

**D&W**  
LOUDSPEAKERS

M A T R I X  
**801**  
S E R I E S 2

M A T R I X  
**802**  
S E R I E S 2

LISTEN AND YOU'LL SEE

# MATRIX 801 SERIES 2

## New heights in critical acclaim

### We quote

Short of seeing for yourself and experiencing the superb sound reproduction, we hope this brochure tells you everything you need to know about the remarkable B&W Matrix 801 and 802 Series 2 monitors. If not, we are sure your local B&W dealer will be only too pleased to provide you with further details.

Most hi-fi product brochures, B&W's included, make only limited use of independent assessment. A practice which is perhaps understandable bearing in mind the problem of reconciling differing shades of critical opinion. However, with due modesty and in the genuine belief that it adds a valuable dimension to your appreciation of the Matrix 801 Series 2, B&W have taken the unusual step of presenting this outstanding monitor around the quoted views of some of the world's most respected hi-fi critics.

*"For me to say that this is just another excellent loudspeaker would make me guilty of a gross understatement. In short, this is the most musically complete and revealing full range dynamic loudspeaker that I have heard to date, effectively redefining such terms as coherent, dynamic, open and involving!"*

Lewis Lipnick STEREOPHILE (USA)  
Vol.10, No.9, Dec. 1987

*"The performers appear to be distributed over a much broader area of sound with decidedly larger dimensions, especially vertically. This characteristic can be fully appreciated by listening to works for large orchestra and choir, by virtue of the greater emphasis which the background and more distant sections seem to have acquired. The sound is very melodious, transparent and luminous and definitely brighter,*

*clearer and more detailed than in the old 801, where the high note register seems less in evidence."*

Egidio Mancianti SUONO (Italy)

### Reverence for reality

With one voice the critics acclaimed it and professional studios and musicians around the world came to insist upon Model 801 following its introduction in 1979.

*"First, always keep in mind that this is a monitor speaker. As such, the recording companies which use it are principally concerned with its accuracy."*

Bert Whyte AUDIO (USA)

The B&W 801 was untouchable. The monitor which would forever identify the 1980's as a turning point in the quest for perfect sound reproduction. And there, B&W could reasonably have been expected to leave it. Fortunately B&W have always been the first to realise that no criticism, however laudatory at the time, remains so for very long. New standards in sound reproduction sharpen perceptions and give rise to even greater expectations. The Matrix 801 Series 2 shows that B&W alone had all the means of fulfilling those expectations. Here is a monitor which completely redefines our perception of faithful sound reproduction to a degree which almost defies customary language. A monitor in which B&W, using new technology, reverences the spirit and pleasure of the live performer with an entirely new reality.

### A new reality

*"My first impression of the Matrix 801 speakers was that none of the desirable characteristics which established the reputation of the original 801 have been in any way changed or compromised. Quite the contrary, imaging and the presentation of depth – both strong points of the original model – have been considerably enhanced."*

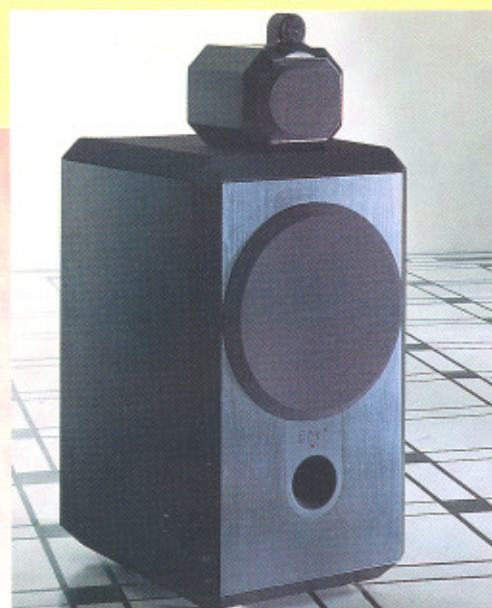
Bert Whyte AUDIO (USA)

*"Listening to these loudspeakers in familiar surroundings with equally*

*familiar equipment and programme material quickly suggested a one-word summing up. Majestic!"*

Geoffrey Horn GRAMOPHONE (UK)

The Matrix 801 Series 2 capitalises on the whole new ranges of technology now used in B&W loudspeaker design. Enclosure radiation has been dramatically reduced through the use of Matrix construction. Bass extension is a full octave more and piston response in the high frequency unit has been extended beyond audibility.



