

FIXTURING FOR PROBERS

Helpful Hints For Making Fixtures

At Huntron, we have had to make fixtures for customers to hold their pcb's in our probers. These fixtures are used when the customer wants to test the same board over and over again. The fixtures speed up the mounting process and alignment. Sometimes fixtures are used when the components on the pcb's are too close to the edge and don't allow mounting directly to the wall or the board spacers.

The fixtures we have made are relatively simple in design and principle. They don't have to be complicated or have elaborate clamping devices to hold them down. Since the only pressure the prober applies to the board is downward, the board only has to be supported so that it does not move side to side and down. Simple rests or posts to support the pcb is necessary.

Figure one shows the side of the prober and the fixture assembly in relation to each other. The idea of the fixture is to mount the pcb in the prober so that it is at the normal probing height. The prober figures it's camera offsets when the pcb is at the height of the three slots on the prober wall. The fixture shown mounts in the second slot, but holds the pcb under test at the upper slot height. The same can be done by mounting the fixture in the third slot and making the standoffs for holding the pcb .440" high instead of .940". The difference being the slot spacing from first to second slot is 1" and the second to third slot is .5".

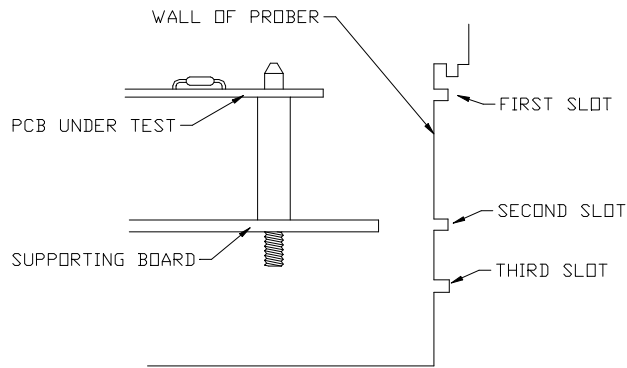


FIG. 1

We use pcb glass-epoxy material for the base of the fixture. It can be .06" for smaller boards and .09" for larger boards that need more support. This material is easy to work and insulates the standoffs from each other. The standoffs are usually made of brass rod, but acetal rod can also be used. The brass is easy to machine very accurately. The bottom end of the standoffs are threaded for mounting to the fixture base.

In making the fixture, the first thing is to cut the base (glass-epoxy material) to a useful size bigger than the pcb to be mounted. Give yourself plenty of room around the edges for probing and handling the pcb. Find mounting holes in the pcb that can be used for the standoffs. Mark their location on the fixture base. If you have a blank pcb, just mark the holes through the pcb while holding it on the fixture base. If not, you will have to measure them. Make the holes in the fixture base large enough so you have a little adjusting room for positioning the standoffs. One thing to consider when laying out the position of the holes is if you are going to probe both sides of the board. If you are, and the board has holes that are symmetrical, you can use the same holes and just flip the board. If not, you will need another set of standoffs for the other side of the board. You might want to arrange the standoffs so the other side of the board can be probed right next to the first side. The fixture base will have to be large enough to have both sets of standoffs mounted.

Next, you will have to make the standoffs themselves. Make them so the top part has a chamfer and is just a little bit smaller than the hole in the pcb you are using. If there is a component or trace close to the hole, you may want to turn down a clearance diameter to clear them. See figure two. If you need support in an area and there is no hole, make a standoff with no top reduced diameter. The board can simply rest on the pcb. Remember, the prober only pushes down.

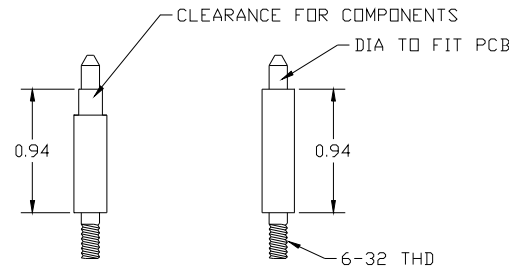


FIG. 2

When you have all the parts made, assemble the fixture with the standoffs, but do not tighten them. Mount the pcb to be tested on the standoffs. See figure three. This will position the standoffs correctly. Your holes in the fixture base were made large enough for some adjustment. With the pcb in place, tighten the nuts on the standoffs.

The fixture is now completed. When mounted in the prober, it will allow you to remove the pcb under test very easily and position the next one without having to recalibrate the prober.

