

The class met at 10 AM.

With only one week left, the student designed speaker project was coming together. You may recall that the students decided to build a satellite/subwoofer system using a 10" subwoofer, 4" extended range cone drivers and 3/4" supertweeters. During the week I completed some cabinet work in the Hobby Shop (HSSP students don't have access to power tools). Parts Express, our friendly sponsor, delivered a port tube and a variety of crossover parts.

Today the goal was to finalize the driver/cabinet selection, finish the passive crossover design and try it. At the end of class we had a mostly-working speaker and subwoofer.

Equipment on hand

- Laptop with LspCAD software
- Edgerton Center CD player; Michael's Audiosource stereo amp
- Soldering irons/helping hands; wire crimpers/strippers
- Lots of wire and crossover components
- Subwoofer and satellite cabinets with drivers mounted

Setup - through 10:20

- Connect amplifier, CD player, speaker drivers
- Load tweeter and cone driver data into LspCAD

Final Design Decisions - through 11:00

- Students listen to drivers connected directly to amplifier for comparison
- Full range driver: Bamboo or titanium cone?
- Listening impressions: titanium driver sounds clearer; similar bass performance
- Tweeter: flat, or recessed into front panel?
- Listening impressions: recessed or "waveguide" tweeter sounds fuller/stronger
- Decision: use titanium cone (Tang Band W4-1337s) driver and mount tweeter 3/8" deep

Passive Filter Design Session - through 11:40

- Implement/adjust baffle step compensation (BSC) with R — L network
- Series resistance on tweeter to balance levels
- Capacitor on tweeter to cancel waveguide boost and filter lows
- Removing BSC resistor
- Tweaking values to get good alignment: move tweeter cutoff up
- Final result: series L on fullrange, series RC on tweeter; $L = 1.1 \text{ mH}$, $R = 7 \Omega$, $C = 2.4 \mu\text{F}$

Experimentation and Construction - through 12:00

- Solder components on back of binding posts
- Switch cone drivers between flat-tweeter and recessed-tweeter cabinets
- Wire up crossover with alligator clips and easily available components
- Listen, discuss, and enjoy

The first speaker sounded very promising, considering that the students had just designed the crossover from scratch (!), and went surprisingly loud. After class, I found that we could make small adjustments to the component values. We will discuss any changes next week and I will post complete updated schematics to the class web site at <http://pricem.mit.edu/hssp>.