Bryston
B100-DA SST
INTEGRATED AMPLIFIER/OPTIONAL DAC

Larry Greenhill

DESCRIPTION Two-channel, solid-state integrated amplifier with optional internal DAC and MM phono modules. **DAC:** Inputs: 2 S/PDIF, 2 TosLink, activated by pressing A/D button on remote. **Preamplifier section:** Frequency response: 20Hz–20kHz, ±0.5dB. High-level sensitivity: 500mV. Noise: <100dB, 20Hz–20kHz, ref. 1V. **Power amplifier section:** Maximum output power: 100W RMS into 8 ohms (20dBW), 20Hz–20kHz (factory rating of unit reviewed: 137W, 21.4dBW). Power bandwidth: <1Hz to >100kHz. Polarity: noninverting. Input impedance: 50k ohms single-ended. Sensitivity: 1V required for 100W into 8 ohms. THD+noise: <0.005%, 20Hz–20kHz at 100W into 8 ohms. IMD: <0.01%, 60Hz+7kHz mixed 4:1. Noise: >108dB below rated output (with 20Hz–22kHz bandpass filter). Slew rate: >60V/µs. Damping factor: >500 at 20Hz, ref. 8 ohms. Power consumption: 30VA at idle, 600VA at maximum power. Heat load: 100 BTU/hour at idle, 288 BTU/hour at maximum power. Optional handheld remote controls: Power, Volume, Balance, Mute, Code. Select Source, Analog: A/D, Aux/Ph, CD, Tuner, TV, Video. Select Source, Digital: D1, D2, D3, D4.
DIMENSIONS 17" (432mm) W (a 19", 487mm front panel is also available) by 4.75" (122mm) H by 13.91" (357mm) D. Weight: 30 lbs (13.6kg).
FINISHES Black or silver front panels.
SERIAL NUMBER OF UNIT REVIEWED 000237.
PRICE $4395 as reviewed. Basic B100-DA costs $3195. Optional DAC: $1050. Optional MM phono board: $400. Optional remote control: $400. Approximate number of dealers: 200.
MANUFACTURER Bryston Limited, P.O. Box 2170, 677 Neal Drive, Peterborough, Ontario K9J 7Y4, Canada. Tel: (705) 742-5325. Fax: (705) 742-0882. US: Bryston Service USA, 30 Coventry Street, Newport, VT 05855. Tel: (802) 334-1201. Fax: (802) 334-6658. Web: www.bryston.ca.

cutline

Over the years, I have used and enjoyed in my audio system large, single-purpose components. Each of these chassis has had but one role: preamplifier, amplifier, digital-to-audio converter (DAC), etc. I guess I've been just a little suspicious of products with multiple functions crammed into a single small chassis; I've figured that the designer may have cut a corner that could affect the sound.

Which brings me to the topic of this review, the Bryston B100-DA SST, which is three separate components in one slim chassis: a DAC, a preamplifier, and a 100Wpc power amplifier. (An MM phono module is also available.) Has serving all of these different functions compromised its sound?

There was another reason I was curious about the B100-DA SST. Its optional DAC made it very easy to use with a new type of audio component: the networked music player. Such devices—Slim Devices' Squeezebox and Roku's Soundbridge 1000, for examples—can stream digital music from the excellent Internet radio stations praised by Sam Tellig and Wes Phillips, or to a centralized digital music library, as extolled by John Atkinson. The B100-DA SST also avoids the need to use the often mediocre DACs found in some network players, and eliminates from the analog signal path the extra jacks, plugs, and connectors required when using an external DAC.

Internal components

The power-amplifier section of the B100-DA SST ($4395 as reviewed; I didn't specify the phono option) is based on the 2B-ST, Bryston's 100W basic two-channel power amp (see my review in the October 1996 *Stereophile*, Vol.19 No.10). It offers dual-mono architecture with two 250VA toroidal transformers; a third, smaller toroidal helps power the B100-DA's digital module. The amp contains over a dozen regulated or stabilized voltage supplies.

Removing the B100-DA's top panel revealed excellent build quality: minimal point-to-point wiring, high-quality resistors and capacitors, and thick, double-sided, glass-epoxy printed-circuit boards with clear markings. The B100-DA's analog preamplifier uses multiple-pole relays to switch sources, and an integrated resistance network is used to control the unit's volume. All analog signal circuits are fully discrete and Bryston uses 0.1% metal-film resistors, polystyrene capacitors, and selects and matches transistors by hand to keep noise and distortion to absolute minimums.

The B100-DA's DAC is described in an article written by one of the company's customers, Jeff Switzer, that appeared in Vol.8 No.3 of the company's online newsletter (www.bryston.ca/newsletters/83_files/vol8is3.html). A digital signal input through the S/PDIF jacks on the B100-DA's rear panel is fed via impedance-matching transformers to a Cirrus Logic C58420 digital interface chip. This reduces jitter and upsamples the data from 16-bit/44.1kHz to 24/96. As Switzer states, "the upsampling process doesn't add any new data to that which came off the CD but it puts the data in a form

MEASUREMENTS

Because the Bryston B100-DA has a D/A section and offers both preamplifier output and power-amplifier input jacks, it's really three products in one. (The review sample was not fitted with the phono option.) I performed a full set of measurements on each section and also on the amplifier as a whole. I preconditioned the B100-DA by running it for 60 minutes at one-third power into 8 ohms, which is the worst case for an amplifier with a class-B output stage. At the end of that time the heatsink was way too hot to touch, and even the front panel was hot. The amplifier didn't turn off, however, and the THD+noise percentage was the same at the end of that time as it had been at the beginning: 0.0059%.

