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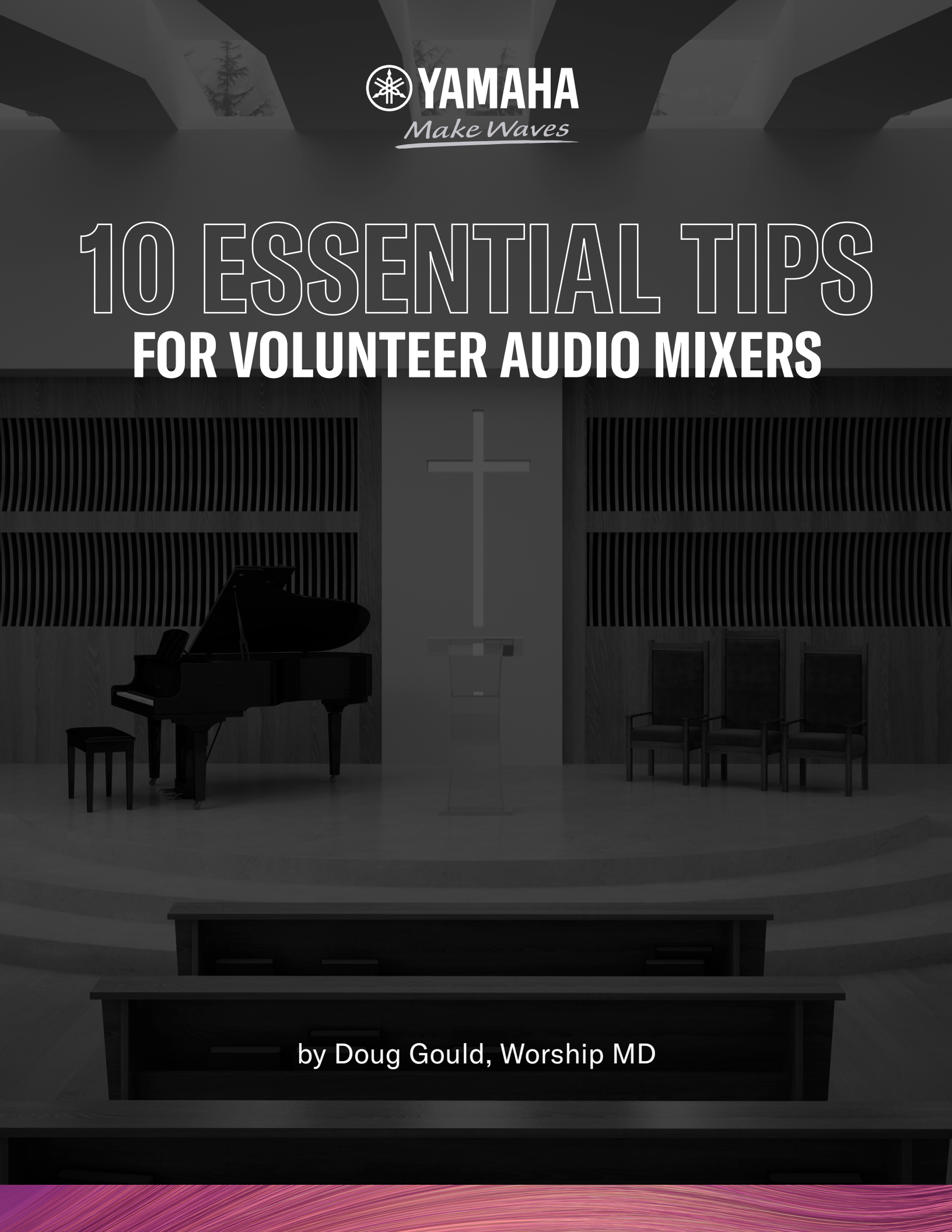
10 ESSENTIAL TIPS
FOR VOLUNTEER AUDIO MIXERS



by Doug Gould, Worship MD

ARE YOU A VOLUNTEER SOUND TECH at your church who has never professionally mixed live sound but wants to improve your skills? Here are ten practical tips that may help. These simple steps can take your mix to the next level on your journey to becoming a better audio engineer.

