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FEATURES

MAY 2007 VOL.30 NO.5



A Midas Voice A fourth tenor has arisen. Meet the great Rolando Villazón. By Robert Levine

EQUIPMENT REPORTS

- 48 Nagra CDP CD player (Wes Phillips)
- 61 **Rega P1 record player** (Art Dudley)
- 67 **Roku SoundBridge M1001 WiFi music server** (*Larry Greenhill*)
- 77 **PSB Alpha B1 loudspeaker** (John Atkinson)
- 89 **Peak Consult El Diablo loudspeaker** (*Michael Fremer*)
- 101 **Oppo Digital DV-970HD universal disc player** (*Wes Phillips*)

FOLLOW-UP

115

61

- 43 JL Audio Fathom f113 powered subwoofer (Kalman Rubinson)
- 115 Westone earmolds for Shure headphones (*Jim Austin*)
 - VTL TL-7.5 Mk.II Stereo Reference line preamplifier (Brian Damkroger)

EQUIPMENT REPORT

Nagra

CD PLAYER

Wes Phillips

ESCRIPTION Single-box, fixedoutput CD player with outboard 12V DC power supply and remote control. Formats played: CD, CD-R, CD-RW. D/A conversion: 24 bits. Oversampling: 8x (352.8kHz). Analog outputs: 1 pair RCA, 1 pair balanced XLR. Digital outputs: coaxial S/PDIF, AES/EBU, TosLink S/PDIF. Analog output levels: 3.5V RMS or 1V RMS (user selectable, balanced and RCA). Frequency response: 20Hz (0dB)-20kHz (-1dB). Signal/noise: >108dB. THD: <0.003%. Channel separation: 90dB. Jitter: "unmeasurable." Power consumption: 6W continuous, 12W peak.

3" (77mm) H by 10" (255mm) D. Weight: 8.8 lbs (4kg).

15/16/16/16/15502189998003. 16/16 \$13,495. Approximate number of dealers: 14.

Nagra-Kudelski Group S.A., Route de Genève 22, 1033 Cheseaux, Switzerland. Tel: (21) 732-0101. Fax: (21) 732-0100. Web: www.nagra.com. US distributor: Nagra USA Inc., 357 Riverside Drive, Suite 230C, Franklin, TN 37064. Tel: (615) 726-5191. Fax: (615) 726-5189. Web: www.nagraaudio.com. udiophiles are frequently accused of being more in love with gizmos than with music. There may be a kernel of truth in that, but a scant few companies actually exploit the *giz* factor to give

you mo'-a lot mo'. One manufacturer rises above the rest when it comes to invoking sheer gizmoidal lust: Nagra. Since 1951, the Swiss firm has built the gear that professional recordists in the broadcast

and film industries have turned to when they couldn't afford to risk using more temperamental components. Nagras were built to *work* in the field, and to keep working. Hang out with anthropologists and newsmen and you'll hear tales of Nagra Es and Nagra IVs that survived burial in snowdrifts, artillery near-misses, and being run over by tanks.

As if utility weren't enough, Nagra gear tends to be gorgeous as well. In a review in the January 1996 *Stereophile* (www.stereophile.com/hirezplayers/461/), John Atkinson described the Nagra-D open-reel digital recorder as "a small, elegant, immaculately engineered expression of form-follows-function...[that] works as anyone with any recording experience would wish; nothing is unnecessary; every component is designed with an eye to how well it needs to be engineered to fulfill its function; the result is maximum quality, both physical *and* sonic."

Nagra's CDP CD player (\$13,445) doesn't record, but otherwise, JA's description fits it to a T-a shiny, lust-invoking T.

By concentrating on precision, one arrives at technique...

The CDP is a compact (12.2" W by 3" H by 10" D), front-loading player with an outboard power supply that feeds it 12V DC. The brushed-aluminum chassis is almost plain; the main focus is on the front and rear panels. Up front sits what Nagra calls the "mono-block tray," which houses not only the disc drawer but the entire drive mechanism and the backlit LCD display as well. The mechanism slides in and out of the CDP on drawer rails with Swiss horological precision (there, got that out of the way). Also present on the faceplate are three *really* small switches: display on/off, open/close, and skip. In typical Nagra fashion, there's also a large, mechanical, rotary function switch. This has the usual icons for play, stop, and pause, plus one labeled Off and one cryptically marked "R." That stands for Remote, as I discovered when I finally read the manual in an attempt to discover why the CDP's remote control wasn't working. D'oh!

