Classé CP-800 Digital Hub

By Jimmy Hughes

Classé's £4,450 CP-800 is an analogue/digital preamp offering balanced/unbalanced inputs and outputs, plus a 24bit/192kHz USB DAC. Remarkable claims are made for the CP-800. Not only is it an extremely good purist analogue preamp, it also features digital tone controls, parametric equalisation, and Bass Management.

More radically, Classé asserts that CDs ripped to a computer hard drive, and played though the CP-800's DAC via its USB port, will deliver outstanding sound quality; superior (they claim) to any CD player, regardless of price. If true, that's absolutely incredible – a game-changer, no less.

Effectively it means a CP-800 upgrades your entire CD collection, while enabling you to access music from sources such as an iPhone, iPod, and iPad, or your home computer. Audibly better sound quality, and greater convenience? Game On! But can ripped CDs really sound better than the discs themselves?

Before answering that, let's look at the CP-800 as a purely analogue preamp. Outwardly, it appears to be a fairly simple Spartan device. There's a power on/off button, a menu button, and a volume control. Access to the various options can be made through the remote handset, or an illuminated front panel touch pad.

More than meets the eye

Although the CP-800 seems outwardly simple, hidden away are various options including left/right stereo balance, parametric equalisation, plus a 'tilt' type tone control which boosts the bass while reducing the treble – or vice-versa – with user selectable frequency points. You can individually pre-set the gain of each input.

The volume control is a continuous rotation type with a large digital display that reads from -90 to +14. This makes it easy to set volume levels precisely – useful when you're comparing items and need to maintain consistent volume settings. There's a choice of two balanced inputs (XLR) and three unbalanced inputs (RCA).

There's the option of balanced or unbalanced outputs (XLR and Phono), and a series of digital inputs – S/PDIF, Tos-Link, and USB. But it's the Asymmetric USB input that makes the CP-800 different and special, enabling Classé to 'clock' the digital signal with unusually high precision – see separate panel.

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Classé's claims regarding superior USB performance seem to hold water. Okay, we haven't compared the CP-800 to every high-end CD player out there. But it's certainly a very tough act to follow. Via the CP-800's USB input, ripped CDs do sound exceptionally open and clear.

They exhibit a clean natural tonal quality, wide dynamic range, enhanced clarity, and a firmer noticeably more solid and powerful bass. That slight high-frequency 'congestion' you typically experience with CD is virtually eliminated. The sound has notably greater purity, and feels more 'analogue'..

Musically-speaking, ripped CDs exhibit crisper attack and seem more solidly focused. Slight changes of dynamics and tone colour appear to 'tell' with greater clarity. The sound has greater cleanness and transparency, and seems truer and more natural – as though a layer of grunge had been stripped away.

Via the CP-800, ripped CDs have something of the purity and relaxed naturalness you get from SACD. It would be going too far to say that the CP-800 makes CD sound as good as the best SACDs on a top-class SACD player, but the sonic gulf is much reduced.

Enter the Dragon…

Nevertheless, Musical Fidelity's £7k AMS CD player provided stiff competition. The MF delivered excellent clarity and outstanding transparency, with low levels of congestion. The CP-800 sounded slightly cleaner, and seemed a tad more open and natural. It was a close-run thing, but (for us) the CP-800 shaded it.

Audio being subjective, some may prefer the AMS CD player over the CP-800. But, factor-in the latter's lower price, plus its versatility, and clearly it's delivering exceptional performance and value. Classé claim the CP-800 eliminates the need for high-end CD players. While we acknowledge this, we don't entirely agree.

Many of us like CD, and prefer music in a physical format. Also, certain CDs (discs that play perfectly well on CD players) failed to rip for some reason, and therefore could not be stored. Lastly, because the CP-800 sets such high standards, you need an exceptional CD player (like the AMS CD) to keep pace with it!

Also, for those with very large CD collections, there probably isn't enough time to rip everything to hard drive. Lastly, some of our discs refused to rip – whether due to hardware or software problems was not clear - so a CD player is needed for such discs. For these reasons, we would not want to be without a high-end CD player.

Aside from the sonic benefits, the advantage of storing music on a hard drive really shows with long continuous works, like opera, that are spread over several discs. It means you can listen without annoying breaks between acts, and (assuming enough stamina!) experience an entire work without having to leave your seat.

CDs ripped to a hard drive or storage device give you faster more convenient access to music. By itself, this is a hugely attractive proposition. And, when combined with audibly improved sound, the advantages of listening to music via Classé's CP-800 become very difficult to ignore. Even for the Luddites among us, it's a no-brainer!

Using iTunes, and storing music in Apple Lossless, we tried experimenting with the various 'equalisation' settings found under Options. The one labelled Acoustic seems to do a very good job, imparting extra depth and dimensionality to the sound, and (I can't believe I'm writing this!), it's become our preferred choice.

As an analogue preamp, we'd say the CP-800 is it up there with the best. It delivers a crisp, open sort of tonality that sounds very neutral – it's definitely not rich, warm, or euphonic. Yet the presentation seems very truthful and unexaggerated, delivering a rightness that is unmistakeable.

For best results, ticking the Analogue Bypass box on each analogue input is essential. This switches off the various internal clocks so there's no risk of digital noise affecting things. It works! You hear a slight improvement in top-end cleanness when the Analogue Bypass box is ticked.

Tone Controls? Parametric Equalisation?

