

**D&W**  
LOUDSPEAKERS

# ACOUSTITUNE™

ACOUSTICALLY TUNED

# SUBWOOFER



THE NEW ACOUSTICALLY TUNED SUBWOOFER FOR SMALLER LOUDSPEAKER SYSTEMS

B&W'S REPUTATION IN THE REALM OF HIGH QUALITY SOUND REPRODUCTION IS WELL KNOWN. SO IT'S HARDLY SURPRISING TO FIND THEIR MONITORS PREFERRED BY VIRTUALLY EVERY PROFESSIONAL CLASSICAL RECORDING STUDIO IN THE WESTERN WORLD.

EVEN SO IT'S THE SAME HIGHLY SOPHISTICATED TECHNOLOGY USED TO ACHIEVE SUCH ACOUSTICAL EXCELLENCE WHICH HAS NOW BEEN APPLIED TO THE PROBLEM OF UPGRADING SMALLER, LESS EXPENSIVE LOUD-SPEAKER SYSTEMS. THIS INVOLVES FILLING IN, OR AUGMENTING, THE UNSATISFACTORY, AND USUALLY IMPOSSIBLE TO REPRODUCE, LOWER OCTAVES WHICH TYPIFY THE PERFORMANCE OF THE SMALLER SPEAKER.

THANKS LARGELY TO B&W'S COMPUTER AIDED DESIGN PROGRAMME, THE ACOUSTITUNE IS A SIMPLE INEXPENSIVE SUBWOOFER WHICH COMPLEMENTS B&W'S EXISTING SMALL MONITOR SPEAKERS. THE MAIN ADVANTAGE IS THAT IT CAN BE INTRODUCED INTO ANY SMALL SPEAKER SYSTEM WITHIN THE SENSITIVITY RANGE OF 80 TO 90DB PER WATT.

### SIZING UP THE DESIGN PROBLEMS

AS WELL AS GOOD SENSITIVITY AND POWER HANDLING ABILITY, A GENERAL PURPOSE SUBWOOFER SHOULD ADD THOSE MISSING OCTAVES BELOW 100HZ NOT FOUND IN SMALLER LOUDSPEAKERS. IT SHOULD ALSO AUGMENT THE LOW FREQUENCY PERFORMANCE OF SPEAKERS WHERE THE BASS IS PERHAPS LESS THAN SATISFYING.

APART FROM THESE BASIC REQUIREMENTS IT SHOULD:

- HAVE EASILY ADJUSTED VARIABLE SENSITIVITY.
- ROLL-OFF ABOVE 100HZ SO THAT IT CAN'T BE LOCATED BY EAR — GIVING THAT 'ALL ROUND' SOUND.
- MAINTAIN GOOD SENSITIVITY WHILST ACHIEVING EXTENDED LOW FREQUENCY PERFORMANCE.
- USE THE MINIMUM OF CROSSOVER COMPONENTS.
- EFFECTIVELY SUM BOTH CHANNELS AUTOMATICALLY.

### FINDING THE WAY

ONE METHOD OF ACHIEVING ALL THIS WOULD BE TO USE ACTIVE FILTERS, LOW LEVEL CROSSOVERS AND SEPARATE AMPLIFIERS FOR BOTH THE SUBWOOFER AND THE SATELLITES, BUT THIS IS EXPENSIVE AND FAR TOO COMPLICATED.

ANOTHER IDEA WOULD BE TO HAVE AN ORDINARY BASS REFLEX BOX CROSSED OVER VERY LOW DOWN. HOWEVER, THIS TIME SOMETHING COMMON TO ALL LOUD-SPEAKERS PRESENTS A PROBLEM — IMPEDANCE PEAKS. THESE PEAKS MAKE A CROSSOVER AT 100HZ VERY COMPLICATED, NOT TO SAY EXPENSIVE, SIMPLY BECAUSE IT REQUIRES THE ADDITION OF IMPEDANCE LINEARISATION COMPONENTS.

THE ANSWER THEREFORE HAS TO BE SOME FORM OF BAND-PASS ENCLOSURE BECAUSE THIS IS THE ONLY FORM OF DRIVER BOX COMBINATION WHICH HAS AN ACOUSTIC CROSSOVER BUILT-IN.

... WITH THE B&W DESIGN PROGRAMME B&W'S SUBWOOFER RESEARCH PROGRAMME WAS ABLE TO PREDICT THE RESPONSE OF VIRTUALLY EVERY COMBINATION OF ENCLOSURE AND DRIVE UNIT. IT FINALLY SUGGESTED THAT AN ENHANCED BAND-PASS TYPE OF ENCLOSURE LOOKED TO BE THE MOST PROMISING.



