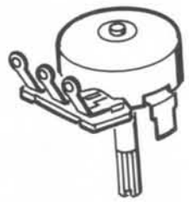
ILLUSTRATION BOOKLET

Part of 595-3298

DISPLAY CIRCUIT BOARD
PARTS PICTORIAL

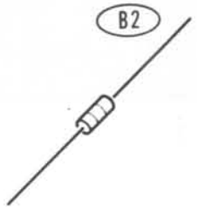
A1

A2



B1

B2

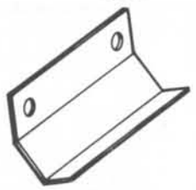


B3

B4

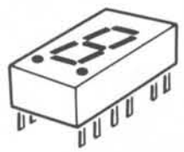
C1

C2



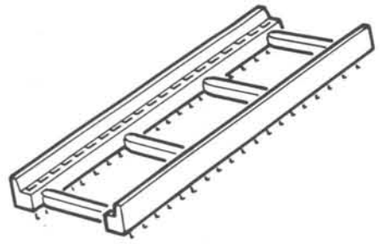
C3

C4

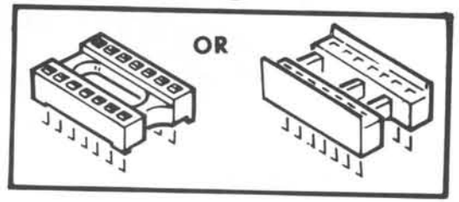


C5

C6



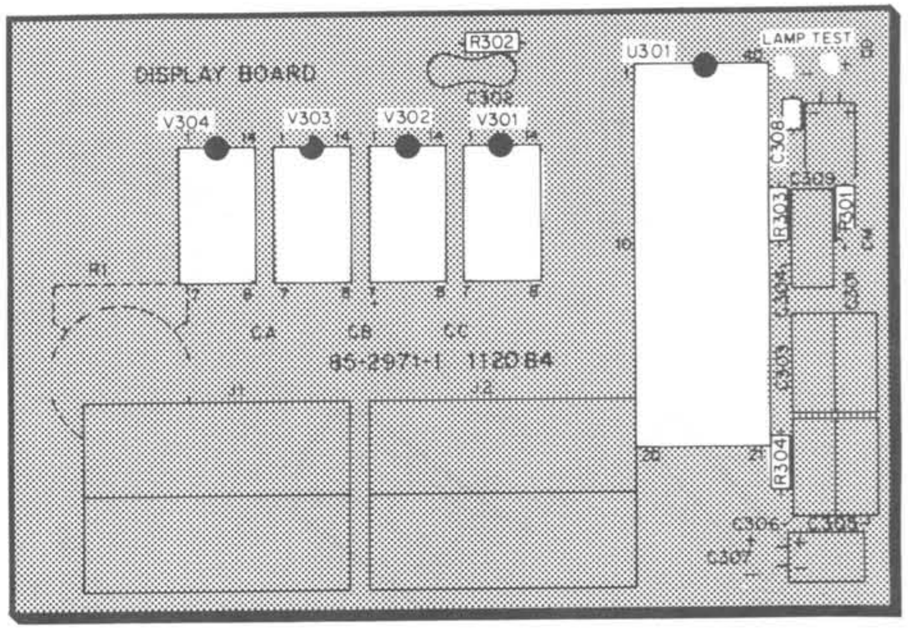
C7



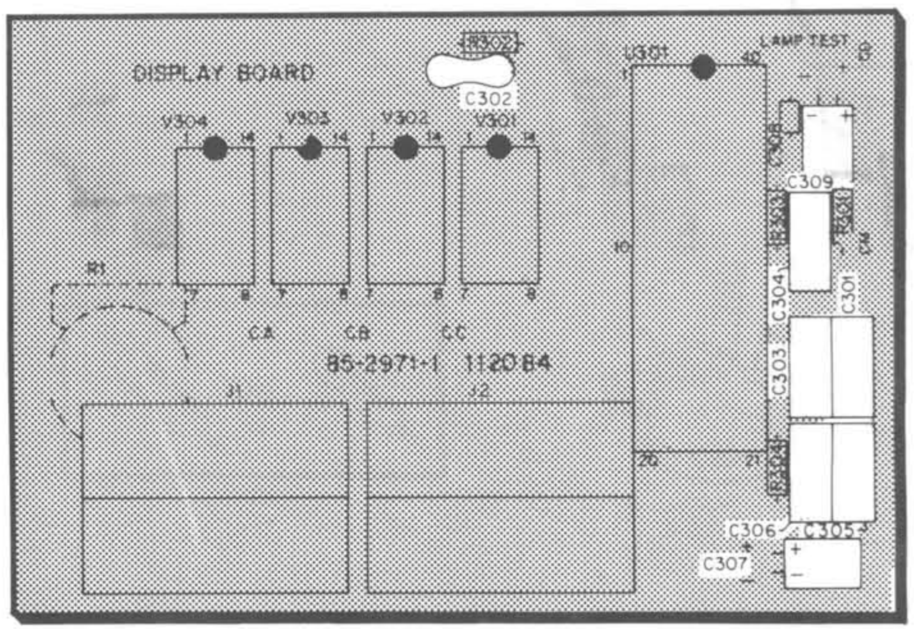
C8

D1

D2

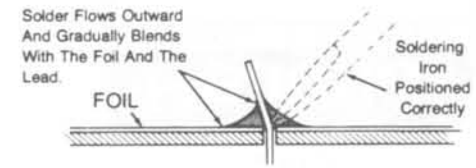


PICTORIAL 1-1



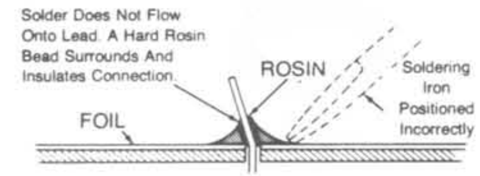
PICTORIAL 1-2

A GOOD SOLDER CONNECTION

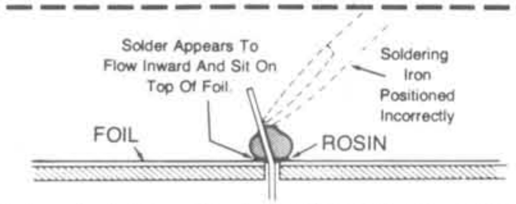


When you heat the lead and the circuit board foil at the same time, the solder will flow evenly onto the lead and the foil. The solder will make a good electrical connection between the lead and the foil.

POOR SOLDER CONNECTIONS



When the lead is not heated sufficiently, the solder will not flow onto the lead as shown above. To correct, reheat the connection and, if necessary, apply a small amount of additional solder to obtain a good connection.

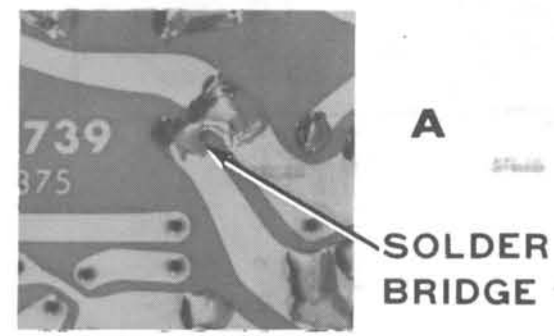


When the foil is not heated sufficiently the solder will blob on the circuit board as shown above. To correct, reheat the connection and, if necessary, apply a small amount of additional solder to obtain a good connection.

SOLDER BRIDGES

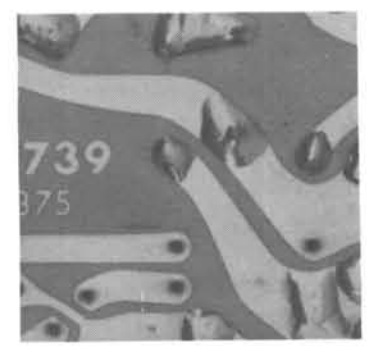
A solder bridge between two adjacent foils is shown in photograph **A**. Photograph **B** shows how the connection should appear. A solder bridge may occur if you accidentally touch an adjacent previously soldered connection, if you use too much solder, or if you "drag" the soldering iron across other 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 most circuit boards has a coating on it called "solder resist." This is a protective insulation to help prevent solder bridges.

