RTR Soft Dome Speaker Systems

75D·100D·300D·600D

Theory becomes reality

Myths abound in the loudspeaker business. None are more prevalent than the notions about "flat frequency response curve." For years, many who took a scientific approach to speaker design insisted that an audiophile quality system must be integrated to produce a flat frequency response curve. Usually, the flatter the better.

Old myths die slowly. Fortunately for those who value natural musical and vocal reproduction, speaker designers are now learning that "flat response" alone rarely describes nature. Their products should improve accordingly.

We call attention to this traditional myth and its unmasking because it illustrates the basic creative difference between RTR engineers and competitors. Their abilities to see beyond the current norm put them ahead of their contemporaries over a decade ago and keep RTR well in front today.

This is the RTR theory of musical reproduction... a theory which culminates in the reality of the RTR soft dome D-Series speaker systems.

A flat sine-wave response curve does not assure accurate musical reproduction. A mechanical system such as a transducer that converts electrical impulses into acoustical output can be made to respond very uniformly to symmetrical input signals such as those represented by pure sine waves.

If music were as simple as that, there would be no problems in reproduction. But music and voices are far more complex because they contain many unsymmetrical pulses, transients and intricate combinations of sine waves.

A genuinely accurate sound reproducer must do more than reproduce an accurate sine wave. It must be able to respond instantly to sudden pulses or peaks and stop moving instantly when the input ceases. It must resolve subtle nuances and slight, rapidly-changing signals to capture the original sonic balance. And it must reproduce peak levels without compressing or smearing.

This is only the beginning of demands on a system of transducers designed to produce natural, appealing sound. They must also react in unison without relative time-lag (transient phase distortion); must not generate frequency constituents not contained in the original source material (mechanical and electrical non-linearities which manifest themselves as harmonic and intermodulation distortion); must have diaphragms of low relative mass and free mechanical suspensions so inertial effects don't mask subtle input signals.

Beyond these basics, RTR engineers insist the signal distribution network (crossover) generate minimal distortion and insertion loss so the signal is not degraded before it reaches the transducers.

If music is to be reproduced at life-like levels, transducers need to absorb considerable input power without degradation in quality or breakdown.

What's more, the transducer enclosure should introduce little or no coloration into the system, and the signal must be uniformly dispersed within the environment in a manner similar to the live performance.

No wonder there is so much variation in the quality of music from different speakers—even though they are all designed to exhibit a flat response curve. RTR engineers are among the few who consider all these essential design phases in creating their products, possibly the only ones who have done so for more than a dozen years. Consequently, RTR speaker systems are a dozen years ahead of most when it comes to reproducing natural music and voices—sounds you can live with comfortably.

The key to musical accuracy

RTR designs, engineers and builds all its transducers, cabinets and associated components from the ground up. This assures totally integrated designs which resolve most problems facing the loudspeaker designer. This is the meaning of the RTR "total capability" program. Because RTR believes that only through complete integration can all components correctly interact to reproduce music as accurately as the laws of physics and materials technology will allow. Experience in total design assures the correct parameters to preserve the dynamics and subtleties of live music and bring them into your home intact.

Computerization speeds evolution

Most current addition to the RTR design arsenal is an IBM computer system utilizing advanced RTR-developed programs to facilitate design evolution and correct parameter selection. By initiating a computer-assisted Total Systems Integration (TSI) development program, RTR engineers are better equipped to implement the continually-advancing state-of-their-art. As a consequence, you can be assured they will continue producing the finest, most advanced loudspeakers.

Thus RTR "total capability" translates to your advantage as a serious loudspeaker buyer. Because RTR maintains total control over its products, you receive absolutely uncompromised speakers at an affordable price.

Regardless of the price range you may be considering, you can be confident you will receive superior quality in every RTR loudspeaker. Size and price make no difference in the quality. Larger RTR speakers have capabilities to handle more power, play into larger listening areas, and provide greater deep bass response. But smaller units may well serve your musical needs. That is why RTR produces the total speaker line.

And now. . . the RTR Soft Dome Speaker Systems

All of the design innovations and engineering excellence gained by RTR to date are reflected in the new D-Series loudspeakers. They are meant to be the finest products within their price range yet available, from RTR or any other manufacturer. For home use, studio audio systems or research reference units, they defy price and performance comparison. And they prove that superbly realistic sound can be obtained at realistic prices.

