Voltage Regulator Installation

There is one MC7805 5-volt regulator to be installed on the 8800 Disply/Control Board.

(/) Set the MC7805 in place on the board and align the mounting holes. (see drawing)

(/) Use a pencil to mark the point on each of the three leads where they line up with their respective holes on the board.

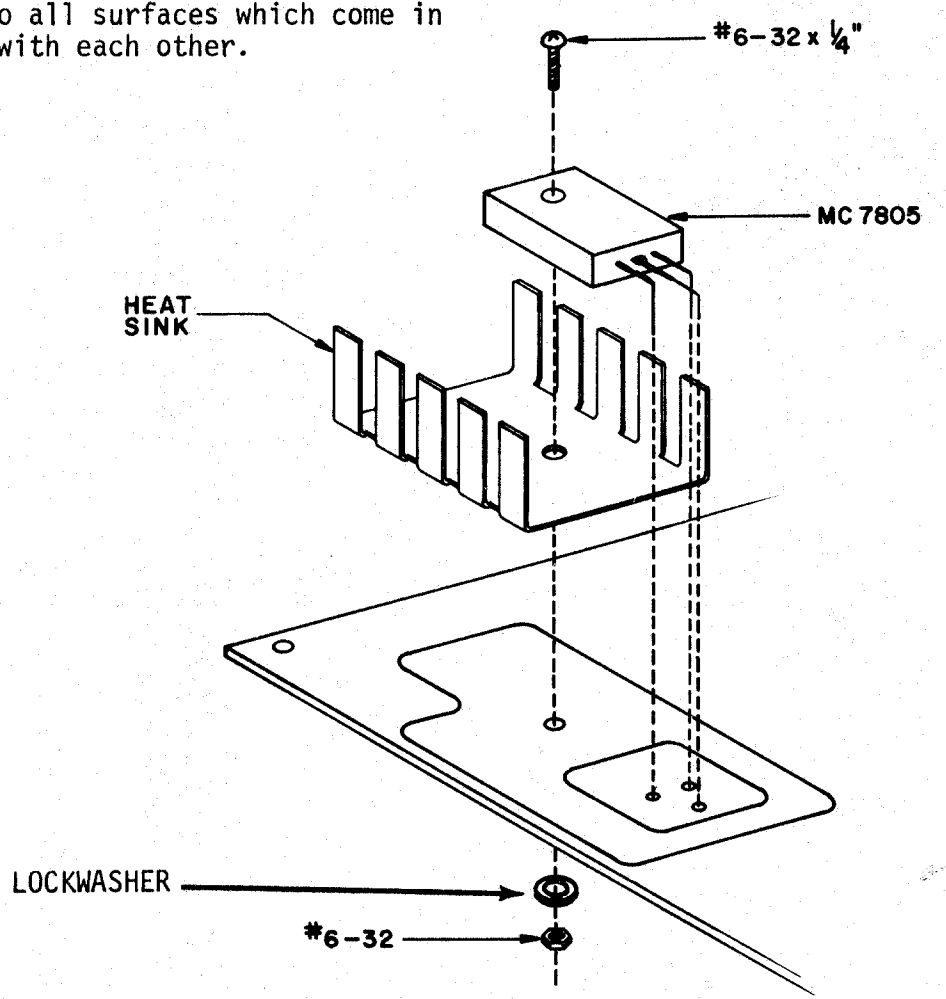
(/) Use needle-nose pliers to bend each of the three leads at a right angle on the points where you made the pencil marks.

NOTE: Use heat-sink grease when installing this component. Apply the grease to all surfaces which come in contact with each other.

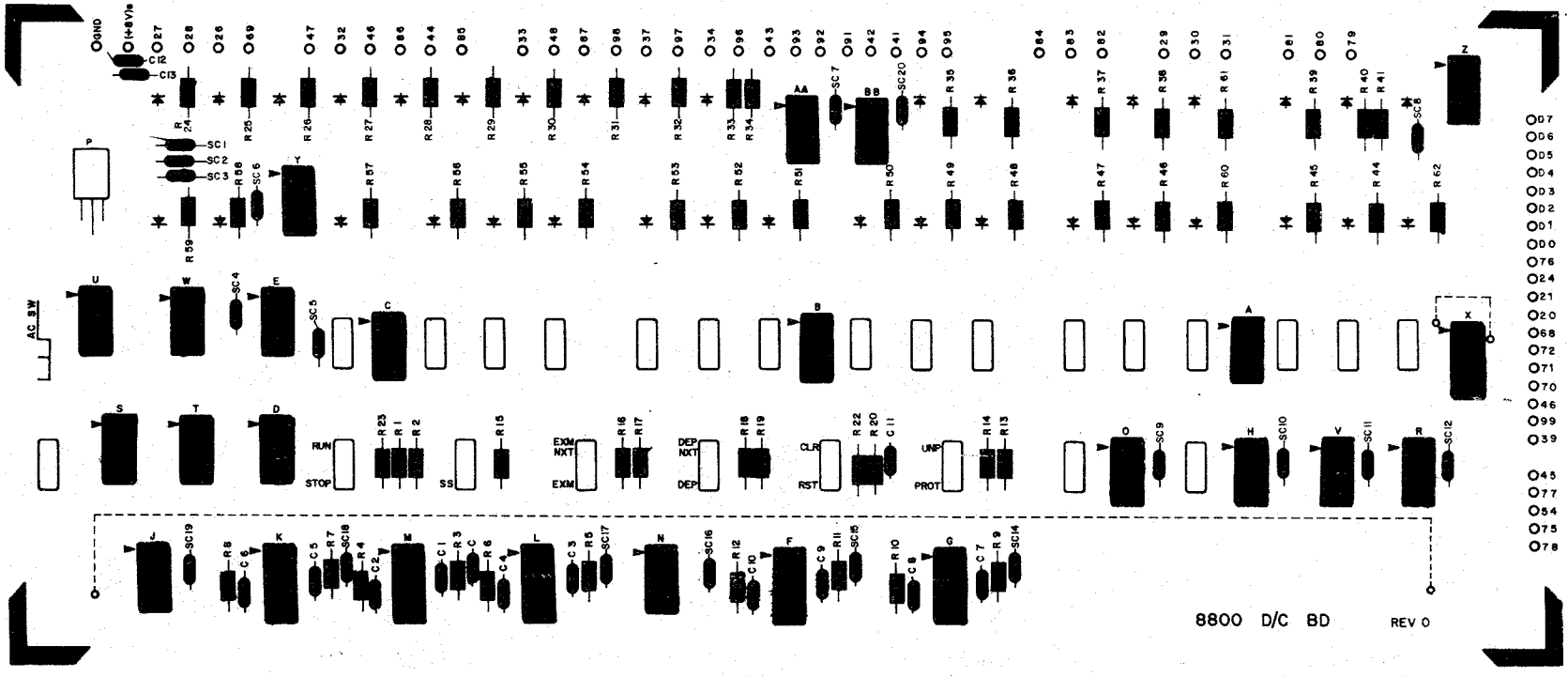
(/) Referring to the drawing, set the regulator and heat sink in place on the silk-screened side of the board. Secure them to the board using a #6-32 nut. Hold the regulator in place as you tighten the nut to keep from twisting the leads.

(/) Turn the board over and solder the three leads to the foil pattern on the back side of the board. Be sure not to leave any solder bridges.

(/) Clip off any excess lead lengths.



(✓) Install P (uA7805)



8800 DISPLAY/CONTROL BOARD HARDWIRE CONNECTIONS

There are 62 loose wire connections and 2 jumper wire connections to be made on the 8800 Display/Control Board.

The two jumper connections are to be made by inserting the wires from the silk-screened side of the board and soldering them on the back side. Be sure to clip off any excess lead lengths as you make each connection.

( ) Connect one end of an 18 inch wire to one of the pads labeled "J1".

( ) Cut the wire as necessary so that it is just long enough to reach the other pad labeled "J1" and then solder it to the pad.

( ) Use the length of wire that was cut from the 18 inch wire above to connect both pads labeled "J2". Make this connection in the same manner as that used above.

There are 63 three foot lengths of wire to be connected to the 8800 Display/ Control Board.

Make all of these connections by inserting the wires from the back side of the board and soldering them on the silk-screened side. Be sure to clip off any excess lead lengths as you make each connection.

