Section 9.0 : Conclusion

Over the past few years, I have been accumulating notes on horn loaded loudspeakers. When I started, I really did not understand what made a horn work. The texts and papers I read did not provide a start to finish derivation and solution of the horn wave equation or provide enough information for me to quickly gain the insight I needed to be comfortable designing a horn loaded speaker system. So my efforts up until recently were essentially trial and error simulations or attempts at reverse engineering horn designs from the Internet. Most of these efforts produced very poor calculated response plots. This was particularly true for back loaded horns.

The preceding sections represent my attempt at providing a start to finish derivation, solution, and then some simulation results for two types of horn loaded loudspeaker geometries. I have re derived many of the equations and relationships used to size and simulate exponential horns. By the time I finished writing Section 5, everything I needed to do a comprehensive study of front and back loaded exponential horn enclosures was complete. Sections 6 and 7 are the first two installments of my continuing work on horn loaded loudspeakers. With the completion of Sections 6 and 7, a general first pass through horn design has been completed. Additional studies and documents will follow as I work on the details required to design and build a high performance horn loudspeaker system.

Several results presented in Sections 3 and 4 have not been used in Sections 5, 6, or 7. In particular, the radiation pattern created by the mouth of the horn has not been accounted for in any simulations. Also, the exact shape of the horn's mouth and the impact on the acoustic impedance and SPL had not been addressed. And finally, the impact of loading the horn's mouth by a room boundary had not even been mentioned. These three topics were looked at in detail in Section 8 and also in follow up documents to be added at a later date.

So in conclusion, my first pass through the derivation of the one dimensional exponential horn wave equation has been completed and additional more advanced studies are being added as they are completed. I have learned and am still learning a lot and hope that the reader has also found something that increases their understanding after reading the different sections. There is a lot more work to be done and documented that I would like to add to this page of my website. As always any feedback, comments, corrections, or direction for future study will be appreciated and taken into consideration. Maybe I will even have time to design and build a horn loudspeaker system soon. Thanks for taking the time to read this first installment in my study of horns.