I began by examining the D/A section's performance at the preamplifier output jacks. With the volume control at its maximum, a 1kHz tone at 0dBFS resulted in an output of 10.75V, well above the level needed to drive a power amplifier to its maximum. With the volume control at 12:00, the output was 757mV. The digital section was non-inverting; *ie*, it preserved absolute polarity. The digital input locked on to data sampled up to 96kHz, and fig.1 shows the digital frequency response at –12dBFS with both 44.1kHz and 96kHz sample rates. The latter is flat to 40kHz, with then a sharp rolloff to –3dB at 46kHz. Channel separation via the digital input (not shown) was superb, at better than 120dB across most of the audioband.

Digital resolution was equivalent to around 18 bits. The top trace in fig.2 shows a spectral analysis of the B100-DA's preamp output while it decoded data representing a dithered 1kHz tone at –90dBFS. The trace peaks at exactly –90dBFS, and other than some low-level, power-supply–related spuriae at 60Hz and 120Hz, the noise floor

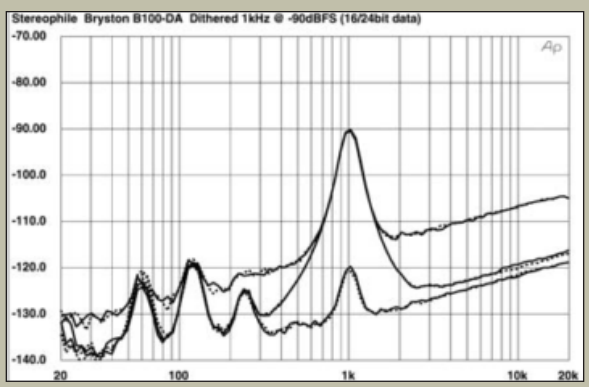


Fig.2 Bryston B100-DA, ⅓-octave spectrum with noise and spuriae of dithered 1kHz tone at –90dBFS, 16-bit data (top) and 24-bit data (bottom). (Right channel dashed.)

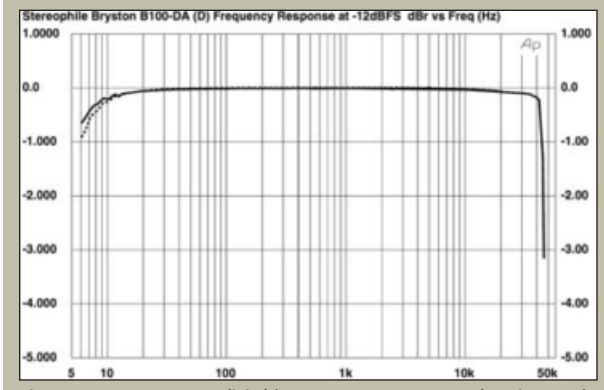


Fig.1 1 Bryston B100-DA, digital frequency response at –12dBFS into 100k ohms with 44.1kHz and 96kHz sample rates (right channel dashed, 0.5dB/vertical div.).

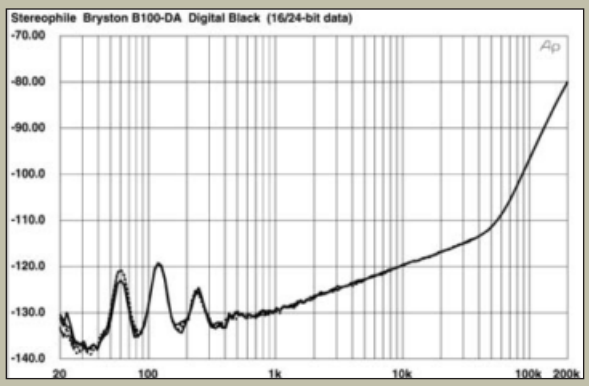


Fig.3 Bryston B100-DA, ⅓-octave spectrum with noise and spuriae of digital black, 24-bit data (right channel dashed).

which can better be used by the DAC." Another advantage is that a "new clock signal is applied which causes a significant reduction in jitter."

The D/A conversion is handled by a Crystal CS43122 chip. A digital low-pass filter is applied to the signal before its conversion to analog, and an analog filter afterward. The DAC's performance is tightly regulated by a separate filtered analog power supply with carefully routed grounds. The same circuitry can be found in Bryston's SP 2, the five-channel preamplifier and digital processor reviewed by Kalman Rubinson in his "Music in the Round" column in September 2006 (Vol.29 No.9). The only difference is that the B100-DA's DAC reclocks and resamples the digital input.

THE **BRYSTON** B100-DA IS BUILT TO LAST.

The B100-DA is built to last. Each unit must survive a 100-hour factory burn-in in which a squarewave input signal drives the amplifier into a load capacitor at slightly under clipping for one hour, followed by one hour off, and so on. This load is designed to draw the amplifier's maximum current delivery on the squarewave's rising leg. Unlike a resistive load, which dissipates all the energy as heat, the capacitor feeds back the entire signal into the amplifier, which puts maximal stress on the output stages. This heats the amplifier, cools it, and heats it again. This expansion and contraction exposes any loose connections or devices subject to early failure. After burn-in, is that of the recorded dither noise. Increasing the word length to 24 bits drops the noise by a good 12dB in the midrange and treble, though this unmasks another supply-related peak, at 240Hz. Repeating the analysis over a wider bandwidth with the B100-DA fed data representing 24-bit digital black again revealed the low level of audioband noise, but with a rising ultrasonic content due to the noiseshaping used by the DAC chip to achieve its resolution (fig.3).

