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)
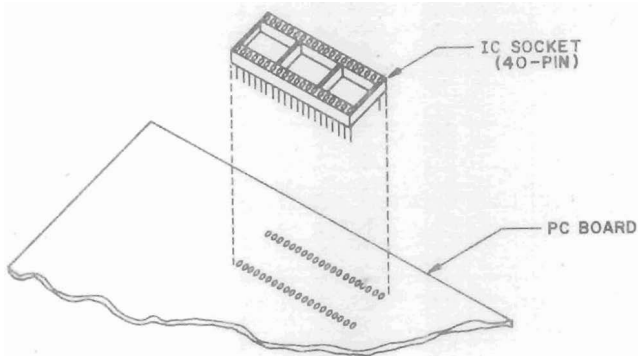

( ) Turn the board over and solder each pin to the foil pattern on the back side of the board. Be sure to solder each pin and be careful not to leave any solder bridges.

( ) 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.

8800 CPU BD REV 0
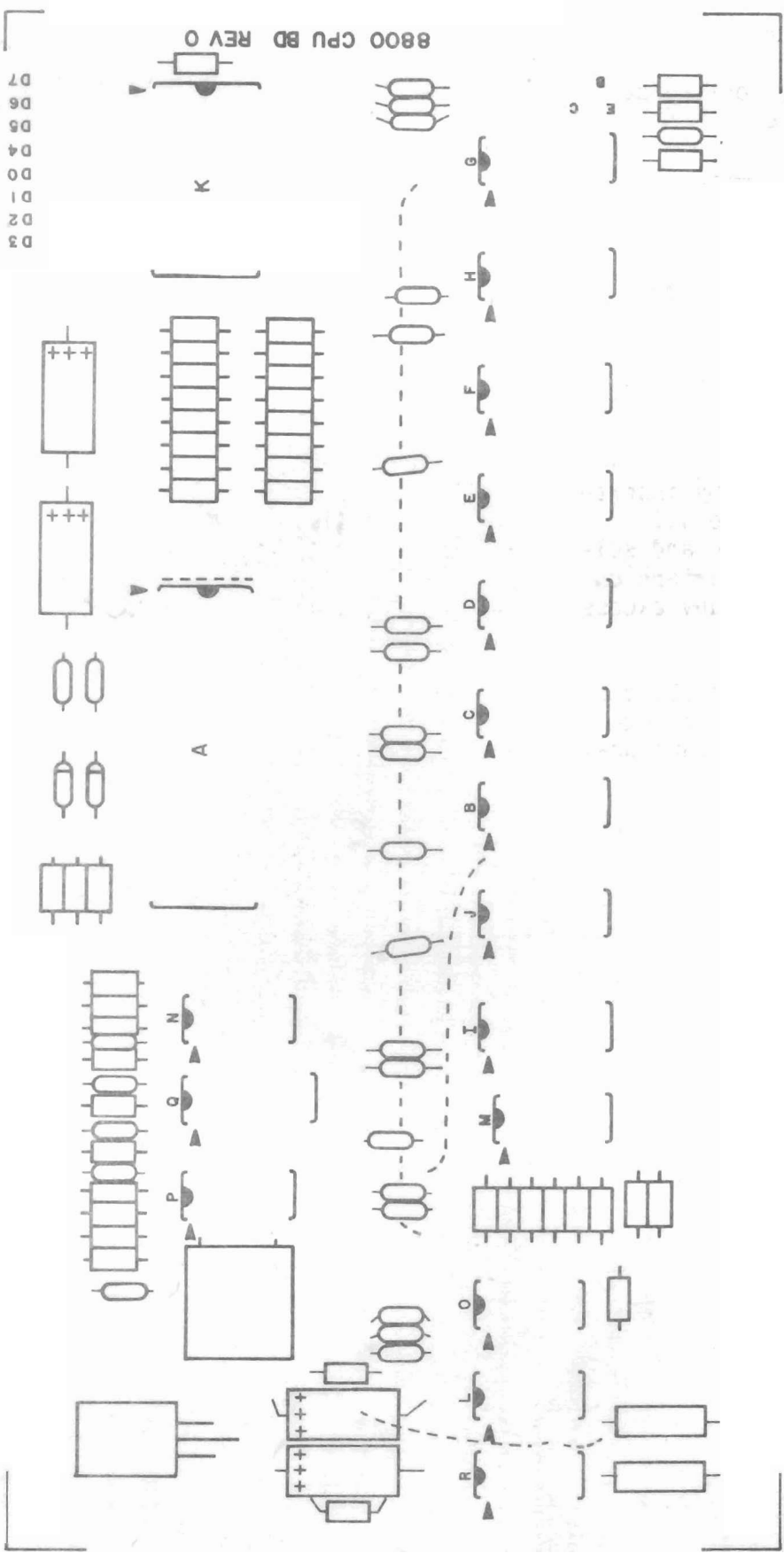
( ) Install a 40-pin socket in IC A position.

( ) K is an 8212

