

Figure 2

- ( ) Temporarily short the antenna connector to ground. Be sure that the RF GAIN control is in its maximum clockwise position and the AVC switch is in the AVC position. Adjust the METER ZERO ADJ control for a zero reading on the "S" meter.
- ( ) Remove the short from the antenna connector.

#### FRONT END ALIGNMENT

In order to obtain optimum results from the Receiver, the front end assembly should be aligned with an accurate amplitude modulated RF signal generator and an AC voltmeter.

It is very important that the signal generator be very accurate. Therefore, the generator should be calibrated against a crystal calibrator or receiver of known accuracy. If the HRA-10-1 Crystal Calibrator has been purchased, it should be assembled at this time and used to calibrate the signal source.

When performing the following steps, bear in mind that the front end assembly has been preset by the manufacturer, however, due to differences in tubes and assembly techniques, some realignment will be necessary. Usually this will consist of not more than 1/2 turn of the coil slugs.

( ) Set all front panel controls as follows:

AF GAIN	Maximum clockwise
RF GAIN	Maximum clockwise
BFO TUNE	12 o'clock
MAIN TUNING	As indicated in Alignment chart.
BAND Switch	As indicated in Alignment chart.
BFO	OFF
ANL	OFF
AVC	OFF
STBY-REC	REC
CAL RESET	12 o'clock
ANT TRIM	12 o'clock

( ) Connect the RF signal generator to the ANT-enna connector.

( ) Connect the AC voltmeter across the Speaker jack.

( ) Complete each step as indicated in the following chart. Refer to Figure 3 for the location of each coil. Be sure to keep the signal generator level as low as possible while still obtaining a usable reading of the meter, this should be just above the normal noise level.

#### FRONT END ALIGNMENT CHART

BAND SWITCH POSITION	RECEIVER AND GEN. FREQ.	ADJUST FOR MAX	SECTION BEING ADJUSTED
80 meters	3.50 mc	L11 *	Oscillator
	3.75 mc **	L1 and L6	Antenna and mixer coils
40 meters	7.00 mc	L12 *	Oscillator
	7.15 mc **	L2 and L7	Antenna and mixer coils
20 meters	14.00 mc	L13 *	Oscillator
	14.15 mc **	L3 and L8	Antenna and mixer coils
15 meters	21.00 mc	L14 *	Oscillator
	21.25 mc **	L4 and L9	Antenna and mixer coils
10 meters	28.00 mc	L15 *	Oscillator
	29.00 mc **	L5 and L10	Antenna and mixer coils

\*There will be no signal heard until these coils are peaked near the correct setting. Once the correct setting is found, carefully adjust for a maximum reading.

\*\*Set the Receiver and generator frequency as indicated in the chart and adjust the CAL RESET until the signal is heard.

## FINAL ASSEMBLY

Refer to Figure 3 (fold-out from Page 26) for the following steps.

- ( ) Install four rubber feet on the bottom plate as shown. Use 6-32 x 3/8" screws, #8 flat steel washers, #6 lockwashers, and 6-32 nuts.
- ( ) Mount the bottom plate to the chassis with #6 sheet metal screws.
- ( ) Place the cabinet cover over the chassis and secure it on each side with two 6-32 x 1/4" painted truss head screws.

NOTE: The blue and white identification label shows the Model Number and Production Series

Number of your kit. Refer to these numbers in any communications with the Heath Company; this assures you that you will receive the most complete and up-to-date information in return.

- ( ) Install the identification label in the following manner:

1. Select a location for the label where it can easily be seen when needed, but will not show when the unit is in operation. This location might be on the rear panel or the top of the chassis, or on the rear or bottom of the cabinet.
2. Carefully peel away the backing paper. Then press the label into position.

## INSTALLATION AND OPERATION

### CONTROLS

AF GAIN - Turns the Receiver ON or OFF, and varies the volume in the speaker or headphones.

RF GAIN - Varies the amount of gain in the RF and IF amplifier stages.

BFO TUNE - Makes it possible to tune the injected BFO signal either side of the IF center frequency for Single Side Band (SSB) and CW reception.

BAND - Selects one of the five Amateur bands: 80, 40, 20, 15, and 10 meters.

CAL RESET - Provides fine adjustment of the oscillator portion of the tuning capacitor for calibration points.

ANT TRIM - Peaks the signal at the frequency being received.

