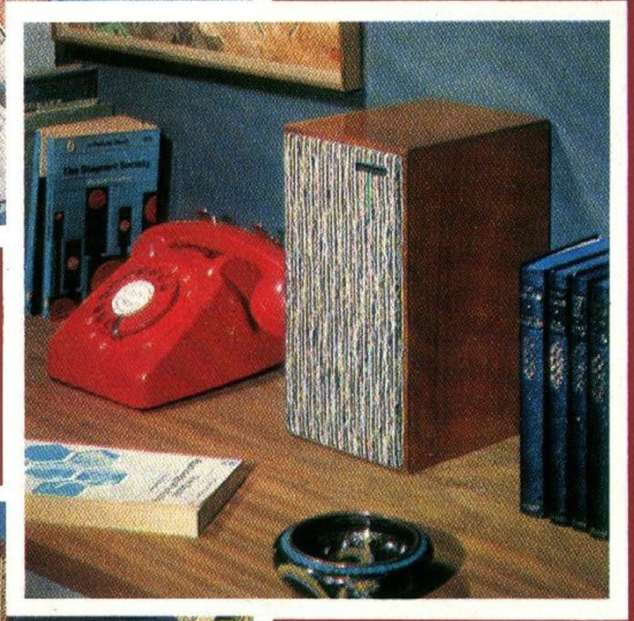
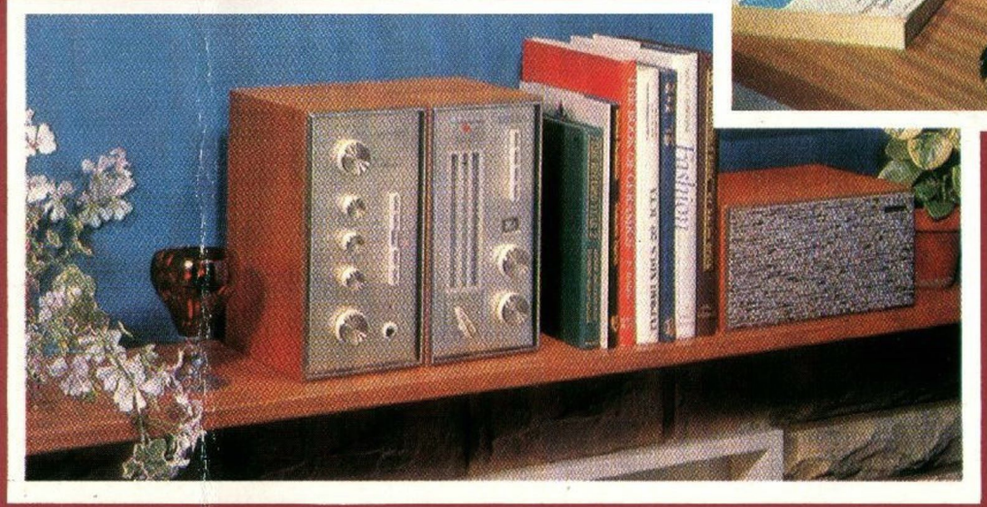
GOODMANS
HIGH FIDELITY

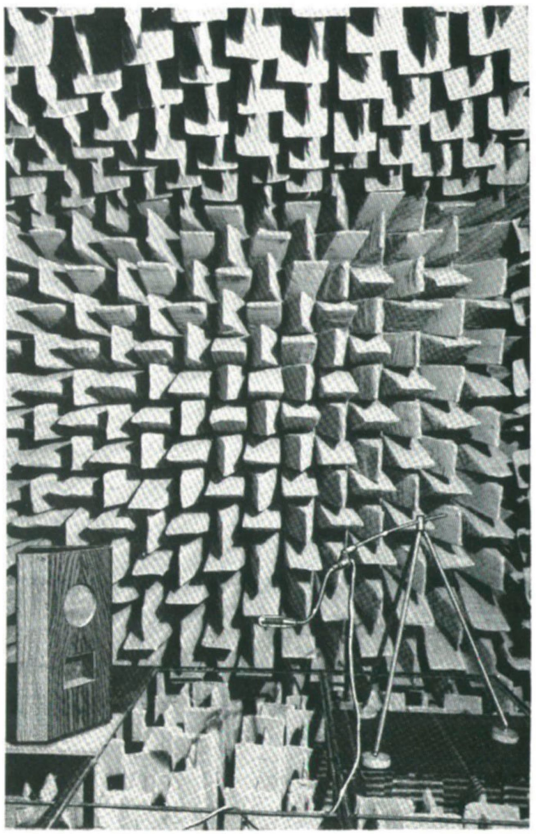
1967





GOODMANS LOUDSPEAKERS LTD

Goodmans Loudspeakers Ltd., of Wembley, England, are the largest manufacturers of High Fidelity loudspeakers in Europe. This lead has been gained by constant research and development, and by meticulous attention to detail and a very high standard in all phases of design and production. The extensive loudspeaker range has now been augmented by other components in the High Fidelity chain; notably the **MAXAMP 30**, the **FIRST** British all-silicon transistor stereophonic High Fidelity amplifier—the **STEREOMAX**, the matching **AM/FM** stereophonic tuner and the **MT.1000** Goodmans High Fidelity Record Player. Goodmans are proud of their Tradition of Excellence, both mechanical and acoustical.



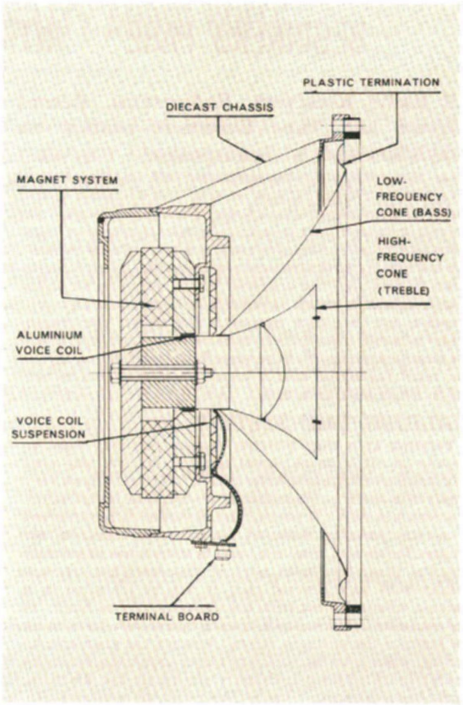
ANECHOIC TEST CHAMBER IN GOODMANS LABORATORIES

Pictured here is part of the anechoic chamber in the laboratory wing. The function of this room is to simulate free-space conditions. Absolute acoustic measurements can be made to such a degree of accuracy that results obtained can be used not only for research and development, but also as a basis for discussion with national and commercial laboratories throughout the world.

The room occupies 4,500 cubic feet, and all its internal surfaces (including the power-operated slide-away door) are lined with bonded glass-fibre 'wedges' 3 feet long. To minimise structurally borne vibrations within the room, the whole chamber, complete with its masonry, is resiliently suspended within the main building.

In these pages you will find the most complete and advanced range of High Fidelity Loudspeakers in the world. Goodmans AUDIO SUITE—comprising Amplifier, Tuner, Record Player and Loudspeakers from the Goodmans High Fidelity range—is the ultimate in Audio Systems, compact, adaptable, technically superb, and purpose-matched in both performance and styling. The AUDIO SUITE comprises the famous MAXAMP 30 (pages 6 and 7), the STEREOMAX (AM, FM Stereo Tuner, pages 8 and 9) and the MT. 1000 (Record Player, page 27). Choose the loudspeakers to complete the SUITE from the range shown in this Manual. The M-range of High Fidelity Loudspeakers Systems is particularly recommended. Be guided by the comments on each page, relating them to your own personal requirements. In case of difficulty do not hesitate to use Goodmans free advisory service—by telephone or letter—which is equipped to advise you in all matters relating to sound reproduction. A special guide for beginners in High Fidelity is on page 4, and an article on the "Mysteries" of Stereo, on page 26.

Next to each Loudspeaker you will find details of the recommended enclosure for that loudspeaker. These drawings are sufficiently detailed for any cabinet maker. On the Price List will be found a list of manufacturers who have submitted samples of their enclosures to Goodmans Acoustic Laboratory and who have received Goodmans' Laboratory Approval for the cabinets listed. Some of the firms listed will make these cabinets to your individual choice of colour and grille-cloth.



This is a cross-section of the most popular 12-in. twin-cone single unit High Fidelity loudspeaker in the world—the AXIOM 301. 12 in. diameter—20 watts power—15 ohms impedance. (For more details and recommended cabinet details see pages 18 and 19.)

CONTENTS

GOODMANS LOUDSPEAKERS LTD · AXIOM WORKS · LANCELOT ROAD · WEMBLEY · MIDDLESEX · ENGLAND

Telephone: 01-902 1200 · Cables: Goodaxiom · Wembley · England. And from Agents and Distributors in most Countries.

INTRODUCTION TO HIGH FIDELITY

All Radio Receivers, Radiograms, Record Players and Tape Recorders contain an Amplifier and a Loudspeaker. In many cases the quality of the amplifier and loudspeaker is governed by considerations of cost and available space, and although the resulting sound quality is adequate for general entertainment it cannot produce the sense of being actually "there"—at a live performance. To be "there" you need really faithful sound reproduction—High Fidelity—and this can only be achieved by the use of an amplifier and loudspeaker which have been designed—without compromise—for this very purpose. Naturally, the gramophone pick-up, microphone, tape or radio unit which feed the amplifier must be of the same high order of quality, as also must the signal source itself, whether it be a record, a tape, or an F.M. broadcast.

BUILDING THE SYSTEM

In building up a High Fidelity system you may want to use any or all of these signal sources, *but will only need ONE amplifier and loudspeaker system!* Figure 1 shows very simply the main components of a complete installation. The "control unit" is part of the amplifier (often referred to as the pre-amplifier); it contains the controls for volume, treble and bass, etc., and is sometimes physically separate from the main part of the amplifier—though usually sold together—so that it can be installed in a position where the controls are conveniently to hand. It also contains a selector switch so that you can—by turning the knob to the position shown, connect the gramophone pick-up, tape recorder, radio or other sound source to the amplifier. All the components shown in the diagram, except the loudspeaker, can be built into the same cabinet, or "built-in" to a room in any way that you wish (e.g. shelves, room dividers, etc.). The loudspeaker, however, needs its own specially designed enclosure if it is to perform properly. Details of suitable enclosures are given in this manual. The system in Figure 1 is a monophonic system; on page 26 you will find a description of this type of system, also an explanation of stereophonic systems, and their advantages.

HOW MUCH TO SPEND

Whatever installation you decide upon, you will have to choose a loudspeaker to do justice to the rest of the equipment. Your choice will be governed by three main considerations. **(1) The amount you are prepared to spend on the loudspeaker system. (2) The size of the room in which it is to be used. (3) The possibility of later development of the system.** A useful guide to the expenditure on the different parts of a High Fidelity system is to divide the total into three roughly equal parts—so that you spend about the same amount on the loudspeaker and its enclosure, as you spend on the amplifier with pre-amplifier, and about the same amount again on each signal source.

NOW FOR THE LOUDSPEAKER

The size of your room influences your choice of a loudspeaker. A small loudspeaker (e.g. Axiette 8 or Axiom 10, pages 14 and 17) would be large enough for most sitting rooms, and in addition the enclosure is compact. However, there is no bar to using a larger loudspeaker for even better sound (e.g. Axiom 201 or Axiom 301, page 18), except that the enclosure is rather larger.

There is often a fear in people's minds that a large loudspeaker will be "too loud". This is quite unfounded as the loudness is under your own control at all times. A large loudspeaker is *capable* of producing a larger volume of sound than a small one, so it may be worth considering if it is likely that your "Hi-Fi" might later be moved into a larger room. A 12-in. Axiom is ideal as the basis for a stage-built system (page 21.)

It is very important that a High Fidelity system is "quality balanced". All the components should be ultimately of the same degree of quality: our Technical Advisory Service will be pleased to help you. Incidentally, it is not usually advisable to replace the loudspeaker in a "mass production" radiogram with a High Fidelity loudspeaker, as any imperfections not ordinarily noticeable with a general purpose loudspeaker will be reproduced faithfully—and distressingly—by the High Fidelity loudspeaker.

