

# PrimaLuna DiaLogue Seven

ART DUDLEY

POWER AMPLIFIER

## DESCRIPTION

Monophonic tube amplifier with push-pull output stage. Tube complement: two 12AX7, two 12AU7, four KT88. Maximum output power: 40Wpc in triode mode (16dBW into 8 ohms, 70Wpc in ultralinear mode (18.45dBW into 8 ohms), both at 2% THD. Frequency response: 10Hz–100kHz,  $\pm 3$ dB. Input impedance: 100k ohms. Output impedances: 2, 4, 8 ohms. Signal/noise:  $>84$ dB unweighted (no reference level given). Total harmonic distortion:  $<0.25\%$  at 1W, 2% at rated power.

**DIMENSIONS** 15.2" (385mm) W by 8.3" (210mm) H by 15.9" (405mm) D. Weight: 63.8 lbs (29kg).

## SERIAL NUMBERS OF UNITS REVIEWED

08073916, L & R.

**PRICE** \$4999/pair. Approximate number of dealers: 11, also sold direct.

**MANUFACTURER** Durob Audio BV, PO Box 109, 5250 AC Vlijmen, The Netherlands.

Tel: (31) 73-511-25-55.

Web: [www.primaluna.nl](http://www.primaluna.nl)

US distributor: PrimaLuna USA, 2504 Spring Terrace, Upland, CA 91784.

Tel: (909) 931-9686.

Web: [www.primaluna-usa.com](http://www.primaluna-usa.com).



PrimaLuna DiaLogue Seven monoblock power amplifier

**S**tep 1: Find something that works. Step 2: Use it. Step 3: Repeat as necessary, then retire.

That doesn't work everywhere—the arts are inhospitable—but for those with less lofty goals, it's nice to have a *formula*, especially a good one. The people behind the PrimaLuna line of audio electronics probably know that as well as anyone. A few years ago they combined a unique amplifier design with a similarly distinctive business model to create the ProLogue One, a product known for both value and reliability: the former by combining Chinese assembly with European (in this case, Dutch) quality, the latter for a circuit innovation that made the thing darn near foolproof.

The formula has been applied, with apparent success, to a number of subsequent products, the latest being the PrimaLuna DiaLogue Seven monaural tubed amplifier (\$4999/pair), which offers 70Wpc in ultralinear mode or 40Wpc when run as a triode amp—and does so in a mildly remarkable way.

## Description

As with earlier PrimaLuna amplifiers, the DiaLogue Seven's calling card is a circuit innovation called Adaptive AutoBias. The term *auto bias* normally describes a circuit in which the signal grid of a power tube is referenced to ground, and the potential

of the cathode is raised above ground through a cathode resistor,<sup>1</sup> thus prompting the tube to adjust itself under operating conditions. PrimaLuna's variation of the name refers to something different: a fixed-bias amp in which the voltage applied to the signal grid is adjusted, minutely and continuously, in response to such variables as operating temperature and input-signal amplitude. Thus the Adaptive AutoBias circuit, central to which are a microprocessor and other silicon bits, keeps the output tubes operating within their best parameters at all times—which, according to PrimaLuna, provides significant reductions in both distortion and tube wear. The circuit is also said to allow greater-than-usual flexibility in swapping tubes, in terms of

1 The presence of a cathode resistor is not itself a sign of auto bias: A very-low-value resistor here makes it possible for a technician to measure and adjust his output tubes yet still run them in fixed-bias mode.

both age and tube type, while keeping performance on an even keel. I'm told that one can even use in the DiaLogue Seven different ages or types of tubes for the two sides of a single complementary pair, for the sheer jaunty fun of it.

Another innovation distinguishes this new PrimaLuna amp from the competition—and, in this instance, from the company's humbler ProLogue series: Not only can the DiaLogue Seven be run in either triode or ultralinear mode, but the user can switch between those modes at will, with the push of a button on a remote handset (included). The late, great Peter Snell, who devised some clever ways to adjust crossover parameters from his listening seat in an effort to perfect his loudspeaker designs, is surely smiling upon this.

When I opened the DiaLogue Seven's chassis for a look inside, the key to its dual-mode design surprised me. (Had I

given it just a bit more thought, I might have figured it out when I first lifted the amp from its sturdy triple carton—and noted its 71-lb-per-channel shipping weight.) Each monophonic DiaLogue Seven contains one mains transformer and *two complete output transformers*. In triode mode, of course, the screen grids of the KT88 pentode tubes are tied to the plates, and the tubes operate as indirectly heated triodes. But in ultralinear mode, the screen grids are tied to a portion of the primary windings of the output transformer, in a distortion-canceling scheme that functions rather like feedback. Because that requires tapping the primary at a very specific ratio, the luxury of an extra output transformer on an amp such as this is a Godsend.

