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esoterica

A FLIGHT OF FANCY

Italy's finest amplifier tested, reviewed and rated...

AUDIA FLIGHT FLS10
INTEGRATED AMPLIFIER

Italian high-end hi-fi manufacturer Audia Flight has in recent years worked very hard to not only increase the number of products in its range, but also increase the diversity of its range, this last a project that is enhanced because most of the company's products are able to be customised by adding modules so that audiophiles can option in only those features and facilities they want included, and don't have pay for added-cost features they didn't really want in the first place.

The Audia Flight FLS10 is a perfect case in point, because although in its most basic form (which is hardly 'basic', by the way!) it has five analogue inputs (three of which are unbalanced and two of which are balanced) and also both balanced and unbalanced line-level outputs, you can additionally fit it with up to two additional plug-in modules to extend its capabilities. Currently there are four modules available: an MM/MC Phono module; a Streamer module; two line-level modules that add either two unbalanced inputs or two balanced inputs, and a DAC module that has an asynchronous USB input (up to 32-bit/768kHz PCM and up to DSD5.6) and five coaxial digital inputs (one optical, one AES/EBU, two SPDIF, and one specifically dedicated to the output from an Audia Flight SACD transport). The five coaxial inputs accept up to 32-bit/192kHz and can upsample to 32-bit/768kHz.

The phono module is $1,900; the line-level modules are $900 each; and the DAC module is $3,500. The price for the Streamer module was not available at the time of going to press.

According to Audia Flight, the FLS10 uses exactly the same output stage as its FLS4 power amplifier, which is fine by me, because I truly believe in the truth of the two sayings 'there's no point in re-inventing the wheel' and 'if it ain't broke, don't fix it'. The Italian company spent a great deal of money on research and development designing and building the FLS4's output stage, so it makes good sense to re-use the same tech in the FLS10. That output stage, by the way, is rated at 200-watts per channel into 8Ω, 380-watts per channel into 4Ω and 700-watts per channel into 2Ω. The output stage is a fully-balanced design using 16 output transistors per channel and, because it is fully balanced, the 'negative' terminal is not referenced to ground so you should never connect any product to them whose negative terminal might be referenced to ground: this would include many (but not all) powered subwoofers, but might possible include some types of electrostatic speakers.

The Audia Flight FLS10's power supply comprises a 2000VA toroidal transformer that feeds 12 different voltage rails, with the highest-voltage rail feeding the output stage being smoothed by 288,000µF-worth of low-impedance capacitors.

As for the circuitry itself, I have already said that the output stage is basically the FLS4's, but the overall topology is actually based on Audia Flight's original Flight 100 power amplifier, which was launched 'way back in 1970. Basically, after the first input stage, which uses voltage amplification, a transconductance stage switches the amplification type to current-mode, which is converted back into voltage by the output stages. It all seems unnecessarily complicated and inevitably adds noise and distortion because this approach effectively doubles the number of components in the signal path, but presumably Audia Flight's design team had its reasons.

THE EQUIPMENT

It's easy to see this is an Audia Flight component, even from a thousand paces, because the 'family' design is so distinctive. That solid slab of aluminium alloy that comprises the front panel is bisected by a blue-ish coloured 'Madonna smile' OLED display. Below the display is a sloping shelf that means the lower part of the front panel housing the controls stands a little proud of the upper section. The controls are tiny, feather-touch pushbuttons, except that they're not really 'feather touch' because you need to press them very firmly and then hold for a fraction of a second to ensure correct operation. A quick 'push' just doesn't do it. Presumably this is a fail-safe against accidental operation.

All the buttons are recessed into the front panel inside shallow circular depressions; the only control that stands proud of the front panel is the large rotary control on the right-hand side of the front panel. This is an optical encoder that is used to control volume (in absolutely tiny 0.5dB steps, from –90dB to +10dB, about which more later) as well as input selection, channel balance, display brightness and other of the menu options… and those 'menu options' are extensive, as we will discover.

For example, you can set the gain of each input over a 12dB (±6dB) range to ensure that when you switch from one input to another, the speaker (and headphone) volume remains the same. This is called 'Set Gain Input'.

You can also give each input a name of your own choosing, so that instead of showing 'Analog 1' for example (which is the default) it could instead show 'CDplayer'… which is obviously far more user-friendly, especially if you've optioned in the board with additional analog inputs. Names can be up to eight characters (and/or numerals) long.

In the event that you haven't optioned in any boards, and you don't even need the number of inputs already fitted to the Audia Flight FLS10, you can deactivate inputs so that they don't appear in the menu. This feature is rather confusingly called 'Set Active Input'. Although you'll quickly work out how this feature works, the instructions in the manual aren't exactly helpful, saying, in part: '*By pressing the volume button <<+>> or <= => or operate the volume knob display becomes NO, blinking, and the selected input is then deactivate after sunset for validation and return to normal display.*' I quite understand that the English manual provided with my review sample was a translation from the original Italian, but it reads rather like Audia Flight used Google Translate rather than employing the services of a specialist technical translator.

Yet another feature of the Audia Flight FLS10 is that you can set one of the inputs to bypass the volume control completely, which would be extremely useful if the amplifier is doing double-duty powering the front channels of a home theatre system. There doesn't seem to be any 'fail-safe' to prevent accidental selection of this mode, so if you use it, I would recommend 'proceeding with caution.'

Rather strangely, Audia Flight has included (and identifies as a 'feature') a mode that allows you to make the supplied infra-red control unable to be used to operate the amplifier. As I said, this seems very strange. I can only imagine that it might be used in situations where you have other infra-red controls that, because they use the same infra-red command codes, are interfering with the correct operation of the FLS10.

One feature I did like a whole lot was the fact that you can adjust the 'depth' of the muting circuit (which can be operated using a front-panel control or a button on the remote) between maximum muting (–90dB) and –30dB, which gives quite a bit of flexibility. Whichever mode you use, the muting is 'ramped' rather than instantaneous, meaning that if you press the mute button, the sound doesn't disappear immediately, but instead the volume fades out slowly (it takes around five seconds) until it reaches your chosen mute level. Then, when you 'de-mute' the amplifier, the sound level ramps back up to the original volume. I like this feature, possibly because I think it's rather 'cool' and professional… radio stations always use fades, after all.

