

Church Sound 101

The Do's and Don'ts of Great Church Audio

Great church sound doesn't have to be complicated, and it certainly doesn't have to be expensive. Whether you're operating an analog mixer or a modern digital console, the same basic principles apply.

Many of the audio problems churches experience are not caused by defective equipment. They're caused by improper microphone selection, poor microphone placement, incorrect gain staging, speaker positioning, and unnecessary signal processing.

Before spending money on new equipment, take a little time to understand what you already have. You might be surprised by how much better your system can sound!

The 12 Do's and Don'ts of Church Audio

DO	DON'T
Choose the correct microphone for the sound source.	Assume every microphone works equally well for every application.
Position microphones correctly before adjusting gain.	Compensate for poor microphone placement with excessive gain.
Set input gain with adequate headroom.	Run every input as hot as possible.
Use appropriate peak levels for each source.	Assume all instruments need identical gain settings.
Position PA speakers to minimize sound entering microphones.	Place mains behind open microphones whenever avoidable.
Select speakers appropriate for the room and coverage requirements.	Assume more wattage automatically means better sound.
Maintain a practical master fader operating range.	Sacrifice proper gain structure to force a fader to unity.
Use processing only when it serves a purpose.	Add EQ, compression, gates, and FX simply because they're available.
Correct feedback problems at their source.	Expect EQ and gates to fix every feedback problem.
Calibrate speaker input sensitivity appropriately.	Turn speaker gain all the way up and rely on another fader.
Monitor channel, bus, and output levels.	Forget that multiple channels combine at the mix bus.
Listen critically and train your sound team.	Make every decision by watching meters alone.

1. Good Sound Begins at the Microphone

The first step in proper gain staging is choosing the right microphone and placing it correctly. A microphone positioned too far from its sound source captures more room ambience and unwanted sound relative to the direct signal.

For example, placing a Shure SM57 twelve inches away from a bass guitar cabinet instead of close to the speaker grille can significantly change the sound and the amount of isolation you achieve. Moving the microphone closer may reduce the preamp gain needed to reach the desired input level.

Remember: Turning up the gain does not improve microphone placement!

2. Understand Proper Input Gain

Input gain is one of the most important adjustments on your mixer. Excessive gain reduces available headroom and can contribute to clipping. Insufficient gain can make noise more noticeable when additional amplification is required later.

For digital consoles using peak meters, a conservative starting point is approximately -18 dBFS on the loudest expected peaks for many vocals and instruments. Some percussion sources may be set around -12 to -10 dBFS, provided adequate headroom remains. These are starting points, not universal requirements.

Analog mixers use different meter references, so always understand your mixer's metering system.

3. Multiple Inputs Add Up!

When multiple audio signals are mixed together, their combined level can be higher than the level of any individual input.

For equal-level, uncorrelated signals, doubling the number of inputs increases combined average power by approximately 3 dB. That means 2 inputs add 3 dB, 4 add 6 dB, 8 add 9 dB, 16 add 12 dB, and 32 add approximately 15 dB compared with one input.

This mathematical relationship describes average power, not guaranteed peak-meter readings. Actual mix levels depend on the source material, channel fader settings, and signal correlation.

That is one reason proper input gain and bus headroom are so important.

4. Speaker Placement Matters

One of the most common problems I encounter in churches is main PA speakers positioned behind the praise and worship team.

When microphones capture sound from the PA, that sound can return through the mixer and speakers repeatedly, creating an acoustic feedback loop.

Whenever practical, position the main speakers so they provide good coverage of the congregation while minimizing sound entering open microphones. Microphone pickup patterns, speaker direction, and stage layout all matter.

You cannot always EQ your way out of poor speaker placement.

5. More Speaker Wattage Doesn't Automatically Mean Better Sound

A properly selected PA system should provide adequate coverage, intelligibility, and clean output for the room.

Speaker sensitivity, dispersion, room acoustics, and listening distance are just as important as amplifier wattage. A powerful system operated at excessive volume can make feedback and acoustic problems worse.

Before purchasing speakers, try my free [Church PA System Sizing Calculator](#) to help estimate your sound system requirements.

6. Keep Your Master Fader in Its Sweet Spot

When a sound system is properly calibrated, I prefer operating the Main L/R fader around unity, generally within approximately -5 dB to +5 dB. I call this the sweet spot.

This is a practical operating preference, not a requirement for clean audio. A fader below unity does not automatically indicate incorrect gain staging.

On digital mixers, a matrix can provide separate control of the PA output level while the Main L/R fader remains near unity. However, a matrix does not correct excessive powered-speaker input sensitivity or noise generated inside the speakers.

7. Don't Overprocess Your Audio

Modern digital mixers offer powerful EQ, compression, gates, inserts, and effects. But just because a processor is available doesn't mean it needs to be used.

Start with a good source signal. Apply EQ when necessary, compression when dynamics require control, and effects when they improve the mix.

Unnecessary processing can introduce tonal problems, pumping, excessive gain changes, and reduced clarity.

If the signal already sounds good, don't feel obligated to change it!

8. Find the Cause of Feedback

When feedback occurs, don't immediately start cutting frequencies with your EQ. First investigate microphone placement, loudspeaker positioning, stage volume, microphone pickup patterns, and overall acoustic gain.

Carefully applied EQ can improve gain-before-feedback, but aggressive cuts can also damage the natural sound of vocals and instruments. Gates are not a substitute for correcting the acoustic problem.

9. Set Your Powered Speakers Correctly

Turning powered-speaker gain controls all the way up is not automatically the correct approach.

Excessive input sensitivity can make noise more noticeable, depending on the speaker's electronics and the signal feeding it. Properly match the mixer output and speaker input sensitivity while maintaining sufficient headroom.

If the speaker's controls are difficult to reach, a matrix may provide convenient output control, but it cannot remove hiss originating inside the speaker itself.

10. Watch Your Mix Buses

Even when individual channels are operating at reasonable levels, their combined signals can create high levels on your Main L/R, subgroup, or matrix buses.

Monitor the meters at different points in your signal path. Remember that EQ boosts, compressor makeup gain, inserts, and other processing can change signal levels.

Always leave enough headroom for unexpected peaks.

11. Your Ears Are Just as Important as Your Meters

Meters help identify levels, clipping, and signal activity. They cannot tell you whether the congregation understands the words, whether the mix is balanced, or whether the music sounds natural.

Walk the room, listen from different locations, and pay attention to speech intelligibility. Good sound is measured by what people hear, not simply by what the console displays.

12. Knowledge Is More Important Than the Price Tag

A \$20,000 sound system installed and operated incorrectly can sound worse than a \$2,000 system that's properly designed, positioned, and operated.

A great sound engineer can make an inexpensive mixer sound good, but an expensive mixer cannot automatically make an inexperienced operator sound great.

Before investing in more equipment, invest some time in understanding what you already own.

Good audio engineering isn't brand-specific!

The fundamentals of great sound remain the same whether you're mixing on a \$200 analog console or a \$20,000 digital system. It's not about the name on the equipment. It's about the knowledge of the person operating it.

Need Help With Your Church Sound System?

I offer 100% free online audio training for churches in loving memory of my wife, Liz. Whether your church uses an analog or digital mixer, the goal is to help your team understand the equipment, solve problems, and mix with confidence.

You can also use my free PA sizing calculator to help plan your sound system.

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