In other ways, the PrimaLuna DiaLogue Seven is comparatively straightforward: solid-state rectification and a robust *pi* filter for the power supply, along

## MEASUREMENTS

I examined the PrimaLuna DiaLogue Seven's measured behavior using *Stereophile's* loaner sample of the top-of-the-line Audio Precision SYS2722 system (see the January 2008 "As We See It" and [www.ap.com](http://www.ap.com)); I also used my Audio Precision System One Dual Domain for some tests. With three output-transformer taps and two output operating modes (triode and ultralinear), the DiaLogue Seven offers six choices of how it can be used. I performed a complete set of measurements from each tap in triode and ultralinear modes, but have published here only a limited selection of the graphs to illustrate the points I want to make.

The PrimaLuna preserved absolute polarity (*ie*, was non-inverting) from all transformer taps in both ultralinear and triode mode. As expected, however, the gain varied according to both mode and tap. In ultralinear mode, the voltage gain into 8 ohms was 26.9, 26.3, and 24.8dB, from the 8, 4, and 2 ohm transformer taps, respectively. In triode mode, the corresponding figures were 23.5, 22.1, and 20dB. Even with the generally low gain, however, the preamplifier used with the DiaLogue Seven won't be asked to deliver more than 1.5V RMS to drive the amplifier to its maximum output.

The DiaLogue Seven's input impedance was very high, at around 100k ohms in the bass and midrange, dropping to a still-high 70k ohms at the top of the audioband. High is good for a component's input impedance, as this means it won't load down the source component's output in any significant way. High is not good for a component's output impedance, however, and, as with other PrimaLuna amplifiers *Stereophile* has reviewed, the DiaLogue Seven's output impedance was indeed high. In the worst case, ultralinear mode from the 8 ohm tap, the impedance was 8 ohms across the audioband. Triode mode dropped this to a still-high 4.3 ohms, and in general, changing to an output transformer tap with half the nominal impedance halved the output impedance in both

ultralinear and triode modes. In the best case, triode mode from the 2 ohm tap, the PrimaLuna's output impedance was 1.2 ohms, which is still quite high in absolute terms.

The justification for designing an amplifier to have a high output impedance is that the maximum transfer of power occurs when the output impedance is equal to the load impedance. An 8 ohm impedance feeding an 8 ohm load transfers more power to the load than would a greater or smaller impedance. However, there is a price to be paid: because loudspeaker impedances vary considerably with frequency, high output impedances result in significant modification of the amplifier's frequency response, due to the Ohm's Law interaction between the amplifier and loudspeaker impedances. This is illustrated by the gray trace in fig. 1, which shows the DiaLogue Seven's frequency response from the 4 ohm tap in ultralinear mode into *Stereophile's* standard simulated loudspeaker. The response varies by up to  $\pm 2.1$  dB, which will be audible. From the 8 ohm tap (not shown), the response variation was  $\pm 3.2$  dB, which will be very audible. Three other things can be seen in

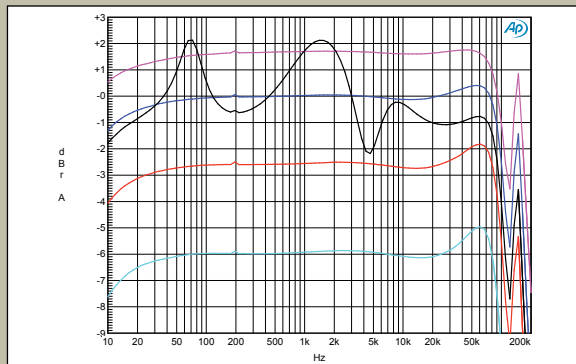


Fig. 1 PrimaLuna DiaLogue Seven, ultralinear, 4 ohm tap, frequency response at 2.83V into: simulated loudspeaker load (gray), 16 ohms (magenta), 8 ohms (blue), 4 ohms (red), 2 ohms (cyan). (1dB/vertical div.)

with parallel 12AX7 tubes and a long-tail pair of 12AU7 tubes for the input/driver section. But in one other regard the amp is far from ho-hum: the quality and care with which it's made. Apart from the above-mentioned AutoBias circuit and the logic bits for the remote control, the DiaLogue Seven is completely hand-wired, point to point—and I've never seen a better-built amp. Wires were neatly trimmed and dressed, with no strand out of place. I spent a long time trying to find a single bad solder joint, and could not: Someone made this as if it mattered.

