PARASOUND HALO

INTEGRATED AMPLIFIER/DAC

The arrival of Parasound's new 'Halo' integrated amplifier came as something as a surprise to this reviewer, because Parasound has not built an integrated amplifier since 1986. This doesn't mean that founder Richard Schram and designer John Curl have been sitting around doing nothing for thirty years. What happened is that after that first integrated amplifier, the two decided to instead specialise in building separate preamplifiers and power amplifiers… which they've done with resounding success, winning dozens of awards and literally hundreds of rave reviews over the decades.

Maybe the reason they decided to build the Halo is that it's not 'just' an integrated amplifier. This new Parasound amp has an onboard digital-to-analogue converter, as well as a subwoofer output with its own variable low-pass crossover network, and a built-in electronic crossover that can be used to tailor the signal at the Halo's own speaker terminals as well as those at the 'pre-out' terminals on the rear panel. It also has home theatre bypass circuitry. Plus it has a high-quality headphone amplifier. So while it's certainly a two-channel integrated amplifier, it's one that offers much, much more than you'd expect.

THE EQUIPMENT

Parasound's Halo is certainly full-featured. On the analogue side, there are five line-level analogue inputs, four of which are unbalanced (RCA terminals) and one of which can either be balanced (XLR terminals) or unbalanced (RCA terminals)—but not both at the same time… you can only connect one or the other—plus there's a phono input that handles both moving-coil (MC) and moving-magnet (MM) cartridges—with selectable load (100Ω or 47kΩ) for the moving-coil option. Additionally, there's a front-panel 3.5mm input so you can connect your phone or portable player.

On the digital side, there are optical (Toslink), coaxial (RCA) and USB (Type B) inputs. The digital inputs route to a 32-bit/384kHz Sabre32 Reference DAC (ES9018K2M). Via optical and coax this DAC can handle PCM 16-bit and 32-bit words at sampling rates of up to 192kHz. Via the USB input it can handle up to 32-bit/384kHz PCM as well as DSD and DoP. Apple users can just plug 'n play, but Windows users will need to download the free USB driver from Parasound's website: www.parasound.com.

The Halo also has a home theatre bypass output that outputs the left-channel, right-channel and subwoofer signals without any processing or volume adjustment, plus there's also a pair of fixed-level Record Outputs, so you could send analogue audio to a recorder of some kind.

The front panel continues a cosmetic theme that has been a constant at Parasound for many years now. The slightly outwardly-curved front panel has a shallow groove running along the bottom that houses most of the tell-tale LED indicators and, in this case, the Power on/off and Mute buttons as well. Also carried over is the symmetrical control layout, though in this case Schram has not achieved perfect symmetry, with four controls at the right of the panel (the input selector, subwoofer level control, balance control and volume control) and only two at the left (bass and treble tone controls). Despite this, a degree of symmetry is achieved because the left side of the panel is also home

to the tone control circuit's on/off button, an infra-red receiver window, a 3.5mm auxiliary input and a 3.5mm headphone output… both of the latter being gold-plated.

The LEDs in the previously-mentioned groove light-up to indicate input selection in the following order: Aux, Line 1, Line 2, Line 3, Line 4, Line 5, Phono, Opt, Coax, USB, Bypass. While I was happy changing inputs using the remote control (which is a nice little unit, about which more in a moment), it felt a little strange changing inputs when using the tiny rotary front-panel control. If Schram likes things to be symmetrical, why not balance the large volume control by using an equal-sized input selector?

There was power aplenty from the Parasound Halo. I dare say you will never—ever—need more power than the 160-watts per channel available…

The Parasound Halo measures 437×150×413mm (WHD) and weighs-in at a fairly hefty 15kg. It's available in either black or silver finishes.

As for that remote control, it's made from plastic, but feels very solid in the hand and comes with illuminated keys, which is a particularly nice touch. Press the 'illuminate' button on the remote and the keys glow for a usefully-long ten seconds. Using either of the volume controls on the remote cancels muting, whereas it should really only be cancelled when the 'up' volume control is pressed. The remote is powered by two AA batteries which, as supplied, were Toshiba zinc-carbon types. I would recommend that you immediately replace these batteries with high-quality leak-proof alkaline types to avoid damaging the remote control.

