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Primare CD31

CD PLAYER

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Primare CD31 CD player

DESCRIPTION Integrated CD player. D/A conversion: 8x-oversampling, 4 Burr-Brown PCM1704 K 24-bit/96kHz D/A converter chips. Digital filter: Burr-Brown DF1704 24-bit/96kHz. Output level: fixed, 2.0V unbalanced, 4.0V balanced. THD+noise: 0.01%, 20Hz–20kHz. Output impedance: 100 ohms. Frequency response: 20Hz–20kHz, +0/–0.5dB. Signal/noise: 105dB, A-weighted. Outputs, analog: 1 pair unbalanced (RCA), 1 pair balanced (XLR). Outputs, digital: 75 ohm S/PDIF (RCA), 110 ohm AES/EBU (XLR), optical. Inputs: RS-232, Primare intercomponent data link. Power consumption: 34W standby.

DIMENSIONS 17" (430mm) W by 4" (100mm) H by 15" (385mm) D. Weight: 24 lbs (11kg).

FINISHES Black, Titanium.

SERIAL NUMBER OF UNIT REVIEWED
954-103.

PRICE \$2295. Approximate number of dealers: 50. Warranty: 3 years, nontransferable.

MANUFACTURER Primare Systems, Renvägen 1, SE-352 45 Växjö, Sweden. Fax: (46) (0)470-72-98-25. Web: www.primaresystems.com. US distributor: Sumiko, 2431 Fifth Street, Berkeley, CA 94710. Tel: (510) 843-4500. Fax: (510) 843-7120. Web: www.sumikoaudio.net.

At \$2295, the CD31 is the most expensive integrated CD player from Swedish manufacturer Primare, and an evolution of their D30.2, which I reviewed in the June 2004 *Stereophile*. I knew that the CD31 wasn't a clean-sheet design, but my first look suggested that it wasn't even much of an evolution—a comparison of its and the D30.2's spec sheets matched almost line for line. When I asked Terry Medalen of Sumiko, Primare's US distributor, about the similarity, and if the CD31 was just a mild tweaking of the D30.2, he said, "Well, yes and no. You really need to listen to it."

So what's the big deal?

The most obvious change from the Primare D30.2 to the CD31 is visual. The difference isn't dramatic, but enough to make the CD31 look fresh and modern by comparison, with an overall effect that's stereotypically Scandinavian: spare, clean lines, with a rounded glass inset that nicely echoes the rounded knobs and buttons used in all Primare products. The second major difference is under the skin: the CD31 uses a DVS DSL-710A "ultra-silent" transport mechanism instead of the D30.2's stock OEM Sony device. The CD31 also has optical and AES/EBU digital outputs in addition to the Toslink S/PDIF, and replaces the D30.2's Fixed Power switch—which kept that player's analog circuitry warmed up—with a Power switch in the AC cord receptacle. While the CD31 keeps more of its circuitry warmed up than did the D30.2, its front-panel On/Off button, like the earlier player's, toggles between Standby and Operate.

The CD31's basic circuitry is much like the D30.2's. The S/PDIF signal moves from the transport to a DIR1703 digital receiver and two Burr-Brown PCM1704-K D/A converters per channel, resulting in a true balanced analog signal. Each component of the signal goes through a Burr-Brown OPA2134 op-amp for voltage-to-current conversion,

then finally to the output stage, which uses an active current source to drive matched discrete MOSFETs. According to Medalen, the differences are in the details and optimization, and he suggested I take a close look under the CD31's cover. "We put a lot of effort into the power supply," he said, "adding storage throughout the circuits, and keeping the paths between storage and delivery as short as possible."

Sure enough, the CD31's main circuit board looked like Nebraska farmland, with silo-like clusters of capacitors liberally scattered across the plain—something like 140 caps, according to my casual count. This is in addition to Primare's basic CD-player architecture, in which each circuit block has its own thirteenfold filtered power supply, actively regulated in the case of the analog output stage. Medalen summed it up: "The new transport is much quieter and more stable, so it gives us more information to work with. The circuit and power-supply modifications allow you to use this, and to translate the information into better resolution of subtle nuances."

