



of Home Theater and High Fidelity review

Bryston BUC-1 USB Converter - November 2014

“Everything sounded perfect.”

BY JOHN E. JOHNSON, JR.

“It does the job extremely well, is superbly built, and priced right.”

INTRODUCTION

Up until perhaps 5 years ago, we played music from CD players and iPods. That was about it. You could listen to music on your computer through the audio outputs, but it was just for background, not serious listening.

When high resolution music (24/96) became available as downloads, we could still play them on our computer, because the DACs started to be capable of playing them. But 24/96 download music was not free, and it was made for serious listening, not a cheap computer DAC and a \$49 set of computer speakers.

So, quality DACs started to have USB inputs for connection to our computers. The problem was (and still is) that the signal coming out of the computer is in chunks, not a steady stream, and secondly, it was ravid with jitter. The result, through our big music systems, was less than satisfactory.

Enter “Asynchronous”.

Those first DACs with the USB connections for computer music were “Synchronous”, that is, the clock in your hifi system’s DAC synchronized to the clock in the computer. So, all that jitter, plus having to put the chunks of data in the bitstream end-to-end, resulted in lousy sound quality.

An “Asynchronous” connection in the outboard DAC means that the outboard (your hifi system) DAC uses its own clock to synchronize the bitstream, not the computer’s clock. Of course, if your outboard DAC is a cheap one, the results may still not be so good, but assuming your hifi system has a good DAC, the sound would now be the same quality as if you were playing a CD.

Once the asynchronous USB inputs could handle 24/192 and DSD128 (in the last year or so), those expensive downloaded music albums could sound as good as if you played them from a disc, whether it be Redbook CD, DVD-Audio (now defunct, but there were some albums with this format sold), or SACD. High resolution PCM music on discs now appears to be selling in the Blu-ray format.

DESIGN

The BUC-1 only has one input: USB. The photo on the next page shows the rear panel with the grounded AC socket, remote trigger, USB input, and then the three digital outputs, BNC, Coax, and AES/EBU (XLR).



The software driver for the BUC-1 comes on a thumb drive, and it installs on your computer. You will need a software music player other than the standard Windows Media Player. JRiver seems to be the most popular player, and I used it for this review. Select the Bryston BUC-1 in the Device menu in the player and you are all set. You don't need to install drivers if you have a Mac.

The incoming bitstream from the computer is truly a mess. It does not have a proper clock frequency for PCM decoding, and the data are sent in chunks rather than being a continuous bitstream. No wonder that playing music from computers sounded terrible before asynchronous USB input on DACs became available.

The BUC-1 can handle all PCM up to 24/192 at 128X oversampling. The clock frequency for integer sample rates - 48 kHz, 96 kHz, and 192 kHz is 24.576 MHz. The clock frequency for non-integer sample rates - 44.1 kHz, 88.2 kHz, and 176.4 kHz is 22.5792 MHz.

So, when the USB bitstream "mess" comes into the BUC-1 from your computer, it extracts the music bitstream ("signal recovery") from the 24 MHz clock of the computer, and then uses the extracted music signal to modulate the BUC-1's own clock (the music bitstream and the clock signal are blended) at either 24.576 MHz, or 22.5792 MHz, as noted above.

The new, freshly and properly, clocked bitstream is then sent to the three outputs on the BUC-1. You connect your choice of output (I used the AES/EBU - XLR) to your DAC with the corresponding type of input (in my case, it was the AES/EBU input on the HA-1 headphone amplifier).

IN USE

I used the BUC-1 with an OPPO HA-1 headphone amplifier and OPPO PM-1 headphones. My computer was connected to the BUC-1 with the USB port, and I used the AES/EBU output to the HA-1.

Headphones allow you to hear all of the fine detail in the music, compared to sitting 12-15 feet from speakers, where the high frequencies tend to fall off faster than the bass. So, for a test like this, headphones were

ideal.

The sound coming from my computer, through the BUC-1 to the HA-1 was identical to the sound played through my reference system, using physical CDs, and the headphone jack. Totally awesome!

Clarity, depth of soundstage, and a lack of distortion. You can't ask for more.

I also tested the BUC-1 using my two reference DACs, the AURALiC VEGA and NAD M51, connecting to the AES/EBU and Coax inputs, respectively, on the DACs. The AURALiC feeds a Pass Labs Xs preamplifier which is connected to Pass Labs Xs 300 monoblock power amplifiers. The NAD connects to a Classé SSP-800 pre-pro and Classé CA-5200 multi-channel power amplifier. I use a portable laptop with JRiver Media Center Version 20 to play the music through the USB port, out to the DACs.

Everything sounded perfect.

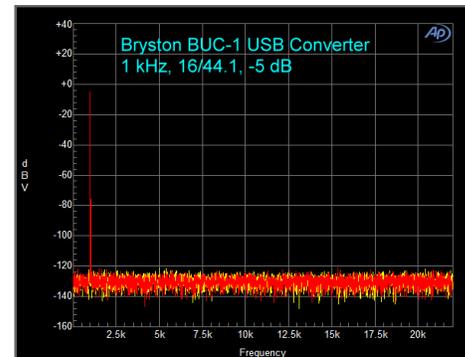
ON THE BENCH

For the bench tests, I used DSP analysis rather than FFT (FFT is used for analog signals). So, the signal going into the Audio Precision was the digital output of the BUC-1, and the analysis was performed totally in the digital domain, rather than being converted to analog before the spectrum was created.

