EQUIPMENT **PROFILE**

DAHLQUIST DQ-30i LOUDSPEAKER

The last Dahlquist loudspeaker reviewed by *Audio* (the M-907i, August 1990) was a conventional box. The DQ-30i, Dahlquist's most expensive system, follows the successful, patented Phased Array Technology design introduced with the firm's first model, the DQ-10, in 1974.

Phased Array Technology addresses two main areas: The minimization of time-based errors by proper driver positioning and the careful elimination of re-radiated sound by controlling diffraction through such features as raised grille frames, specially shaped and smoothed baffles, and flock coatings on baffle surfaces. In addition, each driver's baffle is designed to be as acoustically small as possible, to minimize diffraction and cabinet colorations, and yet sized and shaped so as to maximize driver efficiency.

Dahlquist also pays close attention to minimizing cabinet resonances and unwanted mechanical coupling. In the case of the DQ-30i, this yields, in their words, a "wide open, un-boxy" sound. Both the woofer and separate midrange enclosures have nonparallel sides to inhibit standing waves. The trapezoidal midrange enclosure is only connected to the woofer enclosure indirectly, through metal support rods. (The tweeter is in an open-backed, foam-filled baffle.) The woofer baffle is reinforced with a secondary baffle to increase cabinet rigidity and minimize front-panel flexure.

The DQ-30i looks like no loudspeaker you've seen before. Its most distinctive feature is its bold, swept-back curved grille. The mid/high driver module is enclosed on three sides by hole-punched sheet metal, with a high proportion of open space, held by a metal framework. This assembly provides a very open, acoustically transparent covering. The flexible grille is made from a similar open-punched metal, covered by cloth and held in place by ribbon magnets around its periphery.

The system utilizes a 10-inch woofer in a vented box, tuned to what Dahlquist calls a

SPECS

System Type: Three-way, floor-standing, phased-array, vented second-order quasi-Bessel system.

Drivers: 10-in. cone woofer, 5-in. cone midrange, and ⅞-in. aluminum-alloy dome tweeter.

Frequency Response: 23 Hz to 27 kHz, +0, –6 dB; 27.5 Hz to 27 kHz, +0, –3 dB.

Sensitivity: 89 dB at 1 meter, 2.83 V rms applied.

Crossover Frequencies: 280 Hz and 3.2 kHz.

Nominal Impedance: 4 ohms.

Recommended Amplifier Power: 25 to 250 watts per channel.

Dimensions: 47 in. H × 17½ in. W × 15 in. D (119.4 cm × 44.5 cm × 38.1 cm).

Weight: 95 lbs. (43.2 kg) each.

Finish: Black burled or rosewood finish on metal trim.

Price: $2,000 per pair; optional spiked base for use on carpet, $200 with trade-in of old base.

Company Address: 601 Old Willets Path, Hauppauge, N.Y. 11788.

For literature, circle No. 91

"second-order quasi-Bessel bass alignment." The alignment apparently tunes the box's Helmholtz resonance frequency significantly lower than conventional vented enclosures do. This serves to improve low-frequency power handling and response, while allowing a gradual roll-off, and is said to provide a tighter response than traditional vented or sealed systems do.

DAHLQUIST'S SPECIAL ALIGNMENT IMPROVES POWER HANDLING AND TIGHTENS THE BASS.

The DQ-30i's woofer enclosure is divided into two interior chambers; several large holes in the separating partition allow sound to pass between them. The chamber behind the woofer is completely stuffed with fiberglass and foam absorption materials. The second chamber, which contains the vent, contains no absorption material at all.

The mid and high drivers are sourced from Vifa of Denmark, while the bass driver is supplied by an American manufacturer. All are customed manufactured to Dahlquist's specifications. The long-throw bass driver has an extremely rigid cone and employs Kevlar/cellulose composites said to give the cone material an unusually high stiffness-to-mass ratio.

