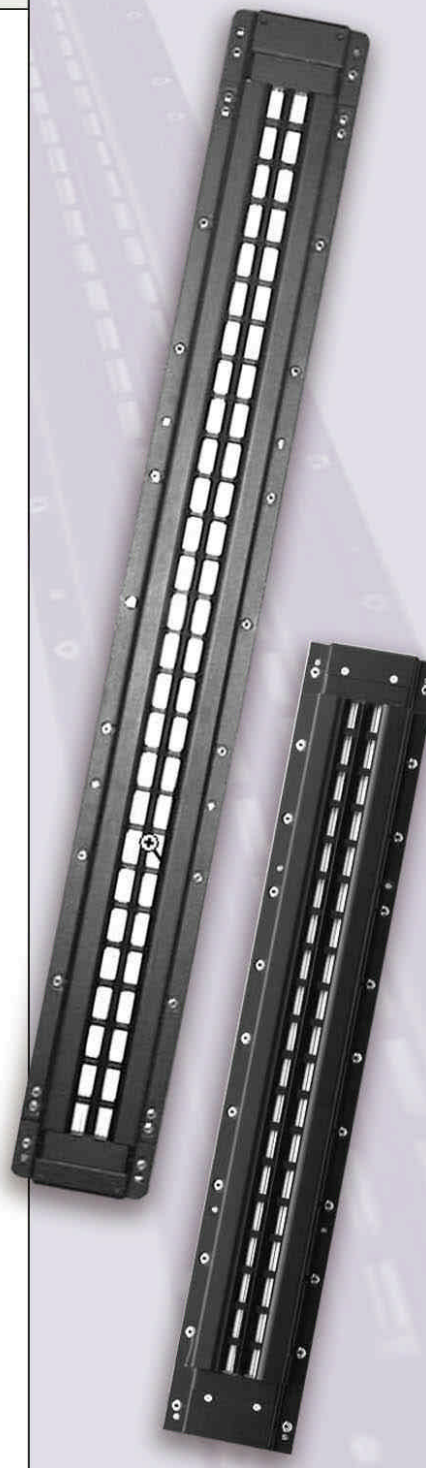
RD75, RD50, RD48, RD40, RD28.1, RD22C
Planar–magnetic transducers
with true line source characteristics



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. Other discrete (multiple-driver) designs exhibit severe lobing, energy leakage, and chaotic spectrum balance changes along the listening axis. In addition to being a nearly perfect line source, the RD drivers have all of the advantages unique to planar ribbon transducers – unsurpassed transparency and accuracy of reproduction.

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

Unique features:

- Extremely wide and even horizontal dispersion throughout the reproduced frequency range. This yields a highly stable "sweet spot", vastly expanded soundstage, and improved stereo imaging;
- Little-to-no vertical dispersion, which eliminates annoying reflections of sound from ceilings and floors, helping to deliver superior clarity and intelligibility. The designer can greatly reduce harmful room affects from the equation;
- Sound pressure level drops off at half the rate (-3dB) of conventional speakers (-6dB) with a doubling of distance;
- The driver is very easy to drive due to the purely resistive load presented to the amplifier;
- Due to the large radiating surface area, very little driver excursion is required to produce a given SPL, resulting in very low levels of distortion;
- The driver is capable of reproducing sound over seven octaves, requiring no crossover in the critical midrange region. The lack of a crossover in this region removes phase incoherency in the critical midrange, helping preserve the spectral and temporal integrity of vocal recordings;
- The RD series drivers can handle large amounts of power with ease due to the excellent dissipation of heat over the entire surface area of the diaphragm.

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Driver Construction

The RD drivers are manufactured as dipoles, with nearly identical output from the front and back of the element. The drivers feature a highly effective push-pull symmetric magnet system (Ceramic 8 magnets are located on both sides of the diaphragm). Having symmetric magnets insures maximum SPL output, minimum distortion, and a cost-effective design. The diaphragm is made of a very thin polyester (PET) film with laminated aluminum strips creating a planar spiral voice coil. The tensioned diaphragm is extremely light, with a mass very close to the mass of the associated air volume that vibrates along with the diaphragm. This close coupling of mass allows the driver to exhibit immediate and precise response to micro-dynamic changes in the recorded signal. The driver frame is comprised of three layers of high-strength steel that provide structural rigidity and maintain critical tolerances. The RD drivers' solid construction makes it free from any inherent structural resonances.

