

australian

# hi fi



# 20-Year Warranty!

We review and test Bryston's fabulous B135 SST<sup>2</sup> amplifier

**ALSO REVIEWED**

**NAD PP-2i**

Phono Preamplifier

**GoldenEar Aon 3**

Loudspeakers

**Unison Research Simply Italy**

Integrated Amplifier

**Whatmough Signature P15 SE**

Monitor Speakers



**esoterica  
magazine  
inside!**

May/June 2013  
A\$8.95 NZ\$10.99

**AVHUB.COM.AU**





# Bryston B135-SST<sup>2</sup>

## INTEGRATED AMPLIFIER

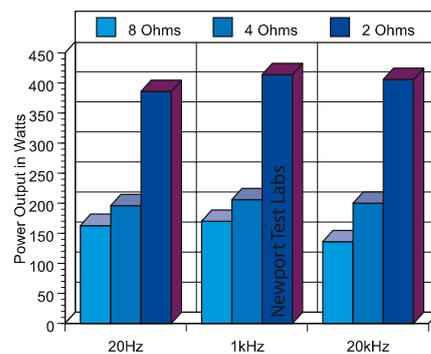
I have just been hexed by the god of smoke. In case I'm being too obscure with this reference, I should point out that I'm referring to an old electronic technician's joke which had it that the reason all electronic components worked was because of smoke. This was easily provable because when any smoke leaks out from any electronic component, it stops working.

As for me being recently hexed by the god of smoke, I have suddenly experienced a spate of such smoke-related incidents, involving two amplifiers, a CD player, a network audio player, and two computers (one portable, the other a desktop). These incidents have been not only extremely annoying and personally disruptive, but have also caused me to become intimately acquainted with the current outrageous cost of spare parts and the equally outlandish hourly rate for electronics technicians. Having perused a few of their invoices, I was thinking about writing an apologetic letter to the surgeon who operated on me last year for having the gall to complain about the bill he sent me following my surgery.

'So what the hell has any of this got to do with a review of the Bryston B135-SST<sup>2</sup>?', I

hear you ask. Quite a lot, as it happens. You see, Bryston is the only hi-fi manufacturer of which I'm aware that offers a full 20-year warranty on its analogue electronic components. And if your jaw hasn't dropped after reading that, I'll say that again, but add a bit of bold type to the truly jaw-dropping bit: a full **20-year warranty**. That is precisely 19 years longer than the average manufacturer's warranty, and around 17 years longer than the very best of them. I once asked Brian Russell, President of Bryston, who is a regular visitor to Australia, how he could afford to offer such a long warranty and he just shrugged and told me: 'because nothing ever goes wrong with them.'

To realise why Bryston amplifiers don't break down you need to know that this proudly Canadian company started off (51 years ago, so they're no babes in the woods) making medical electronics, and when you're making medical electronics, you have to be 200 per cent certain nothing is going to go wrong! It was only afterwards that the company started building amplifiers for professional audio applications—recording studios, radio stations and the like. And although amplifier failures in these



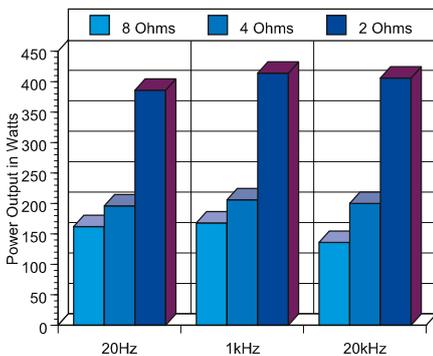
Power Output: Single channel driven into 8-ohm, 4-ohm and 2-ohm non-inductive loads at 20Hz, 1kHz and 20kHz.

applications aren't a matter of life and death, they're certainly mission-critical, particularly if a radio station goes off-air in the early hours of the morning, or some fabulously well-paid musicians are waiting around in a recording studio because of an electronics failure, so it's important that professional amplifiers be completely 'bulletproof'.

How do you go about doing this? If you're Bryston, you start with good circuit designs, then build them with the highest-

quality components money can buy, and then operate these components well within their thermal and electrical limits, but build in some sophisticated protection circuits just in case. Then you make sure you have total control over build quality by building your amplifiers entirely in your own factory in Peterborough, Ontario, Canada, including first-class quality control systems. Finally, before shipping any amplifier, you run it at high-power for a full 100-hours before you pack it for shipping to the customer.

All of which is not to say you won't have the occasional failure, possibly because of matters beyond your control. You'll be pleased to know that if this does happen with a Bryston, you can be assured of gold-plated service, because an independent survey



Power Output: Both channels driven into 8-ohm, 4-ohm and 2-ohm non-inductive loads at 20Hz, 1kHz and 20kHz.

conducted in 43 US states and 7 Canadian provinces by industry publication 'Inside Track' put Bryston at the top in the 'Product Performance' and 'Resolution of Service Return/Repair' categories and at the number two spot in the 'Tech Support' category.

**THE EQUIPMENT**

The B135-SST<sup>2</sup> integrated amplifier is a completely new design for Bryston, one that took two years to perfect, even given that it apparently incorporates some technologies developed for Bryston's SP3 processor and also borrows some from Bryston's SST power amplifiers. Like many integrated amplifiers these days, the B135-SST<sup>2</sup> comes in a few different 'flavours'. You can purchase the amplifier as a basic stereo amplifier, in which case it retails for \$5,999. Or, if you like the idea of incorporating a DAC on-board (to make an 'AmpliDAC') you can option-in Bryston's DAC for an additional \$1,699.

