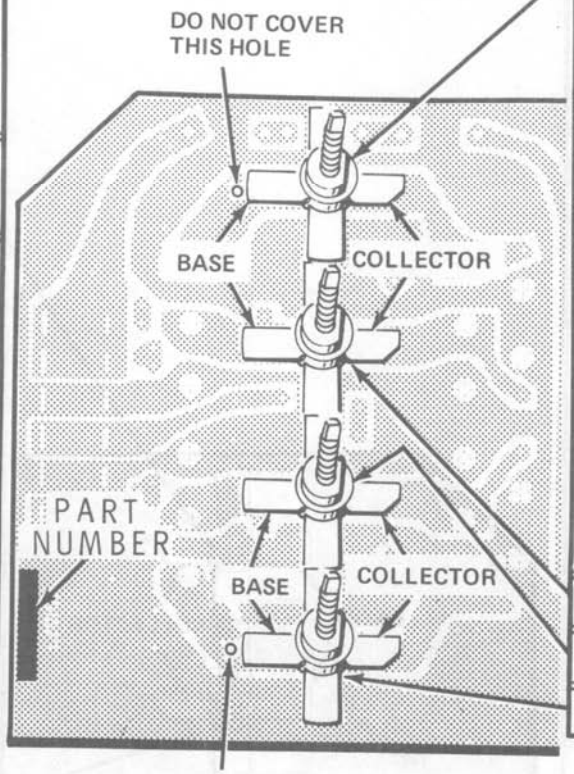
2. Before you solder transistor leads:

   A. Make sure the white body is centered in its circuit board hole.

   B. Make sure the base lead does not cover the holes indicated in the Pictorial. Trim the base lead as necessary to clear the hole.

   C. Push the leads against the circuit board foil. When soldering, run the solder along the edges of the leads as close as possible to the transistor body. It may help to press the lead against the circuit board foil with a screwdriver blade until the solder hardens.

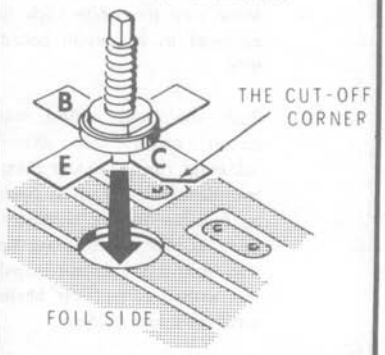
3. When you are instructed to tighten a nut "finger tight," it means to tighten that nut with your fingers as much as possible. It does not mean to leave the nut loose, nor does it mean to use a wrench.



PICTORIAL 11-8

CONTINUE

( ) Q954: From the foil side of the circuit board, place the round, white, top portion of a CTC CD-2664A transistor into the hole shown. Position the lead with the cutoff corner so it points in the same direction as the letter C on the top of the board. Form the leads down against the foil for as much of their length as possible. Make sure each transistor stud is perpendicular to the circuit board. Then solder each lead to the foil. Carry the solder up as close as possible to the transistor body to reduce the effective length of the leads.



( ) Q953: CTC CD-2664A transistor.

( ) Q952: CTC CD-2664A transistor.

( ) Q951: CTC CD-2664A transistor.

Proceed to Pictorial 11-10 on Page 155.

START

IMPORTANT: Follow this Pictorial ONLY if you were furnished type 2N6456 transistors (#417-831).

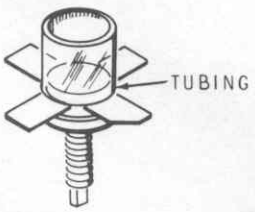
Study the following steps carefully and have in mind just what is to be done and how you will do it. Only then should you perform the steps.

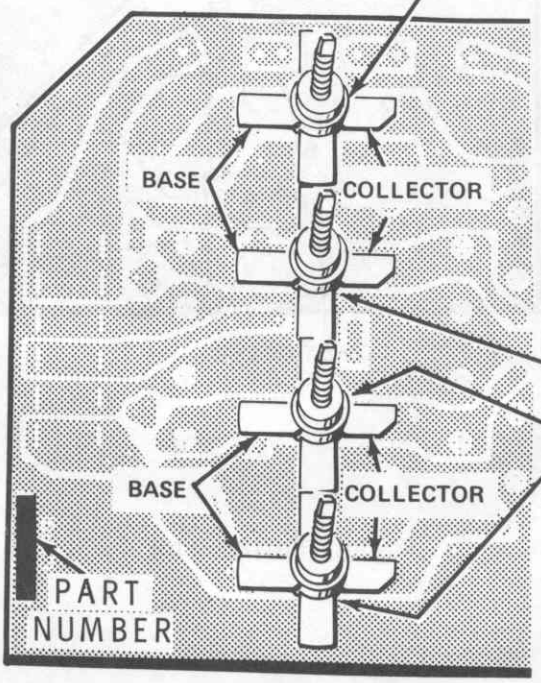
NOTES:

1. Handle power transistors with care, particularly the studs.
2. Before you solder transistor leads:
   A. Make sure the white body is centered in its circuit board hole.
   B. Push the leads against the circuit board foil. When soldering, run the solder along the edges of the leads as close as possible to the transistor body. It may help to press the lead against the circuit board foil with a screwdriver blade until the solder hardens.
3. When you are instructed to tighten a nut "finger tight," it means to tighten that nut with your fingers as much as possible. It does not mean to leave the nut loose, nor does it mean to use a wrench.

( ) Cut a 1" piece of clear plastic tubing.

( ) Carefully stretch one end of the plastic tubing over the top of a transistor.

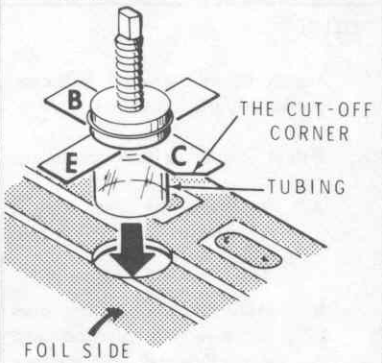




CONTINUE

( ) Turn the circuit board foil-side-up so the part number is in the position shown.

( ) Q954: From the foil side of the circuit board, push the tubing and then the transistor into the hole shown. Position the lead with the cutoff corner so it points to the letter C on the top of the board. Form the leads down against the foil for as much of their length as possible. Make sure the transistor stud is perpendicular to the circuit board. Then solder each lead to the foil. Carry the solder up as close as possible to the transistor body to reduce the effective length of the leads.



( ) Remove the tubing for use with the remaining three transistors.

NOTE: Install the following transistors as before.

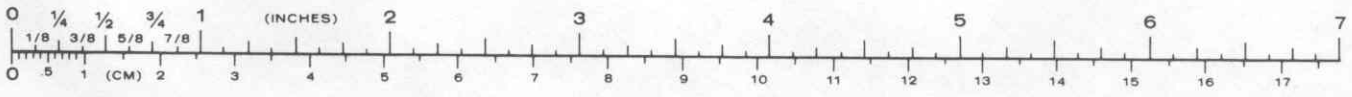
( ) Q953: 2N6456 transistor.

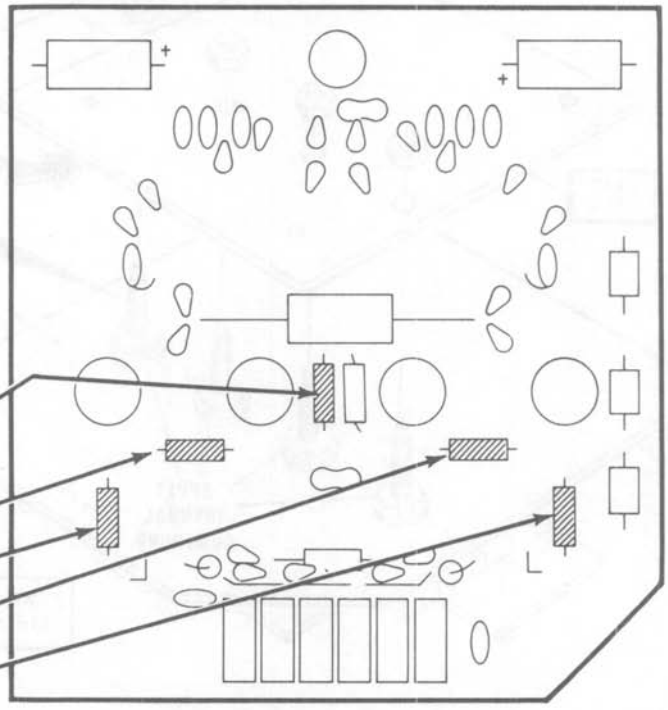
( ) Q952: 2N6456 transistor.

( ) Q951: 2N6456 transistor.

Proceed to Pictorial 11-10.

PICTORIAL 11-9





START

( ) Five 10 Ω (brown-black-black) resistors.
R951. . . . . .
R955. . . . . .
R953. . . . . .
R957. . . . . .
R958. . . . . .

( ) Solder the leads to the foil and cut off the excess lead lengths.

Circuit Board Checkout

Carefully inspect the circuit board for the following conditions.

( ) Unsoldered connections.

( ) "Cold" solder connections.

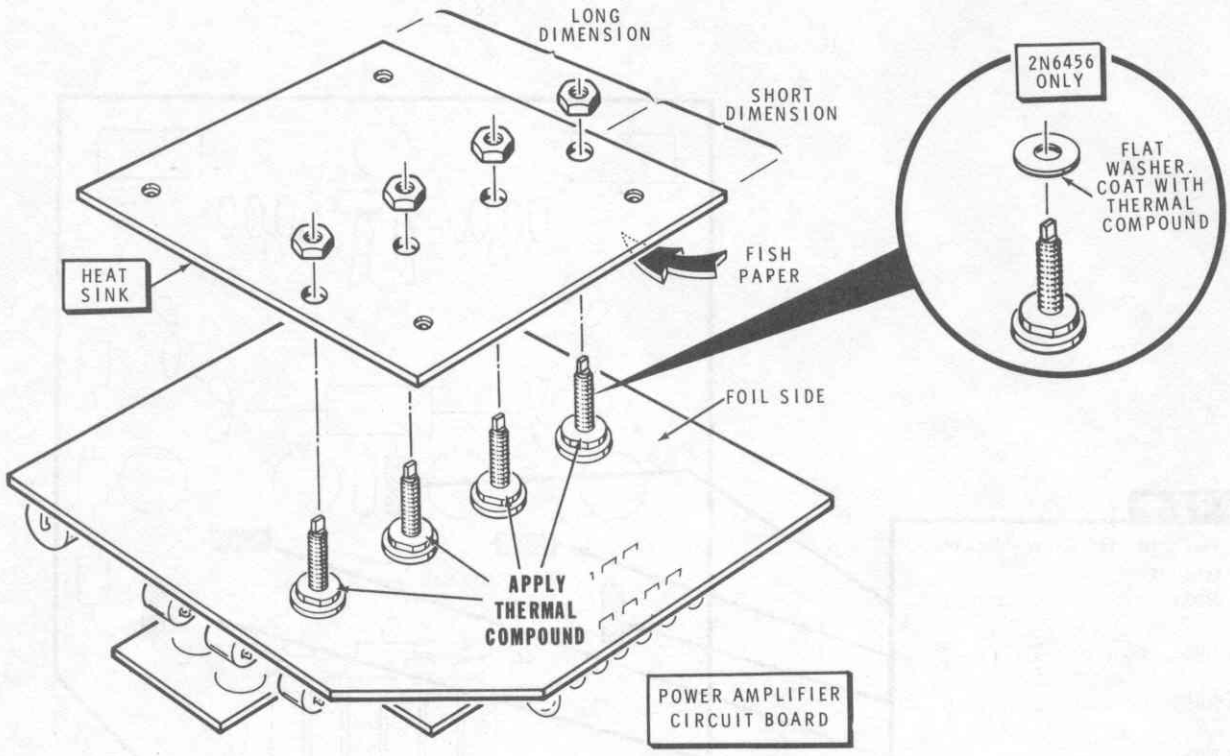
( ) Solder bridges between foil patterns.

( ) Protruding leads. No lead should be more than 1/8".

( ) Transistors for the proper type and installation.

( ) Electrolytic capacitors for the correct position of the positive (+) end.

PICTORIAL 11-10



PICTORIAL 11-11

Refer to Pictorial 11-11 for the following steps.

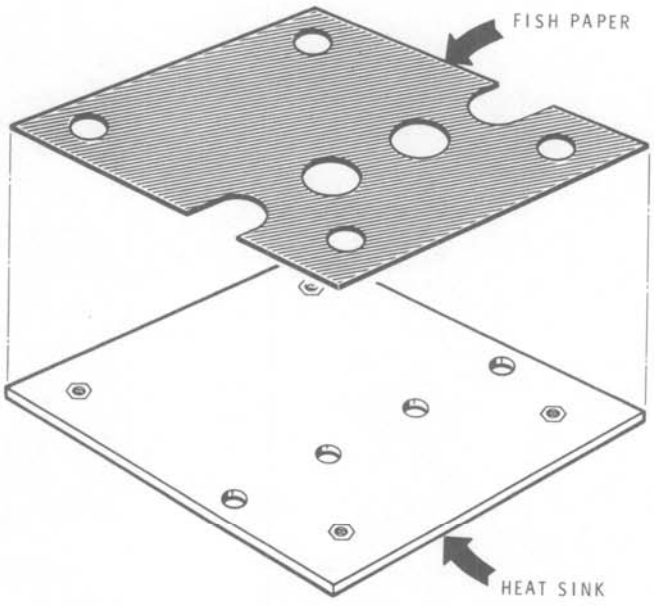
WARNING: You will be using Dow Corning 340 thermal heat sink compound in the next step and in several other steps in the Manual. Although the compound is not caustic, it may cause temporary discomfort if it gets into your eyes. If this happens, rinse your eyes with warm water. If the compound gets into your clothing, the clothing may require professional cleaning. The compound contains Zinc Oxides, SiO_2, and slight traces of CO_2.

( ) Place a liberal amount of thermal compound on the shoulders of the four power transistors as shown in the Pictorial.

NOTE: Perform the following step ONLY if you have 2N6456 power transistors.

( ) Place the four flat washers over the transistor studs. Then liberally coat these washers with thermal compound.

( ) Refer to Detail 11-11A and remove the protective covering from the fish paper. Center the fish paper holes over the heat sink holes and press the adhesive side of the fish paper onto the back of the heat sink as shown. Be sure the hexagonal part of each of the four captive nuts is toward the fish paper.



Detail 11-11A

NOTE: When you mount the heat sink on the transistor studs in the following steps, position the gray fish paper side of the heat sink toward the circuit board foil.

( ) Place the heat sink onto the four transistor studs as shown. Use the nuts provided with the transistors. If no nuts were packed with the transistors, use 8-32 nuts with 2N6456 transistors, or 10-32 nuts with CD-2664A transistors. Turn the nuts as tightly as you can with your fingers ONLY.

Detail 11-11B

( ) Sight between the heat sink and the circuit board to make sure there are no long leads which can touch the back of the heat sink and cause a short circuit. Remove the heat sink and trim any long leads.

( ) Refer to Detail 11-11B and hold the wrench flats on the end of the transistor stud with pliers to keep the transistor stud from turning. Then tighten each mounting nut 1/8 turn more with a wrench.

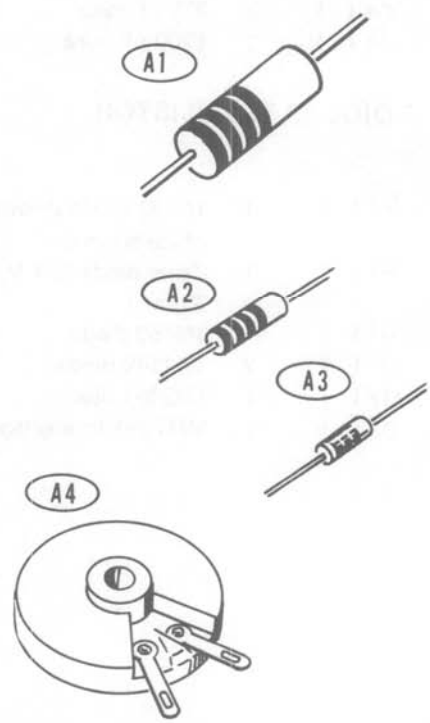
This completes the step-by-step assembly of your power amplifier circuit board. Set it aside temporarily.

CHASSIS ASSEMBLY

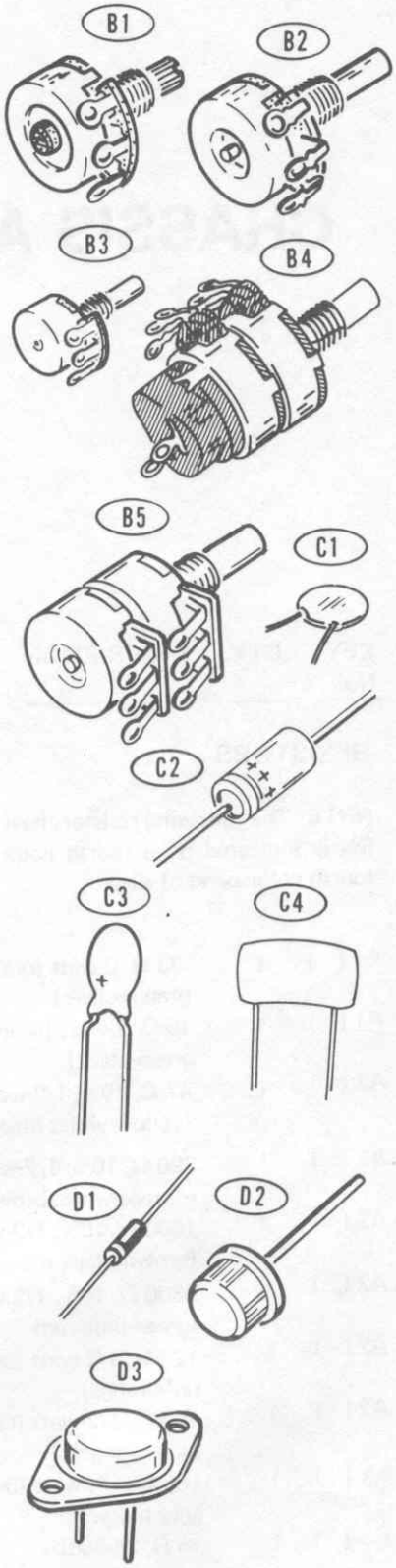
PARTS LIST

Check each of the remaining parts against the following list. Make a check (✓) in the space provided as you identify each part. Return any part that is packed in an individual envelope with the part number on it back in the envelope after you identify it until it is called for in a step. Do not throw away any packing materials until all parts are accounted for.

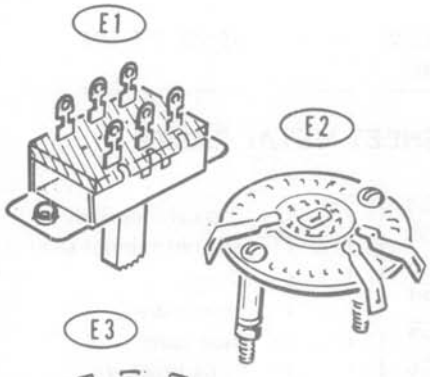
KEY No.	QTY.	DESCRIPTION	PART No.	CIRCUIT Component No.
RESISTORS				
NOTE: The following resistors have a 5% tolerance unless otherwise noted. 5% is indicated by a fourth color band of gold. 10% is indicated by a fourth color band of silver.				
A1 ( )	1	.33 Ω, 2-watt (orange-orange-silver)	3-2-2	R6
A1 ( )	1	15 Ω, 1-watt (brown-green-black)	1-12-1	R11
A2 ( )	1	47 Ω, 10%, 1/2-watt (yellow-violet-black)	1-1	RF Det.
A2 ( )	1	390 Ω, 10%, 1/2-watt (orange-white-brown)	1-48	R18
A2 ( )	2	1000 Ω, 10%, 1/2-watt (brown-black-red)	1-9	R19,R21
A2 ( )	1	5600 Ω, 10%, 1/2-watt (green-blue-red)	1-18	R16
A2 ( )	1	12 kΩ, 1/2-watt (brown-red-orange)	1-109	R17
A2 ( )	1	16 kΩ, 1/2-watt (brown-blue-orange)	1-177	R12
A3 ( )	1	180 Ω, 1/4-watt (brown-gray-brown)	1-61-12	R5
A4 ( )	1	16 Ω, 24-watt	3-3-24	R14

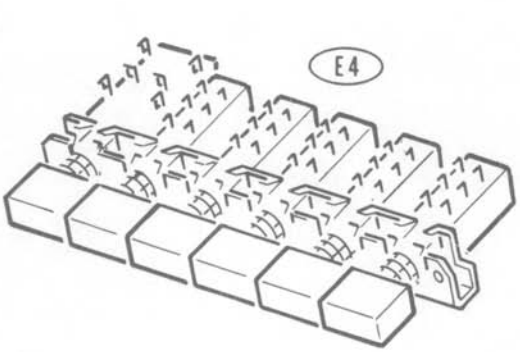


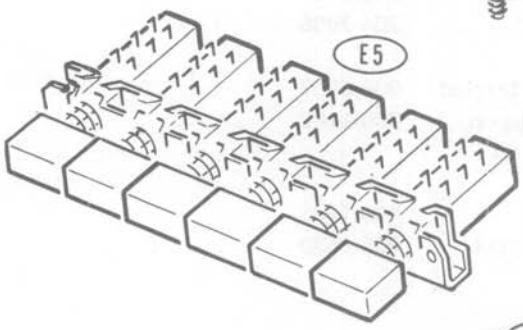
KEY No.	QTY.	DESCRIPTION	PART No.	CIRCUIT Component No.
CONTROLS				
B1 ( )	2	10 kΩ, .12-watt control	10-88	R7, R8
B2 ( )	1	10 kΩ, .5-watt control	10-31	R9
B3 ( )	2	100 kΩ, .3-watt control	10-995	R1, R3
B4 ( )	1	10 kΩ/10 kΩ dual control with switch	14-16	R15/SW6
B5 ( )	1	200 kΩ/1500 Ω dual control	12-138	R2
CAPACITORS				
C1 ( )	1	18 pF disc	21-60	Test
C1 ( )	1	220 pF disc	21-22	C12
C1 ( )	1	.001 μF disc	21-140	C14
C1 ( )	4	.01 μF disc	21-176	C5, C11, C18, RF Det.
C1 ( )	2	.1 μF, 10 V disc	21-95	C4, RF Det.
C1 ( )	1	.1 μF, 100 V disc	21-195	C17
C2 ( )	1	3.5 μF electrolytic	25-129	C16
C2 ( )	1	10 μF electrolytic	25-54	C1
C2 ( )	2	500 μF electrolytic	25-157	C13, C15
C2 ( )	1	1000 μF electrolytic	25-111	C6
C3 ( )	2	47 μF tantalum	25-223	C2, C3
C4 ( )	2	255 pF mica	20-126	C7, C9
C4 ( )	1	1300 pF mica	20-127	C8
DIODES-TRANSISTOR				
D1 ( )	1	1N191 diode (brown-white-brown)	56-26	RF Det.
D1 ( )	1	Zener diode (9.1 V, 25 mA)	56-19	ZD1
D1 ( )	1	1N458 diode	56-24	D4
D1 ( )	2	1N4149 diode	56-56	D2, D3
D2 ( )	1	1N3491 diode	57-34	D1
D3 ( )	1	MHT2910 transistor	417-162	Q1

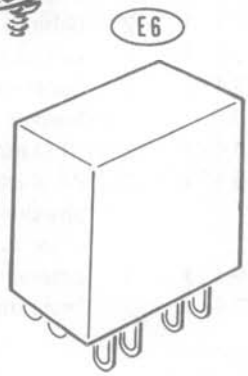


KEY No.	QTY.	DESCRIPTION	PART No.	CIRCUIT Component No.
SWITCHES-RELAY-DETENTS				
E1 ( )	1	DPDT slide switch	60-2	SW5
E2 ( )	1	3-lug wafer switch	63-722	SW4
E3 ( )	1	12-lug wafer switch	63-1236	SW1
E4 ( )	1	Pushbutton switch	64-673	SW3
E5 ( )	1	Pushbutton switch	64-674	SW2
E6 ( )	1	Relay	69-72	RY
E7 ( )	1	3-position detent	266-219	
E7 ( )	1	9-position detent	266-160	

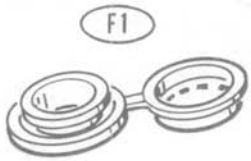


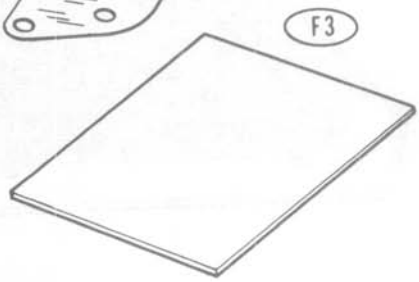






INSULATORS			
F1 ( )	4	Plastic grommet	73-45
F2 ( )	1	Transistor socket insulator	75-44
F3 ( )	1	Fish paper (2" x 1-3/4")	75-108

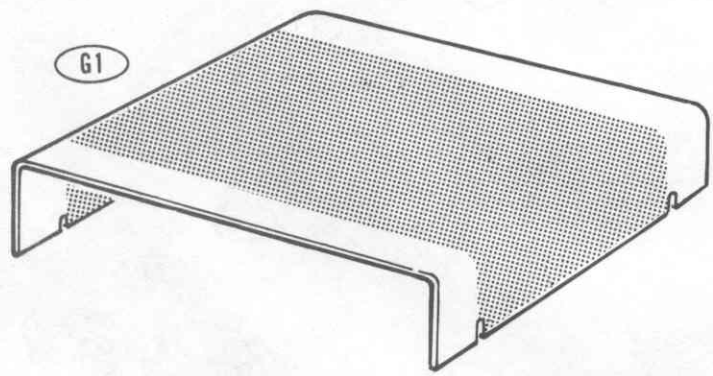


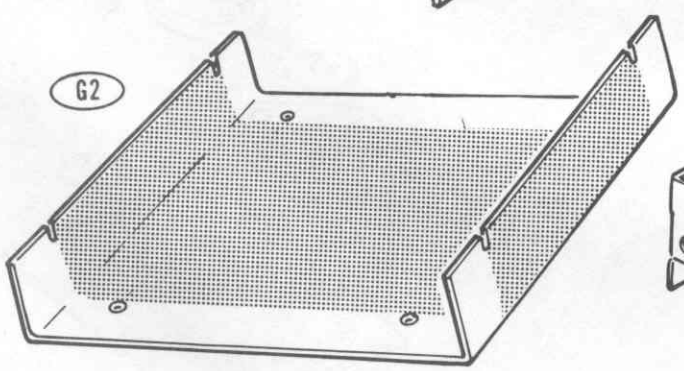


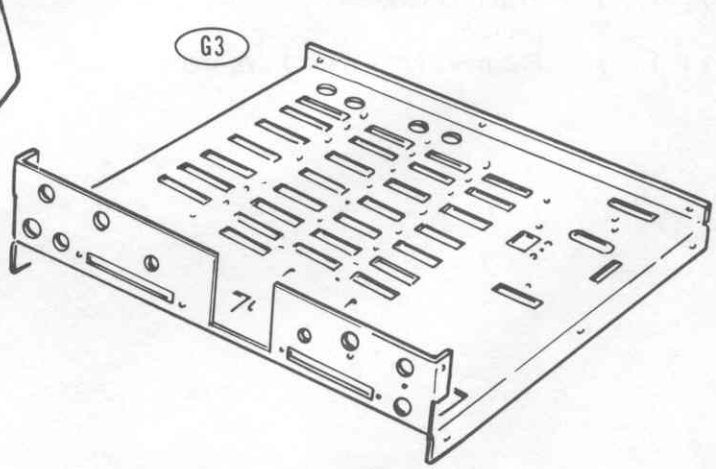
KEY No.	QTY.	DESCRIPTION	PART No.	CIRCUIT Component No.

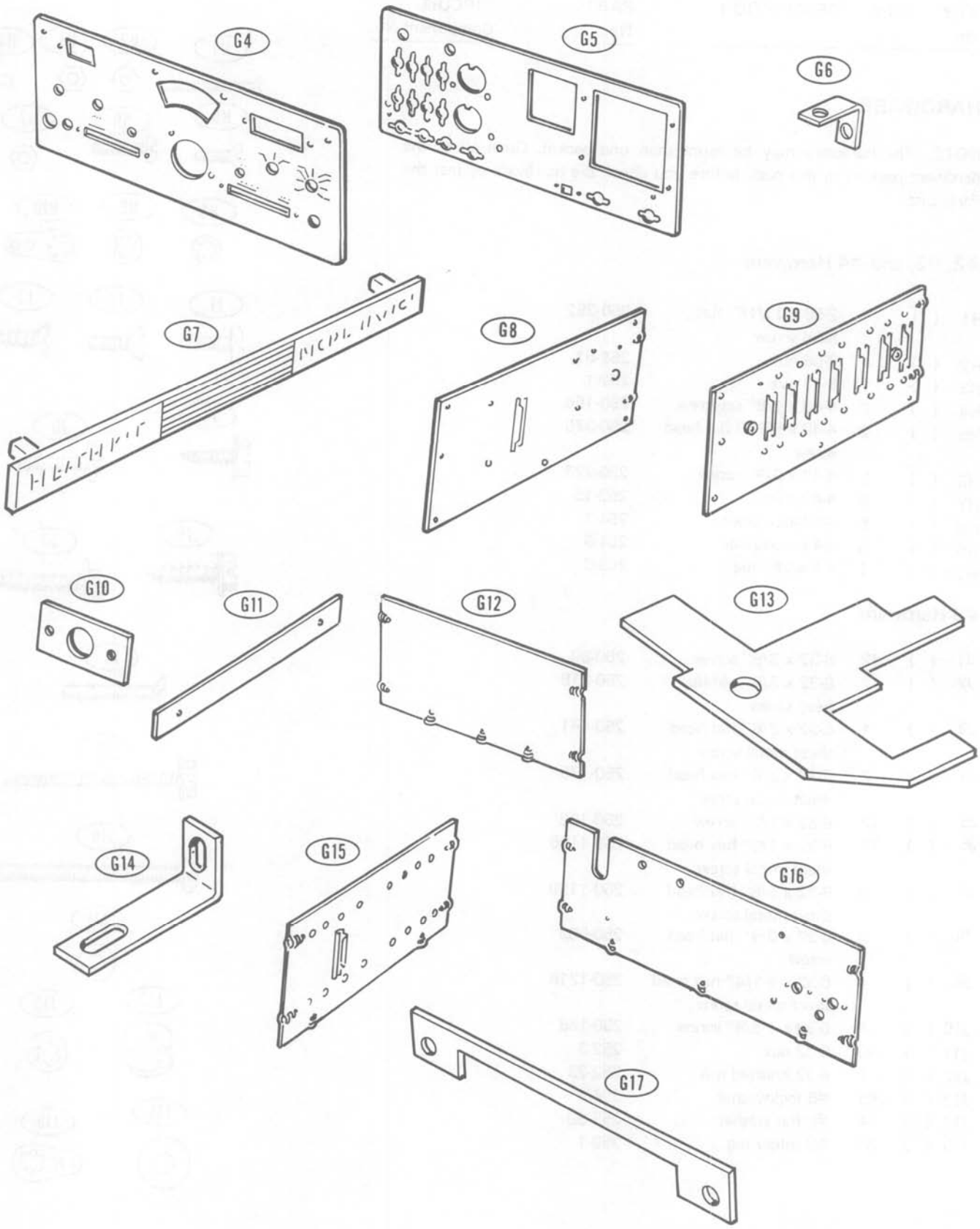
SHEET METAL PARTS

G1	( )	1	Top cabinet shell	90-1106-2
G2	( )	1	Bottom cabinet shell	90-1107-2
G3	( )	1	Chassis	200-1232
G4	( )	1	Front panel	203-1692-1
G5	( )	1	Rear panel	203-1596-2
G6	( )	2	Panel bracket	204-102
G7	( )	1	Name plate	391-95
G8	( )	1	Right side panel	205-1555
G9	( )	1	Left side panel	205-1556
G10	( )	1	Diode retainer plate	205-1557
G11	( )	2	Cabinet retainer strip	205-1576
G12	( )	7	Circuit board shield	206-1101
G13	( )	1	Meter mounting bracket	204-2085
G14	( )	2	VFO mounting bracket	204-2087
G15	( )	1	PA shield (7 clips on one side, 1 clip on other side)	206-1102
G16	( )	1	Lateral shield	206-1103
G17	( )	2	Dial pointer bracket	205-1630








G4
G5
G6
G7
G8
G9
G10
G11
G12
G13
G14
G15
G16
G17

KEY No.	QTY.	DESCRIPTION	PART No.	CIRCUIT Component No.

HARDWARE

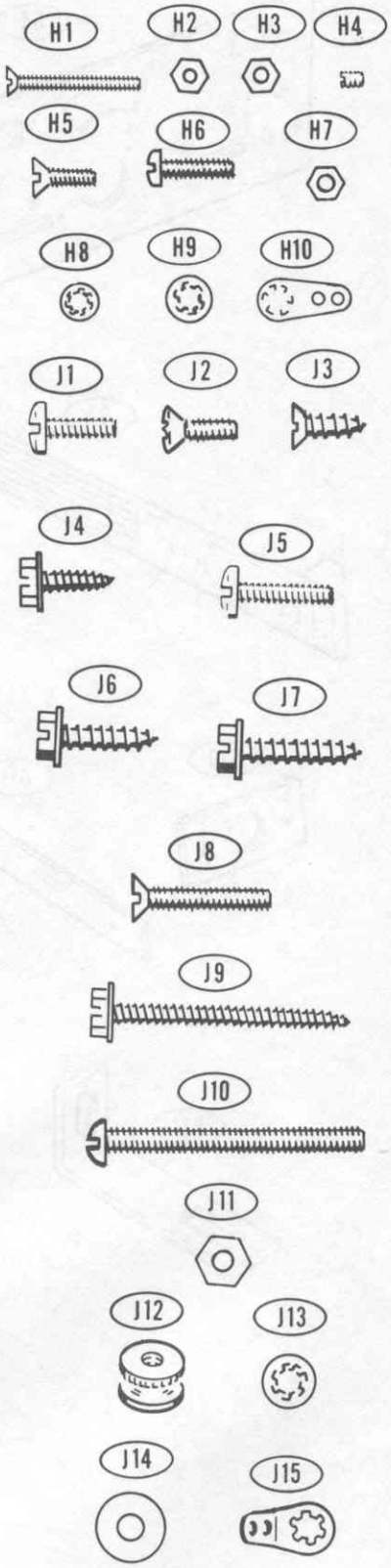
NOTE: The hardware may be more than one packet. Open all of the hardware packets in this pack before you check the hardware against the Parts List.

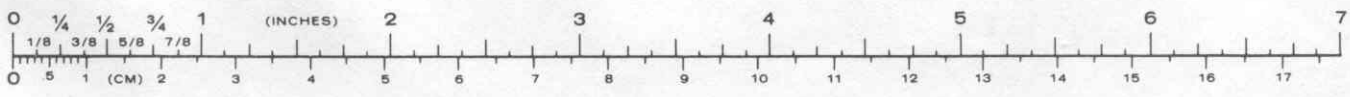
#2, #3, and #4 Hardware

H1	( )	4	2-56 x 11/16" flat head screw	250-352
H2	( )	4	2-56 nut	252-51
H3	( )	1	3-48 nut	252-1
H4	( )	2	4-40 x 1/8" setscrew	250-156
H5	( )	2	4-40 x 5/16" flat head screw	250-375
H6	( )	2	4-40 x 3/8" screw	250-273
H7	( )	8	4-40 nut	252-15
H8	( )	5	#3 lockwasher	254-7
H9	( )	8	#4 lockwasher	254-9
H10	( )	1	#4 solder lug	259-9

#6 Hardware

J1	( )	42	6-32 x 3/8" screw	250-89
J2	( )	2	6-32 x 3/8" phillips head screw	250-218
J3	( )	4	6-32 x 3/8" flat head sheet metal screw	250-441
J4	( )	2	6-32 x 3/8" hex head sheet metal screw	250-475
J5	( )	12	6-32 x 1/2" screw	250-162
J6	( )	72	6-32 x 1/2" hex head sheet metal screw	250-1195
J7	( )	6	6-32 x 5/8" hex head sheet metal screw	250-1199
J8	( )	2	6-32 x 3/4" flat head screw	250-503
J9	( )	4	6-32 x 1-1/4" hex head sheet metal screw	250-1216
J10	( )	2	6-32 x 1-3/8" screw	250-168
J11	( )	46	6-32 nut	252-3
J12	( )	1	6-32 knurled nut	252-23
J13	( )	45	#6 lockwasher	254-1
J14	( )	4	#6 flat washer	253-60
J15	( )	26	#6 solder lug	259-1





KEY No.	QTY.	DESCRIPTION	PART No.	CIRCUIT Component No.

Hardware (cont'd.)