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.

Listening Distances

The RD drivers are essentially line-source radiators, hence there is a certain relation between the driver length and listening distance, as outlined the table below. Smaller listening distances may result in a somewhat subjective perception of decreased output at the highest frequencies. This limitation can be overcome in smaller systems with a complementing super tweeter.

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

Crossover Suggestions

The RD line-source elements offer many possibilities in system design. Their correct implementation is very important for the best results. Normally, an RD series driver is capable of reproducing sound in the 150 Hz – 20 kHz range. However, for each particular design the specific application must be considered when choosing the low frequency crossover point and filter slope. Large rooms with high absorption, high playback levels, or long listening distances usually require a somewhat higher crossover frequency (at least 300 Hz second order high pass crossover).

In an average or small sized room with low absorption and shorter listening distance, a 150-200 Hz crossover point may be used. At least third order crossover is recommended for this application.

The RD series drivers should be used with a notch filter (see attached schematic and table for particular component values), which equalizes a natural frontal cavity resonance. This peak is pronounced in the 5 kHz area on-axis, with a diminishing peak further off-axis. The values in the following chart are the manufacturer's recommended filter.

High quality crossover components (especially series capacitors) are essential to provide a transparent signal path for this highly revealing transducer.

Dipole Suggestions

In dipole or open baffle situations, low frequency extension and SPL output is largely dependent on baffle size and geometry. To achieve a sufficient low-end response, a minimum baffle width of 12" is recommended. Generally speaking, a baffle with irregular or sloped side(s) (e.g. trapezoidal) will yield a smoother response due to the spreading out of baffle edge diffraction effects. In dipole situations, special attention should be given to in-room speaker placement and room acoustic treatment. A minimum distance to the rear wall of 2 feet is recommended with the use of absorptive/diffusive materials on the rear wall between left and right speakers.

Sealed Enclosure Suggestions

If the driver is used in a sealed enclosure, the depth of the cabinet and amount of dampening will significantly affect the driver performance. For optimum results, a rear enclosure up to 10" deep is recommended with 3.5" being the minimum. The rear enclosure should be filled with poly fibers (Dacron, Acousta Stuff), fiberglass, or other similar dampening materials. Additional dissimilar dampening material such as Black Hole 5 or medium density 1/4"– 1/2" felt, placed on the internal rear panel, is highly recommended. As in all loudspeaker cabinets, non-parallel walls, good-quality construction, and effective bracing will improve performance by reducing cabinet resonances and standing waves. The rear panel can be slanted to prevent pronounced internal resonance and reflections.

Subwoofer Integration

A matching subwoofer/woofer system should have a high level of resolution for the best sonic integration with the RD series drivers. It is recommended to use at least a 2nd order low-pass crossover on the woofer. Better results can be achieved with higher order crossovers. The use of high order active electronic crossovers is also recommended.

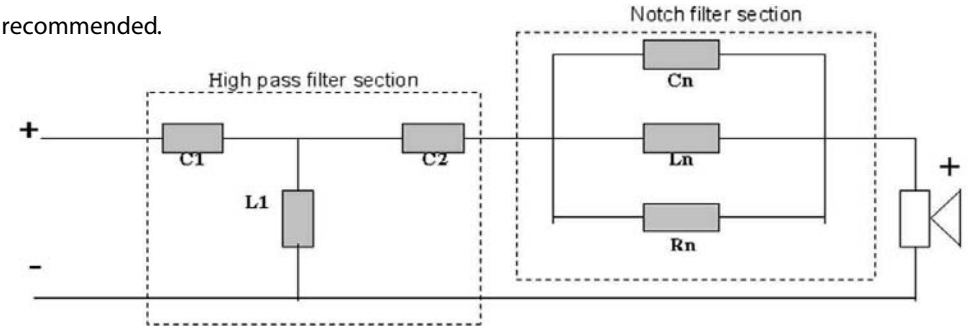
Recommended Notch Filter Use and Application

