



Classé Audio

CA-M400 Monobloc Power Amplifiers

One of the best endorsements in the world of high-end audio is when a company's product is chosen by a world-leading recording studio as its in-house reference. So it is with the amplification behemoths on review here, the Classé CA-M400 monobloc amplifiers from Canada, which have been selected by Abbey Road Studios as its amplifiers of choice for a number of its famous recording rooms. Not only that, but the very pair at hand supplied to Australian Hi-Fi for review were, prior to this located *in-situ* at a Sydney-based studio where they performed amplification duties during the production of the Happy Feet movie soundtrack, amongst others.

Upon receiving these amplifiers, I was struck straight away by the quality and solidity of the packaging. No mere cardboard boxes here. I'm talking a rib-reinforced box of plastic-type material that can take not only the unit's weight, but also support and protect it against the clumsiest of couriers. What's more, unpacking the rather heavy amplifiers is a breeze (well, almost); there's no turning the box upside down, no re-tipping the amp back up, etc. The box simply disassembles and collapses around its contents—or assembles around the product when packing it back. If more heavy products were packaged in this manner there would be many more reviewers with healthier backs. This level of care goes some way towards establishing a buyer's sense of confidence in a product that reflects an overall philosophy of quality, extending from packaging to the product itself.

Enough about the packaging. The CA-M400 amplifiers are an example of industrial design at its pinnacle. The aesthetics are simple, clean, and very elegant: a design theme that is carried through to the company's numerous other products. The thick and solid natural aluminium fascia bends curvaceously around towards the rear at the sides without a wrinkle or blemish in sight (it's a difficult task to bend such thick aluminium into such a curve) as it meets the extensive custom heat-sinking and solid steel chassis. A contrasting black-anodised aluminium control panel is located off-centre, where it's host to the stand-by/on, mode and select buttons. In conjunction, the mode and select buttons control and configure the amplifier for either balanced or single-ended input. They also control the configuration for the turn-on delay or amplifier number (in multi-amplifier set-ups) for connection with a Classé preamplifier. The rear of the amplifier caters for RCA single-ended and XLR balanced inputs which can be connected simultaneously and switched via RS-232 or via the front panel switching. Two sets of speaker outputs are provided for bi-wiring and there are 3.5 mini-jack communication sockets in addition to the previously-mentioned RS-232 connectors.

This attention to detail extends to the amplifier's feet which are substantial aluminium casings inset with a specialised rubber vibration-absorbing compound.

Classé rates the CA-M400 at 1kHz as having an output of 400-watts into 8Ω and 800-

watts into 4Ω ohms. Voltage gain is claimed to be 29.1dB and the signal-to-noise ratio 112dB. Oddly, the all-important input impedance—crucial for proper preamplifier matching—is not specified in the CA-M400's page of Classé's website, although mention is made of the 'easily-driven' input stage. For *Newport Test Labs*' take on all of the above and more please read on after the review.

Classé's designers chose to use J-FET devices in the input stages because of their high input impedance and low offset current. As a result, Classé amplifiers are easy to drive and low-noise, and the J-FET input stages don't necessitate the use of sound-degrading coupling capacitors. The driver and output stages use a combination of MOSFETs and bipolar devices so as to achieve what Classé's engineers say is '*the ideal balance for great sound.*' Each amplifier houses a massive custom toroidal transformer amongst other robust power supply components. The CA-M400s also incorporate extensive self-protection against d.c., heatsink overheating and all manner of other potential mishaps.

According to Classé's philosophy, design decisions were arrived at only after comprehensive listening tests. This from the owner's manual: '*Excellent measured performance is to be expected in world-class products, and Classé products deliver that performance. However, experience has shown that technical excellence alone is insufficient to guarantee subjectively musical results. For this reason, all Classé products are laboriously fine-tuned during the development*

process by carefully controlled listening tests. Our ears are still some of the finest laboratory test instruments available, and nicely complement more traditional engineering test equipment. In the course of optimising the circuitry for a product, hundreds of decisions are made based on the subjective impression given by substituting one high quality part for another.'

Listening Impressions

In the spirit of Classé Audio's stated design philosophy, I took up the challenge to see whether my ears are on par with the good folk at Classé. Slotting the amps into my system required siting them on timber platforms in front of the Finite Element equipment rack, rather than inside it, as these monsters are physically enormous.

