

Don't Kill The Artist!

Electrical safety on stage

By Dave Rat

Although the musicians we work with can tax our patience at times, and occasionally less than pleasant thoughts regarding them cross our minds, I seriously doubt that watching them fry from high voltage is something any of us would want to be responsible for.

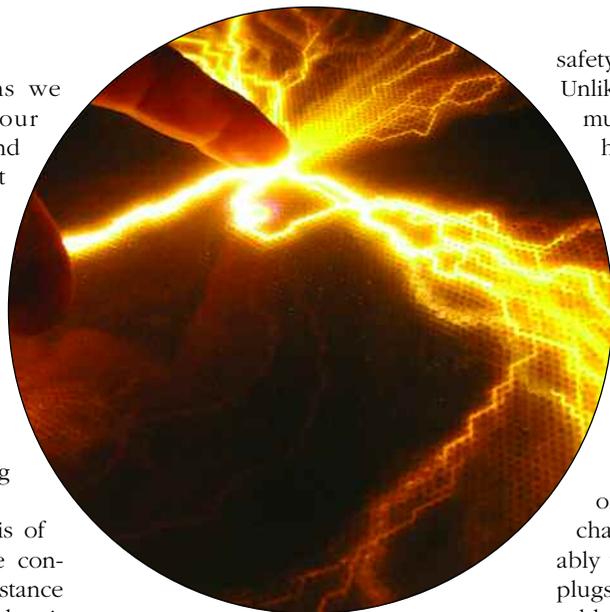
With that in mind, here are some basic precautions and tests to reduce, if not eliminate, the possibility of electrocuting our musical friends.

Let's start by stating that it is of the utmost importance that the console with the shortest snake distance to the stage use the same AC (electrical alternating current) ground as the backline power.

Microphones are grounded by the "pin 1's" of the snake, and ultimately, the console(s) that your snake is plugged into. The console closest (and again, by closest I mean "cable length") to the stage should not be pin 1 lifted. All mics short pin 1 to the casing of the mic itself. This "close" console provides the critical ground to your mics.

By "same AC ground," I mean that the backline power should come from a circuit that shares a common close proximity ground with the "close" console. If there's a separate stage console, it should be plugged into the same AC distribution as the backline.

The same thing applies when using a single console. The majority of buzz, hum and shock problems exist when



the people setting up the system use a convenient outlet, rather than making sure that backline and consoles all use circuits with close proximity grounds.

A list of the absolute minimal number of devices to AC ground starts with the backline gear and console (front-of-house in the cases where just one console is used). I don't want to get sidetracked into the various system grounding techniques, but keep in mind that AC lifting various pieces of gear can present potential hazards.

You want the hum to go away, but you know AC lifting is not the safest thing to do. Yet cutting pin 1 on every loom to a rack is not only impractical, but might not even solve the particular problem.

One of the more difficult things to get a handle on is the grounding and

safety of the backline gear itself. Unlike a sound system, it's pretty much something that you often have little or no control over.

The affinity over "vintage" gear combined with multiple amp setups can often present an even more unwieldy situation. Though I can't cover all possible configurations, here are two rules of thumb that help keep musicians safe:

1) Whether there is one or multiple guitar (or bass) amps all connected together, at least one piece of gear in the signal chain must be AC grounded, preferably the one that the guitar (or bass) plugs into or the closest (shortest cable length) one.

2) When presented with a "vintage amp" that has a non-polarized ungrounded plug, pay extra attention to how it is plugged in. At least mark the plug, and actually, it's best to replace it! These are the AC plugs that don't have the "fat" and "skinny" flat blades – both blades are "skinny." On all modern ungrounded plugs the "fat" blade is neutral and the "skinny" blade is hot, therefore making sure the plug cannot be reversed in the outlet.

PESKY GREMLINS

I was on tour with a very well known band and everything was going very smoothly until one day, out of nowhere, bam! The singer took a "blue light special" from the mic right on his lips.

Dazed, the poor guy struggled to finish the song without getting

Rat Tales

shocked again. It only happened that one time, and the rest of the show was fine. The stage techs investigated, but to no avail. A few days later, it happened again.

So I spoke with the guitar tech that religiously tests this guitar rig for shock prior to every show. He, too, was at a loss as to the cause.

After further evaluation, we were able to determine that the guitar player, mid-tour, had purchased a small vintage amp (with two-prong old-style AC plug) from a pawnshop, and had added it to his rig. He only played through it for one song a night.

Before each show, the guitar tech would dutifully touch the guitar strings to the mic, and if it buzzed, he would flip an AC polarity switch on the back of the amp. Soundcheck would end, and he would go to dinner. But when the support acts set up, they would invariably unplug the amp and use the AC box for their guitar rig.

After their set, they would put the AC box back and plug in that little vintage amp. Some days it would be plugged in one way, some

days the other way, and the problem was that when the plug was reversed, 120 volts would show up between the mic and the guitar.

