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HEATH COMPANY

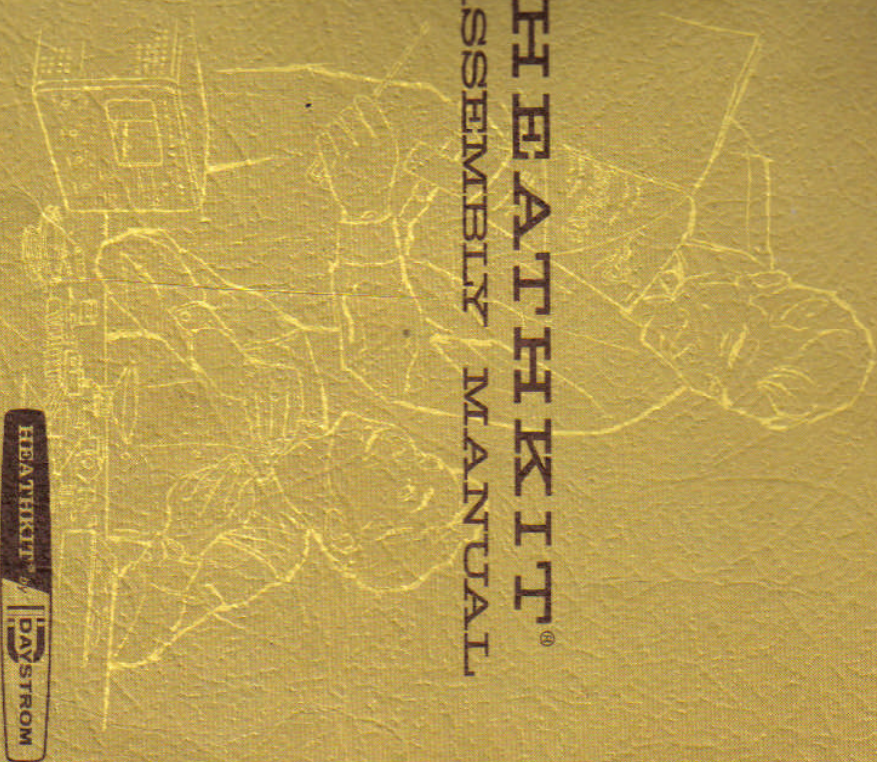
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**HEATHKIT®
ASSEMBLY MANUAL**



HEATHKIT
DAYSTROM



HANDTESTER KIT
MODEL M-1

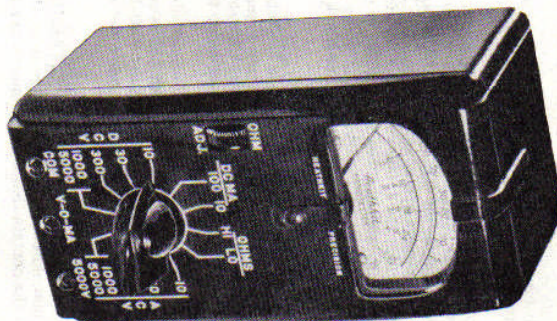
STANDARD COLOR CODE — RESISTORS AND CAPACITORS

