

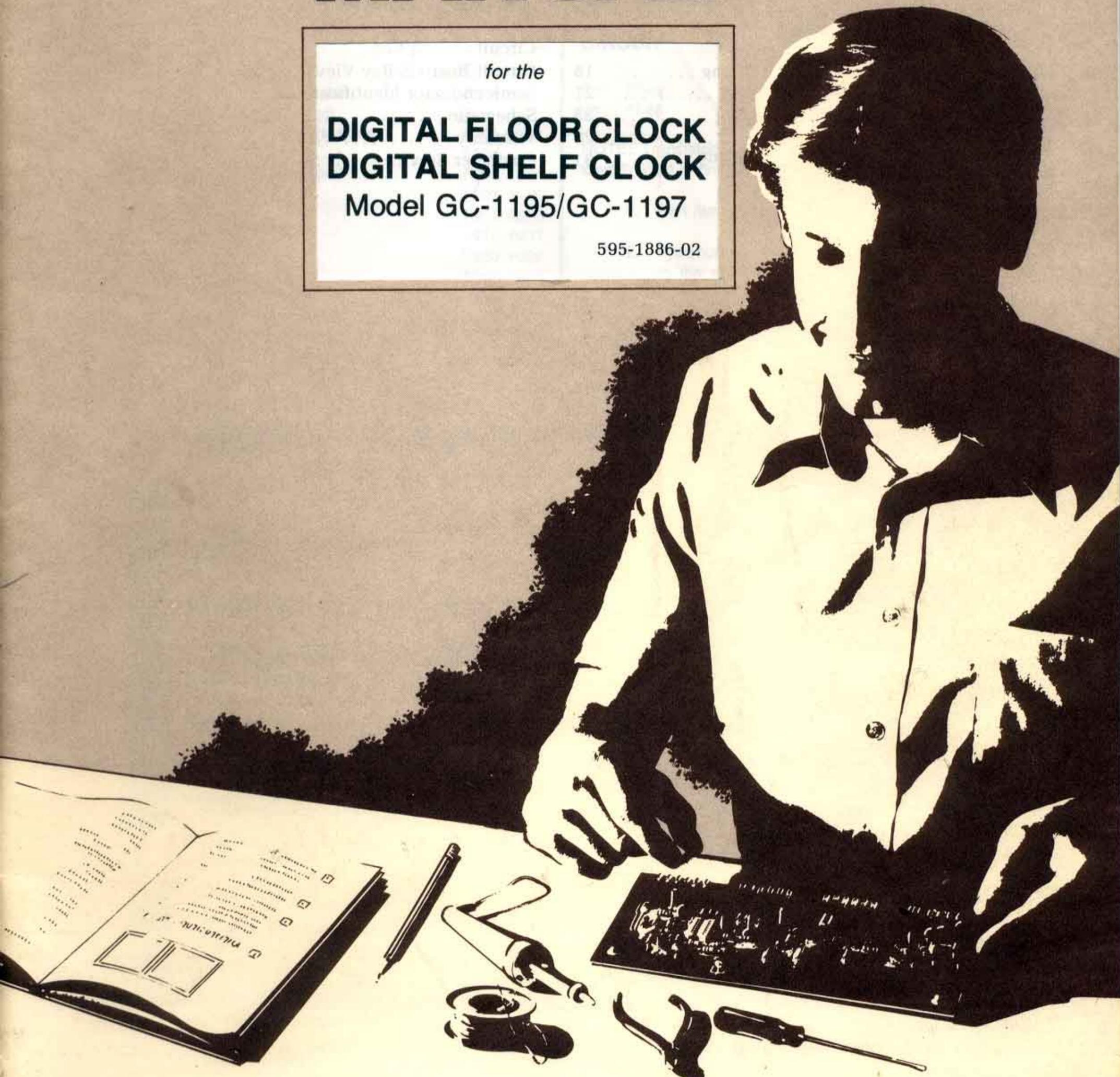
HEATHKIT[®] MANUAL

for the

**DIGITAL FLOOR CLOCK
DIGITAL SHELF CLOCK**

Model GC-1195/GC-1197

595-1886-02



HEATH COMPANY • BENTON HARBOR, MICHIGAN

Heathkit® Manual

for the

DIGITAL FLOOR CLOCK
DIGITAL SHELF CLOCK
Model GC-1195/GC-1197

595-1886-02

DIGITAL FLOOR CLOCK
MODEL GC-1195

(floor model pictured)

DIGITAL SHELF CLOCK
MODEL GC-1197



HEATH COMPANY
BENTON HARBOR, MICHIGAN 49022

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PARTS LIST

Check each part against the following list. Any part that is packed in an individual envelope with a part number on it should be placed back in the envelope after you identify it until it is called for in a step. Do not throw away any packing material until all parts are accounted for.

Each circuit part in this kit has its own component number (R2, C4, SW1, etc.). This is a specific number for only that one part. The purpose of these numbers is to help you easily identify the same part in each

section of the Manual. These numbers will appear:

- In the Parts List,
- At the beginning of each step where a component is installed,
- In some illustrations,
- In the sections at the rear of the Manual.

To order a replacement part, use the Parts Order Form furnished with this kit. If a Parts Order Form is not available, refer to "Replacement Parts" inside the rear cover of the Manual. For price information, refer to the separate "Heath Parts Price List."



| KEY PART No. | QTY. | DESCRIPTION | CIRCUIT Comp. No. |
|--------------|------|-------------|-------------------|
|--------------|------|-------------|-------------------|

RESISTORS

NOTE: The following resistors have a 10% tolerance (silver fourth band) unless otherwise stated. The resistors may be packed in more than one envelope. Open all the resistor envelopes in this pack before you check the resistor against the Parts List.

1/2-Watt

| | | | | |
|----------------|-------|---------------|---------------------------------------|--|
| LA1 | 1-129 | 1 | 4.7 Ω (yellow-violet-gold) | R219 |
| LA1 | 1-80 | 25 | 1200 Ω (brown-red-red), 5% | R101, R201, R224 |
| LA1 | 1-44 | 20 | 2200 Ω (red-red-red) | R203, R205, R207, R209, R211, R213, R215, R217, R220, R222, R226, R228, R230, R232, R234, R236, R238, R240, R242, R244, R104 |
| LA1 | 1-14 | 1 | 3300 Ω (orange-orange-red) | |
| LA1 | 1-21 | 24 | 15 k Ω (brown-green-orange) | R107, R109, R202, R204, R206, R208, R210, R212, R214, R216, R218, R221, R223, R225, R227, R229, R231, R233, R235, R237, R239, R241, R243, R245, R106, R108 |
| LA1 | 1-50 | 2 | 68 k Ω (blue-gray-orange) | R105, R111 |
| LA1 | 1-26 | 2 | 100 k Ω (brown-black-yellow) | |
| LA1 | 1-33 | 1 | 470 k Ω (yellow-violet-yellow) | R105 |

Other Resistors

| | | | | |
|----------------|-------|---|--------------------------------|------|
| LA2 | 2-345 | 1 | 950 Ω , 1% | R103 |
| LA3 | 2-181 | 1 | 5490 Ω (5.49 k), 1% | R102 |
| LA4 | 9-73 | 1 | LDR (light dependent resistor) | LDR1 |

| KEY PART No. | QTY. | DESCRIPTION | CIRCUIT Comp. No. |
|--------------|------|-------------|-------------------|
|--------------|------|-------------|-------------------|

CAPACITORS

| | | | | |
|----------------|--------|---|---------------------------|------------|
| LB1 | 21-176 | 2 | .01 μ F ceramic | C103, C104 |
| LB2 | 25-804 | 1 | 100 μ F electrolytic | C102 |
| LB3 | 25-241 | 1 | 1200 μ F electrolytic | C101 |

DIODES-TRANSISTORS-INTEGRATED CIRCUIT

| | | | | | |
|---------------|-------|---|--------------|----------------------|------------|
| DT | 57-42 | 2 | 3A1 diode | <i>ECG 156</i> 3A | D101, D102 |
| DT | 57-65 | 2 | 1N4002 diode | <i>ECG 116</i> 1A | D103, D104 |

NOTE: Transistors and integrated circuits are marked for identification in one of the following four ways:

1. Part number.
2. Type number. (On integrated circuits this refers only to the numbers; the letters may be different or missing.)
3. Part number and type number.
4. Part number with a type number other than the one shown.

| | | | | |
|---------------|---------|----|--------------------|--|
| D1 | or | | | |
| DB | 417-91 | 1 | 2N5232A transistor | Q102 |
| DT | 417-94 | 22 | 2N3416 transistor | Q201, Q202, Q203, Q204, Q205, Q206, Q207, Q208, Q209, Q210, Q211, Q212, Q213, Q214, Q215, Q216, Q217, Q218, Q219, Q220, Q221, Q222 |
| DT | 417-200 | 1 | X29A826 transistor | Q103 |
| DB | 417-215 | 1 | 2N3055 transistor | Q1 |
| DB | 417-801 | 1 | MPSA20 transistor | Q104 |
| DB | 417-864 | 1 | MPSA05 transistor | Q101 |

CAUTION: The following integrated circuit (#443-702) can be damaged by static electricity. Do not remove it from its protective carrier until you are instructed to do so in a step.

| | | | | |
|----------------|----------------|---|-------------------------|-------|
| DET | 443-702 848 | 1 | 3817 integrated circuit | IC101 |
|----------------|----------------|---|-------------------------|-------|

| KEY PART No. | QTY. | DESCRIPTION | CIRCUIT Comp. No. |
|--------------|------|-------------|-------------------|
|--------------|------|-------------|-------------------|

HARDWARE

NOTE: Hardware packets are marked to show the size of the hardware they contain (HDW #4, or HDW #2 & #6, etc.). You may have to open more than one packet — in this pack — to locate all the hardware of any one size (#6, for example).

#4 Hardware

| | | | |
|-----|---------|---|-------------------|
| LF1 | 250-52 | 5 | 4-40 x 1/4" screw |
| LF2 | 252-2 | 3 | 4-40 nut |
| LF3 | 253-1 | 1 | #4 fiber washer |
| LF4 | 254-9 | 4 | #4 lockwasher |
| LF5 | 255-175 | 1 | 4-40 x 1" spacer |

#6 Hardware

| | | | |
|------|---------|---|------------------------------|
| LF6 | 250-170 | 4 | #6 x 1/4" self-tapping screw |
| LF7 | 250-89 | 8 | 6-32 x 3/8" screw |
| LF8 | 250-162 | 2 | 6-32 x 1/2" screw |
| LF9 | 250-569 | 2 | 6-32 x 3/4" black screw |
| LF10 | 252-3 | 4 | 6-32 nut |
| LF11 | 252-85 | 2 | #6 Speed Nut* |
| LF12 | 253-60 | 5 | #6 flat washer |
| LF13 | 254-1 | 5 | #6 lockwasher |

METAL PARTS

| | | | |
|-----|------------|---|-----------------------------|
| VG1 | 200-1271-1 | 1 | Chassis |
| VG2 | 204-557 | 1 | Bottom support bracket |
| VG3 | 204-1046 | 1 | Top support rail |
| VG4 | 204-1288 | 1 | Right circuit board bracket |
| VG5 | 204-2035 | 1 | Left circuit board bracket |

MISCELLANEOUS

NOTE: DO NOT throw away the three rubber bands supplied with your kit. They will be used later.

| | | | | |
|---|-----------|----|-----------------------|----|
| ✓ | 54-928 | 1 | Power transformer | T1 |
| ✓ | 60-6 | 2 | Slide switch | |
| ✓ | 75-24 | 1 | Strain relief | |
| ✓ | 75-108 | 1 | Insulating paper | |
| ✓ | 75-140 | 1 | Transistor insulator | |
| ✓ | 75-710 | 52 | Standoff insulator | |
| ✓ | 85-1799-1 | 1 | Power circuit board | |
| ✓ | 85-1800-1 | 1 | Display circuit board | |
| ✓ | 89-13 | 1 | Line cord | |
| ✓ | 260-65 | 2 | Fuse clip | |
| ✓ | 266-857 | 1 | LDR shield | |
| ✓ | 266-890 | 24 | Diffuser segment | |
| ✓ | 266-914 | | | |

*Registered Trademark, Tinnerman Co.

| KEY PART No. | QTY. | DESCRIPTION | CIRCUIT Comp. No. |
|--------------|------|-------------|-------------------|
|--------------|------|-------------|-------------------|

Miscellaneous (cont'd.)

| | | | | |
|---|------------|-----|----------------------------------|-------------|
| ✓ | 344-50 | 12" | Black wire | |
| ✓ | 346-26 | 7" | Clear sleeve | |
| ✓ | 347-55 | 27" | 8-wire cable | |
| ✓ | 352-13 | 1 | Silicone grease | |
| ✓ | 390-1255 | 1 | Fuse label | |
| ✓ | 390-1303 | 1 | Label sheet | |
| ✓ | 390-1343 | 1 | Black label strip | |
| ✓ | 412-621-24 | 26 | Lamp (2 extra) | PL201-PL224 |
| ✓ | 421-20 | 1 | 1/2-ampere, 3 AG, slow-blow fuse | F1 |
| ✓ | 431-43 | 1 | Large terminal strip | |
| ✓ | 431-62 | 1 | Small terminal strip | |
| ✓ | 432-67 | 1 | Wire nut | |
| ✓ | 432-144 | 4 | Connector pin | |
| ✓ | 434-117 | 1 | Transistor socket | |
| ✓ | 434-297 | 2 | Socket strip | |
| ✓ | 434-305 | 24 | Lamp socket | |
| ✓ | 446-670 | 1 | Orange window diffuser | |
| ✓ | 490-5 | 1 | Nut starter | |
| ✓ | 702-2 | 3 | Rubber band | |
| ✓ | 597-260 | 1 | Parts Order Form | |

Assembly Manual (See Page 1 for part number.)

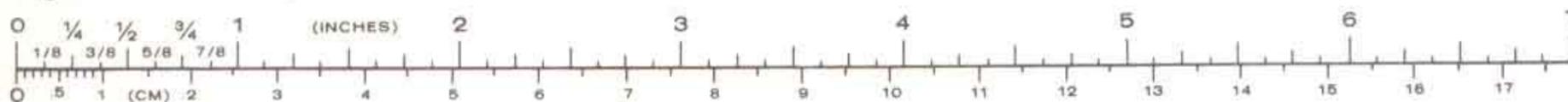
Solder

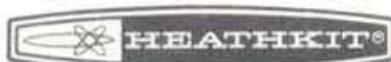
CABINET PARTS FOR THE GC-1195

| | | | | |
|---|------------|----|------------------------------|--|
| ✓ | 73-38 | 14 | Rubber cushion | |
| ✓ | 94-573 | 2 | Cabinet side panel | |
| ✓ | 203-1784 | 4 | Trim rail | |
| ✓ | 204-2198-1 | 2 | Bottom panel | |
| ✓ | 204-2199-1 | 1 | Center panel | |
| ✓ | 204-2200-1 | 1 | Top panel | |
| ✓ | 207-613 | 3 | Line cord retainer | |
| ✓ | 250-56 | 20 | 6-32 x 1/4" screw | |
| ✓ | 250-314 | 18 | #6 x 3/4" wood screw | |
| ✓ | 252-196 | 20 | Expansion nut | |
| ✓ | 703-9 | 1 | Black paper sheet | |
| ✓ | 391-34 | 1 | Blue and white label | |
| ✓ | 446-676 | 1 | Glass package consisting of: | |
| | 446-666 | 4 | Shelf | |
| | 446-675 | 1 | Window (marked with a dot) | |

CABINET PARTS FOR THE GC-1197

| | | | |
|----|---------|---|----------------------|
| K1 | 91-278 | 1 | Wood cabinet |
| K2 | 261-29 | 2 | Large plastic foot |
| K3 | 261-41 | 4 | Small plastic foot |
| | 446-667 | 1 | Window |
| | 391-34 | 1 | Blue and white label |

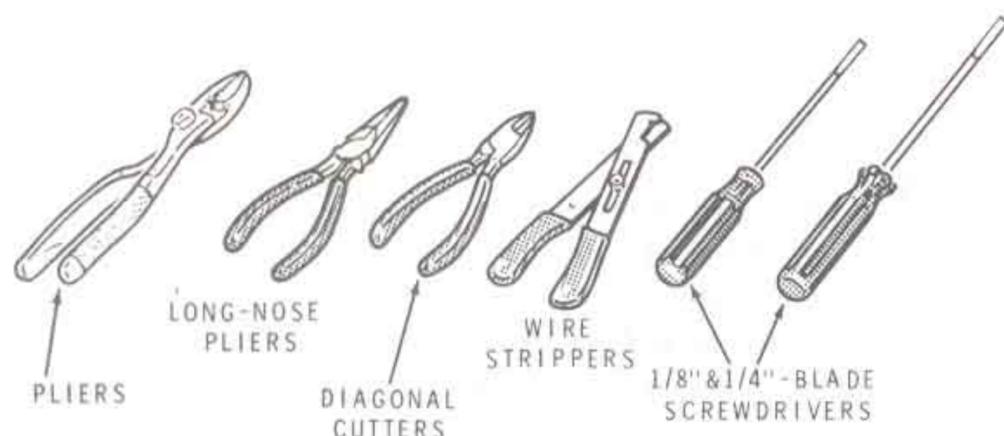




ASSEMBLY NOTES

TOOLS

You will need these tools to assemble your kit.

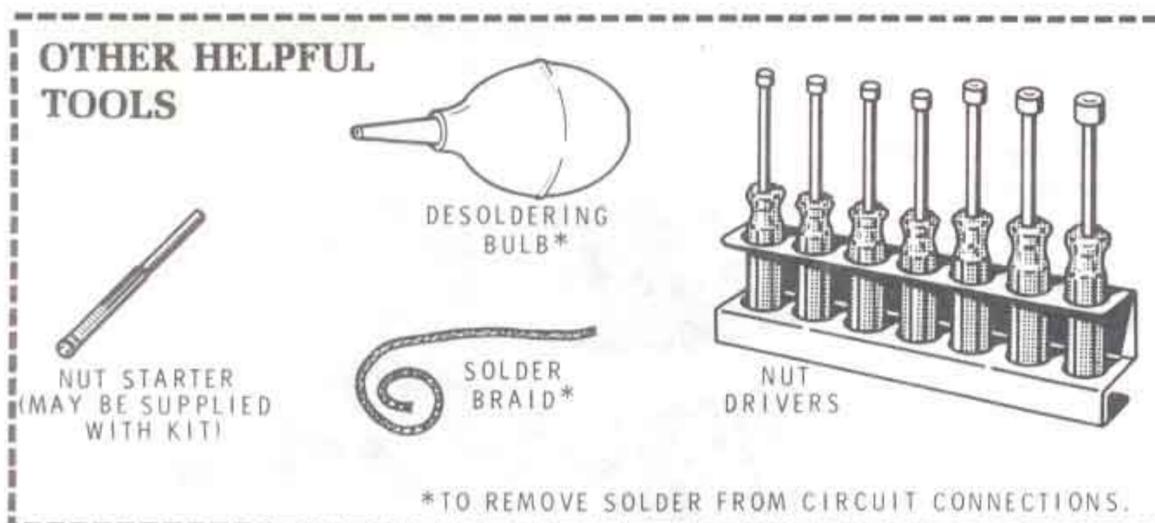


HEATHKIT
SOLDERING
IRON

OR



PENCIL
SOLDERING IRON
(25 TO 40 WATTS)



*TO REMOVE SOLDER FROM CIRCUIT CONNECTIONS.

ASSEMBLY

1. Follow the instructions carefully, and read the entire step before you perform the operation.
2. Position all parts as shown in the Pictorials.
3. The illustrations in the Manual are called Pictorials and Details. Pictorials show the overall operation for a group of assembly steps; Details generally illustrate a single step. When you are directed to refer to a certain Pictorial "for the following steps," continue using that Pictorial until you are referred to another Pictorial for another group of steps.
4. A separate "Illustration Booklet" contains illustrations (Pictorials, Details, etc.) that are too large for the Assembly Manual. When the Manual says to refer to a certain Pictorial or Detail and that illustration is not on the same page, or on the page across from it, refer to the "Illustration Booklet."

Keep the "Illustration Booklet" with the Assembly Manual. The illustrations in it are arranged in Pictorial number sequence.

5. Solder a part or a group of parts only when you are instructed to do so.

6. Resistors will be called out by their resistance value in Ω (ohms), $k\Omega$ (kilohms), or $M\Omega$ (megohms), and color code. Use 1/2-watt resistors unless directed otherwise.
7. Capacitors will be called out by their capacitance value (in pF or μF) and type (ceramic, Mylar, or electrolytic).
8. When you are instructed to cut something to a particular length, use the scales (rulers) provided at the bottom of the Manual pages.

SAFETY WARNING: Avoid eye injury when you cut off excess lead lengths. Hold the leads so they cannot fly toward your eyes.

SOLDERING

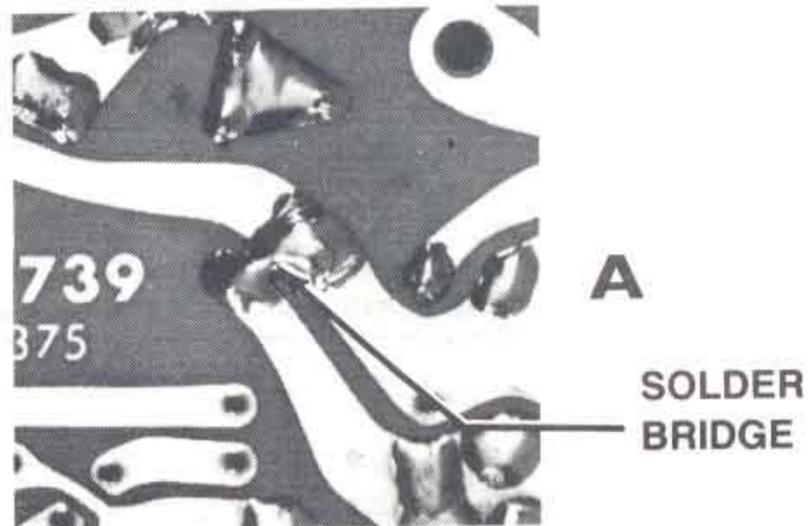
Soldering is one of the most important operations you will perform while assembling your kit. A good solder connection will form an electrical connection between two parts, such as a component lead and a circuit board foil. A bad solder connection could prevent an otherwise well-assembled kit from operating properly.

It is easy to make a good solder connection if you follow a few simple rules:

1. Use the right type of soldering iron. A good quality, 25 to 40-watt, pencil soldering iron with a 1/8" or 3/16" chisel or pyramid tip works best.
2. Keep the soldering iron tip clean. Wipe it often on a wet sponge or cloth; then apply solder to the tip to give the entire tip a wet look. This process is called tinning, and it will protect the tip and enable you to make good connections. When solder tends to "ball" or does not stick to the tip, the tip needs to be cleaned and retinned.
3. 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 between two adjacent foils is shown in photograph A below. Photograph B shows how the connection should appear. A solder bridge may occur if you accidentally touch an adjacent previously soldered connection, if you use too much solder, or if you "drag" the soldering iron across other foils as you remove it from the connection. A good rule to follow is: 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. NOTE: It is alright for solder to bridge two connections on the same foil.

Use only enough solder to make a good connection, and lift the soldering iron straight up from the circuit board. If a solder bridge should develop, turn the circuit board foil-side-down and heat the solder between connections. The excess solder will run onto the tip of the soldering iron, and this will remove the solder bridge. NOTE: The foil side of each circuit board has a coating on it called "solder resist." This is a protective insulation to help prevent solder bridges.





STEP-BY-STEP ASSEMBLY

POWER CIRCUIT BOARD

START

In the following steps you will be given detailed instructions on how to install and solder the first part on the circuit board. Read and perform each step carefully. Then use the same procedure whenever you install parts on a circuit board.

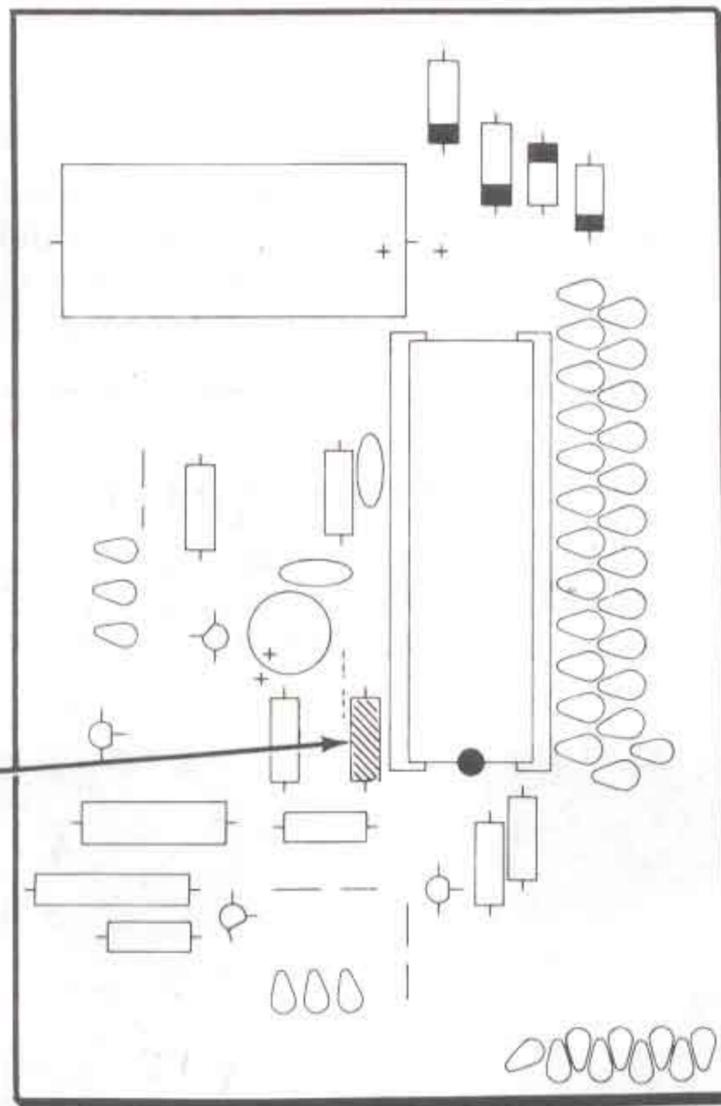
(X) Position the power circuit board as shown with the printed (not the foil) side up.

(X) R109: Hold a 15 k Ω (brown-green-orange) resistor by the body as shown and bend the leads straight down.



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

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

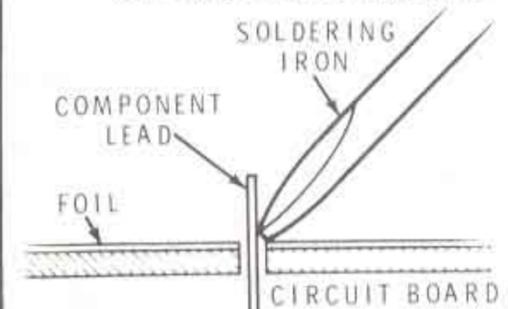


PICTORIAL 1-1

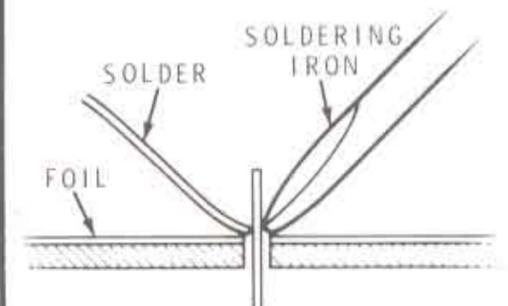
CONTINUE

() Solder the resistor leads to the circuit board as follows:

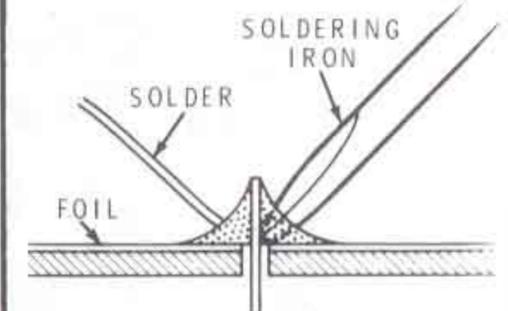
1. Push the soldering iron tip against both the lead and the circuit board foil. Heat **both** for 2 or 3 seconds.



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



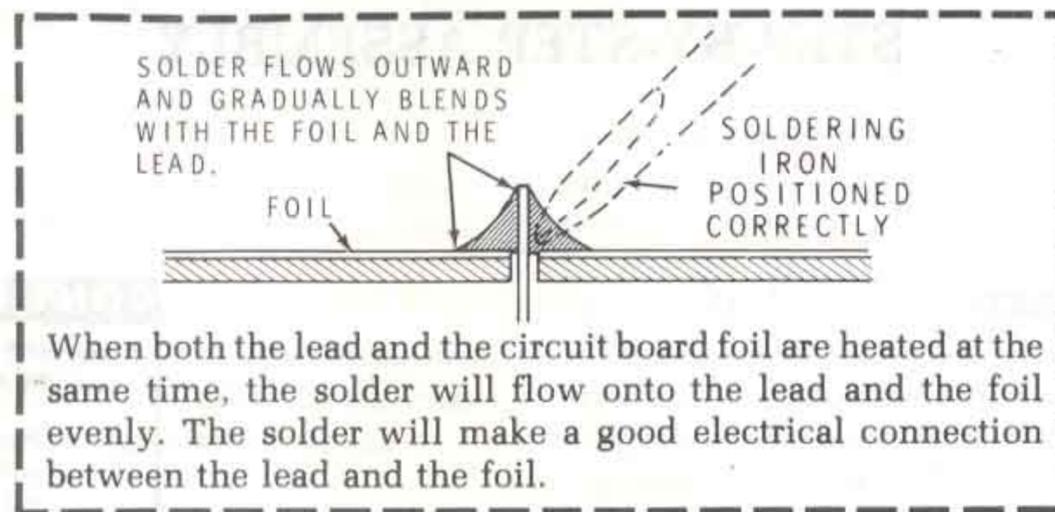
3. As the solder begins to melt, allow it to flow around the connection. Then remove the solder and the iron and let the connection cool.



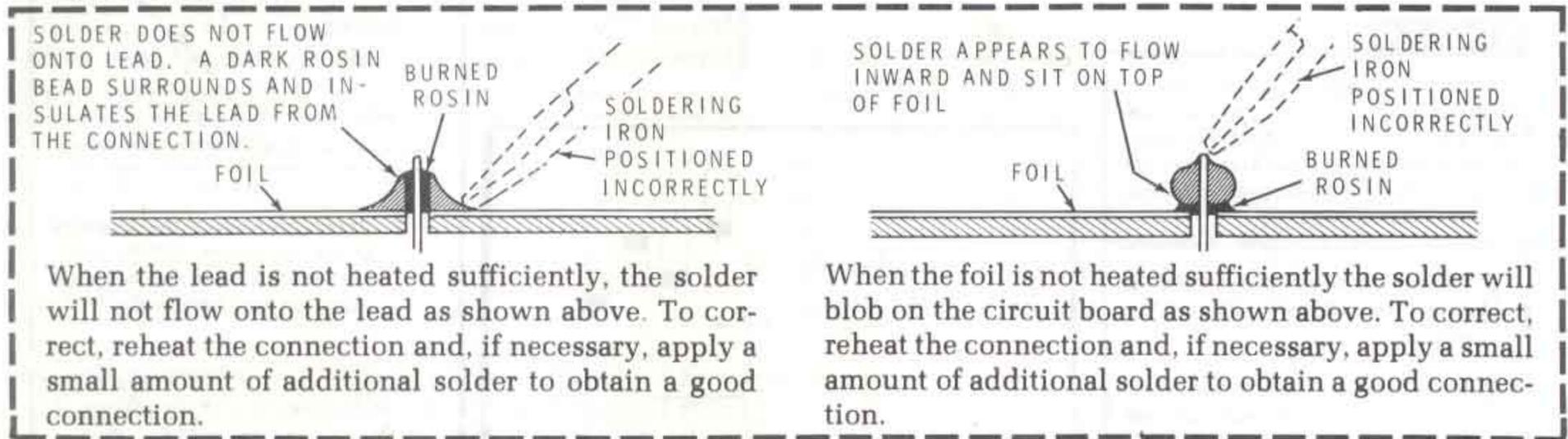
(X) Hold the lead with one hand while you cut off the excess lead length close to the connection. This will keep you from being hit in the eye by the flying lead.

(X) Check the connection. Compare it to the illustrations on the next page. After you have checked the solder connections, proceed with the assembly on Page 9. Use the same soldering procedure for each connection.

