

# HEATHKIT<sup>®</sup> MANUAL

**Heathkit<sup>®</sup> Manual**

*for the*

**KEYPAD ACCESSORY**

Model HWA-5400-3



HEATH COMPANY • BENTON HARBOR, MICHIGAN

## 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 component 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.

## 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  
Applications Programs ..... (616) 982-3884  
Heath Craft Wood Works ..... (616) 982-3423

Prices and specifications subject to change without notice.

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## **KEYPAD ACCESSORY**

**Model HWA-5400-3**

**595-2968**

**HEATH COMPANY**  
**BENTON HARBOR, MICHIGAN 49022**

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## **INTRODUCTION**

The Heathkit Model HWA-5400-3 Keypad Accessory provides you with the added convenience of keypad frequency entry while operating your HW-5400 Transceiver. You can select new frequencies by pushing the keypad buttons. You will not have to watch the digital display while selecting a

frequency. The positive-return action and clearly marked pushbuttons add an additional dimension of operating ease and safety, especially when you are operating the HW-5400 mobile.

## PARTS LIST

Check each part against the following list. The key numbers correspond to the Parts Pictorial. Do not discard any packing materials until all parts are accounted for.

To order a replacement part, always include the Part Number and use the Parts Order Form furnished with this kit. If a Parts Order Form is not available, refer to "Customer Service" on Page 15. Your Warranty is on Page 16. For prices refer to the separate "Heath Parts Price List."

<u>KEY</u> <u>No.</u>	<u>HEATH</u> <u>Part No.</u>	<u>QTY.</u>	<u>DESCRIPTION</u>	<u>CIRCUIT</u> <u>Comp. No.</u>
A1	56-26	4	1N191 (brn-wht-brn) diode	D205, D206, D207, D208
	340-8	1	Bare wire	
A2	64-903	1	Keypad	
	85-2769	1	Circuit board	
A3	390-2433	1	Keypad label	
A4	252-146	3	Round push-on nut	
		1	Blue and white label	
			Solder	
	597-260	1	Parts Order Form	
		1	Manual (See Page 1 for the part number.)	

## STEP-BY-STEP ASSEMBLY

**NOTE:** If you have purchased the Keypad Accessory with your HW-5400 HF SSB Transceiver, disregard this Accessory Manual. The steps for installing it will be in the HW-5400 Manual.

**NOTE:** Before the Keypad Accessory can be installed in your HW-5400 Transceiver, you will have to do some minor disassembling to expose a certain area of the display circuit board. When you perform the following steps, be careful not to misplace any of the hardware.

- ( ) Remove the two screws on each side of the cabinet and remove the Transceiver.

Refer to Pictorial 1 (Illustration Booklet, Page 2) for the following steps.

- ( ) Remove the twelve screws that fasten the controller shield and remove the shield.

- ( ) Peel the plain label from the front panel.
- ( ) Tape the front of the window to the escutcheon to keep the window from falling out during the assembly process.
- ( ) Peel the backing from the keypad label and install it where the plain label was installed.
- ( ) Remove the two screws on each side of the bezel and remove the bezel.
- ( ) Refer to Pictorial 2 (Illustration Booklet, Page 3) and remove screws A, B, C, D, and E that fasten the display circuit board to the escutcheon.
- ( ) Unplug sockets S201, S204, S205, and the connector with the green wire at C.

- ( ) Carefully pull back the display board to expose the push-on nuts at F, G, and H. Remove the nuts by pinching the tab end together with a pair of long-nose pliers.

Refer to Pictorial 4 (Illustration Booklet, Page 5) for the following steps.

