

PRICE \$1.00

HEATH COMPANY • BENTON HARBOR, MICHIGAN

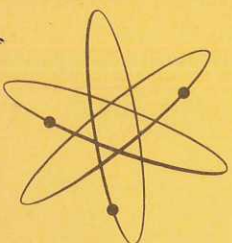


# HEATHKIT® ASSEMBLY MANUAL



**ACOUSTIC SUSPENSION  
SPEAKER SYSTEM**

**MODEL AS-2A**





# RESISTOR AND CAPACITOR COLOR CODES

## RESISTORS

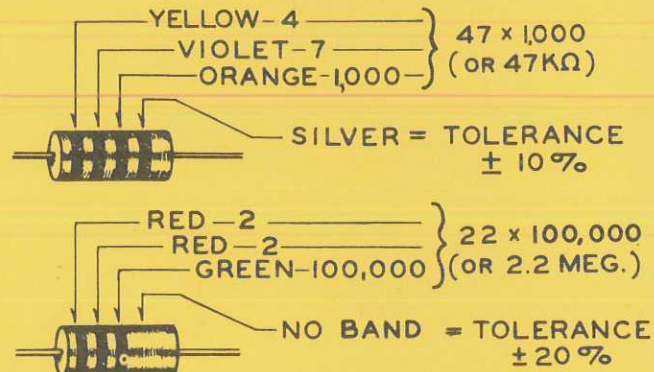
The colored bands around the body of a color coded resistor represent its value in ohms. These colored bands are grouped toward one end of the resistor body. Starting with this end of the resistor, the first band represents the first digit of the resistance value; the second band represents the second digit; the third band represents the number by which the first two digits are multiplied. A fourth band of gold or silver represents a tolerance of  $\pm 5\%$  or  $\pm 10\%$  respectively. The absence of a fourth band indicates a tolerance of  $\pm 20\%$ .

The physical size of a composition resistor is related to its wattage rating. Size increases progressively as the wattage rating is increased. The diameters of 1/2 watt, 1 watt and 2 watt resistors are approximately 1/8", 1/4" and 5/16", respectively.

The color code chart and examples which follow provide the information required to identify color coded resistors.

COLOR	1ST DIGIT	2ND DIGIT	MULTIPLIER
BLACK	0	0	1
BROWN	1	1	10
RED	2	2	100
ORANGE	3	3	1,000
YELLOW	4	4	10,000
GREEN	5	5	100,000
BLUE	6	6	1,000,000
VIOLET	7	7	10,000,000
GRAY	8	8	100,000,000
WHITE	9	9	1,000,000,000
GOLD	-	-	.1
SILVER	-	-	.01

### EXAMPLES



TOLERANCE  
GOLD  $\pm 5\%$   
SILVER  $\pm 10\%$   
NO BAND  $\pm 20\%$

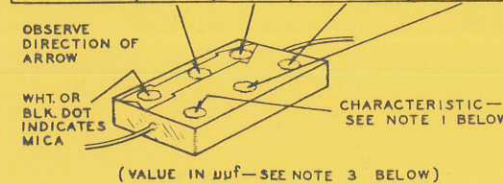
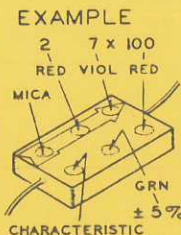
## CAPACITORS

Generally, only mica and tubular ceramic capacitors, used in modern equipment, are color coded. The color codes differ somewhat among capacitor manufacturers, however the codes

shown below apply to practically all of the mica and tubular ceramic capacitors that are in common use. These codes comply with EIA (Electronics Industries Association) Standards.

### MICA

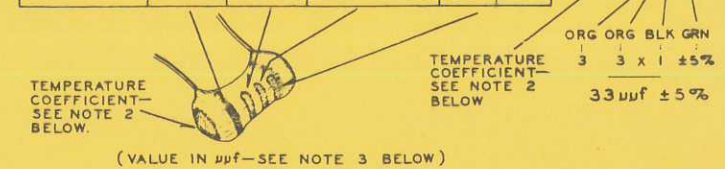
COLOR	1ST DIGIT	2ND DIGIT	MULTIPLIER	TOLER. %
BLACK	0	0	1	$\pm 20$
BROWN	1	1	10	$\pm 2$
RED	2	2	100	$\pm 3$
ORANGE	3	3	1,000	$\pm 5$
YELLOW	4	4	10,000	—
GREEN	5	5	—	—
BLUE	6	6	—	—
VIOLET	7	7	—	—
GRAY	8	8	—	—
WHITE	9	9	—	—
GOLD	—	—	—	$\pm 10$
SILVER	—	—	—	—



### TUBULAR CERAMIC

Place the group of rings or dots to the left and read from left to right.

COLOR	1ST DIGIT	2ND DIGIT	MULTIPLIER	TOLER. %
BLACK	0	0	1	$\pm 20$
BROWN	1	1	10	$\pm 0.1$
RED	2	2	100	$\pm 1$
ORANGE	3	3	1,000	$\pm 2.5$
YELLOW	4	4	10,000	—
GREEN	5	5	—	$\pm 0.5$
BLUE	6	6	—	$\pm 5$
VIOLET	7	7	—	—
GRAY	8	8	—	$\pm 0.25$
WHITE	9	9	—	$\pm 10$



### NOTES:

1. The characteristic of a mica capacitor is the temperature coefficient, drift capacitance and insulation resistance. This information is not usually needed to identify a capacitor but, if desired, it can be obtained by referring to EIA Standard, RS-153 (a Standard of Electronic Industries Association.)

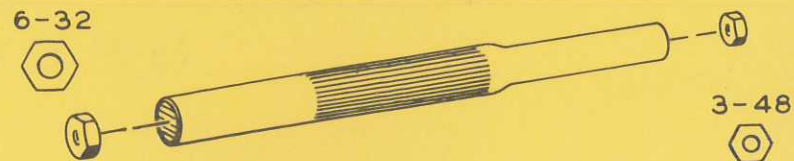
expressed in parts per million per degree centigrade. Refer to EIA Standard, RS-198 (a Standard of Electronic Industries Association.)

2. The temperature coefficient of a capacitor is the predictable change in capacitance with temperature change and is

3. The farad is the basic unit of capacitance, however capacitor values are generally expressed in terms of  $\mu\text{fd}$  (microfarad, .000001 farad) and  $\mu\mu\text{f}$  (micro-micro-farad, .000001  $\mu\text{fd}$ ); therefore, 1,000  $\mu\mu\text{f}$  = .001  $\mu\text{fd}$ , 1,000,000  $\mu\mu\text{f}$  = 1  $\mu\text{fd}$ .

### USING A PLASTIC NUT STARTER

A plastic nut starter offers a convenient method of starting the most used sizes: 3/16" and 1/4" (3-48 and 6-32). When the correct end is pushed down over a nut, the pliable tool conforms to the shape of the nut and the nut is gently held while it is being picked up and started on the screw. The tool should only be used to start the nut.



## Assembly and Operation of the



# ACOUSTIC SUSPENSION SPEAKER SYSTEM MODEL AS-2A



HEATH COMPANY,  
BENTON HARBOR,  
MICHIGAN

a subsidiary of  
**DAYSTROM, INCORPORATED**

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All prices are subject to change without notice. The Heath Company reserves the right to discontinue instruments and to change specifications at any time without incurring any obligation to incorporate new features in instruments previously sold.



## SPECIFICATIONS

Frequency Response. . . . .	±5 db from 40 to 20,000 cps.
Crossover Frequencies. . . . .	2000 cps and 7500 cps.
Recommended Amplifier Power. . . . .	20 to 40 watts rms.
Nominal Impedance. . . . .	8 Ω.
<b>Speakers -</b>	
Super Tweeter. . . . .	1-3/8" dome type.
Midrange. . . . .	Two 5" cone type.
Woofer. . . . .	10" acoustic suspension; 1.1 lb alnico magnet; resonant frequency (mounted) 58 cps.
Crossover Type. . . . .	Coil-capacitor network.
Damping Factor. . . . .	Unity.
Horizontal Dispersion. . . . .	90 degrees.
<b>Cabinet -</b>	
Type. . . . .	Infinite.
Dimensions. . . . .	24" wide x 13-1/2" high x 11-3/8" deep.
Material. . . . .	3/4" furniture-grade plywood, with chipboard front and rear panels.
Finish. . . . .	Walnut or unfinished.
Net Weight. . . . .	36 lbs.
Shipping Weight. . . . .	40 lbs.

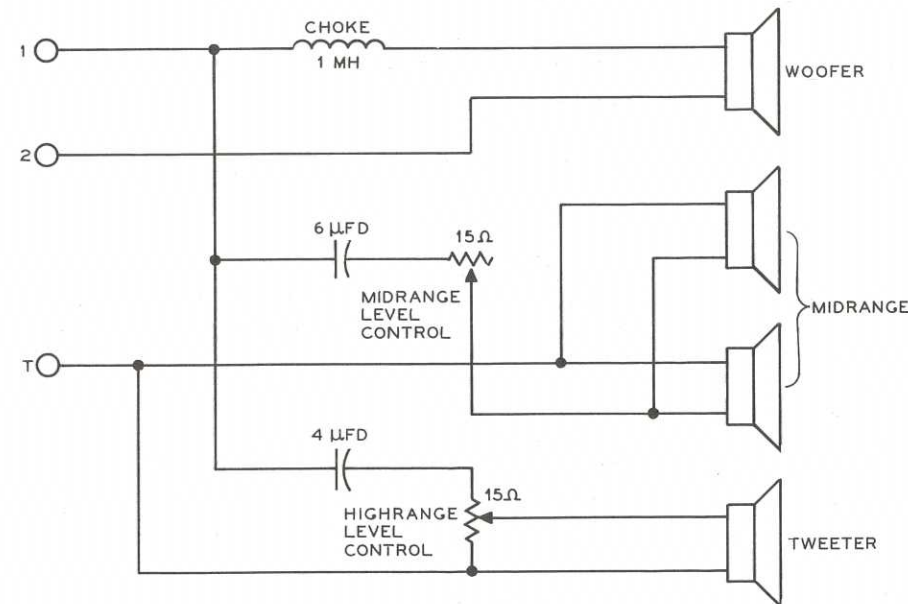
## INTRODUCTION

The Heathkit Model AS-2A Speaker System is designed to provide excellent wide range audio reproduction from a relatively small enclosure. This outstanding performance is accomplished by the Acoustic Suspension System developed and licensed to the Heath Company by Acoustic Research Incorporated.

