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THE DIGITAL ISSUE

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DIGITAL RECORD PLAYERS

dCS Scarlatti and Puccini CD/SACD Players

By Jonathan Valin

Photography By Adam Voorhes



dCS Scarlatti and Puccini CD/SACD Players

My colleague, the estimable Robert E. Greene, implies in this issue (see p. 69) that the heyday of analog is finally over thanks to CD DACs like the Benchmark he reviews. For a guy who used to extol Stanton moving-magnet cartridges as state-of-the-art, maybe analog's day in the sun is over—in fact, for REG maybe it never truly dawned. However, isn't it just a little bit disingenuous to claim that vinyl's superiority has been "trumped" and perfect sound forever is now perfected if you thought, as Robert did, that CD was more or less perfect to begin with? Before intoning final rites over the most lifelike playback system the world has yet known, I think it would behoove my pal REG to listen to some of the best record players and cartridges currently on the market—and then some of the best digital. If he does, I guarantee he won't need a double-blind test to hear that they still sound different (albeit less so than they used to). What digital does well—clarity, transients, focus, dynamic range, (some kinds of) lower noise, bass—it still does exceedingly well. What analog does well—timbre, texture, low-level detail, space, air, dimensionality, bloom, treble—it, too, still does exceedingly well.

It used to be that opting for one of these two sets of virtues (digital or analog) kept you from enjoying the other set. You could have the slaw or the fries with your burger, but you couldn't have both. Now, to a certain extent, you can. As with the transistor and the tube (to which these two playback media bear so many striking resemblances), CD/SACD playback and LP playback have gradually moved closer together sonically as each has improved.

It was only a year or two ago, for instance, that the Audio Research Corporation—which seems to make a specialty out of bridging the divide between solid-state and glass audio—sent me its Reference CD7 player, which in several key respects so narrowed the gap between LP and CD playback that it shocked me. What made the CD7 extraordinary wasn't just the way it approximated some of analog's space, bloom, air, and dimensionality, but the way it did this without surrendering (or at least without completely surrendering) digital's superior transient response, dynamic range, bass extension, and clarity. No, the CD7 didn't have the whip-crack attack or journey-to-the-center-of-the-earth bass of a top-line MBL player (or something like the exceptional new Bow Technologies' ZZ-8), but its sound wasn't soft or bland or pre-chewed, either. This wasn't the ersatz tube sound of the throw-a-blanket-over-the-digital-nasties players of yore. It was something new and persuasively lifelike—a CD player that seemed to do some (not all) of the things that up until then only analog rigs could do, and to do them without giving away everything in its own toy chest.

Of course, the Reference CD7 is a hybrid player—virtually a mini-Reference 3 linestage coupled to a Crystal 24-bit DAC and Philips Pro2 transport. From a digital purist's point of view, it was definitely a bit of a kludge job (although it did highlight—for me, at least—the key importance of the analog part of digital-to-analog conversion).

Come now two completely different animals—the \$67k dCS Scarlatti stack (separate transport, DAC, and clock) and the \$20k dCS Puccini (transport, DAC, and clock in one box)—that are unquestionably the work of some of the smartest and most innovative thinkers in digital technology, David Steven, Chris Hales, and Andy McHarg of the British firm dCS. There is nothing kludgy about the Scarlatti or the Puccini; there aren't any glowing filaments in them, either.

For those of you who don't already know it, dCS has long been a pioneer in CD/SACD playback. Under Mike Story, who has now stepped away from the firm, these Brits were the first to develop and implement upconversion (initially, from 16-bit to 24-bit, then from 16/44 to 24/96 and 24/192, and now from PCM to DSD); they were also among the first to address the problem of "jitter" (in a brilliant white paper by Mike Story, parts of which even I could follow, and the entirety of which you can still find on line at www.dCSLtd.co.uk/technical_papers/jitter.pdf).

Though Story, Steven, Hales, McHarg, et al. are world-class engineers, what intrigues me about dCS is the role that close listening plays—and has always played—in the development of its products. For instance, there is some theoretical dispute about the benefits of upsampling PCM to DSD (and about the benefits of upsampling in general); in its literature, dCS concedes this, but points out that—whether the results can be rationalized completely or not—upsampled CDs *sound better*.