The rear panel accommodates balanced XLR and RCA analog connections, as well as coaxial S/PDIF, AES/EBU, and TosLink digital. (The outputs can be moved to the traditional Nagra side-mounted position.) The ACPS II power supply connects to the CDP via a three-pin Lemo locking connector. There's also a ground connection, linked directly to the CDP's case.

...but by concentrating on technique one does not arrive at precision

Nagra says they pondered long and hard when deciding which formats their digital front-end products should support. (There are also the CDC CD player-preamplifier, for \$14,995, and the CDT transport, for \$12,495.) They focused on CD for several reasons, chief among them that they felt universal players "accumulate solutions of compromise and cannot therefore excel in any of the three standards." Furthermore, they say, SACD and DVD-Audio never achieved "the intended success and



NAGRA CDP

one could question whether they will truly penetrate the market one day."

In addition to CD enjoying the lion's share of the market, Nagra feels the format has never stopped progressing throughout its 24-year lifespan. "Recordings, often themselves of excellent quality, cover all styles of music, and the number of available titles is always increasing, and represents an important factor in itself for format longevity."

The actual transport module in the CDP's mono-block tray is a Philips CD-Pro2M, which is used stock, other than Nagra's addition of their own suspension system and locking disc weight. The electronics were all developed in-house by Nagra, starting with PLL resynchronization of the signal and low-jitter, high-precision, voltage-controlled crystal oscillators (VCXOs). The resynced signal is fed to an 8x-oversampling Burr-Brown sigma-delta D/A converter and thence to Burr-Brown output devices.

The ACPS II power supply contains not only the AC transformer, but the regulator and smoothing circuits as well. It outputs 12V DC to the CDP via a ferrite-treated cable. The CDP itself has nine discrete power supplies: the digital circuits use decoupling converters, synchronized to the reference clock of the transport module, while the analog boards use additional lownoise regulators. The program code is stored on flash Eprom and can be updated at the Nagra factory. The bits'n'bobs are all prime quality: the printed-circuit boards are multilayer, with separate power and ground planes. Capacitors are from Wima; the rotary control is from Elma.

Precision: 6" to the right and Lincoln would have seen the end of the play

Setting up the CDP was relatively simple. The mono-block tray glides along its rails with so little friction that the CDP is shipped with four transport bolts locking it in place. These, of course, must be removed before you use the player. (After that, Nagra advises that you just tilt the player's rear panel

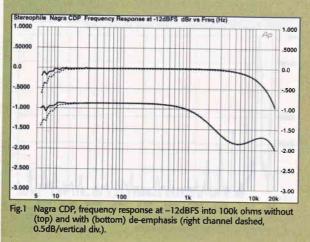
MEASUREMENTS

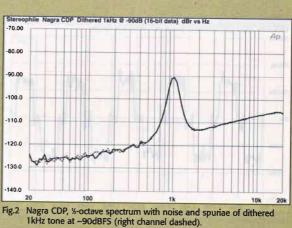
he Nagra CDP's maximum output level at 1kHz was 3.175V from its unbalanced jacks, 4dB higher than the CD standard's 2V. The balanced output was 0.67dB higher, at 3.42V. (The level can also be set to 1V.) Both outputs were absolute-polarity-correct; *ie*, non-inverting (the XLRs are wired with pin 2 hot, the AES standard). The output impedance was a low 50 ohms from both sets of outputs at treble and midrange frequencies, but rose at 20Hz to 344 ohms (balanced) and 146 ohms (unbalanced). With preamps having an input impedance of 10k ohms or higher, this increase will not have any audible consequences.

The CDP's error correction was the best I have encountered. Monitoring the player's digital output with the RME DigiCheck program running on a PC, there were no audible glitches or flagged errors in the output datastream until track 34 of the Pierre Verany Test CD, which has laser-cut gaps in its bit spiral exactly 2mm in length. Even then, this was only at the start of the track, the rest of which played without errors. It took the 4mm data gaps in track 38 for the Nagra to mute its output, which is extraordinary. Unusually, the flag in the player's output datastream was not set when a data error occurred; instead, bit 17 became active when an error occurred. Even more unusual, bit 18 in the output word was permanently set to "1." This is irrelevant to the listening experience, but nonetheless ...unusual.