If you have a turntable, you have the further choice of optioning in a moving-magnet phono stage (\$799). I was a bit

surprised to find that the remote control is also an optional extra, and that if you want one, it will cost you a further \$749. However, if, like me, you consider a remote control a bit of an unnecessary luxury—at least on an amplifier—you will need to know something about Bryston's remote, which is that if you plan on using the B135-SST<sup>2</sup>'s 'Pass Through' feature (about which more later), you will have to buy the remote control because it's required to activate (and deactivate) the 'Pass Through' circuitry.\* (\*This is not strictly true, because you can also control the status of the pass-through circuitry by sending the required command codes via the RS232 serial data input on the B135-SST<sup>2</sup>'s rear panel but frankly, I can't see anyone doing this when it's so much easier to do it with the remote control.)

The Bryston B135-SST<sup>2</sup> amplifier loaned to me for review by Syntec was the company's most basic model, sans DAC and sans phono stage. This meant that I was able to switch between seven line-level inputs: CD, Tuner, Aux-1, Aux-2, Video, TV, and Record-In. (There's also a 'Power Amp' input, which Bryston counts as an 'eighth' input, and I suppose it is, but to use the Power Amp input requires accessing a slider switch on the rear panel, and when you're in 'Power Amp' mode you not only can't switch between line-level inputs; you also deactivate the front panel volume control and the muting circuitry.)

The 'basic' model offers more analogue input options than the other versions, because if you option in the DAC, you will lose one line input (Aux 2), because when the DAC is installed, the left-channel Aux-2 input is reallocated as a coaxial (SPDIF) digital input (D1) and the right channel Aux-2 input is re-allocated as a second coaxial digital (SPDIF) input (D2). And if you also option in the Phono module, you effectively 'lose' the second auxiliary input as well, because the Aux-1 input terminals become the phono input terminals. However, even fully-optioned, the Bryston still has five line-level inputs, which I think is more than sufficient, even in these multi-source times.

The large volume control is motorised, so it rotates if you press the 'Up' and 'Down' buttons on the remote control, and Bryston has scribed a thin white line on the remote so you can see how far the control is turned even if you're sitting some distance away from it.

To the left of the remote is a pair of buttons for adjusting channel balance. The circuit attenuates the channel you've selected in 1dB steps to a maximum of 6dB, and the

attenuated channel is indicated by the green LED above the relevant button. However you can also mute one channel entirely, by pressing the button an eighth time, in which case the LED turns red to show what you've done. (And, since I've mentioned muting, you can also mute the output of both channels entirely, using the 'Mute' button to the right of the volume control. There's also a 'Mute' button on the remote.)

Alongside the 'Mute' button is a most interesting LED! It's a clipping indicator that flashes whenever the amplifier's output stage is being driven so hard that the music waveform is being 'clipped' at the tops and bottoms. Given the power output capability of the B135-SST<sup>2</sup>—which Bryston specs as being 'nominally' 135-watts per channel and

**BRYSTON B135-SST<sup>2</sup> INTEGRATED AMPLIFIER**

**Brand:** Bryston  
**Model:** B135-SST<sup>2</sup>  
**Category:** Integrated Amplifier  
**RRP:** \$5,999  
**Warranty:** 20 Years  
**Distributor:** Syntec International Pty Ltd  
**Address:** Unit 3, 31 Gibbes Street  
 Chatswood NSW 2067  
 ☎ **1800 648 628**  
 ☎ **(02) 9910 6700**  
 ✉ **sales@syntec.com.au**  
 🌐 **www.syntec.com.au**

- High power
- Superb sound
- 20-year warranty
- Turn-on delay
- Slow push-button response

**LAB REPORT**

Readers interested in a full technical appraisal of the performance of the Bryston B135-SST<sup>2</sup> SST2 Integrated Amplifier should continue on and read the LABORATORY REPORT published on page 30. 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.



**Lab Report on page 30**

a 'maximum' of 165-watts per channel (both into 8Ω)—I can't imagine many users will see this LED flash too often (if at all), but it's comforting to know that it's there, so you will know if you're driving the amplifier too hard (and thus potentially running the risk of damaging your loudspeakers).

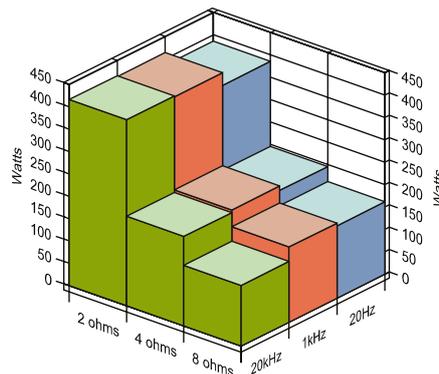
Although clipping indicators are almost universal on professional power amplifiers, and Bryston may have fitted one to the B135-SST<sup>2</sup> because of its professional heritage, I suspect the company might also have fitted one because it knew full well that it *wouldn't* light, even when music was being played at very loud volume. (This is one reason why manufacturers of lower-powered amplifiers do not fit clipping indicators to their products—most audiophiles would be horrified to discover how often the clipping indicator on a lower-powered amplifier came on, even when playing at fairly low listening levels.)

The power button alongside the 'Mute' button switches the amplifier between 'Standby' (in which mode the LED will glow red) and 'On' (in which mode the LED will glow green). If the amplifier's protection circuitry triggers for any reason, the power light will flash alternately red and green.