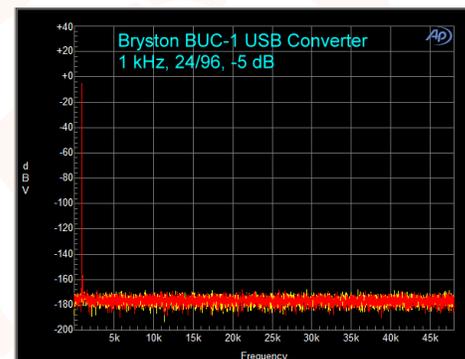
At 16/44.1 sampling and 1 kHz, the resulting spectrum showed no distortion. When I used a separate FFT test (FFT is performed in the analog domain) to measure the THD+N, it was below 0.0000%. In fact, for all the tests, distortion was below 0.0000%.

"Clarity, depth of soundstage, and a lack of distortion. You can't ask for more."

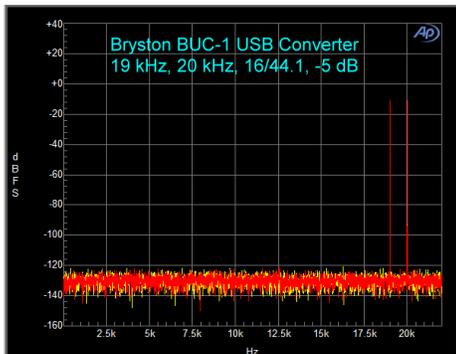
The noise floor for the test shown below was in the -120dB to -130 dB range.



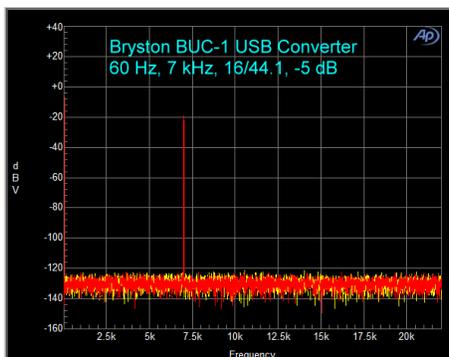
At 24/96, the signal peak looks the same. Only the noise floor has changed, which was -170 dB to -180 dB. The test results for 24/192 were the same as for 24/96, so only the 24/96 spectra are shown.



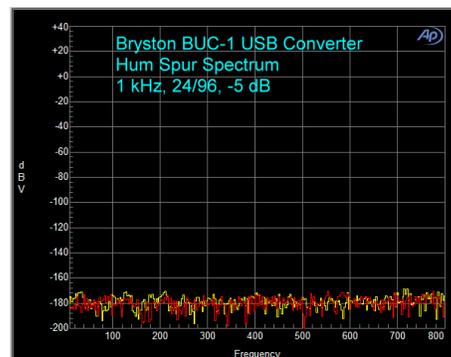
Using 19 kHz and 20 kHz, and 16/44.1 sampling, there were no side peaks and no B-A peak at 1 kHz.



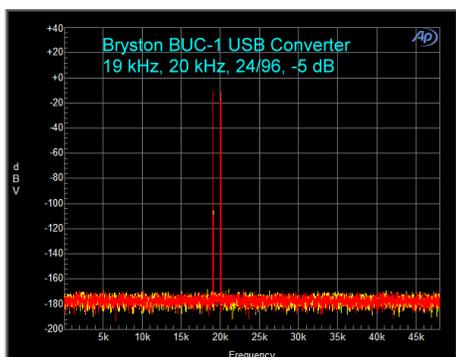
IMD was in the same pattern as the other tests. No distortion peaks of any kind.



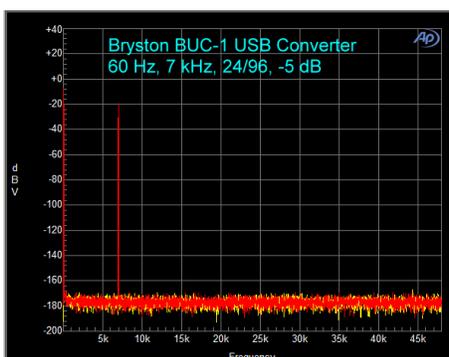
Just to be thorough, here is the hum spur spectrum for 24/96:



For 24/96, it was the same in terms of the peaks. The noise floor, again, is much lower. Wouldn't it be nice if we could get this kind of performance from the DAC when it decodes the signal to analog? Someday, perhaps.



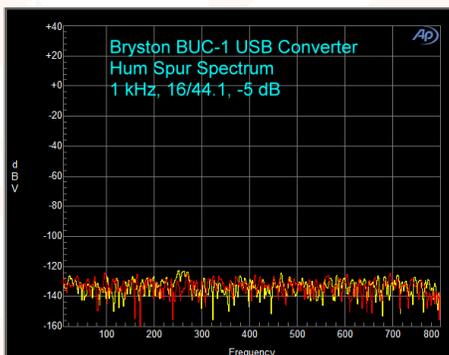
And, at 24/96 . . .



CONCLUSIONS

The Bryston BUC-1 is a very useful device for those of you who have purchased expensive outboard DACs years ago, and which do not have asynchronous USB inputs. You may also have a nice receiver for which you want to add a USB input so you can play music from your computer. It does the job extremely well, is superbly built, and priced right.

Here is a hum spur spectrum at 1 kHz and 16/44.1 sampling. No hum spurs are present. The reason for this is that the signal is being analyzed in the digital domain, so only the digital test signal gets into the results. A 60 Hz spur and its harmonics are in the analog domain.



Specifications:

- Design: Re-clocks Digital Signal from Computer
- Codecs: PCM Only; 16/44.1, 24/88.2, 24/96, 24/176.4, 24/192
- Input: USB from Computer
- Outputs (All Digital): BNC, Coax, AES/EBU (XLR Balanced)
- Dimensions: 2.25" H x 5.63" W x 8" D
- Weight: 9 pounds
- MSRP: \$799 USD; Available with Silver or Black Faceplate
- Bryston





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