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JOHN ATKINSON

Classé CP-800

D/A PREAMPLIFIER

I was setting up for some musical demonstrations I was to present for a Music Matters evening at the ListenUp! store in Boulder, Colorado, in May 2011. For these events, an audio store invites manufacturers (and the occasional journalist) to demonstrate to local audiophiles the musical benefits of high-end audio playback. In Boulder, I was to share the store's big listening room with Dave Nauer, president of Classé Audio, who had set up a system with B&W Diamond 802 speakers, a Classé stereo amplifier, and a preproduction sample of Classé's new CP-800 preamplifier (\$5000), all hooked up with AudioQuest cable. I unpacked my MacBook, with which I was going to play the high-resolution master files of some of my *Stereophile* recordings, and looked around for a DAC. There wasn't one.

I hadn't realized that the CP-800 is an example of a new breed of audio component: Not only is it a two-channel line preamplifier, it offers a complete set of digital inputs, including USB and an iPod connector. It can serve as a system's one-box heart, replacing the D/A processor and the cables connecting it to a conventional preamp. It even has a headphone output and a complete set of equalization features.

Plugging my laptop's USB output into the CP-800's rear-panel USB port, I was good to go chez ListenUp! I also vowed that the CP-800 would spend some quality time chez Atkinson.

What it does

The CP-800 shares the curved aluminum front panel Classé has used for its Delta-series products since the beginning of the century. This starts life as a flat extrusion with raised edges, and is gently bent into a U to form the front and side panels. Dominating the front panel is a large color LCD touchscreen that, in combination with the chunky metal remote, gives the user access to all functions via the usual hierarchical menu tree.

Flanking the touchscreen, within its bezel, are the Menu (left) and Mute (right) buttons, these duplicated on the remote. A black horizontal styling strip conceals: the Standby On/Off button to the left of the screen and, to the right, the infrared remote receiver window; a USB Host connector for an iPod (Apple portable devices only; the CP-800's remote can control the iPod's transport functions); and a ¼" headphone jack. The large black knob for the shaft encoder that controls volume is at the right end of the black strip.

On the bottom of the rear panel are, from left to right: three pairs of unbalanced analog inputs on RCA jacks; two pairs of balanced analog inputs on XLR jacks; and two pairs of balanced outputs on XLRs, along with a single XLR output labeled Sub—all with their unbalanced counterparts on adjacent RCAs. The second pair of outputs can be assigned to double the main output pair, to permit biamping; alternatively, they can be used

SPECIFICATIONS

Description Remote-controlled, solid-state preamplifier with touchscreen display, DSP-implemented tone and equalizer controls, 10 digital inputs (AES/EBU, 3 S/PDIF on coax, 4 S/PDIF on TosLink, asynchronous USB, front-panel USB host input for iPods, etc.), and analog inputs (2 pairs balanced on XLR jacks, 3 pairs unbalanced on RCAs). Analog outputs: 3 pairs balanced on XLRs, 3 pairs unbalanced on RCAs, headphones on ¼" (6.35mm) jack. Other inputs/outputs:

Ethernet, trigger, CAN-Bus, IR. Frequency responses: 8Hz–200kHz, <1dB, stereo analog bypass; 8Hz–20kHz, <0.5dB, all other sources. Channel matching: <0.05dB. THD+noise: 0.0005%, digital source/bypassed analog source; 0.002%, processed analog source. Maximum input levels: 2V (DSP), 4.5V (bypass), single-ended; 4V (DSP), 9V (bypass), balanced. Maximum output levels: 9V single-ended, 18V balanced. Gain range: -93dB to +14dB. Input impedances:

100k ohms, single-ended; 50k ohms, balanced. Output impedances: 100 ohms, single-ended; 300 ohms, balanced. Signal/noise (ref. 4Vrms input, unweighted): 104dB, bypassed analog source; 101dB, processed analog source; 105dB, digital source ref. 0dBFS. Channel separation: >100dB. Crosstalk (any input to any output): better than -130dB at 1kHz. Standby power consumption: <1W. Rated power consumption: 31W.

Dimensions 17.5" (445mm) W by 4.78" (121mm) H by 17.5" (445mm) D. Weight: 23 lbs (10.43kg) net, 33 lbs (15kg) shipping.