1. BUILD STRONG RELATIONSHIPS

Establishing strong relationships within the worship and tech teams can create significant benefits, especially when it comes to communication. For instance, imagine a situation where a guitar player or drummer, whom you don't know very well, plays louder than usual. If you were to simply tell him to turn down his amp, his response might not be very friendly. However, if you've taken the time to connect with him on a personal level and learned more about his interests and hobbies, profession and music preferences, the conversation could go like this:

You: Hey, Johnny, can I ask you for a favor?

Johnny: Sure, what do you need?

You: I was wondering if you could turn down your amp a bit. It would really help with my mix.

Johnny: Sure, no problem, I got you.

Being friends can help solve a technical problem more effectively and positively. You begin to trust one another and start to serve and help each other. Read Philippians 2:1-11, which emphasizes the importance of unity, humility and considering others before ourselves.

2. TRAIN YOUR EAR

Improve your mixing skills by training your ears. Your church may have great sound gear, but that doesn't guarantee the best results. Mixing music requires both artistic sense and technical acumen. For this reason, I firmly believe that musicians make the best techs. Why? Because they listen to music often.

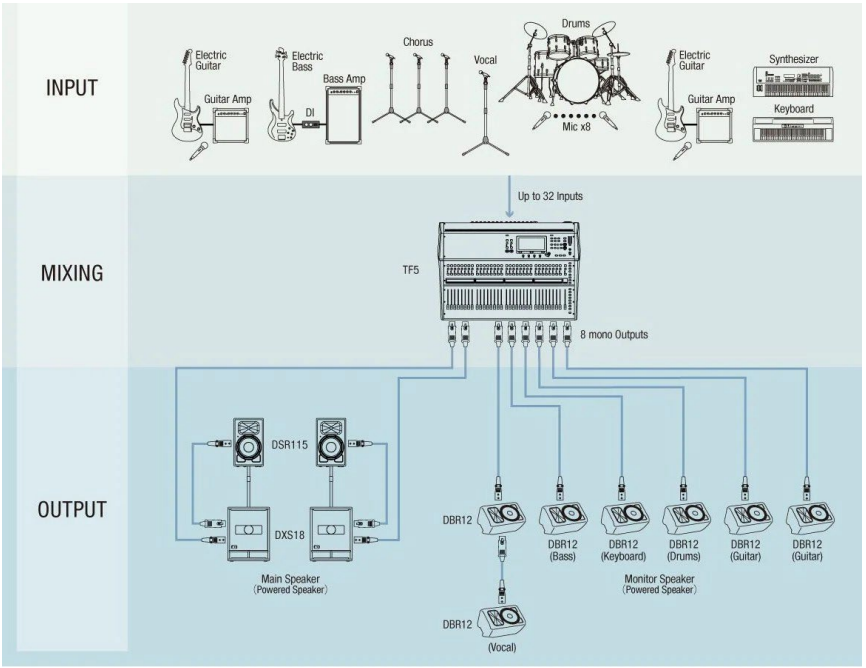
I know there are fantastic audio engineers who don't play or sing, but they love music, and that's the difference. To develop your skills, listen to music regularly, especially the same type of music as your worship leader.

Learn how to use EQ. Knowing when and where to equalize an instrument, a vocal or the loudspeakers in a room can make or break the mix. You can use affordable apps like Quiztones or HearEQ to discern the differences between pitch/frequency, tone/timbre and level. When adjusting frequencies, it's generally recommended that you cut them before boosting. Cut or turn down in a narrow range (Q) and boost a little wider swath to achieve the best sound.

Spend an hour or two each week to develop your critical listening skills, and you'll be able to distinguish a good mix from a bad one. Turn off the TV and develop your ears.

3. SIGNAL FLOW

To become a successful mixer, it's essential to have a deep understanding of your console and system signal flow. Mixing can be fun, but much of your time will be focused on troubleshooting and rooting out problems and their causes. Understanding how the audio console and other components that make up your system work will help you do this quickly and efficiently.



An excellent way to familiarize yourself with your system setup is to create a diagram of the entire system, which includes all the inputs and outputs and how the mixer is connected to other equipment. This exercise will help you gain a clear visual representation of your setup so you can quickly detect any issues that arise. A diagram is also a blessing for someone who may fill in or take over in case you're absent.

Another way to ensure your mixing experience runs smoothly is to stay organized and label your cables. Most digital consoles have "scribble strips" and the ability to assign colors beyond names and icons to show the inputs of your mix. This will help you avoid the frustration and chaos that can occur when things do not work correctly. Knowing your system inside and out lets you focus on your primary job — mixing the service.