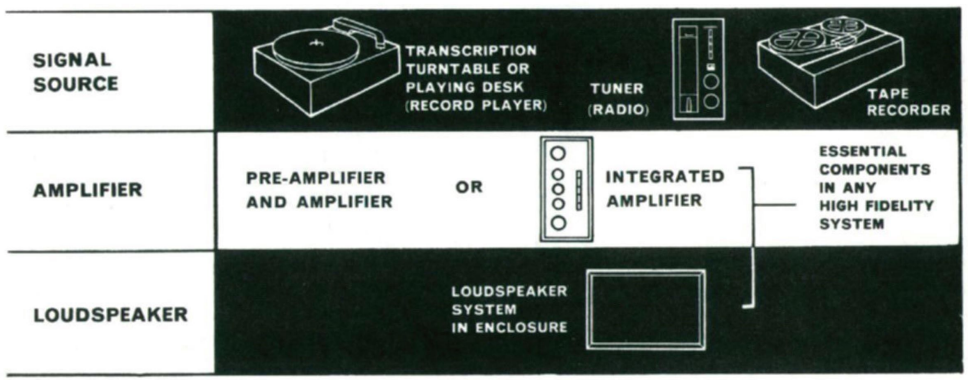


Figure 1

GOODMAN'S HIGH FIDELITY AUDIO SUITE

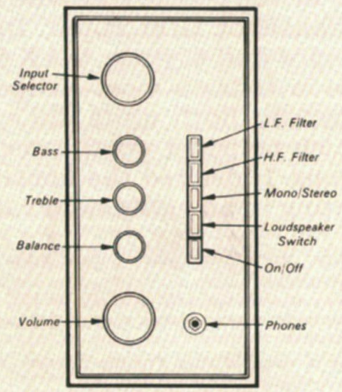
audiosuite

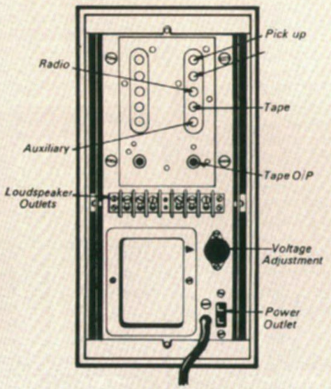
For more than 35 years Goodmans have led the field in High Fidelity Loudspeaker design. In 1966 another major step was achieved by the release of the MAXAMP 30—the FIRST British High Fidelity all-silicon transistor stereophonic Amplifier, and in 1967—the STEREOMAX—Goodmans AM/FM Stereophonic all-transistor HiFi Tuner. Designed to complement each other in performance and styling, MAXAMP 30 and STEREOMAX are fitting partners in today's most compact and sophisticated High Fidelity Audio System. Both units are supplied complete in either Teak or Walnut finish polished wood housings instantly ready for book-shelf installations. If desired the housings are easily removable for flush-panel mounting in an equipment cabinet.

Also in 1967 came the release of the Goodmans High Fidelity record-player MT. 1000 complete with professional pick-up arm and high-trackability cartridge, the whole handsomely housed in Teak or Walnut-finish wood cabinet with up-to-the-minute see-through panel, styled to complement the MAXAMP 30 and STEREOMAX.

These three handsome, custom-made, precision instruments—plus, of course, the Loudspeakers—make up GOODMANS AUDIO SUITE—compact, adaptable, easy to install, elegant and performance-matched.

The M-range of High Fidelity Loudspeaker systems is recommended for use with it.





audiosuite

MAXAMP 30

SPECIFICATION

Power Output:
30 Watts r.m.s. maximum (15 Watts per channel) into an 8 ohm load. 20 Watts r.m.s. maximum (10 Watts per channel) into a 4 or 15 ohm load.

Total Harmonic Distortion:
Less than 0·3% for 15 Watts per channel into an 8 ohm load at 1,000 Hz

Frequency Response:
20 Hz to 20 kHz ± ½ db.

Inputs:
Pickup: Mono or stereo: R.I.A.A. characteristic.
Sensitivity (a) 3·5 mV, input impedance 47 k ohms.
(b) 50 mV, input impedance 100 k ohms.
Radio Tuner: Mono or stereo: flat characteristic.
Sensitivity 100 mV, input impedance 100 k ohms.
Tape: Mono or stereo: flat characteristic.
Sensitivity 150 mV, input impedance 100 k ohms.
Auxiliary: Mono or stereo: for low output microphones, tape heads, etc. flat characteristic.
Sensitivity 3 mV, input impedance 50 k ohms.

Outputs:
Loudspeaker 4-8-15 ohms.
Tape high level signal for tape recording.

Hum & Noise:
With reference to 15 Watts, volume control at maximum, all inputs-55 db overall. Main section of amplifier only – 80 db with input shorted.

Crosstalk:
With input selector in any position, with unused channel input open circuit, better than -40 db with reference to 10 Watts into 8 ohms on the active channel.

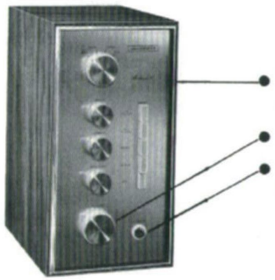
Supply:
Adjustable for 105-120-200-220-240 volts AC 40 - 60 Hz

CONTROLS AND FACILITIES

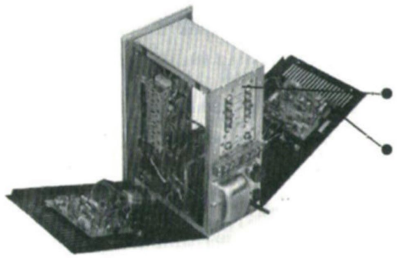
Input Selector: A clearly marked rotary input selector provides choice of pick-up, radio, tape, or auxiliary, as detailed in the Performance Specification.
Volume Control: A ganged control gives simultaneous control of both channels.
Balance Control: A ganged control provides accurate balance facility. At extremes of rotation each channel is silenced.
Bass Control: A ganged control enabling boost or cut up to 12db at 50 Hz.
Treble Control: A ganged control enabling boost or cut up to 12db at 10 kHz.
L. F. Filter: A push-button control inserting a high-pass filter giving a cut of 10db at 20 Hz, ultimate rate 12db/octave, for the rejection of turntable rumble signal.
H. F. Filter: A push-button control inserting a low-pass filter with an 8 k Hz turnover, giving a cut of 16db at 20 k Hz ultimate rate 12db/octave, for use with old recordings, limited range signals, interference rejection etc.
Mono/Stereo Control: A push-button control combining both output channels for monophonic signals.
On/Off: A push-button control, with associated pilot light.
Phones Socket: On front panel, for connection of stereophonic headphones.
Loudspeaker Switch: A push-button control for muting the loudspeakers during headphone listening.
Power Outlet: A power outlet is provided on the rear panel for feeding turntable, tuner, etc. Controlled by main On/Off switch. Lead and plug supplied.
Fuses: A fuse is fitted in the A.C. power circuit for overall protection, and additional fuses are fitted in each output circuit to protect the output transistors.

HIGH FIDELITY TRANSISTORISED STEREO AMPLIFIER

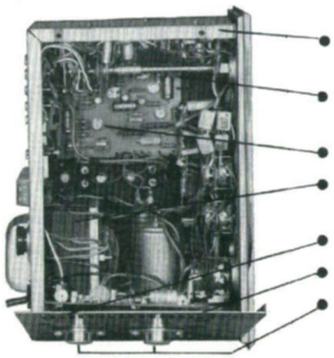
audiosuite



- Polished wood case—only 10½" × 5½" × 7¼"—easily removable.
- Comprehensive controls, easily operated.
- Panel and controls styled in scratch grain finish, Danish Silver colour.



- Clearly identified external connections, with easy access.
- Printed circuit panels for consistency and compactness.



- Girdered steel chassis frame maintains precise location of components and sub-assemblies.
- Printed circuit panels for consistency and compactness.
- Output and mains circuits fully fuse protected.
- Self-contained solid-state power pack with magnetic screening.
- Generous heat-sink and ventilation provision.
- Hinged panels provide easy access to all parts.
- Silicon Transistors throughout, for excellent stability and wide-band performance.

HIGH FIDELITY TRANSISTORISED STEREO TUNER

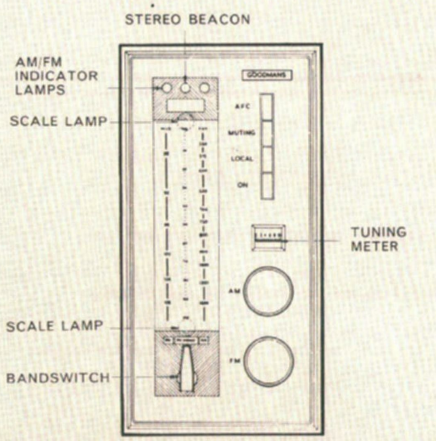
audiosuite

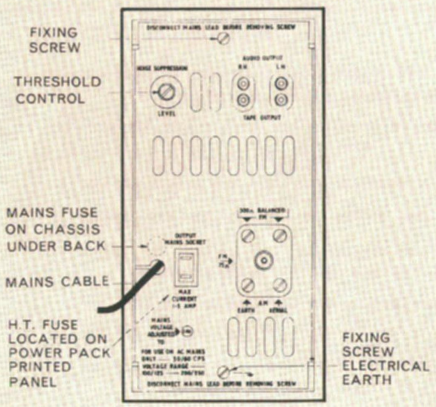
STEREOMAX is a STEREOPHONIC solid-state transistorised High Fidelity TUNER using silicon transistors throughout, and receiving both AM and FM programmes with incomparable reliability, stability and accuracy. **Size only** 10½" × 5½" × 7¼" deep (same as MAXAMP 30).

Performance—designed and built to the same exceptionally high standards as the MAXAMP 30. Sophistication of specification combined with absolute reliability and stability—yet simple to operate. **Complete**—AM/FM—and (optional) built-in stereo facilities.

Styling—in the same elegant idiom as the MAXAMP 30 housed in polished wood cabinet (teak or walnut finish to order) easily removable if required for flush panel mounting. Control panel in matching Danish Silver finish.

STEREOMAX A.M. F.M.—STEREO





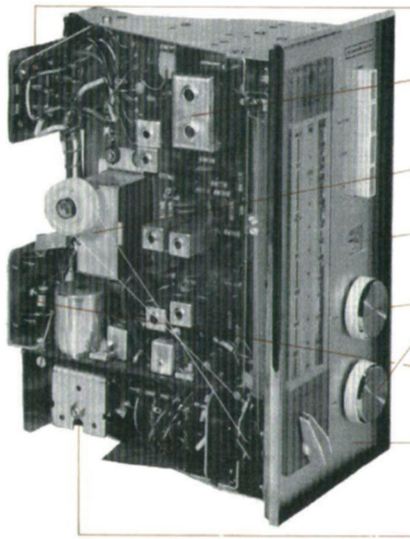
SPECIFICATION

Tuning Range:
F.M. 87·5–108 MHz **A.M.** 1650–545 kHz (186–550 metres)
Audio Response: F.M. without decoder ±1 db 20–20,000 Hz with decoder −3 db at 15,000 Hz with standard de-emphasis applied (50 μsecs European, 75 μsecs American). A.M. 20–3,500 Hz +0–3 db's, 9,000 Hz rejection 30 db's.
Distortion: Overall harmonic distortion. F.M. <0·6% at 100% modulation. A.M. <1·5% at 1 mV input measured at 30% modulation 400 Hz. Hum −80 db's.
Audio Output: 250 μV for 30% modulation into 100 k ohms.
Sensitivity F.M. 2 μV for 30 db's quieting (IHFM) 100 μV for 65 db's s/n. A.M. 20 μV for 20 db's s/n average through tuning range.
Intermediate Frequency Amplifier: F.M. 10·7 MHz Bandwidth 300 kHz at −6 db's.
Discriminator 600 kHz peak to peak A.M. rejection −40 db's.
A.M. 470 kHz Bandwidth 3 kHz at −3 db's.
Interference Rejection: F.M.–I.F. (10·7 kHz) −60 db's.
Image >7–10 db's.
Capture ratio 3·5 db's (IHFM) A.M. −50 db's.
A.M.–I.F. (470 kHz) −50 db's. 2nd Channel >7–40 db's.
Automatic Frequency Control: F.M. only ±100 kHz pull-in range.
Stereo Decoder: Channel separation (crosstalk) at 1,000 Hz: 38 db's.
Residual 19 kHz pilot and harmonics: 50 db's below output at 100% modulation.
Supply: Adjustable for 105–120–200–220–240 volts A.C., 40–60 Hz.

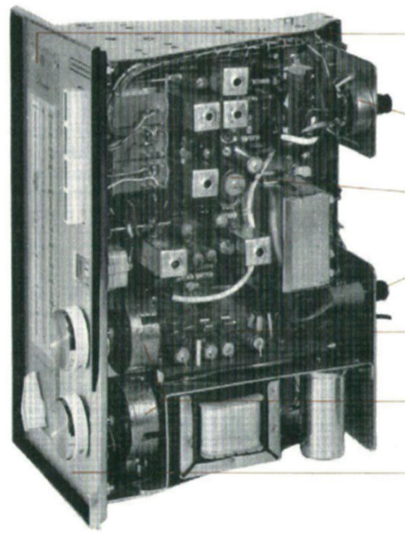
CONTROLS AND FACILITIES

Bandswitch: Selects F.M. Stereo, F.M. Mono (for use when reception conditions are not suitable for stereo transmissions) and A.M. Broadcast Bands.
F.M. Tuning, A.M. Tuning: Separate tuning controls for A.M. and F.M. permit switching bands without disturbing the selected stations.
A.F.C. Push Button: Locks and holds F.M. signal on tune so that reception is always free from distortion due to mis-tuning.
Muting Push Button: Removes the annoying inter-station noise when tuning. The level of background on quiet tuning is adjusted at the threshold control on the back of the receiver.
Tuning Indicator: Shows strength of received signals for precision tuning of selected station.
Local Push Button: To avoid overloading when in close proximity to a local or powerful station.
On/Off: Push Button Control.
Indicator Lamps: Show which band is selected and when a stereo signal is being received.
Aerial Connections: Provision is made on the rear for the connection of separate aerials for A.M. and F.M. (F.M. 300 ohms balanced or 70 ohms unbalanced).
Audio Outlets: Sockets are provided for connections to the amplifier and an *extra* pair are provided to feed a secondary piece of equipment—tape recorder, etc.—direct.
Power Outlet: A power outlet is provided on the rear panel for feeding a turntable, tape-deck, etc., head and plug supplied.
Fuses: Fuses are fitted in the A.C. Power circuit for overall protection, and the stabilised supply unit.