The rear panel is very busy, not least because even though my review sample was not fitted with a DAC, the two Toslink digital inputs are already fitted (located immediately above the IEC 240V power socket). There's also an RS-232 connector and a 12V trigger assembly. But the connectors I have to single out for special mention are the right and left channel speaker connectors. I don't know where Bryston got them, but I've never seen them before and they're simply magnificent! They're multi-way types (banana, spade, bare-wire, etc) but they have huge surface area (for best conductivity) and they're super-easy to use. In fact, these are the best speaker connectors I have ever seen, period. They should become standard equipment on all amplifiers. (And if I could pass a law to this effect, I would!)

As for that 'Pass Through' mode I mentioned earlier, what it does is lock out the volume and balance controls for any analogue input source you choose.

So, for example, if you have a surround processor, you could connect its front-channel left and right outputs to the TV input and then engage the Pass Through mode for this input so that the processor's volume control would then take over totally, allowing all 5.1-channels of surround to be adjusted at the same time, despite the fact that the Bryston B135-SST<sup>2</sup> would be providing the power for the two front channel speakers, and some other amplifier(s) would be providing the power for the centre and surround channels.



Power Output: Both channels driven into 8-ohm, 4-ohm and 2-ohm non-inductive loads at 20Hz, 1kHz and 20kHz. [Bryston B135]

### SST<sup>2</sup> CIRCUITRY

I couldn't find any information at all about SST<sup>2</sup> on Bryston's otherwise exceptionally informative website (you can get Owners Manuals and schematic diagrams for any component the company has ever made!) but some quick googling revealed that earlier amplifiers labelled ST indicated that the amplifiers were designed by Bryston's own Stuart Taylor, and that 'SST' stands for 'Super Stuart Taylor' and that the 'squared' sign after the SST indicates a second-generation circuit. Apparently the major change between the ST and the SST models was the removal of a switch that let users change the bridged circuit from series to parallel for driving ultra-low impedance loudspeakers. Again according to Google, the major changes for the second generation circuit were the use of ultra-fast driver transistors in a 'quad complementary' output stage using new output devices; a reduction of crossover notch distortion by introducing a 'storage delay' in the output transistors at the crossover point; newly designed output chokes to help reduce distortion at high frequencies; a new low-noise power transformer; increased power supply capacitance and the elimination of all point-to-point wiring in the power-supply circuitry.

### IN USE AND LISTENING SESSIONS

When you first power-up the Bryston you will have to wait around nine seconds while the internal protection circuitry runs a few diagnostic checks, during which time the 'Mute' circuit will activate, which will also have the happy effect of protecting your speakers from any unwanted turn-on 'thumps'. Once the protection circuitry has given the all-clear for safe switch-on, the Mute circuit will automatically de-mute and you'll be ready to listen to music. The same start-up delay also occurs whenever you switch the amplifier from standby to 'on'... though in this case the amplifier adds one operational nicety, which

is that it switches to whatever input you were using when you last used the amplifier.

Selecting inputs via the front panel controls is easy, even though the buttons barely move under your fingertips... although I did occasionally find that if I pressed a button too quickly, I sometimes found nothing happened and I'd have to press the button again, leaving my finger there a little longer. No doubt you'd become accustomed to this very quickly... and even if you didn't, it's a far better system than those which require you to 'cycle' through the various inputs by pressing the same button repeatedly. The volume control moved nicely under my fingers, and could be positioned very accurately, giving no hint that was motorised. (Many motorised controls feel sluggish when turned by hand, and are difficult to set correctly because when you take your finger off them, they 'settle' a little forward or backward from the position they were in when you took your fingers away.)

The first sounds that blasted forth from my speakers after I'd connected the B135-SST<sup>2</sup> were from Butterfly Boucher... the first track ('5678!') from her new self-titled album ... and what a wonderfully refreshing way to kick off not only an album, but also a listening session. The dynamics of the track are great, and the power of the Bryston B135-SST<sup>2</sup> just highlighted them to best effect. I'd actually misjudged my initial setting of the volume control, so when I say the sound 'blasted forth' I meant that literally, but not only did I not hear any clipping despite the high volume, I also didn't see any clipping, using that front-panel clipping indicator.

The sound was just as impressive as the album continued with 'The Weather' which again showed the Bryston's ability to really deliver on super-low notes, but also its incredible speed on transients: there isn't any music I've heard of that will catch the B135-SST<sup>2</sup> napping! 'Warning Bell' (Track 3) will give you an idea of how the Bryston handles the 'space between the notes' because the silences are deep and when you hear the 'dream echoes' in the mix you will instantly hear that they're beautifully positioned for maximum emotive effect. Listen, too, to Boucher's pure voice which is so clearly rendered by the Bryston that, if you listen carefully, you'll hear some tiny nasalities that she could look to eliminating with a little more vocal training.

I wasn't overly impressed by Boucher's cover of Missy Higgins' 'Unashamed Desire', perhaps because she adds nothing personal... it's pretty much a straight cover, and Higgins not only sings it better, but has better musical back-up and production. (The only thing wrong with Higgins' version is the accompanying video clip!) And yes, I know that it's Higgins herself who's singing back-up on Butterfly Boucher's

version of Unashamed Desire.

I think Butterfly Boucher (the album) is well worth buying: there are some great songs on it, some great lyrics and some wonderful sounds, but I do issue a caution that you'll also hear what I can only assume is deliberately added distortion on many tracks, particularly on 'Not Fooling Around'. I found this so annoying that I actually programmed my CD player to skip that track! You can decide for yourself whether you'd like to buy Butterfly Boucher before you buy it because you can hear samplers of all the tracks on her site [www.butterflyboucher.com] and if you decide to buy you can download them immediately (WAV, Flac, Apple Lossless), or buy a CD or LP. If you look at the site's pricing for the album I hope that, like me, you will be incensed by the fact that Aussies and Kiwis have to pay \$17, whereas everyone else in the world pays just \$10.