Listening to superior math—rather than simply trumpeting it or using it to browbeat the unwashed idjits who have only their poor ears and the love of music to rely on—is damn refreshing. This isn't to say that dCS's math is dependent on the vagaries of comparative listening tests. The Scarlatti, for example, is, by all standard repeatable measures, one of the lowest-distortion, highest-accuracy players money can buy. What it does say—and it says a



dCS Scarlatti and Puccini CD/SACD Players

lot—is that, once dCS gets its math right, the brain trust listens to what those numbers sound like and if there are improvements to be made outside the realm of scientific explanation, it makes them on the basis of what it hears.

I like folks who listen. I also like folks who, if I may be so bold, aren't absolutists, who concede that there is wiggle-room even in the most rigorous science, that all applied math is—to a small, jittery, slightly unpredictable extent—fuzzy math, simply because of all we don't yet know how to quantify. Thus, I was prepared to like the dCS gear, which I'd already heard sound marvelous at various trade shows. What I wasn't prepared for—especially since there wasn't a tube in sight—was how much more of that still-appreciable gap between the virtues of analog and the virtues of digital the Scarlatti and (to a somewhat lesser degree) the Puccini were going to close.

I might as well say it outright: The Scarlatti and Puccini are the best CD players I've yet heard. On really well recorded discs, they can make voices and select instruments sound nearly “fool-you” realistic. I am a little less sanguine about the dCSes' playback of SACD, where I think an argument could be made that the Meitner gear (or, at least, the generation of Meitner gear that I listen to) is competitive. (I will get to this later.) But for the moment let's concentrate on CD.

As much as I like the ARC Reference CD7, the Scarlatti and Puccini outdo it (as well they should, for three-to-eight times the dough) at its own game. And yet it's not really the same game. I could say that, like the CD7, the dCS gear brings the analog virtues of timbre, texture, and spatiality into the digital realm with even less of a sacrifice of digital virtues than the CD7 makes, and that would be true enough. I could also say that, like the CD7, the dCS Scarlatti and Puccini are dead-center neutral in tonal balance, without a trace of digital darkness, and airier on top than any other CD players I've ever heard (although still not as airy and easy as vinyl), and that would also be true. I could even say that when you listen to performers like Captain Luke singing “Rainy Night in Georgia” or Guitar Gabriel performing “Keys to the Highway” on *Came So Far* [MusicMakers], their voices and guitars, which have always sounded exceptionally well recorded, suddenly sound as if they aren't recorded at all, as if they are there in the room with you. Yet even that doesn't adequately explain how different CDs sound through the Scarlatti and Puccini.

It is not just that much more low-level information about timbre, texture, air, and space is being resolved (although it is); it is the sheer *audible density* of this information, the way it adds up to a less fragmentary, more complete presentation of music and music-makers, and the effect this more “holistic” presentation has on the way you listen to CDs, that are so profoundly new (and better). Perhaps the best way to describe these improvements (particularly to an analog hound) is to say that when you listen to CDs



through these dCS components you listen in *almost* exactly the same way that you do to LPs through a great record player: You listen to the recording rather than the player—i.e., you're not constantly second-guessing the vagaries of the medium. Part of the reason that the dCSes are so much more transparent to sources and easy to listen to is that they aren't thrusting individual details in your face like an overly edge-enhanced DVD; instead, details are being subsumed into musical wholes, which are made that much more lifelike by this addition. Indeed, after spending some time with the dCS duo it seemed to me that a lot of what we used to hear on CD as “great detail” was, in fact, *the absence of other details*, that the denser the information being presented to the ear, the less isolate-able its individual bits are—rather in the same way that the greater density of information in a Blu-ray picture looks smoother, more fully integrated, more holistic, and hence more realistic to the eye than DVD (no matter how enhanced).

Greater realism is absolutely the key that sets the Scarlatti and Puccini apart from every other CD player I've heard in my home (although I haven't heard the latest MBL gear, yet). It may not seem strange to you, but it does seem strange to me to be talking about how close to the absolute sound a CD player comes, because I never really thought CDs came close all that often compared to the best vinyl. Oh, I thought they sounded “good” or “exciting,” even “beautiful” and “thrilling” on occasions. But real? Real like,



oh, parts of *The Firebird* on a plum-label Mercury or the piano and other percussion on Reiner Bredemeyer's "Schlagstück 5" on Nova? Seldom.