Linearity error assessed with 16-bit data really shows only the effect of the recorded dither (fig.4), while the Bryston's reproduction of undithered data representing a 1kHz tone at exactly –90.31dBFS was essentially perfect with both 16-bit data (fig.5) and 24-bit data (not shown). The B100-DA was also excellent when it came to rejecting word-clock jitter, even via its TosLink optical input. Fig.6, taken with the Miller Audio Research Jitter Analyzer, shows a narrowband spectral analysis of the Bryston's preamplifier output while it decoded 16-bit data representing a high-level tone at exactly one quarter the sample rate, over which had been laid the LSB toggling on and off at exactly 1/192 the sample rate—very much a worst-case test. Even so, the jitter level was just 182.7 picoseconds peak–peak, with data-related sidebands (red numeric markers) almost at the residual level of the test signal. Most of the jitter comes from a sideband pair at ±15.6Hz, but some spectral spreading of the peak representing the 11.025kHz tone can also be seen, suggesting the presence of some random low-frequency jitter.

Turning to the Bryston's preamplifier section, this too preserved absolute polarity for analog input signals, and had a usefully high input impedance of 49k ohms at low and

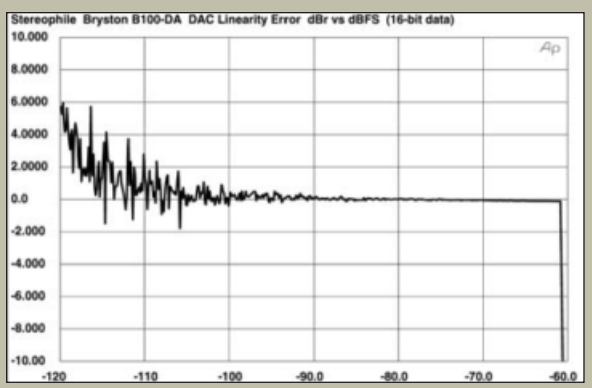


Fig.4 Bryston B100-DA, left-channel departure from linearity, 16-bit data (2dB/vertical div.).

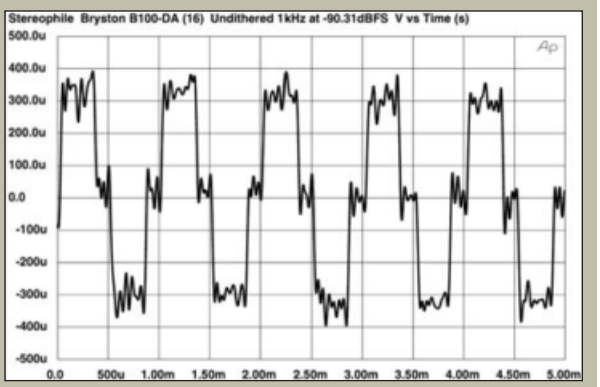


Fig.5 Bryston B100-DA, waveform of undithered 1kHz sinewave at –90.31dBFS, 16-bit data.

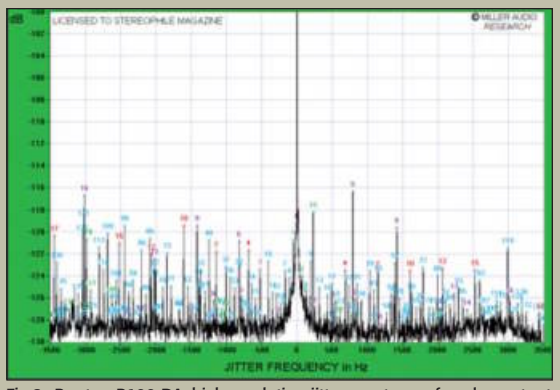


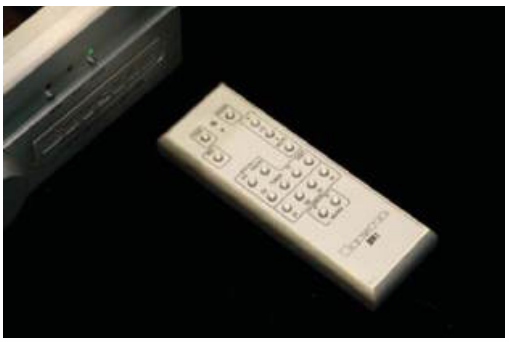
Fig.6 Bryston B100-DA, high-resolution jitter spectrum of analog output signal (11.025kHz at –6dBFS sampled at 44.1kHz with LSB toggled at 229Hz), 16-bit data sourced from PC with RME soundcard and TosLink connection. Center frequency of trace, 11.025kHz; frequency range, ±3.5kHz.

each B100-DA is bench-tested, and those results are shipped with the unit.

Such overengineering, extensive burn-in, and building to the stringent, constant-use demands of professionals allow Bryston to offer its unique warranty program: Bryston will pay parts and labor costs, plus shipping one way, for the first 20 years of ownership (except for the digital circuits, which are warranted for five years, parts and labor).

Rear-panel connections, front-panel controls

At each end of the B100-DA's rear panel are pairs of speaker terminals. Between them are 10 unbalanced analog RCA input jacks per channel, configured in two rows of five each for each side. There is also rear-panel access to the drive circuits for outboard infrared LEDs, and a bidirectional RS-232 data connector for downloading from Bryston's website. Below this is a 12V remote trigger output, and next to it an IEC 320 AC power inlet. A single Connected/Separate switch next to each channel's input bank lets the user internally connect or disconnect the preamp to/from the power-amp section.



cutline

Digital streaming music up to 24/96 can be fed to the B100-DA's S/PDIF coaxial inputs or TosLink optical inputs, which are found near the center of the rear panel. The innermost bottom RCA jacks are designated D1 (S/PDIF coax 2 among the

measurements, *continued*

midrange frequencies, this dropping inconsequentially to 45k ohms at 20kHz. Voltage gain with the volume control set to its maximum was a sensible 12.1dB, while the unity-gain setting was 2 o'clock The output impedance for the preamp jacks was a low 75 ohms at midrange and high frequencies, increasing to 102 ohms at 20Hz, which resulted in a slight infrasonic rolloff when the frequency response was measured into the punishing 600 ohm load (fig.7, bottom pair of traces below100Hz). Into 100k ohms (fig.7, top traces), the preamp response was flat in the audioband, rolling off at ultrasonic frequencies to –3dB at 142kHz. This graph was taken with the volume control set to its maximum; with it set to 12 o'clock, the bandwidth increased very slightly, to –3dB at 156kHz, but the superb channel matching seen in fig.7 didn't change.

