

FRED KAPLAN

Krell Cipher

SACD/CD PLAYER



Around the turn of the century, a review of the latest hair-raisingly expensive turntable would often begin with a soothing chant that, yes, the Rotor-GazmoTron XT-35000 *is* a tad pricey, but it *will* be the last piece of analog gear you ever buy—so go ahead, take the plunge. A dozen years later, pressing plants are stamping out LPs 'round the clock, and new high-end turntables are rolling off production lines at a respectable clip. So who

knows whether today's Cassandras might be equally premature in bewailing the death of the Compact Disc? Which is to say that I can't in good conscience urge you to pay \$12,000 for a CD player on the grounds that the medium's about to die, so splurge now while there's still something to splurge on. But if you have the scratch, and the itch for such a product, step right up and let me tell you about the Krell Cipher.

The Cipher—a strangely inert name for such a dynamo

SPECIFICATIONS

Description SACD/CD player compatible with CDR, 44.1 WAV, AAC (ADTS & ADIF), DVD-R/RW/+R. Class-A balanced, zero-feedback, Krell Current Mode topology from input to output. D/A conversion: 2 DSD1794 DACs (1 per channel, 2 per pair of surround channels). Digital outputs: 1 S/PDIF via RCA, 1

S/PDIF via TosLink. Analog outputs: 1 pair CAST via 4-pin bayonet connectors, 1 pair balanced via XLR, 6 single-ended via RCA. Control inputs: 1 RS-232 port via 9-pin D-subminiature connector, 1 12VDC trigger input, 1 Krell CAN Link. Frequency response: 20Hz–20kHz, +0/–0.25dB. Signal/noise,

A-weighted: 112dB. THD: 20Hz–20kHz, <0.005%dB. Power consumption: 61W. IR remote control included.

Dimensions 17.3" (438mm) W by 6" (153mm) H by 17.3" (438mm) D. Weight: 29 lbs (13.2kg) net, 37 lbs (16.8kg) shipping.

Serial Number of Unit Reviewed 2931120054.

Price \$12,000. Approximate number of dealers: 85. Warranty: 5 years, parts & labor, circuitry; 3 years, mechanical.

Manufacturer Krell Industries, 45 Connair Road, Orange, CT 06477-3650. Tel: (203) 298-4000. Fax: (203) 891-2028. www.krellonline.com.

machine—is Krell's follow-up to the slightly cheaper Evolution 505 (\$10,000, reviewed by me in the September 2008 issue, www.stereophile.com/hirezplayers/908krell/index.html). Like the 505, the Cipher is a fairly massive SACD/CD player: 29 lbs, half a foot high, and a foot and a half wide and deep, with a case of aircraft-grade aluminum (it comes in silver or black) sporting slitted edges on the side, which give it a modicum of grace. Also like the 505, and like all amps and preamps in the Evolution series, the Cipher employs Krell's proprietary CAST circuitry.

Description

As outlined in my reviews of Krell's Evolution 505 and FBI integrated amplifier (July 2007, www.stereophile.com/integratedamps/707krell/index.html), the company's Current Audio Signal Transmission (CAST) circuitry manipulates audio signals in the current domain rather than in, as is usual, the voltage domain. It does this in the circuits within a component and—if you have a Krell preamp and a special CAST cable—the connection between two components (more about that later). In theory, this approach reduces distortion in two ways. First, the signal is a continuous stream of current; it doesn't have to be converted from current to voltage and back to current. Second, signals in the voltage domain go from low impedance to high, while signals in the current domain go vice versa. As a result, say Krell's technicians, factors that inevitably corrupt a signal—stray capacitance and inductance on a circuit board, the various effects caused by the mismatched impedances of interconnects—are reduced or eliminated. But operating in the current domain requires about twice as many transistors, which means the component must be bigger and heavier, run hotter, and thus cost more.