As you install each wire, label the end opposite the connection with a piece of masking tape marked with the same designation as the pad to which it is connected.

NOTE: There are two pads with the designation "46", one on the top edge and one on the side. Only one of these pads need be connected to a wire.

( ) Connect 3 foot wires to the row of 37 pads along the top edge of the board. Start with the pad labeled "GND" and end with the pad labeled "79".

( ) Connect 3 foot wires to the row of 24 pads along the right edge of the board. Start with the pad labeled "D7" and end with the pad labeled "78".

( ) Connect 3 foot wires to the two pads on the left edge of the board labeled "AC SW".

NOTE: There are four heavier guage wires provided for four of the wire connections. Use the heavier #18 wire for the connections to "AC SW", "GND" and "(+8V)B". Use the lighter #26 wire for the other connections.

Sense Switch Address Wiring

There is one jumper connection to be made on the 8800 Display/Control Board to place the sense switches at address 255.

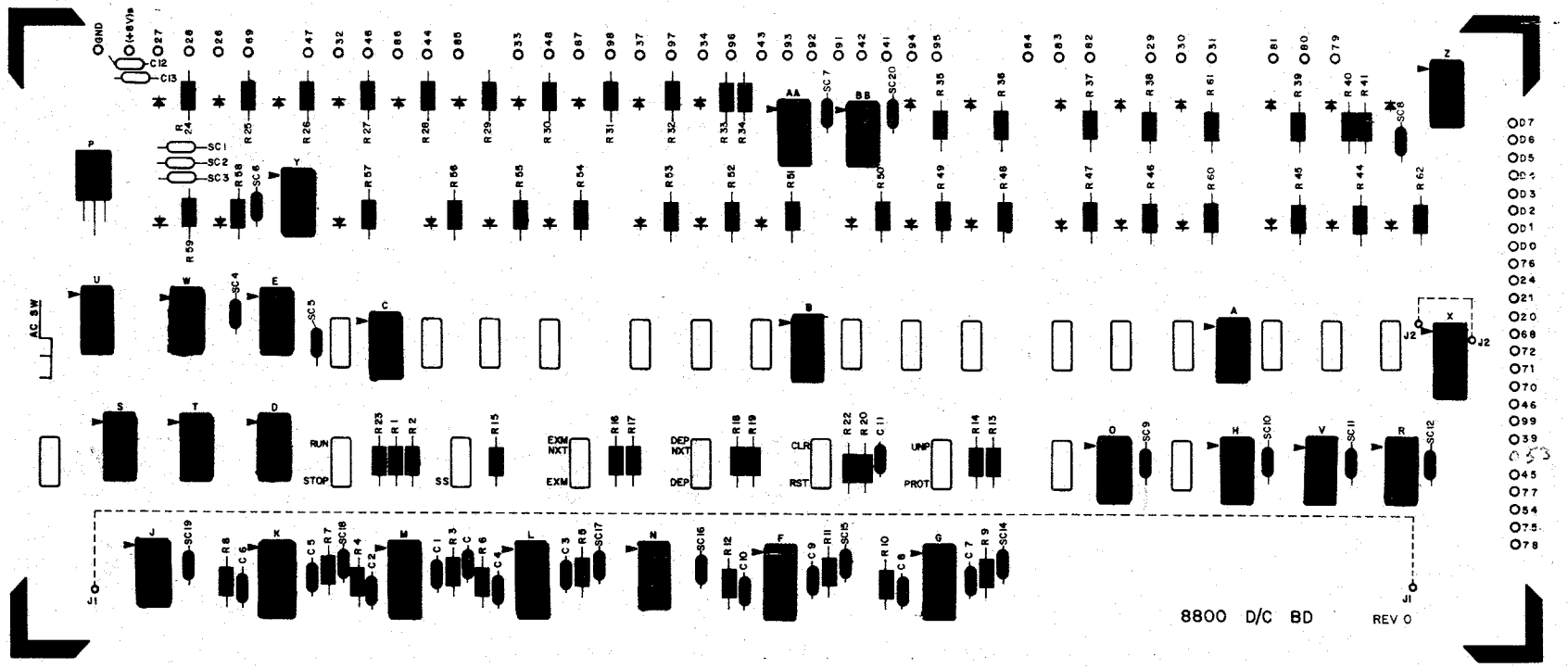
( ) Make this connection in the same manner as jumpers J1 and J2.

( ) The jumper should be connected between the hole just below IC T and the pad just to the left of the unmarked pad between pads 39 and 45 on the right edge of the board.

( ) Connect a 3 foot wire to the unmarked pad mentioned above in the same manner as described on page 14. Label this wire "53".

(✓) Install jumpers ~~J1~~ & J2

(✓) Connect 3-foot wires to pads
as instructed on page 14



CHASSIS AND SUB-PANEL REMOVAL

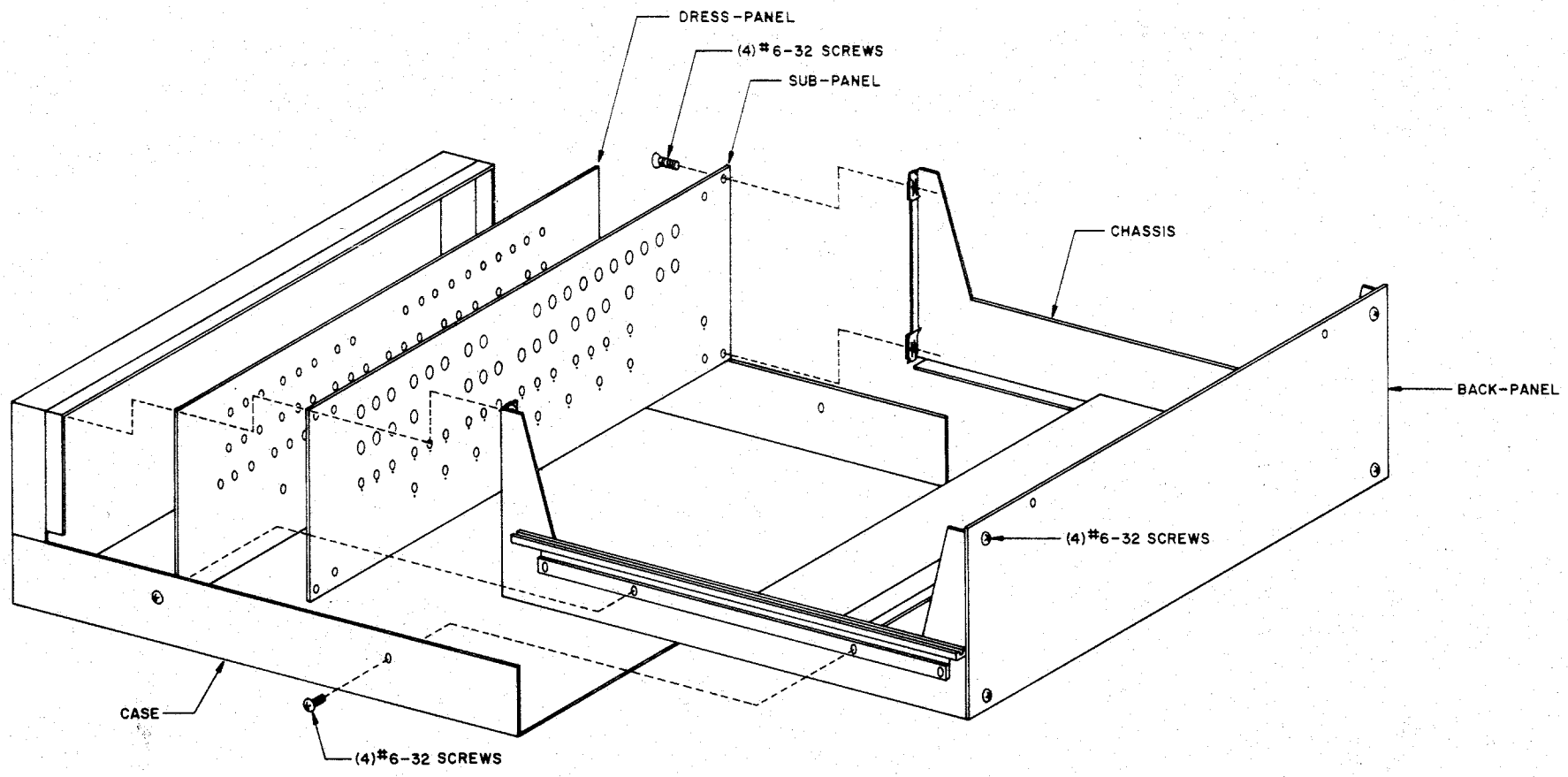
In order to correctly install the LED displays and the switches on the 8800 Display/Control Board, the Sub-Panel must first be removed from the case. The Sub-Panel and Dress-Panel will be used for alignment purposes while installing the remaining components.