For optimum performance of the BG RD series drivers, it is recommended that a simple notch filter be installed. This notch filter corrects for cavity resonances between the magnet structure and the diaphragm in the 5K to 6K range. The notch filter is placed in the positive signal path prior to the RD element and can be used in addition to other crossover elements. To achieve a flat frequency response throughout the entire spectrum, please use the following notch filter. Values are as recommended by BG and may be customized to personal taste.

Recommended passive crossover schematics for BG Corp. planar- magnetic transducers

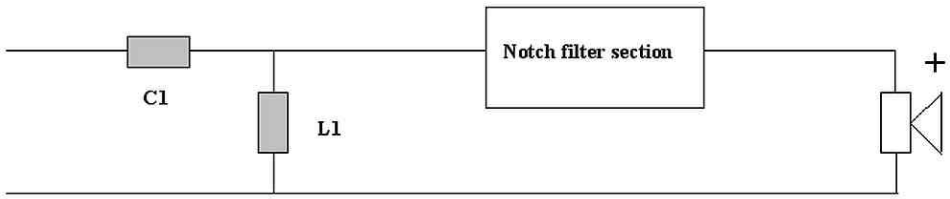
RD planar transducers generally can be used with two types of crossover network:

1) high pass filter with 150Hz cut off frequency (minimum 18dB/oct.slope) and notch filter. Schematic and component values are given below. Recommended for applications where RD drivers are not used at their maximum power capacity but primarily for reproduction at moderate sustained levels. In case when 150 Hz crossover point and very high SPL levels are required, fourth order high pass filter is recommended.



Transducer	C1	C2	L1	Cn	Ln	Rn
RD75	130	390	4.4	20	0.05	10
RD50	210	620	2.7	20	0.05	8
RD40	270	820	2.1	6.8	0.12	15
RD28.1	200	590	2.9	20	0.05	4.7

2) high pass filter with 300 Hz cut off frequency (minimum 12dB/oct.slope) and notch filter. Recommended for applications where RD drivers may be used at their maximum power capacity at very high sustained levels or in very large rooms. Schematic and component values are given below. Notch filter schematic and values are the same as above.



C1= 125 µF, L1=2.3mH, 19 AWG.

NOTES:

These crossovers are given only as guidelines. A designer is free to use any other reasonable approach.
All capacitor values are in microfarads, all inductor values are in mH, all resistor values are in ohms, nominal power rating is 10W.
All C1 and C2 are non-polar (NP,BP) capacitors with at least 100V rating. All Cn are polypropylene capacitors with 250VDC rating.
All RD drivers exhibit a frontal cavity resonance naturally inherent due to a magnet structure in front of the diaphragm. Notch filter provides compensation of this resonance yielding smooth frequency response.
For better reproduction of very high frequency signals C1 and C2 can be assembled from multiple non-polar capacitors and bypassed with high quality polypropylene capacitors of a small value (0.47 uF– 1uF).

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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 (2 for RD28), resistive	4 ohms, resistive up to 5 kHz
Sensitivity, 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	40 100 200
Crossover network recommen-dations	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" x 4.675" x 1.53"	48.0" x 6.130" x 1.59"	40.026" x 4.675" x 1.53"	28.25" x 4.675" x 1.53"	22.312" x 4.675" x 1.53"
Weight (lbs)	35.5 lbs.	25.2 lbs.	24.5 lbs.	18.4 lbs.	13.4 lbs.	10.5 lbs.

