The SOUND OF WORSHIP
SOUND ADVICE FOR TODAY'S HOUSE OF WORSHIP — Spring 2007

Attention Secretary, PLEASE ROUTE TO:

- ❑ Sound Operator
- ❑ Pastor
- ❑ Music Minister
- ❑ Other_____
- ❑ Save for the Sound Operator Manual

A newsletter for anyone who wants to learn about sound!

Advanced A/V Technologies
P.O. Box 1793 • Sulphur, LA 70664
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Presented by

Advanced A/V Technologies
A Quality Audio/Video Experience

P.O. Box 1793
Sulphur, LA 70664
(337) 527-1001
www.advancedav.biz

Proper Microphone Use for the Church Choir

There are many reasons why a choir or large vocal group would need to use microphones. Perhaps the service or concert is being recorded or videotaped. Maybe the church is too dead acoustically, the room is large, or the choir is small and the choir needs a little extra help to produce a big choral sound. Whatever the reason, you've decided you need to add some microphones. But what type? How many? And where should you place them?

Type of Microphone

The choir microphone must be able to pick up voices at 6 to 10 feet from the microphone. It must be very sensitive. A condenser microphone is usually preferred since it can have a 10 to 15 dB higher output level over a dynamic microphone. This means your mixer preamplifier electronics will not have to provide as much gain or amplification in order to obtain a sufficient volume. The result is a higher signal-to-noise ratio (a lower hiss or noise) and better dynamic range.

Flat Frequency Response

Another important quality for a choir microphone is a flat frequency response. The microphone should pick up all the audio frequencies at the same volume. Many microphones have their low frequencies intentionally rolled-off (less sensitive). A typical example

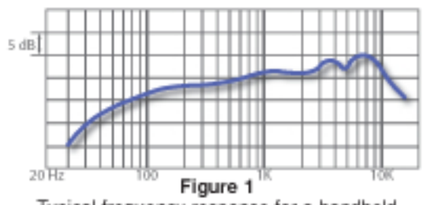

Figure 1
Typical frequency response for a handheld microphone

is shown in Figure 1. It is designed to be used close to the mouth. Notice in Figure 1 how the bass is rolled off starting at about 400 Hz. That frequency is about "middle A." The fundamental frequencies of male voices are below this frequency. When this microphone is used at a distance, it will sound quite thin or tinny because of its reduced bass pick-up. However, when it is used up close, it will sound much better due to the bass boost that is caused by the proximity effect (Figure 2).

A microphone that is designed for distance will have a flat response and will reproduce a very natural sound. See Figure 3 for a good example.

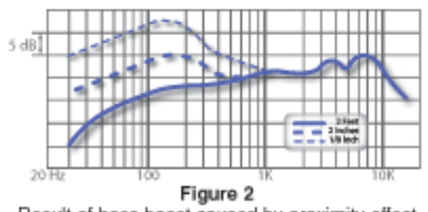

Figure 2
Result of bass boost caused by proximity effect

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2 A good rule-of-thumb for selecting the correct number of microphones for a choir.

3 Take advantage of your mixer's Subgroups.

For Further Information

Phone:
(337) 527-1001
(337) 513-9646

Website:
www.advancedav.biz

Email:
aavtinfo@yahoo.com

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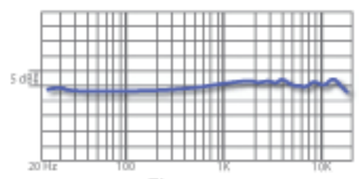

Figure 3
Typical frequency response for a distance microphone

Another very important thing to look at is the off-axis frequency response (the response from the sides and the rear of the microphone). The gain-before-feedback and the overall sound are greatly affected by how smooth or even the off-axis response is. Gain-before-feedback is the maximum

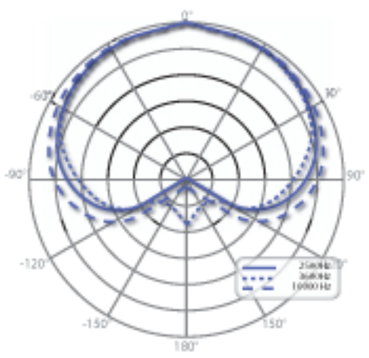

Figure 4
Very even off-axis frequency response

amplification of the sound before the sound system goes into feedback and starts squealing. The polar graphs of the microphone will give a good idea of its response. Figure 4 shows a

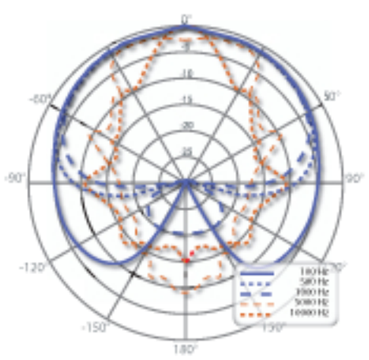

Figure 5
Frequency response of a microphone with off-axis coloration

microphone that has a very even off-axis response. The sound this microphone picks up at the sides is very similar to the on-axis (the front) except it is lower in volume. It has very little off-axis frequency coloration. Figure 5 shows another type of microphone that has very poor off-axis frequency response.

Cardioid Pattern Microphone

In most cases, a cardioid pattern (directional) will produce more gain-before-feedback than an omnidirectional microphone. The cardioid pattern can also be used to reduce the pick-up of a band or the audience noises.

