

Fundamental Techniques for Sound Checks and Mixing

by

Greg Sedlak

of

Revelation Sound

Sound Check

A full sound check should be done with the worship team when ever changes have been made to the sound system or worship team. Or if you are experiencing problems with feedback, sound quality or worship team volume.

You need to adjust the volume and tone of each instrument one at a time using the following procedure:

- **Set the channel fader, main fader and subgroups to 0 dB,**
- **Mute all of the other channels**
- **Turn the channel gain and monitor send all the way down (full counter clockwise).**
- **Un-mute the first vocal or instrument and press the solo button.** The solo button allows you to listen to individual channels and shows their level on the output meters.
- **Increase the channel gain until the vocal or instrument level is around 0dB on the meter. If the volume in the sanctuary is too loud than lower the main fader.**
- **Slowly turn up the monitor aux send, asking the musician to signal you when the volume level is good in their monitor.**
- **Evaluate the sound quality and make adjustments to the channel equalizer if necessary.**
 - Does it sound harsh?
 - Does it sound muddy and unclear?
 - Does it sound boomy?
 - Do any notes stick out?
 - Does it sound good the way it is?

Equalization:

Corrective equalization:

Using the channel equalizer to compensate for microphone response and instrument sound quality is called **corrective equalization**. Corrective equalization is cutting prominent or harsh frequencies to obtain a natural sound. When mixing live sound you want to avoid boosting frequencies on vocals and microphoned instruments. Boosting frequencies can cause feedback or excess distortion. You should always try reducing what there is too much of before you boost any frequencies.

For example if you want more bass and highs try reducing the mid range instead of boosting the highs and bass. This will prevent over driving the filters and feedback.

Most audio mixers have a three band equalizer on every channel. A high pass filter, low pass filter, and one band pass bass filter. The high pass filter is for adjustment of high frequencies generally 10 KHz and above. The low pass filter is for low frequency adjustment generally 100 Hz and below. The band pass filter is usually adjustable in frequency between 10 KHz and 100 Hz.

Low Cut Filter:

Mixers also have a low cut filter which starts at 80Hz or 100Hz. This is a very important tool for the audio engineer. The low cut filter should be used on all inputs which do not produce low bass (ie. acoustic guitar and vocals). This prevents low frequency feedback, reduces microphone handling noise and wind noise.

The method for reducing prominent tones, harsh tones or feedback is as follows:

- Determine if the frequency is high, midrange or low bass in order to choose the correct filter.
- High or low frequencies reduce the high pass or low pass filter until you hear the tone diminish or the instrument sounds balance.
- Midrange frequencies

Corrective equalization (continued):

- **Set the mid frequency on the channel at the highest frequency if the tone is high or to the lowest frequency if the tone is low.**
- **Set the midrange equalizer on the channel to - 6 dB.**
- **Turn the mid frequency knob until you hear the tone diminish.**
- **Adjust the amount of cut for the most natural sound.** If the frequency is beyond the mid range use the high or low equalizer to reduce the tone.

The channel equalizer is a broadband filter so you have to compromise between reducing prominent or harsh tones and maintaining a full sounding instrument or vocal.

Equalization for effect:

Another method of equalization is **equalization for effect** where tone of the instrument is adjusted to fit the style of the music. Equalization for effect involves finding a sweet spot of an instrument and boosting it to give it a unique sound. For example if you are mixing rock music you may want to boost the upper midrange for a slappy bass or kick drum sound.

Some times the upper midrange of a vocal or guitar is boosted to improve clarity. This is sometimes referred to as cutting through the mix. Since most vocal microphones have a built in mid frequency boost this is usually only necessary in rooms with poor acoustics or with a system that has poor sound quality.

When using equalization for effect you need to be careful. When you are boosting frequencies you can make the instrument or vocal sound worse, increase noise, cause distortion or cause feedback.

Although sound engineers use a combination of both methods **corrective equalization is one of the most important tools of a sound engineer.** For contemporary worship music you want a more mellow natural sound so I recommend using corrective equalization most of the time. I also

Corrective equalization (continued):

recommend that equalization be done during practice and not the service to avoid any feedback or distraction.

In order to develop an ear for the natural sound of an instrument or voice you should listen to them without amplification. This is very helpful for equalizing worship and the pastor's voice. If there are problems with the instruments' natural tone then try to make adjustments to the instrument. For example drums may need to be retuned or dampened, the tone of an electric guitar amp may need to be adjusted, etc.

With an accurate sound system and quality instruments, channel equalization should be minimal. When the response of the system is inaccurate or an instrument has poor sound quality more equalization will be necessary. I recommend moderate equalization to be on the safe side. Learning how to equalize takes a lot of practice and trial and error.

Tips for setting the channel equalizer:

Always use low cut filter on vocals and acoustic and electric guitar

<u>Sound</u>	<u>Frequency</u>
Sizzle, S's	Cut High frequency
Harsh, sharp	Cut 3K
Hard	Cut 1K
Muddy, unclear	Cut 250Hz
Boomy	Cut Low frequency
Dull, unclear	Boost 3K
Soft	Boost 1K
Thin	Boost 250Hz

Mixing Live Sound

Pick Out Every Instrument and Vocal:

The key to mixing is being able to **pick out every instrument and vocal** in the mix. In order to do this you need to know what each individual vocalist and instrument sounds like.

