BRYSTON BCD-3

CD PLAYER

A question I am often asked is: 'Why would anyone buy a CD player these days?' I usually just answer with a single word: 'Simplicity'. I am now consciously trying to reduce the stresses of modern living by making my own life as simple as possible. When I want to play music, I rather like that I can just pop a CD in a drawer, press play and be listening to music immediately. Yes, I have ripped all my CDs. Yes, I have a music server connected to my system. Despite this, when I want to listen to music, it's more likely that I'll browse the CDs stored on my shelf, select one and play it than that I'll pull out my phone, fire up an app, browse through the music stored on my NAS and play from that.

The same question must often be asked of the folks up at Bryston, in Canada, because they have an answer published on their website. Here it is, verbatim: '*Although high resolution digital downloads dominate the attention of audiophiles, many music lovers have hundreds or thousands of CDs that require the finest playback equipment to sound their best. Though universal disc players or DVD players can play back CDs, they certainly won't resolve the full dynamic range and nuance the medium is capable of. Such players inherently compromise CD playback to support additional formats.*'

THE EQUIPMENT

The Bryston BCD-3's front panel looks quite standard until you switch it on and the display lights up and you discover that it's amazingly crisp and sharp.

In fact it's downright beautiful… probably the best display I have ever seen on any CD player ever. It turned out to be an OLED, of course, but in the course of discovering this, I also discovered that it comes in different colours: blue and green. You can choose either, but it's a factory-only option, so if your local hi-fi store doesn't have both colours in stock, ordering a different colour might take a while.

Despite the provision of this state-of-the-art display, Bryston has included an option that means you don't have to use it. If you connect the BCD-3 to your local area network (via the Ethernet interface on the rear panel), you can control it via a web browser.

You can also update the BCD-3's firmware via Ethernet for the purpose (according to Bryston) of '*ensuring reliable operation and add new features.*'

If you choose to operate the Bryston using the front panel controls you'll find all the usual buttons are there, along with the less-usual 'Repeat' button (though it only does Track and Disc repeats, not A–B repeats), and 'Random'. If you use Bryston's BR2 remote control to control the BCD-3 (which will require an additional purchase, since Bryston doesn't provide one with the BCD-3), you will get a feature that is not available from the front panel: direct track access using 0–9 buttons. This is handy if you regularly skip tracks on CDs that have dozens of tracks, but on most CDs I find it's faster

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to just press the 'Previous' or 'Next' buttons multiple times. This system of skipping tracks works particularly well on the BCD-3 because it has a buffer than allows you to press multiple times very quickly, and track access is also quick, so I probably wouldn't bother buying the remote unless I had other Bryston components (though if this were the case you might already own a BR2 remote!).

The disc drawer is very solid and, rather refreshingly, made of metal rather than plastic. Rather too solid in fact, because there are metal rods either side of the tray that no doubt increase rigidity but make it very hard to remove discs unless you jamb your finger into the CD's centre hole and remove the disc from the tray that way. I found it almost impossible to remove a disc from the tray by grasping it by its outer circumference.

The rear panel of the Bryston BCD-3 has both balanced (XLR) and unbalanced (RCA) analogue outputs, and AES/EBU (XLR) and S/PDIF (RCA) digital outputs. It also has RS232, Ethernet, USB and 'Remote' connectors. Note, however, that the USB input is only for system control—it does not accept (or output) digital audio signals. There is also no headphone output—either on the front or the rear panel which, because I do a lot of headphone listening and prefer my headphones to be as close to the original source as possible (so as to have the least circuitry in the way) I view as a fairly significant oversight… but you might have a different opinion.

Not surprisingly (since they were both designed by the same person and they have almost identical model numbers) the BCD-3 uses most of the same digital circuitry as Bryston's BDA-3 DAC, including exactly the same DACs (AKM 4490s) in exactly the same configuration (two per channel, in differential mode). And, as with the BDA-3, the analogue output section of the BCD-3 operates entirely in Class-A, and all the gain and buffering devices are discrete and all the components for it are on their own PCB. The power supply is on another PCB all by itself and the digital circuitry is split over two PCBs. In fact, in a rather beautiful piece of electronics design, there are only 12 'thru-hole' components in the entire machine… all else is surface-mount. Well done Dan Marynissen! I have to mention the build quality too, which is exceptionally good, plus the fact that the BCD-3 is made in Bryston's own factory in Canada.

