



BY HOWARD JOHNSON, PhD

## Pointy tips

**S**ome high-speed oscilloscope probes come with tips so pointy and sharp that you can set them down onto a PCB (printed-circuit-board) trace just as gently as a phonograph needle and still pick up a great signal. The sharper the point, the less pressure you need to penetrate the thin oxide layer that coats every copper or solder surface.

I recently obtained a set of such probes. After a while, I noticed the probes working less and less well. They seemed to take increasing amounts of pressure to maintain contact. Soon, I found myself attaching weights to the probes or aggressively taping them to maintain that vital contact pressure. I assumed that the probe tips had just become dull.

To check that assumption, I put the tips under a powerful inspection microscope and saw, to my great amusement, that the tips were not at all dull but simply bent like little elf shoes at the tips. My probes were bent so badly that I was touching the trace with what amounts to the side of the probe tip instead of its end.

Now, I check my probes frequently. To do that all you need is a 20× power lens—or a 10× lens and really good eyes. When I find a tip starting to go, like this one, I get out two things: a tiny anvil and a hardened-steel screwdriver. For the anvil, I use a drill-press vise. That instrument resembles a miniature bench vise. It is rather flat so that it can hold small things under the spinning chuck of a drill press. Pick one up in a pawn shop or flea market. Mine has hardened faces. You are going to be straightening a couple of hardened-steel pins, so you need tough equipment to do the job.

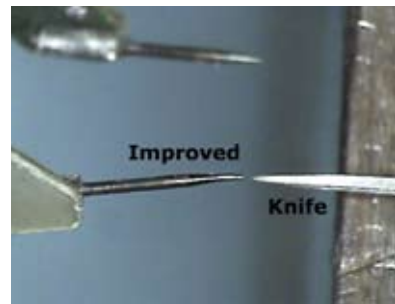
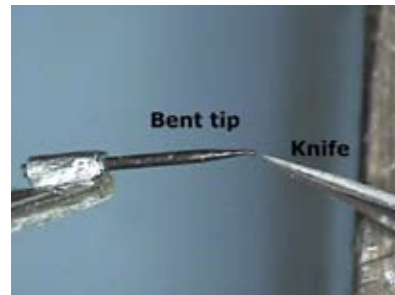
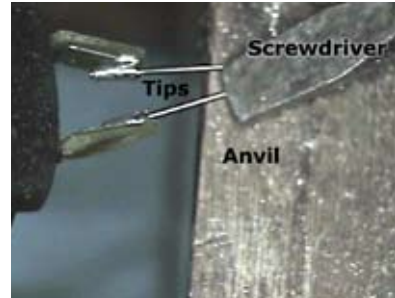
My screwdriver has a high-quality, hardened blade. Many of the pocket-sized screwdrivers for computer work

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are too soft for this job. Get a real machinist's quality tool. Mine has a blade width of 0.125 in.

Place the probe tip on the anvil and gently stroke it with the screwdriver blade. Watch carefully as you do this. Keep turning the probe so you can see it from all directions so that you know which way to hold it for the next stroke. Just go for a little adjustment at a time; don't break it. After a few passes, the tip will look much better. Keep working, and you can make it look almost brand-new.

Now that I've learned about probe tips, I'm more careful setting them down. Before I touch a trace, I check



to make sure that I've completely scraped away the solder mask, and I dress the underlying copper with a little #600 sandpaper glued to the end of a stick. That process thins the oxide, so the probe needs less pressure. **EDN**

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