(✓) There are four screws securing the chassis to the case bottom, two on each side. Remove these four screws and set them asside. It would be adviseable to place the screws in a small envelope and label it "Chassis Mounting Screws". (see drawing)

(✓) Remove the chassis from the case bottom by sliding it towards the back of the case. It will be necessary to lift up on the back of the chassis in order to completely remove it from the case. The Dress-Panel should fall free when the chassis is removed.

(✓) There are four screws securing the Sub-Panel to the chassis. Remove these four screws and set them aside.

The chassis and case should now be set out of the way.


DRESS-PANEL
(4)#6-32 SCREWS
SUB-PANEL
CHASSIS
BACK-PANEL
(4)#6-32 SCREWS
CASE
(4)#6-32 SCREWS

Switch Installation

There are 25 toggle switches to be mounted on the 8800 Display/Control Board. Eight of these are momentary contact SPDT switches and seventeen are latching type SPDT switches.

For alignment purposes, the switches must first be mounted to the Sub-Panel before connecting them to the Display/ Control Board itself.

(/) Referring to the drawing, install all 25 switches into the proper holes on the Sub-Panel. Tighten the nuts on the switches just enough to keep the switch from falling off the panel.

NOTE: The momentary contact switches can be distinguished from the latching type switches by their spring action. The momentary contact type will return to the center position automatically when preassure is removed.

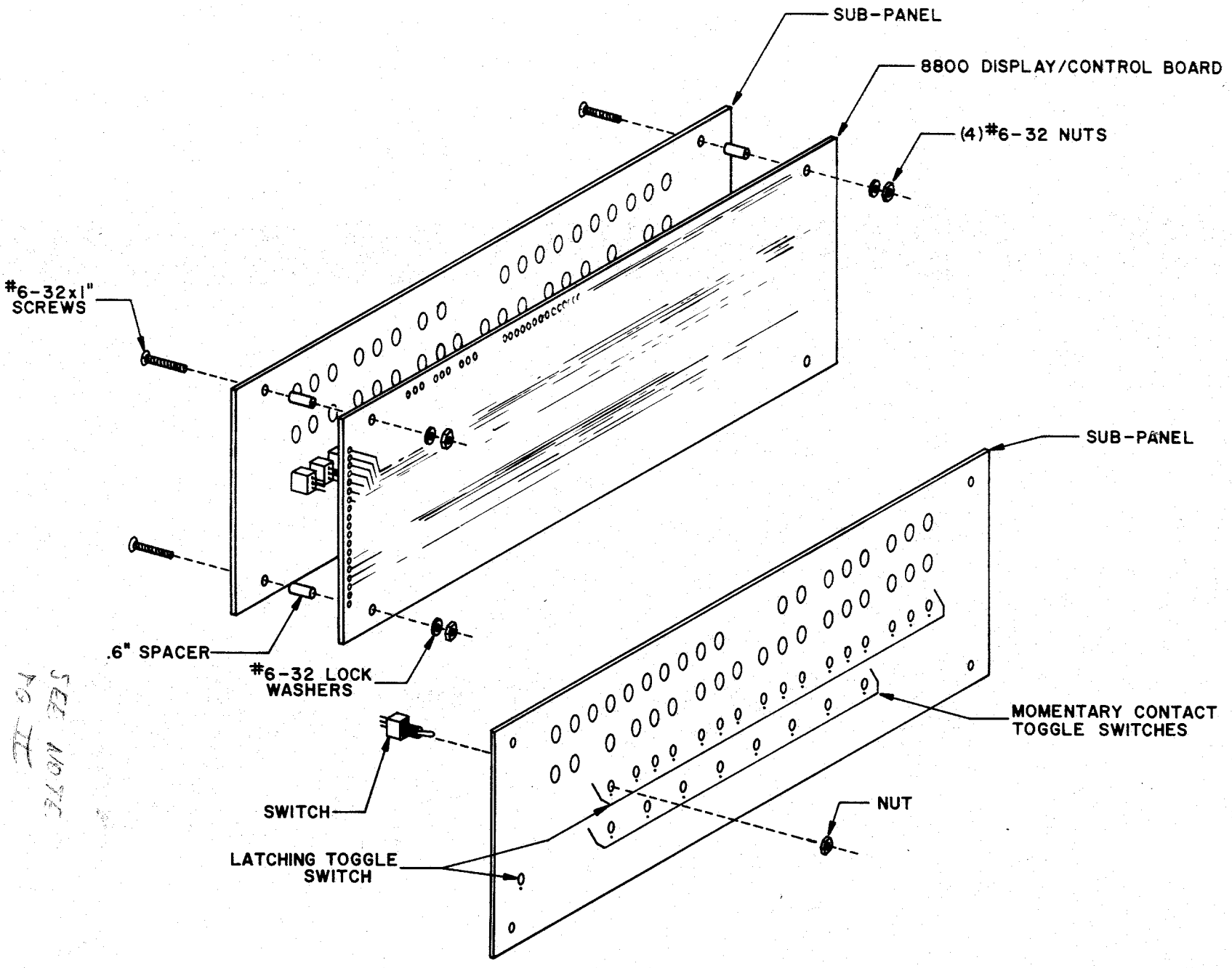
(/) The Display/Control Board should now be mounted to the Sub-Panel. Refer to the drawing and mount the board to the panel using #6-32 X 1 inch screws and .6 inch spacers.

NOTE: As the Display/Control Board is set into place with the Sub-Panel it may be necessary to guide the switches into the holes on the board with a screwdriver. The switch leads should protrude approximately 1/8 inch through the PC board.

(/) Once the switches are all in place tighten the nuts on all of them so that they are fastened as securely as possible onto the Sub-Panel.

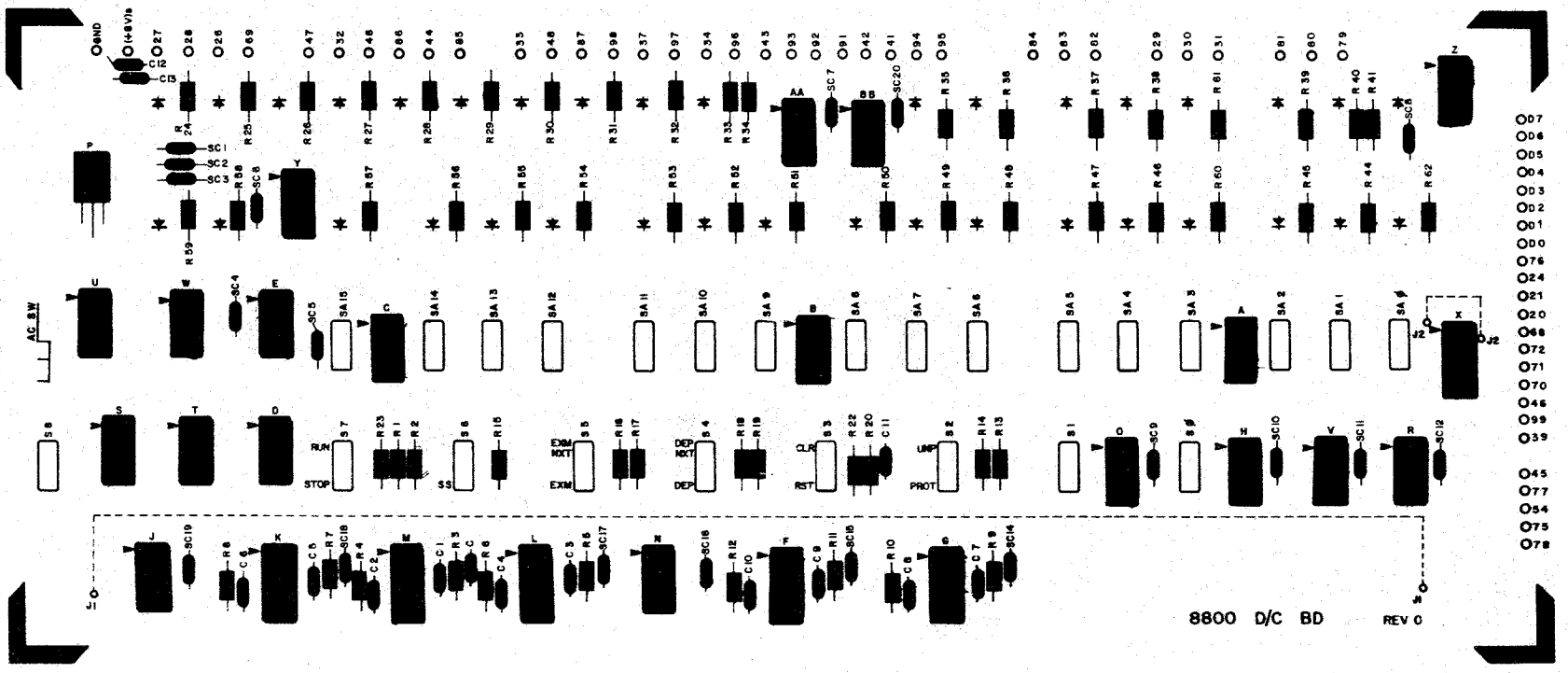
(/) Place the entire assembly in front of you with the PC board facing up.