IN USE AND LISTENING SESSIONS

After loading my very first CD into the player (and these are the only discs the BCD-3 will play, by the way) I played around with the transport controls a little and made a few discoveries. The first was that the fast-forward and fast-reverse buttons are multi-stage so one press will start a slow-ish search and a second press will speed that search up. Pressing the button a third time drops you back into play.

The 'Play' button does the usual, but if you press it while a disc is playing, it will re-start play at the beginning of the track. Conversely, if you press |<< while playing a track, it skips you back to the beginning of the previous track. I was not used to this functionality, but once I became used to it, it then seemed like an excellent way of arranging the transport logic.

What wasn't quite so logical—at least to me—is that the player won't skip tracks while a disc is paused, and in order to get the player out of its pause mode you need to press pause again: pressing 'play' won't do it. Another quirk I discovered was that whenever I connected the BCD-3 to my network and used my browser to control it, whatever CD I next tried to load into the player would rarely load, with the display just showing 'Reading' continuously. Ejecting the disc and then re-loading it always fixed this issue, so it's obviously just a programming glitch and will likely already have been fixed by the time you read this review, because the machine I was using had old firmware (V2016.12c).

The very first disc I just had to play was a strange one titled 'Colour Thinking' by Human 2.0 that was recorded by Dutch outfit trptk in 352.8kHz 32-bit DSD using only state-of-the-art technology. The company makes its recordings available in all formats, but obviously I was listening to the CD version. It's a conceptual album that marries conventional instruments with electronics and samples plus a small choir. I'd been finding it strangely beguiling on other components and in other formats and I wanted to hear how well the Bryston BCD-3 would reproduce the sounds on the disc, more than listen to the music itself. Wow! It was immediately obvious just from the very first track (*Progress*) that the sound from the Bryston BCD-3 left the sound from my own player in the shade, which rather stuck in my craw since BCD-3 retails for just over half of what I paid for my own machine. I was hearing deep, rich, bass sound, super-authentic percussion (cymbals in particular, but the sound of the snare drum was also amazing), but it's the overall soundscape that's created by the BCD-3 that is the most mesmerizing. The guitar sound on *Problem Child* howled from my speakers like a banshee, echoing the howl of lead singer Robin Coops.

Despite its strangeness, I liked this disc so much that I invoked the BCD-3's 'Repeat' mode, and through a curious twist of fate discovered that this mode is eternal: if you switch it on, the Bryston will continue to play the disc (or track) forever.

This obviously wouldn't be good for either the drive motor or the laser, so I'd advise using this mode with caution, and making sure you remember to turn the player off whenever you've finished listening… just in case. (But again, this might have been fixed in firmware already… which is one of the beauties of the BCD-3's firmware being updateable.)

On more familiar fare, the performance of the Bryston BCD-3 was equally exceptional. Listening to Winds of Change's 'Work of Art', the reproduction was as good as I've ever heard this album sound at 16-bits and 44.1kHz. Listen, for example, to the finger snaps that kick off *My Love for You* and you'll be amazed by the clarity and reality of the sound… indeed it's so clear and so realistic-sounding that I am prepared to bet that you just will not believe you're listening to a standard Red Book CD. Listen through the entire album and you'll be equally amazed by the dynamics: they're simply incredible.

I sampled more highly dynamic music listening to Aix Records' album 'Guitar Noire' which features ex-Wings guitarist Laurence Juber, Steve Forman (percussion) and Domenic Genova (bass). The sound of Juber's Martin acoustic is perfectly captured, as is the sound of Genova's double-bass. The realism of these instruments—and the sound of the percussion—as reproduced by the Bryston BCD-3 is inspiring.

