

attached to one end of the cone, the voice coil is also damped and the amplifier is presented with a rather benign load. This selective acoustical loading was the secret of the Hegeman Model 1s.

OVERVIEW

Figure 1 illustrates the impedance characteristics at the open end of a quarter-wave pipe closed at one end and the equivalent circuit, a parallel resonance circuit is set by R. (See Harry F. Olson's *Elements of Acoustical Engineering* for a more thorough discussion of resonance pipes.) Figure 2 shows the relationship of the four tuned pipes used in this subwoofer. The response of the pipes merges into a bandpass filter response representing the resistance applied to the driver cone. The Q of the individual pipes is adjusted by varying a resistive element placed in the mouth of each pipe.

Figures 3A and 3B show the driver impedance in free air superimposed upon the impedance response of the finished unit for the MCM and Audiomobile drivers. The finished response for the MCM unit indicates a center frequency of about 54Hz and a corresponding bandwidth of 73Hz, resulting in a Q of about 0.74, which results in an excellent transient response. The Q for the Audiomobile driver is 0.78—again, excellent transient response. Now for the “no free lunch” The nominal impedance of the MCM driver is listed as 8Ω and the maximum input power as 175W. The MASS 2010 impedance curves of Fig. 3 indicate an impedance of approximately 18–20Ω over the operating range. To fully drive these speakers, an amplifier must be able to put out about 200 to 600W into 16Ω. I am using a Hatter DH220 operating in

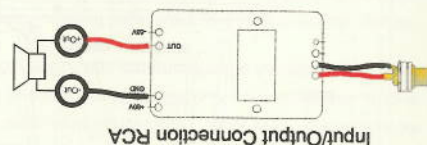
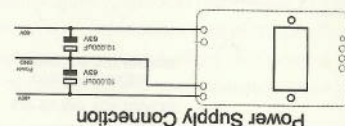
Hardware. Coupling between the pipes and the cone is accomplished with a relatively small plenum into which the rear of the driver projects. Sealing this box is a must.

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