A GOOD SOLDER CONNECTION

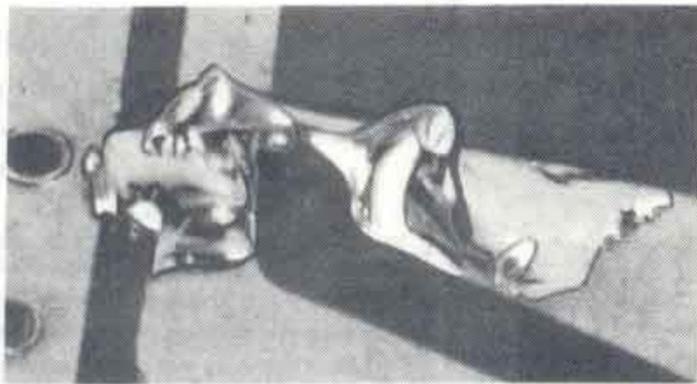


POOR SOLDER CONNECTIONS



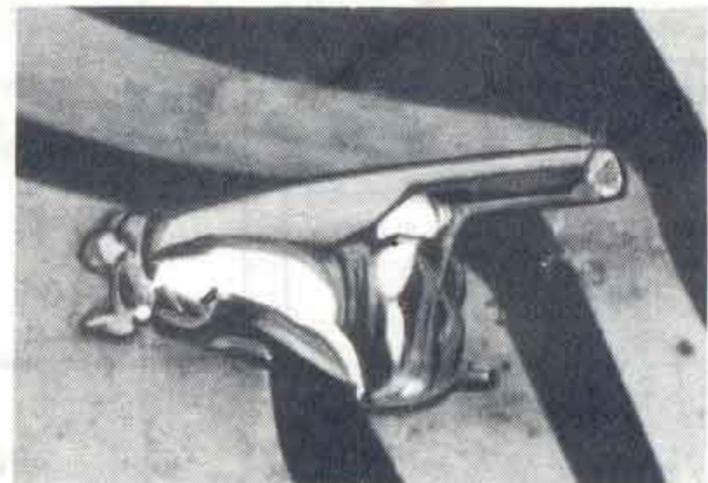
SOLDER CONNECTIONS TO WATCH OUT FOR

The following photographs show examples of the types of bad solder connections that are the most common cause of trouble. If you locate any of these bad solder connections in your kit, correct them as instructed.



Here, hot solder has been dropped onto the foil and the solder connected or bridged (or crossed) three foils. To correct, hold the circuit board above the soldering iron and reheat the solder. As the solder melts, it will flow down the iron.

NOTE: Solder that bridges two connections on the SAME FOIL is alright and should not be corrected.



Here, solder has flowed along a lead and bridged to another foil. To correct, hold the circuit board above the soldering iron and reheat the solder. As the solder melts, it will flow down the iron. Then cut off the excess lead lengths. **PROTECT YOUR EYES.**



START →

NOTE: When a bare wire is called for, use the black solid wire. Cut it to the specified length and remove the insulation.

(X) R111: 100 kΩ (brown-black-yellow).

(X) R101: 1200 Ω (brown-red-red).

(X) 1" bare wire at J.

NOTE: The line frequency in the U.S.A. is 60 Hz. PERFORM THIS STEP ONLY IF THE LINE FREQUENCY IN YOUR AREA IS 50 Hz

(X) 1" bare wire at J.

(X) R104: 3300 Ω (orange-orange-red).

(X) R106: 68 kΩ (blue-gray-orange).

(X) R102: 5490 Ω (5.49k), 1%. *parallel 47000*

(X) R103: 950 Ω, 1%.

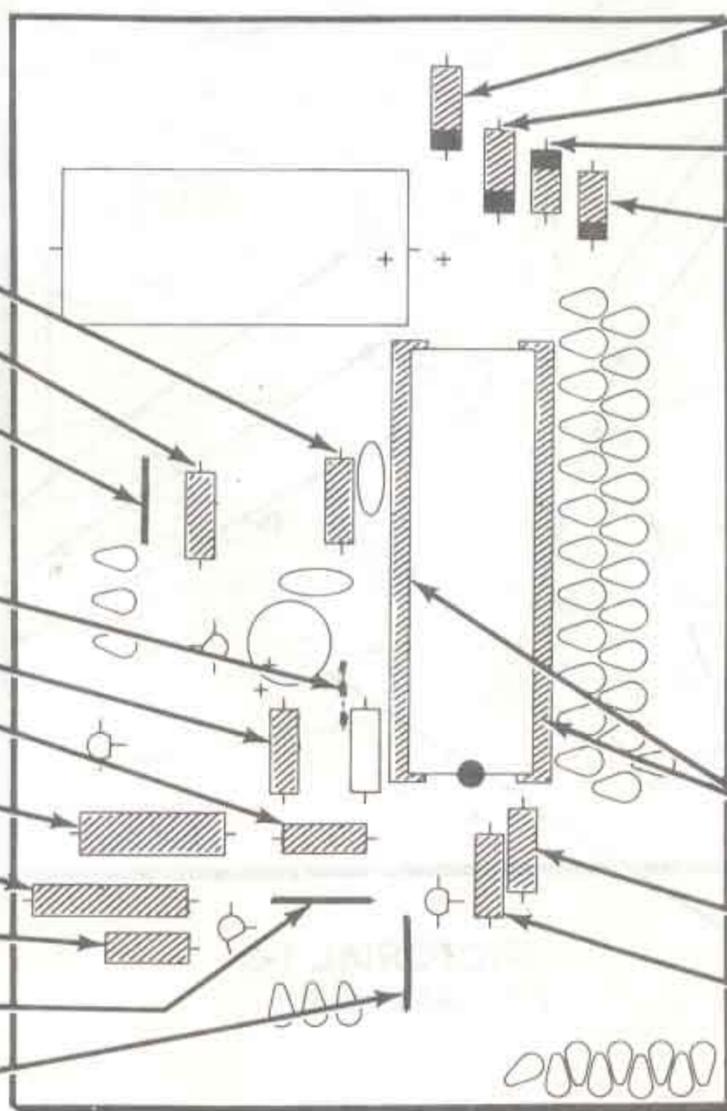
(X) R105: 100 kΩ (brown-black-yellow).

(X) 1" bare wire at J.

(X) 1" bare wire at J.

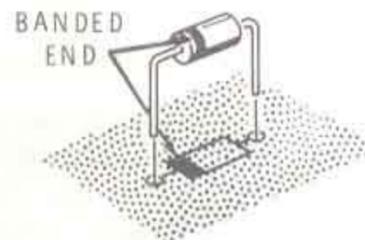
(X) Solder the leads to the foil and cut off the excess lead lengths.

NO!



CONTINUE →

NOTE: When you install a diode, always match the banded end of the diode with the band mark on the circuit board.



(X) D102: 3A1 diode (#57-42).

(X) D101: 3A1 diode (#57-42).

(X) D103: 1N4002 diode (#57-65).

(X) D104: 1N4002 diode (#57-65).

(X) Solder the leads to the foil and cut off the excess lead lengths.

NOTE: In the following step, install each socket strip as follows:

1. Be sure the socket is seated firmly against the circuit board; then turn the circuit board over and solder one pin at each end of the socket strip.
2. Re-examine the socket strip to make sure it is still seated firmly against the circuit board. Then solder the remaining pins.

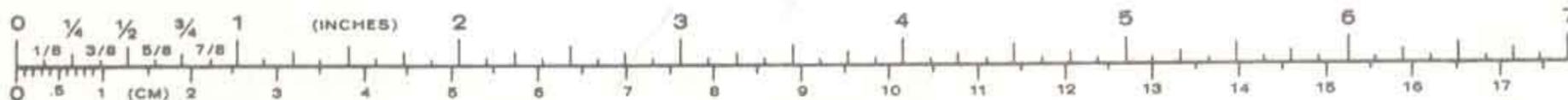
(X) Two socket strips at IC101. They can be installed in either direction. Solder the pins to the foil.

(X) R108: 68 kΩ (blue-gray-orange).

(X) R107: 15 kΩ (brown-green-orange).

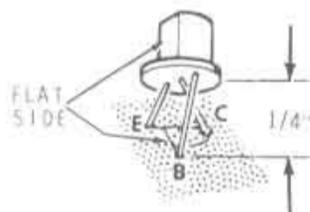
(X) Solder the leads to the foil and cut off the excess lead lengths.

PICTORIAL 1-2



START →

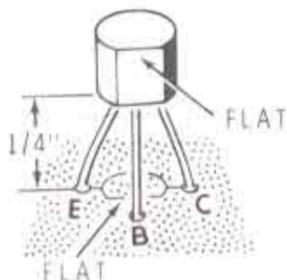
NOTE: Install the following transistors in the manner shown. First line up the flat of the transistor with the outline of the flat on the circuit board. Insert the transistor leads into their correct holes indicated by E, C, and B. Solder each lead to the foil and cut off the excess lead length.



(X) Q102: 2N5232A transistor (#417-91).

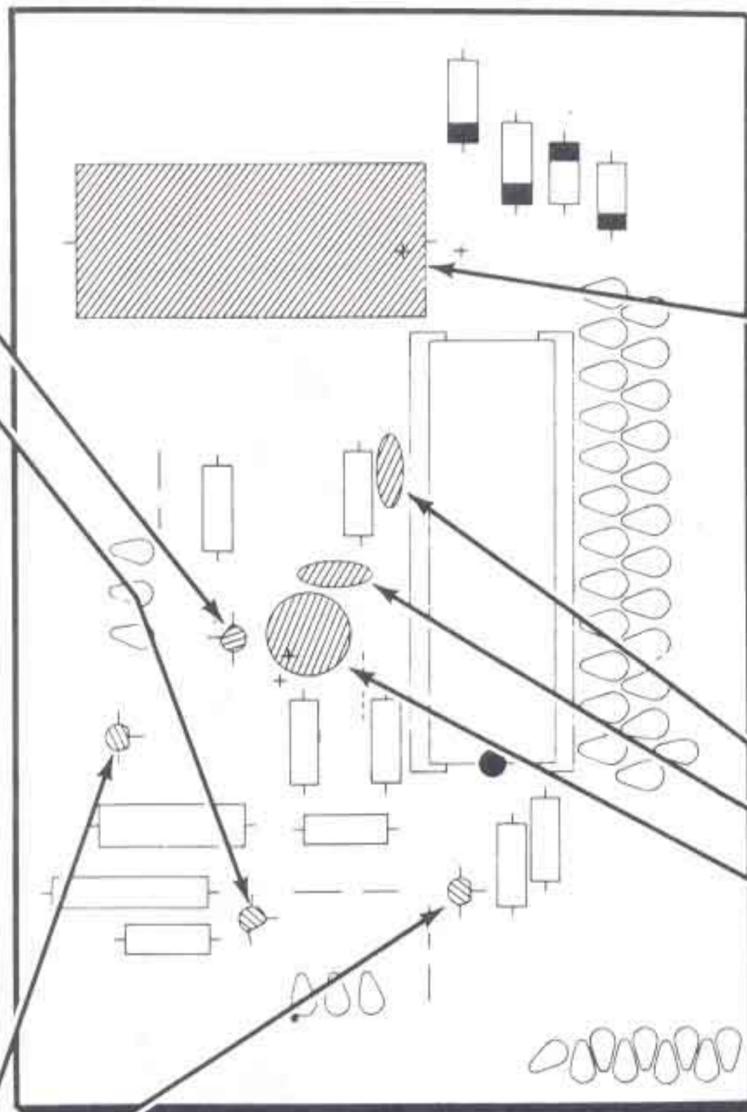
(X) Q103: X29A826 transistor (#417-200).

NOTE: When you install each of the following transistors, line up the flat on the transistor with the outline of the flat on the circuit board. Then insert the E, B, and C leads of the transistor into the corresponding E, B, and C holes in the circuit board. Position the transistor 1/4" above the circuit board. Solder the leads to the foil and cut off the excess lead lengths.



(X) Q101: MPSA05 transistor (#417-864).

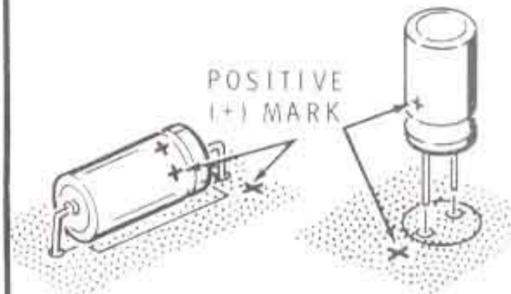
(X) Q104: MPSA20 transistor (#417-801).



PICTORIAL 1-3

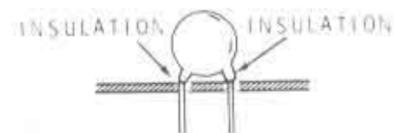
CONTINUE ↘

NOTE: When you install an electrolytic capacitor, be sure you match the positive (+) marking on the capacitor with the positive (+) marking on the circuit board.



(X) C101: 1200 μ F electrolytic.

NOTE: When you install ceramic capacitors, do not push the insulated portions of the leads into the circuit board holes. This could make it difficult to solder the leads to the foil.



(X) C104: .01 μ F ceramic.

(X) C103: .01 μ F ceramic.

(X) C102: 100 μ F electrolytic.

(X) Solder the leads to the foil and cut off the excess lead lengths.

Temporarily lay the power circuit board aside.



DISPLAY CIRCUIT BOARD

START

(X) Position the display circuit board as shown. Then complete the steps in the following Pictorials.

(X) R202: 15 kΩ (brown-green-orange).

(X) R204: 15 kΩ (brown-green-orange).

(X) R210: 15 kΩ (brown-green-orange).

(X) 1-1/4" bare wire at J.

(X) R205: 2200 Ω (red-red-red).

(X) R206: 15 kΩ (brown-green-orange).

(X) Solder the leads to the foil and cut off the excess lead lengths.

(X) R212: 15 kΩ (brown-green-orange).

(X) R211: 2200 Ω (red-red-red).

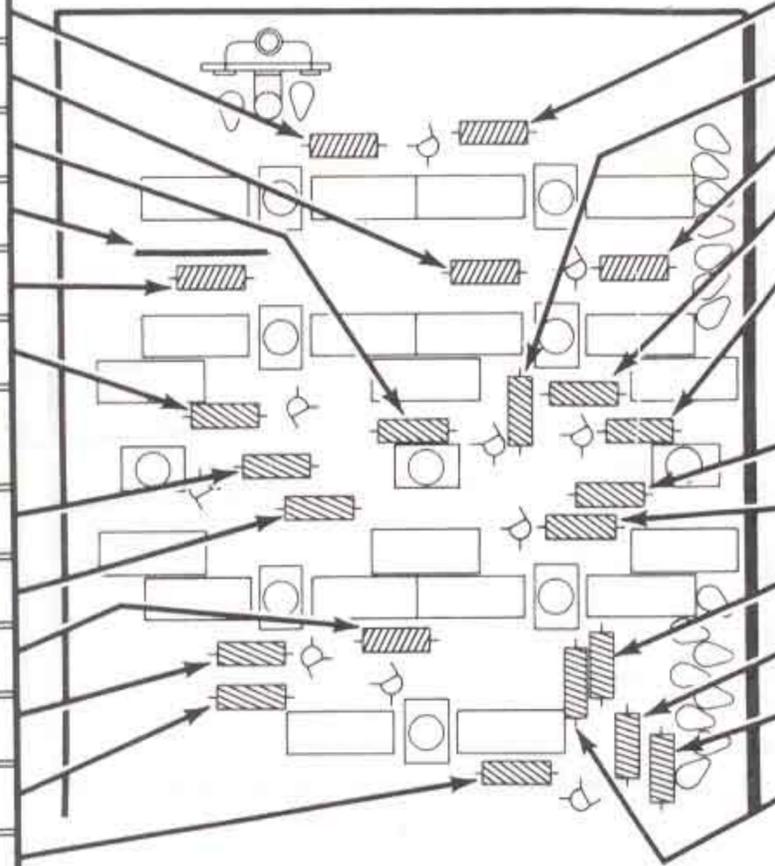
(X) R215: 2200 Ω (red-red-red).

(X) R216: 15 kΩ (brown-green-orange).

(X) R218: 15 kΩ (brown-green-orange).

(X) R221: 15 kΩ (brown-green-orange).

(X) Solder the leads to the foil and cut off the excess lead lengths.



CONTINUE

(X) R201: 1200 Ω (brown-red-red).

(X) R209: 2200 Ω (red-red-red).

(X) R203: 2200 Ω (red-red-red).

(X) R207: 2200 Ω (red-red-red).

(X) R208: 15 kΩ (brown-green-orange).

(X) Solder the leads to the foil and cut off the excess lead lengths.

(X) R214: 15 kΩ (brown-green-orange).

(X) R213: 2200 Ω (red-red-red).

(X) R217: 2200 Ω (red-red-red).

(X) R220: 2200 Ω (red-red-red).

(X) R224: 1200 Ω (brown-red-red).

(X) R219: 4.7 Ω (yellow-violet-gold).

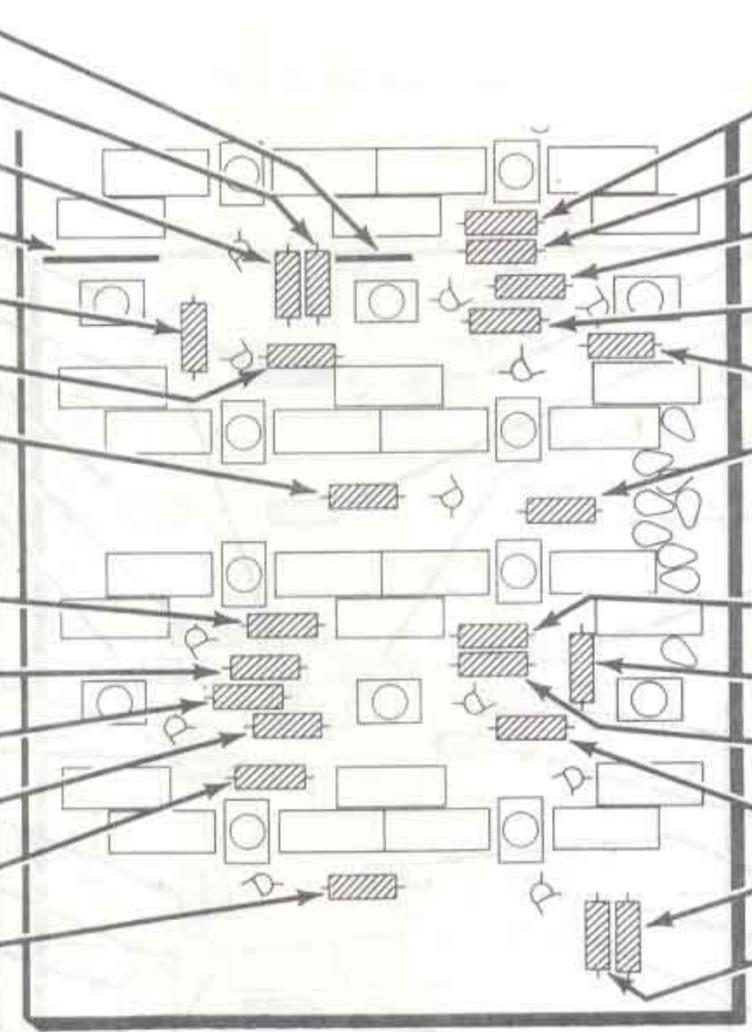
(X) Solder the leads to the foil and cut off the excess lead lengths.

PICTORIAL 2-1



START →

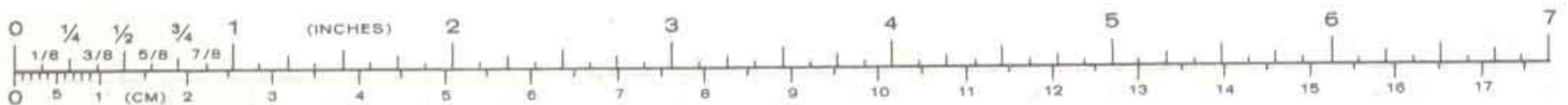
- (X) 1" bare wire at J.
- (X) R222: 2200 Ω (red-red-red).
- (X) R223: 15 kΩ (brown-green-orange).
- (X) 1-1/4" bare wire at J.
- (X) R231: 15 kΩ (brown-green-orange).
- (X) R230: 2200 Ω (red-red-red).
- (X) R233: 15 kΩ (brown-green-orange).
- (X) Solder the leads to the foil and cut off the excess lead lengths.
- (X) R234: 2200 Ω (red-red-red).
- (X) R235: 15 kΩ (brown-green-orange).
- (X) R241: 15 kΩ (brown-green-orange).
- (X) R240: 2200 Ω (red-red-red).
- (X) R245: 15 kΩ (brown-green-orange).
- (X) R244: 2200 Ω (red-red-red).
- (X) Solder the leads to the foil and cut off the excess lead lengths.



CONTINUE ↘

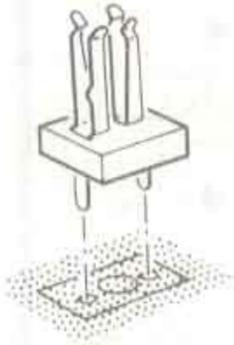
- (X) R226: 2200 Ω (red-red-red).
- (X) R227: 15 kΩ (brown-green-orange).
- (X) R225: 15 kΩ (brown-green-orange).
- (X) R229: 15 kΩ (brown-green-orange).
- (X) R228: 2200 Ω (red-red-red).
- (X) R232: 2200 Ω (red-red-red).
- (X) Solder the leads to the foil and cut off the excess lead lengths.
- (X) R238: 2200 Ω (red-red-red).
- (X) R236: 2200 Ω (red-red-red).
- (X) R237: 15 kΩ (brown-green-orange).
- (X) R239: 15 kΩ (brown-green-orange).
- (X) R242: 2200 Ω (red-red-red).
- (X) R243: 15 kΩ (brown-green-orange).
- (X) Solder the leads to the foil and cut off the excess lead lengths.

PICTORIAL 2-2

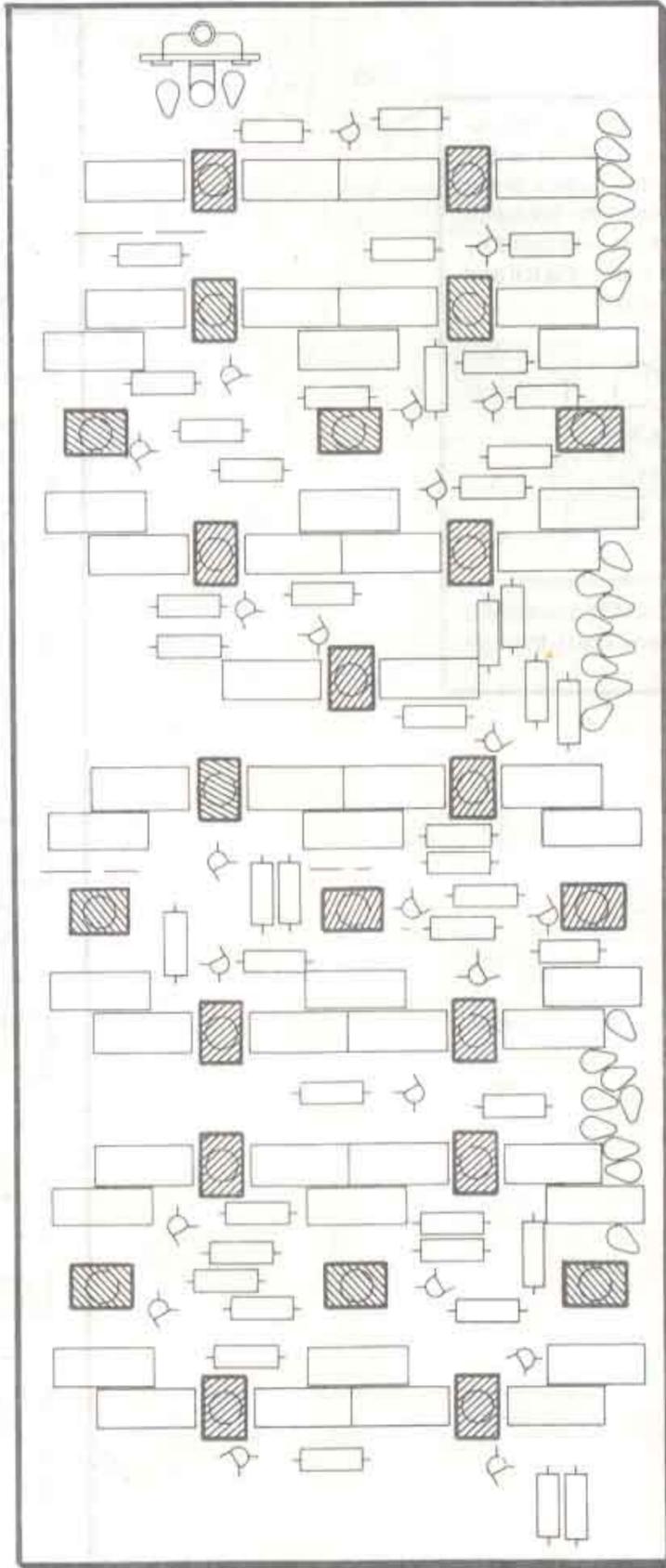


**START** →

- (X) Install twenty-four lamp sockets at locations PL201 through PL224. Solder the lugs to the foil as you install each socket. **BE SURE TO POSITION THE SOCKETS FLAT AGAINST THE CIRCUIT BOARD.**



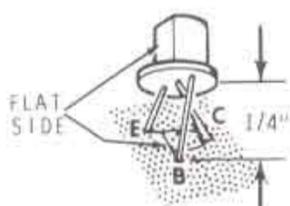
- (X) Check to see that all of the sockets are positioned flat against the circuit board.



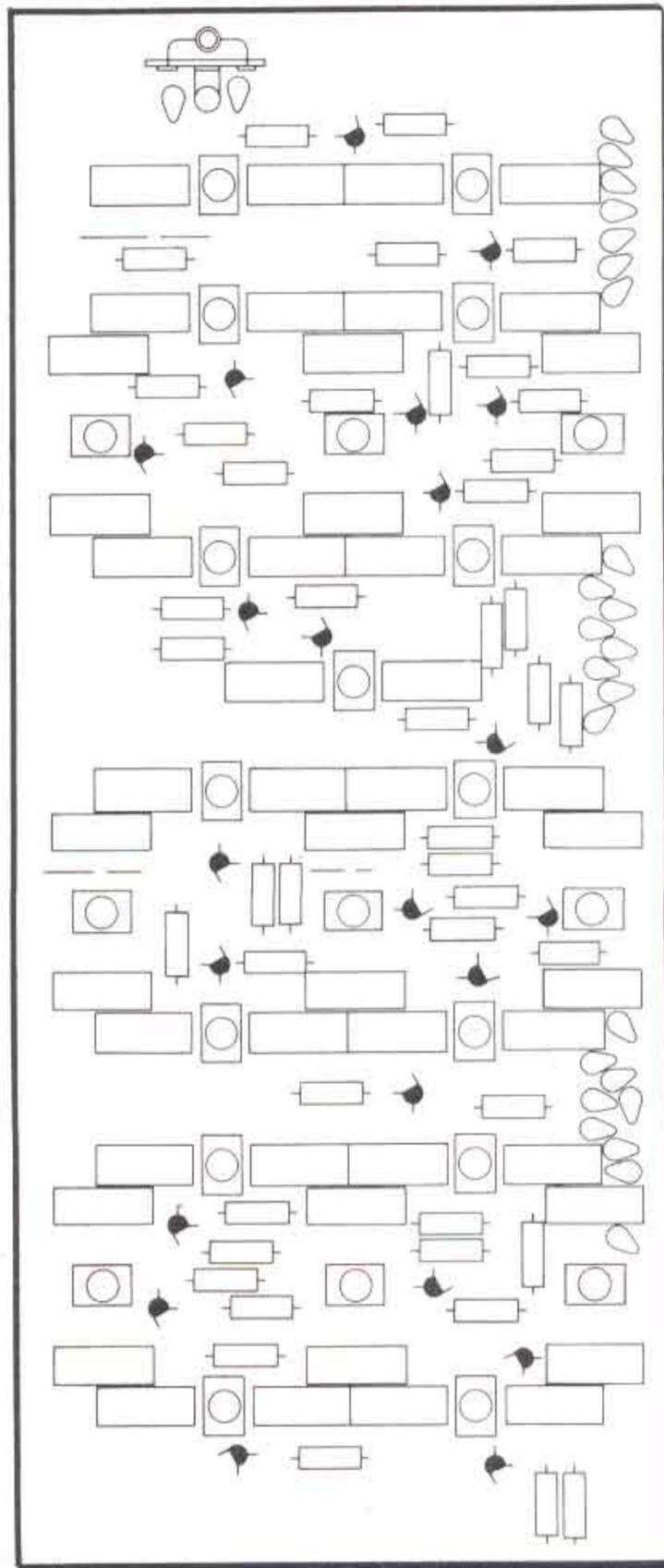
PICTORIAL 2-3

START ↓

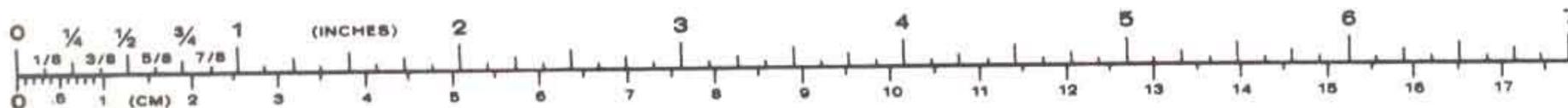
NOTE: Install each of the following transistors in the manner shown. First line up the flat of the transistor with the outline of the flat on the circuit board. Insert the transistor leads into their correct holes, indicated by E, C, and B. Solder each lead to the foil and cut off the excess lead length.



(X) Install twenty-two 2N3416 transistors (#417-94) at locations Q201 through Q222.



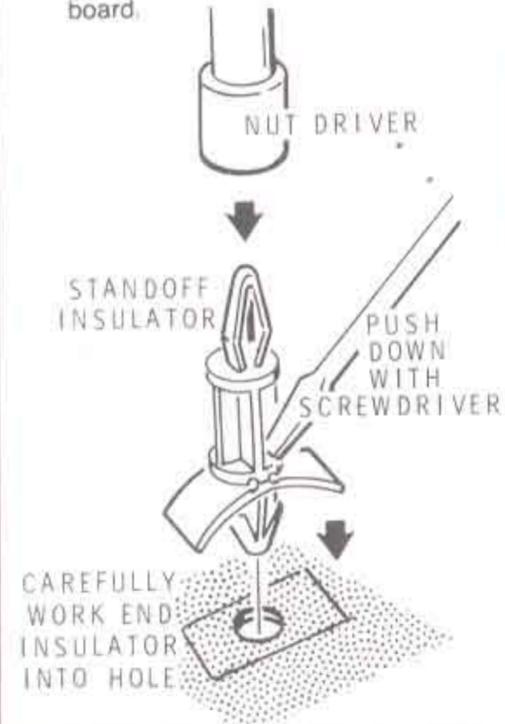
PICTORIAL 2-4



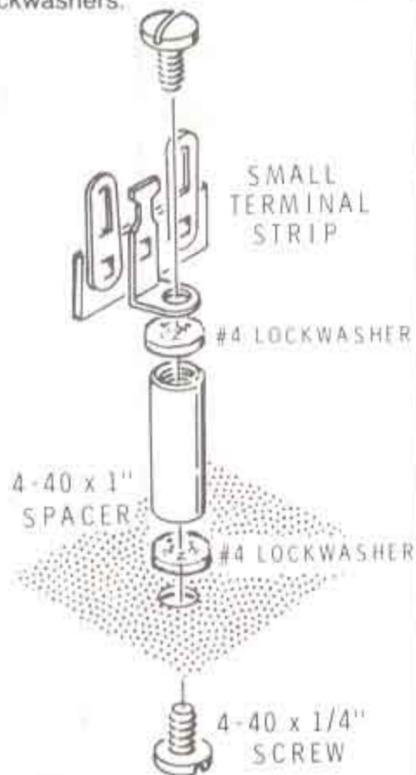

START

- (X) Place all of the standoff insulators in a container of warm water and soak them for 3-5 minutes.

- (X) Install forty-eight standoff insulators at the indicated locations on the circuit board.