Even on 'standard' commercial pressings, such as Red Hot Chilli Pepper's 'Blood Sugar Sex Magik', tracks such as *Suck my Kiss* showed the Bryston BCD-3 delivered superlative sound throughout… not the least impressive characteristic of which was the ability to delineate bass lines in the midst of high-powered bass mayhem. More than a few components have difficulty resolving Chad's closely-miked kick drum and Flea's simultaneous hi-jinks on bass on *Suck* in particular, but listening to the BCD-3, the bass sounds were completely differentiated and delivered with amazing detail, without losing any pace, rhythm or timing.

CONCLUSION

Many pundits in the hi-fi industry will tell you: '*The CD is dead*.' I'd have to disagree, but even if they're right and I'm wrong, I can tell you that if you had to buy your very last CD player, Bryston's BCD-3 is most definitely the one I would recommend. *Martin Iredale*

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Readers interested in a full technical appraisal of the performance of the Bryston BCD-3 CD Player should continue on and read the LABORATORY REPORT published on the following pages. Readers should note that the results mentioned in the report, tabulated in performance charts and/or displayed using graphs and/or photographs should be construed as applying only to the specific sample tested.

CONTACT DETAILS

Brand: Bryston
Model: BCD-3
RRP: $5,199
Warranty: Three Years
Distributor: BusiSoft AV Pty Ltd
Address: 158 Christmas Street
Fairfield VIC 3078
TF: 1300 888 602
T2: (03) 9810 2900
W: www.busisoft.com.au

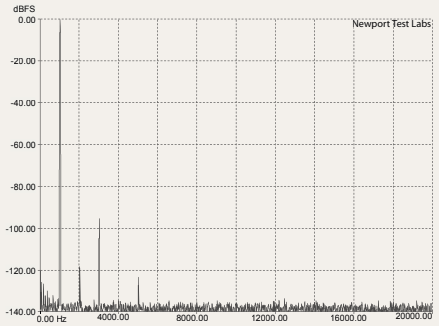
- Incredible sound
- Build quality
- Upgradeability

- Remote control
- Headphone output
- Digital input

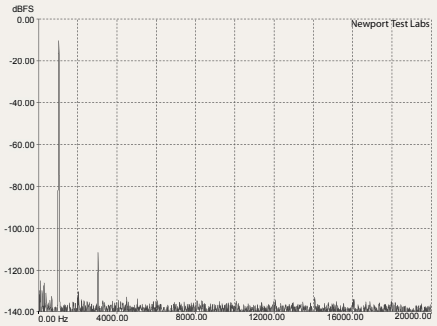
LABORATORY TEST REPORT

Newport Test Labs measured the output voltage of the balanced outputs of the Bryson BCD-3 as being a bit over 4-volts (see the table for the exact voltages), with of course the unbalanced outputs coming in at half this voltage. The difference in voltage between the two channels put the channel balance at an outstandingly good 0.051dB. Channel separation was so good that the guys at the lab were asked to double-check their results, but they reported that they were right the first time: 150dB at 20Hz, 157dB at 1kHz and 137dB at 20kHz. I am fairly certain that those are the best results *Newport Test Labs* has ever recorded for a CD player.

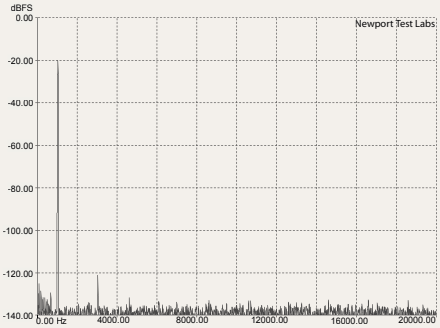
Graph 1. THD @ 1kHz @ 0dB recorded level.



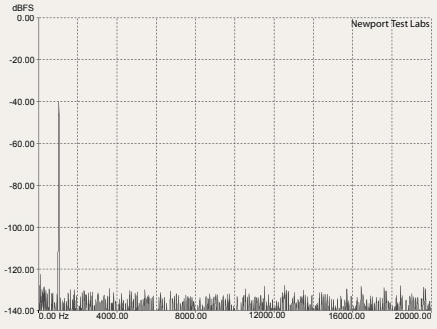
Graph 2. THD @ 1kHz @ –10dB recorded level.