The 5-inch midrange driver employs poly/carbon fiber composites and hardened polypropylene materials to resist flexure and improve response. The tweeter, ⅞ inch in diameter, incorporates an aluminum-alloy dome, described by Dahlquist as being "dead soft." The high internal damping of the dome is said to move spurious resonances up to inaudible frequencies. The dome is supported by a soft, long-throw, butyl rubber surround that Dahlquist claims enables a longer excursion on powerful transients and greater dynamic range.

Dahlquist says that their Phased Array Technology "places each driver at an optimal position to compensate for its size and reaction time, so that sound from each driver arrives at the listeners at precisely the same time." The company states that "your ears receive a unified wavefront which provides all musical components simultaneously," and thus "sonic realism is dramatically increased."

The crossover of the DQ-30i contains 19 parts, not counting paralleled units. These include six inductors, seven capacitors, and six resistors. All parts are sorted by Dahlquist for close matching. Iron-lamination and air-core coils are used, as are Mylar, polypropylene, and nonpolarized electrolytic capacitors. Electrical slopes are either 12 or 18 dB per octave, and impedance-compensating networks are used generously. The mid/high and the woofer sections of the crossover are connected separately to the rear of the loudspeaker, for possible bi-wiring. Large-diameter stranded wire is employed throughout.

The rear connection panel has two sets of hefty double-banana terminals, connected by gold-plated straps that can be removed for bi-wired operation. The binding posts have hexagonal tops that accept a half-inch nut driver for secure tightening; I wish more systems had this feature.

Measurements

Figure 1 displays the DQ-30i's tenth-octave-smoothed on-axis frequency response. Measurements were taken at a distance of 1 meter from the tweeter, on the tweeter's axis, with 2.83 V rms applied. The response below 400 Hz was derived from in-room and near-field measurements. (I made these tests when 16 inches of snow were on the ground and the temperature was 10° F. Such conditions did not allow convenient outdoor measurements!)

The response is quite smooth and exhibits no significant peaks or dips, but it does show a slight, broad rise between 200 Hz and 3 kHz. The overall curve fits within a fairly tight response window of 5.5 dB from 40 Hz to 20 kHz, with the level at 1 kHz just touching the high edge of the window. The grille causes a fairly major effect on the response above 5 kHz: It reduces the response between 5 and 10 kHz and between 15 and 20 kHz, and increases the response at 12 kHz. Above 20 kHz (not shown), the supersonic response exhibited a sharp dip at 23.6 kHz, followed by a sharp peak at 25.8 kHz—both presumably due to dome breakup.

Averaged from 250 Hz to 4 kHz, the DQ-30i's sensitivity measures 87.4 dB,

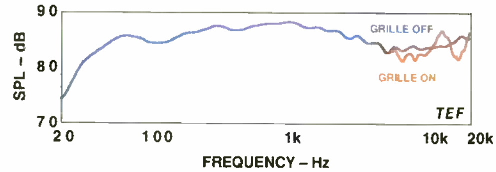

Fig. 1—On-axis frequency response.

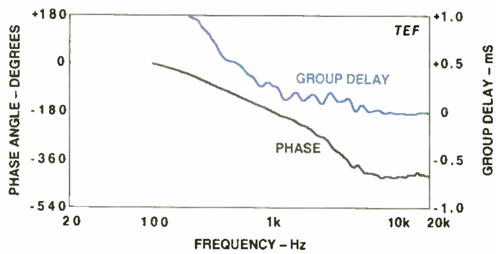

Fig. 2—Phase response and group delay.

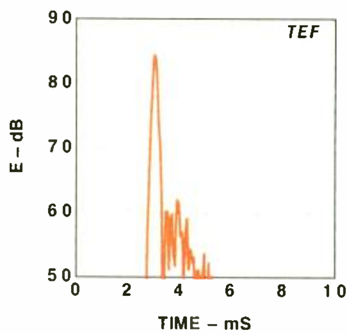

Fig. 3—Energy/time response.

somewhat lower than Dahlquist's 89-dB rating. Right/left matching was a fairly close ± 1.0 dB from 100 Hz to 20 kHz. The main deviation occurred above 3.5 kHz, where one system's tweeter was about 1 dB below that of the opposite system.

