Bohlender Graebener Corporation

RD75,RD50,RD48,RD40,RD28,RD28.1,RD22C
planar–magnetic transducers with true line source characteristics

The RD line of planar-magnetic ribbon drivers represents the ultimate thin film diaphragm technology. The RD drivers are the only commercially available products on the market that possess true line source characteristics. They generate a continuous and perfectly coupled wavefront even at the highest frequencies, where other, discrete (multiple driver array), designs exhibit severe lobing, energy leakage and chaotic spectrum balance changes along the listening axes.

Besides being a nearly perfect line source, the RD driver has all unique sound qualities of a planar ribbon transducer – unsurpassed transparency and accuracy of reproduction. It will communicate the full richness and complexity of sound, revealing all subtle details and texture quality of recording.

The RD driver can be implemented as a dipole, mounted on an open baffle, or as a monopole with rear enclosure, or as an in-wall loudspeaker. This offers unlimited freedom of creativity for a system designer, enabling the construction of very exquisite and unique loudspeakers.

Unique features:

- Extremely wide and even horizontal dispersion through the whole reproduced frequency range results in large and highly stable "sweet spot", vastly expanded soundstage, and improved stereo imaging;
- Little to no vertical dispersion, which eliminates annoying reflections of sound from ceiling fixtures, roofs and floors and delivers ultimate clarity and intelligibility, greatly removes detrimental room's influence on sound reproduction;
- Sound pressure level drops off at half the rate (-3dB) of conventional speakers (-6dB) as a function of distance (there is also a complex relation of this phenomenon to frequency and driver length);
- The design presents a purely resistive load, thus requiring no specialized equipment to drive them (any one of the many high quality, commonly available amplifiers of sufficient power can be used);
- The large radiating area moves a very small distance even at high volumes, resulting in very low levels of distortion;
- The driver is capable of reproducing sound over seven octaves, requiring no crossover in the critical mid frequency range, thus preserving spectral and temporal integrity of a human voice in vocal recordings;
- The RD drivers handle large amounts of power with ease due to a significant cooling area of the planar diaphragm.

The RD driver is manufactured as a dipole with nearly identical output from front and back with 180º phase difference (except RD22C). The driver has push-pull symmetrical magnet system arrangement (Ceramic 8 magnets are located on both sides of the diaphragm). This insures maximum SPL output, minimum distortion and cost effective design. The actual diaphragm is made of a very thin polyester (PET) film with the laminated aluminum strips creating a planar spiral voice coil. The tensioned diaphragm is extremely light. It's mass compares to the mass of

associated air volume that vibrates along with the diaphragm. This allows the driver for an immediate and precise response to micro-dynamic changes in a recorded signal, delivering ultimate level of resolution.
The driver has three layers of specially shaped steel frames that support structural rigidity and precision integrity of the unit. The RD driver's solid construction is free from any inherent resonanses.

The RD drivers are essentially line source radiators, hence there is a certain relation between the driver length and a minimum recommended listening distance outlined in a table below. Smaller listening distances may result in minor subjective lack of the very high frequency output. This limitation can be overcome in systems with a complementing supertweeter.

Model	RD75	RD50/RD48	RD40	RD28/RD28.1	RD22C
Minimum recommended listening distance, feet (m)	15(4.6)	10(3.1)	8 (2.45)	6(1.83)	none

The RD line drivers offer many possibilities in system design and their correct application is very important for the best results. Normally, the RD driver is capable of reproducing sound in 150 Hz – 20 kHz range, however, in each case the actual design and particular application must be considered when choosing the low frequency crossover point and filter slope rate. A larger room, significant room absorption, higher playback levels or extended listening distance could require a higher crossover frequency and filter slope (200-300 Hz high pass crossover with at least 4th order slope), while a system used in average or small size room with low absorption and moderate listening distances could use 150-200 Hz (sometimes even 125Hz for RD75) with 3rd order crossover. If the driver is used as a dipole, in an open baffle, the baffle width (12" is min. recommended) and shape will affect the low frequency extension and SPL output irregularities. Generally speaking, a baffle with irregular or sloped side(s) (e.g. trapezoidal) can yield a smoother response (for useful detailes visit http://www.snippets.org/alsr/dbsindex.html). Special attention should be paid to a dipole system placement; the use of absorptive/diffusive materials on the rear wall (in the middle between left and right system) and a minimum distance of 2 feet (0.6m) are recommended. If the driver is used in a sealed enclosure, the depth of the cabinet and amount of dampening will affect the performance. For the best results, the enclosure should be at least 6"(0.16m) deep with sufficient amount of dampening material. The use of additional, medium density ¼" – ½ " thick felt lining, placed inside, on the rear panel, is highly recommended. Sloped rear panel (or internal brace) could also improve the performance by suppressing internal modal resonances of the enclosure.

