



B&W DM2A

Instruction
manual
test certificate
and guarantee

B&W electronics

B&W

DM2A

B&W DM. Trade mark of B&W electronics

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B&W electronics
Meadow Road · Worthing
England · BN13 1QA
Telephone 0903 205611
Grams 'Monex Worthing' Telex 87342



General description and introduction

The DM2A 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. Variation of frequency balance is possible by means of a switched contour-control.

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.

In order to offer the best possible stereophonic performance under widely varying domestic and studio conditions the DM2A'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 DM2A 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 DM2A under widely differing domestic conditions we have designed a range of accessories. Before you commence installation the following details may be helpful.

STA/V2

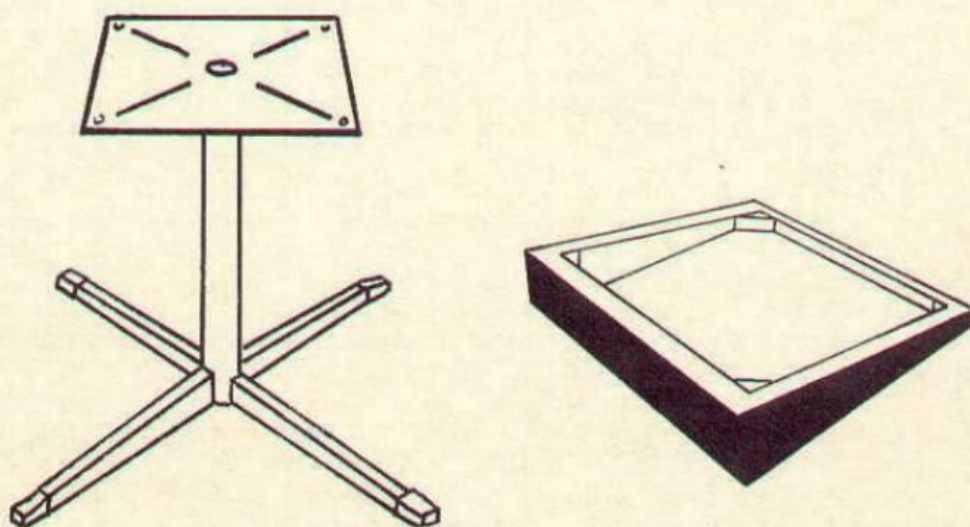
A metal stand as illustrated below for vertical mounting of the DM2A some 17in. from the floor; Cruciform base — finished matt black.

PLS/2

A hardwood shallow plinth screwed by customer to base of speaker. Fitted with steel dome glides. There is a 9-degree backward tilt on the plinth to give correct listening height when seated in an armchair. Finish egg-shell black. Illustration below.

WMK/2

A Kit of wall mounting brackets complete with full instructions and templates, Rawlplugs and screws, allowing the DM2A to be mounted on the wall in a vertical position.



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 DM2A 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. STA/V2 or WMK/2) 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.

The facility is provided on the DM2A to alter the upper mid-frequency output level. The control is located on the terminal dish at the rear of the cabinet. The three switch positions, marked "-2", "0", and "+2", correspond on two decibels cut, flat response, and two decibels left over the frequency range 4 kHz. to 13 kHz. (Refer to frequency response plots in the "Specification" section.)

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 DM2A 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.

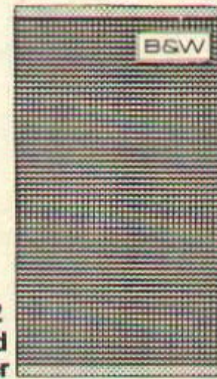
To obtain the best results, certain basic simple rules must be observed. The subject of room acoustics and placement of loudspeakers is, if dealt with in depth, both long and technically advanced. We will therefore confine our comments to a few simple rules.

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

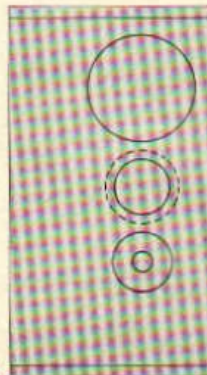
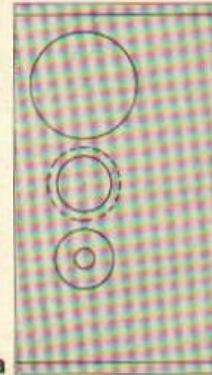


Fig. 2a



Simplified instructions for loudspeaker positioning.