The CP-800's tone controls and various equalisation options function digitally, which means tonal compensation can be implemented with less signal degradation than is invariably the case with analogue circuits. Parametric ▶

Equalisation allows you to correct frequency imbalances independently on each channel.

The Tilt control is very effective at brightening or darkening the sound, and being able to choose turn-over frequencies allows you to fine-tune things for best results. There's also something called Bass Management, which will help reduce bass boom in rooms that create excessive emphasis at specific low frequency points.

With analogue sources, best results will usually be achieved using the CP-800's Balanced inputs and outputs. Being able to individually alter the gain of each input allows the sensitivity of Unbalanced sources to be raised, so they're comparable in volume level to Balanced.

But, while the CP-800 more than holds its own as an analogue preamp, it's likely that most potential buyers will principally be attracted by its performance as a digital device. It offers a smooth easy entry into the world of computer audio – whether from ripped CDs, downloads, or both.

TECHNICAL SPECIFICATIONS

Frequency Response: 8 Hz - 200 kHz < 1 dB, stereo analog bypass
8 Hz - 20 kHz < 0.5 dB, all other sources
Channel matching: better than 0.05dB
THD+N: 0.0005% (digital, analogue), 0.004% processed analog
Dimensions (WxHxD): 45x12x45cm
Weight: 18.4kg
Price: £4,450

Manufactured by: Classé Audio
URL: www.classeaudio.com
Tel: 0800 232 1513 (UK only)

Interestingly, Classé doesn't produce a separate outboard DAC using its special technology. It claims there's no point, because it couldn't be configured to give comparable results to their USB preamp. We actually tried putting a USB signal through three high-end outboard DACs. None sounded as clean as the CP-800…

Rip it up

So, while having a USB input on your CD player allows you to listen to ripped CDs from a hard drive, the sound is unlikely to be much better than listening to the disc itself via a good CD player. There may be a difference, but you won't get the sort of improvement delivered by the CP-800.

To many audiophiles of a certain age, downloading music is not something that appeals. As creatures of habit, we prefer to have music on CD. But, after getting a CP-800, such attitudes may change! While still not choosing to download if a CD can be purchased, you'll soon warm to music stored on a hard drive.

The improved quality of sound delivered by the CP-800 is one reason, but so too is the ability to listen to long works without breaks. We predict you'll find yourself listening to a lot more music each evening – simply through not having to get out of your seat every hour or so. By itself, this is a huge benefit.

Confession time; your reviewer wasn't looking to replace his existing preamp, but having experienced the CP-800 and what it has to offer, it's become difficult to live without. We've actually bought a laptop exclusively for use as a USB music storage device. We're hooked! There's no going back!

THE CP-800 EXPLAINED.

The CP-800's USB subsystem is galvanically isolated to prevent noise from connected USB devices entering the audio circuitry. In other words, there's no direct electrical connection between the USB source and anything inside the CP-800.

According to Classé, the problem with the standard USB/DAC interface is that the USB device determines the amount of jitter in the system. Worse, USB sources may cause degradation to DAC power supplies and analogue circuits due to noise-coupling through power supplies and electromagnetic pathways.

A USB/DAC has a USB microcontroller which loads the incoming audio data into a buffer. This is clocked to the DAC, and is synchronous to the USB source. In this arrangement, the computer or portable device is in charge, and (as with S/PDIF) jitter is introduced into the system that no amount of post-processing can eradicate.

The two clocks are kept synchronized by continually adjusting clock rates, which entails pulling data from the buffer and into the DAC. Unfortunately, this forces the USB DAC to lock to a compromised high-jitter clock system.

This synchronous technique is also known as Adaptive USB, since the output rate adapts itself to the average rate of the incoming data. It is therefore susceptible to noise and clock degradation. Tweaks can be applied upstream of the USB input which may result in audible changes, but they do not solve the fundamental problem

Asynchronous USB

Performance improvements to the USB subsystem are possible using external control options offered by certain USB microcontroller chips. One involves controlling the clock locally in the USB/DAC. By making it asynchronous to the clock in the computer or portable USB device, the USB microcontroller now controls the flow of data from the source, rather than the other way round.

In the CP-800, dedicated master clocks are used for different sampling frequencies. The CP-800 achieves complete galvanic isolation, severing all electrical pathways from the source to ensure unwanted noise is kept out of the audio path. At this point, most manufacturers would probably stop. The Classé Design team, however, went further.

Single Clock Substrate

The CP-800 employs a technique called Single Clock Substrate to ensure best possible performance. The USB microcontroller is itself rather noisy, with its own clock and that of the source device loading its buffer. These microcontrollers are good at many things, but keeping clocks isolated is not among them! While you can partition functions on the silicon, you cannot isolate them.

The solution developed for the CP-800 places a Field Programmable Gate Array (FPGA) near the DAC and Master Clock oscillators. Data from the USB microcontroller on the digital input board is received and buffered by the FPGA located adjacent to the DAC on the motherboard.

Data is transferred to the DAC synchronously from the CP-800 master audio clock (the only clock used in the FPGA). This, of course, is synchronous with the data arriving into the buffer via the USB microcontroller's asynchronous transfer algorithm.

This topology ensures the greatest isolation of clocks and data from all upstream artefacts. The digital signal arrives at the DAC with correct data and precise timing, ready for conversion to analogue. Thanks to the technical superiority of this unique configuration, Classé believes the CP-800 outperforms even the best CD players. +