However, despite having my total approval, I have heard on the forums that some audiophiles don't like fades. They instead want an instantaneous mute so they can cut the sound instantly to hear a voice, for example. Because of this, might I suggest to Audia Flight that it consider adding yet another option to the FLS10's menu, one that allows users to choose between a fade or an instantaneous mute. They might also consider also offering additional attenuation options so instead of just –30dB or –90dB, you might instead get to choose between –10dB, –20dB, –30dB, –40dB etc, all the way in 10dB steps down to –90dB.

These changes would be fairly easy to implement, because Audia Flight uses programmable software to control all the features on the FLS10. This enables you to load the default configuration to undo any and all configurations you may have made, effectively restoring the original factory settings.

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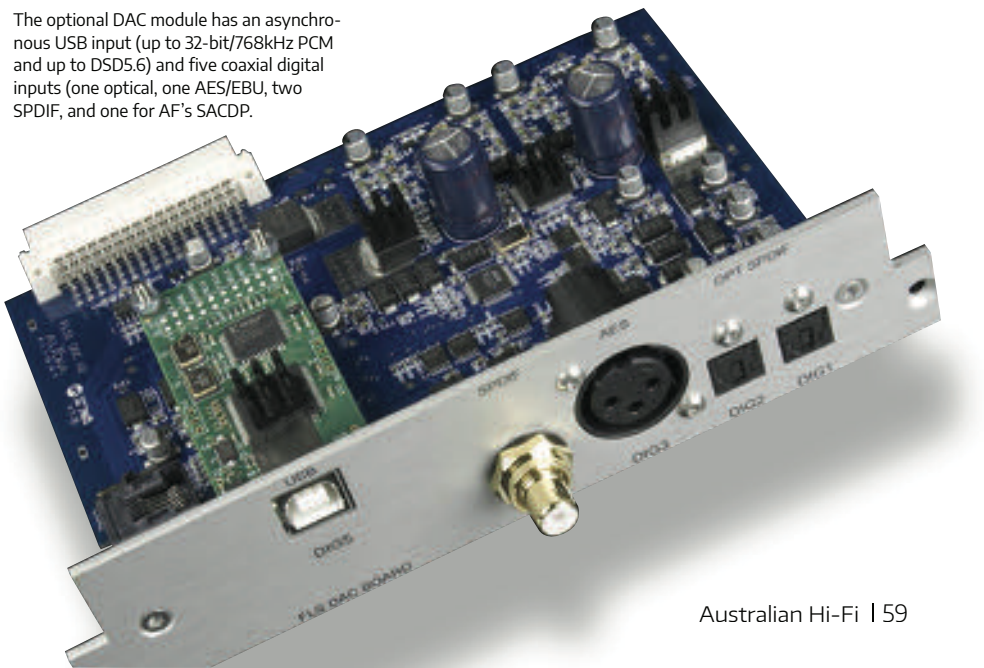
You can view the particular software release fitted to your particular amplifier by invoking the 'Software Release' mode, which is the last item in the 'SET' menu.

What features haven't I covered? Phase is one. The Audia Flight FLS10 allows you to adjust the absolute phase of each input individually. So if you have a CD or SACD player connected that inverts phase (and many do) you can 'uninvert' it to ensure the phase is matched with, say, your turntable. There's also a button on the front panel identified as 'SPK' which enables you to disconnect your loudspeakers, so you can have 'silent' headphone listening. Obviously, this means that the speakers do not automatically de-activate when you plug your headphones into the front panel jack. This means that if you use 'open' headphones, you can wear them while also having your speakers playing. If you haven't tried this, it really is an experience you really need to try out. Many people can't try this out because on their amplifier, plugging headphones in automatically mutes the speakers. Luckily, this doesn't happen with the FLS10. But since I am mentioning the headphone socket, I do think it would look better if it was gold or rhodium-plated, rather than finished in black, as it is.

The optional DAC module has an asynchronous USB input (up to 32-bit/768kHz PCM and up to DSD5.6) and five coaxial digital inputs (one optical, one AES/EBU, two SPDIF, and one for AF's SACDP.



The remote control supplied as standard with the Audia Flight FLS10 (unlike the remotes provided with many high-end units these days, it's not an 'added cost' option, but included in the retail price) is not a plastic 'off the shelf' item, but a beautifully made, solid aluminium device that enables you to switch the amplifier on and off, control volume and channel balance, dim the front panel display (through three brightness levels), adjust menu options and select inputs. It's so small (45×160×15mm) that it has to use child-unfriendly 'button' batteries (2×CR2032). Luckily children won't be able to access them, because the battery compartment is fixed in place by cross-head screws that require a jeweller's screwdriver to undo rather than by a simple catch. (Do not underestimate the danger that button batteries represent to children. In Australia alone, 20 children are admitted to hospital every week requiring emergency treatment after having ingested a button battery. The result of a child swallowing such a battery can be catastrophic or even fatal.)

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The rear panel of the Audia Flight FLS10 has some layout and linguistic anomalies that could potentially result in some grief, so you'll need to be on your toes when making connections. Let's look at the speaker connectors first. They're high-quality multi-way WBT types, so no issues here, except that there are four per channel, even though there aren't switchable speaker outputs, and the two (+) terminals (red coloured) are together at the top and the two (–) terminals (black coloured) are together at the bottom (though don't forget they're not at earth potential). First, Audia Flight should probably have used blue terminals rather than black ones, as an added visual warning, though to be fair, the words 'DO NOT CONNECT ANY OUTPUT TERMINALS TO GROUND' are printed clearly (and in capitals) above each terminal block. As for the positioning of the terminals, I think I'd have preferred the terminals (top to bottom) to be in the order (+) (–) (+) (–), rather than (+) (+) (–) (–) or maybe even (+) (–)(–)(+)… but there are good, equally valid arguments for each configuration. Just make sure you get it right!

The linguistic confusion comes about because Audia Flight has labelled one of the two line-level outputs 'RCA' which is meaningless, as it just describes the type of connector that's being used, not its purpose. It's also immediately above the three *input* terminals, all of which use gold-plated RCA connectors, so I can quite easily see someone accidentally plugging an input lead into the line output. Audia Flight should fix this immediately, via a sticker, and then re-do the screen printing for the rear panel. My personal recommendation would be to print REC OUT and LIN OUT above the relevant RCA connectors, just to make it blindingly obvious.