The CDP's frequency response dropped almost to -1dB at 20kHz (fig.1, top pair of traces) but was otherwise flat. However, with pre-emphasized data (fig.1, bottom traces), a negative 2dB error appeared in the mid-treble. With those rare pre-emphasized CDs, the CDP will sound slightly distant or polite. Channel separation (not shown) was superb from both sets of outputs, at better than 110dB below 500Hz. It did decrease to a still very good 80dB at 20kHz, due to the usual capacitive coupling.

Playing back dithered data representing a 1kHz tone at -90dBFS, the Nagra's unbalanced output was free from either harmonic or power-supply-related spuriae. In fact, the %-octave-wide traces in fig.2 show just the spectral content of the recorded dither noise, the player's own noise being lower than what the CD medium is capable of achieving. Extending the analysis to 200kHz with the CDP playing back a "digital black" track (not shown) indicated





down while carrying it around the house.) As with all CD players that come with disc clamps, you need to develop good habits for storing and remembering to use that little sucker (probably not much of an issue for folks who don't change gear as much as I do).

One feature that Nagra's literature doesn't mention but that I found quite thoughtful: the three red interior LEDs that illuminate the tray when it opens,

NAGRA CDP

making disc placement easier. I found the remote control a bit of a letdown, however; the numeric pad didn't seem to give me direct access to tracks—I had to keep hitting Next to navigate discs. This isn't something that I really need when listening to (as opposed to comparing) CD players, but coupled with the LED display's small letters, it made cross-room navigation hard for this vision-impaired old fogey. Nagra's US distributor feels the unbalanced outputs are the better-sounding, because there is less circuitry in the signal path. However, I used the CDP's balanced output connections, because that's how I normally connect my Ayre C-5xe universal player to the Ayre K-1xe preamp and MX-R power amps currently residing in my reference system.¹

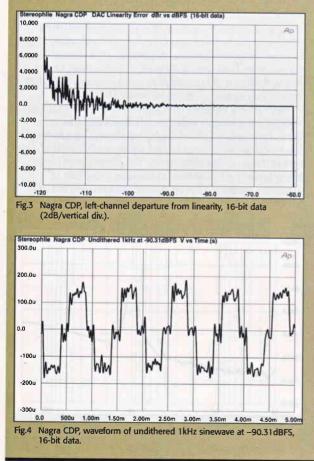
1 I will be comparing the Nagra CDP's balanced and unbalanced outputs in a "Follow-Up" report.

measurements, continued

that the player has very little ultrasonic noise present in its output. Though a slight rise in the noise floor was visible above the audioband, it still lay at only -96dBFS at 200kHz.

Linearity error was less than $\pm 2dB$ down to -110dBFS (fig.3). In fact, this graph really shows only the contribution of the recorded dither noise. The Nagra's very low level of self-noise meant that, with undithered data, its reproduction of a 1kHz tone at exactly -90.31dBFS was essentially perfect (fig.4), the three DC voltage levels being very clearly delineated. Though a very slight DC offset can be seen in this graph, it is less than 30µV, which is negligible.

When it came to harmonic distortion, the Nagra CDP did well, although it was not quite as linear as the best I



have measured. Fig.5, for example, is an FFT-derived spectral analysis of the unbalanced outputs while the CDP played back a 1kHz tone at 0dBFS. The THD was a low 0.003%, with the highest-level harmonic the third, at -91.5dB (0.004%). Note, however, that the fifth and seventh harmonics make appearances (circled in blue). Though both lie at -100dB (0.001%) or below, I would rather they weren't there at all. At -90dBFS (not shown), all the distortion harmonics were buried in the player's noise floor, as suggested by fig.2.