MAIN TUNING - Tunes in the desired station.

MUTING - Muting provisions have been incorporated in this Receiver. The jumper installed in the octal plug in a previous step should be removed and replaced with two separate wires. These wires are then connected to an antenna relay so that when the relay is in the receive position, the wires are shorted together activating the Receiver; when the relay is in the transmit position, the wires are open muting the Receiver. When this method of muting is used the STBY-REC switch is left in the REC position.

### AM OPERATION

STBY-REC Switch - REC  
CAL-OFF Switch - OFF  
BAND Switch - Desired Band  
BFO-OFF Switch - OFF  
AVC-ON Switch - ON  
RF GAIN - Maximum clockwise  
ANL-OFF - OFF  
AF GAIN - Comfortable listening level

- ( ) Rotate the MAIN tuning capacitor until an AM signal is tuned in. Proper tuning of the AM signal will be indicated by maximum deflection of the "S" meter.
- ( ) Rotate the ANT TRIM capacitor for maximum signal strength. Once this adjustment has been made, it should not be necessary to readjust it except when changing bands.

NOTE: When listening to an extremely strong signal, the RF GAIN control should be "backed off," turned counterclockwise, to prevent blocking of the Receiver.

### CW OPERATION

STBY-REC Switch - REC  
CAL-OFF Switch - OFF  
BAND Switch - Desired band  
BFO-OFF - BFO  
BFO-TUNE - 12 o'clock  
AVC-OFF - OFF  
RF GAIN - Comfortable listening  
AF GAIN - 3 o'clock

- ( ) Rotate the MAIN tuning capacitor until a CW station is located.
- ( ) Adjust the BFO TUNE control for the most comfortable listening tone.
- ( ) It is usually best to adjust the listening level using the RF GAIN control. This provides maximum RF amplification for a weak signal.

### SSB OPERATION

For SSB reception, set the controls as explained for CW operation, except turn the AVC

switch to AVC and adjust the BFO TUNE control as follows: The BFO TUNE control will normally be set at 10 o'clock for upper SSB stations and 2 o'clock for lower SSB stations. Upper sideband transmission is usually used on the 10, 15, and 20 meter bands. Lower sideband transmission is usually found on 40 and 80 meters. Should you find it impossible to tune in a SSB station, reverse the BFO TUNE control setting, as this station may be transmitting on the other sideband.

As with CW reception the listening level should be adjusted with the RF GAIN control, with the AF GAIN control in the 3 o'clock position.

### ANTENNA

The Receiver will operate using a long wire attached to the antenna connector, however, for the best results the antenna should have an impedance of 50 to 75  $\Omega$ . This could be a dipole type antenna. The dipole should be constructed for the band that you desire to receive. Naturally, if this Receiver is to be used in conjunction with a transmitter, the transmitting antenna should also be used for reception. For this

type of operation, a method for switching the antenna from the transmitter to the Receiver must be used.

If you wish to construct a dipole type of antenna, we suggest that you refer to the ARRL Handbook, an Antenna Handbook, or one of the periodical amateur radio magazines. These references are available at most Radio-TV Distributors.

### IN CASE OF DIFFICULTY

1. Recheck the wiring. Trace each lead in colored pencil on the Pictorial as it is checked. It is frequently helpful to have a friend check your work. Someone who is not familiar with the unit may notice something consistently overlooked by the constructor.
2. It is interesting to note that about 90% of the kits that are returned for repair, do not function properly due to poor connections and soldering. Therefore, many troubles can be eliminated by reheating all connections to make sure that they are soldered as described in the Proper Soldering Techniques section of this manual.
3. Check to be sure that all tubes are in their proper locations. Make sure that all tubes light up properly.
4. Check the tubes with a tube tester or by substitution of tubes of the same types and known to be good.
5. Check the values of the parts. Be sure that the proper part has been wired into the circuit, as shown in the pictorial diagrams and as called out in the wiring instructions.
6. Check for bits of solder, wire ends or other foreign matter which may be lodged in the wiring.
7. If, after careful checks, the trouble is still not located and a voltmeter is available, check voltage readings against those shown on the Schematic Diagram. NOTE: All voltage readings were taken with an 11 megohm input vacuum tube voltmeter. Voltages may vary as much as 10%.
8. A review of the Circuit Description will prove helpful in indicating where to look for trouble.