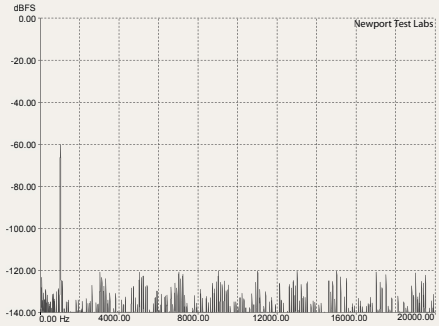
Graph 3. THD @ 1kHz @ –20dB recorded level.



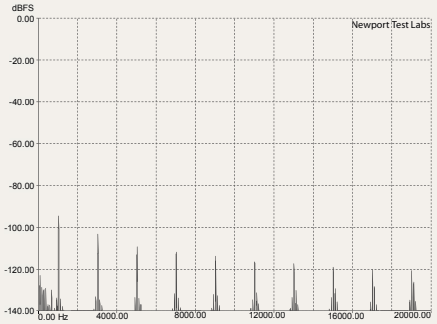
Graph 4. THD @ 1kHz @ –40dB recorded level.



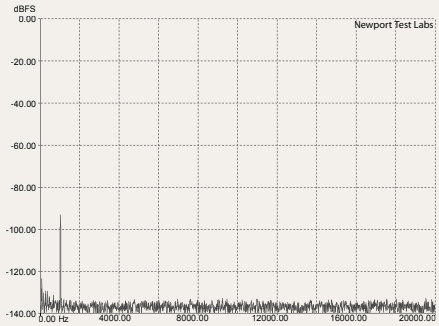
Graph 5. THD @ 1kHz @ –60dB recorded level.



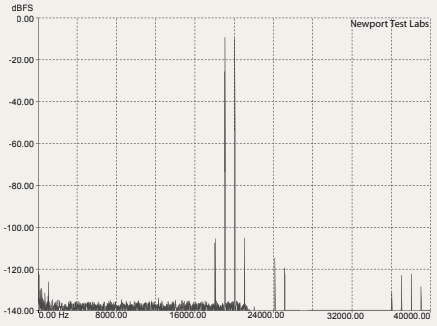
Graph 6. THD @ 1kHz @ –91.24dB recorded level. (No dither)



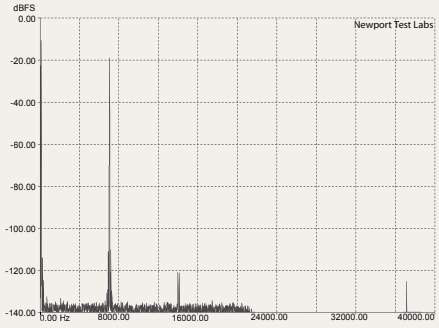
Graph 7. THD @ 1kHz @ –90.31dB recorded level. (With dither)



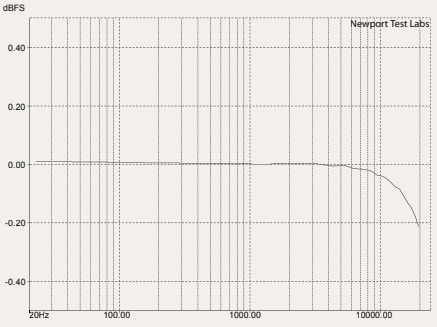
Graph 8. CCIF Distortion (Twin-Tone Intermodulation) @ 0dB using 19kHz and 20kHz test signals in 1:1 ratio.