( ) P is a 7404

( ) Q is a 74123

( ) N is a 7406

( ) R is a 74L00

( ) L is a 74L74

( ) O is a 74L02

( ) M is a 74LS04

( ) I, J, B, C, D, E, F, H, and G are 8T97's
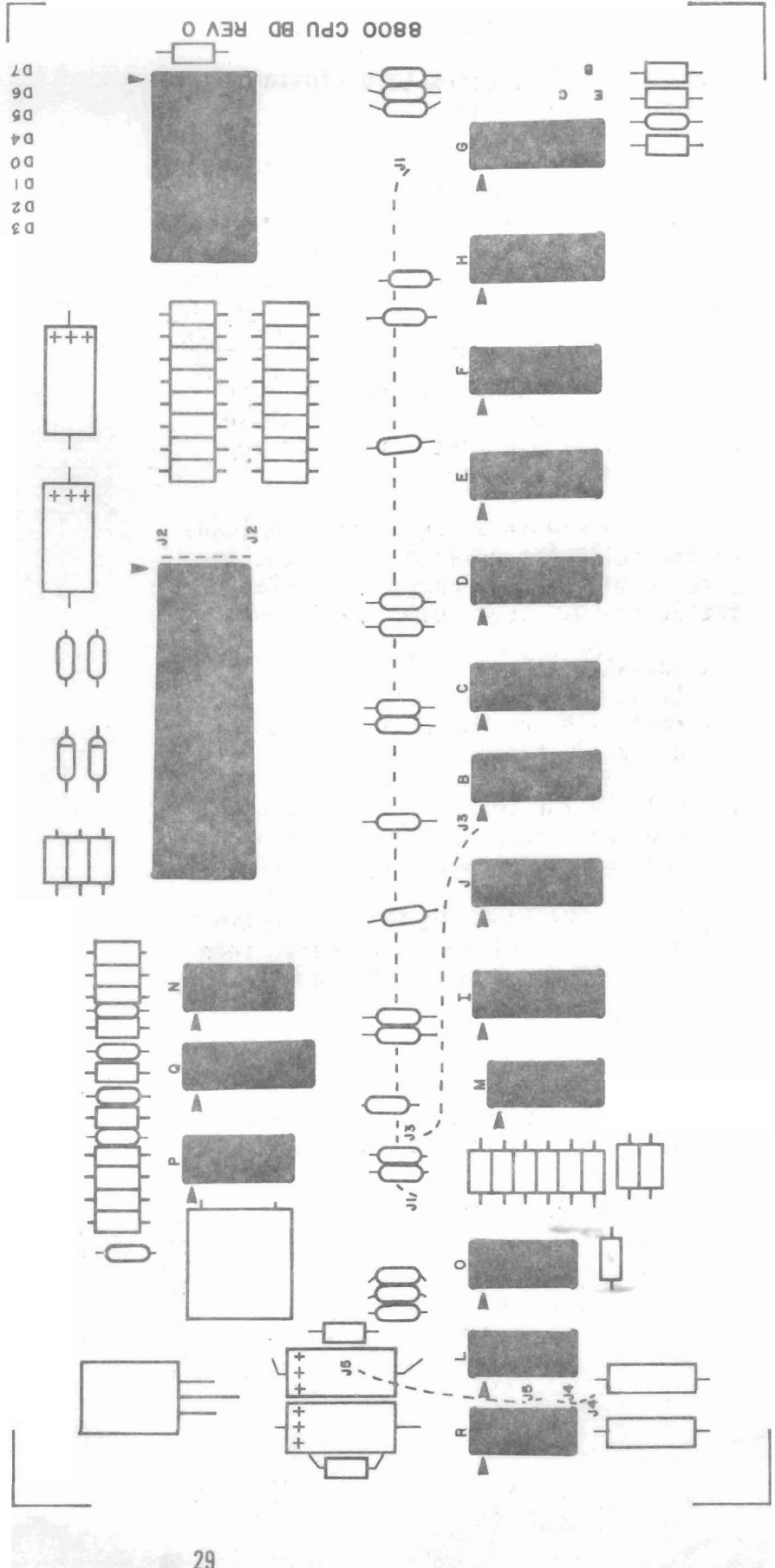
27

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 insert-
    ing the wire ends from the silk-
    screened side of the board and sol-
    dering 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 de-
    signation each time.