I also used the Soundtrack for 'Searching for Sugar Man', the award-winning documentary about Sixto Rodriguez. This choice was triggered by my interest in

Rodriguez's Australian tour, which took place while I was reviewing the Bryston. I don't know the exact providence of the 14 tracks on this CD, but I thought the sound was overall very good, though very 'late 60s' as you'd expect with, for example, a big 'phat' bass sound (particularly evident on 'I Wonder' and 'Like Janis', but evident throughout) and that annoying 70's engineering habit of really playing around with the sound in the left and right channels, fading it up and down and panning across them. (I can only assume they did this to compete with the many so-called 'electronically-processed' stereo LPs which were actually re-mastered mono LPs, re-released in stereo. Remember that true stereo LPs weren't widely available until the mid-60s, despite being introduced around 1958.) Still, you can use the Bryston to reveal Rodriguez' voice nicely, and there's some good deep bass, particularly kick-drum, to give your woofers a work-out. If you want some Rodriguez to own, I'd recommend purchasing the Soundtrack or his 'Coming

from Reality' album rather than his most famous album ('Cold Fact'), because Rodriguez actually gets paid royalties from the Soundtrack and Coming from Reality albums. (The doco doesn't really tell the whole story about this!)

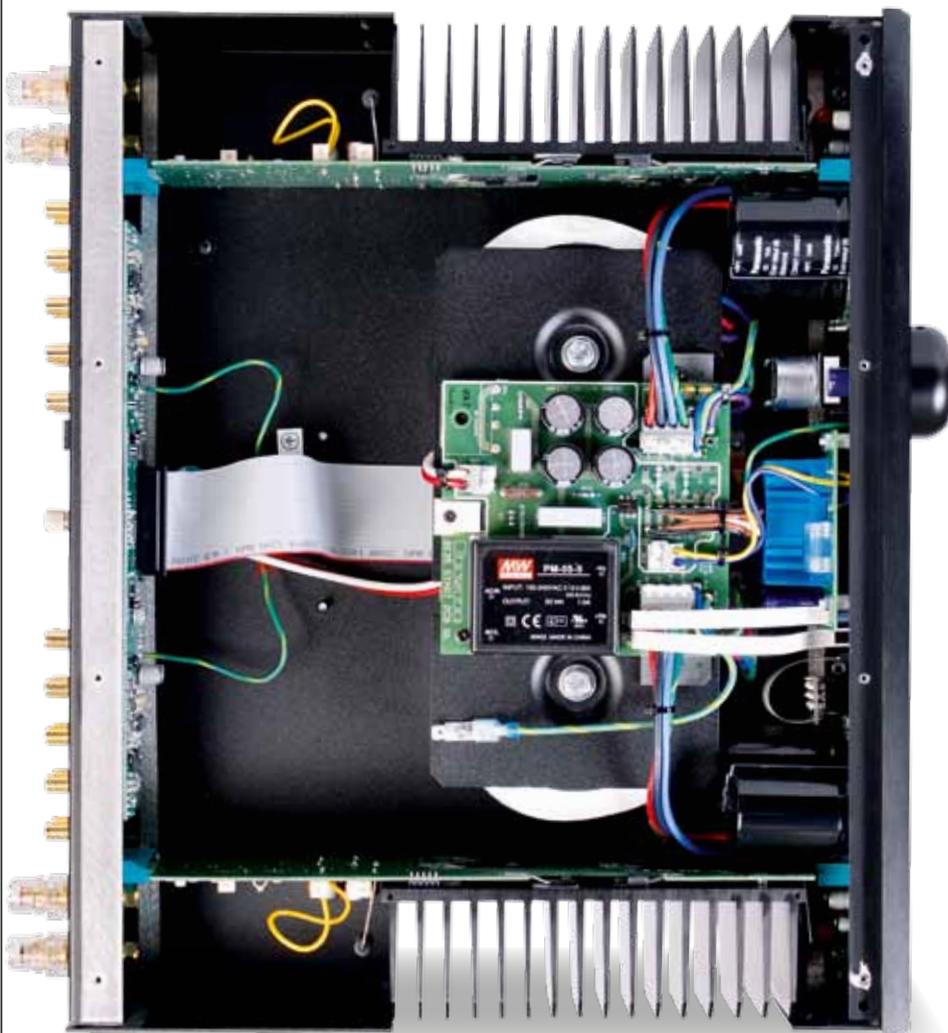
High frequency performance of the Bryston I evaluated with a great new release on Melbourne's Melba label, which has soprano Siobhan Stagg and pianist Amir Farid, fresh from winning the Mietta Song Competition, singing a wide selection of art songs. Titled 'Hymne à l'amour' it's their first studio album and it has Move's typical 'natural' sound against a super-quiet background, so you can hear not only Stagg's ravishing tone and amazing technique, but also Farid's sympathetic musicianship. He simply makes the piano 'sing' along with Stagg so cleverly that as I listened, it was as if I were listening to two instruments, rather than 'piano and voice'. If you're a fan of art songs, you should add this album to your collection, and if you've never heard art song, this album would be an ideal place to start. Only three of the songs are in English, but the liner notes have translations, and I actually preferred listening to the French, German and Italian songs (which I could not understand), because I found that I could better concentrate on the sonics when I wasn't being distracted by the lyrics. It's not only the balance of piano and voice that is wonderful, the stereo imaging is also outstanding, so it was obvious the Bryston B135-SST<sup>2</sup> was playing its part to perfection, keeping the two channels completely separate and making sure that the gain in each channel was identical.