System—but does it really matter? Since my review in 2004 of the D30.2, every aspect of my system has changed. I've built a dedicated listening room, brought in gear from Halcro, VTL, and Wilson, and upgraded my analog setup. Along the way, I'd also heard a few truly stellar digital front-ends, SACD as well as CD. On one hand, the CD31 had a great environment in which to shine. On the other, my frame of reference, and hence my standards, has been significantly upgraded in the past three years, and I've become especially attuned to how subtle performance nuances distinguish sublime components from the merely excellent.

Listening

I began my serious listening sessions with the Nylons' *One Size Fits All* (Open 'Air OD-0301). The CD31 was well balanced and true to the music, and had no distracting quirks or "listen-to-me" audiophile traits. As I'd found with the D30.2, the CD31's tonal balance was slightly warm, though not enough to draw attention to

the upper bass and lower midrange. The Nylons, and male vocalists in general, simply had slightly richer timbres, and images—*ie*, my sense of a chest behind each voice—were more solid and obvious.

Ambience cues, whether real or mixed in, were wonderfully portrayed—another strength that the CD31 shared with its predecessor. In the case of the Nylons disc, the church-like echo surrounding the vocals was rich and thick. On a different disc, *Together at the Bluebird Café*, with Steve Earle, Townes Van Zandt, and Guy Clark (Snapper Classics SDPCD161), I noticed how well the CD31 made my listening room melt away, leaving the performers and original venue. I've found that the very best digital systems—in particular, SACD setups—do this, but the Primare re-created the recording space in a way and to an extent that usually occurs only with vinyl.

The CD31's natural, vinyl-like feel also showed up in its reproduction of inner detail. The tonal and temporal characteristics that distinguish an individual instrument or voice were clearly identifiable,

MEASUREMENTS

From its unbalanced jacks, the Primare CD31's maximum output level at 1kHz was 2.086V, just 0.37dB higher than the CD standard's 2V. As expected, the balanced output was exactly twice the unbalanced value, at 4.173V. Both outputs were absolute-polarity correct; *ie*, non-inverting (the XLRs are wired with pin 2 hot, the AES standard). The output impedance was a low 100 ohms across the audioband from the unbalanced jacks and, again as expected, exactly twice that figure from the balanced jacks. Error correction was superb, the CD31 suffering no audible glitches in its output until the gap in the data spiral on the Pierre Verany Test CD reached an astonishing 2.5mm in length. Surprisingly, the error flag in the digital data output was not set when the player's output muted with a gap this long.

The CD31's frequency response was perfectly flat (fig. 1, top pair of traces), and identical from the balanced and

unbalanced outputs. The response error with pre-empha-

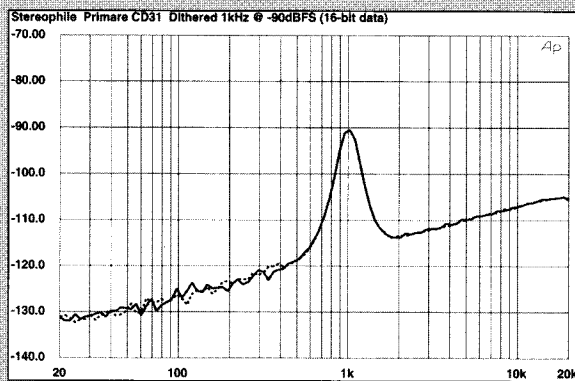


Fig.2 Primare CD31, 1/2-octave spectrum with noise and spurs of dithered 1kHz tone at -90dBFS (right channel dashed).

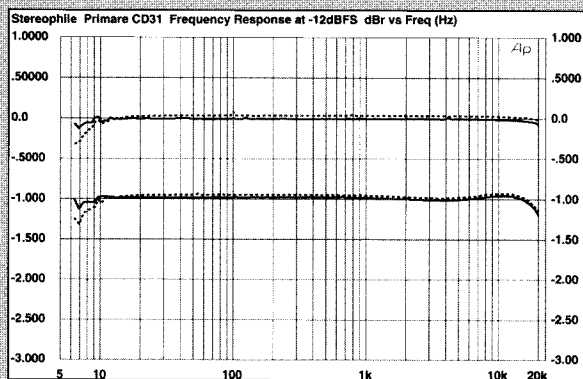


Fig.1 Primare CD31, frequency response at -12dBFS into 100k ohms without (top) and with (bottom) de-emphasis (right channel dashed, 0.5dB/vertical div.).