Serial number of unit reviewed 2144108, firmware version 1C01.

Price \$5000. Approximate number of dealers: 116.

Manufacturer Classé Audio, 5070 François Cusson, Lachine, Quebec H8T 1B3, Canada. Tel: (514) 636-6384. Fax: (514) 636-1428. www.classeaudio.com.



CLASSE

0.0

Source Selection

USB F

Balanced 1



USB B

Line 2

Coax 1

Line 1

Line 3

Optical 1

Balanced 2

MUTE

CP-800

ERIC SWANSON

to provide stereo subwoofer outputs. The Sub output passes a mono low-frequency signal when enabled, but when the CP-800 is set up via the menu to manage bass, there is full control of crossover frequency and high-pass filter slope.

From left to right along the top of the rear panel are: the On/Off switch, and the AC input on an IEC jack; a USB port for connecting to a computer for audio streaming; a single AES/EBU digital input; three electrical S/PDIF digital inputs on RCAs (all digital inputs are galvanically isolated); four optical S/PDIF inputs on TosLinks; and various trigger and comms ports, including RS-232 and Ethernet. (On the review sample, the latter had still to be implemented.)

How it does it

Inside the CP-800, in front of the rear panel, a large, six-layer printed-circuit board runs the full width of the chassis. This carries the analog circuitry and the A/D, D/A, and DSP sections. Above this board and connected to it with two ribbon cables, a smaller, full-width, six-layer board carries the digital input circuitry. A small board behind the touchscreen, again connected to the main board with two ribbon cables, as well as to the screen with another ribbon, carries the CP-800's microcontroller.

Next to the controller board is the power supply. This is a switching type, but unlike conventional switch-mode power

supplies, which have a bad rap in high-end audio circles for their propensity to introduce noise and enharmonic spurs, the CP-800's supply uses Zero Volt Switching (ZVS), in which the primary switch operates when the incoming DC voltage is at a minimum, thus allowing the supply to have a low-noise RF footprint. In addition, the CP-800's supply is fully power-factor corrected, meaning that the incoming AC voltage and current are sinusoidal and in phase. (A white paper on this and the other technologies featured in the CP-800 can be downloaded at <http://tinyurl.com/7mvqz3j>.)

The CP-800's rear-panel USB port operates in asynchronous mode, in which the flow of data is controlled by the DAC clock, not the computer. But the CP-800's operating mode, which Classé calls Optimal Asynchronous with Single Clock Substrate, differs from topologies used in competing products. Usually, the microcontroller in the asynchronous USB receiver chip controls the master clock. In the CP-800, a high-precision clock signal is buffered by a high-speed Field-Programmable Gate Array (FPGA) chip placed next to the DACs and master-clock oscillators. This is said to result in increased clock purity and more accurate D/A conversion. Additionally, when the CP-800 is processing data encoded at 44.1kHz and its multiples, the 48kHz master clock is turned off, and vice versa, to avoid cross contamination.

In Analog Bypass mode, analog signals are fed straight to

MEASUREMENTS

I measured the Classé CP-800 with *Stereophile's* loan sample of the top-of-the-line Audio Precision SYS2722 system (see www.ap.com and the January 2008 "As We See It," <http://tinyurl.com/4ffpve4>); for some tests, I also used my vintage Audio Precision System One Dual Domain.

Looking first at the CP-800's performance via its digital inputs, with the volume control locked to unity analog gain or "0.0" with the Input Passthrough setting and in Analog Bypass mode, the AES/EBU and S/PDIF inputs successfully locked to data with sample rates ranging from 32 to 192kHz. However, as can be seen in fig.1, the frequency response with 192kHz data was no wider than with 96kHz data, both being down by 6dB at

42kHz. With lower sample rates there was a fraction-of-a-dB rolloff at the top of the audioband before the steep drop in output due to the reconstruction filter. The Mac USB Prober utility reported that the USB input operated as claimed in isochronous asynchronous mode, and handled sample rates of 32, 44.1, 48, 88.2, and 96kHz, with 24-bit word lengths. USB Prober identified the product as the "CP-800" from "Classe Audio Inc," with a serial number of "2144108."