BOHLENDER GRAEBENER CORPORATION

radia SERIES

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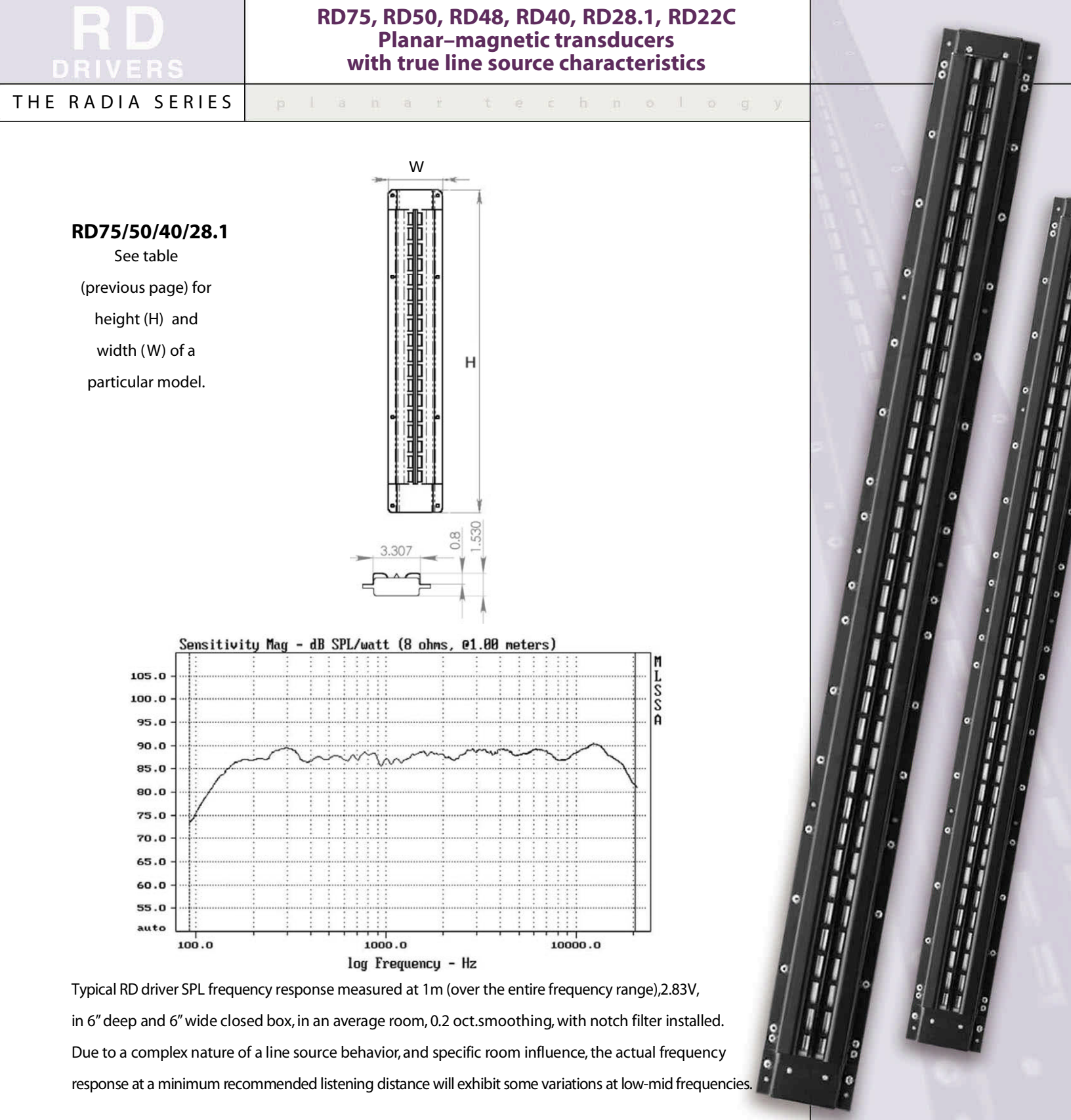
p l a n a r t e c h n o l o g y



RD75/50/40/28.1

See table (previous page) for height (H) and width (W) of a particular model.

Typical RD driver SPL frequency response measured at 1m (over the entire frequency range),2.83V, in 6" deep and 6" wide closed box, in an average room, 0.2 oct.smoothing, with notch filter installed. 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.

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