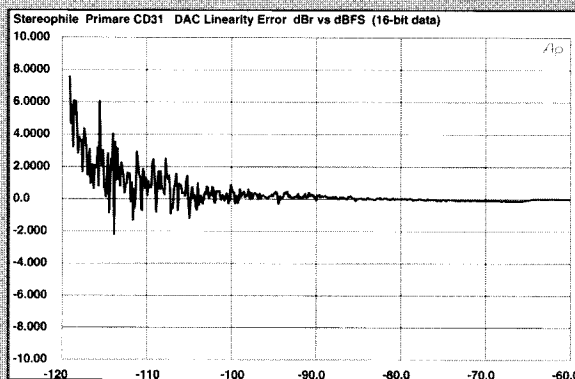


Fig.3 Primare CD31, left-channel departure from linearity, 16-bit data (2dB/vertical div.).

but not in the audiophile sense of being individually polished and separately displayed. The Primare integrated these nuances into a coherent whole in which the detail wasn't about the audibility of chairs squeaking and people coughing backstage, but about the subtle nuances of a particular musician's style.

The impression I had from early, casual listening was that the Primare lacked focus, but after listening to a series of natural recordings made in venues of different size, I concluded that its focus was just fine. Individual instruments in an orchestra, or images of a vocalist on a stage, weren't at all blurred or indistinct. What I was hearing was the absence of the razor-sharp edge definition and stark spaces that can be so spectacular in small doses. One great example of how the CD31 combined detail and coherence occurs at the opening of "Pancho and Lefty." Townes Van Zandt's guitar begins, someone in the audience claps, Van Zandt begins to sing, and then applause erupts more widely. Each successive component had the presence and

dimensionality to solidly pop into the three-dimensional space, but each was itself a cohesive image, and all merged perfectly into the single surrounding space.

When I looked back through my review of the D30.2 and my listening notes from that period, I found that much of what I wrote applies to the CD31 as well. The "clarity and openness to the D30.2's sound that made other players sound overstated or forced in comparison" was equally present in the CD31. Both had "a natural ease, and a beguiling sweetness through the midrange," though these extended further toward the frequency extremes with the CD31. My description of the D30.2 as "pure and natural," with excellent transparency, clarity, and low distortion, applies equally to the CD31. On the other hand, the new player didn't have the D30.2's softened upper midrange or slightly recessed soundstage.

My take on the CD31's dynamic performance was also similar to what I'd heard with the D30.2—lively and quick but with slightly softened dynamic transients, and lacking the transient precision

of the very best cost-no-object players. I suspect that the CD31 was noticeably faster and more dynamic than its predecessor, but it still softened the fastest transients. The CD31's bottom end was powerful and articulate, with excellent pitch definition. Orchestras were solidly grounded and floated realistically above the low-frequency foundation—but I wouldn't describe the CD31's bass performance as "seismic" or "window-rattling," as I did its predecessor's. One caveat is that the D30.2 was in a system driving Thiel CS6 speakers sitting on a suspended wood floor; my current setup uses Wilson Audio Sophia 2s on concrete.

What the CD31 did do that the D30.2 never quite managed was cross the line from being very good to being truly sublime. This realization hit me one morning as the CD31 was spinning the Warren Zevon tribute album, *Enjoy Every Sandwich* (Artemis ATM-CD-51581). Listening to Jackson Browne and Bonnie Raitt's cover of "Poor Poor Pitiful Me," I found myself completely drawn into the music, and captivated by Browne's

sized data (fig.1, bottom traces) was negligible, though a slight top-octave boost is evident. Channel separation was superb, at better than 100dB below 1kHz, though this did decrease to a good 77dB at 20kHz due to the usual capacitive coupling (not shown).

Playing back data representing a dithered 1kHz tone at -90dBFS and sweeping a ½-octave-wide bandpass filter from a center frequency of 20kHz to one of 10Hz gave the spectral analysis shown in fig.2. No harmonic or power-supply spurious can be seen, and the noise floor in this graph is actually that of the dither noise recorded on the test CD. Repeating the analysis with a "digital black" signal and a 200kHz bandwidth (not shown) indicated that the CD31 has very low analog noise. Though this graph did unmask a power-supply component at 120Hz, at a level of -130dBFS this will be of zero concern, even to the keenest-eared audiophile!