**Installation and setup**

The DiaLogue Seven's input and output characteristics suggest good installation flexibility, the former by its 100k ohm impedance (and apparently generous gain), the latter by its choice of loudspeaker connections: 2-, 4-, and 8-ohm secondaries. As for that, I played the PrimaLunas

through two very different loads: my usual Audio Note AN-E SPe HE (for High Efficiency) loudspeakers, and a borrowed pair of Wilson Audio Specialties Sophia 2s, recently and expertly installed by Wilson's Peter McGrath. My original

The DiaLogue Sevens weren't fussy about placement—a nice thing to say about any pair of amplifiers that together weigh more than some adults—and for the most part I kept them on my hardwood floor, without benefit of isolation tweaks. They

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intention was to try the DiaLogue Sevens with my rebuilt Quad ESLs, as well: Regrettably, I wasn't able to do that within this initial review period, but PrimaLuna USA is allowing me to keep the review samples a little longer than usual, during which time I'll try the Quad option.

became warm during use but not alarmingly so; their elegant-looking tube cages, held neatly in place with banana-style bayonet connectors, provided ample protection, amp from user and user from amp.

Notwithstanding unrectified current on all tube heaters, the Sevens never

fig.1: first, the DiaLogue Seven features a wide small-signal response that doesn't begin to roll off until >60kHz; second, in ultralinear mode, there is a sharply defined resonant peak around 150kHz, though the height of this peak drops a little with decreasing load impedance; and third, a low-frequency peak starts to develop into lower impedances.

Fig.2 shows the PrimaLuna's response from the 4 ohm tap but with the amplifier now in triode mode. The variation into the simulated loudspeaker is now  $\pm 1.25$ dB, due to the lower output impedance in this mode, and there is now just a vestigial peak around 150kHz. There is also no sign of any lower-frequency peak, and the response is maintained to well above the audioband. At the other end of the spectrum, the low-frequency response starts to roll off below 40Hz, but is still down only 1.4dB at 10Hz. These are well-designed output transformers, the DiaLogue Seven's reproduction of a 1kHz squarewave in triode mode being extremely square, with flat tops and almost no ringing (fig.3). Similarly, a 10kHz squarewave in triode mode offers only small degrees of overshoot

and ringing, with very short risetimes (fig.4), whereas in ultralinear mode (fig.5), both overshoot and ringing are considerably more developed, this correlating with the ultrasonic peak in the frequency response.

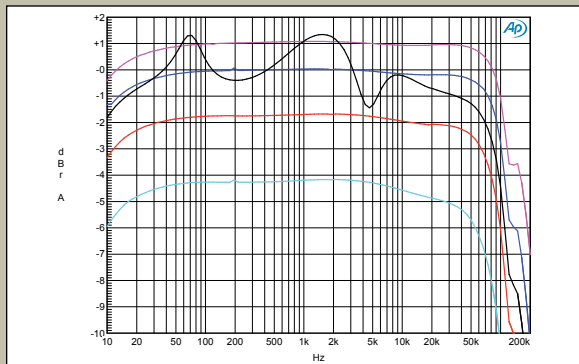


Fig.2 PrimaLuna DiaLogue Seven, triode, 4 ohm tap, frequency response at 2.83V into: simulated loudspeaker load (gray), 16 ohms (magenta), 8 ohms (blue), 4 ohms (red), 2 ohms (cyan). (1dB/vertical div.)

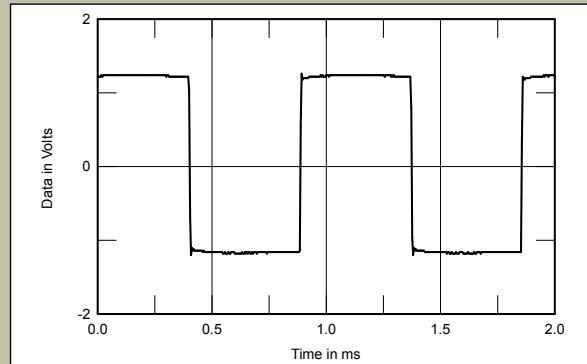


Fig.3 PrimaLuna DiaLogue Seven, triode, 2 ohm tap, small-signal 1kHz squarewave into 8 ohms.

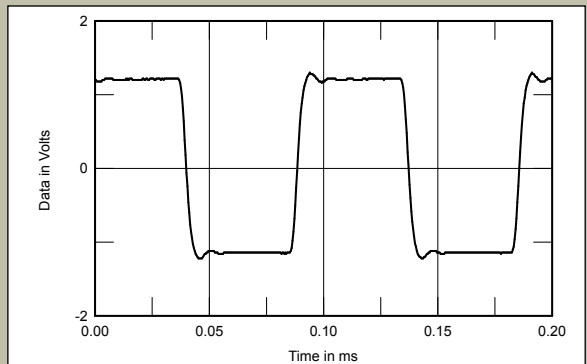


Fig.4 PrimaLuna DiaLogue Seven, triode, 8 ohm tap, small-signal 10kHz squarewave into 8 ohms.

hummed—another testament to their excellent layout and construction. There were no unwanted noises of any sort, in fact, except for a soft and apparently harmless *click* that I heard when using the remote control to switch between triode and ultralinear modes (which, incidentally, is the handset's only function). The only problem I experienced was when the handset became taciturn, seemingly overnight, and would no longer work from distances of greater than a foot. I attempted a battery change, but became listless myself when I saw that the battery was an oddball disc type, and not the sort that I keep around the house.

