

# dCS Puccini CD/SACD Player and Puccini U-Clock USB Converter/Clock





I've lived with quite a few of the most ambitious digital-playback products in my twenty-one years as a full-time reviewer, but somehow never managed to audition a unit from England's Data Conversion Systems (dCS) until now. That's a shame, because the dCS Puccini CD/SACD player and U-Clock combination has turned out to be one of the world's great digital front ends.

Robert Harley

**T**he company dCS has a long history of technical accomplishments in both professional and consumer audio. The firm pioneered many cutting-edge advancements, including the proprietary "Ring" DAC found in all its digital-to-analog converters (see sidebar). Mike Story, dCS's founder, was also at the forefront of high-resolution digital audio long before it was a commercial reality. I attended a paper he presented at an Audio Engineering Society convention in the early 1990s in which he correctly posited that the sonic improvement rendered by high sampling rates was the result of improved time-domain performance due to the relaxed filter requirements. That's accepted wisdom today, but it was revolutionary nearly twenty years ago. Over the decades dCS has addressed such topics as upsampling, PCM-to-DSD conversion, jitter, noise-shaping, the time-domain performance of digital filters, and other issues long before they became part of the high-end mainstream.

dCS is again taking the technology lead with the U-Clock, a device that vaults the sound of the company's Puccini CD/SACD player into new sonic territory while simultaneously expanding its functionality to incorporate state-of-the-art decoding of high-resolution digital audio from a PC-based music server.

The \$17,999 Puccini player is the same model Jonathan Valin commented on in his review of the Scarlatti, dCS's \$67,000 three-box statement product (Issue 183). Jonathan concluded that the Scarlatti was the best digital he'd heard, an opinion apparently shared by quite a few high-end manufacturers judging from the number who have purchased the Scarlatti for their own development work or trade-show demonstration. Jonathan also thought that the less-than-third-the-price Puccini was very nearly as good as the reference-quality Scarlatti.

The \$4999 U-Clock improves the Puccini's sound quality by delivering an ultra-precise clock to the player, reducing jitter. As has become abundantly apparent, great-sounding digital audio requires extraordinarily precise timing in the conversion of digital data to an analog waveform. My review of the \$16,000 Esoteric G-0Rb rubidium clock (Issue 180) created skepticism among certain readers that human ears can detect timing variations that are measured in picoseconds (see, for example, the letter from Dave Martson in Issue 198). The objections to expensive outboard clocks are not based on these readers' own listening experience, but purely on theoretical grounds—conventional clocks *should* be good enough, in their view. But there's a simple way to determine for yourself if jitter is a factor in digital audio reproduction—listen to a Puccini with and without the U-Clock engaged. As we'll see in the report on my listening impressions below, the difference is not subtle.

The U-Clock's second important function is to allow the Puccini CD/SACD player to operate as a digital-to-analog converter for PC-based music servers that have a USB output. The U-Clock takes in digital audio data from a PC on the USB interface and converts it to S/PDIF for presentation to the Puccini. That might not sound like a big deal—one can buy a box for \$250 that does the same thing—but dCS has engineered a state-of-the-art USB interface that introduces absolutely no sonic compromises. Rather than considering USB a limiting factor in PC-based audio sound quality, dCS believes USB is the *optimum* interface if engineered correctly.

In most digital interfaces, including S/PDIF, AES/EBU (a variant of S/PDIF), and FireWire, the source component (the CD transport or PC music server, for examples) is the master clock to which the receiving device must lock. Virtually all USB DACs operate in this way, which is known as "Adaptive Mode." Asking the receiving device to lock to the source's clock is problematic for several reasons. Although the USB interface was never designed for transmitting high-quality audio, it inherently has the ability to allow the receiving device to control the data rate from the source device—a feature not possible with S/PDIF, AES/EBU, or even FireWire.

dCS has developed its own technology for exploiting USB's built-in "feedback" system which allows its own high-precision clock to serve as the master, forcing the source (the PC-based music server) to slave to that clock. This technique, called "Asynchronous Mode," transforms the USB interface into a high-quality interface. Rather than the computer establishing the clock precision (not a good idea for many reasons), the entire audio system is clocked by a high-precision crystal inside the U-Clock. Note that an asynchronous USB interface doesn't automatically confer low-jitter and better sound; it still must be implemented with a high-quality circuit.

Moreover, locating this asynchronous USB interface in a separate chassis (the U-Clock) rather than in the DAC itself has many benefits. First, noise in the PC is isolated from the DAC by the U-Clock. Second, the DAC needn't incorporate another clock running at a frequency unrelated to the audio-based clocks. Multiple clocks running at different frequencies within the same chassis can introduce cross-contamination.

