Bryston BDA-3 External DAC (Digital to Analogue Converter)

Impeccable sound quality and versatility

— *By* **Michel Forbes** —

For more than 35 years, **Bryston** (Canada) has offered solid and well-designed products aimed as much towards professional as audiophile markets. Well known for its analogue audio devices, **Bryston** also offers digital devices by offering a full range of digital-to-analog converters (*DAC*). The new *BDA-3* is therefore flagship of the range of *DAC*s offered by **Bryston**. Its position at the top of the range is anchored in its support of *DSD* 256 and *PCM* 384 kHz formats, as well as the multitude of digital inputs. The very classic look of the *BDA-3* fully integrates visually with the design of all other

products offered by **Bryston**. Let's go to the heart of the matter and explore the **Bryston** *BDA-3*

The design and functionality of the *BDA-3* are on par with the existing product range in this category. The approach is resolutely industrial with a look similar to devices that may very well be those of a recording studio. A simple and solid construction, giving the user a robust, solid feel. The front is made of 5 mm thick aluminum, the manufacturer's name is engraved on the left and is followed by a series of indicator lights specifying the different *PCM* and *DSD* sampling rates supported by the *BDA-3*. To the right, we find an alignment of eleven switches used to select the different digital inputs and a power switch. This design is clean, creating no ambiguity about its operation. Everything is clear and accessible to your fingertips. As all other **Bryston** equipment, the *BDA-3* is available in silver or black.

The back of the *BDA-3* displays a host of digital inputs and analog outputs which are listed here:

• No, not one, but two class 2 *USB Audio*, (used with computers, servers or streamers);

• Four digital inputs including two 75 Ohm coaxial inputs with *RCA* and *BNC* connectors;

• A *TOSLINK* input (optical connector);

• A *XLR* input (*AES/EBU* 110 ohm type signals);

• Four *HDMI* inputs where inputs 1 to 3 are compatible with *HDCP 1.4a*, while the fourth is compatible with *HDCP2.2*. It is therefore possible to use this input with *UltraHD* or *4K* devices.

The only digital output available on this *DAC* is an *HDMI* pass-through, meaning an output where video signals are passed without processing.

The *BDA-3* is compatible with 3rd party remote control devices such as **Crestron**, **Control4**, etc. Three ports are dedicated to this use with either a 1/8 inch plug for *RS232* protocol, a *USB* port and finally a *RJ-45* (*Ethernet*) connector. There is also a 1/8 inch *Trigger* input which allows to connect various **Bryston** devices and power them up simultaneously through a single turn-on command.

Here is a very complete choice of protocols and connectivity that will appeal to the automated systems integrators. As soon as the *DAC* is connected to a home network, it is possible to access a Web page indicating the configuration and to update the *BDA-3*'s firmware.

An *IEC-320 C14* connector is used to supply the *BDA-3 AC* power.

The consumer will be able to experiment at will, with various *AC* cords, in an attempt to improve (or not) the sound of this *DAC*.

Finally, the **Bryston** *BDA-3* has two fixed volume analog outputs, on balanced *XLR* connectors for a 4 Volts output, or unbalanced *RCA* connectors for a of 2 Volts output. Both outputs can be used simultaneously (**Bryston** has reported no contraindications to this statement). Strangely both *RCA* sockets are white; ideally the right output socket should be red for easy spotting.

The use of *HDMI* ports on a stereo *DAC* is rather unusual.

It should be noted that the *HDMI* protocol does not support *PCM* digital signals above 192 kHz and is limited to the *DSD* 64 for type *DSD* signals.

Recently, **Bryston** has introduced a digital player called *BDP-Pi*. This player is actually a *Rasberry Pi* computer to which has been added a *DAC* card with coaxial and optical *S/PDIF* and *HDMI* outputs limited to stereo 48 kHz / 16 bit signals. For now, the *BDP-Pi* is the only device offered by **Bryston** which has a *HDMI* output.

One or two additional *S/PDIF* Toslink inputs would have been appreciated considering that audio sources such as TVs or media players often provide this type of optical or coaxial connector.

