AUDIO ANALOGUE AACENTO

INTEGRATED AMPLIFIER

I reviewed Audio Analogue's mighty Maestro Anniversary integrated more than two years ago. At first glance the AAcento might not seem to be in its bigger sibling's league, with a rated power output of 'only' 100-watts per channel into 8Ω, compared to the Maestro's rated output of 150-watts per channel into 8Ω, but all is not what it seems.

Most audiophiles (and a good many professionals in the industry who should know better, I'm afraid), think that to double the volume you get from your speakers you need an amplifier with double the power output. This isn't true. You would actually need an amplifier that's 10 times more powerful in order to double the volume level you're getting from your speakers. So in order to get twice as powerful as a 100-watt amplifier, you'd need to buy a 1,000-watt amplifier. In terms of decibels, this is a 10dB difference.

So if you do the maths, you'll find that the Maestro Anniversary—at 150-watts per channel into 8Ω—is only 1.76dB more powerful than the AAcento. Is this significant? Well the smallest difference said to be perceptible to the human ear is generally held to be 1dB when using test signals and 3dB when using music, so you tell me…

THE EQUIPMENT

The front panel of the AAcento bears many similarities to the Maestro and, as you'll find for yourself as you read further into this review, it shares the same basic control and protection circuits as the Maestro—something Audio Analogue calls 'microcontroller-based equipment management.'

This microcontroller-based equipment management circuitry allows Audio Analogue to do many very clever tricks with the AAcento. The first (but by no means the last or the least) of these is that you can control all the amplifier's functions using that single rotary control on the front panel. For starters, it's the power switch… or, to be more precise, it's the standby power switch, since the main power switch is on the rear panel. A short push (followed by a release) will see the amplifier spring into life, which it does with something of a blaze of glory, as when it does, all the LEDs on the front panel light-up, and they're really, really bright… at least they are if you leave them in their 'default' brightness configuration.

If, like me, you think they're just too bright, you can choose between two alternative brightness settings. One is 'mid' brightness, or what Audio Analogue calls 'mean' brightness, and the other is what Audio Analogue calls 'Dark Mode' where the LEDs will glow only when you make an adjustment to any of the controls, after which whatever LED(s) glow(s) as a result of your adjustment (switching from one input to another, for example) will then extinguish, leaving the front panel of the amplifier 'Dark.' (And in the case of my review sample, which came with a black anodised aluminium finish, that word was truly descriptive. I don't imagine that quite the same would be the case if you ordered the AAcento in its bright brushed aluminium finish.)

Once you have turned the amplifier on and the internal circuitry has stabilised and the protection circuitry has checked for any potential fault conditions, the input circuit will default to the last-used input and the volume will default to zero. I can't say that I was much enamoured of this logic. It would seem to me to be far more sensible to have the switch-on volume default to whatever volume level was last used. I know I'm not alone in my preference, because most other hi-fi manufacturers that provide electronic switching have their volume default to something other than zero. Some use the 'last used' volume, others default to a nominal but low volume level, while still others allow you to set your own preferred default switch-on volume level.

I also wasn't particularly happy with the time it takes to switch from one input to the other using the front panel switch. As it happens, the source I was primarily using to drive the AAcento to prepare this review was connected to the balanced inputs, but I was also using the phono inputs.

The remote Audio Analogue supplies with the AAcento is the same one it supplies with its top-of-the-range Maestro

The reason for my annoyance was that I was using the front panel control to switch from one input to the other, rather than the remote control. (The reason being that after I have established a remote control's functionality—or otherwise—I tend to put it back in the packaging straight away, because this reduces the risk of me forgetting to include it when I return the review unit to the distributor.)

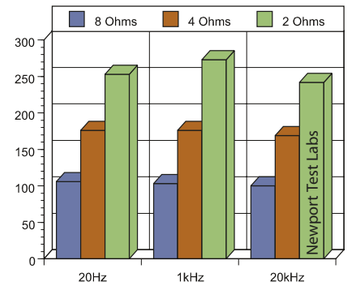
In the case of the AAcento, using the front panel control to switch inputs involves pushing and holding the control for a minimum of three seconds after which, if you release the control, it switches to the next input. But the selector only goes in the one direction, so if you're using Input 4 and wish to switch to Input 3, it will take you 12 seconds to get there using the front panel control. Here's the sequence: Push, wait three seconds, release… push, wait three seconds, release… push, wait three seconds, release… Wait! Why not use the bloody remote control! I hear countless readers crying out in frustration (and probably Audio Analogue's manufacturer as well).