(/) Solder the leads on each of the 25 switches to the foil pattern on the back side of the board. Be careful not to leave any solder bridges.


SUB-PANEL
8800 DISPLAY/CONTROL BOARD
(4)#6-32 NUTS
#6-32x1" SCREWS
SUB-PANEL
.6" SPACER
#6-32 LOCK WASHERS
MOMENTARY CONTACT TOGGLE SWITCHES
SWITCH
NUT
LATCHING TOGGLE SWITCH

( ) Install latching toggle switches SA0 through SA15 and S8.

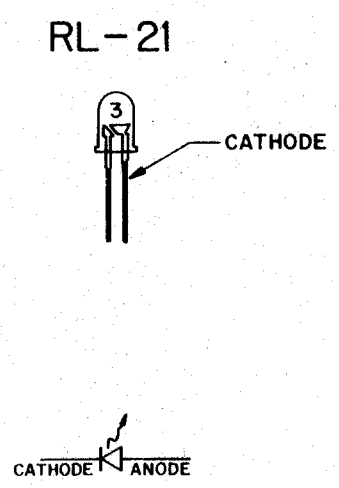
( ) Install momentary contact toggle switches S0 through S7.



LED Installation

There are 36 RL-21 LED's to be installed on the 8800 Display/Control Board. Care must be taken during this procedure to ensure correct physical alignment and polarity orientation.

Refer to the drawing below for the correct polarity orientation of the LED's.



( ) Insert the top row of 18 LED's with the cathode lead towards the top edge of the board. Insert the LED's through the holes on the Sub-Panel into the correct holes on the Display/Control Board. Bend the two leads protruding through the board slightly outward just enough to keep each LED from falling back out. (see drawing)

( ) Insert the second row of 18 LED's in the same manner, but with the cathode lead towards the switches on the bottom. (see drawing)

( ) Referring to the drawing, set the Dress-Panel in place over the Sub-Panel. Secure the two panels together using rubber bands.

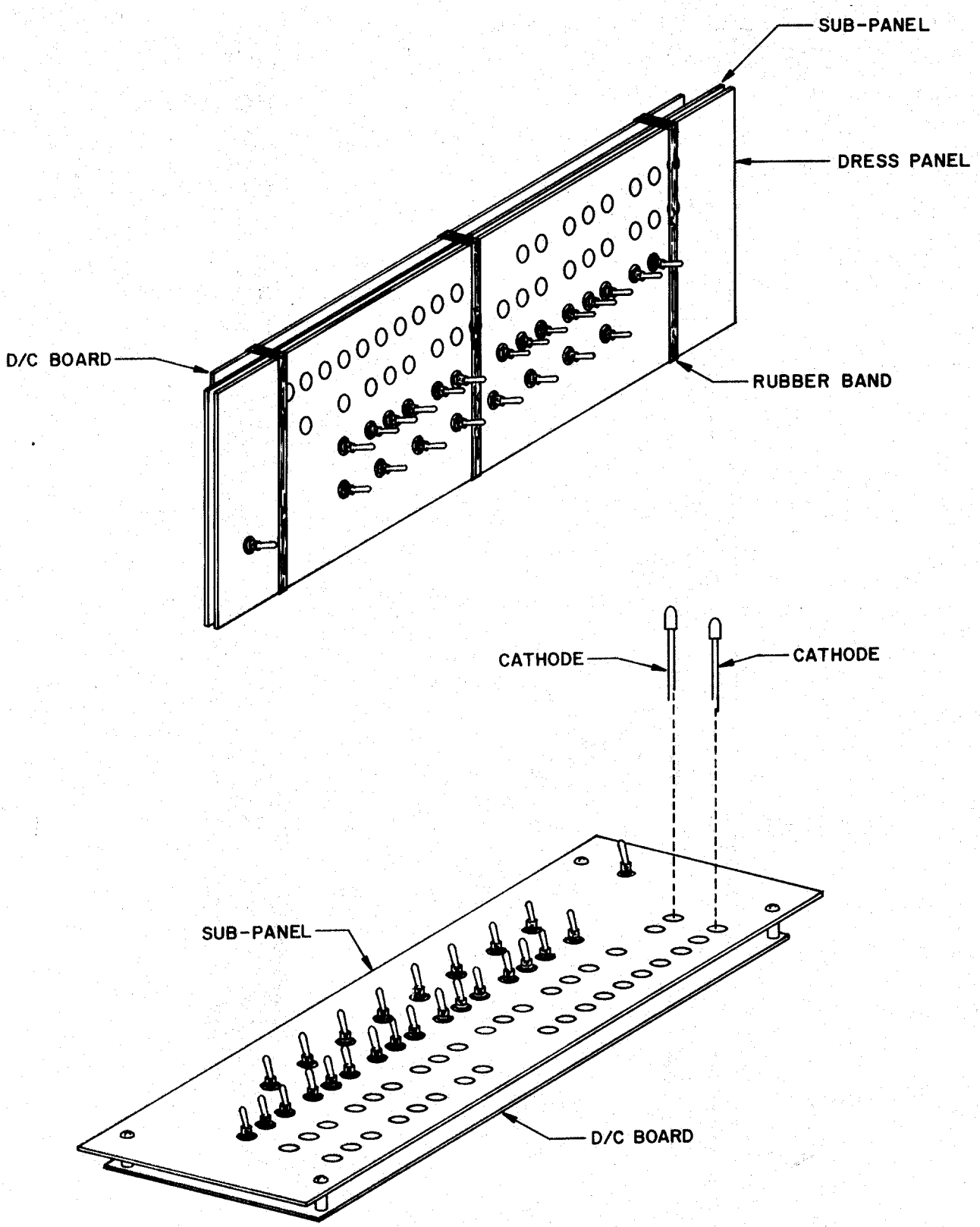
( ) Set the entire assembly in front of you so that you have easy access to both sides.

( ) One at a time, align each LED with the correct hole on the Dress-Panel and solder the two leads to the foil pattern on the back side of the Display/Control Board.

