

The

HEATH

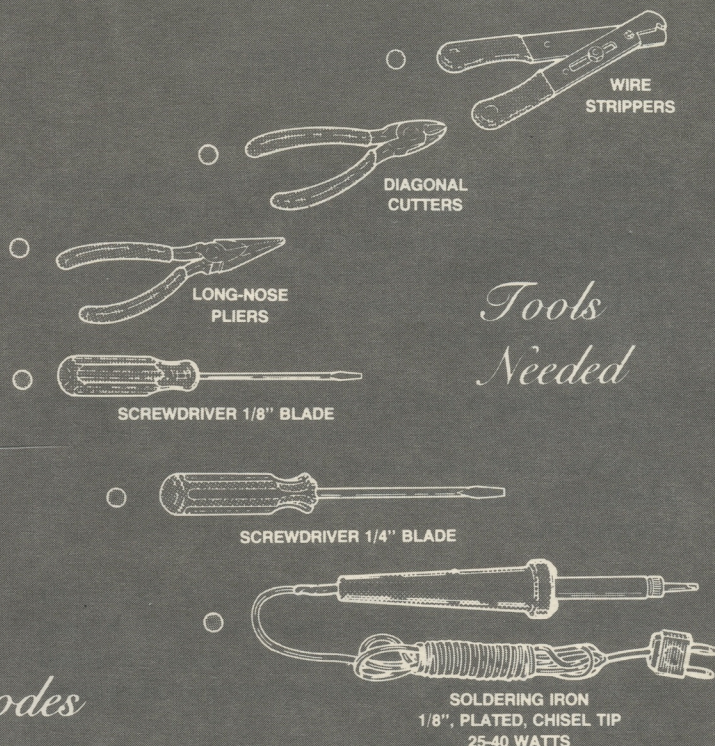
Schlumberger

Kit Builder's Guide To:

Installing parts

Proper soldering

Resistor & capacitor codes



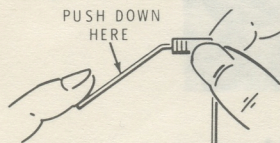
CIRCUIT BOARDS

To Install a Part:

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

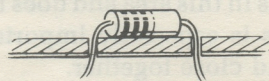
1. Position the circuit board as shown in the Manual with the printed side (not the foil side) up.

2. Hold the resistor by the body as shown and bend the leads straight down.

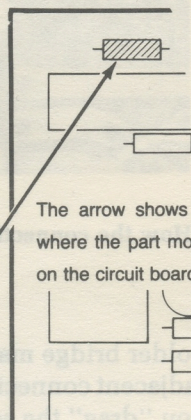


3. Push the leads through the holes at the proper location on the circuit board. The end with color bands may be positioned either way.

4. Press the resistor against the circuit board. Then bend the leads outward slightly to hold the resistor in place.



EXAMPLE CIRCUIT BOARD

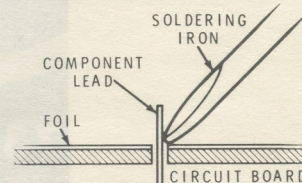


The arrow shows you where the part mounts on the circuit board.

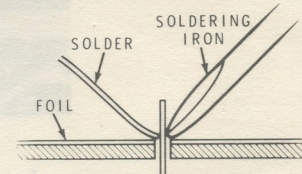
NOTE: A pencil-type soldering iron, as shown above, will give the best results.

To Solder a Connection:

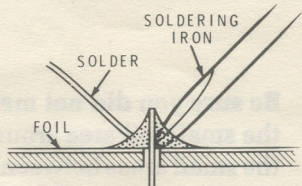
1. Place the soldering iron tip against both the lead and the circuit board foil. Heat both for 2 or 3 seconds.



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.



