SOUND & LIGHTING

SOUND SYSTEMS CLASS 101

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While reading Brian Harris' Keyboards column in the February issue of *Canadian Musician*, it occurred to me that most articles and columns are written with the assumption that the reader has a basic knowledge and understanding and is versed in a vocabulary of terms pertaining to the specific topic under discussion. I pride myself in my ability to observe the obvious.

These assumptions of common knowledge are necessary simply because it would be too tedious to have to redefine every term and to reiterate all the required background information on any given subject.

Obviously there are a lot of readers, and more importantly, potential readers who are not versed in the fundamentals and basic principles of sound systems.

I thought it would be helpful to try to establish the basics of a sound system by starting at the beginning and working through the whole mess to the end.

Since my particular interests are in live sound reinforcement and amplification, I won't be dealing with the other areas of broadcast sound, public address, recording, playback systems or instrument systems, at least initially.

I will try to establish certain basics and fundamentals in the easiest terms I can in the hopes of dispelling as much confusion as possible about the nature of sound reinforcement and the equipment that it involves.

Consider this to be Live P. A. Class 101.

The first major function of a sound system is to enable a number of listeners to hear an instrument or voice or a number of instruments and voices which could not be heard acoustically that is through the natural transmission of sound waves.

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This requirement exists for several reasons:

1. The sound source is very quiet; it has a low output level.

2. The distance between the sound source and the listener is too great for the acoustic sound waves to be heard by the human ear, which is what most of us are equipped with.

3. There are large numbers of listeners. Their bodies tend to absorb and block the sound waves, compounded with the fact that some of the listeners will also be at a great distance.

4. There is background noise, interference from people, machines, wind etc.

The second major function of a sound system (and operator) is to blend a number of acoustic sources so that they can all be heard. A fiddle may be loud enough for a given audience to hear but it would overpower a voice or a dulcimer which would not be audible to the same audience. These various sources can be amplified to various degrees producing a blend of the sources so that they are all audible and in relative balance.

The chain of functions within a sound system utilizing specific pieces of equipment for each stage of operation occurs as follows:

1. Pickup of the sound source, be it voiced, blown, plucked, struck or electronically generated, by a microphone or transducer pickup.

2. Blending of the sound source with other sound sources by means of a mixer.

3. Amplifying the blended signal with a number of pre-amplifier components (equalizers, limiters, electronic crossovers) and then with power amplifiers.

4. Projecting the amplified signal to a number of listeners (and performers) through a speaker system.

The process of these four steps that the original sound goes through is referred to as the sound chain. This is the basic process of sound reinforcement.

In order for the whole process to be effective each step must be dealt with properly with an aim to accomplishing four specific goals.

1. Quality of sound: The amplified sound should be an accurate recreation and suitable balance of the original sounds.

2. Quantity of sound: All listeners should be able to hear at a suitable volume. NOTE: In live sound work the qualitative and quantitative aspects of sound reproduction are always haunted by the nemesis of feedback, which must always be controlled.

3. Portability: The required equipment must be relatively convenient to transport and set up.

4. Durability: The equipment must be able to achieve the other three goals consistently, without failure. You are not dealing with the relatively stable environment of a studio, the equipment must be able to stand up to the realities of a lot of moving around in hostile environments that are not temperature, humidity, pollution or yahoo controlled.

In order to fulfill these four goals, the equipment which is used must be chosen carefully and matched to each of the other components in the sound chain. The final result can only be as good as the weakest link.

Now that I have hopefully established what we are trying to achieve and why, we'll look at the first step in the sound reinforcement process, receiving the sound source.

NEXT ISSUE: The Microphone