

HEATH

Schlumberger



# kit builders guide

STEPS TO EASY  
HEATHKIT ASSEMBLY...

- UNPACK
- TOOLS
- RESISTORS
- PARTS
- ASSEMBLY
- SOLDERING
- INTEGRATED CIRCUITS
- MANUAL
- HEATHKIT SERVICE INFORMATION

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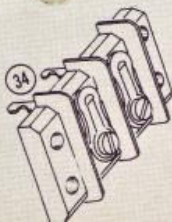
- ☐ Read any special unpacking information in the Manual.
- ☐ Save the packing material until all the parts are checked.
- ☐ Lay out parts so they will be handy when you assemble the kit. Muffin tins and egg cartons are ideal for holding small parts.



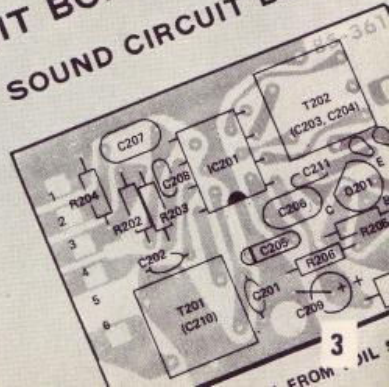


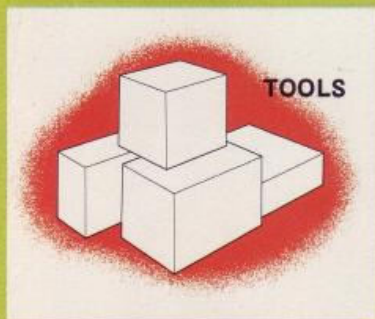
A close-up photograph of a person's hand holding a small, gold-colored electronic component, likely a microchip or integrated circuit. The hand is positioned over a document that features the text "CIRCUIT BOARD X-RAY VIEW" and "SOUND CIRCUIT BOARD". The document also includes a small diagram of a circuit board and some other text, including "COMPO" and "45-36". The background is a dark, textured surface.

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CIRCUIT BOARD X-RAY VIEW  
SOUND CIRCUIT BOARD





You will need these tools to assemble most Heathkits.

**LONG-NOSE  
PLIERS**



**DIAGONAL  
CUTTERS**



**WIRE  
STRIPPERS**



**SCREWDRIVER — 1/4" Blade**



**SCREWDRIVER — 1/8" Blade**



**25-WATT TO 30-WATT PENCIL  
SOLDERING IRON WITH A 1/8"  
TO 1/4" TIP.**



A good soldering iron is your most important tool. Choose a good one and keep its tip in good condition.

**PLASTIC NUT STARTER**  
— Supplied with most kits  
to pick up and start small  
nuts and washers.





These tools, though not required, will make your Heathkit assembly even easier.



**HEATHKIT  
SOLDERING IRON**  
Designed especially for Heathkits.

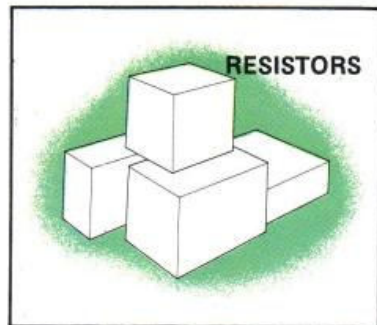
**NUT DRIVERS**



**PLIERS**



**SOLDERING AID**



You're never confused with Heathkit parts because the Manual shows you exactly what each part looks like and where it goes.

RESISTORS come in several sizes and shapes, each one with its color code or value printed on it. The Manual calls out the value, and color code when used, of each resistor at the time it is installed.

