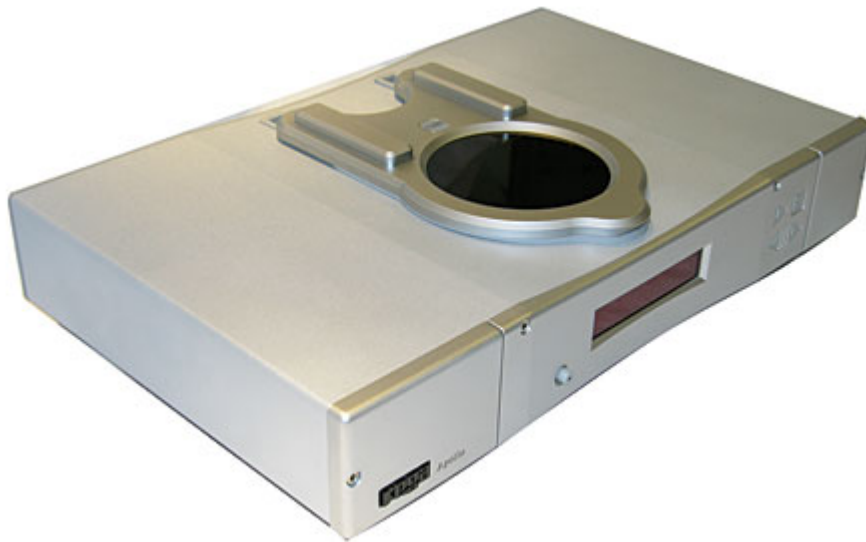


Rega Apollo CD player

Art Dudley, June, 2006

You've heard it said that the early bird catches the worm, which is all well and good if you like worms. If you're more interested in music, you might want to follow the lead of Roy Gandy instead: He's the managing director of Rega Research, a 33¹/₃-year-old audio company that was the very *last* of its kind to enter the CD market. Rega's first CD player, the Planet of 1996, was a success in virtually every way.



The world has moved on since then, for better and for worse: better in the sense that digital sound has continued to improve, worse in the sense that the major corporations with the technology for making integrated digital control systems—the basic servo and data-control chipsets—have shifted their focus toward DVD and away from the humble music-only compact disc. That state of affairs has prompted Gandy and company to tap a different technology source, and to launch an entirely new player: the \$995 Rega Apollo.

As Gandy puts it, "If we go back three years, that's when 'the big five' stopped supplying kit to specialist manufacturers. And all of them rely on chipsets or transports or whatever from Sony, Philips, and the rest. Around the same time, CD-player sales were decreasing. So Rega got together with two other specialist manufacturers in the UK, and we eventually found a company near Cambridge that had foreseen this hole in the market, with all the Japanese companies pulling out. They predicted, correctly, that a number of people would continue to want to make boomboxes in China, so they developed their own chipsets, and not just the software."

Gandy can't name the UK company in question—his relationship with them involves a confidentiality agreement—but he says that both they and Rega stand to benefit.

"We agreed to work with them at the debugging stage, to help work out various problems—which their Chinese clients are in less [of] a position to do—and in exchange Rega gets to buy chipsets in small quantities."

Small in amount—but hardly small in power. Gandy says that the Apollo incorporates more than 20MB of memory, along with true 32-bit processing capabilities. That's several times the power of early digital control systems, and Gandy suggests that this newer level of technology was needed all along to attain the performance goals set for "Red Book" digital playback in the first place. "This isn't at all like working with the *old* CD chipsets," he says. "For the first time, we've got a CD operating mechanism that is so good, all we've had to do is avoid messing it up. Now, for example, we can design a better power supply and it makes the player better instead of worse: We don't have to worry that we're taking out something that was masking a flaw."

From puck to chuck

The Apollo is built into the same casework as the Rega Planet, with one key difference: The new player's transport holds the disc with a three-point ball chuck instead of a magnetic puck. That means the motor has less mass to spin, so the disc can accelerate and decelerate with greater ease. It also means that Rega's already elegant transport lid is now a single, undisturbed expanse of smoked Plexiglas—which looks very nice indeed.

The Apollo's transport, manufactured by Sanyo, is compliantly suspended from the upper portion of Rega's standard chassis of cast aluminum alloy. The D/A converter is Wolfson's top-of-the-line WM8740, a dual-differential chip that operates in sigma-delta mode and supports word lengths of up to 24 bits. The output section, which is said to apply class-A amplification to a digital source component in an entirely new way, is Rega's own design.