With the volume at "0.0," a full-scale signal at 1kHz resulted in a level of 3.67V at the balanced outputs, 1.83V at the single-ended outputs; both preserved absolute polarity. Channel separation via the digital inputs was superb, at >120dB below 2kHz. With 16-bit data representing a dithered

1kHz tone at -90dBFS, the USB, S/PDIF, and AES/EBU inputs gave a spectrum with the tone at the correct level and a noise floor free from supply-related or harmonic spurs (fig.2, cyan and magenta traces). Increasing the bit depth to 24 dropped the noise floor by 10dB or so (fig.2, blue and red traces), implying resolution of around 18 bits. This graph also indicates that the left channel (blue trace) was slightly noisier than the right (red) at low frequencies, this confirmed by 1/3-octave analysis (not shown). Even so, the CP-800's reproduction of an undithered tone at exactly -90.31dBFS (fig.3) showed excellent differentiation of the three DC voltage levels. With 24-bit undithered data (not shown), the CP-800 produced an excellent if slightly noisy sinewave.

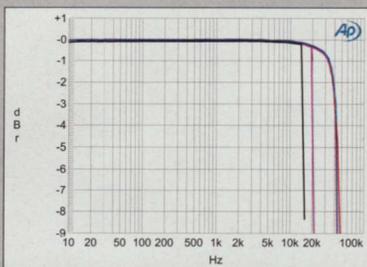


Fig.1 Classé CP-800, digital frequency response at -12dBFS into 100k ohms with data sampled at: 32kHz (left channel green, right gray), 44.1kHz (left cyan, right magenta), 96kHz (left blue, right gray), 192kHz (left green, right red) (1dB/vertical div.).

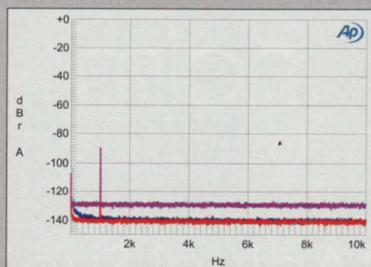


Fig.2 Classé CP-800, FFT-derived spectrum with noise and spurs of dithered 1kHz tone at -90dBFS, with: 16-bit data (left channel cyan, right magenta), 24-bit data (left blue, right red).

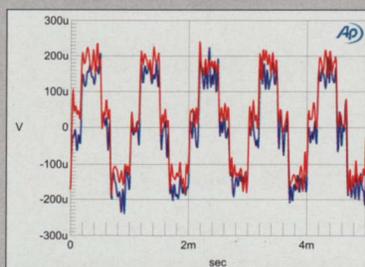


Fig.3 Classé CP-800, waveform of undithered 1kHz sinewave at -90.31dBFS, 16-bit data (left channel blue, right red).



Analog inputs and outputs below; digital inputs and comms ports above.

the volume control and output circuits and the digital clocks are turned off. (The volume control is implemented with two two-channel Burr-Brown PGA2310 programmable-gain chips, one per channel used as a differential volume control.) However, the tone or equalization controls are implemented using two Analog Devices DSP chips. So if the user wants to use these controls, the analog input signals are converted to 24-bit digital data with a Cirrus Logic 5381 A/D chip. Digital data are turned back to analog using two Wolfson WM8741 DAC chips, each of these a high-performance, multi-bit, sigma-delta, two-channel type capable of operating with 32-bit data. Each DAC chip operates in differential mode, one per channel, and runs at a constant rate of 176.4 or 192kHz. The voltage-output DACs are followed by a fourth-order reconstruction filter with a 100kHz passband.

Operation

While the CP-800 offers myriad customizing options via its touchscreen menu, the default settings out of the box proved to be all that I needed. Pressing any part of the touchscreen's Home screen or the Source Select button on the remote

allows you to choose a digital or analog input. The chosen source is then displayed on the bottom left of the Home screen. If digital, the Home screen displays the current sample rate in small print at the bottom. Large numerals in the top half of the screen indicate the current volume setting.

Pressing Menu allows you to adjust balance, switch to dual-mono, and activate the tone controls. Pressing Menu, then System Set-Up brings up a screen where you can program the parametric equalization, tone control, input-volume offset and maximum, bass management, and DC trigger and display options. You can also define up to six custom configurations that can be recalled at the touch of a button, as well as program the eight function keys on the remote. If you enable EQ or the tone controls, the words "EQ," "Tone," or "Mono" appear at the bottom right of the Home screen.