*"The bass reproduction can attain the highest requirements."*

H. J. Baum SOUND (Switzerland)

*"This speaker's low- and mid-bass reproduction are the most accurate I've heard so far."*

Lewis Lipnick STEREOPHILE (USA)  
Vol.10, No.9, Dec. 1987

### Extending the bass

The new Matrix 801 Series 2 is the first professional speaker to benefit from B&W's research and development programme into computer aided design (CAD). And nowhere is it more evident than in the new bass driver. A special bass-end design programme has made it possible to extend the bass response by a full octave and at the same time increase sensitivity by a full 2dB. The extended response has also been given appreciably tighter characteristics than the previous model without incurring any of the

problems normally associated with bass reflex design.

The design programme accepts any response shape in the form of ratios of acoustic elements as well as some 60 standard shapes – some with exotic names such as Lavern Terraces, Laplaces and Gaussens. The standard shape finally chosen for the Matrix 801 Series 2 is a sixth-order Butterworth. Since this is essentially three second-order filters in series it has the double advantage of greater bass extension and less overall cone extension.

*"The bass range is very clear and controlled and is definitely less intrusive than in the old 801 although it is deeper and more powerful."*

Egidio Mancianti SUONO (Italy)

The cone itself is made from a specially formulated plastic compound allowing the critical mass required to be controlled accurately.

An indication of the radically different and extremely demanding design parameter of the driver is its magnetic flux of some 13,000 Gauss and a magnet weighing 6kg (13lb).

*"The non-compromise approach is underlined by a huge, heavy magnet-motor-assembly and the high stiffness bass chassis made out of a massive aluminium die-cast."*

Uli Michalik STEREO (West Germany)



#### *Preserving a classic*

Changing the classic appearance of Model 801 needed to be resisted. Its unique shape had already become an integral feature of the legend, and had in any case been designed to be relatively free from diffraction effects. It was therefore a relief to find that the virtual elimination of radiation characteristics from the bass cabinet could be achieved from the inside using Matrix technology.

*"One of the most admired qualities of the 801 was its nearly three-dimensional sound field. In the new Matrix 801 there is virtually no panel re-radiation. Therefore the direct sound reaches your ears without the time-smearing affect of panel radiation. The result is incomparable stereo imaging. The Matrix 801*

*has an almost palpable, broadly panoramic sound field."*

*Bert Whyte AUDIO (USA)*

#### *Sounding out the cabinet*

Every loudspeaker enclosure has its own particular 'sound' or resonant frequency. Tap one sharply and you'll hear it.

Unfortunately, when a speaker has to reproduce the sound of, say, a double bass with the same enclosure volume as its own, there's a problem. Its walls oscillate in sympathy muddying the true double bass sound you want to hear.

This muddying effect also takes place when the mass of out-of-phase wave forms at the rear of a cone reflects back off the inside walls of the cabinet as slanting waves.

Despite years of research into these problems by different loudspeaker manufacturers results have been strictly limited. Once again it was B&W who finally broke the barrier.

#### *The matrix effect*

*"No other company has so diligently pursued the demons of resonance, nor devoted so much research to its suppression and elimination.*

*Years of research into anti-resonant loudspeaker enclosure construction peaked in 1986 when B&W introduced its Matrix system enclosure technology."*

*Bert Whyte AUDIO (USA)*

Matrix, a unique, patented B&W invention, has virtually solved the oscillating cabinet problem once and for all. Evidence of this in the Matrix 801 Series 2 can easily be demonstrated even before a note is played by simply tapping the enclosure.

"Like other B&W Matrix models, the 801 incorporates a honeycomb construction with a number of interlocking vertical and horizontal elements. This combination gives the bass cabinet an incredibly high stiffness, reducing cabinet resonances and sound colourations to a minimum."