In the design of the Acoustic Suspension System, the cone of the woofer speaker is mounted with very free suspension. The mounting is so compliant that it is unable to provide the elastic restoring force normally required. The missing elasticity is then reintroduced by the pneumatic spring of the air enclosed in the cabinet. The cone literally rides on air instead of mechanical springs. This substantially reduces harmonic distortion.

A crossover network, consisting of a coil and two capacitors, is used to filter and pass the proper frequency ranges to the appropriate speakers. The coil passes low frequencies to the woofer and tends to block high frequencies; the 6 μfd capacitor passes midrange and higher frequencies to the midrange speakers; and the 4 μfd capacitor passes high frequencies to the super tweeter. The capacitors tend to block low frequencies from reaching the midrange speakers and the tweeter. Level controls are provided so that you may adjust the midrange and high frequencies to the desired level.

The cabinet of the AS-2AW Speaker System is supplied with an attractive walnut finish. If you purchased the AS-2AU System, the cabinet is presanded and ready to accept the finish of your choice.



**SCHEMATIC OF THE  
HEATHKIT®  
MODEL AS-2A  
HIGH FIDELITY  
SPEAKER SYSTEM**





## UNPACKING INSTRUCTIONS

The speakers represent the major portion of the purchase price of this kit, therefore, too much caution cannot be exercised in handling all speakers. Carefully open the carton in which the 10" woofer speaker was shipped. Inspect the speaker to make sure there is no damage, then return the speaker to its carton until it is called for during kit assembly.

UNPACK THE KIT CAREFULLY AND CHECK EACH PART AGAINST THE PARTS LIST. In so doing, you will become acquainted with the parts. Refer to the charts and other information on the inside covers of the manual to help you identify the components. If some shortage or parts damage is found in checking the Parts List, please read the Replacements section of the manual and supply the information called for therein. Include all inspection slips in your letter to us.

We suggest that you do the following before work is started:

1. Lay out all parts so that they are readily available.
2. Provide yourself with good quality tools. Basic tool requirements consist of a screwdriver with a 1/4" blade; a phillips head screwdriver; long-nose pliers; diagonal wire cutters; a pen knife or a tool for stripping insulation from wires; a soldering iron (or gun) and rosin core solder.

In checking the parts against the Parts List, you will find a piece of 2 feet x 2 feet brown paper packing material which should not be discarded. This piece of packing material must be kept for use in the kit.

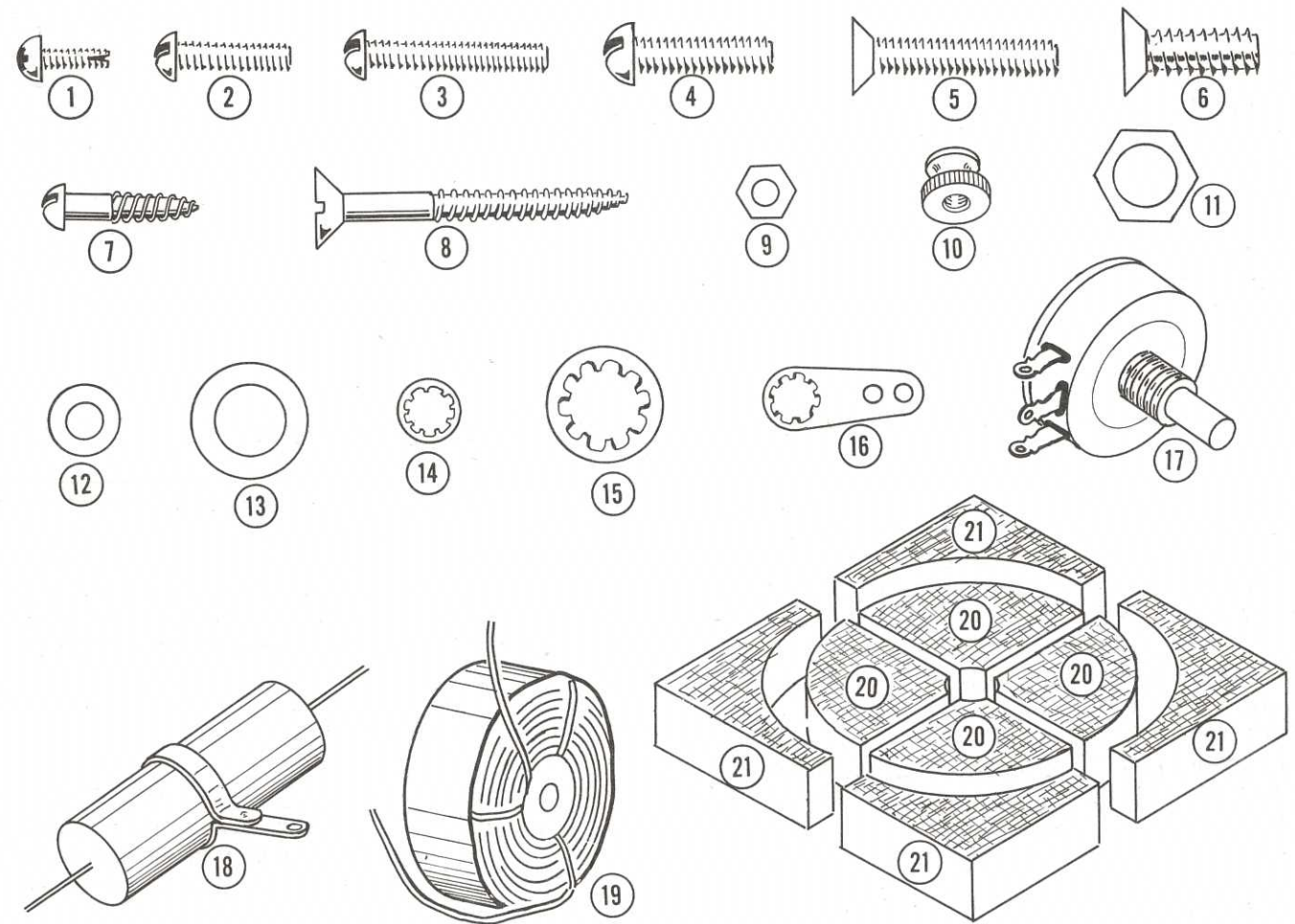
## PARTS LIST

NOTE: The circled numbers in the Parts List are keyed to the circled numbers on the Parts Pictorial to aid in parts identification.

PART No.	PARTS Per Kit	DESCRIPTION	PART No.	PARTS Per Kit	DESCRIPTION
<b>Hardware</b>			<b>Wire-Sleeving</b>		
(1) 250-171	8	6-32 x 3/8" self-tapping screw	344-15	1	Length black hookup wire
(2) 250-92	3	8-32 x 5/8" screw	344-16	1	Length red hookup wire
(3) 250-97	2	8-32 x 1" screw	346-2	1	Length sleeving (small)
(4) 250-152	6	10-24 x 3/4" screw	346-7	1	Length sleeving (large)
(5) 250-244	6	10-24 x 1" screw	<b>Speakers</b>		
(6) 250-245	3	1/4-20 x 3/4" screw	401-28	1	10" woofer speaker
(7) 250-57	6	#6 x 3/4" wood screw	401-29	2	5" midrange
(8) 250-154	1	#10 x 1-1/2" wood screw	401-83	1	1-3/8" super tweeter
(9) 252-4	5	8-32 nut	<b>Miscellaneous</b>		
(10) 252-28	5	8-32 thumbnut	(17) 11-32	2	15 Ω wire-wound control
(11) 252-7	2	Control nut	(18) 23-98	1	4 μfd 50 V tubular capacitor
(12) 253-9	9	#8 flat washer	23-86	1	6 μfd 50 V tubular capacitor
(13) 253-10	2	Control flat washer	(19) 40-194	1	1 mh crossover coil
(14) 254-2	5	#8 lockwasher	94-398	1	Network mounting board
(15) 254-4	2	Control lockwasher	95-2	1	Midrange speaker housing
(16) 259-2	6	#8 solder lug	351-1	1	Glue
264-9	10	1/2" brass brad			



PART No.	PARTS Per Kit	DESCRIPTION	PART No.	PARTS Per Kit	DESCRIPTION
<b>Miscellaneous (cont'd.)</b>			<b>Miscellaneous (cont'd.)</b>		
353-1	1	Caulking	391-17	1	Nameplate
490-20	2	Plastic glove	462-17	2	Knob
(20) 335-2	8	Fiberglas bat (1/4 circle 2" radius)	331-6		Solder
(21) 335-3	8	Fiberglas bat corner pieces	595-627	1	Manual
335-1	3-1/2	Fiberglas bat (large)	<b>One Of The Following</b>		
382-7	1	2 feet x 2 feet packing material	91-120	1	Cabinet, unfinished (AS-2AU)
390-133	1	Label	91-121	1	Cabinet, walnut finished (AS-2AW)





## CABINET FINISHING NOTES

**NOTE:** If you purchased the AS-2AU Speaker System and the cabinet is to be finished, it should be done at this time.

It is not the objective of these notes to provide finishing instructions. Many good finish systems and appropriate materials are available; regardless of which system you use, follow the supplier's instructions explicitly. However, an early step in any system of finishing, after preparation of the wood surface, is the application of a "filler" or "sealer." The purpose of this treatment is at least twofold. It fills the pores or surface cells of the wood, thereby providing a uniformly smooth, hard surface over which the varnish, lacquer, or other protective and beautifying finish coats are applied; it also seals the cell structure of the wood surface to minimize moisture absorption and consequent warping during the life of the furniture.

The decorative finish is normally applied only to those surfaces which are visibly exposed; it

therefore would follow that this provides protection against moisture absorption only to those surfaces, and leaves a condition which is conducive to warping. It is strongly recommended that one or more coats of a good liquid sealer be applied to all surfaces, exterior and interior, to which the decorative finish is not applied. This should be done immediately following the application of the filler or sealer to the surfaces which will receive the decorative finish.

A careful sanding with fine sandpaper before applying the finish is recommended. There are many types of finishes available, such as wax, synthetic lacquer, hard lacquer, and varnish. If you have had no experience in finishing furniture, we suggest you use either wax or synthetic lacquer as these have been designed for use by the novice. Varnish requires much more skill and unless expertly applied, will give a poor finish. For more information on cabinet finishes, we suggest you consult your local paint supplier.

