B&W

DM2

Instruction manual

B&W electronics

Contents

B&W electronics
Worthing, Sussex, England.
Tel 0903 205611 Grams 'Monex' Worthing.

1 General description and introduction

The DM2 is a precision three unit monitor loudspeaker employing highly developed units with B&W acoustic line loading giving extremely low distortion and exceptional frequency linearity.

This loudspeaker fully meets professional monitor requirements and is capable of most realistic reproduction of both speech and music programme material. Because of its low distortion, wide and balanced frequency response, and freedom from colouration it will be analytical and may well reveal faults in programme material and defects in ancillary equipment which an inferior product would mask.

We hope this simple instruction book will assist you in easily connecting and placing your loudspeakers, and we have quite deliberately restricted these instructions to a simple and non-technical nature. For the professional user or those who may be interested in a detailed treatment of the design we have prepared a complete technical release which is available either from us direct or in the case of overseas users from our appointed agent and distributor in your country.

In order to offer the best possible stereophonic performance under widely varying domestic and studio conditions the DM2's are supplied in matched pairs with a different polar distribution pattern for the left and right-hand loudspeaker — dealt with in detail under section 4.

At this stage the following identification may be helpful.

Left-hand loudspeaker Carton printed BLUE B&W Badge on left-hand side looking at front.	**Right-hand loudspeaker** Carton printed RED B&W Badge on right-hand side looking at front.

In common with all our products the DM2 is subjected to the most stringent quality control throughout every stage of manufacture. We individually frequency response test every loudspeaker system before packing and provide you with a calibration curve with the guarantee registration card.

Provided the instructions are followed your loudspeaker should give you many years of completely trouble free service. In the event of any query we would ask you to adopt the following procedure if service is required :—

England, Scotland & Wales :
Contact the dealer from whom you purchased the loudspeakers.

All other Countries :
Contact our distributor for your country—name and address supplied from our factory if in doubt.

B&W have appointed agents throughout the world, selected with great care to give you the best possible service. Should you have any reason to feel dissatisfied or if any queries arise, we will be pleased to assist wherever possible.

2 Accessories

Regardless of size or price the performance of any loudspeaker system is influenced by its position in the listening room and we have dealt with this subject under section 3. In order to allow easy and tasteful inclusion of the DM2 under widely differing domestic conditions we have designed a range of accessories. Before you commence installation the following details may be helpful.

PLB/2
A floor-standing plinth fitted with castors allowing the loudspeaker to be moved easily for cleaning and accurate positioning. This plinth is designed to angle the loudspeaker in order that the sound is projected to the correct level for a seated listener.

STA/V
For those who wish the loudspeaker to be free-standing this accessory provides proper support at the correct height for vertical operation.

STA/H
If you wish to support your DM2 in a horizontal position the correct height of the loudspeaker base is some 600mm. This stand is similar to STA/V.

WFB/2
Two-part metal wall fixing bracket allowing the DM2 to be securely flush mounted. Due to the relatively high weight, proper plug fixing must be carried out, and the screws supplied are provided to ensure safety.

The listening room

Most people have relatively little control over their listening room in terms of size or shape, but as the environment in which the loudspeaker is used plays such a big part in the quality of sound we hear, some comments on room characteristics may be helpful before we proceed in section 4.

There are two aspects of listening rooms which will most widely influence sound reproduction: The basic dimensions of the room and large items of furniture controlling the lower frequencies; and items of soft furnishing together with wall and other coverings affecting the middle and upper frequencies.

All rooms have resonances, and so indeed does the concert hall, but in the case of the latter these are so low in frequency, and by design, so well spaced that they add ambience rather than colouration. The worst example in a listening room or studio would be the unlikely event of all dimensions being the same and the room forming a cube. The best case being a relatively large room where all dimensions are different. Fortunately the worst example is rarely, if ever, encountered but where a choice is possible as between a square or rectangular room the latter is to be preferred as the room resonances — known as eigentones — occur at spaced frequencies and are therefore of lower amplitude.

The most pronounced eigentones occur at low frequencies below approximately 200Hz. In addition to these eigentones there is another important influence the room has over the lower octaves of reproduced sound. Due to the relatively small dimensions of the loudspeaker compared with wavelengths of sound in the lower octaves, the radiation pattern or distribution of sound at these frequencies is effectively spherical. When operating a loudspeaker in a room, this sphere of sound is contained, to a greater or lesser degree, depending on position within a series of plain surfaces formed by the walls, floor and ceiling. This produces a factor known as 'room gain' and does in fact make the lower frequencies considerably louder than if, for instance, the loudspeaker were operated in the open air.

In the design of the DM2 detailed basic research has been carried out in evaluating room gain, and the acoustic line has assisted in contouring the response of the lower octaves.