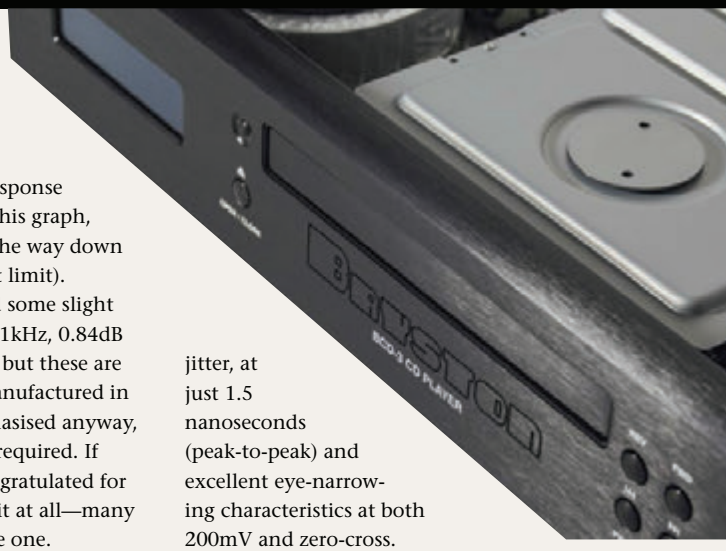
Graph 9. SMPTE Distortion @ 0dB using 60kHz and 7kHz test signals in 4:1 ratio.



Graph 10. Frequency Response at @ 0dB recorded level.



Remember, too, that this is ordinary Red Book CD testing! Inter-channel phase was also outstandingly good, coming in at 0.01° at 20Hz, with a 'worst' result of just 0.81° at 20kHz. THD+N was a vanishingly low 0.002% at 1kHz at 0dB and the distortion spectrum is shown in Graph 1. You can see there's a second harmonic distortion component at –118dB (0.0001%), a third at –95dB (0.0017%) and a fifth at –123dB (0.00007%). That's it! What's more, the overall noise floor is sitting down at –140dB, with the low-frequency noise at the extreme left at around –120dB. If you look at the tabulated results, you'll see that *Newport Test Labs* measured the overall signal-to-noise ratio at 116dB unweighted, and 123dB A-weighted. This means the Bryston BCD-3 is going to be a lot quieter



than any electronics you use to amplify its signal. At a recorded level of –10dB, which is more like what will be peak level on a typical commercial CD, only two harmonics are visible, a second at –132dB (0.00002%) and a third at –112dB (0.00025%). The low-frequency noise has dropped a little, so even that little noise at 0dB was likely caused by the maximum signal level… which would not be present on a commercial CD.

At –40dB recorded level, there's no harmonic distortion visible at all, just 'grass' on the noise floor because of the lack of dithering on the 1kHz test signal. (If the signal had been dithered, the 'grass' would disappear.) You can see this on Graph 6, which shows the Bryston BCD-3's response to an undithered 1kHz test signal recorded at –91.24dB compared to Graph 7, which shows the Bryston's performance with a dithered 1kHz test signal at –90.31dB. The distortion components disappear entirely, and the noise floor becomes uniform across the audio spectrum… though slightly higher in level. However, since that noise floor is still sitting down at –140dB, it's not an issue. You can read an excellent article about dither at www.tinyurl.com/magic-dither.

Newport Test Labs measured intermodulation distortion (IMD) using two different techniques, CCIF (Graph 8) and SMPTE (Graph 9) and the Bryston BCD-3 returned superb results in both cases. On Graph 8 you can see the two test signals at 19kHz and 20kHz around the centre of the graph. There are only two sidebands, both down at around –105dB (0.0005%) and the unwanted 1kHz difference signal is down even further at –126dB (0.00005%). The signals above 20kHz are IMD products related to the sampling frequency, but other than one at –117dB (0.00014%) they're all 120dB (0.0001%) or more down. All these IMD products would be completely inaudible. On Graph 9 the test signals are at 60Hz and 7kHz (in a 4:1 ratio) and you can see some sidebands on the 60Hz signal that are around 110dB (0.00031%) down, plus some distortion around 16kHz that's more than 120dB down (0.0001%). As I said: superb results.