**Listening**

An enthusiast of low-power amps, I didn't think I'd like the DiaLogue



Cutline QQQ

Seven's high-power ultralinear mode as much as its low-power triode mode. I imagined the former would sound smaller and fussier, more mechanical, and altogether more *hi-fi* than I prefer. I was wrong. Among other things, music through the PrimaLunas in ultralinear

mode sounded every bit as large and *present* as through my Shindo Haut-Brion, itself a low-power amp in which pentode tubes are wired as triodes, but operated with a very small amount of global feedback.

In ultralinear mode the DiaLogue Seven was stunningly dramatic through both loudspeaker pairs. Georg Solti and Leontyne Price's recording of Verdi's *Aida* (LP, RCA Living Stereo LSC-6158) was intensely involving, from the great orchestral and choral tuttis of Act I, Scene 1 ("Guerra! Guerra! Guerra!") to those at the end of Act IV, Scene 1 ("Traditor! Traditor! Traditor!"). At the other end of the spectrum, the dynamic peaks within Jeremy Backhouse and the Vasari Singers' recording of Herbert Howells' motet *Take him, earth, for cherishing* (CD,

**measurements, continued**

I experimented with the grounding between the DiaLogue Seven and my test equipment, but couldn't eliminate a very low level of power-supply noise. The wideband, unweighted signal/noise ratio was therefore good rather than great, at 66.6dB (ref. 2.83V into 8 ohms) from the 8 ohm tap, this improving slightly from the lower-impedance transformer taps. A-weighting the measurement improved the S/N ratio to 83dB.

Figs.6–11 show how the THD+noise percentage in the PrimaLuna's output varies with output power into loads ranging from 2 to 16 ohms. Figs.6–8 were taken in ultralinear mode from the 8, 4, and 2 ohm taps, respectively; figs.9–11 were taken in triode mode. PrimaLuna specifies the DiaLogue Seven's maximum output power at 2% THD rather than the more usual 1%, and you can see from a close inspection of these graphs that, when the load is matched to the nominal value of the transformer tap, the amplifier does meet its specified power outputs of 70W in ultralinear mode (18.45dBW into 8 ohms) and 40W in triode mode (16dBW into 8 ohms) at 2% THD. The lowest

distortion at lower levels is obtained when the load is much higher than the output tap used, and the amplifier is at its most linear from the 2 ohm tap in ultralinear mode, with around 0.07% THD+noise typical below 1W. However, triode

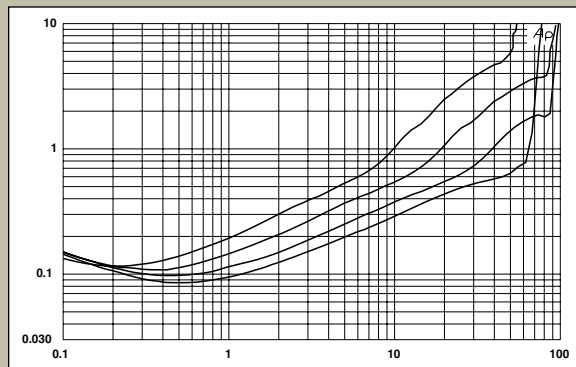


Fig.6 PrimaLuna DiaLogue Seven, ultralinear, 8 ohm tap, distortion (%) vs 1kHz continuous output power into (from bottom to top): 16, 8, 4, 2 ohms.

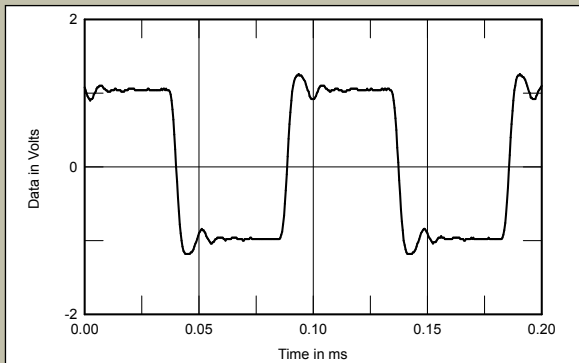


Fig.5 PrimaLuna DiaLogue Seven, ultralinear, 4 ohm tap, small-signal 10kHz squarewave into 8 ohms.