As for the Audia Flight FLS10's chassis itself, it's a very substantial piece of kit, measuring 450×177×440mm (HWD) and tipping the scales at 36kg. This means that because (to preserve its attractive appearance) there are no handles or lifting points, it's very definitely a 'two-person' carry. (Audia Flight recommends three people, but two means just 15.5kg each, or rather less than a case of a dozen bottles of wine, so two persons should be more than ample.)

IN USE AND LISTENING SESSIONS

Like any high-end amplifier—or any audio amplifier for that matter—the Audia Flight FLS10 should be fully run-in to ensure best sound quality. Audia Flight has done some of the hard lifting for you, by running in the amplifier for 50 hours at its factory in Civitavecchia, Italy. However, the company recommends you run it in for a further two hundred hours, and specifies that this running in must involve 'the presence of a signal'.

I mention this specifically because although I have always run-in products using signals (usually music, but sometimes pink noise), I only recently discovered that some audiophiles think that leaving an amplifier (or any other product) switched 'On' is sufficient to run it in. Sorry, but Audia Flight is right: you do need to use a signal and, for best results, the signal level should be such that the connected speakers are delivering around 85dBSPL in the listening room. (And, yes, you do need to be playing through speakers, though you can substitute a 'dummy' load for speakers if it's not speakers you're running in. However, few audiophiles have access to, or would be prepared to pay for, the type of dummy load required (one that offers inductive, capacitive and resistive elements … not just a high-power resistor).

In the section of Audia Flight's Owner's Manual that mentions this, the company also recommends that you disconnect the amplifier from the mains power supply if you will not be using it for a significant amount of time. I just have to share with you how the original Italian version is translated into English: '*During a long period of disuse, the complete extinction by the switch on the rear panel is recommended.*' Mmmmm. Not very PC methinks.

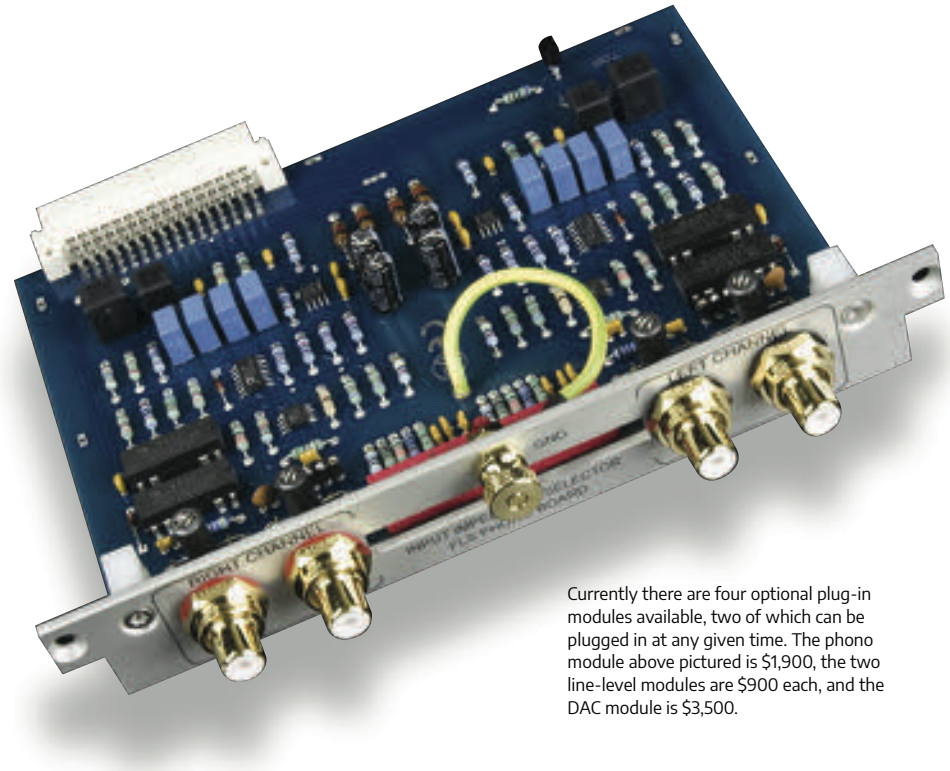
In the course of racking up the two hundred hours, which required several turn-offs and turn-ons to ensure quiet while I was sleeping, I found that if you turn the amplifier off via the remote or the front panel switch, when you turn it back on it will default to not only whatever input you were listening to when you turned it off, but also to the same volume level. I'm OK with the same input, but not convinced about the same volume level… it would be better if you could preset it to come on at a preset default volume level (i.e., not too loud, yet not too soft). If you turn the amplifier off using the rear panel mains power switch, the FLS10 defaults to 'Analog 1' (or whatever you've renamed it) and a –90dB (minimum) volume level.

Racking up the two hundred hours allowed me plenty of time to become familiar with the volume control, and it does take some time to become accustomed to, because of those miniscule 0.5dB increments I mentioned previously and also because of the linear nature of the encoder circuit. Basically, because the increments stay the same across the entire 100dB range (why Audia Flight calibrates this as –90dB to +10dB instead of –99dB to 0dB is entirely beyond me… it makes no sense at all) it means that you have to turn the volume control continuously clockwise for a long time before you get any sound at all, after which fairly small changes make significant differences to the volume level. Most manufacturers arrange their encoder circuits so they accelerate the rate of change when you're moving the control quickly, then slow it down when you move the control slowly. The FLS10 has only a single speed. Thankfully, the pushbuttons on the remote control enable much better control over volume than the dial on the front panel.

Having done my homework for this review, I discovered that Cliff Joseph and Paul Miller, of *Hi-Fi News*, had reviewed an early version of the Audia Flight FLS10 built in December 2017—so early in the production cycle that the company had not yet finished building the optional modules for it—and the pair reported being able to hear: '*a low-level buzz emanating from the right channel of our B&W 800 D3 loudspeakers*'. The two went on to say that: '*thankfully this never proved loud enough to disturb the music, but it did occasionally rear its head during a lengthy pause between tracks. Loudspeaker sensitivity will prove a factor here.*'

Because of this, the very first thing I did was turn the volume up high and listen closely to my right-channel loudspeaker. I heard nothing: no humming, no buzzing. So I checked the left-channel speaker, just to be sure. Same result: no hum, no buzz. Audia Flight has obviously worked on this issue and solved it, and deserves full marks for being so responsive.

