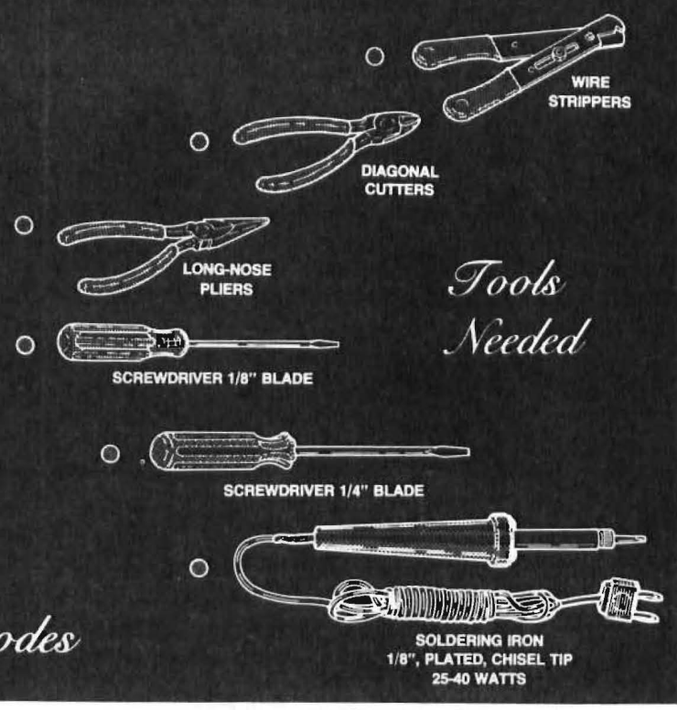
The HEATH ZENITH Kit Builder's Guide To:

Installing parts
Proper soldering
Resistor & capacitor codes

Tools Needed

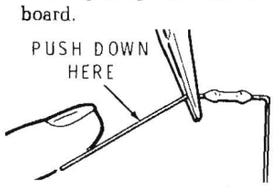


CIRCUIT BOARDS

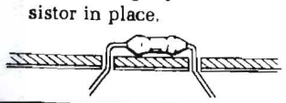
To Install a Part:

The following example uses a resistor, since resistors are usually installed first.

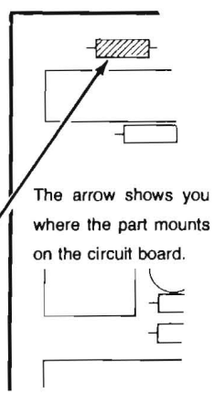
1. Position the circuit board as shown in the Manual with the printed side (not the foil side) up.
2. Hold the resistor as shown and bend the leads straight down with long-nose pliers to fit the hole spacing on the circuit board.



3. Push the leads through the holes at the proper location on the circuit board. The end with color bands may be positioned either way.
4. Press the resistor against the circuit board. Then bend the leads outward slightly to hold the resistor in place.



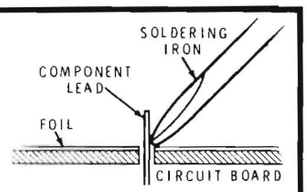
EXAMPLE CIRCUIT BOARD



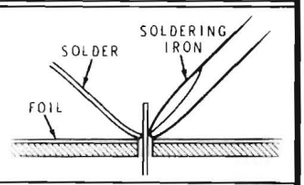
NOTE: A pencil-type soldering iron, as shown above, will give the best results.

To Solder a Connection:

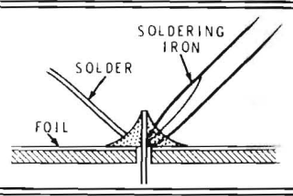
1. Place the soldering iron tip against both the lead and the circuit board foil. Heat both for 2 or 3 seconds.



2. Then apply solder to the other side of the connection. IMPORTANT: Let the heated lead and the circuit board foil melt the solder.



3. As the solder begins to melt, allow it to flow around the connection. Then remove the solder and the iron and let the connection cool.