## PROPER SOLDERING TECHNIQUES

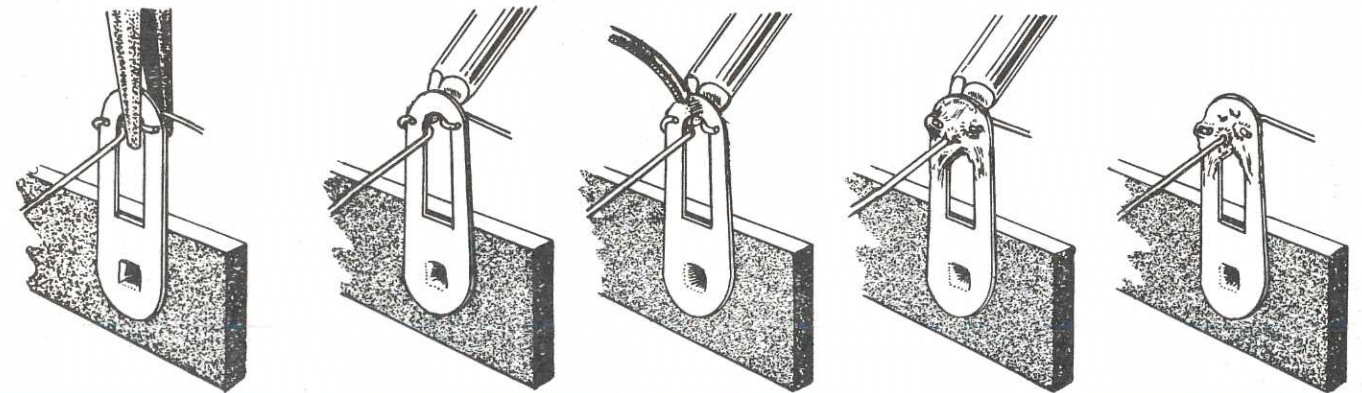
Only a small percentage of Heathkit equipment purchasers find it necessary to return an instrument for factory service. Of these instruments, by far the largest portion of malfunctions are due to poor or improper soldering.

If terminals are bright and clean and free of wax, frayed insulation and other foreign substances, no difficulty will be experienced in soldering. Correctly soldered connections are essential if the performance engineered into a kit is to be fully realized. If you are a beginner with no experience in soldering, a half hour's practice with some odd lengths of wire may be a worthwhile investment.

For most wiring, a 25 to 100 watt iron or its equivalent in a soldering gun is very satisfactory. A lower wattage iron than this may not heat the connection enough to flow the solder smoothly over the joint. Keep the iron tip clean and bright by wiping it from time to time with a cloth.

### WIRING AND SOLDERING

1. All wire used is the type with colored insulation (hookup wire). In preparing a length of hookup wire, 1/4" of insulation should be removed from each end unless directed otherwise in the assembly step.



CRIMP WIRES    HEAT CONNECTION    APPLY SOLDER    ALLOW SOLDER TO FLOW    PROPER SOLDER CONNECTION

2. Leads on capacitors and similar components are generally longer than they need to be to make the required connections. In these cases, the leads should be cut to proper length. In general, the leads should be just long enough to reach their terminating points.
3. Crimp or bend the wire (or wires) around the terminal to form a good joint without relying on solder for physical strength. If the wire is too large to allow bending or if the step states that the wire is not to be crimped, position the wire so that a good solder connection can still be made.
4. Position the work, if possible, so that gravity will help to keep the solder where you want it.
5. Place a flat side of the soldering iron tip against the joint to be soldered until it is heated sufficiently to melt the solder.
6. Then place the solder against the heated terminal and it will immediately flow over the joint; use only enough solder to thoroughly wet the junction. It is usually not necessary to fill the entire hole in the terminal with solder.
7. Remove the solder and then the iron from the completed junction. Use care not to move the wires until the solder is solidified.

A poor or cold solder joint will usually look crystalline and have a grainy texture, or the solder will stand up in a blob and will not have adhered to the joint. Such joints should be reheated until the solder flows smoothly over the entire junction. In some cases, it may be necessary to add a little more solder to achieve a smooth bright appearance.

ROSIN CORE SOLDER HAS BEEN SUPPLIED WITH THIS KIT. THIS TYPE OF SOLDER MUST BE USED FOR ALL SOLDERING IN THIS KIT. ALL GUARANTEES ARE VOIDED AND WE WILL NOT REPAIR OR SERVICE EQUIPMENT IN WHICH ACID CORE SOLDER OR PASTE FLUXES HAVE BEEN USED. IF ADDITIONAL SOLDER IS NEEDED, BE SURE TO PURCHASE ROSIN CORE (60:40 or 50:50 TIN-LEAD CONTENT) RADIO TYPE SOLDER.



## STEP-BY-STEP PROCEDURE

The following instructions are presented in a logical step-by-step sequence to enable you to complete your kit with the least possible confusion. Be sure to read each step all the way through before beginning the specified operation. Also read several steps ahead of the actual step being performed. This will familiarize you with the relationship of the subsequent operations. When the step is completed, check it off in the space provided. This is particularly important as it may prevent errors or omissions, especially if your work is interrupted. Some kit builders have also found it helpful to mark each part in colored pencil on the Pictorial as it is added.

In general, the illustrations in this manual correspond to the actual configuration of the

kit; however, in some instances the illustrations may be slightly distorted to facilitate clearly showing all of the parts.

The abbreviation "NS" indicates that a connection should not be soldered yet as other wires will be added. When the last wire is installed, the terminal should be soldered and the abbreviation "S" is used to indicate this. Note that a number will appear after each solder instruction. This number indicates the number of wires that are supposed to be connected to the terminal in point before it is soldered. For example, if the instruction reads, "Connect a wire to lug 1 (S-2)," it will be understood that there will be two wires connected to the terminal at the time it is soldered.

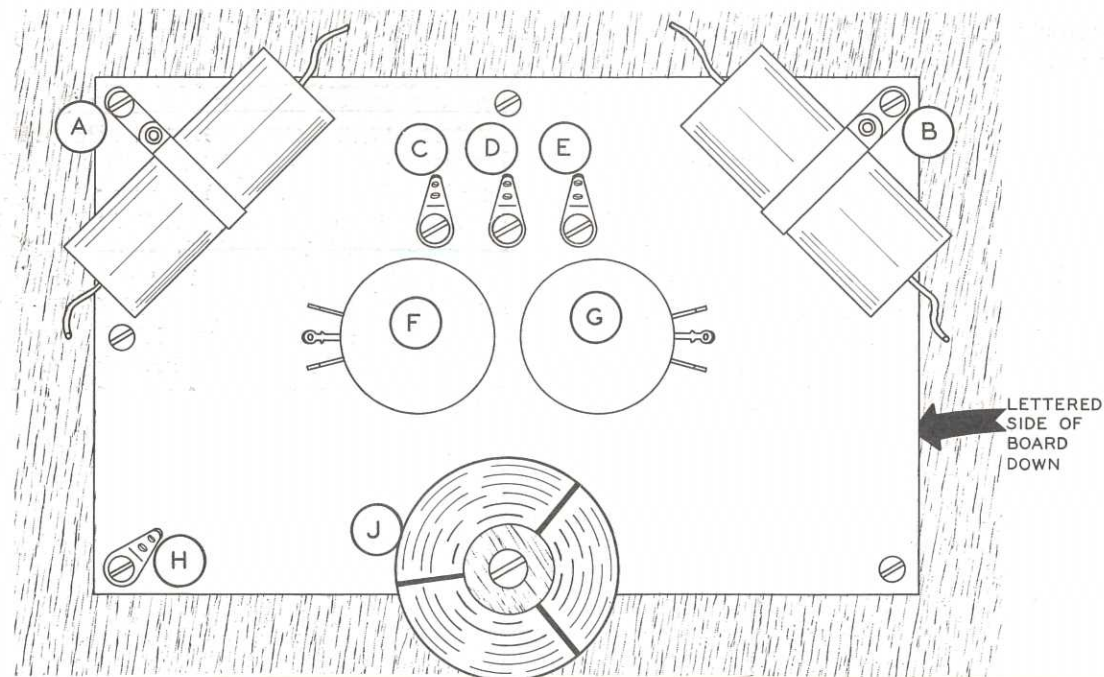
## STEP-BY-STEP ASSEMBLY

### PARTS MOUNTING

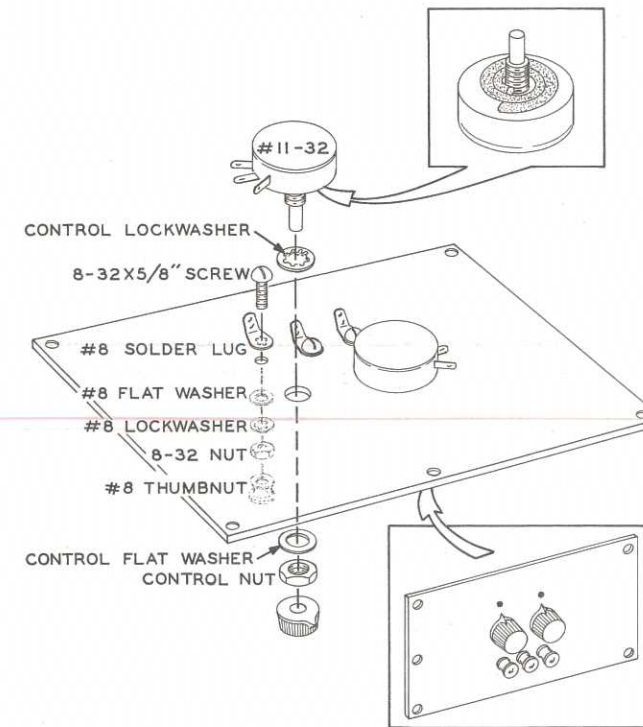
Refer to Pictorial 1 for the following steps.

- (✓) Mount #8 solder lugs at C, D, and E on the network mounting board as shown in Detail 1A. Use 8-32 x 5/8" screws, #8 flat washers, #8 lockwashers, 8-32 nuts, and #8 thumbnuts.

- (✓) Place caulking around the bushing of each control as shown in the inset drawing on Detail 1A.
- (✓) Mount the 15  $\Omega$  level controls at F and G as shown in Detail 1A. Use a control lockwasher, control flatwasher, and a control nut for each control.