I have been having a bit of fun lately playing some really old music, because I moved home recently and discovered a box of LPs in the carport loft that I'd put there when we first moved in twenty years ago and had somehow forgotten. Using my own phono pre-amp, because my review loaner of the Audia Flight FLS10 didn't have the optional phono module installed, some of the first LPs I span up were by Melanie Safka. Obviously her classic album 'Candles in the Rain' got a lengthy spin, but also her in many ways much better (though less popular) 'Stoneground Words'. Lovely vinyl it all was too… some pinch distortion on the peaks, but lovely quiet surfaces and a beautifully warm sound. But I had forgotten how over-arranged these early albums were, and with the benefit of hindsight and greater worldliness, I now wonder whether her late husband (and producer), Peter Schekeryk, was trying to use it to cover the fragility of her voice and her fairly pedestrian guitar playing.



Currently there are four optional plug-in modules available, two of which can be plugged in at any given time. The phono module above pictured is $1,900, the two line-level modules are $900 each, and the DAC module is $3,500.

That said, enlisting the likes of Hugh McCracken and Al Gorgoni to flesh out the guitar sound was never going to hurt her career! The intro to *Leftover Wine* is a delicate acoustic guitar accompanied by some tender drumming that just hovers above a starry darkness until Melanie's unique—and it is unique—voice enters on cue. And it's all wonderfully rendered by the Audia Flight FLS10, which keeps the drums tight and dry, whilst still leaving the engineered reverb on the vocal, and never conflating the two. On the choir-led song that is *Lay Down*, the FLS10 was able to deliver the massed voices of the Edwin Hawkins singers at high volume without losing touch with the individual voices, while the absolutely excellent bass line (by Herbie Flowers, another inspired musical choice by Schekeryk) bounces along with a *joie de vivre* than counterpoints the joyous lyric. Lyrically, Safka was an enigma. It's difficult to credit that the same person who wrote *Stoneground Words, Uptown Down* and *I Don't Wanna Hear It* could also write such silly songs as *Animal Crackers, Alexander Beetle*, and *Brand New Key*, while her covers of *Carolina in my Mind, Ruby Tuesday* and *Mr Tambourine Man* are real mind-stickers. The sound of her almost-spoken voice rendition of Dylan's classic is cathartic and the sonic purity of the Audia Flight FLS10 keeps it absolutely pristine. I can tell you that sonically, it really doesn't get any better than this.

In my investigation of the Audia Flight FLS10's ability to deliver deep bass at the very highest power levels, I enlisted a reviewer favourite, not so much because I'm a great fan of the music on it, but because you really don't get acoustic instruments playing any lower than this… on any format—analogue, Red Book, or hi-res. I refer of course to the 16Hz pedal notes produced by the 32-foot pipes of the Great Organ of Saint Eustache, in Paris as reproduced on Dorian DOR-90134. Turn up the volume on the FLS10, using speakers whose response extends down to 16Hz, and you'll be rattling your walls, windows and lighting fixtures in no time at all… the levels of acoustic energy in my listening room were absolutely awesome, thanks to the clean, distortion-free power available from the Audia Flight FLS10.

> The levels of acoustic energy in my listening room were absolutely awesome, thanks to the clean, distortion-free power available from the AF FLS10

After lashings of sound from Bach, Liszt and Widor, it was time for some light relief, so I spent a few pleasant hours listening to some classic Jean-Jacques Goldman, such as *Je Marche Seul*, which moves along like classic pop, with a great bass line and a melody that you keep humming for long after the track's finished. Then there's his beautiful *C'est ta Chance*. Listen to it and you get the feeling that if he'd been singing in English he'd be as famous as Elton John. (Actually, in France Goldman is more famous than Elton, so I guess it depends on which direction you have to look to see the Channel to gauge stardom.) Even if you've never heard of Goldman, you will have heard a lot of his work, due to his collaborations with Céline Dion, particularly on her 'Falling into You'. The live sound of *Peur de rien Blues* was transmitted magically by the Audia Flight FLS10, from the audience noise to the acoustics of the venue, and most especially by the plaintive scream of the lead guitar. Mesmerizing.

However you need to audition hi-fi components while listening to acoustic instruments to judge whether an amplifier is passing tonal quality through its circuitry transparently, and one of my favourites for judging this is an outstanding SACD hybrid by ARS Produktion (ARS38162) recorded by the Storioni Trio. It has two of my absolute favourite piano trios on it, and they're both by women: Rebecca Clarke and Clara Schumann. Clarke's work is her justly-famous Piano Trio from 1920, while Schumann's is her Piano Trio in G minor, Op. 17. You'll need to listen to this SACD a few times to become familiar with the music (more so for Clarke than Schumann!) but once you've ceased being amazed by the music, you can then start being amazed by the realism of the sound of the instruments that has been captured. The piano is a piano. The violin is a violin. The cello is a violoncello. The tonal accuracy of the three instruments is astoundingly true, and the Audia Flight FLS10 reproduced it as well, if not better, than any amplifier I have ever heard. Masterful performances on all counts.

Solo piano is another instrument that's unforgiving of inferior amplification, so I played a new find of mine, Bach's Well-Tempered Clavier (Book 1), as played by Kimiko Ishizaka (on Novona NV5993). On paper an unlikely pianist (her prize medals were for Olympic weight-lifting and power-lifting), it turns out she only took up those sports to improve her piano playing, which she'd been improving on since the age of four. '*In my early 20s, I had very thin arms—I couldn't get a beautiful sound out of the piano*,' she said in an interview published in *Gramophone*. She says that after weight training, '*I got stronger: I found a way of using my shoulders, arms and back to produce the sound. These days I only use my fingers for support.*'

She's also found a way of playing Bach that is miraculous. No pedal, for a start, using only her fingers for sustain, but she's found a way of playing Bach that's completely organic and natural, yet without any of the personal mannerisms that most pianists superimpose over the music, yet also without the 'vanilla' sound inevitably delivered by pianists who play Bach strictly according to the score. Much as I hate adding yet more Bach to my musical library, her playing is such that she has forced me to add more—even against my wife's vehement protestations. '*Why could you possibly need yet another version of the Well-Tempered Clavier?*' she asked as she looked over my shoulder at the computer screen while I was ordering.

