B&W LOUDSPEAKERS

Instruction Manual

MATRIX 801 SERIES 2

PROFESSIONAL MONITOR LOUDSPEAKER SYSTEM

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Introducing B&W Matrix 801 Series 2

Seven years on from its launch, B&W model 801 continues to occupy a special place in world esteem. There is so much in this celebrated system that was the result of original thinking, painstaking research and triumphantly successful new technology. Among the many innovations first seen in the 801 were :

Audio-powered overload circuit (APOC).
The unique, freely-diffracting midrange head assembly – fabricated in a laminate of structural foam and Fibrecrete.
The spherical tweeter TS26.

Triumphantly successful? Within three years of its release, Model 801 was employed in the recording studios of such giants as EMI and the Polygram Group (Decca, L'Oiseau Lyre, DGG) as a playback monitor system.

Meanwhile, new influences have been at work – some of them of B&W's own making – resulting in quite dramatic improvements in both transducer technology and enclosure design. Not least, our invention of Matrix construction, with its very significant reduction of enclosure radiation. (Interestingly though, the performance of the 801 structural foam and Fibrecrete head is still very comparable with that of the Matrix; but sheer weight precludes its use for bass and midrange enclosures.)

Another all-important development has come about. It is today's universal availability of digital recordings, with their wide spectrum and high dynamic range.

All-round re-appraisal led B&W into computer-aided design programmes targeted to fulfil these more exacting requirements in a new professional monitor system. The result is the B&W Matrix 801 Series 2 system.

Getting the best from your system

The purpose of this manual is to enhance your enjoyment of the Matrix 801 Series 2 loudspeakers you have chosen. A system of this high class is still dependent on the signals fed into it and is also influenced by the immediate environment in which it operates. Useful advice on these aspects will be found in the following pages.

An international network of carefully chosen distributors handles B&W products in more than forty countries worldwide. If at any time you have a problem that your Dealer cannot resolve, the B&W Distributor for your area will be more than willing to help.

Thank you for the confidence you have shown in purchasing your Matrix 801 Series 2 loudspeakers. Please be assured of our continuing interest in your long-term listening pleasure.

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B&W Matrix 801 Series 2 – design background

The enclosure

In view of the proven success of our Matrix series of loudspeakers, B&W engineers adopted this new construction for Matrix 801 Series 2, with all the following advantages:

(a) Reduction of the colourations so often associated with box-type loudspeakers. (Any radiation from the enclosure inevitably adds its own unwanted character to the relatively neutral, uncoloured sound of the drive units.)

(b) Curtailment of the decay time of enclosure vibrations, resulting in an improvement in transient response – so important for the correct reproduction and full enjoyment of the new generation of compact discs.

(c) Improved detail and depth in the stereo image. This is achieved by reduction of those rear and sideways radiations that confuse the image when reflected back to the listener.

The bass alignment designed for Matrix 801 Series 2 is a sixth-order Butterworth, using vented cabinet construction and an external electronic filter to give bass extension to 19Hz (3dB frequency). However, the system may be used without the optional filter, to give a fourth order Bessel response 9dB down at 19Hz.

The drive units

In order to refine driver performance to take fullest advantage of the new Matrix technology, extensive development work was required. To begin with, reduction of enclosure radiation to the very low levels achieved has the unfortunate side effect of exposing hitherto inaudible defects. This had to be counteracted.

The resulting bass driver has a cone of specially formulated plastic compound, heavily damped to remove unwanted colourations and fitted with a massive 13,000 Gauss magnet weighing some 13lb (6kg) to give the required sensitivity and bass control.

The high frequency transducer is an entirely new design, incorporating a metal-domed diaphragm. This unit exhibits perfect piston-like behaviour to frequencies well beyond audibility. It is the result of advanced research using B&W's established laser techniques and the new science of finite element analysis, which can predict the performance of drivers – thus enabling the engineer to assess many more options than if each had first to be built and tested.

Filter networks and protection circuits

Just as the drivers required refinement to accord with improvements in enclosure design, so care was needed to ensure that the crossover filtering would maintain overall system performance. The quality and tolerance of components had to be controlled to fine limits in order to meet the high standards of distortion and linearity we set.

