

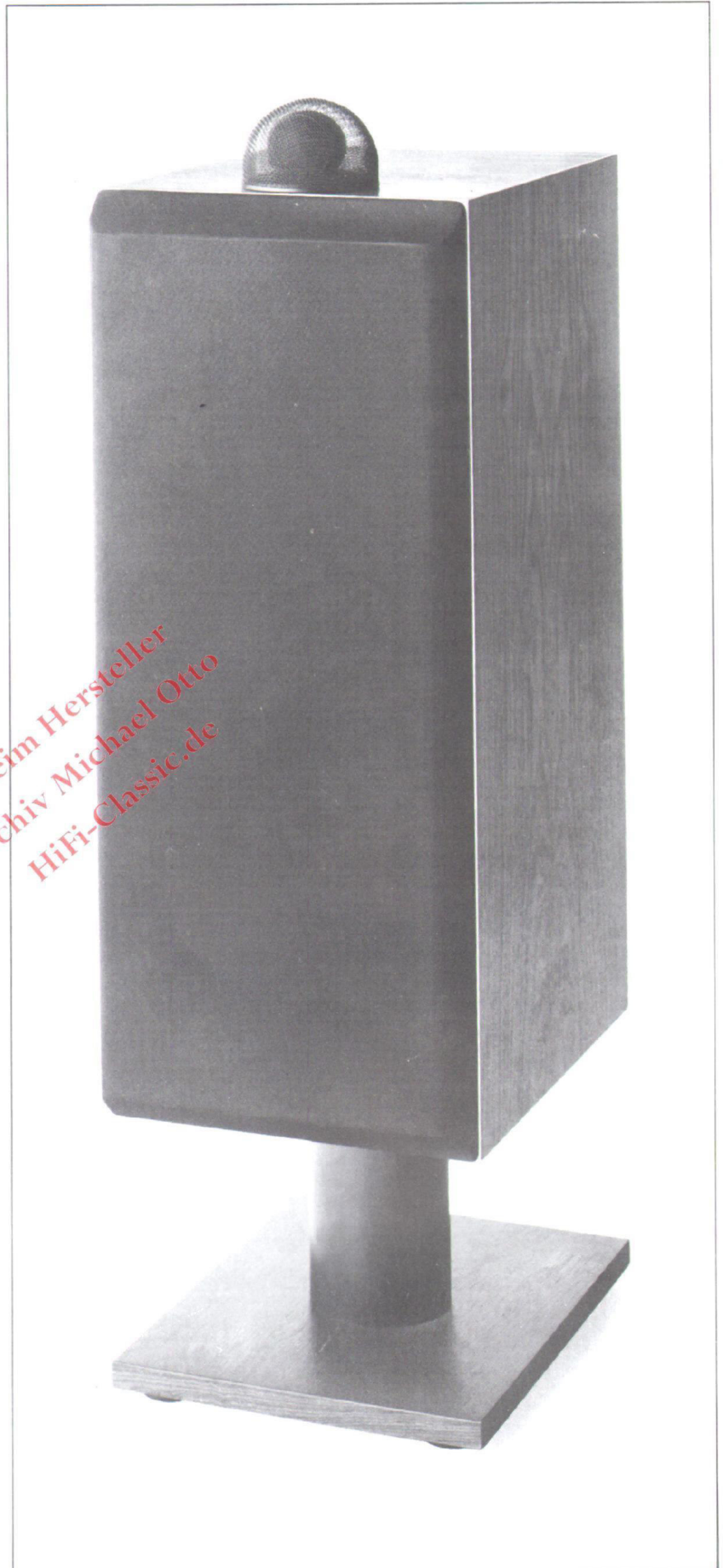
B&W DM7Mk2

The Design Brief

The original DM7 represented a significant milestone in B&W's history, since it was the first loudspeaker system to benefit from our in-house computer system. Following the extensive research programme completed for our professional monitor Model 801, there were obvious advantages to be gained by applying this technology to DM7 Mk2.

The following were target areas where improvement seemed feasible:

- Redesign crossover network using B&W computer optimisation programme to achieve fourth order Butterworth squared (-6dB at crossover) characteristic.
- Within the crossover optimisation, assess the possibility of increasing the overall sensitivity of the system.
- Design and incorporate an audio powered protection system based on the original powered version which has proved so successful in Model 801.
- Explore the possibility of even further linearising the amplitude response of the system.
- Using our in-house computer programme for system optimisation, explore the possibilities for redesign of the system's low frequency high pass characteristic.



The Drivers

The original development work carried out on the drive units for DM7 has proved its validity—and on re-examination no changes (with the exception of one in ADR resonance) to the original DM7 drivers were necessary.

The bass/mid-range driver B&W type BM220 comprises a 160mm diameter piston formed from a matrix of polyamide fibres (B&W Patent No 1 491 080) coupled to a 38mm dia. high-temperature voice coil. B&W's patented matrix cone assembly has proved its superiority over all existing materials—firstly in DM6 and more recently in our professional monitor Model 801, which was chosen by EMI as the classical music monitor for their Abbey Road studios and on location throughout the world. The bass/mid-range driver is acoustically coupled to the ultra-low frequency radiator type ADR 220 which employs an entirely new diaphragm material of cross-linked polyethylene foam. The three-driver complement of the DM7 Mk2 is completed by the unique TS26 high frequency transducer. Spheroidal in shape and mounted on top of the speaker in a woven wire dome, it has excellent transient response and high power-handling capability. Frequency response extends almost completely linearly to beyond audibility.