Internally, as you've probably already guessed from its size and weight, the Halo uses a tried-and-tested Class-A/B bipolar output stage, although the driver stage uses MOSFETs and the input stage uses JFETs. Servo circuitry ensures that d.c. is never present at the output terminals, and there's also circuitry to prevent the amplifier from accidental short-circuits, excessive current draw and overheating. The heart of the headphone amplifier circuit is a Texas Instruments TPA6120A2, which is a Class-AB current-feedback design that has a very high slew-rate to eliminate odd-order distortion, enable 'current-on-demand' at the output so the amplifier responds quickly and linearly without distortion, and gain-independent frequency response to ensure that it delivers full bandwidth at all volume settings.

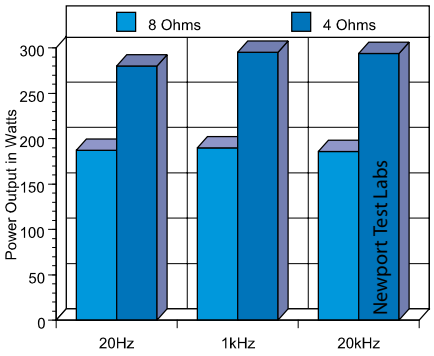
Parasound says all its amplifiers are designed, engineered and QC-tested after completion in the USA, after being built in Taiwan. In Australia, the Halo comes with a three year warranty and full after-sales support from long-established local distributor Network AV, but Schram is happy for Parasound owners to contact him directly and is renowned for answering every email he gets, which has earned him a well-deserved reputation for providing 'service second to none.'

As for the thirty-five year background of the company, Parasound was founded by Richard Schram in 1981 and he is still its sole owner and the very prominent 'public face' of Parasound, as well as the person who decides what products will be built—and he only builds products that, in his words, are *'saleable, reliable, and most of all, relevant.'* His lead designer is none other than John Curl, whose reputation was forged by his epoch-making designs for Mark Levinson, back when Levinson actually owned the company that still bears his name (the Mark Levinson JC-2 being perhaps the most famous of his designs). Less well-known is that Curl also has designed mastering recorders for Wilson Audio and Mobile Fidelity as well as a professional audio mixing console for The Grateful Dead.

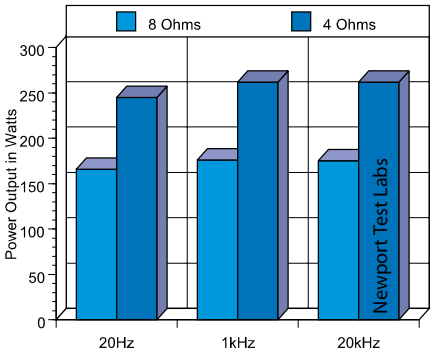
IN USE AND LISTENING SESSIONS

I used Parasound's Halo in two different systems. One was a two-channel system using only a single pair of large floor-standing speakers; the other was also a two-channel system, but comprised of small bookshelf speakers and a subwoofer. I used this second system primarily so I could evaluate the Parasound Halo's crossover circuitry. I appreciated the Halo's extensive feature set right from the outset. The illuminated blue strip inset into the volume control is easy to see from anywhere in the room, so you instantly know how high the volume is set. The blue illumination that indicates the tone controls are in circuit, and the red illumination that indicates that the muting circuit is active are also great aids to useability. I wasn't quite so enamoured of the headphone output. Firstly I would certainly have preferred a full-sized 6.5mm 'phone socket. Secondly, plugging headphones in immediately mutes the loudspeakers, the corollary of which is that unplugging your headphones turns the loudspeakers back on, and if the volume level is set high when you do this, you could potentially damage your loudspeakers. Parasound has deliberately built extra gain (12dB) into the headphone circuit to ensure that this is unlikely to happen.

No matter which of the two systems I used, there was power aplenty available from the Parasound Halo. I dare say you will never—ever!—need more power than the 160-watts per channel available (240-watts per channel if you're using 4Ω loudspeakers!), no matter what loudspeakers you connect to it. It's also good, clean, distortion-free power, no matter whether I was listening at background music levels, my 'standard' listening levels



Power Output: Single channel driven into 8 ohms (light blue) and into 4 ohms (dark blue). Parasound Halo Integrated Amplifier.