Testing the Primare player's linearity error with a

dithered 500Hz tone swept from -60dBFS to -120dBFS really shows only the effect of the dither noise (fig.3). The CD31's own noise is so low in level, and its linearity sufficiently good, that its playback of an undithered 1kHz tone at exactly -90.31dBFS was textbook in its symmetry and in its representation of the three DC voltage levels described by the data (fig.4).

The Primare CD31 was similarly superb when it came to distortion. Fig.5 shows an FFT-derived spectrum of its unbalanced output while it reproduced a full-scale 1kHz tone into a fairly low 8k ohm load. The THD (true sum of the harmonics) was 0.0011% in both channels, with the second harmonic the highest in level at -100dBFS. Higher harmonics are all lower in level, though a trace of fifth harmonic made an appearance in the right channel only (circled in red). The distortion didn't rise when I reduced the load to just 600 ohms, suggesting that the CD31 will not be fazed by any load it will see. Intermodulation dis-

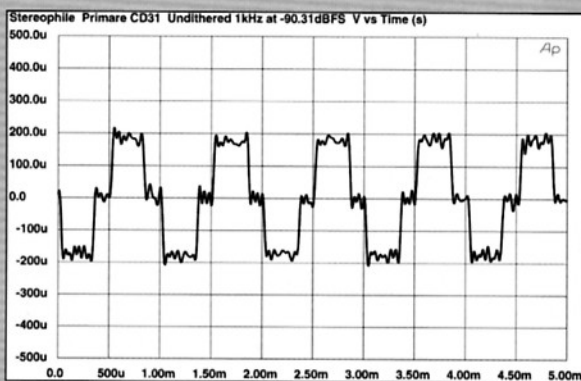


Fig.4 Primare CD31, waveform of undithered 1kHz sinewave at -90.31dBFS, 16-bit data.

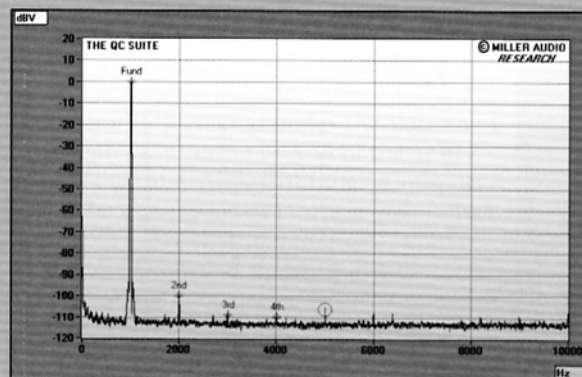


Fig.5 Primare CD31, spectrum of 1kHz sinewave at 0dBFS into 8k ohms, unbalanced (linear frequency scale).

voice. It had an uncanny palpability and richness of detail, and an electric presence that was simultaneously natural and unforced. A light bulb lit up over my head—the CD31 was combining the subtleties and nuances of Browne's voice in exactly the right way to let me hear *through* the recording, to experience the feeling and emotion of the performance.

As I absorbed this realization, I remembered Browne's album of a few years ago, *The Naked Ride Home*, which I recalled as sounding pretty ordinary, with nowhere near this kind of presence. I popped it into the CD31, hit Play, and it was apparent within the first few notes that here, too, I was experiencing a kind of open window on and direct connection to the original performance. A few hours later, I looked at my forgotten list of the day's chores and scribbled in my notes that the Primare CD31 had "that little extra something that makes me ignore the world and remain in the listening room." The CD31's performance was beyond "good," "very good," "really good for the money," or even "excellent"—it was *sublime*.

The connection I felt with the Jackson Browne performances was re-created over and over in the next several weeks, as I worked through a variety of recordings. The CD31 didn't create a sense of realism where there was none, and never imbued the sound with any sort of hi-fi hyper-reality. Indiffer-

ASSOCIATED EQUIPMENT

ANALOG SOURCE VPI HR-X turntable & tonearm, Lyra Titan cartridge.

PREAMPLIFICATION Sutherland PhD phono stage; Sutherland Direct, Placette Active, VTL TL-7.5 Series 2 line stages.

POWER AMPLIFIERS VTL Ichiban & S-400, Halcro dm58 & dm88.

LOUDSPEAKERS Wilson Audio Specialties Sophia 2.

CABLES Interconnects & speaker: Stereovox, Shunyata Research, Nordost. AC: Audience, Shunyata Research.

