tion of my ears in my listening chair. The spatial averaging minimizes position-dependent room effects, while the measurement integrates the speaker's on- and off-axis behaviors in a manner that has proved in the past to correlate quite well with what is heard. The response trend is generally smooth, though a rise is apparent throughout the midrange. The off-axis flare at the bottom of the tweeter's passband doesn't completely smooth out the step in the on-axis response, but it does reduce its severity. Despite my feeling that the Totem could sound a bit mellow, there is actually plenty of energy present in-room in the top two audio octaves. The bass is shelved down, but the rate of rolloff is not as severe as I might have expected; in the positions the Totems ended up in, they were definitely getting some low-frequency reinforcement from my room's sidewalls.

Finally, the Totem's cumulative spectral-decay plot on the tweeter axis (not shown) was a little cleaner than that of the original (see www.stereophile.com/standloudspeakers/820/index3.html), with slightly less delayed energy evident at the frequency of the low-treble response step. The region covered by the tweeter was very clean.

Summing Up: No doubt about it: Totem's Model 1 Signature is a little gem, a *pur sang* minimonitor. As long as it is used in a room that offers it sufficient low-frequency support, it will provide long-lasting satisfaction. It joins the Harbeth HL-P3ES2 ($1850/pair) and the AAD Silver One ($1550/pair) in the list of my favorite minis. Highly recommended—again!

PrimaLuna ProLogue Eight CD player

Back in the July issue, Fred Kaplan and I jointly reviewed the PrimaLuna ProLogue Eight CD player ($2495; see www.stereophile.com/cdplayers/708prima). Designed in the Netherlands but manufactured in China,[5] the ProLogue Eight features technologies both old and new. While each channel's DAC chip is a highly specified, 24-bit Burr-Brown PCM1792 fed by a Burr-Brown SRC4192 upsampling converter running at 192kHz, the audio signal is handled by pairs of 12AX7 and 12AU7 dual-triode tubes, with 5AR4 tubes used for power-supply rectification. And rather than the usual

cutline

crystal-controlled solid-state clock circuit, the ProLogue Eight uses a crystal working with an oscillator based on a mini-triode tube.

Information about the sonic advantages of using a tube in this application were not available at the time of our original review. However, subsequent correspondence with PrimaLuna engineer Marcel Crouse revealed that while the clock frequency is set by the crystal, the purity of that frequency is controlled by the noise floor of the amplifying device in the oscillator circuit. In the region of interest, 0–40kHz (a relatively narrow bandwidth because of the oscillator's very high Quality Factor, or Q), the tube actually has lower self-noise than a typical wide-bandwidth, low-noise transistor. The result, according to Crouse, is much lower phase noise on the master clock signal, which in turn results in a more precisely defined datastream.

Fred and I both liked how the ProLogue Eight sounded. In particular, I noted that it "threw the widest, deepest soundstage from CDs that I have experienced," and that "individual images within that stage were clearly delineated, with a palpability more akin to what you get from SACD (or LP)." On the downside, the ProLogue Eight didn't go quite as deep in the bass as my reference Ayre CX-5e player, nor was its upper bass quite as well defined. "Sounding a little soft," I wrote, "the upper harmonics were slightly emphasized, to the detriment of the fundamental and the second harmonic—not unpleasant, but not strictly accurate, either."

Our sample of the ProLogue Eight was the base model, which uses the venerable NE5534 op-amp chip in the current-to-voltage conversion circuit that follows the DAC chip's output. The '5534 is a low-noise, very-low-distortion chip, but ideally, you want an op-amp with as high a slew rate as possible to perform the I/V conversion. PrimaLuna offers a choice of two upgrade boards that replace the four '5534s with better-performing op-amps—while the identity of this new chip is obscured, its slew rate is specified as 100V/µs instead of the older chip's 13V/µs. The Basic I/V board ($150) contains just the four chips; the Super I/V board ($235) adds upgraded bypass capacitors and additional power-supply caps. The Basic board does have the pads and holes to allow the user to solder in his or her own choice of capacitors, though the limited real estate will eliminate the bulkier polypropylenes and polystyrenes.