Power Output: Both channels driven into 8 ohms (light blue) and into 4 ohms (dark blue). Parasound Halo Integrated Amplifier.

or cranked right up to 'party, party' volume levels. I didn't even hear so much as a hint of output stage distortion, no matter how hard I listened, and when nothing is playing, either between tracks or between notes, the Halo was totally silent, with no hum or hiss audible at all. In fact; no circuit noise whatsoever.

When using the Halo in my 2.1 set-up, using the internal electronic crossovers to strip the high-frequencies from the signal going to the subwoofer and the low frequencies from the signals going to the main speakers resulted in a huge difference in sound quality, allowing the small two-way speakers I was using as main speakers to perform at their best. Don't be confused that the crossover controls on the rear panel say 'Pre Output' and appear to relate to the two RCA outputs beneath. They *do* control the signal at these outputs, but they also control the signal sent to the Halo's own speaker terminals.

I was so successful at improving the sound of my bookshelf speakers that I re-connected my large, three-way floorstanding speakers to the Halo, but continued using the 2.1-channel configuration by using the internal crossover to strip away the very lowest frequencies from them so that they handled only the upper bass, and the subwoofer handled the lowest frequencies. I was rewarded with an instant improvement in the performance of the floorstanders: they delivered far-cleaner, much punchier bass, with improved clarity and with much-reduced distortion at higher listening levels.

Turntable owners will find the Halo's input stages completely transparent with both MM and MC cartridges, removing the need for an added-cost external phono stage… unless you have a phono cartridge that requires a particularly unusual loading. Phono RIAA equalisation was spot-on, and the dynamics I was able to extract from the LPs I played proved the phono circuit's overload margin was more than adequate for even the most dynamic audiophile recordings (it later tested at 26dB).

I had the same sonic experience using the digital inputs, no matter whether I was feeding hi-res files over USB or had the Halo connected to the SPDIF digital output of a CD player. Listening to Hein Cooper's *Overflow* (from 'The Art of Escape') the rhythmic drive of the song was delivered like it was on steroids, with the crisp percussion cracking in like rifle shots and the multi-layered vocals delivered with astounding clarity. Exceptional performance indeed, and so exceptionally good that you won't be needing an external DAC either and, if you have an older CD player with a digital output, connecting that player's output to the Halo will result in an immediate improvement in sound quality from all your CDs.

If you do choose to feed the Halo an analogue input—either unbalanced or balanced—you'll be in for an aural experience, because what the Halo will deliver to its outputs is a faithful replica of whatever you deliver to its inputs… just a louder replica! The Halo delivered Janis Joplin's *Work Me, Lord* (from the newly released 'Little Girl Blue') with spine-tingling authenticity, by way of example.

The quality of sound from the headphone output is outstandingly good, so if this is your preferred method of listening at home, you'll be able to dump your external headphone amplifier and simply listen via the Halo. And if you don't have an external headphone amplifier… well the Halo's headphone amplifier sounds so good that you won't need to buy one, no matter what headphones you prefer to use.

CONCLUSION

The Parasound Halo is an excellent amplifier, but it's also an excellent phono stage, an excellent headphone amplifier, an excellent DAC and the inclusion of the electronic crossover circuit is a secret weapon that will improve the performance of any loudspeakers you own when you're also using a subwoofer. No surprise then that I consider the Halo to be outstanding value for money. Indeed Schram was once asked the secret of Parasound's success, and he replied that it was all down to respect. Specifically, he said: '*We respect our customers because most of them don't have trust funds and have to work for their money. So we give them their money's worth and then some.*' I'd have to echo those words, because with Parasound's new Halo integrated, you are most definitely 'getting your money's worth… and then some.' *greg borrowman*

Readers interested interested in a full technical appraisal of the performance of the Parasound Halo Integrated Amplifier/DAC should continue on and read the LABORATORY REPORT published on the following pages.

