

TECH NOTE #101 WATTS vs VOLUME and other stuff....

There exists some confusion about the relationship between watts and volume (loudness). There is often discussion about how this many dB is twice as loud as that many and that many dB is double the power and blah blah..... lots of techie rambling but no real world explanations. I'll try. Let's say you have a guitar amp with a knob to adjust the power (watts). Now say this amp is 20 watts at its maximum power setting and 1 watt at the lowest knob position. It would be reasonable to assume that 20 watts should be loud enough to play with the band and 1 watt would be whisper volume. Anyone who has had the opportunity to test this theory has found quite the contrary. 20 watts through a reasonably efficient speaker is quite loud. 1 watt through the same speaker is also quite loud. What's up with that? Have you ever seen the specs for a 12" speaker? A typical guitar speaker will produce about 95 to 100dB at 1 meter (about 3.3ft) with 1 watt of input power. Now put 2 or 4 of that same speaker in a cabinet and the output is even greater. What this is saying is that even with a mere 1 watt of power, that speaker will put out the volume about equal to a person yelling. Obviously not "TV watching" volume. To obtain that whisper volume, you might need as little as 1/10 of a watt or less but.....at that low a volume, most guitar speakers start to sound terrible. In addition, there is a phenomenon that occurs with human hearing that is documented by Fletcher and Munson (two really smart guys) that graphs the way we hear things at different volumes. Look it up on the internet. The Fletcher/Munson curves show how our ears, at lower volumes, are less sensitive to low and high frequencies. That means the quieter you play, the more we tend to want to boost the bass and treble to compensate for our own hearing. Ever seen the "loudness" contour switch on a home stereo? That is what the switch does. It boosts the treble and bass to make it sound better quiet. On a guitar amp you often find knobs for boosting the low and high end in the power amp section. Typically these controls are called Presence for the high end boost and Resonance or Depth or Density (Egnater) for the low end. At low volumes you typically turn those controls up but the louder you play, the more you find you need to turn them down. Fletcher/Munson again.

OK...let's say you are playing an amp at home or in a music store at relatively low volume. Recall what was said earlier about how little power it really takes to get a fairly loud volume. If you're playing quiet, you might be using even less than 1 watt to obtain the loudness you're at. If you have a chance, try this on an Egnater Rebel or any other amp with some form of "power scaling". Play fairly quiet and turn the WATTS knob from 20 watts to 1 watt. What do you hear? Very little change! Why? Because at that volume you probably are not even using up 1 watt let alone 20 watts. Sort of like driving a car at 5MPH. It doesn't matter if the engine is a 100HP or 500HP, you are still only going 5MPH and using very little HP to maintain that speed. Same with your amp. To cruise along at low volume requires very little power (watts). Having the extra horsepower (watts) doesn't make the amp louder when you play at low to medium volume. Now try this. Set the power to the highest setting, turn the master full up and turn up the gain knob until you start to hear some distortion. It will be loud. While you're playing turn the WATTS knob down. You will clearly hear and feel the way less power creates a spongier, lower volume tone. Some players say the knob isn't really cutting the power but is reducing the headroom. Call it what you will, the result of reducing power is more of a "feel thing" than a volume thing. Ultimately the idea is to set it to where you like the sound and be happy.....play your guitar. Another question that comes up. Is 20 watts (or 10 or 50 or ??) enough power to play with the band. There is no simple answer. If your band (drummer) plays loud, and you wish to play loud and clean, you will need more power than you think. 50 to 100 watts maybe needed depending on your needs. Keep in mind, once you use up your available power (watts), you can keep turning up but your sound will only get more distorted, not louder. This can be good or bad, depending on what sounds you are looking for. The hope may be that you can play rhythm at a lower, cleaner volume and then turn up for some power tube distortion. There is a compromise between cool, power amp distortion and volume. The difficulty is when you only have one amp and hope to use it at the same volume in all situations. This is where a properly designed amp with a

good master volume can help or an amp with some sort of Power Scaling control helps. I learned this the hard way. One of the first real amp mods I did long ago was to take my Fender Deluxe Reverb and "hotrod" one channel for higher gain. I left the clean channel intact. Even put an EV speaker in it. Worked great at rehearsal in a small room. The first gig with it was at a wedding in a large hall. It was so under powered I literally could not hear it. 20 watts was clearly not enough power for me in that situation.