Class of Cambridge

New analogue amplifier technologies are rare but Cambridge Audio has broken the mould with its patented XD regime. Paul Miller goes under the hood

DETAILS

- Cambridge Azur 840A integrated amplifier
- £750
- www.cambridgeaudio.com
- 0845 0902288
- Taut, expressive and detailed
- System sensitivity

REVIEW SYSTEM

Source: Denon DVD-A1XV Mk II universal DVD player
Amp: Arcam AV9 processor/pre-amp
Speakers: B&W Nautilus 802 loudspeakers
Cables: Townshend interconnects and QED speaker cable

For the last three years, pure economics have determined that Cambridge's Azur range of amplifiers and AV receivers have been targeted at a low-cost, high-volume market. These amplifiers, including the £250 Azur 540R receiver reviewed back in January 2006, have typically pushed the boundaries of performance in the budget sector, but Cambridge's growing band of engineers still hanker after an assault on the high-end. With one eye still firmly focused on value for money, the high-end starts at just £750 with the first of the company's new 840-series components, headed by the Azur 840A integrated amplifier.

I should say at the outset that the only thing this 840A has in common with either the 540A or 640A amplifiers is the Azur brand name. Otherwise, this fully logic-controlled amplifier is a completely new and, arguably, revolutionary design concept. Cambridge's XD or Crossover Displacement technology lies at the heart of its power amp section, explained opposite, but the separate pre-amplifier is no less radical. This integrated pre-amp has its own power supply and a novel ladder-network volume control that's stepped via a series of relays. Hit the up/down volume control on the accompanying 840 remote or spin the rotary encoder on its (silver or black) fascia and you'll hear these relays ticking away in the background.

'Word of the Cambridge 840A's qualities had already spread through the audio grapevine'

Changes in volume, balance, bass/treble tone and input selection are all illustrated on a back-lit display panel which has more in common with a comprehensive AV product than a purist stereo amplifier. In fact, all eight of its line-level inputs may be custom-named just as its fixed-level inputs allow the 840A to drive the front channels of a home cinema.

Further home integration may be achieved through its RS232 port, industry-standard A-BUS and proprietary Incognito connections, the latter designed for use with compatible keypads in a three-zone multiroom system. In all respects, this looks, feels and operates like a true upmarket product.

LISTENING

Word of the 840A's qualities had already spread through the audio grapevine before a sample had even landed on my lab bench although, illustrating the danger of subjective rumour, the real thing was not as I had been led to believe. In fact

THE INSIDE TRACK ON... CROSSOVER DISPLACEMENT (XD)

Crossover distortion has gnawed at the ability of every audio engineer who's had a stab at designing a new, typically analogue amplifier. It's caused by the non-linear transition from one power transistor to its complementary partner as the audio waveform swings from positive through to negative and vice-versa. In a Class A amplifier, there's always sufficient standing current to ensure the pair(s) of transistors are permanently conducting – there's no zero-cross distortion, no 'dead zone' to kink the waveform. But as half the current is wasted, Class A amplifiers run very hot indeed and are very expensive, watt for watt.

Class AB amplifiers utilize sufficient current to keep the transistors 'on' through the zero-cross region, and are typically more efficient, but suffer a large step-change in distortion as this bias current is exhausted and the amplifier drops into stone cold Class B. Most audio amplifiers are Class AB in execution.

Rather than try to eliminate crossover distortion altogether, Cambridge's renowned engineer and eccentric thinker, Doug Self, decided to simply shift it away from the zero-crossing point of the waveform. In its basic form, XD or Crossover Displacement, applies a negative bias current to offset the position of the crossover point without causing a DC offset of the audio (voltage) waveform itself. So there's no need to apply an inverse correction afterwards. There's an important distinction here with 'sliding bias' amplifiers championed by the likes of Technics many moons ago. Dynamically adjusting (sliding) the bias current according to the amplitude of the audio signal provides a *symmetrical* shift in the zero-crossing point. XD, by contrast, moves it *asymmetrically* with a negative current offset.

In practice, rather than use a fixed offset current, Cambridge has achieved better efficiency and lower distortion with an offset that tracks the audio (voltage) signal, up to a point. At low signal levels the crossover point is shifted below the maximum negative swing of the audio waveform, yielding all the benefits of a pure Class A performance. Beyond a certain output, which is equivalent to about 1W/8 ohm, this offset crossover point falls within the cycle of the audio waveform, although any crossover distortion will necessarily only occur on one half of the cycle only, rather than both.

