

84



DON BARBER

SOUND & LIGHTING

SOUND SYSTEM BASICS

My golden rule of live sound is to present the intent of the performer to the audience present. The sound should be suitable to that which the performer or speaker is presenting and it must be represented to the number of people in attendance at the given location. It must also fulfill the expectations of the particular audience with a mind to their age and sensibilities. The sound that would suitably represent a church sermon to a congregation of 300 people would not be suitable for a reggae band at a street festival, which would not be suitable for a jazz combo in a club, etc.

The kind and amount of equipment, its placement and operation will all vary depending on the source of the sound and the area and audience that it must cover.

There are four reasons sound systems do not work or are unsuitable:

- (1) Choosing the wrong equipment. Whether it's too big or too small, doesn't match properly with the rest of the equipment or is just plain bad, the equipment must suit the task it is required to do. (Despite this, a good operator will make any equipment sound as good as it can.)
- (2) Improper installation. Miswiring or bad speaker placement are the two most common problem areas in setting up a system. There is usually only one way to install a system properly. There are lots of wrong ways.
- (3) Operator error. Most bad sound systems are usually just way too loud, are operated beyond the capabilities of the equipment, have too much noise, hum, too many effects and are overloading and distorting at some point in the system chain. A lot of people just don't seem to know what clean sound is.
- (4) Improper maintenance, bad patch cables, improper packaging which provides no protection to the gear and loose things, like screws and speakers which cause all sorts of noises until something breaks.

All of these problems can really be chalked up to operator error or ignorance. Again I must stress the critical role of the sound engineer.

Rules to Work By

Amplifiers: On last, off first. If you turn mixers and electronics on or off while your amplifiers are on you will get a very loud report from your speakers that you are doing them damage. Don't drive amplifiers past clipping. It sounds awful and is very hard on speakers and amps.

Horns & Tweeters: To save your expensive diaphragms from dying, avoid feedback like the plague. Use a fuse - $P = I^2R$ Power (in watts) = Fuse Value (amps)² x impedance of driver. E.G. 1/2 amp fuse 16 ohm driver: $(1.5 \times 1.5) \times 16 =$ Power = 2.25 x 16 = 38 watts.

Remember it's always safer to underrate the fuse. They do not blow Instantaneously. One and a half

amps would be a good value for a 50 watt 16 ohm driver. (Use a capacitor in line to eliminate bass from accidentally getting at your drivers.) Hums & Buzzes: They are usually caused by faulty cables and connectors or by ground loops. If the ground has a number of sources it can create a signal path which will in turn induce noise into the audio signal path. A/C ground loops cause hum; plug your mixer into the same ground source as your amplifiers.

If you must lift ground, use an adaptor - do not cut groundpins. Not only is it dangerous but proper grounding gets rid of noise more often than it causes it.

Never never lift the ground on your mixer. It is the first ground source for the microphones and is critical for avoiding shocks and literally, death among musicians. High frequency oscillation is often a ground loop between the mixer and the out-board electronics and amps. Keep a supply of in-line electronic ground lifters and balancing transformers which will provide isolation against such noises getting through the signal path, (similar in effect to the ground lift switch on a direct box)

The Essential Tools

Besides screwdrivers and pliers etc. the most valuable tool you can have is a circuit continuity tester. It's basically two pen light batteries with a light bulb and probe on one end and a wire lead off the other. Placed across the terminals, a speaker will click if it's good. (This won't really tell you if the speaker is rubbing.) You can also check fuses, cables and lamps - very handy and only a few dollars.

An A/C checker is a cheap way to ensure your power is OK, in phase and has a good ground. A meter will do all these functions and more but they're more expensive and they're no good if you don't know how to use them. I've encountered so many guys who futz around trying to figure out how their meter works when all you want to know is if there's power or whether a cable's shorted or good.

Carry lots of patch cables and adaptors (make sure they work) from everything to everything.

A Last Word for Thought

To all you potential sound techs and engineers: How many studios are there and how many people do they employ? How many bands, bars, discos and music and paging systems are there? Where do you think some training and experience is more likely to get you some work?

From a seminar given at the Canadian Music Show, 1984



As vice-president of Westbury Sound and president of Select Concert Products Inc., Don Barber has been studying sound systems since 1973. also studied theatre at Queen's