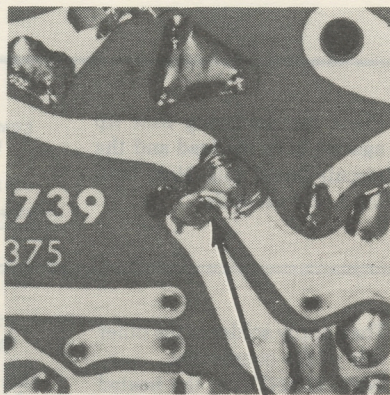
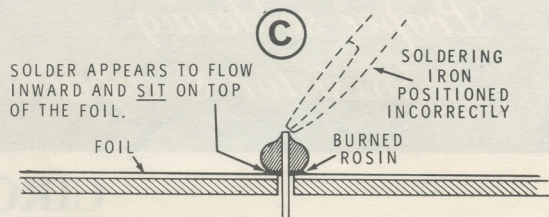
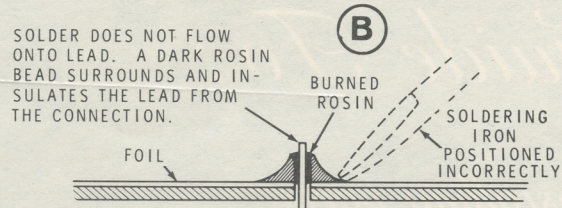
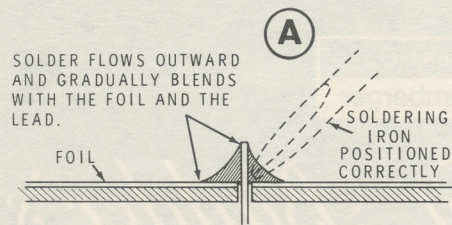
4. Hold the lead with one hand while you cut off the excess lead length close to the connection. This will keep you from being hit in the eye by the flying lead.

To Check a Connection:

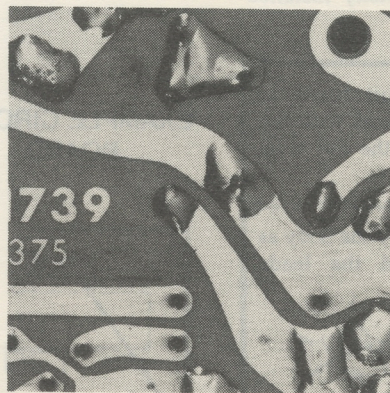
Be sure the solder made a good electrical connection. When both the lead and the circuit board foil are heated at the same time, the solder will flow onto the lead and the foil evenly. See Illustration A. The solder will then make a good electrical connection between the lead and the foil.

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.

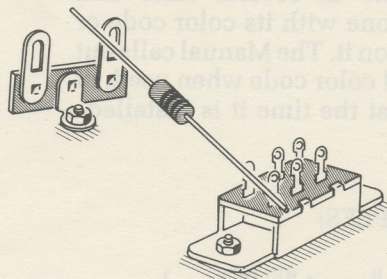


Be sure you did not make any solder bridges. Due to the small foil area around the circuit board holes and the small areas between foils, you must use the utmost care to prevent solder bridges between adjacent foil areas.

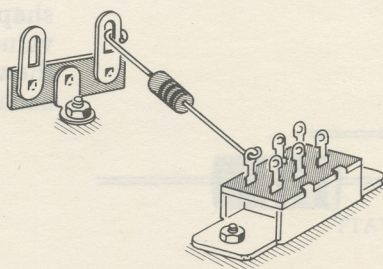
A solder bridge may occur if you accidentally touch an adjacent connection, if you use too much solder, or if you "drag" the soldering iron across other foils as you remove it from the connection. Always take a good look at the foil area around each lead before you solder it. Then, when you solder the 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

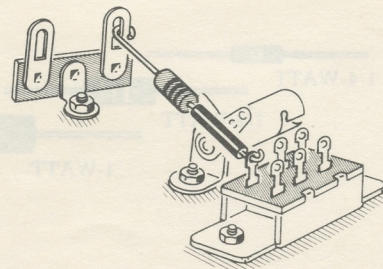
To Install a Part:



1. Cut the leads to the proper length.



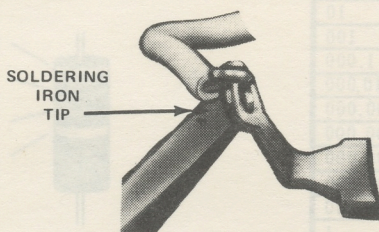
2. Fasten the lead ends.



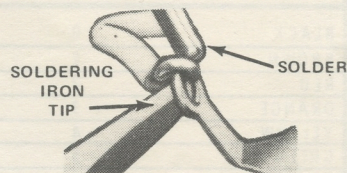
NOTE: Use sleeving when it is called for to provide insulation.

To Solder a Connection:

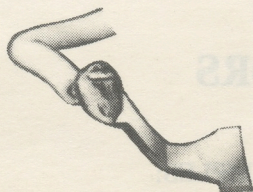
1. Heat both the wire and the connection point; do not burn the insulation on the wire.