It's important to appreciate that there's no less crossover distortion because there's still the same number of transitions, albeit all on the negative-going portion of the waveform. This results in a unique distortion spectrum, with fewer odd-order harmonics, that negative feedback is better able to deal with.

So that's XD in a nutshell: combining the benefits of Class A at low signal levels without the step-change in distortion suffered by Class AB amplifiers at higher power.

the 840A rather exceeded my expectations, for this is not an inherently bright, aggressive or scratchy-sounding amplifier. It is, however, more sensitive to grounding, environmental and system matching than might ordinarily be the case with similarly priced rivals, so I'd certainly recommend auditioning the 840A outside of an office complex harbouring photocopiers and associated paraphernalia ...

'The 840A reveals true class, oozing the unflappable quality of a far, far costlier piece of kit'

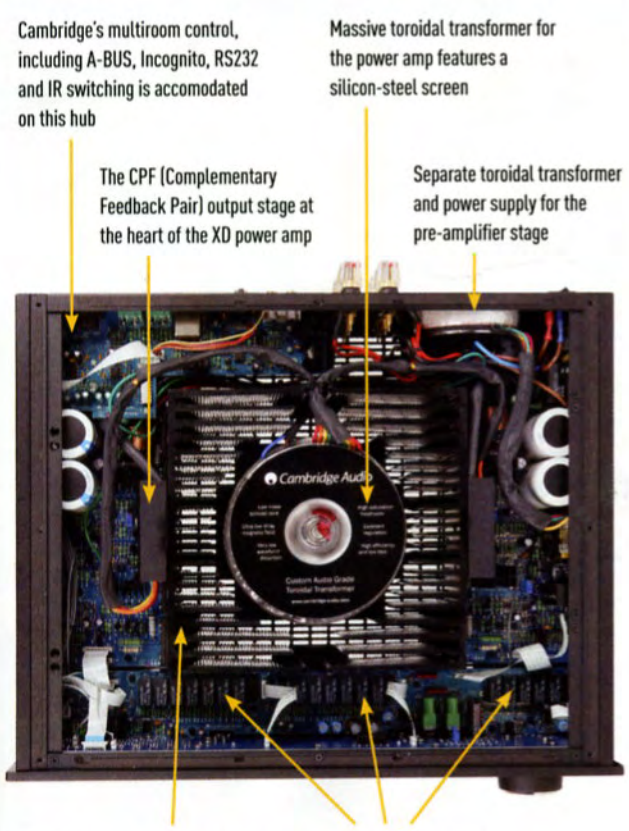
The 840A also benefits from being driven from a Class 1 (earthed) source like the Denon/Arcam combination used in my media room than a Class 2 (double insulated) player equipped with the familiar figure-of-eight socket.

DISTINCTIVE

All this duly noted, the 840A has the capacity to sound both distinctive and truly memorable. Its sure-footed delivery extends from the deepest, heaviest bass to the subtlest of treble harmonics, all of which are securely placed into the room rather than casually bounced from the loudspeakers. Indeed, there's no guesswork about the sound of this amplifier, no sense that it's taking things especially easy, taking a breather or lazily going with the flow.

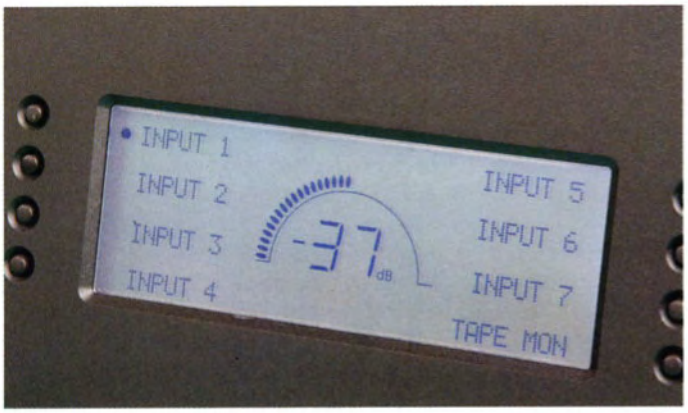
Instead, the 840A sounds determined, positive and articulate without introducing a hint of stress or strain into the melody at hand. I would hesitate to use the term 'explicit' because this might suggest the 840A was somehow unforgiving. Sure enough, it is revealing of its partnering equipment but never so coldly analytical about the music itself. It certainly made light work of the driving bass line underpinning KT Tunstall's 'Suddenly I See', the

LIFTING THE LID



REAR PANEL

There are seven inputs plus tape with input 1 available from both single-ended and balanced (XLR) sockets. Speaker A and B outlets allow easy bi-wiring while a host of wired-IR, A-BUS, Incognito and RS232 connections facilitate full home integration.