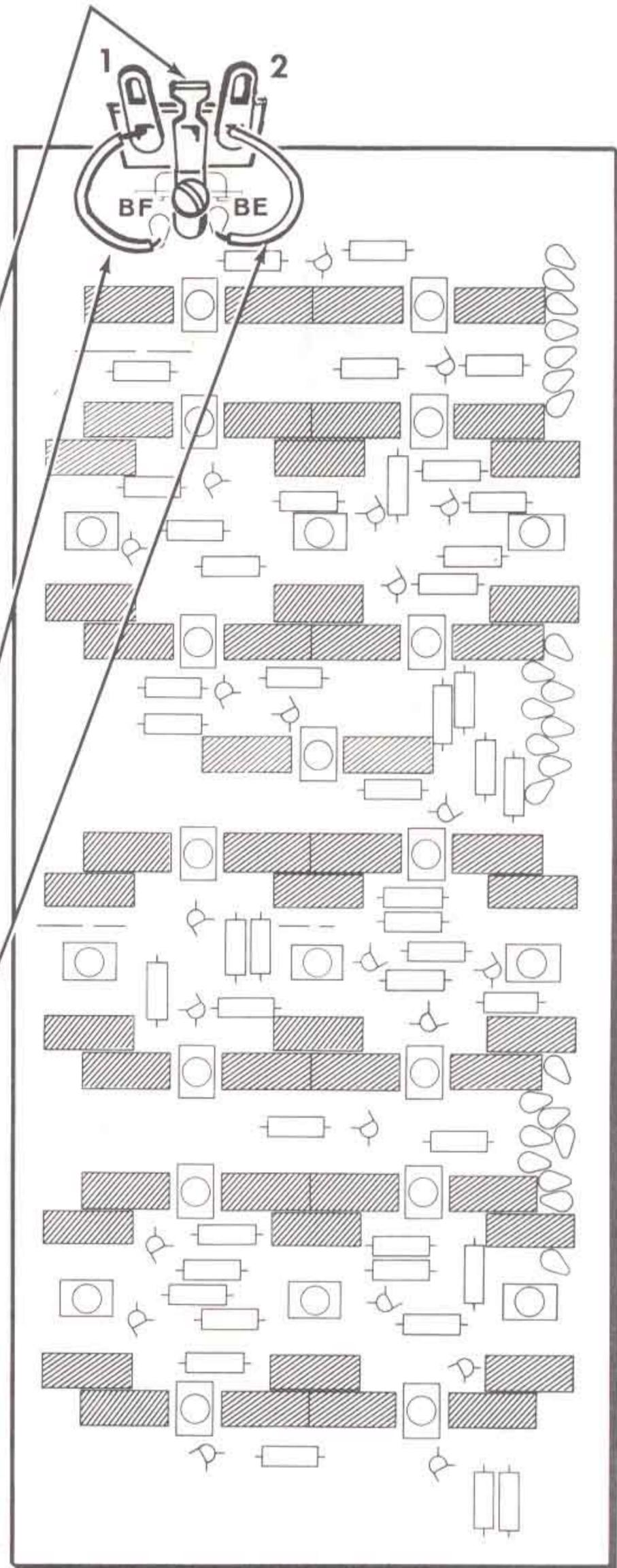
- (X) Mount a 4-40 x 1" spacer and a small terminal strip as shown. Use two 4-40 x 1/4" screws and two #4 lockwashers.



NOTE: To prepare a wire, cut it to the indicated length and remove 1/4" of insulation from each end.

- (X) Prepare and install a 2" black wire from BF to the eyelet in lug 1. Solder both ends of the wire.

- (X) Prepare and install a 2" black wire from BE to the eyelet on lug 2. Solder both ends of the wire. Be careful; do not make a solder bridge between this connection and the screw head.


PICTORIAL 2-5

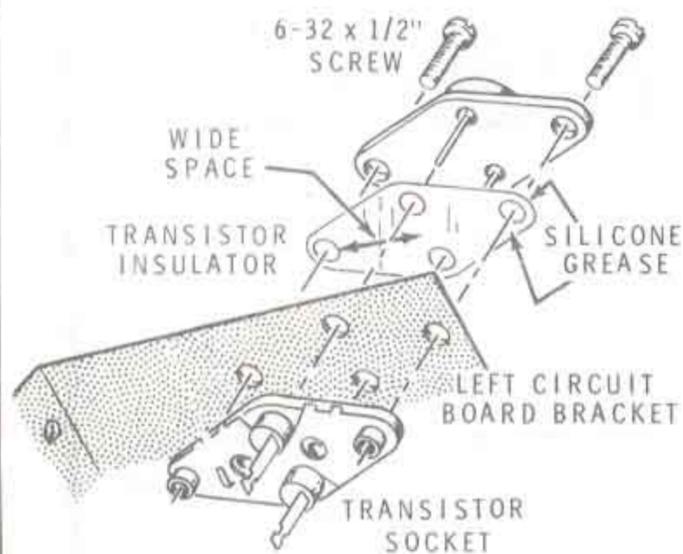
START 

(X) Mount the right circuit board bracket to the circuit board as shown. Use two #6 x 1/4" self-tapping screws. Be sure to position the bracket against the foil side of the circuit board.

(X) Locate the transistor insulator, transistor socket, 2N3055 (#417-215) transistor, left circuit board bracket, silicone grease and two 6-32 x 1/2" screws.

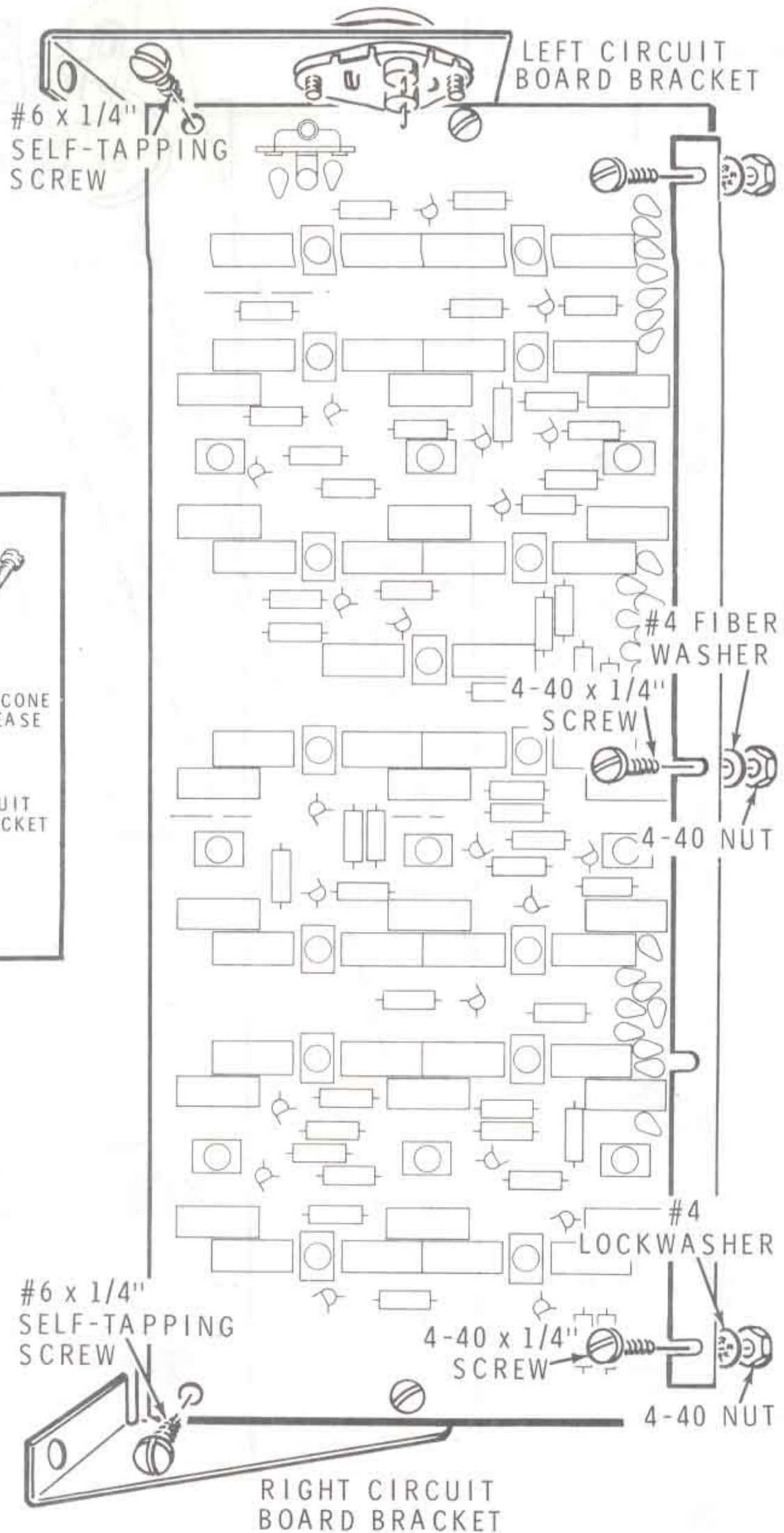
(X) Apply a thin layer of silicone grease to each side of the transistor insulator. Then place the transistor insulator onto the transistor.

(X) Mount the transistor socket and the transistor to the left circuit board bracket as shown. Position the socket so the ridges on the socket seat into the holes in the bracket.



(X) Mount the left circuit board bracket to the circuit board as shown. Use two #6 x 1/4" self-tapping screws. Be sure to position the bracket against the foil side of the circuit board.

(X) Mount the top support rail to the circuit board as shown. Use three 4-40 x 1/4" screws and three 4-40 nuts. Use #4 lockwashers on the two outside screws and a #4 fiber washer on the inside screw. Be sure to position the rail against the component side of the circuit board.

PICTORIAL 2-6

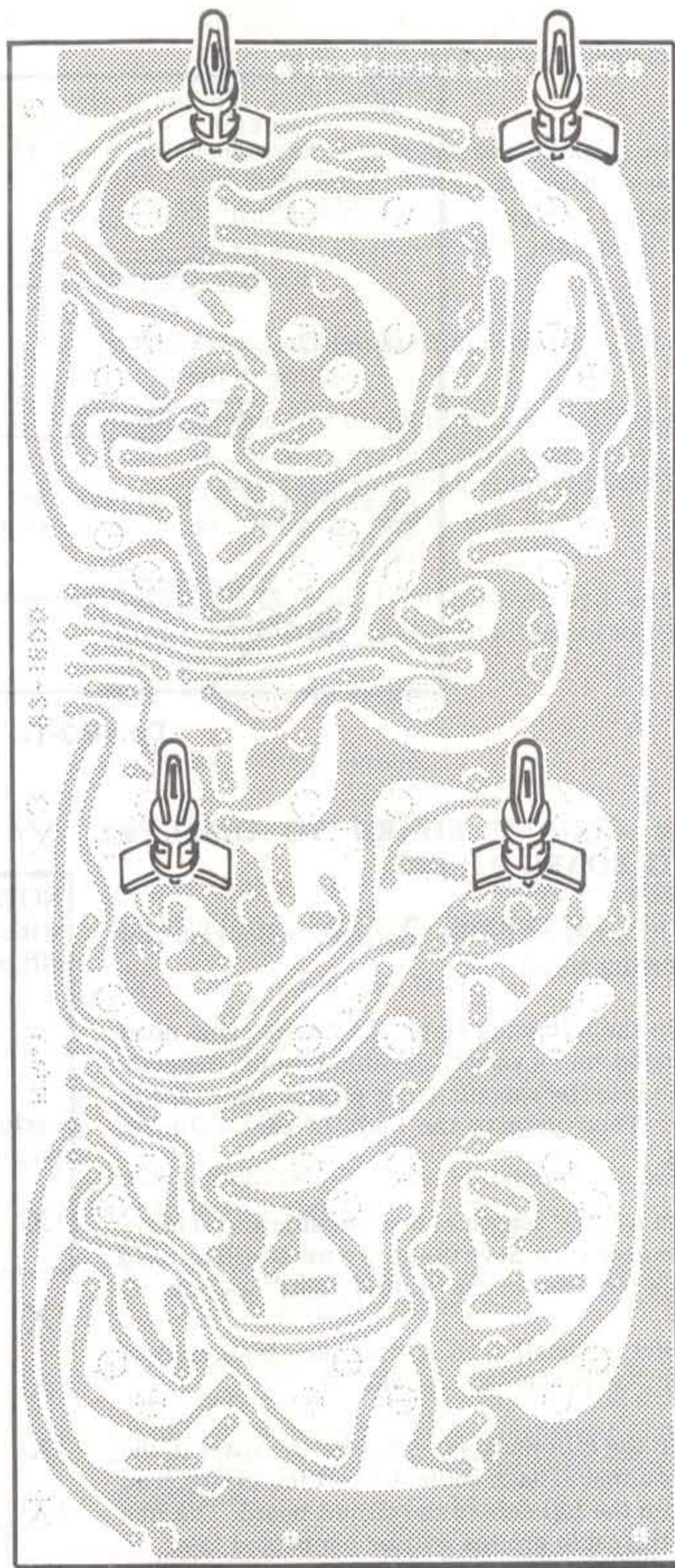
**START** →

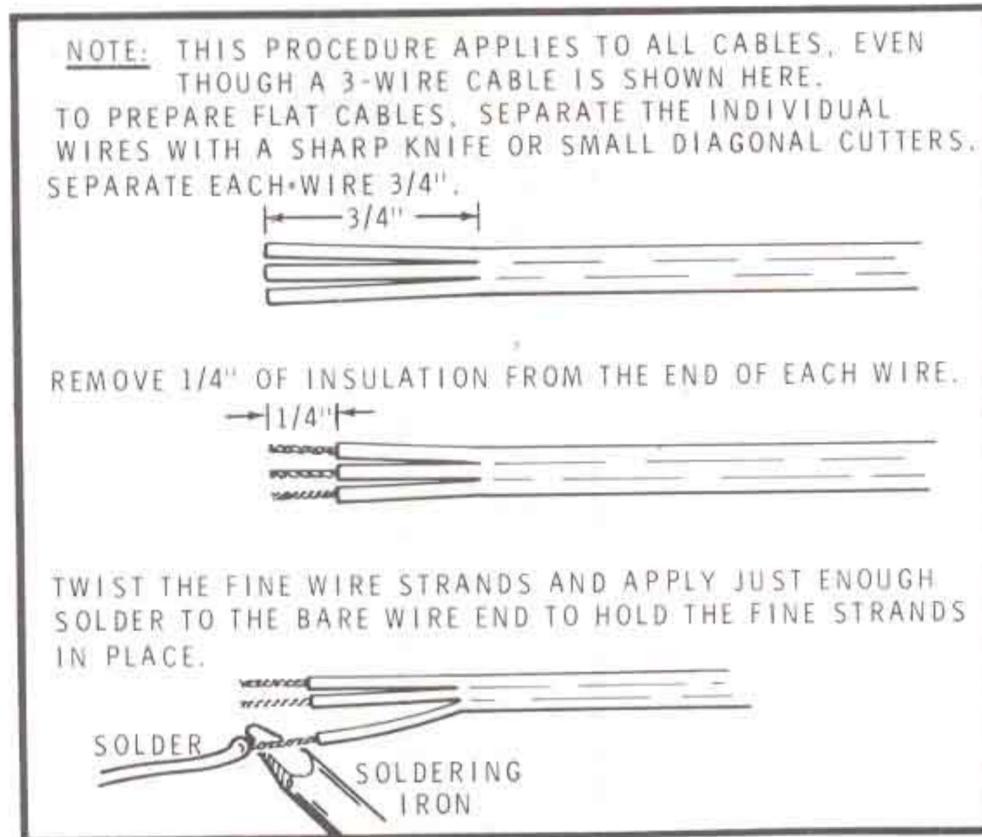
(X) Position the display circuit board FOIL SIDE up as shown.

(X) As before, install four standoff insulators at the locations shown.

NOTE: The standoff insulators can be turned slightly so they will not interfere with any solder connections.

Temporarily lay the display circuit board aside.

**PICTORIAL 2-7**



Detail 3-1A

POWER CIRCUIT BOARD TO DISPLAY CIRCUIT BOARD WIRING

Refer to Pictorial 3-1 (in the "Illustration Booklet") for the following steps.

NOTE: In the following steps, the 8-wire cable must be separated into a variety of cable groups. Separate the cable into the specific color groups called for in the step. Then prepare the ends of each cable as directed.

- (X) Cut a 3-1/2" length of 8-wire cable and remove the gray wire. Save the gray wire; it will be used as a test lead in the "Initial Tests" section.
- (X) Refer to Detail 3-1A and prepare both ends of the 7-wire flat cable as shown.

NOTE: In the following steps, solder the wires to the foil as you install each cable. Cut off the excess lead lengths on the foil side of the circuit board. The free ends of the cable groups will be connected later.

Connect either end of the 3-1/2" 7-wire cable to the power circuit board as follows:

- (X) Brown wire to hole AA.

NOTE: In the next step, you may choose one of two wiring options. Your display can be wired to indicate either:

- (#1) A flashing colon (flashes once per second).
- (#2) A constant colon.

Perform only the step that corresponds to the option you choose.

- (X) #1: Red wire to hole AB.
#2: Red wire to hole G.
- (X) Orange wire to hole AC.
- (X) Yellow wire to hole AD.
- (X) Green wire to hole AE.
- (X) Blue wire to hole AF.
- (X) Violet wire to hole AG.
- (X) Cut a 4-1/2" length of 8-wire cable.



- (X) Refer to Detail 3-1A and prepare both ends of the 8-wire cable as shown.

Connect either end of the 4-1/2" 8-wire cable to the power circuit board as follows:

- (X) Brown wire to hole AH.
- (X) Red wire to hole AJ.
- (X) Orange wire to hole AK.
- (X) Yellow wire to hole AL.
- (X) Green wire to hole AN.
- (X) Blue wire to hole AP.
- (X) Violet wire to hole AR.
- (X) Gray wire to hole AS.
- (X) Cut a 5-1/2" length of 8-wire cable.
- (X) Refer to Detail 3-1A and prepare both ends of the 8-wire cable as shown.

Connect either end of the 5-1/2" 8-wire cable to the power circuit board as follows:

- (X) Brown wire to hole AT.
- (X) Red wire to hole AU.
- (X) Orange wire to hole AX.
- (X) Yellow wire to hole AY.
- (X) Green wire to hole AZ.
- (X) Blue wire to hole BA.
- (X) Violet wire to hole BB.
- (X) Gray wire to hole BC.
- (X) Cut an 11" length of 8-wire cable and separate it into the following cables:

a brown, red, and orange 3-wire cable.
a yellow and green 2-wire cable.
a blue, violet, and gray 3-wire cable.

- (X) Cut the 11" yellow and green 2-wire cable to a length of 6". The remaining 5" length of this cable may be discarded.

- (X) Cut the 11" brown, red, and orange 3-wire cable to a length of 9". Then remove the orange wire from the remaining 2" length of cable for use later. The 2" brown and red cable may be discarded.

- (X) Refer to Detail 3-1A and prepare both ends of each cable.

- (X) At one end of the 6" yellow and green 2-wire cable, twist the two wire ends together. Then connect this end of the cable to hole BD on the power circuit board.

Connect either end of the 9" brown, red, and orange 3-wire cable to the power circuit board as follows:

- (X) Brown wire to hole C.
- (X) Red wire to hole B.
- (X) Orange wire to hole E.

Connect either end of the blue, violet, and gray 3-wire cable to the power circuit board as follows:

- (X) Blue wire to hole D.
- (X) Violet wire to hole F.
- (X) Gray wire to hole A.

Refer to Pictorial 3-2 (in the "Illustration Booklet") for the following steps.

- (X) Position the display circuit board near the power circuit board as shown.

NOTE: In the following steps, pull each wire completely through the holes from the foil side of the circuit board so the bare wire ends will not touch the top support rail. Bend the cables away from the top support rail.

Connect the free end of the 3-1/2" 7-wire cable coming from holes AA through AG on the power circuit board to the display circuit board as follows:

- (X) Brown wire to hole AA.





- (X) Red wire to hole AB.
- (X) Orange wire to hole AC.
- (X) Yellow wire to hole AD.
- (X) Green wire to hole AE.
- (X) Blue wire to hole AF.
- (X) Violet wire to hole AG.

Connect the free end of the 4-1/2" 8-wire cable coming from holes AH through AS on the power circuit board to the display circuit board as follows:

- (X) Brown wire to hole AH.
- (X) Red wire to hole AJ.
- (X) Orange wire to hole AK.
- (X) Yellow wire to hole AL.
- (X) Green wire to hole AN.
- (X) Blue wire to hole AP.
- (X) Violet wire to hole AR.
- (X) Gray wire to hole AS.

Connect the free end of the 5-1/2" 8-wire cable coming from holes AT through BC on the power circuit board to the display circuit board as follows:

- (X) Brown wire to hole AT.
- (X) Red wire to hole AU.
- (X) Orange wire to hole AX.
- (X) Yellow wire to hole AY.
- (X) Green wire to hole AZ.
- (X) Blue wire to hole BA.
- (X) Violet wire to hole BB.
- (X) Gray wire to hole BC.
- (X) At the free end of the 6" 2-wire cable coming from hole BD on the power circuit board, twist

together the two wire ends. Then connect this end of the cable to hole BD on the display circuit board.

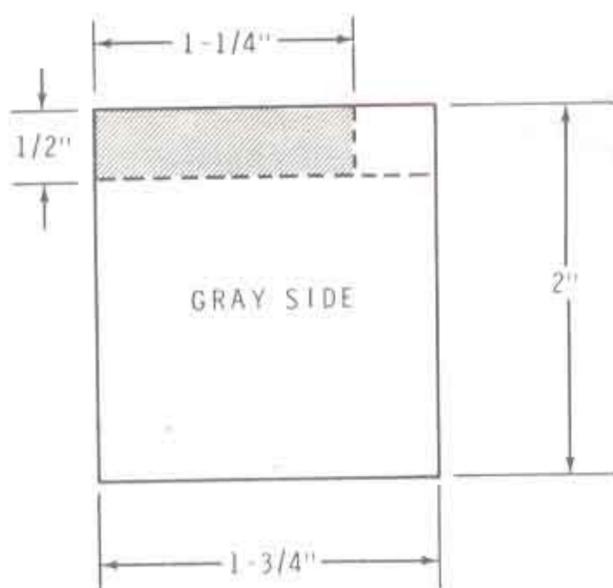
NOTES:

1. In the following steps, (NS) means not to solder because other wires will be added later. "S-" with a number, such as (S-2), means to solder the connection. The number following the "S" tells how many wires are at the connection.
2. Be careful not to solder the transistor leads to the socket lugs.
3. You may want to remove the small terminal strip for easier access to the transistor socket lugs. Be sure to remount the terminal strip after you wire the socket.

Connect the free end of the 9" 3-wire cable coming from holes E, B, and C on the power circuit board to transistor Q1 (on the left circuit board bracket) as follows:

- (X) Brown wire to Q1 lug 3 (S-1).
- (X) Red wire to Q1 lug 1 (S-1).
- (X) Orange wire to Q1 lug 2 (NS).
- (X) Locate the 2" orange wire you saved earlier and remove 1/4" of insulation from each end. Then twist the fine wire strands together and melt a minimum amount of solder on the wire ends to hold the fine strands together.
- (X) Connect the 2" orange wire between Q1 lug 2 (S-2) and the small terminal strip lug 1 (NS).
- (X) Insert the LDR into the LDR shield as shown in the inset drawing. Bend the leads perpendicular to the LDR shield as shown.
- (X) Cut the LDR leads 1/2" from the LDR shield as shown.
- (X) Connect the LDR to the small terminal strip between lug 1 (S-2) and lug 2 (S-1). Position the LDR approximately 3/8" from the terminal strip.
- (X) Temporarily lay the circuit board assembly aside.



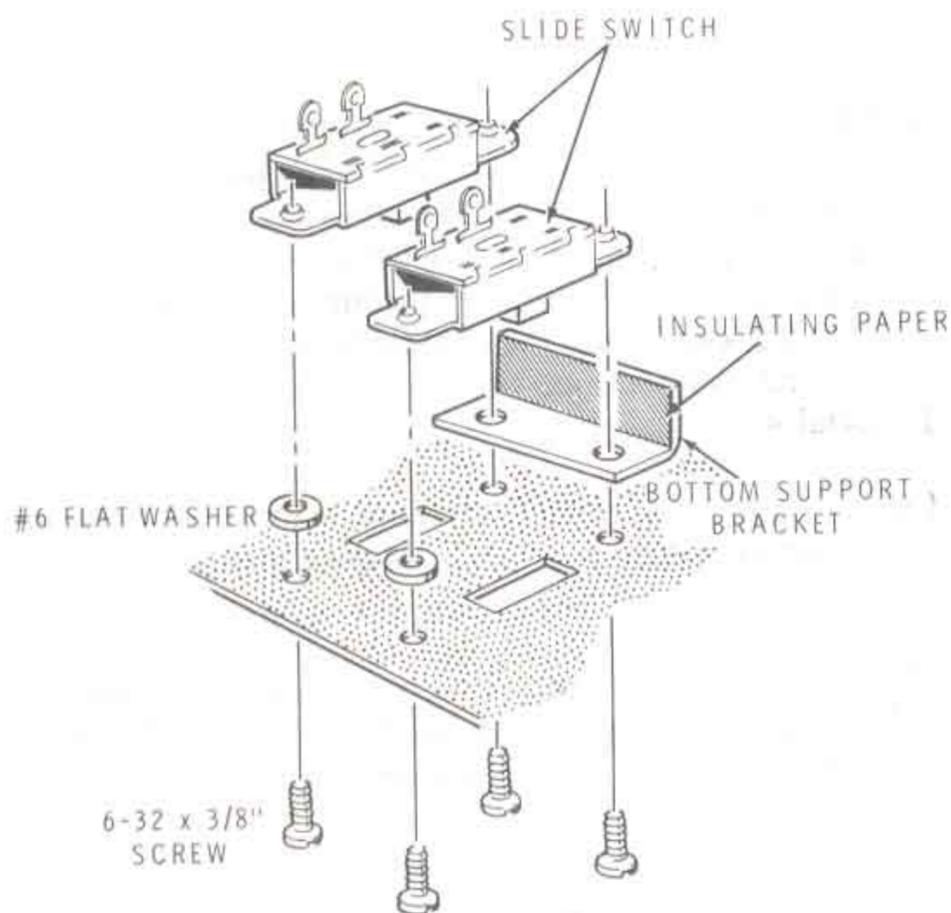


Detail 4-1A

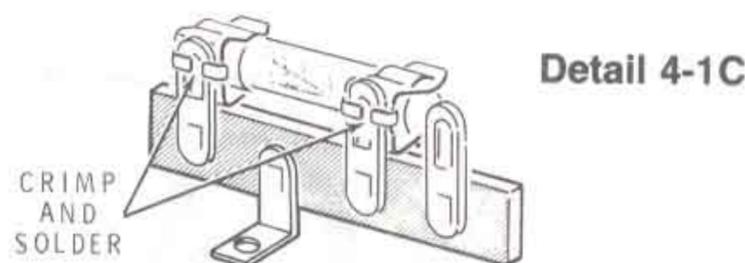
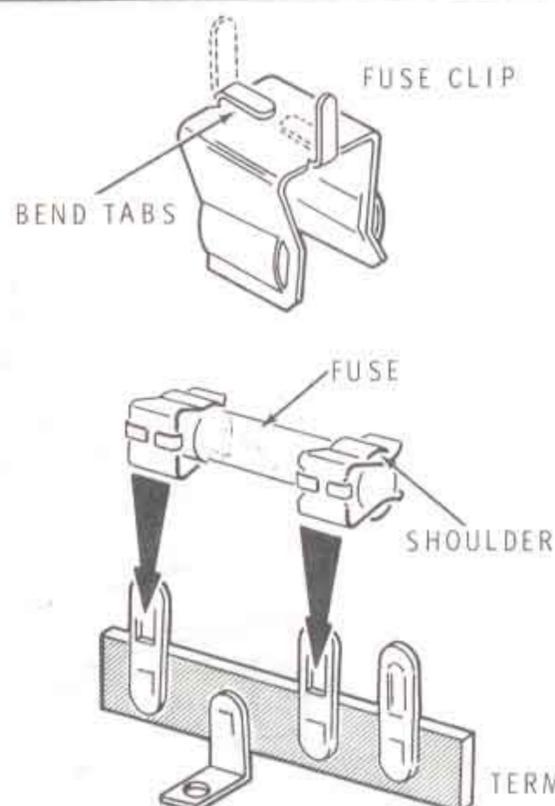
CHASSIS ASSEMBLY

Refer to Pictorial 4-1 (in the "Illustration Booklet") for the following steps.

- (X) Install two #6 Speed Nuts onto the chassis as shown. Position the flat side of the nut towards the bottom of the chassis.
- (X) Refer to Detail 4-1A and prepare a 1-1/4" x 1/2" piece of insulating paper as shown.
- (X) Remove the protective backing from the insulating paper and press the insulating paper onto the bottom support bracket as shown in Detail 4-1B. Be sure it covers the large holes in the bracket.



Detail 4-1B

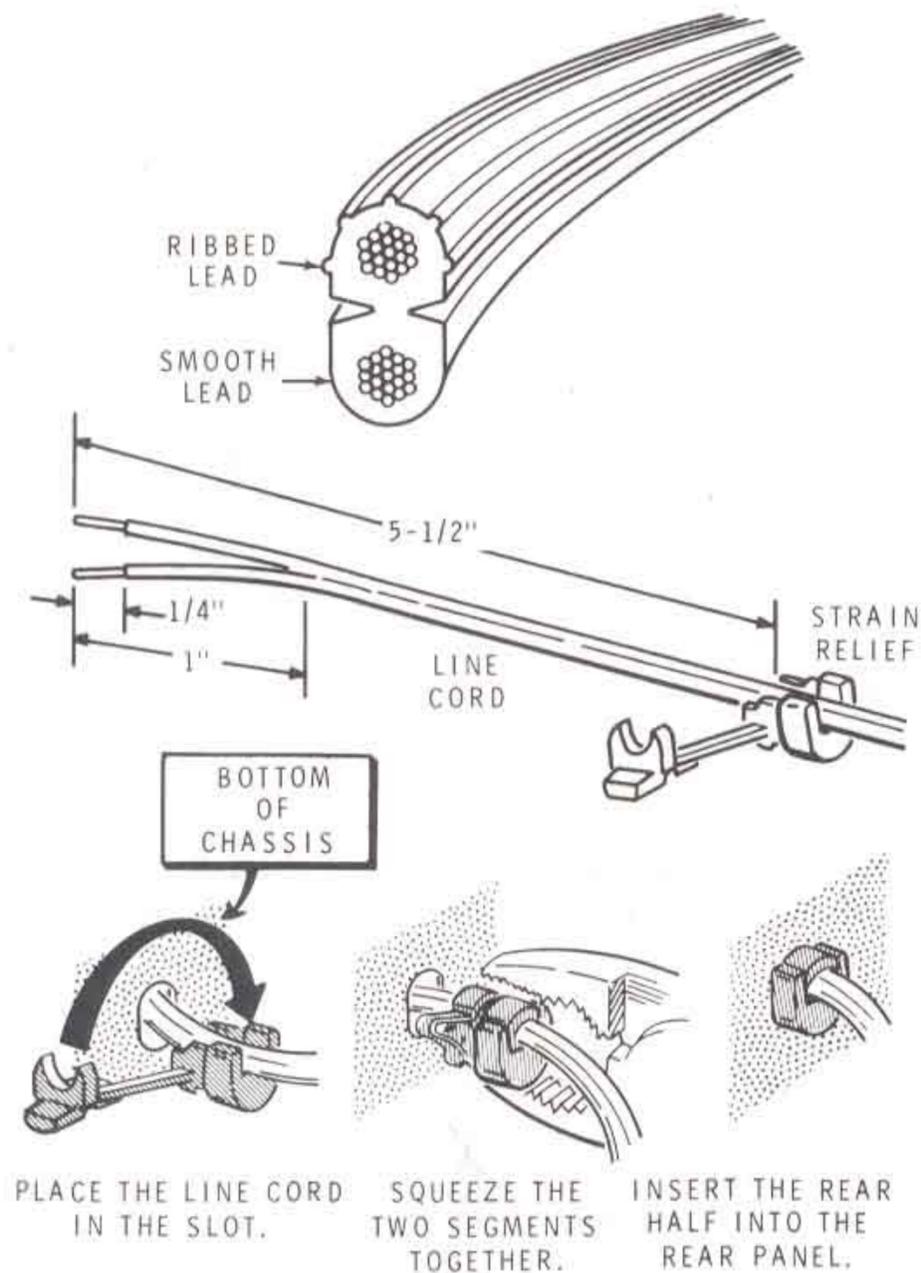


Detail 4-1C

- (X) Refer to Detail 4-1B and mount the bottom support bracket and two slide switches to the chassis as shown. Use four 6-32 x 3/8" screws and two #6 flat washers. Position the lugs as shown.

Refer to Detail 4-1C and install two fuse clips on the large terminal strip as follows:

1. (X) Bend both tabs on each fuse clip. Do not bend the tabs completely to the fuse clip base.
 2. (X) Install a fuse clip onto each end of the fuse. Note the position of the fuse clip shoulder.
 3. (X) Install the fuse clips and fuse onto the terminal strip lugs as shown. Crimp and solder the fuse clip tabs to the terminal strip lugs.
 4. (X) Remove the fuse and lay it aside.
- (X) Refer to Detail 4-1D (in the "Illustration Booklet") and mount the transformer and large terminal strip to the chassis as shown. Use two 6-32 x 3/8" screws, three #6 lockwashers, three #6 flat washers, and two 6-32 nuts. Be sure to position the transformer as shown.



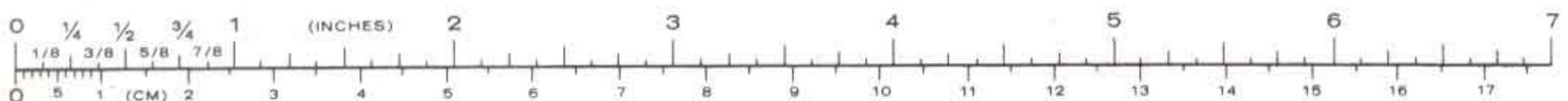
Detail 4-2A

Refer to Pictorial 4-2 (in the "Illustration Booklet") for the following steps.

- (X) Refer to Detail 4-2A and separate the two line cord leads for a length of 1". Then twist together the fine wire strands at the end of each lead and apply a minimum amount of solder to hold the fine strands together.
- (X) Place the strain relief on the line cord, as shown in Detail 4-2A, 5-1/2" from the end. Then install the strain relief into the chassis from the underside of the chassis.