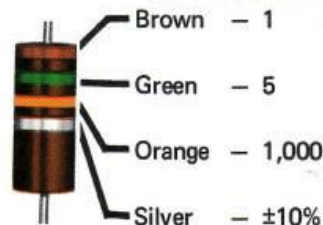


### RESISTOR COLOR CODE



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:



$$15 \times 1,000 = 15,000 \Omega \text{ (or } 15 \text{ k}\Omega\text{)}$$



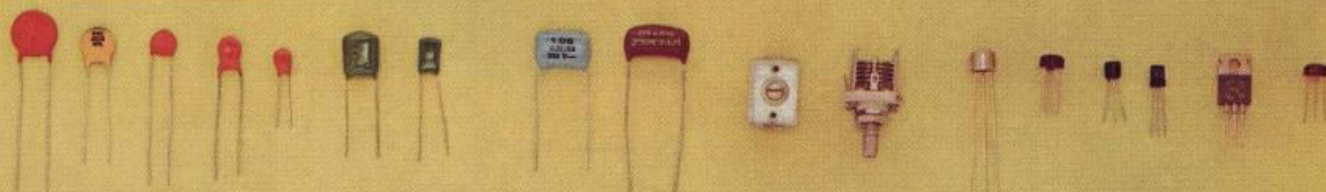
$$30 \times 100,000 = 3,000,000 \Omega \text{ (or } 3 \text{ M}\Omega\text{)}$$



# PARTS

CAPACITORS also come in several sizes and shapes. Many different types of capacitors are used in Heathkits. The Manual calls out both the type and the value of each capacitor at the time it is installed.

OTHER PARTS in Heathkits are identified with numbers and/or drawings. In every case the Manual provides you with positive identification, leaving little chance for error.



DISC

TANTALUM

MYLAR\*

TRIMMER

TRANSISTORS

ELECTROLYTIC

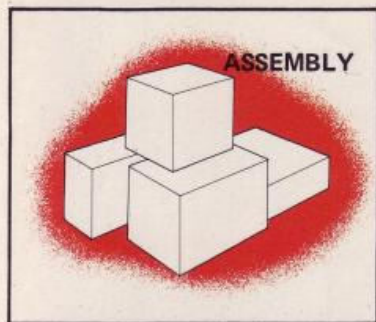
VARIABLE

TUBULAR ELECTROLYTIC

INTEGRATED  
CIRCUITS

DIODES

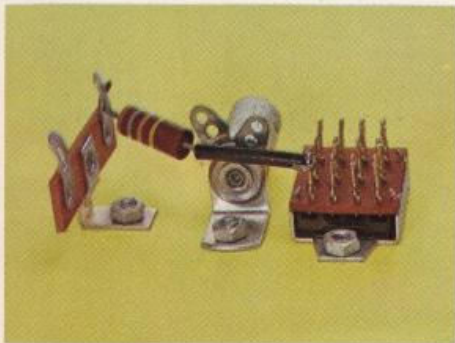
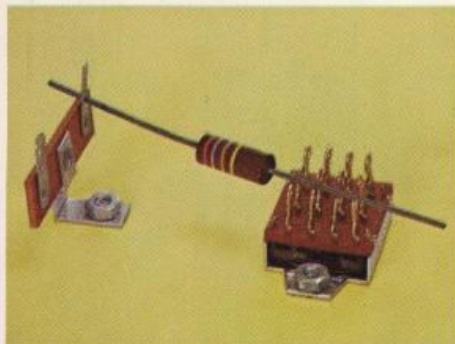
\*DuPONT REGISTERED TRADEMARK



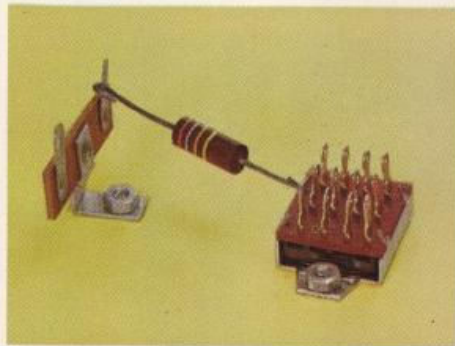
You can build top quality into your Heathkit by carefully following the step-by-step assembly instructions. Remember. . .

- ☐ The leads on many of the parts are generally longer than necessary. Cut the leads to the proper length before installing the part.
- ☐ Hookup wire is the type with colored insulation. Use this type of wire unless the Manual calls for another type.
- ☐ To prepare hookup wire, you will normally cut it to the proper length, and then remove 1/4" of insulation from each end.