Upgrading the ProLogue Eight with one of the new boards is a relatively straightforward matter requiring no special tools or soldering skills. You flip the player upside down and remove the bottom cover. The four NE5534 chips can be seen immediately behind the output RCA jacks, plugged into 8-pin DIP sockets on the main circuit board. These chips can be removed with nee-

5 The ProLogue Eight costs $2495. The Super I/V upgrade boards cost $150 (Basic) and $235 (Super). Manufacturer: Durob Audio BV, PO Box 109, 5250 AC Vlijmen, The Netherlands. Web: www.primaluna.nl. US distributor: PrimaLuna USA, 2504 Spring Terrace, Upland, CA 91784. Tel: (909) 931-9686. Web: www.primaluna-usa.com.

dle-nose pliers. (Make sure you don't snag any of the leads on the four vertically mounted resistors adjacent to the chips.) Each of the new boards carries four surface-mount chips on its top side; underneath, it has four sets of 8 pins each that plug into the now-vacant DIP sockets. It's a bit of a tight fit; I found it helped to unplug the jumper cable that connects the left-channel output jacks to the main board, which allowed me to see that I had correctly engaged the rather fragile pins with the sockets before pushing down on the board (not the caps) to secure it in place. If all is well, the jumper cable can then be reconnected and the player's bottom cover replaced.

Before I auditioned the upgrade boards with the ProLogue Eight, I performed a full set of measurements with each board. The maximum output levels, output impedances, frequency responses, low-level spectral analyses, and distortion signatures were the same with either of the new boards as with the original I/V stage (see www.stereophile.com/cdplayers/708prima/index5.html). The jitter rejection was also unchanged—while the measured jitter level was higher than with the best-performing players, this is due to the presence of sidebands at the power-supply–related frequencies of ±60Hz and ±120Hz. Data-related sidebands were at the residual level in both cases. Though the analog noise floor with the high–slew-rate op-amps was about 6dB higher than with the NE5534s, it was still below the CD's 16-bit noise floor. Still, these measurements did *not* lead me to expect any change in sound quality.

Which is why I was surprised by what I heard. Now, I admit that it was not possible to do direct comparisons of the new I/V boards with the stock player, but my listening notes are consistent: To a noticeable degree with the Basic board, and to a greater degree with the Super board, there was more of a sense of ease to the sound. Nonmusical aspects of a recording, such as the analog tape compression and modulation noise on the 1962 recording of Delius's *La Calinda*, with George Weldon conducting the Philharmonia Orchestra (CD, EMI CDM 7 69534 2), floated a little bit more free of the music. Paradoxically, this allowed the spuriae to be both more readily identified *and* more easily ignored. On more modern, more sonically pure record-

ings, such as Vladimir Horowitz's final concert in 1987, *Horowitz in Hamburg* (CD, Deutsche Grammophon 00289 477 7558), the piano image sounded more palpable within the dome of ambience than it had through the stock ProLogue Eight.

Even with one of the new I/V boards, the ProLogue Eight didn't dig quite as deep in the bass as the Benchmark DAC 1, let alone the Mark Levinson No.30.6. But its upper bass seemed better delineated than with the NE5534 chips. Tony Levin's obbligato bass-guitar chords at the start of "Don't Give Up," from Peter Gabriel's *Secret World Live* (CD, Geffen 20642 47222), had a touch more leading-edge definition, his bottom-octave riffing at the end of the song a tad less boom. The combination of enormous soundstage projection, an increased sense of ease, and a cleaned-up bass allowed such complex soundscapes as the "I hold the light" chorus of "San Jacinto," from Gabriel's *Security* (British CD, Charisma 800 091-2), to sound simply magnificent. This may be one of the oldest CDs in my collection, in theory suffering from all manner of early "digititis" ills, but through the updated ProLogue Eight I could listen at high levels without strain—and that was with me *knowing* that the PrimaLuna becomes less linear with signals that approach 0dBFS. So much for the power of suggestion!

Do I have any other grumbles? Just two, both trivial, and neither concerning the player's sound. First is the lack of numeric track access via the remote control. Second, the CD drawer is the *slowest* I have ever used. After placing a CD in the open drawer and pressing Play, you have time to get a coffee before sitting in your listening chair.

I auditioned the I/V board upgrades for the ProLogue Eight while preparing this issue's "Recommended Components" list. Trying to decide on a fair rating for the standard player was an exercise in frustration: while it excelled in soundstage reproduction, it was more pedestrian in other areas, such as its softened upper bass. But with either of the I/V upgrades installed, the PrimaLuna becomes a straight Class A recommendation.

The question is, which board to install? For my money, I would go straight to the Super I/V upgrade. The extra $85 is well worth the extra sonic satisfaction, I feel. **–John Atkinson**