The Scarlatti and Puccini have changed that. From single voices and simple instrumentation like the Captain Luke and Guitar Gabriel cuts mentioned above or Dean Martin playing the part of a charming, crooning drunk on *Summit: In Concert* [Artanis], to huge orchestras like the plethora of studio musicians on the soundtrack of Hans Zimmer's bumptious-but-fun *Pirates of the Caribbean* [Disney], this dCS duo is capable of making music and music-makers sound "there in the room with you." Paradoxically, the higher level of realism it elicits from great discs affects the way you hear less-than-stellar ones. Now, they don't just sound "bad"; they sound bad *because* they sound "less real." (I couldn't honestly say that—or think that—before, because I didn't feel that CDs came near enough to the sound absolute to be judged as "real" or "less real." All of them were "less real.")

Where, you may be asking, is all of the dCSes' added density of information coming from? Bits is bits, ain't they? Well, apparently not, at least not until after they're been retrieved from a CD by the Scarlatti's drive (which uses Esoteric's top-of-the-line VRDS Neo mechanism with dCS's own proprietary control board), properly timed to remove jittery artifacts or add dithery ones via the temperature-compensated VCXOs (voltage-controlled crystal oscillators) in the Scarlatti's Master Clock (for the importance of a highly accurate clock, see Robert Harley's review of the Esoteric G-ORb in Issue 180), and then upsampled from multibit PCM to

THE DCS "RING" DAC

At the heart of the Scarlatti and the Puccini is dCS's patented Ring DAC, which isn't really a ring but sort of acts like one. Here, in so far as I understand it, is how it works.

In conventional multibit DACs, a specific-value resistor is tied to the current source for each bit. Starting with the Most Significant Bit (MSB), each of these resistors has to be *precisely* half the value of the preceding resistor in order for a multibit word to be translated accurately. With a 24-bit DAC, this means that the resistors for the less significant bits are *extremely* small values. (According to dCS, the theoretically correct value of the last resistor for the least significant bit in a 24-bit DAC is 0.000000119209289550781 of the first.) Because it is commercially and physically impossible to produce such resistors with anything like the accuracy necessary for truly linear response, all multibit DACs distort the signal somewhat. According to dCS, "this distortion becomes greater as you move from more significant bits to less significant (loud stuff to background detail). Typically, somewhere around the 20th bit the ability to resolve any additional detail is lost."

Contrarily, with single-bit players (such as Delta/Sigma CD players and DSD players), the resistor problem is eliminated and linearity is high. However, "the signal-to-noise ratio is awful (6dB)." This problem can be ameliorated by noise-shifting and oversampling. But, once again according to dCS, when high oversampling frequencies are used, "timing errors become significant, jitter increases, and the end result is the same" as it is with multi-bit DACs: a loss of linearity and low-level resolution.

The Ring DAC was dCS's ingenious solution to both of these problems. It is a five-bit "unitary" design ("unitary" here means that it uses resistors that are the same value for each of the current sources for its five bits). Because it uses the same value resistors for its current sources, the resistor-matching problem of multibit DACs is solved. And since it is a five-bit DAC, signal-to-noise ratio starts off being considerably better than it is with a single-bit DAC, and the noise-shaping necessary to raise it even higher is orders of magnitude less than it is with a single-bit DAC (and, ergo, potentially much less damaging).

However, that is not all there is to the Ring DAC. Since you can encounter small variations in even the same value resistors and since time and temperature can also change these values, dCS doesn't just use one resistor of the same value per bit but a large *array of resistors* of the same value. From sample to sample the signal is channeled randomly "around" the resistors in this array, as if it were being passed around a circle (or ring). Thus, the inevitable small variations in even the same value resistors are "evened out" or, to use dCS's words, "randomly distributed throughout the quantizing range... effectively turn[ing] any tolerance errors into random white noise, which is far more benign than the distortion that would otherwise have occurred." I'm not technical enough to say for sure whether the dCS Ring DAC is the reason for the added "density of information" I hear on CDs and SACDs via the Scarlatti and Puccini. What I can say for sure is there *is* added density of information and that, according to dCS, such low-level details are precisely what the Ring DAC is supposed to resolve. **JV**

dCS Scarlatti and Puccini CD/SACD Players

DSD and converted to “Ring DAC” format (five-bit DSD at approximately 2.8MHz) via the latest and greatest version of dCS’s famous Ring DAC. (The Puccini does virtually the same thing, albeit with a less expensive Esoteric drive and other budget-cutting compromises, although its Ring DAC is identical to the one in the Scarlatti.)