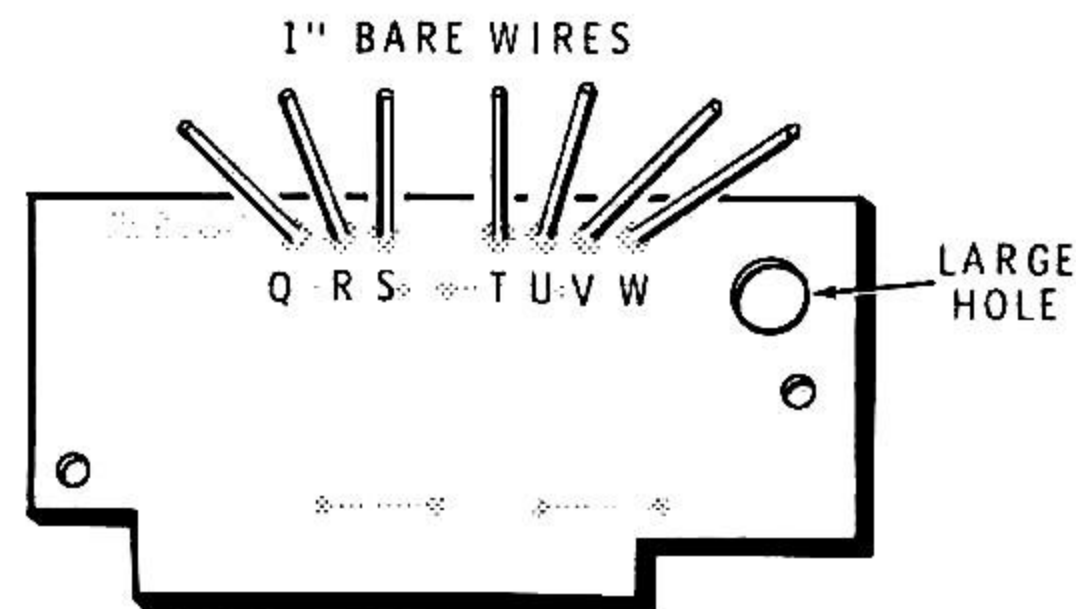
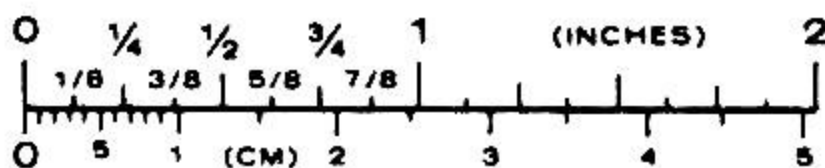
NOTE: When you install the following diodes on the display circuit board, be sure to position the banded end toward the board as shown in the inset drawing. Solder the leads to the foil and cut off the excess lead lengths.

Install the 1N191 (brn-wht-brn) diodes at the following locations:

- ( ) D205.  
( ) D206.  
( ) D207.  
( ) D208.

Refer to Pictorial 5 for the following steps.

- ( ) Position the keypad circuit board with the foil side down and the large hole in the upper right as shown.



**PICTORIAL 5**

- ( ) Cut seven 1/2" lengths of bare wire.

