JORDAN WATTS

the voice of high-fidelity

WHY JORDAN-WATTS LOUDSPEAKERS REPRODUCE SOUNDS SO NATURALLY AND TIRELESSLY

The Jordan-Watts loudspeaker is probably the most fundamentally correct sound reproducing device designed to date and it owes much of its remarkable performace to its basic simplicity. It began with a detailed study of the current state of the art in sound recording and reproduction, what new developments had taken place, what new materials were now available, and what were the requirements necessary for absolute accuracy in converting electrical energy into sound, regardless of cost, size, method, or "the way it has always been done".

The study showed that origins still strongly influenced design, the first "loudspeaker" being a small megaphone attached to the earpiece of a telephone receiver to form an elementary pressure unit. Flat diaphragms transmuted to cones and electro-magnetic development passed through the stages of moving iron, energised magnets, moving coils, permanent magnets, and as amplifier powers increased so did the size of loudspeaker cones, thus creating intermodulation distortion problems. This distortion is usually reduced by using two or more sizes of loudspeaker in each enclosure, coupled by crossover networks, so that each unit reproduces a limited band of frequencies. Different loudspeakers however, create different qualities of sound and with the additional effect of crossover roughness, there remains a gap between results and perfection. Furthermore the reactive element of crossovers adversely affects performance of some transistorised amplifiers.

Correct diaphragm design and size are of paramount importance in a loudspeaker. The "ideal piston" (an imaginary device having infinite rigidity and no mass) had often been quoted as the ultimate in diaphragm design, but in practice such properties are unsuitable for wide range sound propagation.

These ideals are widely believed to be essential for good transient response and the avoidance of cone "break-up", but theoretically this is not so. Consider thin glass and lead foil as diaphragm materials. The rigid glass diaphragm on being struck would continue to ring for some seconds, an effect which in loudspeaker terms would be very poor transient response and serious cone break-up. The lead diaphragm would produce no more than the sound of the impact, showing no hangover, a very desirable reaction for a loudspeaker cone, yet lead is far softer and denser than glass. There is no inherent advantage in making a cone merely light or rigid unless these properties are related to many more complex factors in the design.

To achieve a smooth and extended high frequency response—and this is the difficult region—the effective area of the diaphragm must decrease with elevating frequency in accordance with a mathematical law, and to avoid intermodulation distortion the diaphragm diameter should not exceed about four inches. (10 cms.) These characteristics, so different from the "idea piston" can only occur in a diaphragm having mass and flexibility and driven at one point on its surface. They exist only in a SINGLE cone loudspeaker, which is why this type has remained supreme for fifty years.

Jordan-Watts had first to perfect a diaphragm that behaved in accordance with that law and had then to create conditions necessary for it to generate distortion free sound radiation at an acceptable power level and efficiency. Because the optimum diameter for the diaphragm is only 4", about one third of the conventional size for high fidelity loudspeakers, Jordan-Watts designed a radically new cantilever metal suspension system to permit the large movement necessary to achieve radiated power at low frequencies and to apply some axial restoring force to the voice coil. Every minute detail has received the same careful thought, using new ideas and new materials to create a loudspeaker of faultless performance which sets a new standard of clarity and definition in sound reproduction. Here are some of the Jordan-Watts advanced design features:

1. Acoustically correct size and profile of non-rigid metal diaphragm.
2. Proper mechanical termination at diaphragm edge and centre to prevent unwanted resonances and break-up. An ingenious flexible collar decouples the mass of the suspension system from the coil at high frequencies thus extending the level response and aiding the excellent mid-range polar radiation.
3. Triple copper alloy tangential coil suspension system allows large excursions without distortion. Unaffected by climate and does not sag with ageing as is unavoidable in corrugated cloth discs. The suspension provides the electrical circuit to the coil.
4. Its lightweight coil remains completely immersed in the deep magnet gap, even at maximum amplitude, to ensure superb transient response. Coil heat is dissipated through an aluminium former. Metal and plastic construction, unaffected by climate or humidity.
5. Massive, rigid, an inert chassis and magnet system improves efficiency of moving parts and provides a rear radiation area four times that of the diaphragm and a magnet area greater than that of the diaphragm.
6. Each module is acoustically damped to maintain linear low frequency response—an advantage over electro-magnetic damping because it applies equally over the entire diaphragm surface instead of only the centre. This also maintains the correct damping factor where two or more modules are mounted in the same enclosure.
7. The small diaphragm area enables correspondingly small enclosures to provide superb bass performance.
8. Standing wave problems are negligible because (a) with small enclosures the relevant frequencies are high, (b) the metal diaphragm is three times less transparent acoustically than is paper (c) the open area of the front baffle is small (d) the module itself is acoustically damped.