I really didn't have to answer… you only need to listen to Ishizaka playing Book 1 to realise why you need her version in your collection. I could hear the hammers as they hit the strings, the sonorities of the sounding board, the interplays of the harmonics during sustains, along with the perfection of the playing. The perfection allows you to become totally involved with the music: it takes over your entire consciousness. And, if you're a Bachian, you'll hear themes you've never heard before… yet they're themes that have obviously been hidden in plain sight for all the years you've been listening.

CONCLUSION

I am writing this conclusion whilst looking rather wistfully at the Audia Flight FLS10 because it's ticking all the 'buy me' boxes that I don't usually get to tick. Firstly, and most importantly, it's attractive enough that it already has my other half's stamp of approval, which is something that rarely happens when I have large audiophile amps in for review. Secondly, it's powerful enough that it not only easily drives my own rather power-hungry speakers, but will equally easily be able to drive any other speakers I'm ever likely to be loaned for review. Thirdly, it's essentially free of distortion… in fact it's probably the cleanest-sounding and most transparent amplifier I have ever heard. Fourthly, it has lots of neat features that I will get to use, and the remote control is a really stunner. (I probably wouldn't option in any modules, because I prefer using separate components for the functions those modules offer.)

So I am looking at the Audia Flight FLS10 rather wistfully because I'm thinking: '*you're going to cost me quite a bit of money, aren't you big fella?*' but if I bite down on the bullet fast enough, I will be able to claim a very hefty deduction in this tax year… or will I have to depreciate it over several years? That could make a difference. Cheerio, I'm off to ring my accountant. *Martin Grahame*

Audia Flight FLS10

Brand: Audia Flight
Model: FLS10
RRP: $16,500
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Readers interested in a full technical appraisal of the performance of the Audia Flight FLS10 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.

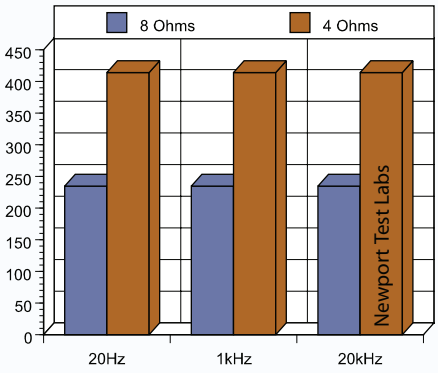
LABORATORY TEST REPORT

Newport Test Labs measured the power output of the Audia Flight FLS10 at 225-watts continuous, both channels driven into 8Ω, just barely (+0.5dB) above Audia Flight's specification of 200-watts at 20Hz and 1kHz. At 20kHz, the FLS10 delivered 215-watts for only a few seconds, after which protection circuitry cut in and put the amplifier into stand-by mode, with the front panel read-out showing the word 'Over-voltage'. This happened every time the lab tried to make measurements at 20kHz. (When reproducing music, no amplifier—no matter how powerful— would ever be required to deliver 200-watts at 20kHz, and there's no tweeter—or high-frequency compression driver—that could take this level of power anyway.)

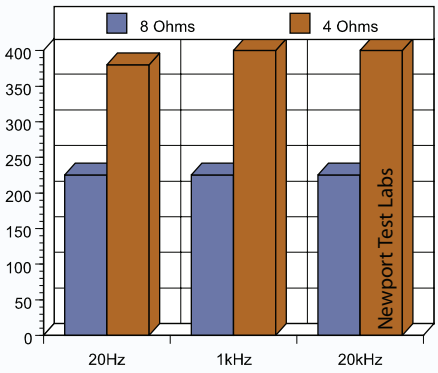
When the amplifier was driving 4Ω loads with both channels driven, the amplifier delivered a continuous rating of 400-watts per channel, again a little bit higher than its specification, which was obviously derived using the amplifier's maximum output at 20Hz, where *Newport Test Lab*s measured the specified 380-watts per channel. Although you can see '400-watts' as the output in the tabulated figures as being the power output at 20kHz, this is not a continuous figure: the amplifier will only deliver 400-watts for a few seconds, after which Audia Flight's protection circuitry triggers.

Although Audia Flight rates the FLS10 with a power output of 700-watts per channel into 2Ω loads, this must be a peak short-term power output rating, rather than a continuous one, because when *Newport Test Labs* connected 2Ω loads to the amplifier's output, the protection circuitry cut in after only a hundred watts or thereabouts, with the front panel display this time reading 'Over–voltage'. Intriguingly, if either the overvoltage or overcurrent protection circuits trigger, you will not be able to turn off the power via the switch on the front panel—you will have to turn off the main power switch on the rear panel, wait for 5–10 seconds, then switch it back on again, after which the amplifier resets to Analog 1, Volume –99 and otherwise acts like nothing happened.

The frequency response of the Audia Flight FLS10 was absolutely outstanding, with *Newport Test Labs* measuring 1Hz–155kHz (–1dB) and <1Hz–208kHz (–3dB). So this is an extremely wideband amplifier. Across the audio band, as you can see from Graph 6, the FLS10's response was 0.08dB down at 20Hz and 0.04dB high at 40kHz, with the response almost ruler-flat between these points, putting the audio-band response at 20Hz to 40kHz ±0.06dB. This response is for the black trace, which shows the amplifier's performance into a standard non-inductive 8Ω test load. The Audia Flight FLS10's frequency response when driven into a 'real world'



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



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

Harmonic distortion at an output of 1-watt was vanishingly low no matter whether the Audia Flight FLS10 was driving 8Ω loads or 4Ω loads

load (one simulating that which would be presented by a two-way bookshelf loudspeaker) is shown by the red trace on Graph 6. You can see that the deviation from the result into a non-inductive load is negligible, suggesting a low output impedance. (Any readers used to seeing flat lines for frequency responses should check the vertical scale of Graph 6, by the way: the topmost horizontal line is +0.5dB and the bottommost –0.5dB, so the scale has been hugely expanded in order to show the smallest details.)