In short, it didn't matter what genre of music I played, what loudspeakers I used with it, or what playback levels I used, from whisper-quiet levels to ear-shattering, the Bryston B135-SST<sup>2</sup> performed impeccably through-out, delivering the music exactly as the performers and engineers intended, without added noise or distortions and without any frequency aberrations at all. Incredibly good performance that's a gilt-edged investment in good sound.

## CONCLUSION

Here in Australia, Bryston prices recently dropped, presumably at least in part because of the continued strength of the Australian dollar, so there's never been a better time to buy a Bryston product. And when you consider the price of the B135-SST<sup>2</sup> I'd say you'd be mad not to buy one. A state-of-the-art, high-power, super-low distortion, low noise, Canadian-made amplifier, with a brand name that's renowned the world over... and one that comes with a 20-year warranty, that's on sale for less than six grand? That's not just a bargain: it's amazing value for money. 

**■ Incredibly good performance that's a gilt-edged investment in good sound ... amazing value for money.**



CONTINUED FROM PAGE 28

## TEST RESULTS

I was rather surprised to discover that Bryston supplies every one of its amplifiers with a hand-written test report. It seems that part of its quality control and production processes is that every single amplifier it manufactures is individually tested. So the Bryston B135-SST<sup>2</sup> measured by *Newport Test Labs* had already been measured by someone in Bryston's own test laboratory. One interesting thing about this was that whereas Bryston states that the 'maximum' power output of the B135-SST<sup>2</sup> is 165-watts per channel, its own laboratory measurements show the maximum power output of our sample was 152-watts (at 2kHz). However *Newport Test Labs* measured the maximum power output at 170-watts (at 1kHz). Although this seems confusing, it isn't really, because there are several variables that account for the discrepancies. The first is the mains voltage. As you can see from the tabulated results, *Newport Test Labs* doesn't hold the mains voltage steady at 240V during testing, so the mains voltage in fact varied during the testing from 244 to 254 volts. Presumably Bryston doesn't hold the mains voltage constant either (and they're probably using only the Canadian-standard 120-volt mains power supply anyway), so Bryston's technician could have measured the amp while the mains voltage was a little low, and *Newport Test Labs*' technician could have measured it while it was a bit high. Then there's the test frequency itself. *Newport Test Labs* measures at 20Hz, 1kHz and 20kHz, whereas Bryston measures at 20Hz, 2kHz and 20kHz. I had to laugh when I saw Bryston was using a 2kHz test frequency. It's non-standard—most authorities measure at 1kHz—but the 1kHz frequency is just a throw-back to the days when all test equipment was analogue. I won't go into too much detail, but these days, almost all test equipment is digital and a side-effect of it being so is that it's actually time-consuming to set a generator frequency at 20Hz, then at 1kHz, then at 20kHz, whereas it's really easy to switch across 20Hz, 2kHz, 20kHz, hence Bryston's use of 2kHz rather than 1kHz. It speeds up the testing process dramatically and, as they say, time is money. Anyway, all this is mainly to explain why, when you purchase a Bryston B135-SST<sup>2</sup> and you see the hand-written sheet of test results that accompanies it, the measured results might be slightly different from Bryston's own specifications and from the results measured by *Newport Test Labs*. And, as it happens, at least in the area of power output, Bryston only claims '135-watts' per channel anyway, and as you can see, our test sample amplifier delivered this power level easily at all frequencies, with all test

loads, under all mains power conditions.

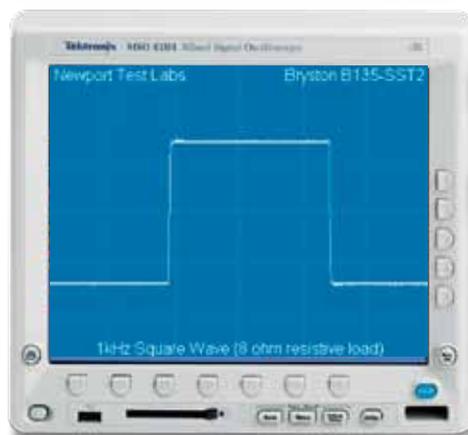
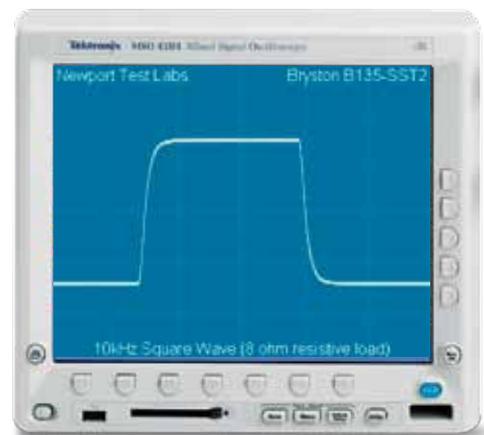
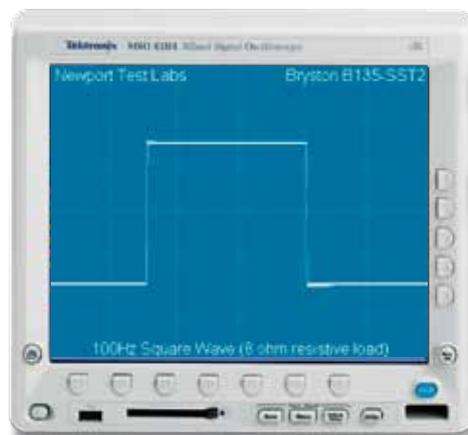
Looking at the power output test table, it appeared to me that the Bryston B135-SST<sup>2</sup> is essentially a 'dual mono' design, because the per-channel power output doesn't change irrespective of whether one or both channels are driven. So at a frequency of 1kHz, the Bryston will deliver 170-watts per channel into 8Ω, 206-watts per channel into 4Ω and 414-watts per channel into 2Ω. However, it can't quite do this up at 20kHz, where *Newport Test Labs* measured maximum power output at 136-watts into 8Ω, 200-watts into 4Ω and 406 watts into 2Ω. It would seem that it's the amplifier's power output at 20kHz that is the reason for Bryston's power output claim being for '135-watts.' Obviously, all these figures put the Bryston B135-SST<sup>2</sup> into the 'high power output' category. It is a very powerful amplifier, and can deliver that high power at all test frequencies, into all loads, and does so with complete stability. I did find it interesting that the difference between the power output between the 8Ω and 4Ω loads was less than the difference between the 4Ω and 2Ω loads and can only assume that this is something to do with Bryston's 'SST' circuitry.