Well, yes, I could do that, and in fact I got so frustrated that that's exactly what I did do in the end. But I thought I'd mention it as a salutary lesson not to lose the remote control!

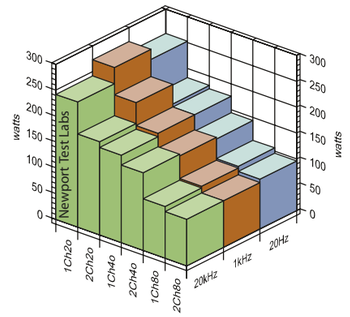
And the remote control is pretty easy to lose, because it's as black as the front panel of the AAcento, and relatively small, at 45mm wide, 140mm deep and 20mm thick. It weighs 250g, a weight which may come as a surprise until I tell you that the remote is carved from a block of solid aluminium, save for the aluminium bottom plate that must be removed when replacing the batteries (two AAAs). I was pleased to find that Audio Analogue pre-fits the remote with high-quality alkaline batteries. (You'd be amazed by how many high-end manufacturers put cheap, zinc-carbon batteries, most of which are prone to leaking, into their super-expensive remotes just to save themselves a few cents.)

In fact the remote control Audio Analogue supplies with the AAcento is exactly the same one it supplies with its top-of-the-range Maestro. There are two buttons for input selection (one steps 'up' and the other 'down' so you can get to inputs faster), two for volume control (again, 'up' and 'down'), one for 'Mute', one for 'Standby', and one for 'SETUP', about which more later. The remote uses infra-red, addressing the circular infra-red receiver recessed into the front panel at the left of the panel. (Note to the Editor: In the past I would not have mentioned this, but with so many high-end amplifiers now using either r.f. or Bluetooth, I'm thinking of mentioning this in all my reviews now and in the future.)

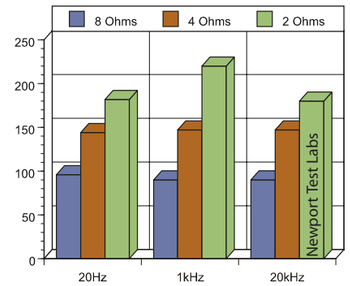
I have to say that I don't know whether Audio Analogue read my review of their Maestro, in which I complained about the



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



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



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

operation of the Mute control, but they've fixed all those issues on this new AAcento, so you can change inputs when the amplifier is muted and all the volume LEDs that are on will flash whenever the amplifier is muted so you can actually *see* that it is muted, and you can also use the SETUP modes while the amplifier is muted. So well done for paying attention guys… but there's still one issue requiring attention, which is that you can increase volume (using either the remote or the front panel control) while the amplifier remains muted. This is not such a good idea. Best practise is to have the amplifier unmute itself if the VOL+ button on the remote is pressed (but not if the VOL– button is pressed). Ditto for the front panel control.

But I seem to have skipped ahead of myself and forgotten to mention that in addition to the Phono and Balanced inputs, which I have already mentioned, the AAcento also has three other line-level inputs, rather sensibly numbered 1, 2 and 3.

Well done for paying attention guys… but there's still one issue requiring your attention: the muting circuit…

Although there is only one Phono input, it can be switched to accommodate either moving-magnet (MM) or moving-coil (MC) cartridges… but only by using the remote control. Using the same input for both MM and MC types means that only the gain of the input stages can be adjusted: it does not permit the possibility of adjusting the input capacitance or load resistance (which would have been possible if Audio Analogue had provided separate MM and MC inputs).

For mine, not providing an adjustable phono stage on an amplifier retailing at the price of the AAcento seems a tad miserly, but it could equally be argued that anyone using such an amplifier would be using an external phono stage, which *would* offer such niceties.

Although it is not obvious, the AAcento has a balance control and an infrasonic filter (which Audio Analogue incorrectly calls a 'subsonic' filter, but it might be a translation error, since the Italian word for this control is '*filtro subsonico*'… unless it should be '*filtro infrasonico*' in Italian as well). The balance control is accessed by using the 'SETUP' button on the remote to select what you're actually adjusting and the 'VOL' buttons to make the necessary adjustment.