Figure 2 shows the phase and group-delay responses of the DQ-30i, referenced to the tweeter's arrival time. Both curves are fairly smooth and well behaved. Between 1 and 20 kHz, the phase response rotates a significant 240°. This rotation is due to a combination of crossover design and the offset between the acoustic centers of the midrange and tweeter. Between 1 and 4 kHz, the midrange's output lags the tweeter's by about 0.14 mS. Apparently, even though Dahlquist claims the DQ-30i is closely aligned in time because of its Phased Array Technology, the alignment is not as close as advertised.

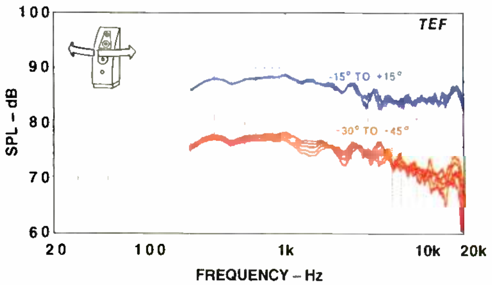

Fig. 4—Horizontal off-axis responses; see text.

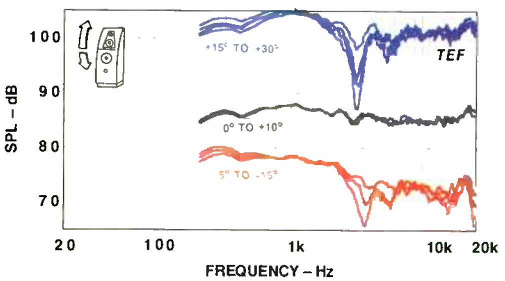

Fig. 5—Vertical off-axis responses; see text.

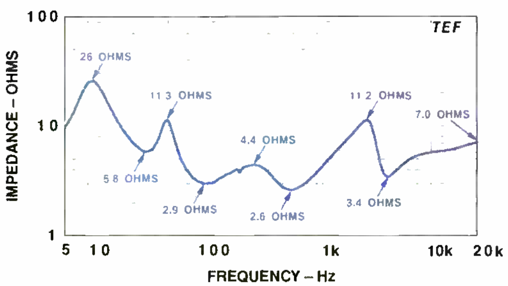

Fig. 6—Impedance.

The DQ-30i's energy/time response is shown in Fig. 3. The test parameters were chosen to accentuate the response from 1 to 10 kHz, which includes the upper crossover. The main spike, at 3 mS, is very compact and narrow; this indicates close, coherent summing of the midrange and tweeter outputs. All delayed responses were at least 22 dB down from the main peak. The tight peak of the curve is actually in some disagreement with the previous data for group delay. Dahlquist does mention in their literature that they use a process called Envelope Alignment to attain optimum driver positioning.

Because I was not able to make my usual 2-meter polar responses outside, I was forced to make what measurements I could in my listening room. I was able to gather an acceptable set of horizontal polar curves at 1 meter but not a set of vertical polar curves. For the vertical responses, rather than mounting the DQ-30i on its side and rotating it to gather data, I moved the test microphone vertically in an arc, at a constant 1-meter distance from the tweeter, and gathered data at 5° intervals from –15° to +45°. Because of the incomplete vertical data, both sets of off-axis response curves are presented in a composite format rather than in my usual "3-D" format.

Figure 4 shows the composite horizontal off-axis responses, without smoothing. The very close grouping in the top set of curves indicates excellent coverage in the ±15° primary listening window. The range covered in the bottom set of curves is from –45° to –30° and from +30° to +45°, in 5° increments. This set of curves is also quite closely grouped but exhibits some high-frequency roll-off above 7 kHz.