Before leaving the way in which the room affects the low frequency part of the sound spectrum, a word should be said on the construction especially of the floor.

The ideal is a solidly built ground floor room with a concrete floor. In rooms where there is a board and joist floor this will play a part in both adding to bass gain and room colouration. The suspended floor acts as a supplementary bass radiator operating at the main resonance of the room. If your listening room has other than a solid floor the best solution is to free-stand the loudspeaker (e.g. on STA/V, STA/H or WFB) in such a position that the eigentones are excited to a minimum extent.

The subject of positioning your loudspeakers is dealt with in section 4, but before leaving the listening room we will mention its effect on middle and high frequencies.

The soft furnishings — chairs, curtains and carpet, together with wall and ceiling coverings are the main factors governing the performance of a room at middle and upper frequencies. Position of cupboards, bookshelves and other items of wall furniture also play an important role in these parts of the spectrum.

A room with insufficient soft furnishing will give a hard or steely tonal quality to middle and upper frequencies, with strings suffering especially. A room with too many soft furnishings — an over-damped room — will sound dull and lifeless, a somewhat similar effect to putting 'top cut' on your amplifier tone control.

The ideal mid/high frequency reverberation times (a measure of acoustic 'brilliance' or 'dullness') are somewhat subjective, but generally a good balance can be obtained by opposing a reflective surface with an absorbent one. As an example ceilings are usually bare and reflective and this can be well balanced by a fitted carpet. An unbroken wall facing large window areas can be broken by a bookcase on the opposite wall.

When furnishing a new room which is to be used for listening to reproduced music, it is usually wise initially to underdamp the room and then add absorbent articles after the correct balance has been determined.

4 Siting your loudspeakers

The positioning of loudspeakers is usually determined by existing furniture and the DM2 design has kept this fact firmly in mind, being optimised to allow correct loading by placing the loudspeakers close to a wall or in a corner. It was felt that designs which call for a marked free-standing condition — with the loudspeaker removed a considerable distance from the boundaries of the room — place severe and often unpractical restrictions on the user.

To obtain the best results, certain basic simple rules must be observed. The subject of room acoustics and placement of loudspeakers is, if dealt with in depth, both long and technically advanced. We will therefore confine our comments to a few simple rules. For those interested in a more detailed treatment we would refer you to our technical design release mentioned earlier.

Figs. 1 and 2 illustrate left and right-hand positioning

Fig.1
Left-hand
loudspeaker

Fig.2
Right-hand
loudspeaker

Figs. 1a and 2a show unit positions with grilles removed.

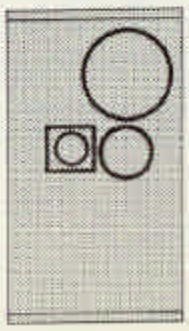

Fig. 1a

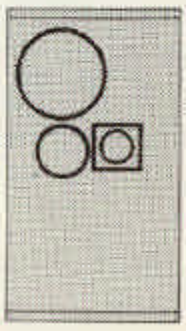

Fig. 2a

Figs. 3 and 4 indicate the area of dispersion for **vertical** and **horizontal** positioning.

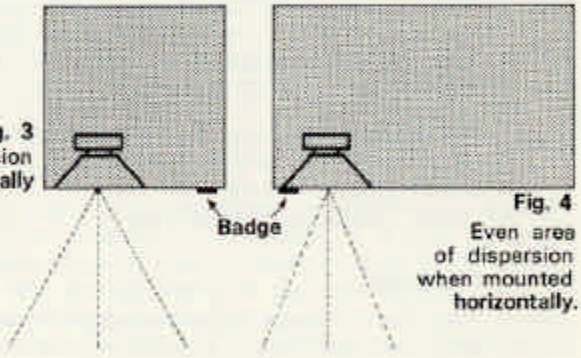

Fig. 3
Even area of dispersion when mounted **vertically**

Fig. 4
Even area of dispersion when mounted **horizontally.**

Electrical installation and connection

For stereophonic operation twin connecting leads will be required from the outputs of your amplifier to each loudspeaker. The terminals at the rear of the loudspeakers are colour-coded red and black and these are connected to the positive and negative terminals of your amplifier.

It is advisable to keep the series resistance of connecting cables as low as possible by using reasonably heavy guage cables. Our recommendations are as follows :

Under 10 metres : 16/0.2 mm. Over 10 metres : 24/0.2 mm.

PHASING

The centre image in stereophonic reproduction relies on 'in phase' components of equal amplitude and it is important to check that your loudspeakers and other items in the reproducing chain are correctly connected. If other items in the chain such as pick-up cartridge etc. are correctly connected the method of connection of loudspeakers outlined at the beginning of this section will be correct. However, there is a simple test which is worthwhile carrying out.