1. If the distance between the loudspeakers exceeds 2.5m the badges on the front grille cloth should be on the outside. If less than this, reverse this handing and place the loudspeakers with badges on the inside.
2. The height of the cabinet is important and the base of the loudspeaker should be approximately 450mm for vertical mounting and 600mm for horizontal mounting — from the floor. The exception for this recommendation is when the loudspeaker is floor-standing. We should then recommend the tilted accessory plinth (PLS/2) which will project the sound image correctly to the listener when seated. When mounted horizontally the grille badges should be situated at the bottom of the grille in order that the units are uppermost.
3. Bass response within the bottom two octaves (30 Hz to 120 Hz) will vary with position relative to any plane surface (i.e. essentially encompassed by three plane surfaces). Conversely, minimum bass will occur when the loudspeaker is free-standing in the middle of the room.
4. It is suggested that in initial wiring, a flexible lead is used, and position of loudspeakers experimented with on familiar music until a natural balance is obtained. Permanent fixing with the necessary accessories may then be undertaken.
It is important to note that in vertical operation the height of the loudspeaker is the most critical factor, whilst in horizontal operation the angle in respect of the wall surface is the critical parameter.
5. The final point for consideration is whether to place the loudspeakers parallel with the wall or surface or to angle them towards the listening area. The governing factors are the distance between the loudspeakers and the listening distance from them. Considerable latitude is given by the wide dispersion of the DM2A, but as a general rule the angle by which they should be turned is increased the further they are apart and the closer you are seated to them.

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

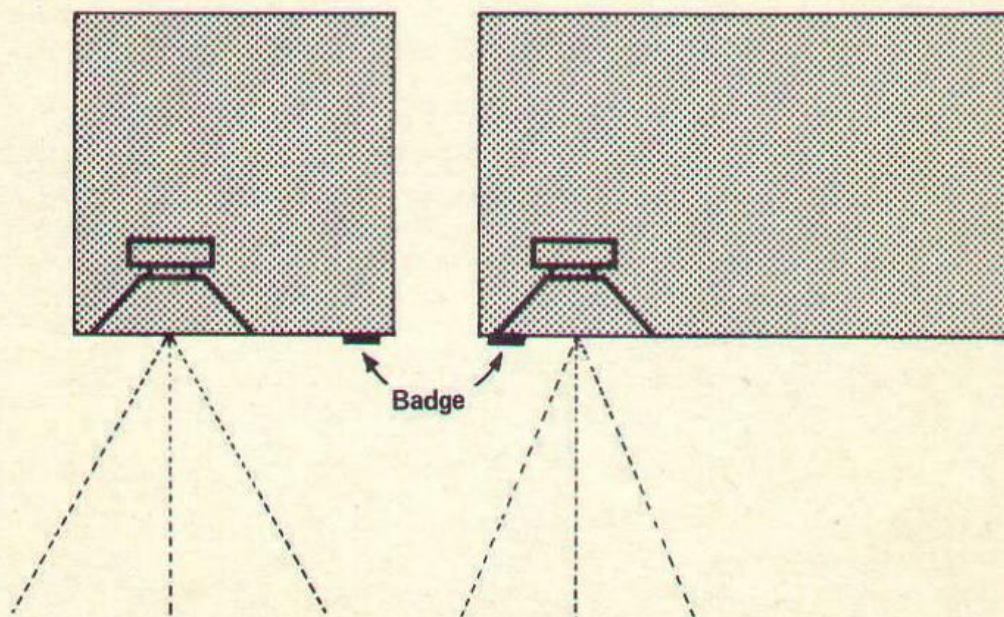


Fig. 3.
Optimum area of dispersion
when mounted vertically

Fig. 4
Optimum 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 gauge 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 DM2A 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 DM2A 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 25 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.



Specification

General Description

The DM2A is a three unit monitor Loudspeaker system comprising highly developed Bextrene coned Bass/Mid-range unit, rear loaded with the B & W eighth wave acoustic line (U.K. patent application numbers 31793/71 & 5257/72) type HF 1300 Mk. II lower high frequency unit and a 19 mm plastic domed upper high frequency unit. Third order Butterworth filters are used and band stop section to further linearise mid-frequencies.