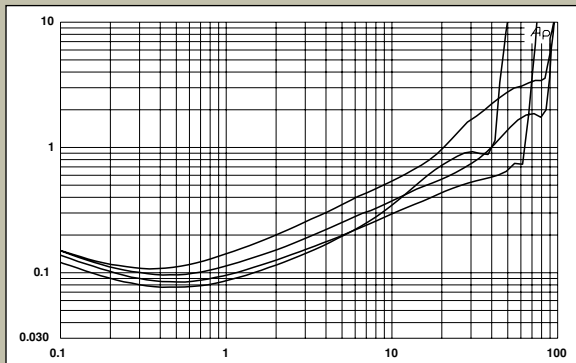


Fig.7 PrimaLuna DiaLogue Seven, ultralinear, 4 ohm tap, distortion (%) vs 1kHz continuous output power into (from bottom to top): 16, 8, 4, 2 ohms.



United 88033) were consistently moving while never sounding harsh or mechanical. Lines of notes had very good momentum and flow, and vocal colors were fine.

In triode mode the DiaLogue Seven sounded softer overall, with a little less sparkle in its upper octaves—yet with more midrange texture, which can impart a sense of natural presence and detail even in the absence of an extended treble range. Similarly, in triode mode the DiaLogue Seven offered less bass content and impact than in ultralinear, as I especially noted when listening to César Franck's *Grande pièce Symphonique*, Op.17, performed by organist Torvald Torén (LP, Lyricon LRC 2-5)—which itself didn't have the floor-rattling capabilities of either the Haut-Brion or the ultralinear but feedback-free Shindo Corton-Charlemagne monoblocks.

My preconceptions were soon con-

founded in another way: I thought the DiaLogue Seven's comparatively soft, tubey triode mode would yield poorer temporal performance—musical timing, momentum, and the like—than its ultralinear mode. Again, that wasn't so. With

up the timing. It sounded dazzling, as it should.

The same held true with pop music. As expected, the DiaLogue Seven's triode mode helped tame overly crisp recordings, such as "Already Dead," from Beck's

## IN TRIODE MODE THE DIALOGUE SEVEN SOUNDED SOFTER OVERALL, WITH A LITTLE LESS SPARKLE IN ITS UPPER OCTAVES—YET WITH MORE MIDRANGE TEXTURE.

the amps in their low-power mode, I very much enjoyed the final movement of Beethoven's Symphony 4 with Pierre Monteux and the London Symphony Orchestra (LP, Victrola/Classic VICS-1102)—a performance that lives or dies on the ability of one's gear to not muck

*Sea Change* (LP, Geffen B00004372-01). Low-frequency note attacks were also softened on that and other tracks from this album—but, again, I was surprised to hear little or no timing distortion on up-tempo songs that depend on kick drum and electric bass for their sense of drive.

### measurements, continued

mode is considerably less linear than ultralinear, reaching 1% THD around 10W from every tap into every load.

The traces in the six preceding graphs were taken at 1kHz. Plotting the THD+N percentage against frequency

revealed that the amplifier's small-signal linearity decreased at both high and low frequencies. Fig.12, for example, was taken in ultralinear mode from the 4 ohm tap, and while the amplifier is obviously more comfortable driving

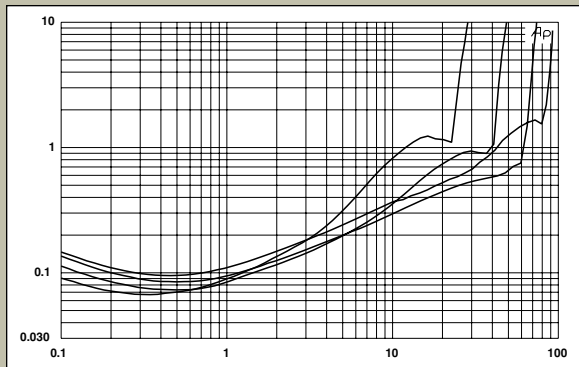


Fig.8 PrimaLuna DiaLogue Seven, ultralinear, 2 ohm tap, distortion (%) vs 1kHz continuous output power into (from bottom to top): 16, 8, 4, 2 ohms.

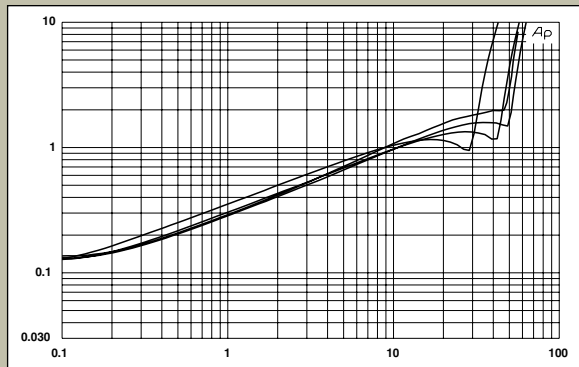


Fig.10 PrimaLuna DiaLogue Seven, triode, 4 ohm tap, distortion (%) vs 1kHz continuous output power into (from bottom to top): 16, 8, 4, 2 ohms.