High quality crossover components (especially series capacitors) are essential in order to provide a transparent signal path for this highly revealing transducer.
A matching subwoofer/woofer system should have a high level of resolution for the best sonic integration with the RD drivers. It is recommended to use at least 2nd order low pass crossover for the woofer. Better results could be achieved with higher order crossover. The use of high order active electronic crossovers is also recommended.
The RD drivers (except RD22C) should be used with a notch filter (see attached schematic and table for particular component values), which equalizes a natural frontal air cavity resonance.
The RD drivers are essentially line source radiators over the significant part of its effective frequency range and listening distances in residential environment. For example, at 4m (13 feet) the RD50 will have only 6 dB SPL loss in relation to SPL at 1m(3.27 feet) distance. A conventional point source system will have 12dB SPL loss at the same conditions. Thus, providing both systems have the same 2.83V/1m sensitivity, the RD50 needs 4 times less power to achieve the same SPL level at 4m listening position. The RD48 is specifically designed as an upgrade/repair unit for Carver AL-III, Genesis 2 and Genesis 2.01 loudspeakers. The RD75 can be used as an upgrade/repair unit for Genesis Model 1.1

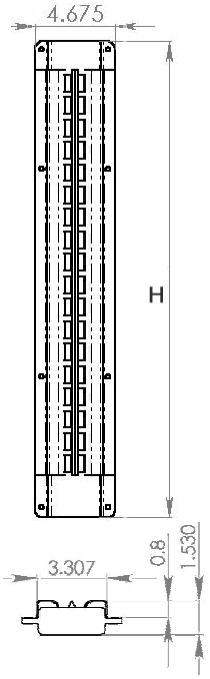
The RD22C is a hybrid planar midrange/dome tweeter assembly. The RD22C's planar ribbon panel has a special section in the middle where 1" silk dome tweeter with Neodymium magnet system is placed. The tweeter is mounted flush with the frontal metal plate of the driver. The RD22C can be used as a midrange-tweeter section for a very slim centre channel speaker with relatively wide horizontal dispersion or for a complete multichannel system.

Specifications

Model	**RD75**	**RD50**	**RD48**	**RD40**	**RD28.1(28)**	**RD22C assembly**
Effective frequency range, sealed enclosure, (-6dB from average SPL)	125 Hz – 20 kHz	125 Hz –20kHz	125 Hz–20kHz	150 Hz –20kHz	150 Hz –20kHz	250 Hz –20,000 Hz ± 3dB (two way with crossover)
Frequency response, sealed enclosure, 1m, with notch filter*	150 Hz – 18,500Hz ± 3dB	150 Hz – 18,500Hz ± 3dB	150 Hz – 18,500Hz ± 3dB	150 Hz – 18,500Hz ± 3dB	150 Hz – 18,500Hz ± 3dB	250 Hz –20,000 Hz ± 3dB (two way with crossover)
Impedance	6 ohms, resistive	4 ohms, resistive	4 ohms, resistive	4 ohms, resistive	4 ohms, resistive (2ohms for RD28)	4 ohms, resistive up to 5 kHz
Senitivity, equivalent to 1W/1m, (measured at 2m)	88 dB	88 dB	88 dB	88 dB	88 dB	88 dB
Diaphragm	Tensioned Polyester film with laminated aluminum ribbon conductors	Tensioned Polyester film with laminated aluminum ribbon conductors	Tensioned Polyester film with laminated aluminum ribbon conductors	Tensioned Polyester film with laminated aluminum ribbon conductors	Tensioned Polyester film with laminated aluminum ribbon conductors	Tensioned Polyester film with laminated aluminum ribbon conductors (midrange panel), Silk dome tweeter
Magnet system (all drivers are magnetically shielded)	Symmetric, push-pull, with Ceramic 8 magnets enclosed in steel chassis	Symmetric, push-pull, with Ceramic 8 magnets enclosed in steel chassis	Symmetric, push-pull, with Ceramic 8 magnets enclosed in steel chassis	Symmetric, push-pull, with Ceramic 8 magnets enclosed in steel chassis	Symmetric, push-pull, with Ceramic 8 magnets enclosed in steel chassis	Symmetric, push-pull, with Ceramic 8 magnets enclosed in steel chassis, Neodymium tweeter
Power handling RMS, W Program, W Peak, W	 100 200 400	 70 135 270	 65 120 240	 50 100 200	 40 80 180	 40 100 W 200 W
Crossover network recommendations	150Hz, minimum 12 dB/oct. electrical minimum	150Hz, minimum 24 dB/oct. electrical minimum	150Hz, minimum 24 dB/oct. electrical minimum	150Hz, minimum 24 dB/oct. electrical minimum	150Hz, minimum 24 dB/oct. electrical minimum	250Hz, minimum 12 dB/oct. electrical minimum
Dimensions, H x W x D, inch	75.563”x 4.675”x 1.53”	51.5”x4.675”x 1.53”	48.0”x6.130” x1.59”	40.026”x 4.675”x1.53”	28.25”x 4.675”x1.53”	22.312”x4.675”x 1.53”
Weight	35.5 lbs.	25.2 lbs.	24.5 lbs.	18.4 lbs.	13.4 lbs.	10.5 lbs