NOTE: In some of the following steps, you will be instructed to "make a mechanically secure connection." To do this, insert the wire through the lug and wrap it around the lug before you solder the connection, or insert the wire through the lug eyelet and bend it away from the chassis bottom before you solder the connection. See the inset drawing on Pictorial 4-2.

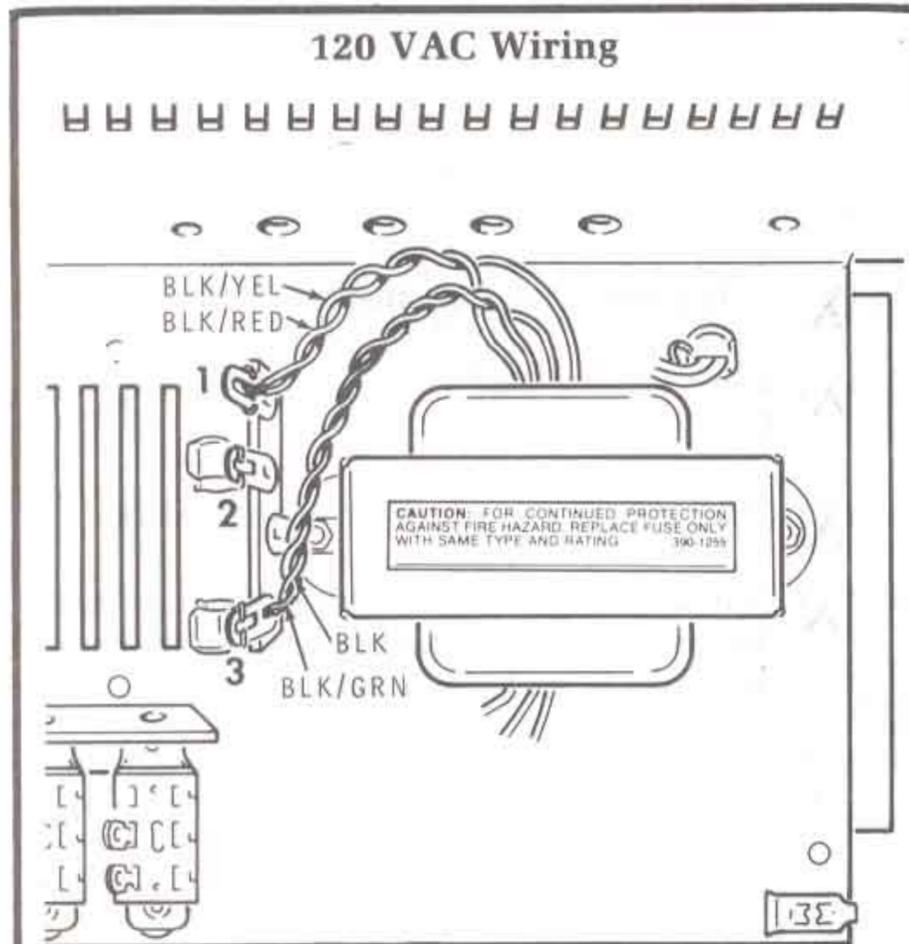
- (X) Connect the ribbed line cord lead to the large terminal strip lug 1 (NS). Make a mechanically secure connection.
- (X) Connect the smooth line cord lead to the large terminal strip lug 2 eyelet (S-1). Make a mechanically secure connection.





ALTERNATE LINE VOLTAGE WIRING

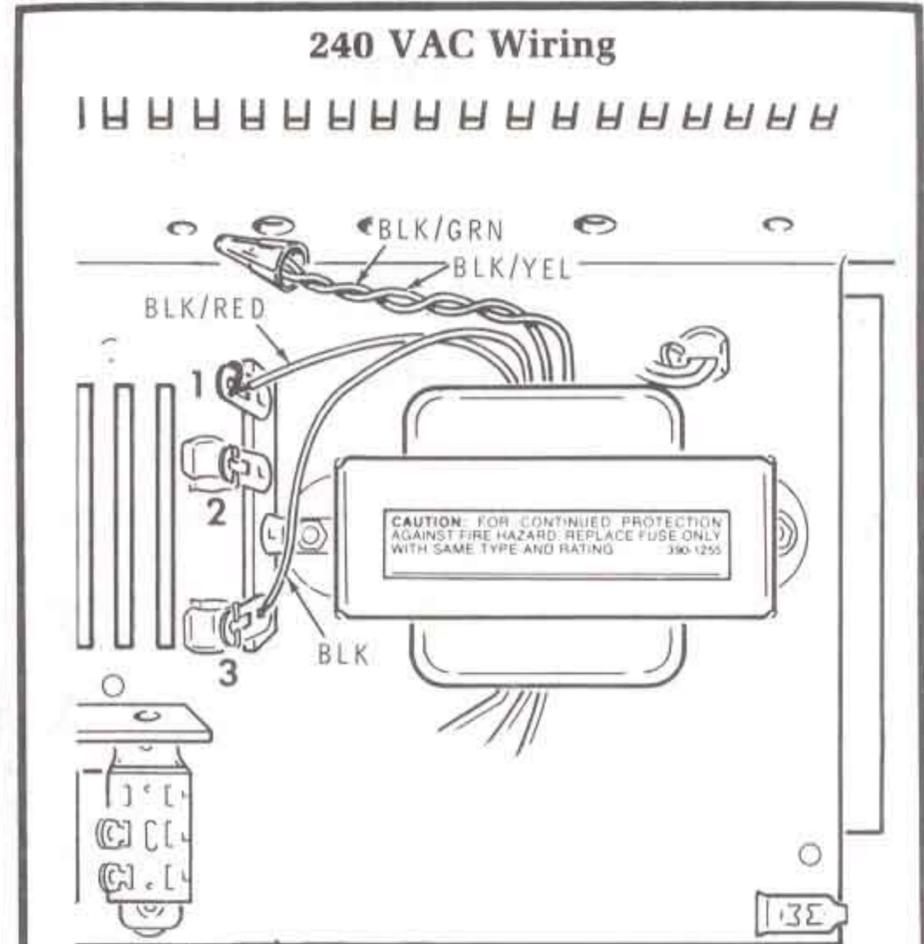
Two sets of line voltage wiring instructions are given, one for 120 VAC line voltage and the other for 240 VAC line voltage. In the U.S.A., 120 VAC is most often used, while in other countries, 240 VAC is more common. USE ONLY THE INSTRUCTIONS THAT AGREE WITH THE LINE VOLTAGE IN YOUR AREA.



Detail 4-2B

Refer to Detail 4-2B for the following steps.

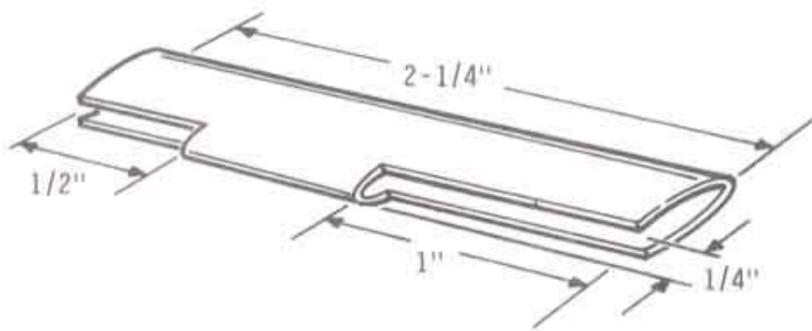
- (X) Twist the black-yellow and black-red transformer leads together.
- (X) Connect the black-yellow and black-red twisted pair to the large terminal strip lug 1 (S-3). Make a mechanically secure connection.
- (X) Twist the black and black-green transformer leads together.
- (X) Connect the black and black-green twisted pair to the large terminal strip lug 3 eyelet (S-2). Make a mechanically secure connection.
- (X) Locate the fuse label and write the fuse value (1/2-ampere, slow-blow) on it.
- (X) Remove the protective backing from the fuse label and press the label onto the transformer as shown.



Detail 4-2C

Refer to Detail 4-2C for the following steps.

- () Connect the black-red transformer lead to the large terminal strip lug 1 (S-2). Make a mechanically secure connection.
- () Connect the black transformer lead to the large terminal strip lug 3 eyelet (S-1). Make a mechanically secure connection.
- () Twist the black-green and black-yellow transformer leads together as shown. Then twist the wire nut onto the lead ends in a clockwise direction. Position these leads as shown.
- () Locate the fuse label and write the fuse value (1/4-ampere, slow-blow) on it.
- () Remove the protective backing from the fuse label and press the label onto the transformer as shown.



Detail 4-2D

CHASSIS ASSEMBLY (cont'd.)

- (X) Cut a 2-1/4" length of clear sleeve.
- (X) Refer to Detail 4-2D and prepare the sleeve as shown.
- (X) Insert the proper fuse (1/2-ampere slow-blow for 120 VAC; 1/4-ampere slow-blow for 240 VAC) into the clear sleeve. Then push the fuse into the fuse clips on the large terminal strip.
- (X) Locate the circuit board assembly set aside earlier.
- (X) Cut the blue and violet wires (coming from holes D and F on the power circuit board) 1-1/4" from the free end and prepare the wire ends. Save the 1-1/4" blue wire.
- (X) Connect the 1-1/4" blue wire between SW1 lug 1 (NS) and SW2 lug 1 (S-1).

Position the circuit board assembly near the chassis and connect the blue, violet, and gray 3-wire cable to the chassis switches as follows:

- (X) Blue wire to SW1 lug 1 (S-2).

- (X) Violet wire to SW1 lug 2 (S-1).
- (X) Gray wire to SW2 lug 2 (S-1).
- (X) Twist the two red and the red-yellow transformer leads together. If it has not already been done, melt a minimum amount of solder on the wire end to hold the fine strands together.

Refer to Detail 4-2E for the next five steps.

Connect the transformer leads to the power circuit board as follows:

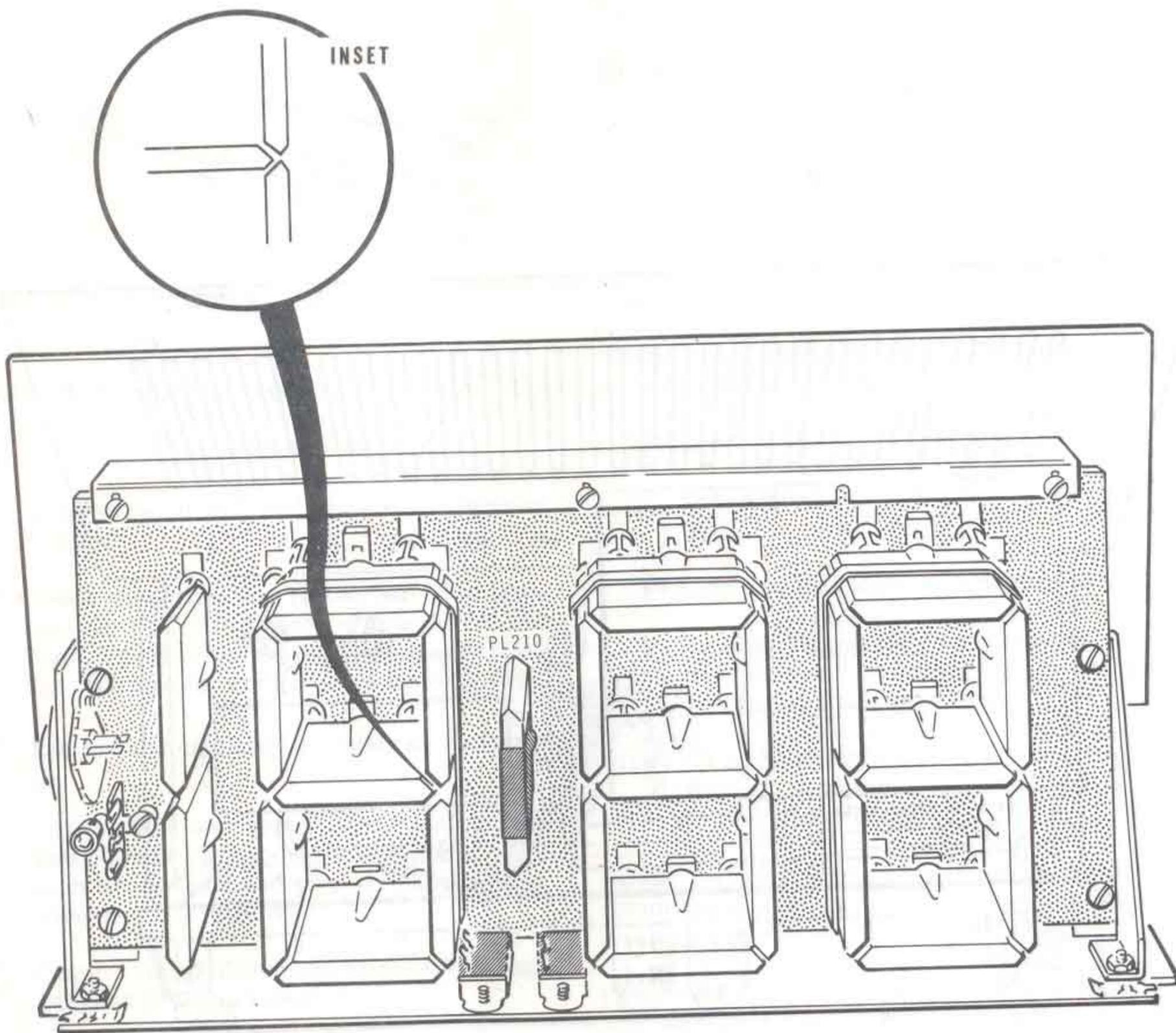
1. (X) Either red to the hole marked RED.
2. (X) Red-yellow lead to the hole marked RED/YEL.
3. (X) Other red lead to the hole marked RED.
4. (X) Carefully inspect the circuit board to be sure there are no solder bridges between the three transformer lead connections.
5. (X) Press the power circuit board onto the four standoff insulators on the foil side of the display circuit board.

NOTE: If it becomes necessary to remove the power circuit board, gently squeeze the small tab on each insulator and pull out on the circuit board.

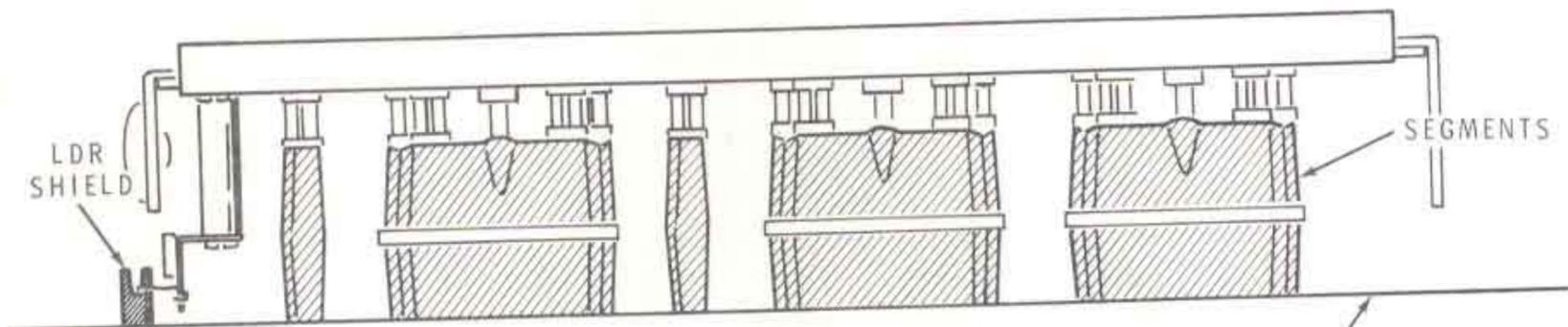
- (X) Mount the circuit board assembly to the chassis as shown. Use two 6-32 x 3/8" screws, two #6 lockwashers, and two 6-32 nuts. Be careful not to pinch any cables between the circuit board brackets and the chassis. Be sure to position the circuit board in front of the bottom support bracket.

INSTALL
SPEAKER
ETC.



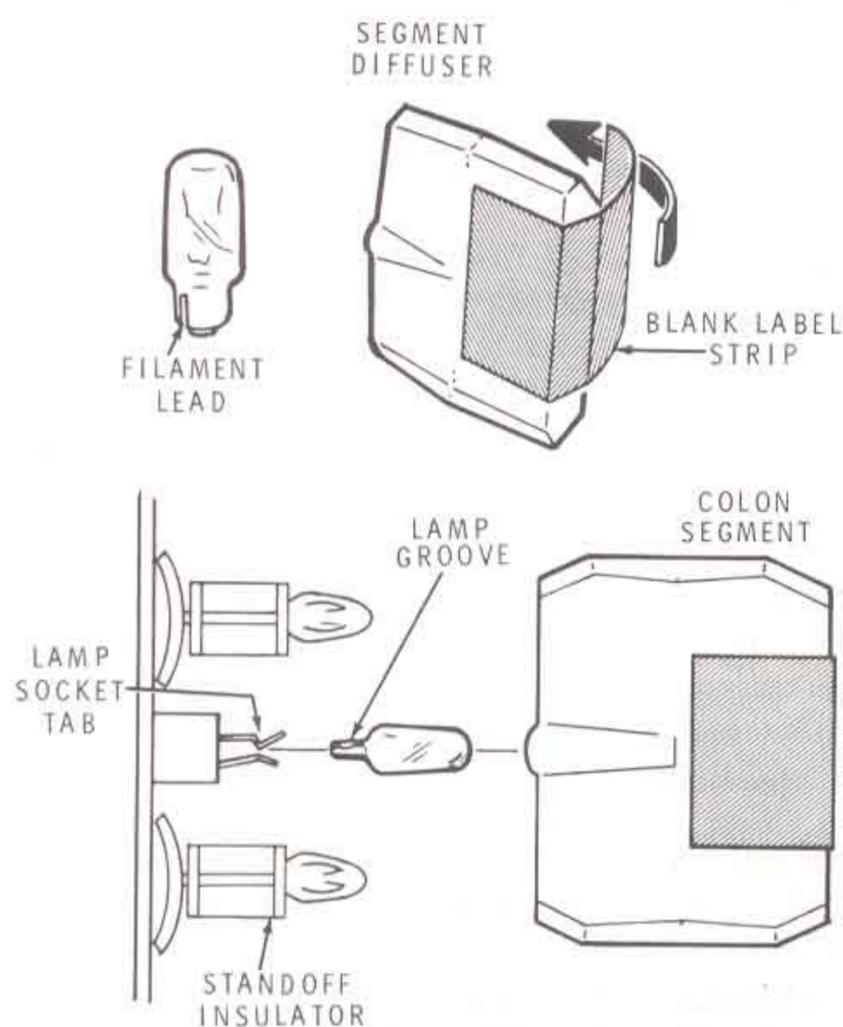


PICTORIAL 4-3



Detail 4-3B

STRAIGHTEDGE



Detail 4-3A

Refer to Pictorial 4-3 for the following steps.

- (X) Inspect each lamp to be sure the filament leads (one on each side) are positioned straight, as shown in Detail 4-3A.
- (X) Carefully push a lamp into each of the twenty-four lamp sockets on the display circuit board, as shown in Detail 4-3A, until you hear the first faint "click." Be sure the tabs on the sockets fit into the grooves in the lamps. NOTE: You will have two extra lamps. Save these lamps for future use.

- (X) Carefully peel the 1-1/2" x 3/4" blank label strip from the label sheet.
- (X) Refer to Detail 4-3A and press the label strip onto a segment diffuser as shown. Be sure you install the label strip in the center of the segment diffuser. This segment will be used as the colon segment.
- (X) Install the colon segment onto the standoff insulators at PL210 as shown in the Detail. The segment should fit over the top of the lamp socket tips and flush against the standoff insulators. Be sure to position the segment as shown in the Pictorial.
- (X) Install the remaining twenty-three segment diffusers onto the standoff insulators. Be sure to position the segments as shown in the Pictorial (see the inset drawing).
- (X) Carefully "square" the segments that form the number "8". Then install a rubber band around the segments to hold them in place.
- (X) Align the two "1" segments so they are straight and parallel to the adjacent digit.
- (X) Refer to Detail 4-3B and lay a straightedge across the tops of the segments and LDR shield. Then adjust the LDR shield so that it is flush with the tops of the segments.

NOTE: Holes CA through C) will not be used at this time. These holes will be used to install the Electronic Clock Chimes, Model GCA-1195-1.

This completes the wiring of your Clock. (The IC will be installed later.) Check the Clock over carefully at this time to be sure there are no loose wires or poor solder connections. Also make sure there are no wire clippings or solder splashes lodged in the wiring. Then proceed to the "Initial Tests" section.



INITIAL TESTS

If you do not get the indicated results as you perform each test, refer to the "Possible Cause Chart" which follows. If none of the difficulties listed in the chart is the cause of the malfunction, refer to the appropriate part of the "In Case of Difficulties" section. If you have a difficulty, DO NOT proceed until it has been corrected since, in some cases, the difficulty may cause further damage.

Refer to Figure 1-3 for IC pin locations and to Figure 1-4 for display segment locations. Both Figures are in the "Illustration Booklet."

- (X) Locate the 3-1/2" gray wire that you saved earlier and remove 1/4" of insulation from each end. Then twist the fine wire strands together and melt a minimum amount of solder on the ends to hold the fine strands together.
- (X) Refer to Figure 1-1 (in the "Illustration Booklet") and cut off two single connector pins. Then solder a connector pin to each end of the 3-1/2" gray wire.

- (X) Insert one connector pin on the test lead you assembled into socket IC101, pin 28. DO NOT let the free end of the test lead touch the chassis.
- (X) Connect the Clock's line cord plug to an appropriate AC outlet. The colon segment should be lit. If it is not, refer to the "In Case of Difficulty" section.

WARNING: High voltage is present in the Clock. See Figure 1-2 (in the "Illustration Booklet").

Refer to the following chart and, in sequence, insert the connector pin on the free end of the test lead into the corresponding pin in the "Pin Number" column. The segment listed in the "Segment Lit" column should light up.

The following chart lists possible causes for specific malfunctions. If a particular part is mentioned (PL201 for example) as a possible cause, check that part to see that it is installed and wired correctly. It is also possible, on rare occasions, for a part to be faulty and require replacement.

| | Pin Number | Segment Lit | Possible Cause Chart |
|-----|------------|-------------|--|
| (X) | 2 | 10's Hours | 1. PL201, PL202. 2. Q201. 3. R201, R202. |
| (X) | 3 | Hours f | 1. PL203. 2. Q202. 3. R203, R204. |
| (X) | 4 | Hours g | 1. PL206. 2. Q205. 3. R209, R210. |
| (X) | 5 | Hours a | 1. PL205. 2. Q204. 3. R207, R208. |
| (X) | 6 | Hours b | 1. PL208. 2. Q207. 3. R213, R214. |
| (X) | 7 | Hours d | 1. PL207. 2. Q206. 3. R211, R212. |



| | Pin Number | Segment Lit | Possible Cause Chart |
|-----|------------|----------------------------|--|
| (X) | 8 | Hours c | 1. PL209. 2. Q208. 3. R215, R216. |
| (X) | 9 | Hours e | 1. PL204. 2. Q203. 3. R205, R206. |
| (X) | 10 | 10's Minutes f | 1. PL211. 1. Q210. 3. R220, R221. |
| (X) | 11 | 10's Minutes g | 1. PL214. 2. Q213. 3. R226, R227. |
| (X) | 12 | 10's Minutes a and d | 1. PL213, PL215. 2. Q212. 3. R224, R225. |
| (X) | 13 | 10's Minutes b | 1. PL216. 2. Q214. 3. R228, R229. |
| (X) | 14 | 10's Minutes e | 1. PL212. 2. Q211. 3. R222, R223. |
| (X) | 15 | 10's Minutes c | 1. PL217. 2. Q215. 3. R230, R231. |
| (X) | 16 | Minutes f | 1. PL218. 2. Q216. 3. R232, R233. |
| (X) | 17 | Minutes g | 1. PL221. 2. Q219. 3. R238, R239. |
| (X) | 18 | Minutes a | 1. PL220. 2. Q218. 3. R236, R237. |
| (X) | 19 | Minutes b | 1. PL223. 2. Q221. 3. R242, R243. |



| | Pin Number | Segment Lit | Possible Cause Chart |
|-----|------------|-------------|---|
| (X) | 20 | Minutes e | 1. PL219. 2. Q217. 3. R234, R235. |
| (X) | 21 | Minutes d | 1. PL222. 2. Q220. 3. R240, R241. |
| (X) | 22 | Minutes c | 1. PL224. 2. Q222. 3. R244, R245. |

(X) Unplug the line cord. Then remove the test lead.

NOTE: The integrated circuit that you will install in the next step is a rugged and reliable component. However, normal static electricity discharged from your body, through an integrated circuit pin, to an object can damage the integrated circuit. Read the instruction first. Then carefully perform each step without interruption.

1. Remove the IC from its package, with both hands.
2. Hold the IC in one hand, remove the conductive foam, and straighten any bent pins with the other hand.
3. Align the pin 1 end of the IC (indicated by a 1) with socket pin 1. Carefully start the IC pins into the sockets; then push the IC down into the sockets. Once the IC's are inserted into the sockets they are protected against static electricity.

(X) IC101: Refer to Figure 1-5 (in the "Illustration Booklet") and install a 3817 integrated circuit (#443-702) at IC101.

(X) Connect the Clock's line cord plug into an appropriate AC outlet. The Clock should show a flashing display.

(X) Push and hold the FAST ADVANCE switch (SW1) for approximately 15 seconds. The time display should advance at a rapid rate and each segment should light at some time during this 15 seconds. (See Figure 2-1 in the "Illustration Booklet" for switch locations.)

(X) Release the FAST ADVANCE switch. The display should be on at a constant brightness level.

(X) Push the SLOW ADVANCE switch (SW2). The time display should advance at a slow rate.

(X) Release the SLOW ADVANCE switch. The display should be at a constant brightness level.

(X) Cover the LDR (light dependent resistor) with a dark colored object (not your finger). The display should dim.

(X) Unplug the line cord.

NOTE: Variations in bulb brightness may be noticeable at low brightness levels. If this occurs, interchange bulbs to form groups of the same brightness to minimize this effect.

This completes the "Initial Tests." Proceed to the "Cabinet and Final Assembly" for the model you have chosen (GC-1195 on page 31, or GC-1197 on Page 34).



CABINET AND FINAL ASSEMBLY (GC-1195)

Refer to Pictorial 5-1 (in the "Illustration Booklet") for the following steps.

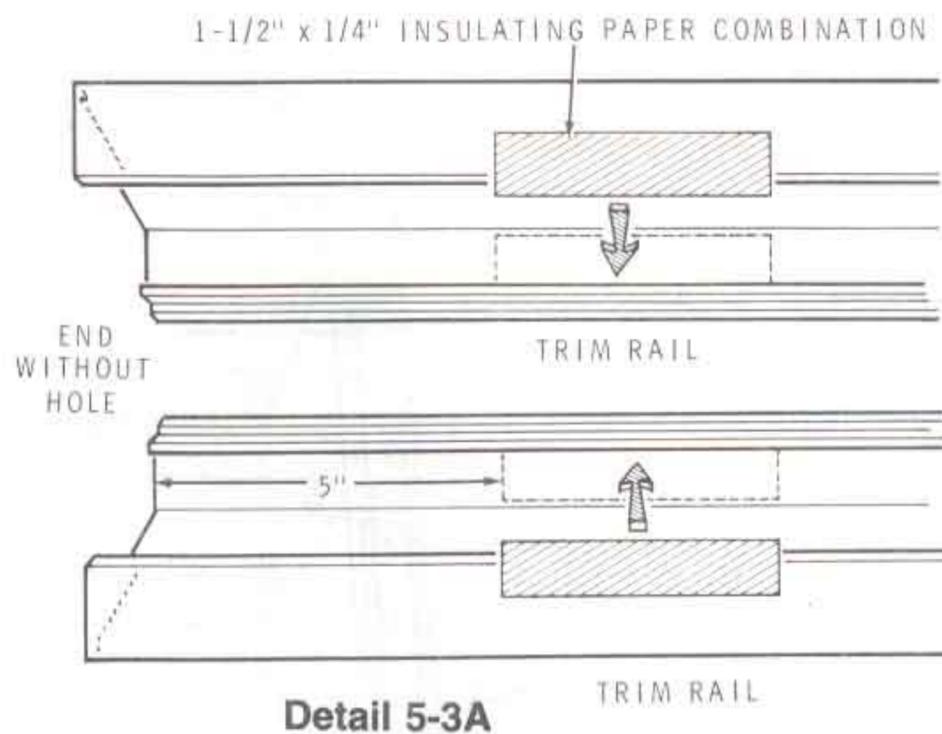
- (X) Position the cabinet side panels on carpeting or a large soft cloth as shown.
- (X) Install ten expansion nuts into each side panel as shown. Tap the nuts into the panels with a hammer. Be careful not to mar the panels.
- (X) Install a 6-32 x 1/4" screw into any of the twenty expansion nuts. Install the screw as far as possible and then remove it. This is to "set" the nut in the side panel.
- (X) Repeat the above step for each of the remaining nineteen expansion nuts.
- (X) Install seven rubber cushions onto each side panel in the predrilled holes as shown. Use seven #6 x 3/4" wood screws. Be sure to install the top screw in the indicated hole. Do not overtighten the screws and flatten the rubber cushions.

Refer to Pictorial 5-2 (in the "Illustration Booklet") for the following steps.

- (X) Mount a bottom panel to the left side panel as shown. Use three 6-32 x 1/4" screws.
- (X) In the same manner, mount the remaining bottom panel to the left side panel.
- (X) Mount the center panel (with hole) to the left side panel as shown. Use two 6-32 x 1/4" screws. Be sure to position the panel as shown.
- (X) Mount the top panel to the left side panel as shown. Use two 6-32 x 1/4" screws. Be sure to position the panel as shown.
- (X) Mount the right side panel to the left side panel assembly. Use ten 6-32 x 1/4" screws. Be sure to position the top rubber cushion towards the front of the cabinet as shown.

Refer to Pictorial 5-3 (in the "Illustration Booklet") for the following steps.

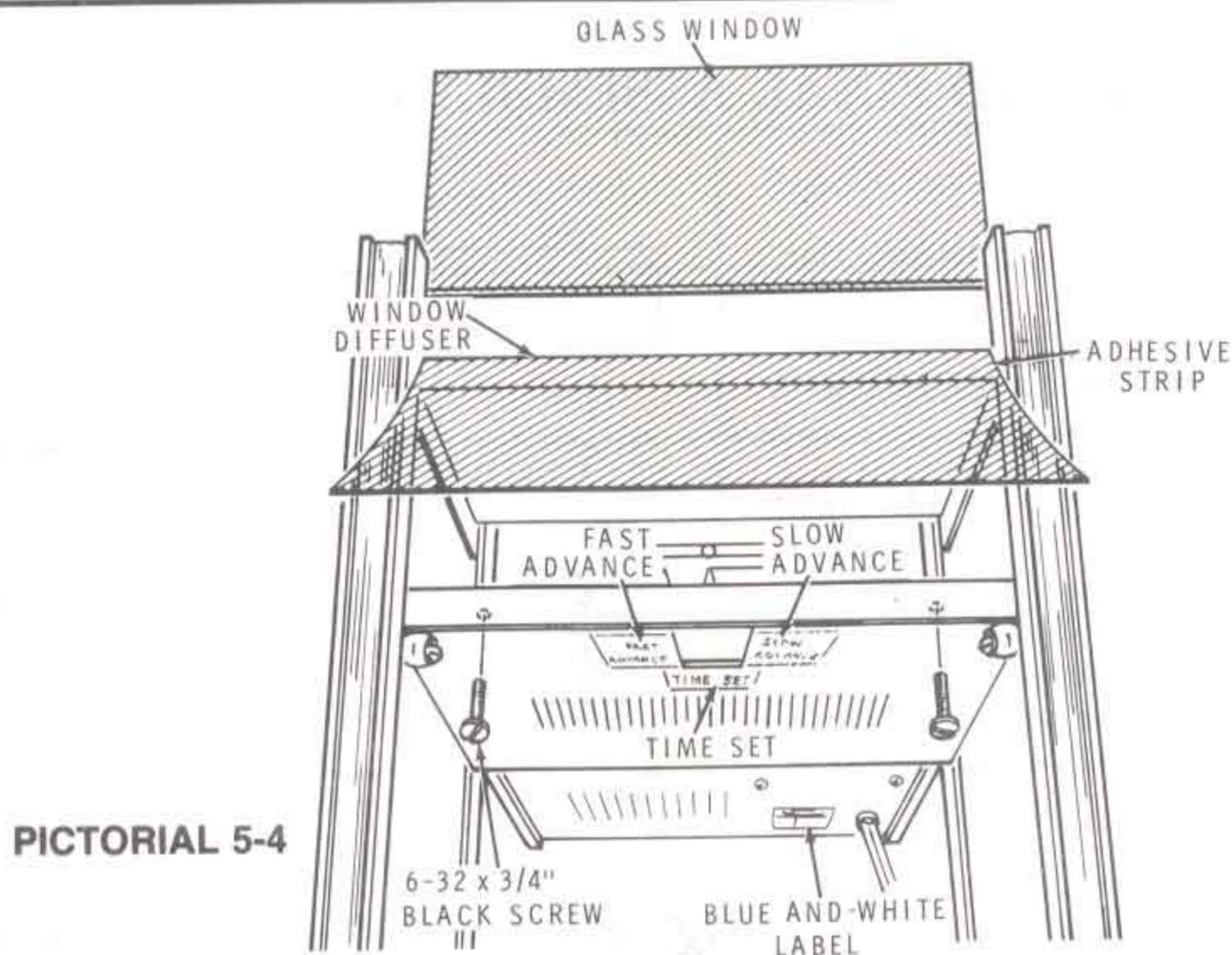
- (X) Cut four 1-1/2" x 1/4" pieces of insulating paper from the piece remaining from the "Clock" assembly.