*Newport Test Labs* tested the output levels at which the 'clipping' LED on the front panel illuminated and reported that when driving an 8Ω load it will light at a power output level of 182-watts, whereas into 4Ω

loads, it will light at a level of 206-watts, proving that you can rely on it to give you an accurate indication of whether or not the amplifier's output stage is being overdriven.

The measured distortion levels of the Bryston B135-SST<sup>2</sup> were impressively low, as you can see from the four graphs showing the output distortion spectra (Graphs 1 through 4). At an output level of one watt (Graphs 1 and 2) the level of second harmonic is so low that it's difficult to spot, being obscured by noise. Driven into 8Ω, the second harmonic is down at -88dB (0.003%), with a third-order harmonic just to the right at -98dB (0.001%). If there is a fourth, it's more than 100dB down and the same goes for the fifth, which appears to be at -93dB (0.002%) and a sixth at -96dB (0.001%). There are no other high-order distortion components visible, and you can see that the noise floor is close to being 110dB down above 6kHz. Interestingly, distortion appears to be a little lower into the 4Ω test load than into the 8Ω load. The second harmonic is fractionally lower (-90dB, or 0.003%), the third fractionally higher (-95dB, or 0.001%), with the fourth and fifth the same, but the sixth below -100dB (0.001%). In both graphs you can see some low-frequency noise components to the left of the fundamental at around -75dB.

Measured at a power output level of 135-watts (into both 8Ω and 4Ω test loads) you can now see the individual harmonic



distortion components a little more clearly, but that's only really because the overall noise floor has dropped to be more than 120dB down, which is excellent. Into the 8Ω load there's a second harmonic at -110dB (0.0003%) and a third at -115dB (0.0001%), then a fourth and fifth at around -108dB (0.0003%). At this power level distortion is slightly higher into the lower-impedance load, but the most obvious distortion components, the fourth and fifth-order ones, are at -101dB (0.0008%) and -102dB (0.0007%) respectively—far too low down to be audible. There are some higher-order components visible above the noise floor, but they're more than 110dB down (0.0003%) and the highest one that's visible is the 11th. Note that at the extreme left of the graph (to the left of the fundamental), some low-frequency noise is again visible, but this time, it's down more than 90dB.

For those who don't regularly closely

examine harmonic distortion graphs, I should point out that the Bryston B135-SST<sup>2</sup>'s performance is exceptionally good, one of the best I've seen.

The same goes for the graph showing intermodulation distortion (CCIR-IMD) at an output level of one watt. Again, it's exceptionally good. There are no sidebands either side of the 19kHz and 20kHz test signals at the right-end of the graph, and the 1kHz IMD distortion component is 90dB down, essentially lost in the noise floor. Brilliant performance.

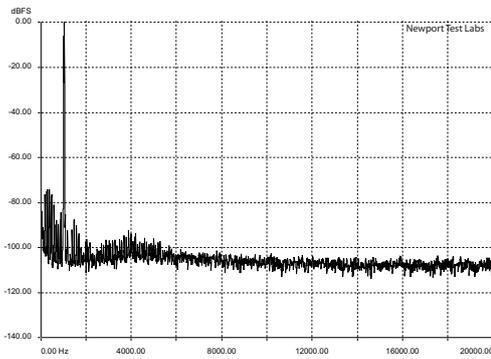
The frequency response of the Bryston B135-SST<sup>2</sup> proved to be ruler-flat, irrespective of whether the amplifier was tested driving a non-inductive high-power laboratory-grade test resistor or a highly reactive load that simulates the load that would be presented by a small two-way loudspeaker. The traces measured by *Newport Test Labs* are shown in Graph 6, where you should note that

the very top of the graph is +1dB and the very bottom is -1dB, so the vertical scale is quite exaggerated. You can see that the low-frequency response of the Bryston only starts 'rolling off' below 10Hz, then essentially tracks the 0dB reference line up to 2kHz, irrespective of load. Above this frequency the traces diverge very slightly before starting to roll off above 20kHz. This is excellent performance and indicates that the B135-SST<sup>2</sup> amplifier will 'sound' exactly the same no matter what loudspeakers you connect to it. Overall, *Newport Test Labs* measured the 3dB down-points of the Bryston's response at 0.1Hz and 91kHz. The actual normalised frequency response was measured as being 0.4Hz to 52kHz ±0.5dB.

