

AE Series Important Tuning Information

IMPORTANT!

Read this document **BEFORE** applying AE Series tunings. For proper performance, it is important to understand the following:

- **Different digital controllers process the audio signal differently – sometimes very differently. Identical “settings” on another controller can result in very different results.** Digital algorithms approach simulating analog filters in different ways. For example, parametric EQs with identical settings can exhibit a variety of skirt shapes and even different center frequencies. The same is the case with high-pass and low-pass filters.

Possibly the most crucial difference may be that of output channel latency. Depending on the amount of processing on an output channel (high-pass slope, low-pass slope, high-pass or low-pass filter types, EQ bands, etc.), the signal of THAT output channel can be delayed relative to the OTHER output channels. This can mis-align all your signal alignment.

Use the exact controller whenever possible. When you must use a different controller, you will need to utilize a measurement system to adjust the tuning. Be especially aware of output latencies. *The information in the FAQ section below provides further information.*

- **These AE Series tunings are set for maximized “FLAT” on-axis and off-axis performance balance. The various filters also work integrally together for proper beamwidth control. You may need to make EQ adjustments up-stream for “house curve” and to adjust for the acoustics of the room.** Flat frequency response is a known neutral starting point, but it may not be what necessarily sounds best for your application. For example, it is common in performance applications to add a “house curve” EQ with a shallow-slope high frequency rolloff, starting between 4 kHz and 8 kHz. In addition, you should use an acoustic test system to make adjustments for the acoustical environment.

Whenever possible, try NOT to make adjustments to the OUTPUT channel filters, as that may affect your polar response around the crossover frequencies and other performance factors. The crossover filters in these tunings are not simple textbook filters -- they are set to work with the acoustic response of each driver. Unless you're out of DSP filters, make EQ adjustments UPSTREAM from the crossover and output channels. *The information in the FAQ section below provides further information.*

More complex adjustments may be necessary when arraying speakers. Please see the “AE Series Array Guide” for guidelines.

- **Mis-adjustment of external factors can seriously compromise these tunings.** Pay attention to factors like amplifier channel gain settings (they should be identical) and polarities (from the controller output through the amp to the speaker).

Please read the FAQ below for more information about these factors and for additional important information about the AE Series Tunings:

FAQ -- AE Digital Loudspeaker Controller Tunings:

Supported Digital Loudspeaker Controllers:

Q: *Which DSP loudspeaker controllers does JBL currently provide tunings for?*

A: BSS FDS-366, BSS Soundweb, and (coming soon) DBX DriveRack 260

Q: *What format are BSS FDS-366 tunings provided as?*

A: Soundbench “.PPG” files for FDS-366. Also, Excel Spreadsheet and Adobe PDF format for manual entry of parameters.

Q: *What format are SoundWeb tunings provided as?*

A: SoundWeb Designer “.SDF” format, and “.SMC” macro formats.

Q: *What format are the DBX DriveRack 260 files? (coming soon!)*

A: These tunings are incorporated in the Driverack 260 “Wizard” functionality. In many cases, PDF text format is also available for manual entry. DriveRack 260 parameters may be downloaded using a PC, and the firmware is Flash upgradable.

Q: *I'm using a BSS FDS-366. What do I need to know?*

A: The “Phase Compensation” parameter **must** be set to “OFF” to use these AE tunings!. BSS provides a Flash firmware upgrade if you have a unit with earlier versions of the firmware that does not provide this feature. See the BSS web-site: www.bss.co.uk

Using other DSP controllers with JBL AE series loudspeaker tunings:

Q: *Can I use the filter and crossover parameters shown for the FDS-366 on other loudspeaker controllers such as JBL's DSC-260, Crown IQ PIP modules, etc?*

A: Care must be used since different products may produce different delay (latency) between channels even though the crossover filters are “the same”. Also Q or bandwidth of parametric filters may vary in implementation between different products.

Q: *How do I know if a tuning translates to a different model of loudspeaker controller?*

A: Performing an acoustical measurement is the most certain way to be sure. Using a measurement system equivalent to SMAART, TEF, or MLSSA, you'll see if it's necessary to adjust channel delays, and parametric Q or Bandwidth.

AE Controller tuning Assumptions:

Q: *What amplifier gain is assumed for each channel?*

A: Equal gain is assumed for each channel. For amplifiers with different voltage gain, DSP controller output level should be adjusted to compensate appropriately.

Q: *What are the limiter settings?*

A: Each tuning has the limiter function disabled or set to its maximum level. Limiters should generally be set to avoid amplifier clipping. Most often, setting limiters so limiting occurs at between 2x to 4x the rated continuous power handling of each section will provide good protection. However limiters should always be set so that amplifier clipping does not ever occur for more than 5% of the time while the system is under peak operation.

Q: *What acoustical polarity is assumed for each transducer or passive-section?*
 A: For all AE tunings, a positive voltage applied to the input of the power amplifier should produce positive acoustical pressure from each driver or passive pass-band. (Indicated as “green” or “+” on a commercial polarity checker.)

Q: *Why do the fully passive full-range systems have an “active tuning”?*
 A: These settings provide recommended high pass filtering and low frequency alignment filters. This provides maximized LF extension and output. The tuning protects the woofer from over-excursion.