- (X) Remove the protective backing from one of the pieces of insulating paper.
- (X) Press the insulating paper to the top (gray) side of another piece of insulating paper.
- (X) Remove the protective backing from this insulating paper combination.
- (X) Press this insulating paper combination to the inside edge of one of the trim rails, as shown in Detail 5-3A.
- (X) In the same manner prepare and install another insulating paper combination to another trim rail. Be sure to install this combination to the opposite rail side as before.

NOTE: In the following steps, the trim rails will fit approximately 1/8" above the bottom edge of the side panels.

- (X) Slide a trim rail with insulating paper onto the front of the cabinet side panel. Be sure to position the side with the insulating paper towards the top inside edge of the cabinet. Secure the trim rail to the side panel with a #6 x 3/4" wood screw in the predrilled hole in the side panel.
- (X) In the same manner, install the other trim rail with insulating paper onto the front of the cabinet side panel. Be sure to position the side with the insulating paper towards the top inside edge of the cabinet.
- (X) In the same manner, install the two remaining trim rails onto the back of the cabinet side panels.



PICTORIAL 5-4

Refer to Pictorial 5-4 for the following steps.

NOTE: The blue and white label in the next step shows the model number and production series number of your kit. Refer to these numbers in any communications with the Heath Company; this assures you that you will receive the most complete and up-to-date information in return.

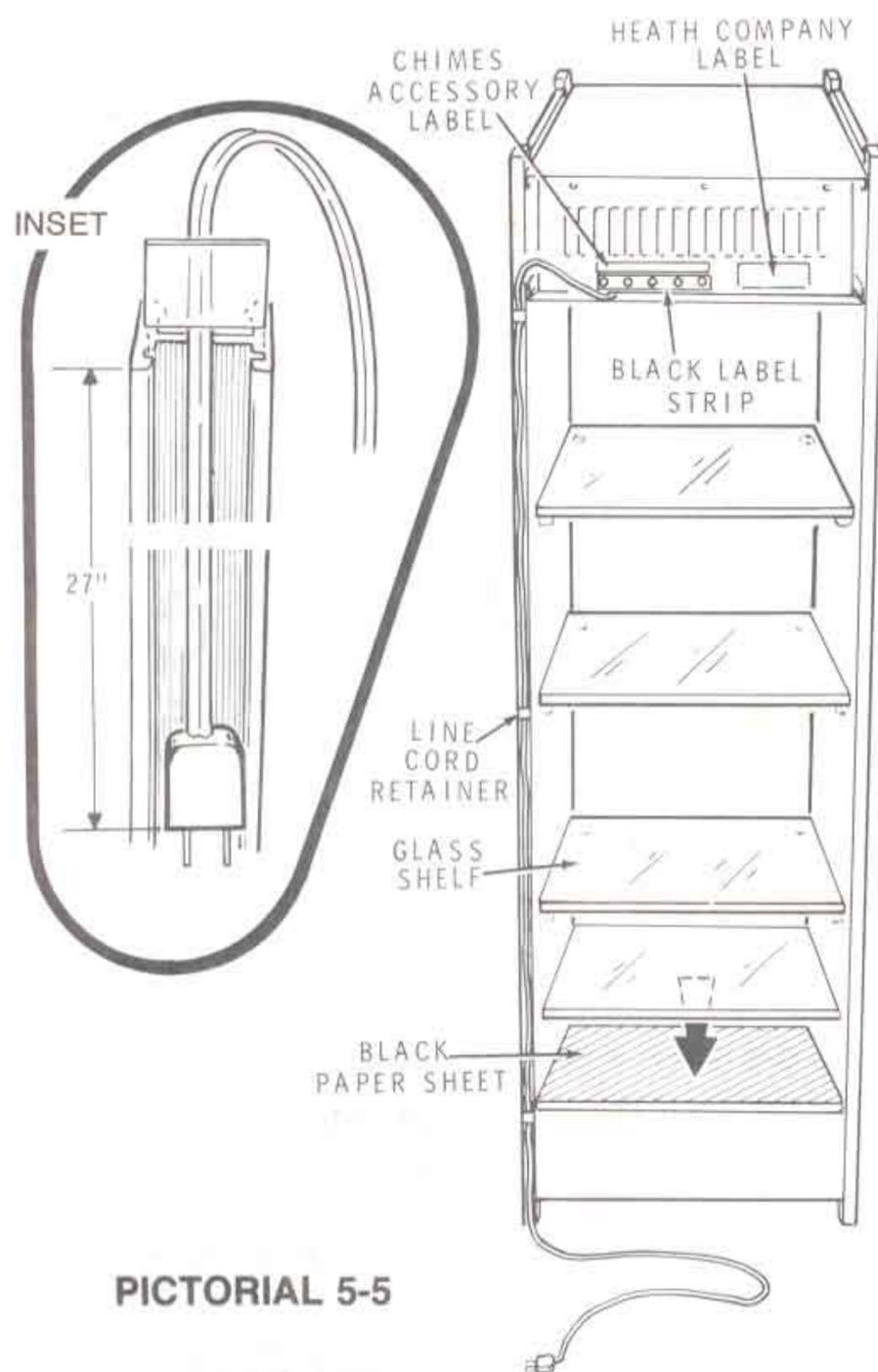
- (X) Carefully remove the protective backing from the blue and white label. Then press the label onto the chassis bottom as shown.
- (X) Install the Clock into the cabinet top as shown. Loosely fasten the Clock to the cabinet with two 6-32 × 3/4" black screws.
- (X) Clean both sides of the window diffuser and glass window. Then handle them carefully to avoid fingerprints on their surfaces.

NOTE: If you desire a contemporary "see through" styling, do not install the window diffuser in the following step.

- (X) Carefully remove the strip of protective backing from the window diffuser. Then press the diffuser onto the top panel as shown.

- (X) Carefully peel the dot from the glass window. Then slide the window into the cabinet top between the trim rails and the top and center panels as shown. NOTE: If the window is difficult to install, remove the clock chassis and loosen the eight 6-32 × 1/4" screws that hold the center and top panels to the side panels. Then slide the window into place, tighten the screws, and reinstall the clock chassis.
- (X) Connect the Clock's line cord to an appropriate AC outlet.
- (X) Slide the Clock firmly against the window so the display is clear. Then tighten the two 6-32 × 3/4" black screws until they are snug. DO NOT overtighten these screws.
- (X) Unplug the line cord.
- (X) Carefully peel the FAST ADVANCE label from the label sheet. Then press the label onto the center panel bottom as shown.
- (X) Carefully peel the SLOW ADVANCE label from the label sheet. Then press the label onto the center panel bottom as shown.
- (X) Carefully peel the TIME SET label from the label sheet. Then press the label onto the center panel bottom as shown.



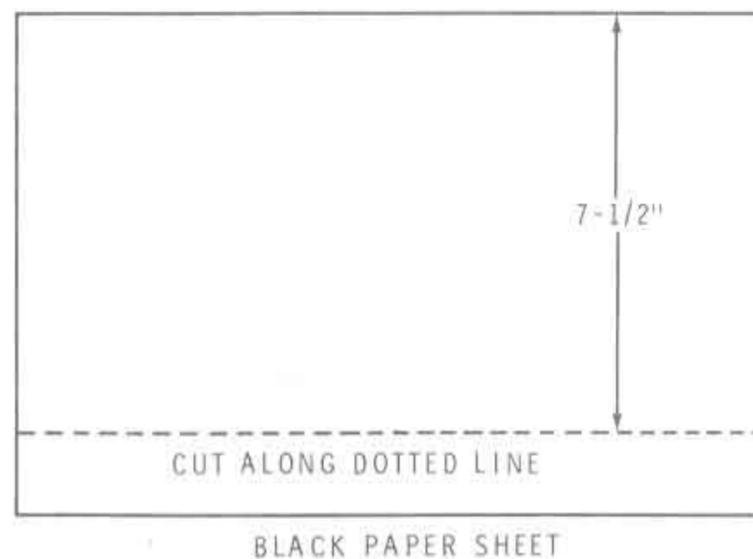


PICTORIAL 5-5

Refer to Pictorial 5-5 for the following steps.

- (X) Refer to Detail 5-5A and prepare the black paper sheet as shown. The small strip of paper may be discarded.
- (X) Install the black paper and four glass shelves into the cabinet as shown.
- (X) Carefully peel the HEATH COMPANY label from the label sheet. Then press the label onto the chassis back as shown.
- (X) Carefully peel the CHIMES ACCESSORY label from the label sheet. Then press the label onto the chassis back as shown.

NOTE: If you intend to install the Accessory Chimes Assembly in the near future, disregard the next step.



Detail 5-5A

- () Carefully remove the protective paper backing from the black label strip. Then press the label onto the chassis back as shown. Be sure to cover the four large holes and the right small hole in the chassis back.

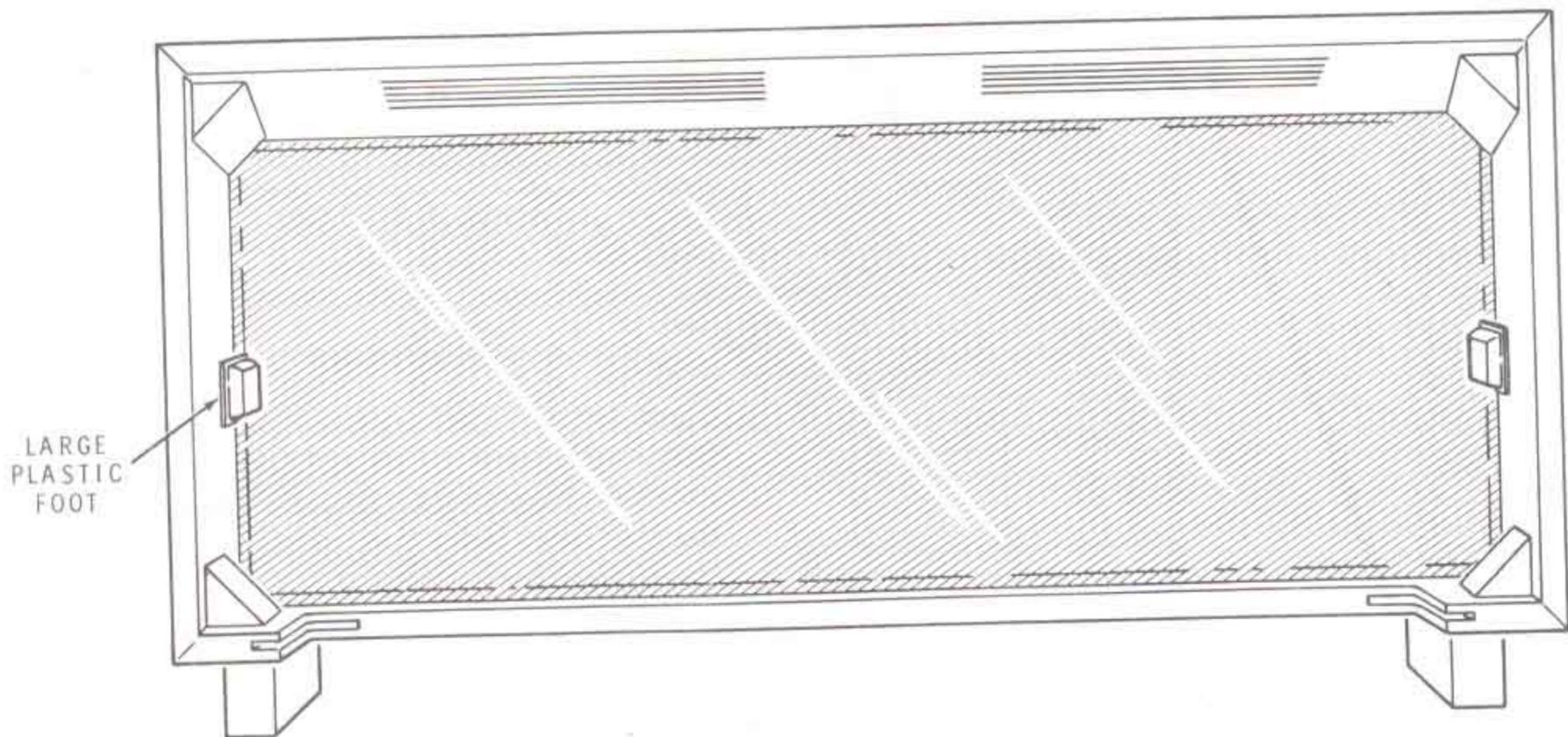
NOTE: In the following steps, the line cord and three line cord retainers can be installed in either the right or left rear trim rail.

Install the line cord and line cord retainers in a rear trim rail as follows:

- () Position the line cord flat against the trim rail approximately 27" from the plug end. See the inset drawing on Pictorial 5-5.
- () Insert a line cord retainer into the slots in the trim rail over the line cord, as shown in the inset drawing.
- () Slide the line cord and line cord retainer down the trim rail approximately 24" from the top.
- () In the same manner, install another line cord retainer over the line cord.
- () Slide the line cord and both line cord retainers down the trim rail approximately 24" from the top.
- () In the same manner, install the remaining line cord retainer over the line cord. Slide the line cord and three retainers down the trim rail until the retainers are positioned as shown in the Pictorial.

This completes the "Final Assembly." Proceed to the "Operation" section.

CABINET AND FINAL ASSEMBLY (GC-1197)

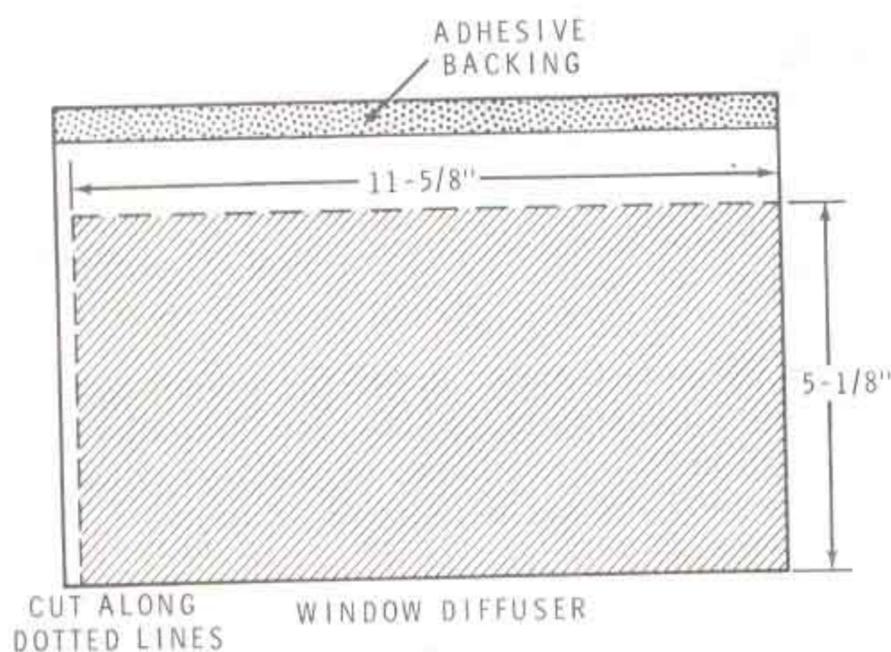


PICTORIAL 6-1

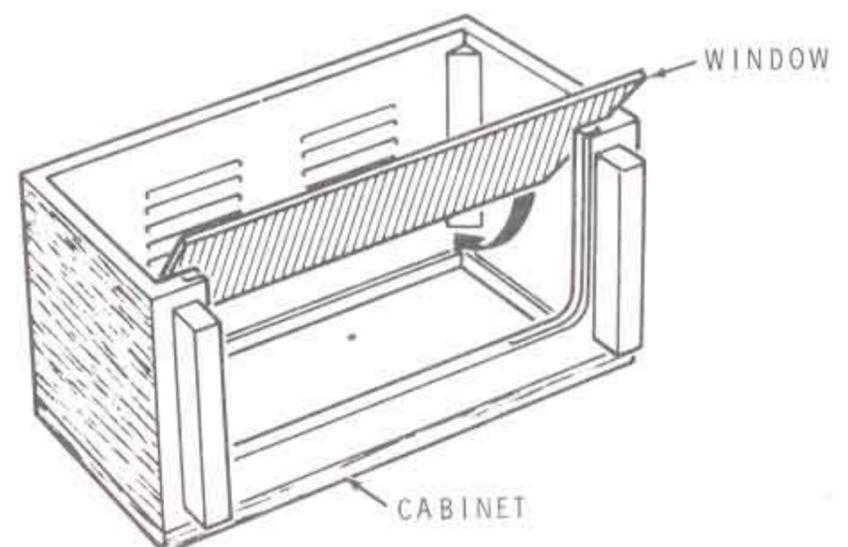
Refer to Pictorial 6-1 for the following steps:

NOTE: IF you desire a contemporary "see through" styling, do not prepare or install the window diffuser in the following steps.

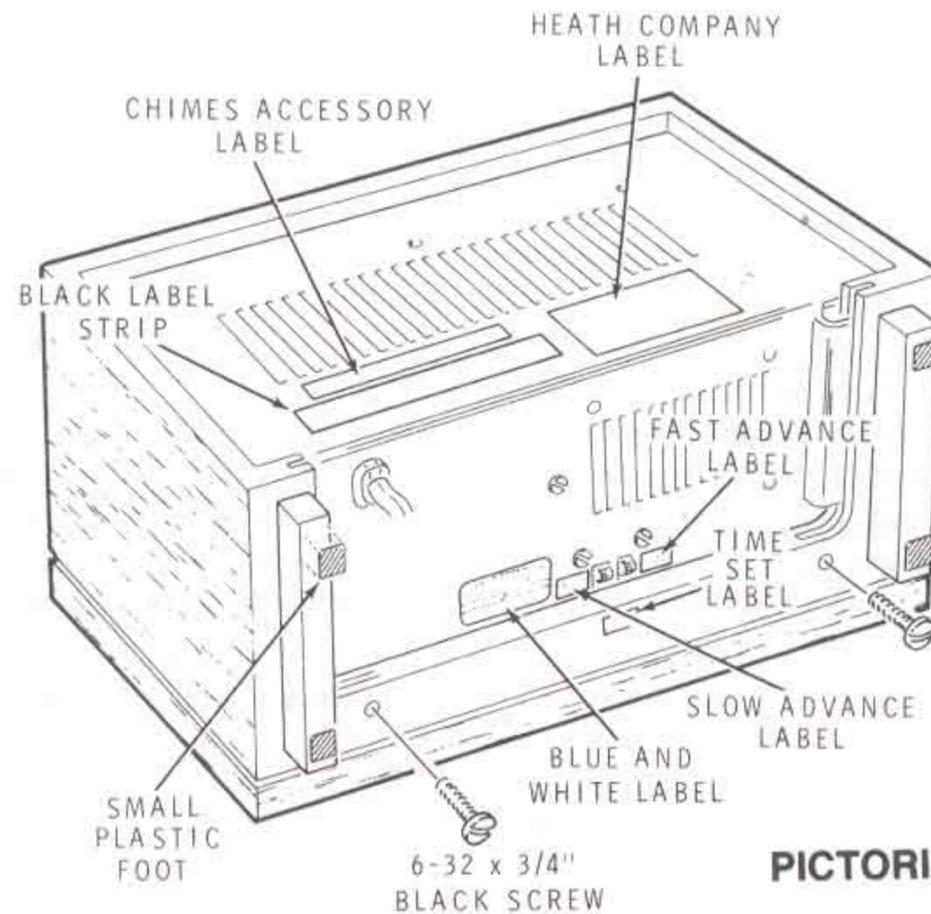
- () Refer to Detail 6-1A and prepare the window diffuser as shown. Be sure to cut off the indicated edge of the diffuser.
- () Carefully remove the protective covering from both sides of the window.
- () Refer to Detail 6-1B and install the window into the cabinet as shown.
- () Install the window diffuser into the cabinet as shown.
- () Carefully remove the protective backing from a large plastic foot. Then press the foot onto the inside of the cabinet as shown. Position the foot firmly against the window.
- () In the same manner, install the remaining large plastic foot into the cabinet as shown. Position the foot firmly against the window.



Detail 6-1A



Detail 6-1B



PICTORIAL 6-2

Refer to Pictorial 6-2 for the following steps.

- () Position the chassis into the grooves and install the clock into the cabinet as shown. Secure the clock to the cabinet with two 6-32 x 3/4" black screws. DO NOT overtighten these screws.
- () Carefully remove the protective backing from a small plastic foot. Then press the foot onto the cabinet bottom as shown.
- () In the same manner, install the three remaining plastic feet to the cabinet bottom as shown.

NOTE: The blue and white label in the next step shows the model number and production series number of your kit. Refer to these numbers in any communications with the Heath Company; this assures you that you will receive the most complete and up-to-date information in return.

- () Carefully remove the protective paper backing from the blue and white label. Then press the label onto the chassis bottom as shown.
- () Carefully peel the FAST ADVANCE label from the label sheet. Then press the label onto the chassis bottom as shown.

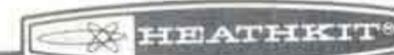
- () Carefully peel the SLOW ADVANCE label from the label sheet. Then press the label onto the chassis bottom as shown.
- () Carefully peel the TIME SET label from the label sheet. Then press the label onto the chassis bottom as shown.
- () Carefully peel the HEATH COMPANY label from the label sheet. Then press the label onto the chassis back as shown.
- () Carefully peel the CHIMES ACCESSORY label from the label sheet. Then press the label onto the chassis back as shown.

NOTE: If you intend to install the Accessory Chimes Assembly in the near future, disregard the next step.

- () Carefully remove the protective backing from the black label strip. Then press the label onto the chassis back as shown. Be sure to cover the four large holes and the small hole in the chassis back.

This completes the "Final Assembly." Proceed to the "Operation" section.





OPERATION

Refer to Figure 2-1 (in the "Illustration Booklet") as you read the following information.

Your Digital Clock will keep very accurate time once it is plugged in and correctly set. If the Clock is ever momentarily unplugged, or if the AC power is ever interrupted for more than two seconds, the display segments will blink to indicate that power has been off and that the Clock must be reset.

SETTING THE CLOCK

The procedure that you use to set your Digital Clock always advances the display until it agrees with the actual time. You cannot back up or hold the display. If you advance it too far, just advance the display again to the actual time.

Use the following procedure whenever you set your Digital Clock:

- Pull the FAST ADVANCE slide switch forward to rapidly advance the display; hold it until the display indicates approximately one-half hour before the actual time. Then release it.
- Quickly pull and release the FAST ADVANCE switch again, or as many times as necessary, until the display is about 5 to 15 minutes before the actual time.
- Pull the SLOW ADVANCE slide switch (on the right side) forward to slowly advance the display; hold it until the display indicates the actual time. Then release it.

DISPLAY BRIGHTNESS

Your Digital Clock has a display dimming circuit that dims the display as the ambient room light decreases. The amount of light that strikes the LDR (light dependent resistor) determines the brightness of the display. The brighter the ambient room light, the brighter the display; the lower the room light, the dimmer the display. You may find that different

locations of the Clock within the same room may cause different display brightness effects. This is due to the amount of ambient light that strikes the LDR at each location.

If the dimming effects do not suit your particular needs or desires, you can change either or both of two resistors (R102 and R104, Page 9) that directly affect the ambient light/display brightness relationship.

If at **maximum** room brightness you want . . .

| The display brightness to be: | Change R102 to: |
|-------------------------------|--------------------------|
| High | 5490 Ω (supplied) |
| Medium | 4700 Ω 5% |
| Low | 4300 Ω 5% |

If at **minimum** room brightness you want . . .

| The display brightness to be: | Change R104 to: |
|-------------------------------|--------------------------|
| High | 4700 Ω |
| Medium | 3300 Ω (supplied) |
| Low* | 2700 Ω |

If your display remains dim even in a brightly lighted room (especially if used in fluorescent lighting), change R105 to 470 k Ω (supplied).

LAMP REPLACEMENT

The incandescent lamps used in your Clock have a very long life. However, after approximately 2 years, if a lamp failure occurs, we advise replacing the complete set of lamps. This assures you of another long period of trouble-free operation and eliminates brightness variations due to aging.

*Variations in bulb brightness may be more noticeable at low brightness levels. Interchange bulbs to form groups of the same brightness to minimize this effect.



PLACEMENT

If you place the Digital Floor Clock on a shag or heavily sculptured carpet, it is a good idea to place some additional weight inside the base of the Clock to make it more stable. To do this, cut a $1/2" \times 7" \times 11"$ piece of plywood and place it inside the base of the Clock; then place weight, such as several bricks, on the plywood in the base.

Do not cover the ventilation slots in the top of the Digital Shelf Clock. Also, do not place the Clock in direct sunlight, as this will cause excessive heat buildup.

CLEANING

You can use any good quality furniture polish on the wood cabinets to maintain their appearance. Wipe dust from the display window with a soft cloth. If smudges still remain, clean the window with a non-caustic window cleaner and a soft cloth. Be careful that you do not scratch the plastic window in the Digital Shelf Clock.

OTHER CONSIDERATIONS

You can create special display effects by using translucent colored film (not available from Heath Company) in place of the diffuser window that is supplied.

IN CASE OF DIFFICULTY

Begin your search for any trouble that occurs after assembly by carefully following the steps listed below in the "Visual Tests." After you complete the "Visual Tests," refer to the "Troubleshooting Chart."

NOTE: Refer to the "Circuit Board X-Ray Views" on Page 42 for the physical location of parts on the circuit board.

VISUAL TESTS

1. Recheck the wiring. Trace each wire in colored pencil on the Pictorial as it is checked. It is frequently helpful to have a friend check your work. Someone who is not familiar with the unit may notice something consistently overlooked by the kit builder.
2. About 90% of the kits that are returned to the Heath Company for repair do not function properly due to poor connections and soldering. Therefore, many troubles can be eliminated by reheating all connections to make sure that they are soldered as described in the "Soldering" section of the "Assembly Notes." Be sure there are no solder "bridges" between circuit board foils.

3. Check to be sure that all transistors and diodes are in their proper locations. Make sure each lead is connected to the proper point. Make sure that each diode band is positioned above the band printed on the circuit board.
4. Check the values of the parts. Be sure in each step that the proper part has been wired into the circuit, as shown in the Pictorial diagrams. It would be easy, for example, to install a 1200Ω (brown-red-red) resistor where a 2200Ω (red-red-red) resistor should be installed.
5. Check for solder bits, wire ends, or other foreign matter which may be lodged in the unit.
6. A review of the "Circuit Description" may also help you determine where the trouble is.

If you still do not locate the trouble after you complete the "Visual Tests," and a voltmeter is available, check voltage readings against those shown on the "Schematic Diagram." NOTE: All voltage readings were taken with an $11 \text{ M}\Omega$ input impedance voltmeter. Voltages may vary as much as 20%.

In an extreme case where you are unable to resolve a difficulty, refer to the "Customer Service" information inside the rear cover of the Manual. Your Warranty is located inside the front cover.



PRECAUTIONS FOR TROUBLESHOOTING

1. Be cautious when you test transistor circuits. Although they have almost unlimited life when used properly, they are much more vulnerable to damage from excessive voltage or current than tubes.
2. Be sure you do not short any terminals to ground when you make voltage measurements. If the voltmeter probe should slip, for example, and short across components or voltage sources, it is very likely to cause damage to one or more transistors or diodes.

SILICON BIPOLAR TRANSISTOR CHECKING

To check a transistor accurately, you should use a transistor checker. However, if one is not available, you can use an ohmmeter to determine the general condition of the transistors in this kit. The ohmmeter you use must have at least 1 volt DC at the probe tip to exceed the threshold of the diode junctions on the transistor being tested. Most vacuum tube voltmeters meet this requirement.

To check a transistor with an ohmmeter, proceed as follows:

1. Remove the transistor from the circuit.
2. Set the ohmmeter on the R X 1000 range.
3. Connect one of the ohmmeter test leads to the base (B) of the transistor. Touch the other meter lead to the emitter (E) and then to the collector (C). Both readings should be approximately the same, but may be either high or low. If one reading is high and the other low, the transistor should be replaced. (Identify the transistor leads on the Identification Chart on Page 44.)
4. Repeat step 3 with the test leads reversed.
5. Check the resistance from the collector to the emitter to make sure there is no short circuit.

NOTE: In the unusual case when the readings are all low, or all high, no matter which ohmmeter lead is connected to the base, the transistor should be replaced.

SHIPPING YOUR CLOCK

These instructions are for shipping your Clock to the factory. If it is at all feasible, we suggest that you bring your Clock into the nearest Heathkit Electronic Center.

RETURN THE CLOCK ONLY. The cabinet of your Clock is not needed for service and may be damaged if it is shipped with the Clock chassis.

1. Remove the Clock from its cabinet. Save the two black mounting screws to remount the Clock when it is returned to you.
2. Make sure all of the chassis screws are tight, especially the transformer mounting screws.
3. **DOUBLE PACK THE CLOCK.** Place the Clock in a box slightly larger than the Clock. Then pack this box with rolled newspapers to cushion the Clock. Place this box inside another larger box with at least 2" of space on all sides of the smaller box. Then pack this space with rolled newspapers.
4. Mark the box "FRAGILE" on at least two sides.
5. Follow the additional instructions under "Repair Service" on the inside rear cover of your Manual.



Troubleshooting Chart

The following chart lists conditions and possible causes of several specific malfunctions. If a particular part is mentioned (Q1 for example), as a possible cause, check that part to see that it is installed and/or wired correctly. It is also possible, on rare occasions, for a part to be faulty and require replacement.

| CONDITION | POSSIBLE CAUSE |
|---|---|
| Fuse blows. | <ol style="list-style-type: none"> 1. The case of transistor Q1 is shorted to the chassis. 2. Diodes D101, D102, D103, D104 installed backwards. 3. Transformer T1 wired incorrectly. |
| Colon doesn't light with IC101 removed. | <ol style="list-style-type: none"> 1. Lamp PL210 not making good contact or defective. 2. Transistors Q1, Q101, Q102 installed or wired incorrectly. |
| Display doesn't dim. | <ol style="list-style-type: none"> 1. Transistors Q1, Q101, Q102, Q103 installed or wired incorrectly. |
| Display doesn't blink when clock is first plugged in (IC101 installed). | <ol style="list-style-type: none"> 1. Transistor Q104 installed incorrectly. 2. Integrated circuit IC101 installed incorrectly. |
| Fast and/or slow time advance doesn't operate. | <ol style="list-style-type: none"> 1. Switches SW1 and/or SW2 wired incorrectly. 2. Integrated circuit IC101 installed incorrectly. |
| Individual segment is dim or doesn't light. | <ol style="list-style-type: none"> 1. Poor connection at the associated lamp. 2. Associated transistor installed incorrectly. 3. Integrated circuit IC101 installed incorrectly (associated pin bent or not soldered). |
| Light dimmer doesn't function when installed in the cabinet. | <ol style="list-style-type: none"> 1. LDR shield is not positioned flush with the window diffuser. |
| Clock gains or loses time. | <ol style="list-style-type: none"> 1. 50 Hz-60 Hz jumper wire on power circuit board. (See Page 9). |



SPECIFICATIONS

| | |
|--------------------------|--|
| Display | 3-1/4" diffused incandescent readout. |
| Format | 3-1/2 digit (12 hour) time readout. |
| Time Accuracy | Determined by accuracy of power line frequency. No accumulative error. |
| Power Requirements | 108 — 132 VAC, 50/60 Hz, 30 watts. 216 — 264 VAC, 50/60 Hz, 30 watts. |
| Dimensions | GC-1195 60-1/2" H × 14" W × 9-1/2" D. (153.7 cm H × 35.6 cm W × 24.1 cm D.) GC-1197 6-1/2" H × 12-1/2" W × 6-1/4" D. (16.5 cm H × 31.8 cm W × 15.9 cm D.) |
| Net Weight | GC-1195 48-1/2 lbs. (22 kg.) GC-1197 6-1/4 lbs. (2.8 kg.) |

The Heath Company reserves the right to discontinue products and to change any specifications at any time without incurring any obligation to incorporate new features in products previously sold.



CIRCUIT DESCRIPTION

Refer to the Schematic Diagram (on a separate fold-in sheet) while you read this Circuit Description.

CLOCK CIRCUIT

All time-keeping functions are performed by integrated circuit IC101. 60 Hz pulses from the transformer secondary (T1) are fed to IC101, pin 35. This 60 Hz input signal is filtered by R111 and C103 to remove any power line transients that could cause miscounting.