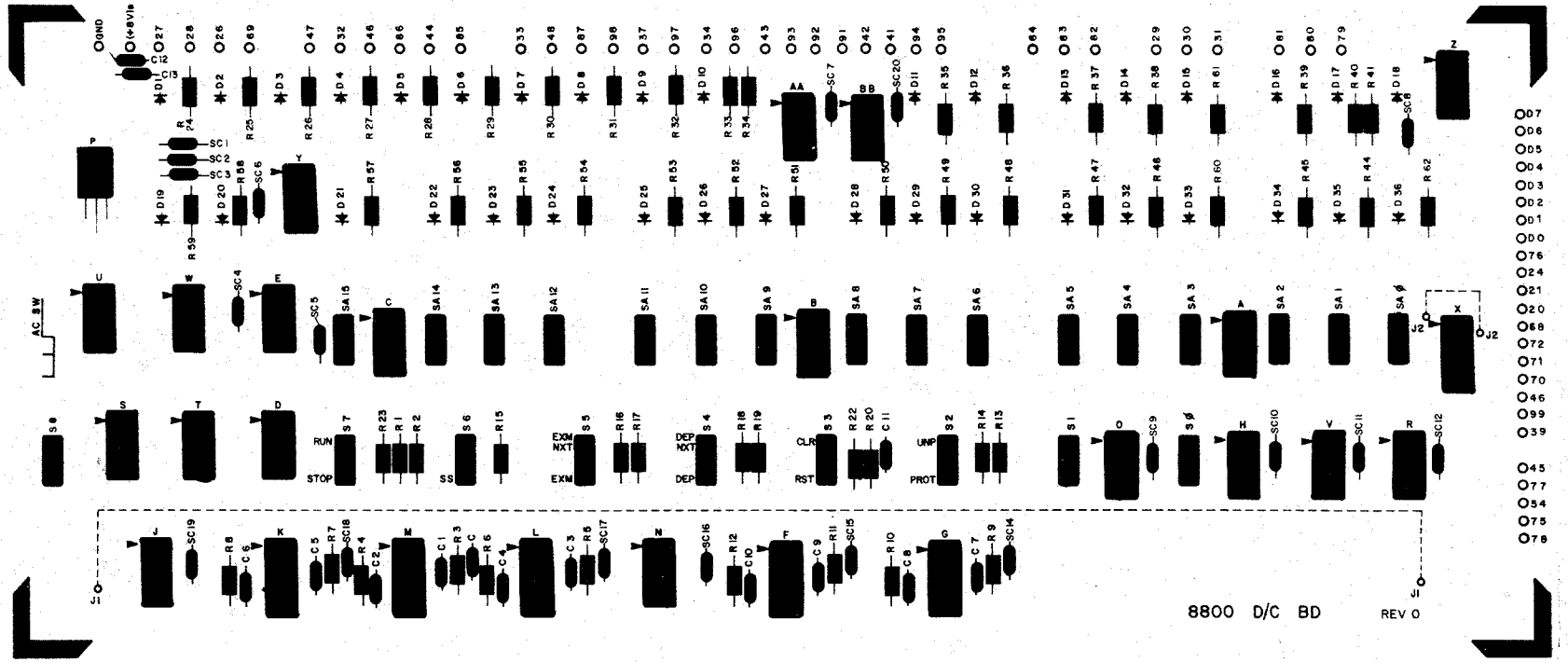
NOTE: Due to supply variations, the LED's in your kit may or may not fit all the way through the holes in the Dress-Panel. If they don't, set them as close as possible to the panel. If they do fit through, set them as desired.

WARNING: These LED's are heat sensitive. Use a minimum amount of heat for a minimum length of time when soldering them.

( ) Clip off any excess lead lengths from each LED after it is soldered into place.


SUB-PANEL
DRESS PANEL
D/C BOARD
RUBBER BAND
CATHODE
CATHODE
SUB-PANEL
D/C BOARD

(✓) Install RL-21 LED's D1 through D36.



Connector Plug Installation

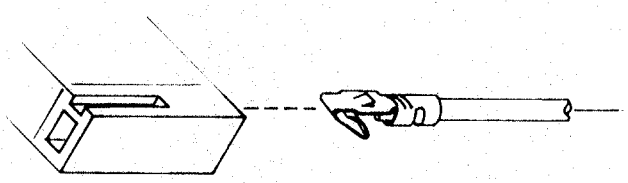
There is one 10-pin female connector to be installed onto 8 of the wires from the 8800 Display/Control Board.

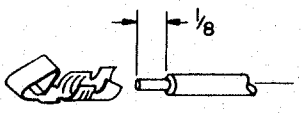
(✓) There are 8 wires coming from the row of wires on the shorter edge of the Display/Control board labeled "D0" through "D7". Move the labels on these wires to within 10 inches of the board itself; then cut each of the wires to approximately 16 inches in length.

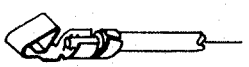
(✓) Strip 1/8 inch of insulation from the ends of each of the wires and tin the exposed ends by applying a thin coat of solder.

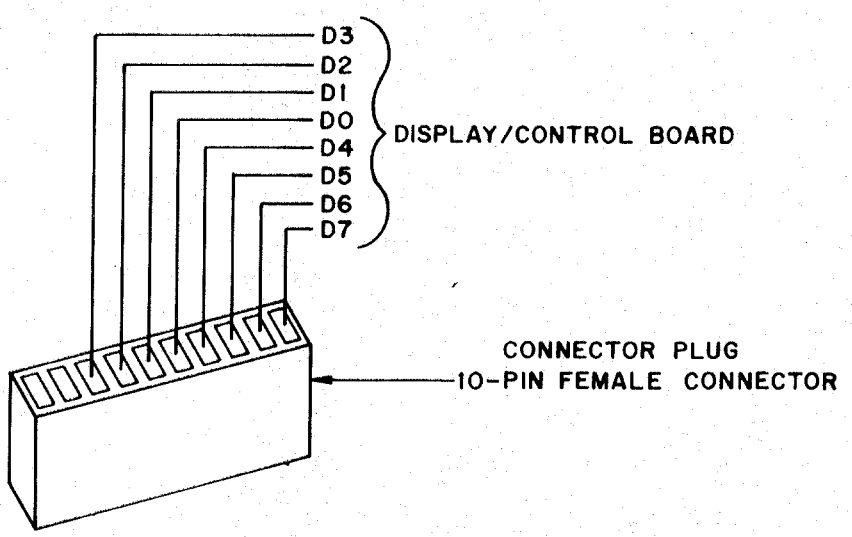
(✓) Install one of the connector pins onto the end of each of the wires. Do this by crimping the wire into place; then soldering the end to the pin itself. (see drawing)

(✓) Insert the 8 pins into the 10-pin connector as shown in the drawing below. Be sure that you install them in the order indicated in the drawing.







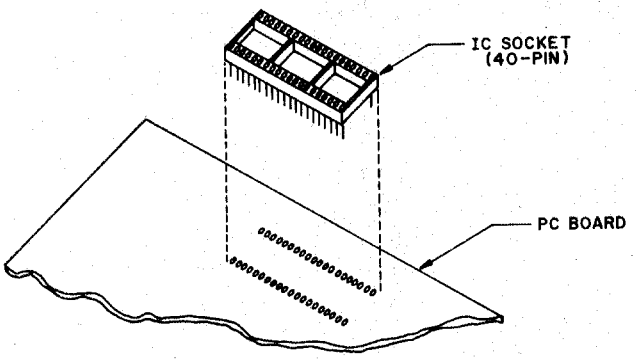


8800 CPU BOARD ASSEMBLY

Integrated Circuit Installation

There are 18 integrated circuits (IC's) to be installed on the 8800 CPU Board. One of these, the 8080 CPU IC, will be provided with a 40-pin IC socket. The 8080 IC itself should not be installed into the socket until the entire board is ready to be installed in the 8800.

( ) Referring to the component layout, set the 40-pin IC socket included in your kit into place, and secure it with a piece of masking tape. (see drawing below)



( ) Turn the board over and solder each pin to the foil pattern on the back side of the board. Be sure to solder each pin and be careful not to leave any solder bridges.

( ) Turn the board over again and remove the masking tape.

( ) Referring to the component layout, remove the IC with the correct part number from its holder. If there are any bent pins, straighten these using needle-nose pliers. Ensure that you choose the IC with the correct part number as you install each one.

( ) Orient the IC so that its notched end corresponds with the notch printed on the PC board, and pin 1 of the IC corresponds with the pad marked with an arrowhead on the board.

NOTE: If the IC does not have a notch on one end, refer to the IC Orientation Chart included with your manual for the identification of pin 1.