( ) Install jumpers J1 through J5

8800 CPU BD REV O

D7
D6
D5
D4
D0
D1
D2
D3

B
E C

G H F E D C B J I M O L R N Q P

J1 J2 J3 J4 J5

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( ) 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.

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

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

NOTE: R31 and R34 are to be omitted.

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)
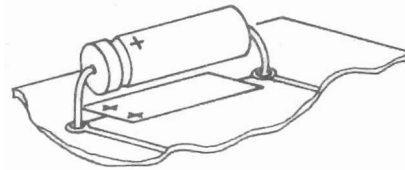
ELECTROLYTIC CAPACITOR
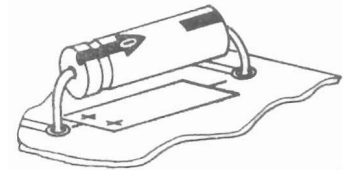
One type will have plus (+) signs on the positive end; another will have a band or a groove around the positive side in addition to the plus signs. The third type will have an arrow on it; in the tip of the arrow there is a negative (-) sign and the capacitor must be oriented so the arrow points to the 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 35uf.

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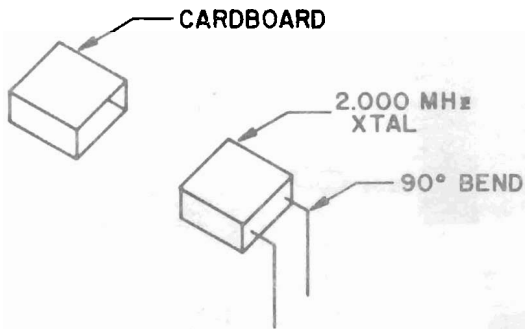
( ) Using needle-nose pliers, bend the two leads of the crystal at right angles as in the drawing above.

( ) 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.

8800 CPU BD REV 0
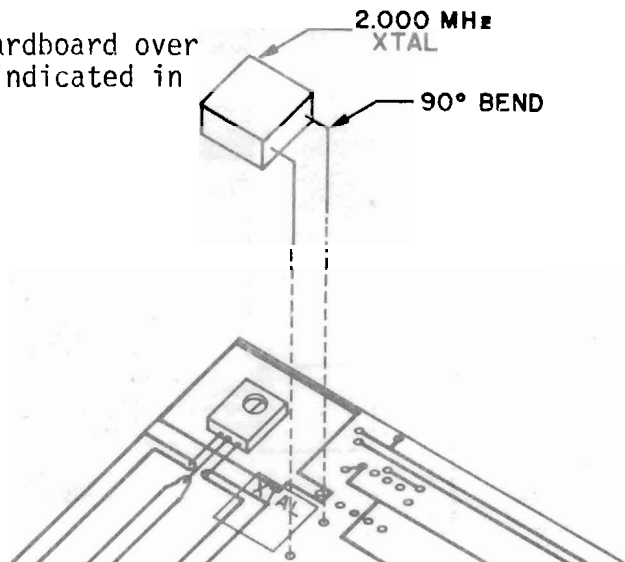
( ) XTAL is a 2.000MHz crystal.

( ) D1 is a 12v zener diode.