This works pretty well once you've worked it out for yourself, which you'll have to do because the Owner's Manual supplied by Audio Analogue is wrong in some areas and not overly helpful in others. For example it says you should use the 'Set Mode' button, when there is no 'Set Mode' button. It then refers you to the six input LEDs you will need to use, when in fact there are only five input LEDs. It's not overly hard to work out what whoever wrote the manual meant to say, but it's not that easy either.

My advice is to ask your dealer to run through all the adjustments with you to make sure you know what you're doing, because if you don't you could end up damaging your loudspeakers. This could occur, for example, if you accidentally set the AAcento to its 'DIRECT' mode. If you accidentally do this, the signal from any source component you have connected to Input 2 will bypass the AAcento's volume control and be sent directly to the input of the power amplifier stage, so the amplifier will be operating at maximum gain. This could potentially result in damage to your loudspeakers. (The DIRECT mode should only really ever be used when Input 2 is connected to an external preamplifier, either for two-channel operation or as part of a multi-channel audio set-up.)

The volume indication LEDs on the front panel have another purpose: They can bring to your attention any internal fault conditions that might occur. For example, if the amplifier gets too hot, either or both of the fifth and sixth LEDs in the line will glow to indicate 'Overtemperature Right Channel' and 'Overtemperature Left Channel' respectively. If there's a d.c. offset detected at the speaker terminals (which could damage your loudspeakers), either or both of the third and fourth LEDs will glow as a warning.

Finally, if the internal d.c. rail voltages fall too low, the first and second LEDs in the line will glow—the first if the positive rail is too low, and the second if the negative rail is too low (and of course, both will glow if both rails are too low).

To the right of the volume LEDs is a 6.35mm gold-plated phone socket. Audio Analogue uses a discrete, dedicated Class-A headphone amplifier to drive this socket, for which it claims a power output of 500mW into 16Ω, 1-watt into 32Ω and 120mW into 300Ω.

The rear panel is well laid-out, with gold-plated RCA terminals used for the unbalanced inputs and outputs, XLR terminals for the balanced inputs and high-quality multi-way terminals for the speaker outputs. When connecting your speakers, pay careful attention to the colour-coding and the labelling on the speaker terminals, because the negative terminal is on the right for the right channel and on the left for the left channel (that is, they're mirror-imaged).

Note, too, that the balanced input has what Audio Analogue says is a 'native' differential input. According to designer Andrea Puccini, because the AAcento does not use global feedback the negative terminal, which would normally be part of a feedback loop, can instead be used for signal. '*The majority of feedback amplifiers, for the balanced input, host an op-amp configured as instrumentation amplifier or they are directly configured as instrumentation amplifiers but they normally are designed for a single-ended input*,' he said. '*The AAcento is designed from the outset with a differential input stage, so it's for this reason we say it's a "Native Differential Stage"*.'

Although there is only one phono input, it can be switched to accommodate either moving-magnet (MM) or moving-coil (MC) cartridges.

Audio Analogue also makes much of the fact that the amplifier does not use global feedback (although it almost certainly uses localised negative feedback loops, but I neglected to check this with Puccini).

Negative feedback is a process where a small amount of the music signal at the output of the amplifier is looped back and re-inserted at the input of the amplifier, with the aim of compensating for errors in the amplification process. If you think this is an outlandish idea, you're in good company. When Harold Black, who invented it (in order to reduce distortion in repeater amplifiers used for telephone transmission) tried to patent it, the U.S. Patent office refused to grant him one for more than nine years, because they thought it was an outlandish idea as well. After finally being granted his patent in 1937, Black wrote in an article for IEEE Spectrum (the journal of the US Institute of Electrical and Electronics Engineers): '*One reason for the delay was that the concept was so contrary to established beliefs that the Patent Office initially did not believe it would work*.'

In fact many audio amplifier designers still don't believe global negative feedback works with music signals, not least because the signal from the output that's re-injected at the input is not part of the music it's supposed to be correcting… a bit like shutting the stable door after the horse has bolted. There's also the fact that although negative feedback can demonstrably reduce low-order distortions (2nd, 3rd, 4th, etc) on sine waves, it also introduces higher-order distortion components (15th, 16th, 17th, etc), the problem here being that whereas low-order distortion components sound 'good' to the human ear (or are obscured by the music signal itself), high-order distortion components sound harsh to the human ear, and are not obscured by the music signal, since they occur at such high frequencies.