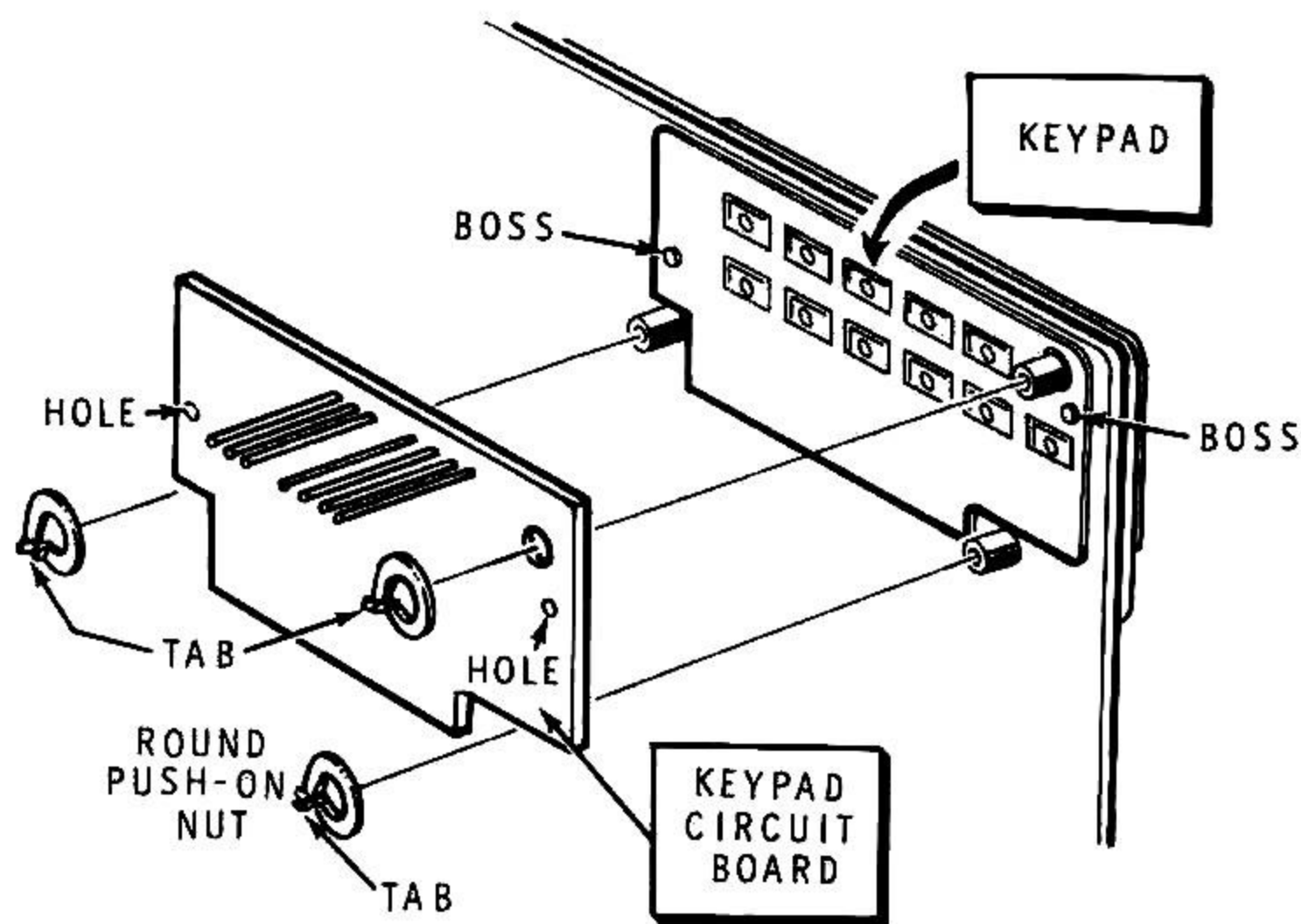
NOTE: When you install these wires, keep the board flat against your work bench so the wires cannot protrude through the holes. Solder each wire to the small foil pad as you install it.

- ( ) Install the wires in holes Q through W.

Refer to Pictorial 6 for the following steps.

- ( ) Position the keypad as shown and insert the pushbuttons into the holes in the escutcheon.

- ( ) Place the keypad circuit board over the keypad. Make sure the two bosses on the keypad seat into the two small holes in the board.
- ( ) Fasten the assembly in place with the three round push-on nuts. Position each nut so the tabs are as shown.



PICTORIAL 6

Refer to Pictorial 7 (Illustration Booklet, Page 6) for the following steps.

- ( ) Push the seven wires through their respective holes Q through W in the display circuit board. Bend the two outside wires over to hold the assembly in place temporarily.
- ( ) Fasten the display board to the escutcheon at locations A, B, C, D, and E with five #4 × 1/4" self-tapping screws. Make sure the display window, display, and meter seat properly in the escutcheon.
- ( ) Solder the seven wires to the display circuit board. Hold the end of each wire with a pair of long-nosed pliers, so it will not fall into the wiring, and cut off the excess length.
- ( ) Plug in sockets P201, P204, P205, and the connector at pin C.
- ( ) Install the bezel over the front panel and fasten it with four 6-32 × 3/16" flat head screws.
- ( ) Remove the tape from the window.
- ( ) Position the controller shield on the chassis and under the filter circuit board shield. Then secure the shield to the left side of the chassis with six #4 × 3/16" black sheet metal screws. Use three #6 × 3/8" hex head sheet metal screws and a grounding clip to secure the shield to the center shield. Be sure to mount the grounding clip under the center screw. The clip may face any direction. Use three #6 × 1/4" hex head sheet metal screws to secure the filter circuit board shield.
- ( ) Install the cabinet halves with the four 6-32 × 3/8" black phillips head screws.

## **OPERATION**

Use the following method to select a frequency with the keypad.

Press the ENT (enter) button. The most significant digit (next to the mode display) will disappear and a cursor (—) will appear at the bottom segment of the digit.

Press a digit button. Each digit button will enter that digit into the display at the location of the cursor, which will then move one position to the right.

