LOUDSPEAKER POWER RATINGS

COMMUNITY'S POWER RATINGS

"So how many watts can this baby handle?" You've heard this question a thousand times from customers. The answer is: it depends on the thermal/mechanical limits of the drivers and crossover components. It also depends on the input signal: its peak/average ratio, rise times, and spectral (frequency) content. Actually the REAL question is not what is the power handling, but what is the OPTIMUM power to use?

PROGRAM POWER RATING

For Community loudspeakers the best answer lies in the Program Power Rating. This is the size amplifier you should use. In case you just missed it, repeat after me: The Community Program Power Rating is the optimum size amplifier power to use. If you can't find an amplifier with that exact rating, multiply the program power rating by 0.8 and also by 1.25 to find the range of power we recommend. For example, the range for a loudspeaker with a 500W program rating is from 400W (0.8 x 500) to 625W (1.25 x 500). Anything larger is potentially excessive power. Anything smaller can cause damage from the amplifier clipping before activating the PowerSense™ protection circuits. Remember that the power amplifier output you select must be rated for the nominal impedance of the loudspeaker (i.e. 8 or 4 Ohms). If powering two or more identical loudspeakers from the same channel then the combined impedance must be used (i.e. 4 Ohms for 2 x 8 Ohm speakers).

CONTINUOUS / RMS POWER RATING

Our "continuous" or "RMS" ratings represent the thermal power limit for the loudspeaker. These are also standard numbers for comparing to other products. Our program rating represents a realistic scenario for most actual audio signals. It equals 2.5 times or 4 dB more power than the continuous or RMS rating. An amplifier's RMS rating is based on a sine wave measurement. The peak power in a sine wave is 3 dB more than the RMS power. Therefore using the program power rating allows 4 dB + 3 dB = 7 dB headroom for short term power peaks over the RMS rating and the loudspeaker can easily handle this. Typically at least 10 dB is needed for peaks in an audio signal above its RMS value. Therefore, with a properly sized amplifier just clipping on the peaks, the RMS value of typical audio signals will be at least 3 dB below loudspeaker's continuous or RMS ratings providing a margin of safety.

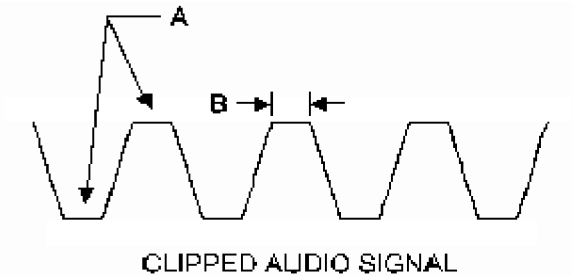
PERFECTION?

Having said this, it is still possible blow a loudspeaker with an amplifier that's in our

recommended power range. Why? Because power handling also depends on the type of input signal and the user, not us, controls the input signal. For example, the RMS and peak power can be about equal on a Guns ‘N Roses track, thus rendering any amplifier headroom above the RMS rating totally useless! Also, no matter what size the amplifier is clipped signals are death to loudspeakers, even if the clipping occurs in the mixer, equalizer or other signal processor.

In summary there is not and cannot be a perfect answer to the power handling question but our Program Rating is the best and most realistic guide Community can provide as to what size power amplifier to use.

CLIPPING = DRIVER FAILURE



CLIPPED AUDIO SIGNAL

The tops of the signal are "clipped off" (A) because the signal level is exceeding the maximum capability of the power amplifier *OR SOME OTHER PIECE OF EQUIPMENT IN THE SYSTEM*. During the times (B) when a signal is flat-topped, loudspeaker cones do not move. This means all power goes into quickly heating up their voice coils instead of producing sound. In other words, during (B) a loudspeaker is *100% EFFICIENT* at converting power into *HEAT*. Ironically, the more efficient the driver, the worse the problem. A horn tweeter (~30% efficient) normally converts 70% of its input power to heat. During clipping it must convert 30% *MORE* power to heat. A cone woofer (~3% efficiency) normally converts 97% of its input power to heat. During clipping it has to convert a mere 3% more to heat. Now you know why tweeters burn out much more easily.

CLIPPING FACTS:

- ***ANY CLIPPED SIGNAL CAN BLOW A LOUDSPEAKER*** - It does *NOT* matter if it is caused by the mixer, amplifier *OR* any other piece of equipment in the system *OR* whether the amp is at full output.
- ***A PRIMARY CAUSE OF DRIVER FAILURES*** is using too small an amplifier. If it is driven into clipping, it can easily burn out a loudspeaker that has a power rating *HIGHER* than the amplifier.
- ***COMMUNITY’S POWERSENSE DDP*** cannot detect clipping *OR* prevent damage from clipping, nor can any electronic or loudspeaker limiters. Some amplifier do have built-in limiters set to activate before clipping, however they do not actually detect clipping.
- ***LOUDSPEAKER POWER RATINGS*** are valid on for un-clipped input signals.
- ***WATCH THOSE CLIP INDICATORS*** on every piece of equipment to avoid *ANY* clipping.

Chuck McGregor
Community Professional Loudspeakers
Sep 99