

# Re: Prototyping?

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"Joerg" <[notthisjoergsch@xxxxxxxxxxxxxxxxxxxxxxxx](mailto:notthisjoergsch@xxxxxxxxxxxxxxxxxxxxxxxx)> wrote in message  
[news:kGtWi.2430\\$yV6.1485@xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx](mailto:news:kGtWi.2430$yV6.1485@xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx)

Agreed. I breadboard only when trying to use parts in really unorthodox ways (happens a lot...) or when I need a one-off to control something and it doesn't have to be pretty. Beats the usual 1-2 week wait for fab, stuffing and all the Fedex in between.

OK... but say for something as "simple" as a UHF bandpass filter (say a standard ham band one... 420-450MHz, assume you've decided you need a 5th order Chebyshev filter to obtain the skirts you want), do you (or John) expect you can design and layout a working PCB without either...

1) Performing simulation using one of the high-end CAD tools like Genesys, ADS, or Microwave Office, which can use very good models of the capacitors and inductors you're wanting to use as well as accounting for most parasitic effects of pads and trace width variation.

2) Fully intending to perform a fair amount of tweaking (generally of capacitor values, given the frequencies involved) once you actually build the board.

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I certainly can't do so myself, and if someone else can I'd love to learn their tricks! The fact that I've never read of such a method in amateur publication (books, magazines, etc.) suggests to me that it probably isn't doable... and the commercial guys just go with method #1 up there.

Trying to meet a customer schedule deadline, I've seen tens of thousands of dollars spent to do a quick-turn of a many-layer PCB containing relatively simply circuitry such as RF switches, splitters, etc... but going to, say, 3GHz. And I've seen engineers find out within no more than 15 minutes of receiving a stuffed PCB that their design doesn't meet some prescribed isolation or frequency response flatness requirement. I cringe, because I could have predicted before spending that sort of dough that there was no better than a 50/50 chance that it would have worked anyway. Now, from a business perspective at some point perhaps you can't increase those odds so

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you might as well spend the money anyway (a 50% chance of something working for, say, \$25k may be better than a 0% chance of something working for free and your missing a \$60k customer payment...), but what I've taken away from such experience is that one is better off going through \*more\* prototyping cycles \*early on\* in the project so that you hopefully don't have to fight such Pyrrhic battles in the first place.

---Joel

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