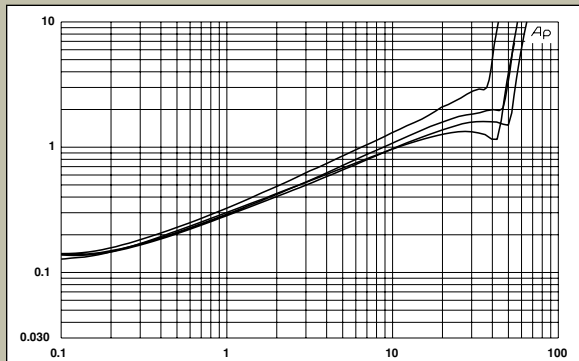


Fig.9 PrimaLuna DiaLogue Seven, triode, 8 ohm tap, distortion (%) vs 1kHz continuous output power into (from bottom to top): 16, 8, 4, 2 ohms.

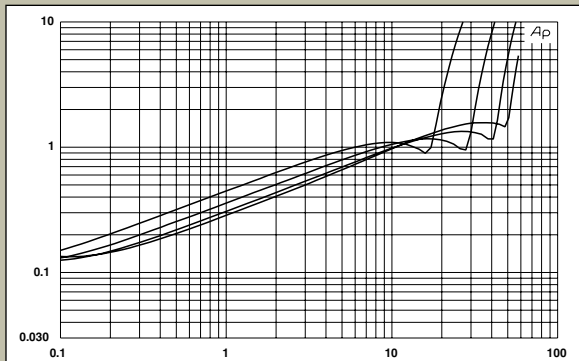


Fig.11 PrimaLuna DiaLogue Seven, triode, 2 ohm tap, distortion (%) vs 1kHz continuous output power into (from bottom to top): 16, 8, 4, 2 ohms.

And though this falls afield of my usual performance notes, I can't resist mentioning the nearly unique clarity and directness—and the latter certainly is a quality I associate with low-power triode amplifiers—that the triode-mode DiaLogue Sevens brought to the *Sprechgesang* in Karl Böhm and Dietrich Fischer-Dieskau's famous recording of Berg's *Wozzeck* (LP, Deutsche Grammophon 2707 023). Many lines had me jumping in my seat, wondering why there were Germans in the house.

Which mode did I most enjoy? As much as the ultralinear mode earned my respect—and, in a number of ways, surprise—I ultimately preferred the DiaLogue Sevens' triode mode with both the Audio Note and Wilson speakers. Even on large-scale music, though the amps seemed more effortless in high-power mode, they compressed the peaks more gracefully in low-power mode, and conse-

## ASSOCIATED EQUIPMENT

**ANALOG SOURCES** Thorens TD-124 Mk.II turntable; EMT 997 tonearm; Shindo SPU, Ortofon SPU 90th Anniversary, EMT OFD 25 & OFD 65 cartridges.

**DIGITAL SOURCES** Sony SCD-777ES SACD/CD player, HRT Music Streamer+ USB DAC (with Apple iMac).

**PREAMPLIFICATION** Auditorium 23 Hommage T1 step-up transformer, Shindo Masseto preamplifier.

**POWER AMPLIFIERS** Shindo Haut-Brion & Corton-Charlemagne monoblocks. **LOUDSPEAKERS** Audio Note AN-E/SPe HE, Wilson Audio Specialties Sophia Series 2.

**CABLES** USB: Belkin Pro. Interconnect: Audio Note AN-vx, Shindo Silver. Speaker: Auditorium 23. AC: JPS Labs The Digital (SACD/CD player).

**ACCESSORIES** Box Furniture Company rack (source, amplification components); Vertex AQ Super Kinabalu platforms; Keith Monks RCM record-cleaning machine.—*Art Dudley*

quently sounded slightly less mechanical overall. A fine example of that was on the song "Sabbath Morning at Sea," from Janet Baker and John Barbirolli's recording

of Elgar's *Sea Pictures* (LP, EMI ASD 655): the London Symphony Orchestra's unmistakably Wagnerian crescendo was less *sweaty* in ultralinear, but somewhat more

## measurements, continued

higher impedances, the distortion increases dramatically into all the loads below 100Hz. The change in behavior with different loads is less extreme in triode mode (fig.13), though the overall distortion is considerably higher than in ultralinear mode.

Fortunately, as with the Rogue tube amplifier also reviewed this month, the distortion at low levels is heavily second-harmonic in content (fig.14), though narrowband spectral analysis indicates that the third and fifth harmonics are also present, as well as the power-supply spurious mentioned earlier (fig.15). At higher powers, the third harmonic rises almost to the level of the second, with now a regular series of harmonics apparent (fig.16).