Channel separation was superb, at better than 110dB in both directions below 4kHz (not shown), and the B100-DA's preamp section could also output very high levels without distortion. Even into 600 ohms, the Bryston preamp section didn't clip (defined as a THD+N level of 1%) until almost 12V RMS (fig.8, top trace). The fact that

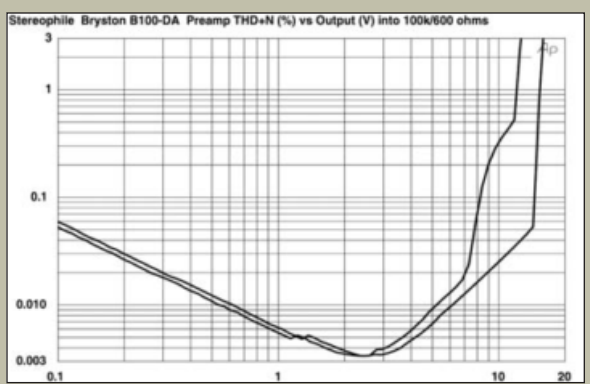


Fig.8 Bryston B100-DA, THD+noise (%) *vs* 1kHz output voltage into (from bottom to top): 100k, 600 ohms.

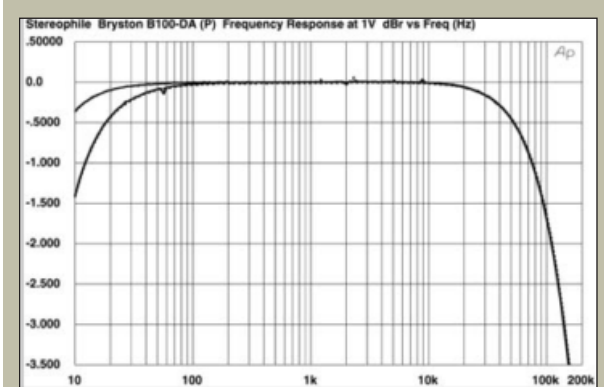


Fig.7 Bryston B100-DA, preamplifier frequency response at 1V into (from top to bottom at 20Hz): 100k, 600 ohms (0.5dB/vertical div., right channel dashed).

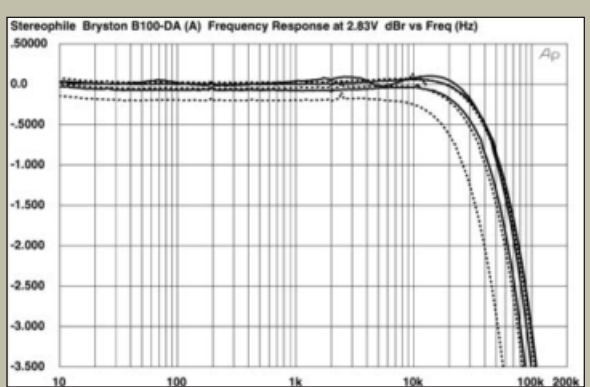


Fig.9 Bryston B100-DA, frequency response at 2.83V into (from top to bottom at 2kHz): simulated loudspeaker load, 8, 4, 2 ohms (0.5dB/vertical div.).

left-channel sockets) and D2 (S/PDIF coax 2 among the right). In the middle of the rear panel are two TosLink optical input jacks, designated D3 and D4.

On the B100-DA's front panel one finds, on the left, a row of seven pushbuttons, above each an LED. These 7 buttons are labeled along the bottom, from left to right: Aux 2, Aux 1/Phono, CD, Tuner, TV, Video, Rec. Pressing the leftmost pushbutton, Aux 2, activates the B100-DA's internal DAC, causing its LED to turn green. When the LEDs of D1 (S/PDIF 1 source), D2 (S/PDIF 2 source), D3 (TosLink 1 source), or D4 (TosLink 2 source), also glow green, this indicates a PCM digital bitstream is present and connected properly. If no bitstream is available, or if the bitstream is incorrect (*ie*, not PCM), the LED will turn red. Pushing Aux 2 again toggles its light off and puts the B100-DA in analog mode. This means that only one source LED of the remaining six input-selector buttons will be illuminated, indicating the exact analog source. The large, anodized, motorized master volume knob can be operated via the remote control in both analog and digital modes. Also on the front panel are the headphone jack, IR sensor, and pushbuttons for {Balance, Mute, Clip, and} Power.

Bryston offers the B100-DA's remote control as a $400 option. Although I grumbled at the thought of having to *pay* for a remote, I changed my tune when I held this full-function example in my hand: it's very well made, its brushed aluminum is highly attractive, and it controls everything: selection of any source, volume up/down, mute, balance, power off/on, and discrete code entry. Its backlighting is even triggered by a motion detector—it lights up as soon as you pick it up. This is the most attractive and cleverly designed remote control I've seen for a high-end audio product. If you buy a B100-DA, definitely get the remote as well.