The three units are arranged in an in-line configuration offset from centre to give an asymmetric polar response and assist the formation of a stereo image for various systems placings.

The DM2A has a range of optional accessories including all metal stand, plinth and wall mounting kit. Each DM2A is individually packaged with comprehensive instruction book. Every loudspeaker system is tested in our production Anechoic Chamber as part of final quality control and Brüel & Kjaer response curves are supplied with every loudspeaker.

The detailed specification which follows is, we believe, one of the most extensive of any production loudspeaker system in the world. It is indicative of the care and high standard both of development and subsequent production.

DETAILED SPECIFICATION

Drive Units

DW 200. Bass/Mid-range unit consists of 152 mm. diameter piston of critically contoured Bextrene with mid-frequency dome, driven from a 38.5 mm voice coil on an aluminium former. The entire voice coil is coated with bonding agent and heat cured to ensure long term stability at high operating temperatures. A long throw voice coil with rubber roll surround ensure high amplitude/low distortion operation and a massive magnet assembly weighing some 4½lbs (2.1 Kg.) give excellent damping and transient response. Pressure die-cast chassis of alloy material. All units are hand assembled; cones treated with critical damping compounds and frequent quality response

curves and distortion measurements are taken on Brüel & Kjaer equipment.

HF1300 Mk. II Upper mid-frequency unit as used in the BBC monitor type LS3/6, offering wide dispersion from a virtual point source.

High Frequency Unit

A 19 mm. low diaphragm mass plastic dome type unit extending the response to above 25 k.Hz.

Crossover and Filter Network

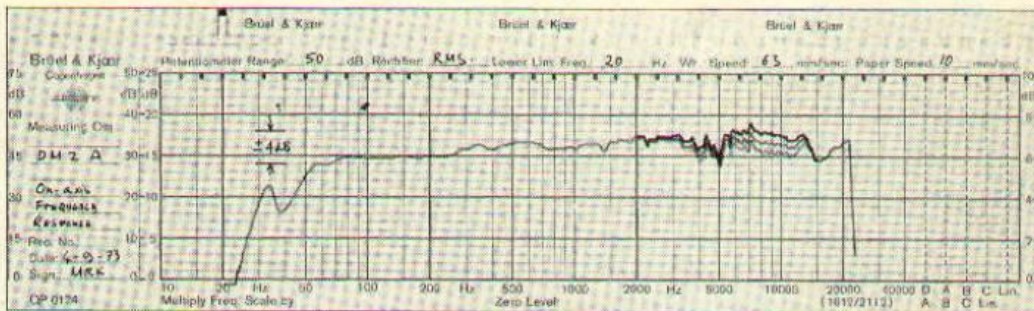
Third order Butterworth filters and band stop section following the first low pass section to further linearise the mid-frequency response. Stop band attenuation of 18 db per octave for all units. All components of close tolerance and LF inductors are of low distortion Ferrite construction to reduce winding resistance and ensure maximum amplifier damping to voice coil. All condensers are close tolerance polyester dielectric — not electrolytic. A total of 14 components plus a printed circuit board used in each crossover unit.

Cabinet

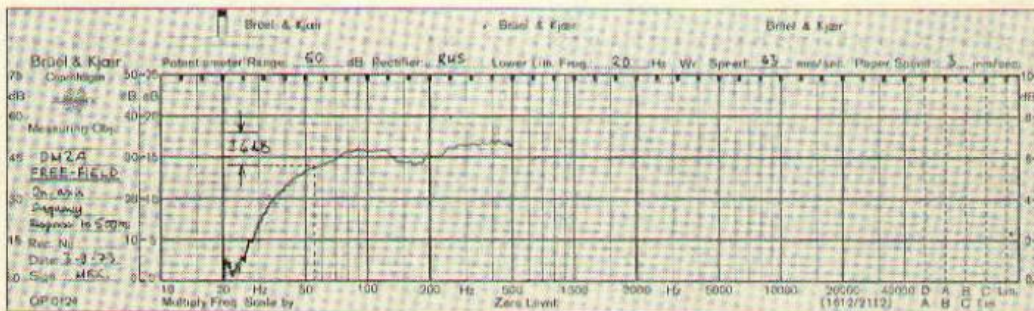
Constructed throughout of 750 density chip-board with balancing veneers. Material thickness not less than 19mm, with 25mm. baffle thickness and in addition to bracing formed by line dividers additional bracing and general construction ensures that the entire enclosure is a most rigid structure. Considerable care has been taken that the excellent acoustic line operation is complimented by an enclosure giving minimum 'readout' or colouration. There is a choice of Teak, Walnut, or Rosewood veneers, plus a Satin White finish.