As with Audio Analogue's Maestro, the AAcento is entirely designed, developed and manufactured in Italy—in a little spot called Monsummano Terme between Florence and Lucca, in Tuscany, according to Stefano Blanda. Obviously the company buys in the components that make up its amplifiers, but it says that all the mechanical parts, the power transformers and the circuit boards are made in Italy. Despite being in business for so many years, Audio Analogue is still a family company, managed by Stefano Blanda, who is the son of the company's founder, Giuseppe Blanda. And if you were wondering where the 'cento' came from (the AA bit being fairly obvious after all), it's Italian for 'one hundred' which of course is the amplifier's rated power output.

IN USE AND LISTENING SESSIONS

Using a row of LEDs to indicate volume is a something of a curate's egg ('good in parts', for those of you not familiar with the expression). For example, I liked the fact that the LEDs are easy to see from across the room, so if I decided that having four LEDs visible was a good playback level for a particular time of day, I could easily dial up the four LEDs every time. However, because the rest of the LEDs are off, you have no 'visual idea' of how much power the amplifier might have in reserve, as you do when a volume control is set to, say, 9 o'clock. Obviously I knew that there were 16 LEDs in total to indicate volume level, so if four were showing, I was at 'one-quarter power', but knowing something is not quite the same as seeing it.

Despite what I wrote in the previous paragraph, the number of LEDs showing really gives only an indication of the gain of the amplifier, not the volume from the speakers, or even the actual output power, because these will vary with the voltage from the source component and the efficiency of the loudspeakers. Because of this Audio Analogue does in fact give you some control over how the number of LEDs showing relates to actual volume level, rather than just gain. By using the SETUP menu you can select between four different 'Volume Scales' that adjust the rate at which the volume is increased relative to the movement of the volume control (or how long you press the volume buttons on the remote).

According to Audio Analogue, Scale #1 is best-suited for speakers of average efficiency, Scale #2 is best-suited for high-efficiency loudspeakers, Scale #3 allows more precise volume control adjustments across 'mid volumes', while Scale #4 is a 'linear in dB' scale.

Basically, all the different scales simply vary the number of LEDs that glow for any particular setting of the volume control. There did seem to be a discrepancy (a sudden boost in volume) in the linearity of Scale #1 at the top-most step of the resistor ladder, but it's unlikely this will ever be encountered in ordinary day-to-day use.

As for the actual process of varying the volume, the control has a smooth rotation and a smooth sloping surface which means you can't 'grasp' it with your fingers as you can a straight-sided knob. You instead have to push inwards (with one or more fingers) to get some grip on the control surface, and then rotate the control clockwise or anticlockwise. But in doing this you have to be careful not to push too hard, or you'll switch the control to its 'Input Source' function… and if you hold it down for too long, this action will switch the amplifier off. If you use the amplifier often, you'll quickly get used to the control operation, but overall I think using the remote to control the amplifier will result in a superior 'user experience'.

You'll certainly be in no doubt that you're experiencing a 'superior user experience' when you listen to the way the Audio Analogue AAcento reproduces your music, because it sounds absolutely glorious. I say 'absolutely glorious' because although the sound is clean, uncoloured and intricately detailed, it has at the same time a richness and warmth that envelops you in whatever music is playing.

Listening to Fiona Joy playing *A Walk In The Past* from her album 'Into The Mist', the sound of the 1885 Steinway she's playing is seemingly propelled forward into the room, and the sound of the hammer felts hitting the strings somehow seemed more dynamic than I have heard previously. Then, in *Moon Over The Lotus Pond*, where Joy keeps her foot on the sustain pedal for long periods of time, the fuller sound of the piano that results from this action resonates more richly—and more like a real piano—with additional depth to the lower-frequency resonances of the piano frame itself than I've heard before. Admittedly not all the piano recordings I own are recorded to the same quality as this disc (recorded, mixed and mastered by Cookie Marenco on DSD256), so this was certainly a factor in the great sound quality, but when I double-checked by playing some very ordinary-sounding piano recordings—mostly garnered from Philips's Great Pianists of the 20th Century set (100 volumes featuring recordings by 72 of the greatest pianists of the 20th Century)—the AAcento still delivered wondrous piano sound. (I don't own all 100 volumes, by the way, I selected only those pianists who most interested me and although the recording quality varies dramatically depending on the age of the recording, the performances are all to die for… even the idiosyncratic ones).