An In-Depth Look…

The essence of a *DAC* is the use of a chip which converts the digital signals presented on *S/PDIF*, *AES* or *USB* inputs into an analogue signal. **Bryston** chose a Japanese-made chip, the ***AKM****4490* designed and built by **Asahi Kasei Microdevices Corporation**. The **AKM** chips are often present in professional audio devices, but the new *Velvet Sound line* of products is used specifically for the audiophile market. The **AKM** chip can support *PCM* formats up to 768 kHz and *DSD* 256 (4 times DSD 64) and the internal audio processing is done at a 32 bit depth. **Bryston** uses two of these chips in monophonic mode in the *BDA-3* to decode *PCM* and *DSD* digital signals. Two specially designed *XMOS* circuits are used to channel audio signals through the *USB* interfaces.

The *BDA-3* consists of three separate modules: a section dedicated to the switching of the four *HDMI* inputs, another for the analogue section and finally the main digital section. A toroidal transformer is used to power the various components. No complaints about the quality of construction or assembly, **Bryston** has been offering strong and rugged products since its beginnings and continues to do so even after 35 years of existence.

> *« The volume is slightly higher and it is the articulation of the music on the rhythmic plan which is the most obvious and easily detectable, if we focus on the electric bass of rhythm section. All audio content is more detached and less blurry, much more engaging in terms of listening. »*

My Time with the BDA-3

The *BDA-3* is very user friendly. The *BDA-3* offers a simplicity that will appeal to more than one user – eleven green light-emitting diodes (*LED*) are used to indicate the different *PCM* and *DSD* sampling rates. The locking option (*Lock*) is turned on as soon as a valid digital signal is detected at the input. A series of switches is available to select any one of eleven inputs as well as re-sampling and re-clocking. The *Upsampling* option is available only for *S/PDIF*, *TOSLINK*, and *AES* inputs, and oversampling is dependent on the two internal clocks. With an input sampled at 44.1 kHz, the *BDA-3*'s internal clock will go to 176 kHz whereas a 48 kHz input will be upsampled to 192 kHz. In both cases, this equates to a multiple of four times the initial sampling frequency.

The installation of *USB* drivers on *Windows 7* and/or *10* is simple. Using streaming software like **Foobar2000** and **JRiver** is supported and their configuration is well documented in the user guide provided with the *BDA-3*. For **Mac** and **Linux** users, it is not necessary to install drivers, as the *USB 2.0* protocol is native on both platforms. It was necessary to adjust the output level to 100 % in the **Linux** *AlsaMixer* to make the *BDA-3* functional. The manufacturer has been notified of this problem.

Having two separate *USB* ports was much appreciated in this assessment, the first having been connected to a music server using *Linux* and the second connected to a *Surface pro* computer using *Windows 10* and **Foobar2000** software.

The first advantage of the *HDMI* standard is the transfer of audio and video signals on a single wire. When a *Blu-ray* drive, or a multimedia reader is connected to the *BDA-3*, the stereophonic audio signal will be extracted and decoded into an analog signal by the *BDA-3*. An elegant solution that will appeal to lovers of home theatre and allow them to benefit from multichannel AND stereophonic signals while using the same sources.

To test the *HDMI* input, I opted for a *Rasberry Pi* computer using the piCorePlayer. This drive connects directly to my music server through my local network. The *Rasberry Pi* has an *HDMI* plug that can be used for stereo audio output and it displays the navigation interface provided by the playback software.

Finally as the BDA-3 has no variable outlets, a headphones amplifier was connected to the *RCA* jacks.

Listening Tests

We can confirm that the sound quality is different depending on the technology used and the type of circuit used for the decoding of digital signals. The rendering of the ***AKM****4490* chip is very close to a professional sound usually found in studio devices. This isn't a clinical or "sterile" sound, but a rather very well-articulated and detailed one. It is a hybrid approach that takes the qualities of the studio sound of **Burr-Brown** chips with the definition of the **ESS** chips.

