

Tok Tech

Simplifying the technical jargon about music and sound!

Let's take a look at the "audio chain" from start to finish and identify the components that make up a professional audio system. We can call it a chain because all the links must work together for the system to perform properly.

The first link in the audio chain is the microphone. This is where the voice or instrument is first captured and turned into an electrical signal which can then be amplified and reproduced through the speakers (the final link in the chain). Microphone choice is very important to establish a good first link in the audio chain – there are many types of microphones, all suited to different styles of music and with different capabilities. The most common type for live work is the cardioid pattern microphone which is used generally for vocals but also works for instruments. The cardioid pickup pattern gives a good tight field of pickup at the front of the microphone while rejecting unwanted signals from the rear – it picks up what you "point" it at. Other types include omnidirectional (picks up signals all around the microphone), Figure 8 as well as some dedicated stereo and surround field microphones. These other types are usually used in a recording studio situation or for specialist surround sound recordings and special effects. Of course, there are "wireless" microphones as well, but in this case the receiver unit of the wireless microphone system sends the electrical signal down the cable to the mixer.

From the microphone (or wireless microphone receiver unit) the electrical signal travels via cable to the mixer input. It is important to select good quality cables to transmit your signals throughout the entire audio chain to avoid any "weak links". When the microphone signal reaches the input channel of the mixer it can be altered by equalisation (bass, middle and treble controls), it can be boosted in level (gain) and it can be sent to various effect units to change the sound eg. reverb. The mixing console can also "split" the microphone signal to send it to various different places at the same time, for example to the monitor speakers for a stage performance, to an echo unit, to headphones and to a recording device as well.

Most importantly, the mixing console provides the ability to balance the relative volumes of each voice and instrument so that they "mix" in a musical and harmonious way. Signals can also be sent from the mixer to other devices such as compressors, limiters, gates and external equalisers to further enhance the audio quality.

From the mixer outputs the signal is routed, again via cable, to the amplifiers. In a live situation there may be two types of output to amplifiers – main (or "front of house") and monitor. The main output will power the larger speakers that face the audience, the monitors will be used by the performers to hear themselves properly. Again, choosing

good quality cables will preserve the signal and not create a weak link in your audio chain.

Often sound engineers will introduce several components in between the mixer output and amplifiers. These are generally graphic equalisers, compressor/limiters and a crossover. The graphic equaliser allows final “fine tune” of the overall mixed sound before it gets to the amplifiers. The compressor/limiter will offer some protection to the sound system in case of power failure, accident (like dropping a microphone) or simply a very loud performer! The crossover unit “splits” the audio signal into various frequencies and directs each frequency band to the proper set of speakers – low frequency sound to the subwoofers, higher frequency sound to midrange and high frequency speakers in a multi-speaker rig.

From the crossover, the sound is carried by cable to the amplifiers which boost the signal many times over before passing the signal along to the speakers. Make sure you use good quality speaker cables as they carry a lot of voltage from the amplifier-boosted signal!

At the last link in the audio chain, the speakers, the electrical signal is converted back into sound as we know it. This is where the tiny electrical signal from way back at the microphone end of the chain is converted back into music as it comes out in its final amplified form. This is how 10,000 people can hear the voice of one singer.

More on the intricacies of “the mixer” next issue!

Wishing everyone a very Merry Christmas and a safe, prosperous and Happy New Year in 2006.

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