Apart from all that, the Apollo is a straightforward thing, with a front-mounted board for the logic bits and a single main circuit board for all the rest, fastened to the bottom of the chassis alongside the smallish toroidal mains transformer. RCA and optical digital output jacks are on the rear panel for those who wish to use an outboard DAC, as well as the usual pair of phono jacks for line-level analog output. In addition to the mains switch, the front panel has only the most basic start, stop, and track-advance buttons, while those and a full brace of other user controls appear on the nicely styled remote handset—including a button that can be used to kill the display lights. To jump ahead just a bit: As with the same feature on recent CD players from Naim Audio, that last one really did make an audible difference for the better; all of my comments on sound quality below refer to the Apollo's performance with its display dark.

As far as the control interface is concerned, the Apollo provides only one small surprise: After a disc is loaded and the transport door closes, the player doesn't respond to further user input for about eight seconds, during which time "INITIALISING" (spelled, or rather *spelt*, just so) remained on the display. I could, and often did, press the start button repeatedly, but the Apollo ignored me until *it* was ready. The culprit, if you want to call it that, is the new Cambridge-sourced chipset and its attendant surplus of memory: Each time the user loads a new disc, the Apollo reads the whole of the CD's subcode data into memory, analyzes it (footnote 1) and then selects the most appropriate of four levels of error correction. That way, the music is never overcorrected per se, and the integrity of the original datastream is kept intact to the greatest extent possible. In any event, the Apollo's eight-second wait is a mere blink of the eye compared with the best-case 27-second delay between loading a disc in the transport of my [Sony SCD-777ES](#) SACD/CD player and actually hearing music. Once again, a manufacturer has sent his wares to the most sympathetic reviewer imaginable.

From buck to cluck

From day one, the Apollo endeared itself to me—no other word for it—by cheaply doing well a great many things I consider crucial to music playback. Its rhythmic performance was strong—no surprise there, given that none of the Rega products I've heard have made music sound sluggish or unengaging—and its frequency range was well extended in both directions, with good balance between its strong bass registers and crisp, open-sounding trebles.



But it was the *cleanness* of the Apollo's sound that most impressed me that first day. In that sense, the Apollo was audibly, obviously different from most other players. After it had undergone a weeklong break-in period in my living-room system, I brought the Apollo into my dedicated listening room and installed it in my main system. The first song I played was Roy Wood's lovely "Whisper in the Night," from the first album by the much-abused Electric Light Orchestra, *No Answer* (Epic ZK 35524). After just the first few measures I was brought up short, and compelled to switch back to the Sony for comparison's sake: The Rega had an unambiguously lower noise floor. Through the Apollo, there was more emptiness between the notes—spaces had been filled with texture through the Sony, which I'd never noticed before. Consequently (or so it seemed), listening to the music was now easier: The tension that belonged in the music was still there, but the stress of listening to it was gone.

I heard much the same on "Lady Sweet," from Big Star's new album, *In Space* (Rykodisc RCD 10677). A mixture of gritty electric and clean acoustic guitars played more or less in unison—the thickness of the former, the percussive qualities of the latter—has always been a hallmark of the Big Star sound, but the qualities of the individual instruments are usually hard to pick out on a lesser system. The Apollo revealed them more cleanly than anything else in the house, stripping away a lot of electrical grunge from the spaces within the overall sonic tapestry (if you'll forgive a onetime use of that foppy cliché).

This effect wasn't limited to pop recordings. In fact, the Apollo's clean, open sound was even more pleasantly welcome with classical music. An obvious but good example came during the hushed opening measures of Strauss's *Tod und Verklärung*, with Lorin Maazel and the Bavarian Radio Symphony Orchestra (BMG 68221-2). With most players, good ones included, the susurrations of the strings is hard enough to hear; with the Apollo, those sounds emerged from the darkness with all their musical meaning and sonic texture and color intact.

Hilary Hahn's exquisite recording of Elgar's Violin Concerto (SACD/CD, Deutsche Grammophon 00289 474 8732) is one of the most satisfying new classical releases in recent years (the CD booklet's good art direction doesn't hurt, either) sounded wonderful and emotionally satisfying through the Apollo. The player couldn't do anything about the curious lack of texture and warmth in the orchestral instruments—the sound, while not quite horrible, is a strange mix of dark and cold, although the solo violin fares better—but it played the melodies on the disc's "Red Book" layer with a DSD level of flow and momentum. Recent good SACD players, fed the DSD layer, did better with the performance's sense of drama and dynamic ease, though the Apollo was at least satisfying in that regard.