Except for the name on the faceplate, the Cipher looks outwardly identical to the Evolution 505. Inside there are some similarities—the disc transport still rests on a rigid aircraft-grade aluminum subchassis, and its drawer is mounted on a steel plate to maximize reading accuracy—but much has been upgraded. The disc drive—made by a Chinese company called Raymedia, and also used in the 505—incorporates newly customized firmware said to further improve reading accuracy, and extra damping material to reduce noise when it's tracking a hard-to-read disc. The separate output levels for the CD and SACD laser heads are now individually hand-calibrated. (Krell will apply this upgrade to your 505 if you send it to the factory.) Whereas the 505 had a single stereo D/A converter, the Cipher uses a pair of 24-bit/192kHz DACs, which deliver higher current to the analog stages and expand the dynamic range by 3dB. New current-mirror technology are said to generate a closer match between the hot and cold signals of the balanced circuitry. The new output stage, which requires about one-third more components than that used in the 505, is said to produce less distortion and wider dynamic range. The Cipher also uses the same anti-jitter circuit that was retrofitted to later units of the 505, and which Krell claimed reduced jitter between the transport and the DAC by a factor of five.

**Like all
amps and
preamps
in the
Evolution
series,
the Cipher
employs
Krell's
proprietary
CAST
circuitry.**

MEASUREMENTS

To measure the Krell Cipher, I used *Stereophile's* loan sample of the top-of-the-line Audio Precision SYS2722 system (see www.ap.com and the January 2008 "As We See It," <http://tinyurl.com/4ffpve4>); for some tests, I also used my vintage Audio Precision System One Dual Domain. It wasn't possible to measure the player's performance from its current-mode CAST output, but I did do so from its balanced and unbalanced outputs.

To test the Cipher's performance as an SACD player, I used the "provisional" Sony Test SACD. Although Krell doesn't mention DVD playback on their website in their lists of features and specifications for the Cipher, I found that it would play DVD-A discs. So as well as 16-bit test signals burned to a CD-R, I used 24-bit files burned as a DVD-A on a DVD-RW. While the Cipher would play commercial SACDs and DVD-As without problem, it would sometimes not recognize the DVD-RW, presumably

because of that medium's low reflectivity compared with pressed discs.

Navigating the Pierre Verany Test CD, the Cipher demonstrated excellent error correction, coping with gaps in the data spiral without glitches in the analog output until those gaps reached 2mm in length. The player muted its output when the gaps were 2.4mm long. The maximum output level at 1kHz with CDs and DVDs was 3.835V from the balanced jacks and 1.918V from

the unbalanced RCAs, sourced from impedances of 350 and 175 ohms, respectively. With SACDs, the maximum output level depended on the filter selected: Filter 1 gave the lowest levels, at 1.8V/900mV, balanced/unbalanced outputs; Filter 3 gave the highest levels, at 3.237V/1.62V. Both the balanced and unbalanced outputs preserved absolute polarity (*ie*, were non-inverting), the XLRs being wired with pin 2 hot.

With CD and DVD playback, the Cipher's frequency response depended on which of the two filter options was in use. At all sample rates, Filter 2 gave an earlier high-frequency rolloff than Filter 1 (fig.1). As with earlier Krell SACD/CD players, both the ultrasonic response rolloff and the absolute level varied considerably with which of the four filters was being used (fig.2; see also fig.1 at www.stereophile.com/content/krell-evolution-505-sacdcd-player-measurements). All filters had responses that were flat within the audioband, but Filter 3 was 5.1dB higher in level than

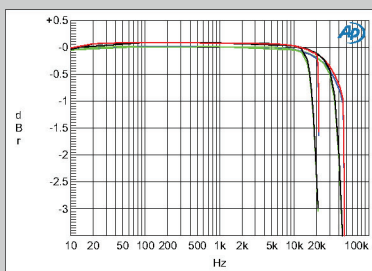


Fig.1 Krell Cipher, PCM frequency response at -12dBFS into 100k ohms with data sampled at 44.1 and 96kHz with: Filter 1 (left channel blue, right red), Filter 2 (left green, right gray) (0.5dB/vertical div.).

