

## ZH8 CPU

### ASSEMBLY INSTRUCTIONS

1. Install all resistors (50) on the printed circuit board first. A forming tool will be useful to bend the resistor leads. Most of the resistor leads will be bent on  $\emptyset.500$  in. centers. R1, R2 and R3 are bent on  $\emptyset.350$  in. centers, R38 on  $\emptyset.450$  in. and R46 on  $\emptyset.600$  in. centers. The resistor leads will be dirty and require careful soldering. After the leads are clipped, the solder connections should be touched up.

R51 and R52 are trim resistors used to adjust the +5 volt power supply voltage. The values of these resistors will vary and a single resistor should be installed only if required to adjust the +5 volt supply voltage. This voltage should be between 4.90 and 5.10 volts. Installing R51 will raise this voltage, while installing R52 will lower it. These resistors fit on top of R1, R2 and R3.

2. Install all capacitors next. Observe polarity when installing the tantalum filter capacitors. Install clear teflon sleeving on the leads of C14, C25, C39 and C40. The  $\emptyset.01$  MF filter capacitors have small glass cases and axial leads and may look like diodes. Be careful to install a 33 PF capacitor at C9. Do not confuse C9 with a  $\emptyset.1$  MF filter capacitor.

C10 and L1 form a resonant (tank) circuit to force crystal XL1 to oscillate at its fundamental frequency. These parts will not normally be needed and are not installed on the board. The C24 reference designation is not used. After the capacitor leads are clipped, the solder connections should be touched up.

3. Install jumper wires at J1, J2 and J3. Use #26 tinned bus wire and clear teflon sleeving. These wires should be short, straight and flat against the board.
4. Install all of the integrated circuit sockets next. It is desirable, but not strictly necessary, to observe polarity when installing these sockets. All of the integrated circuits mount in the same direction, with pin 1 toward the top of the board. Be sure to observe polarity when installing the socket for U1, however. The sockets for resistor modules RU1 through RU6 should also be installed at this time.

Be sure all sockets mount flat against the printed circuit board. Soldering opposite corners of the sockets first is a good idea. These connections may then be reheated while pressing the sockets to the board. Do not cut the socket leads after soldering.

5. Install the dual-in-line (DIP) switch packages next (SW1, SW2 and SW3). Install single-in-line (SIP) resistor modules (RU7 and RU8). Be sure to observe polarity when installing these parts.

6. Install the pin strips (P1 through P30, PA and PB) next. The pin strips are prepared according to instructions on a separate sheet. Be careful not to push the pins out of the strips during installation. The solder pads for the pins are very small and care is required while soldering.

If pin strips P10 through P15 and P19 through P23 are cut from a larger strip, care must be taken to insure they have been cut sufficiently close to allow close mounting to pin strips PA and PB. All of the pin strips should be mounted tight against the printed circuit board.

7. Install connectors CN1, CN2, CN3 and CN4. These connectors should fit tightly against the printed circuit board.
8. Install Crystal XL1. A rubber pad should be cut to size (slightly larger than the crystal outline) and installed first, under the crystal. The pad may be attached with a small piece of double backed adhesive film, cut from the piece supplied. The crystal should fit flat against the printed circuit board, on top of the pad.
9. Install transistors Q1 and Q2. Do not confuse these parts. Observe polarity during installation. Install L.E.D. (light emitting diode) D1. Observe polarity. Match the flat side of the diode to the flat side of the silkscreen outline on the board. Install Zener diode VR2. Observe polarity. The banded-end of the diode is the cathode (-).
10. Install transistors Q3, Q4, Q5, Q6 and voltage regulator VR1. Mount these parts on the metal mounting bracket according to instructions given on a separate sheet. The bracket is mounted with the vertical flange away from the board. The rubber pads are used in place of heat sink compound to transfer heat from the transistors to the metal bracket, which acts as a heat sink. The bracket must be mounted off the printed circuit board with plastic washers. After the entire assembly is bolted in place, the transistor leads are soldered to the board. Clip the leads after soldering.
11. The board may now be cleaned in a vapor degreaser if one is available, to remove the solder flux. All solder connections should be touched up, as required, before this time.
12. Install each of the integrated circuits in their respective sockets. Observe polarity when installing the integrated circuits. Be very careful not to bend any of the integrated circuit leads up under the case during installation. This is, by far, the greatest cause of failure after a board is assembled. It is impossible to detect bent leads after the integrated circuit is installed in the socket. The part must be removed to determine if a lead is bent under.