**CUT THE LEADS TO THE PROPER LENGTH**

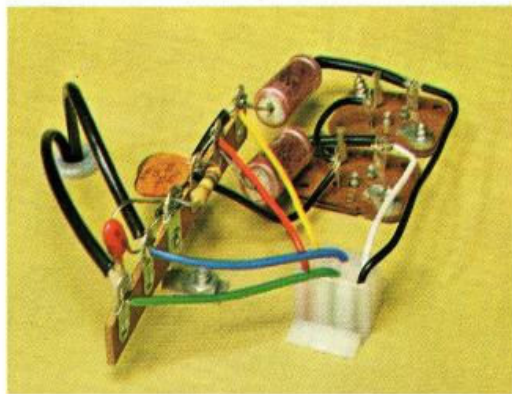


**USE SLEEVING WHEN CALLED FOR TO PROVIDE INSULATION**



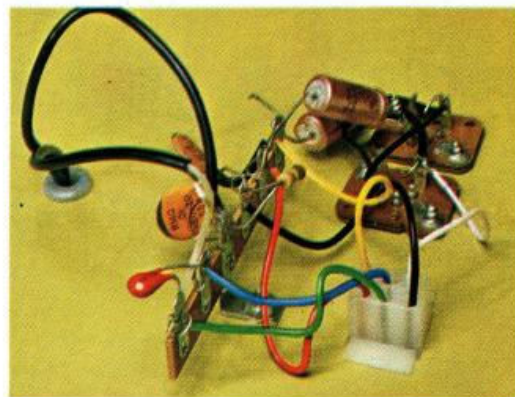
**FASTEN THE LEAD ENDS**





**RIGHT**

Chassis wiring should be as neat as possible. Position each wire and part as shown in the Manual.



**WRONG**



**RIGHT**

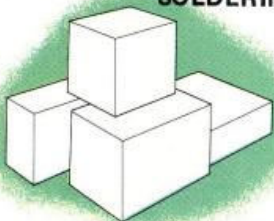
Circuit board parts should be mounted tightly against the circuit boards (unless the steps direct otherwise). The leads of each part should be inserted through the correct holes in the circuit board, and then bent slightly outward to hold the part in place.

After a group of parts has been installed, solder each lead to the foil and clip off the excess lead lengths.



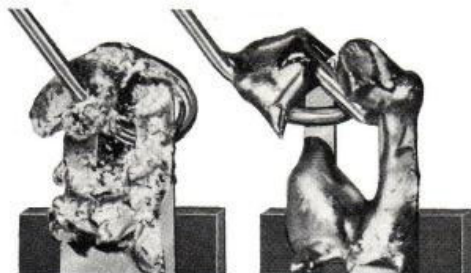
**WRONG**

## SOLDERING

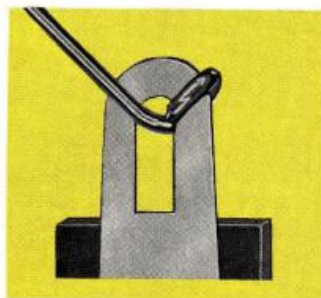


Good solder connections are **MOST IMPORTANT**: About 90% of all service problems are caused by poor soldering. Always...

- ☐ Make sure the connection to be soldered is clean. Wax, frayed insulation, and other foreign substances cause poor connections.
- ☐ Keep your soldering iron tip clean. Wipe it often with a damp cloth or sponge.
- ☐ Notice the soldering abbreviations given 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.)



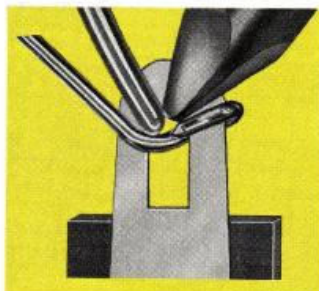
**POOR CONNECTIONS** LOOK CRYSTALLINE AND GRAINY, OR THE SOLDER TENDS TO BLOB.