ABOVE: Ladder-network volume control is stepped via relays controlled from the remote control handset while all eight line-level inputs can be given individual names

pounding rhythm scoring a metrical line under the resonant strumming of guitar and husky sound of her voice. This is a busy sounding album that can easily appear compressed, making for edge-of-the-seat but slightly uncomfortable listening. Not with the 840A, which cuts through the bustling mix, highlighting every instrument and performer with his or her own ray of sunshine, illuminating the scene to impressive but undemanding effect. It's moments like this that the Azur 840A reveals its true class, oozing the unflappable quality of a far, far costlier piece of kit.

Listen to the vivacious strings from Bach's *Suite No 3 (Air on a G String)* and you can almost taste the resin as the bows are drawn with a fierce but single-minded intent across the bridge of the viola and violins.

PASSION OF PERFORMERS

And yet while you are rewarded with a penetrating, lucid insight into the colour of these instruments, the passion of the performers and a very real sense of the venue's acoustic, neither is the performance drilled unceremoniously into your skull. The 840A succeeds in painting a bold and contrasting image, packed with intriguing detail and yet cradled with an emotional warmth. Sit a technician and a musician side by side and both will find the 840A's performance utterly compelling. ◘

'Listen to the vivacious Bach strings and you can almost taste the resin as the bows are drawn'

BELOW: Casework comprises a 7mm-thick aluminium front panel and a 2mm base plate of formed steel; all-in-all, the Cambridge looks and feels like a true upmarket product

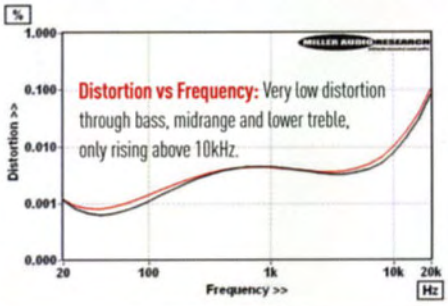
DATA FILE

MEASURED SPECS

Power output into 8/4 ohm (<1% THD)	160W/255W x 2
Dynamic power (20msec, 8/4/2/1 ohm)	190W/335W/485W/145W
Output impedance 20Hz-20kHz	0.07-0.12 ohm
Frequency response 20Hz-100kHz	0.0dB to -1.0dB
Input sensitivity (ref 1W/full output)	40mV/505mV
A-wtd S/N ratio (ref 0dBW/full output)	85dB/107dB
Distortion, 20Hz-20kHz, 0dBW	0.0008-0.09%
Stereo separation, 20Hz-20kHz	>60dB
Dimensions (hwd)	115 x 430 x 385mm
Weight	15kg

LAB REPORT

This amplifier is very conservatively rated by Cambridge at 120W/8 ohm, for it achieves closer to 160W/8 ohm and 255W/4 ohm in practice, increasing still further to 190W, 335W and 485W into 8, 4 and 2 ohm loads, respectively, under dynamic conditions. Distortion is lowest through bass and midrange between 30-70W/8 ohm at some 0.0008% but increases relatively sharply above 10kHz to reach ~0.09% at 20kHz. An increase in THD with frequency is typical for any class of operation of amplifier, depending on the dominant pole of its feedback network, but the fact the 840A holds distortion so very low up to 10kHz is less common and subjectively very desirable. The amp's response is also highly extended and just -1dB down at 100kHz through a moderate 0.07 ohm output impedance. If there's a fly, then this is exposed by the A-wtd S/N ratio test which at 95dB (left) and 85dB (right) indicates a significant asymmetry in the layout of the amp. My money's on the complex relay-driven attenuator's in the 840A's pre-amp section.



HI-FI NEWS VERDICT

Cambridge has delivered us a truly distinctive amplifier in its Azur 840A, a test bed for a technology soon to be used in a multichannel AV receiver and, doubtless, other matching components. It offers an unflappable combination of technology and entertaining music making.