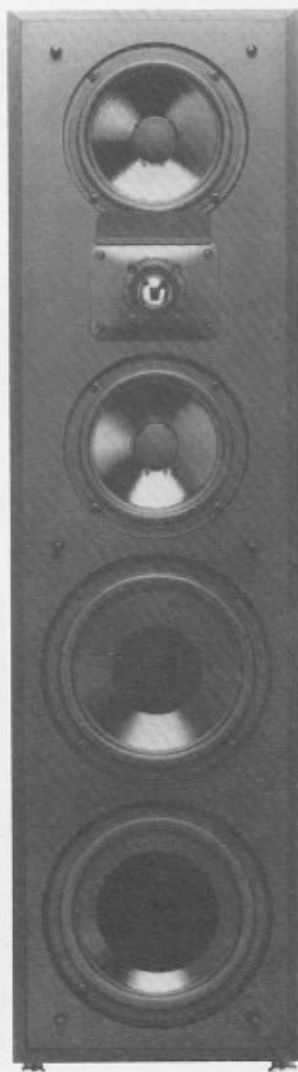


The Polk Speaker

Technical Information from Matthew Polk and the Design/Engineering Team



RTA 8TL



RTA 11TL

Product Goals

The RTA 8T and RTA 11T are two of the most popular and successful loudspeaker systems ever produced by Polk Audio. The goal of their redesign was to further refine and develop the original design concepts to enhance their performance and value. Particular attention was paid to eliminating midrange and high frequency coloration and to extending and flattening the low frequency range. The RTA 8TL and RTA 11TL incorporate new technology developed for the model RTA 15TL, which was introduced in April of 1990. Most significant among the design enhancements is the use of the SL3000 tweeter in the RTA 11TL and the new SL2500 in the RTA 8TL. Other refinements include new extended low frequency alignments, greatly improved diffraction control through new grille/cabinet geometry and the new "diffraction spoiler," as well as the use of new cabinet construction techniques which offer greater rigidity. Both models are now available with spikes and leveling feet. The new models are distinguished from the old by the "L" added to the model designation.

Improved Low Frequency Performance

The original RTA 11T pioneered the use of two bass radiators tuned to two different frequencies as a means to provide extended low frequency response with greater control. This configuration provides both well defined and musical bass associated with small woofer systems and deep bass found in large woofer designs. The two eight inch radiators provide a more effective radiating area than a single ten inch unit, while avoiding the high amplitude, high "Q" resonant peak commonly found in single-radiator designs (see figure 1). This innovation continues with the RTA 11TL in which the radiators have been modified to improve their performance at higher listening levels.

The bass and midrange performance of the RTA 8TL have been enhanced through improved cabinet cross-bracing and the use of a new 6-1/2 inch driver, the MW6516. Further refinements were made through changing the position of the port on the baffle. Computer modeling and intensive measurements showed that resizing and tuning the port produced better results after this change was made. The result of this optimization is a much smoother transition between midrange and bass, with greater impact and detail in the mid-bass, and a more solid and convincing image, especially on vocal program material.

To further improve bass performance, both the RTA 8TL and RTA 11TL now feature adjustable leveling feet and optional floor spikes for better mechanical coupling to the floor. By anchoring the cabinet more firmly, all driver energy is used to move air rather than to rock the cabinet. This results in more bass power and impact as well as enhanced midrange clarity.

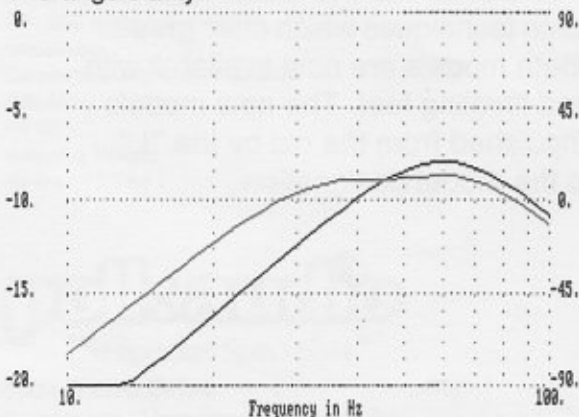


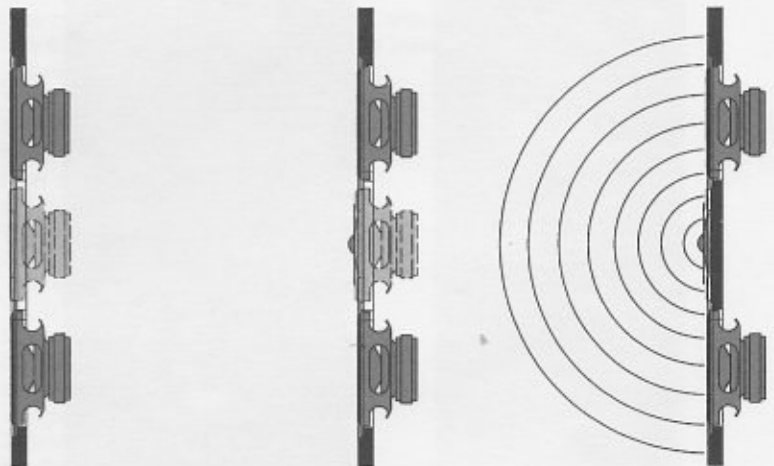
Figure 1 - Comparison of single and dual radiator systems