CONTACT DETAILS

Brand: Parasound
Model: Halo
Category: Amplidac
RRP: $4,995
Warranty: Three Years
Distributor: Network Audio Visual Pty Ltd
Address: Unit 6B, 3 – 9 Kenneth Road
Manly Vale NSW 2093
T: (02) 9949 9349
E: info@networkav.com.au
W: www.networkav.com.au

⊕
- High power, low distortion
- Tuneable subwoofer output
- Built-in electronic x/o
- On-board DAC

⊖
- 3.5mm headphone socket
- Using headphones disables spkrs

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LABORATORY TEST REPORT

Newport Test Labs measured the power output of the Parasound Halo at 1kHz as being 176-watts both channels driven into 8Ω loads, and 262-watts both channels driven into 4Ω loads, both figures being just a little higher than Parasound's specification of 160-watts into 8Ω loads and 240-watts into 4Ω loads. The reason for Parasound's lower specification becomes clear when you look at the tabulated figures (or the relevant bar graphs), which show that at 20Hz, the Parasound Halo was only able to deliver 166-watts into 8Ω and 245-watts into 4Ω. Parasound deserves congratulations for the honesty of its power output specification. Many of its competitors are now quoting the output power at 1kHz with only a single channel driven as their 'power output' specification—a trick that's illegal in the USA and Australia, but I don't know about other jurisdictions. There are no 2Ω power output results shown because when *Newport Test Labs* connected the Parasound Halo to a 2Ω test load, the Halo's internal protection circuit triggered after an output of only tens of watts had been attained. This was no doubt because, unlike music, test signals are continuous, which presents maximum load. However, I would recommend that users avoid using the Halo with loudspeakers whose impedance dips below 2Ω.

The frequency response of the Parasound Halo was very flat and extended… at least when the tone control circuitry was defeated. With the controls at this setting, the Halo's low-frequency response was down 1dB at 8Hz and 3dB at 4Hz, and its high-frequency response down 1dB at 55Hz and 3dB down at 103kHz. The response across the audio band is shown in Graph 5, both into a standard 8Ω resistive laboratory test load (black trace) and into a load that simulates that of a two-way bass reflex loudspeaker (*Newport Test Labs* uses Ken Kantor's circuit, with John Atkinson's modification that includes Zobel impedance compensation in the treble.) You can see that the two traces track each other perfectly, which is an excellent result that means the amplifier will sound exactly the same irrespective of the impedance magnitude of the loudspeakers you use.

The response rolls off as expected at low and high frequencies, to be 0.5dB down at 20Hz and 0.3dB down at 20kHz, which puts the normalised frequency response at 20Hz to 20kHz ±0.25dB. Channel separation was measured at discrete frequencies, and was 95dB at 20Hz, 73dB at 1kHz and 51dB at 20kHz. The result is obviously the poorest at 20kHz, but 51dB is still more than adequate to ensure perfect channel separation and stereo imaging. Inter-channel phase errors were, perhaps, just a touch higher than I'm used to seeing, particularly the 1.97° result at 20kHz, but still low enough not to be audible, even under controlled listening conditions. Channel balance was an outstandingly good 0.08dB.

The Halo's frequency response is not nearly as good when the tone control circuit is

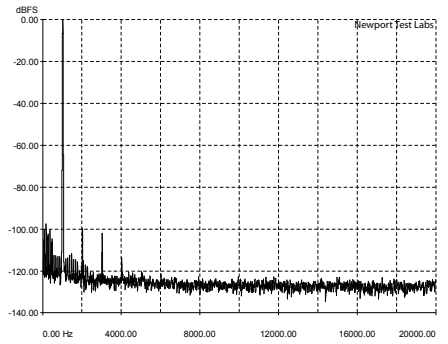
The frequency response of the Parasound Halo was very flat and extended … at least when the tone control circuitry was defeated

engaged, as you can see from Graph 6, which compares the 'in-circuit' (red trace) and 'out-of-circuit' (black trace) responses. Firstly, inserting the tone control circuit reduces the overall gain by around 0.4dB across the midrange and high frequencies, and a bit over 1dB at low frequencies. This means that if you switch between one and the other while playing music, the 'defeat' position will appear to deliver 'better' sound, but this is simply because the music will be louder, which the human ear detects as appearing 'better' rather than simply 'louder'. But with the controls in-circuit, the amplifier will also appear to sound slightly bass-shy as well, despite the fact that the overall frequency response with the tone controls in-circuit is still a very creditable 20Hz to 20kHz ±0.5dB.