Music Serving

As I said, I chose to review the DAC-equipped B100 so I could use it with my network music player. I use a Slim Devices Squeezebox network player ($299) placed atop my Krell KRC-28 CD player, connected via a WiFi link to the D-Link DW 624 router sitting in the kitchen, about 20' away. The music is stored on an IBM X-30 laptop, which sits one floor below in my office, which is also connected wirelessly to my WiFi

the traces in this graph slope upward below 2V suggests that the preamplifier's distortion remains below the noise floor at all levels that will be encountered in practical use.

Turning to the power-amplifier section, the input impedance was a low 10k ohms at all audio frequencies, and this section, too, preserved absolute polarity. The voltage gain into 8 ohms was 29dB, resulting in an overall maximum gain for the B100-DA of 41dB. The output impedance was a very low 0.07 ohm at low and midrange frequencies (including 6' of speaker cable), rising very slightly to 0.1 ohm at 20kHz. As a result, the modification of the amplifier's response by the usual Ohm's Law interaction between the source impedance and the way in which the impedance of our standard simulated speaker load changes with frequency (see www.stereophile.com/reference/60) was negligible (fig.9, top trace at 2kHz). Fig.9 shows that while the amplifier's bandwidth did decrease slightly into lower impedances, it was still wide overall, at –3dB at 100kHz into 8 ohms. As a result, the Bryston's reproduction of a 10kHz squarewave featured short risetimes (fig.10), but with a *very* slight uptilt of the waveform tops, this correlating with the *very* slight frequency-response plateau apparent in fig.9 just before the high-frequency rolloff.

The amplifier's channel separation was again superb, at better than 110dB below 3kHz, but capacitive coupling reduced this to a still excellent 94dB in both directions at 20kHz. The unweighted, wideband signal/noise ratio, with the input shorted ref. 2.83V into 8 ohms, was an excellent 84.4dB, this improving to 93.5dB when A-weighted.

With one channel driven, the B100-DA easily exceeded its specified output powers of 100W into 8 ohms (20dBW) and 180W into 4 ohms (19.55dBW). With clipping defined as 1% THD+N, the Bryston clipped at 148W into 8 ohms[1] (21.7dBW) and 200W into 4 ohms (20dBW). The B100-DA is not rated into 2 ohms, but fig.11 shows that it delivered 102W into that impedance (14.1dBW).

The downward slopes of the traces in fig.9, which were taken with a 1kHz tone, suggest that the distortion lies

1 That this is higher than the 137W measured by Bryston's tech is most probably due to my AC line voltage being higher.

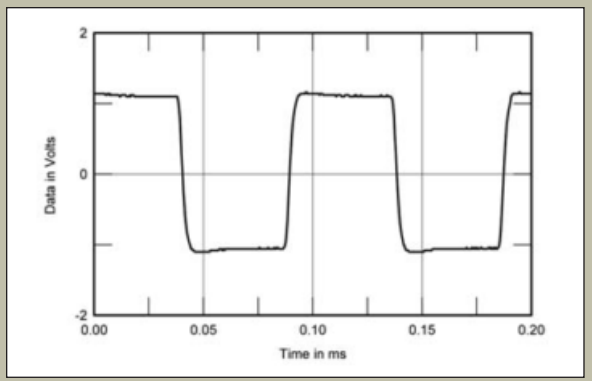


Fig.10 Bryston B100-DA, small-signal 10kHz squarewave into 8 ohms.

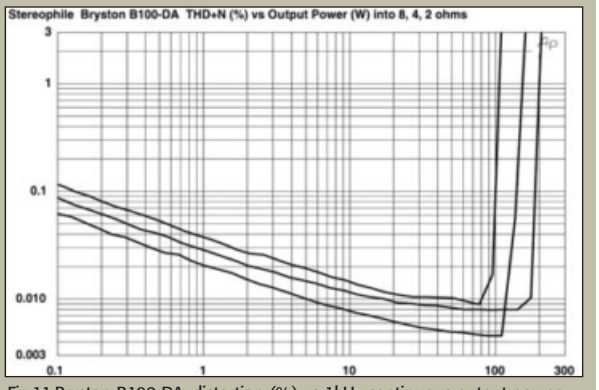


Fig.11 Bryston B100-DA, distortion (%) *vs* 1kHz continuous output power into (from bottom to top at 100W): 8, 4, 2 ohms.

network. (I use a DWL G800 AP D-Link signal booster.) I connected the Squeezebox's S/PDIF output to the B100-DA's D1 S/PDIF input, using a 1.5m length of Wireworld Starlight digital coaxial cable.

I then installed of the Slimserver software on my laptop and used Windows Media Player v.10 to rip tracks from my favorite music CDs as Windows Media Audio (WMA) Lossless files—*ie*, the best sound quality, which requires 206–411MB of hard-drive space per CD. The Slimserver software (v.6.5.0, downloaded from Slim Devices' website) allowed me to gather these lossless music files into a playlist I titled "Stereophile Music CD Test Program." For the listening tests, I also downloaded Beethoven's Symphony 9, with Wyn Morris conducting the London Symphony, from the iTunes website.[1]

Returning upstairs, I remotely browsed my laptop's music folders via the Squeezebox until I found the My Music directory and the "Stereophile

1 According to John Atkinson, though downloaded iTunes music files are protected by Apple's DRM software, the DRM is eliminated when the owner burns the files to a CD. I got the four MP4P music files (one for each movement) comprising Beethoven's Symphony 9 to play over a Slim Devices Squeezebox by first burning them to a blank CD, then ripping them back to my computer's hard drive.

measurements, *continued*

beneath the amplifier's noise floor at almost all power levels. I therefore plotted the Bryston's THD+N percentage against frequency at a fairly high level: 9V, or the equivalent of 10W into 8 ohms. The results are shown in fig.12; the measured distortion below 1kHz or so is actually noise, which is why it doesn't change as the load impedance drops. However, the distortion does rise above 1kHz and into lower impedances, though not to a significant level.