Spatial performance was fine, and certainly the equal of my Sony and the Naim CD5x. With very-well-recorded orchestral music—obvious choices such as Charles Munch and the Boston Symphony's various recordings in RCA's early Living Stereo series come to mind—ensembles sounded convincingly wide and deep, with last-row brass players sounding as if that was where they were coming from. Percussion sounds had great specificity, such as the snare drum and triangle in the first part of the 1955 recording of Ravel's *Daphnis et Chloé* (JVC XR-0222-2).

From one disc to the next, regardless of the style of music, the Rega was clean, clear, and never boring. The only shortcoming I noted was a tendency for the trebles to sound a little too crisp on a few discs in my collection—such as David Grisman's *Bluegrass Mandolin Extravaganza*, on his own Acoustic Disc label (ACD-35). I love the version of the weird old fiddle tune "The Dusty Miller" on that album, with Ricky Skaggs and his father-in-law, Buck White—although the great mandolinist Frank Wakefield steals the show toward the end with an edgy solo that throws all caution to the wind as he bangs back and forth between major and minor voicings. But the sound got edgy, too, in a way that the more expensive Naim CD5x and Ayre AX-7e did not. No big deal—but I'd think twice before buying a Rega Apollo for a system with a relentless top end.

Because the new data-control chipset they're using contains an MP3 decoder, Rega decided to make the Apollo MP3-compatible as well. I tried it out by burning a bog-standard Fujifilm blank with some MP3 files from my iMac's music library, including Clarence and Roland White playing "Nine Pound Hammer," and another charmingly weird fiddle tune (this one with vocals), "Cluck Old Hen," by Fiddlin' Powers and Family. (The latter was transcribed from an Edison Diamond Disc—meaning we've more or less come full circle, I think.) They played without a hitch or a glitch.

A final performance note: The Rega Apollo seemed more or less blasé about the quality of the cable used to take its line-level signal to my preamp—I wound up relying on my second-hand, 2m-long Audio Note AN-Vx interconnect, if only because it was so delightfully perverse to connect a \$995 CD player to my system with a cable that cost even more. But it did respond to the Ayre Myrtle Block isolation supports I've mentioned in issues past. The Blocks enhanced the Rega's

performance in most ways, chief among which was the sense of musical ease and flow, although I did think the bass went slightly deeper without them. (The Apollo's own feet are standard-issue rubber things, not the fancy layer-cake jobs that Rega puts under their turntables.) Go figure.

Wrap it up

Rather like the Cyrus CD player I [reviewed](#) in the January 2006 *Stereophile*, the Rega Apollo seems a canny response to the challenge posed by format wars, potential obsolescence, and the declining dollar: When in doubt, spend as little as possible, striving all the while for the best quality imaginable. I mean that last bit literally: Until recently, I doubt anyone could have *imagined* "Red Book" CD playback this good from a sub-\$1000 player.

While the Rega Apollo is free of obvious flaws, you'd be forgiven for wondering what the extra money for an [Ayre CX-7e](#) (\$2950) or a [Naim CD5x](#) (\$2900) might buy. For that matter, you could ask how much more could be had from Rega's own forthcoming upmarket players, which will be based on the same digital-control chipset. (The Rega Saturn, poised for release as I write this, comes immediately to mind.) I haven't heard the other new Rega machines, but as far as the others are concerned, more money *can* get you more texture and color, more drama, and, most important (to me, at least), more of a sense of humanness, of the human *force* behind every note that's sung or played. The Apollo is not lacking in any of those qualities—but it's as wrong to imply as it is naive to assume that you can't do better.

For the here and now, however—*here* being \$1000 and *now* being \$1000 as well—the Rega Apollo is satisfying in a way that no similarly priced player of my experience can boast: It wouldn't embarrass any system I know (save for the most irredeemably bright), and would only improve the core musical values of most. The Apollo is a surprising step forward in a field that I'd thought was empty of same, and a hell of a bargain. Very strongly recommended.