The best way to achieve this is to “**solo**” each instrument and vocal individually and listen to them in the headphones. To balance groups of vocals or instruments you should use the channel solos (PFL’s). Solo all the vocals or instruments, bringing them in one at a time and adjusting their fader levels appropriately until they are all equal. All vocals and instrument should be mixed evenly with the exception of lead vocals and instruments, which should be slightly louder.

If the fader setting for one of the inputs is less than -10 dB or more than +10 dB, then adjust the channel gain accordingly.

Keep Your Eyes on the Worship Team:

You should watch the band for solos, instrument changes, signals about the monitors and who is singing or playing during a song. If the musician is not performing during that song you should mute their microphone or instrument to minimize background noise and feedback. If you watch the band carefully you can avoid a lot of mistakes. As a sound person you are part of the worship team and you’re there to serve. It is easy to start worshiping, and get distracted. As a soundman you need to pay attention and perform your ministry.

Monitor Mix:

Most churches have between 2-4 monitor mixes for the worship team. Individual mixes are used to give worship team members only what they need to here. Monitor mixes can be divided up any way that best suits the worship team. For example worship leader mix, vocal mix, drum mix, instrument mix. Each mix is then tailored to that specific group or individual.

The monitor mix can be adjusted by pressing the solo button on the monitor aux send and listening to the mix in the headphones, or by asking the band about the monitor mix after the first couple songs during practice and making adjustments.

Do not adjust the monitor mix during the service unless you are signaled by a worship team member or an instrument or vocal is too loud. The headphones may not accurately reflect what the worship team is hearing. Changing the mix during the service can be very distracting to the worship team. If an instrument or vocal is too loud in the monitors and affecting the house mix than solo the monitor mix and adjust it accordingly. If the monitor mix is too loud and overpowering the house mix than you can turn down the monitor mix.

Worship Volume:

Once you get a good mix you then need to decide the **appropriate volume** level for the sanctuary. The congregation is your background vocals or choir and is part of the mix. The worship team should be loud enough to be heard clearly, but not so loud that they drown out the congregation worshipping.

If the worship team is **too loud** or too soft, it hinders the congregation from worshipping. If members of the congregation cannot hear themselves singing or become out of breathe trying to sing they won't sing.

If the worship volume is **too low** members of the congregation might feel self conscious about singing. Exceptions to this are special music played or performed for the congregation.

If the volume of the **worship team is too loud** and cannot be brought down, then modifications to the sound system, stage area or monitors system need to be made.

Stage Monitors and Instrument Amplifier

Monitors And Amplifiers Should Face The Musicians:

Amplifiers or stage monitors need to be positioned so they can be heard clearly by the musician. Instrument amplifiers and stage monitors should always be positioned so they are pointed towards the musicians head. They should be position in front of the musician or directly to the side to minimize there coverage of the audience area and prevent feedback

Pastors Volume:

The pastor's volume should be loud enough that they can be heard clearly throughout the sanctuary. If the pastor's volume is too low people may not hear parts of the message or may not pay attention. If the pastor's volume is too loud people may get fatigued. If there is a situation where the pastor's volume is loud, but the message is hard to understand then modifications need to be made to the sound system or sanctuary to improve intelligibility. Intelligibility is the ability to understand speech. The main factors effecting intelligibility are reverb time, echo and frequency response in the room.

Microphone Types and Positioning:

There are two types of microphones - dynamic and condenser. There are three types of pick up patterns - cardioid, hypercardioid and omni directional.

Dynamic microphones have a diaphragm that generates a small voltage when it vibrates, which is amplified by the mixer. These microphones are made for close range micing of vocals and instruments, 2-6 inch from the source.

Condenser microphones also have a diaphragm that vibrates, but have a pre amp to boost the signal to the mixer. These microphones are much more sensitive and offer better sound quality. They can be used for close range and distance micing of vocals and instruments. They can be used to mic choirs or groups of singers from 2-3 feet away.

Omni directional microphones pick up sound all the way around the microphone; this makes them susceptible to feedback and not useful for live sound reinforcement.

Cardioid microphones have a controlled, cone shaped pick up pattern in front of the microphone making them ideal for sound reinforcement.

Hyper cardioid microphones have a controlled pick up pattern which is even narrower than the cardioids making them ideal for highly reverberant rooms or situations where feedback is a problem.

Direction for Worship Team Members

No Practice No Play:

If a vocalist or musician is not at practice they should not be there on Sunday morning. There is no time to adjust monitor and main levels before the service. Making these adjustments during the service can cause feedback or distract the sound person from mixing the rest of the worship team.

Always Use The Same Microphone:

Worship team members should always use the same microphone for singing during practice and during the service. If they do not sing during the practice then they should not sing during the service. Changes during the service can cause confusion and create sound problems.

Monitor Adjustments:

If a member of the worship team needs something in the monitor they should signal the sound person as clearly as they can with out being distracting to the congregation. Work out signals with the sound person ahead of time and have the whole worship team use the same signals to be consistent.

Bio for Greg Sedlak:

- Accepted the Lord in 1989
- Started mixing church sound and mixing sound for special events in 1990
- Graduated from RIT with Bachelors in Engineering Technology in 1993
- Founded Revelation Sound in 1995, a company which specializes in church sound system and acoustical design.

Contact Information:

Revelation Sound
344 East Manitou Rd.
Hilton, NY 14468
585-392-1900
www.revelationsound.us