

APPENDIX IV

Sweet Adelines Microphone and Sound System Guidelines

This document establishes a common source of microphone and sound system guidelines for the members of the Sweet Adelines. These guidelines provide:

- A level of understanding and confidence for discussing microphone and sound system requirements for quartets and chorus groups with venue and contract sound engineers. You will know why to ask for specific equipment and setups as well as what to ask for.
- A consistent microphone and system design technique to be used at local, area, and district level events.

The Microphone

The beginning of the sound system chain is the microphone. No sound system can make up for poor microphones, and no show—whether it is held in the local grange hall or on the international championship competition stage—will provide a fair representation of the talents of the performers to the audience without good microphones.

Microphone Recommendations

Any reasonably large city will have an audio rental company that will provide - via UPS if necessary - rental microphones of studio quality. Rental rates vary, but you can expect to pay between ten and twenty dollars per microphone per day of usage. You do not pay for the time during which the microphones are in transit, only when they are in use.

The following lists provide the names of commonly available small diaphragm cardioid condenser microphones, which are suitable for use with both quartets and choruses. We do not recommend large diaphragm condenser microphones - the choice for vocal recording - for Sweet Adelines events. When floor monitor speakers are used at the singing position, the typical loss of pattern control at low frequencies in these microphones results in feedback. In simple terminology, the monitor is picked up by the microphones and re-amplified; causing what is known as feedback. Small diaphragm microphones provide better low frequency pattern control and therefore can be used successfully with floor monitor speakers.

Recommended Microphones

“A” List	“B” List
Sennheiser MKH 40	AKGC391B
Audio-Technica 4051a	AKG C460-CK61 or 480-CK61
Audio-Technica 401a	AKG C460-CK61 or 480-CK61
Schoeps MK4	AKG C451E
Neumann KM140	Shure SM81
Neumann KM 84	
Neumann KM 184	

Quartet Microphone Setup

A pair of the same microphones, such as two Sennheiser MKH40's, should be mounted to a single mic stand using a device called a “stereo bar.” A stereo bar is a simple flat bar that attaches at the center of a standard mic stand and has a slug at each end for attaching a standard mic clip to the bar. Microphones attached in such a manner can then be aimed by adjusting the clips to point the capsules in relationship to the performers.

Choosing a Mic Stand

If the stage is a permanent one, we recommend an Atlas Soundolier MS25 stand with a boom attachment. This is a heavy-duty stand with a tripod-shaped heavyweight cast iron base. It is capable of supporting the microphones on a boom without additional weights to hold the stand in place. The boom attachment places the vertical portion of the stand out of the way of hand gestures by the performers. Straw hats, canes, and other props have a knack for finding their way against a mic stand.

If the stage is a temporary one, we recommend an Atlas Soundolier BS36 stand placed on the solid floor in front of the stage, weighted if necessary, and extended to place the microphones on a boom at stage height. You have seen this method used for the past several years at Internationals. It keeps the stage noises caused by performer movement from being picked up mechanically through the stand.

Aligning the Microphones

The microphones should be at mid-chest height for a “standard” five and a half foot tall barbershop singer or higher. The microphones should be adjusted so the **capsules** are at the same point in space, perfectly aligned vertically with one atop the other, and as close as possible without the microphone bodies touching each other. Since you can actually see the capsules on most of the microphones we recommend, this should be easily accomplished before placing the windscreens on the mics.

When viewed from the top, looking down at the mics, the capsules should create a pickup radius of about 180 degrees horizontally. So, if you begin with the capsules 90 degrees to each other and increase that angle by moving the capsules another 15 degrees each, you should be close to correct. The capsules should appear to crossfire and aim at quartet singing positions one and four. Only mic-tests, which are described later, will confirm the accuracy of the alignment.

Marking the Toe-Line Radius

The next essential step—critical in competition but proper for shows as well - is to mark a standard radius on the floor that the performers are not allowed to cross. This “toe-line” radius should be approximately 36 inches from the center point of the microphone setup. Mark the floor with white tape or some other highly visible method that the performers will be able to see even with stage lights in their eyes.

Placing the Floor Monitor Speakers

Floor monitor speakers should be placed behind the microphones, between the lip of the stage and the rear of the microphone array. Place the speakers as close to the vertical mic stand as possible, and angled out to face the performers. One speaker should serve performers one and two, and the other should serve performers three and four.

The speakers should project sound toward the least sensitive area of the microphone pattern. With cardioid microphones, the least sensitive area is the backside of the capsule; therefore, you would aim the speakers at the tail of those microphones. Slight adjustments may be necessary to find the best sound gain before feedback, but generally this location will serve the needs of the performers. Adjustment of monitor EQ will be necessary to maximize the available gain before feedback.