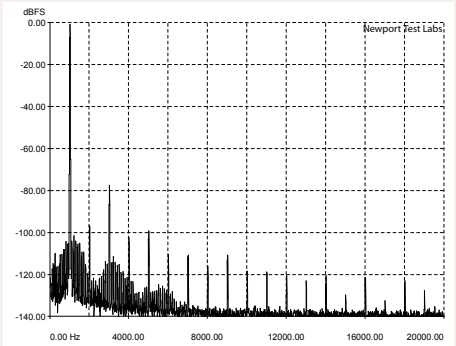
As for the tone controls, my advice would be that if you are using them, you should do so sparingly

As for the tone controls themselves, their action is shown in Graph 7. The bass tone control affords much more boost and cut than is usual, delivering around 16dB of boost and cut at 20Hz (10–12dB is more usual). At high frequencies boost and cut is still fairly extreme, at around ±13dB. The boost on both controls is partially shelved—full shelving would have been preferable, and both controls will have an effect on the midrange, whereas it would have been better if they didn't. My advice would be that if you are using the tone controls, do so sparingly, perhaps not using more than around half the available range and, if you are not using the controls, ensure the tone control circuit is defeated.

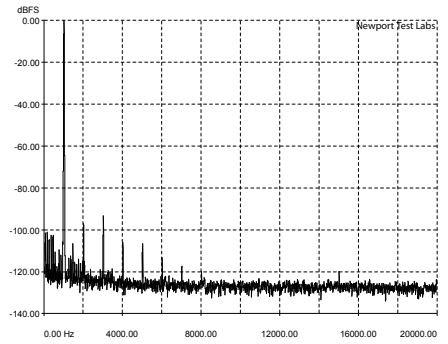
Harmonic distortion was very low, with *Newport Test Labs* measuring overall THD+N at 0.006% at an output of one watt, and just 0.018% at rated output. Spectrum analysis of the individual distortion components that delivered this result is shown in Graphs 1 through 4. At an output of 1-watt into 8Ω (Graph 1), there was a second harmonic distortion component at –100dB (0.001%), a third harmonic at –102dB (0.0007%), a fourth at –112dB (0.0002%) and a fifth at –120dB (0.0001%). If there were any higher-order components, they were buried in the noise floor. Reducing load impedance to 4Ω (Graph 2) resulted in slight increases in the levels of the first five distortion components and the addition of sixth, seventh and eighth-order components but with the exception of the first two components (the second at –97dB or 0.0014% and the third at –95dB or 0.0017%) all were more than 110dB down (0.0003%).



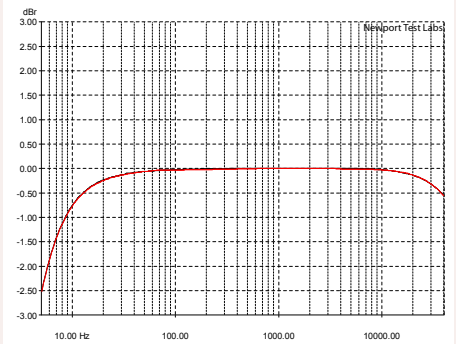
Graph 1: Total harmonic distortion (THD) at 1kHz at an output of 1-watt into an 8-ohm non-inductive load, referenced to 0dB. [Parasound Halo 2.1 Integrated Amplifier/DAC]



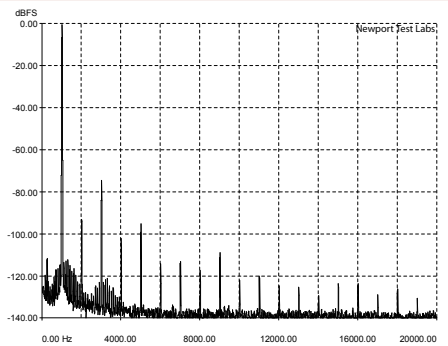
Graph 4: Total harmonic distortion (THD) at 1kHz at rated output (240-watts) into a 4-ohm non-inductive load, referenced to 0dB. [Parasound Halo 2.1 Integrated Amplifier/DAC]