#8 and #10 Hardware

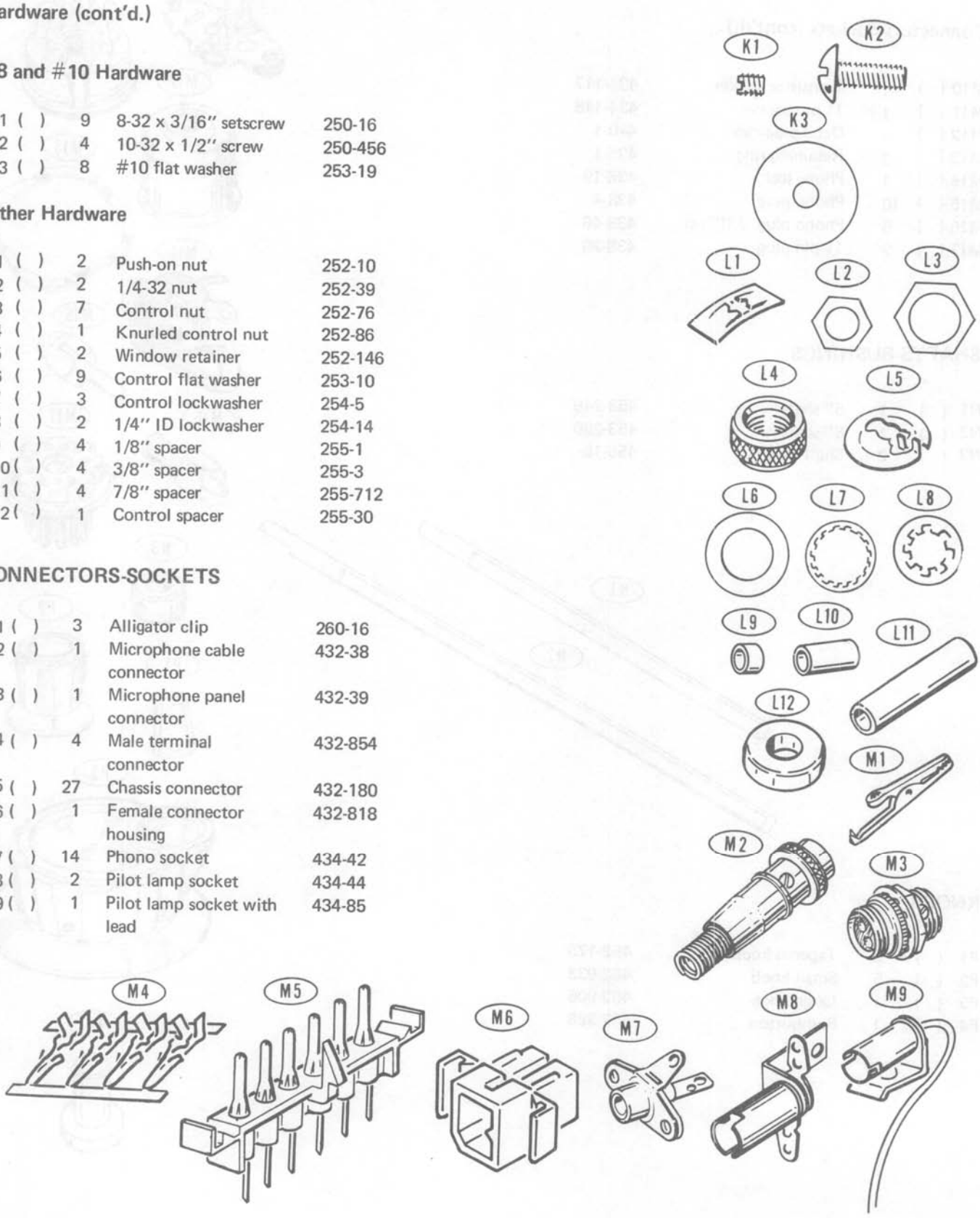
K1 ( )	9	8-32 x 3/16" setscrew	250-16
K2 ( )	4	10-32 x 1/2" screw	250-456
K3 ( )	8	#10 flat washer	253-19

Other Hardware

L1 ( )	2	Push-on nut	252-10
L2 ( )	2	1/4-32 nut	252-39
L3 ( )	7	Control nut	252-76
L4 ( )	1	Knurled control nut	252-86
L5 ( )	2	Window retainer	252-146
L6 ( )	9	Control flat washer	253-10
L7 ( )	3	Control lockwasher	254-5
L8 ( )	2	1/4" ID lockwasher	254-14
L9 ( )	4	1/8" spacer	255-1
L10 ( )	4	3/8" spacer	255-3
L11 ( )	4	7/8" spacer	255-712
L12 ( )	1	Control spacer	255-30

CONNECTORS-SOCKETS

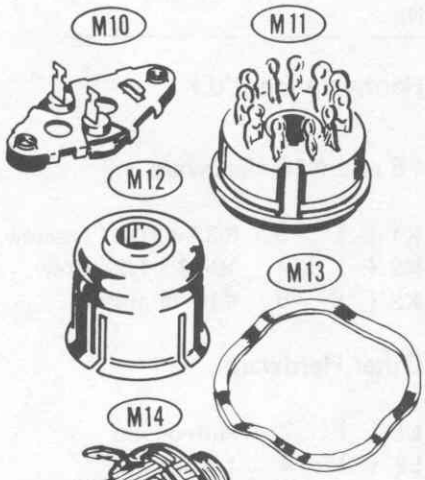
M1 ( )	3	Alligator clip	260-16
M2 ( )	1	Microphone cable connector	432-38
M3 ( )	1	Microphone panel connector	432-39
M4 ( )	4	Male terminal connector	432-854
M5 ( )	27	Chassis connector	432-180
M6 ( )	1	Female connector housing	432-818
M7 ( )	14	Phono socket	434-42
M8 ( )	2	Pilot lamp socket	434-44
M9 ( )	1	Pilot lamp socket with lead	434-85



KEY No.	QTY.	DESCRIPTION	PART No.	CIRCUIT Component No.

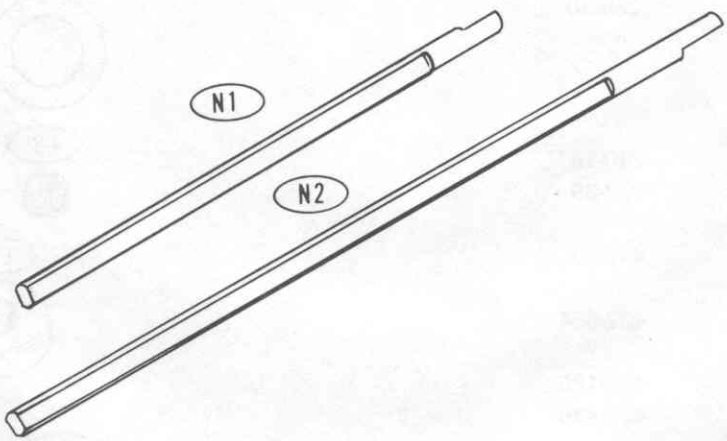
Connectors-Sockets (cont'd.)

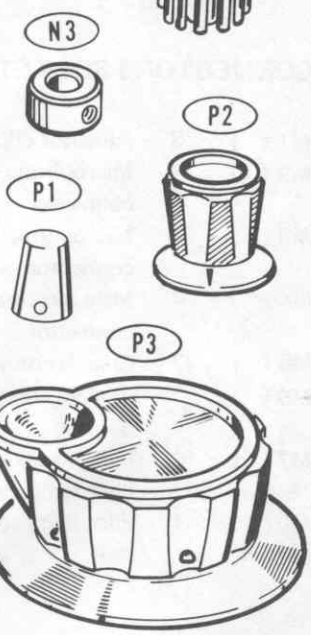
M10 ( )	1	Transistor socket	434-117
M11 ( )	1	11-pin socket	434-118
M12 ( )	1	Octal plug cap	440-1
M13 ( )	2	Retaining ring	435-1
M14 ( )	1	Phone jack	436-19
M15 ( )	10	Phono plug	438-4
M16 ( )	5	Phono plug, 3/8" tip	438-46
M17 ( )	2	11-pin plug	438-29



SHAFTS-BUSHINGS

N1 ( )	1	5" shaft	453-249
N2 ( )	1	8" shaft	453-250
N3 ( )	2	Shaft collar	455-15

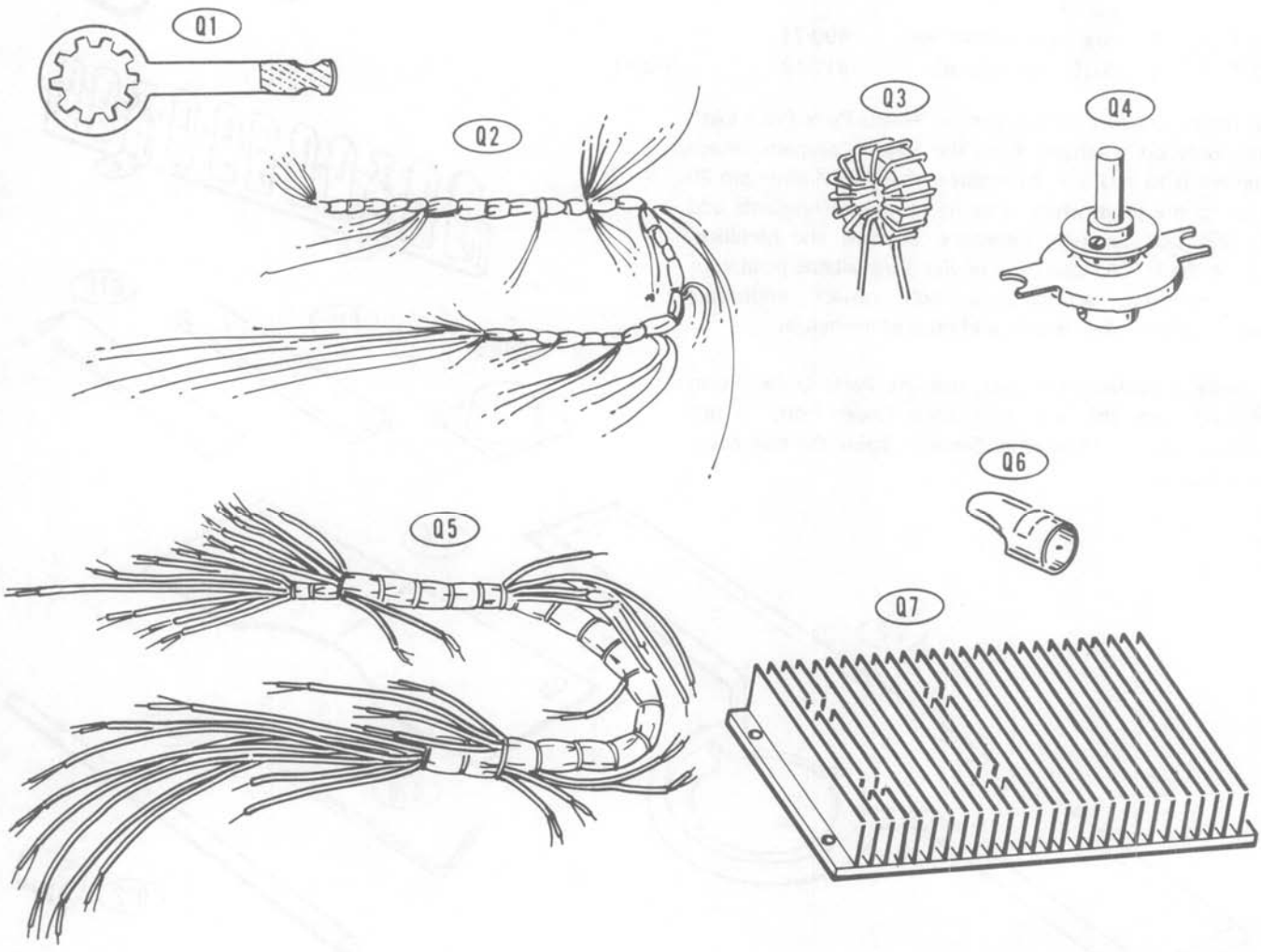




KNOBS

P1 ( )	2	Tapered knob	462-175
P2 ( )	5	Small knob	462-933
P3 ( )	1	Large knob	462-906
P4 ( )	1	Pushbutton	462-288

KEY No.	QTY.	DESCRIPTION	PART No.	CIRCUIT Component No.
MISCELLANEOUS				
Q1 ( )	3	Control solder lug	259-10	
Q2 ( )	1	Wiring harness	134-924	
Q3 ( )	1	0.23 μH toroid coil (blue dot)	40-1862	L2
Q3 ( )	2	1.31 μH toroid coil (green dot)	40-1869	L1, L3
Q4 ( )	1	Vernier drive	100-1608	
Q5 ( )	1	Cable harness	134-886	
Q6 ( )	3	Lamp shield	206-86	
Q7 ( )	1	Heat sink	215-79	



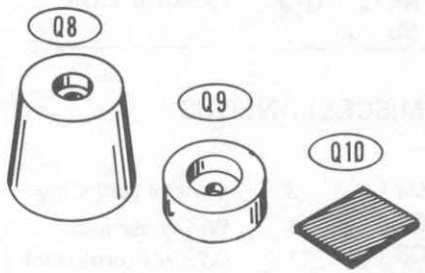
KEY No.	QTY.	DESCRIPTION	PART No.	CIRCUIT Component No.

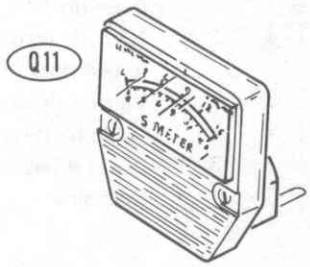
Miscellaneous (cont'd.)

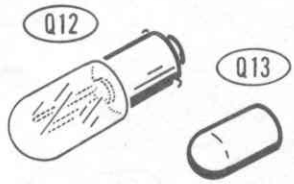
Q8 ( )	2	Tapered foot	255-59	
Q9 ( )	4	Round foot	261-9	
Q10 ( )	1	Square foot	261-41	
Q11 ( )	1	Meter	407-187	
Q12 ( )	3	#1813 lamp	412-58	
Q13 ( )	1	Plastic lens	413-39	
Q14 ( )	2	11-lug terminal strip	431-49	
Q15 ( )	2	Thermal compound	352-31	
Q16 ( )	1	Identification strip (clear)	446-640	
Q17 ( )	1	Diffuser strip (frosted)	446-641	
Q18 ( )	1	Panel window	446-648	
Q19 ( )	1	Dial pointer	463-65	
Q20 ( )	1	Allen wrench	490-23	
( )	1	Circuit board packing carton	380-846	
Q21 ( )	1	Insulated screwdriver	490-71	
Q22 ( )	4	5/16" ferrite beads	417-12	FB(4)

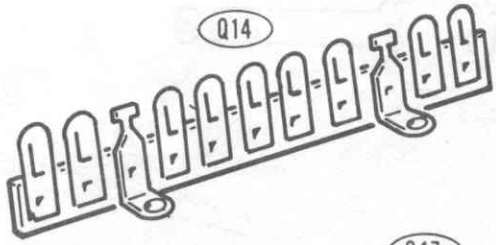
The prices shown on the separate "Heath Parts Price List" apply only on purchases from the Heath Company where shipment is to a U.S.A. destination. Add 10% (minimum 25 cents) to the price when ordering (Michigan residents add 4% sales tax) to cover insurance, postage, and handling. Outside the U.S.A., parts and service are available from your local Heathkit source and will reflect additional transportation, taxes, duties, and rates of exchange.

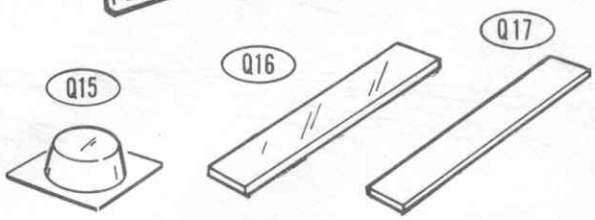
To order a replacement part, use the Parts Order Form furnished with this kit. If a Parts Order Form is not available, refer to "Customer Service" inside the rear cover of this Manual.

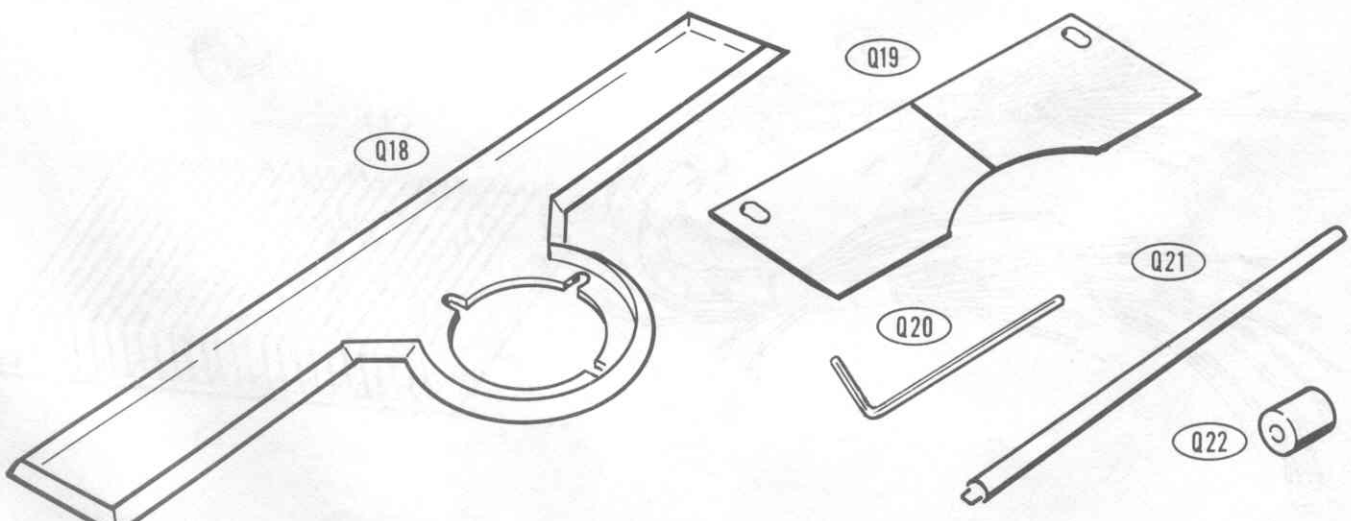




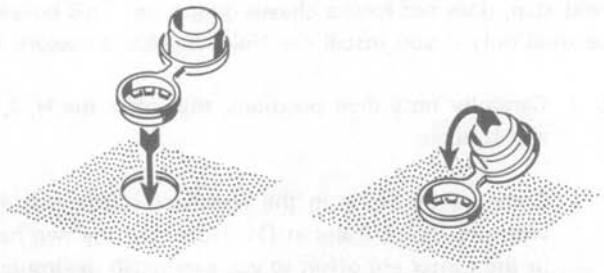








STEP-BY-STEP ASSEMBLY



POSITION THE SMALL PORTION OF THE GROMMET INTO THE CHASSIS HOLE.

BEND THE LARGE PORTION OF THE GROMMET OVER AND INTO THE SMALL PORTION. PRESS IT FIRMLY INTO PLACE.

Detail 12-1A

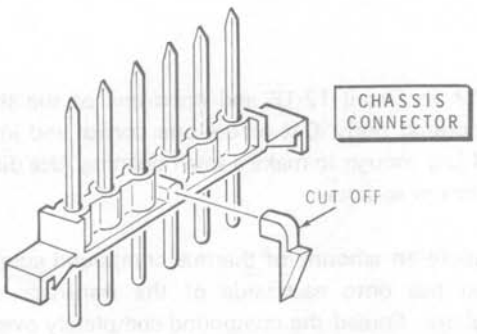
CHASSIS PARTS MOUNTING

Refer to Pictorial 12-1 (in the "Illustration Booklet") for the following steps.

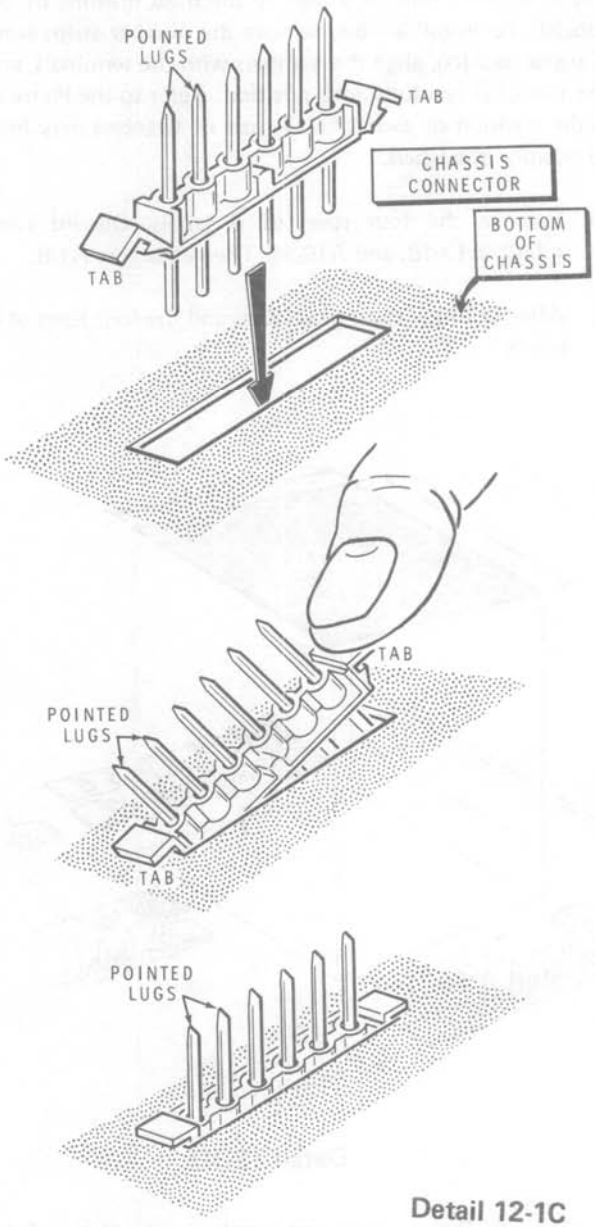
( ) Position the chassis bottom-side-up as shown in the Pictorial.

( ) Refer to Detail 12-1A and install plastic grommets in holes BA, BB, BC, and BD.

( ) Refer to Detail 12-1B and cut the arrow-shaped lug from each of the 27 chassis connectors.



Detail 12-1B



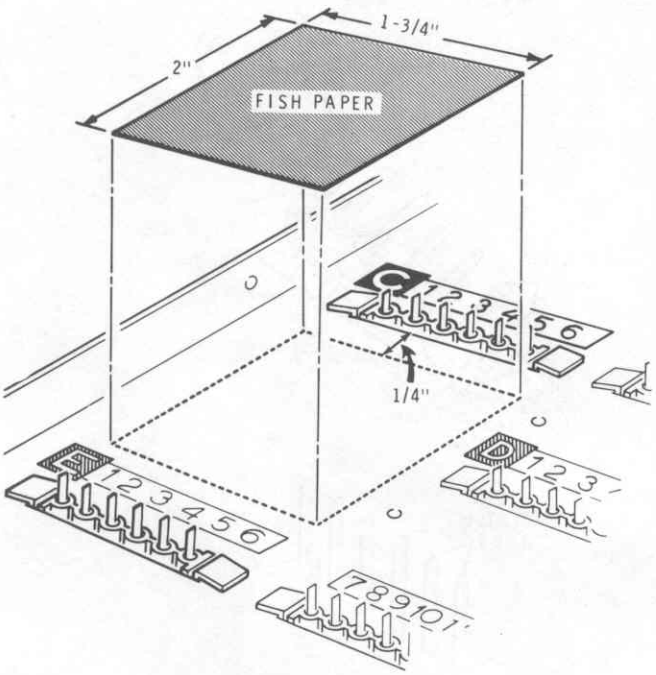
Detail 12-1C

( ) Refer to Detail 12-1C and install the chassis connectors in the 27 indicated rectangular openings in the chassis. Install each connector with the rounded terminals down. Bend the tabs of the connector up, place the slotted tab against one end of the opening, and push the other end of the connector down until it snaps into place (use a screwdriver blade, if necessary).

NOTE: The terminal identification labels, which you will install in the following steps, will positively identify each of the plug-in terminals. It is important that you affix each label at the correct connector and that you align each number with its pins as shown in the inset drawing of the Pictorial. To install a label, remove the number strips from the paper backing, align the numbers with the terminals, and press the label carefully into position. Refer to the Pictorial for the position of each label. A pair of tweezers may help you position the labels.

( ) Remove the four rows of A labels. Discard rows A7-12, A13-18, and A19-24. Then affix row A1-6.

( ) Affix the four rows of B labels and the four rows of C labels.



Detail 12-1D

( ) Refer to Detail 12-1D and install a piece of gray fish paper. Remove and discard the protective covering. Then center the 1-3/4" edge of the paper about 1/4" below connector C1-6, place the adhesive side of the gray paper against the chassis, and rub it into place.

( ) Remove the four rows of D labels. Discard row D19-24. Then affix the other three rows.

( ) Affix the four rows of E labels.

( ) Affix the four rows of F labels.

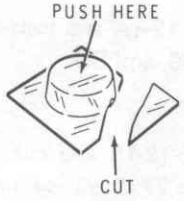
( ) Affix the four rows of G labels.

NOTE: The L label, which you will install at hole AD in the next step, does not have a chassis connector. This hole will be used only if you install the Noise Blanker accessory kit.

( ) Carefully note their positions; then affix the H, J, K, and L labels.

( ) Compare the holes in the transistor socket insulator with the chassis holes at Q1. Note that the two holes in the center are offset so you can install the insulator only one way.

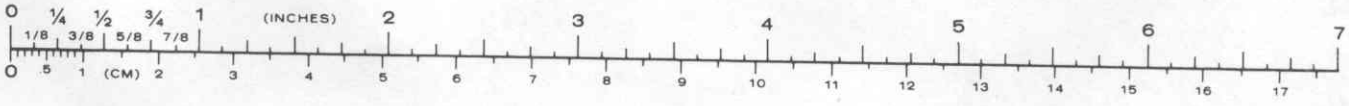
WARNING: You will be using Dow Corning 340 thermal heat sink compound in the next step and in several other steps in the Manual. Although the compound is not caustic, it may cause temporary discomfort if it gets into your eyes. If this happens, rinse your eyes with warm water. If the compound gets into your clothing, the clothing may require professional cleaning. The compound contains Zinc Oxides, SiO_2, and slight traces of CO_2.

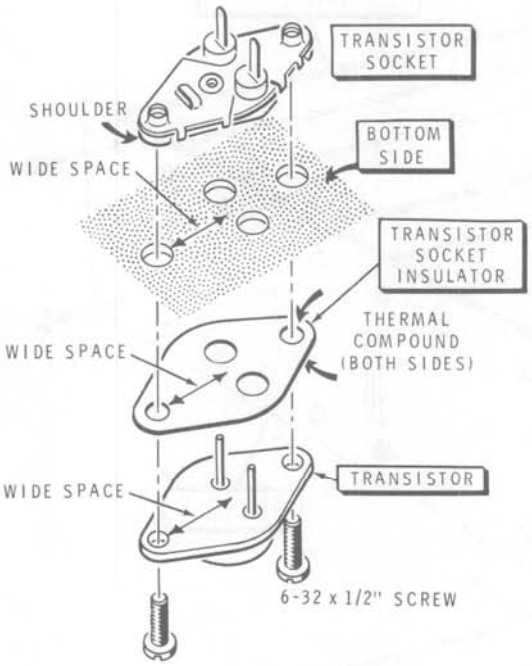


Detail 12-1E

( ) Refer to Detail 12-1E and open one of the thermal compound pods. Cut across one corner and into the pod just enough to make a small opening. Use diagonal cutters or scissors.

( ) Squeeze an amount of thermal compound equal to a small pea onto each side of the transistor socket insulator. Spread the compound completely over both sides of the insulator. Then, on the TOP side of the chassis, place the insulator over the chassis holes at Q1. Make sure the insulator holes are aligned with the chassis holes. WASH YOUR HANDS.





Detail 12-1F

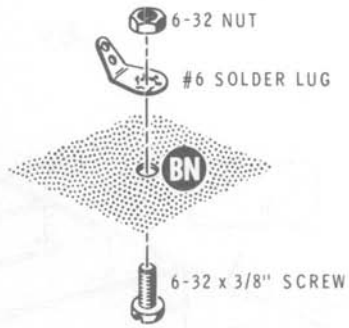
( ) Q1: Refer to Detail 12-1F and mount an MHT9210 transistor (#417-162) on top of the chassis and a transistor socket on the bottom of the chassis at Q1. Use 6-32 x 1/2" screws in the tapped holes of the socket. Make sure the two shoulders around the socket holes fit into the chassis holes.

( ) Wipe the excess thermal compound from the transistor.

( ) Use an ohmmeter to make a resistance check from each pin and from the body of the transistor to the chassis. The ohmmeter should read full scale (infinity) on any range. If it does not, the transistor, the socket, and the insulator should be remounted.

NOTE: When a step calls for hardware, only the screw size will be given. For example, if "6-32 x 3/8" hardware" is called for, it means that you should use a 6-32 x 3/8" screw, one or more #6 lockwashers, and a 6-32 nut at each mounting hole. The Detail referred to in the step will show you the proper number of lockwashers to use.

( ) Refer to Detail 12-1G and mount a #6 solder lug on the bottom of the chassis at BN. Use 6-32 x 3/8" hardware.

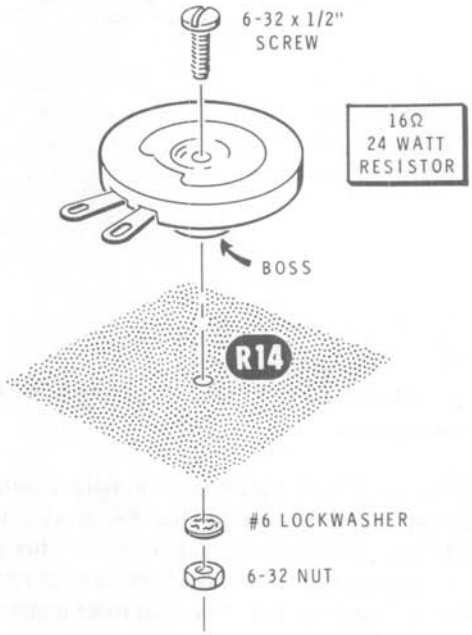


Detail 12-1G

( ) R14: Refer to Detail 12-1H and mount the 16 Ω, 24-watt resistor at R14 with the raised boss toward the chassis. Use 6-32 x 1/2" hardware. DO NOT overtighten the screw, as the resistor body can be broken. Position the resistor lugs as shown in the Pictorial.

( ) Mount two #6 solder lugs at BK. Position the lugs as shown. Use 6-32 x 3/8" hardware.

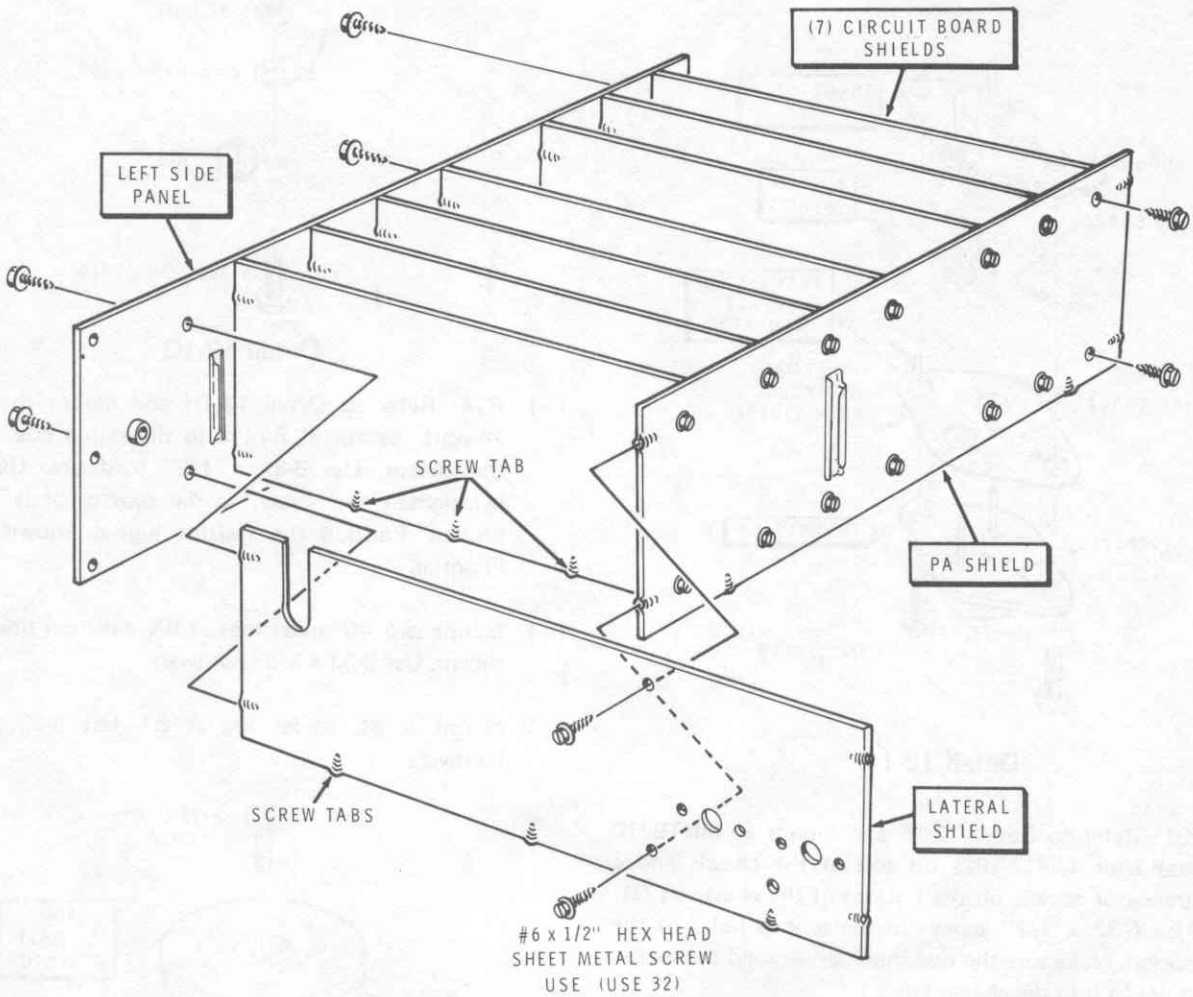
( ) Mount a #6 solder lug at BJ. Use 6-32 x 3/8" hardware.



Detail 12-1H

( ) Cut a 5/8" x 1-1/4" insulator from one of the pieces of fish paper left over from the VFO assembly.

( ) Remove the paper backing from the prepared insulator. Then press the insulator onto the chassis between chassis connectors F19-24 and G19-24 as shown on the Pictorial.



Detail 12-2A

Refer to Pictorial 12-2 (in the "Illustration Booklet") for the following steps.

( ) Refer to Detail 12-2A and loosely assemble seven circuit board shields to the PA shield, the lateral shield, and the left side panel. Be sure the screw tabs on all long edges are on the bottom of the assembly as shown. Use #6 x 1/2" hex head sheet metal screws.

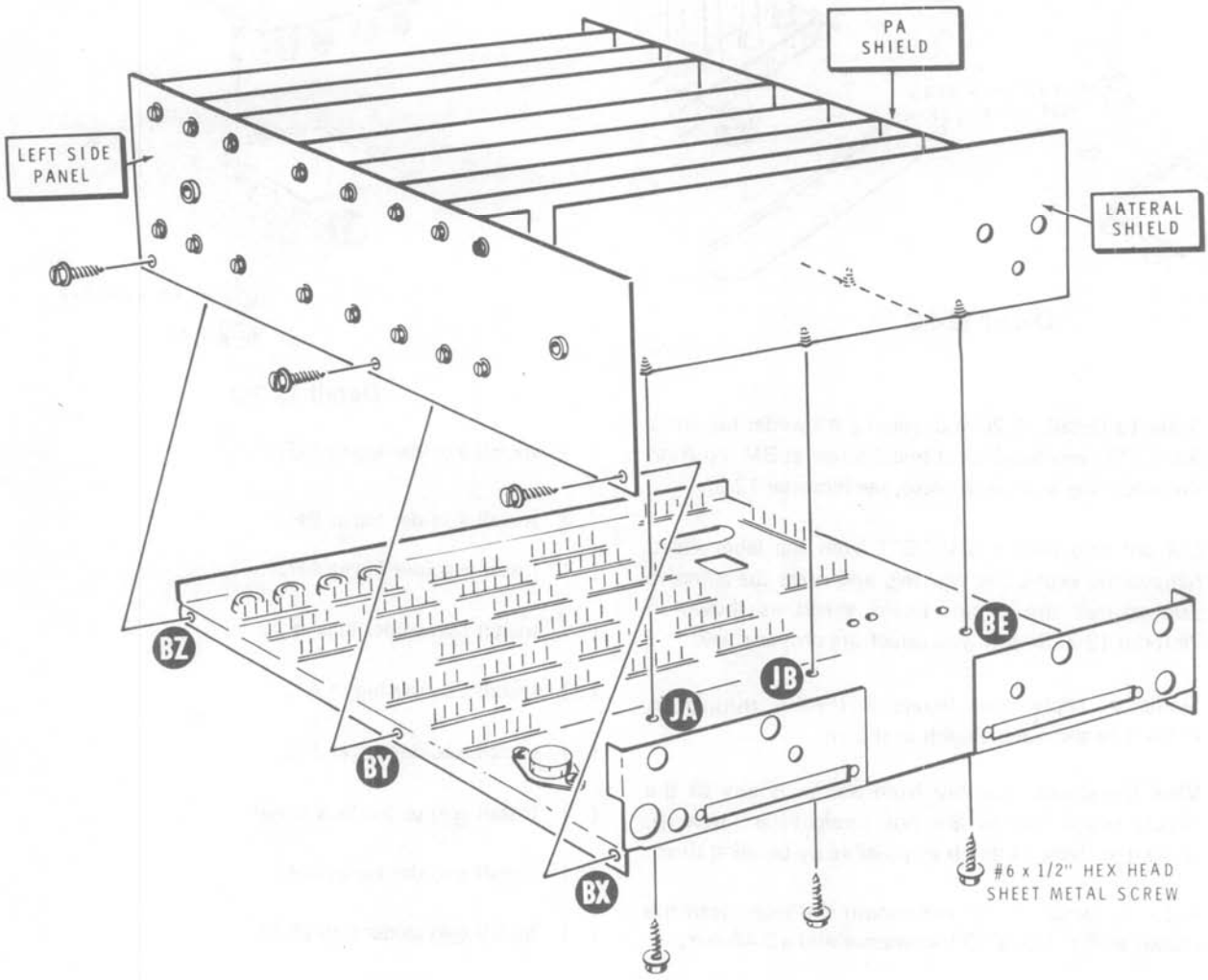
Refer to Detail 12-2B for the next three steps.