HIGH FIDELITY TRANSISTORISED STEREO TUNER



- Audio outlet socket panel.
- F.M. discriminator on intermediate amplifier printed circuit.
- F.M. Tuning unit in silver plated screened case.
- Tuning meter.
- Separate tuning controls for A.M. and F.M.
- Aerial input connectors.
- Panel and controls in scratch grain finish. Danish silver colour.
- A.M. Tuning unit.

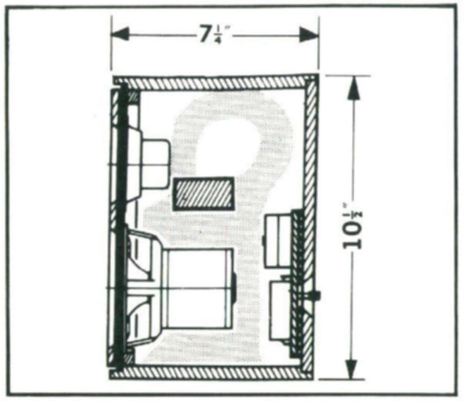


- Stereo beacon lights-up when stereo transmission is being received.
- Quiet tuning level control.
- Stereo decoder unit.
- Mains fuse.
- Power unit with stabilised supply voltage.
- Flywheels for ultra-smooth tuning control.
- Polished chrome diecast front panel for high mechanical stability.

Can be used upright or horizontally

Selected by Council of Industrial Design for the Design Centre, London

The sturdy little enclosure is meticulously finished and polished on all sides so it can be used upright or horizontally equally well; — and no troubles in finding room for the Maxim — just move a couple of books!



m·RANGE

MAXIM

This tiny Loudspeaker system is the smallest true High Fidelity reproducer in the world, and represents a major break-through in the battle of Space versus High Fidelity! The Maxim gives full-sized real High Fidelity reproduction BUT in an enclosure so small that even two (for stereo) can be "lost" among books on a shelf or mantelpiece. It has been described as "shoebox size"; the largest dimension is less than a foot — actual size 10½" x 5½" x 7¼" deep. Power handling –12 watts with an easy competence — ample for any domestic listening.

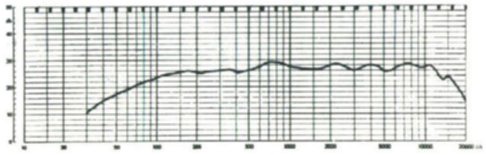
Most important of all—it gives *true* High Fidelity reproduction—over a frequency range of 45—20,000 Hz. The handsome little enclosure is meticulously finished in triple-coat, hand-rubbed teak or walnut —to order.

The development of this amazing reproducer has involved the most exhaustive investigations into diaphragm behaviour and electro-magnetic characteristics. The result is two tiny precision direct radiator drive units, with the most unusual capabilities. Quite apart from their ability to handle more than enough power for domestic listening, they cover the frequency range with less deviation from level response than almost any other High Fidelity Loudspeaker. These "mighty midget" drivers were developed exclusively for use in this very tiny enclosure, so that in this sized housing they are giving optimum results. If they were housed in a larger enclosure, performance would suffer.

It has taken a long time for Goodmans' experienced designers to achieve results like this, so give the Maxim the signal it deserves! Treat the Maxim as you would any top quality High Fidelity Loudspeaker; use a High Fidelity Amplifier *and* Radio Tuner/Transcription Turntable/Tape Recorder. Do not take liberties with the Maxim because of its size If you feed distortion to it, it will reproduce the distortion.

Specification

Dimensions	10½" x 5½" x 7¼" deep (26.7 x 14 x 18.4cm)
Frequency Range	45 – 20,000 Hz.
Power Handling	12 watts.
Impedance	15 – 16 ohms
Finish	Teak or Walnut to order.



L. S. TYPE: Maxim System **INPUT:** Constant Voltage.
MICROPHONE: B & K 4133. **FURTHER DATA:** Free standing. Anechoic conditions.

m·RANGE

MEZZO II

MEZZO II is the latest addition to the 'M' range of High Fidelity reproducers and meets the demand for a Goodmans bookshelf enclosure. Only 9" deep it will fit into any bookcase and the styling is restrained yet distinctive–following the trend of the enormously successful studio class MAGNUM-K. A new feature is the attenuator control flush-fitted in the back panel. This is for mid and high frequency control enabling MEZZO II to be 'tailored' to individual taste *and* room.

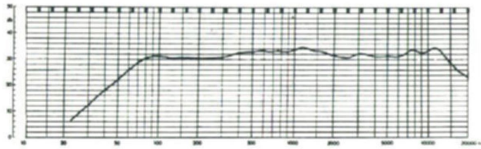
MEZZO II embodies a wealth of design experience and is craftsman-built to the highest engineering standards. It handles 15 watts (30 watts U.S.A.) of power yet measures only 12" x 19½" x 9" deep. The frequency range is a clear and clean 40-20,000 Hz with a control and smoothness provided by two new specially developed and patented loudspeakers–a robust 12" long-throw bass unit and a sealed-back 4" mid-and treble unit. The L.C. crossover network operates at 2000 Hz. The 12" bass unit is of very advanced design and construction. The mid-and treble unit completes the quality picture and is controlled by a flush-mounted attenuator in the back panel. The result is a carefully controlled performance unrivalled in a reproducer of this size, whilst retaining the highest efficiency.

The impedance of 8 ohms is particularly advantageous when used with todays quality transistorised amplifiers.

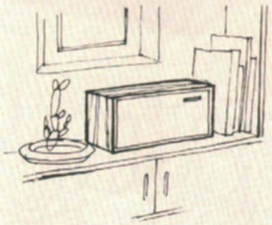
Listening tests and acoustic measurements show that even at 'larger than life' sound levels the distortion level is extremely low. MEZZO II is designed to avoid listening fatigue–it is in truth–the Loudspeaker to Live With.

Specification

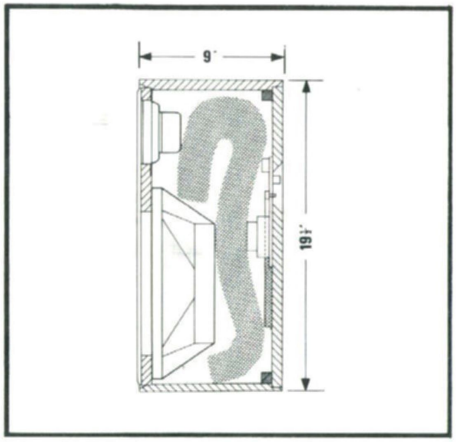
Dimensions	12" × 19½" × 9" deep. (30.5 cm × 48.3 cm × 22.9 cm)
Frequency range	40—20,000 Hz
Power handling	15 watts r.m.s. (30 watts U.S.A.)
Impedance	8 ohms
Crossover	2000 Hz
Attenuator	Controlling high frequencies flush fitted into back panel
Finish	Teak or Walnut to order

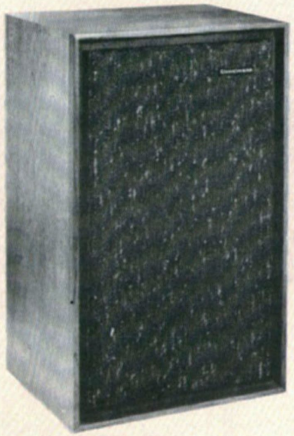


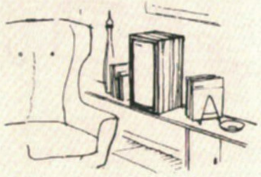
L. S. TYPE: Mezzo System **INPUT:** Constant Voltage.
MICROPHONE: B & K 4133. **FURTHER DATA:** Free standing. Anechoic conditions.



Can be used upright or horizontally

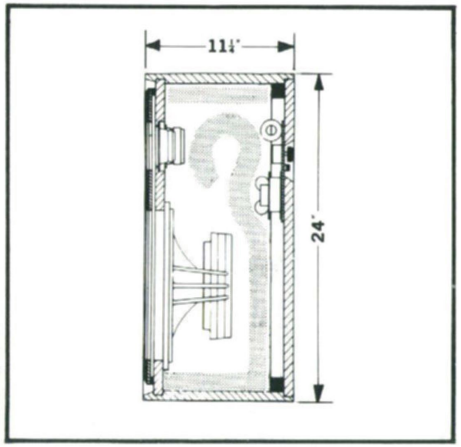






Can be used upright or horizontally

Selected by Council of Industrial Design for the Design Centre, London



m·RANGE

MAGNUM-K

The Magnum-K is the most exciting result of Goodmans many years experience in low distortion wide-range loudspeaker systems. Designed to a very high standard for monitoring studios, the Magnum-K brings these same standards to the audio enthusiast at home.

It is a 3-way system, and although reasonably compact (15" x 24" x 11¼"), no performance compromises have been accepted. Every detail that could contribute to really accurate sound reproduction has been included.

Magnum-K is exceptionally versatile—*both middle and high frequency units are adjustable* by means of mounted attenuators—and it is able to handle up to 25 watts of power—though due to its high efficiency, amplifiers from 6–12 watts are quite adequate for use in the home.

The Bass reproducer is a new 12" unit with a unique moving assembly. Air cushion suspension is employed (first used by Goodmans in the 1930's) in the same manner as in the fabulously successful Maxim Mini System. The result is minimal distortion right down to 20 Hz. The bass unit is built into a new and very strong chassis of open construction.

The mid-range unit is a newly developed direct radiator with precisely controlled characteristics, built into a closed die-cast chassis.

The high-frequency unit is a precision built back-loaded direct radiator with outstanding smoothness of performance.

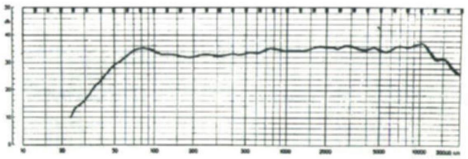
A multiple section cross-over network operates at 1,500 Hz and 6,000 Hz.

Variable controls of the constant impedance type are fitted to permit independent control of mid-range and high frequency units to suit individual taste and the acoustical characteristics of the room in which the system is used.

The handsomely dignified enclosure finely finished in Teak (or Walnut) is very solidly built, and has rigorous internal treatments to damp out any panel resonances, and provide an air-tight enclosure.

Specification

Dimensions	15" x 24" x 11¼" deep (38 cm x 61 cm x 28.5 cm)
Frequency Range	30-20,000 Hz
Maximum Power Capacity	25 watts
Impedance	4-8 ohms
Finish	Teak (or Walnut to order)



L. S. TYPE: Magnum-K System **INPUT**: Constant Voltage.
MICROPHONE: B & K 4133. **FURTHER DATA**: Free standing. Anechoic conditions.

ELEGANZIA II

Since its introduction the Eleganzia II has proved to be the most sought-after slim-style High Fidelity loudspeaker system. The smoothness of its performance, combined with its fantastically shallow dimension ONLY 6¼" deep (front to back) make the Eleganzia II an ideal loudspeaker system for even the smallest living room (or even two for Stereo). The generous power handling capacity caters equally well for large rooms or even public recitals in smaller halls where High Fidelity is demanded.

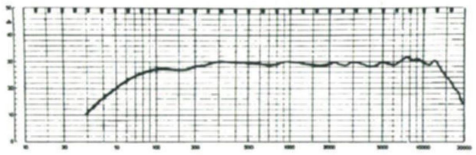
Dignified simplicity in styling is combined with an ease and accuracy of reproduction that is at once stimulating, without over-emphasis, and deeply satisfying.

Inside this intriguing enclosure are two loudspeakers, each the result of many months' careful development directed towards the production of bass and treble units specifically for operation in a very shallow enclosure. The 12" bass unit is unique in being the first loudspeaker in this country to employ Goodmans SUPRFOAM diaphragm **(see * below)**. This is a composite diaphragm employing a lightweight impermeable cellular plastic which fulfils two functions; it provides the felted fibre piston with elements of mechanical resistance, with hardly any additional mass, producing the best diaphragm behaviour control yet devised. In addition, it forms the diaphragm edge suspension and allows very large linear excursion with perfect diaphragm termination. *(It should be noted that the Suprfoam diaphragm is in no way similar to the commonly used expanded polystyrene diaphragm.)* An extra long voice coil to maintain constant drive conditions at high amplitude and a deep roll centre suspension complete the moving assembly, which is mounted in a super-slim diecast chassis that has been designed and produced specially for this reproducer. Finally the chassis contains a powerful Feroba II magnet system, operating at a maximum efficiency. At 900 Hz an L.C. crossover network transfers the electrical drive to an entirely new back loaded mid-range and high frequency unit, whose plastic suspended and terminated diaphragm is housed in a die-cast frame specifically produced for this system. The terminal board is flush mounted so that the Eleganzia II can be placed flat against the wall if desired.

