

What Watt?

By Darren Springthorpe

What's up with Watts? How can I tell if the specification sheet tells me the right Watts? How many Watts do I need and why do I need them? Where do I go to get the right information? Home entertainment to produce a sound requires system amplification. With more choice than ever, the right choice of amplifier can be daunting and confusing to say the least.



To compare a home theatre receiver with another based on output power specification alone, without knowing the process taken to get to that specification is naive.

The specifications provided by the manufacturer are well developed marketing tools, and as a colleague regularly states "Yet another form of Distortion"

Consider the following comparison example: Brand A specifies power delivery something in the order of 5 x 80 watts, whereas, Brand B specifies power delivery something approximately 5 x 100 watts. Now on the

surface it would appear the 5 x 100 would be the better choice, however we at this stage do not know several extremely important factors.

Brand A's policy for specifications is to test with **All channels driven, 20Hz-20kHz** whereas Brand B test for **One channel driven at 1kHz**. This indicates that Brand A has a significantly larger power supply, and when consideration is given that amplifiers consume power not generate power; the input power is at the very least as important as the power output of an amplifier.

So in order to clarify some of the confusion and debunk some myths this article came to life.

If you are in the market, for an Integrated Stereo or Separates, maybe even mono Block Power Amplifiers, an Integrated AV Surround Receiver or Multi Channel Power amplifier, and do not know which one to choose, read on, some helpful information will follow.

Have you asked yourself the follow questions? How much power do my speakers, need? How much power will my amplifier deliver? How is power output measured?

With this article, we attempt to cut through the confusion of marketing hype, and plainly explain the relevance **Watts** has, to **Audio** performance.

Where do we start?

Most will say the most important thing for amplifiers is Watts per channel, and in part, I would have to agree, but how do we know what Watts is best?

Amplifiers types and variations include everything from Valve, Single Ended Triode; Transistor Class A, Class A/B through to Class D. The difference between the types of amplifiers and drive is a whole other article.

Power Output

There are a number of variables worth consideration when looking at the power of amplifiers. True power output performance is a ratio of power consumption, frequency and channels driven: and to answer fully is not that straightforward, stay with me here, I will do my best.

The Specification Sheet

First thing to do with the Specification Sheet in most cases is to file it in the round filing cabinet, (BIN). More often than not, many of us will refer to the specification sheet to establish the performance of an amplifier the higher the watts the better. Well not always, depending on how the output power is measured, and output power from amplifiers can be measured in many different ways.

The resulting specification can be misleading, unless we understand the measurement method, the resulting specification and how this affects the true audio performance of the unit, often this specification is meaningless.

Many amplifiers are tested and measured with only one channel driven, at a pure tone (generally 1 KHz) with generally unacceptably high levels of THD (Total Harmonic Distortion) what we are looking for is **all channels driven 20Hz-20 KHz with LOW THD.**

With manufacturers jostling for market share, many manufacturers are using their marketing departments instead of their engineering departments to drive new model specifications. In many brand cases, it is the tail wagging the dog; when it comes to audio performance this scenario is at best, poor form, at worst highway robbery, in my humble opinion.

Watts Misleading?

The use of the technical term RMS in relation to (amplifier) power is by definition misleading; now before you make up your mind about that statement read on and I will explain.

Keep in mind RMS does not by definition give a clear indication as to the sonic character of the amplifier nor does it inform in real terms how loud the unit will go. Other variables that require consideration include things such as speaker sensitivity and input sensitivity of the amplifiers pre stage and gain of amplifier.



To hone in and focus on the 'RMS' output of an amplifier is about as sensible as focusing on the Kilowatts of a car without taking into account the weight of the vehicle.

For example, A 225 Kilowatt V8 in a family sedan will outperform the same engine in a car twice its weight. Conversely the same engine will appear to perform better if in a car that weighs half that of the family sedan. Consider the following; a high spec engineered 225 Kilowatt in line 6 cylinder vs. a 225 Kilowatt V8, which is best?

The following Watt table gives an indication as to the power output from the one amplifier. The marketing departments of brand manufacturers will influence which is the advertised measurement on the specification sheet; be careful to note the THD% when reading these specifications.

Which of the following specifications would you think is best practice for measuring output of an amplifier?

- 25 dB-Watts 0.0001%
- 100 Watts RMS 0.1%
- 150 Watts DIN 0.7%
- 1,000 Watts PMPO 7%

Other power specifications that are also important with amplifiers include transient power and Power Consumption.

The History of 'RMS' Amplifier Specifications

Introduced in 1978 in the US, amplifier standard known as IHF A202.

The words 'watts RMS' originally used to show the continuous average power output of an amplifier measured correctly according to IHF A202 standards.

Testing Method

A signal generator tone into amplifier stage generally a pure tone as mentioned previously 1kHz, for a period of time for measurement usually five minutes, a calibrated voltmeter with an accuracy of better than 1%, without exceeding a specific level of distortion (0.1%) into a fixed usually 8-ohm load.

As speakers by design are not a fixed resistive loads and a pure tone is NOT music, how can any power measurement from this test be taken with any level of respectability or seriousness.

Power output measurements of an amplifier is somewhat like specifying how fast a car will travel without knowing the road conditions, will the Bugatti Veyron travel as fast on a road full of potholes compared with a smooth road?.

As a general rule, for non technical individuals reading this article, it is fair and reasonable to conclude, an amplifier with a higher max power requirement than the total of all channels driven be of superior performance than that of an amplifier with an output higher than its maximum required power.

Amplifier Brand "A"

Rated output 5 x 100 Watts power requirements 995 Watts

Amplifier Brand "B"

Rated output 5 x 100 Watts power requirements 395 Watts.



Even the most novice of all people wanting at least a respectable level of performance will conclude brand 'A' amplifier will be more than likely able to perform to the apparent rated output. Moreover, we used the power consumption to come to that conclusion not the specification sheet!

Be aware not all manufacturers state the power requirements on the back panel, they may not even publish this figure in the specification literature, my advice, RUN.

Determine the output of an amplifier as measured one channel, or all channels driven. Take a look on the back panel of the Amplifier; the power consumption requirements of the unit will be located near the power input plug, this will give you a clear Watts required, in this case, generally

the higher the number the better the performance.

This also relates to the number of channels the amplifier is driving, an amplifier can rarely have too much power!

Other very important areas of amplifiers include the following points and if we were to cover these and more, this article would become a book.

Power Capacitance

Slew Rates

THD and IMD Distortion

Signal to Noise Ratio

Frequency Response

Amplifier Output Impedance

Damping Factor

Gain

Input sensitivity

Topography

Channel separation



If this article has provided you with some insight as to what Watts are important make an appointment at Audio Trends and experience with your ears what Watts can do for your system.

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