Guest Column

How to Avoid Feedback (The Bad Kind)

By Brett Ratner

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Greetings all!

Here's another good reader suggestion for an article...

> Brett,
>
> The article was great, I've really appreciated the suggestions. Why don't you write an article on how to avoid feedback on electric guitars?
>
> Thanks.
>
> Luca - Italy

Well, Luca, it depends on what kind of feedback you mean... The first kind of feedback is where an audience or producer or bandmate or girlfriend or A&R guy or whomever else offers their opinion of your playing and/or music. This can come in the form of anything from applause (or lack thereof) to an unreturned phone call... if the phone doesn't ring, it's obviously the A&R guy.

Since the aforementioned feedback is a good thing (whether you like the

feedback or not), Luca was more likely referring to the sonic sort of feedback. Of course, there's two kinds of sonic feedback... the GOOD kind (think the intro to "Foxy Lady") and the BAD kind (think of the time the principle dropped a microphone during that school assembly).

While the two don't sound much alike, they are related in that an amplified sound is feeding back into the sound source, being amplified again, and so on.

Since I'm not an engineer (as some of you have been kind enough to point out in reader responses!), I won't attempt to delve far beyond layman's terms as to how all this works. But I can offer some real-world suggestions on how to avoid the bad kind of feedback while controlling the good kind.

To begin with, I think the technical term for the common the bad kind of feedback is "microphonic" feedback. This is the high-pitched squeal that stops people in their ear-bleeding tracks. In reference to guitar, there are two basic causes of this.

The first has to do with the paraffin wax on some pickups. This wax coats the copper wounds inside the pickup. If the wax coating is melted or damaged in some way (which can happen when a soldering iron gets too close), the bare wires can vibrate against each other, creating the squeal. The solution is having the pickups redipped (if you can find someone who knows how to do that), or to replace the offending pickup.

Personally, I have had many more problems with feedback stemming from impedance mismatches and improper gain structures.

Basically, the signal coming out of a guitar can have a variety of strengths, depending on the pickups and whether it's active or passive circuitry. However, the RANGE the signal strength falls under is commonly referred to as an "instrument" or "low" level signal (-60 to 0dB). The signal that passes in and out of a typical stomp box effect is also an instrument or low level signal.

The signal that typically comes out of the effects send of your amp's effects loop, again, can be of varying strength. However, it is boosted quite a bit from "instrument" level signal, and it is typically referred to as a "line" level signal or "preamp" level signal (around +4dB).

The signal that comes out of your speaker jacks ... you guessed it ... can be of varying strength, is boosted quite a bit from line level signal, and is sometimes referred to as a "speaker" level signal.

In a nutshell, an instrument/low level signal feeds out of your guitar and into your amp. A line level/preamp level signal feeds out of the amp's preamp section and into the amp's power amp section (notice how some effects loops say "preamp out" and "power amp in"). Finally, the speaker

level signal feeds your speakers.

This is all well and good until you start messing with effects, specifically, rack-style effects.

For example, I used to own an Alesis Quadraverb GT. It was designed to be a stand-alone preamp and to feed a dedicated power amp (which I didn't own). Instead, I tried to use it either in front of my guitar amp or in the effects loop of my guitar amp. The problem here is that if I put it in the effects loop, the line level effects send was feeding the instrument level input of the Quad GT (which, for aforementioned reasons didn't have enough headroom). The result? Massive clipping and feedback.

Conversely, if I fed the Quad GT's preamp level output into the instrument level input of the amp, the resulting feedback would be the same (not to mention crappy tone).

The correct answer (which I never quite figured out) was to feed the guitar directly into the Quad GT and then feed the mono out of the Quad GT directly into the amp's effects return, bypassing the amp's preamp section.

The long-term lesson here is to ALWAYS make sure all of your levels are matched up properly. Furthermore, when shopping for amps and/or effects, always make sure all the inputs and outputs are compatible with the stuff you already own. Rivera amps for example, have adjustable send and return levels, making the effects loop compatible with virtually any effects device. Conversely, the Mesa "V-Twin" pedal/preamp features a " to guitar amp" out (instrument level), a "recording" out (line level with speaker emulation), and a "to power amp" out (line level, no speaker emulation), making it compatible with just about anything you want to feed it into.

On the other hand, stay away from products that don't feature multiple or adjustable inputs and outputs (aside from stomp boxes). Keeping the right signal levels feeding the right inputs is your best defense against feedback.

In reference to the "good" kind of feedback (the holwing, violin-ish sound), it's interesting to note that the guitar is one of the few instruments where it is desirable, let alone acceptable, to overdrive a signal to enhance the tone.

The layman's explanation of overdrive is that a signal is radically boosted in either the instrument, preamp, power amp, or speaker stage of the signal path (or any combination). The boosted signal is so strong that it overloads the following stage. This creates a compressed effect (sustain), and also emphasizes various overtones, thus "thickening" the sound.

The problem, however, is that when a signal is boosted like that, it is prone to feeding back... especially when you are playing at gig volume. The phenomenon of feedback may sound cool occasionally, but when it unintentionally sneaks in between the notes of your lead, it can be irritating.

If this is a problem for you, the obvious solution is not to use so much distortion. It's important to note that the distortion setting that sounds right in your bedroom is probably too much on stage. The reason for this is that when you play loud, the power tubes and even the speaker itself may be distorting. Therefore, you don't need to dial in so much at the pedal and/or preamp stage. Besides, extremely saturated tones may sound muddy in the context of a full band.

Some people, on the other hand, play acoustic/electric guitars, electric hollowbody or semi-hollow guitars that can feed back even at moderate volumes and/or distortion settings.

For acoustic guitars, many companies offer rubber or plastic disks that cover the sound hole. For an electric hollowbody, Ted Nugent's solution was to pack foam inside the instrument, though that can compromise the natural resonance of the guitar.

Another solution might be to use an EQ of some sort, such as the Boss GE-7 pedal. Here you can dial out the offending frequency, while keeping the rest of the tone intact. Similarly, many acoustic guitar amps, or even some electric/acoustic guitars feature "notch" filters to pinpoint the feedback frequency and remove it without radically altering the overall tone.

But what if you WANT to incite feedback... at a moment's notice? Again, Boss GE-7 might be useful tool, though used in the opposite manner. What you should do is pinpoint the frequencies prone to feeding back, and boost them with the pedal. Leaving the pedal off for most of the gig, step on it at strategic moments (such as a long sustained note at the end of your solo) to incite glorious, perfectly-timed feedback. Accompany the feedback by pointing at your guitar or raising your hands towards the heavens and nod your head in approval (big Joe Satriani move).

Amp placement also plays a big role in the feedback characteristics of your guitar. Typically, if the amp is behind you, feedback is fairly easy to control. If you WANT feedback, the classic move is to turn around and place your guitar directly in front of the speaker. Resting the headstock on the amp also works.

Finally, nothing will irritate your bandmates more than if there is a "stop" in the music, everyone stops playing, but the silence is broken by your howling guitar. Especially when using lots of distortion and volume, it's difficult to silence your guitar merely by placing your palm

over the strings. If there is a stop, roll off the volume on the guitar, use a volume pedal to roll off the volume, or turn your distortion off. The result? They stop, you stop, and everyone is happy.

Then you can start the next tune with a wicked feedback solo!

Brett

Brett Ratner is a contributor to Guitar Player, Musician, Electronic Musician and Music & Computers. He also spent two years as the Creative Writer for www.gibson.com. Currently, Brett plays sessions and performs regularly around Nashville with the band Katoorah Jayne. Please email Brett at ratocaster@harmony-central.com with any questions, comments or ideas.