<div>AXIAL LEAD RESISTOR</div> <div><p>Brown — Insulated Black — Non-insulated</p><p>Tolerance Multiplier 1st and 2nd Significant Figures</p><p>Wire wound resistors have 1st digit band double width</p></div>	<table><tr><th>INSULATED UNINSULATED Color</th><th>FIRST RING BODY COLOR First Figure</th><th>SECOND RING END COLOR Second Figure</th><th>THIRD RING DOT COLOR Multiplier</th></tr><tr><td>BLACK</td><td>0</td><td>0</td><td>None</td></tr><tr><td>BROWN</td><td>1</td><td>1</td><td>0</td></tr><tr><td>RED</td><td>2</td><td>2</td><td>00</td></tr><tr><td>ORANGE</td><td>3</td><td>3</td><td>,000</td></tr><tr><td>YELLOW</td><td>4</td><td>4</td><td>0,000</td></tr><tr><td>GREEN</td><td>5</td><td>5</td><td>00,000</td></tr><tr><td>BLUE</td><td>6</td><td>6</td><td>000,000</td></tr><tr><td>VIOLET</td><td>7</td><td>7</td><td>0,000,000</td></tr><tr><td>GRAY</td><td>8</td><td>8</td><td>00,000,000</td></tr><tr><td>WHITE</td><td>9</td><td>9</td><td>000,000,000</td></tr></table>	INSULATED UNINSULATED Color	FIRST RING BODY COLOR First Figure	SECOND RING END COLOR Second Figure	THIRD RING DOT COLOR Multiplier	BLACK	0	0	None	BROWN	1	1	0	RED	2	2	00	ORANGE	3	3	,000	YELLOW	4	4	0,000	GREEN	5	5	00,000	BLUE	6	6	000,000	VIOLET	7	7	0,000,000	GRAY	8	8	00,000,000	WHITE	9	9	000,000,000	<div>DISC CERAMIC RMA CODE</div> <div><p>5-Dot Capacity Multiplier Tolerance Temp. Coeff.</p></div>
INSULATED UNINSULATED Color	FIRST RING BODY COLOR First Figure	SECOND RING END COLOR Second Figure	THIRD RING DOT COLOR Multiplier																																											
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<div>RADIAL LEAD (BAND) RESISTOR</div> <div><p>Multiplier 2nd Figure 1st Figure Tolerance</p></div>	<div>BY-PASS COUPLING CERAMIC CAPACITOR</div> <div><p>Capacity Multiplier Tolerance Voltage (Opt.)</p></div>	<div>AXIAL LEAD CERAMIC CAPACITOR</div> <div><p>Temp. Coeff. Capacity Multiplier Tolerance</p></div>																																												

The standard color code provides all necessary information required to properly identify color coded resistors and capacitors. Refer to the color code for numerical values and the zeroes or multipliers assigned to the colors used. A fourth color band on resistors determines tolerance rating as follows: Gold = 5%, silver = 10%. Absence of the fourth band indicates a 20% tolerance rating.

The physical size of carbon resistors is determined by their wattage rating. Carbon resistors most commonly used in Heathkits are 1/2 watt. Higher wattage rated resistors when specified are progressively larger in physical size. Small wire wound resistors 1/2 watt, 1 or 2 watt may be color coded but the first band will be double width.

ASSEMBLY AND USE HEATHKIT HANDITESTER MODEL M-1



SPECIFICATIONS

Range DC Volts..... Full scale 10-30-300-1,000 and 5,000 Volts
 Range AC Volts..... Full scale 10-30-300-1,000 and 5,000 Volts
 Range Ohmmeter..... 0-3,000 Ohms 30 Ohms Center
 Range Ohmmeter..... 0-300,000 Ohms 3000 ohms Center
 Range Milliamperes..... 0-10 MA 0-100 MA DC
 Meter Movement..... 400 Microampere 3"
 AC Rectifier..... Dual half wave
 Accuracy..... 1% divider and calibrating resistors provided
 Meter movement 2% of full scale
 Streamline molded phenolic
 Case..... Size "C" No. 1 Flashlight cell
 Ohmmeter Battery.....

CIRCUIT DESCRIPTION

The Heathkit Handtester uses a 400 microampere meter movement. This movement is shunted with resistors to provide a uniform 1 milliamperere load on both AC and DC ranges. This allows the use of but one set of divider resistors on both AC and DC and provides a simplicity of switching which is handled with only one switch--there are no separate AC-DC switches to forget.

The AC rectifier circuit uses a high quality Bradley rectifier in a dual half wave hookup. The dual half wave type was chosen because of its excellent linear characteristics. A comparison of the red AC scale with the black DC scale shows this.

The ohmmeter uses a 1 1/2 volt internal battery in series with the unknown resistance. The low range is obtained by shunting the meter circuit with a known low resistance.

The milliamperere ranges are obtained by shunting the basic meter movement with the proper shunts. The meter is provided with a hairline type pointer which can be read with maximum accuracy. Always read AC voltages on the RED scale. DC voltages are always read on the BLACK scale. The 10 and 30 volt ranges are read directly. The 300 volt range is obtained by adding one zero (0) to the 30 volt scale; the 1,000 volt range by adding two zeros (00) to the 10 volt scale; and the 5,000 volt range by adding three zeros (000) to the 5 volt scale.

The divisions for the 30 volt scale are found above the red and black lines while the divisions for the 5 and 10 volt scales are below the red and black lines.