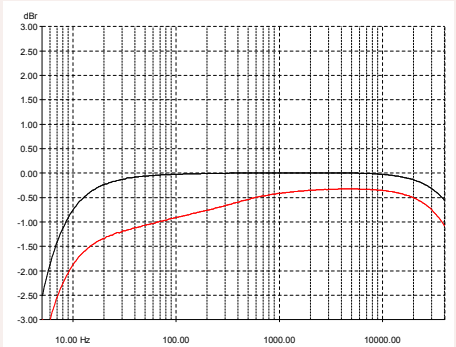
Graph 2: Total harmonic distortion (THD) at 1kHz at an output of 1-watt into a 4-ohm non-inductive load, referenced to 0dB. [Parasound Halo 2.1 Integrated Amplifier/DAC]



Graph 5: 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). [Parasound Halo 2.1 Integrated Amplifier/DAC]

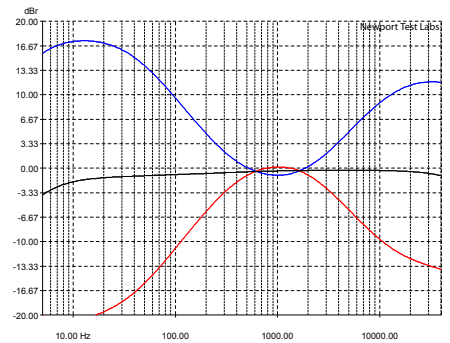


Graph 3: Total harmonic distortion (THD) at 1kHz at rated output (160-watts) into an 8-ohm non-inductive load, referenced to 0dB. [Parasound Halo 2.1 Integrated Amplifier/DAC]

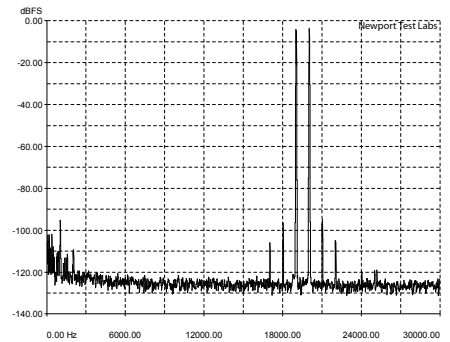


Graph 6: Frequency response of line input with tone controls defeated (black trace) and with tone control circuit engaged, but with bass and treble controls at '12'o'clock' positions (red trace). [Parasound Halo 2.1 Integrated Amplifier/DAC]

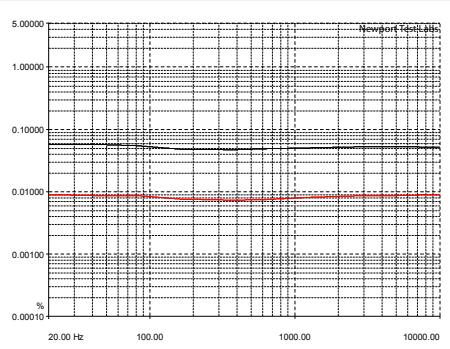
Harmonic distortion increased when the amplifier was operating at its maximum output into 8Ω and 4Ω loads, as you'd expect, and the distortion spectrum was similar for both loads, both in its spectral distribution and level. In both cases the third harmonic dominated, at a level of around –76dB (0.0158%), with a second at around –95dB (0.0017%) and the higher-order components at around 100dB down (0.001%) or more.



Graph 7: Frequency response with tone section engaged, plus tone control action. [Parasound Halo 2.1 Integrated Amplifier/DAC]



Graph 8: 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. [Parasound Halo 2.1 Integrated Amplifier/DAC]



Graph 9: THD and Noise Vs Frequency (DAC) at 0dB (red trace) and -20dB (black trace) using AES-17 48kHz/24-bit test signal. [Parasound Halo 2.1 Integrated Amplifier/DAC]

You can see that the noise floor is mostly down below –120dB at frequencies above 4kHz. The 'grass' on the noise floor at lower frequencies is a sign that the Parasound Halo's power supply is at its limit delivering rated power into these loads.