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JUNO JULIET JUMBO JANET

QUBIQE
Heavy ceramic panels give stiffness, density and mass to the solid wooden framework of this artistically designed reflex High Fidelity loudspeaker.
An item of furniture of outstanding beauty.
Oak or Walnut finish with honey or pimento coloured panels. 30 cm. cube 4, 8, or 16 ohms. 40 watts (20 watts rms).
Weight 14 kg.

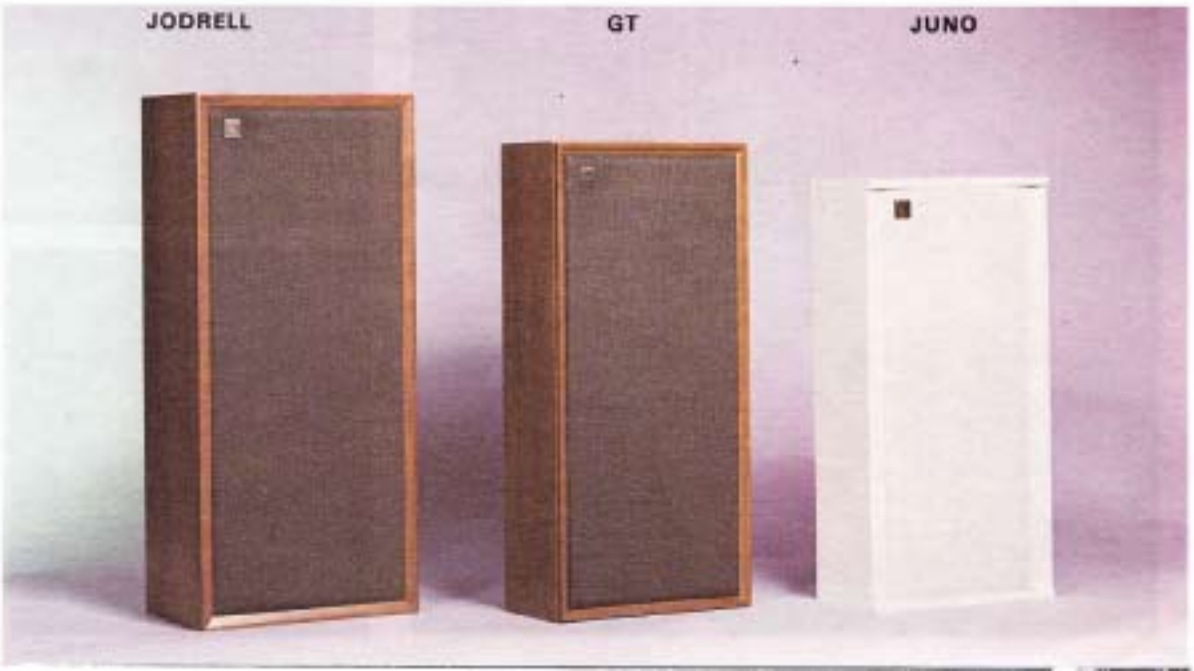
JUNO
A slender 0.6 cu. ft. reflex system of elegant style and impeccable balanced performance. Powerful smooth bass and measured response almost flat from 40 Hz through 20,000 Hz. Remarkable low distortion and a quality of sound difficult to surpass by any loudspeaker regardless of size or complexity. 20 watts (40 watts peak). 4, 8, or 16 ohms.
Size 24½" x 12" x 6½".
(61 x 30 x 16 cms.)
Weight 30 lbs. (14 kg.)
Teak/Vynair.

JULIET
A beautiful 'bookshelf' loudspeaker of the finest sound quality.
Although only 16" x 10" x 9" deep it spans the entire audio frequency range from a rich full bass to a sparkling treble with delightful clarity and low distortion. 40 Hz to 20,000 Hz. The reflex enclosure is finished in medium teak with a padded Vynair grille in a solid teak surround 20 watts power handling. Impedances 4, 8, or 16 ohms.
Weight 28 lbs. (13 kg.)
(40 x 25 x 23 cms.)