Coincident Radiation Array

The vertical symmetry of the transducer array, centered on the tweeter, causes the acoustic centers of the tweeter and the driver array to coincide (see figure 2), improving imaging and creating a seamless blend between the midrange and high frequencies through the crossover region. The audible result is a rock-solid sonic image relatively unaffected by the position of the listener in the room, along with a natural, effortless sound balanced evenly across the audible frequency range.

Reduced Baffle Area and Vertical Line Source Array

The baffle of a loudspeaker acts to direct the sound produced by the transducers mounted on it. The magnitude of this effect depends largely upon the size of the baffle and the wavelength of the energy being produced. Low frequencies have long wavelengths compared to the size of the baffle, and tend to be radiated as though from a "point source," whereas higher frequencies, whose wavelengths are shorter, are directed more strongly by the baffle. Hence, to improve dispersion, particularly through the critical midrange frequencies, baffle areas of the RTA series loudspeakers have been kept to a minimum.



The perceived source of sound of two identical drivers is centered in the area between them.

In the Polk loudspeaker the tweeter is positioned at the acoustic center of the drivers.

Drivers and tweeter appear to operate together as an ideal point source resulting in precise imaging, uniform dispersion, and startling midrange accuracy.

Figure 2 - The principles of coincident radiation

It is well known that room reflections which reach the listener within 5 milliseconds of the original signal serve to "smear" the image and otherwise degrade the sound. Wall reflections can be easily avoided by judicious speaker placement. However, a floor standing speaker cannot be positioned to avoid reflections from the floor and ceiling.

A line source acts to focus the sound energy between the floor and ceiling and into the listening area (see figure 3), while at the same time allowing near-perfect horizontal dispersion. By arranging the 6 1/2" drivers as a vertical line source, floor and ceiling reflections in the midrange are minimized without sacrificing excellent horizontal dispersion. This arrangement allows the listener to hear the acoustics of the original recording over a very broad listening area free of coloration caused by floor and ceiling interactions.

Diffraction Control

When sound traveling away from the transducers on the front surface of a loudspeaker encounters cabinet edges or discontinuities, it is reradiated from these points. This reradiated sound energy interferes with the direct sound from the transducers, causing irregularities in frequency response and reduced dispersion. The audible effect is a reduction in clarity of the sonic image, and "peaky" characteristics in which certain frequencies are accentuated over others.

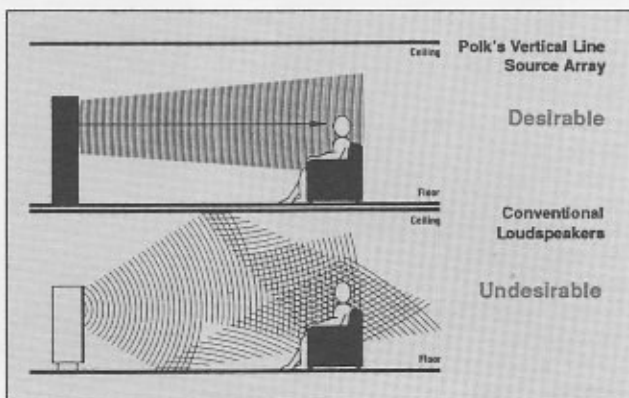


Figure 3 - Line source technology focuses the vertical dispersion of midrange frequencies.

The RTA 8TL and RTA 11TL address cabinet diffraction through conventional means by mounting drivers and tweeters flush with the front surface of the baffle and by using low-profile grille frames with rounded inside edges to break up reflections. However, another innovation from the RTA 15TL has been transferred to the RTA 8TL and RTA 11TL, the use of the "diffraction spoiler." This "spoiler" acts to break up the symmetry of the drivers above and below the tweeter, thereby minimizing the audible and measurable effects of diffraction (see figure 4). Additionally, the grille frame dimensions have been carefully optimized to further reduce diffraction effects. The RTA 8TL and 11TL are among a rare group of superior loudspeakers which actually sound better with their grilles on. The result is pinpoint image clarity coupled with superb dispersion of high frequencies.