The content of that distortion is predominantly third harmonic (fig.13, with 32 readings averaged to reduce the effect of noise on the oscilloscope trace), though the THD is very low in level even at powers approaching clipping (fig.14). Intermodulation distortion was also very low, even at a power level just below visible clipping on the 'scope screen (fig.15).

The Bryston B100-DA offers a lot of functionality for a relatively modest price. Commendably, its performance has not been compromised in any one area to achieve that functionality. The amplifier should not be used by those wanting to play their music at high powers with loudspeakers whose impedance drops much below 4 ohms, but that's not really a significant limitation. I was impressed by what I found. *—John Atkinson*

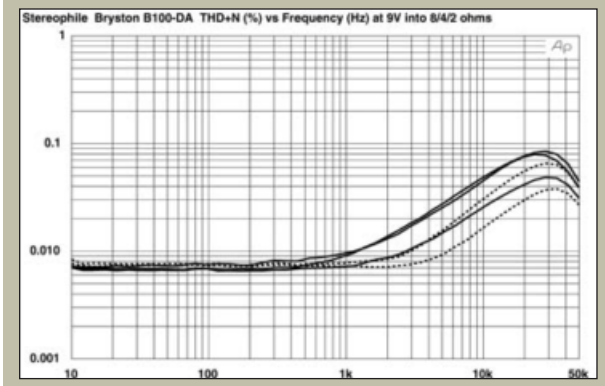


Fig.12 Bryston B100-DA, THD+N (%) *vs* frequency at 9V into (from bottom to top): 8, 4, 2 ohms.

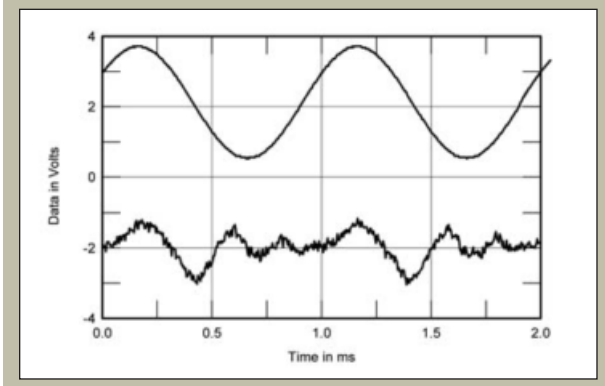


Fig.13 Bryston B100-DA, 1kHz waveform at 25W into 8 ohms (top), 0.0084% THD+N; distortion and noise waveform with fundamental notched out (bottom, not to scale).

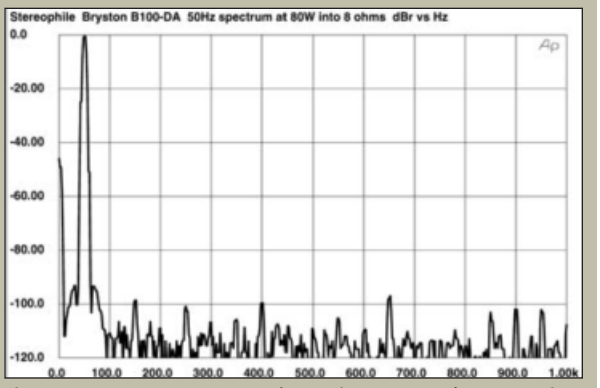


Fig.14 Bryston B100-DA, spectrum of 50Hz sinewave, DC–1kHz, at 80W into 8 ohms (linear frequency scale).

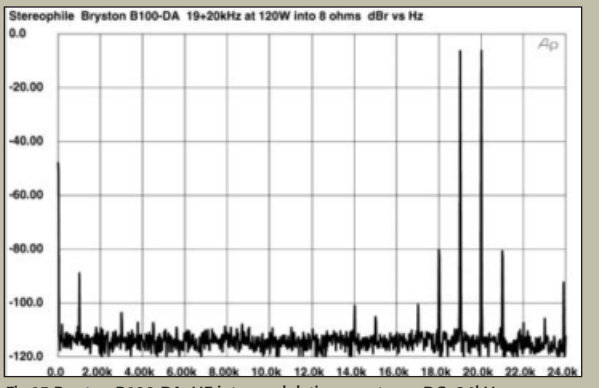


Fig.15 Bryston B100-DA, HF intermodulation spectrum, DC–24kHz, 19+20kHz at 120W peak into 8 ohms (linear frequency scale).

Music CD Test Program" playlist. During my audition of the B100-DA, I selected various tracks from this playlist from my listening-room chair, using the Squeezebox's handheld remote. I also used the free subscription to www.Pandora.com supplied with the Squeezebox to set up my own Internet radio station to play Keith Jarrett recordings over my system.

Setup

The B100-DA SST's chassis is slim, and smaller than that of the Bryston 4B-SST power amplifier, with which I compared it (see sidebar). My components are mounted on a long sidewall, the amplifiers situated out in the room behind my Quad ESL-989 electrostatic loudspeakers. I had to think about just where I would place the B100-DA: with the source equipment on the shelves, or with the amplifiers? The former required very long runs of speaker cable from the sidewall shelves to the speakers, the latter long runs of interconnect from the SACD player, CD player, and tuner—or a Manley Skipjack source switcher. I decided to put the B100-DA and Squeezebox on my equipment shelf and run long speaker cables to the Quads.