The menu offers more options and functions than can be described in a review; everything is fully described in the excellent manual, which can be downloaded from <http://tinyurl.com/7rg72w3>. I commend Classé for including, as well as conventional tone controls, a Tilt control that allows the entire response be hinged up or down by up to 6dB at

measurements, continued

Although the level of distortion with a full-scale digital input signal was low in absolute terms, it was higher than I expected, the third harmonic lying at -77dB, or 0.014% (fig.4). Reducing the output level by 10dB with the volume control preserved the level of the third and other harmonics (fig.5), whereas reducing the level of the signal data by the same 10dB dropped the third harmonic to -87dB, or 0.005% (fig.6). This suggests that the slight nonlinearity

occurs in the D/A conversion circuitry ahead of the volume control. But, as I said, the distortion was still low, and with an equal full-scale mix of 19 and 20kHz tones, the intermodulation products were also low in level (fig.7).

The CP-800 offered superb rejection of word-clock jitter via all of its digital inputs. Fig.8, for example, shows the spectrum of its analog output while it decoded a 24-bit version of the Miller-Dunn J-Test signal presented to the USB

input. The noise floor is free from any jitter- or supply-related sidebands, and the picture was equally superb via the S/PDIF and AES/EBU inputs.

Turning to the CP-800's performance as an analog line preamplifier and setting it to Analog Bypass, the maximum gain from the balanced outputs was 14dB with the volume control set to "14.0"; with an unbalanced input, it was 7.6dB from the unbalanced jacks. The volume control operated in accurate 1dB

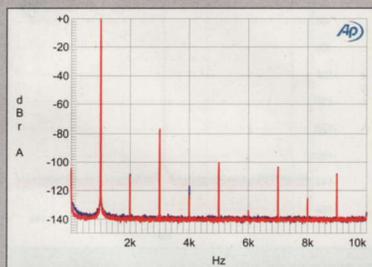


Fig.4 Classé CP-800, spectrum of 1kHz sine wave, DC-1kHz, at 0dBFS into 100k ohms, volume = "0.0" (left channel blue, right red; linear frequency scale).

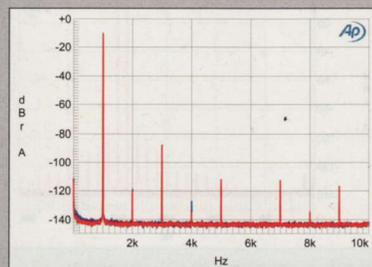


Fig.5 Classé CP-800, spectrum of 1kHz sine wave, DC-1kHz, at 0dBFS into 100k ohms, volume = "-10" (left channel blue, right red; linear frequency scale).

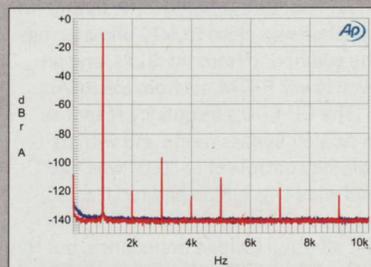


Fig.6 Classé CP-800, spectrum of 1kHz sine wave, DC-1kHz, at -10dBFS into 100k ohms, volume = "0.0" (left channel blue, right red; linear frequency scale).



When an iPod is plugged into the CP-800's front-panel, it can be controlled with the remote.

each end of the spectrum. Introduced at the end of the 1970s in analog guise, by Quad Electroacoustics in their Model 44 preamplifier, this kind of control is the only one I have found useful for adjusting recorded balances to sound neutral.

Made in China

Back in 2005 I visited the Classé factory, in a Montreal suburb, and was impressed with what I saw. Here was a major high-end audio brand that still manufactured its products in North America. It was thus with some sadness that I learned last year that the CT-M600 and CA-M600 amplifiers, which I positively reviewed in March 2011, were among the last products Classé was to make in Canada. Like B&W, Classé is owned by the B&W Group, whose products, along with

Rotel's, are distributed in North America by the Canadian Equity International conglomerate. In fall 2011 the B&W Group moved Classé's production to the facility it owns in China, which already was responsible for manufacturing Rotel gear as well as 600 and CM series B&W models. My review sample of the CP-800 is one of the first to come from the Chinese factory.