Figure 6
The 3-to-1 Rule

Quantity of Microphones

Many factors must be taken into account, such as choir size and arrangement. One important rule is the 3-to-1 Rule (Figure 6). That is, the distance from one microphone to the next must be at least three times the distance the first microphone is from its source of sound. This will assure minimum interaction. If the choir is to be amplified, then gain-before-feedback is always a major concern. Always use the least number of microphones possible. Every time the number of microphones that are on doubles, the volume before feedback will drop 3 dB. Adding more microphones will not necessarily mean you will be able to get the choir louder. You must first move the microphones closer to the choir so the sound level reaching the microphones is louder and so the 3-to-1 Rule" is not violated. Of course, you now start picking up more of the individual voices, so the choir members may have to be shifted to provide a better balance. A good rule of thumb is to employ one microphone for about 25 people. Don't forget—in audio, less is often better.

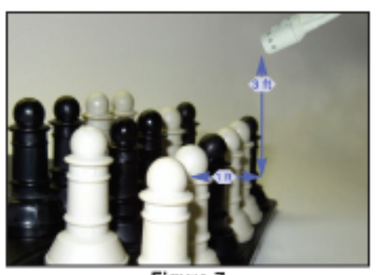

Figure 7
Position the microphone one foot in front and three feet above the front row

Microphone Position

Figure 7 shows a formula that is very effective for up to three rows of singers. The microphones are one foot in front of the first row and 24 to 36 inches over the heads of people in the first row. The microphones are then pointed at the heads of people in the back row. This technique takes advantage of the microphone's cardioid pattern. People in the back row sing directly into the microphone's most sensitive sides (front, on-axis). The front row singers are closer to the microphone but they are also further off-axis so the microphone is less sensitive. Therefore, the microphone picks up the front and back row voices at about the same volume.

Choir microphones can be set up on microphone stands with booms or installed to hang from the ceiling depending on your visual and portability needs.

Many factors must be considered in selecting a microphone for each particular choir application. Please feel free to call and we will be glad to help answer your questions.

■ *Ron Huisinga*

TECH TALK
Exploring Your Mixer's SUBGROUPS

If you are exploring a new mixer for your sound system, you will likely find some faders on that glossy brochure picture that are labeled "subgroups." Or if you recently purchased a mixer, it is likely you have discovered four or eight faders that have different colored knobs from the rest of the faders. Unfortunately, many sound techs do not know what to do with those faders and they often sit unused. Let's discover how to use the subgroups. The new knowledge can help you create better sound.

Let's break down the name. A subgroup is formed when two or more signal channels on the mixer (the group) are combined together and the volume of the selected channels are controlled by a single control called the subgroup fader. The subgroup is often composed of similar sources. For example, a quartet is scheduled to sing and they want to use four handheld microphones. During rehearsal, the positions of the four channel faders are fine-tuned to achieve a perfect balance. But after a careful listen, you decide the overall volume needs to be decreased. Now you try to position your fingers on the four faders that unfortunately are not next to each other. After moving the channel faders down, you realize the previous great mix is now a mess and you have to start over.

There is a great solution to the problem. With subgroups, you can now assign those four microphones to Subgroup 1. Now, with just one control, you can adjust the overall volume of the quartet. You can use the same techniques with the instruments. Perhaps the guitars and bass are assigned to Subgroup 2. The drum microphones are routed to Subgroup 3 and the piano and keyboard are sent to Subgroup 4. Now, with only a few faders, you can easily control the overall balance of the mix. As the number of microphones for vocalist and instruments grows, the sound tech will really appreciate the level of control that subgroups can provide. Most mixers now have at least four subgroups. Step-up mixers will have 8 or more subgroups.

Let's explore the four-subgroup mixer and learn the correct way to "map" the individual channels to a subgroup. Look at Channel 16's fader in Figure 8. On most mixers, you will see three buttons that are positioned next to their corresponding channel. They are often called the channel assign buttons. The top button is labeled "1-2", the middle button is "3-4" and the lowest button is "L-R". These are the buttons that determine which "road" the signal will travel on its way to the mixer's output and to your loudspeakers. Before we look at each "road," it should be mentioned that normally only one button (or road) should be selected.

In Channel 16, the "1-2" button is depressed.

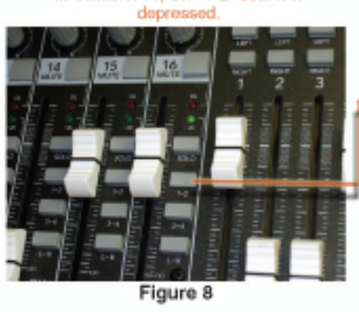

Figure 8

Because the Pan knob is rotated counter-clockwise, the channel is assigned to Subgroup 1.

Figure 9

If the subgroups are not being used, the normal method is to push (select) the "L-R" button. The signal on Channel 16 is then routed to the mixer's Left or Right Master fader (or Mono) and out of the mixer to the sound system amplifiers and loudspeakers. In fact, if no button is selected, the signal cannot get out of the mixer. This would be one of the first things to check if you can't get a microphone to work.

Now let's assign Channel 16 to Subgroup 1. First, make sure the "L-R" button is not pushed down. Then push the "1-2" button. We have now assigned Channel 16 to either Subgroup 1 or Subgroup 2. Adjustment of the Pan control is the next step to get our signal to Subgroup 1. Rotate the Pan control to its odd side or fully counter-clockwise (CCW). This will route our signal to Subgroup 1 (Figure 9). Similarly, rotating the Pan control to the right (clockwise) will route the signal to Subgroup 2.

Sending or assigning Channel 16 to Subgroups 3 or 4 is done in exactly the same way except the "3-4" button is pushed down instead of the "1-2" button. Similarly, Subgroup 3 is selected by rotating the Pan control CCW and Subgroup 4 is with the Pan fully CW.

The outputs of the subgroup faders are normally routed to the mixer's master faders and on to the rest of the sound system.

If you haven't used your subgroups, take some time to explore. You may find it is a very rewarding adventure.

■ *Ron Huisinga*