AE Tuning Configurations provided:

Q: *What configurations of AE loudspeaker systems does JBL provide tunings for?*
 A: 14 standard configurations are provided:

- Passive 2-way full-range enclosures (ie: AM6212-95, set to passive mode)
- Passive 2-way full-range enclosures, with a sub (ie: AM6212-95 in passive mode + sub)
- Bi-amped 2-way enclosures used full-range (ie: AM6212-95)
- Bi-amped 2-way enclosures, with a subwoofer (ie: AM6212-95 + sub)
- Passive 3-way enclosures (ie: AM4315-95)
- Passive 3-way enclosures, with a subwoofer (AM4315-95 + sub)
- Bi-amped 3-way enclosures, used full range (ie: AM6315-95)
- Bi-amped 3-way enclosures, with a subwoofer (ie: AM6315-95)
- Tri-Amped 3-way enclosures used full-range (ie: AM6315-95 set to tri-amp mode)
- Tri-Amped 3-way enclosures, with a subwoofer (ie: AM6315-95 + sub)
- Bi-amped 2-way mid-high systems, with a LF box (ie: AM6200-95 + AL6125)
- Bi-amped 2-way mid-high systems, with an LF and, and a sub (ie: AM6200-95 + AL6125 + sub)
- Passive 2-way mid-high systems, with an LF box (ie: AM6200-95 + AL6125)
- Passive 2-way mid-high systems, w/ LF box, and sub (ie: AM6200-95 + AL6125 + sub)

Q: *I’m installing an array of AE loudspeakers, can I use these tunings?*
 A: In many cases the crossover filters and parametric filters offer a good starting point. In most cases EQ filters will need to be adjusted due to acoustical coupling and interaction within the array. Recommended crossover frequencies and slopes provide optimized off-axis response for each enclosure. Maintaining these crossover filters, as you adjust the response of each enclosure with parametric filters, may provide the best performance. See the “technical information” section below for details.

AE Subwoofer and “With Subwoofer” tunings:

Q: *What are the assumptions on tunings “with subwoofer”?*
 A: Each “with subwoofer” tuning produces the identical acoustic response at an 85 Hz crossover point. This allows any AE subwoofer tuning to sum uniformly with any full range (Passive, low-high, low-mid-high) enclosure. Channel delay setting can be adjusted appropriately at the time of system installation.

Q: *What are the assumptions on subwoofer tunings?*
 A: Each subwoofer tunings provides LF alignment parametric EQ, a high-pass driver protection filter, and low pass 85 Hz acoustical crossover filtering. This provides maximum LF extension while protecting the subwoofer from over-excursion. The electrical crossover filters produce an 85 Hz acoustical crossover that sums flat with AE systems using the “with sub” tuning for each system. Channel delay settings can be adjusted appropriately at the time of system installation.

Technical Details of AE controller tunings:

- Q: *What is the “target response” of each AE Tuning?*
 A: Each tuning is engineered to provide flat on-axis response, and optimized off-axis response. This ensures uniform dispersion within the nominal coverage of each speaker enclosure.
- Q: *Do these loudspeaker tunings have a similar family voicing?*
 A: Each AE enclosure tuning was compared to other AE models in controlled listening tests. Subtle changes of channel output level and parametric EQ ensure a consistent sound quality between all AE models. Each individual tuning provides an equally “neutral” sound characteristic that can then be adjusted as required for the particular installation.
- Q: *Why do the crossover filters “overlap” or “underlap”? Why are the crossover slopes different, and why do the crossover points differ?*
 A: Using asymmetrical filters takes into account the raw acoustical response of each transducer (sub, low, mid, high). The acoustical response of each driver combined with optimized electrical filtering provides optimal acoustical summation and optimal polar response through the acoustical crossover region.
- Q: *How do these tunings help in installing and commissioning a system?*
 A: Using these tunings takes the guesswork out of deciding on crossover frequencies and crossover filter-slopes. Asymmetrical electrical crossover filters are utilized to provide uniform response with-in the engineered coverage of the loudspeaker, and also to maximize power handling and minimize distortion.

Equalization and AE Tunings:

- Q: *There are a lot of parametric EQ filters in these tunings! What’s the deal?*
 A: Each tuning was developed to provide flat on-axis response, uniform off-axis response, and a consistent sound quality between models. This is typically a good starting point for installations, or for demonstrating AE speaker systems. When it’s time to commission the system, the room acoustics and the required “house curve” may require different filtering/EQ.
- Q: *I’d like to maintain the optimized engineered polar response of the AE series. How should I modify the parametric filters when I commission a system?*
 A: If processor DSP “horse-power” is available, it’s easiest to simply use additional “input” EQ in front of the crossover to achieve the target response in the room. Depending on the location of each cabinet and how each enclosure is aimed, inter-channel delay may need to be adjusted. Using a measurement system equivalent to SMAART, TEF, or MLSSA will provide the best results.
- Q: *The loudspeaker processor is out of available filters, and anyway I don’t like “stacking” filters with overlapping cuts and boosts. Now what?*
 A: Generally any filter within ½ octave off the crossover-filter influences acoustic summation and influences polar response. Filters “beyond the crossover” (outside of the pass-band) are intentionally used to improve polar response of the speaker. These filters are normally best left as-is because they will impact uniform coverage in the room. Filters more than one octave away from the electrical crossover filter may be modified while still maintaining the engineered polar response of each AE systems.
- Q: *How were inter-channel delay setting determined?*
 A: Delay is set to provide optimized on- and off-axis response within the intended coverage angle of each loudspeaker system. In cases where the speaker can’t be pointed directly at its intended audience area, some adjustment may be required. Using a measurement system equivalent to SMAART, TEF, or MLSSA will indicate this.