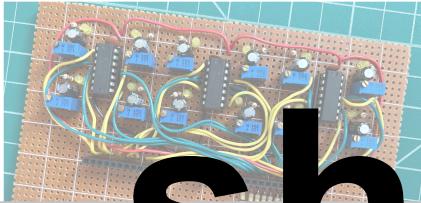


## Perf/Proto-board Tips



### On Design

I had a friend who played guitar who had a hard time learning how to play it, in part because learning how to play it, he'd watch videos of like Stevie Ray Vaughan or whatever on YouTube and he'd think "I could never do this!..." And so he stopped trying. And then he sold the guitar.

The moral of the story is that, if he'd just start small and simple and build up to the advanced stuff, today he'd be a perfectly content guitar player owner.

And I tell that dumb story because, when people talk about design, I think it's just as often discouraging as it is encouraging. Examples of "good design" are market-validated. Apple will sell 200 million phones this year, but if we're not gonna make iPhones, then why bother?

So, before we have any conversation about Design-With-A-Capital-D, I first want to outline a process of how I think about making electronic musical things:

## Gotchas!

I wanted to quickly write on a couple things I've noticed in class that have tripped people up:

1. This stuff is small! Parts are genuinely, physically hard to see.
2. It's strange! Even when we can see what's in front of us, it's unfamiliar.
3. Its instructions are unclear! Hmph!

Let's see what we can do...

### 1. Small stuff



### Serial vs Parallel



So far we've been using solitary resistors\* in class, but they don't always have to be so lonely. Introducing... serial and parallel resistors!

## Modulation

"Modulation" just means one thing altering or varying another. For sound, those two things are waves. The first wave is the *carrier*, and it's the rate of modulation. The second wave is the *message*, and it's where the information is.

Let's build some modulators to get a better idea of what exactly that means.

There are two kinds of wave modulation that we can roughly implement with our workshop kits, and they're commonly known to musicians as AM and PM.