( ) Secure the shield assembly to the top of the chassis with 6-32 x 1/2" hex head sheet metal screws at holes BX, BY, and BZ.

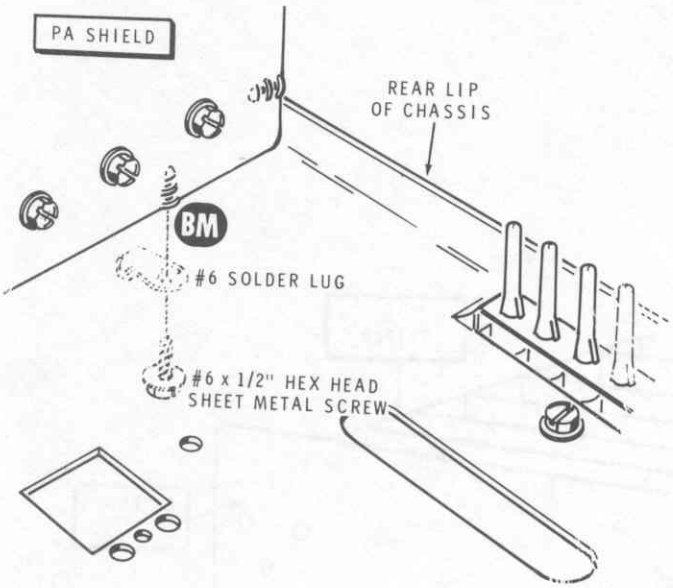
( ) Tighten the shield assembly screws in the following sequence:

1. Left side panel screws except the two holding the lateral shield.
2. All screws in the PA shield.
3. Two screws holding the PA shield to the lateral shield.
4. Two screws holding the lateral shield to the left side panel.

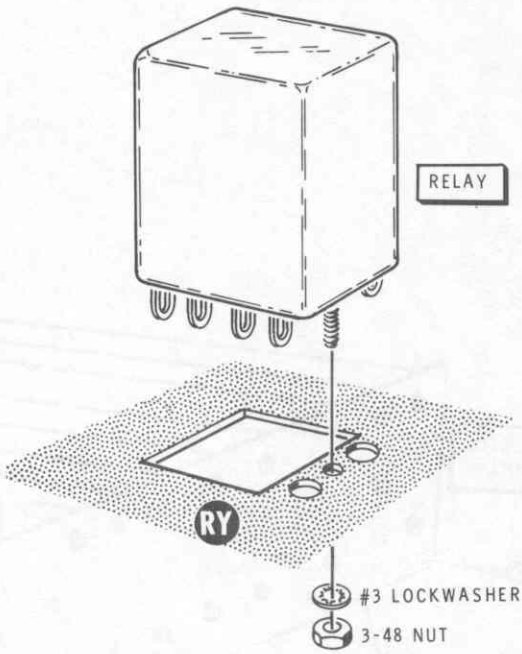
( ) Install #6 x 1/2" hex head sheet metal screws at holes BE, JA, and JB as shown.


PA SHIELD
LEFT SIDE PANEL
LATERAL SHIELD
BZ
BY
BX
JA
JB
BE
#6 x 1/2" HEX HEAD SHEET METAL SCREW

Detail 12-2B



Detail 12-2C



Detail 12-2D

( ) Refer to Detail 12-2C and install a #6 solder lug and a #6 x 1/2" hex head sheet metal screw at BM. Position the solder lug as shown. (Also, see Pictorial 12-3).

( ) Cut out two letters G ("GG") from the label sheet, remove the protective backing, and press the adhesive side against the circuit board shield as shown in Pictorial 12-2. Be sure you select the proper shield.

( ) Similarly, apply two letters F ("FF") through A ("AA") to the other shields as shown.

( ) View the shield assembly from above. If any of the circuit board shields are not straight (are bowed), straighten them as much as possible by bending them.

( ) Refer to Detail 12-2D and mount the relay onto the chassis at RY. Use a #3 lockwasher and a 3-48 nut.

Refer to Pictorial 12-3 (in the "Illustration Booklet") for the following steps.

NOTE: In the following steps, mount the #6 solder lugs with #6 x 1/2" hex head sheet metal screws. Be sure to position each solder lug as shown in the Pictorial.

( ) Install a solder lug at AV.

( ) Install a solder lug at AF.

( ) Install a solder lug at AG.

( ) Install a solder lug at BF.

( ) Install a solder lug at AH.

( ) Install two solder lugs at AJ.

( ) Install a solder lug at AL.

( ) Install a solder lug at AN.

( ) Install two solder lugs at AP.

( ) Install a solder lug at AR.

( ) Install two solder lugs at AS.

( ) Install a solder lug at AT.

( ) Install a solder lug at AU.

( ) Install a solder lug at AW.

( ) Leave holes AE, AK, and AM open, and install #6 x 1/2" hex head sheet metal screws in the remaining five open holes marked with arrows.

( ) Be sure all sheet metal screws are tight.

CHASSIS WIRING

NOTE: When you solder a wire to a terminal of a chassis connector, wrap the end of the wire tightly around the terminal as close to the connector body (or previously installed wire) as possible. Place the tip of your soldering iron against the terminal and the wire and heat them thoroughly. Then apply a small amount of solder to the joint. Be sure that each wire is soldered. Two or more wires may be soldered to one terminal at different times.

( ) Cut the following lengths of small bare wire. Wires are listed in the order in which you will use them.

2"	1-3/4"
1-1/2"	2"
1"	1-3/4"
2-1/4"	1-1/4"
1-3/4"	2-1/2"

Refer to Pictorial 12-4 (in the "Illustration Booklet") for the following steps.

Install small bare wires as follows:

( ) 2" from solder lug AV (NS) to terminal A1 (S-1).

( ) 1-1/2" from solder lug AV (NS) to terminal A3 (S-1).

( ) 1" from solder lug AV (S-3) to terminal A6 (S-1).

( ) 2-1/4" from the lower hole of solder lug AH (NS) to terminal C2 (S-1).

( ) 1-3/4" from the lower hole of solder lug AH (S-2) to terminal C9 (S-1).

( ) 1-3/4" from solder lug AJ (NS) to terminal B22 (S-1).

( ) 2" from solder lug AJ (S-2) to terminal C23 (S-1).

( ) 1-3/4" from solder lug AL (NS) to terminal D3 (S-1).

( ) 1-1/4" from solder lug AL (S-2) to terminal D5 (S-1).

( ) 2-1/2" from solder lug AN (S-1) to terminals D16, D17, and D18. The wire should touch terminals D16 and D17 and encircle D18. Solder the wire to the three terminals.

( ) Cut the following lengths of small bare wire:

2-1/4"	2-1/2"
1-1/2"	2-3/4"

Install small bare wires as follows:

( ) 2-1/4" from the lower hole of solder lug AY (S-1) to terminal E2 (S-1).

( ) 1-1/2" from solder lug AP (S-1) to terminal E8 (S-1).

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

( ) 2-1/2" from terminal F12 (S-1), through the lower hole of solder lug AR (S-2), to terminal F13 (S-1).

( ) 2-3/4" from terminal F18 (S-1), through the lower hole of solder lug AZ (S-2), to terminal F20 (S-1).

( ) Cut the following lengths of small bare wire:

3-1/2"	2-1/2"
1-3/4"	1-1/4"
2-1/2"	1-1/4"

Install small bare wires as follows:

( ) 3-1/2" from terminal E22 (S-1), through the lower hole of solder lug AS (S-2), to terminals F22, F23, and F24. The wire should touch terminals F22 and F23 and should encircle F24. Do not let the wire touch F21. Solder the wire to the three terminals.

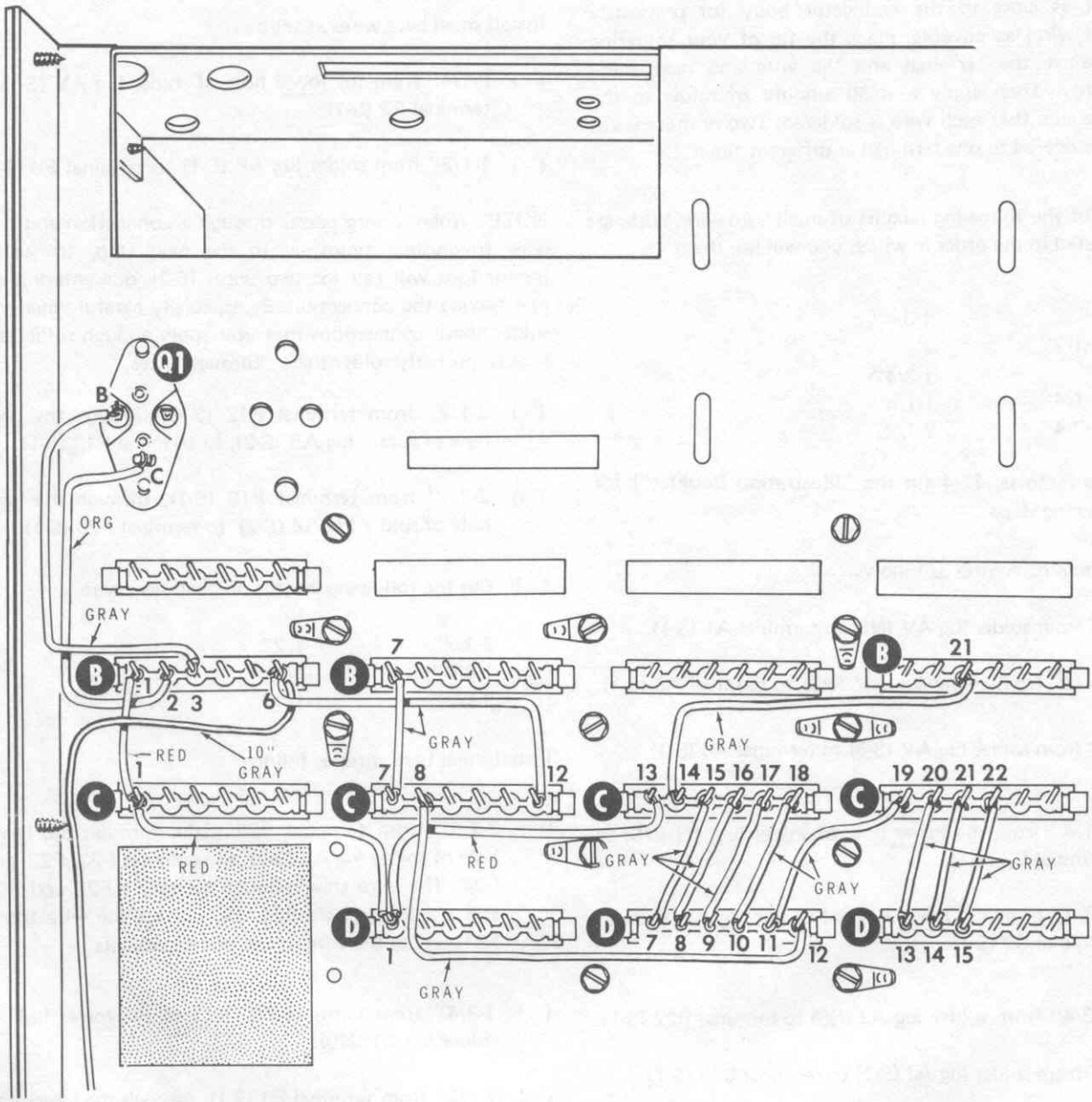
( ) 1-3/4" from terminal F2 (S-1) to the lower hole of solder lug AT (NS).

( ) 2-1/2" from terminal F6 (S-1), through the lower hole of solder lug AT (S-3), to terminal G3 (S-1).

( ) 2-1/2" from terminal G12 (S-1), through solder lug AU (S-2), to terminal G16 (S-1).

( ) 1-1/4" from terminal G19 (S-1) to solder lug AW (S-1). Route this as shown.

( ) 1-1/4" from terminal G23 (S-1) to solder lug BM (S-1). Be sure this wire does not touch terminal G24.



PICTORIAL 12-5

Refer to Pictorial 12-5 for the following steps.

NOTE: When you wire this kit, you will be instructed to prepare lengths of wire ahead of time, as in the following step. To prepare a wire, cut it to the indicated length and remove 1/4" of insulation from each end. The wires are listed in the order in which you will use them.

( ) Prepare the following solid (insulated) wires. NOTE: Do not use the stranded wire unless it is called for.

4" orange	10" gray
4" gray	3-3/4" gray
1-1/2" red	1-1/2" gray
3-3/4" red	4" gray
4" red	

Connect the prepared wires as follows:

( ) 4" orange from Q1 lug C (NS) to terminal B2 (S-1).

( ) 4" gray from Q1 lug B (NS) to terminal B3 (S-1).

NOTE: To avoid the possibility of a missed solder connection, each wire (with a few exceptions) will be soldered at the time it is connected to a chassis connector terminal. To help you check your work, if one or more wires have previously been soldered to a terminal, the solder step will indicate it. For example, the solder step for the first wire that you connect to terminal B14 will read (S-1); for the second wire, the solder step will read (S-1/2); for the third wire, the solder step will read (S-1/3). Position each wire down toward the bottom of the terminal, or the last wire connected to the terminal, before you solder it.

( ) 1-1/2" red from terminal B1 (S-1) to terminal C1 (S-1).

( ) 3-3/4" red from terminal C1 (S-1/2) to terminal D1 (S-1).

( ) 4" red from terminal C13 (S-1) to terminal D1 (S-1/2).

( ) 10" gray to terminal B6 (S-1). Route the wire as shown, the other end will be connected later.

( ) 3-3/4" gray from terminal B6 (S-1/2) to terminal C12 (S-1).

( ) 1-1/2" gray from terminal B7 (S-1) to terminal C7 (S-1).

( ) 4" gray from terminal B21 (S-1) to terminal C14 (S-1).

( ) Prepare the following solid wires:

One 5-1/2" gray Three 1-5/8" gray
Four 1-5/8" gray
One 2-1/4" gray

Connect the prepared wires as follows:

( ) 5-1/2" gray from terminal C8 (S-1) to terminal D12 (S-1).

( ) 1-5/8" gray from terminal C15 (S-1) to terminal D7 (S-1).

( ) 1-5/8" gray from terminal C16 (S-1) to terminal D8 (S-1).

( ) 1-5/8" gray from terminal C17 (S-1) to terminal D9 (S-1).

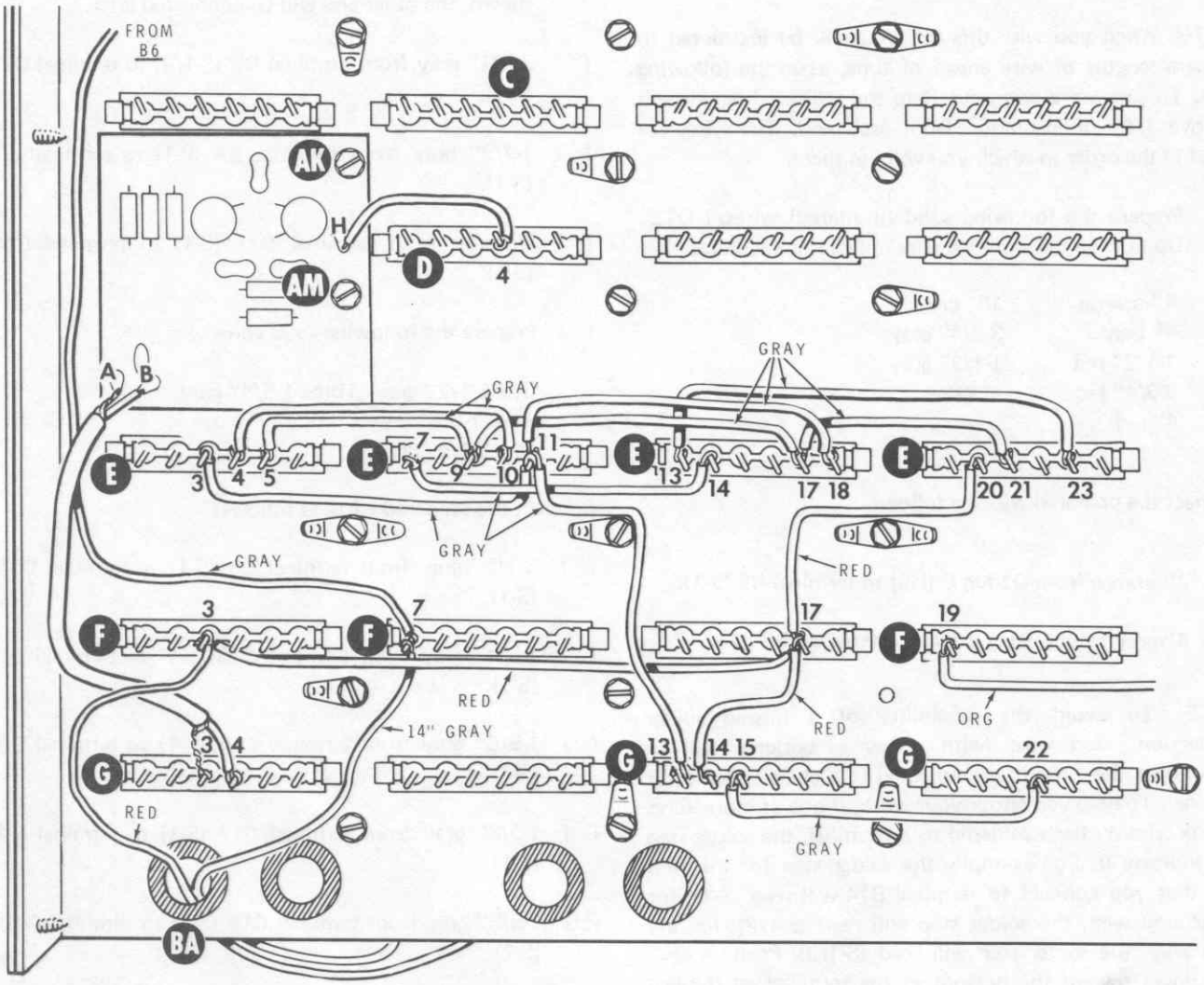
( ) 1-5/8" gray from terminal C18 (S-1) to terminal D10 (S-1).

( ) 2-1/4" gray from terminal C19 (S-1) to terminal D11 (S-1).

( ) 1-5/8" gray from terminal C20 (S-1) to terminal D13 (S-1).

( ) 1-5/8" gray from terminal C21 (S-1) to terminal D14 (S-1).

( ) 1-5/8" gray from terminal C22 (S-1) to terminal D15 (S-1).



PICTORIAL 12-6

Refer to Pictorial 12-6 for the following steps.

( ) Connect the end of the gray wire coming from terminal B6 to terminal F7 (S-1).

( ) Prepare the following solid wires:

3" gray	3-3/4" gray
4" gray	4" gray
3" gray	4-5/8" gray
3-1/2" gray	3-1/2" gray

Connect the prepared wires as follows:

( ) 3" gray from terminal E5 (S-1) to terminal E9 (S-1).

( ) 4" gray from terminal E9 (S-1/2) to terminal E17 (S-1).

( ) 3" gray from terminal E17 (S-1/2) to terminal E21 (S-1).

( ) 3-1/2" gray from terminal E4 (S-1) to terminal E10 (S-1).

( ) 3-3/4" gray from terminal E11 (S-1) to terminal E18 (S-1).

( ) 4" gray from terminal E3 (S-1) to terminal E11 (S-1/2).

( ) 4-5/8" gray from terminal E13 (S-1) to terminal E23 (S-1).

( ) 3-1/2" gray from terminal E7 (S-1) to terminal E14 (S-1).

( ) Prepare the following solid wires:

4-1/2" gray	6" red
3-1/2" red	3-3/4" gray
1-3/4" red	7" orange
9-3/4" red	14" gray

Connect the prepared wires as follows:

( ) 4-1/2" gray from terminal E11 (S-1/3) to terminal G13 (S-1).

( ) 3-1/2" red from terminal E20 (S-1) to terminal F17 (S-1).

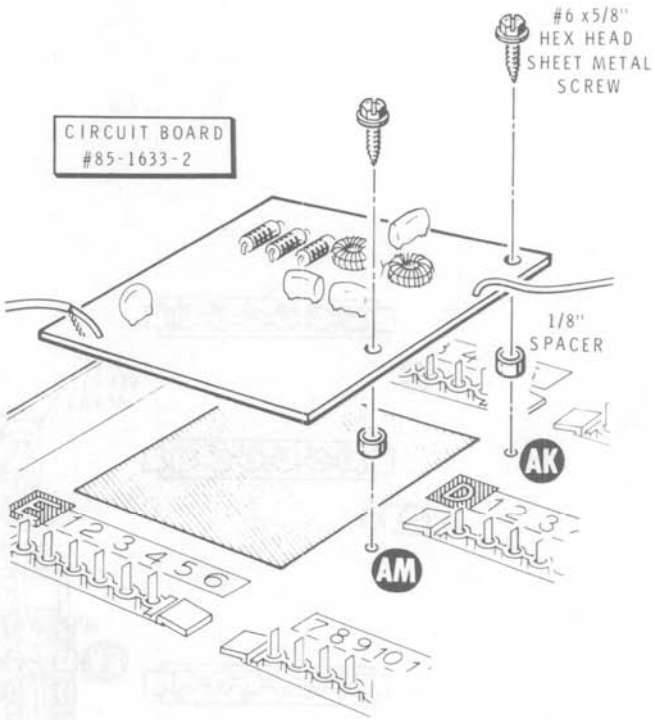
( ) 1-3/4" red from terminal F17 (S-1/2) to terminal G14 (S-1).

( ) 9-3/4" red to terminal F3 (S-1). Push the other end of the wire through grommet BA. It will be connected later.

( ) 6" red from terminal F3 (S-1/2) to terminal F17 (S-1/3).

( ) 3-3/4" gray from terminal G15 (S-1) to terminal G22 (S-1).

( ) 7" orange to terminal F19 (S-1). Route the wire as shown. The other end will be connected later.



Detail 12-6A

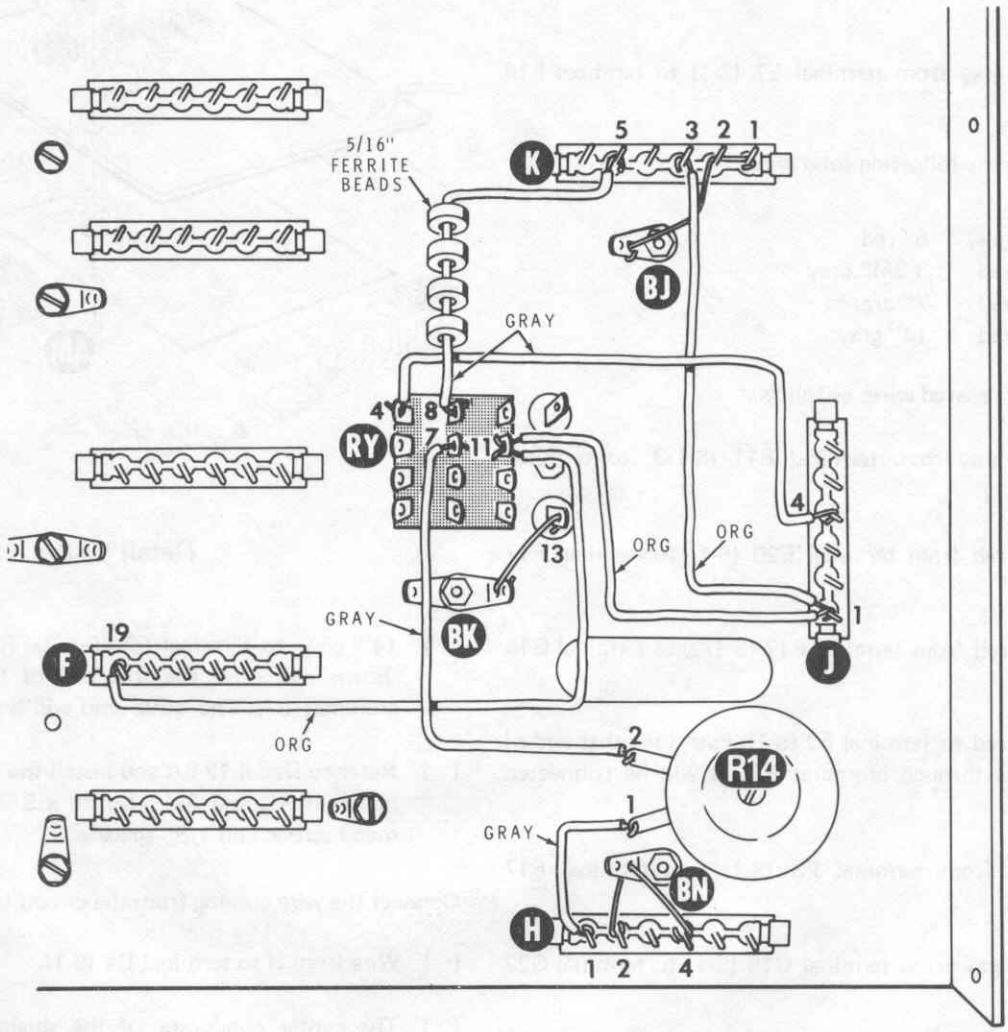
( ) 14" gray to terminal F7 (S-1/2). Route the wire as shown and push the free end of the wire through grommet BA. The other end will be connected later.

( ) Refer to Detail 12-6A and install the VFO filter circuit board at AK and AM. Use #6 x 5/8" hex head sheet metal screws and 1/8" spacers.

Connect the wire coming from the circuit board as follows:

( ) Wire from H to terminal D4 (S-1).

( ) The center conductor of the shielded cable coming from B to terminal G4 (S-1) and the shield wire to terminal G3 (S-1/2).



PICTORIAL 12-7

Refer to Pictorial 12-7 for the following steps.

( ) Prepare the following lengths of small bare wire:

2"	1-3/4"
1"	

Install small bare wires as follows:

( ) 2" from the lower hole of solder lug BJ (S-1) to terminals K2 and K1. The wire should touch terminal K2 and encircle terminal K1. Solder the wire to both terminals.

( ) 1" from relay RY lug 13 (NS) to the lower hole of solder lug BK (S-1).

( ) 1-3/4" from terminal H4 (S-1), through the lower hole of solder lug BN (S-2), to terminal H2 (S-1).

( ) Prepare the following solid wires:

4" orange	4-1/4" gray
5" orange	1-3/4" gray
4-3/4" gray	3-3/4" gray

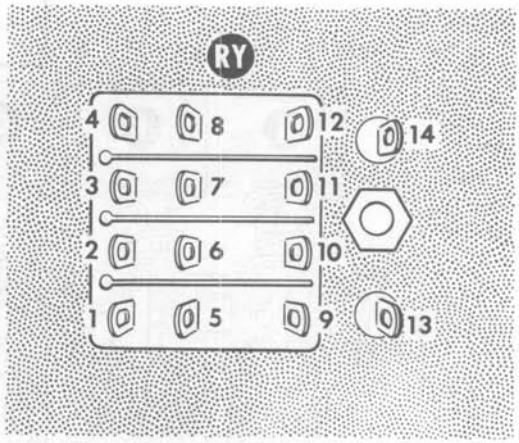
Connect the prepared wires as follows:

NOTE: Refer to Detail 12-7A for the lug numbering of relay RY.

( ) 4" orange from relay RY lug 11 (NS) to terminal J1 (S-1).

( ) Connect the orange wire coming from terminal F19 to relay RY lug 11 (S-2).

( ) 5" orange from terminal K3 (S-1) to terminal J1 (S-1/2).



Detail 12-7A

( ) 4-3/4" gray from relay RY lug 4 (S-1) to terminal J4 (S-1).

( ) 4-1/4" gray from relay RY lug 7 (S-1) to R14 lug 2 (S-1).

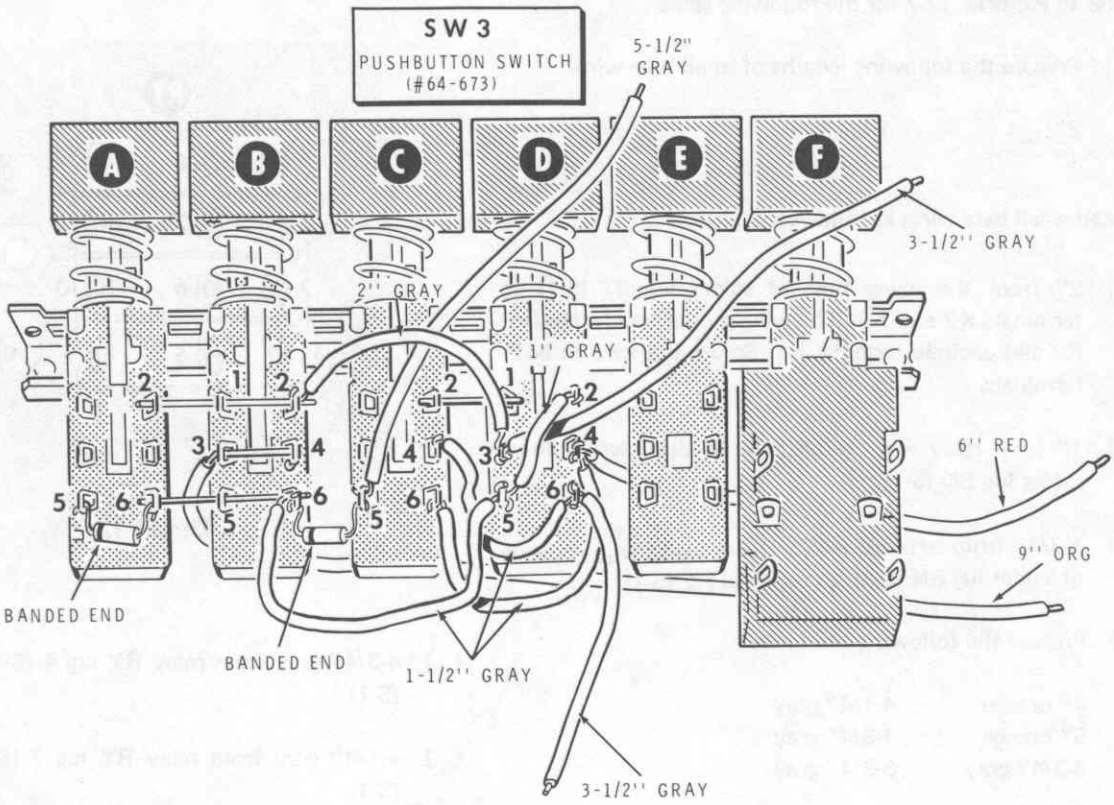
( ) 1-3/4" gray from R14 lug 1 (S-1) to terminal H1 (S-1).

( ) Slide four 5/16" ferrite beads over the 3-3/4" gray wire.

NOTE: In the next step, apply a drop of cement to each ferrite bead. Then, when you install the gray wire, push the beads down against the chassis so the cement will hold them to the chassis.

( ) 3-3/4" gray wire with ferrite beads from relay RY lug 8 (S-1) to terminal K5 (S-1).

Temporarily set the chassis aside.



PICTORIAL 12-8

Pushbutton Switch Prewiring

Refer to Pictorial 12-8 for the following steps.

Prewire pushbutton switch SW3 (#64-674) as follows:

( ) Connect a 1" small bare wire from switch section A lug 2 (S-1), through switch section B lug 1 (S-2), to switch section B lug 2 (NS).

( ) Connect a 3/4" small bare wire from switch section C lug 2 (S-1) to switch section D lug 1 (S-1).

( ) Connect a 1" small bare wire from switch section A lug 6 (NS), through switch section B lug 5 (S-2), to switch section B lug 6 (NS).

( ) Prepare the following solid wires:

2" gray	1-1/2" gray	9" orange
5-1/2" gray	6" red	
3-1/2" gray	3-1/2" gray	
1" gray	1-1/2" gray	
1-1/2" gray		

Connect the prepared wires to switch SW3 as follows:

( ) 2" gray from section B lug 2 (S-2) to section D lug 3 (NS).

( ) 5-1/2" gray to section C lug 5 (NS). The other end will be connected later.

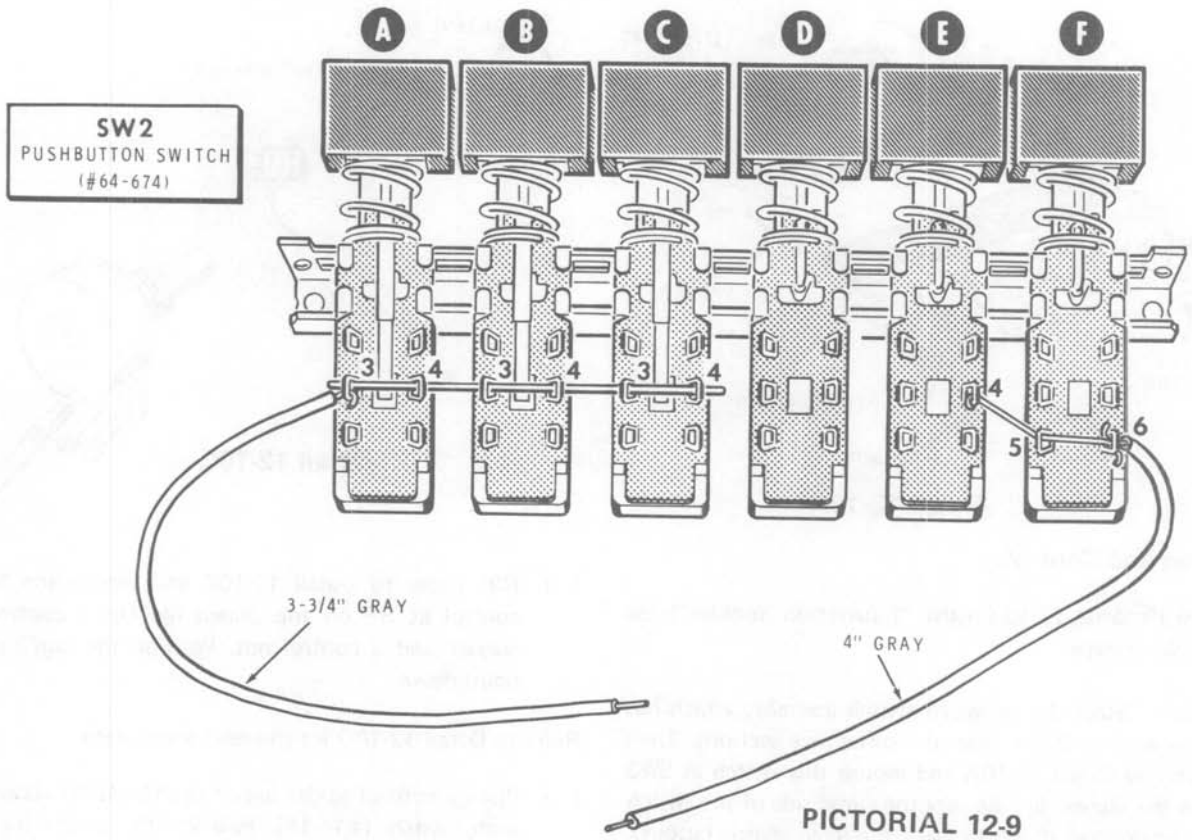
( ) 3-1/2" gray to section D lug 3 (S-2). The other end will be connected later.

( ) 1" gray from section D lug 2 (S-1) to section D lug 5 (NS).

( ) 1-1/2" gray from section C lug 6 (NS) to section D lug 4 (NS).

( ) 1-1/2" gray from section C lug 4 (S-1) to section D lug 6 (NS).

( ) 6" red to section D lug 4 (S-2). Route this wire down and under the pushbutton switch assembly as shown. The other end of this wire will be connected later.



PICTORIAL 12-9

( ) 3-1/2" gray to section D lug 6 (S-2). The other end will be connected later.

( ) 1-1/2" gray from section B lug 6 (NS) to section D lug 5 (S-2).

( ) Remove an additional 1/4" of insulation (total 1/2") from one end of the 9" orange wire. Then connect this end of the wire through section B lug 3 (S-2) to section B lug 4 (NS). Route this wire down and under the pushbutton switch assembly as shown. The other end will be connected later.