In a frank discussion at the 2012 Consumer Electronics Show, Classé's Dave Nauber outlined for me the reasons for offshoring manufacturing. With many of the components used in Classé products already made in the Far East, it made sense to move actual manufacture there. There's no real difference, Nauber said, between, say, installing a Chinese-made transformer in an amplifier in Montreal and in China. To guarantee quality, the important thing is that the Chinese facility be not an independent contractor, but vertically integrated with the owner's other brands.

Most important, the creation of the intellectual property embodied in Classé's products—the R&D and design—remain in Canada.¹

Sound Quality

Tonally, as a line preamplifier in Analog Bypass mode, the CP-800 fell into the camp of the clean and clear rather than the mellow and euphonicly colored. In that respect it was somewhat similar to the Parasound Halo JC 2 (\$4000), which I reviewed in March 2008: A wealth of recorded detail was laid bare without being spotlighted. In level-matched comparisons with the Ayre Acoustics K-5xe^{MP} (\$3500; I reviewed

¹ It is fair to note, however, that Scottish engineer Alan Clark, who was chief technology officer for the B&W Group and played an important role in the development of the CP-800, has for personal reasons relocated from Montreal to Calgary, where he now holds the position of executive vice president of R&D at Ayre Acoustics.

measurements, continued

steps, with superb matching between the two channels at all levels. The output was polarity correct from both outputs, the XLRs being wired with pin 2 hot. The balanced input impedance was 48k ohms at low and middle frequencies, which is close to the specified 50k ohms, dropping slightly but inconsequentially to 35k ohms at 20kHz. The impedance of the unbalanced input is specified as a high 100k ohms, but I got around 10k ohms at all frequencies. This should not be a problem. The output impedance was close to 600 ohms across the audioband from the XLRs, and an even lower 100 ohms from the RCAs.

The CP-800's frequency response in Analog Bypass mode and with its volume control set to "0.0" was flat and wide (fig.9, blue and red traces), lying at -0.8dB at 200kHz. This was not affected by load impedance, but the ultrasonic rolloff did increase slightly, to -1.5dB at 200kHz, with the volume control set to "14.0" (not shown). Switching to EQ mode, but with all

tone controls and EQ parameters set to flat, gave the cyan and magenta traces in fig.9. As all of these functions are implemented with a digital signal-processing chip, analog input signals must be converted to digital. The sharp rolloff above the audioband, reaching -3dB at 45kHz, suggests that the conversion is done at 96kHz, which in turn suggests that this is the sample rate at which the DSP is performed. This would

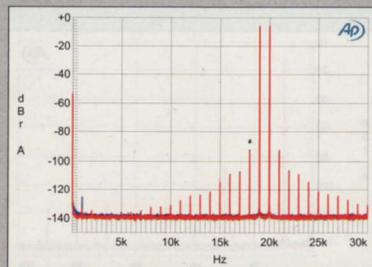


Fig.7 Classé CP-800, HF intermodulation spectrum, DC-30kHz, 19+20kHz at 0dBFS into 100k ohms, volume = "0.0" (left channel blue, right red; linear frequency scale).

explain why the frequency response with 192kHz digital data is no wider than with 96kHz data—the digital input data are sample-rate-converted to 96kHz in order to be compatible with the CP-800's DSP section.

Once engaged, the Classé's EQ functions are comprehensive, offering both conventional, Baxandall-type tone controls and Quad-like Tilt controls, as well as parametric equalization, with full con-

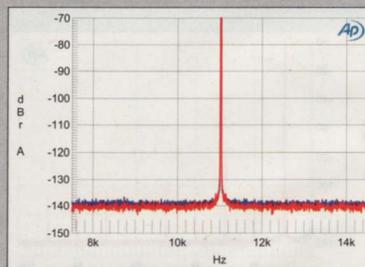


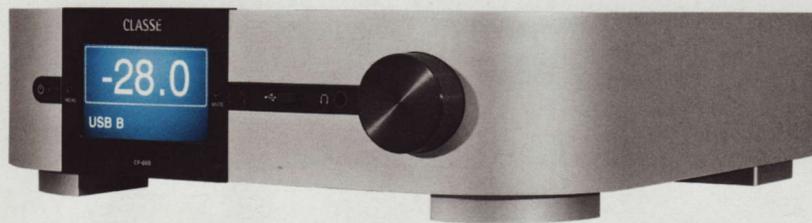
Fig.8 Classé CP-800, high-resolution jitter spectrum of analog output signal, 11.025kHz at -6dBFS, sampled at 44.1kHz with LSB toggled at 229Hz: 24-bit data via USB from MacBook (left channel blue, right red). Center frequency of trace, 11.025kHz; frequency range, ±3.5kHz.

