

K.K. PROFFITT
finds first-class
results in the
new and
surprisingly
low-cost D/A
converter from
Benchmark, the
DAC1.

The DAC1 is a two-channel 96kHz digital-to-analog converter that will also play back 192kHz audio with a 48kHz bandwidth. It features selectable AES/EBU and S/PDIF inputs as well as balanced XLR, unbalanced RCA and two headphone outputs that are all simultaneously available.

On the Back

In addition to balanced Neutrik gold-pin male XLR and unbalanced RCA outputs, the left side of the panel has a three-position output level switch. "Up" position is calibrated: analog output levels are controlled by 10-turn trim controls. "Center" position mutes analog outputs on the back, while headphone outs on the front remain active. "Down" is variable: analog output levels are controlled by the front panel gain control. The output level switch never affects the headphone amp; headphone outs are always enabled and their level is controlled from the front panel.

Both the Neutrik female XLR and female BNC coaxial digital inputs are DC isolated, transformer coupled, current limited and diode protected. The XLR input has 110Ω

potentiometers, however, tracking with the variable gain control pot was not good enough for critical listening. It varied as much as 0.6 dB between channels at various points. We preferred the calibrated output levels for monitoring.

UltraLock

The DAC1's D/A conversion clock is totally isolated from the AES/EBU digital audio clocks. In fact, the DAC1 can decode signals in the presence of very high jitter without measurable addition of jitter artifacts. In one test, the converter was fed signal through 1000 feet of Cat5e cable and produced the same results as a similar test with two feet of cable: that is, with no jitter-induced sidebands.

High-Res Listening

We checked the DAC1 against two other converters: those in our Pioneer Elite 45A DVD player, and the converters in a Pro Tools HD 192 system (generously provided by Clay Vann of Vango Digital, Inc).

We recorded various percussion instruments at 96kHz using the Pro Tools system with John Hardy M-1 pre-



Benchmark DAC1 D/A CONVERTER

impedance and while it is designed to work with standard 4 Vpp AES signals, it can function with levels as low as 300 millivolts. The BNC connector has 75 Ω input impedance with internal termination that may be removed if the user needs to loop the coaxial feed through other pieces of equipment. The third input is an optical TOSLINK connector that is useable with sample rates up to 96kHz (higher sample rates require either XLR or coaxial inputs). All inputs can decode AES/EBU and S/PDIF input in either professional or consumer format. Sample rate is determined by measuring the incoming signal, so sample rate status bits that are absent or incorrectly set will not cause loss of audio. There's also a fully digital de-emphasis circuit which supports 44.1, 48, 88.2 and 96kHz.

When the unit is used in a critical audio path, internal jumpers may be used to disable the front panel input selector switch and permanently select one of the three digital inputs.

On the right side of the back panel is an IEC connector for the 115V, 230V, 50-60 Hz international power supply. Inside, there's also a low radiation torroidal power transformer that eliminates hum and line related interference.

On the Front

Three bright LEDs show status on the front panel. The blue "power" LED lights when the DAC1 is powered on. The middle red "error" LED indicates a signal that is out of sample range, or too low or no digital input signal. The bottom red "Non PCM" LED indicates a signal that cannot be decoded by the DAC1, such as Dolby AC3.

A three-position toggle switch selects either unbalanced coaxial, balanced XLR or TOSLINK optical input at the rear panel. Two quarter-inch stereo jacks on the front are controlled by the variable gain control pot adjacent to them. They are driven by Benchmark's HPA2 headphone amplifier, which can deliver high current at high output without distortion into a pair of 60Ω headphones.

The front-panel gain control can also be used to control the output levels of the balanced XLR and unbalanced RCA analog outputs. As with many stereo-ganged

amplifiers and a Sony ECM-MS5 stereo microphone. While the Pro Tools converters were quite good, transient response of instruments like the shekere, cabassa and maracas showed the Benchmark DAC1 to be superior. Long envelopes on the triangle sounded more natural through the DAC1 and "converter killer" sounds like keys, sleigh bells and tambourine survived the A/D/A loop with more pleasant frequency spread and better sound stage.

We also listened to two 96kHz DVD-Audio classical discs from AIX Records: Debussy, Glinka and others (Music For Solo Harp) and Mozart and Schumann (Variations K. 573 & Fantasie Op. 17 for Solo Piano). A third disc, Classic Records' *The Brightest Smile in Town* by Dr. John, was originally recorded to tape in 1983 and remastered for DVD-Audio. We monitored through Pro Tools HD, the Pioneer Elite 45a and the DAC1. The Pioneer Elite 45a converters ran a poor third to the other two, but again the DAC1 gave better performance than the Pro Tools converters. Most apparent were string attacks on the harp and clarity of the hammer strikes with the Mozart, but other nuances, like the breathing of the harpist and the sense of space for the piano's room made for a more natural presentation via the DAC1.

The Final Bits

The Benchmark DAC1 is an excellent, affordable addition to the studio for critical listening. Its remarkable performance combined with flexible I/O makes it a first choice for those who need accurate monitoring. Here's hoping that Benchmark brings out the eight and twelve-channel versions soon. □

INFORMATION

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