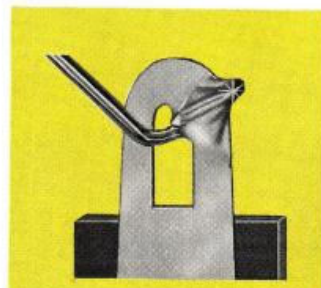
**ATTACH THE WIRE.**



**HEAT BOTH THE WIRE AND THE CONNECTION POINT.**



**APPLY SOLDER TO BOTH THE TIP AND THE CONNECTION.**



**LET THE CONNECTION HARDEN BEFORE MOVING THE WIRE. THEN CHECK FOR A SMOOTH, BRIGHT JOINT.**



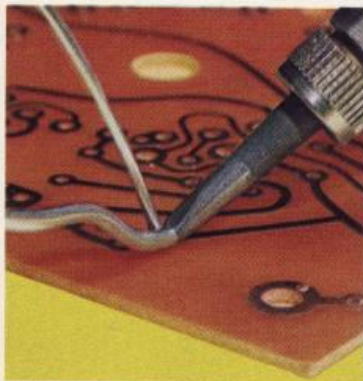
ROSIN CORE SOLDER IS SUPPLIED WITH YOUR KIT. THIS TYPE OF SOLDER MUST BE USED FOR ALL SOLDERING IN THE KIT. THE USE OF OTHER TYPES OF SOLDER VOIDS THE WARRANTY, AND WE WILL NOT SERVICE EQUIPMENT IN WHICH ACID CORE SOLDER OR PASTE FLUXES HAVE BEEN USED. IF ADDITIONAL SOLDER IS NEEDED, BE SURE TO PURCHASE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

CLEAR PLUGGED HOLES BY HEATING AND PUSHING A RESISTOR LEAD THROUGH THE HOLE FROM THE OTHER SIDE.

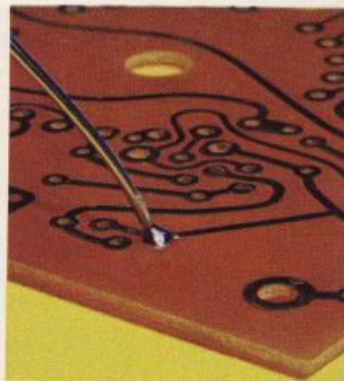
CLEAR SOLDER BRIDGES BETWEEN FOILS BY HEATING AND QUICKLY WIPING AWAY THE MELTED SOLDER WITH A SOFT CLOTH.



HEAT BOTH WIRE AND FOIL.



APPLY SOLDER TO BOTH THE TIP AND THE CONNECTION.



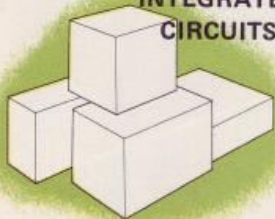
LET THE CONNECTION HARDEN BEFORE MOVING THE WIRE OR BOARD. THEN CHECK FOR A SMOOTH, BRIGHT JOINT.



CLIP OFF THE EXCESS WIRE LENGTH.