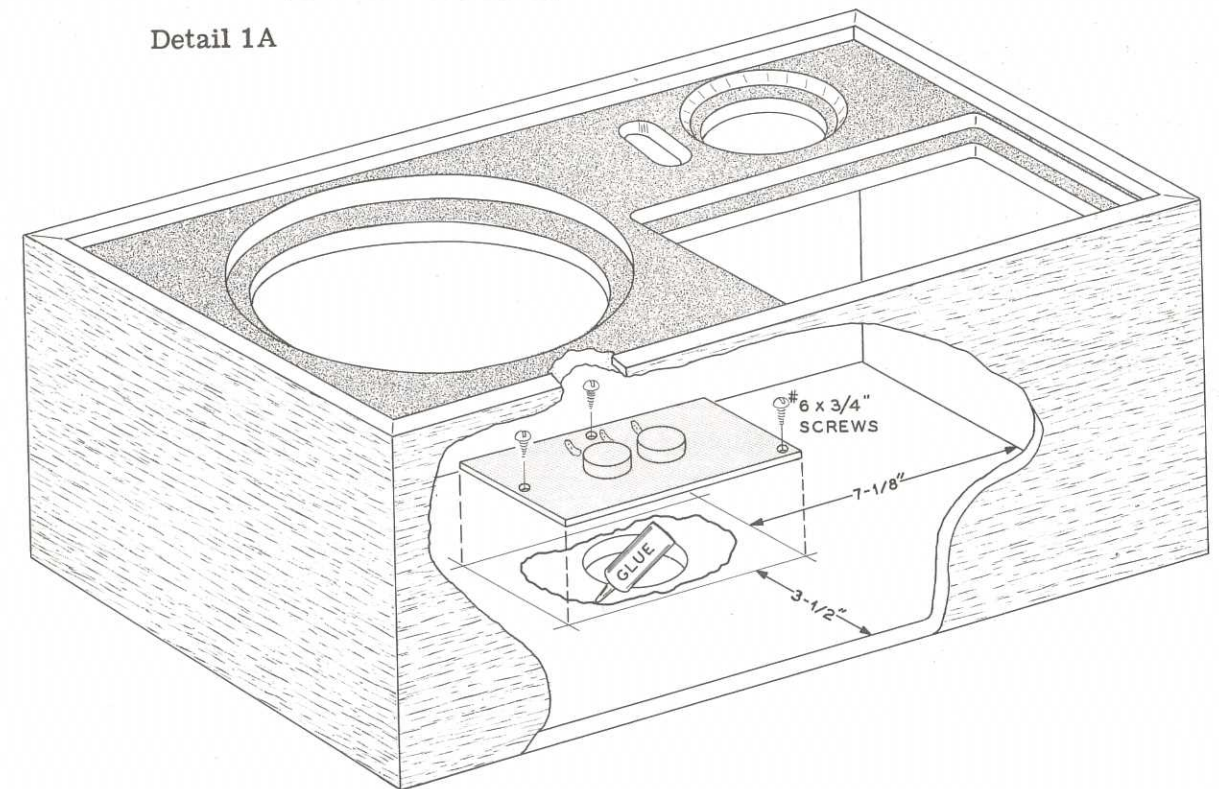


Pictorial 1



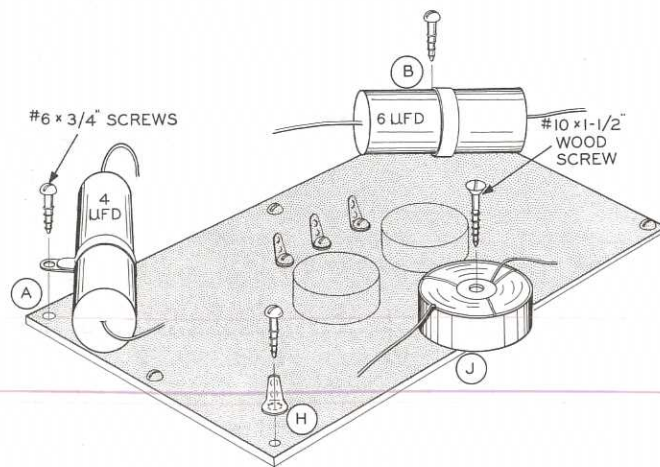
Detail 1A

- (✓) Mount a knob on each level control. Position the knob on the shaft so the pointer is at the dot when the control shaft is at the center of its rotation.
- ( ) Place the sheet of 2 feet x 2 feet packing material on your work area and lay the cabinet on it with the front side of the cabinet up. This will prevent marring the cabinet during assembly.
- ( ) Referring to Detail 1B, measure from the cabinet end and side as shown. Now draw the outline of the network mounting board.
- ( ) Run a bead of glue around inside the line just drawn and another bead around the large hole in the back of the cabinet.
- ( ) Press the network mounting board onto the outlined area. Fasten it with three #6 x 3/4" wood screws as shown in Detail 1B.



Detail 1B





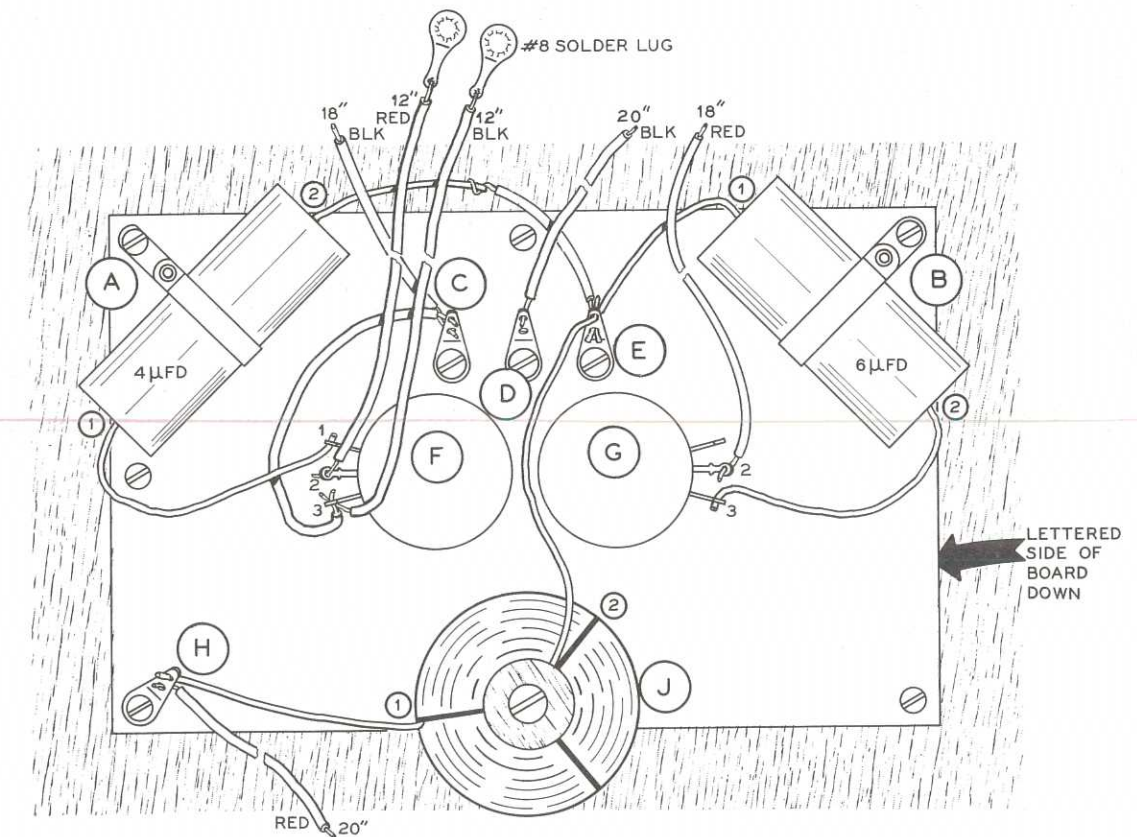
Detail 1C

- (✓) Referring to Detail 1C, mount a #8 solder lug at H, using a #6 x 3/4" wood screw. Position the solder lug as shown.
- (✓) Mount the 4 μfd capacitor at A, using a #6 x 3/4" wood screw. Position the capacitor as shown.
- (✓) Similarly, mount the 6 μfd capacitor at B. Position it as shown.
- (✓) Mount the coil at J, using a #10 x 1-1/2" wood screw. Position the coil with its leads as shown.

## WIRING

Refer to Pictorial 2 for the following steps.

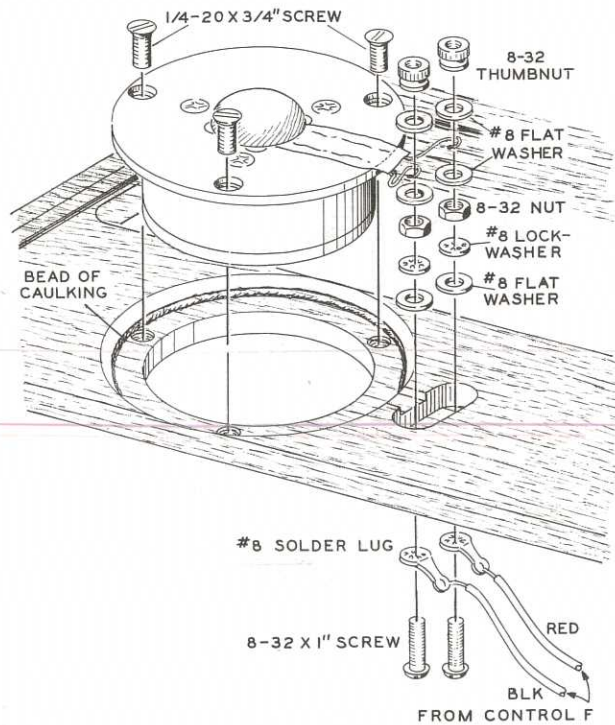
- (✓) Connect lead 1 of coil J to solder lug H (NS).
- (✓) Connect lead 2 of coil J to solder lug E (NS). Place this lead so it does not touch the control.
- (✓) Connect a 2" red hookup wire from lead 2 of capacitor A (S-1) to solder lug E (NS).
- (✓) Connect lead 1 of capacitor A to lug 1 of control F (S-1).
- (✓) Connect lead 1 of capacitor B to solder lug E (S-3).
- (✓) Connect lead 2 of capacitor B to lug 3 of control G (S-1).
- (✓) Connect a 4" black hookup wire from lug 3 of control F (NS) to solder lug C (NS).
- (✓) Cut two 20" lengths of hookup wire, one red and one black.
- (✓) Connect one end of the 20" red wire to solder lug H (S-2). Leave the other end free.
- (✓) Connect one end of the 20" black wire to solder lug D (S-1). Leave the other end free.
- (✓) Prepare two 18" lengths of hookup wire, one black and one red.