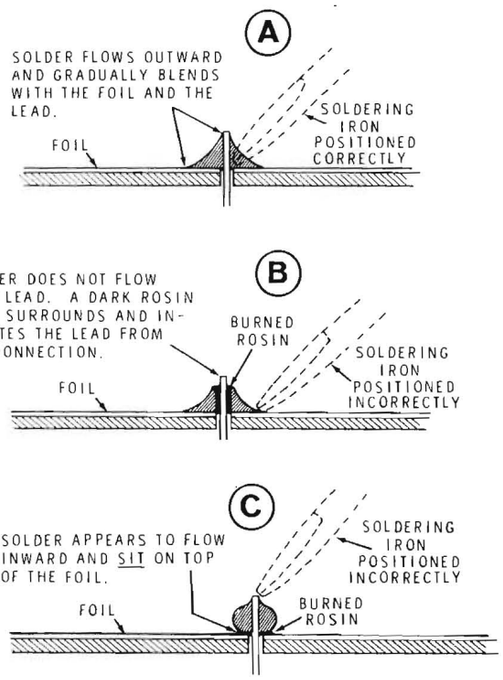
4. Hold the lead with one hand while you cut off the excess lead length close to the connection. This will keep you from being hit in the eye by the flying lead.

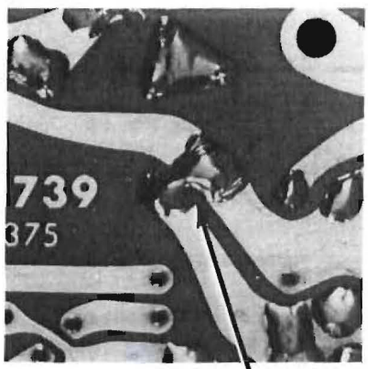
To Check a Connection:

Be sure the solder made a good electrical connection. When both the lead and the circuit board foil are heated at the same time, the solder will flow onto the lead and the foil evenly. See Illustration A. The solder will then make a good electrical connection between the lead and the foil.

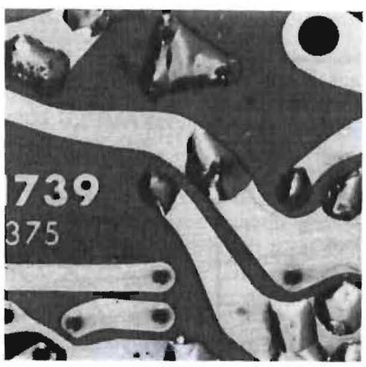
When the lead is not heated sufficiently, the solder will not flow onto the lead as shown at B. Reheat the connection and, if necessary, apply a small amount of additional solder to obtain a good connection as shown at A.

When the foil is not heated sufficiently, the solder will blob on the circuit board as shown at C. Reheat the connection and, if necessary, apply a small amount of additional solder to obtain a good connection as shown at A.





A solder bridge between two adjacent foils



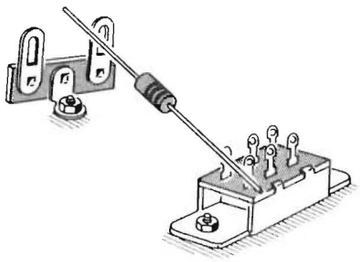
How the connection should appear.

Be sure you did not make any solder bridges. Due to the small foil area around the circuit board holes and the small areas between foils, you must use the utmost care to prevent solder bridges between adjacent foil areas.

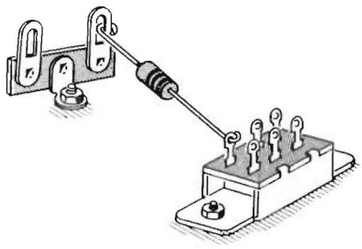
A solder bridge may occur if you accidentally touch an adjacent connection, if you use too much solder, or if you "drag" the soldering iron across other foils as you remove it from the connection. Always take a good look at the foil area around each lead before you solder it. Then, when you solder the connection, make sure the solder remains in this area and does not bridge to another foil. This is especially important when the foils are small and close together.

CHASSIS WIRING

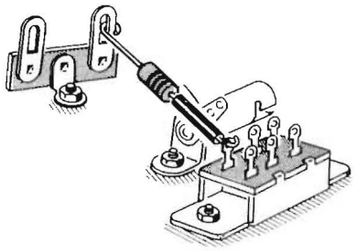
To Install a Part:



1. Cut the leads to the proper length.



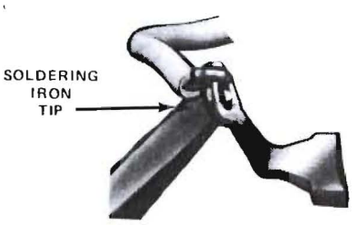
2. Fasten the lead ends.