Setup

I did all of my listening with the Cipher resting on three Black Diamond Racing Mk.IV Cones¹—which, as usual, tightened the transients a little bit—and plugged into Bybee Technologies' Signature Model Power Purifier, which in turn was plugged into hospital-grade wall sockets wired to a dedicated 20-amp circuit. Speakers were a pair of Revel Ultima Studio 2s. (The Cipher can play multichannel SACDs, but I didn't.) For most of the time I used Simaudio's Moon Evolution 700i integrated amplifier, but I also swapped it out for Krell's FBI integrated, so that I could test the Cipher's CAST output circuitry using a strand of Nordost CAST interconnect.

Although the Cipher offers a choice of two filters for CD playback and four for SACD playback, Krell told me that Filter 1 was the best in general. I listened to the others, but just briefly, as it struck me that Filter 1 was indeed the best. That's what I used.

Sound

In my review of the Evolution 505, I singled out the player's finesse at revealing the finest subtleties of a musical passage, untangling the knottiest complexities, and showering light on the tonal colors of a voice, an instrument, or an ensemble. I also praised its airy highs and subterranean lows, and its knack for tossing up a palpable soundstage (wide width, deep depth, sharp but not Etch-a-Sketch images). Summing up the Cipher, I'd say: all that, taken up a notch or two on every count.

On "Tangled Up in Blue," from the SACD of Bob Dylan's *Blood on the Tracks* (Columbia CK 9032), I still heard the "extra octave of air [that] seemed to rise from the steel

guitar," but the acoustic guitar's strumming was also harder, clearer, and more melodic. On Michael Tilson Thomas and the San Francisco Symphony's performance of Mahler's Symphony 9 (SACD/CD, SFSO 821936-0007-2), sounds were still "popping out all over the soundstage, very precisely but in full harmonic richness," but now with greater clarity. For instance, just before 2:00, clarinets come in under the strings for just a measure or two, but I'd never heard them jump out with such vibrancy or sound so much like clarinets, with their reediness and the wind jetting out the long narrow tube, as opposed to horn-like notes coming out of some ill-defined thing.

The Cipher's way with bass tones was particularly impressive. Thunderous bass has always been one of Krell's specialties, but that's not all I'm talking about here. I'm talking about the details, the melody, even the delicacies of a double bass. On "Mood Indigo," from the Duke's *Masterpieces by Ellington* (Columbia/Legacy CK 87043, CD), I could hear every pluck of Wendell Marshall's bass, the value of each note, and the shifts in his cadence, even when the full orchestra blares forth. This isn't mere detail for detail's sake; it's crucial to the rhythm—the "mood indigo," if you will, of the piece—which Marshall alters by lagging just behind the beat. Ditto for Charlie Haden's fingerwork on his bass's soundboard and neck—and, even more, the resonance of the wood—in *Jasmine*, his duet album with Keith Jarrett (CD, ECM 2165). And Jarrett's piano sounded richer than I've heard when spinning this disc in other players, perhaps because the Cipher got the harmonic overtones just right.

Overtone has a lot to do with distinguishing an instrument from one that's similar but not quite the same. Listening to James Carter's tribute to Django Reinhardt, *Chasin' the Gypsy* (CD, Atlantic 83304-2), I'd never heard so clearly

1 We are sorry to report that Black Diamond Racing's Donald "DJ" Kasser succumbed to lung cancer and its related complications on January 13, 2012 at Columbia-St. Mary's Hospital in Milwaukee.—Ed.

measurements, continued

Filter 1, Filter 2 was 0.55dB higher, and Filter 4 was 3.3dB higher. These level differences are sufficiently large to invalidate any listening tests comparing the filters unless compensated for with the preamplifier's volume control. Channel separation (not shown) was superb at >125dB in both directions below 5kHz, and still 110dB at 20kHz.