The U-Clock is an apparently simple, yet brilliant, solution to adapting a CD player (the Puccini) to the needs of music-server owners. It solves sonic compromises of the USB interface with state-of-the-art design and implementation in a separate chassis, as well as allowing music-server users to decode files through the Puccini's outstanding DACs.

Although Jonathan covered the Puccini as a CD player in his review, let's recap the machine's highlights. The unit is simply stunning visually, with gracious curves and an unusual surface pattern etched into the shiny aluminum front panel. My only complaint is that the front-panel button markings are small and hard to read, a problem that diminished with familiarity. The drawer mechanism of the Esoteric-sourced transport is all-metal

and operates silently and smoothly. A front-panel display allows the user access to a wide range of controls through an extensive menu system. One of these controls allows the user to select whether and how the signal is upsampled. One option is to convert any resolution PCM (from CD or files from a music server) to DSD before decoding (the other option is PCM-to-PCM upsampling). I found that the PCM-to-DSD conversion sounded the best, and this was the option I used for nearly all my auditioning. The display shows the clocking status via a clever icon of two gears meshing. The Puccini will decode 44.1kHz, 48kHz, 88.2kHz, or 96kHz, all with up to 24-bit word length. Note that it will not decode 176.4kHz (such as Reference Recordings HRx files) or 192kHz.

The rear panel offers both balanced and unbalanced outputs, along with digital inputs and outputs (two each on RCA jacks). A BNC connector accepts the clock signal from the U-Clock. The Puccini has a variable output, enabling it to drive a power amplifier directly. You can select a maximum output level of 2V or 6V; I recommend the 2V setting if you are driving a preamplifier.

The U-Clock matches the Puccini visually, and the two look stunning together. The front panel has just two pushbuttons and three LEDs. The leftmost button and accompanying LED is intriguing, to say the least. Marked "Dither," it modulates the clock edges in a controlled way in an effort to improve sound quality. It's counterintuitive that changing the timing of the clock edges could make the Puccini sound better, but dCS found that this small variation "exercises" the PLL in the Puccini and results in better sound. The modulation is easily filtered by the PLL. You can judge for yourself simply by turning dither on and off. The second button selects the clock frequency, either 44.1kHz (used for 44.1kHz sources and multiples of 44.1kHz, including SACD) and 48kHz (for 48kHz and 96kHz sources).

Puccini/U-Clock  
delivers an enormously  
appealing and involving  
musical presentation



### Listening

I started by listening to the Puccini as a CD and SACD player without benefit of the U-Clock. It was immediately apparent that this was one serious contender for the best digital I'd heard. The sound was immensely appealing, particularly the gorgeous, liquid, and glare-free midrange. The presentation was a bit set-back rather than forward, with tremendous depth, clarity, and transparency. There was also an intangible sense of sonic coherence that manifested itself as a kind of "musical rightness." Whatever the Puccini was doing, it was different from other great digital I've heard.

After getting a general impression of the Puccini itself, I engaged the U-Clock. One little front-panel button-push vaulted what was already a spectacular sound into

entirely new territory. The U-Clock snapped images into sharp(er) focus, increasing the sense of clarity, precision, and definition I had enjoyed from the Puccini alone. The heightened focus had a profound effect on the sense of instruments existing within an acoustic. Without the U-Clock, reverberation tended to be connected to the image itself, as though the image and the hall were merely variations of the same sonic cloth. With the U-Clock, the instrumental image was presented as a clearly defined object existing *within* an acoustic space rather than simply fused to it. The instrument and the surrounding acoustic were presented in a closer facsimile to what we hear it in life.

That was just the beginning of the U-Clock's magic. The Puccini's reproduction of timbre, which already had a bell-like clarity, was taken to a new level by the U-Clock. Timbres had greater palpability and realism, partly the result of less grain and edge (which were already very low) and partly because of greater resolution of textural detail. Similarly, the U-Clock made the Puccini's reproduction of transient information even more lifelike. The leading edges of piano attacks, for example, had a trace of edge that vanished with the U-Clock engaged. Listen, for example, to the wonderful new recording of Vassily Primakov performing Chopin mazurkas on Bridge Records. The U-Clock made the piano more lifelike in transient attack, in richness of tone color, and particularly, in the sense of space surrounding the instrument. I pulled out this CD as a diagnostic tool to listen for specific sonic attributes of the U-Clock but immediately forgot about the sound and listened to the entire disc, completely captivated by the





