OSI APP NOTE

Subject: 400 Series Construction Hints   Number 3.

Early Non-Plated Through Hole Boards

The following procedures have been used very successfully on boards which do not have plated through holes.

1. The use of wire wrap sockets and pins everywhere is an expensive but nice luxury. The wire wrap sockets are raised about $\frac{1}{4}$ inch, allowing the pins to be soldered to the top of the board. Custom modifications can then be very easily and professionally implemented by wire wrapping.

2. Feed Throughs. Place the bare board on a sheet of rigid styrofoam (the type used for Christmas decorations). Use $\frac{1}{2}$ inch long straight wire for feed throughs. Push the wire through the board and $\frac{1}{4}$ into the styrofoam. Solder all feed throughs to the top of the board. Pull the board straight up off the styrofoam. Turn the board over and push it straight down into the foam so that the foam is holding all wires again. Now, solder the feed throughs on the rear of the board (now face up). Remove the foam and clip all wires on both sides of the board. This technique produces a very professional looking job in a fraction of the time of other techniques.

3. IC-Sockets. Where feed throughs are located at IC pins, special techniques must be utilized if sockets are desired. The use of wire wrap sockets and conventional sockets with fine gauge wire feed throughs is discussed in the Model 400 Manual. Another approach is to use wire wrap socket pins such as vector R32 pins. These are the individual pins from wire wrap sockets. They can be very easily soldered to the top and bottom of the board. Standard Molex pins can be used, but careful soldering is required since the pins will easily wick solder into the pin mating area and will be ruined. However, Molex pins are by far the cheapest socket technique.

The best technique is not to use sockets at all! The highest reliability is realized when the IC is soldered directly to the top and bottom of the board. The problem is then IC removal. A desoldering aid called desoldering wick is now available from most electronic parts sources including Radio Shack! It is copper braid impregnated with flux. By placing the braid between the joint of interest and a hot soldering iron, virtually all solder can be removed from the joint. OSI staff personnel have removed and installed a 24 pin IC six times with no damage to the board or the IC!

Plated Through Hole Boards

All OSI boards delivered after June 1, 1976 are solder plated with plated through holes. Plated through hole boards allow the easy use of sockets, but make it virtually impossible to remove ICs intact without a professional vacuum desoldering station. For this reason, we highly recommend the use

of sockets at all locations where the IC costs more than the socket,
i.e., all MOS parts. If an IC that is soldered in must be removed, all
leads should be cut free from the device and individually removed from
the board. Solder wick and tinned copper wire can then be used to clean
out the through holes.

Plated throuhgh holes should be soldered in for maximum reliability.
Power bus feed throughs should really have wire feed throughs installed
because faulty plated through holes in power handling circuits can blow
out with time.

Board Modifications

The enterprising computer enthusiast should be capable of modifying
boards to suit his needs. Board modifications generally require cutting
tapes and adding jumpers. PC tapes should be cut in two places about
1/16 inch apart with a ver sharp knife or razor. The 1/16 inch strip
should then be pried out. For maximum reliability, a dab of epoxy should
be applied to the cut ends to preclude tape peeling.

Wire jumpers should never be installed in such a way so as to rely on the
PC tape to board bond. Wherever possible, remove a wire feed through and
replace it with one end of the wire jumper. To pick up a foil on the other
side of the board, drill a small hole next to, but not into, the foil.
Place the wire through the hole and bend over the foil. Jumpers should
be epoxied at foil terminations to eliminate the possibility of foil
lifts and breaks.

Power Supply Considerations

OSI boards specifically do not use on board regulators. This is
because on board regulation greatly increases the heat generated in the
card cage, and on board regulation allows several catastrophic hardware
failure modes.

The power supply used with the 400 system should have the following features:
  A. Primary Fuse
  B. Fused +5 and -9
  C. Foldback Current Limit
  D. Over-Voltage Crowbar
  E. An Unregulated +5 of at least 10 volts for brownout protection.

The power supply should be mounted such that it does not apprecialbly
affect the temperature of the 400 boards.

Mechanical Considerations

The OSI 400 series boards are designed to mate with the 480 Backplane
Board to produce an easy to mount package. The 480 board has four mounting
holes which are used to fasten the board to a firm surface. The board
should be backed by a firm non-conductive surface such as masonite or
bare G-10 circuit board.

The surface behind this insulator should be conductive and should be grounded to the backplane to provide ground plane action. The lower left hand corner of each system board is clear to accept a small right angle bracket. Refer to the attached diagram for mounting details.

OSI 400 boards are designed to operate with natural convection cooling. As long as at least two sides of the board set are open to free circulation, the system will run quite cool. The local board temperature will generally not exceed 40°C even with high power 250 ns. RAMs, providing a long-life, high reliability system.

480 board
Insulating Backing

400
System board

8"

Mounting Screw

Right angle bracket

Metal Right angle

10 ½"

F

F

480 board goes here

8"

holes for 8 400 board Right angle brackets

~ 10"

~ 10 ½"

F

F