Footnote 1: Very unusually, after a CD has been initialized, when you select a track, its playing time is briefly displayed.—**John Atkinson**

Sidebar 1: Specifications

Description: Single-box CD player. Formats supported: CD, CD-R, MP3, WMA. Digital output jacks: RCA, optical. Analog output jacks: RCA. Maximum output level: 2.0V RMS. Power consumption: 12W.

Dimensions: 17" (435mm) W by 3.9" (100mm) H by 10.5" (270mm) D. Weight: 8 lbs (3.64kg).

Serial Number Of Unit Reviewed: 036792.

Price: \$995. Approximate number of dealers: 115.

Manufacturer: Rega Research Ltd., 119 Park Street, Westcliff-on-Sea, Essex SS0 7PD, England, UK. Tel: (44) 1702-333071. Web: www.rega.co.uk. US distributor: The Sound Organisation, 11140 Petal Street, Suite 350, Dallas, TX 75238. Tel: (972) 234-0182. Fax: (972) 234-0249. Web: www.soundorg.com.

Sidebar 2: Associated Equipment

Analog Sources: Linn LP12 turntable with Naim Armageddon power supply; Naim Aro tonearm; Miyabi 47, Linn Akiva, Brinkmann/EMT cartridges; Tamura TKS-83 moving-coil step-up transformer.

Digital Sources: Naim CD5x, Ayre CX-7e CD players; Sony SCD-777ES SACD/CD player.

Preamplifiers: Linn Linto phono preamplifier; Audio Note M3 Phono, Naim NAC 32.5 preamplifier.

Power Amplifiers: Lamm ML2.1 monoblocks, Yamamoto A-08, Naim NAP 110.

Loudspeakers: Quad ESL-989, Audio Note AN-E Lexus Signature, Lowther PMM6a drivers in modified Medallion horns.

Cables: Interconnect: Audio Note AN-Vx & Sogon, Nordost Valhalla. Speaker: Audio Note AN-SPe & LX, Nordost Valhalla, Naim NACA-5. AC: JPS Labs The Digital (CD players), Cardas Golden Reference (some other components).

Accessories: Mana Reference Table, Reference Wall Shelf (turntables); Ayre Myrtle Blocks (various other components).—**Art Dudley**

Sidebar 3: Measurements

The Rega Apollo had a maximum output level of 2.175V at 1kHz, 0.73dB above the CD standard of 2V RMS. Its output preserved absolute polarity (*ie*, was noninverting). The Apollo's output impedance was a little higher than usual, at 596 ohms over most of the audioband and rising slightly to 653 ohms at 20kHz, but this should have no subjective consequences, even with amplifiers having a low input impedance. The Rega's error correction, assessed using the Pierre Verany Test CD, was simply superb, the player coping with gaps in the data spiral up to 2.4mm long without either audible glitches or the error flag in its digital output being set. However, it did stumble when playing back CD-Rs, which have lower reflectivity than CDs. Some of my older test discs—all of my CD-player test tones are burned onto CD-Rs—played back with frequent dropouts and glitches.

The Apollo's frequency response rolled off slightly at the very top of the audioband, reaching an inconsequential -0.5dB at 20kHz (fig.1, top pair of traces), the rolloff increasing very slightly during playback of pre-emphasized data (fig.1, lower traces). Channel separation (not shown) was superb in the midband, with any crosstalk buried beneath the noise floor. However, the usual capacitive coupling degraded the separation to a still excellent 100dB at 20kHz. It also decreased to 90dB at 20Hz, suggesting a power-supply impedance slightly higher than usual.