IC101 counts and decodes the 60 Hz signal into seven-segment display information. The outputs of IC101 are individual DC voltages that drive transistor switches Q201 through Q222. For example, a DC voltage on IC101, pin 3 causes transistor switch Q202 to turn on, which in turn lights lamp PL203. Therefore, the Hours "f" segment is lighted. Since lamps PL201 and PL202 form the "1" for the tens of hours digit, and are always on together, they are driven by a single transistor, Q201. Likewise, lamps PL213 and PL215 are driven by transistor Q212 since the tens of minutes segments "a" and "d" are always on together.

POWER SUPPLY CIRCUIT

The power supply is comprised of an unregulated +18-volt source and a regulated +5-volt* lamp source.

*This voltage is not filtered and may not read 5 volts on many voltmeters. This voltage also depends on the LDR resistance and will be less in dim ambient light.

The unregulated +18-volt source is full-wave rectified by diodes D101, D102, D103, and D104 and filtered by capacitor C101. This +18-volt source supplies the power for IC101.

The power supply for the lamps is a regulated, full-wave rectified +5-volt source. Transistor Q102 and resistors R102 and R103 sample the lamp voltage from the emitter of transistor Q1. If the lamp voltage is too low, Q102 turns off, which allows more current to flow to transistors Q101 and Q1. This causes Q101 and Q1 to turn on, thus increasing the lamp voltage.

LDR CIRCUIT

In dim ambient light, the LDR (light dependent resistor) resistance increases, which turns on Q103 and increases the voltage feedback to Q102 through R104. Q102 then turns on and decreases the current flow to Q101 and Q1. This results in a lower lamp voltage and dimmer display. In bright ambient light, the LDR resistance is low, which keeps Q103 turned off and allows a bright display.

POWER FAILURE CIRCUIT

Q104 receives a power failure signal from pins 1 and 40 of IC101. Q104 then modulates Q102 with one pulse per second to indicate a power failure. A power failure is indicated by a flashing display.

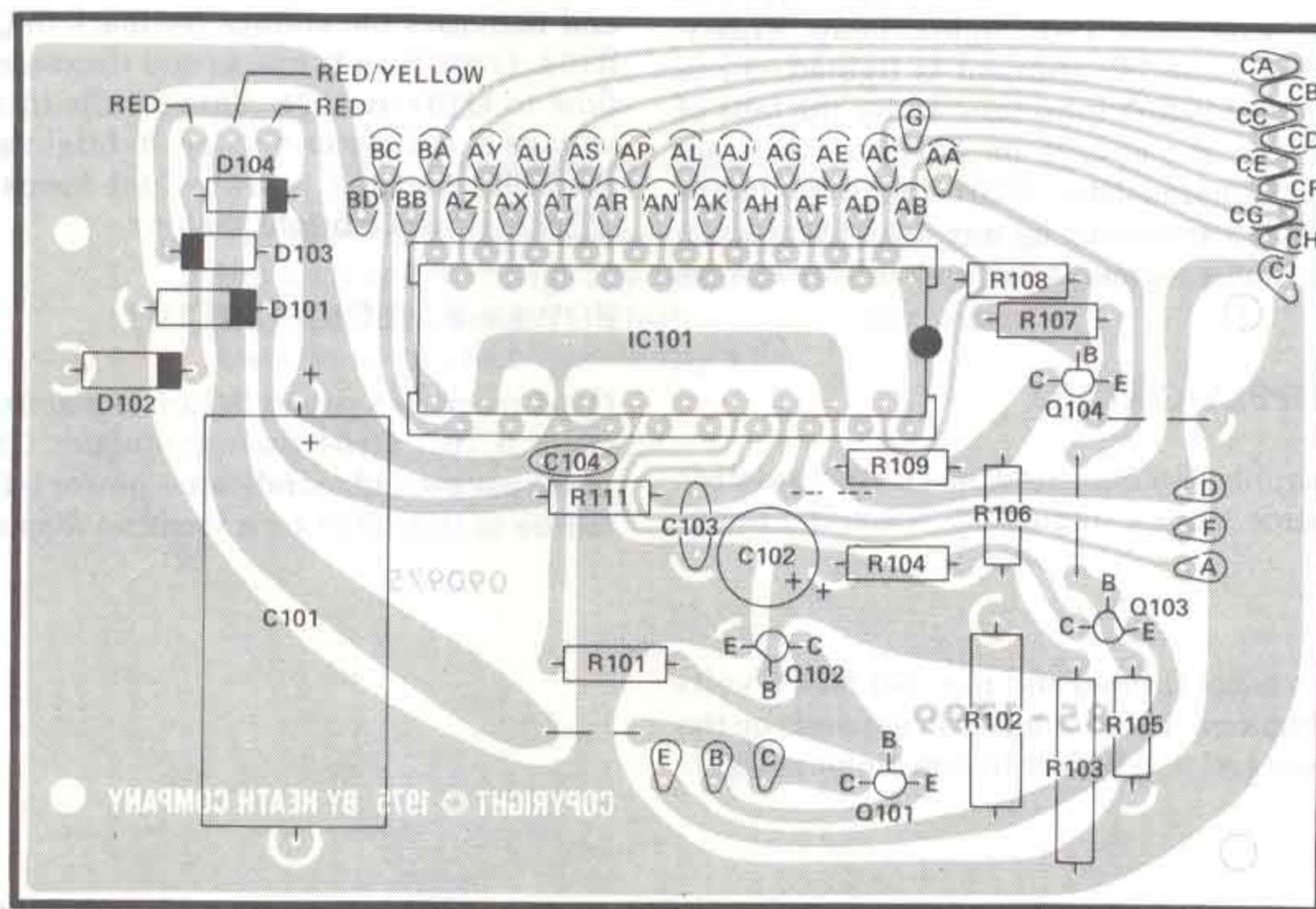
CIRCUIT BOARD X-RAY VIEWS

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

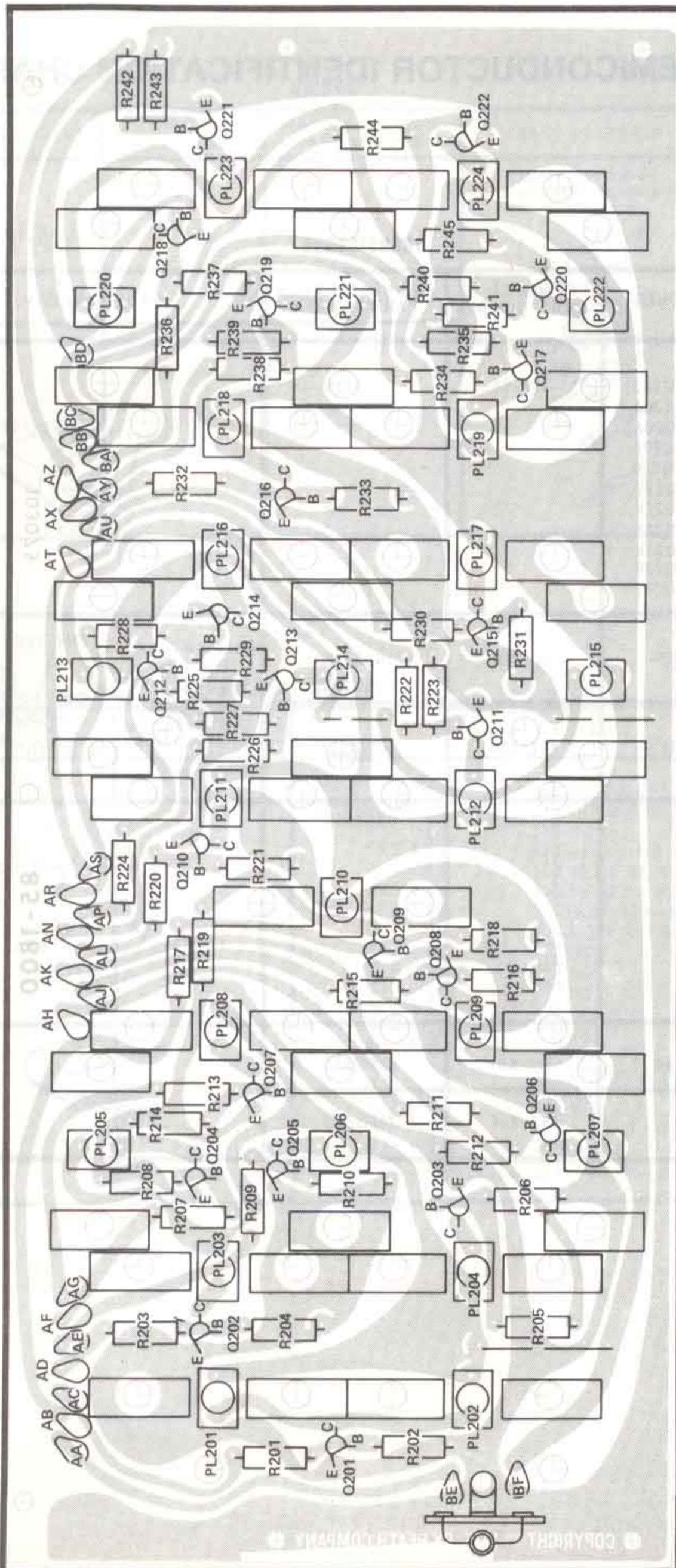
A. Find the circuit component number (R5, C3, etc.) on the X-Ray View.

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.



POWER CIRCUIT BOARD



DISPLAY CIRCUIT BOARD



SEMICONDUCTOR IDENTIFICATION CHARTS

TRANSISTORS

| COMPONENT | HEATH PART NUMBER | MANUFACTURER'S PART NUMBER | BASE DIAGRAM |
|--|-------------------|----------------------------|--------------|
| Q201, Q202, Q203, Q204, Q205, Q206, Q207, Q208, Q209, Q210, Q211, Q212, Q213, Q214, Q215, Q216, Q217, Q218, Q219, Q220, Q221, Q222 | 417-94 | 2N3416 | |
| Q102 | 417-91 | 2N5232A | |
| Q103 | 417-200 | X29A826 | |
| Q1 | 417-215 | 2N3055 | |
| Q104 | 417-801 | MPSA20 | |
| Q101 | 417-864 | MPSA05 | |



DIODES

| COMPONENT | HEATH PART NUMBER | MANUFACTURER'S PART NUMBER | BASE DIAGRAM |
|------------|-------------------|----------------------------|--|
| D101, D102 | 57-42 | 3A1 | NOTE: HEATH PART NUMBERS ARE STAMPED ON MOST DIODES. |
| D103, D104 | 57-65 | 1N4002 | |

INTEGRATED CIRCUIT

| COMPONENT | HEATH PART NUMBER | MANUFACTURER'S PART NUMBER | BASE DIAGRAM |
|-----------|-------------------|----------------------------|---|
| IC101 | 443-702 | 3817 | <p> AM OUTPUT 1 10 HRS. b&c 2 HRS f 3 HRS g 4 HRS a 5 HRS b 6 HRS d 7 HRS c 8 HRS e 9 10 MIN f 10 10 MIN g 11 10 MIN a&d 12 10 MIN b 13 10 MIN e 14 10 MIN c 15 MIN f 16 MIN g 17 MIN a 18 MIN b 19 MIN e 20 </p> <p> 3817 40 PM OUTPUT 39 1HZ OUTPUT 38 NC 37 BLANKING INPUT 36 50 OR 60 HZ SELECT 35 50 OR 60 HZ INPUT 34 FAST SET INPUT 33 SLOW SET INPUT 32 NC 31 NC 30 NC 29 VDD 28 VSS 27 NC 26 ALARM OFF INPUT 25 NC 24 NC 23 OUTPUT COMMON SOURCE 22 MIN c 21 MIN d </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.

Replacement parts are maintained specifically to repair Heath products. Parts sales for other reasons will be declined.

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

HEATH

Schlumberger

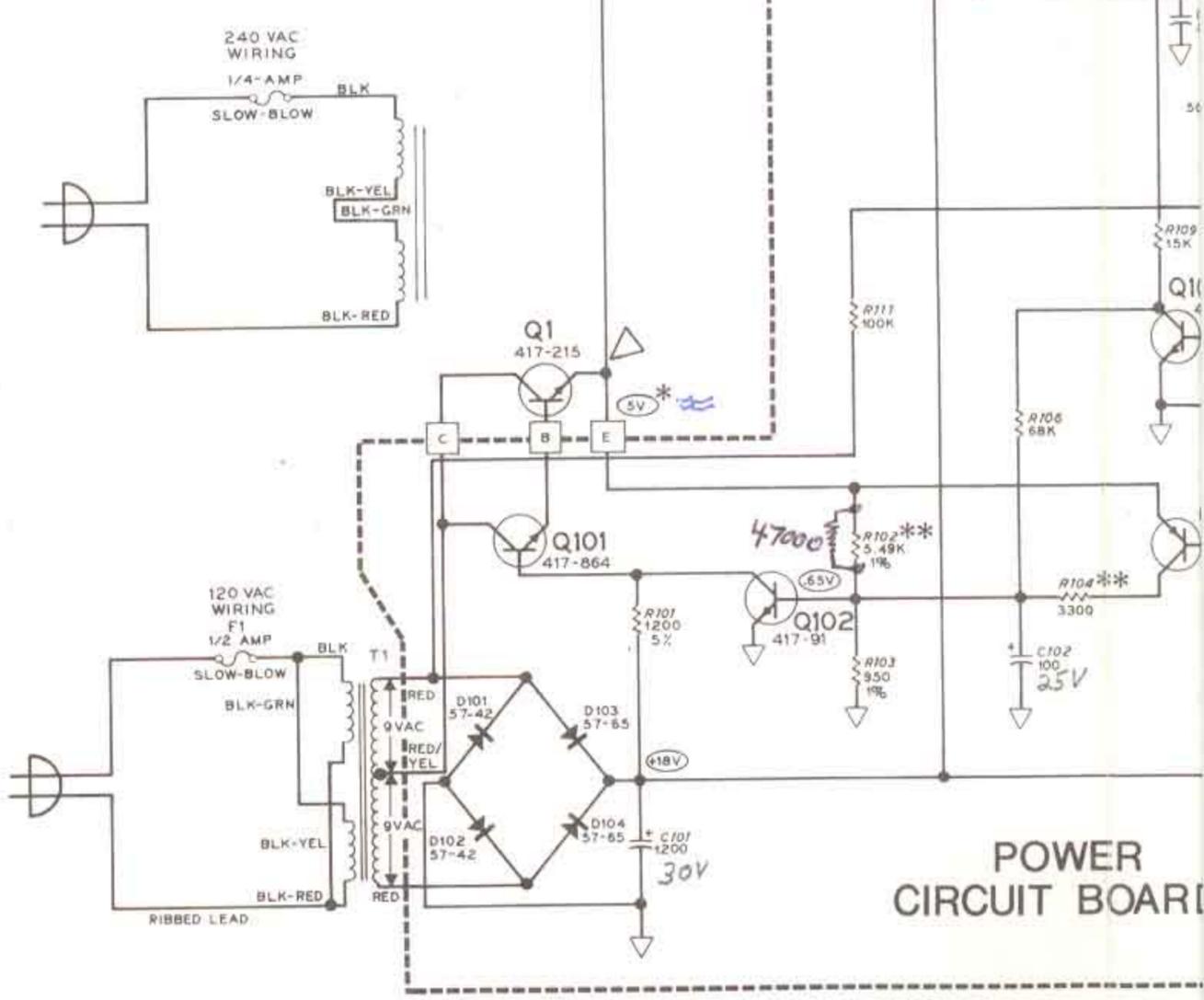
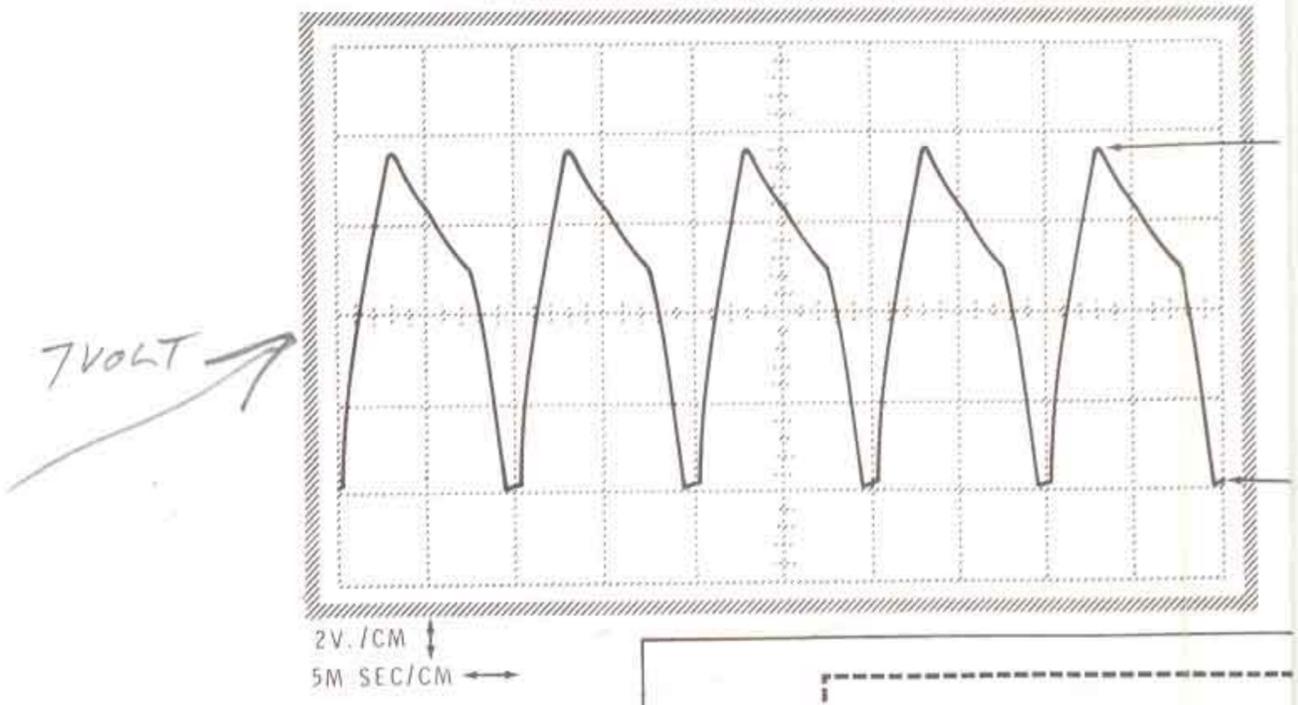
HEATH COMPANY • BENTON HARBOR, MICHIGAN
THE WORLD'S FINEST ELECTRONIC EQUIPMENT IN KIT FORM

LITHO IN U.S.A.

SCHEMATIC OF THE HEATHKIT® DIGITAL FLOOR CLOCK / DIGITAL SHELF CLOCK MODEL GC-1195/GC-1197

NOTES:

1. ALL RESISTORS ARE 1/2-WATT. VALUES ARE SHOWN IN OHMS (K=1000).
 2. CAPACITOR VALUES ARE SHOWN IN MICROFARADS.
 3. SYMBOLS:
 = LETTERED CIRCUIT BOARD HOLE.
 = CIRCUIT BOARD GROUND.
 = CHASSIS GROUND.
 = DC VOLTAGE.
 = WAVEFORM
 4. COMPONENTS ARE NUMBERED FOLLOWING GROUPS:
 1 - 10 PARTS ON THE
 101 - 150 PARTS ON THE
 201 - 250 PARTS ON THE
- * THIS VOLTAGE IS NOT FILTERED ON MOST VOLTMETERS. THIS IS THE LDR RESISTANCE AND VOLTAGE LIGHT.
 ** THESE RESISTORS MAY BE FOUND ON SEE PAGE 36 OF THE MANUAL



With new chip when power goes off then on clock will show a Random time and not 12:00 like old chip.

With 121 VAC
 C101 = 17.98 200MV(AC)
 Q1 B = 5.05
 E = 4.12
 C = 5.35

PIN 1 & 40 OF IC101 = 17.6

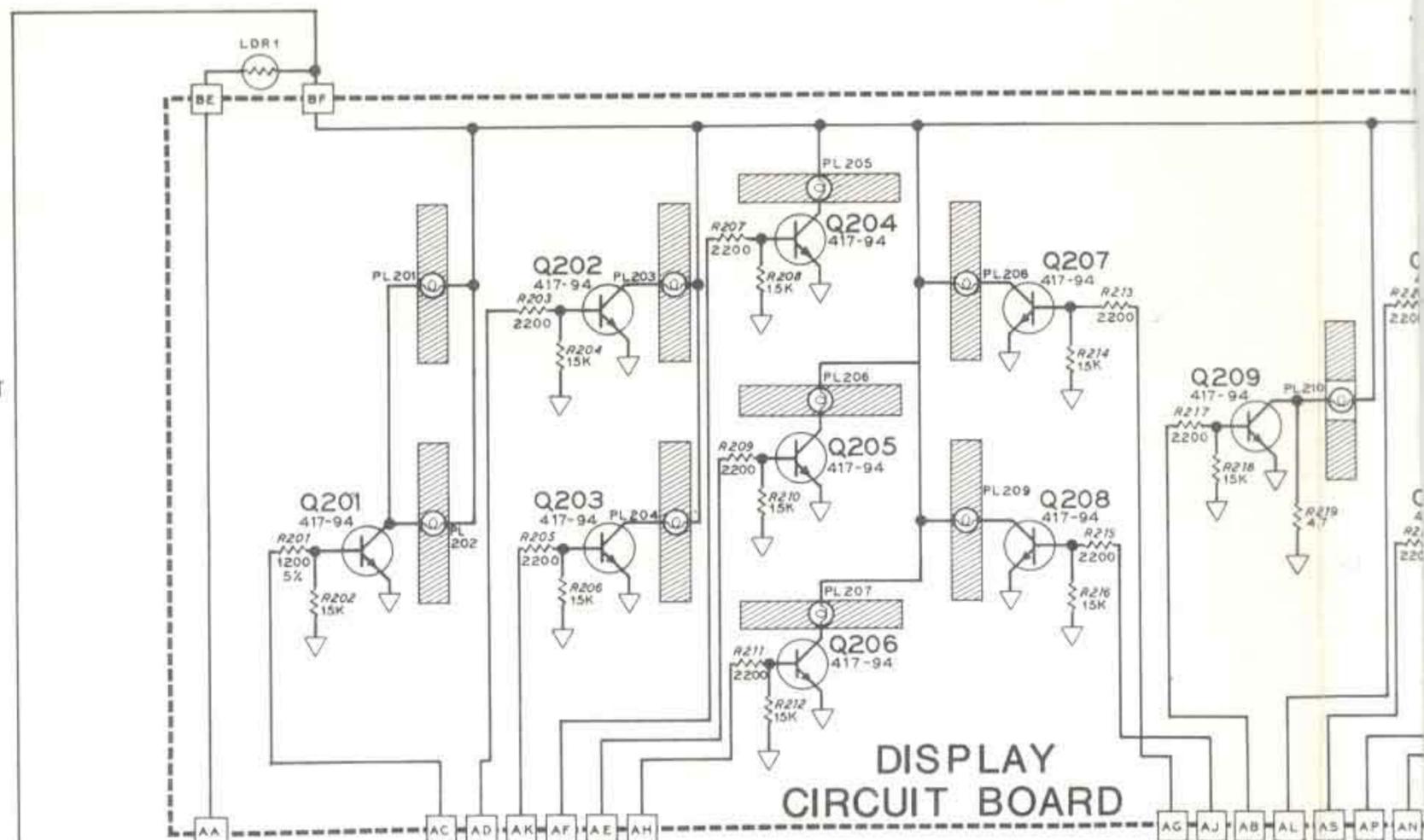
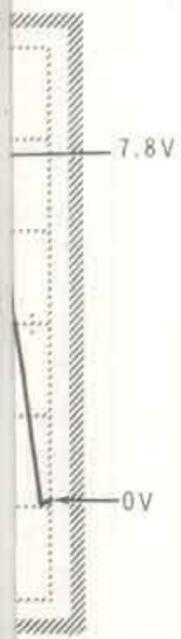
** 3.3 chip out of socket*

NUMBERED ON THE SCHEMATIC IN THE S:

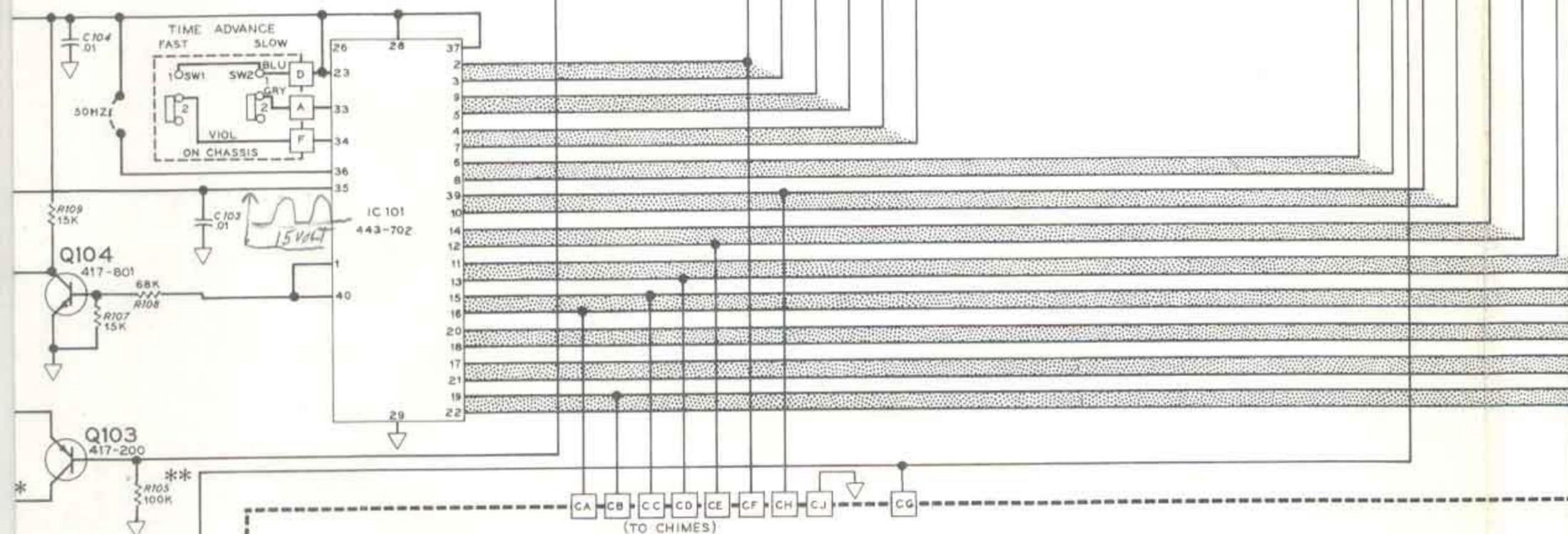
S ON THE CHASSIS
S ON THE POWER CIRCUIT BOARD.
S ON THE DISPLAY CIRCUIT BOARD.

NOT FILTERED AND MAY VARY GREATLY
RS. THIS VOLTAGE ALSO DEPENDS ON
CE AND WILL BE LESS IN DIM AMBIENT

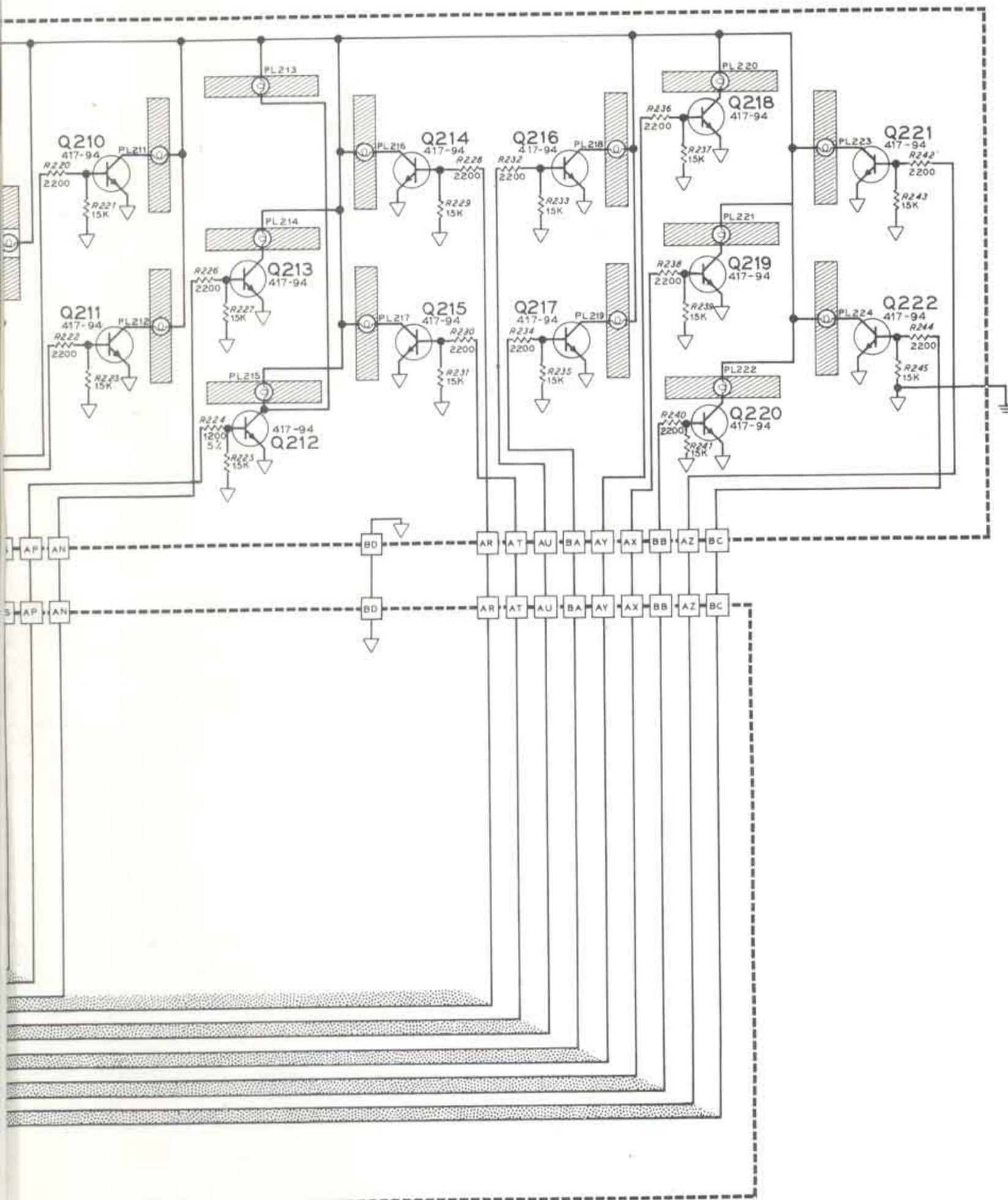
MAY BE A DIFFERENT VALUE.
MANUAL.