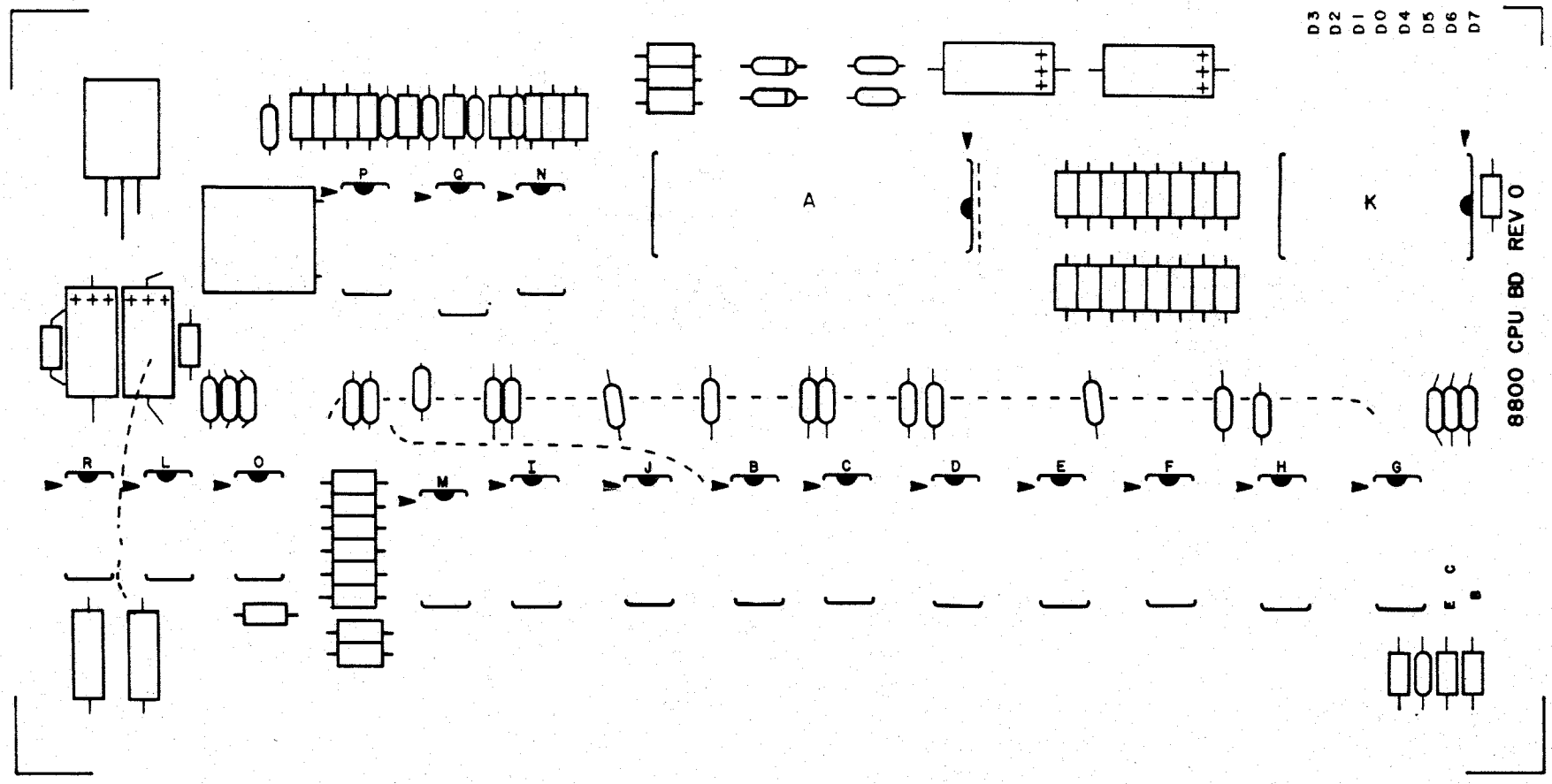
( ) When you have the correct orientation, start the pins on one side of the IC into their respective holes on the silk-screened side of the PC board. DO NOT PUSH THE PINS IN ALL THE WAY. If you have difficulty getting the pins into the holes, use the tip of a small screwdriver to guide them.

( ) Start the pins on the other side of the IC into their holes in the same manner. When all of the pins have been started, set the IC in place by gently rocking it back and forth until it rests as close as possible to the board. Make sure that the IC is perfectly straight and as close as possible to the board; then tape it in place with a piece of masking tape.

( ) Turn the board over and solder each pin to the foil pattern on the back side of the board. Be sure to solder each pin and be careful not to leave any solder bridges.

( ) Turn the board over again and remove the piece of masking tape.

Use the same procedure to install each of the IC's. Be sure that you have the correct part number and the correct orientation as you install each one.



(✓) Install a 40-pin socket in IC A position.

(✓) K is an 8212

(✓) P is a 7404 14

(✓) Q is a 74123 16

(✓) N is a 7406

(✓) R is a 74L00

(✓) L is a 74LS74 or a 74L74

(✓) O is a 74L02 14

(✓) M is a 74LS04 14

( ) I, J, B, C, D, E, F, H, and G are 8T97's

Hardwire Jumper Connections

There are 5 jumper connections to be made on the 8800 CPU Board.

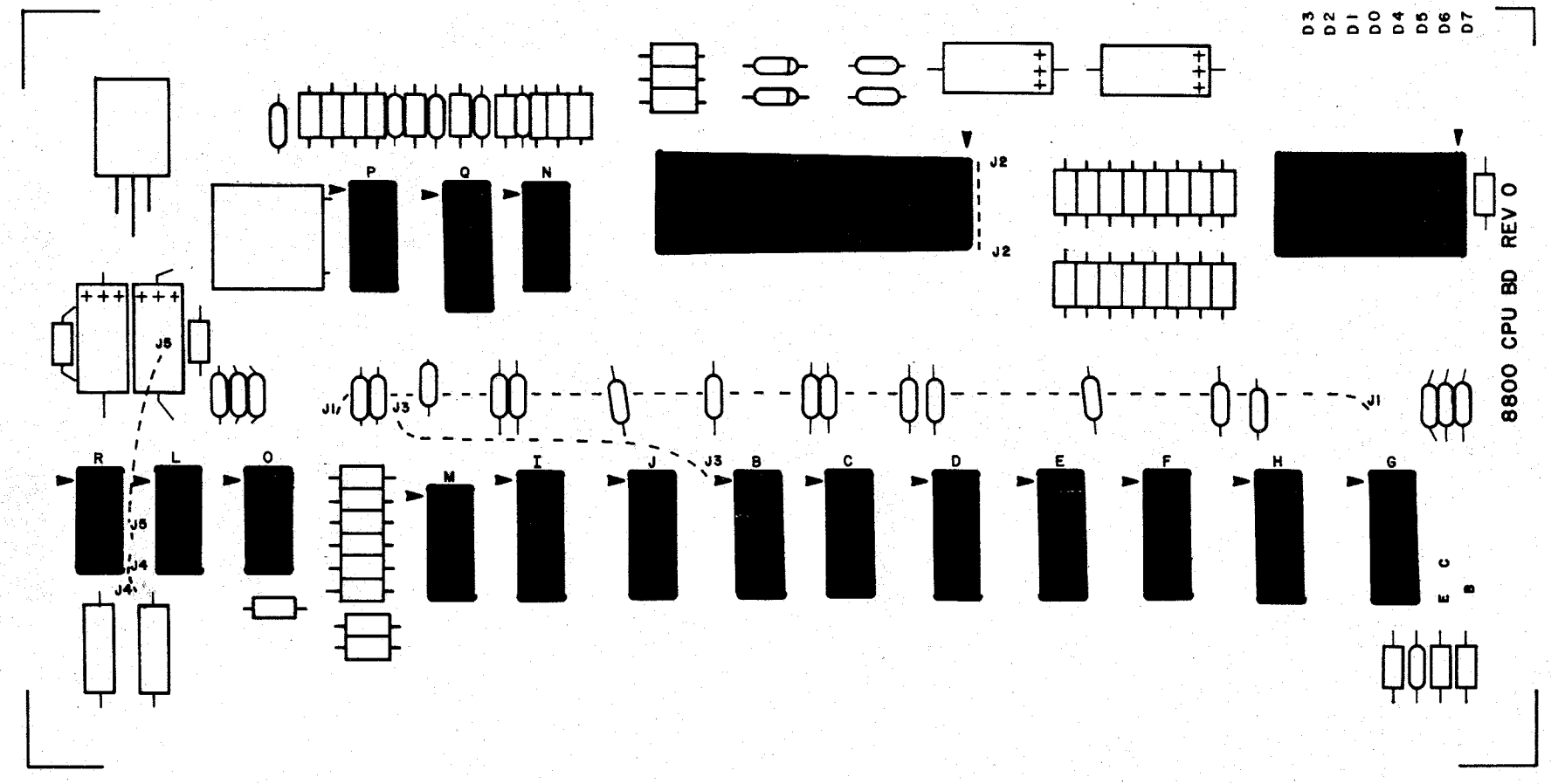
All of the jumper connections on this board are to be made in the same manner. These connections are indicated on the board by two pads marked with the same designation and connected by a broken line. (i.e., J1----------J1)

Use the wire provided in your kit for jumper connections and cut each one to length as needed.