it in June 2011), the Ayre sounded slightly veiled, though there was a robustness to its soundstaging that resulted in more fully fleshed-out images within that soundstage.

Using as a source my newly repaired Mark Levinson No.30.6 D/A processor, I selected the CP-800's EQ section but set it to do nothing. This way, analog signals were digitized, then converted back to analog. Though the extra processing added a very slight hardness to the sound in absolute terms, this will be offset by the tonal changes that are then possible.

For most of my auditioning of the CP-800 I fed it digital data, either via USB from my 2.7GHz i7 Mac mini, or via AES/EBU from my Ayre C-5xe^{MP} disc player. There was a delightful delicacy to the sound, without any significant difference audible between the USB and AES/EBU modes. Leonard Cohen's husky baritone in his reading of Joni Mitchell's "The Jungle Line," from Herbie Hancock's *River: The Joni Letters* (Apple Lossless 24/96, Verve/HDrtracks), sounded as natural as I can recall, without any emphasis of sibilance. The drum opening of "Penguins," from Lyle Lovett's *Live in Texas* (Apple Lossless file ripped from CD, Curb MCAD-11964), effectively lit up the surrounding ambience, while the horn interjections punched holes in the appropriate places in space.

With the levels matched using the CP-800's Input Offset Level control to within 0.1dB, the kick drum on this album didn't have as much LF authority as the No.30.6's analog output. The older megabuck processor, however, couldn't quite match the Classé's delicacy in the treble. The complex mix of "The Afterlife," from Paul Simon's



The large touchscreen offers access to all the CP-800's functions.

So Beautiful or So What? (24/96 Apple Lossless file, Hear Music/HDrtracks, transcoded to USB to AES/EBU using Empirical Audio Off-Ramp4), sounded muddier with the Levinson, even though the bass guitar had cleaner leading edges to its tone.

Against the Debussy

A more relevant comparison for the CP-800's performance as a D/A processor was with the dCS Debussy (\$10,999, reviewed in January 2011), again with levels at 1kHz matched to within 0.1dB. (Comparisons were rendered easier by the fact that the transport controls on the CP-800's remote functioned with iTunes on the Mac mini.) The Debussy was used with its apodizing filter selected, which is how I feel it performs at its best.

While there was no real difference in the processors' treble characters, with the Debussy I got a better sense of the surrounding space of Chad Kassem's Blue Heaven Studios in "The Mooche," from the Jerome Harris Quintet (*Editor's Choice*, CD/Apple Lossless file, Stereophile STPH016-2). The Classé, however, offered slightly more lower-midrange energy in the sound of Jerome's Taylor acoustic bass guitar.

measurements, continued

control of center frequency, Q, and boost/cut. Fig.10 shows the effect of the Treble and Bass controls, set to their maximum (+6dB) and minimum (-6dB) positions, with corner frequencies of 200Hz and 2kHz. The latter frequencies conform to the control's ± 3 dB frequency, and the maximum boost and cut are ± 6 dB, as specified. Fig.11 shows the effect of the Tilt control, set to its maximum positive and negative slopes.

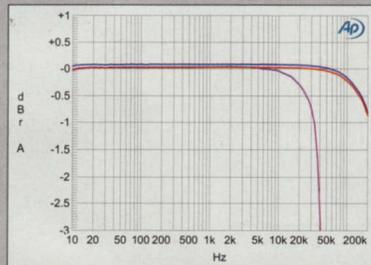


Fig.9 Classé CP-800, balanced frequency response at 1V into 100k ohms with volume control at "0.0" in analog bypass mode (left channel blue, right red), and in EQ mode with all controls set to flat (left cyan, right magenta) (0.25dB/vertical div.).