JUMBO
The smallest 20 watts High Fidelity loudspeaker system obtainable. Cleanly reproduces from a satisfying 70 Hz to beyond audibility with tireless ease. Size 16½" x 8" x 3½" Infinite baffle. Teak/Vynair finish, classical styling. 4, 8, or 16 ohms.

Widely used as 'rear channel' loudspeakers for surround sound and quadrophonic systems.
4, 8, or 16 ohms.
Weight 15lbs, 6.8kg.
(42 x 20 x 9 cms.)

JANET
An infinite baffle (closed box) High Fidelity loudspeaker system of small frontal area, designed for bookshelf mounting or other positions where loudspeakers should preferably be heard but not seen. This has a performance similar to the JUMBO. 70-20,000 Hz, handles up to 20 watts and is fitted with the new Jordan-Watts full range single driving unit. Beautifully finished teak cabinet with inset padded Vynair grille. Impedances 4, 8, or 16 ohms.
Weight 16 lbs. (7 kg.)
Size 12" x 8" x 6",
(30 x 20 x 15 cms.)



JODRELL GT JUNO

GT JODRELL JUPITER and TLS

GT
High performance loudspeaker in elegant reflex enclosure with choice wood finishes. Has an adjustable output wide angle H.F. radiator for controlled reinforcement of the higher frequencies. Exceptional frequency range. 30-22,000 Hz 20 watts 4, 8, or 16 ohms. Size 26¾" x 12¾" x 6½", 68 x 32.4 x 16.6cms. Weight 33lbs. (15Kgs.) Floor standing or wall mounting. Teak or Walnut. Rosewood (extra).

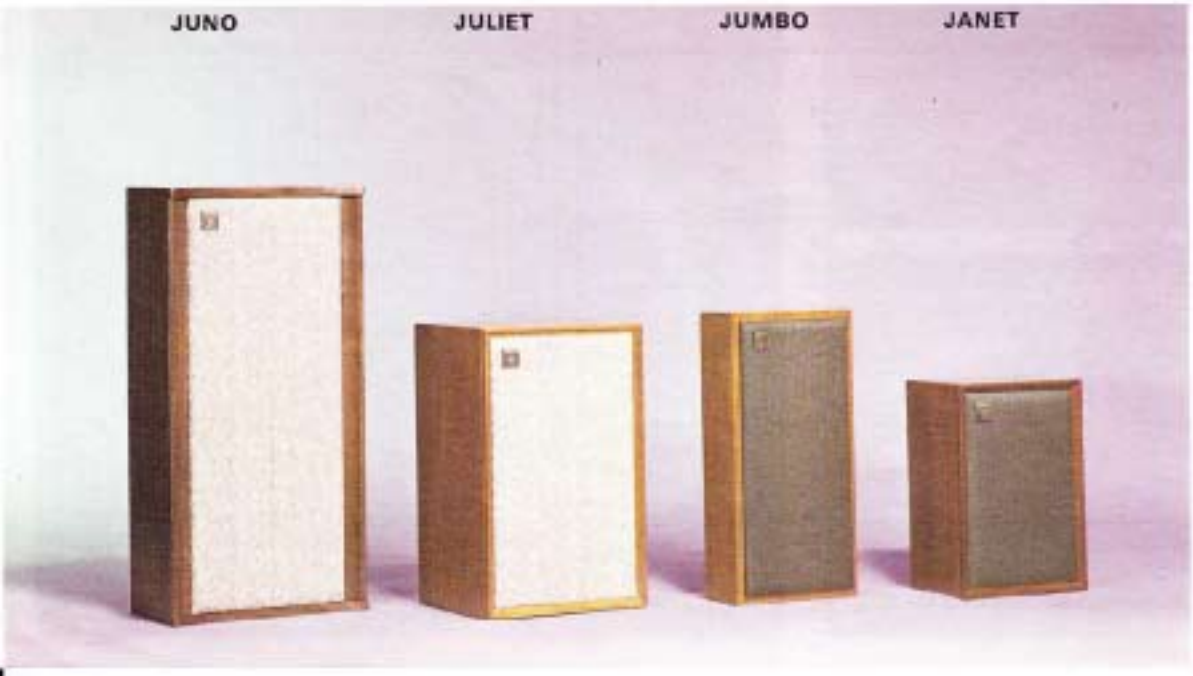
JODRELL
A powerful High Definition reflex loudspeaker handling 40/80 watts inputs through twin balanced driving units. Has an adjustable reinforcement to the upper middle and treble frequencies. Extended frequency range spans 30 Hz to 22,000 Hz. 4, 8, or 16 ohms. Size 30" x 13½" x 8½", 76 x 34.5 x 22cms. Weight 55lbs, 25kgs. Finish, Teak or Walnut veneer, Vynair grille.