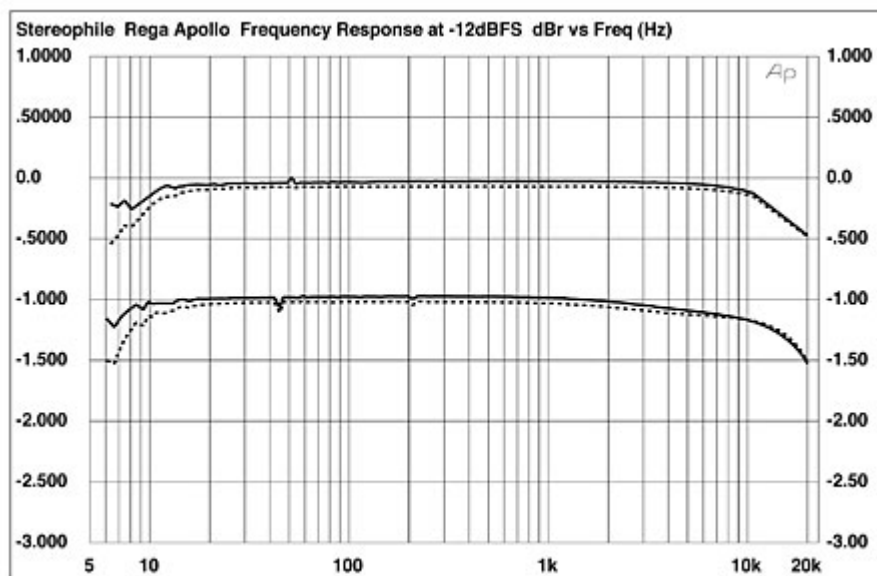


Fig.1 Rega Apollo, frequency response at -12dBFS into 100k ohms, with de-emphasis (bottom below 1kHz) and without (right channel dashed, 0.5dB/vertical div.).

Fig.2 shows the spectrum of the Apollo's output while it decoded dithered data representing a 1kHz sinewave at -90dBFS . The trace peaks exactly at this level and is free from harmonic spurious, though there is a little more low-frequency noise than I usually find. Repeating the test over a wider bandwidth and with data representing a -1LSB DC offset gave a spectrum with a lower level of noise (fig.3), and without the expected ultrasonic rise due to the DAC's noiseshaping. It looks as if the Rega's DAC mutes its output when fed this signal, to give an optimistically high signal/noise ratio.

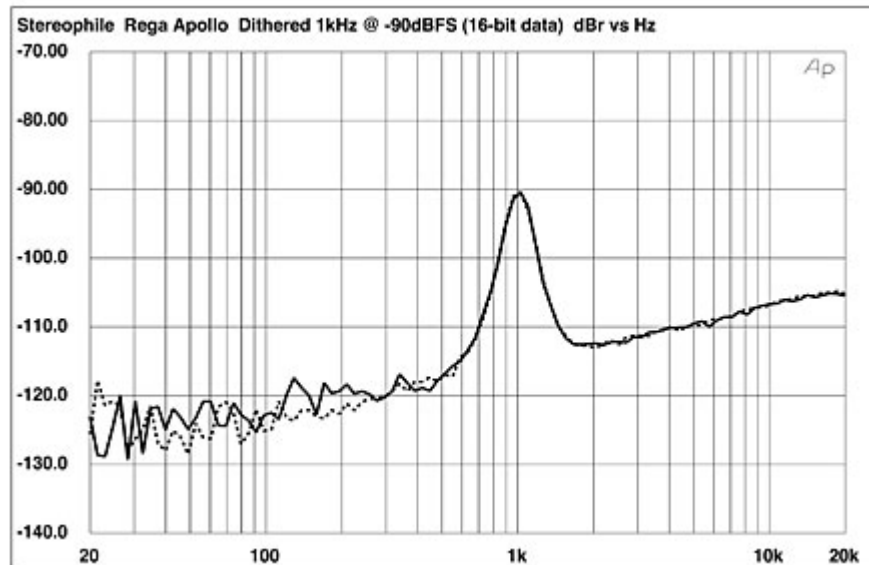


Fig.2 Rega Apollo, 1/3-octave spectrum of dithered 1kHz tone at -90dBFS , with noise and spurs (16-bit CD data, right channel dashed).