The maximum input level the CP-800 can accept depends on whether it is set to Analog Bypass or EQ. Fig.12 shows how the THD+noise percentage in the preamp's output changes with the output level of a 1kHz tone into 100k ohms with the volume set to its maximum. The output stage clips at 20V RMS, equivalent to an input voltage of 3.9V. (Clipping is defined as when the THD+N percentage reaches 1%.) With a very low load

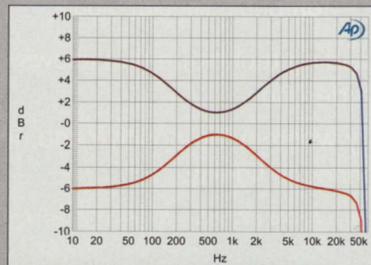


Fig.10 Classé CP-800, tone-control response at 1V into 100k ohms with volume control at "-12.0," tone-control turnover frequencies set to 200Hz and 2kHz, and Treble and Bass controls set to +6dB (left channel blue, right magenta) and -6dB (left cyan, right red), respectively (2dB/vertical div.).

impedance of 600 ohms, the maximum output drops to just under 10V. Backing off the volume control allows the input voltage needed to produce clipping to increase, meaning that at unity gain, the CP-800 will handle more than the Audio Precision's maximum output of 15V RMS without clipping. With the volume control set to "0.0" and with EQ engaged, the balanced input clipped at 5.7V. This is somewhat higher than the specified

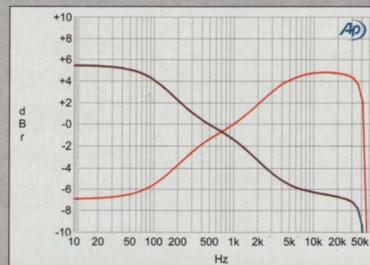


Fig.11 Classé CP-800, tone-control response at 1V into 100k ohms with volume control at "-12.0"; and Tilt control set to +6dB at LF, -6dB at HF (left channel blue, right magenta), and -6dB at LF, +6dB at HF (left cyan, right red) (2dB/vertical div.).

ASSOCIATED EQUIPMENT

Analog Sources Linn Sondek LP12 turntable with Lingo power supply, Linn Ekos tonearm, Linn Arkiv B phono cartridge.

Digital Sources Ayre Acoustics C-5xe^{MP} & DX-5 universal players; Apple 2.7GHz i7 Mac mini laptop running OS10.7, iTunes 10, Pure Music 1.86; Shuttle PC with Lynx AES16 soundcard & dual-core AMD Athlon processor running Windows 7, Foobar 2000, Adobe Audition 3.0; Halide DAC HD, dCS Debussy, Benchmark DAC1, Logitech Transporter, Mark Levinson No.30.6 D/A converters; Ayre Acoustics QA-9 USB A/D converter.

Preamplification Liberty B2B-1 phono preamplifier, Ayre Acoustics K-5xe^{MP}.

Power Amplifiers Classé CT-M600, Lamm M1.2 Reference (both monoblocks).

Loudspeakers BBC LS3/5a, Emotiva XRT-5.2 X-Ref, Lansche 5.1, PSB Imagine Mini, Sony SS-AR2.

Cables Digital: DH Labs Silver Sonic. AES/EBU: AudioQuest Coffee, Belkin Gold USB. FireWire: AudioQuest FireWire 400 (prototype). Interconnect (balanced): AudioQuest Wild. Speaker: QED. AC: XLO Reference 3, manufacturers' own.

Accessories Audio Power Industries 116 Mk.II & PE-1, APC S-15 AC line conditioners (computers, hard drive); ASC Tube Traps, RPG Abffusor panels; Target TT-5 equipment racks; Ayre Acoustics Myrtle Blocks; Shunyata Research Dark Field cable elevators. AC power comes from two dedicated 20A circuits, each just 6' from breaker box.—John Atkinson

Lossless file, Verve Forecast B0011631-02), the dCS gave his frantic strumming a little more propulsive drive, while the Classé was slightly better at bringing out the jangly quality of his open-string acoustic guitar. With the solo cello at the song's beginning, it was a wash.