Both loudspeakers are sealed in the enclosure so that the bass diaphragm operates on an "air cushion" which forms a large part of the total suspension stiffness, another factor in the remarkably low distortion characteristics of this reproducer.

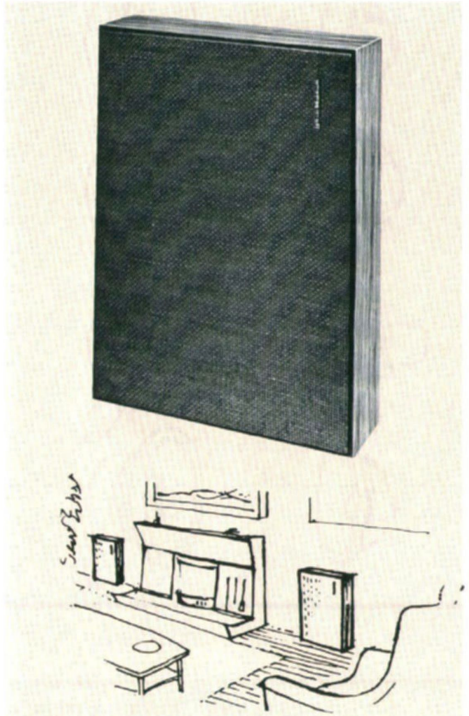
Specification

Dimensions	27" high x 20" wide x 6¼" deep (68.9 x 50.8 x 15.9 cm)
Frequency range	35-15,000 Hz
Maximum power handling capacity	15 watts
Impedance	15-16 ohms
Finishes available to order	Teak or Walnut

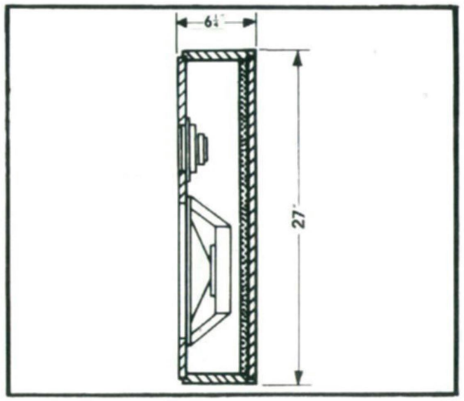


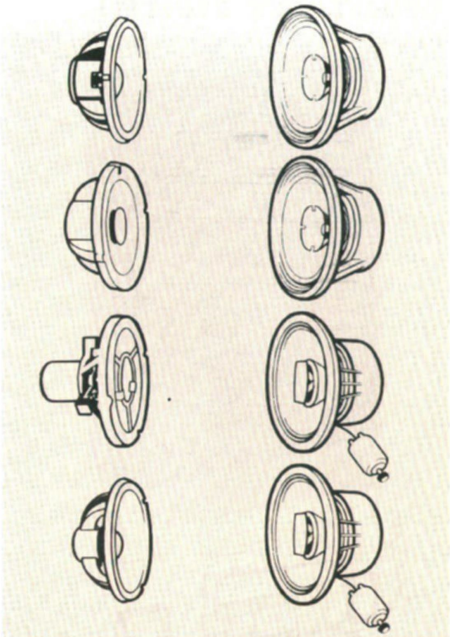
L. S. TYPE: Eleganzia II System **INPUT**: Constant Voltage.
MICROPHONE: B & K 4133. **FURTHER DATA**: Free standing. Anechoic conditions.

* British Patent No. 965597



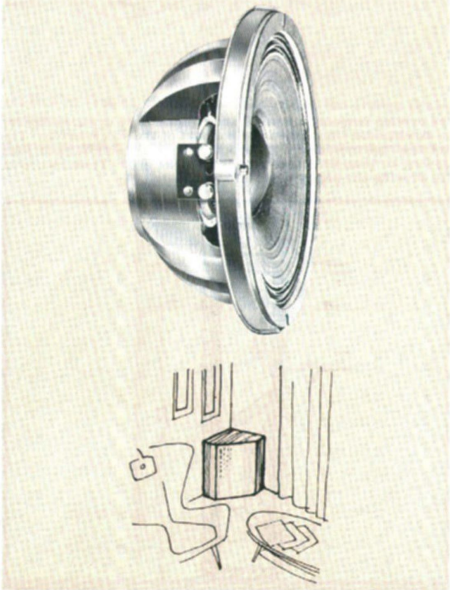
The overall response curve of the Eleganzia II is shown below. Its exceptional smoothness tells a part of the success story. The fact that harmonic and intermodulation distortion have been reduced to inaudible levels tells another part. Your own ears will provide the happy conclusion.





FULL RANGE SINGLE UNIT HIGH FIDELITY LOUDSPEAKERS

The eight loudspeakers under this heading are all designed to cover the full audible frequency range on their own. Mounted in an enclosure of correct design each is a complete High Fidelity Loudspeaker system. Other units can of course be added to them as required later (e.g. Trebax, or Trebax 5K/20XL and Midax, see page 20).



AXIETTE 8 8 inch - 6 watt - 15 ohms

The Axiette 8 is the smallest real High Fidelity loudspeaker unit made, and features a high efficiency permanent magnet system using Feroba II anisotropic ceramic magnet material, enabling a particularly shallow depth magnet assembly to be used. The unique plastic terminated hyperbolic diaphragm, aluminium drive coil and magnet system are housed in a precision diecast chassis of strong and slender design. Enclosure volume requirement—only 3,000 cubic inches. This is an ideal speaker for compact high fidelity installations—whether monophonic or stereophonic. (Use 2 Axiette 8's [each in its own cabinet] for stereo).

Specification

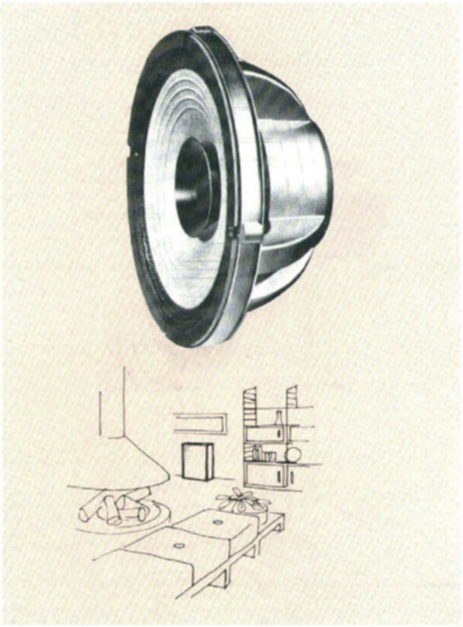
Frequency range	40-15,000 Hz
Maximum power handling capacity	6 watts (12 watts U.S.A.)
Fundamental resonance	65 Hz
Flux density	13,500 gauss
Total flux	53,000 maxwells
Voice coil	1" (2.54 cm) diameter-aluminium
Impedance	15-16 ohms
Chassis	Diecast
Overall diameter	$8\frac{9}{32}$" (21 cm)
Overall depth	$3\frac{5}{8}$" (9.2 cm)
Reflex enclosure volume (internal)	3,000 cu. ins
Baffle hole diameter	7" (17.8 cm)
Fixing holes	4 holes $\frac{9}{32}$" (0.7 cm) diameter equally spaced on a circle of $7\frac{5}{8}$" (19.4 cm) diameter.
Nett weight	4 lbs (1.81 kg)

TWINAXIETTE 8 8 inch - 6 watt - 15 ohms

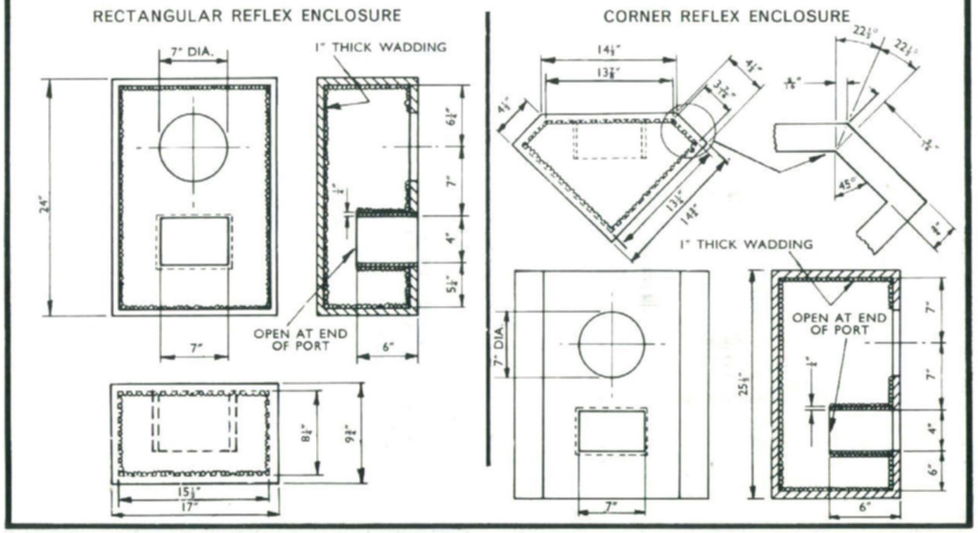
The TwinAxiette 8 is a twin-diaphragm version of the Axiette 8—the smallest High Fidelity loudspeaker unit made. It has all the advantages of the Axiette 8 coupled with the extended frequency range provided by the high stability inner cone. The unique bass cone is plastic terminated and hyperbolic, and the voice coil aluminium; the housing is a heavy non-resonant precision diecast chassis. Enclosure volume needed is only 3,000 cu. ins. making it an ideal reproducer for compact high fidelity systems whether monophonic or stereophonic.

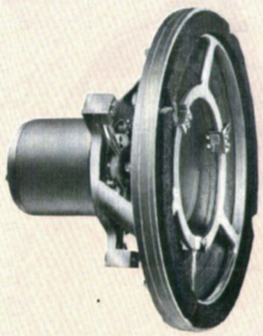
Specification

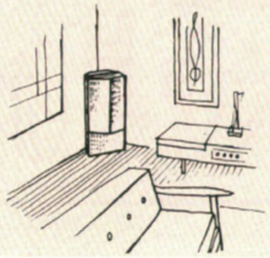
Frequency range	40-18,000 Hz
Maximum power handling capacity	6 watts (12 watts U.S.A.)
Fundamental resonance	65 Hz
Flux density	13,500 gauss
Total flux	53,000 maxwells
Voice coil	1" (2.54 cm) diameter-aluminium
Impedance	15-16 ohms
Crossover: Mechanical at	2,000 Hz
Chassis	Diecast
Overall diameter	$8\frac{9}{32}$" (21 cm)
Overall depth	$3\frac{5}{8}$" (9.2 cm)
Reflex enclosure volume (internal)	3,000 cu. ins
Baffle hole diameter	7" (17.8 cm)
Fixing holes	4 holes $\frac{9}{32}$" (0.7 cm) dia. equally spaced on a circle of $7\frac{5}{8}$" (19.4 cm) diameter
Nett weight	4 lbs (1.81 kg)



RECOMMENDED ENCLOSURES FOR AXIETTE 8 AND TWINAXIETTE 8







AXIOM 80 9½ inch - 6 watt - 15 ohms

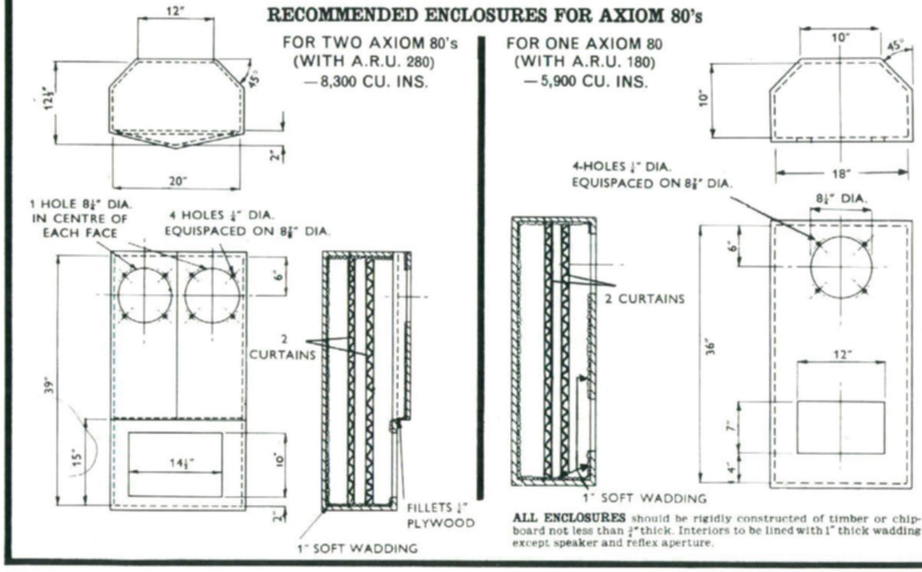
A twin-cone transducer capable of the highest accuracy of sound reproduction at medium power levels. The moving assembly is 'free-edged', suspended on two sets of double-acting cantilevers which provide extremely low and linear axial stiffness combined with strong radial centering action.