ACCESSORIES Audience AdeptResponse, Shunyata Research Hydra power conditioners; Finite Elemente Reference equipment stand, Cera-ball equipment footers; Nordost ECO3, Disc Doctor, Audience Auric Illuminator CD cleaning/treatment systems; Wally Phono Tools; VPI HW-16.5 record-cleaning machine & fluid; Lyra SPT stylus cleaner; Echo Busters room-treatment devices.

—Brian Damkroger

ent recordings usually sounded boring and bad ones often unlistenable, but with well-done recordings of any scale, the CD31 was magic. I could easily have been convinced that I was listening to some over-the-top, multi-box system instead of an unimposing \$2295 integrated player. In fact, most of my guests did assume that they were listening to one of the my more spectacular players—or even a record—rather than the Primare. Every one of those visitors immediately sat down and began requesting favorite discs.

Summing up

Primare's CD31 isn't a perfect CD player. It's not absolutely neutral, instead superimposing a slightly warm, slightly soft charac-

ter on the sound. Nor is it completely transparent. It doesn't totally "vanish," as do such components as the VTL TL-7.5 line stage or the Halcro dm88 amplifiers. The CD31 "disappears" in a different way, conjuring up an open window on the original performance. It combines detail resolution, timing, harmonic structure—all of the components we use to describe a component's sound—in a mix in which subtleties and nuances are reproduced in just the right way. The CD31's reasonable price is almost irrelevant in light of its performance, but profound in that it makes that performance available to many more people than is usually the case. The CD31 isn't perfect—but it's sublime. ■

measurements, continued

tion was also superbly low in level, even into demanding loads (fig.6).

As always with CD players, my final test was to examine the Primare's analog output for evidence of word-clock jitter, using the Miller Jitter Analyzer and a special test signal comprising a high-level sinewave at 11.025kHz and a low-level squarewave at 229.6875Hz. (Both tones are exact integer submultiples of the sample frequency, meaning that any spurious in the player's output will not be due to quantizing errors.) The jitter level was a low 239 picosec-

onds peak-peak, with most of the jitter coming from a pair of sidebands at 11.025kHz, ± 229.6875 Hz (fig.7, red "4" markers); and another at ± 15.1 Hz (purple "1"). This is excellent performance.

Overall—and in common with some other players recently reviewed in *Stereophile*, from Linn, Naim, Simaudio, and Nagra—Primare's CD31 offers state-of-the-art "Red Book" CD performance. —John Atkinson

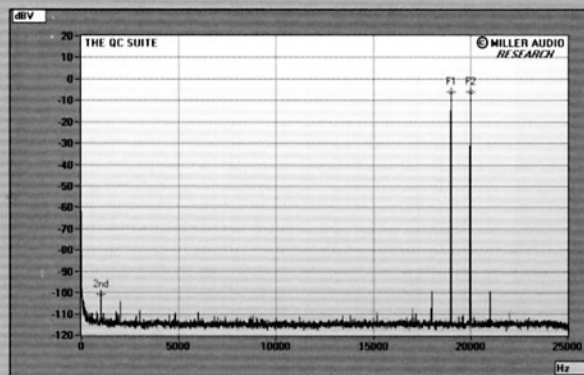


Fig.6 Primare CD31, HF intermodulation spectrum, 19+20kHz at 0dBFS peak into 8k ohms, unbalanced (linear frequency scale).

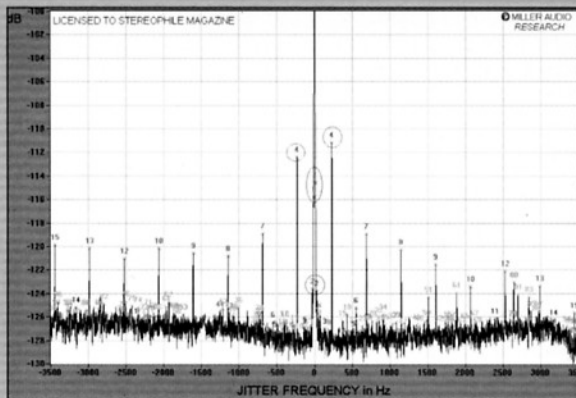


Fig.7 Primare CD31, high-resolution jitter spectrum of analog output signal (11.025kHz at -6dBFS, sampled at 44.1kHz with LSB toggled at 229Hz), 16-bit CD data. Center frequency of trace, 11.025kHz; frequency range, ± 3.5 kHz.