Despite the B100-DA's relatively small chassis, its speaker terminals are still large enough to make speaker-cable connections tight and fast. As on other Bryston products, the B100-DA's hollow posts can directly accept single banana plugs, even though they're also placed the requisite 19–25mm apart to meet EU regulations. The posts are also shrouded in plastic to keep fingers from directly contacting the metal. Slots in the shrouds accommodate spade lugs up to 5⁄16" thick.

Listening

After burning in the B100-DA SST by having it drive my Quad ESL-989s, I began feeding its DAC digital signals from my Krell KRC-28 CD player and the Slim Devices Squeezebox, which let me compare CD and wireless sources. Listening to "Too Rich for My Blood," from Patricia Barber's *Café Blue* (CD, Premonition/Blue Note 5 21810 2), I could detect no difference between the digital outputs of the Krell playing the CD and the Squeezebox playing the losslessly compressed file of the same track through the B100-DA's internal DAC—but both digital sources were decidedly better than the SB's internal DAC feeding an analog signal to the B100-DA. For the bulk of my listening, I listened only to streaming digital files fed to the B100-DA.

Through its own internal DAC, the B100-DA's bass response reminded me strongly of the Bryston 3B-ST's. I enjoyed the solidity of the sustained pedal chords from the Lay Family Concert Organ in John Rutter's "The Lord Is My Light and My Salvation" (CD, Reference RR-57CD), and the staccato plucked bass and

BRYSTON 4B-SST POWER AMPLIFIER

I asked Bryston to send me one of their 4B-SST dual-monophonic amplifiers ($3550). I wanted to determine what sonic difference, if any, I could hear between a smaller, 100Wpc integrated amplifier and a larger, 250W power amp from the same company.

I had reviewed various versions of the 4B-SST twice in the past 20 years: for *Audio* in November 1985, and for *Stereophile* in May 1992 (Vol.15 No.5) and in October 1999, Vol.22 No.10. The 4B-SST is Bryston's earliest product, first brought to market in 1976. Its reputation for ruggedness and reliability has resulted in its acceptance by recording engineers and touring musicians, and it has done well with audiophiles because of its good sound and its ability to drive difficult speaker loads. The original 4B-NRB was rated to deliver over 250Wpc, both channels driven, into 8 ohms; and over 350Wpc, both channels driven, into 4 ohms. (Tom Norton confirmed these figures in the January 1993 *Stereophile*, Vol.16 No.1.) The current version of the amplifier, the 4B-SST, is rated at 300Wpc into 8 ohms, 400Wpc into 4 ohms, and over 1000W in bridged monaural mode.

Weighing 44 lbs, the 4B-SST is more massive than the B100-DA SST. It has a 17"-wide silver faceplate, more prominent, rounded heatsink fins, a remote 12V trigger input with delayed output, and selectable inputs for balanced or single-ended input connectors.

Like the B100-DA, the 4B-SST has a separate power supply for each channel, both in a single chassis. Its two separate amplifiers are arranged symmetrically, with every part is duplicated, with the exceptions of the single power cord and the bridging-circuit board. Two large toroidal-core transformers fill the front of the chassis, near the front panel, where they are optimally supported when the amp is mounted in a rack. Output transistors and drivers are mounted in vertical groups of three to the sides and back of the chassis. One PC board in each channel spans two vertical groups and contains the amplifier drive circuitry. Two other boards are hardwired to this drive board. The 4B-SST's construction allows for the entire board assembly to be removed for replacement. Eight 4700µF filter capacitors per channel are connected directly to the channel-frame PCBs.

The 4B-SST uses a double-complementary differential input circuit. The 4B-SST's output stage has been improved over the years, partially through hand-selecting the bipolar devices, which produces an output stage quite tolerant of loading. It also is said to eliminate all zero-crossing anomalies, including notch distortion.

Listening to the earlier version of this amplifier 14 years ago, I praised its "solid, deep, fast, powerful, and well-defined" bass response, along with its excellent width of soundstage, depth of image, and separation between instruments.

After throwing the B100-DA's rear-panel Connected/Separate switches to disconnect its own power-amp sections, I connected its two preamp-output jacks to the 4B-SST's input jacks. The combination of B100-DA and 4B-SST drove my Quad ESL-989 speakers to produce the same bass slam and snap, the same deep soundstaging, the same separation between instruments I'd heard with the B100-DA alone. Together, the two components were slightly more transparent than the integrated amplifier, but even so, I was hard-pressed to hear any improvement over the B100-DA's extended highs and smooth midrange through the Quads. However, the 4B-SST did play deeper in the bass and had better dynamics when driving the more power-hungry Revel Ultima Salon speakers.

I recommend both amplifiers for use in a high-end system, but the 4B-SST has the advantage when higher sound levels are desired from dynamic speakers.

—Larry Greenhill

deep synthesizer in "Something's Wrong," from Randy Edelman's score for the film *My Cousin Vinny* (CD, Varèse Sarabande VSD-5364). The synthesizer notes in Terry Dorsey's "Ascent," from *Time Warp* (CD, Telarc CD-80106), were well defined and went deep, and I could easily discern pitch changes in low-frequency synthesizer notes on "Behind the Veil," from Jeff Beck's *Beck's Guitar Shop* (CD, Epic EK 44313).

Besides reproducing deep bass, the B100-DA could create a sense of depth and space that seemed an accurate facsimile/re-creation of the recording venue. This was evident when I listened to Jean Guillou's transcription for pipe organ of Mussorgsky's *Pictures at an Exhibition* (Dorian DOR-90117)—in *Gnomus,* the organ was reproduced with the airiness I associate with a cathedral. The B100-DA also could create more intimate ambiences, such as the one heard surrounding Glen Moore's plucked string bass in "The Silence of a Candle," from Oregon's *Beyond Words* (CD, Chesky JD130).