JERICHO
Should bring the walls down! Especially designed for the music aficionado who demands clean crisp sound at high power levels. 10" bass driver plus Jordan-Watts modules and tweeter. 100 watts music power. 8 ohms. Weight 58 lbs. (26 kg.) Teak finish, fabric grille.

JUPITER TLS
A Monitor class Transmission Line Speaker of only 2.3 cu. ft. volume. Has A.B.R. reinforcement of bass down to 25 Hz at robust levels. Pure high definition sound through to 22,000 Hz. 40/80 watts. 8 ohms. Weight 92lbs. (42kg.) 34½" x 15" x 10½", 88 x 38 x 27cms. Teak or Walnut, Vynair grille.

JUPITER CENTURION
100 watts plus. Power-packed 6 unit reflex High Fidelity loudspeaker for articulate sound coverage over large areas. Four Jordan-Watts modules and two adjustable high frequency units housed in a sturdy teak finished enclosure. 34½" x 15" x 10½", (88 x 38 x 27cms.) Response 30-22,000 Hz. 80/150 watts. 8 ohms. Weight 90lbs. (41kg.)

FLAGON
A decorative high fidelity loudspeaker in artistic kilned ceramicware enclosure, acoustically superior to conventional wooden enclosures. Extremely stiff non-reflecting internal shape eliminates panel resonances to produce delightfully clean and natural sound. Ideal wherever ordinary loudspeakers would disturb the décor. 33 cm. diam 40 watts (20 watts rms). 4, 8, or 16 ohms. Weight 9 kg.



JUNO JULIET JUMBO JANET

INSTALLATION NOTES

Most Brand name Hi-Fi stereo systems are a collection of various specialist makers' components selected for compatibility and commercial appeal, the quality of sound they produce depending on the capability of the components, particularly the loudspeakers.

Loudspeakers always have the final say in any sound reproduction system and the better the equipment the more exacting is the performance demanded of the loudspeakers. All components in the chain i.e. turntable, pick-up, pre-amp, tape deck, and power amplifier etc. must perform to High Fidelity standards both individually and collectively, and it is in the collective sense that it is so often advisable to have expert advice from your dealer or an informative book on the subject before planning a Hi-Fi system. Jordan-Watts loudspeakers are quite impartial – they will reproduce good or bad signals with equal fidelity, even though they may be blamed for the latter.

Choosing your Loudspeakers

Jordan-Watts loudspeakers can cover the entire audible range of frequencies from 20 Hz to 20,000 Hz at an extremely low distortion level due to their unique driving unit of single metal diaphragm construction that eliminates the need for crossover networks. Power requirements from a fraction of a watt upwards can be met by using these modules singly or in multiple arrays. Low frequency response is determined by the enclosure and is independent of the number of units used. As a general rule allow 10 amplifier watts for each 1,000 cubic feet of room. For stereo purposes this applies to EACH loudspeaker system. The lowest frequency that can be reproduced in any room is calculated by dividing the longest dimension (in feet) into 560, and there is no advantage in using an enclosure system that can produce frequencies below this figure. Rooms differ widely acoustically because of shape, construction and furnishing and a loudspeaker may sound quite differently in one room as compared to another. Even positions in the same room may affect performance. Generally the loudspeakers should be directed towards the usual listening area, preferably about normal listening height and not masked by intervening furniture. They should be located where they can best convey the relative positions of the original sound.

FOR STEREO the speakers should be spaced sufficiently apart to prevent the sounds from merging yet not so far as to create a 'hole in the middle' effect. Because of their small diaphragm area Jordan-Watts Loudspeakers have an unusually wide polar response but normally a total angle of 40° to the listener will be found most satisfactory.

JUNO, JUMBO and G.T. Loudspeakers can, if desired, be suspended from the wall and as they are available in a choice of finishes can fit unobtrusively into most decoration styles.

JODRELL and G.T. HIGH DEFINITION LOUDSPEAKERS. There is no universal loudspeaker that can satisfy all the variables of room acoustics resulting from shape, size, construction, furnishings, decoration and listeners' widely differing preferences in sound.