( ) D3: Connect the lead at the banded end of a 1N4149 diode (#56-56) to switch section A lug 5 (NS). Connect the other diode lead to section A lug 6 (S-2).

( ) D2: Connect the lead at the banded end of another 1N4149 diode (#56-56) to switch section B lug 6 (S-3). Connect the other diode lead to section C lug 5 (NS).

Temporarily set this pushbutton switch assembly aside.

Refer to Pictorial 12-9 for the following steps and prewire the remaining pushbutton switch as follows:

( ) Insert a 1-3/4" small bare wire through lugs 3 and 4 of switch sections A, B, and C. DO NOT solder lug 3 of section A. Solder the other five connections. Trim off any excess wire between sections C and D.

( ) Connect a 1" small bare wire from switch section E lug 4 (S-1), through switch section F lug 5 (S-2), to switch section F lug 6 (NS).

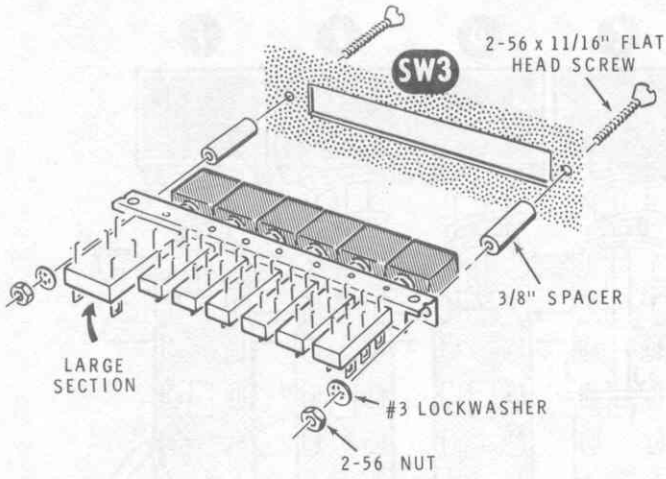
( ) Prepare the following solid wires:

3-3/4" gray
4" gray

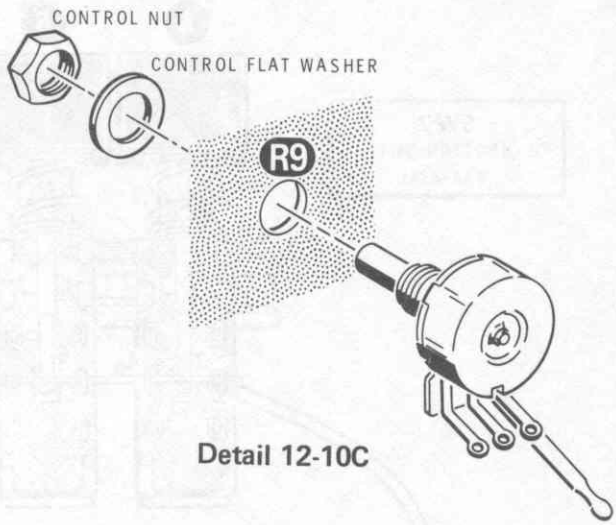
( ) Connect one end of the 3-3/4" gray wire to switch section A lug 3 (S-2). The other end will be connected later.

( ) Connect one end of the 4" gray wire to switch section F lug 6 (S-2). The other end will be connected later.

Temporarily set this pushbutton switch assembly aside.



Detail 12-10A



Detail 12-10C

Switches and Controls

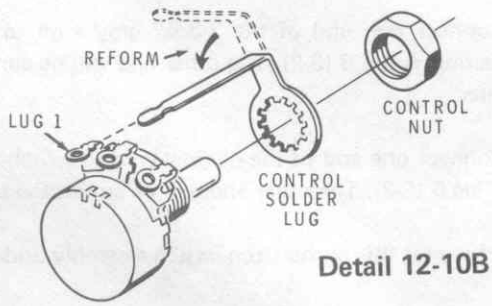
Refer to Pictorial 12-10 (in the "Illustration Booklet") for the following steps.

( ) SW3: Select the prewired switch assembly which has one section larger than the other five sections. Then refer to Detail 12-10A and mount this switch at SW3 on the chassis lip. Be sure the wired side of the switch is positioned down (toward the large chassis cutout). Use a 3/8" spacer, a 2-56 x 11/16" flat head screw, a 2-56 nut, and a #3 lockwasher at each mounting hole.

( ) SW2: In the same manner, mount the other prewired pushbutton switch assembly at SW2 on the chassis lip. Be sure the wired side of the switch is positioned down.

( ) Check the operation of the pushbuttons on the two ends of each switch. Loosen the hardware, if necessary, and readjust the switch position to eliminate any binding of the switch against the spacers.

( ) Refer to Detail 12-10B and place a control solder lug and a control nut on a 10 kΩ control (#10-31). Form the solder lug so it touches lug 1 of the control. Solder the two lugs together. Then remove the control nut.



Detail 12-10B

( ) R9: Refer to Detail 12-10C and mount the 10 kΩ control at R9 on the chassis lip. Use a control flat washer and a control nut. Position the lugs so they point down.

Refer to Detail 12-10D for the next seven steps.

( ) Place a control solder lug on the 10 kΩ/10 kΩ control with switch (#14-16). Position the solder lug near control lugs 1 and 4. Secure it temporarily with a control nut.

( ) R16: Connect a 5600 Ω resistor (green-blue-red) from lug 3 (S-1), through lug 4 (NS), to the solder lug (NS).

( ) R18: Connect a 390 Ω (orange-white-brown) resistor from lug 5 (NS) to lug 4 (S-3).

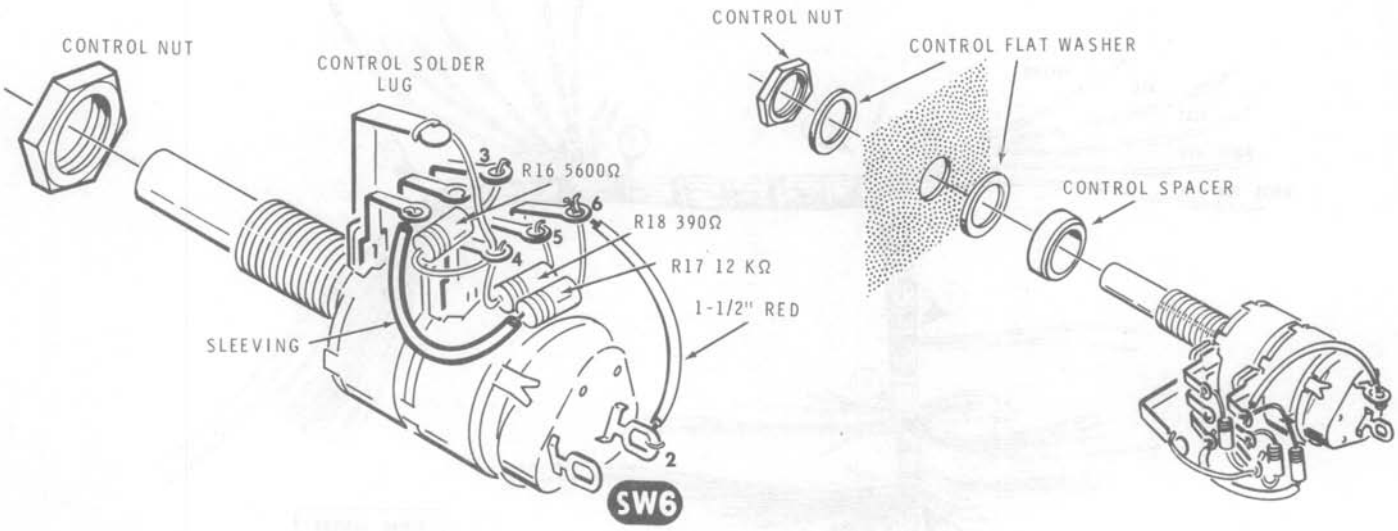
( ) R17: Cut one lead of a 12 kΩ resistor (brown-red-orange) to 1" and the other lead to 3/8". Place a 3/4" length of small sleeving on the 1" lead. Then connect this lead to lug 1 (S-1). Connect the other resistor lead to lug 6 (NS).

NOTE: In the next step, switch SW6 is the switch mounted on the rear of the control.

( ) Connect a 1-1/2" length of red wire from lug 6 (NS) to SW6 lug 2 (S-1).

( ) Remove the control nut.

( ) R15/SW6: Refer to Detail 12-10D and mount the prepared 10 kΩ/10 kΩ control with switch at R15 on the chassis lip. Use a control spacer, two control flat washers, and a control nut. Position the control lugs as shown in the Pictorial.



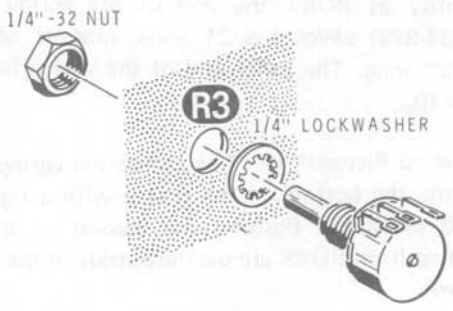
Detail 12-10D

Refer to Detail 12-10E for the next two steps.

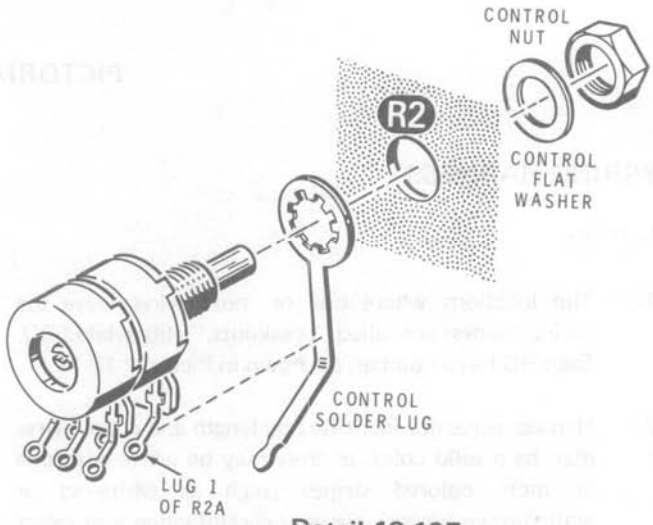
( ) R3: Mount a 100 kΩ control (#10-995) at R3 on the chassis lip with the lugs pointing up. Use a 1/4" nut and a 1/4" lockwasher. Rotate this control slightly, if necessary, so the lugs do not touch the lugs of control R15.

( ) R1: Similarly, mount another 100 kΩ control (#10-995) at R1 on the chassis lip with the lugs pointing up. Use a 1/4" nut and a 1/4" lockwasher.

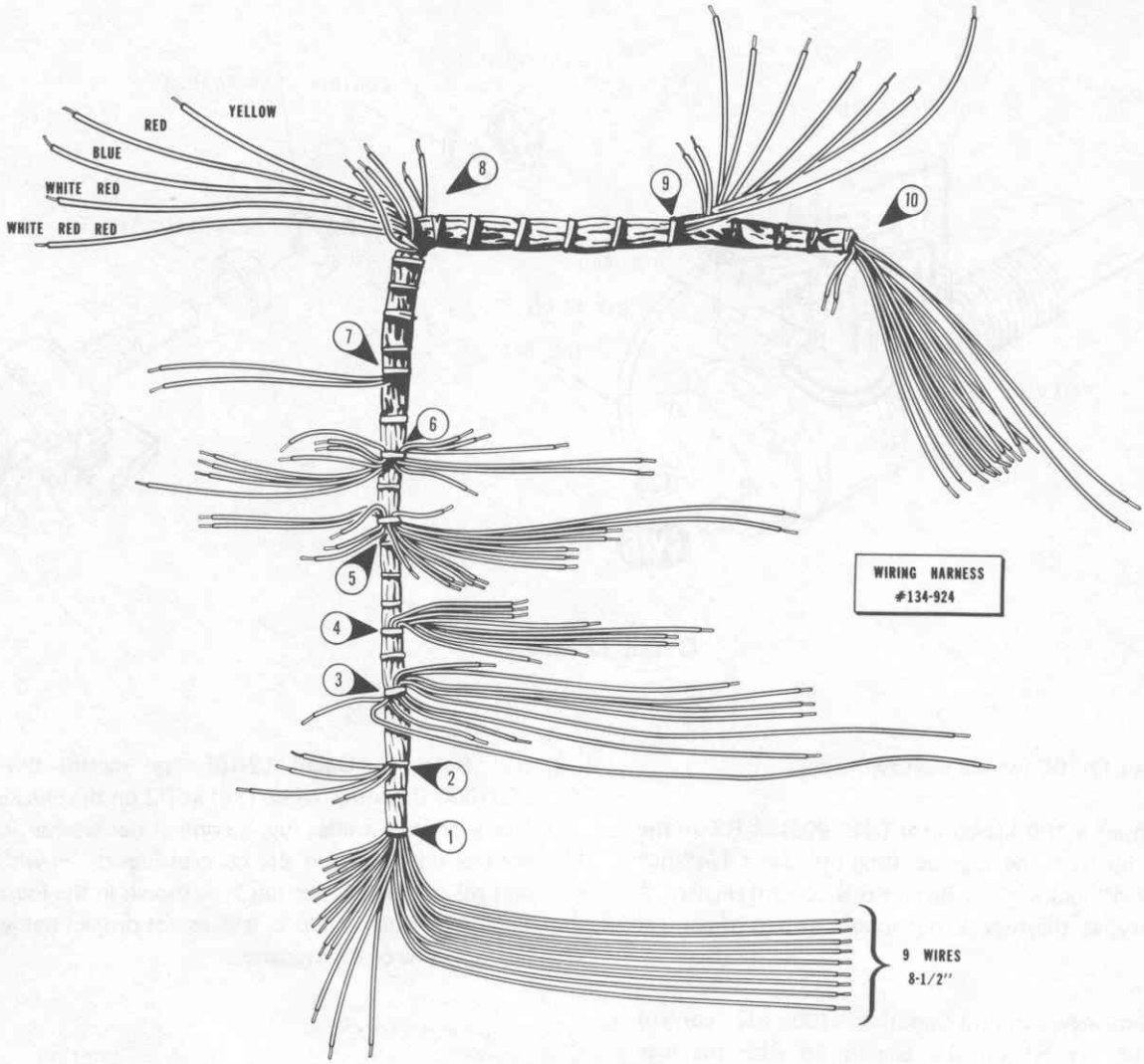
( ) R2: Refer to Detail 12-10F and mount the 200 kΩ/1500 Ω control (#12-138) at R2 on the chassis lip. Use a control solder lug, a control flat washer, and a control nut. Position the control lugs down with the control solder lug near lug 1, as shown in the Pictorial. Bend the solder lug up so it does not project below the bottom edge of the chassis.



Detail 12-10E



Detail 12-10F



PICTORIAL 12-11

WIRING HARNESS

NOTES:

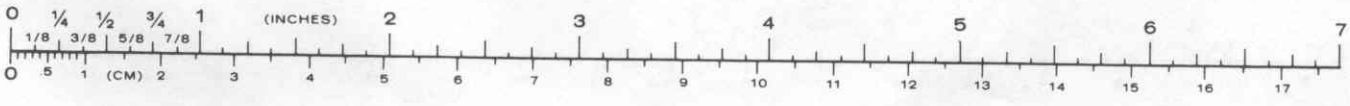
1. The locations where one or more wires leave the wiring harness are called "breakouts," abbreviated BO. Each BO has a number, as shown in Pictorial 12-11.

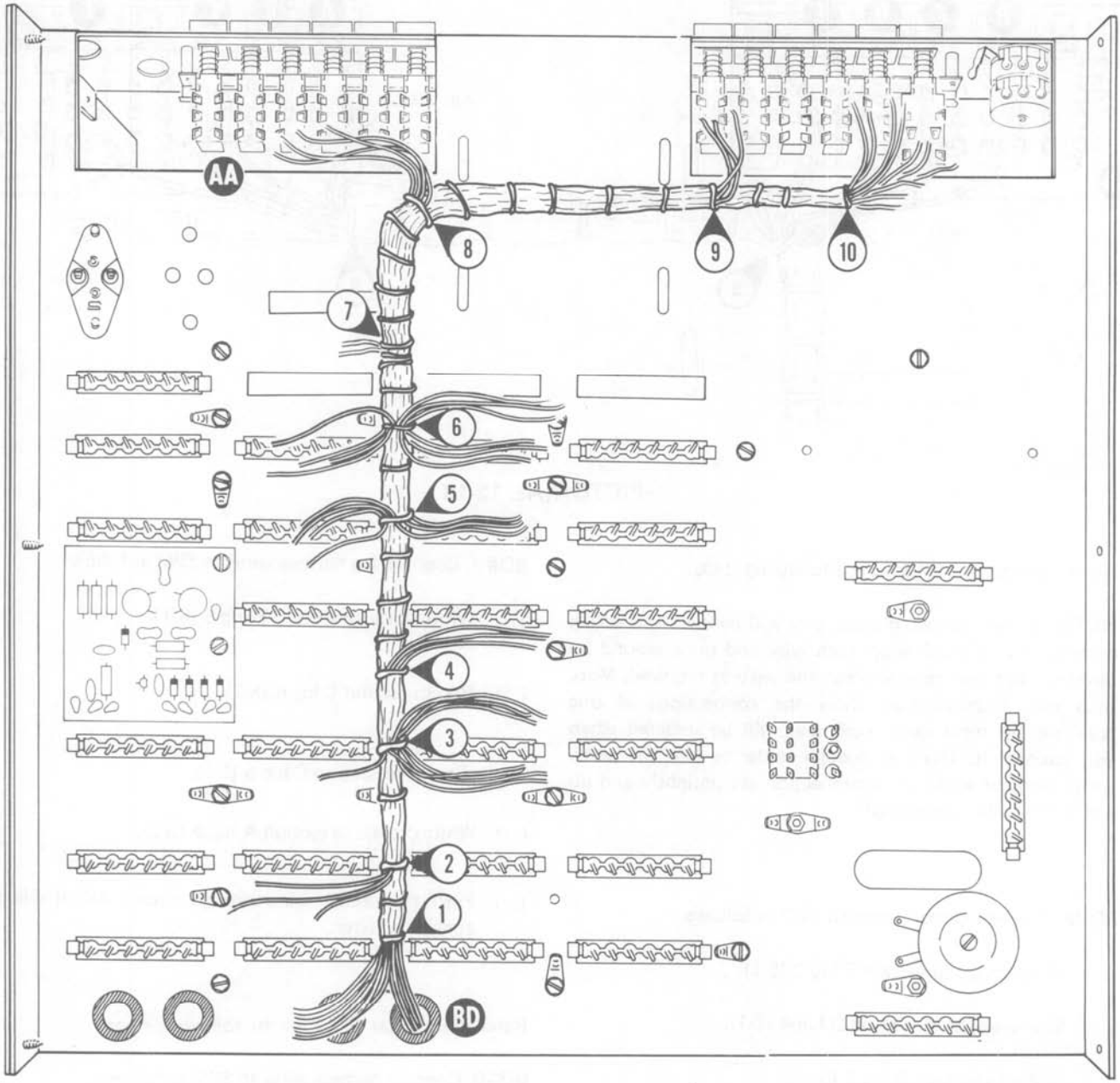
2. Harness wires are identified by length and color. Wires may be a solid color, or they may be white with one or more colored stripes (such as white-red or white-brown-brown). Be very careful when you select the harness wires as, for example, it is very easy to confuse white-yellow with white-yellow-yellow.

3. Identify as BO#1 the end of the wiring harness (#134-924) which has 21 wires, nine of which are 8-1/2" long. The other end of the wiring harness is BO#10.

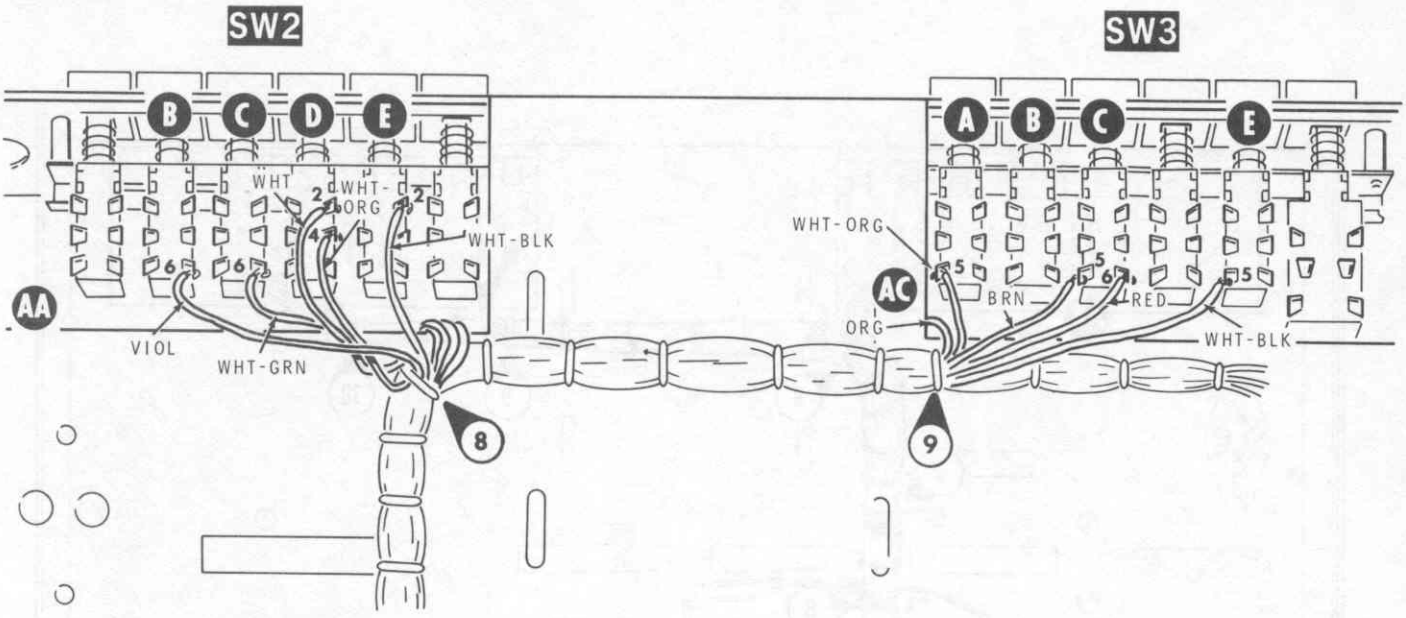
( ) Refer to Pictorial 12-12 and place the wiring harness against the bottom of the chassis with a right angle bend at BO#8. Position the harness so the wires coming from BO#8 are on the outside of the bend, as shown.

( ) At BO#1, group together the 9 longest wires. Push this group of 9 wires through grommet BD. They will be connected later.





PICTORIAL 12-12



PICTORIAL 12-13

Refer to Pictorial 12-13 for the following steps.

NOTE: In the following steps you will connect the wiring harness. You should wrap each wire end once around its terminal, but you may shorten the wire as required. More than one Pictorial may show the connections at one breakout. In most cases, each wire will be soldered when you connect it. Use just enough solder to join the parts. Large globs of solder on a connection are unsightly and do not improve the connection.

BO#8. Connect harness wires to SW2 as follows:

( ) White-black to section E lug 2 (S-1).

( ) White-orange to section D lug 4 (S-1).

( ) White to section D lug 2 (S-1).

( ) White-green to section C lug 6 (S-1).

( ) Violet to section B lug 6 (S-1).

( ) Push the remaining five wires coming from BO#8 down through chassis cutout AA. They will be connected later.

BO#9. Connect the harness wires to SW3 as follows:

( ) White-black to section E lug 5 (S-1).

( ) Red to section C lug 6 (S-2).

( ) Brown to section C lug 5 (S-3).

( ) White-orange to section A lug 5 (S-2).

( ) Push the orange wire through cutout AC, it will be connected later.

Refer to Pictorial 12-14 for the following steps.

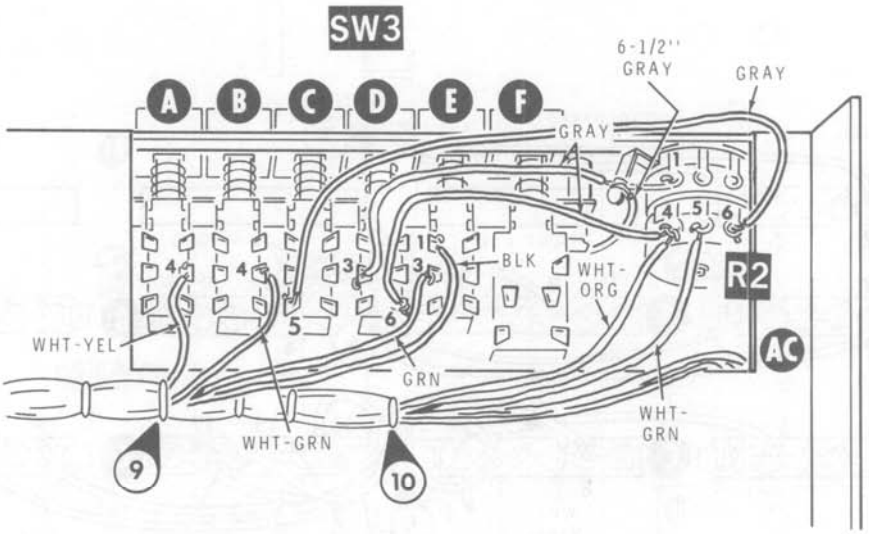
BO#9. Connect harness wires to SW3 as follows:

( ) White-yellow to section A lug 4 (S-1).

( ) White-green to section B lug 4 (S-2).

( ) Green to section E lug 3 (S-1).

( ) Black to section E lug 1 (S-1).



PICTORIAL 12-14

BO#10. Connect harness wires as follows:

( ) White-green to R2 lug 5 (S-1).

( ) White-orange to R2 lug 4 (NS).

( ) Connect the gray wire coming from SW3 section D, lug 6, to R2 lug 4 (S-2).

Refer to Detail 12-14A for the next step.

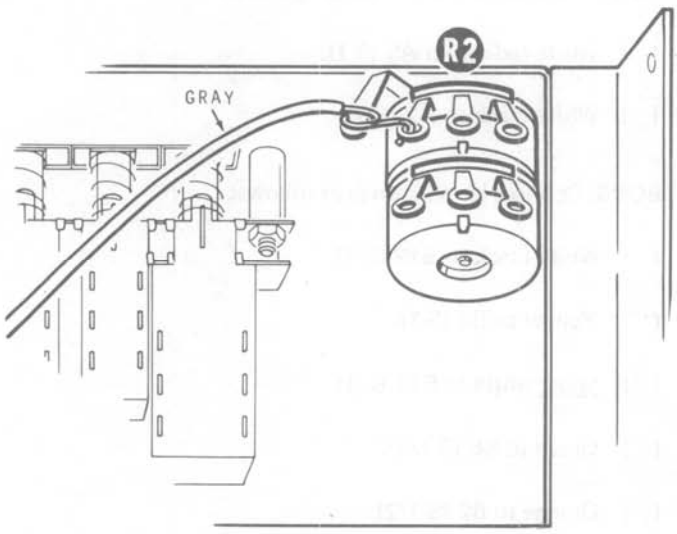
( ) Remove an additional 3/4" of insulation (total 1") from the end of the 3-1/2" gray wire coming from SW3, section D, lug 3. Wrap this end around the control solder lug at R2 (NS); then connect the end to R2, lug 1 (NS). NOTE: Three shielded cable wires will be connected later to lug 1.

( ) Prepare a 6-1/2" gray wire.

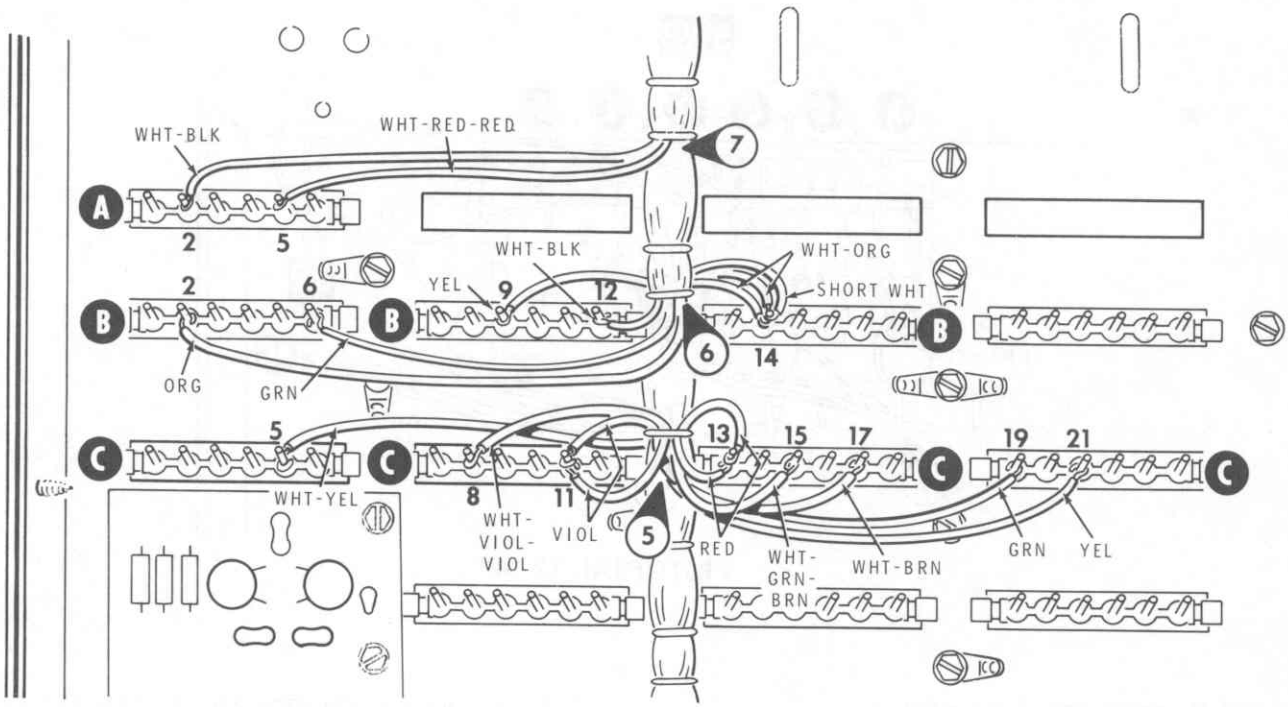
( ) Remove an additional 1/4" of insulation (total 1/2") from one end of the prepared 6-1/2" gray wire. Connect this end of the wire to the control solder lug at R2 (NS). Push the other end up through chassis cutout AC. It will be connected later.

( ) Connect the gray wire coming from SW3 section C, lug 5, to R2 lug 6 (NS).

( ) Push all remaining wires at this end of the wiring harness up through chassis cutout AC.



Detail 12-14A



PICTORIAL 12-15

Refer to Pictorial 12-15 for the following steps.

BO#7. Connect harness wires as follows:

( ) White-red-red to A5 (S-1).

( ) White-black to A2 (S-1).

BO#6. Connect harness wires as follows:

( ) White-black to B12 (S-1).

( ) Yellow to B9 (S-1).

( ) Short white to B14 (S-1).

( ) Green to B6 (S-1/3).

( ) Orange to B2 (S-1/2).

( ) Both white-orange to B14 (S-2/3).

More wires from BO#6 will be connected later.

BO#5. Connect harness wires as follows:

( ) Both violet to C11 (S-2).

( ) Both red to C13 (S-2/3).

( ) White-green-brown to C15 (S-1/2).

( ) White-brown to C17 (S-1/2). Do not use the white-brown-brown.

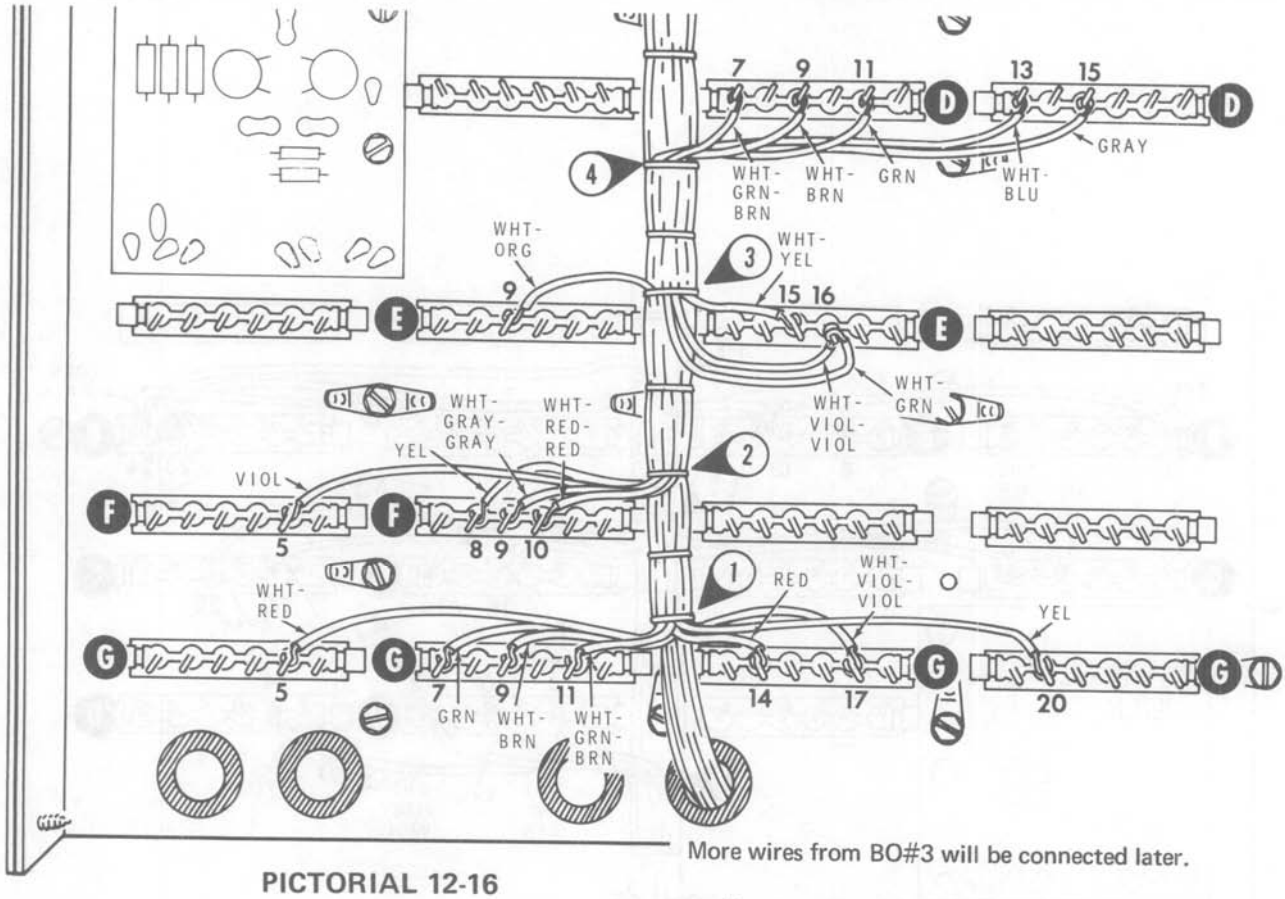
( ) Green to C19 (S-1/2).

( ) Yellow to C21 (S-1/2).

( ) White-violet-violet to C8 (S-1/2).

( ) White-yellow to C5 (S-1).

More wires from BO#5 will be connected later.



PICTORIAL 12-16

Refer to Pictorial 12-16 for the following steps.

BO#4. Connect harness wires as follows:

( ) White-green-brown to D7 (S-1/2).

( ) White-brown to D9 (S-1/2). Do not use the white-brown-brown.

( ) Green to D11 (S-1/2).

( ) White-blue to D13 (S-1/2).

( ) Gray to D15 (S-1/2).

More wires from BO#4 will be connected later.

BO#3. Connect harness wires as follows:

( ) Short white-orange to E9 (S-1/3).

( ) White-yellow to E15 (S-1).

( ) White-violet-violet to E16 (S-1).

( ) White-green to E16 (S-1/2).

More wires from BO#3 will be connected later.

BO#2. Connect harness wires as follows:

( ) White-gray-gray to F9 (S-1).

( ) White-red-red to F10 (S-1).

( ) Violet to F5 (S-1).

( ) Yellow to F8 (S-1).

BO#1. Connect harness wires as follows:

( ) White-green-brown to G11 (S-1).

( ) White-brown to G9 (S-1).

( ) Green to G7 (S-1).