Sonically, one thing that I noticed straight off the bat is the Classé's smoothness throughout the mid-band and top-end. The amps manage a balancing act that retains resolution and separation of musical strands while maintaining a level of detail that impressed me. Jazz ensemble recordings are a great medium to test and reveal these particular qualities. *Round Midnight*, a Herbie Hancock production, puts together a group of musos headed by Hancock himself and tenor saxophonist Dexter Gordon, all apparently recorded live within the film set's authentic reproduction of the real-life Blue Note Jazz Club. Here the CA-M400 amps revealed all the instruments in tight focus and in an airy space within the wide and deep soundstage. We hear Herbie on a large-sounding and tonally accurate piano, and Dexter's saxophone is equally well-reproduced, and really swings dynamically.


Playing the wonderfully re-mastered JVC XRCD version of Lightnin' Hopkins' 'Goin' Away' (originally recorded in 1963), Lightnin's deep vocal growl was rendered with precision and accuracy as if the man and his guitar were placed in my listening room. If your speakers are up to it, then these Classé

amps will deliver the full measure of information. Bass guitar and stand-up bass packed a real punch with these amps. It's here that the massive power supply contained within really proves its worth. All bass-heavy music was controlled and powerful.

The CA-M400 amplifiers performed outstandingly in all areas however, being an expert nitpicker, I initially thought I noticed a deficiency in PRaT, or Pace, Rhythm and Timing. For example, Porcupine Tree's well-produced *In Absentia* has an opener that could easily make the top fifty all-time best guitar intros. I found the CA-M400s ever so slightly slowed the rhythm and pace, taking the edge and tension off this killer rock riff and at first I thought that this was simply because my reference system uses very revealing speakers with extraordinarily dynamic and fast amplifiers. However, I experimented a little further and for those 'cables don't make a difference'

instrumental groups were clearly resolved by the amplifiers, greatly enhancing the impression of being at a live performance. Similarly, with chamber ensembles—as illustrated on the Wilson Audio label recording of Debussy and Bartok sonatas—the Classé amps captivated me by the way they separated and resolved the piano, violins and cello, all with realistic detail and presence.

Conclusion

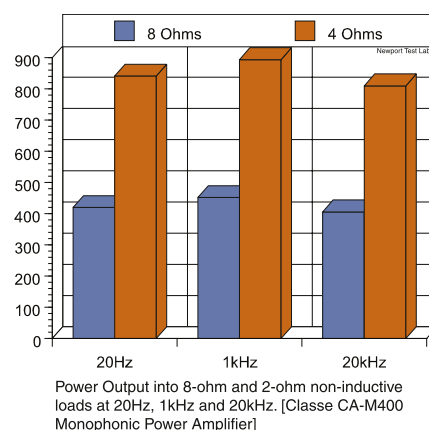
The Classé CA-M400 monobloc amplifiers are superbly built and—as much as it is possible for power amplifiers to be—comprehensively featured. They have the hallmarks of expertly-engineered electronics that are bound to last a lifetime. What's more, they have an engaging sound that is dynamic, smooth throughout the frequency range, accurate in detail and spatially massive. Classy indeed. 

Edgar Kramer

"the CA-M400 amps revealed all the instruments in tight focus and in an airy space within the wide and deep soundstage."

doubters, discovered that a change to a short run of reasonably-priced silver cable almost totally redressed the PRaT situation. This occurrence—for lack of a better word—serves to highlight the CA-M400's revealing and accurate sound that makes it essential to ensure it's correctly matched with appropriate speakers and ancillaries.

Classical music was reproduced superbly via the Classé amps. Recording quality permitting, as in Decca Legend's recording of Solti conducting Beethoven's 3rd, the Classés sounded powerful and dynamic and provided a vivid semblance of the venue in which the Symphony was recorded. The orchestra's in-



Classé Audio CA-M400 Monobloc Power Amplifiers

Brand: Classé Audio
Model: CA-M400
Category: Mono Power Amplifier
RRP: \$12,000 each
Warranty: Two Years
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F: (02) 9700 0000
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- Power output
- Information retrieval
- Build Quality



- Physical size
- Cable-sensitive

LAB REPORT

Readers interested in a full technical appraisal of the performance of the Classé CA-M400 Power 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.