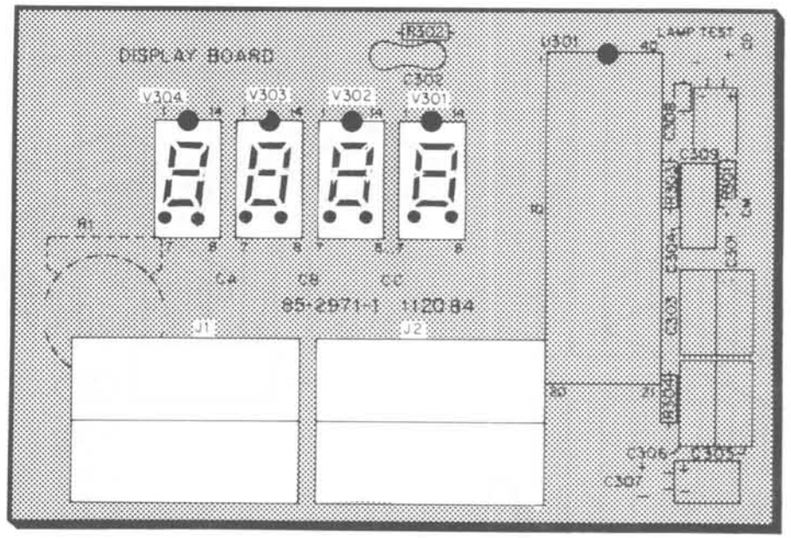


A

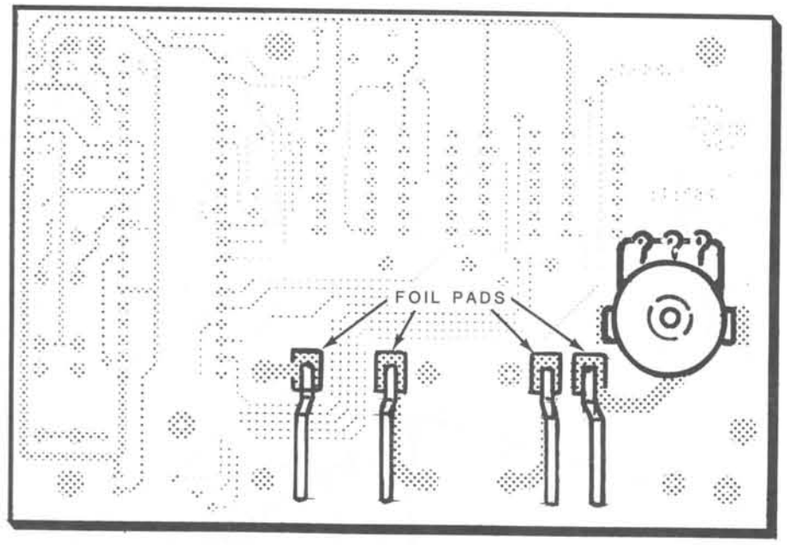
B



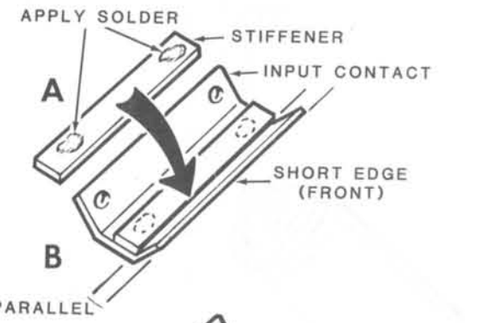
Detail 1-1A



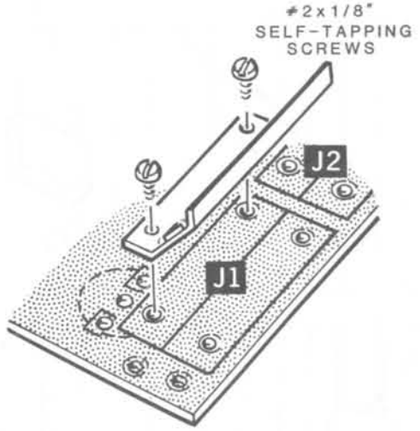
PICTORIAL 1-3



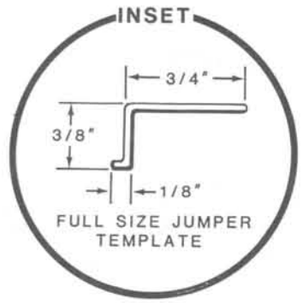
PICTORIAL 1-4

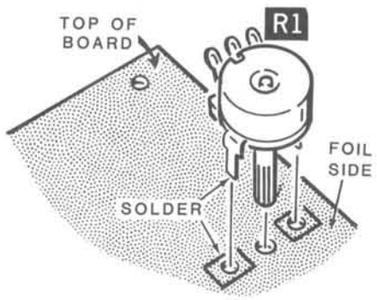


Detail 1-3A



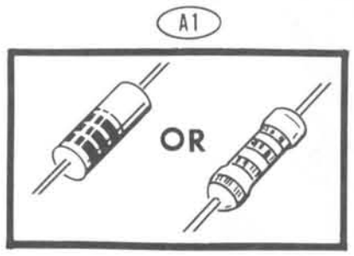
Detail 1-3B

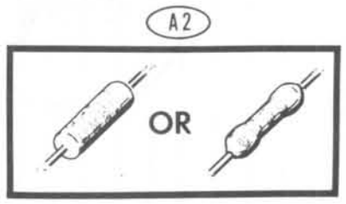


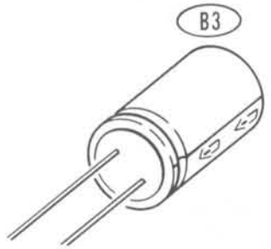


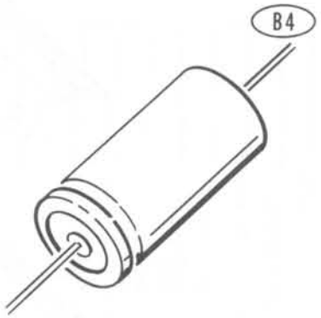
Detail 1-4A

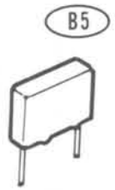
MAIN CIRCUIT BOARD, BOARD WIRING, AND CHASSIS ASSEMBLY PARTS PICTORIAL

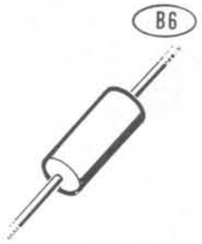


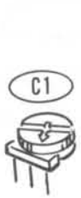


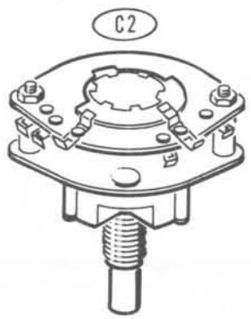


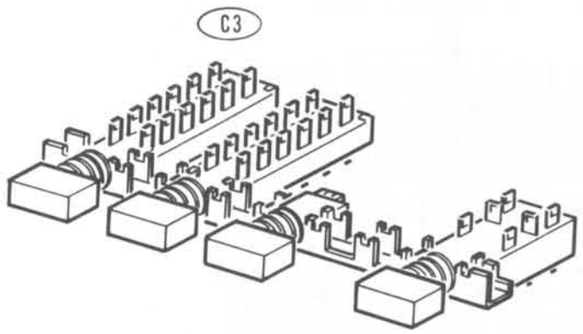


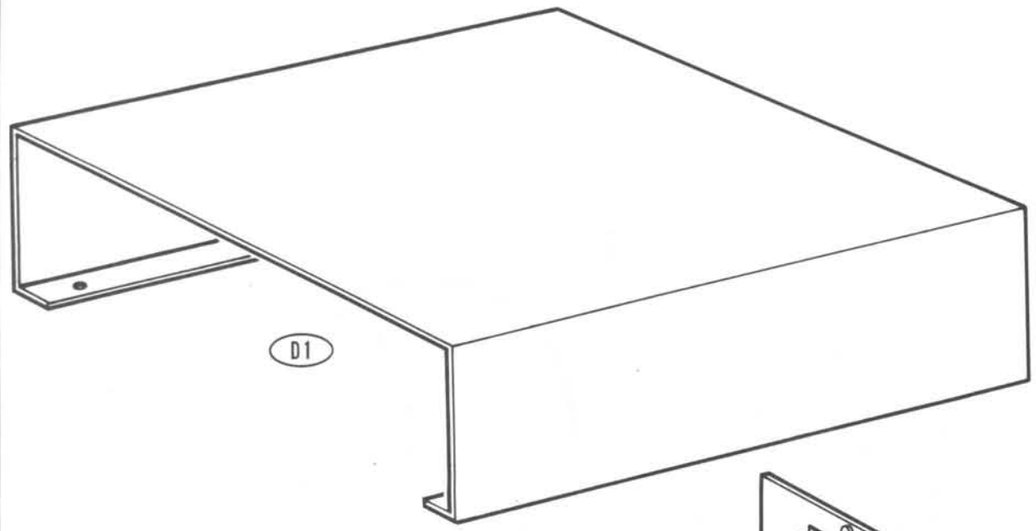


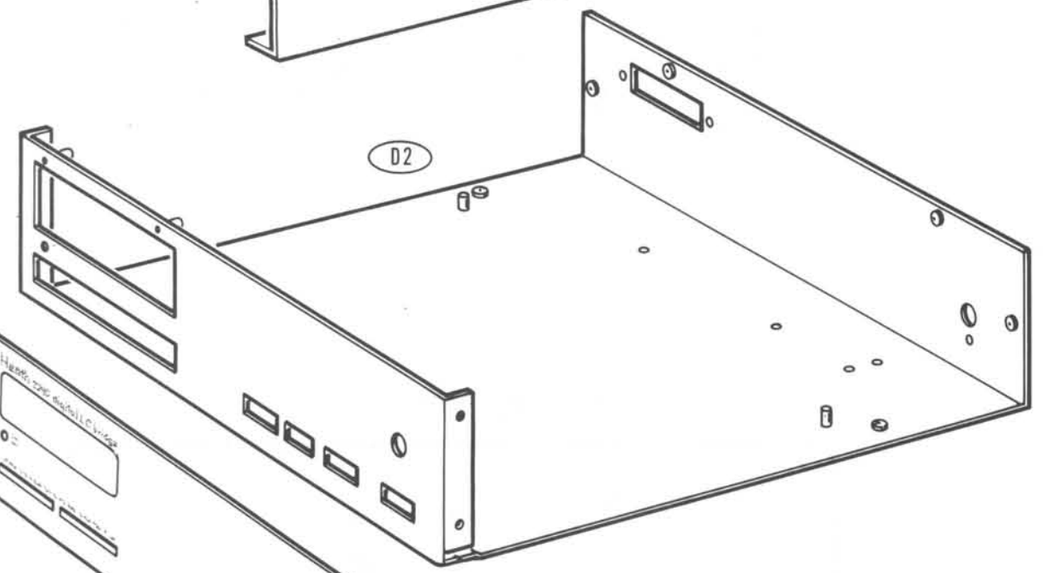


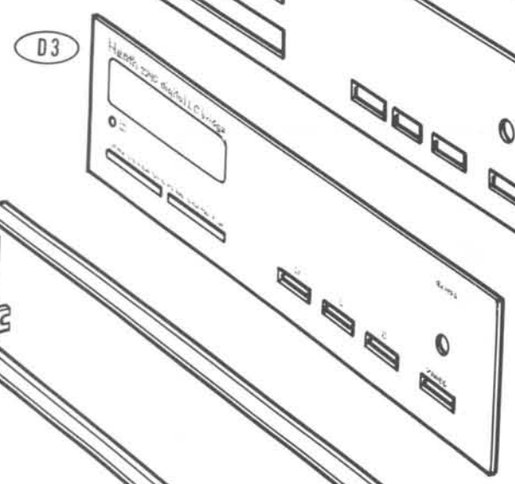


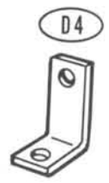


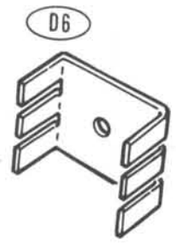




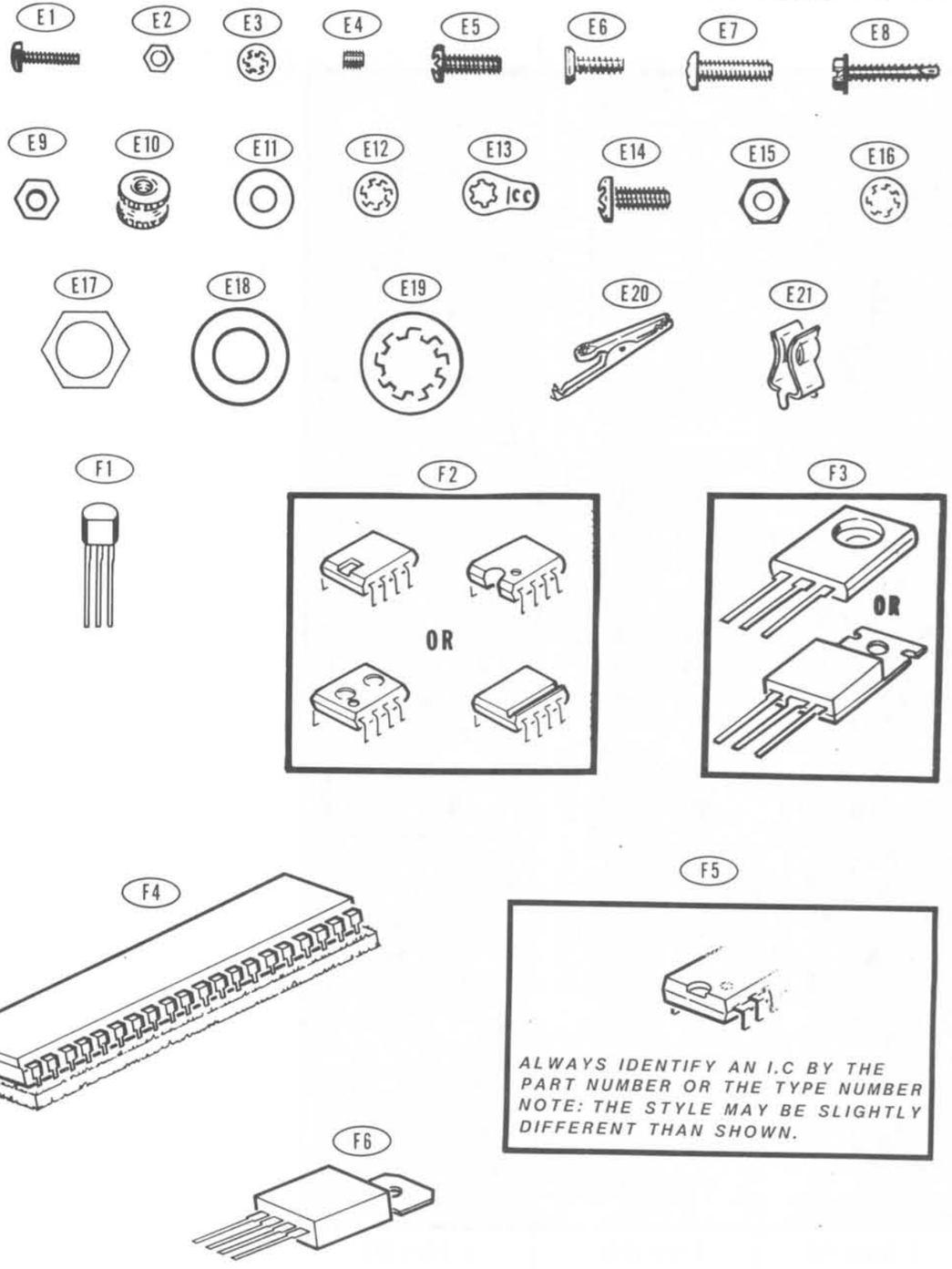


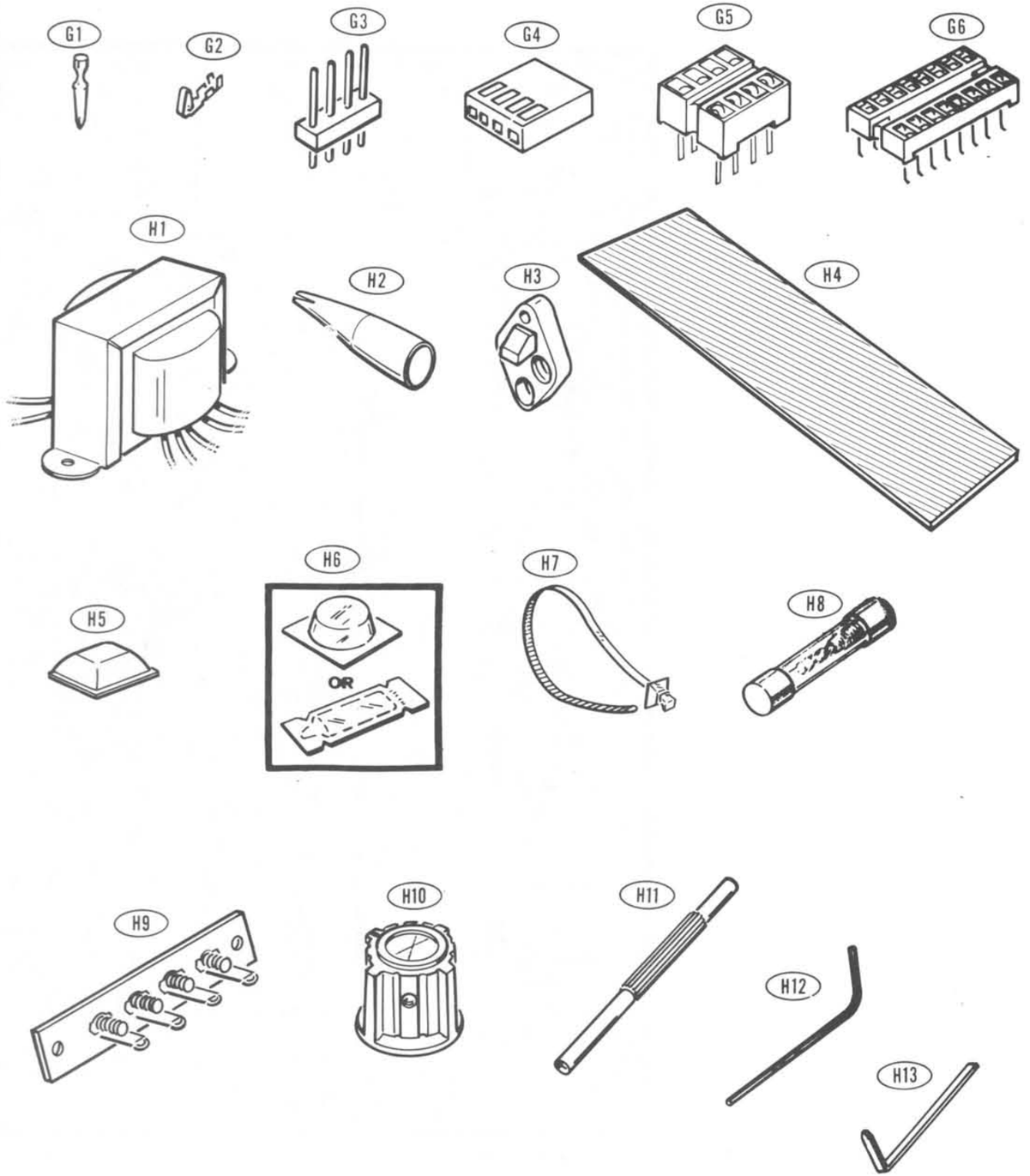


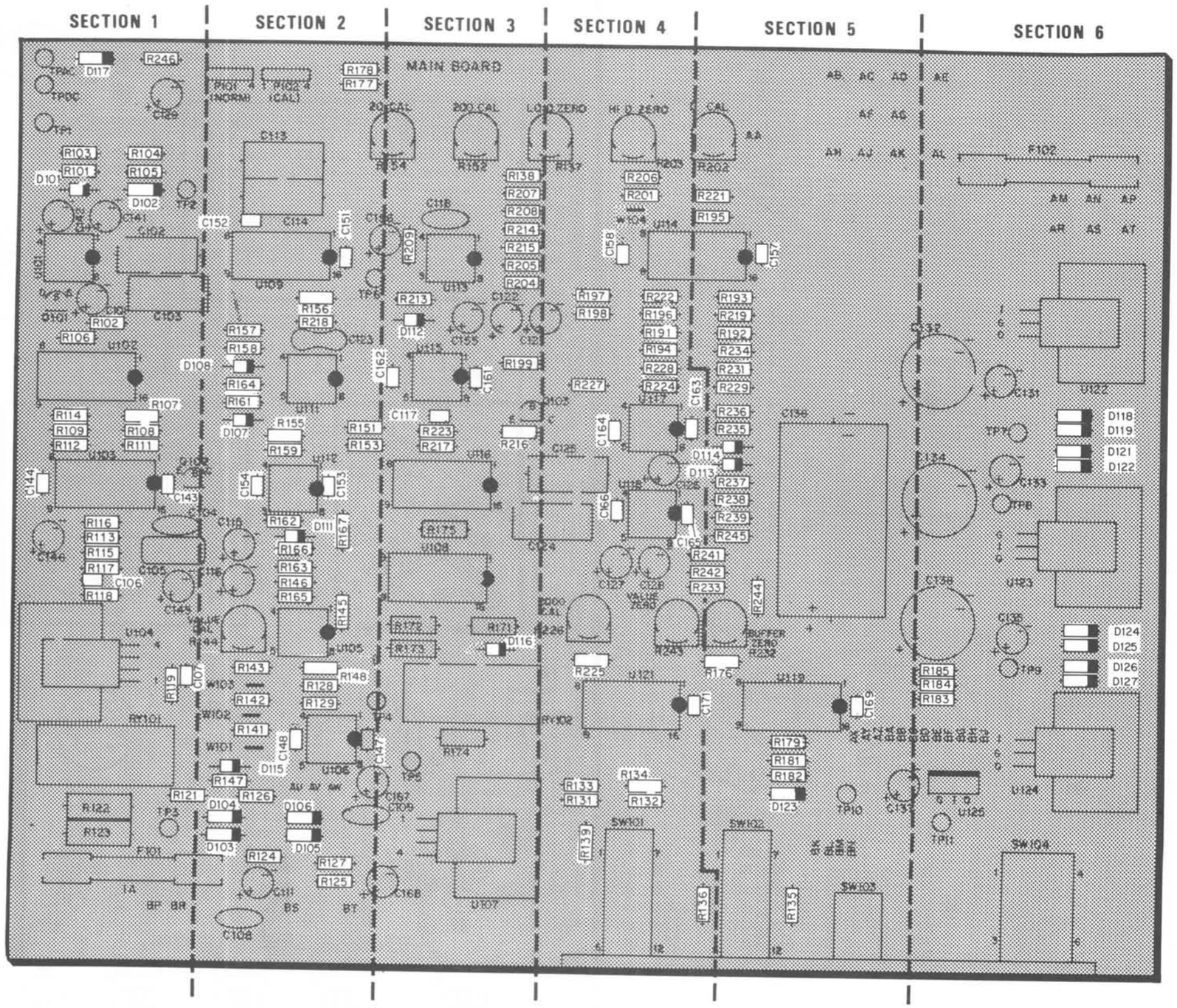




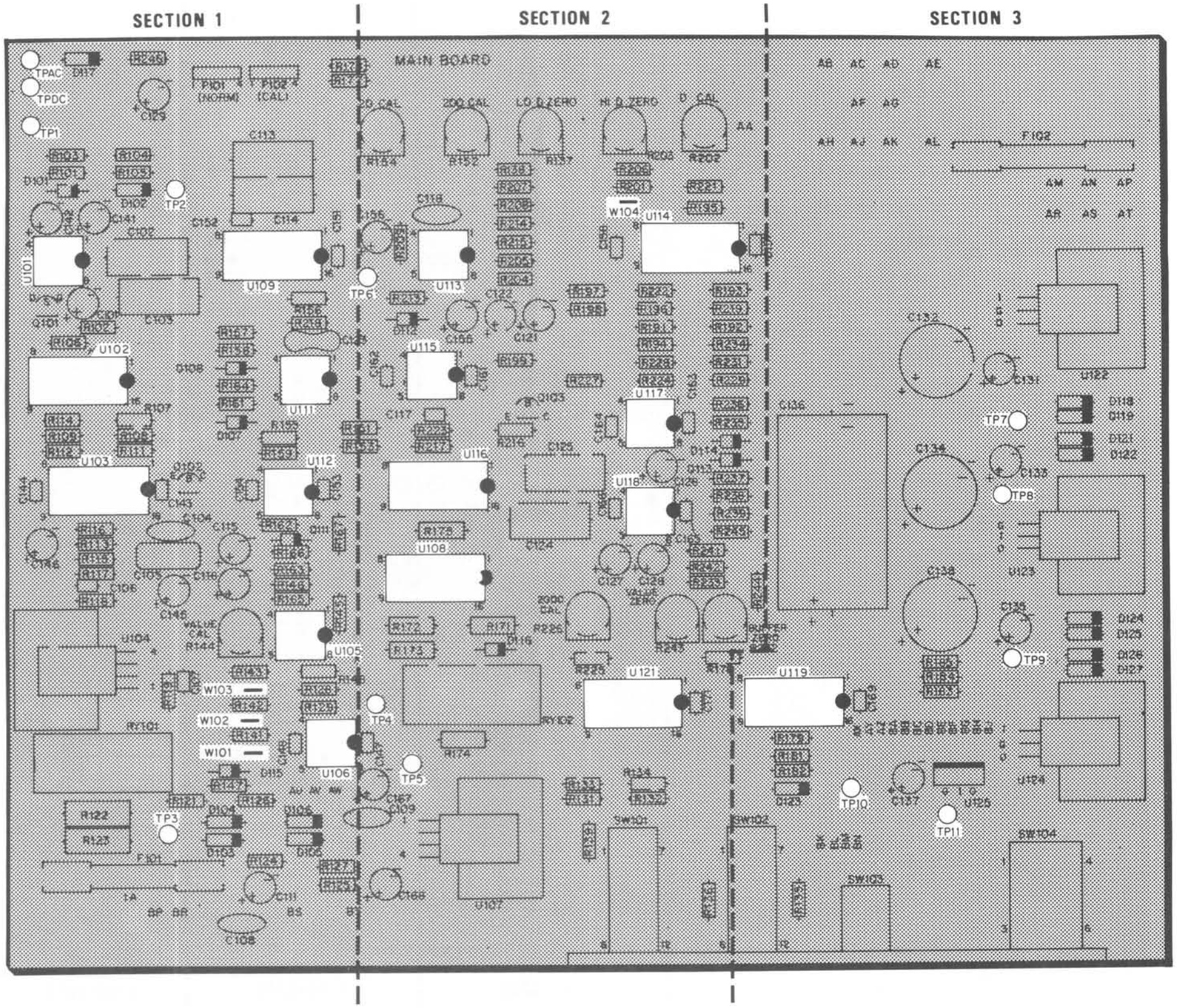
MAIN CIRCUIT BOARD, BOARD WIRING, AND CHASSIS ASSEMBLY PARTS PICTORIAL (Cont'd.)