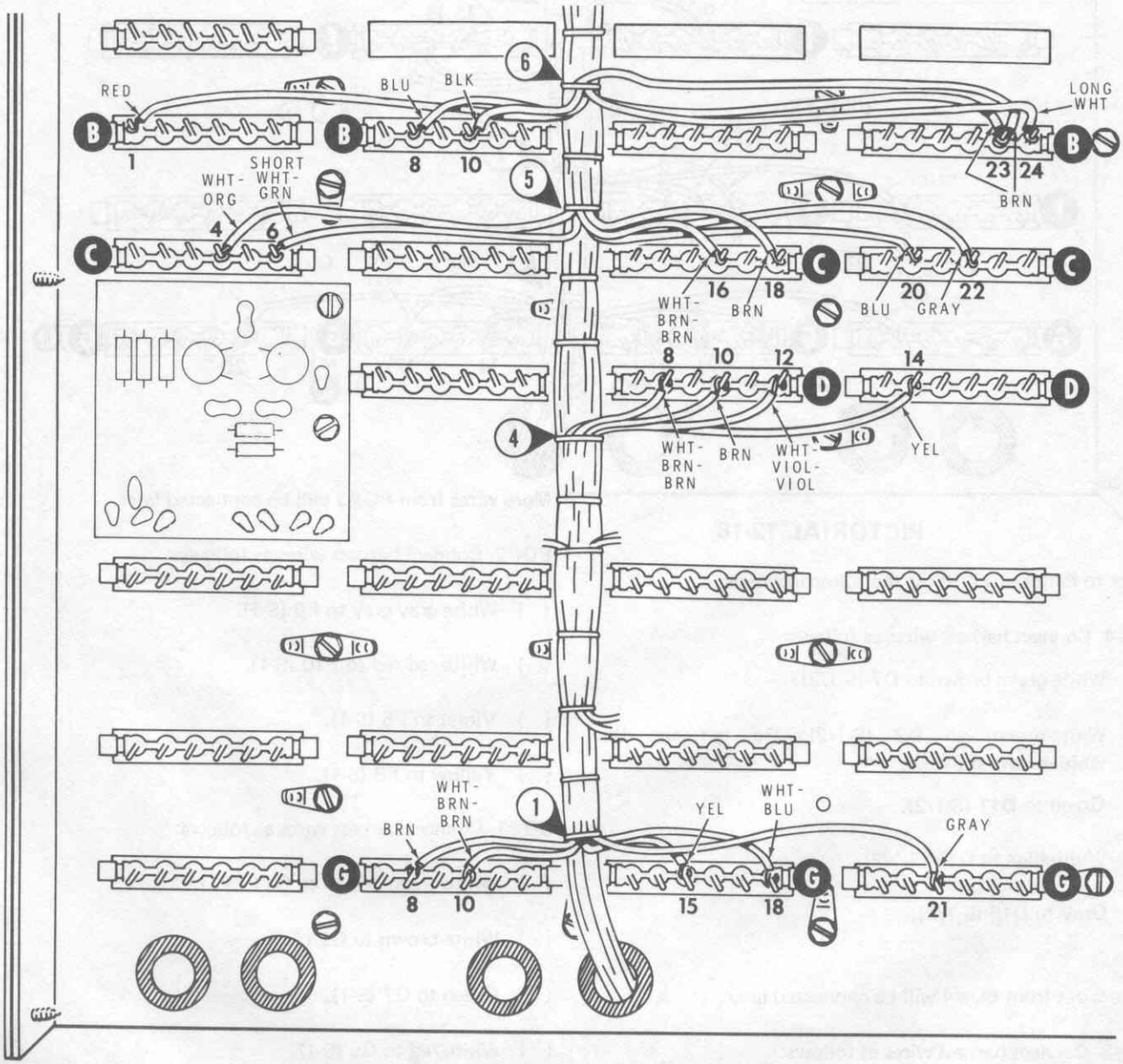
( ) White-red to G5 (S-1).

( ) Red to G14 (S-1/2).

( ) White-violet-violet to G17 (S-1).

( ) Long yellow to G20 (S-1).

More wires from BO#1 will be connected later.



PICTORIAL 12-17

Refer to Pictorial 12-17 for the following steps.

BO#6. Connect harness wires as follows:

( ) Black to B10 (S-1).

( ) Blue to B8 (S-1).

( ) Red to B1 (S-1/2).

( ) Both brown to B23 (S-2).

( ) Long white to B24 (S-1).

BO#5. Connect harness wires as follows:

( ) Brown to C18 (S-1/2).

( ) White-brown-brown to C16 (S-1/2).

( ) Blue to C20 (S-1/2).

( ) Gray to C22 (S-1/2).

( ) Short white-green to C6 (S-1).

( ) White-orange to C4 (S-1).

More wires from BO#5 will be connected later.

BO#4. Connect harness wires as follows:

( ) White-brown-brown to D8 (S-1/2).

( ) Brown to D10 (S-1/2).

( ) White-violet-violet to D12 (S-1/2).

( ) Yellow to D14 (S-1/2).

BO#1. Connect harness wires as follows:

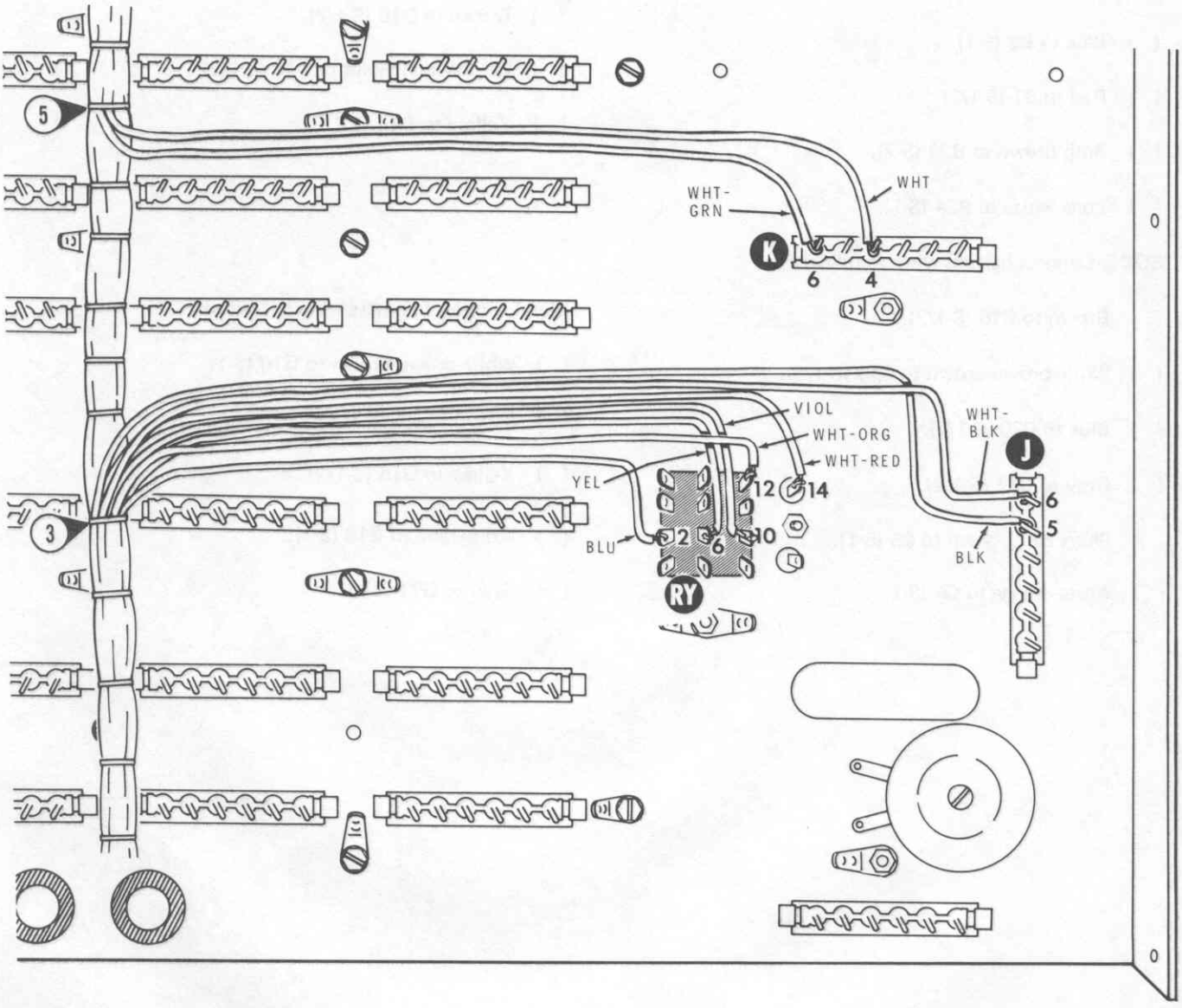
( ) White-brown-brown to G10 (S-1).

( ) Brown to G8 (S-1).

( ) Yellow to G15 (S-1/2).

( ) White-blue to G18 (S-1).

( ) Gray to G21 (S-1).



PICTORIAL 12-18

Refer to Pictorial 12-18 for the following steps.

BO#5. Connect harness wires as follows:

( ) White-green to K6 (S-1).

( ) White to K4 (S-1).

NOTE: When you connect a harness wire to the relay, as in the following steps, push the wire through the lug opening, and then up and over the top of the lug and down along the flat side. Shorten the bare wire end as necessary to keep it from touching another lug. See Detail 12-18A.

Detail 12-18A

BO#3. Connect harness wires as follows:

( ) Blue to relay RY lug 2 (S-1).

( ) Yellow to relay RY lug 6 (S-1).

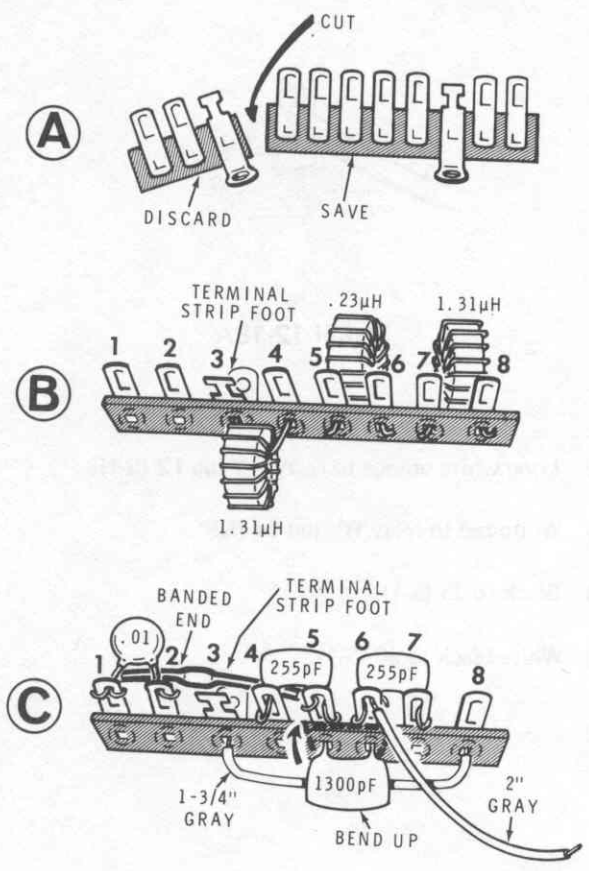
( ) Violet to relay RY lug 10 (S-1).

( ) Long white-orange to relay RY lug 12 (S-1).

( ) White-red to relay RY lug 14 (NS).

( ) Black to J5 (S-1).

( ) White-black to J6 (S-1).



Detail 12-19A

PARTS AND CABLES

Refer to Pictorial 12-19 (in the "Illustration Booklet") for the following steps.

( ) R12: Place a 1-1/4" length of small sleeving on each lead of a 16 kΩ, 1/2-watt (brown-blue-orange) resistor. Then connect the resistor from the collector of Q1 (NS) to switch SW2, section A, lug 5 (S-1).

( ) C15: Connect the positive (+) lead of a 500 µF electrolytic capacitor to the collector of Q1 (S-3). Connect the other capacitor lead to terminal A6 (S-1/2).

( ) Place a 3/4" length of small sleeving on one lead, and a 1" length of small sleeving on the other lead of a .33 Ω, 2-watt (orange-orange-silver) resistor.

NOTE: In each of the following two steps, do not use so much solder that it runs down the transistor lug.

( ) R6: Connect the lead of the prepared .33 Ω resistor with the 3/4" length of sleeving to lug E of transistor Q1 (S-1). Connect the resistor lead with the 1" length of sleeving to B1 (S-1/3).

( ) C1: Connect the positive (+) marked lead of a 10 µF electrolytic to terminal C7 (S-1/3). Connect the other capacitor lead to the upper hole of solder lug AH (NS).

( ) C17: Connect a .1 µF, 100 V disc capacitor from terminal C2 (S-1/2) to terminal C4 (S-1/2).

( ) C18: Connect a .01 µF disc capacitor from terminal C5 (S-1/2) to the upper hole of solder lug AH (NS).

( ) C16: Connect lead from the positive (+) marked end of a 3.5 µF electrolytic capacitor to R2 lug 6 (S-2). Connect the other capacitor lead to the control solder lug at R2 (S-4).

( ) C12: Connect a 220 pF disc capacitor from terminal C9 (S-1/2) to terminal C10 (S-1).

( ) C14: Connect a .001 µF disc capacitor from terminal F13 (S-1/2) to terminal F15 (S-1).

( ) C4: Connect a .1 µF, 10 V disc capacitor from terminal C6 (S-1/2) to the upper hole of solder lug AH (S-1/3).

( ) C5: Connect a .01 µF disc capacitor between relay RY lugs 13 (S-2) and 14 (S-2).

( ) C2: Connect a 47 µF tantalum capacitor between terminals J3 (S-1) and J4 (S-1/2). Be sure to connect the lead by the + mark or color dot to terminal J4.

( ) C3: Connect another 47 µF tantalum capacitor between terminals H4 (S-1/2) and H5 (S-1). Be sure to connect the lead by the + mark or color dot to terminal H5.

( ) Refer to Part A of Detail 12-19A and cut a #431-49 terminal strip as shown. Only the part marked "save" will be used.

Refer to Part B of Detail 12-19A for the next three steps.

NOTE: Install toroid coils perpendicular to the terminal strip insulator with the shortest possible leads.

( ) L1: Install a 1.31 μH toroid coil (#40-1869 green dot) at lower holes 3 (NS) and 4 (S-1).

( ) L3: Install another 1.31 μH toroid coil (#40-1869 green dot) at lower holes 7 (S-1) and 8 (NS).

( ) L2: Install a .23 μH toroid coil (#40-1862 blue dot) at lower holes 5 (NS) and 6 (NS).

Refer to Part C of Detail 12-19A for the following steps:

NOTE: When you install components in the following steps, push the leads down against the terminal strip insulator before you solder them.

( ) C7: Connect a 255 pF mica capacitor from lug 4 (S-1) to lug 5 (NS).

( ) C9: Connect another 255 pF mica capacitor from lug 6 (NS) to lug 7 (S-1).

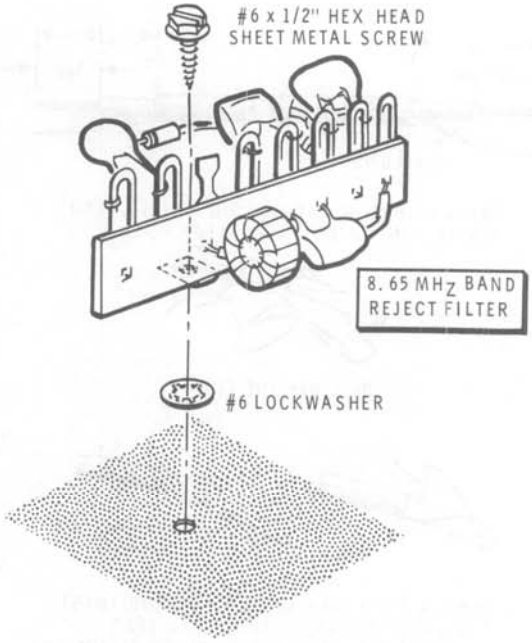
( ) C8: Connect a 1300 pF mica capacitor from the lower hole of lug 5 (S-2) to the lower hole of lug 6 (S-2). Before you solder, bend this capacitor up so its body is beside lugs 5 and 6.

( ) Prepare a 1-3/4" gray wire and connect it from the lower hole of lug 3 (S-2) to the lower hole of lug 8 (S-2).

( ) D4: Push a 1" length of small sleeving over the leads and body of a type 1N458 diode (#56-24) so the diode body is centered within the sleeving. For identification, bend the lead at the banded end. Connect this lead to lug 1 (NS) and the other diode lead to lug 5 (NS).

( ) C11: Connect a .01 μF disc capacitor from lug 1 (NS) to lug 2 (NS).

( ) Prepare a 2" gray wire. Connect one end of this wire to lug 6 (S-2). The other end will be connected later.



Detail 12-19B

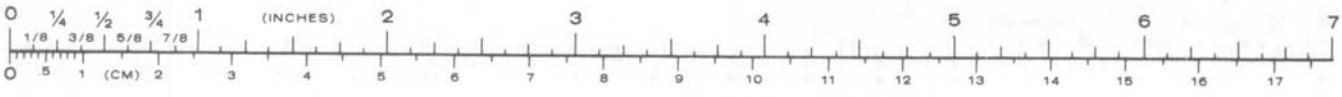
( ) Refer to Detail 12-19B and mount the 8.65 MHz band reject filter onto the chassis at AE. Use a #6 x 1/2" hex head sheet metal screw and a #6 lockwasher. Be sure none of the filter components touch the solder lug at AW or any of the terminals between G19 and G24.

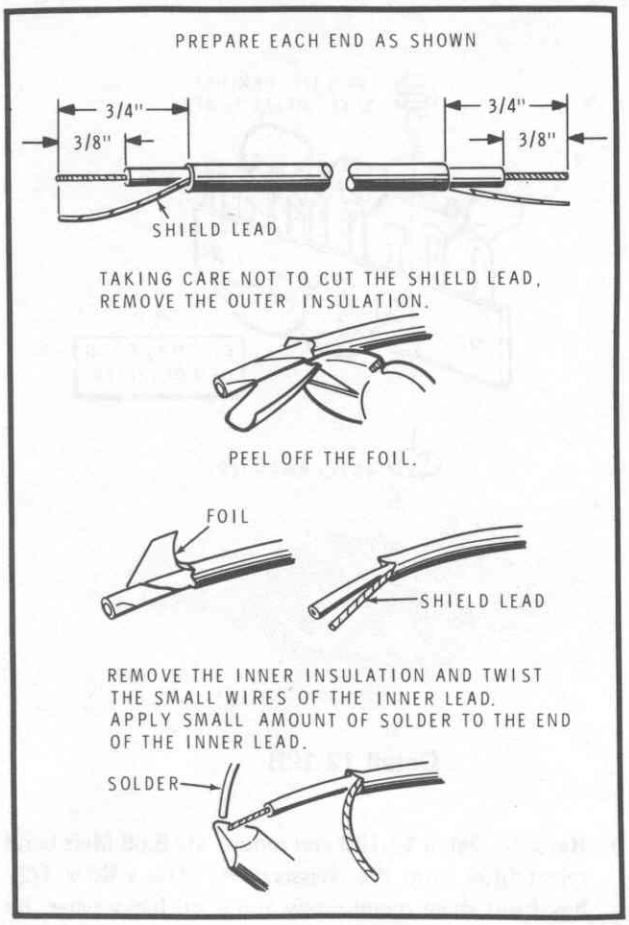
( ) Connect the gray wire coming from terminal strip AE lug 6 to terminal G24 (S-1).

( ) Place a 1-1/8" length of small sleeving on each lead of a 1000 Ω, 1/2-watt (brown-black-red) resistor.

( ) R21: Connect the 1000 Ω resistor from terminal strip AE lug 5 (NS) to terminal G13 (S-1/2).

( ) R19: Connect another 1000 Ω (brown-black-red) resistor from terminal strip AE lug 1 (S-3) to terminal G15 (S-1/3).





Detail 12-19C

Refer to Detail 12-19C for the preparation of the shielded cables in the following steps. Cut each cable to length and then prepare each end as shown. Be very careful when you remove the outer insulation so you do not cut the inner insulation or shield wires.

( ) Prepare shielded cables as follows. DO NOT use the RG-58 A/U cable. Cables are listed in the order in which you will use them.

18"	7-3/4"	8-1/4"
3-1/2"	3-3/4"	4-1/2"
5-1/4"	3-1/2"	2"
5-1/2"	3-3/4"	

Connect the prepared shielded cables to the chassis connector terminals as follows. The connections of the center conductors are designated first in each step, followed by the shield wires.

( ) 18" from A4 (S-1) to terminal strip AE lug 5 (S-4), with the shield wires to A3 (S-1/2) and terminal strip AE lug 3 (NS). Bend the solder lug at BF around this cable to hold it in place.

( ) 3-1/2" from E1 (S-1) to G1 (S-1), with the shield wires to E2 (S-1/2) and G3 (S-1/3).

( ) 5-1/4" from D2 (S-1) to G6 (S-1), with the shield wires to D3 (S-1/2) and the upper hole of solder lug AT (S-1/4).

( ) 5-1/2" from E12 (S-1) to F1 (S-1), with the shield wires to solder lug AR (S-1/3) and F2 (S-1/2).

( ) 7-3/4" from C3 (S-1) to E6 (S-1), with the shield wires to C2 (S-1/2) and solder lug AY (S-1/2).

( ) 3-3/4" from E19 (S-1) to F14 (S-1), with the shield wires to solder lug AS (S-1/3) and F13 (F-1/3).

( ) Connect one end of the 3-1/2" cable to F11 (S-1) and the shield wire to F12 (S-1/2). The other end will be connected later.

( ) Connect one end of the 3-3/4" cable to terminal strip AE lug 2 (S-2) and the shield wire to lug 3 (S-2). The other end will be connected later.

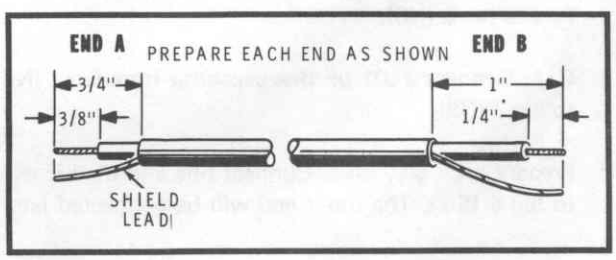
( ) Connect one end of the 8-1/4" cable to H3 (S-1) and the shield wire to H2 (S-1/2). The other end will be connected later.

( ) Connect one end of the 4-1/2" cable to relay RY lug 1 (NS) and the shield wire to solder lug BW (NS). The other end will be connected later.

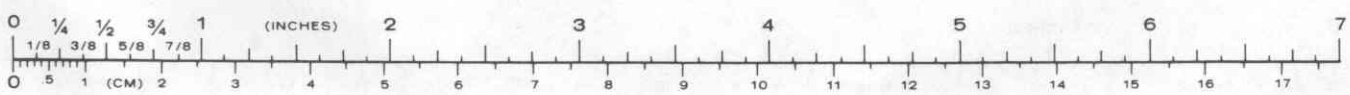
( ) Connect the 2" cable from C10 (S-1/2) to D6 (S-1), with the shield wires to C9 (S-1/3) and D5 (S-1/2).

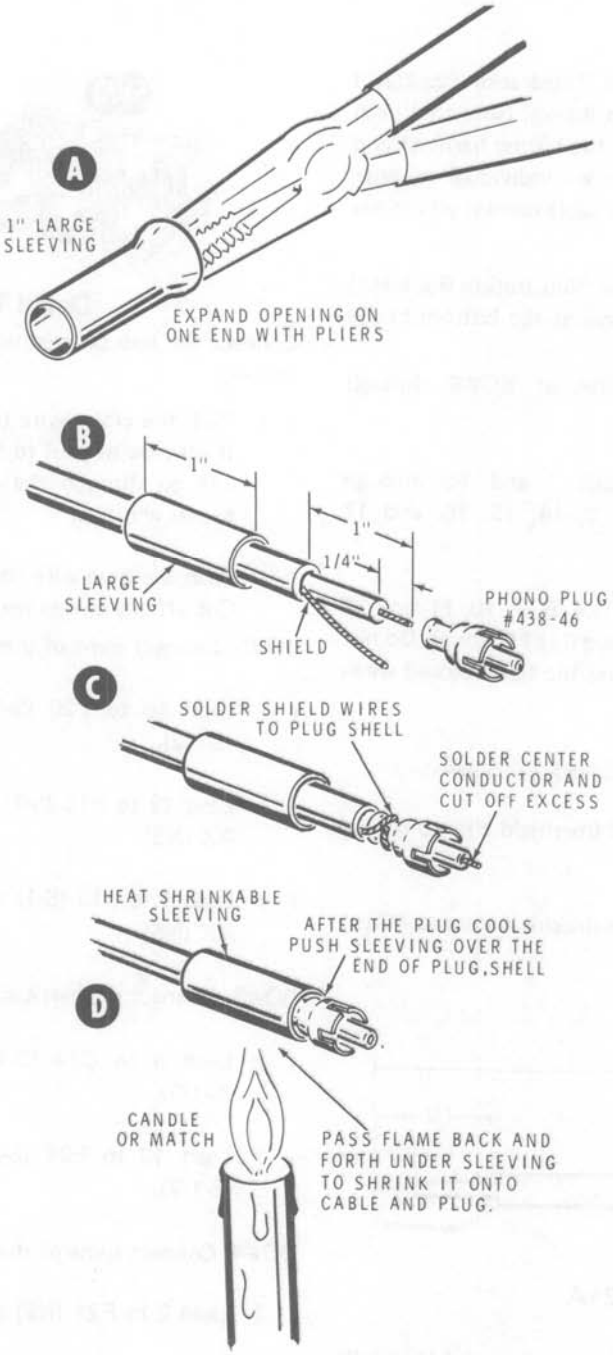
( ) Refer to Detail 12-19D and prepare shielded cables as follows. DO NOT use the RG-58 A/U cable.

9-1/4"
9-3/4"



Detail 12-19D





Detail 12-19E

( ) Refer to four-part Detail 12-19E and install a phono plug on end B of each of the two shielded cables prepared in the preceding step. Be sure to use plug #438-46.

Connect end A of the prepared shielded cables as follows:

( ) 9-1/4" cable to H3 (S-1/2) and the shield wire to solder lug BN (S-1/3). Push the free end of the cable up through chassis cutout BL.

( ) 9-3/4" cable to relay RY lug 1 (S-2) and the shield wire to solder lug BW (S-2). Push the free end of the cable up through chassis cutout BL.

CABLE HARNESS

( ) Refer to Pictorial 12-20 (in the "Illustration Booklet") and form the cable harness as shown. Note that each breakout has a number (as in the wiring harness) and that each shielded cable has an individual number label. BO#1 is the end of the cable harness which has the violet and the blue wire.

( ) Refer to Pictorial 12-21 (in the "Illustration Booklet") and place the cable harness against the bottom of the chassis.

( ) Push all seven colored wires at BO#6 through grommet BC.

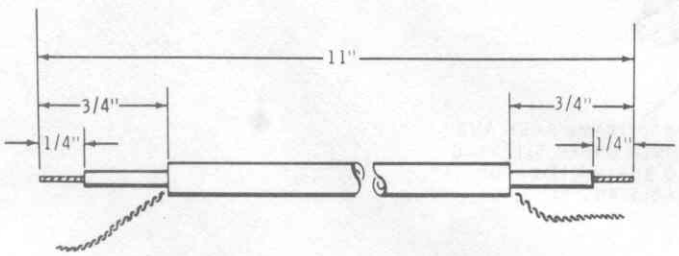
( ) At BO#7, push shield leads 3 and 10 through grommet BA; and leads 1, 2, 14, 15, 16, and 17 through grommet BB.

( ) At BO#1, push shield leads 1, 4, 6, 7, 10, 11, and 12 through chassis cutout AC (lead 6 is 11" long). Do not push shield leads 8 and 9 and the two colored wires through the cutout.

BO#1. Connect some of the harness leads as follows:

( ) Lead 8 to R2 lug 2 (S-1) and the shield wire to R2 lug 1 (NS).

( ) Lead 9 to R2 lug 3 (NS) and the shield wire to R2 lug 1 (NS).



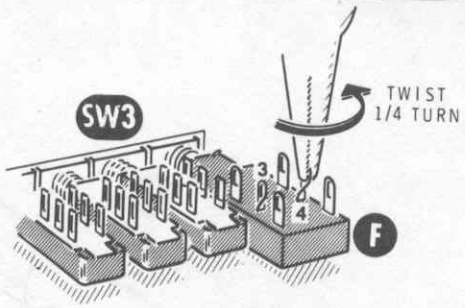
Detail 12-21A

( ) Refer to Detail 12-21A and prepare an 11" small shielded cable.

( ) Connect one end of the prepared cable to R2 lug 3 (S-2) and the shield wires to R2 lug 1 (S-4). Push the other end of this cable through chassis cutout AC.

( ) Refer to Detail 12-21B and twist lugs 3 and 4 of SW3, section F, 1/4 turn so the holes in the lugs are aligned.

( ) Remove insulation from the violet and the blue wires so each has 3/4" of bare wire exposed.



Detail 12-21B

Connect the two colored wires to switch SW3, section F, as follows:

( ) Push the violet wire through lug 3 (S-2) to lug 4 (S-1). It may be helpful to flatten the wire end slightly so it will go through the switch lugs easier. Cut off any excess wire end.

( ) Push the blue wire through lug 5 (S-2) to lug 6 (S-1). Cut off any excess wire end.

BO#2. Connect some of the harness leads as follows:

( ) Lead 16 to B20 (S-1) and the shield wire to B22 (S-1/2).

( ) Lead 12 to B18 (S-1) and the shield wire to solder lug AX (NS).

( ) Lead 9 to B15 (S-1) and the shield wire to solder lug AX (NS).

BO#3. Connect the harness leads as follows:

( ) Lead 5 to C24 (S-1) and the shield wire to C23 (S-1/2).

( ) Lead 13 to E24 (S-1) and the shield wire to E22 (S-1/2).

BO#4. Connect some of the harness leads as follows:

( ) Lead 2 to F21 (NS) and the shield wire to F23 (NS).

( ) Lead 4 to F21 (S-2) and the shield wire to F23 (S-2/4).

( ) Lead 7 to F16 (S-1) and the shield wire to solder lug AZ (NS).

BO#6. Connect the harness leads as follows:

( ) Lead 17 to F15 (S-1/2) and the shield wire to F18 (S-1/2).

( ) Lead 3 to G4 (S-1/2) and the shield wire to G3 (S-1/4).

Refer to Pictorial 12-22 (in the "Illustration Booklet") for the following steps.

BO#2. Connect the harness leads as follows:

( ) Lead 15 to B19 (S-1) and the shield wire to solder lug AG (NS).

( ) Lead 14 to B17 (S-1) and the shield wire to solder lug AG (S-2).

( ) Lead 13 to B11 (S-1) and the shield wire to solder lug AF (S-1). Be careful; do not let the soldering iron touch other wires.

( ) Lead 11 to B16 (S-1) and the shield wire to solder lug AX (NS).

( ) Lead 8 to B13 (S-1) and the shield wire to solder lug AX (S-4).

BO#4. Connect one of the harness leads as follows:

( ) Lead 6 to F15 (S-1/3) and the shield wire to solder lug AZ (S-2/4).

BO#7.

( ) Cut the orange wire 2-1/2" from where it leaves the breakout. Save the cut off piece.

( ) Connect the free end of the orange wire coming from the harness to terminal G2 (NS).

( ) Connect the orange wire that was cut off the harness from terminal G2 (S-2) to terminal B2 (S-1/3). Route this wire as shown on the Pictorial.

Refer to Pictorial 12-23 for the following steps.

BO#5. Connect the harness leads as follows:

( ) Remove an additional 1/2" of insulation (total 7/8") from one of the red wires. Wrap the bare end around terminal H5 (NS) and then around H6 (S-1).

( ) Wrap the bare end of another red wire around H5 (S-3/4).

( ) Wrap the bare end of another red wire around terminal H6 (S-1/2).

( ) Wrap the bare end of the remaining red wire around H6 (S-1/3).

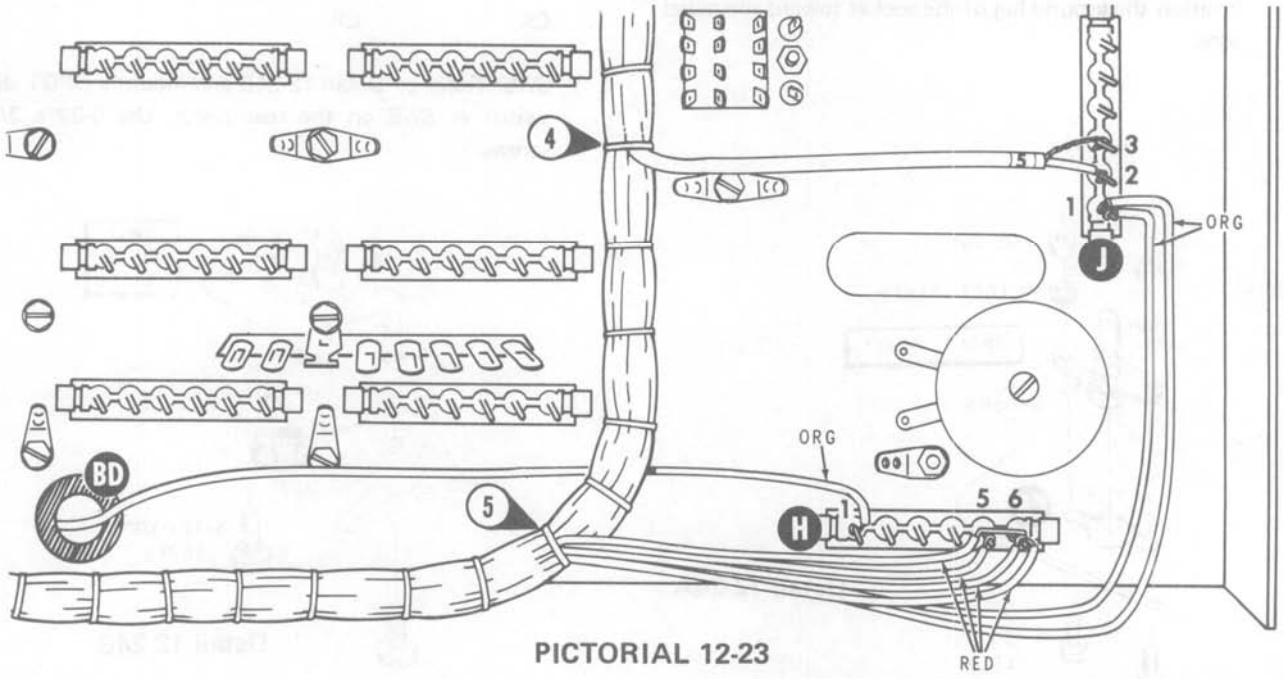
( ) Connect both orange wires to terminal J1 (S-2/4).

( ) Prepare a 12-1/2" stranded orange wire.

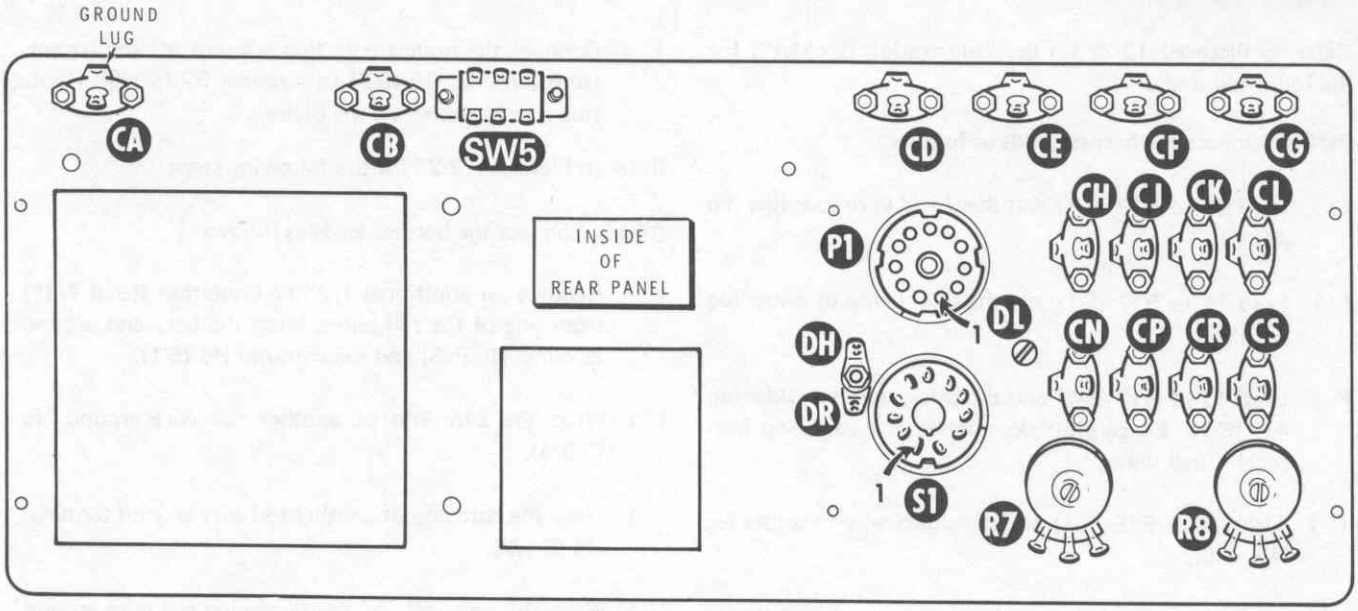
( ) Connect one end of the orange wire to terminal H1 (S-1/2). Push the other end of the wire through grommet BD.

( ) Connect lead 5, coming from BO#4, to J2 (S-1) and the shield wire to J3 (S-1/2).

Set the chassis assembly aside until it is called for in a step.



