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Application Note

Monolith Version 2 Crossover and Filtering Configuration Suggestions

Although available from the factory in either a bi-amplified or tri-amplified configuration, the Monolith Version 2 is most often selected for bi-amp use. The following suggestions relate to the bi-amplified configuration. In this configuration, the Monolith Version 2 loudspeaker requires separate amplifier channels for the LF and MF/HF sections. Through testing and extensive listening tests, suggested crossover and equalization parameters have been established. These should be used simply as a guide, but are not "etched in stone." It is highly recommended that all settings be configured, and modified as required, for each specific installation.

Crossover: For optimum performance what is essentially an asymmetrical crossover configuration is desired. This can be created several ways, but the best being a symmetrical crossover filter combined with a notch filter. This should prove simple to implement using virtually any of the DSP-based speaker processing systems. Begin by configuring both the LF and MF/HF channels for a –6dB crossover point of 240Hz. The slope of crossover filters should be 24dB per octave, with a Linkwitz-Riley filter implementation preferred. Then configure a –10dB notch filter centered at about 190Hz, with a bandwidth of 0.40 (Q=2.5). This filter combines with the LF output's low-pass filter to create the desired asymmetrical crossover response.

Equalization: Besides the possible use of one "notch" filter, suggested as part of the crossover implementation, no equalization, such as notch filters or shelf filters, is required for excellent sonic performance. For additional LF impact a 0.7 octave (Q=1.4) "bass bump" at 50Hz can be implemented. Depending on the taste of the listener, anywhere from +3 to +10dB of equalization (bump) can be very effective. The test listeners who liked to hear lots of bass energy selected +10dB as their preference. No high-frequency horn compensation ("CD horn EQ") is necessary. But adding some if desired will not cause a problem if judiciously selected.

Loudspeaker Protection: Implementing a high-pass filter in the LF channel will provide protection for the Monolith Version 2's 18-inch woofer. This will prevent the woofer from receiving low-frequency energy in the frequency band where it is not capable of generating significant acoustic output. If not filtered out, essentially all of the energy in this frequency band would simply be dissipated in the voice coil as heat. Using a filter whose slope is 24dB per octave, with a –6dB point at 44Hz would be appropriate. If subwoofers are to be used with one or more Monolith Version 2's, selecting a higher –6dB point, such as 80Hz, will offer additional protection. It will also allow the subwoofers to better perform their intended role.

Practical Implementation: In this example, two Monolith Version 2's are used to provide full-range, stereo reinforcement. The speaker processor selected was an XTA Electronics DP224, configured in its 2 x 2 way crossover mode. For the crossover, setting both the LF output's low-pass filter and the HF output's high-pass filter to 241Hz worked very well. The filter types were set for Linkwitz-Riley, 24dB per octave. The LF output had its high-pass filter set for 44Hz, again with a filter type of Linkwitz-Riley per 24dB per octave selected. The HF output's low-pass filter was left in its 22kHz-default setting. In the LF output section, two filters were configured. The first is a –10dB notch centered at 191Hz, with a bandwidth 0.40 (Q=2.5). This filter combines with the LF output's low-pass filter to create the desired asymmetrical crossover response. The second filter is a "bass bump" of +10dB at 50Hz, bandwidth 0.71 (Q=1.4). This creates very intense bass performance. With the aforementioned configuration, the overall sonic performance of the Monolith Version 2 was excellent. Other fine loudspeaker management systems, such as from BSS or Ashly Audio, should be able to be similarly configured.