Uli Michalik STEREO (West Germany)

To absorb out-of-phase interference a precisely cut length of acoustic foam is inserted into each Matrix cell, effectively creating a series of miniature anechoic chambers.



keep it in vogue for many more years."

Geoffrey Horn GRAMOPHONE (UK)

"...the same goes for the midrange and high frequency reproduction. Strings and vocals are being reproduced by this English monitor with exemplary openness and freedom of colouration."

Uli Michalik STEREO (West Germany)

"The most interesting aspect as regards the bass section is the use of Matrix technology for the unit. This original construction approach eliminates to a considerable extent resonances in the unit which damage the clearness and transparency of the image throughout the bass range."

Egido Mandanti SUONO (Italy)

#### Midrange

The laminated head assembly of structured foam and fibrecrete was the only existing feature left over from the original 801 design, and judged to be incapable

of improvement. And then only after applying the rigorous radiation measurement techniques used for the development of the Matrix enclosure.

Even re-appraisal of driver performance did not lead to any changes in the midrange drive unit.

"...That leaves the midrange, which was always an 801 strong point, especially with some of our famous singers, and probably the one which has earned it a place in most studios. It is a virtue which continues in this current version and one which will

when one compares it with 'on-baffle' versions."

Geoffrey Horn GRAMOPHONE (UK)

Having predicted the likely shapes and radii of domes, for Matrix 801 B&W chose the metal dome developed for the Concept 90 range. This meant re-designing the motor system and front end phasing plate to give the necessary sensitivity. The result is a freely diffracting construction, with a nickel cobalt magnet assembly pulling up the extreme top end response and operating with true piston action. The acoustic output is almost totally flat and well beyond the audio band.

"The Matrix 801 is spectrally seamless from top to bottom, dynamic, refined, harmonically accurate, open, and last but certainly not least, revealing... I have discovered a very soft, but magically effective suspended cymbal roll in the first movement... [Fennel's performance of Holst's First Suite for Military Band]. Having not heard this through previous speakers, and thinking the 801's were producing some aberration, I checked the score, and sure enough, there was the cymbal roll."

Lewis Lipnick STEREOPHILE (USA)  
Vol.10, No.9, Dec. 1987

#### Crossover and filter networks

Computer optimised throughout, all networks in the crossover section use a proven fourth-order Butterworth configuration. The insertion of an external high-pass bass alignment filter between pre- and power amplifier, or in the tape loop of the pre-amplifier, achieves a sixth-order Butterworth response. This lowers the cut-off frequency down to 19Hz in comparison with 37Hz for the original Model 801.

"The crossover is designed to permit bi-wiring, thus reducing intermodulation arising from common ground paths between mid- and low-frequency filter sections. Bi-amplification is possible, but it is advisable to use identical amplifiers

for the bass and midrange/tweeter inputs. All drivers are protected by audio power overload circuitry (APOC) and an external bass alignment filter\* is provided. With the vented system, this gives a sixth-order Butterworth alignment that affords a low frequency response of only -3dB at 19Hz!"

Bert Whyte AUDIO (USA)

\*Optional in some countries

The free-field linearity and excellent transient behaviour of the original 801 has been maintained but the sensitivity of the new Matrix 801 has been increased. Gold-plated terminals for bi-wiring, selected and matched components for the crossover and dedicated Van den Hul internal wiring, guarantees the highest standard of sound reproduction.

"The spectral balance of the Matrix 801 is quite smooth from top to bottom. The voices of both the soprano and the baritone are rock solid, centred as a phantom image between the speakers. In the three-dimensional sound field of these speakers, these voices seem very real - their voices are at exactly the right height, as if they were standing right in front of you."

Bert Whyte AUDIO (USA)

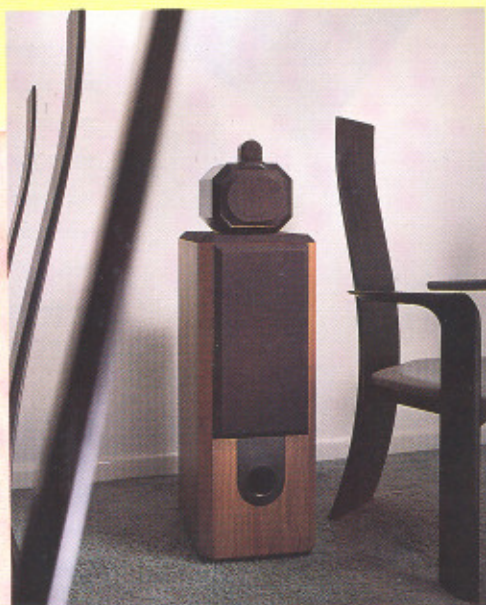
© Audio Magazine, DCI, Inc. 1988



"...If you are searching for the emotional involvement only live performance can provide, and are willing to live with absolute sonic honesty, then the B&W Matrix 801 Series 2 monitor is, musically, the end of the road."

Lewis Lipnick STEREOPHILE (USA)  
Vol.10, No.9, Dec. 1987

M A T R I X  
**802**  
S E R I E S 2



*Bringing it home to you*

Nothing gives B&W more pleasure or satisfaction than sharing its greatest technical achievements with the worldwide community of true music lovers.

And in the Matrix 802 Series 2 it shows. More accessible in terms of cost, more amenable in terms of size, the Matrix 802 preserves all the essential fidelity and grandeur of its professional counterpart.

Much slimmer than the Matrix 801, and therefore less in girth, the Matrix 802 occupies less than half the floorspace. A fact which allows its entry into any number of domestic environments.

*A brilliant translation*

Virtually all the technical advances achieved in the Matrix 801 have been translated into the 802 – word for word. A brilliant technological feat in itself.

The superlative high frequency system, the now classic midrange system, the dual audio powered overload circuits – are all there. As is the bi-wiring facility. And, of course, the all-transforming Matrix technology.

By staggering its in-line configuration B&W have ensured wide horizontal dispersion and corrected time arrival. Whilst the whole head assembly can be rotated relative to the low frequency enclosure.

*The low frequency drivers*

The monitor's extremely compact dimensions are largely due to the ingenious design of the bass unit which consists of two low frequency drivers mounted vertically in-line.

With its rubber-mounted, specially laminated polymer cones, this double unit provides a uniquely satisfying performance of true reference quality.

*A statement for today*

Functional, yet immensely pleasing in appearance, the Matrix 802 also represents what is probably the most singular visual contribution to loud-speaker design in this decade. A beautifully conceived statement calculated to add new grace and significance to any roomscape.

## The technology of perfection

Time was when the science employed in loudspeaker development technology could be easily explained and understood.

In recent years however the task has become far more daunting, particularly at B&W, where sophistication has percolated into every aspect of monitor loudspeaker design.

Nowhere is this more apparent than in the Matrix 801. Destined to provide yet another generation with its definitive professional status, the Matrix 801 completely vindicates a philosophy which gives R&D a priority way above that accorded to it by any other loudspeaker manufacturer. A priority in which the pursuit of excellence often supersedes considerations of short-term commercial advantage.

Here we touch on just a few of the techniques which help to make B&W's research laboratory what it is today.

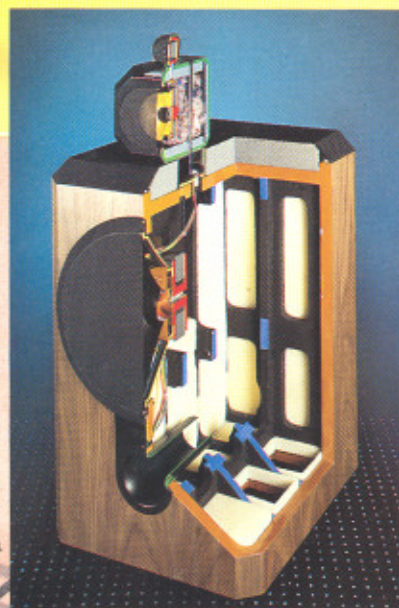
### CAD

Computer Aided Design, using B&W mathematics, allows the building of a computer-simulated woofer, tweeter or even a complete loudspeaker system, and predict performance if actually built. The great advantage is that it allows investigation of an infinitely greater number of design alternatives than could ever have been attempted with the old-fashioned trial-and-error process.

Matrix 801 and 802 are the fullest expressions yet of CAD's ability to influence every aspect of performance in everything from driver design to how board sizes should be cut to build the speaker enclosure.

### Speckle interferometry

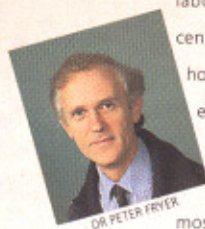
In this, a laser beam is used to identify distortion by measuring extremely small movements of around 1/3000 of a millimetre in the surface of the cabinet as the loudspeaker is playing. As a good indicator of unwanted cabinet resonances, this technique played a crucial part in determining the Matrix technology employed in 801 and 802 Series 2. It was also used to establish the reinforcement



### The inside story

Advanced technology of the order found in the Matrix 801 and 802 could only have originated in what is generally regarded as one of the most advanced loudspeaker research laboratories in Europe. B&W's R&D centre in Steyning, West Sussex, is home to some twenty or so specialist engineers and scientists, some of whom, like Dr Peter Fryer, are widely regarded as among the most eminent in their field. The sophisticated facilities at their disposal are awesome – providing access to the very latest digital, laser and computerised techniques.

With the exception of their specially designed classical cabinets, every Matrix 801 and 802 component has been developed at Steyning and then manufactured in B&W's own production unit. In this way, the Company makes sure of rigorous quality control throughout. A practice which is in direct contrast to most other loudspeaker manufacturers who simply buy-in components from sources outside their control – a policy known as 'badge engineering'.



DR PETER FRYER



and damping needed to eliminate unwanted resonances in the driver chassis.

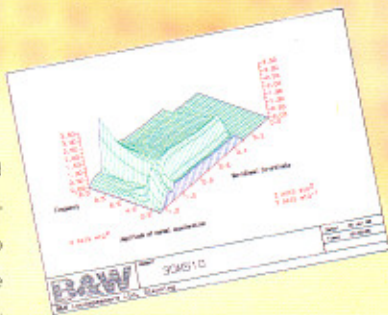


### Finite element analysis

A technique mathematically adapted by B&W in which the profile of a loudspeaker diaphragm is divided into a number of short curved 'finite elements', each of which is relatively easy to define in terms of performance.

Their characteristics and interaction with neighbouring elements are then calculated and combined to predict, and finally perfect, diaphragm performance.

The same technique also helped to dictate the design of the voice coil, former, spider and dust cap, all of which contribute towards the enclosure and speaker performance of Matrix 801 and 802.



### A design statement

The appearance of Matrix 801 and 802 are legends in themselves. Truly classical design statements combining the functional with the aesthetic. And another visible achievement for Kenneth Grange of the Pentagram Partnership – designer of legendary products such as kitchen machines for Kenwood, Instamatic cameras for Kodak, razors for Wilkinson and British Rail's 125 High Speed Train.



KENNETH GRANGE

### Lumped parameter modelling

An extremely sophisticated method of simulating a system in which many different factors are optimised to achieve the deepest bass response from a given enclosure. In the Matrix 801 this has meant a full octave more of bass extension with the -3dB response lowered from around 40Hz to the infrasonic 19Hz.

### Laser doppler velocimetry

A technique which produces 3-D plots showing the spread and direction of each point on the diaphragm as it vibrates. The perfect loudspeaker produces a cylindrical plot with a flat top. As well as helping B&W engineers to build drivers which are as close to the ideal as possible, this technique also helps in revealing design and manufacturing flaws. Vital as it is, scientific measurement is only part of the story. Other sophisti-

### In tribute

Supreme achievements for B&W, Matrix 801 and 802 are also lasting tributes to John Bowers, B&W's founder, who sadly died in December 1987. No monitors represent a more complete expression of his years of dedication to loudspeaker technology. David Motley of CBS Masterworks had this to say in tribute to him: "His efforts and achievements in the development of audio excellence, especially at the moment when digital recording arrived to enhance and widen the scope of sonic reproduction, contributed to one of the most exciting steps forward in the recording industry, and his success in providing the necessary technology will long be remembered."



JOHN BOWERS

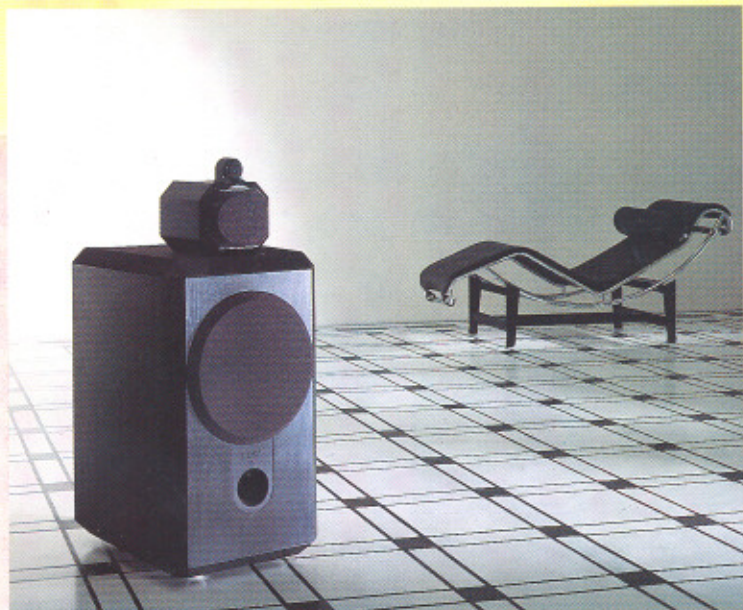
### A unique involvement

The success of the Matrix 801 highlights B&W's unique involvement with music and leading musicians worldwide. An involvement which B&W not only enjoys but appreciates in a very practical way. Not least through the contribution it makes to the jazz and classical movements.

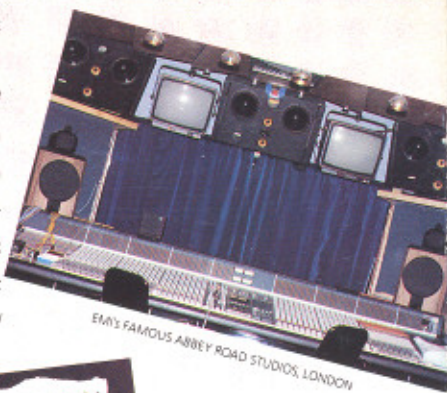
Recent events sponsored by the Company include a concert by Christopher Hogwood and his Academy of Ancient Music at the Royal Festival Hall. Some of the items performed at this concert have since been included in a unique



CHRISTOPHER HOGWOOD



CD of Christopher Hogwood's most popular works now available through B&W dealers. At other levels B&W strive hard to forge links between industry and the arts. To this end, in 1987 B&W started to present the passionate jazz enthusiasts of Montreux with a new venue within their Jazz Festival. At the 1988 Festival, B&W continued with a series of concerts in the Platinum discotheque of the Montreux Casino, introducing a number of musicians from all parts of the world – some celebrated, others virtually unknown.



EMI'S FAMOUS ABBEY ROAD STUDIOS, LONDON



The B&W Platinum concerts presented more than 34 groups and featured two special evenings with new Theta label artistes – including Scarlet Rivera, Joan Bibiloni, Tim Wheater and Ray Russell. There were memorable performances, too, from up-and-coming names – Frank Gambale, Timna Brauer, Eli Meiri, Robin Kenyatta, Bireli Lagrene and Babik Reinhardt (son of Django). In close co-operation with Theta, B&W is producing a live sampler CD of the Montreux concerts for customers worldwide.



### The professionals

In the late 60's, when the Beatles crossed the road to record their famous albums at the EMI Abbey Road studios in London, B&W could not have known that some twenty years later its Model 801 would be used to prepare the master tapes for the new digital age. With great care, EMI engineers remastered the original tapes using Model 801, to release the Beatles' masterpieces on compact disc.

Since the late 70's at the Abbey Road studios, EMI have also been using B&W loudspeakers to monitor all their classical recordings. Many of their customers too use B&W Models 801 and 808 in Studio Number One, recording to their great satisfaction orchestral works and soundtracks for some of today's finest movies.

