Subject: Build Thread: 2Pi Towers, 6Pi Corner horns (and possibly a sub and center)
Posted by joshua43214 on Tue, 22 May 2018 02:09:38 GMT
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Greetings everyone!
This post will be mostly introduction and planning. At the time of this writing the 2Pi Towers are all but complete and in service, and the 6Pi mid-horns are in the last stages of construction.

Introduction:
Almost 20 years ago, I invested in a set of Athena Audio speakers for my home theater. They sat alongside my venerable Acoustic Research speakers which finally went to their maker about 5 years later. Acquiring a new set of high end speakers for music ended up getting put off because the cost of anything much better than the Athena's was cost prohibitive. I came across Pi Speakers 5 or so years ago, and giving them a try has been on my list of things to do ever since. Last year, one of the drivers in my surrounds packed up, I thought this was a good chance to test the Pi Speaker philosophy and built a pair of 1Pi's. These little speakers are really amazing for what they are. If you are in the market for a pair of nice monitors, I highly recommend them.
A couple of months ago another speaker and the sub from my Athena kit failed, and I decided to go ahead and build corner horns and 2Pi surrounds.

When I started planning this project, I realized I have a lot of unusual experience, and that this would make a very nice build thread. I have been working with wood since I was a little boy, and have had the pleasure of being a professional furniture maker, a semi-professional wood worker, and now a hobbyist wood worker. In more recent years, I have acquired a some machine tools, and become a fairly competent hobby machinist. I have also been blessed with almost perfect pitch and very good hand-eye coordination, which made me a passable acoustic guitar player. I returned to college after a serious back injury ended my 2nd career, and now hold degrees in Molecular Genetics and Mathematics and work in a research capacity.

My intention is to write a detailed (and lengthy) thread on constructing these speakers, and I hope that my experience will benefit (or even inspire) others to take on the challenge of speaker making. In many ways this will be a series of "pro-tips," but I would like to also cover basics like tooling and adhesives, as well as alternative methods. In my view, the best method for doing something is the method that gets the job done with the expected degree of accuracy, and the minimal amount of fuss given the tools a person owns.

I quick word on safety. I will describe some techniques in this thread that might make you cringe at first glance. Please take a moment to look closely and read my descriptions before jumping to the conclusion I am being unsafe. Rest assured, I take safety more seriously than most people do. That said, woodworking machinery is probably the most dangerous machinery I have used. My planer has a sizable dent from a sheet of plywood that climbed over the blade of my table saw and frizbee'd across the shop.

Choosing the Right Stuff:
Like many of us, I was at a quandary over which models to buy, and what options to buy. My room

is not especially big, squeezing in a pair of 3Pi's or 4Pi's along with flanking subs would require some lifestyle changes. On the other hand, my screen comes down in front of the fireplace which is flanked by open bookshelves of questionable ancestry, so I am not convinced that corner horns are the best fit either. My reasoning for going with the corner horns is they use space more efficiently, are substantially cheaper to build, and the worst case is I have to (finally) replace the open shelves with closed front shelves. After reading through many threads on this forum, I also decided that the 7Pi is too big for my space and settled on the 6Pi. I also went with the basic kit with no upgrades. I learned from the 1Pi's that Wayne really gets the best out of Eminence drivers, and I am not convinced My Denon AVR produces high enough quality signal to take advantage of the upgraded electronics.

I chose the 2Pi Towers because I want the lower extension, and they save me the trouble of building stands.

I have not decided on what to do about a center channel yet, and I am shopping around for a plate amp for a 3Pi sub which I will try to include in this thread.

Planning:

I began by modeling the speakers in CAD. I use Fusion 360, and I highly recommend it. The software is free to hobbyists, students, and small businesses. Certainly the 2Pis can be built from a napkin sketch (I did that for the 1Pi's), and even 3 or 4 Pi's can be built with little more than a simple sketch. The corner horns on the other hand have some complicated parts, and taking the time to draw them up in CAD has many benefits - some of which will come up during this thread. Most importantly, a CAD model lets you test different designs easily, test last minute design changes, take angle or radius measurements that would otherwise require some real math, and produce detailed drawings for the shop.

Once I had the major components drawn in CAD, I collected the dimensions and used MaxCut to optimize a cut list. I used MaxCut because it is free, and was the first software on a Google search that did what I needed. I am sure there are better programs out there. It does have one issue for this project - you can only give it rectangular parts. There is a script you can install into Fusion 360 that lets you place all the parts in your design onto a sheet, but you have to manually move stuff around to make it fit. It turned out that rectangular parts was fine, details later.

The 4 speakers combined have 54 major parts, and used 5 sheets of 3/4" MDF. This does not include the tweeter box for the 6Pi's and the assorted scrap needed. So I purchased a 6th sheet.

Up Next, the 2Pi Tower build.