The composite vertical off-axis responses, again without smoothing, are shown in Fig. 5. The middle set of curves shows the responses from 0° to 10° above the tweeter's axis. The very close grouping indicates excellent vertical coverage in the primary, sitting-to-standing, listening window. The top set shows a composite of the responses from 15° to 30° above the tweeter's axis. These curves are also quite closely grouped except for interference in the 3-kHz crossover region, which causes severe dips in the response. The bottom set shows the responses in the range of 5° to 15° below the tweeter's axis. This set is also closely grouped except for some interference in the crossover region and above it. Fortunately, the smoothest vertical response is exhibited in the primary listening range of 0° to 10° above the tweeter's axis.

All the previous off-axis curves were taken on the DQ-30i's tweeter axis. It is noted, however, that the tweeter is actually mounted quite high in the system, about

OVERALL SOUND WAS WELL BALANCED AND WIDE-RANGE, WITH EXTENDED BASS AND VERY GOOD IMAGING.

42½ inches above the floor. A typical seated listener can therefore expect some roughness in the upper midrange, because his ears are likely about 36 to 38 inches above the floor, which is about 3.1° below the tweeter's axis.

Figure 6 displays the impedance of the DQ-30i over the extended range from 5 Hz to 20 kHz. A minimum impedance of 2.6 ohms occurs at 460 Hz and a maximum of 26 ohms at the subsonic frequency of 9 Hz. Above 20 Hz, a maximum of 11.3 ohms occurs at 40 Hz. Similarly low impedance minimums occur at 80 Hz (2.9 ohms) and 3.1 kHz (3.4 ohms). The lowest frequency corresponding to an impedance minimum (in this case, 27 Hz, where the impedance drops to 5.8 ohms) is often considered the vented-box tuning frequency, where the enclosure's resonant loading is at its maximum. I prefer to consider the tuning frequency as being the minimum excursion point, which is measured at high drive levels; for the DQ-30i, this occurs at about 33 Hz. (Normally, these two tuning frequencies are closer together, but I don't know what significance, if any, to attach to that.) The system's multiple low-impedance points at low frequencies show that it will be a fairly demanding load for power amplifiers.

Within the passband from 20 Hz to 20 kHz, the max/min variation is about 4.3 to 1 (11.3 divided by 2.6), which means that the Dahlquist will be somewhat sensitive to cable resistance. This resistance should therefore be limited to a maximum of about 50 milliohms to keep cable-drop effects from causing response peaks and dips greater than 0.1 dB. For a typical run of about 10 feet, low-inductance cable of 14-gauge or larger diameter should be used.

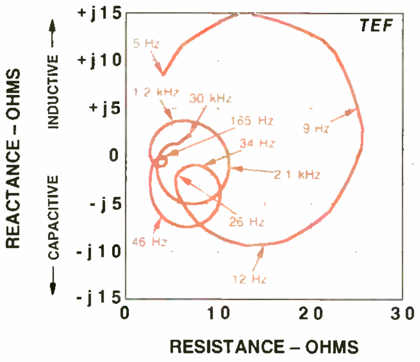

Fig. 7—Complex impedance.

Figure 7 shows the DQ-30i's complex impedance, plotted over the range from 5 Hz to 30 kHz. It is well behaved. The impedance phase within the passband (not shown) reached a maximum angle of +39° (inductive) at 975 Hz and a minimum angle of –59° (capacitive) at 48 Hz.

On a high-level low-frequency sine-wave sweep, no significant cabinet resonances of the woofer enclosure were evident. However, in the range from 160 to 185 Hz, the side and rear metal screens vibrated badly, generating an objectionable sound. This buzzing occurred at levels above about 1 V rms. A close look at the impedance curves of Figs. 6 and 7 reveals that the screen resonance shows up there as well, in the form of slight aberrations at about 170 Hz.