Integrated circuit leads are sprung out at angle from the parts to hold them in place on the printed circuit board during automated flow soldering. Integrated circuits are not normally installed in sockets. They are soldered directly to the printed circuit board. This reduces manufacturing costs and increases reliability. Troubleshooting, on the other hand, is considerably more difficult, as is part replacement.

Each integrated circuit should be carefully rolled on the workbench to bend the leads back so that they protrude exactly at right angles from the case for easy socket insertion. Failure to do this may result in poor electrical socket connections or bent under pins.

The Z80 MPU chip (U22) and the two ROMS/EPROMS (U23 and U24) are MOS devices and must be handled with care to prevent damage from static charge. They should not be handled unnecessarily and should be kept in conducting foam until ready for installation.

The leads on U1 (TO-18 case) should be cut to 1/4 in. lengths before insertion in the socket.

13. Install resistor modules at RU4, RU5 and RU6. Be sure to observe polarity. The use of resistor modules at RU1, RU2 and RU3 is optional. The resistor modules both pull up and terminate the bus. It is only necessary to terminate the data lines at the front (Z-H8) end of the bus at this time.
14. The pin strips should now be programmed with wire-wrapping wire according to the configuration instructions provided on separate sheets. A wire-wrapping tool should be used for this purpose. Please do not solder to the pins. Adjacent pin connections can be made with bare (stripped) wire. Insulated wire should be used for longer connections.
15. Install the connector key on connectors CN1 and CN2. Use the double adhesive film provided. Cut two pieces and install one under each side of the key.
16. Install a 6-32 large-head screw at each end of the metal mounting bracket. These will be removed later to install the Z-H8 board in the H8 computer. Cut to size and install the heat sink bumper on the metal mounting bracket.
17. Install a gold spring clip on the ends of an orange and a black (22AWG) wire. Install the spring clips in the connector shell. The orange wire should be in the center. The black wire may be located on either side. Twist the two wires loosely together to hold them in place. This cable plugs into connector CN-4 and connects to the H8 disk controller card. It is used for optional side select operation. Do not install this cable unless side select operation is desired.