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

## SPECIFIC PROBLEMS

PROBLEM	CHECK
Filaments do not light.	<ol style="list-style-type: none"> <li>1. Check fuse.</li> <li>2. Check filament wiring.</li> <li>3. Open tube filament - Check for continuity with an ohmmeter.</li> <li>4. Check power transformer wiring against Pictorial 2.</li> </ol>
Filaments light, but no sound with GAIN controls turned fully clockwise.	<ol style="list-style-type: none"> <li>1. Make sure the STBY-REC Switch is not in STBY position, check muting circuit.</li> <li>2. Check wiring of the GAIN controls.</li> </ol> <p><b>CAUTION:</b> When making the following checks, do not touch the chassis with your other hand. Be sure that the chassis is not connected to an earth ground and that you touch only the specified lug on the tube socket.</p> <ol style="list-style-type: none"> <li>3. Turn the Receiver on and place a small screwdriver on lug 7 of tube socket V6, then touch your finger to the metal portion of the screwdriver; a low pitched hum should be audible.</li> <li>4. Now place the screwdriver on lug 2 of tube socket V6. Again touch your finger to the metal portion, this time the hum should be louder.</li> </ol> <p>If no hum is present check the components of tube V6 and the wiring to the speaker jack.</p>
Audio present - no signals can be heard.	<p><b>CAUTION:</b> When making the following tests, do not touch the chassis with your other hand.</p> <ol style="list-style-type: none"> <li>1. Place a small screwdriver on lug 2 of tube socket V4 and with your finger, touch the metal portion of the screwdriver. A low pitched hum should be heard.</li> </ol> <p>If no hum is present, check the components around tube socket V4.</p> <ol style="list-style-type: none"> <li>2. Similarly, make the screwdriver test on lug 1 of tube socket V3. The hum should be louder.</li> <li>3. Similarly, make the screwdriver test on lug 2 of tube socket V2. The hum should be louder.</li> <li>4. Similarly, repeat the screwdriver test on lug 1 of tube socket V1. The hum should be louder.</li> </ol> <p>If no hum is present or if the hum level does not increase, check the components on the circuit around the tube sockets.</p>

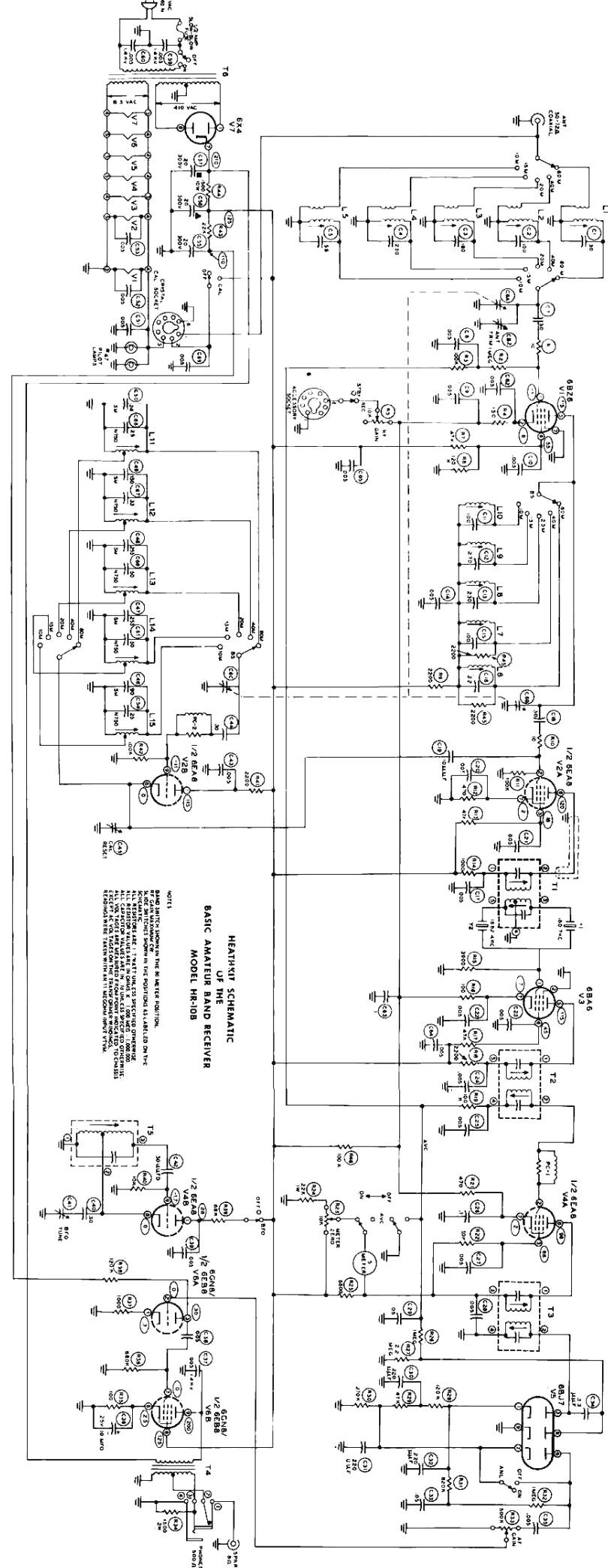


## REPLACEMENT PARTS PRICE LIST

PART No.	PRICE Each	DESCRIPTION	PART No.	PRICE Each	DESCRIPTION
<b>RESISTORS</b>					
1-41	.10	10 $\Omega$ 1/2 watt	10-57	.35	10 K $\Omega$ tab-mount control
1-3	.10	100 $\Omega$ 1/2 watt	10-131	.55	10 K $\Omega$ control
1-66	.10	150 $\Omega$ 1/2 watt	19-72	.95	500 K $\Omega$ control w/SPST switch
1-6	.10	470 $\Omega$ 1/2 watt	60-18	.15	SPST slide switch
1-9	.10	1000 $\Omega$ 1/2 watt	60-36	.30	DPDT slide switch
1-44	.10	2200 $\Omega$ 1/2 watt	<b>SWITCHES-CONTROLS</b>		
1-46	.10	3900 $\Omega$ 1/2 watt	431-10	.10	3-lug terminal strip
1-19	.10	6800 $\Omega$ 1/2 watt	431-12	.10	4-lug terminal strip
1-20	.10	10 K $\Omega$ 1/2 watt	431-15	.10	1-lug terminal strip
1-22	.10	22 K $\Omega$ 1/2 watt	431-16	.10	2-lug terminal strip
1-25	.10	47 K $\Omega$ 1/2 watt	431-45	.10	6-lug terminal strip
1-60	.10	68 K $\Omega$ 1/2 watt	431-40	.10	4-lug terminal strip
1-26	.10	100 K $\Omega$ 1/2 watt	434-34	.15	7-pin phenolic tube socket
1-121	.10	120 K $\Omega$ 1/2 watt	434-35	.30	7-pin ceramic tube socket
1-30	.10	270 K $\Omega$ 1/2 watt	434-36	.30	9-pin ceramic tube socket
1-34	.10	680 K $\Omega$ 1/2 watt	434-39	.15	Octal socket
1-68	.10	820 K $\Omega$ 1/2 watt	434-42	.10	Phono socket
1-35	.10	1 megohm 1/2 watt	434-43	.20	9-pin molded tube socket
1-37	.10	2.2 megohm 1/2 watt	434-56	.15	9-pin phenolic tube socket
1-5-1	.10	22 K $\Omega$ 1 watt	434-74	.15	Crystal socket
1-14-2	.20	1500 $\Omega$ 2 watt	434-85	.20	Pilot lamp socket
3-11-10	.20	1500 $\Omega$ 10 watt wire-wound	436-21	.95	Phone jack
<b>CAPACITORS</b>					
20-100	.15	30 $\mu\mu$ f resin dipped	438-6	.35	Octal plug
21-3	.10	10 $\mu\mu$ f disc ceramic	438-4	.10	Phono plug
21-33	.10	3.3 $\mu\mu$ f disc ceramic	440-1	.20	Octal plug cap
21-22	.10	220 $\mu\mu$ f disc ceramic	<b>HARDWARE</b>		
21-48	.15	.05 $\mu$ fd disc ceramic	250-4	.05	4-40 x 3/8" round head ma- chine screw
21-27	.10	.005 $\mu$ fd disc ceramic	250-8	.05	#6 x 3/8" sheet metal screw
21-72	.20	.005 $\mu$ fd 1.4 KV disc ceramic	250-18	.05	8-32 x 3/8" round head ma- chine screw
27-47	.20	.1 $\mu$ fd Mylar	250-33	.05	6-32 x 1/8" setscrew
25-4	.50	10 $\mu$ fd 25 V electrolytic	250-43	.05	8-32 x 1/4" setscrew
25-9	1.15	20-20-20 $\mu$ fd 300 V twist- prong electrolytic	250-1193	.05	8-32 x 3/8" setscrew
26-84	4.15	15-15-15 $\mu$ uf 3-gang variable	250-49	.05	3-48 x 1/4" screw
26-64	1.40	21 $\mu$ uf single-section variable	250-56	.05	6-32 x 1/4" screw
<b>COIL-TRANSFORMERS-CHOKE</b>					
40-429	.90	1682 kc BFO coil	250-70	.05	6-32 x 3/16" flat head screw
45-43	.25	Parasitic choke wound on 47 $\Omega$ resistor	250-89	.05	6-32 x 3/8" screw
51-84	2.20	Audio output transformer	250-100	.05	6-32 x 5/16" setscrew
52-17	1.65	Interstage IF transformer	250-116	.05	6-32 x 1/4" truss head ma- chine screw (black)
52-50	1.35	Input IF transformer	250-138	.05	6-32 x 3/16" screw
54-122-24	6.00	Power transformer	252-1	.05	3-48 nut
			252-3	.05	6-32 nut
			252-4	.05	8-32 nut
			252-7	.05	Control nut
			252-15	.05	4-40 nut
			252-22	.05	6-32 speednut