Playing the digital stream, the B100-DA's highly satisfying performance captured the different timpani pitches in Stravinsky's *The Rite of Spring,* as performed by Eiji Oue conducting the Minnesota Orchestra (CD, Reference RR-70CD, tracks 21–24). The B100-DA tracked the pitch and dynamic contrasts heard on this excellent recording, coaxing surprisingly deep bass from the Quads. The Bryston's midrange reproduction was most impressive—the brassiness of trumpets, for example, was raw and involving without being annoying.

The B100-DA revealed the richness of Patricia Monheit's dark voice in her rendition of the 1941 torch song "Besame Mucho," from The Frank and Joe Show's *33⅓* (Hyena SD 9320). This track was just as enthralling for its "seductive timbral voluptuousness," as John Marks described it in "The Fifth Element" in the April 2006 issue. The B100-DA also conveyed the beguiling sadness and sweetness of Richard and Linda Thompson harmonizing on "Dimming of the Day," from the soundtrack of *Divine Secrets of the Ya-Ya Sisterhood* (CD, DMZ/Columbia CK 86534). Paul Simon's voice remained clear and warm at high volumes as he sang "Trailways Bus," from *Songs from The Capeman* (CD, Warner Bros. 46814-2).

The B100-DA's highs were clean, open, effortless, grain-free, and extended. Paul Simon's vocal sibilants at the beginning of "Trailways Bus" didn't hiss, but were natural, not irritating. Billy Drummond's brushed ride cymbal in "The Mooche," from the Jerome Harris Quintet's *Rendezvous* (CD, Stereophile STPH013-2), had the characteristic buzz and shimmer of wire brushes, not the static-like hiss heard from lesser amplifiers.

The B100-DA's imaging was delightful. Patricia Barber's voice was holographic and riveting on "Too Rich for my Blood," the instruments behind her clearly separated and occupying their own spaces. In Ariel Ramirez's *Misa Criolla* (CD, Philips 420 955-2), tenor José Carreras was centered, surrounded by huge amounts of space that helped conjure up an empty, desolate ambience of solitude and desolation. Live recordings also benefited, as revealed by the intimacy and relaxed atmosphere of the Green Mill nightclub, where Patricia Barber recorded *Companion* (CD, Premonition/Blue Note 5 22963 2). The width of the Bryston's soundstaging was also impressive, as I heard when I played the instrumental finish of Richard Thompson's "Why Must I Plead," from *Rumor and Sigh* (CD, Capitol CDP 7 95713 2). The B100-DA was able to move the guitar's image well beyond the outer edge of my right-channel Quad ESL-989.

The dynamic range was very good to excellent. In "The Hand-Off," from James Horner's soundtrack score for *Sneakers* (CD, Columbia CK 53146), the piano scales exploded out of dead-black silence. And while not as dynamic-sounding as the Revel Salon speakers, my Quads when driven by the B100-DA captured the explosive rim shots, tom-tom beats, kick-drum notes, and audience callouts during the drum solo in "The Maker," from Emmylou Harris' *Spyboy* (CD, Eminent EM-25001-2).

Conclusions

I'm excited about Bryston's B100-DA SST integrated amplifier. Not only is it a rugged and reliable amplifier with a 20-year warranty, it's small, compact, and with the DAC option, it will integrate well with an audio system based on a centralized, wirelessly delivered music library. Whether playing music from a hard drive, or downloaded, or streamed from such services as Pandora.com or Rhapsody.com, the owner of a B100-DA will be able to tap an excellent sonic source.

Sonically, the B100-DA has much of the 4B-SST's character, with its bass definition and speed, openness of high frequencies, and soundstage width, lacking only the 4B-SST's deep-bass punch and greater macrodynamics.While it's easier to warm up to an amplifier with a seductively captivating midrange, such as the much more expensive VTL S-400 ($20,000), the B100-DA is much more neutral and can also throw one of the deepest, broadest soundstages of any amplifier I've heard.

And for streaming digital sources, I'll take the B100-DA's tonal neutrality, conveniences, small size, easy installation, superb DAC, and backlit remote. Combine all of those features with the B100-DA's bass definition, wide soundstaging, and open highs, and I can hear the music's subtlest details through my Quad ESL-989s. Like Bryston's own 14B-SST and 4B-SST, their little B100-DA SST integrated amplifier connects me to what I truly love in my music collection, and proves that multiple audio functions can work well in a small package.

ASSOCIATED EQUIPMENT

ANALOG SOURCE Linn Sondek turntable with Lingo power supply, Linn Ittok tonearm, Spectral MC cartridge.
DIGITAL SOURCES Krell KRC-28 CD player, Sony SCD-C555ES multichannel SACD/CD player, Slim Devices Squeezebox and Roku Soundbridge M-1001 network music players.
FM TUNERS Day-Sequerra Signature 1, McIntosh MR-78.
PREAMPLIFIER Krell KCT.
POWER AMPLIFIERS Bryston 4B-SST, Mark Levinson No.334, Krell FPB 600c, VTL S-400.
LOUDSPEAKERS Quad ESL-989, Revel Salon, Velodyne DD-18, REL Studio III.
CABLES Digital coax: Wireworld Starlight. Interconnect: Red Rose Silver One, Krell CAST, Mark Levinson Silver single-ended, Bryston balanced. Speaker: Ultralink Excelsior 6N OFHC, Coincident Speaker Technology CST 1.
ACCESSORY RadioShack 33-2050 analog sound-level meter.

—Larry Greenhill