## INTEGRATED CIRCUITS

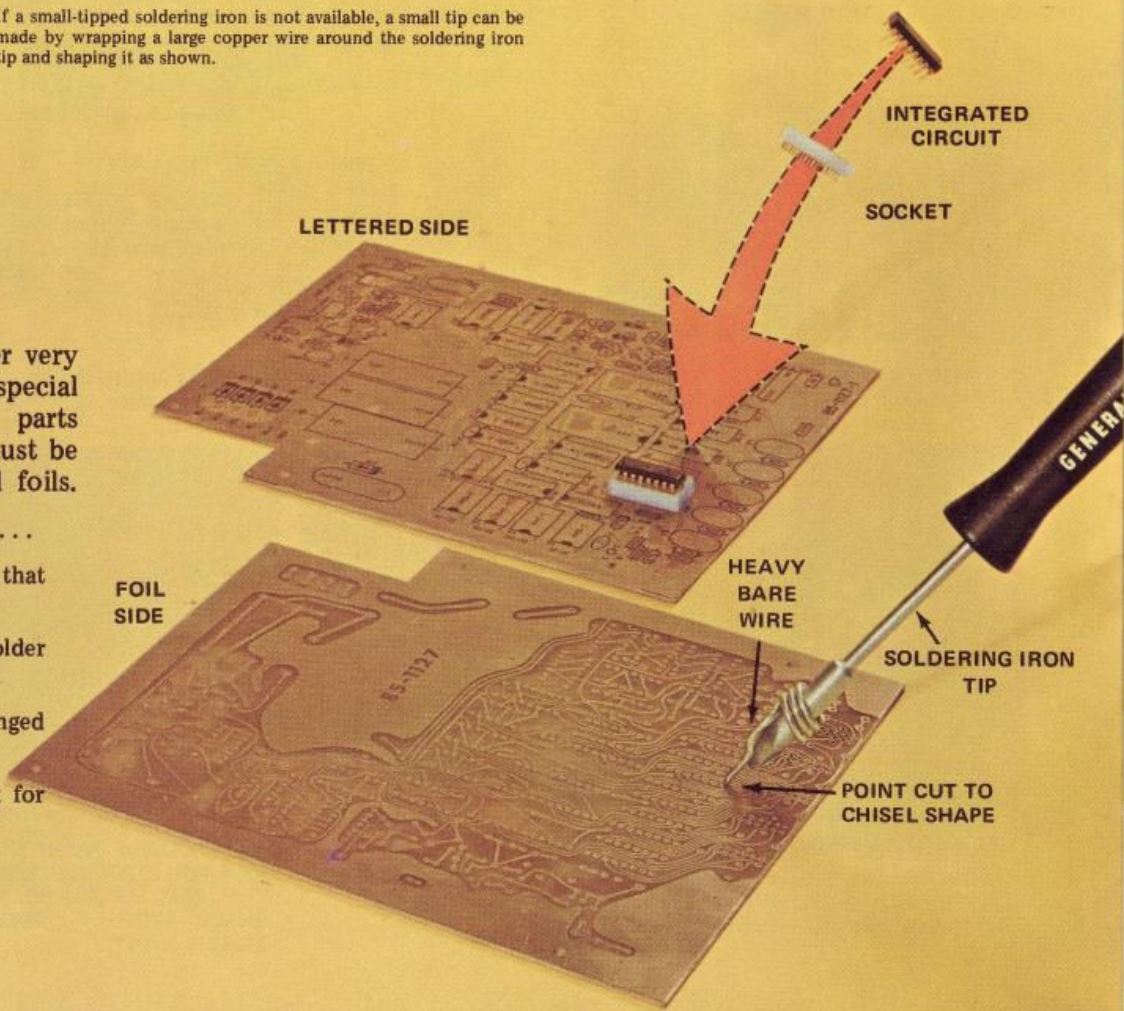


\* If a small-tipped soldering iron is not available, a small tip can be made by wrapping a large copper wire around the soldering iron tip and shaping it as shown.

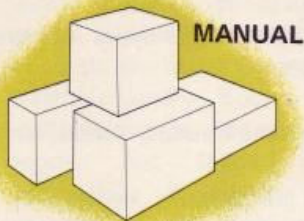
Integrated circuits (IC's) and other very small parts often require special soldering considerations. These parts usually have very fine leads that must be connected to small, closely spaced foils.

When mounting parts of this type, always...

- ☐ Use a small-tipped soldering iron that does not exceed 25 watts.\*
- ☐ Use only the minimum amount of solder necessary to make a good connection.
- ☐ Avoid subjecting the parts to prolonged or excessive heat.
- ☐ Inspect the soldering area to check for solder bridges between adjacent foils.