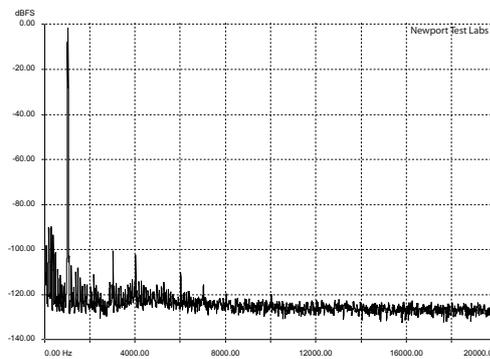
Channel separation was superb, particularly at low frequencies, where it came in at 106dB at all frequencies below 1kHz. Separation diminished very, very slightly with increasing frequency, but it was still 98dB at 20kHz... just a tad shy of a three-figure result. Channel balance was also superb, with just a 0.02dB difference in level between the channels at 1kHz, which is far better than I usually see.

Inter-channel phase was perfect at low-frequencies, and so close to perfect at 1kHz that I think we'd be running into the limits of measurement reliability. The very slight (0.13°) discrepancy at 20kHz is of no consequence, not to mention the best result I've seen from an amplifier for some years.

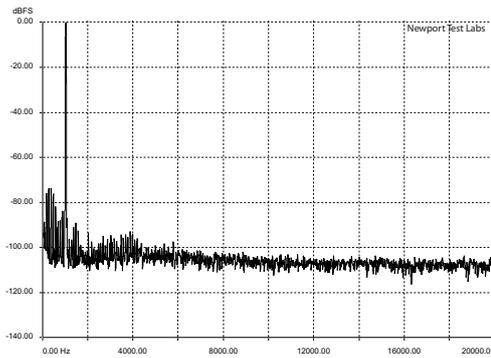
The signal-to-noise ratio of the Bryston was measured by *Newport Test Labs* at 70dB unweighted and 74dB A-weighted referenced to an output of one watt, and 90dB unweighted and 95dB A-weighted referenced to rated output (135-watts). These are good figures for an integrated amplifier, but I was puzzled that they fell 'way short of the actual measurements on the same amplifier made by Bryston, which came in at 108dB (presumably weighted, but Bryston doesn't actually specify whether it is or not). A little investigation revealed that Bryston measures the pre-amplifier section of the B135-SST<sup>2</sup> and the power amplifier sections separately, and reports on only the power amplifier section, which it no doubt justifies on the basis that you can operate the B135-SST<sup>2</sup> as a preamplifier, as a power amplifier, or as an integrated amplifier. It also uses a higher input voltage for its test than *Newport Test Labs* does for its tests.



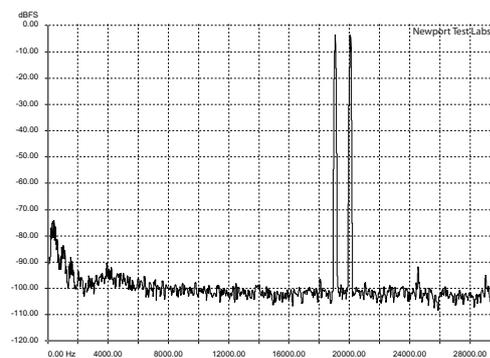
Graph 1: Total harmonic distortion (THD) at 1kHz at an output of 1-watt into an 8-ohm non-inductive load, referenced to 0dB. [Bryston B135-SST2 Integrated Amplifier]



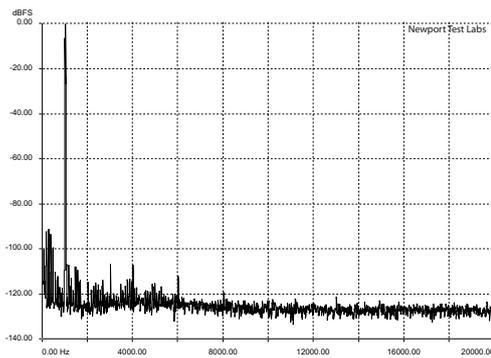
Graph 4: Total harmonic distortion (THD) at 1kHz at an output of 135-watts into a 4-ohm non-inductive load, referenced to 0dB. [Bryston B135-SST2 Integrated Amplifier]



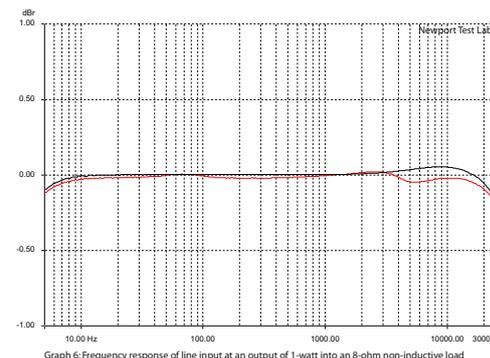
Graph 2: Total harmonic distortion (THD) at 1kHz at an output of 1-watt into an 8-ohm non-inductive load, referenced to 0dB. [Bryston B135-SST2 Integrated Amplifier]



Graph 5: Intermodulation distortion (CCIF-IMD) using test signals at 19kHz and 20kHz, at an output of 1-watt into an 8-ohm non-inductive load, referenced to 0dB. [Bryston B135-SST2 Amp]



Graph 3: Total harmonic distortion (THD) at 1kHz at rated output (135-watts) into an 8-ohm non-inductive load, referenced to 0dB. [Bryston B135-SST2 Integrated Amplifier]



Graph 6: Frequency response of line input at an output of 1-watt into an 8-ohm non-inductive load (black trace) and into a combination resistive/inductive/capacitive load representative of a typical two-way loudspeaker system (red trace). [Bryston B135-SST2 Integrated Amplifier]

Out of interest, I asked *Newport Test Labs*, which still had the amplifier at its premises, to measure the signal-to-noise ratio of the power amplifier, using an input voltage of 1-volt, rather than the 500mV it usually uses (since Bryston measures with a 1-volt input). It turned out that using this input voltage, and measuring only the power amplifier section of the B135-SST<sup>2</sup>, the signal-to-noise figures came in at 103dB unweighted and 109dB A-weighted, which are not only outstandingly good figures, but the A-weighted figure is also better than claimed by Bryston.