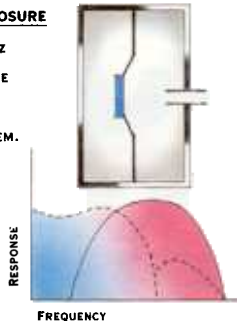
**B&W**  
**ACOUSTITUNE**  
ACOUSTICALLY TUNED  
**SUBWOOFER**



**HERE ARE THE FOUR OPTIONS  
FINALLY CONSIDERED**

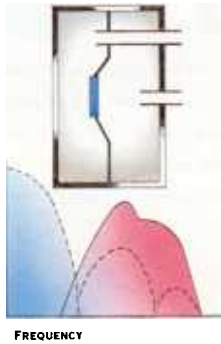
**A. SIMPLE BAND-PASS ENCLOSURE**

IN WHICH A BOX-LIKE HELMHOLTZ RESONATOR IS PLACED OVER THE FRONT OF AN INFINITE BAFFLE OR CLOSED BOX SPEAKER SYSTEM.



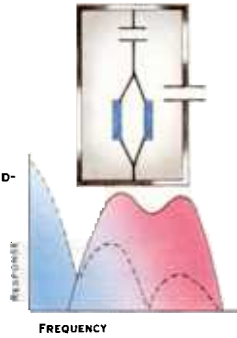
**B. DOUBLE TUNED,  
DOUBLE ENCLOSURE**

HELMHOLTZ AT BOTH FRONT AND REAR, OFFERING MORE SENSITIVITY THAN THE SIMPLE BAND-PASS TYPE AND REDUCING CONE AMPLITUDE AT THE LOWER END OF THE BAND.



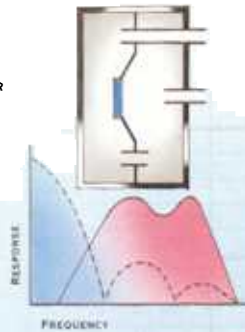
**C. HELMHOLTZ RESONATOR  
PLACED OVER THE FRONT  
OF A BASS REFLEX SYSTEM**

GIVING THE ADVANTAGE OF GREATER SENSITIVITY AND FLEXIBILITY OVER A SIMPLE BAND-PASS SYSTEM, AND REDUCING CONE AMPLITUDE AT THE LOWER END OF THE BAND.

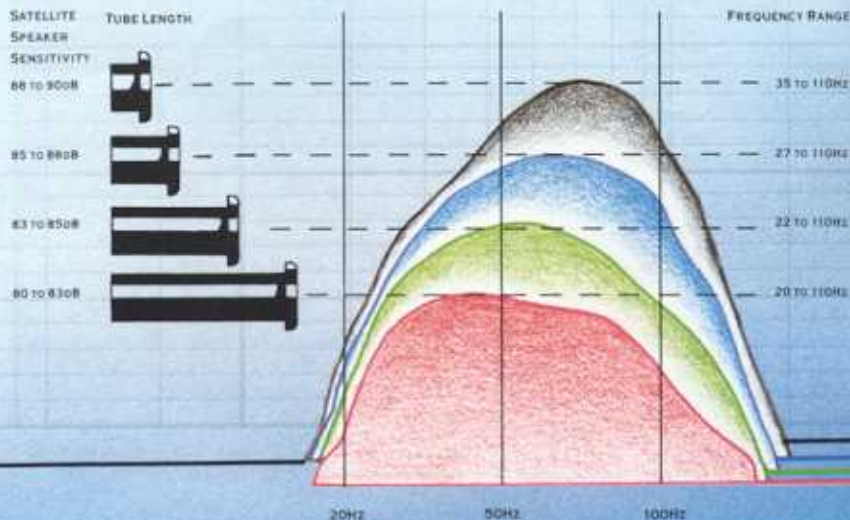


**D. TWO-BOX,  
THREE-PORT SYSTEM**

A SOLUTION IN WHICH THE REAR CAVITY OF SYSTEM 'C' IS MADE INTO A HELMHOLTZ RESONATOR.

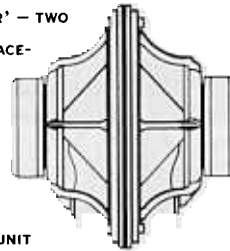


AMPLITUDE -----  
PRESSURE RESPONSE -----  
SYSTEM 'D' GAVE TOO STEEP AN UPPER ROLL-OFF RATE FOR OUR PURPOSES AND WAS QUITE DIFFICULT TO TUNE. SYSTEM 'C' WAS THEREFORE CHOSEN.