DISPLAY CIRCUIT BOARD



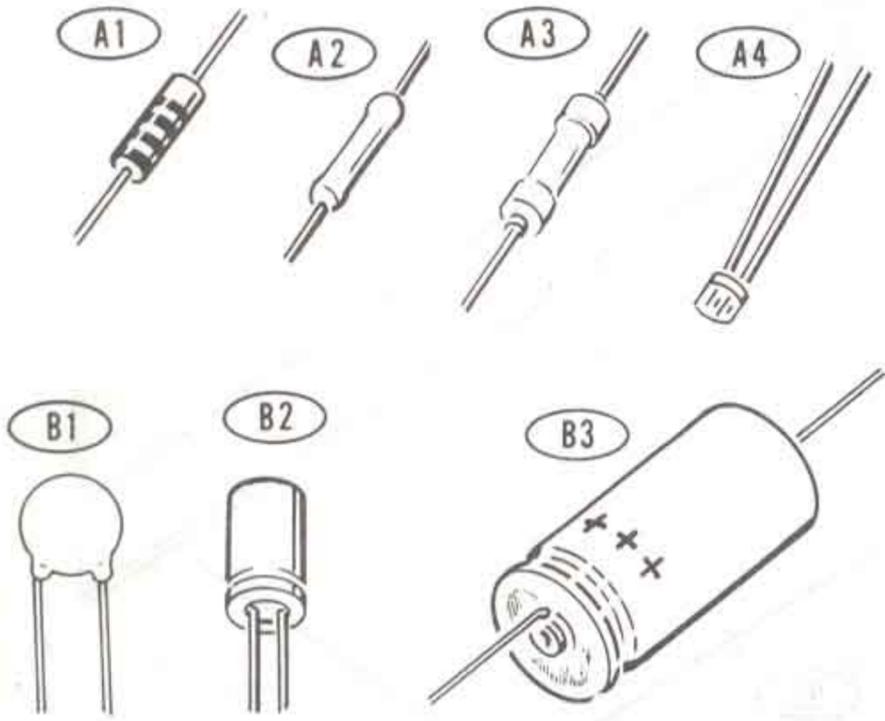
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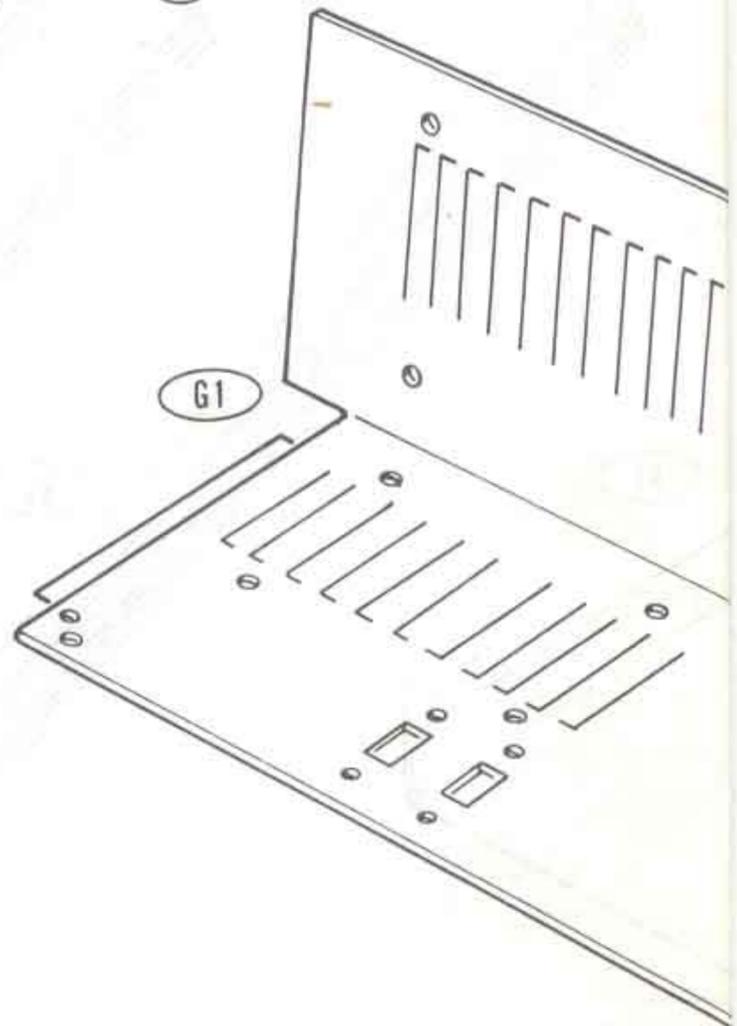
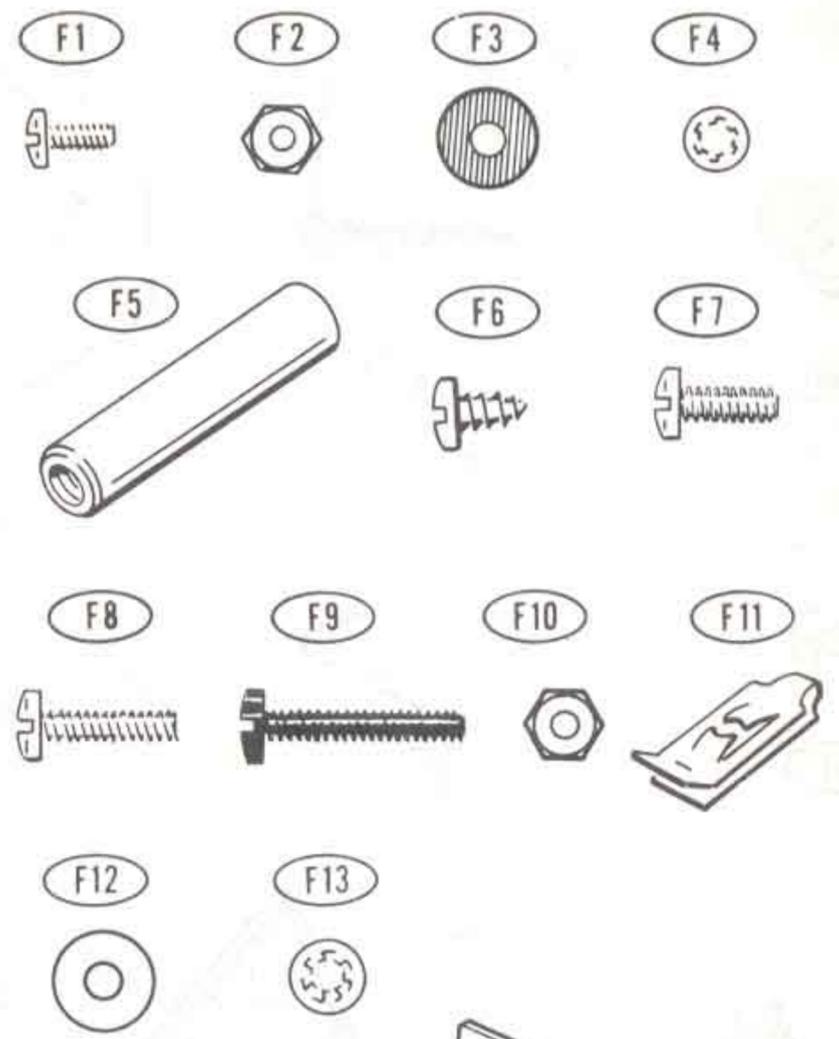
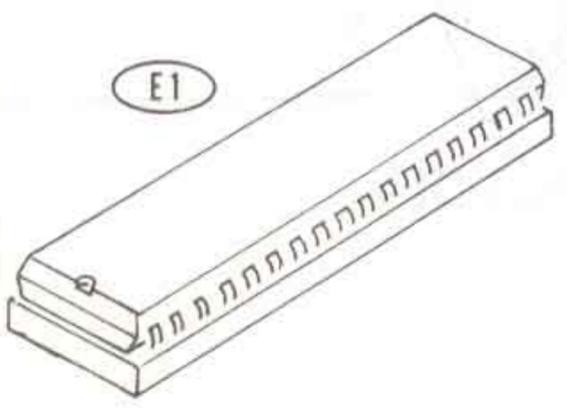
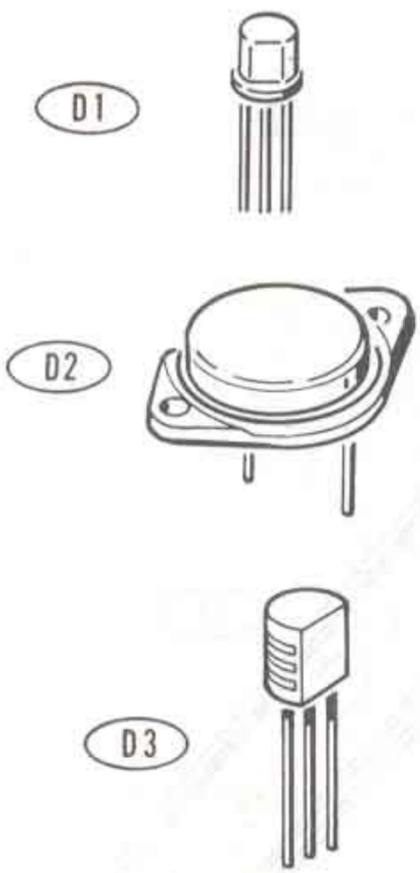
ILLUSTRATION

PARTS LIST



C1

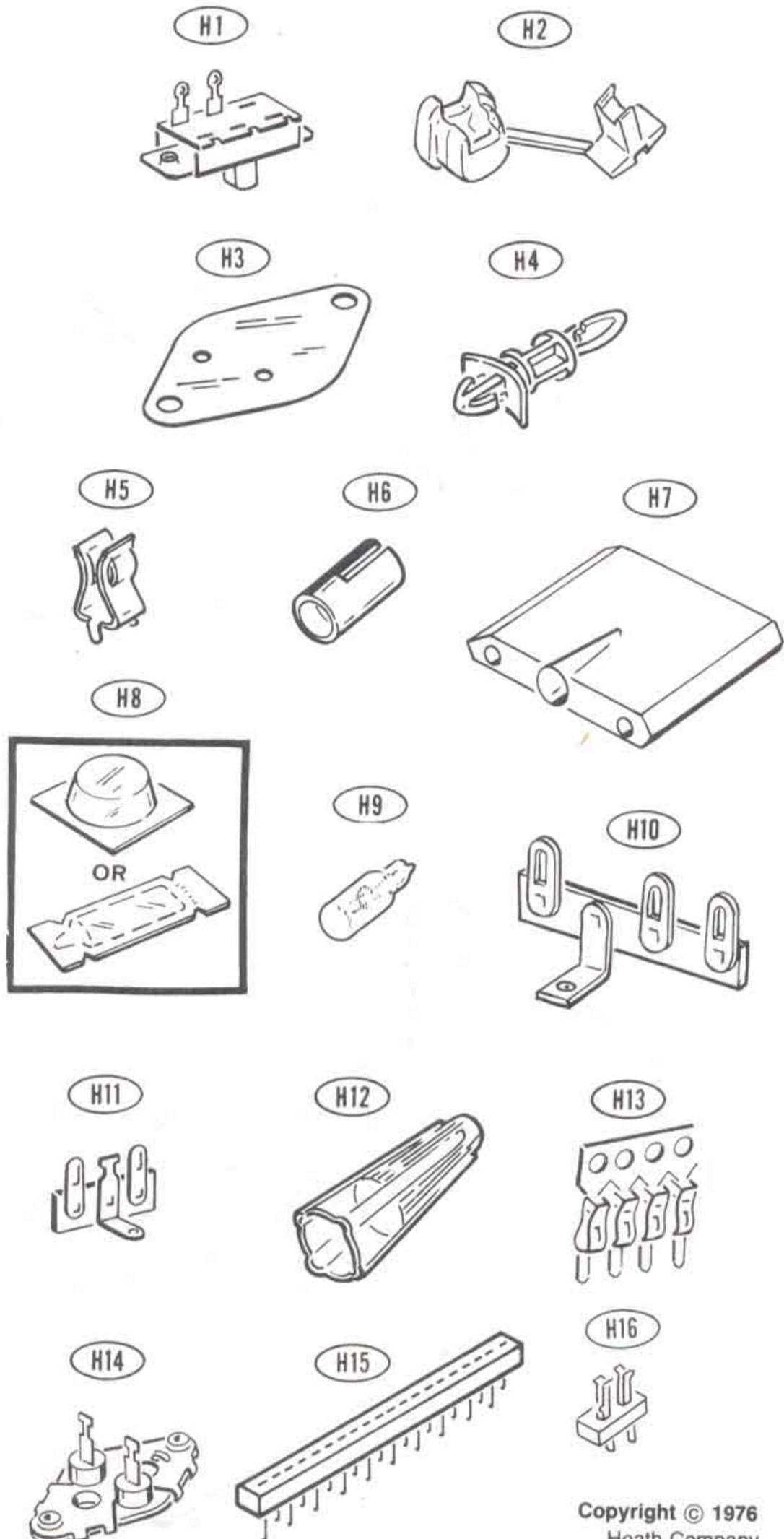
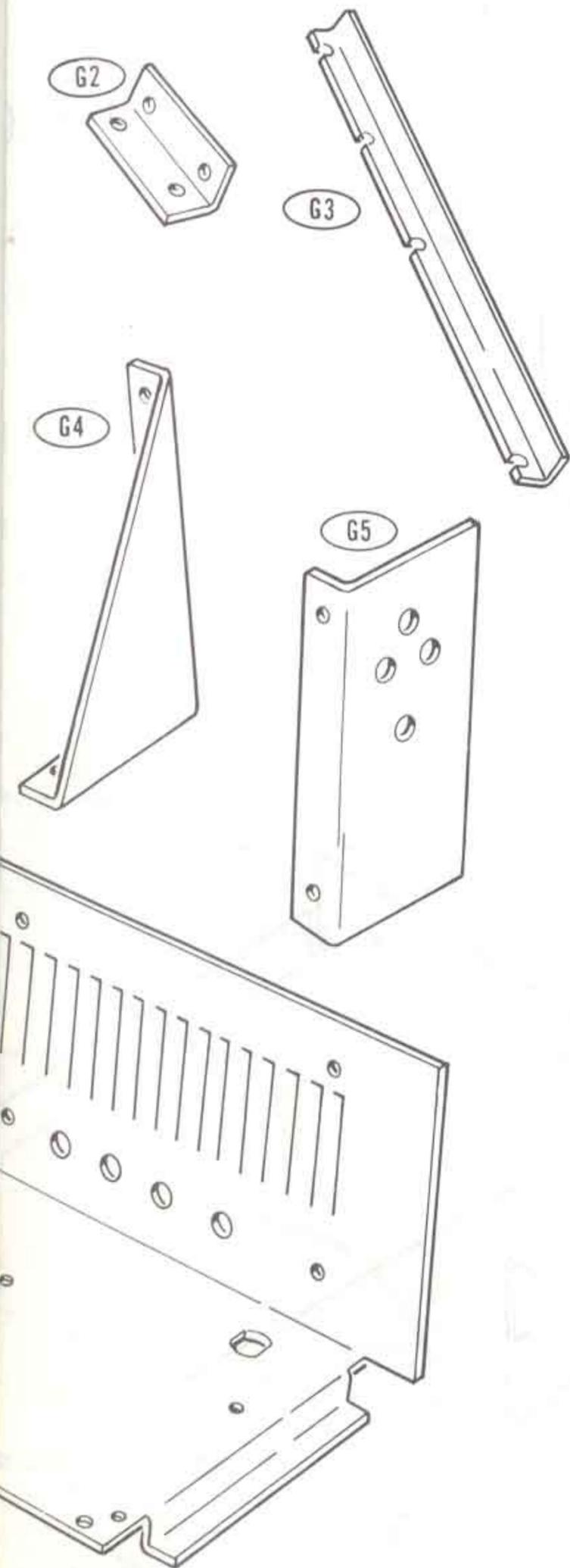
NOTE: HEATH PART NUMBERS ARE STAMPED ON MOST DIODES.



ON BOOKLET

CTORIAL

Part of 595-1886-02

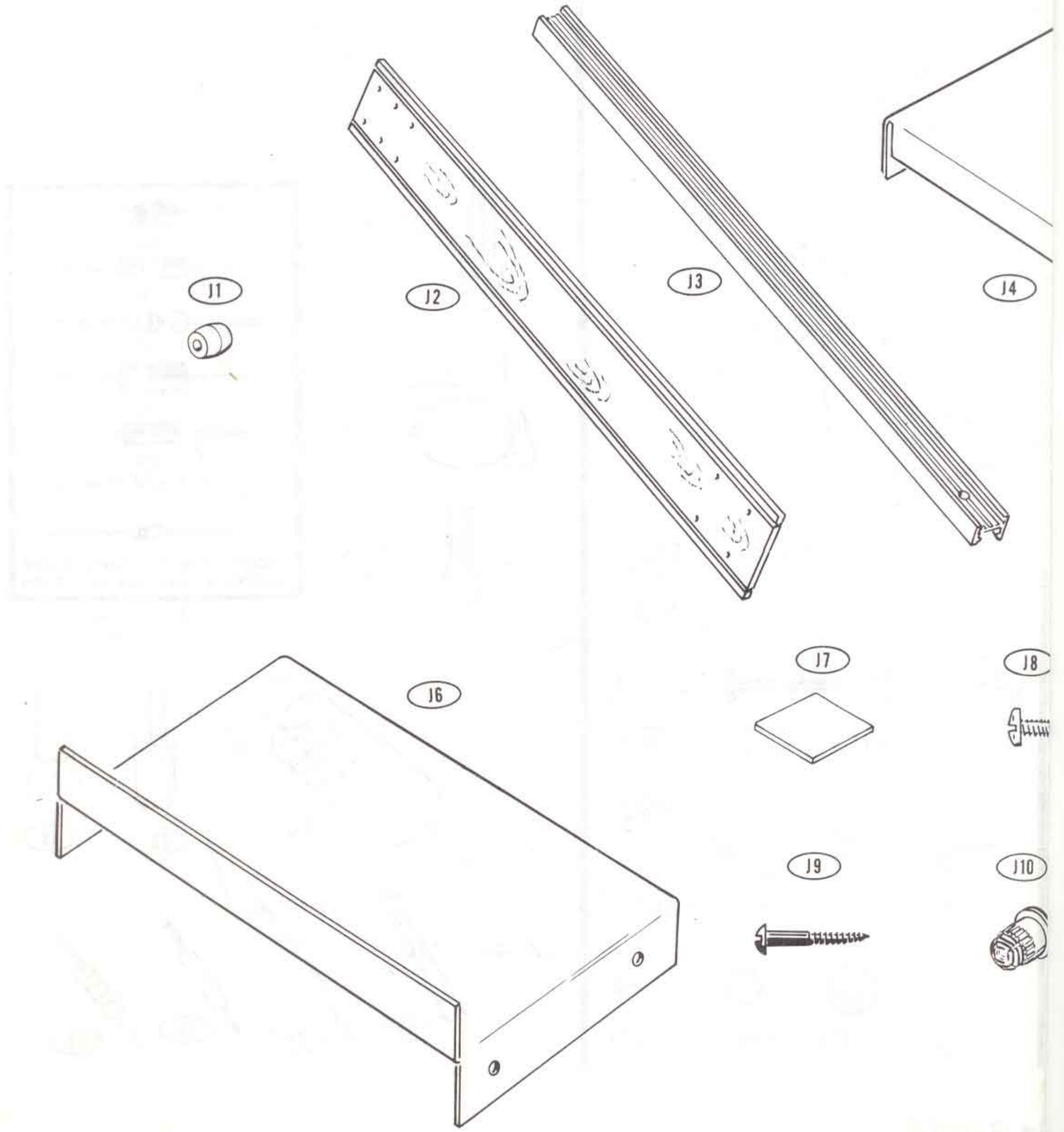


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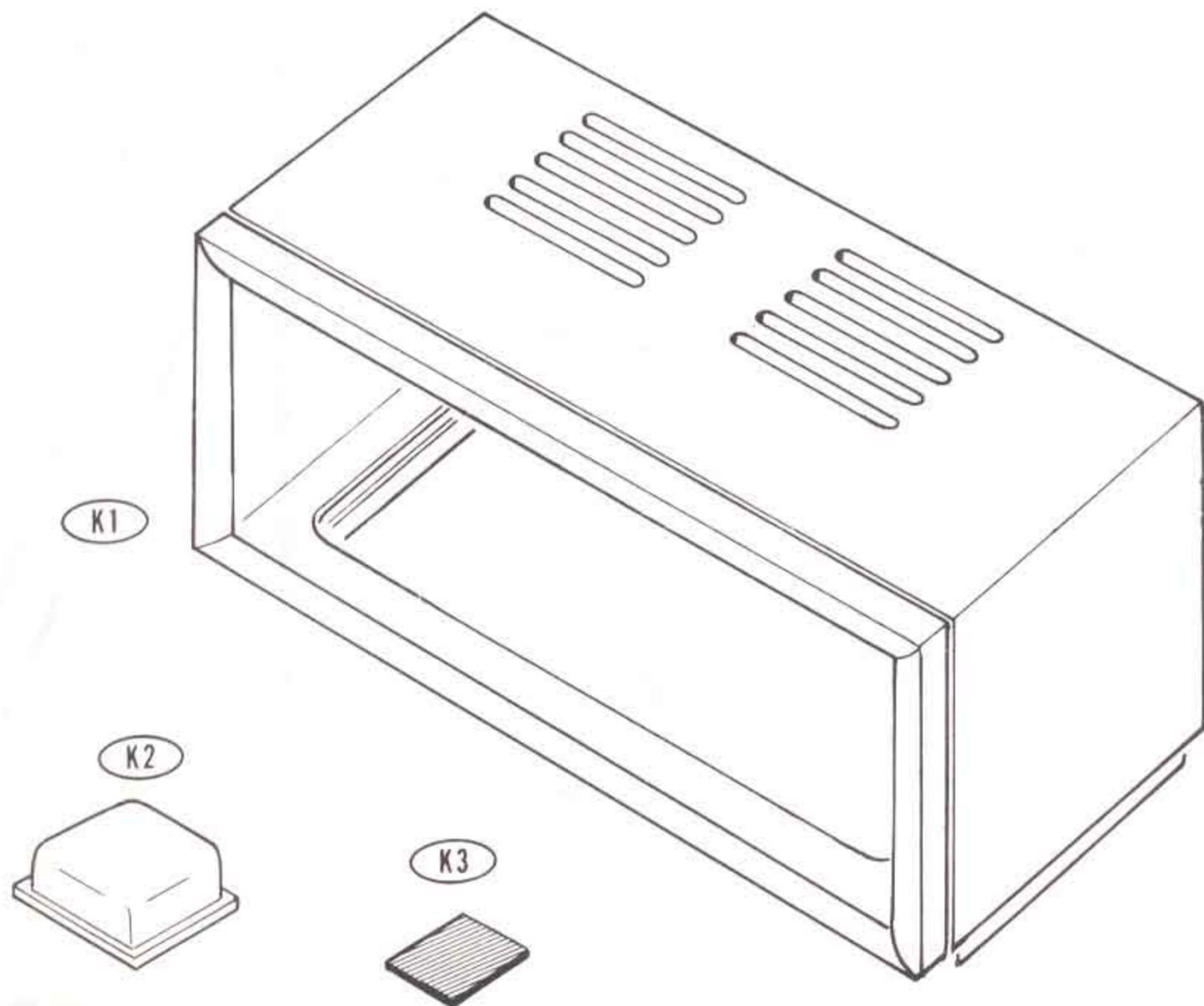
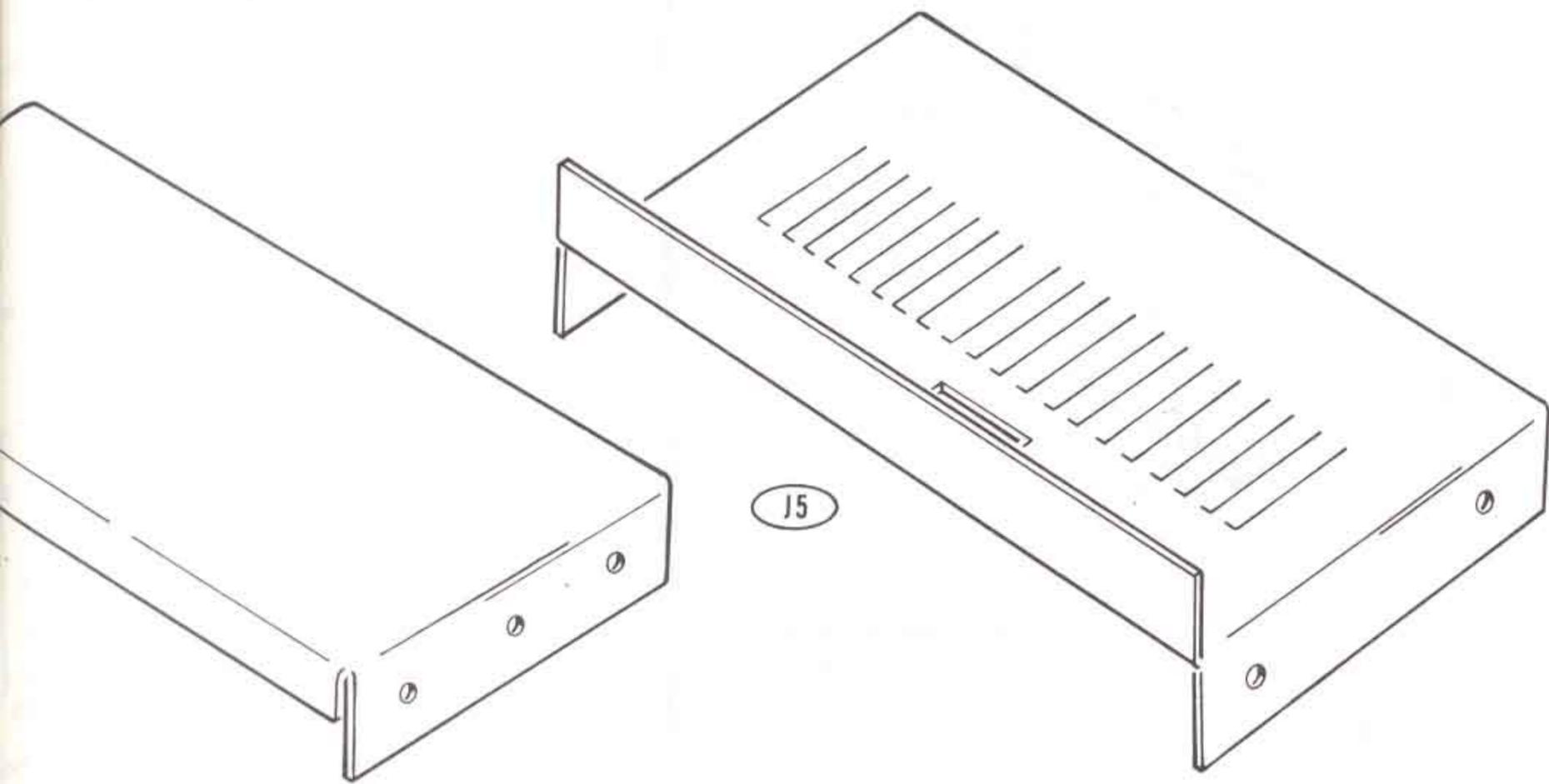
Model GC-1195/GC-1197

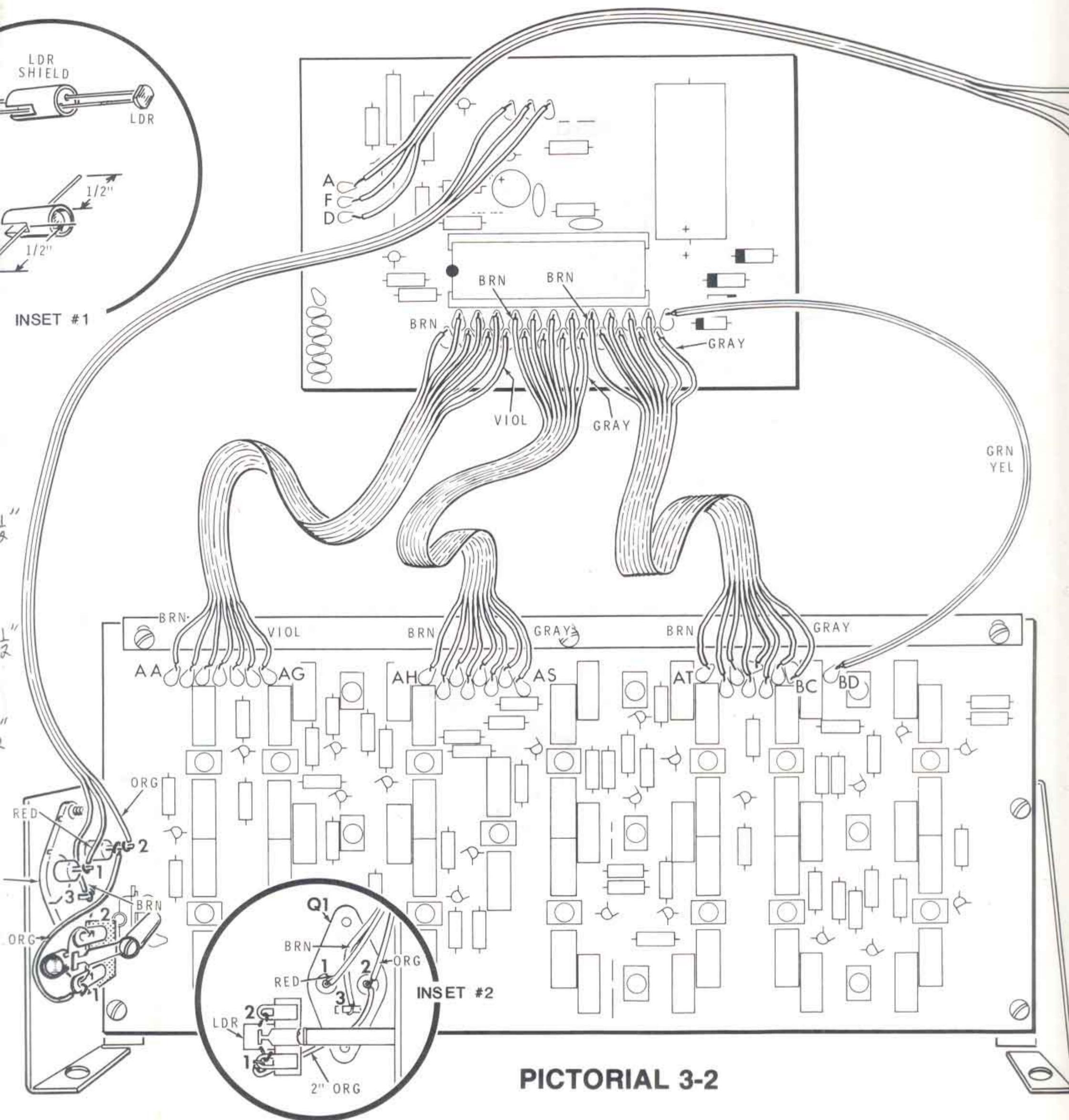
Printed in the United States of America

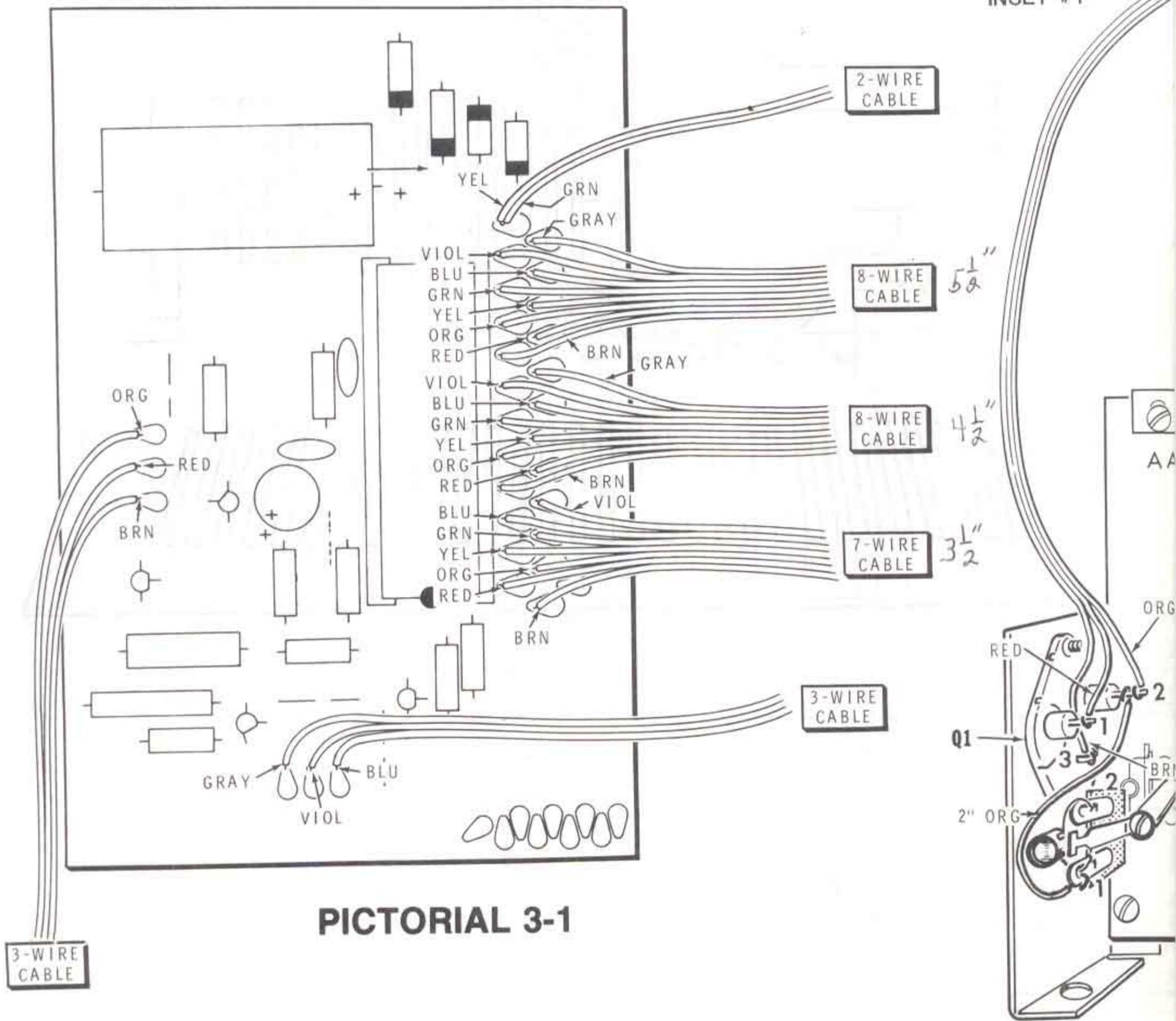
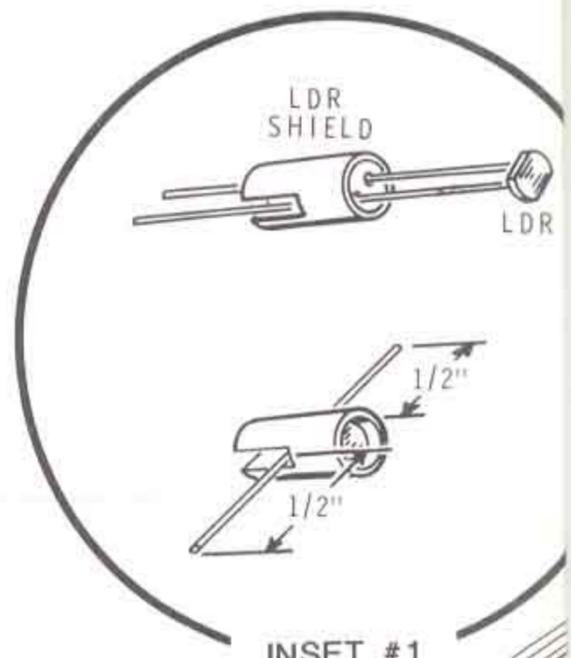
Parts Pictorial