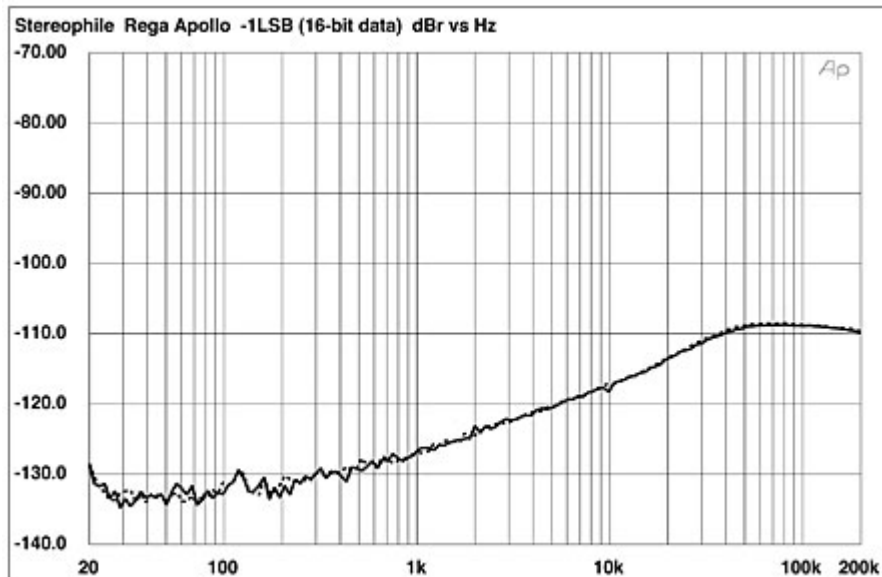


Fig.3 Rega Apollo, 1/3-octave spectrum of -1LSB DC offset, with noise and spurs (16-bit CD data, right channel dashed).

The Rega's linearity error is shown in fig.4. The output becomes increasingly dominated by noise below -100dBFS , both recorded dither and analog playback noise, with negligible error. This good DAC performance is confirmed by the waveform of an undithered 1kHz tone at exactly -90.31dBFS (fig.5), which is both symmetrical and clearly shows the three DC voltage levels that describe this signal.

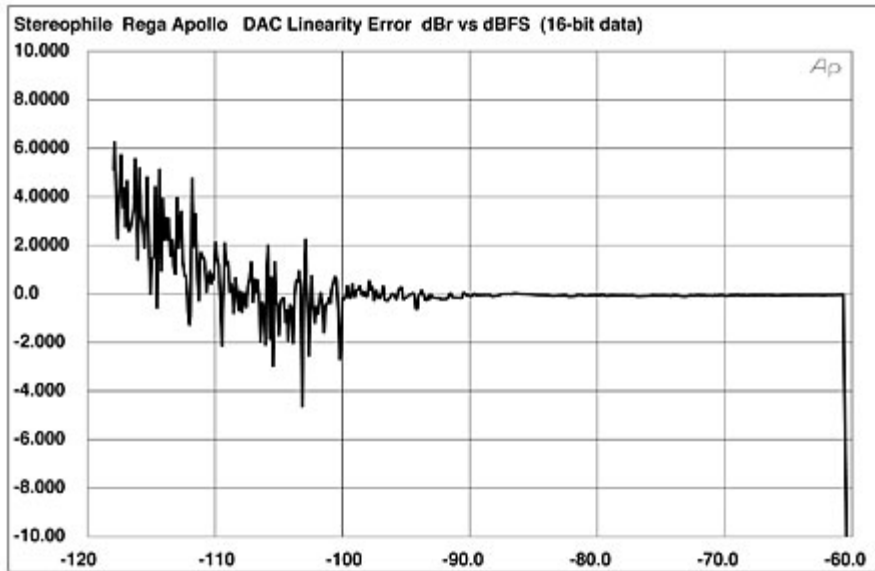


Fig.4 Rega Apollo, left-channel departure from linearity, 16-bit CD data (2dB/vertical div.).

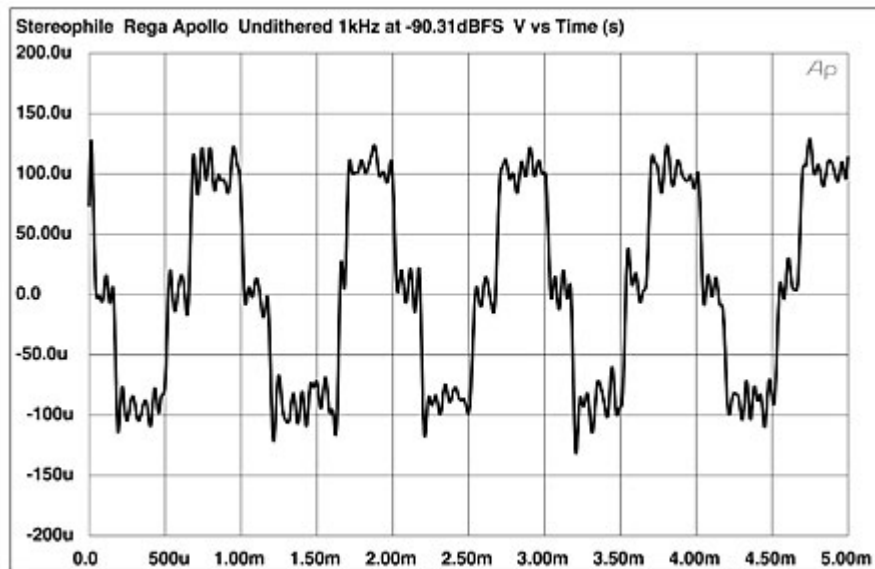


Fig.5 Rega Apollo, waveform of undithered 1kHz sine wave at -90.31dBFS, 16-bit CD data.