PICTORIAL 12-23



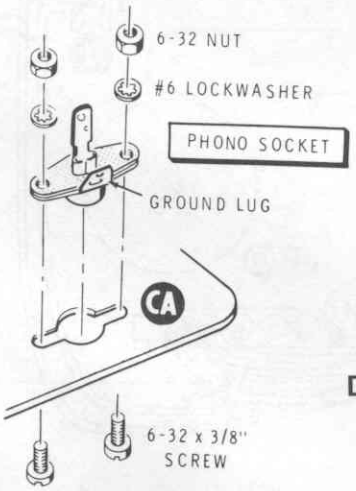
PICTORIAL 12-24

REAR PANEL

Refer to Pictorial 12-24 for the following steps.

NOTE: Place a soft cloth on your workbench to prevent scratching the panel surface.

( ) Refer to Detail 12-24A and mount a phono socket at CA on the rear panel with 6-32 x 3/8" hardware. Use the plastic nut starter to hold and start the nuts. Position the ground lug of the socket toward the panel edge.



Detail 12-24A

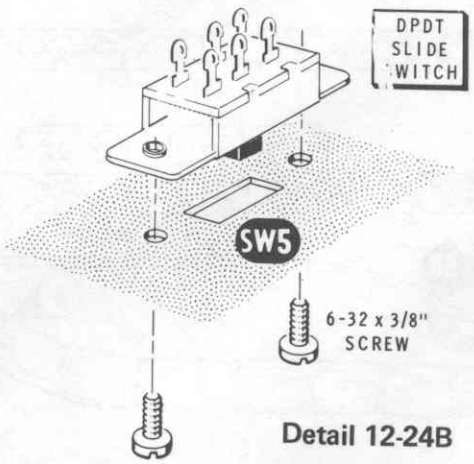
( ) Similarly, use 6-32 x 3/8" hardware to mount five phono sockets at the following locations:

CB	CF
CD	CG
CE	

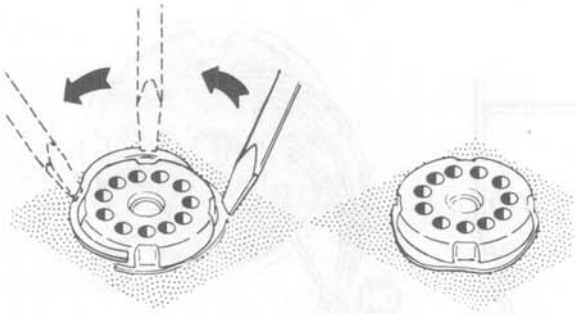
( ) Mount eight phono sockets at the following locations with 6-32 x 3/8" hardware. Position the ground lugs toward holes P1 and S1.

CH	CL	CR
CJ	CN	CS
CK	CP	

( ) SW5: Refer to Detail 12-24B and mount a DPDT slide switch at SW5 on the rear panel. Use 6-32 x 3/8" screws.



Detail 12-24B

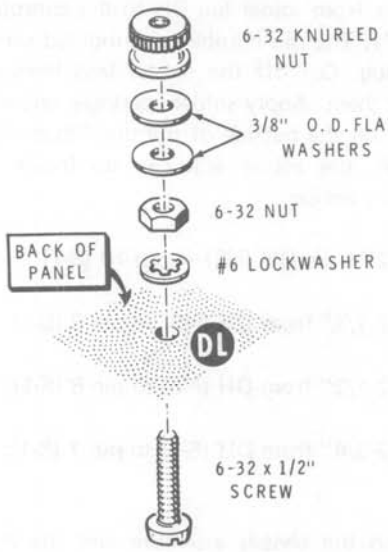


HOLD THE PLUG IN THE CHASSIS HOLE AND PLACE ONE END OF THE RING INTO THE GROOVE OF THE PLUG. USING A SCREWDRIVER, PRESS THE RING INTO THE GROOVE AROUND THE PLUG.

Detail 12-24C

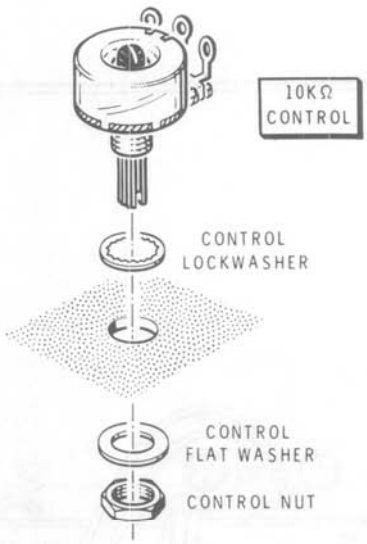
( ) Refer to Detail 12-24C and mount an 11-pin plug at P1 with a retaining ring. Position pins 1 and 11 of the plug toward the letters ACC on the panel. The pin numbers are molded into the plug.

( ) Similarly, mount an 11-pin socket at S1 with a retaining ring. Position lugs 1 and 11 of the socket toward the letters ACC on the panel.



Detail 12-24D

( ) Refer to Detail 12-24D and mount a 6-32 x 1/2" screw, a #6 lockwasher, a 6-32 nut, two 3/8" OD flat washers, and a 6-32 knurled nut at hole DL.

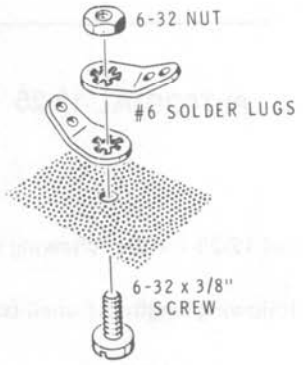


Detail 12-24E

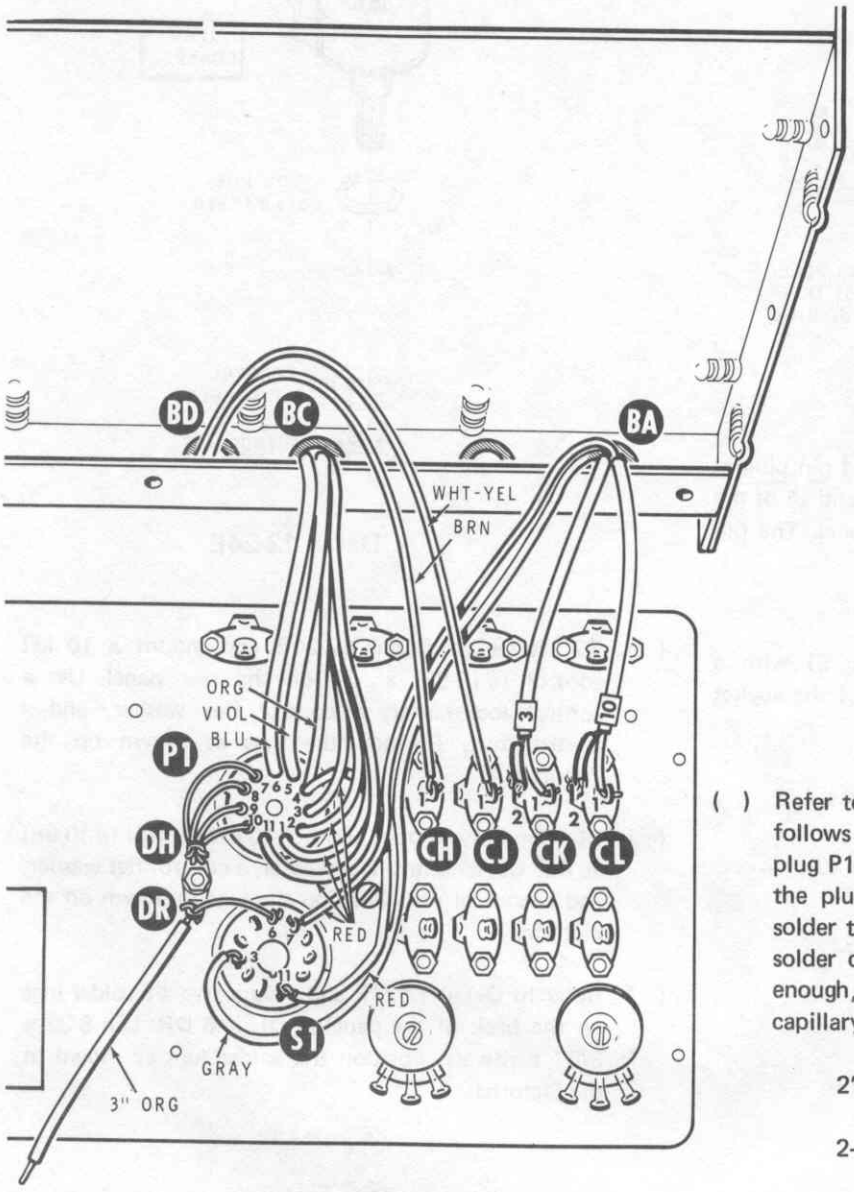
( ) R7: Refer to Detail 12-24E and mount a 10 kΩ control (#10-88) at R7 on the rear panel. Use a control lockwasher, a control flat washer, and a control nut. Position the lugs as shown on the Pictorial.

( ) R8: Similarly, mount another 10 kΩ control (#10-88) at R8. Use a control lockwasher, a control flat washer, and a control nut. Position the lugs as shown on the Pictorial.

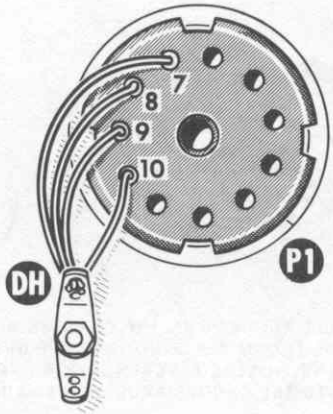
( ) Refer to Detail 12-24F and mount two #6 solder lugs on the back of the panel at DH and DR. Use 6-32 x 3/8" hardware. Position the solder lugs as shown in the Pictorial.



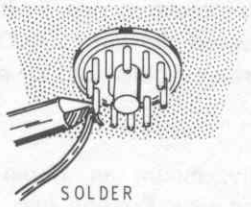
Detail 12-24F



PICTORIAL 12-25



PUSH THE WIRE INTO THE HOLE UNTIL IT COMES OUT OF THE END OF THE PIN. APPLY SOLDER TO THE TIP OF THE HEATED PIN. SOLDER WILL FLOW UP INTO THE PIN BY CAPILLARY ACTION. CUT OFF THE EXCESS WIRE AT THE END OF THE PIN.



Detail 12-25A

( ) Refer to Detail 12-25A and connect the bare wires as follows from solder lug DH to the appropriate pin of plug P1. The pin numbers are molded on the back of the plug. Cut off the excess lead lengths after you solder them. Apply solder sparingly and avoid getting solder on the outside of the pin. When the pin is hot enough, the solder will run up inside the pin by capillary action.

2" from DH (NS) to pin 10 (S-1).

2-1/4" from DH (NS) to pin 9 (S-1).

2-1/2" from DH (NS) to pin 8 (S-1).

2-3/4" from DH (S-4) to pin 7 (S-1).

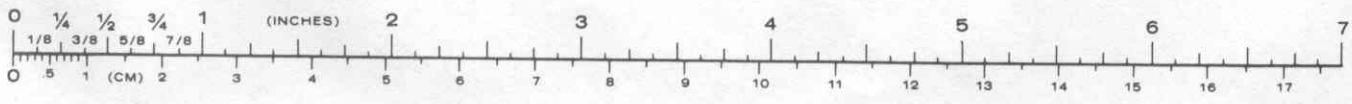
Refer to Pictorial 12-25 for the following steps.

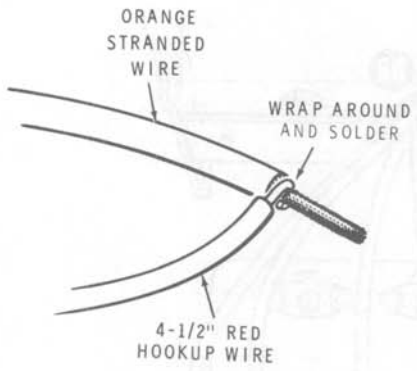
( ) Cut the following lengths of small bare wire:

2"	2-1/2"
2-1/4"	2-3/4"

( ) Position the chassis assembly and the rear panel as shown in the Pictorial.

( ) Remove an additional 3/8" of insulation (total 3/4") from each of the seven wires coming from grommet BC.





Detail 12-25B

( ) Prepare a 4-1/2" red wire.

( ) Refer to Detail 12-25B and, just below the insulation, wrap one end of the 4-1/2" red wire around the orange stranded wire coming from grommet BC (S-1).

( ) Push the end of the orange stranded wire into pin 4 of plug P1 until the wire emerges from the end of the pin and the end of the wire insulation is covered by the plug. Refer to Detail 12-25A and solder the wire to the plug tip.

( ) Connect the free end of the 4-1/2" red wire to socket S1 lug 11 (S-1).

( ) Connect the other six wires coming from grommet BC to the pins of plug P1 as follows. Solder each wire to the tip of its pin.

Blue to pin 6	Red to pin 3
Violet to pin 5	Red to pin 2
Red to pin 11	Red to pin 1

( ) Tug gently on each wire to make sure it is well soldered.

( ) Cut off excess lead lengths at the tip of each pin.

( ) Inspect the outside of each pin for the presence of solder. If you find any, shave it off with a sharp knife so the pins can enter the power cable socket without interference.

( ) Connect the red wire coming from grommet BA to socket S1 lug 7 (S-1).

( ) Connect the end of the gray wire coming from grommet BA to socket S1 lug 3 (S-1).

Connect the two shielded cables coming from grommet BA as follows. Use 5/8" of small sleeving on the shield wire of each cable.

( ) Center conductor of cable 3 to phono socket CK lug 1 (S-1), and the shield wire to lug 2 (S-1).

( ) Center conductor of cable 10 to phono socket CL lug 1 (S-1), and the shield wire to lug 2 (S-1).

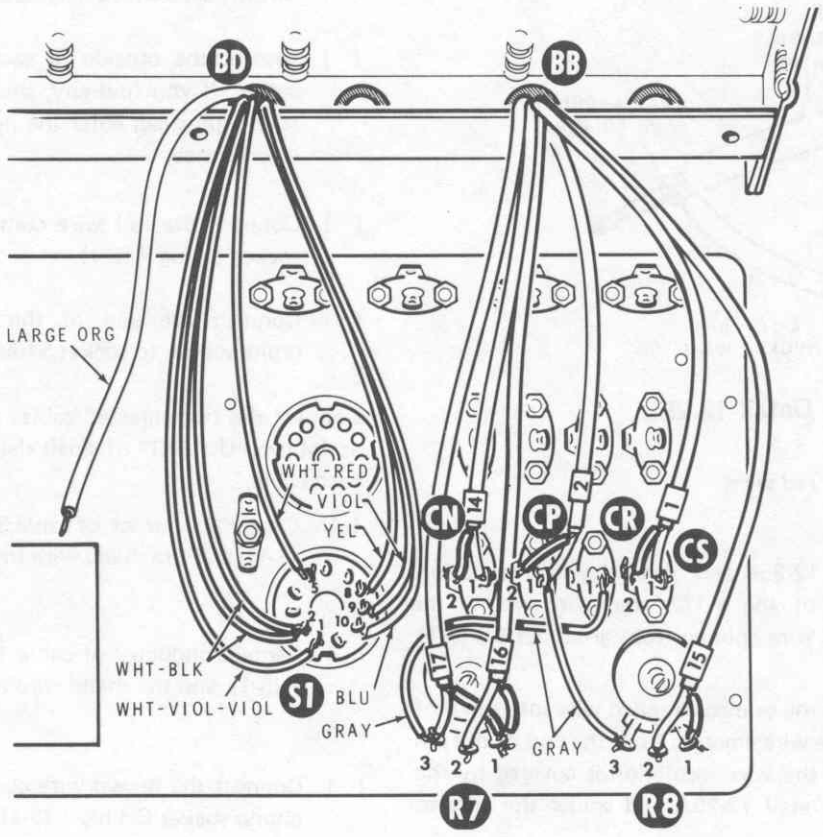
( ) Connect the brown wire coming from grommet BD to phono socket CH lug 1 (S-1).

( ) Connect the white-yellow wire coming from grommet BD to phono socket CJ lug 1 (S-1).

( ) Connect a 1-1/2" small bare wire from socket S1 lug 6 (S-1) to solder lug DR (NS).

( ) Cut a 3" orange stranded wire. Remove 3/8" of insulation from each end. Melt a minimum amount of solder on each bare end to hold the fine strands together.

( ) Connect one end of this wire to solder lug DR (S-2). The other end will be connected later.



PICTORIAL 12-26

Refer to Pictorial 12-26 for the following steps.

( ) Prepare the following gray wires:

4" 2-3/4"

( ) Connect the 4" gray wire from phono socket CR lug 1 (S-1) to control R7 lug 3 (NS).

( ) Connect the 2-3/4" gray wire from phono socket CP lug 1 (NS) to control R8 lug 3 (S-1).

Connect the shielded cables coming from grommet BB as follows. Use 5/8" of small sleeving on the shield wire of each cable.

( ) Center conductor of cable 14 to phono socket CN lug 1 (S-1), and the shield wire to lug 2 (S-1).

( ) Center conductor of cable 1 to phono socket CS lug 1 (S-1), and the shield wire to lug 2 (S-1).

( ) Center conductor of cable 17 to control R7 lug 3 (S-2), and the shield wire to lug 1 (NS).

( ) Center conductor of cable 16 to control R7 lug 2 (S-1), and the shield wire to 1 (S-2).

( ) Center conductor of cable 2 to phono socket CP lug 1 (S-2), and the shield wire to lug 2 (S-1).

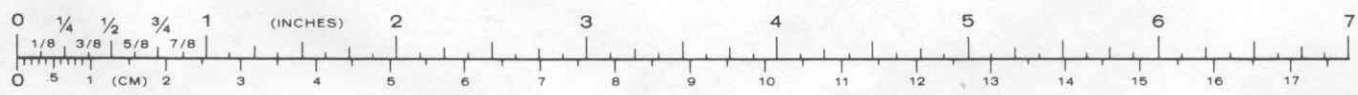
( ) Center conductor of cable 15 to control R8 lug 2 (S-1), and the shield wire to lug 1 (S-1).

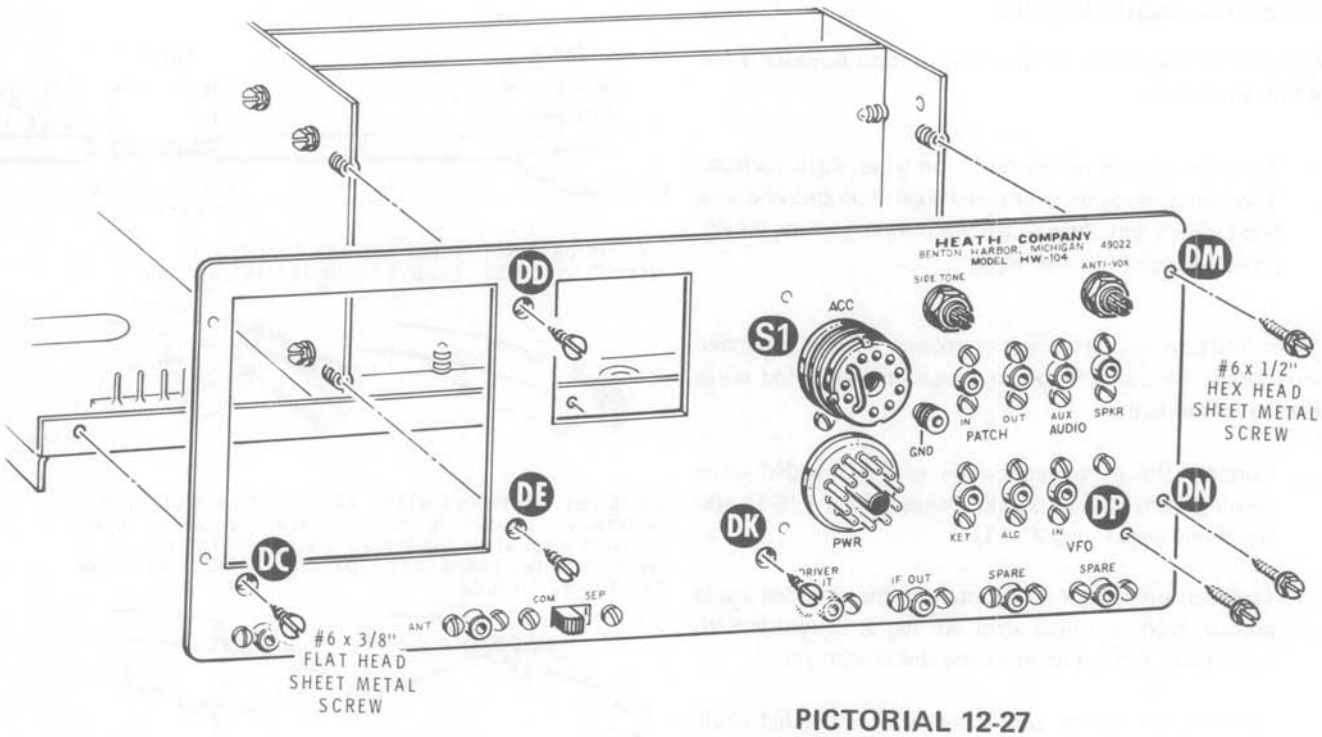
Connect the wires coming from grommet BD to socket S1 as follows:

( ) Yellow to lug 8 (S-1).

( ) Violet to lug 9 (S-1).

( ) Blue to lug 10 (S-1).





PICTORIAL 12-27

( ) White-red to lug 5 (S-1).

( ) Two white-black to lug 2 (S-2).

( ) White-violet-violet to lug 1 (S-1).

NOTE: The large orange wire coming from grommet BD will be connected later.

Refer to Pictorial 12-27 for the following steps.

( ) Refer to the Pictorial and attach the rear panel to the back of the chassis and the shields. Use #6 x 3/8" flat head sheet metal screws at DC, DD, DE, and DK. Use #6 x 1/2" hex head sheet metal screws at DM, DN, and DP. CAUTION: Inspect the junction of the panel and chassis carefully to make sure no wires have been pinched between the two pieces.

( ) Use an ohmmeter to check for short circuits at each phono socket. Connect the common lead to the panel and insert the probe into the phono socket to contact the center conductor.

( ) Use a phono plug to check each of the phono sockets for excessive solder. If a plug cannot be inserted, reheat the center lug of the socket and position the rear panel so the solder will flow back toward the wire connected to it.

( ) Prepare a 2-3/4" small orange solid wire. Remove 1/2" of insulation from each end.

( ) Refer to Detail 12-27A and, from the back of the remaining 11-pin plug, push the ends of the orange wire into pins 2 and 5. Solder the wires at the pin tips and cut off any excess wire lengths.

( ) Insert the plug as far as it will go into socket S1 on the rear panel.

( ) An octal plug cap is furnished for this plug. Install it now, if you so desire.

Detail 12-27A

UNDER-CHASSIS WIRING

Refer to Pictorial 12-28 (in the "Illustration Booklet") for the following steps.

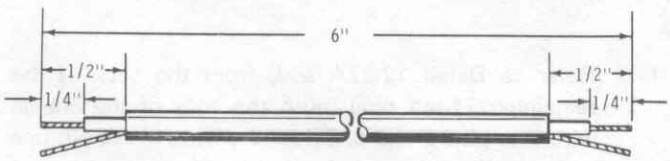
( ) Turn the chassis upside-down on your work surface. Then sight along the rear panel edge from one end and bend down any lugs 2 of the phono sockets which project above the panel edge.

NOTE: Shift the wiring harness as necessary when you make connections. Be careful not to touch any insulated wires with the soldering iron.

( ) Connect the center conductor of the shielded cable coming from F11 to phono socket CE lug 1 (S-1), and the shield wire to lug 2 (S-1).

( ) Connect the center conductor of the shielded cable coming from terminal strip AE lug 2 to switch SW5 lug 2 (S-1). Do not connect the shield wire yet.

( ) Connect the center conductor of the shielded cable coming from relay RY lug 1 to switch SW5 lug 3 (S-1). Do not connect the shield wire yet.

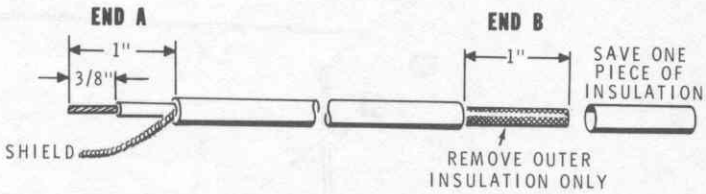


Detail 12-28A

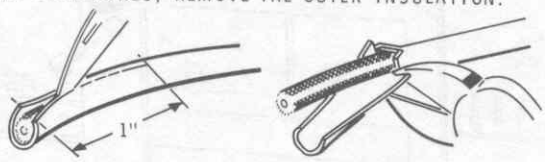
( ) Refer to Detail 12-28A and prepare a 6" small shielded cable.

( ) Connect the center conductor at one end of the prepared cable to SW5 lug 1 (S-1), and the shield wire to lug 4 (S-1). At the other end of the cable, connect the center conductor to phono socket CA lug 1 (S-1), and the shield wire to lug 2 (NS).

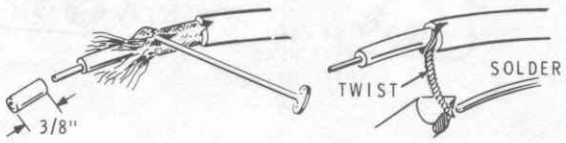
( ) C13: Place a 1" length of small sleeving on each lead of a 500 μF electrolytic capacitor. Then connect the lead from the positive (+) marked end to J1 (S-1/5) and the other lead to phono socket CA lug 2 (S-2). Position this capacitor so no part of its body projects below the edge of the chassis.



TAKING CARE NOT TO CUT THE OUTER SHIELD OF VERY THIN WIRES, REMOVE THE OUTER INSULATION.



COMB OUT THE SHIELD WIRES AND TWIST THEM TIGHTLY TOGETHER. REMOVE 3/8" OF THE INNER INSULATION APPLY A SMALL AMOUNT OF SOLDER TO THE END OF THE SHIELD WIRES AND THE INNER LEAD. USE ONLY ENOUGH HEAT FOR THE SOLDER TO FLOW.



Detail 12-28B

( ) Connect the shield wire of the cable coming from terminal strip AE lug 3 to switch SW5 lug 5 (S-1).

( ) Connect the shield wire of the cable coming from solder lug BW to switch SW5 lug 6 (S-1).

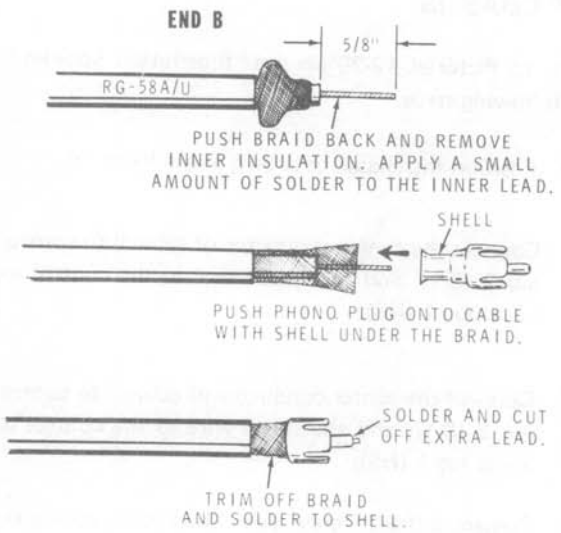
( ) Connect the center conductor of the shielded cable coming from H3 to phono socket CD lug 1 (S-1), and the shield wire to lug 2 (S-1).

( ) Cut three 11" RG-58A/U coaxial cables.

( ) Refer to Detail 12-28B and prepare the three 11" coaxial cables as shown. At end B of each cable, carefully cut the outer insulation completely around the cable and slide off the 1" length of insulation in one piece. Save one of these pieces for use later.

( ) Refer to Detail 12-28C and install a phono plug on end B of each coaxial cable. Be sure to use plug #438-46.

( ) Cut three 1" lengths of large sleeving.



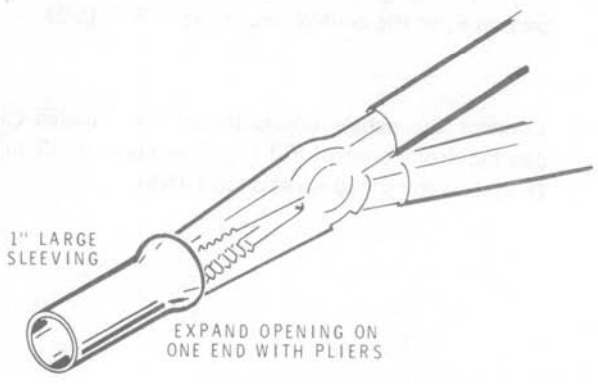
Detail 12-28C

( ) Refer to Detail 12-28D and use pliers to expand the opening at one end of each piece of large sleeving.

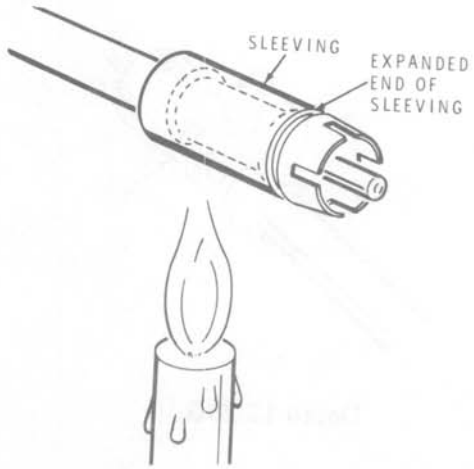
( ) Refer to Detail 12-28E and, starting at the other end of each of the cables, push the expanded end of the sleeving along the cable and up over the braid soldered to the shell of the phono plug.

( ) Pass a flame back and forth under all sides of each large sleeving to shrink it tightly in place.

( ) Cut the 1" length of outer insulation (saved earlier) to 3/4". Then slide the insulation onto the shield on one of the 11" coaxial cables. Connect the shield to phono socket CB lug 2 (S-1), and the center conductor to lug 1 (S-1).



Detail 12-28D



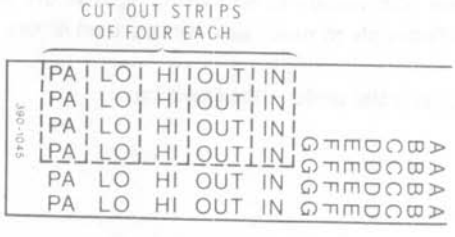
Detail 12-28E

( ) Slide the piece of insulation completely over phono socket CB lug 2 so the two phono socket lugs cannot short-circuit if they should become bent.

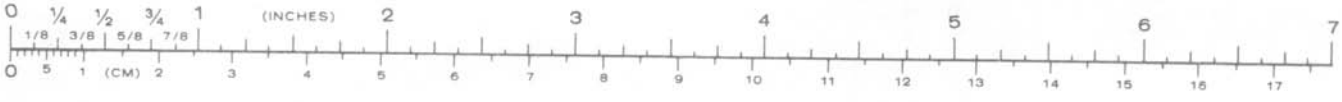
( ) Connect the center conductor of the second coaxial cable to relay RY lug 5 (S-1), and the shield wire to solder lug BK (NS).

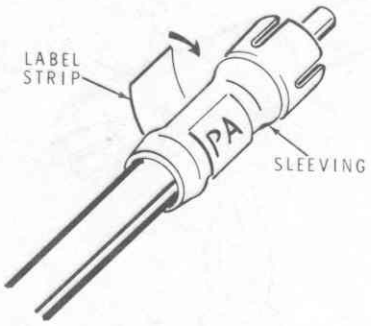
( ) Connect the center conductor of the third coaxial cable to relay RY lug 9 (S-1), and the shield wire to solder lug BK (S-3). If you cannot push these shield wires through the solder lug hole, wrap them around the bare wire between solder lug BK and lug 13 of the relay. Be sure to solder both shields.

( ) Refer to Detail 12-28F and, from the label sheet, cut out four strips of four groups each of PA, LO, HI, OUT, and IN.



Detail 12-28F





Detail 12-28G

( ) Remove the protective backing from the letters PA. Then refer to Detail 12-28G and wrap the adhesive side of the label around the black sleeving of the phono plug on the end of the coaxial cable coming from relay RY lug 5. The letter strips are long enough to overlap.

Similarly, apply letters to the phono plug sleeving on the other cables as follows:

( ) Letters IN to the cable coming from relay RY lug 9.

( ) Letters OUT to the cable coming from phono socket CB.

( ) Letters HI to the small cable coming from H3 and chassis cutout BL.

( ) Letters LO to the small cable coming from relay RY lug 1 and chassis cutout BL.

( ) Push the three large coaxial cables through chassis cutout BL (the two shielded cables, now HI and LO, were previously pushed through cutout BL).

( ) Check the under-chassis wiring against the steps and the Pictorials to make sure there are no errors.

This completes the under-chassis wiring.

TOP CHASSIS

Refer to Pictorial 12-29 (in the "Illustration Booklet") for the following steps.

( ) Position the chassis as shown in the Pictorial.

( ) Connect the center conductor of cable 6 to control R9 lug 2 (S-1), and the shield wire to the control solder lug at lug 1 (NS).

( ) Connect the center conductor of cable 7 to control R9 lug 3 (S-1), and the shield wire to the control solder lug at lug 1 (NS).

( ) Prepare a 3-1/2" gray wire. Then connect one end to control R9 the control solder lug at lug 1 (S-3). The other end will be connected later.

( ) Connect the yellow wire coming from BO#8 to control R15 lug 2 (S-1).

( ) Connect the red wire coming from BO#8 to control R15 lug 6 (S-3).

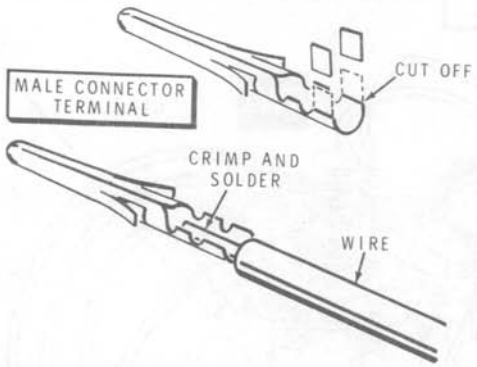
( ) Connect the white-red wire coming from BO#8 to control R15 lug 5 (S-2).

( ) Connect the white-red-red wire coming from BO#8 to SW6 lug 1 (S-1).

( ) Connect a 1-1/2" length of small bare wire from control R3 lug 1 (NS) to the control solder lug at R15 (NS).

( ) Connect the gray wire coming from switch SW2, section F, to the control solder lug at R15 (S-3).

( ) Connect the center conductor of the shielded cable coming from control R2 lug 3 to control R3 lug 3 (S-1), and the shield wire to lug 1 (NS).



Detail 12-29A

( ) Connect the center conductor of cable 12 to control R3 lug 2 (S-1), and the shield wire to lug 1 (S-3).

( ) Prepare a 9" red wire.

( ) Clip the four male terminals from their retaining bands. Then prepare each terminal so it appears as shown in Detail 12-29A.

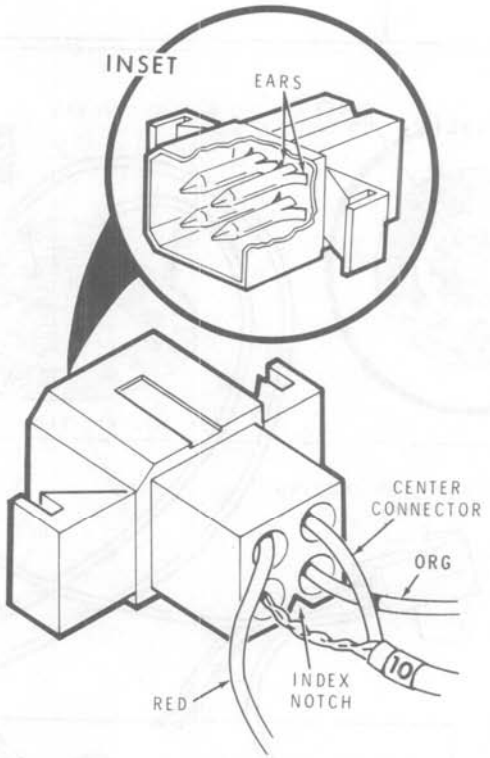
Refer to Detail 12-29A and install male terminals on wires as follows:

( ) Male terminal on the 9" red wire (S-1).

( ) Male terminal on the center conductor of cable 10 (S-1).

( ) Male terminal on the shield wire of cable 10 (S-1).

( ) Male terminal on the orange wire coming from switch SW3, section B (S-1).