Lightly furnished rooms with large reflecting surfaces permit echoes and an over-brilliance of high frequency (treble) sound that may be shrill and tiring to sensitive ears. Conversely, heavily draped and carpeted rooms and upholstered furniture absorb much of the high frequencies, leaving an unbalanced bass-heavy sound lacking in liveliness.

To meet such various conditions Jordan-Watts have developed two superb High-Definition loudspeakers having the facility of instantly adjustable reinforcement of the upper middle and treble frequencies in a manner made possible by the technically advanced design of their full range driving units. These new high performance loudspeakers are compact, beautifully styled examples of craftsmanship in keeping with the standard of quality associated with Jordan-Watts loudspeaker enclosures.

AMPLIFIER MATCHING. Jordan-Watts loudspeakers and driving units are made with 4, 8, or 16 ohms nominal impedances suitable for all valve or transistorised amplifiers Where the latter are stated as "4 to 16 ohms" output the best loudspeaker impedance is usually 8 ohms, but always follow manufacturers instructions because insufficient impedance load may harm the amplifier. Impedance mismatching does not normally affect a loudspeaker: they all mismatch to some extent in operation. Within common-sense limits it is better to use an amplifier capable of a higher power output than the watts rating of the loudspeaker because this will avoid the common trouble of amplifier overload distorting the signal. Great care must of course be taken to prevent damaging the loudspeakers and the amplifier power control should always be returned to minimum setting before any switching occurs because loudspeakers are subjected to severe treatment if surges or "plops" take place at high amplifier gain.

MATCHING YOUR FURNITURE

Jordan-Watts loudspeakers are finished in selected teak or walnut veneers. The Juno and Jumbo models are additionally available in eggshell white. Other finishes to special order.

THE DRIVING UNIT OR MODULE

Dimensions are 6" x 6" square and 2½" deep (15.2 x 15.2 x 6.4 cms.) plus ¼" flanges on two sides. For fixing use four bolts 2BA or $\frac{7}{16}$" dia. (5mm.) spaced 6½" x 4" apart (16.5 x 10.1 cms) between centres. Diaphragm 4" (10.2cms) diameter of metal alloy, capable of a total excursion of 0.25 inches (6.5mm.) Fundamental resonance 41 Hz. Total Weight 4 kg. Power handling 20 watts rms (40 watts music). Frequency range on axis: 30–17,000 Hz ± 3 dB 25–20,000 Hz ± 6 dB. Frequency range 30° off axis: 30–17,000 Hz ± 6 dB. Impedance: 4, 8, or 16 ohms.

JORDAN WATTS

MAKING YOUR OWN ENCLOSURE

The fine quality and obvious cabinet making skill evident in Jordan-Watts enclosures earns much praise, but there is no inherent acoustic advantage in using the maker's enclosures. You can obtain the same perfection in sound by following these hints when building your own enclosures.

Use ¾" (19 mm) veneered plywood, chipboard, or timber and ensure that all joints are glued and screwed to be rigid and airtight. Please note that all dimensions shown are INTERNAL. The final appearance of your enclosures is very important because they will be on show for many years.

Select the right impedance for your amplifier. Jordan-Watts driving units are available in 4 ohms, 8 ohms or 16 ohms nominal impedance. For loudspeakers handling more than 20 watts use two or more modules connected preferably in parallel to provide the correct impedance match. For example, two 16 ohms driving units connected in parallel as in JODRELL or JUPITER will give 8 ohms load to the amplifier.

All Jordan-Watts enclosures, excepting the JULIET, have one rectangular hole which serves for the loudspeaker opening and the reflex port, where fitted. The top member of the tunnel structure bridges the lower part of this opening inside the front panel, and the driving unit rests directly on this member. Restriction of air movement caused by the grille covering over the mouth of the reflex port is greatly reduced by this arrangement, which provides an 'expansion chamber' before the obstruction is reached. The tunnel consists of an open ended, three sided tray of ½" by ¾" framework (1" in the case of 40 watt systems) with a plywood or hardboard panel glued over. All joints of the cabinet should be glued and screwed to ensure airtightness, and the removable back panel firmly screwed to internal fillets. It is advisable to use foam plastic sealing strip between modules and tunnel top as an air seal.

Style and shape may be varied to suit individual tastes within the limitations of prescribed volume and tunnel dimensions. The compactness of Jordan-Watts enclosures simplifies the adaptation of existing furniture or the use of architectural cavities to house the modules.

