

Testing Amp Peak Power at the RMAF

Here's a follow-up report on an audio clinic at the most recent Rocky Mountain Audio Fest.

In our previous report (*audioXpress* 2/07) on the Rocky Mountain Audio Fest (RMAF), Bob Cordell wrote about an amp comparison clinic we conducted. We also performed peak power comparisons, using two digital meters to show the difference between long- and short-term RMS power in real time. The long-term RMS meter showed average watts over five or so seconds. The short-term RMS meter captured RMS power consumption over a fraction of a second and held the peak reading for a second so you could see it. If a second peak occurred during the hold, the new peak replaced the old one.

Bob Cordell first showed these measurements at a speaker DIY event in 2005, but it involved voltage comparisons and was harder to read. We knew we would need something more professional for RMAF, and Bob stepped up to the plate, putting together a much more usable meter pair with large LED readouts and a voltage/watts converter. This clinic showed both meters running at the same time, and you could clearly make out the 2-3W average and compare it to peak RMS watts.

RESULTS

The meters were on during the amplifier comparison so people could see the generally low wattage requirements of most songs. Throughout most tests, the long-term meter would hover around 2W (Bob intentionally left off decimal points because it made reading more difficult) with the peak meter rarely stretching into the 20W range. We needed to be careful on some dynamic recordings that

jumped to the 30W range, because that would have exposed which amp was the tube amp.

Our first discovery with this setup was that many songs that seem to be quite dynamic are, in fact, not. Conversely, many songs that seem innocuous are quite dynamic. The long and short of this is that we have no idea when our amps are called to greatness. This played out again and again over the weekend. Bob found in early testing that the most dynamic song he owned was Ricky Lee Jones' *Flying Cowboys*, "Ghetto of My Mind." This piece cruises along at an average 2-3W but peaks at 250-300W.

To demonstrate peak watts, we played this CD and turned the volume up so the long-term average was about 3W. This was loud but bearable. At 3W on the long-term meter, the peak meter would spike a lot into the 280W range. Then we would put on any other cuts and note the smaller peaks or try users' cuts to see whether we could find another highly dynamic track.

The main points were that some songs are clipping your amps and that it is not always clear from the energy in the room when large amounts of wattage are used. This momentary clipping is probably not directly audible, but how a system responds to this clipping may be part of why some systems simply sound better. As the weekend progressed, we decided to experiment.

MORE TESTING

The first experiment involved trying to figure out whether we could hear the amps clipping. The solid-state amp was almost impossible to clip without blow-

ing us out of the room. Next time we will need to bring a lower power amp for the clip test. The tube amp was rated at 35W, which was much easier to clip.

The peak meter showed that even a 35W tube amp had headroom to take it to an occasional 45W peak, but that was it. Mostly the amp gave out at about 38W. We could play a song we knew had 300W peaks on a tube amp peaking at 45W. We played the CD and a number of songs at higher levels, and most people could hear clipping on the tube amp at a certain point, i.e., very loud, but not hear it below that.

The second experiment tried to determine whether you could hear the difference in amps more clearly at higher volumes. The answer was a clear yes! Once the tube amp was straining, there was a much greater difference in sound between the amps. Remember that, in this test, the tube amp was clipping but the solid-state amp was not. A 300W solid-state amp will take you further than a 35W tube amp when played loudly.

Again, this would have been more interesting with a lower power solid-state amp. This leads to a number of other questions, such as at what point would a lower power solid-state amp sound worse than a 35W tube amp and how low in watts can you go in tube power before the amp is straining all the time? These are common questions in audio, but seeing and hearing it in a live forum is intriguing.

We also played with watts being tied to certain octaves. Before you jump out of your seat, we know the energy curve across octaves is flat, but it seems as though (and many people think) the

lower octaves should take more energy than higher octaves. This is probably because woofer movement is visible and seems like it would take more energy than a tiny tweeter moving only a little. In a live venue with the watt meters, we can play Bela Fleck's *Flight of the Cosmic Hippo* and see it doesn't take much power.

Another point the peak test brought to the surface is how much power is tied to speaker efficiency. Most audiophiles know this routine pretty well, but it was interesting to see the watts in action and note that just a 3dB drop in speaker efficiency would have changed the test radically by clipping both amps much sooner.

Our hotel room was very live and a closed box. Many people have a much deader room and often have an open side to another room. Also, the speakers we chose for this event had 90dB efficiency. Move that down to an average 85dB and most people would be in watts trouble. I will need to build some lower efficiency speakers for the next clinic. *aX*

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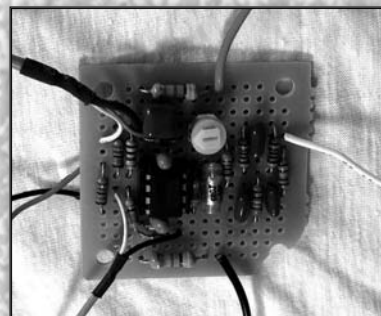
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