Testing the Cipher's resolution by

sweeping a $\frac{1}{3}$ -octave bandpass filter from 20kHz down to 20Hz while it played a dithered 1kHz tone at -90dBFS from CD (fig.3, top pair of traces below 5kHz), all that can be seen is the dither noise used to encode the signal. The bottom pair of traces in fig.3 were taken with 24-bit DVD data representing this signal; the noise floor drops by around 16dB at high frequencies, which suggests

that the Krell has almost 19-bit resolution in this region, less at low frequencies. The middle pair of traces in fig.3 were taken with SACD data. As with the Krell Evolution, which Fred Kaplan reviewed in September 2008, the Cipher's conventional outputs are a little noisier than the best players I've tested with SACD, resulting in only a modest increase in resolution compared with CD. However,

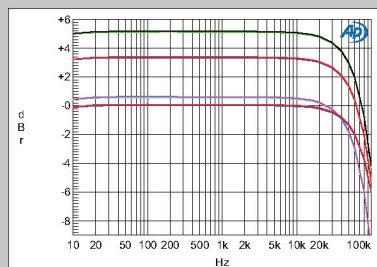


Fig.2 Krell Cipher, SACD frequency response at -3dBFS into 100k ohms with: Filter 1 (left channel blue, right red), Filter 2 (left cyan, right magenta), Filter 3 (left green, right gray), Filter 4 (left blue, right red) (2dB/vertical div.).

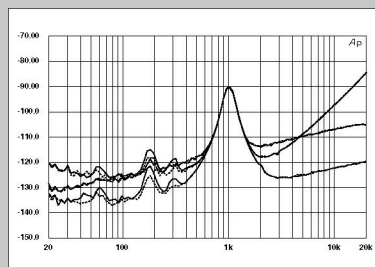


Fig.3 Krell Cipher, $\frac{1}{3}$ -octave spectrum with noise and spurs of dithered 1kHz tone at -90dBFS, with: 16-bit data (top), 24-bit data (middle), DSD data (bottom) (right channel dashed).

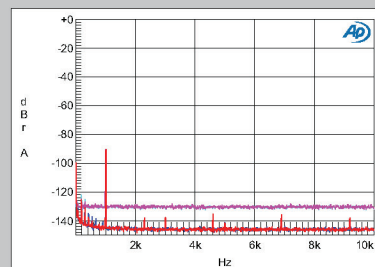


Fig.4 Krell Cipher, FFT-derived spectrum with noise and spurs of dithered 1kHz tone at -90dBFS with: 16-bit data (left channel cyan, right magenta), 24-bit data (left blue, right red) (linear frequency scale).

the difference between the steel- and nylon-string guitars. Through other players (including the Evolution 505), the start of Radiohead's *In Rainbows* (CD, TBD 0001) has sounded a bit like a train wreck, the drums and the electronic gnashings smooshed together; through the Cipher, they sounded not only more crisp and dynamic, but also more distinct, in terms of both space and timbre.

The Evolution 505 let me hear more vibrato from the bass strings in David Zinman and the London Sinfonietta's recording of Górecki's *Symphony 3* (CD, Elektra/Nonesuch 79282-2), more attack from all strings, and more modulation in soprano Dawn Upshaw's voice, than I'd heard with other CD players. The Cipher did all that, and it let me hear much more bowing in the deep double basses in the movement's first minute (which is all but inaudible through some systems), as well as much more counterpoint between the cellos and the double basses in the third minute. I also heard the piano chords under Upshaw's voice with greater clarity than ever.

But I don't mean to turn this review into a checklist, or to liken the Cipher to an X-ray machine clinically spotlighting each lung and ligament of some musical anatomy. Some pieces of gear with exceptionally high resolution are like that: white light, but no warmth. The remarkable thing about the Cipher was that it unveiled all the details without losing what makes them add up to music: the seamless dynamic contrasts, the holographic imaging of a voice or instrument (especially up front), the uncanny sense that a foot is stepping on the pedal of the kick drum, that a bow is gliding across the violin, that vocal cords and even—with a really well-recorded disc, such as Lorraine Hunt Lieberson's of J.S. Bach's *Cantatas BWV 82 and 199* (CD, Nonesuch 79692-2)—that a chest and lungs are heaving forth a singer's voice.