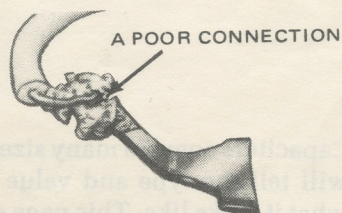
2. Apply only enough solder to thoroughly wet both the tip and the connection.



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.



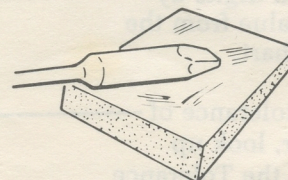
Remember:

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.

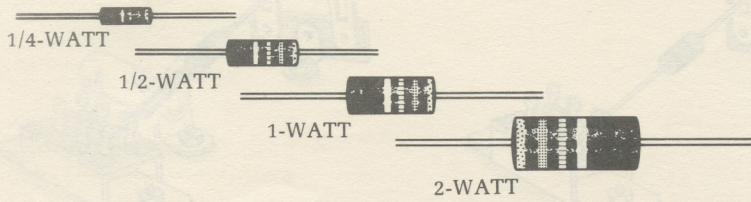
Keep the soldering iron tip clean. Wipe it often on a wet sponge or cloth; then apply solder to it to give the entire tip a wet look. This "tinning" process will protect the tip and enable you to make good connections. When the solder tends to "ball" or not stick to the tip, the tip needs to be cleaned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



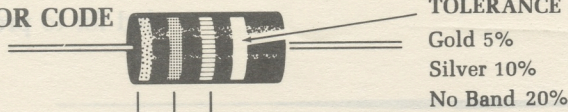
Use rosin core, radio-type solder (60:40 or 50:50 tin-lead content) for all soldering in the kit. The Warranty will be void and we will not service any kit in which acid core solder or paste fluxes have been used.

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.

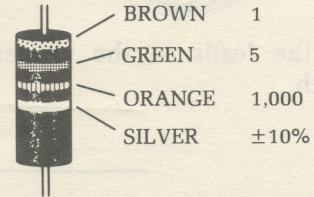


RESISTOR COLOR CODE

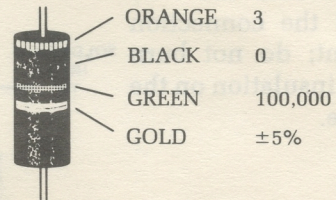


COLOR	1st DIGIT	2nd DIGIT	MULTIPLY BY
BLACK	0	0	1
BROWN	1	1	10
RED	2	2	100
ORANGE	3	3	1,000
YELLOW	4	4	10,000
GREEN	5	5	100,000
BLUE	6	6	1,000,000
VIOLET	7	7	10,000,000
GRAY	8	8	100,000,000
WHITE	9	9	1,000,000,000
GOLD			.1
SILVER			.01

EXAMPLES:



$15 \times 1,000 = 15,000 \Omega$ (15,000 OHMS),
or "15 k"



$30 \times 100,000 = 3,000,000 \Omega$ (OR 3 MΩ)
3 MΩ = 3 MEGOHMS

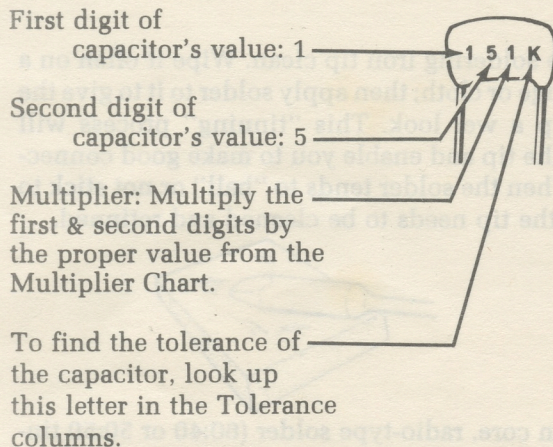
CAPACITORS

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:

$151K = 15 \times 10 = 150 \text{ pF}$
 $759 = 75 \times 0.1 = 7.5 \text{ pF}$

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	±0.1 pF	B	
1	10	±0.25 pF	C	
2	100	±0.5 pF	D	
3	1000	±1.0 pF	F	±1%
4	10,000	±2.0 pF	G	±2%
5	100,000		H	±3%
			J	±5%
8	0.01		K	±10%
9	0.1		M	±20%