When the least significant digit of the frequency you have selected is entered, the cursor will disappear and the frequency will be selected, if it is within the allowed band limits. If it is not, the frequency limit that is nearest the entered frequency will be substituted. If you press the ENT button but do not press a digit button, the cursor will advance over that digit and leave it unchanged.

## TROUBLESHOOTING CHART

NOTE: Digit buttons are not functional unless the ENT button is pressed first.

CONDITION	POSSIBLE CAUSE
When a button is pushed, the correct results are not obtained.	<ol style="list-style-type: none"><li>1. Contaminant between button and circuit board foil.</li><li>2. Open diode D205 - D208.</li></ol>
Erroneous display when digit button is held in.	<ol style="list-style-type: none"><li>1. Shorted or incorrectly installed diode D205 - D208.</li></ol>

NOTE: Refer to the "Circuit Board X-Ray Views" on Page 12 for the physical location of parts.

## **CIRCUIT DESCRIPTION**

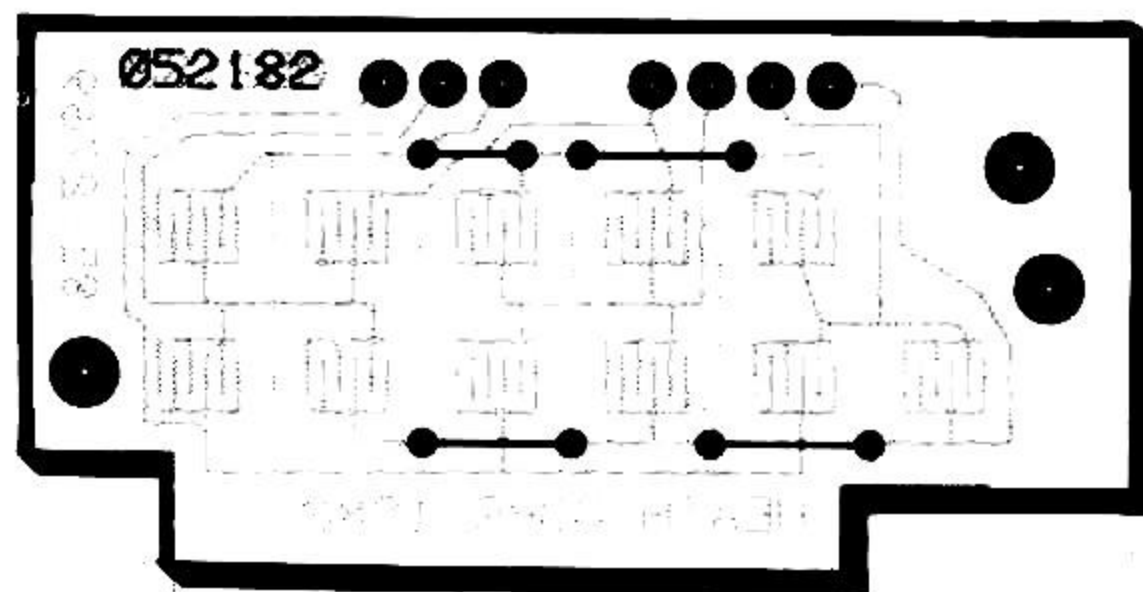
Pins 6, 7, and 8 of U207 (on the display board) are connected to the eleven key foil pads on the key pad circuit board. As U207 scans the front panel display digits, it detects and processes the digit that is pressed. Diodes

D205, D206, D207, and D208 prevent incorrect images from appearing on the display when a button is pressed.