Two examples. First: At a Consumer Electronics Show several years ago, I sat in one room (I forget what components were involved) listening to Sheryl Crow & Friends' *Live in Central Park* (CD, A&M 06949-0574-2), amazed at how *live* it sounded: the eye-blinking drums, the wailing guitars, Crow's palpable presence, the ambiance of the crowd, the sheer dancing-in-your-head joy of it. Over the years, I've tried to get my various systems make that disc sound the way it sounded in that CES room, but they never quite have. I figured maybe my speakers weren't big enough, or my amp wasn't powerful enough. But with the Cipher, I heard it; I got that goose-bump sensation for the first time.

Second: Miles Davis's trumpet in his performance of Cyndi Lauper's "Time After Time," from his terrific, strangely neglected *Live Around the World* (CD, Warner Bros. 46032-2). I could go on about how the Cipher let me hear more of his breath on the mouthpiece, the slight sputtering, the purity of his tone in the quiet parts. But what dazzled me was the emotional depths of his playing, the mournful quality he lent to this pop tune, to a degree I'd never heard before—and I've listened to this track through other machines probably 100 times.

True, I made some similar claims in my review of the Evolution 505. I feel a bit like Nigel Tufnel in *This Is Spinal Tap*, saying that his guitar amp goes up to 11. But believe

The remarkable thing about the Cipher was that it unveiled all the details without losing what makes them add up to music.

I performed this test with the Cipher set to Filter 1, which, on Krell's recommendation, was how FK had listened to SACDs; the low output level of this Filter slightly compromises absolute resolution.

Fig.4 repeats the spectral analysis for 16- and 24-bit data with an FFT technique; again, it reveals that the increase in bit depth drops the noise floor by around 16dB above 1kHz, though a few very-

low-level idle tones are unmasked by the reduction in noise. Figs. 3 and 4 also show that some power-supply spurs are present, though these all lie at or below -120dB and will therefore be inconsequential. Commendably, with DSD data there was no change in the noise floor as the signal level changed (fig.5).

Linearity error with 16-bit data (not shown) was less than 41dB above

-110dBFS, and was dominated by the recorded dither noise. With an undithered CD signal at exactly -90.31dBFS, the Cipher's excellent linearity and low noise readily allowed the waveform to be reproduced with good symmetry (fig.6). This graph was taken with Filter 1; Filter 2 gave an identical result. DSD data at the same level gave a well-formed sinewave (fig.7).

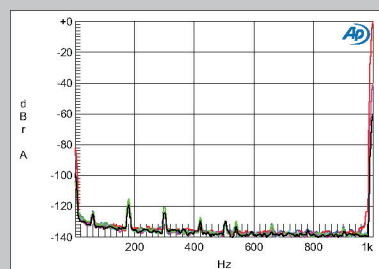


Fig.5 Krell Cipher, spectrum of 1kHz sinewave with DSD data, DC-1kHz, at 0dBFS into: 100k ohms (left channel blue, right red), -40dBFS (left cyan, right magenta), -60dBFS (left green, right gray) (linear frequency scale).

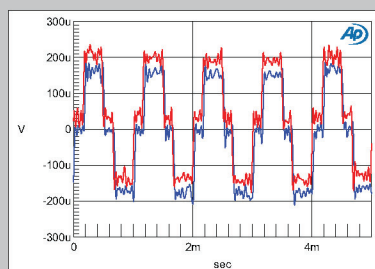


Fig.6 Krell Cipher, Filter 1, waveform of undithered 1kHz sinewave at -90.31dBFS, 16-bit data (left channel blue, right red).

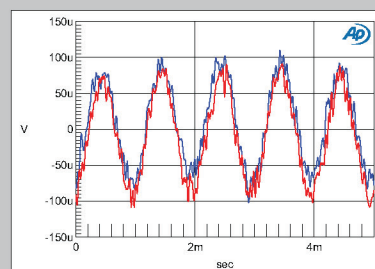


Fig.7 Krell Cipher, Filter 1, waveform of dithered 1kHz sinewave at -90dBFS, DSD data (left channel blue, right red).