Pictorial 2

- (✓) Connect one end of the 18" black wire to solder lug C (S-2). Leave the other end free.
- (✓) Attach a #8 solder lug to one end of each wire just prepared, and solder.
- (✓) Connect one end of the 18" red wire to lug 2 of control G (S-1). Leave the other end free.
- (✓) Connect the end of the black wire without the solder lug to lug 3 of control F (S-2).
- (✓) Prepare two 12" hookup wires, one black and one red.
- (✓) Similarly, connect the red wire to lug 2 of control F (S-1).





Pictorial 3

Refer to Pictorial 3 for the following steps.

- ( ) Place a bead of caulking around the super tweeter hole in the front of the cabinet.
- ( ) Mount the super tweeter connecting terminals in the front of the cabinet. Use the #8 solder lugs on the ends of the wires coming from control F, 8-32 x 1" screws, #8 flat washers, #8 lockwashers, 8-32 nuts, and 8-32 thumbnuts.
- ( ) Mount the super tweeter in its mounting hole. Carefully position the leads near the connecting terminals as shown. Use 1/4-20 x 3/4" screws for the super tweeter mounting.

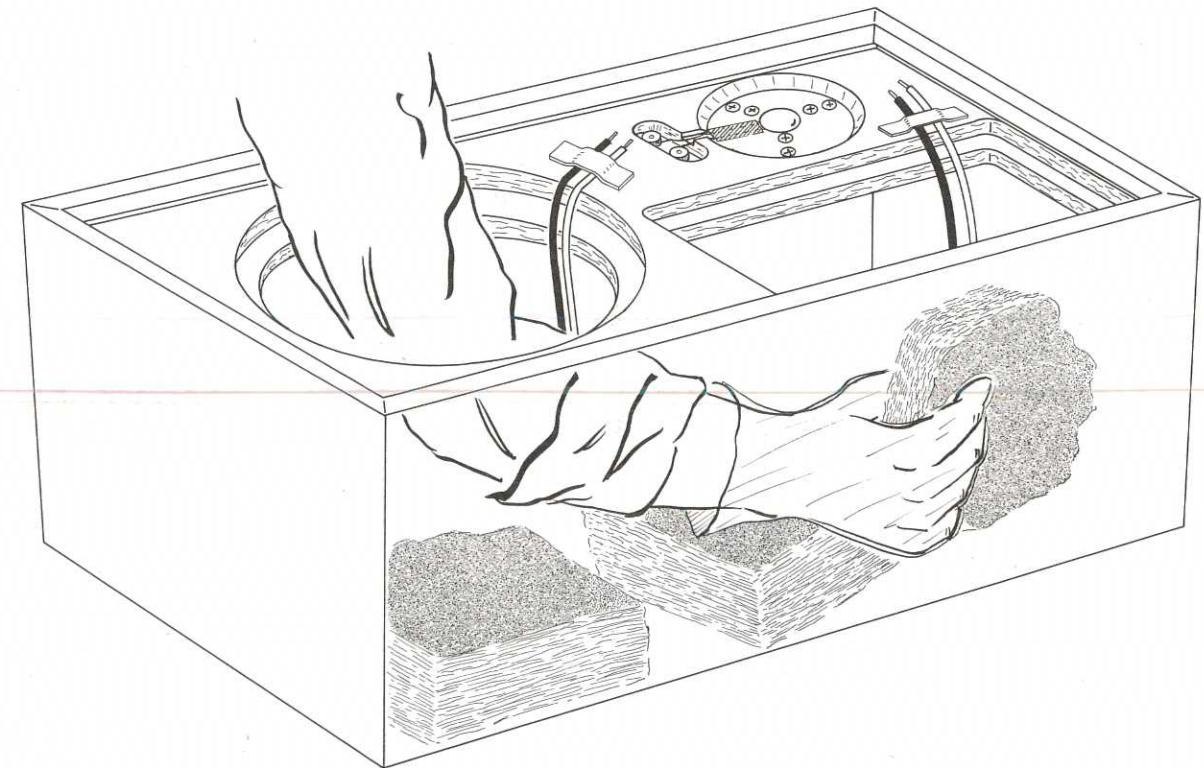
**WARNING:** The leads of the super tweeter are aluminum and cannot be soldered should they be broken. Leave approximately 1/2" slack in the leads when connecting them in the next step.

- ( ) Connect the super tweeter leads between the flat washers under the thumbnuts of the connecting terminals.

**INSTALLING FIBERGLAS IN CABINET**

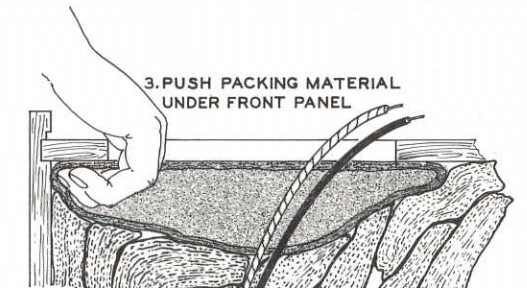
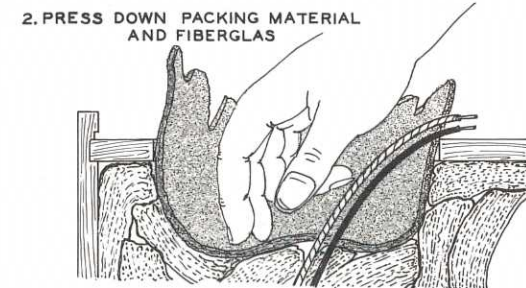
Refer to Pictorial 4 for the following steps.

- ( ) Position the woofer speaker wires from terminals D and H of the crossover network board up through the round hole of the cabinet front, and tape them to the cabinet as shown in Pictorial 4.
- ( ) In the same manner, place the midrange speaker wires through the rectangular hole. These wires come from lug 2 of control G and solder lug C.
- ( ) Put on the plastic gloves furnished with the kit, then proceed with the following steps. **NOTE:** The plastic gloves are provided to keep your hands from being scratched when you handle the fiberglas.
- ( ) Tear the large fiberglas bats into 3" to 4" squares and position them in the cabinet through the speaker holes. The fiberglas should be distributed as evenly as possible. **CAUTION:** Keep the woofer and midrange speaker wires pulled up through the speaker holes of the cabinet.
- ( ) Make a small hole near the center of the large (2 feet x 2 feet) piece of packing material and pull the woofer speaker wires through it. See Detail 4A.



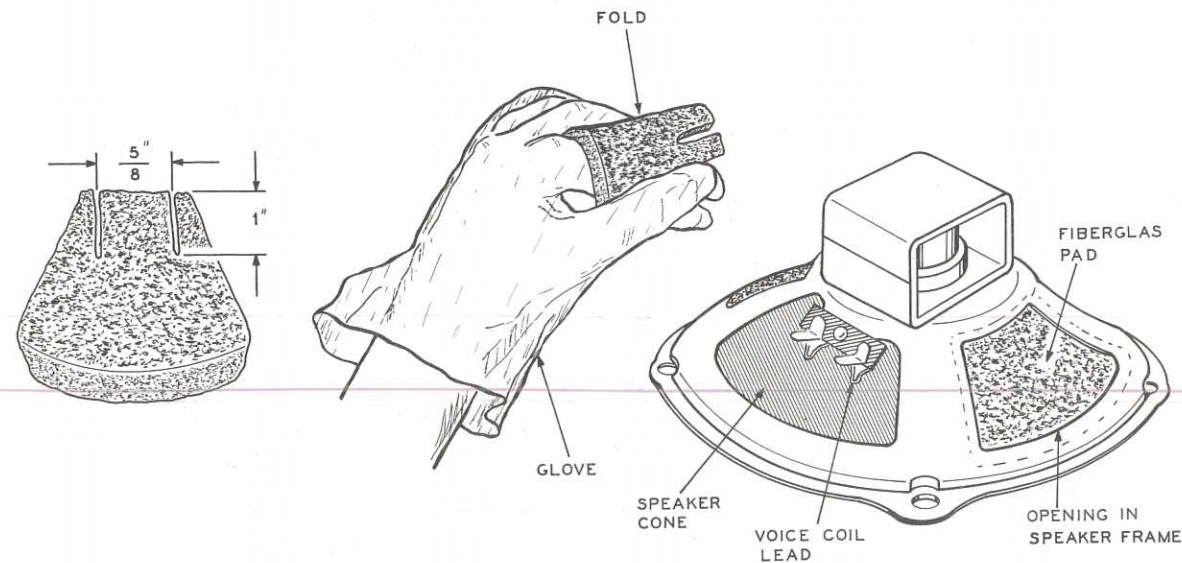
Pictorial 4

- ( ) Without tearing the packing material, carefully push it down in the center of the woofer hole, compressing the fiberglas. This will make a depression in which the woofer is to be placed.
- ( ) Without tearing or pulling up the packing material, push the remaining packing material under the edges of the woofer hole in the cabinet.



Detail 4A





Pictorial 5

### INSTALLING FIBERGLAS IN MIDRANGE SPEAKERS

- (✓) Locate the two 5" midrange speakers and the eight pieces of fiberglass which resemble 1/4 circles. (Make sure these pieces are not stuck together.) Refer to Pictorial 5.

NOTE: Perform the following four steps once for each 5" midrange speaker.