**ENTER THE SUPERDRIVER**

BECAUSE WE WANTED TO KEEP THE ENCLOSURE AS SMALL AS POSSIBLE WE NEEDED A DRIVER WITH BOTH HIGH MASS AND HIGH MAGNETIC STRENGTH. THIS MEANT LITERALLY SPLITTING THE REQUIREMENTS OF THE DRIVER IN TWO SO CREATING WHAT IS IN EFFECT A 'SUPERDRIVER' - TWO BASS DRIVERS ASSEMBLED FACE-TO-FACE AND DRIVEN OUT OF PHASE.



**SUMMING UP**

THE TINY VOLUME OF AIR BETWEEN THE DUAL DRIVER UNIT PRODUCES TIGHT ACOUSTIC COUPLING WHICH, AT LOW FREQUENCIES, MAKES THEM BEHAVE AS IF THEY WERE GLUED TOGETHER. FEEDING THE LEFT CHANNEL TO ONE OF THEM AND THE RIGHT CHANNEL TO THE OTHER, ACOUSTICALLY SUMS THE TWO STEREO CHANNELS OVER THE LOW FREQUENCY RANGE.

**LESS DISTORTION -  
AND EVEN LESS CONE EXCURSION**

SINCE THE DRIVERS CREATE A 'PUSH-PULL' EFFECT, SECOND HARMONIC DISTORTION IS MUCH LESS THAN IN MORE NORMAL DRIVER CONFIGURATIONS WITH THE DRIVING FORCE RENDERED TOTALLY SYMMETRICAL. DISTORTION IS FURTHER REDUCED OVER THE SIMPLE BAND-PASS SYSTEM 'A', BECAUSE THE RESONANCE OF THE INTERNAL PORT REDUCES CONE AMPLITUDE AT LOW FREQUENCIES, PLACING LESS STRAIN ON THE SUSPENSION.

**THE CABINET**

ALL BOXES WITH TUNING PORTS IN THEM (AND THIS INCLUDES BASS REFLEX ENCLOSURES), NOT ONLY HAVE THE FUNDAMENTAL RESONANCES WHICH DESIGNERS CAN USE TO GOOD EFFECT BUT A WHOLE SERIES OF UNWANTED HIGHER HARMONICS.

CABINET TYPE 'B' HAS TWO SETS OF THESE RESONANCES BEING FED DIRECTLY TO THE OUTSIDE WORLD. HOWEVER, EVEN THOUGH CABINET TYPE 'C' IS LESS SUSCEPTIBLE TO THESE HIGHER HARMONICS, AN INDUCTOR IS ALSO INCLUDED IN SERIES WITH EACH DRIVER AND A CAPACITOR IN PARALLEL TO FURTHER REDUCE THE AMPLITUDE

OF THESE HIGHER FREQUENCIES, LEAVING THE STRONGEST OF THEM BETTER THAN 30DB DOWN ON THE PASS-BAND LEVEL.

**B&W'S REVOLUTIONARY SOLUTION -  
THE ACOUSTITUNE SUBWOOFER**

THE SUBWOOFER COMES WITH FOUR SEPARATE PORT TUBE LENGTHS ALLOWING YOU TO SELECT JUST THE SENSITIVITY YOU WANT. THESE TUBES COUPLE THE HIGH ACOUSTIC ENERGY FROM INSIDE THE CABINET OVER THE LOW RANGE OF FREQUENCIES TO THE OUTSIDE WORLD.

EACH SUCCESSIVELY SHORTER TUBE INCREASES THE SENSITIVITY BY 2DB WITH HARDLY A CHANGE IN THE RESPONSE. WHICH MEANS THE ACOUSTITUNE SUBWOOFER CAN BE USED WITH ANY MAKE OF SPEAKER PROVIDED IT HAS A SENSITIVITY OF BETWEEN 80-90DB.

THE ACOUSTITUNE PORT TUBE SYSTEM ALLOWING YOU A REMARKABLE RANGE OF LISTENING EXPERIENCES. EXPERIMENT TO DISCOVER WHICH STYLE OF SOUND YOU PREFER. YOU MIGHT ENJOY THE EMPHASIS ON A PROFOUNDER MORE DOMINANTLY BASS, PREFER A SUBTLE BALANCE OR USE THE SUBWOOFER TO PROVIDE A LIGHTER FOUNDATION TO WHATEVER MUSIC YOU ARE PLAYING.

THE ROBUST, MULTI-FOLDED ENCLOSURE CONSTRUCTION MINIMISES PANEL RESONANCES, AND THE SYSTEM IS FULLY PROTECTED AGAINST EXCESSIVE OVERLOAD.