The Axiom 80 employs a cast chassis and suspension frame, and a highly efficient ring magnet system. Hand built throughout. Note that 2 or 4 Axiom 80 units may be used for higher power applications. Enclosure designs for 1 and 2 units are shown below. Designs for 4 units available upon request.

Specification

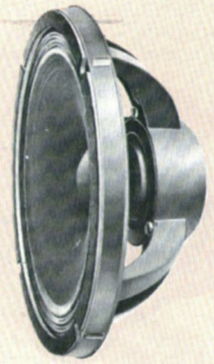
Frequency range	20-20,000 Hz
Maximum power handling capacity	6 watts (12 watts U.S.A.)
Fundamental resonance	20 Hz
Flux density	17,000 gauss
Total flux	62,000 maxwells
Voice coil	1" (2.54 cm) diameter
Impedance	15 ohms
Chassis	Diecast
Overall diameter	9½" (24.1 cm)
Overall depth	6⅜" (16.2 cm)
ARU enclosure	see below
Baffle hole diameter	8¼" (20.9 cm)
Fixing holes	4 holes ¼" (0.6 cm) diameter equispaced on a circle of 8⅞" (22.5 cm) diameter
Nett weight	9 lbs 6 ozs (4.2 kg)

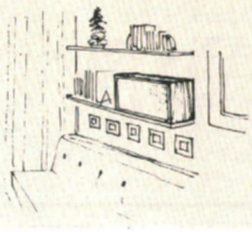
RECOMMENDED ENCLOSURES FOR AXIOM 80's



ALL ENCLOSURES should be rigidly constructed of timber or chipboard not less than ¾" thick. Interiors to be lined with 1" thick wadding except speaker and reflex aperture.

FULL RANGE SINGLE UNIT HIGH FIDELITY LOUDSPEAKERS





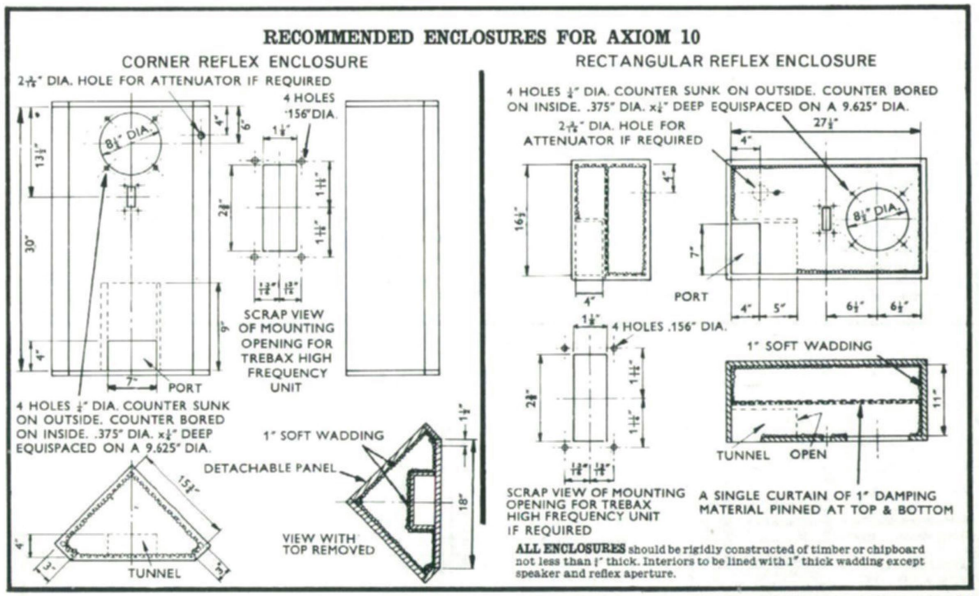
AXIOM 10 10 inch - 10 watt - 15 ohms

The Axiom 10 is the choice of the man who can afford—and has the room for—a larger speaker than the Axiette 8, but does not need, or has not space for one of the larger and more powerful 12" systems. Axiom 10 possesses a highly efficient magnet system in Feroba II anisotropic ceramic magnet material, plastic terminated diaphragm with hyperbolic form and aluminium voice coil. The chassis is a diecast precision-built housing combining strength with elegance. The power handling is 10 watts, and the enclosure volume required is only 5,000 cubic inches; with these advantages this loudspeaker is a very satisfactory and economical unit for all medium sized domestic High Fidelity assemblies.

Specification

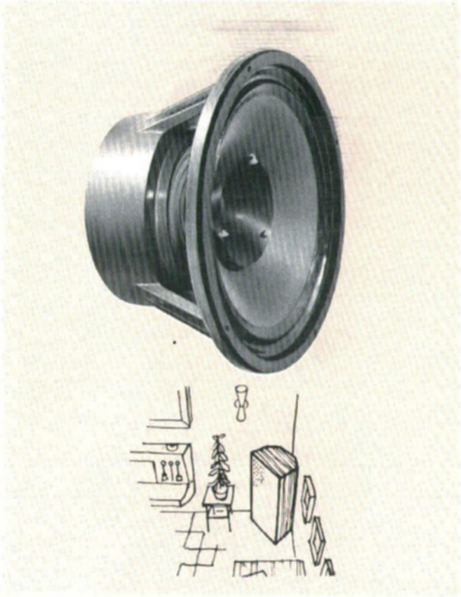
Frequency range	40-15,000 Hz
Maximum power handling capacity	10 watts (20 watts U.S.A.)
Fundamental resonance	45 Hz
Flux density	13,500 gauss
Total flux	53,000 maxwells
Voice coil	1" (2.54cm) diameter-aluminium
Impedance	15-16 ohms
Chassis	Diecast
Overall diameter	10 13/32" (26.6cm)
Overall depth	4 7/16" (10.9cm)
Reflex enclosure volume (internal)	5,000 cu. ins
Baffle hole diameter	8½" (21.6cm)
Fixing holes	4 holes ¼" (0.6cm) diameter equally spaced on a circle of 9⅜" (24.4cm) diameter
Nett weight	4 lbs 12 ozs (2.16 kg)

RECOMMENDED ENCLOSURES FOR AXIOM 10



ALL ENCLOSURES should be rigidly constructed of timber or chipboard not less than ¾" thick. Interiors to be lined with 1" thick wadding except speaker and reflex aperture.

FULL RANGE SINGLE UNIT HIGH FIDELITY LOUDSPEAKERS



AXIOM 201 12 inch - 15 watt - 15 ohms

The Axiom 201 is specially designed for the Audio Enthusiast who insists upon a 12" loudspeaker for its extended range, rich true bass, and very low distortion, but does not need the high power handling and efficiency of the Axiom 301.
This remarkable twin diaphragm 12" unit has smooth performance from 30—16,000 Hz and can be used with amplifiers up to 15 watts.

AXIOM 301 12 inch - 20 watt - 15 ohms

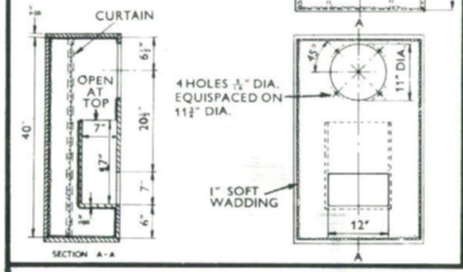
The latest model of the world's most popular 12" High Fidelity Twin Cone loudspeaker incorporates a highly efficient permanent magnet system using Feroba II anisotropic ceramic material. A very low level of distortion and exceptionally smooth and extended response is obtained from twin diaphragms specially terminated to prevent standing waves and spurious resonances.
The Axiom 301 is ideal for single unit loudspeaker systems and is the recommended first step in the stage-built system.
BOTH MODELS have an all plastic suspension for extra flexibility, linearity with strength, aluminium voice coil and extended high frequency response, powerful Feroba II magnetic assembly, and is mounted in a new and striking diecast chassis of great strength, combined with a slender and open profile; the construction is fully dustproof.
Suitable for stereophonic or monophonic installations.

Specification	Axiom 201	Axiom 301
Frequency range	30-16,000 Hz	30-16,000 Hz
Maximum power handling capacity	15 watts (30 watts U.S.A.)	20 watts (40 watts U.S.A.)
Fundamental resonance	35 Hz	35 Hz
Flux density	13,000 gauss	16,500 gauss
Total flux	87,500 maxwells	185,000 maxwells
Overall depth	$5\frac{23}{32}$" (14.8 cm)	$6\frac{1}{4}$" (15.9 cm)
Nett weight	10 lbs 14 ozs (4.93 kg)	17 lbs 5 ozs (7.85 kg)

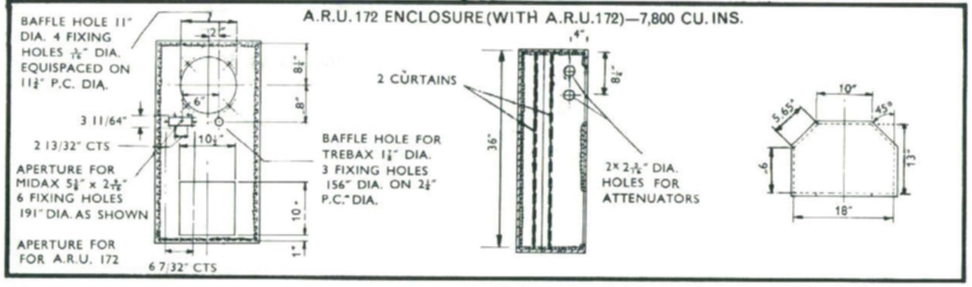
Both models

Voice coil	$1\frac{1}{2}$" (4.4 cm) diameter-aluminium
Impedance	15-16 ohms
Chassis	Diecast
Overall diameter	$12\frac{17}{64}$" (31.2 cm)
ARU 172 enclosure volume (internal)	7,800 cu. ins.
Baffle hole diameter	11" (28 cm)
Fixing holes	4 holes 0.312" (0.8 cm) diameter equally spaced on a circle of $11\frac{3}{4}$" (29.8 cm) diameter.

RECTANGULAR REFLEX CABINET (WITHOUT A.R.U.) —12,500 CU. INS



A.R.U.172 ENCLOSURE (WITH A.R.U.172)—7,800 CU. INS.



FULL RANGE SINGLE UNIT HIGH FIDELITY LOUDSPEAKERS

TRIAXIOM 212C 12 inch–15 watt–15 ohms

In one compact unit: a full 15 watt twin cone High Fidelity loudspeaker, complete with high efficiency HF pressure unit, built-in crossover and constant impedance L-pad attenuator on flying lead for high frequency level balancing.

TRIAXIOM 1220C 12 inch-20 watt-15 ohms

In one compact unit you have a full 20 watt 12" twin cone High Fidelity loudspeaker, complete with high efficiency HF pressure unit, built-in crossover and constant impedance L-pad attenuator on flying lead for high frequency level balancing.

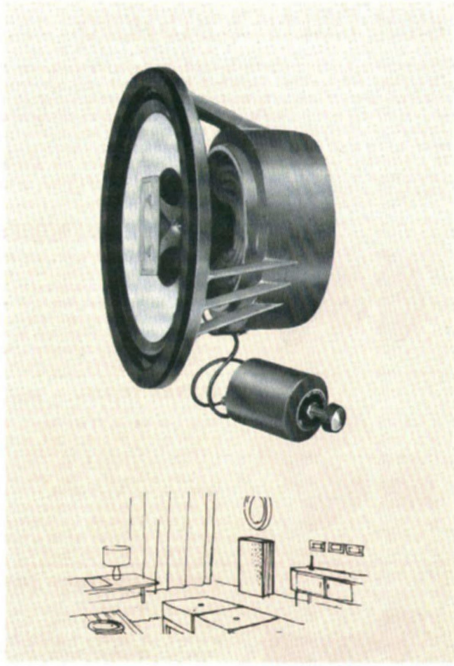
BOTH MODELS are complete triple-element full range 12" High Fidelity reproducers having all 3 radiating elements integrated into one compact High Fidelity loudspeaker system. A full sized 12" SUPRFOAM patented diaphragm plastic edged gives rich true bass: automatic crossover at 2,000 Hz to high stability mid-range radiator gives accurate and 'living presence to the mid-frequencies: pre-wired double section L-C type electrical network with integral treble control is fitted with a 5,000 Hz crossover to the pressure driven horn-loaded high frequency unit (complete with its own separate magnet system) which provides delicate precision to the critical high frequencies. The HF unit has an aluminium diaphragm and 1" diameter aluminium voice coil in self aligning assembly with air chamber and phase equaliser.

Specification	Triaxiom 212C	Triaxiom 1220C
Frequency range	30-20,000 Hz	30-20,000 Hz
Maximum power handling capacity	15 watts (30 watts U.S.A.)	20 watts (40 watts U.S.A.)
Fundamental resonance	35 Hz	35 Hz
Total flux.....(main gap)	87,500 maxwells	185,000 maxwells
Overall depth	5 $\frac{37}{32}$" (14.84 cm)	$6\frac{1}{4}$" (15.9 cm)
Nett weight	11 lbs 4 ozs (5.1 kg.)	18 lbs 10 ozs (8,45 kg.)