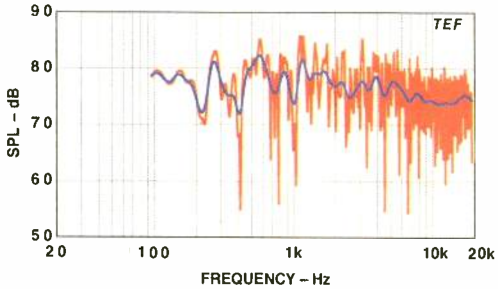

Fig. 8—Three-meter room response.

By covering the port, I determined that it normally reduces the woofer's excursion over a wide frequency range, from 19 to 42 Hz, with minimum excursion occurring at 33 Hz. As noted previously, the minimum excursion at high drive levels (which, in general, indicates the frequency of box resonance) occurred at a significantly higher frequency than the impedance minimum (which is measured at low drive levels). At the 33-Hz box tuning, the excursion was about 40% less than it was when I closed off the port.

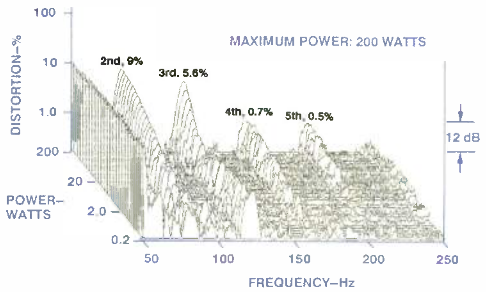

Fig. 9—Harmonic distortion for E_1 (41.2 Hz).

With power levels of 100 watts and below (about 20 V rms), at frequencies at and near box resonance (between 25 and 35 Hz, where port air velocity is maximum), vent noise and air turbulence were very low. The DQ-30i sounded quite clean and effortless at all bass frequencies above 20 Hz. The maximum excursion of the 10-inch woofer was a very generous 0.8 inch, peak to peak, with a linear excursion of about 0.6 inch, peak to peak. The woofer overloaded very gracefully but did exhibit some dynamic-offset problems, which made the speaker's center of vibration change with different bass frequencies.

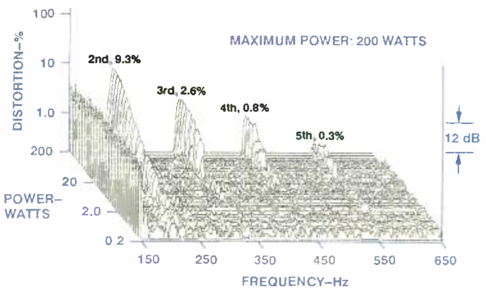

Fig. 10—Harmonic distortion for A_2 (110 Hz).

The DQ-30i's 3-meter room response is shown in Fig. 8 with both raw and sixth-octave smoothed curves. The speaker was in the right-hand stereo position, aimed at the listening position, and the test microphone was at ear height (38 inches), at the listener's position on the sofa. The system was driven with a swept sine-wave signal of 2.83 V rms (corresponding to 2 watts into the rated 4-ohm load). The direct sound and 13 mS of the room's reverberation are included. Overall, the averaged curve fits a fairly tight window of 10 dB (±5 dB) from 100 Hz to 20 kHz, even including the floor-bounce region from 300 to 600 Hz. The general trend of the response is fairly flat.

The single-frequency harmonic distortion spectra versus power for the musical notes E_1 (41.2 Hz) and A_2 (110 Hz) are shown in Figs. 9 and 10. The results for A_4 (440 Hz) are not shown, because the distortion levels were below 1% and consisted of only second and third harmonics. (Side note: The first system I tested for A_4 distortion developed a buzzing midrange. I subsequently made a retest after replacing the bad midrange with a new driver sent from the factory.) The power levels were computed using the Dahlquist's rated impedance of 4 ohms. A maximum level of 200 watts (28.3 V rms) was set as the upper power limit.

THE DQ-30i EXHIBITED EXCELLENT REALISM AND A VERY DETAILED, LIVE, AND CLEAN SOUND.