To minimise time delay distortion, the DM7 Mk2 drive units are stepped and arranged vertically in line.

The Crossover Network

A 14-element computer-optimised network provides the necessary filter and crossover network to give fourth order Butterworth squared (−6dB at crossover) complementary high- and low-pass sections. Given correct driver alignment (to correct for inter-unit time delay as is the case in DM7) the fourth order Butterworth squared crossover configuration ensures a perfectly symmetrical vertical polar response either side of the listening axis. With an attenuation in the stop bands of 24dB per octave it also enables a very high distortion-free power output to be obtained from the drive units. To maintain the close tolerances necessary with this complex network, high grade polyester (not electrolytic) condensers are used throughout and coupled with low resistance ferrite-cored inductors. The long term stability of the configuration is thus ensured, together with minimum insertion loss.

The Enclosure Design

When one realises that the surface area of the enclosure is some twelve times that of a bass/mid-range driver, the importance of making the enclosure both extremely rigid and as free as possible from discrete resonances will be appreciated. The cabinet has 25mm laminated walls which, together with internal bracing, produce an acoustical performance superior to 50mm reinforced concrete! The purpose-tooled front baffle and grille assembly are moulded from polystyrene structural foam to minimise diffraction.

The Overload Protection

B&W was the first manufacturer in the world to introduce a complete electronic protection device into a production loudspeaker; that was in January 1979 for Model 801. This highly effective device has been further developed, resulting in an audio-powered overload protection which makes it virtually impossible to destroy the drive units of the loudspeaker. Immediately the maximum thermal safety limit for any driver has been reached the system input is severely attenuated and the LED indicator shows a fault condition. The loudspeaker returns to normal working condition only when the excessive fault condition has been removed. The device is entirely automatic in operation.

The Accessories

A purpose-designed stand with matching wood veneered base is supplied with Model DM7 Mk2. This ensures that the centre of the listening window is at the correct height for normally-seated listeners.

Conclusion

The five areas of improvement outlined in the design brief have been met, resulting in an even better product than the original DM7. Extensive listening tests with direct comparison between the original and the Mk2 version have shown three areas of improvement: increased clarity in the sound (voices and strings, for example, are more naturally reproduced), higher acoustical output with lower distortion, and even greater freedom in seating location, while still retaining excellent stereo location and depth perspective.

We offer DM7 Mk2 with total confidence that it will fulfil the needs of those who demand lifelike re-creation of the original sound in their own home . . . yet require a loudspeaker of modest dimensions.

SPECIFICATION

Frequency response

80Hz to 20kHz \pm 2dB free-field at centre of the listening window at 2m.

Low-frequency system

Passive-radiator type, system parameters:
(after R. H. Small)

$$f_s = 31\text{Hz} \quad Q_T = 0.22 \quad \alpha = 1.75 \\ h = 1.06 \quad \delta = 7.50$$

Dispersion

Vertical: \pm 1dB over 10° arc.

Horizontal: +0 – 3dB over 60° arc, 20Hz – 15kHz.

Drive units

Two, vertical in-line and staggered for correct time alignment.

Bass/mid-range driver BM220

Diaphragm: 160mm dia. aromatic polyamide fibre matrix cone.

Voice coil: 38mm. dia.

Vibration-isolated mountings reduce excitation of structural resonances of the enclosure.

High-frequency driver TS26

Diaphragm: 26mm dia. multi-filament polyester weave dome.

Voice coil: 26mm dia.

To achieve a compact unit with excellent directional characteristics, a high-energy nickel cobalt centre pole is used in the magnet system.

Distortion

For a nominal s.p.l. of 95dB at 1m. 40Hz to 20kHz.

Second harmonic less than 3%.

Third harmonic less than 2%.

Impedance

8ohms nominal.

Minimum magnitude 6.5ohms.

Sensitivity

1 watt into 8ohms for a s.p.l. of 86dB at 1m, sinewave input at 1kHz.

Power handling

Suitable for amplifiers having a power output of 40watts or greater.

No upper limit because of electronic overload protection device.

Maximum s.p.l. at 1kHz 110dB, at 1m.

Dimensions

Height: 900mm (35 $\frac{7}{8}$ in).

Width: 270mm (10 $\frac{1}{8}$ in).

Depth: 382mm (15 in).

Weight

29kg (64lb).

Cabinet finish

Standard: selected veneers of teak or walnut.

Special: selected veneers of rosewood or black ash.

B&W Loudspeakers Ltd reserve the right to amend details of their specifications in line with technical developments.



B&W Loudspeakers Ltd

Meadow Road Worthing West Sussex BN11 2RX England

B&W DM and Series 80 are registered trade marks of B&W Loudspeakers Ltd



Printed in England GSB5920/80