

# Auto Room Correction vs. Room Analysis and Tuning

*"You should perform standard calibration (EQ, levels, and delay) on Dolby Atmos playback systems, just as you would with traditional systems. Most home AVR systems feature auto calibration technologies that handle level setting, delays, and frequency response correction adequately for the home theater. However, such systems are not perfect, and we recommend that you or a professional home theater installer combine a manual calibration sweep with skilled listening and adjustment of the system's responses to ensure accurate reproduction capability and consistency of channel-to-channel timbre."*

- Dolby Laboratories

The ACT 4 room compensation EQ system has been specifically designed for use with the most popular semi-pro and professional-level room analysis and tuning tools available including Omnimic, REW, XTZ and others. With these companion tools, the ACT 4 allows the installer to quickly and easily measure the response of any and all speakers in the room from any listening position, find optimal EQ filter values, apply these filters and then, in real-time, compare the end results before and after EQ.

Each loudspeaker driven by the ACT 4 (up to 16) can have up to 6 parametric EQ filters applied to tailor its room response.

More information on recommended companion room tuning tools for the ACT 4 is shown below for your reference. These are some of the very same tools used by professional acoustic designers. This is not an exhaustive list. Many other tools exist that are compatible with the ACT 4 tuning interface.

## **REW: Room EQ Wizard** [www.roomeqwizard.com](http://www.roomeqwizard.com)

REW is a free room acoustics analysis software for measuring and analyzing room and loudspeaker responses. The audio analysis features of REW help you optimize the acoustics of your listening room, studio or home theater and find the best locations for your speakers, subwoofers and listening position. It includes tools for generating audio test signals; measuring SPL and impedance; measuring frequency and impulse responses; measuring distortion; generating phase, group delay and spectral decay plots, waterfalls, spectrograms and energy-time curves; generating real time analyzer (RTA) plots; calculating reverberation times; determining the frequencies and decay times of modal resonances; displaying equalizer responses and automatically adjusting the settings of parametric equalizers to counter the effects of room modes and adjust responses to match a target curve.

## **Notes about the ACT 4 and REW**

Here are some guidelines when using Room EQ Wizard in conjunction with the ACT 4. We HIGHLY recommend this 15 minute video on REW instructions <https://youtu.be/ial9y0ipNeU>.

- Focus on the Low-frequency range for REW automatic PEQ filter parameter generation (below 200Hz).
- First, set the loudspeaker delay settings for each speaker according to the distance from the main listening position (assume 1mS is approximately 1 foot)
- Next, select the loudspeaker size (small or large). Adjust the crossover frequency if other than 80Hz (which is most common).
- Next, using the test tones in the ACT 4 1.0 firmware and a sound level meter (handheld or built-in to Room EQ Wizard), set the relative levels of each loudspeaker at the main listening position to within 1 dB C-weighted fast. Start with the center channel as this one generally determines the dynamic range of the rest of the system. We recommend the pink noise tone built-in to ACT 4 1.0 firmware.
- You shouldn't need to adjust polarity unless a speaker was miswired. (We are designing a test for that in a future version of firmware.)
- Next adjust the EQ for the subwoofers to compensate for room modes and resonances. This is where Room EQ Wizard helps by measuring the room response curve in the low frequency range (below the transition frequency) and automatically calculating compensation filter parameters (PK type).
- You may use the same sound level meter he uses in the video but a different audio interface to convert to

- USB to get the microphone audio into the computer. You can also use a USB microphone to go directly into the computer without an audio interface.
- Be sure to calibrate as he suggests in the video.
- Use the EXT button on the right hand side of the speaker parameter and EQ pages for playing the external sweep only through the speaker to be tested and EQ'd.
- Set REW for 4 parametric filters, tell REW to calculate the target response, and then simply copy the calculated filter values (frequency, gain, q) into the ACT 4 EQ for each subwoofer channel.
- You will see that it is OK to select the closest Q value for example when REW Q values don't match ACT 4 Q values. The measured curve generally comes out within a dB of the calculated curve from REW.
- You can run the sweep tone from REW into the ACT 4 on any input except inputs 15, 21.
- We do not recommend trying to flatten the response at high frequencies as this tends to improve sound only at the mic location and make other locations worse off. Rather, to adjust high frequency brightness higher or lower, use the global high shelf EQ to adjust all channels equally.
- If there are any significant peaks found at higher frequencies in REW, you can apply EQ to lower them if you wish, but be sure to listen and measure at multiple locations to confirm whether the peaks are constant or vary with position.
- We never recommend boosting dips greater than about 5dB in frequency response with EQ.

\* More about room EQ is here: [https://www.roomeqwizard.com/help/help\\_en-GB/html/modalsim.html](https://www.roomeqwizard.com/help/help_en-GB/html/modalsim.html)

## **Dayton Audio: OmniMic V2 Precision Measurement System**

[www.daytonaudio.com](http://www.daytonaudio.com)

Dayton Audio's OmniMic V2 is a must-have omnidirectional acoustic measurement system for audio system integrators, acoustic engineers, and residential A/V installers. The OmniMic V2's new hardware provides fast, comprehensive, and accurate audio measurements.

## **XTZ Room Analyzer 2 Pro** [www.xtzsound.us](http://www.xtzsound.us)

A good loudspeaker can only do as much as its placement in the room will permit. This is because the listening position and the room itself have a significant effect on the sound. Our measurement systems and room analyzer software help you find and fix these problems. Our software for Windows with its easy to use interface, in combination with our hardware, enables a number of different analysis methods. You can learn more about standing waves, room modes, phase shift and delay time, and how each of these factors affects the sound you hear in the room. It also gives you information about each of the problems it detects and what kinds of countermeasures you should consider taking.