PART No.	PRICE Each	DESCRIPTION	PART No.	PRICE Each	DESCRIPTION
<b>Hardware (cont'd.)</b>					
253-9	.05	#8 flat steel washer	453-35	.15	1/4" diameter x 4-3/8" long shaft
253-10	.05	Control flat washer	453-90	.10	1/4" x 1-7/8" shaft
253-36	.05	Formed spring brass washer	453-114	.10	1/4" x 2-1/2" dial cord drive shaft
253-49	.10	Flat nylon washer	454-12	.50	Flywheel
254-1	.05	#6 lockwasher	455-9	.15	3/8" x 3/8" bushing
254-2	.05	#8 lockwasher	455-15	.10	1/4" x 1/4" collar
254-4	.05	Control lockwasher	456-7	.25	Metal coupling
254-7	.05	#3 lockwasher	462-257	.55	1-9/16" diameter green knob
254-9	.05	#4 lockwasher	462-122	.20	Gray knob with skirt and pointer
255-30	.10	Spacer	462-258	.30	9/16" diameter green knob with white pointer mark
258-1	.05	Dial cord spring			
259-1	.05	#6 solder lug			
259-6	.05	#6 small solder lug			
259-10	.05	Control solder lug			
260-7	.05	IF transformer clip			
260-29	.25	Crystal holding clip			
<b>GROMMETS-WIRE</b>					
73-1	.10	3/8" rubber grommet	90-358	2.80	Top cover
73-4	.10	5/16" rubber grommet	100-362	.30	Dial drum
89-1	.35	Line cord with plug	100-369-1	.70	Dial back plate assembly
134-40	2.60	Wiring harness	100-370	.15	Pulley bracket assembly
206-4	.15	Length spiral shield	100-640	1.00	Front panel
340-8	.05/ft	Length #22 bare wire	110-8	20.35	Front end tuner assembly
343-2	.10/ft	Length coax cable	200-332-1		
344-51	.05/ft	Length brown hookup wire	204-449	.30	Chassis
344-52	.05/ft	Length red hookup wire	204-450	.10	Variable capacitor mounting bracket
344-54	.05/ft	Length yellow hookup wire	204-451	.10	Pilot lamp bracket
346-4	.05/ft	Length sleeving 1/16" diameter	205-260	.90	Pilot lamp bracket
346-2	.05/ft	Length sleeving 3/16" diameter	205-337	.10	Chassis bottom plate
			205-350-1	.15	Dial spacer plate
					Meter spacer plate
<b>TUBES-CRYSTALS-PILOT LAMPS-FUSE</b>					
404-184	5.00	1680.70 kc $\pm$ .005% tolerance crystal	75-24	.10	Line cord strain relief
404-185	5.00	1682.40 kc $\pm$ .005% tolerance crystal	206-3	.20	9-pin tube shield
407-90	5.00	Meter	206-25	.15	7-pin tube shield
411-64	.80	6X4 tube	261-9	.05	Rubber foot
411-90	.95	6BA6 tube	349-3	.05/ft	Length dial cord
411-113	1.50	6BJ7 tube	422-1	.25	Fuse block
411-124	1.50	6EA8 tube	463-31	.30	Dial pointer
411-126	1.05	6BZ6 tube	481-2	.10	Capacitor mounting wafer
411-161	2.20	6GN8/6EB8 tube	490-1	.10	Alignment tool
412-20	.20	#47 pilot lamp	490-5	.10	Nut starter
421-20	.30	1/2 ampere slow-blow fuse	464-23-2	1.45	Dial plate (plastic)
			331-6	.15	Solder
				2.00	Manual (see front cover for part number)