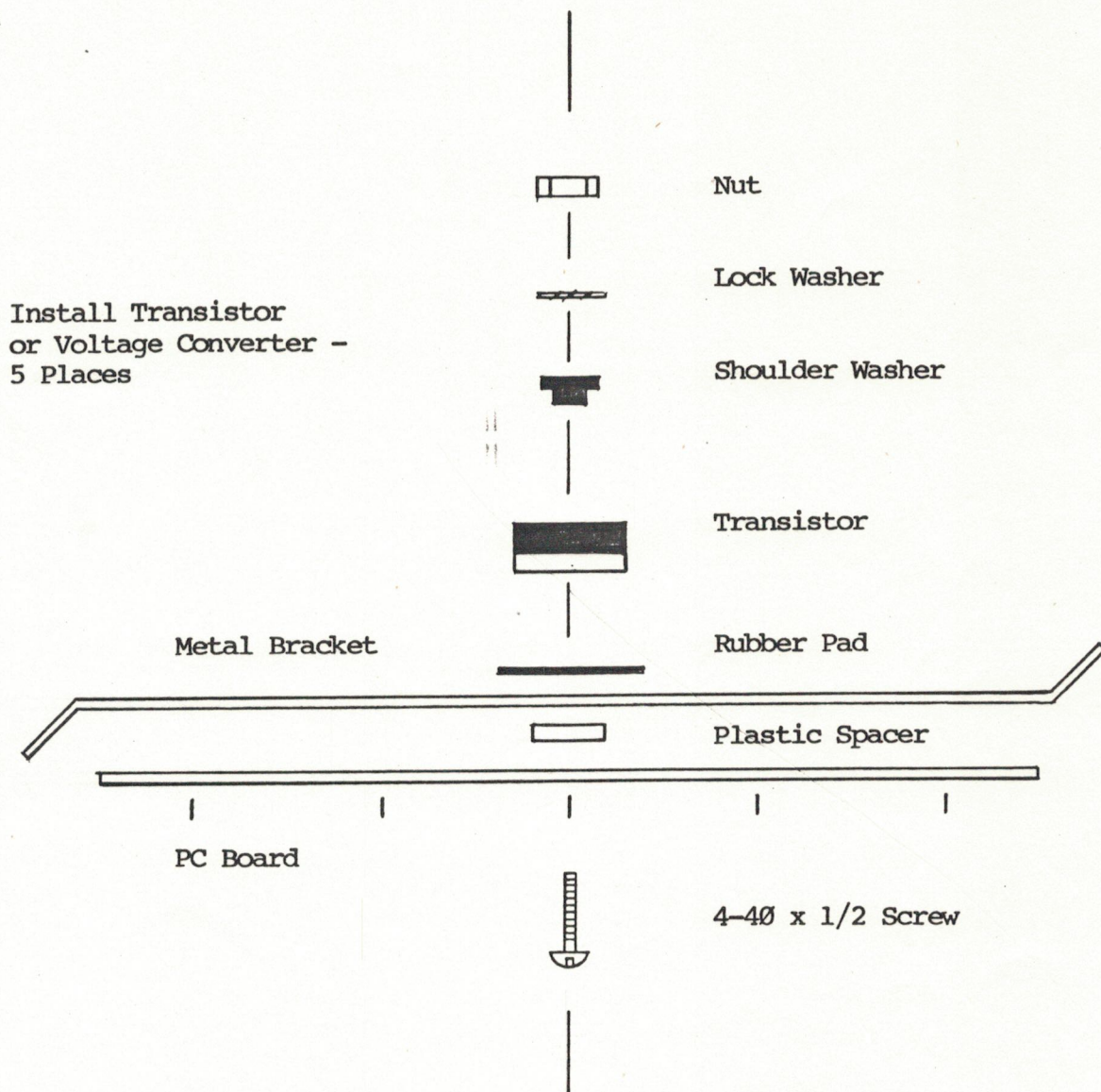
18. Provision exists on the Z-H8 printed circuit board to mount an optional "B" connector for use with the Trionyx T-H90 motherboard. The B connector is provided in the EC-TH90 expansion connector kit which may be obtained from Trionyx Electronics at additional cost (\$15.00). This connector provides additional grounding of the Z-H8 CPU board to the motherboard. The connector should be installed using the two mounting holes provided on the Z-H8 printed circuit board. Ground wires should then be connected (identified from the Z-H8 schematic or T-H90 motherboard pin assignment chart) from the B connector board to the Z-H8 printed circuit board. Use #26 tinned buss wire. These will be straight, short (riser wire) connections from one board to the other.

Additional signal lines can also be used on the T-H90 motherboard using the B connector. All B connector signal lines are terminated on the Z-H8 CPU board. External wire connections can be made from various points on the Z-H8 board to the termination resistor socket connections. The appropriate B connector connections are then made using straight riser wire connections between the two boards.

19. This completes the assembly of the Z-H8 CPU board. Installation and operating instructions are provided separately. Be certain all of the switches are set properly before trying to use the board. D1 is "on" whenever the board is running at 4 MHz.

Z-H8 CPU

Top Side of Board



METAL BRACKET (HEAT SINK) ASSEMBLY

Z-HB CPU

Pin Strip Preparation

The 2-pin (15), 3-pin (9) and 5-pin (1) strips are normally supplied pre-formed to the proper size. (If this is not the case, they may be cut from longer 25-pin strips which will be supplied.)

The remaining 6-pin (2), 8-pin (3), 9-pin (1), 12-pin (1) and 14-pin (1) strips must be cut from the three standard-size 25-pin strips supplied:

Cut a 14-pin and a 9-pin strip from one of the 25-pin strips.

Cut one 12-pin and two 6-pin strips from another 25-pin strip.

Cut three 8-pin strips from the remaining 25-pin strip.

The pins may readily be pulled out of the hard rubber strips in which they are held. Certain pins must be pulled from some of the strips before they are installed on the printed circuit board.

The pin strips must be carefully inserted into the printed circuit board. They fit tightly into the printed circuit board mounting holes so that they will stand up straight. Care must be taken not to push any pins out of the rubber strips as they are inserted in the printed circuit board mounting holes.

Cut the pin strips and remove selected pins (x) as follows:

