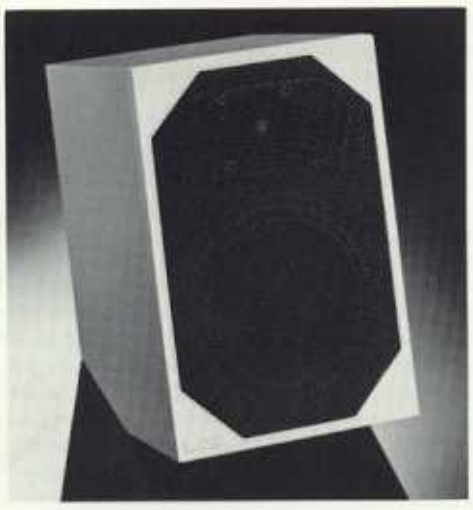
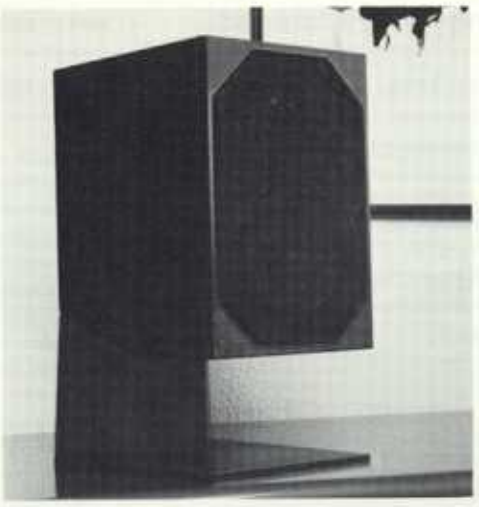
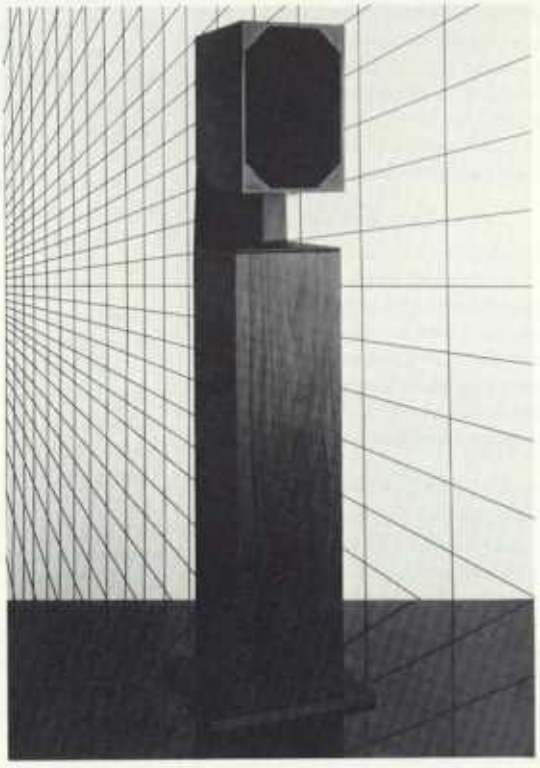
B&W CONCEPT 90

Instruction Manual



CM1





CM2

CM1 & CM2

MONITOR LOUDSPEAKER SYSTEMS

1

Introducing B&W Concept 90

Design Philosophy

Music lovers are as likely as anyone else to live in smallish houses or flats – and probably rather more likely to have an appreciation of good design. Hitherto, such limited living space has imposed frustrating restrictions on the enjoyment of recorded music: because until now it has been virtually impossible to recreate full, accurate sound without installing loudspeakers of unacceptable size.

This challenging question of how to get the musical quart into the domestic pint pot has occupied B&W for some years. In fact, the basic design philosophy for Concept 90 was conceived back in 1984, when designer Kenneth Grange presented his ideas for a small, elegant enclosure – totally at home in such limited roomscapes as the small sitting room, study, dining area or studio apartment.

Thanks to the ingenuity of the B&W design team, that concept is now an exciting reality in which you will share through your purchase of a B&W Concept 90 system.

B&W Matrix Construction

The 'M' in the model name CM1 indicates that the loudspeakers are of B&W Matrix construction, incorporating the recent invention that eliminates unwanted cabinet vibrations and brings you all the advantages of low enclosure radiation.

Although small dimensions bring real advantages in the middle and high frequencies, problems arise from the conflicting needs of output and low frequency extension. Within the restraints imposed by the very compact external dimensions that are the raison d'être of Concept 90, added wall thickness would have reduced CM1's internal volume unacceptably (conventional construction materials called for wall thickness of 15 to 18mm). Not for the first time, B&W engineers sought a new material and finally chose a fibre-reinforced polymeric board. This allows a considerable reduction in wall thickness – therefore a valuable gain in internal volume. It took this major advance, combined with all B&W's computer optimisation expertise, to produce in CM1 a system whose bass output so belies its diminutive size.

You will find that this is a system of true monitor quality, capable of surprisingly high sound levels. Also, thanks to its wide and balanced frequency response, your Concept 90 CM1 will faithfully reproduce even the most delicate nuances of solo instrumentalists. Overall, it responds splendidly to the wide dynamic range of today's compact disc players, just as it was designed to do.

CM2 – extended bass, higher power capacity

In Concept 90, we have not overlooked the requirements of those audiophiles whose interests demand further extension of bass response and greater power handling capacity. For them we have produced B&W Concept 90 in its CM2 form, which provides an extra octave-and-a-half of low frequency extension beyond that of the CM1. Consequently, model CM2 faithfully recreates the sound of double bass, bass drum and the organist's deepest notes in all their full weight and splendour.

This generous extension in bass response and increase in power-handling were achieved within the Concept 90 design philosophy of acoustic performance uncompromised by enclosure elegance. It was done by designing the CM2 bass units into the back of the enclosure. Because of the low crossover frequency used, this configuration in no way impairs performance and it results in a desirably omnidirectional pattern of sound radiation.

Getting the best from your system

The purpose of this manual is to enhance your enjoyment of the Concept 90 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 Concept 90 loudspeakers. Please be assured of our continuing interest in your long-term listening pleasure.

2

B&W Concept 90 – design background

The enclosure: CM1

Following the development and worldwide success of the Matrix series, and with Concept 90's basic requirement of compactness always in mind, the B&W design team seized the opportunity to take Matrix construction one important step further by moulding the CM1 enclosure and matrix in one piece, using glass-fibre reinforced polyester (a material that is both acoustically desirable and exceptionally rigid).

This new construction permits enclosure wall thickness to be reduced from the usual 15mm to only 5mm, thus allowing a gain of 46% internal volume, with a consequent extension of the low frequencies by about one-third of an octave. To this advantage one must add the acknowledged benefits of Matrix construction:

(a) Significant reduction of those unwanted colourations so frequently associated with box-type loudspeakers. (Any radiation from an enclosure adds its own character to the desirable neutral, uncoloured sound produced by the drive units.)

(b) Reduction of the decay time of enclosure vibrations, with consequent improvement in transient response – a key factor in correct reproduction of compact discs.

(c) Improved detail and depth in the stereo image, due to reduction of image-confusing rear and sideways radiation. The sounds seem to be in the space around and between the speakers – not emanating from them.

The enclosure: CM2

Because the columnar sub-bass module of the CM2 is small, and not required to reproduce anything above 150 Hz, it incorporates semi-Matrix construction – ie the spacing within the matrix reinforcement is greater than usual. This has proved more than adequate to ensure that unwanted enclosure radiation is kept to a very low level indeed.

The CM2 employs reflex loading of the drivers. Computer modelling ensures optimisation of output and bass extension.

The drive units: CM1

Reducing enclosure radiation to such extremely low levels can give rise to an unfortunate side effect: the exposure of hitherto inaudible defects in driver performance. It was therefore necessary to carry through a programme of driver development, refining unit performances to meet the exacting demands of the new Matrix technology.

The resulting bass/midrange driver has a cone of woven Kevlar, similar to that used in the renowned B&W studio monitors.

The high frequency transducer is of entirely new design, incorporating a metal-domed diaphragm. It exhibits perfect

piston-like behaviour up to frequencies well beyond audibility. This unit is the result of advanced research using established B&W laser techniques – plus the new science of finite element analysis, which can predict driver performance, permitting many more options to be assessed than if each had to be built and tested.