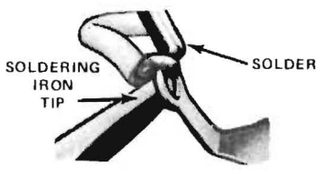
NOTE: Use sleeving when it is called for to provide insulation.

To Solder a Connection:

1. Heat both the wire and the connection point; do not burn the insulation on the wire.

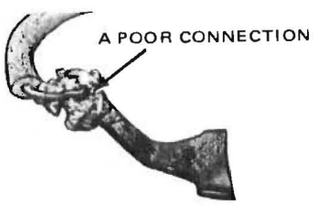


2. Apply only enough solder to thoroughly wet both the tip and the connection.



3. Let the connection harden before moving the wire. The connection should be smooth and bright.

4. Check the connection. Poor connections look crystalline and grainy, or the solder tends to blob. Reheat the connection if it does not look smooth and bright.



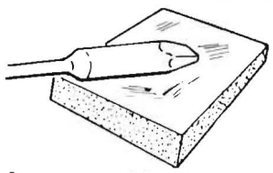
Remember:

Soldering abbreviations are 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...S-2).

When there are several wires at a connection, be sure **all** of them are soldered.

Good solder connections are MOST IMPORTANT: 90 percent of all service problems are caused by poor soldering.

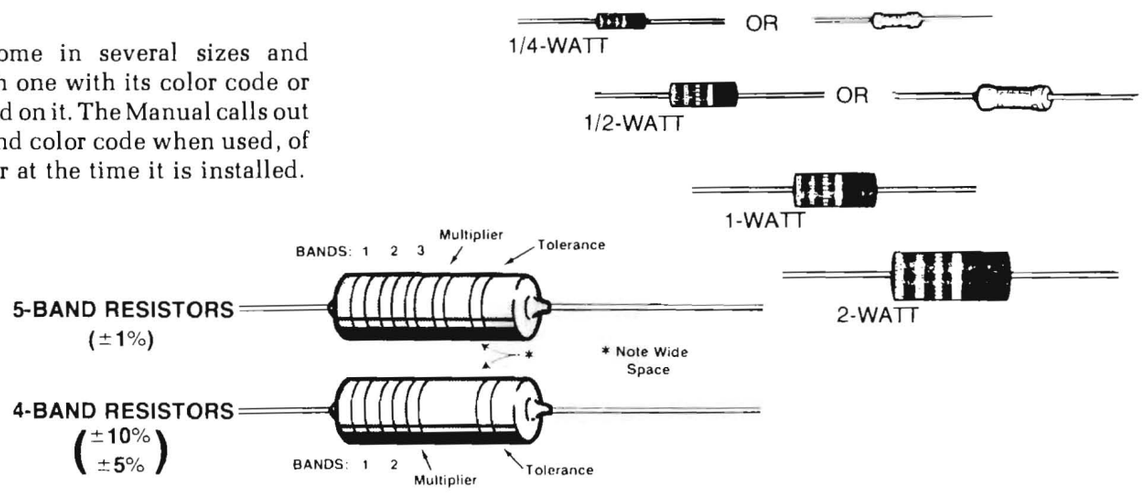
Keep the soldering iron tip clean. Wipe it often on a wet sponge or cloth; then apply solder to it to give the entire tip a wet look. This "tinning" process will protect the tip and enable you to make good connections. When the solder tends to "ball" or not stick to the tip, the tip needs to be cleaned and retinned.



Use rosin core, radio-type solder (60:40 or 50:50 tin-lead content) for all soldering in the kit. The Warranty will be void and we will not service any kit in which acid core solder or paste fluxes have been used.

RESISTORS

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.