Intermodulation distortion is shown in Graph 8. There are only four sidebands either side of the two test signals at 19kHz and 20kHz, which is excellent performance, and

Parasound Halo Integrated Amp– Laboratory Test Results

Test	Measured Result	Units/Comment
Frequency Response @ 1 watt o/p	8Hz – 55kHz	–1dB
Frequency Response @ 1 watt o/p	4Hz – 103kHz	–3dB
Channel Separation (dB)	95dB / 73dB / 51dB	(20Hz / 1kHz / 20kHz)
Channel Balance (Direct/Tone)	0.08	dB @ 1kHz
Interchannel Phase (Direct)	0.34 / 0.11 / 1.97	degrees (20Hz / 1kHz / 20kHz)
THD+N	0.006% / 0.018%	@ 1-watt / @ rated output
Signal-to-Noise (unwghted/wghted)	80dB / 86dB	dB referred to 1-watt output
Signal-to-Noise (unwghted/wghted)	94dB / 100dB	dB referred to rated output
Input Sensitivity	28mV / 362mV	(1-watt / rated output)
Output Impedance	0.02Ω	at 1kHz
Damping Factor	400	@1kHz
Power Consumption	0.29 / 56.72	watts (Standby / On)
Power Consumption	82 / 554	watts at 1-watt / at rated output
Mains Voltage Variation during Test	241 – 253	Minimum – Maximum

Parasound Halo Integrated Amp – Test Results – Power Output

Channel	Load (Ω)	20Hz (watts)	20Hz (dBW)	1kHz (watts)	1kHz (dBW)	20kHz (watts)	20kHz (dBW)
1	8 Ω	187	22.7	190	22.8	186	22.7
2	8 Ω	166	22.2	176	22.4	175	22.4
1	4 Ω	280	24.5	295	24.7	294	24.7
2	4 Ω	245	23.9	262	24.2	262	24.2

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

Parasound Halo Int. Amp. — Test Results — Digital Input

Digital Section	Result	Units/Comment
Out of Band Spurious Components	-111.805	
Suppression of Imaging Components	113.537	(Worst Case)
Level Dependent Logarithmic Gain	0.087	
Intermodulation Distortion (1)	-99.33	18kHz/20kHz 1:1 Ratio
Intermodulation Distortion (2)	-97.63	41Hz/7993Hz 4:1 Ratio
Low Level Noise Modulation	1.877	Worst Case
Idle Channel Noise	-115.64	CCIR-RMS weighting
Signal-to-Noise Ratio	-116.20	CCIR-RMS weighting
Power Line Products	-115.72	50Hz
Non-Linear Interchannel Crosstalk (a)	-106.613	3kHz (2nd-order ref 17kHz/20kHz)
Non-Linear Interchannel Crosstalk (b)	-99.419	6kHz (3rd-order ref 17kHz/20kHz)
Non-Linear Interchannel Crosstalk (c)	-103.99	10.040kHz (2nd re 40Hz/10kHz)
Non-Linear Interchannel Crosstalk (d)	-101.43	10.080kHz (3rd re 40Hz/10kHz)
Absolute Phase	Normal	Normal/Inverted

the levels are quite low, at around –95dB (0.0017%) for the 18/21kHz signals and at around –105dB (0.0005) for the 17/22kHz signals. There is an unwanted difference signal generated down at 1kHz, as you can see at the left of the graph, but it's 95dB (0.0017%) down, therefore would not be audible.

The Parasound Halo's 100Hz square wave shows the considerable tilt one would expect from the –3dB downpoint being at 4Hz, but there's no bending to indicate any phase shift, which is excellent. The 1kHz square wave is very close to perfect, also an excellent result. The 10kHz square wave shows some rounding, the result of the Halo's high-frequency response being 3dB down at 103kHz, but is otherwise excellent. Performance into a highly reactive load was fairly typical of a solid-state amplifier, with a half-height overshoot and a few cycles of quickly-damped ringing, so the Halo will be perfectly stable when driving highly reactive loads.

Signal-to-noise ratios were very high when referenced to either one-watt (where the Halo returned figures of 80dB unweighted and 86dB A-weighted) or rated output, where it returned figures of 94dB unweighted and 100dB A-weighted). All are excellent results, and most particularly the A-weighted result at rated output: Not too many integrated amplifiers can break into the three-digit range, and most particularly not if they contain digital circuitry!