The E_1 (41.2-Hz) data of Fig. 9 shows that at maximum power the distortion reaches a moderate 9.0% second harmonic and 5.6% third harmonic. The fourth and higher harmonics were all less than 0.8%. At 200 watts, the system generated a loud 106 dB SPL at 1 meter with a 41.2-Hz signal applied.

The A_2 (110-Hz) data of Fig. 10 also indicates a moderate 9.3% second harmonic and a lower, 2.6%, third harmonic. The fourth and higher harmonics were all less than 0.8%. At 200 watts, the DQ-30i generated a loud 108 dB SPL at 1 meter with the 110-Hz signal.

Figure 11 displays the IM distortion created by tones of 440 Hz (A_4) and 41.2 Hz (E_1) of equal input power. The IM rises only to the low level of 4.2% at 100 watts (the maximum power level I used for this test, in order not to overdrive the midrange). The distortion is relatively low because the speaker's lower (280-Hz) crossover separates the two IM test tones, thus minimizing the distortion.

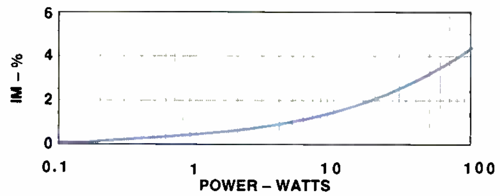

Fig. 11—IM distortion for 440 Hz (A_4) and 41.2 Hz (E_1).

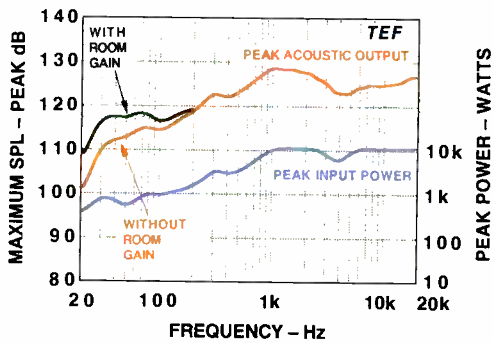

Fig. 12—Maximum peak input power and sound output.

Figure 12 shows the short-term peak-power input and output capabilities of the DQ-30i, as a function of frequency, measured using a 6.5-cycle tone burst with a third-octave bandwidth. The peak input power was calculated by assuming that the measured peak voltage was applied to the rated 4-ohm impedance.

The peak input power starts out quite high, about 325 watts at 20 Hz, rises to a maximum of 800 watts at 31 Hz, falls somewhat to 500 watts at 50 Hz, and then rises thereafter, reaching 11 kW (210 V, peak) above 1 kHz. A reduction at 4 kHz is noted at the low end of the tweeter's range, caused by the test amplifier running out of steam rather than any limitation of the speaker. Between 125 and 630 Hz, the speaker and my test amplifier reached their limits at about the same point, due to the speaker's low impedance through this range.

The top curves in Fig. 12 show the maximum peak sound pressure levels the Dahlquist can generate, at a distance of 1 meter on axis, for the input levels shown in the bottom curve. Also shown is the "room gain" of a typical listening room at low frequencies, which adds about 3 dB to the response at 80 Hz and 9 dB at 20 Hz.

With room gain, the peak output starts very strong, at 110 dB at 20 Hz, rises rapidly to a plateau of about 117 dB between 30 and 150 Hz, and then rises to a maximum of about 128 dB at 1 kHz! The maximum output then falls somewhat, thereafter continuing quite strong to 20 kHz. The DQ-30i can easily create the peak SPLs of live music in a typical listening room if you use an amplifier of appropriately high peak power capabilities. With room gain, the speaker's maximum output exceeds 110 dB above 20 Hz and 120 dB above 220 Hz. The low-frequency maximum output of the Dahlquist ranks it with the best speakers I have tested! A stereo pair will reach even higher low-frequency levels with bass material common to both channels.