"1.0" ohms are read directly from the ohms scale, which is the top scale. "Hi" ohms range is obtained by multiplying the scale by 100. In using the ohms ranges, the test leads are always shorted together and the ohms adjust control adjusted until the meter pointer is exactly on the zero (0) of its scale. When the pointer can no longer be adjusted for full scale, the flashlight battery should be replaced.

In all uses, the black test lead is negative or common and should be connected to the "Com" jack. The red lead which is positive or hot should be connected to "V-O-MA" for all uses and ranges except the 5,000 volt range. For the 5,000 volt range, move the red lead to the jack marked "5,000 V."

CAUTION--HIGH VOLTAGES ARE DANGEROUS. USE EXTREME CARE. It is best on the 5,000 volt range to connect the instrument before the voltage is applied. Make the measurement without touching the test leads. Be certain that all condensers are discharged before removing the test leads.

To read milliamperes, connect the test leads in series with the current to be measured. Always use the higher scale at the start, as the meter can readily be damaged by overload. For the 10 milliamperere range, use the 10 volt scale, adding one zero (0) for the 100 milliamperere range.

CAUTION: The meter cannot be guaranteed against overload on any range--always start with the highest range, lowering it to obtain the reading in the middle section of the scale if possible.

Functional diagrams showing the circuit for each type of use are shown on the schematic diagram.

NOTE: ALL GUARANTEES ARE VOIDED AND WE WILL NOT REPAIR OR SERVICE INSTRUMENTS IN WHICH ACID CORE SOLDER OR PASTE FLUXES HAVE BEEN USED. WHEN IN DOUBT ABOUT SOLDER, IT IS RECOMMENDED THAT A NEW ROLL, PLAINLY MARKED "ROSN CORE RADIO SOLDER" BE PURCHASED.

ASSEMBLY

This Handtester uses the finest quality materials and deserves the best of workmanship. Work slowly, checking each step. The pictorial diagram shows the approximate location of each part. The assembly instructions to follow give the proper order of assembly--follow them, checking off each step as completed.

Thoroughly familiarize yourself with the layout pictorial and read the instructions completely through before starting. Many components are supplied by the manufacturer with leads that are longer than the particular application requires. Of course, all excess lead lengths should be removed so as to permit neat and direct installation of the component involved. Following this procedure will very definitely result in superior operation of the instrument and will afford the kit builder a definite sense of satisfaction and pride in having constructed a neat, professional appearing instrument.

Make a good mechanical joint of each connection--metal to metal, as solder itself is not a good conductor and serves only to hold the connection rigid. When soldering, use enough heat at the point of connection to allow a smooth, even flow of solder. Avoid excessive use of solder to prevent a possible solder flux flooding condition. Be sure to use solder that is plainly marked, "Rosin core solder."

Check the parts against the parts list--identify each part. This will avoid throwing away small parts in the packing.

STEP BY STEP ASSEMBLY AND WIRING

Check off each step as it is completed. Make all wiring to terminals mechanically strong. Connections should be soldered only when so indicated in the step by step procedure.

When assembling parts to the molded meter cover, use a soft cloth on your work bench or table to prevent scratching or otherwise marring the cover.

MECHANICAL ASSEMBLY

- () Assemble battery holder to meter studs as shown in pictorial. It is important that one set of nuts be used as spacers between the meter and battery holder.
- () Mount ohms adjust control to bracket using two #1-72 control nuts.
- () Mount bracket to molded cover by pressing speed nut over stud in cover, as shown in pictorial, with the control projecting through slot opening provided. This assembly should be carefully done so that the mounting stud will not be broken.
- () Mount the meter rectifier to bracket with one self tapping screw as shown in pictorial.
- () Install the three banana jack inserts in the cover. Bend the solder end slightly so that the inserts cannot be pulled out from the cover.

SWITCH WIRING

In this construction procedure the switch should be completely wired before mounting to instrument case. It is important that the switch be properly oriented in respect to its final assembly to panel before resistor mounting and wiring are completed. Notice the location of dummy lugs #6 and #7 on lower deck of switch assembly. These dummy lugs can be used as a guide in the proper wiring of the switch and its assembly to the meter cover.