Create backup systems in case of an emergency, and always visualize scenarios where you figure out what you would do if this or that happened. Take the manuals home and study them, but make sure to bring them back on Sunday and put them near the console for easy access. Be sure to have service providers' contact information nearby as well in case of emergency.

4. MICROPHONES

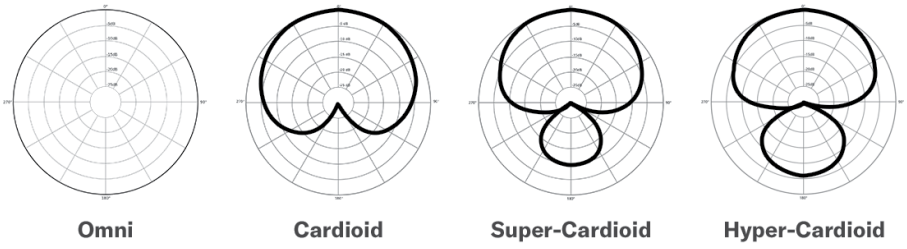
This article cannot begin to explain how critical microphones are to your mix, but knowing the basics of mics is fundamental to any great mix. Mics are the most important element after the source, and if you understand what type works best for each situation, most audio problems — including feedback — can be avoided.

Learn the types of microphones because each has strengths and weaknesses.

- Dynamics — Which can be “moving coil” or “ribbons”
- Condensers

Microphones have a pickup, or polar, pattern that dictates the most and least sensitive spots. Learn what pattern works best for your situation. The patterns include:

- Omnidirectional
- Directional — Cardioid, Super-cardioid and Hyper-cardioid
- Bi-Directional or a Figure 8



Diagrams from Wikipedia, by Galak76

In a live sound environment, you should place microphones as close to the sources as possible to prevent picking up other sounds or reflections. Take the time to find the correct mic position for each source — vocal or instrument. Moving the mic closer or farther away or angling it off-axis or straight on will affect the sound and prevent you from having to fix it at the console.

5. GAIN STRUCTURE

Gain structure — or “gain staging” — a console is the method of using the gain setting for each input channel to set up that channel’s overall peak volume. This ensures that the input is at an adequate peak volume level throughout the sound system, from where it starts to where it ends.

It’s essential to ensure that the sound level is not too quiet, which makes it hard to hear, or too loud, which can distort the sound or hurt congregants’ ears. By adjusting the peak gain level of each input, you provide a “headroom” to mix the input for your space properly. If you do this correctly, the mix will be clear and easy to listen to.

One important principle to remember is that each piece of gear in the signal chain can introduce noise or distortion if the gain level is too high or low. For example, if the input gain level of a microphone is too low, the resulting signal may be noisy and difficult to work with. Conversely, the microphone may clip or distort the signal if the gain level is too high. Once you set the gain for each source, leave it alone. You don’t want to live mix with the gain knob.

The mic pre-amp, mic sensitivity, head amp and mic gain knob are all names for the same thing, and it’s the most important control on the mixer. This is not “set to taste” but adjusted for the small amount of voltage a microphone sends to the mixer’s input channel. Microphones send millivolts to mixers at line level — or about one volt. The mixer must raise the level of the mic input signal to collaborate with it. The correct setting projects the microphone’s signal level to all the places it must go: the mains, the monitors, the stream, the foyer, the cry room … everywhere. If you

raise the mic pre-amp level during the service, you have just increased the level to every one of the mic signal's destinations. If you turn it down, you have just lowered the level of that microphone to the mains, the worship leader's in-ear mix and the live stream. When gain staging a system, you should always complete the adjustment BEFORE the rehearsal and service.

It's important to keep a consistent gain structure throughout the signal chain, from input sources to output devices. This helps ensure that the audio signal is clean, clear and free from unwanted noise or distortion and that you have perfected the overall sound quality. If you don't take the time to perfect the gain, especially with microphones, your chances of creating a great mix are slim to none.

6. SOUNDCHECK AND REHEARSAL

A sound check is a technical process that takes place before a performance to ensure that all the audio equipment — including mics, amplifiers and speakers — function correctly and the sound levels are balanced. It's usually performed by the audio engineer or the sound technician, who adjusts the sound settings and checks for

any technical issues. It ensures that the sound quality suits the venue and performance. Check out this great Paul Baloche video: How to Do a Soundcheck.