Both Models

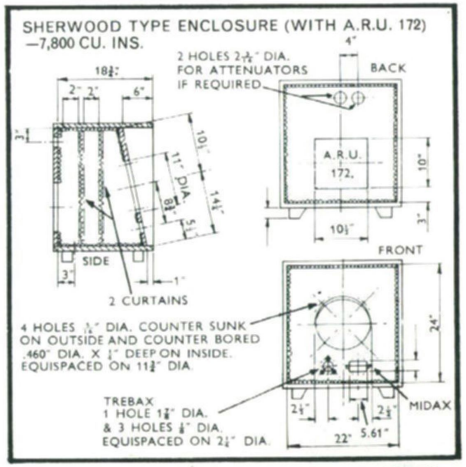
Pole diameter.....(main gap)	$1\frac{3}{4}$" (4.4 cm) dia (Bass and Mid-range)
(HF gap)	1" (2.54 dia. aluminium (High Frequency)
Impedance	15-16 ohms
Crossover	5 kHz L.C. network
HF Control	15 ohms L-pad
Chassis	Die Cast
Overall diameter	$12\frac{17}{64}$" (31.2 cm)
ARU172 enclosure volume (internal)	7,800 cm. ins,
Baffle hole diameter	11" (28 cm)
Fixing holes	4 holes 0.312" (0.8 cm) dia. equally spaced on a circle of $11\frac{3}{4}$" (29.8 cm) diameter.
Attenuator cut-out	$\frac{3}{8}$" dia.

THE THREE ENCLOSURE DESIGNS SHOWN ON THESE PAGES ARE RECOMMENDED FOR GOODMANS 12" TRIAXIOM, AXIOM AND AUDIOM BASS HIGH FIDELITY LOUDSPEAKERS



ENCLOSURES
for Triaxiom 212 C and 1220C are the same as for all other 12" loudspeakers —see below *BUT* the attenuator hole is $\frac{3}{4}$" diameter (instead of 2 $\frac{1}{16}$" dia. as on drawings).

SHERWOOD TYPE ENCLOSURE (WITH A.R.U. 172) —7,800 CU. INS.



ALL ENCLOSURES should be rigidly constructed of timber or chipboard preferably ¾" thick but not less than ½" thick. Interiors to be lined with 1" thick wadding except speaker and reflex aperture.
See note under Triaxiom 1220C for different attenuator cut-out size.

MID-RANGE AND HIGH FREQUENCY UNITS FOR MULTIPLE SPEAKER HIGH FIDELITY SYSTEMS

The pressure driven horn-loaded loudspeakers shown on this page have been designed specifically for use with Audiom Bass units to form very low distortion multiple-unit High Fidelity Loudspeaker Systems. The 12" Axioms on page 18 are equally suitable as bass units and should be used if you are "stage-building" your system—see page 21. If a two-way system *only* is required choose an Axiom loudspeaker to be used with one of the Trebax High Frequency Units.

The 'system power handling capacity' figures shown below imply that the units can be incorporated (with the necessary crossovers—this page) in multiple systems of this power.
Trebax and Midax units have a very high sensitivity so that if required they may be used with horn-loaded bass units. However it is more usual to use them with direct radiator bass loudspeakers such as the Audiom series. In these cases some attenuation of the inputs to the Trebax and Midax will be necessary to give a flat overall response. The attenuator has been specially designed for this purpose (this page.)

TREBAX HIGH FREQUENCY PRESSURE UNITS

TREBAX 100 A very high efficiency horn-loaded pressure driven High Frequency unit designed to cover the treble register with complete freedom from irregularities in response, and with very low distortion. Trebax is a precision instrument, incorporating a self-centering coil and diaphragm assembly complete with plug connector. The frequency range is from 2,500 Hz to 20,000 Hz. To allow the proper overlap region the crossover frequency should be placed at 5 kHz

Specification

Frequency range	2,500—20,000 Hz
Crossover frequency	5,000 Hz
System power handling capacity	25 watts (50 watts U.S.A.)
Impedance	15 ohms at 10 kHz
Baffle hole diameter	1¾" (4.8 cm)
Fixing holes (Horn flange)	3 holes 0.156" (0.4 cm) diameter equally spaced on a circle of 2¼" (5.7 cm) diameter

TREBAX 5K/20XL A high efficiency pressure driven horn-loaded High Frequency unit with built-in (twin ½-section L.C.) crossover network, ready wired, complete with 15 ohm L-pad on 2ft. (61 cm) cable. The Trebax 5K/20XL has a frequency coverage of 2,500 Hz to 20,000 Hz and may be used in systems handling up to 20 watts (maximum). The crossover frequency of the built-in network is 5,000 Hz.
To add the unit to any existing loudspeaker system (e.g. Axiom 10, 201 etc.) it is only necessary to transfer the input leads on the existing loudspeaker to the terminals marked 'INPUT' on the Trebax, and then to connect the existing unit to the terminals marked 'BASS' on the Trebax.

Specification

Frequency range	2,500-20,000 Hz
Crossover frequency	5,000 Hz (built in network)
System power handling capacity	20 watts max.
Impedance	15 ohms at 10 kHz
Construction of Driver	Aluminium diaphragm and voice coil with integral air chamber in removable self-aligning assembly
Baffle cut-out	1⅛" x 2⅛" (2.9 cm x 6.0 cm)
Attenuator fixing	3 holes, 0.156" (0.4 cm) diameter equally spaced on a circle of 2½" (6.3 cm) diameter
Attenuator cut-out	2⅛" (5.5 cm) diameter

MIDAX MID-RANGE PRESSURE DRIVEN HORN UNIT

This unit is the correct choice when the major advantages of a horn-loaded middle register loudspeaker are required (i.e. freedom from distortion, smoothness of response, and high efficiency). The total frequency range covered by the Midax 650 is 650 Hz to 8 kHz; to make a proper allowance for the overlap regions crossover frequencies should be 950 Hz and 5 kHz. The horn is an attractive and sturdy diecasting; reliable plug and socket connections are provided, and an easily replaced self-centering diaphragm is fitted.

Specification

Frequency range	650—8,000 Hz
Crossover frequencies	950 and 5,000 Hz
System power handling capacity	25 watts (50 watts U.S.A.)
Impedance	15 ohms
Baffle cut-out	5⅝" x 2⅞" (14.3 cm x 6.5 cm) with ⅛" (0.79 cm) radii at corners
Fixing holes (Horn flange)	6 holes 0.191" (0.4 cm) diameter
Overall length	9½" (25.3 cm)

ATTENUATOR

VARIABLE, 12db 8-STEP This accessory is designed for use with the Midax and Trebax units to enable easy and accurate balancing of the two-way or three-way systems. The attenuator is of the constant impedance type, so that at all settings it will present an impedance of 15 ohms at its input, when connected to a 15 ohm load, such as the Midax or Trebax. It is variable in eight steps as follows:— 0db, 2db, 4db, 6db, 8db, 10db, 12db and off. In the 'off' position (fully anti-clockwise) the loudspeaker under control is switched off altogether and a dummy load automatically replaces it to maintain correct matching. This position is useful when checking the operation of the various loudspeaker units in a multiple system.
In the system described above, the setting of the attenuators for level response will normally lie between the 2db and 8db positions, depending on the choice of bass units. There is thus effectively a facility for 'boost' or 'cut' available with these controls. This enables a system to be adjusted to suit the characteristics of any particular room in which it may be used. There is also sufficient scope to allow for individual preferences and special requirements. Another useful feature lies in the ability of these controls to "tailor" the response to an extreme degree as is often necessary, for example, when playing pre-electric recordings. In such cases it is often desirable to remove all response above 5 kHz; and this is easily done by switching the Trebax attenuator to the 'off' position.
The attenuator is supplied complete with knob and engraved escutcheon. (Cut-out required 2⅞"—5.5 cm. dia.)

XO/5000 A double half-section type Crossover network operating at 5 kHz, providing an attenuation of 12 db/octave beyond this frequency. As indicated on page 21, this network should be used when building up a two-way system e.g. Trebax with either Axiom 201 or Axiom 301. The XO/5000 is housed in a moulded plastic case provided with easy flange fixing. All terminations are 15 ohms.

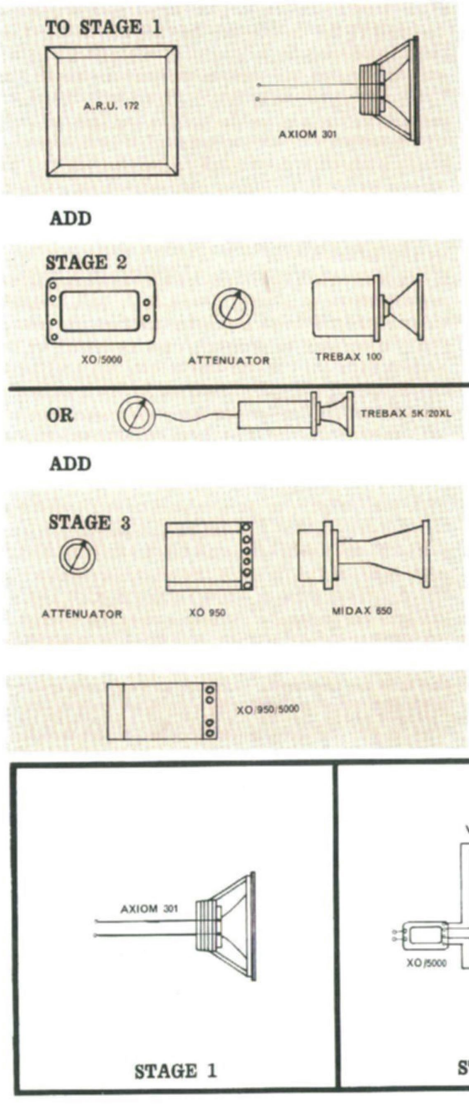
XO/950 A double half-section type Crossover network, operating at 950 Hz with an attenuation of 12 db/octave, beyond this point. The XO/950 should be used when converting the two-way system to the three-way system (see page 21).

XO/950/5000 A multiple Crossover network comprising four half-section filters. Crossover frequencies are 950 Hz and 5,000 Hz; all attenuation rates are 12 db/octave. For use in 3-way systems complete from the start and *not* in stages. It is housed in a wooden case, provided with terminal block connectors, and a flange for easy mounting. All terminations are 15 ohms.

XO/950

GOODMANS 'STAGE-BUILT' HIGH FIDELITY LOUDSPEAKER SYSTEMS

The 'Stage-Built' system is a method of building up a multiple-unit High Fidelity reproducer having a performance of the highest order. One of the advantages of a stage-built system is that the total outlay for the complete system can be split into 3 parts, thus dividing the 'expense load'. The main feature of the 'Stage-Built' system is that *each stage is a complete full range High Fidelity Loudspeaker System* which is improved by the addition of the next stage. Thus at no time is the user without an excellent High Fidelity loudspeaker; neither is there any wastage of components, since all parts used in one stage are automatically used in the next. In this way it is possible to improve the quality of the loudspeaker system in a most economical manner as and when the remainder of the apparatus (pick-up, amplifier, etc.) is improved.



STAGE 1

Start with one of the 12" twin-cone Axiom loudspeakers: either the Axiom 201 (15 watts) or the Axiom 301 (20 watts) depending upon the power handling capacity required (it should be remembered that at this stage the choice of power handling capacity fixes that figure for the remaining two stages); and an ARU 172, enabling an enclosure of only 7,800 cu. ins. internal volume to be used. Full details of the Axiom 201 and Axiom 301 are given on page 10, and of the ARU 172 on page 22
The choice of an enclosure is very important at this stage. If it is planned to ultimately proceed right through to Stage 3, it is then advisable to use the three-way system Enclosure from the start, with the apertures for the Midax and Trebax blanked off until required. (Enclosure designs pages 18 & 19

STAGE 2

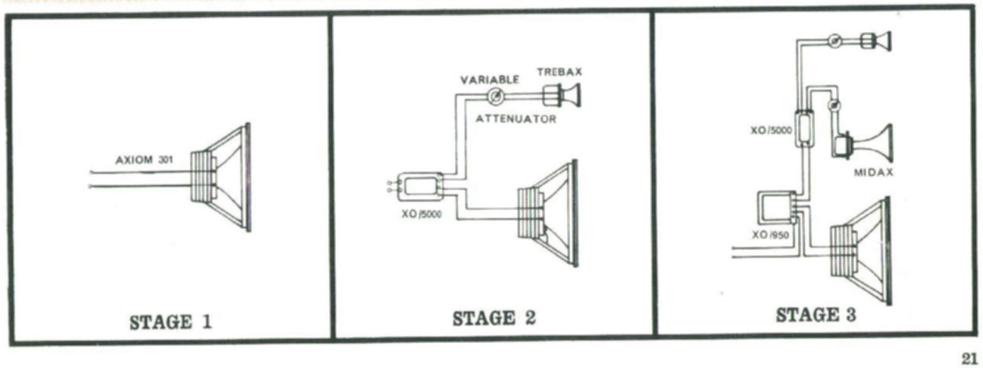
In this stage the 12" twin-cone Axiom loudspeaker chosen for Stage 1 is used to cover the bass and mid-frequency range only, up to 5,000 Hz from which point the Trebax pressure-driven horn-loaded high frequency unit (described on page 20) covers the remainder of the range up to 20,000 Hz. Crossover network XO/5000 (page 20) is used to perform the frequency division, and the eight-step 12 db variable attenuator (page 20) is used to provide adjustment of high frequency output. Note that, since the Trebax is more sensitive than the Axiom 201 or the Axiom 301, this control will have the useful function of treble "cut" or "boost".