The AAcento's amazing dynamic capabilities were amply demonstrated by its ability to deliver The Stress Of Leisure's 'Achievement' album at the high volume levels that it should be played, yet there wasn't a single moment during my auditioning sessions that I thought I needed more power than was being delivered… or more power than was obviously in reserve. Jane Elliot's exceptionally good playing (on bass) is a constant throughout this album, and the AAcento kept the pace, rhythm and timing of her delivery exactly as I experienced it when I heard the band live in Brisbane. On *aim high/get high* the dirty synth sound contrasts with the purity of the damped cymbal smashes from Phil Usher (since replaced by Jessica Moore). The way the AAcento was able to separate the several contrastingly syncopated rhythms of *brain jam* was as impressive as the musicianship demonstrated by this track, which is probably my favourite on this album. I could listen to it forever.

The beautiful high-frequency sound of the AAcento was also clearly in evidence reproducing the classic sound of Neil Kowald's Hammond on *This Is Sound* from The Sons of Mod's first album, 'We Baptize you in the Name of MOD'. Another great demo of the AAcento's presentation comes at the end of *Hamburg Stomp*, where the music stops abruptly. Listen to the acoustic around the sporadic handclaps and the authenticity of the sound of the announcement: '*jolly good show chaps*.' Then there's the sound of the cymbals on *Our Man in Havana* and the way you can hear them sizzling and spitting behind the lead guitar break while not losing that luscious 'ride' sound.

The Audio Analogue's sonic strengths are so many that I'd really not dare to single any one out as being greater than any of the others, but if you twisted my arm behind my back until I did, it would have to be the almost-miraculous way it handled vocals, of both male and female singers alike. From the dusky sounds of Frank Sinatra to the wails of Minnie Riperton to the strangeness of Björk, the sadness of Joni Mitchell, the croak of Leonard Cohen or the raspiness of Bob Dylan, the AAcento just nailed their sonic deliveries individually, so it's almost as if you're listening to the same music you've always owned, but it's suddenly been miraculously re-mastered to extract the absolute highest fidelity.

CONCLUSION

In my introductory paragraphs I pointed out the fact that the difference in output power between Audio Analogue's Maestro and AAcento is insignificant when listening to music. I've also proved during the review that much of the internal circuitry of the AAcento is either identical, or insignificantly different from the Maestro. Build quality is also identical. The remote control is also identical. What is certainly different is the pricing, with the Maestro retailing for $12,300 and the AAcento for just $5,590. Oh, and I almost forgot… the Maestro doesn't have a phono stage or a headphone output, whereas the AAcento has both. Sure the Maestro has far higher power output into low impedances and its additional power output into 8Ω will be helpful with transients if you have inefficient speakers, plus I think it looks nicer, and the external heat-sinking means it's going to run cooler, but if you don't need any of these abilities—and you don't care about the looks—Audio Analogue's AAcento would seem to offer rather more bang for your buck. *Jutta Dziwnik*

Readers interested in a full technical appraisal of the performance of the Audio Analogue AAcento Integrated Amplifier 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: Audio Analogue
Model: AAcento
RRP: $5,590
Warranty: Two Years
Distributor: Absolute HiEnd
Address: PO Box 370
Ormond VIC 3024
T2: (04) 8877 7999
E: info@absolutehiend.com
W: www.absolutehiend.com

- Powerful
- Excellent sound
- Brilliant design

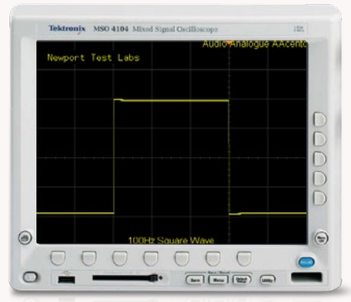
- Switch-on logic
- Phono input options
- Owner's manual