Distortion was as good at low frequencies into high impedances (not shown), but when I drove a full-scale 50Hz tone at 0dBFS from the CDP's unbalanced output into the punishing 600 ohm load (fig.6), the third har-

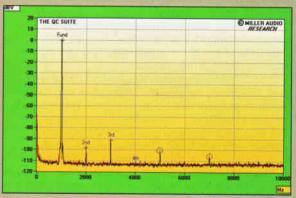
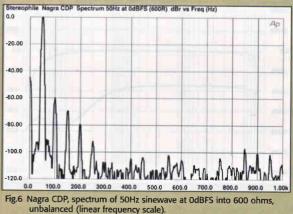


Fig.5 Nagra CDP, spectrum of 1kHz sinewave at 0dBFS into 8k ohms, unbalanced (linear frequency scale).



NAGRA CDP

I'd take precision over power any day My first sonic impression of the CDP was of a tightly focused, phenomenally detailed musical image. I listened to "Cloudburst," from Lambert, Hendricks, & Ross's *The Hottest New Group in Jazz* (CD, Columbia/Legacy C2K 64933)-which, despite bearing the name of the group's first Columbia LP, is a two-CD compilation of all three of their recordings for that label. Immediately, I was reassured that the CDP wasn't going to be one of those

finicky players that demand I cherrypick my recordings. Even though the material was all recorded between 1960 and 1962, the Nagra made it sound as fresh and bright as it must have 47 years ago.

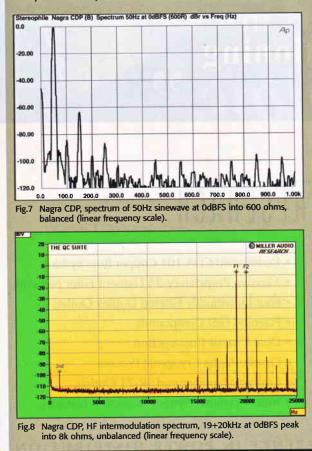
That's the disc mastering, you say? That's true to a great degree, but I've auditioned expensive (and "high-resolution") CD players that emphasized older discs' analog origins all too vividly. Yes, when listening at very high levels, I was quite aware of some tape hiss, but at volumes that were normal chez Wez, that hiss was well down in the mix.

What was front and center was loads of detail that I *did* want to hear. The three singers were each miked separately, and the CDP not only revealed that readily, but made it obvious that they were each using a different model of microphone. Drummer Ike Isaacs' tom-toms had transient snap and a mellow bloom, and his ride cymbal had an immense range of color-ranging from the brilliant *pings* from the

measurements, continued

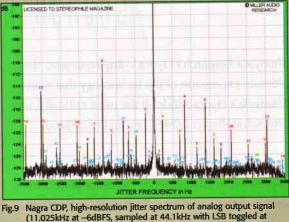
monic rose to -70dB (0.03%), with now the second harmonic predominant, at -60dB (0.1%). As expected, the balanced output into the same low load had very much lower even-order harmonics, but the third was a little higher than the unbalanced output, at -63.5dB (0.07%, fig.7). Tested for intermodulation distortion, the Nagra produced a very low level of second-order difference product from an equal mix of 19kHz and 20kHz tones peaking at 0dBFS, but some higher-order components were apparent (fig.8).

Finally, when tested with the Miller Audio Research Jitter Analyzer for its rejection of word-clock jitter, the Nagra CDP



was superb, its output suffering from just 215 picoseconds peak-peak of jitter-related sidebands (fig.9). Other than a pair of sidebands at \pm 230Hz (red "2" markers), all the data-related components were close to the residual level in the test signal. The main sidebands present lay at \pm 1375Hz (purple "6") and \pm 3030Hz (purple "13"), but these are of unknown origin. They weren't present when I tested the Nagra with a different measurement system I am evaluating, which indicated just 151ps p-p of jitter. However, both systems indicated some slight spectral spreading of the central peak in the graph, due to the presence of some random low-frequency jitter. Paul Miller has conjectured that this produces a somewhat larger depiction of objects within the soundstage than is strictly accurate, coupled with a rather laid-back presentation.

The Nagra CDP's digital-domain measurements, especially regarding its ability to cope with data errors and its rejection of jitter, are among the best I have encountered. Considered purely as a CD transport, it doesn't get any better than this. In the analog domain, the CDP works best with higher impedances, when it is almost beyond reproach, though the de-emphasis did raise my eyebrows a tad. I do wonder, however, if its signatures of harmonic and intermodulation distortion correlate with the somewhat forward soundstage presentation WP noted in his auditioning. —John Atkinson



(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, ±3.5kHz.