Though the DiaLogue Seven is less linear at high frequencies than in the midrange, the amplifier did quite well on the high-frequency intermodulation test. At a level just below visible waveform clipping on the oscilloscope, both the second-order difference tone at 1kHz and the higher-order tones at 18 and 21kHz lay at  $-52\text{dB}$  ( $0.25\%$ ) in ultralinear mode (fig.17), and  $-46\text{dB}$  ( $0.5\%$ )

in triode mode (not shown). At low powers (fig.18), the difference tone dropped to  $-66\text{dB}$  ( $0.05\%$ ) and the higher-order products almost disappeared.

When I measure amplifiers like PrimaLuna's DiaLogue

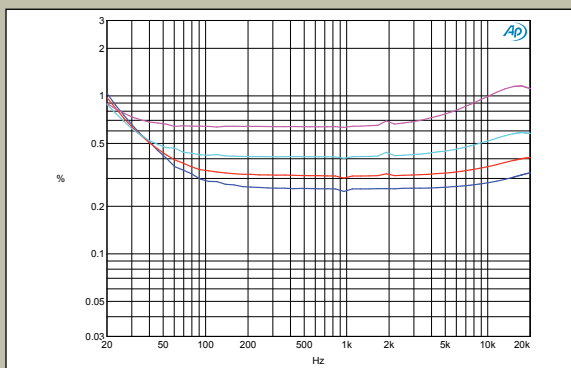


Fig.13 PrimaLuna DiaLogue Seven, triode, 4 ohm tap, THD+N (%) vs frequency at 2.83V into: 16 ohms (blue), 8 ohms (red), 4 ohms (cyan), 2 ohms (magenta).

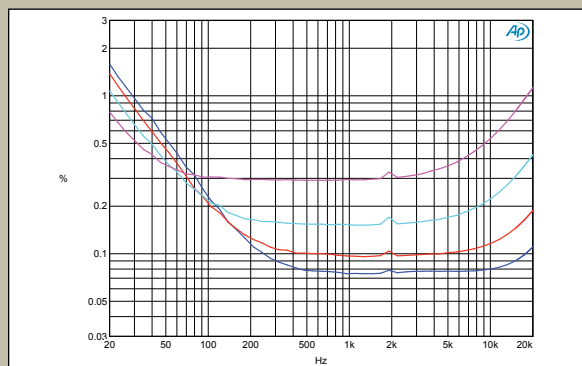


Fig.12 PrimaLuna DiaLogue Seven, ultralinear, 4 ohm tap, THD+N (%) vs frequency at 2.83V into: 16 ohms (blue), 8 ohms (red), 4 ohms (cyan), 2 ohms (magenta).

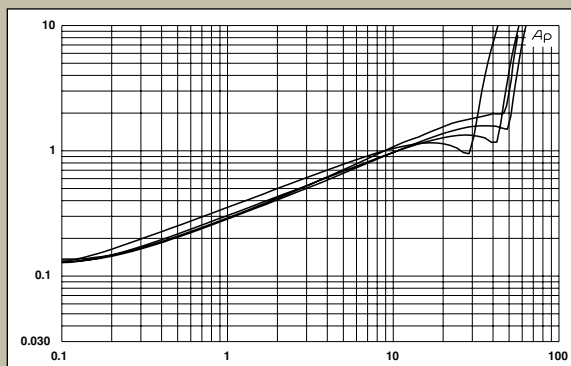


Fig.14 PrimaLuna DiaLogue Seven, ultralinear, 8 ohm tap, 1kHz waveform at 2W into 8 ohms (top), 0.154% THD+N; distortion and noise waveform with fundamental notched out (bottom, not to scale).

mechanical, too; smoothness, albeit with appropriate amounts of believable string texture, was greater in triode mode.

Where did the DiaLogue Sevens fall down? Nowhere, really. They committed no errors of addition, failing only to give *even more* of those things I love, available for a price from a few other sources: the more saturated timbral colors of a Shindo Corton-Charlemagne, the greater bass grip of a Naim NAP250, the even greater psychedelic presence of solo instruments and voices of a Fi 2A3 Stereo. Yet the PrimaLunas were more than satisfying in all those regards, and consistently impressed me with their flexibility and, perhaps more important, their value.

### Conclusions

With each passing year, the products we buy seem more intimately tied to the cir-

cumstances of their creation. In a free society, it's okay to buy whatever we want. That said, it's also okay to be more selective than that, if you feel the need. For consumers as for everyone else, it's okay to *care*.

I'll bet PrimaLuna has *that* figured out, too, because it seems they've made peace with who they are: a company

right there on page 8 of the DiaLogue Seven owner's manual: "Have fun with [this amp] and never let people tell you what sounds right." I couldn't agree more.

