Growing a Sound Garden

Digital amplifiers solve problems

By Leslie Stevens

Back in the early 1950s, the audiophile market was in its infancy stage. Quality speakers and amplifiers were just becoming available to the consumer market. Of course, tube tuners and amplifiers were still analog, and although at the time it wasn't a problem, analog amplifiers generated a significant amount of heat.

By the late 1950s, most people began upgrading their audio systems to stereo performance. We saw newly designed two-channel amplifiers on the market, which incorporated transistors instead of tubes. These amplifiers were slightly more efficient and generated less heat. However, as all A/V equipment was at the time, they were still analog.

QUANTIFYING THE CHANGES

During this time of change (from tubes to transistor technology), many of you may have asked, what about audio performance of the transistor amplifier? Well, unless you were part canine, less than 0.1 percent of the population could hear the difference. The sonic difference was so miniscule that only the most discerning audio enthusiasts could distinguish the sound difference.

DEALING WITH THE HEAT

But much has changed since the 1950s. Now, we are seeing whole-house audio distribution systems, surround sound systems, home theaters and outdoor speakers in the front and backyards. Today, custom installers need more amplified channels for these multi-zone applications. Thus, they are stacking three to four 12-channel amplifiers in one rack so that they can power the entire house and yard. However, there are two main problems with this scenario: weight and heat.

According to Frank White, technical expert in the A/V industry, "The reason that so much heat is generated from analog amplifiers is that the amplifier is sensing total system impedance, indicating what the potential speaker loading requirements could be. Of course, 'could' is an ambiguous word in a scientific sense. The amplifier, sensing lower system impedance (as the number of drivers increases), requires the standby power to be available to drive lower impedance (a larger energy) load. Thus, a lot of power is needed to move big amounts of energy, such as when tremendous bass is required to form an explosion in a movie. However, most of the time, this energy is not used, and it is subsequently burned-off as heat."

WHAT GOES INTO GROWTH

Before going on with the significance of stacking multiple amplifiers in one location, let's look at the physiology of an amp. An amplifier makes an audio signal usable by a loudspeaker by combining information in an audio signal with electrical energy from the wall. The goal of the amplifier is to best reproduce the audio signal via the speaker with the best quality sound reproduction.

For the past 75 years, manufacturers have been trying to make audio sound better by utilizing higher-end components and making design changes. This is partly driven by the fact that so many speakers are being placed in numerous locations in the home.

Jeff Francisco, vice president of product development at SpeakerCraft, said, "We saw the trend for more entertainment in the home, which by default, requires amplifiers to deliver more channels and power. After some research, we discovered, at the time, that nothing was being done to resolve this problem. Pending consultation with our dealers, we decided to develop a digital amplifier that was lighter and gave off less heat.

"Another driving force behind digital amplified technology was the demand for higher performance speakers, which by default, requires the amplifier to deliver more channels and power. Thus, our goal was to deliver an amplifier that was not only lighter and produced less heat, but was reliable and provided great performance."

Those who have been audiophiles since the 1950s may question whether digital amplifiers differ much in sound quality from analog amplifiers. Well, unlike true audio enthusiasts, who can hear the sonic difference between tube analog amplifiers and transistor analog amplifiers, the majority of users will not be able to tell them apart. Thus, again, consumers will see digital amplifiers as a huge advancement in technology simply due to their smaller physical size and reduction of heat.

DIGITAL-ANALOG DIFFERENCE

So how and why are digital amplifiers superior to analog amplifiers? A digital amplifier is 90 percent efficient, thereby reducing heat sinks and cabinetry. According to White, "Unlike analog amplifiers, digital amplifiers synthesize capacitance, resulting in dramatically lower heat."

The appeal to the custom installer is obvious. No longer need the dealer, nor the informed homeowner, worry about excessive heat buildup in a cabinet or rack. Also, the reduction in size, which is approximately ⅛ the size of a conventional analog amplifier, enables installation when closet or rack space is at a premium. A standard analog amplifier on the other hand, is about 50 percent efficient, meaning that half the power is dissipated in heat. Also, this heat contributes to the size of the unit because of the necessary heat sinks and the associated cabinet.

At the present time, the price of digital amplifiers is only slightly higher than that of analog amplifiers. But in the near future, digital amplifiers should be available to the market for less than the cost of an equivalent analog amplifier. The cost will naturally be driven down further as more chip manufacturers deliver the appropriate driver circuits. We will also see a drop in price due to competition and increased volume of units being purchased. A third reason for the eventual price decrease is that the size of the chassis has shrunken due to the smaller size of required components. Even with all this said about price, the market demand and driving force behind digital amplifiers are still based upon the heat reduction and smaller size of the chassis, not the price.

A lot has changed since the 1950s—we no longer have to speak loudly into the microphone. Advancement in digital technology now produces sound qualities that even part canines can enjoy.

Leslie Stevens owns and operates Eclipse Marketing, a high-tech marketing and public relations firm serving the CE industry.