Major design objectives had to be defined and achieved to produce the stunning performance evident in each D-Series speaker. Two of the most formidable objectives can be explored in some depth to illustrate the degree of achievement represented by their solution. "Attack" of the speakers and "coherency" of the system—that is its ability to respond instantaneously and faithfully to the applied signal without overshout, ringing or smearing.

Drivers of low relative mass and high rigidity with good internal damping—audiophile quality drivers in the usual context—were only the beginning of the RTR D-Series design. Once conceived, they had to be integrated into the total system with other drivers, crossovers and enclosure. Then their total performance as a unit had to be measured and optimized. The results yielded by this extra measure of concern for the final product is similar to the difference between the static tuning of an automobile compared with dynamometer tuning which takes into account dynamic operating conditions and yields superior performance. In speaker systems as in auto tuning, the more methodical, scientific approach delivers better results.

Many speaker systems employing quality drivers do not sound "alive" but rather muffled and rounded; their "attack" and/or "coherency" is compromised by inferior systems design. RTR D-Series speakers deliver live sound without compromise. A recording of a snare drum, for example, is sharp and well-defined; it sounds like a snare drum, not a metal can or a damper on the drumskin. This is the difference between ordinary, even expensive systems, and the D-Series.

Soft Dome is the key to reality

A significant breakthrough in designing the D-Series came with development of the 1.5-inch soft dome midrange unit. Soft dome drivers enjoy an enviable reputation among design engineers because of their smooth frequency response and uniform dispersion characteristics. Their major drawback has been limited power handling and low acoustic output which yield less than life-like sound reproduction levels and higher distortion.

RTR's new 1.5-soft dome midrange driver captures the desirable characteristics and completely eliminates the drawback. Utilizing fresh coil winding and bonding techniques, the new single layer voice coil dome can dissipate a minimum 40 watts of long-term continuous power over its band width. The short term power handling is well in excess of 100 watts with negligible distortion. The 1.5-inch diameter is ideal for maintaining exceptionally smooth frequency response and dispersion over a range of 900 Hz to beyond 10,000 Hz. Exceptionally low moving mass permits instantaneous response to transients and excellent control in conjunction with the massive 3.16 pound magnetic assembly.

Many manufacturers claim very low mass domes utilizing exotic metals. However, it is important to consider the total moving mass in judging low mass domes—that is the total moving mass of the voice coil assembly, lead wires and dome. RTR's soft dome has a total moving mass of approximately one gram. This is considerably less than any other midrange driver available for comparison test. And to complete the dome's superior performance, RTR developed a unique sealant (patent pending) which provides superb internal damping and thereby reduces modal resonances of the diaphragm, a coloration problem which plagues rigid dome drivers.

The enlarged air cavity behind the dome's suspensions allows more symmetrical displacement at high power input levels, significantly reducing distortion and improving dynamics. Special care has been taken in designing the magnet circuit to minimize hysterisis loss effects and allow for maximum efficiency signal conversion; peaks are accurately reproduced without being clipped or truncated.

With its broad frequency range, the RTR soft dome eliminates crossovers in regions where the ear is most sensitive to phase shift; you hear seamless musical reproduction in the upper midrange. To further reduce distortion and coloration, a special tuned resonant circuit parallels the soft dome and nulls its resonance characteristics. Minimal inertial resistance and compliance of the dome assembly allows reproduction of even the most subtle musical notes.

All things considered, the RTR 1.5-inch soft dome is the final choice for those who seek uncolored, detailed midrange response—at life-like listening levels or as quiet background.

One breakthrough demands another

Outstanding performance of the new 1.5-inch soft dome midrange driver made it clear that conventional woofers and enclosures would not suffice. An intensive research and development campaign was launched stressing dynamic operating parameters and cause/effect relationships pertaining to material selection, physical constants and driver-enclosure interaction. Drivers and enclosures must reflect more than high individual quality—they must be designed in tandem to operate as an integral system. As a result of their "total capability" program in which they produce their own drivers and enclosures, RTR engineers can determine precisely

the size, number of windings and bobbin material of the voice coil, magnet size and strength, type of cone material, surround and other specifics. With the aid of computer-assisted testing, they arrived at the optimum design for each application—and built to their own specifications.