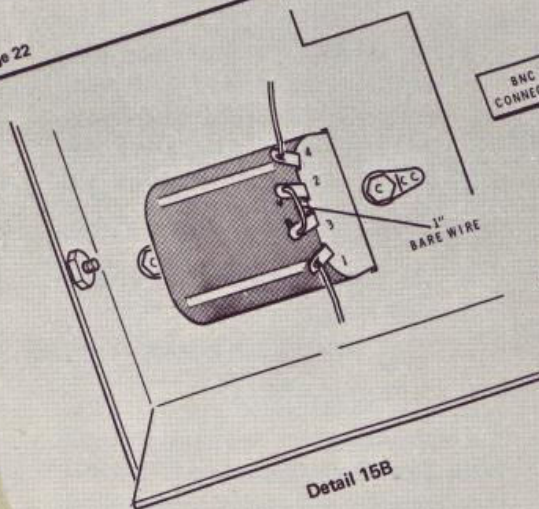




The Manual leads you step-by-step through the assembly, adjustments, and operation of your Heathkit. All you have to do is...

- ☐ Read each step all the way through before you do the work.
- ☐ Refer to any Pictorial or Detail drawing called out in a step.
- ☐ Check the step off in the space provided (✓) when it is completed.

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Detail 15B

### 240 Vac Wiring

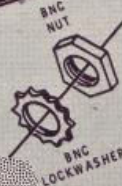
Refer to Detail 15B for the following steps.

- (✓) Solder the connection at lug 4 (S-1) of the power transformer.
- ( ) Solder the connection at lug 1 (S-1) of the power transformer.



BNC CONNECTOR

Detail 16A



BNC NUT

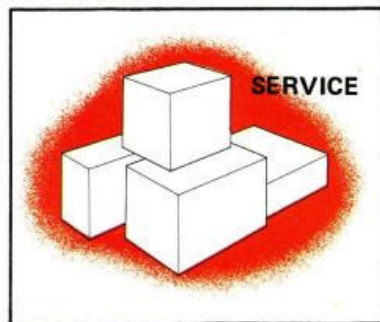
BNC LOCKWASHER

- (✓) Connect this bare wire to lug 4 (S-1) of the power transformer.
- (✓) Turn the chassis over.

### FRONT PANEL ASSEMBLY

Refer to Pictorial 16 for the front panel assembly.

- ( ) Position the front panel on the chassis.
- ( ) Remove the label and install the front panel.
- ( ) Remove the label and install the front panel.
- ( ) Refer to Detail 16B for the BNC connector.



### TECHNICAL CONSULTATION

Need help with any of your Heathkit equipment? If so, simply drop a line to our Technical Consultants. You'll find them eager to answer those sticky questions that sometimes pop up. Sorry, but information on special modifications just isn't available, and never send parts for testing unless they are specifically asked for.



The completeness of the answer the Consultant sends back to you depends on the completeness of the information you furnish. Be sure to include:

- The Model Number and Series Number of the kit (on blue and white identification label).\*
- Date of purchase.
- An exact description of the difficulty. Include switch positions, connections to other units, operating procedures, voltage readings, and any other information you think might be helpful.
- List everything you have done in attempting to correct the difficulty.

### REPLACEMENT PARTS

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

- Part number and description as shown in the Parts List.
- Model Number and Series Number of the kit.

If your kit is in the Warranty period, add:

- Date of purchase.
- Nature of defect.

Heath Company will fill your order promptly. Please **DO NOT RETURN PARTS** unless they are requested. Parts that are damaged through carelessness or misuse by the kit builder will not be replaced without cost.

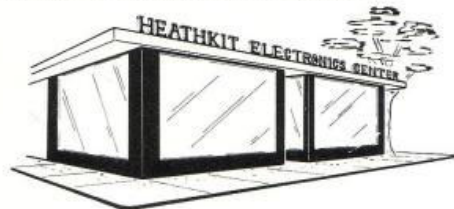
Parts are also available from your nearest Heathkit Electronic Center. These Centers are listed in your Heathkit Catalog. Service Centers require you to return the original part with your request for a replacement.

### REPAIR SERVICE

Our Service Facilities are always available to repair your completed Heathkit for a



minimum service fee. (Sorry, but we can't accept modified kits for repair.) Repair service is available at the factory or any Heathkit Electronic Center listed in your Heathkit Catalog. You need not ask for authorization to ship your Heathkit for repair. Just follow the Shipping Instructions for details on how to package and ship your equipment.