Two upgraded APOC protection circuits are incorporated, one operating on the bass unit and the other on the midrange/tweeter combination, ensuring reliable operation even when the system is bi-wired.

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Unpacking, installation and aftercare

Unpacking

We suggest that after unpacking your loudspeakers you retain the packing against the possibility of wishing to transport them at a later date.

Each Matrix 801 Series 2 loudspeaker carton contains:

(a) One Matrix 801 Series 2 loudspeaker system.
(b) One top grille.
– and in one carton only:
(c) One instruction manual.
(d) One cleaning brush.
(e) Two calibration certificates – one for each loudspeaker.
(f) One coin for removing the head-retaining bolt.
(g) One accessory bag containing eight spikes, the fitting of which is covered under Section 7.

It is important to follow these unpacking and assembly instructions carefully:

(a) Having opened the top of the carton and read these instructions, the other end of the carton should be opened, the box returned to its original position (lettering right way up) and the outer cardboard case removed to reveal the inner polystyrene pack.
(b) Remove the top section of the pack to reveal the head assembly and the accessory pack.
(c) Remove the polythene bag containing the top cover for the bass enclosure.
(d) Using the coin provided, loosen the head-retaining bolt (which is captive in the head) and lift off the head assembly, unplugging the flexible lead from the bass chamber. Remove the polystyrene block from the top of the cabinet.
(e) Fit the foam and fabric top cover to the top of the bass enclosure.
(f) Reconnect the head assembly by reversing the process described in (d) above. It is important to tighten the head-retaining bolt only sufficiently to retain the head firmly. The head should be free to rotate, and may be angled in a horizontal plane for final installation.
(g) Repeat the above procedure for the other loudspeaker.

Installation

The Matrix 801 Series 2 is fitted with two sets of input terminals. This provides the option of using separate cables for the low frequency unit and the midrange and high frequency units, thus removing the possibility of inter-modulation of low and high frequencies in the cables.

The loudspeakers are supplied with the two sets of terminals linked together on the crossover board, so that either set may be used for normal operation.

To make use of the bi-wiring facility, the bottom cover of the loudspeaker must be removed and the two links taken out of the screw connector (see Fig.1).

The two pairs of screw terminals on the back of the cabinet are marked red for positive and black for negative. These should be connected to your amplifier + and – outputs respectively, using a good quality cable.

Since the currents involved when playing loud music can be large, it is recommended that the cable cross-sectional area should be not less than 1.5mm for runs up to 3 metres and correspondingly larger for longer runs.

The Matrix 801 Series 2 system is floor standing and as such places the drivers at the correct height in relation to most seating arrangements. A purpose-made stand is available as an extra (see Section 7).

Aftercare

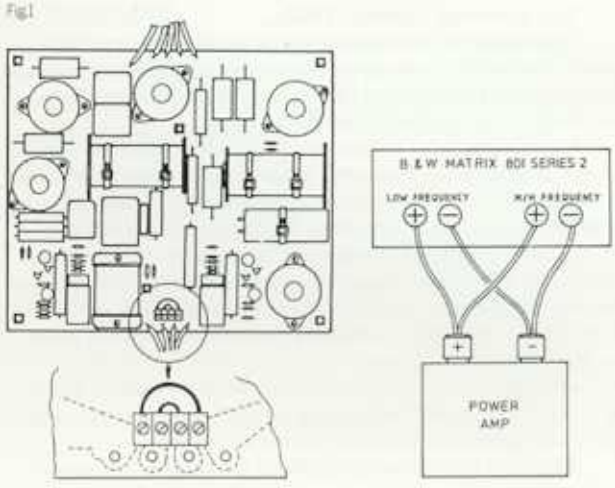
The Matrix 801 Series 2 head assembly is finished in a semi-gloss paint. Consequently the greatest care should be taken to ensure that any cleaning is done without the use of abrasive materials. A soft, damp cloth should be all that is necessary to clean the paintwork. Proprietary polishes, such as car polish, are not recommended.

The bass cabinet is finished in real wood veneer and should be treated in the same way as you would treat a normal piece of furniture. However, if you use an aerosol, please spray on to a piece of cloth first in order to avoid the application of polish to the grilles.

The grilles may be cleaned after first removing them by brushing with the brush provided.