*Newport Test Labs* measured the output impedance (at 1kHz) of the Bryston B135-SST<sup>2</sup> at a tiny 0.01Ω, which I could almost have guessed by eye-balling the frequency response of the amplifier into the simulated loudspeaker load. Some calculations on this figure show that the amplifier has a damping factor of 800 (at 1kHz). This is again an

excellent test result, and far more than you'll ever need.

The Bryston proved to be unusually sensitive regarding its input voltage requirements, needing only 22mV at the CD input for the amplifier to produce 1-watt at the speaker terminals, and only 260mV for it to deliver 135-watts from the speaker terminals. (The sensitivity of the other line-level inputs was identical). This means you will be able to use any music source with the Bryston, though I would recommend you use good-quality shielded interconnect cables, and be careful to route them away from the power cord to ensure you don't introduce unwanted hum.

The 1kHz square wave oscillogram measured into a highly reactive load proves that the Bryston will be completely stable when driving any loudspeaker load, including electrostatic loudspeakers, exhibiting little overshoot and quickly controlled ringing.

The 100Hz wave is completely flat on the top, showing the extended low-frequency response, and there's no curvature of the line, so no evidence of low-frequency phase shift. The 1kHz wave is a perfect square wave (the tiny glitches are due to the use of a digital oscilloscope rather than an analog CRO). The 10kHz square wave shows a very fast rise time, consistent with the Bryston's measured -3dB response downpoint of close to 1MHz.

Power consumption when the amplifier is being played at extremely high volume levels may get up to around 529-watts, so I'd make sure you have good quality mains cables. Also, because of the high power output and current draw I'd be wary of using a mains power conditioner in conjunction with this Bryston amplifier, because depending on the design of the conditioner, it could potentially limit the amplifier's ability to draw current from the mains. I note that Bryston says much the same thing in its Owners Manual, though it recommends a 'Torus' conditioner as being suitable for use with the B135-SST<sup>2</sup>. No doubt there are other mains power conditioners that would also be suitable, but it would be as well to do your own research. The amplifier draws only 2.6-watts from the mains when it's in Standby mode, so given this low level, I'd recommend leaving the amplifier in Standby whenever you're not using it, most particularly since mains power consumption increases to nearly 60-watts when the amplifier is switched on, but not playing music. (Given that Bryston offers a 20-year warranty I guess you wouldn't have to worry about trying to extend the life of the internal components by switching off the amplifier when you're not using it!)

I think I have made my feelings about the technical performance of Bryston's B135-SST<sup>2</sup> amplifier pretty clear throughout this analysis of its test results, just as I am sure I have completely overused the work 'superb' in relation to describing almost all aspects of this amplifier's performance, but the simple fact is that Bryston's B135-SST<sup>2</sup> is evidently a brilliantly designed amplifier, with truly excellent—superb!—performance, that is capable of providing extremely high power output levels into any loudspeakers, with minimal distortion and no audible noise. I whole-heartedly recommend it.

*Steve Holding*

**Bryston B135-SST2 Integrated Amplifier - Power Output**

Channel	Load (Ω)	20Hz (watts)	20Hz (dBW)	1kHz (watts)	1kHz (dBW)	20kHz (watts)	20kHz (dBW)
1	8 Ω	163	22.1	170	22.3	136	21.3
2	8 Ω	162	22.0	168	22.2	136	21.3
1	4 Ω	196	22.9	206	23.1	200	23.0
2	4 Ω	196	22.9	206	23.1	200	23.0
1	2 Ω	386	25.8	414	26.1	406	26.0
2	2 Ω	386	25.8	414	26.1	406	26.0

Note: Figures in the dBW column represent output level in decibels referred to one watt output.

**Bryston B135-SST2 Integrated Amplifier - Power Output**

Test	Measured Result	Units/Comment
Frequency Response @ 1 watt o/p	0.4Hz - 52kHz	-1dB
Frequency Response @ 1 watt o/p	0.1Hz - 91kHz	-3dB
Channel Separation (dB)	106dB / 106dB / 98dB	(20Hz / 1kHz / 20kHz)
Channel Balance	0.02	dB @ 1kHz
Interchannel Phase	0.00 / 0.02 / 0.13	degrees ( 20Hz / 1kHz / 20kHz)
THD+N	0.03% / 0.02%	@ 1-watt / @ rated output
Signal-to-Noise (unwghted/wghted)	70dB / 74dB	dB referred to 1-watt output
Signal-to-Noise (unwghted/wghted)	90dB / 95dB	dB referred to rated output
Input Sensitivity (CD Input)	22mV / 260mV	(1-watt / rated output)
Output Impedance	0.01Ω	@1kHz
Damping Factor	800	@1kHz
Power Consumption	2.6 / 59	watts (Standby / On)
Power Consumption	90 / 529	watts at 1-watt / at rated output
Mains Voltage Variation during Test	244 - 254	Minimum - Maximum



**NOW AVAILABLE ON ZINIO**  
for iPad, Android & PC/Mac

# TOUCH US PINCH US

WE'VE GONE ALL DIGITAL

- ★ SOUND+IMAGE
- ★ AUSTRALIAN HI-FI
- ★ PRO PHOTO
- ★ CAMERA
- ★ AUSTRALIAN INCAR ENTERTAINMENT



Buy single issues or special three-issue bargain bundles through [AVHub.com.au](http://AVHub.com.au) or [www.zinio.com/soundimage](http://www.zinio.com/soundimage)