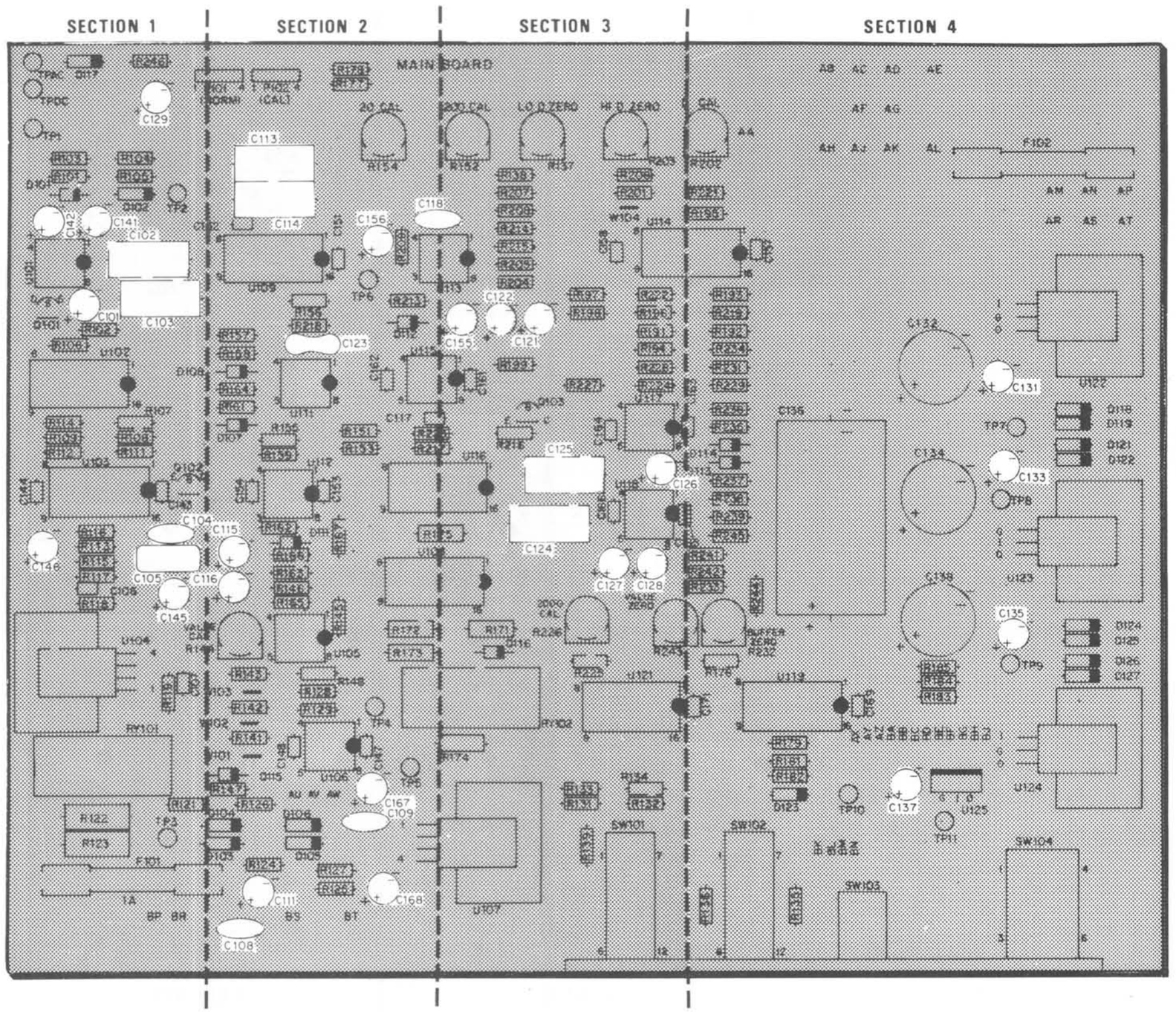




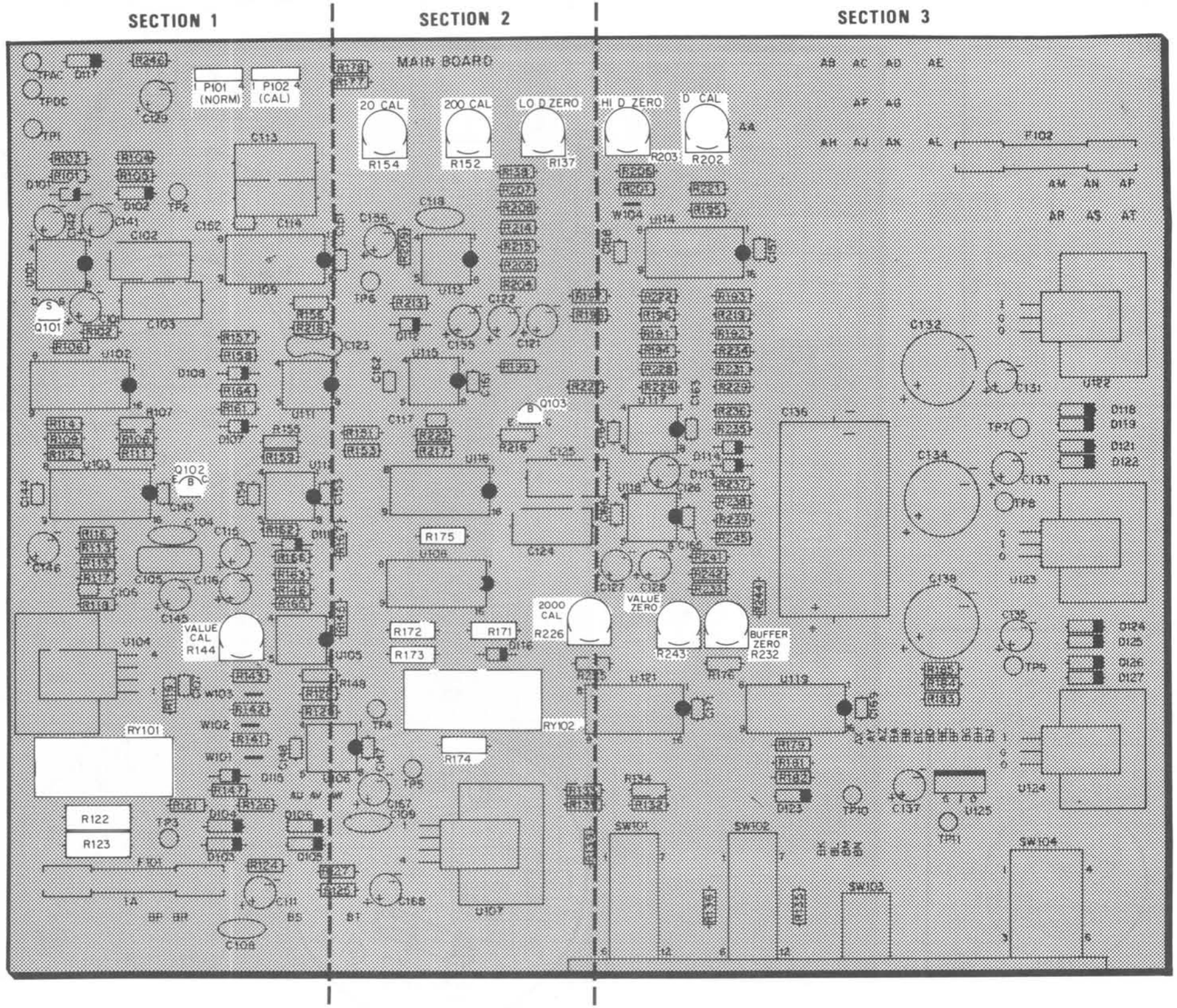
PICTORIAL 2-1



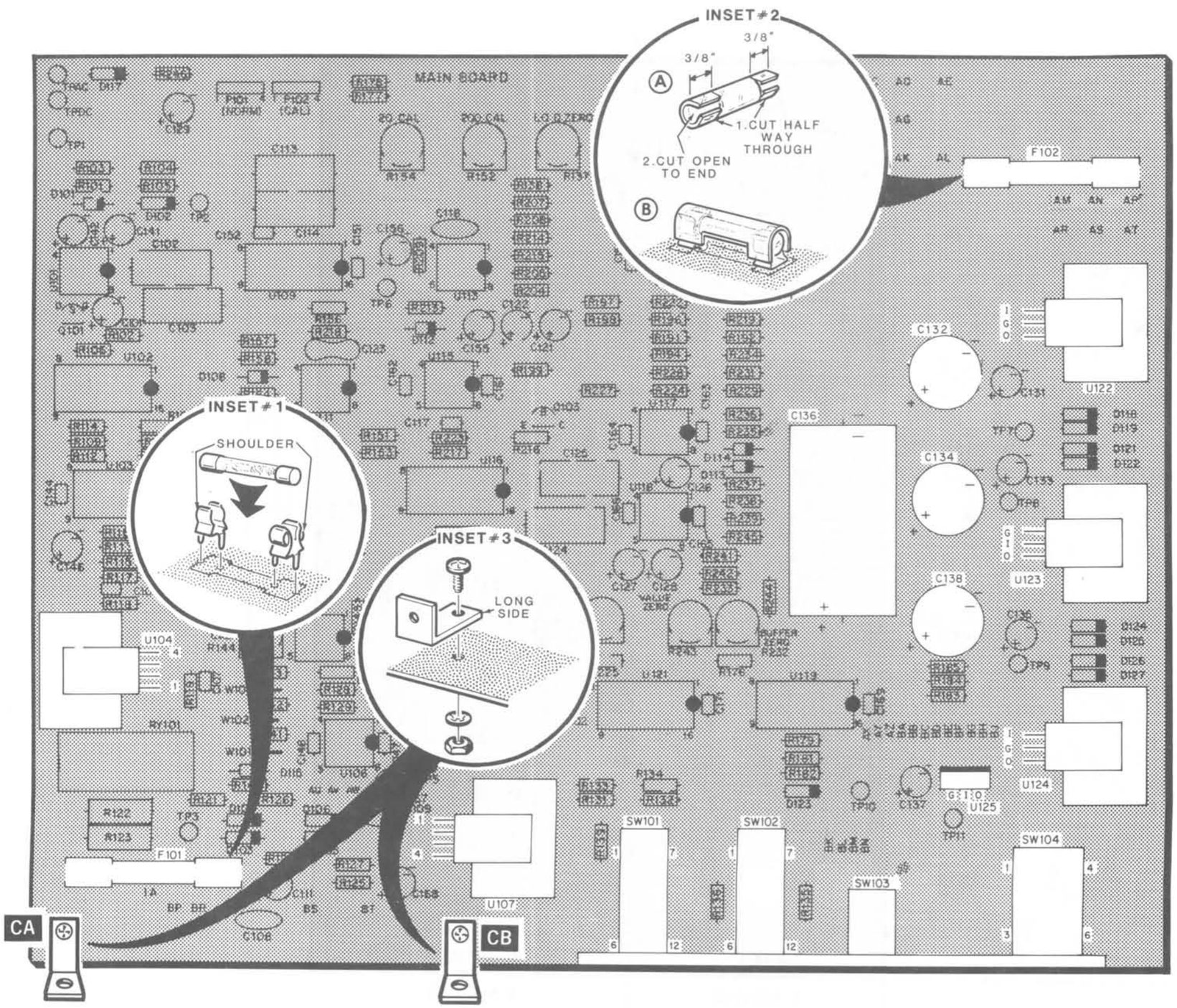
PICTORIAL 2-2



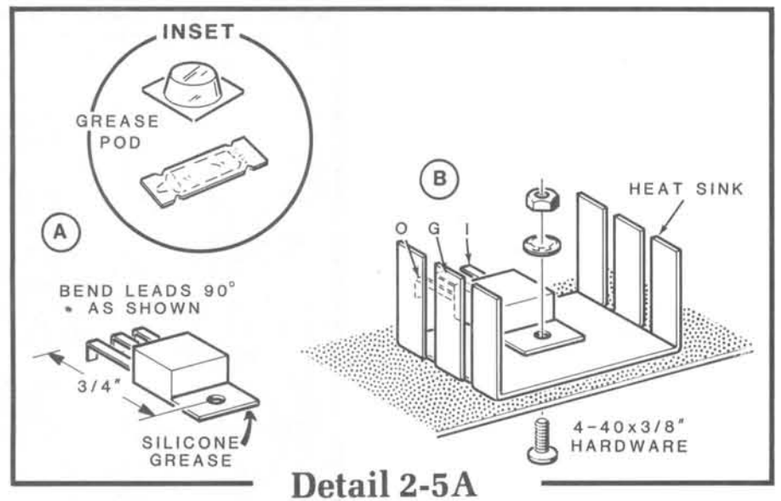
PICTORIAL 2-3



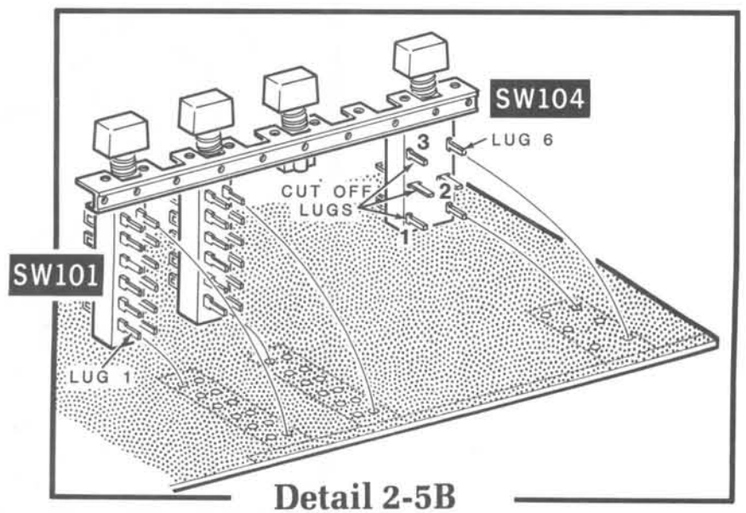
PICTORIAL 2-4



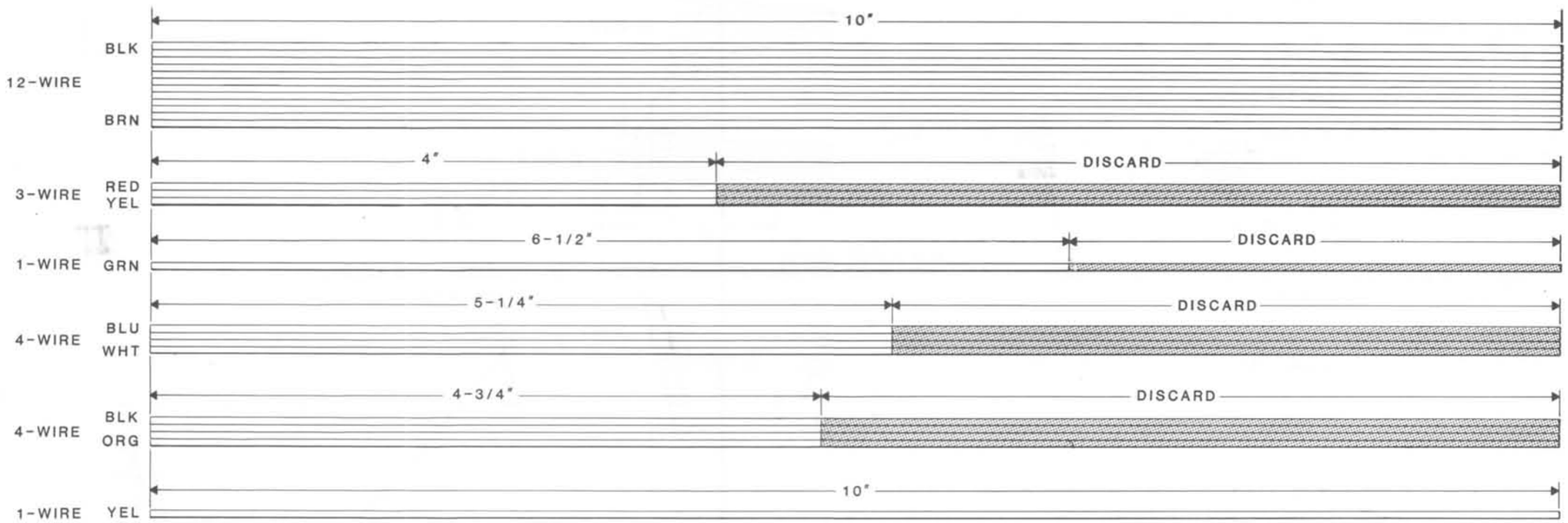
PICTORIAL 2-5

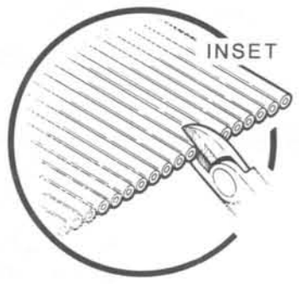


Detail 2-5A

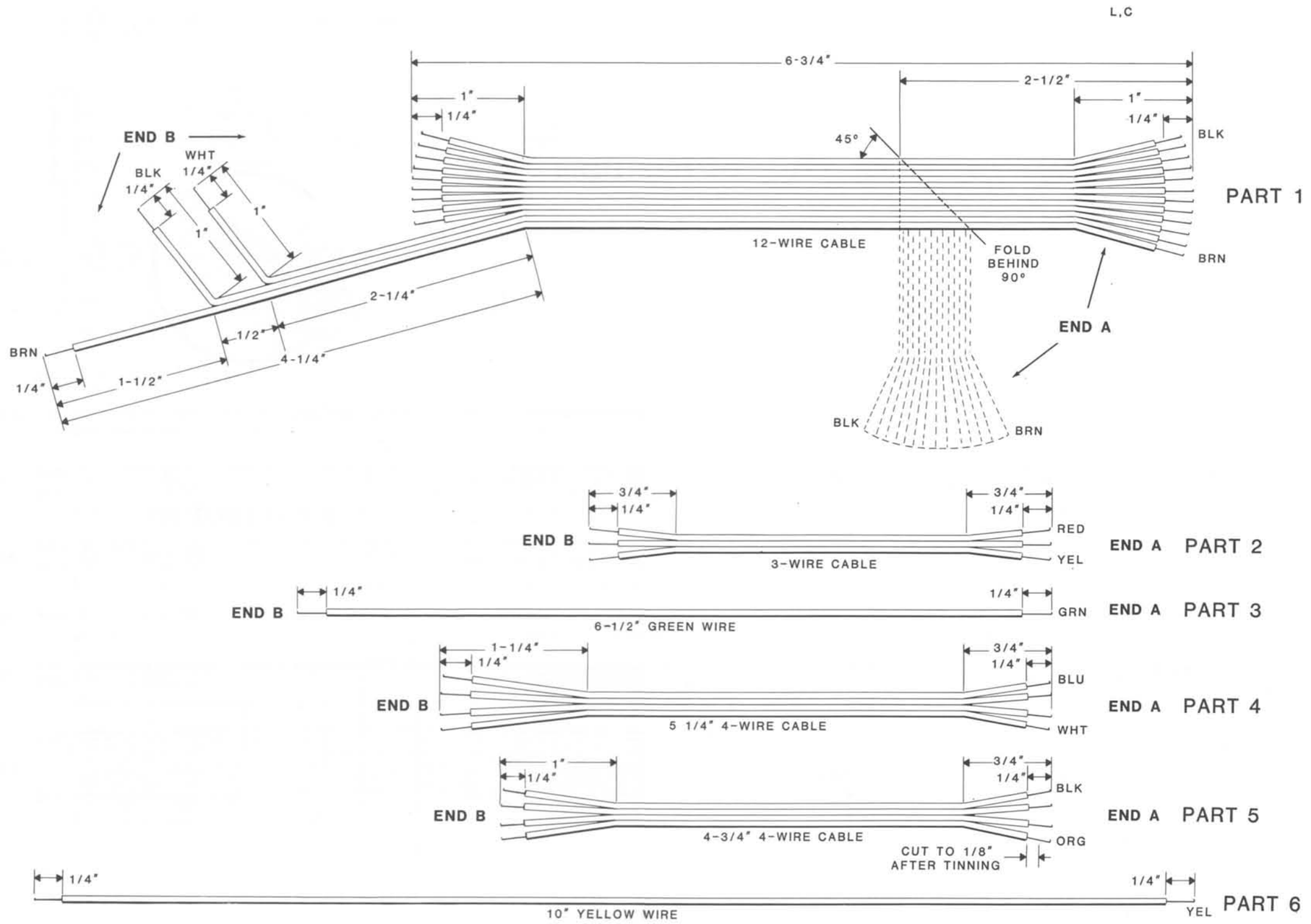


Detail 2-5B

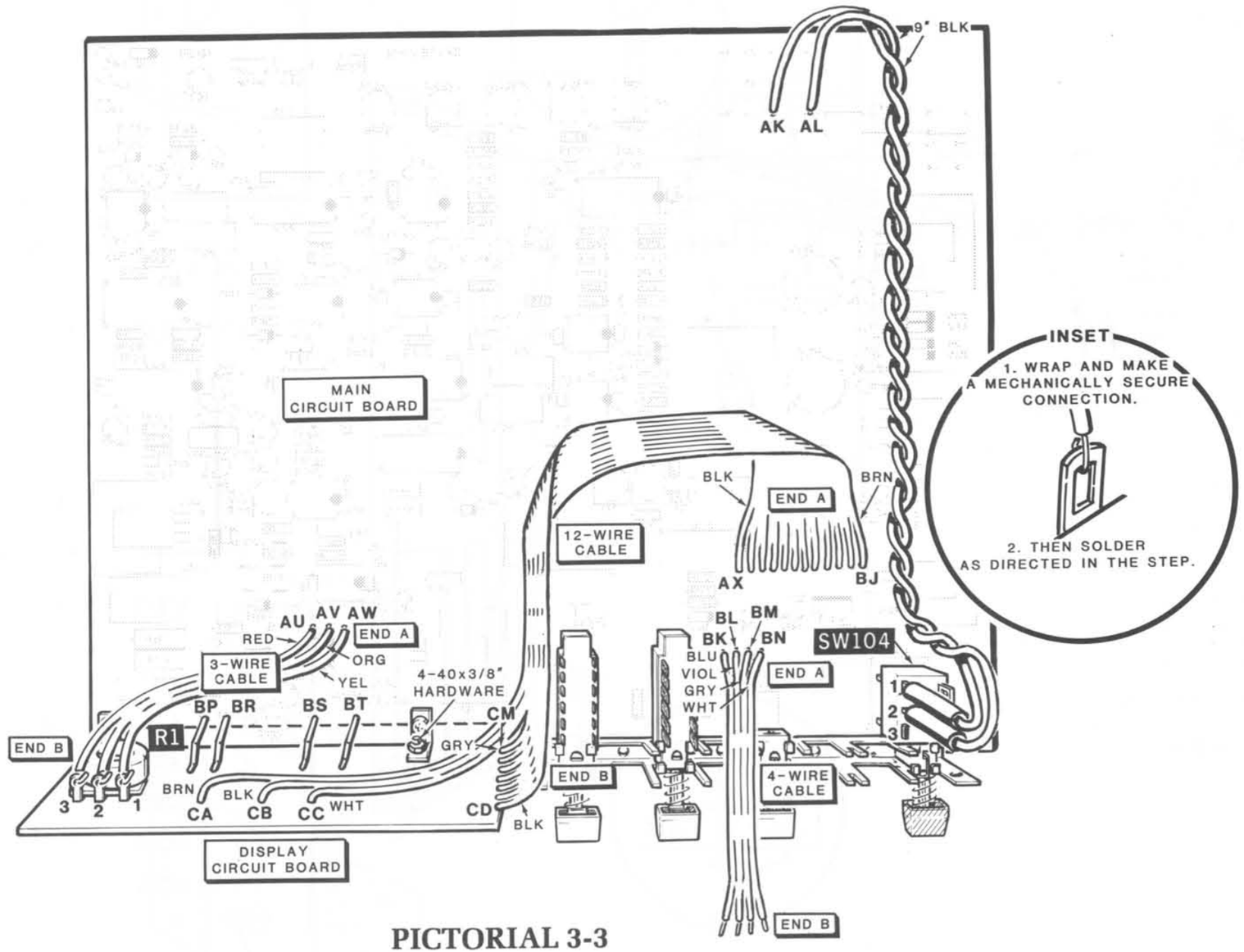




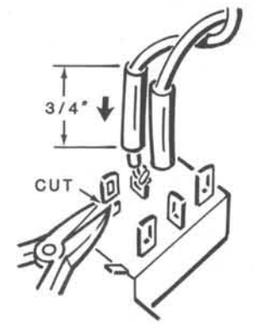
PICTORIAL 3-1



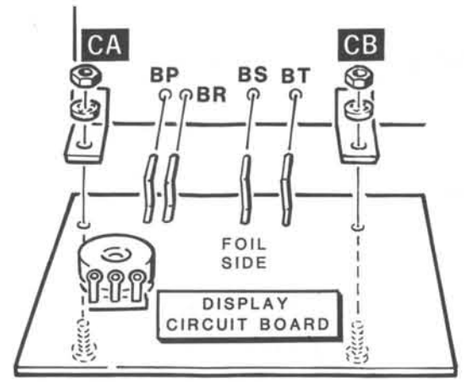
PICTORIAL 3-2



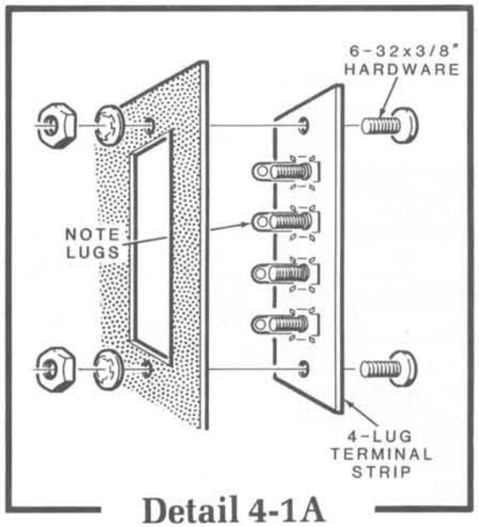
PICTORIAL 3-3



Detail 3-3A

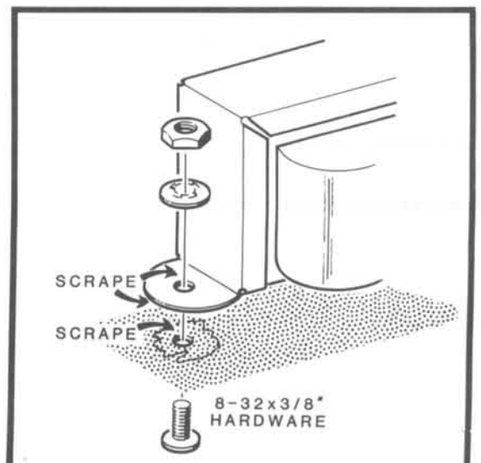


Detail 3-3B

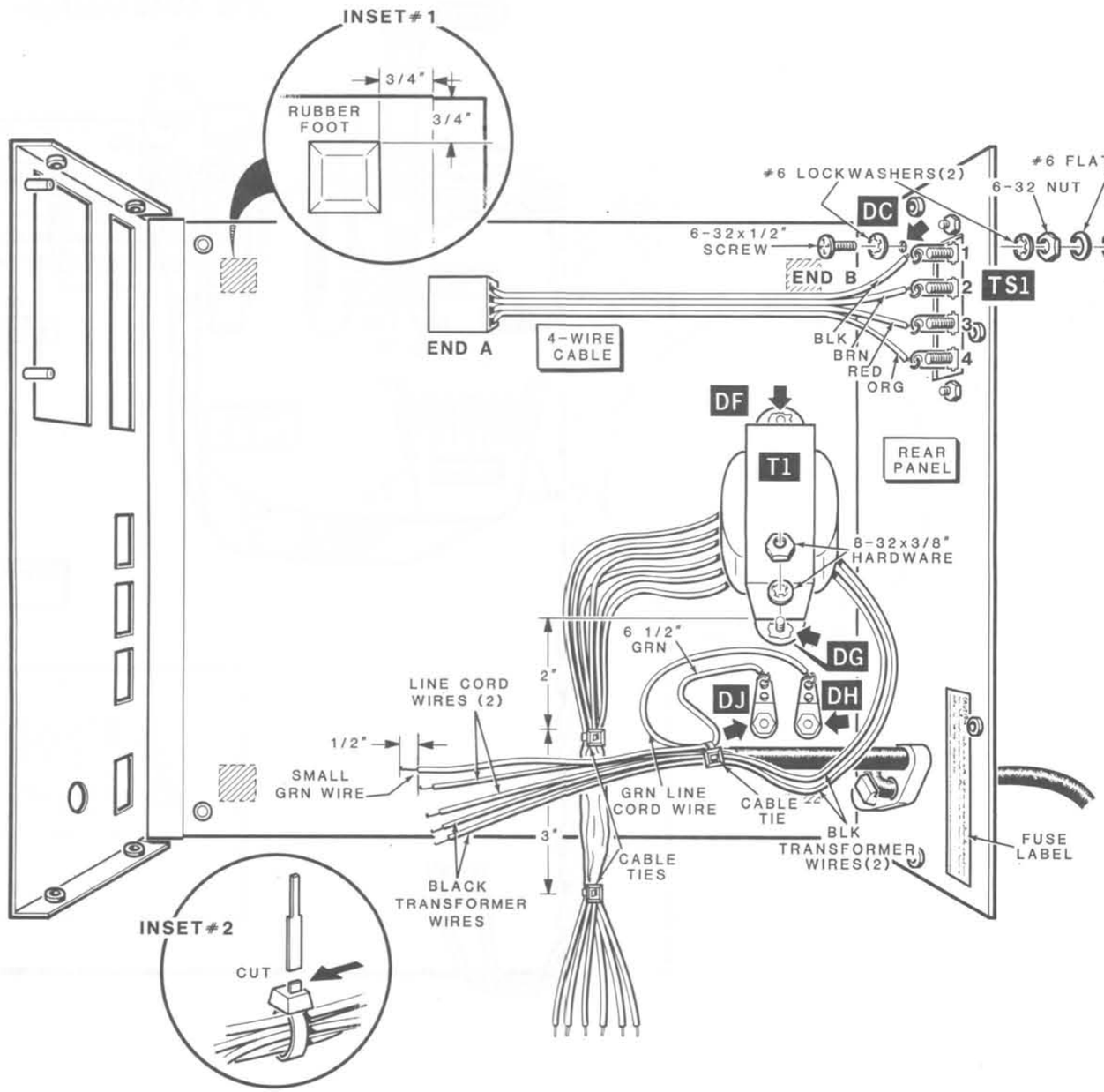


Detail 4-1A

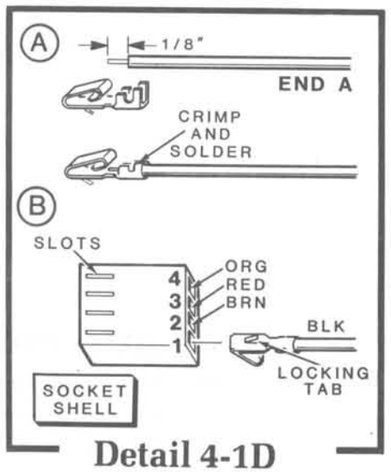
Detail 4-1B



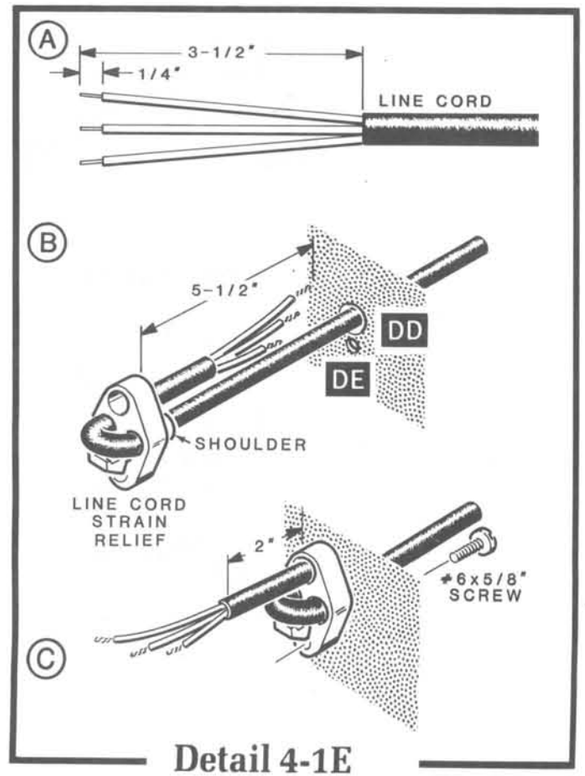
Detail 4-1C



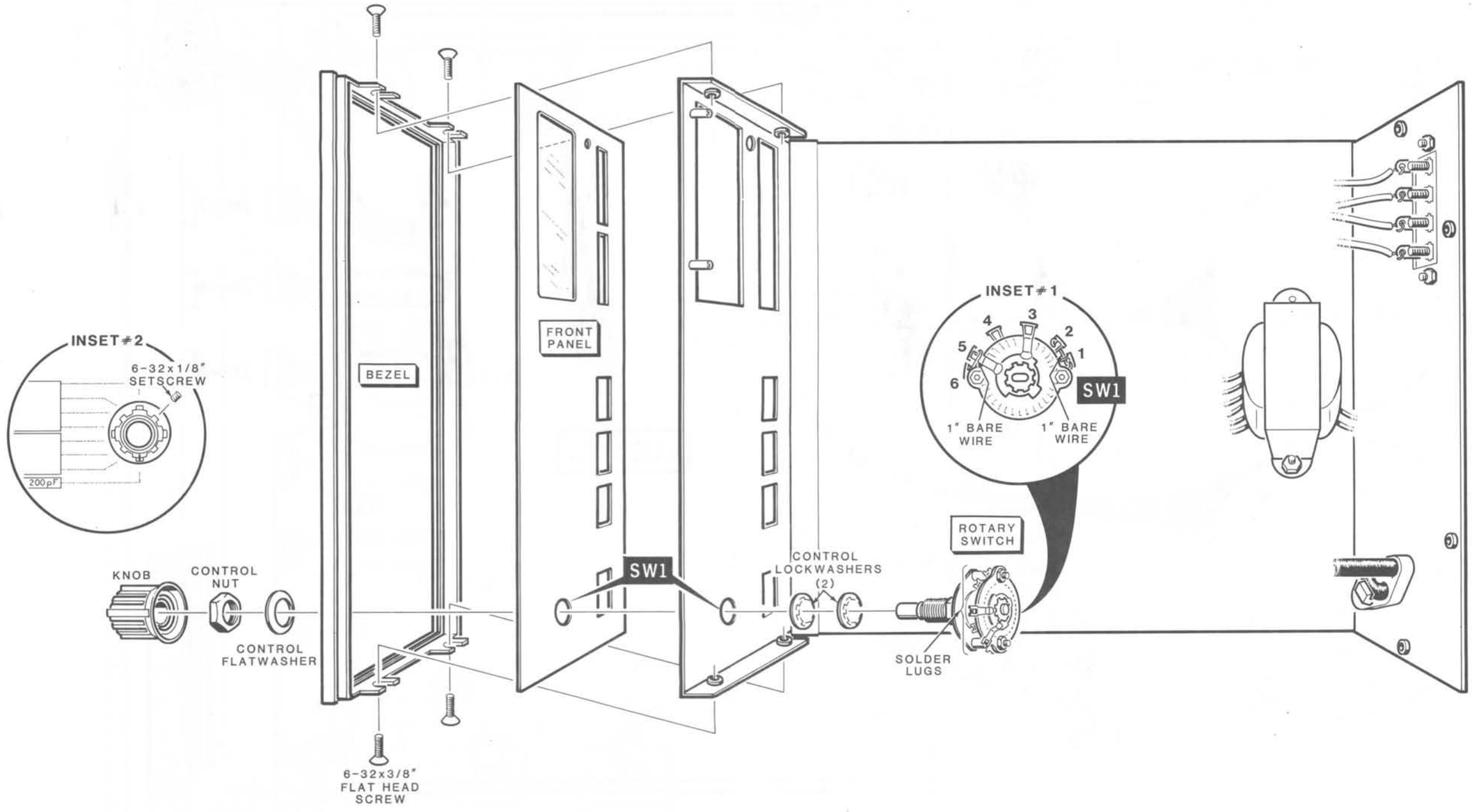
PICTORIAL 4-1



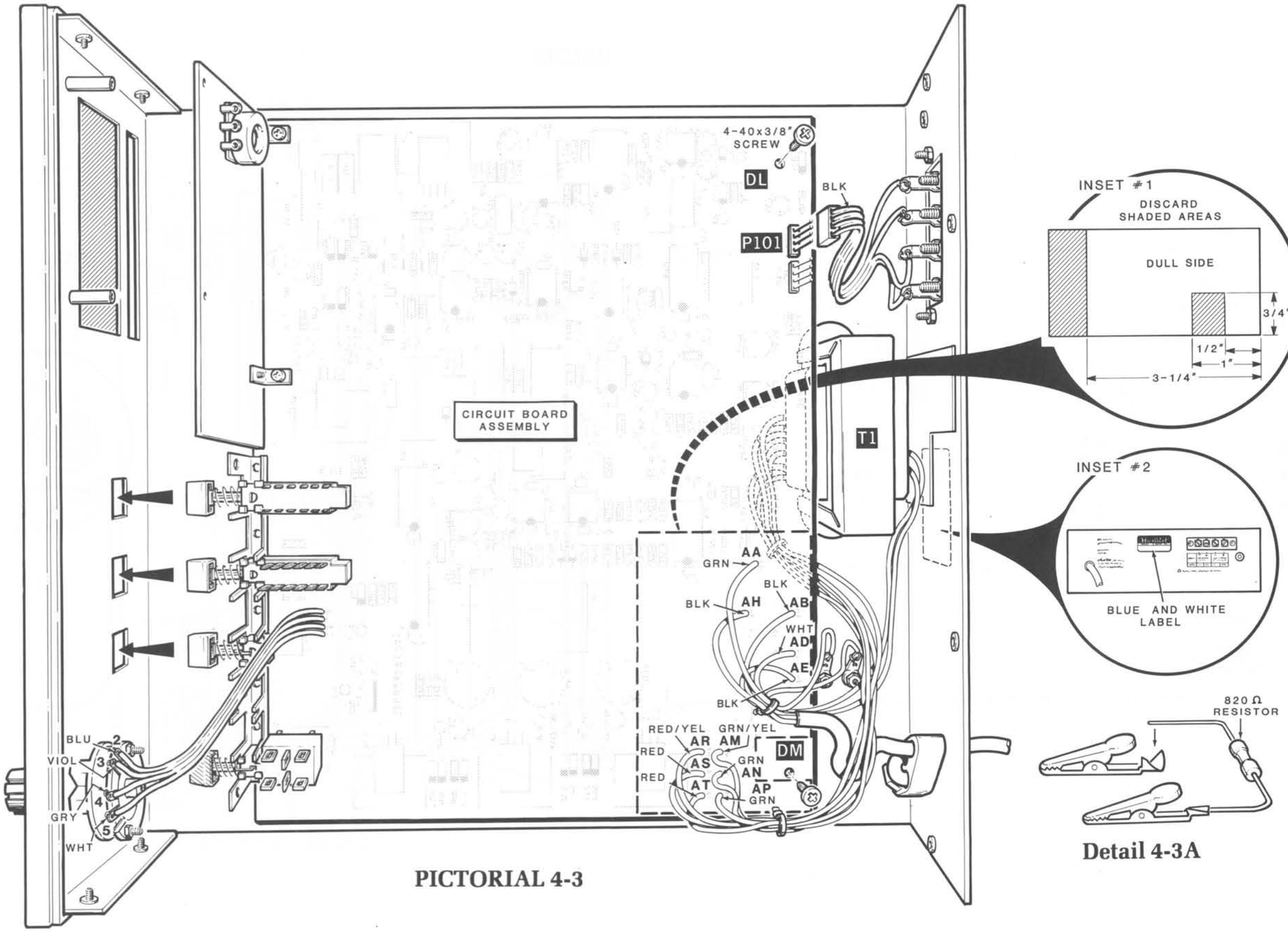
Detail 4-1D



Detail 4-1E

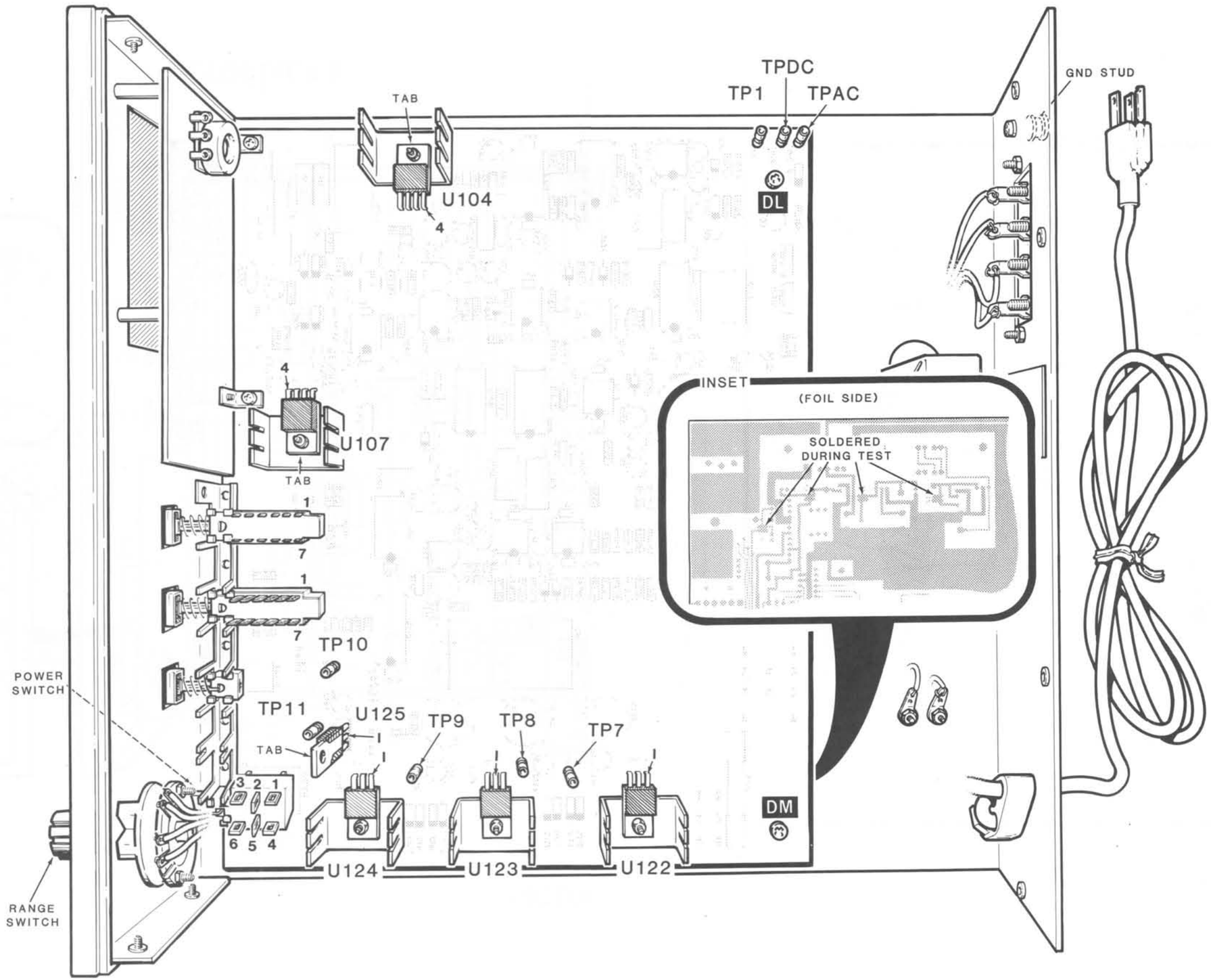


PICTORIAL 4-2

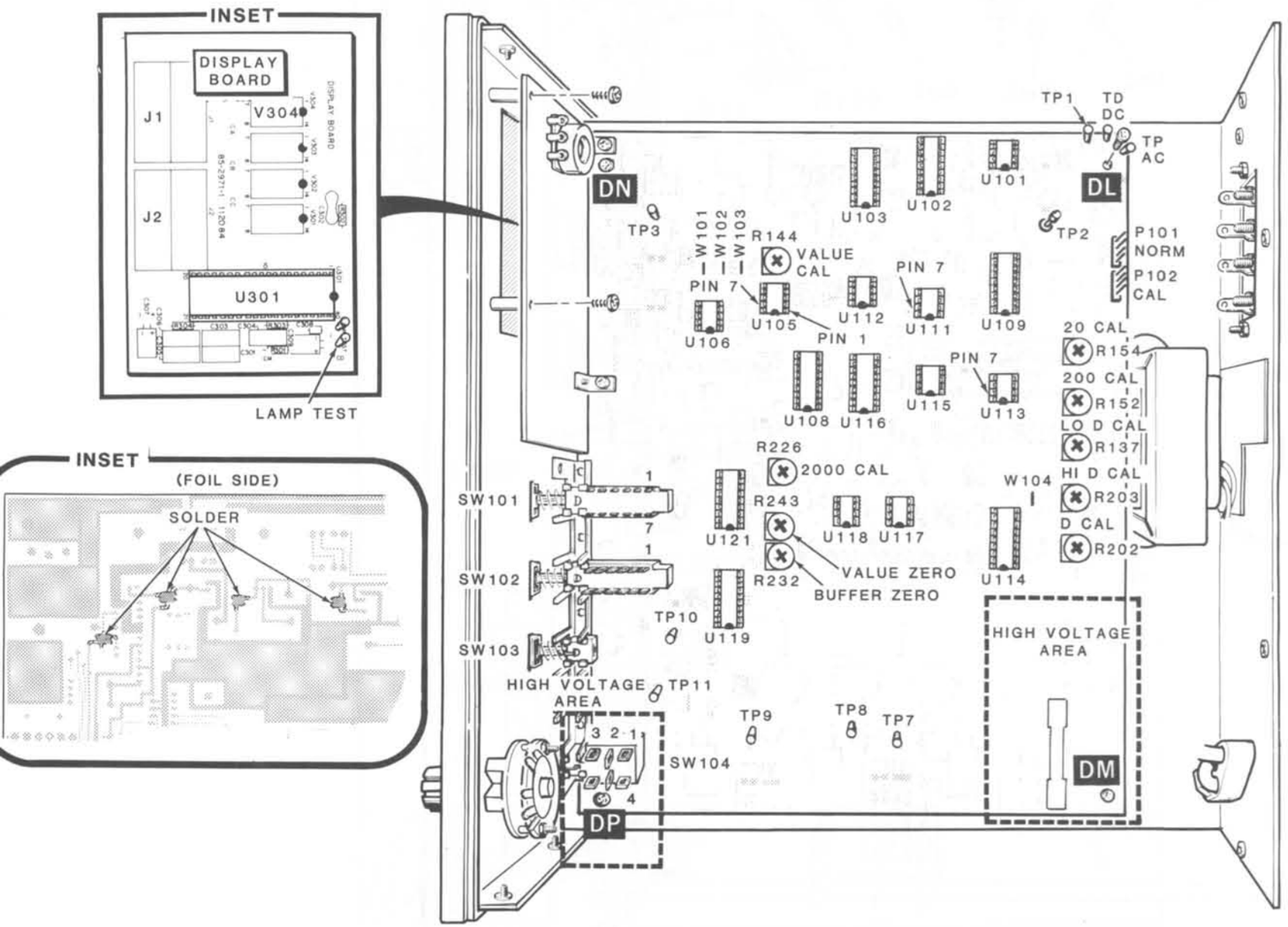


PICTORIAL 4-3

Detail 4-3A



PICTORIAL 5-1

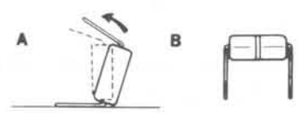