On the other hand, a rehearsal is a practice session where the worship team runs through its set to prepare for a service. It involves working on the timing, phrasing and overall delivery of the hymns, songs and choruses. Rehearsals can also include technical adjustments to the stage setup, lighting and sound cues.

We should also talk about the line check, which is when sound engineers check everything used in the service to ensure it works before the musicians arrive for the sound check.

a. Microphones and loudspeakers

b. Cables and connections

c. Instruments

d. Mixer and all the components connected to it

e. Don't forget the coffee machine

If your team has mid-week rehearsals, this is a great time to hone your technical and relational skills, which is fundamental to achieving a good mix. Rehearsals are great for the band, and you — as the sound tech — are a critical part of the band. This is the time to try new things, make friends and learn the gear.

7. HIGH PASS FILTER

A high pass filter, also known as a low cut filter, is a helpful tool found on every input channel of your mixer. It's designed to allow high frequencies to pass through while attenuating the lows. Typically, it's applied to vocal mics, guitars, snare drums, hi-hats, cymbals, strings, winds and other instruments that produce higher frequencies. Applying it to instruments that produce low frequencies, like bass guitar, kick drum, etc., isn't recommended.

The high-pass filter removes unwanted rumble, often present on stages, that can muddy the sound and make it difficult to hear individual instruments. By deleting this rumble, you improve the mix's clarity, making listening to each instrument and microphone easier. This makes the sound more polished and professional.

What would I apply a high-pass filter to? Virtually everything! This is the first step after gain staging. Click to watch How to Mix Live Music for more explanation.

So, to summarize:

a. Put the right mic in the right place

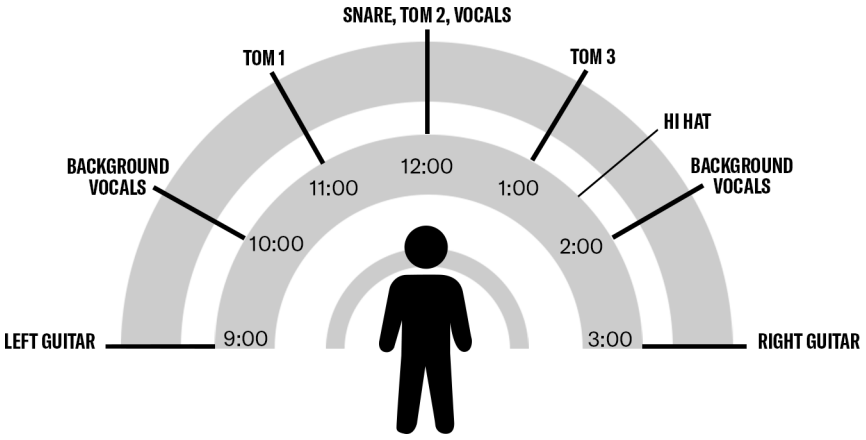
b. Set the proper gain

c. Use a hi-pass filter if needed

8. MONO VS. STEREO

When it comes to live sound reinforcement, the choice between stereo and mono depends on the space's specific needs and the sound system. In general, mono is often preferred because it ensures that the same audio signal is sent to every speaker in the sound system. This can help to avoid issues with phase cancellation or uneven coverage in the congregation's seating area. Mono can also be more practical for larger services or outdoor events, where it may not be possible to ensure that every listener is within the sweet spot of a stereo field.

However, stereo can be useful in certain live sound situations. For example, stereo can create a more immersive listening experience for smaller churches or events in a more controlled environment. In addition, stereo can help specific instruments or vocals that require spatial separation or panning, such as stereo keyboards, time-based effects, background vocals and stage plays.



For an inexperienced volunteer audio tech, mixing a mono system may be more straightforward than mixing a stereo system. This is because, in a mono system, all audio signals are combined into a single channel, making it easier to control and manage the overall mix.

On the other hand, the stereo operation may require less knowledge about equalization. For example, in a modern worship context, keyboards, guitars and vocals occupy similar midrange frequencies, making cutting frequencies from adjacent instruments necessary to avoid overpowering the vocals. In a stereo application, you may be able to prevent the issue by simply panning neighboring instruments to the left and right of the lead vocal as you see them from your position on the board. So, you could have a lead vocal, kick drum, snare and bass centered; other instruments panned to the left, and backup singers panned to the right. You have now spent less time making the elements fit together than you would have by trying to adjust their EQ settings.