Use and Listening Tests

With its curved swept-back appearance, the DQ-30i has a very distinctive, contemporary look that is not soon forgotten. It's a major departure from the pedestrian boxy look that is typical of most loudspeakers. The same fresh look is carried through the whole DQ line; unusual styling has been associated with the Dahlquist name from the start.

My review samples were supplied in black trim, and all exposed surfaces were black. The fit and workmanship were very good. The whole cabinet assembly felt quite strong and solid, with the exception of the metal coverings on the top part of the system. The grille does not look removable, but it's actually easy to take off: Just stick your fingers under its outside edge, and pull. Once removed from the system, the grille is limp and floppy. Jeff Hammerstrom, the speaker's designer, suggested that I might want to do my serious listening with the grilles removed, which I did.

Each DQ-30i is supplied with three large, cone-shaped feet attached to the bottom of the bass enclosure. These feet, which are about 3 inches in diameter, come to a sharp point at a 45° angle. A set of optional cone feet was later supplied to me; these feet had 1¼-inch spikes added to the points of the cones, for better penetration of carpets. I only had time to experiment by replacing just one system's feet with the optional spikes. With them, the cabinet was much more solidly connected to the floor. On my carpeted floor, the optional feet raised the speaker about 1 inch higher than the stock feet. This was a disadvantage, because the DQ-30i's optimum vertical listening axis is already significantly higher than that of most other loudspeakers.

Because the Dahlquist's center of gravity is located towards the front of the cabinet, it took significantly less force to tip the DQ-30i forward than back. I would suggest keeping toddlers and young children away from the rear of the speakers, so they can't accidentally tip the Dahlquists over.

The 13-page owner's manual for the DQ series is extremely well done. It offers good suggestions and guidance in many areas, including choice of speaker wire and connections, bi-wiring, room acoustics and potential problems, and speaker placement. Dahlquist suggests placing the systems as far away from your room's side and rear walls as is practical and toeing them in towards the listener. They suggest following the "rule of thirds," placing the speakers and listeners each one-third of the room's length from the end walls, with each speaker a third of the room's width in from the sides.

I placed the DQ-30i speakers in my usual listening positions, which were in close agreement with Dahlquist's recommendations. This placed the speakers about 8 feet apart, 10 feet from my sofa, and about 5 feet from the wall behind them. My listening equipment includes a newly acquired Krell preamplifier and power amplifier along with Rotel and Onkyo CD players. My reference speakers are the B & W 801 Matrix Series III units (the Series III recently replaced the Series II, which had been my reference from the start). All cabling is from Straight Wire. Listening was done with the Dahlquists' grilles off.

Initial listening disclosed a well-balanced, wide-range sound with extended low-frequency capability and the ability to do justice to many different types of program material. The Dahlquists' imaging capabilities were very good. Their sensitivity was quite close to that of the B & W systems, so no level adjustment was required when switching between speakers.

On the very revealing third-octave band-limited noise signal, the DQ-30is kept up with my B & W systems over most of the low-frequency bands in terms of sheer bass output. However, the B & Ws were somewhat cleaner than the Dahlquists due to lower levels of vent noise. At most bands, the port noise of the Dahlquist systems included a slight but audible whistle-like sound. At the 63- and 80-Hz bands, significant outward cone displacement was evident due to dynamic offset problems. (The easiest way to distinguish dynamic-offset displacement from genuine program-generated displacement is to reverse the leads going to the speaker and note if the direction of the displacement changes. If the direction does not change, it is self-generated dynamic displacement.) In addition, at the 125- and 160-Hz noise bands, highly audible vibration of the top and rear screens was evident. I searched for program material that would cause audible sounds from these screens but did not have much success. The only music that consistently set them off was pipe organ. Fortunately, the energy content of program material must be highly concentrated in the screen's resonance range and be of high level to set off the vibration. Any additional program content in other frequency ranges often masks the vibration's sound.