Channel separation, as measured by *Newport Test Labs*, was exceptionally good at low and midrange frequencies, returning a result of 111dB at 20Hz, and one of 98dB at 1kHz, but slipped to an excellent but unexceptional 77dB at 20kHz. However, this is 'unexceptional' in technical terms only—you'll never, ever, need more than 77dB of channel separation at 20kHz. Channel balance was also excellent—and most particularly considering the dual-mono nature of the amplifier's design, with *Newport Test Labs* measuring 0.03dB at 1kHz. Channel phase was also excellent, and again particularly good considering the dual mono nature of the design.

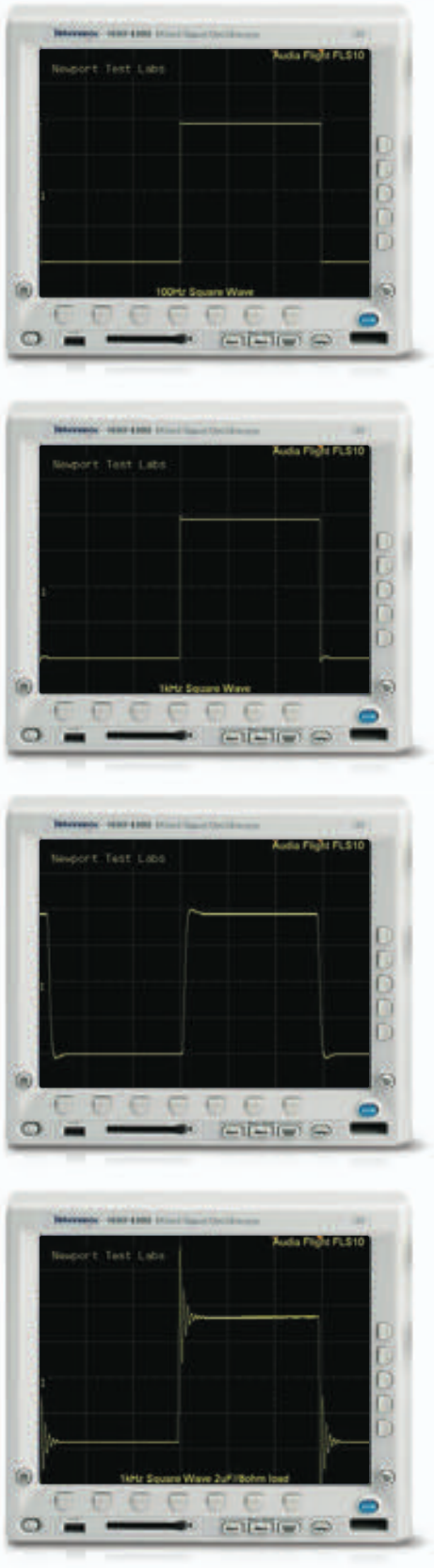
Harmonic distortion at an output of 1-watt was vanishingly low no matter whether the Audia Flight FLS10 was driving 8Ω loads (Graph 1) or 4Ω loads (Graph 2). In Graph 1 you can see that there are no distortion components visible above the amplifier's noise floor at –118dB. What is visible (to the left of the test tone at 1kHz) is some mains hum and harmonics, but it's all more than 100dB down, and would not be audible, even in a totally quiet room.

In Graph 2, where the FLS10 is delivering one watt of power into 4Ω loads, the mains hum and harmonics are still more than 100dB down, but a second harmonic has appeared at –110dB, equivalent to 0.00031% THD. This, too, would not be audible, but even if it was audible, it would be pleasant-sounding, as it's effectively the octave of the fundamental.

Newport Test Labs has recently started measuring amplifier distortion at an output of 20-watts per channel, as it's a more a 'real world' test than testing distortion at rated output (though it will still continue to measure and report on distortion with just a single channel driven into 8Ω until enough data has been collected to establish statistical validity). The results of this new test are shown in Graph 3 (20-watts into 8Ω) and Graph 4 (20-watts into 4Ω). Into 8Ω you can see distortion components out to the eleventh, but most of these are so low that they're almost down in the noise floor at –120dB, so each would contribute only 0.0001% to the total harmonic distortion result. Even the more obvious components—the second harmonic at –108dB (0.00039%), the third at –117dB (0.00014%), and the fourth at –112dB (0.00025%) would not be audible as distortion *per se*. Driven into 4Ω loads, the distortion is almost exclusively second and third harmonic, with the second at –113dB (0.00022%) and the third at –111dB (0.00028%), though there is a tiny fourth-order component at –115dB (0.00017%). Again there is a tiny amount of mains hum and harmonics but it's all more than 110dB down. Overall, this is excellent performance… the amplifier could almost be said to be 'distortion free'… indeed the tabulated result (which includes both distortion and noise) is 0.0019%.

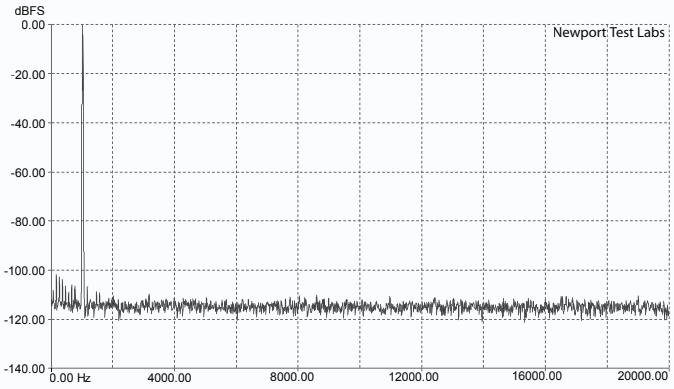
Distortion at rated output (200-watts per channel) into 8Ω is shown in Graph 5, and you can see that the noise floor is now down close to –140dB, with hum-related components more than 120dB down. Distortion has increased, as you'd expect, but every single component is more than 100dB down (0.001%) and most are at or more than 120dB down (0.0001%). Again, this is absolutely outstanding performance, which is again reflected by the overall THD+N result of 0.0023% that is shown in the tabulated table of test results.