NAGRA COP

bell to the lusher sizzle of strokes nearer the rim. But while all of that was impressive, the gestalt was that these guys were *swingin*'. Sorry, that's a different song, but man, was it true.

Hmmm, thunk I, why not try some other music I might not get away with through other big-ticket players?

Out came Odetta Sings the Blues (CD, Riverside 3007), recorded in 1968 in a far more intimate way than the Lambert, Hendricks, & Ross tracks: Odetta's huge voice is placed in a small room with piano, acoustic bass, and drums. I cued up "Nobody Knows You When You're Down and Out." Wowsers! I'd always loved the power and heft of that voice, but how had I never noticed how three-dimensional the whole thing sounded? The lady herself was front and center, piano to the right, drums to the left, the bass somewhat behind her. Convincing and timeless-not to mention a persuasive argument for Nagra's format-longevity argument.

Paavo Järvi's recording of Stravinsky's *The Rite of Spring* (CD, Telarc CD-80615), with the Cincinnati Symphony Orchestra, was fascinating through the Nagra. Although the DSD-recorded CD was incisive and rich, it made me realize that the CDP didn't turn *everything* into gold. That's a good thingand it's why, whenever I audition a component, I always play a few discs that have never before worked for me.

But if the Stravinsky disc was so "incisive and rich," what's my bellyache? I can't fault the CSO's playing, which really is exciting and dynamic-the Jeu du rapt is about as jarring and brutal as any I've heard. But, for me, those first threeand-a-half minutes-the introduction, with its plaintive bassoon and oboe melodies and slow orchestral unfolding-just lacks the awe and mystery I demand from the work. And somehow, as vividly imagined as the next 42 minutes are, they don't work for me without those three minutes of wonder at the beginning. The CDP allowed me to revel in what George Perle has described as the work's "intersecting of inherently non-symmetrical diatonic elements with inherently non-diatonic symmetrical elements," but it didn't fill in the missing magic. And, of course, that's not its job.

However, when a performance and its recording did click, the CDP could be magical. Violinist Mark Feldman's *What Exit* (CD, ECM 1928) is an ear-

opener. An outing for acoustic quartet, this is one of those rare jazz discs that leans as heavily on silence as it does on intense bursts of sound. In a word, it's dynamic. The 22-minute "Arcade" begins in complete silence, broken gently by drummer Tom Rainey's delicate, intensely rhythmic cymbal work. Double-bassist Anders Jormin comes in with an insistent pulse, and the two just develop the groove for a long time-some songs are shorter than this introduction. When Feldman finally enters, it's with a repetitive, two-note bowed motif that begins so quietly it's as much sensed as heard. Things get louder quickly; and although this band is never afraid of not playing, "Arcade" develops in what is as much a series of

In love, as in gluttony, pleasure is a matter of the utmost precision

What was interesting was, as much as I liked the CDP, I was fairly certain that, in comparison listening, it would be more or less sonically equivalent to my Ayre C-5xe. I really like the Ayre, after all, and in most other comparisons it's what I've ended up preferring—which is why it remains my reference player. Of course, the reason we actually *compare* components is because it's so hard to make these judgments in a vacuum.

Why compare the \$13,445 Nagra to a \$5950 universal player when I had on hand several other hi-rez players closer to the CDP's price? Because the Ayre is my reference, for one thing. And because *Stereophile* has not yet reviewed the Krell

THE NAGRA PROJECTED A **SOUNDSTAGE THAT WAS MORE FORWARD** THAN THE AYRE'S.

solos and duets as of ensemble playing.

It's simultaneously free-form and structured—and it's sonically intoxicating. Jormin's bass, John Taylor's piano, and Rainey's drums are big and *loud*, where required. The bottom end is intense, but Feldman's overtone attacks are extended and crystalline. This isn't just one of those rare recordings in which the performances are matched by the sound; it's one of those recordings where anything less than lifelike sound would cripple the performance. The CDP had me lapping it up with a spoon.