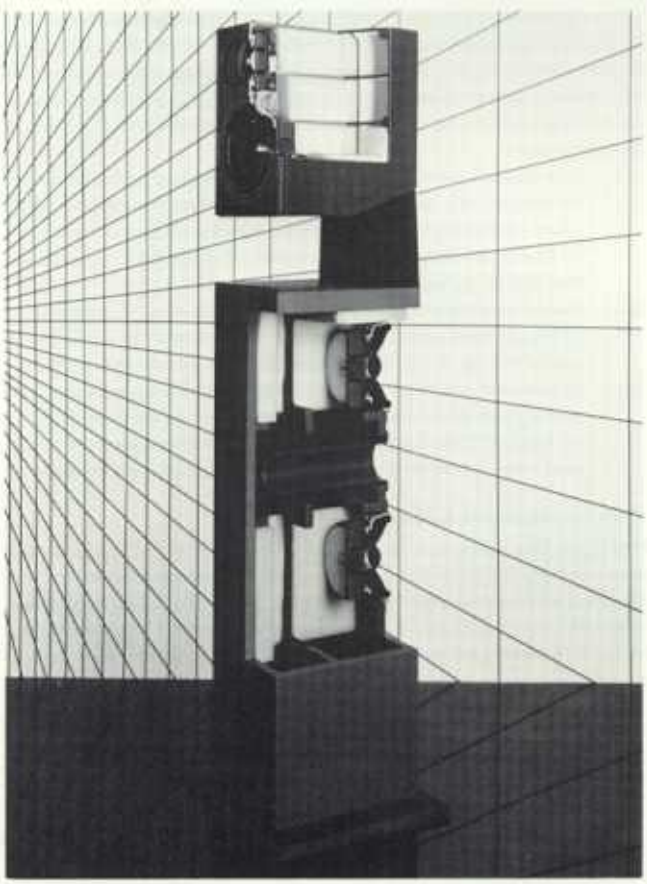
The drive units: CM2

Driver design for the CM2 sub-bass module posed a quite different problem. To achieve a given low frequency level, a driver must move a certain volume of air; thus a large driver cone moves a shorter distance than a smaller one. It follows that the CM2's comparatively small units (dictated by the restricted confines of the module) need large excursion capability in order to deliver the necessary low frequency output. In fact, the CM2 drivers are capable of a peak-to-peak excursion of as much as 20mm. Achieving this, while maintaining correct driver parameters, necessitates the use of a magnet which is actually larger than the effective cone diameter.

Filter networks and protection circuits

So, improvements in enclosure design and refinement of drive units for Concept 90 were interdependent. Likewise, in order to maintain overall system performance, the crossover filtering networks had to be fully capable of meeting the very highest standards – eg under the headings of distortion and linearity. This demands the finest limits in quality and tolerance of components.

The high frequency and bass/midrange drivers are protected by an updated version of the world-patented APOC circuit used so successfully in many B&W monitor loudspeakers.



Limits of this manual

This instruction manual does not seek to give a full account of the technology involved in the creation of B&W Concept 90 systems. If you are interested to pursue the study of detailed measurements and read proof of all that is summarised here, please ask your Dealer for a copy of the relevant B&W Design Story publication.

3

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.

CAUTION Take great care when removing the packing since the metal tweeter dome is easily dented and such damage is irreversible.

Each CM1 loudspeaker carton contains:

(a) Two CM1 loudspeaker systems
(b) Two CM1 grilles
(c) Two interfaces
(d) Two nylon interface securing bolts
(e) Two interface seating pads (for furniture protection)
(f) One copy of this instruction manual

Each of the pair of CM2 loudspeaker cartons contains:

(a) One CM1 loudspeaker system
(b) One CM1 grille
(c) One interface
(d) One interface seating pad (CM1 use only)
(e) One CM2 sub-bass module
(f) One base for module
(g) One base securing bolt
(h) Two bass driver grilles
(i) One accessory bag containing four spikes, (the fitting of these is covered in a later section), and three long metal interface securing bolts.

– and in one carton only:

(j) One instruction manual

Installation: CM1

The rear of the CM1 enclosure is fitted with screw terminals 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 1.5mm² for runs up to 3 metres and correspondingly larger for longer runs.

The use of the interface supplied with your CM1 is optional. It may be used where, for example, a shelf is too low for correct positioning. However, its use is definitely recommended where the loudspeaker is sited on a solid object.

To fit the interface first remove the black screw from the enclosure underside. Retain the screw should you wish to use the CM1 without the interface later. Position the CM1 on the interface (Fig. 1), and fix with the securing bolt (A).

Fit the interface seating pad, and finally fit the grille by pushing firmly over the front casting of the CM1. A small gap should remain between the grille moulding and the enclosure moulding.

Fig1

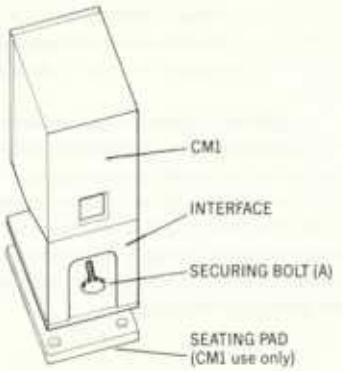
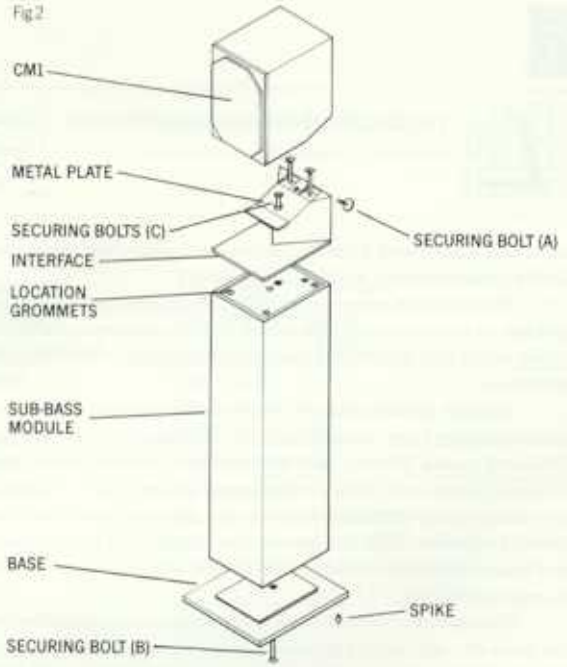


