

R A Q ' s

# Rarely Asked Questions

Strange but true stories from the call logs of Analog Devices

## Breadboarding With Surface Mount ICs Too small, or not too small? That is the question...

**Q.** How do I build breadboards with tiny surface mount (SM) ICs?

**A.** Very carefully — with a printed circuit board (PCB) IC carrier, a solder-well tip to your soldering iron, plenty of flux and a powerful magnifier.

It is seminar time in Europe. Every couple of years, Analog Devices gives about a hundred seminars around the world on topics related to one of our product lines. The current topic is high speed systems. Over six months I shall be giving it in over thirty countries, mostly European, and eating a lot of plastic airline meals as I travel to do so.

A good seminar is a dramatic performance as well as a technical exposition. Seminar speakers should encourage questions to promote audience participation — and at times the questions come fast and furious. Surprisingly, one of the most common questions is not about circuit design — it is about handling tiny modern IC packages in a development laboratory environment in a way that allows major circuit changes to be made without damaging the IC. Breadboarding with dual inline packages (DIPs) was easy, but is tough with small outline ICs (SOICs) and a nightmare with smaller packages having lead pitches of 0.025" or less.

There is a solution. If we build small PCB boards with pads and tracks fitting these small packages, but leading to relative large (0.1" × 0.2" [2.5 mm × 5 mm]) pads around their edges, we can mount the ICs on the PCBs and then breadboard with conveniently-leaded components. If the underside of the PCB is a ground plane, we can decouple the IC to it and use it to mount the PCB to a copper-clad breadboard (using



solder and a **HOT** soldering iron).

This does leave the problem of mounting the IC on its PCB carrier. In fact, a thermostatic soldering iron with a solder-well tip and plenty of flux makes the task of mounting small surface-mount ICs less difficult than it seems. Two leads are soldered down with a fine pointed iron to fix the device in position, and then all the leads are well coated with flux. The "well" in the soldering iron is filled, but not overfilled, with solder and is drawn across the leads on one side of the IC. This solders the leads and, if done carefully, does not short-circuit them to each other. The operation is repeated on each lead side of the IC, then the board is inspected for short-circuits or unmade joints.

The soldering can be done under a bench magnifier or with high power (5-6 dioptre) reading glasses. The links describe the boards and the mounting technique in more detail.

**To learn more  
about breadboards,  
Go to: <http://rbi.ims.ca/5696-120>**



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