DAMPING. Almost as much sound is radiated from the rear as from the front of the loudspeaker diaphragm and fibrous wadding is placed inside the enclosures to absorb or dampen unwanted sound energy, particularly standing waves set up between parallel reflecting surfaces. Suitable materials are fibreglass wadding (e.g. Cosywrap), bonded acetate fibre, cottonwool or teased wool, about 2" (50 mm) thick.

JUMBO and JANET. Loosely but completely fill these infinite baffle enclosures.
ALL OTHERS. Loosely fold the wadding to make two or three thicknesses, according to enclosure size, filling the region behind the driving unit as far as the open end of the reflex tunnel. This must not be obstructed.

In multiple systems the modules should be mounted vertically in line source arrangement to minimise the effects of room acoustics, increase forward projection efficiency, and produce the best polar response. The sound can be tailored to suit unusual room characteristics by the use of capacitors and inductors, where these do not adversely affect the amplifier performance. For most rooms the modules would be connected simply in parallel.

G.T., JODRELL and JUPITER. These loudspeakers have an auxiliary high frequency pressure unit connected in parallel to the amplifier through a blocking capacitor and variable resistance so that the high frequency component of the reproduced sound can readily be adjusted to suit room acoustics and personal preference. Because Jordan-Watts modules span the entire audible frequency spectrum this arrangement eliminates any crossover network roughness. The control knob at the rear should be recessed if the speakers are to fit against a wall.

JORDAN WATTS

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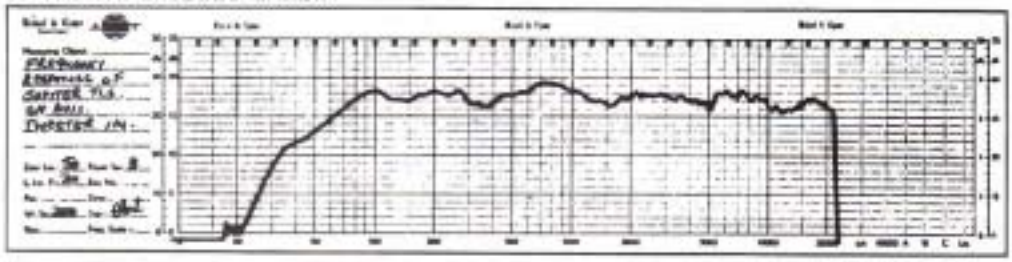
HIGH FREQUENCY UNIT. For the convenience of those making their enclosures we offer a complete H.F. Kit comprising a wide angle dome radiator 8 ohms pressure unit, metallised paper or film capacitor, 50 ohms wire wound variable resistance, and connector block.

GRILLE COVERING. Use a purpose made fabric for this purpose, having the lowest acoustic resistance coupled with maximum visual screening such as I.C.I. Vynair or Tygan. These can be sponge cleaned and can be tautened by warmth if sagging. High frequency performance will be seriously reduced if a thick absorbent fabric is used. Stretch the grille cloth over a foam plastic padded plywood panel of say ¼" (6 mm) plywood. The openings in this panel should be slightly larger than those of the enclosure and be tapered outwards. Matt black paint all whitewood surfaces that may show through. The grille panel can be invisibly attached by pre-fixed screws or patches of "Velcro".

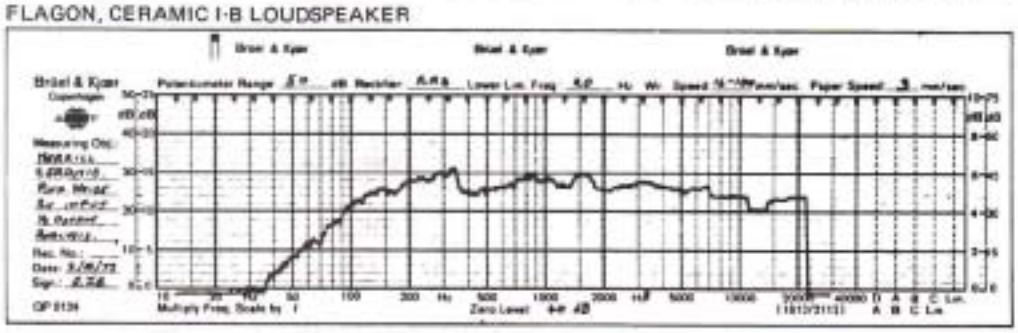
PHASING. The diaphragm movement of all the loudspeaker units throughout the system must be in phase, i.e. all must make synchronous piston movement. Loudspeaker leads and terminals are usually colour marked to identify like connections but if in doubt can be checked as follows: connect a 1½v. dry cell across the loudspeaker leads so that the coil and diaphragm move out from the magnet. The "red" terminal is that which is connected to the + or centre pole of the dry cell.