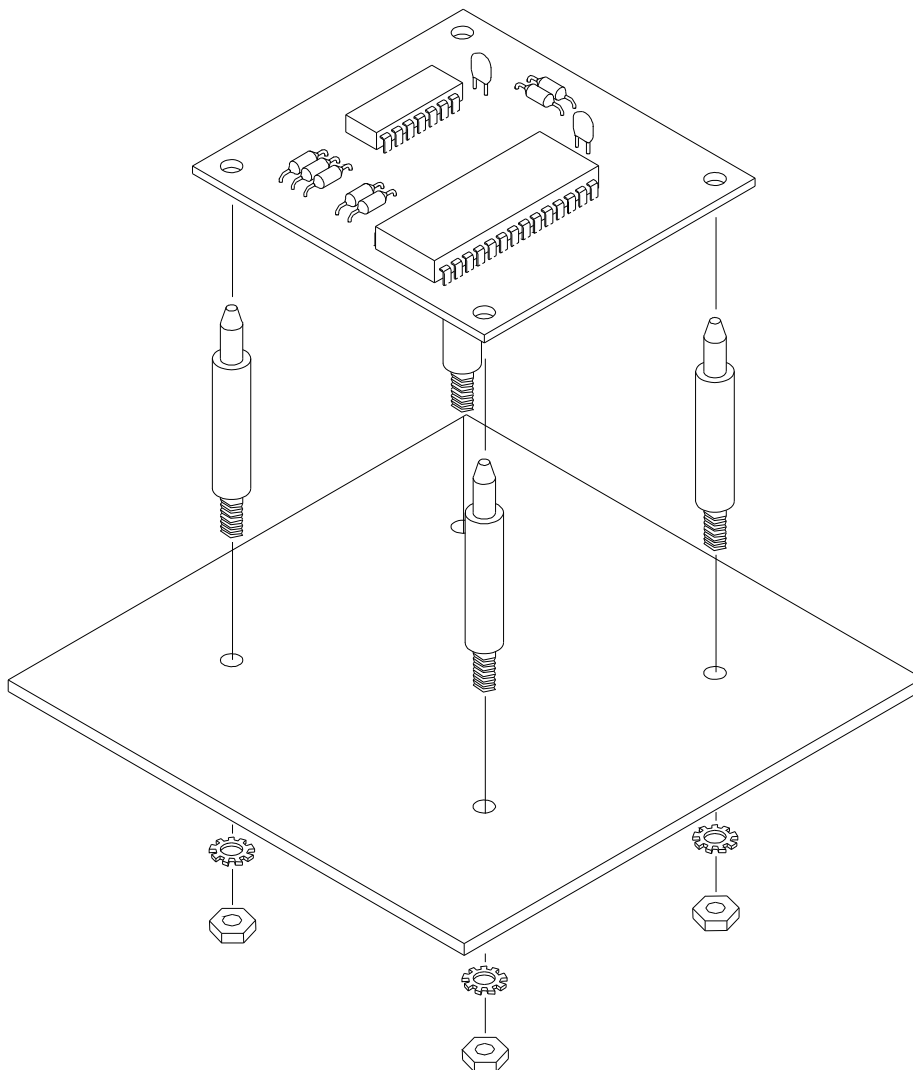


FIG. 3

Also shown below are examples of fixtures made using three different approaches. The first example (fig 4) is built similar to the fixture described above, except this would be good for a board with no mounting holes. The mounting tabs hold the board from the outside edges and also have a lip that holds the boards away from the fixture. The nuts seen in the figure are for mounting another size board on the opposite side so the fixture can be used for two different boards.