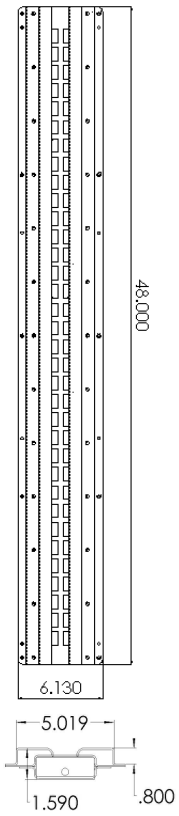
* Refer to the notch filter schematic for proper implementation.

RD75/50/40/28/28.1

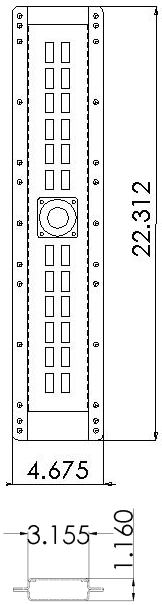


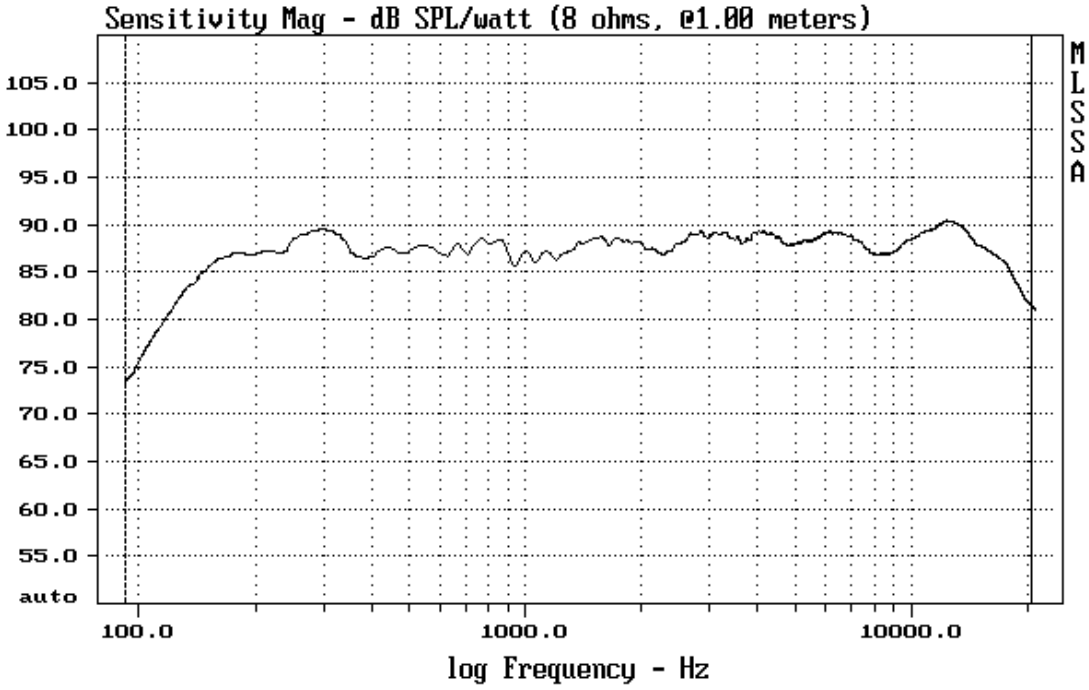
See table above for height H of a particular model

RD48



RD22C





Typical RD driver SPL frequency response measured at 1m (over the entire frequency range), 2.83V, in 6" deep and 6 ½" wide closed box, in an average room, 0.2 oct. smoothing. Due to a complex nature of a line source behavior, and specific room influence, the actual frequency response at a minimum recommended listening distance will exhibit some variations at low-mid frequencies.