Band 1 1st Digit	
Color	Digit
Black	0
Brown	1
Red	2
Orange	3
Yellow	4
Green	5
Blue	6
Violet	7
Gray	8
White	9

Band 2 2nd Digit	
Color	Digit
Black	0
Brown	1
Red	2
Orange	3
Yellow	4
Green	5
Blue	6
Violet	7
Gray	8
White	9

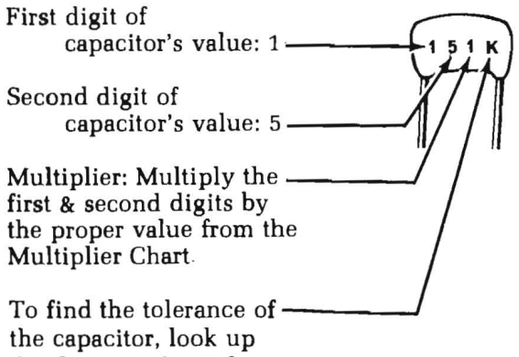
Band 3 (if used) 3rd Digit	
Color	Digit
Black	0
Brown	1
Red	2
Orange	3
Yellow	4
Green	5
Blue	6
Violet	7
Gray	8
White	9

Multiplier	
Color	Multiplier
Black	1
Brown	10
Red	100
Orange	1,000
Yellow	10,000
Green	100,000
Blue	1,000,000
Silver	0.01
Gold	0.1

Resistance Tolerance	
Color	Tolerance
Silver	±10%
Gold	± 5%
Brown	± 1%

CAPACITORS

Capacitors come in many sizes and types. The Manual will tell the type and value of each one, and show what it looks like. This page shows how you can read the code printed on some capacitors.



EXAMPLES:

151K = 15 × 10 = 150 pF
759 = 75 × 0.1 = 7.5 pF

NOTE: The letter "R" may be used at times to signify a decimal point; as in: 2R2 = 2.2 (pF or μF).

pF = picofarads
μF = microfarads

MULTIPLIER		TOLERANCE OF CAPACITOR		
FOR THE NUMBER:	MULTIPLY BY:	10pF OR LESS	LETTER	OVER 10pF
0	1	±0.1pF	B	
1	10	±0.25pF	C	
2	100	±0.5pF	D	
3	1000	±1.0pF	F	±1%
4	10,000	±2.0pF	G	±2%
5	100,000		H	±3%
			J	±5%
8	0.01		K	±10%
9	0.1		M	±20%

YOUR HEATHKIT 90 DAY LIMITED WARRANTY

If you are not satisfied with our service - warranty or otherwise - or with our products, write directly to our Director of Customer Services, Heath Company, Benton Harbor, Michigan 49022. He will make certain your problems receive immediate, personal attention.

Our attorney, who happens to be quite a kitbuilder himself, insists that we describe our warranty using all the necessary legal phrases in order to comply with the new warranty regulations. Fine. Here they are:

For a period of ninety (90) days after purchase, Heath Company will replace or repair free of charge any parts that are defective either in materials or workmanship. You can obtain parts directly from Heath Company by writing us at the address below or by telephoning us at (616) 982-3571. And we'll pay shipping charges to get those parts to you — anywhere in the world.

We warrant that during the first ninety (90) days after purchase, our products, when correctly assembled, calibrated, adjusted and used in accordance with our printed instructions, will meet published specifications.

If a defective part or error in design has caused your Heathkit product to malfunction during the warranty period through no fault of yours, we will service it free upon proof of purchase and delivery at your expense to the Heath factory, any Heathkit Electronic Center (units of Schlumberger Products Corporation), or any of our authorized overseas distributors.

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.

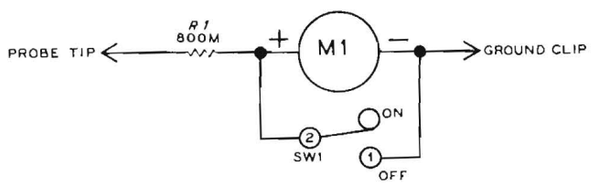
Our warranty does not cover and we are not responsible for damage caused by the use of corrosive solder, defective tools, incorrect assembly, misuse, fire, or by unauthorized modifications to or uses of our products for purposes other than as advertised. Our warranty does not include reimbursement for customer assembly or set-up time.

This warranty covers only Heathkit products and is not extended to allied equipment or components used in conjunction with our products. **We are not responsible for incidental or consequential damages.** 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. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

HEATH COMPANY
BENTON HARBOR, MI. 49022

Prices and specifications subject to change without notice.

SCHEMATIC OF THE HEATHKIT® 40KV PROBE METER MODEL IM-5210



NOTES:

1. R1 IS A 1/2 WATT, 2% RESISTOR.
2. M1 IS A 50μA METER.