Meet Your Maker: Hi-Fi+ Visits CAD (Computer Audio Design)

Blog
by
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Last year I reviewed the CAD 1543 DAC, the first product from a new company that made a deep impression on me and remains one of the most revealing converters available. In February, CAD (Computer Audio Design) made its hi-fi show debut at Sound & Vision Bristol and carried off the Clarity Alliance Best Stereo Sound of the event for its troubles. That company was founded by Scott Berry, a purist audiophile whose converter eschews all digital connections save for USB and even has a captive mains lead. I asked Scott about the thinking behind the 1543 DAC.

JK: What prompted you to build a USB only DAC?

SB: I didn't like the sound quality of most of the digital sources I could afford – and many of those I couldn't! I started experimenting with DACs for my own use, and like many others, I started off with an S/PDIF interface. However, as I began working with some of the early good USB interfaces I found that I couldn't match the sound quality I was getting from a USB interface with the S/PDIF. At the same time, I formed the opinion that audio in the future will be more computer-based: as broadband speed increases, music sales are moving from CDs to downloads, and as memory is becoming cheaper uncompressed higher resolution file formats are becoming more practical.

What do you do that's different?
I am an electrical engineer and worked for many years at Tektronix in the USA and then Xerox. I did quite a bit of work in high frequency design and that experience has helped me with the 1543 DAC. In general my approach was based on educated trial and error, and a lot of listening. I am not a believer in using measurements as an indicator of sound quality. There isn't a measurement that can confirm that sound quality has 'improved'. The best measurement tool we have for audio is our ears and in general we spend far too much time looking at specifications and measurements than actually listening.

You want as few connections and components as possible in the mains power path and the digital and analogue signal paths. The 1543 DAC has a hard-wired power cord, because even the best IEC connector degrades the sound. This design philosophy is carried throughout the DAC.

In digital audio, I feel power supplies are crucial, at least as important as the DAC chips! I don't use 'off the shelf' voltage regulators, there are five independent power supplies using independent transformers and discrete parts.

The 1543 DAC case is made entirely from acrylic. Early on I had prototypes in aluminium cases, I then made a similar case from acrylic and compared the sound quality. Everything inside the two cases was exactly the same and I couldn't believe the difference in sound quality; I much preferred the acrylic case.

The output of all source components is voltage. The TDA1543 DAC chips output current that then has to be converted to voltage. Many designers use tubes, transistors or operation amplifiers to perform this task. I find a 'passive' single resistor and a DC blocking capacitor produces a sound that is more

Why only USB?
I have had a lot of 'feedback' about this. I too started with S/PDIF and the best sound I obtained required a high frequency oscillator with its own power supply along with two independent supplies for the S/PDIF transceiver. The downsides of all this are significant.

High frequency oscillators inject noise into every part of the DAC no matter how hard you try. If you have two inputs you need a switch or isolator to route the digital signals to the converter. These signals are run at very high frequencies (MHz) and all of the switches I tried degraded the I2S signal and sound quality. The USB interface sounds better, and that is what the 1543 DAC is all about.

Are USB connected computers better digital transports than Ethernet linked servers?
Yes! A computer/DAC combination can perform all the functions that a Ethernet linked server can and more. The perceived advantage of a one box Ethernet linked server is the ease of use. However, things have improved drastically in computer audio and setting up a computer for audio use is much easier than it was even six months ago. DAC technology is advancing of course, but in my opinion even more innovation is occurring on the computer hardware and software side of things. There is currently an enormous investment in audio software, opting for a computer/DAC combination lets you take advantage of these improvements. Having a reasonably priced computer connected to a DAC allows you to upgrade computer hardware or software easily if and when you wish.

What tips would you give to computer newcomers?
If you are used to Windows use Windows and if you are used to Apple use Apple. Fantastic sound quality can come from either. You must use high quality playback software. Mac users have many excellent choices of playback software to choose from such as Audirvana, BitPerfect or Pure Music. These software packages integrate with iTunes, can be setup once and will run in the background. If you use Windows your choices for playback software are a bit more limited. At the moment JPlay audio playback software along with JRiver and JRemote on an iPad is a great combination. If you are using Windows I really like dBpoweramp for ripping CDs and changing file formats. In the Apple world XLD is very good, but not as easy to use. Memory is inexpensive nowadays, I see no point to listening to your music in FLAC or any other 'lossless' compressed format. I believe uncompressed formats such as WAV and AIFF sound better. I cannot hear a difference between the two, but AIFF has the ability to store metadata easily whereas WAV does not. For these reasons I always recommend AIFF. If you download music in FLAC format, use dBPoweramp to convert (uncompress) it to AIFF.

The key is to stop thinking about the computer as a 'computer' and think of it as an audio component. The sound quality you can get from a properly setup computer and a good DAC is seriously good: We didn't win the best sound in the Bristol Show (against 188 exhibitors) for nothing.