Overall, the Parasound Halo performed very well in all Newport Test Labs' tests

Newport Test Labs found the line inputs of the Halo were quite sensitive, requiring only 28mV to deliver 1-watt at the speaker terminals, and only 362mV to deliver rated output. Output impedance was only 0.02Ω at 1kHz, resulting in an excellent damping factor of 400, which means the Halo will easily be able to control the back-emf from even the largest-diameter bass driver.

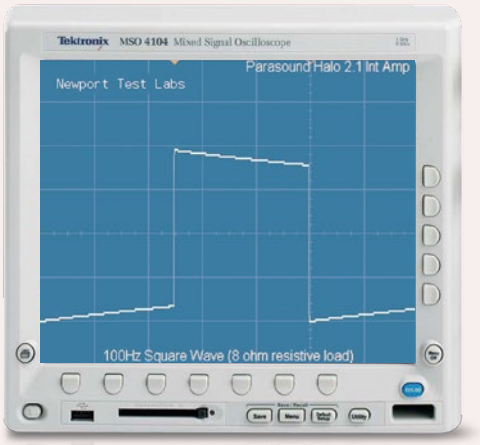
Tests on the Halo's DAC showed that it performs well, but does not represent the state-of-the art so far as digital-to-analogue conversion is concerned, as you can see from the tabulated results. The signal-to-noise ratio was 116dB, with crosstalk hovering either side of 100dB. THD (shown in Graph 9) was low, less than 0.01% right across the frequency band and IMD also low, at close to –100dB (0.001%). Phase was within 0.2 degrees and the circuit was non-inverting.

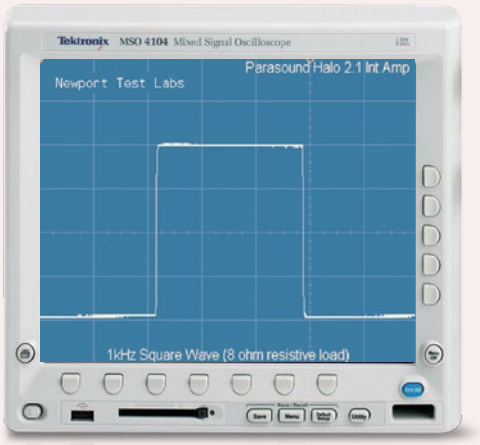
Standby power consumption was measured at 0.29-watts, so the Parasound Halo conforms to the latest Australian standard, and will also pull only a fairly modest 82-watts from your mains when operating at normal listening levels.

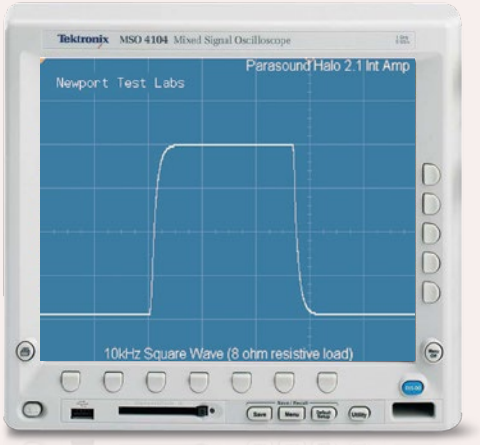
Overall, the Parasound Halo performed very well in all *Newport Test Labs'* tests and has well-designed, non-intrusive protection circuitry, which is a reassuring but oft-omitted feature. Recommended.

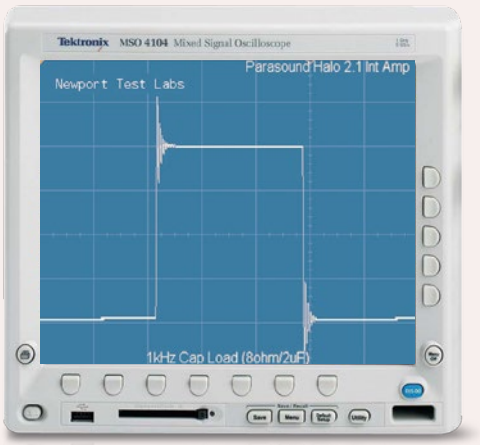
Steve Holding

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.









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