Detail 12-29B

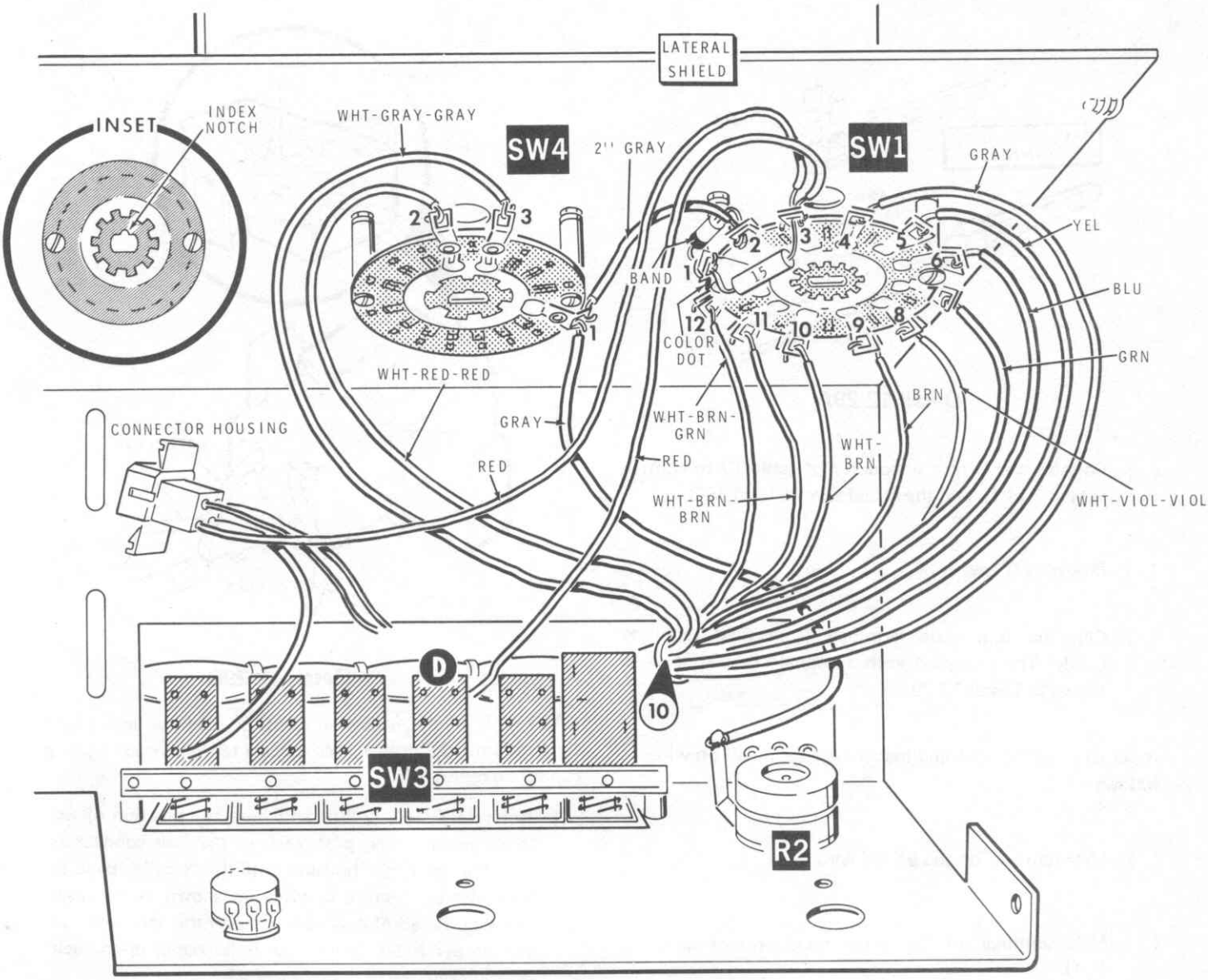
CAUTION: In the following steps, be sure you insert each terminal into the proper hole (once a terminal is installed, it cannot be removed).

( ) Refer to Detail 12-29B and note the position of the index notch. Then push each of the four connectors into the connector housing until the "ears" expand to hold the connectors in place, as shown in the inset drawing. Be absolutely sure to insert the connectors in the proper holes. Select the holes based upon their position relative to the index notch.

( ) Push cables 1, 4, and 11 back through chassis cutout AC. They will be connected later.

( ) Connect the black wire coming from BO#10 to control R1 lug 2 (S-1).

( ) Connect the white-black wire coming from BO#10 to control R1 lug 1 (S-1).



PICTORIAL 12-30

Refer to Pictorial 12-30 for the following steps.

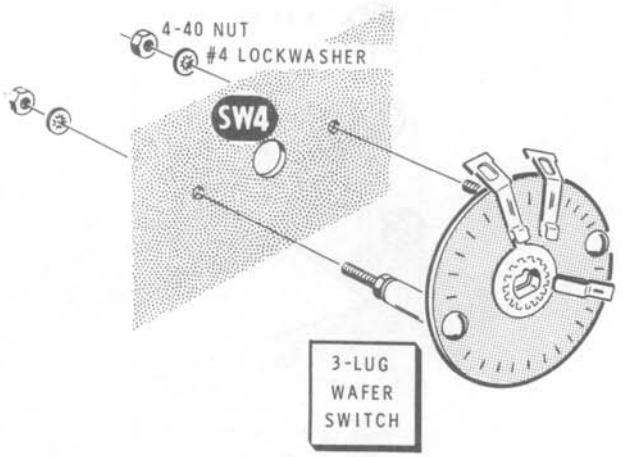
( ) SW4: Refer to Detail 12-30A and mount a 3-lug wafer switch at SW4 on the lateral shield. Use #4 lockwashers and 4-40 nuts. Be sure to position the switch lugs as shown on the Pictorial.

( ) Connect the gray wire coming from control R2 to switch SW4 lug 1 (NS).

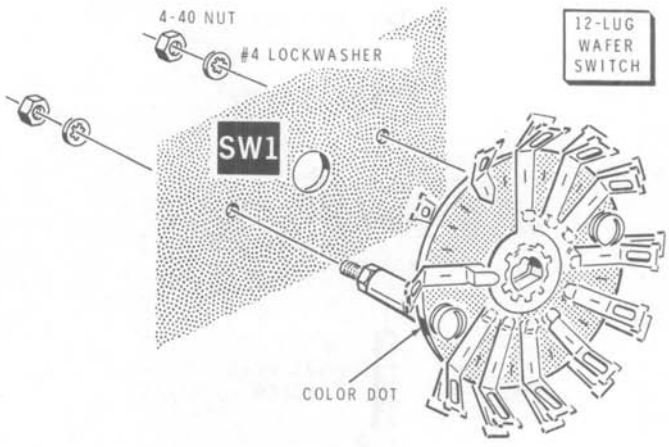
( ) Prepare a 2" gray wire. Then connect one end of this wire to switch SW4 lug 1 (S-2). The other end will be connected later.

( ) Connect the white-red-red wire coming from BO#10 to switch SW4 lug 2 (S-1).

( ) Connect the white-gray-gray wire coming from BO#10 to switch SW4 lug 3 (S-1).



Detail 12-30A



Detail 12-30B

( ) SW1: Refer to Detail 12-30B and mount the 12-lug wafer switch at SW1 on the lateral shield. Use #4 lockwashers and 4-40 nuts. Be sure to position the switch with the color dot as shown on the Pictorial.

( ) ZD1: Connect the lead at the banded end of a VR 9.1 zener diode (#56-19) to switch SW1 lug 1 (NS). Connect the other diode lead to lug 2 (NS).

( ) R11: Connect a 15 Ω, 1-watt (brown-green-black) resistor to switch SW1 from lug 1 (S-2) to lug 3 (NS).

( ) Connect the gray wire coming from switch SW4 to switch SW1 lug 2 (S-2).

( ) Connect the red wire coming from the white connector housing to switch SW1 lug 3 (NS).

( ) Connect the red wire coming from switch SW3, section D, to switch SW1 lug 3 (S-3).

NOTE: You will connect more wires to switch SW1 in the following steps. Connect each wire to the two lugs, one on the front and one on the back of the wafer, at each location. The step will call for "S-2." Be very sure to solder each wire to both switch lugs.

Connect the nine wires coming from BO#10 to switch SW1 as follows:

( ) White-brown-green to lug 12 (S-2).

( ) White-brown-brown to lug 11 (S-2).

( ) White-brown to lug 10 (S-2).

( ) Brown to lug 9 (S-2).

( ) White-violet-violet to lug 8 (S-2).

( ) Green to lug 7 (S-2).

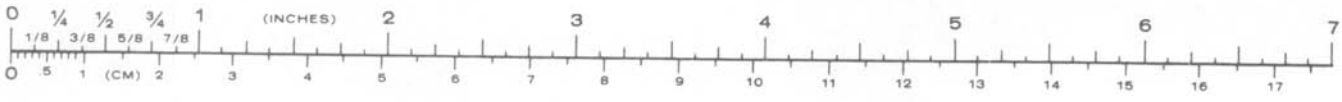
( ) Blue to lug 6 (S-2).

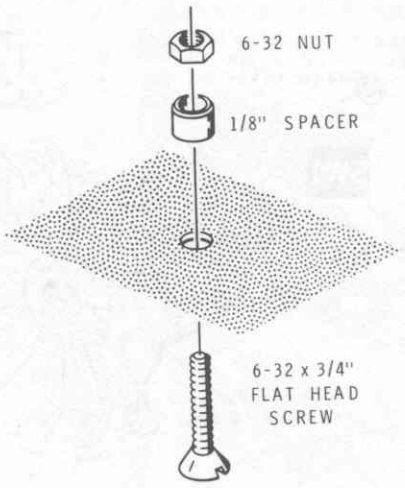
( ) Yellow to lug 5 (S-2).

( ) Gray to lug 4 (S-2).

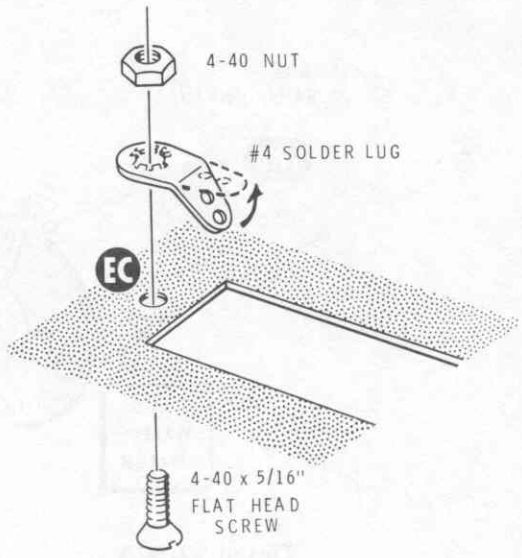
( ) Refer to the inset drawing on the Pictorial and position the rotors of both switch wafers so the index notch is up. You may wish to use one of the switch shafts to turn the rotors.

Temporarily set the chassis assembly aside.

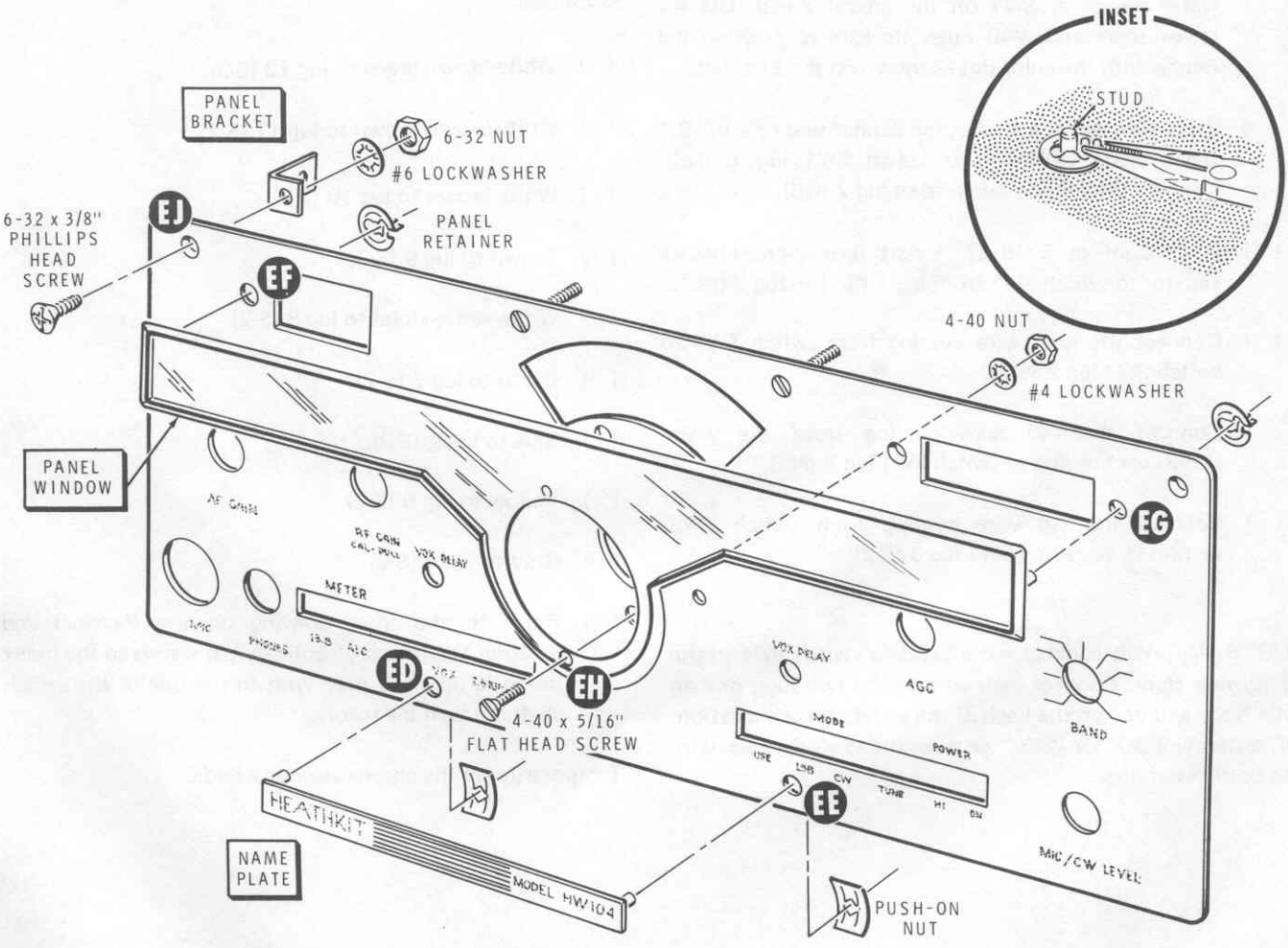




Detail 12-31A



Detail 12-31B



Detail 12-31C

FRONT PANEL PREPARATION

Refer to Pictorial 12-31 (in the "Illustration Booklet") for the following steps.

( ) Place a soft cloth on your work surface so the front panel will not be scratched.

( ) Refer to Detail 12-31A and mount 1/8" spacers at EA and EB. Use a 6-32 x 3/4" flat head screw and a 6-32 nut at each location.

( ) Refer to Detail 12-31B and flatten the #4 solder lug. Then loosely mount the #4 solder lug at EC. Use a 4-40 x 5/16" flat head screw and a 4-40 nut. Position the solder lug as shown on the Pictorial.

Refer to Detail 12-31C for the next eight steps.

( ) From the front of the panel, insert the studs on the nameplate into holes ED and EE.

( ) Hold the name plate in place and turn the panel over so the panel rests on its front (printed side) and the studs are uppermost.

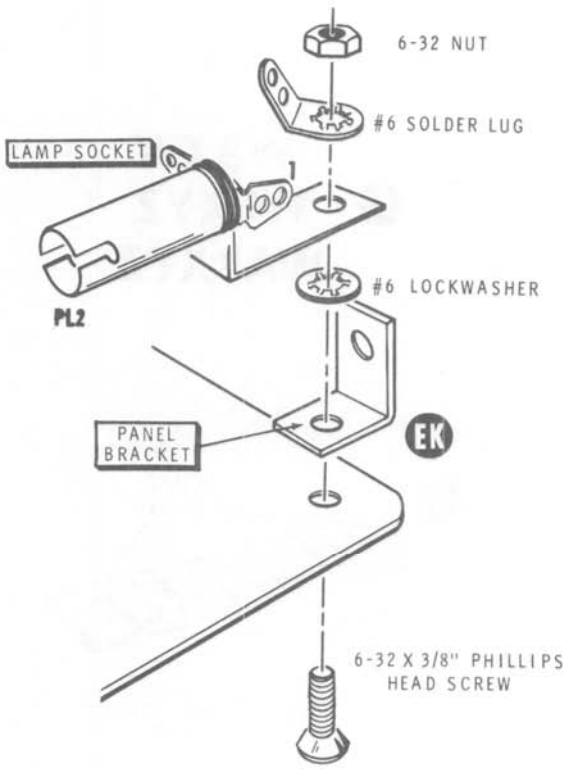
( ) Use two push-on nuts to secure the trim strip to the panel.

( ) Wipe off the panel window with water and detergent to remove all fingerprints. DO NOT SOAK. After drying, do not touch the red part of the window.

( ) From the front of the panel, insert the studs on the panel window into holes EF and EG.

( ) Refer to the inset drawing and secure the window at EF and EG with two panel retainers.

( ) Use 4-40 x 5/16" flat head hardware to secure the window at EH.



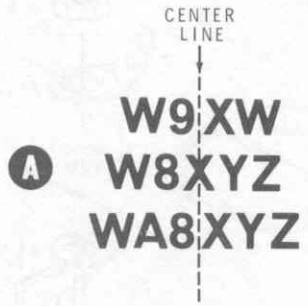
Detail 12-31D

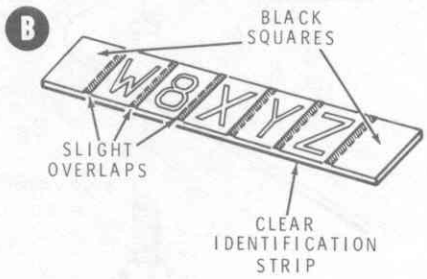
( ) Mount a panel bracket on the rear of the panel at EJ with 6-32 x 3/8" phillips head hardware. Be sure to mount the shorter side of the bracket against the panel.

Refer to Detail 12-31D for the next three steps.

( ) PL2: Mount a lamp socket and a panel bracket onto the front panel at EK with 6-32 x 3/8" phillips head hardware and a #6 solder lug. Be sure to mount the shorter side of the bracket against the panel. Position the solder lug as shown.

( ) Bend lug 1 of the lamp socket, PL2, back as shown.





Detail 12-31E

NOTES:

1. If you wish to use the call letter display, this note and following steps tell you how to mount your call letters on a clear plastic identification strip which you will mount in a front panel opening. If you do not wish to use the display, use the solid black squares on the call letters label to completely cover the clear identification strip. Be sure to overlap the edges of each square.

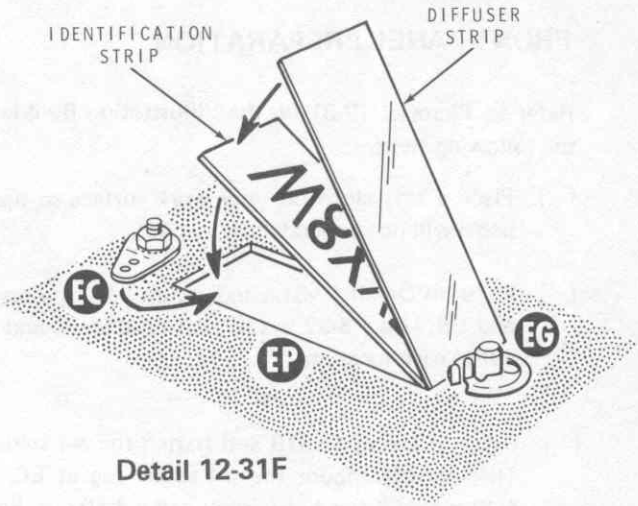
2. The letters of your call will be centered on the clear identification strip. To accomplish this, start at the center of the strip and work first to the right end of your call and then to the left.

3. There are some double letters, such as WA and WB, on the call letter label. Use these double letters whenever possible to insure proper spacing.

( ) Locate the clear identification strip. Then remove the protective backing paper from each side, if not already done.

( ) Refer to Detail 12-31E, Part A, and determine the center line of your call.

( ) Start at the center of your call and remove letters, one at a time, from the call letter label sheet and press the adhesive side into position on the clear plastic identification strip. Tweezers may help you to position the letters properly. The edges of the labels must overlap each other slightly to prevent light leakage, so proper alignment of the labels on the strip is important. Refer to Part B of Detail 12-31E.



Detail 12-31F

( ) After you have your call letters centered on the identification strip, fill the remaining clear spaces at each end of your call with black squares. Remember to overlap the edges.

Refer to Detail 12-31F for the next three steps.

NOTE: When you install the identification strip and the white plastic diffuse strip in the next step, be sure to insert the right end of each piece under the panel retainer at EG.

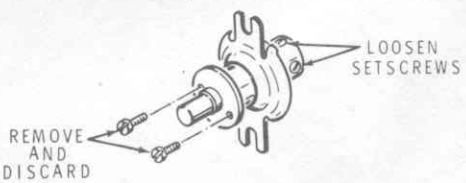
( ) Place the identification strip into opening EP so the letters will appear correctly when viewed from the front panel.

( ) Place the white plastic diffuser strip into opening EP.

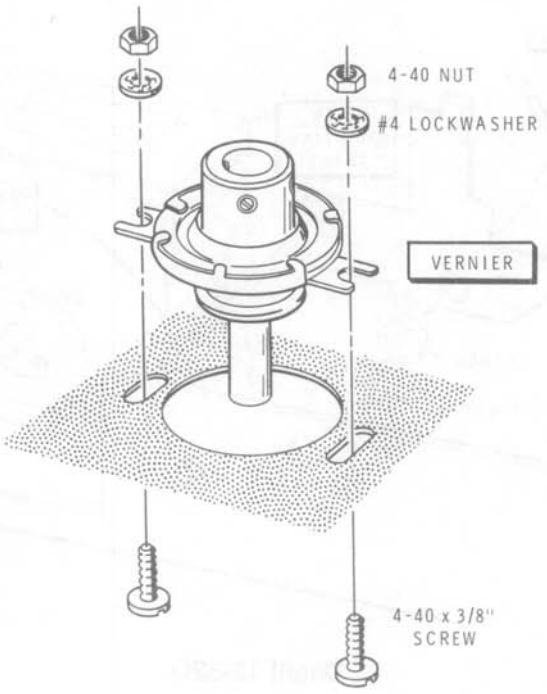
( ) Position the end of the solder lug at EC over the left end of the diffuser strip to hold the display in place as shown in the Pictorial.

( ) Refer to Detail 12-31G and remove and discard the two brass screws in the collar of the vernier drive.

( ) Loosen the two setscrews in the bushing of the vernier drive just enough to allow a 1/4" shaft to be inserted into the bushing.



Detail 12-31G



Detail 12-31H

( ) Refer to Detail 12-31H and loosely mount the vernier onto the panel. Use 4-40 x 3/8" hardware at EL and EN.

FRONT PANEL AND VFO MOUNTING

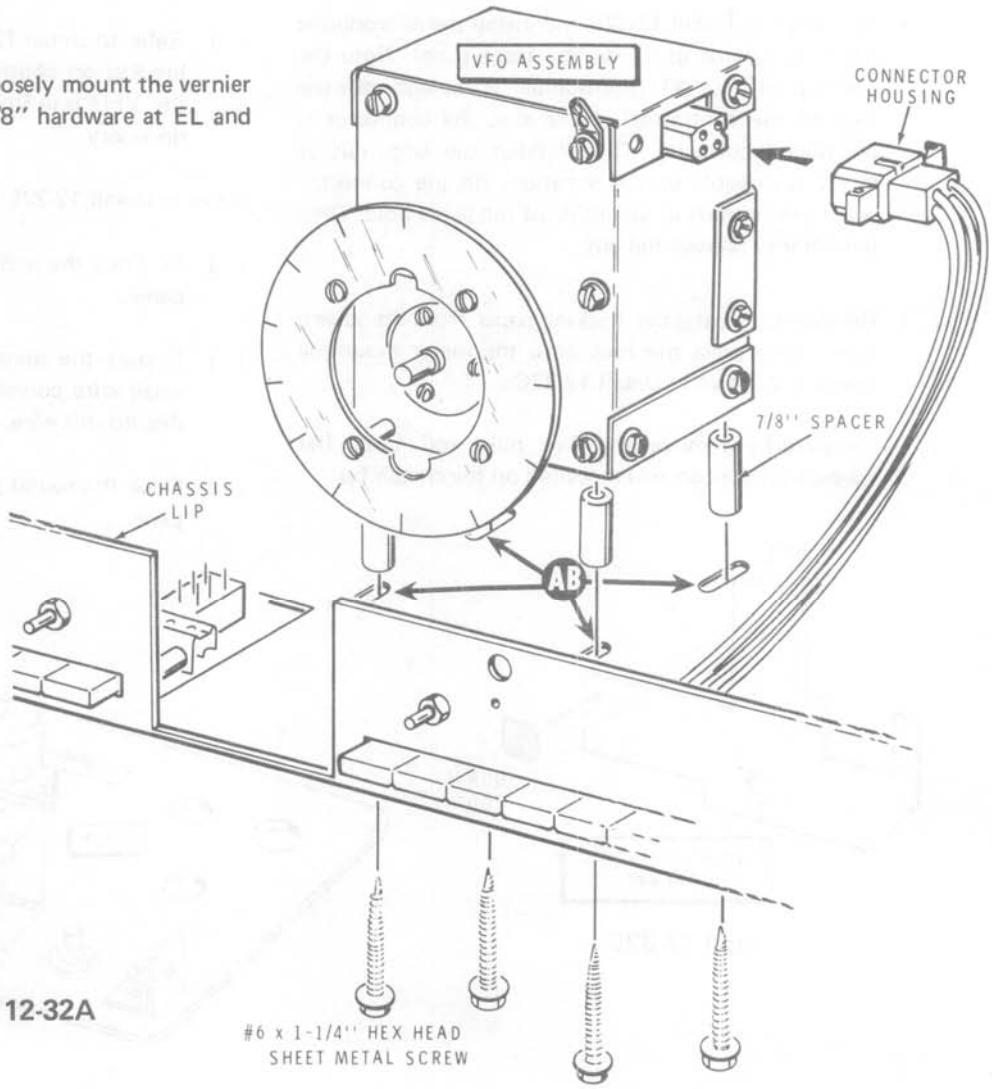
Refer to Pictorial 12-32 (in the "Illustration Booklet") for the following steps.

( ) Use a #6 x 1-1/4" hex head sheet metal screw to prethread the four holes in the bottom of the VFO assembly. Be sure to keep the screw perpendicular to the bottom surface of the VFO.

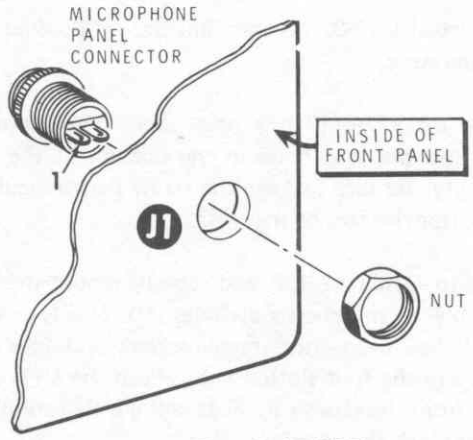
( ) Refer to Detail 12-32A and loosely mount the VFO assembly to the chassis at holes AB. Use four #6 x 1-1/4" hex head sheet metal screws and four 7/8" spacers in the four slotted holes. Push the VFO as far away from the chassis lip as it will go. Be careful you do not pinch the wires.

( ) Plug the 4-wire connector housing onto the 4-wire connector on the VFO.

( ) Position all wires and cables away from the dial.



Detail 12-32A



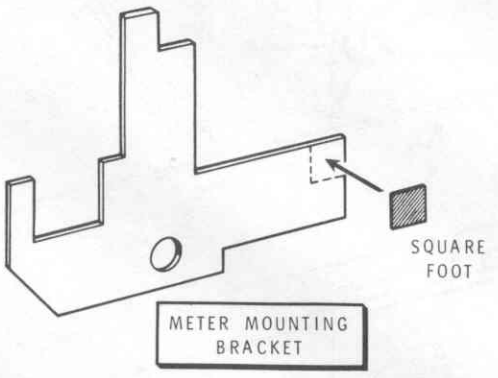
Detail 12-32B

NOTE: In some cases there may be excess paint on the inside of hole J1. Scrape off the excess paint only. Do not remove any metal.

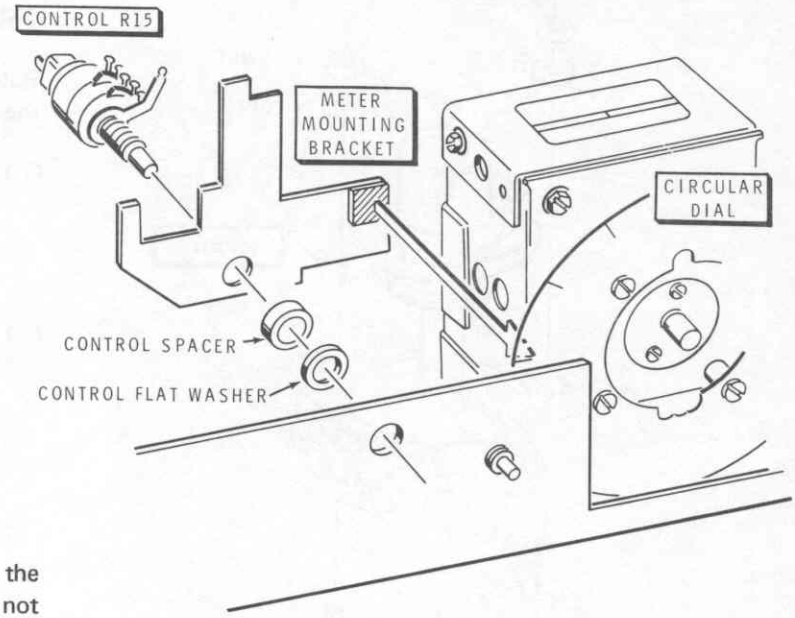
( ) J1: Refer to Detail 12-32B and install the microphone panel connector at J1 on the front panel. Note the position of hole #1 (the number is molded into the face of the connector). Make sure the connector is positioned correctly. Then tighten the large nut as ~~much~~ as possible so the serrations on the connector will form notches in the inside of the panel hole. Then temporarily remove the nut.

( ) Remove the protective backing paper from the square foot. Then press the foot onto the meter mounting bracket as shown in Detail 12-32C.

( ) Temporarily remove the five nuts and three flat washers on the controls mounted on the chassis lip.



Detail 12-32C



Detail 12-32D

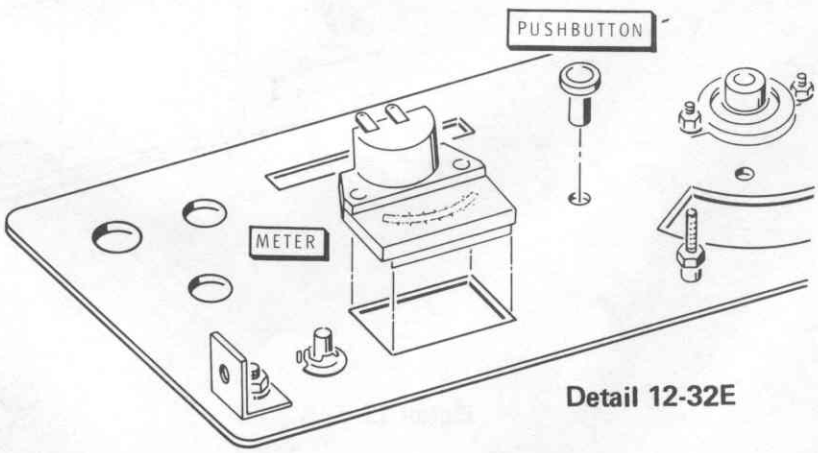
( ) Refer to Detail 12-32D and install the meter mounting bracket on control R15. Be sure the circular dial on the VFO is in front of the bracket. Reposition VFO as necessary.

Refer to Detail 12-32E for the next three steps.

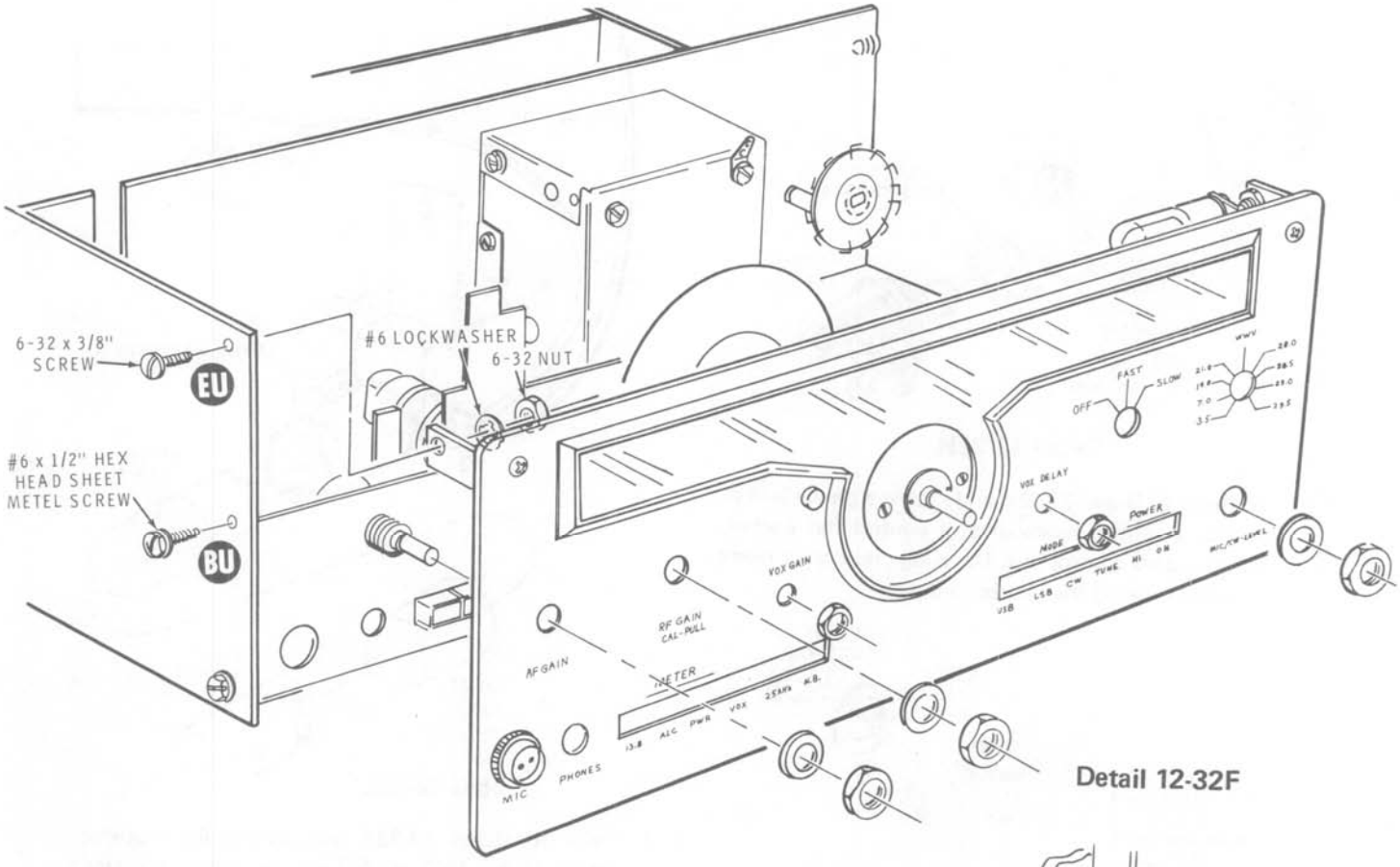
( ) M: Place the meter into the meter cutout in the front panel.

( ) Inspect the meter terminals carefully. If you find a small wire connecting the two terminals, remove and discard this wire.

( ) Place the round pushbutton into its hole in the front panel.



Detail 12-32E



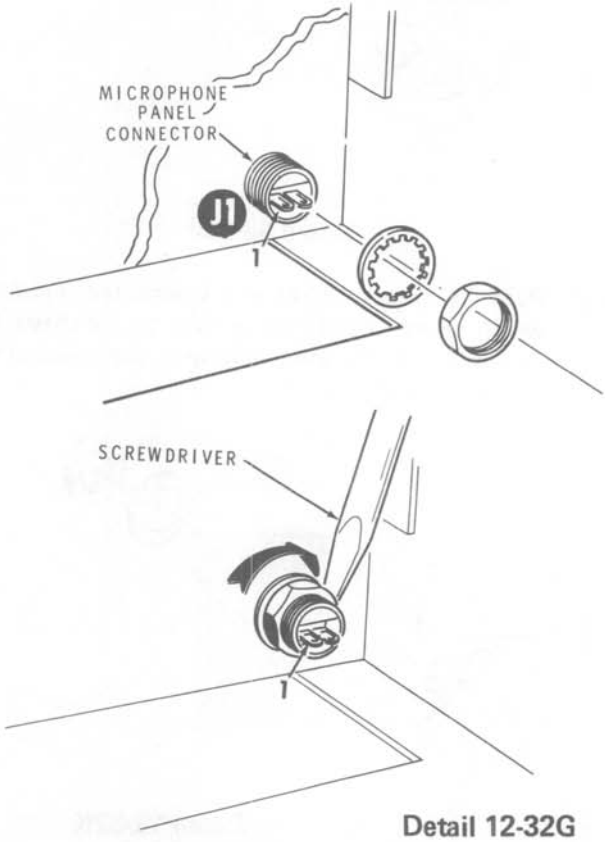
Detail 12-32F

( ) Refer to Detail 12-32F and fit the front panel onto the control bushings and the pushbutton switches. Be sure the meter and the round pushbutton are still in place. Then replace the nuts and washers that you removed earlier. Tighten the nuts finger tight. Check for wires that might be pinched between the panel and chassis.