PICTORIAL 5-2

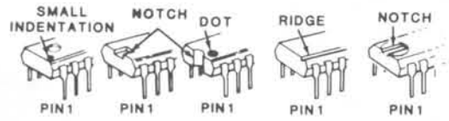
Once you remove a protected IC from its protective foam packing. DO NOT lay the IC down or let go of it until it is installed in its socket. When you bend the leads of a protected IC, hold the IC in one hand and place your other hand on your work surface before you touch the IC to your work surface. This will equalize the static electricity between the work surface and the IC.

The pins on the IC's may be bent out at an angle, so they do not line up with the holes in the IC socket. DO NOT try to install an IC without first bending the pins as described below. To do so may damage the IC pins or the socket, causing intermittent contact.

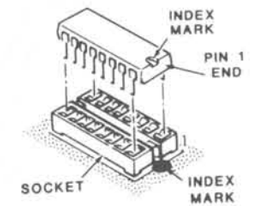
Before you install an IC, lay it down on its side as shown below and very carefully roll it toward the pins to bend the lower pins into line. Then turn the IC over and bend the pins on the other side in the same manner.



Compare the IC to the drawings shown below. Then determine which end of the IC is the pin 1 end.

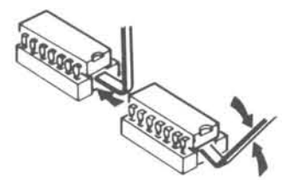


