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December 2003

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### Sound Sanctuary

#### Lack of Power in West Virginia

by Richard Rutherford

**One of the most basic components of any audio system is power. Good old Thomas Edison AC voltage. Without it, the rest of the specifications are meaningless. Normally I would say that speakers are the best improvement for your dollar, with amplifiers next. But first and foremost, get electrified. More is better, period.**

If you calculate power requirements for the average audio rack, you may be surprised just how much noise is in your system because you happen to have three or four or five amps plugged into one little itty-bitty 20-amp circuit. Happens all the time.

Even without the esoteric details of audio mathematics, an amplifier that can put out 600 watts times two channels equals 1200 watts. Go to West Virginia to find the basic current draw required. Watts equal Volts times Amps. See  $W=V \times A$ . Get it? Therefore, two of these amplifiers, each requiring 10 amps, plugged into one circuit, are already at maximum available current draw.

Double the number of amps, cutting the available current draw in half, and bad things happen. Depending on the amplifier, you may suck out the overall dB level you need, but I guarantee your signal to noise ratio at the speaker has probably shifted by 20 or more dB as well. Hit the kick drum hard a few times and you may even blow the breaker!

While a number of newer amplifiers are very efficient in regards to current draw vs. output, many older or less expensive units are based on a large hungry power supply that depends on a steady available flow of current in order to maintain slew rates, consistent distortion levels and overall thermal limitations. Under-powering an amp is the first part of the signal flow that may responsible for blowing cone drivers, especially subwoofers.

Simply put, having to drive an underpowered amplifier near or into clip to attain desired SPL is bad for the speaker.

The good news is that the solution is simple—add more circuits at the amp rack.

This may involve a certain expense, but it is the best place to start improving your overall sound quality. While you are at it, please make sure that all audio circuit receptacles have dedicated ground wires. In systems where a conduit is used as the grounding method, it may be enough, but wire is cheap, so use it. Making sure that all audio circuits are on the same phase, especially in a single-phase electrical system, is another must-do. This, along with proper grounding, will make troubleshooting those little hums and buzzes much easier.

Having an amp on the same phase as an icemaker, air conditioner or other motorized device

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will cause nothing but embarrassing headaches. Just don't do it, ever.

By the way, I have seen a few beautifully designed audio systems get ambushed because of something so small it almost always gets forgotten—lighting controllers. Some better quality audio mixers have a transformer isolated output just for interfacing sound to light control systems. Many do not and when you plug a light control into one phase and your audio mixer into another, beware the evils of 60-cycle hum.

Interfacing light controllers may not be all that common in Houses of Worship, but forgetting to get the stage instrument circuit receptacles wired correctly is very common. When you plug your electric guitar into a direct box, you are now part of the audio system. If your guitar amplifier (or even a power supply for your DI) is phased incorrectly, you'll be unplugging stuff forever until you find that nasty little hum.

Did we mention video yet? Review where your audio sends from VCRs, DVDs and computers interface to FOH and you may be surprised just how many dedicated audio circuits you should have.

Take the time to make a list of all the equipment that is part of your sound system and you'll find that getting the correct power, both in quantity and quality, may be as simple as having your electrician swap a couple breakers. One can only pray it will be that simple.

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