

ROOM LEVEL CALIBRATION 101

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Having a consistent playback level in a sound mixing or mastering room is essential for ensuring that all the bits and pieces you create over the months of a game's development wind up playing together nicely in the end. When you get in the habit of keeping your hands off your room's master level, you'll find yourself fixing things that might have otherwise slipped by.

To set a predictable reference level, you'll want to use pink noise and a sound pressure level (SPL) meter to set the output of each speaker. Keep in mind that this is only one aspect of proper room setup. Choosing room treatments and speaker placement are vitally important topics that are beyond the scope of this primer.

The following assumes a 5.1 surround room. You can use the same technique for a 2 or 2.1 channel stereo setup.

How to Pink a Room

1. Decide what speaker calibration level you want for your room. This decides how much headroom your system will have beyond the level of normal spoken dialogue, by determining the physical amplitude of pink noise at -20dBFS, RMS where 0 dBFS is assigned to the maximum possible level. The higher the number, the higher the peak amplitude for which you're setting the system. Assuming that you want calm, spoken dialogue to always be at about the same level, a higher calibration levels means more headroom above the level of dialogue. Common selections include 85dBc SPL, which is used for large rooms such as movie theaters, and 79dB SPL, which is used in many smaller rooms set up for television, home theater, or games.
2. Determine which controls you will use to set the output of each individual speaker. If possible, put these controls where you can reach them while reading the meter. If not, enlist a second person to adjust the controls while you measure the signal.
3. Set up a noise source that will play pink noise through your system at -20dBFS RMS. In a Pro Tools system, you can use the Noise Generator plug-in set to RMS, selecting Pink Noise as the type and -20 dBFS as the value. The important thing is that it is in your system in a place where there aren't extra pieces of gain stage in front of the speaker: if it's going into a mixer section that will drop it by 6dB, getting a good reading will be complicated.

4. Determine the central listener position in your room. This should be equidistant from your left and right speakers, and from your center speaker unless you use a delay on the center. If you used ITU specs to set up your surrounds, these should also be equidistant from this position.
5. Place a Radio Shack analogue SPL meter, model [33-4050](#), on a camera tripod at this central listener position, at head height.
6. Set it to C-weighted, slow. C-weighting means that it applies a curve before evaluating SPL that rolls off some lows and highs. “Slow” means that it uses a longer window of time to come up with a reading.
7. Set the range on the SPL meter to the appropriate reference sensitivity (e.g. – 70 dB SPL, 80 dB SPL, 90 dB SPL, etc.)
8. Use hearing protection.
9. Play pink noise through your left speaker. Adjust its output until the meter shows the number that you’ve chosen as your calibration level.
10. Repeat this with your center and right speakers, one at a time.
11. Repeat this with your surround speakers. If you have more than one speaker on either side of the surrounds, set them one at a time to 3dB SPL lower than your calibration level.
12. Repeat this with your LFE channel, targeting a level that’s about 6dB SPL higher than your calibration level.
13. Grab one of your favorite DVDs and give it a listen!