Acoustic Loading

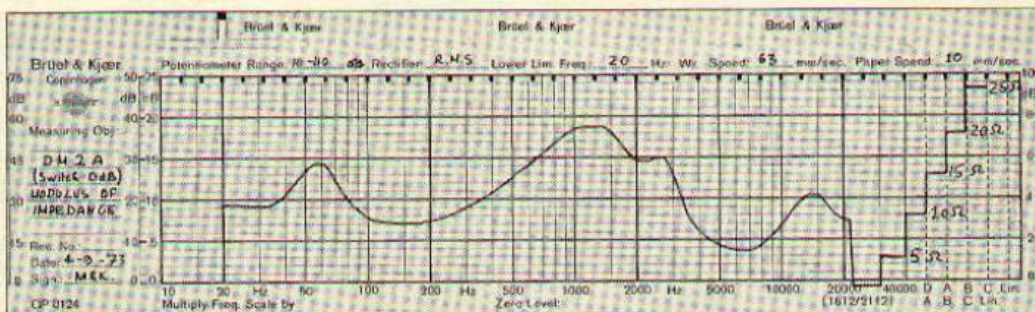
The L.F. loading is by means of the B & W eighth wave line (U.K. Patent application numbers 31793/71 and 5257/72), the vent of which acts as an augmenting sound source to the unit at extremely low frequencies. The multimaterial absorbent layout of acoustic line together with the special line contour ensure that the unwanted rear-radiation of the DW 200 unit in the lower-mid frequencies is effectively absorbed.



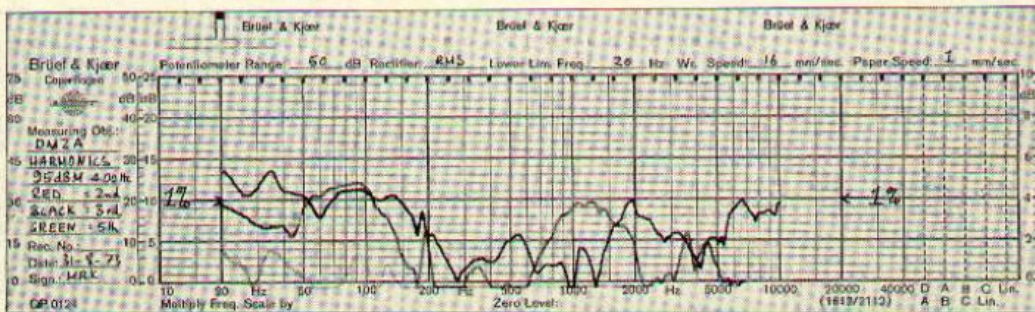
Frequency Response. On Axis ± 4 dB 60 Hz to 20 kHz (control set at "0 dB"). On axis response of a production sample DM2A taken in R & D Anechoic Chamber. B & K equipment used throughout, with type 4133 microphone at one metre.



Free-field Frequency Response. Frequency response up to 500 Hz taken on 5 metre tower in open. Comparison with above plot shows limitation of Anechoic Chamber at very low frequencies only.



Impedance. Nominal impedance 8 Ohms, Not falling below 7 Ohms, or rising above 22 Ohms throughout entire frequency range 20 Hz to 20 kHz (control set at "0 dB").



Harmonic Distortion. Harmonic analysis plotted with frequency, reference level of 95 dB at one meter at 400 Hz. B & K Heterodyne Analyser and Tracking Multiplier used.

Transient response. Tone Burst Oscillograms taken at one-third octave intervals in our Research Anechoic Chamber. Microphone type 4133 at one metre.