(**NOTE:** If the Stage 1 unit is AXIOM 201 and it is not intended to go beyond Stage 2, the TREBAX 5K/20XL may be used in Stage 2. This unit is already complete with its own XO network and attenuator.)

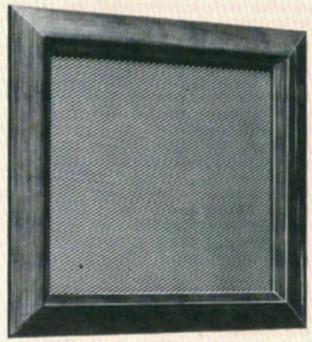
STAGE 3

This final stage is the conversion of the two-way system of Stage 2 to a three-way system, by the addition of the Midax pressure-driven horn loaded unit. This takes over the reproduction of the mid-range frequencies (950-5,000 Hz) from the 12" twin-cone Axiom, which is now called on to cover the bass range only. A 950 Hz crossover network type XO/950 (page 20) performs this extra frequency division and another eight-step 12 db variable attenuator is added to provide adjustment of the mid-range output.
The system is now completed. If all instructions have been correctly followed, the result will be an outstanding reproducer.

When a three-way system is to be built, complete from the start, and *not* in stages, a multiple crossover type XO/950/5000 may be used instead of separate crossover types XO/950 and XO/5000. Also in these circumstances an AUDIOM BASS Unit may be used instead of an AXIOM—but *not* in a two-way system.



ACOUSTICAL RESISTANCE UNIT (A.R.U.)



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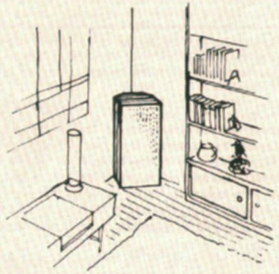


Typical ARU enclosure

Optimum low frequency performance can be obtained from the Axiom 80, 201, 301 Triaxiom 212c 1220c and Audiom Bass loudspeakers by the use of one of the enclosures shown on pages 18, 19, 24 & 25 The most important feature of these enclosures is the inclusion in each of an Acoustical Resistance Unit. This is a rectangular panel having specific acoustic properties, and it is fitted into an aperture cut in one wall of the enclosure. This system reduces the cone resonance both in amplitude and frequency and eliminates all serious resonances above this frequency. As a consequence, transient characteristics are improved and harmonic and intermodulation distortion levels are reduced. No efficiency has been sacrificed; indeed these enclosures out-perform other considerably larger enclosures; e.g. conventional reflex enclosures, these in some cases requiring as much as four times the cubic volume for the same loudspeakers.

If it is desired to build an enclosure to suit individual requirements of shape, the A.R.U. will simplify many of the problems normally involved. It is essentially necessary to construct an enclosure of the correct internal volume and to cut two apertures; one for the loudspeaker and one for the A.R.U. The latter is supplied mounted in a wooden frame which can be screwed directly to the edges of the aperture.

Four models are available, each having been designed for use with a particular loudspeaker system.

Style and shape may be arranged to suit individual taste provided that the internal volume is within ± 10% of the value given in the table. The A.R.U. may be fitted into any of the enclosure walls, but the shortest distance between the A.R.U. and the loudspeaker measured round or over the outside of the cabinet should not be less than one foot. There should be no obstruction within 3" of the front of the A.R.U. The wooden frame is decorative and is normally fitted outside the enclosure, but performance is not affected if the fitting of the A.R.U. is reversed, e.g. in the front panel to present an unobstructed flat surface for covering with a decorative woven fabric material.

All enclosures should be close jointed and rigidly constructed of timber, chipboard, or material of similar or greater density and rigidity, not less than ¾" thick. All internal surfaces (except the loudspeaker and A.R.U.) should be lined with 1" thick soft felt or wool, or cellulose wadding, and one or two curtains (see cabinet drawings) of the same material should be suspended from (approximately) the centre of the top of the enclosure, one 2" behind the other. These curtains should be the full internal width of the enclosure, should extend from top to bottom of the interior and should not be fixed to sides and bottom.

Specifications

A.R.U. Model No.	Loudspeaker Type(s)	Enclosure Volume (cu. ins.)	A.R.U. Aperture Size
180	One Axiom 80	5,900	12" x 7" (30.5 x 17.8 cm)
280	Two Axiom 80's	8,300	14½" x 10" (36.8 x 25.4 cm)
	One Audiom 81 Bass	9,600	
480	Four Axiom 80's	11,700	17½" x 13½" (44.4 x 34.3 cm)
	One Audiom 91 Bass		
172	Axiom 201 Axiom 301 Audiom 51 Bass Audiom 61 Bass Triaxiom 212c Triaxiom 1220c	7,800	10½" x 10" (26.7 x 25.4 cm)

BASS UNITS FOR MULTIPLE SPEAKER HIGH FIDELITY SYSTEMS

AUDIOM BASS units are designed to cover only the bass portion of the musical register and all the features necessary for providing very accurate performance down to the lowest musical frequencies encountered are incorporated in their design. The necessary mid-range and high-frequency units for the completion of multiple systems will be found on page 20 and enclosure details on pages 18 & 19. For Public Address work and special applications such as Electric Guitars use AUDIOMS in their STANDARD versions – please send for special Guitar Leaflet.

AUDIOM 51 BASS 12 inch-15 watt-15 ohms

The Audiom 51 Bass is a rugged 12" single diaphragm unit handling up to 15 watts of power. It is specially designed for High Fidelity enthusiasts who need a 12" Loudspeaker as the Bass unit in their three-way systems but who do not need the high power handling capacity and the extra high efficiency of the Audiom 61. The Audiom 51 Bass has a fundamental resonance of 35 Hz and is fitted with a powerful Feroba II magnet system giving high efficiency and control. Now fitted with extra strength plastic edged cone for maximum flexibility, and a new rigid diecast chassis of open design, holding all parts in permanent alignment; connection is by means of binding posts.

Specification

Maximum power handling capacity	15 watts (30 watts U.S.A.)
Fundamental resonance	35 Hz
Flux density	13,000 gauss
Total flux	87,500 maxwells
Voice coil	1¾" (4.4 cm) diameter
Impedance	15–16 ohms
Chassis	Diecast
Overall diameter	12 17/64" (31·2 cm)
Overall depth	5 23/32" (14·8 cm)
ARU 172 enclosure volume (internal)	7,800 cu. ins.
Baffle hole diameter	11" (28 cm)
Fixing holes	4 holes 0.312" (0.8 cm) diameter equally spaced on a circle of 11¾" (29.8 cm) diameter
Nett weight	10 lbs 13 ozs. (4.91 kg)

AUDIOM 61 BASS 12 inch–20 watt–15 ohms

The Audiom 61 is a very robust 12" single diaphragm unit handling up to 20 watts of power. It is fitted with a massive Feroba II magnet system giving exceptional efficiency and control. Now fitted with extra strength plastic edged cone for maximum flexibility. With its low fundamental resonance of 35 Hz — it is the ideal choice as the Bass unit in a three-way system incorporating the Midax and Trebax (see pages 20 and 21). Enclosure details on pages 18·19. A new rigid diecast chassis of advanced design holds all parts in permanent and accurate alignment. Binding posts are fitted for rapid and secure connection.

Specification

Maximum power handling capacity	20 watts (40 watts U.S.A.)
Fundamental resonance	35 Hz
Flux density	16,500 gauss
Total flux	185,000 maxwells
Voice coil	1¾" (4.4 cm) diameter
Impedance	15-16 ohms
Chassis	Diecast
Overall diameter	12 17/64" (31·2 cm)
Overall depth	6¼" (15·9 cm)
ARU 172 enclosure volume (internal)	7,800 cu. ins.
Baffle hole diameter	11" (28 cm)
Fixing holes	4 holes 0.312" (0.8 cm) diameter equally spaced on a circle of 11¾" (29.8 cm) diameter
Nett weight	17 lbs 4 ozs. (7.82 kg)

FOR RECOMMENDED ENCLOSURES FOR AUDIOMS 51 AND 61 BASS, SEE PAGES 18 AND 19.
For further details on Guitar and Musical Instrument usage, send for 'Guitar' leaflet.

BASS UNITS FOR MULTIPLE SPEAKER HIGH FIDELITY SYSTEMS

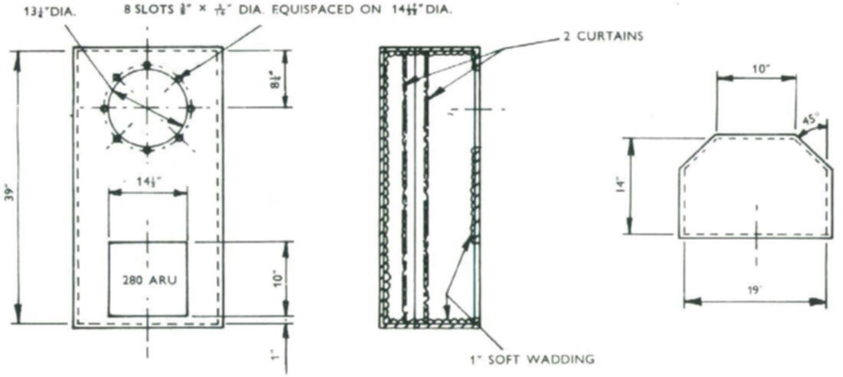
AUDIOM 81 BASS 15 inch-25 watt-15 ohms

The Audiom 81 Bass is a rugged 15" single diaphragm Bass unit of new heavy duty construction and handling up to 25 watts. It is fitted with a massive Feroba II magnet system and 3" voice coil thus combining a shallower assembly and up-to-the-minute styling with exceptional ruggedness in use and the ability to handle high power. The rigid die-cast chassis is of exceptional strength. The all plastic cone edge gives maximum flexibility with enormous strength. Binding posts are fitted for rapid and secure connection.

Specification

Maximum power handling capacity	25 watts (50 watts U.S.A.)
Fundamental resonance	30 Hz
Flux density	14,000 gauss
Total flux	269,000 maxwells
Voice coil	3" (7.6 cm) diameter
Impedance	15-16 ohms
Chassis	Diecast
Overall diameter	15 1/16" (38.2 cm)
Overall depth	7 7/16" (18.9 cm)
ARU 280 enclosure volume (internal)	9,600 cu. ins.
Baffle hole diameter	13 1/4" (33.8 cm)
Fixing holes	8 slots 3/8" x 3/16" (0.95 cm x 0.8 cm) on a circle of 14 17/32" (36.9 cm) diameter
Nett Weight	22 lbs 8 ozs. (10.21 kg)

RECOMMENDED ENCLOSURE FOR AUDIOM 81 BASS HIGH FIDELITY LOUDSPEAKER
(with A.R.U. 280) 9,600 CU. INS.



NOTE This enclosure should be constructed of timber or chip-board not less than 1" thick.

FOR RECOMMENDED ENCLOSURES FOR AUDIOMS 51 AND 61 BASS, SEE PAGES 18 AND 19.
For further details on Guitar and Musical Instrument usage, send for 'Guitar' leaflet.

BASS UNITS FOR MULTIPLE SPEAKER HIGH FIDELITY SYSTEMS

Audiom 91 Bass—For use in very high powered High Fidelity SYSTEMS—(cinemas and concert halls for example)—and in specialised applications such as Electronic Organs.

AUDIOM 91 BASS

The Audiom 91 is an exceptionally robust 18" single diaphragm heavy duty Loudspeaker of massive construction handling up to 50 watts of power. It possesses a massive Feroba II magnet system, 3" voice coil, combining a shallower assembly and sleek styling with exceptional structural strength and power handling ability. The chassis is a rigid casting built to endure punishing conditions. Insulated binding posts are fitted for rapid and secure connections.

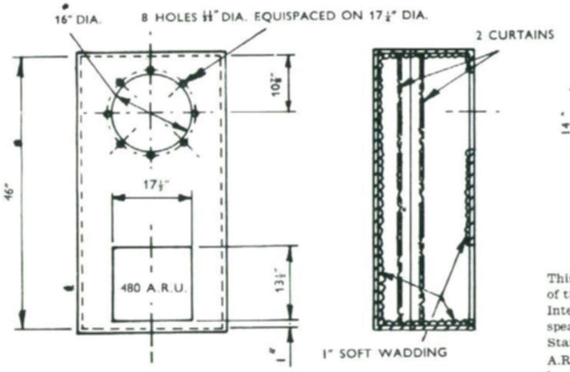
Specification

Maximum Power handling capacity	50 watts (100 watts U.S.A.)
Fundamental resonance (nominal) High Fidelity & electronic organs	30 Hz
Flux density	14,000 gauss
Total flux	269,000 maxwells
Voice coil	3" (7.6 cm) diameter
Impedance	15-16 ohms
Chassis	Diecast
Overall diameter	18 1/16" (45·85 cm)
Overall depth	8¼" (21 cm)
A.R.U. 480 enclosure volume (internal)	11,700 cu. ins.
Baffle hole diameter	16" (40·64 cm)
Fixing holes	8 holes 11/32" (·87 cm) dia. on a circle of 17¼" (43·82cm) diameter
Nett weight	20 lbs 4 ozs (9.185kg)

Audiom 91 Standard. As Audiom 91 Bass but with Fundamental Resonance (Nominal): 55 Hz

Audiom 91/100. Now available—a special version of the Audiom 91 with the ability to handle 100 watts of power (200 watts U.S.A.) with reliability and precision.