OTHER IDEAS. Why not make your loudspeaker enclosures form part of other furniture. For example, as a television table, record storage cabinet, or book-case. The loudspeaker enclosure should not be structurally connected to the turntable support as this may carry vibration to the pick-up. Enclosures for Jordan-Watts modules are so small that they can often be recessed on either side of a wide stone fireplace or wooden surround or can be let into architectural cavities requiring only the front baffle to hold the module and vent. Existing furniture could perhaps be adapted to house these small enclosures so that the room layout is not disturbed. JUMBO, JUNO and G.T. are shallow enough to enable them to be wall mounted.

JUPITER T.L.S. LOUDSPEAKER



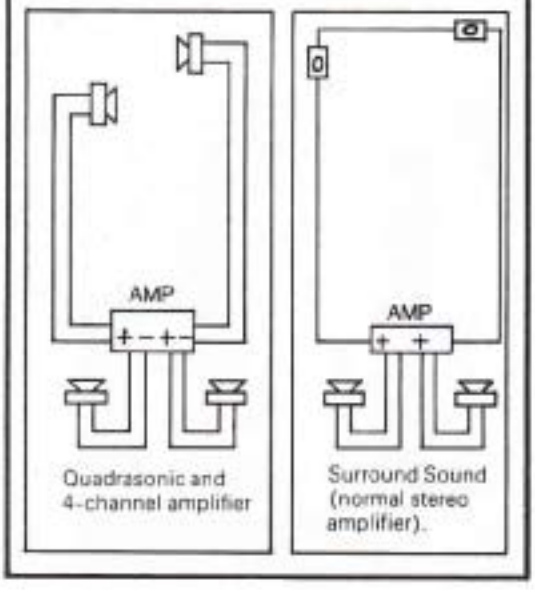
FLAGON, CERAMIC I-B LOUDSPEAKER



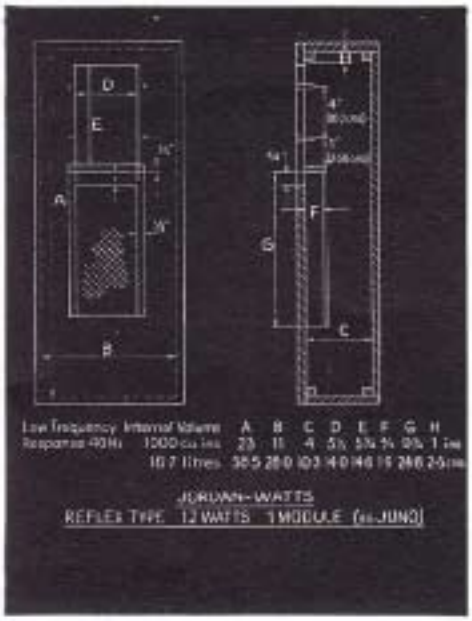
CONSTRUCTION DATA

		Low Frequency Limits	Nominal Internal cubic Volume	Inside Cabinet Dimensions (Inches & Metric) A	B	C	D	E	F	G	H
15-WATT SYSTEMS. 1 MODULE											
Enclosure Infinite Baffle	(Jumbo)	70Hz	360 6L	17 43.2	7 17.8	3 7.6	5½ 14	5½ 14			
	(Janet)	70Hz	380 6L	11 28	7 17.8	5 12.8	5½ 14	5½ 14			
Reflex Connections Direct	(Juno)	40Hz	1000 16.3L	23 58.5	11 28	4 10.3	5½ 14	5¾ 14.6	¾ 1.9	9¾ 24.8	1 2.6
	(G.T.)	30Hz	1470 24L	25½ 65	11½ 29	5 12.7	5½ 14	5¾ 14.6	¾ 1.9	11 28	5½ 14
	(Juliet)	40Hz	1000 16.3L	15 38	9 22	8 20	5½ 14	4½ 14	2" diam. x 6" 5 x 15.2		
30-WATT SYSTEMS. 2 MODULES											
Connections as Circuit	(Jodrell)	30Hz	2000 32.7L	28½ 72.5	12 30.2	6 15.1	5½ 14	11¾ 30	1 2.6	7¼ 18.3	5½ 14
	(Jupiter)	20Hz	4000 65.5L	33 83.6	13½ 34.3	9 22.8	5½ 14	11¾ 30	1 2.6	12¾ 32.4	5½ 2.6