CCIF intermodulation distortion (IMD) has been shown for two power levels, at one watt (Graph 7) and at 20-watts (Graph 8), and both are outstandingly good. At one watt, as you can see for yourself, there are no intermodulation distortion components visible above the noise floor (at –110dB) at all. So if there were components just at the floor, they would be contributing just 0.00031%. At an output of 20-watts, there are only four sidebands skirting the two test signals at 19kHz and 20kHz, and the highest of these is at –115dB (0.00017%). There is an unwanted regenerated difference signal down at 1kHz,

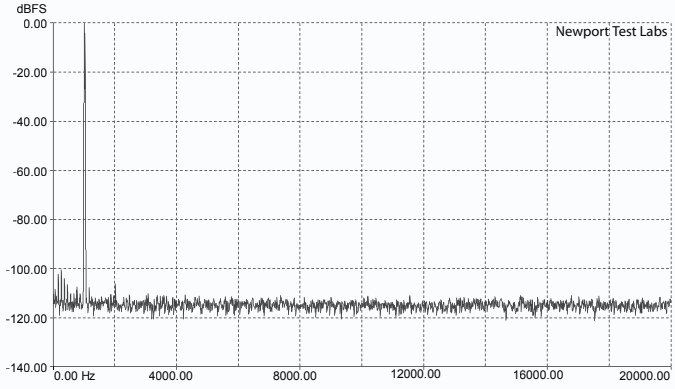


but even this is at –113dB, or 0.00022% IMD.

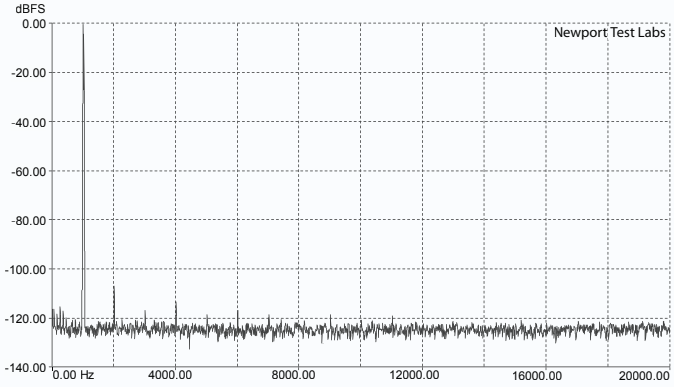
Sensitivity was measured at 13mV (the voltage required at the input in order for the amplifier to deliver 1-watt to its speaker terminals), while to deliver rated output, 189mV is required at the input. This makes the Audia



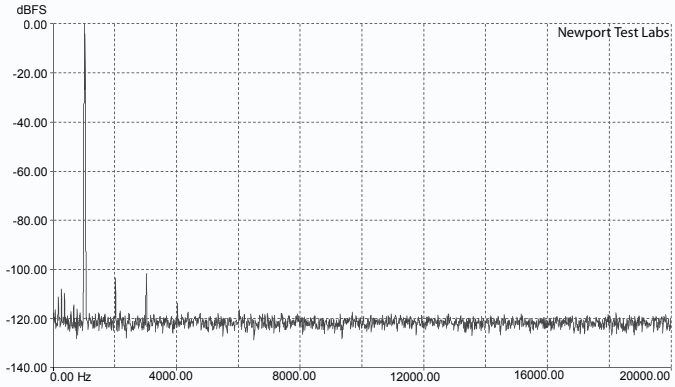
Graph 1. Total harmonic distortion (THD) at 1kHz at an output of 1-watt into an 8-ohm non-inductive load, referenced to 0dB.



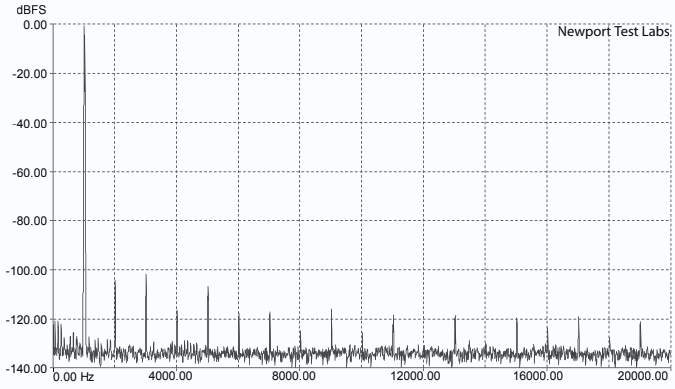
Graph 2. Total harmonic distortion (THD) at 1kHz at an output of 1-watt into a 4-ohm non-inductive load, referenced to 0dB.



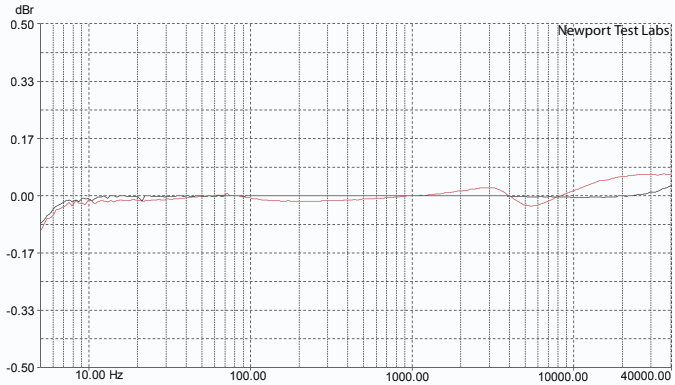
Graph 3. Total harmonic distortion (THD) at 1kHz at an output of 20-watts into an 8-ohm non- inductive load, referenced to 0dB.



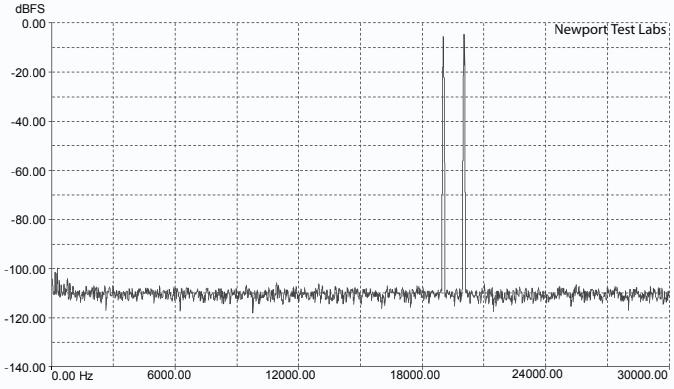
Graph 2. Total harmonic distortion (THD) at 1kHz at an output of 20-watts into a 4-ohm non-inductive load, referenced to 0dB.