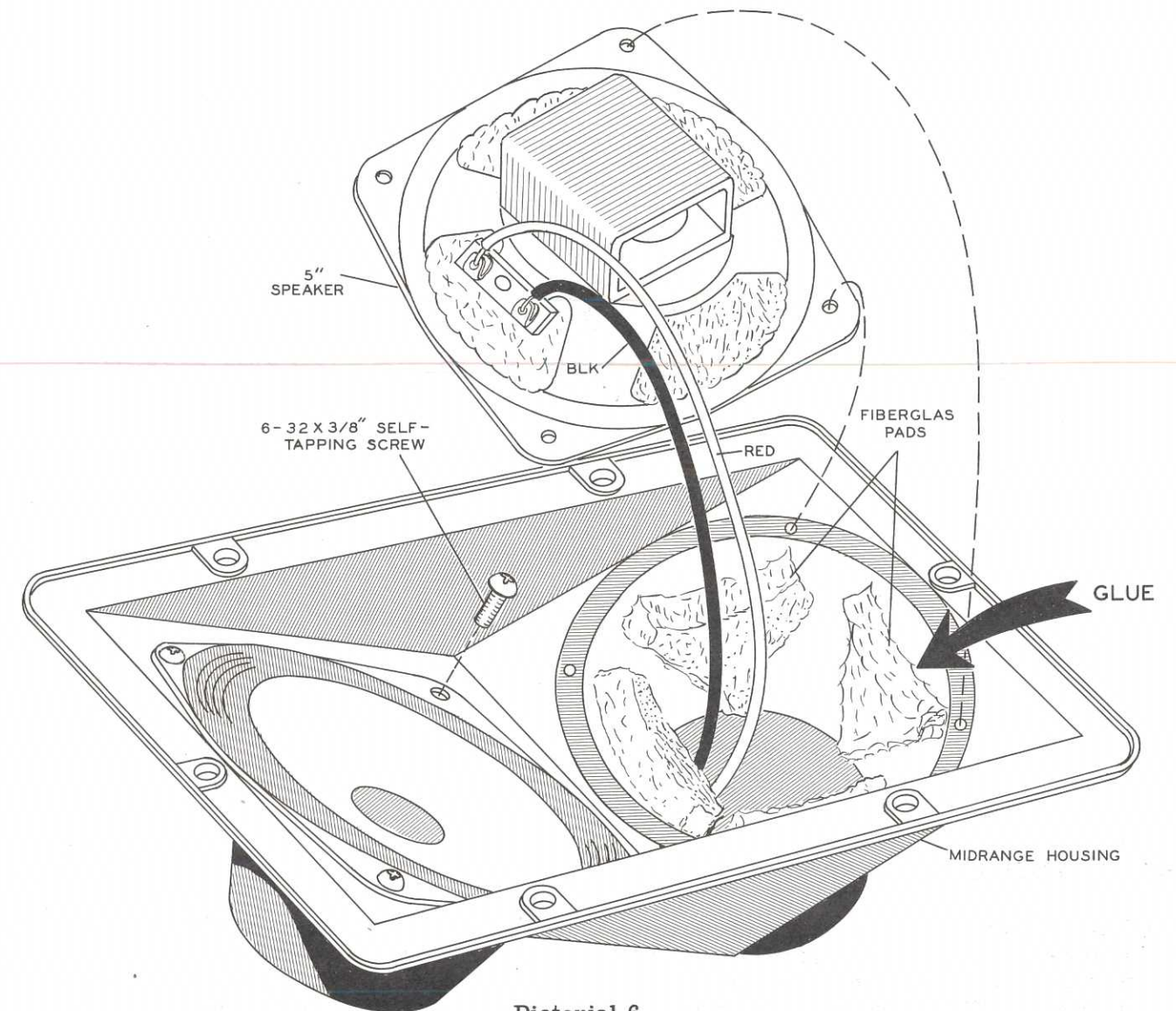
- (✓) (✓) Make two cuts in one of the 1/4 circle pieces as shown in Pictorial 5.
- (✓) (✓) Fold this piece of fiberglass and very carefully push it into the opening in the frame located directly under the terminal strip of a 5" speaker. The slots formed by the cuts in the fiberglass should fit around the voice coil leads going from the terminal strip to the speaker cone. Carefully position the fiberglass until it fits under the edges of the speaker frame hole and is smooth. Be especially careful to avoid placing excessive stress on the paper speaker cone, for it is easily damaged.

- (✓) (✓) Install another piece of fiberglass in one of the other openings. Work the fiberglass until it is under the edges of the hole in the speaker frame. Again make sure that it is smooth and free of humps.
- (✓) (✓) In a like manner, install a piece of fiberglass in each of the two remaining holes in the speaker frame.

### WIRING AND MOUNTING MIDRANGE SPEAKERS

Refer to Pictorial 6 for the following steps.

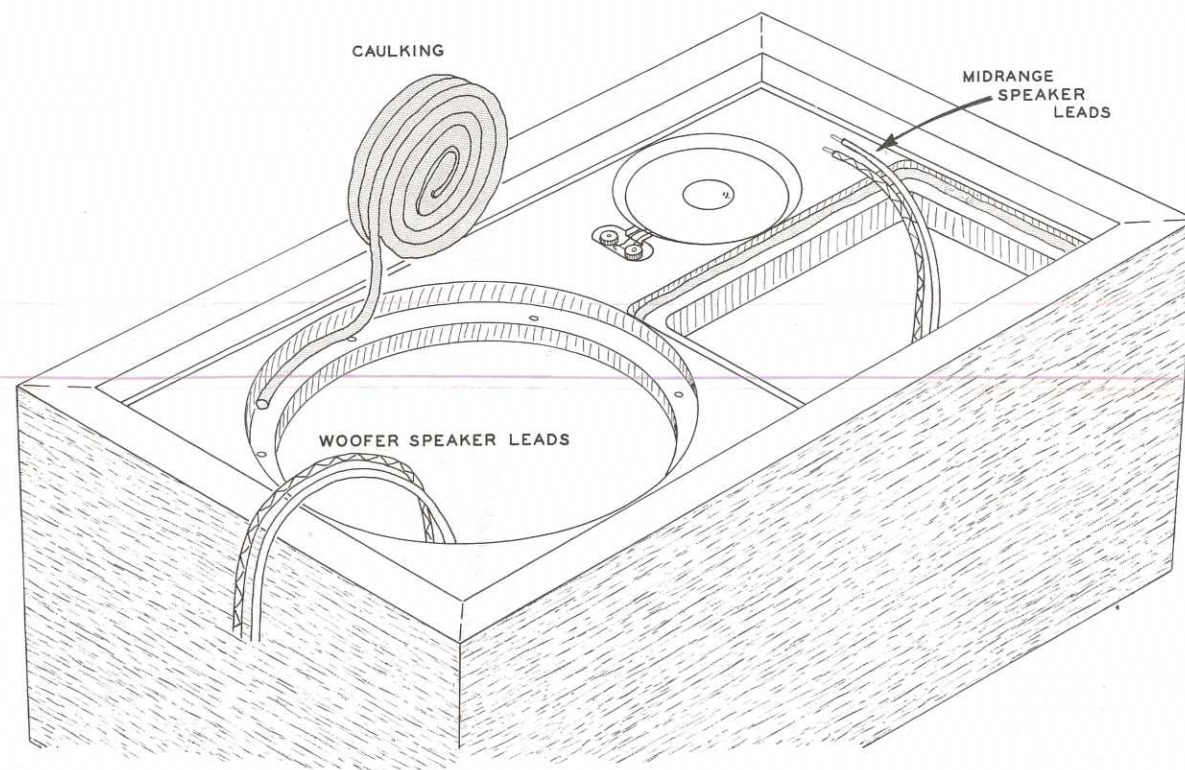
- (✓) Cut two 7" pieces of black hookup wire and two 7" pieces of red hookup wire. Strip 1/4" insulation from only one end of each of the four wires.
- (✓) Position the two 5" speakers according to Pictorial 6.
- (✓) Connect the stripped end of one of the red wires to the terminal nearest the red mark on one of the speakers (S-1). Bend this terminal upward.



Pictorial 6

- (✓) Connect the stripped end of one of the black wires to the other terminal of the same speaker (S-1). Bend this terminal upward also.
- (✓) In the same manner, connect and solder the other two wires to the remaining 5" speaker.
- (✓) (✓) Prepare the midrange housing by gluing four small fiberglass pads (corner pieces of fiberglass) in one speaker position, according to Pictorial 6.
- (✓) (✓) Fit the speaker wires through the holes in the back of the housing. Then install four 6-32 x 3/8" self-tapping screws. Use care not to let the screwdriver slip and damage the speaker cone. Pull the speaker wires fairly tight out of the back of the housing.
- (✓) Repeat the above two steps to install the other 5" speaker in the midrange housing.





Pictorial 7

### INSTALLATION OF SPEAKERS

- ( ) Take the woofer speaker out of the box and remove the jumper wire which may be connected between the two terminals of the speaker. CAUTION: To avoid damaging the woofer cone, do not set the woofer on its face.

Refer to Pictorial 7 for the following steps.

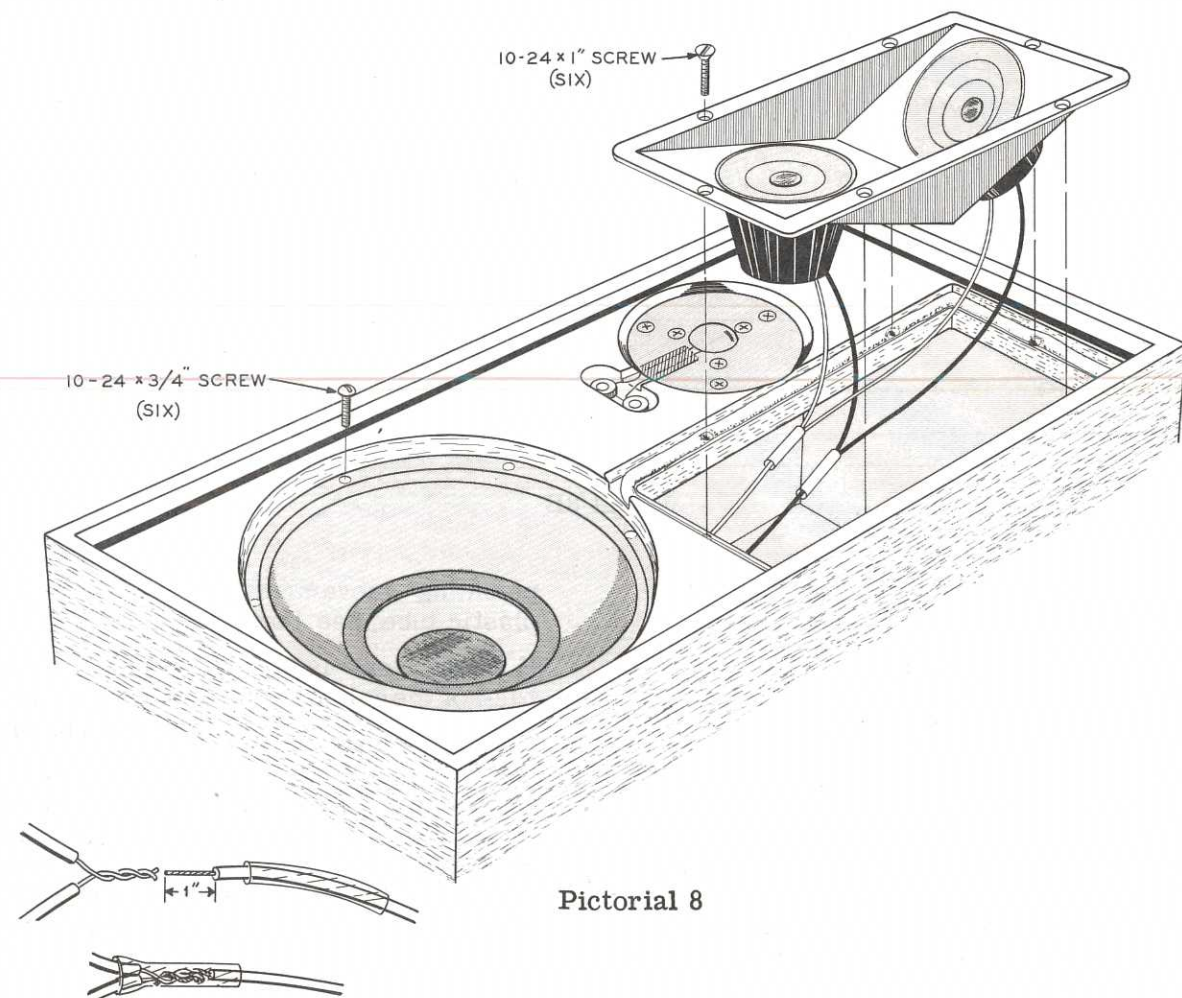
- ( ) Unroll a strip of caulking and place it around the woofer and midrange housing openings in the cabinet front. Make a complete wrap around each opening, as the caulking must seal airtight when the speakers are installed.
- ( ) Connect the red wire for the woofer (taped to the cabinet) to the terminal nearest the red mark on the woofer (S-1).
- ( ) Connect the black wire for the woofer to the other woofer terminal (S-1).