## REPLACEMENT PARTS PRICE LIST FOR THE PREASSEMBLED FRONT END

This list is provided so that you may order replacement parts for the preassembled front end of your Model HR-10B Receiver. If you order a part, give the Part Number and Description.

PART No.	PRICE Each	DESCRIPTION	PART No.	PRICE Each	DESCRIPTION			
<b>CAPACITORS</b>								
20-77	.15	24 $\mu\mu$ f silver mica	40-419	.70	10 meter mixer			
20-99	.15	22 $\mu\mu$ f silver mica	40-420	.70	15 meter mixer			
20-100	.15	30 $\mu\mu$ f silver mica	40-421	.70	20 meter mixer			
20-78	.15	56 $\mu\mu$ f silver mica	40-422	.70	40 meter mixer			
20-119	.15	90 $\mu\mu$ f silver mica	40-423	.70	80 meter mixer			
20-102	.15	100 $\mu\mu$ f silver mica	40-424	.80	10 meter oscillator			
20-105	.20	180 $\mu\mu$ f silver mica	40-425	.75	15 meter oscillator			
20-103	.15	150 $\mu\mu$ f silver mica	40-426	.75	20 meter oscillator			
20-111	.20	230 $\mu\mu$ f silver mica	40-427	.80	40 meter oscillator			
20-126	.25	255 $\mu\mu$ f silver mica	40-428	.70	80 meter oscillator			
20-114	.20	270 $\mu\mu$ f silver mica						
21-7	.10	33 $\mu\mu$ f disc ceramic	<b>MISCELLANEOUS</b>					
21-27	.10	.005 $\mu$ fd disc ceramic	1-41	.10	10 $\Omega$ 1/2 watt resistor			
21-65	.10	25 $\mu\mu$ f tubular ceramic	1-44	.10	2200 $\Omega$ 1/2 watt resistor			
21-66	.10	50 $\mu\mu$ f tubular ceramic	45-43	.25	RF choke			
			63-299	5.00	5-position rotary switch (6-section)			
<b>COILS</b>								
40-414	.75	10 meter antenna	100-360	.60	Assembly shield, bandswitch end plate			
40-415	.75	15 meter antenna	100-361	.55	Assembly shield, bandswitch partition			
40-416	.75	20 meter antenna						
40-417	.80	40 meter antenna	205-335	.20	Coil mounting plate			
40-418	.70	80 meter antenna						

To order parts, use the Parts Order Form furnished with this kit. If a Parts Order Form is not available, refer to Replacement Parts inside the rear cover of the Manual.

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

# CUSTOMER SERVICE

## REPLACEMENT PARTS

If you need a replacement part, please fill in the Parts Order Form that is furnished and mail it to the Heath Company. Or, if you write a letter, include the:

- Part number and description as shown in the Parts List.
- Model number and Series number from the blue and white label.
- Date of purchase.
- Nature of the defect.

**Please do not return parts to the factory unless they are requested.** Parts that are damaged through carelessness or misuse by the kit builder will not be replaced without cost, and will not be considered in warranty.

Parts are also available at the Heathkit Electronic Centers listed in your catalog. Be sure to provide the Heath part number. Bring in the original part when you request a warranty replacement from a Heathkit Electronic Center.

**NOTE:** Replacement parts are maintained specifically to repair Heathkit products. Parts sales for other reasons will be declined.

## 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.
- Copies of all correspondence relevant to the service of the kit.
- A brief description of the difficulty.
- Authorization to return your kit C.O.D. 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.) 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

HEATH

**Schlumberger**

HEATH COMPANY • BENTON HARBOR, MICHIGAN  
**THE WORLD'S FINEST ELECTRONIC EQUIPMENT IN KIT FORM**