Small noises are audible when going from one input to another. They are very low in volume, but ideally, it would be preferable that a small fade (or mute) is made between input changes. However, no sounds are heard when passing form the 44.1 kHz to 48 kHz clock and vice versa. Nothing is more annoying than a heavy noise between two pieces of different resolutions combined in the same playlist.

I started tests using the *HDMI* input and the result was rather unexpected. Surprisingly, the same list of files streamed through the *HDMI* input results in a much more articulate sound than listening through the *USB* input, a sign that the jitter is better handled. The volume is slightly higher and it is the articulation

of the music on the rhythmic plan which is the most obvious and easily detectable, if we focus on the electric bass of rhythm section. All audio content is more detached and less blurry, much more engaging in terms of listening. However, I was not able to play *DSD* 64 files using this platform, even if the configuration of the *piCorePlayer* should make it possible.

With the *HDMI* sources, an observed delay of 2 to 3 seconds occurs when switching from *USB* to *HDMI*. However, the selection between optical, coaxial and *AES* inputs is almost instantaneous and without audible delay. This type of problem is relatively minor and can probably be corrected with the installation of new firmware for the *BDA-3*. **Bryston** was informed and its technical support service has been very responsive to my comments.

From the optical output of my **LG** TV, the new series *Stranger Things* offered by **Netflix** lends itself to this assessment. Fantastic and horror genres often use sophisticated sound mixes to support the typical atmosphere of these types of movies. The introduction to episode 3 offers a sonic landscape that alternates between music of the 1980s and a sophisticated reverb of an empty pool inhabited by a strange malevolent entity. Every little detail of the **Foley** track is well reproduced and articulated. The sound is subtly sweeter by using the *Upsampling* function. The end of reverberations is precise and detailed, and we are tempted to keep our headphones on for several hours.

Back to music and use of the music server in *USB* mode. Most of my list of high-resolution music is very well reproduced, without artifact when switching from one format to another, and this, up to 384 kHz. The separation between each instrument is particularly strong and accurate. We can detect small gaps of time between the voices, especially with the *New Frontier* of **Donald Fagen**'s *NightFly* album play. *Take Five* by **Dave Brubeck Quartet** sampled at 176 kHz, for its part, is reproduced with finesse and the quality of the sound of the cymbals of drummer **Joe Morello** made us appreciate the benefits of high-resolution audio files.

DSD format playback is available and can go up to 256 *DSD*. A key feature of *DSD* is a silky and soft sound, and we are not disappointed here. Once more, the excellent free files from the Norwegian company **2 L - The Nordic Sound** demonstrate the quality of the sound and precise reproduction of the acoustics of the Church.

Using the coaxial input, the *SqueezeBox Touch* produces sound quality very close to the *USB* input. All formats are well reproduced up to 192 kHz and *DSD* files are converted to *PCM* signal.

Conclusion

The *BDA-3* becomes the reference for **Bryston** *DAC* due as much to its sound quality as for its versatility in the many inputs and outputs. Its design and build are a direct complement to the other products offered by the Canadian company. The *BDA-3* will be the perfect companion to a system built from devices form manufacturers other than **Bryston**, especially if we think of control and its integration in terms of home automation. Support of *HDMI* connections opens new avenues in respect to stereo signals and the opportunity to benefit from a sophisticated graphical interface offered by some streamers.

In terms of sound, the *BDA-3* has nothing to envy from products offered by other manufacturers, the choice of the latest **AKM** chips and support of all formats available in *PCM* or *DSD* formats providing excellent durability. One must appreciate **Bryston**'s seriousness to offer a series of products over the years that are as well built as they are successful.

GENERAL INFORMATION

Price: $3 495
Warranty: 5 years, parts and labor
Manufacturer/distributor: Bryston Ltd., Tel.: 1.800.632.8217, www.bryston.com
Mediagraphy
Netflix, *Stranger Things*
Donald Fagen, *NightFly*
Dave Brubeck Quartet, *Take Five,* ***format 176 kHz***