Distortion levels with full-scale signals were very low, at 0.009%, though the spectrum of that distortion revealed some differences between the channels (fig.6). The subjectively innocuous second harmonic was the highest in both channels, followed by the third and then the fourth harmonics. However, the right channel had a higher level of third harmonic, and featured some fifth and seventh harmonics. Admittedly, these are all at very low levels, but I prefer not to see such behavior at all. Intermodulation distortion was very low (fig.7).

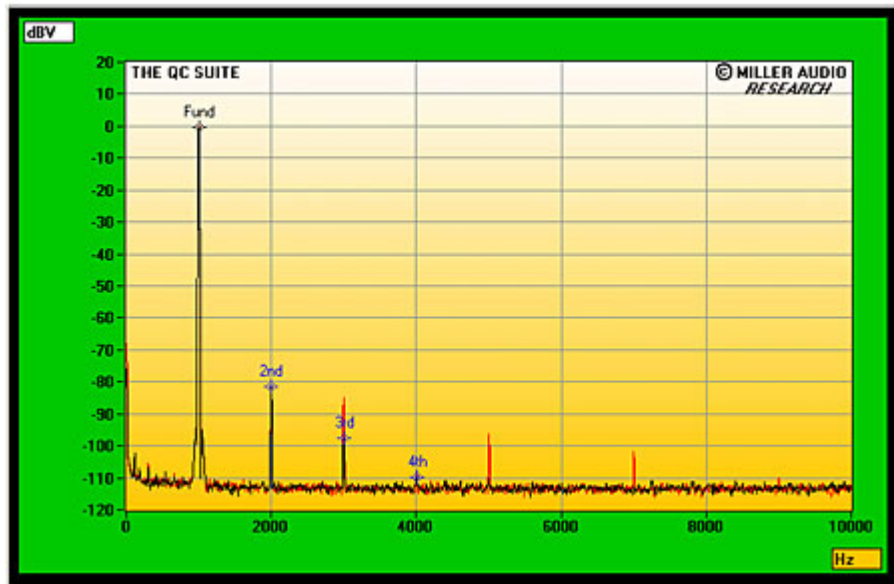


Fig.6 Rega Apollo, spectrum of 1kHz sine wave at 0dBFS into 4k ohms, DC–10kHz (linear frequency scale).

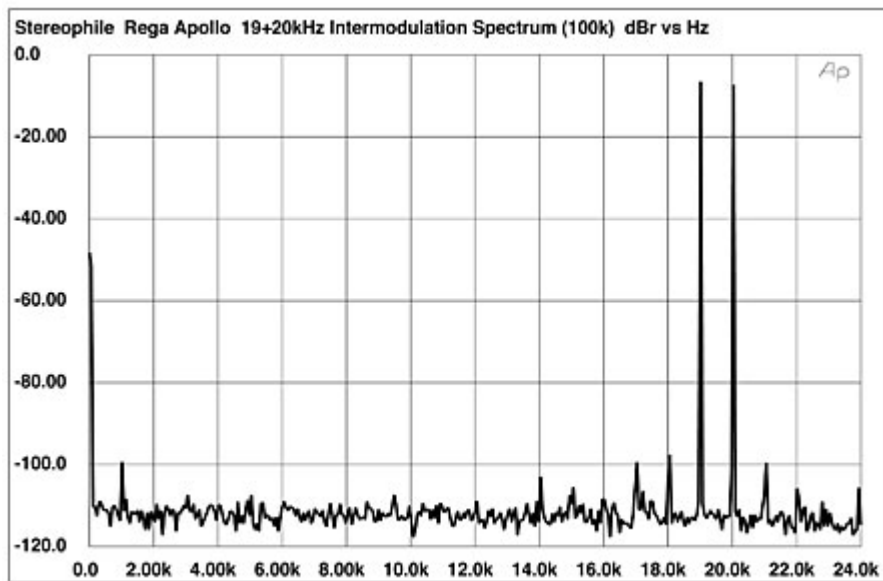


Fig.7 Rega Apollo, HF intermodulation spectrum, 19+20kHz at 0dBFS peak into 100k ohms, DC–24kHz (linear frequency scale).

