

Powered Speaker Primer

The purpose of this document is to give a non-technical description of what a powered speaker is, and why it is superior to conventional speakers.

Anytime music is electronically reproduced there are two key elements involved. One is the loudspeaker, the other is the amplifier that is powering it. One may not recognize the amplifier if it is part of a receiver, but there is always an amplifier in the system.

Advantages of the powered speaker approach:

Speakers and amplifiers vary greatly in their ability to generate and handle power. In the case of the powered speaker, the designer can design the amplifier to deliver just the right amount of power to the speaker without burning it out; conversely the amplifier does not need to be over built in order to survive faulty hook ups and difficult loads. In other words the amplifier can be matched to the speaker that it powers, and higher reliability is the result.

With the electronics in a powered speaker it is a simple matter to include equalization, (the boosting and cutting of various tones) that can offset speaker deficiencies and produce superior sound. This technique is very applicable as a method for improving bass response, allowing smaller powered loudspeakers to achieve bass that was formerly possible only in large speakers. Equalization produces a better speaker. One that plays all tones equally. This reason alone is enough to promote powered speakers to the head of the class.

Powered speakers do not require speaker wires. Long speaker wires are often a cause of reduced fidelity in sound systems. With powered speakers there is no limit to the permissible length of the input cable.

Increased design flexibility. In a conventional speaker the tweeter must be of equal or greater efficiency than the woofer, since there is no practical way of reducing woofer volume. This is not the case with bi-amplified speakers (speakers with two amplifiers built in) such as our 533. With the ability to control the level of each amplifier, any combination of woofer and tweeter may be used. It is also much easier to make changes to a bi-amplified speaker allowing many generations to proceed rapidly through R&D.

When you purchase a PTE Bi-amplified speaker you are receiving all of the following items in one package:

1. A high quality speaker
2. Two or more high powered amplifiers
3. An electronic crossover
4. A specially designed equalizer

You receive all of these items, but since they all share the same power supply and circuit board, and they don't require separate chassis, you get them at a greatly reduced price. All this adds up to value. It also adds up to a higher performance speaker.

In conventional systems the amplifier will run out of power while playing loud bass notes. This causes clipping, a very audible form of distortion. Bi-amplified systems do not suffer the consequences of clipping the same way, for even if the woofer amplifier clips, the tweeter amplifier will not since it is a different unit. The clipping is therefore not nearly as audible. It should be noted that bi-amplified systems will play much louder without audible distress.

There are many other advantages of powered speaker, however most of them are too technical to be described in a short description such as this. -

Many great speaker designers have recognized the advantages of the powered speaker approach. James B. Lansing (the founder of JBL) was an advocate of the process way back in the fifties. Ed Long (a senior editor Audio Magazine) believes in the superiority of the approach. And Chris Stram (Author of the LEAP speaker design software) agrees that powered loudspeakers are the way to go.