RECOMMENDED ENCLOSURE FOR AUDIOM 91 BASS (WITH A.R.U. 480) 11,700 cu. ins.



This enclosure should be rigidly constructed of timber or chip-board not less than 1" thick. Interiors to be lined 1" thick wadding except speaker and A.R.U. apertures. For Audiom 91 Standard, use this enclosure, but use no A.R.U., and cut no aperture other than loudspeaker aperture.

FOR RECOMMENDED ENCLOSURES FOR AUDIOMS 51 AND 61 BASS, SEE PAGES 18 AND 19.
For further details on Guitar and Musical Instrument usage, send for 'Guitar' leaflet.

HIGH FIDELITY STEREOPHONIC SOUND REPRODUCTION

WHY STEREO?

The introduction of stereophonic sound reproduction is the most important single step towards greater accuracy and realism of sound reproduction that has taken place for many years.
Until recently every advance that was made simply concerned further refinements of the "monophonic" system, which is still employed in radios, and many radiograms and record players. Always the sound came from one spot only—the loudspeaker system—and no matter how large the orchestra or how wide the operatic stage, all were compressed in size into one small area at the receiving end.
At best, the situation was similar to having one's sitting room connected directly to the concert hall by a small hole in the wall. All sense of the position of the different instruments or the direction of movement of actors was lost. Imagine now that you can put head and shoulders through the hole in the wall. At once the scene broadens, and the ears can take up their function as direction-finders. You are *in* the concert hall. High Fidelity Stereophonic equipment can do this for you in conjunction with stereophonic records, tape or FM Stereo radio.

THINKING IN TERMS OF TWO!

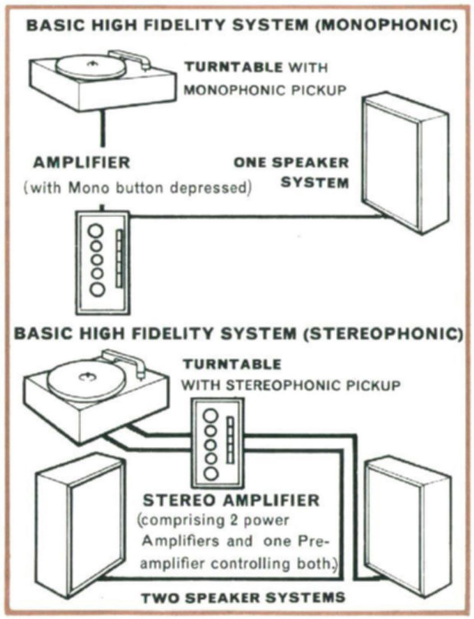
The records contain *two* different impressions in the same groove; these represent the signals from *two* separate microphones spaced apart in front of the performers. The pick-up used in your stereophonic equipment converts these impressions into *two* sets of electrical impulses and passes them to *two* separate amplifiers. Thence they go to separate loudspeaker systems also spaced apart. You, sitting in front of the loudspeakers, and roughly equidistant from each of them, will have the whole sound picture built up before you, with everything in its right place. If a performer moved across the stage in the original performance you will hear him do so between your loudspeakers. It is hardly necessary to dwell on the vast improvement in realism that is gained in this way. It is similar to the difference between an ordinary "flat" picture and a "three-dimensional" one (which again is composed of two separate pictures, taken from different viewpoints).

WHAT IS NEEDED TO INSTALL STEREOPHONIC HIGH FIDELITY IN YOUR HOME?

First, of course, a turntable; it does not pay to buy a cheap one: your listening pleasure can be completely spoilt by slow variations of speed (called "wow") or rapid ones (called "flutter"), or by a noisy mechanism which will pass noises like distant thunder ("rumble") through to your loudspeakers. A good turntable ("transcription" type) will be almost completely free from these faults. You may want to play older 78 r.p.m. records as well (stereophonic records 33 or 45 r.p.m.) so a 3-speed turntable is a wise investment.
Next, a pick-up. A good stereophonic pick-up is a light and comparatively delicate affair, but it will not be damaged in normal use. Many models have a removable head, which can be put away safely when not in use. A completely separate pick-up and arm should be fitted for playing ordinary (monophonic) recordings, and this can be more robust, to withstand normal family use if necessary. Specialist advice should be sought as to the exact choice of pick-ups.
The amplifier as mentioned already actually consists of two separate amplifiers though they may be assembled on one chassis. The controls (volume, treble, bass, etc.) for both amplifiers are usually coupled or "ganged" so that there are no more controls than on ordinary equipment, excepting a "balance" control which enables the two channels to be adjusted to an exactly equal degree of amplification. For normal domestic installations an amplifier having a power output of 10 watts in each channel will be found quite adequate.
Finally, the loudspeakers. Since care has been taken all through the recording and reproducing chain to give each of the two signals identical treatment, it is wise to employ two loudspeakers of the same type. Any of the full-range High Fidelity loudspeakers or loudspeaker systems described in this Manual may be used; the exact choice will be governed by the power handling capacity required and by the space which can be given up to the loudspeaker enclosures. It will be noticed that several very compact models are available, and these are of special value when space is limited.

POSITIONING THE LOUDSPEAKERS

Positioning of the loudspeakers is particularly important. Normally the stereophonic effect will be experienced in a roughly triangular area, the apex of the triangle being mid-way between the loudspeakers. It is usually impossible to extend this area to cover the whole room, but it will be found quite possible to arrange the loudspeakers so that a small group of people can enjoy satisfactory reproduction without abnormal arrangements of furniture. Optimum loudspeaker spacing will be about 8 ft. for most rooms, with listening positions preferably more than about 10 ft. away from each unit. Since no two rooms are acoustically alike, precise guidance is not possible, and a little experiment will prove to be worthwhile. Apart from the actual spacing of the loudspeakers some experiment should be carried out with small variations of the direction in which they face. If, for example, the loudspeakers are located against the shorter wall of a room, start with them both facing straight down the length of the room. Move about the room while playing a stereophonic recording and try to judge the boundaries of the listening area in which the stereophonic effect is satisfactory. Turn both loudspeakers inwards slightly, and repeat the experiment. The object is to try to achieve a satisfactory listening area that corresponds with convenient seating arrangements.
It is vitally important that the loudspeakers should be "phased" correctly. If the connections to one of the loudspeakers should happen to be reversed, the sound picture will not be correct. One of the quickest ways to check for correct phasing is to place the two loudspeakers about 1 ft. apart, facing each other. Put on a stereophonic record of a vocalist, and listen with your head between the loudspeakers, one close to each ear. If all is well, the singer will appear to be in front of you. If the phasing is incorrect, he will be difficult to locate, and there will appear to be a reduction in the loudness of the bass parts of the music. A reversal of the leads to one loudspeaker ONLY will put the situation right.



The diagrams show the essential differences between (monophonic) and stereophonic installations. The Goodmans Stereophonic Amplifier (MAXAMP 30) can be used in a monophonic installation—simply by operation of the Mono push-button.

HIGH FIDELITY RECORD PLAYER

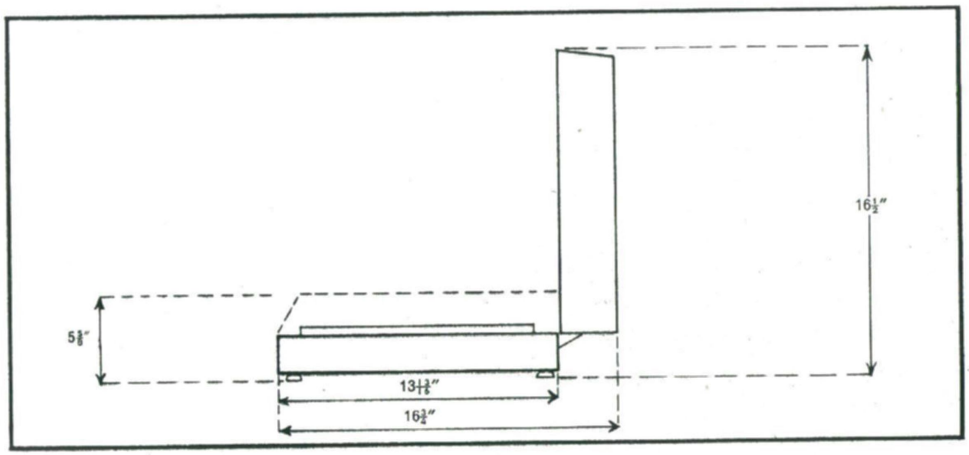
audiosuite

MT. 1000

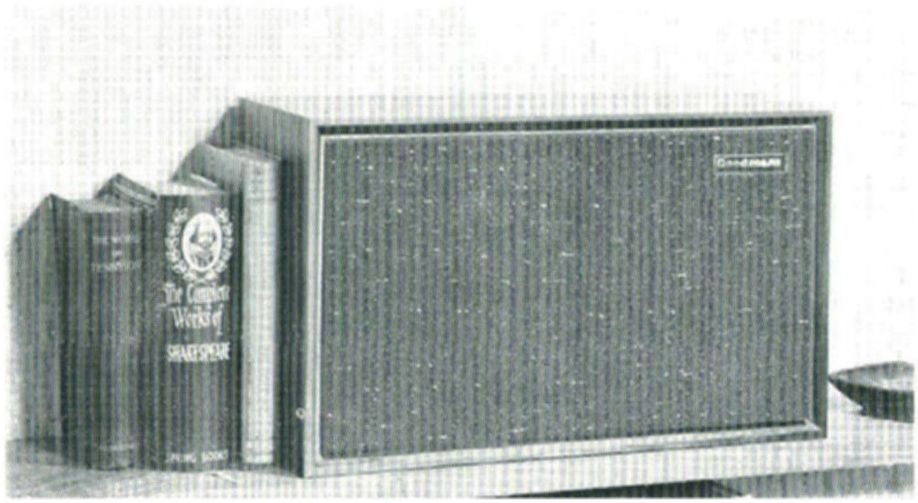
The MT. 1000 Record Player completes Goodmans Audio Suite. The superb Thorens TD150A turntable (including TP13 arm) and the new Shure M75-MB cartridge have been selected to meet the same high standard associated with all Goodmans High Fidelity Units.
The MT. 1000 Record Player is ideally suited for use with the Maxamp 30 Amplifier and any selected 'M' range loudspeaker cabinets. The unit is designed to give optimum performance whilst being simple to use and easy to install.
Audio Suite gives High Fidelity to live with—simple—adaptable—and guaranteed by Goodmans.

Specification

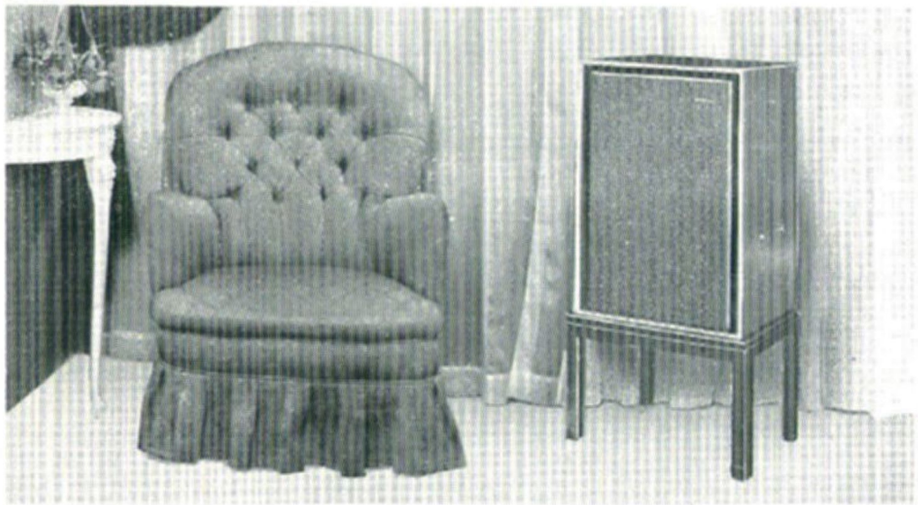
Width 15¾″
Depth (closed) 13⅛″, (open) 16½″
Height including feet (in closed position) 5⅞″
Height including feet (lid open) 16½″
2-speed 33⅓ and 45 R.P.M.
Heavy (7½ lb) two-part non-ferrous Turntable
Low Speed double synchronous motor with unique belt drive system for silent operation
Built-in lowering device
·0006″ Diamond Stylus for Mono and Stereo use
20 c/s-20,000 c/s Frequency Range
Recommended Playing Weight 2 grams
High Trackability
At 400 Hz-18 cm/sec, 1,000 Hz-25 cm/sec, 10,000 Hz-14 cm/sec
Solid Wood Cabinet (Teak or Walnut finish) with Inspection Window
Cartridge meticulously aligned and checked
Hum-free wiring to external terminal board
Goodmans Guarantee



Maxim



Mezzo II



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