- () On lower and middle decks connect bare wire between lugs #1-#2-#3-#4 and #9-#10-#11-#12.
- () On upper deck connect bare wire between lugs #2-#11, lugs #3-#10 and between lugs #4-#9. Use spaghetti covering.
- () On upper deck connect 700K Ω 1 watt resistor between lug #2 and lugs #12 and #1 which are connected together.
- () On upper deck connect 270K Ω resistor between lug #10 and #11.
- () On upper deck connect 20K Ω resistor between lug #3 and #4.
- () Between lower and middle deck connect 2516 Ω resistor between dummy lug #6 on lower deck and long lug under #11 on middle deck. (This resistor may be placed inside the switch alongside the shaft.)
- () On lower deck connect 29 Ω resistor between dummy lug #6 and lug #8.
- () Connect 9750 Ω resistor between lug #4 on upper deck and lug #4 on middle deck.
- () Connect 417 Ω resistor between lug #3 on middle deck and lug #3 on lower deck.
- () Install 9500 Ω resistor between lug #9 on upper deck and dummy lug #7 on lower deck.
- () Install 7000 Ω resistor between lug #10 on middle deck and lug #10 on lower deck.
- () Connect 2.51 Ω resistor between long lug #5 on lower deck and lug #5 on upper deck.
- () Connect a bare wire between middle deck lug #5 and upper deck lug #5.
- () Connect 26 Ω resistor between long lug #5 on lower deck and lug #6 on upper deck.
- () Connect a bare wire between middle deck lug #6 and upper deck lug #6.

Note: When soldering connection avoid excessive use of rosin flux and do not allow a flux flooding condition to occur between switch terminals.

- () Solder all connections except the following: Middle deck, lug #9 and long lug under #11; lower deck, long lug #5, dummy lugs #6 and #7 and lug #9.

FINAL ASSEMBLY

- () Mount the wired switch through bracket hole and cover; fasten securely with control lock-washer and control nut.
- () Wire the rectifier to the switch by connecting the red wire to lug #9 on middle deck, the center wire to dummy lug #7 on lower deck; the remaining wire to lug #9 on the lower deck. Solder all these connections.
- () Wire the control and the meter to the switch by connecting meter + to long lug under #11 on middle deck; meter - and outside contact on control to long contact lug under #8 on the lower deck; center contact on control to lugs #7 and #8 connected together on the middle deck. Solder these connections.

- () Wire the battery contacts to the switch by connecting the + lug to dummy lug #6 on the lower deck; the - lug to lugs #7 and #8 connected together on the upper deck. Solder these connections.
- () Wire the banana jacks to the switch by connecting the "common" jack to the long lug #5 on lower deck; the middle "V-O-MA" jack to the long lug below #3 on the upper deck; and the "5,000 V" jack to the long lug below #12 on the upper deck using two resistors, 2 megohm 2 watt in series, each covered with a large piece of spaghetti as shown in pictorial. Solder these connections.
- () Install flashlight cell observing polarity (the center contact is +) and fasten the knob on the selector switch. It may be necessary to slightly alter the switch mounting so that the pointer knob will line up with panel markings.
- () Slip the completed unit into the case and fasten with the four long screws.
- () Assemble the test leads using the black sleeve and banana plug assembly to the black test lead, solder the alligator clip to the remaining end.
- () Assemble the red sleeve and banana plug assembly to the red test lead and fasten the red test prod to the remaining end of the lead.
- () With completed instrument in horizontal position, check mechanical zero position of meter pointer. If adjustment is required turn the small black screw located just below scale opening. Tap meter lightly during adjusting procedure. For maximum accuracy always use meter in horizontal position.

USE

TO MEASURE D. C. (A. C.) VOLTAGE

Plug black test lead into "Com" jack.
 Plug red test lead into "V-O-MA" jack.
 Set selector to 1,000 DCV (ACV).
 Connect black test lead clip to negative (or common) on source under test.
 Touch red test prod to positive (or hot) on source under test.
 If reading is less than 500 volts, turn selector to 300 volts.
 If reading is less than 30 volts, turn selector to 30 volts.
 If reading is less than 10 volts, turn selector to 10 volts.

Making this procedure a habit will prevent overload and resultant damage.

TO MEASURE D. C. (A. C.) VOLTAGE BETWEEN 1,000 AND 5,000 VOLTS

CAUTION--HIGH VOLTAGES MAY BE DANGEROUS

Plug black test lead into "Com" jack.
 Plug red test lead into "5,000 V" jack.
 Set selector switch to 1,000 DCV (ACV).
 With source turned off, connect black test lead clip to negative (or cold) and red test prod to positive (or hot) on source under test.
 Without touching test leads on instrument, turn source on and observe reading.
 Turn off source and observe reading drop back to zero, then disconnect the leads.
 Making this procedure a habit may prevent serious accidents.