From my experience, the DiaLogue Seven succeeds at everything PrimaLuna set out to do: It's an apparently reliable, obviously wonderful-sounding amp that

## THE PRIMALUNAS CONSISTENTLY IMPRESSED ME WITH THEIR FLEXIBILITY AND, **PERHAPS MORE IMPORTANT, THEIR VALUE.**

that could not offer such a combination of performance quality, build quality, and value without having some of their manufacturing done in China.

To some, those are dangerous ideas. To me, the most dangerous idea of all was

offers higher-than-average value—and a lovely opportunity for you to discover the playback approach that suits your ideas about recorded music while, at the same time, having *fun*. Very strongly recommended. ■

Seven, my eyebrows always rise because the things they do wrong must be balanced against the possible sonic benefits of the other things they do. Certainly, the designer's decision to use very high output impedances will drastically affect

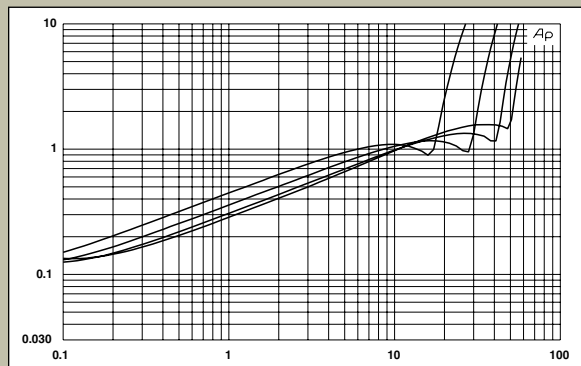


Fig.15 PrimaLuna DiaLogue Seven, triode, 4 ohm tap, spectrum of 1kHz sine wave, DC–1kHz, at 1W into 8 ohms (linear frequency scale).

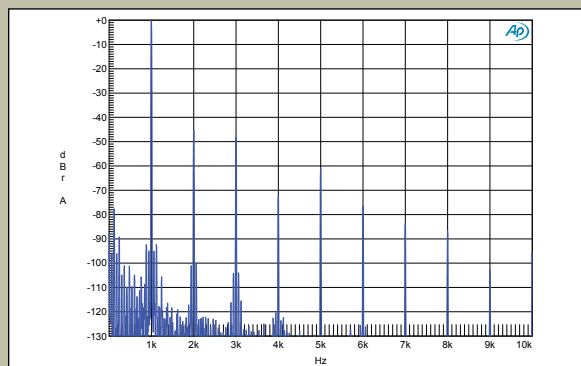


Fig.16 PrimaLuna DiaLogue Seven, ultralinear, 8 ohm tap, spectrum of 1kHz sine wave, DC–1kHz, at 30W into 8 ohms (linear frequency scale).

sound quality for reasons that are well understood. The DiaLogue Seven's measured performance in triode mode was notably worse than in ultralinear mode, yet Art Dudley ultimately preferred triode mode. A puzzle.—John Atkinson

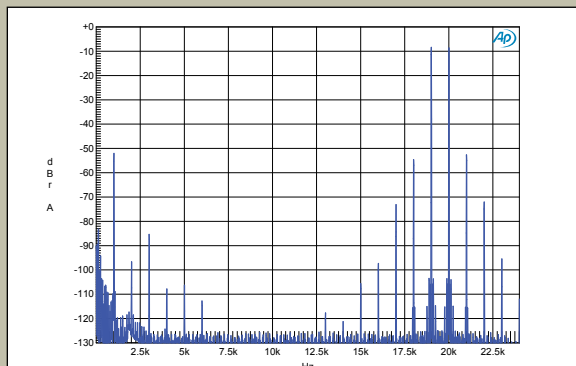


Fig.17 PrimaLuna DiaLogue Seven, ultralinear, 4 ohm tap, HF intermodulation spectrum, DC–24kHz, 19+20kHz at 26W peak into 8 ohms (linear frequency scale).

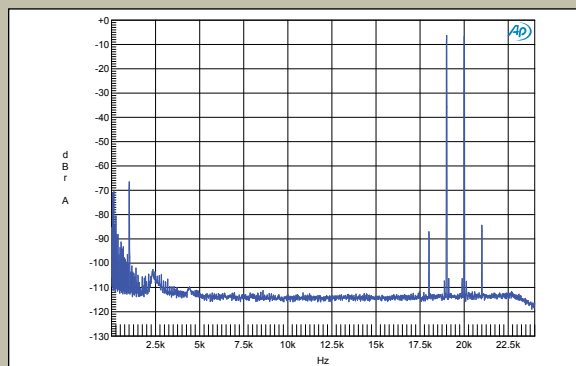


Fig.18 PrimaLuna DiaLogue Seven, ultralinear, 4 ohm tap, HF intermodulation spectrum, DC–24kHz, 19+20kHz at 1W peak into 8 ohms (linear frequency scale).