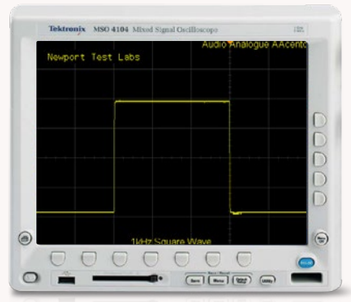
LABORATORY TEST REPORT

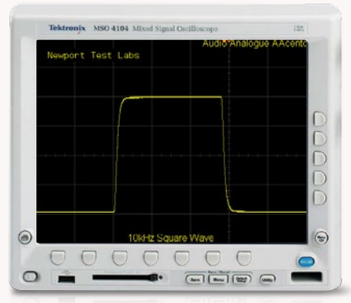
Although Audio Analogue advertises the AAcento as being capable of '100-watts per channel' it adds some 'fine print' in its manual that would indicate that achieving this output power is a 'best case' scenario. For example, it says it acheives this output only when one channel is being driven, plus adds that at this level, THD+N will be 1%. Even more fine print adds that the amplifier cannot sustain this output continuously, which it's supposed to be able to do according to the consumer laws in many countries, including Australia. To be specific, the manual states: '*The AAcento is not designed to sustain continuous output power. High power sine wave tests over a load of 8Ω or less must be evaluated for short time or the over-temperature (sic) will shut down the amplifier.*' This meant that *Newport Test Labs* had to make very quick measurements before the amplifier's thermal protection kicked in. So the power output measurements shown in the tabulated chart are not true 'continuous' measurements as are recorded by other amplifiers, which can sustain their rated output almost indefinitely. The figures do, however, give a fairly true idea of the amplifier's power output capabilities when it's playing music.

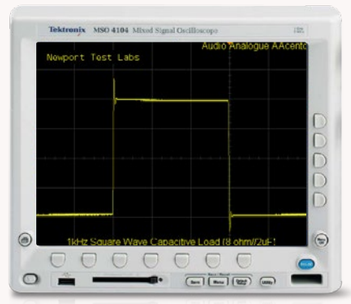
The measurements made by *Newport Test Labs* put the Audio Analogue AAcento's power output at 90-watts per channel, both channels driven into 8Ω at 1kHz from 20Hz to 20kHz. As you can see from the table, the 90-watt limitation comes about because this is the amplifier's maximum output before 0.1% waveform distortion from 1kHz up to 20kHz. At lower frequencies it can deliver 95-watts per channel when both channels are driven. As you can also see, the AAcento delivered 100-watts per channel at 20kHz when only one channel was driven and a touch more than this at lower frequencies… though the differences are insignificantly small, as you can see from the differences in the dBw column—less than 0.1dB at 1kHz and 0.2dB at 20Hz.

When driving 4Ω and 2Ω loads, the AAcento didn't manage to meet its rated output power at any test frequency, even when only a single channel was driven.

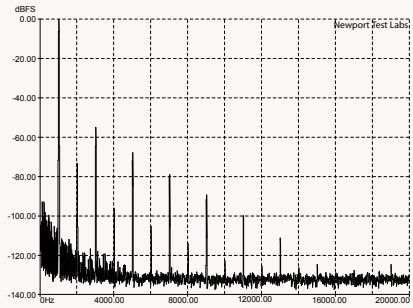




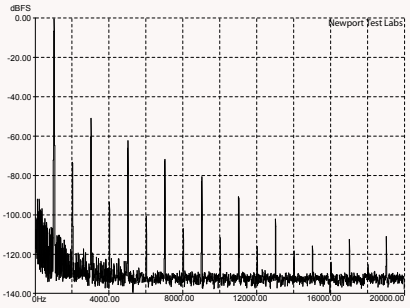




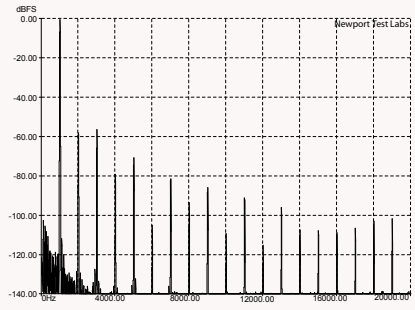
This is no doubt because Audio Analogue measures output power at the point where the test waveform has reached 1.0% distortion, whereas *Newport Test Labs* measured at the point where distortion in the test waveform reached 0.1% THD—which is an order of magnitude less.



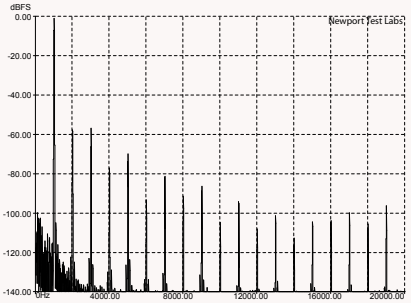
Graph 1. Total harmonic distortion (THD) at 1kHz at an output of 1-watt into an 8-ohm non-inductive load, referenced to 0dB.



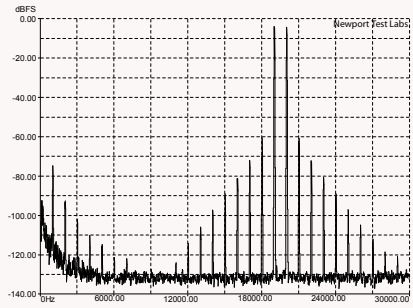
Graph 2. Total harmonic distortion (THD) at 1kHz at an output of 1-watt into a 4-ohm non-inductive load, referenced to 0dB.