Test Results

Despite what you may have read in various reviews published in some other magazines, Classé's CA-M400 does not use a standard output stage. Instead, inside there are two completely separate 200-watt mono power amplifiers that are configured for bridged output mode, which means that one of the amplifiers amplifies a non-inverted signal while the other amplifies an inverted—or 'mirror' signal—'cloned' from the other, after which the outputs from the two amplifiers are summed, so the end result is 400-watts of output power into 8-ohms (if one amplifier's input had not been inverted, the result would be an amplifier with a higher current capability, but only the same available voltage, so the two 200-watt amplifiers would still deliver only 200-watts, but far more current.) This method enables very high power output, and this was in clear evidence in the measurements made by *Newport Test Labs*, which show that the Classé CA-M400 exceeded its rated power output of 400-watts into 8-ohms and 800-watts into 4-ohms at all frequencies, and by clear margins, as you can see from the tabulated figures and the bar graph.

Harmonic distortion was very low, as can be seen in *Graphs 1* through *4*. In *Graph 1*, there is a second harmonic at -110dB (0.0003%), a fourth slightly lower and a fifth slightly lower again. There's a seventh harmonic just poking up above the -120dB graticule (equivalent to 0.00001% distortion!). This is excellent performance. In *Graph 2*, which shows performance into a 4Ω load, the only discernable difference between *Graph 1* is that the third harmonic rises a little in level, to sit at -105dB, or 0.0005% distortion. As you'd imagine from these vanishingly low figures, total harmonic distortion and noise was measured at just 0.002%, better than specified by Classé Audio.

There's more distortion in the output at rated output, as you'd expect, but every individual harmonic component is below 100dB (0.001%) when the amplifier is driving an 8Ω load, and the same would have been true when the amplifier was delivering 800-watts into 4Ω were it not for the peak of the third harmonic distortion component creeping just above it to come in at -99dB (0.0035%). All these components are too low to be audible, even to the most highly trained and discerning 'audiophile' ear. More important is the fact that the Classe's power supply is obviously easily up to task of delivering this power, a fact that is evidenced by the complete lack of spuriaie between the individual distortion components. There are also no mains hum components visible: the extreme left of the graph is almost pristine. Note too that



Classe Audio CA-M400 Mono Power Amplifier - Power Output

Channel	Load (Ω)	20Hz (watts)	20Hz (dBW)	1kHz (watts)	1kHz (dBW)	20kHz (watts)	20kHz (dBW)
1	8Ω	420	26.2	452	26.5	406	26.0
1	4Ω	841	29.2	894	29.5	810	29.0

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

Classe Audio CA-M400 Mono Power Amplifier (S/N 1620333)

Test	Measured Result	Units/Comment
Frequency Response @ 1 watt	6.0Hz-32kHz	-0.1dB
Frequency Response @ 1 watt	0.8Hz-168kHz	-3dB
THD+N	0.002% / 0.001%	1 watt/rated o/p
S/N Ratio (unweighted/weighted)	90dB/96dB	dB re 1 watt output
S/N Ratio (unweighted/weighted)	115dB/122dB	dB re rated output
Input Sensitivity (CD input)	100mV/2V	(1 watt/rated o/p)
Output Impedance	0.083Ω	OC = 2.7923V
Damping Factor	96	@ 1kHz
Power Consumption	122-watts	On
Power Consumption	128-watts/828-watts	1-watt/Rated op
Mains Voltage Variation	238-254 volts	Min-Max



the noise floor is sitting just above -140dB . Superb! Overall THD+N at rated output was measured at just 0.001%—again better than Classé Audio's specification.

Intermodulation distortion was spectacularly low, as you can see in *Graph 6*. This is CCIF-IMD, not SMPTE-IMD, so the two test signals are both just to the right of centre of the graph. There are sidebands evident, but they're almost 90dB down. More important is the almost total lack of a regenerated component, which would be evidenced by a signal at 1kHz. Yes, there is a tiny signal obvious at 1kHz, but it's 110dB below reference, so even if it were present solus, it would be obscured by the noise floor itself.

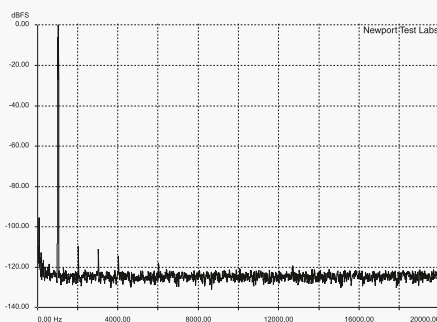
“an excellent set of results, particularly when one considers the exceedingly low distortion and noise levels”

The graphed frequency response shows the CA-M400's response into both a standard laboratory load (black trace) and into a load simulating that of a typical two-way loudspeaker system (red trace). The two traces are almost identical, indicating that the Classé has a low output impedance (*Newport Test Labs* measured it as just 0.083Ω). You can see that the response is incredibly flat, being just 0.1dB down at 6Hz for both traces, and down 0.1dB at 30kHz for the laboratory load and 0.1dB down at 32kHz when driving the simulated loudspeaker load. This graph indicates that the Classé CA-M400 is a very wideband amp and this proved to be the case in the half-power bandwidth testing, with the CA-M400's 3dB frequency response downpoints coming at 0.8Hz and 168kHz.