( ) D2 is a 5.1v zener diode.
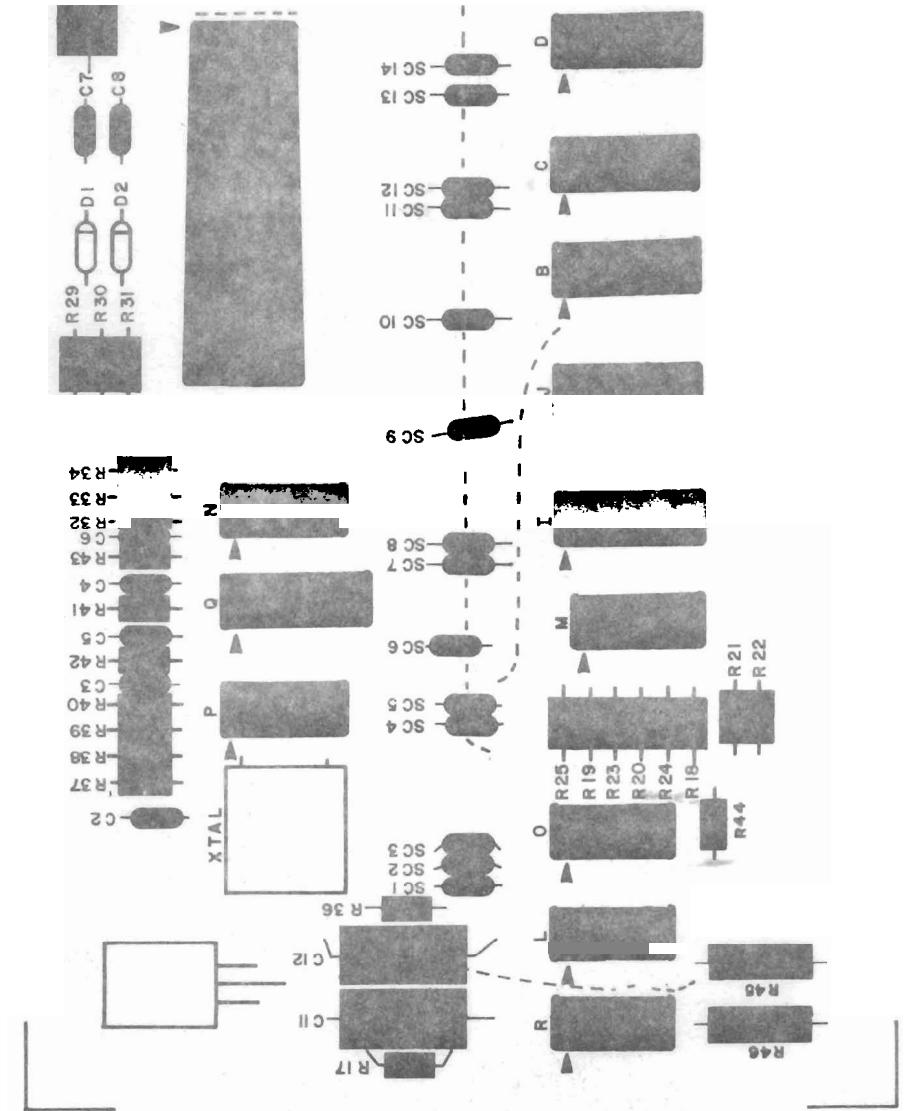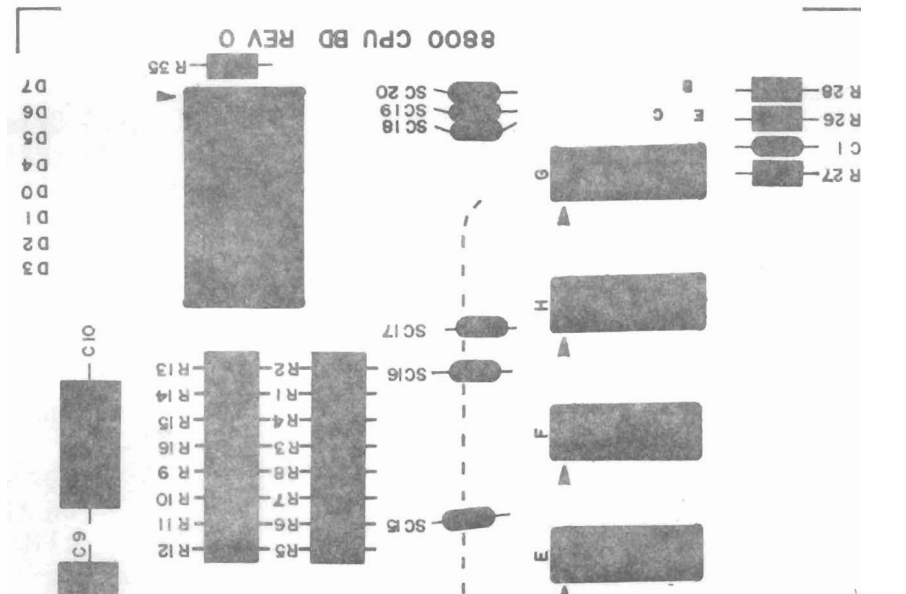
Transistor Installation

There is one CS4410 NPN transistor to be installed on the 8800 CPU Board.

NOTE: When installing this transistor, ensure that you check the part number on it before soldering it into place. Some transistors are identical in physical appearance but differ in electrical characteristics. If the part numbers of your transistors do not match the numbers called for in the instructions, it may be that you have substitutions. In this case, refer to the Transistor Identification Chart included with your manual.