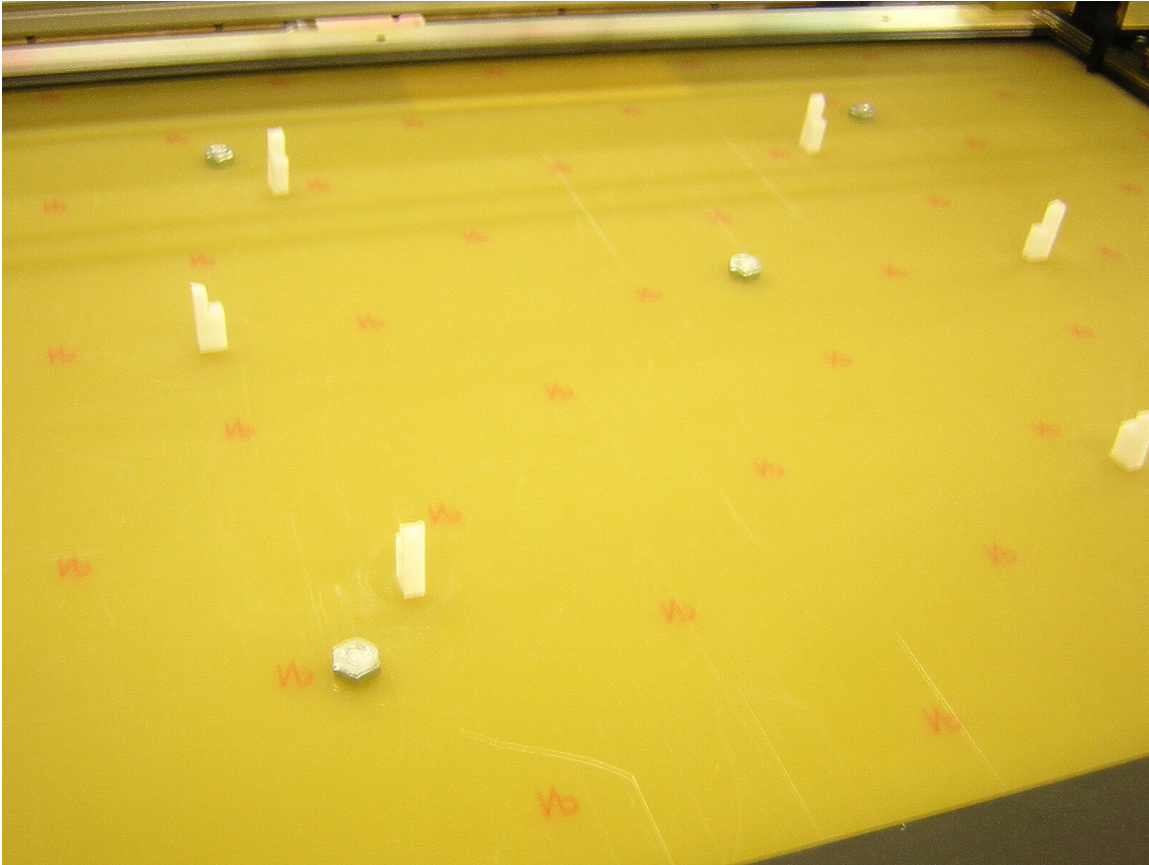


FIG 4

The next example (Fig 5) is made for mounting a rail mounted pcb. The two black delrin holders are tapered and have a latching mechanism for holding the boards. This fixture allows for probing both sides of the board by merely flipping over the pcb. It also allows for any other pcb with the same mounting system to be tested without making another fixture.