Consequently, each D-Series model includes a different woofer system. With the help of the TSI computer program, woofers are mated to the optimum volume and dimension enclosure. This

complex program assures maximally flat response to the cut-off frequency without annoying bass peak typical of most speakers. Dimensions and materials of the enclosure and internal damping means are selected to suppress effects of internal resonant modes and enclosure "breathing"; bass is tight, well-defined, realistic.

Numerous construction features enable D-Series woofers to excel, complement the midrange performance. Magnet structures are massive and powerful;

600D

Corinthian Column Without Compromise

"Awesome" describes the RTR 600D's performance. This stunning three-way Corinthian column shatters all standards for performance and cost. Latest, most sophisticated in the RTR lineage of audiophile columns, the 600D sounds outstanding on all types of source materials whether played at a whisper or a roar.

Two powerful 12-inch woofers with two-inch, high-temp voice coils and massive magnet structures give the 600D unmatched deep bass performance. Top woofer is mass-loaded to yield smoother, tighter bass. Four soft dome drivers, two 1.5-inch midranges and two 1-inch tweeters, deliver high power handling and glassy-smooth, extended frequency response.

Columnar benefits, large internal volume for extended bass response without lost efficiency and ear-level driver placement, provide a strikingly realistic sonic image. Wide dispersion gives a panoramic musical spectrum free from hot spots or drop-outs.

Unique is its "resolved point source radiation field" which stabilizes sonic images. By positioning drivers so the geometric centers of each pair coincide, the net radiating effect is a point source. Gone is frequency dependency, the problem of image wandering due to the apparent source shift up and down the baffle—a common problem in conventional speakers. Stereo image is vastly more stable with markedly improved front-to-back imagery. Performers appear as positioned when recorded, and there is no listening fatigue.

When you audition the 600D, you will experience sonic excellence in a new frame of reference. There are no "ear-shattering breakthroughs" or cosmetic gimmicks. Rather, each component is a rational evolution from proven sonic engineering techniques—designed for accurate reproduction and long-term listener satisfaction. Compared with any other speaker, regardless of cost, the RTR 600D is the most realistic and least costly of its class.

voice coils are large. An RTR breakthrough in voice coil design is development of a heat-resistant thermoset adhesive used to bond voice coils to low mass, non-resonant bobbins. This proprietary bonding, curing and outgassing process enables the voice coil to withstand operating temperatures up to 600°F without delamination or burn-out; woofer service is reliable, trouble-free. Cone materials have been meticulously selected and tested to provide high internal damping to suppress diaphragm resonant modes; excellent rigidity to minimize cone "breakup" on higher frequency ranges; low mass for outstanding delineation.

Add a new soft dome tweeter

To accompany the woofer and midrange drivers, RTR developed a new 1-inch soft dome tweeter. It is the first such unit which possesses the dynamic range and power handling capability

300D

Resolves Point Source Radiation

Corinthian column design at the price of bookshelf speakers. This is the immediately-apparent advantage of the RTR 300D 10-inch three-way loudspeaker system. While occupying no more floor space than a typical bookshelf enclosure, the larger internal volume permits a lower bass cut-off frequency at the same efficiency. Drivers are positioned close to ear level for superior imagery. "Resolved point source radiation field" positions and holds the performers as recorded. And the elegant styling mirrors the RTR 600D.

Bass is handled by two powerful 10-inch woofers with massive magnet structures and 2-inch hi-temp voice coil assemblies for low distortion response. Having considerably greater radiating area than a single 12-inch woofer, less cone displacement is needed for the same output levels; distortion is significantly reduced. And with their lower mass, the 10-inch cones yield better transient response and definition in all frequencies covered by the woofer, especially in the critical crossover region.

The advanced RTR soft dome 1.5 inch midrange and 1-inch tweeter ideally complement the woofer system to provide crystal-clear response well beyond 20kHz.

Efficient enough to be driven with only 25 watts per channel, yet capable of handling 150+ watts per channel in stride, the RTR 300D delivers levels of performance normally reserved for speakers two to three times its price. For an eminently affordable speaker system which comprises the most advanced RTR engineering triumphs, you should audition the 300D.

needed to complement the milestone mid- range dome performance while maintaining broad dispersion and ruler-flat frequency response.