Position the pin 1 end of the IC over the index mark on the circuit board. Then start the IC pins into the socket. Make sure that all of the pins are started into the socket. Then push the IC firmly into the socket. NOTE: An IC pin can become bent under the IC and it will appear as though it is correctly installed in the socket.

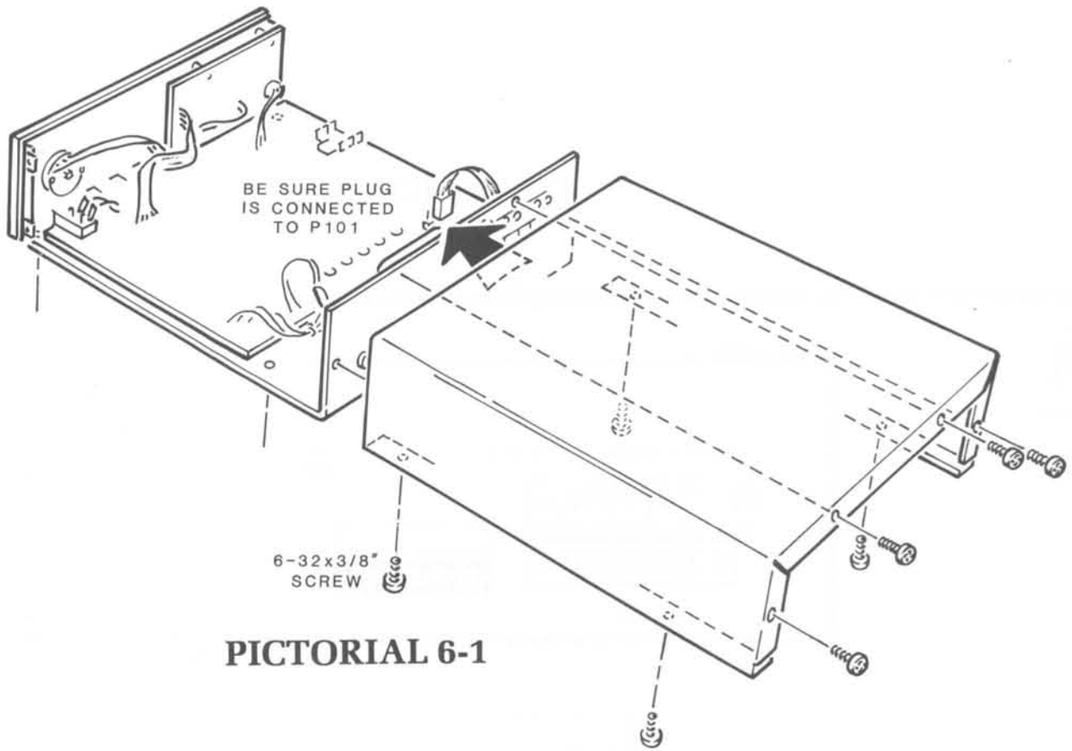


An IC lifter has been furnished so you can remove an inline IC from its socket if this should be necessary.

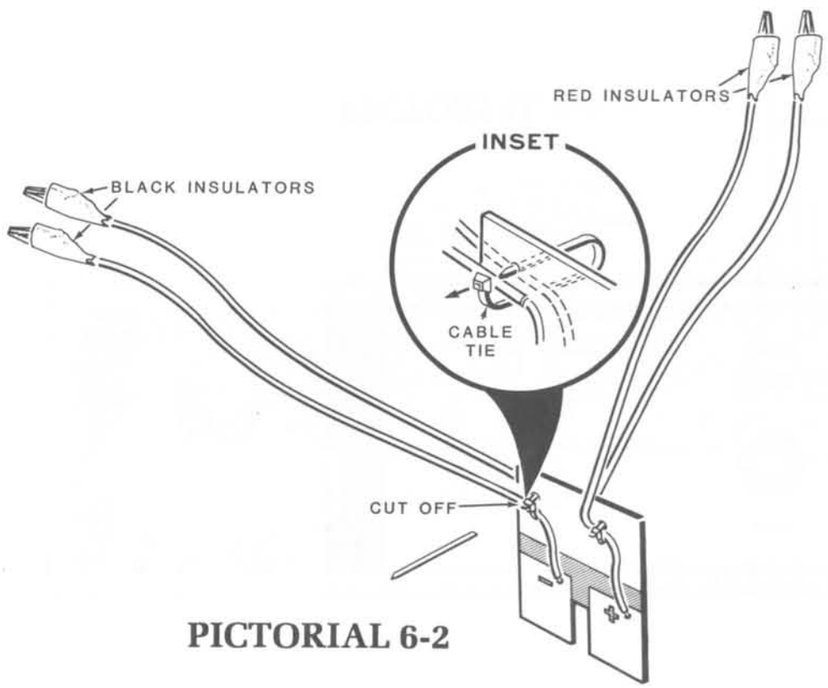
Push the shorter end of the lifter in between the IC and the socket and rock the longer portion back and forth. Be very careful, as the IC pins are very easily bent.



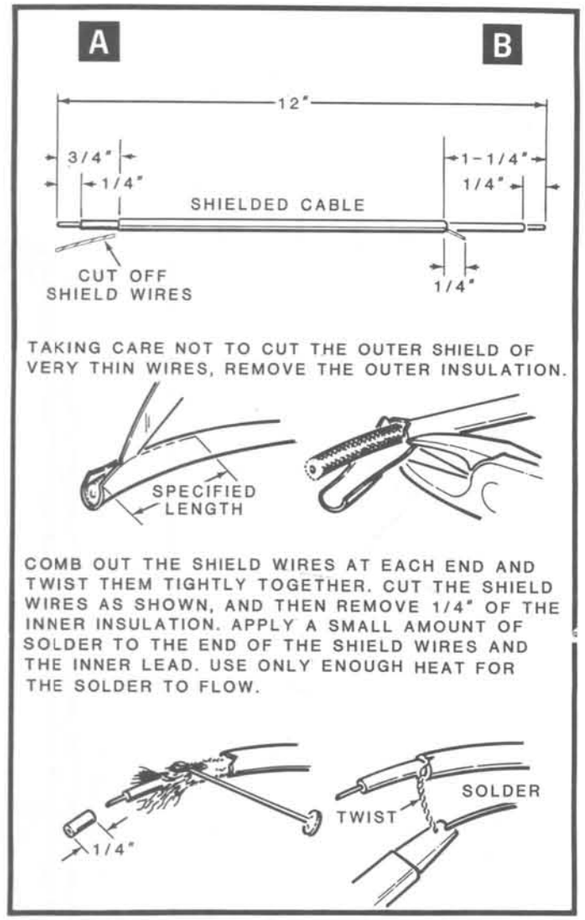
Detail 5-2A



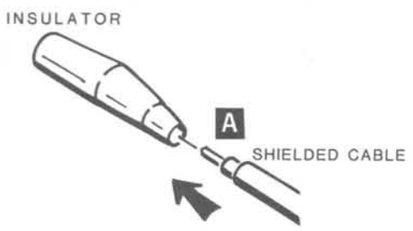
PICTORIAL 6-1



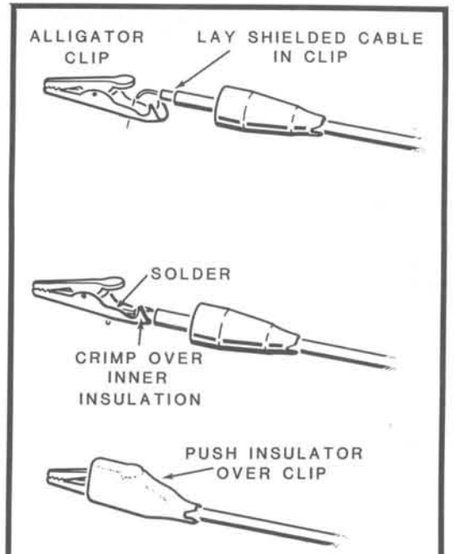
PICTORIAL 6-2



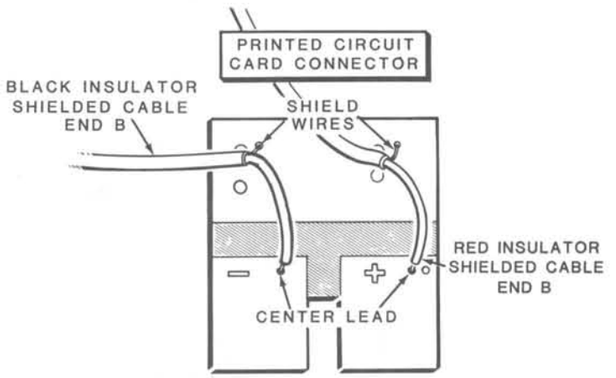
Detail 6-2A



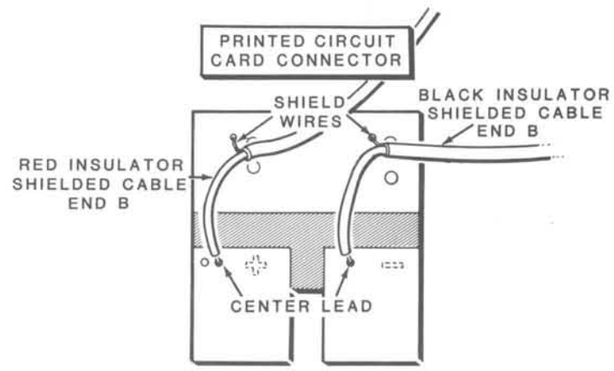
Detail 6-2B



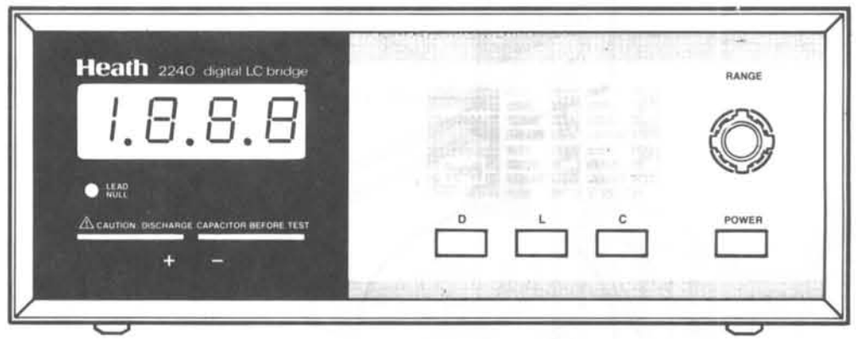
Detail 6-2C



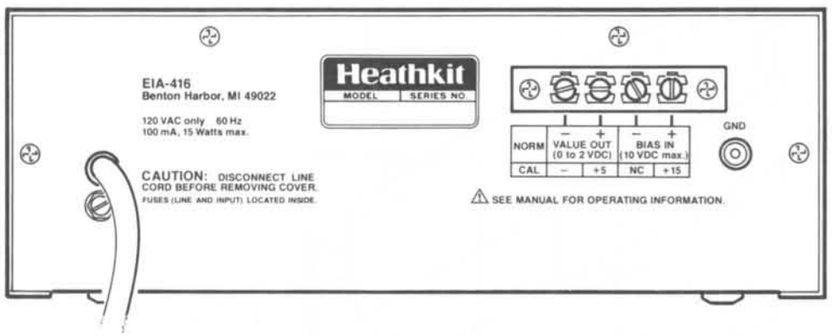
Detail 6-2D



Detail 6-2E



PICTORIAL 7-1



PICTORIAL 7-2

Inductance and Resistance

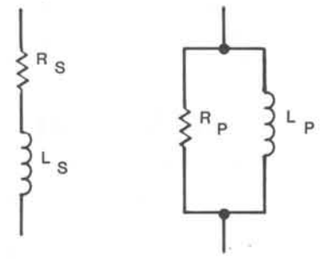
$$L_S = \left(\frac{Q^2}{1+Q^2}\right) L_P = \left(\frac{1}{1+D^2}\right) L_P$$