As Mike Story deftly puts it, in the white paper I referred you to above, a “digital system uses two bits of information—the signal was *this* big at *this* instant—and does subsequent math on them” to turn numbers into sounds. Apparently there is enough slop in the usual digital-to-analog conversion of these “two bits of information” about amplitude and time from sample to sample to make a world of difference in their translation into sound waves. (From my perspective as an editor, this makes perfect sense as the change of a single letter in a long paragraph can make a huge and fateful difference in its meaning—consider, for example, the “Beloved Aunt” episode from Larry David’s *Curb Your Enthusiasm*, where the alteration of what seems like a Least Significant Bit causes hilarious havoc.)

Given the wonders that dCS’s upsampling Ring DAC is capable of with relatively low-res 16/44 CDs, you would think that inherently higher-resolution SACDs would be far more wonderful. But while SACDs are unquestionably superior, I haven’t found the difference between them and CDs to be mind-boggling via the dCSes, and I think I know why. Going from CDs to SACDs amount to a gigantic leap in playback realism via lesser players, which claim to handle both CD and SACD equally well; with the Scarlatti and

SETTING UP THE SCARLATTI AND PUCCINI

There really isn’t much to comment on here, because setup is straightforward and the instruction manual is in real English (actually, English English) and profusely illustrated. Plus, the Scarlatti and the Puccini rather take care of themselves once they’re hooked up to preamps or directly to amps. (Each has its own remote-controllable volume and balance controls.) If you plan to use DSD upsampling with your Scarlatti, you will need to connect the DAC to the Transport via a Firewire (IEEE1394) cable. The Scarlatti’s Master Clock is also hooked to the Transport via a 75-ohm BNC cable. In both instance, higher-grade cables pay audible dividends.

One of the little curiosities about these oh-so-exactly-computed products is the amount of “play” that is built into both (reflecting, as I note in the review, the role that actual listening has in the design of dCS gear). For instance, dCS gives you the option of choosing between four filters in DSD mode (the mode I strongly endorse with CD and, of course, SACD), which progressively reduce out-of-audio-band noise levels at the price of bandwidth. I preferred Filter 1, which offers the highest bandwidth (and the most out-of-audio-band noise). The Master Clock also gives you the option of adding a bit of dither. Dithering a clock seems a little counter-intuitive to me, but the results are interesting: You gain a little focus, a little padding of air around voices with dither on, but you lose a little bloom and immediacy. I couldn’t decide which I preferred, although I generally left the dither off. **JV**

SPECS & PRICES

Scarlatti Transport

Digital outputs: Two IEEE 1394; two AES/EBU on XLR; two SPDIF (one on RCA phono, one on BNC); one TosLink; one SDIF-2 interface on BNCs)
Dimensions: 20" x 16.7" x 5.3"
Weight: 43.2 lbs.
Price: \$32,999

Scarlatti DAC

Analog outputs: One balanced stereo pair on XLR; one unbalanced stereo pair on RCA
Digital inputs: Two IEEE 1394; two AES/EBU on XLR; three SPDIF (two on RCA, one on BNC); one TosLink; one SDIF-2 on BNC
Dimensions: 18" x 15.9" x 2.9"
Weight: 24.9 lbs.
Price: \$23,999

Scarlatti Clock

Outputs: Eight on 75-ohm BNC
Dimensions: 18" x 15.9" x 2.9"
Weight: 21.6 lbs.
Price: \$10,999

Puccini

Type: Single-box, upsampling CD/SACD player
PCM digital inputs: Two SPDIF on RCA
PCM digital outputs: Two SPDIF on RCA
Clock I/O: one each on BNC
Analog outputs: One balanced pair on XLR; one unbalanced pair on RCA
Dimensions: 18" x 16.5" x 4.4"
Weight: 26.6 lbs.
Price: \$19,995