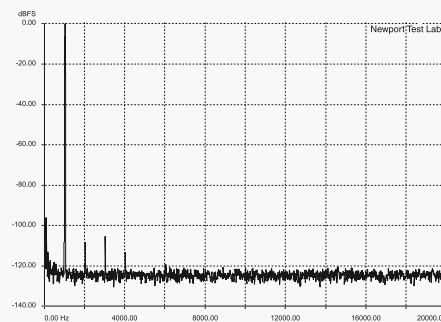
Newport Test Labs reported very high overall signal-to-noise ratios, as shown in the tabulated figures. Referenced to an output of one watt, the CA-M400's S/N ratio was tested at 90dB (unweighted) improving to 96dB with a standard 'A'-weighting filter. Referenced to rated output, the measurements came in at 115dB unweighted and 122dB A-weighted so, yet again, excellent performance.

Overall, I consider this to be an excellent set of results, particularly when one considers the exceedingly low distortion and noise levels in the context of the extremely high power output of which this amplifier is capable.

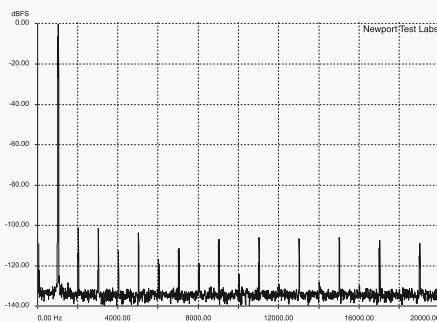
Steve Holding



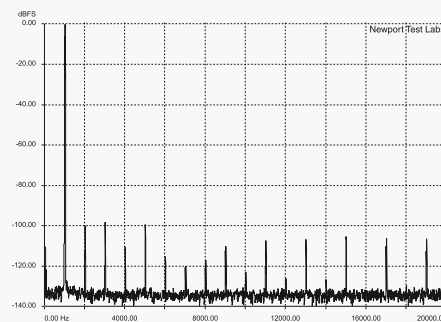
Graph 1: Total harmonic distortion (THD) at 1kHz referenced to 1-watt across an 8-ohm non-inductive load. [Classé CA-M400]



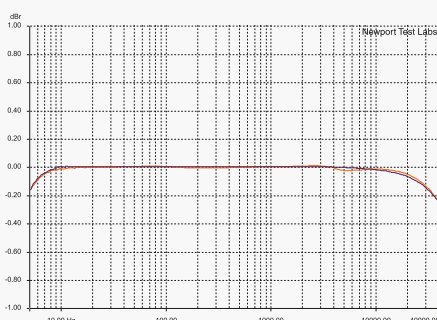
Graph 2: Total harmonic distortion (THD) at 1kHz referenced to 1-watt across a 4-ohm non-inductive load. [Classé CA-M400]



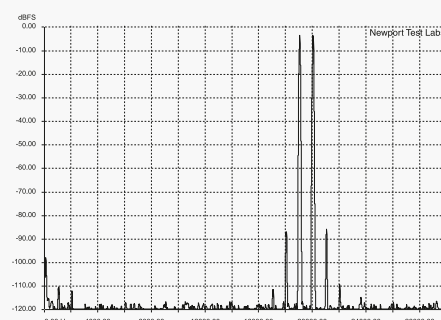
Graph 3: Total harmonic distortion (THD) at 1kHz referenced to rated output (800-watts) across an 8-ohm non-inductive load. [Classé CA-M400]



Graph 4: Total harmonic distortion (THD) at 1kHz referenced to rated output (800 watts) across a 4-ohm non-inductive load. [Classé CA-M400]



Graph 5: Frequency response of line input referenced to a 1 watt output (at 0dB) across an 8 ohm non-inductive load (Black Trace) and across a combination resistive/inductive/capacitive load representative of a typical two-way loudspeaker system (Red Trace). [Classé CA-M400]



Graph 6: Intermodulation distortion (CCIF-IMD) using test signals at 19kHz and 20kHz, referenced to a 1 watt output (at 0dB) across an 8 ohm non-inductive load. [Classé CA-M400]