LOUDSPEAKER INSTALLATION CONNECTIONS

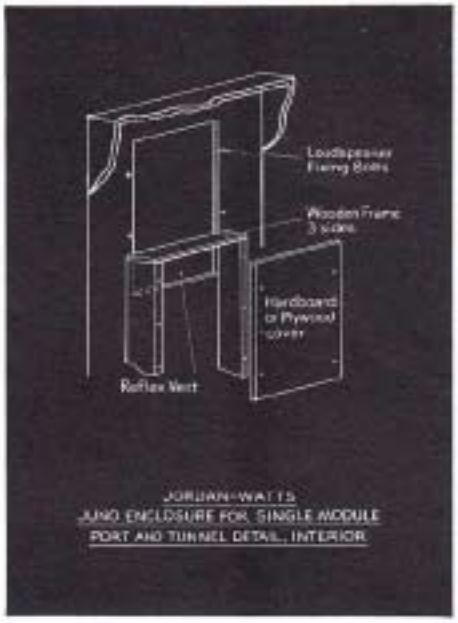


MAKING YOUR OWN ENCLOSURE

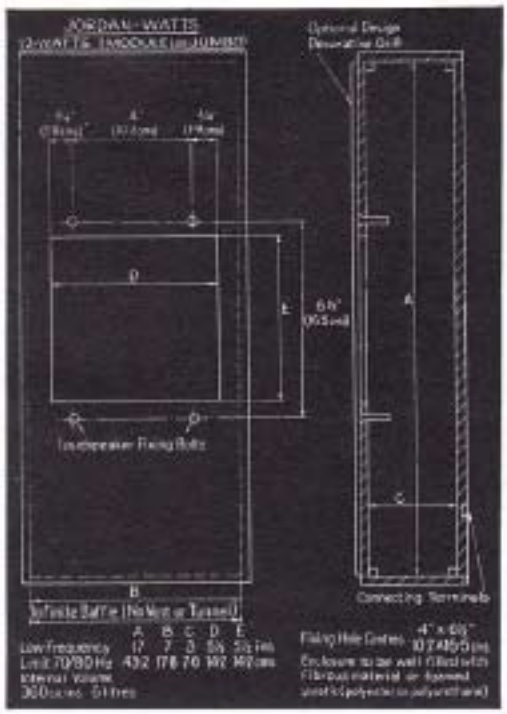


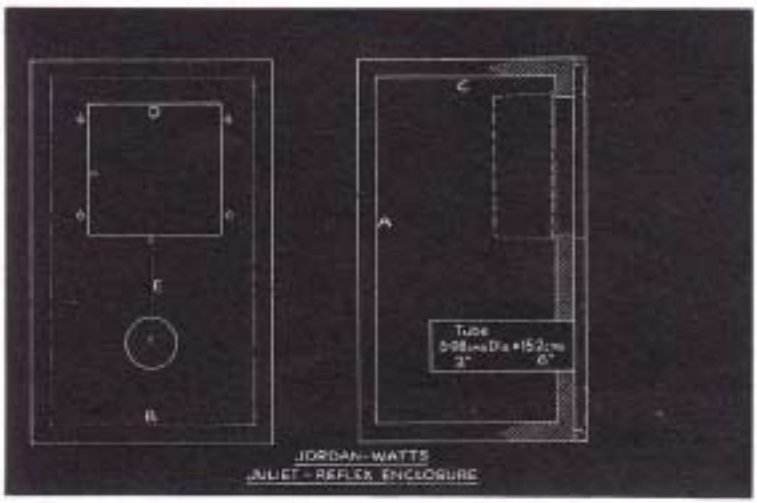
Low Frequency Response 40Hz	Internal Volume	A	B	C	D	E	F	G	H
	1000 cu ins	23	11	4	5½	5¾	¾	9½	1 ins
	16.7 litres	585	280	103	140	146	19	248	25 ins

JORDAN-WATTS
REFLEX TYPE 12 WATTS 1 MODULE (ex JUNO)



JORDAN-WATTS
JUNO ENCLOSURE FOR SINGLE MODULE
PORT AND TUNNEL DETAIL, INTERIOR





JORDAN-WATTS
JULIET - REFLEX ENCLOSURE