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JV’s Reference System

Loudspeakers: Magico Mini II, Symposium Acoustics Panorama, MBL 101 E
Linestage preamps: Audio Research Reference 3, Audio Space Reference 2, MBL 6010 D
Phonostage preamps: Audio Research PH-7, Lamm Industries LP-2 Deluxe
Power amplifiers: Audio Research Reference 610T, MBL 9008, Lamm ML-2

Analog source: Walker Audio Proscenium Black Diamond record player, Da Vinci Gabriel turntable/Da Vinci Grandeeza tonearm, TW Acoustic Raven AC-3/Graham Phantom and Dyanvector 507 MkII tonearm
Phono cartridges: Air Tight PC-1, Clearaudio Goldfinger v2
Digital source: ARC Reference CD7
Cable and interconnect: Tara Labs “Zero” Gold interconnect, Tara Labs “Omega” Gold speaker cable, Tara Labs “The One” Cobalt power cords, Synergistic Research Absolute Reference speakers cables and interconnects
Accessories: Shakti Hallographs (6), Walker Prologue Reference equipment stand, Walker Prologue amp stands, Symposium Acoustics Isis equipment stand, Richard Gray Power Company 600S/Pole Pig line/power conditioner, Shunyata Research Hydra V-Ray power distributor and Anaconda Helix Alpha/VX power cables, Cable Elevators Plus, Walker Valid Points and Resonance Control discs, Winds Arm Load meter, Clearaudio Double Matrix record cleaner, HiFi-Tuning silver/gold fuses

dCS Scarlatti and Puccini CD/SACD Players

Puccini, which actually *do* handle both mediums superbly, moving from CD-upsampled-to-DSD to actual DSD may strike you, as it does me, as less of a dramatic improvement. This isn't to say that SACD playback isn't quite a bit better. On SACDs (with both the Scarlatti and the Puccini), you will hear more air around instruments (particularly in the treble); you will gain hall ambience, increasing the sense of separation between instruments and the surrounding acoustic and improving stage width and depth (though not to an LP-like extent); you will get some added snap on transients, more delicacy of timbre and texture, a hint of bloom and dimensionality (though still nothing like that of LP), a bit more image focus, which increases the individuation of instruments at the sides and back of the hall, and considerably more ease and extension in the top octaves. Everything will seem just a bit more distinct, a bit better defined, a bit more tightly and more incisively focused than the fatter, slacker, more rounded presentation of CD. The Scarlatti and Puccini's dead-center neutral tonal balance remains dead centered.

What is just as interesting as what you gain with SACD is what you don't *lose* (with either player), which is the critical impression that all this added information is being integrated into a less analytical, more holistic, more lifelike presentation of instrumentalists.

Now, I can see where some people might not go for the dCSes' holistic sound on SACD—might prefer to hear their detail raw and undigested, as it were. After all, what good is a higher-resolution

format if you can't hear more stuff served up on a platter? Well, putting aside the difference between quantities and qualities, it's not as if you're not getting "stuff" with the dCS. (You're actually getting *more* information; the individual details just aren't being highlighted.) *But* if you're the kind of guy who turns the "sharpness" control up on your video display (even though you know you shouldn't) and if you tend to favor a slightly more analytic, more solid-state, less "analog" presentation on CD (and I consider this a reasonable preference), then you may prefer something like the Meitner gear to the Scarlatti or the Puccini (on SACD—not, by any stretch of the imagination, on CD). All I can say is that I don't.

Well, there you have it: the best digital sources I've yet heard. No, the Scarlatti and the Puccini don't do depth and dimensionality and air and bloom and timbre and texture with *all* the delicacy of LP, but they do every one of these things (and their own choice things) well enough to make vocalists and instrumentalists on first-rate CDs and SACDs sound "in-the-room-with-you realistic" more often, more consistently, and much more persuasively than any other CD/SACD players I've heard—almost as often and almost as convincingly as the best vinyl playback. The nearly-\$70k Scarlatti does these things better than the \$20k Puccini, but the less expensive single-box unit certainly will not disappoint.

These are great, standard-setting components, and if I had the dough I'd most certainly buy them. (And when's the last time you heard me say that about anything digital?) **TAS**