Feed both channels with monophonic source — e.g. mono radio, a mono record, or a stereophonic record with the control unit function switch turned to 'A + B' or 'Duo.mono.' If phasing is correct, when listening from a centre position between the loudspeakers, the sound will appear to originate from a relatively small area between the loudspeakers. If incorrect the sound image will be broader and spread across the area from the two loudspeaker boundaries.

If phasing of any item of equipment is incorrect reversal of any one item will correct the fault.

Ancillary equipment

Because of its exceptionally good frequency linearity and relative freedom from distortion and colouration the DM2 is capable of extremely natural and faithful reproduction, provided the signal fed to the loudspeaker is of the highest quality. A monitor loudspeaker — and the DM2 fully meets the critical specification — is therefore analytical and will reveal faults in ancillary equipment and programme material which could well be masked by an inferior loudspeaker.

It is not the purpose of this instruction book to recommend specific items of ancillary equipment and fortunately there is a wide range of top quality equipment available. In general terms however it is wise to match the quality of the various items in the reproducing chain. A good guide being to spend approximately equal amounts of money on the pick-up, arm and motor forming group one, the amplifier or tuner/amplifier forming group two and the loudspeakers forming group three.

The power rating of the amplifier will depend on the size of your listening room and the sound level of listening. True RMS outputs of between 15 watts and 60 watts per channel will meet all requirements.

VOLUME & TONE CONTROL SETTINGS

The correct operation of these controls is important if realistic reproduction is to be obtained. Dealing firstly with volume control settings. It is important to set the volume control of your amplifier at such a level as to recreate the original level of sound that would be heard in the concert hall or place of original live performance. The full symphony orchestra should therefore be reproduced at a higher level than say a small chamber orchestra or the spoken voice. If levels of sound differ from the original, tonal balance will be seriously affected. Should the reproduced level be lower than the original then bass, and to a lesser degree treble, will be deficient. If louder than the original the reverse will be the case.

For many reasons it may not always be possible to listen at original sound levels. For this and other reasons, tone controls are provided. The actual tone control settings will depend on a number of factors too numerous to detail. As a general guide, orchestral music will require some bass lift and little, if any, treble control when played below natural level, speech will require bass cut and slight treble cut when played above natural level. Between these two extremes there are many settings which will be quickly determined by listening.

Where a loudness control is fitted to the amplifier this is worth experimenting with, but in our experience, in most cases the 'loudness controls' offer corrections which are too large for anything other than wide variations from original sound level.

Specification

General description

A three unit system, comprising highly developed bass/mid-range Bextrene cone moving coil unit type DW200, lower high frequency unit type HF1300 and a 25mm dome super tweeter carrying the response above 25 kHz.

Rear loading of the bass unit by means of a B&W developed eighth wave acoustic line (patent application numbers 31793/71 and 5257/72) giving significant advantages both in terms of extending the low frequency response and reducing both harmonic and Doppler distortion over conventional loading.

The whole system is housed in an attractively styled cabinet of either rosewood, teak or walnut veneers plus a satin white version.

Matching accessories in the form of stand or plinth are available to allow easy accommodation in the home or studio. All DM2 monitors are individually tested and supplied complete with a Brüel & Kjaer pen test certificate showing frequency response.

Units

Bass/mid-range unit DW200 consisting of 150mm. Bextrene cone with 54mm centre dome. Long throw suspensions allow wide cone displacement with low distortion. The 38mm. voice coil is of special construction on an aluminium former, setting a new standard in terms of safe power dissipation.

Exceptional mid-range linearity and high power handling are features of this unit which employs a die cast chassis. Extreme quality control follows all stages of manufacture — which is carried out in our own factory. Nominal flux density 10,000 gauss.

Lower high-frequency unit comprising HF1300 (as used in the BBC monitor type LS3/6) and a 25mm. dome type super tweeter carrying the frequency response smoothly to above 25kHz.

Acoustic loading

The bass unit of the DM2 is rear loaded with an eighth wave acoustic line. This loading system — a folded tapered pipe, terminated with an open end of approximately cone piston area at the base of the cabinet — allows the line to perform at low frequencies controlling large cone excursions, thereby reducing distortion in addition to acting as an augmenting sound power source. This is achieved by the critical geometric configuration of the acoustic line and the particular grading of acoustical material within the line. The complex line loading employs three different absorbent materials.
Because the DW200 unit is a combined bass and mid-range driver, the acoustic line also provides the internal absorption of the mid-frequency energy to the rear of the DW200. (Patent application Nos. 31793/71 and 5357/72).

Crossover and filter network

Third order Butterworth with close tolerance components used throughout. Stop band attenuation of 18dB per octave with phase/impedance correction carried out on the high pass section of the lower high frequency unit.

The series inductors of the bass low pass section are of ferrite construction to ensure maximum damping applied to voice coil. All capacitors are polyester dielectric — not electrolytic.