Only with 192kHz-sampled tracks, such as from the Ray Brown Trio's *Soular Energy* (24/192 Apple Lossless file ripped from DVD-Audio, HiRez Music HRM2011), did the dCS pull ahead, presumably because the USB data were being downsampled by Pure Music to 96kHz to feed the CP-800.

Summing Up

Classé Audio's CP-800 is that rare component: a multi-function device that, despite its versatility and extensive use of new technologies, doesn't appear to compromise the quality of the sound. Yes, its D/A section is surpassed in both measured and audible performance by expensive state-of-the-art processors such as the dCS Debussy, which also has a 192kHz-capable USB input. However, it must be remembered that the dCS costs more than twice as much, and while its volume control is truly transparent, it lacks both analog inputs and the CP-800's extensive DSP functions.

Six months after starting this review, I am well aware that the CP-800 offers more functions than I have come to grips with. Performance as a headphone amplifier? As an iPod dock? Providing bass management for a sub/satellite system? Sorry. While I can confirm that those functions do work, I have not yet formed opinions of how well. But even without my testing those functions, I highly recommend the CP-800 as a straight, future-proof, two-channel D/A preamplifier. It offers more than its purchaser expects, at a price lower than any would expect to pay. ■

With Richie Havens's imaginative cover of "Won't Get Fooled Again," from his *Nobody Left to Crown* (CD/Apple

measurements, continued

4V, and more than enough to cope with any real-world analog sources. The maximum unbalanced input voltage with EQ engaged was half the balanced figure.

Fig.12 suggests that the measured THD at typical signal levels is dominated by noise, so I haven't shown how the measured THD+N percentage changes with frequency. (It doesn't.) With the input shorted and the volume control set to its maximum, the unweighted, wideband signal/noise ratio was 71dB ref. 1V output. Switching in an A-

weighting filter increased this to 85dB; reducing the volume control to unity gain increased it to 99.2dB.

With the CP-800 in Analog Bypass mode and the volume control set to unity, the distortion harmonics are not much higher than the residual levels in the Audio Precision's output, at -120dB (0.0001%) or below (fig.13), though the slightly higher level of noise at low frequencies can be seen. This spectrum was taken into the benign 100k ohm load; dropping the load impedance to 600 ohms and readjusting

the input level to give the same 2V output increased the third harmonic from -124 to -120dB (not shown), but otherwise the spectra looked identical. Intermodulation levels were similarly very low, even into the punishing 600 ohm load (fig.14).

The Classé CP-800's measured performance in its Analog Bypass mode is beyond reproach. While its digital input offers about 2 bits' worth less resolution than the current state of the art, this didn't prove much of an impediment in my auditioning.—John Atkinson

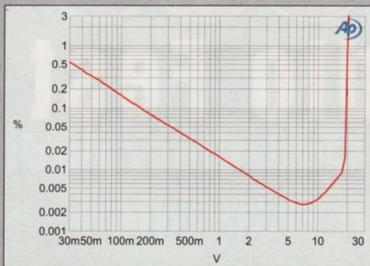


Fig.12 Classé CP-800, volume control set to "14.0," balanced distortion (%) vs 1kHz output voltage into 100k ohms.

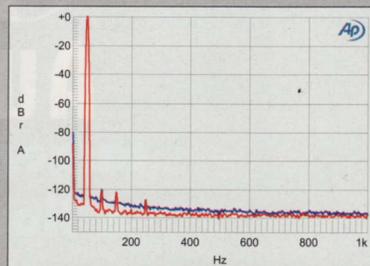


Fig.13 Classé CP-800, balanced spectrum of 50Hz sine wave, DC-1kHz, at 2V into 100k ohms (left channel blue, right red; linear frequency scale).

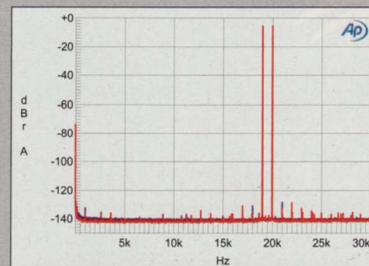


Fig.14 Classé CP-800, balanced HF intermodulation spectrum, DC-30kHz, 19+20kHz at 2V into 600 ohms (left channel blue, right red; linear frequency scale).