Finally, I tested the Apollo's rejection of word-clock jitter using the Miller Analyzer and a test CD-R carrying the diagnostic signal: a high-level tone at exactly one quarter the sample rate, over which has been laid the LSB toggling on and off at a low frequency, again an exact integer fraction of the sample rate. The measured jitter level was a low 293 picoseconds peak–peak. A narrowband spectral analysis of the Apollo's analog output is shown in fig.8: the data-related sidebands (red numeric markers) are all very low in level, with most of the jitter deriving from a pair of sidebands of unknown origin at ± 1350 Hz (purple "8" markers). Low-frequency sidebands can also be seen at ± 51 Hz (purple "1") and ± 120 Hz (blue "2"), the latter obviously power-supply–related.

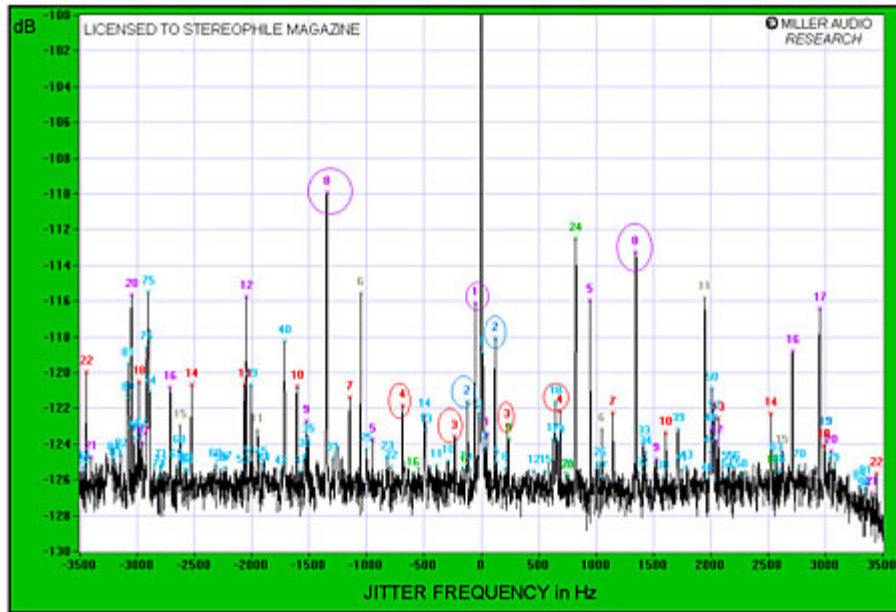


Fig.8 Rega Apollo, high-resolution jitter spectrum of analog output signal (11.025kHz at -6dBFS sampled at 44.1kHz with LSB toggled at 229Hz, 16-bit CD data). Center frequency of trace, 11.025kHz; frequency range, ± 3.5 kHz.

Overall, this is excellent measured performance, though I was a bit bothered by the difficulties the Apollo had tracking CD-Rs.—**John Atkinson**

Sam Tellig wrote about the Rega Apollo in March 2007 (Vol.30 No.3):

Artie Dudley reviewed this CD-rotating apparatus (CD-only players have become nearly as obsolete as turntables) last June and went bananas over it. Quite rightly so, Mr. Dudley.

Now, \$995 might seem a lot of money for a CD player to pair up with a \$645 integrated amp, such as Rega's Brio 3 (footnote 1). But Rega doesn't *make* a less expensive CD player. Besides, Rega believes that it's always better to put as much money as possible into your source components: your CD player or turntable, and preferably both. Rega is still more fondly attached to vinyl.

Like the Brio 3, the Apollo has limitations when compared with some much more expensive players. As Roy Gandy told me, "With the given technology, we had to build it as inexpensively as possible." And that wasn't to rip you off; it's reality. In fact, the Rega Apollo offers far more value, in sound-quality terms, than anything else I've heard at or near the price. There seems to be unanimity among critics about this: the Rega Apollo is a \$1000 category-killer.—**Sam Tellig**

Footnote 1: Wes Phillips reviewed the original Rega Brio in September 1998 (Vol.21 No.9).—**Ed.**