EMI has since been joined by Decca, Deutsche Grammophon, CBS Masterworks, Hungaroton, Supraphon and others in using B&W's Model 801 as their preferred classical music monitor. In the USA, Larry Rosen in his state-of-the-art media room to evaluate all digital master recordings. Drummer Billy Cobham has played



BILLY COBHAM

with many of the jazz greats, including the legendary Miles Davis. His reaction on hearing his own performance through Matrix 801's... 'I'd never heard my drums sound so real... I had to have them.' Now Matrix 801 is his chosen monitor for home listening.

Across the world, eight out of ten classical recordings are monitored on B&W loudspeakers. So it's hardly surprising that, in their homes, leading conductors, musicians and recording engineers evaluate their work on B&W loudspeakers.



JOAN BIBILONI AND FERNANDO GONZALES\*



RAY RUSSELL\*



SIMON PHILLIPS\*



MO FOSTER\*

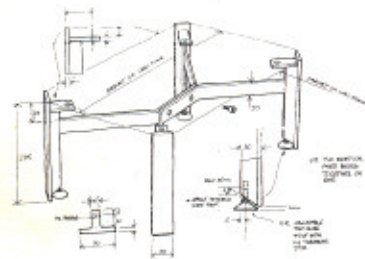


SCARLET RIVERA\*

### Specifications

	MATRIX 801 SERIES 2	MATRIX 802 SERIES 2
Frequency range*	175Hz to 25kHz (-6dB points)	22Hz to 25kHz (-6dB points)
Frequency response*	20Hz to 20kHz ± 2dB (free-field)	27Hz to 20kHz ± 2dB (free-field)
Bass loading*	Sixth-order Butterworth alignment, 19Hz cut-off	Sixth-order Butterworth alignment, 25Hz cut-off
Dispersion	20Hz to 15kHz Vertical: ± 1dB over 10° arc Horizontal: +0 - 3dB over 60° arc	20Hz to 15kHz Vertical: ± 1dB over 10° arc Horizontal: +0 - 3dB over 60° arc
Sensitivity	87dB (2.83V, 1m)	90dB (2.83V, 1m)
Distortion	For 95dB at 1m Second harmonic: < 1.5% (20Hz to 100Hz) < 0.5% (100Hz to 20kHz) Third harmonic: < 0.5% (20Hz to 100Hz) < 0.5% (100Hz to 20kHz)	For 95dB at 1m Second harmonic: < 1.0% (20Hz to 20kHz) Third harmonic: < 1.0% (20Hz to 20kHz)
Impedance	Nominal 8Ω (not falling below 4Ω)	Nominal 8Ω (not falling below 4Ω)
Power handling	Suitable for amplifiers of 100W to 600W	Suitable for amplifiers of 50W to 500W
Crossover network	Fourth-order Butterworth acoustic response crossover frequencies 380Hz and 3kHz	Fourth-order Butterworth acoustic response crossover frequencies 400Hz and 3kHz
Drive units	One 300mm high-power polymer cone bass, one 126mm Kevlar cone midrange, one 26mm metal dome high frequency	Two 200mm high-power polymer cone bass, one 126mm Kevlar cone midrange, one 26mm metal dome high frequency
Dimensions	Height: 1008mm (39 1/2in) Width: 432mm (17in) Depth: 560mm (22in)	Height: 1040mm (41in) Width: 300mm (11 3/4in) Depth: 370mm (14 1/2in)
Weight	54kg (119lb)	32kg (70lb)
Cabinet finish	Selected real wood veneers of walnut, black ash or rosewood, satin white. Special finishes on application	Selected real wood veneers of walnut, black ash or rosewood, satin white. Special finishes on application

\* These response and loading characteristics apply with the use of the high-pass bass alignment filter. Without this the bass loading is fourth-order and the frequency response -9dB at cut-off. The latter response may well be suitable for average domestic requirements.



Matrix 801 floor stand (optional)  
Designed for Matrix 801, this accessory is equally suitable for all previous 801 models.



Matrix 801 high-pass bass alignment filter  
Domestic version:  
unbalanced, with RCA phono sockets.  
Professional version:  
balanced, with XLR sockets.

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