ASSOCIATED EQUIPMENT

Analog Source VPI Classic turntable & tonearm, Lyra Delos cartridge.

Digital Source Krell Evolution 505 SACD/CD player, Ayre Acoustics DX-5 universal player.

Phono Preamplifier Nagra BPS (battery powered).

Integrated Amplifiers Simaudio Moon Evolution 700i, Krell FBI.

Loudspeakers Revel Ultima Studio 2.

Cables Nirvana interconnects and speaker cables, Nordost CAST.

Accessories Bybee Technologies Signature Model Power Purifier, Black Diamond Racing Mk.IV Cones, VPI HW-19 record-cleaning machine.—Fred Kaplan

me: the Cipher does all that the 505 does, but more so: It goes up to 11.

Miscellaneous Comments

I regret one thing about my review of the Evolution 505. The only amp I had on hand at the time was Krell's FBI integrated. For the most part, I listened with CAST cable connecting the 505's CAST outputs to the FBI's CAST inputs. Briefly, though, I listened while using balanced cable between the balanced inputs and outputs. The difference was so jarring—the CAST connection was so superior—that I advised readers not to pay so much money for the 505 unless they also owned or bought an FBI, or a Krell preamp with CAST circuitry.

In retrospect, I think that observation said more about the FBI than the 505, or perhaps about the best way to connect

two Krell CAST components. The Cipher sounded terrific hooked up to the Simaudio Moon Evolution 700i, which has no CAST inputs, meaning I had to use the Cipher's balanced outputs. (To clarify: Although the Cipher's *internal* circuitry is CAST, if you connect it to a non-Krell preamp, the signal is *not* converted to voltage mode until the output stage—you're not wasting the proprietary circuitry, or all those extra transistors, if your other gear is made by a *different* company.) When I connected the Cipher to the FBI, it sounded different, in the same way that the FBI sounds different from the Simaudio. (I wrote about that difference in the March 2011 issue: www.stereophile.com/content/simaudio-moon-evolution-700i-integrated-amplifier.) Which, by the way, suggests that the Simaudio is quite neutral, imposing very little coloration at the start of an often long and bumpy signal path. In any case, my descriptions of the Cipher's sound stem from my listening to it through the Simaudio. Enough said.

One more thing: In order to compare the Cipher with another CD player in its price range other than the Evolution 505, John Atkinson briefly lent me an Ayre Acoustics DX-5 (\$10,000), which has been very favorably reviewed in these pages (www.stereophile.com/content/ayre-acoustics-dx-5-universal-disc-player). I didn't listen long enough to make a systematic evaluation, but my impression was that the Ayre had better midrange, and maybe more coherence, through the upper midrange—as I could hear in the brash clarity of strummed electric guitars. But the Cipher was better at disentangling musical complexities, distinguishing between similar but different kinds of instruments (*ie*, getting the tonal colors and overtones right), and getting dynamics right; I found it more exciting—but not overexciting. It would be great to have a player with the Ayre's mid- to upper mid-

measurements, continued

As expected from a Krell player, the Cipher offered very low amounts of harmonic distortion, with the second and third harmonics highest in level (fig.8). In fact, the distortion is around 10dB lower than with Krell's older Evolution 505 player. This graph was taken into the benign 100k ohm load; dropping the load to 600 ohms actually reduced the level of the third

harmonic, leaving the second harmonic unchanged at -110dBFS (0.0003%, not shown). Tested with an equal, full-scale mix of 19 and 20kHz tones, the Cipher offered very low levels of intermodulation distortion (fig.9), though the fact that I had only a 16-bit version of this test signal on disc means that the noise floor in this graph looks rather hashy. The Evolution 505 offered a rather

idiosyncratic performance when tested for jitter rejection with CD playback.

By contrast, the Cipher's jitter rejection was superb, with no accentuation in its analog output of the odd harmonics of the low-frequency squarewave component of the J-Test signal (fig.10).