ASSOCIATED EQUIPMENT

universal player, Krell Evolution 505 SACD/CD player.

EREAMPLIFIERS Ayre K-1xe, Krell Evolution 202.

Krell Evolution 600.

dence C4, Wilson Audio Specialties WATT/Puppy 8.

Research Aries & Antares. Speaker: Shunyata Research Lyra.

Ayre L-5xe line filter; Furutech eTP-609 distribution box, FP-20A(R) duplex outlets, RDP panels; OSAR Selway/Magruder equipment racks; Ayre Myrtle Wood Blocks. –Wes Phillips Evolution 505 SACD/CD player (Mikey gets to do that one) or the Chord Blu/DAC 64 combo (coming soon), and our policy is to compare products under review only with products for which our opinions are already on the record.

Which is a long way of saying that I was in for a surprise when I did begin level-matched comparisons of the CDP with the C-5xe. First—and this is one of those differences that I couldn't begin to claim was significant—the Nagra projected a soundstage that was more forward than the Ayre's. Not by a lot—the CDP placed performers more or less in the plane of the loudspeakers' baffles, while the Ayre put 'em approximately at the back of the speakers.

Did I prefer one to the other? Not consistently. With "Cloudburst," that more forward placement put the performers closer to me, which made the performance a tad more involving. The whole image was bigger and a touch more dynamic. Jon Hendricks' voice had deeper nap to its velvet during his scat solo, and Isaacs' cymbals had more shimmer and a longer decay.

So the Nagra was remarkably better than the Ayre? No, but it did expand on that musical player's strengths.

Odetta, too, sounded closer to me through the Nagra, and her three backing musicians had more space between them; the Ayre kept everyone clumped together. But what surprised me was that Odetta's diction was slightly more NAGRA CDP

comprehensible through the Nagranot "better," because in this song she channels Bessie Smith's elisions and slurs. Through the Ayre, the line sounded like "And your friends / You haven't ay..." The Nagra couldn't do much with that swallowed consonant, but it sounded more like, "And your friends / You haven't $a_ny...$ "

You just know I'm going to say that the CDP was all over the C-5xe on the Stravinsky, right? Once again, that's why we actually listen. The work's introduction, while not up to my favorite performance (Pierre Boulez and the Cleveland Orchestra), sounded far more moody and mysterious through the Ayre. Not only did the bassoon emanate from deeper in the soundstage, it seemed to come out of a deeper silence. Oddly, the CDP made the soundstage sound flatter-a bit of a cutout, really-but added a bit of texture to it as well. The Nagra did a better job of emphasizing dynamic contrasts, however, which added to the visceral quality of the Jeu du rapt.

That unfettered dynamism made me prefer the CDP with Mark Feldman's "Arcade," as well. The slow, threeminute climb from silence to *forte* at the beginning of the track was a thing of wonder—it just built and built and built, until the four musicians simply had to explode into sheets of sound. It wasn't just music; it was *drama*.

Language is a tool adequate to provide any degree of precision relevant to a particular situation

When it comes to construction and performance, the Nagra CDP is one of the best CD players I've ever heard or of extracting every detail lurking in a CD's bits, I'd have a hard time justifying its \$13,445 price simply in order to obtain the extra performance over my \$5950 Ayre C-5xe—but then, I had to pinch pennies so hard to buy the Ayre that Abe Lincoln actually scowled at me.

Besides, that's putting my wallet in your pocket. If owning something that ranks among the best of its type is important to you and price isn't that big a consideration, you might well consider the Nagra CDP.

WHEN IT COMES TO CONSTRUCTION AND PERFORMANCE, THE NAGRA CDP IS ONE OF THE **BEST CD PLAYERS** I'VE EVER **HEARD OR CARESSED**.

caressed. If you're even the slightest bit prone to pure gizmoid lust, you'll be a goner the minute you get your hands on one.

Here in the real world, many of us must also consider the question of *value*. Although I feel that Nagra has met its design brief in building a player capable But if cost is an object to you, as it is to me, and you're easily swayed by components engineered to fulfill their function with maximum physical and sonic quality, just shut your eyes, stuff your fingers in your ears, and walk on by quickly, muttering, "Get thee behind me." Lust can be the very devil to overcome.