Subject: 3 Pi Review
Posted by rkeman on Mon, 06 Sep 2010 01:35:00 GMT
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Introduction

The life of an audiophile is often complicated and filled with frustration. Several years ago I relocated and left behind a dedicated listening room with superb acoustics that seemed to bring out the best in any speaker. My new listening room has proven to be far more challenging. Serving both music and home theater, it is much larger with an asymmetrical layout, several alcoves and vaulted ceiling. Although a number of highly regarded conventional dynamic speakers have been tried, musically satisfying results have proved elusive. Indistinct imaging, upper midrange harshness, and lifeless dynamics have persistently reared their ugly heads. Perhaps the problem lay in the speaker/room interaction?

Conventional direct radiator speakers (cones and domes) become increasing directional as frequency rises and often show substantial variations in dispersion throughout the audible range. Constant directivity speakers radiate sound uniformly over a specified area thus minimizing room interaction by avoiding early reflections the reflections that most color sound in domestic listening environments. Horns, dipoles, and line arrays are the most common types of constant directivity speakers. Dipole speakers show a figure-eight radiation pattern that maintains constant directivity over the full audible range, but must be placed a substantial distance from the rear wall due to the rear radiation of sound. Horns and line arrays have greater placement flexibility making these quite attractive for domestic listeners.

Pi Speakers 3 Pi

The focus of this review is the 3 Pi, a two-way design based on the Eminence H290 horn (40° x 90°) with a 1" compression driver and a 12" woofer in a vented cabinet. The stock cabinet is 30" x 20" x 14" and has a 2-1/2" port on the front panel. Pi Speakers offers the 3 Pi fully finished, in kit form, or as plans. A variety of driver and crossover component options are available with the basic package including an Eminence Delta 12LF woofer, Eminence PSD2002 compression driver, and crossovers built with good quality 18 gauge air core inductors, non-inductive resistors and polypropylene capacitors. Upgrades include an Acoustic Elegance TD12S woofer, B&C DE250-8 compression driver, and a range of improved crossover components. A finished 3 Pi in oak veneer starts at $850 and kits without cabinets from $320. Wayne Parham, the proprietor of Pi Speakers, offers a number of other horn loaded and direct radiator speakers designed to provide constant directivity, high sensitivity, and good value. The Pi website and forum provide full product descriptions and a wealth of the information regarding speaker design and is worthy of further investigation by any audiophile.

Cabinet Construction

The 3 Pi has a relatively simple rectangular cabinet with a shelf brace located between the woofer and horn. Wall thickness is specified at 5/8" and cross braces (front to rear and side to side tied together) below the woofer are recommended by Pi. I elected to fabricate the enclosure from 3/4" medium density fiberboard (MDF) with a double thickness front panel (1-1/2") and increased the depth 1" to maintain appropriate internal volume. The bottom is double thickness to

accommodate adjustable threaded spiked feet. The final external cabinet dimensions are 30-3/4" x 20-3/4" x 15". The horn and woofer are flush mounted and the port constructed from stacked 4" x 4" squares of 1/2" MDF glued to the rear of the front panel for a total port length of 2-1/2". The shelf brace between the woofer and tweeter is 3/4" MDF with two 7" x 7" cutouts. Two 1" dowel cross braces are placed below the woofer for further reinforcement. Unfaced R-13 fiberglass insulation is glued to the back, bottom, side closest to the port and the shelf brace above the woofer as recommended by Pi Speakers. A lightly textured satin black acrylic finish applied by roller lends an understated modern appearance to the cabinets.

Crossover Construction

The crossovers are constructed using Erse XQ Perfect Lay 2% tolerance 14 gauge air core coils, Erse Pulse X 250 volt 3% tolerance polypropylene capacitors, Mills 1% tolerance 12 watt non-inductive resistors, and 14 gauge Teflon wire mounted on a 1/4" MDF panel with nylon wire ties. Mounted on a slightly oversized piece of dense 3/4" adhesive backed acoustic foam, the crossover boards are attached to the inside bottom panel of the enclosure with six 1-1/4" #8 sheet metal screw. Biwire gold plated brass binding posts are located on the lower rear of the cabinet.

Driver Installation

The Acoustic Elegance TD12S woofer makes quite an impression. The beautiful cast aluminum basket, large motor, brushed aluminum phase plug, and surround define quality of construction. The rubber basket cover also serves as an effective mounting gasket. Voice coil inductance is sufficiently low that no Zobel impedance correction is necessary. The TD12S forgoes the Apollo upgrade that further increases power handling and lowers voice coil inductance. The Eminence H290 is molded of dense plastic compound and has a substantial feel. A series of molded veins are present on the outside of the horn throat and these are filled with pliable electrician's putty. Adhesive backed 1/2" dense acoustic foam is applied to the exposed inner surfaces of the horn and wrapped around the horn throat to further damp the structure. The latter is tied down with several loops of thin nylon thread. The B&C DE250 compression driver is mounted to the horn with the integral foam gasket by using two of the bolts provided with the driver. The final tweeter assembly is virtually non-resonant. The woofer and horn are both mounted to the cabinet using 1" #8 black oxide machine screws. A small amount of flexible rope caulk was used in place of gasket material for the horn and two additional screws are added at the center of the vertical sides of the horn.

Speaker Placement and Set Up

Pi speakers recommends placement the 3 Pi sounds close to room boundaries and agreed - 15" from the sidewalls, 6" from the rear wall and 9' apart. The speakers are toed-in such that cabinet centers cross 2' in front of the listening chair. Acoustic treatments include front wall Auralex diffusers and first reflection point damping/corner bass absorbers (2' x 4' panels of 4" Owens Corning 903 fiberglass in wooden frames). A Marantz SR8002 receiver drives the front speakers in biamplified mode and the surrounds by additional single channels. No center channel is used and multichannel sources employ the phantom mode on the receiver. Two custom subwoofers based Adire Tumult 15" drivers (sadly now unavailable) in sealed cabinets and driven by O Audio 500 watt BASH plate amplifiers handle the low frequency effects (LFE) channel. Sources include an Oppo BPD-80 BluRay player and Scientific Atlanta HD Cable Tuner.

Listening Impressions

The 3 Pi offers amazingly smooth response that neither emphasizes nor slights any portion of the audio spectrum. No bright highs or forward upper midrange here! Bass is nicely extended and has a natural well damped quality that compliments typical room gain. The vent produces no audible chuffing even at insane sound pressure levels. Reproduction of large orchestral works with strings, woodwinds, brass and percussion is limited only by the quality of the recording. The ease of hearing "into the mix" with dense compressed pop music indicates exceptional neutrality and clarity. Rendition of dialog is a very difficult, perhaps the most difficult, test for a loudspeaker. The 3 Pi renders voices accurately with no added chestiness or sibilance. The differences between various microphones and transitions to and from ADR dialog are clearly apparent, yet without undue emphasis. Imaging is solid with a good sense of depth, height and breadth. The phantom image produced with multichannel source is stable and lifelike. Dynamics are simply astounding particularly compared to most audiophile designs favored and are aided by the high sensitivity of the 3 Pi. The load presented by the speaker appears to be benign and is suitable for a wide range of tube and solid state amplifiers.

Conclusion

Is the Pi Speakers 3 Pi the perfect loudspeaker? For many listeners the answer will be yes. It offers superb performance in a relatively compact package and is designed to make the most of typical listening rooms and amplification. Either as a kit or assembled speaker, the 3 Pi is an outstanding value and is highly recommended.