Needless to say we put a three-prong, grounded plug on the amp, and though it's no longer "vintage," it's also no longer trying to kill our beloved performer.

TESTING, TESTING

So let's say you've managed to make your system hum-free while maintaining your solid console and backline grounds. Now the overwhelming goal should be proving, beyond doubt, that the system is absolutely safe. Four steps of progressively increasing intensity should be taken to insure this:

1) Meter the mic to the instrument strings. Touch bare metal on the mic – some mics have painted grills, so the meter will read "0 volts," but there are often small spots where the paint has chipped away that can zap a singer.

Wireless guitars will always measure safe, but if there's a hard-wired spare guitar, it must be checked with the meter. Even if a singer doesn't play an instrument, keep in mind that barefoot singers and/or wet stages can be a problem if the stage is metal or if there are screws in the stage that attach to its metal frame.

Therefore, meter any metal that the performer may come in contact with. You're looking for less than 1 volt or so, and be sure to check for both AC and DC voltages.

2) Turn on the guitar rig, and with the guitar plugged in, touch the



Be careful about those amp plugs – "vintage" units in particular can be outfitted with problematic plugs.

guitar strings to a bare metal part of the mic. The XLR connector often provides a good bare metal connection.

If the guitar rig produces an audible buzz when the strings touch the mic then there is a potential hazard. And if the strings melt and a blue spark erupts, it's a sure sign of things being not so good. If this happens, do not proceed to step 3 without resolving the problem.

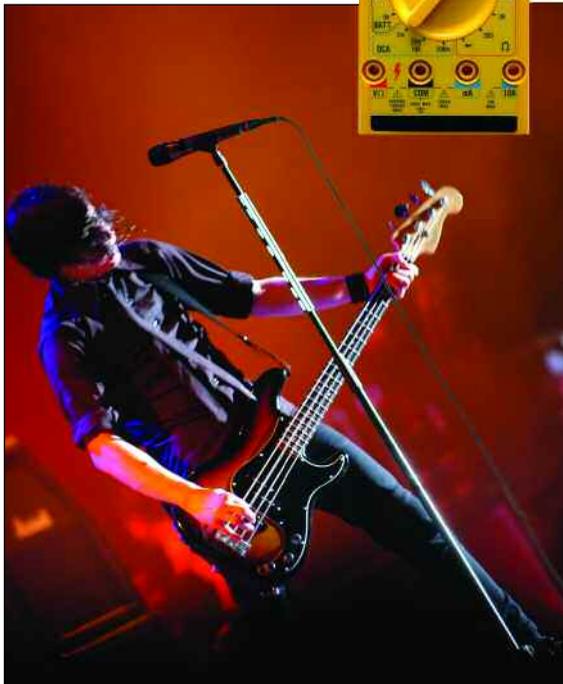
3) Now comes the "fun" stuff. If you're willing to let a performer touch the mic and hold a guitar, then you should be willing to do it yourself (or at least the potential of a lawsuit may inspire you a bit). Hold the strings of the instrument and touch the mic gently with your finger, and work your way up to a your way up to a solid grab of the mic.

If you measure 0 volts and get no buzz from touching the strings, then the mic is quite likely going to be shock-free. The main purpose of this step is to prepare you for the next one.

4) The last and final proof is to do as the performers will do themselves: put your lips to the mic while holding the plugged-in instrument.

FEELING ELECTRICITY

I've been called on many times over the years to resolve shock problems in



Keep a volt meter handy to thoroughly check for any unwanted electricity dangers, and that includes mics and instruments like electric guitar.

a wide variety of situations. Once, at a well-known Hollywood nightclub, a performer refused to play, swearing she was getting shocked by her vocal mic – but the AC meter consistently read 0 volts. It turns out that it was the 48-volt phantom power going to her acoustic (and active) direct box, combined with a poorly grounded snake. AC metering showed no potential, because the voltage was DC.

If you don't trust that a setup is safe then get someone qualified that knows what they're doing

I replaced the active direct boxes with passive ones, and then while she watched, licked the mic while holding her guitar. This reassurance was convincing enough to save the show, although she wanted a different mic!

I can already feel the backlash of those who will shout unsafe practices and not testing test electricity with your own body. I agree wholeheartedly.

However, my point is that if you don't trust that a setup is safe – so safe that you will subject yourself to the same situation you put performers in – then get someone qualified that knows what they're doing and is willing to stand behind their work.

The consequences are far too serious, folks. ■

Dave Rat heads up California-based Rat Sound. Send him your comments and questions via the Rat Sound message board at www.ratsound.com, or via Editor Keith Clark at kclark@livesoundint.com.

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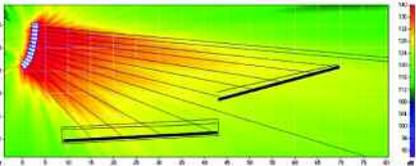
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