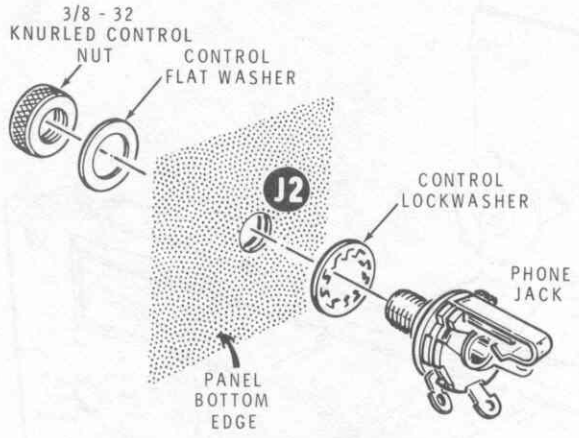
( ) Secure the front panel to the left side panel at EU with 6-32 x 3/8" hardware.

( ) Install a #6 x 1/2" hex head sheet metal screw through the left side panel at BU.

( ) Refer to Detail 12-32G and place the lockwasher on the microphone connector. After the lockwasher is positioned, hold the nut against the back of the threads and turn the nut with the blade of a screwdriver as shown.

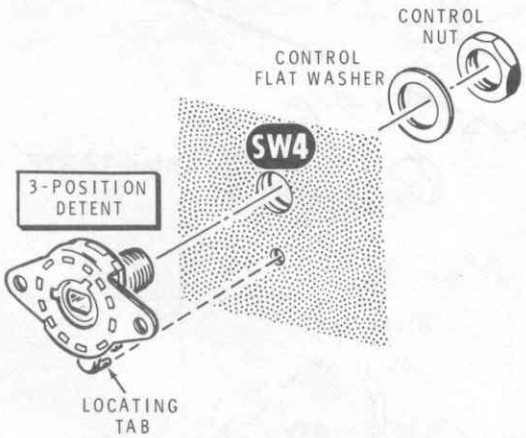


Detail 12-32G



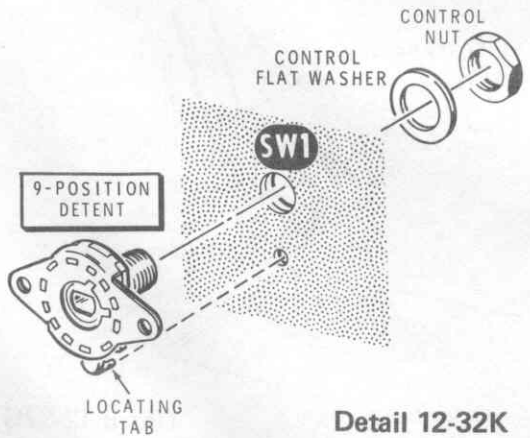
Detail 12-32H

( ) J2: Refer to Detail 12-32H and mount a phone jack at J2. Use a control lockwasher, a control flat washer, and a knurled control nut. Use a rag under your pliers to avoid damaging the knurls on the nut.

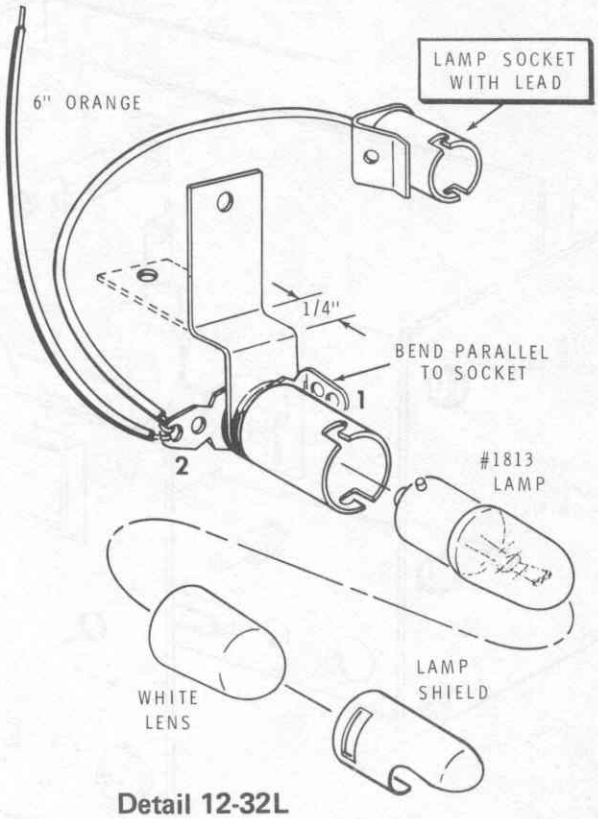


Detail 12-32J

( ) Refer to Detail 12-32J and mount the 3-position switch detent (#266-219) at SW4 on the chassis lip. Be sure the locating tab is in its hole. Use a control flat washer and a control nut.



Detail 12-32K



Detail 12-32L

( ) Refer to Detail 12-32K and mount the 9-position detent (#266-160) at SW1 on the chassis lip. Use a control flat washer and a control nut.

( ) Tighten all nuts on the front panel.

Refer to Detail 12-32L for the next six steps.

( ) Locate the remaining lamp socket with mounting bracket.

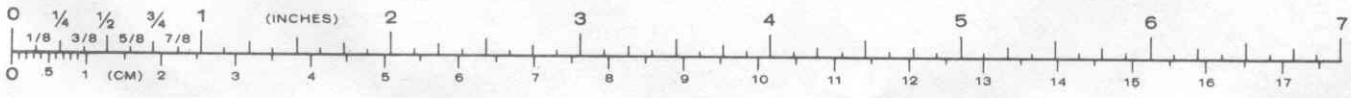
( ) Bend the lamp socket bracket as shown.

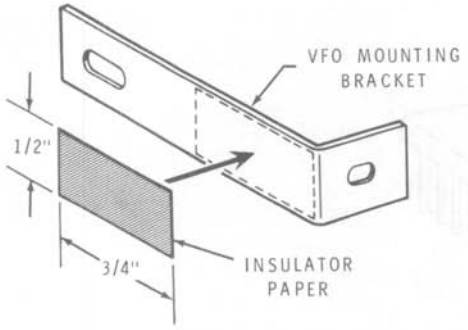
( ) Bend lug 1 parallel to the socket as shown.

( ) Connect the end of the wire coming from the lamp socket with lead to the prepared lamp socket lug 2 (NS). Use the outside hole in the lug as shown.

( ) Prepare a 6" orange solid wire. Then connect one end of the orange wire to the prepared lamp socket lug 2 (S-2). Use the outside hole in the lug as shown.

( ) Insert a #1813 lamp into the prepared lamp socket. Then place a white lens and lamp shield on the lamp. NOTE: It may help to spread the tabs on the lamp shield slightly before you place it over the white lens.





Detail 12-32M

Refer to Detail 12-32M for the next two steps.

( ) Cut a 1/2" x 3/4" insulation from any remaining piece of fish paper.

( ) Remove the backing paper from the prepared insulator. Then press the insulation paper onto a VFO mounting bracket as shown.

Refer to Detail 21-32N (in the "Illustration Booklet") for the next six steps.

( ) Place a dial pointer bracket onto the screws extending from the front panel at EA and EB.

( ) Place the plastic dial pointer on to the screws at EA and EB. Be sure the dial pointer is behind the circular dial on the VFO and the hairline faces the front panel.

( ) Place another dial pointer bracket onto the screws at EA and EB.

( ) Connect the orange wire coming from BO#9 to the inside hole of PL1 lug 2 (S-1).

( ) PL1: Mount the prepared lamp socket and the prepared VFO mounting bracket to the VFO and the front panel assembly. Use a #6 x 3/8" hex head sheet metal screw at HN and a #6 flat washer, a #6 lockwasher and a 6-32 nut at EB. Slide the VFO toward the front panel as much as possible. Tighten the 6-32 nut first. Then tighten the #6 x 3/8" hex head sheet metal screw.

( ) Similarly mount another VFO mounting bracket on the other side of the VFO assembly. Use a #6 x 3/8" hex head sheet metal screw at HL and a #6 flat washer, a #6 lockwasher, and a 6-32 nut at EA.

( ) Be sure the back of the VFO assembly is parallel to the lateral shield. Then tighten the four screws in the bottom of the VFO at holes AB.

( ) Tighten the two setscrews in the vernier drive that is mounted to the front panel.

NOTE: When you perform the next step, make sure the four spacers on the dial drive plate do not rub against the plastic dial pointer. If necessary, loosen the 6-32 nuts at EA and EB and slide the plastic dial pointer upward. Then retighten the 6-32 nuts.

( ) Rotate the main tuning shaft a few turns each direction. Then tighten the two screws holding the vernier drive to the front panel.

( ) Connect the orange wire coming from lamp socket PL1 to lamp socket PL2 lug 1 (S-1).

( ) Connect a 1" small bare wire from socket PL2 lug 2 (S-1) to solder lug EK (S-1).

( ) PL3: Route the lamp socket with lead over the top of the VFO assembly. Then push the clip onto the meter mounting bracket as shown.

( ) Insert a #1813 lamp into the lamp socket at PL3 and place a lamp shield on the lamp. Position the lamp shield so it will illuminate the meter.

( ) Connect a 1" bare wire from socket PL1 lug 1 (S-1) to solder lug HH (S-1).

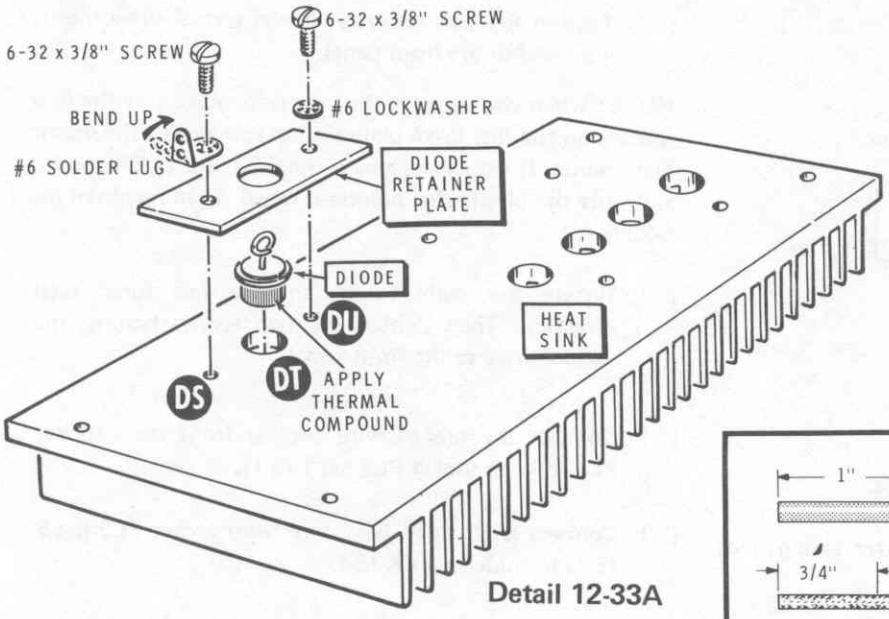
NOTE: Perform the next step only if you have your call letters display in the front panel.

( ) Insert a #1813 lamp into the lamp socket at PL2 and place a lamp shield on the lamp. Position the lamp shield so it will illuminate the call letter display.

( ) R5: Cut the leads of a 180 Ω, 1/4-watt (brown-gray-brown) resistor to 1/2". Connect this resistor between the "+" terminal (NS) and the "–" terminal (NS) of the meter.

( ) Connect the gray wire coming from control R9 lug 1 to the "–" lug of the meter (S-2).

( ) Connect the gray wire coming from switch SW2, section A, to the "+" lug of the meter (S-2).



Detail 12-33A

RIGHT SIDE AND HEAT SINK ASSEMBLY

Refer to Pictorial 12-33 (in the "Illustration Booklet") for the following steps.

( ) Mount the right side panel onto the right side of the chassis. Use 6-32 x 3/8" hardware at EX, and #6 x 1/2" hex head sheet metal screws at GA, GB, GD, GE, GF, and GL.

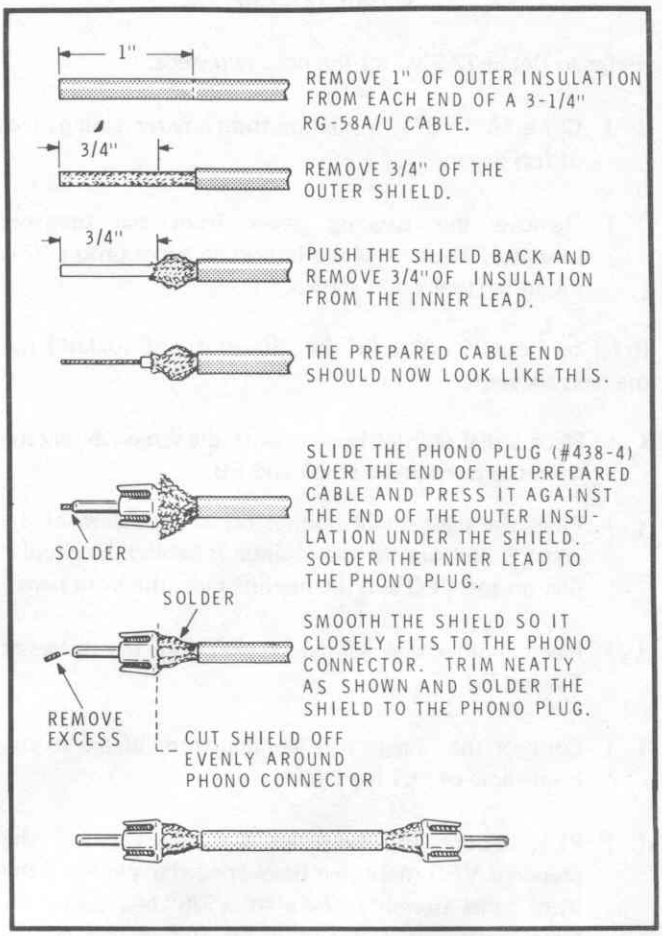
( ) D1: Refer to Detail 12-33A and rub a heavy coating of thermal compound on the case of a 1N3491 diode (#57-34). Then place the diode into hole DT in the heat sink. Use a diode retainer plate, held in place by a #6 lockwasher and a 6-32 x 3/8" screw at DU and by a #6 solder lug and a 6-32 x 3/8" screw at DS. Bend the solder lug so it points straight out from the heat sink. Tighten the screws completely.

( ) Bend a small circle in the end of the diode lead, as shown.

( ) Mount the heat sink onto the rear panel. Start four #6 x 5/8" hex head sheet metal screws at DA, DB, DG, and DJ. Push the heat sink toward the center of the rear panel as much as possible and tighten screws DA and DB. Then tighten screws DG and DJ.

( ) Refer to the inset drawing on the Pictorial and connect the orange wire coming from solder lug DR to the solder lug at DS (S-1).

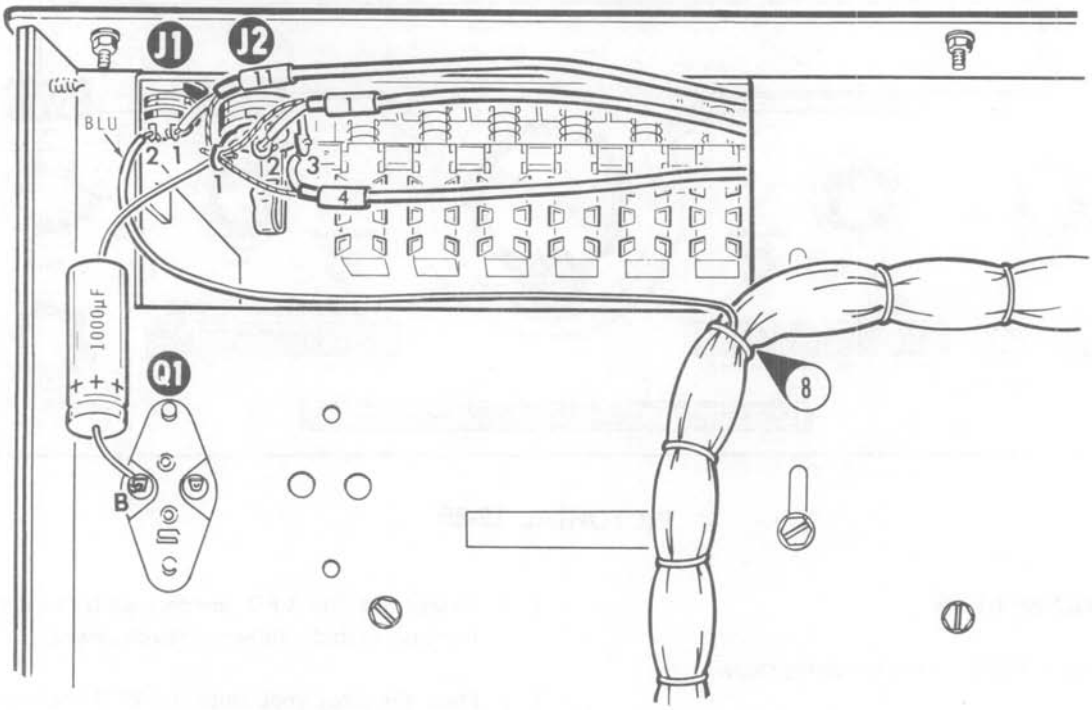
( ) Connect the orange wire coming from grommet BD to the diode lead (S-1).



Detail 12-33B

( ) Refer to Detail 12-33B and prepare the VFO jumper. Just before you solder the braid to the phono plugs, check with an ohmmeter to be sure no fine strands of the braid cause a short circuit to the center conductor.

( ) After the phono plugs are cool, bend the VFO jumper into a U shape and push the plugs into the VFO IN and OUT phono sockets on the rear panel.



PICTORIAL 12-34

UNDER-CHASSIS PANEL WIRING

Refer to Pictorial 12-34 for the following steps.

( ) Connect the blue wire coming from BO#8 to microphone connector J1 lug 2 (S-1).

( ) Connect the center conductor of cable #11 to J1 lug 1 (S-1), and the shield wire to phone jack J2 lug 1 (NS).

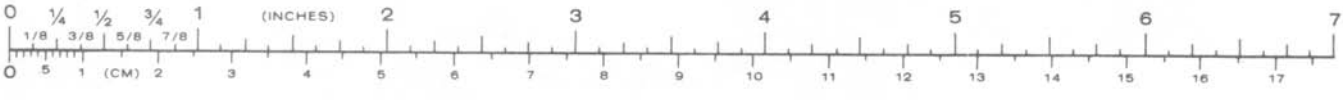
( ) Connect the center conductor of cable #1 to J2 lug 2 (S-1), and the shield wire to lug 1 (NS).

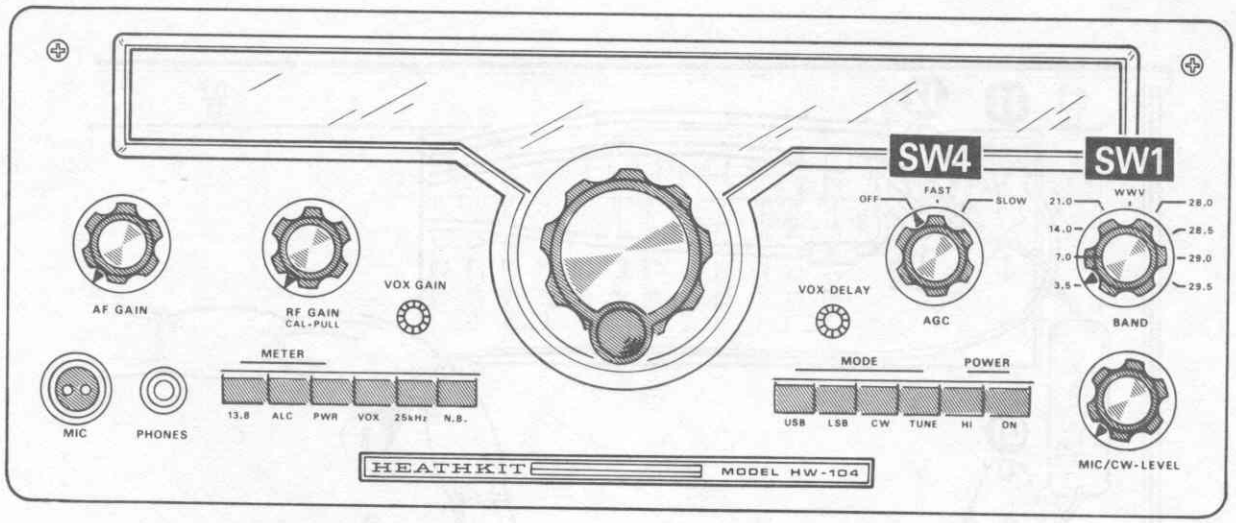
( ) Connect the center conductor of cable #4 to J2 lug 3 (S-1), and the shield wire to lug 1 (NS).

( ) C6: Connect the lead from the positive (+) end of a 1000 µF electrolytic capacitor to lug B of transistor Q1 (S-2). Be careful that you do not get solder inside the transistor socket. Connect the other capacitor lead to J2 lug 1 (S-4).

This completes the wiring of your Single Sideband Transceiver. Look it over carefully at this time to be sure there are no loose connections, unsoldered wires, or wire clippings lodged it it anywhere.

( ) Check your wiring against the "Chassis Connector Wiring Chart" in the "Illustration Booklet" that goes with the Operation Manual.





PICTORIAL 12-35

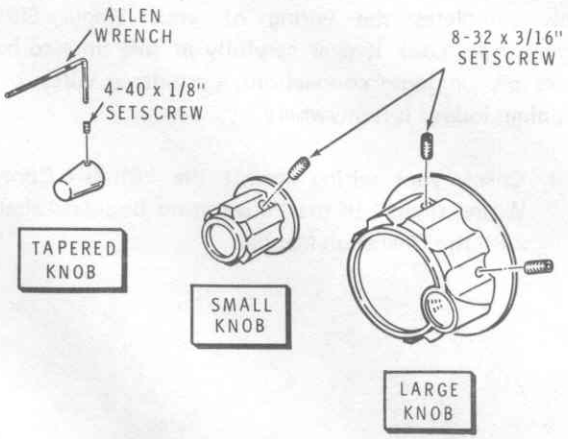
KNOBS AND SHAFTS

Refer to Pictorial 12-35 for the following steps.

( ) Refer to Detail 12-35A and start an 8-32 x 3/16" setscrews into each of the five small knobs. Start two setscrews into the large knob.

( ) Start a 4-40 x 1/8" setscrew into each of the two tapered knobs. Insert the end of the allen wrench into a setscrew and turn the wrench to start the setscrew.

( ) Place the two tapered knobs onto the shafts at Vox Gain and Vox Delay, and tighten the setscrews with the allen wrench.



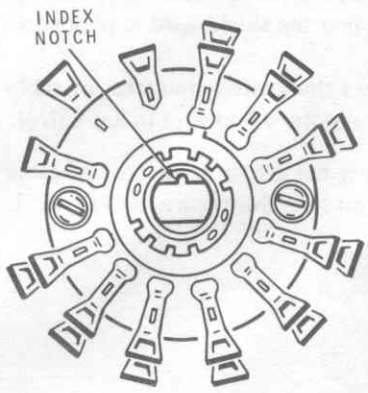
Detail 12-35A

( ) Except for the VFO (center) shaft, turn all of the front panel shafts fully counterclockwise.

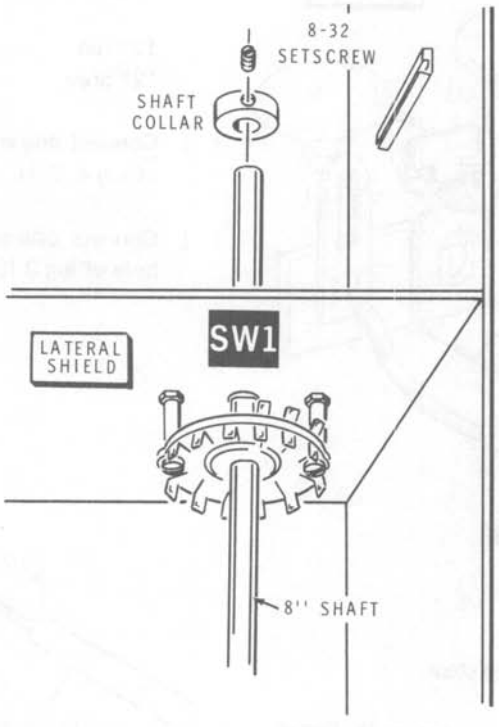
( ) Place the large knob onto the VFO shaft and tighten one of the setscrews (you will temporarily remove this knob later).

( ) Place three small knobs onto the shafts at AF Gain, RF Gain, and MIC/CW Level. Position the knob index marks as shown in the Pictorial and tighten the setscrews.

( ) Refer to Detail 12-35B and make sure the rotor of the switch at SW1 is still positioned so the index notch is up.



Detail 12-35B



Detail 12-35C

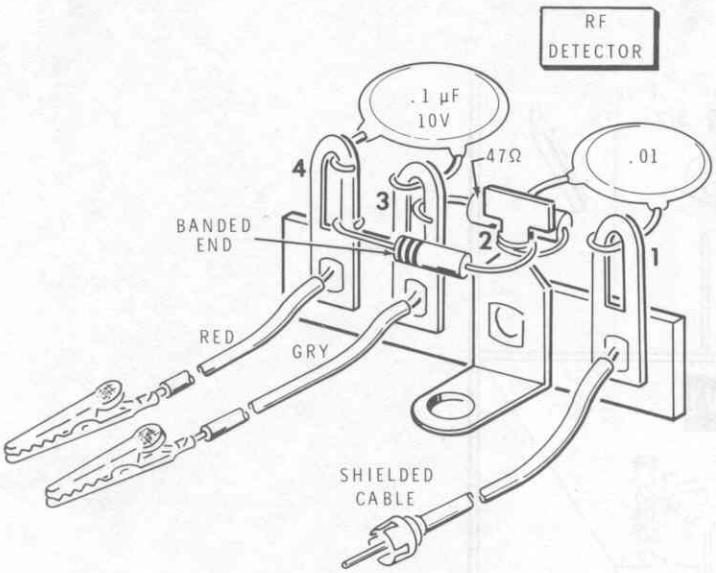
( ) Install a small knob onto the 8" shaft. Make sure the setscrew tightens onto the flat on the knob end of the shaft.

( ) Insert the 8" shaft not more than 1/2" through the detent on the panel at SW1 (BAND). Turn the shaft and detent so the knob index will be at 3.5. Then push the end of the shaft on through the detent and just through the switch wafer at SW1 on the lateral shield. Be very sure the flatted sides of the shaft are aligned with the opening in the switch rotor before you apply any pressure, as the wafer can be damaged.

( ) Refer to Detail 12-35C and start an 8-32 setscrew into a shaft collar.

( ) Slide the shaft collar onto the end of the 8" shaft so it is against the back side of the lateral shield. Push the shaft all the way in and tighten the setscrew just enough to prevent the collar from moving, as you will loosen the collar later.

( ) Install a 5" flatted shaft, shaft collar, and small knob at SW4 (AGC). Turn the shaft fully counterclockwise and align the knob index mark at "Off."

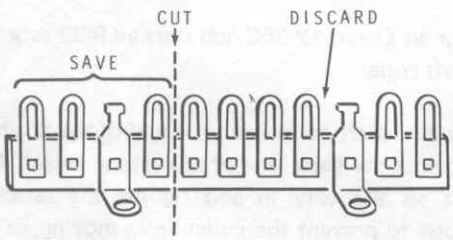


PICTORIAL 12-36

RF PROBE ASSEMBLY

Refer to Pictorial 12-36 for the following steps.

( ) Prepare a 4-lug terminal strip as shown in Detail 12-36A.



Detail 12-36A

( ) Connect a .1 μF, 10 V disc capacitor between terminal strip lugs 3 (NS) and 4 (NS).

( ) Connect a 47 Ω (yellow-violet-black) resistor between lug 2 (NS) and 3 (S-2).

( ) Connect the lead at the banded end of a 1N191 diode (#56-26) to lug 4 (S-2). Connect the other diode lead to lug 2 (NS).

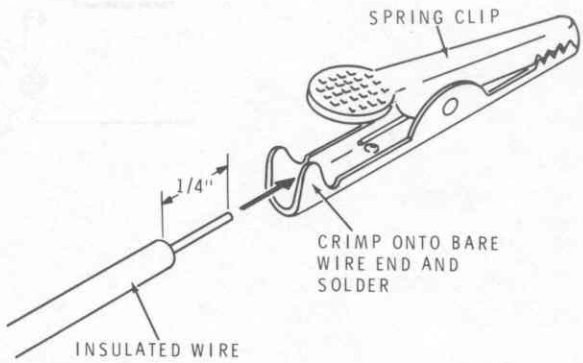
( ) Connect a .01 μF disc capacitor between lug 1 (S-1) and lug 2 (S-3).

( ) Prepare the following lengths of solid wire:

12" red
12" gray

( ) Connect one end of the 12" red wire to the lower hole of lug 4 (S-1).

( ) Connect one end of the 12" gray wire to the lower hole of lug 3 (S-1).

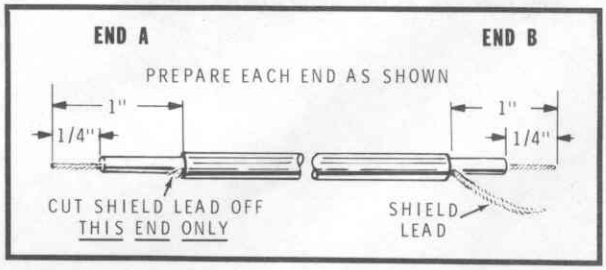


Detail 12-36B

( ) Refer to Detail 12-36B and connect an alligator clip to the free ends of the two wires.

( ) Prepare a 24" small shielded cable as shown in Detail 12-36C.

( ) Connect end A of the prepared cable to the lower hole of lug 1 (S-1).



Detail 12-36C

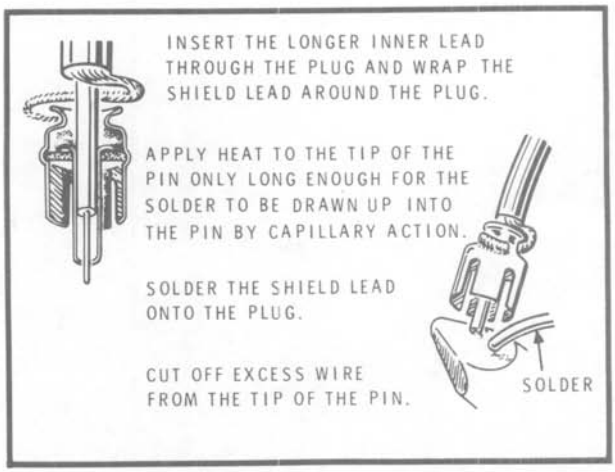
( ) Refer to Detail 12-36D and install a phono plug (#438-4) on the free end of the shielded cable.

Set the RF detector aside until it is called for in a step.

NOTE: You will have an 18 pF disc capacitor, several phono plugs, an alligator clip, and miscellaneous hardware left over at this time. These parts will be used later.

If you purchased the HWA-104-1 Accessory at the same time as you purchased this Transceiver, proceed to that Manual and Assemble the Accessory before you proceed to the "Test and Adjustments" section in the "Operation Manual."

If you did not purchase the HWA-104-1 Accessory, proceed directly to the "Test and Adjustments" section of the "Operation Manual."



Detail 12-36D

FOR PARTS REQUESTS ONLY

- Be sure to follow instructions carefully.
- Use a separate letter for all correspondence.
- Please allow 10 - 14 days for mail delivery time.

DO NOT WRITE IN THIS SPACE

INSTRUCTIONS

- Please print all information requested.
- Be sure you list the correct **HEATH** part number exactly as it appears in the parts list.
- If you wish to prepay your order, mail this card and your payment in an envelope. Be sure to include 10% (25¢ minimum, $3.50 maximum) for insurance, shipping and handling. Michigan residents add 4% tax.

  Total enclosed $_____
- If you prefer COD shipment, check the COD box and mail this form. COD ☐

NAME _____

ADDRESS _____

CITY _____

STATE _____ ZIP _____

The information requested in the next two lines is not required when purchasing nonwarranty replacement parts, but it can help us provide you with better products in the future.

Model # _____ Invoice # _____

Date Purchased _____ Location Purchased _____

LIST **HEATH** PART NUMBER	QTY.	PRICE EACH	TOTAL PRICE
TOTAL FOR PARTS			
HANDLING AND SHIPPING			
MICHIGAN RESIDENTS ADD 4% TAX			
TOTAL AMOUNT OF ORDER			

SEND TO: **HEATH COMPANY**
BENTON HARBOR
MICHIGAN 49022
ATTN: PARTS REPLACEMENT

Phone (Replacement parts only): 616 982-3571

THIS FORM IS FOR U.S. CUSTOMERS ONLY
OVERSEAS CUSTOMERS SEE YOUR DISTRIBUTOR

CUT ALONG DOTTED LINE

FOR PARTS REQUESTS ONLY

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- Use a separate letter for all correspondence.
- Please allow 10 - 14 days for mail delivery time.

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INSTRUCTIONS

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- If you prefer COD shipment, check the COD box and mail this form. COD ☐

NAME _____

ADDRESS _____

CITY _____

STATE _____ ZIP _____

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Model # _____ Invoice # _____

Date Purchased _____ Location Purchased _____

LIST **HEATH** PART NUMBER	QTY.	PRICE EACH	TOTAL PRICE
TOTAL FOR PARTS			
HANDLING AND SHIPPING			
MICHIGAN RESIDENTS ADD 4% TAX			
TOTAL AMOUNT OF ORDER			

SEND TO: **HEATH COMPANY**
BENTON HARBOR
MICHIGAN 49022
ATTN: PARTS REPLACEMENT

Phone (Replacement parts only): 616 982-3571

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CUSTOMER SERVICE

REPLACEMENT PARTS

Please provide complete information when you request replacements from either the factory or Heath Electronic Centers. Be certain to include the **HEATH** part number exactly as it appears in the parts list.

ORDERING FROM THE FACTORY

Print all of the information requested on the parts order form furnished with this product and mail it to Heath. For telephone orders (parts only) dial 616 982-3571. If you are unable to locate an order form, write us a letter or card including:

- Heath part number.
- Model number.
- Date of purchase.
- Location purchased or invoice number.
- Nature of the defect.
- Your payment or authorization for COD shipment of parts not covered by warranty.

Mail letters to: Heath Company
Benton Harbor
MI 49022
Attn: Parts Replacement

Retain original parts until you receive replacements. Parts that should be returned to the factory will be listed on your packing slip.

OBTAINING REPLACEMENTS FROM HEATH ELECTRONIC CENTERS

For your convenience, "over the counter" replacement parts are available from the Heath Electronic Centers listed in your catalog. Be sure to bring in the original part and purchase invoice when you request a warranty replacement from a Heath Electronic Center.

TECHNICAL CONSULTATION

Need help with your kit? — Self-Service? — Construction? — Operation? — Call or write for assistance. you'll find our Technical Consultants eager to help with just about any technical problem except "customizing" for unique applications.

The effectiveness of our consultation service depends on the information you furnish. Be sure to tell us:

- The Model number and Series number from the blue and white label.
- The date of purchase.
- An exact description of the difficulty.
- Everything you have done in attempting to correct the problem.

Also include switch positions, connections to other units, operating procedures, voltage readings, and any other information you think might be helpful.

Please do not send parts for testing, unless this is specifically requested by our Consultants.

Hints: Telephone traffic is lightest at midweek — please be sure your Manual and notes are on hand when you call.

Heathkit Electronic Center facilities are also available for telephone or "walk-in" personal assistance.

REPAIR SERVICE

Service facilities are available, if they are needed, to repair your completed kit. (Kits that have been modified, soldered with paste flux or acid core solder, cannot be accepted for repair.)

If it is convenient, personally deliver your kit to a Heathkit Electronic Center. For warranty parts replacement, supply a copy of the invoice or sales slip.

If you prefer to ship your kit to the factory, attach a letter containing the following information directly to the unit:

- Your name and address.
- Date of purchase and invoice number.
- Copies of all correspondence relevant to the service of the kit.
- A brief description of the difficulty.
- Authorization to return your kit COD for the service and shipping charges. (This will reduce the possibility of delay.)

Check the equipment to see that all screws and parts are secured. (Do not include any wooden cabinets or color television picture tubes, as these are easily damaged in shipment. Do not include the kit Manual.) Place the equipment in a strong carton with at least THREE INCHES of *resilient* packing material (shredded paper, excelsior, etc.) on all sides. Use additional packing material where there are protrusions (control sticks, large knobs, etc.). If the unit weighs over 15 lbs., place this carton in another one with 3/4" of packing material between the two.

Seal the carton with reinforced gummed tape, tie it with a strong cord, and mark it "Fragile" on at least two sides. Remember, the carrier will not accept liability for shipping damage if the unit is insufficiently packed. Ship by prepaid express, United Parcel Service, or insured Parcel Post to:

Heath Company
Service Department
Benton Harbor, Michigan 49022

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