Dynamic Range and Power Handling

The dynamic range and power handling of the RTA 8TL and RTA 11TL have been improved through the addition of the SL3000 trilaminate tweeter in the RTA 11TL and the SL2500 in the RTA 8TL. Both tweeters utilize ultra low viscosity ferromagnetic fluid to cool the aluminum voice coil, resulting in twice the power handling capability of conventional dome tweeters (see issue #2 of *The Polk Speaker*, September 1989, for a detailed technical discussion of the SL3000). Because these devices are so durable, it is no longer necessary to provide special tweeter protection. In addition, the low mass of the Polk driver and tweeter diaphragms' large magnet structures and large internal cabinet volume all contribute to the very high efficiency of the units (w 90 dB @ 1 meter @ 1 watt).

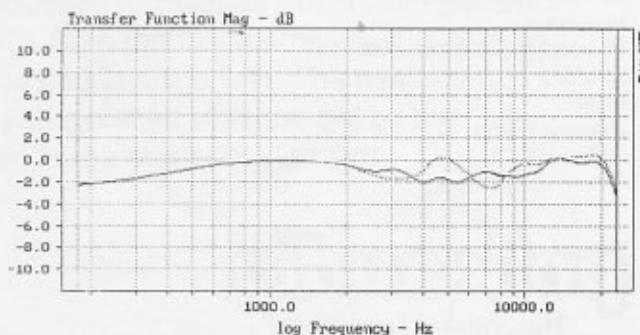
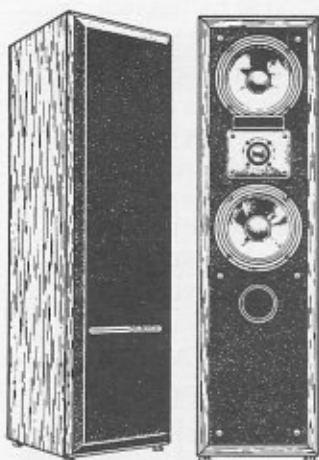


Figure 4 - Frequency response with (solid line) and without (dotted line) spoiler.

The Benefits

Although the original RTA 8t and RTA 11t were strong performers, the incorporation of newly-developed technology has permitted the RTA 8TL and RTA 11TL to join the flagship RTA 15TL at a new level of sonic performance. The new SL3000 and SL2500 tweeters provide smooth, extended high frequency response and the ability to handle the demands of high sound levels without distress.

The new grille designs coupled with the "diffraction spoiler" have greatly reduced the effects of cabinet diffraction resulting in greater clarity and solid imaging. The bass performance of the RTA 11TL has been enhanced through improvements to the bass radiators, while bass performance of the RTA 8TL has benefitted from improved cabinet bracing, a new driver design, and improved system tuning.



RTA 8TL

Driver Complement

One 1 inch (25 mm) Polk SL 2500 dome tweeter
Two 6-1/2 inch (165 mm) Polk trilaminate polymer bass-midrange drivers (6516)

Size (Inches)

32-1/2 H x 9 W x 11-1/2 D
(82.5cm H x 22.9cm W x 29.2cm D)

Overall Frequency Response

30 Hz - 25 kHz

-3dB Limits

42 Hz - 23 kHz

Recommended Amplification

20 - 250 watts / channel

Impedance

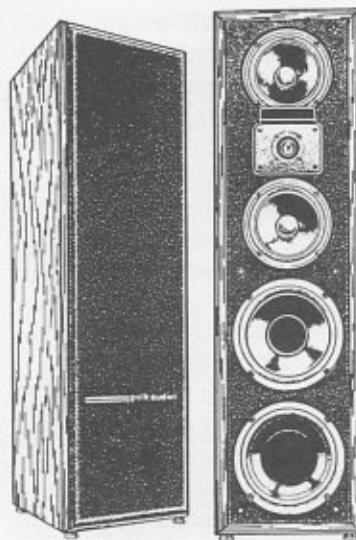
Compatible with 8 ohm outputs

Efficiency

89 dB

Shipping Weight

39 lbs. (17.7 kg.)



RTA 11TL

Driver Complement

One 1 inch (25mm) Polk SL 3000 dome tweeter
Two 6-1/2 inch (165mm) Polk trilaminate polymer bass-midrange drivers (6510)

Two 8 inch (203 mm) sub-bass radiators,
one high resonance, one low resonance

Size (Inches)

38 H x 10-1/2 W x 14-1/2 D
(96.5cm H x 26.7cm W x 36.8cm D)

Overall Frequency Response

22 Hz - 26 kHz

-3dB Limits

36 Hz - 25 kHz

Recommended Amplification

30 - 250 watts / channel

Impedance

Compatible with 8 ohm outputs

Efficiency

90 dB

Shipping Weight

58 lbs. (26.3kg.)

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