To be eligible for replacement parts as spelled out in the Warranty, we'll need your invoice or sales slip, or a copy of either. (If you send your original invoice or sales slip, we'll be sure to get it back to you.)

#### SHIPPING INSTRUCTIONS

Check your equipment to make sure that all the parts and screws are in place.

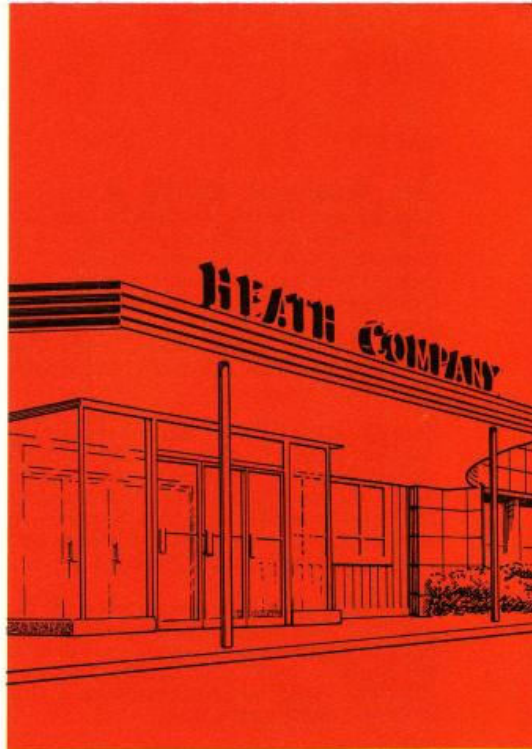
Then, wrap the equipment in heavy paper. Place the equipment in a strong

carton, and put at least three inches of resilient packing, such as shredded paper or excelsior, on all sides between the equipment and the carton. Special cartons are not available from Heath Company for this purpose.



Seal the carton with gummed paper tape and tie it with a strong cord. Be sure to attach a letter to the outside of the package that includes:

- Your name and address.
- Date of purchase.
- A brief description of the difficulty.
- Your authorization to ship the repaired unit back to you C.O.D. for the service and shipping charges, plus the cost of parts not covered by the Warranty.



Ship the package by prepaid Express or insured Parcel Post to:

HEATH COMPANY  
Benton Harbor, Michigan 49022

# ... world leader in electronic kits

**THE STORY OF HEATH.** Edward Bayard Heath founded the Heath Aeroplane Company during the early 1900's. In 1926 he produced an airplane in kit form—the famous Heath "Parasol." For years this light aircraft was a favorite in the flying fraternity. Mr. Heath was killed during a test flight in 1931, marking a tragic end to a brilliant career. From that point through World War II, the Heath Company remained in the aircraft and replacement parts business.

Shortly after World War II, the character of the Heath Company changed. An ambitious engineer named Howard Anthony, who had purchased the Heath Company in 1935, took a calculated gamble. The ingenious Mr. Anthony bought a large stock of surplus wartime electronic parts, designed and "mail order marketed" an oscilloscope kit for \$39.50.

Mr. Anthony based the success of his idea on the premise that anyone, regardless of technical knowledge or skills could assemble a kit himself, and save up to 50% over comparable factory-built models. All that would be required were a few simple hand tools and some spare time.

Orders poured in for the oscilloscope kit, and the foundation for the Heath Company as it exists today was established. Mr. Anthony expanded his test instrument line and soon added amateur radio and hi-fi component kits.

Tragedy struck again in 1954 when Howard Anthony was also killed in an airplane crash. Daystrom, Inc. then acquired the Heath Company. In 1962 Daystrom, Inc. was purchased by Schlumberger Limited, a leader in the development of electronic techniques for oil exploration.



Since 1954, more kit products have been added until at present Heath boasts 14 different product lines, consisting of over 300 kits . . . the world's largest selection.

In order to produce the vast array of Heathkit equipment, a modern 383,000 sq. ft. plant was constructed on the shores of Lake Michigan in St. Joseph, Mich. If you are planning a visit to Michigan, we invite you to stop in and pay us a visit. We're located on Hilltop Rd. just off Business route I-94, south of St. Joseph, Michigan.