25 Hz



31.5 Hz



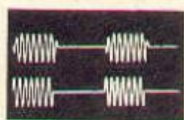
40 Hz



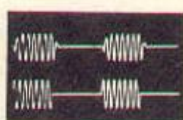
50 Hz



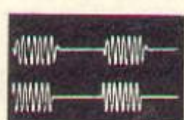
63 Hz



80 Hz



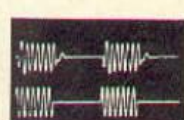
100 Hz



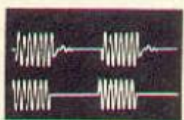
125 Hz



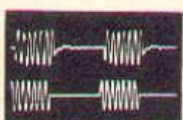
160 Hz



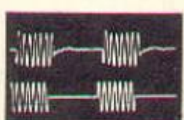
200 Hz



250 Hz



315 Hz



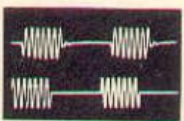
400 Hz



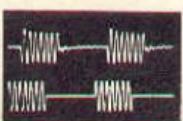
500 Hz



630 Hz



800 Hz



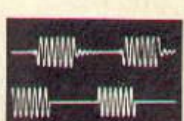
1 kHz



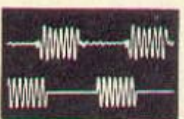
1.25 kHz



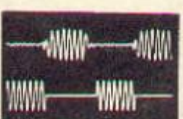
1.6 kHz



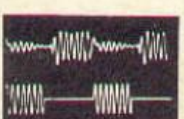
2 kHz



2.5 kHz



3.15 kHz



4 kHz



5 kHz



6.3 kHz



8 kHz



10 kHz



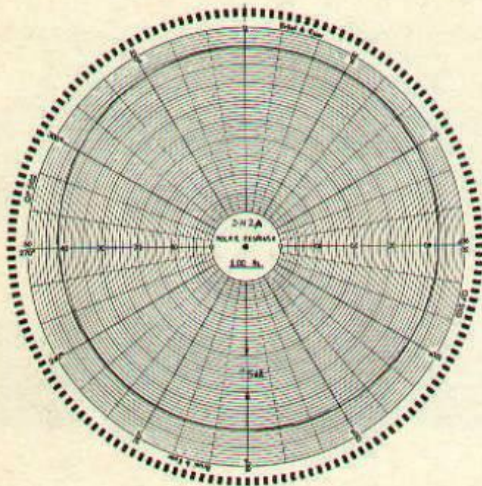
12.5 kHz



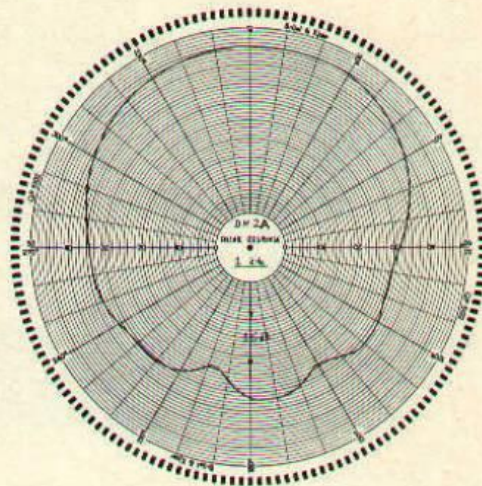
16 kHz



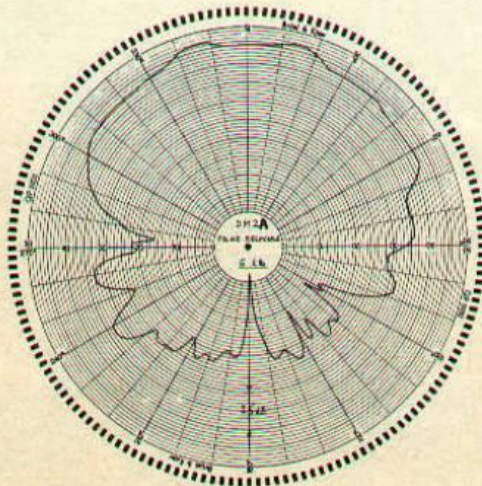
20 kHz



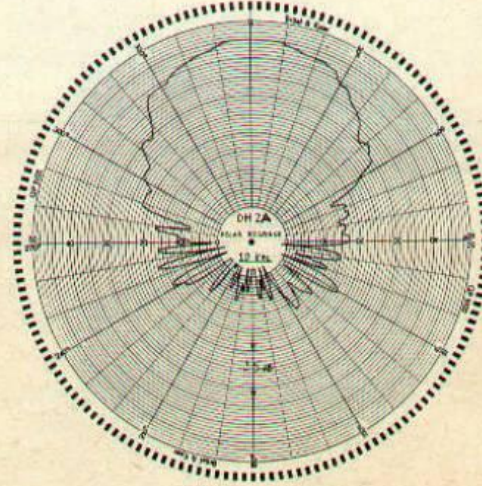
Polar response
100 Hz.



Polar response
1 k.Hz.



Polar response
5 k.Hz.



Polar response
10 k.Hz.

Sensitivity 13 watts into nominal 8 ohm impedance required to produce a sound pressure level of 95 db. at one metre at 400 Hz.

Power Handling Entirely suitable for all high quality amplifiers with true RMS output of between 25 watts and 60 watts

Dimensions Height: 646 mm (25½")
Width: 355 mm (14")

Depth: 347 mm (13¾")
Weight: 22.2 Kg. (49 lbs.)

Acknowledgements

Design Engineers: John Bowers, Dennis Ward, Malcolm R. King, B.Sc.(Eng.), M.Sc.
Styling: J. R. Greenwood.

The manufacturers reserve the right to alter this specification without notice.