$$L_P = \left(\frac{1+Q^2}{Q^2}\right) L_S = \left(1+D^2\right) L_S$$

$$R_S = \left(\frac{1}{1+Q^2}\right) R_P = \frac{\omega L_S}{Q}$$

$$R_P = \left(1+Q^2\right) R_S = Q\omega L_P$$

$$Q = \frac{1}{D} = \frac{\omega L_S}{R_S} = \frac{R_P}{\omega L_P}$$



Capacitance and Resistance

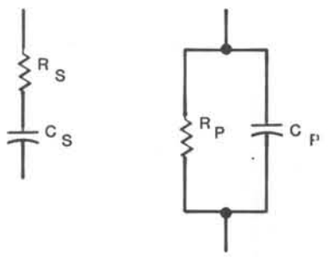
$$C_S = \left(1+D^2\right) C_p$$

$$C_P = \left(\frac{1}{1+D^2}\right) C_S$$

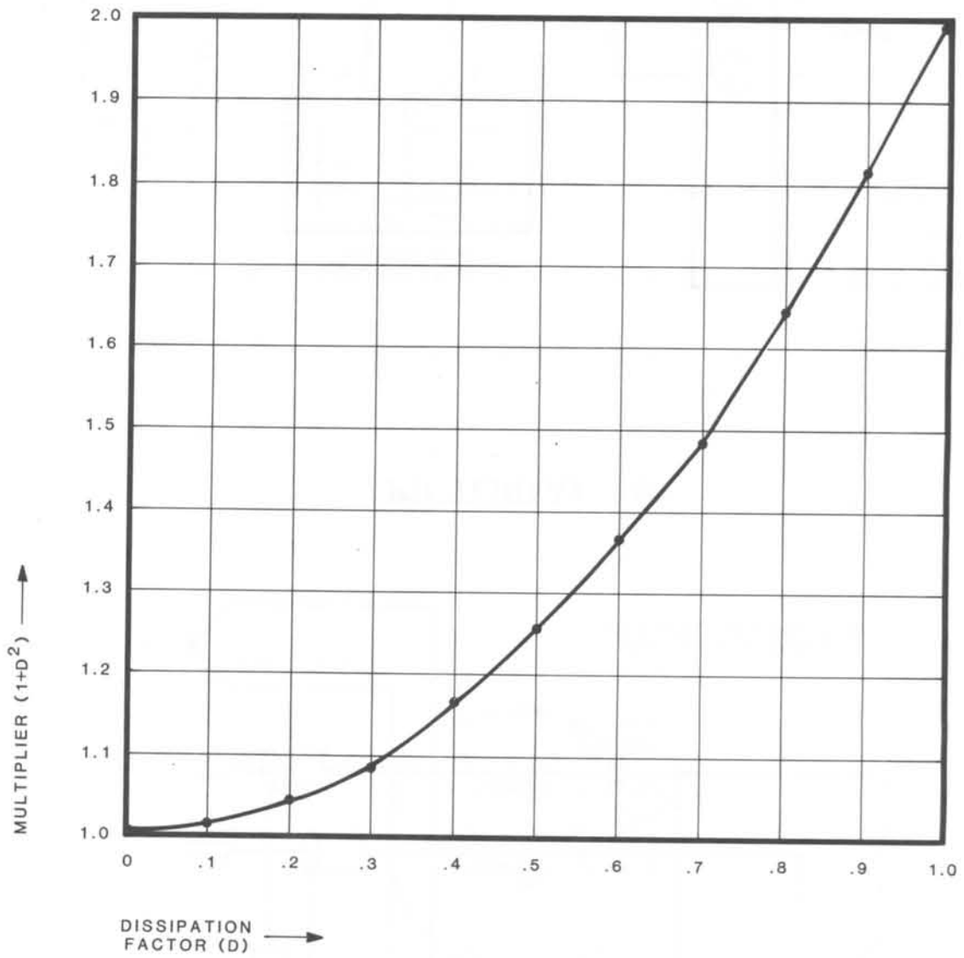
$$R_S = \left(\frac{D^2}{1+D^2}\right) R_P = \frac{D}{\omega C_S}$$

$$R_P = \left(\frac{1+D^2}{D^2}\right) R_S = \frac{1}{\omega C_P D}$$

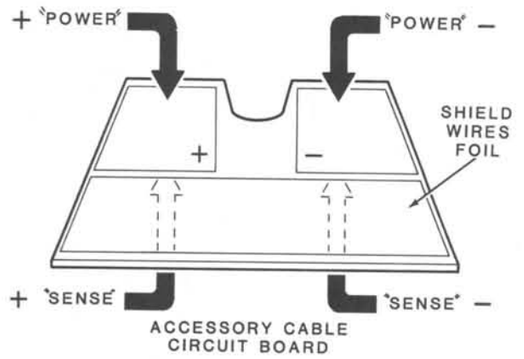
$$D = \omega C_S R_S = \frac{1}{\omega C_P R_P}$$