The Krell Cipher's measured performance can be summed up in one word: superb.—John Atkinson

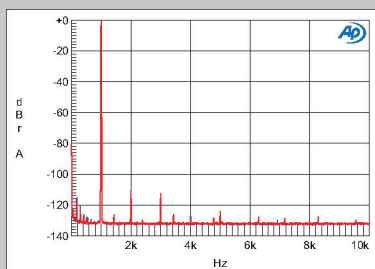


Fig.8 Krell Cipher, spectrum of 1kHz sinewave, DC-10kHz, at 0dBFS into 100k ohms (left channel blue, right red) (linear frequency scale).

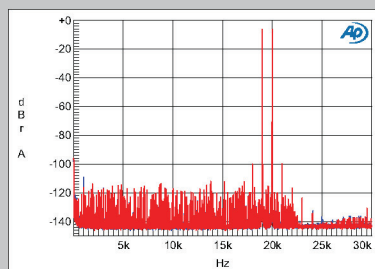


Fig.9 Krell Cipher, HF intermodulation spectrum, DC-30kHz, 19+20kHz at 0dBFS into 100k ohms, 16-bit CD data (left channel blue, right red) (linear frequency scale).

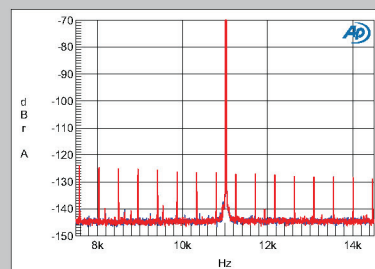


Fig.10 Krell Cipher, high-resolution jitter spectrum of analog output signal, 11.025kHz at -6dBFS, sampled at 44.1kHz with LSB toggled at 229Hz: 16-bit data from CD (left channel blue, right red). Center frequency of trace, 11.025kHz; frequency range, 43.5kHz.

range and the Cipher's everything else. I guess that's what \$20,000 CD players are for.

Caveats

The first Cipher that Krell sent me had problems. A few discs wouldn't load, and the player's innards would grind ferociously while trying to load them. With a few other discs,

The Krell Cipher is a great CD player: the best I've heard in its price range, and the best I've heard, period, in my home system.

the Cipher would skip or go dead silent at certain points or, in a couple of cases, simply stop. I sent it in for examination. Krell's President, Bill McKiegan, said the tech guy found no problems but had replaced the laser head. They sent it back to me, and I started listening. Pretty soon, I heard the same problems. I sent it back again, this time asking McKiegan that he replace it with an entirely different unit, which he did. I've been playing it a *lot*, including those discs that the earlier unit couldn't handle, and I've heard *no* problems.

Early versions of the Evolution 505, which used the same Raymedia disc drive, were also very noisy. A Krell firmware modification made them less so, though still not entirely

quiet, at least not with all discs. As noted earlier, the Cipher incorporates still more firmware mods and extra damping.

The replacement unit has been quiet, and in this most basic function of playing discs has worked flawlessly. Was my first unit a quirk? Or are there quality-control problems with this disc drive? I don't know. Krell provides a three-year warranty on the Cipher's mechanical parts; the problem, when I had it, occurred from the get-go. Even in the worst case, you wouldn't be *stuck* with a lemon.

Two more caveats, the first also true of the 505: The function buttons on the faceplate are arrayed in no apparent logical order—unless, as someone's idea of a joke, they're spelling out a message in Braille. They're also small, and the labels below them (Play, Stop, Pause, etc.) are smaller still. My second complaint is new: The remote control has too many buttons in addition to the ones you need all the time (Play, Stop, Pause, track numbers, etc.), including several that you need only once, if at all (eg, Menu Settings). Because these buttons, too, are small, it's easy to hit the wrong one, especially as there's no backlighting. Please, Krell: A simpler remote would be welcome.

Conclusions

Despite my mutterings about the name and the design—which, in the broad scheme of things, are minor—and assuming that my initial laser problem was a fluke, the Krell Cipher is a great CD player: the best I've heard in its price range, and the best I've heard, period, in my home system. Maybe it will be obsolete before the decade is out, but a lot of CDs will still be out there, waiting to be played. If I can scrounge up the change, I'm buying one. ■