(✓) Connect pad J1 to pad J1 by inserting the wire ends from the silk-screened side of the board and soldering them to the foil pattern on the back side. Clip off any excess lead lengths.

(✓) Connect J2 to J2 and J3 to J3, etc., in the same manner. Be sure you connect the pads with the same designation each time.

(✓) Install jumpers J1 through J5



Resistor Installation

There are 44 resistors to be installed on the 8800 CPU Board.

NOTE: Resistors are color-coded according to their value. The resistors in your kit will have four or possibly five bands of color. The fourth band in both cases will be gold or silver, indicating the tolerance. In the following instructions we will be concerned only with the three bands of color to one side of the gold or silver band. Be sure to match these three bands of color with those called for in the instructions as you install each resistor.

Using needle-nose pliers, bend the leads of the following resistors at right angles to match their respective holes on the PC board. (see component layout)

( ) Install resistor R1 (1K-ohm, 1/2 or 1/4W, brown-black-red) into the correct holes on the silk-screened side of the PC board.

( ) Holding the resistor in place with one hand, turn the board over and bend the two leads slightly outward.

( ) Solder the leads to the foil pattern on the back side of the board; then clip off any excess lead lengths.

Referring to the component layout, install the remaining resistors in the same manner. Be sure you have the correct color-coding for each one as you install them.

( ) R1 to R8, R17 to R25, R35 to R37, R39, and R44 are all 1K-ohm, 1/2W, brown-black-red.

( ) R9 to R16 are 4.7K-ohm, 1/2W, yellow-violet-red.

( ) R26 & R27 are 47K-ohm, 1/2W, yellow-violet-orange.

( ) R28 is 20K-ohm, 1/2W, red-black-orange.

( ) R29, R30, R32 and R33 are 470-ohm, 1/2W, yellow-violet-brown.

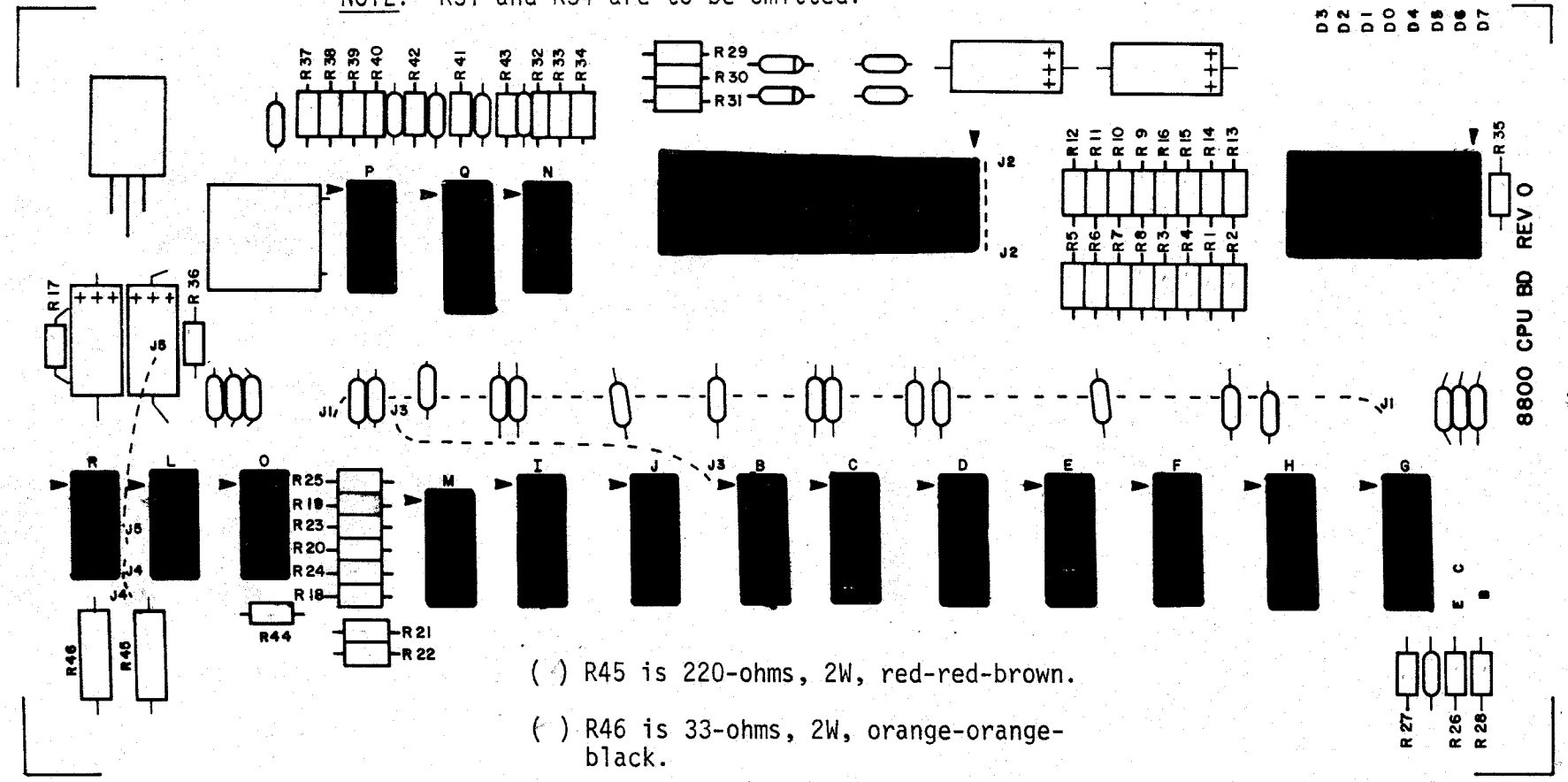
( ) R38 & R40 are 330-ohm, 1/2W, orange-orange-brown.

( ) R41 is 13K-ohm, 1/2W, brown-orange-orange.

( ) R42 is 6.2K-ohm, 1/2W, blue-red-red.

( ) R43 is 680-ohms, 1/2W, blue-gray-brown.

NOTE: R31 and R34 are to be omitted.



( ) R45 is 220-ohms, 2W, red-red-brown.

( ) R46 is 33-ohms, 2W, orange-orange-black.

Capacitor Installation

There are 28 ceramic disk and 4 electrolytic capacitors to be installed on the 8800 CPU Board.

Refer to the component layout and install the ceramic disk capacitors according to the following procedure.

( ) Choose the capacitor with the correct value as called for in the instructions. Straighten the two leads and bend them as necessary to fit their respective holes on the PC board.

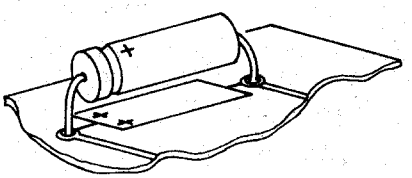
( ) Insert the capacitor into the correct holes from the silk-screened side of the board. Push the capacitor down until the ceramic insulation almost touches the foil pattern.

( ) Holding the capacitor in place, turn the board over and bend the two leads slightly outward.

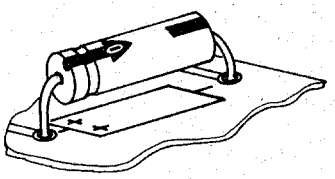
( ) Solder the two leads to the foil pattern on the back side of the board; then clip off any excess lead lengths.

Install all of the ceramic disk capacitors in this manner. Be sure that you have the correct value capacitor as you install each one.

The four electrolytic capacitors for the CPU Board have polarity requirements which must be noted before installation. Those contained in your kit may have one or possibly two of three types of polarity markings. To determine the correct orientation, look for the following: (see drawing above right)



ELECTROLYTIC CAPACITOR



One type will have plus (+) signs on the positive end; another will have a band or a groove around the positive side in addition to the plus signs. The third type will have an arrow on it; in the tip of the arrow there is a negative (-) sign and the capacitor must be oriented so the arrow points to the negative polarity side.