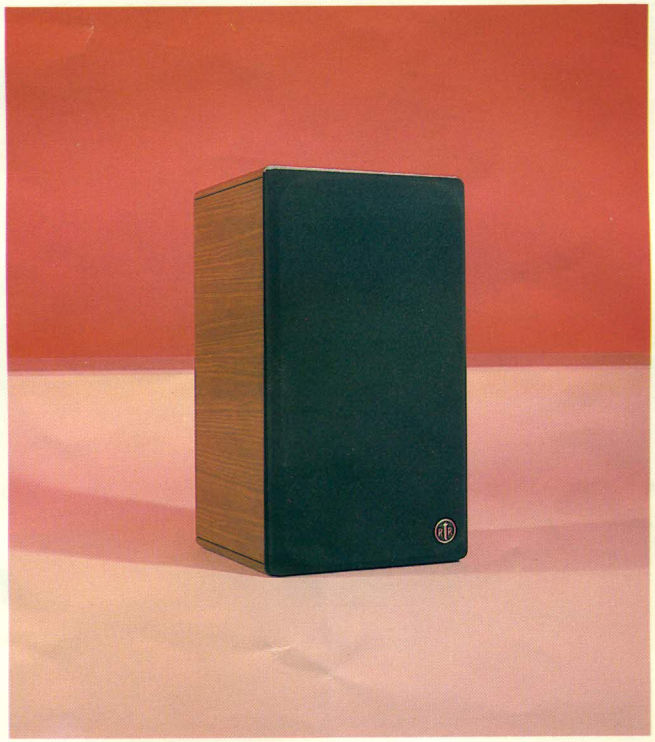
Dynamic range encompasses more than a description of the ability to handle high peak inputs without distortion. Since there is less musical energy in high frequencies, the tweeter must respond faithfully and linearly to the most subtle inputs. Very low relative inertial resistance, combined with extremely linearly small displacement spring constant of the dome suspension, assures phenomenal articulation and detail. This applies to even the faintest input signals, quiet musical passages or music played at low levels. Successful drivers must be able to cope with extreme dynamics, loud and quiet, as well as average level inputs. This ability in the 1-inch soft dome tweeter combined with other D-Series components sets these systems apart as superbly accurate musical reproducers.

Computer-aided crossover selection

In any quality speaker, the crossover network shares importance with the drivers. Crossovers distribute constituent frequencies to the appropriate drivers. Any distortion or losses in the crossover are intolerable because a degraded signal will not allow individual drivers to program up to their potential. RTR's TSI computer assistance program aids in selecting crossover frequencies for each

100D

The Dynamic Dome in a Bookshelf System



The finest bookshelf-format loudspeaker available at any price. From the graceful, stylish curvilinear enclosure to the state-of-the-art drivers, nothing in the RTR 100D has been spared visually or sonically to create this most sophisticated bookshelf speaker. Nothing, that is, except a high price tag.

RTR engineers view the bookshelf unit as a legitimate primary speaker design. As such, it is a packaging and function challenge which they have met successfully in a succession of brilliant bookshelf systems. The 100D was conceived to display the new, technologically advanced, RTR midrange system—and to prove conclusively that compact loudspeakers can exude sonic excellence.

The 12-woofer has a massive magnet structure and 2-inch hi-temp voice coil assembly. With the aid of the RTR TSI computer program, the curvilinear enclosure has been coupled to the woofer to deliver bass response of incredible depth and tightness. The 100D reproduces lows rarely heard through any loudspeaker, much less one of this compact size and efficiency.

Operating in consort with the woofer are two articulate RTR soft dome drivers, 1.5-inch midrange and 1-inch tweeter. They extend useful response, seamlessly and transparently, well beyond 20kHz.

The 100D is one bookshelf speaker which has not been compromised for the sake of size and price. You will understand the remarkable achievements it represents when you audition a pair. This is realistic, natural sound at a modest price.

driver. It takes into account not only the effect of each individual component or total system performance but also mechanical parameters such as moving mass, rigidity, driver area, rise time and other pertinent factors to assure the assigned frequency range is the most efficient utilization of that driver. RTR drivers' high power handling capability enables use of first order crossovers; as a result, transient phase distortion and "suck-out" effects are minimized.