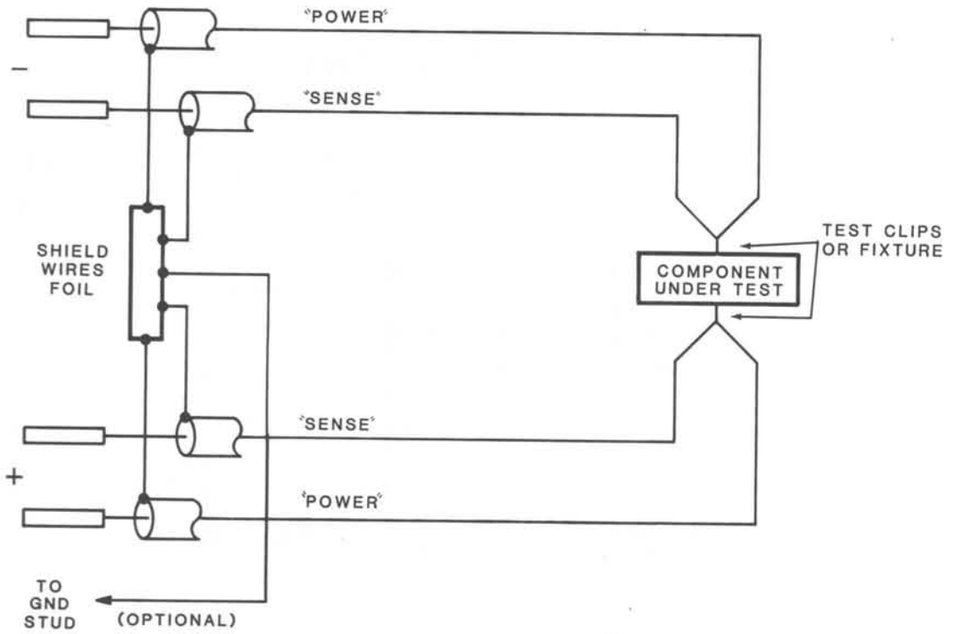


PICTORIAL 7-3

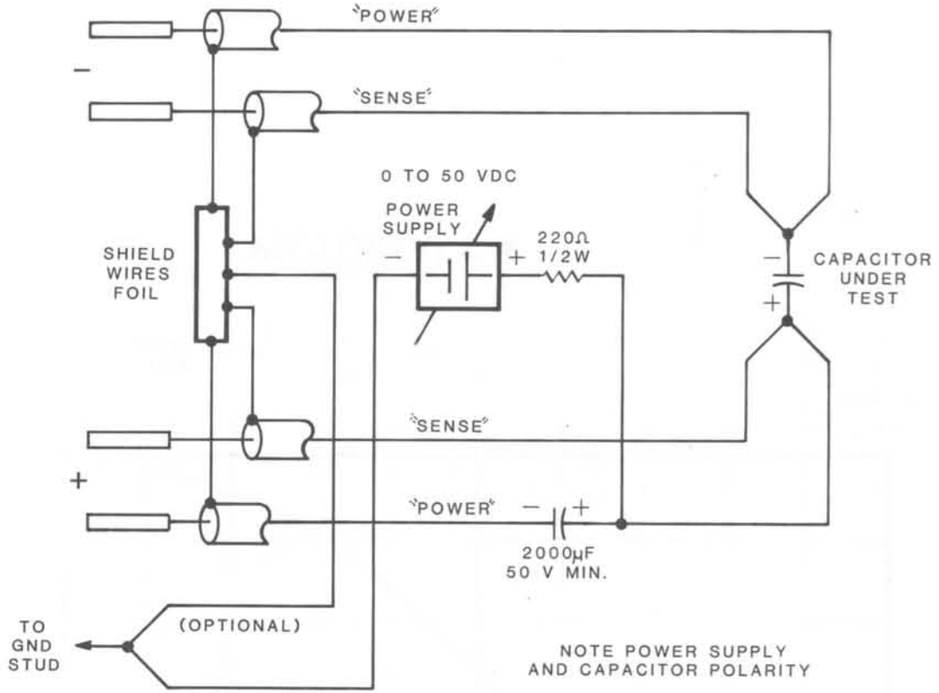


PICTORIAL 7-4

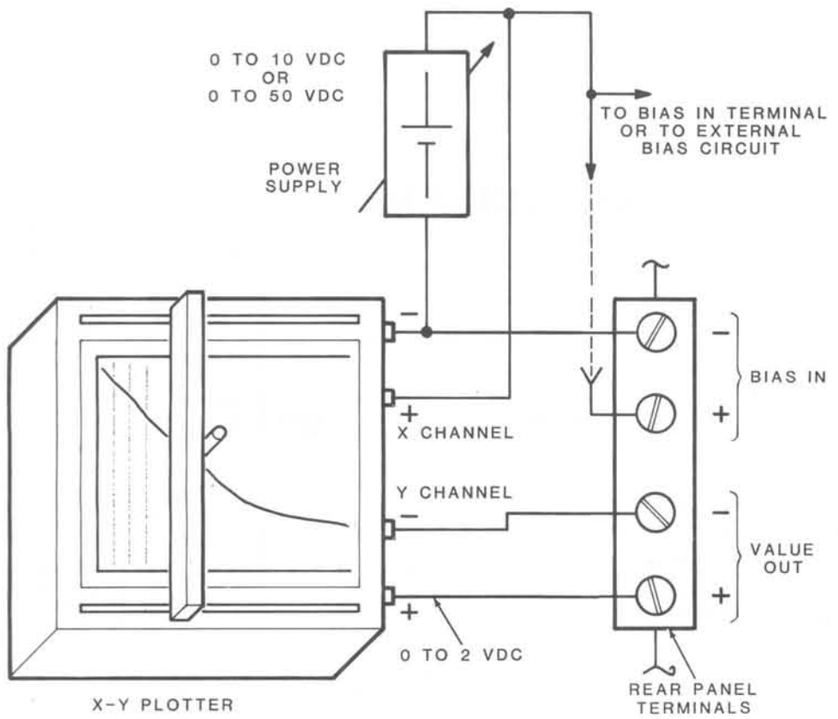




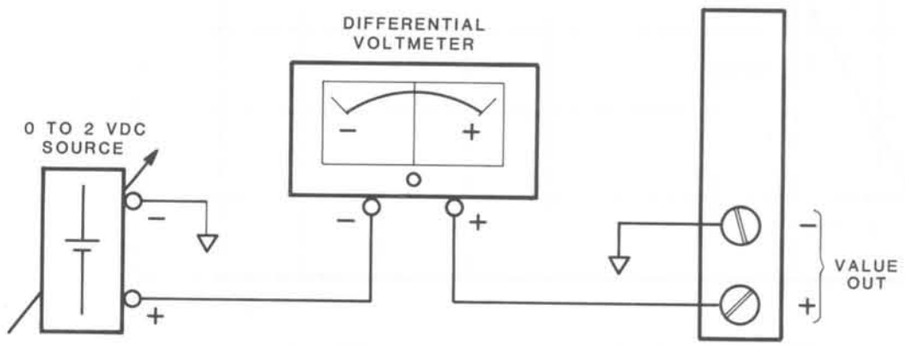
PICTORIAL 7-5



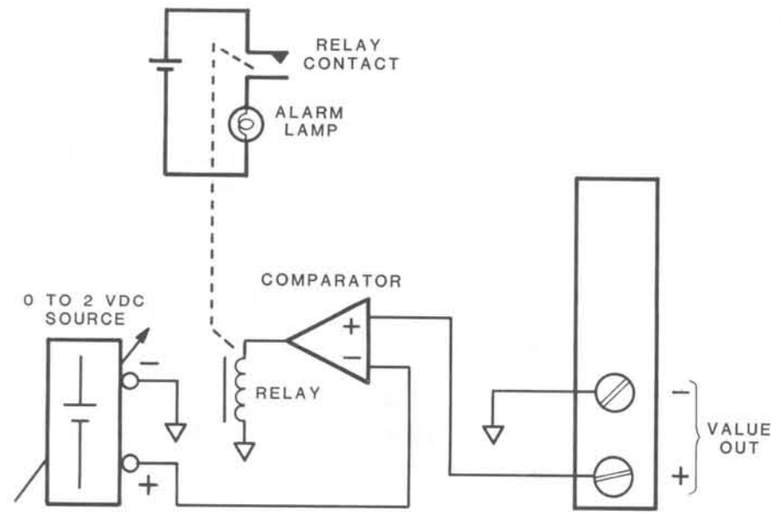
PICTORIAL 7-6



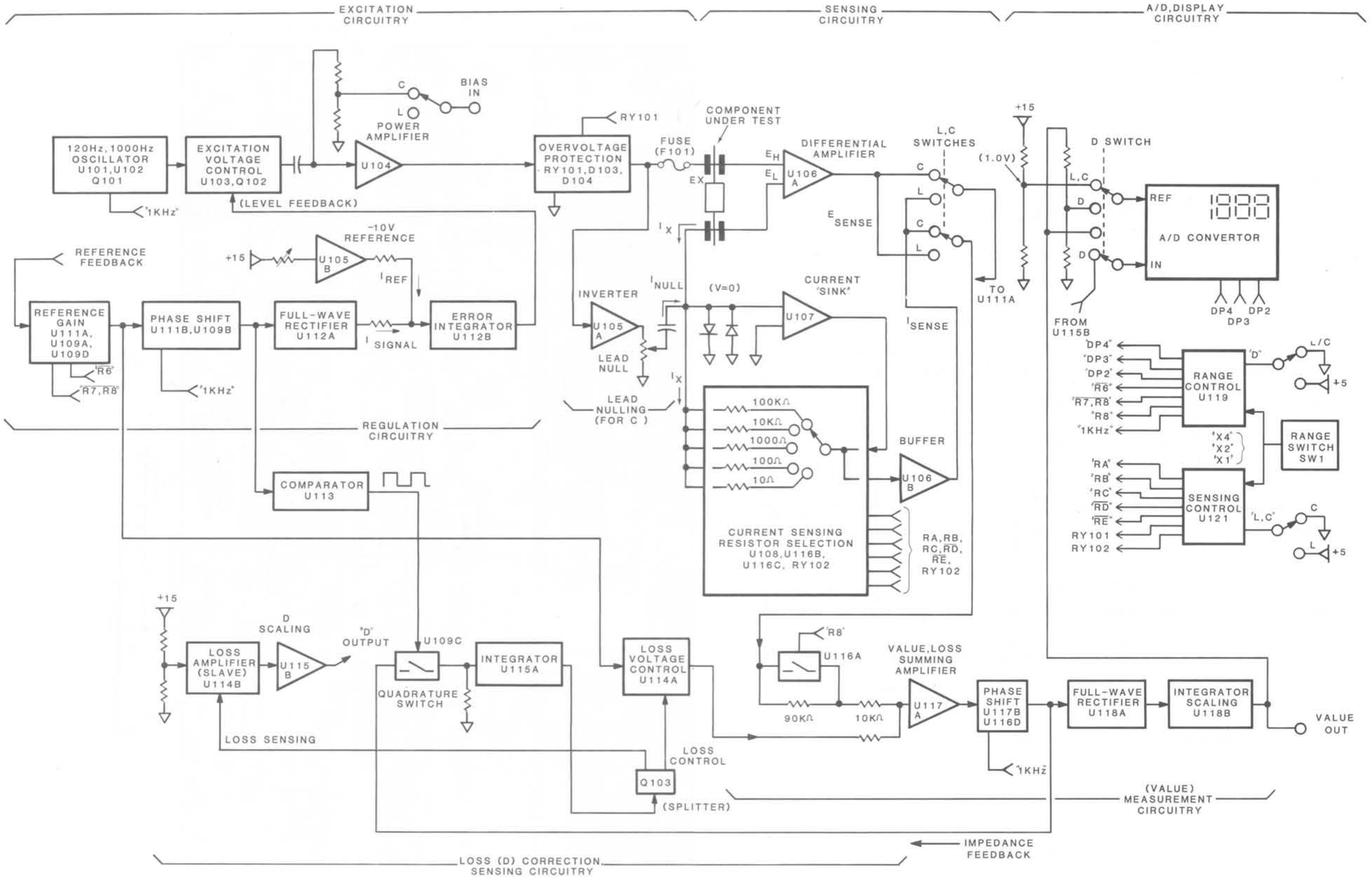
PICTORIAL 7-7



PICTORIAL 7-8

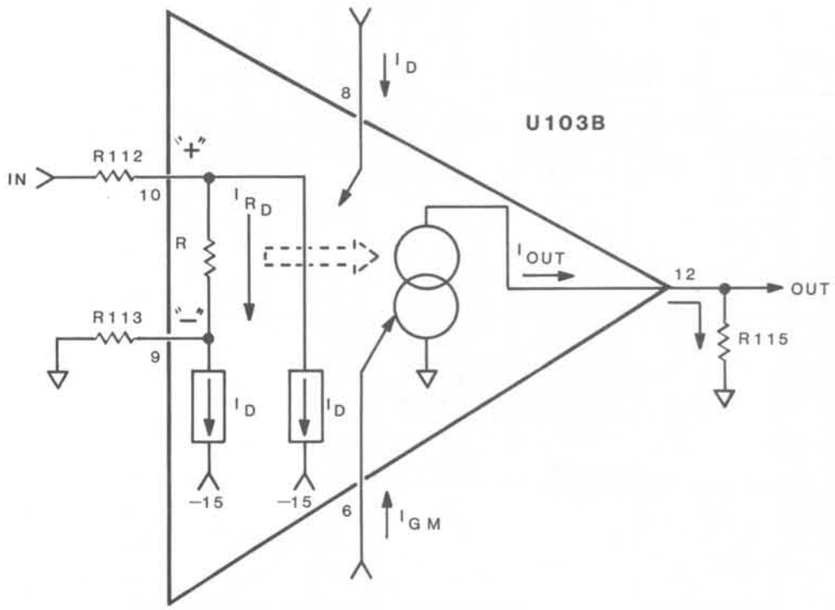


PICTORIAL 7-9

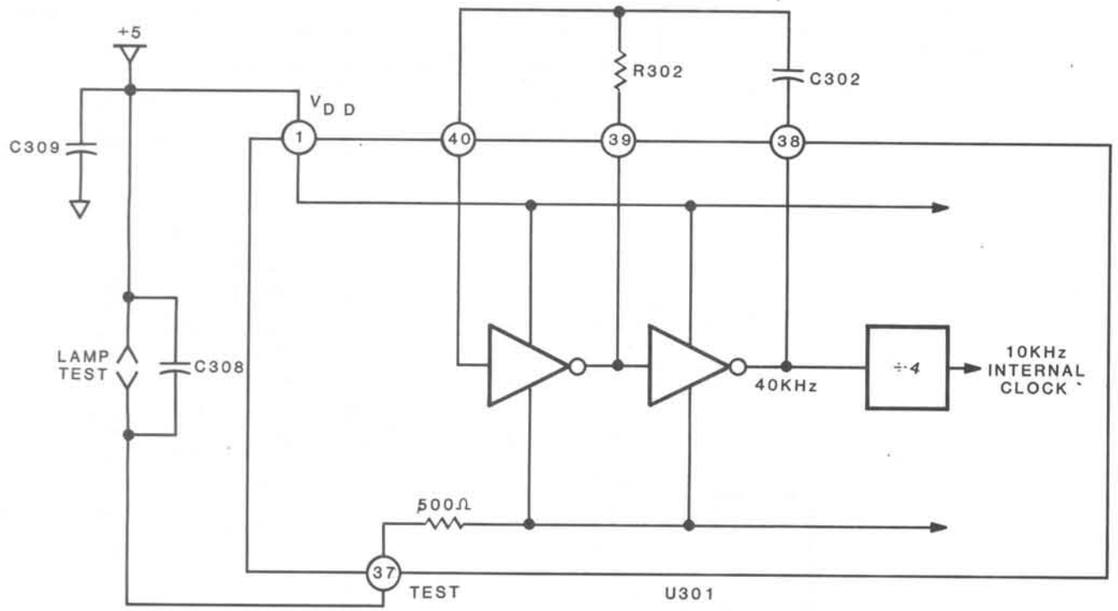


FUNCTIONAL BLOCK DIAGRAM

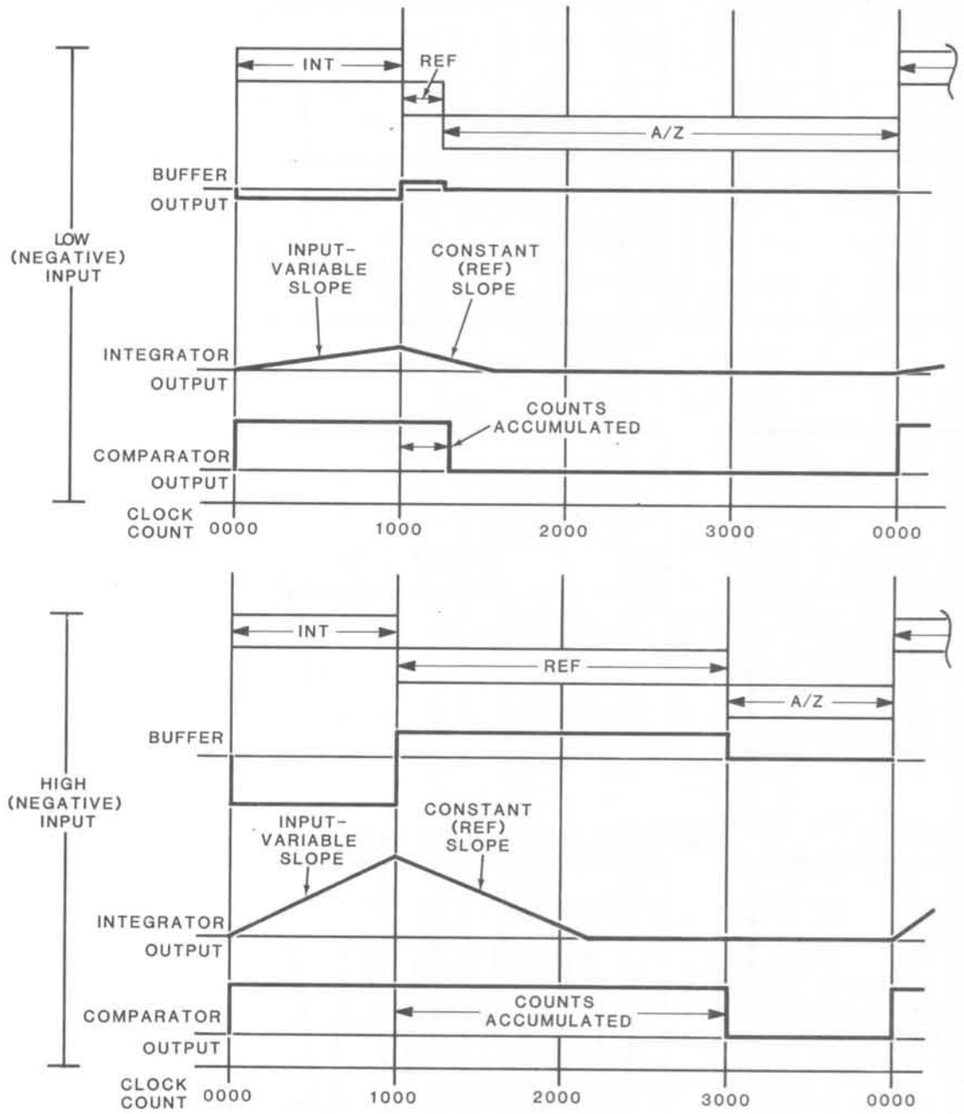
PICTORIAL 8-1



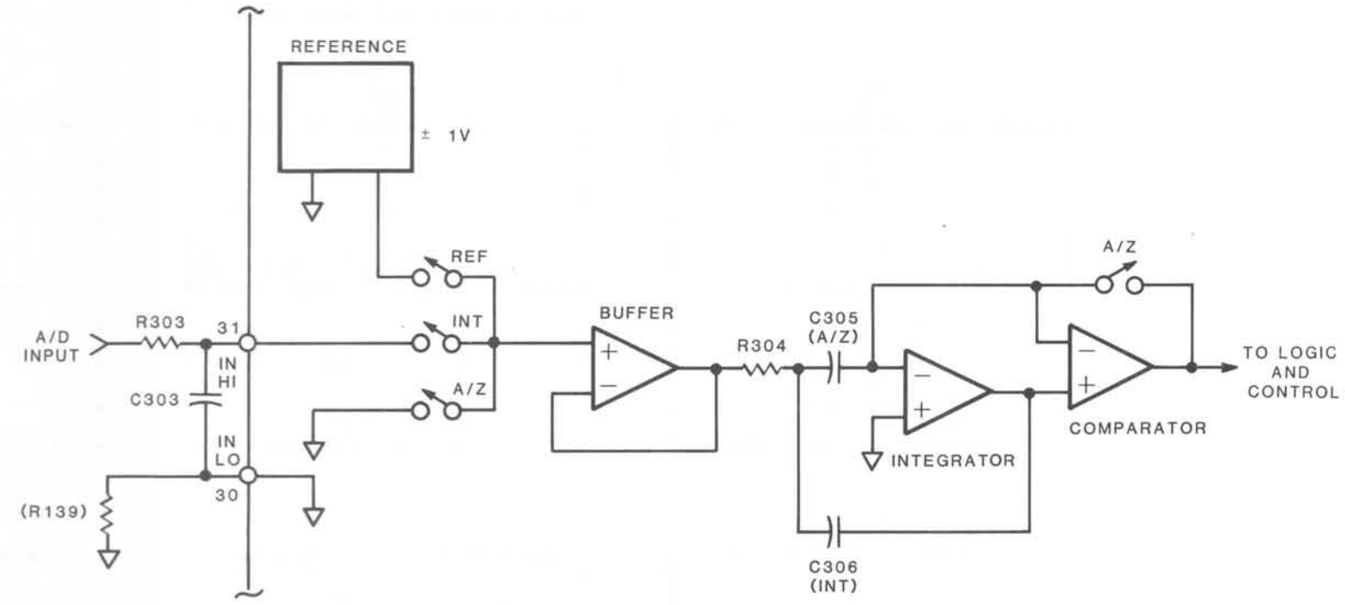
PICTORIAL 8-2



PICTORIAL 8-3

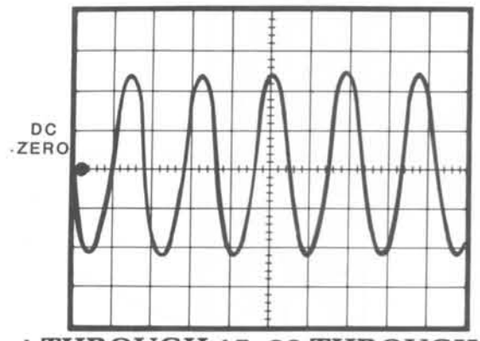


PICTORIAL 8-4

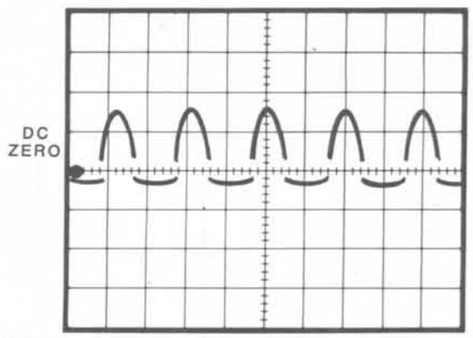


PICTORIAL 8-5

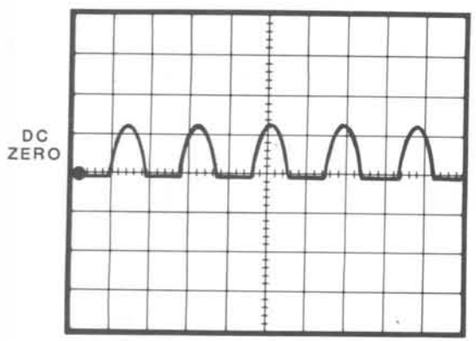
WAVEFORMS



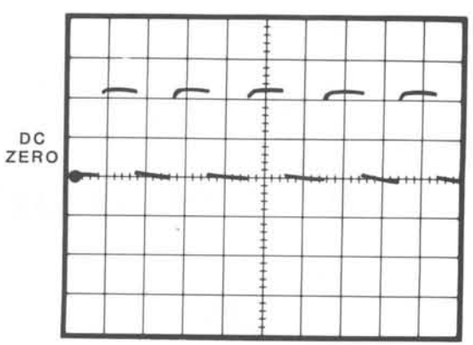
1 THROUGH 15, 20 THROUGH 24



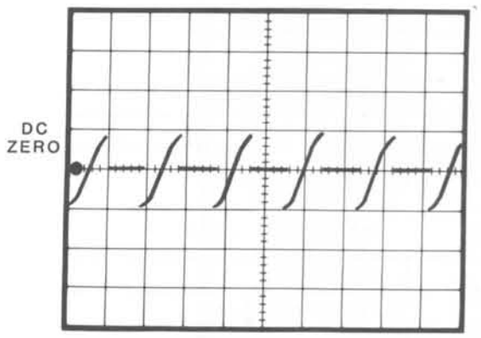
16



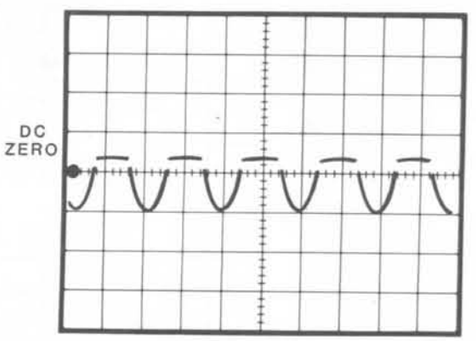
17



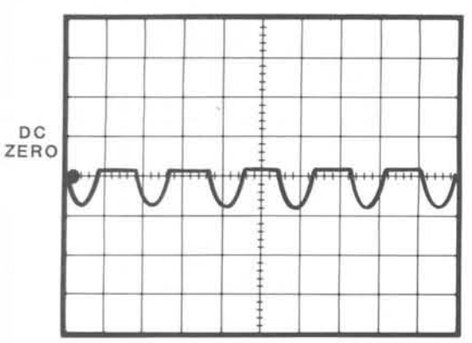
18



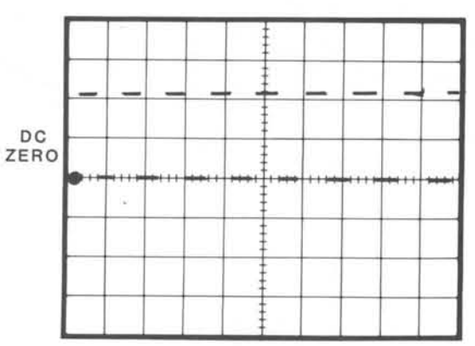
19



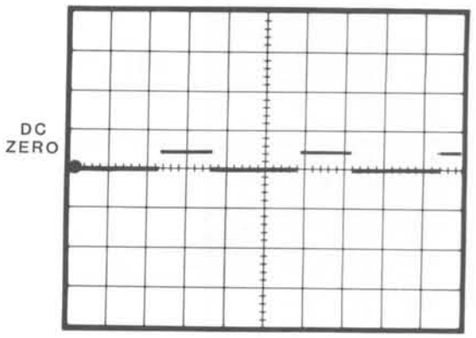
25



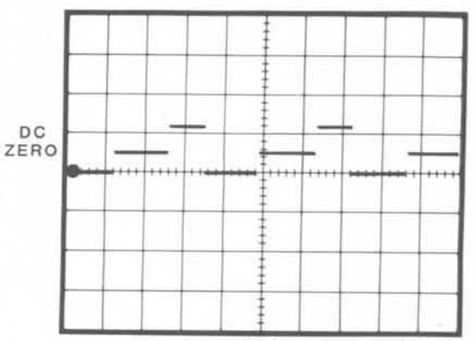
26



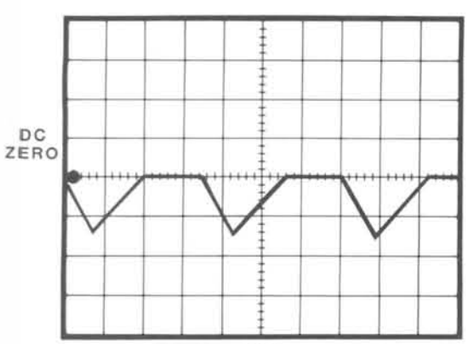
27



28



29



30

CIRCUIT BOARD X-RAY VIEWS

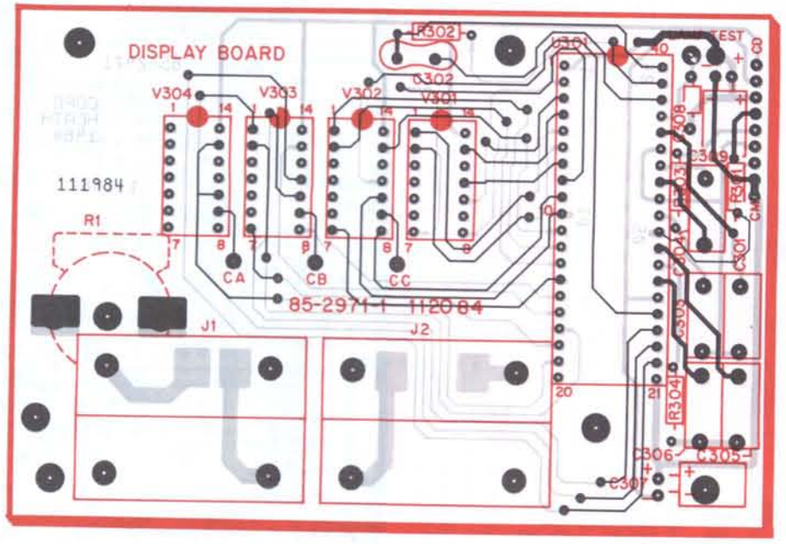
NOTE: To find the PART NUMBER of a component for the purpose of ordering a replacement part:

A. Find the circuit component number (R101, C101, etc.) on the X-Ray View.

B. Locate this same number in the "Circuit Component Number" column of the "Parts List."

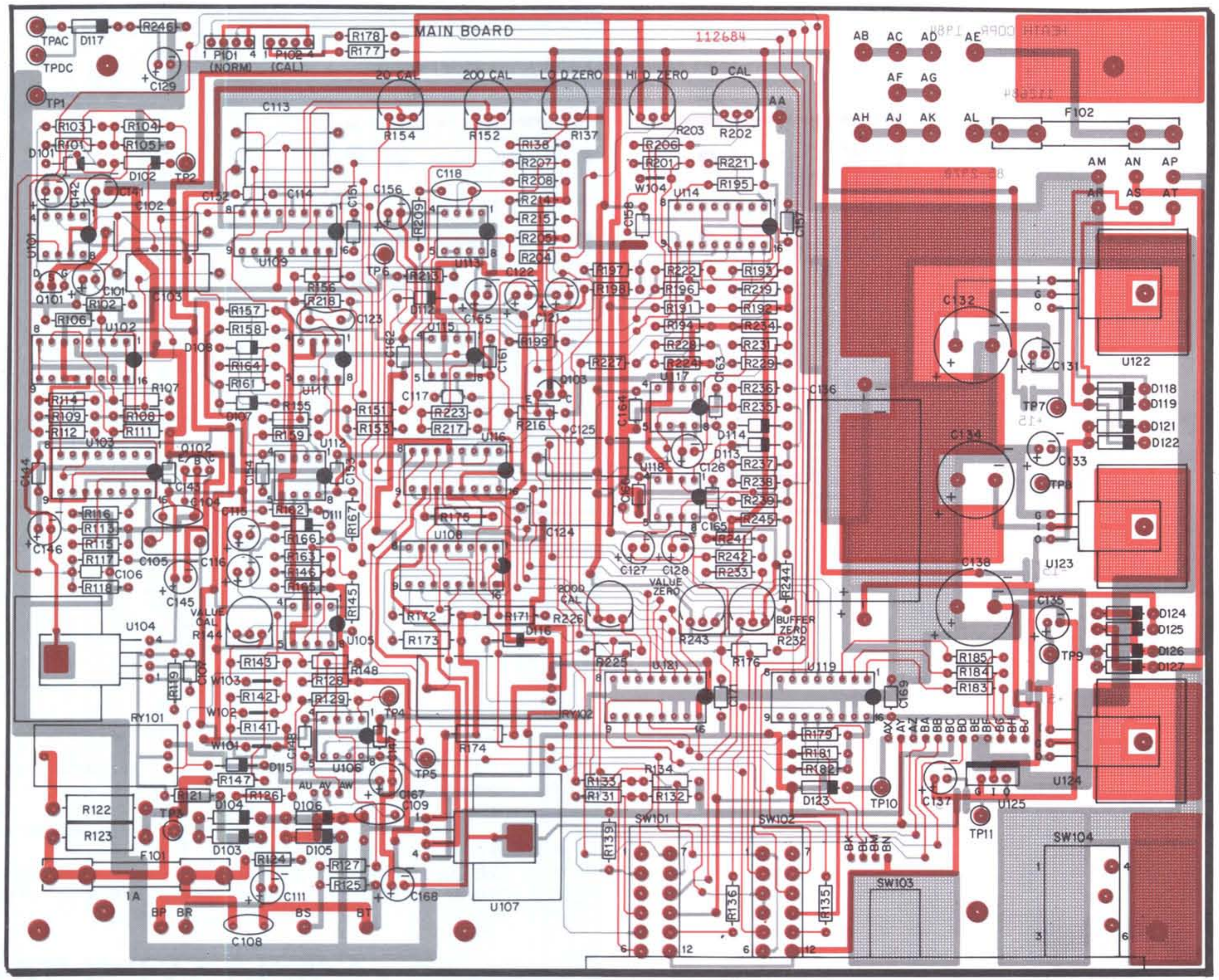
C. Adjacent to the circuit component number, you will find the PART NUMBER AND DESCRIPTION, which must be supplied when you order a replacement part.