( ) This transistor is rounded and has a flat edge near one of the leads. The lead nearest this flat edge is called the emitter. The hole for the emitter is marked with an "E" on the board. If the emitter lead is placed into this hole, the other two leads should fit into their holes with little or no bending and should not cross over each other. (see drawing below)

( ) Orient transistor Q1 (CS4410) so that the lead nearest the flat edge aligns with the hole marked "E" on the board. Insert the transistor into the holes from the silk-screened side of the board.

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

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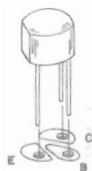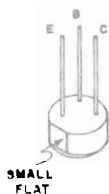
Voltage Regulator Installation

There is one MC7805 5-volt regulator to be installed on the 8800 CPU 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.

8800 CPU BD REV

( ) Q1 is a CS4410, NPN transistor.

( ) S is a uA7805

R46
R45
R17
C11
C12
S
R36
SC1
SC2
SC3
R44
R18 R24 R20 R23 R19 R25
R21 R22
J1
SC4
SC5
J3
SC6
XTAL
P
C2
R37
R38
R39
R40
C3
R42
C5
R41
C4
R43
C6
R32
R33
R34
Q
N
M
SC7
SC8
I
SC9
J
J3
SC10
B
SC11
SC12
R31 R30 R29
D2 D1
C8 C7
J2 J2
C
SC13
SC14
D
C9
E
SC15
C10
F
R5 R12
R6 R11
R7 R10
R8 R9
R3 R16
R4 R15
R1 R14
R2 R13
SC16
SC17
H
J1
R27
C1
R26
R28
G
E C
B Q1
SC18
SC19
SC20
R35
D3
D2
D1
D0
D4
D5
D6
D7

Wafer Connector Installation

There is one 8-pin male connector to be installed on the 8800 CPU Board.

( ) Referring to the drawing below, insert the 8-pin wafer connector into the correct holes on the board from the silk-screened side. Be sure to insert the side with the shorter pins.

( ) Holding the connector in place, turn the board over and solder the 8 pins to the foil pattern on the back side of the board.

WAFER CONNECTOR
8-PIN MALE CONNECTOR

CPU BOARD

DO DO1 DO2 DO3 DO4 DO5 DO6 DO7

C10

K

R35

+5V

+5V
+12V
-5V

8080
IC A

A₀ 25 — GND
A₁ 26 — A0 [79]
A₂ 27 — A1 [40]
A₃ 29 — A2 [81]
A₄ 30 — A3 [31]
A₅ 31 — A4 [30]
A₆ 32 — A5 [29]
A₇ 33 — A6 [82]
A₈ 34 — A7 [83]
A₉ 35 — A8 [84]
A₁₀ 1 — A9 [34]
A₁₁ 40 — A10 [37]
A₁₂ 37 — A11 [87]
A₁₃ 38 — A12 [33]
A₁₄ 39 — A13 [85]
A₁₅ 36 — A14 [86]
— A15 [32]

POC [99]

ADDR DSBL [22]

D0 10 — DO0 [36]
D1 9 — DO1 [35]
D2 8 — DO2 [88]
D3 7 — DO3 [89]
D4 3 — DO4 [38]
D5 4 — DO5 [39]
D6 5 — DO6 [40]
D7 6 — DO7 [90]

TO DISPLAY/CONTROL BD
D7 D6 D5 D4 D3 D2 D1 D0

DO DSBL [23]
DI0 [95]
DI1 [94]
DI2 [41]
DI3 [42]
DI4 [91]
DI5 [92]
DI6 [93]
DI7 [43]
SS [21]
RUN [71]
SINTA [96]
SWO [97]
SSTACK [98]
SHLTA [48]
SOUT [45]
SM1 [44]
SINP [46]
SMEMR [47]
STATUS DSBL [18]

8212 K

CLOCK
ICP 7404
(4 GATES)
ICQ 74123
P-10
(2MH)

PΦ1 22
PΦ2 15

ΦLOC (2 MHz) [49]
PSYNC [76]
PDBIN [78]
C/C DSBL [19]
PWAIT [27]
PWR [77]
PHLDA [26]
PINTE [72]
PRDY
XRDY [3]
PHOLD [74]
PINT [73]
PRESET [75]
Φ1 [25]
Φ2 [24]

SYNC 19
DBIN 17
WAIT 24
WR 18
HLDA 21
INTE 16
READY 23
HOLD 13
INT 14
RESET 12

1/2 7474 ICC
1/2 7474 ICC