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Overseas Agents

Convoy International Pty. Ltd.,
Cnr. Plunkett & Maclean Sts.,
Woolloomooloo,
2011 Sydney,
AUSTRALIA.

Ets. Van der Heyden,
Brusselbaan 278,
9440 Erembodegem,
BELGIUM.

Trans Atlantic Electronics Ltd.,
1789 Cardinal Avenue,
Dorval, Quebec,
CANADA.

Rossing Electronic A/S,
Labaek 2,
4300 Holbaek,
DENMARK.

Centresound Limited,
2 Lincoln Place,
Dublin 2,
EIRE.

Reditec,
27 ter,
Rue du Progres,
93 - MONTREUIL,
FRANCE

de Vivanco & Co.,
2 Hamburg 1,
Steindamm 105,
GERMANY.

Audioscript,
Nieuw Loosdrechtsedijk 107,
Loosdrecht,
HOLLAND.

The Radio People Limited,
25 Chatham Road,
Kowloon,
HONG KONG.

Gammavox,
20129 Milano,
Via P. Calvi 16,
ITALY.

P. Kalidas Limited,
82/84 Knutsford Boulevard,
P.O. Box No. 338,
Kingston,
JAMAICA.

Lux Corporation,
2-22 Nagahashi-Dori,
Nishinari-Ku,
Osaka,
JAPAN.

Arnold & Wright Limited,
210 Willis Street,
Wellington,
NEW ZEALAND.

Matesil,
Rue de Santo Antonio 223.1,
Porto,
PORTUGAL.

Atlas Sound Company,
118 & 120 Market Street,
Multi-Storey Car Park Building,
SINGAPORE 1.

Recordia (Pty.) Limited,
Bosman Building,
97b Eloff Street,
Johannesburg,
SOUTH AFRICA.

Vieta Audio Electronica S.A.,
Diputacion 317,
Barcelona 9,
SPAIN.

Svensk AUDIOproduktion ab.,
Karl X 1-gatan 1,
221 01 Lund,
SWEDEN.

Hi-Fi Electronics,
Idastrasse 3,
CH 8003 Zurich,
SWITZERLAND.

Linear Devices Inc.,
148 French Street,
New Brunswick,
New Jersey 08901,
U.S.A.

R. & S. International Sales,
79 Pembroke Street,
Port-of-Spain,
Trinidad,
WEST INDIES.

Purchasers in above countries return guarantee to company indicated.