TO MEASURE RESISTANCE

Plug black test lead into "Com" jack.
Plug red test lead into "V-O-MA" jack.
Set selector to "Lo" ohms.

Touch red test prod to black test lead clip.

Move "ohms adjust" until pointer reads exactly full scale.

Clip black test lead to one terminal of unknown resistance and touch red test prod to other terminal of unknown resistance.

Observe resistance in ohms on upper meter scale.

If reading is more than 500 ohms, set selector to "Hi" ohms, set "ohms adjust" and reconnect to unknown. Multiply reading obtained by 100 by adding two zeros (00) to find resistance in ohms.

When it is no longer possible to set "adjust ohms" to full scale, the flashlight cell must be replaced.

TO MEASURE D. C. CURRENT

Plug black test lead into "Com" jack.

Plug red test lead into "V-O-MA" jack.

Set selector to 100 DC MA.

With source turned off, break the circuit under test at a convenient point and connect black test lead clip to the more negative side of the break and the red test prod to the more positive side of the break.

Turn source on and be prepared to turn it off again instantly if the pointer should go off scale.

If reading is below 10 MA, turn selector to 10 DC MA.

Making this procedure a habit will prevent overload and resultant damage.

Most meter failures are due to careless operation on a current range.

NOTE: This instrument is not suitable for measuring AC current.

Always check the selector switch before making any test, as the meter will be damaged by making voltage measurements on the MA ranges or making any high voltage measurement on a low range.

ACCURACY

The accuracy of the meter movement is within 2% of full scale, which means that, for instance, on the 1,000 volt range the accuracy of the movement will be within 20 volts at any point of the scale. The accuracy of the multiplier and shunt resistors is within 1%. Thus the accuracy on the DC ranges of the instrument would be within 3% of full scale.

On AC, the inaccuracy of the rectifier is added to this figure, which results in an accuracy within 5% on the AC ranges.

When using this instrument to measure voltages in high impedance circuits, the resistance of the meter loads the circuit under test, and a lower reading is observed. This, however, is not an inaccuracy of the meter, as the meter accurately reads the voltage in the circuit with the instrument connected. But keep in mind that the voltage with the meter across the circuit is not necessarily the same as the circuit voltage without the meter attached.

When comparing this instrument with another instrument, consider that the accuracy of the other may deviate in the opposite direction. Therefore when comparing two instruments of 5% accuracy, the difference might be a total of 10%.

IN CASE OF DIFFICULTY

Recheck the wiring, by comparing it with either the wiring diagram or the pictorial. Trace over the wires on the diagrams with a colored pencil as each wire and part is checked. It is often helpful to have a friend check over the wiring to eliminate mistakes consistently overlooked.

SERVICE

If, after applying the information contained 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.
5. Print or type your name and address, preferably in two places on the letter.

With the above 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. He will make no incorrect assumptions nor waste time checking files for the correct spelling of name and address. (The automatic letter opener sometimes cuts through the letter, hence the suggestion to print the name and address twice.) 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 instrument (including all connecting cables) to the Heath Company for inspection and necessary repairs and adjustments. You will be charged a fixed fee of \$5.00, 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 you may find charges for local service somewhat higher than those listed in HEATHKIT manuals (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 instrument 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.

SPECIFICATION CHANGES

All prices are subject to change without notice. The Heath Company reserves the right to discontinue instruments and to change specifications at

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.

ATTACH A TAG TO THE EQUIPMENT BEARING YOUR NAME, COMPLETE ADDRESS, DATE OF PURCHASE, AND A BRIEF DESCRIPTION OF THE DIFFICULTY ENCOUNTERED. 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, the securely with stout cord. Clearly print the address on the carton as follows:

To: HEATH COMPANY
Benton Harbor, Michigan

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 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.

any time without incurring any obligation to incorporate new features in instruments previously sold.

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.