synthetic gray pall overlaying tone colors, grain and glare embedded in timbres, and a sense of haze or opacity between you and the music. Instruments and voices were vivid and alive, yet the presentation was never forward. In fact, the sound was relaxed and engaging despite the sense of immediacy. Background vocals were revelatory in that I could clearly hear the timbres of individual voices and how they blended into each other. I was also struck by the sheer realism of Neil Young's guitar on some 96kHz/24-bit tracks from *Harvest* sourced from the music server; it had more "guitarness" and less of a mechanical sound than I've heard from this track before. I got the impression of greater density of information, but not in an analytical way. I've heard a number of digital products that sound very clean, precise, and transparent, but those qualities are often accompanied by a mechanical character, a coldness or a stark sterility that doesn't foster musically intimacy. The Puccini/U-Clock's central triumph was the ability to sound super-pristine and precise, yet simultaneously warm and involving.

An analogy that came to mind to describe the Puccini/U-Clock's density of tone color and liquidity of timbre is of two identically colored bed sheets, one made from 600-thread-count cotton and the second made from 400-thread-count material. Put the 400-count sheet through the wash a few times and leave it in the sun for a day. Now compare the two sheets. The 600-thread-count sheet is finer in texture, smoother, and more

continuous. It's also more richly hued and vibrant. The Puccini's rendering of instrumental timbre is like that of the 600-thread-count sheet, while most other digital is analogous to the 400-thread-count sheet.

In addition to this remarkably naturalistic rendering of timbre, the Puccini threw a stunning sense of space and depth, revealing the size of the hall and the spatial relationships between instruments. In addition, the background was jet-black which further highlighted the sense of image tangibility. The pair's exceptional low-level resolution contributed to expansive sound as fine spatial cues in the back of the soundstage were rendered with great clarity. Reverberation decay was stunning in the way it maintained resolution down to the lowest levels, the smoothness of the decay, and the way it seemed to hang in space. This is one area where state-of-the-art modern digital is vastly better than earlier efforts, which truncated reverberation decay and sounded coarser and coarser at lower and lower levels.

compositions and Primakov's expressive performance. Such an experience is always the sign of a great component.

In short, if you own a Puccini the \$4999 U-Clock is an essential upgrade.

The Puccini/U-Clock combination was "plug 'n' play" with regard to the USB interface. I connected a generic USB cable from my fan-less, drive-less PC server to the U-Clock, selected the appropriate input on the Puccini, and the system played back my music files at a variety of sampling rates. I listened to files at 44.1kHz, 88.2kHz, and 96kHz from the server, as well as CDs and SACDs played in the Puccini's transport.

Getting back to the sound of the Puccini/U-Clock combination, I found myself consistently and deeply engaged with the music. The dCS pair had a different presentation than I've heard before from digital that is difficult to describe. The Puccini/U-Clock was distinguished by a pristine clarity of timbre along with a crystalline-like transparency of soundstage. It simply lacked the artifacts we associate with digital, such as a

I found the Puccini/U-Clock highly involving rhythmically. The bass was extremely punchy and dynamic, with a very tight and controlled quality. I heard a dynamic coherence from top-to-bottom, as though the music “gelled,” heightening the feeling of musicians locking into a groove.

There’s one area in which the Puccini/U-Clock significantly distances itself from all competition, and that is in the reproduction of very fine high-frequency transient detail. I was floored by the Puccini’s resolution of micro-detail—think brushes on cymbals, shakers, the zils on a tambourine, gently struck triangles, and güiro. The lower the level and the more transient the nature of the signal, the greater the extent to which the Puccini outshone other digital I’ve heard. Information that was simply blurred by other digital was resolved with pristine and vivid clarity by the Puccini. For example, the triangle on Rachmaninoff’s *Symphonic Dances* had a delicacy that vividly conveyed the mechanism by which the sound was made. It wasn’t just a high-frequency transient, but a pitch accompanied by a strong sense of attack, ringing, and decay. But the track that most dramatically illustrated the Puccini’s unmatched performance in this area is the beginning of “Valentino” by Victor Feldman on the JVC XRC D title *Audiophile* (a compilation of two records made in the 1980s, engineered by the



great Alan Sides). The track starts with a rain stick behind Hubert Laws’ gentle flute passage. I’ve listened to this track countless times over the years, but have never heard the individual beads moving through the rain stick with such startling clarity. I point this out not because I enjoyed this quality for its own sake, but rather to illustrate how the Puccini accurately conveyed very fine transient detail, and how this fidelity fostered a sense of hearing the instrument itself rather than a reproduction of it.