Referring to the component layout, install the electrolytic capacitors on the board.

( ) Bend the two leads of the capacitor with the correct value at right angles to match their respective holes on the board. Insert the capacitor into the holes on the silk-screened side of the board. Be sure to align the positive polarity side with the "+" signs printed on the board.

( ) Holding the capacitor in place, turn the board over and bend the two leads slightly outward. Solder the leads to the foil pattern and clip off any excess lead lengths.

( ) Install the other electrolytic capacitors in the same manner.

(/) C1, C2, C7, C8 and SC1 through SC20 are all .1uf.

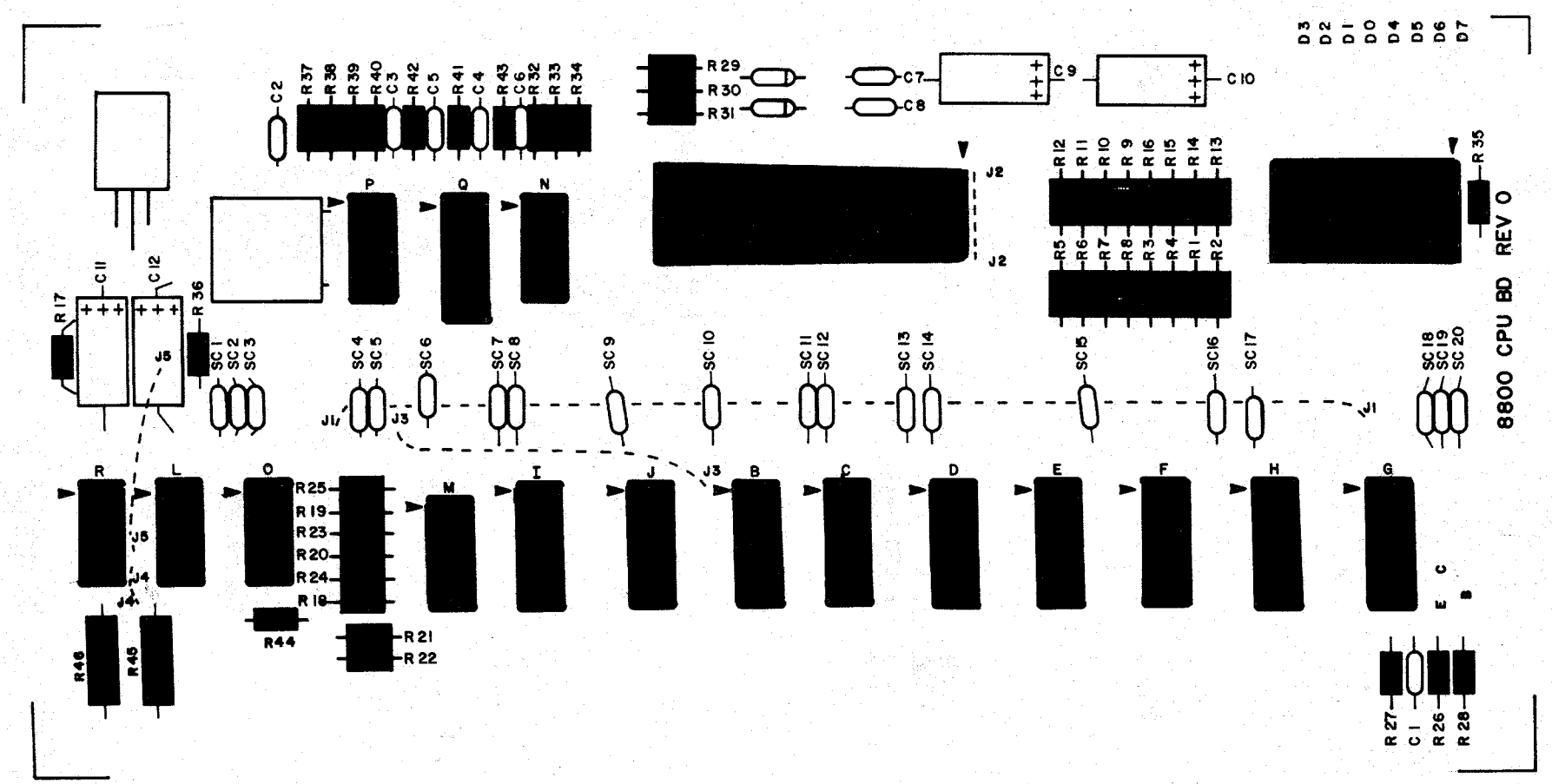
( ) C3 is .01uf.

(/) C4 is 10pf.

( ) C5 is 100pf.

( ) C6 is 20pf.

(/) C9 through C12 are all 20uf to 35uf.

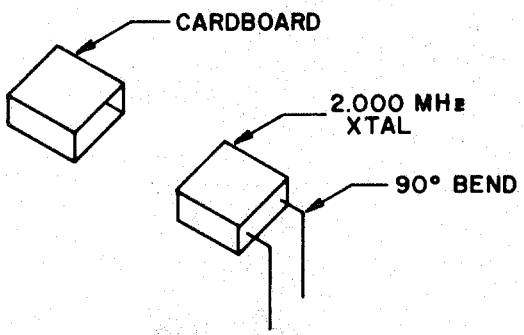


Crystal Installation

There is one 2.000MHz crystal to be installed on the 8800 CPU Board.

( ) Referring to the drawing below, cut a piece of the cardboard container that the crystal is packaged in to the same length as the crystal case itself.

SEE NOTE PG 1



( ) Using needle-nose pliers, bend the two leads of the crystal at right angles as in the drawing above.

( ) Insert the crystal into the correct holes from the silk-screened side of the board. (see component layout)

( ) Holding the crystal in place, turn the board over and bend the two leads slightly outward.

( ) Solder the leads to the foil pattern on the back side of the board; then clip off any excess lead lengths.

( ) Place the piece of cardboard over the crystal case as indicated in the drawing.

Zener Diode Installation

There is one 5.1 volt and one 12 volt zener diode to be installed on the 8800 CPU Board.

NOTE: Diodes are marked with a band on one end indicating the cathode end. The diode must be oriented so that the end with the band is towards the band printed on the board when being installed.

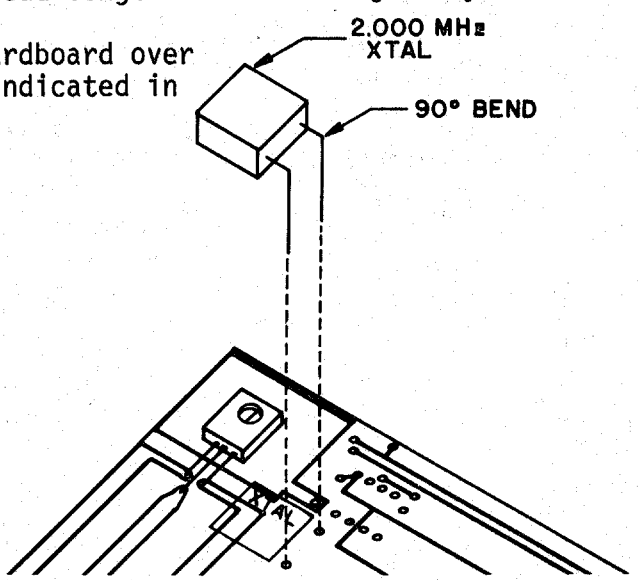
( ) Referring to the component layout, bend the leads on the 12 volt zener at right angles to match the correct holes on the board.

( ) Insert the diode into the correct holes from the silk-screened side of the board. Turn the board over and bend the two leads slightly outward.

( ) Solder the two leads to the foil pattern on the back side of the board; then clip off any excess lead lengths.

( ) Install the 5.1 volt zener diode in the same manner.

Be sure that you have the band on the diode aligned with the band printed on the board for both diodes before proceeding. Failure to orient these two diodes correctly may result in permanent damage to your unit.



(✓) XTAL is a 2.000MHz crystal.

(✓) D1 is a 12v zener diode.

(✓) D2 is a 5.1v zener diode.

The 5v zener will be marked "5v", "5.1v" or 1N4733.

The 12v zener will be marked "12v" or 1N4742.