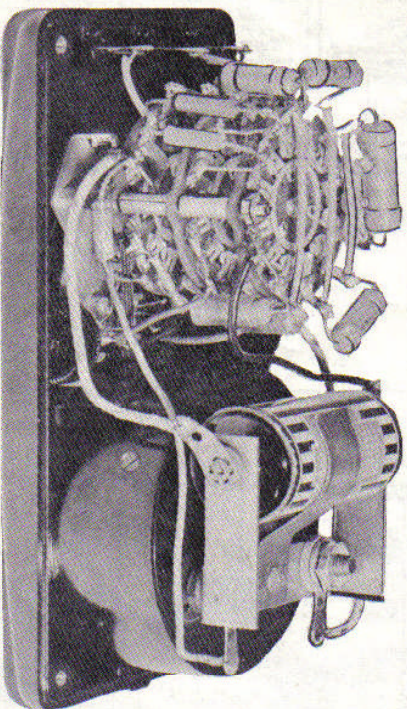
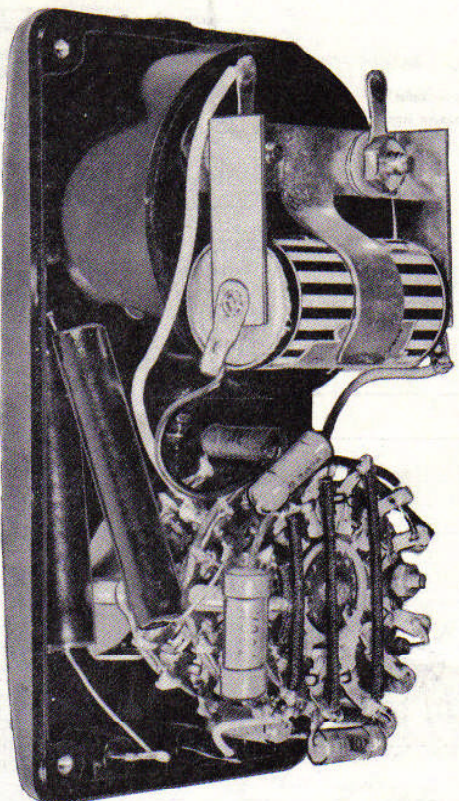
NOTE: The foregoing warranty is completely void and we will not replace, repair or service instruments or parts thereof in which acid core solder or paste fluxes have been used.

HEATH COMPANY

PART No.	PARTS Per Kit	DESCRIPTION	PART No.	PARTS Per Kit	DESCRIPTION
Precision Resistors					
2-6B	2	2 megohm 2 watt	Knobs-Plugs-Panel Connectors-Wire		
2-18	1	2.51 Ω	70-5	1	Banana plug sleeve, black
		(red-green-gold-brown)	70-6	1	Banana plug sleeve, red
2-20	1	26 Ω	260-1	1	Alligator clip
		(red-blue-black-brown)	340-2	1	length #20 Bare wire
2-20A	1	700 K Ω	341-1	1	length Black test lead
2-21	1	29 Ω	341-2	1	length Red test lead
		(red-white-black-brown)	344-1	1	roll Hook-up wire
2-27	1	417 Ω	346-1	1	length Spaghetti (sleeving)
2-32	1	2516 Ω	437-1	1	length Spaghetti (sleeving)
2-34	1	7000 Ω	437-1	3	Banana jack insert
2-36	1	9500 Ω	438-13	2	Sleeve and plug assembly
2-37	1	9750 Ω	439-1	1	Red test prod
2-38	1	20 K Ω	462-24	1	Pointer knob
2-43	1	270 K Ω			
Controls-Switches					
10-24	1	20 K Ω hearing aid control	Hardware		
63-24	1	3 Pole 12 position rotary switch	250-1	1	2-56 x 1/8" self tapping screw
			250-5	4	4-48 x 2 1/8" Fill. H. M. screw
Miscellaneous					
57-7	1	Dual half-wave meter rectifier	252-7	1	3/8-32 control nut
100-M13	1	Battery holder	252-10	1	Speed nut
204-M22	1	Control bracket	252-11	2	1-72 control nut
407-5	1	400 μ a meter with cover	253-3	2	Fiber flat washer
408-M7	1	Case	253-7	2	Fiber shoulder washer
418-1	1	1 1/2 V. Type C Flashlight battery	254-5	1	Thin control lockwasher
995-15	1	Instruction manual			

Heathkit HANDITESTER KIT

MODEL M-1



The HEATH COMPANY • BENTON HARBOR, MICH