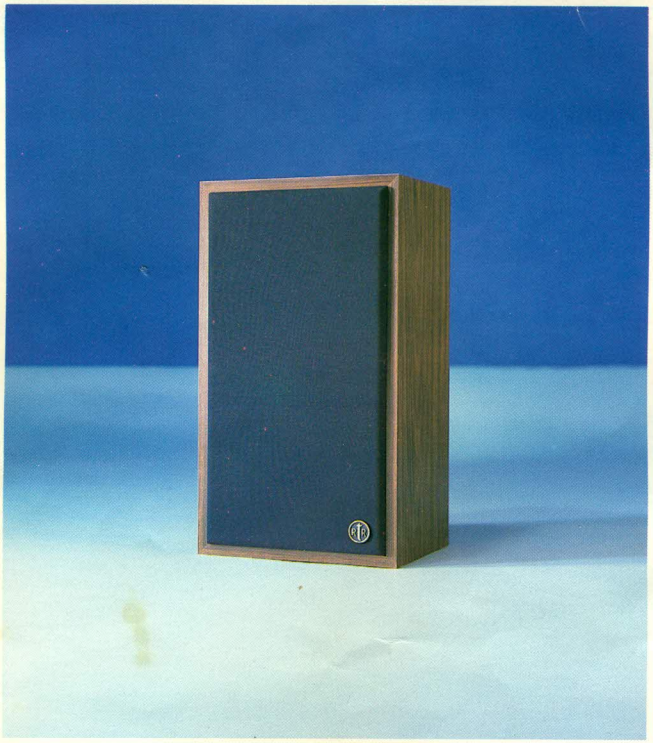
RTR D-Series crossovers employ premium, high tolerance components. Precision wire-wound controls allow adjustment of midrange and tweeter levels to suit room acoustics and personal tastes. A calibrated, user-resetable circuit-breaker protects the speakers from inadvertent overloads.

Accurate for all types of music

For long-term satisfaction from a music system, there is no substitute for accurate sound reproduction. A loudspeaker recommended for classical music or one considered better for rock music is a compromised instrument. It is not an accurate reproducer if it cannot reproduce all types of music satisfactorily. RTR D-Series speakers reproduce all types of music faithfully, as it was captured by the recording engineers. If you listen to classical, rock, jazz or the spoken word for twenty minutes on D-Series speakers, you will know the meaning of accurate reproduction. Then nothing else will sound right.

75D

3-Way System at a 2-Way Price



Performance comparable to the most expensive competitor. The RTR 75D 10-inch three-way system is the least expensive of the D-Series. And yet it out-performs far more costly speakers.

Behind its superior performance is a newly-developed 10-inch woofer which complements the standard D-Series 1.5-inch soft dome midrange and 1-inch soft dome tweeter. The secret to its price is the enclosure, a handsome stain-resistant, walnut grain vinyl; this housing provides maximum price/performance ratio with minimum maintenance.

The introduction of vinyl veneers as replacements for natural wood finishes may offend some traditionalists. But for the sake of economy, without any loss in performance, this substitution is both logical and practical. No competitive system, regardless of cabinetry or design, provides such deep, authoritative bass response, uncolored, precisely defined midrange and extended, crystalline high end reproduction.

Robust construction makes the 75D ideally suited to the rigors of the recording studio. Uncanny articulation at lower listening levels suit it ideally for the home system. In the 75D, RTR proves that audiophile performance, advanced well beyond the norm, can be obtained at a most affordable price. Listen and you are certain to agree.

Specifications:

600D

Enclosure:
Corinthian Column with solid walnut veneers.
Grill:
Black high porosity double knit.
Size:
16½" W x 48" H x 16½" D.
Shipping Weight:
112 lbs.
Sensitivity:
91.5 dB re: 1 watt pink noise input, "A" weighting, 1.0 meter on axis.
Frequency Response:
24-25,000 Hz;
32-20,000 Hz; ± 2 dB
Speaker Complement:
2-12" woofers with 2" high temperature voice coil, cured and outgassed; 2-1.5" dome midranges with single layer high-temp voice coil; lengthened magnetic microgap; 3.16 lb. magnet structure; 2-1" soft dome wide dispersion supertweeters.
Crossover Frequencies:
950 Hz; 10,000 Hz.
Impedance, Nominal:
4 Ohms.
Recommended Amp Power:
25-200 watts RMS, unclipped.
Controls:
Continuously variable midrange and tweeter, push button reset circuit breaker, five-way binding post terminals.