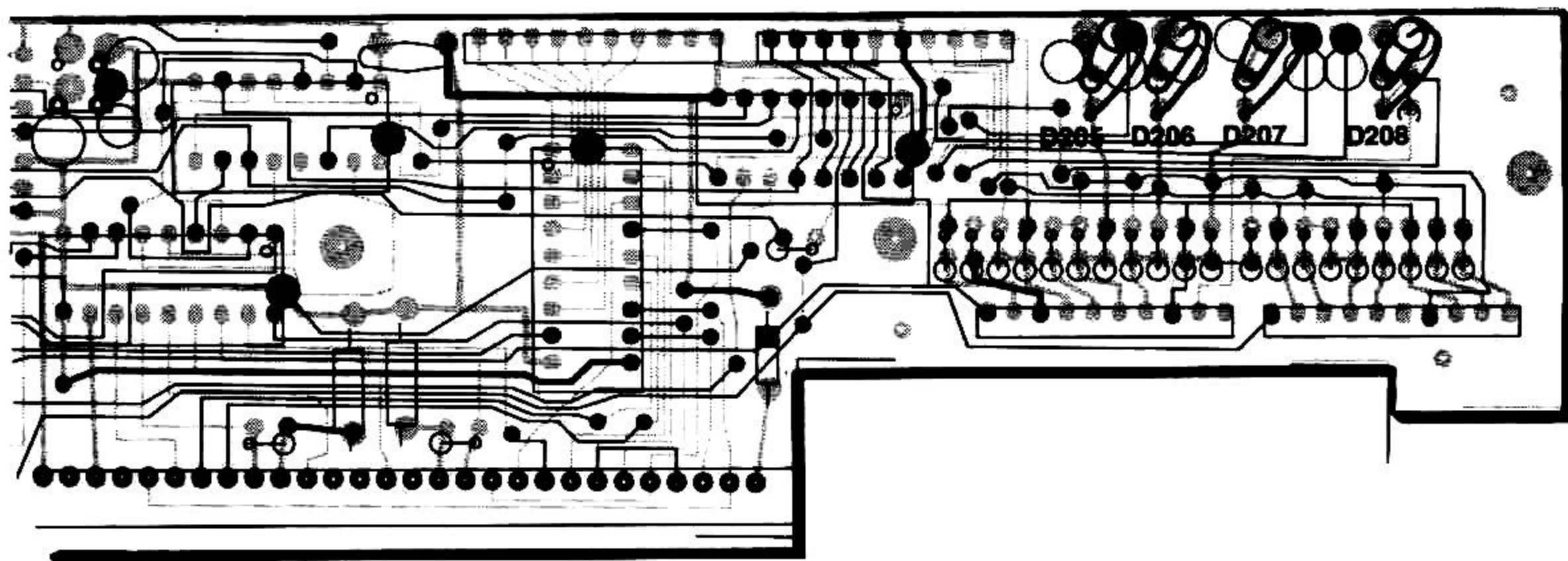
## CIRCUIT BOARD X-RAY VIEWS

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

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

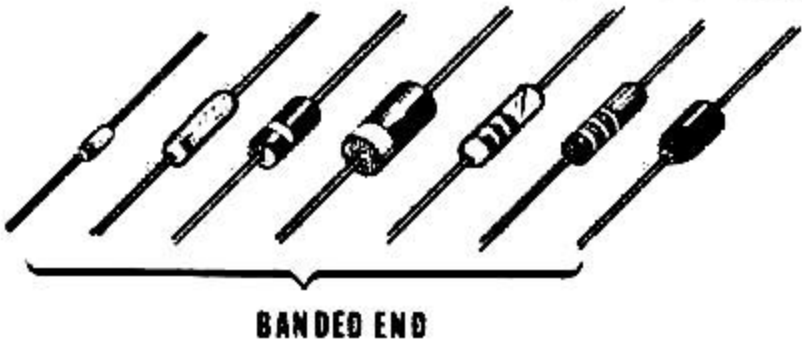


**KEYPAD CIRCUIT BOARD**



**DISPLAY CIRCUIT BOARD**

## SEMICONDUCTOR IDENTIFICATION CHART

HEATH PART NUMBER	MAY BE REPLACED WITH	CIRCUIT COMPONENT NUMBER	IDENTIFICATION
56-26	1N191	D205, D206, D207, D208	<p>NOTE: DIODES MAY BE SUPPLIED IN ANY OF THE FOLLOWING SHAPES. ALWAYS POSITION THE BANDED END AS SHOWN ON THE CIRCUIT BOARD.</p>  <p>The diagram illustrates seven different diode packages: a small axial lead diode, a medium axial lead diode, a large axial lead diode, a surface-mount diode, a through-hole diode with a cylindrical body, a through-hole diode with a rectangular body, and a through-hole diode with a cylindrical body. A bracket below the first six packages points to their banded ends, which are labeled 'BANDED END'.</p>

## 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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Service Department  
Benton Harbor, Michigan 49022



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