Please avoid touching the drive units – especially the dome tweeter, as damage could result.

Fig1



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The listening room and positioning your loudspeakers

The degree of accuracy with which the original musical performance can be reproduced in your own home depends on a number of factors, including the quality of the original recording, the equipment used for reproduction, and the acoustic properties of your listening room.

Regardless of other links in the chain, the listening room will to a greater or lesser degree imprint its character on the reproduced sound you hear. In simple proof of this statement, notice how the sound of the human voice changes according to environment.

Choice of listening room

Few people are fortunate enough to have a choice of listening rooms, but for those to whom this is possible (or anyone planning a new home) the following may be helpful guidelines:

(a) Any room with different dimensions for ceiling height, length and width will sound more even in response than rooms where all three dimensions are similar.
(b) Solid walls are preferable and will show better reproduction of low frequency transients than some modern constructions where the inner walls are of plasterboard and therefore slightly flexible.
(c) Other than in houses with solid or concrete floor structures, a ground floor room is preferable to an upper floor.

Changing listening room acoustics

Quite small changes in the furnishing of a room can affect its acoustic properties significantly. If you already have pictures on the wall, remove these experimentally and at once you will notice a considerable change in the sound from your loudspeakers! We are not suggesting that you should leave the room bare of pictures – quite the reverse, because pictures break up the otherwise plain wall surfaces and generally give fewer discrete high frequency resonances or flutter echoes.

Curtains are another element which can change the sound of your listening room in the mid/upper frequencies. Heavier curtains give more sound absorption of these frequencies and a softer, less reverberant quality to the upper octaves. Conversely if your room sounds too dead, thinner curtains will give more life or sparkle in these frequency regions. So far as sound in the low frequencies is concerned, this is largely controlled by the dimensions and construction of the room. However, large items of furniture do change room behaviour at low frequencies, so it may be worth experimenting with their placement.

Placement of loudspeakers

There is some truth in the notion that cheap loudspeakers correctly placed may sound better than more expensive ones, poorly placed. While this is a somewhat simplistic idea, it is certainly true that the position of your loudspeakers within the available environment will have a greater effect than any other variable under your control.

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Amplifier, control unit and source equipment

The recommended limits of RMS power output for the driving amplifier are 50W min. 600W max. (into 8Ω).

It should be stated that it is impossible to quote amplifier power output precisely, as it depends to some extent on the type of music being reproduced. Similarly, the required amplifier power will depend on room volume and the sound level required by the listener.

It is generally true to say that too high a power output is better than too low, because it allows more headroom for transients and reduces the risk of clipping, with its attendant sharp rise in distortion.

B&W established their own electronics research department for the express purpose of in-depth research into active loudspeakers, protection, amplifiers, test equipment and other aspects of electronics. A range of electronics specifically designed to complement the performance of your loudspeakers will be on the market shortly. We suggest you ask your Dealer for a comparative demonstration of these products.

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The APOC protection circuit

The Matrix 801 Series 2 system is fully protected against excessive signal levels. As soon as the safe limit of any given drive unit is approached, the protection circuit will disconnect the input and illuminate the warning LED until the fault/overload is removed.

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Loudspeaker accessories

Here we comment briefly on four accessories associated with loudspeakers.

Stands

A purpose-made stand is available for Matrix 801 Series 2. It is primarily intended for professional use, where extra height may be required to clear control desks. Also, in some rooms the stand may help to prevent standing waves and bass boom, by moving the system away from the room boundaries and thus lessening the excitation of room modes.

Spikes

Sound reproduction can be assisted in two quite different ways by using the spikes supplied. Firstly, due to their extremely small area of contact relative to the stand base, their interface provides many thousands of times greater pressure at the point of contact. This increases the stability of the loudspeaker and helps withstand any movement of the enclosure due to sound excitation.

The second way in which spikes can assist is by reducing the area of contact between floor and loudspeaker enclosure. This is especially valuable in the case of a resonant floor, which may be regarded as a giant sounding board coupled to the cabinet.

Two areas of improvement in sound reproduction will be noticed when spikes are fitted. Bass transients will be tighter and stereo images will be slightly more precise, due to the increased stability of the system.