300D

Enclosure:
Corinthian Column with solid walnut veneers.
Grill:
Black high porosity double knit.
Size:
14½" W x 42" H x 12½" D.
Shipping Weight:
75 lbs.
Sensitivity:
90.5 dB re: 1 watt pink noise input, "A" weighting, 1.0 meter on axis.
Frequency Response:
28-25,000 Hz;
36-20,000 Hz; ± 2 dB
Speaker Complement:
2-10" woofers with 2" high temperature voice coil, cured and outgassed; 1-1.5" soft dome midrange with single layer high-temp voice coil; lengthened magnetic microgap; 3.16 lb. magnet structure; 1-1" soft dome wide dispersion supertweeter.
Crossover Frequencies:
1250 Hz, 10,000 Hz.
Impedance, Nominal:
4 Ohms.
Recommended Amp Power:
25-150 watts RMS, unclipped.
Controls:
Continuously variable midrange and tweeter, push button reset circuit breaker, five-way binding post terminals.

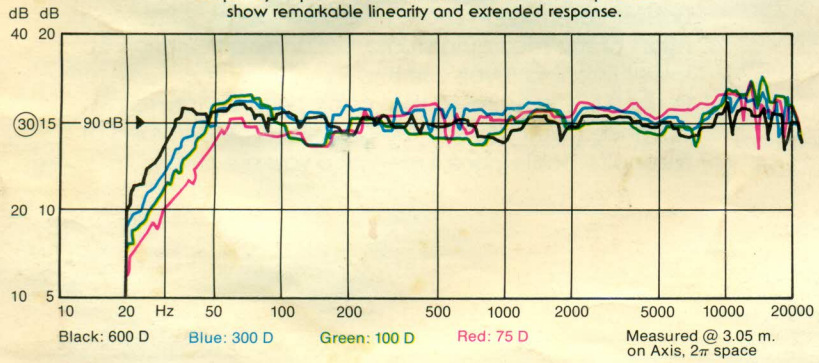
100D

Enclosure:
Genuine walnut veneers with solid walnut radius corners, grooved front to back.
Grill:
Black high porosity double knit.
Size:
15" W x 26½" H x 14" D.
Shipping Weight:
50 lbs.
Sensitivity:
90.5 dB re: 1 watt pink noise input, "A" weighting, 1.0 meter on axis.
Frequency Response:
30-25,000 Hz;
40-20,000 Hz; ± 2 dB
Speaker Complement:
1-12" woofer with 2" high temperature voice coil, cured and outgassed; 1-1.5" soft dome midrange with single layer high-temp voice coil; lengthened magnetic microgap; 3.16 lb. magnet structure; 1-1" soft dome wide dispersion supertweeter.
Crossover Frequencies:
1250 Hz, 10,000 Hz.
Impedance, Nominal:
6 Ohms.
Recommended Amp Power:
25-125 watts RMS, unclipped.
Controls:
Continuously variable midrange and tweeter, push button reset circuit breaker, five-way binding post terminals.

75D

Enclosure:
Walnut grain texture with vinyl finish.
Grill:
Black high porosity double knit.
Size:
14¼" W x 25½" H x 11½" D.
Shipping Weight:
48 lbs.
Sensitivity:
90.5 dB re: 1 watt pink noise input, "A" weighting, 1.0 meter on axis.
Frequency Response:
32-25,000 Hz;
40-20,000 Hz; ± 3 dB
Speaker Complement:
1-10" woofer with 1½" high temperature voice coil, cured and outgassed; 1-1.5" soft dome midrange with single layer high-temp voice coil; lengthened magnetic microgap; 3.16 lb. magnet structure; 1-1" soft dome wide dispersion supertweeter.
Crossover Frequencies:
1250 Hz, 10,000 Hz.
Impedance, Nominal:
6 Ohms.
Recommended Amp Power:
20-100 watts RMS, unclipped.
Controls:
Continuously variable midrange and tweeter, push button reset circuit breaker, five-way binding post terminals.

Frequency response curves of the RTR D-Series loudspeakers show remarkable linearity and extended response.



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