Refer to Pictorial 8 for the following steps.

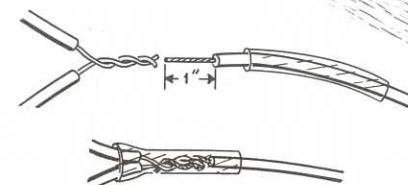
- ( ) Position the woofer in its hole in the cabinet, aligning the screw holes of the woofer with the screw holes of the cabinet. Press down firmly on the woofer.
- ( ) Secure the woofer in place with six 10-24 x 3/4" screws. CAUTION: When tightening these screws, tighten each one a little at a time, working around the woofer in a clockwise direction until it is down tight. Overtightening one screw could warp the frame of the woofer. Be sure the screwdriver does not slip and mar the cabinet or puncture the woofer cone.

### WIRING THE MIDRANGE SPEAKERS TO THE CROSSOVER NETWORK

Refer to Pictorial 8 and Detail 8A for the following steps.



Pictorial 8

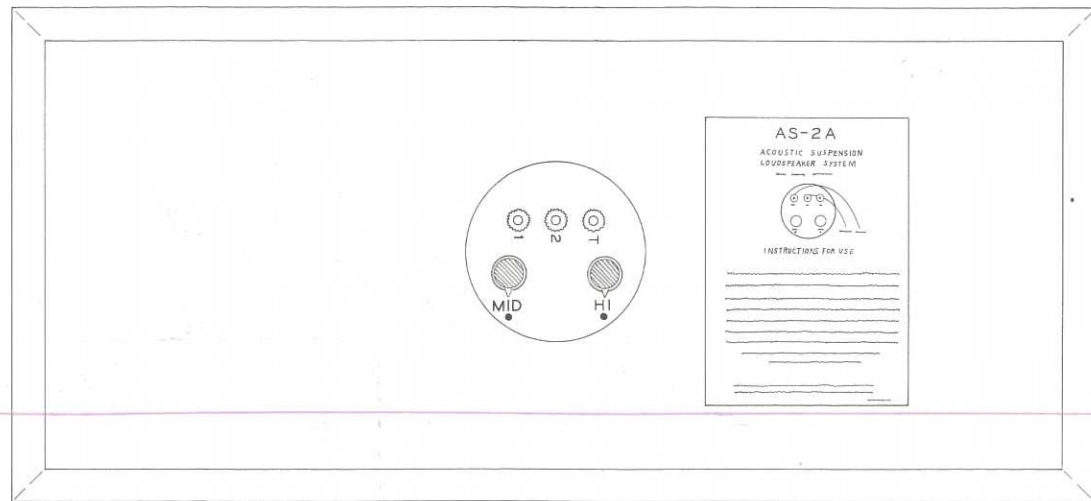


Detail 8A

- ( ) Strip 1" of insulation from the four wires coming out of the midrange housing and the red and black midrange wires extending from the crossover network through the rectangular hole of the cabinet.
- ( ) Locate the short (5") piece of plastic sleeving and cut it in half.
- ( ) Place one of these 2-1/2" pieces of sleeving over each of the midrange wires coming from the cabinet.
- ( ) Tightly twist together the two black wires coming out of the midrange housing.
- ( ) In the same manner, tightly twist together the two red wires coming from the midrange housing.

- ( ) Position the black wire of the crossover network beside the black twisted pair from the midrange housing to form a "Y" connection; tightly twist together all three wires (S-3). See Pictorial 8.
- ( ) In the same manner, tightly twist the three red wires together (S-3).
- ( ) When the solder connections have cooled, slide the plastic sleeving over the connections to keep them from shorting to each other.
- ( ) Run a bead of glue around the wires at the four holes in the back of the midrange housing, to make them airtight.
- ( ) Install the midrange housing in the cabinet and secure in place with the six 10-24 x 1" flat head screws. Tighten the screws evenly.





Detail 8B

- ( ) Remove the protective paper backing from the instruction label and press it to the back of the cabinet. See Detail 8B.

#### CHECKING CABINET FOR AIR LEAKS

To obtain optimum results with this Speaker System, it must be airtight. Proceed as follows to check for air leaks.

NOTE: Every effort should be made to check the Speaker System in the manner suggested below. Using music, rather than an audio oscillator, to test for air leaks is not satisfactory as the music covers the sound of possible air leaks. If an audio oscillator is not available carefully check the system visually for obvious leaks. Very small leaks will have only a minute effect on low frequency response.

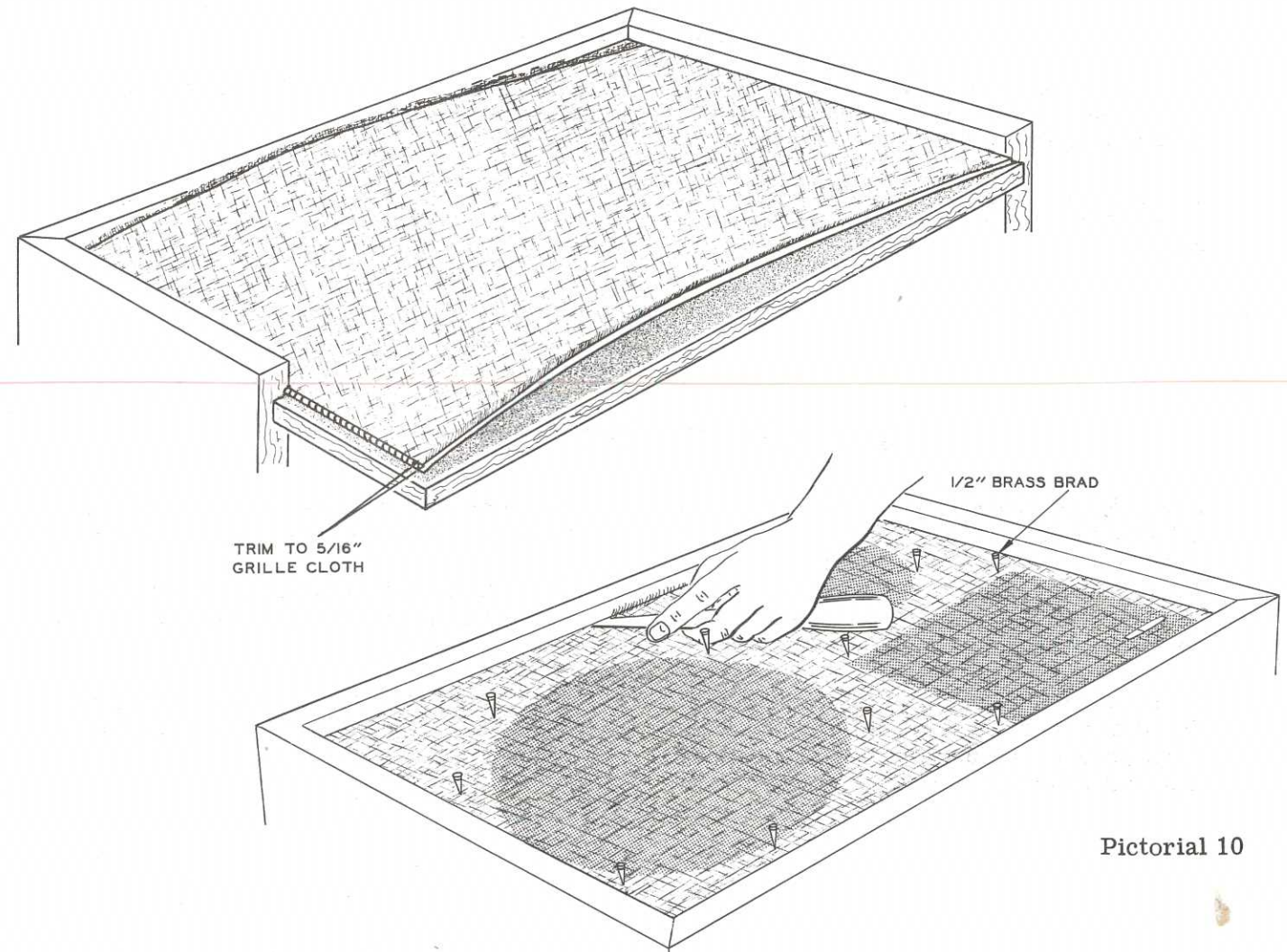
- ( ) Connect an audio oscillator to your amplifier and connect the 8  $\Omega$  output of the amplifier to the Speaker System. See the instruction label for proper hookup. The audio oscillator should be set for 20 cps sine wave output and the level of the amplifier adjusted to give a visible movement of the cone of the woofer, yet be inaudible.
- ( ) Place one end of the long plastic tubing near your ear, and move the other end around the edge of the woofer, the edge of the midrange housing, the super tweeter, the hole in the back of the cabinet where the crossover network is mounted, and all seams of the cabinet. You should be able to easily detect any air leaks by the

pulsating movement of air through the plastic tube. See Pictorial 9.