It occurred to me that one reason the Puccini/U-Clock rendered timbres with such realism could be this fabulous resolution of low-level detail, particularly low-level transients. Musical waveforms contain a richness of micro-dynamic structure (a reed moving back and forth, for example); accurately conveying that structure makes instrumental textures and tone colors more lifelike. Although we’re not consciously aware that the timbral realism is derived from this micro-transient information, it’s simply one less cue to the brain that we’re hearing a reproduction rather than the instrument itself.

Although I don’t have nearly as much experience with cutting-edge SACD playback as I have with CD, I thought the Puccini/U-Clock’s rendering of SACD was the best I’ve heard. Interestingly, however, the Puccini/U-Clock’s reproduction of CD was so good that it narrowed the gap I usually hear between CD and SACD.

Finally, you’re probably wondering how the Puccini/U-Clock compares with the other great digital I’ve heard lately, including the Meridian 808.2 and Spectral SDR-4000 Pro CD players, as well as the Berkeley Alpha DAC. Starting with the Alpha DAC, the Berkeley unit was a bit more forward in spatial presentation, presenting the front of the soundstage a little closer to the listener. The Puccini’s bass was leaner and tighter, with the Alpha DAC sounding “bigger” in the bottom end but somewhat less controlled. The Alpha DAC excelled at macro-dynamics with greater impact on timpani strokes, and also with

## SPECS & PRICING

### Puccini CD/SACD player/DAC

Conversion: dCS Ring DAC  
 Sampling frequencies: Up to 96kHz/24-bit  
 Inputs: S/PDIF (x2) on RCA, clock on BNC  
 Outputs: S/PDIF (x2), balanced analog on XLR, unbalanced analog on RCA  
 Dimensions: 18.1" x 4.4" x 15.8"  
 Weight: 26.6 lbs.  
 Price: \$17,999

### U-Clock

Outputs: Clock signal on BNC (x4), S/PDIF on RCA (x2)  
 Inputs: USB  
 Dimensions: 18.1" x 2.3" x 16.1"  
 Weight: 16.7 lbs.  
 Price: \$4999

### DISTRIBUTOR INFORMATION

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a warmer and fuller rendering of bass guitar. As great as the Alpha DAC is, the Puccini/U-Clock combination bested it overall with a smoother rendering of midrange textures, a heightened sense of space, and, particularly, the resolution of transient detail. The Alpha DAC was at a disadvantage in the comparisons in that it was fed from the same music server as the Puccini, but through an AES/EBU interface rather than through the U-Clock that locked the computer to its timing reference. Also, keep in mind that these are two very different products; the Alpha DAC will decode up to 192kHz sources and has no USB input, disc drive, or SACD capability, but costs less than one-quarter the Puccini/U-Clock's price.

The other contenders for the state-of-the-art in digital playback (at least in my experience), the Meridian 808.2 and Spectral SDR-4000 Pro, make an interesting contrast with the Puccini/U-Clock. The Spectral and dCS better the Meridian in resolution of low-level detail, transient fidelity, and bass definition. But the Meridian excels, uniquely, in

its portrayal of dimensionality—the impression of three-dimensional instruments in three-dimensional space. The 808.2 is also remarkable in its reduction of hardness and glare, particularly in poor-sounding CDs. The Spectral's strengths are in its portrayal of soundstage depth and resolution of fine spatial and timbral detail. I thought the Puccini/U-Clock rendered midrange textures with greater warmth and palpability. All four products have their own virtues, and all are contenders for the state of the art.

Finally, you really need to hear the Puccini/U-Clock driving a power amplifier directly to fully appreciate its clarity and resolving power. Even the best preamplifiers shave off some detail and diminish the sense of immediacy and transparency that are the Puccini's hallmarks.

### Conclusion

The dCS Puccini/U-Clock pair is an extremely sophisticated piece of engineering. Rather than working within the limitations of off-the-shelf technology, dCS has developed a number of innovative and advanced technologies to extract the maximum performance from digital media. That effort has paid off in the listening room—the Puccini/U-Clock delivers an enormously appealing and involving musical presentation that is in many ways competitive with the state of the art, and in some aspects establishes a reference-quality level of performance.

The dCS' sound was different from other top contenders I've heard, and I struggled to put that difference, and its effect on musical involvement, into words. But if I had to boil it down to a single idea, it would be that the Puccini/U-Clock simply presents more musical information to the listener without calling attention to the fact that it's presenting more information.

I can't overstate how much I enjoyed music through the Puccini/U-Clock; it was absolutely enthralling on CD, SACD, and high-resolution sources. This is a digital front-end I could live with for the rest of my life. **tas**

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