9. DEALING WITH STAGE VOLUME

Achieving a balanced sound in your church will depend on controlling the overall stage volume. Prioritize setting the proper levels for the main house speakers over the stage monitors to avoid issues with the mix. Encourage performers to rely less on their floor monitors and listen more to the natural acoustics of the stage and room. This approach will help prevent excessive stage volume caused by too-loud floor monitors. To help musicians achieve a better mix while keeping their volume levels under control, ensure they stand close to their floor monitor and the speaker is aimed at their ears, not their kneecaps. The closer they are to a loudspeaker, the louder it will be. This is because of the natural law known as the inverse square law.

The inverse square law is a physical principle that says that the intensity of a phenomenon (such as light, sound or gravity) decreases in proportion to the square of the distance from the source. When it comes to sound, this means that as you move away from a sound source, the intensity of the sound decreases rapidly. Specifically, if you double the distance from the sound source, the sound intensity decreases by a factor of four (two squared). If you triple the distance, the sound intensity decreases by a factor of nine (three squared) and so on. This is why, for example, you can hear a car horn from far away, but the sound becomes fainter and fainter as the car moves farther away. The same principle applies to any sound source, whether it's a person talking, music playing, etc.

In-ear monitors, or IEMs, can help make for a much cleaner house mix. Musicians and singers often wear earphones to hear themselves and the other musicians without relying on loud floor monitors. This reduces the amount of stage volume bleeding into the main speakers and can result in a clearer sound for the audience. Additionally, with in-ear monitoring, the worship team can hear a consistent mix regardless of where they are on stage. This can help ensure a more consistent sound for the audience throughout the church space.

While it's true that churches are transitioning from floor monitors to personal monitoring, far too many of them have not realized how to use them properly or how to perfect the experience. Look for a future article on "Best Practices for In-Ear Monitoring," including:

a. How to Choose an In-Ear System

b. How to Use In-Ears

10. MIX WITH GROUPS

Mix with groups, not individual inputs. Assigning instruments to groups is a great way to simplify the mixing process and make it easier to control different mix elements. Here are five steps you can use to create groups on your mixing console:

1. Decide which instruments you want to group together. For instance, you might want to group the drum mics, guitar amps and keyboards.
2. Set up your groups in the mixing console. This usually involves selecting faders or channels and assigning them to a specific group channel on your console. Depending on your console, these are typically known as sub-groups, Digital Voltage Controlled Amplifiers (DCA) or Voltage Controlled Amplifiers (VCA).
3. Assign each instrument to its corresponding group. For example, you might assign all the drum mics to the “Drum” group, all the guitar amps to the “Guitar” group, and all the keyboard sounds to the “Keys” group.
4. Use the group faders to control the overall level of each group. If you want to bring up the drums in the chorus, you can simply adjust the fader for the “Drum” group rather than trying to adjust each individual drum mic.
5. Refine your mix by adjusting each group’s individual channel faders. For example, if you want to bring up the kick drum in the chorus, you can adjust the kick drum fader within the “Drum” group.

By using groups in your mix, you can simplify the mixing process and make it easier to control different sound elements. Mixing with fewer faders can also make keeping levels where they need to be easier and achieve a more consistent mix overall. If your mixer has limited group channels, you can mix a whole service with just two groups — one assigned to the band and the other assigned to the vocals. If the band is getting louder than the vocals, pull the band group fader down and voilà, you can hear the vocals again without having to pull down multiple faders.

IN CONCLUSION

There's a great video series from Yamaha that goes into more depth on how to mix live sound. You can watch it here: How to Mix Live Music.

I hope these tips will help you. There's much to learn about live audio mixing, which will take time. That doesn't mean you can't have fun and enjoy the experience!

ABOUT THE AUTHOR

Doug Gould is the CEO and Founder of Worship MD and has been a Pro Audio and Music Technology industry veteran for nearly 30 years, serving in management roles at Shure, Tascam and E-Mu Systems. Doug has served as a worship leader, musician and sound tech at various churches throughout his career.

Over the last 18 years, Doug has been a very effective presenter at hundreds of worship conferences throughout North America and beyond, focusing his experience on consulting and teaching.

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