- ( ) If an air leak is located at the hole in the back of the cabinet, run a bead of glue around the edge of the hole at the network mounting board.
- ( ) An air leak at a seam of the cabinet would necessitate the removal of the woofer speaker or midrange housing and repairing the leak from inside the cabinet with glue.



Pictorial 9



Pictorial 10

- ( ) Any leaks located around the woofer or midrange housing can be eliminated by loosening the unit and applying caulking at the leak. Retighten the screws evenly.
- ( ) Turn off the amplifier and disconnect it from the Speaker System.

#### FINAL ASSEMBLY

Refer to Pictorial 10 for the following steps.

Inspect the speaker grille before installing it to see if the grille cloth is tight on the board. If the grille cloth over the speaker cutouts is sagging, dampen the sagging area with a wet cloth. As the grille dries, it will tighten across the speaker grille board. NOTE: If you wish to tighten the grille cloth after the speaker grille is installed, do not get the speaker cones wet. This could cause the cones to warp.

- ( ) Trim the grille cloth to 5/16" beyond the

grille board along the two long edges.

- ( ) Fit one of the narrow ends of the grille board into the groove at one end of the cabinet.
- ( ) Bow the grille board up in the middle and fit the other narrow end into the groove at the opposite end of the cabinet. Push the grille board down in the middle.
- ( ) Using a smooth-blade table knife, tuck the grille cloth into the groove along the top and bottom of the cabinet.
- ( ) Position and drive the ten 1/2" brass brads through the grille board into the cabinet front. Be careful not to damage the speakers.
- ( ) Remove the protective backing from the nameplate and press the nameplate onto the lower right hand corner of the grille board.

This completes assembly of your Speaker System.



## INSTALLATION

- ( ) Connect the Speaker System to the 8  $\Omega$  output of your amplifier, according to the instruction label on the rear of the cabinet.
- ( ) If your amplifier has variable damping, set it for UNITY for use with this Speaker System.
- ( ) While playing music through the Speaker System, set the two Level controls on the rear of the cabinet for the desired amounts of midrange and high frequencies.

## IN CASE OF DIFFICULTY

1. Recheck the wiring. Trace each wire in colored pencil on the Pictorials as it is checked. It is frequently helpful to have a friend check your work. Someone who is not familiar with the unit may notice something consistently overlooked by the kit builder.
2. It is interesting to note that about 90% of the kits that are returned for repair do not work properly because of poor connections and soldering. Therefore, many troubles can be eliminated by reheating all connections to make sure that they are soldered properly.
3. Check the values of the component parts. Be sure that the proper parts have been wired into the circuit.
4. Check for bits of solder, wire ends or other foreign matter which may be lodged in the wiring.

## SERVICE INFORMATION

### SERVICE

If, after applying the information in this manual and your best efforts, you are still unable to obtain proper performance, it is suggested that you take advantage of the technical facilities which the Heath Company makes available to its customers.

The Technical Consultation Department is maintained for your benefit. This service is available to you at no charge. Its primary purpose is to provide assistance for those who encounter difficulty in the construction, operation or maintenance of HEATHKIT equipment. It is not intended, and is not equipped to function as a general source of technical information involving kit modifications nor anything other than the normal and specified performance of HEATHKIT equipment.

Although the Technical Consultants are familiar with all details of this kit, the effectiveness of their advice will depend entirely upon the amount and the accuracy of the information furnished by you. In a sense, YOU MUST QUALIFY for GOOD technical advice by helping the consultants to help you. Please use this outline:

1. Before writing, fully investigate each of the hints and suggestions listed in this manual under In Case Of Difficulty. Possibly it will not be necessary to write.
2. When writing, clearly describe the nature of the trouble and mention all associated equipment. Specifically report operating procedures, switch positions, connections to other units, and anything else that might help to isolate the cause of trouble.
3. Report fully on the results obtained when testing the unit initially and when following the suggestions under In Case Of Difficulty. Be as specific as possible and include voltage readings if test equipment is available.
4. Identify the kit model number and date of purchase, if available. Also mention the date of the kit assembly manual. (Date at bottom of Page 1.)

5. Print or type your name and address, preferably in two places on the letter.

With the preceding information, the consultant will know exactly what kit you have, what you would like it to do for you and the difficulty you wish to correct. The date of purchase tells him whether or not engineering changes have been made since it was shipped to you. He will know what you have done in an effort to locate the cause of trouble and, thereby, avoid repetitious suggestions. In short, he will devote full time to the problem at hand, and through his familiarity with the kit, plus your accurate report, he will be able to give you a complete and helpful answer. If replacement parts are required, they will be shipped to you, subject to the terms of the Warranty.

The Factory Service facilities are also available to you, in case you are not familiar enough with electronics to provide our consultants with sufficient information on which to base a diagnosis of your difficulty, or in the event that you prefer to have the difficulty corrected in this manner. You may return the completed equipment to the Heath Company for inspection and necessary repairs and adjustments. You will be charged a minimal service fee, plus the price of any additional parts or material required. However, if the completed kit is returned within the Warranty period, parts charges will be governed by the terms of the Warranty. State the date of purchase, if possible.

Local Service by Authorized HEATHKIT Service Centers is also available in some areas and often will be your fastest, most efficient method of obtaining service for your HEATHKIT equipment. Although charges for local service are generally somewhat higher than for factory service, the amount of increase is usually offset by the transportation charge you would pay if you elected to return your kit to the Heath Company.

HEATHKIT Service Centers will honor the regular 90 day HEATHKIT Parts Warranty on all kits, whether purchased through a dealer or directly from Heath Company; however, it will be necessary that you verify the purchase date of your kit.





Under the conditions specified in the Warranty, replacement parts are supplied without charge; however, if the Service Center assists you in locating a defective part (or parts) in your kit, or installs a replacement part for you, you may be charged for this service.

HEATHKIT equipment purchased locally and returned to Heath Company for service must be accompanied by your copy of the dated sales receipt from your authorized HEATHKIT dealer in order to be eligible for parts replacement under the terms of the Warranty.

THIS SERVICE POLICY APPLIES ONLY TO COMPLETED EQUIPMENT CONSTRUCTED IN ACCORDANCE WITH THE INSTRUCTIONS AS STATED IN THE MANUAL. Equipment that has been modified in design will not be accepted for repair. If there is evidence of acid core solder or paste fluxes, the equipment will be returned NOT repaired.

For information regarding modification of HEATHKIT equipment for special applications, it is suggested that you refer to any one or more of the many publications that are available on all phases of electronics. They can be obtained at or through your local library, as well as at most electronic equipment stores. Although the Heath Company sincerely welcomes all comments and suggestions, it would be impossible to design, test, evaluate and assume responsibility for proposed circuit changes for special purposes. Therefore, such modifications must be made at the discretion of the kit builder, using information available from sources other than the Heath Company.

#### REPLACEMENTS

Material supplied with HEATHKIT products has been carefully selected to meet design requirements and ordinarily will fulfill its function without difficulty. Occasionally, improper operation can be traced to a faulty component. Should inspection reveal the necessity for replacement, write to the Heath Company and supply all of the following information.

- A. Thoroughly identify the part in question by using the part number and description found in the manual Parts List.

- B. Identify the type and model number of kit in which it is used.
- C. Mention date of purchase.
- D. Describe the nature of defect or reason for requesting replacement.

The Heath Company will promptly supply the necessary replacement. PLEASE DO NOT RETURN THE ORIGINAL COMPONENT UNTIL SPECIFICALLY REQUESTED TO DO SO. Do not dismantle the component in question as this will void the guarantee. This replacement policy does not cover the free replacement of parts that may have been broken or damaged through carelessness on the part of the kit builder.

#### SHIPPING INSTRUCTIONS

In the event that your instrument must be returned for service, these instructions should be carefully followed.

Wrap the equipment in heavy paper, exercising care to prevent damage. Place the wrapped equipment in a stout carton of such size that at least three inches of shredded paper, excelsior, or other resilient packing material can be placed between all sides of the wrapped equipment and the carton. Close and seal the carton with gummed paper tape, or alternately, tie securely with stout cord. Clearly print the address on the carton as follows:

To: HEATH COMPANY  
Benton Harbor, Michigan

ATTACH A LETTER TO THE OUTSIDE OF THE CARTON BEARING YOUR NAME, COMPLETE ADDRESS, DATE OF PURCHASE, AND A BRIEF DESCRIPTION OF THE DIFFICULTY ENCOUNTERED. Also, include your name and return address on the outside of the carton. Preferably affix one or more "Fragile" or "Handle With Care" labels to the carton, or otherwise so mark with a crayon of bright color. Ship by insured parcel post or prepaid express; note that a carrier cannot be held responsible for damage in transit if, in HIS OPINION, the article is inadequately packed for shipment.



## WARRANTY

Heath Company warrants that for a period of three months from the date of shipment, all Heathkit parts shall be free of defects in materials and workmanship under normal use and service and that in fulfillment of any breach of such warranty, Heath Company shall replace such defective parts upon the return of the same to its factory. The foregoing warranty shall apply only to the original buyer, and is and shall be in lieu of all other warranties, whether express or implied and of all other obligations or liabilities on the part of Heath Company and in no event shall Heath Company be liable for any anticipated profits, consequential damages, loss of time or other losses incurred by the buyer in connection with the purchase, assembly or operation of Heathkits or components thereof. No replacement shall be made of parts damaged by the buyer in the course of handling or assembling Heathkit equipment.

NOTE: The foregoing warranty is completely void and we will not replace, repair or service instruments or parts thereof in which acid core solder or paste fluxes have been used.

HEATH COMPANY

Dear Customer:

No effort has been spared in the design, development, and packaging of your HEATHKIT® to assure its safe arrival and lasting, dependable service.

Just one step in the meticulous care given the manufacture of HEATHKIT® equipment is the inspection of parts to rigid quality standards. However, should any part of your kit be damaged, defective, or missing, such parts will be replaced free by the factory or your nearest HEATHKIT® dealer.\*

In writing to us, return this slip or refer to the number printed below; specify the part number in question, and include your original order blank.

6-4316B

AS-2A

Sincerely,

THE HEATH COMPANY

\*See reverse side for Authorized Service Centers