ROOM POSITION



BASS OUTPUT



TUBE LENGTH



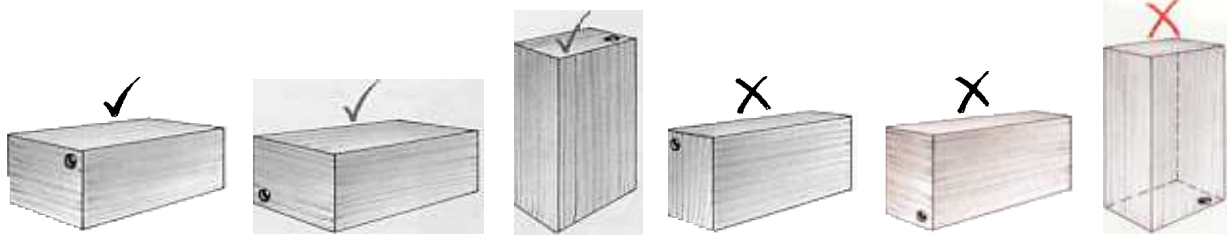
**ALWAYS AT HOME**

NO SUBWOOFER IS MORE EASILY ACCOMMODATED IN THE HOME. PLACED FLAT OR VERTICALLY, IT CAN BE TUCKED UNDER FURNITURE, DISCREETLY HIDDEN BEHIND CURTAINS OR NESTLE IN A CORNER. THE NATURE OF ITS DESIGN, AND THE

FACT THAT ACOUSTITUNE DRIVERS ARE ALWAYS ON THEIR SIDE, ENSURES THAT NO INTERNAL SAGGING WILL OCCUR AND IMPAIR SOUND QUALITY.

THE VERSATILITY OF THE ACOUSTITUNE SUBWOOFER MEANS THAT IDEAL SOUND QUALITY CAN BE ACHIEVED IN TWO WAYS.

EITHER BY CHANGING THE TUBE LENGTHS OR BY THE POSITIONING OF THE UNIT IN A GIVEN ROOM. THE ILLUSTRATIONS SHOW HOW YOU CAN SIMPLY PLACE THE ACOUSTITUNE IN RELATION TO THE WALL OR A CORNER TO FIND THE BEST COMBINATION OF THESE TWO FACTORS.



**SPECIFICATION**

<b>DISTORTION</b>	FOR 90DB AT 1M SECOND HARMONIC: <0.3% (AT 100HZ) THIRD HARMONIC: <1.4% (AT 100HZ)	<b>IMPEDANCE</b>	NOMINAL 9Ω
<b>FREQUENCY RANGE</b>	TUBE LENGTH 25MM 35 TO 110HZ (-6DB POINTS) 50MM 27 TO 110HZ (-6DB POINTS) 100MM 22 TO 110HZ (-6DB POINTS) 150MM 20 TO 110HZ (-6DB POINTS)	<b>CROSSOVER</b>	SECOND-ORDER ACOUSTIC + SECOND-ORDER ELECTRICAL
<b>FREQUENCY RESPONSE</b>	TUBE LENGTH 25MM 44 TO 100HZ (-3DB) 50MM 35 TO 100HZ (-3DB) 100MM 27 TO 100HZ (-3DB) 150MM 22 TO 100HZ (-3DB)	<b>DRIVE UNITS</b>	TWO 160MM (6IN) ACOUSTICALLY COUPLED BASS WITH COMPOSITE SHORT FIBRE CONE. OVERLOAD PROTECTED
<b>BASS LOADING</b>	TUBE LENGTH 150MM BUTTERWORTH BAND-PASS, FOURTH-ORDER BASS ROLL-OFF	<b>POWER HANDLING</b>	SUITABLE FOR AMPLIFIERS WITH 10W TO 200W OUTPUT
<b>DISPERSION</b>	OMNI-DIRECTIONAL OVER THE PASS-BAND	<b>DIMENSIONS</b>	550 X 337 X 250MM (21 1/4 X 13 1/4 X 9 3/4 IN)
<b>SENSITIVITY</b>	SUITABLE FOR SPEAKERS WITH 80 TO 90DB SENSITIVITY	<b>WEIGHT</b>	12.5KG (27 1/2 LB)
<b>ENCLOSURE</b>	COUPLED: REAR; BASS REFLEX, FRONT; HELMHOLTZ RESONATOR LOWER 3dB POINT 35HZ UPPER 3dB POINT 100HZ	<b>CABINET FINISH</b>	SIMULATED BLACK ASH VENEER

B&W LOUDSPEAKERS LTD RESERVE THE RIGHT TO AMEND DETAILS OF THEIR SPECIFICATIONS IN LINE WITH TECHNICAL DEVELOPMENTS.



B&W LOUDSPEAKERS LTD  
MEADOW ROAD, WORTHING BN11 2RX, ENGLAND



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