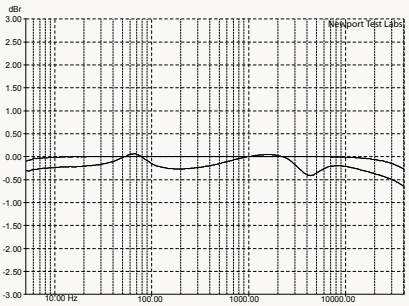
Graph 3. Total harmonic distortion (THD) at 1kHz at rated output (100 watts) into an 8-ohm non-inductive load, referenced to 0dB.



Graph 4. Total harmonic distortion (THD) at 1kHz at 170 watts into a 4-ohm non-inductive load, referenced to 0dB.



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.



Graph 6. Frequency response of line input at an output of 1-watt into an 8-ohm non-inductive load and into a combination resistive/inductive/capacitive load representative of a typical two-way loudspeaker system.

As you can see from the tabulated chart, in *Newport Test Labs'* more stringent power output tests the AAcento delivered 176-watts per channel with one channel driven at low frequencies, and 169-watts per channel at 20kHz. When both channels were driven into 4Ω loads, maximum output dropped to around 150-watts per channel across the audio band. Into 2Ω loads the amplifier delivered 220-watts both channels driven at 1kHz, but at the frequency extremes (20Hz and 20kHz) power output dropped to around 180-watts per channel.

Distortion was quite high irrespective of output level, which is of course what I'd expect from an amplifier that doesn't use global negative feedback.

Looking at Graph 1, you can see the levels of the odd-order components are higher than the even-order, though at these low-order levels, odd-order harmonics are not the problem they'd be if they were at higher orders. The second harmonic is at –75dB (0.01778%), the third at –56dB (0.15848%), the fourth at –87dB (0.00446%), the fifth at –67dB (0.04466%), the sixth at –104dB (0.00063%), the seventh at –79dB (0.01122%), the eighth at –113dB (0.00022%), the ninth at –90dB (0.00316%) and a tenth at –122dB (0.00007%). Except for one higher-order harmonic at 100dB (0.001%) down and one at –111dB (0.00028%) the others are all more than 123dB down (0.00007%).

Graph 2 shows harmonic distortion when the amplifier is driving a 4Ω load at a level of one watt. You can see the levels of the distortion components are roughly similar to those when the amplifier is driving an 8Ω load, except for the higher-order components, which increase in level (but are still all more than 110dB down (0.00031%). Note the admirably low noise floor at higher frequencies on both graphs, and that even the low-frequency noise (extreme left of graph) is mostly more than 100dB down.

Distortion levels at 100-watts into 8Ω (Graph 3)and 170-watts into 4Ω (Graph 4) are not only high, but also almost identical. The only levels that are different are those of the sixth, eighth and tenth harmonics (of the 1kHz test signal). Roughly speaking, the first two harmonics are at –60dB (0.1%), the fifth is at –70dB (0.03162%) and the fourth, seventh and ninth are around –80dB (0.01%). Note again the noise floor at higher frequencies, which has dropped below –140dB, and is more than 100dB down at low frequencies.

The AAcento's intermodulation distortion graph (Graph 5) looks more like one from a valve amplifier than from a solid-state amplifier, not least because of the level of the signal regenerated at 1kHz, which is only 75dB down (0.01778%), which has in turn increased the levels of the sidebands either side of the two test signals at 19kHz and 20kHz, the highest of which are 60dB down (0.1%).

The frequency response of the Audio Analogue AAcento was extremely flat and extended. Overall, it extends from less than 1Hz to 91kHz –1dB, and from less than 1Hz to 151kHz –3dB. These are superbly wideband responses. The response within the audio band is shown in Graph 6 for both the response into a standard non-inductive 8Ω laboratory test load and into a load that simulates that of a two-way bass reflex speaker. The flattest response is the one into the laboratory load, and it's 5Hz to 20kHz ±0.05dB. The response into the simulated speaker load doesn't quite reach the same level of perfection, but it's still 5Hz to 20kHz ±0.2dB, which is outstandingly good.