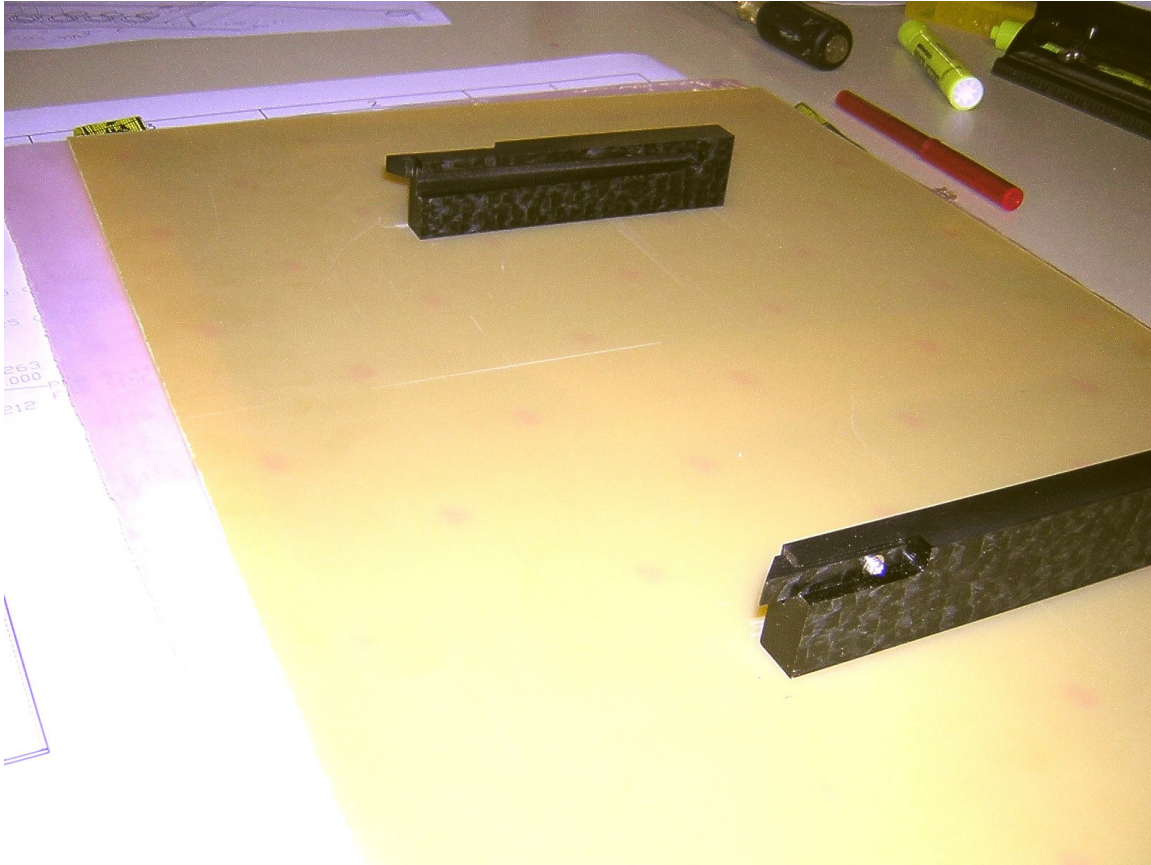


Fig 5

The last fixture is made using a different method of mounting. Instead of spacing the pcb away from the fixture, it uses two layers of pcb material. The top layer fits the board outline holding it aligned and the lower layer supports the pcb from the sides. This particular fixture allows for probing of both sides of the board. To hold the pcb firmly, a tab was milled into the top layer. This tab is made so that it has an interference fit with the pcb and has to be pushed out of the way to allow the pcb to seat on the lower layer. The tab applies pressure to the side of the pcb and holds it into position accurately.

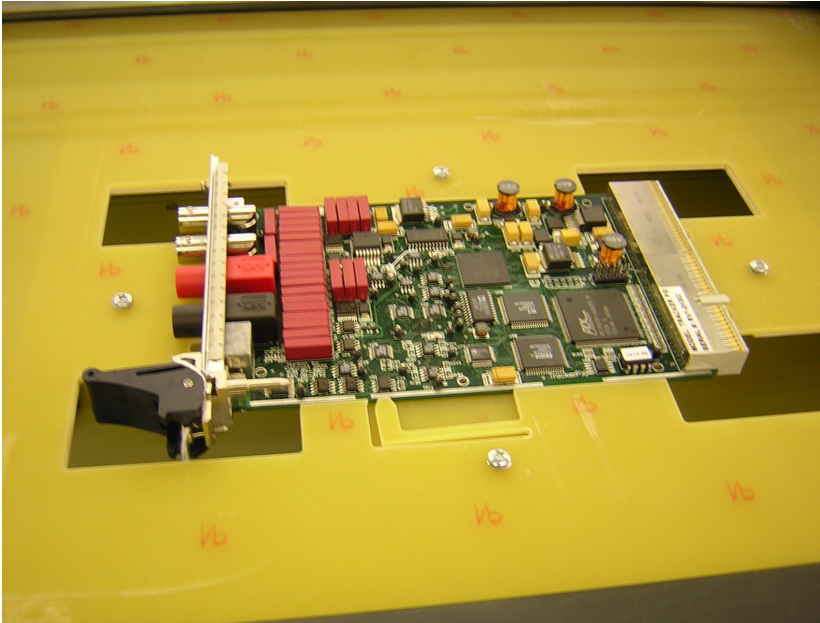


Fig 6



Fig 7

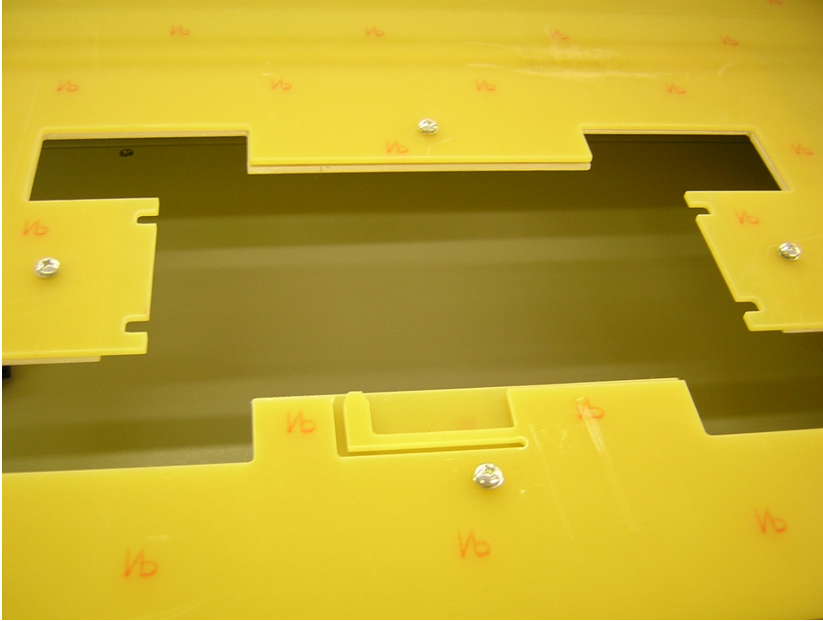


Fig 8