If the spikes are to be used they should be firmly screwed into the base of the cabinet next to the castors (which may remain in position). Then, with assistance, the loudspeaker should be lowered into position so that all four spikes make contact simultaneously.

NOTE: Allowing the loudspeaker to rest on one or two spikes at an angle will damage the threaded inserts.

Cables

The subject of cables between the power amplifier and loudspeakers is dealt with under Section 3 (Installation).

There remains the question of interconnecting cables between the various pieces of equipment and the power amplifier. A number of excellent cables are available on the market and audible differences certainly exist between them. We suggest, therefore, that you choose one of the better cables for this purpose, after consideration of the published reports.

B&W bass alignment filter

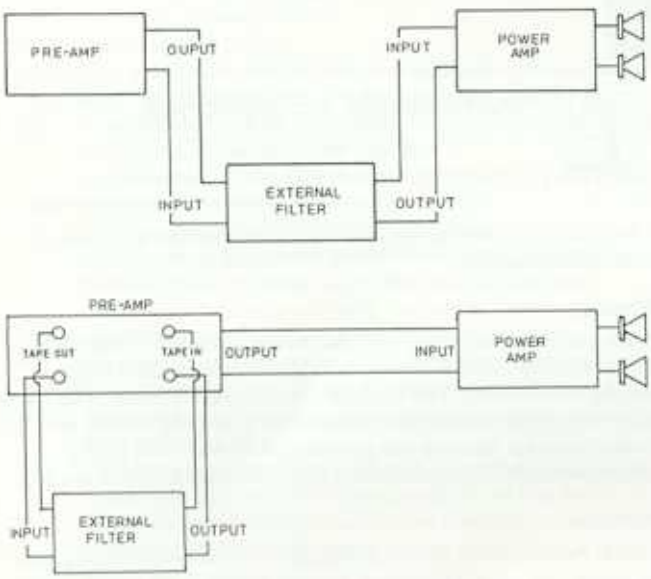
This external filter gives the possibility of extending the

response down to 19Hz (−3dB point) with a sixth-order Butterworth alignment, and also filtering out sub-sonic frequencies which may give rise to excessive cone excursion and intermodulation distortion.

The unit may be either connected permanently between the pre-amplifier and power amplifier, or to the tape input and output sockets of the pre-amplifier, enabling it to be switched in and out by means of the tape monitor switch (see Fig. 2).

It should be noted that the loudspeakers may be used perfectly satisfactorily without this additional filter, giving the system a fourth-order Bessel alignment. Indeed, many recordings have little information below 35Hz, so the effect of introducing the filter can be quite subtle.

Fig. 2



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Arecord suggestion

Your Matrix 801 Series 2 system will take you a giant step nearer to listening to the music rather than to the loudspeakers. You will hear much more of the desirable ambience and detail in good recordings; unfortunately, the faults in poor recordings will also be revealed.

We have produced a special compact disc recording that will enable you to enjoy a full appreciation of your new system. It is available from your Dealer:

B&W label No. BW001, 'B&W Present':
The Academy of Ancient Music: Christopher Hogwood.

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Specification

Frequency range	(−6dB points) 17.5Hz–25kHz
Bass loading	Sixth-order Butterworth alignment 19Hz cut-off
Frequency response	20Hz–20kHz ±2dB free-field
Dispersion	20Hz–15kHz Horizontal: +0 − 3dB over 60° of centre window Vertical: ±1dB over 10° of centre window
Sensitivity	87dB at 1m for 2.83V
Distortion	For 95dB at 1m Second harmonic: <1.5% 20Hz–100Hz <0.5% 100Hz–20kHz Third harmonic: <0.5% 20Hz–100Hz <0.5% 100Hz–20kHz
Crossover network	Fourth-order Butterworth acoustic response crossover frequencies 380Hz and 3kHz
Impedance	Nominal 8Ω (not falling below 4Ω)
Drive units	One 300mm high-power polymer cone bass One 126mm Kevlar cone midrange One 26mm metal dome high frequency
Power handling	Suitable for amplifiers of 50–600W
Dimensions	Height: 1008mm (39¾in) Width: 432mm (17in) Depth: 560mm (22in)
Weight	50kg (110lb)
Cabinet finish	Selected real wood veneers of walnut, black ash or rosewood. Special finishes on application

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

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