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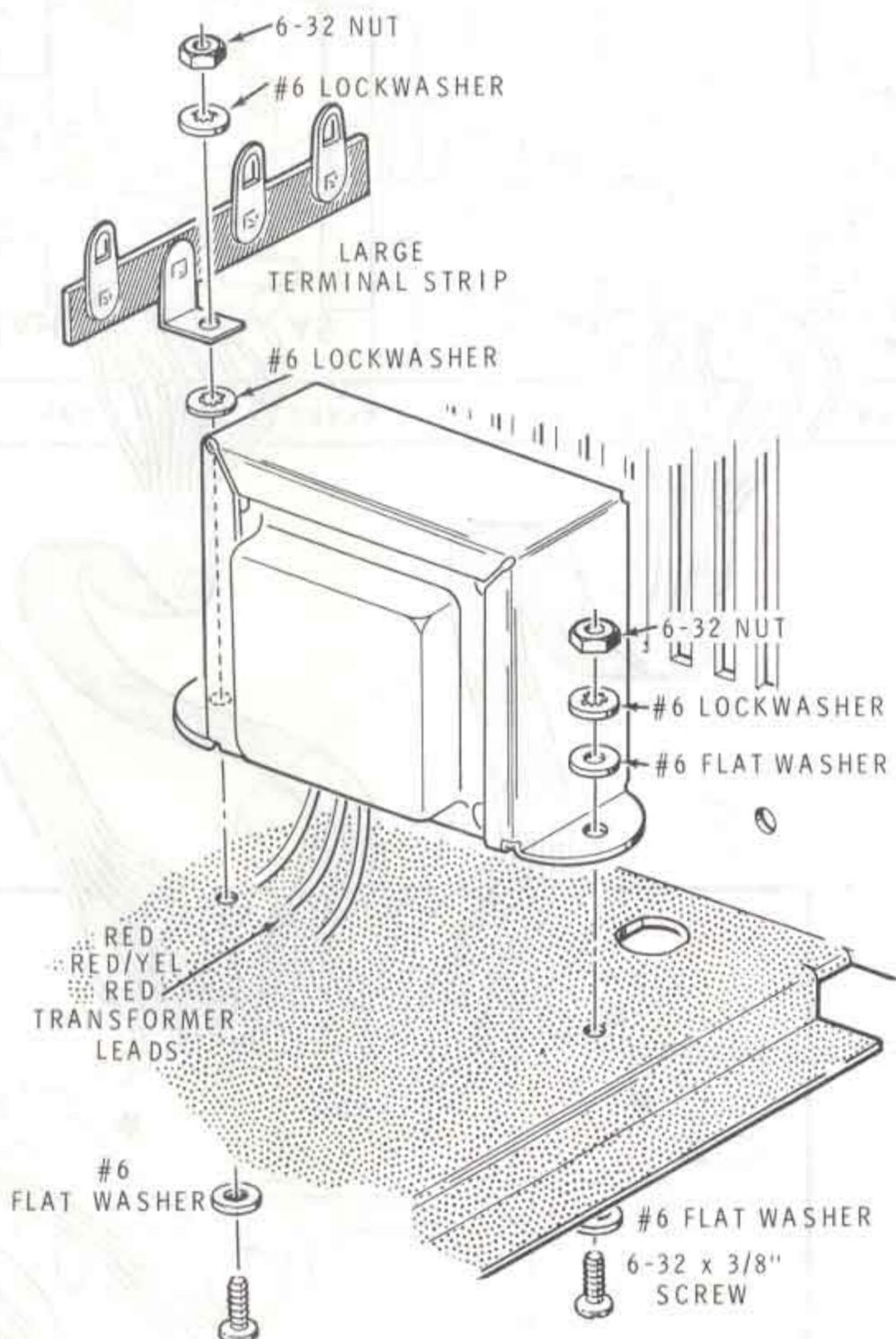




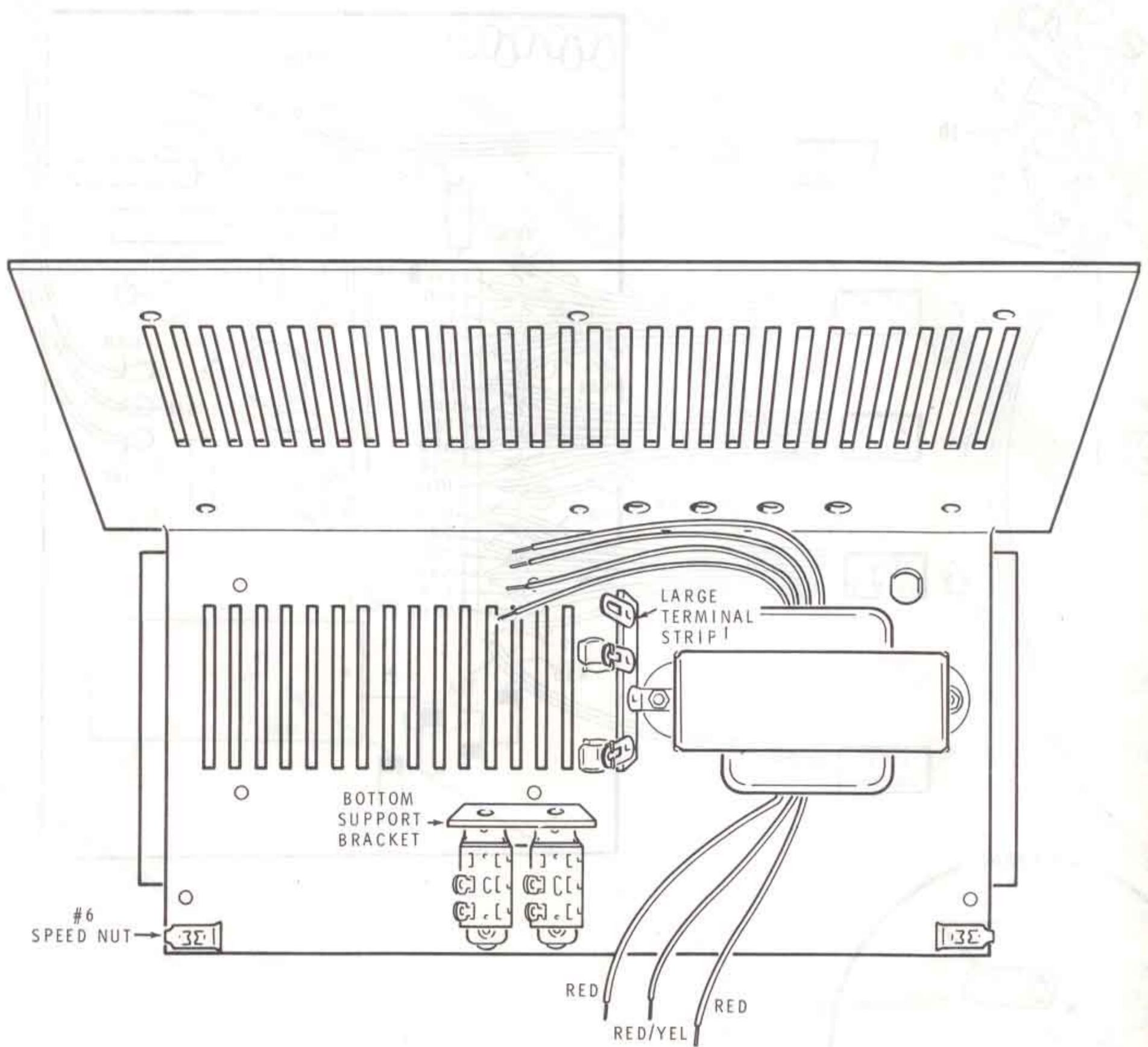


PICTORIAL 3-1

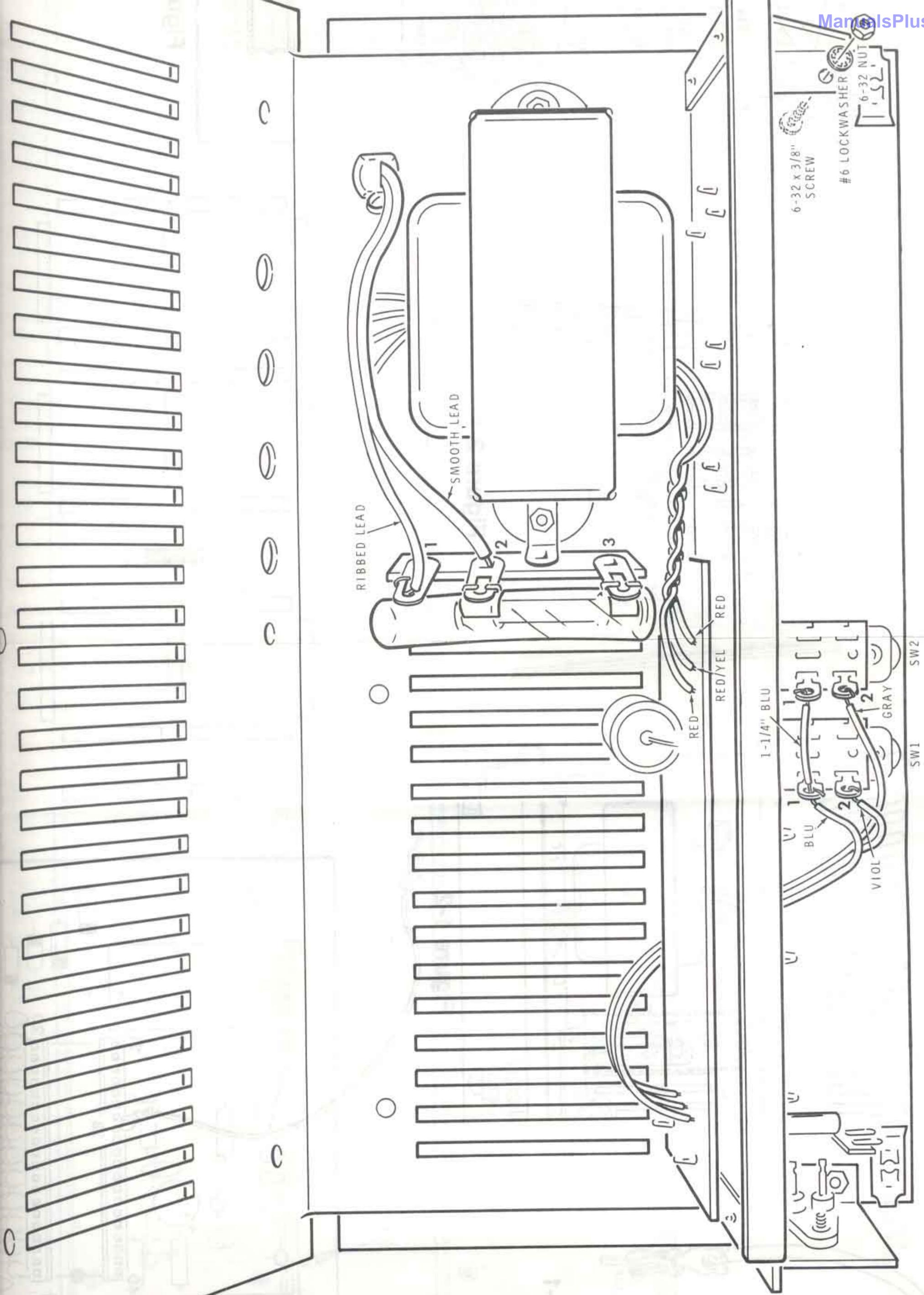
FIGURE 3-5



Detail 4-1D



PICTORIAL 4-1



PICTORIAL 4-2

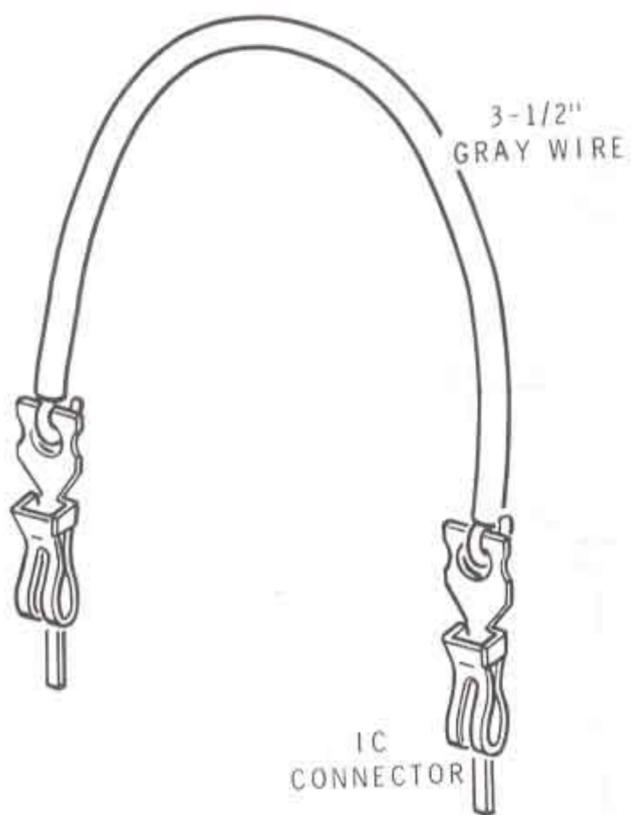


Figure 1-1

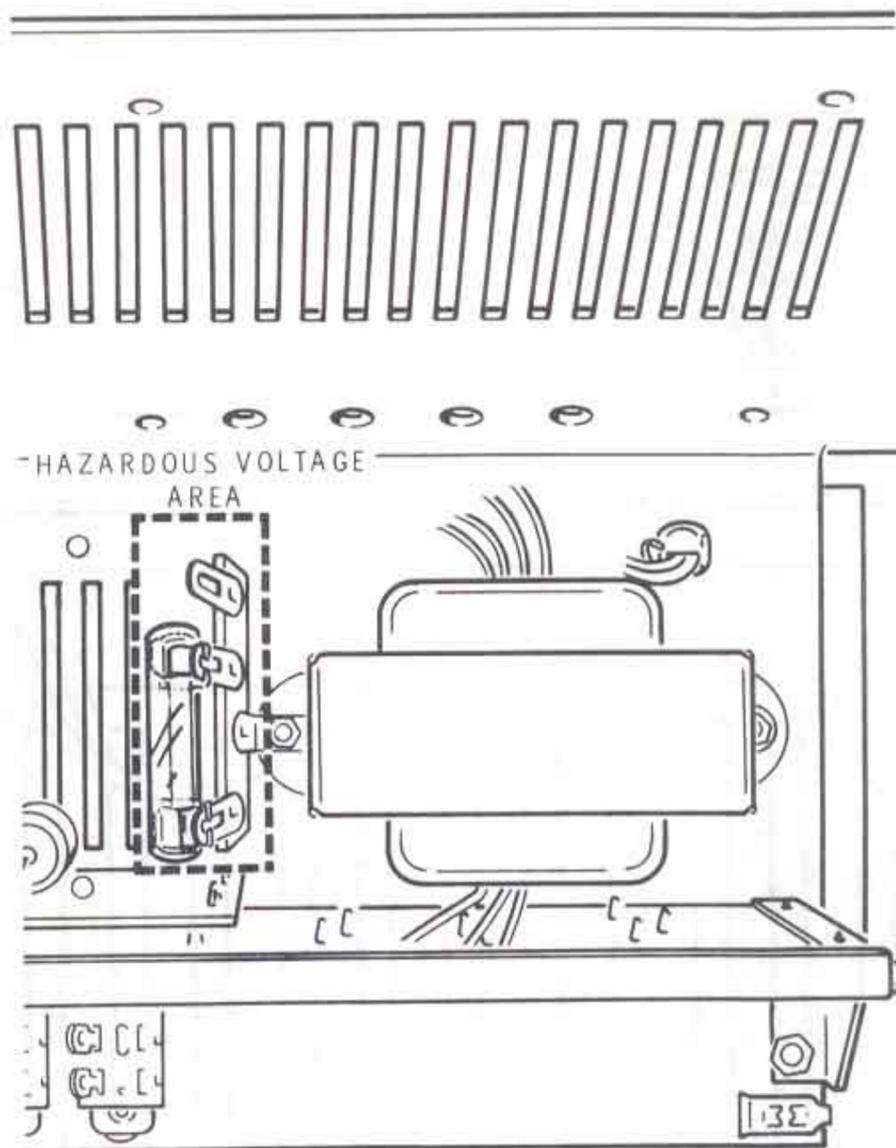


Figure 1-2

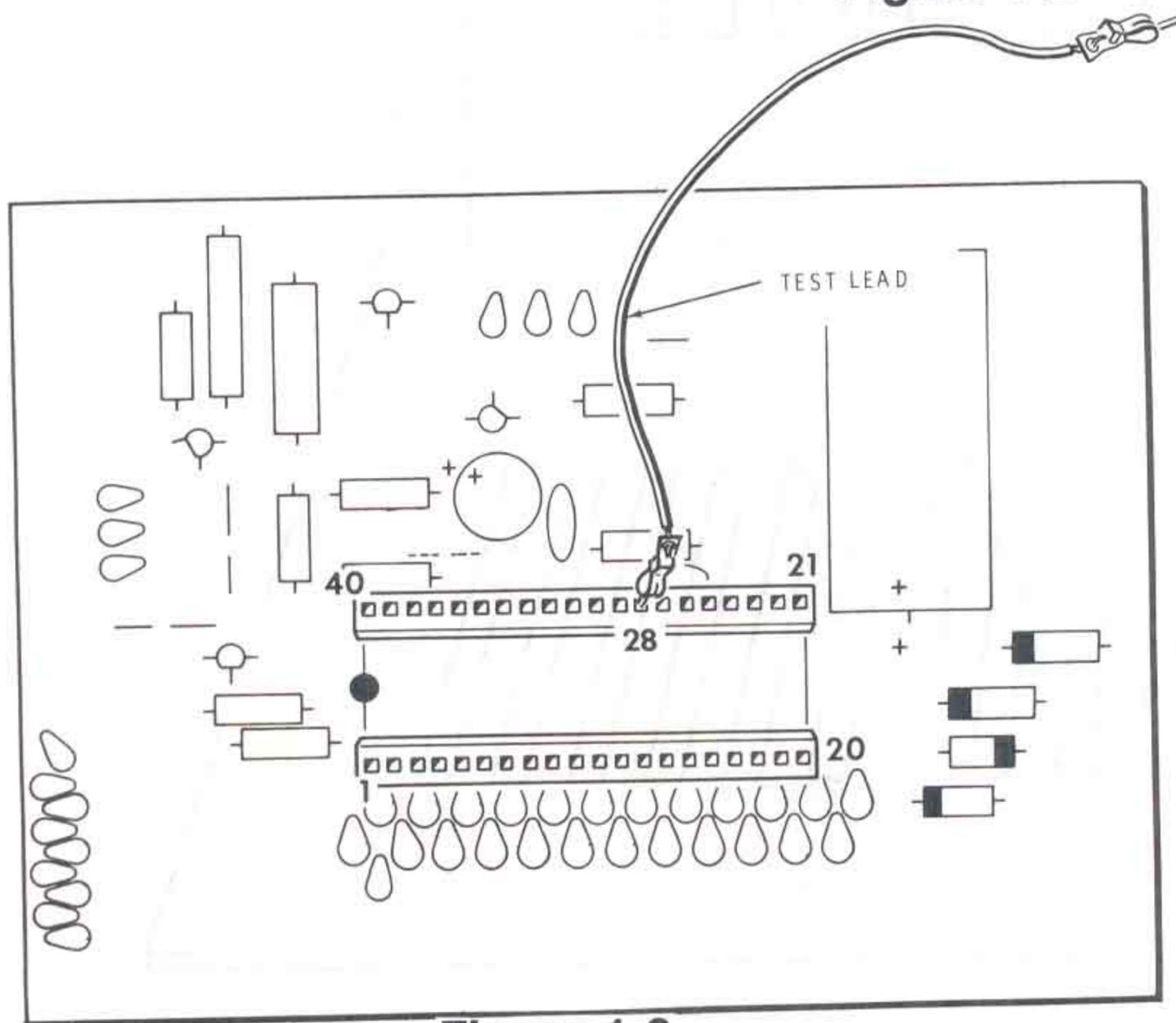


Figure 1-3

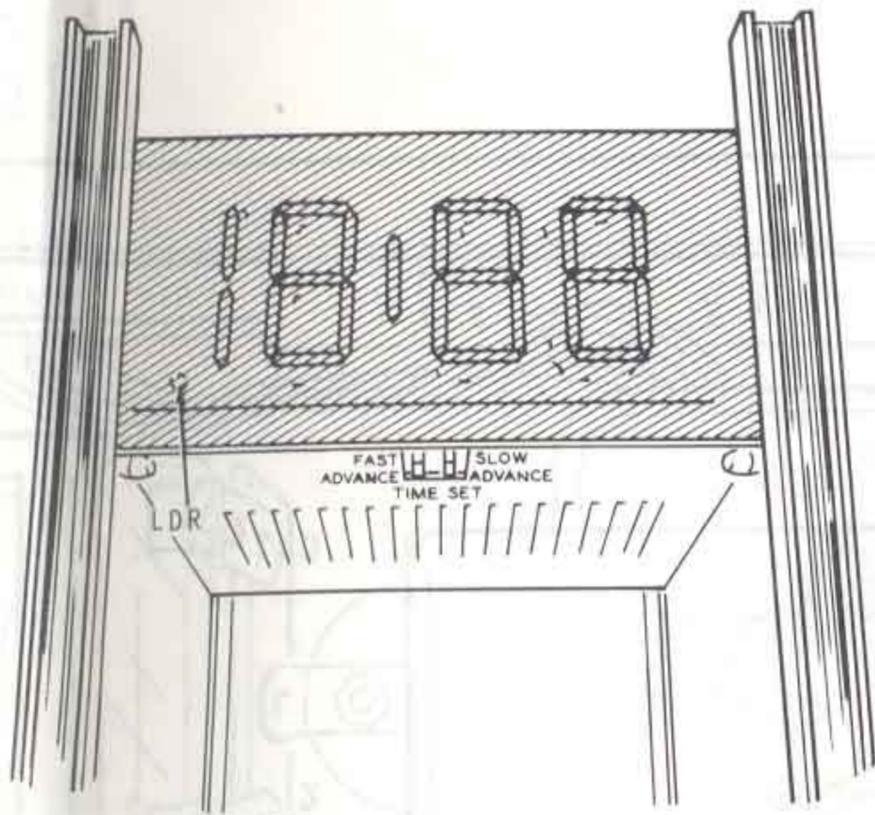
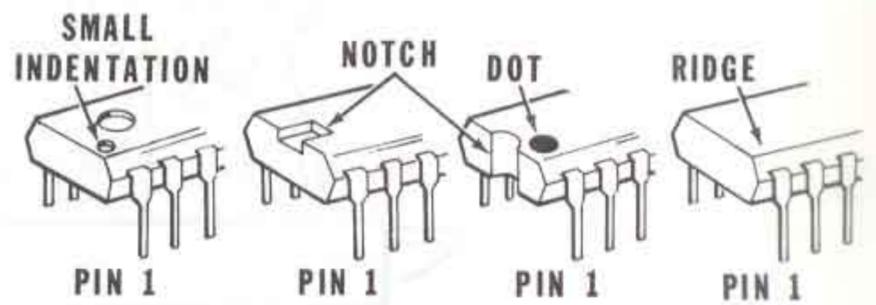


Figure 2-1



1. IDENTIFY THE PIN 1 END OF THE INTEGRATED CIRCUIT.
2. POSITION THE PIN 1 END OF THE IC AT THE END OF THE SOCKET WHERE THE INDEX MARK IS SCREENED ON THE CIRCUIT BOARD.
3. BE SURE THE IC LEADS ARE STRAIGHT. THEN INSERT THE LEADS INTO THE SOCKET AND PUSH THE IC DOWN INTO PLACE.

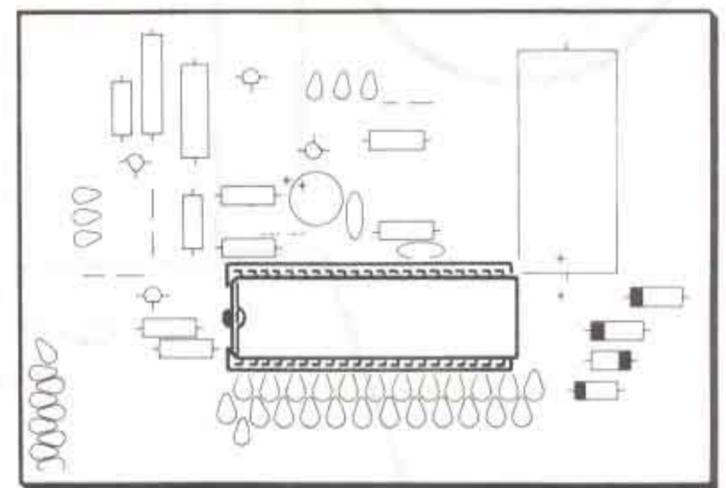
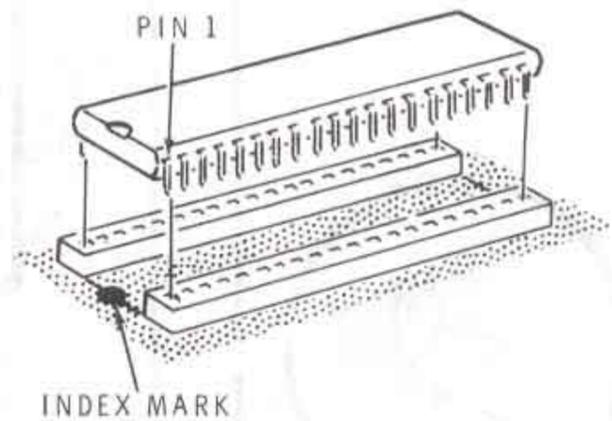


Figure 1-5

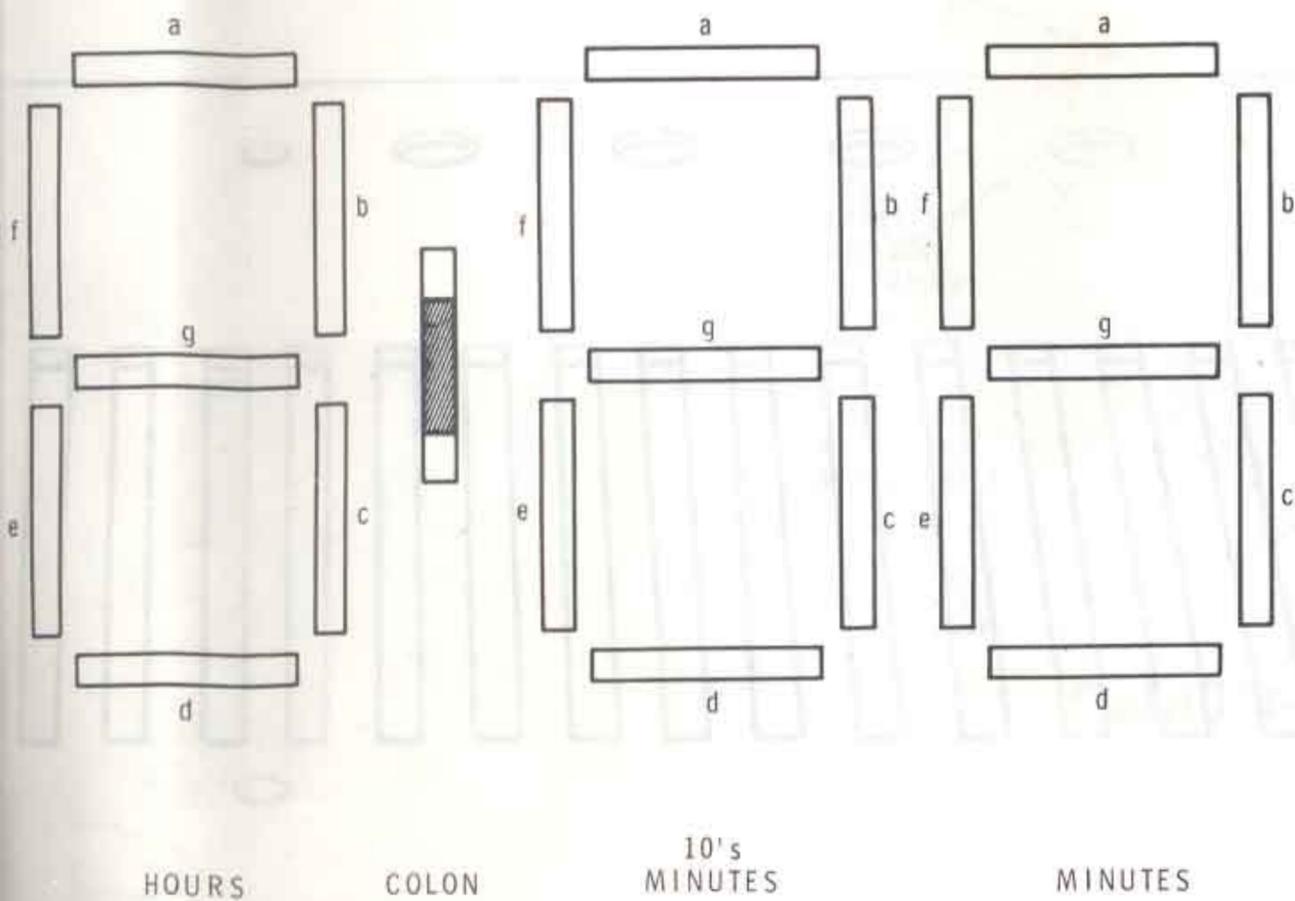


Figure 1-4

INVOICE

HEATH

Schlumberger**HEATH COMPANY**

BENTON HARBOR MI 49022

PHONE 616 - 982-3411

INVOICE NUMBER

231358-01

INVOICE DATE

11/07/77

AMOUNT DUE

ROBERT E MARTIN
 207 N-GILLETTE AVE
 GILLETTE WY 82716
 5

TERMS: CASH

| QTY. | PRODUCT ORDERED | DESCRIPTION | SHIPPING DATE | | UNIT PRICE | EXTENDED PRICE | |
|---|-----------------|------------------|---------------|----------|----------------|----------------|--------|
| | | | SCHEDULED | ACTUAL | | | |
| 1 | GC -1195 | FLOOR CLOCK | | 11/07/77 | 139.95 | 139.95 | |
| 1 | GCA-1195- 1 | CHIMES ACCESSORY | | 11/07/77 | 69.95 | 69.95 | |
| INCLUDE INVOICE NUMBER 231358-01 ON ALL CORRESPONDENCE. REFUND CHECKS WILL BE MAILED SEPARATELY. DO NOT ENCLOSE CASH. DO NOT RETURN MERCHANDISE WITHOUT PERMISSION. ALL CLAIMS FOR SHORTAGE MUST BE MADE WITHIN 15 DAYS OF RECEIPT. | | | ***RECAP*** | | PRIOR SHIPMENT | THIS SHIPMNT | TOTAL |
| PRODUCT VALUE | | | | | | 209.90 | |
| SHIPPING/HANDLING | | | | | | 12.64 | |
| TOTAL | | | | | | 222.54 | 222.54 |
| CASH RECEIVED | | | | | | | 223.18 |
| REFUND BEING SENT SEPARATELY | | | | | | | .64 |

SPECIAL REMARKS:



HEATH COMPANY • BENTON HARBOR, MICHIGAN 49022
TLX 72-9421

TECHNICAL CONSULTATION DEPARTMENT

| PRODUCT LINE | PHONE |
|---|--------------|
| R/C, Audio, and Electronic Organs | 616-982-3310 |
| Amateur Radio | 616-982-3296 |
| Instruments, clocks, and Weather | 616-982-3315 |
| Furniture | 616-982-3423 |
| Television | 616-982-3307 |
| Computers | 616-982-3309 |
| Automotive, Marine, Home Security, Shortwave, Metal Locators, Strobe Lights, and all General Products | 616-982-3496 |
| REPLACEMENT PARTS, Call | 616-982-3571 |

June 19, 1985

MR. R. MARTIN
4621 E. 113TH AVE
ANCHORAGE, AK 99516

Dear Mr. Martin:

Subject: GC-1195

The three integrated circuits that you sent back for us to checkout all checked good and they are being sent back to you. You will most likely receive them shortly after this correspondence. Mr. Swan is currently on vacation and we do not quite understand the problem that you are having. You say in your note "the clock is still working after two days and if the chips are not all bad I may still have a problem". The only information that I can give you is that those three ICs that you sent in for us to have checked checked out okay.

The 443-848 chip will not blink at twelve o'clock when you have a power interrupt. It may blink at any random number just as long as it is blinking. While the other chip (443-702) will only blink at twelve o'clock after a power interrupt.

If you need any further information, please feel free to call or contact us.

Sincerely,

Thomas H. Jones

Thomas H. Jones
Technical Consultant

THJ/rc

443-702 *old chip*
443-848 *new*