Fig.2



Installation: CM2

The CM2 is a floor-standing system, so no other stands are required. Installation simply involves fitting the module base, interface and CM1 enclosure together (Fig.2).

(1) Fit the base to the sub-bass module, having first removed the bolt already screwed into the module. Position the base (note that the hole is offset to the driver side of the module), replace the bolt and firmly tighten (B).

(2) Remove the two nuts and bolts securing the metal plate to the interface and retain for possible future use. With the sub-bass module upright, position the interface by locating the five feet with the corresponding grommets in the module top. Position the metal plate and firmly screw down with the securing bolts (C). Fit the CM1 enclosure to the interface as described earlier (Fig.1).

(3) Connect the lead from the module top to the CM1 enclosure, with the white-coated cable to the positive (red) terminal.

(4) Finally, fit the CM1 grille by pushing firmly over the front casting. Fit the sub-bass module driver grilles by pressing the pins, at the top and bottom of each grille, into the driver chassis grommets.

Connection to the amplifier should be made as outlined in the CM1 installation section, using the screw terminals at the base of the module.

Aftercare

With the CM1 enclosure's high gloss finish 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.

It is important to note that if the white finish is exposed to excessive sunlight the surface can discolour.

The sub-bass module finish in semi-gloss paint should follow the same cleaning procedures as recommended for the CM1.

The real wood veneer finishes should be treated in the same way as you would treat any normal piece of furniture. If you use an aerosol, please spray onto a piece of cloth first in order to avoid getting polish on the grilles.

The grilles may be cleaned (remove them first) by brushing with a soft, clean, clothes brush or something similar. Please avoid touching the drive units, especially the dome tweeter, otherwise damage could result.

4

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 change its acoustic properties quite 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.

The CM1 system is designed to fit into as many different situations as possible. It will function successfully on shelves, furniture or stands – with or without the interface fitted. However, the height should, if possible, be adjusted to keep the top of the enclosure 900 to 1100mm from the floor.

As a floor-standing system, the CM2 places the drivers at the correct height in relation to most seating arrangements.

5

Amplifier, control unit and source equipment

The recommended limits of RMS power output for the driving amplifier are:

CM1 ..... 50W min. 120W max.
CM2 ..... 50W min. 200W max.
(into 4Ω)

Amplifier power output cannot be quoted precisely, as it depends to some extent on the type of music being reproduced, 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.

The control unit

Although it deals with comparatively small voltages, the control unit is a critical part of the listening chain. Choose with care, in the knowledge that the ultimate test for audio components is critical listening.

At B&W's research department there are many different combinations of control units, amplifiers and source components such as analogue/CD players, tuners, etc. It is our experience that each unit (to say nothing of the interconnecting cable) is a variable, and the final listening chain is a combination of variables which should be carefully listened to before making a final choice.

CD player, analogue turntable and tuner

The comments in the previous paragraph apply equally to these items of equipment. CD players have now been on the market for some years and already considerable advances have been made. In its present state of development the CD player, when coupled with the best recordings made on this medium, can provide the most exceptional source material, totally worthy of the finest equipment with which it is associated.

6

The APOC protection circuit

The CM1 system is fully protected against excessive signal levels. As soon as the safe limit of any drive unit is approached, the protection circuit will disconnect the input until the fault/overload is removed.

7

Loudspeaker accessories

Here we comment briefly on two accessories associated with loudspeakers: spikes and cables.

Fitting spikes to your CM2 sub-bass module is simply a matter of unscrewing the small plastic domes already fitted to the base and screwing the spikes into the threaded sockets revealed.

Spikes (two sets of which are supplied with your loudspeakers) can assist sound reproduction in two quite different ways. Firstly, due to their extremely small area of contact relative to the loudspeaker 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 from sound excitation.

The second way in which spikes can assist is by reducing the area of coupling 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 loudspeaker enclosure.

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

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 interconnect 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.

8

A record suggestion

With your CM1/CM2 system, you will find that you are noticeably nearer to listening to the music rather than to the loudspeakers. You will hear 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.