U.K. purchasers return guarantee to:

B & W Electronics Ltd., Meadow Road, Worthing, Sussex, BN13 1QA

INSPECTION CERTIFICATE

Bass Phase	✓	Pwr. & Distortion	✓
White Noise	✓	Pen Test	✓
Programme	✓	Appearance	✓

B 19814

B&W DM2A

Guarantee

The above apparatus is Guaranteed against faulty material and workmanship for a period of one year from the date of purchase subject to the following conditions:

- (1) The attached guarantee registration card must be completed and posted to B. & W. Electronics within 14 days from the date of purchase.
- (2) Any claim arising under this guarantee should be made either direct to B. & W. Electronics, or to the authorised dealer from whom the equipment was purchased and whose name appears on the registration card.
- (3) In the event of service being required from B. & W. Electronics the equipment must be securely packed and despatched to the address below, prepaid and if desired insured by the owner.
- (4) Defective component parts (excluding valves, transistors and fuses – which are covered separately by the manufacturers of these components) will be replaced free of charge but labour and cost of transit may be charged at the discretion of B. & W. Electronics.
- (5) This Guarantee expressly excludes:
 - (a) Damage caused by incorrect use of the apparatus.
 - (b) Loss or damage in transit in either direction.
 - (c) Contingent and third party liability.
- (6) Any service modification or alteration carried out by any other person than the authorised representative of B. & W. Electronics or their appointed agents renders this guarantee invalid.
- (7) No alteration or variation of the Guarantee will be recognized.
- (8) This Guarantee is not transferable.

BOWERS & WILKINS ELECTRONICS LTD.

MEADOW ROAD · WORTHING · ENGLAND · BN13 1QA Telephone 0903 205611

Briel & Kjaer

Copenhagen



Measuring Obj.:

19814

Rec. No.:

Date:

Sign.:

QP 0124

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Potentiometer Range:

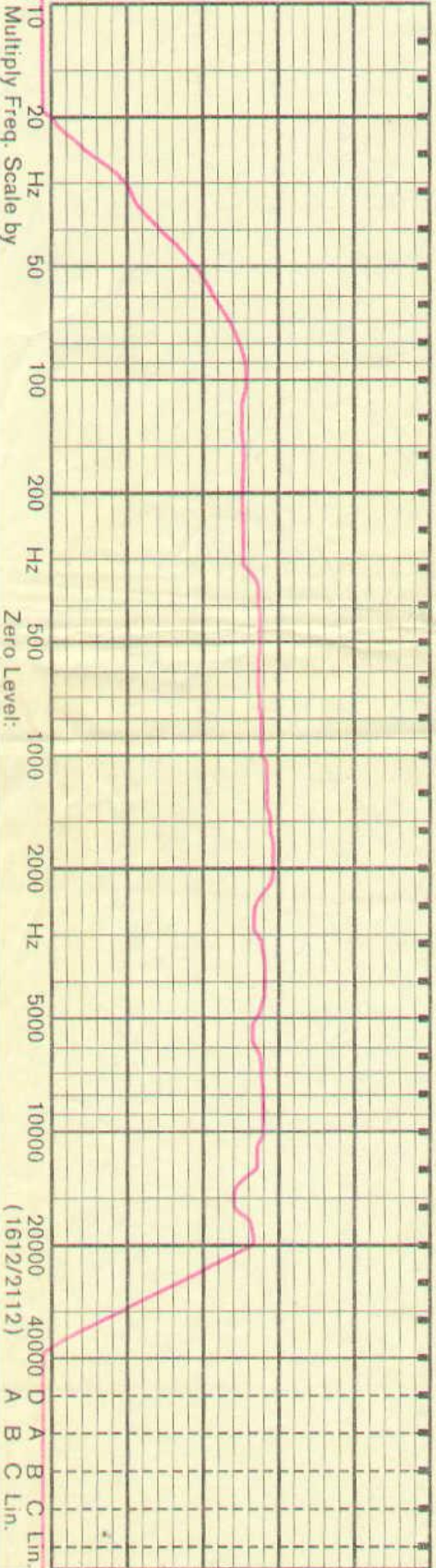
dB Rectifier:

Lower Lim. Freq.:

Hz Wf. Speed:

mm/sec. Paper Speed:

mm/sec.



Multiply Freq. Scale by

Zero Level:

(1612/2112)

A B C Lin.