D. The circuit board view is shown from the component side. The foil on the component side is shown in RED."



DISPLAY CIRCUIT BOARD

(Shown from the component side.)



MAIN CIRCUIT BOARD

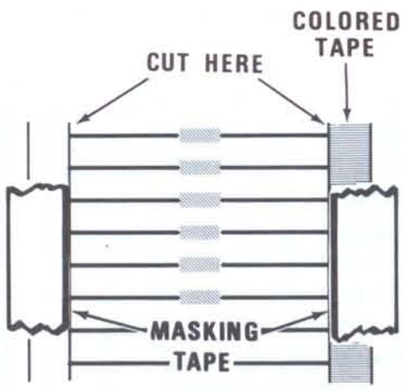
(Shown from the component side. The foil on the component side is shown in red.)

TAPED COMPONENT CHART

Read and Follow These Instructions Before You Install the First Component.

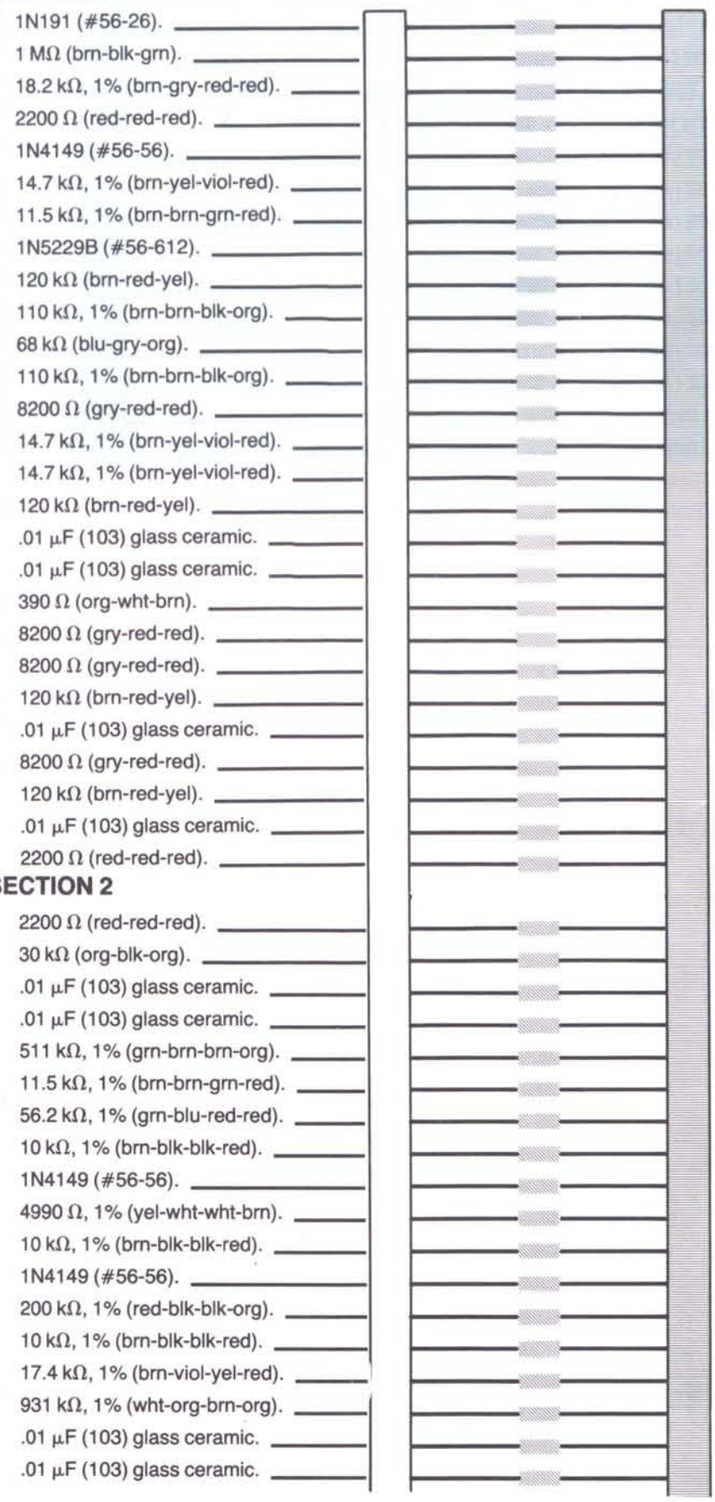
Use masking tape, as shown in the Taping Detail, to tape the component strips over the component drawings. Be sure each part on the strip is over its correct illustration; and that resistor color bands, and any part numbers, match their drawings. Cut the tape, as necessary, to align each section. Do not remove any parts from the strip until they are called for in the assembly instructions.

NOTE: Never attempt to pull the components free from the tape; gum residue from the tape could cause an intermittent solder connection. Use diagonal cutters to remove each part as it is called for in the assembly instructions. Cut the leads at the inside edge of the tape as shown.



Taping Detail

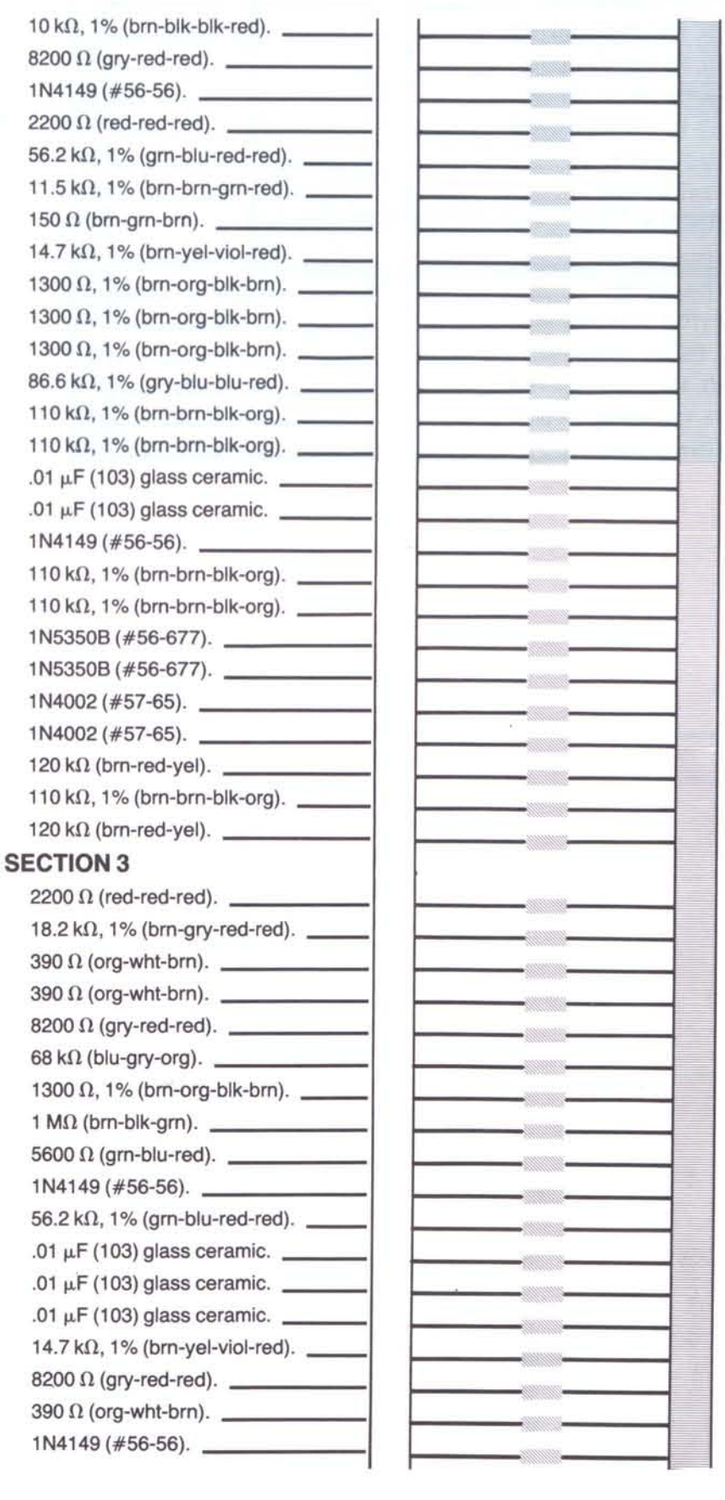
SECTION 1



1N191 (#56-26).
1 MΩ (brn-blk-grn).
18.2 kΩ, 1% (brn-gry-red-red).
2200 Ω (red-red-red).
1N4149 (#56-56).
14.7 kΩ, 1% (brn-yel-viol-red).
11.5 kΩ, 1% (brn-brn-grn-red).
1N5229B (#56-612).
120 kΩ (brn-red-yel).
110 kΩ, 1% (brn-brn-blk-org).
68 kΩ (blu-gry-org).
110 kΩ, 1% (brn-brn-blk-org).
8200 Ω (gry-red-red).
14.7 kΩ, 1% (brn-yel-viol-red).
14.7 kΩ, 1% (brn-yel-viol-red).
120 kΩ (brn-red-yel).
.01 µF (103) glass ceramic.
.01 µF (103) glass ceramic.
390 Ω (org-wht-brn).
8200 Ω (gry-red-red).
8200 Ω (gry-red-red).
120 kΩ (brn-red-yel).
.01 µF (103) glass ceramic.
8200 Ω (gry-red-red).
120 kΩ (brn-red-yel).
.01 µF (103) glass ceramic.
2200 Ω (red-red-red).

SECTION 2

2200 Ω (red-red-red).
30 kΩ (org-blk-org).
.01 µF (103) glass ceramic.
.01 µF (103) glass ceramic.
511 kΩ, 1% (grn-brn-brn-org).
11.5 kΩ, 1% (brn-brn-grn-red).
56.2 kΩ, 1% (grn-blu-red-red).
10 kΩ, 1% (brn-blk-blk-red).
1N4149 (#56-56).
4990 Ω, 1% (yel-wht-wht-brn).
10 kΩ, 1% (brn-blk-blk-red).
1N4149 (#56-56).
200 kΩ, 1% (red-blk-blk-org).
10 kΩ, 1% (brn-blk-blk-red).
17.4 kΩ, 1% (brn-viol-yel-red).
931 kΩ, 1% (wht-org-brn-org).
.01 µF (103) glass ceramic.
.01 µF (103) glass ceramic.



10 kΩ, 1% (brn-blk-blk-red).
8200 Ω (gry-red-red).
1N4149 (#56-56).
2200 Ω (red-red-red).
56.2 kΩ, 1% (grn-blu-red-red).
11.5 kΩ, 1% (brn-brn-grn-red).
150 Ω (brn-grn-brn).
14.7 kΩ, 1% (brn-yel-viol-red).
1300 Ω, 1% (brn-org-blk-brn).
1300 Ω, 1% (brn-org-blk-brn).
1300 Ω, 1% (brn-org-blk-brn).
86.6 kΩ, 1% (gry-blu-blu-red).
110 kΩ, 1% (brn-brn-blk-org).
110 kΩ, 1% (brn-brn-blk-org).
.01 µF (103) glass ceramic.
.01 µF (103) glass ceramic.
1N4149 (#56-56).
110 kΩ, 1% (brn-brn-blk-org).
110 kΩ, 1% (brn-brn-blk-org).
1N5350B (#56-677).
1N5350B (#56-677).
1N4002 (#57-65).
1N4002 (#57-65).
120 kΩ (brn-red-yel).
110 kΩ, 1% (brn-brn-blk-org).
120 kΩ (brn-red-yel).

SECTION 3

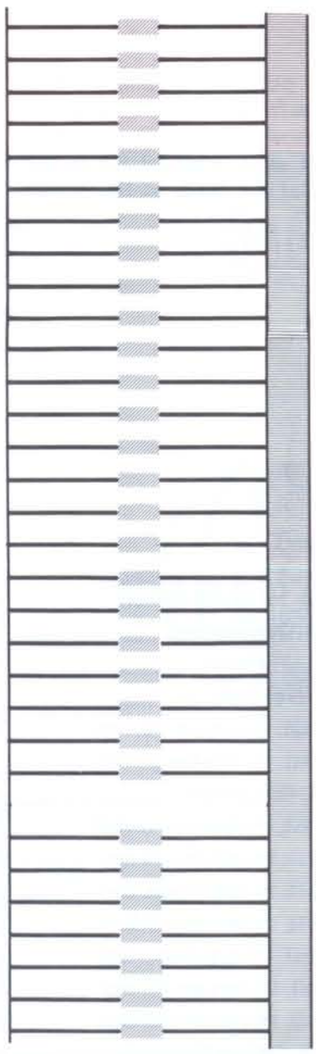
2200 Ω (red-red-red).
18.2 kΩ, 1% (brn-gry-red-red).
390 Ω (org-wht-brn).
390 Ω (org-wht-brn).
8200 Ω (gry-red-red).
68 kΩ (blu-gry-org).
1300 Ω, 1% (brn-org-blk-brn).
1 MΩ (brn-blk-grn).
5600 Ω (grn-blu-red).
1N4149 (#56-56).
56.2 kΩ, 1% (grn-blu-red-red).
.01 µF (103) glass ceramic.
.01 µF (103) glass ceramic.
.01 µF (103) glass ceramic.
14.7 kΩ, 1% (brn-yel-viol-red).
8200 Ω (gry-red-red).
390 Ω (org-wht-brn).
1N4149 (#56-56).

SECTION 4

1 MΩ (brn-blk-grn).
110 kΩ, 1% (brn-brn-blk-org).
.01 µF (103) glass ceramic.
56.2 kΩ, 1% (grn-blu-red-red).
56.2 kΩ, 1% (grn-blu-red-red).
10 kΩ, 1% (brn-blk-blk-red).
56.2 kΩ, 1% (grn-blu-red-red).
56.2 kΩ, 1% (grn-blu-red-red).
14.7 kΩ, 1% (brn-yel-viol-red).
11.5 kΩ, 1% (brn-brn-grn-red).
30 kΩ (org-blk-org).
30 kΩ (org-blk-org).
.01 µF (103) glass ceramic.
.01 µF (103) glass ceramic.
.01 µF (103) glass ceramic.
.01 µF (103) glass ceramic.
86.6 kΩ, 1% (gry-blu-blu-red).
.01 µF (103) glass ceramic.
18.2 kΩ, 1% (brn-gry-red-red).
18.2 kΩ, 1% (brn-gry-red-red).
1300 Ω, 1% (brn-org-blk-brn).
18.2 kΩ, 1% (brn-gry-red-red).
33 Ω (org-org-blk).
390 Ω (org-wht-brn).

SECTION 5

68 kΩ (blu-gry-org).
68 kΩ (blu-gry-org).
.01 µF (103) glass ceramic.
10 kΩ, 1% (brn-blk-blk-red).
11.5 kΩ, 1% (brn-brn-grn-red).
1300 Ω, 1% (brn-org-blk-brn).
150 Ω (brn-grn-brn).



56.2 kΩ, 1% (grn-blu-red-red).
200 kΩ, 1% (red-blk-blk-org).
10 kΩ, 1% (brn-blk-blk-red).
10 kΩ, 1% (brn-blk-blk-red).
1N4149 (#56-56).
1N4149 (#56-56).
10 kΩ, 1% (brn-blk-blk-red).
4990 Ω, 1% (yel-wht-wht-brn).
11.5 kΩ, 1% (brn-brn-grn-red).
1300 Ω, 1% (brn-org-blk-brn).
150 Ω (brn-grn-brn).
2200 Ω (red-red-red).
120 kΩ (brn-red-yel).
1 MΩ (brn-blk-grn).
2200 Ω (red-red-red).
.01 µF (103) glass ceramic.
5600 Ω (grn-blu-red).
5600 Ω (grn-blu-red).
5600 Ω (grn-blu-red).
1N4002 (#57-65).
390 Ω (org-wht-brn).

SECTION 6

1N4002 (#57-65).
1N4002 (#57-65).
1N4002 (#57-65).
1N4002 (#57-65).
1N4002 (#57-65).
1N4002 (#57-65).
1N4002 (#57-65).
1N4002 (#57-65).
390 Ω (org-wht-brn).
390 Ω (org-wht-brn).
390 Ω (org-wht-brn).
1 MΩ (brn-blk-grn).