Channel separation was far more than required, but *Newport Test Labs'* tested results of 77dB at 20Hz, 94dB at 1kHz and 67dB at 20kHz were rather less than I expect to see in such a high-quality amplifier.

Interchannel phase, on the other hand, was a little better than I am used to seeing, being perfect at 1kHz and only 0.01° at 20Hz and 0.15° at 20kHz. All these differences would, of course, be imperceptible to the human ear.

Audio Analogue AAcento Int. Amp. – Test Results – Power Output

Channel	Load (Ω)	20Hz (watts)	20Hz (dBW)	1kHz (watts)	1kHz (dBW)	20kHz (watts)	20kHz (dBW)
1	8 Ω	106	20.2	103	20.1	100	20.0
2	8 Ω	96	19.8	90	19.5	90	19.3
1	4 Ω	176	22.4	176	22.4	169	22.3
2	4 Ω	144	21.6	147	21.7	150	21.8
1	2 Ω	253	24.0	273	24.4	242	23.8
2	2 Ω	182	22.6	220	23.4	180	22.5

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

Audio Analogue AAcento Int. Amp. – Laboratory Test Results

Test	Measured Result	Units/Comment
Frequency Response @ 1 watt o/p	<1Hz – 91kHz	–1dB
Frequency Response @ 1 watt o/p	<1Hz – 151kHz	–3dB
Channel Separation (dB)	77dB / 94dB / 67dB	(20Hz / 1kHz / 20kHz)
Channel Balance (Direct/Tone)	0.67	dB @ 1kHz
Interchannel Phase (Direct)	0.01 / 0.00 / 0.15	degrees (20Hz / 1kHz / 20kHz)
THD+N	0.18% / 0.24%	@ 1-watt / @ rated output
Signal-to-Noise (unwghted/wghted)	79dB / 85dB	dB referred to 1-watt output
Signal-to-Noise (unwghted/wghted)	94dB / 102dB	dB referred to rated output
Input Sensitivity	601mV	for rated output unbalanced
Output Impedance	0.44Ω	at 1kHz
Damping Factor	18	@1kHz
Power Consumption	0.77 / 46	watts (Standby / On)
Power Consumption	72 / 353	watts at 1-watt / at rated output
Mains Voltage Variation during Test	238 – 246	Minimum – Maximum

Signal-to-noise ratios, as measured, were excellent, with the Audio Analogue AAcento returning figures of 85dB A-weighted referred to an output of one watt, and 102dB A-weighted referred to rated output (exceeding Audio Analogue's specification).

Newport Test Labs measured the AAcento's output impedance as being 0.44Ω, compared to Audio Analogue's specification of 0.4Ω, so slightly higher (or perhaps Audio Analogue didn't bother with the second digit), so the damping factor would be a low and likely just-audible 18. When I say 'just audible' this damping factor is about the same as I'd expect from a valve amplifier, which means there will be some interaction between the back-emf from large-coned loudspeakers such that the amplifier won't be able to deliver quite the same level of control over them as an amplifier with a damping factor of 20 or more. (Once damping factor exceeds 20, higher numbers make no audible difference.) But it's close, very close. If the amplifier's output impedance had been exactly 0.4Ω, its damping factor would have been 20, and variations in production could easily account for a 0.04Ω difference.

Mains power consumption varied from 46-watts when the AAcento was idling, to 72-watts when it was operating at typical listening levels, to 353-watts when it was delivering its maximum power output into 8Ω. In stand-by mode, power consumption is less than the one watt specified by Audio Analogue (0.77-watts) but still higher than the Australian standard for stand-by power consumption, which is 0.5-watts.

Square wave performance was outstandingly good, as you'd expect given the linearity and extension of the AAcento's frequency response. You can see that the 100Hz and 1kHz square waves look almost exactly as if they'd come direct from the square wave generator. The 10kHz square wave has only the tiniest amount of rounding on the leading edge—definitely one of the best results I have ever seen for this test. The square wave that shows the AAcento's performance into a highly reactive load is also outstandingly good, with just a single one-eighth-height overshoot that's essentially damped within one cycle. Amplifiers that perform this way in this test are generally held to 'sound better' in listening tests.

Other than distortion, which is inevitably higher than usual if a designer decides to eschew global negative feedback (though to put it into perspective, the AAcento's distortion is no more than I'd expect from a high-quality valve amplifier), the Audio Analogue AAcento returned excellent measured performance on *Newport Test Labs'* test bench in all other areas of technical performance. *Steve Holding*