The sound of pink noise did not change much as I went from sitting down to standing. However, most of the change was heard when I sat, making the Dahlquists sound slightly muffled. This is because the DQ-30i's tweeter is about 42½ inches from the floor, about 6½ inches above my ears when I was sitting on my sofa. That placed my ears about 3.1° below the tweeter's axis. Hammerstrom, the designer, told me that sitting in his favorite listening chair places his ears about 43 inches above the floor, hence his reliance on a higher listening axis. I can't recommend tilting the Dahlquist forward to remedy this, because of the previously mentioned balance problem. My quick fix was to sit on a large overstuffed pillow; another solution might be to remove the cone bases, which would lower the DQ-30i by about 3½ to 4 inches. (As mentioned, the optional base with spikes only makes the tweeter higher.)

The Dahlquists exhibited excellent realism and a very detailed, live, and clean sound on a recording of music from the Renaissance period, *Songs of the Sephardim: Traditional Music of the Spanish Jews* by La Rondinella (Dorian Discovery DIS-80105). They also did very well on quite different music that is normally played quite loud. When I was recently in Berlin to attend an Audio Engineering Society convention, I picked up a German compilation of extended-mix dance versions of club music. The DQ-30is could play loud and clean, with solid low end, on this CD, *Maxi Dance Sensation 8* (BMG/Ariola 74321 11562). The reproduction of horns and the orchestral soundstage of Liszt's "Les Préludes" (you probably know this piece, the old Flash Gordon theme music) were very impressive. The Liszt selection came from *Ravel: Boléro* (Music Digital 31 003, one of Delta Music's inexpensive but high-quality "DDD" classical import compilations; I picked it up at a local supermarket for $2.99.)

Program material permitting, the DQ-30i's soundstage capabilities and stereo focus were always very good. On mono signals, the stability and narrowness of the center image was excellent. The Dahlquists' extended bass response provided a solid underpinning for pipe organ music; they could essentially keep up with my reference B & W 801 Matrix Series IIIs on bass pedal notes.

In summary, the DQ-30i's many virtues well exceed its weaknesses. Its fine imaging capability, smoothness, neutrality, and extended bass response—coupled with its refreshing styling—make for a solid contender in the $2,000-per-pair range.

D. B. Keele, Jr.

Metaxas, *continued from page 66*

power amp included the following: An Oracle turntable fitted with a Well Tempered Arm and Spectral Audio MCR-1 Select moving-coil cartridge, a Krell Digital MD-1 CD transport feeding a PS Audio UltraLink or Counterpoint DA10 D/A converter, a Nakamichi 250 cassette recorder and an ST-7 tuner, and a Technics 1500 open-reel recorder. Preamplifiers used included a Counterpoint SA-5000 and First Sound Reference II. Other power amplifiers used were a Crown Macro Reference and a pair of Quicksilver M135 mono tube prototypes. Loudspeakers used were Win Research SM-10 monitors, early Genesis Technologies two-way prototypes, and Scientific Fidelity Joules.

THE SOLITAIRE OFFERS GREAT TRANSPARENCY AND EXQUISITE SPATIAL PRESENTATION.

The Solitaire is yet another solid-state amplifier that I liked from the first time I heard it in my system. It passed very musical and unharsh sounds through to the speakers. Its sound is characterized by exquisite spatial presentation, solid dynamics, great transparency, and a tonality that is a little soft-sounding in the high frequencies. This amp is lyrical and quick sounding. Some of my favorite software that might be a bit edgy on other otherwise good amps sounded smooth and less irritating on the Solitaire yet had great definition.

I had two nit-picks about the Solitaire: It made a very audible pop some 5 or 10 S after the power switch was turned off, and the hum in the right channel was definitely audible at the loudspeaker and just discernible at the listening position when no signal was going through the system. In practice, however, this hum level is not going to be a problem except with very efficient loudspeakers; it didn't really bother me.

Overall, though, I enjoyed having the Metaxas Solitaire in my system, and listened to a lot of music through it. I forgive its trivial technical flaws for its wonderful music transference. A BHK thumbs-up for this one.

Bascom H. King