Testing the Microphones

The off-axis pattern variations of the microphones are sufficiently different to require the following steps, although the setup may appear to match the preceding instructions. Perform the following steps to test the microphones:

1. A single person, a *talker*, should alternately stand at quartet singing positions one and four, speaking directly on axis to each other microphones, while the sound system operator adjusts the signal levels to match when heard in the house speakers. An appointed *listener* should be in the house to confirm this matching process.
2. The talker should stand exactly between the microphones and, while speaking, move his head within a one-foot side-to-side distance to assure that no coloration of the sound occurs between the pickup of the two microphones. This sound variation is caused by “phasing,” which is a time domain problem between the two capsules.

To fix a phasing problem, move one microphone along its own axis, in towards the other microphone or out away from the other microphone, until no “seam” in the coverage area can be discerned. It is important to retain the angle of the capsules to each other and move only the relationship of the capsules in the horizontal plane. The mechanical center between two microphones and the acoustical center between them may not be the same due to the physical makeup and construction of the particular microphone model. This is a result of construction techniques employed to tune the pickup pattern to the manufacturer’s design criteria.

3. Confirm that this pair of microphones picks up all four voices with equal level. The talker should speak into the mics while moving around the toe line through the four singing positions. The listener should perceive no apparent level difference for those four positions.

To verify the mic levels:

4. If the two outside singers appear to be louder than the two center singers, reduce the angle of the mics from the 110-120 degree setup to a setup closer to 90 degrees.
5. If the center singers are too loud, increase the angle of the mics beyond the 120-degree point. This is a subtle adjustment. A couple of degrees will make a difference. Be sure to recheck the center pickup point if you have to make this change.

Proper setup and testing will result in a microphone array that will provide an accurate and sonically awesome representation of the quartet’s barbershop sound that will both interface with a mono sound reinforcement system and also provide an excellent stereo pickup for recording.

Quartet Sound System Setup

We recommend that you bring a quartet or chorus recording with which you are very familiar to the venue and play it back over the system. To adjust the sound system, perform the following steps:

1. Walk throughout the seating areas and listen to how the system reproduces the music. This procedure is also advisable for selecting a venue for a barbershop performance.

2. After comparing the sound of the recording as you know it sounds, to how the music sounds in the hall, ask the sound system operator to make any necessary equalization adjustments - bass and treble control changes - on the CD input modules of the mix console until the recording sounds correct. Explain to the system operator that you want the live show sound to have the same tonal qualities as the recording.
3. Find a willing and capable quartet to test the mics. Have them take the marked positions and sing while you and the system operator fine tune the sound. Take your time doing this. Do not rush the process. Make small adjustments until you are satisfied.
4. Make it clear to all concerned that the system is not to be further adjusted by anyone before show time except upon request of the panel chair. Final system tuning is best done when the hall is full, as described next.
5. When the audience is in place, you may find that the overall sound level control will have to be increased to compensate for the changes in acoustics that result from the hall being full of people. Small changes in equalization may also be necessary.
6. The final tuning will be done during the inspection under the supervision of the panel chair. This cooperative effort should assure that the panel will accept the competition mic-tester performance with little or no request for further adjustment of the sound system.

Chorus Microphone Setup and Sound System Tips

The microphones listed earlier in this document also can be used for reinforcement of a chorus.

Placing the Chorus Microphones

Three to five microphones should be used, depending on the size of the chorus. These mics should be hung six to eight feet in front of the front edge of the first riser step, and in an arc matching that of the risers. The axis of the microphone should be aimed down at the mouths of singers on the middle row of risers.

When choruses perform all or a portion of a selection off the risers, we recommend that microphones designed to be placed on a flat horizontal surface, such as the Crown PCC 160, be used at the lip of a stage. For example, when choreography is part of the stage presentation, these microphones will assist in retaining the full choral sound while the group is away from their riser positions. Place three microphones at the lip of the stage, one in the center and two others spaced eight feet on each side of center, all three placed eighteen inches upstage from the lip.

Floor microphones are used only if microphones cannot be suspended. Two or three are placed on boom-type stands in the pit with their levels set equally. Floor microphones often pick up noise of foot movement and may distort the audience and recording sound.

Final approval for the use of sound amplification rests with the panel chair. If she determines during the on-site inspections or mic-testing performances that amplification is excessive or that it interferes with the panel's evaluation of the contestant performances, she has the prerogative to request that the gain be lowered or that amplification not be used. The sound technician should be instructed that once the sound system has been approved by the panel chair, no changes are to be made except as authorized by her.

Testing the Chorus Microphones

Follow the same guidelines as for the Quartet Microphone Setup.

1. Make sure that a talker walks the risers from end to end while a listener helps the sound operator adjust the microphone levels until they are matched in the house.
2. Listen to a known CD source and adjust the sound in the house so the sound system operators knows your goal for finished sound.
3. Proceed with a thorough sound check with a mic-testing chorus. Take the time to make the adjustments required.