The Bryston BCD-3's frequency response is shown in Graph 10 and even a cursory glance shows that it's ruler flat, particularly when you realise that the vertical scale of the graph has been expanded so far that each horizontal division represents a difference in level of only 0.2dB. This means the response is within 0.01dB of reference up to 5.2kHz, after which it 'rolls off' to be down 0.21dB down at 20Hz. So normalised, the frequency response measured by *Newport Test Labs* was 20Hz to 20kHz ±0.11dB.

In other words, superb. The response below 20Hz is not shown on this graph, but it extends equally flat all the way down to 2Hz (the lab's measurement limit).

The Bryston BCD-3 showed some slight de-emphasis errors (0.16dB at 1kHz, 0.84dB at 4kHz and 0.34dB at 16kHz) but these are small and no compact disc manufactured in the past 30 years will be emphasised anyway, so de-emphasis would not be required. If anything, Bryston is to be congratulated for including a de-emphasis circuit at all—many modern CD players don't have one.

Linearity errors were very low, as you can see from the tabulated results, with no error at all at –60dB and –70dB and a worst-case error of just 0.11dB, at –80.70dB. This means sounds will be reproduced at the correct level, according to their recorded volume.

Impulse testing showed that the AKM DAC appears to use a minimum-phase reconstruction filter, so there's no pre-ringing at all—all the ringing occurs after the impulse. The square wave shows identical performance.

The quality of the signal from the digital outputs was outstanding, with ultra-low jitter, at just 1.5 nanoseconds (peak-to-peak) and excellent eye-narrowing characteristics at both 200mV and zero-cross.

Power consumption when the Bryston was playing was about what I'd expect for a CD player, but the standby power consumption of 2.07-watts is about twice what I'd expect from a modern hi-fi component, with the Australian government expecting standby consumption to be less than 0.5-watts. That said, 2.07-watts isn't going to impact on your power bills, but to be green, you should turn the player off when you're not using it.

Overall, superb performance from the Bryston BCD-3 CD player. This is a state-of-the-art component. *Steve Holding*

Bryston BCD-3 CD Player — Laboratory Test Results

Analogue Section	Result	Units/Comment
Output Voltage (Balanced Outputs)	4.0484 / 4.0243	volts (Left Ch/ Right Ch)
Frequency Response	See Graph	dB (20Hz – 20kHz)
Channel Separation	150 / 157 / 137	dB at 16Hz / 1kHz / 20kHz
THD+N	0.002%	@ 1kHz @ 0dBFS
Channel Balance	0.051	@ 1kHz @ 0dBFS
Channel Phase	0.01 / 0.04 / 0.81	degrees at 16Hz / 1kHz / 20kHz
Group Delay	180 / 2.77	degrees (1–20kHz / 20–1kHz)
Signal-to-Noise Ratio (No Pre-emph)	116 / 123	dB (unweighted/weighted)
De-Emphasis Error	0.16 / 0.84 / 0.34	at 1kHz / 4kHz / 16kHz
Linearity Error @ –60.00dB / –70.00dB	0.00 / 0.05	dB (Test Signal Not Dithered)
Linearity Error @ –80.59dB / –85.24dB	0.00 / 0.01	dB (Test Signal Not Dithered)
Linearity Error @ –89.46dB / –91.24dB	0.06 / 0.02	dB (Test Signal Not Dithered)
Linearity Error @ –80.70dB / –90.31dB	0.11 / 0.06	dB (Test Signal Dithered)
Power Consumption	2.07 / 13.28	watts (Standby / On)
Mains Voltage During Testing	235 – 254	(Minimum – Maximum)
Digital Section		**Units/Comment**
Digital Carrier Amplitude	254.15mV	Audioband
Digital Carrier Amplitude	3.48V / 3.22V	Differential / Common Mode
Audioband Jitter	1.5 / 0.008	nS (p–p) / UI (p–p)
Data Jitter	1.5 / 0.008	nS (p–p) / UI (p–p)
Deviation	–5.5	ppm
Frame Rate	44099.757	
Eye-Narrowing (Zero Cross)	1.5 / 0.008	nS (p–p) / UI (p–p)
Eye-Narrowing (200mV)	2.7 / 0.016	nS (p–p) / UI (p–p)
Absolute Phase	Inverted	