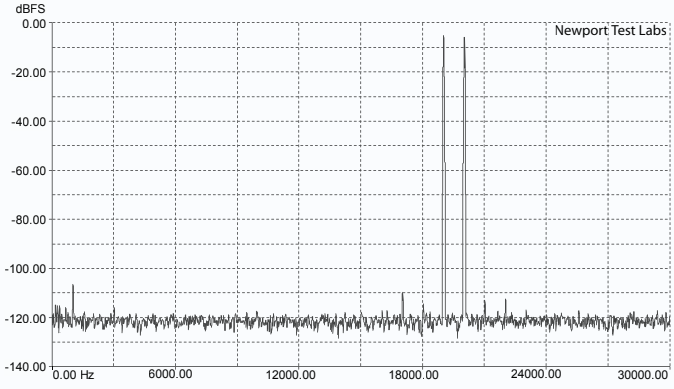
Graph 5. Total harmonic distortion (THD) at 1kHz at an output of 200-watts into an 8-ohm non- inductive load, referenced to 0dB.



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



Graph 7. 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 8. Intermodulation distortion (CCIF-IMD) using test signals at 19kHz and 20kHz, at an output of 20-wattz into an 8-ohm non-inductive load, referenced to 0dB.

Flight FLS10 more sensitive than most integrated amplifiers. Although the noise floor of the Audia Flight FLS10 was low, as you can see for yourself in the spectrograms, the overall signal-to-noise ratios were not quite as high as I might have expected, no doubt the result of the extra components required by the balanced circuitry. At an output of one watt, with a 500mV input, *Newport Test Labs* measured the signal-to-noise ratio as 70dB unweighted and 73dB IHF-A-weighted. Referred to rated output, *Newport Test Labs* measured the signal-to-noise ratios as 90dB unweighted and 95dB IHF-A-weighted. These are all, nonetheless, very good results. I suspect the manufacturer's 110dB specification for this test was measured using a higher input voltage and with the amplifier in its 'Direct Input' mode, which essentially turns it into a power amplifier.

The same can't be said for the square wave results, which are superb. The 100Hz square wave looks like it was drawn by a set-square… almost perfect except for a single overshoot on the leading edge that suggests a peak in the frequency response at an extremely high frequency (obviously a peak that's well above 208kHz). Exactly the same can be said of the 1kHz square wave's waveform. The 10kHz square wave makes the overshoot more obvious, but also indicates an incredibly fast rise-time, showing why this amplifier's bandwidth is so extended at high frequencies. Using a square wave to drive the Audia Flight FLS10 into a highly reactive load resulted in a fair amount of ringing, with a more than a half-height initial overshoot, but the ringing was damped quite quickly, and the amplifier proved to be unconditionally stable whilst driving this load. *Newport Test Labs* measured the output impedance of the Audia Flight FLS10 at 0.07Ω at 1kHz, which equates to a damping factor of 114 at this frequency, which is more than sufficient, although it's a very long way shy of the damping factor of 650 claimed by Audia Flight, suggesting the manufacturer uses a different measurement technique and/or a different test frequency.

Being a linear, Class-A/B amplifier, the Audia Flight FLS10 is quite power-hungry, and will draw more than 700-watts from your mains power supply when it's operating flat-out. At normal listening levels, I'd expect it will pull a more modest 200-watts or so from your mains. However, if you leave it switched on while you're not using it, it will pull more than 100-watts all the time, and also generate quite a considerable amount of heat, so I would recommend switching it to standby whenever you're not using it, in which mode it will consume only 0.6-watts.

Overall, the Audia Flight FLS10 delivered outstanding performance in all the tests conducted on it by *Newport Test Labs*. Perhaps the protection circuitry could be accused of being a tad too trigger-happy, but it's highly unlikely it will ever trigger prematurely when the amplifier is being used to play music (as distinct from amplifying test tones) while on the other hand its low threshold settings and sheer speed mean you can be assured that if some fault condition *is* ever detected, the protection circuitry will instantly jump in to protect your investment, which has to be a good thing.

Highly recommended! *Steve Holding*

Audia Flight FLS10 Integrated Amp – Test Results – Power Output

Channel	Load (Ω)	20Hz (watts)	20Hz (dBW)	1kHz (watts)	1kHz (dBW)	20kHz (watts)	20kHz (dBW)
1	8 Ω	235	23.7	235	23.7	235*	23.7
2	8 Ω	225	23.5	225	23.5	225*	23.5
1	4 Ω	414	26.2	414	26.2	414*	26.2
2	4 Ω	380	25.8	400	26.0	400*	26.0

Note: Figures in the dBW column represent output level in dB referred to one watt. (*Indicates 'See Copy.'

Audia Flight FLS10 Integrated Amplifier – Laboratory Test Results

Test	Measured Result	Units/Comment
Frequency Response @ 1 watt o/p	1Hz – 155kHz	–1dB
Frequency Response @ 1 watt o/p	<1Hz – 208kHz	–3dB
Channel Separation (dB)	111dB / 98dB / 77dB	(20Hz / 1kHz / 20kHz)
Channel Balance	0.03	dB @ 1kHz
Interchannel Phase	0.02 / 0.01 / 0.05	degrees (20Hz / 1kHz / 20kHz)
THD+N	0.0019% / 0.0023%	@ 1-watt / @ rated output
Signal-to-Noise (unwghted/wghted)	70dB / 73dB	dB referred to 1-watt output
Signal-to-Noise (unwghted/wghted)	90dB / 95dB	dB referred to rated output
Input Sensitivity	13mV / 189mV	(1-watt / rated output)
Output Impedance	0.07Ω	@ 1kHz
Damping Factor	114	@ 1kHz
Power Consumption	0.6 / 119	watts (Standby / On)
Power Consumption	147 / 705	watts at 1-watt / at rated output
Mains Voltage Variation during Test	242 – 247	Minimum – Maximum